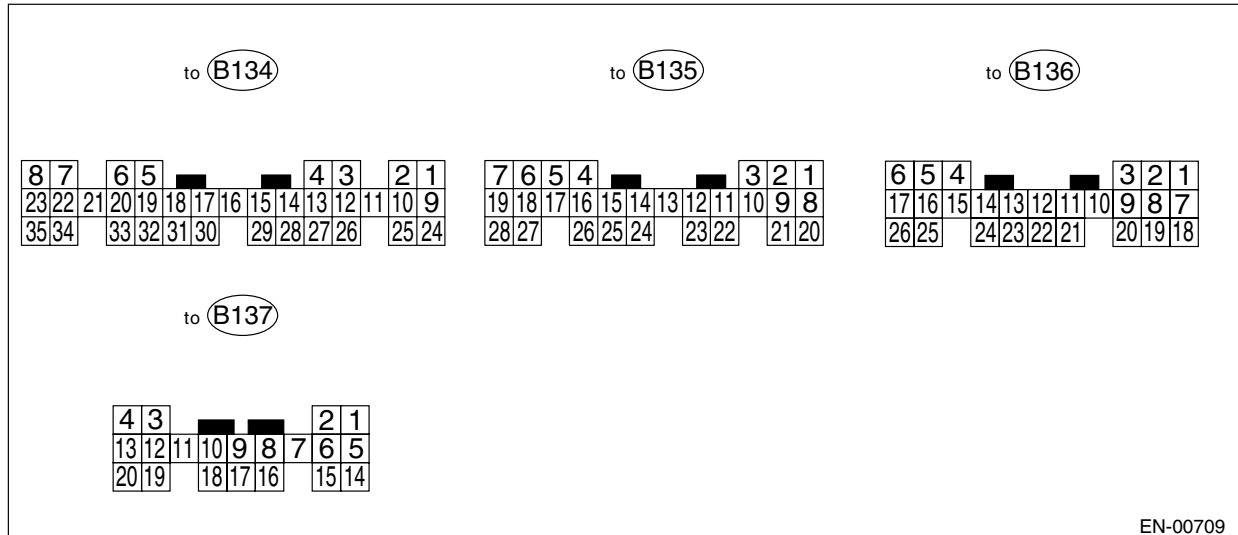


ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

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

A: ELECTRICAL SPECIFICATION



EN-00709

| Content | | Con- nector No. | Termi- nal No. | Signal (V) | | Note |
|---|-------------------|-----------------------|-------------------|--|--------------------|---|
| | | | | Ignition SW ON (Engine OFF) | Engine ON (Idling) | |
| Crank- shaft posi- tion sensor | Signal (+) | B135 | 7 | 0 | -7 — +7 | Sensor output waveform |
| | Signal (-) | B135 | 17 | 0 | 0 | — |
| | Shield | B135 | 28 | 0 | 0 | — |
| Camshaft position sensor | Signal (+) | B135 | 6 | 0 | -7 — +7 | Sensor output waveform |
| | Signal (-) | B135 | 18 | 0 | 0 | — |
| | Shield | B135 | 20 | 0 | 0 | — |
| Throttle position sensor | Signal | B135 | 13 | Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7 | | — |
| | Power supply | B135 | 3 | 5 | 5 | — |
| | GND (sen- sor) | B135 | 19 | 0 | 0 | — |
| Rear oxy- gen sen- sor | Signal | B135 | 14 | 0 | 0 — 0.9 | — |
| | Shield | B137 | 15 | 0 | 0 | — |
| | GND (sen- sor) | B135 | 19 | 0 | 0 | — |
| Front oxy- gen (A/F) sensor heater | Signal 1 | B136 | 6 | 0 — 1.0 | 0 — 1.0 | — |
| | Signal 2 | B136 | 17 | 0 — 1.0 | 0 — 1.0 | — |
| Rear oxygen sensor heater signal | | B136 | 4 | 0 — 1.0 | 0 — 1.0 | — |
| Engine coolant tempera- ture sen- sor | Signal | B135 | 12 | 1.0 — 1.4 | 1.0 — 1.4 | After warm-up the engine. |
| | GND (sen- sor) | B135 | 19 | 0 | 0 | After warm-up the engine. |
| Vehicle speed signal | | B137 | 10 | 0 or 5 | 0 or 5 | "5" and "0" are repeatedly dis- played when vehicle is driven. |
| Starter switch | | B136 | 20 | 0 | 0 | Cranking: 8 — 14 |

