TUNE-UP

Spitfire
TR7

ENGINE IDENTIFICATION

Engine number is stamped on engine boss on left side of block below number four spark plug on Spitfire models and is stamped on the cylinder head between carburetors on TR7 models. The following engine codes (prefix letters) denote engines designed specifically for the USA market.

Engine Identification

Application	Code
Spitfire	FM XXXXXX UE
TR7	
Carb. Models	CV XXXXXX U
Fuel Inj. Models	CK XXXXXX UC

COMPRESSION PRESSURE

Check compression with engine at normal operating temperature, spark plugs removed and throttle wide open. Crank engine through four compression strokes before taking reading. On Spitfire models, minimum pressure is 145 psi (10.2 kg/cm^2). On both Spitfire and TR7 models, lowest pressure should be at least 85% that of highest cylinder.

VALVE CLEARANCE

Spitfire – 1) Disconnect battery, then remove valve cover and spark plugs. Check valve clearance with engine cold. Adjust valves in outlined sequence (numbered front to rear):

Valves Open	Adjust Valves
No. 8 & No. 6	No. 1 & No. 3
No. 4 & No. 7	No. 5 & No. 2
No. 1 & No. 3	No. 8 & No. 6
No. 5 & No. 2	No. 4 & No. 7

2) Turn crankshaft until appropriate valves in first column open. Then check and adjust valves listed in second column.

3) To adjust, loosen lock nut and turn slotted adjusting pin clockwise to decrease clearance and counterclockwise to increase clearance. Tighten lock nut when correct.

TR7 – 1) Disconnect battery and remove camshaft cover. Loosen camshaft bearing cap nuts and retighten to 10-14 ft. lbs. (1.4-1.9 mkg). Rotate engine. Check and record clearance between cam heel and tappet. Maximum clearance is present when cam is in vertical position.

2) If clearance is not within specifications, remove camshaft and individually lift out each tappet and adjusting shim.

3) Using a micrometer, measure thickness of adjusting shim removed. Add to this the measured valve clearance and subtract the specified clearance from the total. This will offer you the thickness of adjusting shim necessary to bring the clearance within specifications.

4) Install tappets and add shims as needed. Install camshaft and tighten bearing caps. Recheck valve clearance, and, when correct, replace camshaft cover.

Valve Clearance Specifications

Application	Clearance (Cold)
Spitfire	
Intake & Exhaust	.010" (.25 mm)
TR7	
Intake	.008" (.20 mm)
Exhaust	.018" (.50 mm)

VALVE ARRANGEMENT

E-I-I-E-E-I-I-E (front to rear).

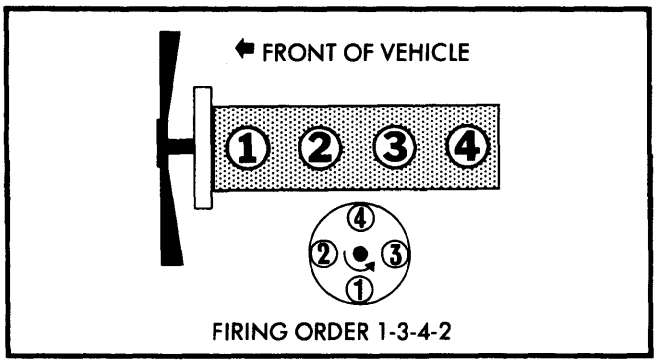

Fig. 1 Firing Order and Distributor Rotation (Spitfire)

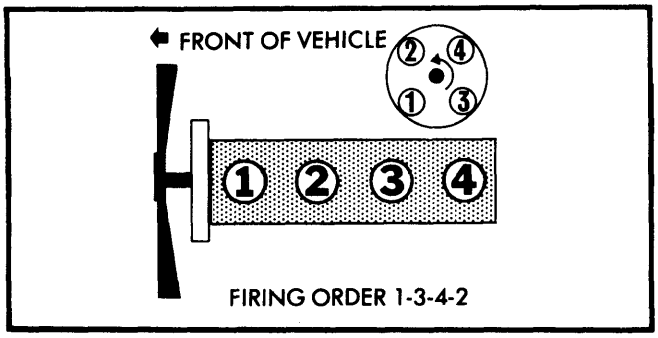

Fig. 2 Firing Order and Distributor Rotation (TR7)

SPARK PLUGS

Application	Gap In. (mm)	Torque Ft. Lbs. (mkg)
All Models	.025 (.64)	20 (2.8)

Spark Plug Type

Application	Champion No.
All Models	N12Y

TUNE-UP (Cont.)

HIGH TENSION WIRE RESISTANCE

Carefully remove high tension wires from spark plugs and distributor cap. Using an ohmmeter, check high tension wire resistance while gently twisting wires. If resistance is not to specifications, or fluctuates from infinity to any value, replace high tension wire(s).

