

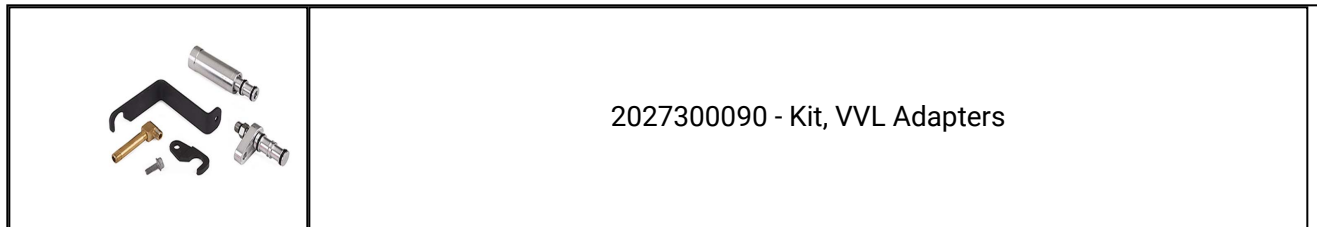
2020 Jeep Truck Gladiator V6-3.6L

Vehicle > ALL Diagnostic Trouble Codes (DTC) > Testing and Inspection > P Code Charts > P105D

POWERTRAIN CONTROL MODULE (PCM) - INTAKE VALVE STUCK IN HIGH LIFT POSITION

P105D-INTAKE VALVE STUCK IN HIGH LIFT POSITION

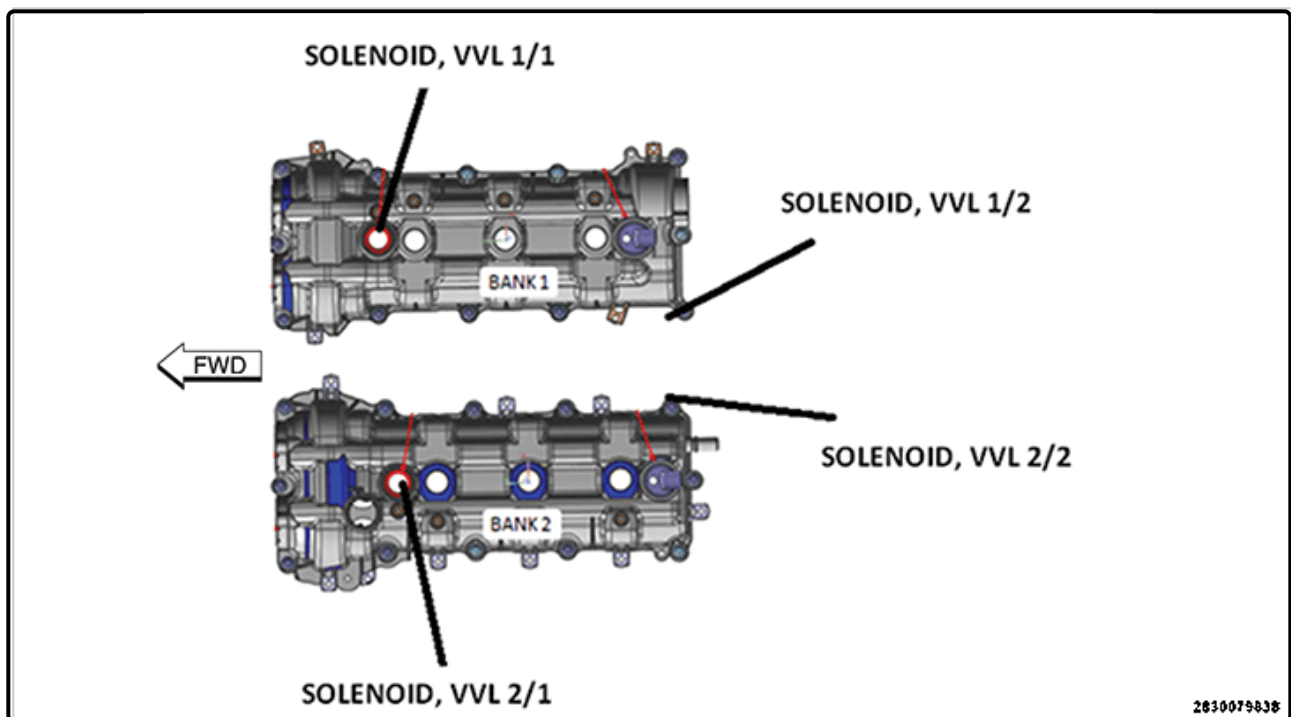
Special Tools



For a complete INTAKE AIR SYSTEM wiring diagram, (refer to the **Wiring Information**) .

