



MANUAL OF  
MAINTENANCE AND INSPECTION  
FOR  
ZEPHYR  
FLYABOUT COLLEGIATE

MODELS

35  
35-70  
35V  
35W

CP-40  
CP-40A  
CP-50  
CP-55  
CP-65

CS-65  
FP-65  
LP-65  
75C

PORTERFIELD AIRCRAFT CORPORATION  
KANSAS CITY MISSOURI

## FOREWORD

The fact that you are the owner of a new Porterfield is an indication that you have a keen appreciation of a well engineered, carefully manufactured airplane. The Porterfield Aircraft Corporation has the utmost confidence in the ability of your ship to fulfill your expectations. It has been designed to perform faithfully for hundreds of hours and this will be assured by a few simple precautions on your part.

This manual has been prepared to acquaint you with the things you should know to secure the utmost in economy and satisfaction.

Know and abide by the Civil Aeronautics Authority regulations and you will fly safely and sanely.

Our Service Department will gladly cooperate in any way possible that you may have the most satisfactory performance from your airplane, with the least possible delay due to repairs and replacements. All blue prints furnished by the Service Department are approved by the Civil Aeronautics Authority and all parts are made under the authority of Type and Production Certificates, issued by the Civil Aeronautics Authority. Replacements or exchange parts and repair work are subject to the same strict Government supervised inspection system, as was your original airplane.

SERVICE DEPARTMENT

PORTERFIELD AIRCRAFT CORPORATION

## C O N T E N T S

CHAPTER I	POWER PLANT
ENGINE, PROPELLER, FUEL SYSTEM, EXHAUST, LUBRICATION, ELECTRICAL	
CHAPTER II	CONTROL SYSTEM
CHAPTER III	LANDING GEAR
CHAPTER IV	STRUCTURAL INSPECTION AND FABRIC
CHAPTER V	ASSEMBLY, RIGGING, LEVELING AND ALTERATION
APPENDIX	LUBRICATION DIAGRAM DRAWING ASSEMBLY

# 1940 PORTERFIELD CP-65 "COLLEGIATE"

SPAN ..... 34' 9"  
LENGTH ..... 22' 8"  
HEIGHT ..... 7' 3"  
ENGINE ..... CONTINENTAL A-65-8  
65 H.P. at 2300 R.P.M.  
PROPELLER .....  
SENSENICH 72" X 44"

## PERFORMANCE:

HIGH SPEED ..... 106 M.P.H.  
CRUISE SPEED ..... 94 M.P.H.  
POWER OFF STALL 40 M.P.H.  
POWER ON STALL 38 M.P.H.  
CLIMB RATE ..... 800 F.P.M.  
SERVICE CEILING 16,000 FT.  
RANGE ..... 300 MILES

## INTERIOR COLOR SCHEME:

All interior exposed steel tubes are gloss black enamel including the control members. The fabric covered interior side panels are dark red to match the exterior of the fuselage. The seat cushions and the door paneling are black leather. The instrument panel and the floor boards are natural wood color but the instrument panel is made of sheet metal. The instrument faces are white with black lettering. The throttle quadrants and all knobs are chrome plated. The exposed stringers on the ceiling are varnished wood.

## EXTERIOR COLOR SCHEME:

The fuselage, vertical fin, rudder and wing struts are dark red. The wings, horizontal fin, elevator, hub caps and fuselage and speed fairing trim are silver. The numbers on the wings are black. On the tail they are silver.

