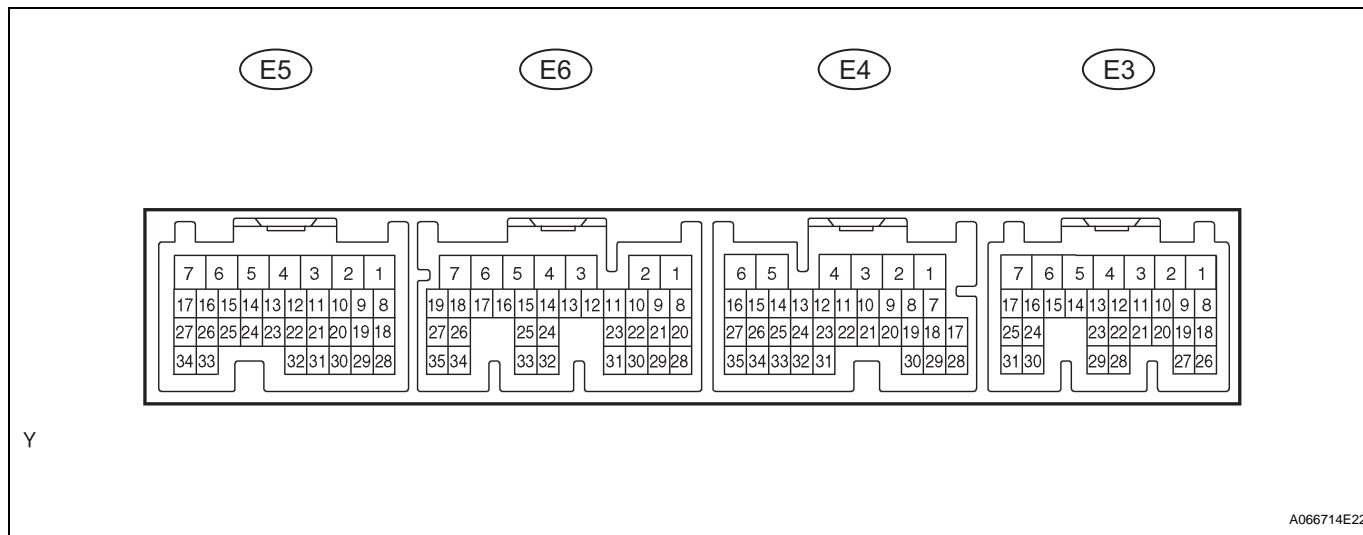


## TERMINALS OF ECM



## HINT:

The standard normal voltage between each pair of ECM terminals is shown in the table below. The appropriate conditions for checking each pair of terminals is also indicated.

The result of checks should be compared with the standard normal voltage for that pair of terminals, displayed in the Specified Condition column.

The illustration above can be used as a reference to identify the ECM terminal locations.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BATT (E3-3) - E1 (E5-3)	B-Y - BR	Battery (for measuring battery voltage and for ECM memory)	Always	9 to 14 V
IGSW (E3-9) - E1 (E5-3)	B-R - BR	Ignition switch	Ignition switch ON	9 to 14 V
FC (E3-25) - E1 (E5-3)	G - BR	Fuel pump control	Ignition switch ON	9 to 14 V
FC (E3-25) - E1 (E5-3)	G - BR	Fuel pump control	Idling	Below 1.5 V
W (E4-30) - E1 (E5-3)	Y-R - BR	MIL	Idling	9 to 14 V
W (E4-30) - E1 (E5-3)	Y-R - BR	MIL	Ignition switch ON	Below 3.5 V
+B (E3-1) - E1 (E5-3)	B-R - BR	Power source of ECM	Ignition switch ON	9 to 14 V
+B2 (E3-2) - E1 (E5-3)	B-R - BR	Power source of ECM	Ignition switch ON	9 to 14 V
MREL (E3-8) - E1 (E5-3)	GR - BR	EFI relay	Ignition switch ON	9 to 14 V
STP (E4-4) - E1 (E5-3)	G-W - BR	Stop light switch	Ignition switch ON, Brake pedal depressed	9 to 14 V
STP (E4-4) - E1 (E5-3)	G-W - BR	Stop light switch	Ignition switch ON, Brake pedal released	Below 1.5 V
F/PS (E4-32) - E1 (E5-3)	Y - BR	Airbag sensor	Ignition switch ON	Pulse generation (see waveform 1)
STA (E3-12) - E1 (E5-3)	B-Y - BR	Starter signal	Cranking	5.5 V or more
PSP (E6-32) - E1 (E5-3)	Y - BR	Power steering oil pressure sensor	Ignition switch ON	9 to 14 V
SPD (E4-8) - E1 (E5-3)	V-W - BR	Speed signal from combination meter	Driving at 20 km/h (12 mph)	Pulse generation (see waveform 2)
TACH (E4-1) - E1 (E5-3)	B - BR	Engine speed	Idling	Pulse generation (see waveform 3)
VC (E5-18) - E2 (E5-28)	R-W - BR	Power source of sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V