Resistance (Ohms) Per Wire

Application	Ohms
All Models	25,000-30,000

DISTRIBUTOR

All models are equipped with Opus Electronic Ignition System and the only adjustment required is adjusting the Pick-Up Module air gap.

CAUTION — *DO NOT insert feeler gauge into pick-up air gap when the ignition circuit is energized.*

Air Gap ..... ①.010-.017" (.25-.43 mm)

① — Measured between timing rotor and pick-up module.

IGNITION TIMING

Check or adjust engine timing with engine idling at normal operating temperature. If correction is needed, rotate distributor.

Ignition Timing Specifications

Application	RPM	Timing
All Models	800	2°ATDC

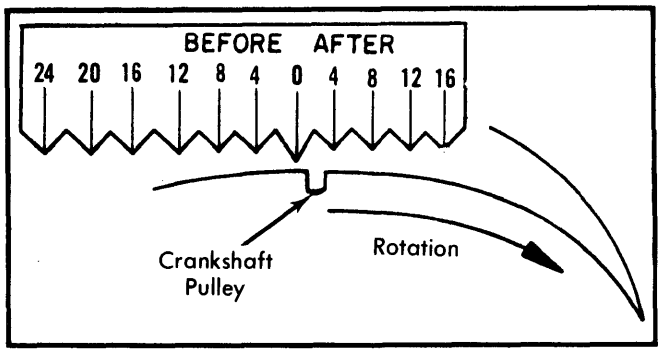

Fig. 3 Ignition Timing Mark Location

IDLE SPEED & MIXTURE

Carbureted Models — **1)** Remove air cleaner and fresh air duct, then ensure oil in carburetor damper is ¼" below top of damper tube. Connect tachometer and CO meter to vehicle, then warm to operating temperature. Unscrew fast idle screw until it does not contact fast idle cam (note amount required).

2) On models with a single carburetor, adjust idle speed to specifications by adjusting throttle adjusting screw. On models with dual carburetors, use an air flow balance meter and synchronize carburetors, then adjust idle speed to specifications by adjusting throttle adjusting screw on each carburetor an equal amount.

3) On all models, stop engine and disconnect and plug air pump outlet hose. Start engine and check CO level. If CO level is not within specifications, adjust idle trim screw(s) clockwise to richen mixture or counterclockwise to lean mixture until CO level is within specified limit. If CO level cannot be adjusted within correct limits by adjusting the idle trim screw(s), proceed to step **4)**.

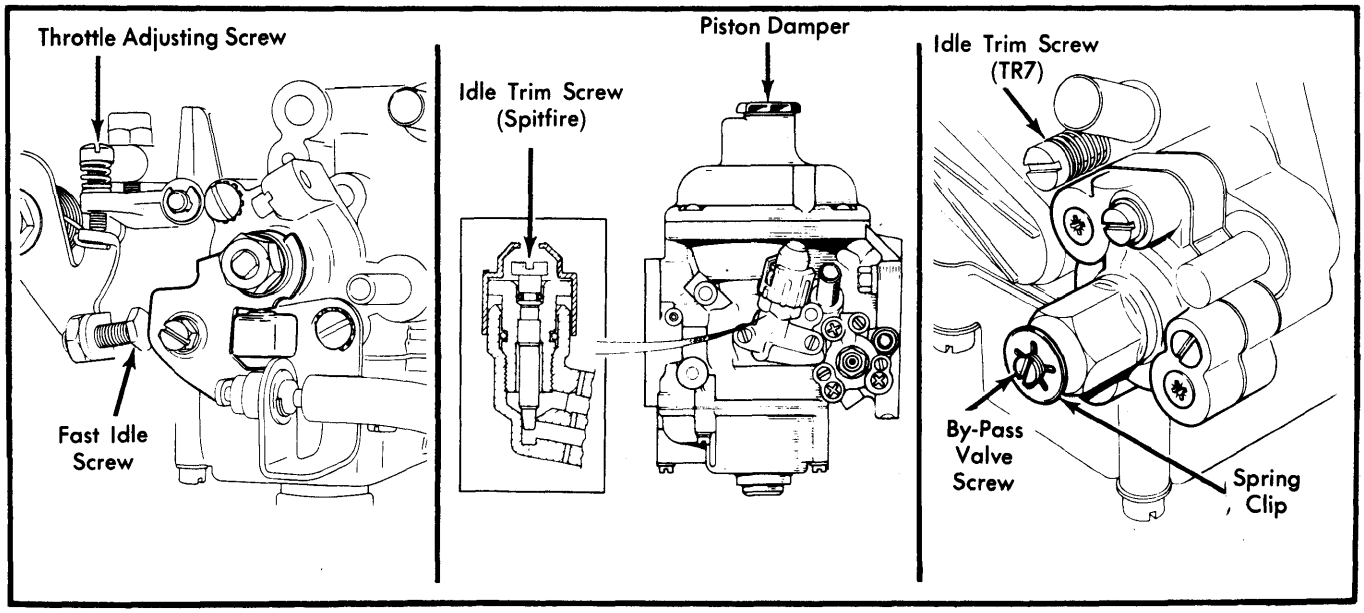

Fig. 4 Screws for Adjusting Idle Speed, Mixture, & Decel Valve (Carbureted Models Only)

TUNE-UP (Cont.)

