

## DESCRIPTION

The EGR system reduces oxides of nitrogen (NOx) in the engine exhaust. This is accomplished by allowing a predetermined amount of hot exhaust gas to recirculate and dilute the incoming fuel/air mixture.

A malfunctioning EGR system can cause engine stumble, sags, or hesitation, rough idle, engine stalling and poor driveability.

# OPERATION

The system consists of:

- | An EGR valve assembly, located toward the rear of the engine.
- | An EGR solenoid, located in the left rear of engine compartment near EGR valve. The EGR solenoid controls the "on time" of the EGR valve.
- | The ECM operates the EGR solenoid. The ECM is located under the hood next to the air cleaner housing.
- | The tandem pump supplies vacuum for the EGR solenoid and the EGR valve. This pump also supplies vacuum for operation of the power brake booster and the heating and air conditioning system. The pump is located in the rear of the cylinder head and is driven by the exhaust camshaft.
- | Vacuum lines and hoses connect the various components.

When the ECM supplies a variable ground signal to the EGR solenoid, EGR system operation begins. The ECM will monitor and determine when to supply and remove this variable ground signal. This will depend on inputs from the engine coolant temperature, throttle position and engine speed sensors.

When the variable ground signal is supplied to the EGR solenoid, vacuum from the tandem pump will be allowed to pass through the EGR solenoid and on to the EGR valve with a connecting hose.

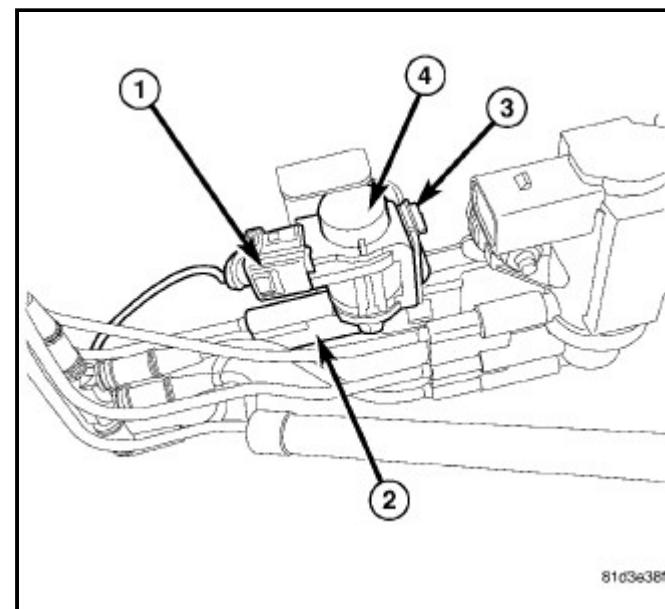
Exhaust gas recirculation will begin in this order when:

- | The ECM determines that EGR system operation is necessary.
- | The engine is running to operate the vacuum pump.
- | A variable ground signal is supplied to the EGR solenoid.
- | Variable vacuum passes through the EGR solenoid to the EGR valve.
- | The inlet seat (poppet valve) at the bottom of the EGR valve opens to dilute and recirculate exhaust gas back into the mixing chamber.

The EGR system will be shut down by the ECM after 60 seconds of continuous engine idling to improve idle quality.

