SECTION 6

Reference Values

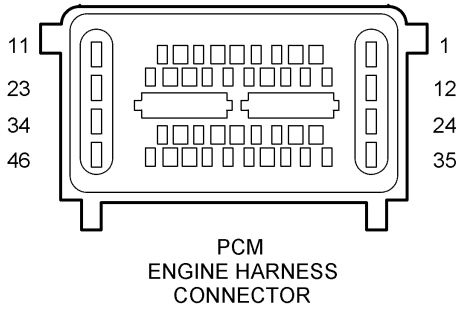
Contents

Control System Diagnostic Sheet Reference

Note: Reference values are typical and may vary 10% depending upon current altitude, accessory operation, engine load, operating time, temperature, and vehicle speed.

PCM Pin Descriptions and Expected Values

46 PIN



PCM
ENGINE HARNESS
CONNECTOR

A0063433

Engine

Pin Number	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 Equals Relay ON B+ Equals Relay OFF
4	GEN2C	B+	B+	B+	B+	Generator 2 Monitor (Dual Generator Only) 0 Equals 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	VGTCH	B+	B+	B+	B+	Variable Geometry Turbo Actuator Voltage

(Continued)

Control System Diagnostic Sheet Reference

Engine

Pin Number	Name	Key On	Low Idle	High Idle	Operating Range	Comments
12	N/A	N/A	N/A	N/A	N/A	N/A
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 Equals ON B+ Equals OFF
15	PTOC	0	0	0	0	PTO Control
16	BCPIL	0	0	0	0	Battery Charge Protection Indicator Lamp
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	11.2 - 12.2	10.3	0 - VPWR	EGR Solenoid Control (Pulse Width Modulated)
24	N/A	N/A	N/A	N/A	N/A	N/A
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 Equals 101 kPa (14.7 psi) 4.7 Equals 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	0.15 - 4.7	Injection Control Pressure Sensor Signal 1.0 Equals 4.5 MPa (652 psi) 4.45 Equals 28 MPa (4061 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 4.9 Equals -40°C (-40°F) 0.47 Equals 100°C (212°F)
33	EGRVP	0.8	0.8 - 1.0	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
36	VREF	5	5	5	5 ± 0.5	VREF

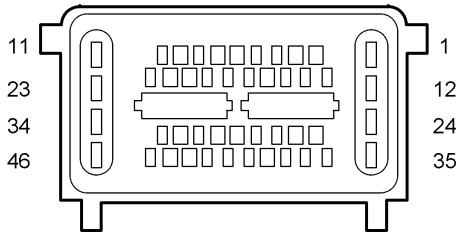
(Continued)

Control System Diagnostic Sheet Reference

Engine

Pin Number	Name	Key On	Low Idle	High Idle	Operating Range	Comments
37	CAN2H	2.9	2.9	2.9	-3 - 16	CAN+ Module Communications (PCM to FICM)
38	N/A	N/A	N/A	N/A	N/A	N/A
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 4.9 Equals -40°C (-40°F) 0.47 Equals 100°C (212°F)
45	IAT2	2.7	3.7	2.9	0.2 - 4.7	Manifold Air Temperature 4.3 Equals 0°C (32°F) 2.5 Equals 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 Number	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+ Equals A/C OFF 0 Equals 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 Equals Enabled
5	FPC	0/B+	0	0	0	Fuel Pump Relay Control B+ Equals Pump OFF 0 Equals 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+ Equals A/C ON 0 Equals A/C OFF
9	BCPSW	—	—	—	—	Battery Charge Protection
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 Equals PTO Disengaged B+ Equals 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 Greater Than 4.4 Water Less Than 3.3
16	ACPSW	0	0/B+	0/B+	0/B+	A/C Pressure Switch 12 Equals A/C Pressure Less Than 325 psig 0 Equals A/C Pressure Greater Than 325 psig
17	PBA	0/B+	0/B+	0/B+	0/B+	Park Brake Applied 0 Equals Brake Applied 12 Equals Brake OFF
18	BPP	0/B+	0/B+	0/B+	0/B+	Brake Pedal Position 12 Equals Brake Applied 0 Equals Brake OFF
19	FPM	0/B+	B+	B+	B+	Fuel Pump Monitor B+ Equals 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

