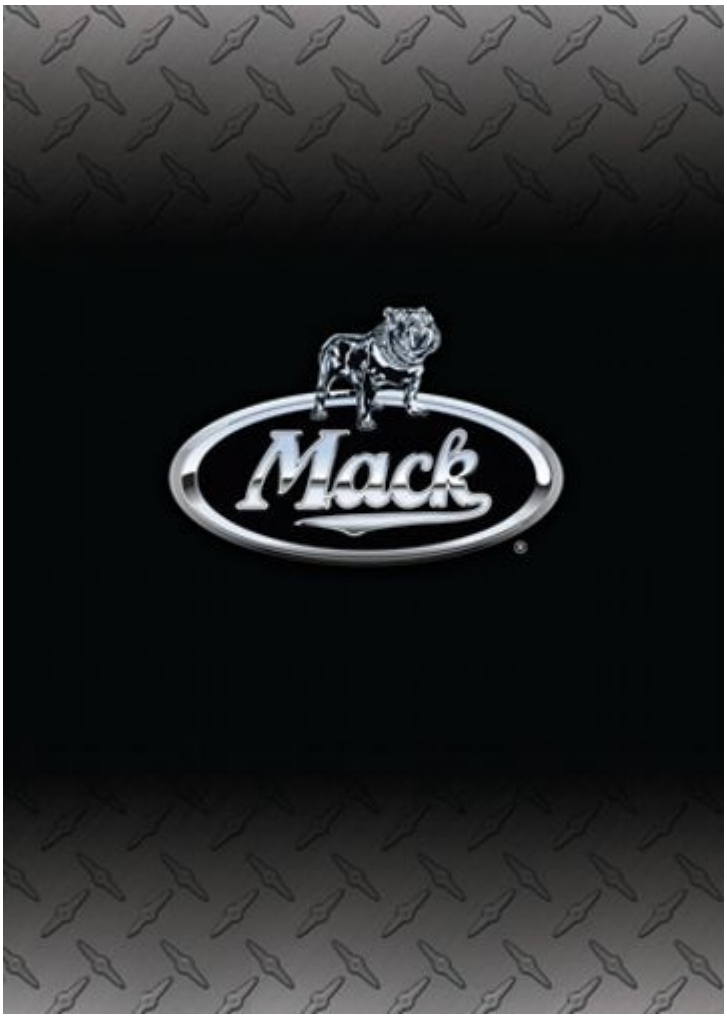
Service Manual
Trucks

Group **36**

Vehicle Electronic Control Unit (MID 144), Diagnostic Trouble Code (DTC), Guide

From build date 1.2007



PV776-88951780

Foreword

The descriptions and service procedures contained in this manual are based on designs and methods studies carried out up to January 2010.

The products are under continuous development. Vehicles and components produced after the above date may therefore have different specifications and repair methods. When this is believed to have a significant bearing on this manual, supplementary service bulletins will be issued to cover the changes.

The new edition of this manual will update the changes.

In service procedures where the title incorporates an operation number, this is a reference to a Labor Code (Standard Time).

Service procedures which do not include an operation number in the title are for general information and no reference is made to a Labor Code (Standard Time).

Each section of this manual contains specific safety information and warnings which must be reviewed before performing any procedure. If a printed copy of a procedure is made, be sure to also make a printed copy of the safety information and warnings that relate to that procedure. The following levels of observations, cautions and warnings are used in this Service Documentation:

Note: Indicates a procedure, practice, or condition that must be followed in order to have the vehicle or component function in the manner intended.

Caution: Indicates an unsafe practice where damage to the product could occur.

Warning: Indicates an unsafe practice where personal injury or severe damage to the product could occur.

Danger: Indicates an unsafe practice where serious personal injury or death could occur.

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Design and Function

MID 144 Vehicle Control Unit

The manufacturer diagnostic tool is the preferred tool for performing diagnostic work. Contact your local dealer for more information or visit “www.premiumtechtool.com”.

