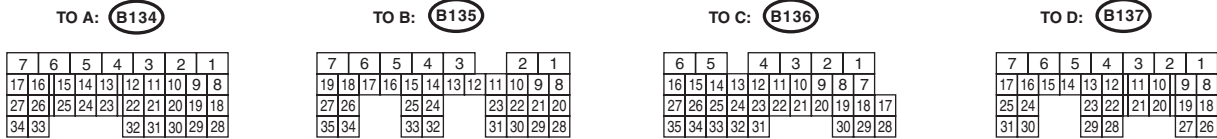


5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION



EN-05288

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sensor	Signal (+)	B137	17	0	-7 — +7	Waveform
	Signal (-)	B137	25	0	0	—
	Shield	B137	31	0	0	—
Front oxygen (A/F) sensor	Signal (+)	B136	19	2.8 — 3.2	2.8 — 3.2	—
	Signal (-)	B136	18	2.4 — 2.7	2.4 — 2.7	—
	Shield	B136	9	0	0	—
Rear oxygen sensor	Signal	B136	20	0	0 — 0.9	—
	Shield	B136	9	0	0	—
	Ground (sensor)	B135	30	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B136	6	—	—	Waveform
	Signal 2	B136	5	—	—	Waveform
Rear oxygen sensor heater signal		B135	6	0 — 13	—	Waveform
Engine coolant temperature sensor	Signal	B137	22	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
	Ground (sensor)	B134	29	0	0	After engine is warmed up.
Air flow sensor	Signal	B136	22	—	0.3 — 4.5	—
	Shield	B136	10	0	0	—
	Ground	B136	11	0	0	—
Intake air temperature sensor signal		B136	31	0.3 — 4.6	0.3 — 4.6	—
Engine oil temperature sensor signal		B137	21	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
Starter switch		B136	16	0	0	Cranking: 8 — 14
Ignition switch		B136	30	10 — 13	12 — 14	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Neutral position switch		B136	35	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Delivery (test) mode switch		B136	34	10 — 13	12 — 14	When fuse is installed: 0
Knock sensor	Signal	B137	2	2.8	2.8	—
	Shield	B137	8	0	0	—
Back-up power supply		B136	2	10 — 13	12 — 14	Ignition switch "OFF": 10 — 13
Control module power supply		B137	7	10 — 13	12 — 14	—
		B136	1	10 — 13	12 — 14	—
Sensor power supply		B134	19	5	5	—
		B135	22	5	5	—
Ignition control	#1	B134	21	0	0 or 5	Waveform
	#2	B134	22	0	0 or 5	Waveform
	#3	B134	31	0	0 or 5	Waveform
	#4	B134	32	0	0 or 5	Waveform
Fuel injector	#1	B134	10	10 — 13	1 — 14	Waveform
	#2	B134	11	10 — 13	1 — 14	Waveform
	#3	B134	12	10 — 13	1 — 14	Waveform
	#4	B134	13	10 — 13	1 — 14	Waveform
Fuel pump relay control		B136	14	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C relay control		B135	35	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C switch		B136	29	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	Manual A/C model
Blower fan switch		B135	19	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	Manual A/C model
A/C middle pressure switch		B136	7	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Main fan relay control		B135	12	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Sub fan relay control		B135	11	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Purge control solenoid valve		B137	6	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	Waveform
EGR control 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	20	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 4	B134	30	0 or 10 — 13	0 or 12 — 14	Waveform
Manifold absolute pressure sensor	Signal	B137	20	1.7 — 2.4	1.1 — 1.6	—
	Power supply	B134	19	5	5	
	Ground (sensor)	B134	29	0	0	
SSM communication line		B135	14	1 or less $\longleftrightarrow$ 4 or more	1 or less $\longleftrightarrow$ 4 or more	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Electronic Throttle	Main	B134	18	Approx. 0.7	Approx. 0.6 — 0.7 (After engine is warmed up.)	Fully closed: Approx. 0.6 Fully open: Approx. 4.0
	Sub	B134	28	Approx. 1.6	Approx. 1.5 — 1.6 (After engine is warmed up.)	Fully closed: Approx. 1.5 Fully open: Approx. 4.2
	Power supply	B134	19	5	5	—
	Ground (sensor)	B134	29	0	0	—
Electronic throttle control motor (+)		B134	2	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor (–)		B134	1	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor power supply		B135	7	10 — 13	12 — 14	—
Electronic throttle control motor relay		B135	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	When ignition switch is turned to ON: ON
Intake oil control solenoid (LH)	Signal (+)	B134	17	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	16	0	0	—
Intake oil control solenoid (RH)	Signal (+)	B134	34	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	27	0	0	—
Exhaust oil control solenoid (LH)	Signal (+)	B134	5	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	14	0	0	—
Exhaust oil control solenoid (RH)	Signal (+)	B134	7	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	15	0	0	—
Intake camshaft position sensor (LH)		B137	16	0 or 5	0 or 5	Waveform
Intake camshaft position sensor (RH)		B137	24	0 or 5	0 or 5	Waveform
Exhaust camshaft position sensor (LH)		B137	29	0 or 5	0 or 5	Waveform
Exhaust camshaft position sensor (RH)		B137	23	0 or 5	0 or 5	Waveform
Camshaft position sensor ground		B137	30	0	0	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

