PCM INSPECTION [L3 Turbo]

id0140b6802500

Without Using the M-MDS

Note

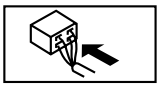
- The PCM terminal voltage can vary with the conditions when measuring and changes due to aged deterioration on the vehicle, causing false diagnosis. Therefore determine comprehensively where the malfunction occurs among the input systems, output systems, and the PCM.

PCM terminal voltage table (Reference)

PCM
WIRING HARNESS SIDE CONNECTOR

2BE	2BA	2AW	2AS	2AO	2AK	2AG	2AC	2Y	2U	2Q	2M	2I	2E	2A
2BF	2BB	2AX	2AT	2AP	2AL	2AH	2AD	2Z	2V	2R	2N	2J	2F	2B
2BG	2BC	2AY	2AU	2AQ	2AM	2AI	2AE	2AA	2W	2S	2O	2K	2G	2C
2BH	2BD	2AZ	2AV	2AR	2AN	2AJ	2AF	2AB	2X	2T	2P	2L	2H	2D

1BE	1BA	1AW	1AS	1AO	1AK	1AG	1AC	1Y	1U	1Q	1M	1I	1E	1A
1BF	1BB	1AX	1AT	1AP	1AL	1AH	1AD	1Z	1V	1R	1N	1J	1F	1B
1BG	1BC	1AY	1AU	1AQ	1AM	1AI	1AE	1AA	1W	1S	1O	1K	1G	1C
1BH	1BD	1AZ	1AV	1AR	1AN	1AJ	1AF	1AB	1X	1T	1P	1L	1H	1D



acxuuw00000125

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
1A	—	—	—		—	—
1B	Starter relay control	Starter relay	Ignition switch off after 10 s		Below 1.0	• Starter relay • Related wiring harness
			Ignition switch to the ON position		Below 1.0	
1C	—	—	—		—	—
1D	Clutch operation	CPP switch	Clutch pedal depressed		Below 1.0	• CPP switch • Related wiring harness
			Clutch pedal released		B+	
1E	—	—	—		—	—
1F	—	—	—		—	—
1G	—	—	—		—	—
1H	Fuel pump control	Fuel pump relay	Ignition switch to the ON position after 10 s		B+	• Fuel pump relay • Related wiring harness
			Cranking		B+	
			Idle		Below 1.0	
1I	A/C	A/C relay	Idle	A/C operating	Below 1.0	• A/C relay • Related wiring harness
				A/C not operating	B+	
1J	Refrigerant pressure switch (middle)	Refrigerant pressure switch (middle)	A/C ON	Refrigerant pressure is more than the specification. (Refrigerant pressure switch (middle) is on.)	Below 1.0	• Refrigerant pressure switch • Related wiring harness
				Refrigerant pressure is less than the specification. (Refrigerant pressure switch (middle) is off.)	B+	
1K	—	—	—		—	—
1L	—	—	—		—	—
1M	IAT	MAF/IAT sensor	Ignition switch to the ON position	IAT 20 °C {68 °F}	Approx. 2.38	• MAF/IAT sensor • Related wiring harness
				IAT 40 °C {104 °F}	Approx. 1.49	
1N	—	—	—		—	—
1O	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
1P	MAF sensor ground	MAF/IAT sensor	Under any condition		Below 1.0	• Related wiring harness
1Q	—	—	—		—	—
1R	—	—	—		—	—
1S	Neutral position	Neutral switch	Shift lever is at neutral position		Below 1.0	• Neutral switch • Related wiring harness
			Shift lever is not at neutral position		B+	
1T	—	—	—		—	—
1U	APP sensor ground	APP sensor	Under any condition		Below 1.0	• APP sensor • Related wiring harness
1V	—	—	—		—	—
1W	—	—	—		—	—
1X	—	—	—		—	—
1Y	APP (No.1)	APP sensor	Ignition switch to the ON position	Accelerator pedal depressed	Approx. 3.0	• APP sensor • Related wiring harness
				Accelerator pedal released	Approx. 0.4	
1Z	—	—	—		—	—
1AA	Fuel pump speed control	Fuel pump speed control relay	Ignition switch to the ON position after 10 s		B+	• Fuel pump speed control relay • Related wiring harness
			Cranking		Below 1.0	
			Idle		Below 1.0	
1AB	Brake	Brake switch	Brake pedal depressed		B+	• Brake switch • Related wiring harness
			Brake pedal released		Below 1.0	
1AC	APP (No.2)	APP sensor (No.2)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• APP sensor • Related wiring harness
1AD	—	—	—		—	—
1AE	Fan control module	Fan control module	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Fan control module • Related wiring harness
1AF	—	—	—		—	—
1AG	—	—	—		—	—
1AH	—	—	—		—	—
1AI	CAN (L)	CAN related module	Because this terminal is for CAN, no valid determination of terminal voltage is possible			• Related wiring harness
1AJ	Constant voltage	APP sensor	Ignition switch to the ON position		Approx. 5.0	• Related wiring harness
1AK	MAF	MAF/IAT sensor	Ignition switch to the ON position		Approx. 0.7	• MAF/IAT sensor • Related wiring harness
			Idle		Approx. 1.3	
1AL	—	—	—		—	—
1AM	CAN (H)	CAN related module	Because this terminal is for CAN, no valid determination of terminal voltage is possible			• Related wiring harness
1AN	—	—	—		—	—
1AO	—	—	—		—	—
1AP	—	—	—		—	—
1AQ	Cruise control switch	Cruise control switch	Ignition switch to the ON position	ON/OFF switch pressed in	Approx. 0	• Cruise control switch • Related wiring harness
				CANCEL switch pressed in	Approx. 1.1	
				SET/COAST switch pressed in	Approx. 3.1	
				RES/ACCEL switch pressed in	Approx. 4.2	
				Except above	Approx. 5.0	
1AR	IAT sensor ground	MAF/IAT sensor	Under any condition		Below 1.0	• Related wiring harness
1AS	—	—	—		—	—

