

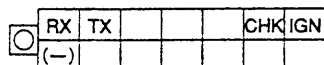
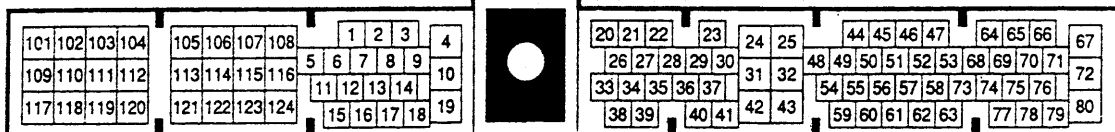
ECM (-TCM) Input/Output Signal Reference Value

SIGNAL VOLTAGES MEASURED WITH OSCILLOSCOPE AND CIRCUIT TESTER

- Signal voltages measured at ECM (-TCM) terminals (terminals for engine control) with a circuit tester and example of waveforms displayed on an oscilloscope are shown below.

For signal terminals for A/T control, refer to "A/T Trouble Diagnosis" in AT section.

Measured data are affected by many factors such as irregularity of parts, vehicle history, operating conditions, environment, service status, and measuring instruments and methods.



(Data link connector for CONSULT)

ECQ0357D

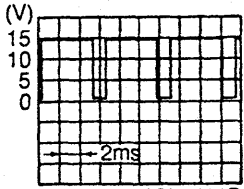
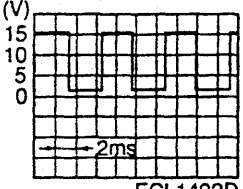
| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|----------------------------|--|---|--|
| 1 2 3 7 8 9 | Ignition signal (Power transistor drive signal) | <p>When cranking: Approx. 0.12V</p> <p>ECL1416D</p> <p>At idle: Approx. 0.1V</p> <p>ECL1417D</p> | <p>Approx. 0.15 - 0.25V</p> <p>ECL1418D</p> |
| 4 | ECM & IGN coil relay control signal | <p>Approx. 1V (During approx. 1.5 sec. after ignition switch turned OFF: Approx. 1V 1.5 sec. after ignition switch turned OFF: Battery voltage)</p> | ← |
| 5 | Tachometer drive signal | <p>[RB20DE (L/B), RB25DE] Approx. 1.2V</p> <p>ECL1647D</p> | <p>Approx. 3V</p> <p>ECL1648D</p> |
| | | <p>[RB25DET] Approx. 7.2V</p> <p>ECL1790D</p> | <p style="text-align: center;">←</p> <p>ECL1791D</p> |

NOTE: Above voltages are measured values obtained by analog circuit tester.

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TROUBLE DIAGNOSES

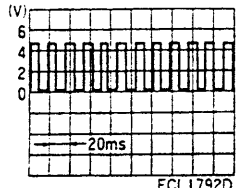
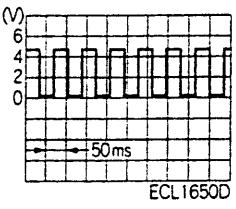
ECM (TCM) Input/Output Signal Reference Value (Cont'd)

| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|----------------------------|---|---|---|
| 11 | AAC valve control signal | Approx. 12V  ECL1421D | Approx. 8V  ECL1422D |
| 13 | Fuel pump relay control signal | [RB20DE (L/B), RB25DE] During 5 sec. after ignition switch turned ON: Approx. 0.25V 5 sec. after ignition switch turned ON: Battery voltage When cranking: Approx. 0.25V At idle: Approx. 0.25V | Approx. 0.25V |
| | | [RB25DET] During 3 sec. after ignition switch turned ON: Approx. 0.9V 3 sec. after ignition switch turned ON: Battery voltage When cranking: Approx. 0.9V At idle: Approx. 0.9V | Approx. 0.9V |
| 14 | Air conditioner relay control signal | Air conditioner OFF: Battery voltage Air conditioner ON: Approx. 0.25V | ← |
| 17 | Malfunction indicator lamp | MIL OFF: Battery voltage MIL ON RB20DE (L/B), RB25DE: Approx. 0.85V RB25DET: Approx. 0.1V | ← |
| 20 | Ignition switch (START) signal | Approx. 0V (Ignition switch at START: Battery voltage) | ← |
| 21 | Air conditioner switch signal | Air conditioner OFF: Approx. 4.7V Air conditioner ON: Approx. 0.1V | ← |
| 22 (CHK) | Check (Diagnosis start) | CONSULT connected: Approx. 0V CONSULT not connected: Approx. 0V | ← |
| 23 | Throttle position sensor signal | Accelerator pedal released: Approx. 0.5V Accelerator pedal fully depressed: Approx. 4.2V (Ignition switch ON, engine not running) | Approx. 0.6 - 0.7V |
| 24 (IGN) | Ignition switch (IGN) signal | Ignition switch OFF: Approx. 0V Ignition switch ON: Battery voltage | ← |
| 25, 32 43 116 124 | Ground | Approx. 0V | ← |
| 26 | Power steering oil pressure switch signal | Steering wheel not turned: Approx. 4.7V Steering wheel turned: Approx. 0V | ← |

