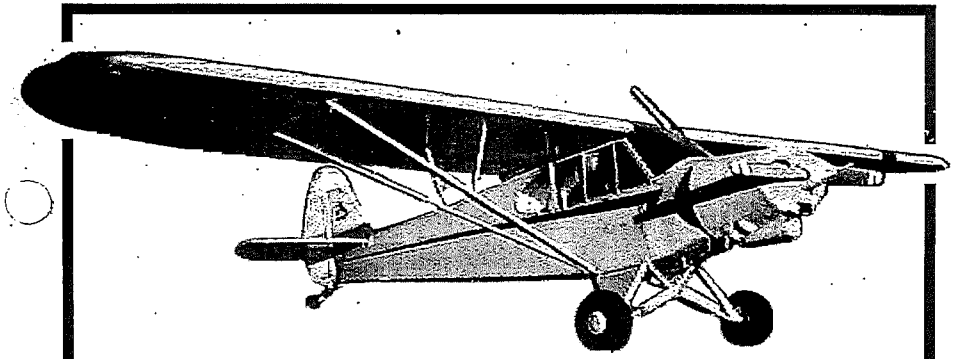

PIPER SUPER CUB

PRE-1974
95/150 hp.

PA-18 and PA-18A OWNER'S MANUAL

UNIVAIR®
Aircraft Corporation

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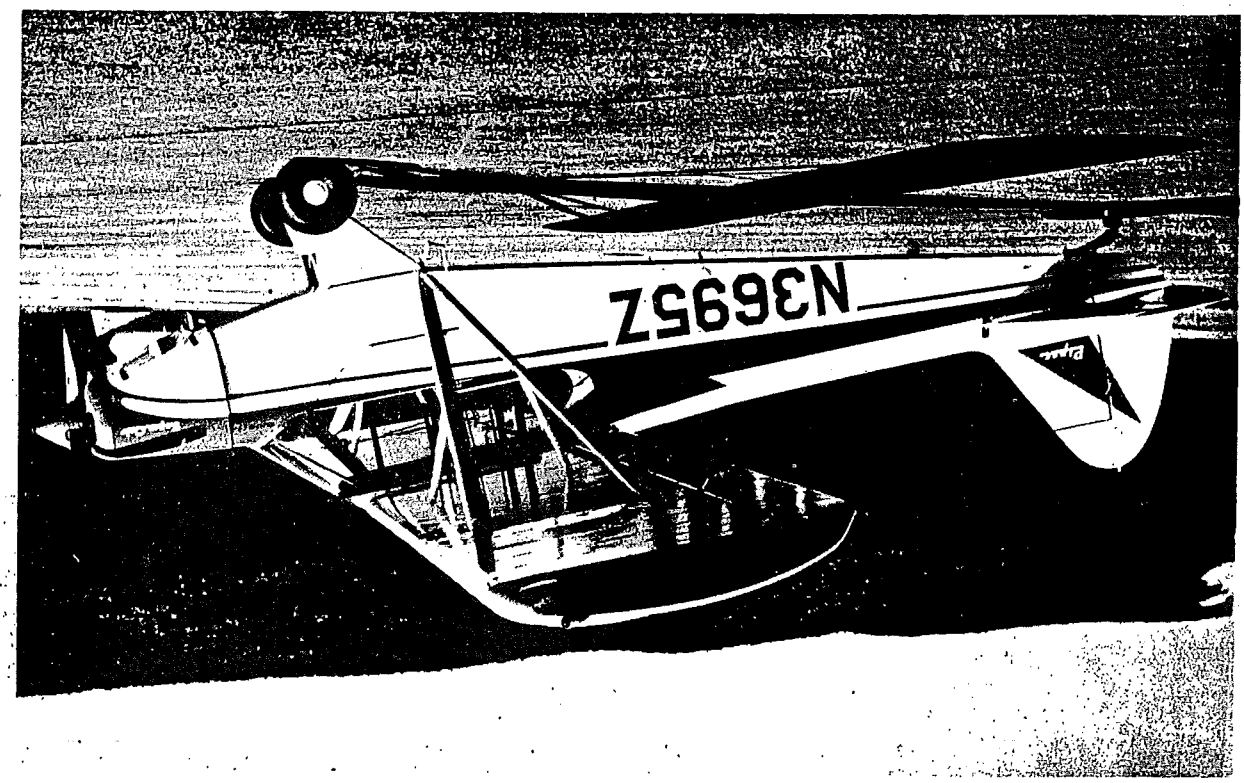

N3695Z

SECTION I

SPECIFICATION FEATURES

SPECIFICATION FEATURES:

POWER PLANT	PA-18-95	PA-18-150
Engine	Cont. C-90	Lyc. O-320
Rated Horsepower	90	150
Rated Speed RPM	2475	2700
Bore, inches	4-1/16	5-1/8
Stroke, inches	3-7/8	3-7/8
Displacement, cubic inches	200.91	319.8
Compression Ratio	7:1	7:1
Fuel Consumption (75% power gph)	5	9
Oil Sump Capacity (qts.)	5	8
Fuel Aviation Grade Octane	80	80

PERFORMANCE	PA-18-95 Wood Prop	PA-18-95 Std. Metal Prop
Take-off Run (ft.)	452	390
Take-off Run over 50 ft. barrier	952	750
Best Rate of Climb Speed (MPH)	71	71
Rate of Climb (ft. per min.)	624	710
Best Angle of Climb Speed (MPH)	63.5	63.5
Best Angle of Climb (Ratio)	1 to 9.4	1 to 8
Service Ceiling	13,500	15,750
Absolute Ceiling	16,000	17,750
Top Speed	110	112
Cruising Speed (75% power MPH)	100	100
Cruising Range (75% power)	360	360
Fuel Consumption (gph) (75% power)	5	5
Stalling Speed (MPH)	42	42
Landing Roll (ft.)	385	385

SPECIFICATION FEATURES: (cont)

PERFORMANCE	PA-18-150 Metal Prop 1750 lbs.
Take-off Run (ft.)	200**
Take-off Run over 50 ft. barrier	500**
Best Rate of Climb Speed (MPH)	75
Rate of Climb (ft. per min.)	960
Best Angle of Climb Speed (MPH)	45
Best Angle of Climb (Ratio)	1 to 5
Service Ceiling	19,000
Absolute Ceiling	21,300
Top Speed (MPH)	130
Cruising Speed (75% power MPH)	115
Cruising Range (75% power)	460
Fuel Consumption (gph) (75% power)	9
Stalling Speed (MPH)	43**
Landing Roll (ft.)	350*

**Flaps extended.

Performance figures are for airplanes flown at gross weight under standard conditions at sea level.

WEIGHTS	PA-18-95	PA-18-150
Gross Weights (lbs.)	1500	1750
Empty Weight (standard) (lbs)	800	930
USEFUL LOAD (lbs.)	700	820

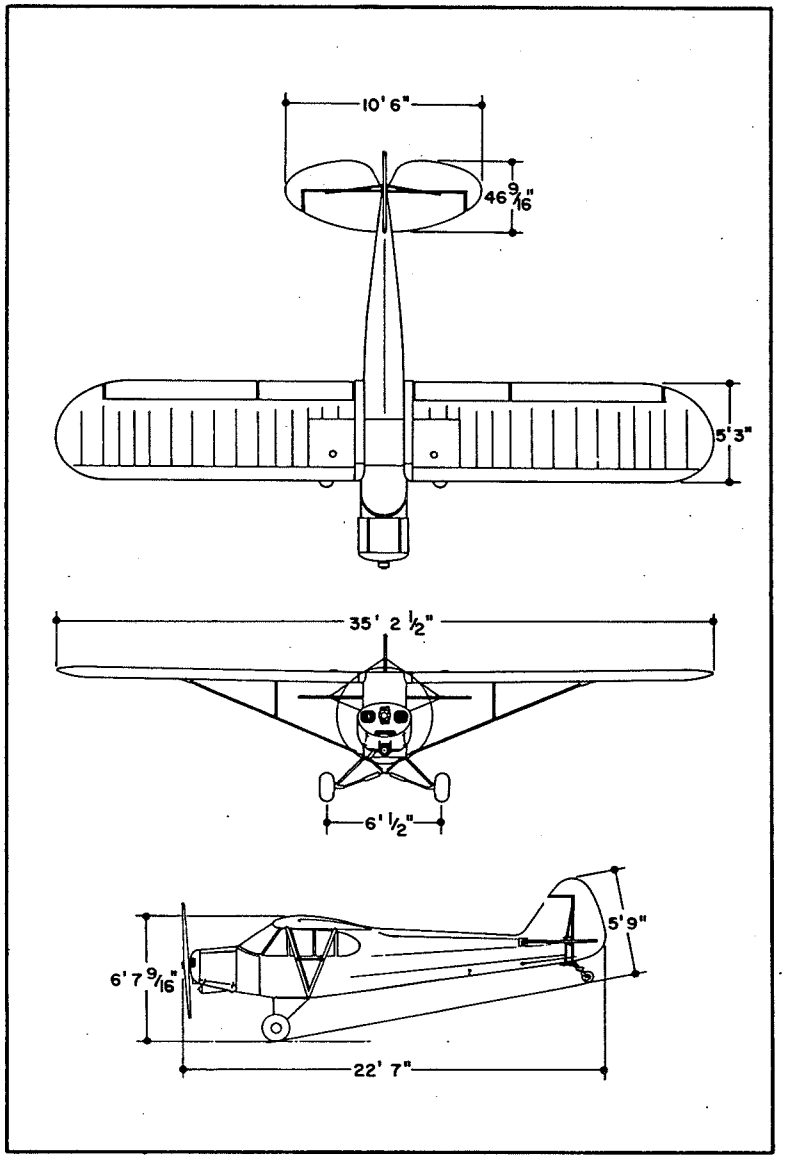
SPECIFICATION FEATURES: (cont)

FUEL AND OIL	PA-18-95	PA-18-150
Fuel Capacity (gal.)	18	36
Oil Capacity (qts.)	5	8

BAGGAGE		
Maximum Baggage (lbs.)	50	50
Baggage Space (cubic ft.)		

DIMENSIONS		
Wing Span (ft.)	35.3	35.3
Wing Area (sq. ft.)	178.5	178.5
Wing Loading (lbs. per sq. ft.)	8.4	10
Length (ft.)	22.4	22.5
Height (ft.)	6.7	6.7
Power Loading (lbs. per HP)	16.6	11.6
Propeller Diameter (max. in.)	74	74

LANDING GEAR		
Tire Pressure (psi)	18	18
Tire Size (four ply rating)	8:00 x 4	8:00 x 4



SECTION II

DESIGN INFORMATION

SECTION II

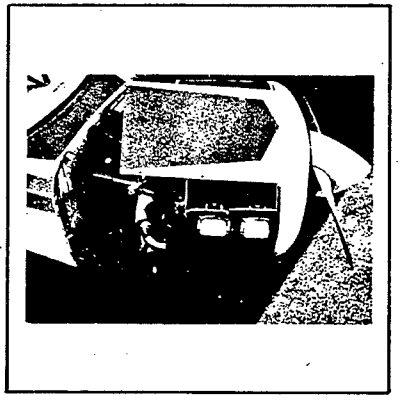
DESIGN INFORMATION

ENGINE AND PROPELLER

The Super Cub 95 is powered with a Continental C-90-8F engine or a C-90-12F if starter and generator (optional equipment) are installed. These engines are rated at 90 H.P. at 2475 R.P.M.

