

SECTION **EC****MODIFICATION NOTICE:**

- Wiring diagrams have been modified.
- MAF sensor has been changed for ZD30DDTi engine models.

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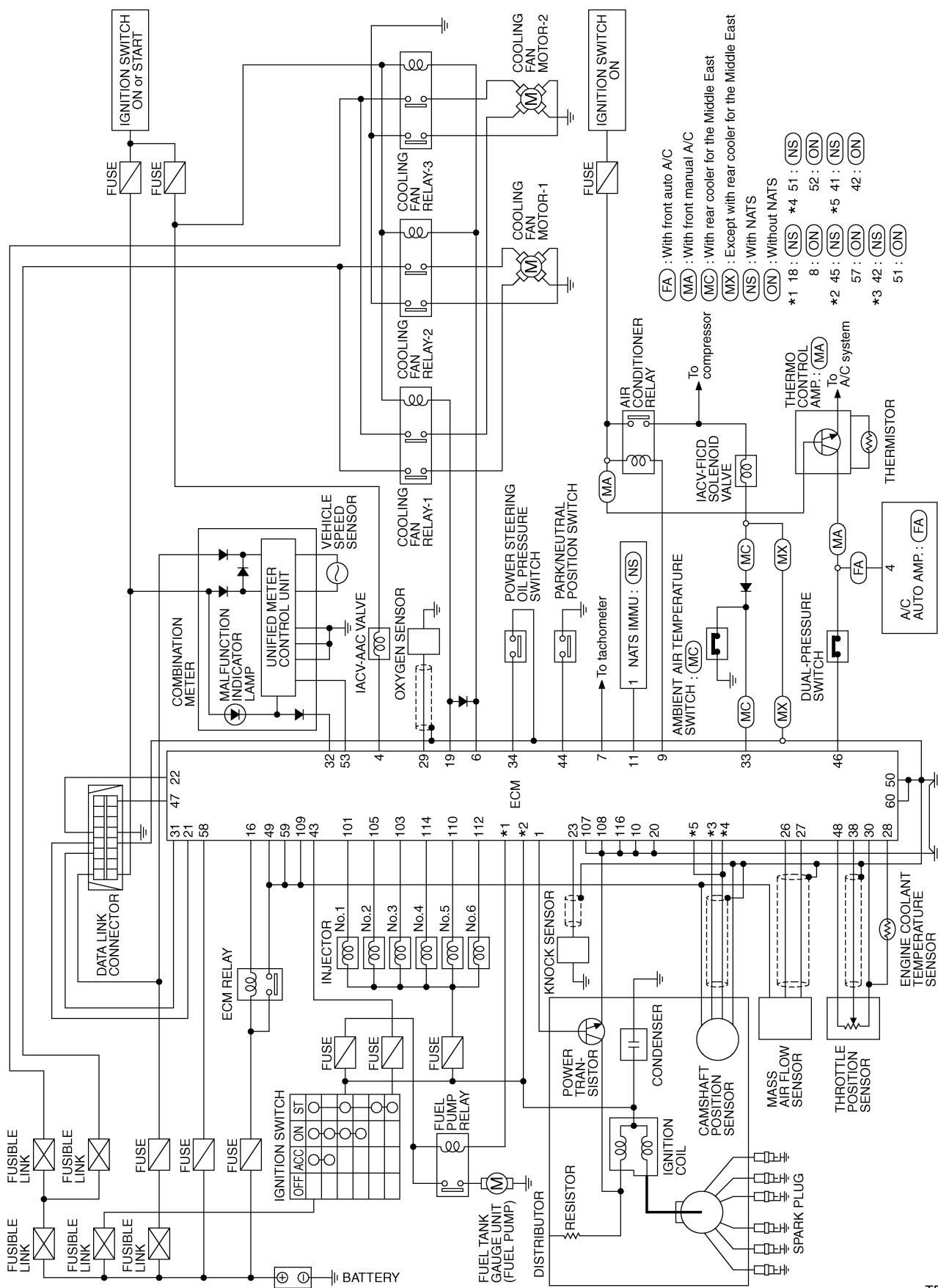
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When you read wiring diagrams:

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

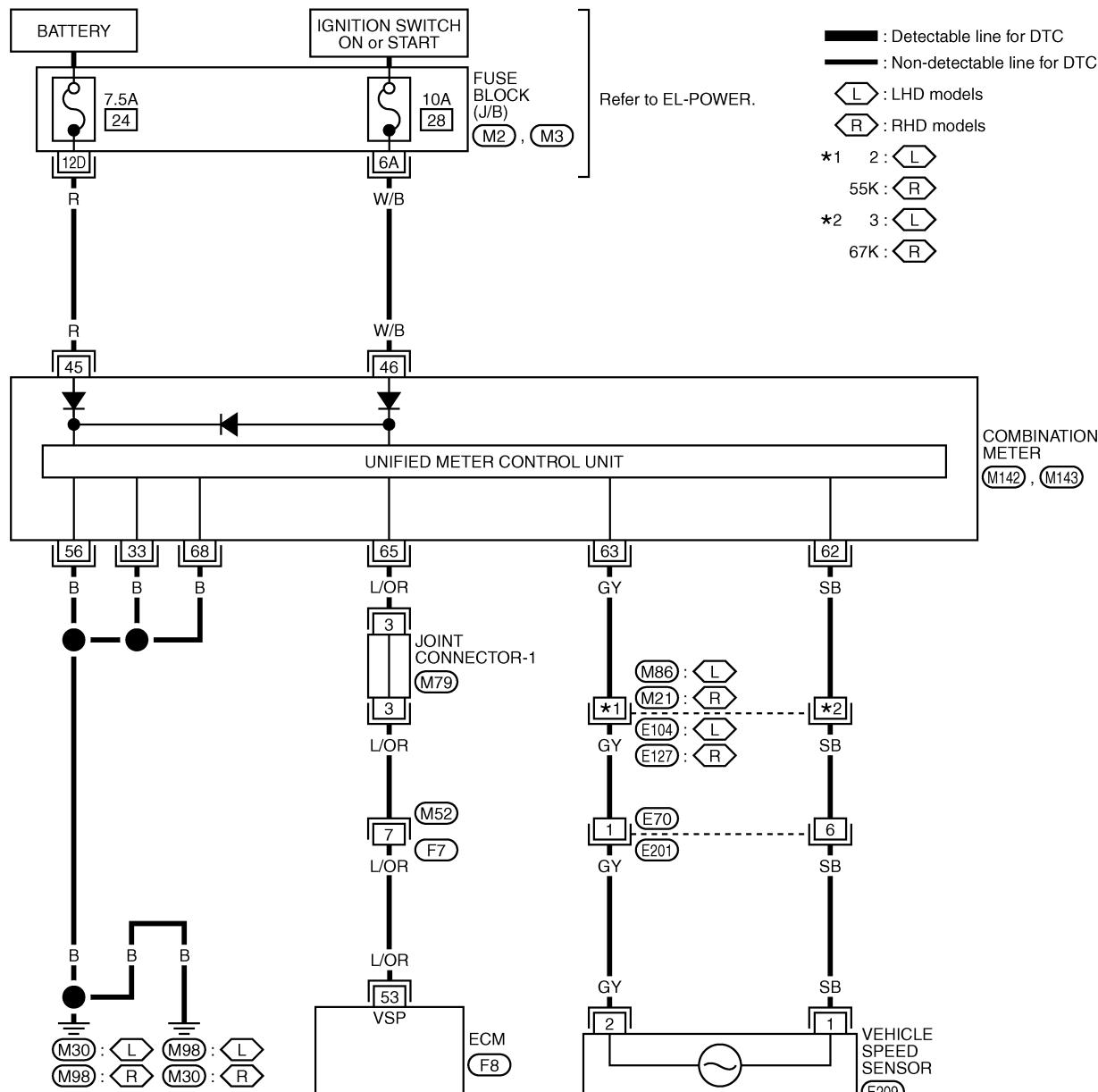
When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES" and "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

## Circuit Diagram



## Vehicle Speed Sensor (VSS)

EC-VSS-01

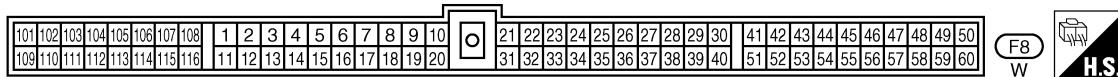
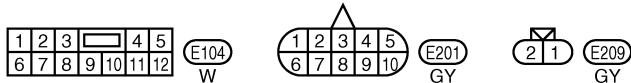
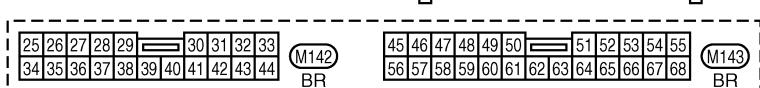


Refer to last page (Foldout page).

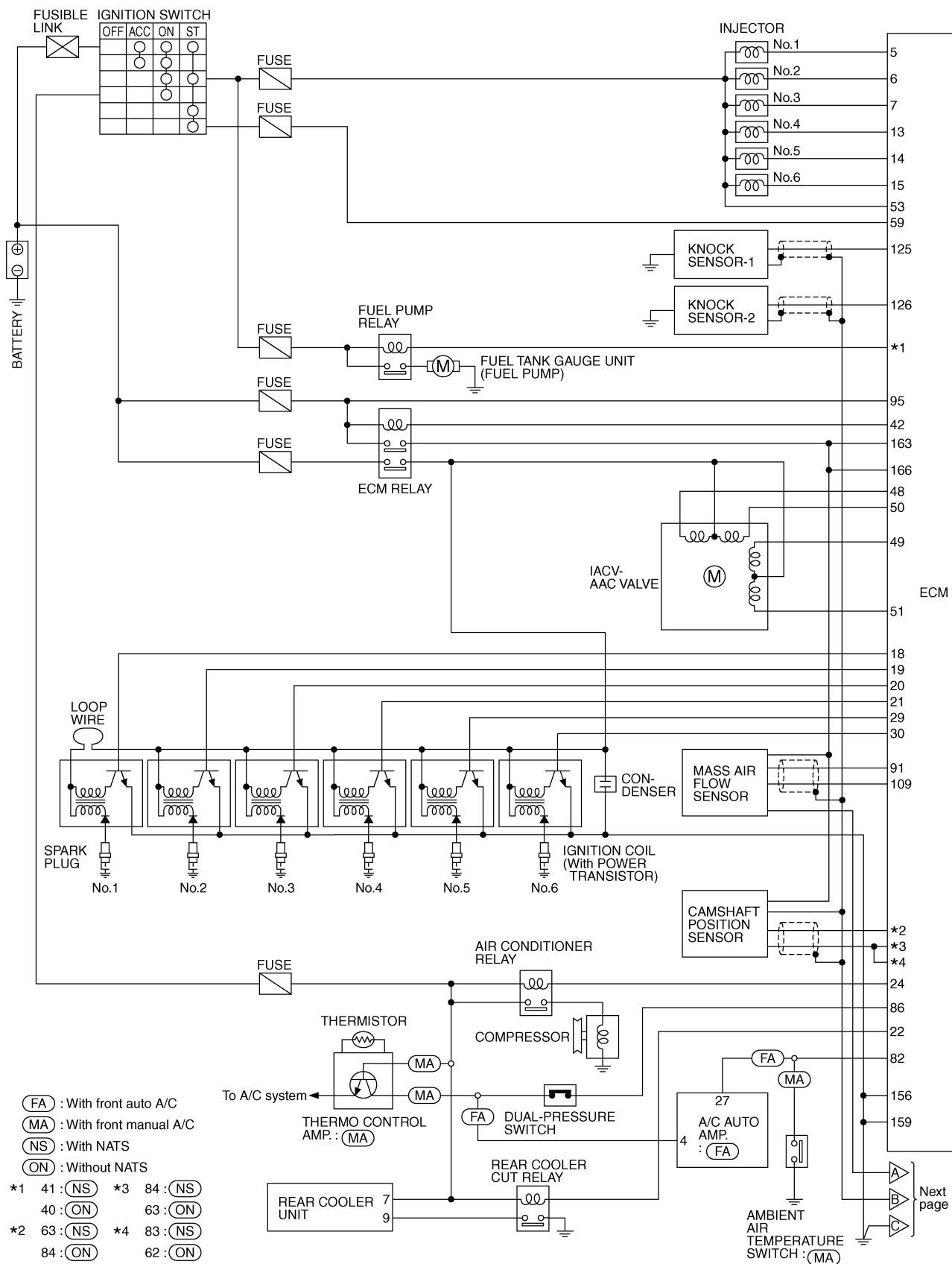
(M21, E127)

(M2)

(M3)



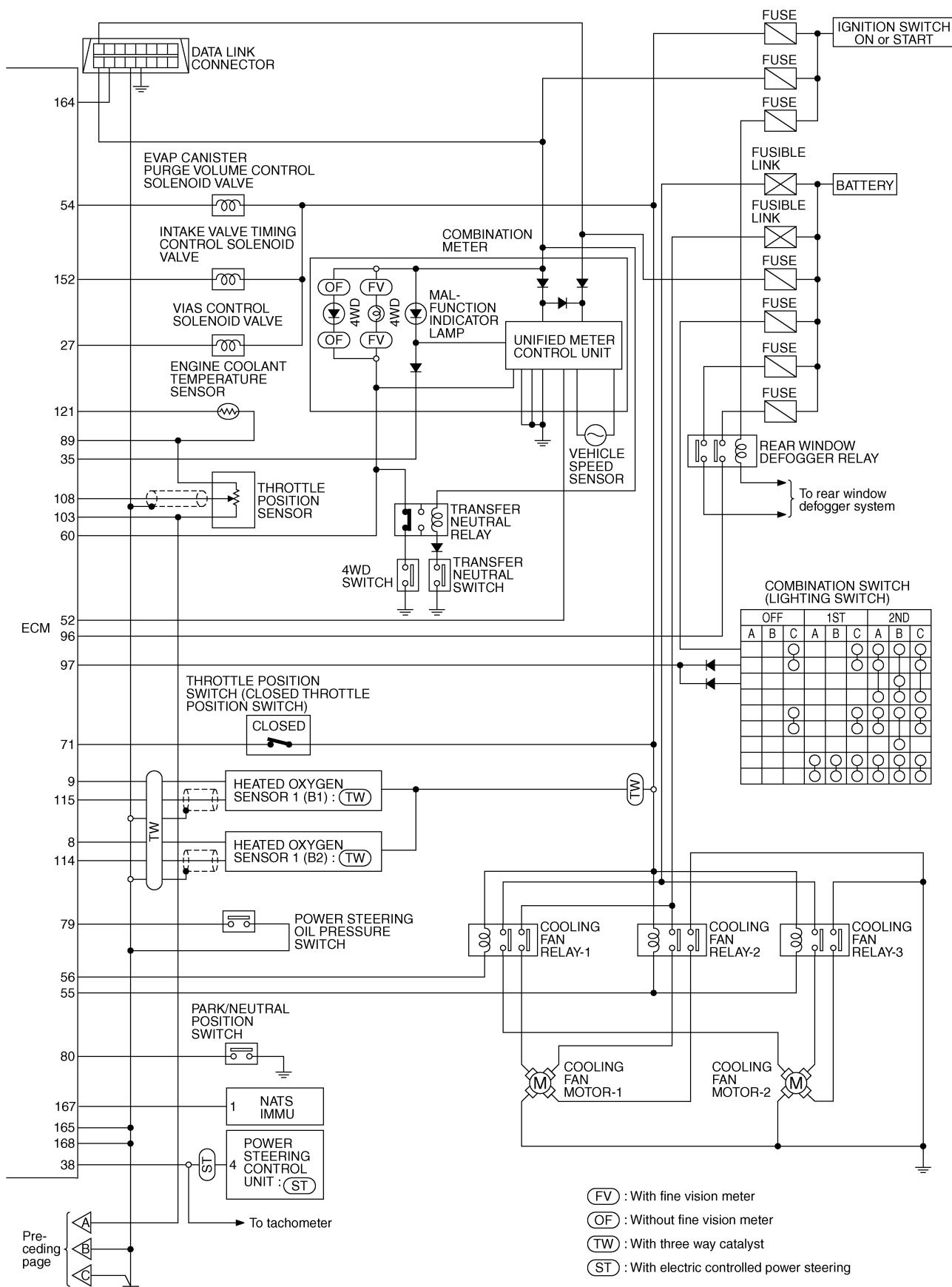
Circuit Diagram



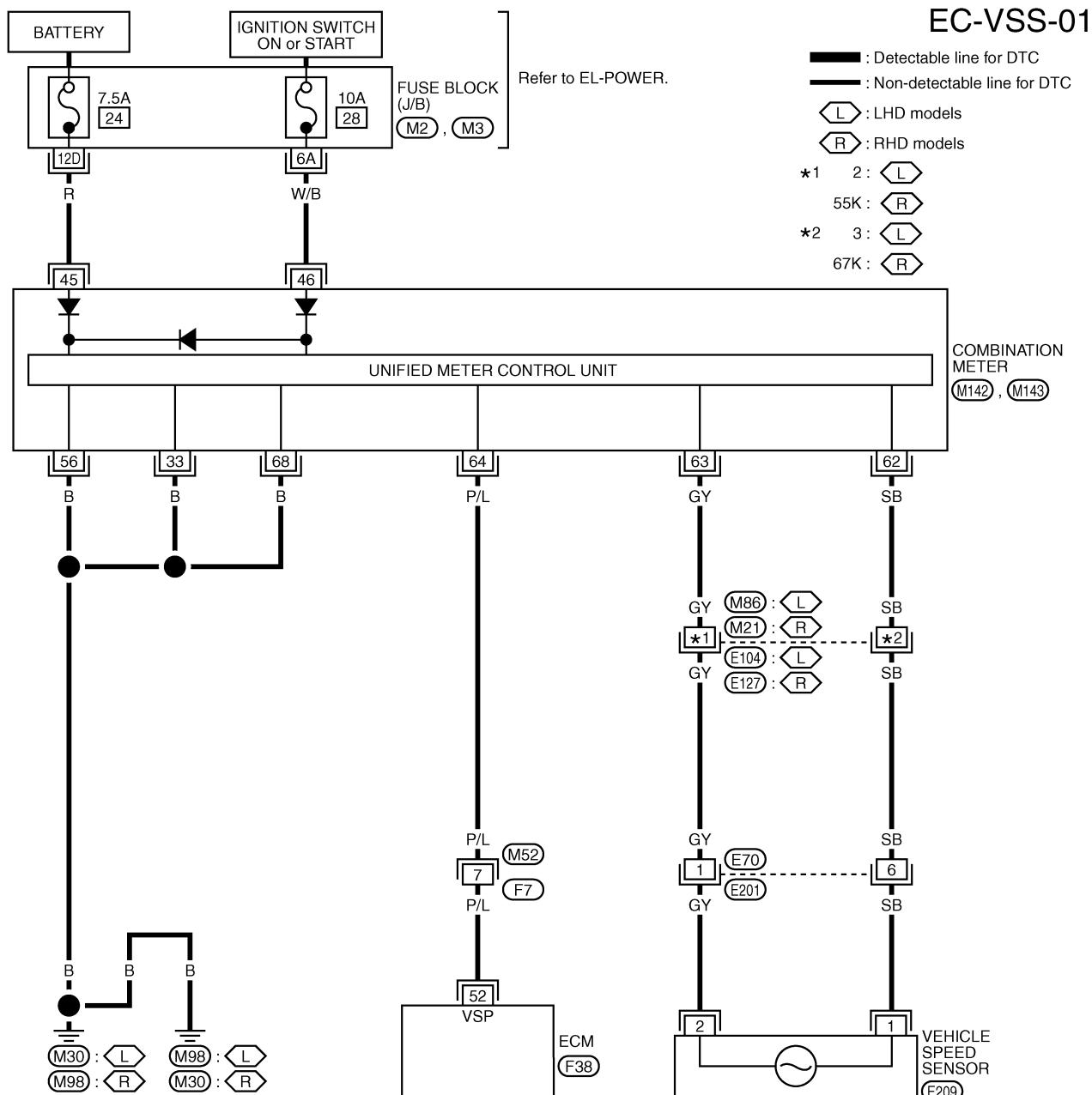
# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

