ENGINE CONTROL SYSTEM

SECTION EC

MODIFICATION NOTICE:

- Wiring diagrams have been modified.

CONTENTS

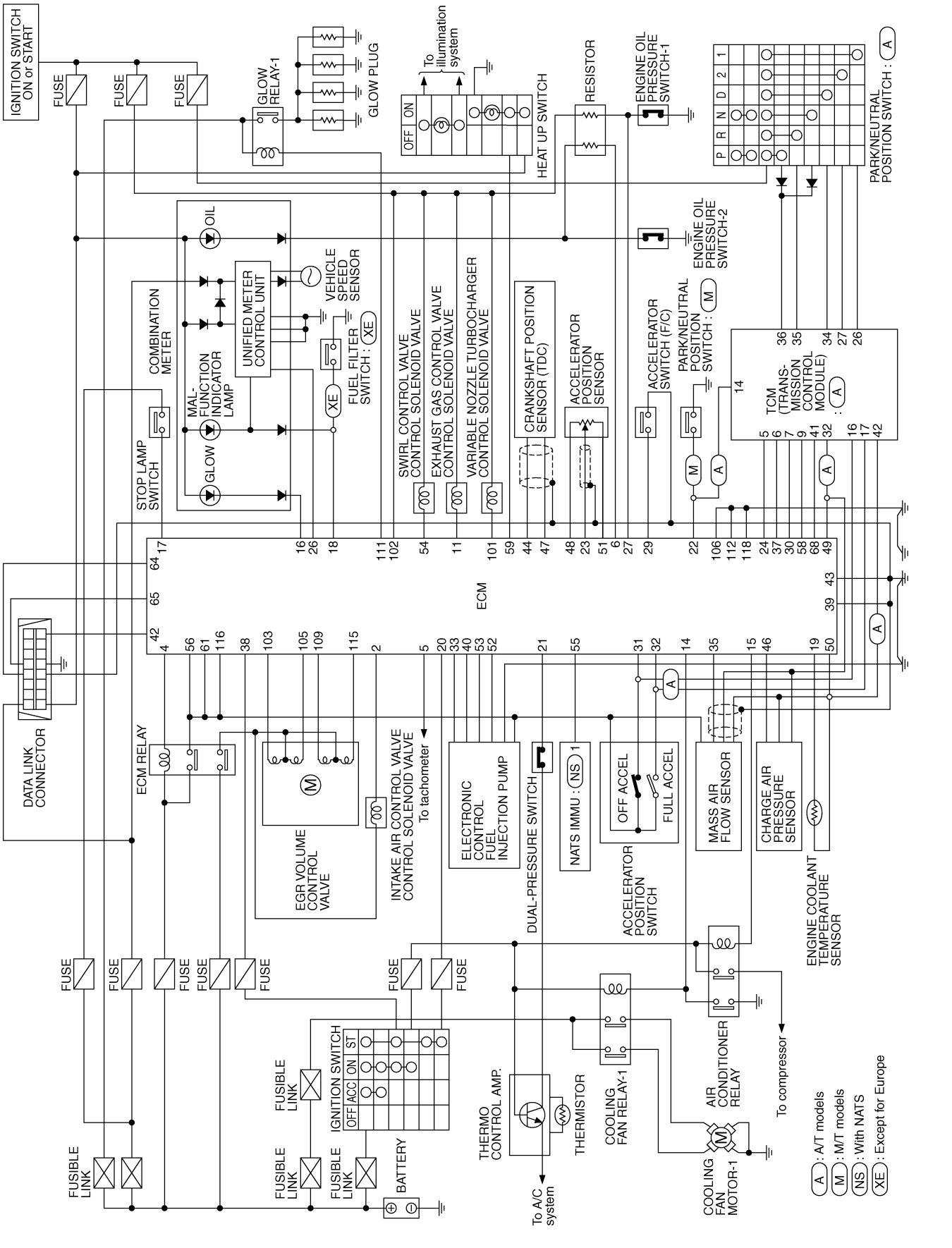
ZD30DDTi

When you read wiring diagrams:

- **Read GI section, "HOW TO READ WIRING DIAGRAMS".**
- **See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.**

When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES" and "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