The Super Cub 150 is powered with a Lycoming O-320 engine, with a rated horsepower of 150 at 2700 R.P.M. The standard installation of this engine is also without electrical system, which is available optionally.

The steel tubular engine mount on the Super Cub models is mounted to the fuselage at the firewall on hinges, so that the rear of the engine can readily be made accessible for service. To hinge the motor mount, first remove the top, side and bottom engine cowl panels, which are quickly detachable by means of cowl fasteners. Next detach the rear end of the cowl support channels from their firewall brackets, extract the right hand hinge bolts, disconnect the tachometer shaft at the engine and swing the right side of the engine forward until the stop mechanism is extended.



The standard propeller on the Super Cub 95 is the Sensenich wood propeller design 72-GK-50. A Sensenich metal propeller design M-76AK-2 is available as optional equipment. On the 150, the standard propeller is the Sensenich metal design 74-DM-56. In general, propeller designs selected for the Super Cub models emphasize take-off, climb and economical

cruising performance rather than high speed cruising. If propellers with higher pitches are used, the cruising speed can be increased somewhat.

A stainless steel cross-over exhaust system is employed on the "150" to scavenge exhaust gases effectively. This permits the use of an efficient muffler without any loss in engine power output due to exhaust back-pressure. The muffler is shrouded to provide sources of heat for the cabin and carburetor heating systems.

STRUCTURES

The fuselage frame of the Super Cub is constructed of steel tubes welded together to form a rigid structure. A number of highly stressed members are of chromemolybdenum steel (4130). Other members are of 1025 steel.

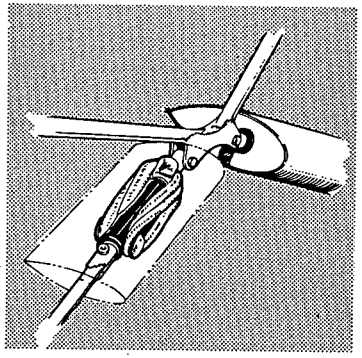
Repairs to the fuselage can be made in the manner approved by the FAA Advisory Circular 43.13-1, and repair facilities for this type of construction are available universally.

The fuselage is made corrosion resistant by the application of a coat of zinc chromate, followed by a sealer coat of nitrate dope. A third coat of dope proof lacquer is sprayed on the fuselage members wherever fabric comes in contact with the structure. If the airplane is to be used in salt water areas, the fuselage can be metalized prior to applying the zinc chromate and dope; at the same time the interior of the tubing is coated with linseed oil to prevent internal corrosion.

The wing framework consists of riveted aluminum ribs mounted on extruded aluminum spars with tubular drag and compression struts and high strength stainless steel drag wires. Aluminum sheet is used to form the leading edge and the aileron false spar. An ash wing tip bow provides a light tough member which can withstand considerable wing tip shock without failing.

The wings are attached to the fuselage at the wing hinge fittings on upper fuselage members, and by means of the lift struts which bolt to the lower fuselage members and to the wing spar fittings. The lift struts can be adjusted in length

by turning in or out the forked fittings at the lower ends. This adjustment is used to set the rigging of the wings. To prevent bending the struts, any lifting of the airplane should be done at the extreme end of the strut and not in the center.



LANDING GEAR

The Super Cub landing gear is the well proven maintenance-free-shock cord type, which employs two 8" x 3/4" shock rings on each shock strut. The only maintenance required on this gear is occasional greasing of the hinge bolts and shock strut members, and inspection of the steel hinge bolt bushings, which can be replaced if worn.

Hydrosorb shock units, which consist of automotive type oleo struts combined with light shock cords, are available optionally.

The Scott steerable full-swivel tail wheel is provided as standard equipment on the Super Cub. The Maule steerable tail wheel, Model SFS-1-4 is offered as optional equipment.

Main wheel assemblies are Goodrich D-3-13-A-1, on which are mounted 8:00 x 4 four ply tires. The tire inflation of 18 lbs. must be maintained reasonably consistant to prevent tire slippage on the wheel and to produce even wear.

CONTROL SYSTEMS

The units which make up the empennage are the fin, rudder, stabilizers and elevators. They are all constructed of tubular steel with steel channel ribs. The control surface hinges have bronze bushing inserts and should be oiled with light oil occasionally. Stainless steel tie rods brace the stabilizer to the fin and fuselage. The tail brace wires should not be used for lifting or handling the airplane.

Although the fin and rudder are identical on both models of the Super Cub, the stabilizers and elevators are different in that the Super Cub 150 has a larger span on the tail surfaces to provide extra longitudinal stability, and the elevators are designed with an aerodynamic balance to increase stability and reduce control forces. On the Super Cub 95 the tail surfaces are almost identical with those of preceding tandem models.

Conventional dual flight and engine controls are provided in the Super Cub. In the model 150, which is equipped with flaps, the flap control is located for front seat operation only. Solo operation of both models is normally from the front seat although rear seat operation is entirely feasible.

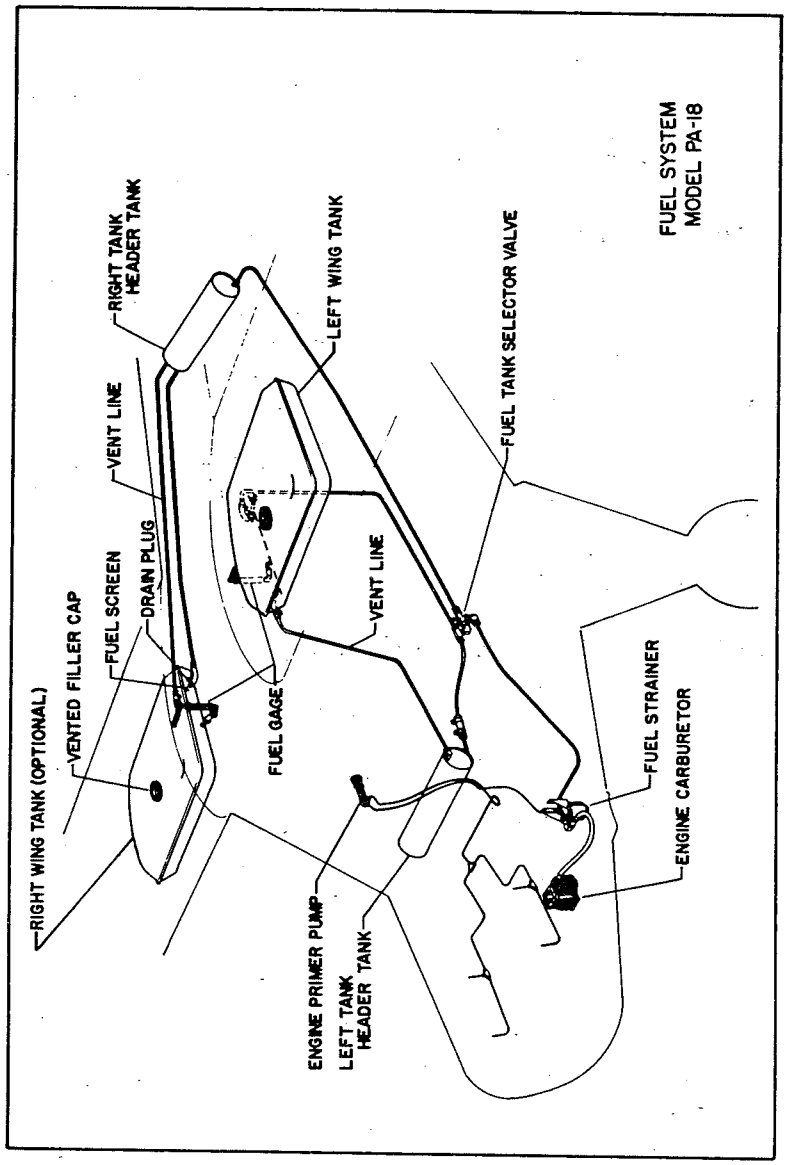
The flap lever can be set in any one of three positions, for full up flap, half flap, or full down flap. Full flap is recommended for minimum speed landings. Half or full flap can be applied to reduce take-off run, the more flap used the shorter the run. A minimum take-off distance is obtained by beginning the take-off with flaps up, then applying full flaps when take-off speed (30-35 M.P.H.) has been reached. The best angle of climb is attained with full flap. The best rate of climb is without any flap extended.

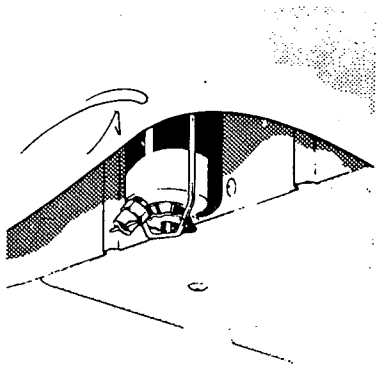
The stabilizer adjustment crank is located on the left cabin panel adjacent to the front seat. A permanently automatic tension adjustment, which consists of an idler pulley held in place near the rear main pulley by a tension spring, maintains correct tension on the stabilizer cable and prevents cable slippage. This system normally requires no attention except for lubrication and inspection. Do not lubricate cables.

FUEL SYSTEM

An 18 gallon fuel tank located in the left wing is the main fuel supply for the Super Cub 95 in the standard installation. A second 18 gallon tank can be installed as optional equipment in the right wing. On the model 150, two 18 gallon tanks are standard equipment.

A small (approximately 2 quarts) header tank which serves to maintain constant fuel flow to the engine regardless of the





attitude of the airplane, is included in the installation of each fuel tank. The header tank for the left or main fuel tank is located forward of the instrument panel, for the right tank it is concealed behind the headlining aft of the rear seat.

Fuel indicator gauges are installed in the upper cabin panels and are easily discernible from either seat. The fuel shut-off valve is in the left cabin panel near the front seat.

The fuel strainer, on the lower left side of the firewall in the engine compartment, traps water or sediment that may collect in the fuel system and should be checked regularly. Fuel screens are provided at each tank outlet, in the strainer, and at the carburetor.

