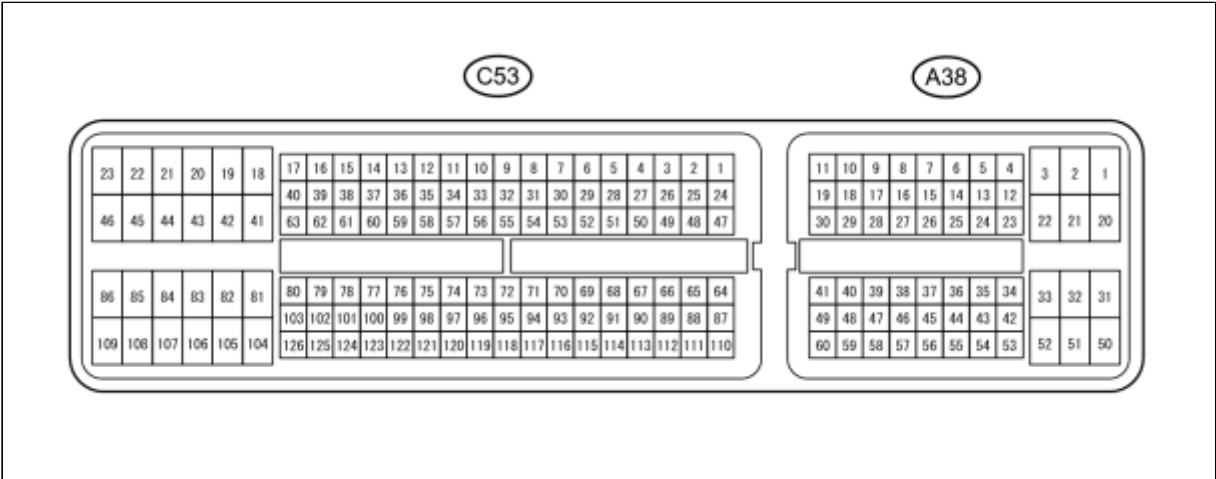


Last Modified: 11-27-2007		1.6 U
Service Category: Engine/Hybrid System	Section: Engine Control	
Model Year: 2008	Model: LX570	Doc ID: RM000000PDH05FX
Title: 3UR-FE ENGINE CONTROL: SFI SYSTEM: TERMINALS OF ECM (2008 LX570)		

TERMINALS OF ECM

1. CHECK ECM



(a) Measure the voltage according to the value(s) in the table below.

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 are 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.

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A38-1 (BATT) - C53-81 (E1)	L - W-B	Battery (for measuring battery voltage and for ECM memory)	Always	11 to 14 V
C53-41 (+BM) - C53-81 (E1)	P - W-B	Power source of throttle actuator	Always	11 to 14 V
A38-28 (IGSW) - C53-81 (E1)	B - W-B	Engine switch	Engine switch on (IG)	11 to 14 V
A38-3 (+B) - C53-81 (E1)	B - W-B	Power source of ECM	Engine switch on (IG)	11 to 14 V
A38-2 (+B2) - C53-81 (E1)	B - W-B	Power source of ECM	Engine switch on (IG)	11 to 14 V
C53-58 (OC1+) - C53-57 (OC1-)	B - B-L	Camshaft oil control valve (OCV) (for Intake Side of Bank 1)	Idling	Pulse generation (See waveform 1)
C53-52 (OC2+) - C53-51 (OC2-)	L-B - R-B	Camshaft oil control valve (OCV) (for Intake Side of Bank 2)	Idling	Pulse generation (See waveform 1)

