TRIUMPH ENGINE MODIFICATION

Spitfire (1971-73)
GT-6 (1968-73)
TR-250 (1968-69)
TR-6 (1969-73)
Stag (1971-73)

DESCRIPTION

Triumph exhaust emission control is accomplished by engine modifications which improve combustion characteristics, along with special designed carburetors and ignition distributors. Carburetor modifications include a biased type spring loaded needle, temperature compensation for mixture and a throttle by-pass valve. All models incorporate "lost motion" accelerator linkage for improved low speed engine operation. Stag models also incorporate a thermostatically controlled air cleaner. All ignition distributors are equipped with mechanical advance. Depending on year model, engine, and fuel system, distributors also have either vacuum advance and/or vacuum retard systems. All late models use a thermostatic vacuum switch to prevent engine overheating by allowing normal ignition advance at high engine temperatures.

OPERATION

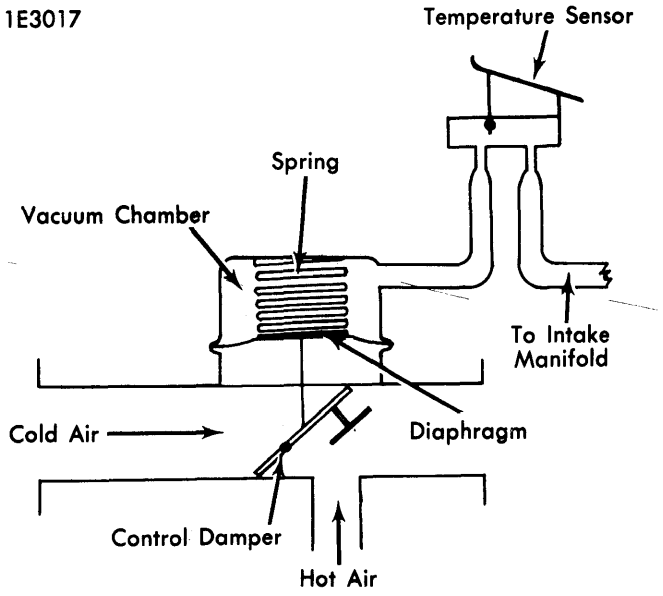
Carburetors – All models use Zenith Stromberg CDSE(V) carburetors. Spitfire models use a single 150 series carburetor, and GT6 models use twin 150 series carburetors. Stag, TR6 and TR-250 models use twin 175 series carburetors. These carburetors are designed for optimum emission control and only idle speed, idle emission, and fast idle are the normal routine adjustments. *For additional information, see appropriate story in CARBURETION Section.*

Ignition Distributors – Ignition timing is varied with mechanical advance mechanisms, and with vacuum advance and retard systems, if equipped. Some distributors have two single vacuum units which work in opposite directions for advance or retard modes. Other distributors have one double acting vacuum unit with two vacuum lines for advance and retard operation. All late models use distributors with vacuum retard and mechanical advance only. No vacuum advance is used. Stag models also use a distributor with two point sets which operate in parallel to extend dwell period.

Vacuum Control Valve (GT-6, TR-250 & TR-6) – Valve times and regulates application of intake manifold vacuum to distributor retard mechanism. Operation of vacuum control valve is controlled by a relay lever, which is connected to accelerator linkage. Valve allows intake manifold vacuum to be applied to distributor retard unit only at idle or under a deceleration condition.

Lost Motion Throttle Link – On GT-6, TR-250 & TR-6 models, when throttle is depressed, lost motion link will prevent throttle valves from opening until vacuum control valve has cut-off retard action of distributor. This action allows distributor to advance normally as engine RPM increases. On Spitfire and Stag models, "lost motion" is incorporated into linkage to ensure complete throttle closure. Linkage does not require adjustment during normal operation.

Thermostatic Air Cleaner – Stag models are equipped with a thermostatically controlled air cleaner to maintain air intake temperatures between 95-105°F. A sensor, mounted in air cleaner, allows intake manifold vacuum to operate a flap valve in air intake duct. This valve permits cold air from forward of radiator, or hot air, from scoop around exhaust manifold, to mix in varying amounts to provide required air temperatures.



