1982 Exhaust Emission Systems

PEUGEOT TURBO DIESEL EXHAUST GAS RECIRCULATION

505 Turbo Diesel, 604 Turbo Diesel

DESCRIPTION

All Peugeot Turbo Diesel models are equipped with an exhaust gas recirculation system to reduce NOx emissions. A controlled amount of exhaust gas is introduced into the intake manifold depending on certain engine loads and temperature. This lowers combustion temperatures and nitrogen oxide formation.

The system consists of an engine speed sensor on the flywheel housing, thermocontact on the rear of the cylinder head, vacuum converter on the injection pump, electronic control box (ECB), electrovalve, EGR valve, vacuum damper, pre-filter, and non-return valve.

OPERATION

SYSTEM OPERATION

When the engine is idling below 1300 RPM (automatic transmission) or 1500 RPM (manual transmission), the speed sensor on the flywheel housing monitors engine RPM and relays this information to the ECB. No EGR occurs. The thermocontact prevents any EGR until the coolant temperature is above 118°F (48°C).

When the engine reaches 1300 RPM (automatic transmission) or 1500 RPM (manual transmission) and temperature is above 118°F (48°C), the ECB opens the electrovalve. The vacuum is at its peak and opens the EGR valve to maximum position. Maximum EGR occurs.

At engine speeds between 1300 RPM (automatic transmission) or 1500 RPM (manual transmission) and 3100 RPM, the amount of EGR decreases as the engine speed increases. At engine speeds above 3100 RPM, the electrovalve closes and no vacuum is applied to the EGR valve. No EGR occurs.

SPEED SENSOR

The speed sensor mounts on the flywheel housing and monitors the rotation of 2 slots in the flywheel. It provides a signal to the ECB which permits EGR to only occur between 1300-3100 RPM (automatic transmission) or 1500-3100 RPM (manual transmission).

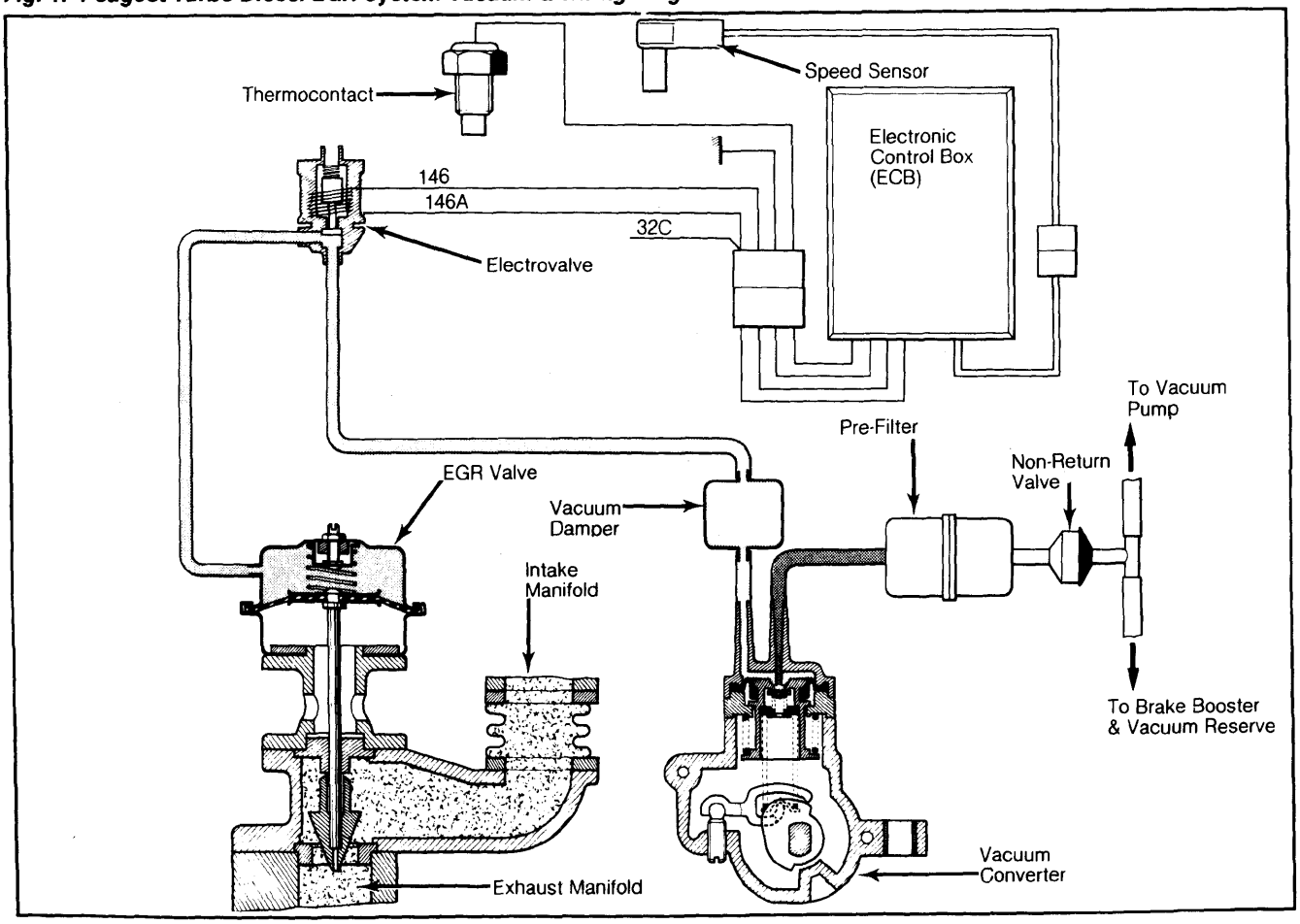
THERMOCONTACT

The thermocontact mounts on top of the right rear corner of the cylinder head and monitors the coolant temperature. It signals the ECB and prevents any EGR until the coolant reaches 118°F (48°C).