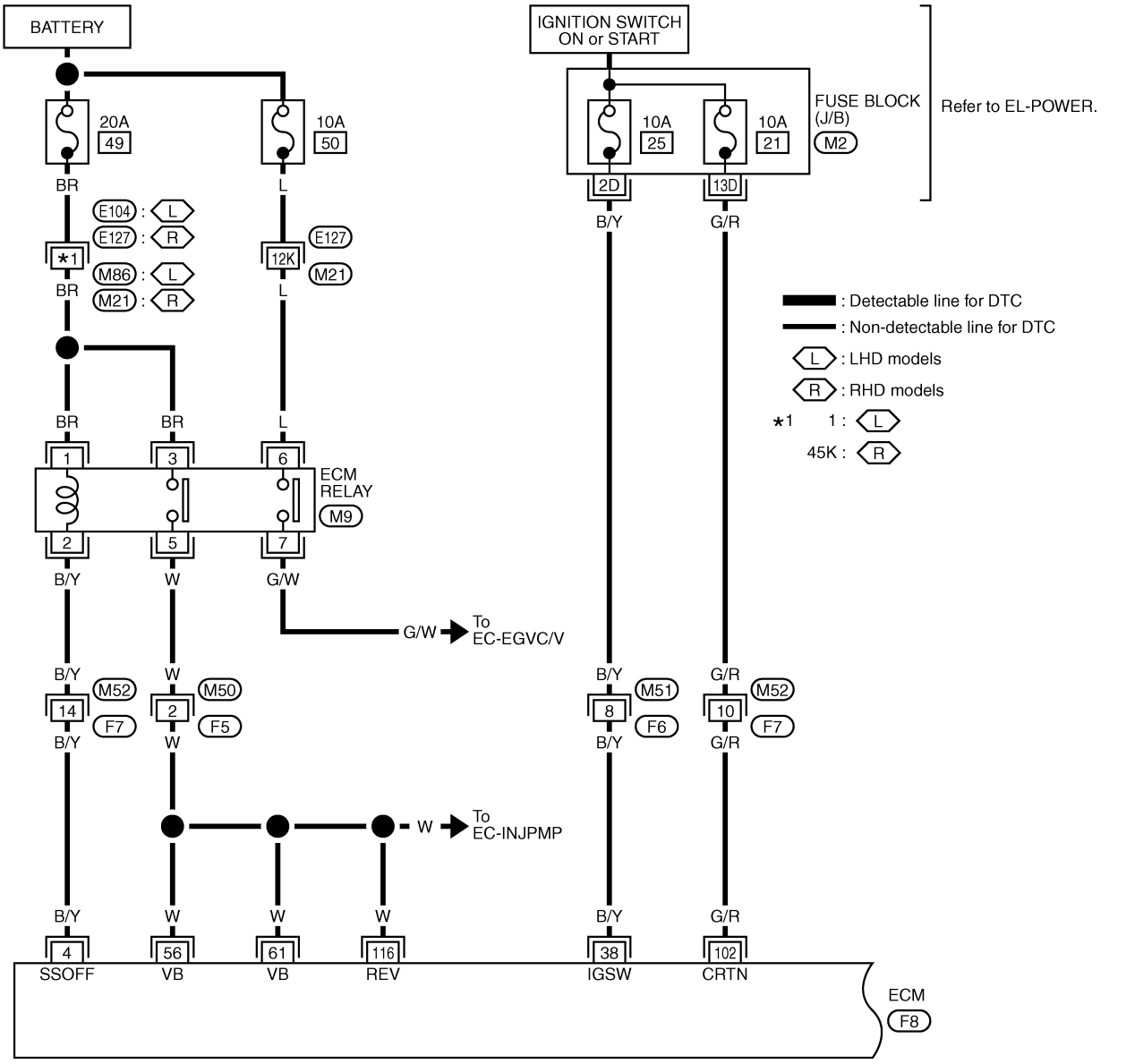
Circuit Diagram

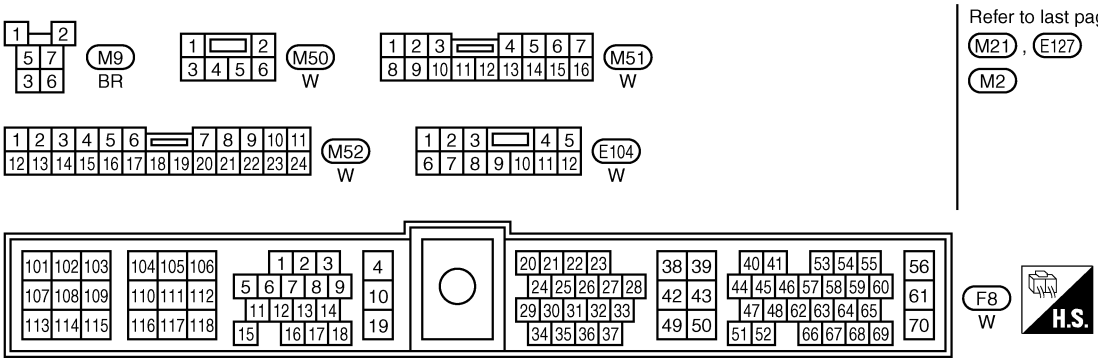


TEC395M

Main Power Supply and Ground Circuit

EC-MAIN-01

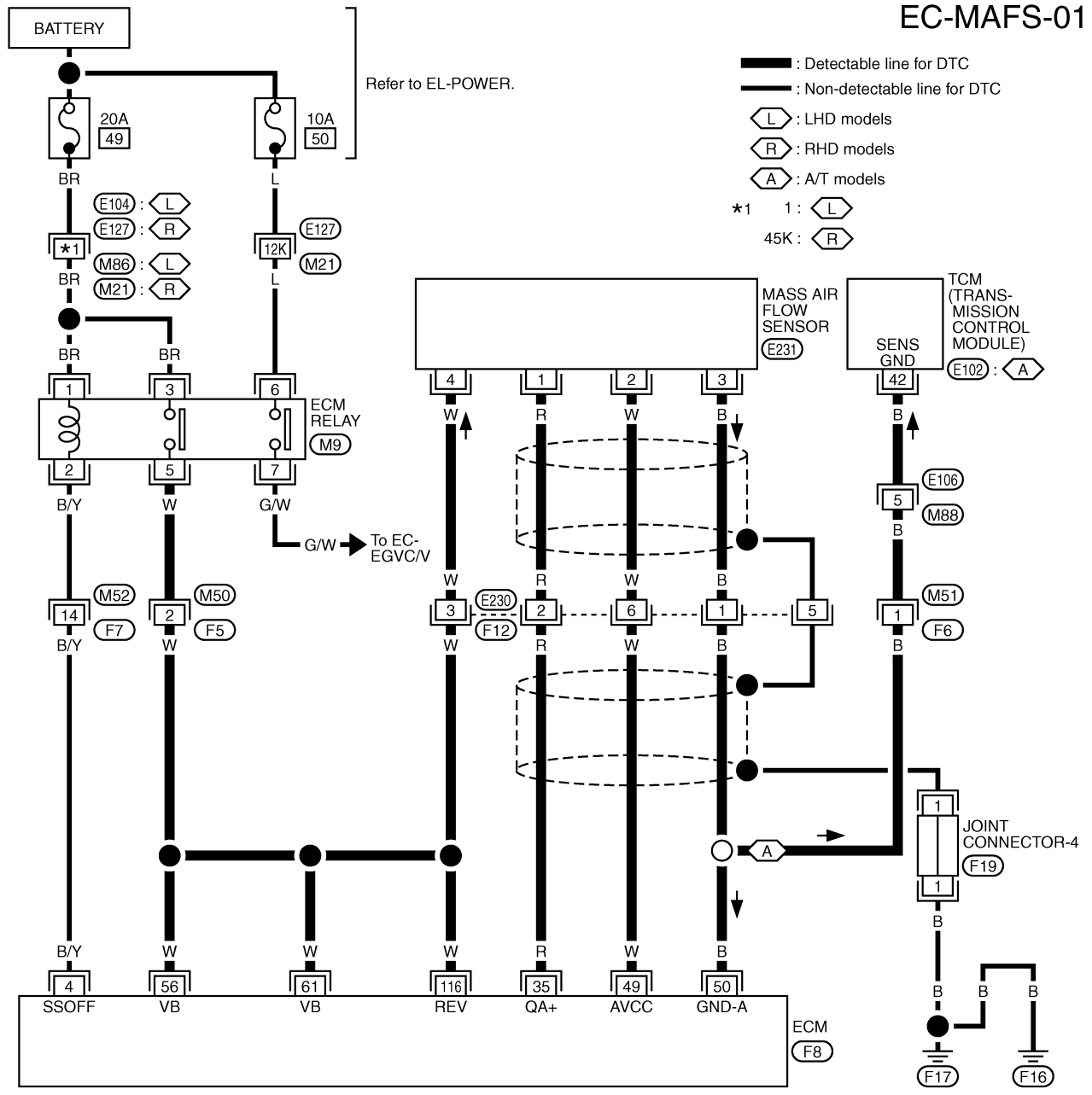




Refer to last page (Foldout page).
M21 , E127
M2

TEC352M

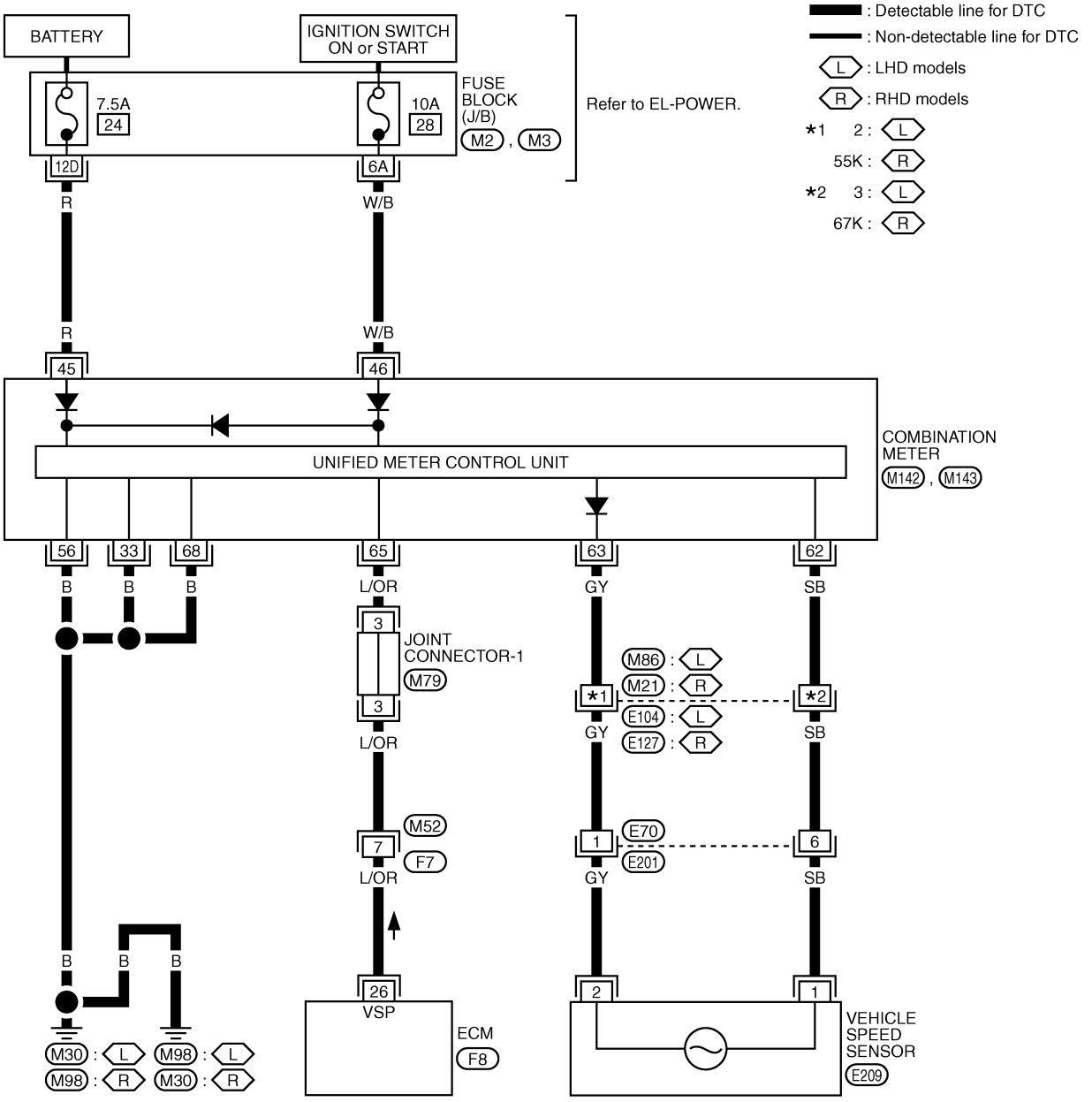
Wiring Diagram

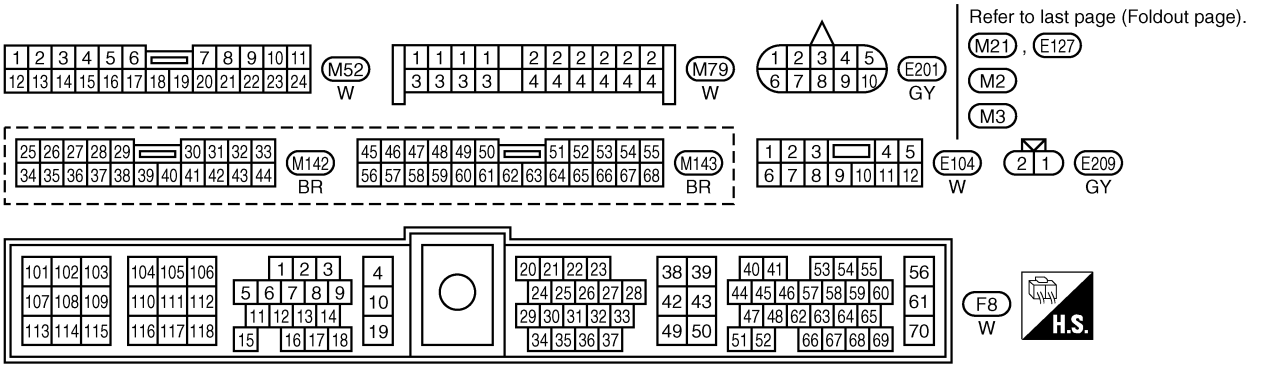


TEC353M

Wiring Diagram

EC-VSS-01

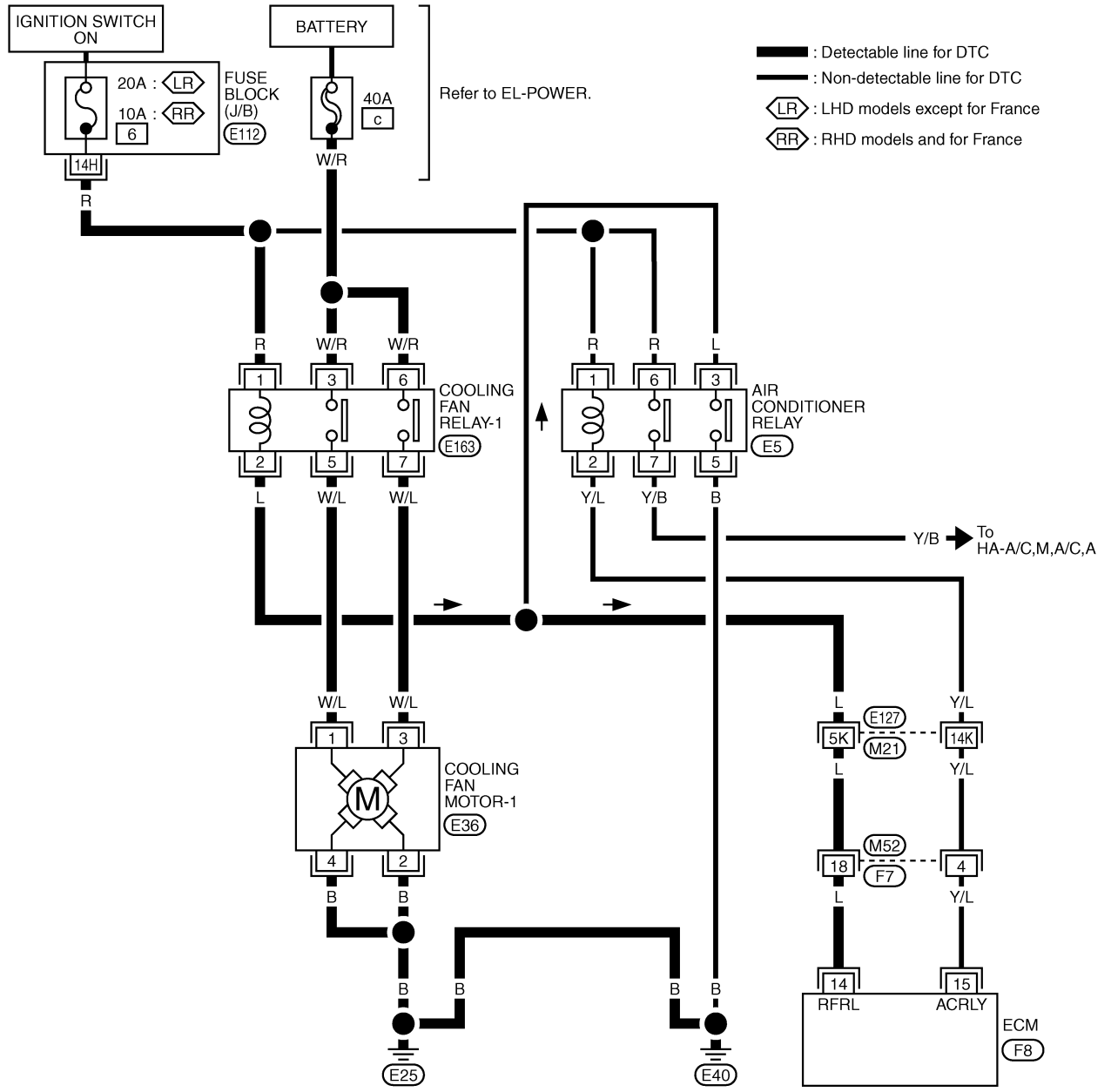


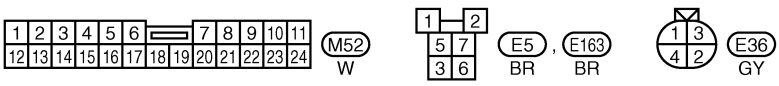


TEC354M

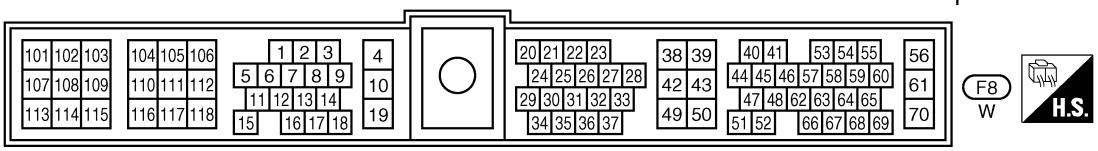
Wiring Diagram

EC-COOL/F-01





Refer to last page (Foldout page).
M21 , E127
E112



TEC355M

Diagnostic Procedure

1	INSPECTION START
Do you have CONSULT-II?	
Yes or No	
Yes ►	GO TO 2.
No ►	GO TO 3.

2	CHECK COOLING FAN OPERATION

With CONSULT-II

1. Turn ignition switch “ON”.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II.

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X

3. Make sure that cooling fan-1 operates.

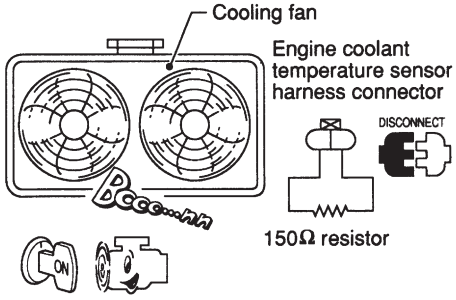
OK or NG

OK ►	GO TO 12.
NG ►	GO TO 4.

3	CHECK COOLING FAN OPERATION

Without CONSULT-II

1. Turn ignition switch “OFF”.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
4. Restart engine and make sure that cooling fan operates.



