

SECTION 6

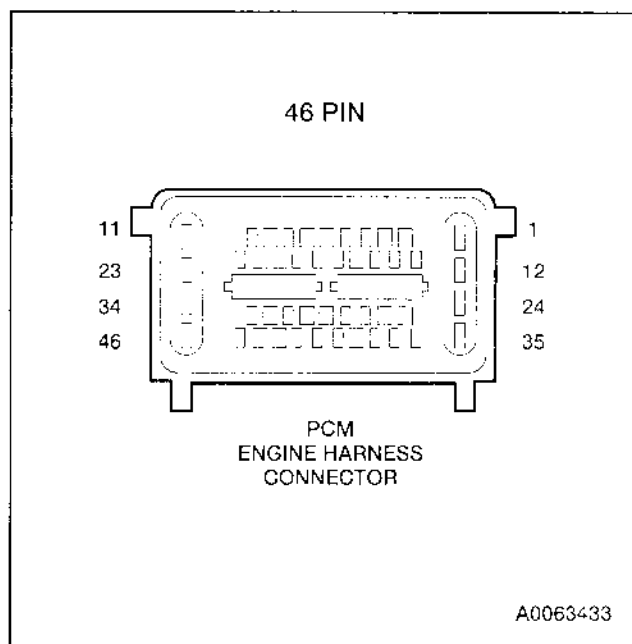
Reference Values

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Control System Diagnostic Sheet Reference

PCM Pin Descriptions and Expected Values



Engine

| Pin # | Name | Key On | Low Idle | High Idle | Operating Range | Comments |
|-------|-------|--------|----------|-----------|-----------------|--|
| 1 | GEN1C | B+ | B+ | B+ | B+ | Generator # 1 Monitor 0 = Fault Detected |
| 2 | IPR | 10.7 | 10.1 | 9.3 | 0 - B+ | Injection Pressure Regulator Control (Pulse Width Modulated) |
| 3 | GPE | 0/B+ | 0/B+ | 0/B+ | 0/B+ | Glow Plug Enable 0 = Relay ON B+ = Relay OFF |
| 4 | GEN2C | B+ | B+ | B+ | B+ | Generator # 2 Monitor (Dual Generator Only) 0 = Fault Detected |
| 5 | N/A | N/A | N/A | N/A | N/A | N/A |
| 6 | FSS | 0 | 5.4 | 5.1 | 0 - VREF | Fan Speed Signal |
| 7 | N/A | N/A | N/A | N/A | N/A | N/A |
| 8 | N/A | N/A | N/A | N/A | N/A | N/A |
| 9 | N/A | N/A | N/A | N/A | N/A | N/A |
| 10 | VGTC | 12.1 | 7.9 | 10.4 | 0 - B+ | Variable Geometry Turbo Actuator Control (Pulse Width Modulated) |
| 11 | VGTC | B+ | B+ | B+ | B+ | Variable Geometry Turbo Actuator Voltage |

(Continued)

Control System Diagnostic Sheet Reference

Engine

| Pin # | Name | Key On | Low Idle | High Idle | Operating Range | Comments |
|-------|----------|--------|----------|-----------|-----------------|--|
| 12 | EGRTPC | 0-B+ | 0-B+ | 0-B+ | 0-B- | Electronic Throttle Control Actuator |
| 13 | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | FC-V | 12.3 | 12.3 | 13.8 | 0 - B- | Cooling Fan Solenoid Control (Pulse Width Modulated) 0 - ON B- - OFF |
| 15 | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | GPD | 0 | 0 | 0 | 0 - VPWR | Glow Plug Control Module/PCM Communication |
| 18 | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | CKPO | 0 | 5.7V | 5.7V | 0 - 6000 Hz | Buffered Crankshaft Signal Output (To FICM) |
| 20 | CMPO | 0 | 1.0V | 1.2V | 0.5 - 50 Hz | Buffered Camshaft Signal Out (To FICM) |
| 21 | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | TPWR GND | 0 | 0 | 0 | 0 | Cooling Fan Sensor Signal Return |
| 23 | EGRVC | 12.2 | 12.2 | 10.3 | 0 - VPWR | EGR Solenoid Control (Pulse Width Modulated) |
| 24 | EGRTPC2 | 0-B+ | 0-B+ | 0-B+ | 0-B+ | Electronic Throttle Control Actuator |
| 25 | SIGRTN | 0 | 0 | 0 | 0 | Signal Return |
| 26 | CAN2L | 2.1 | 2.1 | 2.2 | -3 - 16 | CAN- Module Communications (PCM to FICM) |
| 27 | EP | 1.0 | 1.2 | 1.4 | 0.4 - 4.7 | Exhaust Pressure Signal 0.9 = 101 kPa (14.7 psi) 4.7 = 365 kPa (53 psi) |
| 28 | FICMM | 1.1 | 2.6 | 2.8 | 1 - 4 | Intermodule Communication Signal (PCM to FICM) |
| 29 | ICP | 0.2 | 1.0 | 1.9 | 0.16 - 4.7 | Injection Control Pressure Sensor Signal 1.0 = 4.5 MPa (650 psi) 4.7 = 27 MPa (4045 psi) |
| 30 | CKP+ | 1.58V | 1.60V | 1.60V | 0 - 6000 Hz | Crankshaft Position Signal |
| 31 | CMP+ | 0.25V | 0.25V | 0.38V | 0.5 - 50 Hz | Camshaft Position Signal |
| 32 | ECT | 1.9 | 1.9 | 1.1 | 0.3 - 4.7 | Engine Coolant Temperature 4.7 = -40 C (-40 F) 0.8 = 100 C (212 F) |
| 33 | EGRVP | 0.8 | 0.9 | 1.3 | 0.6 - 4.0 | EGR Valve Position Signal |
| 34 | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | N/A | N/A | N/A | N/A | N/A | N/A |