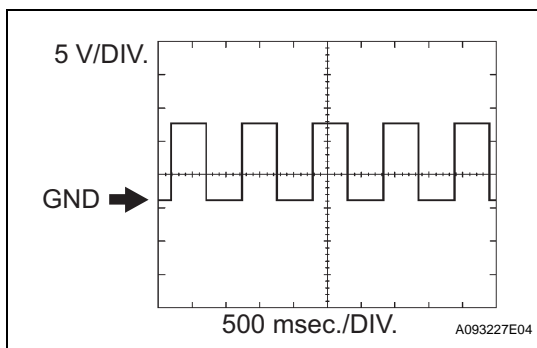
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
PRG (E6-23) - E01 (E5-7)	W-G - BR	Purge VSV	Ignition switch ON and engine stopping	9 to 14 V
PRG (E6-23) - E01 (E5-7)	W-G - BR	Purge VSV	Idling with warm engine	Pulse generation (see waveform 4)
VG (E6-28) - E2G (E6-30)	P - V	Mass air flow meter	Idling, A/C switch OFF	1.1 to 1.5 V
OX1A (E5-21) - E2 (E5-28)	W - BR	Heated oxygen sensor (Sensor 1)	Engine speed maintained at 2,500 rpm for 2 minutes after warming up sensor	Pulse generation (see waveform 5)
HT1A (E5-1) - E03 (E6-4)	B-R - BR	Heated oxygen sensor heater (Sensor 1)	Idling	Below 3.0 V
HT1A (E5-1) - E03 (E6-4)	B-R - BR	Heated oxygen sensor heater (Sensor 1)	Ignition switch ON	9 to 14 V
OX1B (E5-25) - E2 (E5-28)	L - BR	Heated oxygen sensor (Sensor 2)	Engine speed maintained at 2,500 rpm for 2 minutes after warming up sensor	Pulse generation (see waveform 6)
HT1B (E5-2) - E03 (E6-4)	W - BR	Heated oxygen sensor heater (Sensor 2)	Idling	Below 3.0 V
HT1B (E5-2) - E03 (E6-4)	W - BR	Heated oxygen sensor heater (Sensor 2)	Ignition switch ON	9 to 14 V
THW (E5-32) - E2 (E5-28)	R-L - BR	Engine coolant temperature sensor	Idling, Engine coolant temperature 80°C (176°F)	0.2 to 1.0 V
G2+ (E5-26) - NE- (E5-34)	B - W	Camshaft position sensor	Idling	Pulse generation (see waveform 7)
NE+ (E5-27) - NE- (E5-34)	O - W	Crankshaft position sensor	Idling	Pulse generation (see waveform 7)
THA (E6-29) - E2 (E5-28)	Y-B - BR	Intake air temperature sensor	Idling, Intake air temperature 20°C (68°F)	0.5 to 3.4 V
VTA1 (E5-20) - E2 (E5-28)	Y-R - BR	Throttle position sensor	Ignition switch ON, Throttle valve fully closed	0.3 to 1.0 V
VTA1 (E5-20) - E2 (E5-28)	Y-R - BR	Throttle position sensor	Ignition switch ON, Throttle valve fully open	3.2 to 4.9 V
#10 (E6-6) - E01 (E5-7) #20 (E6-5) - E01 (E5-7) #30 (E6-2) - E01 (E5-7) #40 (E6-1) - E01 (E5-7)	B-O - BR B-Y - BR B-W - BR B-L - BR	Injector	Ignition switch ON	9 to 14 V