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: 0.4 — 1.0 Fully opened: 2.4 — 3.7	Fully closed: 0.4 — 1.0 Fully opened: 2.4 — 3.7	—
	Shield	B136	4	0	0	—
	Main power supply	B135	21	5	5	—
	Ground (main sensor)	B135	29	0	0	—
	Sub signal sensor	B135	31	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	—
	Sub power supply	B135	22	5	5	—
	Ground (sub sensor)	B135	30	0	0	—
Starter relay		B135	26	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	ON: cranking
Clutch switch		B135	9	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	MT model
Brake switch 1 (brake switch)		B136	15	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 (stop light switch)		B136	3	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	12	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating following distance setting: 1.5 — 2.5 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 following distance setting: 1.5 — 2.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	—
Cruise control main switch		B136	13	ON: 0 OFF: 5	ON: 0 OFF: 5	—
CAN communication	(Hi)	B136	17	—	—	—
	(Lo)	B136	28	—	—	—
Self-shutoff control		B135	13	0	0	—
Generator control		B135	18	0 — 6.5	0 — 6.5	—
Battery current sensor		B136	32	2.6 — 2.8	2.4 — 2.6	After engine is warmed up. (New battery)

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Battery temperature sensor		B136	24	1.1 — 2.4	1.1 — 2.4	When battery temperature is 20 — 50°C (68 — 122°F)
Oil level switch		B136	26	0	0	Oil level Low: 10 — 14
Tumble generator valve opening angle switch signal (LH)		B137	10	Fully closed: 0.5 or less Fully opened: 9.5 or more	Fully closed: 0.5 or less Fully opened: 9.5 or more	—
Tumble generator valve (LH open)		B134	23	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve (LH closed)		B134	24	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve opening angle switch signal (RH)		B137	11	Fully closed: 0.5 or less Fully opened: 9.5 or more	Fully closed: 0.5 or less Fully opened: 9.5 or more	—
Tumble generator valve (RH open)		B134	25	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve (RH closed)		B134	26	0 or 10 — 13	0 or 12 — 14	—
Immobilizer	Communication 1	B135	25	—	—	—
	Communication 2	B135	24	—	—	—
ELCM	Switching valve	B135	4	10 — 13	12 — 14	Operating: 0
	Pressure sensor	B136	21	1 — 4	1 — 4	When ignition switch is turned to ON: atmospheric pressure
	Vacuum pump	B137	27	10 — 13	12 — 14	Operating: 0
Ground	Sensor	B134	29	0	0	—
		B135	30	0	0	—
	Engine 1	B134	6	0	0	—
	Engine 2	B134	4	0	0	—
	Engine 3	B134	3	0	0	—
	Engine 4	B137	1	0	0	—
	Engine 5	B137	3	0	0	—
	Body	B136	4	0	0	—

