FAA APPROVED

A I R P L A N E   F L I G H T   M A N U A L

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS

MODEL H-295

SERIAL NUMBER ________

FAA IDENTIFICATION NUMBER ________

(THIS DOCUMENT MUST BE KEPT IN THE AIRPLANE AT ALL TIMES)

APPROVED: E. L. Melton
for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: April 8, 1965

A

HELIO MODEL H-295

AIRPLANE FLIGHT MANUAL

I. LIMITATIONS

The following limitations must be observed in the operation of this airplane:

A. Engine: Lycoming Model GO-480-G1D6

B. Engine Limits: Take Off (5 min.) 3400 RPM (295 HP) Full Throttle
All other operations, 3000 RPM (280 HP)

C. Fuel: 100/130 Octane minimum grade aviation gasoline.
58.5 usable (standard configuration)

D. Propeller: Hartzell, Constant Speed, Hub HC-B3Z20-1
Blade 10151C-5
Diameter: 96 in. - No decrease permitted.
Pitch settings at 30 in. station; Low 11.8°
High 30.8°

E. Power Plant Instruments:

Cylinder Head Temp: Green Arc: 250° F - 475° F
(Normal Operating Range)
Red Radial: 475° F

Manifold Pressure: Green Arc: 15 - 29.1 in. Hg.
(Normal Operating Range)

Oil Temperature: Green Arc: 100° - 235° F
(Normal Operating Range)
Yellow Line: 100° F
Red Radial: (Max.) 235° F

Oil Pressure: Green Arc: 65 to 85 psi
(Normal Operating Range)
Red Radials: 25 and 85 psi
Yellow Arc (Caution): 25 - 65 psi

Fuel Pressure: Green Arc: 9 to 15 psi
(Normal Operating Range)
Red Radials: (Min.) 9 and (Max.) 15 psi

Tachometer: Green Arc: 2200 - 3000 RPM
(Normal Operating Range)
Yellow (Caution): 3000 - 3400 RPM
Red Radial: 3400 RPM

I LIMITATIONS (Continued)

F. Airspeed Limits: (Calibrated Airspeed)

Never Exceed (V_{NE})	200 mph (Red Radial)
Caution Range	160-200 mph (Yellow Arc)
Design Cruising Speed (V_C)	160 mph
Normal Operating Range	60-160 mph (Green Arc)
Max. Design Maneuvering Speed (Vp)	103 mph
Max. Flap Extension Speed (V_F)	80 mph
Flap Operating Range	53-80 mph (White Arc)

NOTE: Airspeed instrument markings and their significance:

1. Radial RED line marks the never exceed speed, which is the maximum safe airspeed.
2. YELLOW arc on indicator denotes range of speeds in which operations should be conducted with caution and only in smooth air.
3. GREEN arc denotes normal operating speed range.
4. WHITE arc denotes speed range in which flaps may be safely lowered.

G. Maneuvers: Normal category maneuvers only are approved.

H. Flight Load Factors: (At max. gross weight of 3400 lbs.)

Maneuver: Positive: 3.8g Negative: 1.5g
Flaps extended: 2.0g

WARNING: 1. Use controls with caution above 125 mph (109K) CAS.

2. In gusty air, it is advisable to reduce cruising speed below normal, and in severe turbulence reduce speed below 94 MPH (flaps up) and below 65 MPH (flaps down).

I. Maximum Weight: 3400 lbs.

J. Center of Gravity Limits: (103.8) to (110.0) at 3400 lbs.
(98.9) to (110.0) at 2760 lbs.
(97.0) to (110.0) at 2330 or less
Straight line variation between points given.

J. Center of Gravity Limits: (Continued)

Datum: Datum is 60 inches forward of fuselage station 0. (Station 0 is at upper attachment of engine mount to fuselage.)

NOTE: It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded.

K. Placards:

"THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATION LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUAL"

"NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED"

On pilot window handle "WARNING - DO NOT OPEN WINDOW ABOVE 80 MPH IAS" (Applicable to 1200 Series Only).

II. PROCEDURES

A. Normal Procedures

1. Wing Flap Settings: Takeoff: 0° - 30° (15 turns from full up - 3 from full down = 30°)
   Cruise: 0° (Full up - retracted)
   Landing: 40° (18 turns from full up)
   (1400 Series have electrically operated flaps with flap position indicator)

2. Maximum 90° crosswind velocity demonstrated: 10 mph

3. Carburetor or air filter icing: Use carburetor air heat control full ON.

B. Emergency Procedures:

1. Engine Failure

To permit a normal landing flare-out, maintain an airspeed of at least 60 mph when using 20° to 40° of flaps.

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
HELIO H-295 WITH 120 GALLON FUEL SYSTEM

This document is FAA approved and must be attached to the basic Airplane Flight Manual when the Helio 120 gallon fuel system is installed on the aircraft. The information in this Airplane Flight Manual Supplement supersedes the basic manual only with respect to items contained herein.

I. LIMITATIONS

C. Fuel: 100 octane minimum grade gasoline
118 gallons usable

K. "CAUTION! MONITOR MAIN FUEL QUANTITY DURING AUXILIARY TRANSFER TO AVOID OVERFLOW (LEVEL FLIGHT ONLY)"

II. PROCEDURES

A. Normal Procedure

4. Burn main fuel down to 1/4 before starting to transfer fuel from auxiliary tanks. When main tanks are 3/4 full, stop transfer until main tank supply is again 1/4 full. Transfer fuel from both auxiliary tanks simultaneously.

B. Emergency Procedures

2. In case of an asymmetrical fuel load in auxiliary tanks it is recommended that a no flap landing be made because of lateral control.

APPROVED: E. L. Melton
for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: 4/23/65

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
HELIO H-295 WITH EDO 582-3430 FLOATS

This document is FAA approved and must be attached to the basic Airplane Flight Manual when equipped with Edo 582-3430 floats per Helio drawings. The information in this Airplane Flight Manual Supplement supersedes the basic manual only with respect to items contained herein. For other information refer to the basic manual.

I. LIMITATIONS

J. Center of Gravity Limits (With Edo 582-3430 floats the rear C.G. is restricted to 109")

102.0 to 109.0 at 3400 lbs.
98.0 to 109.0 at 2600 lbs. or less
Straight line variation between points

II. PROCEDURES

A. Normal Procedures

4. Retract water rudder for takeoff and landing.

APPROVED: E. L. Melton
for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: 11/24/65

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
HELIO MODEL H-295/U-10D WITH 4 FUEL TANK SELECTORS

This document must be attached to the basic airplane Flight Manual when the Helio 4 tank -4 individual selector fuel system is installed in the aircraft. The information in this Airplane Flight Manual Supplement supersedes the basic manual only with respect to items contained herein.

I. LIMITATIONS

C. Fuel: 100 octane minimum grade gasoline
116.4 gallon usable

K. Placards: In vicinity of fuel control valves.
"Both mains on for take-off and landing
"Left Auxiliary Level Flight Only"
"Right Auxiliary Level Flight Only"
In vicinity of FM-622A "Homing Unreliable Above 50 M.C."

II. PROCEDURES

A. Normal Procedures

4. Take Off with Right and Left Main ON.

5. When changing fuel tank selection turn ON desired tank before turning OFF tank in use.

6. Burn main fuel down to ½ full before switching to aux tanks. Monitor fuel quantity in Right Main as excess fuel from the carburetor is returned to the Right Main.

7. Select use of any one single tank in level flight only.

CAUTION: ENGINE FUEL STARVATION CAN RESULT FROM SLIPS OR SKIDS WHEN USING FUEL FROM ONLY ONE PARTIALLY FILLED TANK.

B. Emergency Procedure

2. In case of an asymmetric fuel load in auxiliary tanks, it is recommended that a no-flap landing be made because of lateral control.

APPROVED: E. L. Melton
for John A. Carran, Chief
Engineering & Manufacturing
Branch
Central Region

FAA APPROVED

DATE: January 19, 1967

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR HELIO ALTERNATE STATIC SOURCE

This document is FAA approved and must be attached to the Basic Flight Manual when the Helio Alternate Static System, Installation Number 295-100-900, is installed on the aircraft. The information in this Airplane Flight Manual Supplement supersedes the basic manual only with respect to items contained herein.

I. LIMITATIONS:

K. Placard: In vicinity of the Alternate Static Selector Valve:
"SEE FLIGHT MANUAL SUPPLEMENT FOR AIRSPEED-ALTIMETER ERROR"

II. PROCEDURES:

A. Normal Procedures

4. Operate aircraft with Static Selector Valve in the Normal position.

B. Emergency

2. In case of failure of the Normal static source, select Alternate on the static source selector valve.

ALTERNATE STATIC SOURCE CALIBRATION

Airspeed		Altitude		Altitude	
Prim.	Alt.	Prim.	Alt.	Prim.	Alt.
50	63	1000	1090	7000	7095
70	83	2000	2090	8000	8100
90	103	3000	3090	9000	9100
110	123	4000	4090	10000	10100
130	145	5000	5090	11000	11100
		6000	6090	12000	12105
				13000	13105

APPROVED:

E. L. Melton

for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: 1-19-68

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR HELIO ELECTRIC FLAP AND PITCH TRIM TAB

This document is FAA approved and must be attached to the Basic Flight Manual when the Helio Electric Flap and Pitch Trim Tab, Installation Number 295-052-90 is installed on the aircraft. The information in this Airplane Flight Manual Supplement supersedes the basic manual only with respect to items contained herein.

I. LIMITATIONS:

F. Airspeed Limits: (Calibrated Airspeed)
Maximum Flap Extension Speed (V_f) 80 MPH

Flap Operating Range 53 - 80 MPH (White Arc)

II. PROCEDURES:

A. Normal Procedures:

1. Wing Flap Settings:
   - Takeoff: 0° - 30°
   - Cruise: 0°
   - Landing: 40°

B. Emergency Procedures:

1. Electrical Failure

In event of an electrical malfunction resulting in full deflection of elevator trim tab, reduce speed immediately, as stick forces under 80 miles per hour are considerably less than at higher speeds. Maintain less than 80 miles per hour and land at nearest airport.

APPROVED:

E. L. Melton

for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: 7-26-68

HELIO AIRCRAFT CORPORATION
PITTSBURG, KANSAS

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
HELIO MODEL H-250, H-295, H-391B, H-395 and H-395A
FLIGHT WITH ONE DOOR REMOVED

This document is FAA approved and must be attached to the Basic Airplane Flight Manual when the aircraft is flown with one door removed. The information in this Airplane Flight Manual Supplement supersedes the basic manual only with respect to the items contained herein.

I. LIMITATIONS:

F. Airspeed Limits: (Calibrated Airspeed)
Maximum speed 125 MPH with left door removed.

Maximum speed 150 MPH with right door removed.

K. Placards: This airplane may be flown with not more than one cabin door removed provided the aircraft is operated in accordance with applicable Federal Aviation Regulations and the following limitations:

1. Maximum speed not to exceed:

    a. With left door removed: 125 MPH

    b. With right door removed: 150 MPH

2. Intentional slips and skids prohibited.

3. Smoking not permitted with either door removed.

4. All loose items must be tied down or stowed.

5. No baggage may be carried.

6. Operations limited to VFR day operations.

K. Placards (Continued)

7. The following placard must be placed in full view of the pilot.

   "FOR FLIGHT WITH DOOR REMOVED SEE AIRCRAFT OPERATION LIMITATIONS WITH DOOR REMOVED."

8. A copy of these limitations must be carried in the aircraft when flight operations are conducted with a door removed.

APPROVED: E. L. Melton
for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: 12-10-68

K. Placards (Continued)

7. The following placard must be placed in full view of the pilot.

   "FOR FLIGHT WITH DOOR REMOVED SEE AIRCRAFT OPERATION LIMITATIONS WITH DOOR REMOVED."

8. A copy of these limitations must be carried in the aircraft when flight operations are conducted with a door removed.

APPROVED: E. S. Melton
for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

DATE: 12-10-68

HELIO AIRCRAFT COMPANY
A DIVISION OF GENERAL AIRCRAFT CORPORATION
PITTSBURG FACILITY
PITTSBURG, KANSAS

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR HELIO MODEL H-295 INSTALLATION OF MITCHELL STABILIZER MODEL AK256

This supplement must be attached to the Airplane Flight Manual when the Mitchell stabilizer Model AK256 is installed. The information contained herein supplements the information of the basic Airplane Flight Manual only with respect to the items contained herein. For limitations, procedures and performance data not contained in this document, consult the manual proper.

I. LIMITATIONS:

Tracker use prohibited on Localizer.

II. PROCEDURES:

A. NORMAL OPERATIONS

1. ENGAGEMENT

AZM

a. Toggle Switch on instrument panel - ON.

b. Disconnect Switch on left hand side of pilot's wheel - RELEASED.

2. DISENGAGEMENT

a. Grip Disconnect Switch on pilot's wheel. (or)

b. Toggle Switch on instrument panel - OFF.

3. HEADING CHANGES

a. Grip Disconnect Switch, make heading change, release disconnect switch.

b. Move Trim Knob on instrument panel for Drift Correction from a Constant Heading.

FAA APPROVED **4-13-70**

B. EMERGENCY OPERATION

1. In case of malfunction GRIP disconnect switch on pilot's control wheel.

2. Toggle Switch on instrument panel - OFF.

3. Unit may be overpowered manually.

4. In cruise configuration malfunction, 3 second delay results in 35° bank and 100 foot altitude loss.

5. In approach configuration malfunction, 1 second delay results in 10° bank and 40 foot altitude loss.

III. PERFORMANCE: (No Change)

APPROVED: C. L. Melton
for John A. Carran, Chief
Engineering & Manufacturing Branch
Central Region

FAA APPROVED

DATE: 4-13-70

HELIO MODEL H-295

AIRPLANE FLIGHT MANUAL

LOG OF REVISIONS

Rev. No.	Page Number(s)	Description	Date of Revision	Approved By*
1	3	Minor changes, Limitations Section and Procedures Section	2-10-68	E L Milton

* For Chief, Engineering & Manufacturing Branch, Central Region

HELIO MODEL H-295

LOG OF SUPPLEMENTS

Sup. No.	Page Number(s)	Description	Date of Supplement	Approved By*
1	S-1	Adds Helio 120 gallon fuel system	4/23/65	E. L. Melton
2	S-2	Adds Edo 582-3430 Floats	11/24/65	E. L. Melton
3	S-3	Adds 4 tank/4individual selector fuel system	1/19/67	E. L. Melton
4	S-4	Adds Alternate Static Source	1/19/68	E. L. Melton
5	S-5	Electric Flap and Pitch Trim	7/26/68	E. L. Melton
6	S-6	Flight with one door removed	12/10/68	E. L. Melton
7	S-7	Goodyear Iceguard Kits #320-639 (24V) or #320-641 (12V)	10/23/69	E. L. Melton
8	S-8	Adds Mitchell Stabilizer Model AK256	4-13-70	E. L. Melton

*For Chief, Engineering & Manufacturing Branch, Central Region

HELIO MODEL H-295

AIRPLANE FLIGHT MANUAL

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DATE: 4/8/65

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SECTION I

General Description of Airplane

The H-295 is a high wing monoplane. The wing is fully cantilever and of all metal construction. The fuselage cabin section is a metal covered tublar structure and the aft section is an all metal semi-monocoque. The tail surfaces are of all metal construction. Power is supplied as follows:

Model	Engine	Propeller
H-295	Lycoming (295hp) GO-480G1D6	Hartzell Constant speed 96" dia.

The Model H-295 is a six place plane. The occupants are seated in two individual adjustable front seats, two individual middle seats with two reclining positions, and a two place rear seat. Entrance to the front seat is through a left front door. Entrance to the two middle and rear seats is through a rear right door, the sill of which is at floor level height for easy loading and unloading. The rear seat is easily removable for added cargo space.

Surface control is by conventional wheel and rudder pedals. Provisions are made for wheel, rudder pedals and brakes on the right side. Toe brakes are provided on the left side. (Brakes for the right side are optional.) The flaps are actuated by a hand crank on the 1200 series and by an electric motor on the 1400 series. Longitudinal trim is by an elevator trim tab actuated by a hand crank on the 1200 series and by an electric motor on the 1400 series.

The airplane is equipped with long span slotted flaps and full span leading edge slats for high lift operation. Lateral control is obtained by short span Frieze ailerons operated in conjunction with leading edge interceptors. The latter are provided for low-speed control. Pitch change is obtained with an all-moving horizontal tail. Directional control is obtained with a conventional type rudder.

The engine section is composed of the engine installation, oil cooler, carburetor, ram air filter screen, oil system piping, fuel system piping, electrical system, cowl flap system and the necessary mechanical control units. The engine section is completely enclosed by aluminum wrap-around cowls and nose-cowl. The engine mount is a welded steel tube structure bolted to the forward end of the fuselage. The engine is suspended on the engine mount by four vibration isolators. The firewall is of stainless steel.

The main landing gear is located exceptionally far forward to reduce nose-over hazards on soft terrain, and is, in fact, located immediately ahead of the firewall. Cross-wind wheels are optional equipment.

The H-295 is completely modified for float installation except for fairings, steps and other auxiliary parts and hardware.

DESCRIPTION OF STRUCTURE

WING PANEL. The wing is a two-panel full-cantilever unit and all metal construction. Ribs are formed 2024 alclad members. The main spar consists of a 2024 alclad web and 2024 extruded angle capstrips. The rear spar is a 2024 alclad formed channel. The wings are attached to the fuselage through a welded steel truss.

<u>AILERONS AND INTERCEPTORS</u> The ailerons are of the Frieze type, of 2024 alclad diagonal rib truss structure, fabric covered. They are hinged at both ends and operated by a push-pull tube at the center. The interceptors consist of heavy aluminum alloy curved plates (inboard and forward of each aileron). They emerge from the wings in conjuction with the ailerons.

<u>FLAPS</u> The flaps are of a single spar all-metal construction. They are supported to the wing structure by three flap tracks and are actuated by push-pull tubes at the center and outboard tracks.

<u>TAIL GROUP</u> The tail group is composed of a vertical fin and rudder, and an all-movable horizontal surface equipped with an anti-balance and trim tab. All tail surfaces are of aluminum alloy construction.

