PCM INSPECTION [SKYACTIV-G 2.0]

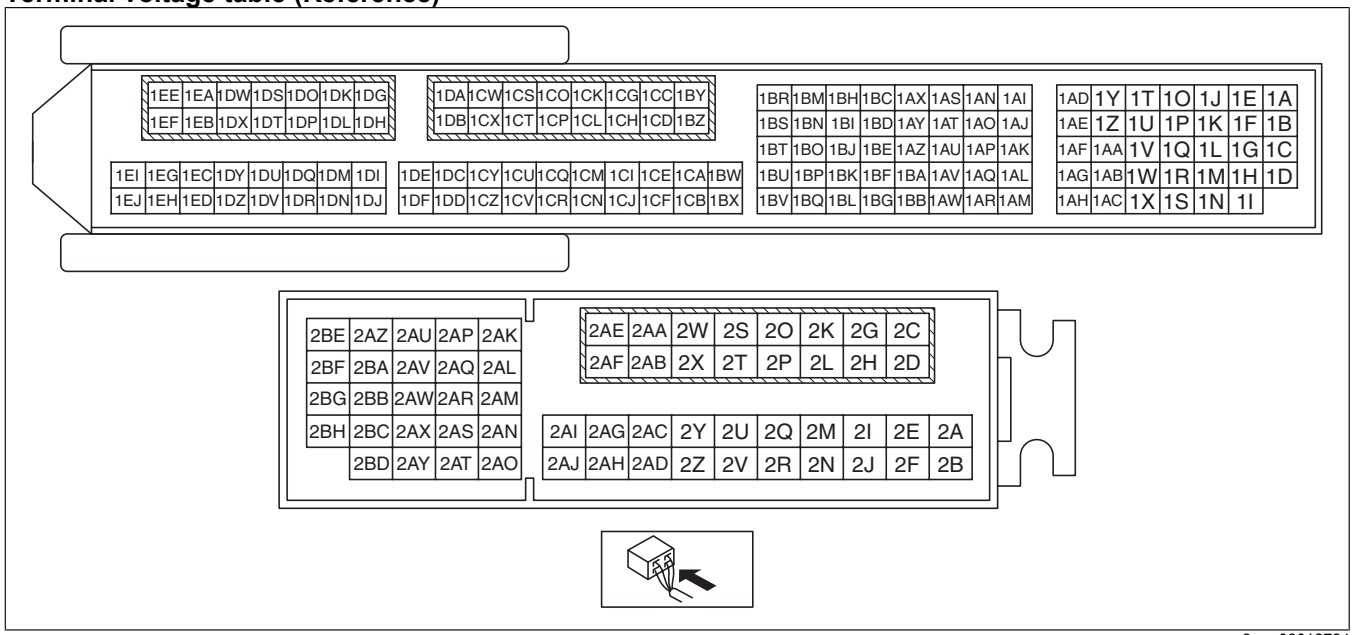
id0140f4802500

Without Using the M-MDS

Note

- Because the PCM uses a waterproof connector, the inspection for the voltage/wave pattern cannot be performed. The following values are for reference.

Terminal voltage table (Reference)



am3zzw00012794

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
1A*1	CAN_2H	CAN system related modules	Because this terminal is for CAN, good/no good judgment by terminal voltage is not possible.			• Related wiring harness
1B*1	CAN_2L	CAN system related modules	Because this terminal is for CAN, good/no good judgment by terminal voltage is not possible.			• Related wiring harness
1C	—	—	—		—	—
1D	Knocking (–)	KS	Switch the ignition ON (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Approx. 1.65	• KS • Related wiring harness
1E	—	—	—		—	—
1F	—	—	—		—	—
1G*5	Neutral switch No.2	Neutral switch No. 2	Switch the ignition ON (engine off)	Neutral	Below 1.0	• Neutral switch No.2 • Related wiring harness
				Except above	B+	
1H	Knocking (+)	KS	Switch the ignition ON (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Approx. 3.38	• KS • Related wiring harness
1I	GND	Sensor shield	Under any condition		Below 1.0	• Related wiring harness
1J	Electric variable valve timing motor (rotation direction)	Electric variable valve timing motor/ driver	(See Electric variable valve timing motor (rotation direction) signal.)			• Electric variable valve timing motor/driver • Related wiring harness
1K*2	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+	