Theory of Operation

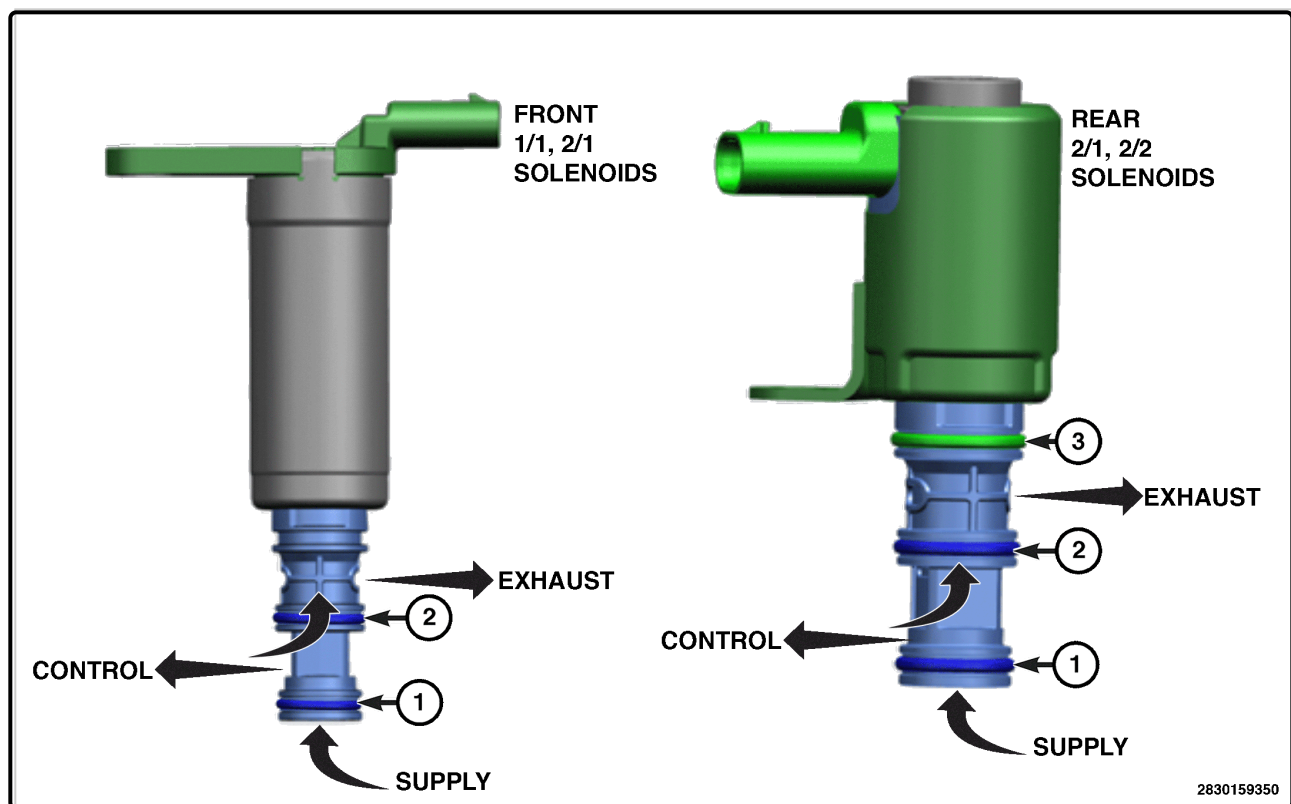
There are four Variable Valve Lift (VVL) Solenoids that control the operation of the Intake Rocker Arms for all six cylinders. See the figure and table below for the VVL Solenoid locations and cylinder control:



VVL SOLENOID	PHYSICAL LOCATION	CYLINDERS CONTROLLED	RELATED FAULT CODES

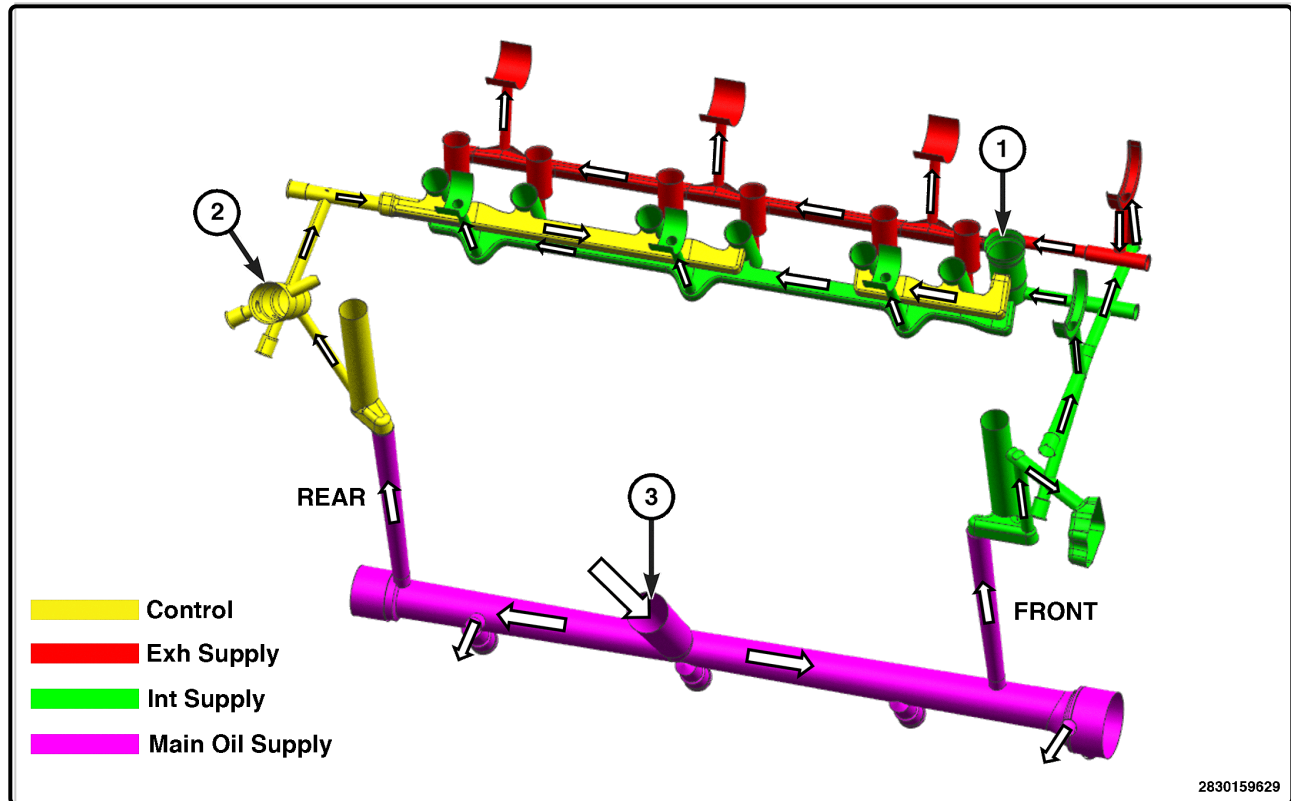
VVL SOLENOID	PHYSICAL LOCATION	CYLINDERS CONTROLLED	RELATED FAULT CODES
VVL SOLENOID 1/1	BANK 1 FRONT SOLENOID	CYLINDER 1 INTAKE VALVES	P1050 / P1051 / P1052 / P1070
VVL SOLENOID 1/2	BANK 1 REAR SOLENOID	CYLINDERS 3 AND 5 INTAKE VALVES	P1053 / P1054 / P1055 / P1071
VVL SOLENOID 2/1	BANK 2 FRONT SOLENOID	CYLINDER 2 INTAKE VALVES	P1056 / P1057 / P1058 / P1072
VVL SOLENOID 2/2	BANK 2 REAR SOLENOID	CYLINDERS 4 AND 6 INTAKE VALVES	P1059 / P105A / P105B / P1073

GENERAL OPERATION: The VVL System is designed to vary the lift and duration of the Intake Valves, to maximize efficiency and engine torque, depending on engine operation. The VVL System consists of 2 step Intake Rocker Arms that are capable of operating in High Lift or Low Lift mode. The PCM energizes and de-energizes the four VVL Solenoids to control the engine oil pressure to the Rocker Arms, controlling low lift and high lift operation. The O-rings on the solenoids prevent oil leakage between passages. The Supply O-ring (1) prevents the pressurized supply oil from entering the control passage when the solenoid is de-energized (off). The Control O-ring (2) prevents the oil from entering the exhaust passage when the solenoid is energized (on). Only the rear solenoid has an Exhaust O-ring (3) preventing an external oil leak. The front solenoid has an external seal to prevent external oil leakage. **If an O-ring is damaged or missing it can cause a Rocker Arm to stick in low lift or high lift mode.**



- **To enter Low Lift Mode** the PCM provides 12.0 volts to the VVL Solenoid to energize the solenoid. When energized the VVL Solenoid opens allowing the supply oil pressure entering the bottom to pass through the solenoid to the control oil passage and Rocker Arm. The pressurized oil pushes against the springs in the lock pins forcing the pins to retract. This allows the center of the Rocker Arm to move down freely and operate in Low Lift Mode. It takes approximately 20.0 psi of engine oil pressure at the Rocker Arm to overcome the springs in the lock pins.

- **To re-enter High Lift Mode** the PCM de-energizes the VVL Solenoid. The solenoid closes and the pressurized oil in the control passage passes through the VVL Solenoid to the exhaust passage. When the oil pressure is relieved the spring loaded lock pin extends keeping the center of the Rocker Arm in the High Lift position. The Rocker Arms default to High Lift mode when no oil pressure is present.



1	Front VVL Solenoid location
2	Rear VVL Solenoid location
3	Oil supply from Oil Filter to the main oil gallery

DIAGNOSTIC OVERVIEW - VARIABLE VALVE LIFT (VVL) SYSTEM

PCM DIAGNOSTICS: The PCM performs **diagnostics** for each VVL Solenoid **High Side Driver (HSD) Circuit** to detect an open or short circuit. If no circuit faults are detected the PCM runs a **rationality diagnostic** to detect Rocker Arms that are stuck in the High Lift or Low Lift positions. The PCM monitors for an erratic MAP Sensor signal as well as the Misfire, Knock, and Individual Cylinder Fuel Control (ICFC) monitors to detect a Rocker Arm that is stuck in an incorrect position. A Rocker Arm or arms can stick due to an oil pressure issue, a mechanical failure of a VVL Solenoid (including O-rings) or a faulty Rocker Arm. When a Rocker Arm fault is detected the PCM will begin to record in-field data. If the fault condition goes away during the next drive cycle the data collected will also be cleared.

