SERVICE AND MAINTENANCE MANUAL

BELLANCA "300" VIKING MODEL 17-30

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SECTION 1

INTRODUCTION

A. GENERAL

This manual contains service and maintenance information for the Bellanca "300" Viking, Model 17-30.

B. SCOPE OF THIS MANUAL

Sections II and X of this Manual consists of the Service Section, whereas the remaining Sections comprize the maintenance instructions. The service instructions include ground handling, servicing and periodic inspections. The maintenance instructions for each system include trouble shooting, removal and installation of components, corrective maintenance and testing. Each major system of the aircraft is covered in a separate section.

C. DESCRIPTION

The Bellanca "300" Viking Model 17-30 is a four-place, low wing monoplane using steel tube construction in the fuselage and tail control surfaces. The fuselage and all control surfaces are covered with a synthetic Dacron fabric which is highly impervious to acids and deterioration of any kind and has an extremely high tensile strength to resist tearing or punctures. This fabric is finished with Butyrate dope and is very easily repaired using standard accepted methods for fabric repair.

The famous Bellanca wing, made of rugged Sitka spruce and mahogany plywood is one of the most efficient in aviation, with a greater weight-strength ratio than that of any other low-wing plane in the private class. The wing is completely submerged in a vat of special wood preservative which also serves as a sealer. This means that every portion of the wing is completely sealed. Wood rot or deterioration of any kind is virtually non-existent, even in the oldest models.

The baggage compartment is aft of the rear seat and is accessible by an outside door and is also accessible from the rear seat during flight.

D. ENGINES

The "300" Viking is equipped with the Continental IO 520 D fuel injected engine rated at 285 HP at 2700 RPM with a 5 minute take-off rating of 300 HP at 2850 RPM. This engine requires a minimum fuel octane rating of 100/130 (Aviation Grade).

This engine is mounted on a Dyna-focal engine mount to dynamically balance the engine during flight and to reduce the transmission of vibration to the airframe.

E. PROPELLERS

The Viking "300" comes equipped with either the McCauley Constant Speed 3 blade, Model D3A32C90 or the McCauley Constant Speed 2 blade, Model D2A34C58.

F. BRAKE SYSTEM

Brakes and wheel are Goodyear, brake model No. 9532278 or 9532181 and wheel model No. 9532111 or 9532673. These assemblies are eligible only with Model VHR Paramount master cylinders.

Each brake master cylinder is independent of each other and has no hydraulic reservoir other than the master cylinder itself.

G. LANDING GEARS

Landing gears are dydraulically operated by a hydraulic power pack located under the front seats. This power pack contains its own reservoir on the top of the power pack and also has an auxiliary reservoir located on the firewall, this reservoir should be filled to the line marked on the end of the reservoir. Should a complete loss of hydraulic fluid in both reservoirs occur, the base of the power pack will retain enough fluid to actuate the gear.

H. FUEL SYSTEMS

The "300" Viking has a standard fuel system of two wing tanks of 19 U. S. Gallons each, and a fuselage Auxiliary tank of 20 U. S. Gallons.

An optional fuel system consisting of two wing tanks of 19 U. S. gallons each, and a 17 U. S. gallon Auxiliary tank in each wing is available for a total of 72 gallons. The 20 U. S. gallon fuselage Auxiliary fuel tank is also available in addition to the above which brings the total of 92 U. S. gallons.

I. INSTRUMENT PANEL

The instrument panel is designed to provide a functional location of all flight, radio and engine instrument groups.

J. HEATER AND DEFROSTING SYSTEM

Cabin heat is supplied by a heater muff which transmitts heated air by conduction from the engine exhaust manifold. Defrosting of the windshield is accomplished through six vents located at the bottom of the windshield which draws heated air from the cabin heater muff. The defroster control is located on the right side of the instrument panel along with the heater controls. To defog windshield while taxiing, pull all three controls.

K. VENTILATION SYSTEM

Four individual airline type adjustable vents are located with one on each side of the instrument panel and one on each side of the rear seat area. These are adjustable by turning the knurled knob to obtain the desired amount of air. The vents are also moveable up, down and sideways by pushing in the desired direction. A cabin exhaust vent is located in the top of the fuselage to expell cabin air, this vent has a filter located inside of the vent to slow down the flow of air somewhat.. This filter should be checked periodically to see that is is not stopped up or clogged. There is also a drain hole located inside the vent to drain any water collected during washing of the aircraft or during rainy weather, this drain should be checked to see that it remains open.

LEADING PARTICULARS AND PRINCIPAL DIMENSIONS

ENGINE

Model	Continental Fuel Injected IO-520-D
Compression Ratio	8.5:1
Firing Order	1-6-3-2-5-4
Cylinder Head Temp. (Max)	460 Degrees F.

Bore (inches)	5.25
Stroke (inches)	4.00
Displacement (cubic inches	520.00
Brake H. P. (max. cont.)	285
Max. H. P. (takeoff)	300 (5 minute maximum)
Recommended Max. H. P. (cruising)	215
Rpm Max. Cont. Operation	2700
Rpm Max. Takeoff	2850 (5 minute maximum)
Recommended Max. for cruising	2550 RPM
Recommended for Idle	600 RPM
Intake Manifold Pressure (Hg)	
Takeoff	Full Throttle
Max. Cont. at Sea Level	28.8 inches
Max. Cont. at Critical Altitude	28.8 inches
Max. for Cruising	24.0 inches
Minimum Fuel Octane Rating	100/130 (Aviation Grade)
Oil Specification	Continental MHS-24
Above 40 Degrees F.	SAE No. 50
Below 40 Degrees F.	SAE No. 30 or (10W30)
Oil Pressure Min. Idle (PSI)	10 pounds
Oil Pressure (Cruising)	30-60 pounds
Oil Sump Capacity (U.S. Qts.)	12
Oil Temperature Limits	
Minimum for Takeoff	75 Degrees F.
Maximum with SAE No. 50 Oil	240 Degrees F.
Recommended Cruising	170 Degrees F.
Ignition Timing	
Left Magneto	20 Degrees BTC
Right Magneto	20 Degrees BTC

CAUTION

Do not turn the propeller while the ignition switch is in the BOTH, LEFT OR RIGHT position, because this could start the engine and cause injury. Do not turn the propeller of a hot engine, even though the ignition switch is in the OFF position, because the engine could "kick" as the result of auto-ignition of a small amount of fuel remaining in the engine.

2. OVERALL DIMENSIONS OUTSIDE

Wing Span	34 Ft., 2 in.
Fuselage Length	23 Ft., 6 in.
Horizontal Stabilizer length	12 Ft., 2 in.
Total Height	7 Ft., 4 in.
Wheel Tread	9 Ft.
Gross Weight	3000 Lbs.

3. LANDING GEARS

Type	Hydraulic
Tread	9 Feet
Main Wheel Type	Goodyear
Main Gear Tires	6.00 x 6 - 6 ply Tubeless
Main Gear Tire Pressure	30 Lbs.
Brake Type	Goodyear
Fluid Type	MIL-H-5606A AM2 Petroleum Based
Nose Wheel Type	Goodyear
Nose Wheel Tire	15 x 6.00 6 ply Tubeless
Nose Wheel Tire Pressure	28 Lbs.

4. CONTROL SURFACES TRAVEL:

FOR SPECIFIC AIRCRAFT, CONSULT FAA AIRCRAFT SPECIFICATION NO. 1A3 OR NO. A18CE. THESE SPECIFICATIONS ARE INCLUDED AT THE BACK OF THIS MANUAL.

SECTION II

HANDLING & SERVICING

CONTENTS

SECTION II

HANDLING AND SERVICE

A. GENERAL

This section provides ground handling and servicing instructions.

B. ACCESS PROVISIONS

Provisions for inspection and maintenance are provided for in the form of snap type inspection plates and flat plates, it is necessary that these plates be removed at each inspection to insure a complete and thorough inspection.

The floor of the baggage compartment is fastened with one-quarter turn fasteners and when raised provides access to the aft portion of the fuselage, battery, oxygen system (if installed) and the radio and electronic mounting racks.

Figure No. 1 shows the inspection plates and fairings and their indentity.

C. GROUND HANDLING

The following instructions are recommended to avoid damage to the aircraft during ground operations.

If improperly handled, extensive damage to the aircraft and its equipment may result. The aircraft may be taxied as required for normal maneuvers, brakes and rudder pedals may be used in taxiing as required. Do not move the nose gear with the rudder pedals while the aircraft is stationary, to do so may bend the nose gear steering rods. It is permissible to move the nose gear with the tow bar while the aircraft is stationary; however, it is not recommended to turn the nose gear by kicking the tire.

Never push down on the tail surfaces to pivot the aircraft; to do so may bend the ribs in the tail surfaces.

Points where pushing the aircraft are permitted are the leading edge of the wings, the wing tips and the inboard position of the propeller blades adjacent to the propeller hub. Do not push or pull anywhere on the tail surfaces.

1. HOISTING THE AIRCRAFT

When it is desired to raise the aircraft for retraction tests or gear servicing, it is suggested that it be done in the following manner.

Place the jacks on the jack pads located on the forward spar as shown in Figure 2. Place a stand approximately 16" high under the tail skid to prevent the tail from going to the ground. This keeps from having to raise the jacks to an excessive height.

The aircraft is in a tail heavy configuration when on the jacks and it is safe to occupy both front seats if necessary and not have the aircraft become nose heavy.

BELLANCA Aircraft Corporation

Fairings & Plates

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
1 – 1	192521-4	Fairing	2	
— 2	192521- --R/H & -2L/H	Fairing	1R/1L	
— 3	196584-10	Inspection Cover		
— 4	193109	Inspection Cover	2	
— 5	19254-3	Fuel Gauge Cover — Lower Aft	1	
— 6	190221-10	Cover	2	
— 7	192518-1	Cover—Aileron Hinge	1R/1L	
— 8	192518-3	Cover—Aileron Hinge	1R/1L	
— 9	192518-2	Cover—Aileron Hinge	1R/1L	
—10	19233-1	Cover—Pilot Tube Access	1	
—11	19286	Fairing Cover—Wing	1	
—12	192521-5	Nose Angle	1R/1L	
—13	192531-1	Fairing Strip—Trailing Edge	1	
—14	190089	Inspection Door—Hyd. Drip Pan	1	
—15	194169	Hub Cap—Main Gear Wheels	2	
—16	196587	Door—Aux. Tank	1	
—17	19254-10	Fuel Cap Cover	2	
—18	191456	Cover—Aux. Wing Tanks	2	
—19	193108-2	Cover—R/H Stabilizer Fittings	1	
—20	193108-1	Cover—L/H Stabilizer Fittings	1	
—21	19701-1	Tab—Aileron	1	
—22	CH-1685-1-160"	Rubber Extrusion	As Req.	
—23	KH-406	"U" Rubber Extrusion	As Req.	

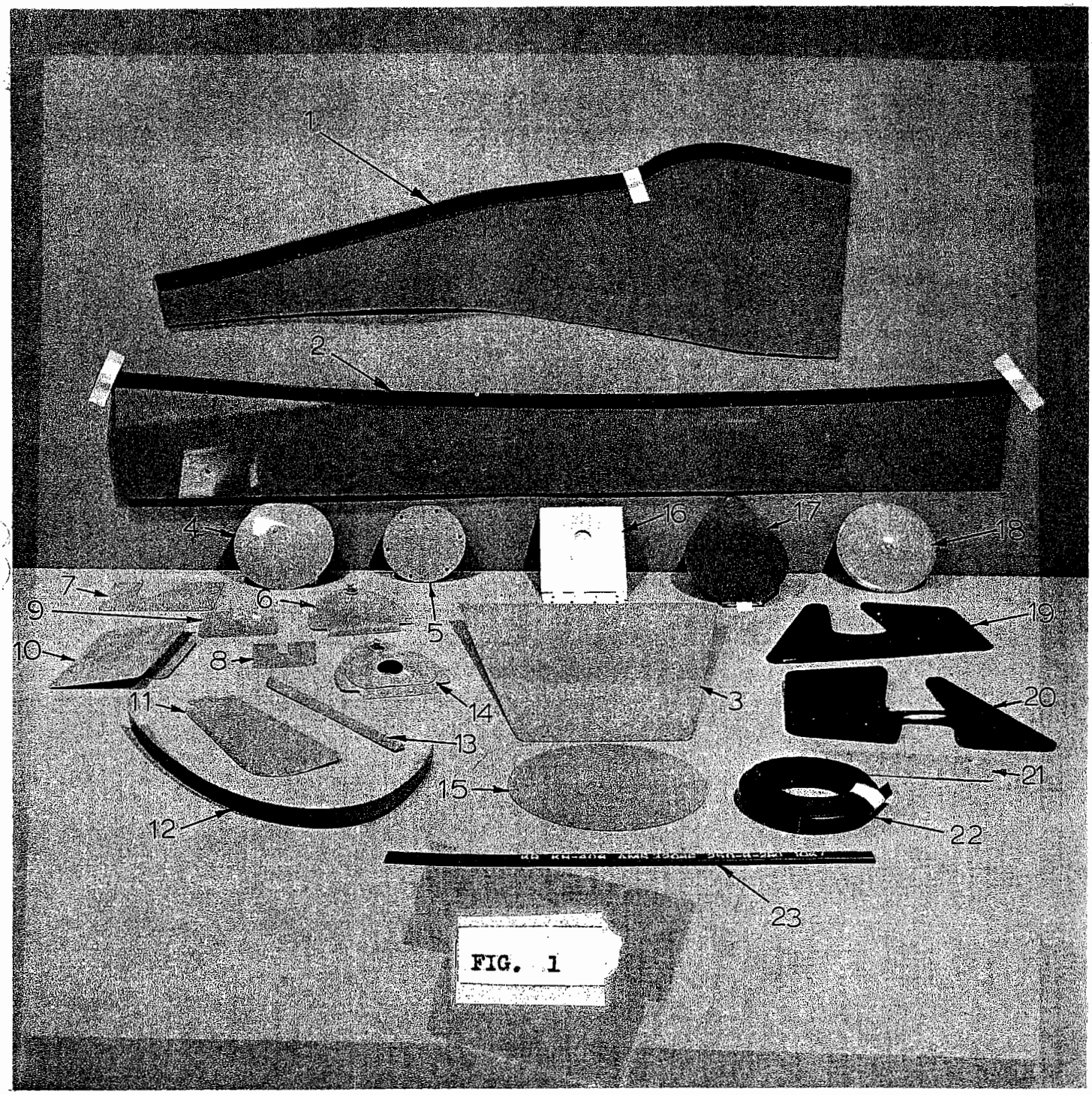


FIG. 1

2. LEVELING THE AIRCRAFT

Longitudinal leveling of the aircraft is accomplished by placing a spirit level on the lugs at fuselage stations 2 & 3. These lugs are located on the extreme right side of the front center section, Station 2 and the rear section station 3 inside the cabin area and are usually covered by the upholstery paneling. Leveling the aircraft horizonally is done across the front center section. To be sure and clear any welds or structure on the center section it is advisable to tape 2 blocks of the same height to the center section and place the level on these blocks.

3. MOORING THE AIRCRAFT

When mooring the aircraft the tie down chains are attached to the retractable tie down rings located on the under side of the wings and to the tail tie down ring which also acts as a tail skid. If extremely turbulent weather is expected it would be wise to secure the aircraft with tie down chains on the main gears also.

4. TOWING THE AIRCRAFT

A tow bar is provided as standard equipment with each aircraft. This tow bar fits into lugs welded to the nose gear fork. Care must be exercised to see that the nose gear is not rotated past its normal turning limits, to do so will damage the limit stops. Check to see that the parking brake is off before towing the aircraft with a tug.

D. SERVICING

1. FUEL SYSTEM

The Viking 17-30 BELLANCA has 2 wing tanks of 19 U. S. gallons each with a 20 U. S. gallon Auxiliary tank located just behind the rear seat. In conjuction with this standard fuel system, 2 extra auxiliary tanks each holding 17 U. S. gallons are located in the wings just outboard of the standard wing tanks are available as optional equipment, and bring the total fuel capacity to 92 U. S. gallons. The fuselage tank may be omitted for a total capacity of 72 gallons.

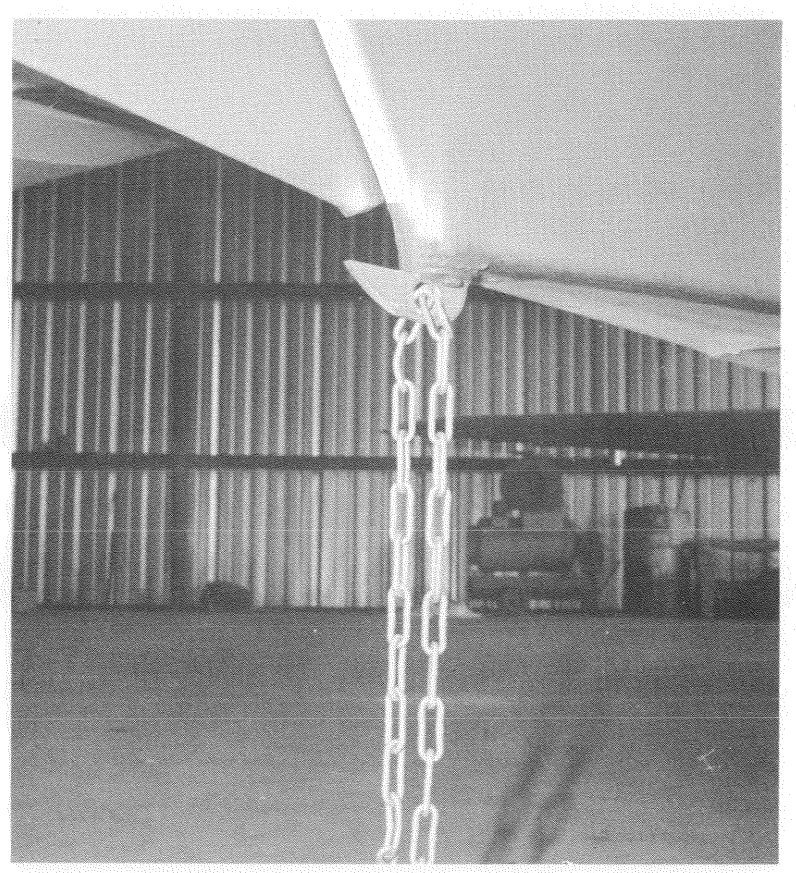
On the standard 58 gallon fuel system each wing tank is accessible for filling by lifting a dzus fastened door and removing the gas cap. A drain is provided to drain off any fuel spilled outside the filler neck. The fuel tank drain is located on the inboard rear corner of each tank underneath the wing. This is the lowest point of each fuel cell.

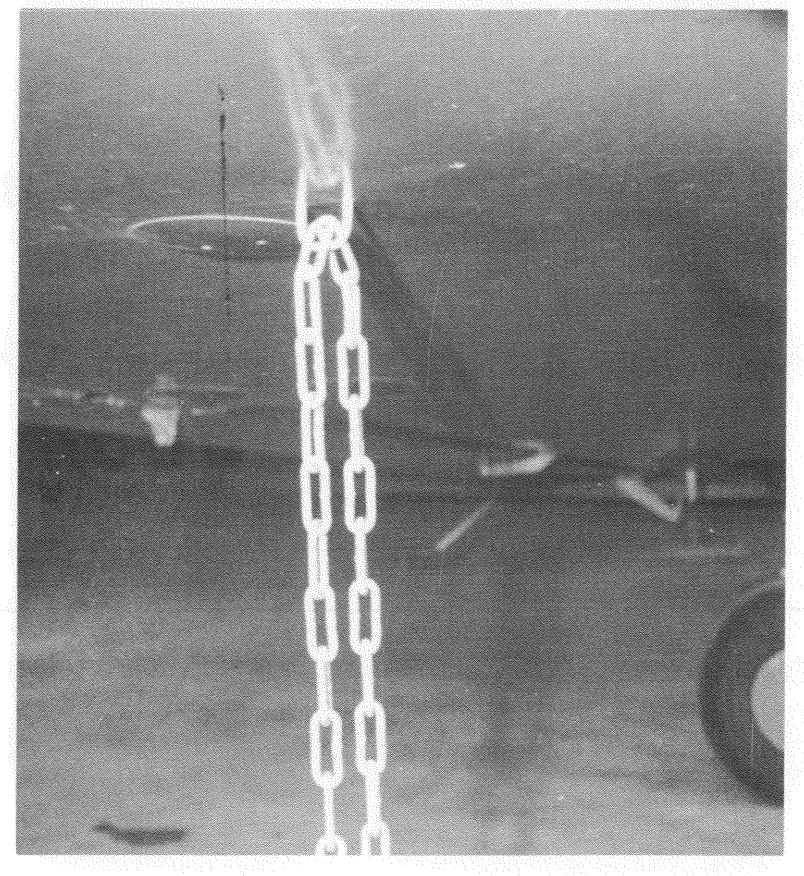
FIGURE 2

Jacking Arrangement

FIGURE 4

Mooring of Aircraft





SECTION III

POWER PLANT

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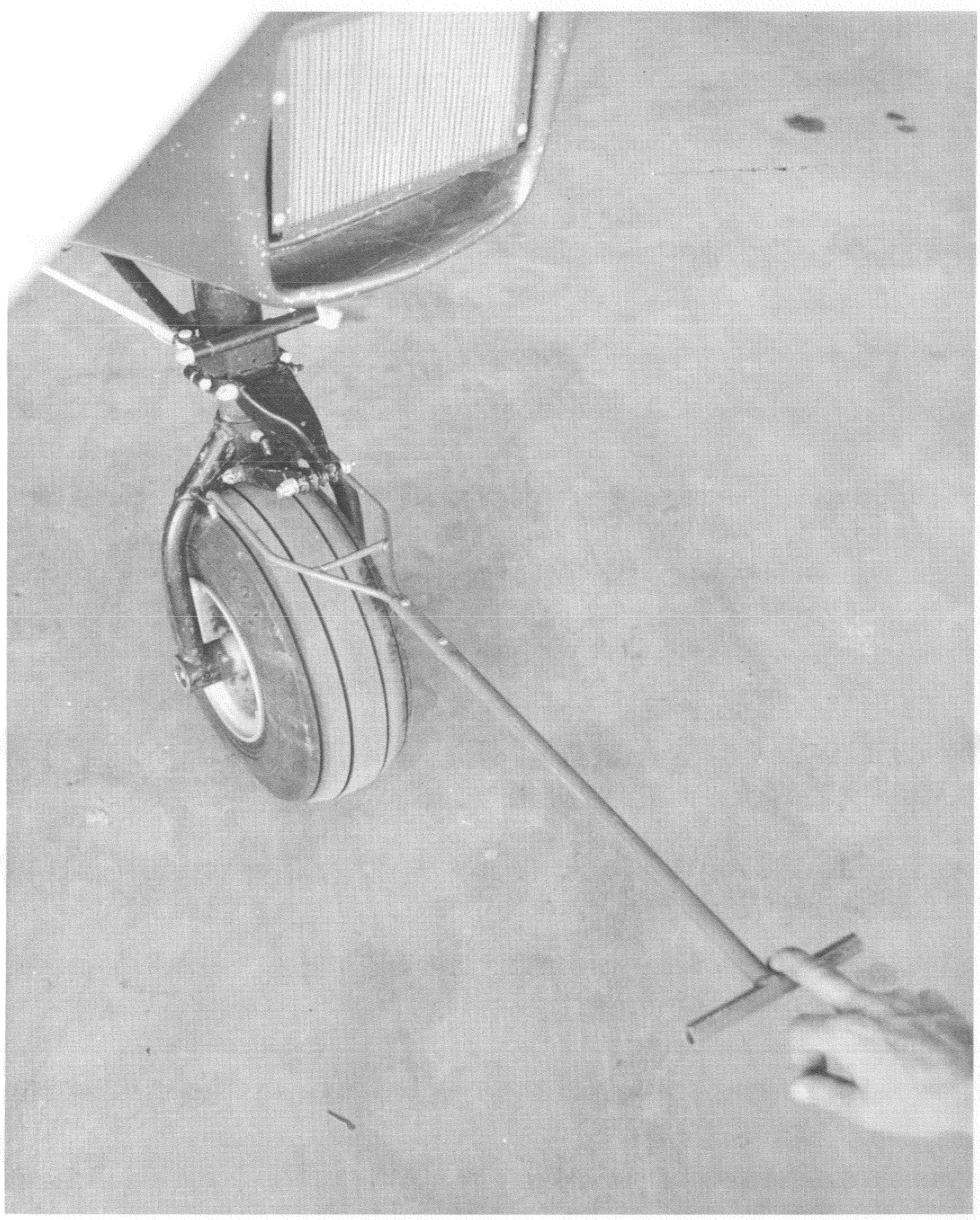
FIGURE 5

Tow Bar Attachment Point



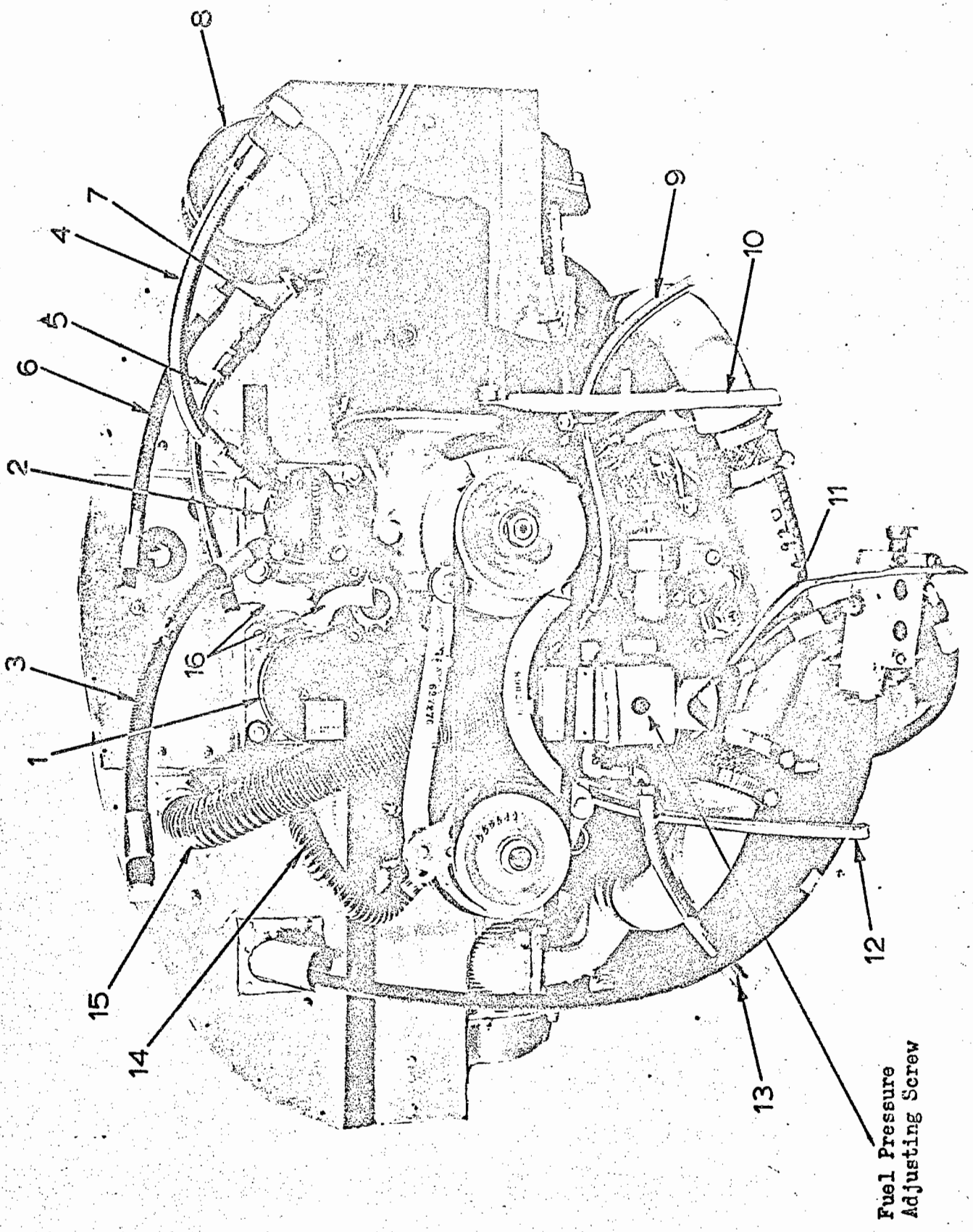


FIG. 41

The 20 U. S. gallon fuselage Auxiliary tank filler opening is located on the right side of the fuselage just behind the rear window. Access to the filler is through a small door. The filler opening is designed to drain off any fuel spilled during the fueling operation. The sump drain for the Auxiliary tank is located on the bottom of the fuselage immediately under the auxiliary tank. Also under the fuselage there is a main fuel system gasculator drain and this is the lowest point in the entire fuel system. This drain is located in the removable plate. This plate also covers the gasculator. This gasculator should be removed and the screen cleaned at every inspection or more frequently if fuel contamination is suspected.

On aircraft equipped with the optional 92 or 72 gallon fuel system, the method of servicing the tanks should be as follows. The rate of fueling should be slow enough to allow the fuel to flow through the connecting line to the inboard fuel cell to insure the complete filling of both outboard cells to capacity.

Minimum fuel Octane rating is 100/130 (Aviation Grade)

2. LUBE OIL SYSTEM

A. FILLING THE ENGINE SUMP

Fill the engine sump with lubrication oil as specified in Table 1. Sump capacity is 12 U.S. quarts maximum. Minimum oil for satisfactory operation and oil cooling is indicated by the LOW mark on the oil dip stick.

3. BRAKE SYSTEM

The brake reservoirs are located in the brake master cylinders, each brake is independent of one another and they are not connected to the hydraulic system which is used for flaps and gear. Brakes should be serviced from the bottom at the wheel cylinders to preclude the possibility of trapping air in the lines. Service brakes with Aircraft Hydraulic Oil AA MIL-H-5606A AM2 Petroleum base fluid. Brake blocks, clips and discs should be checked periodically for wear.

E. LUBRICATION

Refer to the lubrication chart for instructions regarding the location, time intervals and types of lubricants to be used. Grease fittings are provided on the nose gear and main gears. Avoid excessive use of lubricants as they tend to attract dirt and grit and may lead to abnormal wear.

It is very important to keep the down lock spring pistons free of rust and corrosion at all times and also the hydraulic retract cylinders rods free from rust. Periodic inspection of these points should prevent any trouble. The fibre insert on the nose gear steering collar should be lubricated with a light grade oil periodically.

Remove, clean and repack wheel bearings every 100 hours with a suitable bearing grease.

On the bottom of the wings at the inboard end of each aileron bay there is a snap type inspection plate which provides access to the aileron actuating tracks. These tracks should be cleaned of all old grease and relubricated every 100 hours with Lubriplate grease No. 70. This is important if smooth aileron action is to be maintained

All pulleys on the Model 17-30 are of the ball bearing type and need no further lubrication but should be checked for free rotation at each inspection.

Main gear oleos should be serviced with 6 inches of Aircraft Hydraulic Oil AA MIL-H-5606A AM 2 Petroleum Base fluid and the springs should be liberally coated with Lubriplate No. 70 grease, this should be done every 500 hours. Removal of the lower gear legs are required to do this and at this time the seals and O rings should be checked for wear. The nose gear is serviced in the same manner except 4 inches of fluid is used instead of the 6 inches as in the main gears.