(Continued)

Control System Diagnostic Sheet Reference

Body

Pin Number	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 Equals 0.8 - 1.1 WOT Equals 3.1 - 3.5
26	APP1	4.1	4.1	3.5	0.7 - 4.2	Accelerator Pedal Track 1 CT Equals 3.9 - 4.2 WOT Equals 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 Equals Brake Applied B+ Equals 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 Switches ON Equals B+ OFF Equals 0 SET+ Equals 2.8 RESUME Equals 4.7 SET- Equals 0.8 HOLD Equals 6.6
32	PTOGND	0	0	0	0	PTO Ground
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 Equals Switch OFF B+ Equals Switch ON Clutch Pedal Position Switch (Manual Trans) 0 Equals Pedal APPLIED B+ Equals Pedal OFF
37	APP2	1.53	1.53	2.00	1.4 - 4.1	Accelerator Pedal Track 2 CT Equals 1.4 - 1.6 WOT Equals 3.6 - 4.1
38	BARO	4.6	4.6	4.6	0.5 - 4.5	Barometric Pressure
39	FEPS	0	0	0	N/A	Flash EPROM Digital Signal
40	KAPWR	B+	B+	B+	B+	Keep Alive Power
41	MAP	1.35	1.41	1.61	0.5 - 4.5	Manifold Absolute Pressure 1.35 Equals 103 kPa (14.9 psi) 4.5 Equals 300 kPa (43.5 psi)
42	MAF	0	1.36	2.65	0 - 4.7	Mass Air Flow Signal

(Continued)

Control System Diagnostic Sheet Reference

Body

Pin Number	Name	Key On	Low Idle	High Idle	Operating Range	Comments
43	IAT1	2.3	3.1	2.5	0.13 - 4.9	Intake Air Temperature (Mass Air Flow Assembly) 4.9 Equals -40°C (-40°F) 0.5 Equals 100°C (212°F)
44	PTO VREF	5.0	5.0	5.0	5.0	PTO Reference Voltage
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
AST	00:00	00:07	01:00	-	min : sec	Time Since Start
B+	12.6	13.3	14.0	10.5 - 15.5	VOLT	Battery Voltage
BARO	96.5 (14)	96.5 (14)	96.5 (14)	50 - 120 (7.3 - 17.4)	kPa (PSI)	Barometric Pressure
BOO	OFF	OFF	OFF	ON/OFF	ON/OFF	Brake Pedal
BPA	OFF	OFF	OFF	ON/OFF	ON/OFF	Brake Pressure Applied
CLRDIST	926.1	926.1	926.1	-	Miles	Distance Since DTCs Cleared
CLRWRMUP	2	2	2	-	Numeric Value	Number of Warmups Since DTCs Cleared
CMPFM	NO FAULT	NO FAULT	NO FAULT	NO FAULT	NO FAULT/ YES FAULT	CMP Status

(Continued)