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) | | |
| A/C switch | B136 | 11 | ON: 10 — 13 OFF: 0 | ON: 13 — 14 OFF: 0 | — | |
| Ignition switch | B136 | 10 | 10 — 13 | 13 — 14 | — | |
| Neutral position switch (MT) | B136 | 21 | ON: 12±0.5 OFF: 0 | | Switch is ON when gear is in neutral position. | |
| Neutral position switch (AT) | B136 | 21 | ON: 0 OFF: 12±0.5 | | Switch is ON when shift is in "N" or "P" position. | |
| Test mode connector | B136 | 3 | 5 | 5 | When connected: 0 | |
| Knock sensor | Signal | B135 | 16 | 2.8 | 2.8 | — |
| | Shield | B135 | 27 | 0 | 0 | — |
| Back-up power supply | B135 | 9 | 10 — 13 | 13 — 14 | Ignition switch "OFF": 10 — 13 | |
| Control unit power sup- ply | B135 | 1 | 10 — 13 | 13 — 14 | — | |
| | B135 | 2 | 10 — 13 | 13 — 14 | — | |
| Sensor power supply | B135 | 3 | 5 | 5 | — | |
| Ignition control | #1, #2 | B134 | 33 | 0 | 1 — 3.4 | Waveform |
| | #3, #4 | B134 | 32 | 0 | 1 — 3.4 | Waveform |
| Fuel injec- tor | #1 | B134 | 34 | 10 — 13 | 1 — 14 | Waveform |
| | #2 | B134 | 23 | 10 — 13 | 1 — 14 | Waveform |
| | #3 | B134 | 22 | 10 — 13 | 1 — 14 | Waveform |
| | #4 | B134 | 8 | 10 — 13 | 1 — 14 | Waveform |
| Idle air control solenoid valve | Signal 1 | B134 | 20 | — | 1 — 13 | Waveform |
| | Signal 2 | B134 | 6 | — | 1 — 13 | Waveform |
| | Signal 3 | B134 | 5 | — | 1 — 13 | Waveform |
| | Signal 4 | B134 | 19 | — | 1 — 13 | Waveform |
| Fuel pump relay control | B134 | 11 | ON: 0.5, or less OFF: 10 — 13 | 0.5, or less | — | |
| A/C relay control | B134 | 9 | ON: 0.5, or less OFF: 10 — 13 | ON: 0.5, or less OFF: 13 — 14 | — | |
| Radiator fan relay 1 control | B134 | 14 | ON: 0.5, or less OFF: 10 — 13 | ON: 0.5, or less OFF: 13 — 14 | — | |
| Radiator fan relay 2 control | B134 | 13 | ON: 0.5, or less OFF: 10 — 13 | ON: 0.5, or less OFF: 13 — 14 | With A/C vehicles only | |
| Self-shutoff control | B136 | 12 | 10 — 13 | 13 — 14 | — | |
| Malfunction indicator lamp | B134 | 28 | — | — | Light "ON": 1, or less Light "OFF": 10 — 14 | |
| Engine speed output | B134 | 10 | — | 0 — 13, or more | Waveform | |
| Torque control 1 signal | B136 | 1 | 5 | 5 | — | |
| Torque control 2 signal | B136 | 18 | 5 | 5 | — | |
| Torque control cut sig- nal | B136 | 15 | 8 | 8 | — | |
| Purge control solenoid valve | B134 | 29 | ON: 1, or less OFF: 10 — 13 | ON: 1, or less OFF: 13 — 14 | — | |
| Fuel temperature sen- sor | B137 | 5 | 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 | 26 | 2.3 — 2.7 | 2.3 — 2.7 | The value obtained after the fuel filler cap was removed once and recapped. |
| | Power supply | B135 | 3 | 5 | 5 | — |
| | GND (sen- sor) | B135 | 19 | 0 | 0 | — |

