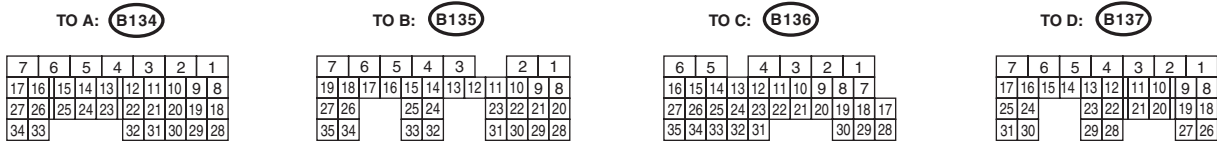


Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

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

A: ELECTRICAL SPECIFICATION



EN-05288

Description		Con- nector No.	Ter- minal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sen- sor	Signal (+)	B137	17	0	-7 — +7	Waveform
	Signal (-)	B137	25	0	0	—
	Shield	B137	31	0	0	—
Intake camshaft position sen- sor (LH)		B137	16	0 or 5	0 or 5	Waveform
Intake camshaft position sen- sor (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	—
Electronic throttle control	Main	B134	18	0.64 — 0.94 Fully open: Approx. 4.04	0.64 — 0.72 (After engine is warmed up.)	Fully closed: Approx. 0.6 Fully open: Approx. 4.04
	Sub	B134	28	1.51 — 1.76 Fully open: Approx. 4.232	1.51 — 1.58 (After engine is warmed up.)	Fully closed: Approx. 1.48 Fully open: Approx. 4.23
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

