

ENGINE CONTROL SYSTEM

SECTION **EC**

EC

MODIFICATION NOTICE:

TD series engine

- TD25Ti engine has been added for Europe. For specifications other than those described here, refer to the TD25 engine.

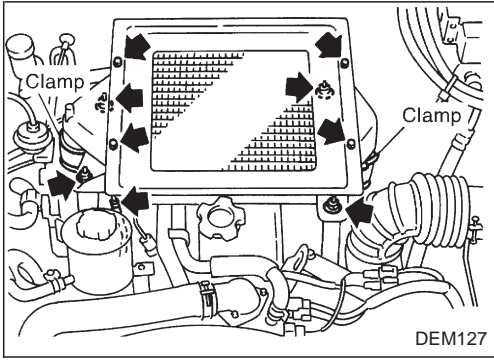
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When you read wiring diagrams:

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

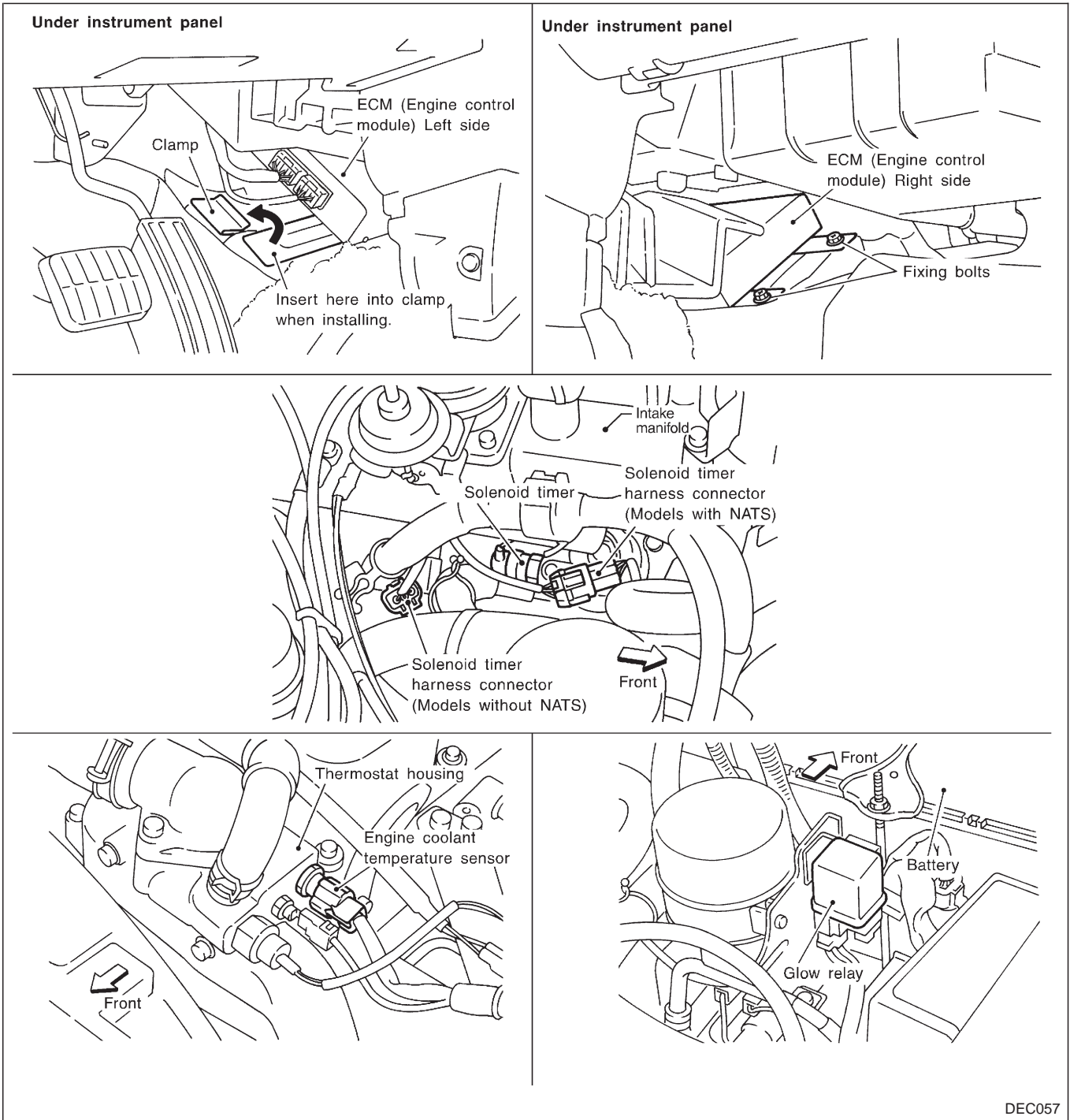
When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES" and "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".



Removal

- Remove charge air cooler before removing injection tube.