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

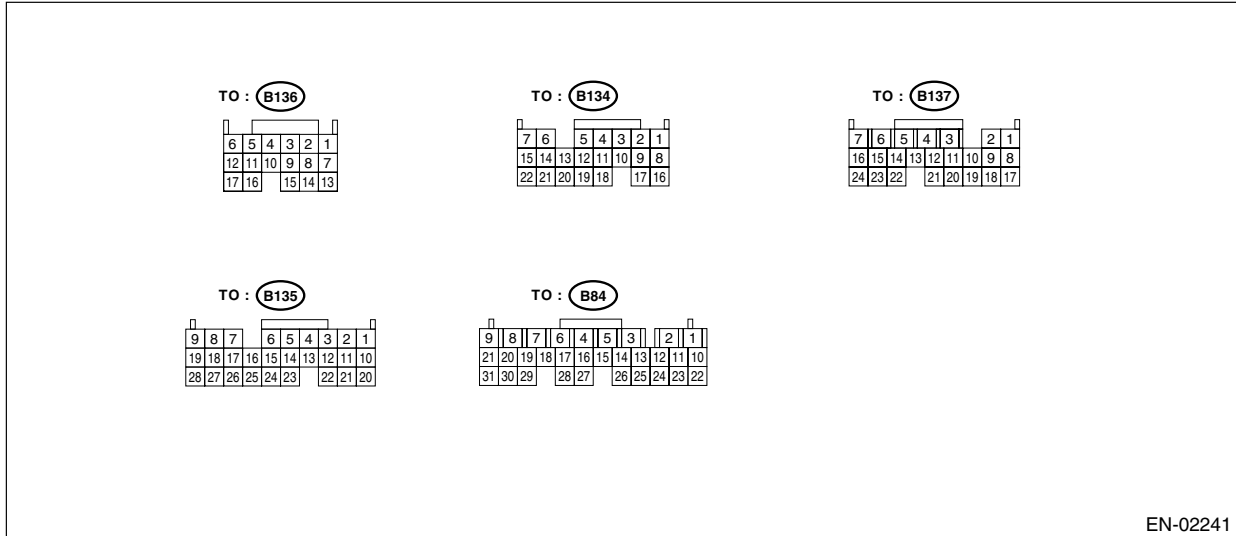
| Content | Con- nector No. | Termi- nal No. | Signal (V) | | Note | |
|---|-----------------------|-------------------|--------------------------------|--------------------------------|--|---|
| | | | Ignition SW ON (Engine OFF) | Engine ON (Idling) | | |
| Pressure control sole- noid valve | B134 | 4 | ON: 1, or less OFF: 10 — 13 | ON: 1, or less OFF: 13 — 14 | — | |
| Drain valve | B134 | 3 | ON: 1, or less OFF: 10 — 13 | ON: 1, or less OFF: 13 — 14 | — | |
| Fuel tank sensor control valve | B134 | 1 | ON: 1, or less OFF: 10 — 13 | ON: 1, or less OFF: 13 — 14 | — | |
| EGR sole- noid valve | Signal 1 | B134 | 18 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| | Signal 2 | B134 | 17 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| | Signal 3 | B134 | 16 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| | Signal 4 | B134 | 15 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| AT diagnosis input sig- nal | B137 | 19 | Less than 1 ←→ More than 4 | Less than 1 ←→ More than 4 | Waveform | |
| Small light switch | B137 | 20 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — | |
| Blower fan switch | B137 | 13 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — | |
| Rear defogger switch | B137 | 4 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — | |
| Front oxygen (A/F) sen- sor signal 1 | B136 | 13 | — | 2.05 — 2.25 | — | |
| Front oxygen (A/F) sen- sor signal 2 | B136 | 22 | — | 1.75 — 1.95 | — | |
| Pressure sensor | B135 | 15 | 4.0 — 4.8 | 1.1 — 1.9 | — | |
| Intake air temperature sensor | B137 | 6 | 3.15 — 3.33 | 3.15 — 3.33 | Intake air temperature: 25°C (75°F) | |
| SSM/GST communica- tion line | B137 | 16 | Less than 1 ←→ More than 4 | Less than 1 ←→ More than 4 | — | |
| GND (sensors) | B135 | 19 | 0 | 0 | — | |
| GND (injectors) | B134 | 35 | 0 | 0 | — | |
| GND (ignition system) | B136 | 26 | 0 | 0 | — | |
| GND (power supply) | B134 | 7 | 0 | 0 | — | |
| GND (control systems) | B137 | 14 | 0 | 0 | — | |
| | B135 | 21 | 0 | 0 | — | |
| GND (oxygen sensor heater 1) | B136 | 5 | 0 | 0 | — | |
| GND (oxygen sensor heater 2) | B136 | 16 | 0 | 0 | — | |