MEC475B

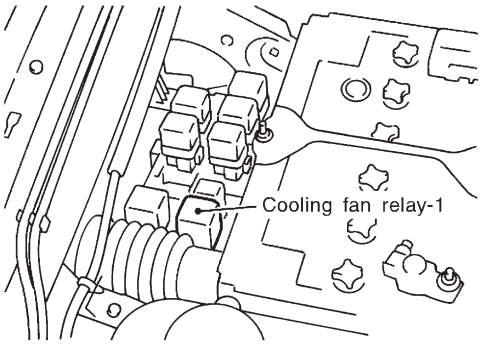
OK or NG

OK ►	GO TO 12.
NG ►	GO TO 4.

Diagnostic Procedure (Cont'd)

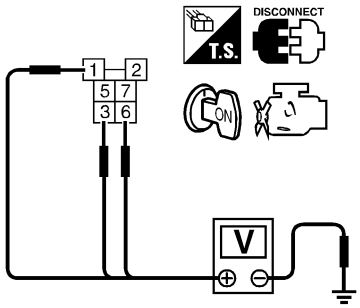
4	CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.



SEF690V

3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEC533D

OK or NG

OK	►	GO TO 6.
NG	►	GO TO 5.

5	DETECT MALFUNCTIONING PART

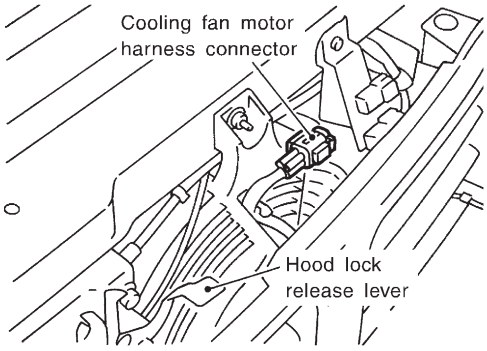
Check the following.
- Fuse block (J/B) connector E112
- 10A fuse or 20A fuse
- 40A fusible links
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

	►	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

6	CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector.



SEF691V

3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan relay-1 terminal 7 and cooling fan motor-1 terminal 3, cooling fan motor-1 terminals 2, 4 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 14 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E127, M21
- Harness connectors M52, F7
- Harness for open or short between cooling fan relay-1 and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK COOLING FAN RELAY-1

Refer to "Component Inspection", EC-3013.

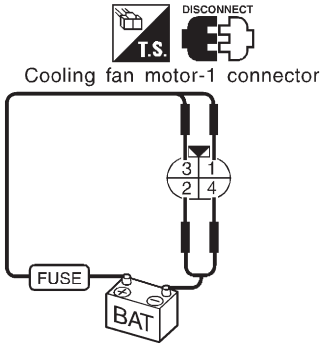
OK or NG