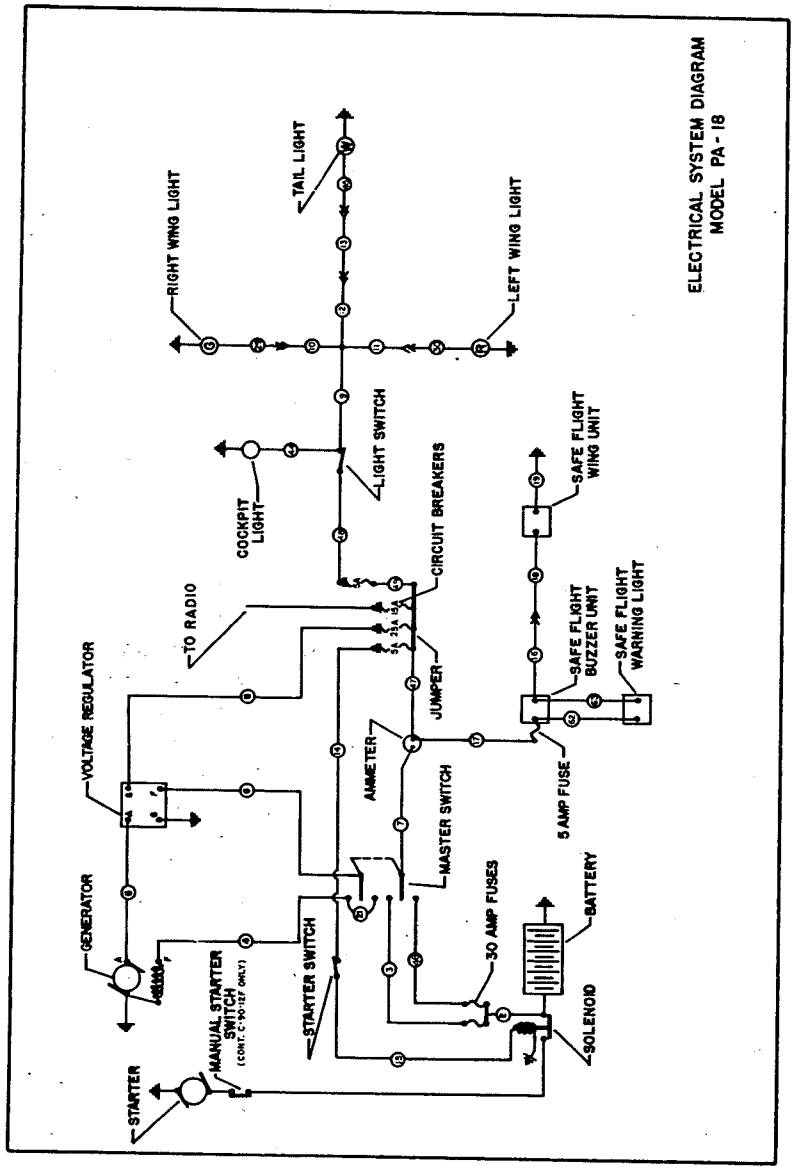
The engine primer pump on the right side of the instrument panel takes fuel from the top of the fuel strainer and pumps directly to all four cylinders on the engine. The primer should be locked in at all times, except when in use, to prevent malfunctioning of the engine.

An idle cut-off is incorporated in the carburetor so that full extension of the mixture control stops the flow of fuel at the carburetor. The cut-off should always be used to stop the engine.

Use fuel alternately from the left and right tanks, about one hour each time, to maintain lateral trim.

ELECTRICAL SYSTEM

An electrical system, consisting of starter, generator,



battery, voltage regulator, ammeter, starter solenoid, circuit breakers, fuses, switches and related wiring, is optional equipment on either model of the Super Cub.

A 12 volt battery is mounted in the fuselage aft of the baggage compartment. A master switch and circuit breakers are located on a panel over the right door. The circuit breakers automatically break the electrical circuits if an overload is applied. To reset the circuit breakers simply push in the buttons. A continuous popping of the circuit breakers indicates a short and should be investigated.

The master switch is connected with a main and a spare fuse, located near the battery box. The starter solenoid is also mounted near this box.

A voltage regulator attached to the engine side of the firewall is incorporated in the system to maintain the required voltage of the battery. Position and instrument panel lights (optional equipment) are operated with the same switch on the electrical panel.

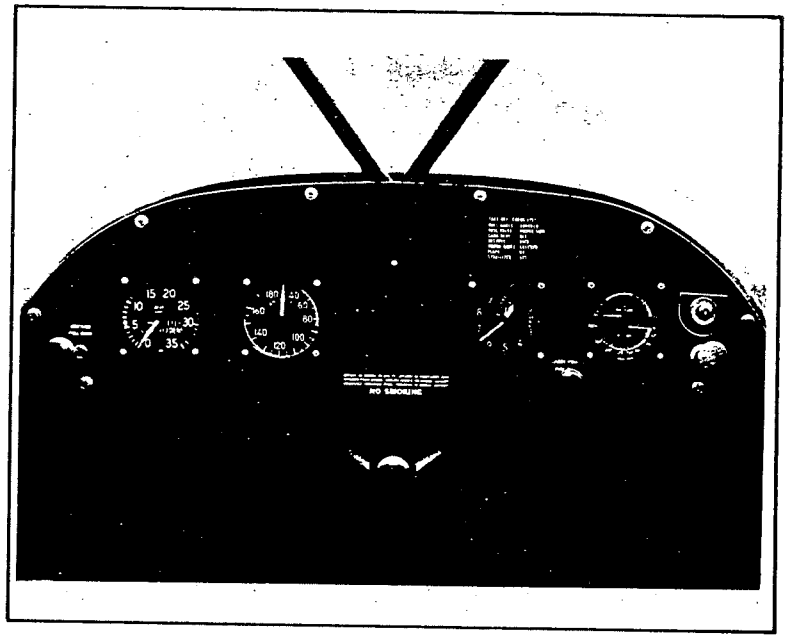
FINISH

The Duraclad finish on the Super Cubs consists of fire resistant butyrate plastic material on the fabric surfaces, and enamel on metal surfaces. Duraclad provides, in addition to the fire resisting qualities, a high-luster, more attractive finish which has a much longer life than earlier nitrate finishes.

All of the fabric, inside and outside, on the new models is treated with butyrate plastic. All of the exterior metal surfaces are finished with enamel. The Duraclad finish must not be covered over with any incompatible material. The use of different materials from those originally applied will damage the finish.

CABIN FEATURES

The standard instrument group in the Super Cub includes the following: Altimeter, Airspeed, Compass, Oil Temperature and Pressure Gauge, and Tachometer. Special panels



which provide complete instrumentation are available as optional equipment. A sensitive altimeter or recording tachometer is also available in the standard panel.

The front seat is adjusted fore and aft by lifting a lever on the left side of the seat frame. To remove the seat entirely, remove the forward stop pin on the left rear corner, then release the adjustment lever and slide the seat forward off its mounting channels.

To increase the space available for cargo carrying, the rear seat back can be easily removed. First pull out the spring

clips at the top of and behind the seat back, which hold the seat back in place. Then lift the back out of its lower sockets.

Shoulder harness kits are available for both seats of the Super Cub.

The control of the flow of hot air for heating the cabin is obtained through the use of the cabin heat control in the left side panel control box. Cooling air is admitted through the sliding windows on the left side of the cabin. For special purpose flights, such as photography, hunting, etc., the right door and window can be opened in flight, but care should be taken not to impose high air loads on the window in the open position.

SECTION III

OPERATING INSTRUCTIONS

SECTION III

OPERATING INSTRUCTIONS

PREFLIGHT

The following safety procedure instructions must become an integral part of the aircraft owner's operational routine and preflight inspection.

Before each flight visually inspect the airplane and determine that:

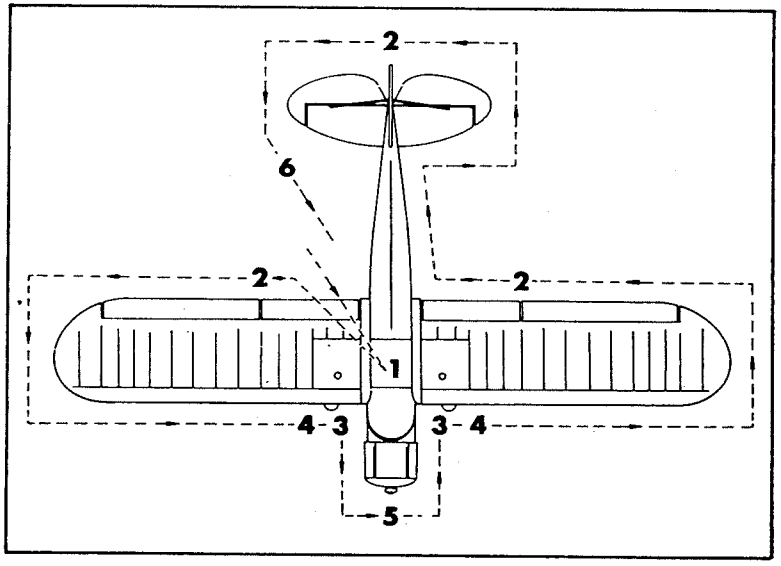
1. a. Ignition and battery switches "OFF".

2. a. There is no external damage or operational interference to the control surfaces, wings, or fuselage.

b. There is no snow, ice, or frost on the wings or control surfaces.

3. a. The fuel supply is checked and caps secured.

4. a. The tires are satisfactorily inflated and not excessively worn.



5. a. The cowling and inspection covers are secured.
   b. The windshield is clean and free of defects.
   c. The propeller is free of detrimental nicks.
   d. There are no obvious fuel or oil leaks.
   e. The engine oil is at the proper level.
   f. The fuel strainer is drained.
6. a. Upon entering the airplane, all controls operate normally.
   b. All the required papers are in order and are in the airplane.
   c. The cabin door is closed and secured.

STARTING

When the engine is cold, prime three to five strokes after turning fuel valve to the proper tank. Push mixture control to full rich, carburetor heat off, and open throttle about one-eighth of an inch or until the intake of air at the carburetor can be heard when the engine is pulled through by hand. Engine should be pulled through at least four times.

Next turn the ignition switch to "Both" and with brakes set, have engine pulled through by hand or engage starter if installed. If the engine does not start in the first few revolutions, open the throttle while the engine is turning over with ignition on. When engine starts, reduce throttle.

If the above procedure does not start the engine, reprime and repeat process. Continue to load cylinders by priming or unload by turning over the engine with the throttle open.

If engine still does not start, check for malfunctioning of ignition or carburetor system.

When the engine is warm, do not prime, but turn ignition switch to "Both" before pulling propeller through. Engine should start after it has been rotated through four compression strokes. If turned over more than four times the engine will frequently "load up" after which it should be started with the throttle well advanced.

WARM-UP AND GROUND CHECK

As soon as the engine starts, the oil pressure should be checked. If no pressure is indicated within thirty seconds stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get an oil pressure indication.

Warm up the engine at 800 to 1000 R.P.M., for not more than two minutes in warm weather, four minutes in cold weather. The magnetos should be checked at 1800 R.P.M., the drop not to exceed 100 R.P.M. The engine is warm enough for take-off when the throttle can be opened without engine faltering.

Carburetor heat should be checked during the warm-up to make sure the heat control operation is satisfactory and to clear out the engine if any ice has formed. It should also be checked in flight occasionally when outside air temperatures are between 20° and 70° to see if icing is occurring in the carburetor. In most cases when the engine loses speed without apparent cause, the use of carburetor heat will correct the condition.

TAKE-OFF, CLIMB, AND STALLS

The stabilizer adjustment should be set approximately in the neutral position for take-off. Fuel selector should be on the correct tank, carburetor heat off, mixture full rich. The flaps can be lowered if desired, but should be retracted as soon as climbing airspeed has been reached to achieve maximum rate of climb. The best rate of climb airspeed at gross load is 75 M.P.H. on both models of the Super Cub. At lighter weights, the best climbing airspeed will be reduced considerably.

The gross weight power off stalling speed with full flaps in the Super Cub 150 is 43 M.P.H.; with flaps up the stalling speed increases about 4 M.P.H.

CRUISING

The cruising speed of the Super Cubs at 75% of rated

engine power, at gross load under standard sea level conditions, is 100 M.P.H. for the model PA-18-95 and 115 M.P.H. for the model PA-18-150. Cruising airspeed and engine R.P.M. will depend on the propeller installed on the airplane.