FIN:	Two-spar construction
RUDDER:	Single-spar construction
STABILATOR:	Single-spar construction

<u>FUSELAGE</u> The forward fuselage structure is a welded steel tube truss. It is covered with alclad sheet in t he cabin section; the remaining portion is semi-monocoque.

<u>LANDING GEAR</u> The main landing gear is a heat-treated steel box section. Each strut is individually sprung with an air-oil shock strut. Exceptional stroke is provided to reduce the landing load factor.

The tail wheel gear is conventional and is fabricated of steel weldments. The tail-wheel fork is a heat-treated part.

<u>SPECIFICATIONS</u>

Gross Weight	3400 lbs.	Fuel Capacity (Useable)	58.5 gals.
Empty Weight (Average)	2023 lbs.	Octane Rating	100 (Minimum)
Wing Span	39 ft.	Oil Capacity	12 qts. (Max.) 10 qts.(Desired)
Wing Chord	72 in.	Power Plant	GO-480G1D6 Lycoming
Wing Area (Slats retracted)	231 sq. ft.	Take-off horsepower	295
Overall Length	30 ft. 4 in.	Normal Rated Horsepower	280
Aileron Area (Each Surface)	10.35 sq. ft.		
Flap Area (Each Surface)	19.05 sq. ft.		
Slat Span (Each Wing)	203.93 in.		
Stabilator Area	37.50 sq. ft.		
Rudder and Fin Area	24.40 sq. ft.		
Wheel Tread	108.00 in.		

STANDARD EQUIPMENT LIST FOR 1400 SERIES MODEL H-295

Nitrided Cylinder Barrels
Hartzell Constant Speed Propeller
50 Amp Generator and 12 Volt Battery
Electric Auxiliary Fuel Pump
Two 30 Gallon Wing Tanks
Cowl Flaps
Heavy Duty Carburetor Air Filter
Shielded Engine Ignition Harness
Heavy Duty Starter
Recording Tachometer
Manifold Pressure Gauge
Engine Gauges
- Ammeter
- Oil Pressure
- Oil Temperature
- Fuel Pressure
- Fuel Quantity
- Cylinder Head Temperature

Outside Air Temperature Gauge
Generator Warning Light
Shock Mounted Instrument Panel
Sensitive Altimeter
Electric Turn and Bank Indicator
Magnetic Compass
Airspeed Indicator
Full Swivel, Lockable Tail Wheel Cockpit Controlled
Extra Heavy Duty Landing Gear Fairings
Extra Heavy Main Landing Gear Trunnions
Adjustable Instrument Panel Lights
Aircraft Tie Down Rings (2)
Baggage Area in Rear of Cabin
Structural Modifications and Fittings for Floats
Steel Control Cables
Retractable Ground Handling Bars
Full Cantilever Wing
Leading Edge Automatic Wing Slats
Slat Interceptors for Slow-Speed Lateral Control
Electrically Operated Ultra High Lift Slotted Flaps
Wing Flap Position Indicator
Oleo-Pneumatic Landing Gear
15-G Steel Tube Cabin Structure
15-G Seat and Shoulder Harnesses'
Cabin Heater
Cabin Ventilator
Four Arm Rests and Ash Trays
Overhead Passenger Light
Front and Rear Door Locks
Floor Carpeting
Two Individually Adjustable Front Seats with Reclining Backs
Two-Place Rear Seat (Two Reclining Middle Seats Optional)
Heavy Duty Fibreglass Insulation and Soundproofing
Extra Quality Durable Interior Furnishings
Pilots Openable Clearview Side Window
Ball Bearing Controls
Hydraulic Brakes
Hand Operated Parking Brake
Navigation Lights
Easy Access Gascolator with Quick Drain

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SECTION II - FLIGHT AND OPERATING INSTRUCTIONS

A. FLIGHT CONTROLS

The H-295 incorporates flight control devices to insure safe flight at the slow air speeds without detriment to high-speed flight. The cockpit controls, however, are conventional and their operation is the same as in any other fixed-wing airplane. The exceptional degree of control is obtained by the use of leading edge slats, large flaps, interceptors and a fully movable horizontal tail surface with its anti-balance tab. Each control is described in detail in the following discussions.

AILERONS The ailerons are operated in a conventional manner by either of the dual control wheels. In addition to the ailerons, the control wheels actuate interceptor blades which extend through the upper surface of the wing directly behind the outboard slat. The ailerons are conventional and they provide the normal corrective forces at high speeds. The interceptors provide the extremely positive lateral control at the slowest speeds obtainable. This control is so effective that it is possible to overcome the effect of full rudder in a stall by use of the aileron-interceptor control and roll into a turn in the opposite direction. The aileron-interceptor combination produces a very high rate of roll at all speeds with comparatively small control movements. Violent, full throw control movements are not necessary to produce satisfactory rates of roll at all airspeeds.

RUDDER The rudder controls are conventional. Toe brakes are provided on the left-hand pair of pedals (right side optional) (pedal adjustment - see Page 27).

STABILATOR The horizontal tail surface, or stabilator, is a single movable surface instead of the usual elevator and horizontal stabilizer. The control operation is conventional and control feel and reaction in the cockpit are the same as in other aircraft.

There are two tabs attached to the horizontal surface, a trim tab and an anti-balance tab. The right hand surface has the anti-balance tab attached to it. It is an anti-balance tab because it moves in the same direction as the surface, thus providing a force which always returns the surface to the trim position. The actuating arm and pivot point for this tab, which is mounted on the fuselage directly under the fin, should be inspected as a part of the daily pre-flight inspection.

The trim tab is located on the left hand surface. It is of the conventional type with a trim tab position indicator located overhead.

SLATS The leading edge wing slats operate fully automatically by the air-loads on them. Their use provides the very slow speeds possible with this airplane. All slats are fully visible from the cockpit, they should normally be open on the final approach. If it appears that any of the four slats have stuck, it is advisable to land about 10 MPH faster than the minimum landing speed.

It should be noted that the lateral and directional control is so effective that through their normal use, it is possible to overcome the effects of both slats remaining closed on one side.

A. **FLIGHT CONTROLS** (Cont'd)

FLAPS Eighteen turns on the hand crank lowers the flaps 40° on aircraft equipped with manual flap control. Fifteen turns on the crank provides approximately 30° of flap. All 1400 Series have electric powered flaps as standard with a flap position indicator on the instrument panel. Full flap can be used for landing under all normal wind conditions. Shortest takeoff runs, under standard air, sea-level conditions, are performed with 30° flaps, although 20° will give a better rate of climb once the airplane is airborne and provides better take-off at higher altitudes, or with maximum gross loads.

B. **PRE-FLIGHT INSPECTION**

1. Pull propeller through several revolutions and inspect blades for nicks and cracks.

2. Open engine cowl; check oil level and inspect fuel and oil lines for leaks. Give engine compartment a complete visual check.

3. Check oleo shock struts and tires for proper inflation.

4. Drain sediment bowl. (Accessible through small door under the forward window on right side fuselage). Fuel Shut-off valve should be opened prior to draining.

5. Check fuel load and make certain that the fuel caps are firmly secured on the fillernecks.

6. Check slat operation for freedom of movement and any unusual play.

7. Move all control surfaces and check security of all hinge bolts and push-pull tubes.

8. Check security of anti-balance tab on horizontal tail and its pivot point on the fuselage.

9. Remove cover if installed on pitot tube, and make sure it is free from dirt or other obstructions. Also make sure that static pressure vents on the sides of the fuselage aft of rear window are free of dirt.

   CAUTION !! !! WHEN CLEANING OR WAXING AIRPLANE, DO NOT ALLOW WAX OR CLEANER TO PLUG STATIC VENT HOLES......

After entering the airplane and before starting the engine:

1. Adjust and fasten the combination seat and shoulder straps.

2. Check all controls for freedom of movement and proper direction.

3. Insure that all cargo is secured and that the load is properly located. (See Section V)

4. Check position of electrical and ignition switches.

5. Open cowl flaps.

PRE FLIGHT INSPECTION (cont'd)

ENGINE STARTING The following starting procedure is taken from the Lycoming Operator's Manual. A copy of the Lycoming Manual is furnished with each airplane and is considered a part of this manual.

Lock the wheels by either wheel brakes or chocks.

Set the propeller control lever all the way forward in INCREASE RPM position.

Be sure fuel valve is "ON".

Set throttle to 1/10 open position.

Place mixture control in the "Idle Cut-off" position (Full out).

Turn on auxiliary fuel pump and check pressure.

Prime - 4 strokes for cold weather; 2 strokes for hot weather.

Turn ignition switch to extreme right and push (this energizes starter).

When the engine begins to fire, immediately put mixture control in "normal" position (full in) and allow ignition switch to return to "both" mag position. On cold starts, additional priming may be necessary. CAUTION - If engine fails to start immediately, return mixture control to Idle Cut-off position. Failure to do so will create an excessive amount of fuel in the carburetor air scoop constituting a fire hazard.

"Vapor locking is not a common occurrence on Lycoming GO-480 engines. However, under certain circumstances it can occur, i.e. when runway and ramp temperatures exceed 100^{o} F particularly on sunny days and at airfields of high elevation where temperatures exceed 80^{o} F. During these conditions vapor locking can occur after a hot engine has been shut-down and a start is attempted within a period of up to one hour after initial shut-down. Vapor lock symptoms are; zero fuel pressure with the electric fuel booster pump on, and by hearing an unusual sound in the booster pump which indicates it is cavitating rather than pumping. When it is suspected that a vapor lock exists the following procedures should be used: Fuel selector ON, Electric fuel booster pump ON, Throttle opened 1/4, Push mixture control to full rich and leave there until fuel pressure builds up and cavitating sound disappears, then return mixture control to idle cut-off and proceed with normal starting sequence. If a solid vapor lock exists the engine primer is usually ineffective until the vapor lock is broken by the method mentioned above".

If oil pressure does not build up after 30 seconds running, stop engine and determine trouble.

Check Engine Driven Fuel Pump for proper pressure by turning off auxiliary fuel pump.

Initial warm up should be at 1000 to 1200 RPM.

PRE FLIGHT INSPECTION (cont'd)

Engine is warm enough for take off when the throttle can be opened without backfiring or skipping.

Check magnetos at 2600 RPM. Drop off should not exceed 175 RPM on either magneto and should be within 50 RPM of each other.

Exercise propeller at 2200 RPM. Pull control to decrease RPM, note drop to 1275 $\pm$ 50 RPM.

Cowl flaps should be open for all ground operation (pull handle out). Avoid prolonged ground operation as it will cause overheating. See page 8 for Maximum Temperature Limitation.

For further information on cold weather starting and engine operation, consult the Lycoming Operator's Manual.

C. OPERATION

TAKE-OFF Prior to take-off, a check should be made to insure that:

1. Weight and Balance is correct.
2. All occupants have properly secured the combination seat and shoulder straps.
3. Stabilator trim tab set.
4. Flaps are extended 30° or less for take-off.
5. Cowl flap lever is pulled out to fully open cowl flaps.
6. Propeller control is pushed in for maximum RPM. (3400 Max.)
7. Fuel selector valve is "ON".
8. Parking brake control is in "OFF" position.
9. If cross-wind gear is installed -- unlock tailwheel, if cross-wind gear is unlocked; lock tailwheel if cross-wind gear is locked.
10. If fixed gear is installed -- tailwheel locked.
11. Auxiliary boost pump "ON".

As soon as possible after take-off, reduce RPM to the maximum continuous setting (3000 RPM) and retract the flaps. Take-off power may be used for a maximum of five (5) minutes, but it is advisable to reduce power as soon as possible. Best rate of climb is obtained at 65 MPH IAS flaps down, and at 90 MPH IAS flaps up at METO power. A cylinder head temperature gauge is provided as standard equipment, and power, cowl flaps, and speed settings should be selected to maintain the cylinder head temperature somewhat less than 475° F. The maximum permissible is 450° F. at cruise power. For take-off and normal rated power, the limit is 475° F.

LANDING During the let down prior to the landing approach:

1. Close the cowl flaps so that the engine does not cool too rapidly.

2. Open throttle occasionally to clear out engine and keep warm.

   Prior to turning into the base leg in the landing approach:

3. Auxiliary Boost Pump "ON.

4. Extend the flaps to the desired position (Maximum flap speed is 80 MPH)

5. Set propeller control to 3000 RPM.

TAXI

1. Retract flap
2. Open cowl flaps
3. Auxiliary Boost Pump "OFF".

STOPPING ENGINE

1. Pull mixture control full out to the idle cut-off position. (Approx. 1000 RPM)
2. After the engine stops, shut off the ignition switch and then the master and generator switch.
3. Leave fuel valve in the "ON" position.

D. GENERAL OPERATING INSTRUCTIONS AND LIMITATIONS

This airplane is licensed in the normal category and no aerobatic maneuvers, including spins, are approved.

PROPELLER LIMITATIONS None

Avoid high engine speed (2800 RPM or higher) in combination with low manifold pressure operation (under 15"). Avoid rapid closing or opening of the throttle (especially from a high RPM and manifold pressure condition).

STALLS AND SPINS The leading edge slats and the restricted motion of the stabilator makes it impossible to fully stall the wing on the H-295. As the minimum speed obtainable is approached with the yoke full back, a center section separation causes tail buffeting. A slight aileron nibble is also noticed as the minimum speed is approached. Minimum speed power-off with the flaps down is approximately 40 MPH IAS. This varies with load and C.G. condition. Voluntary spins are prohibited.

Although the airplane can be forced, under certain conditions, into auto-rotation - which is technically a spin - this maneuver is not the same as the well known "tailspin" in that it cannot occur accidentally and contrary to the pilot's movement of the controls. No dive nor forward movement of the control wheel is required for recovery. Recovery is effected by the normal use of either the aileron or rudder control.

D. GENERAL OPERATION INSTRUCTIONS AND LIMITATIONS (Cont'd)

SPEED LIMITATIONS

The Never-Exceed Speed (V_{ne}) for the H-295 is 200 MPH C.A.S. A red line appears on the airspeed instrument at this speed. MAXIMUM FLAP SPEED (V_f) IS 80 MPH C.A.S. The white range on the airspeed indicator indicates the flap range. Cruising range is marked on the airspeed indicator by a green arc, which extends to the maximum structural cruising speed, 160 MPH C.A.S. In very gusty and bumpy air, the speed should be reduced to 103 MPH C.A.S., Flaps Up. This speed is known as the "maneuvering" speed.

FUEL SYSTEM

The PS-5-BD carburetor should be operated at 11 to 15 psi in accordance with manufacturer's recommendations.

ENGINE OPERATION

Complete operating instructions covering the care and use of the Lycoming engine are provided with each airplane and should be used as a guide in selecting power settings. These instructions are in the form of the Lycoming Operator's Manual.

FUEL

Use fuel with 100/130 octane rating. 58.5 gallons usable with standard wing.

OIL

Engine Model	Average Ambient Air Temperature For Starting	Straight Mineral Type	Multi-Grade Additive Type	Oil Inlet Temperature Desired	Max.
GO-480-G1D6	Above 60°F	SAE 50	SAE 40 or SAE 50	180°	235°F.
	30° to 90°F	SAE 40	SAE 40	180°	235°F.
	0° to 70°F	SAE 30	SAE 40	180°	235°F.
	Below 10°F	SAE 20	SAE 40	170°	210°F.
			20W30	170°	210°F.

ROTATING BEACON LIGHT

If beacon light is installed, this light should be turned off before entering overcast, as reflections from the rotating anti-collision light on clouds or dense haze can produce optical illusions and severe vertigo. This is particularly true at night.

PILOT'S CHECK LIST

STARTING ENGINE

1. Brakes - SET or HOLD
2. Throttle - CRACKED ABOUT 1/10
3. Propeller - FULL INC., RPM
4. Mixture - IDLE CUT-OFF
5. Carburetor Heat - COLD
6. Cowl Flaps - OPEN
7. Fuel Valve - ON
8. Trim Tab Travel - CHECK
9. All Circuit Breakers - IN
10. Master Battery & Generator Switches - ON
11. Aux. Fuel Pump - ON
12. Prime - AS REQUIRED
13. Propeller - CLEAR
14. Ignition Switch - TURN TO EXTREME RIGHT AND PUSH
15. Ignition Switch - TO BOTH AFTER ENGINE STARTS
16. Mixture - RICH (Simultaneously with 15 above)
17. Oil Pressure - CHECK
18. Aux. Fuel Pump - OFF
19. Engine Warm Up - 1000 to 1200 RPM
20. Fuel Quantity Gauge - CHECK

ENGINE RUN-UP

1. Tachometer - SET 1500 to 1700 RPM
2. Carburetor Heat - HOT THEN COLD
3. Ammeter - CHECK
4. Fuel and Oil Pressures - CHECK
5. Oil and Cylinder Head Temperatures - CHECK
6. Vacuum Gauge - CHECK
7. Propeller - SET 2200 RPM AND EXERCISE SEVERAL TIMES (Should decrease to 1275 RPM ± 50 RPM)
8. Propeller - SET 2600 RPM AND CHECK BOTH MAGS (Maximun drop 175 RPM)
9. Power Check - 3400 RPM and 28" HG @ Sea Level

NOTE: NORMAL CRUISE

1. Throttle - 23" HG., M.P.
2. Propeller - 2600 RPM
3. Cowl Flaps - AS REQUIRED

BEFORE TAKE-OFF

1. Flight Controls - FREE, FULL TRAVEL
2. Flight Instruments - SET
3. Engine Instruments - CHECKED
4. Trim Tab - SET
5. Wing Flaps - 20 to 30 DEGREES AS DESIRED
6. Propeller - FULL INCREASE RPM
7. Mixture - RICH
8. Carb., Air - COLD
9. Cowl Flaps - OPEN
10. Seat and Shoulder Straps - TIGHTEN
11. Aux. Fuel Pump - ON

TAKE-OFF

1. Throttle - FULL AND TIGHTEN FRICTION NUT
2. Power Reduction - AFTER LIFT OFF FULL THROTTLE AND REDUCE RPM TO 3000-AIRSPEED 80 MPH MAXIMUM
3. Flaps - RAISE
4. Aux. Fuel Pump - OFF
5. Cylinder Head Temp. - CHECK (AIRSPEED - CLIMB 90 MPH)
6. Slower Climb - FULL THROTTLE AND 2750 RPM

BEFORE LANDING

1. Seat Belts - TIGHTEN
2. Carburetor Heat - COLD (EXCEPT IN ICING)
3. Mixture - RICH
4. Propeller - 3000 RPM
5. Aux. Fuel Pump - ON
6. Wing Flaps - AS DESIRED
7. Propeller - FULL INCREASE ON FINAL APPROACH

AFTER LANDING

1. Cowl Flaps - OPEN
2. Wing Flaps - UP
3. Aux. Fuel Pump - OFF
4. Electrical Switches - UNNECESSARY SWITCHES OFF

ENGINE SHUTDOWN

1. Cylinder Head Temp. - COOL (350°F OR LESS)
2. Throttle - 1000 RPM
3. Propeller - FULL LOW PITCH
4. Mixture - IDLE CUT-OFF
5. All Switches - OFF

IMPORTANT NOTE: It is strongly recommended that all pilots become thoroughly familiar with the techniques outlined in the Owners Manual before operating this aircraft in full-flapped STOL slow-flight.