System Overview

The Vehicle Electronic Control Unit (VECU) is a microprocessor based controller, programmed to perform several functions, these include:

- Driver controls
- Vehicle and engine speed controls
- Starter control
- Cab power
- Broadcasting data on the serial data lines
- Trip data logging
- Diagnostic fault logging and password processing

The VECU performs these functions by monitoring the signals from sensors and switches, and data received over the serial data lines from the other modules. The VECU directly monitors the Throttle Position (TP) Sensor and Vehicle Speed Sensor (VSS).

The VECU also monitors the position or state of multiple switches, to perform its control and diagnostic functions. The switches include:

- A/C Pressure Switch
- Air Suspension Height Control Switch
- Differential Lock Switch
- Engine Brake Switches
- Ignition Key Switch
- PTO Switches (if equipped)
- Service and Park Brake Switches
- Speed Control Switches (Set/Decel, Resume/Accel)
- 5th Wheel Slide Switch

The VECU communicates with other modules and shares its inputs through the SAE J1939 high speed data link as well as the SAE J1587 normal speed data link. The SAE J1587 data link is primarily used for programming, diagnostics and data reporting.

In addition to switch and sensor data, the broadcast between modules also includes various calculations and conclusions each module has developed, based on the input information it has received. These calculations and conclusions are part of the modules on-board diagnostic capability. The on-board diagnostics are designed to detect faults or abnormal conditions that are not within normal operating parameters. When the system detects a fault or abnormal condition, the fault will be logged in one or both of the modules’ memory, the vehicle operator will be advised that a fault has occurred by the illumination of a malfunction indicator lamp and a message in the driver information display, if equipped.

When diagnosing an intermittent code or condition, it may be necessary to use a diagnostic computer connected to the Serial Communication Port. Additional data and diagnostic tests are available when a diagnostic tool is connected to the Serial Communication Port.

For diagnostic software, contact your local dealer or visit “www.premiumtechtool.com”.

Troubleshooting

Vehicle Control Unit, Fault Tracing

The manufacturer diagnostic tool is the preferred tool for performing diagnostic work. Contact your local dealer for more information or visit “www.premiumtechtool.com”.

The control modules on the SAE J1587 data link communicate according to the SAE J1587 standard. The standard has been extended with Mack’s supplement (PPID, PSID). The fault codes set by the control modules contain information that is described by the following abbreviations.

MID — Message Identification Description: Identification of a control module.

PID — Parameter Identification Description: Identification of a parameter (value).

PPID — Proprietary Parameter Identification Description Mack: Unique identification of a parameter (value).

SID — Subsystem Identification Description: Identification of a component.

PSID — Proprietary Subsystem Identification Description Mack: Unique identification of a component.

FMI — Failure Mode Identifier: Identification of fault types.

FMI Table

FMI	Display Text	SAE Text
0	Too high value	Data valid, but above the normal work range
1	Too low value	Data valid, but below the normal work range
2	Incorrect data	Data erratic, Intermittent or incorrect
3	Electrical fault	Voltage above normal or shorted high
4	Electrical fault	Voltage below normal or shorted low
5	Electrical fault	Current below normal or open circuit
6	Electrical fault	Current above normal or grounded circuit
7	Mechanical fault	Mechanical system not responding properly
8	Mechanical or electrical fault	Abnormal frequency, pulse width or period
9	Communication fault	Abnormal update rate
10	Mechanical or electrical fault	Abnormal rate of change
11	Unknown fault	Failure mode not identifiable
12	Component fault	Bad intelligent device or component
13	Incorrect calibration	Out of calibration
14	Unknown fault	Special instructions
15	Unknown fault	Reserved for future assignment by SAE Data Formal Subcommittee

MID 144 Vehicle ECU, Fault Codes

PID

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MID 144 PID 83 Road Speed Limit Status

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 14	• Special instructions	• Low air suspension road speed limit exceeded (Driver exceeded limit with Air Suspension lowered)	• N/A	• Exceeding road speed limit with air suspension lowered

