

2002-04 ENGINE COOLING

Electric Cooling Fans - RAV4

MODEL IDENTIFICATION

MODEL IDENTIFICATION

Model	Engine	VIN Code
RAV4 (2004 Model)	2AZ-FE	D
RAV4 (2002-03 Model)	1AZ-FE	H

DESCRIPTION & OPERATION

Fans are controlled via Engine Coolant Temperature (ECT) switches/sensors. For cooling fan operating conditions, see **COOLING FAN OPERATING CONDITIONS** table.

COOLING FAN OPERATING CONDITIONS

Application & Temperature - °F (°C)	Cooling Fan Operation
More Than 199 (93)	On
Less Than 181 (83)	Off

COMPONENT LOCATIONS

RAV4 uses 2 electric cooling fans located directly behind the radiator. See **ELECTRIC COOLING FAN IDENTIFICATION** . For electrical component locations, see **ELECTRICAL COMPONENT LOCATOR** article. For relay box, circuit breaker and fuse locations, see **FUSES & CIRCUIT BREAKERS** article.

ELECTRIC COOLING FAN IDENTIFICATION

Application	Cooling Fan Location
Condenser Cooling Fan	Passenger's Side, Rear Of Radiator
Radiator Cooling Fan	Driver's Side, Rear Of Radiator

TROUBLE SHOOTING

NOTE: To trouble shoot mechanical cooling system components, see appropriate table in **BASIC TROUBLE SHOOTING** article in **GENERAL INFORMATION**. For A/C related electric cooling fan system trouble shooting procedures, see appropriate **MANUAL A/C-HEATER SYSTEMS- RAV4** article in **HVAC**.

Check fuses, grounds and all connectors. For locations, see **COMPONENT LOCATIONS** .

SYSTEM TESTS

ELECTRIC COOLING FAN

Cooling Fan Operation With Low Temperature (Below 181°F (83°C))

1. With engine coolant temperature less than 181°F (83°C), turn ignition switch to ON position (engine off). Ensure fan stops.
2. If fan does not stop, test cooling fan relay and ECT switch/sensor. See **COOLING FAN RELAYS** and **ENGINE COOLANT TEMPERATURE (ECT) SWITCH** or **ECT SENSOR** . Check for loose or broken connector or wiring between relay and ECT switch. Repair as necessary.
3. Disconnect ECT switch/sensor connector. See **COMPONENT LOCATIONS** . With ignition still in ON position, ensure cooling fan turns on. If not, check fuses, cooling fan relay, and cooling fan motor. Check for short between cooling fan relay and ECT switch. Reconnect ECT switch connector.

Cooling Fan Operation With High Temperature (Above 199°F (93°C))

Start engine and increase coolant temperature to more than 199°F (93°C). Ensure cooling fan turns. If not, check fuses, cooling fan relay, ECT switch and cooling fan motor. See **COOLING FAN RELAYS** , **ENGINE COOLANT TEMPERATURE (ECT) SWITCH** and **INSPECT COOLING FAN** . Replace defective component(s) as necessary.

Inspect Cooling Fan

1. Disconnect the cooling fan connector.
2. Connect battery and ammeter to the cooling fan connector. See **Fig. 1** .
3. Check that the cooling fan rotates smoothly, and check the reading on the ammeter. Reading should be 4.9-8.5 amps at 68°F (20°C).
4. If reading or fan operation is not as specified, replace fan motor.