COCKPIT,  
LOOKING  
FORWARD

COCKPIT,  
LOOKING  
AFT

TYP. WING RIB SECTION

LANDING GEAR IN FLYING POSITION

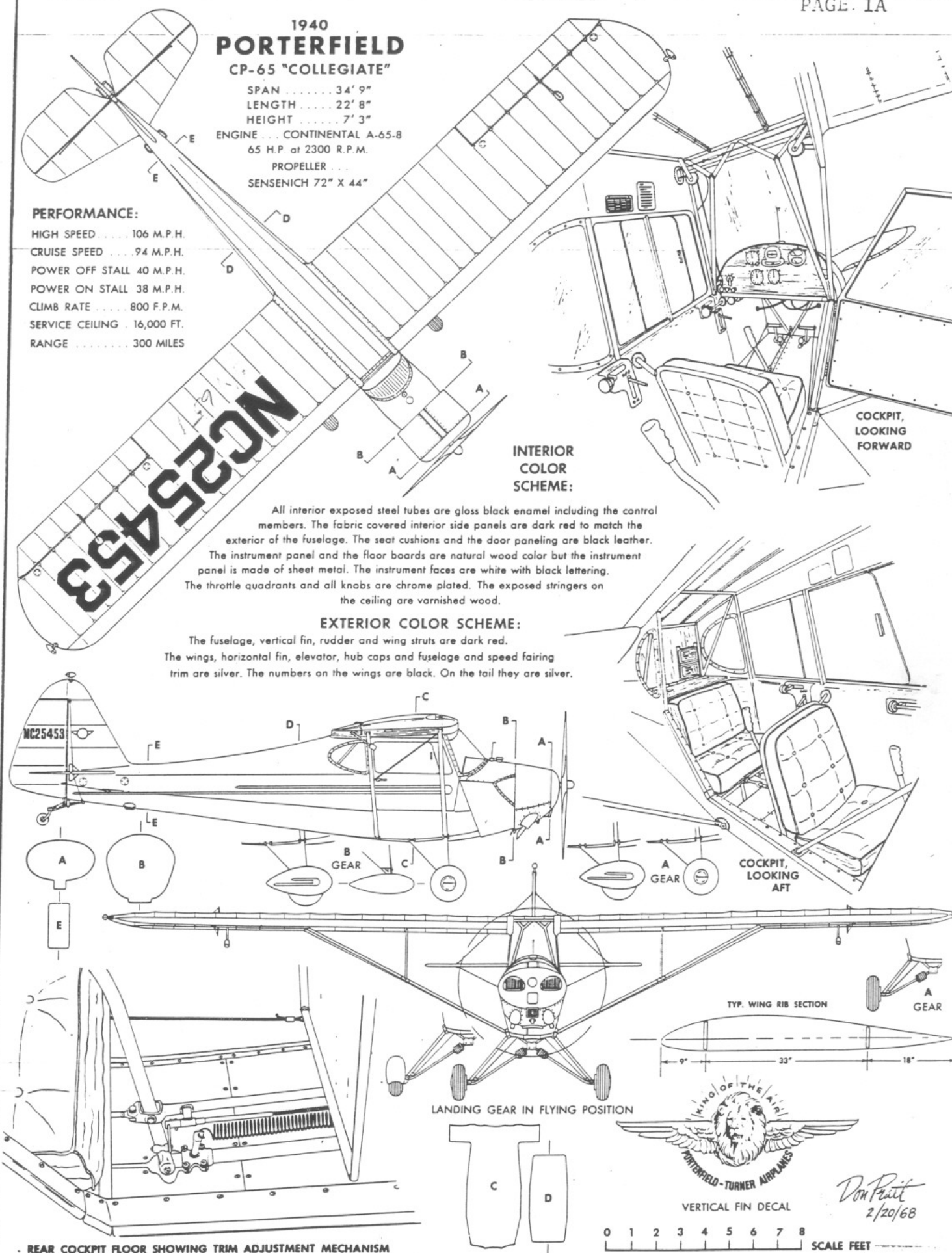
VERTICAL FIN DECAL

0 1 2 3 4 5 6 7 8

SCALE FEET

REAR COCKPIT FLOOR SHOWING TRIM ADJUSTMENT MECHANISM

Don Pratt  
2/20/68



## CHAPTER I

## P O W E R P L A N T

1. ENGINE: Refer to the service manual and supplementary service bulletins issued by the engine manufacturer for all instructions relative to the operation and maintenance of the engine. Your engine manufacturer is either:

Aircooled Motors )FP-65)  
Franklin Engines  
Syracuse, N.Y. U.S.A.

Aircraft Engine Division (CP-65&55)  
Continental Motors Corporation  
Muskegon, Michigan U.S.A

or

Lycoming Division (LP-65)  
Aviation Manufacturing Corporation  
Williamsport, PA U.S.A

2. PROPELLER: The propeller furnished as original equipment was selected for its strength and good all around performance. It should be replaced only with the same make and model. However, if in case of emergency, no similar propeller is available, it may be replaced with any approved propeller of the approved proper horsepower and revolutions per minute rating that is between 70 and 80 inches in diameter with the exception of the CP-65 propeller which should be from 73 to 80 inches in diameter. The propeller shall not permit the engine to turn over rated r.p.m. at 65 m.p.h., indicated airspeed; and shall not permit the engine to turn at least full rated r.p.m. in full throttle level flight at 1000 feet above the field of operations. In any case consult your C.A.A. inspector at the first opportunity. (See Section V regarding changes and alterations in equipment.)

If operations are such as to make a special propeller desirable; such as high altitude work, small fields, or the maximum in cruising speed at some sacrifice in takeoff and climb, the Engineering Dept. will be glad to make specific recommendations. Efficiency to the airplane is very dependant on the efficiency of the propeller. For this reason, guesses at the propeller variations should be avoided. Keep the propeller bolts and hub nuts snug and safetied at all times. Keep the propeller in track; small nicks and scratches should be sanded out and varnished, but do not allow the propeller to get out of balance.

3. FUEL SYSTEM: Only 73 octane aviation fuel should be used. A few ounces should be drained off the tank sump and the strainer bowl cleaned at frequent intervals. Never allow the flexible neoprene hoses to become kinked or twisted.

To assure reliability of your fuel gauge, the following precautions are recommended:

Ascertain that your fuel gauge goes to the bottom of the sump and will not catch on the edge of the sump or finger strainer. If there is any interference, remove the cap and float, insert a 3/4" tube or bar in the neck and set the neck at a slight angle forward and to one side. When your ship left the factory, the

gauge was set in this manner. The rod was cut off flush with the float on the bottom. 5 quarts (15 min.) of fuel were put in the tank and the projecting rod painted red. Since there is the possibility of damaging the rod and/or neck through careless handling of a hose nozzle, this point should be frequently inspected.

If the rod is kinked or the float sensitivity appears inadequate, write the factory and a new one will be furnished. Install it in accordance with the above directions.

PRIMER INSTALLATION: When a primer is installed, it should be used with extreme caution to avoid creating a fire hazard. Two full shots are all that are generally required, and the engine should be turned over while injecting the fuel. The primer should not be used sufficiently to cause gasoline to run freely out of the carburetor air butterfly box drain.

4. EXHAUST-HEATER SYSTEM: Every twenty hours the carburetor heater and cabin heater muffers should be removed and the manifolds carefully inspected for corrosion or oxidation. The manifold flanges and gaskets should be inspected for leaks at a similar interval. It is recommended that in warm weather the cabin heater muff be removed in order to give the manifold greater ventilation. The flexible tubes may then be connected with friction tape to provide cold air ventilation to the cabin.

5. BAFFLES: To insure reliable operation of the engine, it must be properly cooled. This is accomplished by a scientific arrangement of baffles, inlet and outlet areas, to provide proper pressure differential and flow of cooling air. It is important that these baffles not be removed or altered without specific recommendation of the Engineering Dept.

6. LUBRICATION SYSTEM: Use only oil that is recommended by the engine manufacturer for cold weather operation. The oil tank may be lagged with asbestos to enable the oil temperature to be kept at the required level. The hole in the nose cowl for cooling the oil sump may be covered with adhesive tape. Do not cover the inlet to the cabin heater. No flying should be done with the oil temperature less than 120°. An oil immersion heater is very desirable for pre-heating the oil for extreme cold weather operations.

7. ELECTRICAL SYSTEM: Batteries regularly installed are the Reading 324 or 333, or Exide 3AC7 or 4AC7. The level of the electrolyte should be 1" above the baffle plate.

Charge battery at 0.7 amperes for 70 hours. Take a test discharge from battery at 20 amperes, and after 15 seconds read voltage of each cell with current flowing. If each cell is 2.1 volts (at 80°F.) battery is O.K. Read specific gravity of electrolyte from each cell with a hydrometer syringe. If reading of any cell is above 1.310 or below 1.290 adjust the gravity as follows: Invert battery over a rubber or glass jar and allow electrolyte to drain out (requiring 5 or 6 minutes). Adjust this electrolyte to 1.300 specific gravity by adding pure water of 1.400 specific gravity acid as is required.