TB48DE M/T

## Circuit Diagram (Cont'd)

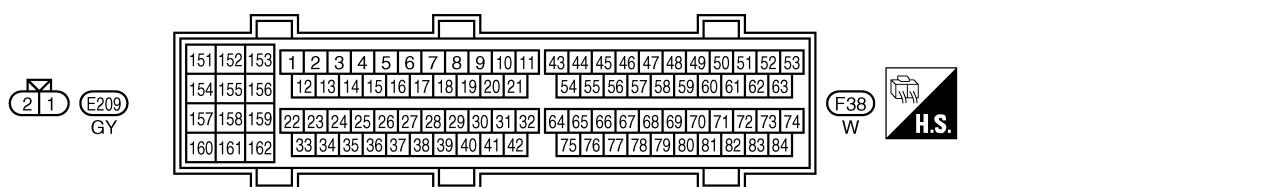


## Wiring Diagram

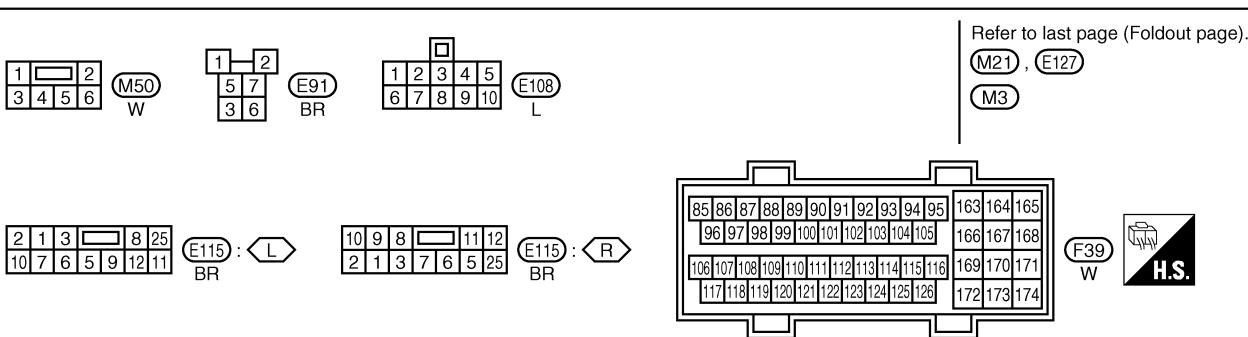
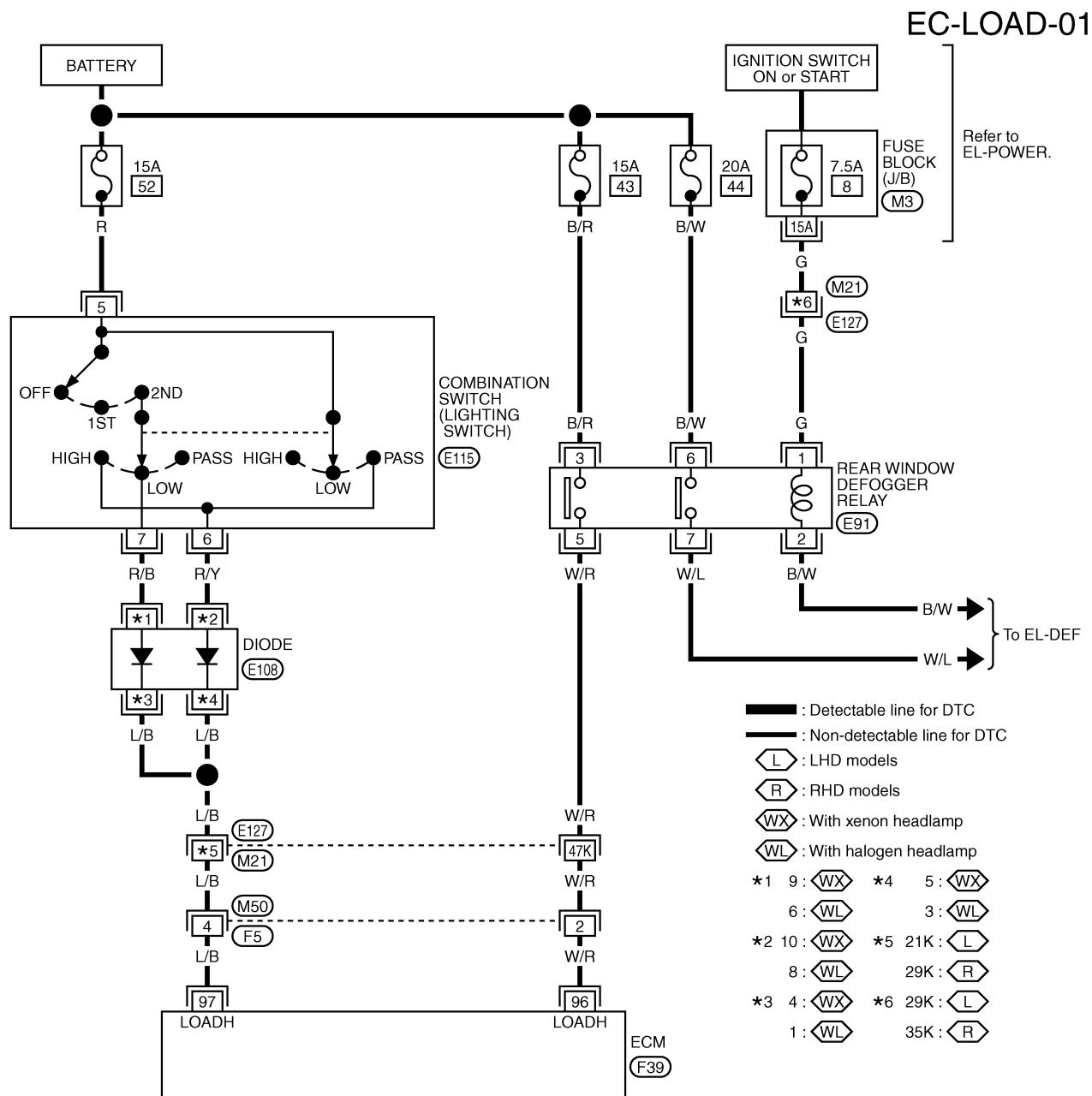


Refer to last page (Foldout page).

(M2, M3, M21, E127)



## Wiring Diagram



DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

DATA MONITOR	
MONITOR	NO DTC
LOAD SIGNAL	OFF

PBIB0296E

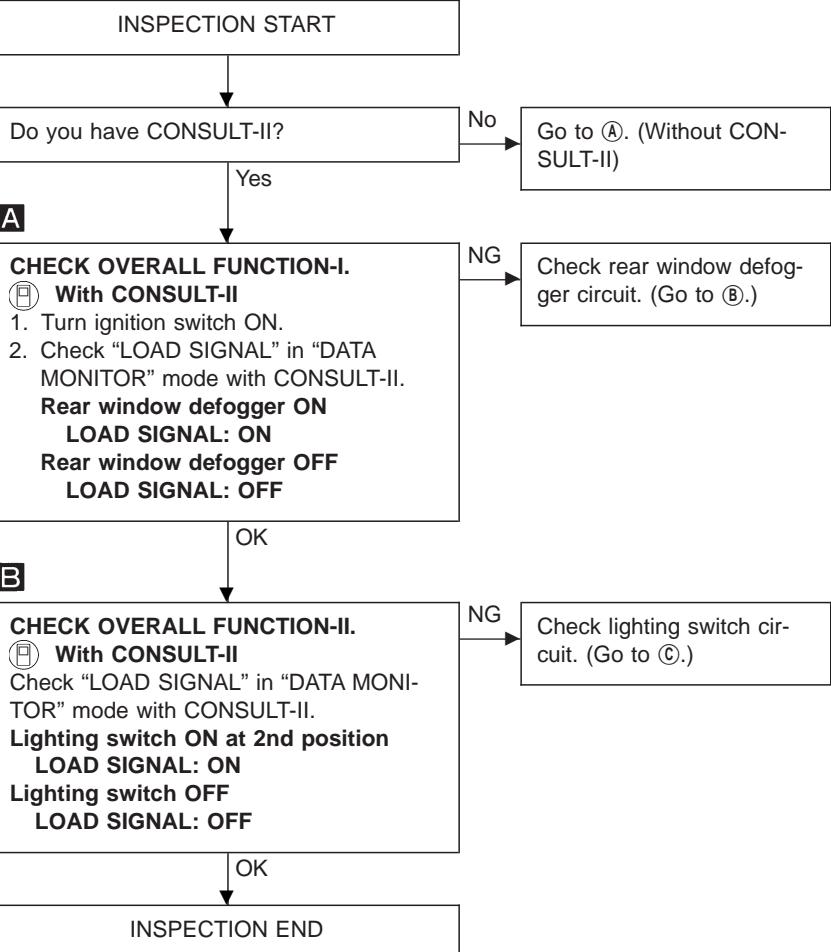
DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

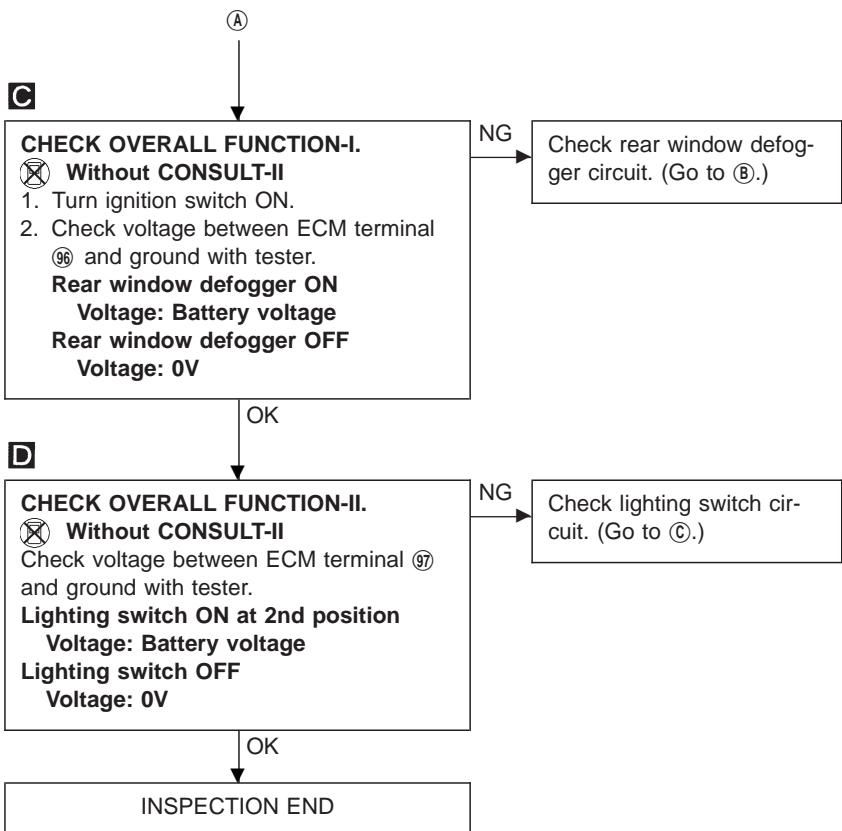
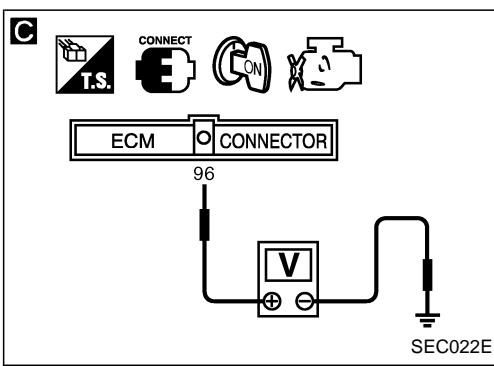
DATA MONITOR	
MONITOR	NO DTC
LOAD SIGNAL	OFF

PBIB0296E

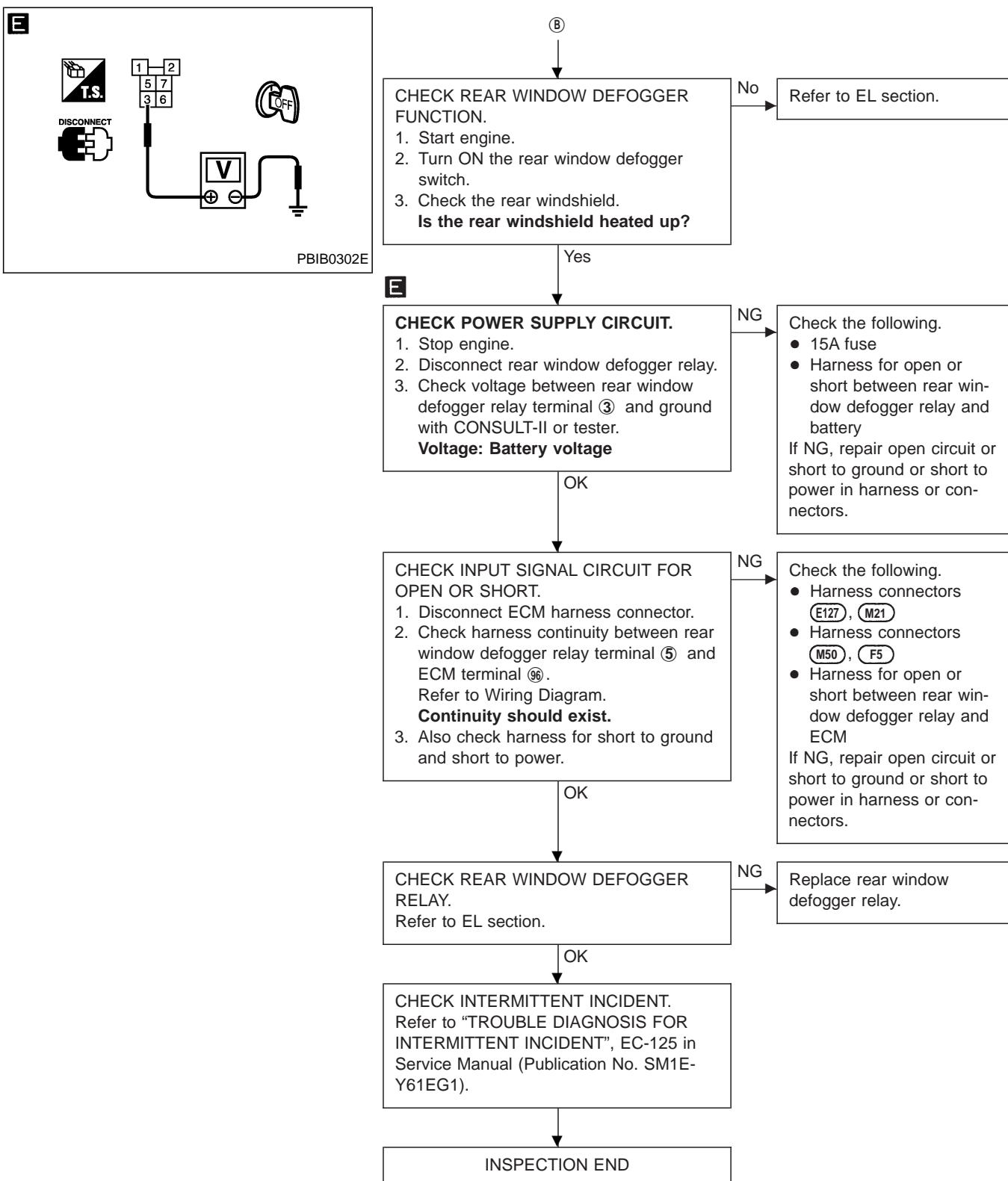
## Diagnostic Procedure



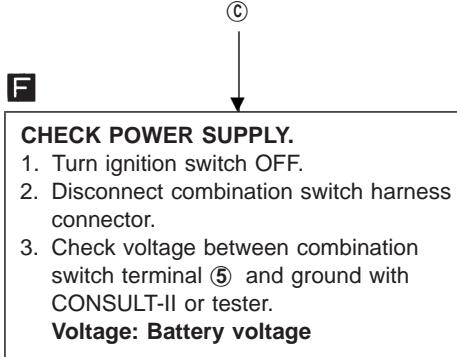
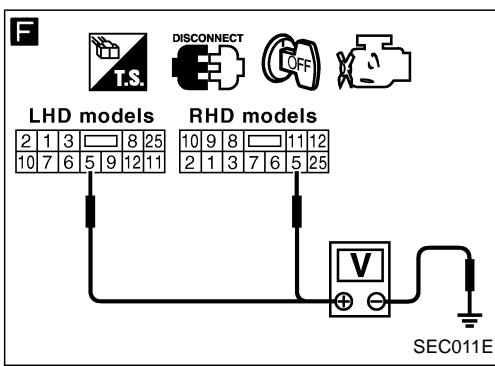
## Diagnostic Procedure (Cont'd)



## Diagnostic Procedure (Cont'd)



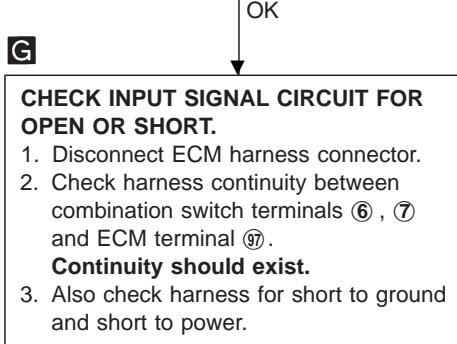
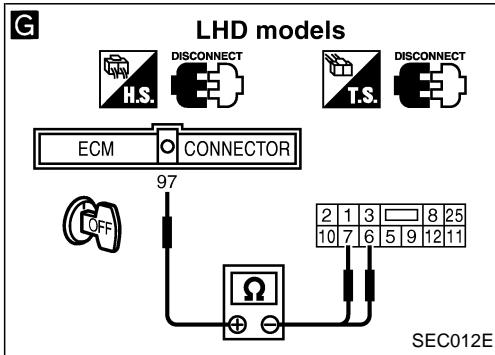
## Diagnostic Procedure (Cont'd)



NG → Check the following.

- 15A fuse
- Harness for open or short between combination switch and battery

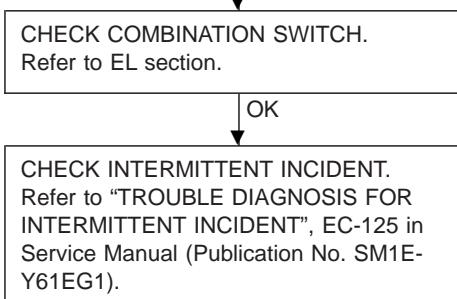
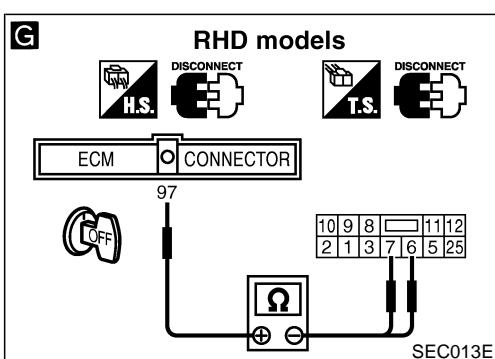
If NG, repair open circuit or short to ground or short to power in harness or connectors.



NG → Check the following.

- Harness connectors (E127, M21)
- Harness connectors (M50, F5)
- Diode (E108)
- Harness for open or short between combination switch and ECM

If NG, repair open circuit or short to ground or short to power in harness or connectors.



NG → Replace combination switch.

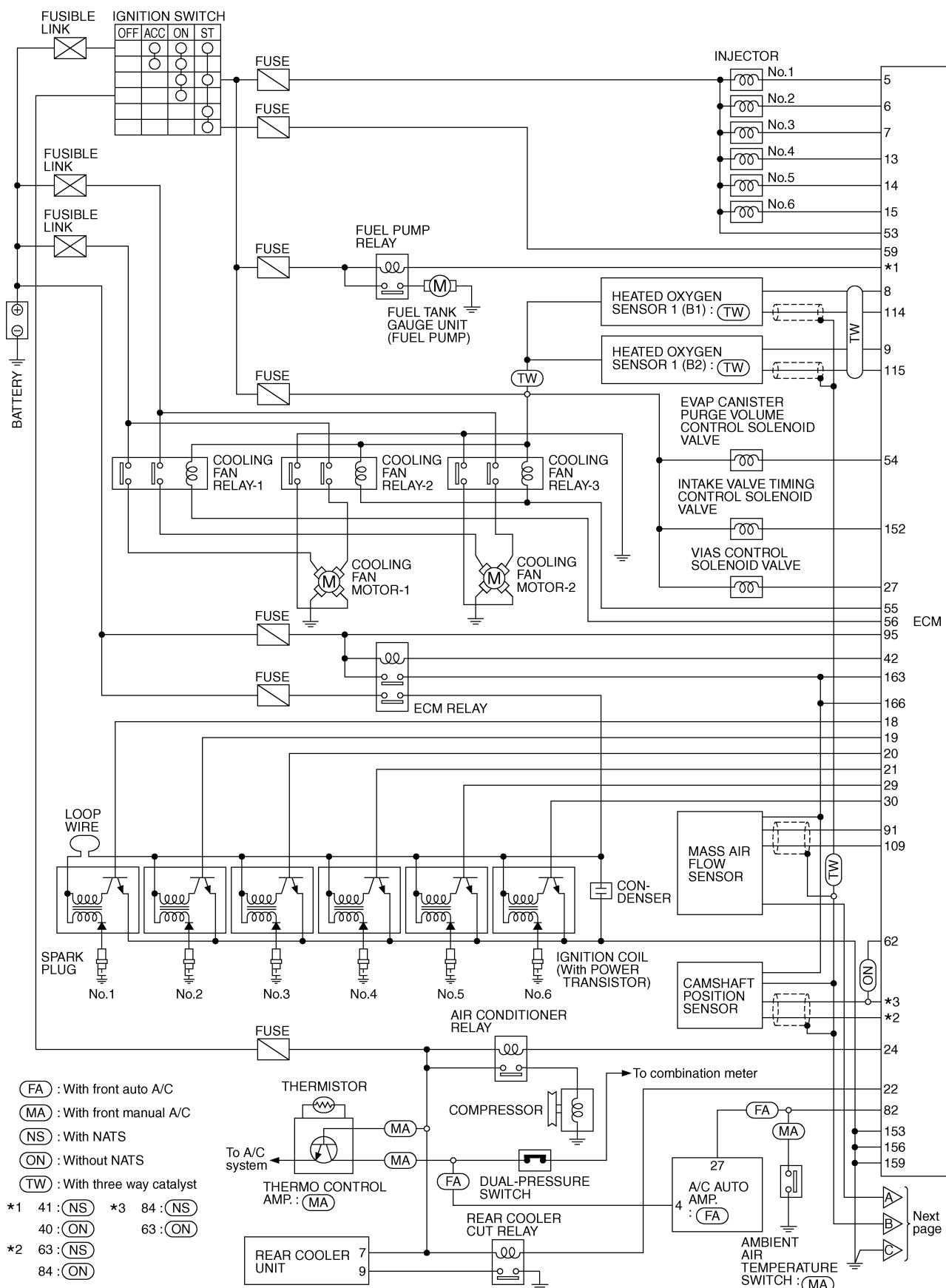
**CHECK INTERMITTENT INCIDENT.**  
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-125 in Service Manual (Publication No. SM1E-Y61EG1).

