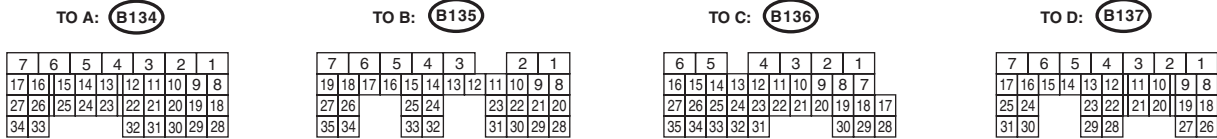


5. Engine Control Module (ECM) I/O Signal

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 (+)	B134	13	0	-7 — +7	Waveform
	Signal (-)	B134	14	0	0	—
	Shield	B134	24	0	0	—
Intake camshaft position sensor (LH)		B134	21	0 or 5	0 or 5	Waveform
Intake camshaft position sensor (RH)		B134	11	0 or 5	0 or 5	Waveform
Exhaust camshaft position sensor (LH)		B134	31	0	-7 — +7	Waveform
Exhaust camshaft position sensor (RH)		B134	12	0	-7 — +7	Waveform
GND (Camshaft position sensor)		B134	22	0	0	—
Electronic throttle control	Main	B134	18	0.64 — 0.94 Fully opened: 4.01	0.64 — 0.72 (After engine is warmed up.)	Fully closed: 0.6 Fully opened: 4.01
	Sub	B134	28	1.51 — 1.76 Fully opened: 4.23	1.51 — 1.58 (After engine is warmed up.)	Fully closed: 1.48 Fully opened: 4.23
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	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: 0.7 Fully opened: 3.5	Fully closed: 0.7 Fully opened: 3.5	—
	Main power supply	B135	21	5	5	—
	GND (main sensor)	B135	29	0	0	—
	Sub sensor signal	B135	31	Fully closed: 0.7 Fully opened: 3.5	Fully closed: 0.7 Fully opened: 3.5	—
	Sub power supply	B135	22	5	5	—
	GND (sub sensor)	B135	30	0	0	—
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		B136	20	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
A/C switch		B136	24	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
A/C middle pressure switch		B136	33	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Ignition switch		B135	19	10 — 13	13 — 14	—
Neutral position switch		B136	31	ON: 0 OFF: 12±0.5		Switch is ON when select lever is shifted into “P” range or “N” range.
Delivery (test) mode connector		B135	27	10 — 13	12 — 14	When connected: 0
Knock sensor 1	Signal	B134	15	2.4	2.4	—
	Shield	B134	25	0	0	—
Knock sensor 2	Signal	B134	16	2.4	2.4	—
	Shield	B134	25	0	0	—
Back-up power supply		B135	5	10 — 13	13 — 14	Ignition switch “OFF”: 10 — 13
Control module power supply		B134	7	10 — 13	13 — 14	—
		B135	2	10 — 13	13 — 14	—
Sensor power supply (engine side)		B134	19	5	5	—
Sensor ground (engine side)		B134	29	0	0	—
Sensor power supply (body side)		B135	22	5	5	—
Sensor ground (body side)		B135	30	0	0	—
Ignition control	#1	B137	18	0	1 — 14	Waveform
	#2	B137	19	0	1 — 14	Waveform
	#3	B137	20	0	1 — 14	Waveform
	#4	B137	21	0	1 — 14	Waveform
	#5	B137	22	0	1 — 14	Waveform
	#6	B137	23	0	1 — 14	Waveform