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
C53-56 (OE1+) - C53-55 (OE1-)	L-W - L-B	Camshaft oil control valve (OCV) (for Exhaust Side of Bank 1)	Idling	Pulse generation (See waveform 1)
C53-50 (OE2+) - C53-49 (OE2-)	L-R - L-B	Camshaft oil control valve (OCV) (for Exhaust Side of Bank 2)	Idling	Pulse generation (See waveform 1)
A38-34 (MREL) - C53-81 (E1)	W-R - W- B	EFI relay	Engine switch on (IG)	11 to 14 V
C53-74 (VG) - C53-75 (E2G)	L-Y - G-W	Mass air flow meter	Idling, Shift lever in P or N, A/C switch off	0.5 to 3.0 V
C53-73 (THA) - C53-97 (ETHW)	Y-B - BR	Intake air temperature sensor	Idling, Intake air temperature 20°C (68°F)	0.5 to 3.4 V
C53-76 (THW) - C53-98 (ETHA)	G-B - BR	Engine coolant temperature sensor	Idling, Engine coolant temperature 80°C (176°F)	0.2 to 1.0 V
C53-80 (VCTA) - C53-79 (ETA)	Y - L	Power source of throttle position sensor (specific voltage)	Engine switch on (IG)	4.5 to 5.5 V
C53-78 (VTA1) - C53-79 (ETA)	R-Y - L	Throttle position sensor (for engine control)	Engine switch on (IG), Throttle valve fully closed	0.5 to 1.2 V
			Engine switch on (IG), Throttle valve fully open	3.2 to 4.8 V
C53-77 (VTA2) - C53-79 (ETA)	Y-B - L	Throttle position sensor (for sensor malfunction detection)	Engine switch on (IG), Throttle valve fully closed	2.1 to 3.1 V
			Engine switch on (IG), Throttle valve fully open	4.5 to 5.5 V
A38-55 (VPA) - A38-58 (EPA)	R - W-L	Accelerator pedal position sensor (for engine control)	Engine switch on (IG), Accelerator pedal released	0.5 to 1.1 V
			Engine switch on (IG), Accelerator pedal fully depressed	2.6 to 4.5 V
A38-56 (VPA2) - A38-60 (EPA2)	GR-G - BR	Accelerator pedal position sensor (for sensor malfunctioning detection)	Engine switch on (IG), Accelerator pedal released	1.2 to 2.0 V
			Engine switch on (IG), Accelerator pedal fully depressed	3.4 to 5.3 V
A38-57 (VCPA) - A38-58 (EPA)	L-W - W-L	Power source of accelerator pedal position sensor (for VPA)	Engine switch on (IG)	4.5 to 5.5 V
A38-59 (VCP2) - A38-60 (EPA2)	V - BR	Power source of accelerator pedal position sensor (for VPA2)	Engine switch on (IG)	4.5 to 5.5 V
C53-22 (HA1A) - C53-23 (E04)	L - W-B	A/F sensor heater	Idling	Below 3.0 V
			Engine switch on (IG)	11 to 14 V

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
C53-20 (HA2A) - C53-21 (E05)	G - W-B	A/F sensor heater	Idling	Below 3.0 V
			Engine switch on (IG)	11 to 14 V
C53-126 (A1A+) - C53-81 (E1)	G - W-B	A/F sensor	Engine switch on (IG)	3.3 V*
C53-125 (A1A-) - C53-81 (E1)	R - W-B	A/F sensor	Engine switch on (IG)	2.9 V*
C53-103 (A2A+) - C53-81 (E1)	P - W-B	A/F sensor	Engine switch on (IG)	3.3 V*
C53-102 (A2A-) - C53-81 (E1)	L - W-B	A/F sensor	Engine switch on (IG)	2.9 V*
C53-45 (HT1B) - C53-46 (E03)	G-B - W-B	Heated oxygen sensor heater	Idling	Below 3.0 V
			Engine switch on (IG)	11 to 14 V
C53-44 (HT2B) - C53-46 (E03)	B - W-B	Heated oxygen sensor heater	Idling	Below 3.0 V
			Engine switch on (IG)	11 to 14 V
C53-114 (OX1B) - C53-115 (EX1B)	G - L	Heated oxygen sensor	Engine speed maintained at 2500 rpm for 2 minutes after warming up sensor	Pulse generation (See waveform 2)
C53-112 (OX2B) - C53-113 (EX2B)	R - W	Heated oxygen sensor	Engine speed maintained at 2500 rpm for 2 minutes after warming up sensor	Pulse generation (See waveform 2)
C53-86 (#10) - C53-43 (E01)	R-L - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-109 (#20) - C53-43 (E01)	L - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-85 (#30) - C53-43 (E01)	R-B - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-108 (#40) - C53-43 (E01)	Y - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-84 (#50) - C53-43 (E01)	G - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
			Idling	Pulse generation (See waveform 3)
C53-107 (#60) - C53-43 (E01)	R - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-83 (#70) - C53-43 (E01)	W - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-106 (#80) - C53-43 (E01)	R-B - W-B	Fuel injector	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 3)
C53-94 (KNK1) - C53-93 (EKNK)	R - G	Knock sensor	Engine speed maintained at 4000 rpm after warming up engine	Pulse generation (See waveform 4)
C53-117 (KNK2) - C53-116 (EKN2)	W - B	Knock sensor	Engine speed maintained at 4000 rpm after warming up engine	Pulse generation (See waveform 4)
C53-96 (KNK3) - C53-95 (EKN3)	W - B	Knock sensor	Engine speed maintained at 4000 rpm after warming up engine	Pulse generation (See waveform 4)
C53-119 (KNK4) - C53-118 (EKN4)	R - G	Knock sensor	Engine speed maintained at 4000 rpm after warming up engine	Pulse generation (See waveform 4)
C53-92 (VV1+) - C53-91 (VV1-)	R - Y	Variable valve timing (VVT) sensor (for Intake Side of Bank 1)	Idling	Pulse generation (See waveform 5)
C53-87 (VV2+) - C53-88 (VV2-)	R - Y	Variable valve timing (VVT) sensor (for Intake Side for Bank 2)	Idling	Pulse generation (See waveform 5)
C53-69 (EV1+) - C53-68 (EV1-)	R-L - Y	Variable valve timing (VVT) sensor (for Exhaust Side of Bank 1)	Idling	Pulse generation (See waveform 16)