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
1L*2	Back up light	Back up light switch	Shift lever is at R position		Below 1.0	• Back up light switch • Related wiring harness
			Shift lever is not at R position		B+	
1M	—	—	—		—	—
1N	—	—	—		—	—
1O	Electric variable valve timing motor (rotation pulse)	Electric variable valve timing motor/ driver	(See Electric variable valve timing motor (rotation pulse) signal.)			• Electric variable valve timing motor/driver • Related wiring harness
1P	Oil pressure	Oil pressure switch	Switch the ignition ON (engine off)		Below 1.0	• Oil pressure switch • Related wiring harness
			Idle (after warm up)		B+	
1Q	—	—	—		—	—
1R	—	—	—		—	—
1S	—	—	—		—	—
1T	Exhaust CMP	Exhaust CMP sensor	(See Exhaust CMP signal.)			• Exhaust CMP sensor • Related wiring harness
1U	—	—	—		—	—
1V	—	—	—		—	—
1W	A/F	A/F sensor	Idle (after warm up)		Approx. 4.2	• A/F sensor • Related wiring harness
1X	GND	Exhaust CMP sensor	Under any condition		Below 1.0	• Related wiring harness
1Y	Intake CMP	Intake CMP sensor	(See Intake CMP signal.)			• Intake CMP sensor • Related wiring harness
1Z	—	—	—		—	—
1AA	—	—	—		—	—
1AB	A/F	A/F sensor	Idle (after warm up): 0 mA			• A/F sensor • Related wiring harness
1AC	GND	Intake CMP sensor	Under any condition		Below 1.0	• Related wiring harness
1AD	CKP	CKP sensor	(See CKP signal.)			• CKP sensor • Related wiring harness
1AE	Electric variable valve timing driver (diagnostic)	Electric variable valve timing motor/ driver	(See Electric variable valve timing driver (diagnostic) signal.)			• Electric variable valve timing motor/driver • Related wiring harness
1AF	Generator output voltage	Generator (terminal P)	(See Generator output voltage.)			• Generator • Related wiring harness
1AG	A/F	A/F sensor	Idle (after warm up)		Approx. 3.48	• A/F sensor • Related wiring harness
1AH	GND	CKP sensor	Under any condition		Below 1.0	• Related wiring harness
1AI	Purge control	Purge solenoid valve	(See Purge control.)			• Purge solenoid valve • Related wiring harness
1AJ	IGT4	Ignition coil No.4	(See IGT1, IGT2, IGT3, IGT4 control.)			• Ignition coil No.4 • Related wiring harness
1AK	ECT	ECT sensor	Switch the ignition ON (engine off)	ECT 20 °C {68 °F}	Approx. 3.10	• ECT sensor • Related wiring harness
				ECT 40 °C {104 °F}	Approx. 2.16	
				ECT 60 °C {140 °F}	Approx. 1.40	
				ECT 80 °C {176 °F}	Approx. 0.87	
				ECT 100 °C {212 °F}	Approx. 0.54	
1AL	—	—	—		—	—
1AM	GND	ECT sensor	Under any condition		Below 1.0	• Related wiring harness
1AN	Hydraulic variable valve timing control	OCV	(See Hydraulic variable valve timing control signal.)			• OCV • Related wiring harness
1AO	IGT3	Ignition coil No.3	(See IGT1, IGT2, IGT3, IGT4 control.)			• Ignition coil No.3 • Related wiring harness
1AP	—	—	—		—	—
1AQ	—	—	—		—	—
1AR	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
1AS	Engine oil control	Engine oil solenoid valve	(See Engine oil control signal.)			• Engine oil solenoid valve • Related wiring harness
1AT	IGT2	Ignition coil No.2	(See IGT1, IGT2, IGT3, IGT4 control.)			• Ignition coil No.2 • Related wiring harness
1AU	—	—	—		—	—
1AV	Ion (No.4)	Ion sensor No.4	Idle (after warm up)		Approx. 4.55	• Ion sensor No.4 • Related wiring harness
1AW	—	—	—		—	—
1AX	—	—	—		—	—
1AY	IGT1	Ignition coil No.1	(See IGT1, IGT2, IGT3, IGT4 control.)			• Ignition coil No.1 • Related wiring harness
1AZ	Electric variable valve timing control	Electric variable valve timing motor/ driver	(See Electric variable valve timing control signal.)			• Electric variable valve timing motor/driver • Related wiring harness
1BA	Ion (No.3)	Ion sensor No.3	Idle (after warm up)		Approx. 4.55	• Ion sensor No.3 • Related wiring harness
1BB	GND	Sensor shield	Under any condition		Below 1.0	• Related wiring harness
1BC	—	—	—		—	—
1BD	—	—	—		—	—
1BE	Generator field coil control	Generator (terminal D)	(See Generator field coil control signal.)			• Generator • Related wiring harness
1BF	Ion (No.2)	Ion sensor No.2	Idle (after warm up)		Approx. 4.55	• Ion sensor No.2 • Related wiring harness
1BG	GND	Sensor shield	Under any condition		Below 1.0	• Related wiring harness
1BH	—	—	—		—	—
1BI	—	—	—		—	—
1BJ	Constant voltage (Vref)	Fuel pressure sensor	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
1BK	Ion (No.1)	Ion sensor No.1	Idle (after warm up)		Approx. 4.55	• Ion sensor No.1 • Related wiring harness
1BL	GND	Sensor shield	Under any condition		Below 1.0	• Related wiring harness
1BM	—	—	—		—	—
1BN	Constant voltage (Vref)	CKP sensor	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
1BO	Constant voltage (Vref)	MAP sensor	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
1BP	TP (No.1)	TP sensor No.1	Switch the ignition ON (engine off)	Accelerator pedal released	Approx. 1.11	• TP sensor No.1 • Related wiring harness
				Accelerator pedal depressed	Approx. 4.59	
1BQ	GND	TP sensor No.1, TP sensor No.2	Under any condition		Below 1.0	• Related wiring harness
1BR	—	—	—		—	—
1BS	Constant voltage (Vref)	TP sensor No.1, TP sensor No.2	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
1BT	—	—	—		—	—
1BU	TP (No.2)	TP sensor No.2	Switch the ignition ON (engine off)	Accelerator pedal released	Approx. 3.92	• TP sensor No.2 • Related wiring harness
				Accelerator pedal depressed	Approx. 0.41	
1BV	—	—	—		—	—
1BW	MAP	MAP sensor	Switch the ignition ON (engine off)		Approx. 4.07	• MAP sensor • Related wiring harness
			Idle (after warm up)		Approx. 1.34	
			Racing (Engine speed: 2,000 rpm)		Approx. 1.05	
1BX	GND	MAP sensor, IAT sensor No.2	Under any condition		Below 1.0	• Related wiring harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
1BY	A/F sensor heater control	A/F sensor heater	(See A/F sensor heater control signal.)			• A/F sensor heater • Related wiring harness
1BZ	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1CA	Fuel pressure	Fuel pressure sensor	Switch the ignition ON (engine off)		Approx. 1.22	• Fuel pressure sensor • Related wiring harness
			Idle (after warm up)		Approx. 1.06	
1CB	GND	Fuel pressure sensor	Under any condition		Below 1.0	• Related wiring harness
1CC	Drive-by-wire control (–)	Throttle valve actuator	Switch the ignition ON (engine off)		Approx. 10.51	• Throttle valve actuator • Related wiring harness
			Idle (after warm up)		B+	
1CD	—	—	—		—	—
1CE	IAT (No.2)	IAT sensor No.2	Switch the ignition ON (engine off)	IAT 20 °C {68 °F}	Approx. 3.57	• IAT sensor No.2 • Related wiring harness
				IAT 40 °C {104 °F}	Approx. 2.70	
				IAT 60 °C {140 °F}	Approx. 1.87	
1CF	—	—	—		—	—
1CG	Drive-by-wire control (+)	Throttle valve actuator	(See Drive-by-wire control (+) signal.)			• Throttle valve actuator • Related wiring harness
1CH	—	—	—		—	—
1CI	—	—	—		—	—
1CJ	—	—	—		—	—
1CK	Battery voltage	Main relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1CL	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1CM	—	—	—		—	—
1CN	—	—	—		—	—
1CO	Battery voltage	Fuel injector relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1CP	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1CQ	—	—	—		—	—
1CR	—	—	—		—	—
1CS	Battery voltage	Fuel injector relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1CT	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1CU	—	—	—		—	—
1CV	—	—	—		—	—
1CW	Battery voltage	Fuel injector relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1CX	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1CY	—	—	—		—	—
1CZ	—	—	—		—	—
1DA	Battery voltage	Fuel injector relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1DB	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1DC	—	—	—		—	—
1DD	—	—	—		—	—
1DE	—	—	—		—	—
1DF	—	—	—		—	—
1DG	Battery voltage	Fuel injector relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1DH	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1DI	—	—	—		—	—
1DJ	—	—	—		—	—
1DK	Battery voltage	Fuel injector relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
1DL	GND	GND	Under any condition		Below 1.0	• Related wiring harness
1DM	—	—	—		—	—
1DN	—	—	—		—	—
1DO	Fuel injection control (–)	Fuel injector No.1	(See Fuel injection control (-) signal.)			• Fuel injector No.1 • Related wiring harness
1DP	Fuel injection control (+)	Fuel injector No.1	(See Fuel injection control (+) signal.)			• Fuel injector No.1 • Related wiring harness
1DQ	—	—	—		—	—
1DR	—	—	—		—	—

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
1DS	Fuel injection control (–)	Fuel injector No.4	(See Fuel injection control (-) signal.)			• Fuel injector No.4 • Related wiring harness
1DT	Fuel injection control (+)	Fuel injector No.4	(See Fuel injection control (+) signal.)			• Fuel injector No.4 • Related wiring harness
1DU	—	—	—		—	—
1DV	—	—	—		—	—
1DW	Fuel injection control (–)	Fuel injector No.2	(See Fuel injection control (-) signal.)			• Fuel injector No.2 • Related wiring harness
1DX	Fuel injection control (+)	Fuel injector No.2	(See Fuel injection control (+) signal.)			• Fuel injector No.2 • Related wiring harness
1DY	—	—	—		—	—
1DZ	—	—	—		—	—
1EA	Fuel injection control (–)	Fuel injector No.3	(See Fuel injection control (-) signal.)			• Fuel injector No.3 • Related wiring harness
1EB	Fuel injection control (+)	Fuel injector No.3	(See Fuel injection control (+) signal.)			• Fuel injector No.3 • Related wiring harness
1EC	—	—	—		—	—
1ED	—	—	—		—	—
1EE	High pressure fuel pump control (+)	High pressure fuel pump	(See High pressure fuel pump control (+) signal.)			• High pressure fuel pump • Related wiring harness
1EF	High pressure fuel pump control (–)	High pressure fuel pump	(See High pressure fuel pump control (-) signal.)			• High pressure fuel pump • Related wiring harness
1EG	—	—	—		—	—
1EH	—	—	—		—	—
1EI	—	—	—		—	—
1EJ	—	—	—		—	—
2A	—	—	—		—	—
2B	—	—	—		—	—
2C	HO2S heater control	HO2S heater	(See HO2S heater control signal.)			• HO2S heater • Related wiring harness
2D	—	—	—		—	—
2E	—	—	—		—	—
2F	—	—	—		—	—
2G	Brake (No.1)	Brake switch (No.1 signal)	Brake pedal released		Below 1.0	• Brake switch (No.1 signal) • Related wiring harness
			Brake pedal depressed		B+	
2H	Ignition (IG1)	IG1 relay	Switch the ignition ON (engine off)		B+	• IG1 relay • Related wiring harness
2I*4	Ambient temperature	Ambient temperature sensor	Switch the ignition ON (engine off)	AAT 20 °C {68 °F}	Approx. 2.70	• Ambient temperature sensor • Related wiring harness
				AAT 30 °C {104 °F}	Approx. 1.80	
2J*2	CPP	CPP switch, Start stop unit	Clutch pedal depressed		Below 1.0	• CPP switch • Start stop unit • Related wiring harness
			Clutch pedal released		B+	
2K	Main relay control	Main relay	Switch the ignition ON (engine off)		Approx. 0.8	• Main relay • Related wiring harness
2L	—	—	—		—	—
2M*5	Clutch stroke sensor	Clutch stroke sensor	Switch the ignition ON (engine off)	Clutch pedal released	Approx. 0.6	• Clutch stroke sensor • Related wiring harness
				Clutch pedal depressed	Approx. 4.5	
2N	—	—	—		—	—
2O	Battery voltage	Battery	Switch the ignition ON (engine off)		B+	• Battery • Related wiring harness
2P*3	DC-DC converter control	DC-DC converter	Switch the ignition ON (engine off)		Below 1.0	• DC-DC converter • Related wiring harness
2Q*3	Power brake unit vacuum	Power brake unit vacuum sensor	Idle (after warm up)	Brake pedal released	Approx. 0.44	• Power brake unit vacuum sensor • Related wiring harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
2R	Brake (No.2)	Brake switch (No.2 signal)	Brake pedal released		Below 1.0	• Brake switch (No.2 signal) • Related wiring harness
			Brake pedal depressed		B+	
2S	Battery voltage	Main relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
2T	Battery voltage	Main relay	Switch the ignition ON (engine off)		B+	• Related wiring harness
2U	IAT (No.1)	IAT sensor No.1	Switch the ignition ON (engine off)	IAT 20 °C {68 °F}	Approx. 2.70	• IAT sensor No.1 • Related wiring harness
				IAT 40 °C {104 °F}	Approx. 1.80	
				IAT 60 °C {140 °F}	Approx. 1.20	
2V	—	—	—		—	—
2W	—	—	—		—	—
2X	—	—	—		—	—
2Y	—	—	—		—	—
2Z	—	—	—		—	—
2AA	GND	GND	Under any condition		Below 1.0	• Related wiring harness
2AB	—	—	—		—	—
2AC	—	—	—		—	—
2AD	GND	Sensor shield	Under any condition		Below 1.0	• Related wiring harness
2AE	Fuel pump control	Fuel pump control module	(See Fuel pump control signal.)			• Fuel pump control module • Related wiring harness
2AF*4	A/C cut-off control	A/C relay	A/C relay OFF		B+	• A/C relay • Related wiring harness
			A/C relay ON		Below 1.0	
2AG	HO2S (–)	HO2S	Idle (after warm up)		Approx. 1.65	• HO2S • Related wiring harness
2AH*3	GND	Power brake unit vacuum sensor, clutch stroke sensor*2	Under any condition		Below 1.0	• Related wiring harness
2AI	HO2S (+)	HO2S	Idle (after warm up)		Approx. 2.49	• HO2S • Related wiring harness
2AJ*4	GND	Refrigerant pressure sensor	Under any condition		Below 1.0	• Related wiring harness
2AK	CAN_H	CAN system related modules	Because this terminal is for CAN, good/no good judgment by terminal voltage is not possible.			• Related wiring harness
2AL	CAN_L	CAN system related modules	Because this terminal is for CAN, good/no good judgment by terminal voltage is not possible.			• Related wiring harness
2AM	Fuel pump control module (diagnostic)	Fuel pump control module	(See Fuel pump control module (diagnostic) signal.)			• Fuel pump control module • Related wiring harness
2AN	APP (No.1)	APP sensor No.1	Switch the ignition ON (engine off)	Accelerator pedal released	Approx. 0.75	• APP sensor No.1 • Related wiring harness
				Accelerator pedal depressed	Approx. 4.1	
2AO	GND	APP sensor No.1	Under any condition		Below 1.0	• Related wiring harness
2AP	—	—	—		—	—
2AQ	Fuel pump control	Fuel pump relay	Switch the ignition ON (engine off)		B+	• Fuel pump relay • Related wiring harness
			Idle (after warm up)		Below 1.0	
2AR	Constant voltage (Vref)	APP sensor No.1	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
2AS	APP (No.2)	APP sensor No.2	Switch the ignition ON (engine off)	Accelerator pedal released	Approx. 0.38	• APP sensor No.2 • Related wiring harness
				Accelerator pedal depressed	Approx. 2.05	
2AT	GND	APP sensor No.2	Under any condition		Below 1.0	• Related wiring harness