INSPECTION END

# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

TB48DE A/T

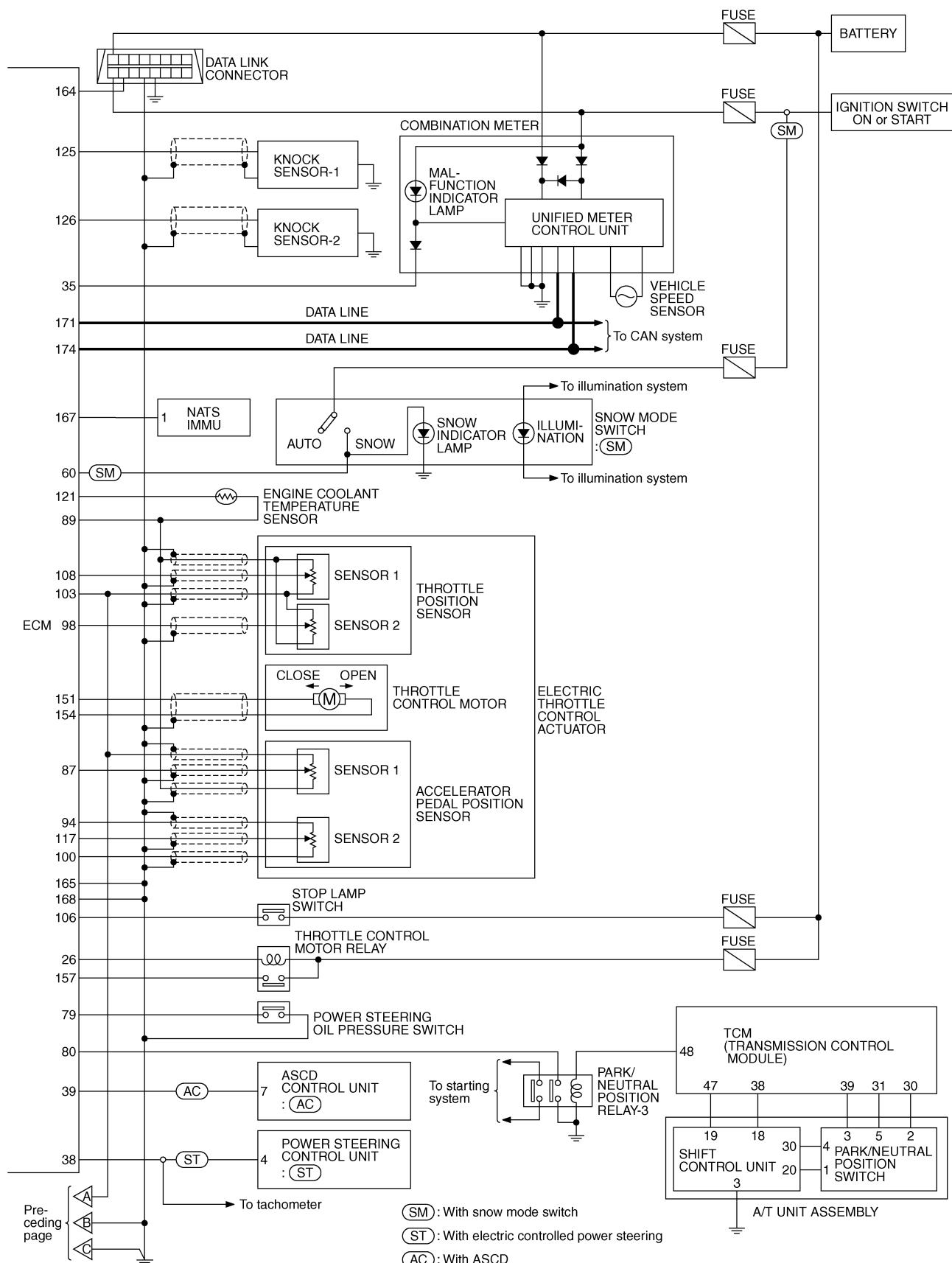
## Circuit Diagram



# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

TB48DE A/T

## Circuit Diagram (Cont'd)

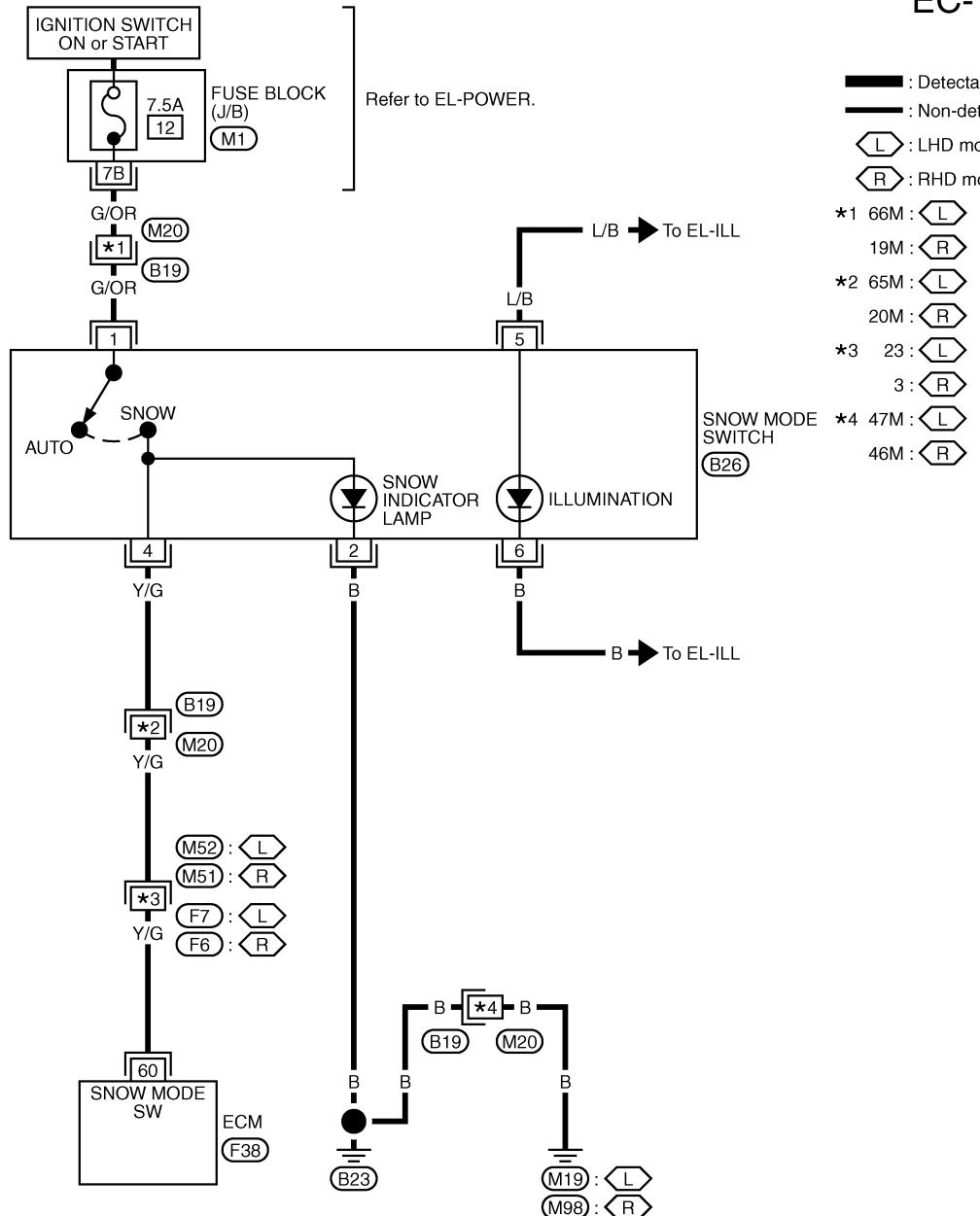


TEC519M

## Wiring Diagram

## WITH SNOW MODE SWITCH

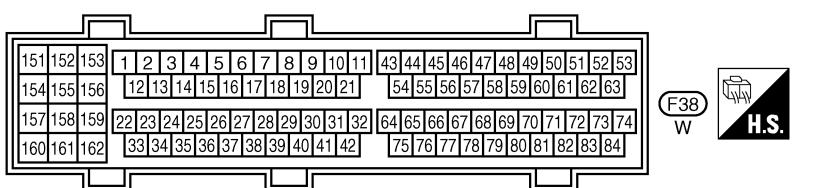
EC-TRQ/SG-01



Refer to last page (Foldout page).

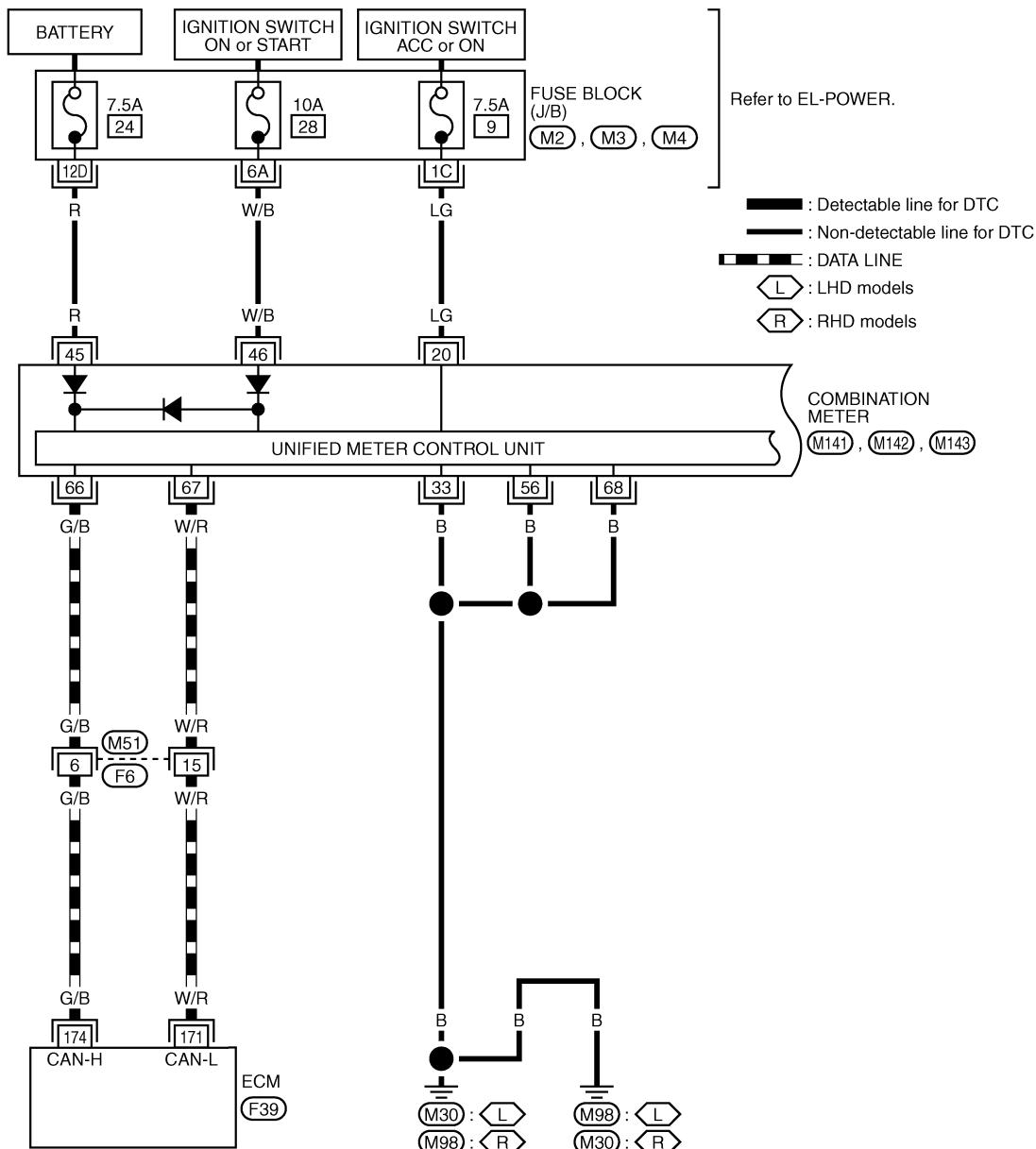
M20 . B19

M1

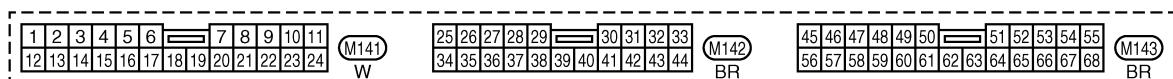
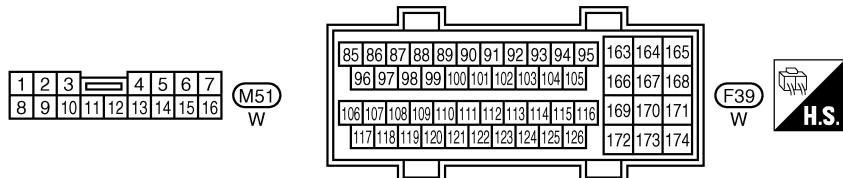


## Wiring Diagram

EC-LOAD-01

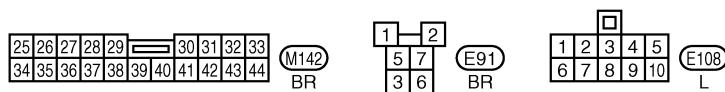
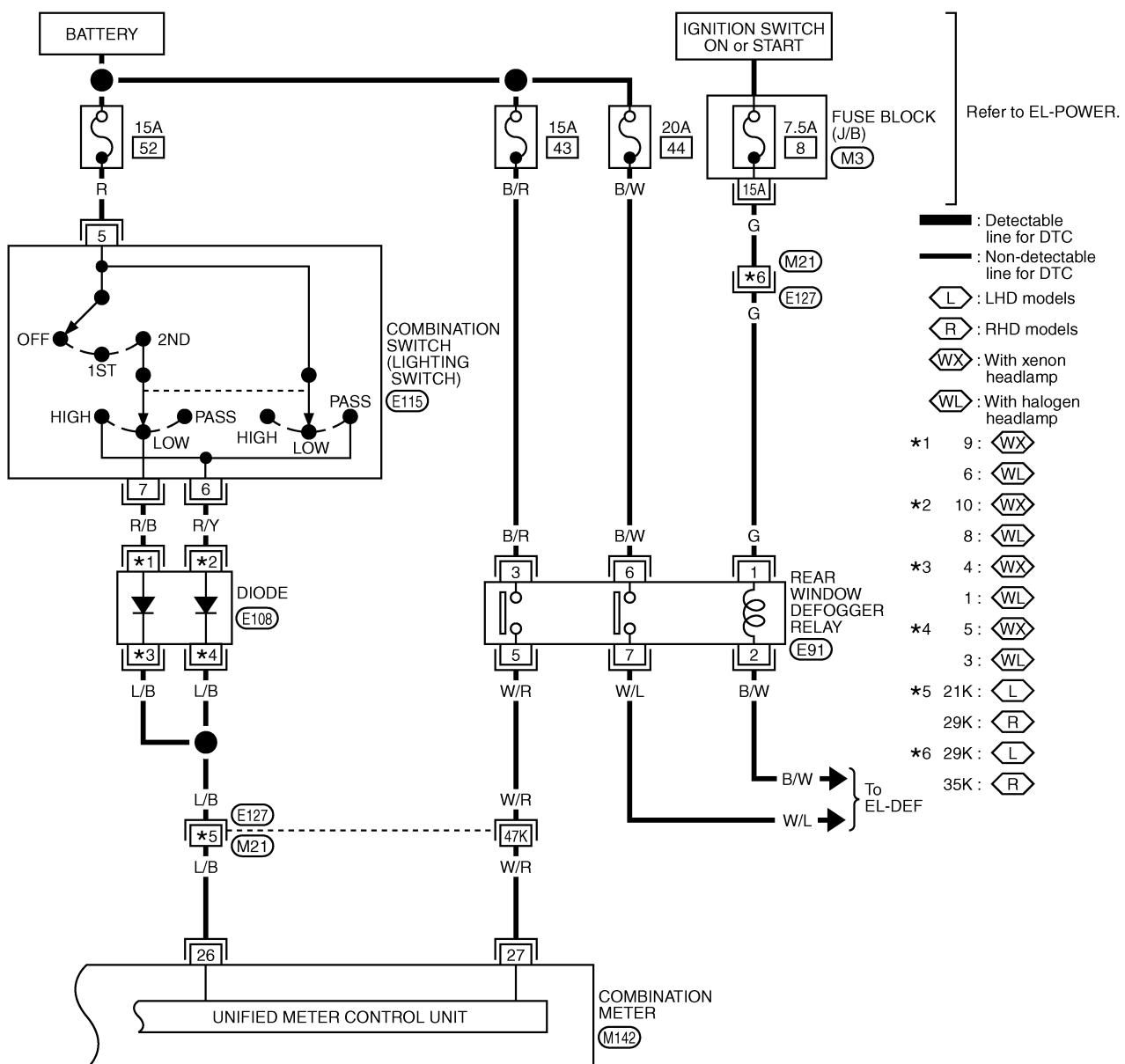


Refer to last page (Foldout page).



## Wiring Diagram (Cont'd)

EC-LOAD-02



Refer to last page (Foldout page).

(M21), (E127), (M3)

## Diagnostic Procedure

### 1 CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Connect CONSULT-II and select "DATA MONITOR" mode.
3. Select "LOAD SIGNAL" and check indication under the following conditions.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

Condition	Indication
Rear window defogger switch "ON"	ON
Rear window defogger switch "OFF"	OFF

MTBL1594

#### OK or NG

OK	► GO TO 2.
NG	► GO TO 3.

## Diagnostic Procedure (Cont'd)

## 2 CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

## With CONSULT-II

Check "LOAD SIGNAL" indication under the following conditions.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

Condition	Indication
Lighting switch "ON" at 2nd position	ON
Lighting switch "OFF"	OFF

MTBL1595

## OK or NG

OK	►	INSPECTION END
NG	►	GO TO 7.

## 3 CHECK REAR WINDOW DEFOGGER FUNCTION

1. Start engine.
2. Turn "ON" the rear window defogger switch.
3. Check the rear windshield. Is the rear windshield heated up?

## Yes or No

Yes	►	GO TO 4.
No	►	Check rear window defogger circuit. Refer to EL section.

## 4 CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Stop engine.
2. Disconnect rear window defogger relay.
3. Disconnect combination meter harness connector.
4. Check harness continuity between rear window defogger relay terminal 5 and combination meter terminal 27. Refer to Wiring Diagram.  
**Continuity should exist.**
5. Also check harness for short to ground and short to power.

## OK or NG

OK	►	GO TO 6.
NG	►	GO TO 5.

## 5 DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E127, M21
- Harness for open or short between rear window defogger relay and combination meter

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

# ELECTRICAL LOAD SIGNAL

TB48DE A/T

## Diagnostic Procedure (Cont'd)

### 6 CHECK COMBINATION METER

Refer to EL section.

OK or NG

OK ► GO TO 11.

NG ► Replace combination meter.

### 7 CHECK HEADLAMP FUNCTION

1. Start engine.
2. Lighting switch "ON" at 2nd position.
3. Check that headlamp high beams are illuminated.

OK or NG

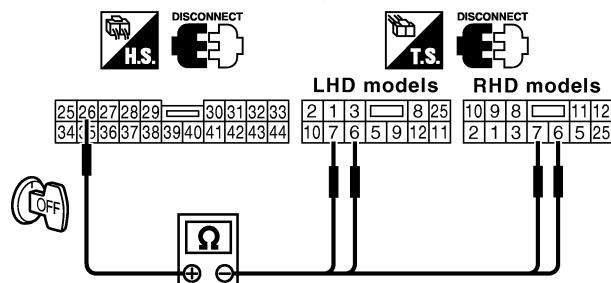
OK ► GO TO 8.

NG ► Check headlamp circuit. Refer to EL section.

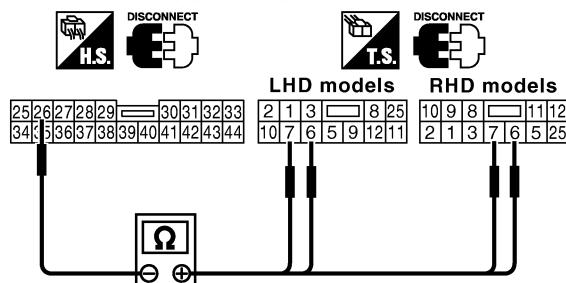
### 8 CHECK HEADLAMP INPUT SIGNAL CIRCUIT

1. Stop engine.
2. Disconnect combination meter harness connector.
3. Disconnect combination switch harness connector.
4. Check harness continuity between combination switch terminals 6, 7 and combination meter terminal 26.

