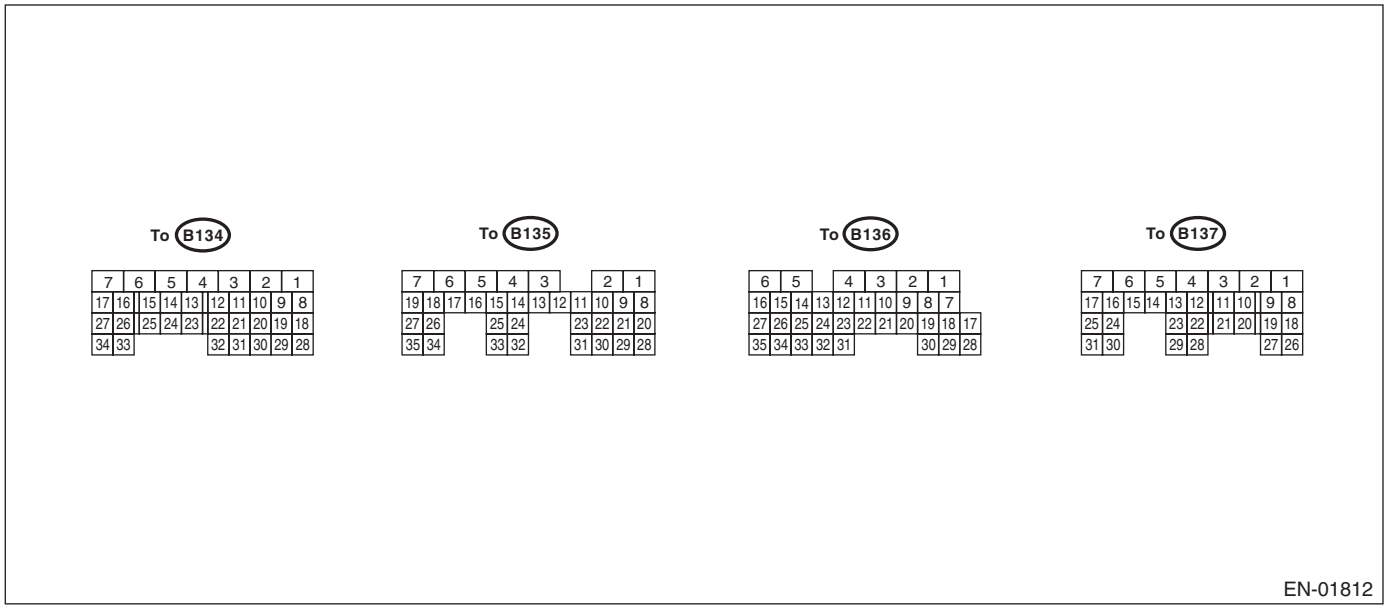
5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION



Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sensor	Signal (+)	B134	13	0	–7 — +7	Waveform
	Signal (–)	B134	14	0	0	—
	Shield	B134	24	0	0	—
Camshaft position sensor	Signal (+)	B134	12	0	–7 — +7	Waveform
	Signal (–)	B134	22	0	0	—
	Shield	B134	24	0	0	—
Electronic throttle control	Main	B134	18	0.64 — 0.72 Fully open: 3.96	0.64 — 0.72 (After engine is warmed-up.)	Fully closed: 0.6 Fully opened: 3.96
	Sub	B134	28	1.51 — 1.58 Fully open: 4.17	1.51 — 1.58 (After engine is warmed-up.)	Fully closed: 1.48 Fully open: 4.17
	Power supply	B134	19	5	5	—
	GND (sensor)	B134	29	0	0	—
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		B136	1	10 — 13	12 — 14	—
Electronic throttle control motor relay		B136	21	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	When ignition switch is turned to ON: ON