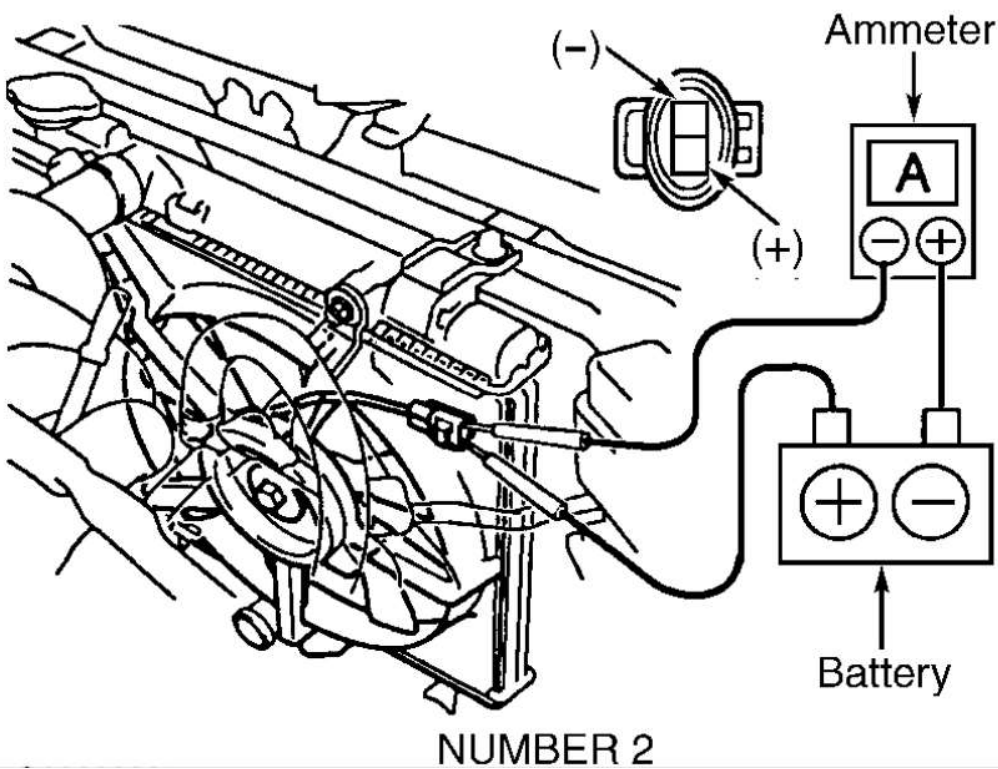
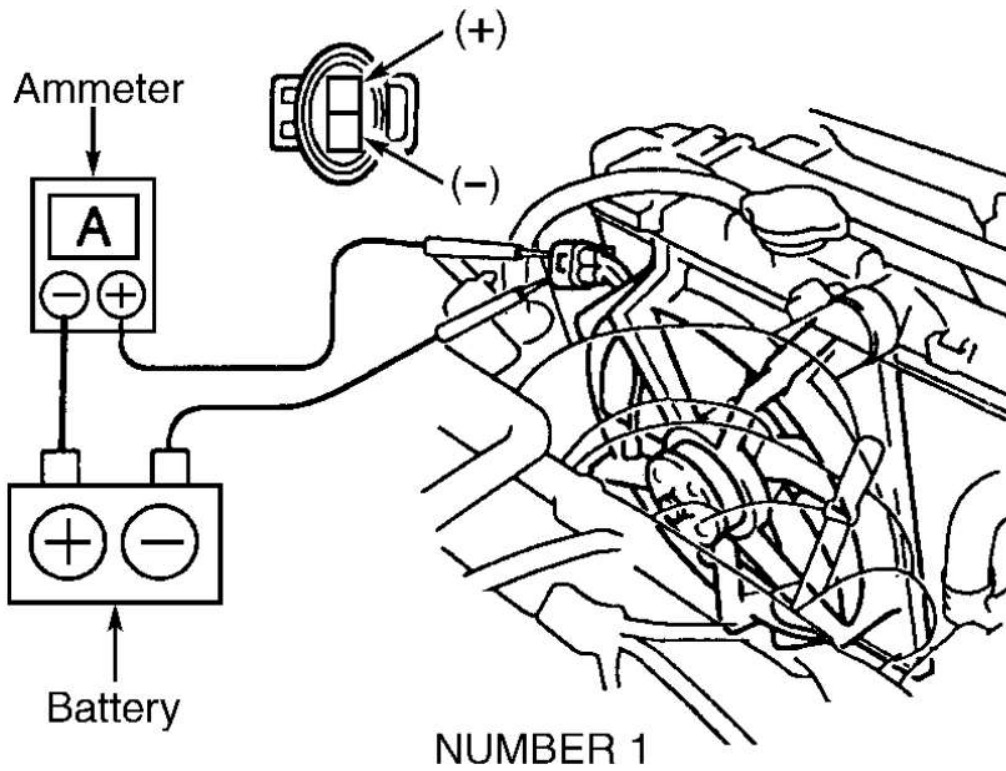


Fig. 1: Testing Amperage At Fan Connectors

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COMPONENT TESTS

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES - TOYOTA** article in **GENERAL INFORMATION** before disconnecting battery.