Control System Diagnostic Sheet Reference

PIDS

Acronym	Key On	Low Idle	High Idle	Operating Range	Measurement Units	Description
CPP/PNP	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	DRIVE/ NEUTRAL	Clutch Pedal Position
DECHOKE	No	No	No	-	Yes/No	Dechoke Mode
DRIVECNT	6	7	7	0 - 65535	NUMBER	Valid Drive Counter
DTCCNT	0	0	0	0 - 255	NUMBER	DTC Count
ECT	88 (190)	88 (190)	88 (190)	-40 - 121 (-40 - 250)	TEMPERA-TURE °C (°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 - 15	32	0 - 44	PERCENT	EGR Duty Cycle
EGR__F	NO FAULT	NO FAULT	NO FAULT	0 - 44	FAULT/NO FAULT	EGR Status
EGRVP	0.8	0.8 - 1.0	1.3	0.6 - 3.5	VOLT	EGR Valve Position
EGRVPDES	0	0	9.72	0 - 14	PERCENT	EGR Desired
EOT	88 (190)	88 (190)	88 (190)	-40 - 150 (-40 - 302)	TEMPERA-TURE °C (°F)	Oil Temperature
EOTFM	NO FAULT	NO FAULT	NO FAULT	NO FAULT	NO FAULT/ YES FAULT	EOT Status
EP	103 (15)	110 (16)	110 (16)	55 - 607 (8 - 88)	kPa (PSI)	Exhaust Pressure
EP__V	0.8	1.2	1.3	0.4 - 4.7	VOLT	Exhaust Pressure
EP DSD	3.26	2.43	2.13		PSI	Exhaust Pressure Desired
FANSS	0	533	488	0 - 4000	RPM	Fan Speed
FANSSM	LOW	LOW	LOW	LOW	LOW/HIGH	Cooling Fan Driver
FAN VAR #	0	0	0	0 - 100	Percent	Fan Speed Monitor
FAN VAR__F	NO FAULT	NO FAULT	NO FAULT	NO FAULT	NO FAULT/ YES FAULT	Fan Speed Monitor
FICMSYNC	NO	YES	YES	YES	YES/NO	Synchronization from FICM
FICM_LPWR	12.0	13.5	13.5	10.5 - 15.5	VOLTS	FICM Logic Power[1]

(Continued)

1 FICM logic power from the FICM relay.

Control System Diagnostic Sheet Reference

PIDS

Acronym	Key On	Low Idle	High Idle	Operating Range	Measurement Units	Description
FICM_MPWR	47	47.5	47.5	40 - 52	VOLTS	FICM Main Power[2]
FICM_VPWR	12.0	14.0	14.0	10.5 - 15.5	VOLTS	FICM Vehicle Power[3]
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
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
GPCTM	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	TEMPERA-TURE (°F)	Intake Air Temp (MAF Assembly)
IAT2	113	113	113	-40 - 250	TEMPERA-TURE °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	0.15 - 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

(Continued)

2 FICM injector power supply from the FICM relay.
3 FICM vehicle power from the ignition switch.

Control System Diagnostic Sheet Reference

PIDS

Acronym	Key On	Low Idle	High Idle	Operating Range	Measurement Units	Description
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	24	40.60	0 - 50	PERCENT	Injection Pressure Regulator
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
MAF__FM	NO FAULT	NO FAULT	NO FAULT	NO FAULT	NO FAULT/ YES FAULT	Mass Air Flow Status
MAP	96 (14)	96 (14)	103 (15)	41 - 324 (6 - 47)	kPa (PSI)	Manifold Absolute Pressure
MAP__V	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
MIL__DIS	926.1	926.1	926.1	-	Miles	Distance Since MIL Activated
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

(Continued)