PILOT'S EMERGENCY CHECK LIST

ENGINE AND PROPELLER FAILURE OR FIRE* DURING TAKE-OFF

1. Abort if BEFORE Airborne

    a. Throttle - Closed
    b. Control Wheel - Back
    c. Wheel Brakes - Apply
    d. *Propeller - Full Decrease RPM
    e. *Mixture - Idle Cut-Off
    f. *Fuel Selector Valve - Off
    g. *Ignition Switch and Master Switch - Off
    h. *Bring Aircraft to Stop and Investigate

2. Abort AFTER Becoming Airborne

    a. If below 50 feet - Hold Yoke Back (Approximate Three-Point Position)
    b. If above 50 feet - Nose over and attempt to pick up approximately 65 MPH to facilitate a normal landing flare-out with flaps down. When Flaps are Up - Glide at 80 MPH, for best glide distance. If time permits, lower flaps, glide at 65 MPH and make Normal Three-Point Landing.
    c. Throttle - Closed
    d. Mixture - Idle Cut-Off

ENGINE FAILURE OR FIRE* DURING FLIGHT

1. Throttle - Closed
2. *Propeller - Full Decrease RPM (OUT)
3. Maximum Glide Distance Airspeed - Attain 80 MPH, IAS with flaps up. Use the excess in airspeed over 80 MPH to attain altitude, if desired.
4. *Mixture - Idle Cut-Off
5. *Fuel Selectors - Off
6. *Ignition Switch - Off
7. Radio Call - Accomplish
8. Flaps - As Required
9. Generator Switch - Off
10. Master Switch - Off

PROPELLER FAILURE IN FLIGHT

1. Propeller Overspeed

    a. Throttle - Retard
    b. Airspeed - Reduce
    c. Propeller - Attempt to decrease RPM with Propeller Control
    d. If propeller governor regains control, maintain 2500 RPM and 70 MPH, IAS and land at nearest airfield. If not, use an attitude, airspeed and power combination to attempt to keep the RPM below 3400. Land at nearest landing area.

PROPELLER FAILURE IN FLIGHT - CONTINUED

2. Propeller Underspeeding

Use power enough to maintain altitude without engine overtorque and proceed to nearest airport. If this is not possible make emergency landing. Use excess altitude and power available to extend glide to best available area.

EMERGENCY MAXIMUM DESCENT

1. Throttle - Closed
2. Propeller - Full Increase RPM
3. Wing Flaps - Full Down
4. Airspeed - Maintain Maximum of 80 MPH, IAS, Flaps Full-Down (a tight spiral helps lose altitude).

LANDING WITH FLAT TIRE

1. Make a minimum safe-speed touch-down.
2. When landing with a flat tire on the main gear, the aircraft will turn in direction of the flat tire. Maintain directional control with the rudder and brakes.

LANDING ON UNPREPARED TERRAIN

1. Landing procedure is similar to MINIMUM RUN LANDINGS (FULL STOL)
2. On soft or rough ground, use caution in applying brakes. Locking the wheels on rough ground produces severe gear strain.
3. If possible, avoid having to re-start and rev-up propeller in loose sand or dirt.

E. SUMMARY OF OPERATIONAL AIRSPEEDS AT GROSS WEIGHT - 3400 LBS.

*Minimum Speed - Power Off
  Flaps Up: 60 MPH I.A.S.
  Flaps Down: 50 MPH I.A.S.

*Minimum Speed - Power On
  Flaps Up: 40 MPH I.A.S.
  Flaps Down: 35 MPH I.A.S.

Never Exceed Speed: 200 MPH I.A.S.
Maximum Flap Speed: 80 MPH I.A.S.

*Minimum speeds are given because it is not possible to fully stall the airplane.

F. TAKE-OFF, CRUISE AND LANDING TECHNIQUES

1. Take-Off*

It is suggested that 30 degree flaps or less be used for all take-offs. This is covered in greater detail under paragraph 4, STOL TAKE-OFF AND LANDING.

When taking off into the wind, first align the aircraft along the intended take-off track and then lock the tail-wheel. Release brakes and apply power smoothly. Hold the tail down on the initial roll to maintain directional control. As aircraft accelerates, raise the tail by applying gentle forward pressure on controls until tail is slightly raised - that is, about half-way up to the full tail-high position customarily used for take-off with more conventional aircraft. Then coordinate controls so as to become airborne in this attitude at approximately 40 MPH.

When airborne, reduce to 3000 RPM and maintain full throttle (5 minutes at take-off RPM of 3400 and full throttle is permitted). While continuing to climb, allow airspeed to increase to minimum of 60 MPH, then raise flaps slowly to prevent level-off or settling. After flaps are raised, reduce to 2750 RPM and maintain full throttle while allowing airspeed to increase to 90 MPH. Full throttle is recommended at 2750 RPM for climb-out to insure adequate engine cooling due to enriching features.

Check fuel pressure and turn off fuel boost-pump. Re-adjust cowl flaps as required. For maximum rate of climb, use 3000 RPM at 65 MPH, 30 degree flaps, or 90 MPH, flaps up. Maximum permissible cylinder head temperature is 475°F for climb and 450°F for cruise power.

Most pilots new to the Courier tend to raise the tail too high and let the aircraft run too long before pulling it off the ground. However, the new pilot quickly learns from experience how soon the ship may be lifted off.

*If aircraft is equipped with Cross-Wind Gear, see paragraph 5 of this Section.

2. Cruise Flight

Throttle - Set (Approximately 24" HG)
Propeller - Set at 2600 RPM
Cowl Flaps - As Required
Carburetor Heat - As Required

NOTE

No manual leaning of the mixture is necessary or recommended because the AMC compensates for altitude and temperature changes.

ENGINE POWER SCHEDULE

210, 196 and 182 BHP

MODEL: H-295
DATE: January 1960
DATA BASIS: Engine Manufacturer

ENGINE: GO-480-G1D6
FUEL DENSITY: 6.0 LBS/GAL.
FUEL GRADE: 100/130

BHP	PRESS ALT. (FEET)	FUEL FLOW Gal/Hr	MANIFOLD PRESSURE (In. Hg) Outside Air Temperature (Degrees C) -40	-20	0	20	40	RPM
210	Sea Level	19.0	21.8	22.7	23.5	24.4	25.2	2750
	1000	19.0	21.7	22.6	23.4	24.3	25.1	2750
75%	2000	19.0	21.6	22.5	23.3	24.2	25.0	2750
METO	3000	19.0	21.5	22.4	23.2	24.1	24.9	2750
PWR	4000	19.0	21.4	22.3	23.1	24.0	24.8	2750
	5000	19.0	21.3	22.1	23.0	23.8	----	2750
	6000	18.6	21.1	22.0	22.9	----	----	2750
	7000	17.4	21.0	21.9	----	----	----	2750
	8000	16.3	20.9	----	----	----	----	2750
196	Sea Level	16.9	21.2	22.0	22.8	23.7	24.5	2700
	1000	16.9	21.0	21.9	22.7	23.6	24.4	2700
	2000	16.9	20.9	21.8	22.6	23.4	24.2	2700
	3000	16.9	20.8	21.7	22.5	23.3	24.1	2700
70%	4000	16.9	20.7	21.5	22.3	23.2	24.0	2700
METO	5000	16.9	20.5	21.4	22.2	23.0	23.8	2700
PWR	6000	16.7	20.4	21.3	22.0	22.8	23.7	2700
	7000	16.1	20.3	21.2	21.9	22.7	23.6	2700
	8000	15.5	20.2	21.0	21.8	22.6	----	2700
	9000	14.9	20.1	20.4	21.7	----	----	2700
	10000	14.3	19.9	19.8	----	----	----	2700
182	Sea Level	14.8	20.6	21.4	22.2	23.0	23.8	2600
	1000	14.8	20.4	21.3	22.1	22.9	23.7	2600
	2000	14.8	20.3	21.1	22.0	22.7	23.5	2600
	3000	14.8	20.2	21.0	21.8	22.6	23.4	2600
65%	4000	14.8	20.1	20.9	21.7	22.4	23.3	2600
METO	5000	14.8	19.9	20.8	21.6	22.3	23.1	2600
PWR	6000	14.8	19.8	20.7	21.5	22.1	23.0	2600
	7000	14.8	19.7	20.5	21.3	22.0	----	2600
	8000	14.8	19.6	20.4	21.2	----	----	2600
	9000	14.0	19.5	20.3	----	----	----	2600
	10000	13.3	19.3	----	----	----	----	2600

REMARKS:

(1) Maximum recommended power setting for performance cruise (75% Power) is 2750 RPM at full throttle.
(2) Maximum recommended power setting for economy cruise (65% Power) is 2600 RPM at full throttle.

PROCEDURE:

Read fuel flow and manifold pressure directly opposite altitude.

ENGINE POWER SCHEDULE

168, 154 and 140 BHP

MODEL: H-295
DATE: January 1960
DATA BASIS: Engine Manufacturer

ENGINE: GO-480-G1D6
FUEL DENSITY: 6.0 Lbs/Gal.
FUEL GRADE: 100/130

BHP	PRESS ALT. (FEET)	FUEL FLOW Gal/Hr.	MANIFOLD PRESSURE (IN. Hg)					
			Outside Air Temperature (Degrees C)					
			-40	-20	0	20	40	RPM
168	Sea Level	13.0	20.1	20.9	21.8	22.5	23.3	2500
	1000	13.0	20.0	20.8	21.6	22.4	23.2	2500
	2000	13.0	19.9	20.7	21.5	22.3	23.0	2500
	3000	13.0	19.8	20.6	21.4	22.1	22.8	2500
	4000	13.0	19.6	20.5	21.2	22.0	22.7	2500
60%	5000	13.0	19.5	20.3	21.1	21.8	22.6	2500
METO	6000	13.0	19.4	20.2	21.0	21.7	22.4	2500
PWR	7000	13.0	19.3	20.1	20.8	21.6	22.3	2500
	8000	13.0	19.2	20.0	20.7	21.4	----	2500
	9000	13.0	19.1	19.9	20.6	----	----	2500
	10000	12.5	19.0	19.8	----	----	----	2500
	11000	12.0	18.9	----	----	----	----	2500
154	Sea Level	11.4	19.2	20.1	20.8	21.6	22.3	2450
	1000	11.4	19.1	19.9	20.7	21.5	22.2	2450
	2000	11.4	19.0	19.8	20.5	21.3	22.0	2450
	3000	11.4	18.8	19.7	20.4	21.1	21.9	2450
	4000	11.4	18.7	19.5	20.2	20.9	21.7	2450
	5000	11.4	18.5	19.4	20.1	20.8	21.5	2450
55%	6000	11.4	18.4	19.2	19.9	20.6	21.4	2450
METO	7000	11.4	18.2	19.1	19.7	20.5	21.2	2450
PWR	8000	11.4	18.1	18.9	19.6	20.3	21.0	2450
	9000	11.4	17.9	18.7	19.5	20.1	20.9	2450
	10000	11.4	17.8	18.6	19.3	20.0	----	2450
	11000	11.4	17.7	18.5	19.2	----	----	2450
	12000	11.15	17.5	18.4	----	----	----	2450
	13000	10.7	17.4	----	----	----	----	2450
140	Sea Level	11.0	18.6	19.6	20.3	21.0	21.6	2200
	1000	11.0	18.5	19.4	20.1	20.7	21.5	2200
	2000	11.0	18.4	19.2	19.9	20.6	21.3	2200
	3000	10.8	18.3	19.1	19.7	20.4	21.2	2200
	4000	10.8	18.0	18.9	19.5	20.1	21.0	2200
50%	5000	10.8	17.9	18.8	19.3	20.0	20.7	2200
METO	6000	10.6	17.7	18.5	19.2	19.7	20.5	2200
PWR	7000	10.5	17.5	18.3	18.9	19.4	20.2	2200
	8000	10.5	17.2	18.0	18.6	19.2	19.8	2200
	9000	10.4	16.9	17.7	18.4	19.0	19.5	2200
	10000	10.3	16.7	17.5	18.2	18.7	----	2200
	11000	10.2	16.4	17.3	18.0	----	----	2200
	12000	10.1	16.3	17.2	----	----	----	2200

REMARKS:

(1) Maximum recommended power setting for maximum range cruise (60% Power) is 2500 RPM at full throttle.

PROCEDURE:

Read fuel flow and manifold pressure directly opposite altitude.

2. Cruise Flight (cont'd)

Cruise power settings can be determined from the appropriate engine power schedule charts on the two preceeding pages.

The above cruise power setting is considered a good average setting for cross-country flights.

3. Power-Off and Power-On Landings*

Since the Courier, in the 20 degree flap (half-flap) configuration, has conventional or normal landing characteristics, it is appropriate to start out on half-flap landings during the first hour of familiarization. Even though the Courier, with half-flaps, handles almost like other conventional aircraft, it still has outstanding short-field characteristics.

For half-flap landings, an approach speed of 65 to 70 miles an hour is usually desirable when instructing a pilot new to the Courier. As the pilot's proficiency increases, approach speeds with half-flaps can be reduced to 60 MPH, though use of some power then becomes advisable. When approaching for landing at this speed, the pilot should be reminded that the slats will pop out just as he begins his flare-out and that they will have no effect upon the controlability or balance of the airplane. With half-flaps at 60 MPH, however, the plane has little "float" and should be flared or rotated out fairly-close to the ground so that it will not develop too much rate-of-sink before touching down.

The best technique for slowing the airplane down in the approach is first to extend the flaps to 20^{o} starting at 80 MPH or less. Then, when the airplane has slowed to about 65 MPH in half-flap condition, the flaps can then be brought into full-down position and a landing made by the suggested method of full three-point position.

One approach to the full-flap landing is to have the pilot pop out the slats by slowing the airplane down to 50 MPH while still several hundred feet in the air and then to compensate for the increased rate-of-sink by maintaining partial power until touch-down.

As we proceed to the full-flap landings, it is well to realize the fact that when the lift of any normal wing is doubled by the use of a flap, the drag is increased four-fold. This high drag at the full-flap position not only produces a very steep rate-of-descent but also means that the airplane will have very little "float" once the nose is raised for flare-out. Consequently, in a full-flap no power landing, the airplane should be held in a nose-down glide until about ten feet from the ground if the gliding speed is approximately 60 MPH. If the gliding speed is higher or lower, the altitude for beginning the flare-out can be higher or lower accordingly.

*If aircraft is equipped with Cross-Wind Gear, see paragraph 5 in this Section.

3. Power-Off and Power-On Landings (Cont'd)

As an example, if the plane is brought in at the relatively comfortable gliding speed of 60 MPH power off and a flare out is begun at the customary approximate thirty feet above the terrain, speed will be lost very rapidly and a high rate-of-sink could develop. The resulting impact could be quite hard. No matter how high the pilot levels out, the automatic slats eliminate all risk of rolling off into an uncontrolled stall or spin, although high rates of descent can occur if insufficient power is used.

The best technique for full-flap landings involves the maintenance of a little power-on, just sufficient to offset the added drag of the flaps and to produce a relatively normal glide angle. This is done by maintaining approximately ten to fifteen inches manifold pressure, depending upon the load and air condition. The aircraft is then flared out and landed in a conventional manner, much the same as with half-flaps. The approach speed, however, is closer to 50 MPH than to 60 MPH.

When using the lower speed landing technique, the throttle should not be closed completely until wheels make contact with the ground, at which time the yoke should be held full back. An advantage of the partial power approach is ease of glide path control by slight increased or reductions in the amount of power. This approach is similar to that taught Navy pilots for Aircraft Carrier operations. Nose-up carrier type approaches are neither advantageous nor recommended, however, due to impairment of vision, as well as the greatly increased skill requirement.

The full-flap no-power landing, while not difficult, is usually desirable only as an emergency procedure, Instruction in this type of landing is necessary. In order to make smooth landings, it involves a different technique with which Courier pilots should be familiar. For full-flap, no-power landings, it is advisable that the pilot keep the approach speed at 60 to 65 MPH, but not below 60 MPH. Maintain approach speed about 65 MPH until the airplane is just off the deck. With power-off, the flare out should not be started until within 10 to 15 feet off the ground so that the nose barely comes up to the full landing position just as the airplane sinks down to ground level.

There is no "float" to this type of full-flap, no-power landing, which is a safety feature for emergency or forced landings. Consequently, a slightly high flare-out will quickly result in a relatively high rate of descent, i.e., a hard landing! Use of full-flaps without power is normally done only in emergency landings. Normal STOL approaches with full -flaps are best accomplished with partial power so as to maintain essentially the same flight-path angle at about 55 MPH as results from 70 MPH at half-flaps and no power. The throttle then becomes the approach control device.

4. STOL Take-Off and Landings

The shortest ground run take-off under standard conditions at 3000 lbs. or less can usually be accomplished with full-flaps, i.e., 40° . (This will not, however, provide the best angle of climb if barrier clearance is the objective.) The use of 30° or less , depending on load and pressure altitude, is recommended for take-off.

