GENERAL MOTORS DIESEL EXHAUST GAS RECIRCULATION

DESCRIPTION & OPERATION

NOTE – *The following information applies to V8 and V6 Diesel engines. The 1.8L Diesel does not have an EGR system.*

To lower formation of nitrogen oxides (NOx), it is necessary to reduce combustion temperatures. This is done by introducing exhaust gases into cylinders. There are 2 EGR systems for V8 diesel engine applications, one for the V6 engine. Usage varies with vehicle options.

V8 ENGINES

Type I: Vacuum from vacuum pump is modulated by Vacuum Regulator Valve (VRV) mounted on injection pump. Vacuum is highest at idle and decreases to zero at wide open throttle. The EGR valve is therefore fully open at idle and closed at wide open throttle. A Response Vacuum Valve is used between VRV and EGR valve to allow EGR valve to change position quickly as throttle position is changed.

Type II: This system is the same as Type I, except a solenoid has been added to the system that shuts off vacuum to EGR valve when Torque Converter Clutch (T.C.C.) is engaged. This solenoid is fed 12V from the T.C.C. switch portion of the VRV and is grounded through transmission's governor pressure switch.

V6 ENGINES

Type III: On V6 diesel engine, vacuum from vacuum pump is modulated by Vacuum Regulator Valve (VRV) mounted on injection pump. Vacuum is highest at idle and decreases to zero at wide open throttle. EGR valve is open to its maximum at idle and closed at wide open throttle. The amount of EGR valve opening is further modulated by a Vacuum Modulator Valve (VMV). The VMV allows for an increase in vacuum to EGR valve as throttle is closed, up to the switching point of VMV. A Response Vacuum Reducer (RVR) valve is used between VRV and Torque Converter Clutch (T.C.C.) operated solenoid. The RVR is used to allow EGR valve to change position quickly as throttle position is changed. A solenoid is placed between RVR and VMV that blocks vacuum to EGR valve whenever torque converter clutch is applied. The solenoid is fed 12V from T.C.C. switch portion of the VRV and is grounded through transmission's governor pressure switch.

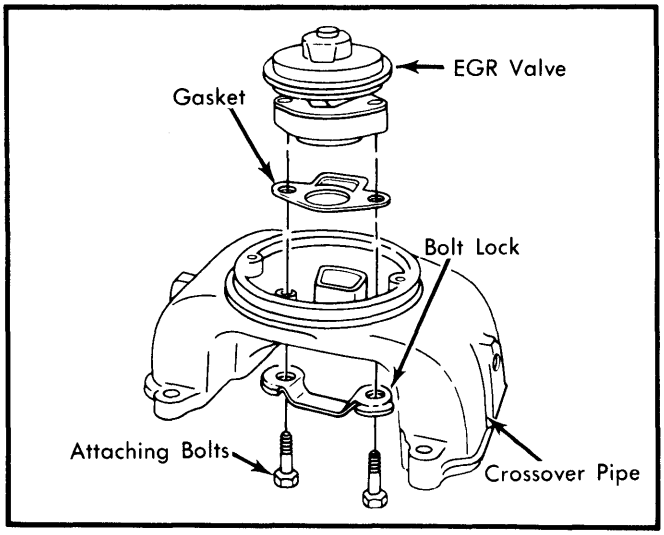

Fig. 1 General Motors Diesel Engine EGR Valve (V8 & V6)

