

MIL "ON" DTC P1DEF - Fuel Cell Performance

Service Category Engine/Hybrid System

Section Engine Control

Market USA

Toyota Supports
 ASE Certification 

Applicability

YEAR(S)	MODEL(S)	ADDITIONAL INFORMATION
2016 - 2017	Mirai	WMI(s): JTD VDS(s): BVRBD Engine(s): MTR Drive Type(s): 2WD Body Type(s): 4Dr. Sedan Transmission(s): MOTOR

Introduction

Some 2016 – 2017 model year Mirai vehicles may exhibit a warning message, "FC malfunction, return vehicle to dealer for service." This message is accompanied by Diagnostic Trouble Code (DTC) P1DEF (450 FC Stack Performance). The Fuel Control Module (FCM) calibration has been revised to address this condition.

Production Change Information

This bulletin applies to vehicles produced **BEFORE** the Production Change Effective VIN shown below.

MODEL	MODEL YEAR	PRODUCTION CHANGE EFFECTIVE VIN
Mirai	2017	JTDBVRBD#HA002788

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Warranty Information

OP CODE	DESCRIPTION	TIME	OFF	T1	T2
EG1705	Reprogram FCM	0.4	898A1-62020 898A1-62021 898A1-62022 898A1-62023	8C	99
EG1706	R & R FC Stack Assembly	6.9	1A100-77040		

APPLICABLE WARRANTY

- This repair is covered under the Toyota Fuel Cell Vehicle System Component Warranty. This warranty is in effect for 96 months or 100,000 miles, whichever occurs first, from the vehicle's in-service date.
- Warranty application is limited to occurrence of the specified condition described in this bulletin.

Parts Information

MODEL YEAR	PART NUMBER		PART NAME	QTY
	PREVIOUS	NEW		
2016 – 2017	1A100-77040		Stack Assy, FC	1
	1A1A1-77020		Label, FC Stack Caution, No.1	1
	90301-10026		Ring, O	2
	90301-09037			1
	90301-99207			1
	90301-11036			1
	G9A2A-62010			Gasket, FC Converter Service Hole, Rear
	G9A2B-62010		Gasket, FC Converter, Rear	1
	58137-62010		Seal, Front Floor Hole	1
	08887-02909		FC Grease	1
	16A42-77010		Element, FC Cooling Water Ion Exchanger	1
	00272-SLLC2		Super Long Life Coolant	1
	08889-80350		FC Stack Coolant Assy Full Service Kit	1
2016	898A1-62020 898A1-62021	898A1-62024	Computer, Fuel Cell Control	-
2017	898A1-62021 898A1-62022 898A1-62023			
-	00451-00001-LBL			

NOTE

- The FCM should NOT be replaced as part of the Repair Procedure.
- Authorized Modification Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) through *Dealer Daily – Parts – Dealer Support Materials Orders*.

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Required Tools & Equipment

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER	QTY
Techstream 2.0*	ADE	TS2UNIT	1
Techstream Lite		TSLITEPDLR01	
Techstream Lite (Green Cable)		TSLP2DLR01	

* Essential SST.

NOTE

- **ONLY ONE** of the Techstream units listed above is required.
- Software version 12.20.024 or later is required.
- Additional Techstream units may be ordered by calling Approved Dealer Equipment (ADE) at 1-800-368-6787.
- Use Techstream or an approved J2534 interface to perform flash reprogramming updates. Visit techinfo.toyota.com for more information regarding J2534 reprogramming.

SPECIAL SERVICE TOOLS (SST)	PART NUMBER	QTY
GR8 Battery Diagnostic Station*	00002-MCGR8	1

NOTE

Additional SSTs may be ordered by calling 1-800-933-8335.

* Essential SST.

Calibration Information

MODEL	MODEL YEAR	CALIBRATION ID	
		PREVIOUS	NEW
Mirai	2016 – 2017	898A36202000	898A36202500
		898A36202100	
		898A36202200	
		898A36202300	
		898A36202400	

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Repair Procedure

1. Using Techstream, check for the following stored DTC:
 P1DEF – 450 FC Stack Performance.
 Is the DTC present?
 - **YES** — Continue to step 2.
 - **NO** — This bulletin does NOT apply. Continue diagnosis using the applicable Repair Manual.
2. Perform a stimulation test.
 - A. Connect Techstream to the DLC3.
 - B. Turn the power switch ON (READY).
 - C. Let the vehicle warm up for 5 minutes.
 - D. Turn Techstream ON.
 - (1) Enter the following menus: *Powertrain – FC – Data List – FC Stack – Cell Monitor*
 - FC Voltage Before Boosting
 - FC Stack Cell Minimum Voltage
 - FC Stack Cell Minimum Voltage Cell Channel No.
 - FC Current
 - Accelerator Degree
 - E. Turn the vehicle OFF, then “IG-ON.”
 - F. Push the H2O button.
 - G. Confirm the H2O light is on.
 - H. Ready ON the vehicle.
 - I. Confirm the Ready light is ON, and then Ready OFF. The active drain water procedure will begin.
 - J. The H2O light will turn OFF when the active drain water procedure is completed.

