



5.13 ENGINE FAILURE CODES

Fault codes DM1

**Industrial engines
DC09, DC13, DC16**

**Marine engines
DI09, DI13, DI16**



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DM1

Fault codes generated in the CAN network are sent via CAN message DM1. This document describes how to interpret these fault codes from the DM1 message.

Abbreviations

Abbreviation	Explanation
SPN	Suspect Parameter Number
FMI	Failure Mode Identifiers

Fault type identifier

Explanation of FMI codes.

Code	Explanation	Code	Explanation
0	Data valid but above normal operational range (that is, engine overheating)	12	Bad intelligent device or component
1	Data valid but below normal operational range (that is, engine oil pressure too low)	13	Out of calibration
2	Data erratic, intermittent, or incorrect	14	Special instructions
3	Voltage above normal or shorted high	15	Data valid but above normal operating range - least severe level
4	Voltage below normal or shorted low	16	Data valid but above normal operating range - moderately severe level
5	Current below normal or open circuit	17	Data valid but below normal operating range - least severe level
6	Current above normal or grounded circuit	18	Data valid but below normal operating range - moderately severe level
7	Mechanical system not responding properly	19	Received network data in error
8	Abnormal frequency, pulse width, or pending	20	Data drifted high
9	Abnormal update rate	21	Data drifted low
10	Abnormal rate of change		
11	Failure mode not identifiable		



List of fault codes

SPN	SPN Name	SPN Description
46	Pneumatic Supply Pressure	The pneumatic pressure in the main reservoir, sometimes referred to as the wet tank.
51	Engine Throttle Valve 1 Position	The position of the valve used to regulate the supply of a fluid, usually air or fuel/air mixture, to an engine.
91	Accelerator Pedal Position 1	The ratio of actual position of the analogue engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device.
94	Engine Fuel Delivery Pressure	Gage pressure of fuel in system as delivered from supply pump to the injection pump.
97	Water In Fuel Indicator	Signal which indicates the presence of water in the fuel.
98	Engine Oil Level	Ratio of current volume of engine sump oil to maximum required volume.
100	Engine Oil Pressure	Gage pressure of oil in engine lubrication system as provided by oil pump.
102	Engine Intake Manifold #1 Pressure	The gage pressure measurement of the air intake manifold.
103	Engine Turbocharger 1 Speed	Rotational velocity of rotor in the turbocharger.
105	Engine Intake Manifold 1 Temperature	Temperature of pre-combustion air found in intake manifold number 1 of engine air supply system.
107	Engine Air Filter 1 Differential Pressure	Change in engine air system pressure, measured across the filter, due to the filter and any accumulation of solid foreign matter on or in the filter.
108	Barometric Pressure	Absolute air pressure of the atmosphere.
110	Engine Coolant Temperature	Temperature of liquid found in engine cooling system.
111	Engine Coolant Level	Ratio of volume of liquid found in engine cooling system to total cooling system volume.
131	Engine Exhaust Back Pressure	
132	Engine Intake Air Mass Flow Rate	Mass flow rate of fresh air entering the engine air intake, before any EGR mixer, if used.
156	Engine Injector Timing Rail 1 Pressure	The gage pressure of fuel in the timing rail delivered from the supply pump to the injector timing intake.
167	Charging System Potential (Voltage)	Electrical potential measured at the charging system output. The charging system may be any device charging the batteries.
168	Battery Potential/Power Input 1	This parameter measures the first source of battery potential as measured at the input of the ECM/actuator etc. coming from one or more batteries, irrespective of the distance between the component and the battery.