VACUUM CONVERTER

The vacuum converter mounts on the injection pump and is directly controlled by the pump output lever through a link-rod. The output lever movement controls the amount of vacuum applied to the EGR valve.

Fig. 1: Peugeot Turbo Diesel EGR System Vacuum & Wiring Diagram



PEUGEOT TURBO DIESEL EXHAUST GAS RECIRCULATION (Cont.)

ELECTROVALVE

The electrovalve controls the vacuum to the EGR valve. When closed, the valve is open to atmosphere and no EGR occurs. When open, the valve routes the various amounts of vacuum from the vacuum converter to the EGR valve.

EGR VALVE

When no vacuum is applied to the EGR valve, it is held closed by spring pressure. When vacuum is applied, the EGR valve opens proportionally with the amount of vacuum.

TESTING

EGR SYSTEM CHECK

CAUTION: Do not attempt to adjust the link-rod or converter ball stud between pump output lever and vacuum converter lever. If link-rod setting is changed, it will be necessary to replace complete pump and vacuum converter assembly.

1) An improperly functioning EGR system results in heavy exhaust smoke and poor engine performance.

2) If symptoms are not found when engine is cold, warm up engine until fan engages. This is to locate the components which malfunction only when hot.

3) To check system, disconnect the connector between ECB and engine speed sensor. Start engine and see if symptoms disappear. If they do, EGR system is at fault.

4) Check the vacuum converter. *See Vacuum Converter Vacuum Check.* If symptoms are still present, perform the following tests.

ELECTRICAL CHECK

NOTE: Tests are made with ignition switch in the "ON" position. Wires are identified by numbers painted on the wire insulation. See Fig. 1 for wire identification.

Electronic Control Box Power

1) Disconnect connector between ECB and preheat control box. Connect voltmeter to ground and wire 32C of connector half leading to preheat control box.

2) Voltage reading should be equal to battery voltage. If no voltage or a large difference in voltage, check wire 32C for shorts. Also check fusebox for blown fuse.

Speed Sensor

Disconnect connector between speed sensor and ECB. Connect leads of ohmmeter to connector terminals of speed sensor. Resistance should be 40-60 ohms. If not, replace speed sensor.

Electrovalve

1) Partially disconnect wire 146A from the electrovalve without breaking electrical contact. Connect voltmeter to ground and to exposed terminal.

2) Voltage should be equal to battery voltage. If not, check problem wire for shorts. Disconnect wire 146 to the electrovalve. Connect a jumper wire in place of it on electrovalve.

3) There should be a "clicking sound" from electrovalve each time jumper wire is grounded. If not, disconnect other wire from electrovalve.

4) Connect leads of ohmmeter to terminals on electrovalve. Resistance should be about 40 ohms. If resistance is infinity or close to it, replace electrovalve.

5) If electrovalve is always open or is open outside of the 1300-3100 RPM limits and checks out okay, it may be necessary to replace electronic controlbox.

VACUUM CHECK

EGR Vacuum Circuit

1) Disconnect wire 146 from electrovalve. Connect a jumper wire in place of it on electrovalve. Connect other end of jumper wire to ground.

2) Start the engine. There should be vacuum at the vacuum converter and electrovalve should be open. Disconnect link-rod from vacuum converter lever.

3) With engine idling, move converter lever smoothly in direction of acceleration for injection pump lever.

4) Diaphragm of EGR valve should move smoothly until the EGR valve closes completely. If not, complete the following vacuum checks.

Vacuum Supply

1) Disconnect hose from vacuum converter side of pre-filter. Connect a vacuum gauge to pre-filter in place of hose.

2) Start the engine. Vacuum should be 17.7 in. Hg or more. If not, check for leaks in vacuum supply circuit.

Vacuum Converter

1) Disconnect hose, with vacuum damper attached to it, from front of vacuum converter. Connect a vacuum gauge to vacuum converter in place of hose.

2) Start the engine. Vacuum should be 12.4-14.2 in. Hg. Disconnect link-rod from vacuum converter lever.

3) With engine idling, move converter lever slowly and smoothly in direction of acceleration for injection pump lever.

4) Vacuum gauge indicator should drop slowly without any jerking. If not, replace pump and converter assembly. Check the factory adjustment of vacuum converter. Reconnect link-rod to vacuum converter lever.

5) Hook up tachometer. Connect vacuum gauge to vacuum converter in place of hose with vacuum damper attached to it.

6) Accelerate slowly until engine reaches 4550-4650 RPM. Vacuum should be 0.0 in. Hg. If not, replace pump and converter assembly.

EGR Valve

1) Disconnect hose from EGR valve and connect vacuum pump to valve. Apply 3.3-4.9 in. Hg. Diaphragm should start to move. Apply vacuum until 15.7-17.3 in. Hg is reached.

2) Diaphragm should move smoothly until it reaches 4550-4650 RPM. Vacuum should be 0.0 in. Hg. If not, replace pump and converter assembly.

ADJUSTMENT

SPEED SENSOR

Loosen clamp holding speed sensor in place on top of flywheel housing. Push sensor down until it contacts flywheel. Pull sensor back up a maximum of 0.020" (0.5 mm). Tighten sensor clamp.