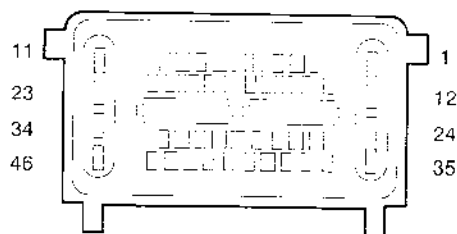
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Control System Diagnostic Sheet Reference

Engine

| Pin # | Name | Key On | Low Idle | High Idle | Operating Range | Comments |
|-------|-------------|--------|----------|------------------|-----------------|--|
| 36 | VREF | 5 | 5 | 5 | 5 ± 0.5 | VREF |
| 37 | CAN2H | 2.9 | 2.9 | 2.9 | -3 - 16 | CAN- Module Communications (PCM to FICM) |
| 38 | EGRTP | 0.3 | 1.0 | (load dependant) | 0.1-4.7 | Intake Throttle Position Signal |
| 39 | N/A | N/A | N/A | N/A | N/A | N/A |
| 40 | N/A | N/A | N/A | N/A | N/A | N/A |
| 41 | CKP- | 1.5V | 1.6V | 1.6V | 0 - 6000 Hz | Crankshaft Position Signal |
| 42 | CMP/CKP SHD | 0 | 0 | 0 | 0 | CMP/CKP Sensor Shield |
| 43 | CMP- | 0.3V | 0.3V | 0.4V | 0.5 - 50 Hz | Camshaft Position Signal |
| 44 | EOT | 2.0 | 2.6 | 1.1 | 0.3 - 4.7 | Engine Oil Temperature 4.7 = -40 C (-40 F) 0.3 = 150 C (302 F) |
| 45 | IAT2 | 2.7 | 3.7 | 2.9 | 0.2 - 4.7 | Manifold Air Temperature 4.3 = 0 C (32 F) 2.5 = 50 C (122 F) |
| 46 | VBPWR | B- | B- | B- | Buffered VBAT | Cooling Fan Speed Sensor Buffered Voltage |

46 PIN



PCM
BODY HARNESS
CONNECTOR

A0063434

Control System Diagnostic Sheet Reference

Body

| Pin # | Name | Key On | Low Idle | High Idle | Operating Range | Comments |
|-------|---------|--------|----------|-----------|-----------------|--|
| 1 | CTO | 12.2 | 12.2 | 12.4 | 1 - VPWR | Tachometer Output (Aftermarket) |
| 2 | ACCR | B+ | 0/B+ | 0/B+ | 0/B+ | A/C Clutch Relay Control B+ = A/C OFF 0 = A/C ON |
| 3 | DOL | 0 | 0 | 0 | 0 - 5 | Tripminder Fuel Economy Digital Signal |
| 4 | TRO PN | 0 | 0 | 0 | 0/B+ | Starter Relay Enable 0 = Enabled |
| 5 | FPC | 0/B+ | 0 | 0 | 0 | Fuel Pump Relay Control B+ = Pump OFF 0 = Pump ON |
| 6 | N/A | N/A | N/A | N/A | N/A | N/A |
| 7 | TPO | 0 | 0 | 0 | 0 | Throttle Position Output |
| 8 | ACCS | 0 | 0/B+ | 0/B+ | 0/B+ | A/C Cycling Pressure Switch B+ = A/C ON 0 = A/C OFF |
| 9 | SCIL | B+ | B- | B- | 0/B+ | Speed Control Indicator B+ = Indicator OFF 0 = Indicator ON |
| 10 | CASEGND | 0 | 0 | 0 | 0 | Chassis Ground |
| 11 | PWR GND | 0 | 0 | 0 | 0 | Power Ground |
| 12 | PTO | 0 | 0/B+ | 0/B+ | 0/B+ | Power Take Off (Aftermarket) 0 = PTO Disengaged B+ = PTO Engaged |
| 13 | CAN1H | 2.7 | 2.7 | 2.7 | -3 - 16 | CAN+ Module Communications |
| 14 | CAN1L | 2.4 | 2.4 | 2.4 | -3 - 16 | CAN- Module Communications |
| 15 | WFS | 4.6 | 4.6 | 4.6 | > 4.4 | Water In Fuel Sensor Diesel > 4.4 Water < 3.3 |
| 16 | ACPSW | 0 | 0/B+ | 0/B+ | 0/B+ | A/C Pressure Switch 12 = A/C Pressure < 325 psig 0 = A/C Pressure > 325 psig |
| 17 | PBA | 0/B+ | 0/B+ | 0/B+ | 0/B+ | Park Brake Applied 0 = Brake Applied 12 = Brake OFF |
| 18 | BPP | 0/B+ | 0/B+ | 0/B+ | 0/B+ | Brake Pedal Position 12 = Brake Applied 0 = Brake OFF |
| 19 | FPM | 0/B+ | B+ | B+ | B+ | Fuel Pump Monitor B+ = Fuel Pump ON |
| 20 | SIGRTN2 | 0 | 0 | 0 | 0 | Accelerator Pedal Position Sensor Signal Return |
| 21 | MAFRTN | 0 | 0 | 0 | 0 | Mass Air Flow Sensor Signal Return |
| 22 | VSO | 0 | 0 | 0 | 0 - VBAT | Vehicle Speed Out |