COOLING FAN RELAYS

NOTE: Place match marks on all relays for proper reinstallation.

Cooling Fan Relay No. 1

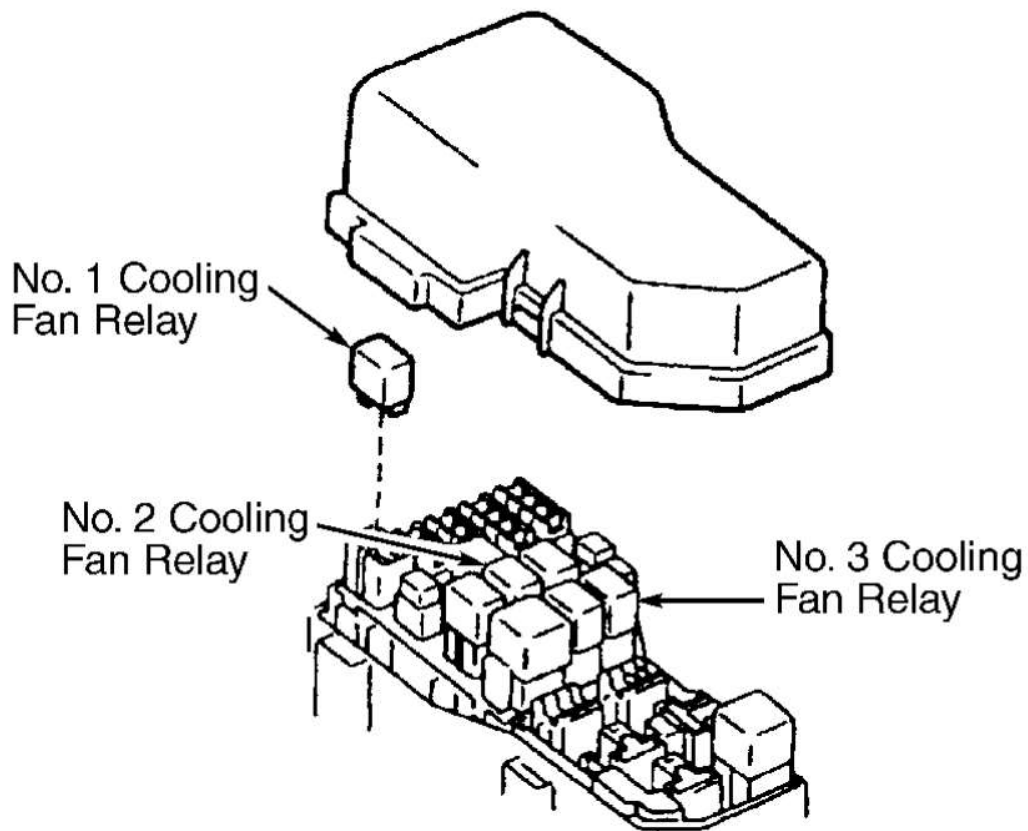
1. Disconnect negative battery cable. Remove cooling fan relay No. 1 from fuse/relay box. See **Fig. 2** . Using an ohmmeter, check for continuity between relay terminals No. 1 and 2. See **Fig. 3** . If there is no continuity, replace relay. Check that no continuity exists between relay terminals No. 3 and 5. If continuity exists, replace relay.
2. To check relay operation, connect positive battery voltage to terminal No. 1 and ground to terminal No. 2. Check for continuity between relay terminals No. 3 and 5. If no continuity exists, replace relay. Reinstall cooling fan relay No. 1.

Cooling Fan Relay No. 2

1. Disconnect negative battery cable. Remove cooling fan relay No. 2 from fuse/relay box. See **Fig. 2** . Using an ohmmeter, check for continuity between relay terminals No. 1 and 2, and No. 3 and 4. See **Fig. 3** . If no continuity exists, replace relay. Check that no continuity exists between relay terminals No. 3 and 5. If continuity exists, replace relay.
2. To check relay operation, connect positive battery voltage to terminal No. 1 and ground to terminal No. 2. Check that no continuity exists between relay terminals No. 3 and 4. If continuity exists, replace relay. Check for continuity between relay terminals No. 3 and 5. If no continuity exists, replace relay. Reinstall cooling fan relay No. 2.