#### CONDITION 1



#### CONDITION 2



SEC014E

Condition	Continuity
1	Should exist.
2	Should not exist.

MTBL1596

5. Also check harness for short to ground and short to power.

OK or NG

OK ► GO TO 10.

NG ► GO TO 9.

### 9 DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E127, M21
- Diode E108
- Harness for open or short between combination switch and combination meter

► Repair open circuit or short to ground or short to power.

## ELECTRICAL LOAD SIGNAL

TB48DE A/T

### Diagnostic Procedure (Cont'd)

#### 10 CHECK COMBINATION METER

Refer to EL section.

OK or NG

OK ► GO TO 11.

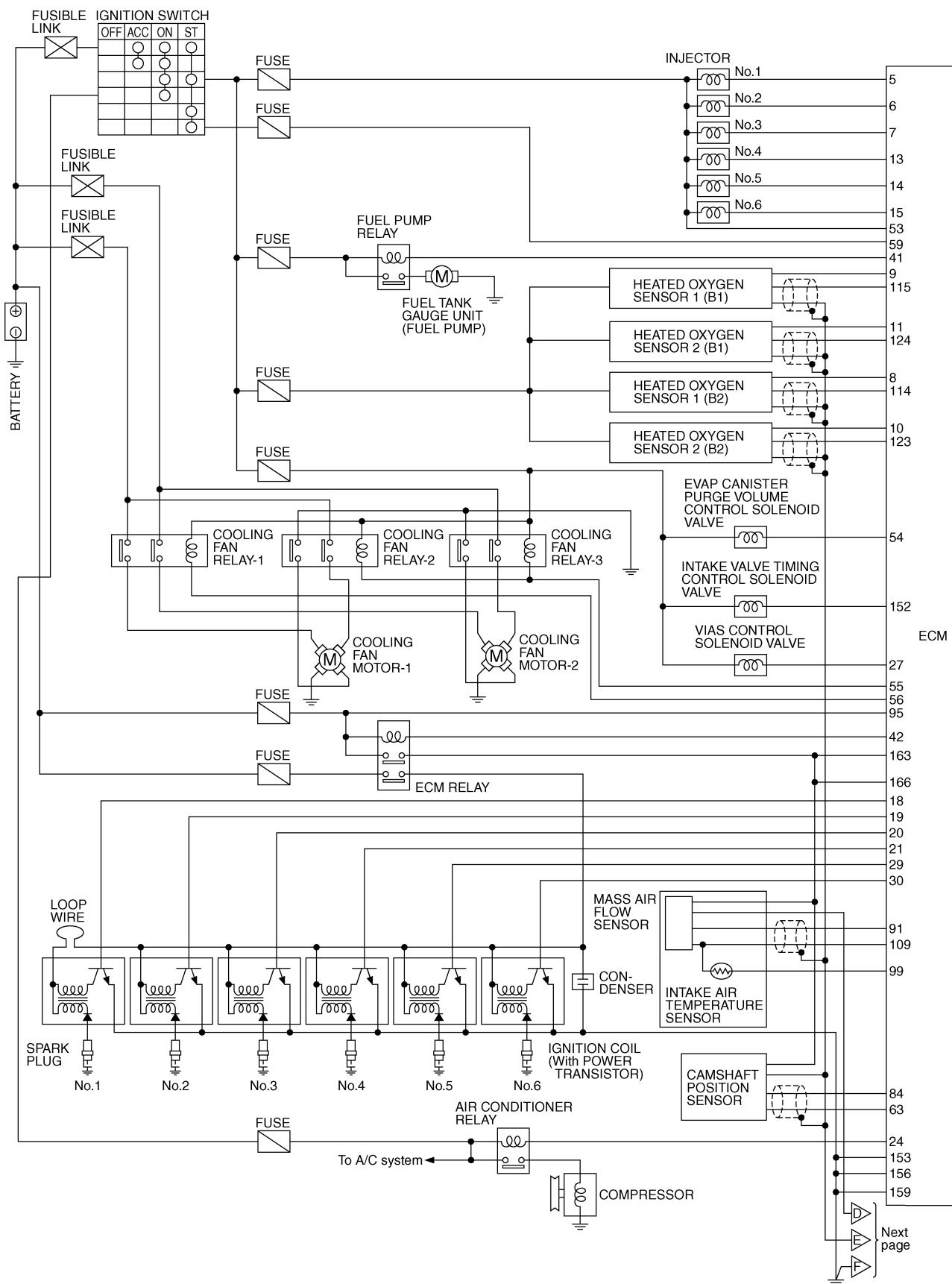
NG ► Replace combination meter.

#### 11 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-125 in Service Manual (Publication No. SM1E-Y61EG1).

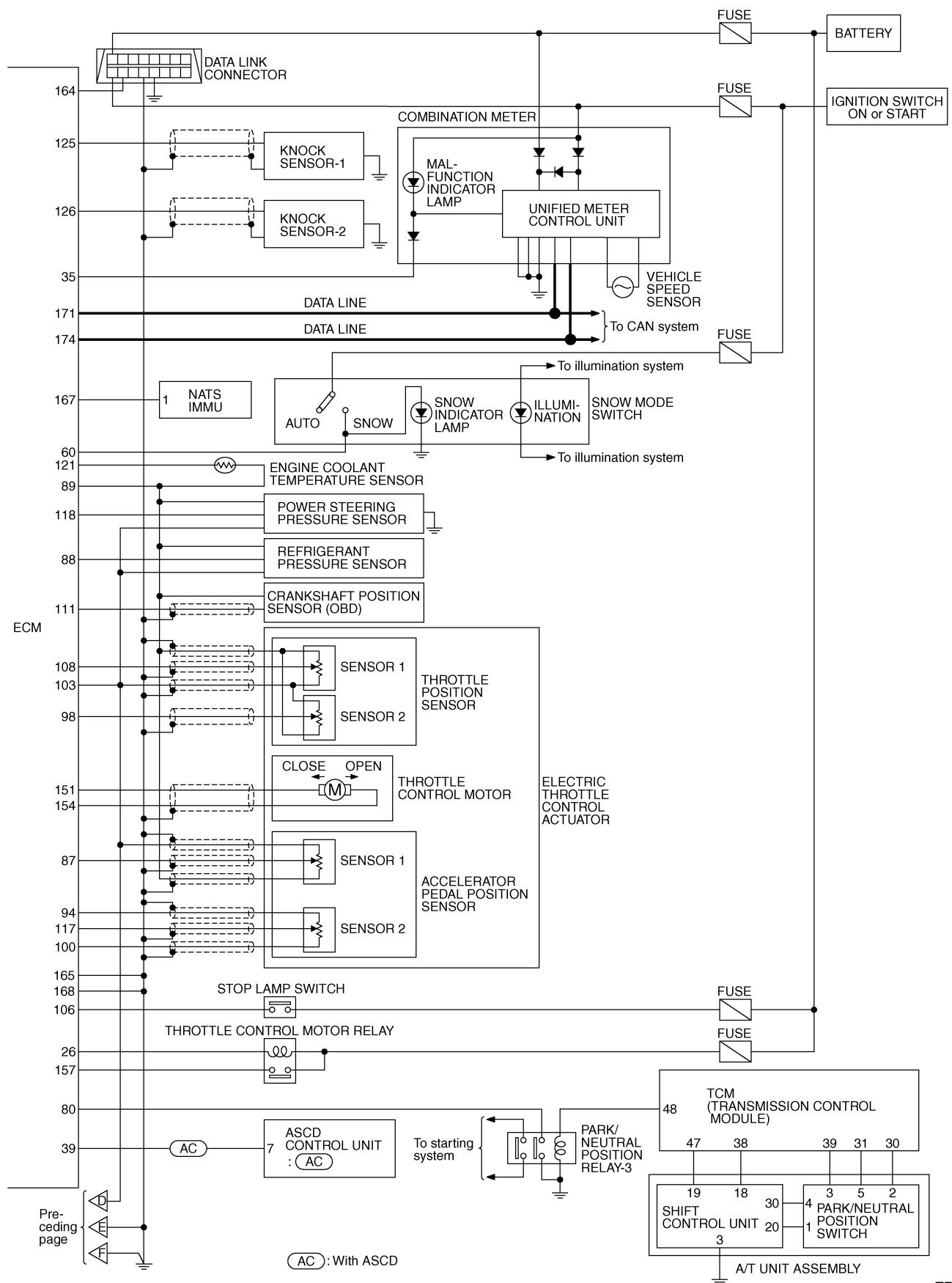
► INSPECTION END

Circuit Diagram



# TROUBLE DIAGNOSIS TB48DE A/T (WITH EURO-OBD)

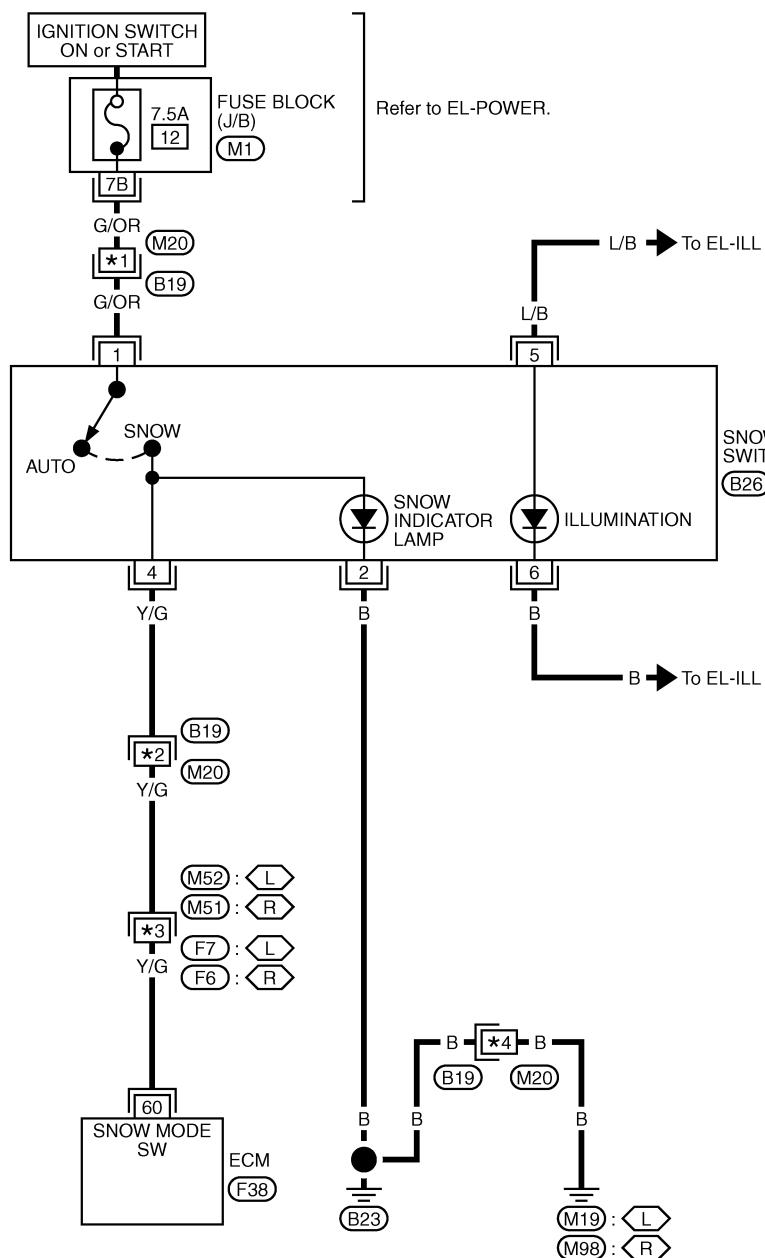
## Circuit Diagram (Cont'd)



TEC520M

## Wiring Diagram

EC-TRQ/SG-01



— : Detectable line for DTC  
 — : Non-detectable line for DTC

 : LHD models  
 : RHD models

\*1 66M :   
 19M : 

\*2 65M :   
 20M : 

\*3 23 :   
 3 : 

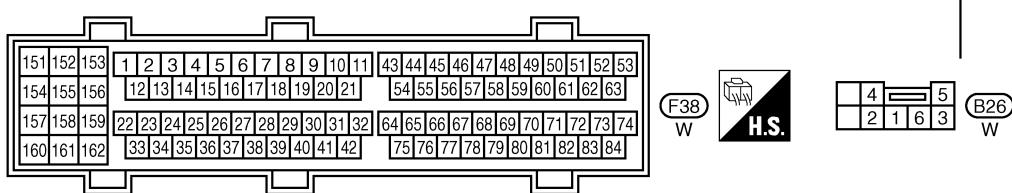
\*4 47M :   
 46M : 

1	2	3	<b>  </b>	4	5	6	7		M51	
8	9	10	11	12	13	14	15	16		W

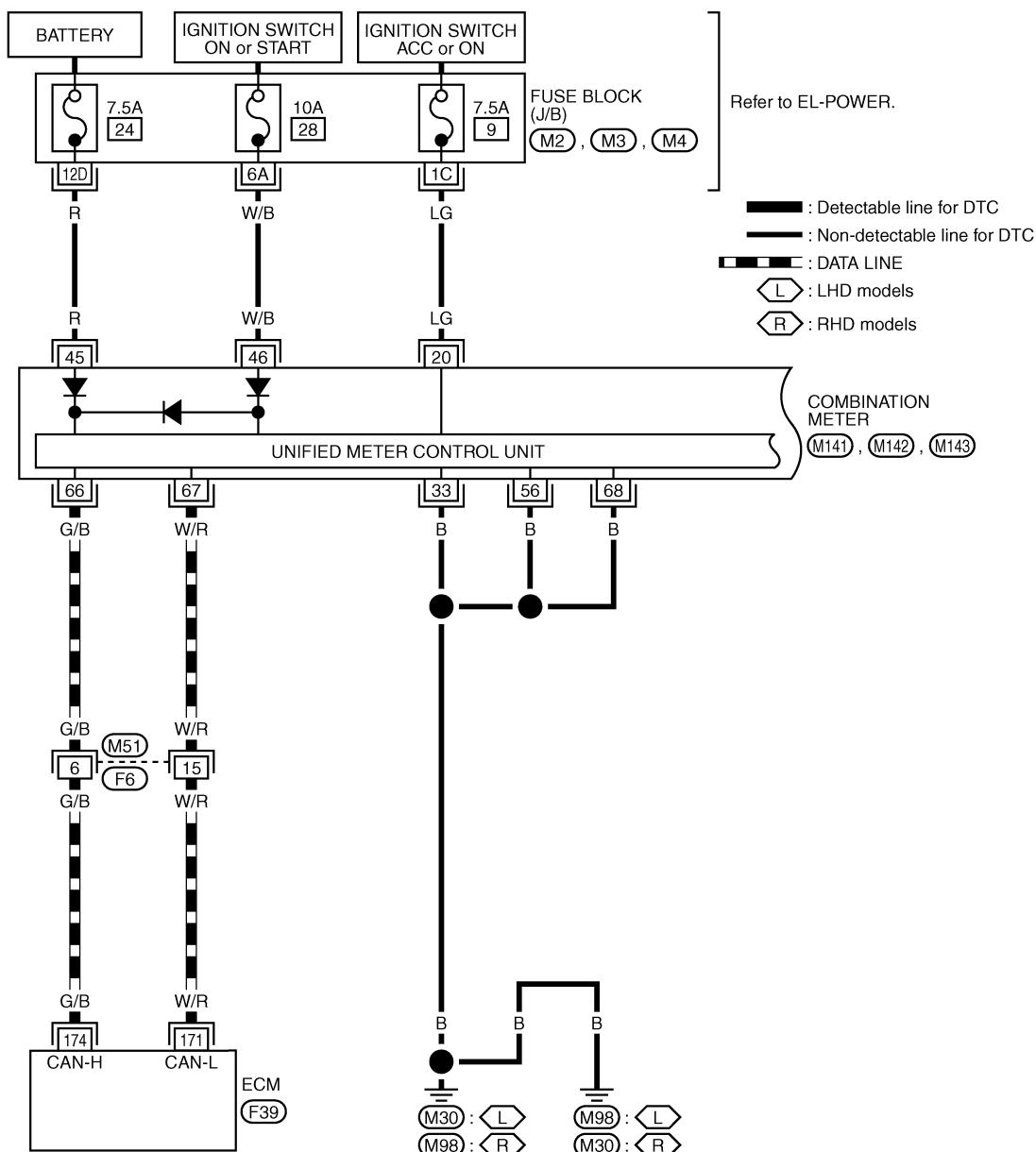
1	2	3	4	5	6	<b>  </b>	7	8	9	10	11	
12	13	14	15	16	17	18	19	20	21	22	23	24

Refer to last page (Foldout page).  
(M20), (B19)  
(M1)

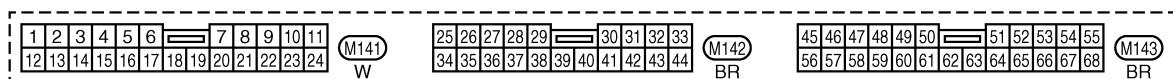
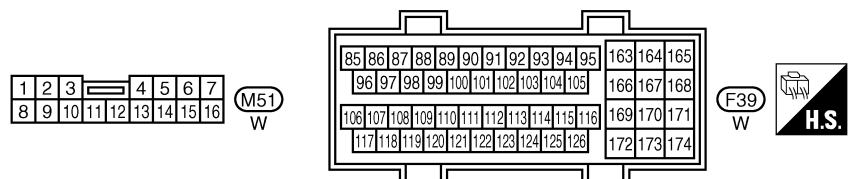


**Wiring Diagram**

**EC-LOAD-01**



Refer to last page (Foldout page).

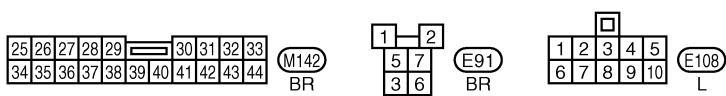
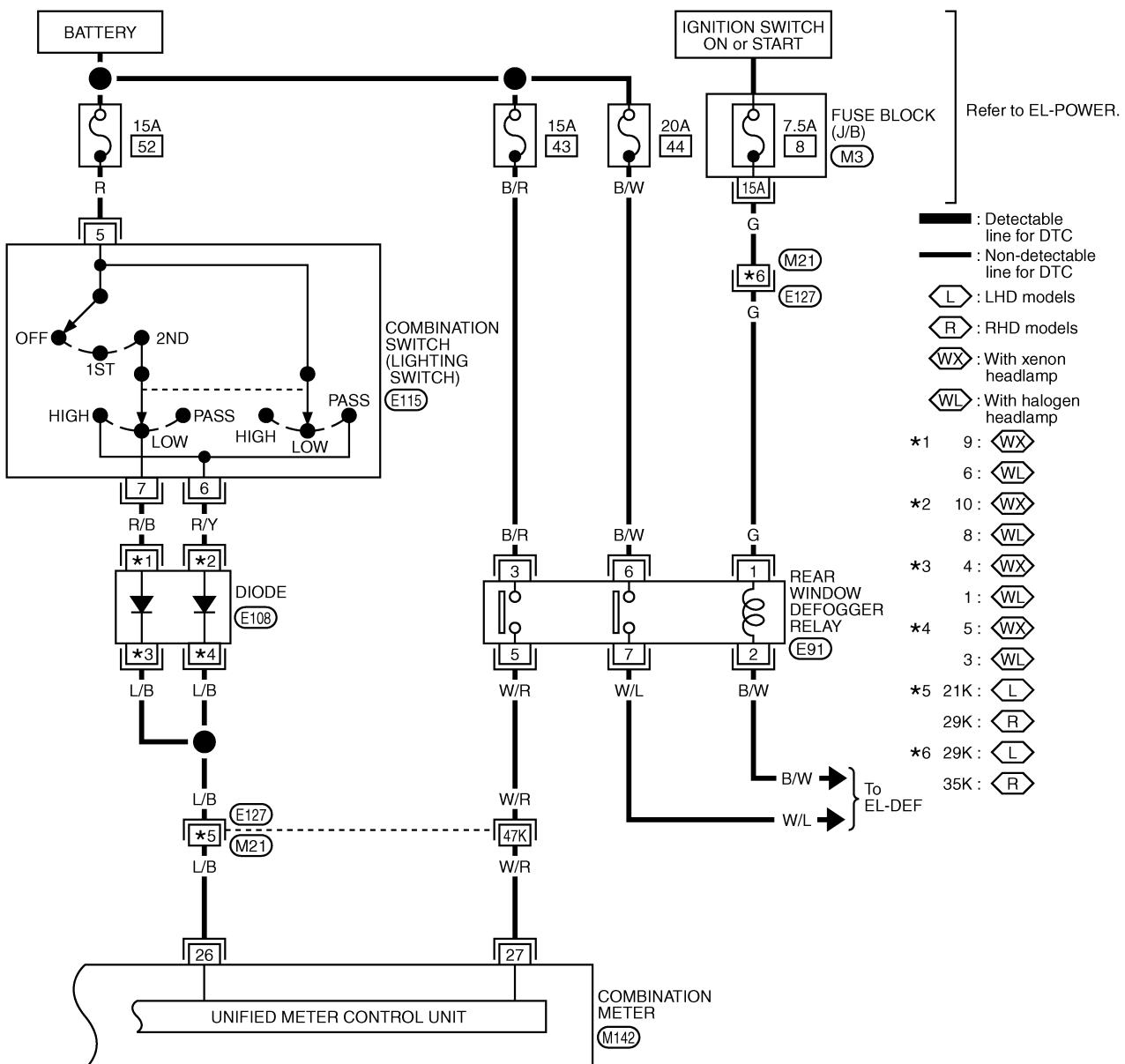


# ELECTRICAL LOAD SIGNAL

## **TB48DE A/T (WITH EURO-OBD)**

## Wiring Diagram (Cont'd)

EC-LOAD-02



| Refer to last page (Foldout page).