Terminal	Signal	Connected to	Test condition		Voltage (V)	inspection item
2AU	Cooling fan control	Cooling fan relay No.1	Cooling fan operating		Below 1.0	• Cooling fan relay No.1 • Related wiring harness
			Cooling fan not operating		B+	
2AV	Cooling fan control	Cooling fan relay No.2, No.3	Cooling fan operating		Below 1.0	• Cooling fan relay No.2, No.3 • Related wiring harness
			Cooling fan not operating		B+	
2AW	Constant voltage (Vref)	APP sensor No.2	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
2AX*4	Refrigerant pressure	Refrigerant pressure sensor	Refrigerant pressure: 1.0 MPa {10 kgf/cm^2, 145 psi}		Approx. 1.58	• Refrigerant pressure sensor • Related wiring harness
			Refrigerant pressure: 1.1 MPa {11 kgf/cm^2, 160 psi}		Approx. 1.75	
			Refrigerant pressure: 1.2 MPa {12 kgf/cm^2, 174 psi}		Approx. 1.88	
2AY	GND	MAF sensor, IAT sensor No.1	Under any condition		Below 1.0	• Related wiring harness
2AZ	Starter cut-off control	Starter relay, start stop unit	Switch the ignition ON (engine off)	**MTX** • Clutch pedal released **ATX** • Selector lever position is not P or N range	B+	• Starter relay • Start stop unit • Related wiring harness
				MTX • Clutch pedal depressed **ATX** • Selector lever position is P or N range	Below 1.0	
2BA	—	—	—		—	—
2BB	Constant voltage (Vref)	Refrigerant pressure sensor*4, MAF sensor	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
2BC	MAF	MAF sensor	Switch the ignition ON (engine off)		Approx. 0.72	• MAF sensor • Related wiring harness
			Idle (after warm up)		Approx. 0.86	
			Racing (Engine speed: 2,000 rpm)		Approx. 1.07	
2BD	Selector lever position*1	TCM, start stop unit	Selector lever position is not P or N range		B+	• TCM • Start stop unit • Related wiring harness
			Selector lever position is P or N range		Below 1.0	
	Starter interlock*2	Starter interlock switch, start stop unit	Clutch pedal depressed		Below 1.0	• Starter interlock switch • Start stop unit • Related wiring harness
			Clutch pedal released		B+	
2BE	—	—	—		—	—
2BF	—	—	—		—	—
2BG*3	Constant voltage (Vref)	Power brake unit vacuum sensor, clutch stroke sensor*2	Switch the ignition ON (engine off)		Approx. 5.0	• Related wiring harness
2BH	—	—	—		—	—

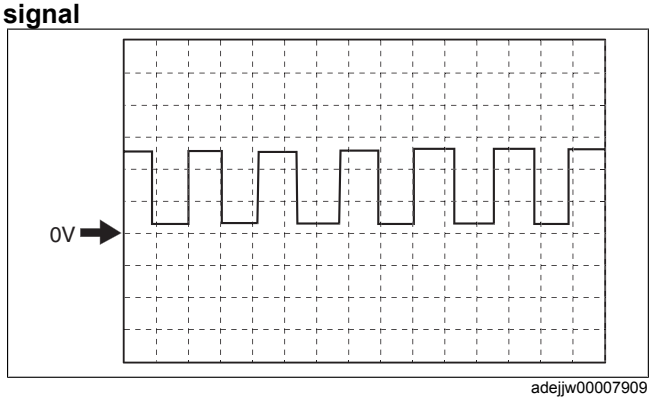
*1 : ATX
*2 : MTX
*3 : Vehicles with i-stop system
*4 : Vehicles with air conditioner

*5 : Vehicles with i-stop system (MTX)

Inspection Using An Oscilloscope (Reference)
Electric variable valve timing motor (rotation direction) signal
PCM terminals
- 1J(+)—body ground(–)

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

Vehicle condition
- Idle (after warm up)

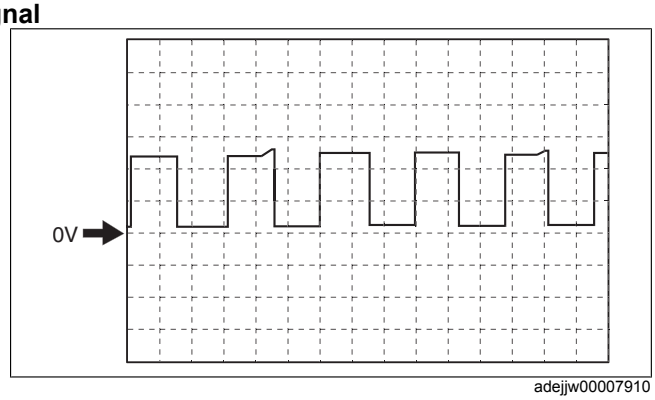


adejjw00007909

Electric variable valve timing motor (rotation pulse) signal
PCM terminals
- 1O(+)—body ground(–)

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

Vehicle condition
- Idle (after warm up)

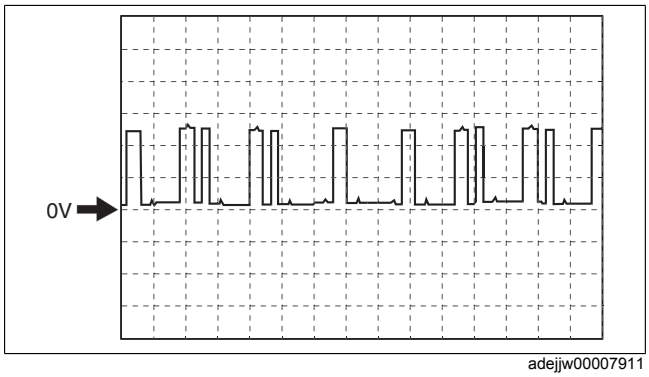


adejjw00007910

Exhaust CMP signal
PCM terminals
- 1T(+)—body ground(–)

