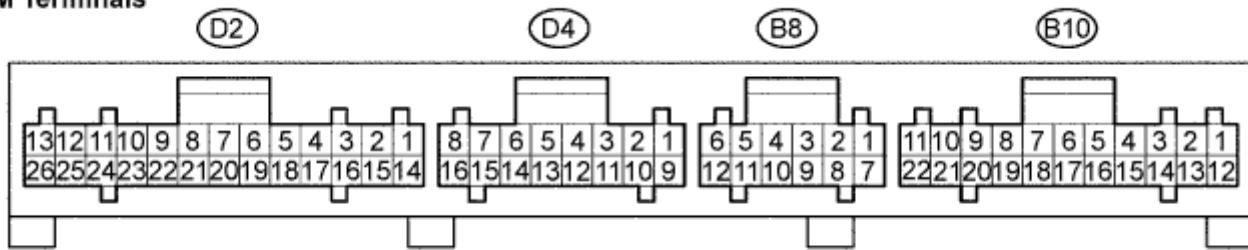**ECM Terminals**

HINT:

Each ECM terminal's standard normal voltage is shown in the table below.

In the table, first follow the information under "Condition". Look under "Symbols (Terminal No.)" for the terminals to be inspected. The standard normal voltage between the terminals is shown under "STD Voltage". Use the illustration above as a reference for the ECM terminals.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	STD Voltage
BATT (B10-1) - E1 (D2-14)	B-R - BR	Battery (for measuring the battery voltage and for the ECM memory)	Always	9 to 14 V
SREL (B10-2) - E01 (D2-13)	G - BR	Glow plug relay	Cranking	9 to 14 V
SREL (B10-2) - E01 (D2-13)	G - BR	Glow plug relay	Idling (engine start and after 600 sec.)	0 to 1.5 V
MREL (B10-3) - E1 (D2-14)	G-Y - BR	EFI relay	IG switch ON	9 to 14 V
MREL (B10-3) - E1 (D2-14)	G-Y - BR	EFI relay	IG switch OFF (after IG switch OFF for 2 sec.)	0 to 1.5 V
TC (B10-4) - E1 (D2-14)	P - BR	Terminal TC of DLC3	IG switch ON	9 to 14 V
W (B10-5) - E1 (D2 -14)	G-R - BR	MIL	Check engine warning light lights up	0 to 3 V
W (B10-5) - E1 (D2-14)	G-R - BR	MIL	Except check engine warning light lights up	9 to 14 V
RFC (B10-7) - E1 (D2-14)	LG-B - BR	Cooling fan ECU	IG switch ON or fan is rotating	Pulse generation (See waveform 1)
THWO (B10-8) - E1 (D2-14)	Y - BR	Combination meter	IG switch ON	Pulse generation

