Service Bulletin

Bulletin No.: 19-NA-219
Date: April, 2023

INFORMATION

Subject: **Diagnostic Tip for Misfire, Chirp, Squeak, Squeal or Tick Noise, Malfunction Indicator Lamp (MIL) Illuminated - DTC P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 and/or P0308 Set**

This bulletin replaces PIP4138R. Please discard PIP4138R.

Brand:	Model:	Model Year:		VIN:		Engine:	Transmission:
		from	to	from	to		
Buick	GM Passenger Cars and Trucks	2002	2023	All	All	V6/V8 Pushrod Engines	All
Cadillac							
Chevrolet							
GMC							
HUMMER							
Pontiac							
Saab							

Involved Region or Country	North America, Europe, Uzbekistan, Russia, Middle East, Iraq, Israel, Palestine, Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela, Japan, Cadillac Korea (South Korea), GM Korea Company, China, Taiwan, Thailand, Singapore, Philippines, Australia/New Zealand, Egypt, Other Africa, South Africa
Condition	Some customers may comment on one or more of the following conditions: • Misfire • Chirp • Squeak • Squeal • Tick • MIL illuminated Technicians may find one or more of the following DTCs set in the Engine Control Module (ECM): • P0300: Engine Misfire Detected • P0301: Cylinder 1 Misfire Detected • P0302: Cylinder 2 Misfire Detected • P0303: Cylinder 3 Misfire Detected • P0304: Cylinder 4 Misfire Detected • P0305: Cylinder 5 Misfire Detected • P0306: Cylinder 6 Misfire Detected • P0307: Cylinder 7 Misfire Detected • P0308: Cylinder 8 Misfire Detected

Information	Noises described coming from the engine may occur consistently or it may occur intermittently: – If a noise is verified, it will not be eliminated by canceling fuel injectors and the noise will occur at camshaft speed (half of crankshaft speed). – The noise may be described as a chirp, squeak, squeal or tick noise and may increase off of idle. – In either case, the cause of this concern may not be isolated after following SI diagnosis. This bulletin is written for technicians who experience this concern and follow SI diagnosis without isolating the cause of this concern.

Important: Service agents must comply with all International, Federal, State, Provincial, and/or Local laws applicable to the activities it performs under this bulletin, including but not limited to handling, deploying, preparing, classifying, packaging, marking, labeling, and shipping dangerous goods. In the event of a conflict between the procedures set forth in this bulletin and the laws that apply to your dealership, you must follow those applicable laws.

Recommendation/Instructions

If SI diagnosis does not isolate the cause of this concern, it may be the result of any of the following:

- Worn camshaft lobe and/or lifter roller
- A sticking valve
- Valve leakage
- A broken valve spring
- A collapsed AFM (Active Fuel Management) lifter

If SI diagnosis does not isolate the cause of this concern, review the information below, determine which description best matches the vehicle you are working on, and perform the suggestions as necessary, starting with the easiest ones first:

1. Worn Cam Lobe and/or Lifter Roller:

Generally, a worn cam lobe on this engine family will create a consistent chirp, squeak, squeal or tick noise at camshaft speed and/or a misfire with a P0300-P0308 DTC. The misfire may or may not be felt and the misfire could occur at all RPM or just a specific RPM, such as idle only or only at high RPM. If a noise is present, it will not be eliminated by cancelling fuel injectors and generally, the static compression and cylinder leakage will be similar on all cylinders.

The following suggestions may help determine if a worn cam lobe and/or lifter is causing this concern:

1. Use a wooden hammer handle to apply pressure to the following locations of the rocker arms during the noise to determine which one is making noise:
   - Valve side
   - Push rod side
   - Side of the rocker

⇒ If the noise is changed by applying pressure to the valve side of the rocker, this is most likely the result of a lifter and/or cam lobe concern on that cylinder. Sometimes this works, sometimes it does not - it seems to depend on the amount of cam lobe wear.

2. Disconnect the coils and injectors on one bank of the engine, run the engine with the related valve cover removed, and back off the related rocker arm a couple of turns and listen for a change in the noise. If necessary, both rockers and push rods can also be removed one cylinder at a time with the related coil and injectors disconnected.

   ⇒ If the noise is eliminated and there is no problem found with the valve spring, push rod, or rocker arm, this is most likely the result of a worn lifter roller and/or cam lobe.

3. Measure the cam lobe lift at the push rod side of the rocker arm. The lift in this location will differ from the SI specification but it should be similar as compared with other rockers on the same bank. The misfiring/ticking cylinder should obviously have less lift than the comparison cylinders if this is the result of a worn lifter roller and/or cam lobe. Another possibility of no/low lift on cylinders 3 or 6 (V6)/1, 4, 6, or 7 (V8) on an AFM engine, would be a collapsed AFM lifter.

   ⇒ If a collapsed AFM lifter is found, refer to the latest version of PIP4568 for additional information.

Note: The step below will NOT work on 2017 and 2018 models.