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Ter- minal 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	—
	Main power supply	B135	21	5	5	—
	Ground (main sensor)	B135	29	0	0	—
	Sub sensor signal	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	—
Engine coolant temperature sensor		B137	22	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
Starter switch		B136	16	0	0	Cranking: 8 — 14
Starter relay		B135	26	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Ignition switch		B136	30	10 — 13	12 — 14	—
Neutral position switch		B136	35	ON: 0 OFF: 12±0.5		Switch is ON when select lever is in “P” range or “N” range.
Delivery (test) mode connector		B136	34	10 — 13	12 — 14	When connected: 0
Knock sensor 1		B137	2	2.4	2.4	—
Knock sensor 2		B137	4	2.4	2.4	—
Knock sensor 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	—
Ignition control	#1	B134	21	0	12 — 14	Waveform
	#2	B134	22	0	12 — 14	Waveform
	#3	B134	31	0	12 — 14	Waveform
	#4	B134	32	0	12 — 14	Waveform
	#5	B134	25	0	12 — 14	Waveform
	#6	B134	26	0	12 — 14	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
	#5	B134	23	10 — 13	1 — 14	Waveform
	#6	B134	24	10 — 13	1 — 14	Waveform
A/C switch		B136	29	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
A/C middle pressure switch		B136	7	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
A/C relay control		B135	35	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Radiator fan control		B135	11	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Ter- minal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Radiator fan control power supply		B135	12	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Self-shutoff control		B135	13	0	0	—
Engine speed output		B135	15	—	0 — 13 or more	Waveform
Purge control solenoid valve		B137	6	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
EGR control valve	Signal 1	B134	8	0 or 10 — 13	0 or 12 — 14	—
	Signal 2	B134	9	0 or 10 — 13	0 or 12 — 14	—
	Signal 3	B134	20	0 or 10 — 13	0 or 12 — 14	—
	Signal 4	B134	30	0 or 10 — 13	0 or 12 — 14	—
Manifold absolute pressure sensor		B137	20	3.5 — 4.8	1.1 — 1.9	—
Air flow sensor	Signal	B136	22	0.74	0.3 — 4.5	—
	Shield	B136	10	0	0	—
	Ground	B136	11	0	0	—
Intake air temperature sensor		B136	31	3.15 — 3.33	3.15 — 3.33	Ambient air temperature
Front oxygen (A/F) sensor LH	Signal (+)	B135	8	2.8 — 3.2	2.8 — 3.2	—
	Signal (–)	B135	20	2.4 — 2.7	2.4 — 2.7	—
	Shield	B136	9	0	0	—
Front oxygen (A/F) sensor heater LH	Signal 1	B135	2	12 — 14	—	Waveform
	Signal 2	B135	1	12 — 14	—	Waveform
Front oxygen (A/F) sensor RH	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	—
Front oxygen (A/F) sensor heater RH	Signal 1	B136	6	12 — 14	—	Waveform
	Signal 2	B136	5	12 — 14	—	Waveform
Rear oxygen sensor LH	Signal	B135	28	0	0 — 0.9	—
	Shield	B136	9	0	0	—
Rear oxygen sensor heater LH signal		B135	5	12 — 14	—	Waveform
Rear oxygen sensor RH	Signal	B136	20	0	0 — 0.9	—
	Shield	B136	9	0	0	—
Rear oxygen sensor heater RH signal		B135	6	12 — 14	—	Waveform
Immobilizer	Communica- tion 1	B135	25	—	—	—
	Communica- tion 2	B135	24	—	—	—
Fuel pump control unit	Control	B136	33	0 or 5	0 or 5	Waveform
	Diagnostic signal	B135	10	0 or 10 — 13	12 — 14	—
Fuel cut demand		B136	14	0 or 10 — 13	0 or 10 — 13	Waveform
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	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Ter- minal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
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 noth- ing: 3.5 — 4.5 When operating RES/ ACC: 2.5 — 3.5 When operating follow- ing distance setting: 1.5 — 2.5 When operating SET/ COAST: 0.5 — 1.5 When operating CAN- CEL: 0 — 0.5	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating following dis- tance 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	—
Intake oil flow control sole- noid valve LH	Signal (+)	B134	17	0	0.6	—
	Signal (—)	B134	16	0	0	—
Intake oil flow control sole- noid valve RH	Signal (+)	B134	34	0	0.6	—
	Signal (—)	B134	27	0	0	—
Exhaust oil flow control solenoid valve LH	Signal (+)	B134	5	0	1.9	—
	Signal (—)	B134	14	0	0	—
Exhaust oil flow control solenoid valve RH	Signal (+)	B134	7	0	1.9	—
	Signal (—)	B134	15	0	0	—
Engine oil temperature sensor signal		B137	21	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
Power steering oil pressure switch		B137	28	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
SSM communication line		B135	14	1 or less ↔ 4 or more	1 or less ↔ 4 or more	—
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	—
	Engine 6	B137	5	0	0	—
	Body	B136	4	0	0	—
CAN commu- nication	(Hi)	B136	17	Pulse signal		—
	(Lo)	B136	28	Pulse signal		—
Brake vacuum sensor		B137	9	1 — 3.8	1 — 3.8	—
Brake vacuum pump		B136	8	0 (When pump is OFF)	0 (When pump is OFF)	—
				10 — 13 (When pump is ON)	12 — 14 (When pump is ON)	