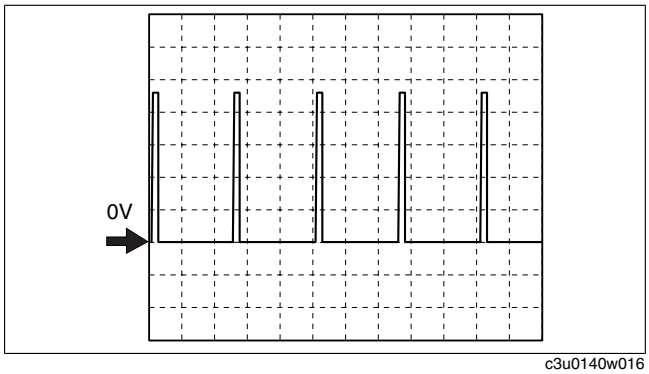
Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
1AT	Main relay control	Main relay	Ignition switch off after 10 s		B+	• Main relay • Related wiring harness
			Ignition switch to the ON position		Below 1.0	
1AU	A/C on signal	Refrigerant pressure switch (high, low)	Idle	A/C switch and fan switch on	B+	• Refrigerant pressure switch (high, low) • Related wiring harness
1AV	APP sensor ground	APP sensor	Under any condition		Below 1.0	• Related wiring harness
1AW	Fuel injector control	Fuel Injector relay	Under any condition		Below 1.0	• Related wiring harness
1AX	Drive-by-wire relay control	Drive-by-wire relay	Ignition switch off after 10 s		Below 1.0	• Related wiring harness
			Ignition switch to the ON position		Below 1.0	
1AY	Ignition switch	Ignition switch	Ignition switch off		Below 1.0	• Related wiring harness
			Ignition switch to the ON position		B+	
1AZ	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BA	Back-up power supply	Battery (positive terminal)	Under any condition		B+	• Battery • Related wiring harness
1BB	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BC	Sensor ground	HO2S	Under any condition		Below 1.0	• HO2S • Related wiring harness
1BD	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BE	B+	Main relay	Ignition switch off after 10 s		Below 1.0	• Battery • Related wiring harness
			Ignition switch to the ON position		B+	
1BF	Throttle actuator power supply	Drive-by-wire relay	Ignition switch off after 10 s		Below 1.0	• Related wiring harness
			Ignition switch to the ON position		B+	
1BG	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BH	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
2A	Throttle actuator control (+)	Throttle body	Ignition switch off		Approx. 1.5	• Throttle actuator • Related wiring harness
			Ignition switch to the ON position		B+	
2B	Throttle actuator control (–)	Throttle body	Ignition switch off		Approx. 1.5	• Throttle actuator • Related wiring harness
			Ignition switch to the ON position		B+	
2C	A/F sensor heater control	A/F sensor heater	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• A/F sensor • Related wiring harness
2D	HO2S heater control	HO2S heater	• Engine speed above 5,000 rpm (Heater control not operating)		B+	• HO2S heater • Related wiring harness
2E	Power supply	Main relay, Variable swirl solenoid valve, CMP sensor	Ignition switch off after 10 s		Below 1.0	• Main relay • Related wiring harness
			Ignition switch to the ON position		B+	
2F	High pressure fuel pump control (+)	High pressure fuel pump	Ignition switch off		Below 1.0	• High pressure fuel pump • Related wiring harness Related wiring harness
			Ignition switch to the ON position		Approx. 9.7	
			Idle		Approx. 9.4	
2G	High pressure fuel pump control (–)	High pressure fuel pump	Ignition switch off		Below 1.0	• High pressure fuel pump • Related wiring harness Related wiring harness
			Ignition switch to the ON position		Approx. 9.6	
			Idle		Approx. 8.6	
2H	Ground	Body ground	Under any condition		Below 1.0	• Related wiring harness
2I	Constant voltage (Vref)	Fuel pressure sensor	Ignition switch to the ON position		Approx. 5.0	• Related wiring harness
2J	—	—	—		—	—
2K	—	—	—		—	—
2L	—	—	—		—	—
2M	Sensor ground	A/F sensor	Under any condition		Below 1.0	• Related wiring harness
2N	Boost air temperature	MAP/Boost air temperature sensor	Ignition switch to the ON position	IAT 20 °C {68 °F}	2.4—2.6	• Boost air temperature sensor • Related wiring harness
				IAT 30 °C {86 °F}	1.7—1.9	
2O	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
2P	Sensor ground	Fuel pressure sensor	Under any condition		Below 1.0	• Fuel pressure sensor • Related wiring harness
2Q	HO2S	HO2S	Idle		0—1	• HO2S • Related wiring harness
2R	Fuel pressure sensor	Fuel pressure sensor	Ignition switch off		Below 1.0	• Fuel pressure sensor • Related wiring harness
			Ignition switch to the ON position		Approx. 1.1	
			Idle		Approx. 1.7	
2S	CMP	CMP sensor	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• CMP sensor • Related wiring harness
2T	PSP	PSP switch	Idle	Steering wheel at straight ahead position	B+	• PSP switch • Power steering system • Related wiring harness
				While turning steering wheel	Below 1.0	
2U	Knocking (+)	KS	Ignition switch to the ON position (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Approx. 4.3	• KS • Related wiring harness
2V	Knocking (–)	KS	Ignition switch to the ON position (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Below 1.0	• KS • Related wiring harness
2W	CKP	CKP sensor	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• CKP sensor • Related wiring harness
