

MAINTENANCE AND OVERHAUL MANUAL

Continental Models A50, A65, A75 and A80 Aircraft Engines



**OPERATION, MAINTENANCE
OVERHAUL INSTRUCTIONS
AND PARTS LIST**

MARCH, 1944

REVISED JANUARY, 1946

REVISED FEBRUARY, 1948

MUSKEGON, MICHIGAN, U. S. A.

Copyright 1948 Continental Motors Corporation

Section 1

TABLE OF SPECIFICATIONS

GENERAL

Type.....	Horizontally Opposed	Piston Displacement (cubic in.).....	171
Operating Cycle:.....	Otto (4 stroke)	Number of Mounting Bolts.....	4
Cooling System Type.....	Air	Diameter of Mounting Bolts.....	$\frac{3}{8}$ " or $\frac{7}{16}$ "
No. of Cylinders.....	4	Overall Width.....	31 $\frac{1}{2}$ "
Cylinder Arrangement.....	(See Fig. 12)	Average Dry Weight (Series 8).....	170 lbs.
Cylinder Bore.....	All Models 3 $\frac{7}{8}$ "	Average Dry Weight (Series 9).....	177 lbs.
Stroke.....	All Models 3 $\frac{5}{8}$ "	Crankshaft Rotation.....	*Clockwise

FEATURES PECULIAR TO EACH MODEL:

Model	A50	A65	‡A75	‡A80
Type Certificate No.	190	205	213	217
Compression Ratio	5.4:1	6.3:1	6.3:1	7.55:1
Rated R.P.M.	1900	2300	2600	2700
Rated Horsepower at Sea Level	50	65	75	80
Maximum Allowed Manifold Press. in In.Hg. (at rated R.P.M.)	29.5	29.4	29.3	29.2
Recommended Cruising R.P.M.	1800	2150	2350	2450
Max. Recommended Manifold Press. in In.Hg. at cruising R.P.M.	27.7	26.8	26.0	25.9
Minimum Fuel Octane Rating	73	73	73	80
Max. Allowable Cyl. Head Temp. (°F)	550	550	550	550
Maximum Oil Temperature (°F)	215	220	220	220
Oil Temp. in °F. (Min. at Take-Off)	90	90	90	90
Approx. Fuel Consumption in Gals. per Hr. at Cruising R.P.M.	3.8	4.4	4.8	5.2
Approx. Max. desirable Oil Consumption in Pints per Hr.	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Oil Sump Capacity in Quarts	4	4	4	4
Oil Pressure (Cruising) in Lbs./Sq. in.	30-40	30-40	30-40	30-40
Oil Press. (Idling) in Lbs./Sq. in. (Min.)	10	10	10	10

IGNITION:

Type.....	Dual, Magneto	Radio Shielding (Optional).....	C.M.C.
Magneto Type.....	Various	Spark Plugs (Shielded).....	Champion 62S
Magneto Rotation (as viewed from Drive End).....	Clockwise	Spark Plugs (Shielded).....	Champion C26S
Crankshaft: Magneto Speed Ratio:.....	1:1	Spark Plugs (Unshielded).....	Champion C26

	A50	A65	A75	A80
Right Magneto Fires Upper Plugs B.T.C.....	25°	30°	29°	29°
Left Magneto Fires Lower Plugs B.T.C.....	28°	30°	32°	32°
Firing Order	1-3-2-4	1-3-2-4	1-3-2-4	1-3-2-4

*NOTE: Direction of rotation as viewed from rear of engine.

‡A75 and A80 are no longer in production. They are replaced by models C75 and C85.

CONTINENTAL A 50, A 65, A 75 A 80 ENGINES

TABLE OF SPECIFICATIONS — Continued

VALVE MECHANISM

Type	Overhead	Intake Remains Open.....	240° Crankangle
Intake Valve Opens	10° B.T.C.	Exhaust Remains Open.....	245° Crankangle
Intake Valve Closes	50° A.B.C.	Valve Lift	0.40"
Exhaust Valve Opens	50° B.B.C.	Valve Clearance (Running)	0
Exhaust Valve Closes	15° A.T.C.	Valve Clearance (Lifters deflated).....	30"-110"

FUEL SYSTEM

Feed	†Gravity
Carburetor Type.....	Float (See Catalog)
††Primer Connection.....	1/8" N.P.T.
Carburetor Inlet.....	1/4" N.P.T.