Normally the 95 should be cruised at 2275 R.P.M. and the 150 at 2400 to 2450 R.P.M., but the 75% of power R.P.M. (low altitudes) can be determined as follows:

1. Fly the aircraft as near sea level as practicable at full throttle until maximum speed is reached. Note R.P.M. at top speed, level flight.

2. Reduce the maximum R.P.M. by 10% and cruise at 90% of full R.P.M. The correct cruising R.P.M. will result in a cruising airspeed of 100 M.P.H. with a fuel consumption of approximately 5 gallons per hour at full rich mixture on the 95, and an airspeed of 115 M.P.H. with a fuel consumption of approximately 9 gallons per hour on the 150. If the 150 is slowed down to the same cruising speed as the 95 or about 100 M.P.H., approximately the same amount of fuel, about 5 gallons per hour, will be used. See fuel consumption chart.

The metal propeller with which the Super Cub 150 is equipped as standard equipment is, unless specified otherwise, a 56 inch pitch propeller which favors take-off and climb rather than cruising speed. The use of this propeller reduces engine power output at normal cruising R.P.M. and therefore improves fuel economy considerably. At 2400 R.P.M. under standard conditions, the engine equipped with this propeller will be producing only about 60% of power rather than the 75% normally used. Fuel consumption will approximate 6.1 gallons per hour instead of the 7.7 gallons consumed at 75% of power.

For training and other purposes which do not require use of full power settings to obtain satisfactory performance, it is recommended that this propeller be operated, during take-off, climb, and cruise, at 2200 R.P.M. or less. This will still provide more performance than was formerly available in 65 H.P. trainers, and will reduce fuel consumption and engine wear very appreciably.

The fuel consumption chart should be consulted to determine most economical cruising R.P.M. for specific requirements.

A considerable saving in fuel usage can be affected in either model by judicious use of the mixture control during cruising flight. Unless icing conditions in the carburetor are severe, do not cruise with the carburetor heat on. Apply full carburetor heat only for a few seconds at intervals determined by icing severity.

APPROACH AND LANDING

During the approach, trim the plane with the stabilizer adjustment until no force is required on the stick to maintain a gliding speed of 70 M.P.H. Lower the flaps at an airspeed not to exceed 85 M.P.H. The mixture should be full rich, fuel valve on correct tank. The carburetor heat need not be used unless icing conditions prevail, but the engine should be cleared occasionally by opening the throttle.

During the landing roll the steerable tail wheel should be used for directional control, and brakes used as little as possible to avoid excessive brake and tire wear.

To stop the engine after landing, pull the mixture control full out to idle-cut off. After the engine stops, turn the ignition and master switch (if any) off.

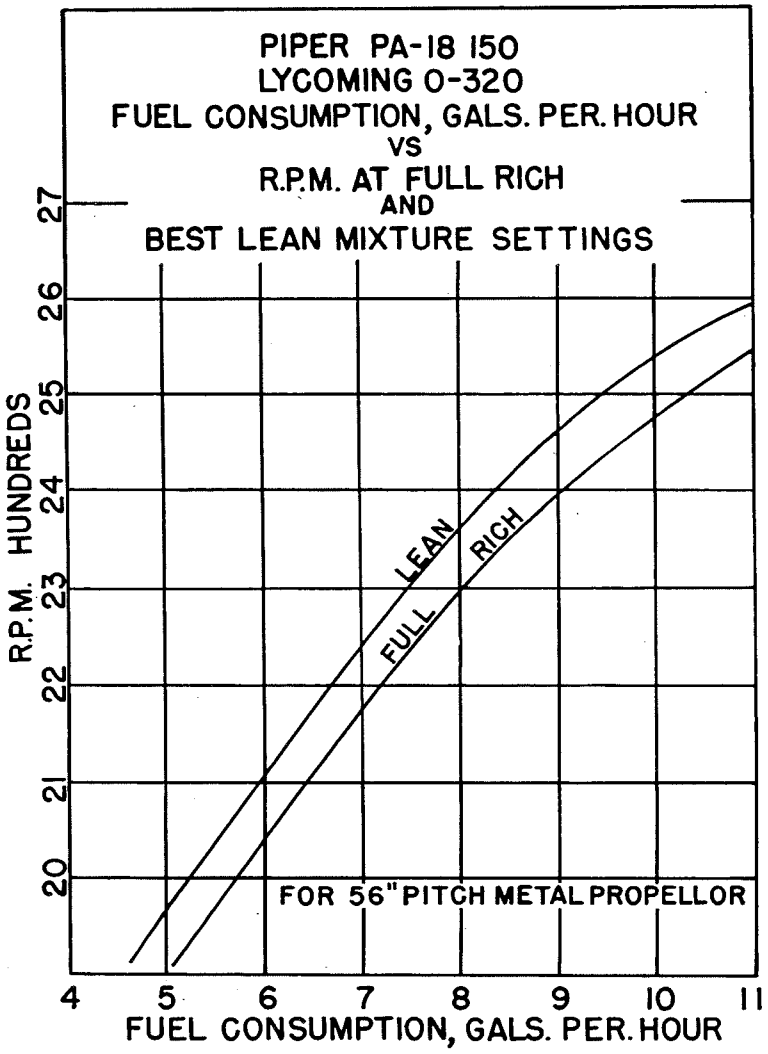
WEIGHT AND BALANCE

For weight and balance data, see the weight and balance sheet which gives the exact weight of the airplane and permissible center of gravity conditions.

NOTES

SECTION V

GENERAL MAINTENANCE


PIPER PA-18 150
LYCOMING O-320
FUEL CONSUMPTION, GALS. PER. HOUR
VS
R.P.M. AT FULL RICH
AND
BEST LEAN MIXTURE SETTINGS
R.P.M. HUNDREDS
20
21
22
23
24
25
26
27
LEAN
RICH
FULL
FOR 56" PITCH METAL PROPELLOR
4
5
6
7
8
9
10
11
FUEL CONSUMPTION, GALS. PER. HOUR

SECTION V

GENERAL MAINTENANCE

TIRE INFLATION

For maximum tire service, keep the tires inflated to the proper pressure, which is 18 pounds on the Super Cub. Reverse the tires on the wheels, if necessary, to produce even wear.

BATTERY SERVICE

A 12-volt 33-ampere hour battery is installed with the electrical equipment as optional equipment. The battery should be checked frequently for proper fluid level. Do not fill the battery above the baffle plates. Be sure all connections are clean and tight. If battery is not up to proper charge, recharge, starting with a charging rate of four amps and finishing with two amps. If a quick charge is desired for the battery, be sure master switch is off while charging.

CARE OF WINDSHIELD AND WINDOWS

The windshield and windows are made of plexiglas and a certain amount of care is required to keep them clean and clear. The following procedure is suggested:

1. Wash with clean water and dislodge excess dirt, mud, etc. with your hand.
2. Wash with mild soap and warm water. Use a soft cloth or sponge. (Do not rub.)
3. Remove oil, grease or sealing compounds with a cloth soaked in kerosene.

NOTE

Do not use gasoline, alcohol, benzene, carbon

tetrachloride, lacque thinner, or window cleaning sprays.

4. After cleaning, apply a thin coat of hard polishing wax. Rub lightly with soft dry cloth.

5. A severe scratch or mar can be removed by using jewelers rouge to rub out scratch, smooth on both sides and apply wax.

FUEL AND OIL REQUIREMENTS

Aviation Grade 80/87 octane gasoline should be used in the Super Cub. The fuel gauge glass should be cleaned occasionally so that the fuel level indicator will always be readily seen. To clean or replace the fuel gauges, first remove lower wing butt fairings. Pinch the rubber line to the lower gauge fitting so that fuel cannot drain from the tank. Then remove the fuel gauges by pulling the fittings from the connecting rubber tubes.

The oil capacity of the O-320 engine is 8 quarts, the C-90 -8F or 12F is 5 quarts. It is recommended the engine oil be changed every 50 hours, or sooner under adverse conditions. Minimum safe quantity of oil is 2 quarts. The following grades are recommended for the specified temperatures:

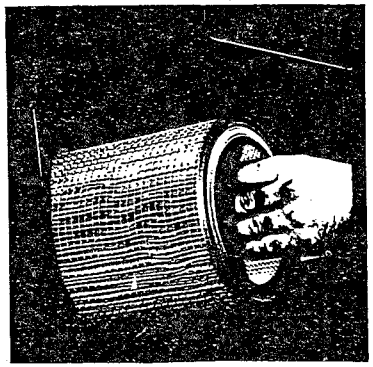
Temperatures above 60° F	SAE 50
Temperatures between 30° F to 90° F	SAE 40
Temperatures between 0° F to 70° F	SAE 30
Temperatures below 10° F	SAE 20

CARBURETOR AIR FILTER

1. Visual Inspection

A visual inspection of the paper cartridge should be made at intervals not exceeding eight (8) hours of operation or at any time after the filter has been subjected to severe dust

conditions. This inspection should be made to determine if there has been a rupture of the paper cartridge, damage to the outer screen or end seals, or blockage of the air flow due to leaves, paper, etc.



2. Cleaning

Remove cartridge and clean by tapping against a hard surface to remove grit, sand and dirt. Do not wash or blow out with an air hose.

3. Replacement

If the present cartridge is found to be in good condition and is not obstructed after being properly cleaned (see paragraphs 1 and 2), the following check should be made:

a. Operate engine to static R.P.M. at full throttle and note R.P.M.

b. Remove filter cartridge and repeat operation in paragraph 3a.

If an increase of 50 R.P.M. or greater is noted, a new cartridge should be installed.

BRAKE SERVICE

The brake system is filled with Univis #40 (petroleum base) hydraulic brake fluid. This should be checked at every 100 hour inspection, and replenished if necessary.

Do not use or mix mineral or vegetable base brake fluids when refilling system. When it is necessary to refill brake system, or when the brakes seem spongy, probably due to air in the lines, the following procedures are to be followed:

1. To fill the brake system, remove filler plugs on right wheel brake master cylinder. Remove bleeder screw from tee on right wheel brake unit and attach line from brake fluid pressure can. Fill system until master cylinders are full.

Repeat procedure for left wheel brake. If pressure can is not available, an open can with line attached may be used, providing can is held higher than master cylinders. When two master cylinders are full, replace filler plugs and bleeder screws. Check brakes for satisfactory operation.

2. Air in the brake lines causes faulty operation which can be corrected by bleeding the brake system as follows:

a. Check entire system for breaks or leaks.

b. Remove bleeder screw from particular brake unit and insert bleeder hose. Place free end in a clean receptacle.

c. Remove filler plug from master cylinders of the particular brake which is being bled.

d. Fill master cylinders with Univis #40 hydraulic fluid and keep cylinders full during bleeding process.

e. Work the brake pedal rapidly to force fluid through bleeder hose into receptacle. Pinch hose shut during return of pedal to off position. Release pressure on hose, and push pedal on rapidly again. While fluid is flowing, restrict bleeder hose and allow brake pedal to return slowly to off position. Continue this process until no more air bubbles are observed coming through bleeder hose. The system is then properly bled.

f. Replace bleeder screw; check to see that master cylinders are full, and replace filler plugs. Check brakes for satisfactory operation.

No adjustment of the brake clearances is necessary on the Super Cub brakes. If, after extended service, the brakes become less effective, the brake segments can be easily replaced as follows: Remove the wheels to expose the brake shoe blocks, then slip blocks from their retainer clips with a screwdriver. Replace with new brake segments and reinstall the wheels.