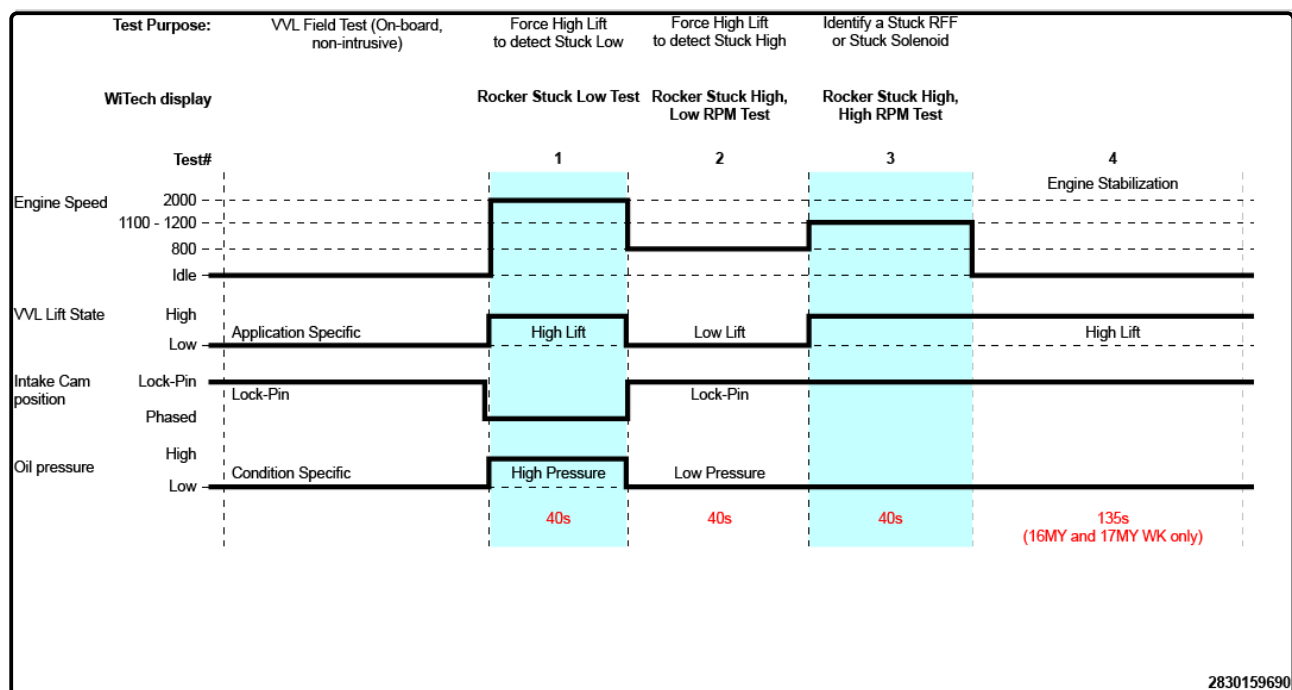
- **Low Lift stick condition:** A single Rocker Arm that is stuck in low lift may not be detected and the system will continue to operate normally. However, some misfire and engine roughness may be felt. One Rocker Arm stuck in Low Lift mode will cause a misfire at higher engine speeds. Two or more Rocker Arms stuck in Low Lift mode can cause a misfire at any engine speed, including idle. If more than one rocker arm is stuck, the in-field

diagnostic will fail, command all Rocker Arms to Low Lift mode and limit the engine speed to approximately 3000 RPM. The PCM will illuminate the MIL on the first trip.

- **High Lift stick condition:** If any Rocker Arm is detected as being stuck in High Lift Mode, the in-field diagnostic will fail and quickly default to commanding all of the Rocker Arms to High Lift mode. The engine will have some roughness and misfire may be felt. A single Rocker Arm stuck in high lift mode typically misfires at idle. The PCM will illuminate the MIL on the second trip.

Tech Tip: Since the two rear cylinders are controlled by the rear solenoid on each bank, a VVL issue that affects both rear cylinders on a bank is most likely a common issue for both cylinders. These would include a damaged or missing O-ring, faulty solenoid, oil supply or control circuit issue. A VVL issue that only affects one of the rear cylinders is more likely going to be a failure of a Rocker Arm or pin for that cylinder.