Fill each cell with sufficient electrolyte, so that at the end of 10 minutes the level is still above the baffle plate. Remove surplus electrolyte to top of baffle plate with syringe. Replace vent plugs.

Drain tube must be kept open and so adjusted to drain free of all parts of the airplane.

Navigation light bulbs for these batteries should be Mazda 88, 15 C.P. 6-8 volts.

If additional electrical equipment is installed, a fuse block must be provided and the installation approved by an inspector for the C.A.A.

## CHAPTER II

### C O N T R O L   S Y S T E M

The stick type of dual control is used. The front stick is removable by the  $\frac{1}{4}$ " aircraft bolt removal and removing the upper portion of the stick. The front rudder pedals are disconnected by disconnecting the inter-pedal straps from the rear pedals.

A few drops of oil should be applied to stick fittings and torque tube bearings during the periodic inspections.

The bungee worm gear should be oiled occasionally to permit easy operation.

The surface hinges should be oiled frequently and examined for wear. There are three hinges on each aileron, three on the rudder and two on each elevator. There is a needle bearing in the elevator horn, this can easily be oiled through the inspection window in the fin at the elevator spar.

The stabilizer is composed of two units right side and left side. To remove the stabilizers, first detach the elevators. This is done by removing the two  $\frac{3}{16}$ " aircraft bolts from the root spar, then remove all hinge pins, deflect elevator until hinge lugs are clear and pull the elevator straight away from the fin. If there is over  $\frac{1}{4}$ " play at the trailing edge, ream holes to .312-.002-.000 and assemble with  $\frac{5}{16}$ " aircraft bolts (AN-5). Remove the two  $\frac{3}{16}$ " aircraft bolts, one at the leading edge and the other at the trailing edge of the stabilizer, and pull the stabilizer straight away from the fin. In replacing the stabilizer, be sure all bolts and pins are properly safetied. All wire adjustments were correct when the plane was originally assembled; this same degree of adjustment should be maintained.

To rig the tail surfaces, the tail post should be straight and vertical. Then the stabilizer should be level right and left. If any adjustment is necessary, raise tail, take position behind the airplane and sight over rear stabilizer spar to upper lift strut fittings. Bring into position by lower wires. Then straighten fin post by inner wires. Inspection windows are provided in each wing for the inspection of pulley brackets and pulleys.

Adjustment of cables: Adjust rudder cables to permit rudder horn to hit stops when front pedals are short of front foot board by  $\frac{1}{4}$ ".

Adjust elevator cables to give  $27^{\circ}$  up travel and  $27^{\circ}$  down travel of the elevator, with ample clearance of the sticks on front and back of the front seat.

Adjust aileron balance cable to center, both ailerons in neutral position, then tighten cables to stick, maintaining a neutral position for stick and both ailerons.

Properly safety all turnbuckles, pins and bolts after adjustment.

Fin is fixed but directional trim may be obtained by slightly bending the trailing edge of the rudder with hands. Bend to the right if airplane has tendency to turn right in level flight. Always trim for wing heaviness first.

### CHAPTER III

#### L A N D I N G G E A R

The landing gear is made of welded chrome molybdenum tubing. The axle is heat treated to 180,000 p.s.i.

NOTE: No welding may be done on axle without annealing and re-heat treating.

Belly "V" fittings are designed so that they may be drilled out and fitted with  $7/16$ " bolts if elongated.

The rubber shock discs should be inspected at frequent intervals. To clean the shock discs, remove them from the spindle, wipe off all grease, oil and dirt, and dust the cleaned discs with powdered or flaked graphite. If the shock discs show any sign of deterioration, they should be replaced. The life of the shock discs should be from twelve to twenty-four months.

Never glue discs together or enclose them in a tight fitting can. The shock disc streamline available through the Service Dept. provides ample clearance for proper action, and protects the rubber from deteriorating elements.

Always maintain the tire pressure at 15 pounds on 2 ply tires.

To grease the wheels, remove the hub caps, loosen the axle nuts and pull the wheels from the axles. Clean the axle, then spread a thin film of grease over it. Wash the old grease from the roller bearings with gasoline. Be sure to remove all grit and sand, clean roller bearing sockets and fill with new grease. In replacing wheels, be sure all washers and roller bearings are in proper places. Be sure axle nut is safetied.

Tail wheel should be greased at frequent intervals. The full swivel and steerable tail wheels have a Zerk grease fitting at the back of the bearing. The spring of the steerable tail wheel should be examined



frequently to assure good alignment fo the tail wheel.

The tail wheel yoke and spindle assembly is heat treated and should not be welded without being re-heat treated to 180,000p.s.i. This unit is considerably over strength and has been proven by overload drop tests. If it is damaged, adjacent parts of the fuselage truss should be inspected for possible damage. If any distortion has taken place it will probably show in the fabric. If no tubes are bent or cracked at the welds, a slight distortion need not be considered serious.

Installation of pants is unusually rigid with heavy steel and dural reinforcements. If bolts are kept tight and the pants are not allowed to become clogged with mud or ice, their life will be good for the life of the plane.

Adjust brakes by the two lugs on down housing. Loosen both lugs, tighten one till the shoe just drags, let off half turn. Repeat with other lug. Take slack out of cable by loosening clamp.

#### CHAPTER IV

#### STRUCTURAL INSPECTION AND FABRIC

The wing spar root fittings should be inspected periodically for excessive play or looseness. The lift strut and landing gear fittings should be inspected periodically.

In case structural repair is needed, consult our Engineering Dept. Approved materials and specifications will be furnished promptly. The fabric is Flightex, light airplane fabric. In washing, care should be taken not to rub particles of sand or grit into the surface. The surface should be rinsed with water and then wiped lightly with a soft cloth. Spots of grease and oil should be removed with kerosene or naptha. Other cleaning fluids should not be used as they may contain solvents. Care should be taken in washing not to apply pressure on formed fairings and curved parts, as this pressure may injure the fabric where it is pulled tightly over the sharp edges.