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)	
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
	#5	B137	12	10 — 13	1 — 14	Waveform
	#6	B137	13	10 — 13	1 — 14	Waveform
A/C relay control		B136	9	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Radiator fan control		B136	18	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Radiator fan control power supply		B136	29	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 13 — 14	—
Self-shutoff control		B136	23	0	0	—
Malfunction indicator light		B136	11	—	—	Light "ON": 1 or less Light "OFF": 10 — 14
Engine speed output		B136	22	—	0 — 13 or more	Waveform
Purge control solenoid valve		B137	29	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
Power steering switch		B134	33	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
Manifold absolute pressure sensor		B134	6	3.5 — 4.8	1.1 — 1.9	—
Air flow sensor	Signal	B135	26	0.74	0.3 — 4.5	—
	Shield	B135	35	0	0	—
	GND	B135	34	0	0	—
Intake air temperature sensor		B135	18	3.15 — 3.33	3.15 — 3.33	Intake air temperature: 25°C (77°F)
Front oxygen (A/F) sensor RH	Signal (+)	B135	9	2.8 — 3.2	2.8 — 3.2	—
	Signal (–)	B135	8	2.4 — 2.7	2.4 — 2.7	—
	Shield	B135	1	0	0	—
Front oxygen (A/F) sensor heater RH	Signal 1	B136	3	12 — 14	—	Waveform
	Signal 2	B136	2	12 — 14	—	Waveform
Front oxygen (A/F) sensor LH	Signal (+)	B135	11	2.8 — 3.2	2.8 — 3.2	—
	Signal (–)	B135	10	2.4 — 2.7	2.4 — 2.7	—
	Shield	B135	1	0	0	—
Front oxygen (A/F) sensor heater LH	Signal 1	B135	7	12 — 14	—	Waveform
	Signal 2	B135	6	12 — 14	—	Waveform
Rear oxygen sensor RH	Signal	B135	4	0	0 — 0.9	—
	Shield	B135	1	0	0	—
Rear oxygen sensor heater RH signal		B136	4	12 — 14	—	Waveform
Rear oxygen sensor LH	Signal	B135	15	0	0 — 0.9	—
	Shield	B135	1	0	0	—
Rear oxygen sensor heater LH signal		B136	5	12 — 14	—	Waveform
Immobilizer communication 1		B136	26	10	10	—
Immobilizer communication 2		B136	34	10	10	—

Engine Control Module (ECM) I/O Signal

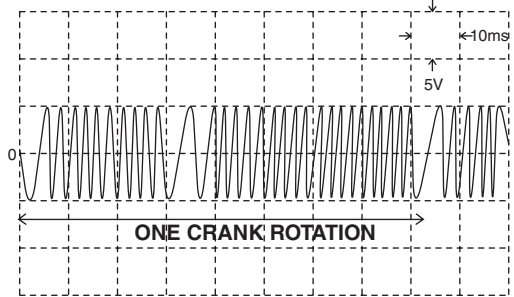
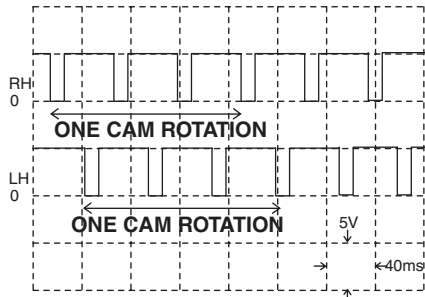
ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Fuel pump control unit	Diagnosis signal	B135	33	10 — 13	13 — 14	—
	Control	B136	12	0	0 or 5	—
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: 13 — 14	—
Brake switch 2		B135	28	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	—
Cruise control command switch		B135	24	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		B135	12	ON: 0 OFF: 5	ON: 0 OFF: 5	—
Intake oil flow control solenoid valve RH	Signal (+)	B137	17	0	0.6	—
	Signal (–)	B137	16	0	0	—
Intake oil flow control solenoid valve LH	Signal (+)	B137	15	0	0.6	—
	Signal (–)	B137	14	0	0	—
Exhaust oil flow control solenoid valve RH	Signal (+)	B137	25	0	0.6	—
	Signal (–)	B137	24	0	0	—
Exhaust oil flow control solenoid valve LH	Signal (+)	B137	31	0	0.6	—
	Signal (–)	B137	30	0	0	—
Oil temperature sensor signal		B134	23	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
EGR valve	Signal 1	B134	8	10 — 13	12 — 14	—
	Signal 2	B134	9	10 — 13	12 — 14	—
	Signal 3	B134	10	10 — 13	12 — 14	—
	Signal 4	B134	20	10 — 13	12 — 14	—
Brake vacuum sensor		B134	27	1 — 3.8	1 — 3.8	—
Brake vacuum pump		B135	25	0 (When pump is OFF)	0 (When pump is OFF)	—
				10 — 13 (When pump is ON)	12 — 14 (When pump is ON)	
Brake vacuum pump relay		B136	8	10 — 13 (When pump is OFF)	12 — 14 (When pump is OFF)	—
				0 (When pump is ON)	0 (When pump is ON)	
SSM communication line		B136	16	1 or less ←→ 4 or more	1 or less ←→ 4 or more	—
Fuel tank pressure sensor		B135	32	2.3	2.7	—