Cooling Fan Relay No. 3

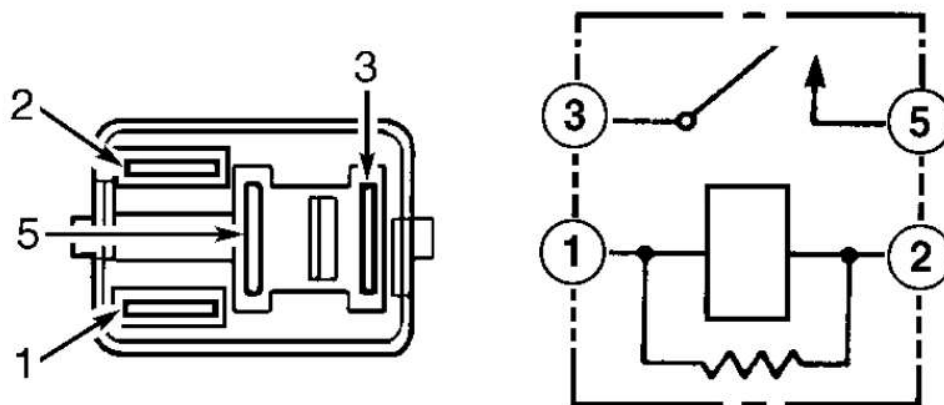
1. Disconnect negative battery cable. Remove cooling fan relay No. 3 from fuse/relay box. See **Fig. 2** . Using an ohmmeter, check for continuity between relay terminals No. 1 and 2. See **Fig. 3** . If no continuity exists, replace relay. Check that no continuity exists between relay terminals No. 3 and 5. If continuity exists, replace relay.
2. To check relay operation, connect positive battery voltage to terminal No. 1. Connect ground to terminal No. 2. Check for continuity between relay terminals No. 3 and 5. If no continuity exists, replace relay. Reinstall cooling fan relay No. 3.



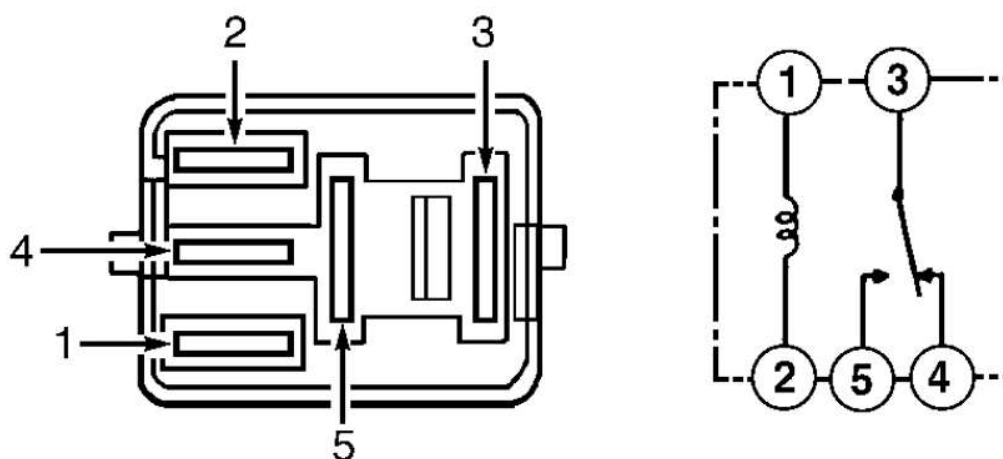
G00038732

Fig. 2: Identifying Relay Locations

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



NO. 1 & NO. 3 COOLING FAN RELAY



NO. 2 COOLING FAN RELAY

G00014183

Fig. 3: Identifying Terminals Of Cooling Fan Relays
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ENGINE COOLANT TEMPERATURE (ECT) SWITCH

1. Drain engine coolant. Remove ECT switch. See **COMPONENT LOCATIONS** . Place ECT switch thermal sensor into a water bath.
2. Using an ohmmeter, check that there is no continuity between ECT switch terminals when coolant temperature is more than 199°F (93°C). If continuity exists, replace ECT switch.
3. Cool water and check that there is continuity when coolant temperature is less than 181°F (83°C). If there

is no continuity, replace ECT switch. Install switch. Fill with engine coolant.