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

Vehicle condition
- Idle (after warm up)

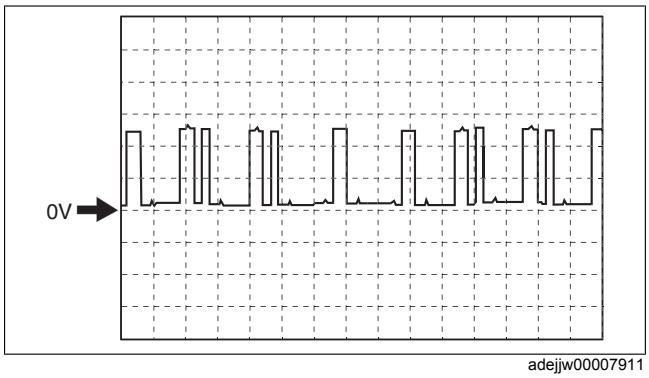


adejjw00007911

Intake CMP signal
PCM terminals
- 1Y(+)—body ground(–)

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

Vehicle condition
- Idle (after warm up)

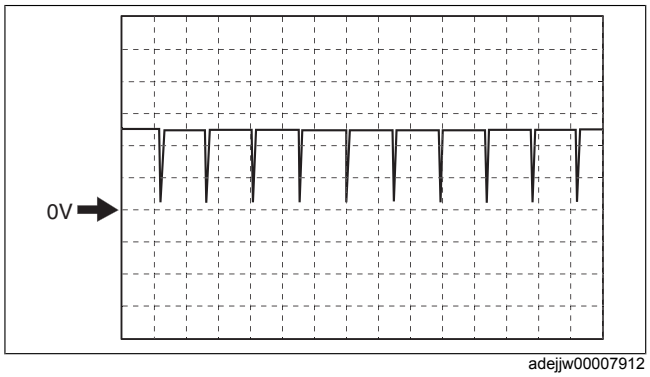


adejjw00007911

CKP signal
PCM terminals
- 1AD(+)—body ground(–)

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

Vehicle condition
- Idle (after warm up)

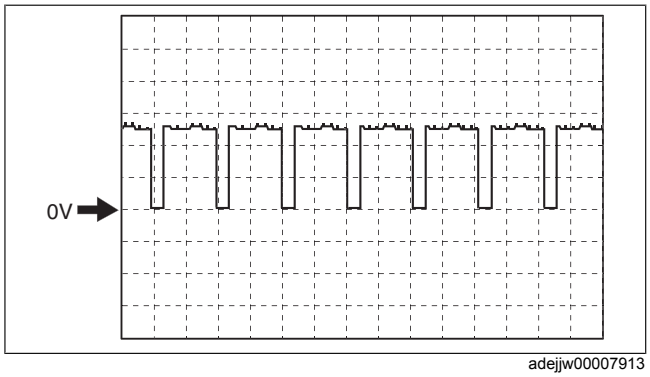


adejjw00007912

Electric variable valve timing driver (diagnostic) signal
PCM terminals
- 1AE(+)—body ground(–)

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

Vehicle condition
- Idle (after warm up)

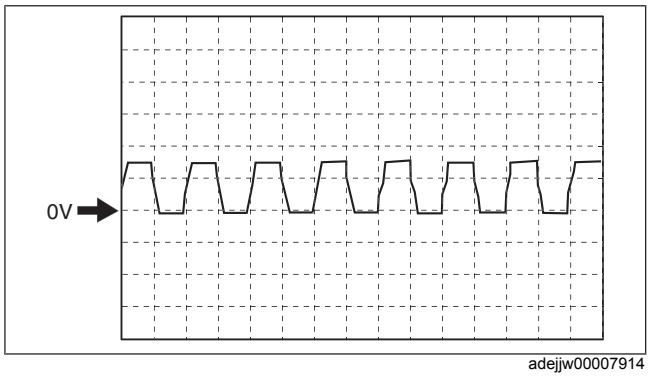


adejjw00007913

Generator output voltage
PCM terminals
- 1AF(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

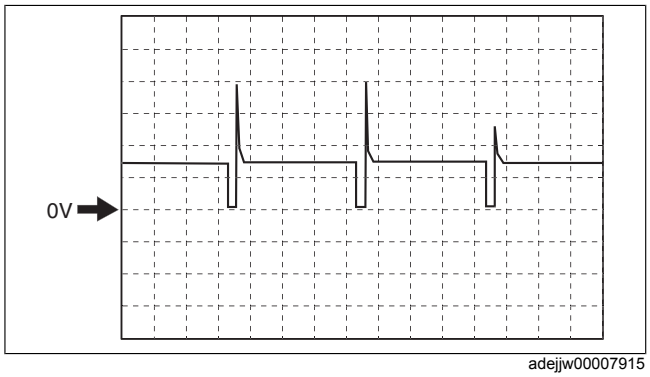


adejjw00007914

Purge control
PCM terminals
- 1AI(+)—body ground(–)

Oscilloscope setting
- 10 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up

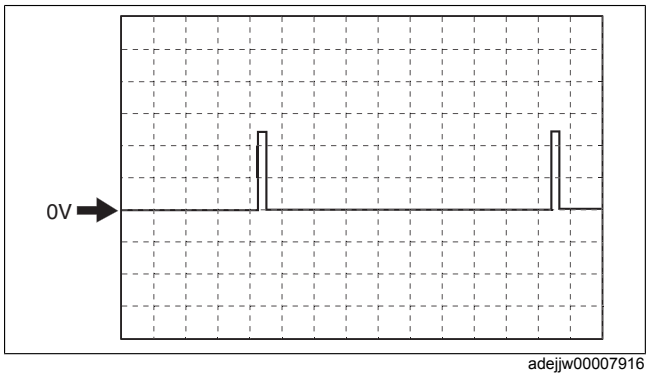


adejjw00007915

IGT1, IGT2, IGT3, IGT4 control
PCM terminals
- IGT1(ignition coil No.1): 1AY(+)—body ground(–)
- IGT2(ignition coil No.2): 1AT(+)—body ground(–)
- IGT3(ignition coil No.3): 1AO(+)—body ground(–)
- IGT4(ignition coil No.4): 1AJ(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

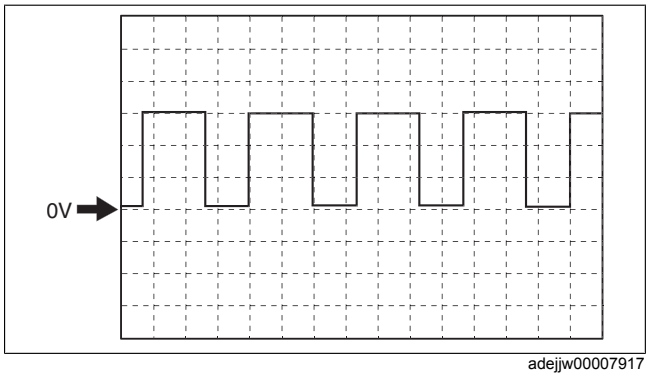


adejjw00007916

Hydraulic variable valve timing control signal
PCM terminals
- 1AN(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

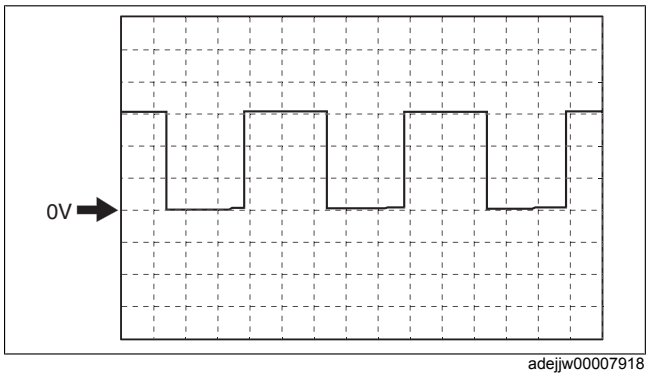


adejjw00007917

Engine oil control signal
PCM terminals
- 1AS(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