NOTE: Above voltages are measured values obtained by analog circuit tester.

TROUBLE DIAGNOSES

ECM (·TCM) Input/Output Signal Reference Value (Cont'd)

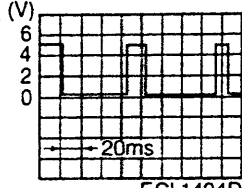
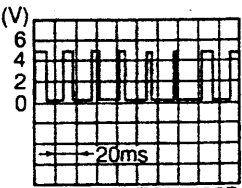
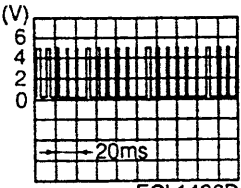
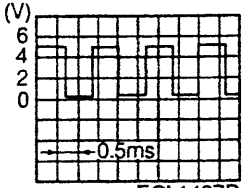
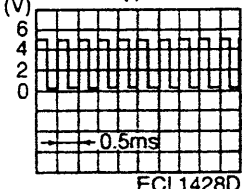
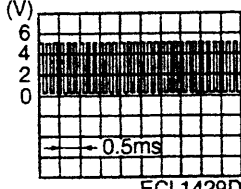
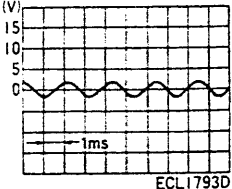
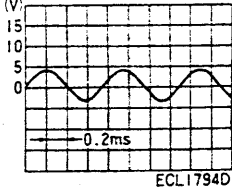
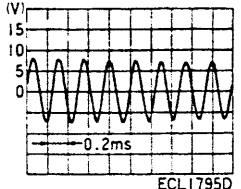
| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|--------------|--|--|--|
| 29 | Vehicle speed sensor signal | Approx. 4.7V or approx. 0V (when parked) | [RB20DE (L/B)] When driving at approx. 40 km/h: Approx. 2.4V  |
| | | | [RB25DE, RB25DET] When driving at approx. 40 km/h: Approx. 2.4V  |
| 30 | Head lamp switch signal | Light switch OFF: Approx. 0V Light switch ON: Battery voltage | ← |
| 31 | Ignition power supply | Ignition switch OFF: Approx. 0V Ignition switch ON: Battery voltage | ← |
| 33 | Idle position switch signal [RB20DE (L/B), RB25DET-A/T] | Battery voltage | Approx. 0V (When accelerator pedal is depressed) |
| 37 | Throttle opening signal [RB25DE-4WD-M/T, RB25DE-A/T, BR25DET] | Accelerator pedal released: Approx. 0.5V Accelerator pedal fully depressed: Approx. 4.2V (Ignition switch ON, engine not running) | Approx. 0.7V |
| 39 | Neutral signal (Park/Neutral position switch) | Selector lever in Neutral or in N or P position: Approx. 0V Selector lever in other positions: Approx. 4.8V | ← |
| 41 | Full switch signal [RB20DE (L/B), RB25DET-A/T] | Accelerator pedal released: Approx. 0V Accelerator pedal fully depressed: Battery voltage (Ignition switch ON, engine not running) | ← |