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
C53-64 (EV2+) - C53-65 (EV2-)	R-L - Y	Variable valve timing (VVT) sensor (for Exhaust Side of Bank 2)	Idling	Pulse generation (See waveform 16)
C53-110 (NE+) - C53-111 (NE-)	W - G-W	Crankshaft position sensor	Idling	Pulse generation (See waveform 5)
C53-40 (IGT1) - C53-81 (E1)	B-Y - W-B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-33 (IGT2) - C53-81 (E1)	L-B - W-B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-37 (IGT3) - C53-81 (E1)	B - W-B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-34 (IGT4) - C53-81 (E1)	L-B - W-B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-35 (IGT5) - C53-81 (E1)	G-R - W- B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-36 (IGT6) - C53-81 (E1)	G - W-B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-38 (IGT7) - C53-81 (E1)	G-W - W- B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-39 (IGT8) - C53-81 (E1)	G-B - W- B	Ignition coil (ignition signal)	Idling	Pulse generation (See waveform 6)
C53-104 (IGF1) - C53-81 (E1)	G-B - W- B	Ignition coil (ignition confirmation signal)	Engine switch on (IG)	4.5 to 5.5 V
			Idling	Pulse generation (See waveform 6)
C53-105 (IGF2) - C53-81 (E1)	R - W-B	Ignition coil (ignition confirmation signal)	Engine switch on (IG)	4.5 to 5.5 V
			Idling	Pulse generation