STAG THERMOSTATIC AIR CLEANER SYSTEM

Thermostatic Vacuum Switch – This switch, located in cooling system, is connected in the vacuum line between carburetor and distributor. A sensor, located inside switch, vents carburetor vacuum to atmosphere at temperatures above 220°F which cancels the effect of the vacuum retard unit on distributor. This will result in an advanced ignition timing which will increase engine idle speed to promote more efficient cooling.

SERVICE PROCEDURES

To provide efficient engine operation and proper control of exhaust emissions, all normal tune-up items should receive careful and thorough attention. No other maintenance of exhaust emission control system is required.

ADJUSTMENTS

NOTE – See Tune-Up Chart for proper ignition and carburetor adjustment specifications.

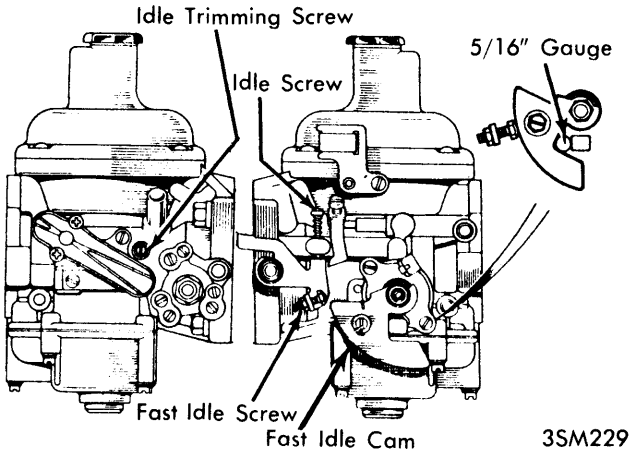
Ignition Timing – With engine at normal operating temperature, cam angle properly set, and engine at idle speed (600 RPM on Stag Models), adjust ignition timing to specifications.

Carburetor Adjustments – 1) With engine at normal operating temperature and ignition timing set to specifications, set idle speed to specifications by turning throttle stop screws equal amounts. *NOTE – Spitfire has a single carburetor, so balancing carburetors per step number 2 is not required.* See Tune-Up Chart for proper specifications.

2) With suitable air flow meter, check and adjust carburetor balance with engine at specified idle speed.

TRIUMPH ENGINE MODIFICATION (Cont.)

3) Install a combustion analyzer and observe combustion efficiency. If readings are slightly outside permitted range, adjust carburetor trim screw(s) equally. *CAUTION — Trim screw is not an ordinary mixture adjustment screw. Adjustment is so fine that only a meter can detect results of adjustment.* It is important to avoid prolonged idling when checking air fuel ratios. After each 3 minute idling period, run engine at 2000 RPM for 1 minute.