Engine Control Module (ECM) I/O Signal

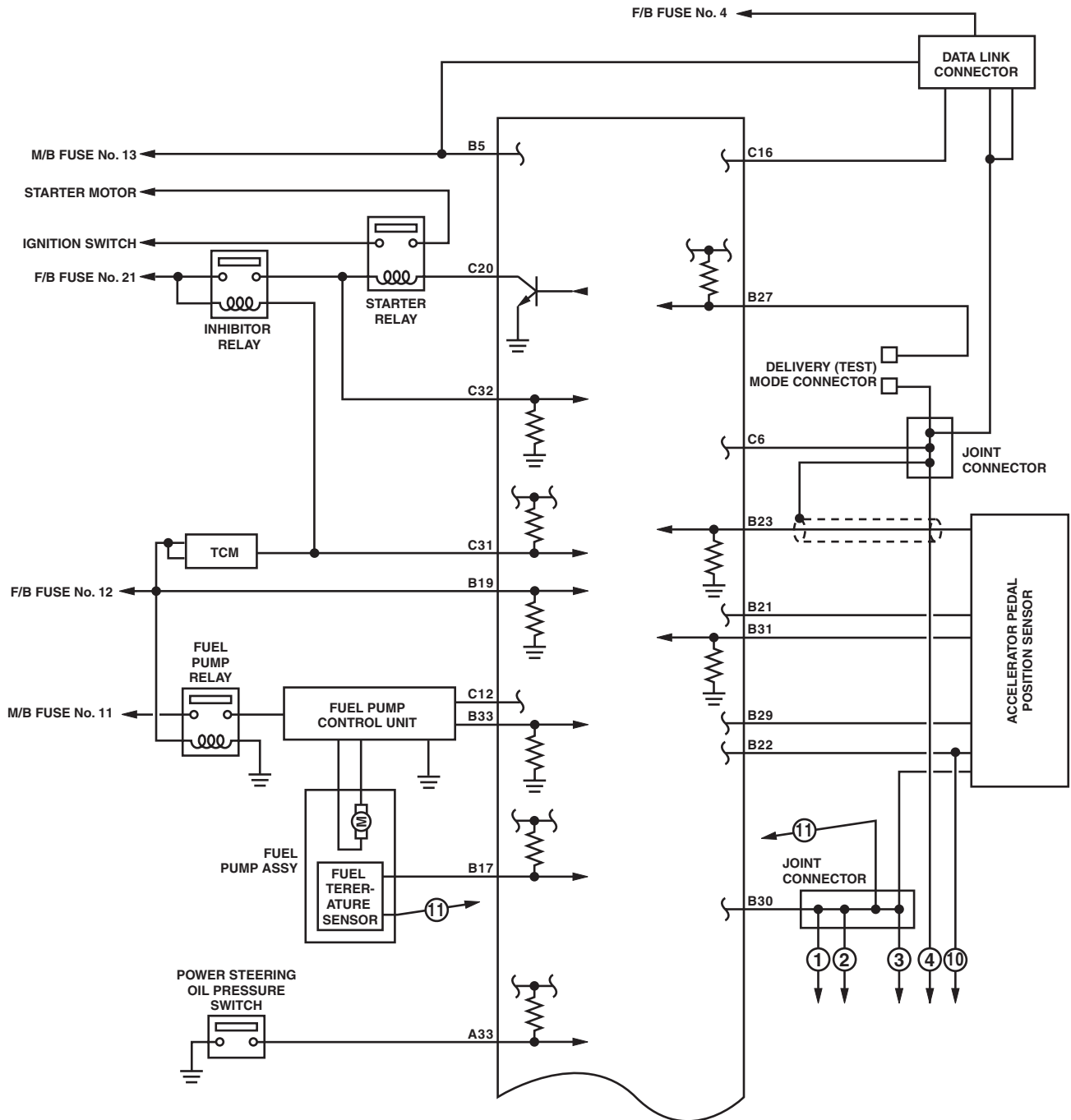
ENGINE (DIAGNOSTICS)