MID 144 PID 84 Vehicle Speed

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 2	• Intermittent or incorrect data	• Speed signal from speedometer and ABS differs too much	• Gauge drops/inoperable • Incorrect road speed displayed in cluster	• VSS Harness • VSS Sensor • Wrong K-factory value (MG and MH parameter in VECU) • ABS reported speed missing or inconsistent
FMI 5	• Current below normal or open circuit	• Sensor open or shorted to ground	• Incorrect road speed displayed in cluster	• VSS Harness/connector • VSS Sensor
FMI 6	• Current above normal or grounded circuit	• Short across sensor	• Incorrect road speed displayed in cluster	• VSS Harness/connector • VSS Sensor
FMI 14	• Special instructions	• Intermittent faulty data • Speed signal from VSS was updated incorrectly	• Incorrect road speed displayed in cluster	• SAE J1587 data link • Wiring harness

MID 144 PID 86 Cruise Control, Set Speed

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 14	• Special Instructions	• Timeout on ACC1 message with adamptive cruise installed	• N/A	• Faulty or no info from ACC (VORAD) • Wiring harness

MID 144 PID 91 Accelerator Pedal Position (Percentage)

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage above 4.3V	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Accelerator pedal position harness shorted high • Faulty accelerator pedal position sensor
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 0.4V	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Accelerator pedal position harness shorted low • Faulty accelerator pedal position sensor • Loss of sensor signal
FMI 5	• Abnormally low current or open circuit	• Input too low compared to IVS1 & IVS2	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Faulty accelerator pedal position sensor
FMI 6	• Abnormally high current or short circuit to ground	• Input to low compared to IVS1 & IVS2	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Faulty accelerator pedal position sensor • Loss of sensor ground
FMI 14	• Special Instructions	• Supply Error from PPID 72	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Accelerator pedal position harness

MID 144 PID 152 Vehicle ECU, Number of Resets

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 12	• Faulty module or component	• Internal software fault causing a reset	• System restarted	• VECU

MID 144 PID 191 Output Shaft Speed

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 5	• Abnormally low current or open circuit	• Lower current then expected	• N/A	• Faulty vehicle speed sensor (VSS) • Wiring harness
FMI 6	• Abnormally high current or short circuit to ground	• Higher current then expected	• N/A	• Faulty vehicle speed sensor (VSS) • Wiring harness

MID 144 PPID 3 Starter relay Output

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Voltage above normal or shorted high	• Excessive current through drive circuitry	• N/A	• Short in harness or drive relays

MID 144 PPID 60 Idle Validation Switch, Power

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Lower voltage then expected	• N/A	• Wiring harness • VECU • Defective idle validation switch • Loss of power supply to the idle validation switch

MID 144 PPID 69 Buffered Idle Validation Switch

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Buffered IVS1 too high compared to IVS1 signal	• Yellow Check lamp lit	• Signal shorted high • Faulty harness
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Buffered IVS1 too low compared to IVS1 signal	• Yellow Check lamp lit	• Signal shorted low • Faulty harness

MID 144 PPID 70 Pedal Switches, Supply

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 3V	• Yellow Check lamp lit	• Faulty connector • Faulty harness • Supply voltage shorted low

MID 144 PPID 71 Cruise Control and Engine Brake, Switch Supply

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 3V	• Yellow Check lamp lit • Engine will not supply requested fuel increase	• Faulty connector • Faulty harness • Supply voltage shorted low

MID 144 PPID 72 Accelerator Pedal and Engine Brake, Sensors Supply

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage above 5.7V	• Yellow Check lamp lit • Requested fuel not supplied to engine • Engine brake retarder is disabled	• Accelerator pedal position sensor harness shorted high • Accelerator pedal position sensor
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 4.7V	• Yellow Check lamp lit • Requested fuel not supplied to engine • Engine brake retarder is disabled	• Accelerator pedal position sensor harness shorted low • Accelerator pedal position sensor