TEC523M

EC-4026

## Diagnostic Procedure

**1 CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I**

 **With CONSULT-II**

 **With GST**

1. Turn ignition switch "ON".
2. Connect CONSULT-II or GST and select "DATA MONITOR" mode.
3. Select "LOAD SIGNAL" and check indication under the following conditions.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

Condition	Indication
Rear window defogger switch "ON"	ON
Rear window defogger switch "OFF"	OFF

MTBL1594

**OK or NG**

OK	►	GO TO 2.
NG	►	GO TO 3.

**Diagnostic Procedure (Cont'd)**

**2 CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II**

**With CONSULT-II**

Check "LOAD SIGNAL" indication under the following conditions.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

Condition	Indication
Lighting switch "ON" at 2nd position	ON
Lighting switch "OFF"	OFF

MTBL1595

**OK or NG**

OK	► <b>INSPECTION END</b>
NG	► GO TO 7.

**3 CHECK REAR WINDOW DEFOGGER FUNCTION**

1. Start engine.
2. Turn "ON" the rear window defogger switch.
3. Check the rear windshield. Is the rear windshield heated up?

**Yes or No**

Yes	► GO TO 4.
No	► Check rear window defogger circuit. Refer to EL section.

**4 CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT**

1. Stop engine.
2. Disconnect rear window defogger relay.
3. Disconnect combination meter harness connector.
4. Check harness continuity between rear window defogger relay terminal 5 and combination meter terminal 27. Refer to Wiring Diagram.  
**Continuity should exist.**
5. Also check harness for short to ground and short to power.

**OK or NG**

OK	► GO TO 6.
NG	► GO TO 5.

**5 DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E127, M21
- Harness for open or short between rear window defogger relay and combination meter

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

**Diagnostic Procedure (Cont'd)**

**6 CHECK COMBINATION METER**

Refer to EL section.

**OK or NG**

OK ► GO TO 11.

NG ► Replace combination meter.

**7 CHECK HEADLAMP FUNCTION**

1. Start engine.
2. Lighting switch "ON" at 2nd position.
3. Check that headlamp high beams are illuminated.

**OK or NG**

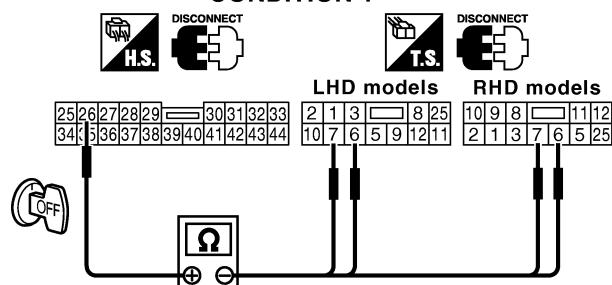
OK ► GO TO 8.

NG ► Check headlamp circuit. Refer to EL section.

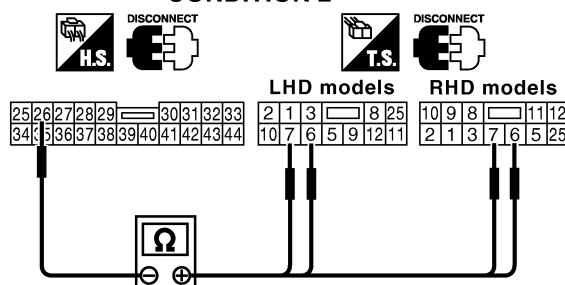
**8 CHECK HEADLAMP INPUT SIGNAL CIRCUIT**

1. Stop engine.
2. Disconnect combination meter harness connector.
3. Disconnect combination switch harness connector.
4. Check harness continuity between combination switch terminals 6, 7 and combination meter terminal 26.

**CONDITION 1**



**CONDITION 2**



SEC014E

Condition	Continuity
1	Should exist.
2	Should not exist.

MTBL1596

5. Also check harness for short to ground and short to power.

**OK or NG**

OK ► GO TO 10.

NG ► GO TO 9.

**9 DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E127, M21
- Diode E108
- Harness for open or short between combination switch and combination meter

► Repair open circuit or short to ground or short to power.

**Diagnostic Procedure (Cont'd)**

**10 CHECK COMBINATION METER**

Refer to EL section.

**OK or NG**

OK ► GO TO 11.

NG ► Replace combination meter.

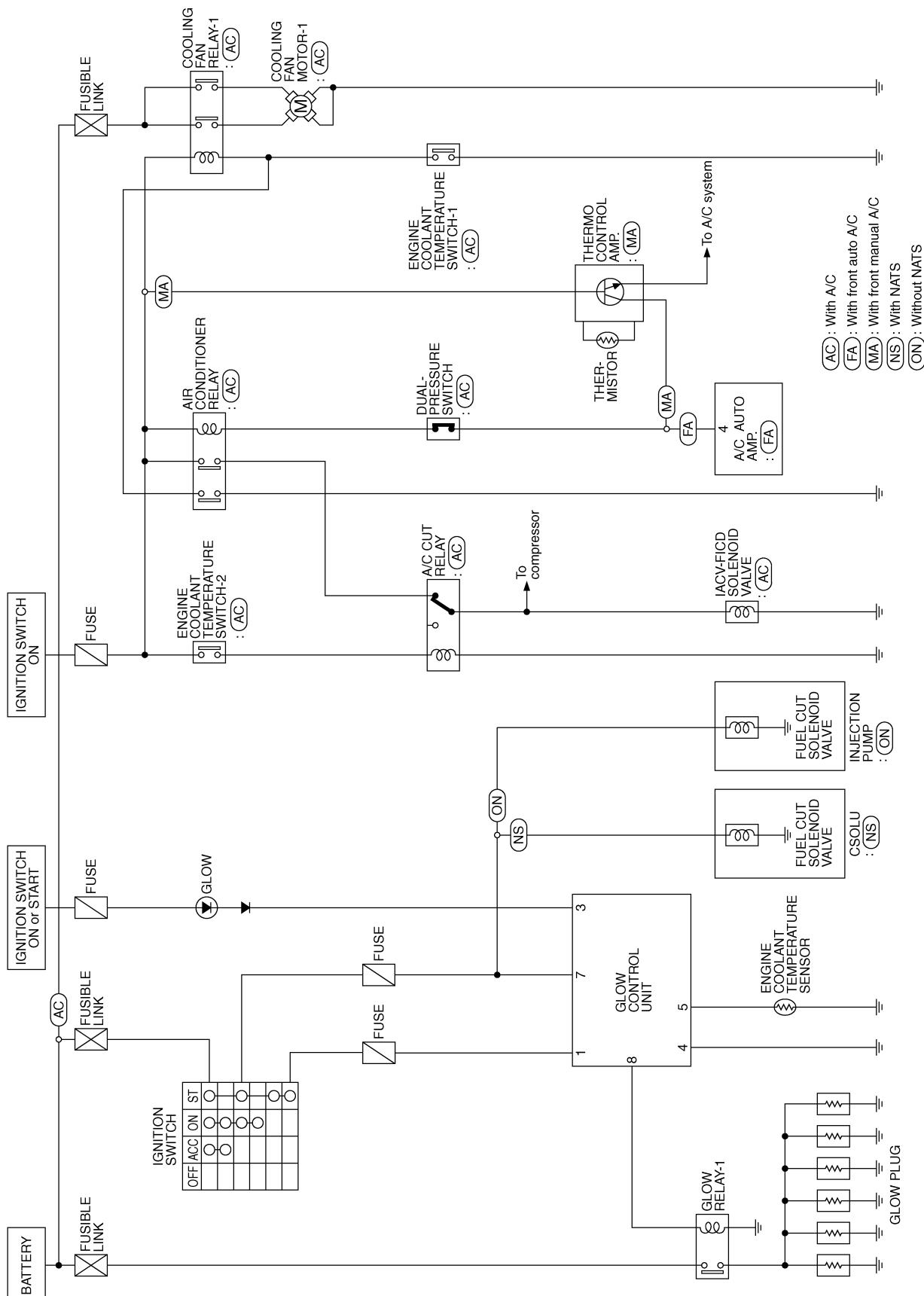
**11 CHECK INTERMITTENT INCIDENT**

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-145 in Service Manual (Publication No. SM2E-Y61FG1).

► **INSPECTION END**

## Circuit Diagram

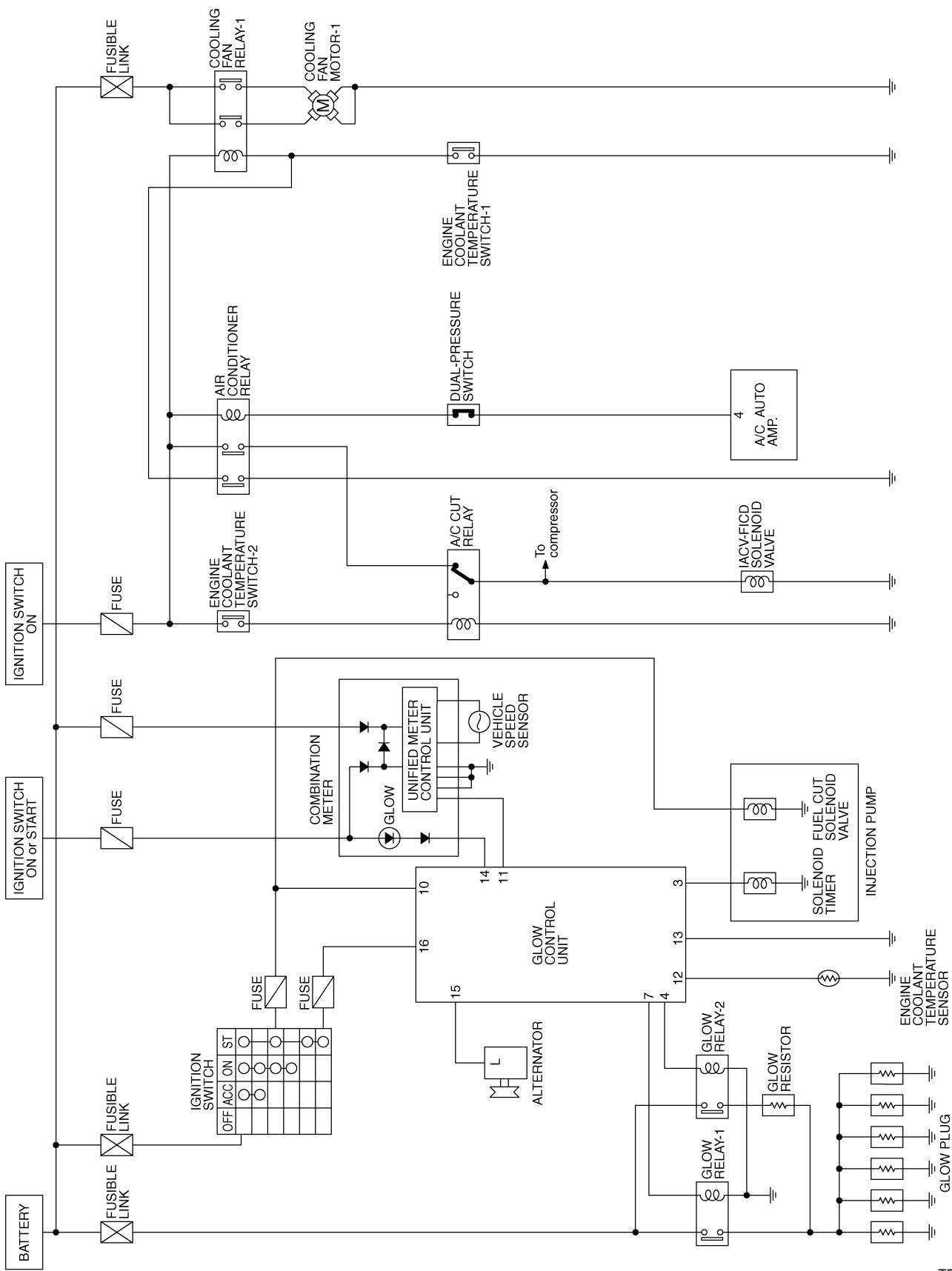
## **EXCEPT FOR COLD AREAS**



## QUICK-GLOW SYSTEM

TD42

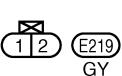
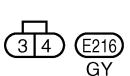
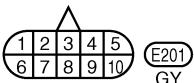
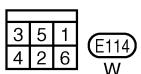
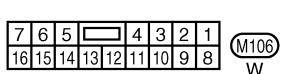
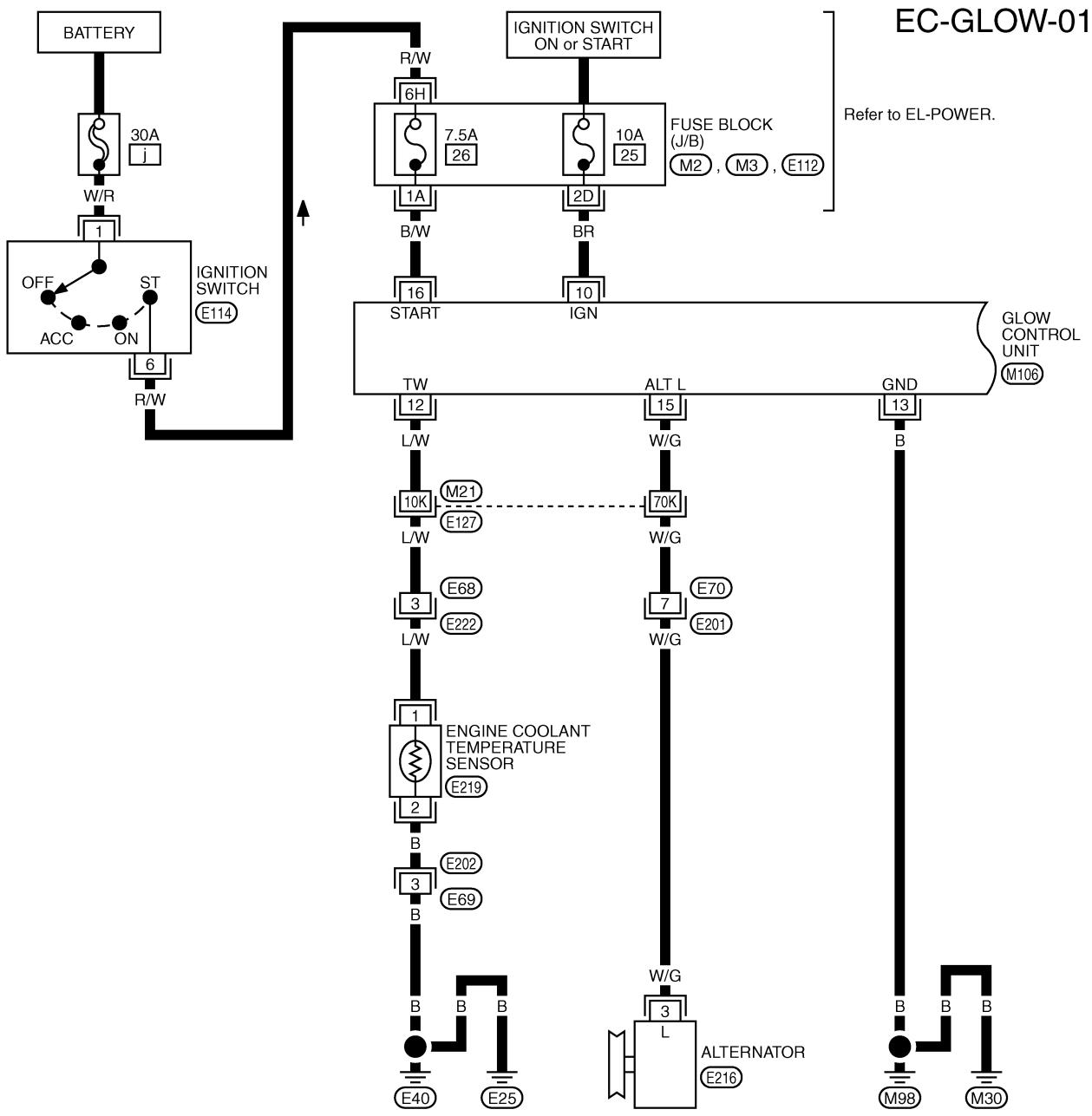
## FOR COLD AREAS



EC-4032

## Wiring Diagram

### FOR COLD AREAS



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(M21), (E127)

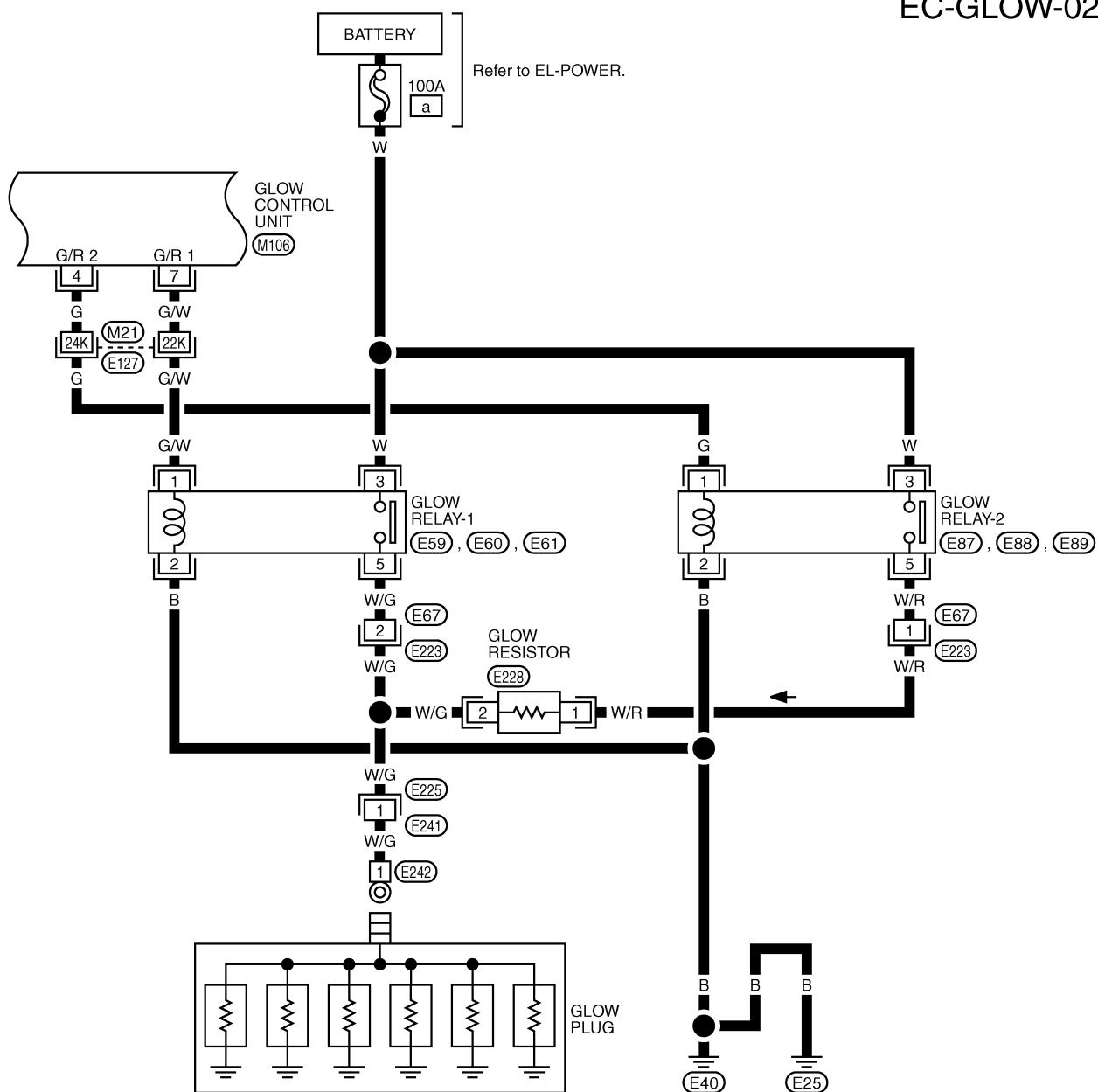
(M2)

(M3)

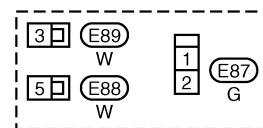
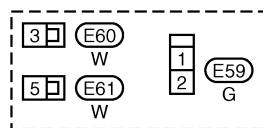
(E112)

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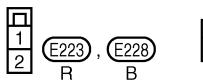
EC-GLOW-02