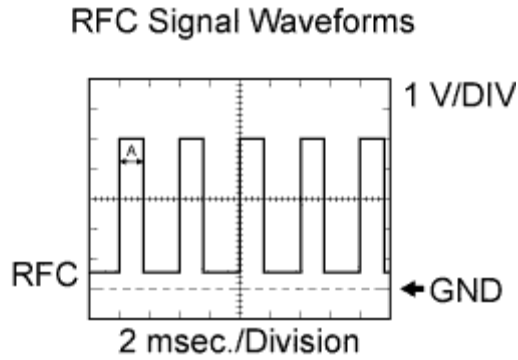|				(See waveform 2)
SPD (B10-9) - E1 (D2-14)	P-L- BR	Speed signal from combination meter	IG switch ON, Rotate driving wheel slowly	Pulse generation (See waveform 3)
STA (B10 -11) - E1 (D2-14)	R - BR	Starter signal	Cranking	6 V or more
+B (B10 -12) - E1 (D2-14)	B-R - BR	Power source of ECM	IG switch ON	9 to 14 V
FAN (B10-13) - E1 (D2-14)	W-L - BR	Fan relay	Sub fan is rotating	0 to 3 V
FAN (B10-13) - E1 (D2-14)	W-L - BR	Fan relay	Sub fan is not rotating	9 to 14 V
IGSW (B10-14) - E1 (D2-14)	B-R - BR	Engine switch	IG switch ON	9 to 14 V
SIL (B10-15) - E1 (D2-14)	W - BR	Terminal SIL of DLC3	Connect intelligent tester to DLC3	Pulse generation
STP (B10-19) - E1 (D2-14)	R-W - BR	Stop light switch	Brake pedal depressed	9 to 14 V
STP (B10-19) - E1 (D2-14)	R-W - BR	Stop light switch	Brake pedal released	Below 1.5 V
HSW (B10-20) - E1 (D2-14)	L-W - BR	Idle up switch	Idle up switch ON	Below 2.5 V
HSW (B10-20) - E1 (D2-14)	L-W - BR	Idle up switch	Idle up switch OFF	9 to 14 V
ALT (B10-22) - E1 (D2-14)	W - BR	Generator (alternator) duty ratio	Idling	Pulse generation (See waveform 4)
GIND (B8-1) - E1 (D2-14)	B-W - BR	Glow indicator light	Glow indicator light lights up	0 to 3 V
GIND (B8-1) - E1 (D2-14)	B-W - BR	Glow indicator light	Except glow indicator light lights up	9 to 14 V
AC1 (B8-2) - E1 (D2-14)	R-B - BR	A/C amplifier	A/C switch ON (at magnet clutch ON)	Below 1.5 V
AC1 (B8-2) - E1 (D2-14)	R-B - BR	A/C amplifier	A/C switch OFF	7.5 to 14 V
VPA (B8-5) - EPA (B8-4)	L - W-L	Accelerator pedal position sensor (for engine control)	IG switch ON, accelerator pedal released	0.5 to 1.1 V
VPA (B8-5) -	L - W-L	Accelerator pedal position	IG switch ON, accelerator pedal	2.6 to 4.5 V

Terminal	Wiring color	Description	Condition	Specified value
EPA (B8-4)		sensor (for engine control)	depressed	
VCPA (B8-6) - EPA (B8-4)	W - W-L	Power source of accelerator pedal position sensor (for VPA)	IG switch ON	4.5 to 5.5 V
TACH (B8-7) - E1 (D2-14)	B-Y - BR	Engine speed	Idling	Pulse generation (See waveform 5)
ACT (B8-8) - E1 (D2-14)	G-W - BR	A/C amplifier	IG switch ON	9 to 14 V
ACT (B8-8) - E1 (D2-14)	G-W - BR	A/C amplifier	At A/C cut controlled (Driving below 30 km/h (18.6 mph), accelerator pedal fully depressed for 5 sec.)	0 to 3 V
ST1 - (B8-11) - E1 (D2-14)	R-L - BR	Stop light switch	Brake pedal depressed	Below 1.5 V
ST1 - (B8-11) - E1 (D2-14)	R-L - BR	Stop light switch	Brake pedal released	9 to 14 V
VPA2 (B8-12) - EPA (B8-4)	B - W-L	Accelerator pedal position sensor (for sensor malfunction detection)	IG switch ON, accelerator pedal released	1.2 to 2.0 V
VPA2 (B8-12) - EPA (B8-4)	B - W-L	Accelerator pedal position sensor (for sensor malfunction detection)	IG switch ON, accelerator pedal depressed	3.4 to 5.3 V
VC (D4-1) - E2 (D4-9)	L-B - Y-R	Power source of sensor (a specific voltage)	IG switch ON	4.5 to 5.5 V
PIM (D4-2) - E2 (D4-9)	P - Y-R	Pressure sensor	Apply vacuum 60 kPa (450 mmHg, 17.7 in.Hg)	0.2 to 0.8 V
PIM (D4-2) - E2 (D4-9)	P - Y-R	Pressure sensor	Apply vacuum 207 kPa (1,550 mmHg, 61.0 in.Hg)	4.2 to 4.8 V
THA (D4-3) - E2 (D4-9)	R-L - Y-R	Intake air temperature sensor	Idling, air intake temp. 0°C (32°F) to 80°C (176°F)	0.5 to 3.4 V
THW (D4-4) - E2 (D4-9)	R-W - Y-R	Engine coolant temperature sensor	Idling, engine coolant temp. 60°C (140°F) to 120°C (248°F)	0.2 to 1.0 V
THF (D4-5) - E2 (D4-9)	R - Y-R	Fuel temperature sensor	IG switch ON (at engine cold)	0.5 to 3.4 V
DATA (D4-6) - E1 (D2-14)	Y - BR	Injection pump	For 0.5 sec. after IG switch ON	Pulse generation
PR2 (D4-8) - E1 (D2-14)	Y-G - BR	Pressure switch	Pressure switch ON (A/C pressure is normal)	Below 1.5 V
PR2 (D4-8) - E1 (D2-14)	Y-G - BR	Pressure switch	Pressure switch OFF (A/C pressure is low)	9 to 14 V
RTHW (D4-12) - E2 (D4-9)	L-R - Y-R	Radiator side engine coolant temperature sensor	Idling, radiator side engine coolant temp. 60°C (140°F) to 120°C (248°F)	0.2 to 1.0 V

