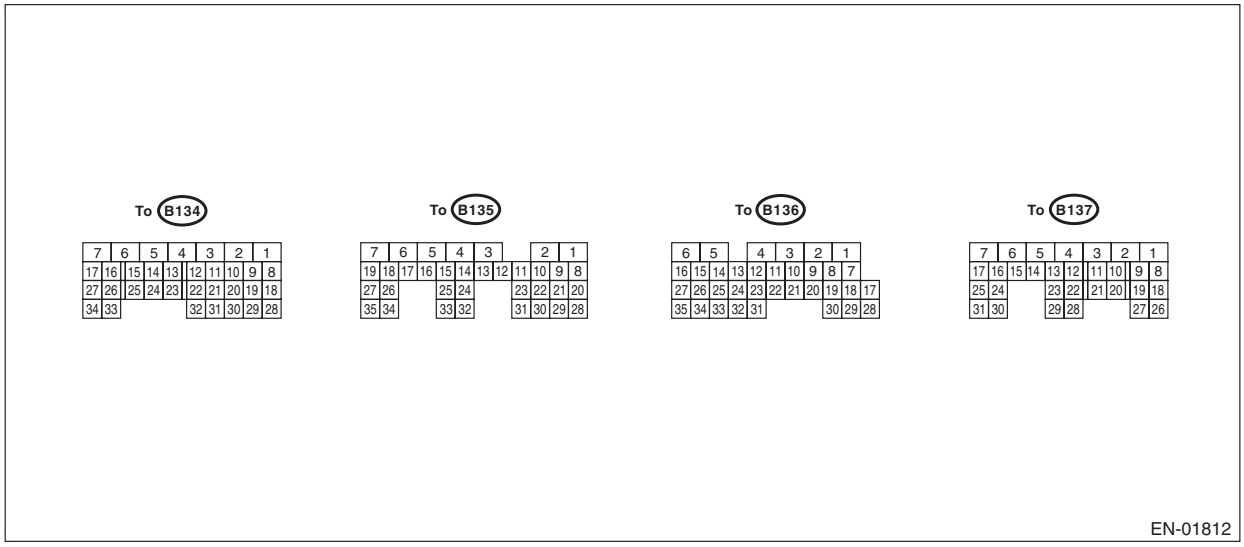
5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION



DESCRIPTION		Connector No.	Terminal No.	Signal (V)		NOTE
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sensor	Signal (+)	B135	10	0	–7 — +7	Waveform
	Signal (–)	B135	22	0	0	—
	Shield	B135	31	0	0	—
Camshaft position sensor	Signal (+)	B135	11	0	–7 — +7	Waveform
	Signal (–)	B135	23	0	0	—
	Shield	B135	31	0	0	—
Electronic throttle control	Main	B136	18	0.64 — 0.72 Fully opens: 3.96	0.64 — 0.72 (After engine is warmed-up.)	Fully closed: 0.6 Fully open: 3.96
	Sub	B136	29	1.51 — 1.58 Fully opens: 4.17	1.51 — 1.58 (After engine is warmed-up.)	Fully closed: 1.48 Fully open: 4.17
Electronic throttle control motor (+)		B137	5	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor (–)		B137	4	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor power supply		B137	6	10 — 13	13 — 14	—
Electronic throttle control motor relay		B135	35	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	When ignition switch is turned to ON: ON
Accelerator position sensor	Main	B136	17	Fully closed: 1 Fully opens: 3.3	Fully closed: 1 Fully opens: 3.3	—
	Power supply	B136	15	5	5	—
	Ground	B136	34	0	0	—
	Sub	B136	28	Fully closed: 1 Fully opens: 3.3	Fully closed: 1 Fully opens: 3.3	—
Rear oxygen sensor	Signal	B137	24	0	0 — 0.9	—
	Shield	B137	31	0	0	—