Wheels are quickly removed by taking off the hub caps, removing the cotter pin from the hub nut and unscrewing the nut. The wheel can then be pulled freely from the axle.

Tires are dismounted from the wheels as follows:

1. Deflate tube.
2. Remove safety clevis pin from outer wheel flange.
3. Extract lock ring which holds the outer flange in place.

4. Slide flange, tire and tube from the hub.

LANDING GEAR SERVICE

The landing gear shock cords, which are enclosed in streamlined shock cord covers, should be inspected regularly for signs of wear. Shock struts and landing gear hinge bolts should be kept properly lubricated with light grease or oil.

LEVELING AND RIGGING

The airplane should be leveled as follows:

Suspend a plumb bob on a string from the hole in the rear of the upper door frame channel. The hole is exposed by removing the wing root fairing at this point. The airplane will be leveled longitudinally and laterally when this plumb bob hangs directly over a depression in the horizontal door frame tube, about one inch ahead of its rearward end.

Lateral leveling: Place jacks or blocks under the inside portion of the axles, adjusting them until the plumb bob is roughly in line laterally with the mark on the door frame.

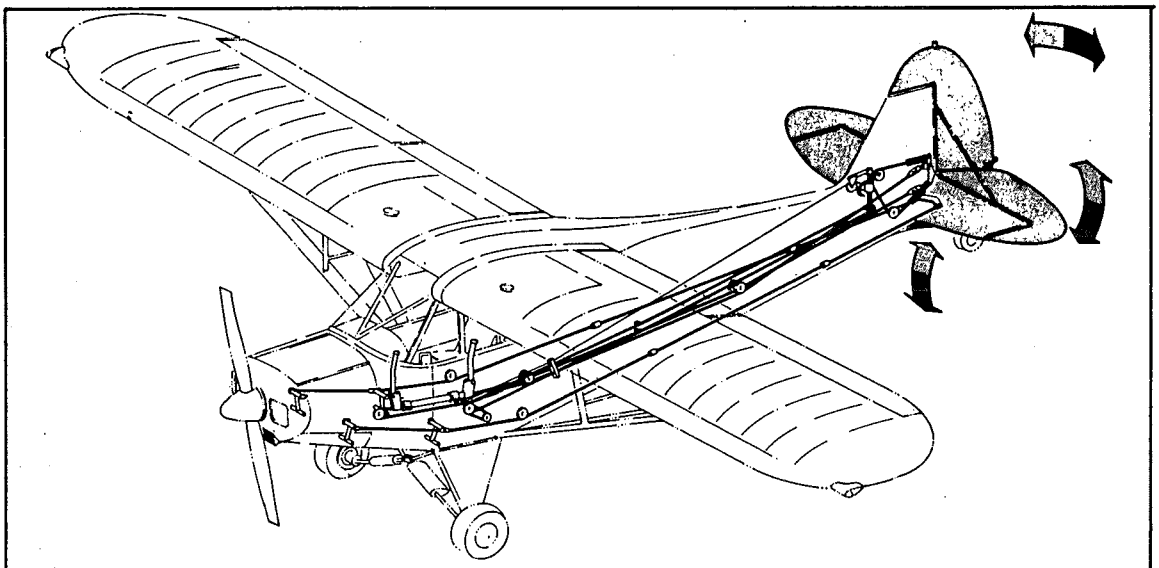
Longitudinal leveling: Support the tail on an adjustable jack or stand so that the airplane is approximately in level flight. Adjust the jack until the plumb bob is in line longitudinally with the reference mark.

Next readjust the lateral leveling jacks until the plumb bob hangs directly over the designated mark. The airplane is then leveled on both axes.

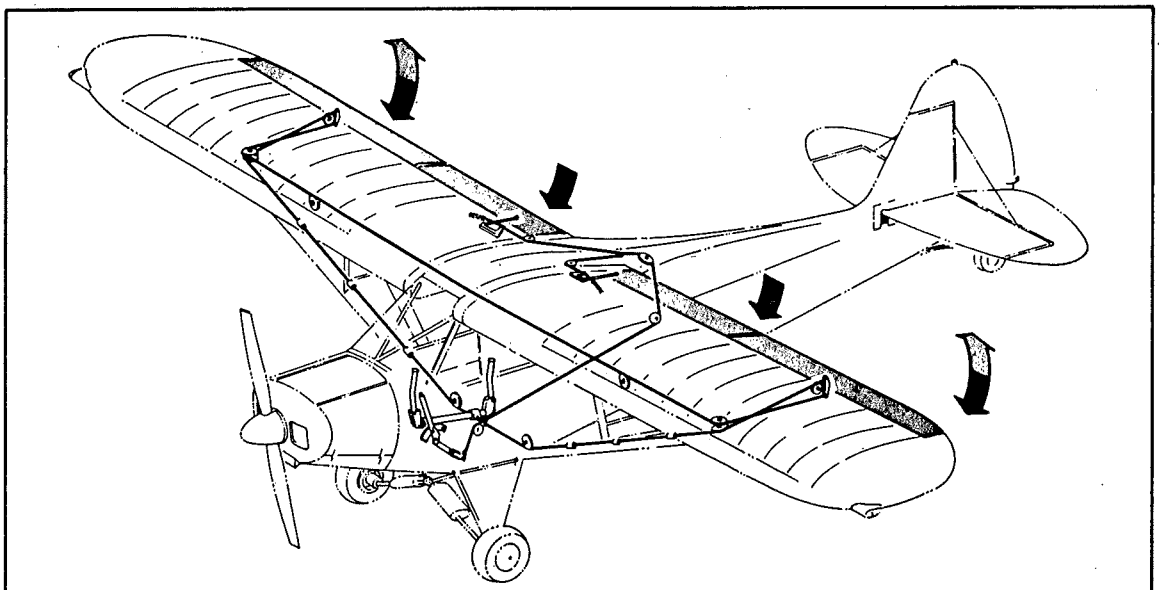
Rigging of the aircraft is done as follows:

1. Dihedral angle: Place a block 3/8" high on one end of a 30" level. Hold the level between the jury strut and the main strut attachments under the front spar with spacer block outboard. When the bubble is centered, the front spars have an angle of 45 minutes off level.

Normally the correct dihedral will be obtained when about seven threads on the lift strut adjustment forks are exposed. (A maximum extension of 15 threads is permissible). If proper



TAIL SURFACES CONTROL SYSTEM PIPER SUPER CUB		
TRAVEL OF:	PA-18-150	PA-18-95
Rudder	25° ±2° Rt. & 25° ±2° Lt.	20° ±2° Rt. & 20° ±2° Lt.
Stabilizer	2-1/2° +1/2° up & 4° ±1/2° Dwn.	2-1/2° ±1/2° up & 4° ±1/2° Dwn.
Elevator	25° ±2° up & 15° ±2° Dwn.	25° ±2° up & 15° ±2° Dwn.



AILERON AND FLAP CONTROL SYSTEM PIPER SUPER CUB		
TRAVEL OF:	PA-18-150	PA-18-95
Aileron	18° ±2° up & 18° ±2° Dwn.	18° ±2° up & 18° ±2° Dwn.
Flap	0° up & 50° ±2° Dwn.	None

rigging does not result from this procedure, check the fuselage for lateral leveling by holding a level between the front landing gear bolt heads, using this means to level the fuselage laterally, rather than the plumb bob. Then recheck for equal and proper dihedral of the wings.

2. Wash out: Place a 3/8" spacer block on top of a 30 inch level at one end. Working on the outboard aileron rib, hold the level fore and aft with the spacer block at the rear and the front end of the level under the front spar. The correct wash out will exist when the bubble is centered. Adjust the rear struts in or out to obtain this condition.

3. Tail Assembly: With the airplane in level position, the stabilizer should be leveled at their rear spars by adjusting the tail brace wires. The elevator hinge line should be straight from tip to tip. The fin should be vertical at the rudder post.

SERIAL NUMBER PLATE

The serial number plate is located under the front seat on the floor. The serial number of the airplane should always be used when referring to the airplane in service or warranty matters.

VOLUME TWO

Model PA-18A Agricultural Version of the Piper Super Cub

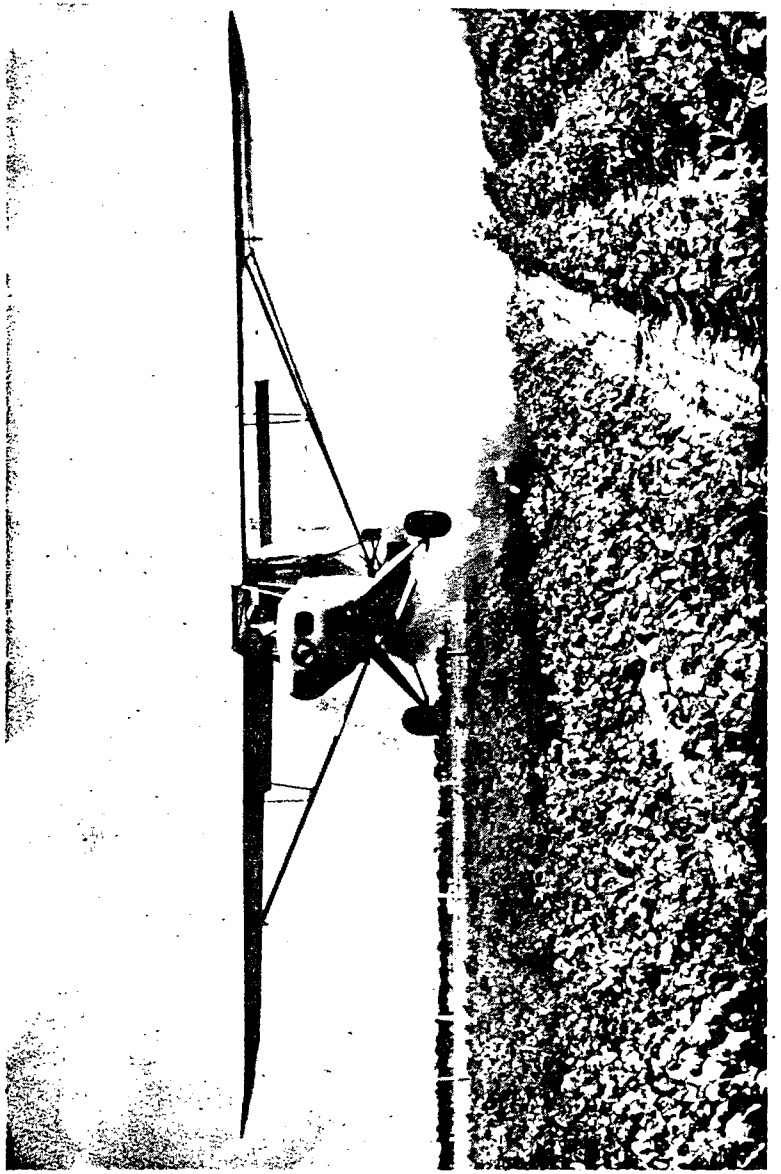


Figure 9

SECTION I

General Design

The PA-18A is basically a version of the well known and well proven Super Cub, which has been very considerably modified to make provision for the latest developments in agricultural dispersal equipment. In order to make possible the convenient installation and removal of a high capacity tank, the fuselage structure in the rear seat and baggage compartment area has been altered, with some tubular members removed to make room for the tank and replaced by structural sheet metal pieces. Other tubes have been added to provide attachment points for the tank or related accessories.