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

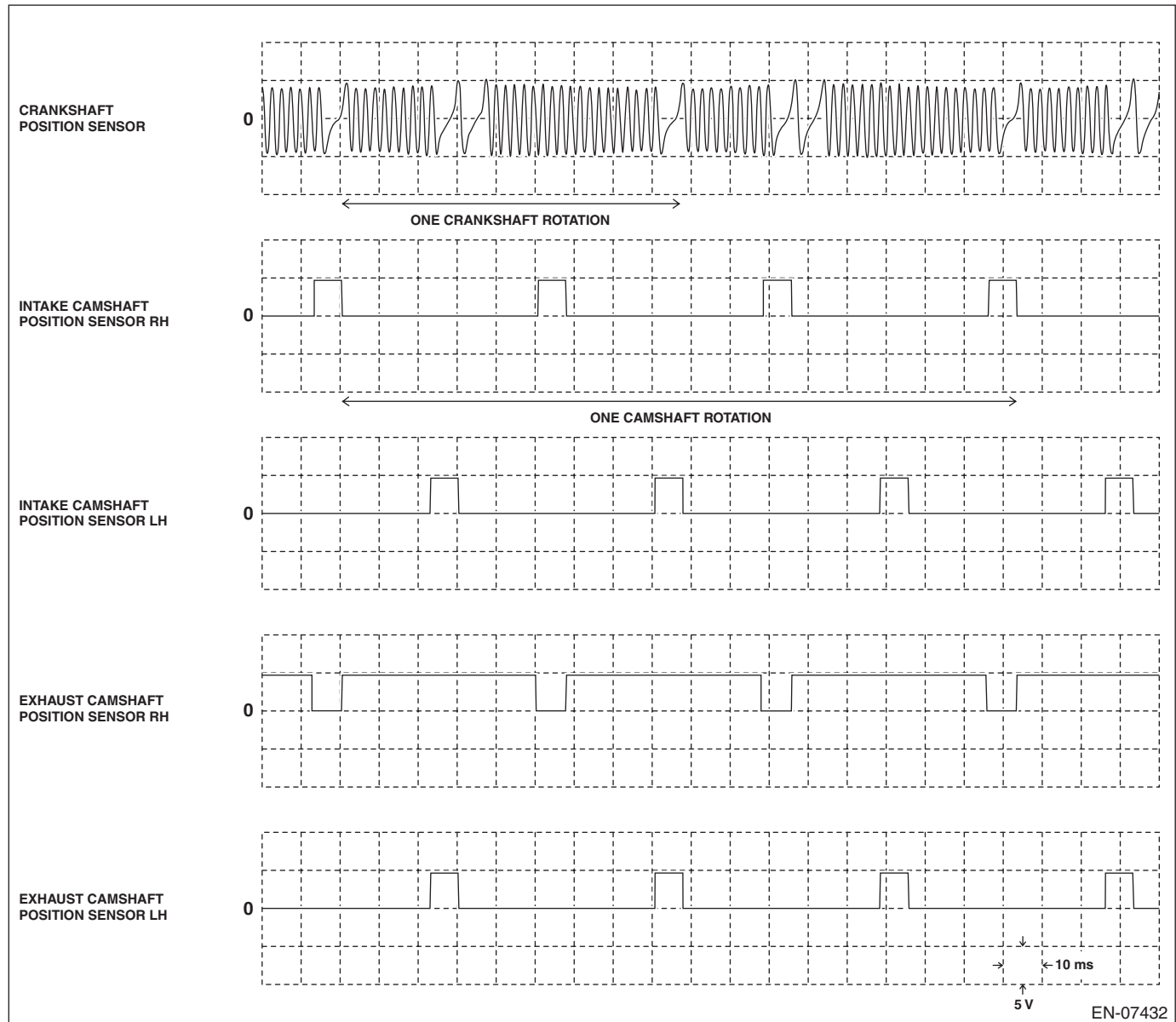
Description		Con- nector No.	Ter- minal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Brake vacuum pump relay		B135	27	10 — 13 (When pump is OFF)	12 — 14 (When pump is OFF)	—
				0 (When pump is ON)	0 (When pump is ON)	
ELCM	Switching valve	B135	4	10 — 13	12 — 14	Operating: 0
	Pressure sen- sor	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

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:

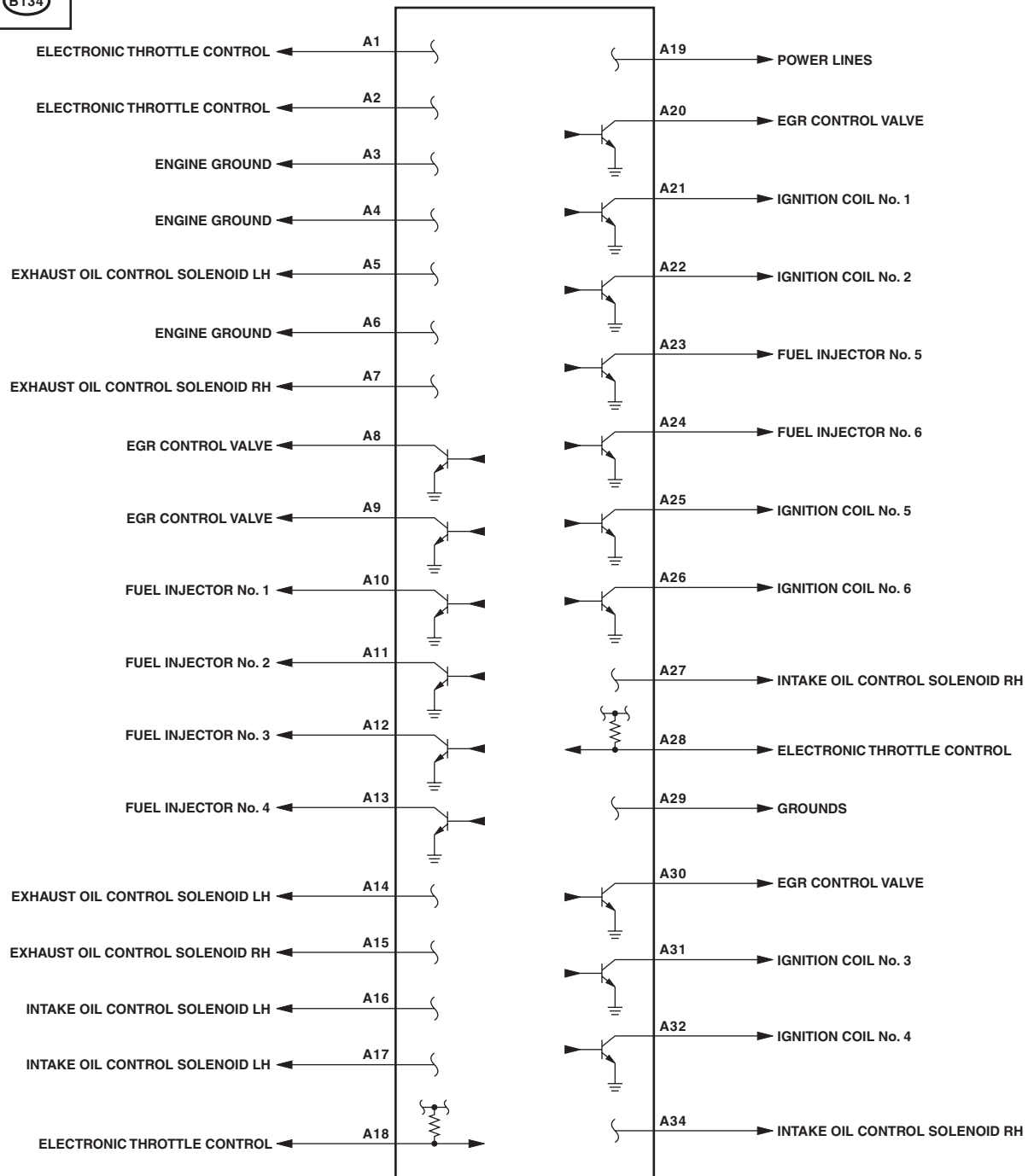
- After warming-up
- At idling



Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