The windows and windshield are made of Pyralin. Commercial window cleaning fluids should not be used on these windows as they may contain harmful solvents. Harsh, abrasive cleaning powder should not be used in cleaning, since they scratch the surface. Dreft or Drene dissolved in water, making a very soapy solution is recommended for windshield cleaning. Wash gently with a soft cloth and rinse with clean water. Small scratches may be removed by polishing lightly with Simoniz Kleener. Rub lightly, using a damp cloth in the direction of the scratches, and at right angles to the scratches. It may be necessary to repeat this operation. Care should be taken not to rub too long in one spot as the heat of friction may cause ridges.

To clean gasoline, grease and other spots from the fabric, a solution of castile soap and water should be used. The gasoline for cleaning injures the finish and usually leaves streaks.

Any minor holes or tears in the covering should be repaired immediately.

## CHAPTER V

A S S E M B L Y - R I G G I N G - L E V E L I N G  
A N D A L T E R A T I O N S

UNCRATING: See that the crate is placed right side up as marked and that there is sufficient room to lay out the various components as they are unpacked. Open both sides of the crate. Remove the wings, tail group and struts. Loosen the bolts securing the fuselage and slide out of crate.

Bolts are in the proper bolt holes and contain washers as needed. Any bolts not so placed are in a small sack in the cabin. In assembly, be very careful to replace all washers as they are placed on the ship so that the cotter keys will fit the castle nuts properly. Never draw a nut up more than snug. All nuts with castle nuts must be safetied with cotter keys, which are in a sack in the cabin. Do not use the bolts attaching fuselage to crate, but attach landing gear with the new bolts in the sack in the cabin.

If the bolts do not fit easily into the holes, use a drift. Never attempt to force a bolt through holes that are not in line, as this injures the threads. Do not change adjustments of rear wing struts or tail brace tie rods, as these were correctly set at the factory.

ASSEMBLY: Block up the fuselage by a saw horse or heavy box under the rear lift strut fittings, and a chain hoist or step ladder under the prop shaft. Be careful that the weight of the fuselage is supported at rigid points and not at intermediate points of the longerons or by fairing.

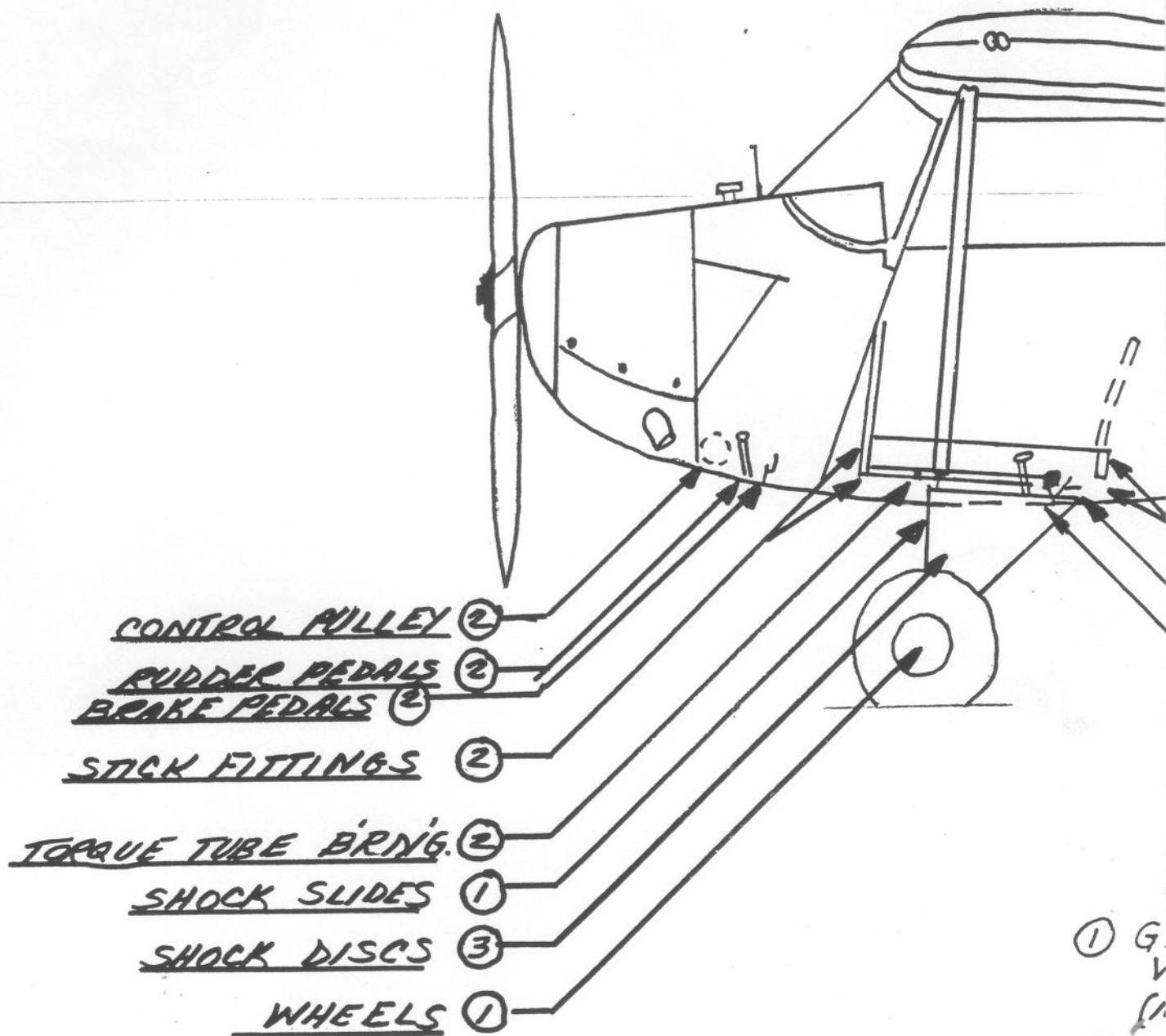
LANDING GEAR: Now attach the landing vees to the fuselage. The rear bolt should be inserted first. Next attach the axles to the landing gear with a 7/16" bolt. Then bring the axles in position at center and insert 3/8" drift in the bolt holes attaching axles to fuselage belly vees and insert bolts.