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
				(See waveform 6)
C53-63 (PRG) - C53-81 (E1)	L-B - W-B	Purge VSV	Engine switch on (IG)	11 to 14 V
			Idling	Pulse generation (See waveform 7)
A38-13 (SPD) - C53-81 (E1)	V-R - W-B	Speed signal from combination meter	Driving at 20 km/h (12 mph)	Pulse generation (See waveform 8)
A38-46 (STA) - C53-81 (E1)	R-B - W-B	Starter signal	Cranking	5.5 V or more
C53-120 (NSW) - C53-81 (E1)	L - W-B	Park/neutral position switch	Engine switch on (IG), Shift lever in other than P and N	11 to 14 V
			Engine switch on (IG), Shift lever in P or N	Below 3.0 V
A38-36 (STP) - C53-81 (E1)	R - W-B	Stop light switch	Brake pedal depressed	7.5 to 14 V
			Brake pedal released	Below 1.5 V
A38-35 (ST1-) - C53-81 (E1)	R-W - W-B	Stop light switch (opposite to STP terminal)	Engine switch on (IG), Brake pedal depressed	Below 1.5 V
			Engine switch on (IG), Brake pedal released	7.5 to 14 V
C53-19 (M+) - C53-82 (ME01)	R - W-B	Throttle actuator	Idling with warm engine	Pulse generation (See waveform 9)
C53-18 (M-) - C53-82 (ME01)	G - W-B	Throttle actuator	Idling with warm engine	Pulse generation (See waveform 10)
A38-48 (FC) - C53-81 (E1)	L-R - W-B	Fuel pump control	Engine switch on (IG)	11 to 14 V
A38-52 (FPC) - C53-81 (E1)	W - W-B	Fuel pump control	Engine switch on (IG)	Below 1.5 V
A38-24 (W) - C53-81 (E1)	R-Y - W-B	MIL	Engine switch on (IG)	Below 3.0 V
			Idling	11 to 14 V
A38-16 (TC) - C53-81 (E1)	V-W - W-B	Terminal TC of DLC3	Engine switch on (IG)	11 to 14 V
A38-15 (TACH) - C53-81 (E1)	W-G - W-B	Engine speed	Idling	Pulse generation (See waveform 11)
A38-30 (VPMP) - C53-81 (E1)	B-L - W-B	Vent valve (built into canister pump module)	Engine switch on (IG)	11 to 14 V

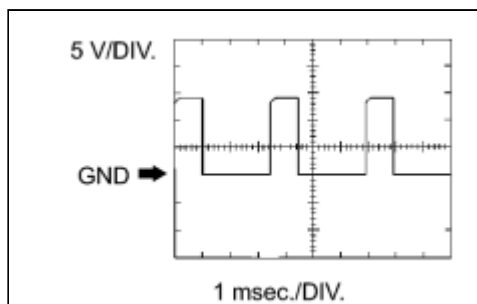
TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A38-49 (MPMP) - C53-81 (E1)	G-O - W- B	Leak detection pump (built into canister pump module)	Leak detection pump OFF	Below 3.0 V
			Leak detection pump ON	11 to 14 V
C53-67 (VCV1) - C53-97 (ETHW)	L - BR	Power source for sensor (specific voltage)	Engine switch on (IG)	4.5 to 5.5 V
C53-66 (VCV2) - C53-97 (ETHW)	L - BR	Power source for sensor (specific voltage)	Engine switch on (IG)	4.5 to 5.5 V
C53-121 (PPMP) - C53-97 (ETHW)	P - BR	Canister pressure sensor (built into canister pump module)	Engine switch on (IG)	3.3 to 4.0 V
C53-32 (ALT) - C53-81 (E1)	R - W-B	Generator	Engine switch on (IG)	11 to 14 V
A38-10 (CANH) - C53-81 (E1)	P - W-B	CAN communication line	Engine switch on (IG)	Pulse generation (See waveform 12)
A38-11 (CANL) - C53-81 (E1)	B - W-B	CAN communication line	Engine switch on (IG)	Pulse generation (See waveform 13)
C53-62 (ACIS) - C53-81 (E1)	L-Y - W-B	VSV for ACIS (Acoustic Control Induction System) operation signal	Engine switch on (IG)	11 to 14 V
C53-28 (AIRV) - C53-81 (E1)	BR - W-B	Air switching valve for secondary air injection system	Engine switch on (IG)	11 to 14 V
C53-54 (AIRP) - C53-81 (E1)	P - W-B	Air pump control	Engine switch on (IG)	11 to 14 V
C53-30 (AIDI) - C53-81 (E1)	G - W-B	Diagnostic information signal for air injection system	Air injection system operates	Pulse generation (See waveform 15)
A38-54 (AIP) - C53-98 (ETHA)	P-L - BR	Secondary air injection system pressure signal	Engine switch on (IG)	3.0 to 3.6 V
A38-43 (ARV2) - C53-81 (E1)	R-L - W-B	Air switching valve for secondary air injection system	Engine switch on (IG)	11 to 14 V
C53-53 (ARP2) - C53-81 (E1)	P-L - W-B	Air pump control	Engine switch on (IG)	11 to 14 V
C53-29 (AID2) - C53-81 (E1)	G-Y - W-B	Diagnostic information signal for air injection system	Air injection system operates	Pulse generation (See waveform 15)
A38-53 (AIP2) - C53-97 (ETHW)	LG-B - BR	Secondary air injection system pressure signal	Engine switch on (IG)	3.0 to 3.6 V
C53-90 (G2) - C53- 89 (G2-)	G - Y	Camshaft position sensor	Idling	Pulse generation (See waveform 14)

TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A38-18 (DI) - C53-81 (E1)	G-Y - W-B	Fuel pump control	Engine switch on (IG)	0 to 3.0 V
A38-14 (STSW) - C53-81 (E1)	R - W-B	Starter switch	Shift lever in P or N, Cranking	6.0 V or more
A38-41 (ACCR) - C53-81 (E1)	L-Y - W-B	ACC relay control signal	Engine switch on (IG) → Cranking	11 to 14 V → Below 1 V
C53-16 (STAR) - C53-81 (E1)	L - W-B	Starter relay control	Engine switch on (IG)	Below 1.5 V
			Cranking	5.5 V or higher
C53-72 (PSP) - C53-81 (E1)	G - W-B	Power steering oil pressure sensor	Engine switch on (IG)	0.5 to 4.5 V

HINT:

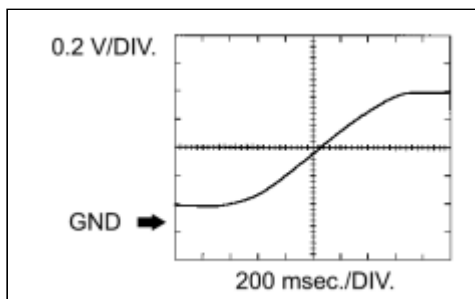
***: The ECM terminal voltage is constant regardless of the output voltage from the sensor.**

(b) WAVEFORM 1:

Camshaft Oil Control Valve (OCV)

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-58 (OC1+) - C53-57 (OC1-)	5 V/DIV., 1 msec./DIV.	Idling
C53-52 (OC2+) - C53-51 (OC2-)	5 V/DIV., 1 msec./DIV.	Idling
C53-56 (OE1+) - C53-55 (OE1-)	5 V/DIV., 1 msec./DIV.	Idling
C53-50 (OE2+) - C53-49 (OE2-)	5 V/DIV., 1 msec./DIV.	Idling

(c) WAVEFORM 2:

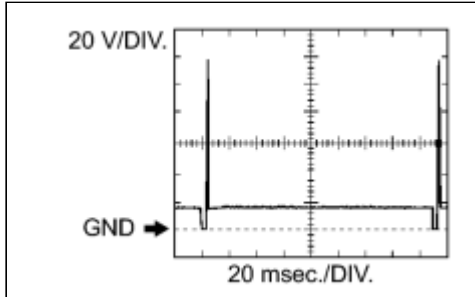
Heated Oxygen Sensor

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-114 (OX1B) - C53-115 (EX1B)	0.2 V/DIV., 200 msec./DIV.	Engine speed maintained at 2,500 rpm for 2 minutes after warming up sensor
C53-112 (OX2B) - C53-113 (EX2B)	0.2 V/DIV., 200 msec./DIV.	Engine speed maintained at 2,500 rpm for 2 minutes after warming up sensor

HINT:

In the Data List, item O2S B1 S2 or O2S B2 S2 shows the ECM input values from the heated oxygen sensor.

(d) WAVEFORM 3:

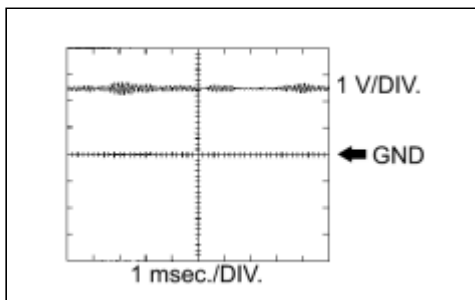
Injector No. 1 (to No. 8) Injection Signal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-86 (#10) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-109 (#20) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-85 (#30) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-108 (#40) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-84 (#50) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-107 (#60) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-83 (#70) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling
C53-106 (#80) - C53-43 (E01)	20 V/DIV., 20 msec./DIV.	Idling

HINT:

The wavelength becomes shorter as the engine speed increases.