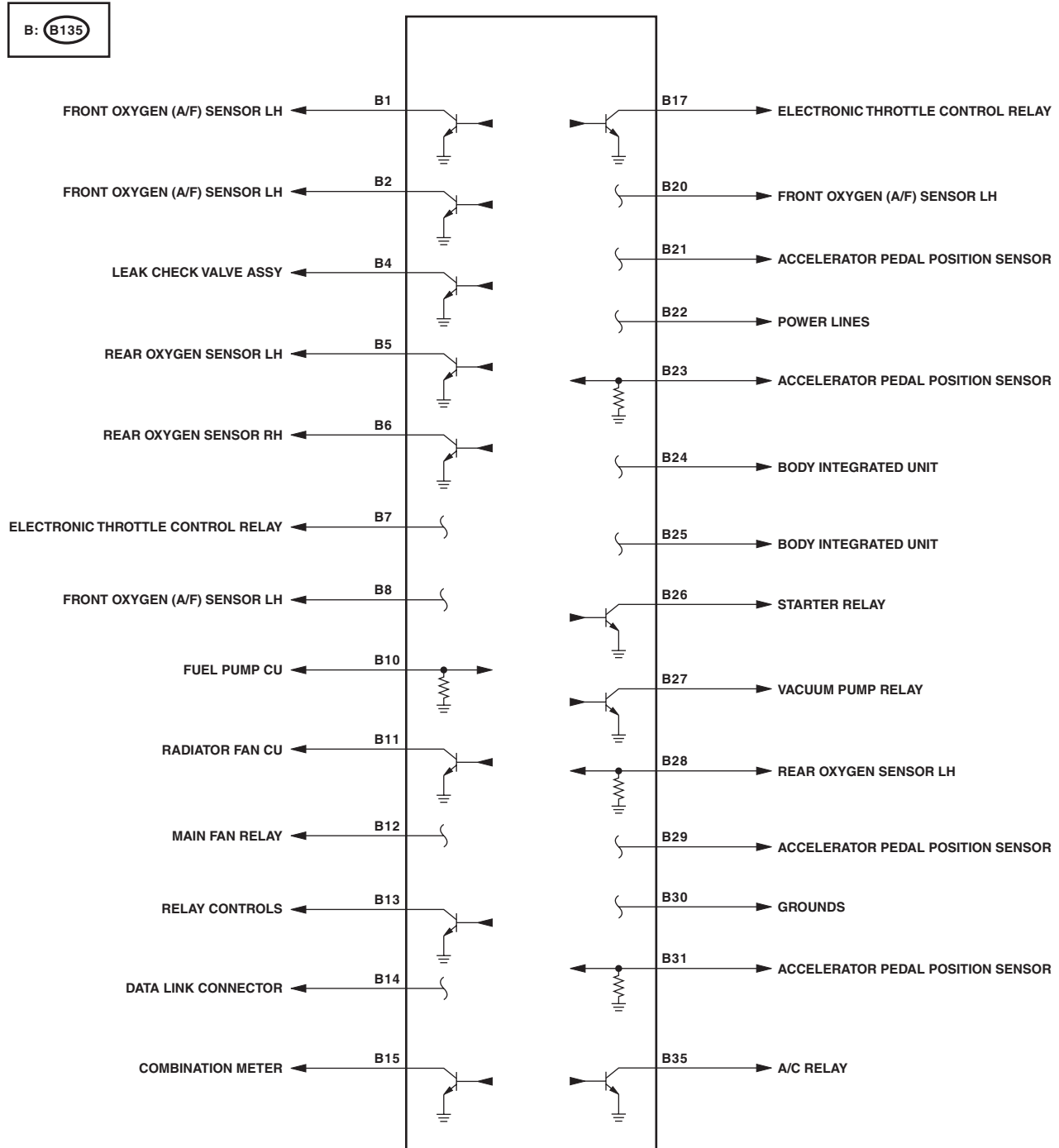
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EN-09596

