

WARREN L. ALLEN
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FAA Approved
AIRPLANE FLIGHT MANUAL
For *99200*



Model 415-D



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UNIVAIR®

DFM

F. A. A.

Approved Airplane Flight Manual

for

Ercoupe Model ~~415-D~~ ^{415-C, 415C-D 8}

Serial Number

Registration Number

This airplane is certificated under the Civil Aeronautics Regulations, Part 03, in the Normal Category. Limitations herein are mandatory as noted. All other data pertain to recommended operating practice and are not considered mandatory.

Approved by

Charles T. Dyer
Director Aircraft & Components Service

Date

June 13 1947

Part I

APPROVED OPERATING MANUAL - TABLE OF CONTENTS

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Log of Revisions

Revision No.	Page No.	Date	F.A.A. Inspector

A. Airplane Operating Limitations

1. Weight and center of gravity:

The center of gravity location for any given gross weight must be between 17.6% M. A. C. (26.65 inches from datum) and 21.13% M. A. C. (30.58 inches from datum).

The maximum gross weight is 1400 pounds. ^{1260 MODEL C} ~~MODEL D~~

2. Airspeeds:

Never exceed speed	144 M. P. H.	TIAS
Design cruising speed	114 M. P. H.	TIAS
Maneuvering speed	108.5 M. P. H.	TIAS

3. Maneuvers:

No acrobatic maneuvers of any kind approved.

4. Positive flight load acceleration

The positive flight load acceleration is 3.5 Gs.

5. Operations Authorized:

Contact flight rules (Night - not for hire).

6. Operating Placards:

The following placards must be prominently displayed in front of and in clear view of the pilot.

- (a) This airplane must be operated as a Normal Category Airplane in compliance with the approved Airplane Flight Manual.
- (b) This aircraft is characteristically incapable of spinning.
- (c) No Acrobatic maneuvers are approved.

7. Airspeed Indicator Markings:

Speed	Symbol	Limits (M.P.H.) True Indicated Airspeed	
		Lower	Upper
Never exceed speed	Red Radial Line	---	144
Caution range	Yellow arc	114	144
Normal Operating Range	Green arc	58	114

A-1 Power Plant Operating Limitations - 75 h.p.

1. Engine

Engine Make - Continental
 Engine Model - C 75-12 or 12P
 Rated Power - 75 HP at 2275 R.P.M.
 Temperature Limits:
 Cylinder Head - 550° F
 Cylinder Barrel - 300° F
 Oil Inlet - 220° F
 Minimum Fuel octane rating - 73

2. Propeller

- a. Fixed pitch wood
 Diameter - Maximum 74 inches
 - Minimum 72.5 inches
 Static R.P.M. limits - not more than 2050
 - not less than 2050
- b. Fixed pitch metal (McCauley Model 1A-90)
 Diameter - Maximum 73 inches
 - Minimum 71.5 inches
 Static R.P.M. Limits - Not more than 2060
 - Not less than 2060

Note: Avoid continuous engine operation between 1850 and 2020 R.P.M. with McCauley 1A-90 propeller.

5. Power plant take-off, maximum continuous operation limits and instrument markings.

Condition	Reading	Marking
Maximum R.P.M.	2275	Red Radial Line
Normal Operating R.P.M.	2050 - 2275	Green Arc
Maximum Oil Pressure	50 Lbs.	Red Radial Line
Maximum Caution Range - Oil Pressure	40 - 50 Lbs.	Yellow Arc
Normal Operating Oil Pressure	30 - 40 Lbs.	Green Arc
Minimum Caution Range - Oil Pressure	10 - 30 Lbs.	Yellow Arc
Minimum Operating - Oil Pressure	10 Lbs.	Red Radial Line
Maximum Oil Temperature	220° F	Red Radial Line
Normal Operating Oil Temp.	100° - 220° F	Green Arc
Caution Range - Oil Temp.	90° - 100° F	Yellow Arc

B-2 Power Plant Operating Limitations - 85 h.p.