SPN	SPN Name	SPN Description
171	Ambient Air Temperature	Temperature of air surrounding vehicle.
172	Engine Air Intake Temperature	Temperature of air entering vehicle air induction system.
174	Engine Fuel Temperature 1	Temperature of fuel passing through the first fuel control system.
175	Engine Oil Temperature 1	Temperature of the engine lubricant.
188	Engine Speed At Idle, Point 1 (Engine Configuration)	Stationary low idle speed of engine which includes influences due to engine temperature (after power up) and other stationary changes (calibration offsets, sensor failures, etc).
190	Engine Speed	Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.
234	Software Identification	Software identification of an electronic module.
532	Engine Speed At High Idle, Point 6 (Engine Configuration)	Engine speed of high idle of the engine torque map.
558	Accelerator Pedal 1 Low Idle Switch	Switch signal which indicates the state of the accelerator pedal 1 low idle switch.
559	Accelerator Pedal Kickdown Switch	Switch signal which indicates whether the accelerator pedal kickdown switch is opened or closed.
590	Engine Idle Shutdown Timer State	Status signal which indicates the current mode of operation of the idle shutdown timer system.
597	Brake Switch	Switch signal which indicates that the driver operated brake foot pedal is being pressed.
598	Clutch Switch	Switch signal which indicates that the clutch pedal is being pressed.
636	Engine Position Sensor	
641	Engine Variable Geometry Turbocharger Actuator #1	Actuator that controls the variable geometry turbocharger geometry.
645	Engine Tachometer Signal Output	
651	Engine Injector Cylinder #01	
652	Engine Injector Cylinder #02	
653	Engine Injector Cylinder #03	
654	Engine Injector Cylinder #04	
655	Engine Injector Cylinder #05	
656	Engine Injector Cylinder #06	
657	Engine Injector Cylinder #07	
658	Engine Injector Cylinder #08	



SPN	SPN Name	SPN Description
677	Engine Starter Motor Relay	Activates the starter.
723	Engine Speed 2	The engine speed as measured by speed sensor 2.
788	Transmission Clutch Actuator	Identifies the status of the actuator that controls the clutch.
968	Engine Idle Increment Switch	Switch signal which indicates the position of the idle increment switch.
972	Accelerator Interlock Switch	Switch signal used to disable the accelerator and remote accelerator inputs, causing the engine to return to idle.
974	Remote Accelerator Pedal Position	The ratio of actual position of the remote analogue engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device.
986	Requested Percent Fan Speed	Fan speed as a ratio of the actual fan drive (current speed) to the fully engaged fan drive (maximum fan speed).
1086	Parking and/or Trailer Air Pressure	The pneumatic pressure in the circuit or reservoir for the parking brake and/or the trailer supply.
1108	Engine Protection System Timer Override	Status signal which indicates the status of the override feature of the engine protection system timer.
1110	Engine Protection System has Shutdown Engine	Status signal which indicates whether or not the engine protection system has shutdown the engine.
1135	Engine Oil Temperature 2	Temperature of the engine lubricant.
1239	Engine Fuel Leakage 1	Status signal which indicates fuel leakage in the fuel rail of the engine. Location can be either before or after the fuel pump.
1322	Engine Misfire for Multiple Cylinders	When a misfire occurs in any one of the cylinders.
1323	Engine Misfire Cylinder #1	Engine misfire detected in cylinder.
1324	Engine Misfire Cylinder #2	Engine misfire detected in cylinder.
1325	Engine Misfire Cylinder #3	Engine misfire detected in cylinder.
1326	Engine Misfire Cylinder #4	Engine misfire detected in cylinder.
1327	Engine Misfire Cylinder #5	Engine misfire detected in cylinder.
1328	Engine Misfire Cylinder #6	Engine misfire detected in cylinder.
1329	Engine Misfire Cylinder #7	Engine misfire detected in cylinder.
1330	Engine Misfire Cylinder #8	Engine misfire detected in cylinder.
1442	Engine Fuel Valve 1 Position	The position of a gaseous fuel valve that is metering the fuel flow to the engine.