OK	▶	GO TO 10.
NG	▶	Replace cooling fan relay.

Diagnostic Procedure (Cont'd)

10	CHECK COOLING FAN MOTOR-1

Supply battery voltage between the following terminals and check operation.



SEF645V

	Terminals	
	(+)	(–)
Cooling fan motor-1	1 , 3	2 , 4

MTBL1304

OK or NG

OK	►	GO TO 11.
NG	►	Replace cooling fan motor.

11	CHECK INTERMITTENT INCIDENT

Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT".

► **INSPECTION END**

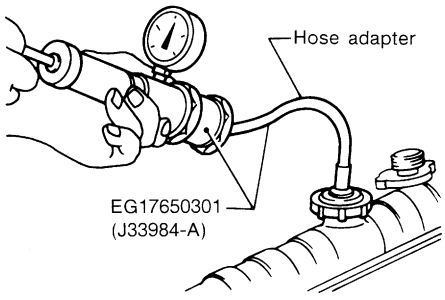
12	CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 98 kPa (0.98 bar, 1.0 kg/cm^2, 14 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage.



SLC754A

Pressure should not drop.

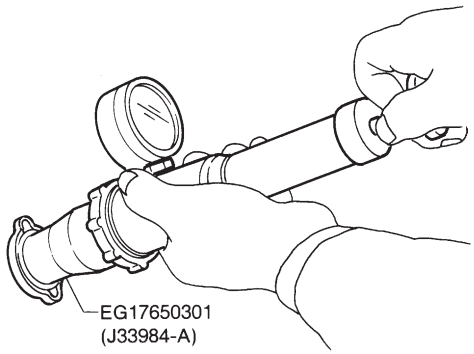
OK or NG

OK	►	GO TO 14.
NG	►	GO TO 13.

Diagnostic Procedure (Cont'd)

13	DETECT MALFUNCTIONING PART
Check the following for leak. ● Hose ● Radiator ● Water pump (Refer to LC section, "Water Pump".)	
▶	Repair or replace.

14	CHECK RADIATOR CAP
Apply pressure to cap with a tester and check radiator cap relief pressure.	



SLC755A

Radiator cap relief pressure:
59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2, 9 - 14 psi)

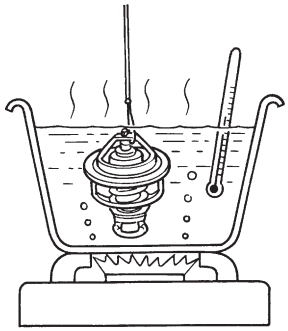
OK or NG

OK	▶	GO TO 15.
NG	▶	Replace radiator cap.