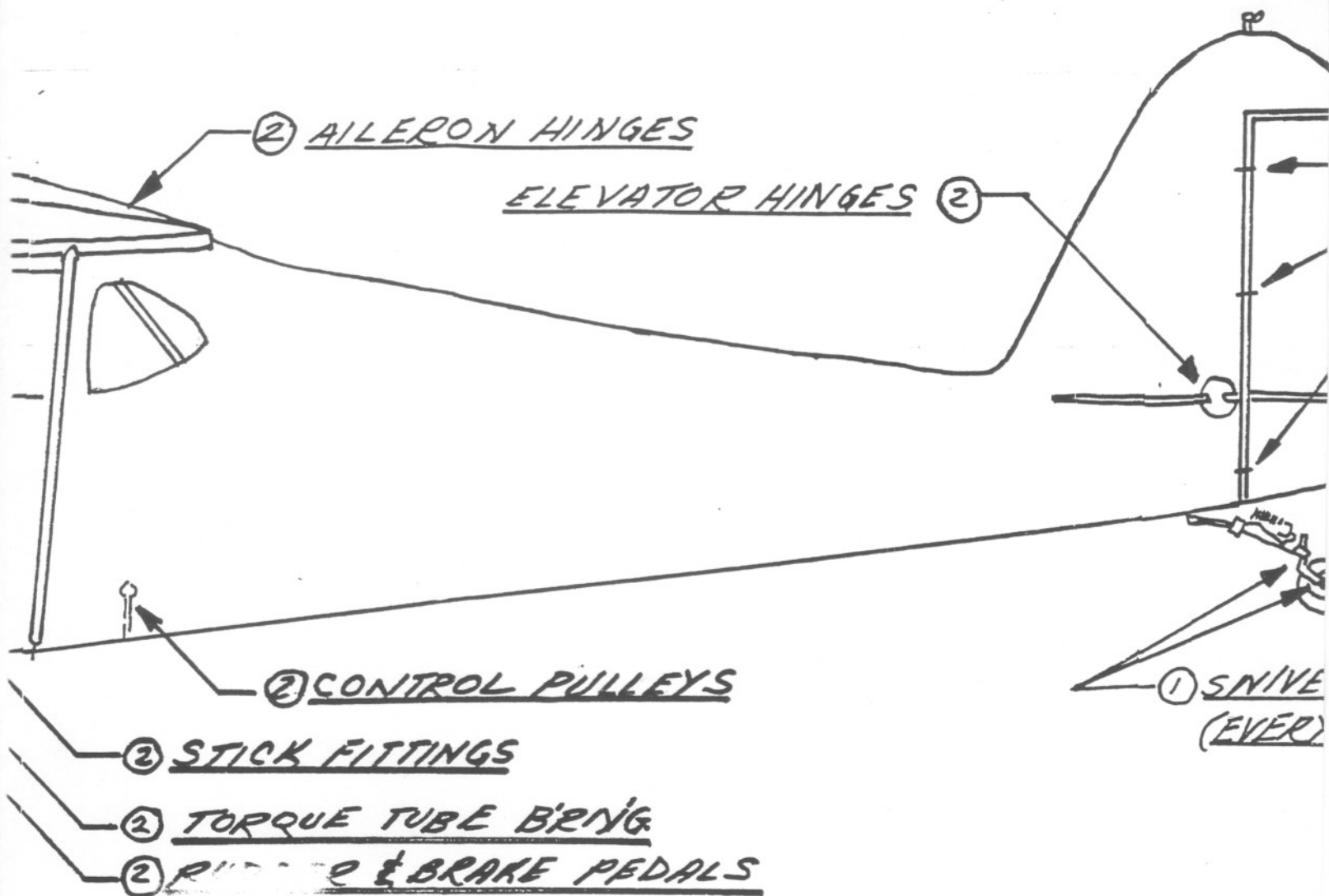
WINGS: Attach front and rear wing struts to the fuselage. Fit wings to fuselage attachment points. Lift wings into position and fasten struts to wing fittings. Next the aileron cables are attached inside the cabin. The two long cables attach to the aileron horn on the torque tube underneath the front seat. Pull cables through the three pulley brackets on each side passing behind upholstery from instrument panel to floor. The two short ends are interconnected overhead. The airspeed is connected by the tube in the upper left hand corner of the cabin. Cement rubber coupling with shellac or varnish. Connect head on jury strut similarly.

ELEVATORS AND STABILIZER: The assembly of the stabilizer and elevators is explained in the chapter on controls.

RUDDER: Attach rudder by hinge bolts on tail post. Bring rudder control wires to horn and attach. Be careful that control wires are not crossed inside the fuselage. They will fit without excessive forcing.

TAIL BRACES: Attach the four tie rods at tail as marked, beginning with the lower set. Rig as is explained in the Control System chapter.





### RECOMMENDED LUBRICANTS

GREASE (20 HOUR PERIODS)

WHEEL BEARING GREASE

MINERAL OIL BASE. FLASH @ 370°F. VISCOSITY 370 @ 100°F & 1

(20 HOUR PERIODS)

MINERAL OIL BASE. FLASH @ 385°F. VISCOSITY 150 @ 100°F

GRAPHITE (20 HOUR PERIOD)