Other than the changes to the fuselage in the vicinity of and aft of the rear seat, there have been no major modifications to the PA-18 in the PA-18A. The wings, landing gear, engine installation and tail surfaces are all identical. The fuel system is essentially the same, and the electrical system is changed only to the extent of moving the battery forward nearer the center of gravity of the plane to a location just behind the rear seat or tank, whichever is installed. The control system is changed by rerouting the flap cable, installing a modified torque tube in the single seat version, and replacing the standard elevator push-pull tube (inside the torque tube) and connecting upper elevator cable with one longer cable.

The PA-18A is available as a two-place plane with dual controls installed, in a cargo version with the rear seat area cleared for cargo hauling, or with the agricultural tank installed, with attachments for spraying, dusting, or both.

As a two-place airplane, the PA-18A is approved under Part 03 of the Civil Air Regulations with a standard license and at a gross weight of 1750 lbs. As an agricultural plane, it is licensed under Part 8 of the CAR and can be flown at a gross weight of 2070 lbs.

Other modifications incorporated in the PA-18A are:

(1) The fabric on the fuselage belly from the tank aft has been replaced with quickly removable aluminum panels, which facilitate cleaning of the interior of the fuselage and general maintenance on the fuselage.

(2) Wire cutters have been applied to the leading edge of the landing gear vees on sprayers or duster.

(3) A shoulder harness and a heavy duty safety belt are installed as standard equipment on the front seat.

SECTION II

Description of the Dispersal Unit

An 18 cubic foot aluminum tank is the principal part of both the spray and dust units. This tank has a liquid capacity of 110 gallons, and a capacity of 500 to 1000 pounds of solids depending on the specific gravity of the material used.

The tank is anchored to the fuselage structure at many points. At the top, the tank is bolted directly to the structure and to the top deck panel, which is in turn bolted to the fuselage members with 25 machine screws. Through the center of the tank runs a structural tube, the end plates of which are connected with a through-bolt to lugs on the upper longerons. Restraining straps tied to the structure with steel tie rods are located as follows: One on the forward face of the tank above the pilot's seat back: one ahead of the tank near the floor, and one aft of the tank at the same level. The bottom portion of the tank extends through the structure in the belly of the fuselage and is restrained at that point.

The bottom panels of the tank are formed of aluminum channels in an H section. To these are clamped with quick attaching clamps, either the bottom plates for the spray unit or for the dusting venturi. When the sprayer is installed, the clamps on the right tank outlet are quickly removable in flight through the use of the dump valve control under the instrument panel. This allows the right sprayer plate to drop down, emptying the tank of liquid in 7 seconds.

The tank is constructed of heavy gauge aluminum, and is fitted with interior baffles to reinforce the tank and prevent surging of the liquid. The lateral baffles can be removed easily by pulling the wires from the attachment hinges, if desired for dusting work.

On the left side of the fuselage are welded lugs for attaching the duster gear box mount. This mount is bolted on with three bolts and to it is fastened the gear box and the brake unit for the agitator fan. The sprayer pump is mounted under the firewall on a second tubular mount.

Ahead of the lower part of the tank mounted on the floor is the control lever stand, with its control lever extending forward along the left side of the pilot's seat. The same lever is used to control output from either the spray or dust unit. To the center of the control lever is clamped the brake control, connected by a flexible wire cable to the brake assembly at the fan.

SECTION III

Operation of the Spray Unit

The spray unit has a liquid capacity of 110 gallons, a maximum output of about 90 gallons per minute, and a pressure range of from 20 to 90 pounds depending on nozzle orifice size and pressure regulator setting. The booms are fitted with 24 or 46 highest quality trouble-free Spraying Systems diaphragm type nozzles which give instant, positive shut-off. 24 nozzles are installed on the low volume sprayer booms, and 46 nozzles in the high volume booms.

All booms are aluminum Heli-arc welded units with end openings for cleaning. The booms are removed or installed with 4 bolts and 1 hose clamp, and are hinged in such a way as to fold back about 80 degrees when encountering an obstacle, reducing impact loads on the boom and the airplane.

A very effective system of pressure relief is employed to prevent a surge of pressure through the system when flow to the booms is shut off; with nearly constant pressure at the pump whether the flow is off or on, an even R. P. M. and pump output is maintained which provides more consistant unit output throughout spray runs. The pressure relief system consists of a dual shut-off arrangement in which a smaller shut-off valve, located in a by-pass line around the boom shut-off, opens when the main shut-off is closed, and vice versa. The liquid when not flowing to the booms (or to the pressure regulating valve on a second by-pass line) flows through the smaller shut-off, maintaining a maximum of 55 lbs. pressure and providing excellent agitation of liquid in the tank as it spurts through the right hand bottom plate.

Pressure in the system, as indicated on the pressure gauge in the instrument panel, is regulated by means of a regulating valve located on the lower face of the tank to the left of the pilot's seat. For maximum pressure the valve is closed, causing all fluid to flow to the booms when the main shut-off valve is opened. For minimum pressure, the valve is opened completely, permitting some of the fluid to by-pass back into the tank and reducing pressure in the booms. Ordinarily the regulating valve will be set at an intermediate position, determined by the pressure desired, and the by-passed liquid will create agitation as it flows into the left side of the tank when the unit is spraying. Thus agitation is provided whether the booms are on or off, as long as the pump is operating.

A fluid quantity gauge is mounted on the right side of the cockpit ahead of the door, calibrated for both level flight and three point attitudes. The glass tube in this sight gauge should be removed occasionally for cleaning.

The two bottom plates clamped to the bottom channels of the tank provide mounting for the dual liquid shut-offs, and outlets for the liquid as it flows to the pump. An inline strainer is located just aft of the fluid pump. The strainer may be cleaned by removing the bottom cap and flushing out the strainer element.

Neoprene rubber molded gaskets are clamped between the bottom tank channels and the bottom plates to provide a liquid tight seal. The 24 nozzles on the low-volume sprayer are equipped with D-8 orifice and No. 45 cores. Two each extra orifices and cores of this size are supplied, along with 26 D-4 orifices. With this combination of orifices and cores, most of the desired lower output quantities can be applied.

The 46 nozzles on the high-volume unit are also fitted with D-8-45 orifices and cores. Two extra D-8 orifices and No. 45 cores are provided with this combination, as well as 48 D-12 orifices, 48 D-4 orifices, and 48 No. 56 cores. Tee fittings and pipe plugs for conversion to the 15 gallon per acre highest density application are included in this kit.

With the high-volume arrangment, quantities ranging from 23 gallons per minute and 3 gallons per acre to 90 gallons per minute or 15 gallons per acre can be applied. If other quantities than listed in the Spray Output Tables are desired, different orifices and cores or different nozzle spacing should be used.

Output quantities should be computed from the Tables (Figures 14 and 15) rather than from the Spraying Systems Chart because results obtained in actual spraying tests varied from the computed quantities on the chart. (The Spraying Systems Chart uses pressures at the nozzle orifice rather than pressures throughout the system).

The output of the spray unit per acre varies with several factors: (1) Pressure; (2) Size of orifices and cores; (3) Speed of plane; (4) Width of swath used. For purposes of standardization, a normal pressure of 40 pounds, a speed of 80 mph, and a swath width of 50 feet are recommended for average use. Any of these variables can be changed to give more satisfactory results under special circumstances.

The speed of the plane can advantageously be increased to 90 mph for use in large acreages, or slowed to 60 to 70 mph on small plots or for heavier application. At a given pressure, the rate of

application per acre will increase as the speed is reduced. A simple formula for determining the output per acre is:

$$\frac{\text{Swath width (feet)} \times \text{speed (mph)}}{500} = \text{acres per min. covered.}$$

Example: $\frac{50 \text{ ft. swath} \times 100 \text{ mph speed}}{500} = 10$ acres min. covered

For calibration purposes, the best way to determine the output of the spray unit is to put a small quantity of liquid in the tank, spray the liquid out in flight leaving an unusable quantity in the tank. Then put in 20 gallons and spray out this quantity, measuring the time required to put out 20 gallons, and converting to one minute of operation. Next apply the formula given above, dividing the output in one minute by acres covered per minute to get application per acre.

Example: If 20 gallons are sprayed out in one minute, divide 20 by 10 acres per min. (as covered in above example) to get 2 gal. per acre application.

The swath width covered by the spray unit under normal conditions is actually from 55 to 60 feet. The use of a 50 foot working swath thus gives a 3 to 5 foot overlap on each side which is normally adequate. In some cases, it may be desirable to reduce the working swath width. This will have the effect of increasing the volume applied to each acre. To double the quantity applied per acre, simply fly a 25 foot swath.

As larger nozzle orifices and cores are used, the droplet size will increase. Also, as lower pressures are used the droplet size will increase. These two variables can be altered to produce the correct quantity per acre and the desired droplet size.

An almost perfect consistancy in size and distribution of droplets is obtained throughout the entire 55 to 60 foot swath in the use of the Piper sprayer.

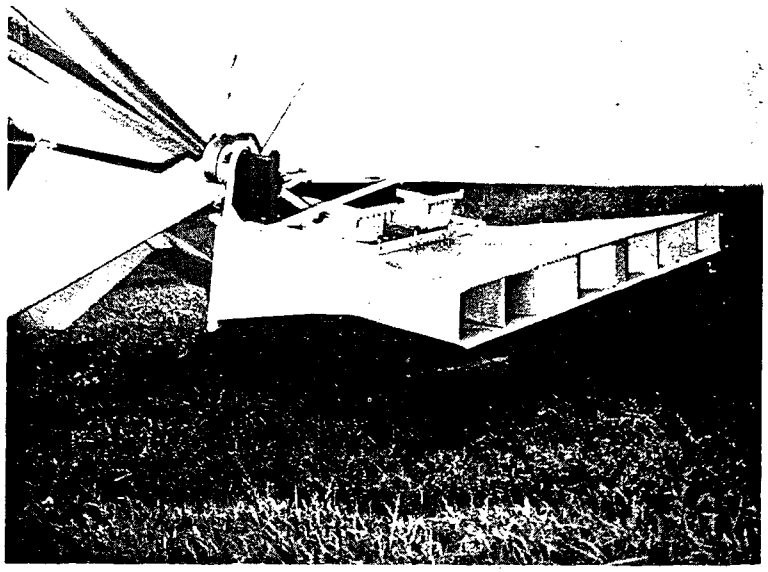


Figure 10

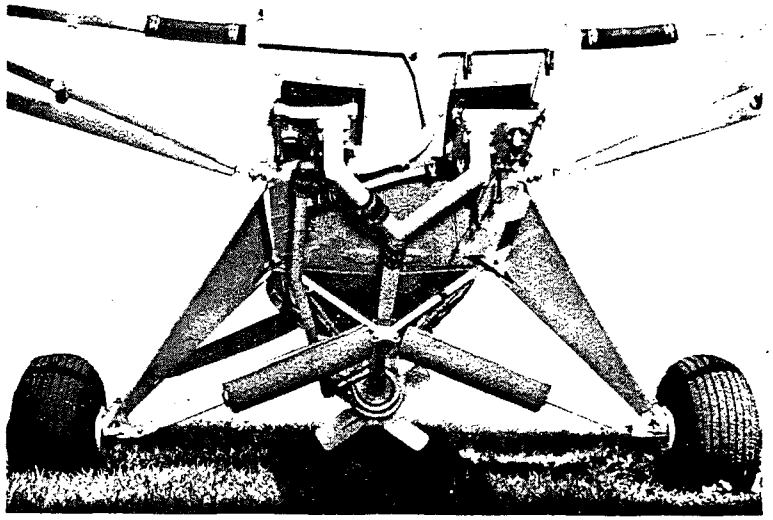


Figure 11

SECTION IV

Operation of the Dust Unit

The dust unit has a capacity of about 600 pounds of the lightest dust, about 800 pounds of standard defoliant, and higher quantities of heavier materials. Output of the dust unit can be varied from 10 lbs./acre of light dust to 100 lbs./acre of fertilizers and seed. Outputs in excess of 25 lbs./acre of dust or 150 lbs./acre of fertilizer generally result in unsatisfactory dispersal due to clogging of the venturi throat. This condition may be recognized in flight by dust entering the cockpit and by heavy streaming of dust throughout your turns after pull-up.