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

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

A: ELECTRICAL SPECIFICATION



EN-02241

| Content | | Con- nector No. | Terminal No. | Signal (V) | | Note |
|--------------------------------------|-----------------|-----------------------|-----------------|--------------------------------------|---|--|
| | | | | Ignition SW ON (Engine OFF) | Engine ON (Idling) | |
| Crank- shaft posi- tion sensor | Signal (+) | B135 | 1 | 0 | -7 to +7 | Sensor output waveform |
| | Signal (-) | B135 | 10 | 0 | 0 | — |
| | Shield | B135 | 20 | 0 | 0 | — |
| Camshaft position sensor | Signal (+) | B135 | 2 | 0 | -7 to +7 | Sensor output waveform |
| | Signal (-) | B135 | 11 | 0 | 0 | — |
| | Shield | B135 | 20 | 0 | 0 | — |
| Electric throttle | Main | B136 | 3 | 0.64 — 0.72 Fully opened: 3.96 | 0.64 — 0.72 (After engine warm- up) | Fully closed: 0.6 Fully opened: 3.96 |
| | Sub | B136 | 9 | 1.51 — 1.58 Fully opened: 4.17 | 1.51 — 1.58 (After engine warm- up) | Fully closed: 1.48 Fully opened: 4.17 |
| | Power supply | B135 | 9 | 5 | 5 | — |
| | GND | B135 | 9 | 0 | 0 | — |
| Electric throttle motor (+) | | B134 | 15 | Duty waveform | Duty waveform | Driving frequency: 500Hz |
| Electric throttle motor (-) | | B134 | 22 | Duty waveform | Duty waveform | Driving frequency: 500Hz |
| Electric throttle motor power supply | | B134 | 1 | 10 — 13 | 13 — 14 | — |
| Electric throttle motor relay | | B137 | 24 | ON: 010 OFF: — 13 | ON: 0 OFF: 13 — 14 | When ignition switch is ON: ON |
| Accelerator position sensor | Main | B136 | 2 | Fully closed: 1 Fully opened: 3.5 | Fully closed: 1 Fully opened: 3.5 | — |
| | Sub | B136 | 8 | Fully closed: 1 Fully opened: 3.5 | Fully closed: 1 Fully opened: 3.5 | — |
| | Power supply | B135 | 8 | 5 | 5 | — |
| | GND | B135 | 18 | 0 | 0 | — |

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

| Content | | Con- nector No. | Terminal No. | Signal (V) | | Note |
|---|------------|-----------------------|-----------------|--|--------------------|---------------------------|
| | | | | Ignition SW ON (Engine OFF) | Engine ON (Idling) | |
| Front oxy- gen (A/F) sensor RH | Signal (+) | B84 | 29 | 2.8 — 3.2 | 2.8 — 3.2 | — |
| | Signal (-) | B84 | 19 | 2.4 — 2.7 | 2.4 — 2.7 | — |
| | Shield | B84 | 18 | 0 | 0 | |
| Front oxy- gen (A/F) sensor heater RH | Signal 1 | B84 | 5 | 0 — 1.0 | — | Sensor output waveform |
| | Signal 2 | B84 | 4 | 0 — 1.0 | — | Sensor output waveform |
| Front oxy- gen (A/F) sensor LH | Signal (+) | B84 | 30 | 2.8 — 3.2 | 2.8 — 3.2 | — |
| | Signal (-) | B84 | 20 | 2.4 — 2.7 | 2.4 — 2.7 | — |
| | Shield | B84 | 18 | 0 | 0 | |
| Front oxy- gen (A/F) sensor heater LH | Signal 1 | B84 | 7 | 0 — 1.0 | — | Sensor output waveform |
| | Signal 2 | B84 | 6 | 0 — 1.0 | — | Sensor output waveform |
| Front oxy- gen sen- sor RH | Signal | B135 | 7 | 0 | 0 — 0.9 | — |
| | Shield | B135 | 25 | 0 | 0 | — |
| Front oxygen sensor heater RH signal | | B136 | 17 | 0 — 1.0 | — | Sensor output waveform |
| Front oxy- gen sen- sor LH | Signal | B135 | 17 | 0 | 0 — 0.9 | — |
| | Shield | B135 | 25 | 0 | 0 | — |
| Front oxygen sensor heater LH signal | | B136 | 16 | 0 — 1.0 | — | Sensor output waveform |
| Rear oxy- gen sen- sor | Signal | B135 | 26 | 0 | 0 — 0.9 | — |
| | Shield | B135 | 25 | 0 | 0 | — |
| Rear oxygen sensor heater signal | | B136 | 4 | 0 — 1.0 | — | Sensor output waveform |
| GND (Front oxygen (A/ F) sensor heater RH 1) | | B84 | 9 | 0 | 0 | — |
| GND (Front oxygen (A/ F) sensor heater RH 2) | | B84 | 8 | 0 | 0 | — |
| GND (Front oxygen (A/ F) sensor heater LH 1) | | B84 | 31 | 0 | 0 | — |
| GND (Front oxygen (A/ F) sensor heater LH 2) | | B84 | 21 | 0 | 0 | — |
| Engine coolant temper- ature sensor | | B135 | 28 | 1.0 — 1.4 | 1.0 — 1.4 | After warm-up the engine. |
| Mass air flow sen- sor | Signal | B136 | 1 | — | 0.3 — 4.5 | — |
| | Shield | B136 | 13 | 0 | 0 | — |
| | GND | B136 | 7 | 0 | 0 | — |
| Intake air temperature sensor signal | | B135 | 27 | 0.3 — 4.6 | 0.3 — 4.6 | — |
| EGR sole- noid valve | Signal 1 | B136 | 5 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| | Signal 2 | B136 | 6 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| | Signal 3 | B136 | 11 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| | Signal 4 | B136 | 12 | 0 or 10 — 13 | 0 or 10 — 13 | — |
| Tumble generator valve position sensor | | B135 | 3 | Fully closed: 3.8 — 4.9 Fully opened: 0.2 — 0.9 | | — |
| Tumble generator valve (open) | | B137 | 20 | 0 or 10 — 13 | 0 or 13 — 14 | Sensor output waveform |