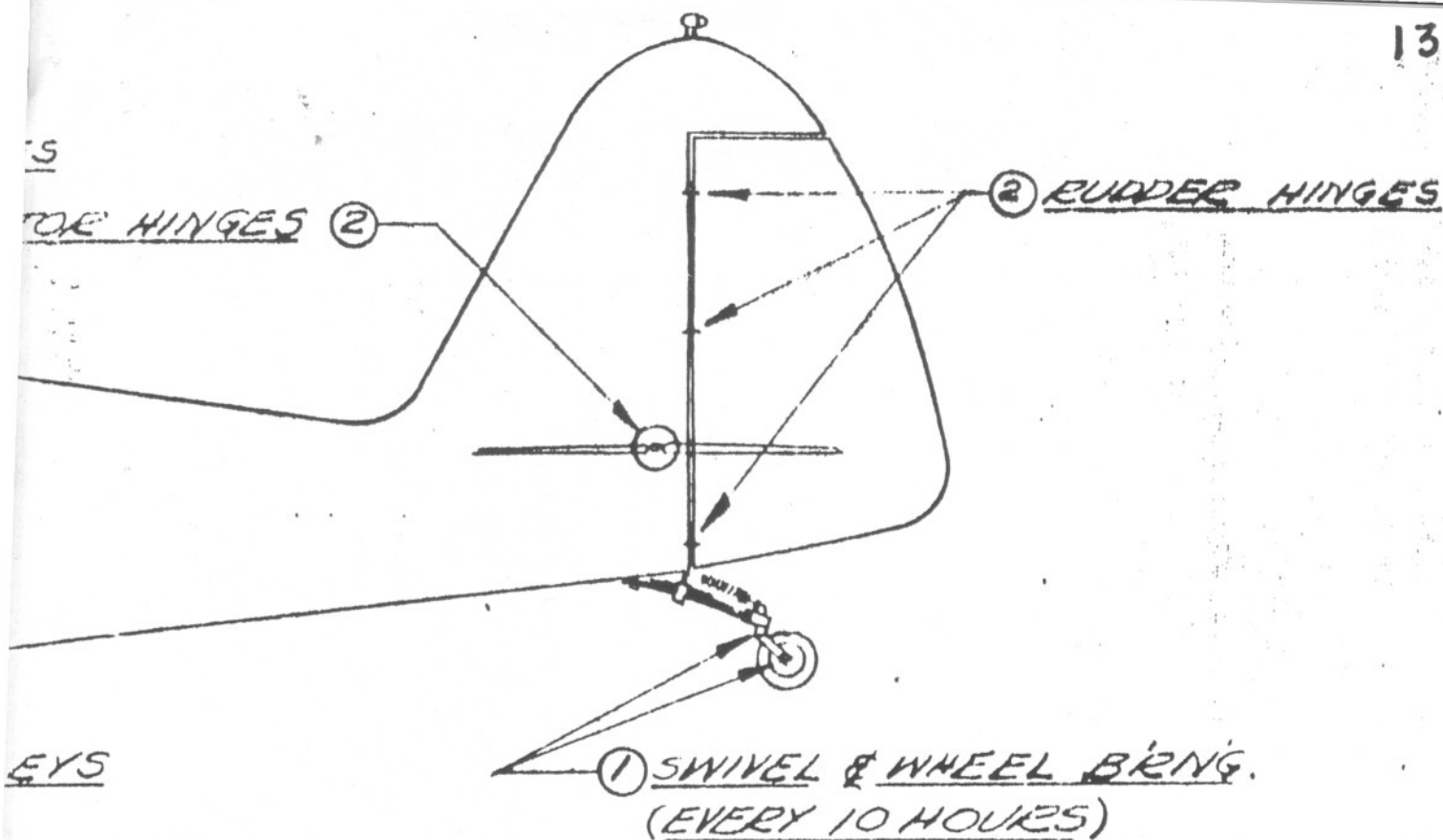
FLAKED OR POWDERED. BETWEEN RUBBER SHOCK DISCS.)

LUBRICATION DIAGRAM

SERVICE MANUAL

COLUMBIA AIRCRAFT





70°F VISCOSITY 370 @ 100°F & 50 @ 210°F)

385°F VISCOSITY 150 @ 100°F)

TWEEN RUBBER SHOCK DISCS.)

UBRICATION DIAGRAM.

ERVICE MANUAL

COLUMBIA AIRCRAFT CORP.  
KANSAS CITY, MO.



was done at the factory before crating. In the event of any difficulties the following rigging instructions are added. Use these only in the event of an obvious misadjustment.

1. Geometry

Angle of incidence=  $30^{\circ} 23'$

Angle of Dihedral=  $1^{\circ}$

2. Leveling

Ship is in level flying position when a bar placed on cross tubes at bottom of instrument panel and top of rear seat is level.

WINGS: Left wing is rigged flat. Right wing is washed out  $1/2$  degree, that is, the angle of incidence at the outer end of aileron is  $1/2$  degree less than the angle at the root. In level flight, both ailerons should trail even with the trailing edge. If not, let out (lengthen) rear strut on side whose aileron is up. Usually about one full turn of the forked end bolt for each  $1/2$  inch misalignment of aileron.

ALTERATIONS: If additional equipment is desired, the equipment must be approved for this model airplane and listed under Class II or III equipment on the Equipment List. For any addition of equipment, a new Weight and Balance must be run off for the airplane, and must be inspected by a Civil Aeronautics Administration Inspector.

If unapproved equipment is desired for this airplane, please consult our Engineering Department, and they will cooperate with you, if the addition of such equipment is practical for the airplane.

Repair and Alteration, and Weight and Balance papers will be prepared by the factory, free of charge, when equipment is ordered from the Service Department. Always be sure to mention Serial Number, NC number, and date of manufacture when writing the factory.

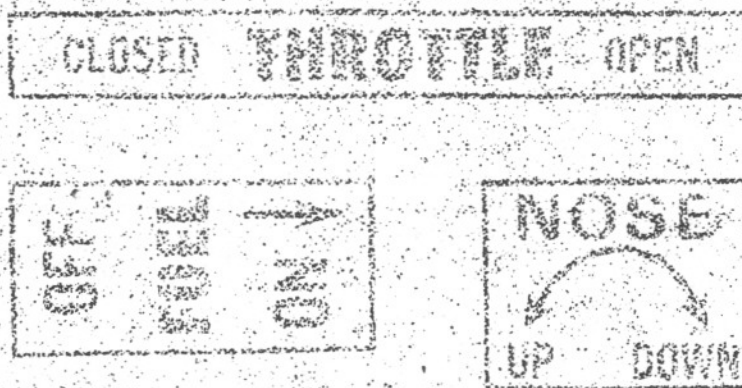
LOCATION: CENTER BAY  
OF VERTICAL FIN, LEFT  
+ RIGHT.



LOGO: USED FROM  
EARLY 1939 TO  
EARLY 1940.

LOGO + PLACARDS: SILVER OVERALL  
WITH BLACK LETTERING + DETAILING.  
TWO REQUIRED OF ALL.

SIDEWALL  
IMMEDIATELY  
BELOW EACH  
FUEL SHUTOFF  
LEVER.



← SIDEWALL  
IMMEDIATELY  
BELOW EACH  
THROTTLE.

↑  
AFT SIDE OF BOTH  
JOY STICKS, LEVEL  
WITH BOTTOM SEAT  
RAIL.

**PORTERFIELD  
AIRCRAFT CORP.**

KANSAS CITY, MO.