2X	Internal ground	KS, CMP sensor, CKP sensor, A/F sensor, TP sensor	Under any condition		Below 1.0	• Related wiring harness
2Y	A/F sensor calibration resistor	A/F sensor	Ignition switch off after 10s		Below 1.0	• A/F sensor • Related wiring harness
			Ignition switch to the ON position		Approx. 3.9	
2Z	A/F sensor power supply	A/F sensor	Idle (after warm up)		Approx. 6.2	• A/F sensor • Related wiring harness
2AA	Wastegate control solenoid valve	Wastegate control solenoid valve	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Wastegate control solenoid valve • Related wiring harness
2AB	Purge solenoid valve	Purge solenoid valve	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Purge solenoid valve • Related wiring harness
2AC	A/F sensor	A/F sensor	Idle (after warm up)		Approx. 3.7	• A/F sensor • Related wiring harness
2AD	A/F sensor	A/F sensor	Idle (after warm up)		Approx. 3.7	• A/F sensor • Related wiring harness
			After racing		2.1—4.8	
2AE	Variable swirl shutter valve monitor	Variable swirl shutter valve switch	variable swirl shutter valve close		Below 1.0	• Variable swirl shutter valve switch • Related wiring harness
			variable swirl shutter valve open		B+	
2AF	OCV control	OCV	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• OCV valve • Related wiring harness
2AG	Manifold absolute pressure	MAP sensor	Ignition switch to the ON position)		Approx. 1.9	• MAP sensor • Related wiring harness
			Idle (after warm up)		Below 1.0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
2AH	ECT	ECT sensor	Ignition switch to the ON position	ECT 20 °C {68 °F}	3.04—3.14	• ECT sensor • Related wiring harness
				ECT 60 °C {140 °F}	1.29—1.39	
2AI	Generator field coil control	Generator (terminal D)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Generator • Related wiring harness
2AJ	Generator output voltage	Generator (terminal P)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Generator • Related wiring harness
2AK	TP (No. 1)	TP sensor (No. 1)	Ignition switch to the ON position	Accelerator pedal is released	0.4—0.6	• TP sensor • Related wiring harness
				Accelerator pedal is depressed	4.5—4.7	
2AL	TP (No. 2)	TP sensor (No. 2)	Ignition switch to the ON position	Accelerator pedal is released	4.4—4.6	• TP sensor • Related wiring harness
				Accelerator pedal is depressed	0.3—0.4	
2AM	EGR valve #3 coil control	EGR valve (terminal A)	Ignition switch to the ON position		B+	• EGR valve • Related wiring harness
			Ignition switch off		Below 1.0	
2AN	EGR valve #6 coil control	EGR valve (terminal F)	Ignition switch to the ON position		B+	• EGR valve • Related wiring harness
			Idle		B+	
2AO	Constant voltage (Vref)	TP sensor	Ignition switch to the ON position		Approx. 5.0	• TP sensor • Related wiring harness
2AP	TP sensor ground	TP sensor	Under any condition		Below 1.0	• TP sensor • Related wiring harness
2AQ	EGR valve #1 coil control	EGR valve (terminal E)	Ignition switch to the ON position		Below 1.0	• EGR valve • Related wiring harness
			Idle		Below 1.0	
2AR	EGR valve #4 coil control	EGR valve (terminal B)	Ignition switch to the ON position		B+	• EGR valve • Related wiring harness
			Ignition switch off		Below 1.0	
2AS	Variable swirl control	Variable swirl solenoid valve	ECT 62 °C {144 °F} or more and engine speed 3,250 rpm or more		B+	• Variable swirl solenoid valve • Related wiring harness
			ECT less than 62 °C {144 °F} and engine speed less than3,250 rpm		Below 1.0	
2AT	IGT4	Ignition coil (No.4 cylinders)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Ignition coil No.4 • Related wiring harness
2AU	Constant voltage (Vref)	MAP sensor	Ignition switch to the ON position		Approx. 5.0	• Related wiring harness
2AV	Sensor ground	MAP sensor	Under any condition		Below 1.0	• Related wiring harness
2AW	IGT2	Ignition coil (No.2 cylinders)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Ignition coil No.2 • Related wiring harness
2AX	IGT3	Ignition coil (No.3 cylinders)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Ignition coil No.3 • Related wiring harness
2AY	Sensor ground	ECT sensor	Under any condition		Below 1.0	• ECT sensor • Related wiring harness
2AZ	Fuel injection (–)(#4)	Fuel injector (No. 4)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Fuel injector No.4 • Related wiring harness
2BA	IGT1	Ignition coil (No.1 cylinders)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Ignition coil No.1 • Related wiring harness
2BB	Fuel injection (–)(#1)	Fuel injector (No. 1)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)			• Fuel injector No.1 • Related wiring harness

