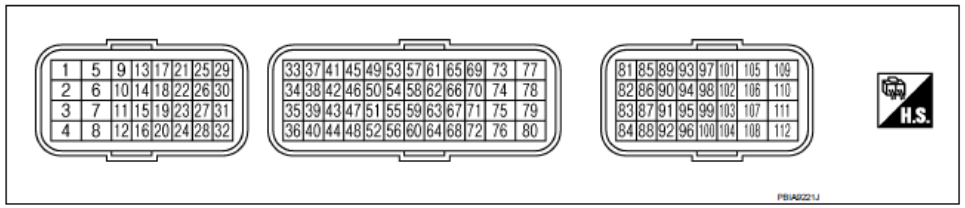
HR12DE - ECM TERMINALS

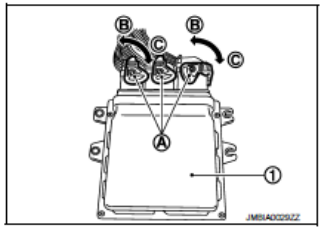
*3: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-130, "How to Handle Battery"

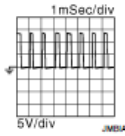
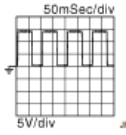
TERMINAL LAYOUT

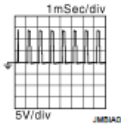
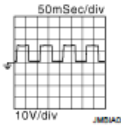
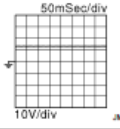
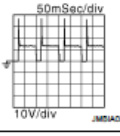


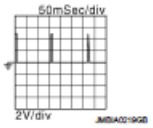
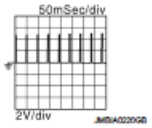
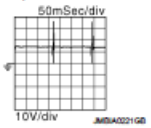
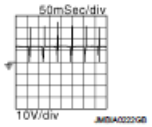
PHYSICAL VALUES

NOTE:
- ECM is located in the engine room left side near battery.
- When disconnecting ECM harness connector (A), loosen (C) it with levers as far as they will go as shown in the figure.
  - ECM (1)
  - Fasten (B)
- Connect a break-out box and harness adapter between the ECM and ECM harness connector.
  - Use extreme care not to touch 2 pins at one time.
  - Data is for comparison and may not be exact.
- Specification data are reference values and are measured between each terminals.
- Pulse signal is measured by CONSULT-III.



Terminal No. +	Terminal No. –	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
1 (L)	107 (B)	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: 1st position • Accelerator pedal: Fully depressed	2 V★ 
2 (SB)	107 (B)	Throttle control motor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
3 (G)	107 (B)	A/F sensor 1 heater	Output	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	2.9 - 8.8 V★ 

Terminal No. +	Terminal No. –	Description: Signal name	Description: Input/ Output	Condition	Value (Approx.)
4 (P)	107 (B)	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Shift lever: 1st position • Accelerator pedal: Fully released	2 V★ 
5 (G)	107 (B)	Heated oxygen sensor 2 heater	Output	[Engine is running] • Engine speed: Below 3,900 rpm after the following conditions are met – Engine: after warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	10 V★ 
				[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,900 rpm	BATTERY VOLTAGE (11 - 14 V)
9 (P)	107 (B)	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed • Accelerator pedal is not depressed even slightly, after engine starting	BATTERY VOLTAGE (11 - 14 V)★ 
				[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	BATTERY VOLTAGE (11 - 14 V)★ 
10 (B)	—	ECM ground	—	—	—
11 (B)	—	ECM ground	—	—	—
12 (R) 16 (LG) 20 (G) 24 (SB)	107 (B)	EGR volume control valve (step 1) EGR volume control valve (step 3) EGR volume control valve (step 2) EGR volume control valve (step 4)	Output	[Engine is running] • Idle speed	0.5 V or BATTERY VOLTAGE (11 - 14 V) Output voltage varies with EGR volume control valve opening angle (step).

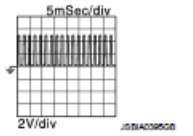
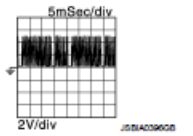
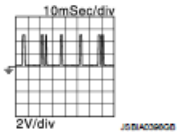
Terminal No. +	Terminal No. –	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
15 (Y)	107 (B)	Throttle control motor relay	Output	[Ignition switch: ON → OFF]	0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
				[Ignition switch: ON]	0 - 1.0 V
17 (R)	107 (B)	Ignition signal No. 1	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0 - 0.3 V★ 
18 (LG)		Ignition signal No. 2			
22 (SB)		Ignition signal No. 3		[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	0.2 - 0.5 V★ 
23 (GR)	107 (B)	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
				[Ignition switch: ON] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14 V)
29 (Y)	107 (B)	Fuel injector No. 3	Output	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★ 
30 (O)		Fuel injector No. 2			
31 (L)		Fuel injector No. 1		[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★ 
27 (LG)	107 (B)	Fuel pump control module (FPCM) check	Input	[Ignition switch: ON] • For 1 second after turning ignition switch ON	10 V
				[When cranking engine]	8 V
				[Engine is running] • Warm-up condition • Idle speed	10.5 - 11.5 V

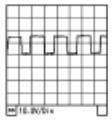
< ECU DIAGNOSIS INFORMATION > [HR12DE (TYPE 1)]