Component Parts Location

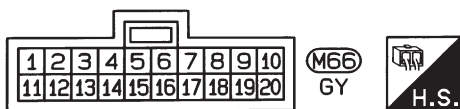
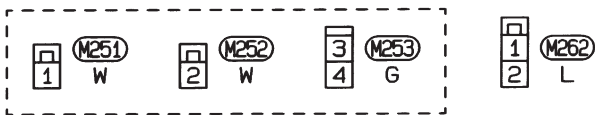
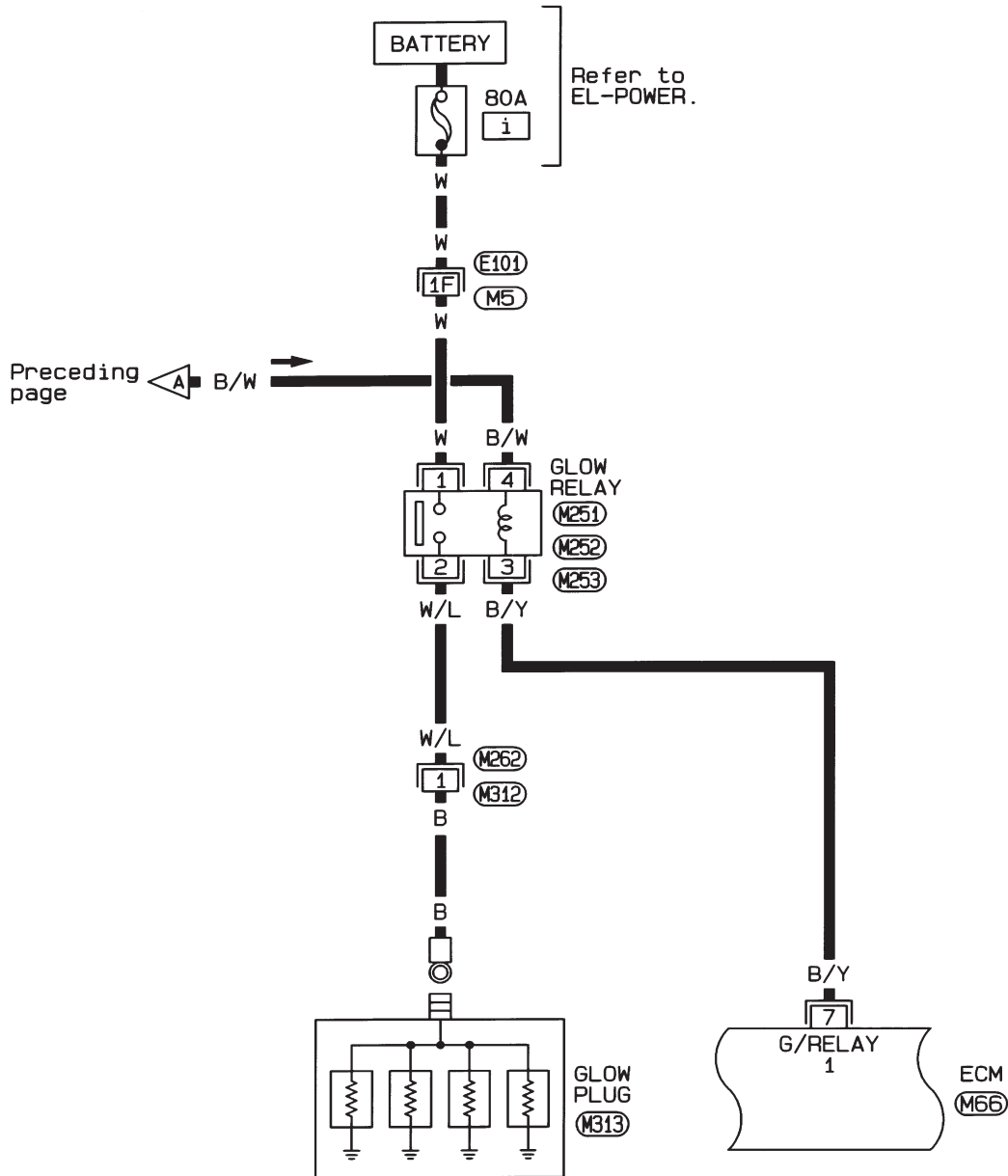


DEC057

Wiring Diagram

TD25 & TD25Ti ENGINE (LHD)

EC-GLOW-14



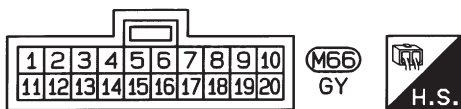
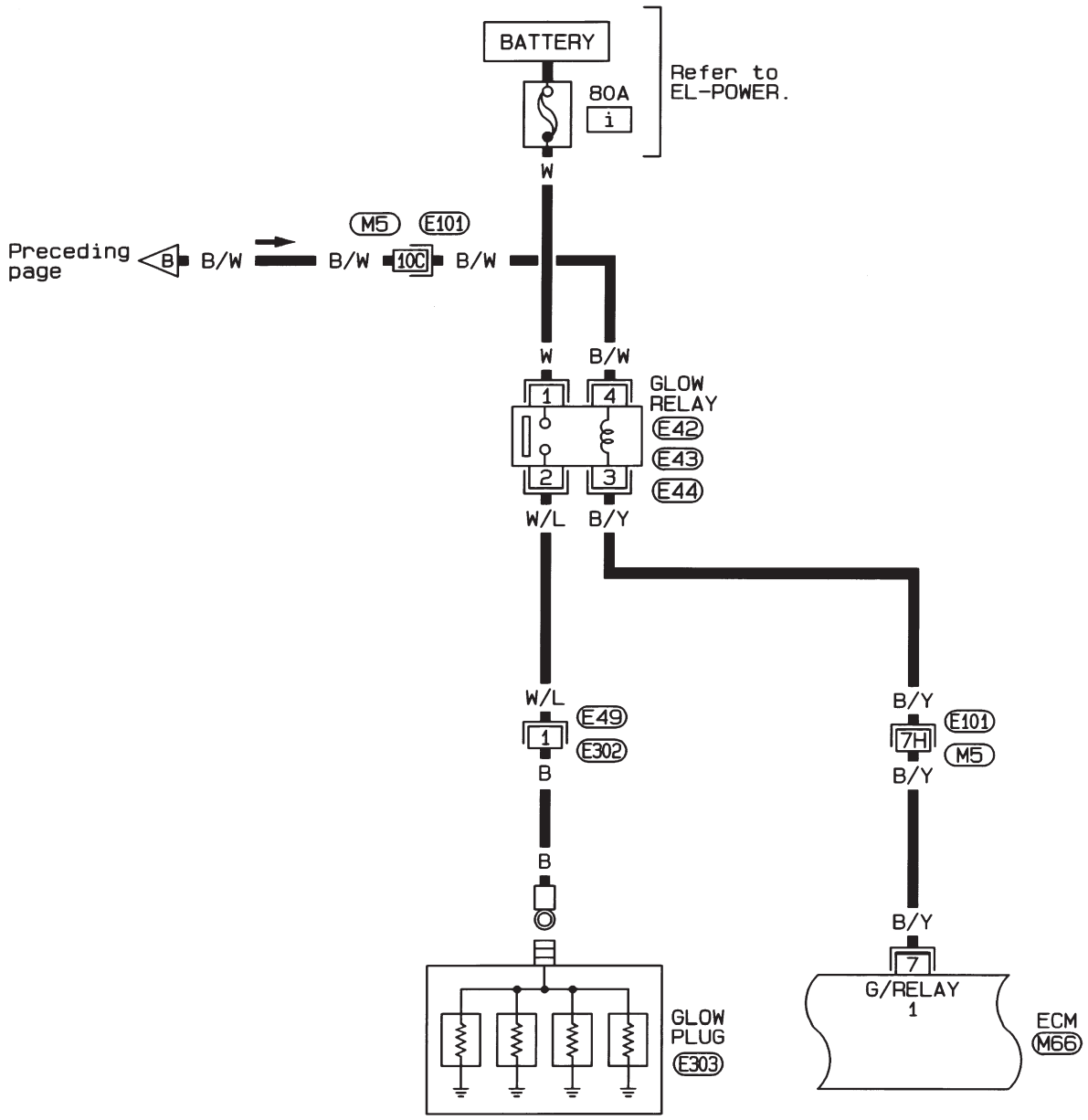
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M5, E101