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Control System Diagnostic Sheet Reference

Body

| Pin # | Name | Key On | Low Idle | High Idle | Operating Range | Comments |
|-------|---------|--------|----------|-----------|---|---|
| 23 | PWRGND | 0 | 0 | 0 | 0 | Power Ground |
| 24 | SCCSRTN | 0 | 0 | 0 | 0 | Speed Control Switch Signal Return |
| 25 | APP3 | 1.0 | 1.0 | 1.45 | 0.8 - 3.5 | Accelerator Pedal Track 3 CT = 0.8 - 1.1 WOT = 3.1 - 3.5 |
| 26 | APP1 | 4.1 | 4.1 | 3.5 | 0.7 - 4.2 | Accelerator Pedal Track 1 CT = 3.9 - 4.2 WOT = 0.7 - 1.2 |
| 27 | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | BPS | 0/B+ | 0/B+ | 0/B+ | 0/B+ | Brake Pressure Switch 0 = Brake Applied B+ = Brake OFF |
| 29 | VREF2 | 5 | 5 | 5 | 5 - 0.5 | Reference Voltage |
| 30 | GENIL | 0 | 0 | 0 | 0/B+ | Generator Indicator |
| 31 | SCCS | 6.7 | 6.7 | 6.7 | 0 - 7.0 | Speed Control Command Switches ON = B+ OFF = 0 SET = 2.8 RESUME = 4.7 COAST = 0.8 HOLD = 6.6 |
| 32 | BUS+ | 0.3 | 0.3 | 0.3 | 0 - 5 | SCP+ Module Communications |
| 33 | SIGRTN | 0 | 0 | 0 | 0 | Signal Return |
| 34 | VPWR | B+ | B+ | B+ | B+ | Vehicle Power |
| 35 | VSS | 8.89V | 9.82V | 9.85V | 5.5 - 333 Hz | Vehicle Speed Signal |
| 36 | CPP:TOW | 0V/B+ | 0V/B+ | 0V/B+ | 0V/B+ | Grade Load Switch (Automatic Trans) 0 = Switch OFF B+ = Switch ON Clutch Pedal Position Switch (Manual Trans) 0 = Pedal PRESSED B+ = Pedal OFF |
| 37 | APP2 | 1.53 | 1.53 | 2.00 | 1.4 - 4.1 | Accelerator Pedal Track 2 CT = 1.4 - 1.6 WOT = 3.6 - 4.1 |
| 38 | BARO | 4.6 | 4.6 | 4.6 | 2.4 - 4.8 (early build) 0.5 - 4.5 (late build) | Barometric Pressure |
| 39 | FEPS | 0 | 0 | 0 | N/A | Flash EPROM Digital Signal |
| 40 | KAPWR | B+ | B+ | B+ | B+ | Keep Alive Power |

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Control System Diagnostic Sheet Reference

Body

| Pin # | Name | Key On | Low Idle | High Idle | Operating Range | Comments |
|-------|------|--------|----------|-----------|-----------------|---|
| 41 | MAP | 1.35 | 1.41 | 1.61 | 0.5 - 4.5 | Manifold Absolute Pressure 1.35 = 103 kPa (14.9 psi) 4.5 = 300 kPa (43.5 psi) |
| 42 | MAF | 0 | 1.36 | 2.65 | 0 - 4.7 | Mass Air Flow Signal |
| 43 | IAT1 | 2.3 | 3.1 | 2.5 | 0.13 - 4.9 | Intake Air Temperature (Mass Air Flow Assembly) 4.9 = -40 C (-40 F) 0.5 = 100 C (212 F) |
| 44 | BUS- | 4.8 | 4.8 | 4.8 | 0 - 5 | SCP- Module Communications |
| 45 | VREF | 5 | 5 | 5 | 5 ± 0.5 | Reference Voltage |
| 46 | VPWR | B+ | B+ | B+ | B+ | Vehicle Power |

PIDS

| Acronym | Key On | Low Idle | High Idle | Operating Range | Measurement Units | Description |
|----------|-------------------|-------------------|-------------------|---|------------------------|----------------------------|
| ACCS | OFF | OFF | OFF | OFF/ON | OFF/ON | AC Cycle Switch |
| ACP | OPEN | OPEN | OPEN | OPEN/ CLOSED | OPEN/ CLOSED | AC Pressure Switch |
| APP | 0 | 0 | 13 | 0 - 17.75 | PERCENT | Accelerator Pedal Position |
| APP1 | 4.0 | 4.0 | 3.4 | 0.7 - 4.2 | VOLT | Accelerator Pedal Track 1 |
| APP2 | 1.4 | 1.4 | 1.9 | 1.4 - 4.1 | VOLT | Accelerator Pedal Track 2 |
| APP3 | 0.9 | 0.9 | 1.4 | 0.8 - 3.5 | VOLT | Accelerator Pedal Track 3 |
| APP MODE | CT | CT | PT | CT, PT, WOT | CT, PT, WOT | Accelerator Pedal Position |
| B+ | 12.6 | 13.3 | 14.0 | 10.5 - 15.5 | VOLT | Battery Voltage |
| BARO | 4.6 (early build) | 4.6 (early build) | 4.6 (early build) | 2.5 - 4.8 (early build) 0.5 - 4.5 (late build) | VOLT | Barometric Pressure |
| BOO | OFF | OFF | OFF | ON/OFF | ON/OFF | Brake Pedal |
| BPA | OFF | OFF | OFF | ON/OFF | ON/OFF | Brake Pressure Applied |
| CMPFM | NO FAULT | NO FAULT | NO FAULT | NO FAULT | NO FAULT/ YES FAULT | CMP Status |
| CPP/PNP | NEUTRAL | NEUTRAL | NEUTRAL | NEUTRAL | DRIVE/ NEUTRAL | Clutch Pedal Position |
| DRIVECNT | 6 | 7 | 7 | 0 - 65535 | NUMBER | Valid Drive Counter |

