

Technical Service Bulletin

Mazda North American Operations
Irvine, CA 92618-2922



Subject: CHECK ENGINE LIGHT ON WITH DTCs P24C6:00, P24AE:00, P24B1:00 AND/OR P24AF:00	Bulletin No.: 01-003/20
	Last Issued: 02/13/2020

APPLICABLE MODEL(S)/VINS
2018-2019 CX-5 SKYACTIV-D 2.2

DESCRIPTION

Some customers may experience a check engine light illumination with DTCs P24C6:00, P24AE:00, P24B1:00 and/or P24AF:00 stored in PCM memory.

- P24C6:00 - PM sensor: internal temperature sensor malfunction (1DC DTC)
- P24AE:00 - PM sensor control circuit range/performance problem (1DC DTC)
- P24B1:00 - PM sensor circuit high input (1DC DTC)
- P24AF:00 - PM sensor circuit range/performance (2DC DTC)

[Particulate Matter (PM) Sensor]

DTCs may be caused by the following:

- DTC P24C6:00: May be caused by water condensation in the exhaust system which may accumulate on the PM sensor element and result in cracks.
- DTCs P24AE:00, P24B1:00, P24AF:00: May also be caused by water condensation in the exhaust system which may accumulate on the PM sensor element and result in an incorrect output signal.

To eliminate these DTCs, the following improvements have been made:

- The PM sensor has been improved (DTC P24C6:00).
- The mounting orientation of the PM sensor has been changed to reduce water accumulation (DTCs P24AE:00, P24B1:00, P24AF:00).
- The detection condition of DTCs P24AE:00 and P24B1:00 has been changed to 2DC, which will no longer detect a temporary incorrect sensor output.

Customers having this concern should have their vehicle repaired using the following repair procedure.

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REPAIR PROCEDURE

1. Verify the customer concern.
2. If DTCs P24C6:00, P24AE:00, P24B1:00 and/or P24AF:00 are stored in memory, use the table below to determine which repair(s) are applicable to the subject vehicle.

MY	VIN Range	Production Date Range	Repair
2018-2019	JM3 KF***** **382622 - 583243	Mar. 23, 2018 - Feb. 22, 2019	PM sensor replacement and DCU reprogramming
2019	JM3 KF***** ** 647477 - 665227	Jun. 3, 2019 - Jul. 3, 2019	PM sensor re-installation and DCU reprogramming

[Dosing Control Unit (DCU)]

- If DTC P24AF:00 is the only DTC stored, perform step 3.

- If DTC P24C6:00 is the only DTC stored, replace the PM sensor with the modified one according to MGSS online (PM SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2]), then perform step 4. **NOTE:** When installing the PM sensor, follow "**PROPER ORIENTATION OF PARTICULATE MATTER (PM) SENSOR**" below.

- If DTCs P24AE:00 and/or P24B1:00 are stored, reprogram the DCU according to "**REPROGRAMMING DOSING CONTROL UNIT (DCU)**" below, then perform step 3.

3. Clear the DTC(s) and perform the compulsory diesel particulate filter regeneration according to the instructions on MGSS online (COMPULSORY DIESEL PARTICULATE FILTER REGENERATION [SKYACTIV-D 2.2]).

- If the same DTC(s) return after performing the compulsory diesel particulate filter regeneration, replace the PM sensor with the modified one according to MGSS online (PM SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2]), then perform step 4. **NOTE:** When installing the PM sensor, follow "**PROPER ORIENTATION OF PARTICULATE MATTER (PM) SENSOR**" below.

- If the same DTC(s) are not stored after performing the compulsory diesel particulate filter regeneration, remove the PM sensor and re-install it according to "**PROPER ORIENTATION OF PARTICULATE MATTER (PM) SENSOR**" below, then perform step 4.

DTC	P24C6:00	P24AE:00 and/or P24B1:00	P24AF:00
Reprogram Dosing Control Unit (DCU)	-	X	-

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Diesel Particulate Filter Regeneration	-	X		X	
Replace Particulate Matter (PM) sensor	X	X	-	X	-
Re-install Particulate Matter (PM) sensor	-	-	X	-	X
Warranty Type	(wa)	(wb)	(wc)	(wd)	(we)

4. Verify repair according to the instructions on MGSS online "**PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION**".

REPROGRAMMING DOSING CONTROL UNIT (DCU):

ATTENTION: READ ALL CAUTIONS AND NOTES BEFORE AND AFTER REPROGRAMMING DCU!