To pack the dusting hopper completely, it is suggested that a small implement be used to push the dust forward in the tank from the loading door. Otherwise the full capacity cannot be utilized.

Agitation is provided at the hopper exit opening to keep the material moving smoothly. The agitator shaft is supported by 4 sealed roller bearings. The oil in the agitator gear box drive must be kept at the proper level, (at upper pipe plug on face of gear box), using a medium weight worm gear lubricant, to prevent undue gear box wear.

The swath width covered by the dusting unit varies greatly with different materials and conditions and is difficult to measure. Approximately 75 feet is covered in a normal application of a talc type dust or of defoliant when applied in quantities of approximately 20 pounds per acre. No definate recommended working swath can be given, but it is suggested to operators start with a width of 40 feet and vary it according to conditions. The speed of the airplane when dusting can be varied to fit the circumstances, as with the sprayer. Normal recommended dusting speed is 80 mph. The swath width varies with application of flaps, and the first flap position (about 1/3 flap) is recommended.

A vernier control is provided on the dust gate lever which allows a fine adjustment of the dust gates in flight.

SECTION V

Original Installation of the Dispersal Units

The agricultural Super Cub, if obtained without either of the dispersal units installed, can be equipped with these units as follows:

SPRAY UNIT:

1. Remove front and rear seats, including all tubes supporting rear seat.

2. Remove battery and battery box if installed.

3. Remove control cable cover plates from floor of baggage compartment.

(Note: If single stick torque tube is installed, disregard next 6 steps.)

4. Remove all metal panels from bottom of fuselage, and top deck panel from top of fuselage.

5. Remove bottom elevator cable from rear and forward through the torque tube horn, as far as bracket under front torque tube bearing.

6. Remove upper elevator cable.

7. Remove torque tube and replace with sprayer type torque tube, making sure that tube is free in its bearings.

8. Install longer top elevator cable through torque tube and connect to front stick stub.

9. Reinstall bottom elevator cable.

10. Remove top deck plate from top of fuselage.

11. Install all tie rods which connect tank restraining straps -two 30¼" rods to front strap, two 10¼" rods to bottom front restraining channel, and two 12¼" rods to bottom rear restraining channel. Rods are held in place with one nut on each side of stub tube in fuselage.

12. Lower tank into position through top hatch keeping bottom of tank as far aft as possible until top of tank can be pushed forward into position. Then slide bottom of tank forward on floorboards until it drops in place.

13. Adjust tank until tie rod can be inserted through tube in tank, (through grommets at side of fuselage near upper longeron), and tighten nut on end of tie rod.

14. Bolt top of tank to adjacent tubular structure with 8 3/16" bolts and elastic stop nuts.

15. Attach top deck plate to top of tank with 10-32 counter sunk machine screws, inserting rubber gasket between tank and top deck plate. Holes should be punched in gasket flange with an awl through screw holes. Butt joint in gasket should be on forward side of opening to prevent leaks.

16. Attach top deck plate to tubular structure using 8-32 round head machine screws.

17. Install 3 tank restraining straps on ends of tie rods, pulling nuts up snug, but taking care not to pull upper part of tank out of position causing fabric distortions.

18. Attach end of aluminum tie strap between two bottom restraining channels using 6-32 machine screws and elastic stop nuts.

19. Cut out two rectangular grommets in bay between landing gear vees in bottom of fuselage.

20. Remove 4 10-32 round head machine screws in rear floorboards adjacent to slots. (Nuts under floorboards are anchored to fuselage). Place control handle assembly in place, attaching with these 4 screws, but omitting washers.

21. Screw pressure regulating valve into ½" pipe bushing in left side of tank, after installing connecting ½" nipple.

22. Install pressure gauge in instrument panel and connect line to ⅛" pipe connection at regulating valve. Line is clamped to floorboards with two offset clamps and parker screws.

23. Install liquid quantity gauge along right side of cockpit ahead of door. Restricting fitting, part #13576 must be installed at top tank fitting, with top line leading into fitting. Quantity calibration strip should be screwed to side panels at designated points.

24. Reinstall battery, if any, and cable covers.

25. Replace all belly plates, fitting leather gaskets around holes through which tank projects before replacing plates at this point.

26. Clamp spray system manifold assembly to bottom of tank with clamps, inserting neoprene gaskets between tank and bottom plates.

27. Install T shaped line to pressure regulating valve through hole in aluminum belly panel, connecting lower ends of the T to pressure relief shut-off and pump outlet pipe with hose clamps.

28. Remove nuts from Landing Gear Cabane Vee, and Lower Engine Hinge Mount bolts. Install pump mount.

29. Attach pump to mount with four ¼" bolts already located in pump.

30. Connect pump inlet with 1¾" hose and clamp. Connect pump outlet with 1¼" hose and clamps.

31. Attach brake assembly to pump mount with two 3/16" bolts, tighten Allen screws.

32. Slide thrust bushing on pump shaft to bear against thrust bearing.

33. Insert key in slot in shaft.

34. Install fan and brake drum. Secure by tightening ⅛" Allen screw.

35. Connect brake flexible wire control from brake unit to brake handle in cockpit, ascertaining that brake control is correct.

36. Cut out rectangular inspection openings, two at rear spar on each wing.

37. Install boom support clamps on spars, using 3/16" bolt and elastic stop nuts.

38. Attach boom support members with one bolt at each hinge point, securing with heavy safety wire through holes in boom supports.

39. Clamp boom to boom supports with clamps attached to end of supports.

40. Clamp boom support brace to rear lift strut, drilling brace on assembly for 6-32 machine screw. Boom should be lined up fore and aft before drilling.

41. Attach inboard ends of booms with hose and hose clamps.

42. Install nozzles on booms.

43. Reinstall front seat.

44. Install wire cutters on leading edge of landing gear.

DUST UNIT:

1. Install tank and control lever assembly as instructed under Spray Unit installation.

2. Attach duster bottom plate assembly to tank throat using the clamps provided and the two neoprene gaskets.

3. Attach gear box mount to three fittings located on left side of fuselage to the rear of wing lift struts.

4. Install gear box on mount, attaching brake assembly and fan, and connecting drive shaft to agitator universal joint.

5. Connect brake control wire from cockpit handle to brake unit.

6. Adjust gate control arms to provide equal travel of gates.

7. Attach venturi to bottom plate assembly.

SECTION VI

Conversion of the Combination Unit

The Agricultural Super Cub can be obtained with either the dust or spray unit installed, and with the other part of the combination unit accompanying the plane or shipped separately. Changing from one unit to the other requires only a short period once the original installation of the sprayer has been accomplished.

To convert from a Sprayer to a Duster:

1. Remove booms by extracting the two hinge bolts and loosening the inboard hose clamp. Leave boom supports in wings unless permanently converting to duster.

2. Remove fan and brake assembly.

3. Remove pump, loosening two hose clamps and extracting the four mounting bolts.

4. Loosen lower hose clamp at pressure regulating valve in cockpit.

5. Detach rods actuating the shut-off valves at the forward end.

6. Remove clamps which attach the bottom plates to the tank and detach the entire spray system manifold in one assembly.

7. Install duster bottom plate assembly with clamps, with rubber gasket in place on tank.

8. Connect gate actuating rods to control lever arms.

9. Adjust forked ends on actuating rods so that both gates move equally.

10. Bolt venturi to bottom plate assembly.

11. Slide gear box agitator drive shaft into universal joint, then bolt gear box to mount.

12. Attach brake assembly and fan to gear box shaft, making sure that fan rotates without brake drag.

13. Install bolt and elastic stop nut at coupling of universal joint and gear box shaft.

To convert back from duster to sprayer, reverse the above procedure.

SECTION VII

Conversion to Two-Place Model

The PA-18A can be converted from either agricultural version to the two-place model as follows:

1. Remove all parts of the agricultural units which will be undesirable on passenger version. (Spray quantity gauge, pressure gauge, and possibly a few other parts can be left in place).

2. Remove single stick torque tube if dual controls are to be connected. Remove upper elevator cable at same time.

3. Install dual stick torque tube with standard cable and push pull tube between sticks.

4. Install rear safety belt.

5. Install rear seat support tubes and assembly. Install rear seat cushions.

6. Install belly plates to close belly openings.

7. Install top deck frame, part #13257 (replacing the top structure of the tank) on the top deck panel. Reinstall top deck panel on the fuselage.

SECTION VIII

Conversion to Cargo Model

1. Remove all necessary parts of agricultural unit.

2. Retain sprayer type control torque tube and cable.

3. Install floorboard panels.

4. Install belly plates to close belly openings.

5. Install tube between lugs on upper longerons (at top of normal rear seat back location). This tube is a structural member and while it can be removed for loading, must be in place during flight.

6. Reinstall top deck panel with top deck frame attached.

Spray Output Table

Low Volume Unit

1" Simplex Pump

24 Nozzles

NOZZLE NO.	LIQUID PRES. Min. and Max. shown		TOTAL CAPACITY G.P.M.	GALLONS PER ACRE 50 Ft. Swath	
	80 MPH	90 MPH		80 MPH	90 MPH
D3-25 Min. Pres. Only	42		7.0	.88	
		55	9.0		1.0
D4-25 Min. Pres. Only	40		9.52	1.19	
		50	10.8		1.20
D4-45	39		11.5	1.43	
	68		12.2	1.53	
		46	13.3		1.47
		90	13.8		1.53
D4-56	42		16.0	2.0	
	75		16.7	2.1	
		46	17.6		2.2
		85	18.1		2.26
D8-45	35		25.0	3.1	
	62		25.5	3.2	
		45	26.1		2.9
		78	26.4		2.9
D12-56	24		60.0	7.5	
	43		63.0	7.95	
		35	64.2		7.13
		52	66.3		7.37

Installation of 24 Nozzles for 50′ Swath

For installation of 24 nozzles, plug every other boom outlet with pipe plug or by installing gaskets in front of orifices of nozzles.

NOTE: Quantities not shown on the tables can be applied by using wider or narrower swaths, by changing nozzle placement, or by using other orifice and core combinations. (See Spraying Systems Bulletin #60).

Spraying Systems chart cannot be used for output figures.