Engine Control Module (ECM) I/O Signal

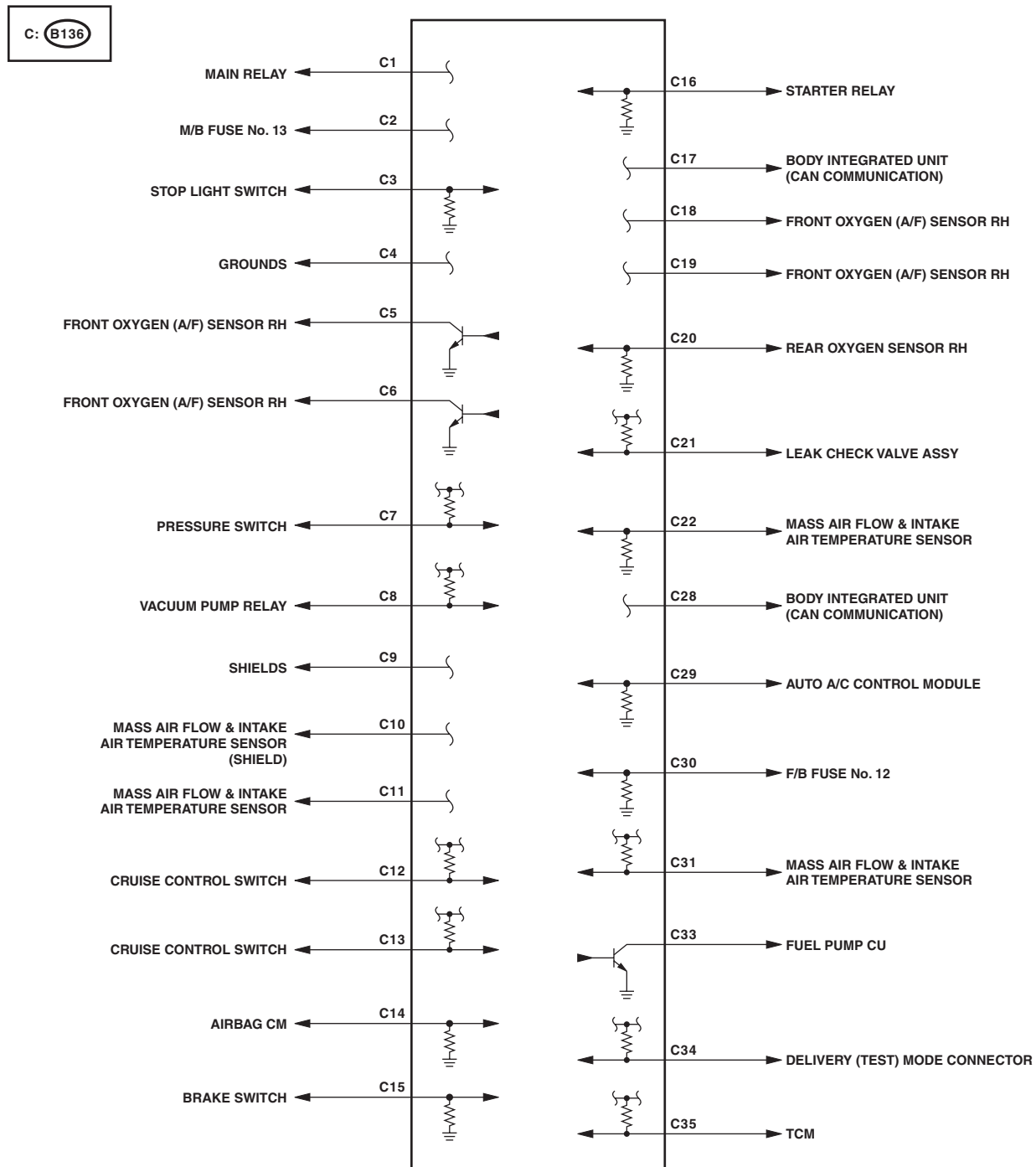
ENGINE (DIAGNOSTICS)