7	6	5		4	3	2	1
16	15	14	13	12	11	10	9



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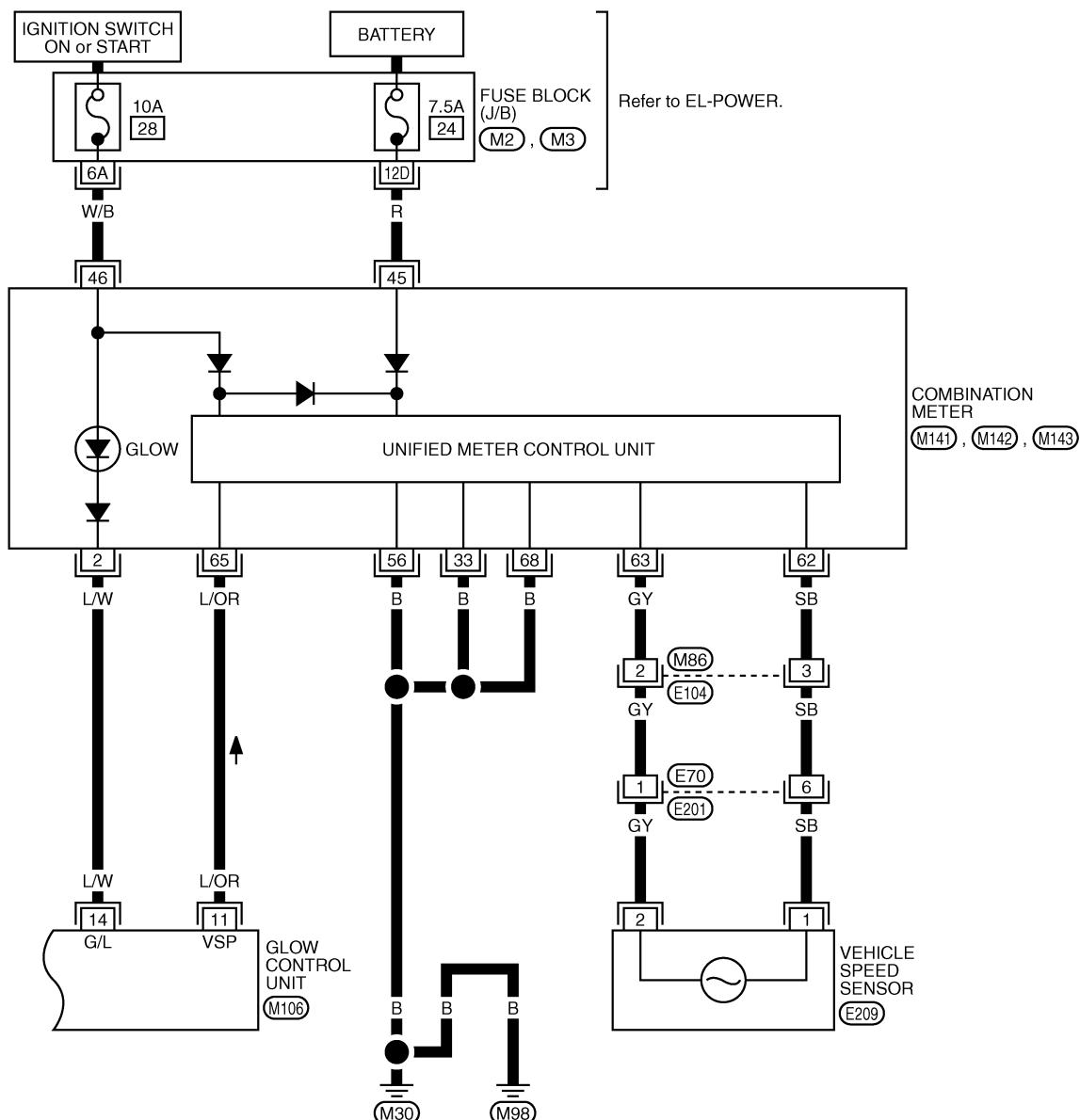


## QUICK-GLOW SYSTEM

**TD42**

## Wiring Diagram (Cont'd)

EC-GLOW-03



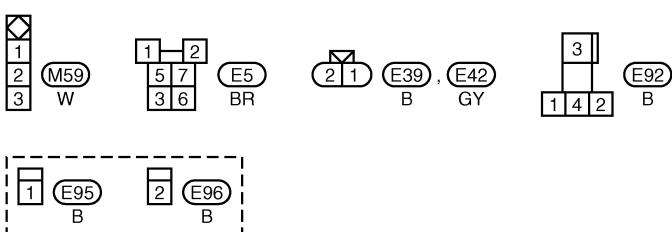
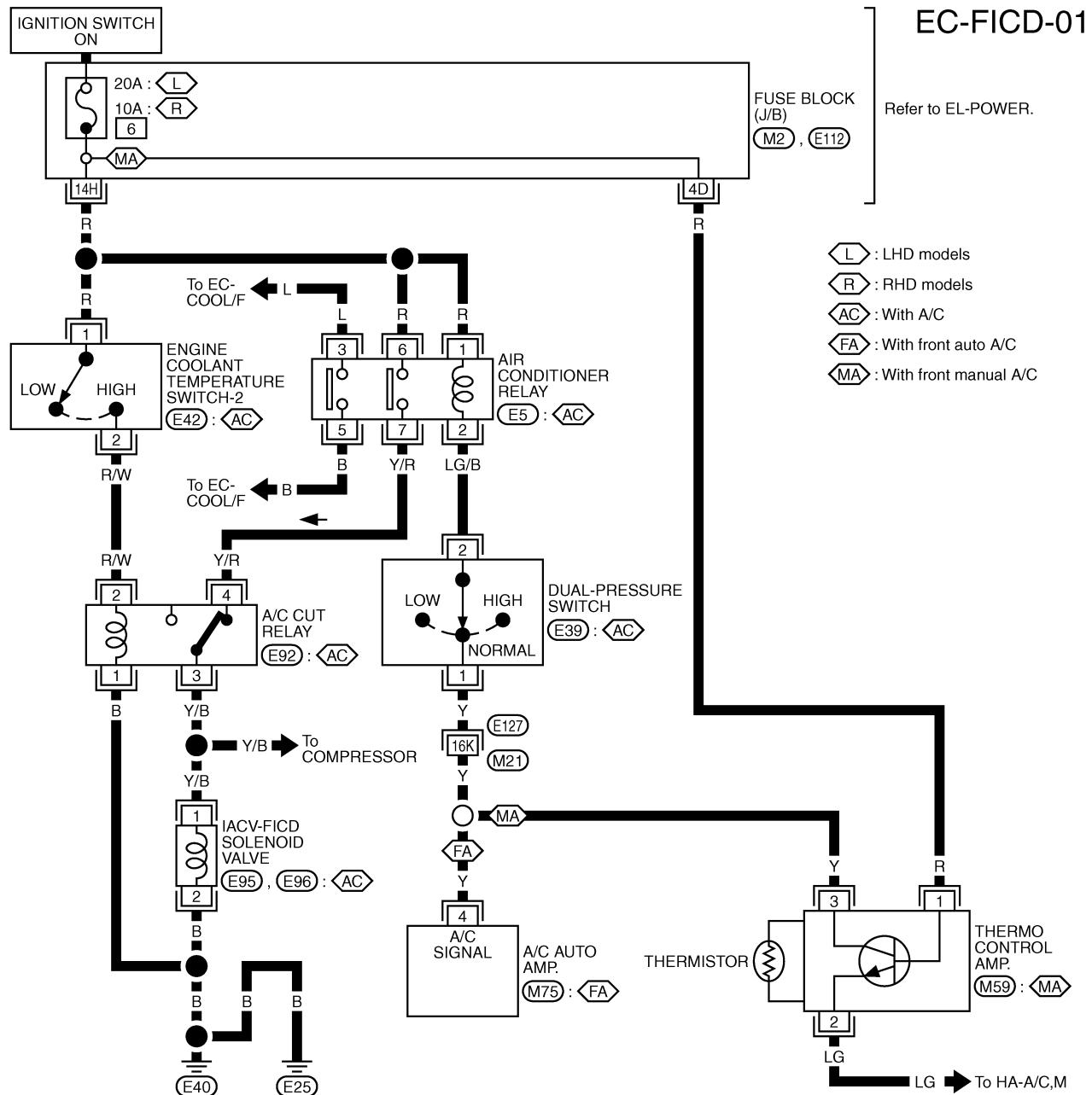
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Refer to last page (Foldout page).

M2

M2

## Wiring Diagram



| Refer to last page (Foldout page).

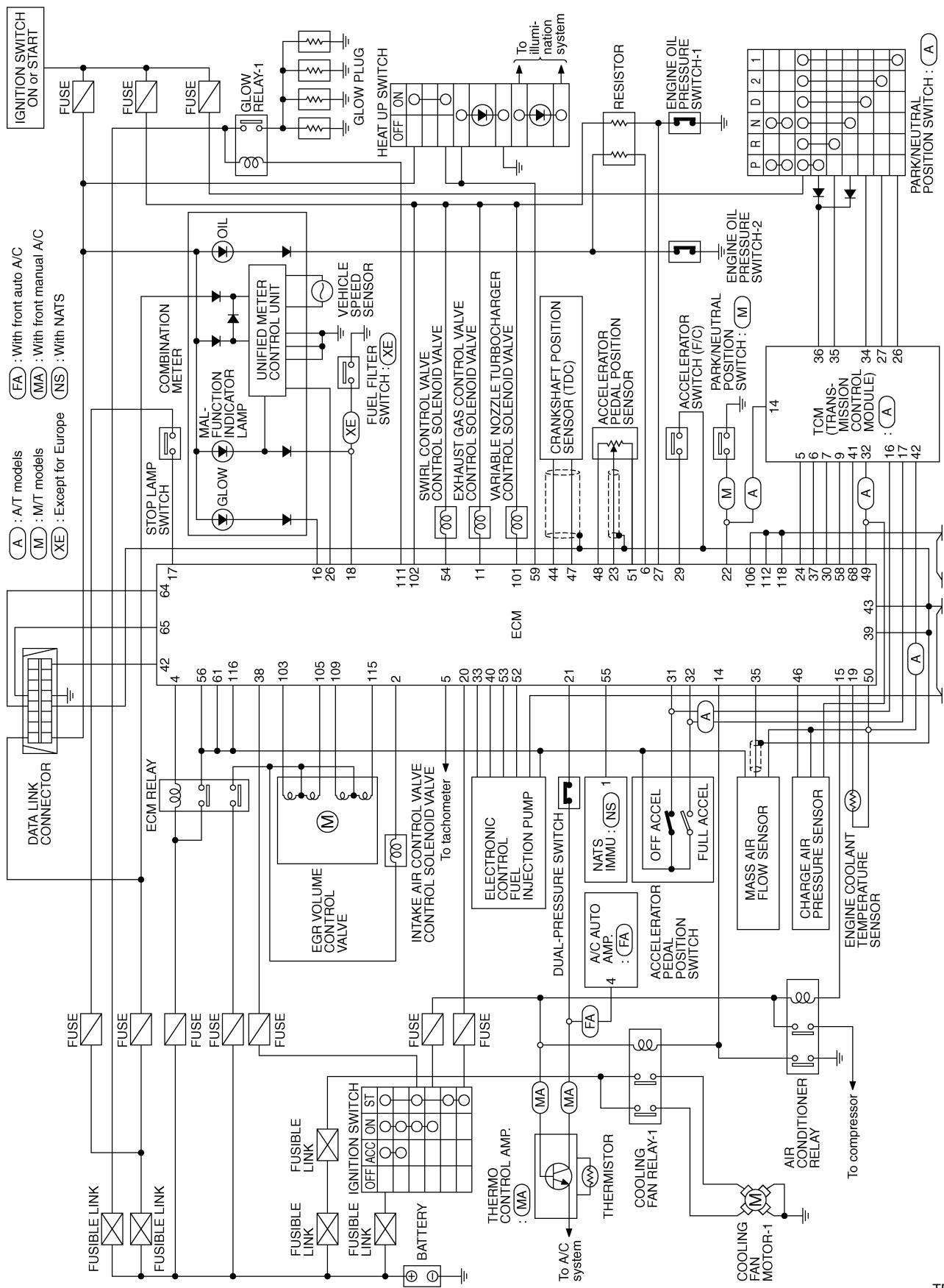
M21, E127

M2

M2

M75

## Circuit Diagram



## CONSULT-II Reference Value in Data Monitor Mode

## Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
- \* Specification data may not be directly related to their components signals/values/operations.

MONITOR ITEM	CONDITION		SPECIFICATION
CKPS-RPM (TDC)	● Run engine and compare CONSULT-II value with the tachometer indication.		Almost the same speed as the tachometer indication.
CMPS-RPM-PUMP			
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
VHCL SPEED SE	● Turn drive wheels and compare CONSULT-II value with the speedometer indication		Almost the same speed as the speedometer indication
FUEL TEMP SEN	● Engine: After warming up		More than 40°C (104°F)
ACCEL POS SEN	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.40 - 0.60V
		Accelerator pedal: fully depressed	Approx. 4.5V
FULL ACCEL SW	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully depressed	ON
		Except above	OFF
ACCEL SW (FC)	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	CLOSE
		Accelerator pedal: slightly open	OPEN
OFF ACCEL SW	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	ON
		Accelerator pedal: slightly open	OFF
SPILL/V	● Engine: After warming up		Approx. 13°C A
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
P/N POSI SW	● Ignition switch: ON	Shift lever: Park/Neutral	ON
		Except above	OFF
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
BRAKE SW	● Ignition switch: ON	Brake pedal: depressed	ON
		Brake pedal: released	OFF
IGN SW	● Ignition switch: ON → OFF		ON → OFF
WARM UP SW	● Ignition switch: ON	Heat up switch: ON	ON
		Heat up switch: OFF	OFF
MAS AIR/FL SE	● Ignition switch: ON (Engine stopped)		Approx. 0.4V
	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1.5 - 1.9V
		Engine is revving from idle to about 4,000 rpm	1.5 - 1.9 to Approx. 4.0V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm.)
DECCELER F/CUT	● Engine: After warming up	Idle	OFF
INJ TIMG C/V	● Engine: After warming up, idle the engine.		Approx. 50 - 70%
AIR COND RLY	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
GLOW RLY	● Refer to EC-252 in Service Manual (Publication No. SM9E-Y61CG3).		
COOLING FAN	● When cooling fan is stopped.	OFF	
	● When cooling fan operates.	ON	

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTi

## CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
EGR VOL CON/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: Neutral position</li> <li>● No-load</li> </ul>	After 1 minute of idling	More than 10 steps
		Revving engine from idle to 3,200 rpm	0 step
VNT S/V 1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: Neutral position</li> <li>● No-load</li> </ul>	Idle	Approx. 56%
		2,000 rpm	Approx. 20%
BARO SEN	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Altitude Approx. 0 m (0 ft): Approx. 100.62 kPa (1.0062 bar, 1.026 kg/cm <sup>2</sup> , 14.59 psi) Approx. 1,000 m (3,281 ft): Approx. 88.95 kPa (0.8895 bar, 0.907 kg/cm <sup>2</sup> , 12.90 psi) Approx. 1,500 m (4,922 ft): Approx. 83.16 kPa (0.8316 bar, 0.848 kg/cm <sup>2</sup> , 12.06 psi) Approx. 2,000 m (6,562 ft): Approx. 78.36 kPa (0.7836 bar, 0.799 kg/cm <sup>2</sup> , 11.36 psi)	
SWRL CON S/V 1	<ul style="list-style-type: none"> <li>● Lift up the vehicle</li> <li>● Engine: After warming up let it idle for more than 1 second.</li> <li>● Air conditioner switch: "OFF"</li> <li>● No-load</li> </ul>	Shift lever: Except "P" and "Neutral" positions	ON
		Shift lever: Neutral position	OFF
EXH/GAS REG V*	<ul style="list-style-type: none"> <li>● Vehicle: Stopped</li> <li>● Engine speed: Below 1,200 rpm</li> <li>● Engine coolant temperature: Below 87°C (189°F)</li> <li>● Heat up switch: ON</li> </ul>	ON	
		OFF	

\*: This item is applicable for cold area models. On other models, "OFF" is always displayed.

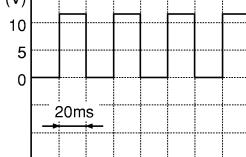
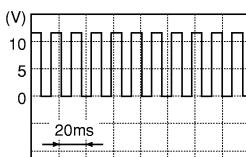
## ECM Terminals and Reference Value

## ECM INSPECTION TABLE

Remarks: Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
2	R/W	Intake air control valve control solenoid valve	Engine is running.	BATTERY VOLTAGE (11 - 14V)
			Ignition switch "OFF" For a few seconds after turning ignition switch "OFF"	Approximately 0.1V
4	B/Y	ECM relay (Self-shutoff)	Ignition switch "ON"	Approximately 0.25V
			Ignition switch "OFF" For a few seconds after turning ignition switch "OFF"	
5	Y/B	Tachometer	Ignition switch "OFF" A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
			Engine is running. Warm-up condition Idle speed	Approximately 5.7V  SEF255Z
5	Y/B	Tachometer	Engine is running. Warm-up condition Engine speed is 2,000 rpm	Approximately 6V  SEF256Z

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTi

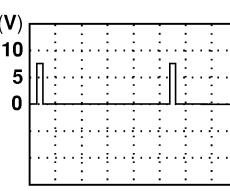
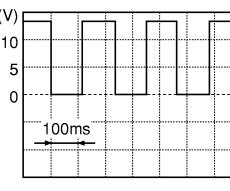
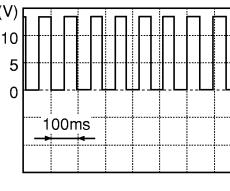
## ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
11	BR/Y	Exhaust gas control valve control solenoid valve	Engine is running. └ Engine speed is below 1,200 rpm └ Engine coolant temperature is below 87°C (189°F) └ Stop the vehicle └ Heat up switch is "ON"	Approximately 0.1V
			Engine is running. └ Except the above condition	BATTERY VOLTAGE (11 - 14V)
14	L	Cooling fan relay	Engine is running. └ Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)
			Engine is running. └ Cooling fan is operating	Approximately 0.1V
15	Y/L	Air conditioner relay	Engine is running. └ Air conditioner switch is "OFF"	BATTERY VOLTAGE (11 - 14V)
			Engine is running. └ Both air conditioner switch and blower fan switch are "ON" └ (Compressor is operating)	Approximately 0.1V
16	L/W	Glow lamp	Ignition switch "ON" └ Glow lamp is "ON"	Approximately 1V
			Ignition switch "ON" └ Glow lamp is "OFF"	BATTERY VOLTAGE (11 - 14V)
17	G/Y	Stop lamp switch	Ignition switch "ON" └ Brake pedal fully released	Approximately 0V
			Ignition switch "ON" └ Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
18	G	Malfunction indicator lamp	Ignition switch "ON"	Approximately 1V
			Engine is running. └ Idle speed	BATTERY VOLTAGE (11 - 14V)
19	LG/R	Engine coolant temperature sensor	Engine is running.	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature
20	R/W	Start signal	Ignition switch "ON"	Approximately 0V
			Ignition switch "START"	BATTERY VOLTAGE (11 - 14V)

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTI

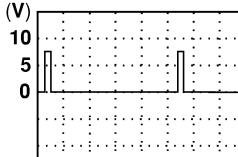
## ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21	LG/B	Air conditioner switch	Engine is running. └ Air conditioner switch is "OFF"	BATTERY VOLTAGE (11 - 14V)
			Engine is running. └ Both air conditioner switch and blower fan switch are "ON" (Compressor is operating)	Approximately 0.1V
22	P/B	Park/Neutral position switch	Ignition switch "ON" └ Gear position is "Neutral" (M/T models) Gear position is "P" or "N" (A/T models)	Approximately 0V
			Ignition switch "ON" └ Except the above gear position	BATTERY VOLTAGE (11 - 14V)
23	W	Accelerator position sensor	Ignition switch "ON" └ Accelerator pedal fully released	0.4 - 0.6V
			Ignition switch "ON" └ Accelerator pedal fully depressed	Approximately 4.5V
24	PU/W	A/T signal No. 1	Engine is running. └ Warm-up condition Idle speed	Voltage goes high up once in a few seconds    SEF448Z
26	L/OR	Vehicle speed sensor	Engine is running. └ Lift up the vehicle In 1st gear position Vehicle speed is 10 km/h (6 MPH)	0 - Approximately 4.8V    SEF257Z
			Engine is running. └ Lift up the vehicle In 2nd gear position Vehicle speed is 30 km/h (19 MPH)	Approximately 2.2V    SEF258Z