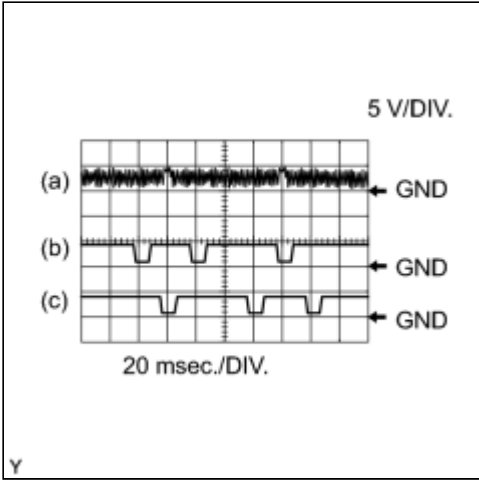
(e) WAVEFORM 4:

Knock Sensor

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-94 (KNK1) - C53-93 (EKNK)	1 V/DIV., 1 msec./DIV.	Engine speed maintained at 4,000 rpm after warming up engine
C53-117 (KNK2) - C53-116 (EKN2)	1 V/DIV., 1 msec./DIV.	Engine speed maintained at 4,000 rpm after warming up engine
C53-96 (KNK3) - C53-95 (EKN3)	1 V/DIV., 1 msec./DIV.	Engine speed maintained at 4,000 rpm after warming up engine
C53-119 (KNK4) - C53-118 (EKN4)	1 V/DIV., 1 msec./DIV.	Engine speed maintained at 4,000 rpm after warming up engine

HINT:

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



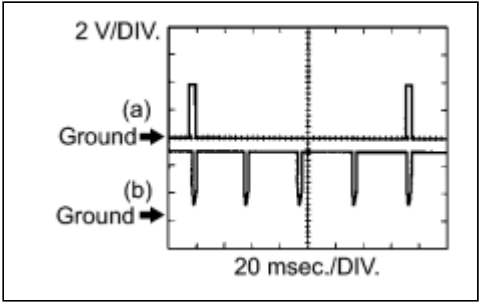
(f) WAVEFORM 5:
Crankshaft Position Sensor and VVT Sensor for Intake Side

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
(a) C53-110 (NE+) - C53-111 (NE-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up
(b) C53-92 (VV1+) - C53-91 (VV1-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up
(c) C53-87 (VV2+) - C53-88 (VV2-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up

HINT:

The wavelength becomes shorter as engine speed increases.

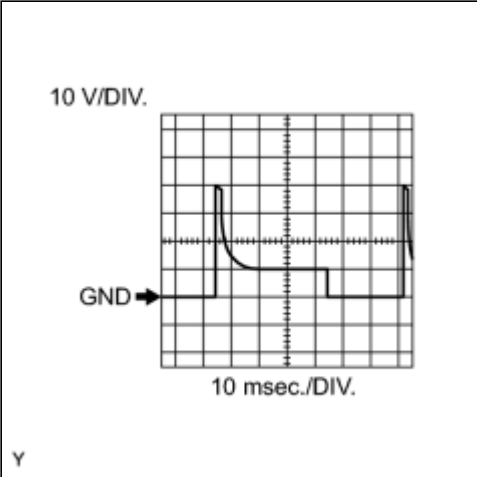
(g) WAVEFORM 6:
Igniter IGT Signal (from ECM to Igniter) and Igniter IGF Signal (from Igniter to ECM)



TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
(a) C53-40 (IGT1) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-33 (IGT2) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-37 (IGT3) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-34 (IGT4) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-35 (IGT5) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-36 (IGT6) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-38 (IGT7) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(a) C53-39 (IGT8) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(b) C53-104 (IGF1) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling
(b) C53-105 (IGF2) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Idling

HINT:

The wavelength becomes shorter as engine speed increases.