SCAN TOOL DIAGNOSTICS: The scan tool intrusive VVL Service Routine can be used to verify the VVL system operation as well as a likely possible cause if there is a fault. The routine can only run if the **misfire monitor** is enabled. **If there is an active open circuit fault for a solenoid the routine will run but display all zero's for the results.** When the routine is initiated the scan tool will check the misfire monitor status. If the monitor is enabled the test will continue. If the monitor is disabled, the routine will abort with a message indicating the test has stopped due to misfire disable condition. There are several other conditions that can disable misfire. Some of the common reasons are fuel level (too high or too low), Cam/Crank TLC not learned or ambient temperature too cold. When the test initiates it will run three tests in an attempt to detect a stuck Rocker Arm condition. The on screen display will describe each test being performed and give relevant data. The test will typically take approximately two minutes. The exception is 2016 and 2017 WK/WD vehicles. The test takes approximately four minutes on these vehicles due to an engine stabilization period after the third forced test. See the graph below for details on the routine.



When the routine completes the results will display in a table showing the misfire percentage result for each cylinder during the three tests that were performed. At the top will be a general description of the possible issue or issues. For a more detailed description of the probable causes compare the misfire percentage data recorded to the table in the diagnostic test below. **NOTE: Only count the misfire percentages that are above 75-80% when looking up the results in the table. Any percentage below 75% should not be factored into the result table.**

When Monitored and Set Conditions

When Monitored: This diagnostic runs continuously when the following conditions are met:

- With the engine running above 750 rpm.
- Battery voltage greater than 11.0 volts.
- Engine Oil Pressure Sensor reading above 20.0 psi.
- Low Lift Mode is requested.
 - VVL Solenoids are commanded on.

Set Conditions:

- The PCM detects that one or more Rocker Arm is stuck in High Lift Mode of operation.

Default Actions:

- The MIL will illuminate.
- If any Rocker Arm is detected as being stuck in High Lift Mode, the PCM will default to commanding all of the Rocker Arms to high lift mode.

Possible Causes

INADEQUATE OIL PRESSURE TO ONE OR MORE ROCKER ARM
VVL SOLENOID CONTROL O-RING DAMAGED OR MISSING
VVL SOLENOID STUCK OFF/CLOSED NOT ALLOWING OIL PRESSURE TO ONE OR MORE ROCKER ARM
CONTROL OIL PASSAGE PRESSURE RESTRICTED TO ONE OR MORE ROCKER ARM
ROCKER ARM LOCK PIN STUCK EXTENDED OR BROKEN
ROCKER ARM LASH ADJUSTER PLUGGED
LOW ENGINE OIL PRESSURE/OIL PUMP FAULTY

Always perform the PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE before proceeding. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

Diagnostic Test

1. PERFORM THE VVL SCAN TOOL DIAGNOSTICS

1. Turn the ignition on.
2. With the scan tool, navigate to Systems Tests, perform the VVL System Diagnostic test and follow the on screen directions.

NOTE: Do not erase the DTC before running the routine.

3. When the test is complete, compare the results to the table below for the probable failure conditions.

Scan tool results:

Compare the results from the routine to the table below.

- When the routine completes the results will display in a table showing each cylinder and the misfire percentage result for each cylinder during the three tests that were performed. At the top will be a general description of the possible issue or issues. For a more detailed description compare the misfire percentage data recorded to the table below for a detailed list of the probable causes. **NOTE: Only count the misfire percentages that are above 75-80% when looking up the results in the table. Any percentage below 75% should not be factored into the result table..**

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
Low misfire percentage on (1) Rocker Stuck Low test, (2) Rocker Stuck High, Low RPM test, and (3) Rocker Stuck High, High RPM test	No VVL issue detected	The misfire condition being detected is not caused by the VVL System. Another system is likely causing the misfire
High misfire percentage on (1) Rocker Stuck Low test , (2) Rocker Stuck High, Low RPM test, and (3) Rocker Stuck High, High RPM test	No VVL issue detected	The misfire condition being detected is not caused by the VVL System. Another system is likely causing the misfire
(1) Rocker Stuck Low test - has high misfire percentage on Cylinder 1	<ul style="list-style-type: none"> VVL Solenoid 1/1 stuck on/open VVL Solenoid 1/1 control circuit shorted to 12 volts VVL Solenoid 1/1 has missing or damaged supply O-ring causing oil pressure leakage from the supply oil passage to the control oil passage Cylinder 1 rocker arm lash adjuster issue (stuck or broken) Cylinder 1 rocker arm lock pin stuck retracted Oil pressure leakage from the supply oil passage to the front control oil passage in the Cylinder Head. 	<ul style="list-style-type: none"> Verify that the VVL Solenoid 1/1 control circuit is not shorted to 12 volts Check operation of VVL Solenoid 1/1 for a stuck on/open condition, damaged or missing supply O-ring Check for broken or stuck Cylinder 1 rocker arms or lock pins It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace the Cylinder Head.