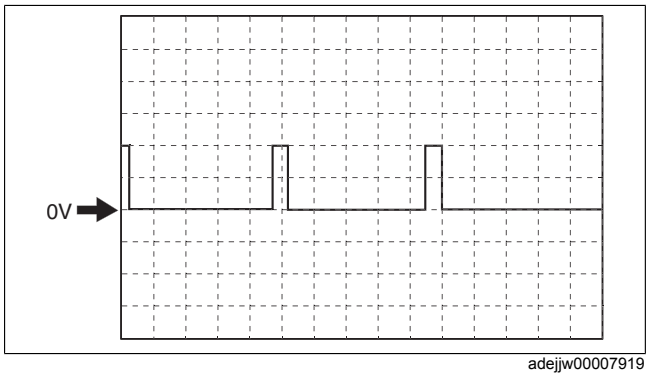


adejjw00007918

Electric variable valve timing control signal
PCM terminals
- 1AZ(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

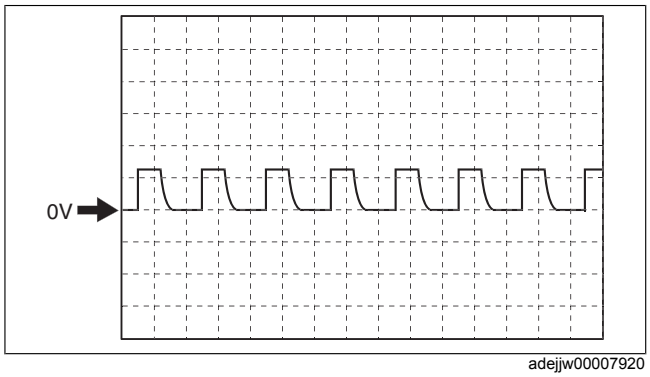


adejjw00007919

Generator field coil control signal
PCM terminals
- 1BE(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

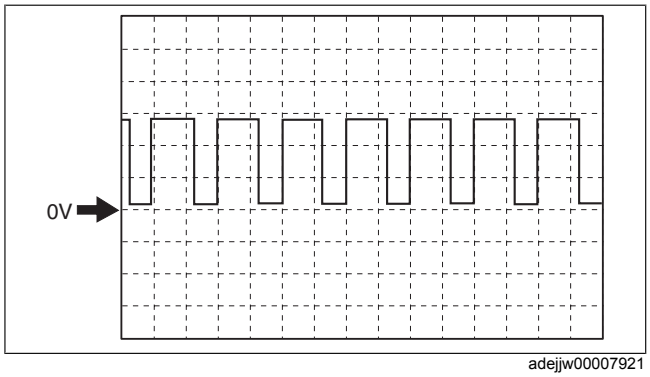


adejjw00007920

A/F sensor heater control signal
PCM terminals
- 1BY(+)—body ground(–)

Oscilloscope setting
- 5 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up

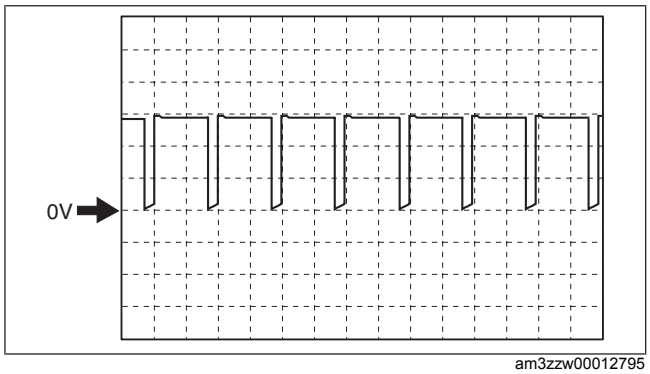


adejjw00007921

Drive-by-wire control (+) signal
PCM terminals
- 1CG(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

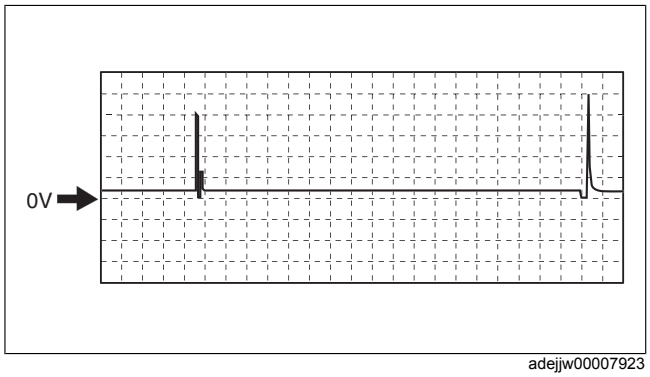


am3zzw00012795

Fuel injection control (-) signal
PCM terminals
- Fuel Injection No.1: 1DO(+)—body ground(–)
- Fuel Injection No.2: 1DW(+)—body ground(–)
- Fuel Injection No.3: 1EA(+)—body ground(–)
- Fuel Injection No.4: 1DS(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

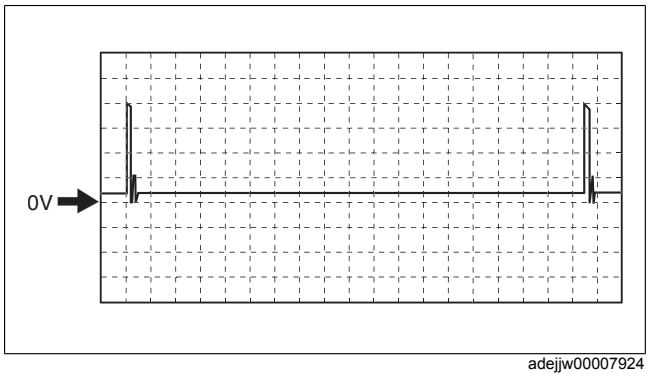


adejjw00007923

Fuel injection control (+) signal
PCM terminals
- Fuel Injection No.1: 1DP(+)—body ground(–)
- Fuel Injection No.2: 1DX(+)—body ground(–)
- Fuel Injection No.3: 1EB(+)—body ground(–)
- Fuel Injection No.4: 1DT(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

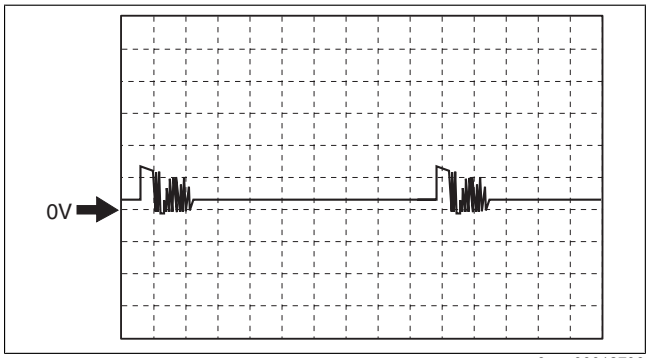


adejjw00007924

High pressure fuel pump control (+) signal
PCM terminals
- 1EE(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

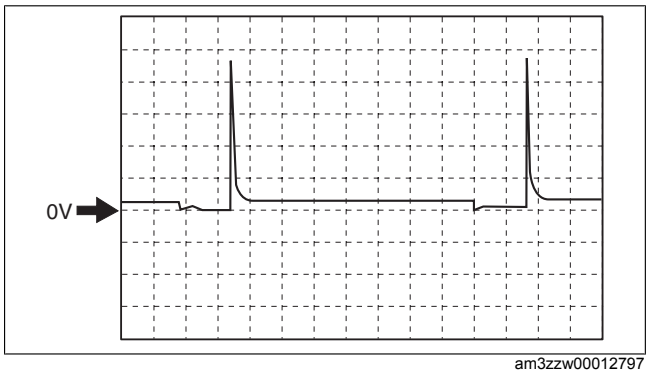


am3zzw00012796

High pressure fuel pump control (-) signal
PCM terminals
- 1EF(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

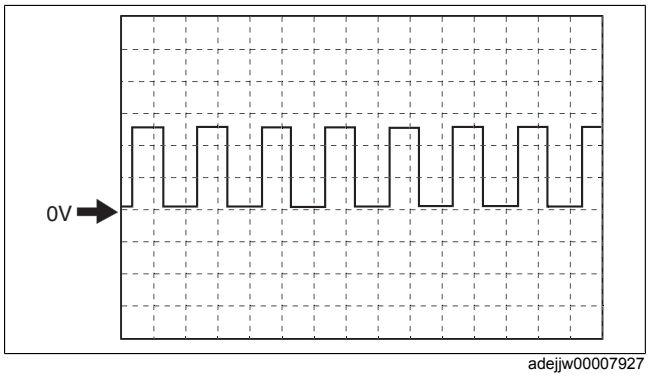


am3zzw00012797

HO2S heater control signal
PCM terminals
- 2C(+)—body ground(–)

Oscilloscope setting
- 5 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle (immediately after starting the engine)