CAUTION:

- IF IDS DOES NOT HAVE SUFFICIENT BATTERY POWER, THE REPROGRAMMING WILL FAIL.
- DCU DAMAGE MAY OCCUR IF THE CORRECT BATTERY CHARGER SETTING IS NOT USED.
- SET THE BATTERY MANAGEMENT SYSTEM TO "POWER SUPPLY MODE" DURING DCU REPROGRAMMING.
- POWER SUPPLY MODE will maintain proper battery voltages during DCU reprogramming.
- If a different charger is used, MAKE SURE IT DOES NOT EXCEED 20 AMPS. IF IT EXCEEDS 20 AMPS, IT COULD DAMAGE THE DCU.
- The charger **MUST** be connected directly to the vehicle battery.
- It is **NOT** necessary to remove any fuses or relays during DCU reprogramming when the IDS screen prompts you to do so. You may accidentally stop power to one of the DCU terminals and **CAUSE THE DCU TO BE BLANKED**, or you may receive error messages during the IDS reprogramming procedure.
- Start/Stop button vehicles: **DO NOT** press the start/stop button during the reprogramming process.

BEFORE REPROGRAMMING DCU:

NOTE:

- DCU is shown as **SCRCU** in M-MDS.
- Verify the current DCU file name in the vehicle by log view screen. If it's the same as shown in thecalibrationchart(s) below (or a later one), you do not need to reprogram the DCU.
- Always update the IDS tool first, then follow on-screen instructions to download the needed calibration file for DCU reprogramming.
- If the vehicle exhibits any trouble codes or driveability symptoms, diagnose and repair using MGSS **BEFORE** attempting to reprogram the DCU.
- When reprogramming a DCU, IDS will always display the "latest" calibration P/N available for that vehicle. If any calibration has been revised/updated to contain new information for a new service concern, it will also contain all previously released calibrations.
- Confirm the DLC cable is in good condition before attempting to reprogram the DCU.

DCU REPROGRAMMING:

1. Reboot the IDS to clear memory before reprogramming.

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2. Using the latest IDS Software available, reprogram the DCU to the latest calibration (refer to “Calibration Information” table) by following the “Module Reprogramming” procedure.
3. Verify the file name matches with the Calibration chart(s) below.
4. Clear all DTCs.
5. Start the engine and confirm that no warning lights stay on.
6. Record the customers radio presets from the infotainment system.
7. Disconnect the negative battery cable and wait at least 30 seconds to reset the fuel control learning data.
8. Re-connect the negative battery cable.
9. Re-enter the customers presets into the infotainment system.

AFTER REPROGRAMMING DCU:**NOTE:**

- IDS shows the calibration part numbers after programming the DCU.
- If any DTCs should remain after performing DTC erase, diagnose the DTCs using MGSS online instructions and submit a warranty claim according to the normal warranty procedure.
- Be aware that DCU calibration part numbers and file names listed in any Service Bulletin may change due to future releases of IDS software, and additional revisions made to those calibrations for service related concerns.

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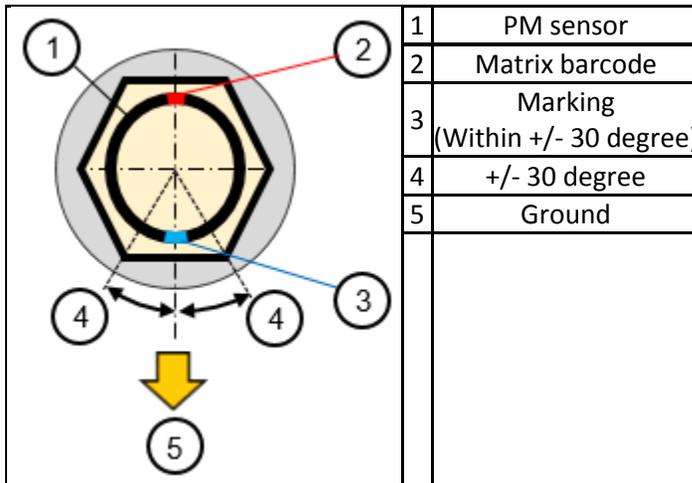
PROPER ORIENTATION OF PARTICULATE MATTER (PM) SENSOR:

NOTE: To reduce water accumulation in the PM sensor, follow the steps below when installing the sensor so the sensor element faces upward.