4. On engines with AFM, you can command AFM on with the scan tool, which will unlatch the lifters on cylinders 3 and 6 (V6)/1, 4, 6, and 7 (V8) and stop opening the related valves.
   - If the noise is eliminated, there is a good chance that the noise is coming from the valve-train of cylinders 3 or 6 (V6)/1, 4, 6, or 7 (V8).
   - If there is no problem found with the push rods, rockers, or valve springs, the noise is most likely coming from a worn lifter roller and/or cam lobe on cylinders 3 or 6 (V6)/1, 4, 6, or 7 (V8).
5. If the tests above do not isolate the cause of this concern, it may be necessary to visually inspect the lifter rollers and cam lobes for the following conditions:
   - Visual damage
   - Flat spots
   - Pits
   - Grooves
   - Scoring
   - Gouging

- Flaking
- Rusting

⇒ It is very easy to overlook a damaged cam lobe when inspecting them through the lifter bores and just because the lifter rollers are not worn, does not mean that the related cam lobes are okay. Both pieces need to be carefully inspected. It may help to use a bore scope or pen light when inspecting the cam lobes through the lifter bores. In some cases, the worn cam lobe may not be discovered until the camshaft is physically removed from the engine and inspected for the issues mentioned above.

Notice: Follow SI procedures to replace the camshaft and all lifters if a worn camshaft lobe or lifter roller is found. Also replace the plastic lifter guide for the lifter that had the damaged cam lobe and/or lifter roller (For 2010 Model Year, replace all the plastic lifter guides). On AFM engines, also replace the VLOM (Valve Lifter Oil Manifold) filter screen that is under the oil pressure sensor.

2. Sticking Valve:

Generally, a sticking valve on this engine family will cause an engine misfire that may or may not be felt and it may occur consistently or intermittently. It is unlikely that any engine noise will be present. It may be temperature sensitive and it may be more apparent during certain operating conditions, such as driving up a grade, cresting a hill, or during hard acceleration. A good indicator of a sticking valve is if engine misfires continue to count on an aggressive deceleration with engine braking. If the misfire occurs consistently, a static compression test, running compression test or cylinder leakage test may isolate the sticking valve. However, it is unlikely that any of these tests will isolate the sticking valve if the misfire only occurs while driving at specific conditions.

The following suggestions may help determine if a sticking valve is causing this concern:

Note: Follow SI procedures to remove the valve springs and seals from the valves of the misfiring cylinder. Before removing the air pressure from the cylinder, tightly wrap a rubber band or tie strap around the tip of each valve stem to prevent the valves from dropping into the cylinder. Release the air pressure from the cylinder and work the valve up and down in the guide while turning the valve 360 degrees.

- If any binding is felt, a stem to guide clearance concern exists and should be repaired by following SI procedures.
- If okay, rotate and snap the valve onto the valve seat to make sure that it easily comes off of the seat again. If you have to use force to tap the valve off of the seat, excessive carbon build up exists, which may be repaired by decarbonizing the engine.

Notice: Refer to Service Bulletin 16-NA-383 for decarbonizing instructions.

3. Valve Leakage:

Generally, valve leakage on this engine family will cause a consistent engine misfire that may or may not be felt and is more apparent at idle or low RPM. Normally, no engine noise will be present and in most cases, a static compression test or running compression test will not reveal anything abnormal unless the leakage is very high.

Typically, the Cylinder Leakage Test outlined in SI should isolate valve leakage by finding excessive leakage past an intake or exhaust valve, as compared with others.

Notice: If a valve sealing concern is found, it should be repaired by following SI repair procedures.

4. Broken Valve Spring:

Generally, a broken valve spring on this engine family will cause a tick noise and/or an engine misfire. In either case, the concern may occur consistently or intermittently. If it is causing an engine misfire, it may or may not be felt and it may only occur at specific operating conditions, such as high RPM driving, etc.

In some instances, a static compression test, running compression test, and/or cylinder leakage test may isolate the broken valve spring, while in other instances; it may not if the spring remains stacked together during the tests. As a result, it may be necessary to visually inspect the valve springs by closely examining them. Sometimes, the two broken pieces of the spring will remain stacked together making it hard to detect when visually inspecting them. As a result, it may help to lightly push on different places on the springs with a small hammer handle.

Notice: If a broken valve spring is found, replace the broken valve spring as necessary.

5. Collapsed AFM Lifter (Engines with AFM Only):

Some customers may comment on a MIL illuminated, engine misfire, and/or tick noise. This may be the result of an AFM lifter that unlocks as soon as the engine is started or one that is mechanically collapsed/stuck.

- If an AFM lifter unlocks as soon as the engine is started, a MIL and DTC P0300 will be experienced with engine misfires on cylinder 3 or 6 (V6)/1, 4, 6, or 7 (V8) but it is unlikely that any noise will be experienced.
- If an AFM lifter is mechanically collapsed/stuck, a consistent valve train tick noise, SES light, and DTC P0300 will be experienced with engine misfires on cylinder 3 or 6 (V6)/1, 4, 6, or 7 (V8).

Notice: If either of these AFM lifter concerns is suspected, please refer to the latest version of PIP4568 for additional information.

Notice: If there is an AFM lifter concern on RPOs L83, L86, LT1 and LT4, follow the latest version of Service Bulletin 15-06-01-002.

Warranty Information

Important: This bulletin should have base emission warranty coverage (code E) applied.

For vehicles repaired under warranty, please use the appropriate warranty labor operation based on the actual cause and repair.

Version	4
Modified	Released September 20, 2019 Revised February 28, 2020 – Removed the Attention statement, updated the bulletin throughout to include V6 information and added an Important statement to the Warranty Information. Revised March 23, 2023 – Added the 2019-2023 Model Years. Revised April 24, 2023 – Updated Involved Region or Country section.