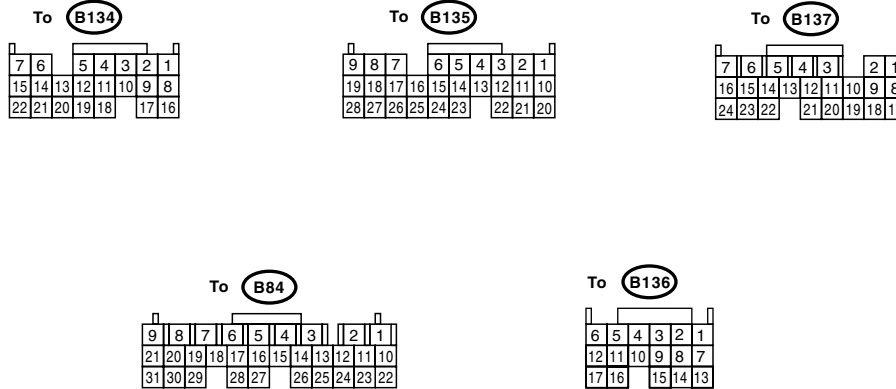


# ENGINE CONTROL MODULE (ECM) I/O SIGNAL

ENGINE (DIAGNOSTICS)

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

### A: ELECTRICAL SPECIFICATION



EN-01286

| Content   |                   | Con-<br>nector<br>No. | Termi-<br>nal No. | Signal (V)   |                    | Note  |
|---|-------------------|-----------------------|-------------------|--|--------------------|---|
|   |                   |                       |                   | Ignition SW ON<br>(Engine OFF)                     | Engine ON (Idling) |   |
| Crank-<br>shaft po-<br>sition sensor              | Signal (+)        | B135                  | 2                 | 0  | -7 — +7            | Sensor output waveform  |
|   | Signal (-)        | B135                  | 11                | 0  | 0                  | —   |
|   | Shield            | B135                  | 21                | 0  | 0                  | —   |
| Camshaft<br>position<br>sensor                    | Signal (+)        | B135                  | 1                 | 0  | -7 — +7            | Sensor output waveform  |
|   | Signal (-)        | B135                  | 10                | 0  | 0                  | —   |
|   | Shield            | B135                  | 21                | 0  | 0                  | —   |
| Throttle<br>position<br>sensor                    | Signal            | B135                  | 7                 | Fully closed: 0.2 — 1.0<br>Fully opened: 4.2 — 4.7 |                    | —   |
|   | Power<br>supply   | B135                  | 9                 | 5  | 5                  | —   |
|   | GND (sen-<br>sor) | B135                  | 19                | 0  | 0                  | —   |
| Rear oxy-<br>gen sen-<br>sor                      | Signal            | B135                  | 17                | 0  | 0 — 0.9            | —   |
|   | Shield            | B135                  | 26                | 0  | 0                  | —   |
|   | GND (sen-<br>sor) | B135                  | 19                | 0  | 0                  | —   |
| Front oxy-<br>gen (A/F)<br>sensor<br>heater       | Signal 1          | B84                   | 5                 | 0 — 1.0  | 0 — 1.0            | —   |
|   | Signal 2          | B84                   | 4                 | 0 — 1.0  | 0 — 1.0            | —   |
| Rear oxygen sensor<br>heater signal               |                   | B137                  | 13                | 0 — 1.0  | 0 — 1.0            | —   |
| Engine<br>coolant<br>tempera-<br>ture sen-<br>sor | Signal            | B135                  | 18                | 1.0 — 1.4  | 1.0 — 1.4          | After warm-up the engine.   |
|   | GND (sen-<br>sor) | B135                  | 19                | 0  | 0                  | After warm-up the engine.   |
| Vehicle speed signal                              |                   | B134                  | 1                 | 0 or 5   | 0 or 5             | "5" and "0" are repeatedly dis-<br>played when vehicle is driven. |