Diagnostic Procedure (Cont'd)

15	CHECK THERMOSTAT

1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.



SLC343

Valve opening temperature:
82°C (180°F) [standard] (Models for cold areas)
76.5°C (170°F) [standard] (Models for except cold areas)
Valve lift:
More than 10 mm/95°C (0.394 in/203°F)

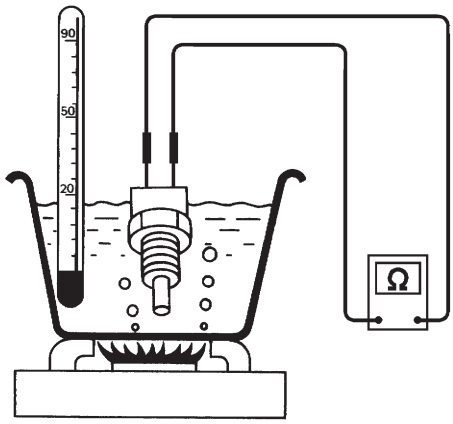
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC section, "Thermostat".

OK or NG

OK	▶	GO TO 16.
NG	▶	Replace thermostat.

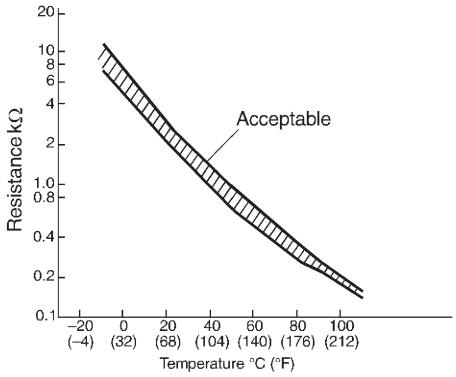
16	CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



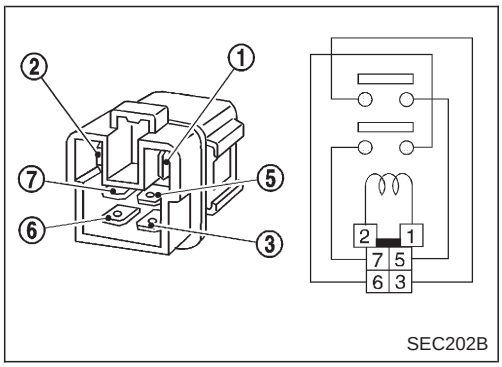
SEF304X

OK or NG

OK	▶	GO TO 17.
NG	▶	Replace engine coolant temperature sensor.

Diagnostic Procedure (Cont'd)

17	**CHECK MAIN 12 CAUSES**
If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-3014.	
►	**INSPECTION END**



Component Inspection

COOLING FAN RELAY-1

Check continuity between terminals ③ and ⑤, ⑥ and ⑦.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.