Align aircraft along intended take-off track. Apply full power in a steady manner. Do not "jam" throttle forward. Release brake as power is applied. Holding brakes on while full power is being applied is not necessary, or desirable. Keep aircraft straight on track by using rudder. Try to avoid application of the foot brakes unless required to maintain directional control.

After the air speed reaches approximately 15 to 20 MPH during the take-off roll, apply forward pressure on the control yoke just enough to lift the tail about 12 to 18 inches off the ground, i.e., to about half of the conventional full tail-up position. At approximately 35 MPH, apply back pressure on the yoke in a positive manner but not so fast that the tail-wheel strikes ground. If the tail-wheel is allowed to strike the ground, the ground-run distance will be longer.

When the aircraft breaks ground, allow it to remain just above the ground for approximately 2 or 3 seconds, so that the airspeed will build up to over 50 MPH before the airplane starts full climb-out. Establish a climb-out speed of 50 to 60 MPH as soon as practical.

Experience gained in this type of take-off will enable the pilot to determine the amount of yoke movement and/or rapidity of action necessary to get the aircraft airborne with the minimum of ground run. This type of minimum run take-off is most useful when the ground is rough, bumpy, muddy or where very low obstacles, such as hedges, fences ditches, etc. are present.

A relatively tail-high take-off technique can also be used to allow airspeed to build up for better directional control before breaking ground. The tail-high take-off is helpful when the take-off area is very narrow and when visibility over the nose may be essential (safer) than breaking ground sooner in the tail-low attitude. In turbulent, gusty air or on very rough ground, this technique can also eliminate the difficulties that arise from becoming airborne prematurely from the three-point position and then striking the ground again with a side-wise drift.

a. Muddy Terrain Take-Off

The Helio Courier is an unusually good "mudder". A moderately muddy field usually presents no problem. At normal pressure altitude and with loads of 3000 lbs. or less, full-flaps are usually more advantageous in breaking free from clinging mud. The following procedure is recommended: Apply full power. (Do not hold power-on so long as to overheat the engine if the aircraft fails to move.) Hold yoke full back then rock yoke abruptly, using

a. Muddy Terrain Take-Off (Cont'd)

full, but not prolonged, forward position, if necessary, to help break the tail-wheel free. When the aircraft begins to move, the oscillating movements of the stabilator should be reduced so that there is equal "flotation" on all three wheels as the aircraft moves forward. Then, when rolling free, use essentially the same technique for the minimum run take-off except that the tail-wheel is usually best held less than a foot off the ground. Since the consistency and effect of different types and depths of mud vary greatly, no single rule or technique can substitute for experience and judgment on soft and irregular field surfaces.

b. Muddy Landing

A muddy landing or deep snow landing can usually best be made by using full-flaps and placing the aircraft onto the ground in a nose-high position at minimum speed. Actually touching the tail-wheel first may be advantageous. At this point, take all power off and hold yoke fully back. If forward speed is thus held low on the touchdown, the weight of the tail, due to the main landing gear being located unusually far forward, will tend to prevent nose-over. (This procedure is essentially the same as that commonly recommended for ditching in water.)

c. Minimum Ground Run Take-Off Over Barrier (Gross Weight 3000# or Less)

Rough ground or other conditions may be a determining factor where, in spite of a barrier, the full-flap minimum ground run take-off may be necessary.

It should be re-emphasized here that even when trying to climb out of a small area at too low a speed with the Helio Courier, there is no danger of stalling, losing lateral control, or going into a spin. However, a condition can develop, especially with full-flaps down, whereby the nose is held too high and the speed too low after take-off, so that the airplane will actually lose altitude with power full on.

IMPORTANT WARNING

The most common cause of Helio crashes and major damage - though never with serious injury to occupants - has been from efforts to pull the airplane off the ground prematurely at too low a speed and/or concurrently to try to climb out with too low an airspeed with flaps down so that the resulting high-drag exceeds the reduced thrust of the propeller at low forward speeds. Thus, with power full-on, the airplane may either sink back to the ground or fail to clear otherwise easily-surmountable obstacles.

c. Minimum Ground Run Take-Off Over Barrier (cont'd)

It takes considerable experience to recognize the point at which the nose high attitude starts to reduce the rate-of-climb and then may finally progress to an actual rate-of-sink despite full power. This condition is often referred to as "the back side" of the thrust drag curve, or simply as "the back side of the power curve". Consequently, a "zoom" after take-off in order to clear a close barrier should be strictly an emergency procedure for well experienced Helio pilots. Climb-out speeds below 50 MPH are not recommended.

d. Shortest Distance Take-Off Over Barrier (Gross Weight 3000# or Higher)

With 30 degree flaps, allow the tail to rise slightly higher than with a full-flap take off, (which will still be a bit nose high by conventional standards). With the airspeed indicating at least 40 MPH, fly the aircraft off by applying the appropriate back pressure on the elevator until it is airborne. Permit the airspeed to build up for approximately two seconds to about 50 MPH, then begin rotation to the point that will climb the airplane over the barrier without further build up of airspeed.

After considerable experience, even shorter barrier distance can be attained by holding the airplane to about 50 MPH on a smooth runway and then "zooming" over the barrier at an angle sufficiently steep to clear the barrier without loss of airspeed after which the nose can be lowered and the normal rate-of-climb airspeed attained. Great skill is necessary, however, to avoid loss of speed and consequent momentary sinking either just before or just after crossing the barrier. Such technique is not recommended for other than emergency situations.

e. Shortest Landing Over a Barrier

With wing flaps full-down, cowl flaps open (this produces a little more drag which is also helpful), and propeller set at 3000 RPM, maintain a constant airspeed of 50 MPH with variation in throttle setting to alter the flight path. Such procedure will provide an optimum balance between ease of control and minimum landing distance. For absolute minimum distances over the barrier, the more experienced pilot can, in effect, reverse the speed variations used for clearing the barrier for take-off. That is, by judicious use of power, he can bring the airplane over the barrier at speeds as low as 40 to 45 MPH (this is the extreme limit, however, requires high skill, and is not recommended except in emergencies).

As soon as the barrier has been passed, the nose is dropped sharply; (do not arbitrarily reduce power) the airplane regains a speed of about 50 MPH and is then rotated into three-point landing position, fairly close to the ground (about 15 feet, no less). Miscalculation in this emergency ultra-short technique can severely damage the airplane.

e. Shortest Landing Over a Barrier (cont'd)

CAUTION

> Many hours of step-by-step practice to attain short field proficiency is therefore essential in advance of any effort to employ maximum techniques.

For this more advanced landing technique, it is at the point of nose-over, after passing the barrier, that the pilot must determine whether to maintain the same power or to diminish power and then re-apply power at the second rotating point to avoid a hard landing. Generally, most of the originally selected barrier crossing power remains on, and, at the final round-out point, even more power may have to be applied to check the somewhat high rate-of-descent.

It is advisable, as soon as the aircraft touches down, to pull all power off immediately and to apply brakes accordingly. The brakes should be applied evenly - increasing to maximum braking but stopping short of the point where brake "chatter" occurs. If "chatter" occurs, ease up on the brakes and then immediately re-apply smoothly.

f. Helpful Hints on Over-a-Barrier Landing

1) The most advisable technique is simply to maintain the recommended 50 to 55 MPH approach speed with full flaps throughout the entire sequence up to the point of touch-down. Variations in throttle setting are then used to steepen or flatten the glide angle as needed.

2) In that most advisable technique, the aircraft approach pattern is set up so as to avoid any intentional deviation from a straight line approach over the barrier. Necessary corrections for turbulence or for errors in initial judgment are then accomplished through changes in the rate-of-descent by power adjustments. The attitude of the aircraft remains more or less the same throughout the entire approach. The one and only rotation is the less abrupt round-out just prior to touch-down.

3) It is very important - as well as easy - for the STOL pilot to develop a sensory awareness of high rates-of-sink. In the importance of this awareness, STOL techniques differ somewhat from the customary techniques with conventional aircraft. A normal, though not good, practice with a conventional airplane, when it appears to be sinking a bit fast, is to raise the nose accordingly. With the STOL-type airplane, however, when the flaps are set at or over 20 degrees and when the airspeeds are below the conventional aircraft minimums, any raising of the nose without compensating power will result in the aircraft sinking rapidly.

f. Helpful Hints on Over a Barrier Landing (cont'd)

A conventional airplane in that condition might then simply stall out and crash. The Helio so abused will not stall out, but if the pilot fails to recognize this condition soon enough, the aircraft will then necessitate using a substantial amount of power to arrest the rate-of-sink. Otherwise, the aircraft will touch down sooner and harder than intended.

The STOL Landing is essentially "throttle" flying." The pilot must become "throttle-conscious". The pilot's hand should always be on the throttle during the STOL final approach and landing. The key to easy, positively controlled landings with the Courier then becomes simple, even for inexperienced pilots. It lies entirely in the use of small variations in amounts of power during the approach and an awareness of the importance of the throttle to control glide-path, flare-out, and touch-down. There is nothing difficult about STOL techniques that any pilot, with proper indoctrination and instruction, cannot reasonably expect to master in a few hours.

Until STOL techniques are mastered, the use of half-flaps and conventional approach permits the easiest possible flying with least dependence on piloting skill. After STOL techniques have been mastered, short-field operations that are tough or impossible for conventional aircraft can be easily accomplished as a matter of routine with the Helio Courier.

5. Cross-Wind Take-Off and Landing Techniques

a. Without Cross-Wind Landing Gear

When Helio Couriers are not equipped with castering cross-wind landing wheels, they commonly have free swivel tail-wheels with locks. It is recommended that the tail-wheel lock be engaged to help maintain directional control of the aircraft on all take offs and landings without cross-wind wheels. However, on a Helio equipped with a steerable tail-wheel, directional control is normally maintained by use of rudder application which in turn steers the tail wheel.

During take offs, greater attention to directional control is required when the cross-wind is from the left. A left cross-wind amplifies the torque effect of the engine, which will also tend to turn the aircraft to the left.

For example, if a left cross-wind of 10 to 15 MPH exists, the following procedures are recommended. Line up the aircraft on the down wind side of the take-off area facing, as closely as possible, into the wind. Lock the tail wheel and use 20 degree to 30 degree flaps (maximum). Hold yoke fully back, then add partial power to get aircraft rolling. After the aircraft begins take-off roll, apply the remainder of power. Monitor the right rudder carefully as the aircraft begins its roll. Holding the yoke back keeps the locked tail wheel on the ground which in turn is a deterrent to the wind vaning tendency of the aircraft. When the aircraft begins to get "light" on the wheels, apply forward elevator pressure and allow the tail to raise slightly less than to a level flight position.

a. Without Cross-Wind Landing Gear (cont'd)

When landing in a cross-wind, either crab or slip for existing wind condition as you would with any conventional landing gear airplane on the approach. Just prior to touch down, align the nose straight with the flight path. Land the aircraft without delay and hold yoke fully back. When the wheels touch down, or slightly before, take all power off. Apply both brakes evenly and slow aircraft down to taxi speed as soon as possible. Move flaps to full-up position, keeping the tail wheel locked until aircraft has almost completely stopped. If the nose still veers sharply into the wind during the landing roll-out, do not apply power, simply apply maximum opposite brake.

b. With Cross-Wind Landing Gear

There has been a misconception among many pilots that a cross-wind landing gear installation will allow an airplane so equipped to be landed casually in any and all cross-wind conditions. This is not true.

The amount of cross-wind and velocity can reach a point where the cross-wind gear will not, by itself, assure a good cross-wind landing. The castering action of the cross-wind gear installed on the Courier is 20 degrees to either left or right. If more than 20 degrees of crab angle is required to make good a desired ground track, then the automatic correcting action of the cross-wind gear must be implemented by additional use of cross-wind techniques which the pilot has been trained in for fixed gear cross-wind touch-down, i.e., up-wind wing low or rudder crab. Remove excess crab angle just before touchdown, otherwise a crab angle of more than 20 degrees would exceed the castering limits of the cross-wind gear and tend to initiate a ground loop.

It is recommended, for a cross-wind take-off (within castering limits), that the aircraft be aligned with the desired take-off track and full power applied. The pilot must keep his eyes on the desired take-off track and disregard the compensating directional swing of the nose. A three-point attitude should be maintained longer than it usually is for normal STOL take-offs. This will give the pilot the aid of positive tail wheel steering, if so equipped, to guide the aircraft along the desired take-off track. This is especially true if the cross-wind is from the left. A three-point lift off is desired and, on becoming airborne, if circumstances permit, speed should be gained immediately to gain greater rudder control. (Usually, taxiing in the take-off direction will give indication whether or not the cross-wind exceeds the castering limits.)

b. <u>With Cross-Wind Landing Gear</u> (cont'd)

During a cross-wind landing within castering limits, the aircraft's final flap setting, the necessary crab angle or side slip, and the approach speed should be established and maintained as soon as possible on the final approach. Maintain a crab angle and/or side slip (depending upon the pilot's training and proficiency) throughout the approach and rotation sufficient to maintain the desired path or track. The crab angle will have to be increased as speed decreases. Make a three-point touch down and maintain ground track with rudder and tail wheel steering, at the same time applying the brakes. If the winds are high, retract the flaps before continuing to taxi.

> <u>Crab Angle</u> is defined as the angle between the direction in which the nose of the airplane is pointing and the track that the airplane is maintaining in relation to the ground. In other words, if the pilot desires to maintain a flight path along the direction of the runway with the wind from his left, he points the nose a sufficient number of degrees to the left so as to offset the tendency of the wind to drift the airplane to the right. This establishes the so called crab angle represented by the number of degrees he must point the nose into the wind to offset the down wind drift tendency.

If, on final approach, the crab angle appears excessive and beyond the cross-wind gear 20 degrees castering limits, continue the approach until a point just before rotation or round-out, then land by "kicking out" some of the crab.

During a cross-wind landing, where wind direction and velocity may require use of a crab angle beyond the castering limits, the following additional procedure is recommended. When the aircraft is on final approach, establish and maintain a straight flight path by slipping into the up-wind side (i.e., hold the up-wind wing low). Maintain the wing-low position as well as the crab so that the crab angle will not exceed 20 degrees. Then, just as the aircraft is about to make ground contact, level the wing and remove any excess in the crab angle.

Immediately upon ground contact, use appropriate rudder and braking action as necessary. After touch-down, heavier application on the down-wind brake pedal will be required to prevent the nose from swinging into the wind. Maximum smooth braking action and <u>not</u> use of throttle is recommended for most effective ground control after touch-down.

SECTION III - OPERATION AND MAINTENANCE OF SYSTEMS

A. FLIGHT CONTROL SYSTEMS

*1. AILERON AND INTERCEPTOR CONTROL SYSTEM

The aileron-interceptor system is actuated by dual control wheels and a series of cables, pulleys, bellcrank and pushrods to the control surfaces. The dual wheels are synchronized through a chain and sprocket arrangement mounted to the control yoke. The system is accessible by removing the covers mounted to the diagonal members forward of the front door post and on the diagonal member of the co-pilot's side. Removal of the inspection cover in the ceiling just above the front seat gives access to the turnbuckles and the removal of the wing inspection covers provides access to the remainder of the system.

The stops for the restriction of travel are located on the aileron bellcrank support in the wings at the front spar forward of the ailerons.

The interceptor system is a part of the aileron system. It is made up of curved metal blades, actuated by a push-rod connected to the aileron bellcrank through a series of arms and a torque tube. This system's primary function is to provide lateral control during slow flight operation. The blades should be approximately 3/8 plus or minus 1/16" below the wing surface and they should be set up in this position when the ailerons are in "level flight" position.

This measurement may be made by resting a scale on the blade edge along the interceptor span. The system does not require lubrication.

To obtain proper hinge moment, the amount of spoiler chord on the tip side of the trailing edge of the aileron varies with the number of interceptor blades installed.

AILERON REMOVAL

A. Remove the outboard wing leading edge inspection covers just forward of the aileron, then remove the bolt that attaches the push-rod to the bellcrank. BE SURE TO RETAIN ALL WASHERS INCORPORATED.

B. Remove the two inspection covers at each end of the aileron. The two center covers need not be removed at this time.

C. Remove the inspection covers from the wing tip and the cover next to the aileron on the wing panel. This gives access to the aileron attachment bolts.

D. Remove bolts and retain washers. They are used to position the aileron to the wing.

E. Remove the aileron.

F. To remove the push-rod from the aileron, remove the two inspection covers remaining on the aileron. Remove the attaching bolt, being sure to retain all washers; IN THIS CASE, TWO ON EITHER SIDE OF PUSHROD.

G. Reverse this procedure for installation.

*Dual Controls are optional equipment.

A. FLIGHT CONTROL SYSTEMS (Cont'd)

1. AILERON AND INTERCEPTOR CONTROL SYSTEM (Cont'd)

INTERCEPTOR ADJUSTMENT

a. Remove the bolt which retains the push rod to the bellcrank.

b. Turn the rod end until the desired static position is obtained.

c. Resafety the rod end and replace the pushrod to the bellcrank.

NOTE: When repairing or repainting an aileron, the maximum static unbalance permitted about the hinge line is 3.50" lbs.

2. RUDDER CONTROL SYSTEM

The rudder control system is made up of a torque tube assembly, (which synchronizes the pilot and *co-pilots rudder pedals) and a series of pulleys and flexible control cables. The torque tube assembly is accessible by removing the floor boards just aft of the firewall. The remainder of the system may be reached by removing the remaining floor boards, the baggage compartment bulkhead and the inspection covers at the rear of the airplane directly under the stabilator. The only lubrication necessary in this system is the torque tube assembly which is lubricated with AH-G-5 general purpose grease. The grease fittings are provided, on the torque tube assembly. The pulleys and the remainder of the system are provided with sealed bearings and need no further lubrication. A rudder stop is provided at the rudder horn. The rudder is equipped with a ground adjustable trim tab - the pilot's rudder pedals have four position adjustments for the convenience of the pilot. See page 29 for diagram of rudder control system.