Terminal	Signal	Connected to	Test condition	Voltage (V)	Inspection item
2BC	Fuel injection (–)(#2)	Fuel injector (No. 2)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.2 • Related wiring harness
2BD	Fuel injection (–)(#3)	Fuel injector (No. 3)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.3 • Related wiring harness
2BE	Fuel injector power supply 1	Fuel Injector relay	Ignition switch off	Below 1.0	• Fuel Injector relay • Related wiring harness
			Ignition switch to the ON position	B+	
2BF	Fuel injector power supply 2	Fuel Injector relay	Ignition switch off	Below 1.0	• Fuel Injector relay • Related wiring harness
			Ignition switch to the ON position	B+	
2BG	Fuel injection (+)(#1, #4)	Fuel injector (No. 1,No.4)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.1, No.4 • Related wiring harness
2BH	Fuel injection (+)(#2, #3)	Fuel injector (No.2, No.3)	• Inspect using the wave profile. (See Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.2, No.3 • Related wiring harness

Inspection Using An Oscilloscope (Reference)
APP sensor signal
Accelerator pedal is released



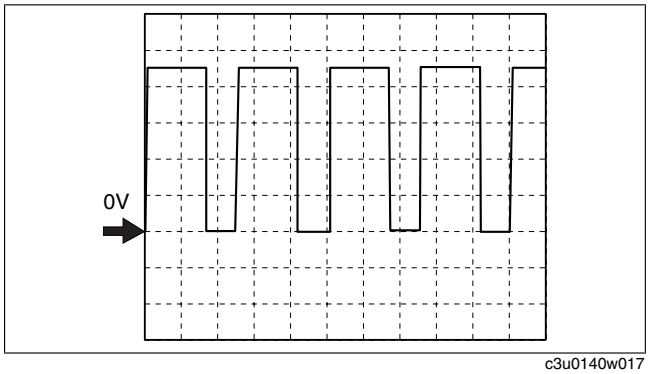
c3u0140w016

Accelerator pedal is depressed

PCM terminals
- 1AC (+)—body ground (–)

Oscilloscope setting
- 2.5 V/DIV (Y), 2 ms/DIV (X), DC range

Vehicle condition
- Ignition switch is turned to the ON position. (engine off)

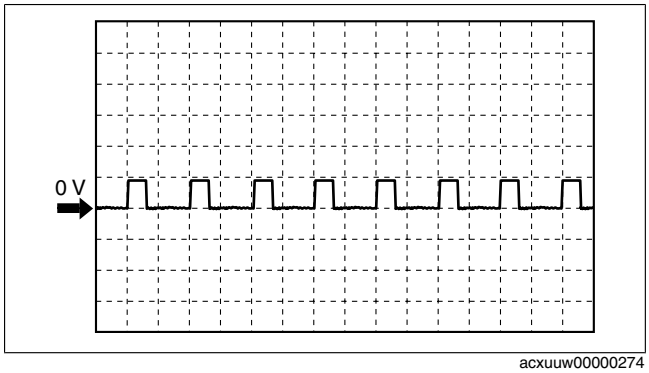


c3u0140w017

Fan control module signal
PCM terminals
- 1AE (+)—body ground (–)

Oscilloscope setting
- 5 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

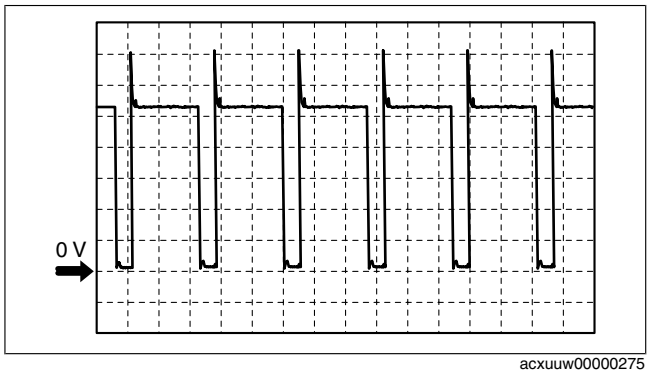


acxuuw00000274

A/F Sensor heater control signal
PCM terminals
- 2C (+)—body ground (–)

Oscilloscope setting
- 2 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

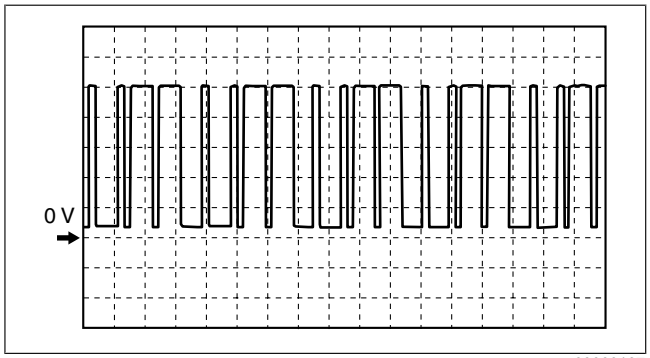


acxuuw00000275

CMP sensor signal
PCM terminals
- 2S (+)—body ground (–)

Oscilloscope setting
- 2 V/DIV (Y), 100 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

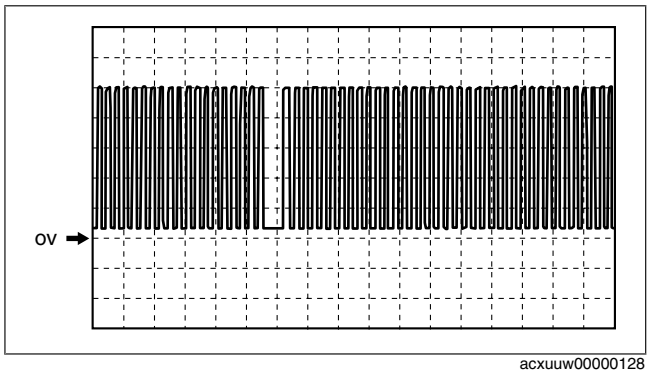


acxuuw00000127

CKP sensor signal
PCM terminals
- 2W (+)—body ground (–)

Oscilloscope setting
- 2 V/DIV (Y), 5 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

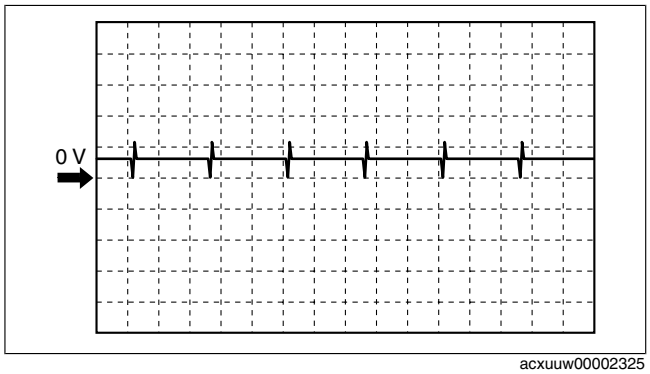


acxuuw00000128

Wastegate control solenoid valve signal
PCM terminals
- 2AA (+)—body ground (–)