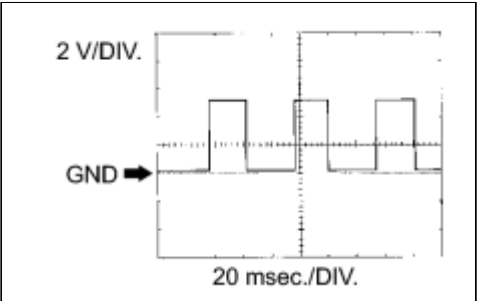
(h) WAVEFORM 7:

Purge VSV

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-63 (PRG) - C53-81 (E1)	10 V/DIV., 10 to 100 msec./DIV.	Idling

HINT:

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



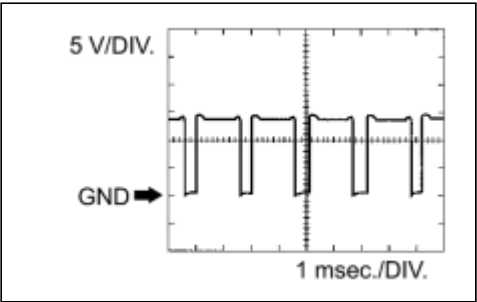
(i) WAVEFORM 8:

Vehicle Speed Signal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
A38-13 (SPD) - C53-81 (E1)	2 V/DIV., 20 msec./DIV.	Driving at 20 km/h (12 mph)

HINT:

The wavelength becomes shorter as the vehicle speed increases.



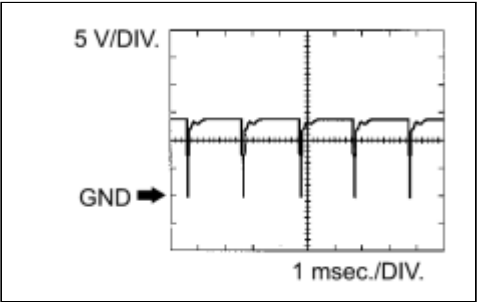
(j) WAVEFORM 9:

Throttle Actuator Positive Terminal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-19 (M+) - C53-82 (ME01)	5 V/DIV., 1 msec./DIV.	Idling with warm engine

HINT:

The duty ratio varies depending on the throttle actuator operation.



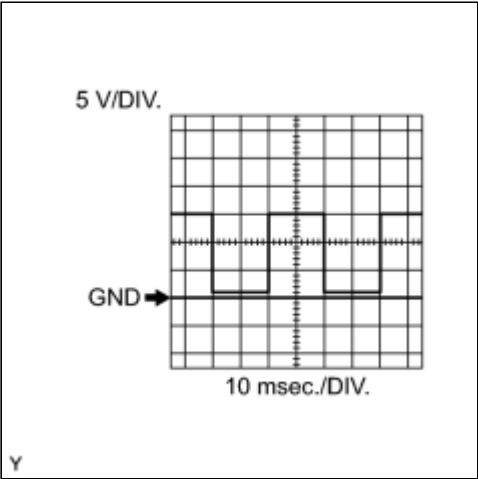
(k) WAVEFORM 10:

Throttle Actuator Negative Terminal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-18 (M-) - C53-82 (ME01)	5 V/DIV., 1 msec./DIV.	Idling with warm engine

HINT:

The duty ratio varies depending on the throttle actuator operation.

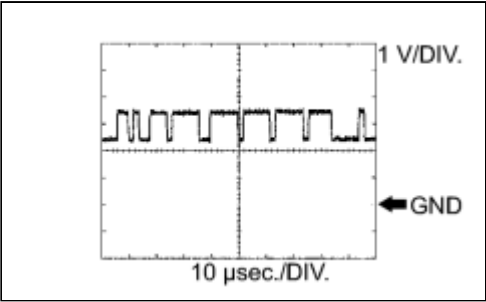


(l) WAVEFORM 11:
Engine Speed Signal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
A38-15 (TACH) - C53-81 (E1)	5 V/DIV., 10 msec./DIV.	Idling

HINT:

The wavelength becomes shorter as the engine speed increases.