SPN	SPN Name	SPN Description
1443	Engine Fuel Valve 2 Position	The position of a gaseous fuel valve that is metering the fuel flow to the engine.
1483	Source Address of Controlling Device for Engine Control	The source address of the SAE J1939 device currently controlling the engine.
1484	Other ECUs Have Reported Fault Codes Affecting Operation	
1485	ECM Main Relay	
1569	Engine Protection Torque Derate	Torque has been derated for protection of the engine.
1632	Engine Torque Limit Feature	Torque limit rating described in the current record.
1639	Fan Speed	The speed of the fan associated with engine coolant system.
1675	Engine Starter Mode	Start cannot take place for one of several different reasons.
1761	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container.
2609	Cab A/C Refrigerant Compressor Outlet Pressure	Gage pressure at the compressor outlet in the cab air conditioning system.
2791	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Desired percentage of maximum Exhaust Gas Recirculation (EGR) valve opening.
2797	Engine Injector Group 1	A first collection of fuel injector circuits that are grouped together.
2798	Engine Injector Group 2	A second collection of fuel injector circuits that are grouped together.
2858	Machine Data Configuration 1	There is a problem involving the parameter list for the data structure for configuring operations within the Controller Application being communicated with.
2859	Machine Data Configuration 2	There is a problem involving one (or more) of the PGN(s) within the parameter list for the data structure for configuring operations within the Controller Application being communicated with.
2860	Machine Data Configuration 3	There is a problem involving the first output control list for the data structure for configuring operations within the Controller Application being communicated with.
2861	Machine Data Configuration 4	There is a problem involving the second output control list for the data structure for configuring operations within the Controller Application being communicated with.
2862	Machine Data Configuration 5	There is a problem involving the third output control list for the data structure for configuring operations within the Controller Application being communicated with.
3031	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Temperature of the diesel exhaust fluid in the storage tank.



SPN	SPN Name	SPN Description
3216	Aftertreatment 1 Intake NOx	The amount of combined NO and NO2 in the exhaust entering the aftertreatment system measured by a NOx sensor at the aftertreatment intake, represented in NOx molecule parts per million non-NOx molecules in exhaust bank 1.
3226	Aftertreatment 1 Outlet NOx	The amount of combined NO and NO2 in the exhaust entering the aftertreatment system measured by a NOx sensor at the aftertreatment outlet, represented in NOx molecule parts per million non-NOx molecules in exhaust bank 1.
3241	Aftertreatment 1 Exhaust Gas Temperature 1	The reading from the exhaust gas temperature sensor located farthest upstream in the aftertreatment system in exhaust bank 1.
3242	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Temperature of engine combustion by-products entering the diesel particulate filter in exhaust bank 1.
3245	Aftertreatment 1 Exhaust Gas Temperature 3	The reading from the exhaust gas temperature sensor located farthest downstream in the aftertreatment system in exhaust bank 1.
3246	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Temperature of engine combustion by-products leaving the diesel particulate filter exhaust in exhaust bank 1.
3249	Aftertreatment 1 Exhaust Gas Temperature 2	The reading from the exhaust gas temperature sensor located midstream of the other two temperature sensors in the aftertreatment system in exhaust bank 1.
3251	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Exhaust differential pressure measured between the intake and exhaust of a diesel particulate filter in exhaust bank 1.
3275	Aftertreatment 2 Exhaust Gas Temperature 1	The reading from the exhaust gas temperature sensor located farthest upstream in the aftertreatment system in exhaust bank 2.
3279	Aftertreatment 2 Exhaust Gas Temperature 3	The reading from the exhaust gas temperature sensor located farthest downstream in the aftertreatment system in exhaust bank 2.
3283	Aftertreatment 2 Exhaust Gas Temperature 2	The reading from the exhaust gas temperature sensor located midstream of the other two temperature sensors in the aftertreatment system in exhaust bank 2.
3340	Engine Charge Air Cooler 1 Intake Pressure	Pressure of air at intake to 1st or only charge air cooler, from multiple first stage turbochargers being cooled and feeding multiple second stage turbochargers.
3360	Aftertreatment 1 Diesel Exhaust Fluid Controller	The Diesel Exhaust Fluid Controller has the ability to read attributes of the SCR system, including but not limited to, diesel exhaust fluid level, diesel exhaust fluid temperature, diesel exhaust fluid quality, and diesel exhaust fluid dosing rate.