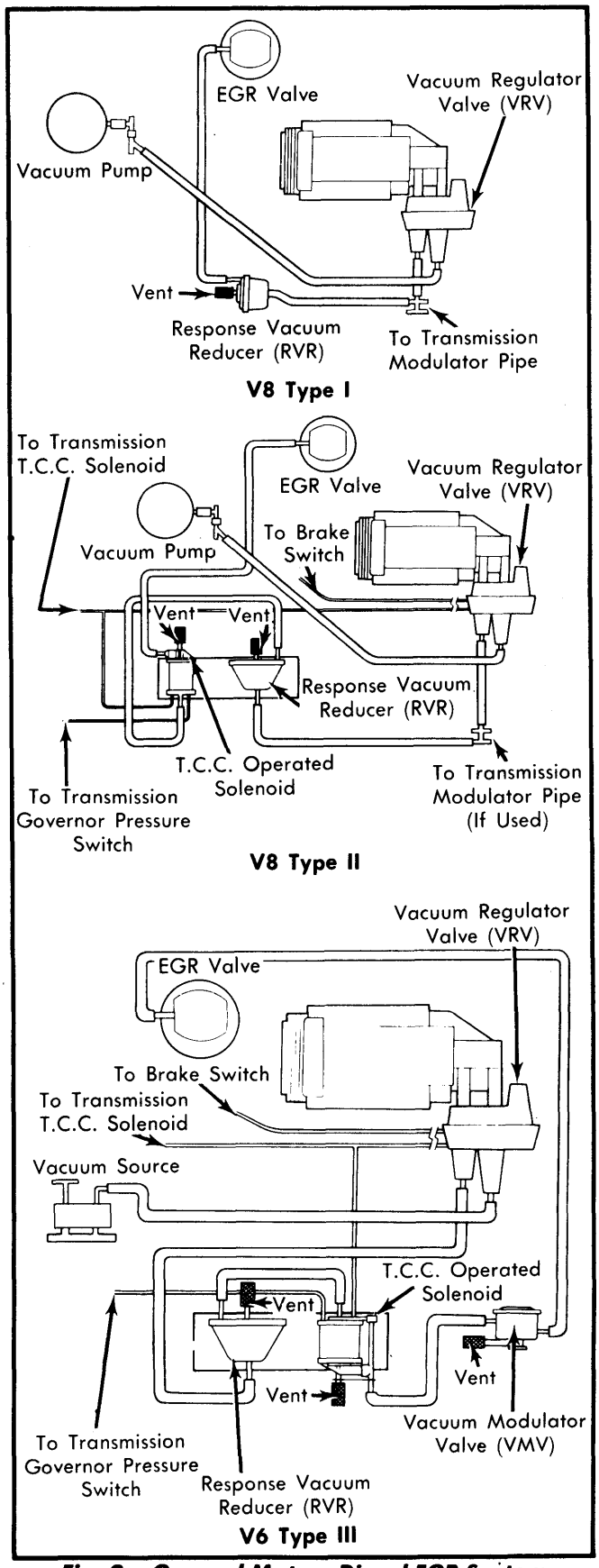

Fig. 2 General Motors Diesel EGR System Vacuum Diagrams

GENERAL MOTORS DIESEL EXHAUST GAS RECIRCULATION (Cont.)

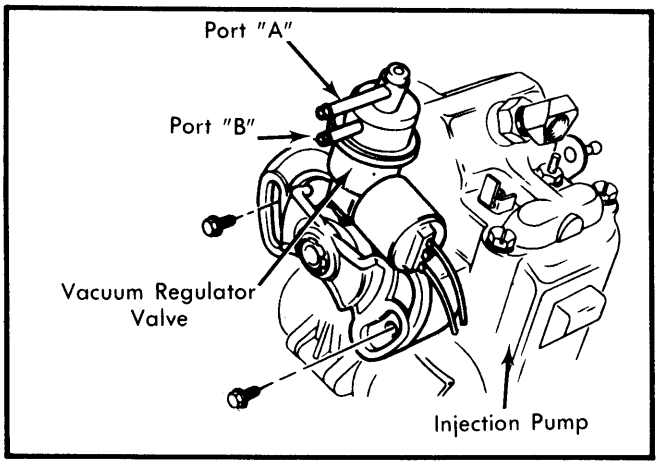

Fig. 3 Vacuum Regulator Valve On Diesel V8 & V6 Engines

TESTING

FUNCTIONAL TESTS

Vacuum Regulator Valve (VRV) – Vacuum Regulator regulates vacuum from vacuum pump in proportion to throttle angle. Vacuum from vacuum pump is supplied to port "A" and vacuum at port "B" is reduced as throttle is opened. At closed throttle, vacuum is 15 in. Hg; at half throttle 6 in. Hg; and at wide open throttle there is zero vacuum. See *Fig. 3*.

Exhaust Gas Recirculation (EGR) Valve – On V8 engines apply vacuum to vacuum port. The valve should be fully open at 10.5 in. Hg and closed below 6 in. Hg. On V6 engines apply vacuum to vacuum port. The valve should be open at 12 in. Hg and closed below 6 in Hg.

Response Vacuum Reducer (RVR) — Connect a vacuum gauge to port marked "To EGR valve" or "T.C.C. solenoid". Connect hand-operated vacuum pump to VRV port. Draw 15 in. Hg of vacuum on pump. The reading on the vacuum gauge should be lower than vacuum pump reading as follows:

- .75 in. Hg on all except High Altitude V8
- 2.5 in. Hg on High Altitude V8

Torque Converter Clutch Operated Solenoid – When Torque Converter Clutch is engaged, an electrical signal energizes solenoid allowing port 1 and 2 to be interconnected. When solenoid is not energized, port 1 is closed and ports 2 and 3 are interconnected.

Vacuum Modulator Valve (VMV) – Block drive wheels, apply parking brake, with shift lever in park, start engine and run at slow idle. Connect a vacuum gauge to hose that connects to port marked "MAN". There should be at least 14 in. Hg of vacuum. If not, check vacuum pump, VRV, RVR, solenoid and connecting hoses. Reconnect hose to "MAN" port. Connect a vacuum gauge to "DIST" port on VMV. The vacuum reading should be as follows:

- 12 in. Hg on all except V8 High Altitude
- 9 in. Hg on V8 High Altitude