Engine Control Module (ECM) I/O Signal

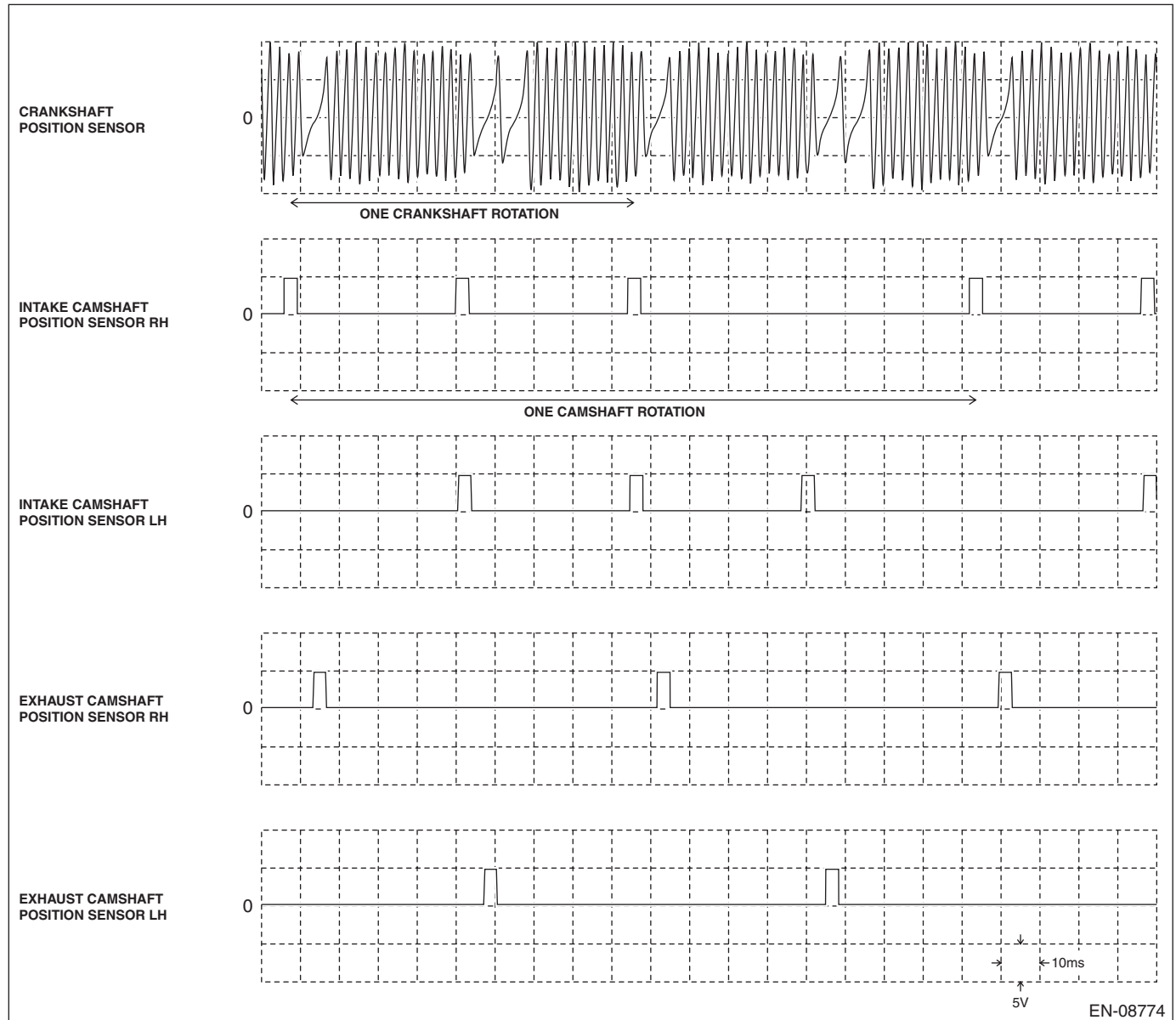
ENGINE (DIAGNOSTICS)

Input/output name:

- Crankshaft position sensor
- Intake camshaft position sensor RH
- Intake camshaft position sensor LH
- Exhaust camshaft position sensor RH
- Exhaust camshaft position sensor LH

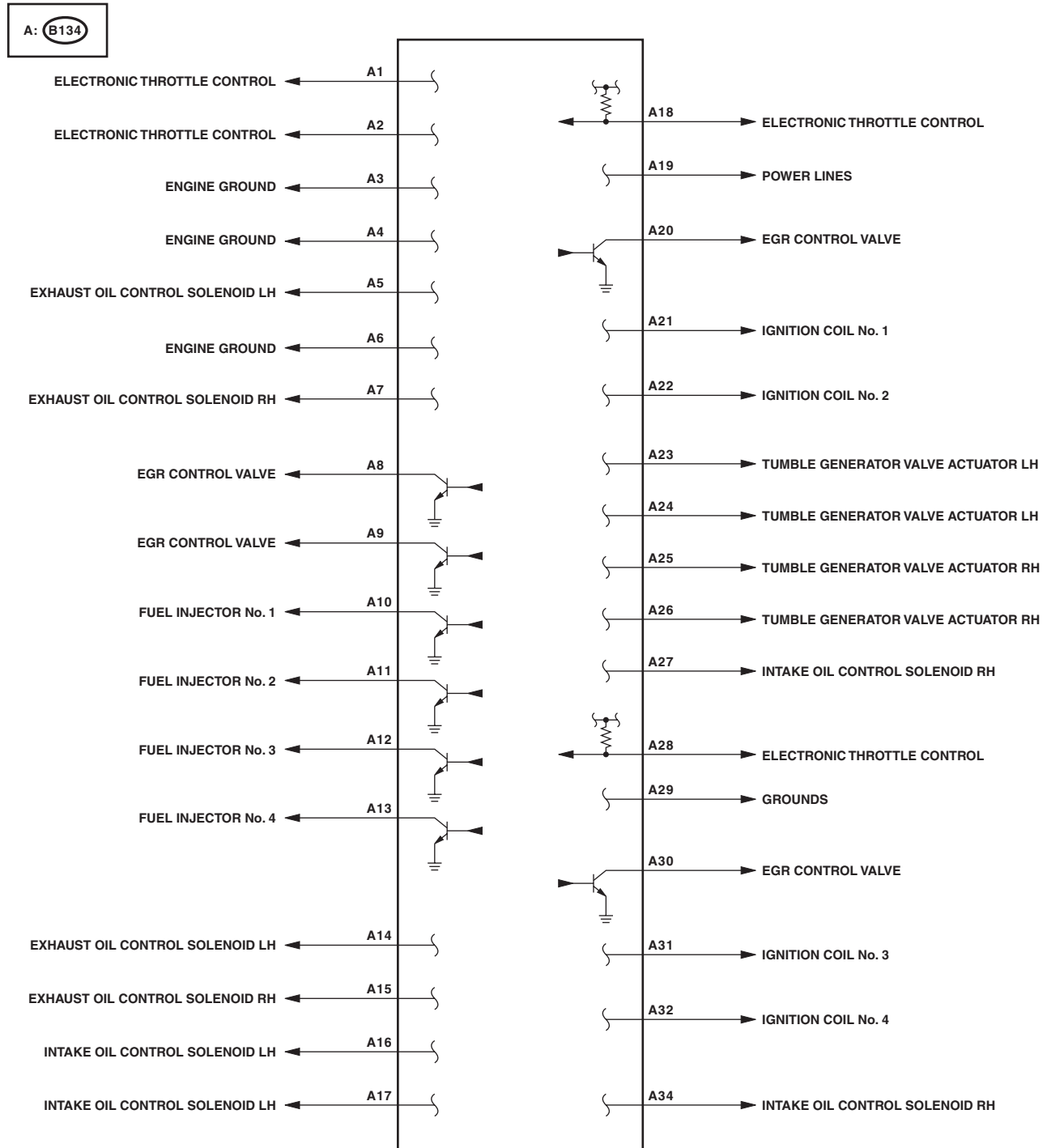
Measuring condition:

