Mack Chassis - Particulate Matter (PM) Sensor Diagnostic Trouble Codes (DTC) Illuminating The Malfunction Indicator Lamp (MIL); Tech Tip TT-014-2016 - US14+OBD16, US17+OBD16 And Newer Emissions, Common Model Year 2017 And Newer - To Be Used For EVERY

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This Solution is relevant regardless of previous visits and sensor replacements. At this time, multiple sensor failures are not uncommon, regardless of how new the sensor is. The same procedure should be followed for <u>every instance</u>.

PLEASE NOTE: Instructions have been updated as of 20 June 2019. If diagnostics indicate that sensor replacement is required, please follow FSB 284 - 068 Exhaust Particulate Sensor, Repair (2016) or FSB 284 - 069 (2017) Exhaust Particulate Sensor, Repair. An eService case is not required

Precautions

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1. The PM sensor is a smart sensor (12V supply and CAN lines) **with an orientation tab as seen below:**



Installation torque of 50

2. PM sensors need to be handled carefully. Dropping them most likely results in permanent damage to the sensor. Keep cap on the sensor until ready to install the sensor to avoid any contamination.

3. NEVER (DO NOT) apply anti-seize to install the PM sensor. *If for some reason someone applied it before this repair, thoroughly clean the threads and sealing surfaces while replacing the sensor.*

4. A removed PM sensor should be capped immediately (cap from replacement sensor) and packaged carefully, if returning to warranty or investigation purposes.

Repair

IMPORTANT:

• If a chassis arrives with a derate warning active, the PM sensor is <u>not</u> the source of the derate and there is a separate existing issue.

• Prior to installing a new sensor for any of the steps below, gently shake the sensor and ensure it does not rattle. If noise is heard, another sensor should be used.

1. Verify the chassis emissions level

- Details can be found in the Product Details box on the Product tab in PTT as seen below:

Tech Tool	Sec. 1	100		
Tech Tool L	inks <u>H</u> elp			
Product	Product History	Diagnose Test	Calibrate Progr	am
Selected	Product (M	926 1001)		
S Refresh	Ø Settings	🔍 Manual Selection	O Latest Selections	🚯 OBD/LVD 🔻
Product Deta	iils			
Chassis ID:			VIN:	
M926 1001			1M2AV27C6	5JM001001
Model:			Company:	
MRU			Mack Trucks	6
Emission Le	evel:	•		
US17 + OBD	2016			
Electrical Sy	/stem:			
V-MAC IV+				

• For US17+OBD16 (Common Rail Fuel System) Chassis setting DTCs P24DA or P1031 ONLY:

• For US17+OBD16 Chassis setting any other codes for the PM Sensor, Proceed with instructions below.

• For US14+OBD16 (Commonly 2017 model year): Proceed with instructions below.

2. Check the DTC Status

Only troubleshoot PM sensor faults if the fault is *Active* or *Confirmed* as shown below.

Detailed status information	
Title 🔺	Value
Confirmed DTC	True
Dending DTC	Falsa

3. Follow the set of instructions for the relevant DTC(s):

• P1033, P1034, P24D0 or U02A3 fault codes (Confirmed or Active)

- These PM sensor fault codes require connections and wiring harness checks for power supply and CAN communications. Repair can be verified with just KEY ON as diagnostics run immediately.

- If wiring harness and connections check isolates the problem to the sensor:

- **1.** Remove the sensor from the exhaust.
- **2.** Obtain a new sensor. Gently shake the new sensor to ensure it does not rattle.

NOTE: A sensor that rattles should **<u>not</u>** be installed.

- **3.** Install the new sensor.
- **4.** Clear the DTCs and release the vehicle.

1. Replace the PM sensor with the latest part. Gently shake the new sensor to ensure it does not rattle.

NOTE: A sensor that rattles should <u>not</u> be installed.

2. Update the Engine Control Module (EMS) software and clear all codes.

3. Release the vehicle.

- If the PM sensor is the current part number:

Live UI . Verify that the EMS software is current.

- 2. Remove the sensor from the exhaust.
- 3. Obtain a new sensor. Gently shake the new sensor to ensure
- it does not rattle.

NOTE: A sensor that rattles should **<u>not</u>** be installed.

- **4.** Install the new sensor.
- **5.** Clear the DTCs and release the vehicle.

• All other PM sensor fault codes (Confirmed or Active)

P24B3, **P24AF**, P2AB0, P24B1, P24B0, **P24DA**, P24B7, P24B5, P24D1, P24FC, **P24AE**, P24B4, and P1032. (Highlighted are common faults).

- **1.** Verify that the EMS software is current.
- 2. Remove the sensor from the exhaust.
- **3.** Obtain a new sensor. Gently shake the new sensor to ensure it does not rattle.

NOTE: A sensor that rattles should **<u>not</u>** be installed.

- 4. Install the new sensor.
- **5.** Clear the DTCs and release the vehicle.