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

| Content | Con- nector No. | Terminal No. | Signal (V) | | Note | |
|-----------------------------------|-----------------------|-----------------|---------------------------------|---------------------------------|---|----------|
| | | | Ignition SW ON (Engine OFF) | Engine ON (Idling) | | |
| Tumble generator valve (close) | B137 | 11 | 0 or 10 — 13 | 0 or 13 — 14 | Sensor output waveform | |
| Vehicle speed signal | B134 | 14 | 0 or 5 | 0 or 5 | "5" and "0" are repeatedly displayed when vehicle is driven. | |
| Starter switch | B134 | 2 | 0 | 0 | Cranking: 8 — 14 | |
| A/C switch | B134 | 9 | ON: 10 — 13 OFF: 0 | ON: 13 — 14 OFF: 0 | — | |
| Ignition switch | B134 | 13 | 10 — 13 | 13 — 14 | — | |
| Neutral position switch | MT | B134 | ON: 12±0.5 OFF: 0 | | Switch is ON when gear is in neutral position. | |
| | AT | B134 | ON: 0 OFF: 12±0.5 | | Switch is ON when shift is in "N" or "P" position. | |
| Test mode connector | B135 | 22 | 10 — 13 | 13 — 14 | When connected: 0 | |
| Knock sensor | Signal | B135 | 2.8 | 2.8 | — | |
| | Shield | B135 | 0 | 0 | — | |
| Back-up power supply | B84 | 10 | 10 — 13 | 13 — 14 | Ignition switch "OFF": 10 — 13 | |
| Control unit power supply | B84 | 3 | 10 — 13 | 13 — 14 | — | |
| | B84 | 2 | 10 — 13 | 13 — 14 | — | |
| Sensor power supply | B135 | 9 | 5 | 5 | — | |
| Ignition control | #1, #2 | B137 | 0 | 1 — 3.4 | Waveform | |
| | #3, #4 | B137 | 0 | 1 — 3.4 | Waveform | |
| | GND | B137 | 18 | 0 | — | |
| Fuel injec- tor | #1 | B137 | 6 | 10 — 13 | 1 — 14 | Waveform |
| | #2 | B137 | 5 | 10 — 13 | 1 — 14 | Waveform |
| | #3 | B137 | 4 | 10 — 13 | 1 — 14 | Waveform |
| | #4 | B137 | 3 | 10 — 13 | 1 — 14 | Waveform |
| | GND | B137 | 8 | 0 | 0 | — |
| Fuel pump relay control | B137 | 7 | ON: 0.5 or less OFF: 10 — 13 | 0.5 or less | — | |
| A/C relay control | B137 | 23 | ON: 0.5 or less OFF: 10 — 13 | ON: 0.5 or less OFF: 13 — 14 | — | |
| Starter relay control | B137 | 16 | ON: 0.5 or less OFF: 10 — 13 | ON: 0.5 or less OFF: 13 — 14 | — | |
| Fan control 1 | B84 | 17 | ON: 0.5 or less OFF: 10 — 13 | ON: 0.5 or less OFF: 13 — 14 | — | |
| Fan control 2 | B84 | 28 | ON: 0.5 or less OFF: 10 — 13 | ON: 0.5 or less OFF: 13 — 14 | Models with A/C | |
| Self-shutoff control | B137 | 2 | 10 — 13 | 13 — 14 | — | |
| Malfunction indicator light | B137 | 22 | — | — | Light "ON": 1 or less Light "OFF": 10 — 14 | |
| Purge control solenoid valve | B84 | 16 | ON: 1 or less OFF: 10 — 13 | ON: 1 or less OFF: 13 — 14 | — | |
| Power steering switch | B135 | 24 | ON: 1 or less OFF: 10 — 13 | ON: 1 or less OFF: 13 — 14 | — | |
| Fuel tank sensor control valve | B137 | 21 | ON: 1 or less OFF: 10 — 13 | ON: 1 or less OFF: 10 — 13 | — | |
| Fuel temperature sensor | B135 | 6 | 2.5 — 3.8 | 2.5 — 3.8 | Ambient temperature: 25°C (75°F) | |
| Fuel level sensor | B135 | 15 | 0.12 — 4.75 | 0.12 — 4.75 | — | |
| Fuel tank pressure sensor | B135 | 14 | 2.3 — 2.7 | 2.3 — 2.7 | The valve obtained after the fuel filler cap was removed once and recapped. | |