Wiring Diagram (Cont'd)

TD25 & TD25Ti ENGINES (RHD)

EC-GLOW-17



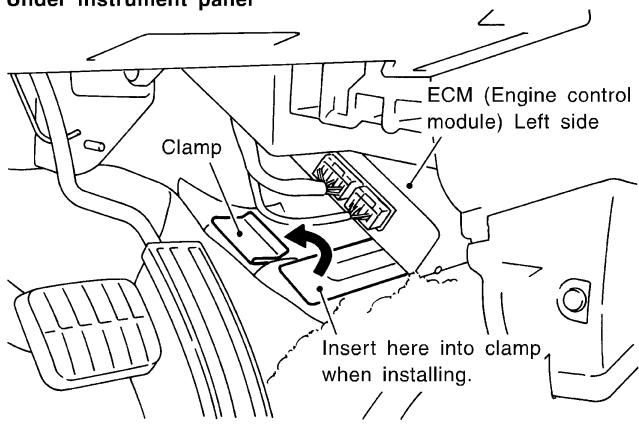
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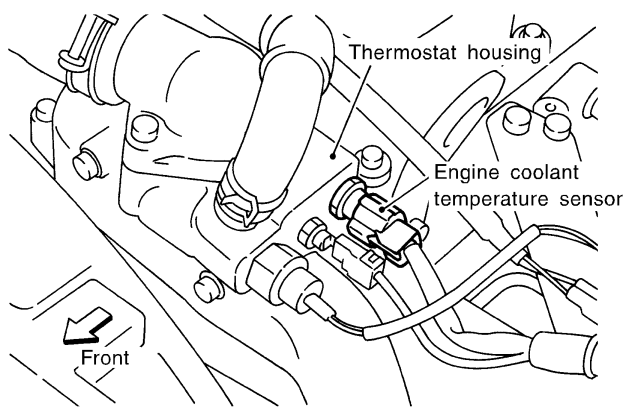
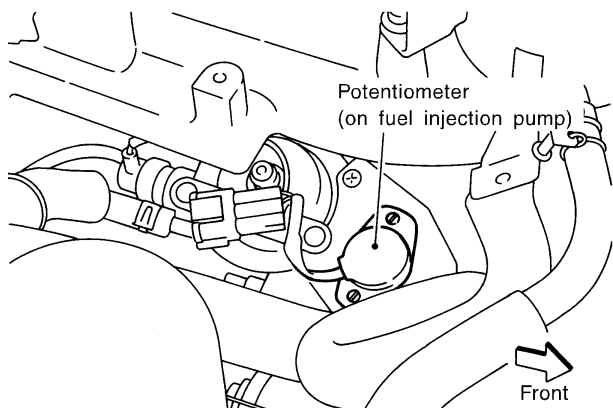
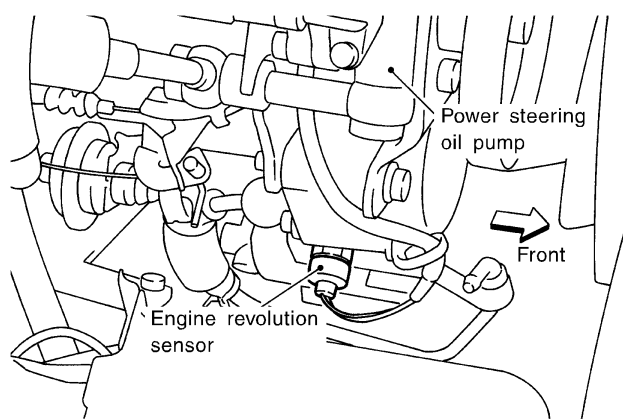
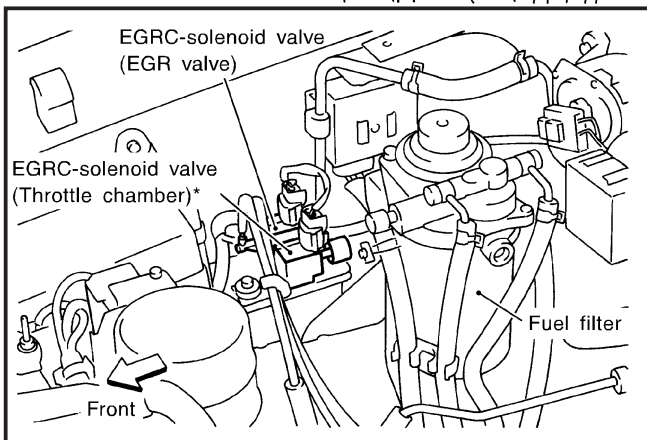
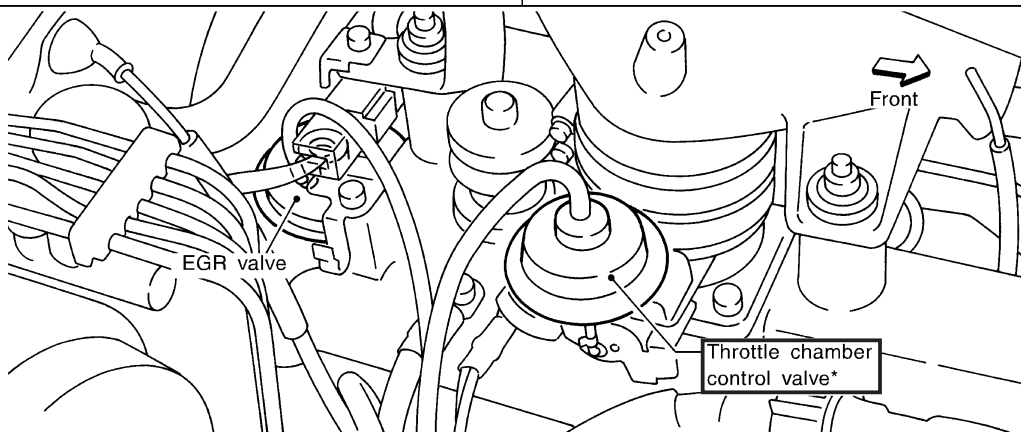
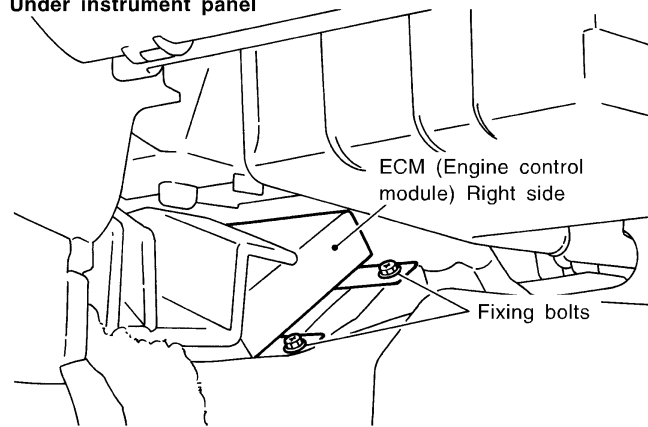
Component Parts Location