Control System Diagnostic Sheet Reference

PIDS

Acronym	Key On	Low Idle	High Idle	Operating Range	Measurement Units	Description
PNP	Neutral	Neutral	Neutral	Park/Neutral	Park/Neutral	Park/Neutral Position Switch
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 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	N0/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
VGTDC #	0	73	43	0 - 100	PERCENT	Turbo Duty Cycle
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	DTC Description	Probable Causes
P0046	VGT Solenoid	Turbo/Super Charger Boost Control Solenoid Circuit Range/Performance	Open circuit, control circuit short to voltage, control circuit short to ground, solenoid
P0069	BARO	MAP/BARO Correlation	Biased MAP or BARO sensor, circuitry
P0096	IAT2	Intake Air Temperature Sensor 2 Circuit Range/Performance	IAT2 sensor biased, circuitry
P0097	IAT2	Intake Air Temperature Sensor 2 Circuit Low Input	Short to ground, IAT2 sensor
P0098	IAT2	Intake Air Temperature Sensor 2 Circuit High Input	Short to voltage, signal circuit open, IAT2 sensor
P0101	MAF	Mass or Volume Air Flow Circuit Range/Performance	Restricted air flow, MAF sensor, contamination, intake air leak
P0103	MAF	Mass or Volume Air Flow Circuit High Input	Restriction, water intrusion, signal short to voltage, return circuit open, MAF sensor
P0107	BARO	Manifold Absolute Pressure/BARO Sensor Low Input	Open VREF, signal circuit short to ground, BARO sensor
P0108	BARO	Manifold Absolute Pressure/BARO Sensor High Input	Short to voltage, signal return circuit open, BARO sensor
P0112	IAT	Intake Air Temperature Circuit Low Input	Short to ground, IAT sensor
P0113	IAT	Intake Air Temperature Circuit High Input	Short to voltage, signal circuit open, IAT sensor
P0117	ECT	Engine Coolant Temperature Circuit Low Input	Short to ground, ECT sensor
P0118	ECT	Engine Coolant Temperature High Input	Short to voltage, signal circuit open, ECT sensor
P012F	ECT	Engine Coolant Temperature/ Engine Oil Temperature Correlation	Low engine coolant level, cooling system flow restriction, cooling system pressure loss, ECT sensor, EOT sensor
P0196	EOT	Engine Oil Temperature Sensor Circuit Range/Performance	Circuitry, biased sensor, thermostat
P0197	EOT	Engine Oil Temperature Sensor Circuit Low Input	Short to ground, EOT sensor
P0198	EOT	Engine Oil Temperature Sensor Circuit High Input	Short to voltage, signal circuit open, EOT sensor
P0219		Engine Overspeed Condition	Incorrect downshift, CKP and CMP interference, excessive engine speed
P0230	Fuel Pump	Fuel Pump Primary Circuit	Control circuit open, fuel pump relay
P0231	Fuel Pump	Fuel Pump Secondary Circuit Low	Inertia switch, fuel pump relay, open or short circuit
P0232	Fuel Pump	Fuel Pump Secondary Circuit High	Fuel pump relay, short circuit, fuel pump
P0234	MAP	Turbo/Super Charger Overboost Condition	MAP circuit short to voltage, Damaged MAP sensor, Damaged EP sensor, Turbocharger vane concerns
P0236	MAP	Turbo/Super Charger Boost Sensor A Circuit Range/Performance	Restricted exhaust, MAP hose, MAP sensor

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

Fault Code	Circuit Index	DTC Description	Probable Causes
P0237	MAP	Turbo/Super Charger Boost Sensor A Circuit Low	Open circuit, short to ground, MAP sensor
P0238	MAP	Turbo/Super Charger Boost Sensor A Circuit High	Circuit short to voltage, MAP sensor, tubocharger vane concerns
P0261	INJ	Cylinder Number 1 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0262	INJ	Cylinder Number 1 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0263	INJ	Cylinder Number 1 Contribution/Balance	Power cylinder, valve train or injector
P0264	INJ	Cylinder Number 2 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0265	INJ	Cylinder Number 2 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0266	INJ	Cylinder Number 2 Contribution/Balance	Power cylinder, valve train or injector
P0267	INJ	Cylinder Number 3 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0268	INJ	Cylinder Number 3 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0269	INJ	Cylinder Number 3 Contribution/Balance	Power cylinder, valve train or injector
P0270	INJ	Cylinder Number 4 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0271	INJ	Cylinder Number 4 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0272	INJ	Cylinder Number 4 Contribution/Balance	Power cylinder, valve train or injector
P0273	INJ	Cylinder Number 5 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0274	INJ	Cylinder Number 5 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0275	INJ	Cylinder Number 5 Contribution/Balance	Power cylinder, valve train or injector
P0276	INJ	Cylinder Number 6 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0277	INJ	Cylinder Number 6 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0278	INJ	Cylinder Number 6 Contribution/Balance	Power cylinder, valve train or injector
P0279	INJ	Cylinder Number 7 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0280	INJ	Cylinder Number 7 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0281	INJ	Cylinder Number 7 Contribution/Balance	Power cylinder, valve train or injector
P0282	INJ	Cylinder Number 8 Injector Circuit Low	Open circuit, fuel injector, FICM connector loose
P0283	INJ	Cylinder Number 8 Injector Circuit High	Circuit short to ground or voltage, fuel injector
P0284	INJ	Cylinder Number 8 Contribution/Balance	Power cylinder, valve train or injector
P0297	INJ	Vehicle Overspeed Condition	Excessive engine speed, VSS interference

