KE: Injection Pressure Regulator (IPR)

KE: Introduction

KE1 DIAGNOSTIC TROUBLE CODE (DTC) P1283

Note: DTC P1283 indicates an IPR circuit failure was detected by the PCM.

- Disconnect IPR harness connector.
- Remove PCM relay.
- Measure resistance between IPR harness connector pin A and PCM relay terminal 361 (RD).

Is the resistance less than 5 ohms?

Yes	No
GO to KE2 .	REPAIR open circuit 361 (RD). RESTORE system. CLEAR DTCs and RETEST.

KE2 CHECK IPR COIL RESISTANCE

- Measure resistance of IPR coil.

Is the resistance 5 to 20 ohms?

Yes	No
GO to KE3 .	INSTALL a new IPR. RESTORE system. CLEAR DTCs and RETEST.

KE3 IPR CONTROL CIRCUIT SHORT TO POWER OR GROUND

- Install breakout box; leave PCM disconnected.
- Measure resistance between PCM test pin 83 and PCM test pins 71 and 97.
- Measure resistance between PCM test pin 83 and PCM test pins 25, 51, 77 and 103.

Is the resistance greater than 10,000 ohms?

Yes	No
GO to KE4 .	REPAIR short in circuit 552 (YE/RD). RESTORE system. CLEAR DTCs and RETEST.

KE4 IPR HARNESS CONTROL CIRCUIT — RESISTANCE

- Measure resistance between PCM test pin 83 and point B in the IPR regulator harness connector.

Is the resistance less than 5 ohms?

Yes	No
INSTALL a new PCM. RESTORE system. CLEAR DTCs and RETEST.	REPAIR open circuit 552 (YE/RD). RESTORE system. CLEAR DTCs and RETEST.

KE5 DIAGNOSTIC TROUBLE CODE (DTC) P1282

- DTC P1282 indicates excessive injection control pressure was detected during continuous diagnostic monitoring.
- Possible causes:
  - intermittent IPR control circuit short to ground
  - stuck IPR
- Disconnect IPR harness connector.

Will the engine start?

Yes	No
INSTALL a new IPR. RESTORE system. CLEAR DTCs and RETEST.	GO to KE6 .

KE6 CHECK FOR INTERMITTENT SHORT TO GROUND

- Install breakout box; leave the PCM disconnected.
- Measure resistance between PCM test pin 83 and ground.
- Wiggle IPR circuit connectors and wires to attempt to induce short to ground.

Is the resistance greater than 10,000 ohms?

Yes	No
CLEAR codes. RERUN KOER test. If codes return, INSTALL a new PCM. RESTORE system. CLEAR DTCs and RETEST.	REPAIR short to ground. RESTORE system. CLEAR DTCs and RETEST.

KE7 KOER ON-DEMAND DIAGNOSTIC TROUBLE CODE (DTC) P1211

- DTC P1211 indicates that injection control pressure was above or below commanded desired pressure during self test mode.
- Possible causes:
  - incorrect oil or viscosity
  - poor oil quality

- gel fuel/no fuel
- low fuel pressure
- damaged IPR valve
- high-pressure oil system leak
- damaged high-pressure oil pump
- damaged PCM

- Verify correct oil quality/viscosity and correct fuel grade are being used for the temperature conditions.

Is the oil and fuel quality OK?

Yes	No
GO to KE8 .	REPAIR fuel or oil condition and VERIFY DTC does not return. RESTORE system. CLEAR DTCs and RETEST.

KE8 CHECK FUEL PRESSURE

- Measure fuel pressure at regulator block.
- Measure fuel pressure at idle and on road at WOT at full load. Fuel pressure at idle should be 310 kPa (45 psi) minimum, and 310-551 kPa (45-80 psi) at WOT full load.

Is the fuel pressure OK?

Yes	No
GO to KE9 .	REPAIR fuel system concern. RESTORE system. CLEAR DTCs and RETEST.

KE9 CHECK OIL RESERVOIR LEVEL

- Remove plug in top of oil reservoir and check level.

Is the oil level within 25.4 mm (1 inch) of the top of the reservoir?

Yes	No
GO to KE10 .	REPAIR condition causing low oil supply to the reservoir. RESTORE system. CLEAR DTCs and RETEST.

KE10 ICP SENSOR CHECK

- Key on, engine off.
- Access ICP PID.

Is the ICP reading 0 kPa (0 psi)?

Yes	No
GO to KE11 .	INSTALL a new ICP sensor. RESTORE system. CLEAR DTCs and RETEST.

KE11 OIL AERATION CHECK

- Accelerate engine to wide-open throttle and hold for three minutes.

Does the ICP reading increase above 12,410 kPa (1,800 psi)?