TD25Ti ENGINE

Under instrument panel



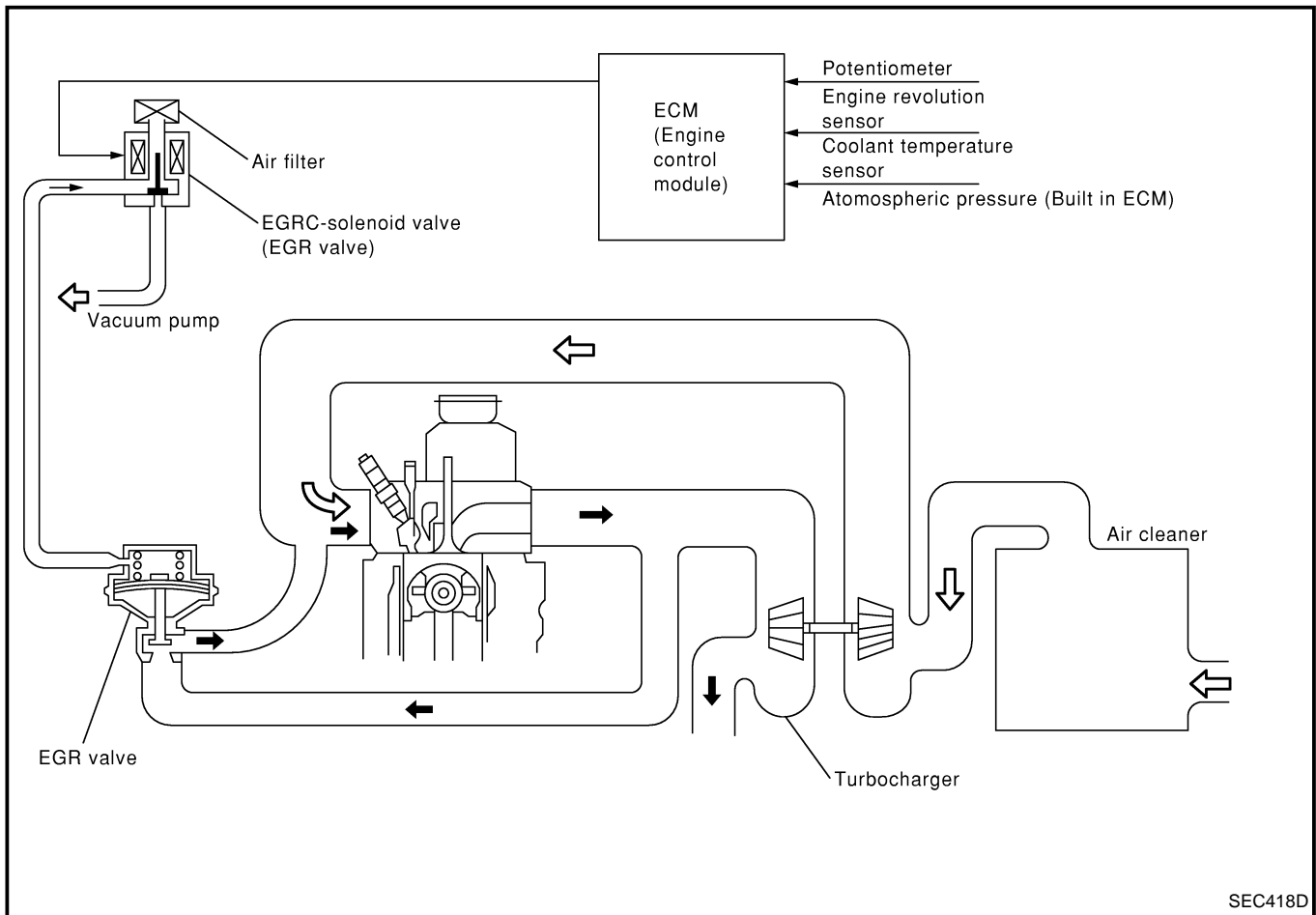
Under instrument panel



*: If so equipped.