RUDDER REMOVAL

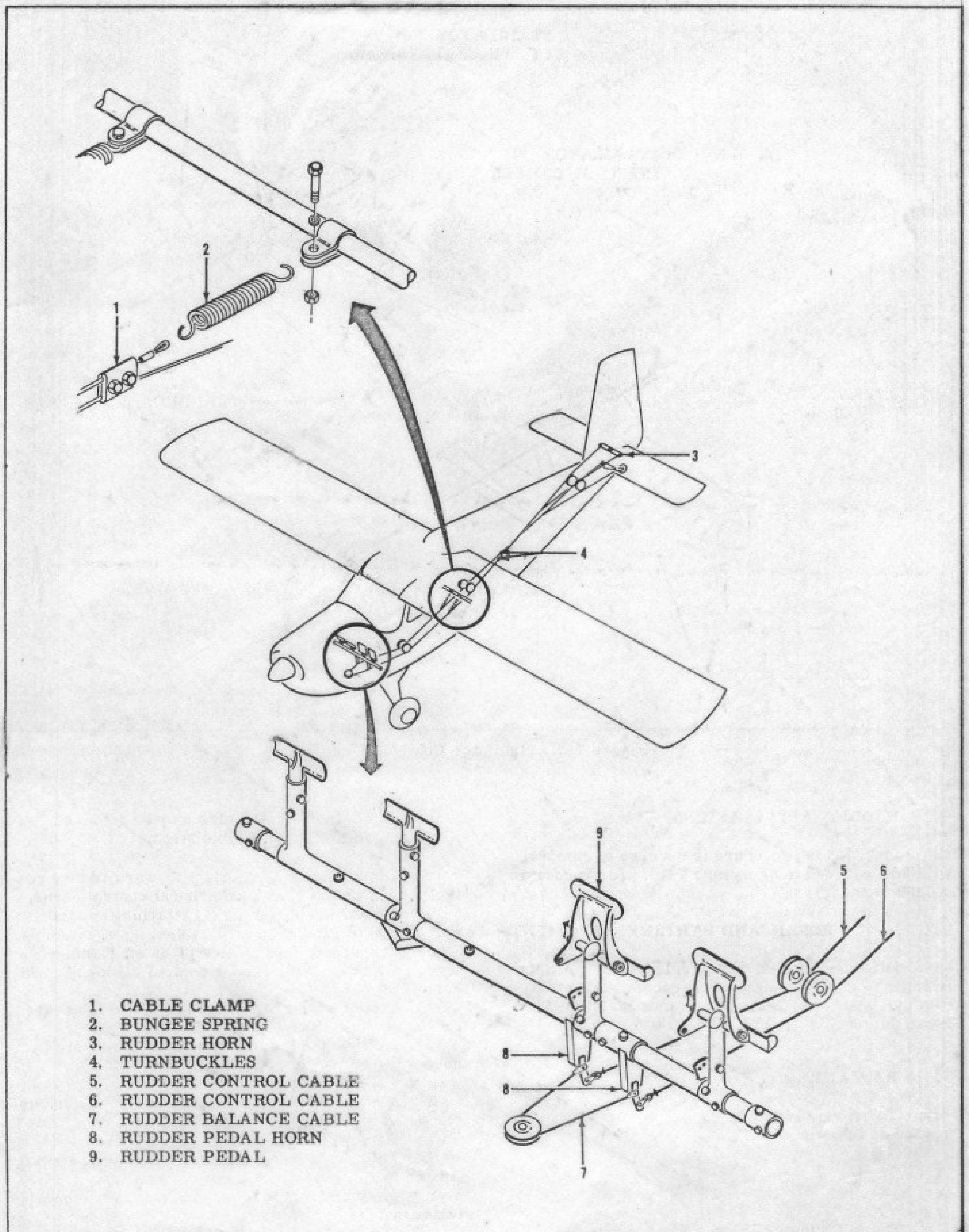
a. Release the tension from cables by loosening the turnbuckle.
b. Disconnect the cables from the rudder horn.
c. Remove the running light wire.
d. Remove the lower attachment bolt, being sure to retain the washers.
e. Remove the top and center attachment bolts.
f. Remove the rudder.
g. Reverse this procedure for installation.

NOTE: When repairing the rudder, the maximum permitted static unbalance about the hinge line is 4.50" lbs.

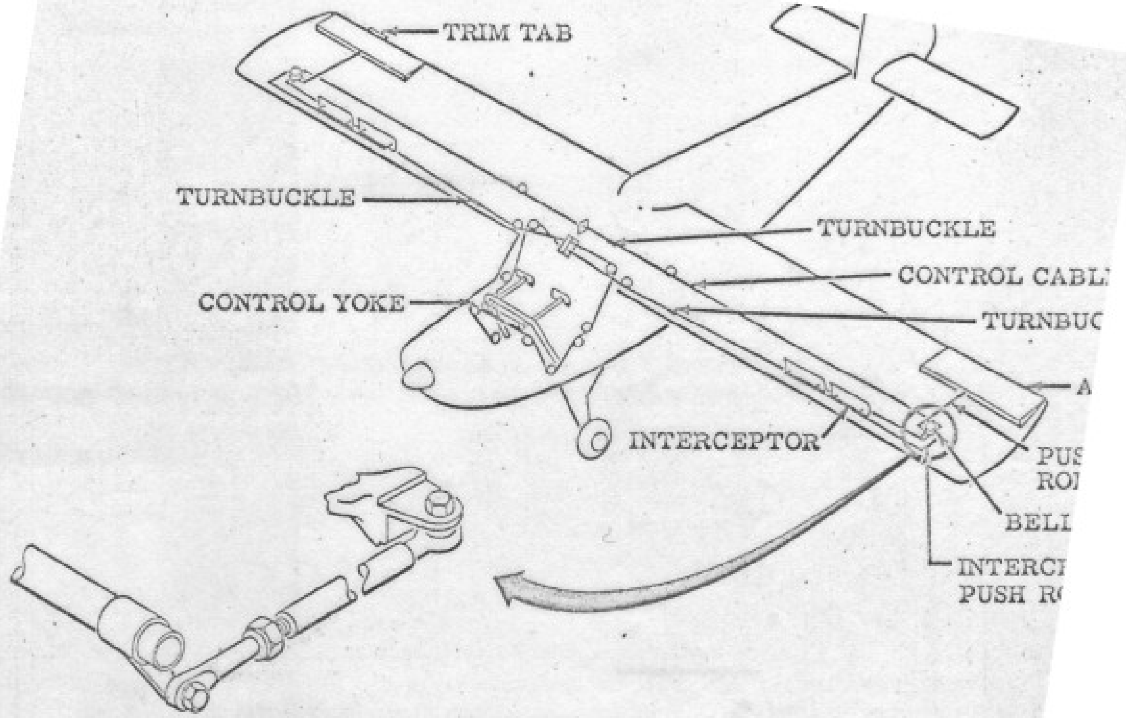
3. STABILATOR CONTROL SYSTEM

The stabilator is a one piece all movable surface and is actuated through a control yoke assembly, flexible control cables and pulleys to a sector connected to the stabilator surface. There are no adjustments necessary on this system as all stops are pre-set at the factory. Accessibility to the system is acquired by removing the cockpit floor boards, baggage compartment bulkhead and the inspection covers just below the stabilator. See page 30 for diagram of stabilator control system.

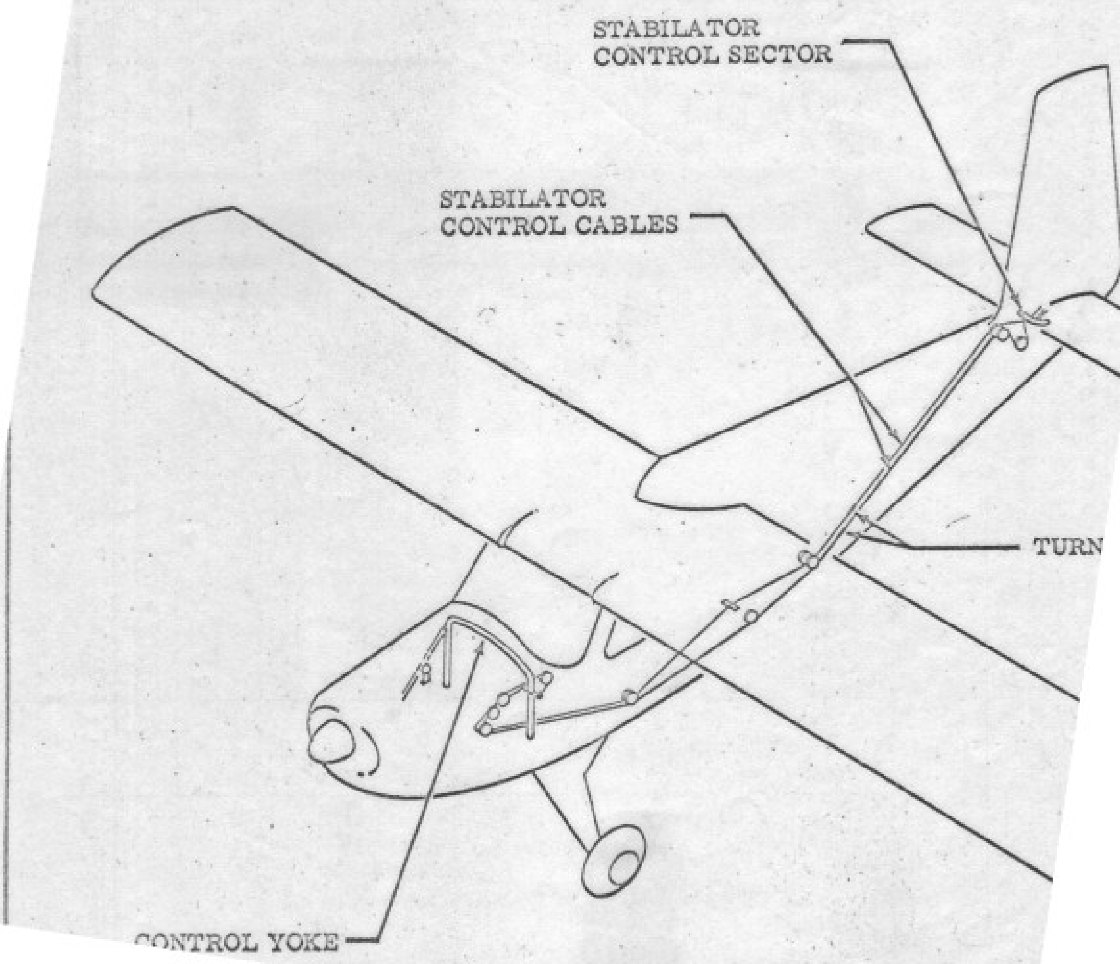
* Co-pilots rudder pedals are optional equipment.



Rudder Control System



Aileron Interceptor Control System



Stabilator Control System

A. FLIGHT CONTROL SYSTEMS (Cont'd)

3. STABILATOR CONTROL SYSTEM (Cont'd)

In order to remove the stabilator from the airplane, the vertical fin and rudder must first be removed. The stabilator is hinged to the forward spar of the vertical fin and may be removed as follows:

A. Disconnect the rudder cable and running light wire and remove the rudder.

B. Disconnect the anti-balance tab pivot and trim tab controls.

C. Disconnect the stabilator attachment bolts (AN174-11A) which attach the stabilator to the vertical fin, permitting the stabilator to rest on the fuselage longerons.

D. Remove the vertical fin from airplane.

E. Disconnect the cables from the stabilator control sector and carefully remove the stabilator from the airplane.

F. Reverse this procedure for installation.

No lubrication is required in this system because of the use of sealed ball bearings.

NOTE: When repairing the stabilator, the maximum permitted static unbalance is 8.0" lbs.

4. STABILATOR TRIM TAB AND ANTI-BALANCE CONTROL SYSTEM

The stabilator trim tab is an auxiliary control surface located on the trailing edge of the left half of the stabilator and is actuated through a system of cables, pulleys and a flexible push-pull control. On aircraft prior to Serial #1400 the tab is controlled by rotating the tab control crank located above and to the right of the pilot's head. The tab indicator is located just forward of the control crank. COUNTER CLOCKWISE ROTATION FOR NOSE UP CONDITION AND CLOCKWISE FOR NOSE DOWN.

On the 1400 Series aircraft the elevator tab is electrically operated by a switch on the pilots wheel.

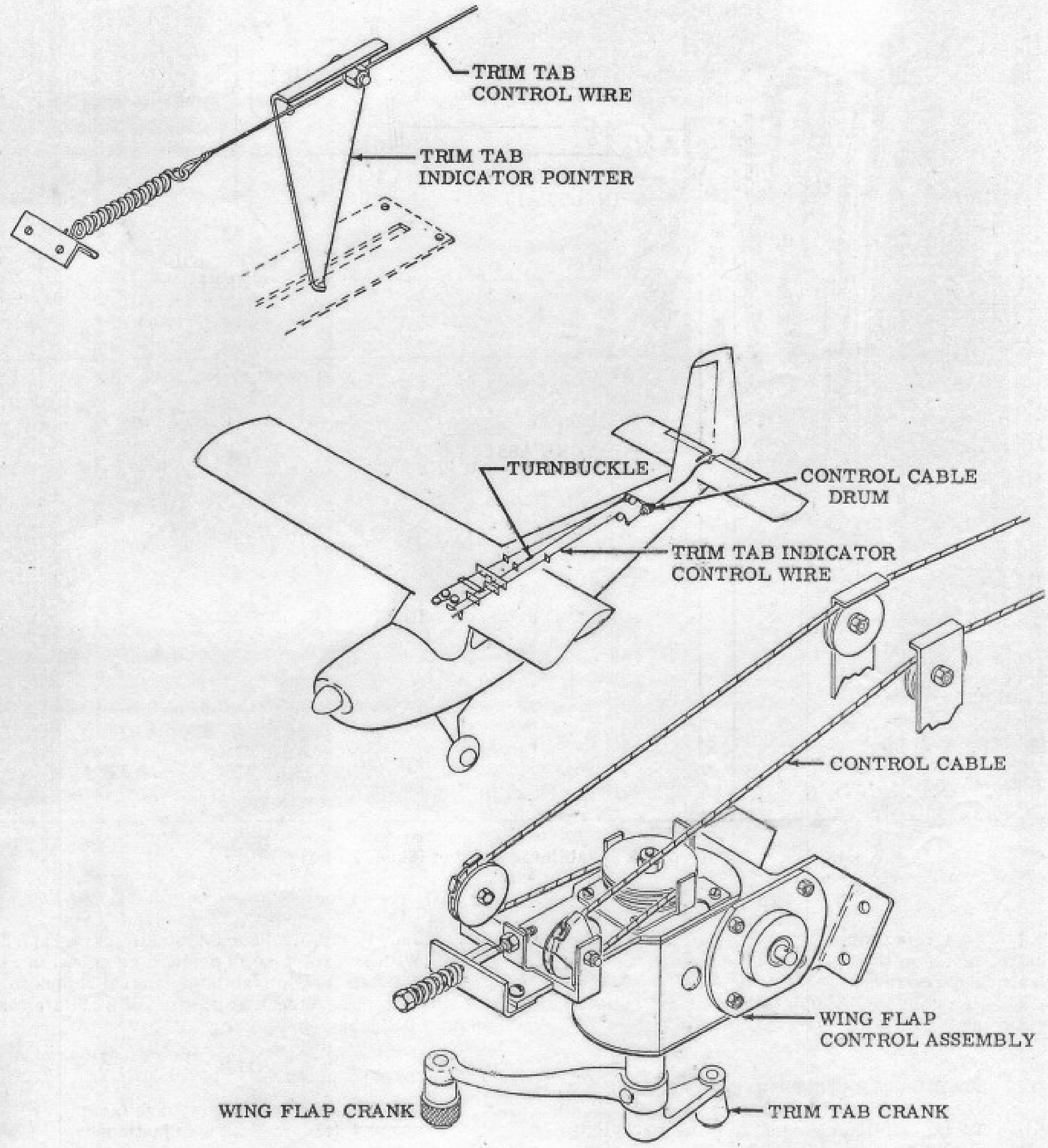
The stops incorporated in this system have been set at the factory and need no further adjustment.

The anti-balance tab is located on the trailing edge of the right side of the stabilator and is operated automatically by the movement of the stabilator. No adjustment is necessary in this system.

NOTE: The total free play of the trim or anti-balance tab should not exceed a total of 1/10 of an inch at the trailing edge. This play should be checked periodically.

5. SLAT SYSTEM

The slat system is contained entirely within the wing panel. Since the slats operate automatically, there are no cockpit controls. The system contains four independent slats - each with its own mechanism, consisting



Stabilator Trim Tab Control System

A. FLIGHT CONTROL SYSTEMS (CONT'D)

5. SLAT SYSTEM (Cont'd)

of torque tube, arms, links and slat support tubes. To inspect and service the system, remove the eight inspection covers on the underside leading edge of the wing panels. Check each slat for freedom of operation by grasping the leading edge and moving the slat in and out of the wing. Little or no maintenance is required to keep this system in operation and lubrication has been elimated by the use of nylon and sealed guide roll bearings. If for any reason the slats are removed, be sure that the washer spacers between the slat support tube and the slat proper are retained, as these washers are necessary for proper fit of slat to wing.

6. FLAP SYSTEM

On aircraft prior to Serial #1400 the flaps are operated by a control crank through a series of gears, screws, pushrods and bellcranks to the surfaces. The control crank is located above and to the right of the pilot. Accessibility to the system requires removal of the inspection cover in the ceiling above the front seat and the removal of the wing leading edge inspection covers. By rotation of the crank, the flaps may be set in any position from 0^{o} to 40^{o}.

On 1400 Series aircraft the flaps are actuated by an electric motor.

This system needs no lubrication as all bearings are either nylon or sealed ball bearings. See page 35 for diagram of flap control system.

FLAP REMOVAL

a. Remove the two bolts which attach the two pushrods to the flap proper. There are two pushrods per flap.
b. Remove the six bolts that retain the flap track bearings. BE SURE TO RETAIN ALL WASHERS AND SPACERS AS THEY ARE USED TO LOCATE THE FLAP PROPERLY. Remove flap.
c. Reinstall by reversing the above procedure.