NOTE

This procedure will take approximately 10 minutes.

- K. Drive the vehicle for 10 minutes.

CAUTION

When performing the confirmation driving pattern, obey ALL speed limits and traffic laws.

- L. Stop the vehicle in a safe location.

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Repair Procedure (Continued)

M. Record a snapshot of the Data List.

Perform one of the following steps to achieve maximum power output and record the maximum values of FC Current, FC Voltage Before Boosting, and FC Stack Cell Minimum Voltage.

STEP No.	STIMULATION TEST PROCEDURE	MEASURE OF SPEED REACHED
1	A. From idle, press the accelerator pedal to 100% and hold for 4 seconds. B. Stop the vehicle in a safe location and place the vehicle in P range.	49.7 mph (80 km/h)
2	A. In P range, press the accelerator pedal to 100% and wait for a beep. Keep the accelerator depressed for 4 seconds. B. Release the accelerator pedal. C. Change range to D, press the accelerator pedal to 100%, and hold for 2 seconds	28 mph (45 km/h)
3	A. Operate the vehicle at a speed of 25 mph. B. From 25 MPH, press the accelerator pedal to 100% and increase speed to 37 mph. C. Decrease speed back to 25 mph. D. Repeat steps B and C three times.	37.3 mph (60 km/h)
4	A. Make sure the vehicle is stopped. B. From idle, press the accelerator pedal to reach 100% in approximately 3 seconds.	28 mph (45 km/h)

3. Check Techstream snapshot data – FC Current (maximum value).

Is FC Current above 400A?

- **YES** — Continue to step 4.
- **NO** — The stimulation test **MUST** be performed until 400A or more is achieved.

4. Using the FC Current MAX value, check Techstream snapshot data – FC Voltage Before Boosting and FC Stack Cell Minimum Voltage.

Calculate $\Delta V = (\text{FC Voltage Before Boosting} \div 370) - \text{FC Stack Cell Minimum Voltage}$.

	ΔV	=	FC VOLTAGE BEFORE BOOSTING	÷	370	-	FC STACK CELL MINIMUM VOLTAGE
Example	41.64mV		222.6				0.56

Is ΔV less than 110 mV?

- **YES** — Go to step 7.
- **NO** — Continue to step 5.

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Repair Procedure (Continued)

5. Check Techstream snapshot data – FC Stack Cell Minimum Voltage Cell Channel No.
Is the channel between 186ch and 195ch?
 - **YES** — Continue to step 6.
 - **NO** — Perform the stimulation test again.
6. Replace the fuel cell stack.

NOTICE

BEFORE replacing the fuel cell stack, ensure that a code compliant facility for hydrogen repair has been approved with the local Authority Having Jurisdiction (AHJ). This repair **MUST** be performed in a code compliant facility.

Refer to the Technical Information System (TIS), applicable model and model year Repair Manual:

- 2016 – 2017 Mirai:
Engine/Hybrid System – Fuel System – “FC Control: FC Stack: [Removal](#) / [Installation](#)”

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Repair Procedure (Continued)

7. Check for the Authorized Modification Label affixed to the vehicle in the location shown below. Confirm if the FCM calibration has been updated.

Is the calibration ID listed the latest FCM calibration?

- **YES** — This bulletin does NOT apply. Continue diagnosis using the applicable Repair Manual.
- **NO** — Continue to step 8.

Figure 1. Location of Authorized Modification Label for 2016 – 2017 Mirai



1	Replacement FCM Part Number (i.e., 898A1-62024)
2	New Calibration ID (i.e., 898A36202500)
3	Dealer Code

4	Date Completed
5	This SB Number

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Repair Procedure (Continued)

8. Flash reprogram the FCM.

NOTE

- The GR8 Battery Diagnostic Station **MUST** be used in Power Supply Mode to maintain battery voltage at 13.5V while flash reprogramming the vehicle.
- For details on how to use the GR8 Battery Diagnostic Station, refer to the "[GR8 Instruction Manual](#)" located on TIS, *Diagnostics – Tools & Equipment – Battery Diagnostics*.

Follow the procedures outlined in the Service Bulletin [T-SB-0134-16](#), "Techstream ECU Flash Reprogramming Procedure," and flash the FCM with the NEW calibration file update.

9. Prepare and install the Authorized Modification Label.
 - A. Using a permanent marker, enter the following information on the label:
 - ECM part number [*Refer to the **Parts Information** section for the **NEW PART NUMBER***]
 - Calibration ID(s) [*Refer to the **Calibration Information** section for the **NEW CALIBRATION ID***]
 - Dealer Code
 - Repair Date
 - Change Authority [***This bulletin number***]
 - B. Install the Authorized Modification Label on the vehicle at the location shown in Figure 1. The Authorized Modification Label is available through the MDC, P/N 00451-00001-LBL.
10. Start the engine, warm it up to normal operating temperature, and test drive to confirm proper vehicle operation.