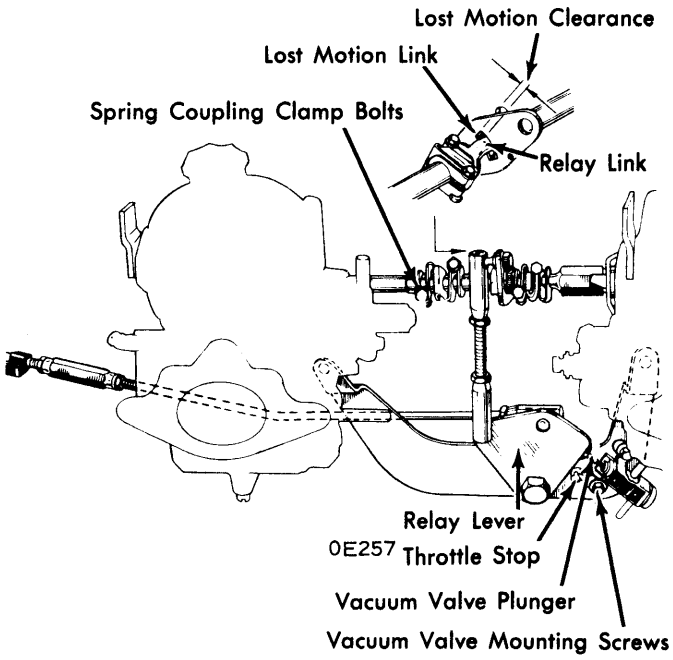
CARBURETOR ADJUSTMENT

Fast Idle (1968-72 Models) — On GT-6, TR-250 & TR-6 models, with choke control fully pushed in, make sure that each choke lever is against its stop. If necessary, adjust cables to achieve this condition. Pull out choke control until cable connection lines up with pivot of lever and fast idle screw. Adjust fast idle screws until they just contact cam, start engine and while cold (68-86°F) adjust screws an equal amount to obtain a fast idle speed of 1100 RPM. On Spitfire & Stag models, with choke control pushed in, adjust gap between fast idle screw and cam to .030" (Spitfire) or .075-.080" (Stag). Start engine and pull out control knob fully. While engine is cold (68-86°F) adjust fast idle speed to 1100 RPM with fast idle screw(s).

Fast Idle (1973 Models) — Check that mixture control cam lever, on both carburetors (if equipped), returns to its stop. Check that mixture control cables are neither too slack nor too tight. Pull choke control knob out and insert a 5/16" drill or gauge rod between fast idle cam and stop. Adjust fast idle screw until it lightly touches cam. Repeat adjustment on second carburetor (if equipped). Remove gauge, push knob in, then pull out again and check that fast idle speed is to specifications. If necessary, readjust fast idle screws using a suitable air flow meter to maintain carburetor balance on twin carburetor models.

Vacuum Control Valve Adjustment — With engine idling at correct specification, place a .030" feeler gauge between relay lever and plunger. Slide valve towards lever until plunger is fully depressed. Tighten locating bolts. *NOTE — Linkage between relay lever and accelerator pedal is adjustable for length. Relay lever stop is mounted on eccentric screw for fine adjustment.*

Lost Motion Throttle Link Adjustment — With engine at idle speed and relay lever against stop, "lost motion link" clearance should be 3/32" (GT-6) or 1/16" (TR-250 & TR-6). To adjust, put shank of twist drill in link while tightening botn clamp bolts. At the same time, check throttles to make sure they are against their stops.



ACCELERATOR LINKAGE (GT-6, TR-250 & TR-6)

TESTING

Checking Idle Retard (GT-6) — Start engine and while idling, remove air valve pipe from diaphragm connection (distributor body side of diaphragm). Engine should speed up and when pipe is connected again, engine speed should drop. *NOTE — When pipe is disconnected cover end with finger.*

Checking Idle Retard (TR-250 & TR-6) — Start engine and while idling, look at advance diaphragm unit (front). See if it is drawn in towards engine 1/8". Slightly open throttle linkage, front diaphragm should move 1/8" away from distributor. If movement is not apparent, check vacuum control valve connections and retard diaphragm. *NOTE — Rear diaphragm is fixed and does not move.*

Thermostatic Air Cleaner — With engine cold and not running, control damper should be down in cold air position. Start engine, damper should move up to warm air position. As engine warms up, damper should assume a midway position. *NOTE — Use a mirror to observe control damper.*

TROUBLE SHOOTING

Poor or Rough Idle — Check distributor breaker points, spark plugs, ignition wiring, choke, vacuum fittings and hoses, oil filler cap, ventilation hoses and carburetor.

Loss Of Power — Check distributor breaker points, spark plugs, ignition wiring, choke, vacuum fittings and hose, oil filler cap, ventilation hoses, distributor, air cleaner and ignition timing.

High Load Misfire — Check distributor breaker points, spark plugs, ignition wiring and ignition coil.

High Fuel Consumption — Check choke, carburetor, air cleaner and coil.

Overheating At Idle Speed — Check ignition timing and thermostatic vacuum switch.

Stalling — Check vacuum fittings and hoses.

Engine Run On — Check Run On Valve.