(Continued)

Diagnostic Trouble Code (DTC) Descriptions

Fault Code	Circuit Index	DTC Description	Probable Causes
P0298	EOT	Engine Oil Overtemperature Condition	EOT sensor, circuitry, cooling system, thermostat
P0299	EP	Turbo/Super Charger Underboost	EP sensor, VGT control valve slow/lack of response, tubocharger vane concerns
P0300	INJ	Random Misfire Detected	Oil/fuel aeration, base engine
P0301	INJ	Cylinder Number 1 Misfire Detected	Base engine, injector
P0302	INJ	Cylinder Number 2 Misfire Detected	Base engine, injector
P0303	INJ	Cylinder Number 3 Misfire Detected	Base engine, injector
P0304	INJ	Cylinder Number 4 Misfire Detected	Base engine, injector
P0305	INJ	Cylinder Number 5 Misfire Detected	Base engine, injector
P0306	INJ	Cylinder Number 6 Misfire Detected	Base engine, injector
P0307	INJ	Cylinder Number 7 Misfire Detected	Base engine, injector
P0308	INJ	Cylinder Number 8 Misfire Detected	Base engine, injector
P0335	CKP	Crankshaft Position Sensor A Circuit	Circuitry, CKP sensor, electrical noise
P0336	CKP	Crankshaft Position Sensor A Circuit Range/Performance	Circuitry, CKP sensor, electrical noise
P0340	CMP	Camshaft Position Sensor A Circuit (Bank 1 or Single Sensor)	Circuitry, CMP sensor, electrical noise
P0341	CMP	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or Single Sensor)	Circuitry, CMP sensor, electrical noise
P0381	GPL	Glow Plug/Heater Indicator Circuit	Open circuit, short to ground, indicator
P0401	EGR	Exhaust Gas Recirculation Flow Insufficient Detected	EGR valve (integral to the EGR actuator), EGR valve O-rings, EGR position sensor bias, EP sensor bias, MAF sensor contamination, MAF sensor
P0402	EGR	Exhaust Gas Recirculation Flow Excessive Detected	EGR valve, EGR position sensor bias, EP sensor bias
P0403	EGR	Exhaust Gas Recirculation Control Circuit	Open circuit, short to ground or voltage, EGR valve
P0404	EGR	Exhaust Gas Recirculation Control Circuit Range/Performance	EGR sensor or valve, EGR position circuit, tubocharger vane concerns
P0405	EGR	Exhaust Gas Recirculation Sensor A Circuit Low	Open circuit, short to ground, EGR position sensor
P0406	EGR	Exhaust Gas Recirculation Sensor A Circuit High	Short to voltage, EGR position sensor
P0460	FLI	Fuel Level Sensor A Circuit	Open circuit, short circuit, fuel sending unit, instrument cluster
P0462	FLI	Fuel Level Sensor A Circuit Low Input	Open circuit, short circuit, fuel sending unit, instrument cluster
P0463	FLI	Fuel Level Sensor A Circuit High Input	Open circuit, short circuit, fuel sending unit, instrument cluster
P0470	EP	Exhaust Pressure Sensor	EP sensor, open signal return
P0471	EP	Exhaust Pressure Sensor Range/Performance	EP sensor, restricted supply tube

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Diagnostic Trouble Code (DTC) Descriptions