1. Engine

Engine Make - Continental
 Engine Model - C85-12 or 12P
 Rated Power - 85 HP at 2575 RPM
 Temperature Limits:
 Cylinder Head - 540° F
 Cylinder Barrel - 300° F
 Oil Inlet - 225° F
 Minimum Fuel Octane Rating - 73

2. Propeller

- a. Fixed pitch wood
 Diameter - Maximum 74 inches
 - Minimum 72 inches
 Static RPM Limits - Not more than 2100
 - Not less than 1900
- b. Fixed pitch metal (McCauley Model 1A-90)
 Diameter - Maximum 71 inches
 - Minimum 69.5 inches
 Static RPM Limits - Not more than 2225
 - Not less than 2025

Note: For other propeller installations, see Aircraft Specification A-787.

Condition	Reading	Marking
Maximum RPM	2575	Red Radial Line
Cruising RPM	2400 - 2575	Green Arc
Maximum Oil Pressure	50 lbs	Red Radial Line
Maximum Caution Range - Oil Pressure	40-50 lbs	Yellow Arc
Normal Operating Oil Pressure	30-40 lbs	Green Arc
Minimum Caution Range - Oil Pressure	10-30 lbs	Yellow Arc
Minimum Operating Oil Pressure	10 lbs	Red Radial Line
Maximum Oil Temperature	220° F	Red Radial Line
Normal Operating Oil Temperature	100° - 220° F	Green Arc
Caution Range - Oil Temperature	90° - 100° F	Yellow Arc

C Operating Procedureg

Cockpit Check ListStarting:

1. Amount of gas and oil.
2. Both fuel valves on.
5. Mixture - Full Rich at all times.
4. Carburetor - Air Heat off.
5. Prime 2 to 6 strokes -lock plunger.
6. Throttle - Crack one eighth inch.
7. Ignition on - Pull starter.
8. Warm up - 700 - 900 R.P.M.

Before Take Off:

1. Carburetor air heat off (use full heat in icing conditions.)
2. Oil temperature - 90°F Minimum.
3. Oil pressure - 35 lb. / sq. in. (above 1900 R.P.M.)
4. Full throttle 2050 R.P.M. approx.
5. Ignition check - maximum 75 R.P.M. Drop on either magneto.

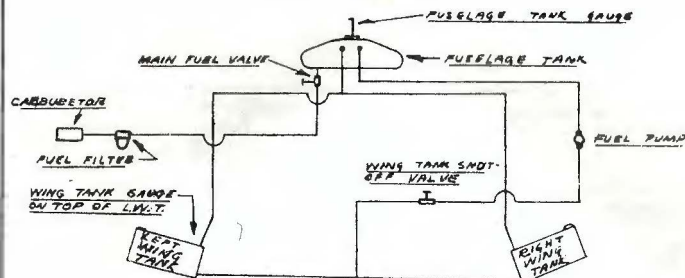
Flight:

1. Oil pressure 30 to 40 lb. / sq. in.
2. Oil temperature range 100° to 220°F.
3. Adjust mixture control for best R.P.M. (above 5000 ft.)

Landing:

1. Mixture control - Full Rich.
2. Open throttle periodically in a glide to clear cylinders.

For operating instructions in greater detail refer to Ercope Instruction Manual.

FUEL SYSTEMFuel System Operation - Reference Figure 1

The engine driven fuel pump moves gasoline from the wing tanks to the six gallon fuselage tank. Excess fuel drains from the fuselage tank overflow back to the wing tanks.

Fuel is gravity fed from the fuselage tank to the engine. In case of fuel pump failure, the engine will continue to function until the six gallon fuselage tank is drained.

Main Fuel Valve

The main fuel valve is located approximately half way between the brake handle and the left control wheel shaft and directly behind the instrument panel.

This main valve should be ON at all times except in case of emergency.

Wing Tank Shut-Off Valve

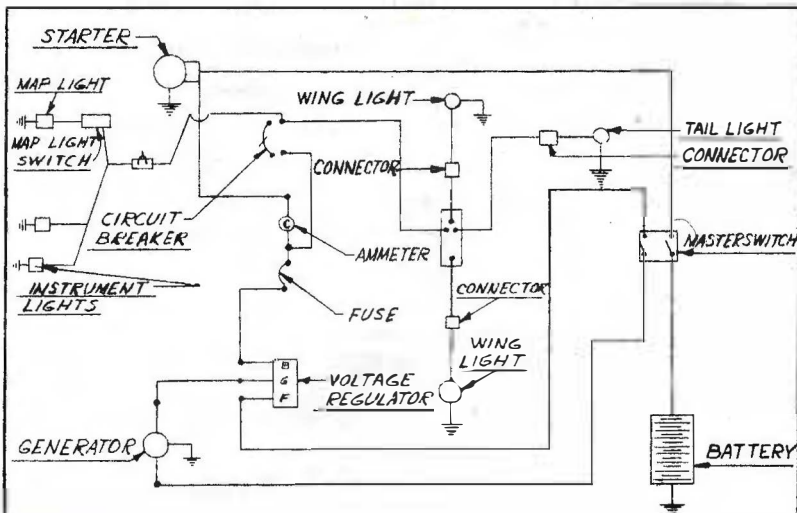
This valve is located on the right side skin forward of the seat.