# 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)    |                                |
| Mass air flow sensor                      | Signal       | B136          | 13           | —  | 0.3 — 4.5             | —                              |
|   | Shield       | B136          | 8            | 0  | 0                     | —                              |
|   | GND          | B136          | 7            | 0  | 0                     | —                              |
| Intake air temperature sensor signal      |              | B135          | 27           | —  | —                     | —                              |
| Exhaust gas temperature sensor            | Signal       | B135          | 16           | —  | —                     | —                              |
|   | GND (sensor) | B135          | 19           | 0  | 0                     | —                              |
| Tumble generator valve position sensor RH | Signal       | B135          | 23           | Fully closed: 0.2 — 1.0<br>Fully opened: 4.2 — 4.7 |                       | —                              |
|   | Power supply | B135          | 9            | 5  | 5                     | —                              |
|   | GND (sensor) | B135          | 19           | 0  | 0                     | —                              |
| Tumble generator valve position sensor LH | Signal       | B135          | 13           | Fully closed: 0.2 — 1.0<br>Fully opened: 4.2 — 4.7 |                       | —                              |
|   | Power supply | B135          | 9            | 5  | 5                     | —                              |
|   | GND (sensor) | B135          | 19           | 0  | 0                     | —                              |
| Tumble generator valve RH (open)          |              | B136          | 4            | 0 or 10 — 13                                       | 0 or 13 — 14          | —                              |
| Tumble generator valve RH (close)         |              | B136          | 5            | 0 or 10 — 13                                       | 0 or 13 — 14          | —                              |
| Tumble generator valve LH (open)          |              | B136          | 10           | 0 or 10 — 13                                       | 0 or 13 — 14          | —                              |
| Tumble generator valve LH (close)         |              | B136          | 11           | 0 or 10 — 13                                       | 0 or 13 — 14          | —                              |
| Wastegate control solenoid valve          |              | B84           | 24           | 10 — 13  | 13 — 14               | —                              |
| Starter switch                            |              | B134          | 16           | 0  | 0                     | Cranking: 8 — 14               |
| A/C switch                                |              | B134          | 2            | ON: 10 — 13<br>OFF: 0                              | ON: 13 — 14<br>OFF: 0 | —                              |
| Ignition switch                           |              | B134          | 5            | 10 — 13  | 13 — 14               | —                              |
| Neutral position switch (MT model)        |              | B134          | 8            | ON: 10 — 13<br>OFF: 0                              | ON: 13 — 14<br>OFF: 0 | —                              |
| Neutral position switch (AT model)        |              | B134          | 8            | ON: 0<br>OFF: 10 — 13                              | ON: 0<br>OFF: 13 — 14 | —                              |
| Test mode connector                       |              | B134          | 14           | 5  | 5                     | When connected: 0              |
| Knock sensor                              | Signal       | B135          | 4            | 2.8  | 2.8                   | —                              |
|   | Shield       | B135          | 22           | 0  | 0                     | —                              |
| Back-up power supply                      |              | B84           | 10           | 10 — 13  | 13 — 14               | Ignition switch "OFF": 10 — 13 |
| Control unit power supply                 | B84          | 2             | 10 — 13      | 13 — 14  | —                     |                                |
|   | B84          | 3             | 10 — 13      | 13 — 14  | —                     |                                |
| Sensor power supply                       |              | B135          | 9            | 5  | 5                     | —                              |
| Line end check 1                          |              | B134          | 10           | 0  | 0                     | —                              |
| Ignition control                          | #1           | B137          | 24           | 0  | 13 — 14               | Waveform                       |
|   | #2           | B137          | 23           | 0  | 13 — 14               | Waveform                       |
|   | #3           | B137          | 22           | 0  | 13 — 14               | Waveform                       |
|   | #4           | B137          | 21           | 0  | 13 — 14               | Waveform                       |