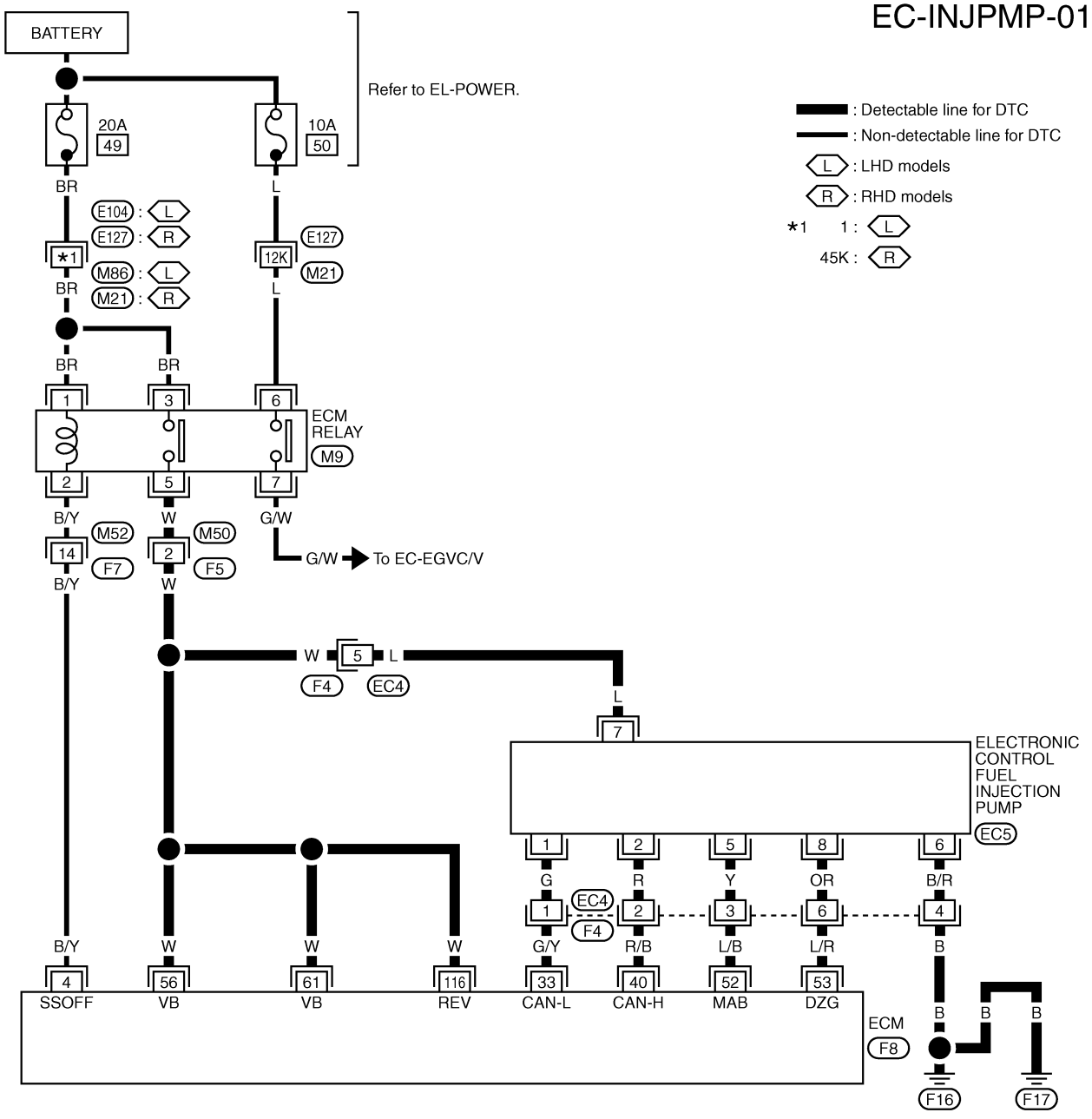
Main 12 Causes of Overheating

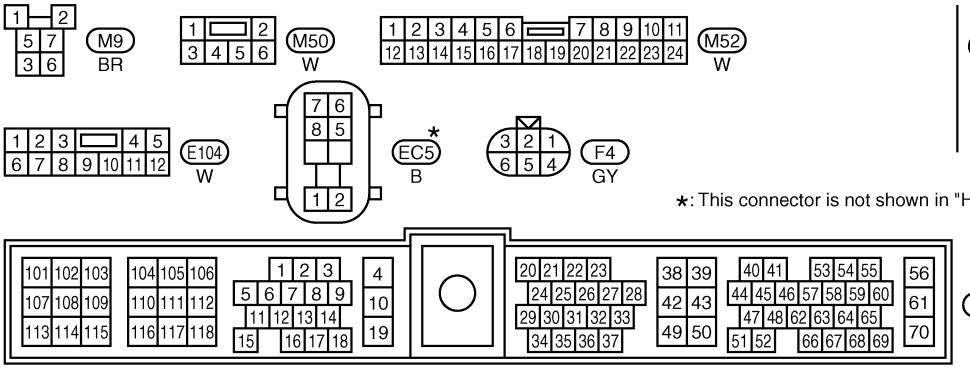
Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	30 - 50% coolant mixture	See “RECOMMENDED FLUIDS AND LUBRICANTS” in MA section.
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See “Changing Engine Coolant”, “ENGINE MAINTENANCE” in MA section.
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	See “System Check”, “ENGINE COOLING SYSTEM” in LC section.
ON*2	5	● Coolant leaks	● Visual	No leaks	See “System Check”, “ENGINE COOLING SYSTEM” in LC section.
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot.	See “Thermostat” and “Radiator”, “ENGINE COOLING SYSTEM” in LC section.
ON*1	7	● Cooling fan	● Visual	Operating	See “DTC 0208 OVER HEAT”.
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See “Changing Engine Coolant”, “ENGINE MAINTENANCE” in MA section.
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See “ENGINE MAINTENANCE” in MA section.
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See “Inspection”, “CYLINDER HEAD” in EM section.
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See “Inspection”, “CYLINDER BLOCK” in EM section.

*1: Engine running at idle.
*2: Engine running at 3,000 rpm for 10 minutes.
*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.
*4: After 60 minutes of cool down time.
For more information, refer to “OVERHEATING CAUSE ANALYSIS” in LC section.

Wiring Diagram

EC-INJPMP-01



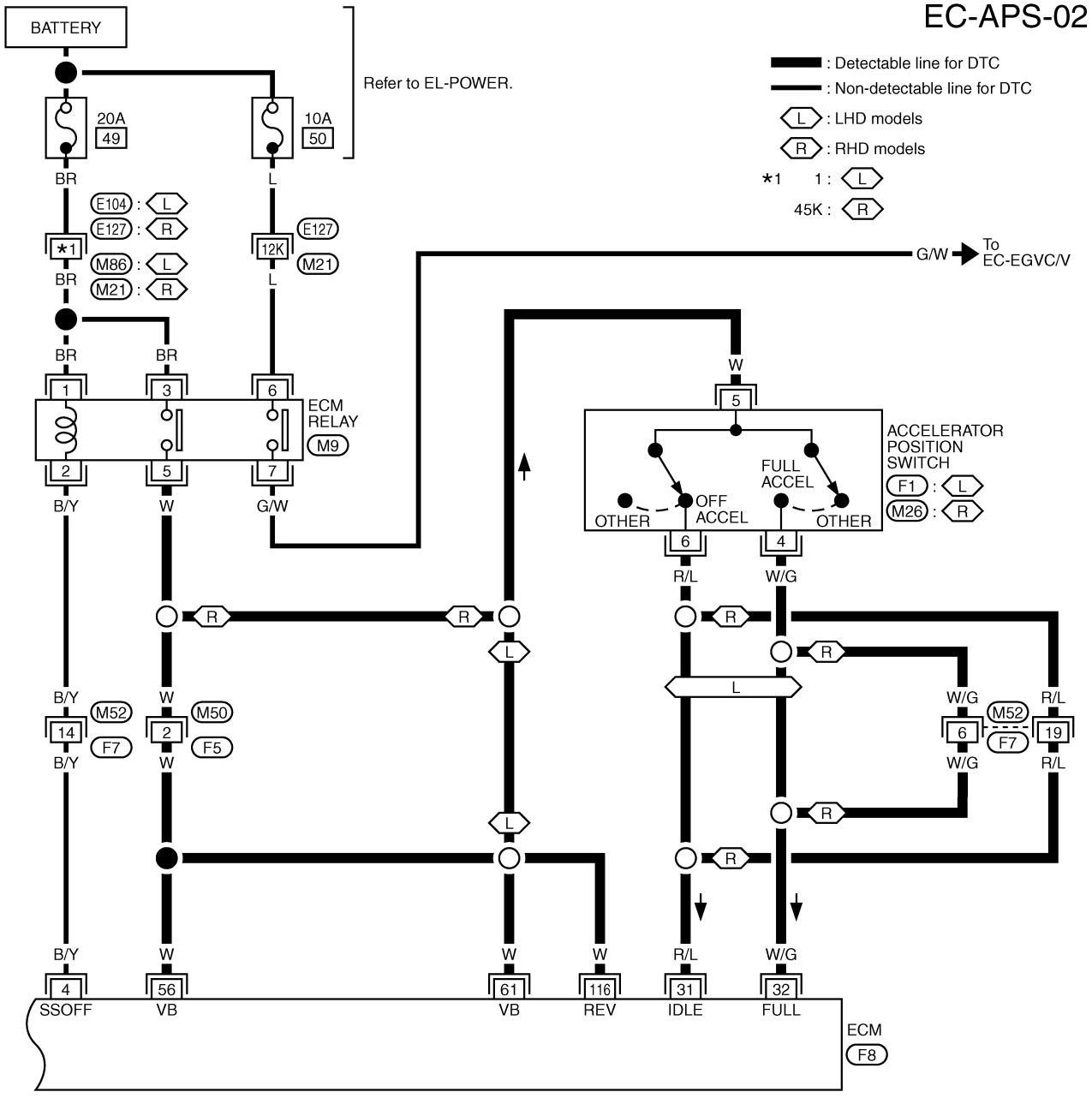


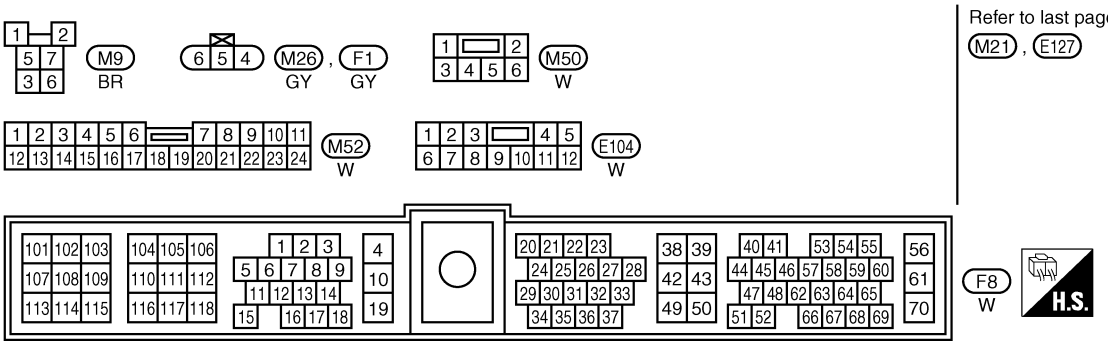
Refer to last page (Foldout page).
M21 , E127

*: This connector is not shown in "HARNESS LAYOUT", EL section.

