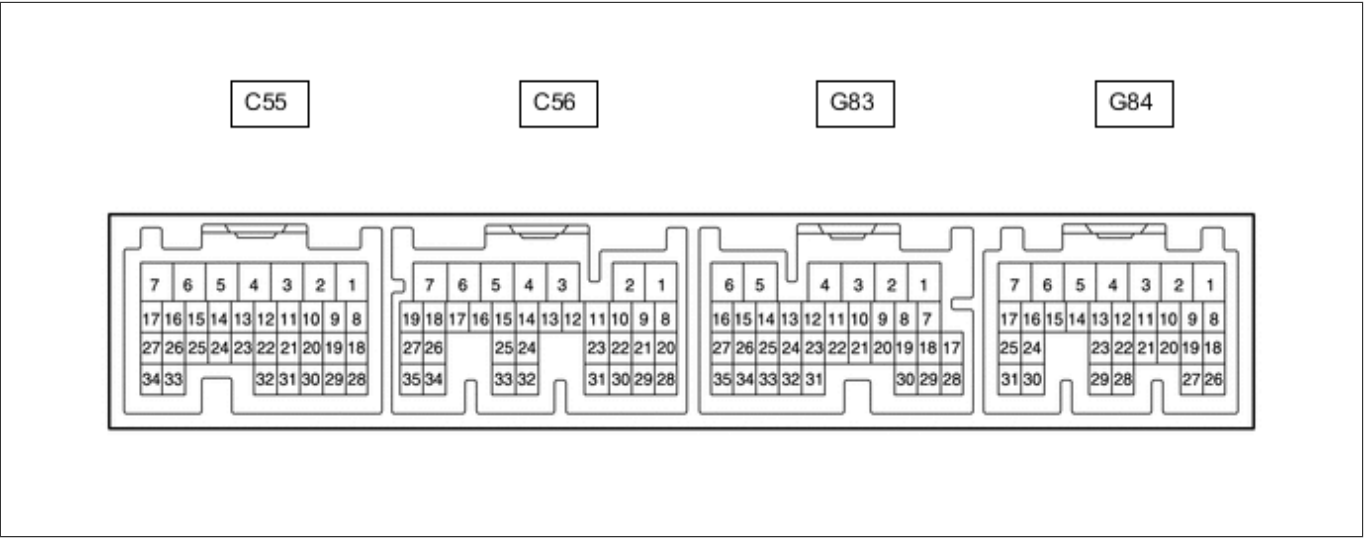


ECD SYSTEM TERMINALS OF ECM



Tech Tips

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

In the table, first follow the information under "Condition". Look under "Terminal No. (Symbol)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specified Condition".

Use the illustration above as a reference for the ECM terminals.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
G83-2 (BATT) - C56-7 (E1)	Y - W-B	Battery (for measuring the battery voltage and for the ECM memory)	Always	11 to 14 V
G84-9 (IGSW) - C56-7 (E1)	GR - W-B	Ignition switch	Ignition switch ON	11 to 14 V
G84-1 (+B) - C56-7 (E1)	L - W-B	Power source of ECM	Ignition switch ON	11 to 14 V
G84-8 (MREL) - C56-7 (E1)	G - W-B	MAIN relay	Ignition switch ON	11 to 14 V
			10 seconds elapsed after Ignition switch off	0 to 1.5 V
C55-18 (VC) - C55-28 (E2)	G - BR	Power source of sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
C56-2 (VCS) - C56-1 (E2S)	B - P	Power source of fuel pressure sensor (sub)	Ignition switch ON	4.5 to 5.5 V
G84-22 (VPA) - G84-28 (EPA)	W - G	Accelerator pedal position sensor (for engine control)	Ignition switch ON, accelerator pedal fully released	0.6 to 1.0 V