CLK (D4-14) - E1 (D2-14)	L - Y-R	Injection pump	For 0.5 sec. after IG switch ON	Pulse generation
THOP (D4-15) - E1 (D2-14)	L - BR	Intake shutter fully opened switch	Idling (engine warmed up)	9 to 14 V
THOP (D4-15) - E1 (D2-14)	L - BR	Intake shutter fully opened switch	IG switch ON (once within 5 sec.)	0 to 3 V
LU-B (D2-7) - E01 (D2-13)	G - BR	Intake restrictor valve control motor (Intake shutter)	Racing (engine warmed up)	Pulse generation (See waveform 6)
LU+B (D2-8) - E01 (D2-13)	R - BR	Intake restrictor valve control motor (Intake shutter)	Racing (engine warmed up)	Pulse generation (See waveform 6)
LU-A (D2-9) - E01 (D2-13)	W - BR	Intake restrictor valve control motor (Intake shutter)	Racing (engine warmed up)	Pulse generation (See waveform 6)
LU+A (D2-10) - E01 (D2-13)	B - BR	Intake restrictor valve control motor (Intake shutter)	Racing (engine warmed up)	Pulse generation (See waveform 6)
TCV (D2-11) - E01 (D2-13)	B-W - BR	Timing control valve	IG switch ON	9 to 14 V
TCV (D2-11) - E01 (D2-13)	B-W - BR	Timing control valve	Idling	Pulse generation (See waveform 7)
SPV+ (D2-12) - E1 (D2-14)	B - BR	Spill control valve	IG switch ON	9 to 14 V
SPV+ (D2-12) - E1 (D2-14)	B - BR	Spill control valve	Idling	Pulse generation
TDC+ (D2-17) - TDC- (D2-16)	R - G	Crankshaft position sensor	Idling	Pulse generation (See waveform 8)
NE+ (D2-19) - NE- (D2-18)	Y - L	Engine speed sensor	Idling	Pulse generation (See waveform 8)

SPV- (D2-25) - E1 (D2-14)	B-L - BR	Spill control valve	Idling	Pulse generation (See waveform 9)

Waveform 1 (Reference):

RFC Signal Waveforms

1 V/DIV

RFC

← GND

2 msec./Division

C

1. Cooling fun signal.

Terminal	RFC - E1
Tool Setting	1 V/DIV., 2 ms/DIV.
Condition	When fan operating

2. HINT:
3. Waveform time A changes according to coolant temperature.
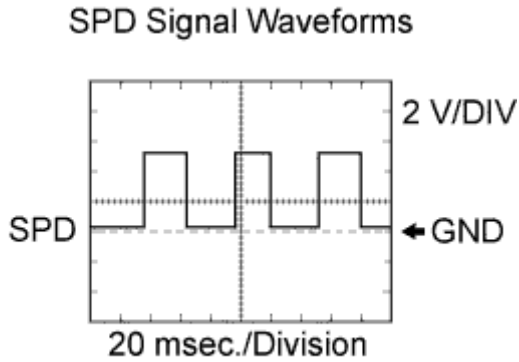
Waveform 2 (Reference):

THWO Signal Waveforms

5 V/DIV

THWO

← GND

0.1 sec./Division (Idling)

