



Diagnostic Trouble Code Diagnosis Charts

| P0422 | Main catalyst efficiency below threshold |
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| Threshold Value ~ Quality factor (AHKAT) ~ Manual trans: >0.70 Auto trans: >0.60 Enable Conditions ~ Engine speed: Between 720 and 2520 RPM Load value: Within pre-determined map criteria Calculated Catalyst temperature: >738 degrees F Catalyst load: Within pre-determined map criteria Fuel system status: Closed loop Time Requirements ~ Continuous (>80 seconds) MIL Illumination ~ 2 driving cycle | Related Items ⇨ ⇨ NOTE: If any codes relating to O2 Sensor, MAF Sensor, injectors a P0171 or a P0172 are present, do ALL REPAIRS associated with them before proceeding with this troubleshooting tree. |

Connect KIA Data Pro to OBD-II connector and proceed to screen for User Data List for ECM. Switch O2S B1 S1 and O2S B1 S2 to YES and leave all others at NO (press enter). While monitoring O2 Sensor voltages, press F5 to access graph of data. Press left arrow once to lower graph time to 15 seconds. Allow engine to idle and stabilize at operating temperature. Graph should be similar to the sample on the left, though the exact amplitudes and switching times will be different. The main criteria to look at is the bottom graph (Rear O2 Sensor) should be very flat compared to the top graph (Front O2 Sensor) as in the sample A. Sample B is a worst-case-scenario. It represents a completely burned out Catalytic Converter (Cat). A weak Cat will have a lower Rear O2 Sensor amplitude, but will mimic the Front O2 Sensor in appearance. Replace Cat if O2 Sensor graphs indicate it is deteriorated. If Front O2 Sensor voltages are consistently high, or freeze frame data shows an excessively high negative long fuel trim, check fuel pressures and injectors per steps 1 and 2. If Front O2 Sensor voltages are consistently low, or freeze frame data shows an excessively high positive long fuel trim, check fuel pressures and injectors per steps 1 and 2. Also check all vacuum hoses and intake for vacuum leaks per inspections in steps 3 and 4. Make sure there are no exhaust leaks which could dilute the rear O2 sensor readings by performing inspection per step 5. Recheck O2 Sensor operation after completing repairs while test driving vehicle. Verify the vehicle is not running in an overly rich condition as this will burn out a Cat.

| STEP | INSPECTION | Y/N | ACTION |
|------|--|-----|--|
| 1 | WARNING! Refer to Service Manual for proper test procedures and precautions before doing any fuel pressure tests. Perform Fuel Pressure Test (34 to 38 PSI). Perform Maximum Fuel Pressure Test (50 PSI minimum). Perform Fuel Pressure Hold Test (21 PSI minimum after 5 minutes). Are fuel pressure test within specifications? | YES | Go to step 2. |
| | | NO | Repair as necessary. |
| 2 | Perform Fuel Injector Inspection and Volume Test per Service Manual. Are fuel injectors working okay and dispensing proper volume? | YES | Go to step 3. |
| | | NO | Repair as necessary. |
| 3 | Check for any split, disconnected or perforated vacuum hoses. Also, check PCV valve for proper operation and Purge Solenoid Valve (PSV) for proper installation and operation. Are vacuum hoses, PCV and PSV okay? | YES | Go to step 4. |
| | | NO | Replace faulty vacuum hose(s), PCV or PSV. |

Start engine and allow to warm up to operating temperature. With engine idling, monitor Front O2 Sensor voltage or graph and perform the following test:
 In short spurts, spray aerosol carb cleaner in the following areas while looking for a long rise in voltage at Front O2 Sensor (a rise in voltage that is approximately as long as the spray of carb cleaner indicates some of the carb cleaner was drawn into the intake chamber richening the fuel mixture verifying a leak). Allow enough time between areas checked for carb spray to dissipate.

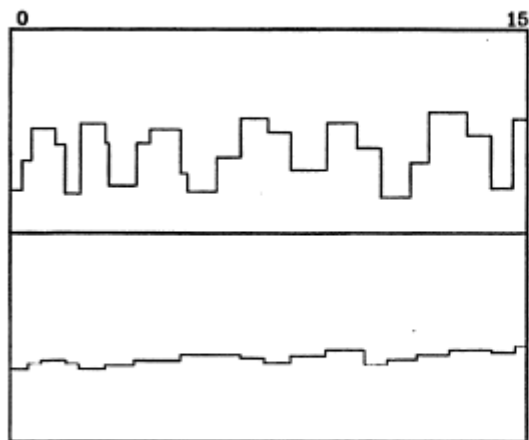
CAUTION

Do not spray carb cleaner on or near coils or plug wires. An arcing wire or coil could start a fire!

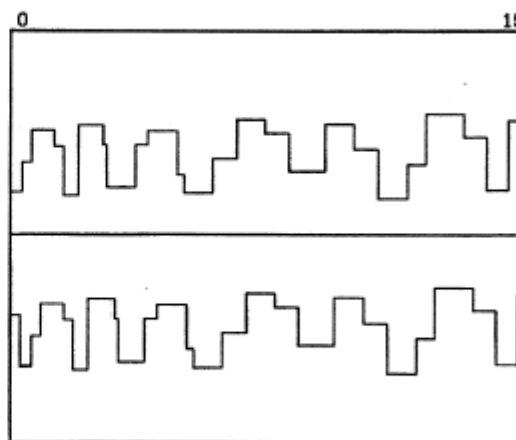
- ⇒ Throttle body gasket
- ⇒ Gasket between intake manifold and cylinder head
- ⇒ Gasket between intake manifold and surge tank
- ⇒ Seals between intake manifold and fuel injectors

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| Are any air leaks indicated? | YES | Repair as necessary. |
| | NO | Go to step 5. |
| Check for exhaust leaks by having a helper hold a wadded rag against tailpipe and listen for exhaust leaks between main catalytic converter and cylinder head with vehicle running. Are any exhaust leaks detected? | YES | Repair as necessary. |
| | NO | Go to step 6. |
| 6 | Clear codes and return vehicle to original condition. Verify any repairs by driving vehicle with KIA Data Pro connected to OBD-II connector and monitoring for pending codes (refer to section 3 of the KIA Data Pro Generic OBD-II Program Card reference manual). | |



A



B