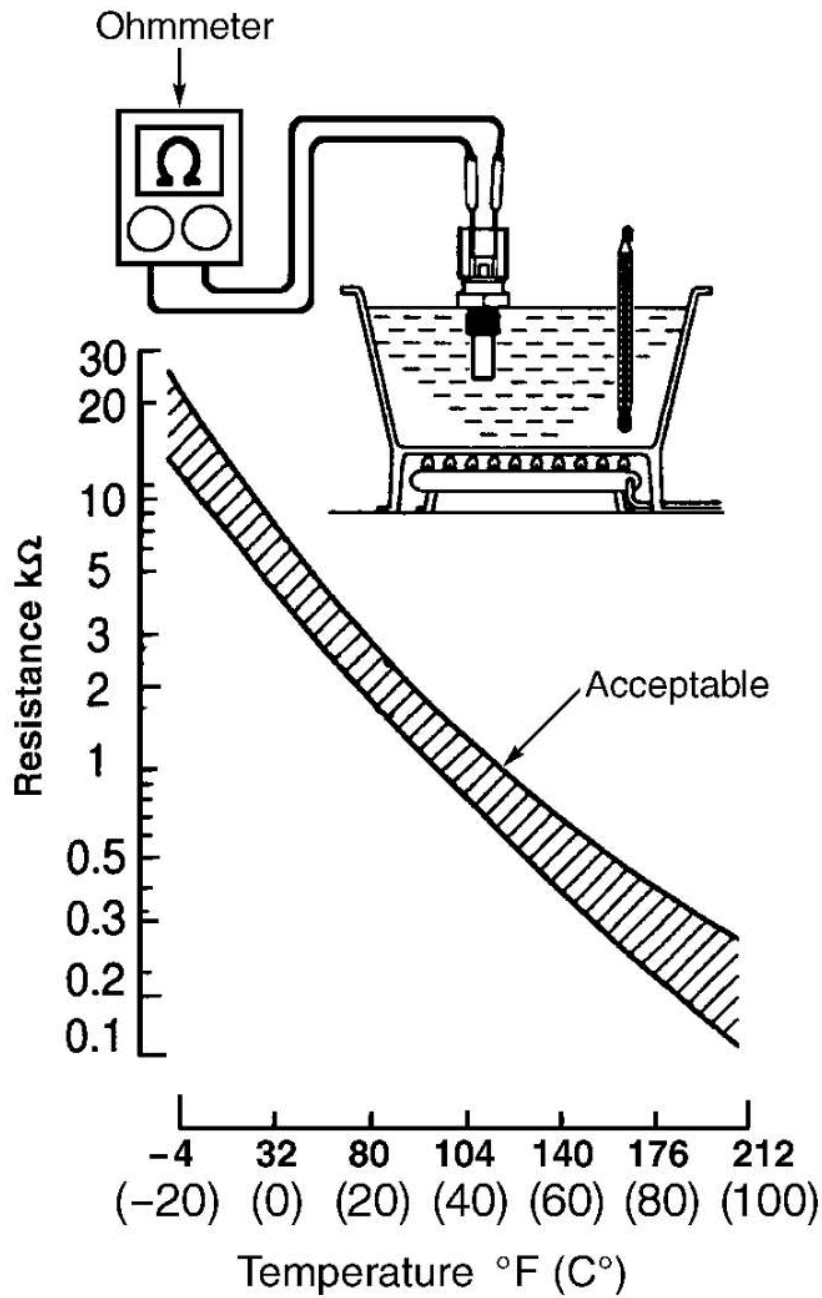
ENGINE COOLANT TEMPERATURE SENSOR

1. Drain engine coolant. Remove ECT sensor. See **ECT SENSOR LOCATIONS** . Place ECT sensor and thermometer into a water bath.

ECT SENSOR LOCATIONS

Application	Sensor Location
RAV4	Rear Of Engine, Below Air Cleaner Assembly

2. Measure resistance between terminal Nos. 1 and 2. See **Fig. 4** . If resistance is not as specified, replace ECT sensor.
3. Install NEW gasket on sensor, and install ECT sensor. Fill with engine coolant.