- After warming-up
- At idling



Engine Control Module (ECM) I/O Signal

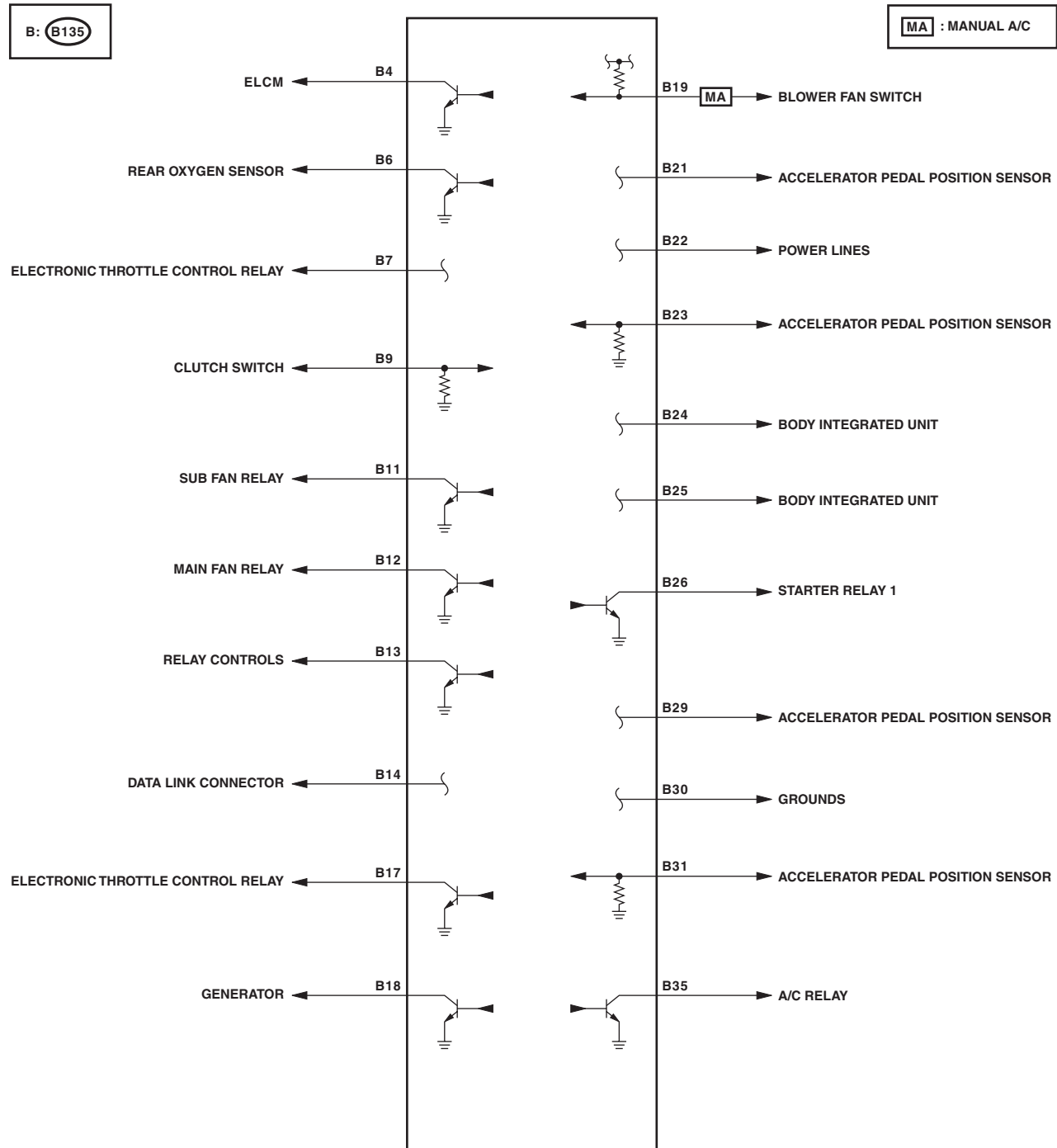
ENGINE (DIAGNOSTICS)