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTI

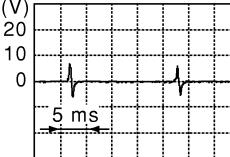
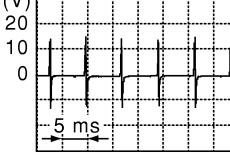
## ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	R/L	Accelerator switch (F/C)	Ignition switch "ON" └ Accelerator pedal fully released	BATTERY VOLTAGE (11 - 14V)
			Ignition switch "ON" └ Accelerator pedal depressed	Approximately 0V
30	P	A/T signal No. 3	Engine is running. └ <b>Warm-up condition</b> Idle speed	Approximately 0V
			Engine is running. └ <b>Warm-up condition</b> Engine speed is 2,000 rpm	Approximately 7.7V
31	R/L	Accelerator position switch (Idle)	Ignition switch "ON" └ Accelerator pedal fully released	BATTERY VOLTAGE (11 - 14V)
			Ignition switch "ON" └ Accelerator pedal depressed	Approximately 0V
32	W/G	Accelerator position switch (Full)	Ignition switch "ON" └ Accelerator pedal released	Approximately 0V
			Ignition switch "ON" └ Accelerator pedal fully depressed	BATTERY VOLTAGE (11 - 14V)
33	G/Y	Electronic control fuel injection pump	Engine is running. └ <b>Warm-up condition</b> Idle speed	Approximately 2.5V
35	R	Mass air flow sensor	Ignition switch "ON"	Approximately 0.4V
			Engine is running. └ <b>Warm-up condition</b> Idle speed	1.5 - 1.9V
			Engine is running. └ <b>Warm-up condition</b> Engine is revving from idle to about 4,000 rpm	1.5 - 1.9 to Approximately 4.0V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm.)
37	P/B	A/T signal No. 2	Engine is running. └ <b>Warm-up condition</b> Idle speed	Voltage goes high up once in a few seconds  

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTI

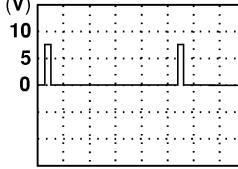
## ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
38	B/Y	Ignition switch	Ignition switch "OFF"	0V
			Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
39 43	B B	ECM ground	Engine is running. └─ Idle speed	Approximately 0V
40	R/B	Electronic control fuel injection pump	Engine is running. └─ <b>Warm-up condition</b> Idle speed	Approximately 2.5V
42	L/G	Data link connector	Engine is running. └─ Idle speed (CONSULT-II is connected and turned on)	Approximately 0V
64	Y/G		Engine is running. └─ Idle speed (CONSULT-II is connected and turned on)	Approximately 0V
65	Y/R		Engine is running. └─ Idle speed (CONSULT-II is connected and turned on)	Less than 9V
44	L	Crankshaft position sensor (TDC)	Engine is running. └─ <b>Warm-up condition</b> Idle speed	Approximately 0V  (V) 20 10 0 5 ms  SEF333Y
			Engine is running. └─ <b>Warm-up condition</b> Engine speed is 2,000 rpm	Approximately 0V  (V) 20 10 0 5 ms  SEF334Y
46	L	Charge air pressure sensor	Engine is running. └─ <b>Warm-up condition</b> Idle speed	Approximately 2.0V
47	B/W	Crankshaft position sensor (TDC) ground	Engine is running. └─ <b>Warm-up condition</b> Idle speed	Approximately 0V
48	G/R	Accelerator position sensor power supply	Ignition switch "ON"	Approximately 5V
49	W	Sensor power supply	Ignition switch "ON"	Approximately 5V
50	B	Sensor ground	Engine is running. └─ <b>Warm-up condition</b> Idle speed	Approximately 0V

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTI

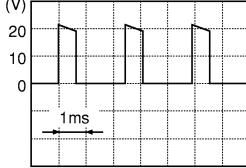
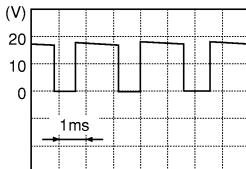
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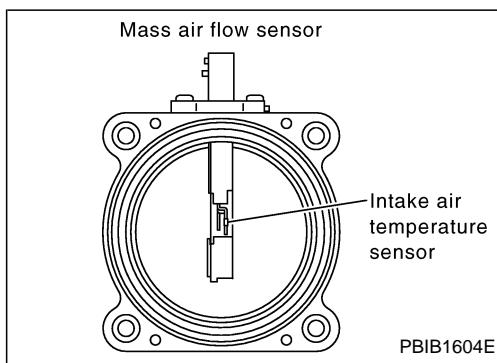
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
51	L/W	Accelerator position sensor ground	Engine is running. └ Warm-up condition Idle speed	Approximately 0V
52	L/B	Electronic control fuel injection pump	Engine is running. └ Idle speed	Approximately 0.1V
53	L/R	Electronic control fuel injection pump	Engine is running. └ Idle speed	Approximately 1.0V
54	L/B	Swirl control valve control solenoid valve	Engine is running. └ Warm-up condition At idle speed for more than 1 second Lift up the vehicle Gear position is in positions other than "P" and "Neutral"	Approximately 0.1V
			Engine is running. └ Idle speed Lift up the vehicle Gear position is in "P" or "Neutral"	BATTERY VOLTAGE (11 - 14V)
56 61 116	W W W	Power supply for ECM	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
58	L/OR	A/T signal No. 4	Engine is running. └ Warm-up condition Idle speed	Voltage goes high up once in a few seconds    SEF448Z
59	BR/W	Heat up switch	Ignition switch "ON" └ Heat up switch is "ON"	Approximately 0V
			Ignition switch "ON" └ Heat up switch is "OFF"	BATTERY VOLTAGE (11 - 14V)
68	B/W	Accelerator position sensor signal output	Ignition switch "ON" └ Accelerator pedal fully released	0.4 - 0.6V
			Ignition switch "ON" └ Accelerator pedal fully depressed	Approximately 4.5V

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ZD30DDTi

## ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
101	R/B	Variable nozzle turbo-charger control solenoid valve	Engine is running. └ Warm-up condition Idle speed	Approximately 6.8V 
			Engine is running. └ Warm-up condition Engine speed is 2,000 rpm	SEF253Z Approximately 11V 
102	G/R	Current return	Engine is running. └ Idle speed	BATTERY VOLTAGE (11 - 14V)
103 105 109 115	L/Y L/W L R/L	EGR volume control valve	Engine is running. └ Warm-up condition Idle speed	0.1 - 14V
106 112 118	B B B	ECM ground	Engine is running. └ Idle speed	Approximately 0V
111	LG/B	Glow relay	Refer to "GLOW CONTROL SYSTEM", EC-252 in Service Manual (Publication No. SM9E-Y61CG3).	



## Component Description

The mass air flow (MAF) sensor is placed in the stream of intake air. It measures the intake air flow rate by measuring a part of the entire intake air flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

## CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS AIR/FL SE	• Ignition switch: ON (Engine stopped)	Approx. 0.4V
	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: Neutral position • No-load	Idle 1.5 - 1.9V
		Engine is revving from idle to about 4,000 rpm 1.5 - 1.9 to Approx. 4.0V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm.)

## ECM Terminals and Reference Value

Specification data are reference values, and are measured between each terminal and ground.

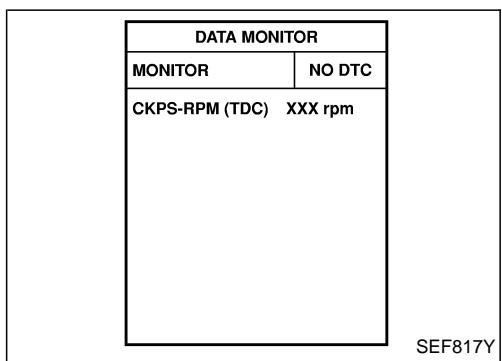
### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	R	Mass air flow sensor	Ignition switch "ON"	Approximately 0.4V
			Engine is running. └ Warm-up condition Idle speed	1.5 - 1.9V
			Engine is running. └ Warm-up condition Engine is revving from idle to about 4,000 rpm	1.5 - 1.9 to Approximately 4.0V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm.)
50	B	Sensor ground	Engine is running. └ Warm-up condition Idle speed	Approximately 0V

## On Board Diagnosis Logic

Malfunction is detected when ...	Check Items (Possible Cause)
• An excessively high or low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor



SEF817Y

## DTC Confirmation Procedure



### WITH CONSULT-II

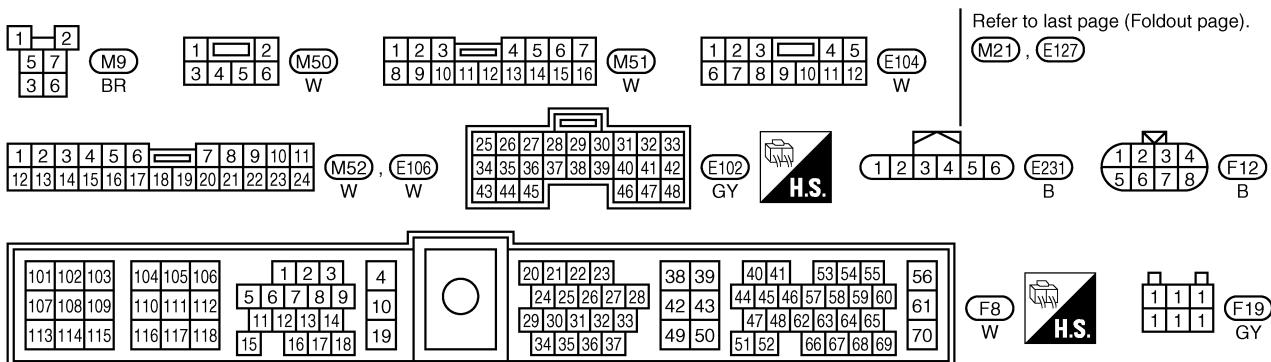
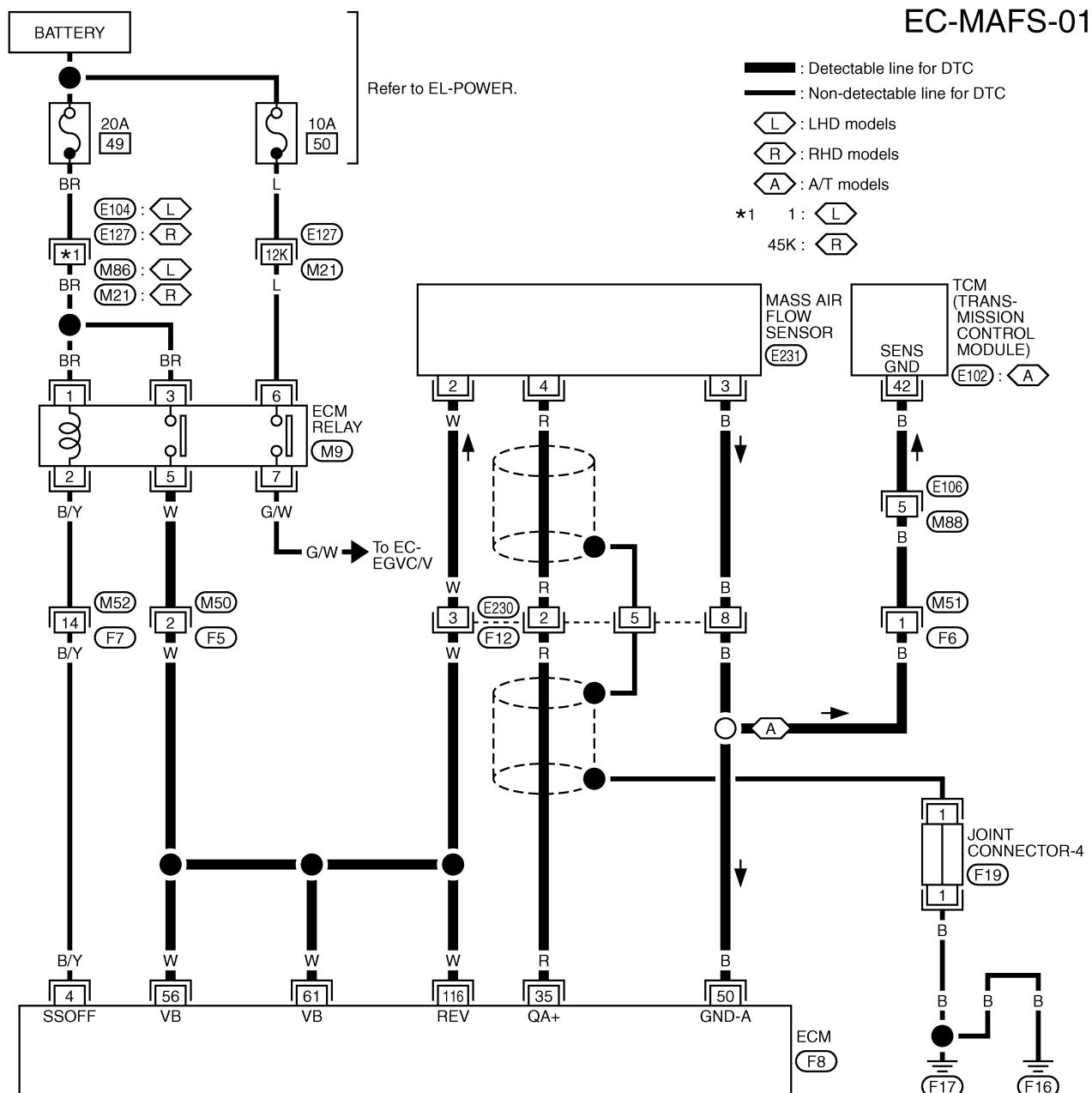
- 1) Turn ignition switch "ON", and wait at least 6 seconds.
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 3 seconds.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-4050.



### WITHOUT CONSULT-II

- 1) Turn ignition switch "ON", and wait at least 6 seconds.
- 2) Start engine and wait at least 3 seconds.
- 3) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 4) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.
- 5) If DTC is detected, go to "Diagnostic Procedure", EC-4050.

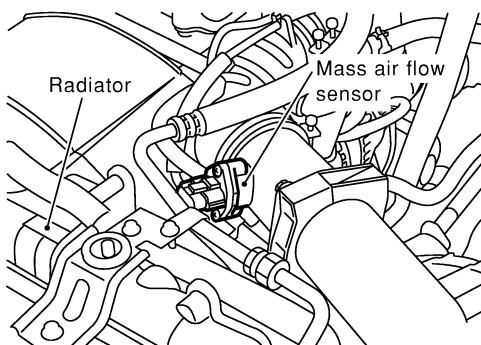
## Wiring Diagram



## Diagnostic Procedure

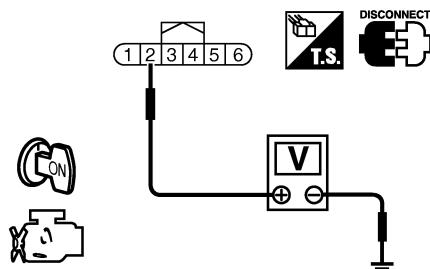
### 1 CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor harness connector.



SEF226Z

3. Turn ignition switch "ON".
4. Check voltage between mass air flow sensor terminal 2 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

OK ► GO TO 3.

NG ► GO TO 2.

SEC015E

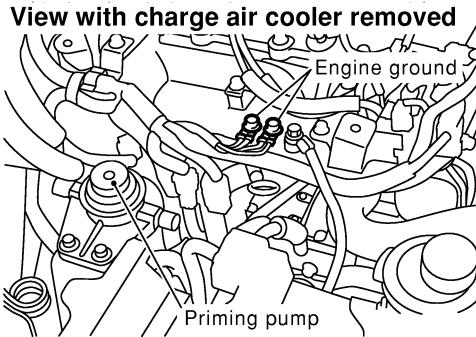
### 2 DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E230, F12
- Harness connectors M50, F5
- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and ECM relay

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

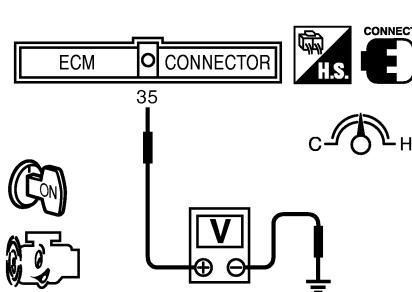
## Diagnostic Procedure (Cont'd)

3	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT			
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.				
				
SEF227Z				
<p>3. Disconnect ECM harness connector.          4. Disconnect TCM harness connector.          5. Check harness continuity between mass air flow sensor terminal 3 and ECM terminal 50, TCM terminal 42. Refer to Wiring Diagram.  <b>Continuity should exist.</b>          6. Also check harness for short to ground and short to power.</p>				
OK or NG				
OK	► GO TO 5.			
NG	► GO TO 4.			
4	DETECT MALFUNCTIONING PART			
<p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E230, F12</li> <li>● Harness connectors M51, F6</li> <li>● Harness connectors E106, M88</li> <li>● Harness for open or short between mass air flow sensor and ECM</li> <li>● Harness for open or short between mass air flow sensor and TCM (Transmission control module)</li> </ul>				
► Repair open circuit or short to ground or short to power in harness or connectors.				
5	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT			
<p>1. Check harness continuity between mass air flow sensor terminal 4 and ECM terminal 35. Refer to Wiring Diagram.  <b>Continuity should exist.</b>          2. Also check harness for short to ground and short to power.</p>				
OK or NG				
OK	► GO TO 7.			
NG	► GO TO 6.			
6	DETECT MALFUNCTIONING PART			
<p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E230, F12</li> <li>● Harness for open or short between mass air flow sensor and ECM</li> </ul>				
► Repair open circuit or short to ground or short to power in harness or connectors.				

## Diagnostic Procedure (Cont'd)

7	CHECK SHIELD CIRCUIT			
1. Disconnect harness connectors E230, F12. 2. Check harness continuity between harness connector F12 terminal 5 and ground. Refer to Wiring Diagram. <b>Continuity should exist.</b> 3. Also check harness for short to power.				
OK or NG				
OK ► GO TO 9.				
NG ► GO TO 8.				

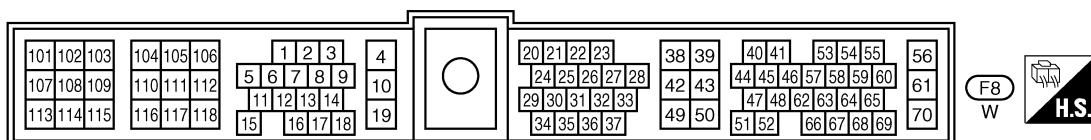
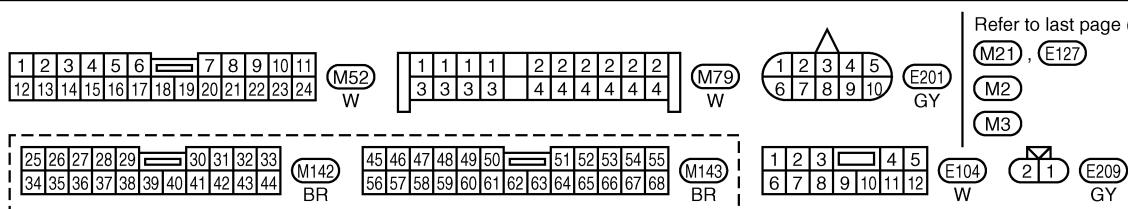
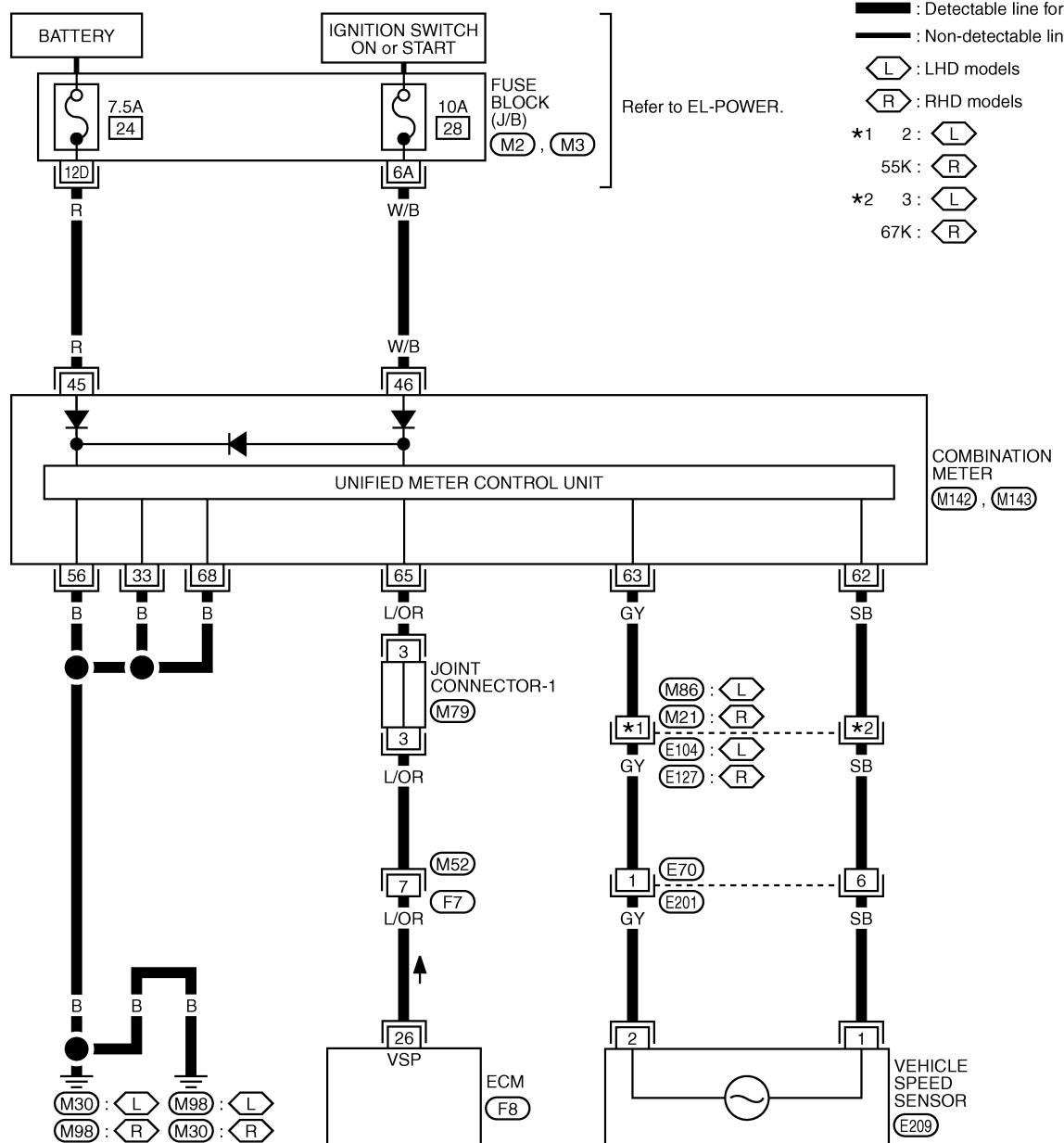
8	DETECT MALFUNCTIONING PART			
Check the following. ● Joint connector-4 ● Harness for open or short between harness connector F12 and ground				
► Repair open circuit or short to power in harness or connectors.				