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Control System Diagnostic Sheet Reference

PIDS

| Acronym | Key On | Low Idle | High Idle | Operating Range | Measurement Units | Description |
|-----------|----------|----------|------------------|-----------------|------------------------|-------------------------------|
| DTCCNT | 2 | 2 | 2 | 0 - 255 | NUMBER | DTC Count |
| EP | 0.8 | 1.2 | 1.3 | 0.4 - 4.7 | VOLT | Exhaust Pressure |
| ECT | 170.6 | 170.6 | 190.6 | -40 - 250 | TEMPERATURE (°F) | Coolant Temperature |
| ECT FM | NO FAULT | NO FAULT | NO FAULT | NO FAULT | NO FAULT/ YES FAULT | ECT Fault |
| EGR EVAL | NO | NO | NO | YES | NO/YES | EGR Evaluated |
| EGR DC# | 0 | 0 | 32 | 0 - 44 | PERCENT | EGR Duty Cycle |
| EGRTP_V | 0.32 | 1.00 | (Load dependant) | 0.1-4.7 | VOLT | EGR Throttle Position Voltage |
| EGRTP | 0% | 16.5% | (Load dependant) | 0-100 | PERCENT | EGR Throttle Position Control |
| EGRVP | 0.8 | 0.8 | 1.3 | 0.8 - 3.5 | VOLT | EGR Valve Position |
| EGRVPDES | 0 | 0 | 9.72 | 0 - 14 | PERCENT | EGR Desired |
| EOT | 150 | 150 | 194 | -40 - 302 | TEMPERATURE (°F) | Oil Temperature |
| EOTFM | NO FAULT | NO FAULT | NO FAULT | NO FAULT | NO FAULT/ YES FAULT | EOT Status |
| FANSS | 0 | 533 | 488 | 0 - 4000 | RPM | Fan Speed |
| FANSSM | LOW | LOW | LOW | LOW | LOW/HIGH | Cooling Fan Driver |
| FICMSYNC | NO | YES | YES | YES | YES/NO | Synchronization from FICM |
| FICM LPWR | 15.0 | 14.5 | 13.0 | 10.5 - 15.5 | VOLTS | FICM Logic Power |
| FICM MPWR | 47.5 | 48.0 | 47.5 | 40 - 52 | VOLTS | FICM Main Power |
| FICM VPWR | 15.0 | 14.5 | 12.5 | 10.5 - 15.5 | VOLTS | FICM Vehicle Power |
| FLI | 36.1 | 36.1 | 34.1 | 0 - 100 | PERCENT | Fuel Level Indicator |
| FP# | ON/OFF | ON | ON | ON | ON/OFF | Fuel Pump |
| FPM | ON/OFF | ON | ON | ON | ON/OFF | Fuel Pump Monitor |
| FUELPW | 0 | 990 | 680 | 0 - 50000 | (μ seconds) | Fuel Pulse Width |
| GENB F | NO FAULT | NO FAULT | NO FAULT | NO FAULT | NO FAULT/ YES FAULT | Generator 2 Output Fault |

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Control System Diagnostic Sheet Reference

PIDS

| Acronym | Key On | Low Idle | High Idle | Operating Range | Measurement Units | Description |
|------------|----------|----------|-------------|-----------------|------------------------|--------------------------------|
| GENFIL | OFF | OFF | OFF | OFF | OFF/ON | Generator Fault Indicator |
| GEN_F | NO FAULT | NO FAULT | NO FAULT | NO FAULT | NO FAULT/ YES FAULT | Generator 1 Output Fault |
| GPTCM | 0 | 0 | 0 | 0 - 180 | TIME (seconds) | Glow Plug Coil On Time |
| GPL | ON/OFF | OFF | OFF | ON/OFF | ON/OFF | Glow Plug Indicator |
| GPLTM | 0 | 0 | 0 | 1 - 10 | TIME (seconds) | Glow Plug Indicator On-Time |
| IAT | 98.6 | 98.6 | 96.8 | -40 - 250 | TEMPERATURE (°F) | Intake Air Temp (MAF Assembly) |
| IAT2 | 113 | 113 | 113 | -40 - 250 | TEMPERATURE °F | Intake Air Temp (Manifold Air) |
| IATFM | NO FAULT | NO FAULT | NO FAULT | NO FAULT | NO FAULT/ YES FAULT | IAT Status |
| ICP | 0.2 | 1.0 | 1.8 | 0.18 - 4.7 | VOLT | Injection Control Pressure |
| ICP_DES | 0 | 625.5 | 1400 - 1450 | 0 - 4045 | PRESSURE (PSI) | ICP Desired |
| INJ1_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ2_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ3_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ4_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ5_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ6_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ7_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ8_OFF # | NORMAL | NORMAL | NORMAL | NORMAL | DISABLE/ NORMAL | Injector Disabled |
| INJ_TIM | 0 | -8.71 | +3.5 | -50 - 50 | ANGLE (Degrees) | Injector Timing (TDC) |
| IPR # | 14.84 | 25.78 | 40.60 | 0 - 50 | PERCENT | Injection Pressure Regulator |