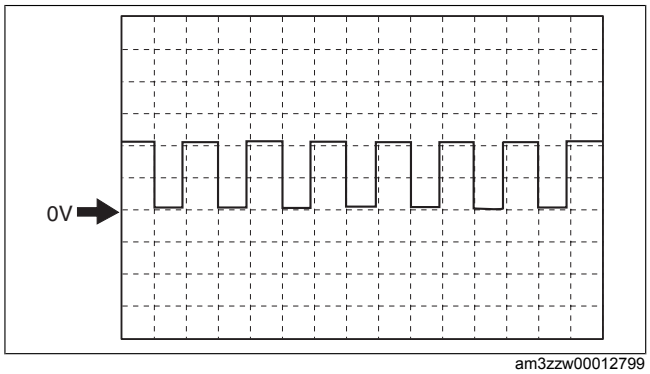


adejjw00007927

Fuel pump control signal
PCM terminals
- 2AE(+)—body ground(–)

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

Vehicle condition
- Idle after warm up

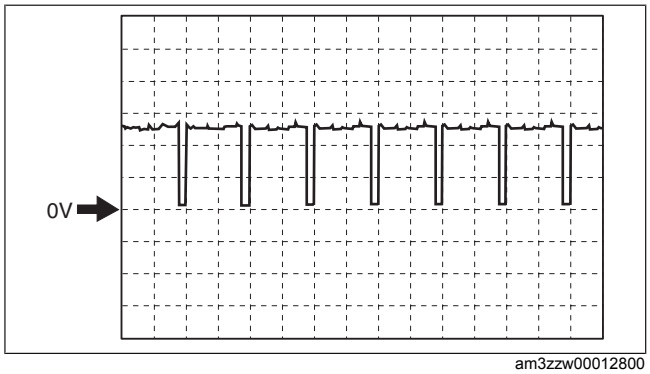


am3zzw00012799

Fuel pump control module (diagnostic) signal
PCM terminals
- 2AM(+)—body ground(–)

Oscilloscope setting
- 2 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle after warm up

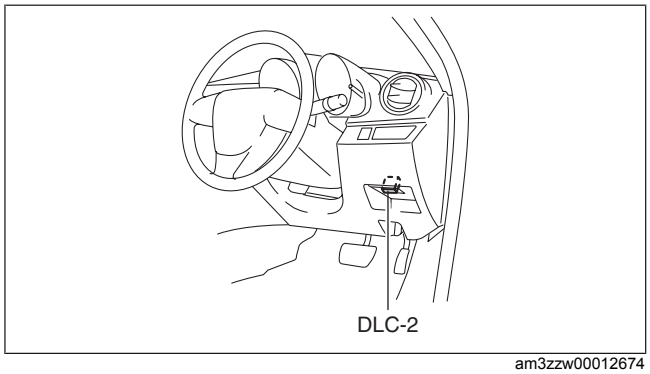


am3zzw00012800

Using The M-MDS

Note
- PIDs for the following parts are not available on this model. Go to the appropriate part inspection page.
  - — Intake CMP sensor and Exhaust CMP sensor (See CAMSHAFT POSITION (CMP) SENSOR INSPECTION [SKYACTIV-G 2.0].)
  - — Main relay (See RELAY INSPECTION.)

1. Connect the M-MDS to the DLC-2.
2. Switch the ignition ON (engine off).
3. Measure the PID value.
   - If PID value is not within the specification, follow the instructions in Action column.



am3zzw00012674

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.
- The simulation items that are used in the ENGINE CONTROL SYSTEM OPERATION INSPECTION are as follows.
  - — ACCS, ALTF, ARPMDES, EVAPCP, FAN1, FAN2, FAN3, FP, INJ_1, INJ_2, INJ_3, INJ_4, OIL_P_SOL, Test, VT EX_DES

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
AAT*4 (Ambient air temperature)	°C, °F	• Displays the ambient air temperature	• IAT sensor No.1

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
ACCS*4 (A/C relay)	OFF/ON	• A/C relay is OFF: Off • A/C relay is ON: On	• A/C relay • The following PIDs — AC_PRES, APP1, APP2, TP1, TP2, ECT, RPM
AC_PRES*4 (Refrigerant pressure)	kPa, Bar, psi	• Displays the refrigerant pressure	• Refrigerant pressure sensor
	V	• Refrigerant pressure is 1.0 MPa {10 kgf/cm^2, 145 psi}: Approx. 1.58 V • Refrigerant pressure is 1.1 MPa {11 kgf/cm^2, 160 psi}: Approx. 1.75 V • Refrigerant pressure is 1.2 MPa {12 kgf/cm^2, 174 psi}: Approx. 1.88 V	
AC_REQ*4 (A/C request signal)	OFF/ON	• A/C switch OFF: Off • A/C switch ON: On	• A/C switch
ALTF (Generator field coil control duty value)	%	• Switch the ignition ON (engine off): 0% • Idle: Approx. 42% • Racing (Engine speed is 2,000 rpm): Approx. 29%	• Generator • The following PIDs — IAT, ECT, RPM, VPWR
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
AMB_TEMP*4 (Ambient air temperature)	°C, °F	• Displays the ambient air temperature	• Ambient temperature sensor
APP (Accelerator pedal position)	%	• Accelerator pedal released: Approx. 0% • Accelerator pedal depressed: Approx. 100%	• The following PIDs — APP1, APP2
APP1 (APP sensor No.1)	%	• Accelerator pedal released: Approx. 15% • Accelerator pedal depressed: Approx. 82%	• APP sensor No.1
	V	• Accelerator pedal released: Approx. 0.75 V • Accelerator pedal depressed: Approx. 4.1 V	
APP2 (APP sensor No.2)	%	• Accelerator pedal released: Approx. 7.45% • Accelerator pedal depressed: Approx. 41%	• APP sensor No.2
	V	• Accelerator pedal released: Approx. 0.38 V • Accelerator pedal depressed: Approx. 2.05 V	
ARPMDES (Target engine speed)	RPM	• Displays the target engine speed	• The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, BOO, BPA, ALTT V, AC_REQ
BARO (Barometric pressure)	kPa, Bar, psi	• Displays the BARO	• BARO sensor
	V	• Switch the ignition ON (at sea level): Approx. 4.08 V	
BATT_CUR (Current sensor)	A	• Displays the battery charge/discharge current value	• Current sensor
BATT_DAY (Vehicle battery - days in service)	—	• Displays the vehicle battery days in service	• Current sensor
BATT_RES (Battery inferred internal resistance)	—	• Displays the battery inferred internal resistance	• Current sensor
BATT_SOC (Battery estimated state of charge)	%	• Displays the battery estimated state of charge	• Current sensor
BATT_TEMP (Battery fluid temperature sensor)	°C, °F	• Displays the battery fluid temperature	• Current sensor
BATT_V (Battery voltage)	V	• Displays the battery voltage	• Battery

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
BBP*3 (Power brake unit vacuum sensor)	kPa, psi, Bar	• Displays the power brake unit vacuum	• Power brake unit vacuum sensor
	V	• Power brake unit vacuum is 7.54 kPa {0.0769 kgf/cm^2, 1.09 psi}: approx. 0.29 V • Power brake unit vacuum is 96.7 kPa {0.986 kgf/cm^2, 14.0 psi}: approx. 3.81 V	
BFP (Brake fluid pressure)	kPa, psi, Bar	• Displays the brake fluid pressure	• DSC HU/CM
BOO (Brake switch)	OFF/ON	• Brake pedal released: Off • Brake pedal depressed: On	• Brake switch (No.1 signal)
BPA (Brake pressure applied switch)	OFF/ON	• Brake pedal released: Off • Brake pedal depressed: On	• Brake switch (No.2 signal)
CATT11_DSD (Estimated catalytic converter temperature)	°C, °F	• Displays the estimated catalytic converter temperature	• Perform applicable DTC troubleshooting.
CHRGLP (Charging system warning light)	OFF/ON	• Charging system warning light not illuminates: Off • Charging system warning light illuminates: On	• Charging system warning light • Perform applicable DTC troubleshooting.
COLP (Refrigerant pressure (middle))	OFF/ON	• Refrigerant pressure is less than the specification.: Off • Refrigerant pressure is more than the specification.: On	• Refrigerant pressure sensor
CLU_CUT_SW*1 (Starter interlock)	OFF/ON	• Starter interlock switch ON: On • Starter interlock switch OFF: Off	• Starter interlock switch
CPP*1 (Clutch pedal position)	OFF/ON	• Clutch pedal depressed: On • Clutch pedal released: Off	• CPP switch
CPP/PNP*1 (Shift lever position)	OFF/ON	• Neutral: On • Other than neutral: Off	• Neutral switch No.1
ECT (Engine coolant temperature)	°C, °F	• Displays the ECT	• ECT sensor
	V	• ECT is 20 °C {68 °F}: Approx. 3.10 V • ECT is 40 °C {104 °F}: Approx. 2.16 V • ECT is 60 °C {140 °F}: Approx. 1.40 V • ECT is 80 °C {176 °F}: Approx. 0.87 V • ECT is 100 °C {212 °F}: Approx. 0.54 V	
EQ_RAT11 (Equivalence ratio (lambda))	—	• idle (after warm up): Approx. 1	• A/F sensor
EQ_RAT11_DSD (Desired equivalence ratio (lambda))	—	• Indicate the target lambda (Excess air factor = supplied air amount / theoretical air/fuel ratio)	• A/F sensor
ETC_ACT (Electric throttle control actual)	°	**Switch the ignition ON (engine off)** • Accelerator pedal released: Approx. 12.89 ° • Accelerator pedal depressed: Approx. 86.03 ° **Idle (after warm up)** • Accelerator pedal released: Approx. 3.2 °	• Throttle valve actuator • The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, BOO, BPA, ALTT V, AC_REQ
ETC_DSD (Electric throttle control desired)	%	• Displays the target TP angle (percent)	• Throttle valve actuator • The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, BOO, BPA, ALTT V, AC_REQ
	°	• Displays the target TP angle	

