

EGR SYSTEM - DIESEL

1986 Isuzu Trooper II

1986 Exhaust Emission Systems
ISUZU DIESEL EXHAUST GAS RECIRCULATION

P'UP, Trooper II

DESCRIPTION

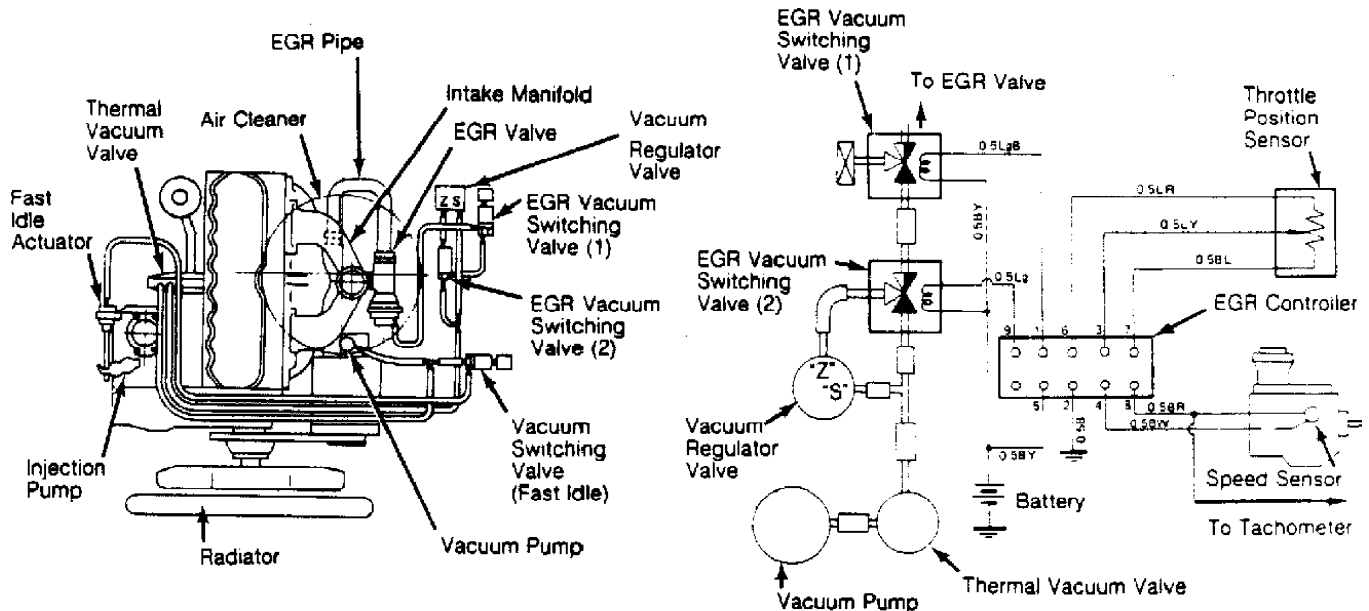
Exhaust gas recirculation (EGR) system is used to reduce oxides of nitrogen (NOx) by recycling some exhaust gas back into the intake manifold to lower combustion chamber temperatures.

The EGR valve is mounted on intake manifold. EGR system consists of an EGR valve, vacuum switching valve(s), and connecting hoses and tubes. An electronic EGR controller monitors throttle position sensor voltage, engine speed and a thermal vacuum valve to sense coolant temperature.

OPERATION

EGR VALVE

Vacuum diaphragm chamber of EGR valve is connected to a vacuum pump through vacuum switching valve(s). Vacuum switching valve(s) allow vacuum to reach EGR valve when opened by signals from EGR controller. When vacuum overcomes EGR valve spring force, it opens EGR valve to allow recirculation.



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Fig. 1: Isuzu Diesel EGR System & Vacuum Diagram

ELECTRONIC EGR CONTROLLER

This unit responds to input signals from the speed sensor, throttle position switch. Electronic EGR controller will signal vacuum switching valve(s) to open according to input signals.

The electronic EGR controller will open vacuum switching

valve number 1 when coolant temperature is over 122°F (50°C), engine is between 1200-2500 RPM and throttle position sensor is less than or equal to $.0007 \times 2200 \text{ RPM} + 4.11$ volts.

Vacuum switching valve number 1 will also be open when coolant temperature is over 122°F (50°C), engine is between 2500-3000 RPM and throttle position sensor voltage is between 3.51-4.32 volts.

Electronic EGR controller will open vacuum switching valves 1 and 2 when coolant temperature is over 122°F (50°C) and throttle position sensor is between $.0007 \times 2200 \text{ RPM} + 3.30$ and 4.11 volts.

ENGINE SPEED SENSOR

Engine speed sensor is located on the right side of the fuel injection pump. It has a magnetic pickup which senses speed of injection pump gear teeth. Engine speed sensor sends these signals to EGR controller.

THROTTLE POSITION SENSOR

This sensor is mounted on front upper part of fuel injection pump. As throttle angle changes, resistance value changes. This signal is sent to the EGR controller.

THERMAL VACUUM VALVE (P'UP)

Mounted on intake manifold, thermal vacuum valve is connected between vacuum pump and valve switching valves. Valve opens when coolant temperature reaches 115-129°F (46-54°C). With valve closed, EGR system does not operate. As coolant warms, valve opens, allowing normal EGR operation.

VACUUM REGULATOR VALVE (P'UP)

This component reduces vacuum pump vacuum to 8.8 in. Hg. When vacuum switching valve number 1 is open, vacuum from the vacuum regulator valve opens EGR valve half way.

VACUUM SWITCHING VALVE(S)

The vacuum switching valve(s) are opened by signals from the EGR controller. When open, vacuum is allowed to operate EGR valve.

TESTING

COOLANT THERMO SWITCH

Place thermo switch in water. Raise water temperature. Connect an ohmmeter and check for continuity above 131°F (50°C). If not, replace coolant thermo switch.

ELECTRONIC EGR CONTROLLER

1) Using a voltmeter, connect positive lead to the Light-Green or Light-Green/Black wire at the vacuum switching valve wiring connector. Connect negative test lead to Black/Yellow wire.

2) Check for 12 volts to vacuum switching valve(s) when engine speed is less than 3000 RPM. If not, replace EGR controller.

EGR VALVE

1) Detach vacuum hose from EGR valve and connect outside

vacuum source, such as hand pump with gauge. Apply vacuum, EGR valve should not leak down.

2) While applying vacuum, watch movement of valve stem. At 17.7 in. Hg, stem should move diaphragm to full up position. If valve does not respond as indicated, replace EGR valve.

THROTTLE POSITION SENSOR

Connect a voltmeter to the Blue/Yellow (positive) and Blue/Red (negative) color coded terminals without disconnecting the throttle position sensor. Open throttle lever to within 9/32" (7 mm) from idle stop screw. Voltmeter should read 3.3-4.4 volts after starting the engine. If not, replace throttle position sensor.

THERMAL VACUUM VALVE (P'UP)

Remove thermal vacuum valve from engine and place sensing portion in water, 115-129°F (46-54°C). Blow through hoses connected to valve. Air should pass through. If not, replace valve.

VACUUM REGULATOR VALVE (P'UP)

Attach a vacuum pump and gauge to port "S". Attach a vacuum gauge to port "Z". Apply 27.5 in. Hg to the vacuum regulator valve. Vacuum gauge on port "Z" should read 8.8 in. Hg. If not, replace vacuum regulator valve.

VACUUM SWITCHING VALVE(S)

The vacuum switching valve(s) may be checked by connecting 12 volts directly to terminals. With 12 volts connected, listen for plunger operation noise.