Terminal No. +	Terminal No. –	Description Signal name	Description Input/ Output	Condition	Value (Approx.)
28 (R)	107 (B)	Fuel pump control module (FPCM)	Output	[When cranking engine]	0 V
				[Engine is running] • Warm-up condition • Idle speed	4 - 6 V
32 (P)	107 (B)	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0 V
				[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
33 (LG)	36 (Y)	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Shift lever: 1st position • Accelerator pedal: Fully released	More than 0.36 V
				[Ignition switch: ON] • Engine stopped • Shift lever: 1st position • Accelerator pedal: Fully depressed	Less than 4.75 V
34 (O)	36 (Y)	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Shift lever: 1st position • Accelerator pedal: Fully released	Less than 4.75 V
				[Ignition switch: ON] • Engine stopped • Shift lever: 1st position • Accelerator pedal: Fully depressed	More than 0.36 V
36 (Y)	—	Sensor ground (Throttle position sensor)	—	—	—
37 (W)	40 —	Knock sensor	Input	[Engine is running] • Idle speed	2.5 V
38 (P)	44 (B)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.
39*1 (P)	—	—	—	—	—
40 —	—	Sensor ground (Knock sensor shield circuit)	—	—	—
42 (O)	51 (Y)	EGR temperature sensor	Input	[Engine is running] • Warm-up condition	Less than 4.8 V
				[Engine is running] • Warm-up condition • EGR system: Operating	0 - 1.5 V
44 (B)	—	Sensor ground (Engine coolant temperature sensor)	—	—	—

Terminal No. +	Terminal No. −	Description Signal name	Input/ Output	Condition	Value (Approx.)
45 (G)	52 (LG)	Mass air flow sensor	Input	[Ignition switch ON] • Engine stopped	0.4 V
				[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.3 V
				[Engine is running] • Warm-up condition • Engine is revving from idle to about 4,000 rpm	0.9 - 1.3 to 2.4 V (Check for linear voltage rise in response to engine being increased to about 4,000 rpm.)
46 (V)	55 (O)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.
49 (L)	107 (B)	A/F sensor 1	Input	[Ignition switch: ON]	2.2 V
50 (W)	59 (B)	Heated oxygen sensor 2	Input	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 1.0 V
51 (LG)	—	Sensor ground (EGR temperature sensor)	—	—	—
52 (LG)	—	Sensor ground (Mass air flow sensor)	—	—	—
53 (R)	107 (B)	A/F sensor 1	Input	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	1.8 V Output voltage varies with air fuel ratio.
54*1 (V)	—	—	—	—	—
55 (O)	—	Sensor ground (Intake air temperature sensor)	—	—	—
56 (P)	—	Sensor ground (Heated oxygen sensor 1)	—	—	—
57*1 (R)	—	—	—	—	—
58 (R)	68 (V)	Battery current sensor	Input	[Engine is running] • Battery: Fully charged*2 • Idle speed	2.5 - 3.5 V
59 (B)	—	Sensor ground (Heated oxygen sensor 2)	—	—	—

ECM

Terminal No. +	Terminal No. −	Description Signal name	Input/ Output	Condition	Value (Approx.)
61 (W)	62 (R)	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	4.0 V★ 
				[Engine is running] • Engine speed: 2,000 rpm	4.0 V★ 
62 (R)	—	Sensor ground [Crankshaft position sensor (POS)]	—	—	—
63 (BR)	—	Sensor ground [Camshaft position sensor (PHASE)]	—	—	—
65 (G)	63 (BR)	Camshaft position sensor (PHASE)	Input	[Engine is running] • Warm-up condition • Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle	0.8 V★ 
				[Engine is running] • Engine speed is 2,000 rpm	0.8 V★ 
68 (BR)	—	Sensor ground (Battery current sensor)	—	—	—
69 (W)	107 (B)	PNP signal	Input	[Ignition switch: ON] • Shift lever: Neutral position	BATTERY VOLTAGE (11 - 14 V)
				[Ignition switch: ON] • Shift lever: Except above position	0 V
71 (V)	68 (Y)	Sensor power supply (Battery current sensor)	—	[Ignition switch: ON]	5 V
72 (V)	36 (Y)	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5 V

Terminal No. +	Terminal No. −	Description: Signal name	Description: Input/Output	Condition	Value (Approx.)
73 (P)	107 (B)	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] • Warm-up condition • When revving engine up to 2,000rpm quickly	7 - 10 V★ 
75 (BR)	62 (R)	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5 V
78 (O)	63 (BR)	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5 V
81 (P)	107 (B)	Power supply for ECM (Back-up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
83 (P)	—	CAN communication line	Input/Output	—	—
84 (L)	—	CAN communication line	Input/Output	—	—
85 (GR)	98 (BR)	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V
88 (SB)	—	Data link connector	Input/Output	—	—
93 (O)	107 (B)	Ignition switch	Input	[Ignition switch: OFF]	0 V
				[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
98 (BR)	—	Sensor ground (Refrigerant pressure sensor)	—	—	—
99 (R)	107 (B)	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0 V
				[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
101 (W)	98 (BR)	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5 V
102 (BR)	104 (R)	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5 V
103 (W)	104 (R)	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V

ECM

< ECU DIAGNOSIS INFORMATION > [HR12DE (TYPE 1)]

Terminal No. +	Terminal No. −	Description: Signal name	Description: Input/Output	Condition	Value (Approx.)
104 (R)	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—
105 (G)	107 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
106 (V)	111 (GR)	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5 V
107 (B)	—	ECM ground	—	—	—
110 (SB)	111 (GR)	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111 (GR)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)
*1: Not used for engine control system.
*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-130, "How to Handle Battery".