Description

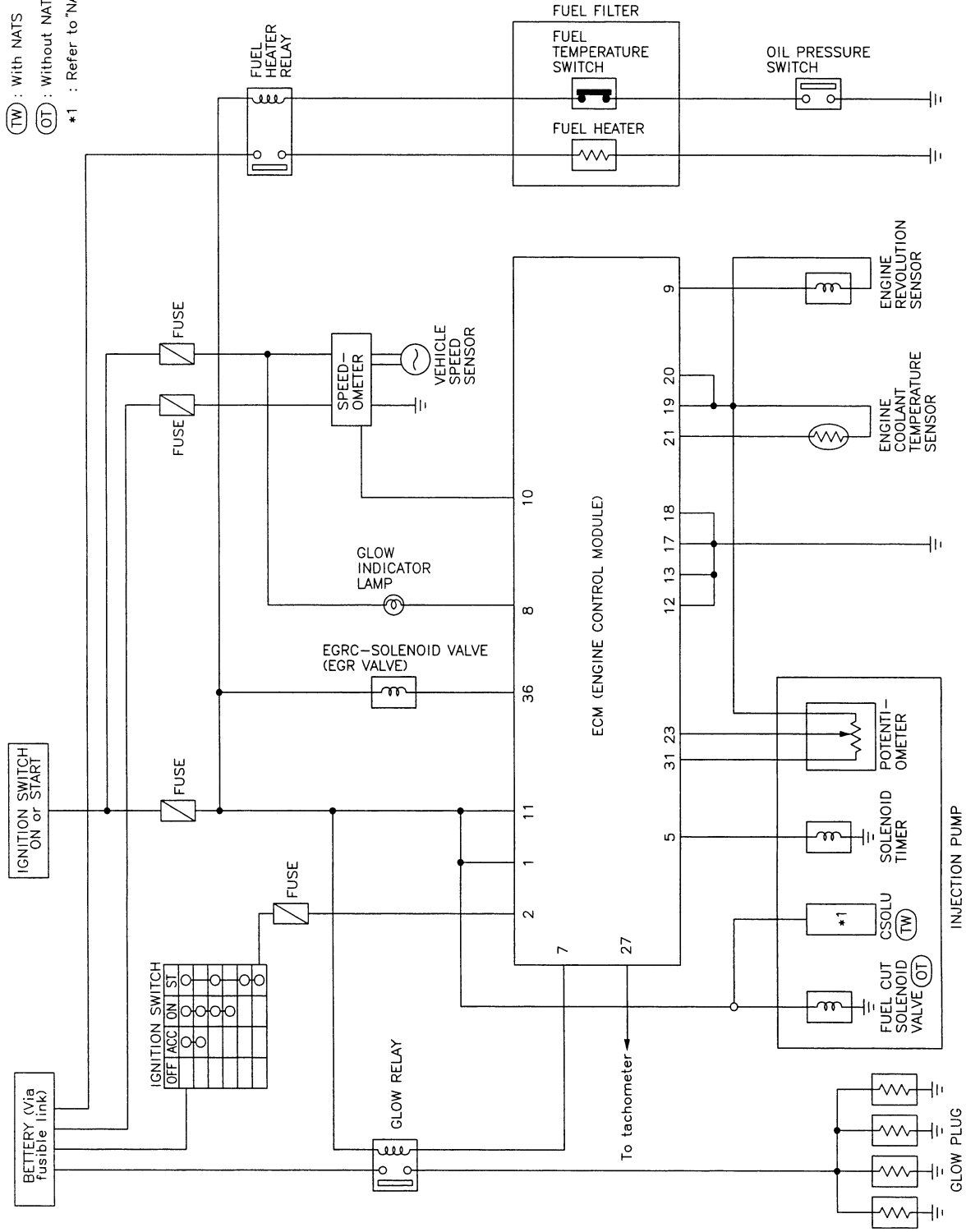
TD25Ti ENGINE



The EGR system is designed to control the formation of NO_x emission by recirculating the exhaust gas into the intake manifold passage through the EGR valve.
For electrical circuit of the EGR system, refer to "Circuit Diagram" on the next page.

Circuit Diagram

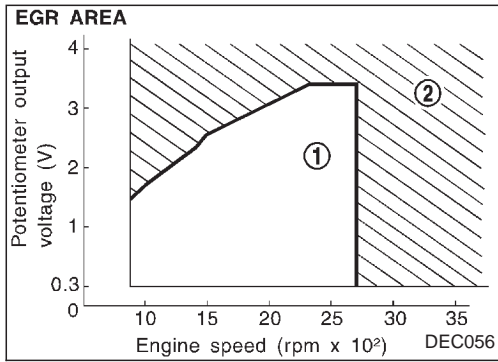
(TW) : With NATS
 (OT) : Without NATS
 *1 : Refer to "NATS" in EL section.

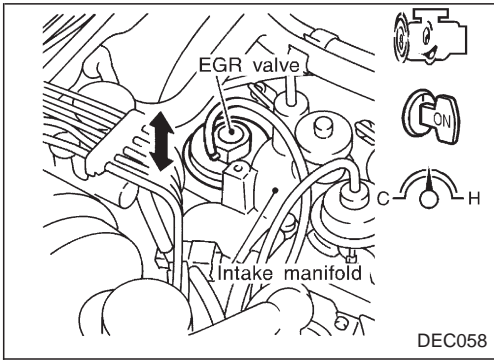


Operation

Coolant temperature °C (°F)	Engine load (EGR area)	EGRC-solenoid valve (EGR valve)	EGR valve	Flow of EGR gas
Below 60 (140)	All	OFF (Closed)	Closed	No
Above 60 (140)	Low load (Area ①)	ON (Open)	Open	Yes
	High load*1 (Area ②)	OFF (Closed)	Closed	No

*1: Also includes conditions, in which the engine is stopped with the ignition switch ON or the atmospheric pressure is below 90.0 kPa (900 mbar, 675 mmHg, 26.57 inHg).





System Inspection

OVERALL FUNCTION

1. Start engine and warm it up sufficiently.
2. Make sure that EGR valve diaphragm movement (Use your finger to confirm EGR valve diaphragm movement) under the following conditions.

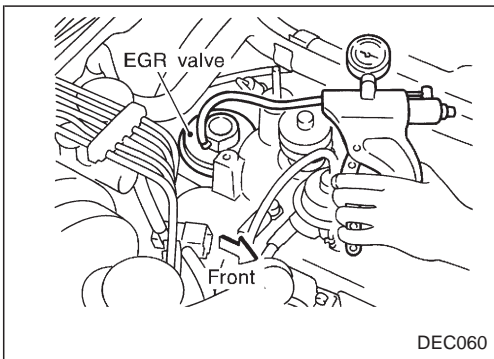
At idle:

Diaphragm does not move.

Revving engine from idle to between 1,000 and 2,700

rpm:

Diaphragm moves.



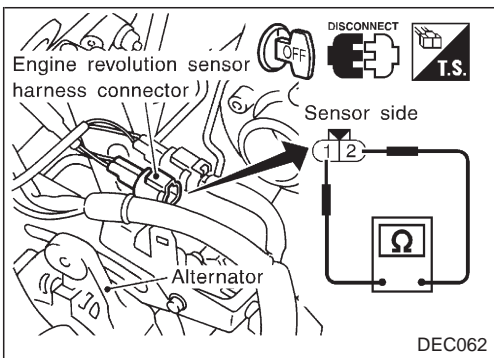
Component Inspection

EGR valve

Apply vacuum to EGR vacuum port with a hand vacuum pump.

EGR valve diaphragm should lift.

If NG, replace EGR valve.

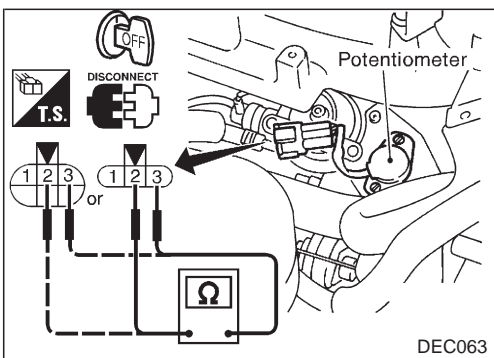


Engine revolution sensor

1. Disconnect engine revolution sensor harness connector.
2. Check resistance between terminals ① and ②.

Resistance: Approximately 1.6 kΩ [at 25°C (77°F)]

If NG, replace sensor.