#10 (E6-6) - E01 (E5-7) #20 (E6-5) - E01 (E5-7) #30 (E6-2) - E01 (E5-7) #40 (E6-1) - E01 (E5-7)	B-O - BR B-Y - BR B-W - BR B-L - BR	Injector	Idling	Pulse generation (see waveform 8)
IGT1 (E5-17) - E1 (E5-3) IGT2 (E5-16) - E1 (E5-3) IGT3 (E5-15) - E1 (E5-3) IGT4 (E5-14) - E1 (E5-3)	G-R - BR G-B - BR G-O - BR G-Y - BR	Ignition coil (ignition signal)	Idling	Pulse generation (see waveform 9)
IGF (E5-23) - E1 (E5-3)	Y - BR	Ignition coil (ignition confirmation signal)	Ignition switch ON	4.5 to 5.5 V
IGF (E5-23) - E1 (E5-3)	Y - BR	Ignition coil (ignition confirmation signal)	Idling	Pulse generation (see waveform 9)
RSD (E5-5) - E01 (E5-7)	B-R - BR	Idle air control valve	Ignition switch ON	9 to 14 V
OC1+ (E5-13) - OC1- (E5-12)	R-Y - R-B	Camshaft timing oil control valve	Ignition switch ON	Pulse generation (see waveform 10)
KNK1 (E5-29) - EKNK (E5-30)	W - B	Knock sensor	Idling	Pulse generation (see waveform 11)
TC (E4-17) - E1 (E5-3)	P-B - BR	Terminal TC of DLC3	Ignition switch ON	9 to 14 V
NSW (E3-30)* - E1 (E5-3)	B - BR	Park/Neutral position switch signal	Ignition switch ON and shift lever P or N position	Below 1 V
NSW (E3-30)* - E1 (E5-3)	B - BR	Park/Neutral position switch signal	Ignition switch ON and shift lever except P or N position	9 to 14 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
VPMP (E3-5) - E1 (E5-3)	P - BR	Vent valve (built into canister pump module)	Ignition switch ON	9 to 14 V
MPMP (E3-6) - E1 (E5-3)	V - BR	Leak detection pump (built into canister pump module)	Leak detection pump OFF	0 to 3 V
MPMP (E3-6) - E1 (E5-3)	V - BR	Leak detection pump (built into canister pump module)	Leak detection pump ON	9 to 14 V
PTMK (E3-31) - E1 (E5-3)	R - BR	Canister pressure sensor (built into canister pump module)	Ignition switch ON	3 to 3.6 V
CANH (E4-33) - E1 (E5-3)	B - BR	CAN communication line	Ignition switch ON	Pulse generation (see waveform 12)
CANL (E4-34) - E1 (E5-3)	W - BR	CAN communication line	Ignition switch ON	Pulse generation (see waveform 13)