C

1. A/C amplifier signal.

Terminal	THWO - E1
Tool Setting	5 V/DIV., 0.1 s/DIV.
Condition	During idling

2. HINT:
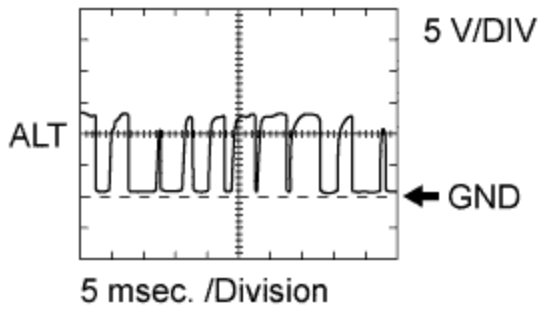3. Waveform time A changes according to coolant temperature.

Waveform 3 (Reference):

SPD Signal Waveforms

c

1. Speed signal.

Terminal	SPD - E1
Tool Setting	2 V/DIV., 20 ms/DIV.
Condition	When driving at approx. 20 km/h (12.4 mph).

2. HINT:
   - As vehicle speed increases, the waveform becomes shorter.
   - As vehicle speed increases, the waveforms amplitude become greater.

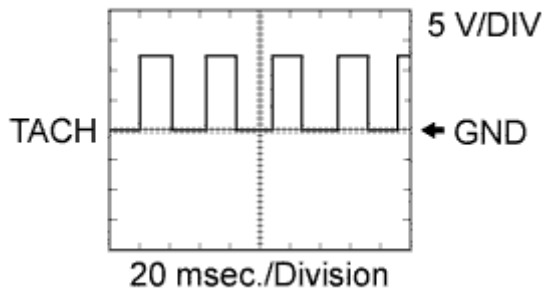Waveform 4 (Reference):

ALT Signal Waveforms

5 V/DIV

ALT

← GND

5 msec. /Division

c

1. Generator signal.

Terminal	ALT - E1
Tool Setting	5 V/DIV., 5 ms/DIV.
Condition	During idling

Waveform 5 (Reference):

TACH Signal Waveforms

5 V/DIV

TACH

← GND

20 msec./Division

c
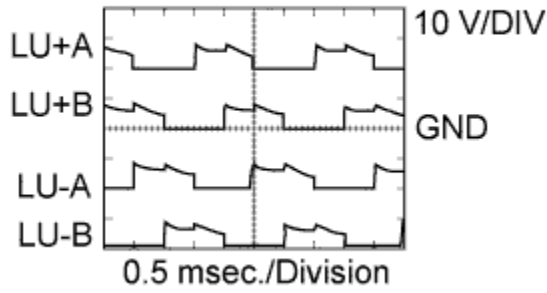
1. Engine speed signal.

Terminal	TACH - E1
Tool Setting	5 V/DIV., 20 ms/DIV.
Condition	1. After warming up 2. During idling

HINT:
As engine speed increases, the waveform becomes shorter.
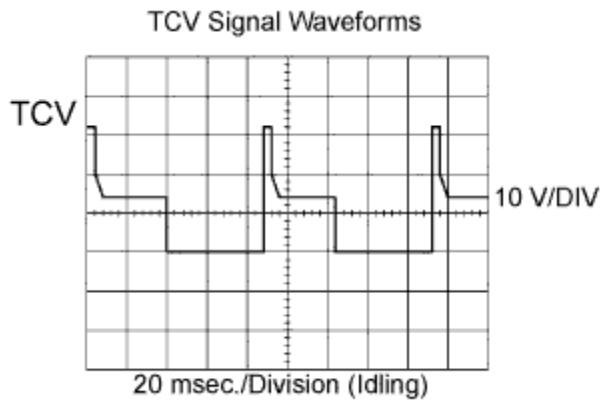
Waveform 6 (Reference):

Signal Waveforms

LU+A
LU+B
LU-A
LU-B

10 V/DIV
GND
0.5 msec./Division

c

1. Intake restrictor valve control motor signal.

Terminal	LU+A, LU-A, LU+B, LU-B - E01
Tool Setting	10 V/DIV., 0.5 ms/DIV.
Condition	During engine racing

Waveform 7 (Reference):

TCV Signal Waveforms

TCV

10 V/DIV

20 msec./Division (Idling)

1. Timing control value signal.

Terminal	TCV - E01
Tool Setting	10 V/DIV