TABLE 1

A. OIL SPECIFICATIONS

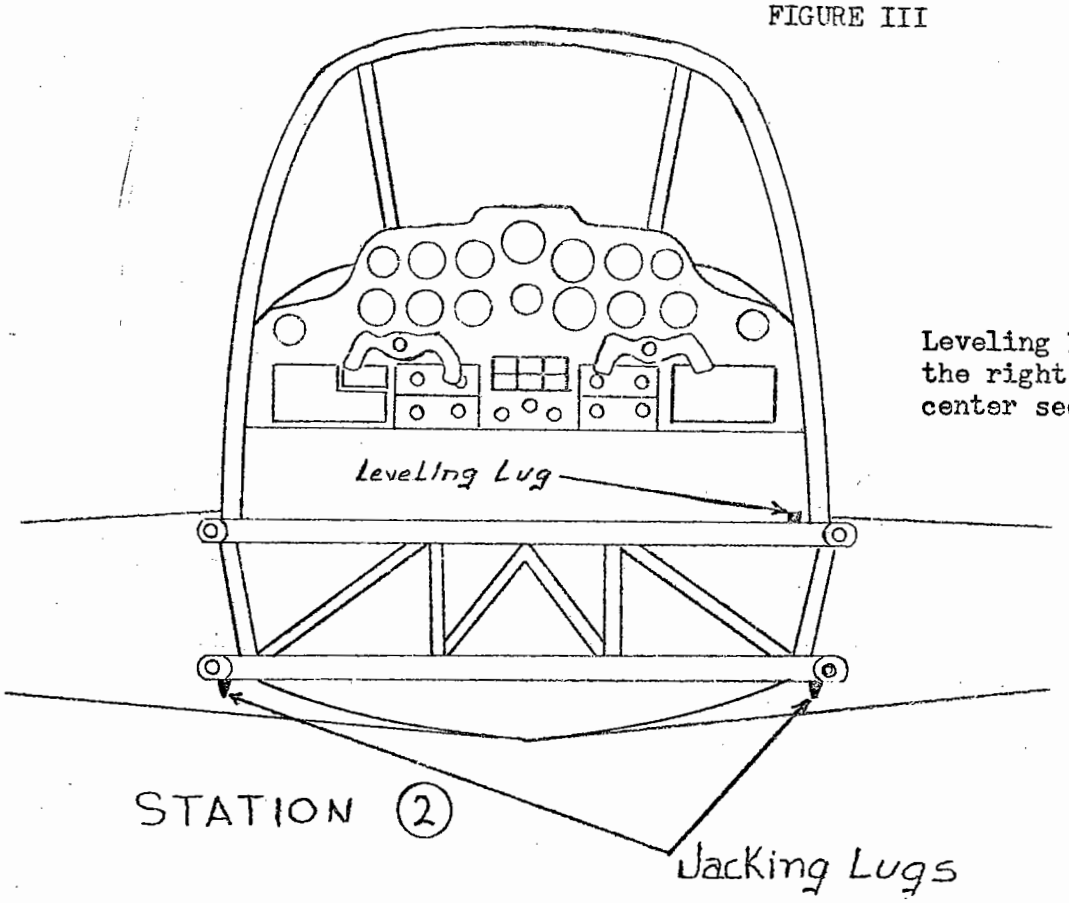
Detergent oil, compounded to meet Continental Motors Corporation Specifications MHS-24, is the only lubricant which meets all qualifications peculiar to these engines, and is the only recommended lubrication oil.

RECOMMENDED VISCOSITY	AMBIENT AIR TEMPERATURE
SAE 30	Below 40 Degrees Far.
SAE 50	Above 40 Degrees Far.

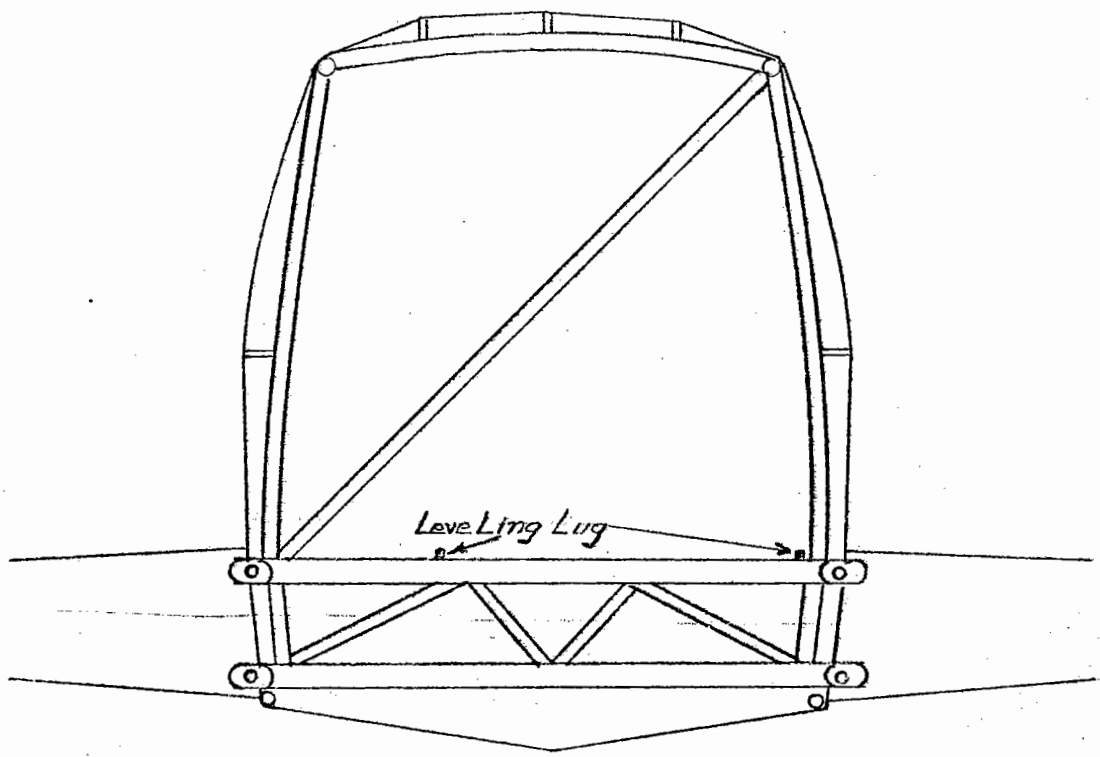
When average ambient air temperature is approximately at the dividing line of the above temperature ranges, use the lighter oil.

It is recommended that the oil supply be drained and the engine sump filled with fresh oil after each 75 hours of engine operation. Always start and warm the engine to operating temperature before draining the oil. Remove and clean the oil screen at each oil change.

FIGURE III



Leveling Lugs are located on the right hand side of each center section as shown.



SECTION III

POWER PLANT

A. GENERAL

The Continental IO520-D engine is a 6 cylinder, fuel-injected engine with a continuous rating of 285 HP at 2700 RPM. The IO-520-D engine also incorporates a 5 minute take-off rating of 300 HP at 2850 RPM. These air cooled engines have a wet sump oil system, dual magnetos and continuous-flow injection system. The fuel injection system supplies metered fuel to the individual cylinders through injector nozzles, to assure the proper fuel-air ratio for best performance at all altitudes.

The engines have air cooled, horizontally opposed overhead valve, cylinders with 5.25 inch bore, 4.00 inch stroke, 520 cubic inch displacement, and a compression ratio of 8.5:1. The cylinders have down-directed exhaust outlets. The crankshaft flange has six bolt holes, two dowel pins and a center pilot extension provided for attaching the propeller. Provisions are made in the pilot extension for the hydraulic propeller control oil which is supplied internally from the governor pad. The crankshaft is also equipped with pendulum type torsional damper weights. The engine has removable type hydraulic tappets. Positive rotation is provided for the exhaust valves by the use of rotators. Tappets, pushrod ends and rocker arm bearings are lubricated by the engine main oil pressure system.

The engines are furnished with a direct cranking starter and a generator. The exhaust manifold systems are not supplied with the engines, The engine main fuel filter, engine controls, vacumn pump and propeller governor are furnished by the aircraft manufacturer.

1. Starting Engine
   a. Turn on the fuel selector valve
   b. Set mixture control to "Full Rich" position
   c. Open throttle slightly (See note 1)
   d. Turn Master Switch ON
   e. Turn ignition switch to BOTH
   f. Set auxiliary pump switch ON
   g. When fuel pressure gauge shows normal idle pressure (2 to 2.5 psi), engage starter.

CAUTION

If engine is hot, press starter button first, then turn auxiliary fuel pump switch ON.

NOTE 1

The auxiliary pump delivers a continuous flow of fuel in proportion to the amount of throttle opening and length of time before engaging starter. If the engine is flooded, follow this sequence:

1. Turn auxiliary pump OFF
2. Turn ignition switch OFF
3. Set throttle FULL OPEN
4. Set mixture control to IDLE CUT-OFF
5. Engage starter and crank engine for about 10 seconds to clear cylinders of excess fuel.
6. Repeat normal engine starting procedure.

2. Warm Up

Maintain engine speed at approximately 900 to 1000 RPM for at least one minute in warm weather, and as required during cold weather to prevent cavitation in the pressure oil pump, and to assure adequate lubrication.

CAUTION

Do not run engine at the run-up speed unless oil temperature is at least 75 degrees F.

Restrict ground operation to the time necessary for warm-up and testing.

Increase engine speed to 1700 RPM only long enough to perform the following checks:

1. Check Magnetos. Due to design changes in today's higher output engines, the comparison of single magneto operation versus both magnetos is no longer a sound criteria for evaluation of magneto performance. Therefore all magneto checks should be performed on a comparative basis between Right and Left magneto performance.

Move the ignition switch first to "R" position and note engine RPM, then move switch back to "BOTH" position to clear the other set of sparkplugs. Then move the switch to "L" position and note RPM. The difference between the two magnetos operated singly should not differ more than 50 RPM.

If no drop in speed is observed when operating on either magneto alone, switch circuit should be inspected for loose connections.

2. Check throttle and engine tachometer.
   a. Slowly move propeller governor control toward low RPM position and observe affect on tachometer reading. Engine speed should decrease, Return governor control to high speed position.
   b. Slowly advance throttle to wide open position and observe tachometer. Engine speed should approach maximum RPM. Immediately after this check, close throttle to idle position.

CAUTION

Do not operate the engine at a speed in excess of 1500 RPM longer than necessary to test operation and observe engine instruments. Proper cooling of engine depends upon forward speed of the aircraft. Discontinue testing whenever temperature or pressure limits are approached.

3. INSTRUMENT INDICATIONS

(1) Oil Pressure: The oil pressure relief valve will maintain pressure within specified limits if the oil temperature is within the specified limits and if the engine is not excessively worn or dirty. Fluctuating or low pressure may be due to dirty oil passing the valve.

(2) Oil Temperature: The oil cooler and vernatherm control valve will maintain oil temperature within the specified range unless the cooler oil passages or air channels are obstructed, or the vernatherm valve is held open by solid particles in the engine oil. Oil temperature above the prescribed limit may cause a drop in oil pressure, leading to rapid wear of moving parts in the engine.

(3) Cylinder Head Temperature: Any temperature in excess of the specified limit may cause cylinder or piston damage. Cooling of cylinders depends on cylinder baffles being properly positioned on the cylinder heads and barrels, and other joints in the pressure compartment being tight so as to force air between the cylinder fins. Proper cooling also depends on operation practices.

On the Viking aircraft it is very important to see that the rubber sealing strips along the outer edge of the engine baffles are facing up when installing the top cowling, and that the rubber strips on the front of the cowling are over the engine baffles.

(4) Battery Charging: The ammeter should indicate a positive charging rate until the power used for starting has been replaced by the battery charging circuit, unless the electrical load on the generator is heavy enough to require its full output, in which event the ammeter reading should return to the positive side as soon as the load is reduced. A low charge rate is normal after the initial recharging of the battery. A zero reading or negative reading with no battery load indicates a leak or malfunction in the generator or regulator system.

TURBO CHARGER OPERATION

The two Rajay turbo superchargers on your Turbo Super Viking are used to obtain or maintain power at higher altitudes.

Turbo supercharging is done by diverting exhaust gasses through a turbine which in turn drives a turbine in the induction system and compresses the inlet air. Turbocharger operation, though quite simple, contains some new considerations that you should become acquainted with.

The turbines are controlled by a vernier type push-pull control grouped with the other engine controls. The control operates in the same sense as the throttle.

Starting the turbocharged airplane is handled the same way as the normally aspirated airplane except check to be sure the turbo control is fully off before attempting a start, otherwise, the induction system may be damaged. Never use the turbochargers with part throttle.

After the engine is started, and at times when the engine is being operated in the lower part of the r.p.m. range, the low-oil-pressure light may flicker. This is normal.

During climb, when you are unable to obtain your desired manifold pressure with full throttle, advance the turbo control while monotoring manifold pressure. The control is relatively ineffective in the early part of the travel so major movement may be made. The control becomes sensitive in the final inch of travel and the vernier should be used to advance the control. When the control is fully in and all exhaust gasses travel through the turbines, the sound level inside the airplane will be noticeably lower.

The gasses driving the turbines heats the induction air and reduces its density so it is all right to use two inches more manifold pressure during turbocharging than you would in the normally aspirated mode.

Climbs at 75% power or more should be made with full rich mixture unless the engine is rough. Fuel pressure begins to drop off above 15,000 ft. and it may be necessary to boost the pressure with the auxiliary fuel pump.

Leaning is best done with an EGT as the primary reference. Lean until the peak EGT is reached then enrich 125° less, (5 graduations on unmarked indicator) unless EGT manufacturer instructs otherwise. After leaning with the EGT, monitor the cylinder head temperature gage to assure that proper leaning has been accomplished. Without EGT, lean until the engine becomes rough and enrich until smooth operation is regained. Monitor cylinder head temperature.

On power reduction, reduce the turbocharging first. After the turbo control is completely out, do the remaining power reductions with the throttle.

SECTION III

B. ENGINE TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
1. Engine will not start	a. No fuel gauge pressure No fuel to engine	a. Check fuel control for proper position, auxiliary pump ON and operating, feed valves open. Fuel filters open, and tank fuel level.
	b. Have gauge pressure- engine flooded	b. Turn off auxiliary pump and ignition switch, set throttle to FULL OPEN and fuel control to IDLE CUT-OFF, and crank engine to clear cylinders of excess fuel. Repeat starting procedure.
	c. Have gauge pressure- No fuel to engine	c. Check for bent or loose fuel lines. Loosen one line at fuel nozzle if no fuel shows replace fuel manifold valve.
2. Engine starts but fails to keep running.	a. Inadequate fuel to fuel manifold valve	a. Set fuel control in FULL RICH POSITION turn auxiliary pump ON, check to be sure feed lines and fuel filters are not restricted. Clean or replace defective components.
	b. Defective ignition system	b. Check accessible ignition cables and connections. Tighten loose connections. Replace defective spark plugs.
3. Engine runs rough at idle	a. Improper idle mixture adjustment	a. Readjust idle setting. Tighten adjustment screw to lean mixture and back off adjustment screw to richen mixture.
	b. Fouled spark plugs	b. Remove and clean plugs, adjust gaps. Replace defective plugs.
4. Engine has poor acceleration.	a. Idle Mixture too lean	a. Readjust idle mixture as described in 3-a.
	b. Incorrect fuel-air mixture, worn control linkage, or restricted air cleaner.	b. Tighten loose connections, replace worn elements of linkage. Service air cleaner.
	c. Defective ignition system	c. Check accessible cables and connections. Replace defective spark plugs.

B. ENGINE TROUBLE SHOOTING CHART (Cont)

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
5. Engine runs rough at speeds above idle	a. Improper fuel-air mixture	a. Check manifold connections for leaks Tighten loose connections. Check fuel control and linkage for setting and adjustment. Check fuel filters and screens for dirt. Check for proper pump pressure, and replace pump if defective.
	b. Restricted Fuel nozzle	b. Remove and clean all nozzles.
	c. Ignition system and spark plugs defective	c. Clean and regap spark plugs. Check ignition cables for defects. Replace defective components.
6. Engine lacks power, reduction in maximum manifold pressure	a. Incorrectly adjusted throttle control, "sticky" linkage or dirty air cleaner.	a. Check movement of linkage by moving control from idle to full throttle. Make proper adjustments and replace worn components. Service air cleaner.
	b. Defective ignition system	b. Inspect spark plubs for fouled electrodes, heavy carbon deposits, erosion of electrodes, improperly adjusted electrode gaps, and cracked procelains. Test plugs for regular firing under pressure. Replace damaged or misfiring plugs. Spark plug gap to be .015 to .019 inch.
	c. Loose or damaged intake manifolding	c. Inspect entire manifold system for possible leakage at connections. Replace damaged components, tighten all connections and clamps.
	d. Fuel nozzles defective	d. Check for restricted nozzles and lines and clean or replace as necessary.

B. ENGINE TROUBLE SHOOTING CHART (Cont)

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
7. Low fuel pressure	a. Restricted flow to fuel metering valve	a. Check mixture control for full travel. Check for restrictions in fuel filters and lines, adjust controls and clean filters. Replace damaged parts.
	b. Fuel control lever	b. Check operation of throttle control and for possible contact with cooling shroud. Adjust as required to obtain correct operation.
	c. Incorrect fuel injector pump adjustment and operation.	c. Check and adjust using appropriate equipment. Replace defective pumps.
	d. Defective fuel injector pump relief valve	d. Replace pump
8. High fuel pressure	a. Restricted flow beyond fuel control assembly	a. Check for restricted fuel nozzles or fuel manifold valve. Clean or replace nozzles. Replace defective fuel manifold valve.
	b. Defective relief valve operation if fuel injector	b. Replace fuel injector pump
	c. Restricted re-circulation passage in fuel injector pump	c. Replace pump
9. Fluctuating fuel pressure	a. Vapor in fuel system, excess fuel temperature	a. Normally operating the auxiliary pump will clear system. Operate auxilairy pump and purge system
	b. Fuel gauge line leak or fuel in gauge line	b. Drain gauge line and tighten connections.
	c. Restriction in vapor separator vent	c. Check for restriction in ejector jet of vapor separator conver. Clean jet with solvent (only) Do not use wire as probe. Replace defective parts

B. ENGINE TROUBLE SHOOTING CHART (Cont)

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
10. Low oil pressure on engine gauge	a. Insuffucient oil in oil sump, oil dilution or using improper grade oil for prevailing ambient temperature	a. Add oil, or change oil to proper viscosity
	b. High oil temperature	b. Defective vernatherm valve in oil cooler; oil cooler restriction. Replace valve or clean oil cooler.
	c. Leaking, damaged or loose oil line connections- Restricted screen or filter	c. Check for restricted lines and loose connections, and for partially plugged oil filter or screens. Clean parts, tighten connections, and replace defective parts.
11. Poor engine idle cut-off	a. Engine getting fuel	a. Check fuel control for being in full IDLE CUT-OFF position. Check auxiliary pump for being OFF. Check for leaking fuel manifold valve. Replace components.

ENGINE AIR FILTER:

TYPE: AC Spark Plug No. AAF104

SERVICE BY REPLACEMENT ONLY!

This filter is treated with a special wetting agent which is necessary for maximum filter efficiency. To maintain engine protection, do not wash or re-use the filter.

REPLACE WHEN ANY OF THESE CONDITIONS OCCUR:

1. 50% of surface covered by foreign material.
2. 300 hours of engine operation.
3. Filter has been in use 12 months.

Model 17-30A Aircraft, serials 30263 thru 30445, were originally equipped with AC Spark Plug No. A48C Engine Air Filter. No. A48C and No. AAF104 Air Filters are interchangeable.

C. ENGINE REMOVAL

Remove the propeller, the top and bottom engine cowl and drain the oil from the engine crankcase.

Disconnect the following.

a. Tachometer cable
b. Oil temperature wires from sender unit
c. Oil pressure line.
d. Fuel pressure lines
e. Mainfold pressure line
f. Cylinder head temperature wire from sender unit
g. Electrical cannon plug on the firewall (left side)
h. Generator wires from generator
i. Main fuel line from fuel pump
j. Vacumn pump line
k. Hydraulic pump lines from firewall
l. Throttle control
m. Propeller governor control
n. Mixture control
o. Starter cable from starter
p. Ground cable from starter
q. Magneto wires

Attach a suitable hoist to the engine lifting eye. Remove the four engine mount bolts from the engine mount, raise the engine straight up from the mount. Check continously while hoisting the engine to make sure there are no cables, wires, or hoses hanging, and to see that no lines were left connected.

D. PROPELLER REMOVAL

a. Remove the spinner
b. Remove the six nuts from the back of the engine crankshaft flange, propeller must be worked forward from time to time to provide clearance for the nuts as they are loosened.
c. After all the nuts are off the bolts the propeller should be worked of the crankshaft. When the propeller comes off the flange there will be a small amount of oil come out of the end of the crankshaft, provision should be made to keep this oil off the air cleaner.

E. ENGINE INSTALLLATION

Hoist engine directly above engine mount and lower carefully into place. Make sure alignment pins on mount rubbers are in the alignment holes on the engine mount, and that the spacers are between the mount rubbers. The barrel nuts which are located in the engine mount legs should be aligned with the holes. Lower engine to set on mount rubbers, align holes and insert bolts.

Attach all lines, hoses and wires, check all lines for leaks. Check fuel system for leaks by running the fuel boost pump for ten seconds and observing all fuel fittings for leaks.

E. ENGINE INSTALLATION (contd)

Check all engine controls to see that they work smoothly and have full travel from stop to stop.

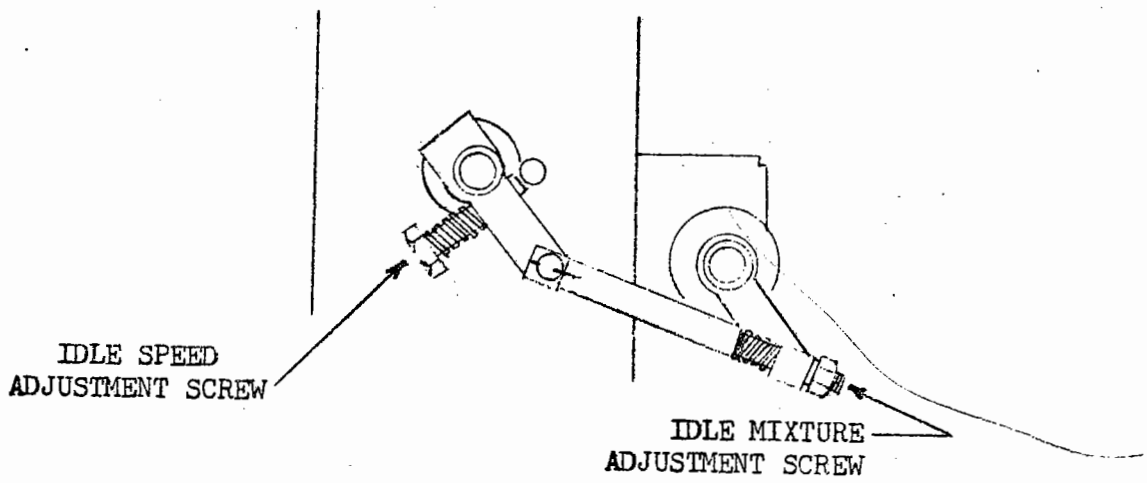
F. PROPELLER INSTALLATION

1. Clean and check mating surfaces of the propeller hub flange and the engine crankshaft flange.
2. Install the "O" ring seal in the propeller hub and lubricate liberally with clean lubricating oil.
3. Line up the dowel pins in the propeller hub with the holes in the crankshaft flange, engage the crankshaft pilot in the propeller hub and push the hub straight back until the studs in the propeller hub engage the holes in the crankshaft flange. When the studs protrude through the crankshaft flange far enough, install the washers and nuts.
4. Avoid twisting and shaking of the propeller as much as possible as damage to the "O" ring could result and cause an oil leak.

G. ADJUSTMENTS

1. Mixture

The idle mixture adjustment is the locnut at the metering valve end of the linkage between the metering valve and the air throttle levers. Tightening the nut to shorten the linkage provides a richer mixture. A leaner mixture is obtained by backing off the nut to lengthen the linkage. Adjust to obtain a slight and momentary gain in idle speed as the mixture control is slowly moved toward idle cut-off. (If set too lean, idle speed will drop under the same conditions.) See illustration below for adjustment locations.



G. ADJUSTMENTS (cont)

2. Idle

Set engine to idle at 500 to 550 RPM.

3. Fuel Pressure

Fuel pressure adjustment is made by turning the screw in to increase fuel pressure and out to decrease fuel pressure. See drawing ~~below~~ to locate screw. Pressure should be adjusted to a minimum of $1\frac{1}{2}$ - 2 pounds at idle speed.

ON PAGE 23b

BELLANCA Aircraft Corporation

Engine Accessories for Models 3A and 17-30

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY.	USABLE NO CODE
41— 1	5M 2708	Vacuum Pump	1	
— 2	Model 1235 HBG	Hydraulic Pump	1	
— 3	350-5-0136	(17-30) or 350-5-0110 (3A) Flex. Hose	1	
— 4	601000-6D-0115	Flex. Hose	1	
— 5	306-3 (17-30)	or 350-3-0100 (3A) Manifold Press. Hose	1	
— 6	350-3-0100 (3A)	or 350-3-0130 (17-30) Flex. Hose	1	
— 7	191305-4	Manifold Press. Tube (12½" Long) (3A Only)	1	
— 8	198008-62	Drain Tube	1	
— 9	601000-4-0205	(17-30) or 601001-4-0200 Flex. Hose	1	
—10	191305-40	Engine Ground Cable	1	
—11	191305-27	Vent Tube (27" Long)	1	
—12	601000-4-0324	Flex. Hose	1	
—13	601000-8-0153	(17-30) or 601002-6D-0113 (3A) Flex. Hose	1	
—14	191305-39	Flex. Air Duct	1	
—15	191305-36 (3A)	Flex. Air Duct	1	
	or CAT-6	(1½ O.D.) Flex. Air Duct (17-30)		

SECTION IV

STRUCTURE

CONTENTS

SECTION IV

STRUCTURE

A. GENERAL

The fuselage, vertical fin, rudder, horizontal stabilizer and elevators are constructed of 4130 chrome alloy steel tubing, covered with dacron fabric and finished with butyrate dope.

The wings, flaps and ailerons are constructed of Sitka spruce and mahogany plywood and covered with dacron fabric and finished with butyrate dope.

Repairs to the airframe should be done in accordance with Manual 18 and AC 43:13-1.

Removal of fuel cells in the wing for purpose of repairs is accomplished as follows: On the standard 60 gallon system a removeable plywood panel secured with wood screws is located over the top of each wing tank. The outline of this panel can be seen on the fabric surface of each wing, a strip of fabric approximately 2 inches wide should be removed from around this line. One inch on either side of the line, removal of this fabric will expose the location of these screws which are slightly counter sunk into the wood filler. Remove this wood filler and then the wood screws. Disconnect all fuel lines, two large lines at the bottom of the tank and one small line at the top center of the tank, disconnect the fuel gauge wires and pull out the wood filler strips located around the front and back of the tank. It may be necessary to remove the reducer plug located at the top of the tank on the inboard side to clear the butt rib. Lift the tank straight up out of the wing. Only Heli Arc welded repairs are recommended. Leaks may be located by sealing all openings, pressurizing the tank to $2\frac{1}{2}$ pounds per square inch and using a soap solution in the suspected areas. After repair tanks should be rechecked before installing.

CAUTION

Tanks should be thoroughly cleaned before any repairs are made.

When installing tanks be sure rubber pads are securely cemented to tank mounts and the wood filler strips are located around the tank to hold it securely in position.

When installing the tank cover the rubber seal around the filler opening is to be cemented thoroughly all around with a fuel impervious cement to prevent excess fuel or spillage from seeping inside the wing.

After screwing tank cover down and filling holes with wood filler, and sanding smooth the 2 inch wide strip, at least 3 inch tape should be used for proper overlap, doped and finished.

The 92 gallon or 72 gallon fuel system requires removal of a larger portion of the wing skin. This is not a removable panel such as used on the inboard tanks, and if removal of any of these tanks is necessary it is recommended that the factory be contacted for drawings and blue prints to accomplish this.

When installing inspection plates that are secured with screws, care must be exercised to not tighten the screws to the point of stripping them out of the wood. Should this happen it is best to repair the hole by cemented a wood plug in the hole and after the glue has dried to replace the original size screw, rather than replacing the screw with the next larger size.

B. REMOVAL OF WINGS

Place aircraft on jacks or stands located on the jack pads as shown in Fig. 2, Section II. This should be done first before removing any plates, lines or fittings. Next lock the nose gear retracting links with C clamps in the down position. (See illustration Fig. 1, Section IV)

Remove both front seats, rear seat and front floorboards. Disconnect the hydraulic lines from the power pack located under the front seats. These four lines lead out to the main gear retract cylinders. Disconnect the ailerion balance cable and the aileron torque tube at the bellcrank located under the rear seat at the right and left side of the fuselage. All electrical wiring should be disconnected at the splices (remove battery from aircraft before disconnecting an electrical wiring). Disconnect pitot tube hoses and air intake hoses, brake lines and flap cables. It is necessary to remove the flaps to have access to the flap cable pulley, which must also be removed. This pulley is located in the wing at the inboard end of each flap bay.

All fuel lines must be disconnected. Access to these lines is obtained by removing the lower wing bands. There is one line at the top of each fuel cell that is best removed after the wing bolts are removed and the wing pulled away from the fuselage 3 to 4 inches as this makes it much more accessible.

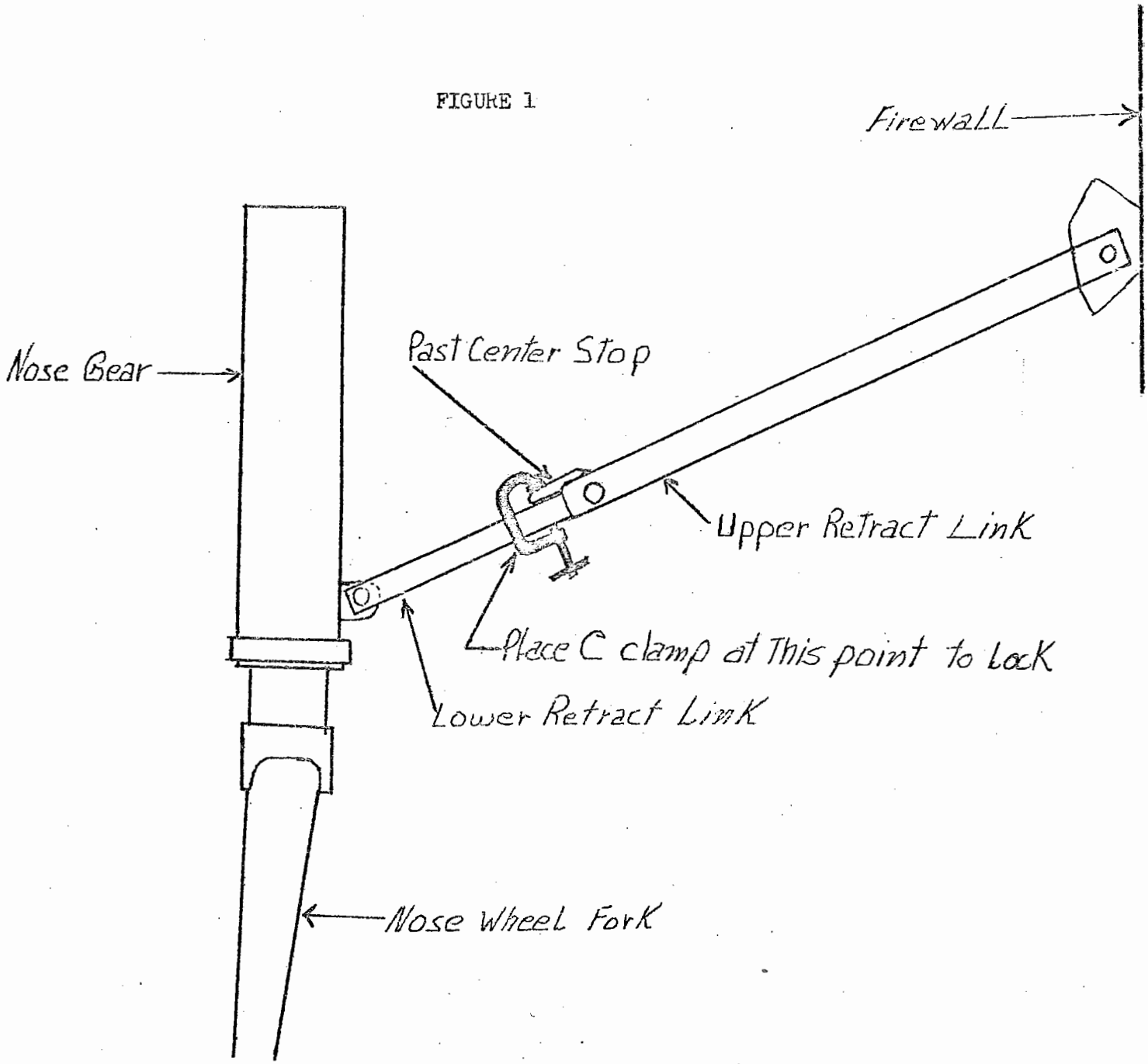
When wing bolts are removed a man should be at the leading and trailing edge on the butt end of each wing and one man on the tip end to hold and steady the wing. It is possible to leave the main gear in a down position and use the wheel itself to carry the weight of the butt end of the wing and to help make it easier to move. This makes it possible for two men to handle the wing very easily. Wings should be placed on wooden horses or pads to prevent damage.

