AUDI ENGINE MODIFICATION

Audi
Super 90 (1968-71)
100 Series (1971-73)
Fox (1973)

DESCRIPTION

Audi engines were designed from initial stages to obtain the most efficient combustion thereby reducing exhaust emissions to a minimum. Carburetion and ignition control are set to maintain minimum proportions of carbon monoxide and hydrocarbon content in exhaust gases. The following exhaust emission devices and engine modifications are used on Audi vehicles.

Triple Port Intake Manifold (Super 90 & 100 Series) – Manifold has two passages for carburetor intake system and one passage for engine coolant. Primary intake air passage is heated by engine coolant to promote more complete fuel vaporization for improved combustion.

Fuel Recirculation (1972-73 100 Series) – System consists of a fuel return valve located in fuel line near carburetor, a vacuum control line and fuel return line to fuel tank.

EGR System – System is designed to reduce NOx emissions by recirculating a limited amount of exhaust gas through intake system during partial load operation. Components of system are: an exhaust gas filter, a vacuum controlled exhaust gas recirculation valve, and various connecting hoses.

TCS System (1973 100 Series) – Transmission controlled spark is used on manual transmission vehicles only. System consists of electric cutoff valve, vacuum lines and switch on transmission case. TCS system prevents ignition retard during high gear operation.

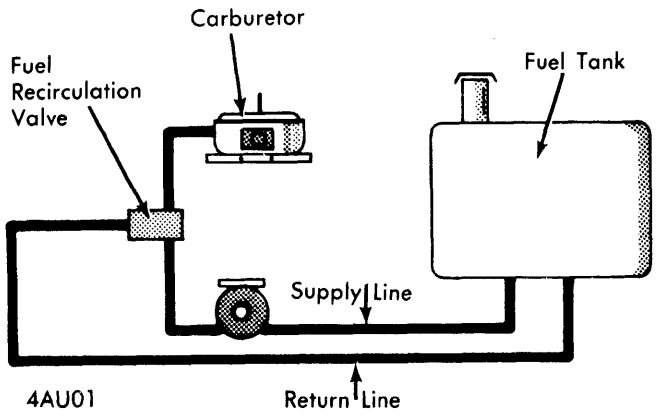
TAC System – Some air cleaners have a thermal intake air control device which consists of a control valve in intake manifold, a vacuum unit with spring loaded flap within air cleaner, and two vacuum lines, and a warm/cool air duct. Purpose of unit is to maintain intake air temperature at 86°F. for improved combustion of air/fuel mixture.

OPERATION

Fuel Recirculation – Fuel return valve is operated by vacuum from intake manifold. Valve is open during high vacuum periods such as at idle, and excess fuel returns to fuel tank. During low vacuum, full load operation, return valve closes and total amount of fuel delivered by fuel pump flows to carburetor.

EGR System – When carburetor throttle valve is opened 18°, vacuum is applied to EGR valve located on left side of transmission bell housing. Exhaust gas is taken from exhaust header pipe near muffler through a flexible hose, and passes to EGR filter located on left side of transmission near oil pan. Filtered exhaust gas then moves through line to EGR valve and then to intake manifold.

TCS System – When operating a manual transmission vehicle in high gear, a cutoff valve is electrically operated by a switch on transmission case. The cutoff valve vents distributor retard vacuum and this mainly prevents engine hesitation during low speeds with a lean carburetor, and retarded ignition timing settings.



FUEL RECIRCULATION SYSTEM

TAC System – Thermal control valve located in intake manifold remains open at mixture temperatures up to 86°F. Vacuum from thermal valve opens vacuum unit flap and intake air is taken from warm air duct. When intake air temperature heats thermal valve above 86°F, valve closes vacuum port and vacuum drops. This allows flap in air intake unit to close regulating intake air temperature according to thermal valve vacuum, and temperature.

TESTING

EGR System – Remove EGR valve and visually inspect for deposits. Check that diaphragm plunger moves freely. Connect EGR valve to vacuum source and apply vacuum; diaphragm plunger should lift off seat. Disconnect vacuum line; diaphragm plunger must return to valve seat. Replace copper seal on valve holder side and reinstall valve. Check entire system (lines, filter, connections) for leaks, deposits and restrictions.

Fuel Recirculation – Inspect all hoses for deterioration or leaks.

ADJUSTMENT

IGNITION TIMING

Audi Super 90 – With vacuum line off distributor, set timing to 18° BTDC at 3000 RPM. Reconnect vacuum line and timing should be 9±1° ATDC at 950±50 RPM.

Audi 100 (1970-71) – With vacuum line off distributor, set timing to 27° BTDC at 2500 RPM. Reconnect vacuum line and timing should be 9±1° ATDC at 950±50 RPM.

Audi 100 (1972) – With vacuum line connected to distributor, set timing to 8° ATDC at 925±75 RPM.

Audi Fox – Run engine under load (not idle) until it reaches operating temperature. Check and adjust dwell angle to 50±2°. Disconnect and plug vacuum lines from distributor. Check that timing is 30° BTDC at 3000 RPM; if not, adjust by rotating distributor body. Reconnect vacuum lines and check timing for 0±2° at 925±75 RPM. *NOTE – Ignition timing marks are on flywheel.*

AUDI ENGINE MODIFICATION (Cont.)

IDLE SPEED & MIXTURE

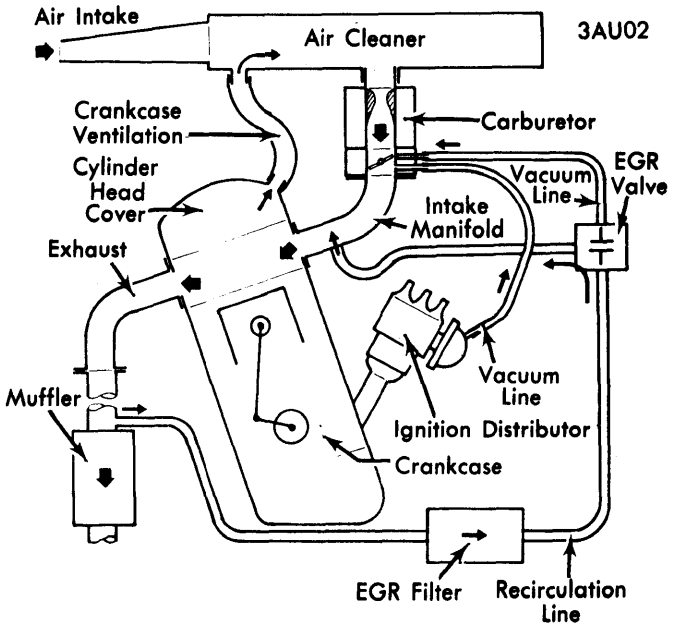
Audi 90 & 100 Series – With ignition timing correctly set, turn headlights on high beam and set idle to 925±75 RPM by carefully turning air control screw and make certain that CO is 1±0.5%. Adjust if necessary by turning idle mixture control screw.

Audi Fox – With engine at normal operating temperature and ignition timing properly set, adjust idle speed by turning the auxiliary mixture control screw located in carburetor base between the flange bolts. Then check CO content for 1.3±0.7% CO and if necessary, adjust CO level with auxiliary fuel control screw located above accelerator pump housing.

MAINTENANCE

EGR Valve – System should be checked for leaks and condition of hoses. Check EGR valve for proper operation every 10,000 miles.

Exhaust Gas Filter – Replace filter every 20,000 miles or every two years, whichever occurs first.



AUDI 100 EGR SYSTEM