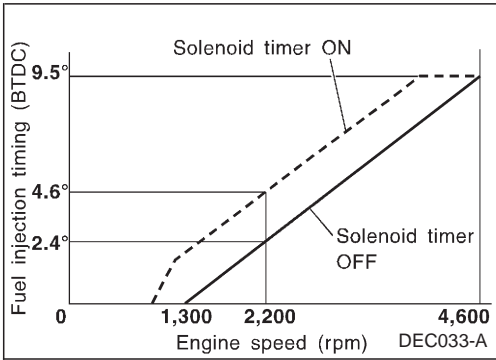
Potentiometer

1. Disconnect potentiometer harness connector.
2. Make sure that resistance between terminals ② and ③ changes when accelerator operated.

Accelerator pedal condition	Resistance kΩ [at 20°C (68°F)]
Completely released	Approximately 0.7
Partially depressed	0.7 - 5
Completely depressed	Approximately 5

If NG, replace potentiometer.

EC-1009



Operation

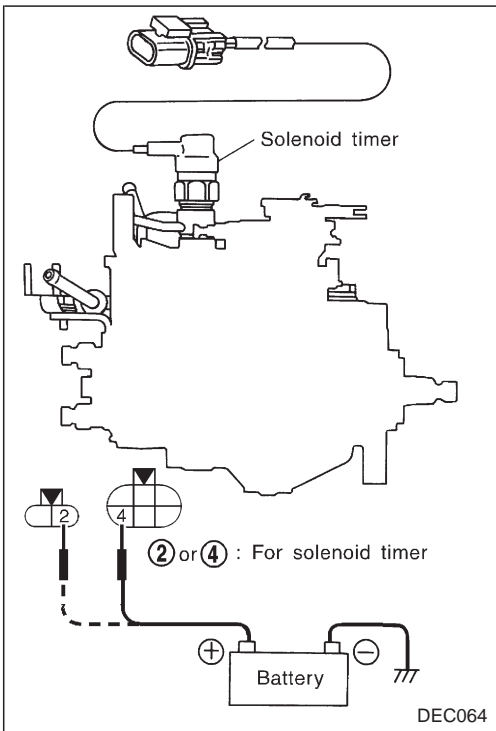
TIMER CHARACTERISTICS

The figures show the differences in fuel injection timing in relation to engine speed when the solenoid timer is both ON and OFF.

When the solenoid timer turns ON, fuel injection timing advances by approximately 2°. Thus, cold engine starting in cold weather is greatly improved.

Application:

	Part No.	Pump assembly No.
TD25Ti	16700 3S900	104780-9010
	16700 3S901	104780-9020



Inspection

SOLENOID TIMER

1. Disconnect solenoid timer harness and check for “clicking” sound from solenoid when battery is connected and disconnected.

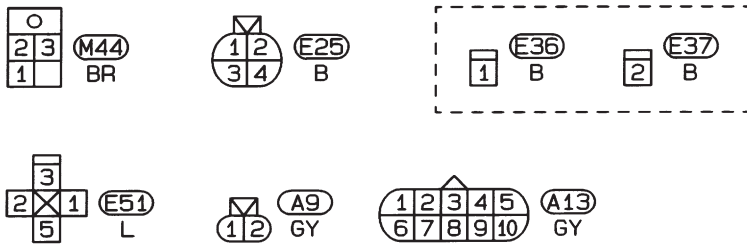
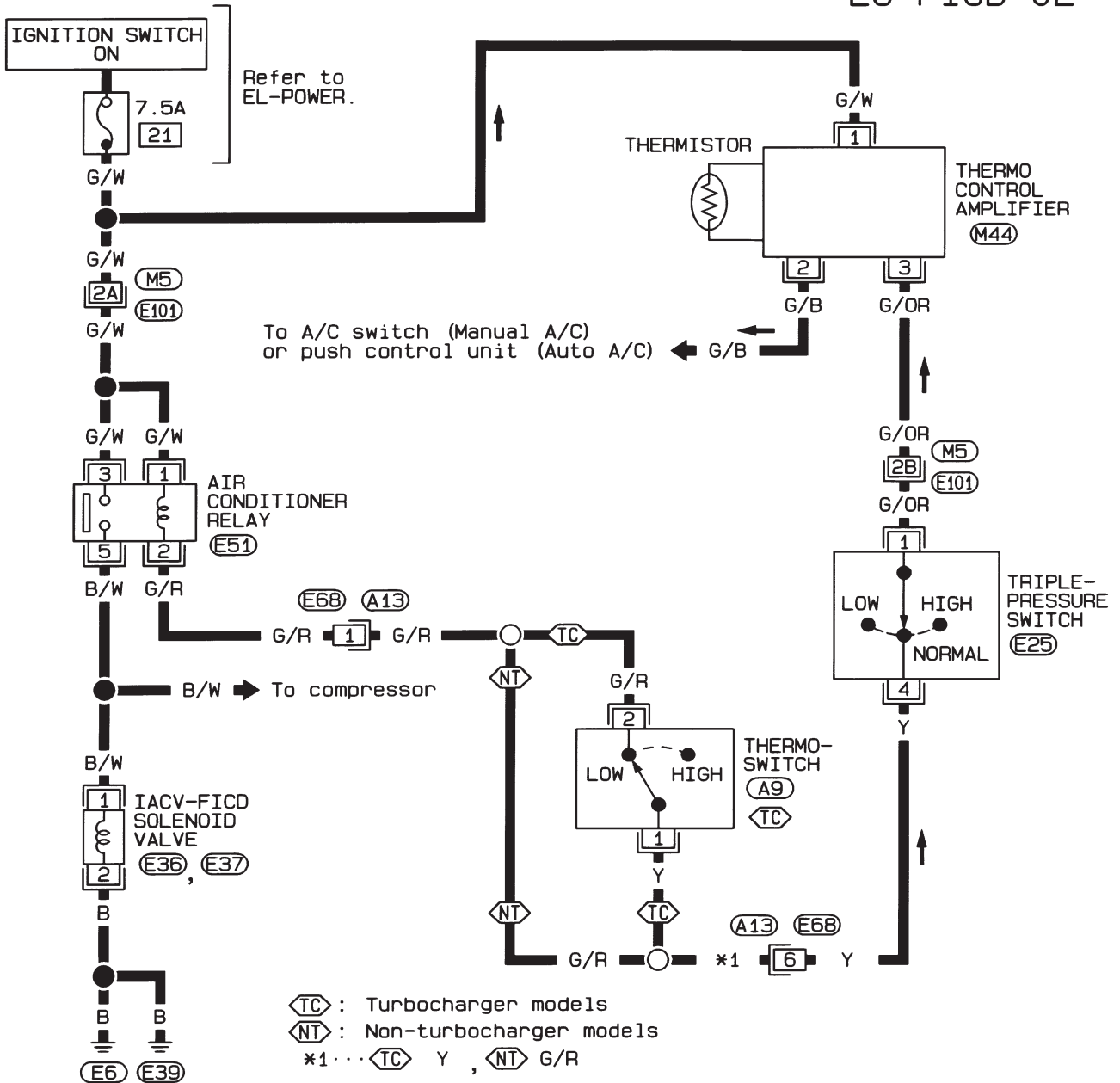
If solenoid has malfunction, replace it.