C. REMOVAL OF TAIL SURFACES

Remove inspection plates located on the vertical fin and on the bottom of the fuselage. Through the access plate in the bottom of the fuselage remove the strut nuts on each strut and directly above the strut fittings there are two bolts securing the leading edge of the horizontal stabilizer to the fuselage. Remove these bolts, two to each stabilizer. Through the access plates located in the vertical fin there are three bolts securing the trailing edge of the horizontal stabilizers. Two of these bolts are $\frac{1}{4}$" in diameter and the third is 3/16" diameter clevis bolts.

Remove the bolts holding the trim mechanism acuating arm to the trim mechanism. Remove stabilizer and elevators in one unit by pulling outward on the stabilizer, making sure not to bend the stabilizer struts.

FIGURE 1



Place "C" clamp as shown above to lock nose gear when wings are removed from aircraft.

As soon as the stabilizer is free from the fuselage a brace should be installed from the leading edge of the stabilizer to the stabilizer lift strut to hold the strut in its original position to prevent damage to the strut.

The trim tab is removable from the elevator by pulling the hinge pin. This pin runs through all three hinge points, the inboard end of the pin is drilled and tapped for a $\frac{1}{2}$ x 24 screw. A screw or bolt of this size is screwed into the end of this hinge pin and is used as a point to pull from. As the pin is removed the tab should be held to prevent it from bending the hinge points.

For all control surface movements refer to Section I under Leading Particulars and Principal dimensions.

D. REMOVAL OF FLAPS AND AILERONS

The flaps are removed by disconnecting the flap actuating cable from the flap arm, then remove all three hinge pivot bolts, holding the flap securely. When all three bolts are out, work the flap downward to release the tension on the flap retract spring and then disconnect the spring from the eye bolt on the flap.

When removing or installing the flaps be sure and inspect the inboard flap pivot fitting for looseness where it is bolted on to the flap and also check the inboard flap pivot fitting that is attached to the wings for looseness or a bent condition.

Removal of the ailerons requires a patch of fabric to be removed from the inboard top end of the aileron to gain access to the bolt which the aileron actuating arm pivots on. The three hinge bolts are accessable from the bottom of the aileron by removing the small inspection plates on the bottom of the ailerons.

E. INSTALLATION ON WINGS AND SURFACES

Installation of the wings is a reversal of the procedures for the removal, however, a few precautions should be observed.

The wings should be aligned very carefully and all lines and wires that enter the fuselage should be inserted in their respective positions as the wing is mated to the fuselage.

The line that fits at the top of the wing tank should be secured as soon as the wing is close enough to the fuselage.

The spar fittings should be aligned perfectly with the center section wing fittings before the wing bolts are inserted, if it takes too much force to make the bolts enter the holes, recheck for alignment. Do not force the bolts, to do so may peel some of the metal from the aluminum spar straps causing a loose fit on the bolts. After the bolts are installed, the nuts are put on and run up flush with the spar straps and tightened just to the next castellation which will align with the key hole in the bolt. Do not tighten beyond this point as the four wing bolts serve only as pins.

Installation of flaps and ailerons is the reverse procedure of removal. Check and make sure all bushings in the hinge pivot points are in their place.

SECTION V

LANDING GEAR AND BRAKE SYSTEM

A. GENERAL

B. REMOVAL OF LANDING GEARS
   1. Main Gears
   2. Nose Gear

C. REASSEMBLY AND INSTALLATION OF LANDING GEARS
   1. Main Gears
   2. Nose Gears

D. BRAKE AND WHEEL MAINTENANCE

E. LANDING GEAR RIGGING PROCEDURE
   1. Nose Gear Adjustment
   2. Bleeding Procedure

A. GENERAL

The landing gears on the Bellanca 17-30 Viking are hydraulic operated and have spring-oil type oleos. Gear parts are heat treated and should not be welded or repaired unless equipment for reheat treating is available along with trained personnel to do the job.

B. REMOVAL OF LANDING GEARS

1. Main Gears

Place aircraft on jacks as shown in Figure 2, Section II. Remove wheels, disconnect scissors from upper and lower gear legs. Piston and plunger rod are removed by taking nut off of the upper end of the upper gear leg.

Remove the long pivot bolt at the top of the upper gear leg by sliding outboard through the small clearance hole, then remove upper leg from wheel well, being very careful not to damage the micro switches located in the wheel well.

2. Nose Gear

Remove engine cowl, disconnect hydraulic cylinder shaft from nose gear and disconnect steering rods, Then remove pivot bolt at top of nose gear and remove nose gear from engine mount arms. Disconnect scissors and remove nut on the top of nose gear upper leg to separate top and lower gear legs.

C. REASSEMBLY AND INSTALLATION OF GEARS

1. Main Gears are reassembled by reversing procedure outlined in Part B. Gears should be completely serviced as outlined in Section II of this manual. Extreme care should be taken not to damage micro switches.
2. Nose gear reassembly is the reverse of Part C. The fibre steering collar insert should be lightly oiled and not tightened to the point of binding.

D. BRAKE AND WHEEL MAINTENANCE

1. Instroduction

2. Tire Maintenance

3. Overhaul of Wheels

4. Overhaul of Brake Assembly

BELLANCA AIRCRAFT CORPORATION
Post Office Box 624
Alexandria, Minnesota 56308

GROSS WEIGHT: 3325 lbs.

MODEL: 17-30A
MODEL: 17-31A
MODEL: 17-31ATC

OLEO SHOCK STRUTS

An "O" ring seal retains the fluid and air in the landing gear struts. If the struts fail to hold air pressure or show seepage of fluid, the "O" ring must be replaced. This "O" ring is an AN6227B31.

MAIN GEAR:
The "O" ring on the Main Gear can be replaced by releasing all air pressure, removing one bolt from the nutcracker, and pulling the lower barrel assembly straight down, clear of the upper trunion. A new "O" ring can then be installed. The fluid should be dumped and replaced with 14 fluid ounces of MIL-H-5606A-AM2 Hydraulic Fluid. Reassemble the strut in the reverse order of disassembly steps. Add air pressure to 35 lbs. per square inch with the strut fully extended. The Hydraulic fluid may be added after reassembly, by removing the air inflation valve and adding the fluid through this port, if you think this method to be easier.

NOSE GEAR:
The "O" ring on the Nose Gear can be replaced by releasing all air pressure, removing one bolt from the nutcracker, removing the snap ring at the "O" ring gland, and pulling the lower barrel assembly straight down, clear of the upper trunion. The upper collar must then be removed from the lower barrel to free the "O" ring gland by driving out the 3 retaining pins (from the inside out) which secure the collar. With the collar removed you can remove the gland and replace the "O" ring. CAUTION: On reassembly of these components, care must be taken to assure a smooth surface at the retaining pin holes so the new "O" ring will not be cut on reinstallation of the gland. When the retaining pins are reinstalled, they should be staked in 3 places. Later versions have this upper collar attached with a snap ring, which eliminates the three pins. Check to see that snap ring is securely in place. The fluid should be dumped and replaced with fifteen (15) fluid ounces of fresh MIL-H-5606A-AM2 Hydraulic Fluid. Reassemble the strut in the reverse order of disassembly steps. Add air pressure to 60 lbs. per square inch with the strut fully extended. Here again, the hydraulic fluid may be added after reassembly, if you prefer this method.

There is also an external (AN6230B5) O-ring on the lower bushing of the upper leg. If this external bushing is leaking, the bushing can be removed, and the O-ring replaced. Be sure to thoroughly oil the inside of the upper leg, the O-ring, and the bushing with hydraulic fluid before pressfitting the bushing back in place.

If a strut is losing air pressure and neither the O-rings on the lower bushing, nor the inflation valve are at fault, this indicates it could be the AN6227B7 O-ring on the top of the inner oleo piston where it attaches to the plug in the top of the upper leg. When replacing this O-ring coat the O-ring with a small amount of Sealube, or equivalent compound, and place the O-ring on top of the piston before positioning piston into upper leg. Put a little Sealube under AN960-716 washer before installing washer and stop-nut. Hold piston firmly by machined flats when tightening nut so that piston does not turn, thereby twisting or damaging the O-ring.

cont'd on Reverse

BRAKE ACTUATING CYLINDERS

Bleed out air from these cylinders before refilling the master cylinder with fluid.

BRAKE MASTER CYLINDERS

The reservoir, located in the passenger compartment at the rudder pedals, must be kept full. Use Texaco Hydraulic Fluid MIL-H-5606A-AM2, or equivalent petroleum-base hydraulic fluid. Do not use fluid with a castor oil base.

BELLANCA AIRCRAFT CORPORATION
Box 624 Municipal Airport
Alexandria, Minnesota 56308

MAINTENANCE PROCEDURE

FOR

40-75E/30-52M

CLEVELAND AIRCRAFT PRODUCTS

WHEEL AND BRAKE ASSEMBLIES

USED ON BELLANCA AIRCRAFT, VIKING MODELS

I. Cleaning and Inspection of Main Wheel Assembly

1. Degrease all parts and dry thoroughly. A soft bristle brush may be used to remove hardened grease, dust or dirt.

WARNING

DRY-CLEANING SOLUTIONS ARE TOXIC AND VOLATILE. USE IN A WELL-VENTILATED AREA. AVOID CONTACT WITH SKIN OR CLOTHING. DO NOT INHALE VAPORS.

2. Visually inspect bearing cones for nicks, scratches, water staining, spalling, heat discoloration, roller wear, cage damage, cracks or distortion. Replace if defective or worn.
3. Inspect wheel bearing grease for contamination and solidification at each periodic maintenance inspection. Do not exceed 500 wheel miles between repacking intervals. Repack wheel bearings with Mobil Bearing Grease (Mobilgrease 77 or Mobilus EP2) or equivalent.
4. Inspect wheel halves for cracks, corrosion, and other damage. Cracked or badly corroded castings should be replaced. Small nicks, scratches, or pits can be blended out using fine (400 grit) sandpaper.
5. Inspect snap rings and grease seals for distortion or wear. Replace if damaged or deformed. Saturate grease seal felts with SAE10 oil (do not soak).
6. Inspect bearing cups for looseness, scratches, pitting, corrosion, or evidence of overheating. If evidence of any defect exists, replace cup as explained in Replacement of Bearing Cup Procedures. Coat cups with clean bearing grease.

(Cont'd)

7. Inspect brake disc assembly for cracks, exessive wear, or scoring, rust and corrosion. Remove rust and blend out small nicks, using Fine (400 grit) sandpaper. Brake disc assembly should be replaced when flange thickness wears to .328 inch.
8. Inspect wheel bolts for cracks, corrosion or other damage. Replace cracked bolts.
9. Inspect self-locking nuts for self-locking feature. Replace if self-locking feature is damaged or destroyed.

II. Replacement of Bearing Cups (See Figure 4-21)

1. Heat wheel half (9 or 14) in boiling water for one hour, or in an oven not exceeding 250° F for 30 minutes.
2. Remove wheel half from source of heat. Bearing cup should be loose enough to fall out of bearing bore when inverted. If cup does not drop out, tap evenly from bore with a fiber drift pin.
3. After cup has been removed, repeat Step #1. Chill bearing cup in dry ice.
4. Remove wheel half from source of heat and bearing cup from dry ice.
5. Dry chilled bearing cup and coat contacting surfaces with zinc chromate primer.
6. Install chilled bearing cup in heated wheel half. Tap gently and evenly into place, using a fiber drift pin or suitable arbor press.

III. Repainting of Main Wheel Repaired Surfaces

1. Thoroughly clean repaired surfaces and areas of the wheel from which paint has been removed.
2. Paint exposed areas with one coat or primer and one coat of aluminum lacquer.

CAUTION

NEVER PAINT WORKING SURFACES OF BEARING CUPS.

I. Cleaning and Inspection of Brake Assembly

1. Clean all metal parts, insulators, and o-rings with denatured alcohol (gasoline and dry cleaning fluids will damage o-rings). If o-rings are damaged or worn excessively, they should be replaced.
2. Inspect brake cylinder for cracks, nicks, corrosion, damaged threads, etc. Inspect inlet and outlet hydraulic ports for foreign contaminates. Examine cylinder walls for scoring or excessive wear. Blend and polish light scratches in piston cavities with fine emery cloth (600 grit). Castings that are cracked or have damaged threads should be replaced.
3. Inspect anchor bolts for cracks, corrosion, permanent set,and excessive wear. Replace bolts that are bent, cracked or severely corroded.
4. Inspect pistons for cracks, nicks, burrs, or excessive wear. Remove burrs and blend out nicks, using fine emery cloth (600 grit), and clean thoroughly.
5. Inspect pressure plate assembly for cracks, damaged rivets and excessive warpage. Replace if cracked or severly deformed. Replace cracked or deformed rivets.
6. Inspect brake cylinder bolts for cracks, thread damaged, and self-locking feature. Replace bolts that are cracked, bent or have damaged threads.
7. Inspect brake linings for excessive edge chipping and surface deterioration. Linings should be replaced when worn to a thickness or .080 inch. Worn linings may be easily removed by drilling out rivets, using a 5/32 drill. Install new linings in place, using 105-00200 rivets.

(Cont'd)

8. Inspect torque plate for cracks, nicks, burrs, rust, excessive wear and brinelling in bolt holes. Replace if cracked or severely deformed.

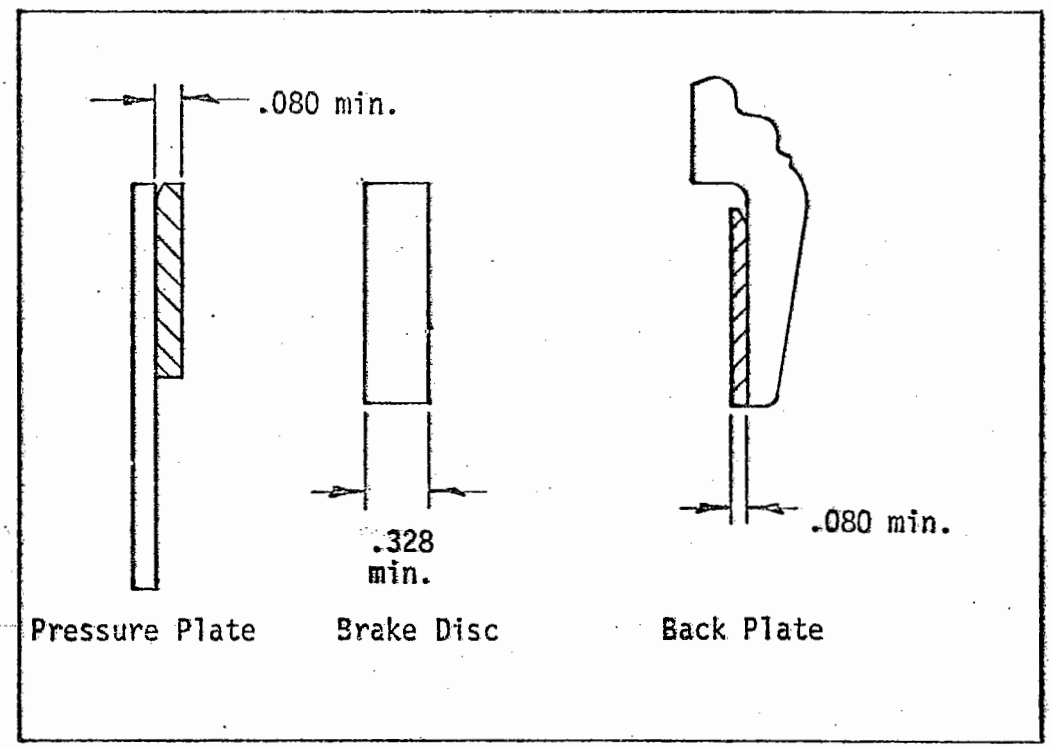
II. Repainting of brake assembly

1. Thoroughly clean repaired surfaces and areas of the brake assembly from which paint has been removed.
2. Paint exposed areas with one coat of primer and one coat of aluminum lacquer.

CAUTION

DO NOT PAINT PISTONS OR THE PISTON BORES IN THE BRAKE CYLINDER.

III. Recommended Wear Limits for Disc and Linings



E. LANDING GEAR RIGGING PROCEDURE

1. Nose Gear Adjustment

Disconnect nose gear steering rods from nose gear and set nose gear and rudder on the center line of fuselage. Tape a bar or stick across all 4 rudder pedals, then adjust nose gear steering rods to fit nose gear, checking to be sure the nose gear wheel is still aligned with the center line. If this checks, insert bolts back in steering rods.

Check rudder for alignment and rudder pedals for alignment. If rudder or rudder pedals do not line up, adjustments on the rudder cable turnbuckles may be made.

2. Bleeding Procedure

Place aircraft on jacks, remove top cowl and remove plug from the firewall reservoir. Raise both front seats and remove the center cover between the seats, then remove the 1/8" plug located on the top of the power pack cover. Use two wrenches, one to hold the base plug and one to remove the 1/8" pipe plug. Loosen the hydraulic line fitting running from the firewall reservoir to the firewall (this should be loosened at the firewall and not at the reservoir), and service the hydraulic power pack located under the front seat, by filling the firewall reservoir. The 1/8" plug on the top of the hydraulic power pack should be removed to ascertain when the power pack is full with fluid being run through the firewall reservoir until it comes out the top of the hydraulic power pack. Insert the 1/8" plug and fill the firewall reservoir to the mark indicated on the side of the reservoir. The line that was loosened previously should now be tightened and the reservoir plug reinstalled.

With the gear lever in the neutral position and the gear in the down and locked position, loosen the down line connection on all cylinders. Place the gear selector handle in the up position and slowly pump the emergency gear handle several times until air is expelled from the cylinders, and then tighten all lines.

Now raise the gear to the full up and locked position with the hand pump until the selector handle returns to the neutral position. With the gear in the up position loosen the up lines at the hydraulic cylinders. The weight of the gear coming down will expell the air from the cylinders. Pump the gear handle slowly several times, as this will expell the air from the lines themselves. After taking each gear through this cycle tighten each line as a gear is bled. To check the gear to be sure that all lines and cylinders are free from air, put the gear in the up position and obtain a red light on the gear indicator. Then apply down pressure to the nose gear by pulling down on the gear. If the gear is solid and does not come down any, the system is usually free of air. If the nose gear can be pulled down any, the system has not been purged of all the air and it will be necessary to repeat the above bleeding procedure. After the gear is bled and is satisfactory, then check the firewall reservoir and power pack and if fluid level is low, service as previously mentioned.

If landing gears bleed down in flight, place aircraft on the jacks and remove the up gear lines completely from the hydraulic cylinders. Then place gear handle in the down position and pump the gear handle until the gear selector handle returns to the neutral position or fluid comes from a cylinder or one of the lines. If fluid comes from a cylinder, this indicates an internal O ring is out in the cylinder. If fluid comes from a line, this indicates an O ring seal is out in the hydraulic power pack itself, and the power pack should be replaced. The seal on the power pack lid should not be broken or removed as to do so will void the warranty on the power pack.

ELECTRIC-HYDRAULIC LANDING GEAR

Bellanca airplanes (S/N 30123 thru 30230 Model 17-30), (S/N 32-1 thru 32-13 Model 17-31) and (S/N 31001 thru 31003 Model 17-31TC) have an electric-hydraulic system for landing gear operation. This system consists of an electric motor driving a hydraulic pump and three landing retraction cylinders. The pump and motor are combined with a reservoir to form a power pack. A lever switch on the instrument panel controls the operation of the power pack. Limit switches control the limits of the gear travel. These switches are connected in parallel so that all switches must be actuated before an indication is given that the gear is in its proper position.

When the panel lever is placed in the up position, the motor starts to force fluid to the up side of all the landing gear cylinders. (Since all the lines are connected together, the gear with the least resistance will retract first.) As the gears come up, they will depress their respective limit switches. When all three switches are depressed the motor will stop and the red "All Unlocked" light will go off. The pump is internally valved to maintain the up pressure. If a cylinder is leaking (internally or externally) the motor will restart as soon as any gear opens a limit switch. If the limit switches are not properly adjusted the motor may fail to stop and cause the circuit breaker to open or the gears may not be snug in the wheel wells after retraction. For a condition where the gear is not snug in the wheel well, pull on each wheel with the gear in the up position, to determine which limit switch needs adjusting. If the motor fails to start when the wheel is given a sharp pull, the limit switch needs adjusting. In the case of the motor failing to stop, readjust each limit switch starting with the nose wheel until the motor operates properly. Care should be taken not to adjust the gear too snug, as a steep turn in flight will cause the motor to operate.

Gear down operation differs from gear up in that the pump is not internally valved to maintain down pressure. To maintain down pressure, the system is provided with a check valve and a solenoid valve. The solenoid valve must operate to retract the gear. If the solenoid valve fails to function the down pressure is maintained and the gear cannot retract. The down limit switch should be adjusted to start the motor if the retraction strut breaks over center. This over center adjustment should be 1/16 inches. Over center travel can be measured by stretching a string between the centerline of the pivot bolts.

Electric hydraulic gear retraction and extension on Model 17-30 (S/N 30241 thru 30262), Model 17-31 (S/N 32-14), Model 17-30A (S/N 30263 thru 30324), Model 17-31A (32-15 thru 32-34), Model 17-31ATC (S/N 31004 thru 31012) works and is rigged similar to the serials previously described except there is no hydraulic down lock but overcenter travel was increased to .25". This system has greater operating reliability and gear down switch rigging does not have to be as precise as the previous system. The feature is retained that if the contacts are opened on any of the three down limit switches, the motor is energized and the gear is pumped down. Because of the lack of down pressure, caution should be exercised not to bump the retraction link over center when the airplane power is off. A third system, now in use, and similar to the second system, uses a hydraulically operated pressure switch to end the up cycle. This system completely eliminates up rigging of the gear retraction.

Emergency extension of the landing gear is provided by a dump valve which relieves the pressure from the up side back to the reservoir. No bleeding of the system

is necessary after using the emergency extension.

Should a leak develop at a cylinder causing a loss of fluid to a point affecting gear operation, the system should be bled. Fluid can be checked or added to the reservoir by removing the screw at the forward right corner of the reservoir. Do not remove the screw labeled "vent" that is adjacent to, but higher than, the filler screw. A plastic squeeze bottle with a short hose works very well to add fluid.

Most Bellanca models with the electric-hydraulic retraction feature "auto-axtion" automatic gear extension which will lower the gear for landing if the pilot fails to do so.

The automatic gear extend system consists of a pressure switch connected to the pitot system. When speed falls below a predetermined amount (95 to 115 mph, depending on serial) and the gear switch has not been moved to the down position, the pressure switch will energize the gear extend system and extend the gear automatically. If the automatic mode has been used, the red "unlocked-all" light will remain on when the gear is down and locked, as a warning that the gear switch is not in the proper position. This light will also come on when airspeed is below the automatic extend speed if the gear motor circuit breaker has popped, and shows that automatic action was called for. The automatic extend cannot occur; however, unless power is supplied to the motor. Position of this circuit breaker and unusual indicator light patterns should be a part of the routine cockpit check.

Means has been provided to override the automatic system so the gear can be retracted after take off at speeds below the automatic extend speed. Earlier serials feature a momentary "on" button located below the gear switch. When the button is held in, the system is being overridden. On later serials, the automatic system is overridden when the throttle is in the full open position.

A safety "squat" switch was also installed, beginning with serials 30281, 32-31, and 31008. This switch is located on the right main gear and will prevent operation of the retraction system until the weight is off of the gear and the gear is fully extended. This serves to prevent inadvertent gear retraction on the ground.

HYDRAULIC SYSTEM OPERATION

Retraction

When the landing gear switch is operated to select "up", the electric-hydraulic power pack (hereafter, "pack") motor is energized. Concurrently, solenoid valve HH20302 is energized to open and allows fluid in the "down" side of the system to return to reservoir. After the landing gear retracts and all three up limit switches have been contacted, the motor circuit is interupted and the pump stops. A zero leakage valve within the pack traps the fluid when the pump stops. The gear is locked in the up position by this trapped fluid.

For retraction to occur, the auto-action override button must be held down, or an airspeed of approximately 100 MPH must be attained.

Extension

Emergency When the dump valve is opened (lever moved down), fluid in the up side is allowed to return to the reservoir.

Normal When landing gear extension is selected with the landing gear switch, the electric-hydraulic pack motor is energized to rotate in the opposite direction used for retraction (green wire to motor). The fluid passes from the pump through a one-way valve (Model B-101), and on to the cylinders. After the landing gear extends and all 3 down limit switches have been contacted, the motor circuit is interupted and the pump stops. The fluid is trapped by the one-way valve, model B-101, and solenoid valve HH20302, and locks the gear down.

Automatic When airspeed is reduced to approximately a range of 90 to 100 MPH the gear will extend automatically regardless of the position of the gear switch. After gear is down, the red light will remain on until the gear selector is in the down position. The auto-action operates the regular extend system automatically. This means that operation is electrically; therefore, auto-action will not work if the circuit breaker is out or the master switch is off.

Miscellaneous

The manifold on the bottom of the pack distributes the fluid. There is a pattern of 3 ports in the bottom of the aluminum manifold block. This is an unsymmetrical pattern. The center port supplies down pressure, the end one nearest it supplies up pressure, and the third one is to reservoir.

The power pack is located just aft of the front carry-through spar, about the center of the cabin. The pack can be serviced by removing the panel under the right front seat. The reservoir should be serviced with clean MIL-H-5606A hydraulic oil.

* Unless converted per Service Letter #65 in which case treat as higher serial (30241 through 30324).

Trouble Shooting

Trouble	Could be
Gear will not retract (Motor won't run).	Defective override switch. Relay not operating. Bad motor. Up limit switch failed.
Gear will not retract (Motor tries to run but stalls).	Excess pressure in down side of system caused by thermal expansion of fluid (relieve by loosening any fitting). Solenoid valve not energizing.
Gear retracts but circuit breaker pops.	Up limit switch rigged to far from stop.
Gear will retract but red light flashes in turbulence.	Up limit switch rigged to close to stop.
Gear will retract but red light flashes occasionally.	Leak - Could be external (visible), or internal. Check cylinders first. Leak in dump valve. Leak in plumbing. Internal leak in pack.

HYDRAULIC SYSTEM OPERATION

Retraction

When the landing gear switch is operated, to select "up", the electric-hydraulic power pack (hereafter, "pack") motor is energized (blue wire to motor). Concurrently, the solenoid valve (HH 20402) is energized to close, blocking the fluid passage to the reservoir. The landing gear retracts and when all three up limit switches are contacted, the motor circuit is interupted and the pump stops. Pressure is trapped in the system and locks the gear in the up position. This pressure also holds the solenoid valve closed (since there is now no electrical energy applied). At least 600 PSI is required to keep this valve closed.

Extension

Emergency When the dump valve is opened (lever moved down), fluid in the up side is allowed to return to the reservoir.

Normal When landing gear extension is selected with the switch, the pack motor (green wire) is energized to rotate the motor in the opposite direction. Fluid from the pump forces the piston in shuttle valve (A255) past the center port of the valve and fluid flows to the cylinders. After all three down limit switches have been contacted the motor circuit is opened and the pump stops. The piston in the shuttle valve A255 returns to its original position and ports the fluid in the extension side to the reservoir; therefore, there is no down hydraulic pressure.

Automatic When airspeed is reduced to approximately a range of 105 to 120 MPH the gear will extend automatically regardless of the position of the gear switch. After gear is down, the red light will remain on until the gear selector is in the down position. The auto-action operates the regular extend system automatically. This means that operation is electrically; therefore, auto-action will not work if the circuit breaker is out or the master switch is off.

Miscellaneous

The manifold on the bottom of the pack distributes the fluid. There is a pattern of 3 ports in the bottom of the aluminum manifold block. This is an unsymmetrical pattern. The center port supplies down pressure, the end one nearest it supplies up pressure, and the third one is to reservoir.

The power pack is located just aft of the front carry-through spar, about the center of the cabin. The pack can be serviced by removing the panel under the right front seat. The reservoir should be serviced with clean MIL-H-5606A hydraulic oil.

* If converted per Service Letter #62, treat as higher serial 30335, 32-35, & 31013.

Trouble shooting

Trouble	Could be
Gear will not retract (Motor won't run).	Not enough air pressure in right strut to operate squat switch (if switch is installed. Broken squat switch wire. Defective squat switch. Defective override switch (on throttle). Bad motor. Up limit switch inoperative.
Gear will not retract (motor runs).	Solenoid valve not energizing. Defective solenoid valve. Excessive hydraulic fluid in struts Defective dump valve. Excessive air pressure in main gear struts
Gear will not stay up - starts cycling.	Gears contacting up limit switches too soon, preventing buildup of sufficient pressure to hold solenoid valve closed.
Gear will not stay up - cycles, but longer period.	External leak (visible). Internal leak in one of cylinders. Leaky solenoid valve. Leaky dump valve. Internal leak in pack.
Gear goes up, but light stays on until circuit breaker pops.	Limit switches set too far away from stops. *

* SPECIAL NOTE: When rigging the landing gear with this system, install a 0-1500 PSI pressure gage in the "up" side , and set switches so that final up pressure is around 1000 PSI when the pump stops, and certainly no less than 600 PSI.

Ser. 30325 Thru 30412
32-35 Thru 32-53
31013 Thru 31028

HYDRAULIC SYSTEM OPERATION

Retraction

When the landing gear switch is operated to select "up", the electric-hydraulic power pack (hereafter, "pack") motor is energized (blue wire to motor). Concurrently, the solenoid valve (H H20402) is energized to close, blocking fluid passage to the reservoir (later versions to not have this solenoid valve). The landing gear retracts and system pressure builds to about 1300 PSI and hydraulic pressure switch 6607A breaks the circuit, stopping retraction. A zero leakage valve within the pack blocks the fluid in the system after the pump stops and holds the pressure. Pressure both holds the gear up, and holds the solenoid valve closed. A minimum of 600 PSI is required to hold this valve closed.

The landing gear will not retract unless the right strut is fully extended and the squat switch is depressed. During retraction, the throttle must be full open to override the auto-action or, airspeed must be approximately 120 MPH or more.

Extension

Emergency When the dump valve is opened (lever moved down), fluid in the up side is allowed to return to the reservoir.

Normal When landing gear extension is selected with the switch, the pack motor (green wire) is energized to rotate the motor in the opposite direction. Fluid from the pump forces the piston in shuttle valve (A255) past the center port of the valve and fluid flows to the cylinders. After all three down limit switches have been contacted the motor circuit is opened and the pump stops. The piston in the shuttle valve A255 returns to its original position and ports the fluid in the extension side to the reservoir; therefore, there is no down hydraulic pressure.

Automatic When airspeed is reduced to approximately a range of 105 to 120 MPH the gear will extend automatically regardless of the position of the gear switch. After gear is down, the red light will remain on until the gear selector is in the down position. The auto-action operates the regular extend system automatically. This means that operation is electrically; therefore, auto-action will not work if the circuit breaker is out or the master switch is off.

Miscellaneous

The manifold on the bottom of the pack distributes the fluid. There is a pattern of 3 ports in the bottom of the aluminum manifold block. This is an unsymmetrical pattern. The center port supplies down pressure, the end one nearest it supplies up pressure, and the third one is to reservoir.

The power pack is located just aft of the front carry-through spar, about the center of the cabin. The pack can be serviced by removing the panel under the right front seat. The reservoir should be serviced with clean MIL-H-5606A hydraulic oil.

Trouble shooting

Trouble	Could be
Gear will not retract (motor won't run)	Not enough air pressure in right strut to operate squat switch. Broken squat switch wire. Defective squat switch. Defective override switch (on throttle). Bad motor.
Gear will not retract (motor runs).	Solenoid valve not energizing. Defective solenoid valve. Defective dump valve.
Gear will not stay up - starts cycling.	Leak - Could be external (visible) or internal. If internal, check cylinders first, then solenoid valve, dump valve, plumbing Internal leak in pack.
Gear goes up but light stays on until circuit breaker pops.	Pressure switch defective or set too high.