1. Find the matrix barcode (2) on the PM sensor (1) that faces the same direction as the sensor element (See "Location of matrix barcode" below).
2. Mark (3) the sensor body 180 degrees opposite of the matrix barcode and harness side of the free nut.
3. Install the PM sensor so that the marking faces downward to the ground (5) +/- 30 degrees (4).

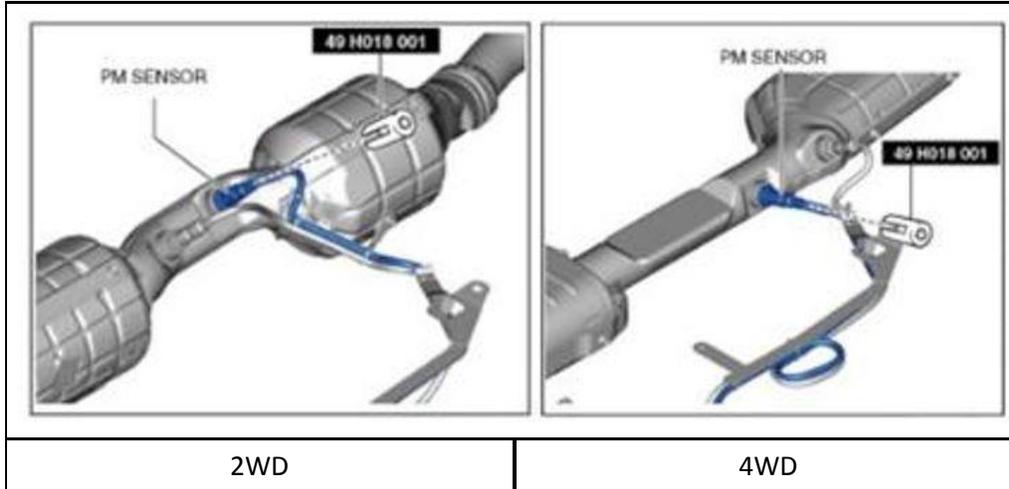
NOTE: When tightening the free nut, the sensor housing may turn together. For the best result, temporarily tighten the nut holding the sensor housing at 15 degrees before the target angle, then tighten to the specified torque.

- **Tightening torque: 30-44 ft·lbf {40-60 N·m, 4.1-6.1 kgf·m}**



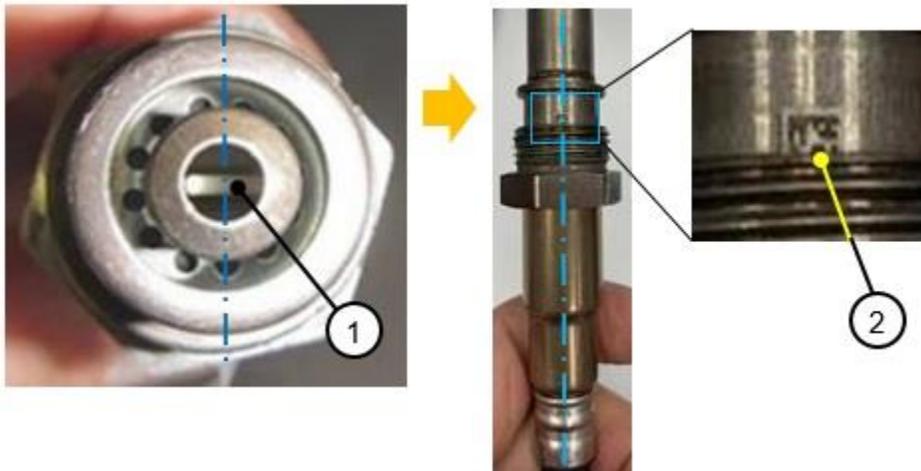
Location of the PM sensor:

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Location of the matrix barcode:

Locate the sensor element plate (1) and imagine the dashed line as shown below. The matrix barcode (2) is printed at the crossing of the line and either side of the sensor housing.



NOTE: If the matrix barcode is not found, it may be hidden under the free nut. This may be due to a variation in manufacturing.

Use the following procedures to locate it the matrix barcode.

