

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 - 2019	Mirai	

REVISION NOTICE

September 20, 2019 Rev2:

- Applicability has been updated to include 2018 and 2019 model year Mirai vehicles.
- The Production Change Information, Parts Information, and Calibration sections have been updated.

September 5, 2018 Rev1:

- The Parts Information section has been updated.

Introduction

Some 2016 – 2019 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	2019	JTDBVRBD8KA007354

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Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
EG1705	Reprogram FCM	0.4	898A1-62020 898A1-62021 898A1-62022 898A1-62023 989A1-62024 989A1-62025	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 – 2019		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	1
		G9A2B-62010	Gasket, FC Converter, Rear	1
		58137-62010	Seal, Front Floor Hole	1
		08887-02909	FC Grease	1
		0416A-56010	Element Kit, Ion Exchanger	1
		00272-SLLC2	Super Long Life Coolant	1
		08889-01502	FC Stack Coolant 50	5

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Parts Information (continued)

MODEL YEAR	PART NUMBER		PART NAME	QTY
	PREVIOUS	NEW		
2016	898A1-62020 898A1-62021	898A1-62026	Computer, Fuel Cell Control	—
2017	898A1-62021 898A1-62022 898A1-62023 898A1-62024			
	898A1-62024 898A1-62025			
	898A1-62025			
	2018			
2019	898A1-62025			
—	00451-00001-LBL		Authorized Modifications Labels	1

NOTE

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

Required Tools & Equipment

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

*Essential SST.

NOTE

- ONLY ONE of the Techstream units listed above is required.
- Software version 14.20.019 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
Battery Diagnostic Tool*	DCA-8000P T	1

*Essential SST.

NOTE

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

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Calibration Information

MODEL	MODEL YEAR	CALIBRATION ID	
		PREVIOUS	NEW
Mirai	2016 – 2019	898A36201300	898A36202800
		898A36202200	
		898A36202300	
		898A36202400	
		898A36202500	
		898A36202600	
		898A36202700	

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.

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Repair Procedure (continued)

- 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.
- 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)

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Repair Procedure (continued)

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.
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 TIS, applicable model and model year Repair Manual:

- [2016](#) / [2017](#) / [2018](#) / [2019](#) Mirai:
Engine/Hybrid System – Fuel System – “FC Control: FC Stack: Removal”
- [2016](#) / [2017](#) / [2018](#) / [2019](#) Mirai:
Engine/Hybrid System – Fuel System – “FC Control: FC Stack: Installation”

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Repair Procedure (continued)

7. Check for the Authorized Modifications 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 Modifications Label for 2016 – 2019 Mirai



1	Replacement FCM Part Number (i.e., 898A1-62026)
2	New Calibration ID (i.e., 898A36202800)
3	Dealer Code

4	Date Completed
5	This SB Number

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Repair Procedure (continued)

8. Flash reprogram the FCM.

NOTE

- The battery diagnostic tool **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 battery diagnostic tool, refer to the [DCA-8000 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 Modifications Label.
 - A. Using a permanent marker, enter the following information on the label:
 - FCM 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 Modifications Label on the vehicle at the location shown in Figure 1. The Authorized Modifications Label is available through the MDC, P/N 00451-00001-LBL.
10. Start the engine and warm it up to normal operating temperature.
11. Test-drive the vehicle to confirm proper vehicle operation.