COSWORTH ENGINEERING LTD.

TYPE MAE, FORMULA THREE ENGINE 1967.

GENERAL INFORMATION, ISSUED NOV. '66.

Capacity 997 c.c.

Bore 81 mm.

Stroke 48.35 mm. 4 Cylinder

Compression ratio

12.5:1

Gross Horsepower rating: 105 b.h.p. minimum @ 9000 r.p.m.

Gross Torque rating: 65 lb. ft. 2 8000 r.p.m.

SPECIFICATION:

Cylinder Head:

Cast Iron Ford 105E modified. Fitted 10 mm plug

inserts. Coded 'Red/Black'.

Cylinders:

C.I. - Bored in Block. Bore dia.3.1870/3.1882.

Crankcase:

C.I. - Monobloc type. 3 Main Bearings.

Crankshaft:

Forged-Nitrided-steel. End paly .002" - .011" Thrust taken by two half thrust washers. Main

journal dia. 2.1255"/2.1260".

Conn-rod journal dia. 1.9370/1.9375. Stroke 1.902"/

1.906".

Main Bearings:

Shells - 'Vandervell', lead indium, steel backed.

Cosworth part number F.0012.

Main Bearing caps are special steel, housings

bored .015" o/s.

Camshaft:

Iron, running in 3 bearings. Driven by a train of 3 gears from the crankshaft. Bearings - white metal Vandervell pressed into block. Camshaft drilled to provide oil jet lubrication to the

tappets.

Valve Mechanism:

Push rod. Mushroom type tappets, running directly on the camshaft. Tappets are chill cast iron Rocker gear with steel pillars and hardened steel

shaft. Direct valve spring lubrication.

Valve Timing:

Cosworth Camshaft. A.6. - 106 MAE.

Valve Lift 400". Cam Lift .270". Ramp Olo".

Set up to give timing, inlet fully open 106 A.T.D.C.

" 106° B.T.D.C. exhaust "

Connecting Rods: Material EN.24. Length, centre to centre 4.826"

End play .002"/.006". Shells - Trimetal (steel

backed).

Valves - Inlet: Material Nimonic alloy. Head diameter 1.40".

Seat angle 45°. Stem dia. 9/32" nominal.

Exhaust: Material Nimonic alloy. Head diameter 1.25"

Seat angle 45°. Stem dia, 9/32" nominal.

Valve Springs: Double Springs, outer variable-pitch wound,

Rate 260 lb/in. Free length 1.65", fitted length 1.29"/1.31" (both measured on outer).

Close coils to be fitted at head end.

Hardened steel spring cups and titanium retainers.

Pistons: Special Cosworth/Hepolite, forged in RR59:

one compression ring, one oil control ring.
When fitting crown to be 000! - 004! down home

When fitting crown to be .002" - .004" down bore

at T.D.C.

Gudgeon Pins: Hollow taper bored. Ground o/d. 13/16" dia.

nominal. Clearance .0002" - .0005". Retained

by flat circlips.

Compression Ring: Material C.I. Plain high radial pressure.

Ring gap .019".

Oil Control Rings: Two separate scrapersin single groove.

Water pump: Driven by toothed steel pulleys and belt.

Lubrication: See diagram - page 5.

Dry sump full pressure system. Main bearings - pressure fed. Connecting rods - pressure fed.

Gudgeon pins - splash. Cylinder walls - splash.

Camshaft Bearings - pressure fed.

Tappets - jet and splash.

Timing gears - jet and splash.

Oil Pumps: 'Hobourn-Eaton' type, Cosworth designed, mounted

integral with timing cover.

Oil Filter: Not supplied with engine. Should be full-flow

with special felt cartridge, and by-pass valve

blanked off.

Ignition: Lucas. Opus 3 transistorised. Rotation anti-elockwise

(looking from rotor arm end.) Firing order 1 2 4 3.

For wiring diagram see Page 4.

Carburation: Weber 40 DCOE using one choke, mounted on adaptor with regulation 30 mm x 3 mm orifice. Machined for 'O' ring flexible mounting.

Inlet Manifold: Cast aluminium alloy

MAINTENANCE AND RUNNING DATA

Oil Pressure:

70 min. p.s.i. - 80 - 85 p.s.i. normal at running speeds.

Max Oil Temperature: 100° C. Measured in tank.

Tappet Clearance:

.018" - .019" exhaust (cold)

Note:

Engines before No. MAE 66037 have KE 965 Inlet Valves and tappet clearance (cold) should be .014" - .015". Engines after No. MAE 66037 have nimonic valves and tappet clearance (cold) should be .011" - .012".

Oil:

Vegetable 30. Mineral 40/50 S.A.E. Running at 90 - 100° C. Any oil starvation will cause big end shell failure.

Fuel:

Normally Esso Golden Extra, but any equivalent should be satisfactory.

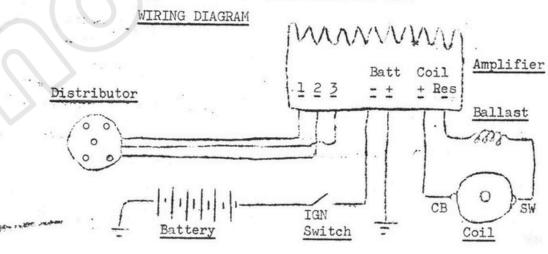
Carburetter Mounting:

The nuts should not be tightened right down, but a gap between the manifold and the carburetter faces should be left to allow the rubber 'O' ring to take up vibrations. The nut on the forward end of the manifold adaptor should not be tight, but allow .O15 Feeler between washer and manifold.

Ignition Timing:

Marks in distributor line up when No.4 cylinder is about to fire, approx. 40° B.T.D.C. - N.B. Line up notch in crank pulley rear flange with centre of web on front cover.

Lucas Transistor Assisted Ignition Opus 3 - 12 volt
This equipment replaces the earlier type of contact
breaker ignition and comprises four main parts:
distributor, amplifier, coil and ballast.
The Amplifier is a separate unit having seven
Lucar terminals and provision for bolting to the
car chassis. This unit should preferably be kept cool.
Coil and Ballast should be mounted together as in the
wiring diagram and it should be noted that the coil is
type S.A. 6 or marked lutronic 12v.



Notes: It is most important that the battery is connected with the correct polarity (which is positive earth). The three wires coming from the distributor are all numbered and it should be noted that No.3 is connected between Nos. 1 and 2. This is so that Nos. 1 and 2 wires are kept apart.

Sparking Plugs: Lodge 10RL 50 or equivalent.

Bolt and Nut: Cylinder Head 70 - 75 lb. ft. torque

Tightnesses: Main Bearing Cap 55 - 60 lb. ft. torque
Rocker Pillar Bolts 35 - 40 lb. ft. torque
Big End 43 - 45 lb. ft. torque
Flywheel to Crank 45 - 50 lb. ft. torque

Head Tightening: Number bolts starting from 1 - 5 on manifold side.
6 - 10 on distributor side, then order of tightening is 8, 3, 7, 4, 9, 2, 10, 1, 6, 5.

Rev. Limits:

Safe limit 9,500 r.p.m. 9,000 in first and second gears.

Do not allow the engine to 'tick-over' for long periods.

Running below 3,000 r.p.m. will shorten camshaft life.