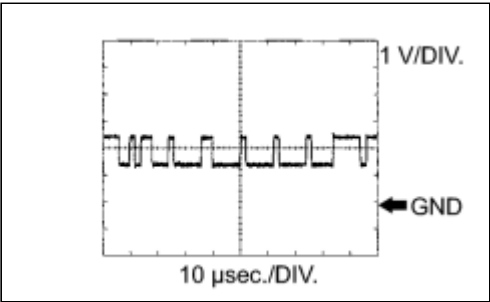


(m) WAVEFORM 12:
CAN Communication Signal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
A38-10 (CANH) - C53-81 (E1)	1 V/DIV., 10 µsec./DIV.	Engine stops and engine switch on (IG)

HINT:

The waveform varies depending on the CAN communication signal.



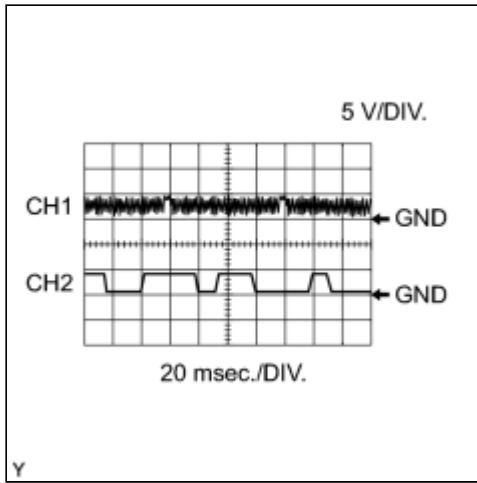
(n) WAVEFORM 13:
CAN Communication Signal

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
A38-11 (CANL) - C53-81 (E1)	1 V/DIV., 10 µsec./DIV.	Engine stops and engine switch on (IG)

HINT:

The waveform varies depending on the CAN communication signal.

(o) WAVEFORM 14:

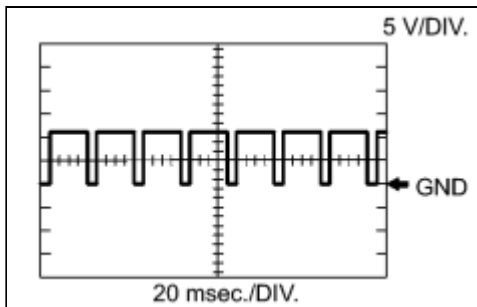
Crankshaft Position Sensor and Camshaft Position Sensor

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
CH1: C53-110 (NE+) - C53-111 (NE-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up
CH2: C53-90 (G2) - C53-89 (G2-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up

HINT:

The wavelength becomes shorter as the engine speed increases.

(p) WAVEFORM 15:

Terminal DI of Air Injection Control Driver

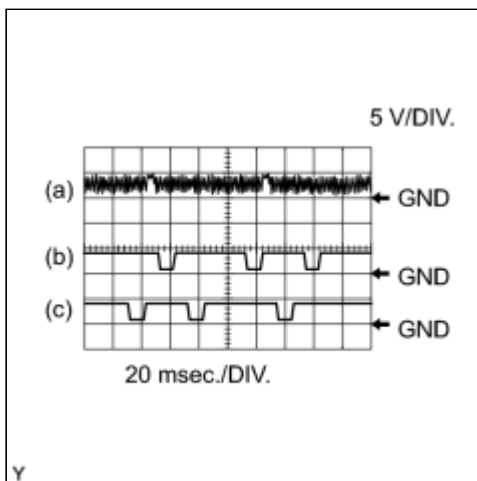
TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
C53-30 (AIDI) - C53-81 (E1)	5 V/DIV., 20 to 40 msec./DIV.	Performing system check using Techstream (air injection check)
C53-29 (AID2) - C53-81 (E1)	5 V/DIV., 20 to 40 msec./DIV.	Performing system check using Techstream (air injection check)

HINT:

The wavelength changes when the air injection control driver detects malfunctions in the air injection system

INFO

(q) WAVEFORM 16:

Crankshaft Position Sensor and VVT Sensor for Exhaust Side

TERMINAL NO. (SYMBOLS)	TOOL SETTING	CONDITION
(a) C53-110 (NE+) - C53-111 (NE-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up
(b) C53-69 (EV1+) - C53-68 (EV1-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up
(c) C53-64 (EV2+) - C53-65 (EV2-)	5 V/DIV., 20 msec./DIV.	Idle after engine warmed up

HINT:

The wavelength becomes shorter as engine speed increases.