Ser 30413 Thru ___
32-54 Thru ___
31029 Thru ___

HYDRAULIC SYSTEM OPERATION

Retraction

When the landing gear switch is operated to select "up", the electric-hydraulic power pack (hereafter,"pack") motor is energized (blue wire to motor). The landing gear retracts and system pressure builds to about 1300 PSI and hydraulic pressure switch 6607A breaks the circuit, stopping retraction. A zero leakage valve within the pack blocks the fluid in the system after the pump stops and holds the pressure. Pressure holds the gear up.

The landing gear will not retract unless the right strut is fully extended and the squat switch is depressed. During retraction, the throttle must be full open to override the auto-action or, airspeed must be approximately 120 MPH or more.

Extension

Emergency When the dump valve is opened (lever moved down), fluid in the up side is allowed to return to the reservoir.

Normal When landing gear extension is selected with the switch, the pack motor (green wire) is energized to rotate the motor in the opposite direction. Fluid from the pump forces the piston in shuttle valve (A255) past the center port of the valve and fluid flows to the cylinders. After all three down limit switches have been contacted the motor circuit is opened and the pump stops. The piston in the shuttle valve A255 returns to its original position and ports the fluid in the extension side to the reservoir; therefore, there is no down hydraulic pressure.

Automatic When airspeed is reduced to approximately a range of 105 to 120 MPH the gear will extend automatically regardless of the position of the gear switch. After gear is down, the red light will remain on until the gear selector is in the down position. The auto-action operates the regular extend system automatically. This means that operation is electrically; therefore, auto-action will not work if the circuit breaker is out or the master switch is off.

Miscellaneous

The manifold on the bottom of the pack distributes the fluid. There is a pattern of 3 ports in the bottom of the aluminum manifold block. This is an unsymmetrical pattern. The center port supplies down pressure, the end one nearest it supplies up pressure, and the third one is to reservoir.

The power pack is located just aft of the front carry-through spar, about the center of the cabin. The pack can be serviced by removing the panel under the right front seat. The reservoir should be serviced with clean MIL-H-5606A hydraulic oil.

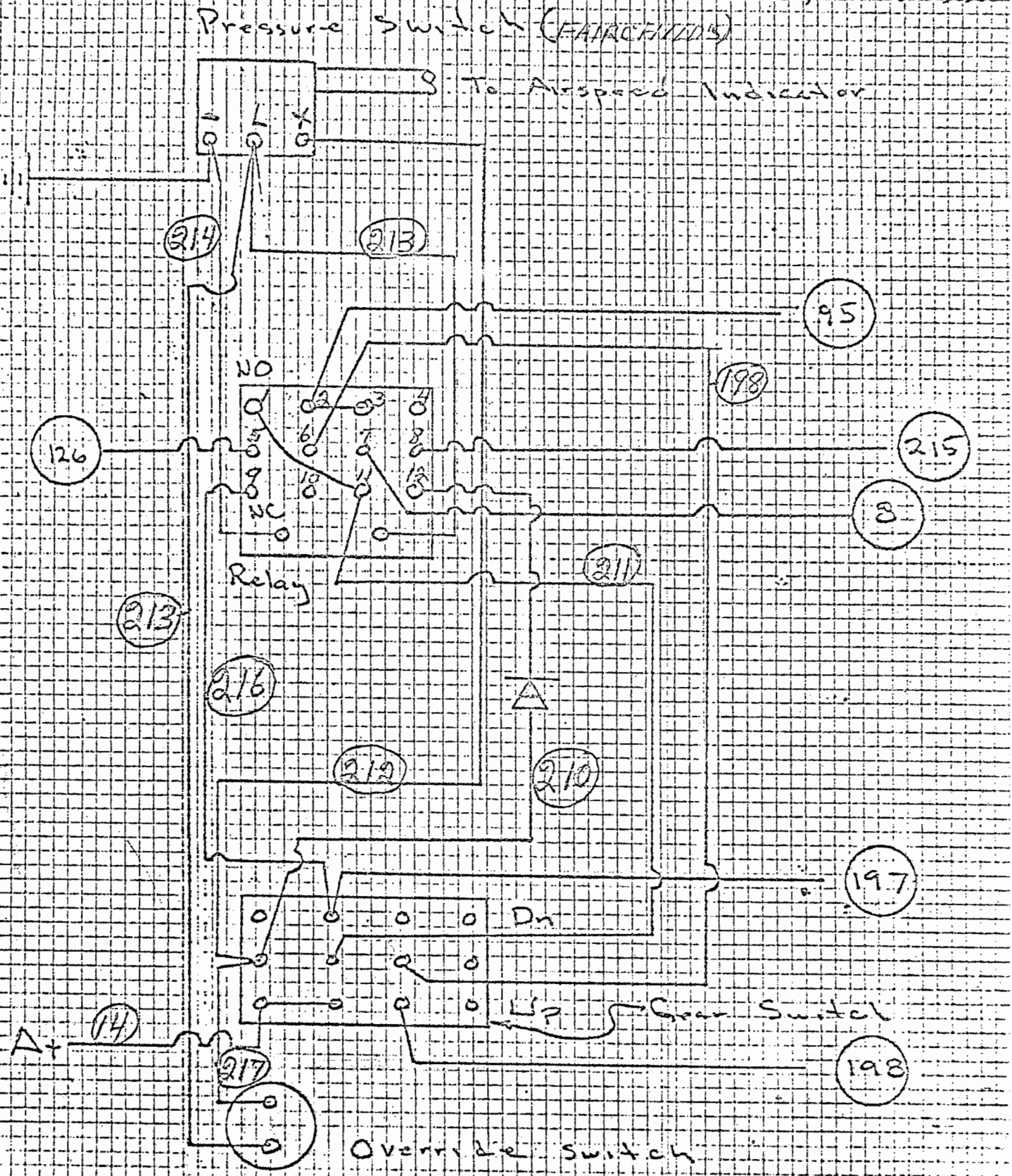
Ser 30413 Thru ___
32-54 Thru ___
31029 Thru ___

Trouble Shooting

Trouble	Could be
Gear will not retract (motor won't run)	Not enough air pressure in right strut to operate squat switch. Broken squat switch wire. Defective squat switch. Defective override switch (on throttle). Bad motor.
Gear will not retract (motor runs).	Defective dump valve.
Gear will not stay up - starts cycling.	Leak - Could be external (visible) or internal. If internal, check cylinders first, then dump valve, plumbing. Internal leak in pack.
Gear goes up but light stays on until circuit breaker pops.	Pressure switch defective or set too high.

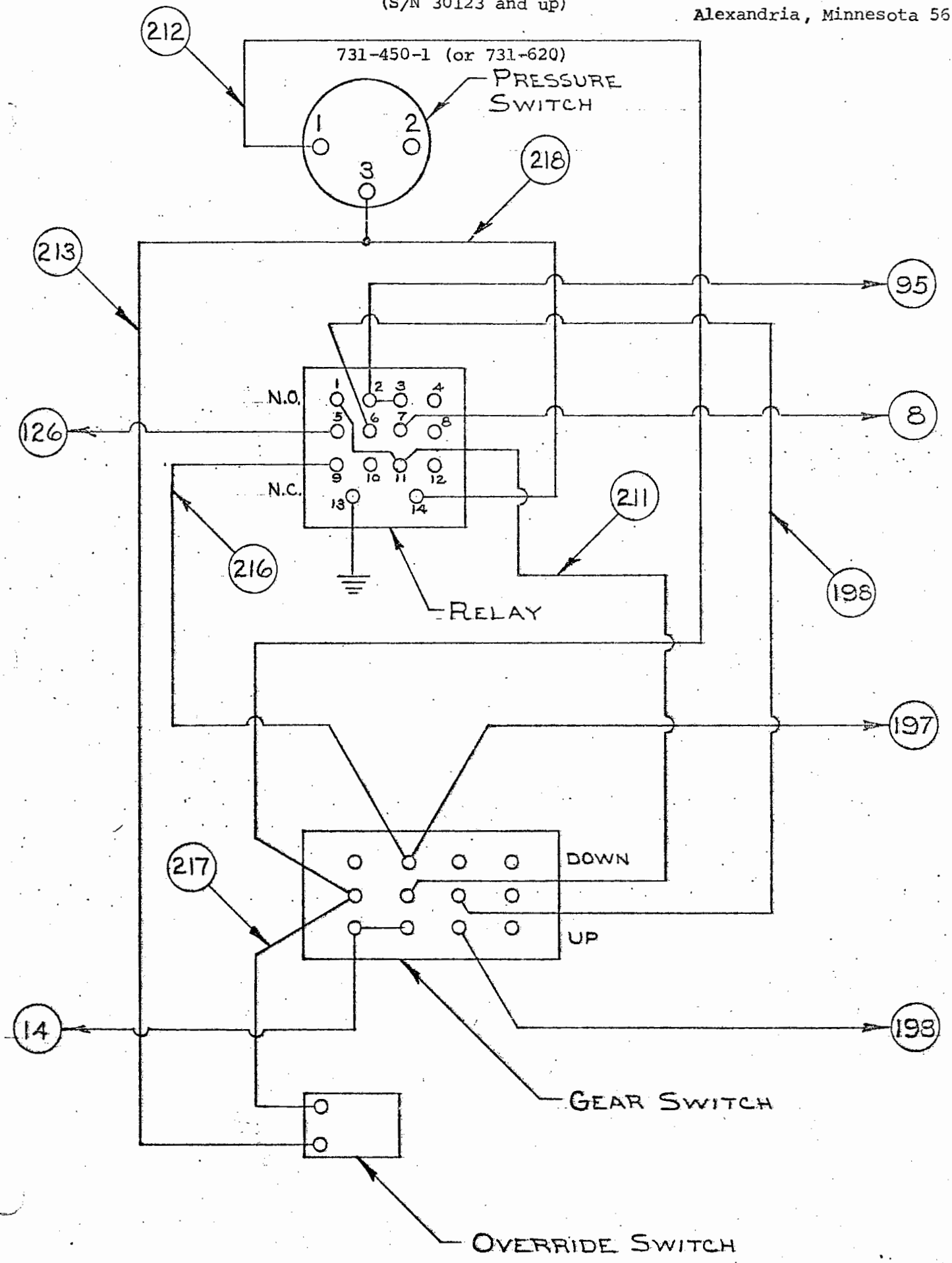
LANDING GEAR CIRCUIT
S/N 330123 and Up

BELLANCA AIRCRAFT CORPORATION
P. O. BOX 624
ALEXANDRIA, MINNESOTA 56308



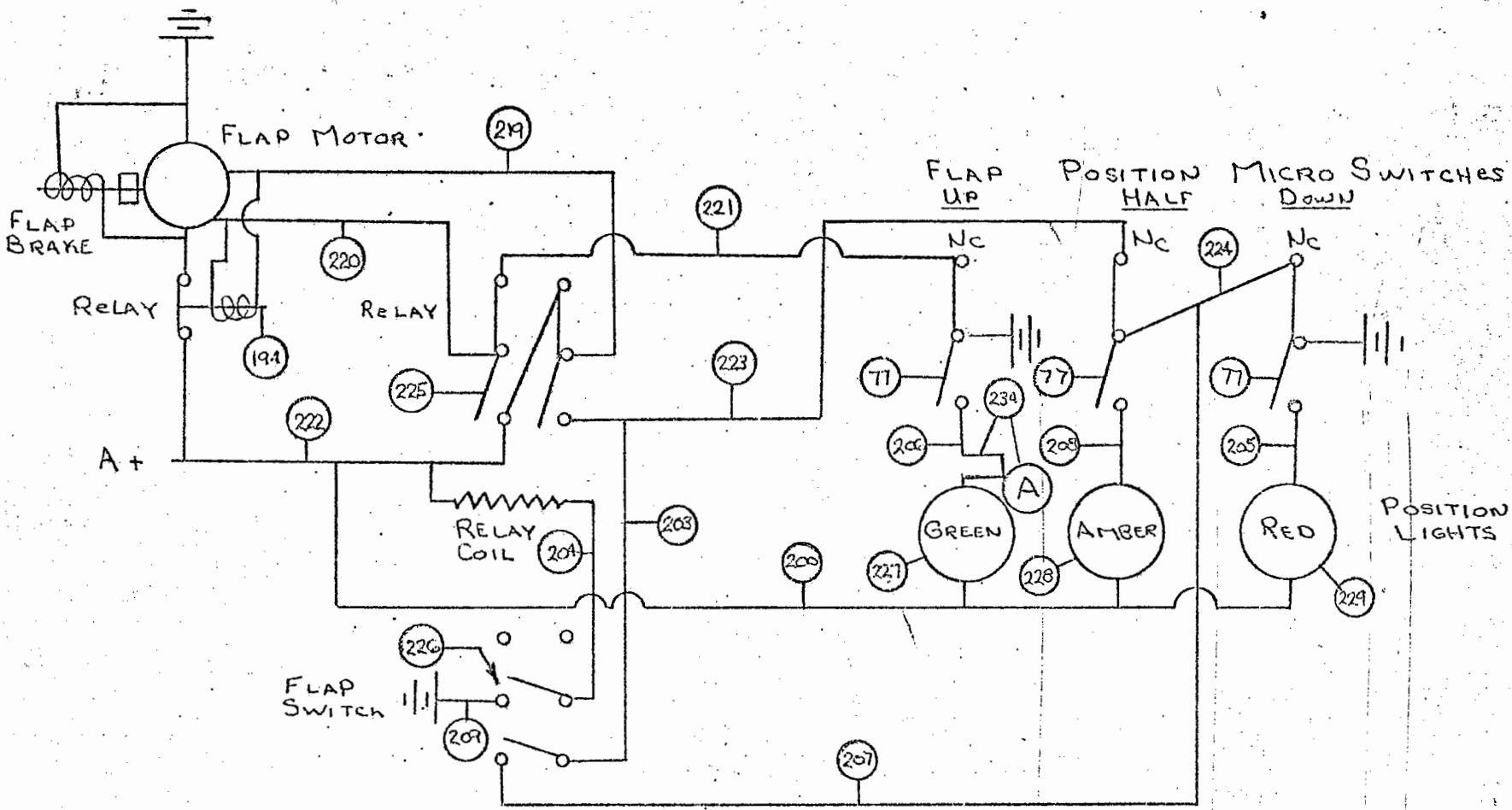
LANDING GEAR WIRING SCHEMATIC
(S/N 30123 and up)

BELLANCA AIRCRAFT CORPORATION
P.O. Box 624
Alexandria, Minnesota 56308



BELLANCA RAFT CORPORATION
P. O. Box 624
Alexandria, Minnesota 56308

SCHEMATIC



FLAP CIRCUIT
AUTOMATIC FLAP POSITION

Models: 17-30
17-31
17-[illegible]

SECTION VI

CONTROL SURFACES

CONTENTS

SECTION VI

CONTROL SURFACES

A. GENERAL

Horizontal stabilizers, elevators and rudder are of tubular steel construction covered with dacron fabric and finished with butyrate dope. Flaps and ailerons are constructed of spruce and covered with dacron fabric and finished with butyrate dope.

The ailerons are actuated by cables and torque rods, whereas the flaps, elevators and rudder are actuated by a cable and pulley arrangement.

B. SPECIFICATIONS

Wings	161.5 square feet (including flaps, ailerons and fuselage cross section)
Flaps	16.16 square feet
Ailerons	11.77 square feet
Wing Loading	18.58 pounds per square foot

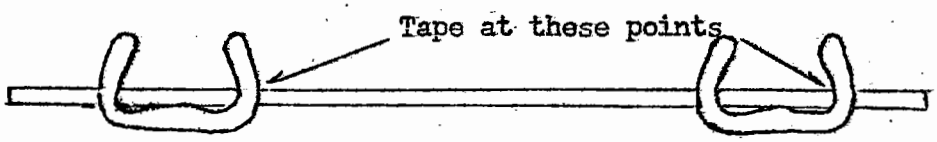
Control Surface travels

Rudder	22 degrees right	22 degrees left
Elevator	22 degrees up	15 degrees down
Trim Tab	8 degrees up	35.5 degrees down
Flaps		46 degrees down

C. RIGGING AND ADJUSTMENTS

1. Ailerons

Set and clamp the control wheels in a neutral position. This may be done by taping a stick or rod to both control wheels as illustrated below.



Adjust turn buckles so the bellcranks are an equal distance from the center line of the airplane. Clamp the aileron in a neutral position and adjust the torque tubes so the distance between the torque tube attachment points are .460 longer than the distance between the hinge points of the bellcranks at the fuselage.

Install the bolts and check aileron travel by means of the stops of the quadrant on the control column. If aileron travel is excessive, shorten the distance between the torque tube attachment points.

2. Flaps

Flaps are adjusted by inserting a small shim or by removing material from the inboard and outboard end of the blocks located in the flap bay area of the wing. If adding shim material to these blocks they should be both glued and nailed in place using small brads and should be painted for protection. If removing material from the blocks, the same applies in that the exposed area of the wood after trimming should be painted. The inboard end of the trailing edge of the flap should be in line with the trailing edge of the wing at that point.

When flaps become out of alignment the inboard flap hinges that are bolted to the wing should be checked to see that they are not bent out of shape.

3. Elevators

Elevators are adjusted for proper travel by lengthening or shortening the elevator control cables at the turnbuckles. See control travel specifications for correct degrees of travel. These specifications are listed in the front part of this section.

4. Trim Tab

Trim Tab adjustments are made at the trim tab actuating arm located at the inspection plate on the aft of the fuselage. It is of the utmost importance to keep the play in this arm and in the trim tab at a minimum. Excessive play in the trim tab or in the trim tab mechanism could cause a flutter at high speeds. Should this occur an immediate reduction in speed is recommended.

5. Rudder

Rudder adjustment is accomplished by shortening or lengthening the turnbuckles on the rudder cables.

6. Rigging Tension

Rigging tension on Aileron Cables and Elevator Cables should be:

AILERON 19 lbs $^{+4}_{-2}$ ELEVATOR 31 lbs $^{+4}_{-2}$

The best place to check aileron cable tension is at the wing root. Access may be gained by removing lower fairing between wing and fuselage bottom.

Elevator cable tension can be checked in the tail cone by raising the baggage compartment floor.

SECTION VII

FUEL SYSTEM

A. GENERAL

The fuel system on the Bellanca 17-30 Viking is a positive pressure system utilizing an engine driven fuel pump for the main source and backed up by an electric fuel boost pump which is used for starting pressure and as an emergency boost pump in case of engine driven pump failure.

B. TROUBLE SHOOTING

While this system is relatively trouble free, the sump drain and gasculators should be drained regularily and the fuel screen checked for any sediment and cleaned. It is recommended that the tanks be filled after each flight to prevent condensation of moisture in the system.

C. FUEL INDICATOR SWITCH ADJUSTMENT

The fuel quanity switches are located under the pedestal between the two front seats which is covered over with carpet, and mounted to the fuel selector.

To adjust the fuel switches, put selector on the tank needing adjustment. Loosen jam nut on switch and move switch in or out by means of the nut located on both sides of the bracket. Move the switch in or out until points open or close to give the correct reading on the desired fuel tank.

D. FUEL PRESSURE ADJUSTMENT

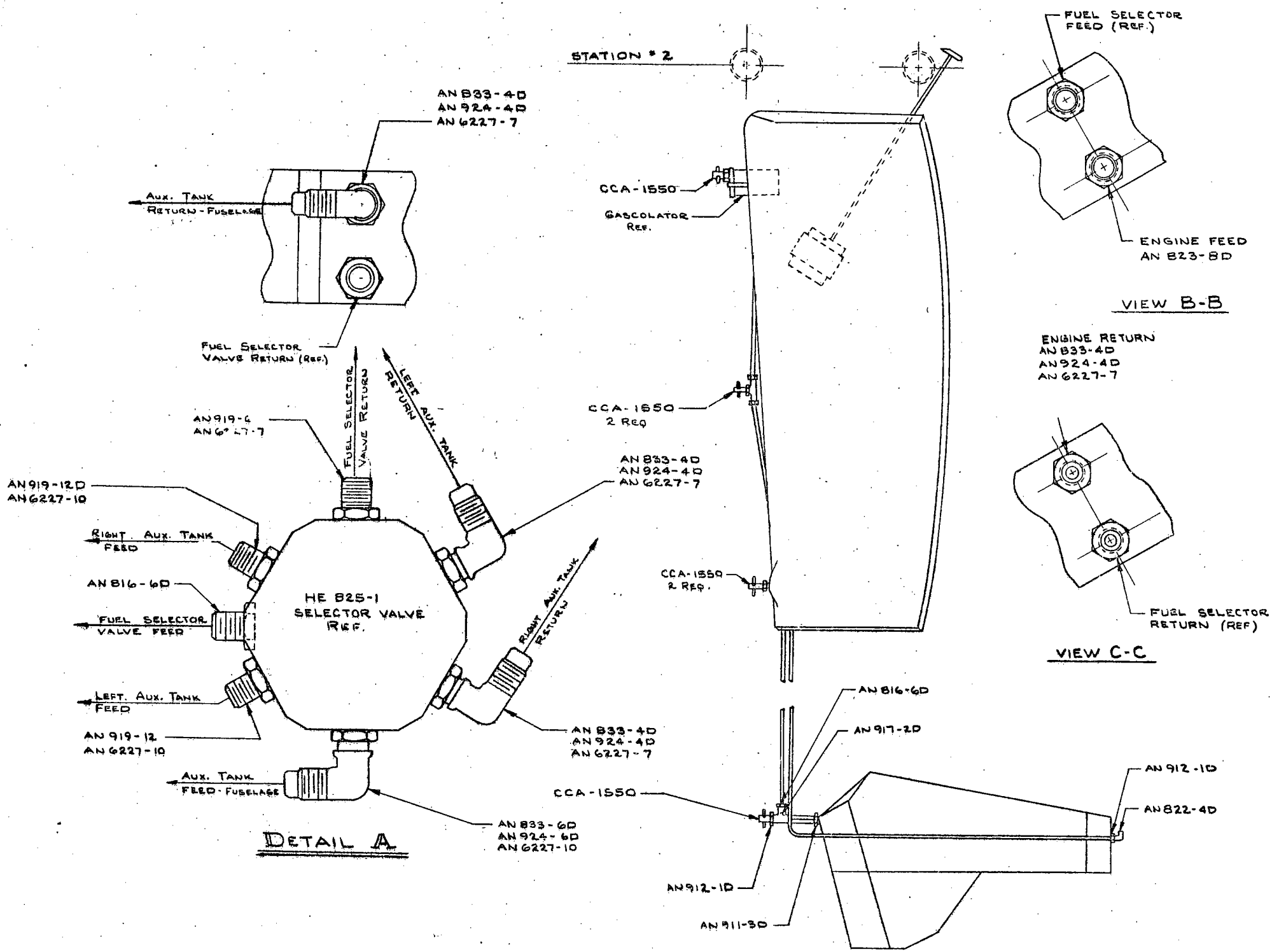
Fuel Pressure adjustment is made at the engine driven fuel pump. Turn the screw located at the back of this pump in to increase fuel pressure and out to decrease. Pressure should be $3\frac{1}{2}$ pounds to $4\frac{1}{2}$ pounds at 550 rpm.

E. FUEL BOOST AND EMERGENCY PUMP

The electric fuel boost pump is located under the left front seat. This is a sealed unit and has no adjustment as to pressure. The boost pump switch on the early model Viking is a two position switch with the up position used for emergency in flight conditions, and the lower position is used for starting. On late model Vikings the up position is used for both starting pressure and emergency use also.

F. FUEL SYSTEMS SCHEMATIC

Found on following pages.


STATION # 2
AN 833-4D
AN 924-4D
AN 6227-7
AUX. TANK
RETURN - FUSELAGE
FUEL SELECTOR
VALVE RETURN (REF.)
CCA-1550
GASCOLATOR
REF.
CCA-1650
2 REQ
CCA-1550
2 REQ.
FUEL SELECTOR
FEED (REF.)
ENGINE FEED
AN 823-8D
VIEW B-B
ENGINE RETURN
AN 833-4D
AN 924-4D
AN 6227-7
FUEL SELECTOR
RETURN (REF)
VIEW C-C
AN 919-6
AN 6227-7
FUEL SELECTOR
VALVE RETURN
LEFT AUX. TANK
RETURN
AN 919-12D
AN 6227-10
AN 833-4D
AN 924-4D
AN 6227-7
RIGHT AUX. TANK
FEED
AN 816-6D
FUEL SELECTOR
VALVE FEED
HE 825-1
SELECTOR VALVE
REF.
RIGHT AUX. TANK
RETURN
LEFT AUX. TANK
FEED
AN 919-12
AN 6227-10
AUX. TANK
FEED - FUSELAGE
AN 833-6D
AN 924-6D
AN 6227-10
DETAIL A
AN 816-6D
AN 917-2D
AN 912-1D
AN 822-4D
CCA-1550
AN 912-1D
AN 911-3D

SECTION VIII

ELECTRICAL SYSTEM

A. GENERAL

The electrical system is protected by reset circuit breakers. The breaker panel is located at the lower right hand corner of the instrument panel.

B. ELECTRICAL SYSTEM MASTER DIAGRAM

The electrical system master diagram is found on the following page.

Data Pertinent to All Models

Datum	Leading edge of Rib No. 1 (23.5 in. outboard of airplane center line for reference: (1) Datum is 10.75 in. forward of fuselage station; (2) Forward face of firewall is 17.05 in. forward of datum, when aircraft is leveled.
Leveling means	Lugs at fuselage stations 2 and 3 in cabin on right side (wing spar station).
Certification basis	Part 23 of the Federal Aviation Regulations dated February 1, 1965, as amended by 23-1 thru 23-6. Application for Type Certificate dated May 5, 1969. Type Certificate No. A18CE issued October 31, 1969.
Production basis	None. Prior to original certification of each aircraft, an FAA representative must perform a detailed inspection for workmanship, materials, and conformity with the approved technical data and a check of the flight characteristics.
Equipment	The basic required equipment as prescribed in the applicable airworthiness regulations (See Certification basis) must be installed in the aircraft for certification. In addition, the following item of equipment is required: (1) Stall warning indicator, Safe Flight Model R.

NOTE 1. Current weight and balance report, including list of equipment included in certificated empty weight, and loading instructions, must be in each aircraft at the time of original certification. A copy of the approved loading instructions should be posted inside the baggage compartment at all times.

The Model 17-31ATC certificated empty weight and corresponding center of gravity location must include unusable fuel of 48 lb. at +29 and undrainable oil of 3.7 lb. at -42.

The Model 17-31A certificated empty weight and corresponding center of gravity location must include unusable fuel of 48 lb. at +29 and 1 lb. at +72 and undrainable oil of 3.0 lb. at -42.

The Model 17-30A certificated empty weight and corresponding center of gravity location must include unusable fuel of 48 lb. at +29 and undrainable oil of 11.0 lb at -41.

NOTE 2. The placards specified in the appropriate FAA Approved Flight Manual must be displayed.

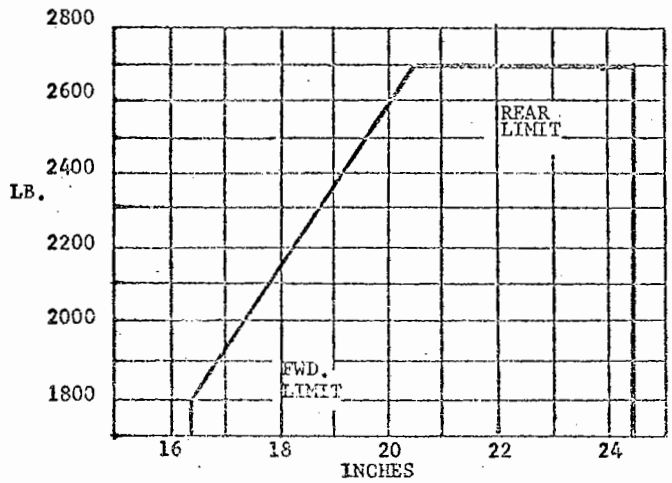
... END ...