TEC356M

Wiring Diagram

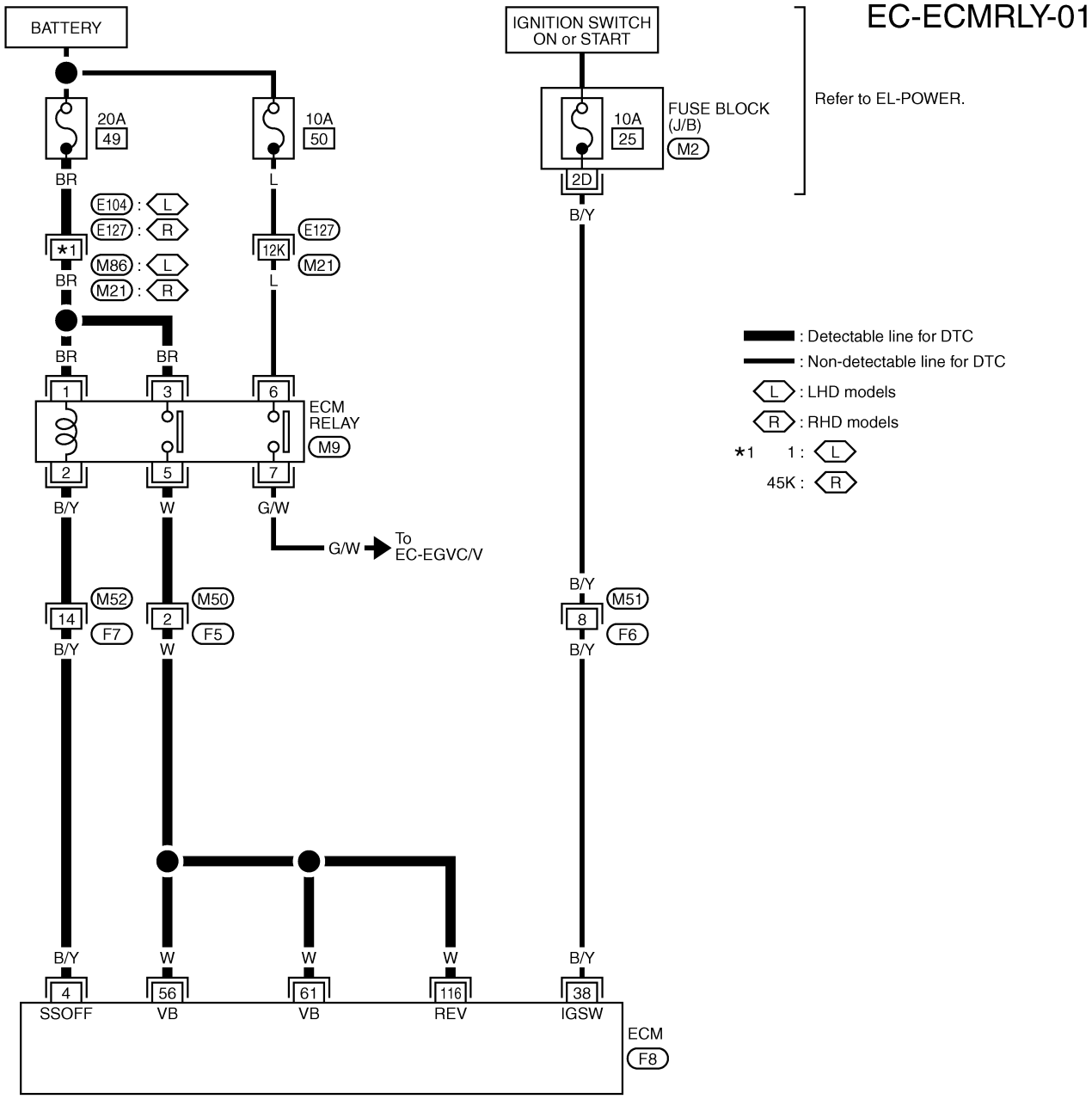


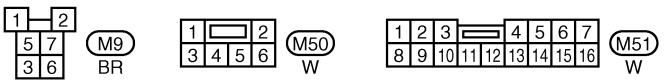


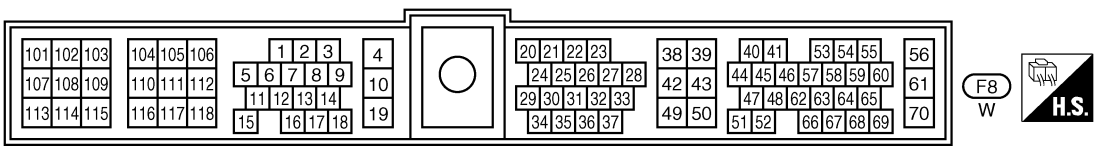
Refer to last page (Foldout page).
M21 , E127

