With this condition, the engine may actually run lean of stoichiometry 14.7 to 1 (9 to 1 E100) air to fuel ratio, if the PCM is not able to compensate enough to correct for the condition. This condition can be caused by unmetered air entering the engine. Vacuum leaks normally are most apparent when high manifold vacuum is present (for example, during idle or light throttle). If freeze frame data indicates the fault occurred at idle, a check for vacuum leaks and unmetered air might be the best starting point.

For example, loose, leaking or disconnected vacuum lines, intake manifold gaskets or O-rings, throttle body gaskets, brake booster, air inlet tube or unseated engine oil dipstick.

Insufficient Fueling

With this condition, the engine runs lean of stoichiometry 14.7 to 1 (9 to 1 E100) air to fuel ratio, if the PCM is not able to compensate enough to correct for the condition. This condition is caused by a fuel delivery system concern that restricts or limits the amount of fuel being delivered to the engine. This condition is normally apparent as the engine is under a heavy load and at high RPM, when a higher volume of fuel is required. If the freeze frame data indicates the concern occurs under a heavy load and at higher RPM, a check of the fuel delivery system (checking fuel pressure with engine under a load) is the best starting point.

Examples of this include:

- low fuel pressure (fuel pump, fuel filter, fuel leaks, restricted fuel supply lines)
- fuel injector concerns

Exhaust System Leaks

In this type of condition, the engine runs rich of stoichiometry 14.7 to 1 (9 to 1 E100) air to fuel ratio, because the fuel control system is adding fuel to compensate for a perceived (not actual) lean condition. This condition is caused by the heated oxygen sensor (HO2S) sensing the oxygen (air) entering the exhaust system from an external source. The PCM reacts to this exhaust leak by increasing fuel delivery. This condition causes the exhaust gas mixture from the cylinder to be rich.

Examples of this include:

- exhaust system leaks upstream or near the HO2S
- cracked or leaking HO2S boss

DTCs P0172 and P0175 System Too Rich Diagnostic Aids

Note: *If the system is rich at certain conditions, then the LONGFT PID would be a negative value at that airflow, indicating that decreased fuel is needed.*

System rich concerns are caused by fuel system concerns, although the MAF sensor and base engine (for example, engine oil contaminated with fuel) should also be checked.

Air Measurement System

With this condition, the engine runs rich or lean of stoichiometry 14.7 to 1 (9 to 1 E100) air to fuel ratio, if the PCM is not able to compensate enough to correct for the condition.

Fuel System

With this condition, the engine runs rich of stoichiometry 14.7 to 1 (9 to 1 E100) air to fuel ratio, if the PCM is not able to compensate enough to correct for the condition. This situation causes a fuel delivery system that is delivering excessive fuel to the engine.

Examples of this include:

- fuel pressure regulator (mechanical returnless fuel systems) causes excessive fuel pressure (system rich at all airflows), fuel pressure is intermittent, going to pump deadhead pressure, then returning to normal after the engine is turned off and restarted.
- fuel injector leaks (injector delivers extra fuel).
- evaporative emission (EVAP) purge valve leak (introduces extra fuel).
- fuel rail pressure (FRP) sensor (electronic returnless fuel systems) concern causes the sensor to indicate a lower pressure than actual. The PCM commands a higher duty cycle to the fuel pump control module, causing high fuel pressure (system rich at all airflows).

Intake Air System