ES

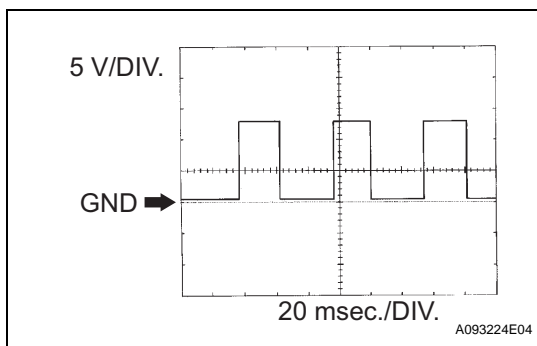
\*: A/T only

**1. WAVEFORM 1  
Airbag sensor assembly**



ECM Terminal Names	Between F/PS and E1
Tester Ranges	5 V/DIV., 500 msec./DIV.
Conditions	Idling with warm engine

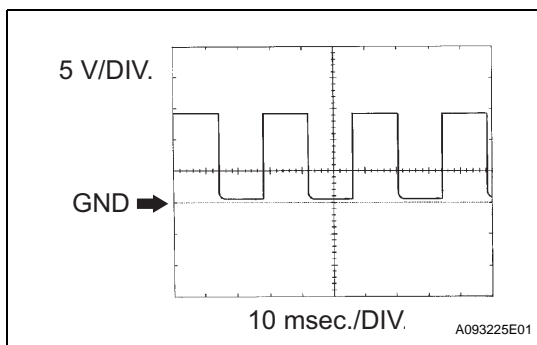
**2. WAVEFORM 2  
Vehicle speed signal**



ECM Terminal Names	Between SPD and E1
Tester Ranges	5 V/DIV., 20 msec./DIV.
Conditions	Driving at 25 mph (40 km/h)

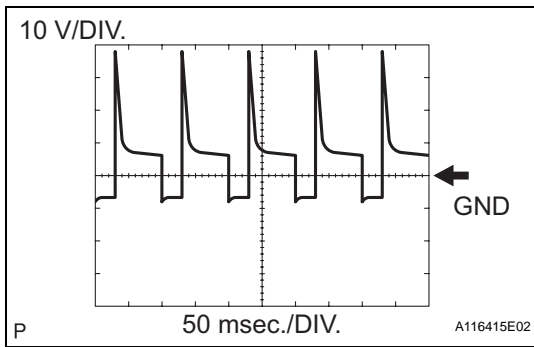
**HINT:**  
The wavelength becomes shorter as the vehicle speed increases.

**3. WAVEFORM 3  
Engine speed signal**



ECM Terminal Names	Between TACH and E1
Tester Ranges	5 V/DIV., 10 msec./DIV.
Conditions	Idling

**HINT:**  
The wavelength becomes shorter as the engine rpm increases.

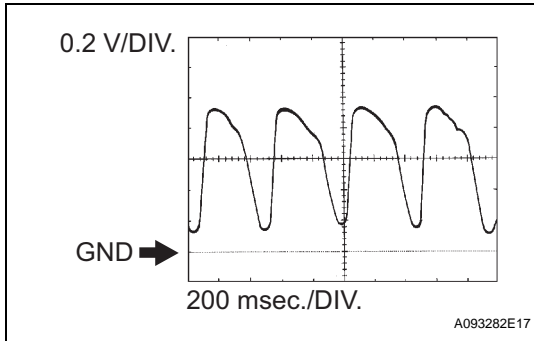


**4. WAVEFORM 4  
Purge VSV**

ECM Terminal Names	Between PRG and E01
Tester Ranges	10 V/DIV., 50 msec./DIV.
Conditions	Idling

**HINT:**

If the waveform is not similar to the illustration, check the waveform again after idling for 10 minutes or more.

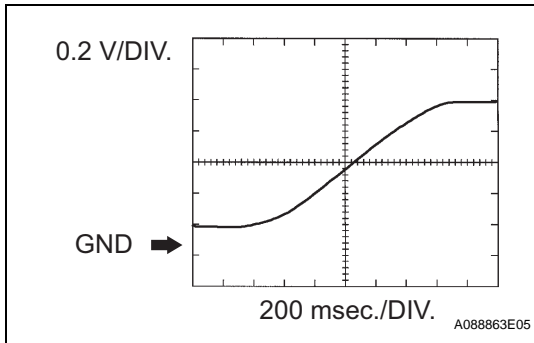


**5. WAVEFORM 5  
Heated Oxygen (HO2) sensor (sensor 1)**

ECM Terminal Names	Between OX1A and E2
Tester Ranges	0.2 V/DIV., 200 msec./DIV.
Conditions	Engine maintained at 2,500 rpm when warmed up

**HINT:**

In the DATA LIST, item O2S B1S1 shows the ECM input values from the front HO2 sensor (sensor 1).