Spray Output Table

High Volume Unit

1" Simplex Pump

46 Nozzles

NOZZLE NO.	LIQUID PRES. Min. and Max. shown		TOTAL CAPACITY G. P. M.	GALLONS PER ACRE 50 Ft. Swath	
	80 MPH	90 MPH		80 MPH	90 MPH
D4-45	34		23.0	2.87	
	67		25.0	3.19	
		43	26.4		2.93
		83	27.2		3.02
D8-45	30		43.0	5.37	
	58		46.1	5.76	
		35	48.0		5.3
		67	51.3		5.8
D12-56	13		70.8	8.35	
			82.5	10.32	
		18	76.3		8.48
		37	89.5		9.94

46 Nozzles in T's in Inboard Outlets

33 Ft. Swath

D12-56	13		70.8	13.4	
	32		82.5	15.5	
		18	76.3		12.83
		37	89.5		15.0

Installation of 46 Nozzles for 50′ Swath

Install one nozzle with reducer nipple at each boom outlet.

Installation of 46 Nozzles for 33′ Swath

Remove nozzle extension at #1 station on the inboard end of boom, and remove nozzles with reducer nipples from all stations except #3, 6, 9, 12 and 14 counting outboard from #1.

Assemble two nozzles with reducer nipples to each ¼" pipe tee.

Install tees with ¼" close nipples in stations #1, 2, 4, 5, 7, 8, 10, 11, and 13.

Install ¼" pipe plugs in all outboard boom outlets.

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INDEX (cont)

Luftfartstilsynet
Civil Aviation Authority - Norway

Bardufoss Flyklubb
Postboks 1025
9326 BARDUFOSS

Vår saksbehandler:	Vår referanse:	Vår dato:
Monica Terese Sunde	200400155-2/332/MTS	12. februar 2004
Telefon direkte:	Deres referanse:	Deres dato:
23 31 78 92		8. januar 2004

Godkjenning til bruk av bilbensin i PA18, LN-ACI i henhold til STC SA1961CE og STC SE2031CE

Luftfartstilsynet viser til flyklubbens søknad av 8. januar 2004 om godkjennelse til bruk av bilbensin i PA 18, LN-ACI, i henhold til STC SA 1961CE og STC SE2031CE.

Luftfartstilsynet har behandlet søknaden etter bestemmelsene i BSL B 1-6 pkt. 7 og BSL B 3-2 pkt. 6.4 med grunnlag i innsendte STCs og Installation Instructions Kit AF PA-18.

Etter en vurdering av de opplysninger som er kommet frem i saken, finner Luftfartstilsynet at vilkårene for å kunne godkjenne søknaden er tilstede. Det er ved avgjørelsen lagt vekt på at begge STC er godkjent av amerikanske myndigheter.

Godkjennelsen forutsetter at flyets vedlikeholdsdokumentasjon oppdateres.

Deres søknad er således innvilget.

Bardufoss Flyklubb har sendt inn Luftfartstilsynets Flygehåndbok for oppdatering i henhold til ovennevnte STCs. Vi er i gang med å gå bort fra denne ordningen. I stedet ønsker vi at fabrikantens egen Flight Manual/Owners Manual/Operation Manual skal benyttes. Dette gjøres samtidig for å tilpasses det nye EASA.

For å autorisere fabrikantens manual må denne sendes Luftfartstilsynet. Denne blir godkjent ved at det utstedes en Autorisasjonsside til denne. Innsendte Flight Manual Supplement tilhørende STC SA1961CE skal settes inn i denne manualen når det er signert og godkjent av Luftfartstilsynet..

Med vennlig hilsen

Andreas Mourud
seksjonssjef
Teknisk-operativ avdeling

Monica Terese Sunde
overingeniør

Kopi: PAL

Utstyrsliste – masse og balanse.

Nasjonalitets- og registreringsmerke	Serienummer	Fabrikasjonsår
Piper PA-19	18-3239	1953

Nr.	Beskrivelse	Type	Masse kg/lbs	Arm cm / in
	23 – Communication			
1	Com : Becker	AR-4201		
2	Intercom : Flightcom	403 MC		
	25 – Equipment			
1	Førstehjelpskrin	BSL D1-9		
2	Brannslukker : Gloria			
3	Nødpeilesender: ACK	E-01		
	24 – Electrical Power			
1	Generator:	50-1008-102		
2	Battery: Gill	G-35		
	31 – Instruments			
1	Turteller :			
2	Høydemåler :			
6	Air Speed Ind. fremre :			
7	Air Speed ind. bakre :			
8	Vertical Speed Ind. : AC	AC-135-3		
9	Svingeviser: Kun kule			
10	Oil Press/ Temp ind : US Gage	450-681		
	32 – Landing Gear			
1	Hjul : Fast med halehjul			
	34 – Navigation			
1	Magnetkompass : Aipath	C2300		
2	Transponder : Garmin	GTX 320A		

Tommasse- og balanserapport. Veiing av luftfartøy.

Nasjonalitets- og registreringsmerke:	LN- ACI	
Fabrikant og typebetegnelser	Serienummer	Fabrikasjonsår
Piper PA-19	18-3239	1953

Tommasse tyngdepunkt-område: Ikke oppgitt

Understell: x Hjul ☐ Ski ☐ Flottører ☐ Amfibium ☐ Skid

Forrige Tommasse- og balanserapport.

Dato: 01.10.04 Utført av: NAC Maintenance Tommasse: 433 kg Tyngdepunkt: 19,49"

Datum / Referanseplan: Vingeforkant

Vennepunkter	Avlest kg/lbs	Tara kg/lbs	Netto kg/lbs	Arm cm/inch	Moment kg/lbs
Venstre hovedhjul	199 kg	0	199 kg	2,25"	447,75
Høyre hovedhjul	198 kg	0	198 kg	2,25"	445,5
Nese- / halehjul	34 kg	0	34 kg	201,0"	6834,0
Justering					
Justering					
Total			431 kg	17,93"	7727,25

Referanse og dato for gjeldende vedlagte utstyrsliste: Dato 06.02.2007

Referanse

Tommasse i kg/lbs	431 kg	Tyngdepunkt i cm/inch	17,93"

Type vekter: Road Runner Electroniske Vekter Dato for siste kalibrering 31.01.07

Anmerkninger: Tidligere tyngdepunkt beregning må ha vært gal.

Årsak til veiing: Over 10 år og omtrekking av skrog.

Undertegnede bekrefter herved at veieresultatet og beregningen av tommasse og tyngdepunkt er kontrollert og funnet tilfredsstillende.

Sted / dato Notodden 05.02.2007

Navn/stilling (Underskrift)

Øyvind Vassbotten

Verkstedsjef

Utførende godkjent vedlikeholdinstans:
Flyteknisk Notodden AS

Telefon 350 12177

Sted / dato Notodden 05.02.2007

Navn/ stilling(Underskrift)

Øyvind Vassbotten

Verkstedsjef

Flyteknisk Notodden A/S
EASA NO.145.0112

LN-ACI forts.

3	Encoder : ACK	A-30
	61 Propeller	
1	Propeller: Sensenich	M76AK-2
	72 – Engine	
1	Continental :	C-90-8F
	73 – Fuel system and Controls	
1	Carburetor : Facet	10-4252-2
	74 – Ignition	
1	Magnet : Slick LH	4333
2	Magnet : Slick RH	4333

Overnevnte komponenter er inkludert i tomvekten

Dato: 05.02.2007	Sted: Notodden	Sign. Øyvind Vassbotten Verkstedsjef. Flyteknisk Notodden A/S EASA NO.145.0112

Petersen Aviation, Inc.
Route 1, Box 18
Minden, NE 68959

Supplement No. 1

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

Piper Model PA-18, PA-18S, PA-18 (105), PA-18S (105), PA-18A, PA-18 (125), PA-18S (125), PA-18 (135), PA-18A (135), PA-18S (135), PA-18AS (135), PA-18 (150), PA-18A (150), PA-18S (150), PA-18AS (150), PA-19, PA-19S.

Registration Number LN-ACI

Serial Number 18-3239

This Supplement must be attached to the FAA Approved Airplane Flight Manual applicable to that particular airplane when the airplane has been modified in accordance with STC SA1961CE. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures and performance information not contained in this supplement, consult the basic Airplane Flight Manual.

LIMITATIONS: 12826864

Fuel:
The use of unleaded automotive gasoline, 87 minimum antiknock index and leaded automotive gasoline, 80 minimum antiknock index (RON + MON)/2 per ASTM Specification D-439 is approved for use in low compression 80/87 octane engines only. The approved engine model numbers are listed on the applicable engine STC. Intermixing with aviation gasoline is also approved.

FAA APPROVED Jim Bede

FOR
Manager, Wichita Aircraft Certification Office
Central Region
Wichita, Kansas

Date March 23, 1984

Revised January 11, 1985

United States of America

Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number SA753CE

This certificate issued to Aero Ski Manufacturing Company, Inc.
P. O.Box 58
Brooten, MN 56316

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 3 *of the* Civil Air *Regulations*, dated 16 December 1946, Amendments 1-4.

Original Product—Type Certificate Number: 1A2
Make: Piper
Model: PA-18, 90 thru 150

Description of Type Design Change:

Install Aero Ski Manufacturing Co., Inc. Model M1500, M1800, M2000, and M3000H aircraft skis in accordance with Aero Ski Manufacturing Co., Inc. Installation Instructions, revised April 10, 1990, and Master Drawing List, dated April 11, 1990, or later FAA approved revisions.

Limitations and Conditions: 1. This approval should not be extended to other specific airplanes of this model on which other previously approved modifications are incorporated, unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane. 2. FAA Approved Airplane Flight Manual Supplement dated February 18, 1971, reissued October 30, 1990, or later FAA Approved revisions, is required with this installation.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: December 19, 1970
Date of issuance: March 25, 1971
Date reissued:
Date amended: October 30, 1990

By direction of the Administrator

Donald A Michal
(Signature)

Donald P. Michal, Manager
Chicago Aircraft Certification Office
(Title)

AERO SKI MANUFACTURING COMPANY
PARK RAPIDS, MINNESOTA 56470

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
PIPER MODEL PA18 (90 THROUGH 150)

REGISTRATION NO. LN-AGI

SERIAL NO. 18-3235

This supplement must be attached to the appropriate FAA Approved Airplane Flight Manual (date given in Aircraft Specification 1A2) when Aero Ski Model M1500, M1800 or M2000 Main Skis are installed in accordance with STC SA753CE. The information herein supplements the information of the basic Airplane Flight Manual; for limitations, procedures and performance information not contained in this supplement, consult the basic Airplane Flight Manual.

I. LIMITATIONS: Omit references to categories other than NORMAL. Placard in full view of pilot -

"OPERATE IN NORMAL CATEGORY
ONLY WHEN AERO SKIS
ARE INSTALLED"

II. PROCEDURES: No change.

III. PERFORMANCE:

Climb: Skiplane climb performance is essentially equal to that of the landplane.

Take-Off and Landing: Under the most favorable conditions of smooth packed snow at temperatures approximating 30°F, skiplane take-off distance is essentially equal to the landplane distance. The landing distance of the skiplane is approximately 20% greater than the landplane distance. In applying the above performance data, caution should be exercised in that lower temperatures or other snow conditions will increase the friction and hence increase the take-off run and decrease the landing run.

Stall: Skiplane stalling speeds are same as shown for the landplane.

APPROVED BY Charles N Rueger
JOHN A. CARRAN, Chief
Engineering & Mfg. Branch
Central Region
Kansas City, Missouri

DATE 18 February 1971