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(1) Rocker Stuck Low test - has high misfire percentage on Cylinder 2	<ul style="list-style-type: none"> • VVL Solenoid 2/1 stuck on/open • VVL Solenoid 2/1 control circuit shorted to 12 volts • VVL Solenoid 2/1 has missing or damaged supply O-ring causing oil pressure leakage from the supply oil passage to the control oil passage • Cylinder 2 rocker arm lash adjuster issue (stuck or broken) • Cylinder 2 rocker arm lock pin stuck retracted • Oil pressure leakage from the supply oil passage to the front control oil passage in the Cylinder Head. 	<ul style="list-style-type: none"> • Verify that the VVL Solenoid 2/1 control circuit is not shorted to 12 volts • Check operation of VVL Solenoid 2/1 for a stuck on/open condition, damaged or missing supply O-ring • Check for broken or stuck Cylinder 2 rocker arms or lock pins • It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace the Cylinder Head. Proceed to step below to check the oil pressure in the Cylinder Head
(1) Rocker Stuck Low test - has high misfire percentage on Cylinder 3	<ul style="list-style-type: none"> • Cylinder 3 rocker arm lash adjuster issue (stuck or broken) • Cylinder 3 rocker arm lock pin stuck retracted 	<ul style="list-style-type: none"> • Check for broken or stuck Cylinder 3 rocker arms or lock pins
(1) Rocker Stuck Low test - has high misfire percentage on Cylinder 4	<ul style="list-style-type: none"> • Cylinder 4 rocker arm lash adjuster issue (stuck or broken) • Cylinder 4 rocker arm lock pin stuck retracted 	<ul style="list-style-type: none"> • Check for broken or stuck Cylinder 4 rocker arms or lock pins
(1) Rocker Stuck Low test - has high misfire percentage on Cylinder 5	<ul style="list-style-type: none"> • Cylinder 5 rocker arm lash adjuster issue (stuck or broken) • Cylinder 5 rocker arm lock pin stuck retracted 	<ul style="list-style-type: none"> • Check for broken or stuck Cylinder 5 rocker arms or lock pins
(1) Rocker Stuck Low test - has high misfire percentage on Cylinder 6	<ul style="list-style-type: none"> • Cylinder 6 rocker arm lash adjuster issue (stuck or broken) • Cylinder 6 rocker arm lock pin stuck retracted 	<ul style="list-style-type: none"> • Check for broken or stuck Cylinder 6 rocker arms or lock pins

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(1) Rocker Stuck Low test - high misfire percentage on Cylinder 3 and Cylinder 5	<ul style="list-style-type: none"> • VVL Solenoid 1/2 stuck on/open • VVL Solenoid 1/2 control circuit shorted to 12 volts • VVL Solenoid 1/2 has missing or damaged supply O-ring causing oil pressure leakage from the supply oil passage to the control oil passage • Oil pressure leakage from the supply oil passage to the rear control oil passage in the Cylinder Head. <p>NOTE: It's less likely but possible for a rocker arm lash adjuster failure (stuck or broken) or lock pin stuck retracted on both Cylinder 3 and Cylinder 5</p>	<ul style="list-style-type: none"> • Check the VVL Solenoid 1/2 control circuit for a short to 12 volts condition • Check operation of VVL Solenoid 1/2 for a stuck on/open condition, damaged or missing supply O-ring • It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace the Cylinder Head.
(1) Rocker Stuck Low test - high misfire percentage on Cylinder 4 and Cylinder 6	<ul style="list-style-type: none"> • VVL Solenoid 2/2 stuck on/open • VVL Solenoid 2/2 control circuit shorted to 12 volts • VVL Solenoid 2/2 has missing or damaged supply O-ring causing oil pressure leakage from the supply oil passage to the control oil passage • Oil pressure leakage from the supply oil passage to the rear control oil passage in the Cylinder Head. <p>NOTE: It's less likely but possible for a rocker arm lash adjuster failure (stuck or broken) or lock pin stuck retracted on both Cylinder 4 and Cylinder 6</p>	<ul style="list-style-type: none"> • Check the VVL Solenoid 2/2 control circuit for a short to 12 volts condition • Check operation of VVL Solenoid 2/2 for a stuck on/open condition, damaged or missing supply O-ring • It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace the Cylinder Head. Proceed to step below to check the oil pressure in the Cylinder Head

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(1) Rocker Stuck Low test - high misfire percentage Cylinder 1, Cylinder 3, and Cylinder 5	<ul style="list-style-type: none"> Both bank 1 solenoids have missing or damaged supply O-ring causing oil pressure leakage from the supply oil passage to the control oil passage for both bank 1 solenoids Oil pressure leakage from the supply oil passage to the front and rear control oil passages in the Cylinder Head. 	<ul style="list-style-type: none"> Check operation of VVL Solenoid 1/2 for a stuck on/open condition, damaged or missing supply O-ring It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace the Cylinder Head. Proceed to step below to check the oil pressure in the Cylinder Head
(1) Rocker Stuck Low test - high misfire percentage Cylinder 2, Cylinder 4, and Cylinder 6	<ul style="list-style-type: none"> Both bank 2 solenoids have missing or damaged supply O-ring causing oil pressure leakage from the supply oil passage to the control oil passage for both bank 2 solenoids Oil pressure leakage from the supply oil passage to the front and rear control oil passages in the Cylinder Head. 	<ul style="list-style-type: none"> Check operation of VVL Solenoid 2/2 for a stuck on/open condition, damaged or missing supply O-ring It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace the Cylinder Head. Proceed to step below to check the oil pressure in the Cylinder Head
(1) Rocker Stuck Low test - high misfire percentage for all Cylinders (1 - 6)	<ul style="list-style-type: none"> Missing or damaged supply O-rings causing oil pressure leakage from the supply oil passage to the control oil passage for front and rear solenoids on bank 1 and bank 2 Oil pressure leakage from the supply oil passage to the front and rear control oil passages in both Cylinder Heads. 	<ul style="list-style-type: none"> Check operation of all VVL Solenoids for a stuck on/open condition, damaged or missing supply O-rings It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if all other possible causes are exhausted, replace both Cylinder Heads.