Description	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW ON (engine OFF)	Engine ON (idling)	
Drain valve	B136	17	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 13 — 14	—
Fuel temperature sensor	B135	17	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (77°F)
CAN communication (+)	B136	27	2.0 or more $\longleftrightarrow$ 4.5 or less	2.0 or more $\longleftrightarrow$ 4.5 or less	—
CAN communication (—)	B136	35	0.5 or more $\longleftrightarrow$ 3.0 or less	0.5 or more $\longleftrightarrow$ 3.0 or less	—
Ground (Ignition system 1)	B137	26	0	0	—
Ground (Ignition system 2)	B137	6	0	0	—
Ground (engine 1)	B134	5	0	0	—
Ground (engine 2)	B137	7	0	0	—
Ground (engine 3)	B137	2	0	0	—
Ground (engine 4)	B137	1	0	0	—
Ground (engine 5)	B137	3	0	0	—
Ground (engine 6)	B134	3	0	0	—
Ground (body)	B136	6	0	0	—

Input/output name	Measuring condition	Waveform
1. Crankshaft position sensor	At idling	 EN-05357
2. Camshaft position sensor	At idling	 EN-05358

Engine Control Module (ECM) I/O Signal

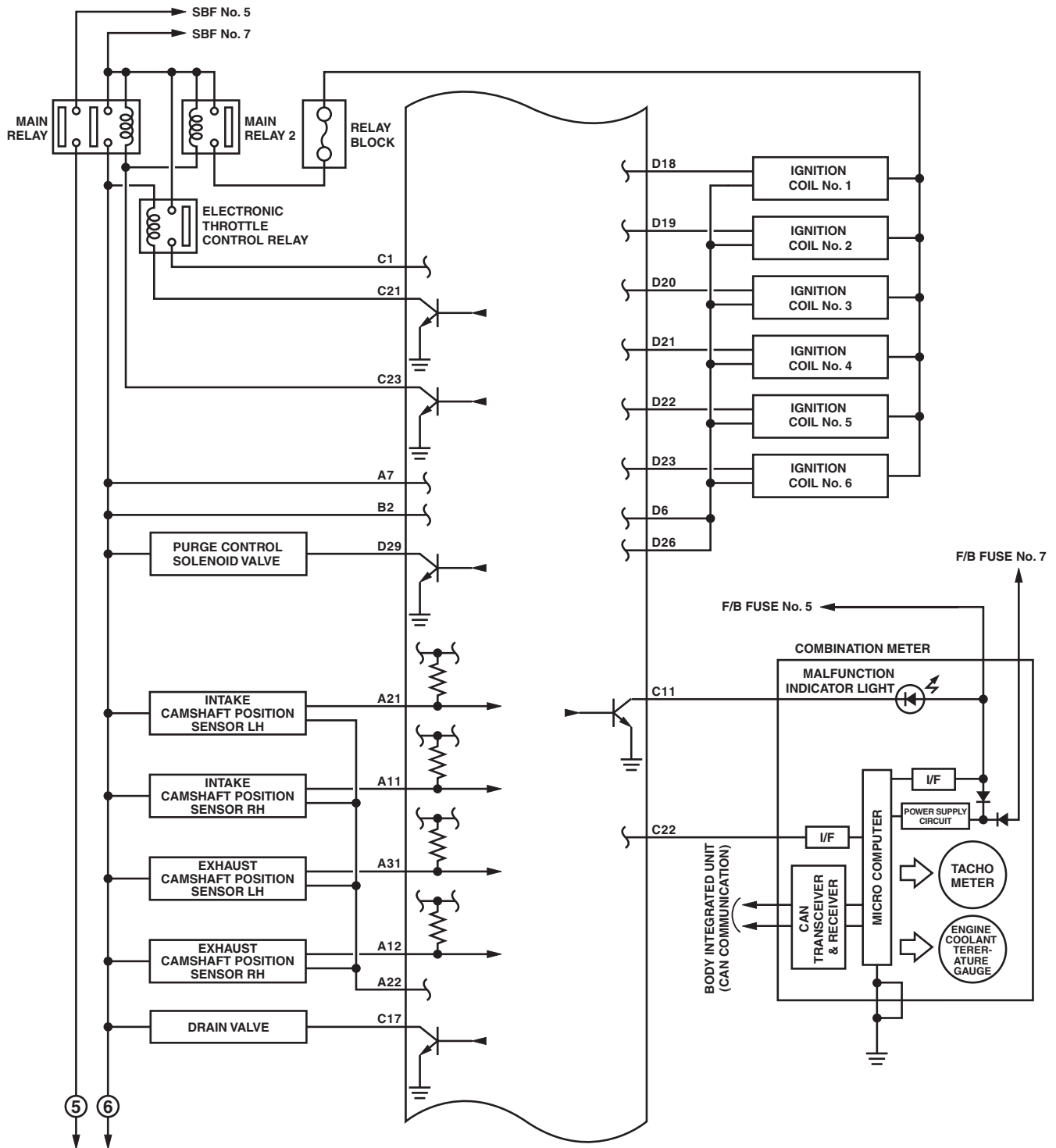
ENGINE (DIAGNOSTICS)