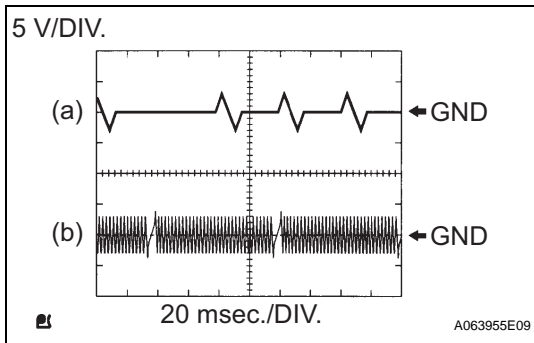


**6. WAVEFORM 6  
Heated Oxygen (HO2) sensor (sensor 2)**

ECM Terminal Names	Between OX1B and E2
Tester Ranges	0.2 V/DIV., 200 msec./DIV.
Conditions	Engine maintained at 2,500 rpm when warmed up

**HINT:**

In the DATA LIST, item O2S B1S2 shows the ECM input values from the rear HO2 sensor (sensor 2).

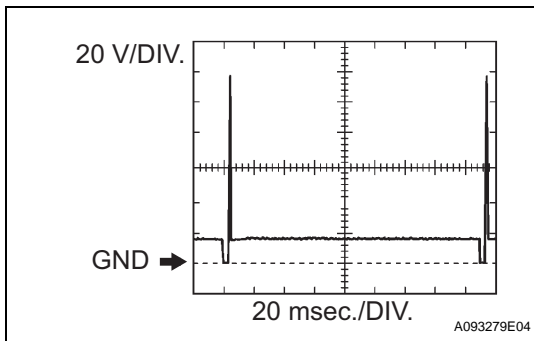


**7. WAVEFORM 7  
Camshaft position sensor and crankshaft position sensor**

ECM Terminal Names	(a) Between G2+ and NE- (b) Between NE+ and NE-
Tester Ranges	5 V/DIV., 20 msec./DIV.
Conditions	Idling

**HINT:**

The wavelength becomes shorter as the engine rpm increases.



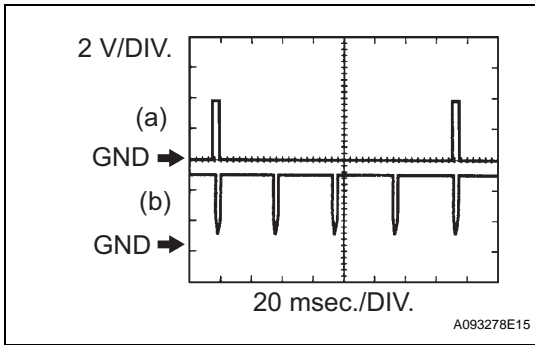
**8. WAVEFORM 8  
Fuel injector**

ECM Terminal Names	Between #10 (to 40) and E01
Tester Ranges	20 V/DIV., 20 msec./DIV.
Conditions	Idling

**HINT:**

The wavelength becomes shorter as the engine rpm increases.