SPN	SPN Name	SPN Description
3361	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit	The diesel exhaust fluid dosing unit is a device that mixes the diesel exhaust fluid and air, and delivers a metered quantity of this mixture to the exhaust stream.
3362	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Input Lines	The diesel exhaust fluid dosing unit is a device that mixes the diesel exhaust fluid and air, such that it contains an input line from the air tank and an input line from the diesel exhaust fluid tank.
3363	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater	Percentage of heating applied to the aftertreatment 1 diesel exhaust fluid tank heater.
3464	Engine Throttle Actuator 1 Control Command	The control command to throttle actuator 1, normalized to percent.
3468	Engine Fuel Temperature 2	Temperature 2 of fuel.
3471	Aftertreatment 1 Fuel Pressure Control Actuator	Diagnostic SPN for the actuator controlling aftertreatment 1 fuel pressure.
3472	Aftertreatment 1 Air Pressure Control Actuator	Diagnostic SPN for the actuator controlling aftertreatment 1 air pressure.
3480	Aftertreatment 1 Fuel Pressure 1	First fuel pressure measurement for the aftertreatment 1 system.
3485	Aftertreatment 1 Supply Air Pressure	Pressure of the supply air for aftertreatment 1.
3515	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Temperature of the diesel exhaust fluid at the device measuring diesel exhaust fluid quality.
3516	Aftertreatment 1 Diesel Exhaust Fluid Concentration	A measure of the concentration of urea in water.
3563	Engine Intake Manifold #1 Absolute Pressure	The absolute pressure measurement of the air intake manifold.
3606	Engine Controlled Shutdown Request	A signal issued by the engine control system to a user or external system requesting for a controlled shutdown.
3607	Engine Emergency (Immediate) Shutdown Indication	A signal issued by the engine control system to a user or external system indicating that it is immediately shutting the engine down.
3673	Engine Throttle Valve 2 Position	The sensed position feedback of the valve, coming from a second electrical actuator for a second throttle plate, used to regulate the supply of a fluid, usually air or fuel//air mixture.
3822	Engine Exhaust Gas Recirculation 1 Valve 2 Position	The position of the second exhaust gas recirculation valve expressed as a percentage of full travel.
3936	Aftertreatment Diesel Particulate Filter System	Non-specific failures of the aftertreatment diesel particulate filter system.
4090	NOx limits exceeded, root cause unknown	On-Board Diagnostics has determined that the limits for NOx in the exhaust stream have been exceeded, but the root cause cannot be determined by the OBD system.
4094	NOx limits exceeded due to Insufficient Diesel Exhaust Fluid Quality	On-Board Diagnostics has determined that the limits for NOx in the exhaust stream have been exceeded due to an insufficient diesel exhaust fluid quality.



SPN	SPN Name	SPN Description
4095	NOx limits exceeded due to Interrupted Diesel Exhaust Fluid Dosing	On-Board Diagnostics has determined that the limits for NOx in the exhaust stream have been exceeded due to an interruption in diesel exhaust fluid dosing activity.
4096	NOx limits exceeded due to Empty Diesel Exhaust Fluid Tank	On-Board Diagnostics has determined that the limits for NOx in the exhaust stream have been exceeded due to the diesel exhaust fluid tank being empty.
4201	Engine Speed 1	The engine speed as measured by speed sensor 1.
4202	Engine Speed 3	The engine speed as measured by speed sensor 3.
4225	NOx limits exceeded due to error in the NOx control system	On-Board Diagnostics has determined that the limits for NOx in the exhaust stream have been exceeded due to an error in the NOx control system.
4301	Aftertreatment 1 Fuel Injector 1 Heater Control	Heating level that the controller is commanding the aftertreatment 1 fuel injector 1 heater control to maintain.
4334	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	The SCR dosing diesel exhaust fluid absolute pressure (measured closest to dosing valve) for aftertreatment system 1 (exhaust bank 1).
4337	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature	The diesel exhaust fluid dosing temperature (measured closest to dosing valve) for aftertreatment system 1 (exhaust bank 1).
4341	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Preliminary FMI	Used to identify the applicable J1939-73 FMI detected in the diesel exhaust fluid line heater 1, by the manufacturer's control software in exhaust bank 1.
4343	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Preliminary FMI	Used to identify the applicable J1939-73 FMI detected in the diesel exhaust fluid line heater 2, by the manufacturer's control software in exhaust bank 1.
4345	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 Preliminary FMI	Used to identify the applicable J1939-73 FMI detected in the diesel exhaust fluid line heater 3, by the manufacturer's control software in exhaust bank 1.
4347	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 4 Preliminary FMI	Used to identify the applicable J1939-73 FMI detected in the diesel exhaust fluid line heater 4, by the manufacturer's control software in exhaust bank 1.
4374	Aftertreatment 1 Diesel Exhaust Fluid Pump Motor Speed	Rotational speed of the motor driving a pump for diesel exhaust fluid used in an aftertreatment system.
4427	Aftertreatment 2 Diesel Exhaust Fluid Tank Temperature	Temperature of the diesel exhaust fluid in the storage tank.
4782	Diesel Particulate Filter 1 Soot Density	Soot density in diesel particulate filter 1.
4809	Aftertreatment 1 Warm Up Diesel Oxidation Catalyst Intake Temperature	The temperature measured at the intake of the warm up oxidation catalytic converter in exhaust bank 1.