EN-06936

Engine Control Module (ECM) I/O Signal

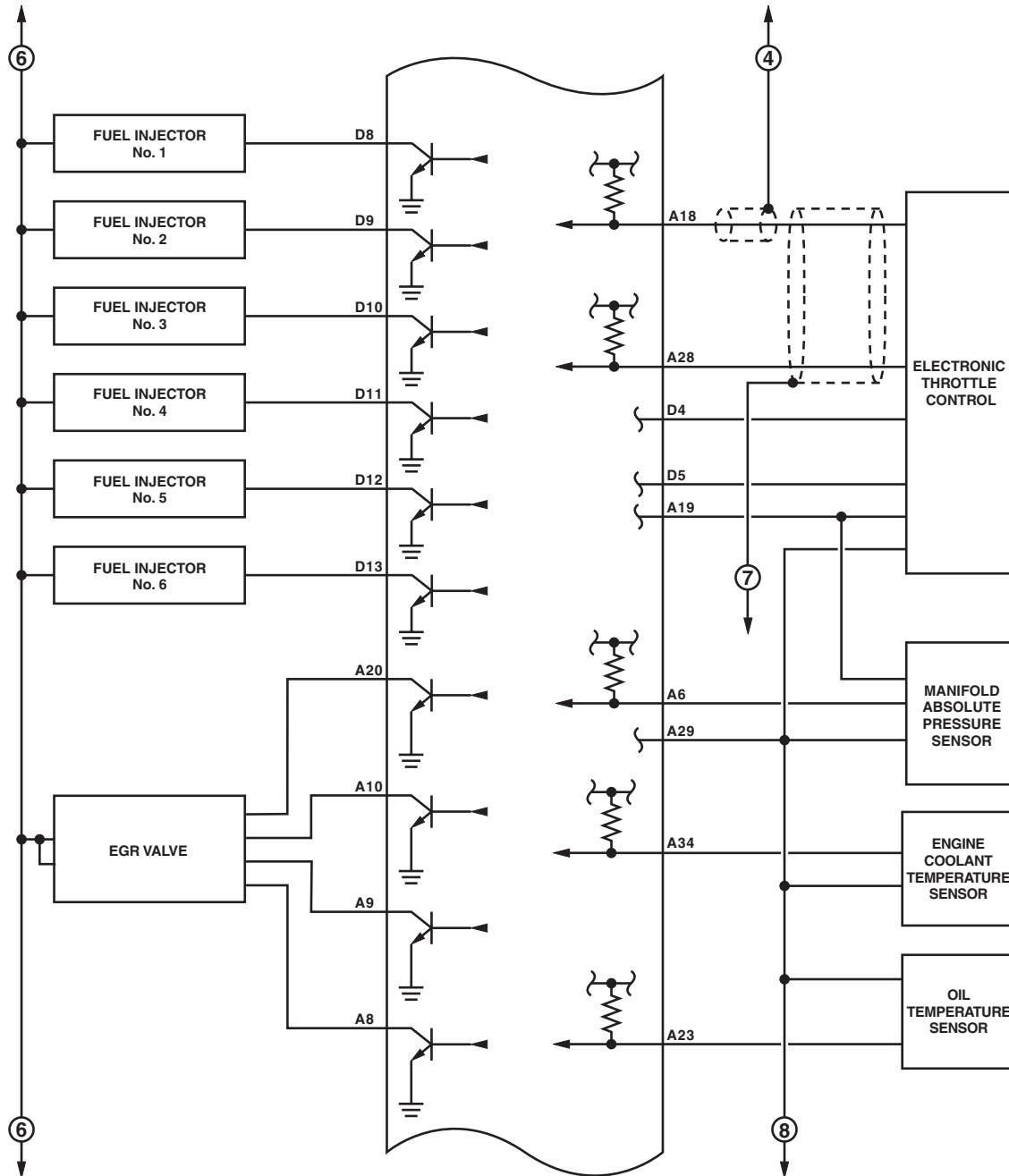
ENGINE (DIAGNOSTICS)