FLAP TRAVEL ADJUSTMENT (Refer to Diagram on page 39)

UP TRAVEL (See Page 34)

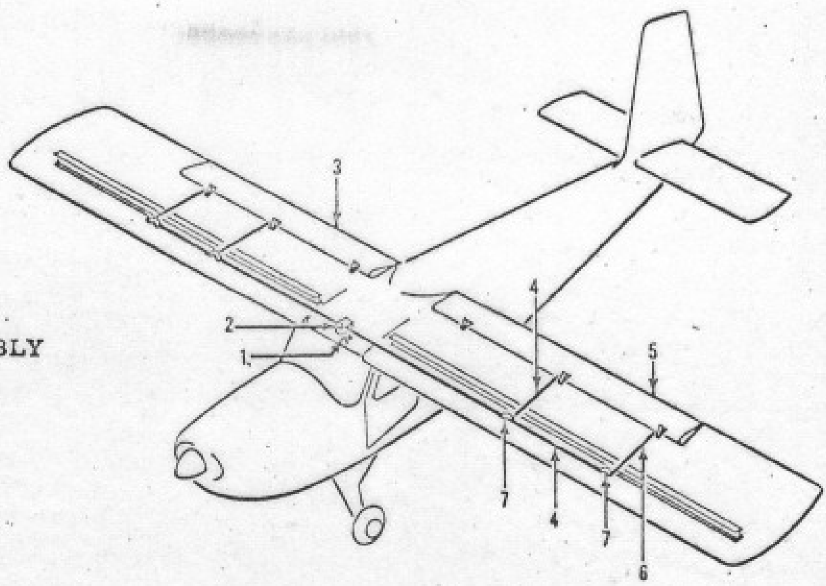
Crank the flaps to the UP position. Press out ROLLPIN #2. Turn Stop #3 in either direction, whichever is necessary for proper travel. Reinstall pin.

DOWN TRAVEL (SEE Page 34)

a. Remove the ROLLPIN #9 which attaches UNIVERSAL #1 to flap control mechanism.

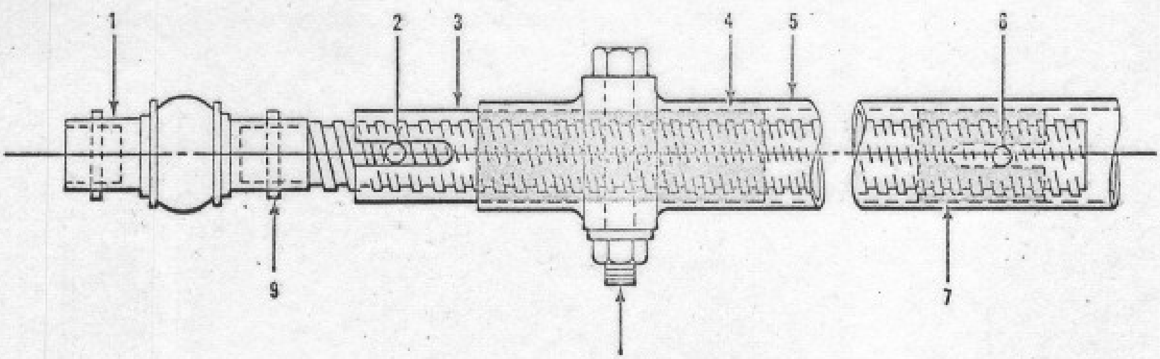
b. Remove the two BOLTS #8 which retain SLEEVE #4 to the push-pull tube proper. Slide the screw unit out of the tube; this will give access to the down stop on the other end of the actuating screw.

c. Press out ROLLPIN #6 and turn stop in either direction, whichever is necessary for proper adjustment.



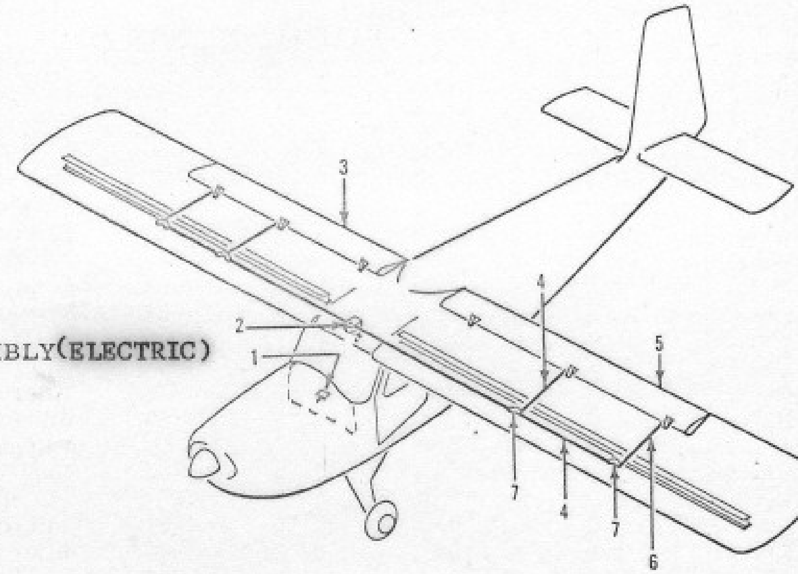
1. WING FLAP CRANK
2. WING FLAP CONTROL ASSEMBLY
3. RIGHT WING FLAP
4. PUSH-PULL RODS
5. LEFT WING FLAP
6. PUSH-PULL ROD
7. BELLCRANK

Figure 7-1 Wing Flap Control



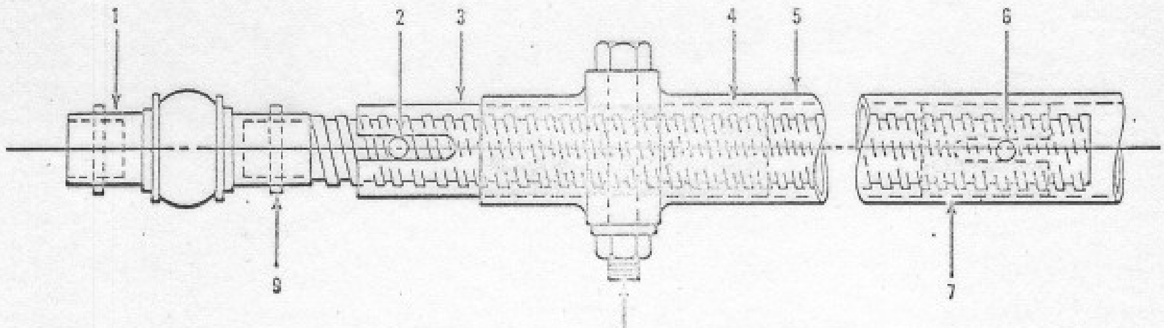
1. UNIVERSAL
2. ROLL PIN
3. STOP
4. SLEEVE
5. PUSH-PULL AND BLOCK ASSY.
6. ROLL PIN
7. STOP
8. BOLT
9. ROLL PIN

Wing Flap Jack Screw Rigging



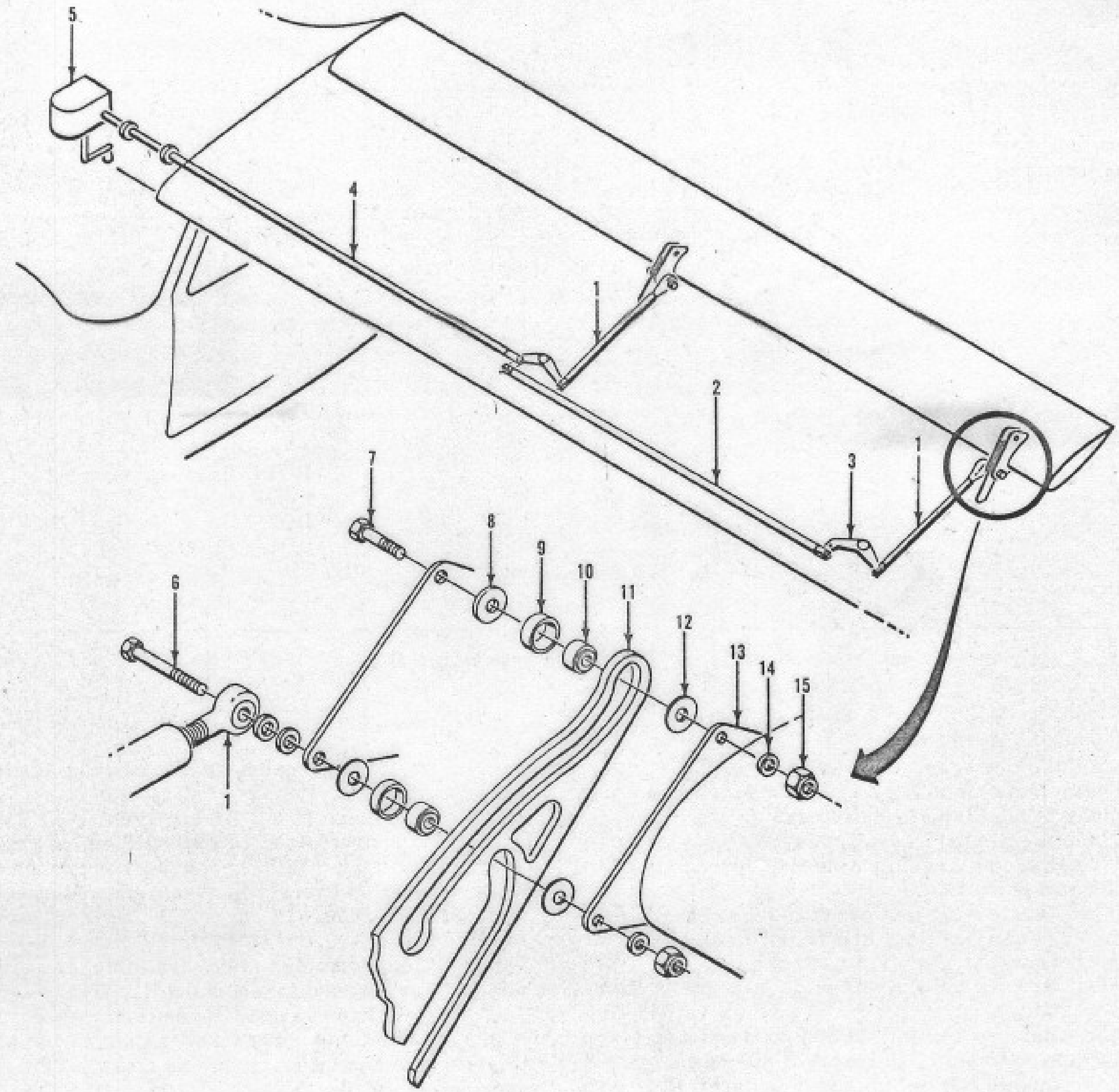
1. WING FLAP SWITCH
2. WING FLAP CONTROL ASSEMBLY(ELECTRIC)
3. RIGHT WING FLAP
4. PUSH-PULL RODS
5. LEFT WING FLAP
6. PUSH-PULL ROD
7. BELLCRANK

Wing Flap Control



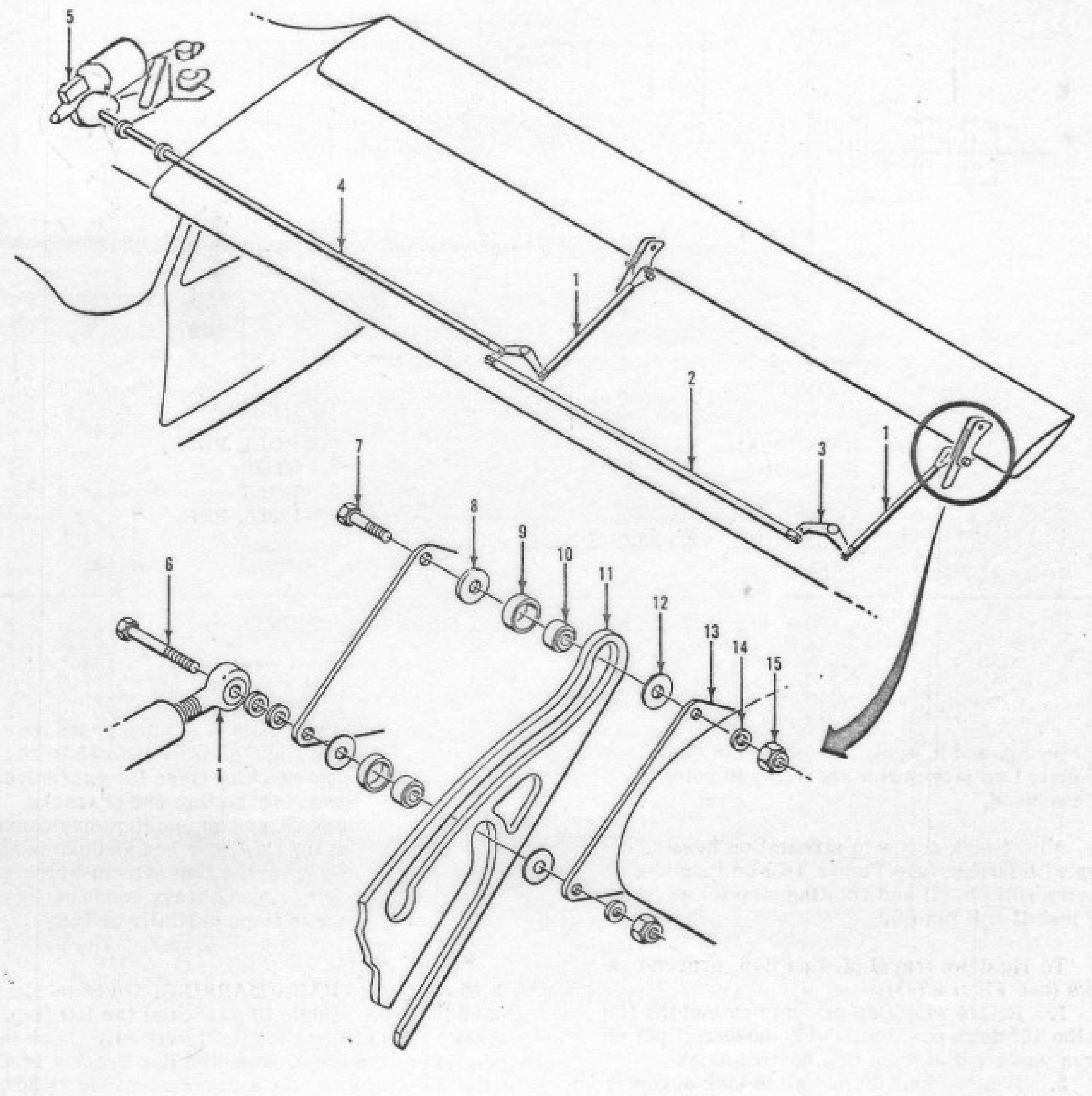
1. UNIVERSAL
2. ROLL PIN
3. STOP
4. SLEEVE
5. PUSH-PULL AND BLOCK ASSY.
6. ROLL PIN
7. STOP
8. BOLT
9. ROLL PIN

Wing Flap Jack Screw Rigging



1. WING FLAP TO BELLCRANK PUSH-PULL ROD
2. BELLCRANK TO BELLCRANK PUSH-PULL ROD
3. BELLCRANK
4. BELLCRANK TO JACK SCREW PUSH-PULL ROD
5. WING FLAP CONTROL ASSEMBLY
6. BOLT
7. BOLT
8. SPACER
9. BEARING HOUSING
10. BEARING
11. FLAP TRACK
12. SPACER
13. WASHER
14. NUT

Wing Flap Installation



1. WING FLAP TO BELLCRANK PUSH-PULL ROD
2. BELLCRANK TO BELLCRANK PUSH-PULL ROD
3. BELLCRANK
4. BELLCRANK TO JACK SCREW PUSH-PULL ROD
5. WING FLAP CONTROL ASSEMBLY (ELECTRIC)
6. BOLT
7. BOLT
8. SPACER
9. BEARING HOUSING
10. BEARING
11. FLAP TRACK
12. SPACER
13. WASHER
14. NUT

Wing Flap Installation

A. FLIGHT CONTROL SYSTEMS (Cont'd)

6. FLAP SYSTEM (Cont'd)

DOWN TRAVEL (Cont'd)

d. Replace pin and reinstall the screw unit in the tube, being sure to line up the locking grooves in the SLEEVE #4 with the holes provided in the PUSH-PULL TUBE #5. This prevents rotation of the THREADED SLEEVE #4.

e. Reconnect the universal to the flap control unit.

CAUTION: Avoid undue manual upward pressure on one flap when checking for free play when flaps are extended. This may distort flap actuating mechanism enough to cause a wing heavy condition with flaps extended.

7. CONTROL COLUMN INSTALLATION

A diagram provides information on the control column installation. The diagram (Detail "A", page 37) shows the sprocket assembly. The yoke is attached to fuselage truss by AN bolts.

8. CONTROL SYSTEM MOVEMENTS AND CABLE RIGGING LOADS

Stabilator (Trailing edge)	Up 19°	Down 10°
Stabilator (Trim Tab)	Up 36°	Down 20°
Stabilator (Anti-Balance Tab)	Up 36°	Down 20°
Ailerons	Up 20°	Down 20°

Interceptor:
The top edge 3/8, plus or minus 1/16" below surface of wing skin when ailerons are in level flight position.