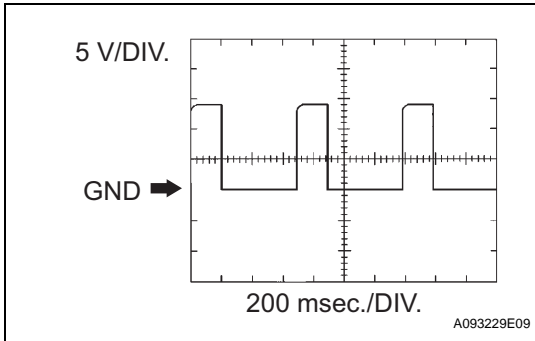
ES



**9. WAVEFORM 9**  
**Igniter IGT signal (from ECM to igniter) and igniter IGF signal (from igniter to ECM)**

ECM Terminal Name	(a) Between IGT (1 to 4) and E1 (b) Between IGF and E1
Tester Ranges	2 V/DIV., 20 msec./DIV.
Conditions	Idling

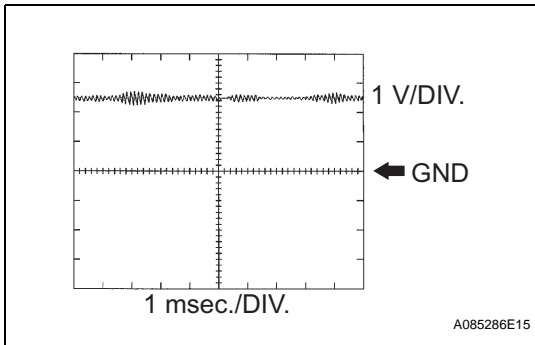
**HINT:**  
The wavelength becomes shorter as the engine rpm increases.



**10. WAVEFORM 10**  
**Camshaft timing oil control valve (OCV)**

ECM Terminal Names	Between OC1+ and OC1-
Tester Ranges	5 V/DIV., 200 msec./DIV.
Conditions	Idling

**HINT:**  
The wavelength becomes shorter as the engine rpm increases.

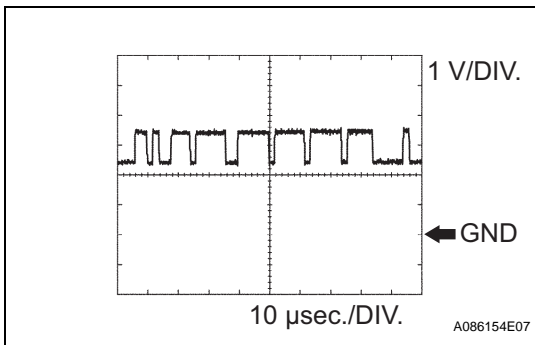


**11. WAVEFORM 11**  
**Knock sensor**

ECM Terminal Names	Between KNK1 and EKNK
Tester Ranges	0.01 to 10 V/DIV., 0.01 to 10 msec./DIV.
Conditions	Engine maintained at 4,000 rpm when warmed up

**HINT:**

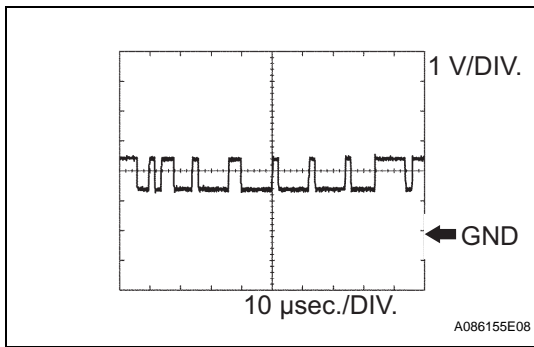
- The wavelength becomes shorter as the engine rpm increases.
- The waveforms and amplitudes displayed differ slightly depending on the vehicle.



**12. WAVEFORM 12**  
**CAN communication signal**

ECM Terminal Names	Between CANH and E1
Tester Ranges	1 V/DIV., 10 µsec./DIV.
Conditions	Engine stopped and ignition switch ON

**HINT:**  
The waveform varies depending on the CAN communication signal.



**13. WAVEFORM 13**  
**CAN communication signal**

ECM Terminal Names	Between CANL and E1
Tester Ranges	1 V/DIV., 10 μsec./DIV.
Conditions	Engine stopped and ignition switch ON

**HINT:**

The waveform varies depending on the CAN communication signal.