MID 144 PPID 73 Second Accelerator Pedal, Supply Sensors

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage above 5.3V	• Yellow Check lamp lit • Engine will not supply requested fuel to engine • Display show minimum wet tank pressure	• Signal shorted to high • Faulty harness • Faulty tank air pressure sensor
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 4.7V	• Yellow Check lamp lit • Engine will not supply requested fuel to engine • Display show minimum wet tank pressure	• Signal shorted low • Faulty harness • Faulty tank air pressure sensor

MID 144 PPID 74 Vehicle ECU, Power Supply

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 4.7V	• Yellow Check lamp lit • Engine will not supply requested fuel to engine • Display show minimum wet tank pressure	• Signal shorted low • Faulty harness • Faulty tank air pressure sensor

MID 144 PPID 265 Vehicle Speed Sensor Supply

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage above 9V	• Yellow Check lamp lit	• VSS harness shorted high • Faulty VSS
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 6.5V	• Yellow Check lamp lit	• VSS harness shorted low • Faulty VSS

MID 144 PPID 279 Air dryer, Dry Agent Reservoir

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 0	• Data valid, but above the normal working range	• Air volume too high pumping through the air cartridge	• Yellow Check lamp lit • Air cartridge valves may be hard to handle	• Air Filter

MID 144 PPID 312 Air Dryer, Regeneration

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 0	• Data valid, but above the normal working range	• Airflow used is to high to get time to regenerate	• Yellow Check lamp lit • Reduced air pump ability	• Air Filter • Plain air leakage • ECS
FMI 7	• Incorrect response from a mechanical system	• Valve have been open for 30 seconds and the pressure is still the same	• N/A	• Faulty harness • Valve block stuck open • Air filter

MID 144 PPID 430 Air Dryer, Regeneration

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 0	• Data valid, but above the normal working range	• Airflow used is too high to get time to regenerate	• Yellow Check lamp lit • Reduced air pump ability	• Air suspension regulates too much • Air leak • Air Filter

MID 144 SID 230 Idle Validation Switch 1

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 7	• Incorrect response from a mechanical system	• Faulty readout from IVS1	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Idle Validation Switch (IVS) • IVS connector • IVS harness • Loss of ground to the accelerator pedal sensor

MID 144 SID 231 SAE J1939 Data Link

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 2	• Intermittent or incorrect data	• VECU doesn't get acknowledge on sent messages	• Yellow Check lamp lit	• CAN communication • SAE J1939 data link down/shorted

MID 144 SID 240 Program Memory

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 2	• Intermittent or incorrect data	• Check sum calculated at startup differs from the stored one	• Yellow Check lamp lit • ECU keeps resetting • Vehicle not drivable	• Software error • Faulty flash hardware • VECU

MID 144 SID 243 Cruise Control Set Switch

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 7	• Incorrect response from a mechanical system	• Signals SET+ and SET- received at the same time	• Yellow Check lamp lit • Cruise control deactivated	• Faulty harness • Connector

MID 144 SID 250 SAE J1587 Data Link

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 2	• Intermittent or incorrect data	• Faulty messages on the link received	• Some function disturbances may occur	• SAE J1587 data link down/shorted

MID 144 SID 253 Calibration Memory EEPROM

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 2	• Intermittent or incorrect data	• Datasets have incorrect checksum	• Yellow Check lamp lit • Some functions may be deactivated	• Faulty EEPROM • VECU
FMI 14	• Special instructions	• Incorrect data found in datasets • Error when programming	• Yellow Check lamp lit • Some functions may be deactivated	• Faulty EEPROM • VECU

MID 144 PSID 1 Retarder Control Set Switch

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 7	• Incorrect response from a mechanical system	• Signals SET+ and SET- received at the same time	• Yellow Check lamp lit • Retarder Control deactivated	• Faulty harness • Connector

MID 144 PSID 2 Idle Validation Switch 2

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 7	• Incorrect response from a mechanical system	• Faulty readout from IVS2	• Yellow Check lamp lit • Engine will not supply requested fuel to engine	• Idle Validation Switch (IVS) • IVS connector • IVS harness

MID 144 PSID 4 Engine Brake Stalk Lever

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage above 4.8V	• Yellow Check lamp lit • Retarder deactivated	• Faulty harness • Connector
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 0.2V	• Yellow Check lamp lit • Retarder deactivated	• Faulty harness • Connector