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DESCRIPTION		Connector No.	Terminal No.	Signal (V)		NOTE
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Front oxygen (A/F) sensor heater	Signal 1	B134	3	0 — 1.0	0 or 13 — 14	Duty waveform
	Signal 2	B134	2	0 — 1.0	0 or 13 — 14	Duty waveform
Rear oxygen sensor heater signal		B135	2	0 — 1.0	0 or 13 — 14	Duty waveform
Engine coolant temperature sensor		B136	14	1.0 — 1.4	1.0 — 1.4	After engine is warmed-up.
Starter switch		B137	8	0	0	Cranking: 8 — 14
Starter relay		B135	32	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
A/C switch		B137	16	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B137	15	10 — 13	13 — 14	—
Neutral position switch	AT	B137	9	ON: 0 OFF: 12±0.5		Switch is ON when select or shift lever is shifted into “P” or “N” range. (AT model)
	MT			ON: 12±0.5 OFF: 0		Switch is ON when shift lever is shifted into “N” range. (MT model)
Test mode connector		B137	14	5	5	When connected: 0
Knock sensor	Signal	B136	25	2.8	2.8	—
	Shield	B136	33	0	0	—
Back-up power supply		B135	19	10 — 13	13 — 14	Ignition switch “OFF”: 10 — 13
Control module power supply		B135	6	10 — 13	13 — 14	—
		B135	5	10 — 13	13 — 14	—
Sensor power supply		B136	16	5	5	—
Ignition control	1	B135	18	0	1 — 3.4	Waveform
	2	B135	17	0	1 — 3.4	Waveform
Fuel injector	#1	B136	6	10 — 13	1 — 14	Waveform
	#2	B136	5	10 — 13	1 — 14	Waveform
	#3	B136	4	10 — 13	1 — 14	Waveform
	#4	B136	3	10 — 13	1 — 14	Waveform
Fuel pump relay control		B135	26	ON: 0.5 or less OFF: 10 — 13	0.5 or less	—
A/C relay control		B135	33	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Radiator fan relay 1 control		B134	31	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Radiator fan relay 2 control		B135	34	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Self-shutoff control		B137	17	0.5 or less	0.5 or less	—
Malfunction indicator light		B134	17	—	—	Light “ON”: 1 or less Light “OFF”: 10 — 14
Engine speed output		B134	23	—	0 — 13 or more	Waveform
Purge control solenoid valve		B134	14	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	Duty waveform
EGR solenoid valve	Signal A+	B134	11	0 or 10 — 13	0 or 10 — 13	Waveform
	Signal A–	B134	10	0 or 10 — 13	0 or 10 — 13	Waveform
	Signal B+	B134	9	0 or 10 — 13	0 or 10 — 13	Waveform
	Signal B–	B134	8	0 or 10 — 13	0 or 10 — 13	Waveform

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DESCRIPTION		Connector No.	Terminal No.	Signal (V)		NOTE
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Power steering switch		B137	10	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
Blower fan switch		B137	13	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
A/C middle pressure switch		B136	30	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Front oxygen (A/F) sensor signal 1		B134	33	—	2.6 — 3.0	—
Front oxygen (A/F) sensor signal 2		B134	26	—	2.2 — 2.6	—
Front oxygen (A/F) sensor shield		B134	25	0	0	—
Manifold absolute pressure sensor		B136	22	4.0 — 4.8	1.1 — 1.9	—
Air flow sensor	Signal	B136	23	—	0.3 — 4.5	—
	Shield	B136	32	0	0	—
	Ground	B136	31	0	0	—
Intake air temperature sensor		B136	13	3.15 — 3.33	3.15 — 3.33	intake air temperature: 25°C (75°F)
SSM communication line		B137	20	Less than 1←→ More than 4	Less than 1←→ More than 4	—
GND (sensor)		B136	35	0	0	—
GND (injector)		B137	7	0	0	—
GND (ignition system)		B135	12	0	0	—
GND (power supply)		B135	4	0	0	—
		B135	1	0	0	—
GND (control system)		B137	2	0	0	—
		B137	1	0	0	—
GND (Front oxygen (A/F) sensor heater 1)		B134	7	0	0	—
GND (Front oxygen (A/F) sensor heater 2)		B134	6	0	0	—
GND (Electronic throttle control)		B137	3	0	0	—
Main switch		B136	7	ON: 0 OFF: 5	ON: 0 OFF: 5	—
Clutch switch		B136	10	When clutch pedal is depressed: 0 When clutch pedal is released: 10 — 13	When clutch pedal is depressed: 0 When clutch pedal is released: 13 — 14	—
Brake switch 1		B136	9	When brake pedal is depressed: 0 When brake pedal is released: 10 — 13	When brake pedal is depressed: 0 When brake pedal is released: 13 — 14	—
Brake switch 2		B136	8	When brake pedal is depressed: 10 — 13 When brake pedal is released: 0	When brake pedal is depressed: 13 — 14 When brake pedal is released: 0	—

DESCRIPTION	Connector No.	Terminal No.	Signal (V)		NOTE
			Ignition SW ON (engine OFF)	Engine ON (idling)	
Cruise control command switch	B136	11	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	—
Fuel temperature sensor	B136	12	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (75°F)
Fuel tank pressure sensor	B136	21	2.3 — 2.7	2.3 — 2.7	Value after removing fuel filler cap and installing again
Fuel tank sensor control valve	B134	24	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
Pressure control solenoid valve	B134	12	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
Drain valve	B134	13	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
CAN communication line (+)	B137	18	2.5 — 3.5	2.5 — 3.5	Waveform
CAN communication line (–)	B137	26	1.5 — 2.5	1.5 — 2.5	Waveform
AT/MT identification switch	B137	22	0	0	MT model