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
			Ignition switch ON, accelerator pedal fully depressed	3.0 to 4.6 V
G84-23 (VPA2) - G84- 29 (EPA2)	GR - Y	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, accelerator pedal fully released	1.4 to 1.8 V
			Ignition switch ON, accelerator pedal fully depressed	3.7 to 5.0 V
G84-26 (VCPA) - G84- 28 (EPA)	LG - G	Power source of accelerator pedal position sensor (for VPA)	Ignition switch ON	4.5 to 5.0 V
G84-27 (VCP2) - G84- 29 (EPA2)	R - Y	Power source of accelerator pedal position sensor (for VPA2)	Ignition switch ON	4.5 to 5.0 V
C56-24 (VG) - C56-32 (EVG)	W - R	MAF meter	Idling, A/C switch OFF	0.5 to 3.4 V
C55-31 (THA) - C55-28 (E2)	B - BR	IAT sensor (built into MAF meter)	Idling, intake air temperature at 20°C (68°F)	0.5 to 3.4 V
C55-20 (THIA) - C55-28 (E2)	G - BR	Intake air temperature sensor	Atmospheric air temperature	0.5 to 3.4 V
C55-19 (THW) - C55-28 (E2)	R - BR	ECT sensor	Idling, engine coolant temperature at 80°C (176°F)	0.2 to 1.0 V
G84-7 (STA) - C56-7 (E1)	GR - W-B	Starter signal	Cranking	6.0 V or more
C55-24 (#1) - C56-7 (E1) C55-23 (#2) - C56-7 (E1) C55-22 (#3) - C56-7 (E1) C55-21 (#4) - C56-7 (E1)	B - W-B R - W-B V - W-B Y - W-B	Injector	Idling	Pulse generation (see waveform 1)
C55-27 (NE+) - C55-34 (NE-)	Y - L	Crankshaft position sensor	Idling	Pulse generation (see waveform 2)

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
C56-23 (G+) - C56-31 (G-)	Y - L	Camshaft position sensor	Idling	Pulse generation (see waveform 2)
G83-15 (STP) - C56-7 (E1)	L - W- B	Stop light switch	Ignition switch ON, brake pedal depressed	7.5 to 14 V
			Ignition switch ON, brake pedal released	0 to 1.5 V
G83-14 (ST1-) - C56-7 (E1)	GR - W-B	Stop light switch (opposite to STP)	Ignition switch ON, brake pedal depressed	0 to 1.5 V
			Ignition switch ON, brake pedal released	7.5 to 14 V
G84-11 (TC) - C56-7 (E1)	R - W-B	Terminal TC of DLC3	Ignition switch ON	11 to 14 V
G83-17 (SPD) - C56-7 (E1)	V - W-B	Speed signal from combination meter	Ignition switch ON, slowly rotate wheel	Pulse generation (see waveform 3)
C56-28 (PIM) - C55-28 (E2)	L - BR	Manifold absolute pressure sensor	Apply negative pressure of 40 kPa (300 mmHg, 11.8 in.Hg)	0.1 to 0.7 V
			Same as atmospheric pressure	0.8 to 1.5 V
			Apply positive pressure of 170 kPa (1,275 mmHg, 50.2 in.Hg)	1.6 to 2.3 V
G84-10 (IREL) - C56-7 (E1)	R - W-B	EDU relay	Ignition switch ON	0 to 1.5 V
G84-4 (TACH) - C56-7 (E1)	V - W-B	Engine speed	Idling	Pulse generation (see waveform 4)
C55-26 (PCR1) - C55-28 (E2)	W - BR	Common rail pressure sensor (main)	Idling	1.7 to 2.2 V

Terminal No.	Wiring			Specified
--------------	--------	--	--	-----------

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
C55-33 (PCR2) - C56-1 (E2S)	R - P	Common rail pressure sensor (sub)	Idling	1.2 to 1.6 V
G84-15 (GREL) - C56- 7 (E1)	LG - W-B	GLOW relay	Cranking	11 to 14 V
C55-29 (THF) - C55-28 (E2)	B - BR	Fuel temperature sensor	Ignition switch ON	0.5 to 3.4 V
C55-8 (ALT) - C56-7 (E1)	G - W-B	Generator duty ratio	Idling	Pulse generation (see waveform 5)
C55-2 (PCV+) - C55-1 (PCV-)	G - Y	Suction control valve	Idling	Pulse generation (see waveform 6)
C55-25 (INJF) - C56-7 (E1)	L - W- B	EDU	Idling	Pulse generation (see waveform 7)
C55-10 (VNT0) - C56- 7 (E1)	B - W-B	Turbo motor driver	Idling	Pulse generation (see waveform 8)
C55-17 (VNTI) - C56-7 (E1)	R - W-B	Turbo motor driver	Idling	Pulse generation (see waveform 9)
C55-32 (PRD) - C56-7 (E1)	GR - W-B	EDU	Ignition switch off	4 to 6.5 V
C56-29 (VLU) - C55-28 (E2)	B - BR	Throttle position sensor	Ignition switch ON, throttle valve fully opened	3.6 to 4.2 V
Terminal No.	Wiring	Terminal Description	Condition	Specified