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TROUBLE DIAGNOSES

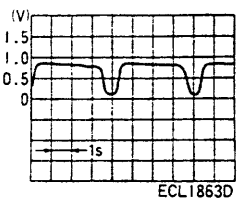
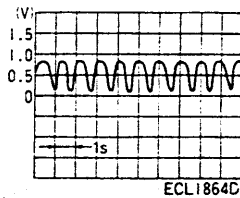
ECM (TCM) Input/Output Signal Reference Value (Cont'd)

| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|--------------|---|---|--|
| 44 45 | Crankshaft position sensor 120° (REF) signal | <p>When cranking: Approx. 1.3V</p>  <p>ECL1424D</p> <p>At idle: Approx. 1.35 - 1.4V</p>  <p>ECL1425D</p> | <p>Approx. 1.4V</p>  <p>ECL1426D</p> |
| 46 | Crankshaft position sensor 1° (POS) signal | <p>When cranking: Approx. 2.6V</p>  <p>ECL1427D</p> <p>At idle: Approx. 2.6V</p>  <p>ECL1428D</p> | <p>Approx. 2.6V</p>  <p>ECL1429D</p> |
| 47 | Ring gear crankshaft position sensor signal [RB20DE (L/B)] | <p>When cranking (DC range): Approx. 0.1V (AC range): Approx. 0.5V</p>  <p>ECL1793D</p> <p>At idle (DC range): Approx. 0.1V (AC range): Approx. 1.3V</p>  <p>ECL1794D</p> | <p>DC range: Approx. 0.1V AC range: Approx. 3.2V</p>  <p>ECL1795D</p> |
| | Turbo pressure sensor signal [RB25DET] | Approx. 2.7V | ← (When engine raced suddenly: Approx. 2.7 - 3.1V) |
| 48 | Throttle position sensor, refrigerant pressure sensor, turbo pressure sensor power supply | Approx. 5.2V | ← |
| 49 | Rear defogger switch signal | Rear defogger switch OFF: Approx. 0V Rear defogger switch ON: Battery voltage | ← |

NOTE: Above voltages are measured values obtained by analog circuit tester.

TROUBLE DIAGNOSES

ECM (.TCM) Input/Output Signal Reference Value (Cont'd)

| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|--------------|---|---|--|
| 50 | Heated oxygen sensor signal | Fluctuates between approx. 0.1 to 0.4V and approx. 0.7 to 0.9V  |  |
| 51 | Throttle motor sensor signal [RB25DET] | Approx. 3.4V | ← (Voltage becomes lower when TCS operates.) |
| 53 | Motor throttle switch signal [RB25DET] | Approx. 4.7V | ← (When TCS is operating: Approx. 0V) |
| 54 | Mass air flow sensor signal | Ignition switch ON: Approx. 0.2V At idle: Approx. 1.1 - 1.2V | Approx. 1.6 - 1.7V |
| 55 | Mass air flow sensor ground | Approx. 0V | ← |
| 56 | Engine coolant temperature sensor signal | Coolant temperature approx. 20°C: Approx. 3.5V Coolant temperature approx. 80°C: Approx. 1.2V | ← |
| 57 | Refrigerant pressure sensor | Approx. 0.36V min. (Voltage increases as the air conditioner refrigerant pressure increases.) | ← |
| 62 | Knock sensor signal 1 | Approx. 0.4 - 2V (*) | ← |
| 63 | Knock sensor signal 2 | *: Voltage varies with measuring range (internal resistance) of a circuit tester. | ← |
| 67 72 | Control unit power supply | Battery voltage | ← |
| 75 (RX) | Receive (Data input to control unit) | CONSULT connected: Approx. 0.25V CONSULT not connected: Battery voltage | ← |
| 76 (TX) | Transmit (Data output from control unit) | CONSULT connected: Approx. 9V max. CONSULT not connected: Approx. 0V | ← |
| 78 | Auxiliary electric fan relay control signal [RB25DE, RB25DET] | Fan stopped: Battery voltage Fan operating: Approx. 0.2 - 0.3V | ← |