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

| Content | Con- nector No. | Terminal No. | Signal (V) | | Note |
|--|-----------------------|-----------------|---|---|----------|
| | | | Ignition SW ON (Engine OFF) | Engine ON (Idling) | |
| Pressure control sole- noid valve | B84 | 22 | ON: 1 or less OFF: 10 — 13 | ON: 1 or less OFF: 13 — 14 | — |
| Drain valve | B84 | 11 | ON: 1 or less OFF: 10 — 13 | ON: 1 or less OFF: 13 — 14 | — |
| Cruise control set light | B84 | 27 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — |
| Main light | B84 | 15 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — |
| Clutch switch | B134 | 12 | When clutch pedal is depressed: 0 When clutch pedal is released: 10 — 13 | When clutch pedal is depressed: 0 When clutch pedal is released: 13 — 14 | — |
| SET/COAST switch | B84 | 14 | ON: 10 — 13 OFF: 0 | ON: 13 — 14 OFF: 0 | — |
| Brake switch 1 | B84 | 25 | 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 | B84 | 24 | 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 | — |
| RESUME/ACCEL switch | B84 | 26 | ON: 10 — 13 OFF: 0 | ON: 13 — 14 OFF: 0 | — |
| Main switch | B84 | 13 | ON: 10 — 13 OFF: 0 | ON: 13 — 14 OFF: 0 | — |
| AT diagnosis input sig- nal | B134 | 4 | Less than 1 ↔ More than 4 | Less than 1 ↔ More than 4 | Waveform |
| Small light switch | B134 | 20 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — |
| Blower fan switch | B134 | 17 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — |
| Rear defogger switch | B135 | 21 | ON: 0 OFF: 10 — 13 | ON: 0 OFF: 13 — 14 | — |
| Manifold absolute pres- sure sensor | B135 | 23 | 4.0 — 4.8 | 1.1 — 1.9 | — |
| SSM/GST communica- tion line | B134 | 19 | Less than 1 ↔ More than 4 | Less than 1 ↔ More than 4 | — |
| GND (sensors) | B135 | 19 | 0 | 0 | — |
| GND (power supply) | B84 | 1 | 0 | 0 | — |
| | B137 | 17 | 0 | 0 | — |
| GND (control systems) | B137 | 1 | 0 | 0 | — |
| | B134 | 7 | 0 | 0 | — |

ENGINE CONDITION DATA

ENGINE (DIAGNOSTICS)

6. Engine Condition Data

A: ELECTRICAL SPECIFICATION

| Content | Specified data |
|-------------|----------------------------------|
| Engine load | 1.9 — 3.2 (%): Idling |
| | 6.0 — 12.8 (%): 2,500 rpm racing |

Measuring condition:

- After the engine is warmed-up.
- Gear position is in “N” or “P” range.
- A/C is turned OFF.
- All accessory switches are turned OFF.