The valve handle should be ON, (lined up fore and aft) except in case of fuel line failure.

When the valve is turned OFF, the fuel cannot be pumped from the wing tank to the fuselage tank and the engine fuel supply is limited strictly to the capacity of the fuselage tank.

Wing Tank Caps

Wing gasoline tank cap gaskets must be tight in order to maintain equalized pressure in the two wing tanks, thus preventing gasoline overflow from one tank.



Electrical System - Reference Figure 2

Battery

Located in back of right seat under baggage compartment. May be inspected by opening zipper in bottom of baggage compartment.

Ammeter

The ammeter is located on the extreme right hand corner of the instrument panel and indicates the general operating condition of the battery generator circuit.

Navigation Light Switch

The navigation light switch is a circuit breaker located on the right side of the instrument panel. It will automatically snap off if the circuit becomes overloaded.

Master Switch

Located on right side of deck aft of seat. Must be ON at all times during aircraft operation, otherwise the generator may be damaged by open circuit operation.

Generator

Located on engine accessory case, direct drive from engine.

The charging rate of this unit is completely controlled by the generator output regulator.

Generator Output Regulator

The generator output regulator consists of three units, a out-out relay, a current regulator and voltage regulator mounted on the same base with a single cover. The out-out relay closes at 12.4 to 13.4 volts. The current regulator limits voltage to approximately 14 volts.

A normal operation would indicate a charging rate between 11 and 13 amperes for periods of time up to twenty minutes after starting. The charging rate should reduce to two amperes or less in a shorter period of time than two hours of operation. Lesser rates would indicate a favorable condition of the battery. When the charging rates exceed those stated, the system should be checked to determine the trouble.

D. Performance Information

Note: All speeds listed in the following data are true indicated airspeeds (TIAS.) For indicated airspeeds (IAS) see Chart No. 1, page 12.

1. Stall Speed

Power off 58 M.P.H., TIAS., (with center of gravity at 17.6% M.A.C.)

2. Take Off Distance

Take off distance to clear a 50 foot obstruction at 1400 lbs., gross weight, full, throttle, 75 M.P.H., TIAS., zero wind and paved runway.

Fixed Pitch Wood Propeller						
Pressure Altitude	Outside Air Temperature					
	0° F	20° F	40° F	60° F	80° F	100° F
S.L.	1850	1950	2000	2100	2200	2300
2000 ft.	2350	2450	2550	2700	2800	3000
4000 ft.	3000	3200	3350	3600	3800	4050
6000 ft.	4050	4450	4700	5000	5450	5900

Fixed Pitch Metal Propeller (McCauley 1A-90)

Pressure Altitude	Outside Air Temperature					
	0° F	20° F	40° F	60° F	80° F	100° F
S. L.	1650	1750	1850	1950	2000	2100
2000 ft.	2100	2250	2400	2500	2650	2800
4000 ft.	2800	3050	3250	3500	3700	3950
6000 ft.	4000	4450	4800	5200	5750	6250

3. Landing Distance

Landing distance over a 50 foot obstruction at 1400 lb. gross weight, center of gravity at 17.6% M.A.C., power off, zero wind and paved runway.

Approach speed 75 M.P.H. - **80 M.P.H.**

Pressure Altitude	Outside Air Temperature					
	0° F	20° F	40° F	60° F	80° F	100° F
S. L.	1600	1650	1700	1750	1800	1850
2000 ft.	1700	1750	1800	1850	1900	1950
4000 ft.	1800	1850	1900	1950	2000	2100
6000 ft.	1900	1950	2000	2100	2150	2200

4. Climb Data

Rate of climb at 1400 lbs. gross weight, full throttle, standard pressure and 69 M.P.H. T.I.A.S.