(Symbol)	Color	Terminal Description	Condition	Condition
			Ignition switch ON, throttle valve fully closed	0.4 to 1.0 V
C56-4 (LUSL) - C56-7 (E1)	GR - W-B	Diesel throttle motor duty signal	Engine warmed up, racing engine	Pulse generation (see waveform 10)
C55-15 (SCV) - C55-7 (E01)	GR - W-B	VSV for swirl control valve	Idling	0 to 1.5 V
			Engine speed 2600 rpm or more	11 to 14 V
G84-6 (NSW)* - C56-7 (E1)	L - W-B	Park/Newtral Position Switch	Ignition switch ON, shift lever not in P or N	11 to 14 V
			Ignition switch ON, shift lever in P or N	Below 1.0 V
G83-22 (CAN+)* - C56-7 (E1)	G - W-B	CAN communication line	Ignition switch ON	Pulse generation (see waveform 11)
G83-21 (CAN-)* - C56-7 (E1)	V - W-B	CAN communication line	Ignition switch ON	Pulse generation (see waveform 12)

Tech Tips

- *: for Automatic Transmission

1. WAVEFORM 1

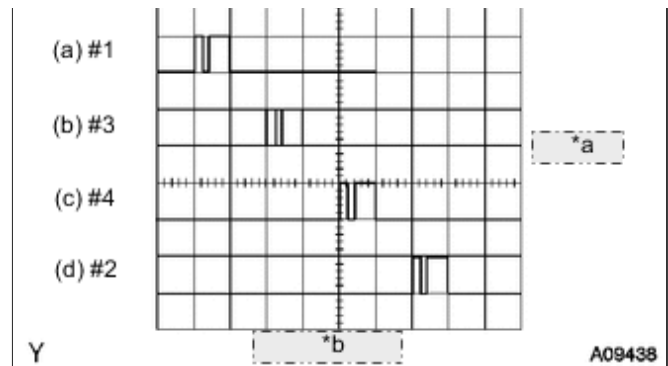
Injector No. 1 (to No. 4) Injection Signal

ECM Terminal Name	(a) Between #1 and E1 (b) Between #3 and E1 (c) Between #4 and E1 (d) Between #2 and E1
Tester Range	5 V/DIV., 20 msec./DIV.
Condition	Idling with warm engine



Tech Tips

The waveform varies depending on the injector injection.

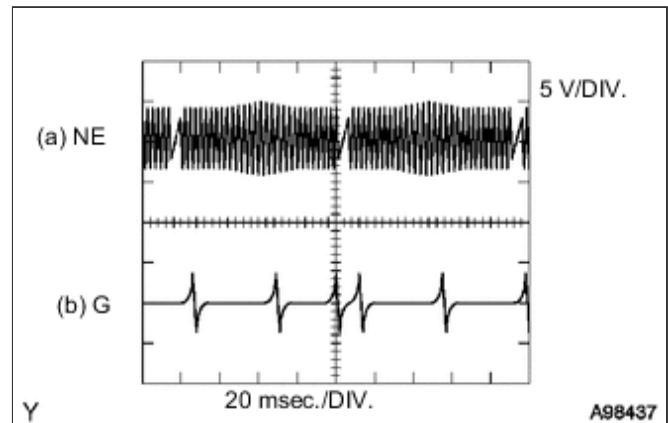


*a	5 V/DIV.
*b	20 msec./DIV.

2. WAVEFORM 2

Crankshaft Position Sensor Signal and Camshaft Position Sensor Signal

ECM Terminal Name	(a) Between NE+ and NE- (b) Between G+ and G-
Tester Range	5 V/DIV., 20 msec./DIV.
Condition	Idling with warm engine



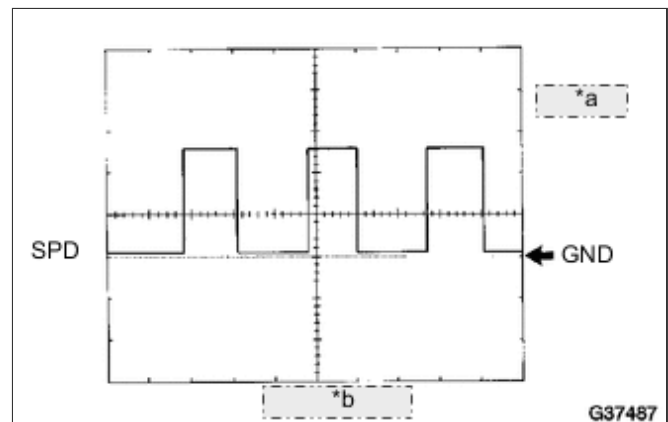
Tech Tips

The waveform varies depending on the engine speed.