EN-06937

Engine Control Module (ECM) I/O Signal

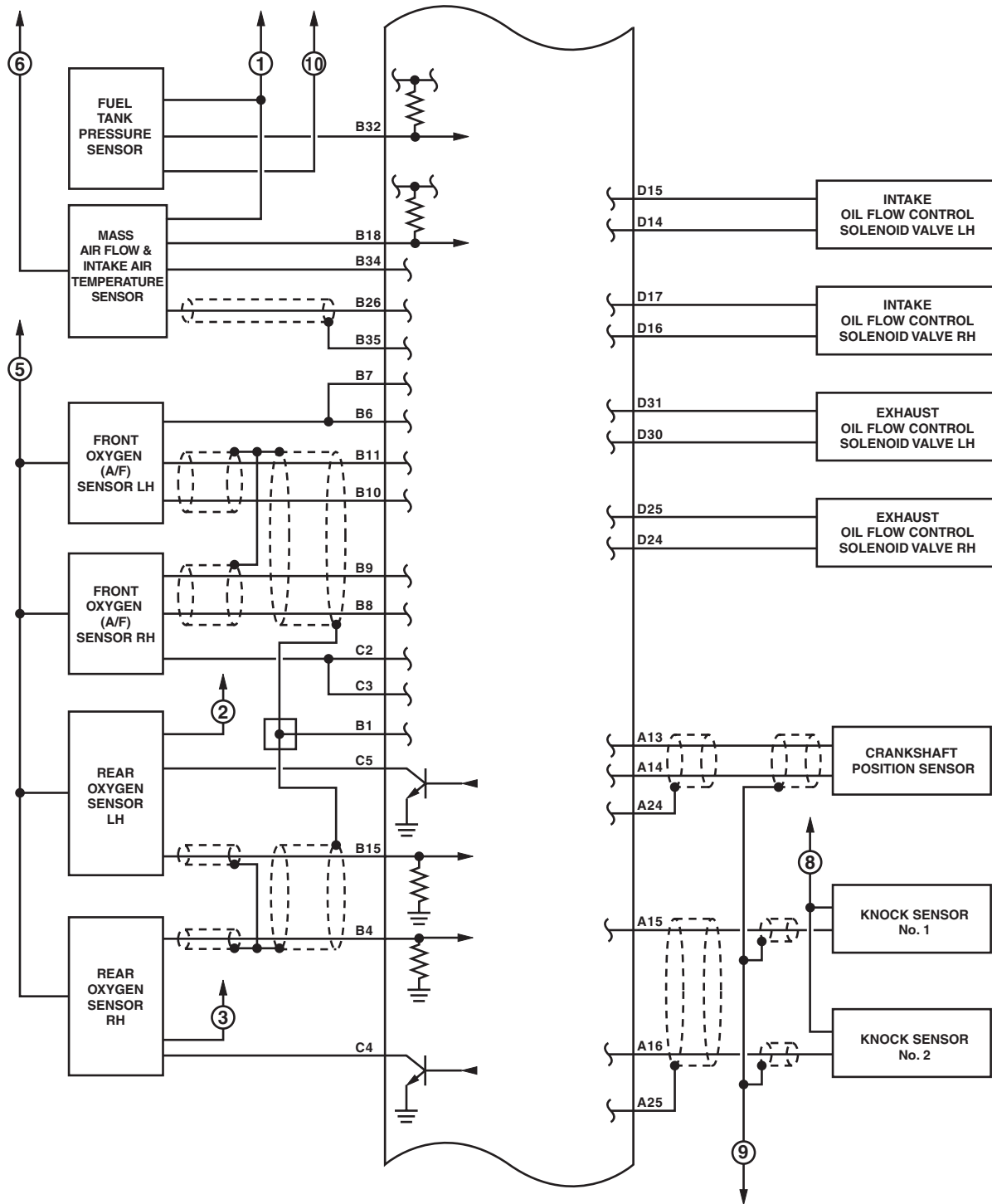
ENGINE (DIAGNOSTICS)