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Control System Diagnostic Sheet Reference

PIDS

| Acronym | Key On | Low Idle | High Idle | Operating Range | Measurement Units | Description |
|-----------|----------|----------|-----------|--|--|--------------------------------|
| LOAD | 0 | 12.5 | 14 | 0 - 100 | PERCENT | Calculated Load Value |
| MAF | 0 | 1.44 | 2.65 | 0.5 - 4.75 | VOLT | Mass Air Flow |
| MAP | 1.30 | 1.33 | 1.40 | 0.5 - 4.5 | VOLT | Manifold Absolute Pressure |
| MFDES | 0 | 7.5 | 10.7 | 0 - 100 | MASS mg/stroke | Mass Fuel Desired |
| MGP | 0 | 0.25 | 0.8 | -10 - 30 | PRESSURE (psi) | Manifold Gauge Pressure |
| MIL | OFF | OFF | OFF | OFF | ON/OFF | Malfunction Indicator |
| MISF_EVAL | NO | NO | YES | YES | NO/YES | Misfire Monitor |
| MP_LRN | YES | YES | YES | YES | NO/YES | Learned Misfire Correction |
| NM | 0 | 0 | 0 | 0 - 65535 | NUMBER | Number of Misfires |
| PATSENABL | ENABLED | ENABLED | ENABLED | ENABLED | ENABLED/DISABLED | Passive Anti-Theft |
| PBA | OFF | OFF | OFF | OFF | OFF/ON | Park Brake Applied |
| RPM | 0 | 628 | 2500 | 0 - 4096 | RPM | Revolutions Per Minute |
| RPMSD | 625 | 625 | 625 | 625 | RPM | Desired Idle RPM |
| SCCS | NONE | NONE | NONE | OFF/ON/ RESUME/ CANCEL/ NONE/SET/ COAST/ NOT AVAILABLE | OFF/ON/ RESUME/ CANCEL/ NONE/SET/ COAST/ NOT AVAILABLE | Speed Control Command Switches |
| STRT_RLY | DISABLED | DISABLED | DISABLED | DISABLED | DISABLED/ENABLED | Starter Relay |
| SYNC | NO | YES | YES | YES | NO/YES | CMP and CKP Synchronized |
| TORQUE | 0 | 9 - 20 | 50 | 400 | Nm | Net Engine Torque |
| TRIP | NO | NO | NO | YES | NO/YES | OBD Trip Completed |
| TRIP_CNT | 0 | 0 | 0 | 0 | 0 - 255 | Trip Count |
| VFDES | 0 | 9 | 14 | 0 - 250 | VOLUME mm ³ | Volume Fuel Desired |
| VGTDCT | 0 | 73 | 43 | 0 - 100 | PERCENT | Turbo Duty Cycle |

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Control System Diagnostic Sheet Reference

PIDS

| Acronym | Key On | Low Idle | High Idle | Operating Range | Measurement Units | Description |
|---------|--------|----------|-----------|-----------------|-------------------|-------------------|
| VGT_F | NO | NO | NO | NO | NO/YES | Turbo Fault |
| VREF | 4.9 | 4.9 | 4.9 | 4.5 - 5.5 | VOLTS | Reference Voltage |
| VSS | 0 | 0 | 0 | 0 - 120 | SPEED (MPH) | Vehicle Speed |
| WAC | OFF | OFF | OFF | OFF | ON/OFF | WOT A/C Cutoff |
| WFS | NO | NO | NO | NO | NO/YES | Water in Fuel |

Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|---|--|
| P0046 | VGT Solenoid | Turbo/supercharger boost control solenoid circuit range/performance | Open circuit, control circuit short to voltage, control circuit short to ground, faulty solenoid, faulty PCM |
| P0069 | BARO | MAP/BARO correlation | MAP/BARO, EP must be within 1 psi |
| P0096 | IAT2 | Intake air temperature sensor 2 circuit range/performance | Faulty sensor, faulty circuitry, faulty PCM |
| P0097 | IAT2 | Intake air temperature sensor 2 circuit low input | Short to ground, faulty sensor, faulty PCM |
| P0098 | IAT2 | Intake air temperature sensor 2 circuit high input | Short to voltage, open in return circuit, faulty PCM, faulty sensor |
| P0101 | MAF | Mass or volume air flow circuit range/performance | Restricted air flow, faulty sensor, contamination, intake air leak, faulty PCM |
| P0103 | MAF | Mass or volume air flow circuit high input | Restriction, water intrusion, signal short to voltage, return circuit open, faulty sensor, faulty PCM |
| P0107 | BARO | Manifold absolute pressure/BARO sensor low input | Open VREF, signal circuit short to ground, faulty sensor, faulty PCM |
| P0108 | BARO | Manifold absolute pressure/BARO sensor high input | Short to voltage, open in signal return, faulty sensor, faulty PCM |
| P0112 | IAT | Intake air temperature circuit low input | Short to ground, faulty sensor, faulty PCM |
| P0113 | IAT | Intake air temperature circuit high input | Short to voltage, open in signal return, faulty sensor, faulty PCM |
| P0117 | ECT | Engine coolant temperature circuit low input | Signal short to ground, faulty sensor, faulty PCM |
| P0118 | ECT | Engine coolant temperature high input | Signal short to voltage, open in return circuit, faulty sensor, faulty PCM |
| P0196 | EOT | Engine oil temperature sensor circuit range/performance | Faulty circuitry, faulty sensor, faulty thermostat, faulty PCM |
| P0197 | EOT | Engine oil temperature sensor circuit low input | Signal short to ground, faulty circuitry, faulty sensor, faulty PCM |
| P0198 | EOT | Engine oil temperature sensor circuit high input | Signal short to voltage, open in signal return, faulty circuitry, faulty sensor, faulty PCM |
| P0219 | | Engine overspeed condition | Excessive engine speed |
| P0230 | Fuel Pump | Fuel pump primary circuit | Open FP relay, inertia switch, faulty fuel pump |
| P0231 | Fuel Pump | Fuel pump secondary circuit low | Fuse, relay, inertia switch, fuel pump, open/short circuit |
| P0232 | Fuel Pump | Fuel pump secondary circuit high | Relay failure, short circuit, pump failure |
| P0236 | MAP | Turbo/supercharger boost sensor A circuit range/performance | Restricted exhaust, hose missing |
| P0237 | MAP | Turbo/supercharger boost sensor A circuit low | Circuit open, short to ground, faulty sensor |

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|--|--|
| P0238 | MAP | Turbo/supercharger boost sensor A circuit high | Circuit short to voltage, faulty sensor |
| P0261 | INJ | Cylinder #1 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0262 | INJ | Cylinder #1 injector circuit high | Circuit short to voltage |
| P0263 | INJ | Cylinder #1 contribution/balance | Power cylinder, valve train or injector failure |
| P0264 | INJ | Cylinder #2 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0265 | INJ | Cylinder #2 injector circuit high | Circuit short to voltage |
| P0266 | INJ | Cylinder #2 contribution/balance | Power cylinder, valve train or injector failure |
| P0267 | INJ | Cylinder #3 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0268 | INJ | Cylinder #3 injector circuit high | Circuit short to voltage |
| P0269 | INJ | Cylinder #3 contribution/balance | Power cylinder, valve train or injector failure |
| P0270 | INJ | Cylinder #4 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0271 | INJ | Cylinder #4 injector circuit high | Circuit short to voltage |
| P0272 | INJ | Cylinder #4 contribution/balance | Power cylinder, valve train or injector failure |
| P0273 | INJ | Cylinder #5 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0274 | INJ | Cylinder #5 injector circuit high | Circuit short to voltage |
| P0275 | INJ | Cylinder #5 contribution/balance | Power cylinder, valve train or injector failure |
| P0276 | INJ | Cylinder #6 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0277 | INJ | Cylinder #6 injector circuit high | Circuit short to voltage |
| P0278 | INJ | Cylinder #6 contribution/balance | Power cylinder, valve train or injector failure |
| P0279 | INJ | Cylinder #7 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0280 | INJ | Cylinder #7 injector circuit high | Circuit short to voltage |
| P0281 | INJ | Cylinder #7 contribution/balance | Power cylinder, valve train or injector failure |
| P0282 | INJ | Cylinder #8 injector circuit low | Short to ground, open circuit, faulty FICM, faulty injector |
| P0283 | INJ | Cylinder #8 injector circuit high | Circuit short to voltage |
| P0284 | INJ | Cylinder #8 contribution/balance | Power cylinder, valve train or injector failure |
| P0297 | INJ | Vehicle overspeed condition | Excessive engine speed |
| P0298 | EOT | Engine oil overtemperature condition | Faulty sensor, faulty circuitry, cooling system fault, faulty thermostat, faulty PCM |

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|--|---|
| P0299 | EP | Turbo/Supercharger Underboost | EP actual is less than commanded |
| P0300 | INJ | Random misfire detected | CKP/CMP not in sync, more that one cylinder is detected |
| P0301 | INJ | Cylinder #1 misfire detected | Mechanical engine failure |
| P0302 | INJ | Cylinder #2 misfire detected | Mechanical engine failure |
| P0303 | INJ | Cylinder #3 misfire detected | Mechanical engine failure |
| P0304 | INJ | Cylinder #4 misfire detected | Mechanical engine failure |
| P0305 | INJ | Cylinder #5 misfire detected | Mechanical engine failure |
| P0306 | INJ | Cylinder #6 misfire detected | Mechanical engine failure |
| P0307 | INJ | Cylinder #7 misfire detected | Mechanical engine failure |
| P0308 | INJ | Cylinder #8 misfire detected | Mechanical engine failure |
| P0335 | CKP | Crankshaft position sensor A circuit | Crankshaft sensor circuit |
| P0336 | CKP | Crankshaft position sensor A circuit range/performance | Crankshaft sensor circuit |
| P0340 | CMP | Camshaft position sensor A circuit (bank 1 or single sensor) | Camshaft sensor circuit |
| P0341 | CMP | Camshaft position sensor A circuit range/performance (bank 1 or signal sensor) | Camshaft sensor circuit |
| P0381 | GPL | Glow plug/heater indicator circuit | Open circuit, short to ground |
| P0401 | EGR | Exhaust gas recirculation flow insufficient detected | EGR valve, sensor failure |
| P0402 | EGR | Exhaust gas recirculation flow excessive detected | EGR valve, sensor failure |
| P0403 | EGR | Exhaust gas recirculation control circuit | Open circuit, short to ground, short to voltage, faulty valve, faulty PCM |
| P0404 | EGR | Exhaust gas recirculation control circuit range/performance | Difference between command and actual exceeds a specified limit |
| P0405 | EGR | Exhaust gas recirculation sensor A circuit low | Voltage below a specified range |
| P0406 | EGR | Exhaust gas recirculation sensor A circuit high | Voltage above a specified range |
| P0407 | EGR | Exhaust gas recirculation sensor B circuit low | Sensor, open circuit, short to ground |
| P0408 | EGR | Exhaust gas recirculation sensor B circuit high | Sensor, short to voltage |
| P0460 | FLI | Fuel level sensor circuit | Open circuit, short circuit, cluster, tank unit, open return |
| P0470 | EP | Exhaust pressure sensor | Faulty sensor, open signal return, faulty PCM |
| P0471 | EP | Exhaust pressure sensor range/performance | Faulty sensor, restricted supply tube, faulty PCM |
| P0472 | EP | Exhaust pressure sensor low input | Open VREF, short circuit, open circuit |
| P0473 | EP | Exhaust pressure sensor high input | Short to voltage |
| P0478 | EP | Exhaust pressure control valve high input | EP above specified value |