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
EVAPCP (Purge solenoid valve duty value)	%	• idle (after warm up): Approx. 0% • Racing (Engine speed 2,000 rpm): 4.3—35% • Racing (Engine speed 4,000 rpm): Approx. 66%	• Purge solenoid valve • The following PIDs — APP1, APP2, MAF, IAT, IAT2, MAP, RPM, ECT, BARO, O2S11, VPWR
FAN1(Cooling fan relay No.1)	OFF/ON	• Cooling fan relay No.1 not operating: OFF • Cooling fan relay No.1 operating: ON	• Cooling fan relay No.1 • The following PIDs — APP1, APP2, MAF, IAT, IAT2, RPM, ECT, BARO, Test, AC_PRES, COLP
FAN2(Cooling fan relay No.2)	OFF/ON	• Cooling fan relay No.2 not operating: OFF • Cooling fan relay No.2 operating: ON	• Cooling fan relay No.2 • The following PIDs — APP1, APP2, MAF, IAT, IAT2, RPM, ECT, BARO, Test, AC_PRES, COLP
FAN3(Cooling fan relay No.3)	OFF/ON	• Cooling fan relay No.3 not operating: OFF • Cooling fan relay No.3 operating: ON	• Cooling fan relay No.3 • The following PIDs — APP1, APP2, MAF, IAT, IAT2, RPM, ECT, BARO, Test, AC_PRES, COLP
FIA (Fuel injection amount)	%	• Displays the fuel injection amount	• Fuel injector • Fuel injector relay
FLI (Fuel level)	%	• Fuel gauge level F: Approx. 100% • Fuel gauge level E: Approx. 0%	• Fuel gauge sender unit • Perform applicable DTC troubleshooting.
FP (Fuel pump relay)	OFF/ON	• Switch the ignition ON (engine off): Off • Cranking: On • idle (after warm up): On	• Fuel pump relay • The following PIDs — FUEL_PRES, RPM, VPWR
FP_DUTY (Fuel pump control module)	%	• Switch the ignition ON (engine off): Approx. 55.74% • Cranking: Approx. 95% • Idle (after warm up): Approx. 55.74%	• Fuel pump control module • The following PIDs — FUEL_PRES, RPM, VPWR
FP_Hi_PRES (High pressure fuel pump)	OFF/ON	• When spill valve control solenoid valve is not energization: Off • When spill valve control solenoid valve is energization: On	• High pressure fuel pump • The following PIDs — MAF, ECT, FUEL_PRES, RPM, VPWR
FUELPW (Fuel injector duration)	sec	• idle (after warm up): Approx. 1.4 ms • Racing (engine speed is 2,000 rpm): Approx. 1.1 ms • Racing (engine speed is 4,000 rpm): Approx. 1.0 ms	• Fuel injector • The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, O2S11, O2S12
FUELSYS (Fuel system status)	OL/CL/ OL_Drive/ OL_Fault/ CL_Fault	• idle (after warm up): OL or CL • Racing (engine speed is 2,000 rpm): CL • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): OL-Drive	• Fuel injector • The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, O2S11, O2S12
FUEL_PRES (Fuel pressure sensor)	kPa, Bar, psi	• Displays the fuel pressure	• Fuel pressure sensor
	V	• Fuel pressure is 3.0 MPa {31 kgf/cm^2, 435 psi}: Approx. 0.92 V • Fuel pressure is 4.8 MPa {49 kgf/cm^2, 696 psi}: Approx. 1.17 V	
FUEL_P_DSD (Fuel pressure desired)	kPa, Bar, psi	• Displays the target fuel pressure.	• Fuel pressure sensor
GEAR*2 (Gear commanded)	1st, 2nd, 3rd, 4th, 5th, 6th, 7th, Park, Neutral, Drive, Reverse	• Selector lever at P position: Park • Selector lever at R position: Reverse • Selector lever at N position: Neutral • Selector lever in 1GR at D position: 1st	• Shift solenoid No.1 • Shift solenoid No.2 • Shift solenoid No.3 • Shift solenoid No.4 • Transaxle range sensor

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
HTR11 (A/F sensor heater)	OFF/ON	• Switch the ignition ON (engine off): Off • Idle (after warm up): On	• A/F sensor heater • Inspect following PIDs — MAF, ECT, RPM
	%	• Switch the ignition ON (engine off): 0% • Idle (after warm up): Approx. 42%	
HTR12 (HO2S heater control)	OFF/ON	• Switch the ignition ON (engine off): Off • Idle (after warm up): On	• HO2S heater • The following PIDs — MAF, ECT, RPM
	%	• Switch the ignition ON (engine off): 0% • Idle (after warm up): Approx. 40%	
IAT (Intake air temperature No.1)	°C, °F	• Displays the IAT (No.1)	• IAT sensor No.1
	V	• IAT is 20 °C {68 °F}: Approx. 2.70 V • IAT is 40 °C {104 °F}: Approx. 1.80 V • IAT is 60 °C {140 °F}: Approx. 1.20 V	
IAT2 (Intake air temperature No.2)	°C, °F	• Displays the IAT (No.2)	• IAT sensor No.2
	V	• IAT2 is 20 °C {68 °F}: Approx. 3.57 V • IAT2 is 40 °C {104 °F}: Approx. 2.70 V • IAT2 is 60 °C {140 °F}: Approx. 1.87 V	
ISC_FBK (ISC feedback value)	%	• Displays the ISC feedback value	• PCM
ISC_FBK_LRN (ISC feedback learning value)	%	• Displays the ISC feedback learning value	• PCM
I-Stop_OFF*3 (i-stop OFF switch)	OFF/ON	• i-stop OFF switch OFF: OFF • i-stop OFF switch ON: ON	• i-stop OFF switch
I-Stop_TRD*3 (i-stop transmission D position selected status)	OFF/ON	• D range:On • Except above: Off	• i-stop related system
I-Stop_VSP*3 (i-stop vehicle speed history flag)	OFF/ON	• Vehicle speed in which engine stop condition is met via i-stop control is detected: On • Except above: Off	• i-stop related system
I-Stop_VST*3 (i-stop vehicle stop flag)	OFF/ON	• Vehicle stop predicted: On • Except above: Off	• i-stop related system
IVS (CTP condition)	Idle/Off Idle	• Idle: Idle • Racing: Off Idle	• Perform applicable DTC troubleshooting.
KNOCKR (Knocking retard)	°	• Switch the ignition ON (engine off): 0 ° • idle (after warm up): 0 °	• KS
LOAD (Engine load)	%	• idle (after warm up): Approx. 17.64% • Racing (engine speed is 2,000 rpm): Approx. 14.51% • Racing (engine speed is 4,000 rpm): Approx. 21.17%	• The following PIDs — MAP, IAT, IAT2, MAF, RPM
LONGFT1 (Long term fuel trim)	%	• idle (after warm up): Approx. -2.34% • Racing (engine speed is 2,000 rpm): Approx. -0.78% • Racing (engine speed is 4,000 rpm): Approx. -0.78%	• The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, O2S11, O2S12
LONGFT12 (Long term fuel trim (HO2S))	%	• idle (after warm up): Approx. 0%	• The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, MAP, RPM, ECT, FUEL_PRES, BARO, O2S11, O2S12
LOW_OIL (Engine Oil Level Status)	NO/YES	• Switch the ignition ON (engine off): YES • idle (after warm up): YES • Racing (engine speed is 2,000 rpm): NO	• Oil pressure switch