Control surface movements (within ±1°)	Elevator trim tab	Up	12°	Down	29°
	Elevator	Up	22°	Down	15°
	Aileron	Up	20°	Down	20°
	Rudders	Right	22°	Left	22°
	Flaps			Down	46°

Serial Nos. eligible — 2000, 2002 thru 4000
Required equipment — Items 1 or 2, 102, 103, 110(c), 201, 202(a), 204(a) and 401(a)

II - Model 14-19-2, 4 PCLM (Normal Category), Approved January 7, 1957

Engine	Continental O-470-K	
Fuel	80/87 minimum grade aviation gasoline	
Engine limits	For all operations, 2600 r.p.m. (230 hp.)	
Airspeed limits	Never exceed	226 m.p.h. (197 knots) True Ind.
	Maximum structural cruising	167 m.p.h. (145 knots) True Ind.
	Maneuvering	115 m.p.h. (100 knots) True Ind.
	Flaps extended	86 m.p.h. (75 knots) True Ind.
	Landing gear extended	167 m.p.h. (145 knots) True Ind.
	Landing gear operation	124 m.p.h. (108 knots) True Ind.
C.G. range (landing gear extended)	(+20.5) to (+24.4) at 2700 lb.	
	(+16.4) to (+24.4) at 1800 lb. or less	
	Straight line variation between points given	



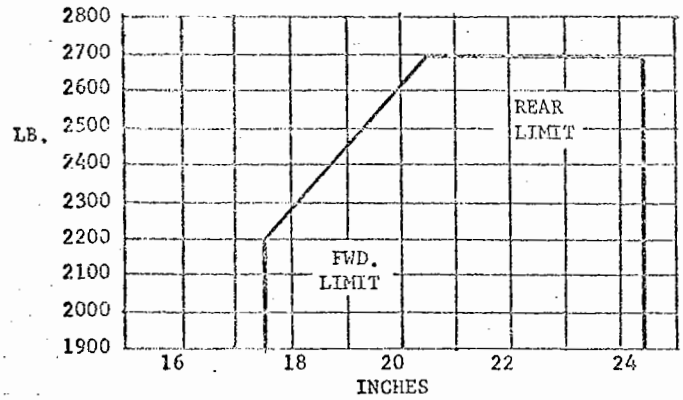
Empty wt. C.G. range — None

Maximum weight	2700 lb.				
No. of seats	4 (2 at +20, 2 at +53)				
Maximum baggage (see loading schedule)	Without auxiliary fuel tank:				198 lb. (+84)
	With empty auxiliary fuel tank (item 105):				186 lb. (+84)
Fuel capacity	Main wing tanks 40 gal. (+29). See item 105 or item 112 for auxiliary tank and NOTE 1 for data on system fuel.				
Oil capacity	12 qt. (+35), 7 qt. usable. See NOTE 1 for data on system oil.				
Control surface movements (within ±1°)	Elevator trim tab	Up	12°	Down	29°
	Elevator	Up	22°	Down	15°
	Aileron	Up	20°	Down	20°
	Rudders	Right	22°	Left	22°
	Flaps			Down	46°

Serial Nos. eligible — 4001 thru 4105
Required equipment — Items 3 or 4, 107, 108, 201, 202(a), 204(a), 401(b) or (c) and 403

III - Model 14-19-3, 4 PCLM (Normal Category), Approved February 20, 1959

Engine	Continental IO-470-F		
Fuel	100/130 minimum grade aviation gasoline		
Engine limits	For all operations, 2625 r.p.m. (260 hp.)		
Airspeed limits	Never exceed	226 m.p.h. (197 knots)	CAS
	Maximum structural cruising	167 m.p.h. (145 knots)	CAS
	Maneuvering	115 m.p.h. (100 knots)	CAS
	Flaps extended	110 m.p.h. (96 knots)	CAS
	Landing gear extended	167 m.p.h. (145 knots)	CAS
	Landing gear operation	124 m.p.h. (108 knots)	CAS
C.G. range (landing gear extended)	(+20.5) to (+24.4) at 2700 lb.		
	(+17.5) to (+24.4) at 2200 lb. or less		
	Straight line variation between points given		

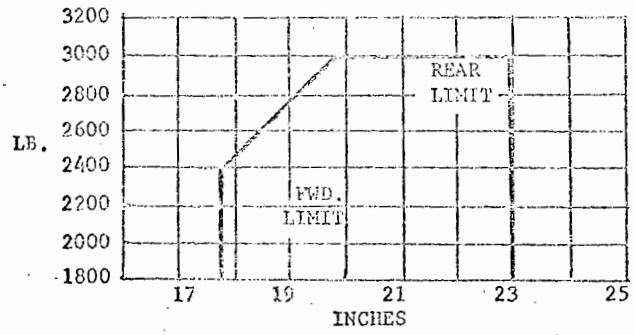


Empty wt. C.G. range	None				
Maximum weight	2700 lb.				
No. of seats	4 (2 at +20, 2 at +53)				
Maximum baggage	186 lb. (+84). (See loading schedule).				
Fuel capacity	Main wing tanks 39.2 gal. (+29). See item 112 for auxiliary tank and NOTE 1 for data on system fuel.				
Oil capacity	12 qt. (-35), 7 qt. usable. See NOTE 1 for data on system oil.				
Control surface movements (within ±1°)	Elevator trim tab	Up	12°	Down	29°
	Elevator	Up	22°	Down	15°
	Aileron	Up	20°	Down	20°
	Rudder	Right	22°	Left	22°
	Flaps			Down	45°
Serial Nos. eligible	4106 thru 4228				
Required equipment	Items 5 or 6, 107, 108, 201(c) or (d), 202(a) or (c), 205(a), (b) or (e) and (c) or (d) or 205(f) and (g), 401(d) and 403				

IV - Model 14-19-3A, 4 PCLM (Normal Category), Approved March 1, 1963

Engine	Continental IO-470-F		
Fuel	100/130 minimum grade aviation gasoline		
Engine limits	For all operations, 2625 r.p.m. (260 hp.)		
Airspeed limits	Never exceed	226 m.p.h. (197 knots)	CAS
	Maximum structural cruising	190 m.p.h. (165 knots)	CAS
	Maneuvering	142 m.p.h. (123 knots)	CAS
	Flaps extended	120 m.p.h. (104 knots)	CAS
	Landing gear extended	167 m.p.h. (145 knots)	CAS
	Landing gear operatior	140 m.p.h. (122 knots)	CAS

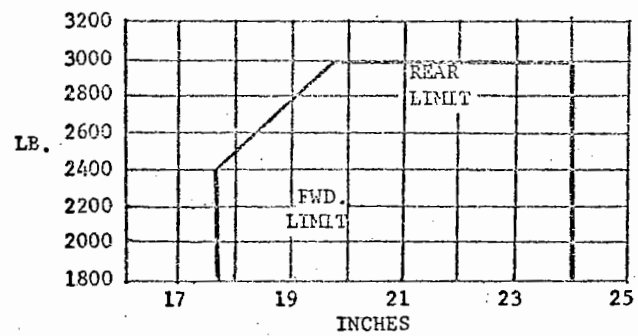
C.G. range (landing gear extended)	(+19.8) to (+23.0) at 3000 lb. (+17.75) to (+23.0) at 2350 lb. or less Straight line variation between points given



Empty wt. C.G. range	None			
Maximum weight	3000 lb.			
No. of seats	4 (2 at +20, 2 at +53)			
Maximum baggage	186 lb. (+84). (See loading schedule)			
Fuel capacity	58 gal. usable (2 wing tanks 19 gal. each at +29, and 1 auxiliary tank in fuselage 20 gal. at +72). See item 113 for optional auxiliary tanks in outboard wing panels and NOTE 1 for data on system fuel.			
Oil capacity	12 qt. (-35), 7 qt. usable. See NOTE 1 for data on system oil.			
Control surface movements (within ±1°)	Elevator trim tab	Up 4°	Down 34.5°	
	Elevator	Up 22°	Down 15°	
	Aileron	Up 20°	Down 20°	
	Rudder	Right 22°	Left 22°	
	Flaps		Down 46°	
Serial Nos. eligible	4229 thru 4342			
Required equipment	Items 7, 107, 108, 201(c) or (d), 202(a) or (c), 205(f) and (h), 401(e) and 403			

V - Model 17-30, 4 PCLM (Normal Category), Approved September 23, 1966

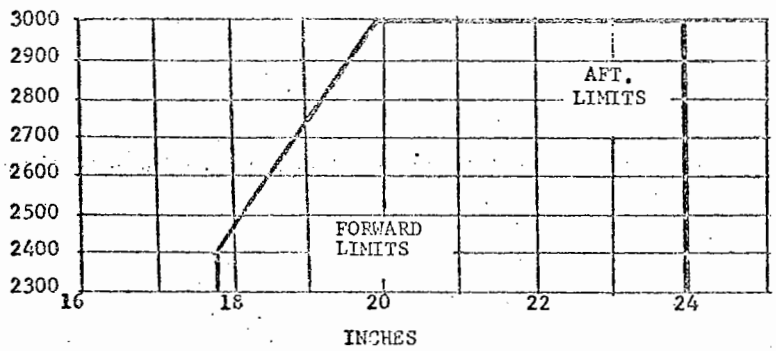
Engine	Continental IO-520-D		
Fuel	100/130 minimum grade aviation gasoline		
Engine limits	Takeoff: 2850 r.p.m. (300 hp.) (5 min. maximum)		
	Max. continuous operation: 2700 r.p.m. (285 hp.)		
Airspeed limits	Never exceed	226 m.p.h. (197 knots)	CAS
	Maximum structural cruising	190 m.p.h. (165 knots)	CAS
	Maneuvering	142 m.p.h. (123 knots)	CAS
	Flaps extended	120 m.p.h. (104 knots)	CAS
	Landing gear extended	167 m.p.h. (145 knots)	CAS
	Landing gear operation	140 m.p.h. (122 knots)	CAS
C.G. range (landing gear extended)	(+19.8) to (+24.0) at 3000 lb. (+17.75 at 2400 lb. or less Straight line variation between points given		



Empty wt. C.G. range	None				
Maximum weight	3000 lb. (See NOTE 4 for 3200 lb. airplanes)				
No. of seats	4 (2 at +20, 2 at +53)				
Maximum baggage	186 lb. max. (+84), 35 lb. min. (see loading schedule)				
Fuel capacity	58 gal. usable (2 wing tanks, 19 gal. ea. at +29, and 1 auxiliary tank in fuselage 20 gal. at +72). See item 113 for optional auxiliary tanks in outboard wing panels and NOTE 1 for data on system fuel.				
Oil capacity	12 qt. (-41), 8.3 qt. usable. See NOTE 1 for data on system oil.				
Control surface movements (within ±1°)	Elevator trim tab	Up	4°	Down	34.5°
	Elevator	Up	22°	Down	15°
	Aileron	Up	20°	Down	20°
	Rudder	Right	22°	Left	22°
	Flaps			Down	46°
Serial Nos. eligible	30001 thru 30262				
Required equipment	Items 8 or 9 or 10 or 11, 101(d)or (f), 107(c) or (d) or (g), 108(b), 110(c), 111(a), 201(d), 202(c), 205(f) and (h), 301(c) or 304(b), 302(f) or (g), 401(f) and 403.				

VI - Model 17-31TC, 4 PCLM (Normal Category), Approved February 20, 1969

Engine	Lycoming IO-540-C1E5, with two (2) Rajay Model 315A10-2 Turbochargers per STC SE6WE	
Fuel	100/130 minimum grade aviation gasoline	
Engine limits	Non turbo charged: all operations 2575 RPM (290 hp)	
	Turbo charged: all operations 2400 RPM 27.0 in. Hg (250 hp) Turbocharger used only with throttle full open	
	Minimum turbocharger - 2200 RPM	
Maximum operating altitude	24,000 ft. with oxygen	12,000 ft. without oxygen
Airspeed limits	Never exceed	226 m.p.h. (197 knots) CAS
Below 15,000 ft.	Maximum structural cruising	190 m.p.h. (165 knots) CAS
	Maneuvering	142 m.p.h. (123 knots) CAS
	Flaps extended	120 m.p.h. (104 knots) CAS
	Landing gear extended	167 m.p.h. (145 knots) CAS
	Landing gear operation	140 m.p.h. (122 knots) CAS
Above 15,000 ft. Same as below 15,000 ft. except	Never exceed	200 m.p.h. (174 knots) CAS
	Maximum structural cruising	165 m.p.h. (144 knots) CAS
C.G. range (landing gear extended)	(+19.8) to (+24.0) at 3000 lb.	
	(+17.75) to (+24.0) at 2400 lb. or less	
	Straight line variation between points given	

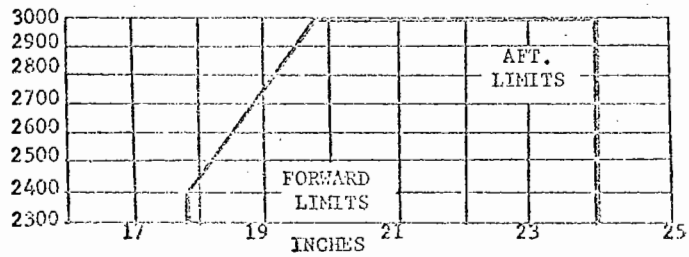


Empty wt. C.G. range	None
Maximum weight	3000 lb. (See NOTE 4 for 3200 lb. airplanes)
No. of seats	4 (2 at +20, 2 at +53)
Maximum baggage	166 lb. max. (+84), 35 lb. min. (See loading schedule)
Fuel capacity	72 gal. usable (2 wing tanks, 19 gal. each at +29, and 2 auxiliary tanks in wing, 17 gal. each at +29). See NOTE 1 for data on unusable fuel.
Oil capacity	12 qt. total (-42), 9 1/4 qt. usable. See NOTE 1 for data on undrainable oil.

Control surface movements (within ±1°)	Elevator trim tab	Up 7°	Down 34.5°
	Elevator	Up 22°	Down 15°
	Aileron	Up 20°	Down 20°
	Rudder	Left 22°	Right 22°
	Flaps		Down 46°
Serial Nos. eligible	31001 thru 31003		
Required equipment	Items 12, 101(e), 107(e), 107(f) or (g), 108(c), 111(a), 113, 114, 201(e), 202(d), 205(b) and (j), 302(g), 304, 401(g) and 403. Item 404 is required for flight above 12,000 ft.		

VII-Model 17-31, 4 PCLM (Normal Category), Approved April 29, 1969.

Engine	Lycoming IO-540-G1B5 (except IO-540-G1E5 for S/N 32-1 only)	
Fuel	100/130 minimum grade aviation gasoline	
Engine limits	All operations 2575 RPM (290 hp)	
Airspeed limits	Never exceed	226 m.p.h. (197 knots) CAS
	Maximum structural cruising	190 m.p.h. (165 knots) CAS
	Maneuvering	142 m.p.h. (123 knots) CAS
	Flaps extended	120 m.p.h. (104 knots) CAS
	Landing gear extended	167 m.p.h. (145 knots) CAS
	Landing gear operation	140 m.p.h. (122 knots) CAS
C.G. range (landing gear extended)	(+19.8) to (+24.0) at 3000 lb.	
	(+17.75) to (+24.0) at 2400 lb. or less	
	Straight line variation between points given	



Empty wt. C.G. range	None		
Maximum weight	3000 lb. (See NOTE 4 for 3200 lb. airplanes)		
No. of seats	4 (2 at +20, 2 at +53)		
Maximum baggage	166 lb. max. (+84), 35 lb. min. (See loading schedule)		
Fuel capacity	58, 72 or 92 gal. (2 wing tanks, 19 gal. each at +29), plus [item 112 (20 gal. at +72) or item 113 (2-17 gal. each at +29)] or [items 112 and 113 (92 gal.)]. See NOTE 1 for data on unusable fuel.		
Oil capacity	12 qt. total (-42), 9 1/4 qt. usable. See NOTE 1 for data on undrainable oil.		
Control surface movements (within -1°)	Elevator trim tab	Up 7°	Down 34.5°
	Elevator	Up 22°	Down 15°
	Aileron	Up 20°	Down 20°
	Rudder	Left 22°	Right 22°
	Flaps		Down 46°
Serial Nos. eligible	32-1 thru 32-14		
Required equipment	Items 12, 101(e), 107(e), 107(g), 108(c), 112 or 113, 111(b), 114, 201(e), 202(d), 205(b) and (j), 302(g), 304(a), 401(h) and 403		

Specifications Pertinent to All Models

Datum	Leading edge of Rib No. 1 (23.5 in. outboard of airplane center line). For reference: (1) Datum is 10.75 in. forward of fuselage station 2; (2) Forward face of firewall is 17.05 in. forward of datum, when aircraft is leveled.	
Leveling means	Lugs at fuselage stations 2 and 3 in cabin on right side (wing spar station).	
Certification basis	Model 14-19:	Part 03 of the Civil Air Regulations dated December 15, 1946
	Model 14-19-2:	Part 03 of the Civil Air Regulations dated December 15, 1946 as amended by 03-1 thru 03-4
	Model 14-19-3:	Part 03 of the Civil Air Regulations dated December 15, 1946 as amended by 03-1 thru 03-4; plus amendment 3-4 (paragraphs 3.80, 3.84a, 3.85a, 3.87, 3.112(c), 3.120 and 3.124(a) only) and amendment 3-6 to CAR 3 dated November 1, 1949
	Model 14-19-3A:	Same as Model 14-19-3 plus amendments 3-7 and 3-13 (paragraph 3.74 only) to CAR 3 dated November 1, 1949 and amendment 3-2 (paragraph 3.75(c) only) to CAR 3 dated May 15, 1956
	Model 17-30:	Same as Model 14-19-3A
	Model 17-31:	Same as Model 14-19-3A
	Model 17-31TC:	Same as Model 17-31 plus amendment 3-5 (paragraph 3.638(a) only) to CAR 3 dated May 15, 1956
	Type Certificate No. 1A3 issued September 26, 1949	
Production basis	None. Prior to original certification of each aircraft, an FAA representative must perform a detailed inspection for workmanship, materials and conformity with the approved technical data and a check of the flight characteristics.	

Equipment: A plus (+) or minus (-) sign preceding the weight of an optional item indicates the net weight change when that item is installed.

Propellers and Propeller Accessories	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
1. (a) Propeller - Koppers Aeromatic, hub model 220-1, blade model 0-74A, Parts list Assembly 4329-1. Installed in accordance with Koppers Co. Adjustment Instructions and Operating Limitations No. 31 Pitch settings at 30 in. sta. Low 12.5° Static r.p.m. at maximum permissible throttle setting not over 2500, not under 2450. No additional tolerance permitted. 51 lb. (-58).	x						
(b) Koppers Aeromatic Altitude Control Assembly 4349-L 11 lb. (-50)	x						
2. Propeller - Hartzell controllable							
(a) Hub model HC-12x20-8, blade model 8428-6 Pitch settings at 30 in. sta. Low 9.2°, high 21.8° Diameter not over 78 in., not under 75 in. 68 lb. (-58)	x						
(b) Hub model HC-12x20-8C, blade model 8433-6 Pitch settings at 30 in. sta. Low 11°, high 22° Diameter not over 78 in., not under 76.5 in. 61 lb. (-58)	x						

Propellers and Propeller Accessories (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
(c) Hartzell propeller control 1 lb. (-6)	x						
3. Propeller - Hartzell Constant Speed							
(a) Hub model HC-82XP-1, blade model 8452-6 Pitch settings at 30 in. sta. Low 12-1/2°, high 25-1/2° Diameter not over 78.5 in., not under 78 in. 62 lb. (-58)		x					
(b) Governor, Woodward D210105 or D210340 4 lb. (-49)		x					
(c) Spinner, Hartzell 835-3 3 lb. (-58)		x					
4. Propeller - McCauley Constant Speed							
(a) Hub model 2A36C18, blade model 90M-12 Pitch settings at 36 in. sta. Low 10°, high 23° Diameter not over 78 in., not under 76 in. 62 lb. (-58)		x					
Supplement to Item 401(b) dated July 11, 1957 required		x					
(b) Governor, Woodward D210105 or D210345 4 lb. (-49)		x					
(c) Spinner and dome kit, McCauley AK8053-21 4 lb. (-58)		x					
5. Propeller - McCauley							
(a) Hub model B2A36C31, blade model 90M-8 Pitch settings at 36 in. sta. Low 11°, high 27.3° Diameter not over 82 in., not under 80 in. 60 lb. (-57.5)			x				
(b) Governor, Woodward D210105 or D210345 4 lb. (-49.5)			x				
(c) McCauley spinner installation 3 lb. (-57.5)			x				
(1) Kit AK8053-21 (McCauley B-2792) adapter ring or 0752004-5 bulkhead required with hub models in items 5(d) and 5(e)							
(2) B-2771 spinner installation (eligible with hub models in items 5(d) and 5(e) only)							
(d) Hub model D2A36C31, blade model 90M-8 Pitch settings at 36 in. sta. Low 11°, high 26.3° Diameter not over 82 in., not under 80 in. 60 lb. (-57.5)			x				
Revision to item 401(d) dated May 10, 1960, required							
(e) Hub model D2A36C33, blade model 90M8 Pitch settings at 36 in. sta. Low 10.8°, high 25.8° Diameter not over 82 in., not under 80 in. 60 lb. (-57.5)			x				
Revision to item 401(d) dated May 10, 1960, required							

Propellers and Propeller Accessories (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
6. Propeller - Hartzell Constant Speed							
(a) Hub model HC-A2XF-1, blade model 8433-2 or -4 Pitch settings at 30 in. sta. Low 14°, high 27° Diameter not over 82 in., not under 80 in. 63 lb. (-57) Revision to item 401(d) dated November 24, 1959 required			x				
(b) Governor, Woodward D210105 or D210340 4 lb. (-49)			x				
(c) Spinner, Hartzell 835-13 4 lb. (-58)			x				
7. Propeller - Hartzell Constant Speed							
(a) Hub model HC-C2YF-1A, blade model 8468-4 Pitch settings at 30 in. sta. Low 13.4°, high 31° Diameter not over 80 in., not under 80 in. 51 lb. (-57)			x	x			
(b) Governor, Woodward H210452G 3 lb. (-49)			x	x			
(c) Spinner and dome - Hartzell 835-23 5 lb. (-58)			x	x			
8. Propeller - McCauley Constant Speed							
(a) Hub model D3A32C90, blade model 82NC-4 Pitch settings at 30 in. sta. Low 11.7°±.2°, high 28.1°±.5° Diameter not over 78 in., not under 76 in. 64 lb. (-63.5)					x		
(b) Governor, Woodward Model P210452G 3 lb. (-55)					x		
(c) Spinner and dome - McCauley model D3669 or D3867 5 lb. (-64)					x		
9. Propeller - McCauley Constant Speed							
(a) Hub model D2A34C58, blade model 90AT-10 Pitch settings at 36 in. sta. Low 8.2±0.1°, high 27.3±.5° Diameter not over 80 in., not under 78 in. 53 lb. (-63.5) Revision 1 to item 401(f) dated May 18, 1967 required					x		
(b) Governor, Woodward Model P210452G 3 lb (-55)					x		
(c) Spinner and dome-McCauley Model D2771 or D3766 4.5 lb. (-64)					x		

Propellers and Propeller Accessories (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
10. Propeller - Hartzell Constant Speed							
(a) Hub model HC-C3YF-1, blade model 8468-8R Pitch settings at 30 in. sta. Low 10.0°, high 32.5° Diameter not over 78 in., not under 76 in. 76 lb. (-63.5) Revision 7 to item 401(f) dated August 10, 1968 required					x		
(b) Governor, Woodward Model P210452 3 lb. (-55)					x		
(c) Spinner and dome - Hartzell model C3535 4 lb. (-64)					x		
11. Propeller - Hartzell Constant Speed							
(a) Hub model HC-C2YF-1, blade model 8475-6 Pitch setting at 30 in. sta. Low 11.1°, high 36.2° Diameter not over 78 in., not under 76 in. 53 lb. (-63.5) Revision to item 401(f) dated August 10, 1968 required					x		
(b) Governor, Woodward Model P210452 3 lb. (-55)					x		
(c) Spinner and dome - Hartzell model C3533 4 lb. (-64)					x		
12. Propeller- Hartzell Constant Speed							
(a) Hub model HC-C3YR-1, blade model 8468-6R Pitch setting measured at 30 in. station Low 13°, high 38° Diameter not over 80 in., not under 78 in. 75 lb. (-64)						x	x
(b) Governor, Woodward Model B210460 3 lb. (-55)						x	x
(c) Spinner and dome - Hartzell model C3552 4.5 lb. (-64)						x	x
Engines and Engine Accessories - Fuel and Oil Systems							
101. (a) Starter, Delco-Remy model 1109652 18 lb. (-21)	x						
(b) Starter, Delco-Remy model 1109678 18 lb. (-21)		x	x	x			
(c) Starter, Delco-Remy model 1109684 18 lb. (-21)			x	x			
(d) Starter, Delco-Remy model 1108249 or 1109926 18 lb. (-21) 18 lb. (-27)				x	x		
(e) Starter-Prestolite model MZ4206 18 lb. (-51.5)						x	x
(f) Starter-Prestolite model MCL6501, CMC P/N 634592 18 lb. (-27)					x		

Engines and Engine Accessories - Fuel and Oil Systems (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
102. Fuel pump, AC Type AH No. 1539722 3 lb. (-20)	x						
103. Oil Cooler, Heat Exchangers, Inc. No. 102C 7 lb. (-45)	x						
104. Auxiliary fuel tank 25 gal. Eligible only when installed in accordance with Bellanca dwg. 18046 and 18175 12 lb. (+77) See NOTE 2(c) for placard required	x						
105. Auxiliary fuel tank 14 gal. Eligible only when installed in accordance with Bellanca dwg. 18183 and 18184 8 lb. (+70) See NOTE 2(d) for placard required	x	x					
106. Auxiliary fuel tanks, 32.5 gal.:							
One 14 gal. tank 8 lb. (+70)	x						
One 18.5 gal. tank 9 lb. (+77) Eligible only when installed in accordance with Bellanca dwg. 18207 and 18199 and Airplane Flight Manual is revised to include pages 4 and 4(a) dated July 3, 1951 See NOTE 2(e) for placard required	x						
107. Fuel pumps							
(a) Engine-driven, Lear ROMEC RD-7420-A1 3 lb. (-20)		x					
(b) Hand emergency, AN-4009-B2 3 lb. (+2)		x					
(c) Electric Auxiliary fuel pump, Weldon 4020A2A 4 lb. (+6.5)			x	x	x		
(d) Electric auxiliary fuel pump, Bendix 480531 2 lb. (+18)					x		
(e) Engine driven fuel pump, Titan 410IB68, Type C6 2.5 lb. (+23.5)						x	x
(f) Electric auxiliary fuel pump, Lear ROMEC P2688-D 4 lb. (+18)						x	
(g) Electric auxiliary fuel pump, Airborne Mfg. Co. 286-9 4 lb. (+18)					x	x	x
(h) Engine-driven, Lear ROMEC RG17980D 2.5 lb. (-23.5)						x	x
108. (a) Oil radiator, Continental Motors P/N 8520912 5 lb. (-49)		x	x	x			
(b) Oil radiator, GMC Model AP13AV10-02 5 lb. (-55)					x		
(c) Oil radiator, Harrison Radiator Div. GMC, Model AP13AV06-01, P/N 8534108 5 lb. (-20.5)						x	x
109. Vacuum pump, Pesco B-11 4 lb. (-20)		x	x	x			

Engines and Engine Accessories - Fuel and Oil Systems (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
110. Hydraulic pumps							
(a) New York Air Brake model 67E025 2 lb. (-20)		x	x	x			
(b) Pesco No. 1P-677 2 lb. (-20)		x	x	x			
(c) Eastern Industries model 102-129 or 1235HEG 2 lb. (-20)	x	x	x	x			
2 lb. (-26)					x		
111. (a) Dry vacuum pump, Airborne Mechanisms, Model 10-113-A2, 113A5 or 200 CW 4 lb. (-20)		x	x	x			
4 lb. (-26)					x		
(b) Dry vacuum pump, Airborne Mechanisms Model 200 CCW 4 lb. (-26)						x	x
112. Auxiliary fuel tank 20 gal. Installed in accordance with Bellanca dwg. 19643 11 lb. (+72)		x	x	x	x		x
See NOTE 2(f) for placard required For the 14-19-2 only Flight Manual Supplement dated February 27, 1970 is required							
Revision to item 401(f) dated April 10, 1968 required					x		
113. Outboard wing auxiliary fuel tanks: (17 gal. each) Installed in accordance with Bellanca dwg. 192500 39 lb. (+29)				x	x	x	x
See NOTE 2(g) for placard required							
Revision to Item 401(e) dated April 10, 1968 required				x			
Revision to Item 401(f) dated May 18, 1967 required					x		
114. Oil filter, AC, FMA OF-81-A, P/N 6437032 2.5 lb. (-26)						x	x
Landing Gear							
201. Two main wheel-brake assemblies, 6.00-6, Type III							
(S/N prior to 2071) (+8)	x						
(S/N 2071 thru 4105) (+6)	x	x					
(S/N 4106 thru 4342) (+32)			x	x			
(S/N 30001 and up) (+38)					x		
(S/N 31001 and up) (+38)						x	
(S/N 32-1 and up) (+38)							x
(a) Goodrich model 605MD Brake assembly No. D-2-112 Wheel assembly No. D-3-105-MD 15 lb.	x						
(b) Firestone Wheel assembly No. DFA180 7 lb. (+6)		x					
Brake assembly No. CFA252 3 lb. (+6)		x					

Landing Gear (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
(c) Goodrich model 14-1132 Wheel assembly No. 3-958 7 lb. (+38)			x	x			
Brake assembly No. 2-747 3 lb. (+38)			x	x			
Eligible only with Goodrich master cylinders model 87-87 and Bellanca P/N's 19503-10 Inboard and 19503-20 Outboard Rudder Pedal shafts, 19503-1 brackets on 19504 Rudder Pedal Torque tubes.							
(d) Goodyear tubeless PD932-2 Wheel assembly 9532111 or 9532673 11 lb. (+38)			x	x	x		
Brake assembly 9532278 or 9532181 6 lb. (+38)			x	x	x		
Eligible only with Paramount master cylinders, model VHR .750, Bellanca P/N 19588 Inboard and 19589 Outboard Rudder Pedal shafts, 19592 brackets on 19504 Rudder Pedal Torque tubes for 14-19-3; 195268 Inboard and 195272 Outboard Rudder Pedal shafts for 14-19-3A and 17-30							
(e) Goodyear tube type PD932-2 wheel assembly 9532522 11 lb. (+38)					x	x	x
Brake assembly 9532278 or 9532181 6 lb. (+38)					x	x	x
(f) Cleveland Wheel assy. No. 40-75E 11 lb. (+38)					x	x	x
Cleveland Brake assy. B-30-52M 6 lb. (+38)					x	x	x
202. Two main wheel tires, 6-ply rating, Type III							
(S/N prior to 2071) (+8)	x						
(S/N 2071 thru 4105) (+6)	x	x					
(S/N 4106 thru 4342) (+38)			x	x			
(S/N 30001 and up) (+38)					x		
(S/N 31001 and up) (+38)						x	x
(a) 6.00-6 Tires and Tubes 17 lb. (+8)	x	x					
6.00-6 Tires and Tubes 20 lb. (+8)	x	x					
(b) 7.00-6 Tires and Tubes 19 lb. (+6)	x						
(c) 6.00-6 Tubeless 20 lb. (+38)			x	x	x		
(d) 6.00-6 Tires and Tubes 20 lb. (+38)					x	x	x
204. Tail wheel assembly							
(a) Firestone model 206-8B, swivel 6.0 x 2.0 3 lb. (+186)	x	x					
(b) Maule model SFS-12, swivel 6.00 x 2.50 4 lb. (+186)	x						
4 lb. (+181)		x					
Either (a) or (b) per Bellanca dwg. 18016							
(c) Maule hub and axle model SFS-P8, General Tire, 8.00, SC per Bellanca dwg. 18222. Use act. wt. chg.	x						
(d) Maule model P-8 hub and tire 3 lb. (+186)		x					

Landing Gear (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
205. Nose wheel assembly 6.00-6 Type III							
(a) Goodrich model D3609, MD-1 wheel assembly			x				
4 lb. (-40.5)							
(b) Goodyear PD941-1 wheel assembly 9532186							
5 lb. (-40.5)			x				
5 lb. (-46.5)					x	x	x
(c) One nose wheel tire, 6-ply and tube			x				
10 lb. (-40.5)							
(d) One nose wheel tire, 4-ply and tube			x				
9 lb. (-40.5)							
(e) Firestone wheel assembly DFA180			x				
4 lb. (-40.5)							
(f) Goodyear PD941 wheel assembly 9532112							
5 lb. (-40.5)			x	x			
5 lb. (-46.5)					x		
(g) One nose wheel tubeless tire, 4-ply			x				
9 lb. (-40.5)							
(h) One nose wheel tubeless tire, 6-ply rating, 15 x 6.00-6, Type III							
9 lb. (-40.5)				x			
9 lb. (-46.5)					x		
(i) One nose wheel tube type tire, 6-ply					x	x	x
9 lb. (-46.5)							
(j) Cleveland wheel assy. 40-76C							
11 lb. (+38)					x	x	x
Electrical Equipment							
301. Generator							
(a) 12 v. 25 a. Delco-Remy 1101882	x						
16 lb. (-21)							
(b) 12 v. 25 a. Delco-Remy 1101892		x					
16 lb. (-21)							
(c) 12 v. 50 a. Delco-Remy 1101912			x	x			
16 lb. (-21)							
16 lb. (-27)					x		
302. Batteries							
(a) 12 v. 34 a. hr. Bowers B-34	x						
26 lb. (+156)							
(b) 12 v. 33 a. hr. Reading R-331	x						
28 lb. (+156)							
(c) 12 v. 34 a. hr. Exide 6TAS-9B		x					
34 lb. (+156)							
(d) 12 v. 33 a. hr. Exide Type AC-69-1 wt. 27 lb. plus 6.5 lb. ballast			x				
34 lb. (+156)							
(e) 12 v. 33 a. hr. Exide Type AC-66 wt. 27 lb. plus 6.5 lb. ballast			x				
34 lb. (+156)							
(f) 12 v. 34 a. hr. Exide Type AC-78 wt. 28 lb. plus 5.5 lb. ballast							
34 lb. (+156)			x				
28 lb. (+86.5) or (+19.5)				x			
28 lb. (+86.5)					x	x	x
(g) 12 v. 35 a. hr. Rebat R-35							
28 lb. (+86.5)					x	x	x
(Model 17-30, S/N 30210 and up)							

Electrical Equipment (con.)	14-19	14-19-2	14-19-3	14-19-3A	17-30	17-31TC	17-31
303. G.E. 4509 landing light and 4503 taxi light in left wing per Bellanca dwg. 18182 (dwg. 19235 for 14-19-3; dwg. 192513 for 14-19-3A and 17-30) 2 lb. (+9)	x	x	x	x	x	x	x
304. Alternator							
(a) 12 v. 40 a. Prestolite ALE-8406 13 lb. (-52.5)						x	x
(b) 12 v. 50a. Prestolite ALY 8402-10A 13 lb. (-27.0) (S/N 30202 and up)					x		
305. Supplementary Lights Whelen Strobe Lights A429, A430 Installed per Bellanca dwg. 197263 2 lb. (+185)					x	x	x
Interior Equipment							
401. (a) FAA Approved Airplane Flight Manual dated February 6, 1950	x						
(b) FAA Approved Airplane Flight Manual dated January 17, 1957 (for aircraft with two valve fuel system)		x					
(c) FAA Approved Airplane Flight Manual revised August 7, 1959 (for aircraft with one valve fuel system)		x					
(d) FAA Approved Airplane Flight Manual dated September 1, 1959			x				
(e) FAA Approved Airplane Flight Manual dated March 1, 1963 with Revision No. 1 dated July 25,1963 (this AFM eligible only until November 22, 1969), or FAA Approved Airplane Flight Manual dated August 11, 1966 with Revision No. 5 dated October 26, 1968				x			
(f) FAA Approved Airplane Flight Manual dated September 21, 1966 with Revision No. 4 dated August 28, 1968					x		
(g) FAA Approved Airplane Flight Manual dated February 20, 1969						x	
(h) FAA Approved Airplane Flight Manual dated April 29, 1969							x
402. Flares (5 one-minute, International) 17 lb. (+86)	x	x	x	x	x	x	x
403. Stall warning indicator, Safe Flight Model R		x	x	x	x	x	x
404. Oxygen System, Sky-Ox Kit SK1001-4b-TV, Installed in accordance with Bellanca dwg. 196795 45 lb. (+86)						x	x

NOTE 1. Current weight and balance report, including list of equipment included in certificated weight empty, and loading instructions, must be in each aircraft at the time of original certification. A copy of the approved loading instructions should be posted inside the baggage compartment at all times.