G00014180

Fig. 4: Measuring ECT Sensor Resistance
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DIAGNOSTIC TESTS

For Diagnostic Trouble Code (DTC) related circuit testing, see appropriate DIAGNOSTIC TESTS under SELF DIAGNOSTICS article in ENGINE PERFORMANCE.

WIRING DIAGRAMS

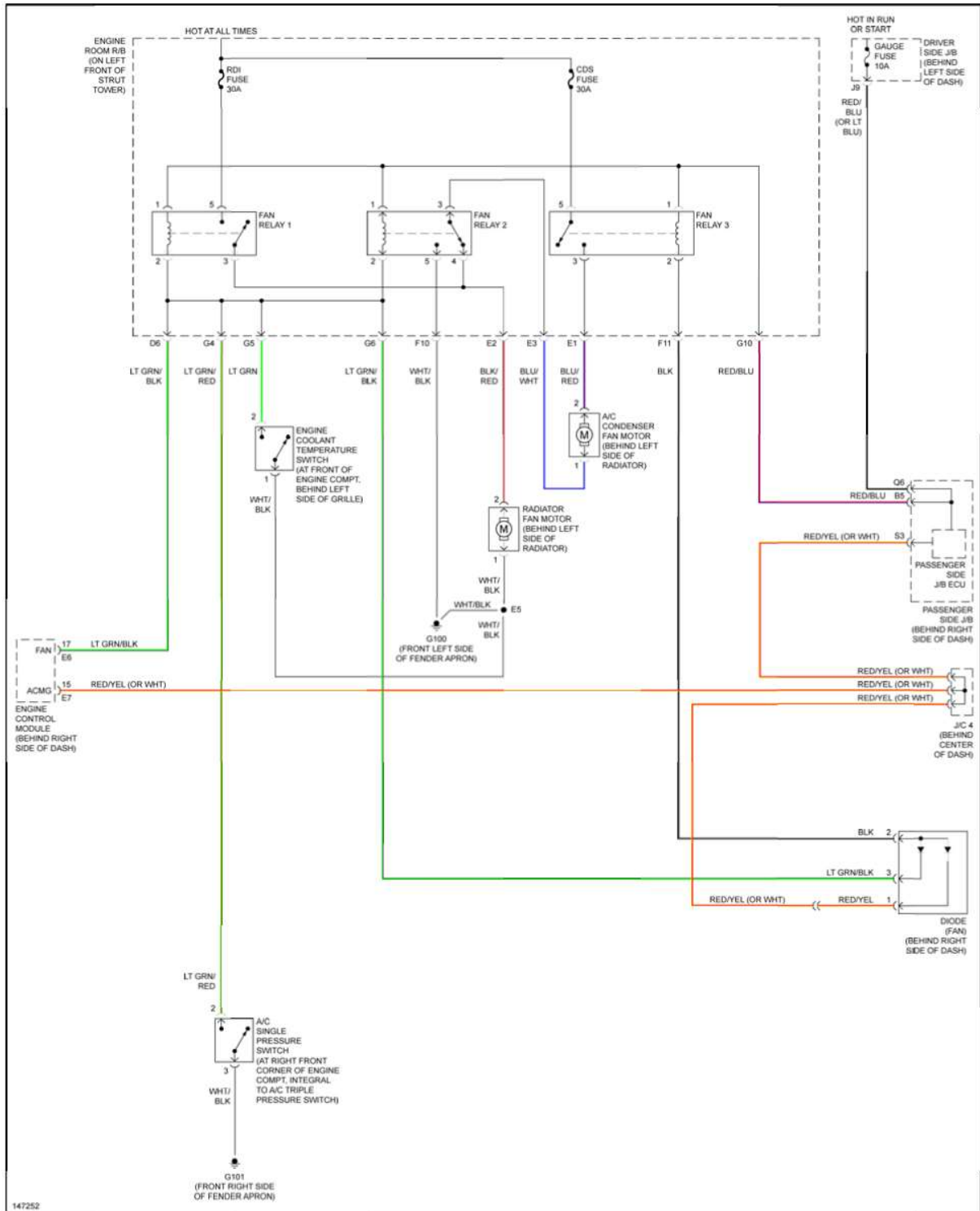


Fig. 5: Electric Cooling Fan Wiring Diagram (2002-04 Models)