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|---|--|
| P0480 | VFAN | Fan 1 control circuit | Short to voltage, short to ground, open circuit |
| P0487 | EGR | EGR throttle position control circuit | Circuit open, shorted, actuator |
| P0488 | EGR | EGR throttle position control range/performance | Throttle plate, actuator, sensor |
| P0500 | VSS | Vehicle speed sensor A | Faulty sensor, circuit failure, PCM failure, trans failure, TR failure |
| P0528 | FSS | Fan speed sensor circuit no signal | Mechanical failure, short to voltage, open circuit, short to ground |
| P0560 | PCED | System voltage | Charging system failure |
| P0562 | PCED | System voltage low | Charging system failure |
| P0563 | PCED | System voltage high | Charging system failure |
| P0565 | SCCS | Cruise control ON signal | Open circuit, short circuit, switch failure, PCM failure to activate switch during testing |
| P0566 | SCCS | Cruise control OFF signal | Open circuit, short circuit, switch failure, PCM failure to activate switch during testing |
| P0567 | SCCS | Cruise control RESUME signal | Open circuit, short circuit, switch failure, PCM failure to activate switch during testing |
| P0568 | SCCS | Cruise control SET signal | Open circuit, short circuit, switch failure, PCM failure to activate switch during testing |
| P0569 | SCCS | Cruise control COAST signal | Open circuit, short circuit, switch failure, PCM failure to activate switch during testing |
| P0603 | PCED | Powertrain control module keep alive memory (KAM) error | Faulty connection, faulty PCM |
| P0605 | PCED | Powertrain control module read only memory (ROM) error | Internal PCM failure |
| P0606 | PCED | ECM/PCM processor | Internal PCM fault |
| P0611 | FICM | Fuel injector control module performance | Internal FICM failure |
| P0620 | ALT | Generator 1 control circuit | Charging system |
| P0623 | ALT | Generator lamp control circuit | Charging system |
| P0645 | PCED | A/C clutch relay control circuit | A/C circuit, A/C relay |
| P0649 | PCED | Cruise control lamp control circuit | Circuit continuity |
| P0670 | GPCM | Glow plug module control circuit | Short to voltage, short to ground, open circuit |
| P0671 | GPCM | Cylinder 1 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0672 | GPCM | Cylinder 2 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0673 | GPCM | Cylinder 3 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|---|---|
| P0674 | GPCM | Cylinder 4 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0675 | GPCM | Cylinder 5 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0676 | GPCM | Cylinder 6 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0677 | GPCM | Cylinder 7 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0678 | GPCM | Cylinder 8 glow plug circuit | Circuit open, short to ground, short to voltage, faulty glow plug |
| P0683 | GPCM | Glow plug control module to PCM communication circuit | Open circuit, short to voltage, short to ground, faulty PCM |
| P0700 | TR | Transmission control system (MIL request) | Internal transmission fault |
| P0703 | BOO | Brake switch B input circuit | Short to ground, open circuit, short to voltage, faulty PCM |
| P0704 | CPP | Clutch switch input circuit | Short to ground, open circuit, short to voltage, faulty PCM |
| P1000 | PCED | OBD systems readiness test not complete | OBD monitors/drive cycles incomplete |
| P1001 | PCED | KOER not able to complete, KOER aborted | Entry conditions for KOER self-test not met |
| P1102 | MAF | Mass air flow sensor in range but lower than expected | VPWR open, return circuit open, signal short to ground sensor |
| P1139 | WIF | Water in fuel indicator | WIF lamp, faulty PCM |
| P1148 | ALT | Generator 2 control circuit | Charging system |
| P1149 | ALT | Generator 2 control circuit high | Charging system |
| P1184 | EOT | Engine oil temperature sensor out of self test range | Engine too cold/hot, leaking thermostat, faulty sensor |
| P1260 | | Theft detected, vehicle immobilized | Anti-theft system failure |
| P1284 | ICP | Aborted KOER — injector control pressure regulator | IPR valve, circuit failure |
| P1334 | EGR | EGR throttle position sensor minimum stop performance | Throttle plate, actuator sensor |
| P1335 | EGR | EGR position sensor minimum stop performance | Difference between command and actual exceeds limit |
| P1378 | INJ Module | FICM supply voltage circuit low | Faulty connection, fuse, faulty relay, short to ground, charging system |
| P1379 | INJ Module | FICM supply voltage circuit high | Charging system |
| P1408 | EGR | Exhaust gas recirculation flow out of self test range | EGR above/below required calibration |
| P1464 | ACCS | A/C demand out of self test range | Operator error, A/C circuit shorted to voltage |
| P1501 | VSS | Vehicle speed sensor out of self test range | Operator error |

