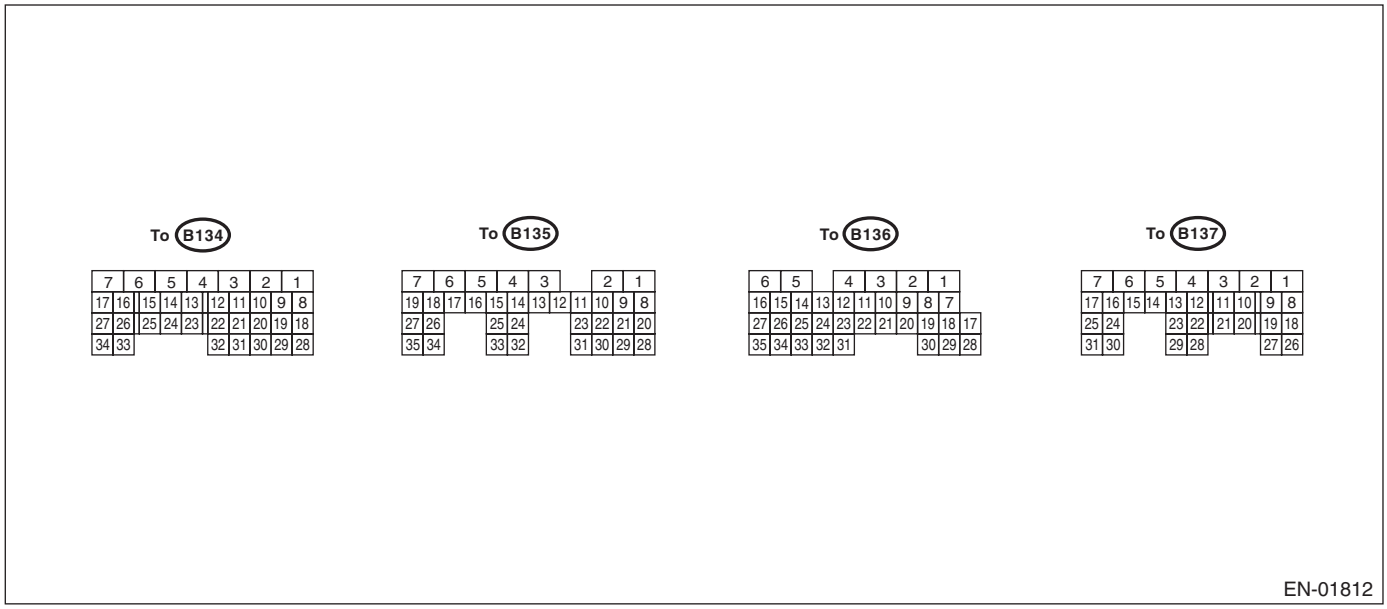
5. Engine Control Module (ECM) I/O Signal

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	—
Rear oxygen sensor	Signal	B137	25	0	0 — 0.9	—
	Shield	B137	31	0	0	—
	GND (sensor)	B136	35	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B134	3	—	—	Waveform
	Signal 2	B134	2	—	—	Waveform
Rear oxygen sensor heater signal		B135	2	0 — 13	12 — 14	Waveform
Engine coolant temperature sensor	Signal	B136	14	1.0 — 1.4	1.0 — 1.4	After engine is warmed-up.
	GND (sensor)	B136	35	0	0	After engine is warmed-up.
Air flow sensor	Signal	B136	23	—	0.3 — 4.5	—
	Shield	B136	32	0	0	—
	GND	B136	31	0	0	—
Intake air temperature sensor signal		B136	13	0.3 — 4.6	0.3 — 4.6	—
Wastegate control solenoid valve		B134	32	0 or 10 — 13	0 or 12 — 14	Waveform
Starter switch		B137	8	0	0	Cranking: 8 — 14
A/C switch		B137	17	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
Ignition switch		B137	14	10 — 13	12 — 14	—
Neutral position switch (MT model)		B137	9	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Neutral position switch (AT model)		B137	9	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Test mode connector		B137	15	10 — 13	13 — 14	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	12 — 14	Ignition switch “OFF”: 10 — 13
Control module power supply		B135	5	10 — 13	12 — 14	—
		B135	6	10 — 13	12 — 14	—
Sensor power supply		B136	16	5	5	—
Ignition control	#1	B135	18	0	12 — 14	Waveform
	#2	B135	17	0	12 — 14	Waveform
	#3	B135	16	0	12 — 14	Waveform
	#4	B135	15	0	12 — 14	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 control unit	Signal 1	B137	28	10 — 13	12 — 14	—
	Signal 2	B135	27	0 or 5	0 or 5	Waveform
A/C relay control		B135	33	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Radiator fan relay 1 control		B135	25	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Radiator fan relay 2 control		B135	24	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	Model with A/C only
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: 12 — 14	Waveform
Manifold absolute pressure sensor	Signal	B136	22	1.7 — 2.4	1.1 — 1.6	—
	Power supply	B136	16	5	5	
	GND (sensor)	B136	35	0	0	
Power steering oil pressure switch		B137	10	10 — 13	ON: 0 OFF: 12 — 14	—
Front oxygen (A/F) sensor signal (+)		B134	33	2.8 — 3.2	2.8 — 3.2	—
Front oxygen (A/F) sensor signal (–)		B134	26	2.4 — 2.7	2.4 — 2.7	—
Front oxygen (A/F) sensor shield		B134	25	0	0	—
SSM communication		B137	20	1 or less ←→ 4 or more	1 or less ←→ 4 or more	—
GND (injector)		B137	7	0	0	—
GND (sensor)		B136	35	0	0	—
GND (ignition system)		B135	12	0	0	—
GND (power supply)		B135	4	0	0	—
		B135	1	0	0	—
GND (control system)		B137	1	0	0	—
		B137	2	0	0	—

