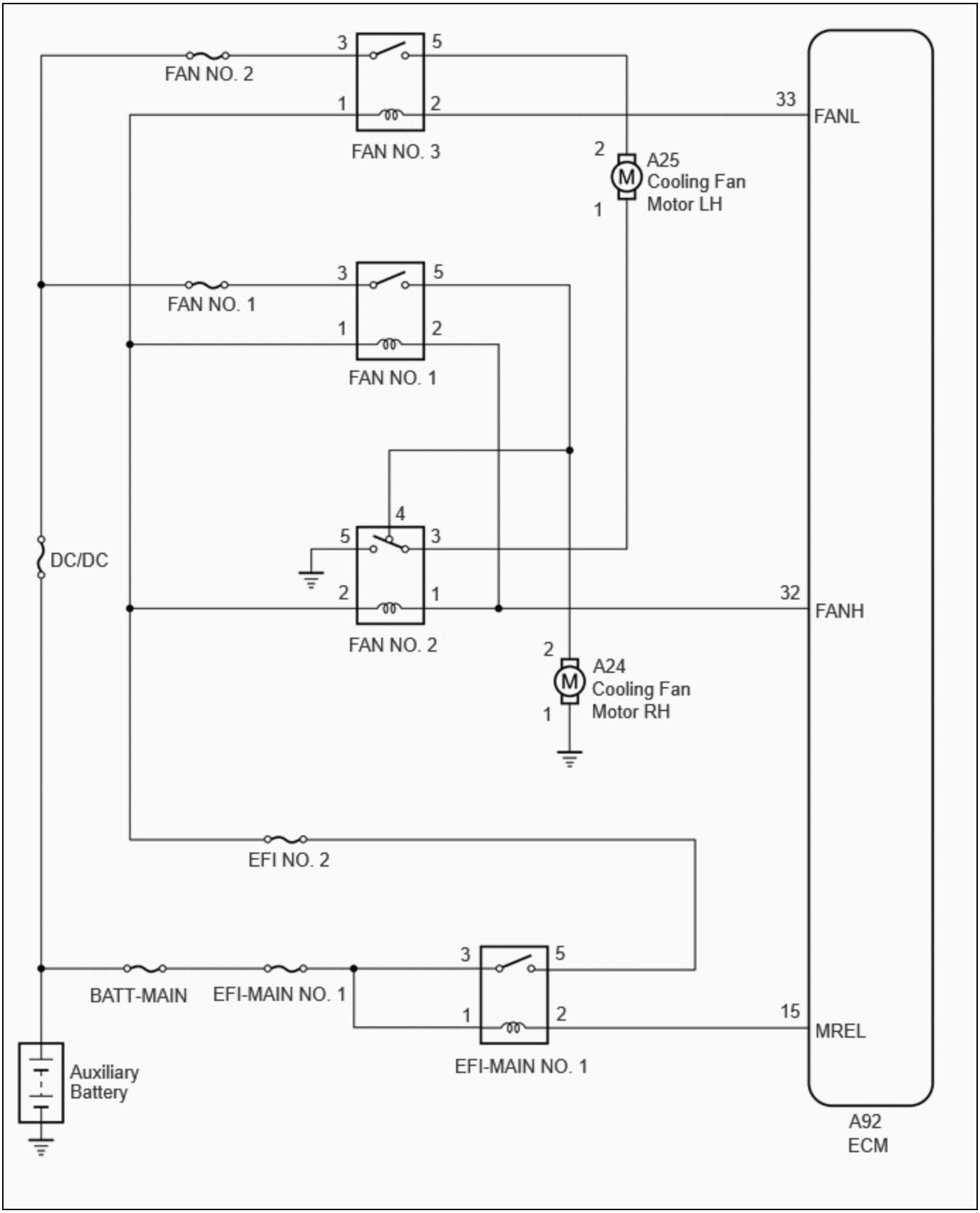
Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000029IT6
Model Year Start: 2023	**Model:** Prius	**Prod Date Range:** [12/2022 -]
Title: M20A-FXS (COOLING): COOLING FAN SYSTEM (for HEV Model): Cooling Fan Circuit; 2023 - 2024 MY Prius [12/2022 -]		

DESCRIPTION

The ECM turns on or off the fan relays using signals calculated from the engine coolant temperature, air conditioning switch (on/off), air conditioning refrigerant pressure, engine speed and vehicle speed signals.

The ECM switches the circuit of the cooling fan motors between series and parallel by turning on or off the fan relays in order to control the speed of the cooling fan motors in two steps.

WIRING DIAGRAM



CAUTION / NOTICE / HINT

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following procedure.
- Before replacing the ECM, refer to Service Bulletin.

PROCEDURE

1.	**PERFORM ACTIVE TEST USING GTS (CONTROL THE ENGINE COOLING FAN)**

(a) Perform the Active Test according to the display on the GTS.