Oscilloscope setting
- 20 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition
- Ignition switch to the ON position

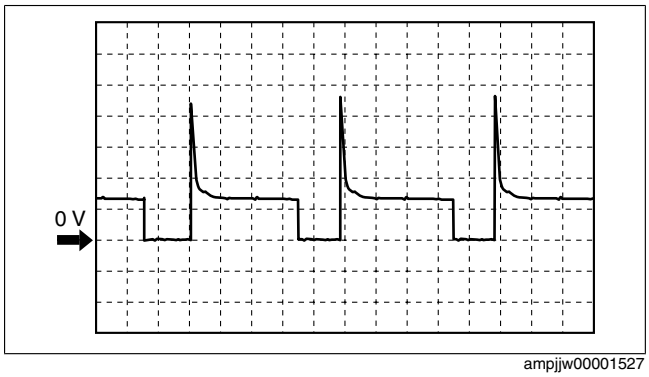


acxuuw00002325

Purge control signal
PCM terminals
- 2AB (+)—body ground (–)

Oscilloscope setting
- 10 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition
- Engine speed is 2,000 rpm

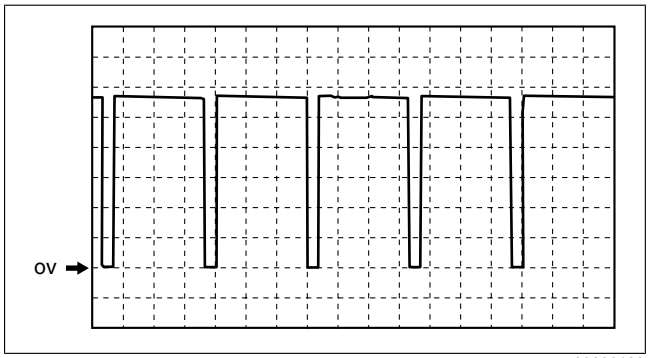


ampjjw00001527

OCV signal
PCM terminals
- 2AF (+)—body ground (–)

Oscilloscope setting
- 2.5 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

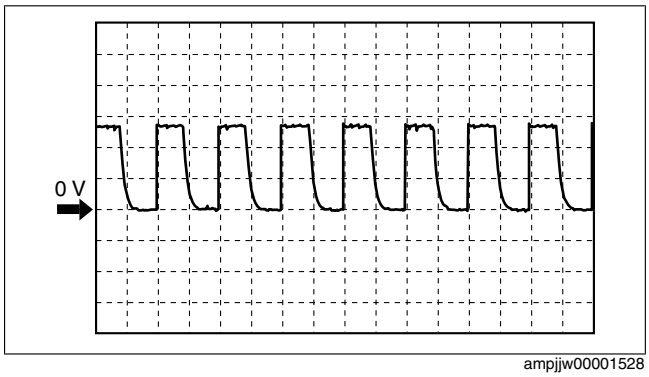


acxuuw00000129

Generator field coil control signal
PCM terminals
- 2AI (+)—body ground (–)

Oscilloscope setting
- 0.5 V/DIV (Y), 2 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (engine speed approx. 650 rpm, no load)

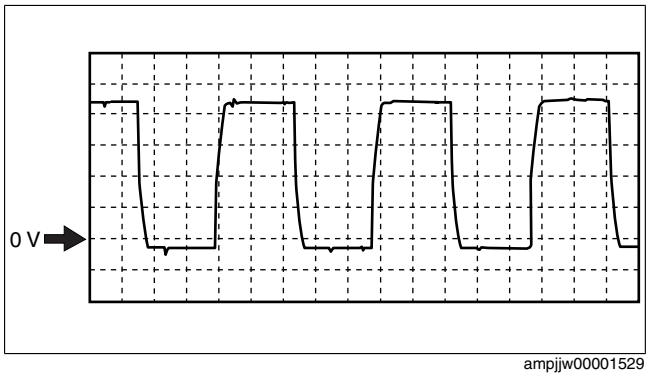


ampjjw00001528

Generator output voltage signal
PCM terminals
- 2AJ (+)—body ground (–)

Oscilloscope setting
- 2 V/DIV (Y),1 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

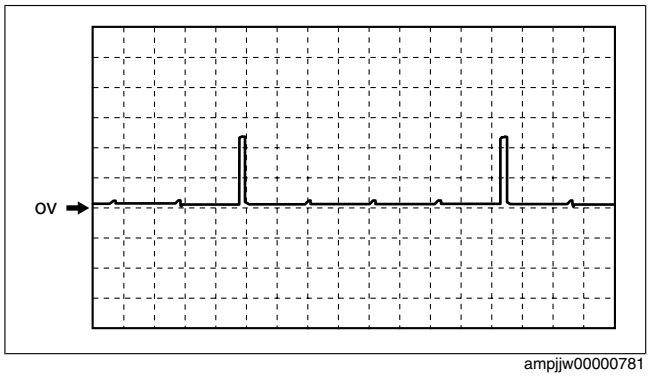


ampjjw00001529

IGT1, IGT2, IGT3, IGT4 control signals
PCM terminals
- IGT1 (No.1): 2BA (+)—body ground (–)
- IGT2 (No.2): 2AW (+)—body ground (–)
- IGT3 (No.3): 2AX (+)—body ground (–)
- IGT4 (No.4): 2AT (+)—body ground (–)