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 1	<ul style="list-style-type: none"> • VVL Solenoid 1/1 control circuit open or shorted to ground • VVL Solenoid 1/1 stuck closed/off • VVL Solenoid 1/1 has missing or damaged control O-ring causing oil pressure leakage from the control oil passage to the exhaust oil passage • Control oil passage pressure restricted • Cylinder 1 lash adjuster plugged • Cylinder 1 rocker arm lash adjuster issue (stuck or broken) • Cylinder 1 rocker arm lock pin stuck extended 	<ul style="list-style-type: none"> • Check the VVL Solenoid 1/1 control circuit for an open or shorted to ground condition • Check the VVL Solenoid 1/1 for a missing or damaged control O-ring • Actuate and check the VVL Solenoid 1/1 operation. Check for debris on screen • Cylinder 1 lash adjuster plugged • Cylinder 1 rocker arm stuck failure or lock pin stuck extended
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 2	<ul style="list-style-type: none"> • VVL Solenoid 2/1 stuck closed/off • VVL Solenoid 2/1 control circuit open or shorted to ground • VVL Solenoid 2/1 has missing or damaged control O-ring causing oil pressure leakage from the control oil passage to the exhaust oil passage • Control oil passage pressure restricted • Cylinder 2 lash adjuster plugged • Cylinder 2 rocker arm lash adjuster issue (stuck or broken) • Cylinder 2 rocker arm lock pin stuck extended 	<ul style="list-style-type: none"> • Check the VVL Solenoid 2/1 control circuit for an open or shorted to ground condition • Check the VVL Solenoid 2/1 for a missing or damaged control O-ring • Actuate and check the VVL Solenoid 2/1 operation. Check for debris on screen • Cylinder 2 lash adjuster plugged • Cylinder 2 rocker arm stuck failure or lock pin stuck extended
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 3	<ul style="list-style-type: none"> • Cylinder 3 lash adjuster plugged • Cylinder 3 rocker arm lash adjuster issue (stuck or broken) • Cylinder 3 rocker arm lock pin stuck extended 	<ul style="list-style-type: none"> • Cylinder 3 lash adjuster plugged • Cylinder 3 rocker arm stuck failure or lock pin stuck extended

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 4	<ul style="list-style-type: none"> • Cylinder 4 lash adjuster plugged • Cylinder 4 rocker arm lash adjuster issue (stuck or broken) • Cylinder 4 rocker arm lock pin stuck extended 	<ul style="list-style-type: none"> • Cylinder 4 lash adjuster plugged • Cylinder 4 rocker arm stuck failure or lock pin stuck extended
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 5	<ul style="list-style-type: none"> • Cylinder 5 lash adjuster plugged • Cylinder 5 rocker arm lash adjuster issue (stuck or broken) • Cylinder 5 rocker arm lock pin stuck extended 	<ul style="list-style-type: none"> • Cylinder 5 lash adjuster plugged • Cylinder 5 rocker arm stuck failure or lock pin stuck extended
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 6	<ul style="list-style-type: none"> • Cylinder 6 lash adjuster plugged • Cylinder 6 rocker arm lash adjuster issue (stuck or broken) • Cylinder 6 rocker arm lock pin stuck extended 	<ul style="list-style-type: none"> • Cylinder 6 lash adjuster plugged • Cylinder 6 rocker arm stuck failure or lock pin stuck extended
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 3 and Cylinder 5	<ul style="list-style-type: none"> • VVL Solenoid 1/2 stuck closed/off • VVL Solenoid 1/2 control circuit open or shorted to ground • VVL Solenoid 1/2 has missing or damaged control O-ring causing oil pressure leakage from the control oil passage to the exhaust oil passage • Control oil passage pressure restricted <p>NOTE: It's less likely but possible for a rocker arm lash adjuster issue (stuck or broken) or lock pin stuck retracted on Cylinder 3 and Cylinder 5</p>	<ul style="list-style-type: none"> • Check the VVL Solenoid 1/2 control circuit for an open or shorted to ground condition • Check the VVL Solenoid 1/2 for a missing or damaged control O-ring • Actuate and check the VVL Solenoid 1/2 operation. Check for debris on screen • Cylinder 3 or 5 lash adjuster plugged • Cylinder 3 or 5 rocker arm stuck failure or lock pin stuck extended