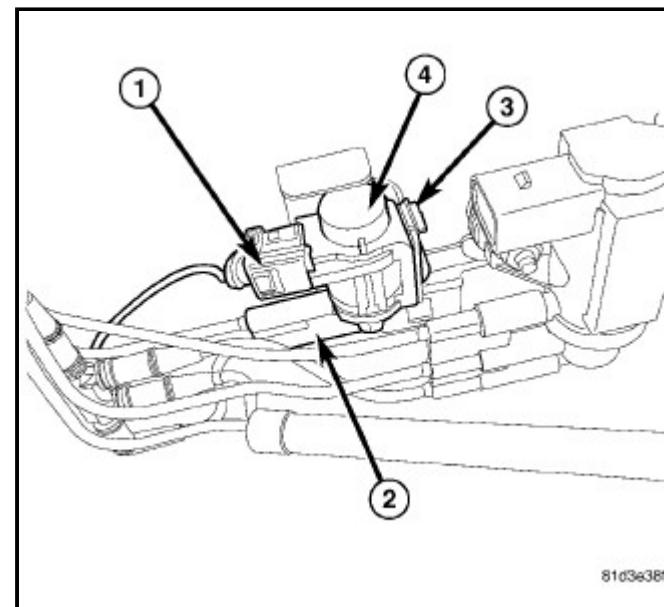
## DESCRIPTION

The EGR solenoid (4) is mounted to a bracket attached to the battery tray in the engine compartment. The EGR solenoid serves two different functions. One is to control vacuum bleed-off of the EGR valve. The other is to control the "on time" of the EGR valve.



## REMOVAL

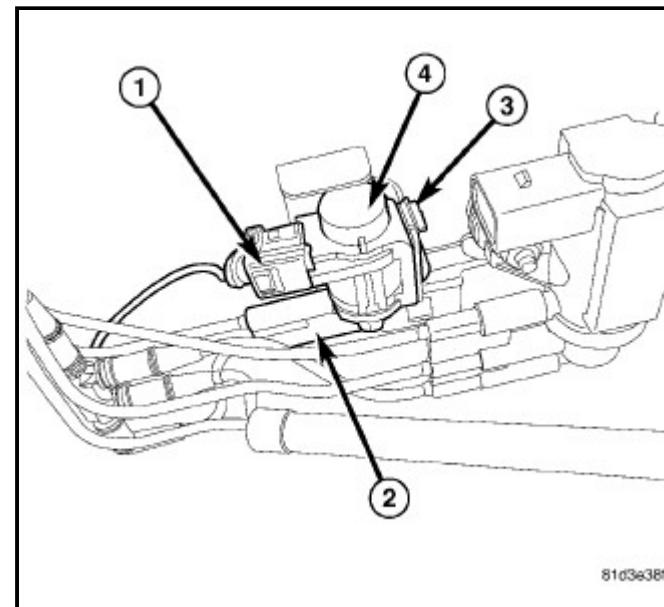
1. Disconnect negative battery cable.
2. Disconnect the EGR solenoid electrical connector (1).



3. Disconnect the EGR vacuum harness (2) from the EGR solenoid (4) valve block.
4. Release EGR solenoid retainer clip (3) and push down to remove the EGR solenoid valve (4) from the bracket.

# INSTALLATION

1. Position and install EGR solenoid valve (4) onto bracket.



2. Connect EGR vacuum harness (2) to the EGR solenoid valve (4).
3. Connect EGR solenoid valve electrical connector (1).
4. Connect negative battery cable.

## DESCRIPTION

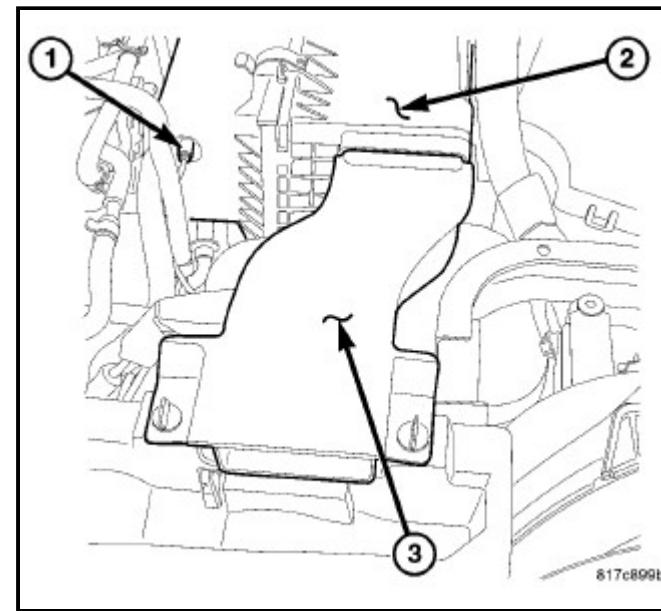
The EGR valve is mounted to the intake manifold.