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|---|--|
| P1502 | PCED | Invalid test — auxiliary power control module functioning | APCM active while KOER test is running |
| P1531 | PCED | Invalid test — accelerator pedal movement | Accelerator moved during KOER testing |
| P1536 | PBA | Parking brake switch circuit | Circuit, switch, PCM failed to activate switch during KOER |
| P1635 | PCM | Tire/axle out of acceptable range | PCM programming |
| P1636 | PCM | Vehicle ID block corrupted, not programmed | PCM programming |
| P1703 | BOO | Brake switch out of self test range | During KOER self-test the BPP signal did not cycle high and low. |
| P1705 | TR | Transmission range circuit not indicating park/neutral during self test | Trans range failure |
| P1725 | | Insufficient engine speed increase during self-test | System voltage out of self-test range. Repeat the self-test. |
| P1726 | | Insufficient engine speed decrease during self-test | System voltage out of self-test range. Repeat the self-test. |
| P2122 | APP | Throttle/pedal position sensor/switch D circuit low input | Faulty sensor, poor connection, open in signal circuit, signal circuit short to ground, faulty PCM |
| P2123 | APP | Throttle/pedal position sensor/switch D circuit high input | Short to voltage, signal return open, faulty sensor, faulty PCM |
| P2127 | APP | Throttle/pedal position sensor/switch E circuit low input | Faulty sensor, poor connection, open in signal circuit, signal circuit short to ground, faulty PCM |
| P2128 | APP | Throttle/pedal position sensor/switch E circuit high input | Short to voltage, signal return open, faulty sensor, faulty PCM |
| P2132 | APP | Throttle/pedal position sensor/switch F circuit low input | Faulty sensor, poor connection, open in signal circuit, signal circuit short to ground, faulty PCM |
| P2133 | APP | Throttle/pedal position sensor/switch F circuit high input | Short to voltage, signal return open, faulty sensor, faulty PCM |
| P2138 | APP | Throttle/pedal position sensor/switch D/E voltage correlation | Difference in sensor readings |
| P2139 | APP | Throttle/pedal position sensor/switch D/F voltage correlation | Difference in sensor readings |
| P2140 | APP | Throttle/pedal position sensor/switch E/F voltage correlation | Difference in sensor readings |
| P2199 | IAT | Intake air temperature 1/2 correlation | Difference between IAT and IAT2 exceeds a specified value |
| P2262 | MAP | Turbo/supercharger boost pressure not detected — mechanical | Minimum boost under load, MAP hose disconnected. |
| P2263 | EP | Turbo/supercharger system performance | EP actual exceeds commanded for a specified time |
| P2269 | WIF | Water in fuel condition | Water in fuel, faulty connection, short in circuit, faulty sensor, faulty PCM |

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Diagnostic Trouble Code (DTC) Descriptions

| Fault Code | Circuit Index | Condition Description | Probable Causes |
|------------|---------------|--|--|
| P2284 | ICP | Injector control pressure sensor circuit range/performance | A difference in commanded versus actual injection oil pressure was detected. |
| P2285 | ICP | Injector control pressure sensor circuit low | ICP signal is lower than specified value |
| P2286 | ICP | Injector control pressure sensor circuit high | ICP signal is higher than specified value |
| P2288 | ICP | Injector control pressure too high | ICP pressure is greater than specified value |
| P2289 | ICP | Injector control pressure too high — engine OFF | ICP pressure is greater than specified value |
| P2290 | ICP | Injector control pressure too low | Actual pressure is less than commanded for a specified time |
| P2291 | ICP | Injector control pressure too low — engine cranking | ICP cranking pressure too low |
| P2552 | FICMM | FICMM circuit - throttle/fuel inhibit circuit | RPM out of range for closed pedal position |
| P2614 | CMP | Camshaft position output circuit | Incorrect CMP signal |
| P2617 | CKP | Crankshaft position output circuit | Incorrect CKP signal |
| P2623 | IPR | Injector control pressure regulator circuit | Open circuit, short to ground, IPR stuck |
| U0101 | PCED | Lost communication with TCM | Communication failure |
| U0105 | PCED | Lost communication with FICM | Communication failure |
| U0155 | PCED | Lost communication with instrument cluster | Communication failure |
| U0306 | PCED | Software incompatibility with fuel injector control module | Communication failure |
| P1610 | PCED | Install a new PCM module | PCM flashing failure |
| P1611 | PCED | Diagnose further | PCM flashing failure |
| P1615 | PCED | Flash erase error | PCM flashing failure |
| P1616 | PCED | Flash erase error, low voltage | PCM flashing failure |
| P1617 | PCED | Block programming error | PCM flashing failure |
| P1618 | PCED | Block programming error, low voltage | PCM flashing failure |