Rudder:
Right $30^\circ \pm 1^\circ$
Left $25^\circ \pm 1^\circ$

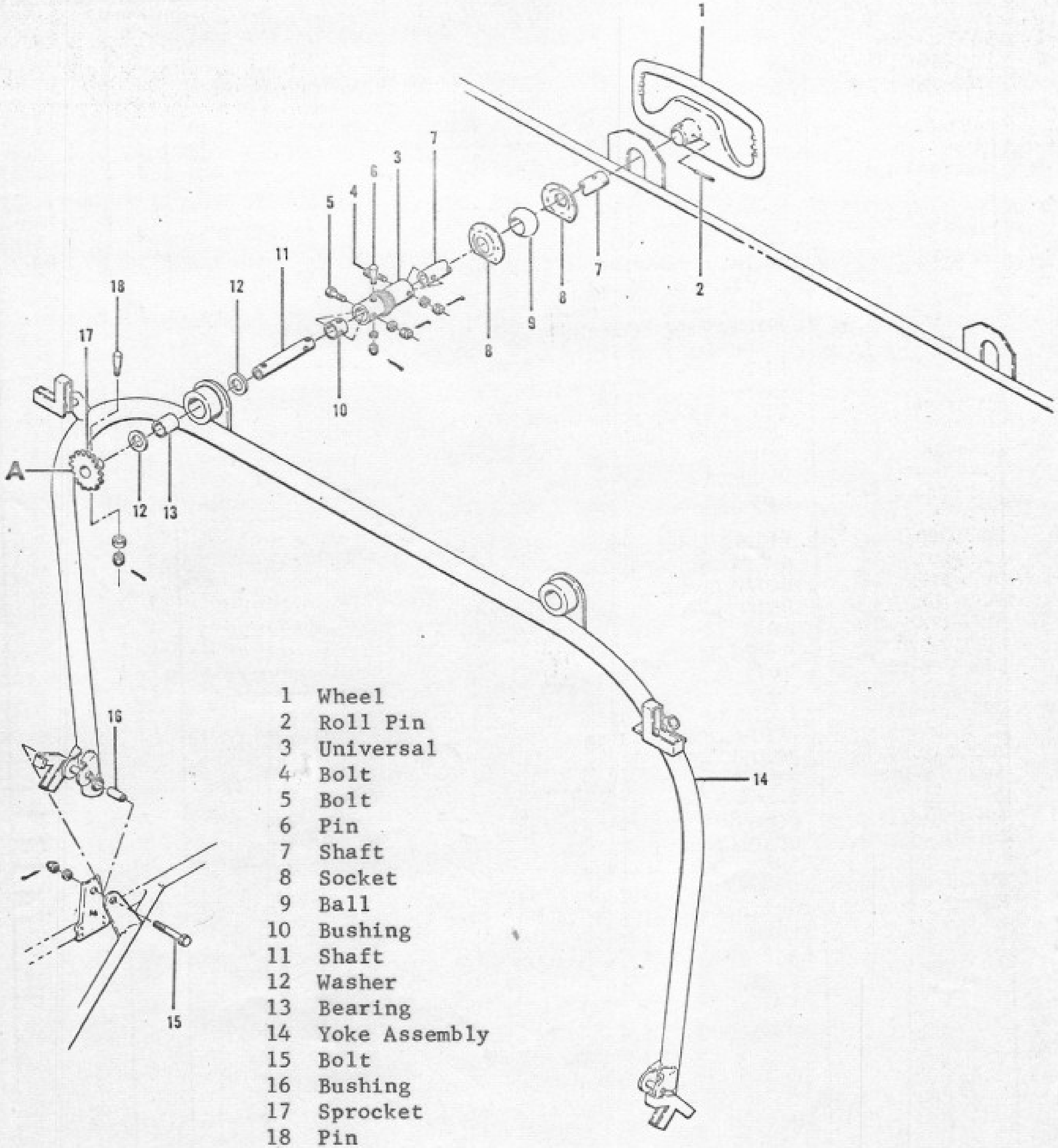
Flaps:
Down $40^\circ \pm 1\frac{1}{2}^\circ$

Tolerances on all angles in plus or minus 1°.

CABLE LOADS

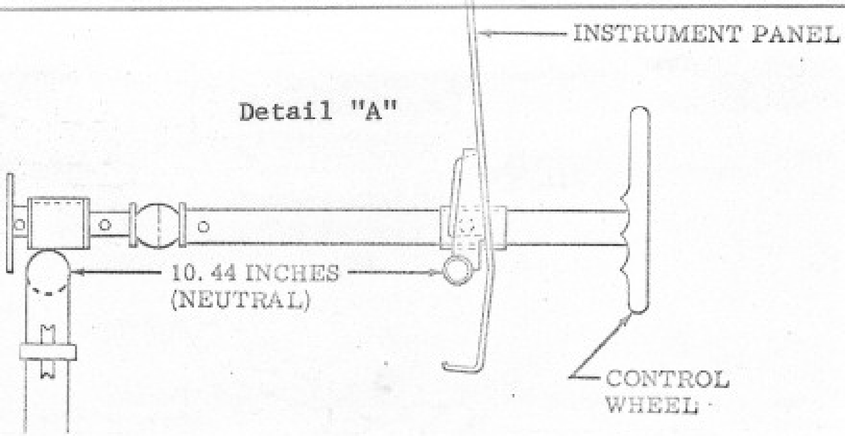
Stabilator 40, plus or minus 5 lbs.
Trim tabs 8 to 10 lbs.
Rudder 30 to 40 lbs., per-load tension

The neutral position of the stabilator is 2.5° (trailing edge down) as measured from the horizontal reference line. The horizontal reference is set up by the use of the leveling buttons which are located at the forward edge of the right hand door just inside the framework (See Sec. IV,para E). The stabilator trim and anti-balance angles are measured from the chord line of the stabilator. Note that the anti-balance tab should be 36° up.

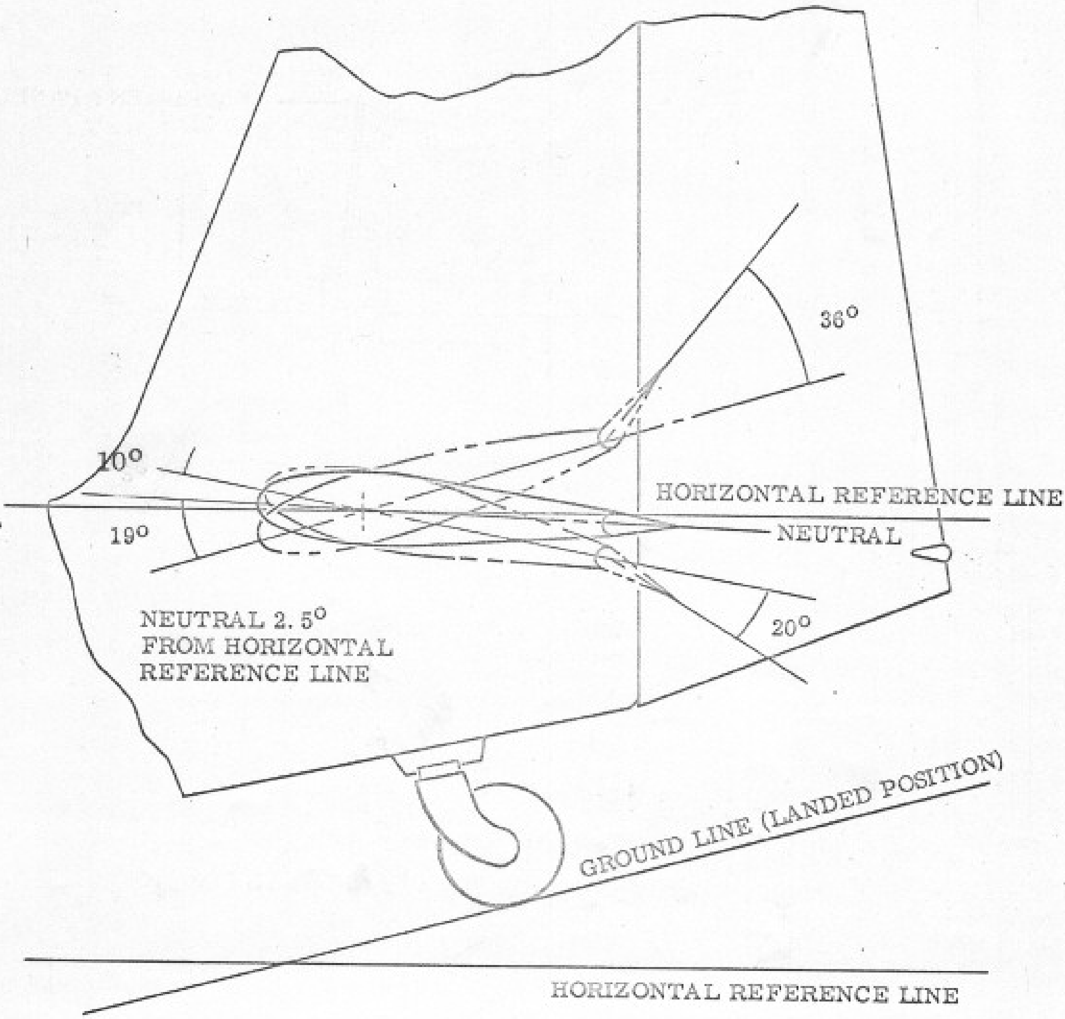


1 Wheel
2 Roll Pin
3 Universal
4 Bolt
5 Bolt
6 Pin
7 Shaft
8 Socket
9 Ball
10 Bushing
11 Shaft
12 Washer
13 Bearing
14 Yoke Assembly
15 Bolt
16 Bushing
17 Sprocket
18 Pin

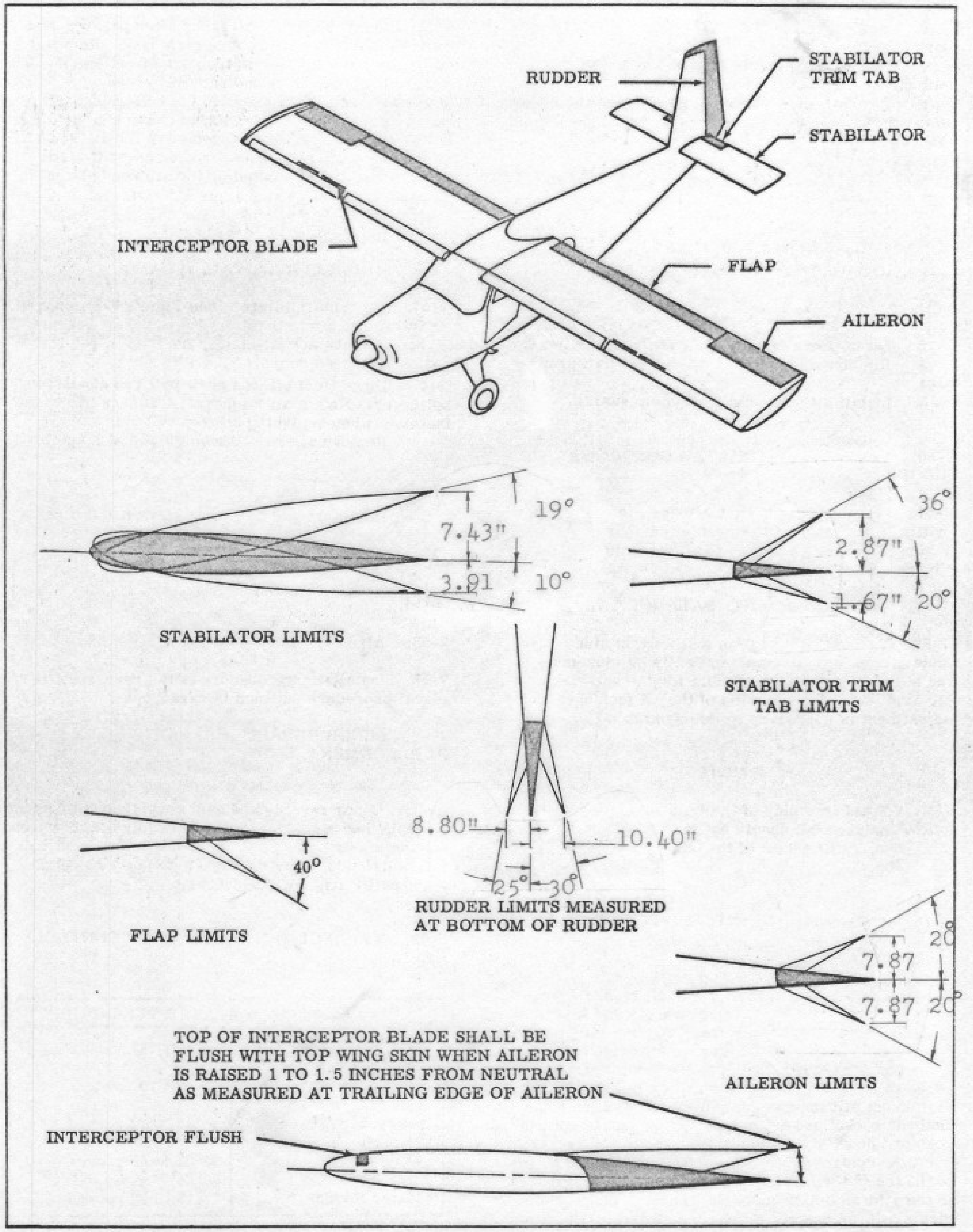
Control Column Installation



SEE DETAIL A TO ESTABLISH NEUTRAL
POSITION OF CONTROL YOKE



Stabilator Rigging



Control Surface Travel Measurements

A. FLIGHT CONTROL SYSTEMS (Cont'd)

8. CONTROL SYSTEM MOVEMENTS AND CABLE RIGGING LOADS (Cont'd)

CABLE LOADS (Cont'd)

measured from the stabilator chord line when the stabilator is up 19° from the stabilator "neutral" position. The anti-balance tab should be down 20° when the stabilator is down 10°. The following sketches clarify the angular measurements. See 38 for diagram showing relationships of trim and anti-balance tabs to the stabilator during extreme movements of stabilator. The diagram is shown with tabs in neutral position.

B. FUEL SYSTEM

The fuel system consists of the two fuel bladder cells, one located in each wing panel, one fuel shut-off valve, a fuel selector valve, one gascolator located under the right hand window, an engine driven fuel pump, one electrically driven booster pump and a hand operated engine primer. The fuel quantity transmitters are of the float type and they are located on the inboard wing ribs. Each cell is filled through a filler neck which extends above the wing panel. The fuel cells are of the collapsible type. The system is suitable for aeromatic fuels.

The main fuel valve is located on the right side of the cockpit, below the forward window. There are only 2 positions, "ON" and "OFF". When "ON", the valve handle is horizontal. This valve controls the fuel flow from both wing tanks, which are interconnected.

The fuel filter is accessible for inspection and drainage from the outside of the plane through a small door located below the right forward window. A needle valve beside the fuel filter can be used to shut off the fuel from the tanks when the filter is to be removed for cleaning. This valve should be safetied in the open position after filter bowl and screen are replaced.

A cross-over line is used to give both tanks a common vent, located on top of the fuselage.

Usable fuel capacity is 58.5 gallons.

The zero reading of the fuel indicators is calibrated for zero usable fuel. Although there is 2.5 gallons left in the system at zero indicator reading, it cannot be safely used in all attitudes of flight.

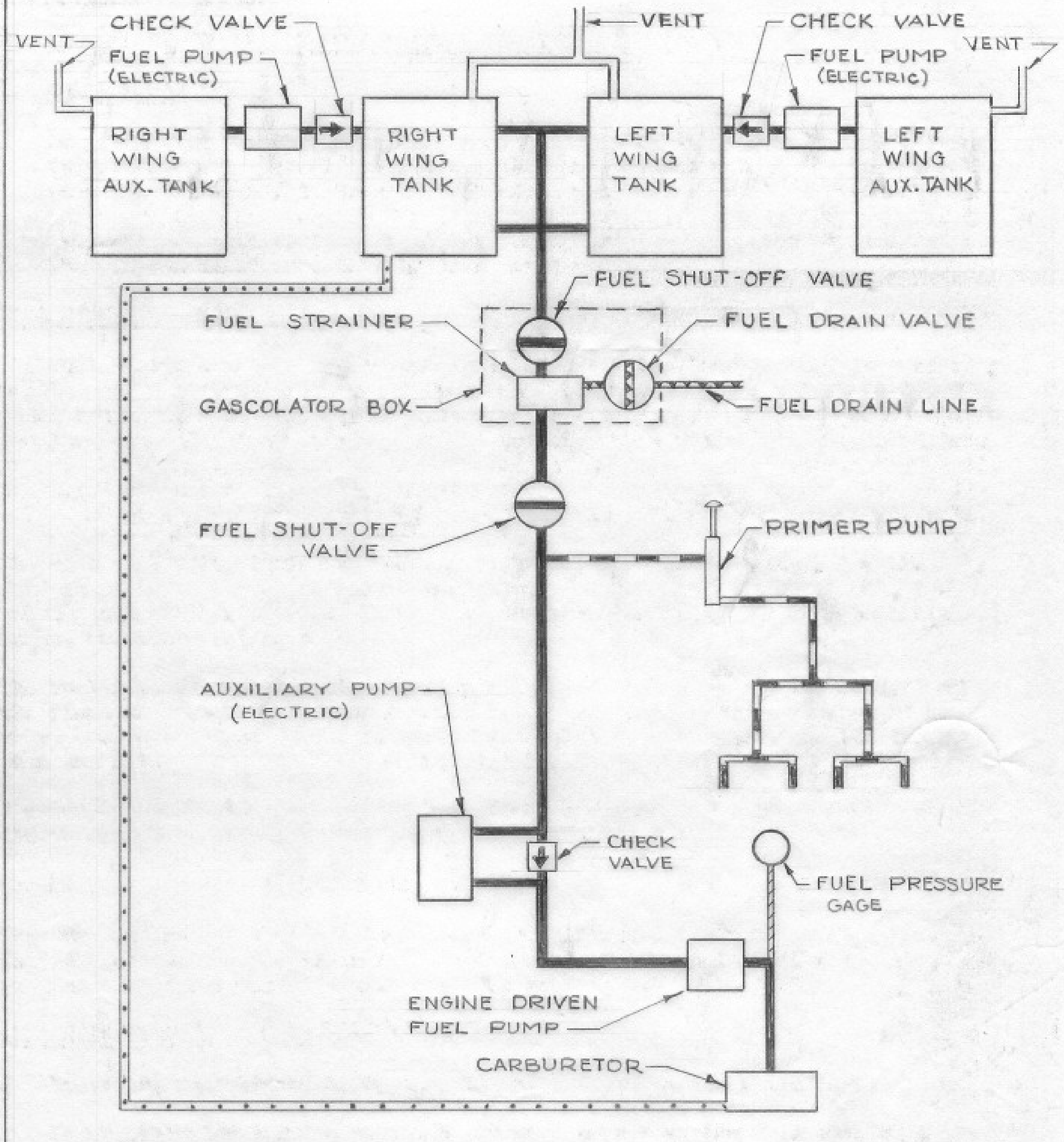
FUEL CELL REMOVAL

1. Drain the fuel system by opening the snap valve on the gascolator.

2. Remove the wing fairing strip, being sure to remove the fuel cell vent which is attached to the cell under the fairing strip.