The Model 14-19-2 certificated weight empty and corresponding center of gravity location must include unusable fuel of 25 lb. at +29 (included in total fuel capacity), and unusable oil of 9 lb. at -35 (included in total oil capacity).

The Models 14-19-3 and 14-19-3A certificated weight empty and corresponding center of gravity location must include unusable fuel of 25 lb.at +29 and unusable oil of 9 lb. at -35.

The Model 17-30 certificated empty weight and corresponding center of gravity location must include unusable fuel of 25 lb.at +29 and unusable oil of 11 lb. at -41.

For the Models 14-19-3A and 17-30 with optional outboard wing panel auxiliary fuel tanks add unusable fuel of 24 lb. to the above certificated weights for these models.

The Model 17-31TC certificated empty weight and corresponding center of gravity location must include unusable fuel of 26 lb. at +29 and undrainable oil of 3.7 lb. at -42.

The Model 17-31 certificated empty weight and corresponding center of gravity location must include unusable fuel of 26 lb. at +29 (item 113) and 1 lb. at +72 (item 112) and undrainable oil of 3.0 lb. at -42.

NOTE 2. The following placards must be displayed in addition to those listed in the limitations section of the Airplane Flight Manual:

(a) In front of and in clear view of the pilot:
  (1) Models 14-19 and 14-19-2
    "This airplane must be operated in compliance with operating limitations in the FAA Approved Airplane Flight Manual."
  (2) Models 14-19-3, 14-19-3A and 17-30
    "This airplane must be operated as a normal category airplane in compliance with the Approved Airplane Flight Manual."

(b) On left side of pilot's storm window:
  Models 14-19 and 14-19-2
  "Do not open above 110 m.p.h."

(c) On or adjacent to the auxiliary fuel tank selector valve when item 104 auxiliary fuel tank is installed:
  (1) "Auxiliary tank, 25 gal. - Use in level flight only."
  (2) "Caution: use fuel from only one tank at a time and keep valves in 'OFF' position when not in use."

(d) On or adjacent to the auxiliary fuel tank selector valve, when item 105 auxiliary fuel tank is installed:
  (1) "Auxiliary tank, 14 gal. - Use in level flight only."
  (2) "Caution: (for two valve fuel system) - use fuel from only one tank at a time and keep valves in 'OFF' position when not in use."

(e) On or adjacent to fuel tank selector valve when item 106 auxiliary fuel tanks are installed:
  (1) "Auxiliary tanks - use in level flight only - 14 gal. rear, 18.5 gal. auxiliary."
  (2) "Caution: use fuel from only one tank at a time and keep valves in 'OFF' position when not in use." (Required for two valve fuel system only).

NOTE 2. (con)

(f) On or adjacent to the fuel tank selector valve when item 112, auxiliary fuel tank is installed:
"Auxiliary tank 20 gal. - use in level flight only."

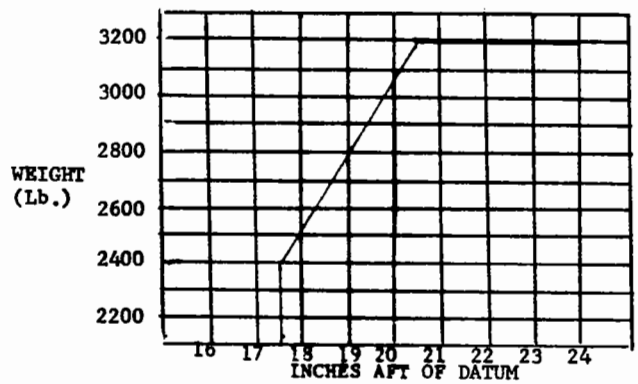
(g) On or adjacent to the fuel tank selector valve when item 113, outboard wing auxiliary fuel tanks are installed:
"Left auxiliary tank 17 gal. - use in level flight only. Right auxiliary tank 17 gal. - use in level flight only. Fuselage auxiliary tank 20 gal. - use in level flight only. The fuel remaining in the tank when the gage reads zero cannot be used safely in flight."

NOTE 3. No life limited structural components.

NOTE 4. The following airplanes may be operated at the weights and center of gravity ranges shown below when Bellanca Kit No. SK-1024 is installed.

Model 17-30	Serial Nos. 30001 thru 30262
Model 17-31	Serial Nos. 32-1 thru 32-14
Model 17-31TC	Serial Nos. 31001 thru 31003

C.G. Range (Landing gear extended)	(+20.6) to (+24.0) at 3200 lb. (+17.75) to (+24.0) at 2400 lb. or less Straight line variation between points
Empty wt. C.G. range	None
Maximum weight	3200 lb.
No. of seats	4 (2 at +20, 2 at +53)
Maximum baggage	Model 17-30: 186 lb. max. (+84), 35 lb. min. Models 17-31 and 17-31TC: 166 lb. max. (+84), 35 lb. min. (See Loading Schedule)



... END ...

Model:_____ Serial No. _____ Reg. No. _____

Circle Type Inspection - See Note -- p. 2 25 100 500 1000 Periodic	Items Blocked Out Not Necessary Under Indicated Inspection

Description	25	100	500	1000
A. **ENGINE GROUP**				
Ground Magneto When Working on Ignition				
1. Remove engine cowl & clean engine.	X			
2. Drain oil, check & clean screens				
3. Check engine seals & clamps for leaks & tightness.				
4. Check ignition harnesses				
5. Replace or clean spark plugs as required				
6. Check magneto per Continental Manual	X			
7. Check condenser action & coil leaks.	X			
8. Check magneto for correct timing	X			
9. Overhaul or replace magnetos	X	X	X	
10. Check engine controls for travel & condition				
11. Check engine mount				
12. Check rubber engine mount bushings				
13. Check exhaust stacks & attachment bolts.				
14. Replace exhaust stack gaskets as required.				
15. Check all engine baffles	X			
16. Remove air cleaner screen and clean per Owner's Manual				
17. Check vacuum pump, oil separator & lines	X			
18. Overhaul or replace vacuum pump.	X	X	X	
19. Inspect condition of flexible fuel lines	X			
20. Replace flexible fuel lines, if necessary.	X	X	X	
21. Check fuel pumps for operation (engine driven & electric).	X			
22. Clean screens on fuel pumps.	X			
23. Fill engine with oil as per information in Owner's Manual.				
24. Major overhaul or replacement of engine (SEE BELOW)	X	X	X	
25. Clean oil radiator cooling fins.	X			
26. Remove & flush oil radiator.	X	X		
27. Replace or overhaul governor	X	X	X	
28. Check firewall seals	X			
29. Check fluid in brake reservoirs.				
30. Check battery & cables . . . Fill per instructions				
31. Check cowl for cracks.				
32. Flush battery section-belly.	X			

CONTINENTAL ENGINES (Refer to Continental Service Bulletin M68-15)

" " Model IO-470 Series (260 H.P.) . . 1500 Hours

" " Model IO-520-D . . . . . 1500 Hours

" " Model IO-520-K1A . . . . . 1500 Hours

LYCOMING ENGINES (Refer to Lycoming Service Instruction No. 1009R)

" " Model IO-540-G1E5. . . . . 1400 Hours

" " Model IO-540-G1F5. . . . . 1400 Hours

" " Model IO-540-K1E5. . . . . 1800 Hours

Date _____ Mechanic _____ Page 1 of 2

(Over)

		25	100	500	1000
B.	PROPELLER GROUP				
1.	Rotate blades & check for tightness.	X			
2.	Inspect hub parts for cracks				
3.	Check prop. mounting bolts				
4.	Check bolt torque per Propeller Manual	X			
5.	Check pitch actuating arms & bolts	X			
6.	Check spinner mounting brackets.	X			
7.	Check for grease & oil leaks				
8.	Inspect blades for nicks & cracks.				
9.	Lubricate Propeller as rqd.				
10.	Overhaul propeller	X	X	X	
11.	Clean & install spinner.				
C.	CABIN GROUP				
1.	Check control wheel, pulleys & cables.	X			
2.	Check parking brake & handle for operations & cylinder leaks				
3.	Check trim operation				
4.	Check instruments, lines & attachments	X			
5.	Check vacuum & electric instruments (overhaul as rqd.)	X			
6.	Check cabin door & windows for damage & operation.				
7.	Check upholstery for tears	X			
8.	Check seats, seat belts, securing brackets & bolts	X			
9.	Check landing, navigation, cabin & instrument lights				
10.	Check operation of fuel valve.				
11.	Compass correction card in aircraft.	X			
12.	Clean filters on gyro horizon & directional gyro	X	X		
13.	Recalibrate Altimeter	X	X		
D.	LANDING GEAR GROUP				
1.	Put airplane on jacks.	X			
2.	Remove wheels, clean & repack bearings	X			
3.	Check brake shoes & disc	X			
4.	Check wheels for cracks, broken bolts.				
5.	Check tires for wear				
6.	Check entire gear for operation & cracks				
7.	Check brake lines.	X			
8.	Check wheels for alignment	X			
9.	Check gear wells & clean out residue				
10.	Check nose gear steering	X			
11.	Retract gear-check clearance & operation	X			
12.	Check warning horn, lights & rigging per Owner's Manual.	X			
13.	Check tire pressure.	X			
14.	Lubricate per Owner's Manual				

		25	100	500	1000
15.	Check nutcrackers replace if necessary.				
16.	Check draglink bolts - replace if necessary	X			
17.	Check oleo fluid level (MIL-H 5606)	X			
18.	Clean kick down assembly.				
19.	Check hyd. fluid level in reservoir (MIL-H 5606).				
E.	WING GROUP				
1.	Remove inspection plates & fairings at wing roots				
2.	Check surfaces, tips, and walkway for damage.	X			
3.	Ck. aileron system for damage & operation	X			
4.	Check flap system for damage & operation.	X			
5.	Check fuel tanks & lines for leaks & water.	X			
6.	Drain & clean strainer bowl				
7.	Fuel tanks marked for capacity.	X			
8.	Fuel tanks marked for minimum octane rating	X			
9.	Check wing attachment bolts	X			
10.	Lubricate per Owner's Manual.				
11.	Check pins & bolts used as hinges	X			
12.	Remove all inspection plates & fairings	X			
F.	FUSELAGE & EMPENNAGE GROUP				
1.	Check elevator system for damage & operation.	X			
2.	Check rudder system for damage & operation.	X			
3.	Check trim mechanisms	X			
4.	Check longerons for damage.	X			
5.	Check landing gear powerpak attachment, hose & fittings	X			
6.	Check emergency operation of gear	X			
7.	Check fuel lines, valve & gauges for damage & operation	X			
8.	Check radio & Auto Pilot installation	X			
9.	Lubricate per Owner's Manual.	X			
10.	Check pins & bolts used as hinges	X			
G.	OPERATION CHECK/PRE-FLIGHT				
1.	Check fuel pump, fuel tank selector				
2.	Check fuel pressure & quan.				
3.	Check oil pressure & temp				
4.	Check generator output.				
5.	Check manifold pressure				
6.	Check parking brake				
7.	Check gyros for noise & roughness				
8.	Check cabin heater operation.				
9.	Check magneto switch oper				

Date_____ Mechanic_____

Model_____ S/N _____

	25	100	500	1000
10. Check magneto RPM variation.				
11. Check throttle operation				
12. Check propeller smoothness				
13. Check propeller governor action.				
14. Check radio & Auto Pilot operation				
15. Check engine idle (550 RPM).				
H. GENERAL				
1. Aircraft conforms to FAA specifications.				
2. Manufacturer's Service Letters complied with				
3. Aircraft papers in proper order.				

Signature of Mechanic	Certificate No.	Date	Total Time on Ship

MODEL S/N

REMARKS:

OWNER: _____

*NOTE: Both the periodic and 100 hour inspections are complete inspections of the aircraft-identical in scope. The periodic inspection must be accomplished by a mechanic with an inspection authorization, a repair station, or the aircraft manufacturer; the 100 hr. insp. may be performed by any certificated rated mechanic.

Model:_____ Serial No. _____ Reg. No. _____

Circle Type Inspection - See Note -- p. 2 25 100 500 1000 Periodic	Items Blocked Out Not Necessary Under Indicated Inspection

Description	25	100	500	1000
A. ENGINE GROUP				
Ground Magneto When Working on Ignition				
1. Remove engine cowl & clean engine.	X			
2. Drain oil, check & clean screens				
3. Check engine seals & clamps for leaks & tightness.				
4. Check ignition harnesses				
5. Replace or clean spark plugs as required				
6. Check magneto per Continental Manual	X			
7. Check condenser action & coil leaks.	X			
8. Check magneto for correct timing	X			
9. Overhaul or replace magnetos	X	X	X	
10. Check engine controls for travel & condition				
11. Check engine mount				
12. Check rubber engine mount bushings				
13. Check exhaust stacks & attachment bolts.				
14. Replace exhaust stack gaskets as required.				
15. Check all engine baffles	X			
16. Remove air cleaner screen and clean per Owner's Manual				
17. Check vacuum pump, oil separator & lines	X			
18. Overhaul or replace vacuum pump.	X	X	X	
19. Inspect condition of flexible fuel lines	X			
20. Replace flexible fuel lines, if necessary.	X	X	X	
21. Check fuel pumps for operation (engine driven & electric).	X			
22. Clean screens on fuel pumps.	X			
23. Fill engine with oil as per information in Owner's Manual.				
24. Major overhaul or replacement of engine (SEE BELOW)	X	X	X	
25. Clean oil radiator cooling fins.	X			
26. Remove & flush oil radiator.	X	X		
27. Replace or overhaul governor	X	X	X	
28. Check firewall seals	X			
29. Check fluid in brake reservoirs.				
30. Check battery & cables . . . Fill per instructions				
31. Check cowl for cracks.				
32. Flush battery section-belly.	X			

CONTINENTAL ENGINES (Refer to Continental Service Bulletin M68-15)

" " Model IO-470 Series (260 H.P.) . . 1500 Hours
" " Model IO-520-D . . . . . 1500 Hours
" " Model IO-520-K1A . . . . . 1500 Hours

LYCOMING ENGINES (Refer to Lycoming Service Instruction No. 1009R)

" " Model IO-540-G1E5. . . . . 1400 Hours
" " Model IO-540-G1F5. . . . . 1400 Hours
" " Model IO-540-K1E5. . . . . 1800 Hours

Date _____ Mechanic _____ Page 1 of 2

(Over)

		25	100	500	1000
B.	**PROPELLER GROUP**				
1.	Rotate blades & check for tightness.	X			
2.	Inspect hub parts for cracks				
3.	Check prop. mounting bolts				
4.	Check bolt torque per Propeller Manual	X			
5.	Check pitch actuating arms & bolts	X			
6.	Check spinner mounting brackets.	X			
7.	Check for grease & oil leaks				
8.	Inspect blades for nicks & cracks.				
9.	Lubricate Propeller as rqd.				
10.	Overhaul propeller	X	X	X	
11.	Clean & install spinner.				
C.	**CABIN GROUP**				
1.	Check control wheel, pulleys & cables.	X			
2.	Check parking brake & handle for operations & cylinder leaks				
3.	Check trim operation				
4.	Check instruments, lines & attachments	X			
5.	Check vacuum & electric instruments (overhaul as rqd.)	X			
6.	Check cabin door & windows for damage & operation.				
7.	Check upholstery for tears	X			
8.	Check seats, seat belts, securing brackets & bolts	X			
9.	Check landing, navigation, cabin & instrument lights				
10.	Check operation of fuel valve.				
11.	Compass correction card in aircraft.	X			
12.	Clean filters on gyro horizon & directional gyro	X	X		
13.	Recalibrate Altimeter	X	X		
D.	**LANDING GEAR GROUP**				
1.	Put airplane on jacks.	X			
2.	Remove wheels, clean & repack bearings	X			
3.	Check brake shoes & disc	X			
4.	Check wheels for cracks, broken bolts.				
5.	Check tires for wear				
6.	Check entire gear for operation & cracks				
7.	Check brake lines.	X			
8.	Check wheels for alignment	X			
9.	Check gear wells & clean out residue				
10.	Check nose gear steering	X			
11.	Retract gear-check clearance & operation	X			
12.	Check warning horn, lights & rigging per Owner's Manual.	X			
13.	Check tire pressure.	X			
14.	Lubricate per Owner's Manual				

BELLANCA AIRCRAFT INSPECTION REPORT

Model:_____ Serial No. _____ Reg. No. _____

Circle Type Inspection -- See Note -- p. 2 25 100 500 1000 Periodic	Items Blocked Out Not Necessary Under Indicated Inspection

Description	25	100	500	1000
A. ENGINE GROUP				
Ground Magneto When Working on Ignition				
1. Remove engine cowl & clean engine	X			
2. Drain oil, check & clean screens				
3. Check engine seals & clamps for leaks & tightness				
4. Check ignition harnesses				
5. Replace or clean spark plugs as required				
6. Check magneto per Continental Manual	X			
7. Check condenser action & coil leaks	X			
8. Check magneto for correct timing	X			
9. Overhaul or replace magnetos	X	X	X	
10. Check engine controls for travel & condition				
11. Check engine mount				
12. Check rubber engine mount bushings				
13. Check exhaust stacks & attachment bolts				
14. Replace exhaust stack gaskets as required				
15. Check all engine baffles	X			
16. Remove air cleaner screen and clean per Owner's Manual				
17. Check vacuum pump, oil separator & lines	X			
18. Overhaul or replace vacuum pump	X	X	X	
19. Inspect condition of flexible fuel lines	X			
20. Replace flexible fuel lines, if necessary	X	X	X	
21. Check fuel pumps for operation (engine driven & electric)	X			
22. Clean screens on fuel pumps	X			
23. Fill engine with oil as per information in Owner's Manual				
24. Major overhaul or replacement of engine (SEE BELOW)	X	X	X	
25. Clean oil radiator cooling fins	X			
26. Remove & flush oil radiator	X	X		
27. Replace or overhaul governor	X	X	X	
28. Check firewall seals	X			
29. Check fluid in brake reservoirs				
30. Check battery & cables . . . Fill per instructions				
31. Check cowl for cracks				
32. Flush battery section-belly	X			

CONTINENTAL ENGINES (Refer to Continental Service Bulletin M68-15)

" " Model IO-470 Series (260 H.P.) . . 1500 Hours

" " Model IO-520-D . . . . . 1500 Hours

" " Model IO-520-K1A . . . . . 1500 Hours

LYCOMING ENGINES (Refer to Lycoming Service Instruction No. 1009R)

" " Model IO-540-G1E5. . . . . 1400 Hours

" " Model IO-540-G1F5. . . . . 1400 Hours

" " Model IO-540-K1E5. . . . . 1800 Hours

Date _____ Mechanic _____ Page 1 of 2

(Over)

		25	100	500	1000
B.	PROPELLER GROUP				
1.	Rotate blades & check for tightness.	X			
2.	Inspect hub parts for cracks				
3.	Check prop. mounting bolts				
4.	Check bolt torque per Propeller Manual	X			
5.	Check pitch actuating arms & bolts	X			
6.	Check spinner mounting brackets.	X			
7.	Check for grease & oil leaks				
8.	Inspect blades for nicks & cracks.				
9.	Lubricate Propeller as rqd.				
10.	Overhaul propeller	X	X	X	
11.	Clean & install spinner.				
C.	CABIN GROUP				
1.	Check control wheel, pulleys & cables.	X			
2.	Check parking brake & handle for operations & cylinder leaks.				
3.	Check trim operation				
4.	Check instruments, lines & attachments	X			
5.	Check vacuum & electric instruments (overhaul as rqd.)	X			
6.	Check cabin door & windows for damage & operation.				
7.	Check upholstery for tears	X			
8.	Check seats, seat belts, securing brackets & bolts	X			
9.	Check landing, navigation, cabin & instrument lights				
10.	Check operation of fuel valve.				
11.	Compass correction card in aircraft.	X			
12.	Clean filters on gyro horizon & directional gyro	X	X		
13.	Recalibrate Altimeter	X	X		
D.	LANDING GEAR GROUP				
1.	Put airplane on jacks.	X			
2.	Remove wheels, clean & repack bearings	X			
3.	Check brake shoes & disc	X			
4.	Check wheels for cracks, broken bolts.				
5.	Check tires for wear				
6.	Check entire gear for operation & cracks				
7.	Check brake lines.	X			
8.	Check wheels for alignment	X			
9.	Check gear wells & clean out residue				
10.	Check nose gear steering	X			
11.	Retract gear-check clearance & operation	X			
12.	Check warning horn, lights & rigging per Owner's Manual.	X			
13.	Check tire pressure.	X			
14.	Lubricate per Owner's Manual				

		25	100	500	1000
15.	Check nutcrackers replace if necessary.				
16.	Check draglink bolts - replace if necessary	X			
17.	Check oleo fluid level (MIL-H 5606)	X			
18.	Clean kick down assembly.				
19.	Check hyd. fluid level in reservoir (MIL-H 5606).				
E.	WING GROUP				
1.	Remove inspection plates & fairings at wing roots				
2.	Check surfaces, tips, and walkway for damage.	X			
3.	Ck. aileron system for damage & operation	X			
4.	Check flap system for damage & operation.	X			
5.	Check fuel tanks & lines for leaks & water.	X			
6.	Drain & clean strainer bowl				
7.	Fuel tanks marked for capacity.	X			
8.	Fuel tanks marked for minimum octane rating	X			
9.	Check wing attachment bolts	X			
10.	Lubricate per Owner's Manual,				
11.	Check pins & bolts used as hinges	X			
12.	Remove all inspection plates & fairings	X			
F.	FUSELAGE & EMPENNAGE GROUP				
1.	Check elevator system for damage & operation.	X			
2.	Check rudder, system for damage & operation.	X			
3.	Check trim mechanisms	X			
4.	Check longerons for damage.	X			
5.	Check landing gear powerpak attachment, hose & fittings	X			
6.	Check emergency operation of gear	X			
7.	Check fuel lines, valve & gauges for damage & operation	X			
8.	Check radio & Auto Pilot installation	X			
9.	Lubricate per Owner's Manual.	X			
10.	Check pins & bolts used as hinges	X			
G.	OPERATION CHECK/PRE-FLIGHT				
1.	Check fuel pump, fuel tank selector				
2.	Check fuel pressure & quan.				
3.	Check oil pressure & temp				
4.	Check generator output,				
5.	Check manifold pressure				
6.	Check parking brake				
7.	Check gyros for noise & roughness				
8.	Check cabin heater operation.				
9.	Check magneto switch oper				

	25	100	500	1000
10. Check magneto RPM variation.				
11. Check throttle operation				
12. Check propeller smoothness				
13. Check propeller governor action.				
14. Check radio & Auto Pilot operation				
15. Check engine idle (550 RPM).				
H. GENERAL				
1. Aircraft conforms to FAA specifications.				
2. Manufacturer's Service Letters complied with				
3. Aircraft papers in proper order.				

Signature of Mechanic	Certificate No.	Date	Total Time on Ship

MODEL S/N

REMARKS:

OWNER: _____

*NOTE: Both the periodic and 100 hour inspections are complete inspections of the aircraft-identical in scope. The periodic inspection must be accomplished by a mechanic with an inspection authorization, a repair station, or the aircraft manufacturer; the 100 hr. insp. may be performed by any certificated rated mechanic.

		25	100	500	1000
15.	Check nutcrackers replace if necessary.				
16.	Check draglink bolts - replace if necessary	X			
17.	Check oleo fluid level (MIL-H 5606)	X			
18.	Clean kick down assembly.				
19.	Check hyd. fluid level in reservoir (MIL-H 5606).				
E.	WING GROUP				
1.	Remove inspection plates & fairings at wing roots				
2.	Check surfaces, tips, and walkway for damage.	X			
3.	Ck. aileron system for damage & operation	X			
4.	Check flap system for damage & operation.	X			
5.	Check fuel tanks & lines for leaks & water.	X			
6.	Drain & clean strainer bowl				
7.	Fuel tanks marked for capacity.				
8.	Fuel tanks marked for minimum octane rating	X			
9.	Check wing attachment bolts	X			
10.	Lubricate per Owner's Manual.				
11.	Check pins & bolts used as hinges	X			
12.	Remove all inspection plates & fairings	X			
F.	FUSELAGE & EMPENNAGE GROUP				
1.	Check elevator system for damage & operation.	X			
2.	Check rudder, system for damage & operation.	X			
3.	Check trim mechanisms	X			
4.	Check longerons for damage.	X			
5.	Check landing gear powerpak attachment, hose & fittings	X			
6.	Check emergency operation of gear	X			
7.	Check fuel lines, valve & gauges for damage & operation	X			
8.	Check radio & Auto Pilot installation	X			
9.	Lubricate per Owner's Manual.	X			
10.	Check pins & bolts used as hinges	X			
G.	OPERATION CHECK/PRE-FLIGHT				
1.	Check fuel pump, fuel tank selector				
2.	Check fuel pressure & quan.				
3.	Check oil pressure & temp				
4.	Check generator output,				
5.	Check manifold pressure				
6.	Check parking brake				
7.	Check gyros for noise & roughness				
8.	Check cabin heater operation.				
9.	Check magneto switch oper				

	25	100	500	1000
10. Check magneto RPM variation.				
11. Check throttle operation				
12. Check propeller smoothness				
13. Check propeller governor action.				
14. Check radio & Auto Pilot operation				
15. Check engine idle (550 RPM).				
H. GENERAL				
1. Aircraft conforms to FAA specifications.				
2. Manufacturer's Service Letters complied with				
3. Aircraft papers in proper order.				

Signature of Mechanic	Certificate No.	Date	Total Time on Ship

MODEL S/N

REMARKS:

OWNER: _____

*NOTE: Both the periodic and 100 hour inspections are complete inspections of the aircraft-identical in scope. The periodic inspection must be accomplished by a mechanic with an inspection authorization, a repair station, or the aircraft manufacturer; the 100 hr. insp. may be performed by any certificated rated mechanic.

SECTION IX

FUEL SYSTEM

9- 1. FUEL SYSTEM DESCRIPTION. The fuel system consists of three interconnected aluminum cells in each wing and an optional auxiliary aluminum tank installed aft of the rear seat. Fuel flows to the selector valve, strainer/drain, electric auxiliary pump, engine driven pump, and fuel control unit. An engine fuel return line routes the excess fuel back to the tank supplying the engine via the fuel selector. See Figure 9-1 for schematic of fuel system.

9- 2. FUEL QUANTITY INDICATORS. Fuel quantity is measured by separate capacitance type gauge in each wing tank and a float type system in the fuselage tank.

9- 3. CAPACITANCE FUEL GAUGE SYSTEM. A capacitance transmitting probe is located in the middle and inboard wing tanks. The probes are connected to a gauge control monitor which is mounted on the fuselage under the leading edge wing root fairing.

9- 4. INBOARD WING FUEL QUANTITY PROBE, REMOVAL AND INSTALLATION.

a. Remove access cover on top of wing near wing root.
b. Remove safety wire, electrical connections, then probe.
c. Install using reverse procedures for removal.

9- 5. MIDDLE WING FUEL QUANTITY PROBE, REMOVAL AND INSTALLATION.

a. Remove triangular access cover under the wheel well on the outboard rib.
b. Remove electrical wires to triangular access cover mounted on the fuel tank, then remove access cover.
c. Use a flashlight and mirror to determine proper installation prior to probe removal.
d. Cut safety wire and slide probe out.
e. Install using the reverse procedures for removal.

9- 6. CALIBRATION OF FUEL SYSTEM. The capacitance fuel gauge system is set at the factory. If the indicator appears to be reading erroneously, one of the system components may need replacement. If a replacement is made, the system must be recalibrated as follows:

Simulator Method (Fuel Quantity Simulator, SK789-6005-20 Required)

a. Remove the leading edge fairing for access to the control monitor.
b. Tail the airplane down until it rests on the main wheels and tail skid.
c. Disconnect the main fuel feed line from the engine driven fuel pump.
d. Drain fuel with fuel boost pump until tank to be calibrated is empty.

CAUTION

Do not allow the hose to touch any live electrical terminal.

e. Leval aircraft with leveling points.
f. Measure in four gallons of fuel by weight at 6 lbs./gal.
g. Locate the two adjusting pots on the control monitor, marked "E" and "F".
h. Check the empty "E" pot first. Turn screw until the needle on panel instrument reads "E" (top of red arc).

i. Plug simulator into connector plug and adjust the full "F" pot by turning screw, until needle reads three quarter full.
j. Disconnect simulator and recheck empty reading. If "E" requires readjustment, reconnect the simulator and recheck three quarter full. Repear until both settings are satisfactory.
k. After "E" adjustments are complete, measure 7-1/2 gallons of fuel and check the 1/4 indication.
l. Measure in another 7-1/2 gallons of fuel and check the 1/2 indication.
m. Measure in another 7-1/2 gallons of fuel and check the 3/4 indication.

Alternate Method of Calibration (Fuel Quantity Simulator Not Required)

a. Perform steps (a) through (h) described in Simulator Method.
b. Measure in 22-1/2 gallons of fuel by weight at 6 lbs./gal. in 7-1/2 gallon increments checking 1/4, 1/2, and 3/4 indicators. If 3/4 reading is correct at 22.5 gal., calibration is completed. If not, connect, proceed to step (c).
c. Adjust "F" for 3/4, then drain tank completely, add 4 gallons and check empty. If empty reading is correct, calibration is completed. If not correct, proceed to step (d).
d. Adjust "E" for empty, then fill tank with 22-1/2 gallons and recheck 3/4 reading. Repear steps (c) and (d) until correct.

NOTE

Rechecking both empty and 3/4 settings is required anytime either the "E" or "F" pot is adjusted.

9- 7. TROUBLESHOOTING THE CAPACITANCE FUEL SYSTEM.

Problem #1 - Gauge Needle Reads Below Empty

a. Check electrical power to fuel gauge at pin #2 on fuel gauge plug; volgage should be 12 volts DC.

b. Check voltage at meter input pin. This is pin "C" on the right side and pin "D" on the left side. At empty, voltage should be approximately 1/2 volt DC. At full, voltage should be approximately 4-1/2 volts DC.

c. Check continuity of meter input wire from pin #1 on control monitor to pi "C" or "D". The control monitor is located under the wing leading edge fairing.

d. Remove nylon plug from control monitor and check continutiy between pin 10 and ground, pin 12 and ground, and between pins 10 and 12 there should be no continuity between these points. If continuity exists between pin 10 and ground, check all connections of probe wire harness to be sure shielding is not touching main wire. If continuity exists between pin 12 and ground, check fastening of wire in wheel well area for possible grounding.

Problem #2 - Unable to adjust Empty and 3/4 Readings on Gauge Prior to Filling Tanks During Calibration Procedure

a. Replace control monitor and recalibrate system.

Problem #3 - Gauge Fluctuates in Flight

a. Check electrical plug behind gauge for loose connections.

b. Check for intermittent or loose connections at probes.

c. Replace fuel gauge and check operation.

Problem #4 - When Filling Tanks, Fuel Indication on Gauge Rises and Then Decreases

a. Check inboard probe for loose connections or shorting of wires.

b. Replace inboard probe.