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Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Accelerator pedal position sensor	Main sensor signal	B135	23	Fully closed: 1.0 Fully open: 3.5	Fully closed: 1.0 Fully open: 3.5	—
	Main power supply	B135	21	5	5	—
	GND (Main sensor)	B135	29	0	0	—
	Sub sensor signal	B135	31	Fully closed: 1.0 Fully open: 3.5	Fully closed: 1.0 Fully open: 3.5	—
	Sub power supply	B135	22	5	5	—
	GND (Sub sensor)	B135	30	0	0	—
Rear oxygen sensor	Signal	B135	4	0	0 — 0.9	—
	Shield	B135	1	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B136	3	10 — 13	1 — 14	Duty waveform
	Signal 2	B136	2	10 — 13	1 — 14	Duty waveform
Rear oxygen sensor heater signal		B136	4	10 — 13	1 — 14	Duty waveform
Engine coolant temperature sensor		B134	34	1.0 — 1.4	1.0 — 1.4	After engine is warmed-up.
Starter switch		B136	32	0	0	Cranking: 8 — 14
Starter relay control		B136	20	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C switch		B136	24	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
Ignition switch		B135	19	10 — 13	12 — 14	—
Neutral position switch	AT	B136	31	ON: 0 OFF: 12±0.5		For AT model, switch is ON when select lever is shifted into “P” or “N” range.
	MT			ON: 0 OFF: 12±0.5		For MT model, switch is ON when select lever is shifted into “N” range.
Test mode connector		B135	27	10 — 13	13 — 14	When connected: 0
Knock sensor	Signal	B134	15	2.5	2.5	—
	Shield	B134	25	0	0	—
Back-up power supply		B135	5	10 — 13	12 — 14	Ignition switch “OFF”: 10 — 13
Control module power supply		B134	7	10 — 13	12 — 14	—
		B135	2	10 — 13	12 — 14	—
Ignition control	#1, #2	B137	18	0	1 — 3.4	Waveform
	#3, #4	B137	19	0	1 — 3.4	Waveform
Fuel injector	#1	B137	8	10 — 13	1 — 14	Waveform
	#2	B137	9	10 — 13	1 — 14	Waveform
	#3	B137	10	10 — 13	1 — 14	Waveform
	#4	B137	11	10 — 13	1 — 14	Waveform
Fuel pump relay control		B136	12	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C relay control		B136	9	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Radiator fan relay 1 control		B136	18	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Radiator fan relay 2 control		B136	29	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Self-shutoff control		B136	23	0.5 or less	0.5 or less	—
Malfunction indicator light		B136	11	—	—	Light “ON”: 1 or less Light “OFF”: 10 — 14
Engine speed output		B136	22	—	0 — 13 or more	Waveform
Oil temperature sensor signal		B134	23	1.0 — 1.4	1.0 — 1.4	After engine is warmed-up.
PCV diagnosis connector		B134	30	0	0	—
Purge control solenoid valve		B137	29	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	Duty waveform
EGR solenoid valve	Signal 1	B134	8	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 2	B134	9	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 3	B134	10	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 4	B134	20	0 or 10 — 13	0 or 12 — 14	Waveform
Power steering oil pressure switch		B134	33	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Blower fan switch		B135	16	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
A/C middle pressure switch		B136	33	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Oil switching solenoid valve RH	Signal (+)	B137	25	0	Duty waveform	Drive frequency: 300 Hz
	Signal (–)	B137	24	0	0	—
Oil switching solenoid valve LH	Signal (+)	B137	31	0	Duty waveform	Drive frequency: 300 Hz
	Signal (–)	B137	30	0	0	—
Variable valve lift diagnosis oil pressure switch RH		B134	31	0	0	—
Variable valve lift diagnosis oil pressure switch LH		B134	32	0	0	—
Front oxygen (A/F) sensor signal (+)		B135	9	—	2.7 — 2.9	—
Front oxygen (A/F) sensor signal (–)		B135	8	—	2.35 — 2.25	—
Front oxygen (A/F) sensor shield		B135	1	0	0	—
Manifold absolute pressure sensor		B134	6	3.4 — 3.8	1.4 — 1.8	—
Air flow sensor	Signal	B135	26	—	0.3 — 4.5	—
	Shield	B135	35	0	0	—
	Ground	B135	34	0	0	—
Intake air temperature sensor signal		B135	18	0.3 — 4.6	0.3 — 4.6	—
Immobilizer communication 1		B136	26	1 or less ←→ 4 or more	1 or less ←→ 4 or more	—
Immobilizer communication 2		B136	34	1 or less ←→ 4 or more	1 or less ←→ 4 or more	—
SSM communication		B136	16	1 or less ←→ 4 or more	1 or less ←→ 4 or more	—

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Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Sensor power supply		B134	19	5	5	—
		B135	22	5	5	—
GND (sensor)		B134	29	0	0	—
		B135	30	0	0	—
Ground	(Engine 1)	B134	5	0	0	—
	(Engine 2)	B137	7	0	0	—
	(Engine 3)	B137	2	0	0	—
	(Engine 4)	B137	1	0	0	—
	(Engine 5)	B137	3	0	0	—
	(Ignition 1)	B137	26	0	0	—
	(Ignition 2)	B137	6	0	0	—
	(Body)	B136	6	0	0	—
Clutch switch		B136	25	When clutch pedal is depressed: 0 When clutch pedal is released: 10 — 13	When clutch pedal is depressed: 0 When clutch pedal is released: 12 — 14	—
Brake switch 1		B135	20	When brake pedal is depressed: 0 When brake pedal is released: 10 — 13	When brake pedal is depressed: 0 When brake pedal is released: 12 — 14	—
Brake switch 2		B135	28	When brake pedal is depressed: 10 — 13 When brake pedal is released: 0	When brake pedal is depressed: 12 — 14 When brake pedal is released: 0	—
Cruise control main switch		B135	12	ON: 0 OFF: 5	ON: 0 OFF: 5	—
Cruise control command switch		B135	24	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		B135	17	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (77°F)
Fuel tank pressure sensor		B135	32	2.3 — 2.7	2.3 — 2.7	Value after removing fuel filler cap and installing again
Pressure control solenoid valve		B136	28	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Drain valve		B136	17	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
CAN communication line (+)		B136	27	2.5 — 3.5	2.5 — 3.5	Waveform
CAN communication line (–)		B136	35	1.5 — 2.5	1.5 — 2.5	Waveform