Fault Code	Circuit Index	DTC Description	Probable Causes
P0472	EP	Exhaust Pressure Sensor Low Input	Open VREF, short circuit, open circuit, EP sensor
P0473	EP	Exhaust Pressure Sensor High Input	Short to voltage, EP sensor
P0478	EP	Exhaust Pressure Control Valve High Input	EP sensor, VGT control valve slow/lack of response, tubocharger vane concerns
P0480	VFAN	Fan 1 Control Circuit	Short to voltage, short to ground, open circuit
P0500	VSS	Vehicle Speed Sensor A	VSS sensor, circuitry
P0528	FSS	Fan Speed Sensor Circuit No Signal	Mechanical fault, short to voltage, open circuit, short to ground
P0560	PCED	System Voltage	Charging system concern, Battery voltage low, VBAT circuit, PCM power relay, Aftermarket accessories
P0562	PCED	System Voltage Low	Charging system fault
P0563	PCED	System Voltage High	Charging system fault
P0565	SCCS	Cruise Control ON Signal	Open circuit, short circuit, switch
P0566	SCCS	Cruise Control OFF Signal	Open circuit, short circuit, switch
P0567	SCCS	Cruise Control RESUME Signal	Open circuit, short circuit, switch
P0568	SCCS	Cruise Control SET Signal	Open circuit, short circuit, switch
P0569	SCCS	Cruise Control COAST Signal	Open circuit, short circuit, switch
P0605	PCED	Powertrain Control Module Read Only Memory (ROM) error	Internal PCM failure
P0606	PCED	ECM/PCM Processor	Internal PCM fault, Engine oil temperature (EOT) sensor connector intermittent connection
P0611	FICM	Fuel Injector Control Module Performance	Internal FICM error
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 circuitry, A/C relay
P0649	PCED	Cruise Control Lamp Control Circuit	Circuitry, indicator
P0670	GPCM	Glow Plug Module Control Circuit	Short to voltage, short to ground, open circuit
P0671	GPCM	Cylinder 1 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0672	GPCM	Cylinder 2 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0673	GPCM	Cylinder 3 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0674	GPCM	Cylinder 4 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0675	GPCM	Cylinder 5 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0676	GPCM	Cylinder 6 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug

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Diagnostic Trouble Code (DTC) Descriptions

Fault Code	Circuit Index	DTC Description	Probable Causes
P0677	GPCM	Cylinder 7 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0678	GPCM	Cylinder 8 Glow Plug Circuit	Open circuit, short to ground, short to voltage, glow plug
P0683	GPCM	Glow Plug Control Module to PCM Communication Circuit	Open circuit, short to voltage, short to ground
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, switch
P0830	CPP	Clutch Pedal Switch A Circuit	Short to ground, open circuit, short to voltage, switch
P0833	CPP	Clutch Pedal Switch B Circuit	Short to ground, open circuit, short to voltage, switch
P1000	PCED	OBD Systems Readiness Test Not Complete	OBD monitors/drive cycle 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 circuit open, return circuit open, signal short to ground, sensor
P1148	ALT	Generator 2 Control Circuit	Charging system
P1149	ALT	Generator 2 Control Circuit High	Charging system
P115A	FLI	Low Fuel Level - Forced Limited Power	Low fuel level
P1184	EOT	Engine Oil Temperature Sensor Out Of Self-Test Range	Engine too cold/hot, thermostat
P1260		Theft Detected, Vehicle Immobilized	Anti-theft system fault
P1284	ICP	Aborted KOER — Injector Control Pressure regulator	IPR valve, circuit failure
P1335	EGR	EGR Position Sensor Minimum Stop Performance	EGR valve
P1378	INJ Module	FICM Supply Voltage Circuit Low	FICM connections, relay, short to ground, charging system
P1379	INJ Module	FICM Supply Voltage Circuit High	Charging system
P1397	GPCM	System Voltage Out Of Self-Test Range	Charging system under/overcharge
P1408	EGR	Exhaust Gas Recirculation Flow Out Of Self-Test Range	EGR control circuit open, short to ground or voltage
P1464	ACCS	A/C Demand Out Of Self-Test Range	A/C circuit shorted to voltage, A/C on during self-test
P1501	VSS	Vehicle Speed Sensor Out Of Self-Test Range	VSS sensor, circuitry
P1502	PCED	Invalid Test — Auxiliary Power Control Functioning	Power take-off or auxiliary idle control active during self-test
P1531	PCED	Invalid Test — Accelerator Pedal Movement	Accelerator moved during KOER self-test
P1536	PBA	Parking Brake Switch Circuit	Circuitry, switch
P1610	PCED	Install a New PCM Module	PCM flashing error

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Diagnostic Trouble Code (DTC) Descriptions