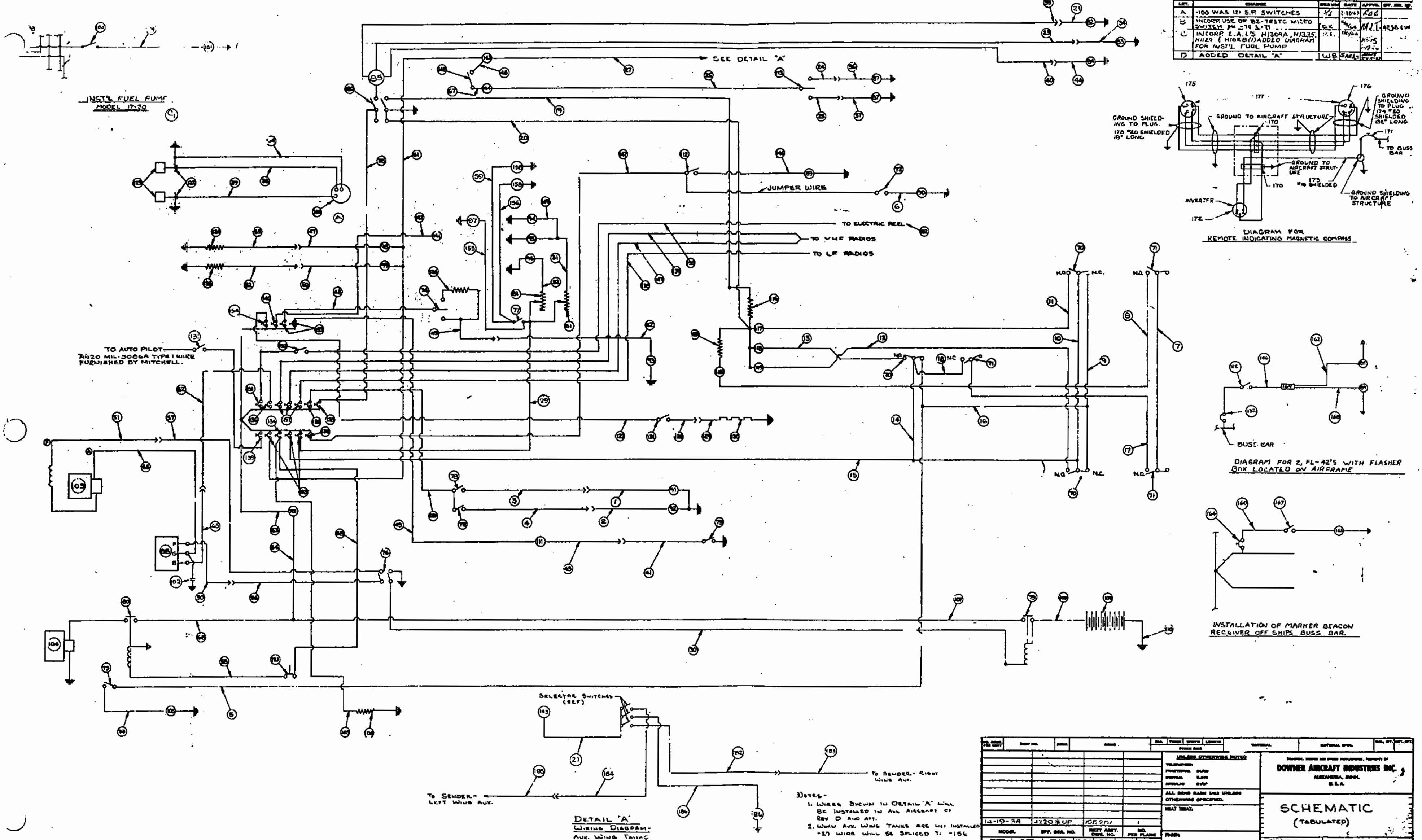
Problem #5 - Gauge Will Not Indicate Over 1/2 With Tanks Full of Fuel

a. Check outboard probe for loose connections or shorting of wires.

b. Replace control monitor and recalibrate system.

REVISIONS

LTR.	CHANGE	DRAWN	DATE	APPVD.	EFF. SER. NO.
A	-100 WAS (2) S.P. SWITCHES	[illegible]	1-10-63	RDG	
B	INCORP. USE OF BZ-TESTC MICRO SWITCH P/N -70 & -71	D.K.	[illegible]	M.I.T.	4238 & UP
C	INCORP. E.A.I.'S H1309A, H1335, H1129 & H1028B(1) ADDED DIAGRAM FOR INST'L FUEL PUMP	R.S.	[illegible]	[illegible]	
D	ADDED DETAIL "A"	W.B.	[illegible]	[illegible]	



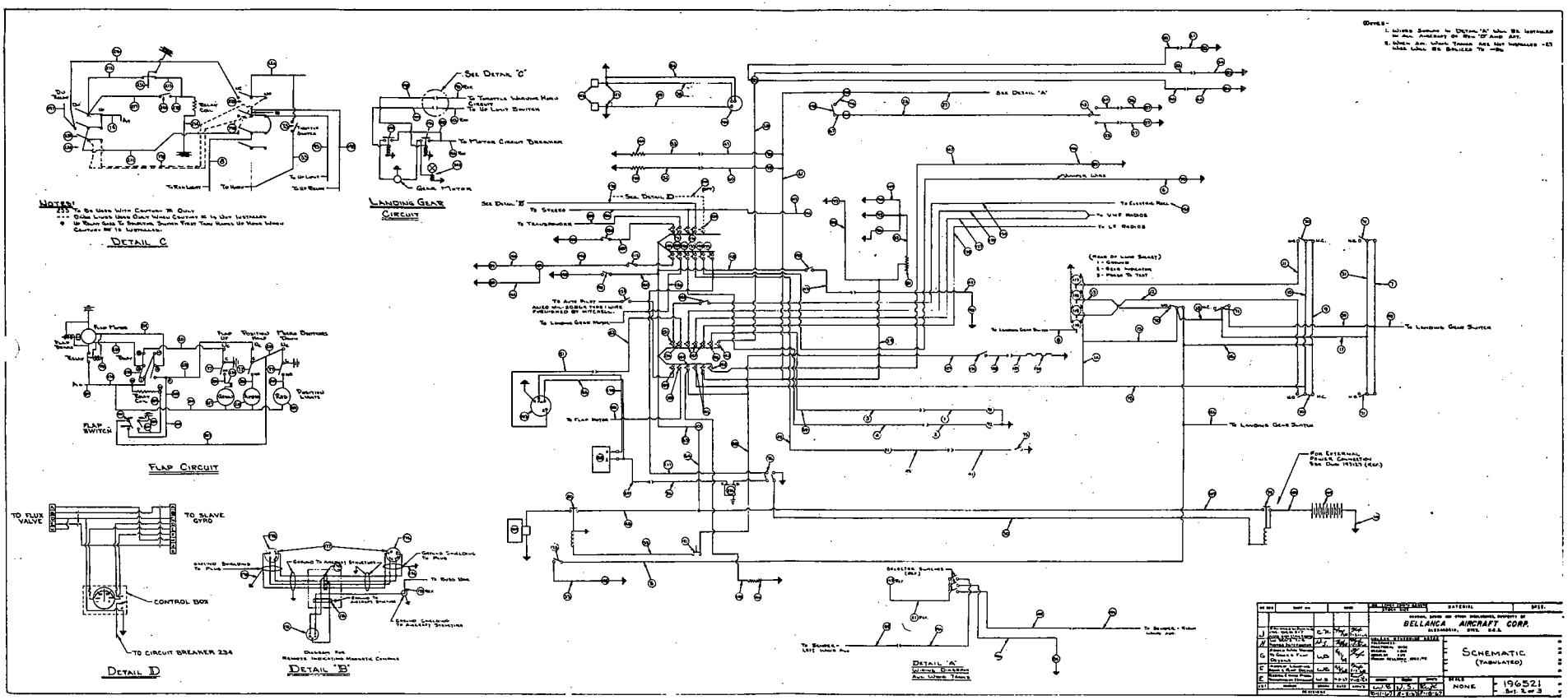
NOTES -

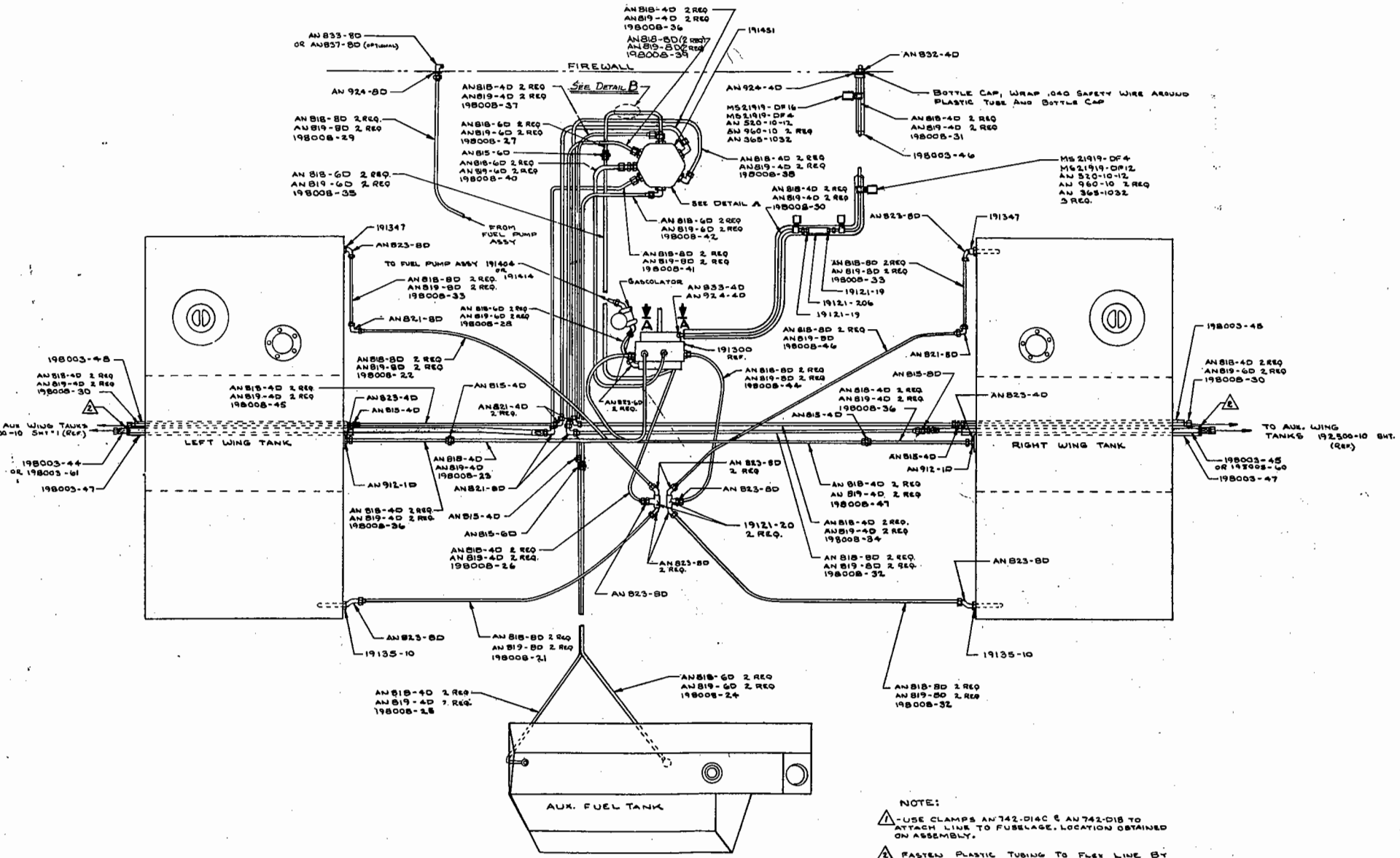
1. WIRES SHOWN IN DETAIL "A" WILL BE INSTALLED IN ALL AIRCRAFT OF REV D AND AFT.
2. WHEN AUX. WING TANKS ARE NOT INSTALLED -27 WIRE WILL BE SPLICED TO -186

DOWNER AIRCRAFT INDUSTRIES INC.
ALEXANDRIA, MINN.
U.S.A.

SCHEMATIC
(TABULATED)

14-19-3A | 4229 & UP | 196521
MODEL | EFF. SER. NO.
N.Y.
9/1/62
SCALE: NONE
196521
196217
SH'T 2 OF 2


DETAIL C
LANDING GEAR CIRCUIT
FLAP CIRCUIT
DETAIL D
DETAIL 'B'
DETAIL 'A'
BELLANCA AIRCRAFT CORP.
SCHEMATIC (TABULATED)
196521


FIREWALL
AN 833-8D OR AN837-8D (OPTIONAL)
AN 924-8D
AN818-8D 2 REQ. AN819-8D 2 REQ 198008-29
AN 818-6D 2 REQ. AN 819-6D 2 REQ 198008-35
AN818-4D 2 REQ AN819-4D 2 REQ 198008-36
AN818-8D(2 REQ) AN819-8D 2 REQ 198008-39
191451
AN818-4D 2 REQ AN819-4D 2 REQ 198008-37
SEE DETAIL B
AN818-6D 2 REQ AN819-6D 2 REQ 198008-27
AN815-6D
AN818-6D 2 REQ AN819-6D 2 REQ 198008-40
FROM FUEL PUMP ASSY
AN924-4D
AN832-4D
MS21919-DF16 MS21919-DF4 AN 520-10-12 AN 960-10 2 REQ AN 365-1032
BOTTLE CAP, WRAP .040 SAFETY WIRE AROUND PLASTIC TUBE AND BOTTLE CAP
AN818-4D 2 REQ AN819-4D 2 REQ 198008-31
198003-46
AN818-4D 2 REQ AN819-4D 2 REQ 198008-38
MS21919-DF4 MS21919-DF12 AN 520-10-12 AN 960-10 2 REQ AN 365-1032 3 REQ.
SEE DETAIL A
AN818-4D 2 REQ AN819-4D 2 REQ 198008-30
AN818-6D 2 REQ AN819-6D 2 REQ 198008-42
AN818-8D 2 REQ AN819-8D 2 REQ 198008-41
AN823-8D
191347
TO FUEL PUMP ASSY 191404 OR 191414
AN818-8D 2 REQ. AN819-8D 2 REQ. 198008-33
AN821-8D
GASCOLATOR
AN833-4D AN924-4D
AN818-6D 2 REQ AN819-6D 2 REQ 198008-28
AN818-8D 2 REQ AN819-8D 2 REQ 198008-33
191219
191219-19
191219-206
191219-19
AN818-8D 2 REQ AN819-8D 198008-46
191300 REF.
AN818-8D 2 REQ AN819-8D 2 REQ 198008-44
AN818-8D 2 REQ AN819-8D 2 REQ 198008-22
AN821-8D
198003-48
AN818-4D 2 REQ AN819-4D 2 REQ 198008-30
AN818-4D 2 REQ AN819-4D 2 REQ 198008-45
AN823-4D
AN815-4D
AN821-4D 2 REQ.
AN823-6D 2 REQ.
AN818-4D 2 REQ AN819-4D 2 REQ 198008-36
AN815-8D
AN823-4D
AN815-4D
AN912-1D
TO AUX WING TANKS 192500-10 SHT 1 (REF)
LEFT WING TANK
RIGHT WING TANK
TO AUX. WING TANKS 192500-10 SHT. (REF)
198003-44 OR 198003-61
198003-47
AN818-4D AN819-4D 198008-23
AN821-8D
AN818-4D 2 REQ AN819-4D 2 REQ. 198008-36
AN815-4D
AN815-6D
AN818-4D 2 REQ AN819-4D 2 REQ. 198008-26
AN823-8D 2 REQ.
AN823-8D
1912.1-20 2 REQ.
AN818-4D 2 REQ AN819-4D 2 REQ 198008-47
AN818-4D 2 REQ. AN819-4D 2 REQ 198008-34
AN818-8D 2 REQ. AN819-8D 2 REQ. 198008-32
AN823-8D
AN823-8D
19135-10
AN818-8D 2 REQ AN819-8D 2 REQ 198008-31
AN818-4D 2 REQ AN819-4D 2 REQ 198008-25
AN818-6D 2 REQ AN819-6D 2 REQ 198008-24
AUX. FUEL TANK
AN818-8D 2 REQ AN819-8D 2 REQ 198008-32
NOTE:
1 - USE CLAMPS AN742-D14C & AN742-D18 TO ATTACH LINE TO FUSELAGE. LOCATION OBTAINED ON ASSEMBLY.
4 FASTEN PLASTIC TUBING TO FLEX LINE BY WRAPPING WITH PLASTIC ELECTRICAL TAPE

SCHEMATIC (TABULATION) P/N 196521 SHEETS (1 of 3) & (3 of 3)

Part No.	Description	
-1	Wire	#12 Shielded
-2	"	#12 Shielded
-3	"	#12 Unshielded
-4	"	#12 Unshielded
-5	"	#20 Unshielded
-6	"	#18 Unshielded
-7	"	#20 Unshielded
-8	"	"
-9	"	"
-10	"	"
-11	"	"
-12	"	"
-13	"	"
-14	"	"
-15	"	"
-16	"	"
-17	"	"
-18	"	"
-19	"	"
-20	"	"
-21	"	#20 Shielded
-23	"	#20 Unshielded
-24	"	"
-25	"	"
-26	"	"
-27	"	"
-28	"	"
-29	"	"
-30	"	"
-31	"	"
-32	"	"
-33	"	"
-34	"	#20 Shielded
-35	"	#20 Unshielded
-36	"	#20 Shielded
-37	"	"
-38	"	"
-39	"	"
-40	"	"
-41	"	#18 Shielded
-42	"	"
-43	"	#18 Unshielded
-44	"	#20 Shielded
-45	"	#18 Unshielded
-46	"	#20 Unshielded
-47	"	#18 Unshielded
-48	"	"
-49	"	"
-50	"	#16 Shielded
-51	"	"
-52	"	#16 Class-D Type -1
-53	"	"
-54	"	#16 Shielded
-55	"	#16 Unshielded
-56	"	"
-58	"	"

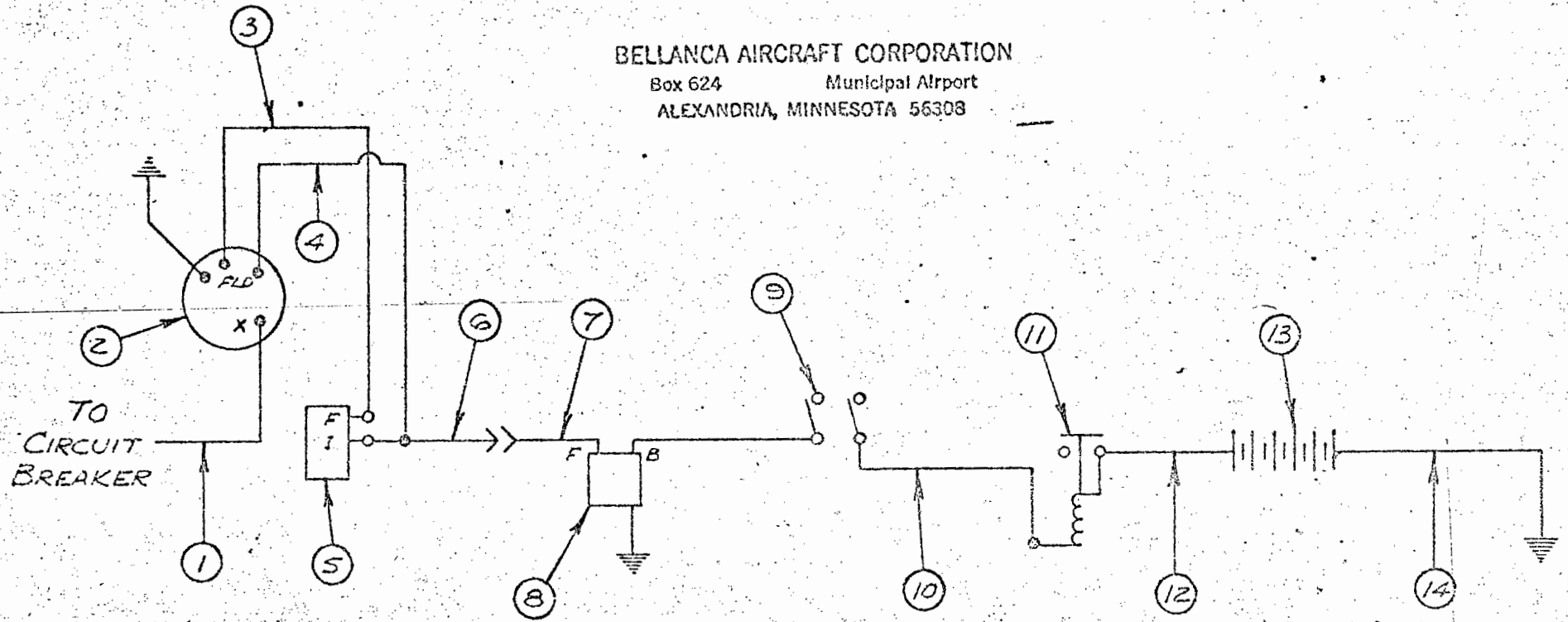
Part No.	Description	
-59	Wire	#20 Unshielded
-60	"	#18 Unshielded
-61	"	#20 Unshielded
-62	"	# 8 Unshielded
-63	"	"
-64	"	"
-66	"	# 8 Shielded
-67	"	#20 Unshielded
-68	"	# 2 Unshielded
-69	"	#12 Unshielded
-70	Down Limit Switch	
-71	Up Limit Switch	
-72	S.P. Switch	
-73	Throttle Warn, Switch	
-74	S.P.D.T. Switch	
-75	Pre-stall Detector	
-76	D.P.S.T. Switch	
-77	S.P. Switch	
-78	"	
-79	12V Battery Relay	
-80	Solenoid	
-81	Rheostat	
-82	W.T. Navg. Light - Green	
-83	Tail Navg. Light - White	
-84	W.T. Navg. Light - Red	
-85	Flasher Navg. Lt.	
-86	Trans. Fuel Tank Aux.	
-87	Trans. Fuel Tanks Main	
-88	Voltage Reg.	
-89	Beacon Light	
-90	Cabin Light	
-91	Landing Light	
-92	Landing Light	
-93	Aux. Fuel Pump	
-94	Compass	
-95	Wire	#20 Unshielded
-96	Instr. Light	
-97	Baggage Light	
-98	Oil Temp. Gauge	
-99	Cyl. Hd. Temp. Gauge	
-100	Mag. Switch	
-101	Ammeter	
-104	Starter	
-105	LD. Gear Horn	
-106	Cigar Lighter	
-107	Wire	
-108	Hot Cable	
-109	Battery	
-110	Ground Cable	
-111	Stall Warning	
-112	S.P. Switch	
-113	Switches	
-114	Resistor	
-115	Resistor	
-116	Warning Light - Red	

Part No.	Description
-117	Warning Light - Green
-118	Warning Light - Green
-119	Warning Light - Green
-120	S.P.S.T. Switch
-121	Starter Switch
-122	Mag. Filter
-123	Magneto
-124	Oil Temp. Bulb
-125	Cyl. HD. Temp. Bulb
-126	Wire #20 Unshielded
-127	Wire #14 Unshielded
-128	Wire #14 Unshielded
-129	Wire #14 Shielded
-130	Pitot Heator
-131	S.P. Switch
-132	Circuit Breaker 10 AMP
-133	Circuit Breaker 5 AMP
-134	Circuit Breaker 10 AMP
-135	Circuit Breaker 25 AMP
-136	Circuit Breaker 50 AMP
-137	Wire #16 Unshielded
-138	Wire #16 Unshielded
-139	Wire #16 Unshielded
-140	Circuit Breaker 2 AMP
-141	Turn & Bank Indicator
-142	Wire #20 Unshielded
-143	Aux. Fuel Gauge
-144	Main Fuel Gauge
-145	Wire #16 Unshielded
-146	Wire #18 Unshielded
-147	Wire #18 Unshielded
-148	Switch
-149	Wire #20 Unshielded
-150	Wire #16 Unshielded
-151	Circuit Breaker 10 AMP
-152	Electric Reel
-153	Electric Reel Control Box
-154	Circuit Breaker 15 AMP
-155	Wire #20 Unshielded
-156	Wire #12 Unshielded
-157	Circuit Breaker (as req.)
-158	Copper Strap
-159	Circuit Breaker 3 AMP
-160	Wire #20 Unshielded
-161	Wire #20 Unshielded
-162	Wire #18 Unshielded
-163	Miniture Plug
-164	Saddle Type Socket
-165	Marker Beacon Receiver
-166	Circuit Breaker 2 AMP
-167	S.P. Switch
-168	Wire #18 Unshielded
-169	Flite-lite
-170	Inverter & Terminal Block
-171	5 Amp. Breaker

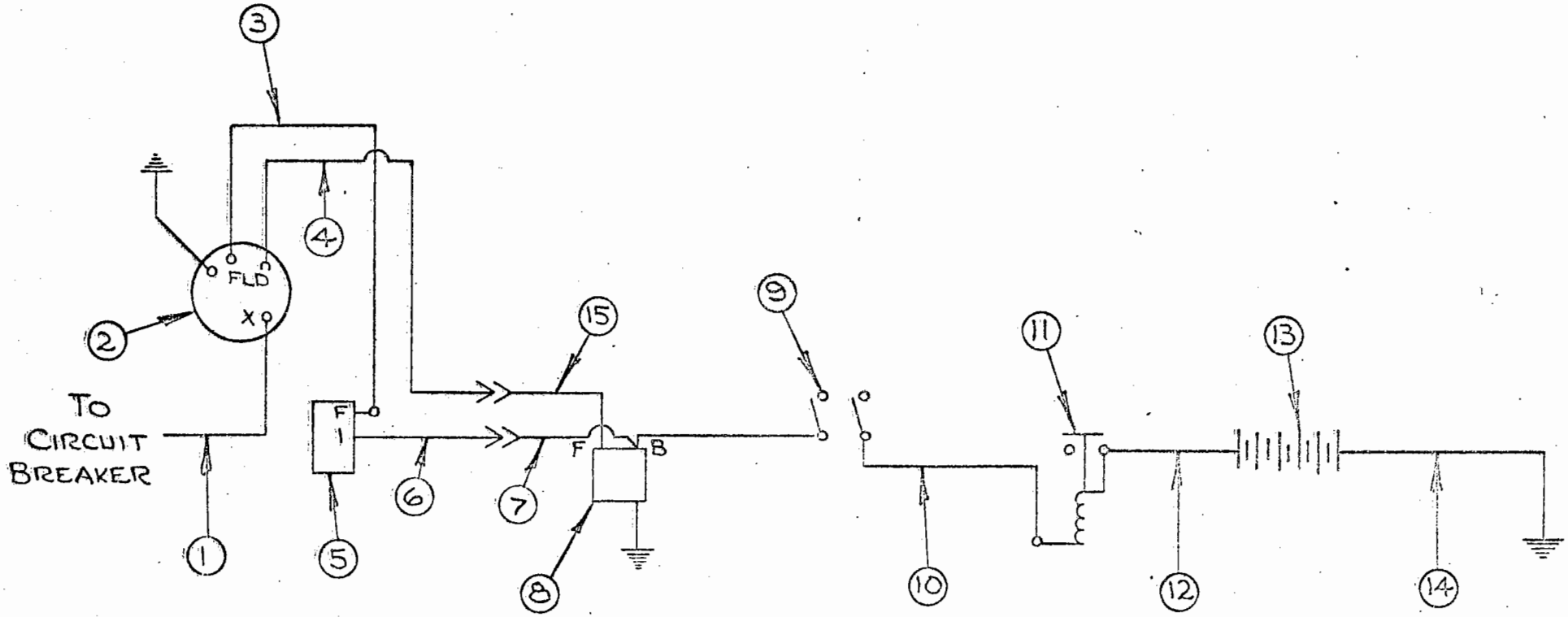
Part No.	Description	
-172	Plug	
-173	Wire	#18 Shielded
-174	Wire	#20 Shielded
-175	Transmitter	
-176	Compass Indicator	
-177	Plug	
-178	Wire	#20 Shielded
-179	Wire	#18 Unshielded
-180	S.P. Switch	
-182	Wire	#20 Unshielded
-183	"	#20 Shielded
-184	"	#20 Unshielded
-185	"	#20 Shielded
-186	"	#20 Unshielded
-187	"	#20 Unshielded
-188	Stabilizer	
-189	Wire	#18 Unshielded
-190	Wire	#20 Unshielded
-191	S.P. Switch	
-192	C.B. Switch	5 AMP
-193	C.B. Switch	10 AMP
-194	Relay (12 Volt)	
-195	T.P.D.T. Switch	
-196	D.P.D.T. Switch	
-197	Wire	#16 Unshielded
-198	"	#16 Unshielded
-200	"	#16 Unshielded
-201	"	#12 Unshielded
-203	"	#16 Unshielded
-204	"	#16 Unshielded
-205	"	#16 Unshielded
-206	"	#16 Unshielded
-207	"	"
-208	"	"
-209	"	#20 Unshielded
-210	"	"
-211	"	"
-212	"	"
-213	"	"
-214	"	"
-215	"	"
-216	"	"
-217	"	"
-218	"	"
-219	"	#16 Unshielded
-220	"	"
-221	"	"
-222	"	"
-223	"	"
-224	"	"
-225	Relay	
-226	D.P.D.T. Switch	
-227	Green Light	
-228	Amber Light	
-229	Red Light	

Part No.	Description
-230	Switch - Overrride
-231	Switch - Pressure
-232	Switch - Gear
-233	Switch - Gear
-234	Fuse Holder or Circuit Breaker
-235	Cable Assembly 216" Long
-236	Over Voltage Relay 12 Volt
-237	Wire Shielded
-238	Wire Shielded

BELLANCA AIRCRAFT CORPORATION
Box 624 Municipal Airport
ALEXANDRIA, MINNESOTA 56308



ALTERNATOR WIRING DIAGRAM - MODEL 17-30 (30202 & UP)



ALTERATOR WIRING DIAGRAM - MODEL 17-30A (30301 & UP)
17-31A (32-35 & UP)
17-31ATC (31011 & UP)

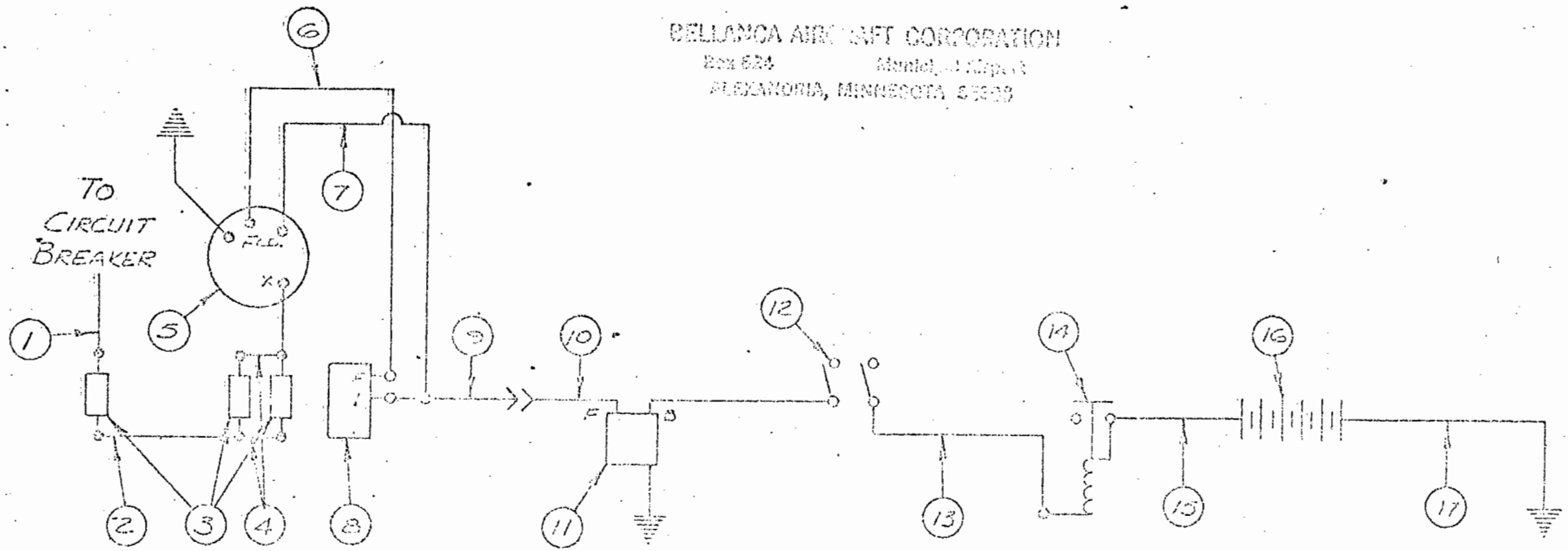
WELLANCE AIRCRAFT CORPORATION
Box 634 Municipal Airport
ALEXANDRIA, MINNESOTA 56308

BILL OF MATERIAL FOR ALTERNATOR WIRING DIAGRAM - MODEL 17-30

BELLANCA AIRCRAFT CORPORATION
Box 624 Municipal Airport
ALEXANDRIA, MINNESOTA 56308

No. Req.	Part No.	Name	Material	Spec.
1		MAG. SWITCH	10-357290-1 BENDIX	
1	14	GROUND CABLE		
1	13	BATTERY		
1	12	HOT CABLE		
1	11	12 V BATTERY RELAY	6041H105A CUTLER HAMMER OR PRESTOLITE	
1	10	WIRE	#20 UNSHIELDED	
1	9	D.P.S.T. SWITCH	26K53 CARLING	
1	8	OVER VOLTAGE RELAY	X-16799 PRESTOLITE	
1	7	WIRE	#16 UNSHIELDED	
1	6	"	#16 SHIELDED PRESTOLITE	
1	5	VOLTAGE REGULATOR	V6F-7201	
1	4	WIRE	#16 UNSHIELDED	
1	3	"	#16 SHIELDED	
1	2	ALTERNATOR	ALY 8402-10A PRESTOLITE	
1	1	WIRE	#8 SHIELDED	

BELLANCA AIRCRAFT CORPORATION
Box 624 Municipal Airport
ALEXANDRIA, MINNESOTA 56308



ALTERNATOR WIRING DIAGRAM - MODELS 17-31 & 17-31 TC (ALL)

BILL OF MATERIAL FOR ALTERNATOR WIRING DIAGRAM - MODELS 17-31 & 17-31TC

BELLANCA AIRCRAFT CORPORATION
Box 624 Municipal Airport
ALEXANDRIA, MINNESOTA 56308

No. Req.	Part No.	Name	Material	Spec.
1		MAG. SWITCH	10-357200-1A BENDIX	
1	17	GROUND CABLE		
1	16	BATTERY		
1	15	HOT CABLE		
1	14	12V BATTERY RELAY	6041H105A CUTLER HAMMER OR PRESTOLITE	
1	13	WIRE	#20 UNSHIELDED	
1	12	D.P.S.T. SWITCH	2GK53 CARLING	
1	11	OVER VOLTAGE RELAY	X-16799 PRESTOLITE	
1	10	WIRE	#16 UNSHIELDED	
1	9	"	#16 SHIELDED	
1	8	VOLTAGE REGULATOR	V6F-7201 PRESTOLITE	
1	7	WIRE	#16 UNSHIELDED	
1	6	"	#16 SHIELDED	
1	5	ALTERNATOR	ALE 8406 PRESTOLITE	
2	4	WIRE	#12 UNSHIELDED	
3	3	CAPACITOR	MOTORAL #8C82571B01 COAXIAL, SMED. - 100 V	
1	2	WIRE	#8 UNSHIELDED	
1	1	"	#8 SHIELDED	

SECTION IX

INSTRUMENTS

A. GENERAL

The Viking 300 has as standard equipment the Mitchell Aero Guide which provides aileron control for wing level flight. In addition to the full gyro panel, the Mitchell turn coordinator is standard equipment on the 17-30.