LUBRICATION SYSTEM:

Pump	Gear Type
Crankshaft: Pump Speed Ratio.....	1:0.5
Pump Drive Gear Rotation.....	*Counterclockwise
Sump Type.....	Wet

ACCESSORY DRIVES AND INSTRUMENT CONNECTIONS

Oil Press. Gauge Line.....	1/8" N.P.T.	Crankshaft: Tach. Drive Ratio.....	1:0.5
Tach. Drive Shaft: Std.....	S.A.E.	Tach. Drive Rotation.....	*Counterclockwise

ACCESSORIES AND WEIGHTS

‡Magnetos (2), Eisemann	AM-4:10.69 #	‡Carburetor (Stromberg NA-S3B)	2.60 #
Magnetos (2), Eisemann	LA-4:12.02 #	Carburetor (Marvel MA-3PA)	
Magneto (2), Scintilla.....	S4RN-20:10.35 #	(Optional)	3.00 #
Radio Shielding.....	2.26 #	Fuel Pump (AC Diaphragm Type).....	1.75 #
Oil Cooler (Harrison).....	4.00 #	Fuel Injector Equip. (Excello B-42).....	4.00 #
Air Intake and Filter Assem.....	2.56 #	‡Spark Plugs (8) (Champion C26)	1.28 #
Propeller Hub Assembly.....	4.39 #	Spark Plugs (8) (Champion C26S)	1.69 #
Propeller Attaching Parts		Exhaust Flanges and Gaskets (4):	0.55 #
(Flanged Crankshaft).....	0.90 #	Rubber Mount Bushings (8) and	
Carburetor (Stromberg NA-S3A1)		Steel Washers (4)	0.55 #
(Optional)	2.70 #		

NOTES:

*Direction of rotation as viewed from rear of engine.

‡Accessories included in Engine Dry Weight.

Add 1.04 lbs. for Flanged Crankshaft (Series 8F and 8FJ).

Magneto Weights include Drive Gears.

†A Stromberg carburetor suitable for use with a pump feed system is available. Gravity feed requires the fuel tank to be elevated and located so that the static fuel head will be at least two inches in the steepest climb and less than 90 inches in the steepest glide.

††The primer nozzle supplied for installation in the intake manifold is effective at temperatures above — 7°C. (20°F.). For starting at lower temperatures a primer manifold system with jets in cylinder intake ports is recommended.

OPERATING AND MAINTENANCE INSTRUCTIONS — Continued

10. GASOLINE AND OIL RECOMMENDATIONS

Engine Model	Recommended Gasoline Octane Rating	OPERATING TEMPERATURE OF OIL — °F.			
		Below 120°F.	120° — 160°	160° — 190°	Above 190°F.
		APPROXIMATE EQUIVALENT IN OUTSIDE AIR TEMPERATURE — °F.			
		Below + 32°	32° — 70°	70° — 100°	Above 100°
A50	73	SAE 20	Aero grade No. 60	Aero grade No. 80	Aero Grade No. 100
A65	73	SAE 20	Aero grade No. 60	Aero grade No. 80	Aero Grade No. 100
A75	73	SAE 20	Aero grade No. 60	Aero grade No. 80	Aero Grade No. 100
A80	80	SAE 20	Aero grade No. 60	Aero grade No. 80	Aero Grade No. 100

Recommended oil changes in all models — each 20 to 30 hours of operation. When operating oil temperatures overlap above column ranges, use the lighter oil.

Section 6

ENGINE TROUBLES AND SERVICE REPAIRS

1. FAILURE OF ENGINE TO START.

a. Lack of Fuel.

(1) Check whether there is a sufficient level of gasoline in airplane tank to flow to the carburetor.

(2) Check the gasoline flow at the carburetor; see that the carburetor float is not stuck, and that the jets are not clogged.

(3) Make certain that the vent holes in the gasoline tank caps are open.

b. Under-priming or Over-priming.

(1) If engine is under-primed, close throttle; with gasoline supply valve turned on, prime the engine two or three strokes.

(2) If the engine is over-primed, turn the ignition switch off, open the throttle, and turn the engine backward to unload the cylinders.

c. Defective Ignition.

(1) Examine ignition wiring for breaks in the insulation.

(2) Check all spark plugs for correct gap setting. Whenever the gap is found to exceed .020 inch, the electrodes will be regapped .015 to .016 inch.

(3) Check magneto points for clearance and possible pitted or oily condition.