Yes	No
CHANGE engine oil and REPEAT test. RESTORE system. CLEAR DTCs and RETEST.	GO to KE12 .

KE12 CHECK ICP WHILE PERFORMING SELF TEST

Note: During KOER On-Demand Self Test, ICP will be commanded high (17 MPa), then low (5 MPa) and then EBP will be commanded high and low.

- Install ICP/EBP Adapter Cable D94T-50-A or equivalent between ICP sensor and engine harness.
- Measure the voltage between ICP signal circuit and ground.
- Perform KOER On-Demand Self Test.

Does the voltage reading increase above 3 V and then decrease to approximately 1 V during the ICP portion of the KOER test?

Yes	No
If DTC 1211 was displayed, INSTALL a new PCM. RESTORE system. CLEAR DTCs and RETEST.	GO to KE13 .

KE13 INJECTOR LEAK TEST

- Disconnect high pressure hose from right cylinder head.
- Using Oil High Pressure Leakage Adapter Set D94T-6600-A or equivalent, plug right high pressure hose.
- Access IPR PID.
- Start vehicle and record IPR reading.
- Key off.
- Reconnect right cylinder head high pressure hose.
- Disconnect left cylinder head high pressure hose. Install adapter and ICP into high pressure hose.
- Start vehicle and record IPR reading.

Are the two readings within 2% of each other?

Yes	No
INSTALL a new IPR valve. If DTC 1211 is still present, GO to KE14 .	REPAIR internal oil leak on the bank with the higher IPR reading. REFER to the Powertrain Group in the Workshop Manual. RESTORE system. CLEAR DTCs and RETEST.

KE14 OIL SYSTEM PRESSURE TEST

- Perform Engine Oil Pressure Test and check for engine oil leaks. Refer to the Workshop Manual.

Is there a leak and/or is oil pressure below specification?

Yes	No
REPAIR as necessary. RESTORE system. CLEAR DTCs and RETEST.	INSTALL a new high pressure oil pump. RESTORE system. CLEAR DTCs and RETEST.

KE15 CONTINUOUS DIAGNOSTIC TROUBLE CODE (DTC) P1211, P1209

- DTC P1209 and P1211 indicates that injection control pressure was above or below desired level under normal driving conditions.
- Possible causes:
  - incorrect oil or viscosity
  - poor oil quality
  - gel fuel/no fuel
  - low fuel pressure
  - damaged IPR valve
  - high-pressure oil system leak
  - damaged high-pressure oil pump
  - damaged PCM
- Verify correct oil quality/viscosity and correct fuel grade are being used for the temperature conditions.

Is the oil and fuel quality OK?

Yes	No
GO to KE16 .	REPAIR fuel or oil condition. RESTORE vehicle. CLEAR DTCs and RETEST.

KE16 RECHECK FUEL PRESSURE

- Measure fuel pressure at regulator block.
- Measure fuel pressure at idle and on road at WOT full load. Fuel pressure at idle should be 138 kPa (20 psi) minimum, and 206-482 kPa (30-70 psi) at WOT full load.

Is the fuel pressure OK?

Yes	No
GO to KE17 .	REPAIR fuel system concern. RESTORE vehicle. CLEAR DTCs and RETEST.

KE17 PERFORM KOER ON-DEMAND SELF TEST

- Perform KOER On-Demand Self Test.

Is DTC P1211 set?

Yes	No
GO to KE9 .	GO to KE18 .

KE18 CHECK OIL LEVEL IN RESERVOIR

Note: If may be necessary to soak vehicle if a leakdown concern is indicated.

- Remove plug from top of oil reservoir and check level.

Is the oil level within 25.4 mm (1 inch) of the top of the reservoir?

Yes	No
GO to KE19 .	REPAIR condition causing low oil supply to the reservoir. RESTORE system. CLEAR DTCs and RETEST.

KE19 CHECK ICP SENSOR

- Key on, engine off.
- Access ICP PID.

Is the injection control pressure reading 0 kPa (0 psi)?

Yes	No
GO to KE20 .	INSTALL a new ICP sensor. RESTORE system. CLEAR DTCs and RETEST.

KE20 CHECK OIL AERATION

- Accelerate engine and hold at 3300 rpm for three minutes.

Does the injection control pressure reading increase above 93 MPa (1800 psi)?

Yes	No
CHANGE engine oil. RESTORE system. CLEAR DTCs and RETEST.	GO to KE21 .

KE21 CHECK IPR DUTY CYCLE UNDER LOAD

- Run vehicle at WOT and full load condition.

Does the IPR duty increase to 65%?

Yes	No
INSTALL a new IPR valve. RESTORE vehicle. CLEAR DTCs and RETEST.	Unable to duplicate failure. RESTORE vehicle. CLEAR DTCs and RETEST.