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 4 and Cylinder 6	<ul style="list-style-type: none"> • VVL Solenoid 2/2 stuck closed/off • VVL Solenoid 2/2 control circuit open or shorted to ground • VVL Solenoid 2/2 has missing or damaged control O-ring causing oil pressure leakage from the control oil passage to the exhaust oil passage • Control oil passage pressure restricted <p>NOTE: It's less likely but possible for a rocker arm lash adjuster issue (stuck or broken) or lock pin stuck retracted on Cylinder 4 and Cylinder 6</p>	<ul style="list-style-type: none"> • Check the VVL Solenoid 2/2 control circuit for an open or shorted to ground condition • Check the VVL Solenoid 2/2 for a missing or damaged control O-ring • Actuate and check the VVL Solenoid 2/2 operation. Check for debris on screen • Cylinder 4 or 6 lash adjuster plugged • Cylinder 4 or 6 rocker arm stuck failure or lock pin stuck extended
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 1, Cylinder 3 and Cylinder 5	<ul style="list-style-type: none"> • VVL Solenoid 1/1 and 1/2 have missing or damaged control O-rings causing oil pressure leakage from the control oil passage to the exhaust oil passage • Bank 1 oil supply passage blockage or restriction to front and rear oil feeds in the bank 1 Cylinder Head • Large internal leakage in bank 1 Cylinder Head affecting the front and rear oil feeds 	<ul style="list-style-type: none"> • Check the control O-rings on the front and rear bank 1 VVL Solenoids for damage • Check for proper oil pressure at the front and rear bank 1 VVL Solenoids. Proceed to step below to check the oil pressure in the Cylinder Head. It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if the oil pressure is low to both solenoids and all other possible causes are exhausted, replace the Cylinder Head <p>NOTE: Low oil pressure in the Cylinder Head will likely also cause issues/faults for the VVT system</p>

SCAN TOOL INTERUSIVE VVL TEST RESULT	PROBABLE CAUSES	REPAIR ACTIONS
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage Cylinder 2, Cylinder 4 and Cylinder 6	<ul style="list-style-type: none"> • VVL Solenoid 2/1 and 2/2 have missing or damaged control O-rings causing oil pressure leakage from the control oil passage to the exhaust oil passage • Bank 2 oil supply passage blockage or restriction to front and rear oil feeds in the bank 2 Cylinder Head • Large internal leakage in bank 2 Cylinder Head affecting the front and rear oil feeds 	<ul style="list-style-type: none"> • Check the control O-rings on the front and rear bank 2 VVL Solenoids for damage • Check for proper oil pressure at the front and rear bank VVL Solenoids. Proceed to step below to check the oil pressure in the Cylinder Head. It is a very low percentage of the time that an internal crack in a Cylinder Head would cause this issue. However if the oil pressure is low to both solenoids and all other possible causes are exhausted, replace the Cylinder Head <p>NOTE: Low oil pressure in the Cylinder Head will likely also cause issues/faults for the VVT system</p>
(2) Rocker Stuck High, Low RPM test, or (3) Rocker Stuck High, High RPM test - high misfire percentage for all Cylinders (1 - 6)	<p>Engine oil pressure too low to both Cylinder Heads due to:</p> <ul style="list-style-type: none"> • Oil level low • Wrong viscosity oil • Oil Filter restriction • Engine mechanical failure (damaged bearings, pick-up tube or seal, engine block, etc.) • Faulty Oil Pump 	<ul style="list-style-type: none"> • Check for proper oil level, filter and viscosity before checking engine oil pressure • If the engine oil pressure is low check for any mechanical issue that could cause low oil pressure. If there are no issues with the bearings, pick-up tube and engine block replace the Engine Oil Pump Assembly <p>NOTE: Low engine oil pressure will likely also cause issues/faults for the VVT system</p>

2. CHECK THE ACTUAL OIL PRESSURE TO THE VVL SOLENOID IN THE CYLINDER HEAD

1. Turn the ignition off.
2. Remove the appropriate VVL Solenoid called out by the scan tool.

3. Install the Kit, VVL Adapters 2027300090 in place of the VVL Solenoid.
4. Start the engine and allow it to idle.
5. With the scan tool, monitor the Dual Oil Pump mode.

NOTE: Let the engine run long enough for the pump to switch to low pump mode.

6. Read and record the oil pressure reading on the oil pressure gauge. Compare the reading to the main engine oil pressure reading from the Engine Oil Pressure Sensor reading on the scan tool.

NOTE: The Cylinder Head oil pressure should be within 5.0 psi of main engine oil pressure reading.

Is the Cylinder Head oil pressure should be within 5.0 psi of main engine oil pressure?

Yes

- Remove and inspect the screen on the VVL Solenoid for debris that can block oil flow through the solenoid. Check the seals on the VVL Solenoid for damage and proper installation. If no debris is found, and the seals appear good replace the VVL Solenoid in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

No

- Diagnose and repair the lack of oil pressure to the VVL Solenoid.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).