After checking, reconnect the connector.

Wiring Diagram

FOR EUROPE

EC-FICD-02



Refer to last page (Foldout page).

(M5), (E101)

VE-type Injection Pump

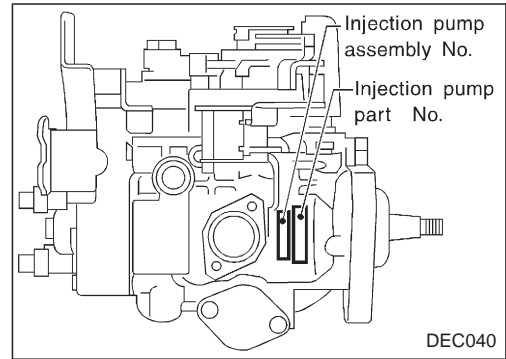
APPLICATION

Engine	Destination	Part No.	Pump assembly No.	Remarks
TD25Ti	Europe	16700 3S900	104780-9010	
		16700 3S901	104780-9020	With Nissan Anti-Theft System (NATS)

INSPECTION AND ADJUSTMENT

Plunger lift

Engine	Plunger lift at TDC mm (in)		Part No.	Pump assembly No.
	Inspection	Adjustment		
TD25Ti	0.71±0.05 (0.0280 ±0.0020)	0.71±0.02 (0.0280 ±0.0008)	16700 3S900	104780-9010
			16700 3S901	104780-9020



Injection Pump Calibration Standard

TD25Ti ENGINE MODEL

Pump rotation: Clockwise—viewed from drive side

Injection pump assembly No.	104780-9010/ 104780-9020
Part No.	16700 3S900/ 16700 3S901

1. Test conditions

1 - 1 Nozzle: 105780-0060 (NP-DN0SD1510)	1 - 4 Injection pipe: 2 dia. x 6 dia. x 450 mm (0.08 dia. x 0.24 dia. x 17.72 in)
1 - 2 Nozzle holder: 105780-2150	1 - 5 Fuel oil temperature: 45 ⁺⁵ ₀ °C (113 ⁺⁹ ₀ °F)
1 - 3 Nozzle opening pressure: 13,000 ⁺³⁰⁰ ₀ kPa (130.0 ^{+3.0} ₀ bar, 133 ⁺³ ₀ kg/cm ² , 1,891 ⁺⁴³ ₀ psi)	1 - 6 Supply pump pressure: 20 kPa (0.20 bar, 0.2 kg/cm ² , 2.8 psi)

2. Setting	Pump speed rpm	Settings	Charge air press kPa (mbar, mmHg, inHg)	Difference in delivery ml (Imp fl oz)
2 - 1 Timing device travel	1,100	OFF 2.1 - 2.5 mm (0.083 - 0.098 in)	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)	—
2 - 2 Supply pump pressure	1,100	OFF 403 - 461 kPa (4.03 - 4.61 bar, 4.11 - 4.7 kg/cm ² , 58 - 67 psi)	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)	—
2 - 3 Full-load delivery	1,200 (Full)	71.1 - 72.1 ml (2.50 - 2.54 Imp fl oz)/1,000 st	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)	6.0 (0.21)
	800 (BCS)	53.4 - 54.4 ml (1.88 - 1.91 Imp fl oz)/1,000 st	30.7 - 33.3 (307 - 333, 230 - 250, 9.06 - 9.84)	—
	500 (NA)	39.0 - 40.0 ml (1.37 - 1.41 Imp fl oz)/1,000 st	0 (0, 0, 0)	—
2 - 4 Idle speed regulation	350	7.4 - 11.4 ml (0.26 - 0.40 Imp fl oz)/1,000 st	0 (0, 0, 0)	2.0 (0.07)
2 - 5 Start	100	60.0 - 95.0 ml (2.11 - 3.34 Imp fl oz)/1,000 st*	0 (0, 0, 0)	—
2 - 6 Full-load speed regulation	2,500	14.7 - 18.7 ml (0.52 - 0.66 Imp fl oz)/1,000 st	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)	—
2 - 7 Load timer adjustment	1,100	1.5 - 1.9 mm (0.059 - 0.075 in)	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)	—

3. Test specifications	Charge air pressure	65.4 - 68.0 kPa (653 - 680 mbar, 490 - 510 mmHg, 19.29 - 20.08 inHg)			
	Solenoid timer	ON		OFF	
3 - 1 Timing device	N = rpm mm (in)	1,100 3.6 - 4.6 (0.142 - 0.181)*	2,150 7.3 - 8.2 (0.287 - 0.323)	700 Below 0.8 (0.031)	1,100 2.0 - 2.6 (0.079 - 0.102)
3 - 2 Supply pump	N = rpm kPa (bar, kg/cm ² , psi)	—		1,100 393 - 471 (3.93 - 4.71, 4.01 - 4.8, 57 - 68)	2,150 608 - 686 (6.08 - 6.86, 6.2 - 7.0, 88 - 100)
3 - 3 Overflow delivery	N = rpm ml (Imp fl oz)/min.	1,100 320 - 580 (11.3 - 20.4)		—	