Fixed Pitch Wood Propeller						
Pressure Altitude	Outside Air Temperature					
	0° F	20° F	40° F	60° F	80° F	100° F
S.L.	610	590	570	550	530	510
2000 Ft.	520	500	480	460	440	420
4000 Ft.	450	410	380	370	340	330
6000 Ft.	340	320	300	280	260	240

Fixed Pitch Metal Propeller (McCauley 1-1-90)						
Pressure Altitude	Outside Air Temperature					
	0° F	20° F	40° F	60° F	80° F	100° F
S.L.	650	610	580	560	540	520
2000 Ft.	550	510	490	470	440	420
4000 Ft.	450	510	390	370	340	330
6000 Ft.	340	320	290	270	250	230

5. Stalling speed variation with angle of bank at 1400 lbs. gross weight and power off.

Angle of bank (degrees)	0	10	20	30	40	50	60
Power Off Stall Speed (M.P.H.)	58	59	60	62	66	72	81

6. Airspeed Calibration

Calibration of the airspeed indicating system with true indicated airspeed vs indicated air speed is shown on Chart No. 1, Page 12.

7. Crosswind Operation

Maximum recommended wind velocity for crosswind operation - 25 M.P.H.

True Indicated Airspeed
VS
Indicator Reading

True Indicated Airspeed	Indicator Reading
60 M.P.H.	56 M.P.H.
70 M.P.H.	67 M.P.H.
80 M.P.H.	78 M.P.H.
90 M.P.H.	89 M.P.H.
100 M.P.H.	100 M.P.H.
110 M.P.H.	111 M.P.H.
120 M.P.H.	122 M.P.H.
130 M.P.H.	133 M.P.H.
140 M.P.H.	142 M.P.H.
144 M.P.H.	144 M.P.H.

Chart No. 1

E. Weight and Balance Data**1. Weight and center of gravity limitations**

1260 MODEL C (1924 LSA)
Maximum gross weight - 1400 pounds. *MODEL D*
Center of gravity limits - 17.6% of the Mean Aerodynamic Chord to 24% of the M.A.C.

2. Normal Loading

Airplane empty weight	815 lb.
Pilot	170 lb.
Passenger	170 lb.
Fuel (R Wing Tank)	54 lb.
Fuel (L Wing Tank)	54 lb.
Fuel (Fuselage Tank)	36 lb.
Oil	8 lb.
Baggage	65 lb.
Miscellaneous Useful Weight -	28 lb.
Total	1400 lb.

MODEL D *MODEL C*
799 LB

1260 LB

Actual weight and balance in envelope on back cover of this manual.

1320 LB MODEL C

- Do not exceed 1400 lb. Gross Weight. (*MODEL D*)
- Do not exceed 17.6% M.A.C. for forward C.G. loading.
- Do not exceed 24.13% M.A.C. for rearward C.G. loading.
- Do not exceed 65 lb. in baggage compartment. (This is the maximum load for which this compartment is approved.)

3. Standard Equipment List

Spec. No.	Item	Unit Wt.	Arm
1	Propeller	14 lbs.	-32
2	Propeller	26 lbs.	-32
101	Carburetor Air Heater	5 lbs.	-2
102	Fuel Pump	2 lbs.	-27
---	Engine	166 lbs.	-22
201	Landing Gear (Main)	28 lbs.	+14
202	Landing Gear (Nose)	9 lbs.	-16
301	Battery (12 volt)	25 lbs.	+55
103	Starter	14 lbs.	-7
302	Generator	10 lbs.	-8
---	Voltage Regulator	2 lbs.	-50

F. Maintenance Record Sheets

Aircraft Maintenance Record
Section I
Weight and Equipment Changes

Note: Record in this section only those repairs and alterations (Form 337) that involve a change in the weight or the empty center of gravity.

Aircraft Serial No. Identification Mark:

Repair and Alteration Form dated: By (Agency name & number): Location & brief description of change or equipment:

New E. W.	New Useful Load	New Empty C. G.
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Aircraft Maintenance Record
Section II
Record of Repairs and Alterations

Note: Repairs and alterations involving changes in weight and empty center of gravity must be recorded in Section I of this record.

Aircraft Serial No. Identification Mark:

Repair & Alteration Form dated: By (Agency name & number): Location & brief description of repair:

Aircraft Serial No. Identification Mark:

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