3. WAVEFORM 3

Vehicle Speed Signal

ECM Terminal Name	Between SPD and E1
Tester Range	5 V/DIV., 10 msec./DIV.
Condition	Driving at vehicle speed of 40 km/h (25 mph)



*a	5 V/DIV.
*b	10 msec./DIV.

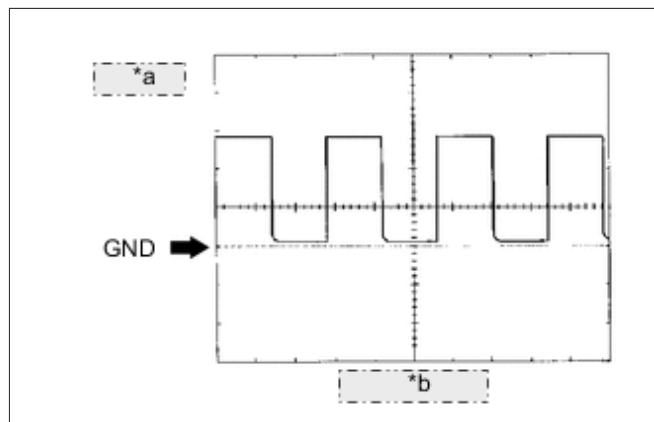
4. WAVEFORM 4

Engine Speed Signal

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

Tech Tips

The wavelength becomes shorter as the engine speed increases.



*a	5 V/DIV.
*b	10 msec./DIV.

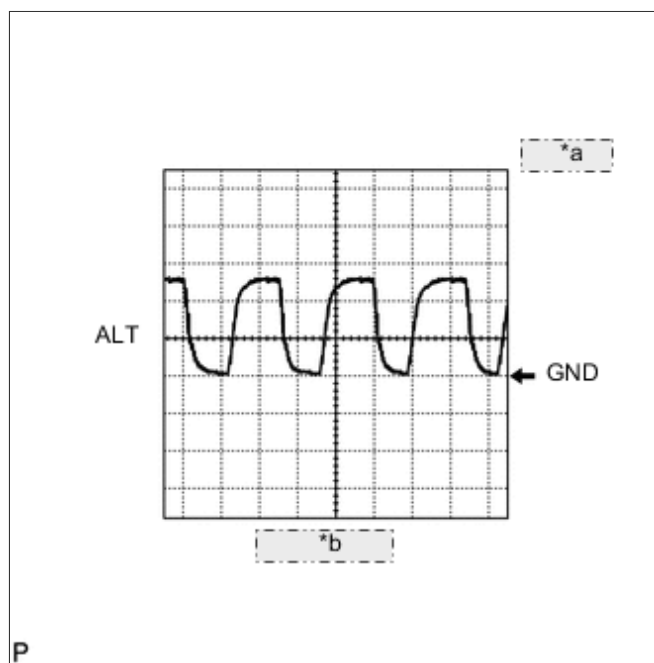
5. WAVEFORM 5

Generator Duty Ratio Signal

ECM Terminal Names	Between ALT and E1
Tester Ranges	5 V/DIV., 2 msec./DIV.
Conditions	Idling

Tech Tips

The wavelength becomes shorter as the engine speed increases.

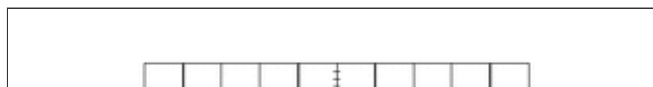


*a	5 V/DIV.
*b	2 msec./DIV.