EN-10095

Engine Control Module (ECM) I/O Signal

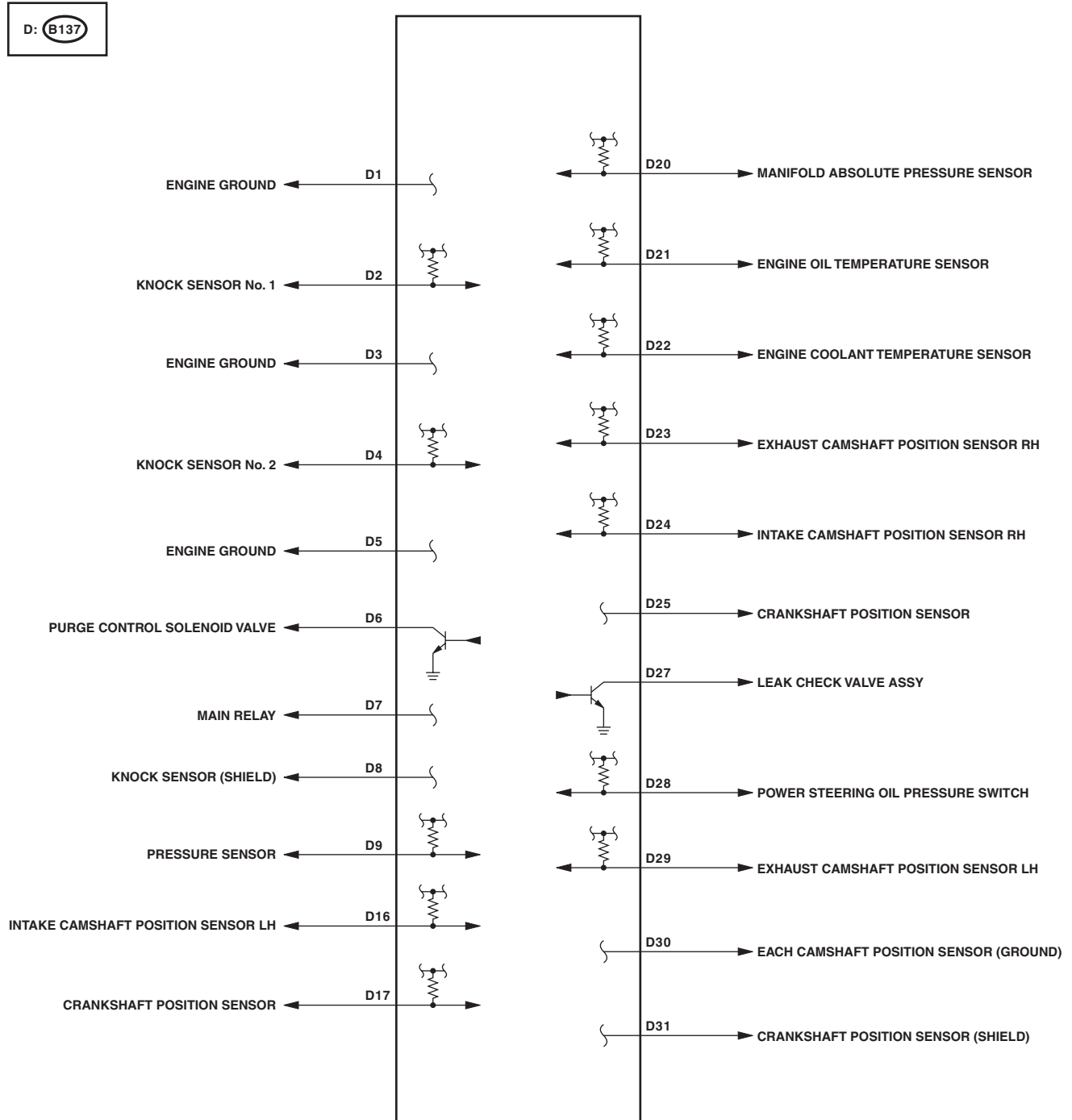
ENGINE (DIAGNOSTICS)



EN-10096

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)



EN-10097