9	CHECK MASS AIR FLOW SENSOR									
1. Reconnect harness connectors disconnected. 2. Start engine and warm it up to normal operating temperature. 3. Check voltage between ECM terminal 35 (Mass air flow sensor signal) and ground.										
										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ignition switch "ON" (Engine stopped.)</td> <td style="text-align: center;">Approx. 0.4</td> </tr> <tr> <td style="text-align: center;">Idle (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.5 - 1.9</td> </tr> <tr> <td style="text-align: center;">Idle to about 4,000 rpm*</td> <td style="text-align: center;">1.5 - 1.9 to Approx. 4.0</td> </tr> </tbody> </table>			Condition	Voltage V	Ignition switch "ON" (Engine stopped.)	Approx. 0.4	Idle (Engine is warmed-up to normal operating temperature.)	1.5 - 1.9	Idle to about 4,000 rpm*	1.5 - 1.9 to Approx. 4.0
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Ignition switch "ON" (Engine stopped.)	Approx. 0.4									
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Idle to about 4,000 rpm*	1.5 - 1.9 to Approx. 4.0									
*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.										
SEF400YA										
4. If the voltage is out of specification, proceed the following. a. Check for the cause of uneven air flow through mass air flow sensor. Refer to the following. ● Crushed air ducts ● Malfunctioning seal of air cleaner element ● Uneven dirt of air cleaner element ● Improper specification of intake air system parts b. If NG, repair or replace malfunctioning part and perform steps 2 to 4 again. 5. Turn ignition switch "OFF". 6. Disconnect MAFS harness connector and connect it again. 7. Perform steps 2 and 3 again.										
OK or NG										
OK ► GO TO 10.										
NG ► Replace mass air flow sensor.										

10	CHECK INTERMITTENT INCIDENT			
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-107 in Service Manual (Publication No. SM9E-Y61CG3).				
► INSPECTION END				

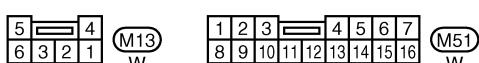
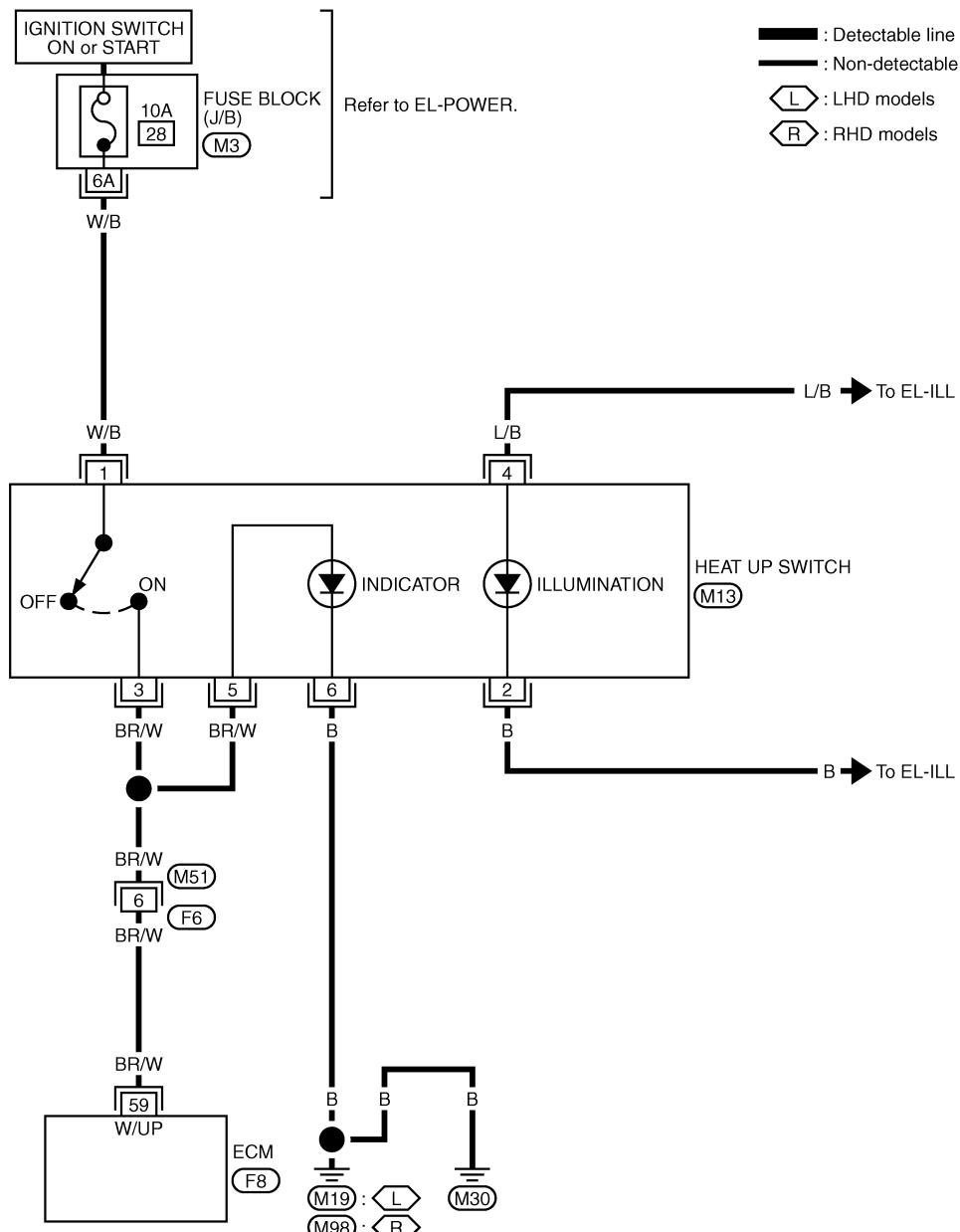
## Wiring Diagram

EC-VSS-01

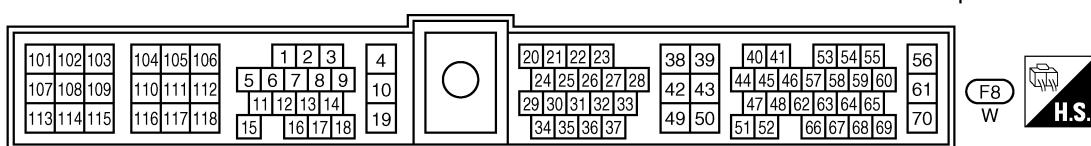


## Wiring Diagram

## EC-HEATUP-01

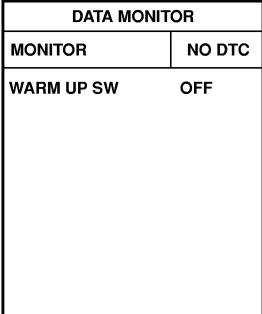


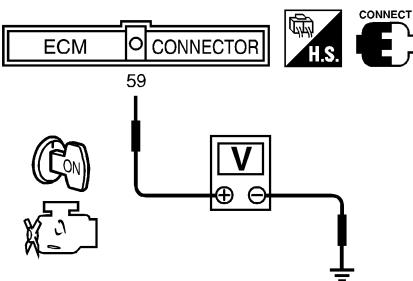
| Refer to last page (Foldout page).



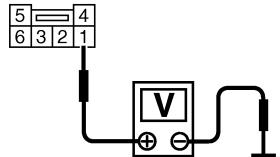
## Diagnostic Procedure

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

2	CHECK OVERALL FUNCTION						
<b>With CONSULT-II</b> 1. Turn ignition switch "ON". 2. Check "WARM UP SW" in "DATA MONITOR" mode with CONSULT-II under the following conditions.							
							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Conditions</th> <th style="text-align: center;">WARM UP SW</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Heat-up switch is "OFF".</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td style="text-align: center;">Heat-up switch is "ON".</td> <td style="text-align: center;">ON</td> </tr> </tbody> </table>		Conditions	WARM UP SW	Heat-up switch is "OFF".	OFF	Heat-up switch is "ON".	ON
Conditions	WARM UP SW						
Heat-up switch is "OFF".	OFF						
Heat-up switch is "ON".	ON						
OK or NG							
OK	► INSPECTION END						
NG	► GO TO 4.						

3	CHECK OVERALL FUNCTION						
<b>Without CONSULT-II</b> 1. Turn ignition switch "ON". 2. Check voltage between ECM terminal 59 and ground under the following conditions.							
							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Conditions</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Heat-up switch is "OFF".</td> <td style="text-align: center;">Approximately 0V</td> </tr> <tr> <td style="text-align: center;">Heat-up switch is "ON".</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table>		Conditions	Voltage	Heat-up switch is "OFF".	Approximately 0V	Heat-up switch is "ON".	Battery voltage
Conditions	Voltage						
Heat-up switch is "OFF".	Approximately 0V						
Heat-up switch is "ON".	Battery voltage						
OK or NG							
OK	► INSPECTION END						
NG	► GO TO 4.						

## Diagnostic Procedure (Cont'd)

4	CHECK HEAT UP SWITCH POWER SUPPLY CIRCUIT			
1. Turn heat up switch "OFF". 2. Turn ignition switch "OFF". 3. Disconnect heat up switch harness connector. 4. Turn ignition switch "ON". 5. Check voltage between heat up switch terminal 1 and ground with CONSULT-II or tester.				
 				
<b>Voltage: Battery voltage</b>				
<b>OK or NG</b>				
OK	▶ GO TO 6.			
NG	▶ GO TO 5.			

SEC016E

5	DETECT MALFUNCTIONING PART			
Check the following.				
<ul style="list-style-type: none"> <li>● Fuse block (J/B) connector M3</li> <li>● 10A fuse</li> <li>● Harness for open or short between heat up switch and fuse</li> </ul>				
▶ Repair open circuit or short to ground or short to power in harness or connectors.				

6	CHECK HEAT UP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT			
1. Turn ignition switch "OFF".				
2. Disconnect ECM harness connector.				
3. Check harness continuity between ECM terminal 59 and heat up switch terminals 3, 5. Refer to Wiring Diagram. <b>Continuity should exist.</b>				
4. Also check harness for short to ground and short to power.				
<b>OK or NG</b>				
OK	▶ GO TO 8.			
NG	▶ GO TO 7.			

7	DETECT MALFUNCTIONING PART			
Check the following.				
<ul style="list-style-type: none"> <li>● Harness connectors M51, F6</li> <li>● Harness for open or short between heat up switch and ECM</li> </ul>				
▶ Repair open circuit or short to ground or short to power in harness or connectors.				

## HEAT UP SWITCH

ZD30DDTi

### Diagnostic Procedure (Cont'd)

#### 8 CHECK HEAT UP SWITCH INDICATOR LAMP GROUND CIRCUIT FOR OPEN OR SHORT

1. Check harness continuity between heat up switch terminal 6 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to power.

OK or NG

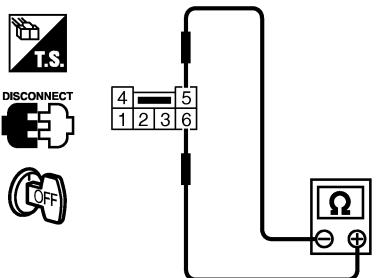
OK ► GO TO 9.

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

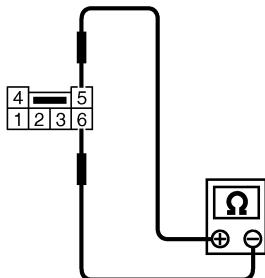
#### 9 CHECK HEAT UP SWITCH INDICATOR LAMP

Check harness continuity between heat up switch terminals 5 and 6 under the following conditions.

##### CONDITION 1



##### CONDITION 2



Condition	Continuity
1	Should exist.
2	Should not exist.

SEC018E

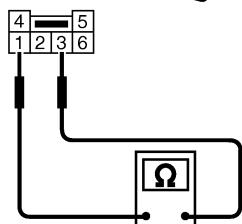
OK or NG

OK ► GO TO 10.

NG ► Replace heat up switch.

#### 10 CHECK HEAT UP SWITCH

Check continuity between heat up switch terminals 1 and 3 under the following conditions.



Conditions	Continuity
Heat-up switch is "OFF".	Should not exist.
Heat-up switch is "ON".	Should exist.

SEC017E

OK or NG

OK ► GO TO 11.

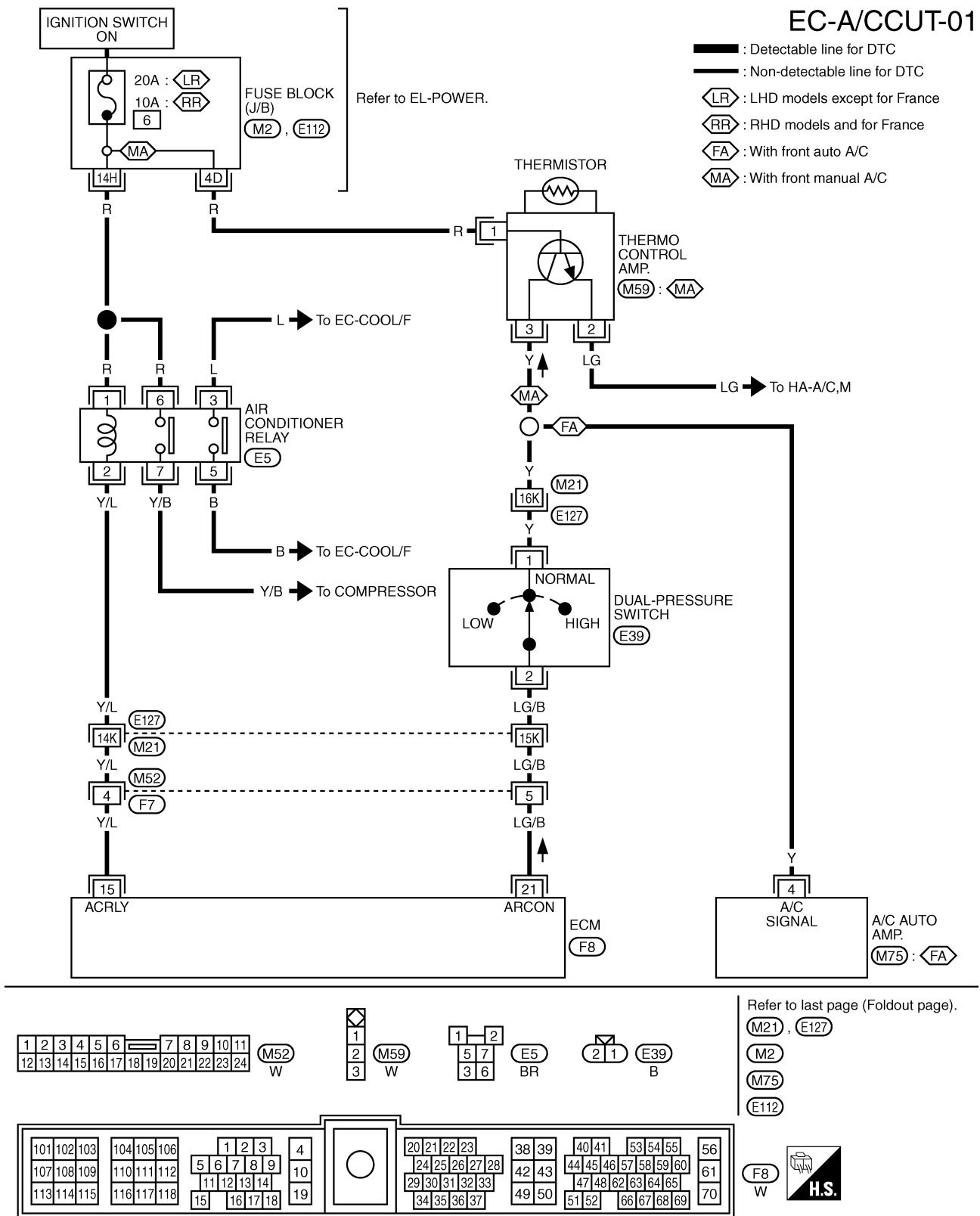
NG ► Replace heat up switch.

#### 11 CHECK INTERMITTENT INCIDENT

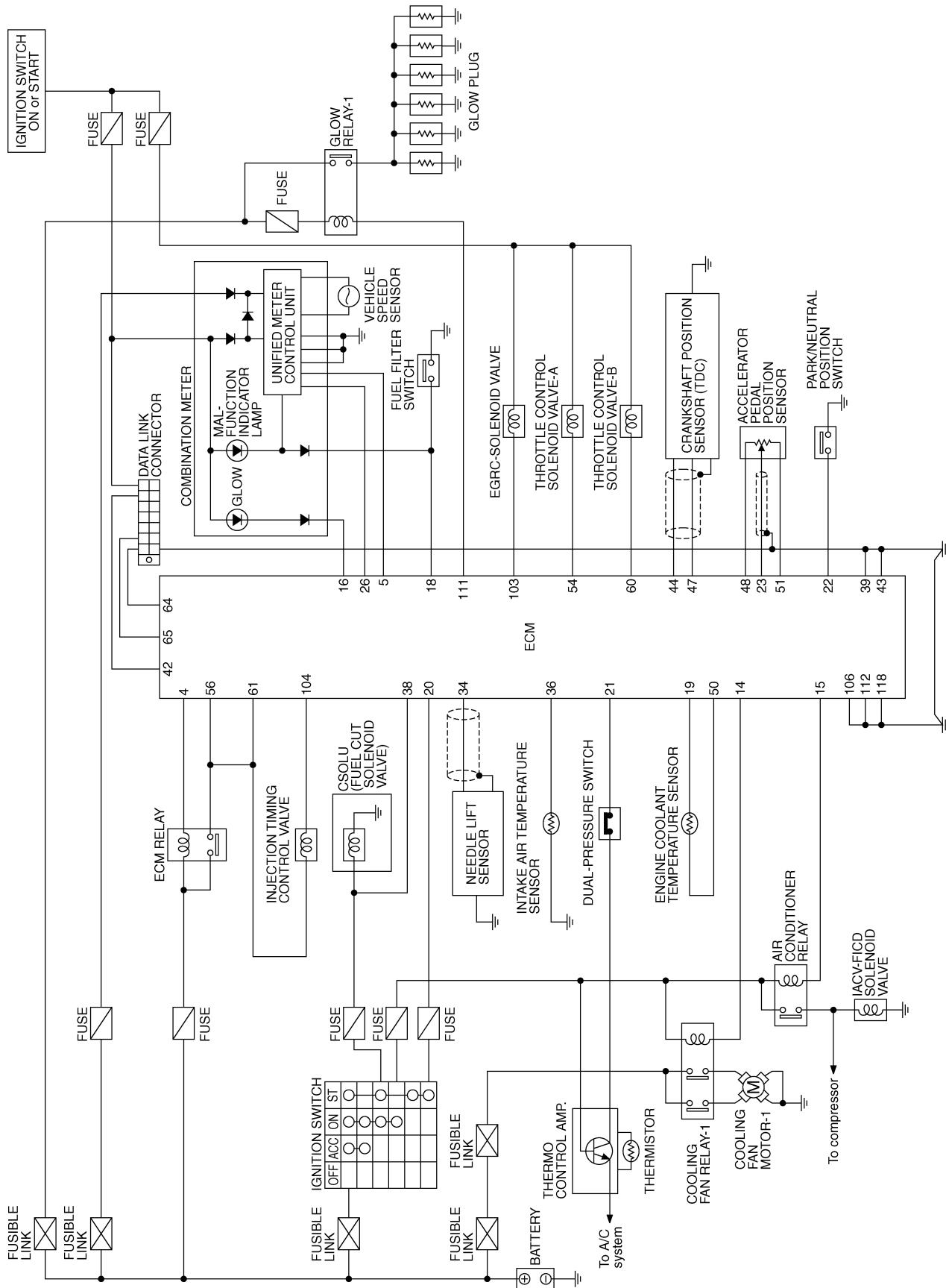
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-107 in Service Manual (Publication No. SM9E-Y61CG3).

► INSPECTION END

## Wiring Diagram



## Circuit Diagram



TEC539M

## Vehicle Speed Sensor (VSS)

EC-VSS-01