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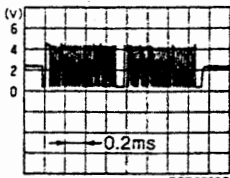
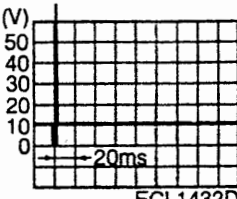
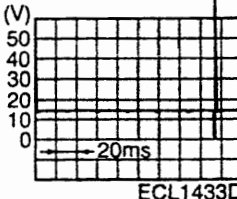
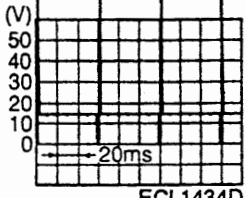
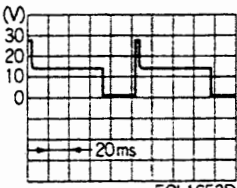
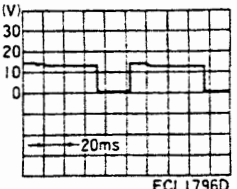
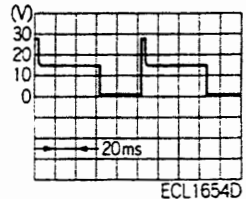
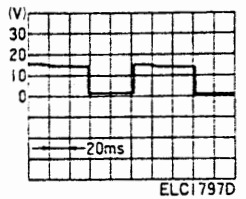
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TROUBLE DIAGNOSES

ECM (·TCM) Input/Output Signal Reference Value (Cont'd)

| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|--|--|---|---|
| 79 | ECM-TCM, TCS/ABS integrated control signal [Multiplex communication] [RB25DE-A/T, RB25DET] | Approx. 2V  ECP0753D | ← |
| 80 | Battery power supply | Battery voltage | ← |
| 101 103 105 110 112 114 | Injector drive signal | When cranking: Approx. 10.5V  ECL1432D At idle: Battery voltage  ECL1433D | Slightly lower than battery voltage  ECL1434D |
| 104 | Variable air intake control solenoid valve control signal [RB20DE (L/B), RB25DE] | Ignition switch ON: Battery voltage (Solenoid valve OFF) At idle: Approx. 0.2 - 0.3V (Solenoid valve ON) | ← At approx. 3,650 rpm and above [RB20DE (L/B)] At approx. 3,500 rpm and above [RB25DE] : Battery voltage (Solenoid valve OFF) |
| | Turbo pressure control solenoid valve control signal [RB25DET] | Battery voltage (Solenoid valve OFF) | ← [When engine raced suddenly: Approx. 0.3V (Solenoid valve ON)] |
| 107 | Air jet swirl control solenoid valve control signal [RB20DE (L/B)] | Coolant temperature below approx. 70°C: Approx. 0.9V (Solenoid valve ON) Coolant temperature approx. 70°C and above: Battery voltage (Solenoid valve OFF) | ← Coolant temperature approx. 70°C and above, and driving at approx. 3,300 rpm and above [M/T] Coolant temperature approx. 70°C and above, and driving at approx. 3,000 rpm and above [A/T] : Approx. 0.9V (Solenoid valve ON) |
| 108 | Canister purge control valve control signal | [RB20DE (L/B), RB25DE] Air conditioner OFF: Battery voltage Air conditioner ON: Battery voltage → Approx. 10V (After approx. 15 sec.)  ECL1653D (Waveform indicates when air conditioner is ON.) [RB20DET] Air conditioner OFF: Battery voltage Air conditioner ON: Battery voltage → Approx. 10V (After approx. 15 sec.)  ECL1796D (Waveform indicates when air conditioner is ON.) | Approx. 9V  ECL1654D Approx. 9V  ELC1797D |

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TROUBLE DIAGNOSES

ECM (.TCM) Input/Output Signal Reference Value (Cont'd)

| Terminal No. | Signal name | At idle | At approx. 2,000 rpm |
|--------------|--|--|---|
| 109 | Control unit power supply (Counter-electromotive current feedback circuit) | Battery voltage | ← |
| 111 | Fuel pump terminal voltage control output signal [RB25DET] | Ignition switch at START: Approx. 0V During approx. 30 sec. after engine started with coolant temperature 50°C or above: Approx. 0V At idle: Approx. 10V | Approx. 0V |
| 117 | Variable valve timing control solenoid valve control signal | Battery voltage (Solenoid valve OFF) | ← [With driving wheels lifted and gear in D position: Approx. 0.45V (Solenoid valve ON)] |
| 118 | Heated oxygen sensor heater control signal | Approx. 0.3V | Approx. 0.3V (At approx. 2,800 rpm and above: Battery voltage) |

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