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
MAF (Mass airflow)	g/sec	• Displays the MAF	• MAF sensor
	V	• Switch the ignition ON (engine off) (MAF: 0.59 g/s {0.078 lb/min}): Approx. 0.72 V • Idle (after warm up) (MAF: 2.17 g/s {0.287 lb/min}): Approx. 0.86 V • Racing (engine speed is 2,000 rpm) (MAF: 4.73 g/s {0.626 lb/min}): Approx. 1.07 V	
MAP (Manifold absolute pressure)	kPa, Bar, psi	• Displays the MAP	• MAP sensor
	V	• Switch the ignition ON (engine off) (MAP:101 kPa {1.03 kgf/cm^2, 14.6 psi}): Approx. 4.07 V • Idle (after warm up) (MAP: 33 kPa {0.34 kgf/cm^2, 4.8 psi}): Approx. 1.34 V • Racing (engine speed is 2,000 rpm) (MAP: 26 kPa {0.27 kgf/cm^2, 3.8 psi}): Approx. 1.05 V	
MF_CAT1 (Number of misfires corresponding to possible catalytic converter damage (No.1 cylinder))	—	• Displays the number of misfires corresponding to possible catalytic converter damage (No.1 cylinder).	• Perform applicable DTC troubleshooting.
MF_CAT_2 (Number of misfires corresponding to possible catalytic converter damage (No.2 cylinder))	—	• Displays the number of misfires corresponding to possible catalytic converter damage (No.2 cylinder).	• Perform applicable DTC troubleshooting.
MF_CAT_3 (Number of misfires corresponding to possible catalytic converter damage (No.3 cylinder))	—	• Displays the number of misfires corresponding to possible catalytic converter damage (No.3 cylinder).	• Perform applicable DTC troubleshooting.
MF_CAT_4 (Number of misfires corresponding to possible catalytic converter damage (No.4 cylinder))	—	• Displays the number of misfires corresponding to possible catalytic converter damage (No.4 cylinder).	• Perform applicable DTC troubleshooting.
MF_CAT_FCC (Number of misfire determinations (for catalytic converter))	—	• Displays the number of misfire determinations (for catalytic converter).	• Perform applicable DTC troubleshooting.
MF_CAT_TTL (Number of misfires corresponding to possible catalytic converter damage (total))	—	• Displays the number of misfires corresponding to possible catalytic converter damage (total).	• Perform applicable DTC troubleshooting.
MF_EMI1 (Number of misfires possibly affecting emission (No.1 cylinder))	—	• Displays the number of misfires possibly affecting emission (No.1 cylinder).	• Perform applicable DTC troubleshooting.

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
MF_EMI_2 (Number of misfires possibly affecting emission (No.2 cylinder))	—	• Displays the number of misfires possibly affecting emission (No.2 cylinder).	• Perform applicable DTC troubleshooting.
MF_EMI_3 (Number of misfires possibly affecting emission (No.3 cylinder))	—	• Displays the number of misfires possibly affecting emission (No.3 cylinder).	• Perform applicable DTC troubleshooting.
MF_EMI_4 (Number of misfires possibly affecting emission (No.4 cylinder))	—	• Displays the number of misfires possibly affecting emission (No.4 cylinder).	• Perform applicable DTC troubleshooting.
MF_EMI_FCC (Number of misfire determinations (for emission))	—	• Displays the number of misfire determinations (for emission).	• Perform applicable DTC troubleshooting.
MF_EMI_TTL (Number of misfires possibly affecting emission (total))	—	• Displays the number of misfires possibly affecting emission (total).	• Perform applicable DTC troubleshooting.
M_GEAR*1 (Manual Gear Position)	OFF/ON	• Displays the manual gear position	• CPP switch • Neutral switch No.1
MIL (Malfunction indicator lamp)	OFF/ON	• MIL not illuminate: Off • MIL illuminate: ON	• MIL • Perform applicable DTC troubleshooting.
MIL_DIS (Travelled distance since the MIL illuminated)	km, ft, mi	• Displays the travelled distance since the MIL illuminated	• Perform applicable DTC troubleshooting.
NEUTRAL_SW1*1 (Neutral switch No. 1)	OFF/ON	• Neutral: On • Other than neutral: Off	• Neutral switch No.1
NEUTRAL_SW2*5 (Neutral switch No. 2)	OFF/ON	• Neutral: On • Other than neutral: Off	• Neutral switch No.2
O2S11 (A/F sensor)	A	• Idle (after warm up): Approx. -39 µA • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 3.84 mA	• A/F sensor
O2S12 (HO2S)	V	• Idle (after warm up): 0—1.0 V • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 0 V	• HO2S
OIL_P_SOL (Engine oil solenoid valve)	OFF/ON	• ECT below 98 °C {208 °F} and engine speed below 4,000 rpm: On • ECT above 98 °C {208 °F} or engine speed above 4,000 rpm: Off	• Engine oil solenoid valve • The following PIDs — MAF, MAP, RPM, ECT
OIL_TEMP (Estimated engine oil temperature)	°C, °F	• Displays the estimated engine oil temperature	• The following PIDs — ECT
PN_SW (Parking/neutral)	Open/Closed	• Selector lever at P position or N position: Closed • Except above: Open	• Transaxle range sensor
RO2FT1 (HO2S fuel trim)	%	• Idle (after warm up): Approx. 0.5% • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 3.99%	• Perform applicable DTC troubleshooting.

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)
RPM (Engine speed)	RPM	• Displays the engine speed	• CKP sensor
SHRTFT1 (Short term fuel trim)	%	• idle (after warm up): Approx. 1.56% • Racing (engine speed is 2,000 rpm): Approx. -3.12% • Racing (engine speed is 4,000 rpm): Approx. -8.59%	• Perform applicable DTC troubleshooting.
SHRTFT12 (Short term fuel trim (HO2S))	%	• idle (after warm up): Approx. 0%	• Perform applicable DTC troubleshooting.
SPARKADV (Ignition timing)	°	• Displays the ignition timing	• Ignition coil • The following PIDs — APP1, APP2, TP1, TP2, MAF, IAT, IAT2, ECT, RPM, KNOCKR, VPWR, ALTT V
Test (Test mode)	OFF/ON	• Test mode OFF: Off • Test mode ON: On	—
TP REL (Relative throttle position)	%	• Accelerator pedal released: Approx. 12% • Accelerator pedal depressed: Approx. 82%	• The following PIDs — TP1, TP2
TP1 (TP sensor No.1)	V	• Accelerator pedal released: Approx. 1.11 V • Accelerator pedal depressed: Approx. 4.59 V	• TP sensor No.1
	%	• Accelerator pedal released: Approx. 22% • Accelerator pedal depressed: Approx. 92%	
TP2 (TP sensor No.2)	V	• Accelerator pedal released: Approx. 3.92 V • Accelerator pedal depressed: Approx. 0.41 V	• TP sensor No.2
	%	• Accelerator pedal released: Approx. 22% • Accelerator pedal depressed: Approx. 82%	
TPCT (TP sensor No.1 voltage at CTP)	V	• Switch the ignition ON: Approx. 0.5 V	• TP sensor No.1
TPCT2 (TP sensor No.2 voltage at CTP)	V	• Switch the ignition ON: Approx. 4.5 V	• TP sensor No.2
VPWR (Battery positive voltage)	V	• Displays the battery voltage	• Battery
VSS (Vehicle speed)	KPH, MPH	• Displays the vehicle speed	• DSC HU/CM
VT_EX_ACT (Actual exhaust valve timing)	°	• Displays the actual exhaust valve timing	• OCV • The following PIDs — APP1, APP2, MAF, RPM, ECT, VPWR
VT_EX_DES (Desired exhaust valve timing)	°	• Displays the desired exhaust valve timing	• OCV • The following PIDs — APP1, APP2, MAF, RPM, ECT, VPWR
VT_EX_DUTY (OCV control)	%	• idle (after warm up): Approx. 0% • Racing (engine speed is 2,000 rpm): Approx. 46%	• OCV • The following PIDs — APP1, APP2, MAF, RPM, ECT, VPWR
VT_IN_ACT (Actual intake valve timing)	°	• Displays the actual intake valve timing	• Electric variable valve timing motor/driver • The following PIDs — MAF, IAT, IAT2, MAP, RPM, ECT, BARO
VT_IN_DES (Desired intake valve timing)	°	• Displays the desired intake valve timing	• Electric variable valve timing motor/driver • The following PIDs — MAF, IAT, IAT2, MAP, RPM, ECT, BARO

*1 : MTX

*2 : ATX
*3 : Vehicles with i-stop system
*4 : Vehicles with air conditioner
*5 : Vehicles with i-stop system (MTX)