← SILVER  
OVERALL  
EXCEPT

STAR + NUMERAL - RED  
+ LETTERING - BLACK

← FIELD OF SHIELD HAS SPECKLED  
TEXTURE. (I HAVE LIGHTLY LINED  
THE EMBOSSED LINES WITH INK  
SO AS TO SHOW ON XEROX)

OFFICIAL PORTERFIELD  
AIRCRAFT CORP LOGO

1939(?), 1940, 1941

LOCATION: LEFT & RIGHT SIDE OF FUSELAGE  
COWL JUST AFT OF  PLATE & CENTERED WITH STRIPING.

WE ONLY BUILT ABOUT 20 OF THE  
75C. IT WAS THE 35W (90HP WARNER JR)  
WITH THE 75HP CONTINENTAL O-171 AND  
THE CP-55 SERIES VERTICAL TAIL, MODIFIED.  
THIS "75" LOGO MAY BE THE ONLY ONE  
LEFT.

ALUMINUM FOIL ON  
LIGHT CRAFT PAPER  
BACKING. TWO REQUIRED.

NUMERALS, RED, WERE:

50	CP-50 (?)
55	CP-55, (CONT. A-50-A, -5, -8)
65	CP-65, FP-65, LP-65
75	75-C (CONT A-75-8)

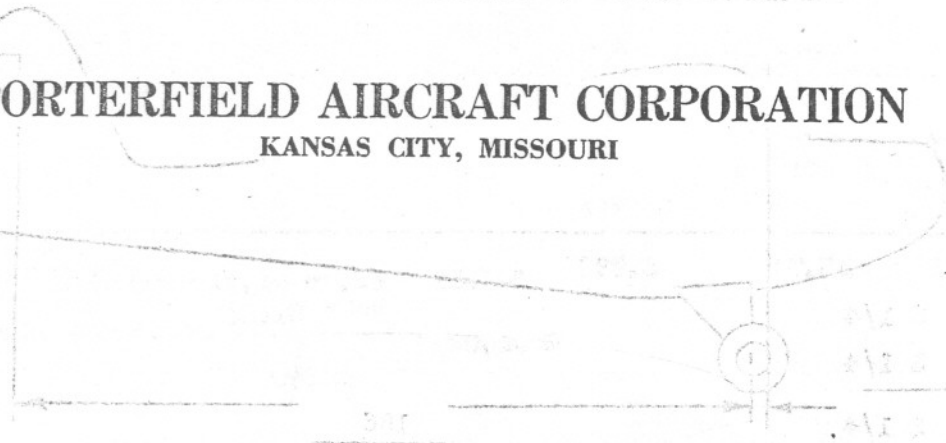
Best regards to all!

F. B. Johnson

3/1941  
54

**PORTERFIELD AIRCRAFT CORPORATION**  
KANSAS CITY, MISSOURI

81  
81A  
81B  
27  
2a



NO.	DESCRIPTION	WEIGHT
1	Engine	1200
2	Propeller	150
3	Wings	1800
4	Fuselage	1200
5	Tail	300
6	Landing gear	400
7	Wheels	100
8	Flaps	100
9	Control surfaces	200
10	Other	0
<b>Total</b>		<b>5350</b>

**ACTUAL WEIGHT AND BALANCE**

**MODEL:** LP-65 **SERIAL NO:** 907

**IDENTIFICATION MARK:** NC 34805

**DATE:** March 10, 1941

**Prepared By:** Taylor

**Checked By:** [Signature]

**Witnessed By:** [Signature]

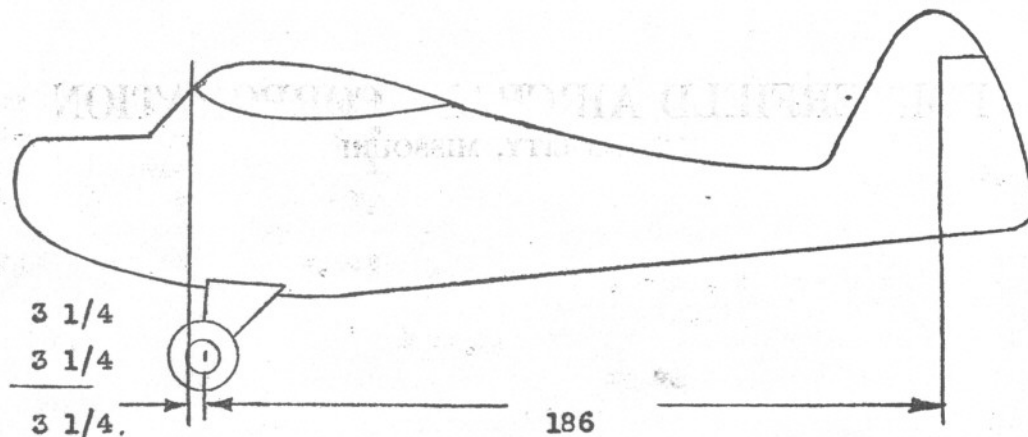
MODEL: LP-65  
SERIAL: 907  
NO.: NC 34805

PORTERFIELD AIRCRAFT CORPORATION  
KANSAS CITY, MISSOURI

PAGE 1

SECTION I—AIRCRAFT EMPTY WEIGHT

A. EMPTY WEIGHT AS WEIGHED IN LEVEL FLYING POSITION



	SCALE	TARE	NET
RIGHT WHEEL	332		332
LEFT WHEEL	335		335
TAIL	58	4	54
TOTAL			721

C. G. AFT C. L. AXLE = 186 (54) = 721 13.93

C. G. AXLE AFT L. E. WING = 3.25

C. G. AS WEIGHED IS AFT L. E. WING = 17.18

B. EMPTY WEIGHT AS WEIGHED INCLUDES THE FOLLOWING

1. Standard Equipment:

ITEM	WEIGHT
PROPELLER AND HUB ( <u>Fahlin D-566 TC</u> <u>681</u> SER. <u>10252</u> )	<u>10</u>
FIRE EXTINGUISHER	7.25
AIR SPEED	.75
ALTIMETER	.50
OIL PRESSURE AND TEMPERATURE GAUGE	1.00
TACHOMETER	1.75
IGNITION SWITCH	.25
WHEELS AND TIRES ( <u>Shinn 6C2HB</u> TC <u>63</u> <u>Firestone 6.00-6</u> PLY <u>2</u> )	<u>23</u>
TAIL SKID AND SPRING	<u>5</u>
SAFETY BELTS (2)	2.00
SEAT BOTTOM CUSHIONS (2 LEATHERETTE)	<u>5</u>
FIRST AID KIT	.30
AIRCRAFT AND ENGINE LOG BOOKS	.20