(4) Examine the magnetos for correct timing to the engine. (Refer to section 11, paragraph 3, i.)

(5) Check ground terminal for possible shorting inside terminal housing.

d. Valve Action.

(1) Check valve stems to be sure they are not gummed with carbon and sticking open.

(2) Check condition of valve springs and see that they are assembled to the valve stem correctly.

(3) Check the working order of the rocker arm assemblies.

(4) Check for worn or bent push rods.

e. **Cold Oil** — With the ignition switch off, turn propeller over by hand to break the drag created by cold oil between the pistons, piston rings, and cylinder walls. If the engine is very stiff, it will be necessary to free the pistons in the cylinders either by applying heat or injecting small quantities of very light oil through the spark plug holes.

f. **Hot Engine** — Do not prime. The engine will frequently start without an additional prime over that left in the cylinders when the engine was shut off. It may be necessary to unload the cylinders by turning the propeller opposite to the direction of rotation.

2. LOW OIL PRESSURE.

a. Check for dirt in the oil screen. Remove screen and clean thoroughly.

b. Check for poor connections in the oil suction tube, causing the pump to draw air.

c. Check the quantity of oil in sump. A minimum of two quarts of oil must be used.

OPERATING AND MAINTENANCE INSTRUCTIONS — Continued

d. Inspect relief valve to see whether plunger is operating smoothly in its guide and seating well, and the control spring is functioning properly. Clean.

e. Inspect and clean oil screen at end of oil suction tube.

3. HIGH OIL TEMPERATURE.

a. This condition may be due to the following:

- (1) Insufficient amount of oil in sump.
- (2) Dirty oil.
- (3) Failure to remove winter baffles, or inefficiency of loose baffles.
- (4) Excessively lean carburetor mixture.
- (5) Worn or stuck rings, indicating piston score.
- (6) Altitude control mixture not adjusted properly.
- (7) Operation at full throttle, low speed.

4. LOW POWER OR SPEED

- a. Check propeller for track, balance, and pitch.
- b. Check spark plugs, wires, condensers, coils.
- c. Check for air leaks at all connections of carburetor and intake manifold.
- d. Check for full opening of throttle valve.
- e. Check for unrestricted flow of fuel to carburetor inlet and for proper operation of carburetor.
- f. Check cylinder compression and valve action.
- g. Check carburetor air temperature. Check for proper operation of carburetor heat control.
- h. Check tachometer to see that it is registering correctly.

5. ROUGH RUNNING.

- a. Check propeller for balance, track and correct installation on the propeller hub and shaft.

- b. Clean, re-gap, and bomb test spark plugs.
- c. Check magneto operation. Check whether ignition cables are breaking down at high speeds.
- d. Check valve operation, especially evidence of sticking, or any lag in valve operating mechanism.
- e. Check engine mounting bolts for tightness.
- f. Check engine mount for cracked or broken members.
- g. Check carburetor air temperature. Check for proper operation of carburetor heat control.

6. ENGINE FAILS TO ACCELERATE PROPERLY.

- a. Motor not sufficiently warm.
- b. Heater control not on, or not functioning properly.
- c. Spark plugs fouled by long idling.
- d. High float level.
- e. Worn intake valve guides and piston rings.

7. ENGINE FAILS TO IDLE PROPERLY.

- a. Air leaks at joints of the carburetor and intake manifold can be located by squirting raw gasoline from a hand oil can around all connections and packing while the engine is running about 400 to 500 rpm. If gasoline is applied at a leaking connection, it will be drawn in, causing the engine to increase its rpm. As soon as this extra fuel is burned, the engine will again fall back to its former rpm.
- b. Leaking primer jets.
- c. Idle air bleed blocked by dirt.
- d. Engine idling jet set too lean or plugged.
- e. Worn intake valve guides and piston rings.

Section 7

SERVICE INSPECTION AND ASSOCIATED MAINTENANCE

1. GENERAL.

a. The work outlined in this section consists of the periodic inspection, cleaning, servicing, lubricating, adjusting, and such maintenance work as is associated with the routine Inspection System.

2. INSPECTION AND MAINTENANCE.

a. Daily — Power Plant.

- (1) Check oil level. Replenish oil supply if necessary.
- (2) Inspect for evidence of engine throwing oil.
- (3) Check security of carburetor air intake and its control valve for operation.
- (4) Inspect carburetor for fuel leakage at connections, drain plugs, and passage plug. Clean