Oscilloscope setting
- 2 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

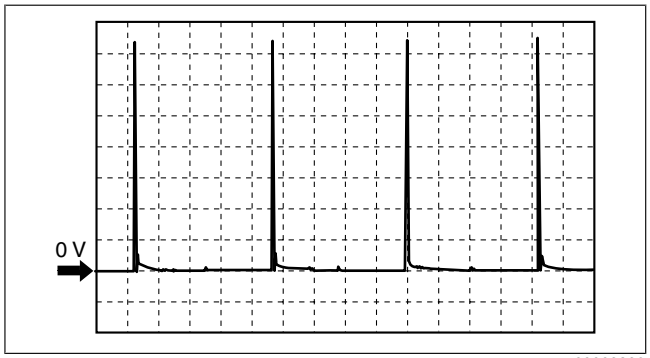


ampjjw00000781

Fuel injection control (–)
PCM terminals
- Fuel injection No.1: 2BB (+)—body ground (–)
- Fuel injection No.2: 2BC (+)—body ground (–)
- Fuel injection No.3: 2BD (+)—body ground (–)
- Fuel injection No.4: 2AZ (+)—body ground (–)

Oscilloscope setting
- 10 V/DIV (Y), 20 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

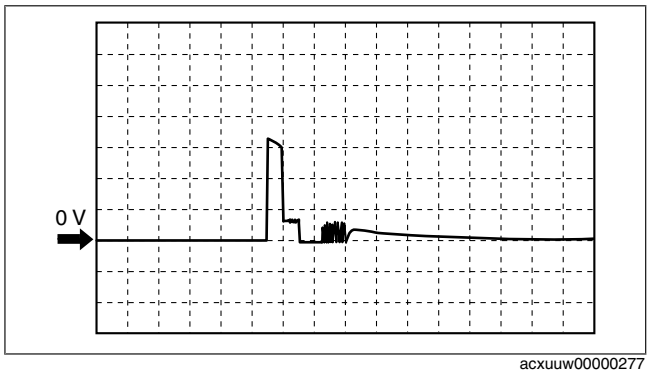


acxuuw00002326

Fuel injection control (+)
PCM terminals
- Fuel injection No.1, No.4: 2BG (+)—body ground (–)
- Fuel injection No.2, No.3: 2BH (+)—body ground (–)

Oscilloscope setting
- 20 V/DIV (Y), 400 µs/DIV (X), DC range

Vehicle condition
- Idle after warm up (no load, P/S off, A/C off)

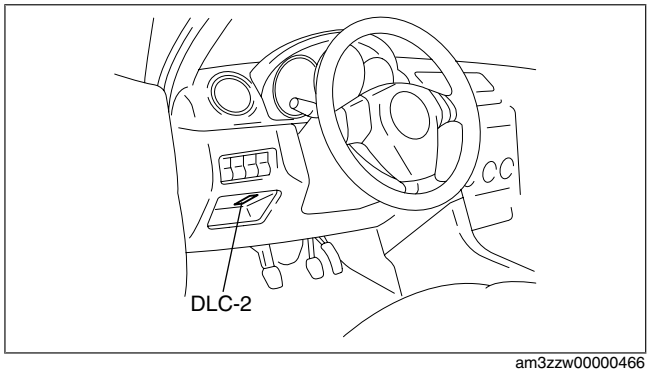


acxuuw00000277

Using the M-MDS

Note
- PIDs for the following parts are not available on this model. Perform the specific inspections for the following parts:
  — CMP sensor (See CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L3 Turbo].)
  — Main relay

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Measure the PID value.
   - If PID value is not within the specification, follow the instructions in the “Inspection item“ column.



am3zzw00000466

Note

- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the PCM. Therefore, an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device. If a monitored value of an output device is out of specification, inspect the monitored value of the input device related to the output control.
- For input/output signals except those of the monitoring items, use a voltmeter to measure the PCM terminal voltage.
- The simulation items that are used in the ENGINE CONTROL SYSTEM OPERATION INSPECTION are as follows.
  — ACCS, ALTF, ARPMDES, FAN_DUTY, EVAPCP, FP, FUELPW1, GENVDSD, HTR11, HTR12, IMRC, INJ_1, INJ_2, INJ_3, INJ_4, SEGRP, test, VT DUTY1 Wt, WGC

PID/DATA monitor table (reference)

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Inspection item	PCM terminal
AC_REQ (Refrigerant pressure switch (high, low))	On/Off	Refrigerant pressure is more than the specification or less than the specification. (Refrigerant pressure switch (high, low) is off.): Off Except above: On	• Refrigerant pressure switch (high, low)	1AU
ACCS (A/C relay)	On/Off	A/C relay is ON: On A/C relay is OFF: Off	• The following PIDs: — RPM, TP, ECT • A/C relay	1I
AFR (Air fuel ratio)	—	Target air fuel ratio is displayed	• A/F sensor	2Z 2AC 2AD
AFR_ACT (Actual air fuel ratio)	—	Actual air fuel ratio is displayed	• A/F sensor	2Z 2AC 2AD
ALTF (Generator field coil control duty value)	%	Ignition switch to the ON position: 0% Idle: 0—100% Just after A/C switch ON and fan switch ON at idle: Duty value rises	• The following PIDs: — IAT, ECT, RPM, VPWR, ALTT V • Generator	2AI
ALTT V (Generator output voltage)	V	Idle (no E/L): Approx. 14 V (This is an internal calculation value and differs from the terminal voltage.)	• Generator	2AJ
APP (Accelerator pedal position)	%	Accelerator pedal is released: 0% Accelerator pedal is depressed: 100%	• The following PIDs: — APP1, APP2 • APP sensor	1Y 1AC
APP1 (APP sensor N0.1)	V	• Accelerator pedal released: Approx. 0.4 V • Accelerator pedal depressed: Approx. 3.0 V	• APP sensor	1Y
	%	• Accelerator pedal released: Approx. 8 % • Accelerator pedal depressed: Approx. 60 %		
APP2 (APP sensor N0.2)	V	• Accelerator pedal released: Approx. 0.4 V • Accelerator pedal depressed: Approx. 3.0 V	• APP sensor	1AC
	%	• Accelerator pedal released: Approx. 8 % • Accelerator pedal depressed: Approx. 60 %		
ARPMDES (Target engine speed)	RPM	Shift position: P or N — No load: 700 rpm — E/L operating: 700 rpm — P/S operating: 700 rpm — A/C ON: 700 rpm	• The following PIDs: — IAT, RPM, MAP, ECT, MAF, TP, INGEAR, PSP, ALTT V • CKP sensor	—