3 - 4 Fuel injection quantities

Speed control lever position	Pump speed rpm	Fuel delivery ml (Imp fl oz)/1,000 st	Charge air press kPa (mbar, mmHg, inHg)
Max. speed	1,200 (Full)	70.6 - 72.6 (2.49 - 2.56)	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)
	800 (BCS)	52.9 - 53.9 (1.86 - 1.90)	30.7 - 33.3 (307 - 333, 230 - 250, 9.06 - 9.84)
	500 (NA)	38.5 - 40.5 (1.36 - 1.43)	0 (0, 0, 0)
	1,000	69.3 - 74.3 (2.44 - 2.62)*	65.4 - 68.0 (653 - 680, 490 - 510, 19.29 - 20.08)
	1,500	68.1 - 74.1 (2.40 - 2.61)*	
	2,000	63.7 - 69.7 (2.24 - 2.45)*	
	2,250	46.2 (1.63)*	
	2,500	13.7 - 19.7 (0.48 - 0.69)	
2,750	Below 5.0 (0.18)		
Switch OFF Magnet valve	350	0 (0)	0 (0, 0, 0)
Idling	350	6.9 - 11.9 (0.24 - 0.42)	0 (0, 0, 0)
3 - 5 Solenoid	Max. cut-in voltage: 8V Test voltage: 12 - 14V		

4. Dimensions	
K	3.2 - 3.4 mm (0.126 - 0.134 in)
KF	5.7 - 5.9 mm (0.224 - 0.232 in)
MS	0.6 - 0.8 mm (0.024 - 0.031 in)
BCS	6.8 - 7.2 mm (0.268 - 0.283 in)
Pre-stroke	0.08 - 0.12 mm (0.0031 - 0.0047 in)
Control lever angle	
α	51.0 - 59.0 degree
β	31.0 - 41.0 degree
γ	—

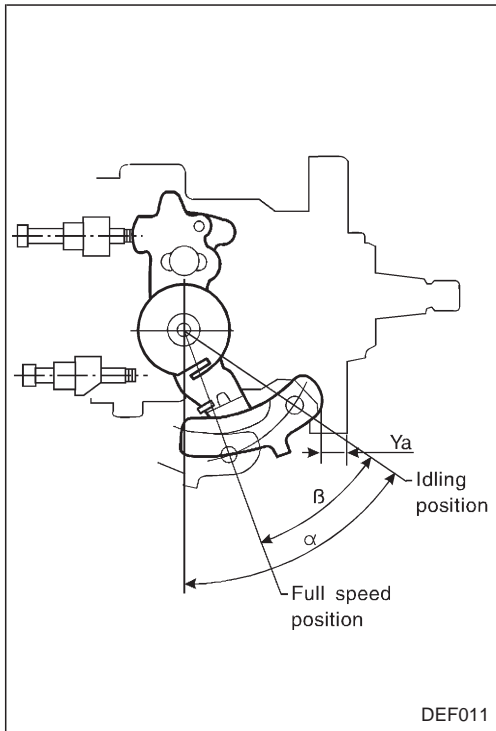
ON: Solenoid timer is ON. *: Reference value
OFF: Solenoid timer is OFF.

If there is no designation in the specifications for the Solenoid Timer's ON-OFF position, then the position should be regarded as OFF.

Injection Pump Calibration Standard (Cont'd)

Control lever angle measurement position

Measure the control lever angles (α , β).



Load timer adjustment

- Adjust the governor shaft so that the clearance between the end of the flange and the end of the governor shaft is approximately 3 mm (0.12 in) and then lock the nut.
- Fix the control lever in the position satisfying the following conditions.
 - Boost pressure:** 66.7 ± 1.3 kPa (667 ± 13 mbar, 500 ± 10 mmHg, 19.69 ± 0.39 inHg)
 - Pump speed:** 1,100 rpm
 - Fuel injection quantity:** 44.0 ± 0.5 ml (1.55 ± 0.02 Imp fl oz)/1,000 st
- With the control lever positioned as described in 2. above, adjust the governor sleeve so that the timer stroke conforms to the specified values (item 2 - 7 of the pump setting table).
- Fix the control lever in the position satisfying the following conditions, and confirm the timer stroke.

Control lever position			Specified values	
Pump speed rpm	Fuel injection quantity ml (Imp fl oz)/1,000 st	Boost pressure kPa (mbar, mmHg, inHg)	Timer stroke mm (in)	Timer stroke reduction value mm (in)
1,100	44.0 ± 1.0 (1.55 ± 0.04)	66.7 ± 1.3 (667 ± 13 , 500 ± 10 , 19.69 ± 0.39)	1.7 ± 0.3 (0.067 ± 0.012)	0.6 (0.024)*
1,100	20.0 ± 2.5 (0.70 ± 0.09)	66.7 ± 1.3 (667 ± 13 , 500 ± 10 , 19.69 ± 0.39)	0.7 ± 0.5 (0.028 ± 0.020)	1.6 (0.063)*

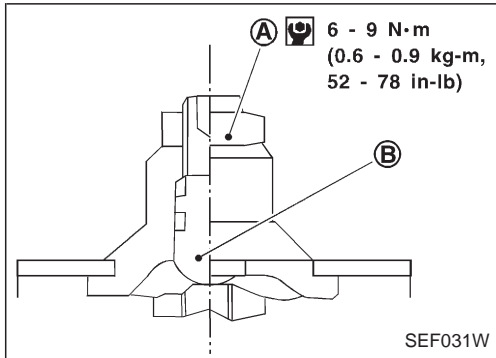
*: Reference value

Potentiometer adjustment

- Hold the control lever in the idling position.
- Adjust the potentiometer so that the output voltage is 1.4 ± 0.03 V. Then fix the potentiometer.
- After adjusting the potentiometer, confirm the potentiometer's output voltage specifications at full control lever angle below.

Output voltage V	Control lever angle	Remarks
1.4 ± 0.03	Idle	Adjusting point
Above 9.5	Full	Check point

(Input voltage: 10V)



Injection Pump Calibration Standard (Cont'd)

Boost compensator (BCS) adjustment

1. Adjust full load injection quantities at pump speed of 1,200 rpm to value as described in item 2-3 of the pump setting table.
2. Adjust BCS's injection quantities at pump speed of 800 rpm to value as described in item 2-3 of the pump setting table.
3. Confirm the NA's injection quantities at pump speed of 500 rpm to value as described in item 2-3 of the pump setting table.
4. If the NA above is not as specified, loosen nut (A) and adjust screw (B) so that NA is as specified and then tighten nut (A).

CAUTION:

Do not tighten or loosen screw (B) more than 1 turn.