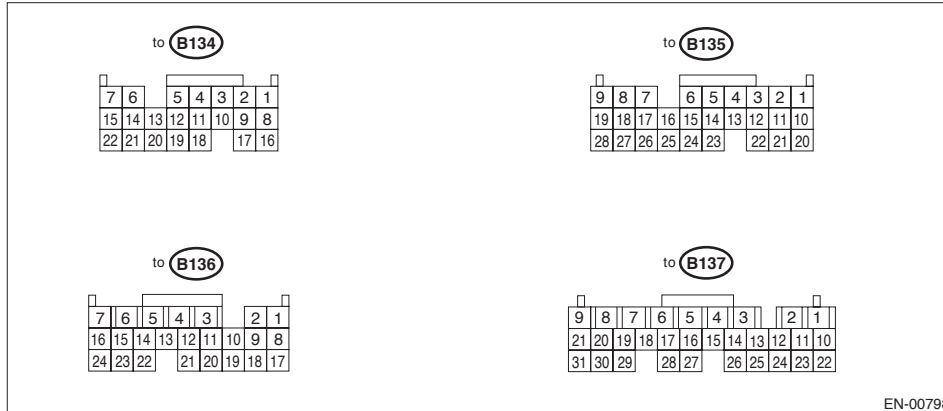


**ENGINE CONTROL MODULE (ECM) I/O SIGNAL**

ENGINE (DIAGNOSTICS)

**5. Engine Control Module (ECM) I/O Signal  
A: ELECTRICAL SPECIFICATION**

EN-00798

Content	Connector No.	Terminal No.	Signal (V)		Note		
			Ignition SW ON (Engine OFF)	Engine ON (Idling)			
Crankshaft position sensor	Signal (+)	B135	2	0	Sensor output waveform <Ref. to EN(H6DO)-30, WAVEFORM, MEASUREMENT, Engine Control Module (ECM) I/O Signal.>		
	Signal (-)	B135	11	0			
	Shield	B135	21	0		0	
Camshaft position sensor	Signal (+)	B135	1	0	Sensor output waveform <Ref. to EN(H6DO)-30, WAVEFORM, MEASUREMENT, Engine Control Module (ECM) I/O Signal.>		
	Signal (-)	B135	10	0		0	
Throttle position sensor	Signal	B135	7	Fully closed: 0.3 – 0.8 Fully open: 4.2 – 4.7	0.3 – 0.8	—	
	Power supply	B135	9	5	5	—	
	GND (sensor)	B135	19	0	0	—	
Rear oxygen sensor	Signal	B135	17	0 – 0.5	0 – 0.9	—	
	Shield	B135	26	0	0	—	
Front oxygen (A/F) sensor heater	Signal	LH1	B137	7	—	—	—
		LH2	B137	6	—	—	—
		RH1	B137	5	—	—	—
		RH2	B137	4	—	—	—
Rear oxygen sensor heater signal	B136	13	—	—	—	—	
Vehicle speed signal	B134	1	0 or 5	0 or 5	“5” and “0” are repeatedly displayed when vehicle is driven.		

**EN(H6DO)-26**

**ENGINE CONTROL MODULE (ECM) I/O SIGNAL**

ENGINE (DIAGNOSTICS)

Content			Con- nector No.	Termi- nal No.	Signal (V)		Note
					Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Engine cool- ant tempera- ture sensor	Signal		B135	18	—	—	After warm-up the engine.
	GND (sensor)		B134	7 15	0	0	After warm-up the engine.
Generator signal			B137	12	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 10 — 13	Waveform
Starter switch			B134	16	0	0	Cranking: 9 — 12
A/C switch			B134	2	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch			B134	5	10 — 13	13 — 14	—
Neutral position switch			B134	8	ON: 0 OFF: 5		Switch is ON when shift is in "N" or "P" position.
Test mode connector			B134	14	5	5	When connected: 0
Knock sen- sor	Signal	1	B135	4	2.5	2.5	—
		2		13	2.5	2.5	—
	Shield		B135	22	0	0	—
Back-up power supply			B137	10	10 — 13	13 — 14	Ignition switch "OFF": 10 — 13
Control unit power supply			B137	2	10 — 13	13 — 14	—
				3	10 — 13	13 — 14	—
Sensor power supply			B135	9	5	5	—
Line end check 1			B134	10	0	0	—
Ignition con- trol	#1		B136	24	0	—	Waveform
	#2		B136	23	0	—	Waveform
	#3		B136	22	0	—	Waveform
	#4		B136	21	0	—	Waveform
	#5		B136	20	0	—	Waveform
	#6		B136	19	0	—	Waveform
Fuel injector	#1		B137	1	10 — 13	1 — 14	Waveform
	#2		B136	6	10 — 13	1 — 14	Waveform
	#3		B136	5	10 — 13	1 — 14	Waveform
	#4		B136	4	10 — 13	1 — 14	Waveform
	#5		B136	3	10 — 13	1 — 14	Waveform
	#6		B136	1	10 — 13	1 — 14	Waveform
Idle air con- trol solenoid valve	Signal		B136	10	10 — 13	—	Waveform
Fuel pump controller		Signal	B135	12	—	—	—
			B136	15	—	—	—
A/C relay control			B137	27	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1 control			B137	17	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 2 control			B137	28	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only
Radiator fan relay 3 control			B137	24	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Self-shutoff control			B134	6	10 — 13	13 — 14	—
Malfunction indicator lamp			B137	15	—	—	Light "ON": 1, or less Light "OFF": 10 — 14
Engine speed output			B136	9	—	0 — 13	Waveform