2. Items for which approval as optional equipment is desired:

ITEM	WEIGHT	ARM	MOMENT
<u>Steerable Tail wheel</u>	<u>5</u>	<u>195</u>	<u>975</u>
<u>Brakes</u>	<u>6.8</u>	<u>3</u>	<u>20</u>
<u>Compass</u>	<u>1</u>	<u>-4</u>	<u>-4</u>
<u>Cabin heater</u>	<u>1</u>	<u>-28</u>	<u>-28</u>
<u>Engine Primer</u>	<u>1</u>	<u>-11</u>	<u>-11</u>
<u>Carpet</u>	<u>2</u>	<u>9</u>	<u>18</u>
<u>Antenna</u>	<u>1.5</u>	<u>60</u>	<u>90</u>



MODEL: LP-65  
SERIAL: 907  
NO.: NC 34805

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KANSAS CITY, MISSOURI

PAGE 2

SECTION II—MOST FORWARD C. G. LOADING CONDITION

ITEM	WEIGHT	ARM	MOMENT
WEIGHT EMPTY	721	17.18	12387
OIL ( 1 GAL.)	7.5	-37	-277
FUEL ( 13.5 GAL.)	81	-16	-1296
PILOT AND CHUTE	190	8	1520

C. G. AFT L. E. M.A.C.  $12.34 - .24 = 12.10"$  999.5 12.34 12334

C. G. PERCENT M.A.C. =  $\frac{12.10 \times 100}{59.04} = 20.49 \%$

SECTION III—MOST REARWARD C. G. LOADING CONDITION

ITEM	WEIGHT	ARM	MOMENT
WEIGHT EMPTY	721	17.18	12387
OIL ( 1 GAL.)	7.5	-37	-277
FUEL (MIN. FOR BALANCE)	32.5	-16	-520
PILOT AND CHUTE (REAR SEAT)	190	35.8	6802
BAGGAGE	16	52	832

967 19.88 19224

C. G. AFT L. E. M.A.C.  $19.88 - .24 = 19.64"$

C. G. PERCENT M.A.C. =  $\frac{19.64 \times 100}{59.04} = 33.27 \%$

SECTION IV—NORMAL FULL GROSS

ITEM	WEIGHT	ARM	MOMENT
WEIGHT EMPTY	721	17.18	12387
OIL ( 1 GAL.)	7.5	-37	-277
FUEL (MIN. FOR HORSEPOWER) 10 Ga.	60	-16	-960
PILOT	190	8	1520
PASSENGER	190	35.8	6802
BAGGAGE	32	52	1664

1200.5 17.61 21136

C. G. AFT L. E. M.A.C.  $17.61 - .24 = 17.37"$

C. G. PERCENT M.A.C. =  $\frac{17.37 \times 100}{59.04} = 29.42 \%$

C. G. LIMITS ARE IN ACCORDANCE WITH SPEC. NO. 720 , ( 10.5 IN., 19.9 IN.)  
AFT L. E. OF WING

PLACARD

MAXIMUM CAPACITY OF BAGGAGE COMPARTMENT = 40  
SOLO REAR SEAT = 16  
PAY LOAD ( 10 GAL. OF FUEL) = 242 Parachutes included in Pay load.  
PAY LOAD ( 13.5 GAL. OF FUEL) = 221 " " " " " "



34805

(Identification mark)

(Inspector's signature)

Date March 10, 1941

## OPERATION LIMITATIONS

### 1. AIRSPEEDS—NEVER TO BE EXCEEDED

Level flight or climb . . . 102 m. p. h. indicated.  
Glide or dive . . . . . 138 m. p. h. indicated.  
Flaps extended . . . . . None m. p. h. indicated.

NOTE.—These airspeed limitations are based on values for which the structure has been designed or tested, and are maximum values which shall not be exceeded. THEY ARE NOT RECOMMENDED OPERATION AIRSPEEDS.

### 2. ENGINE

#### TAKE-OFF (1 MINUTE)

At any altitude . . . . . in. hg. 2550 r. p. m. (65 hp.)

#### MAXIMUM, EXCEPT TAKE-OFF

At sea level . . . . . in. hg. 2550 r. p. m. (65 hp.)

At any feet altitude . . . . . in. hg. 2550 r. p. m. (65 hp.)

(For additional limitations see opposite side of this sheet)

NOTE.—Manifold pressure limit varies lineally between sea level and altitude designated.

These limits apply only with the power plant described below:

Engine manufacturer

Lycoming

Model

0 - 145 - B2

Number installed

1

Propeller manufacturer

Fahlin D-566, wood, fixed.

Hubs

Blades

Number installed

1

### 3. WEIGHT

The maximum certificated weight of this aircraft which shall not be exceeded, is:

1200 Lbs.

(Land, with wheels)

(Land, with skis)

(Water type)

### 4. BALANCE

This aircraft shall be so loaded at all times that the center of gravity falls within the following limits:

Center of gravity limits—Land type 10.5" (17.38% MAC) 19.9" (33.30% MAC)

Center of gravity limits—Water type

(OVER)

*J. H. Line*  
(Inspector's signature)

34805

(Identification mark)

Date March 10, 1941

# EQUIPMENT

Item No. (1)	Class (2)	Name of Item (3)	Arm (4)	Weight (5)
101	I	Propeller, wood, fixed.	-50 -49	10
102	I	Engine cowl	-36 -40	9 10
103	I	Exhaust manifolds	-36 -37	5 4
104	I	Carburetor heater	-35 -40	3
107	I	2 Ply tires and tubes	3	16
108	I	Tail skid spring	193	5
200	II	Antenna installation	60	1.5
203(b)	II	Steerable tail wheel	195	5
301	III	Cabin heater	-28	1
302	III	Compass	-4	1
304	III	Engine primer	-11	1
306	III	Carpet	9	2
312	III	6.00-6 wheels with brakes.....Shinn 602HB	3	14