EN-06938

Engine Control Module (ECM) I/O Signal

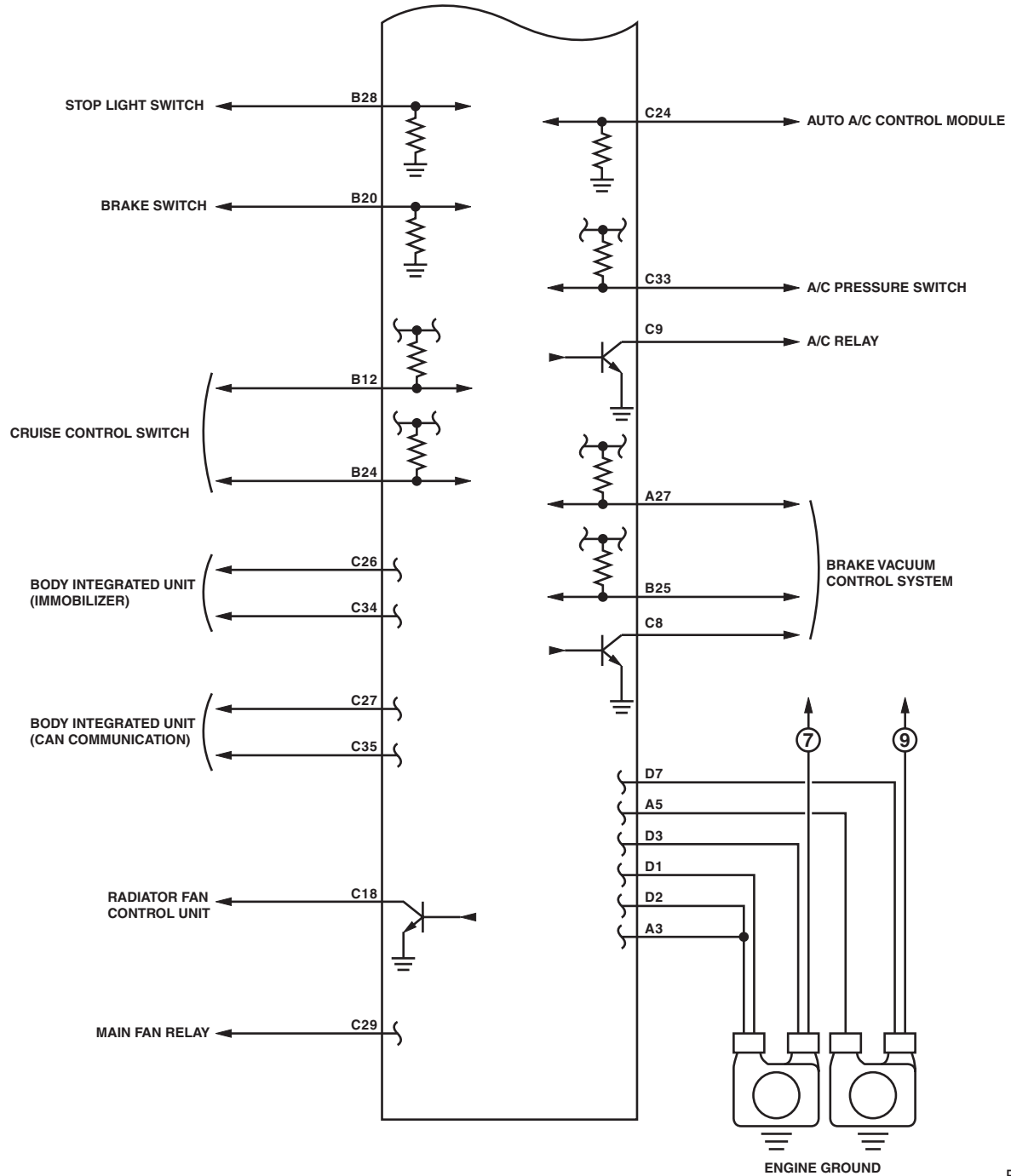
ENGINE (DIAGNOSTICS)



EN-06939

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)



EN-06940