SPN	SPN Name	SPN Description
4810	Aftertreatment 1 Warm Up Diesel Oxidation Catalyst Outlet Temperature	The temperature measured at the outlet of the warm up oxidation catalytic converter in exhaust bank 1.
4814	Engine Coolant Pump command	Command for a coolant pump that can be driven at varying output level.
5264	Engine Exhaust Gas Recirculation 2 (EGR2) Valve Control	Desired percentage of maximum Exhaust Gas Recirculation 2 (EGR2) valve opening. 0% means the valve is closed. 100% means maximum opening (full gas flow).
5265	Engine Exhaust Gas Recirculation 2 (EGR2) Valve 2 Control	Desired percentage of maximum Exhaust Gas Recirculation 2 (EGR2) valve 2 opening. 0% means the valve is closed. 100% means maximum opening (full gas flow).
5285	Engine Charge Air Cooler 1 Efficiency	An indication of the CAC's ability to reduce the temperature of the combustion air that is being routed through the CAC1.
5401	Engine Turbocharger Turbine Bypass Actuator	Diagnostic SPN for the actuator controlling the engine turbocharger turbine bypass valve.
5419	Engine Throttle Actuator 1	Device used to control the flow of air or air/fuel mix to the engine.
5421	Engine Turbocharger Wastegate Actuator 1	Device used to control the turbocharger wastegate.
5435	Aftertreatment 1 Diesel Exhaust Fluid Pump State	State of Aftertreatment 1 Diesel Exhaust Fluid dosing pump.
5485	Aftertreatment 1 Diesel Exhaust Fluid Pump Orifice Flow	The Exhaust Emission Controller aftertreatment reagent pump orifice flow. Could indicate that the flow is being restricted.
5541	Engine Turbocharger 1 Turbine Outlet Pressure	Gage pressure of the combustion by-products exiting the turbine side of the turbocharger 1.
5543	Engine Exhaust Brake Actuator Command	The control command applied to the engine exhaust brake actuator.
5706	Aftertreatment 1 Diesel Exhaust Fluid Pump Heater	Percentage of heating applied to the aftertreatment 1 diesel exhaust fluid pump heater.
5743	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Module will take temperature sensor inputs from the Aftertreatment Selective Catalytic Reduction Temperature Sensors and multiplex the sensor values to the engine ECU via the J1939 network.
5745	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater	Aftertreatment DEF heater internal to the Aftertreatment Dosing Unit.
5841	Diesel Exhaust Fluid Quality Malfunction	The diagnostic system has determined that the engine has been operated with a diesel exhaust fluid (reagent) quality malfunction.
7461	Aftertreatment 1 Diesel Exhaust Fluid Pump 2 Motor Speed	Rotational speed of the motor driving a pump for diesel exhaust fluid used in an aftertreatment system.