The engine instruments are located in a basic cluster with each instrument a separate module removeable for repair or replacement without removing the whole unit. Instruments in this unit are the oil temperature, fuel gauges, oil pressure, amp meter and cylinder head temperature.

The main fuel gauge indicates fuel quanity for left and right wing tanks. The gauge indicates the fuel quanity in the tank the selector valve is on. On the standard 60 gallon fuel sytem, the selector valve is located between the front seats and is placarded as to position.

BELLANCA AIRCRAFT, INC. Form S-9-1

Make: Model: Serial # Reg. #

100 Hour Periodic

DESCRIPTION	M	I
A. Engine Group		
1. Remove engine cowl & clean engine		
2. Drain oil, check & clean screen		
3. Check engine and intake seals for leaks & clamp for tightness		
4. Check ignition harnesses		
5. Replace or clean spark plugs as required		
6. Check magneto per Cont. Manual		
7. Check Condenser action & coil leaks		
8. Check magneto for correct timing		
9. Overhaul or replace magnetos		
10. Drain carburetor, clean carburetor fuel strainer & check fuel system		
11. Check throttle, mixture & propeller governor controls for travel & operating condition		
12. Check engine mount		
13. Check rubber engine mount bushings		
14. Check exhaust stacks & attach		
15. Replace exhaust stack gaskets as required		
16. Check all engine baffles		
17. Remove air cleaner screen clean & reoil per Owner's Manual		
18. Check vacuum pump, oil separator and lines		
19. Inspect condition of flexible fuel lines		
20. Check fuel pumps for operation (engine driven & electric)		
21. Clean screens on fuel pumps		
22. Fill engine with oil as per information in Owner's Manual		
23. Clean oil radiator cooling fins		
24. Check firewall seals		
25. Check fluid in brake reservoirs		
26. Check cowl for cracks		
27. Check battery & cables...Fill per instructions		
28. Flush battery section-belly		

DESCRIPTION	M	I
B. Propeller Group		
1. Rotate blades & check for tightness		
2. Inspect hub parts for cracks		
3. Check prop mounting bolts		
4. Check prop mounting bolt torque per Propeller Manual		
5. Check pitch actuating arms & bolts		
6. Check for grease & oil leaks		
7. Check spinner mounting brackets		
8. Inspect blades for nicks & cracks		
9. Lubricate propeller as required		
10. Clean & install spinner		
C. Cabin Group		
1. Check control wheels, pulleys & cables		
2. Check parking brakes & brake handle for operations & cylinder leaks		
3. Check trim operations		
4. Check instruments, lines & attachments		
5. Check Vacuum operation instruments & electric turn & cylinder leaks		
6. Check cabin door & windows for damage & operation		
7. Check seats, seat belts, securing brackets & bolts		
8. Check landing, navigation, cabin & instrument lights		
9. Check operation of fuel valve		
10. Compass correction card in AC		
11. Clean filters on gyro horizon & directional gyro		
DATE:		
TOTAL TIME ON SHIP:		

SIGNATURE OF MECHANIC CERTIFICATE #

SIGNATURE OF INSPECTOR CERTIFICATE #

DESCRIPTION	M	I
D. Landing Gear Group		
1. Put airplane on jacks		
2. Remove wheels, clean & repack bearings		
3. Check brake shoes & disc		
4. Check wheels for cracks, broken bolts		
5. Check tires for wear		
6. Check gear legs, attachments, nut-crackers, retraction link & bolts for operation & Cracks		
7. Check brake lines		
8. Check wheels for alignment		
9. Check gear wells & clean out residue		
10. Check nose gear steering		
11. Retract gear-check clearance & op.		
12. Check earning horn, lights & rigging per Service Letter # 10 & Owner's Manual		
13. Check gear and tire pressure		
14. Lubricate per Owner's Manual		
15. Check nutcracker, replace if nec.		
16. Check draglink blots, replace if necessary		
17. Check oleo fluid level		
18. Clean kick down assembly		
19. Check hyd. fluid level in reservoir		
E. Wing Group		
1. Remove inspection plates & fairings at wing roots.		
2. Check surfaces & tips for damage, also check condition of walk way		
3. Check ailerons, attachments, cables, pulleys & bellcranks for damage & op.		
4. Check flaps & attachments for damage & operation		
5. Check fuel tanks & lines for leaks & water		
6. Drain & clean strainer bowl		
7. Fuel tanks marked for minimum octane rating		
8. Fuel tanks marked for capacity		
9. Check wing attachment bolts		
10. Lubricate per Owner's Manual		
11. Check pins & bolts used as hinges		
12. Remove all in spection plates and fairings		

DESCRIPTION	M	I
F. Fuselage & Empennage Group		
1. Check stabliator, fins & rudder surfaces for damage		
2. Check elevators for damage		
3. Check rudder, horns & attachments for damage & operation		
4. Check all trim mechanism		
5. Check longerons for damage		
6. Check loop & loop mount, antenna mount & electrical wiring		
7. Check landing gear power pak attachment, hose & fittings		
8. Check emergency operation of gear		
9. Check fuel lines, valve & gauges for damage & operation		
10. Check radio & auto control inst.		
11. Lubricate per Owner's Manual		
12. Check pins & bolts used as hinges		
G. Operation Check Pre-flight		
1. Check fuel pump, fuel tank select.		
2. Check fuel pressure & quanity		
3. Check oil pressure & temp		
4. Check generator output		
5. Check manifold pressure		
6. Check parking brake		
7. Check gyros for noise & roughness		
8. Check cabin heater operation		
9. Check magneto switch operation		
10. Check magneto RPM variation		
11. Check throttle operation		
12. Check propeller smoothness		
13. Check propeller governor action		
14. Check radio & auto control op.		
15. Check engine idle		
H. General		
1. Aircraft conforms to CAA spec.		
2. Manufacturers Service Letters complied with		
3. Aircraft papers in proper order		

NOTE: Both the periodic and 100 hour inspections are complete inspections of the aircraft - identical in scope. The periodic inspection must be accomplished by a mechanic with an inspection authorization, a repair station, or the aircraft manufacturer; the 100 hour inspection may be performed by any certificated rated machanic

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

A18CE
BELLANCA
17-30A
17-31A
17-31ATC
December 15, 1969

TYPE CERTIFICATE DATA SHEET NO. A18CE

This data sheet which is part of type certificate A18CE prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder: Bellanca Aircraft Corporation
Box 624, Municipal Airport
Alexandria, Minnesota 56308

I - Model 17-31A, 4 PCLM (Normal Category), Approved 31 October 1969

Engine	Lycoming IO-540-G1B5 or IO-540-G1E5		
Fuel	100/130 minimum grade aviation gasoline		
Engine limits	For all operations, 2575 r.p.m. (290 hp.)		
Propeller and propeller limits	Propeller - Hartzell Constant Speed (a) Hub model HC-C3YR-1, blade model 8468-6R Pitch setting at 30 in. sta.: Low 13°, high 38° Diameter: not over 80 in., not under 78 in. (b) Governor, Woodward model B210460 (c) Spinner and dome - Hartzell model C3552		
Airspeed limits	Never exceed	226 m.p.h. (197 knots) CAS	
	Maximum structural cruising	190 m.p.h. (165 knots) CAS	
	Maneuvering	148 m.p.h. (128 knots) CAS	
	Flaps extended	120 m.p.h. (104 knots) CAS	
	Landing gear extended	167 m.p.h. (145 knots) CAS	
	Landing gear operation	140 m.p.h. (122 knots) CAS	
C.G. Range (landing gear extended)	(+19.0) to (+24.0) at 3200 lb. (+16.0) to (+24.0) at 2450 lb. or less Straight line variation between points given		
Empty wt. C.G. Range	None		
Maximum weight	3200 lb.		
No. of seats	4 (2 at +20, 2 at +53)		
Maximum baggage	186 lb. max. (+84) (See loading schedule)		
Fuel capacity	72 gal. (2 wing tanks 19 gal. each at +29 and 2 auxiliary tanks in wing, 17 gal. each at +29). 92 gal. (72 gal. system and fuselage auxiliary tank, 20 gal. at +72). See NOTE 1 for data on unusable fuel		
Oil capacity	12 qt. total (-42), 9 qt. usable. See NOTE 1 for data on undrainable oil		
Control surface movements (within -1°)	Elevator trim tab	Up 7°	Down 34.5°
	Elevator	Up 22°	Down 15°
	Aileron	Up 20°	Down 20°
	Rudder	Left 22°	Right 22°
	Flaps		Down 46°
Serial Nos. eligible	32-15 and on		

III - Model 17-30A, 4 PCLM (Normal Category), Approved December 12, 1969

Engine	Continental IO-520-K
Fuel	100/130 minimum aviation gasoline
Engine limits	Takeoff: 2850 r.p.m. (300 hp.) (5 min. maximum) Max. continuous operation: 2700 r.p.m. (285 hp.)
Propeller and propeller limits	1. McCauley Constant Speed (a) Hub model D3A32C90, blade model 82NC-4 Pitch settings at 30 in. sta.: Low 11.7°±.2°, high 28.1°±.5° Diameter: not over 78 in., not under 76 in. (b) Governor, Woodward Model P210452G (c) Spinner and dome - McCauley Model D3669 or D3867 2. McCauley Constant Speed (a) Hub model D2A34C58, blade model 90AT-10 Pitch settings at 36 in. sta. Low 8.2°±0.1°, high 27.3°±.5° Diameter: not over 80 in., not under 78 in. Revision 1 to item 401(f) dated May 18, 1967 required (b) Governor, Woodward Model P210452G (c) Spinner and dome - McCauley Model D2771 or D3766 3. Hartzell Constant Speed (a) Hub model HC-C3YF-1, blade model 8468-8R Pitch settings at 30 in. sta.: Low 10.0°, high 32.5° Diameter: not over 78 in., not under 76 in. Revision 7 to item 401(f) dated August 10, 1968 required (b) Governor, Woodward Model P210452 (c) Spinner and dome - Hartzell Model C3533 4. Hartzell Constant Speed (a) Hub model HC-C2YF-1, blade model 8475-6 Pitch setting at 30 in. sta. Low 11.1°, high 36.2° Diameter: not over 78 in., not under 76 in. (b) Governor, Woodward Model P210452 (c) Spinner and dome - Hartzell Model C3533
Airspeed limits	Never exceed 226 m.p.h. (197 knots) CAS Maximum structural cruising 190 m.p.h. (165 knots) CAS Maneuvering 148 m.p.h. (128 knots) CAS Flaps extended 120 m.p.h. (104 knots) CAS Landing gear extended 167 m.p.h. (145 knots) CAS Landing gear operation 140 m.p.h. (122 knots) CAS
C.G. Range (landing gear extended)	(+19.0) to (+24.0) at 3200 lb. (+16.0) to (+24.0) at 2450 lb. or less Straight line variation between points given
Empty wt. C.G. Range	None
Maximum weight	3200 lb.
No. of seats	4 (2 at +20, 2 at +53)
Maximum baggage	186 lb. max. (+84) (See loading schedule)
Fuel capacity	72 gal. (2 wing tanks, 19 gal. each at +29 and 2 auxiliary tanks in wing, 17 gal. each at +29) 92 gal. (72 gal. system and fuselage auxiliary tank, 20 gal. at +72) See NOTE 1 for data on unusable fuel
Oil capacity	12 qt. (-41), 6.3 qt. usable. See NOTE 1 for data on system oil
Control surface movements (within ±1°)	Elevator trim tab Up 4° Down 34.5° Elevator Up 22° Down 15° Aileron Up 20° Down 20° Rudder Right 22° Left 22° Flaps Down 46°
Serial Nos. eligible	30263 and on

II - Model 17-31ATC, 4 PCLM (Normal Category), Approved 31 October 1969

Engine	Lycoming IO-540-G1E5, with two (2) Rajay Model 315A10-2 Turbocharge per STC SE6WE		
Fuel	100/130 minimum grade aviation gasoline		
Engine limits	Non turbo charged: For all operations, 2575 r.p.m. (290 hp.)		
	Turbo charged: For all operations, 2400 r.p.m., 27.0 in. Hg. (250 hp.). Turbocharger used only with throttle full open		
	Minimum turbocharger - 2200 r.p.m.		
Propeller and propeller limits	Propeller - Hartzell Constant Speed		
	(a) Hub model HC-C3YR-1, blade model 8468-6R		
	Pitch setting at 30 in. sta.		
	Low 13°, high 38°		
	Diameter: not over 80 in., not under 78 in.		
	(b) Governor, Woodward model B210460		
	(c) Spinner and dome - Hartzell model C3552		
Airspeed limits Below 15,000 ft.	Never exceed	226 m.p.h. (197 knots) CAS	
	Maximum structural cruising	190 m.p.h. (165 knots) CAS	
	Maneuvering	148 m.p.h. (128 knots) CAS	
	Flaps extended	120 m.p.h. (104 knots) CAS	
	Landing gear extended	167 m.p.h. (145 knots) CAS	
	Landing gear operation	140 m.p.h. (122 knots) CAS	
Above 15,000 ft.	Same as below 15,000 ft. except		
	Never exceed	200 m.p.h. (174 knots) CAS	
	Maximum structural cruising	165 m.p.h. (144 knots) CAS	
C.G. Range (landing gear extended)	(+19.0) to (+24.0) at 3200 lb.		
	(+16.0) to (+24.0) at 2450 lb. or less		
	Straight line variation between points given		
Empty wt. C.G. range	None		
Maximum weight	3200 lb.		
No. of seats	4 (2 at +20, 2 at +53)		
Maximum baggage	186 lb. max. (+84) (See loading schedule)		
Fuel capacity	72 gal. (2 wing tanks 19 gal. each at +29 and 2 aux. tanks in wing, 17 gal. each at +29). 92 gal. (72 gal. system and fuselage aux. tank, 20 gal. at +72). See NOTE 1 for data on unusable fuel		
Oil capacity	12 qt. total (-42), 9 qt. usable. See NOTE 1 for data on undrainable oil		
Maximum operating altitude	24,000 ft.		
Control surface movements (within ±1°)	Elevator trim tab	Up 7°	Down 34.5°
	Elevator	Up 22°	Down 15°
	Aileron	Up 20°	Down 20°
	Rudder	Left 22°	Right 22°
	Flaps		Down 46°
Serial Nos. eligible	30004; 31004 and on		

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

1A3
Revision 34
BELLANCA
14-19
14-19-2
14-19-3
14-19-3A
17-30
17-31
17-31TC

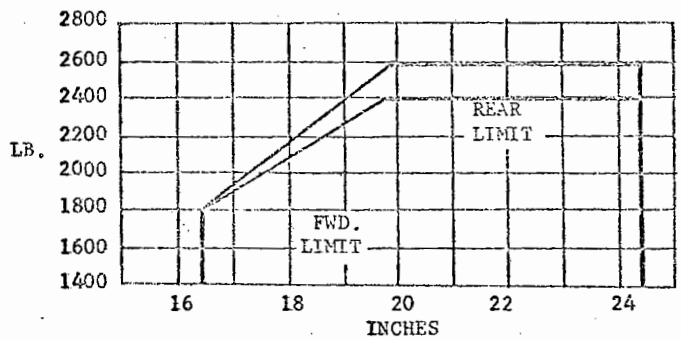
November 2, 1970

AIRCRAFT SPECIFICATION NO. 1A3

Type Certificate Holder — Bellanca Aircraft Corporation
Box 624, Municipal Airport
Alexandria, Minnesota 56308

I - Model 14-19, 4 PCIM (Normal Category), 2 PCIM (Utility Category), Approved September 26, 1949

Engine	Lycoming O-435-A		
Fuel	80 minimum grade aviation gasoline		
Engine limits	For all operations, 2550 r.p.m. (190 hp.)		
Airspeed limits	Never exceed	226 m.p.h. (197 knots)	True Ind.
	Maximum structural cruising	167 m.p.h. (145 knots)	True Ind.
	Maneuvering (Normal Category)	115 m.p.h. (100 knots)	True Ind.
	Maneuvering (Utility Category)	124 m.p.h. (108 knots)	True Ind.
	Flaps extended	86 m.p.h. (75 knots)	True Ind.
	Landing gear extended	167 m.p.h. (145 knots)	True Ind.
	Landing gear operation	124 m.p.h. (108 knots)	True Ind.
C.G. range (landing gear extended)	Normal Category (+19.9) to (+24.4) at 2600 lb.		
	Utility Category (+19.8) to (+24.4) at 2400 lb.		
	Both Categories (+16.4) to (+24.4) at 1800 lb. or less		
	Straight line variation between points given		



Empty wt. C.G. range — None

Maximum weight — Normal Category 2600 lb.
Utility Category 2400 lb.

No. of seats — 4 (2 at +20, 2 at +53)

Maximum baggage

	Normal Category	Utility Category
Without auxiliary fuel tank	198 lb. (+84)	171 lb. (+84)
With empty auxiliary fuel tank (item 104) (see loading schedule)	186 lb. (+84)	159 lb. (+84)

Fuel capacity — Main wing tanks 40 gal. (+29). See items 104, 105 and 106 for auxiliary tanks.

Oil capacity — 12 qt. (-35)

REVISIONS					
LET.	CHANGE	DRAWN	DATE	APPVD.	SPF. SER. NO.
A	-100 WAS (2) S.P. SWITCHES	[illegible]	2-18-65	[illegible]	
B	INCORP USE OF BZ-TRSTC MICRO SWITCH BW -79 & -71	D.K.	[illegible]	[illegible]	4238 & UP
C	INCORP E.A.I.'S H1304A, H1335, H1129 & H1028(1) ADDED DIAGRAM FOR INST'L FUEL PUMP	[illegible]	[illegible]	[illegible]	
D	ADDED DETAIL "A"	LWB	[illegible]	[illegible]	

INST'L FUEL PUMP
MODEL 17-30

SEE DETAIL "A"

JUMPER WIRE

TO ELECTRIC REEL

TO VHF RADIOS

TO LF RADIOS

TO AUTO PILOT
AN20 MIL-3086A TYPE I WIRE,
FURNISHED BY MITCHELL.

GROUND SHIELDINS TO PLUG 178 #20 SHIELDED 18" LONG

GROUND TO AIRCRAFT STRUCTURE 170

GROUND SHIELDING TO PLUG 174 #20 SHIELDED 132" LONG

TO BUSS BAR

GROUND TO AIRCRAFT STRUCTURE

173 #18 SHIELDED

INVERTER

GROUND SHIELDING TO AIRCRAFT STRUCTURE

DIAGRAM FOR
REMOTE INDICATING MAGNETIC COMPASS

BUSS BAR

DIAGRAM FOR 2, FL-42'S WITH FLASHER BOX LOCATED ON AIRFRAME

INSTALLATION OF MARKER BEACON RECEIVER OFF SHIPS BUSS BAR.

SELECTOR SWITCHES (REF)

To SENDER - LEFT WING AUX.

To SENDER - RIGHT WING AUX

DETAIL "A"
WIRING DIAGRAM-
AUX WING TANK

NOTES-
1. WIRES SHOWN IN DETAIL 'A' WILL BE INSTALLED IN ALL AIRCRAFT EX REV D AND SUB.
2. WHEN AUX WING TANKS ARE NOT INSTALLED -27 WIRE WILL BE SPLICED T. -156

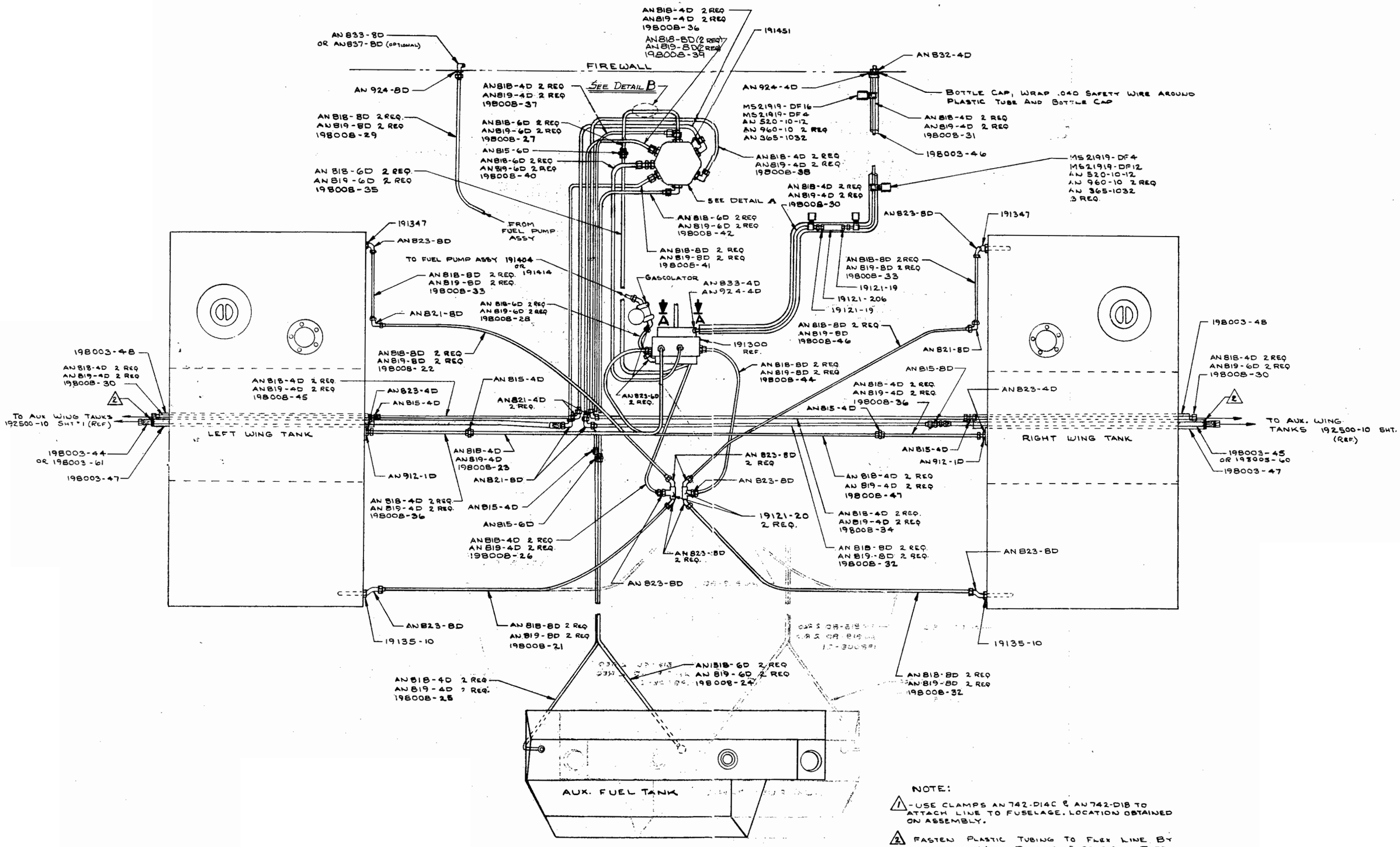
REQ. PARTS PER UNIT	PART NO.	ZONE	NAME	DIA.	THICK	WIDTH	LENGTH	MATERIAL	MATERIAL SPEC.	CAL. WT.	ACT. WT.
				STOCK SIZE							
14-19-3A	4229 & UP	10/201									
MODEL	EFF. SER. NO.		NEXT ASSY. DWG. NO.		NO. PER PLANE						
DRAWN	CHECK	STRUCT.	GR. ENG.	PROJ.	APPVD.						
NY											
8/1/62											

UNLESS OTHERWISE NOTED
TOLERANCES:
FRACTIONAL ±1/32
DECIMAL ±.010
ANGULAR ±1/2°
ALL BEND RADII 1/32 UNLESS OTHERWISE SPECIFIED.
HEAT TREAT.
FINISH

DOWNER AIRCRAFT INDUSTRIES INC.
ALEXANDRIA, MINN.
U.S.A.

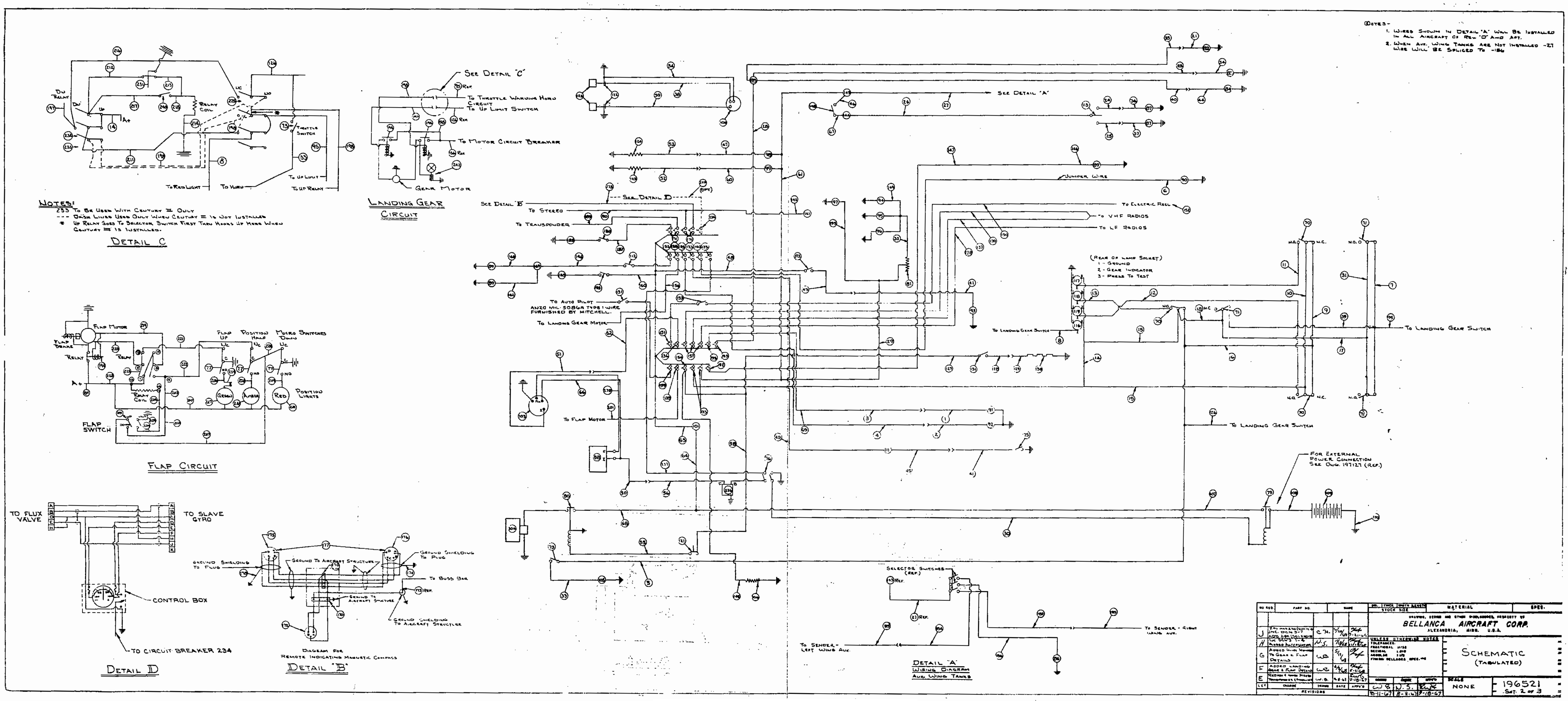
SCHEMATIC
(TABULATED)

SCALE (UNLESS NOTED) NONE
SUPERSEDES 10K217
196521
SHT 2 OF 2



NOTE:

1. USE CLAMPS AN742-D14C & AN742-D18 TO ATTACH LINE TO FUSELAGE. LOCATION OBTAINED ON ASSEMBLY.
2. FASTEN PLASTIC TUBING TO FLEX LINE BY WRAPPING WITH PLASTIC ELECTRICAL TAPE



Notes -
1. Wires Shown In Detail "A" Will Be Installed In All Aircraft Of Rev "D" And Aft.
2. When Aux. Wing Tanks Are Not Installed -27 Wire Will Be Spliced To -186
See Detail "C"
To Throttle Warning Horn Circuit
To Up Limit Switch
To Motor Circuit Breaker
Gear Motor
Landing Gear Circuit
Notes:
253 To Be Used With Century III Only
Dash Lines Used Only When Century III Is Not Installed
Up Relay Goes To Selector Switch First Then Hooks Up Here When Century III Is Installed.
Detail C
Flap Motor
Flap Switch
Flap Circuit
To Flux Valve
To Slave Gyro
Control Box
To Circuit Breaker 234
Detail D
Ground Shielding To Plug
Ground To Aircraft Structure
To Buss Bar
Diagram For Remote Indicating Magnetic Compass
Detail "B"
See Detail "A"
See Detail "B"
See Detail D
To Stereo
To Transponder
To Electric Reel
To VHF Radios
To LF Radios
Jumper Wire
To Auto Pilot
To Landing Gear Motor
To Flap Motor
To Landing Gear Switch
(Rear Of Lamp Socket)
1 - Ground
2 - Gear Indicator
3 - Press To Test
For External Power Connection See Dwg. 197127 (Ref.)
Selector Switches (Ref.)
To Sender - Right Wing Aux.
To Sender - Left Wing Aux.
Detail "A"
Wiring Diagram
Aux Wing Tanks
Bellanca Aircraft Corp.
Alexandria, Minn. U.S.A.
Schematic
(Tabulated)
Scale
None
196521
Sht. 2 of 3
Revisions
Material
Spec.
Stock Size
Unless Otherwise Noted