**EN(H6DO)-27**

**ENGINE CONTROL MODULE (ECM) I/O SIGNAL****ENGINE (DIAGNOSTICS)**

Content	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Torque control 1 signal	B134	19	5	5	—
Torque control 2 signal	B134	18	5	5	—
Torque control cut signal	B136	14	8	8	—
EGR solenoid valve (A-)	B137	26	10 — 13	13 — 14	—
EGR solenoid valve (B-)	B137	25	10 — 13	13 — 14	—
EGR solenoid valve (A+)	B137	14	10 — 13	13 — 14	—
EGR solenoid valve (B+)	B137	13	10 — 13	13 — 14	—
Induction control solenoid valve	B137	23	0	ON: 0 OFF: 13 — 14	—
Purge control solenoid valve	B137	16	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Fuel temperature sensor	B135	6	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (75°F)
Fuel level sensor	B135	25	0.12 — 4.75	0.12 — 4.75	—
Fuel tank pressure sensor	Signal	B135	15	2.3 — 2.7	The value obtained after the fuel filler cap was removed once and recapped.
	GND (sensor)	B134	15	0	
Fuel tank pressure control solenoid valve	B137	22	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Fuel tank sensor control valve	B136	7	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Drain valve	B137	11	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
A/C compressor switch	B134	13	—	—	—
A/C pressure switch	B135	23	OFF: 5	ON: 1, or less OFF: 5	—
AT diagnosis input signal	B135	20	Less than 1 ↔ More than 4	Less than 1 ↔ More than 4	Waveform
AT load signal	B135	28	4.3 — 4.4	0.9 — 1.4	—
Small light switch	B134	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Blower fan switch	B134	9	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Rear defogger switch	B134	3	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Front oxygen (A/F) sensor signal RH (+)	B137	29	3.7 — 3.9	3.7 — 3.9	—
Front oxygen (A/F) sensor signal RH (-)	B137	19	2.6 — 4.4	3.4 — 3.6	—
Front oxygen (A/F) sensor signal LH (+)	B137	30	3.7 — 3.9	3.7 — 3.9	—
Front oxygen (A/F) sensor signal LH (-)	B137	20	2.6 — 4.4	3.4 — 3.6	—
Front oxygen (A/F) sensor shield	B137	18	0	0	—
Pressure sensor	B135	8	3.0 — 4.2	1.0 — 2.6	—
Intake air temperature sensor	B135	27	—	—	—
Power steering switch	B135	24	ON: 0 OFF: 5	ON: 0 OFF: 5	—
SSM/GST communication line	B134	21	Less than 1 ↔ More than 4	Less than 1 ↔ More than 4	—
GND (sensors)	B134	15	0	0	—

**EN(H6DO)-28**

## ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

Content	Con- nector No.	Termi- nal No.	Signal (V)		Note
			Ignition SW ON (Engine OFF)	Engine ON (Idling)	
GND (injectors)	B136	8	0	0	—
GND (ignition system)	B136	18	0	0	—
GND (power supply)	B134	22	0	0	—
	B136	17	0	0	—
GND (control systems)	B134	7	0	0	—
		15	0	0	—
GND (oxygen sensor heater LH)	1	B137	0	0	—
	2	B137			
GND (oxygen sensor heater RH)	1	B137	0	0	—
	2	B137			