Powertrain > Engine > Active Test

TESTER DISPLAY
Control the Engine Cooling Fan

OK:

ACTIVE TESTER OPERATION	FAN OPERATION
HIGH	Cooling fans high speed operate
LOW	Cooling fans low speed operate
OFF	Cooling fans stop

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

NG ▼

2.	**CHECK HARNESS AND CONNECTOR (FANL - FANH POWER SOURCE)**

(a) Disconnect the A92 ECM connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

EWD INFO

Click Location & Routing(A92)
Click Connector(A92)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A92-32 (FANH) - Body ground	Ignition switch ON	11 to 14 V
A92-33 (FANL) - Body ground	Ignition switch ON	11 to 14 V

NG ▶ **GO TO STEP 12**

OK

3.	**CHECK HARNESS AND CONNECTOR (FAN NO. 1 RELAY AND FAN NO. 3 RELAY POWER SOURCE CIRCUIT)**

(a) Remove the FAN NO. 1 relay and FAN NO. 3 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (FAN NO. 1 relay) - Body ground	Always	11 to 14 V
3 (FAN NO. 3 relay) - Body ground	Always	11 to 14 V

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 1 RELAY AND FAN NO. 3 RELAY POWER SOURCE CIRCUIT)**

OK

4.	**INSPECT COOLING FAN RELAY (FAN NO. 1, FAN NO. 2 AND FAN NO. 3)**

(a) Inspect the FAN NO. 1 relay, FAN NO. 2 relay and FAN NO. 3 relay.

Click here INFO

RESULT	PROCEED TO
OK	A
NG (FAN NO. 1 relay)	B
NG (FAN NO. 2 relay)	C
NG (FAN NO. 3 relay)	D

B ▶ **REPLACE FAN NO. 1 RELAY**

C ▶ **REPLACE FAN NO. 2 RELAY**

D ▶ **REPLACE FAN NO. 3 RELAY**

A

▼

5.	**CHECK HARNESS AND CONNECTOR (FAN NO. 2 RELAY - BODY GROUND)**

(a) Remove the FAN NO. 2 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (FAN NO. 2 relay) - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 2 RELAY - BODY GROUND)**

OK

▼

6.	**INSPECT COOLING FAN MOTOR RH**

(a) Inspect the cooling fan motor RH.

Click here INFO

NG ▶ **REPLACE COOLING FAN MOTOR RH**

OK

▼

7.	**CHECK HARNESS AND CONNECTOR (COOLING FAN MOTOR RH - BODY GROUND)**

(a) Disconnect the A24 cooling fan motor RH connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

EWD INFO

Click Location & Routing(A24)
Click Connector(A24)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A24-1 - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (COOLING FAN MOTOR RH - BODY GROUND)**

OK ▼

8.	**CHECK HARNESS AND CONNECTOR (FAN NO. 1 RELAY AND FAN NO. 2 RELAY - COOLING FAN MOTOR RH)**

(a) Disconnect the A24 cooling fan motor RH connector.

(b) Remove the FAN NO. 1 relay and FAN NO. 2 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

EWD INFO

Click Location & Routing(A24)
Click Connector(A24)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A24-2 - 5 (FAN NO. 1 relay)	Always	Below 1 Ω
A24-2 - 4 (FAN NO. 2 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

EWD INFO

Click Location & Routing(A24)
Click Connector(A24)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A24-2 or 5 (FAN NO. 1 relay) - Body ground	Always	10 kΩ or higher
A24-2 or 4 (FAN NO. 2 relay) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 1 RELAY AND FAN NO. 2 RELAY - COOLING FAN MOTOR RH)**

OK ▼

9.	**INSPECT COOLING FAN MOTOR LH**

(a) Inspect the cooling fan motor LH.

Click here INFO

NG ▶ **REPLACE COOLING FAN MOTOR LH**

OK ▼

10.	**CHECK HARNESS AND CONNECTOR (FAN NO. 2 RELAY AND FAN NO. 3 RELAY - COOLING FAN MOTOR LH)**

(a) Disconnect the A25 cooling fan motor LH connector.