Fault Code	Circuit Index	DTC Description	Probable Causes
P1611	PCED	Diagnose Further	PCM flashing error
P1615	PCED	Flash Erase Error	PCM flashing error
P1616	PCED	Flash Erase Error, Low Voltage	PCM flashing error
P1617	PCED	Block Programming Error	PCM flashing error
P1618	PCED	Block Programming Error, Low Voltage	PCM flashing error
P1633	PCED	Keep Alive Power Voltage Too Low	Open circuit, short to ground
P1635	PCM	Tire/Axle Out Of Acceptable Range	PCM programming
P1639	PCM	Vehicle ID Block Corrupted, Not programmed	PCM programming
P1703	BOO	Brake Switch Out Of Self-Test Range	Switch, circuitry, switch not cycled during self-test
P1705	TR	Transmission Range Circuit Not Indicating Park/Neutral During Self-Test	TR sensor, circuitry
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.
P2067	FLI	Fuel Level Sensor A Circuit Low Input	Open circuit, short circuit, fuel sending unit, instrument cluster
P2068	FLI	Fuel Level Sensor A Circuit High Input	Open circuit, short circuit, fuel sending unit, instrument cluster
P2104	APP	Throttle Actuator Control System - Forced Idle	APP sensor, signal circuit shorted
P2122	APP	Throttle/Pedal Position Sensor/Switch D Circuit Low Input	APP sensor, connections, open in signal circuit, signal circuit short to ground
P2123	APP	Throttle/Pedal Position Sensor/Switch D Circuit High Input	Short to voltage, signal return open, APP sensor
P2127	APP	Throttle/Pedal Position Sensor/Switch E Circuit Low Input	APP sensor, connection, open in signal circuit, signal circuit short to ground
P2128	APP	Throttle/Pedal Position Sensor/Switch E Circuit High Input	Short to voltage, signal return open, APP sensor
P2132	APP	Throttle/Pedal Position Sensor/Switch F Circuit Low Input	APP sensor, poor connection, open in signal circuit, signal circuit short to ground
P2133	APP	Throttle/Pedal Position Sensor/Switch F Circuit High Input	Short to voltage, signal return open, APP sensor
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	Sensor bias, open/shorted circuit

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Diagnostic Trouble Code (DTC) Descriptions

Fault Code	Circuit Index	DTC Description	Probable Causes
P2262	MAP	Turbo/Super Charger Boost Pressure Not Detected — Mechanical	CAC system leaks, MAP hose disconnected, exhaust system leaks, intake system leaks, tubocharger vane concerns
P2263	MAP	Turbo/Super Charger System Performance	CAC system leaks, MAP hose disconnected, exhaust system leaks, intake system leaks, tubocharger vane concerns
P2269	WIF	Water In Fuel Condition	Water in fuel, connections, short circuit, WIF sensor
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	Open circuit, short to ground, ICP sensor
P2286	ICP	Injector Control Pressure Sensor Circuit High	Short to voltage, ICP sensor
P2287	ICP	Injector Control Pressure Sensor Circuit Intermittent	ICP signal is intermittent
P2288	ICP	Injector Control Pressure Too High	ICP pressure is greater than specified value
P2289	ICP	Injector Control Pressure Too High — Engine OFF	Signal ground circuit open, ICP sensor
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
P2457	EGR Cooler	EGR Cooler Range/Performance	Engine is overheating, Cooling system has a restriction, Charge air cooler restriction, EGR Cooler restriction
P2552	FICMM	FICMM Circuit — Throttle/Fuel Inhibit Circuit	Open/short circuit
P2614	CMP	Camshaft Position Output Circuit	CMPO circuit noise, connections, circuitry
P2617	CKP	Crankshaft Position Output Circuit	CKPO circuit noise, connections, circuitry
P2623	IPR	Injector Control Pressure Regulator Circuit	Open circuit, short to ground, IPR stuck
U0101	PCED	Lost Communication With ECM/PCM A	Internal communication error
U0101	PCED	Lost Communication With TCM	Internal communication error
U0105	PCED	Lost Communication With FICM	Communication error
U0155	PCED	Lost Communication With Instrument Cluster	Communication error
U0306	PCED	Software Incompatibility With Fuel Injector Control module	Communication error