6. WAVEFORM 6

Suction Control Valve Signal

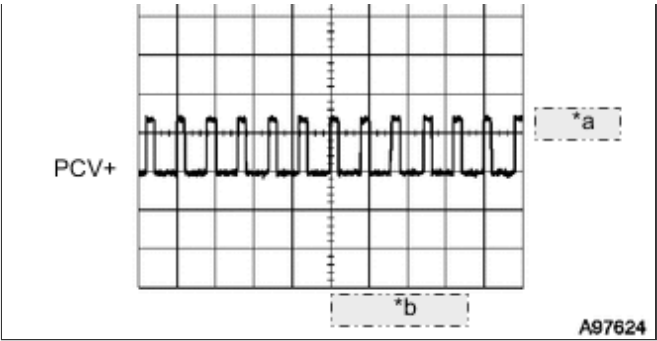
ECM Terminal Name	Between PCV+ and PCV-
Tester Range	10 V/DIV., 5 msec./DIV.



Condition	Idling or cranking with warm engine
-----------	-------------------------------------

Tech Tips

The waveform varies depending on the suction control valve operation.



*a	10 V/DIV.
*b	5 msec./DIV.

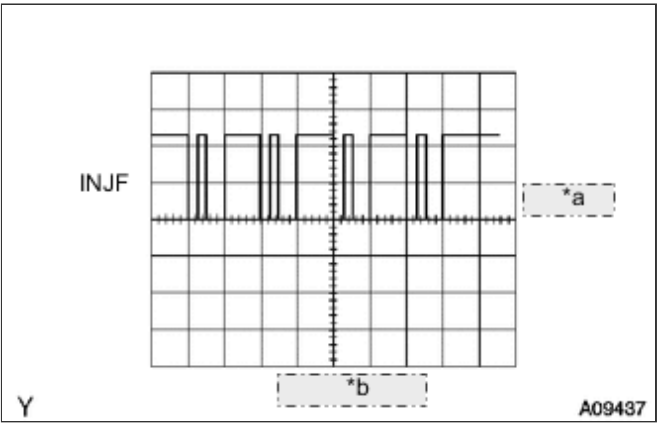
7. WAVEFORM 7

Injector Injection Confirmation Signal

ECM Terminal Name	Between INJF and E1
Tester Range	2 V/DIV., 20 msec./DIV.
Condition	Idling with warm engine

Tech Tips

The waveform varies depending on the injector injection.



*a	2 V/DIV.
*b	20 msec./DIV.

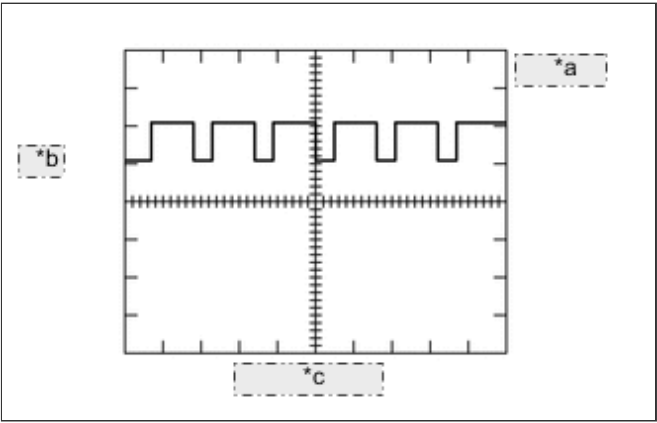
8. WAVEFORM 8

Turbo Motor Driver Input Signal

ECM Terminal Name	Between VNTO and E1
Tester Range	5 V/DIV., 20 msec./DIV.
Condition	Idling with warm engine

Tech Tips

The waveform varies depending on the turbocharger operation.



*a	5 V/DIV.
*h	VNTO

*C	20 msec./DIV.

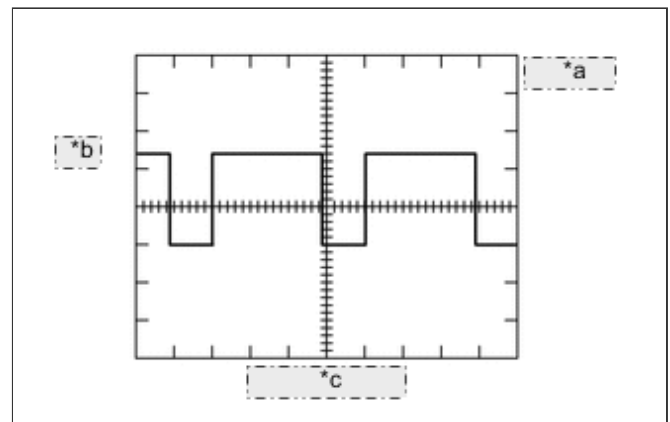
9. WAVEFORM 9

Turbo Motor Driver Output Signal

ECM Terminal Name	Between VNTI and E1
Tester Range	5 V/DIV., 50 msec./DIV.
Condition	Idling with warm engine

Tech Tips

The waveform varies depending on the turbocharger status.