Tags			
k59554255	p1031	p1032-00	p1033-00
p1034-00	p249c-00	p24ae-13	p24af-00
p24b0-00	p24b1-00	p24b3-13	p24b4-92
p24b5-00	p24b7-00	p24d0-00	p24d1-00
p24da-00	p24fc-00	p2ab0-47	p103200
Live UI	p103400	p249c00	p24ae13

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Content creation stages KC-193

p24af00	p24b000	p24b100	p24b313	
p24b492	p24b500	p24b700	p24d000	
p24d100	p24da00	p24fc00	p2ab047	

Related links and attachments

No links or attachments available



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Tech Tip

Release Date: 6/23/2016 Number: TT-014-2016 Function Group: 25 Title: Diagnosing OBD'2016 Vehicles with Particulate Matter Sensor DTCs

Problem – OBD2016 (MY2017) Trucks with Particulate Matter Sensor Fault Codes

All MY'2017 and newer trucks have a Particulate Matter (PM) sensor located after the exhaust muffler (SCR) and very close to NOx sensor after SCR (NOx2). These sensors are designed to detect damaged Diesel Particulate Filter (DPF), visible soot at tail pipe. **PM sensor specific fault code does not result in any derate.**

- 1. PM sensor is a smart sensor (12V supply and CAN lines) with orientation tab.
- <u>PM sensors need to be handled carefully</u>. Dropping them most likely results in permanent damage to the sensor. Keep cap on the sensor until ready to install the sensor to avoid any contamination.
- 3. <u>NEVER (DO NOT) apply anti-seize to install the PM sensor.</u> If for some reason someone applied it before this repair, thoroughly clean the threads and sealing surfaces while replacing the sensor.
- 4. Removed PM sensor should be capped immediately (cap from replacement sensor) and packaged carefully, if returning to warranty or investigation purposes.

Recommended Actions –

1. Only troubleshoot PM sensor faults, if the fault is Active or Confirmed.

Detailed status information			
Title 🔺	Value		
Confirmed DTC	True		
	False		

2. <u>If PM sensor is replaced as part of repair always run, "2589-08-03-17 After-</u> <u>treatment Particulate Sensor, Diagnostic Monitor", and confirm no faults,</u> <u>before releasing truck.</u>

3. P1033, P1034, P24D0 or U02A3 fault codes (Confirmed or Active)

PM sensor fault codes mentioned above require connections and wiring harness checks for power supply and CAN communications. Repair can be verified with just KEY ON as diagnostics run immediately.

If repair required PM sensor change, please run, "2589-08-03-17 After-treatment Particulate Sensor, Diagnostic Monitor", and confirm no faults before releasing truck.

4. P1031 and P24DA (both fault codes and only these fault codes Active)

If Truck has PM sensor part number 22733524 or older, replace PM sensor with part number 22835170. Update engine ECU SW and clear all codes.

Run test, "2589-08-03-17 After-treatment Particulate Sensor, Diagnostic Monitor", and confirm no faults, before releasing truck.

5. All other PM sensor fault codes (Confirmed or Active)

P24B3, P24AF, P2AB0, P24B1, P24B0<mark>, P24DA,</mark> P24B7, P24B5, P24D1, P24FC, P24AE, P24B4, and P1032. (Highlighted are common faults).

Update engine ECU SW and PM sensor. Please run, "2589-08-03-17 Aftertreatment Particulate Sensor, Diagnostic Monitor", and confirm no faults before releasing the truck.

6. Clear all Fault codes.

PM Sensor with orientation tab (sensor is perpendicular to exhaust flow)



Installation torque of 50 Nm +/- 5 Nm

Mack Chassis - Vehicles Equipped With A Vertical Selective Catalytic Reduction (SCR) System -Diagnostic Trouble Codes (DTC) P1031 With Possible P24DA Lighting The Malfunction Indicator Lamp (MIL) - US17+OBD16 (GHG17, Common Rail Fuel System) Emi

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DO NOT Replace the PM sensor for P1031 and/or P24DA on vehicles configured as described above prior to performing the steps below.

Verify the chassis emissions level

- Details can be found in the Product Details box on the Product tab in PTT as seen below:



Review the Detailed Status Information for the relevant code on the DTC Readout.

DTC List (2 Items)				
Control Unit 🚔	DTC		Status	
Brake ECU (MID 136)	SID 69: Axel load sensor, FMI 2: Data erratic, intermittent, or incorrect	Active		
Engine Control Module (EMS)	P229F64: NOx Sensor Gas Outlet Removed, Signal Plausibility Failure	Active	<u> 60</u> 0	
NOx Sensor Gas Outlet Removed				
Detailed status information				
Title 🔺	•	Value		
Confirmed DTC		True		
Pending DTC		False		
Test failed		True		
Test failed since last clear		True		
Test failed this operation cycle		True		
Test not completed since last clear		False		
Test not completed this operation cycle		False		
Warning indicator requested		False		

Once the chassis is confirmed to be US17+OBD16 or US17+OBD18:

Software improvements have been made that address this DTC. There are two

documents that should be reviewed:

Live UI • Product Improvement Pl0883 Engine Control Module (ECM) and Aftertreatment ontrol Module (ACM), Software Updates was released July 2018. This product improvement should appear under the Campaigns section of the Product screen of Premium Tech Tool (PTT) when first connecting to the vehicle. **Applicability to this campaign should be checked first.**

- The Service Program document can be found on the dealer Mack Trucks eMedia.

• **Note:** There will be a prompt to sign in to the Trucks Dealer Portal site if necessary.

• Searching for PI0883 will return a link to the bulletin.

- If the PI applies to the product it is not necessary to proceed to the Field Service Bulletin below.

2. Field Service Bulletin FSB 284-067 Engine Control Module (ECM) and Aftertreatment Control Module (ACM), Reprogramming has been released and should be reviewed if the Product Improvement does not apply to the vehicle.

- The FSB document can be found on Mack Trucks eMedia or under the Service tab in Impact.

• Searching for 284-067 will return a link to the document in either application.

3. If either of the above documents applied and there are no other issues present, the vehicle should be released when software updates have been completed.

If software is current according to the bulletin, refer to CBR Solution K59554255 for more information.

If other symptoms or related codes are present, normal diagnostics will need to be performed to determine the cause.

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p1031

p24da-00

p1031-00

p103100 p24da00

Related links and attachments

No links or attachments available



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