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
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 (electric throttle control)		B137	3	0	0	—
Intake camshaft position sensor (LH)		B135	8	0 or 5	0 or 5	Waveform
Intake camshaft position sensor (RH)		B135	9	0 or 5	0 or 5	Waveform
electric throttle control	Main	B136	18	0.64 — 0.72 Fully open: 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 open: 4.17	1.51 — 1.58 (After engine is warmed-up.)	Fully closed: 1.48 Fully open: 4.17
	Power supply	B136	16	5	5	—
	GND (sensor)	B136	35	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		B137	6	10 — 13	12 — 14	—
Electronic throttle control motor relay		B135	35	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12— 14	When ignition switch is turned to ON: ON
Intake oil flow control valve (LH)	Signal (+)	B134	19	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	29	0	0	—
Intake oil flow control valve (RH)	Signal (+)	B134	18	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	28	0	0	—
Accelerator position sensor	Main sensor signal	B136	17	Fully closed: 1 Fully opened: 3.3	Fully closed: 1 Fully opened: 3.3	—
	Main power supply	B136	15	5	5	—
	GND (main sensor)	B136	34	0	0	—
	Shield	B137	2	0	0	—
	Sub sensor signal	B136	28	Fully closed: 1 Fully opened: 3.3	Fully closed: 1 Fully opened: 3.3	—
	Sub power supply	B136	16	5	5	—
	GND (sub sensor)	B136	35	0	0	—
Starter relay		B135	32	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	ON: cranking

Description	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW ON (engine OFF)	Engine ON (idling)	
A/C middle pressure switch	B136	30	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Clutch switch	B134	1	When clutch pedal is depressed: 0 When brake pedal is released: 10 — 13	When clutch pedal is depressed: 0 When brake pedal is released: 12 — 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: 12 — 14	—
Brake switch 2	B136	8	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 command switch	B136	11	When not operating: 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 not operating: 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	—
Cruise control main switch	B136	7	ON: 0 OFF: 5	ON: 0 OFF: 5	—
Exhaust temperature sensor	B136	24	—	—	—
Fuel tank pressure sensor	B136	21	2.3 — 2.7	2.3 — 2.7	—
Pressure control solenoid valve	B134	12	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Drain valve	B134	13	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Fuel temperature sensor	B136	12	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C(77°F)
Immobilizer Signal 1	B137	19	—	—	—
Immobilizer Signal 2	B137	27	—	—	—
CAN communication line (+)	B137	18	—	—	—
CAN communication (–)	B137	26	—	—	—
AT/MT identification	B134	34	0	0	—
Blow-by leak diagnosis signal	B137	24	0	0	At the time of open circuit (fault): 5
Tumble generator valve position sensor signal (RH)	B136	27	Fully closed: 3.8 — 4.9 Fully open: 0.2 — 0.9	Fully closed: 3.8 — 4.9 Fully open: 0.2 — 0.9	—
Tumble generator valve position sensor signal (LH)	B136	26	Fully closed: 3.8 — 4.9 Fully open: 0.2 — 0.9	Fully closed: 3.8 — 4.9 Fully open: 0.2 — 0.9	—
Tumble generator valve RH (closed)	B134	8	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve LH (closed)	B134	10	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve RH (open)	B134	9	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve LH (open)	B134	11	0 or 10 — 13	0 or 12 — 14	—