# 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)              |   |
| Fuel injector                             | #1           | B84           | 1            | 10 — 13                         | 1 — 14                          | Waveform  |
|   | #2           | B137          | 6            | 10 — 13                         | 1 — 14                          | Waveform  |
|   | #3           | B137          | 5            | 10 — 13                         | 1 — 14                          | Waveform  |
|   | #4           | B137          | 4            | 10 — 13                         | 1 — 14                          | Waveform  |
| Idle air control solenoid valve           | Signal       | B137          | 10           | 0 or 13 — 14                    | 0 or 13 — 14                    | Waveform  |
| Fuel pump control unit                    | Signal 1     | B134          | 13           | —                               | —                               | —   |
|   | Signal 2     | B137          | 15           | —                               | —                               | —   |
| A/C relay control                         |              | B84           | 27           | ON: 0.5 or less<br>OFF: 10 — 13 | ON: 0.5 or less<br>OFF: 13 — 14 | —   |
| Radiator fan relay 1 control              |              | B84           | 17           | ON: 0.5 or less<br>OFF: 10 — 13 | ON: 0.5 or less<br>OFF: 13 — 14 | —   |
| Radiator fan relay 2 control              |              | B84           | 28           | ON: 0.5 or less<br>OFF: 10 — 13 | ON: 0.5 or less<br>OFF: 13 — 14 | Model with A/C only   |
| Malfunction indicator lamp                |              | B84           | 15           | —                               | —                               | Light "ON": 1 or less<br>Light "OFF": 10 — 14                       |
| Engine speed output                       |              | B137          | 9            | —                               | 0 — 13 or more                  | Waveform  |
| Purge control solenoid valve              |              | B84           | 16           | ON: 1 or less<br>OFF: 10 — 13   | ON: 1 or less<br>OFF: 13 — 14   | —   |
| Manifold absolute pressure sensor         | Signal       | B135          | 8            | 1.7 — 2.4                       | 1.1 — 1.6                       | —   |
|   | Power supply | B135          | 9            | 5                               | 5                               |   |
|   | GND (sensor) | B135          | 19           | 0                               | 0                               |   |
| Fuel tank pressure sensor                 | Signal       | B135          | 15           | 2.3 — 2.7                       | 2.3 — 2.7                       | The valve operates when fuel filler cap is removed and reinstalled. |
|   | GND (sensor) | B135          | 19           | 0                               | 0                               | —   |
| Fuel tank pressure control solenoid valve |              | B84           | 22           | ON: 1 or less<br>OFF: 10 — 13   | ON: 1 or less<br>OFF: 13 — 14   | —   |
| Drain valve                               |              | B84           | 11           | ON: 1 or less<br>OFF: 10 — 13   | ON: 1 or less<br>OFF: 13 — 14   | —   |
| Fuel tank sensor control valve            |              | B84           | 23           | ON: 1 or less<br>OFF: 10 — 13   | ON: 1 or less<br>OFF: 13 — 14   | —   |
| Fuel level sensor                         |              | B135          | 25           | 0.12 — 4.75                     | 0.12 — 4.75                     | —   |
| Fuel temperature sensor signal            |              | B135          | 6            | 2.5 — 3.8                       | 2.5 — 3.8                       | Ambient temperature:<br>25°C (75°F)                                 |
| Blow-by leak diagnosis signal             |              | B137          | 2            | 5                               | 5                               | —   |
| Small light switch                        |              | B134          | 17           | ON: 0<br>OFF: 10 — 13           | ON: 0<br>OFF: 13 — 14           | —   |
| Blower fan switch                         |              | B134          | 9            | ON: 0<br>OFF: 10 — 13           | ON: 0<br>OFF: 13 — 14           | —   |
| Rear defogger switch                      |              | B134          | 3            | ON: 0<br>OFF: 10 — 13           | ON: 0<br>OFF: 13 — 14           | —   |
| Power steering oil pressure switch        |              | B135          | 24           | 10 — 13                         | ON: 0<br>OFF: 13 — 14           | —   |
| Front oxygen (A/F) sensor signal (+)      |              | B84           | 29           | 2.8 — 3.2                       | 2.8 — 3.2                       | —   |

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

### ENGINE (DIAGNOSTICS)

| Content                                      | Con-<br>nector<br>No. | Termi-<br>nal No. | Signal (V)                     |                               | Note     |
|--|-----------------------|-------------------|--------------------------------|-------------------------------|----------|
|  |                       |                   | Ignition SW ON<br>(Engine OFF) | Engine ON (Idling)            |          |
| Front oxygen (A/F) sen-<br>sor signal (-)    | B84                   | 19                | 2.4 — 2.7                      | 2.4 — 2.7                     | —        |
| Front oxygen (A/F) sen-<br>sor shield        | B84                   | 18                | 0                              | 0                             | —        |
| SSM/GST communica-<br>tion line              | B134                  | 21                | Less than 1 ←→ More<br>than 4  | Less than 1 ←→ More<br>than 4 | —        |
| Torque control 1 signal                      | B134                  | 19                | More than 4                    | More than 4                   | —        |
| Torque control 2 signal                      | B134                  | 18                | More than 4                    | More than 4                   | —        |
| Torque control cut sig-<br>nal               | B137                  | 14                | 8                              | 8                             | —        |
| AT diagnosis input sig-<br>nal               | B135                  | 20                | Less than 1 ←→ More<br>than 4  | Less than 1 ←→ More<br>than 4 | Waveform |
| AT load signal                               | B135                  | 28                | 4.3 — 4.4                      | 0.9 — 1.4                     | —        |
| GND (sensors)                                | B135                  | 19                | 0                              | 0                             | —        |
| GND (injectors)                              | B137                  | 8                 | 0                              | 0                             | —        |
| GND (ignition system)                        | B137                  | 18                | 0                              | 0                             | —        |
| GND (power supply)                           | B137                  | 17                | 0                              | 0                             | —        |
|  | B134                  | 22                | 0                              | 0                             | —        |
| GND (control systems)                        | B134                  | 7                 | 0                              | 0                             | —        |
|  | B134                  | 15                | 0                              | 0                             | —        |
| GND (front oxygen (A/<br>F) sensor heater 1) | B84                   | 9                 | 0                              | 0                             | —        |
| GND (front oxygen (A/<br>F) sensor heater 2) | B84                   | 8                 | 0                              | 0                             | —        |