TEC357M

Wiring Diagram





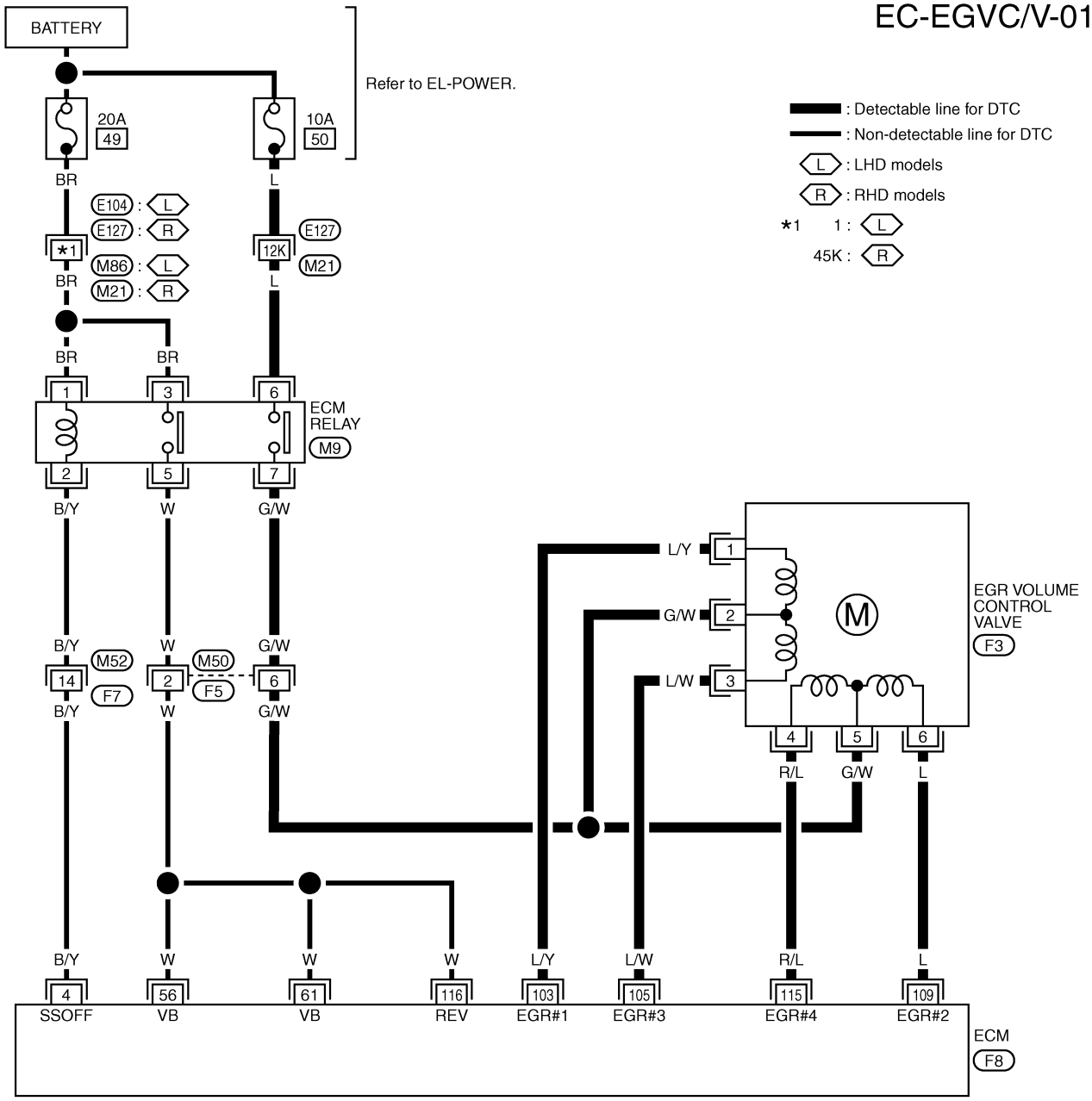


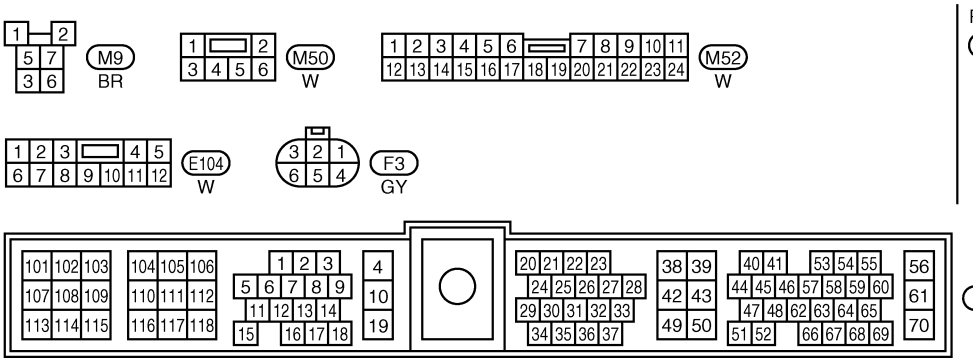
Refer to last page (Foldout page).
M21 , E127
M2

TEC358M

Wiring Diagram

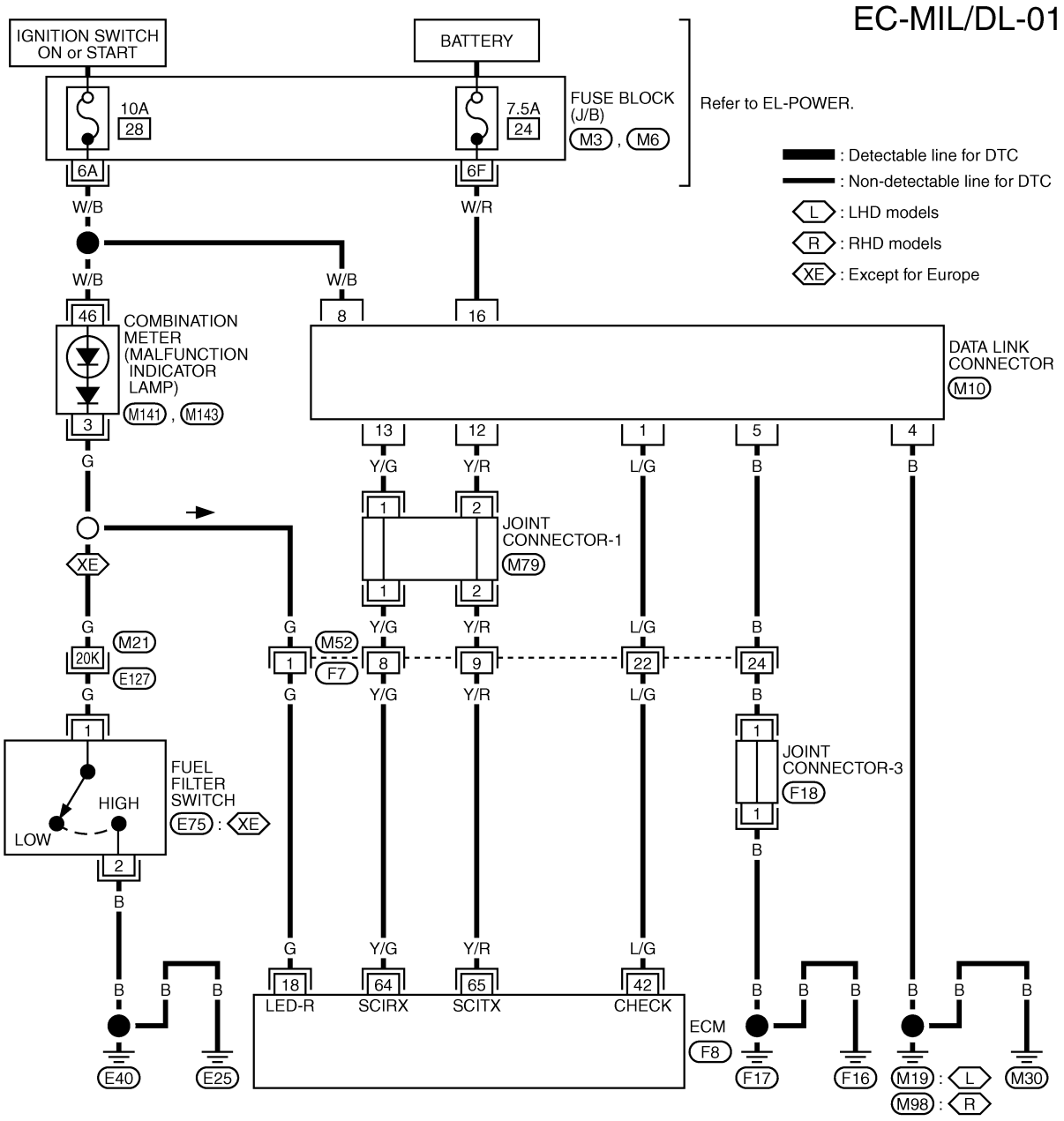
EC-EGVC/V-01

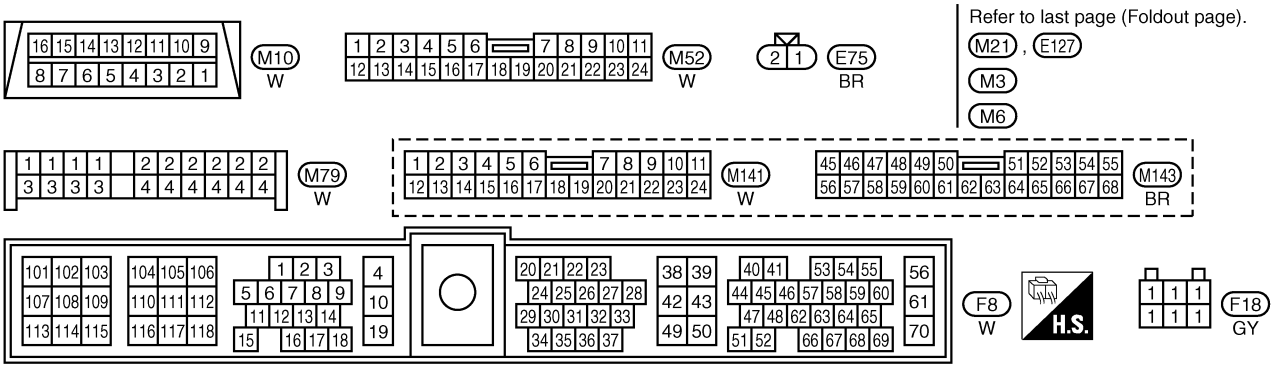




Refer to last page (Foldout page).
M21 , E127

Wiring Diagram





Refer to last page (Foldout page).
M21 , E127
M3
M6

TEC396M

Wiring Diagram (Cont'd)