4) Remove piston damper from carburetor(s). Then, carefully insert needle adjusting tool (BLT 2010) into dashpot until outer tool engages air valve and inner tool engages hexagon in needle adjuster. Hold outer tool stationary and turn inner tool clockwise to richen mixture or counterclockwise to lean mixture until CO level is within specified limits. Remove tool and reinstall damper, then recheck CO level and idle RPM and adjust as necessary. Return fast idle screw to original position.

Fuel Injected Models – 1) Warm engine to operating temperature. Connect tachometer and CO meter, then check ignition timing. Adjust idle speed by loosening lock nut and turning idle adjustment screw.

2) Check CO level. If not correct, remove plug from air flow meter. Turn adjustment screw until specified reading is obtained. Replace plug, recheck idle speed, and remove test equipment.

Idle Speed & CO Level

Application	Idle RPM	CO%
Spitfire	700-900	①3.0-7.0
TR7		
Carb. Models	700-900	①3.0-7.0
Fuel Inj. Models	700-900	0.2

① – Air pump disconnected.

DECEL VALVE ADJUSTMENT

CARBURETED MODELS ONLY

Spitfire – With engine warm, disconnect and plug distributor retard line. Engine speed should increase to 1300 RPM. If speed increases to 2000-2500 RPM, decel valve needs to be adjusted. Turn by-pass screw until speed drops to 1300 RPM, then turn screw an additional ½ turn to fully seat valve. Reconnect vacuum retard line at distributor.

TR7 – Turn decel valve screw on rear carburetor clockwise until engine speed increases, then turn counterclockwise 3 turns. Repeat procedure on front carburetor, but turn screw counterclockwise 2 turns. Turn screw on rear carburetor counterclockwise 1 additional turn.

FUEL PUMP PRESSURE

	Pressure
Spitfire	2.5-3.8 psi (.17-.26 kg/cm²)
TR7 Carb. Models	2.5-3.5 psi (.17-.24 kg/cm²)
TR7 Fuel Inj. Models	36 psi (2.5 kg/cm²)

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

All models are equipped with Lucas Opus Electronic Ignition System.

IGNITION COIL

Coil Resistance (Ohms@68°F)

Application	Primary	Secondary
All Models	1.3-1.5	.....

FUEL SYSTEMS

CARBURETORS

Application	Model
Spitfire	1 Zenith-Stromberg 150 CD4T
TR7	2 Zenith-Stromberg 175 CDFVX

Other Data & Specifications – *See Tune-Up and Zenith-Stromberg Carburetors in FUEL SYSTEMS Section.*

FUEL INJECTION

Fuel injected models are equipped with Bosch Air Flow Controlled (AFC) electronic fuel injection with oxygen sensor.

Other Data & Specifications – *See Bosch AFC Fuel Injecton Systems in FUEL SYSTEMS Section.*

ELECTRICAL

BATTERY

Application	Amp. Hr. Capacity
Spitfire	40
TR7	50

Battery Location – In engine compartment, on firewall.

STARTER

Lucas ..... Overrunning Clutch

Starter Specifications

Application	Volts	Amps	Test RPM
Spitfire	12	65	8000
TR7	12	40	6000

ALTERNATOR

Application	Rated Amp. Output
Spitfire	36
TR7	65

GENERAL SERVICING (Cont.)

ALTERNATOR REGULATOR

Lucas — Non-Adjustable, integral with alternator, with an operating voltage of 13.6-14.4 volts.

BELT ADJUSTMENT

Application	①Deflection
Fan Belt	.75-1.0" (19-25 mm)
Air Pump Belt	.25-.50" (6-13 mm)

① — Deflection is with pressure applied midway on longest belt run.

FILTERS

Filter	Service Interval (Miles)
Oil Filter	Replace every 7500
Air Filter	Replace every 36,000
Fuel Filter	Replace ever 36,000

CAPACITIES

Application	Quantity
Crankcase (Includes Filter)	4.8 qts.
Cooling System (Includes Heater)	
Spitfire	5.6 qts.
TR7	7.8 qts.
Man. Trans. (SAE 75)	
Spitfire	
Without Overdrive	1.8 pts.
With Overdrive	3.3 pts.
TR7	3.3 pts.
Rear Axle (SAE 75)	
Spitfire	1.2 pts.
TR7	2.4 pts.
Fuel Tank	
Spitfire	8.7 gals.
TR7	14.4 gals.