MID 144 PSID 8 Neutral Position Error

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Neutral input shorted high or switch stuck closed	• N/A	• Faulty harness • Neutral switch

MID 144 PSID 14 DataMax General Error

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Clock or Other data missing	• N/A	• N/A

MID 144 PSID 16 Power Relay 1

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Power relay 1 output shorted to battery	• N/A	• Faulty harness • EMS power relay
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Power relay 1 output shorted to ground	• N/A	• Faulty harness • EMS power relay

MID 144 PSID 17 Power Relay 2

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Power relay 2 output shorted to battery	• N/A	• Faulty harness • EMS power relay
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Power relay 1 output shorted to ground	• N/A	• Faulty harness • EMS power relay

MID 144 PSID 20 Power Take-off Signal

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage too high	• Yellow Check lamp lit	• Circuit shorted high • Faulty Harness • Faulty Valve
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 2.3V	• Yellow Check lamp lit	• Circuit shorted low • Faulty Harness • Faulty Valve

MID 144 PSID 23 Air Dryer, Regenerating

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage too high	• Yellow Check lamp lit	• Signal shorted low • Faulty valve
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Voltage below 2.3V	• Yellow Check lamp lit	• Signal shorted high • Faulty valve

MID 144 PSID 24 Compressor, Control

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 3	• Abnormally high voltage or short circuit to higher voltage	• Voltage too high	• Yellow Check lamp lit	• Signal shorted low • Faulty valve
FMI 4	• Abnormally low voltage or short	• Voltage below 2.3V	• Yellow Check lamp lit	• Signal shorted high

	circuit to lower voltage			• Faulty valve

MID 144 PSID 25 Air Leakage

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 14	• Data valid, but below the normal working range	• AIrflow too high (at velocity above 50km/h)	• Small Leakage - Info lamp lit • Large Leakage - Service lamp lit	• Air leakage

MID 144 PSID 200 Communication Interference, Data Link, Engine Control Module (ECM)

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected EMS message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted • Inconsistent or mismatch of configuration between VECU and Engine Control Module (ECM)

MID 144 PSID 202 Communication Interference, Data Link, Instrumentation

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected Cluster message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 datalink Down/Shorted

MID 144 PSID 204 Communication Interference, Data Link, Brake Control Module

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected ABS message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted • VECU is configured to receive J1939 HRW message (High Resolution Wheel Speed) from ABS but isn't receiving it

MID 144 PSID 205 Communication Interference, Data Link, Transmission Control Module

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected TECU message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted

MID 144 PSID 206 Communication Interference, Data Link, Retarder Control Module

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected ECCU—retarder message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted

MID 144 PSID 207 Communication Interference, Data Link, Gear Selector Control Module

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected GSECU message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted

MID 144 PSID 208 Communication Interference, Data Link, Air Suspension

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected ECS message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted

MID 144 PSID 210 SAE J1939 Data Link Interruption, Lighting Control Module (LCM)

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected LCM message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted

MID 144 PSID 211 SAE J1939 Data Link Interruption, Collision Avoidance Control Module

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected ACC message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data linke Down/Shorted

MID 144 PSID 214 Data Link, Bodybuilder Control Module

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 9	• Abnormal update rate	• Expected BBM message/s not received	• Yellow Check lamp lit	• CAN1 Communication Down • SAE J1939 data link Down/Shorted

MID 144 PSID 230 Software Fault

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 4	• Abnormally low voltage or short circuit to lower voltage	• Uncontrolled reset of SW	• Yellow Check lamp lit	• Wiring harness (loss or interruption of supply voltage) • Faulty software • VECU
FMI 5	• Abnormally low current or open circuit	• Software has been shutdown because voltage too low	• N/A	• Wiring harness (loss or interruption of supply voltage)
FMI 12	• Faulty module or component	• Severe error reset the Software	• Yellow Check lamp lit	• Faulty software • VECU

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