(b) Remove the FAN NO. 2 relay and FAN NO. 3 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

EWD INFO

Click Location & Routing(A25)
Click Connector(A25)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A25-1 - 3 (FAN NO. 2 relay)	Always	Below 1 Ω
A25-2 - 5 (FAN NO. 3 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

EWD INFO

Click Location & Routing(A25)
Click Connector(A25)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A25-1 or 3 (FAN NO. 2 relay) - Body ground	Always	10 kΩ or higher
A25-2 or 5 (FAN NO. 3 relay) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 2 RELAY AND FAN NO. 3 RELAY - COOLING FAN MOTOR LH)**

OK ▼

11.	**CHECK HARNESS AND CONNECTOR (FAN NO. 1 RELAY - FAN NO. 2 RELAY)**

(a) Remove the FAN NO. 1 and FAN NO. 2 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay) - 1 (FAN NO. 2 relay)	Always	Below 1 Ω
2 (FAN NO. 1 relay) - 2 (FAN NO. 2 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay) or 1 (FAN NO. 2 relay) - Body ground	Always	10 kΩ or higher
2 (FAN NO. 1 relay) or 2 (FAN NO. 2 relay) - Body ground	Always	10 kΩ or higher

OK ▶ **REPLACE ECM**

Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 1 RELAY AND FAN NO. 2 RELAY - ECM)**

12.	**INSPECT COOLING FAN RELAY (FAN NO. 1, FAN NO. 2 AND FAN NO. 3)**

(a) Inspect the FAN NO. 1 relay, FAN NO. 2 relay and FAN NO. 3 relay.

Click here INFO

RESULT	PROCEED TO
OK	A
NG (FAN NO. 1 relay)	B
NG (FAN NO. 2 relay)	C
NG (FAN NO. 3 relay)	D

B ▶ **REPLACE FAN NO. 1 RELAY**

C ▶ **REPLACE FAN NO. 2 RELAY**

D ▶ **REPLACE FAN NO. 3 RELAY**

A

▼

13.	**CHECK HARNESS AND CONNECTOR (FAN NO. 1 RELAY, FAN NO. 2 RELAY AND FAN NO. 3 RELAY POWER SOURCE CIRCUIT)**

(a) Remove the FAN NO. 1 relay and FAN NO. 2 relay and FAN NO. 3 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay) - Body ground	Always	11 to 14 V
1 (FAN NO. 2 relay) - Body ground	Always	11 to 14 V
1 (FAN NO. 3 relay) - Body ground	Always	11 to 14 V

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 1 RELAY, FAN NO. 2 RELAY AND FAN NO. 3 RELAY - ECM)**

NG

▼

14.	**CHECK HARNESS AND CONNECTOR (FAN NO. 1 RELAY, FAN NO. 2 RELAY AND FAN NO. 3 RELAY - EFI-MAIN NO.1 RELAY)**

(a) Remove the EFI-MAIN No. 1 relay, FAN NO. 1 relay, FAN NO. 2 relay and FAN NO. 3 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay) - 5 (EFI-MAIN No. 1 relay)	Always	Below 1 Ω
2 (FAN NO. 2 relay) - 5 (EFI-MAIN No. 1 relay)	Always	Below 1 Ω
1 (FAN NO. 3 relay) - 5 (EFI-MAIN No. 1 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay) or 5 (EFI-MAIN No. 1 relay) - Body ground	Always	10 kΩ or higher
2 (FAN NO. 2 relay) or 5 (EFI-MAIN No. 1 relay) - Body ground	Always	10 kΩ or higher
1 (FAN NO. 3 relay) or 5 (EFI-MAIN No. 1 relay) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 1 RELAY, FAN NO. 2 RELAY AND FAN NO. 3 RELAY - EFI-MAIN NO.1 RELAY)**

OK ▼

15.	**INSPECT EFI-MAIN NO.1 RELAY**

(a) Inspect the EFI-MAIN No. 1 relay.

Click here INFO

NG ▶ **REPLACE EFI-MAIN NO.1 RELAY**

OK ▼

16.	**CHECK HARNESS AND CONNECTOR (EFI-MAIN NO.1 RELAY POWER SOURCE CIRCUIT)**

(a) Remove the EFI-MAIN No. 1 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (EFI-MAIN No. 1 relay) - Body ground	Always	11 to 14 V

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (EFI-MAIN NO.1 RELAY POWER SOURCE CIRCUIT)**

OK ▼

17.	**CHECK HARNESS AND CONNECTOR (EFI-MAIN NO.1 RELAY - BODY GROUND)**

(a) Remove the EFI-MAIN No. 1 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1(EFI-MAIN No. 1 relay) - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (EFI-MAIN NO.1 RELAY - BODY GROUND)**

OK ▼

18.	**CHECK HARNESS AND CONNECTOR (ECM - EFI-MAIN NO.1 RELAY)**

(a) Disconnect the A92 ECM connector.

(b) Remove the EFI-MAIN No. 1 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

EWD INFO

Click Location & Routing(A92)
Click Connector(A92)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A92-15 (MREL) - 2 (EFI-MAIN No. 1 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

EWD INFO

Click Location & Routing(A92)
Click Connector(A92)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A92-15 (MREL) or 2 (EFI-MAIN No. 1 relay) - Body ground	Always	10 kΩ or higher

OK ▶ **REPLACE ECM**

Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM - EFI-MAIN NO.1 RELAY)**