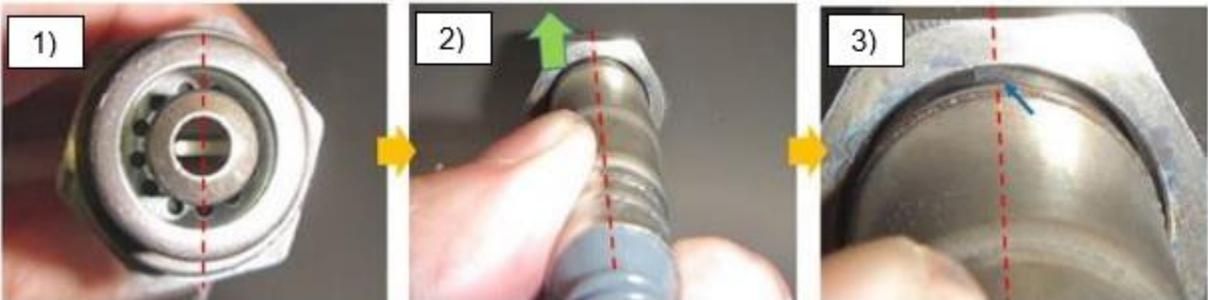
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Procedure (A) Looking from the sensor element side:

- 1) Locate the sensor element plate.
- 2) Push the free nut downward.
- 3) Hold the nut to create clearance, then inspect the area shown below by the arrow.

**Procedure (B)** Looking from the harness side:

- 1) Locate the sensor element plate.
- 2) Push the free nut upward.
- 3) Hold the nut to create clearance, then inspect the area shown below by the arrow.



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CALIBRATION INFORMATION

SCRCU file name in log viewer.

Spec.	File Name
2WD	SH9P-187K2-N
AWD	SH9T-187K2-N

PARTS INFORMATION

Part Number	Description	Qty.	Notes
SHYF-18-7E0	Parts Kit, (Modified)	1	Parts kit includes a modified PM sensor (SH9P-18-641B), replacement bands and clips

NOTE: If the modified parts kit listed in the table above is not available, an older parts kit (SHY6-18-7E0A) may be ok to use for this repair. Follow the sensor inspection instructions below to determine if the older kit can be used for this repair or not.

1. Inspect the ID Number (shown below) on the PM sensor from kit SH9P-18-641A.
 2. Is the ID Number **0281007918/919** or greater?
- If No, the kit cannot be used in this repair.
 - If Yes, the kit can be used in this repair.



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WARRANTY INFORMATION**NOTE:**

- This warranty information applies only to verified customer complaints on vehicles eligible for warranty repair.
- This repair will be covered under California Emission Warranty (Short)
- Additional diagnostic time cannot be claimed for this repair.

(wa) Part replacement only (when only DTC P24C6:00 is stored in memory)

Warranty Type Code	A
Symptom Code	6X
Damage Code	9W
Part Number Main Cause	SHYF-18-7E0 or SHY6-18-7E0A
Quantity	1
Labor Operation Number	XXR82ARX
Labor Hours	1.1 Hrs. (2WD) 0.6 Hrs.(4WD)

(wb) DCU reprogramming and part replacement after compulsory diesel particulate filter regeneration

Warranty Type Code	A
Symptom Code	6X
Damage Code	9W
Part Number Main Cause	SHYF-18-7E0 or SHY6-18-7E0A
Quantity	1
Labor Operation Number	XXR82BRX
Labor Hours	1.4 Hrs. (2WD) 0.9 Hrs. (4WD)

(wc) DCU reprogramming and part re-installation after compulsory diesel particulate filter regeneration

Warranty Type Code	A
Symptom Code	6X
Damage Code	9W
Part Number Main Cause	SHYF-18-7E0 or SHY6-18-7E0A
Quantity	0

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Labor Operation Number	XXR82CFX
Labor Hours	1.4 Hrs. (2WD) 0.6 Hrs. (4WD)

(wd) Part replacement after compulsory diesel particulate filter regeneration

Warranty Type Code	A
Symptom Code	6X
Damage Code	9W
Part Number Main Cause	SHYF-18-7E0 or SHY6-18-7E0A
Quantity	1
Labor Operation Number	XXR82DRX
Labor Hours	1.3 Hrs. (2WD) 0.8 Hrs. (4WD)

(we) Part re-installation after compulsory diesel particulate filter regeneration

Warranty Type Code	A
Symptom Code	6X
Damage Code	9W
Part Number Main Cause	SHYF-18-7E0 or SHY6-18-7E0A
Quantity	0
Labor Operation Number	XXR82EAX
Labor Hours	1.3 Hrs. (2WD) 0.5 Hrs. (4WD)

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