*a	5 V/DIV.
*b	VNTI
*c	50 msec./ DIV.

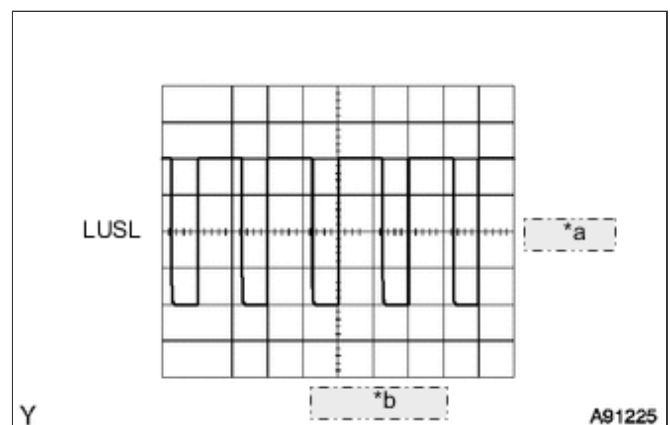
10. WAVEFORM 10

Diesel Throttle Motor Signal

ECM Terminal Name	Between LUSL and E1
Tester Range	1 V/DIV., 2 msec./DIV.
Condition	Warm engine with racing engine

Tech Tips

The waveform varies depending on the throttle valve operation.



*a	1 V/DIV.
*b	2 msec./DIV.

11. WAVEFORM 11

CAN Communication Signal

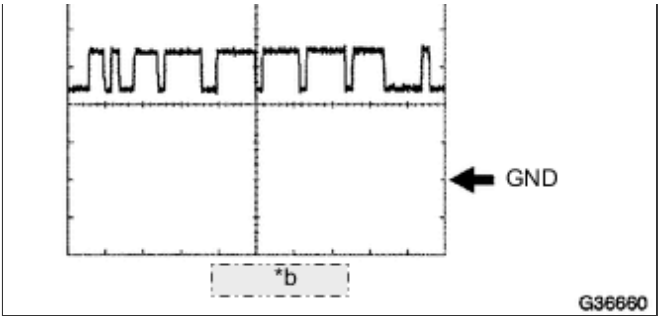
ECM Terminal Name	Between CAN+ and E1
Tester Range	1 V/DIV., 10 msec./DIV.



Condition	Engine is stopped, ignition switch ON
-----------	---------------------------------------

Tech Tips

The waveform varies depending on the CAN communication signal.



*a	1 V/DIV.
*b	10 msec./DIV

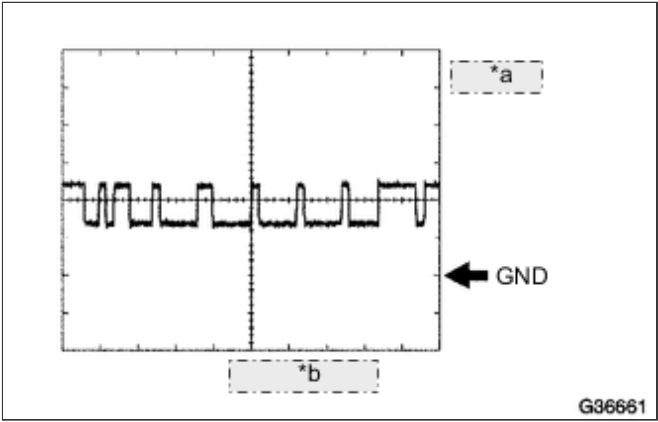
12. WAVEFORM 12

CAN Communication Signal

ECM Terminal Name	Between CAN- and E1
Tester Range	1 V/DIV., 10 msec./DIV.
Condition	Engine is stopped, ignition switch ON

Tech Tips

The waveform varies depending on the CAN communication signal.



*a	1 V/DIV.
*b	10 msec./DIV.