**EN(H6DO)-29**

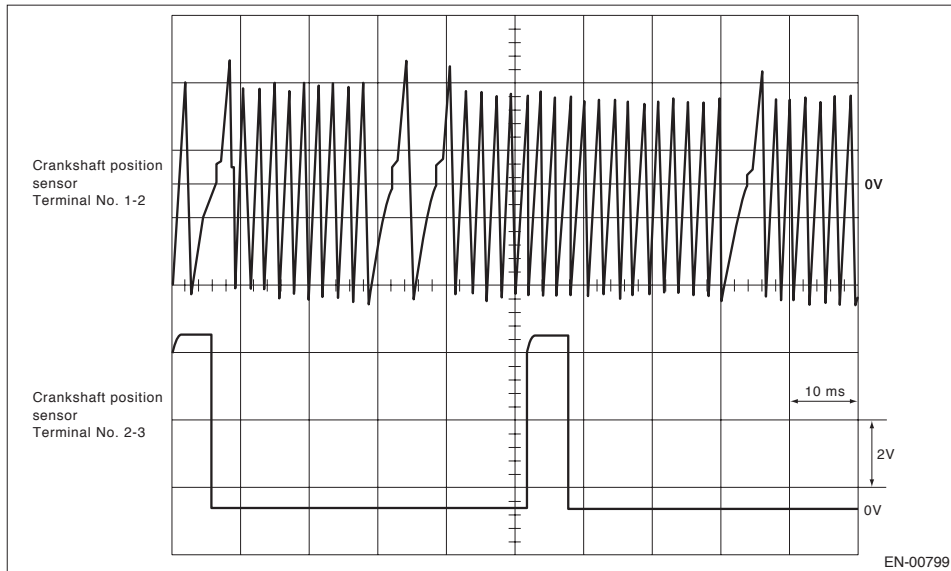
## ENGINE CONTROL MODULE (ECM) I/O SIGNAL

### ENGINE (DIAGNOSTICS)

#### B: MEASUREMENT

Measure input/output signal voltage.

##### 1. WAVEFORM



EN(H6DO)-30

## ENGINE CONDITION DATA

ENGINE (DIAGNOSTICS)

### 6. Engine Condition Data

#### A: ELECTRICAL SPECIFICATION

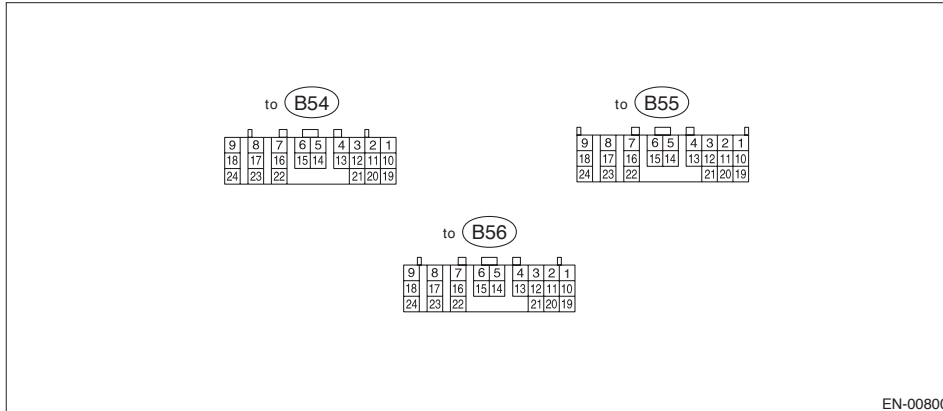
Content	Specified data
Engine load	1.6 — 4.0 (%): Idling
	6.4 — 12.8 (%): 2,500 rpm racing

Measuring condition:

- After warm-up the engine.
- Gear position is in "N" or "P" position.
- A/C is turned OFF.
- All accessory switches are turned OFF.

**TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL**  
ENGINE (DIAGNOSTICS)

**7. Transmission Control Module (TCM) I/O Signal**  
**A: ELECTRICAL SPECIFICATION**



EN-00800

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Back-up power supply	B56	1	Ignition switch OFF	10 – 16	—
Ignition power supply	B54	23	Ignition switch ON (with engine OFF)	10 – 16	—
	B54	24			
Inhibitor switch	"P" range switch	B55	1	Select lever in "P" range	Less than 1
				Select lever in any other than "P" range (except "N" range)	More than 8
	"N" range switch	B55	14	Select lever in "N" range	Less than 1
				Select lever in any other than "N" range (except "P" range)	More than 8
	"R" range switch	B55	3	Select lever in "R" range	Less than 1
				Select lever in any other than "R" range	More than 8
	"D" range switch	B55	4	Select lever in "D" range	Less than 1
Select lever in any other than "D" range				More than 8	
"3" range switch	B55	5	Select lever in "3" range	Less than 1	
			Select lever in any other than "3" range	More than 8	
"2" range switch	B55	6	Select lever in "2" range	Less than 1	
			Select lever in any other than "2" range	More than 8	
"1" range switch	B55	7	Select lever in "1" range	Less than 1	
			Select lever in any other than "1" range	More than 8	
Brake switch	B55	12	Brake pedal depressed.	More than 10.5	
			Brake pedal released.	Less than 1	

## TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
VDC communication signal +	B56	9	Ignition ON	(+) – (–) Plus signal	–
VDC communication signal –	B56	18		(+) – (–) Plus signal	–
Kick-down switch	B55	11	Throttle fully opened.	Less than 1	–
			Throttle fully closed.	More than 6.5	
AT OIL TEMP warning light	B56	10	Light ON	Less than 1	–
			Light OFF	More than 9	
Throttle position sensor	B54	3	Throttle fully closed.	0.3 – 0.7	–
			Throttle fully open.	4.3 – 4.9	
Throttle position sensor power supply	B54	2	Ignition switch ON (With engine OFF)	4.8 – 5.3	–
ATF temperature sensor	B54	11	ATF temperature 20°C (68°F)	2.9 – 4.0	2.1 – 2.9 k
			ATF temperature 80°C (176°F)	0.5 – 0.8	275 – 375
Rear vehicle speed sensor	B55	24	Vehicle stopped.	0	450 – 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Front vehicle speed sensor	B55	18	Vehicle stopped.	0	450 – 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range) 4	
Torque converter turbine speed sensor	B55	8	Engine idling after warm-up. (D range)	0	450 – 650
			Engine idling after warm-up. (N range)	More than 1 (AC range)	
Vehicle speed output signal	B56	17	Vehicle speed at most 10 km/h (6 MPH)	Less than 1 ← → More than 4	–
Engine speed signal	B55	17	Ignition switch ON (with engine OFF)	More than 10.5	–
			Ignition switch ON (with engine ON)	8 – 11	
Cruise set signal	B55	22	When cruise control is set (SET lamp ON)	Less than 1	–
			When cruise control is not set (SET lamp OFF)	More than 6.5	
Torque control signal 1	B56	5	Ignition switch ON (with engine ON)	More than 4.8	–
Torque control signal 2	B56	14	Ignition switch ON (with engine ON)	More than 4.8	–
Torque control cut signal	B55	10	Ignition switch ON	8	–
Intake manifold pressure signal	B54	10	Engine idling after warm-up.	1.2 – 1.8	–
Shift solenoid 1	B54	22	1st or 4th gear	More than 9	10 – 16
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B54	5	1st or 2nd gear	More than 9	10 – 16
			3rd or 4th gear	Less than 1	
Line pressure duty solenoid	B54	9	Throttle fully closed (with engine OFF) after warm-up.	1.5 – 4.0	2.0 – 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	



**TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL**  
ENGINE (DIAGNOSTICS)

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Dropping resistor	B54	8	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	9 – 15
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
Lock-up duty solenoid	B54	7	When lock up occurs.	More than 8.5	10 – 17
			When lock up is released.	Less than 0.5	
Transfer duty solenoid	B54	6	Fuse on FWD switch	More than 8.5	10 – 17
			Fuse removed from FWD switch (with throttle fully open and with select lever in 1st gear).	Less than 0.5	
2-4 brake duty solenoid	B54	18	Throttle fully closed (with engine OFF) after warm-up.	1.5 – 4.0	2.0 – 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake dropping resistor	B54	17	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	9 – 15
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake timing solenoid	B54	16	1st gear	Less than 1	10 – 16
			3rd gear	More than 9	
Low clutch timing solenoid	B54	15	2nd gear	Less than 1	10 – 16
			4th gear	More than 9	
Sensor ground line 1	B54	19	—	0	Less than 1
Sensor ground line 2	B55	9	—	0	Less than 1
System ground line	B56	19	—	0	Less than 1
	B54	20			
AT diagnosis signal	B56	21	Ignition switch ON	Less than 1 ← → More than 4	—
Data link signal (Subaru Select Monitor)	B56	15	—	—	—
		6	—	—	—

## DATA LINK CONNECTOR

ENGINE (DIAGNOSTICS)

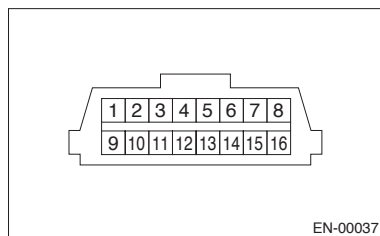
### 8. Data Link Connector

#### A: NOTE

- 1) This connector is used both for OBD-II general scan tools and the Subaru Select Monitor.
- 2) Terminal No. 4 to No. 6 of the data link connector is used for the Subaru Select Monitor signal.

#### CAUTION:

**Do not connect any scan tools other than the OBD-II general scan tools and the Subaru Select Monitor, because the circuit for the Subaru Select Monitor may be damaged.**



EN-00037

(A) Data link connector

Terminal No.	Contents	Terminal No.	Contents
1	Power supply	9	Blank
2	Blank	10	K line of ISO 9141 CARB
3	Blank	11	Blank
4	Blank	12	Ground
5	Blank	13	Ground
6	—	14	Blank
7	Blank	15	Blank
8	—	16	Blank

\*: Circuit only for Subaru Select Monitor