## OPERATION

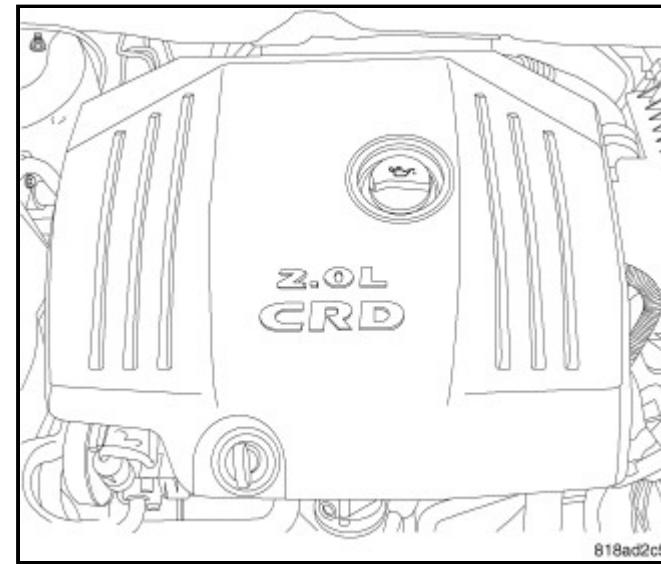
The engines use Exhaust Gas Recirculation (EGR) systems. The EGR system reduces oxides of nitrogen (NOx) in engine exhaust and helps prevent detonation (engine knock). Under normal operating conditions, engine cylinder temperature can reach more than 1649°C (3000°F). Formation of NOx increases proportionally with combustion temperature. To reduce the emission of these oxides, the cylinder temperature must be lowered. The system allows a predetermined amount of hot exhaust gas to recirculate and dilute the incoming air/fuel mixture. The diluted air/fuel mixture reduces peak flame temperature during combustion.