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Inspection item	PCM terminal
BARO (Barometric pressure)	Pa	Indicate the atmospheric pressure	• BARO sensor	—
	V	Ignition switch is ON at sea level: Approx. 4.0 V		
BAT	°C	Boost air temperature is displayed	• MAP/boost air temperature sensor	2N
BAT_V	V	Boost air temperature 20 °C {68 °F}: 2.4—2.6 V	• MAP/boost air temperature sensor	2N
		Boost air temperature 30 °C {86 °F}: 1.7—1.9 V		
BOO (Brake switch)	On/Off	Brake pedal depressed: On Brake pedal released: Off	• Brake switch	1AB
BPA (Brake pressure applied switch)	On/Off	Brake pedal depressed: On Brake pedal released: Off	• Brake switch	1AB
CATT11_DSD (Estimated catalytic converter temperature)	°C / °F	Indicate the estimated catalytic converter temperature	• Perform applicable DTC troubleshooting.	—
CHRGLP (Generator warning light)	On/Off	Ignition switch to the ON position: On Idle: Off	• Perform applicable DTC troubleshooting.	—
COLP (Refrigerant pressure switch (middle))	ON/OFF	Refrigerant pressure is more than the specification. (Refrigerant pressure switch (middle) is on.): On Refrigerant pressure is less than the specification. (Refrigerant pressure switch (middle) is off.): Off	• Refrigerant pressure switch (middle)	1J
CPP (Clutch pedal position)	On/Off	• Clutch pedal depressed: On • Clutch pedal released: Off	CPP switch	1D
CPP/PNP (Shift lever position)	Drive/ Neutral	• Neutral position: Neutral • Others: Drive	Neutral switch	1X
DTCCNT (Number of DTC detected)	—	Indicates number of DTC	• Perform applicable DTC troubleshooting.	—
ECT (Engine coolant temperature)	°C / °F	Indicate the ECT	• ECT sensor	2AH
	V	ECT 20 °C {68 °F}: 3.04—3.14 V ECT 60 °C {140 °F}: 1.29—1.39 V		
EQ_RAT11 (Equivalence ratio (lambda))	—	Idling after warm-up: Approx. 1	• Perform applicable DTC troubleshooting.	—
EQ_RAT11_DSD (A/F sensor)	—	Idling after warm-up: Approx. 1	• Perform applicable DTC troubleshooting.	—
ETC_ACT (Electronic throttle control actual)	°	Indicate the desired TP by angle	• Perform applicable DTC troubleshooting.	2A 2B
ETC_DSD (Electronic throttle control desired)	%	Indicate the desired TP by percent	• The following PIDs: — APP1, APP2, ETC_ACT • TP sensor	2A 2B
	°	Indicate the desired TP by angle		
EVAPCP (Purge solenoid valve duty value)	%	Ignition switch to the ON position: 0% Idle: 0%	• The following PIDs: — IAT, RPM, ECT, MAF, O2S11,BARO, INGEAR, VPWR • Purge solenoid valve	2AB
FAN_DUTY	%	ECT less than 98 °C {208 °F}: 0% ECT 100 °C {212 °F}: 30% ECT 106 °C {223 °F}: 70% ECT 110 °C {230 °F}: 100%	• Fan control module	1AE
FIA (Fuel injection amount)	—	Indicate the fuel injection amount.	• Fuel injector • Fuel Injector relay	—
FP (Fuel pump relay)	On/Off	Idle: On Cranking: On	• The following PIDs: — RPM • Fuel pump relay	1H
FP_Hi_PRES	On/Off	Spill valve control solenoid valve work: On Spill valve control solenoid valve don't work: Off	• High pressure fuel pump	2F 2G