EN-09548

Engine Control Module (ECM) I/O Signal

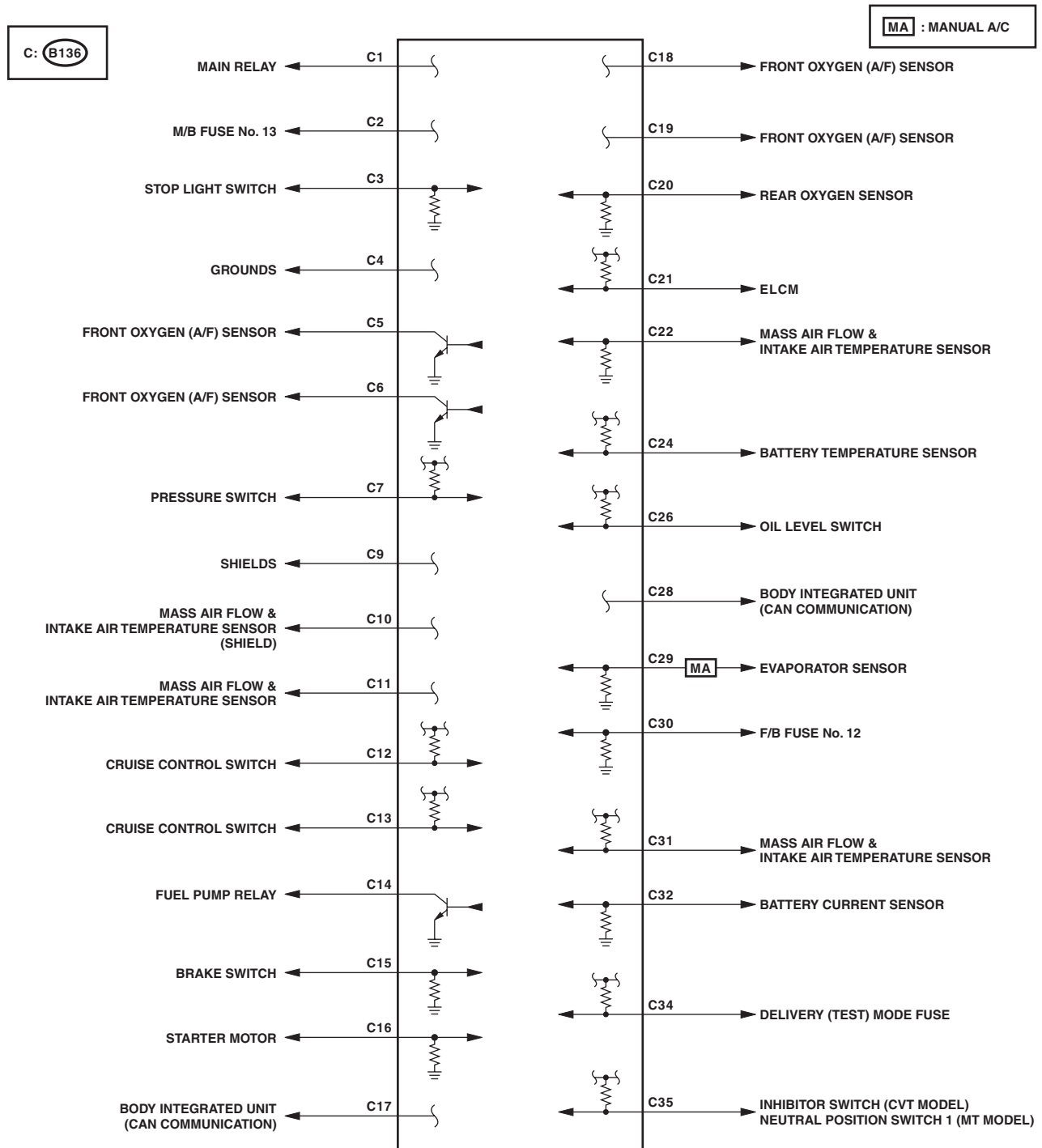
ENGINE (DIAGNOSTICS)