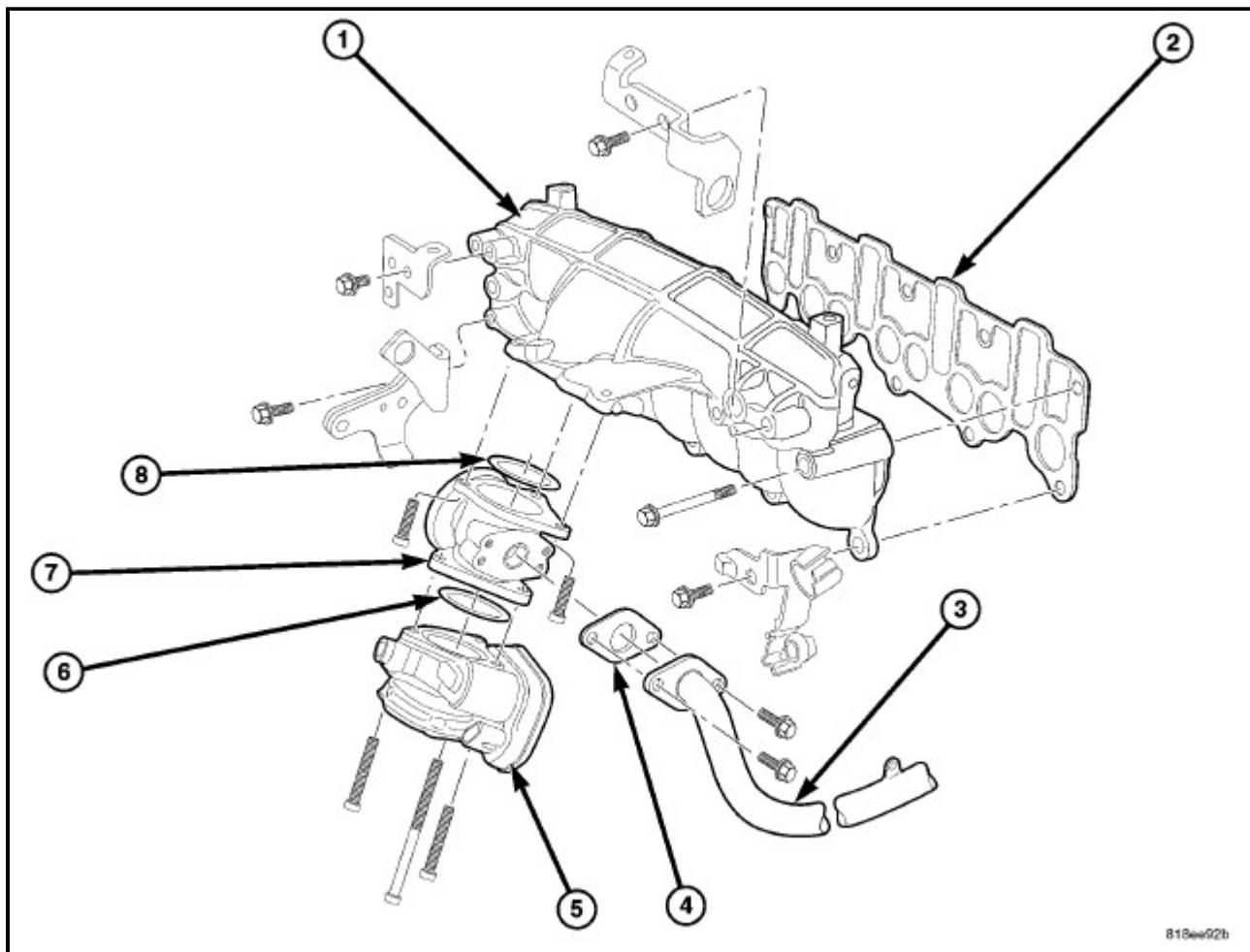
## REMOVAL

1. Remove air inlet duct (3).
2. Disconnect negative battery cable.



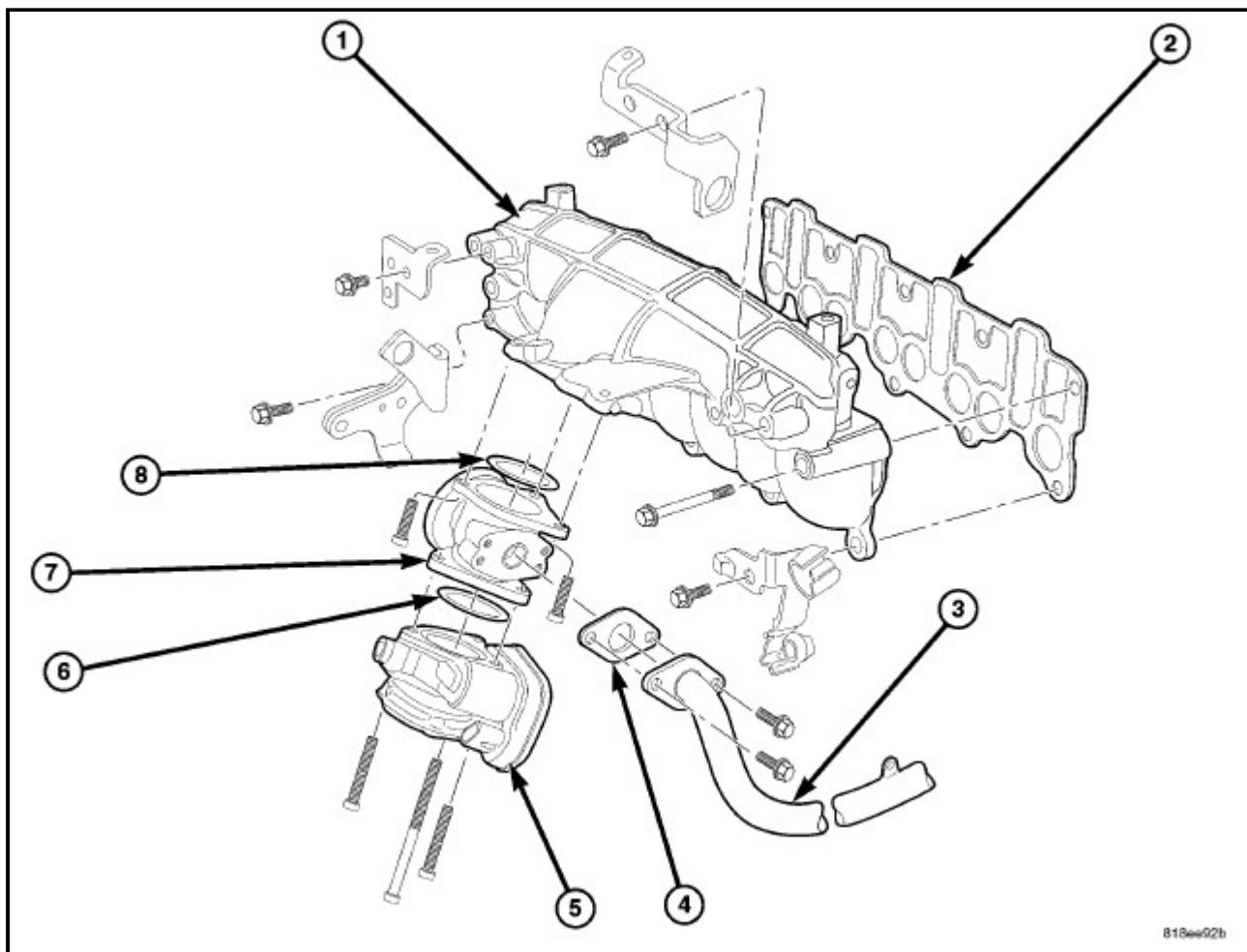
3. Remove engine cover [\(Refer to 09 - Engine - Removal\)](#).