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Inspection item	PCM terminal
FUEL_PRES	Pa	Idle: Approx. 3 MPa Load 60 % or more: Approx. 11.5 MPa	• Fuel pressure sensor	2R
FUEL_PRES_V	V	Ignition switch to the ON position: Approx. 1.1 V Idle: Approx. 1.7 V	• Fuel pressure sensor	2R
FUELPW (Fuel injector duration)	sec	Idle: Approx. 0.2 sec	• The following PIDs: — ECT, IAT, RPM, TP, MAF, O2S11, O2S12, MAP, VSS, TR, BOO, AC_REQ, COLP, VPWR	2AZ 2BB 2BC 2BD
FUELSYS (Fuel system status)	OL/CL/ OL-Drive/ OL-Fault/ CL-Fault	Ignition switch to the ON position: OL_Drive Idle (after warm up): CL	• The following PIDs: — IAT, MAF, TP, MAP, ECT, RPM, O2S11, O2S12, INGEAR, PSP, VPWR, ALTT V • Fuel injector	—
GENVDSD (Generator voltage desired)	V	Idle: Approx. 13.83 V*1(E/L not operating)	• Perform applicable DTC troubleshooting.	—
HTR11 (A/F sensor heater)	On/Off	Idle (after warm up): On⇔Off	• The following PIDs: — IAT, MAF, TP, ECT, RPM	2C
HTR12 (HO2S heater)	On/Off	Idle: On Engine speed is above 4,000 rpm: Off	• The following PIDs: — IAT, MAF, ECT, RPM	2D
IAT (Intake air temperature)	°C / °F	Indicate the IAT	• MAF/IAT sensor	1M
	V	IAT 20 °C {68 °F}: 2.4—2.6V IAT 30 °C {86 °F}: 1.7—1.9V		
IMRC (Variable swirl solenoid valve)	On/Off	Engine speed is below Approx. 3,750 rpm and ECT is below 60 °C {140 °F}: On Others: Off	• The following PIDs: — TP, ECT, RPM • Variable swirl solenoid valve	2AS
INGEAR (Load/no load condition)	On/Off	Driving range: On Except above: Off Others: On	• Perform applicable DTC troubleshooting.	—
IVS (CTP condition)	Idle/ Off Idle	APP closed: Idle Others: Off Idle	• Perform applicable DTC troubleshooting.	2AK 2AL
KNOCKR (Knocking retard)	°	Ignition switch to the ON position: 0 ° Idle: 0 °	• KS	2U 2V
LOAD (Engine load)	%	Ignition switch to the ON position: 0% Idle (after warm up): 17.1—18.5% Engine speed is 2,500 rpm: 14.2—15.2	• MAF/IAT sensor	—
LONGFT1 (long term fuel trim)	%	Idle (after warm up):–14—14%	• Perform applicable DTC troubleshooting.	—
MAF (Mass airflow)	g/sec	Indicate the MAF	• MAF/IAT sensor	1AK
	V	Ignition switch to the ON position: Approx. 0.7 V Idle (after warm up): Approx. 1.3 V		
MAP (Manifold absolute pressure)	Pa	Indicate the MAP	• MAP sensor	2AG
	V	Ignition switch to the ON position: Approx. 1.9 V Idle (after warm up): Below 1.0 V		
MIL (Malfunction indicator lamp)	On/Off	Ignition switch to the ON position: On Idle: Off	• Perform applicable DTC troubleshooting.	—
MIL_DIS (Traveled distance since the MIL illuminated)	km / mile	No DTC: 0 km {0 mile} DTC detected: Not 0 km {0 mile}	• Perform applicable DTC troubleshooting.	—
O2S11 (A/F sensor)	A	Idle (after warm up): –1.0—1.0 A Deceleration (after warm up): 0.25 A or more	• A/F sensor	2Z 2AC 2AD
O2S12 (HO2S)	V	Idle: 0—1 V	• HO2S	2Q

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Inspection item	PCM terminal
PSP (Power steering pressure switch)	High/Low	Steering wheel in straight ahead position: Low Others: High	• PSP switch	2T
RO2FT1 (HO2S fuel trim)	—	• Idle after warm-up: Approx. 0.2	• The following PID — O2S12	2Q
RPM (Engine speed)	RPM	No load: 650—750 rpm E/L operating: 650—750 rpm P/S operating: 650—750 rpm A/C ON: 700—800 rpm	• CKP sensor	2W
SCCS (Speed control command switch)	V	Press ON/OFF: Approx. 0 V Press CANCEL: Approx. 1.1 V Press SET/COAST: Approx. 3.1 V Press RES/ACCEL: Approx. 4.2 V Others: Approx. 5.0 V	• Cruise control switch	1AQ
SEGRP (EGR valve (stepping motor) position)	—	Idle: 0 Cranking: 0—60	• The following PIDs: — MAF, TP, ECT, RPM, VSS • EGR valve	—
SEGRP DSD (Desired EGR valve (stepping motor) position)	%	Idle: 0%	• The following PIDs: — MAF, TP, ECT, RPM, VSS	—
SELTESTDTC (DTC of KOEO/KOER self-test)	—	—	• Perform applicable DTC troubleshooting.	—
SHRTFT1 (Short term fuel trim [A/F sensor])	%	Idle (after warm up): Approx.–30—25%	• Perform applicable DTC troubleshooting.	—
SHRTFT12 (Short term fuel trim)	%	Idle (after warm up): Approx.–30—25%	• Perform applicable DTC troubleshooting.	—
SPARKADV (Ignition timing)	°(BTDC)	Indicate the ignition timing	• The following PIDs: — MAF, TP, ECT, RPM, INGEAR, PSP, VPWR • Ignition timing	—
test (Test mode)	On/Off	—	—	—
TP REL (Relative TP)	%	Accelerator pedal is released: Approx. 5% Accelerator pedal is depressed: Approx. 46 %	• TP sensor	2AK 2AL
TP1 (TP sensor No.1)	%	Accelerator pedal is released: Approx. 15% Accelerator pedal is depressed: Approx. 55 %	• TP sensor	2AK
	V	Accelerator pedal is released: 0.4—0.6 V Accelerator pedal is depressed: 4.7—4.9 V		
TP2 (TP sensor No.2)	%	Accelerator pedal is released: Approx. 15% Accelerator pedal is depressed: Approx. 56%	• TP sensor	2AL
	V	Accelerator pedal is released: 4.4—4.6 V Accelerator pedal is depressed: 0.1—0.3 V		
TPCT (Lowest closed throttle voltage)	V	Ignition switch to the ON position: Approx 1.0 V	• TP sensor	2AK 2AL
VPWR (Battery positive voltage)	V	Indicate the battery voltage	• Battery	1BA
VSS (Vehicle speed)	KPH / MPH	Indicate the vehicle speed	• Perform applicable DTC troubleshooting.	—

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Inspection item	PCM terminal
VT ACT1 (Actual valve timing)	°	Idle: Approx. 0°	• The following PIDs: — TP, ECT, RPM • OCV	—
VT DIFF1 (Difference between actual valve timing and target valve timing)	°	Idle: Approx. 0°	• The following PIDs: — TP, ECT, RPM • OCV	2AF
VT DUTY1	%	Idle: Approx. 11.5%	• The following PIDs: — TP, ECT, RPM • OCV	2AF
WGC	%	Racing with the accelerator pedal fully depressed: 10—100 % Fully closed: 0 %	• Wastegate control solenoid valve	2AA