EN-09219

Engine Control Module (ECM) I/O Signal

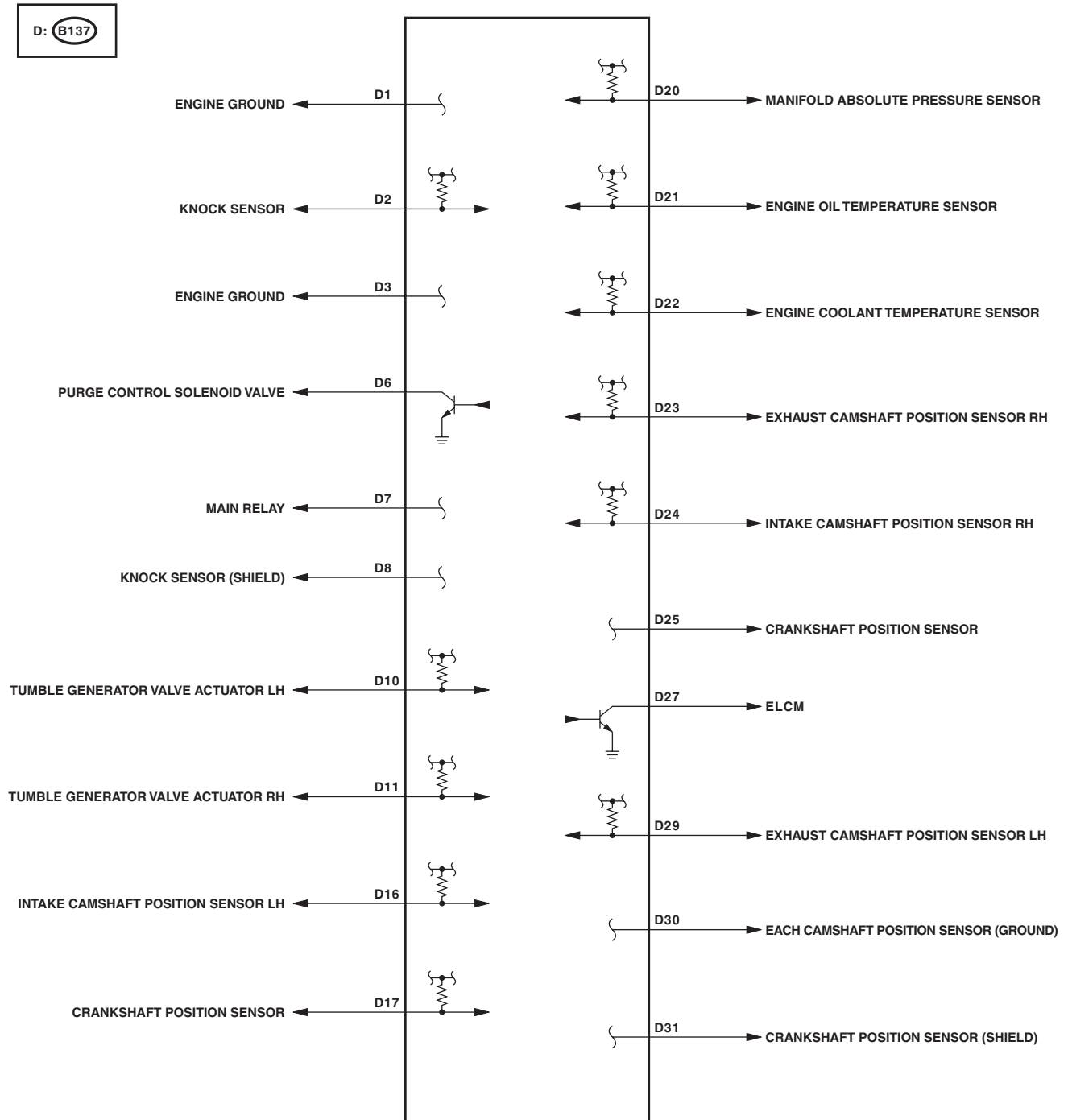
ENGINE (DIAGNOSTICS)



EN-09220

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)



EN-09221