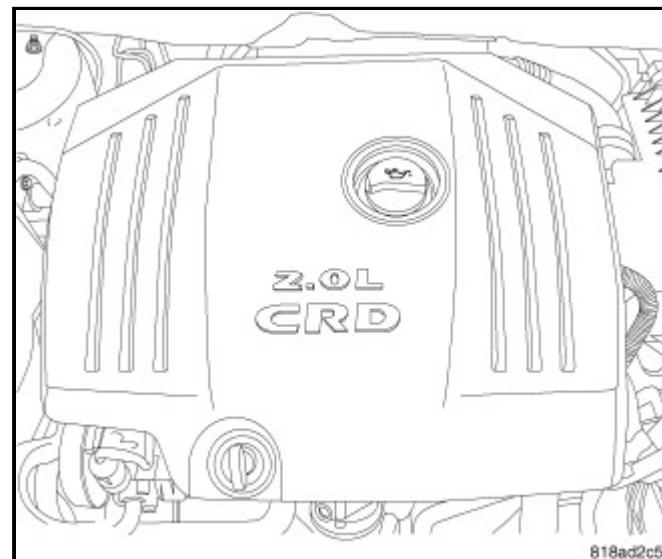


4. Disconnect EGR valve vacuum line.
5. Disconnect EGR pipe (3) at EGR valve.
6. Remove air inlet tube from intake manifold flap motor (5).
7. Remove intake manifold flap motor (5).
8. Remove EGR valve retaining bolts and remove EGR valve (7).

# INSTALLATION



1. Inspect EGR and intake manifold flap motor o-rings (6,8) for damage. Replace as necessary.
2. Install EGR valve (7) to intake manifold. Torque retaining bolts to 10·m (88 lbs.in.).
3. Install intake manifold flap motor (5) to EGR valve (7). Torque retaining bolts to 10 N·m (88 lbs.in.).
4. Inspect EGR pipe gasket (4) for damage, replace as necessary.
5. Connect EGR pipe (3) to EGR valve. Torque retaining bolts to 20N·m (177 lbs.in.).
6. Connect EGR valve vacuum line.
7. Install engine cover ([Refer to 09 - Engine - Installation](#)).



8. Connect negative battery cable.
9. Install air inlet duct (3).