3. Remove the trailing edge inspection covers and remove the hose clamps which retain the 90° elbow to the cell outlet. BE VERY CAREFUL WHEN REMOVING AS THIS ELBOW CONTAINS THE FINGER STRAINER.

4. Remove the fuel quantity indicator wire and indicator proper.



LEGEND

FUEL SUPPLY LINES
PRIMER LINES
VENT LINES
PRESSURE LINES
DRAIN LINES
FUEL RETURN LINES

HELIO AIRCRAFT CORP.

FUEL SYSTEM
SCHEMATIC
FOR MODEL H-295 AIRCRAFT

B. FUEL SYSTEM (Cont'd)

FUEL CELL REMOVAL (Cont'd)

5. Remove the filler neck from the top of the tank. This is attached with AN502-416-10 fillister head machine screws.

6. Remove the lower fuel cell access door.

7. Remove the attaching AN502-416-12 fillister head machine screws which retain the lower fuel cell cover. Remove cover. Before removing cell, wipe or spray entire interior with light engine oil, and let it soak for 24 hours.

8. Reach inside the oval opening to the top of the cell and locate the twelve cell attaching buttons. To release, slip a small piece of rubber hose over the end of each fitting. Push up, and at the same time, pull bottom aft until cell is released from the wing.

9. Roll the bladder cell up and remove it from the cavity through the oval opening being careful not to damage the cell.

10. If fuel cell is not to be replaced immediately, coat entire inner surface with aviation oil to prevent drying out of the surface. Caution: Take care not to strike or drop tools on the inside of tank surface as this may cause permanent damage and possible leaking at a latter date.

11. Reverse this procedure for installation, except that the gaskets should be replaced at each cell removal. The following are the gasket part numbers (manufactured by Uniroyal, Mishawaka, Indiana).

Gasket	Number	Qty. Req'd (per tank)
a. Filler Neck	FCB27519	2
b. Lower Access Opening	FCB25752	1
c. Fuel Qty. Transmitter	FCB25750	1

See page 41 for a schematic diagram of the fuel system.

C. ELECTRICAL SYSTEM

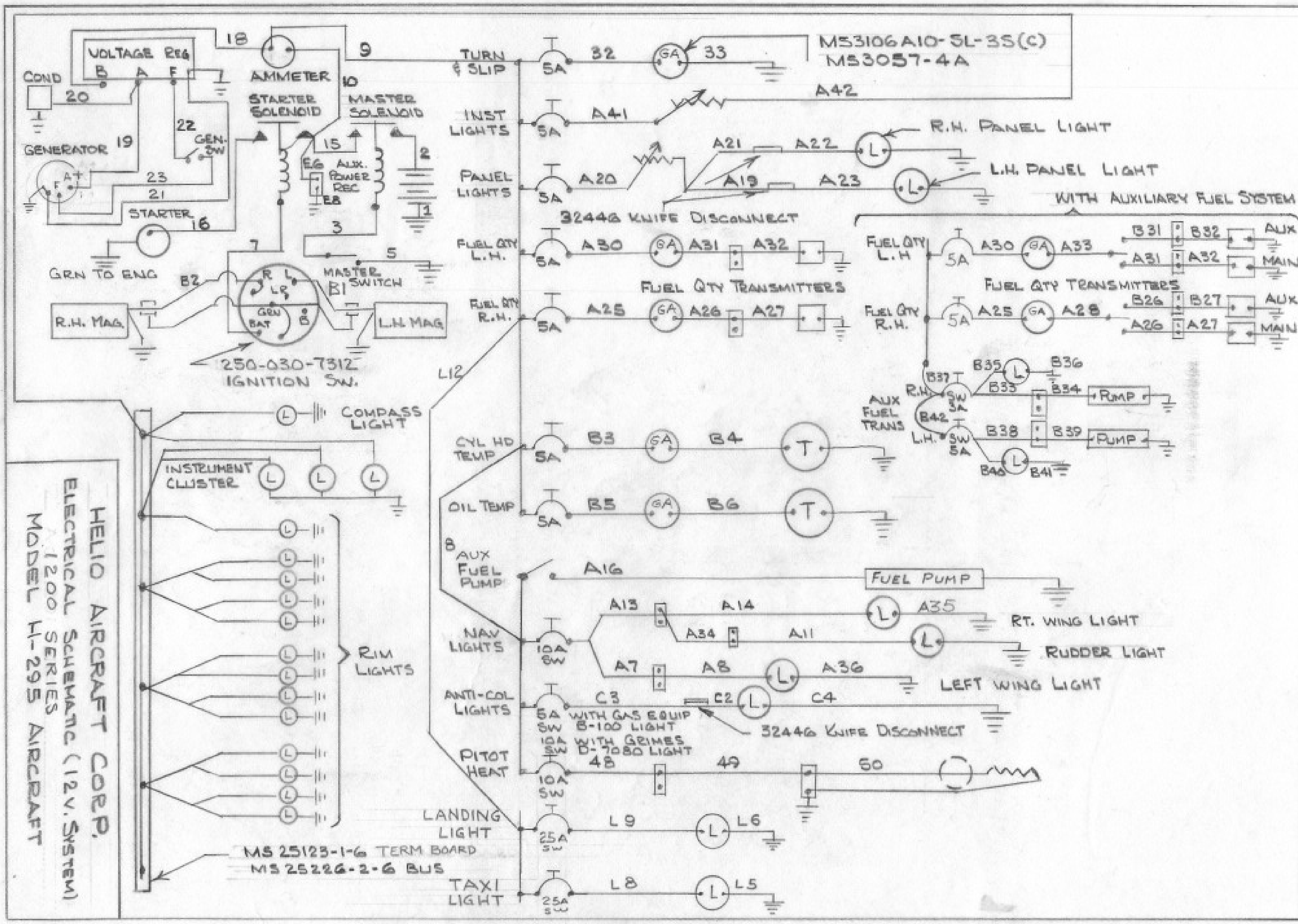
See Page 43 for electrical wiring schematic.

A twelve volt battery and an engine driven generator supply electrical power for the single wire electrical system. The battery and case are located behind the third seat and to the right of fuselage center line on airplanes prior to Serial #1400. On the 1400 Series aircraft the battery is located in the left side of the engine accessory section. Power from the generator is fed to the electrical system through a voltage regulator which is limited to 50 amperes.

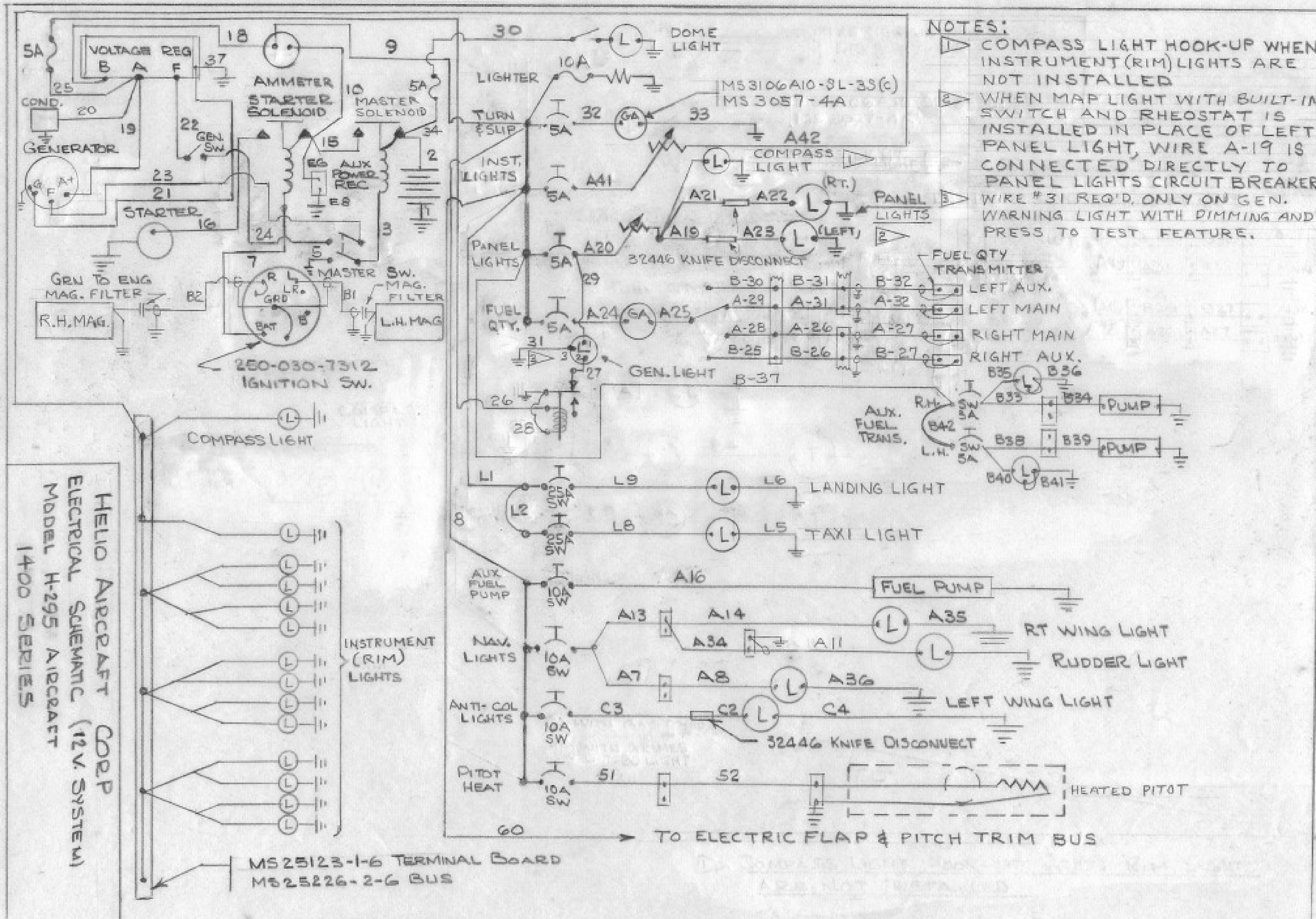
The master switch must be in the "ON" position before operation of the electrical system is possible.

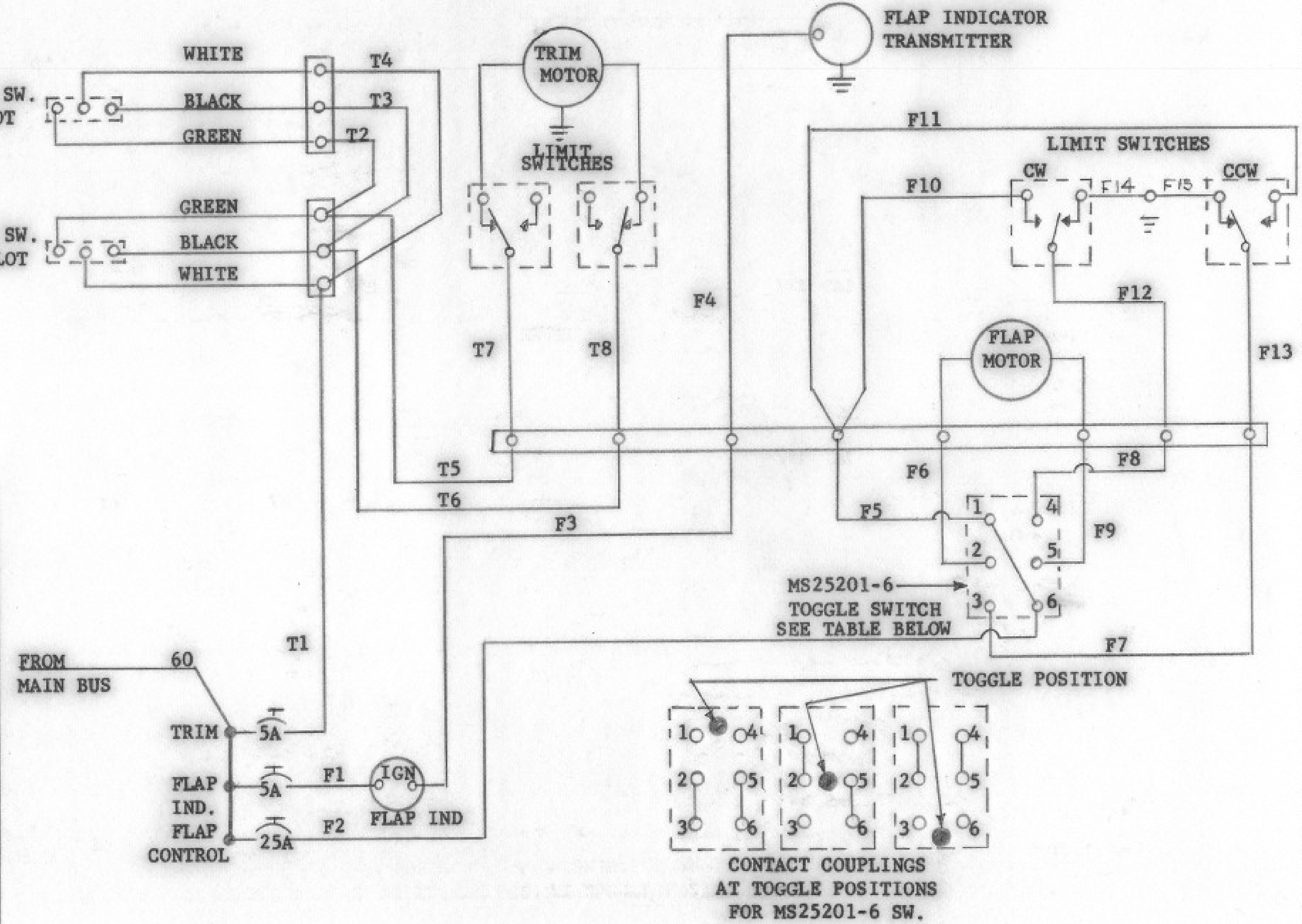
Circuit breakers are installed to protect electrical components.

It is very important that the battery be properly filled at all times. Inspection of the liquid level in the battery should be made at approximately every 20 hours. The acid solution should be up to, never over, the baffle plate



HELIO AIRCRAFT CORP.
ELECTRICAL SCHEMATIC (12 V. SYSTEM)
1200 SERIES
MODEL H-295 AIRCRAFT


NOTES:
1 COMPASS LIGHT HOOK-UP WHEN INSTRUMENT (RIM) LIGHTS ARE NOT INSTALLED
2 WHEN MAP LIGHT WITH BUILT-IN SWITCH AND RHEOSTAT IS INSTALLED IN PLACE OF LEFT PANEL LIGHT, WIRE A-19 IS CONNECTED DIRECTLY TO PANEL LIGHTS CIRCUIT BREAKER
3 WIRE #31 REQ'D. ONLY ON GEN. WARNING LIGHT WITH DIMMING AND PRESS TO TEST FEATURE.
5A
VOLTAGE REG
B A F
37
18
9
30
DOME LIGHT
LIGHTER
10A
25
COND.
20
19
GENERATOR
22
GEN. SW.
AMMETER
STARTER SOLENOID
10
MASTER SOLENOID
5A
34
15
2
EG
AUX POWER REC
E8
23
21
STARTER
16
24
5
3
MASTER SW.
7
GEN TO ENG MAG. FILTER
R.H. MAG.
B2
GRD
BAT
B1
MAG. FILTER
L.H. MAG
250-030-7312 IGNITION SW.
TURN & SLIP
32
5A
MS3106A10-SL-3S(C)
MS 3057-4A
33
A42
COMPASS LIGHT
INST. LIGHTS
A41
A21
A22
(RT.)
PANEL LIGHTS
A19
A23
(LEFT)
PANEL LIGHTS
A20
32446 KNIFE DISCONNECT
29
FUEL QTY TRANSMITTER
B-30
B-31
B-32
LEFT AUX.
A-29
A-31
A-32
LEFT MAIN
FUEL QTY.
A24
A25
A-28
A-26
A-27
RIGHT MAIN
B-25
B-26
B-27
RIGHT AUX.
31
GEN. LIGHT
27
B-37
26
28
B35
B36
R.H.
SW 5A
B33
B34
PUMP
AUX. FUEL TRANS.
B42
L.H.
SW 5A
B38
B39
PUMP
B40
B41
COMPASS LIGHT
L1
L2
25A SW
L9
L6
LANDING LIGHT
L8
L5
TAXI LIGHT
8
AUX FUEL PUMP
10A SW
A16
FUEL PUMP
NAV. LIGHTS
A13
A14
A35
RT WING LIGHT
A34
A11
RUDDER LIGHT
A7
A8
A36
LEFT WING LIGHT
ANTI-COL LIGHTS
C3
C2
C4
32446 KNIFE DISCONNECT
PITOT HEAT
51
52
HEATED PITOT
60
TO ELECTRIC FLAP & PITCH TRIM BUS
INSTRUMENT (RIM) LIGHTS
MS25123-1-6 TERMINAL BOARD
MS25226-2-6 BUS
HELIO AIRCRAFT CORP
ELECTRICAL SCHEMATIC (12V. SYSTEM)
MODEL H-295 AIRCRAFT
1400 SERIES



HELIO AIRCRAFT CORP.
ELECTRICAL SCHEMATIC OF
FLAP AND PITCH TRIM SYSTEMS
MODEL H-295 AIRCRAFT

C. ELECTRICAL SYSTEM (Cont'd)

(protective sheet over plates) or not more than 1/4 inch above the separators. The use of an aircraft type of battery hydrometer will automatically fill to the proper height.

C. ELECTRICAL SYSTEM (Cont'd)

ADJUST GENERATOR VOLTAGE

It is sometimes necessary to adjust the generator voltage. It is done as follows:

1. Disconnect B+ wire at control box.

2. CONNECT voltmeter across armature circuit. A+ to ground.

3. Control box cover should be in place for all checks.

4. Run up engine to 2600 RPM or above.

5. Adjust regulator spring tension until the voltmeter indicates between 14.2 and 14.4 volts.

6. Reconnect B+ terminal at control box and again run up engine to check for proper operation.

NOTE: Cut out should connect the generator circuit to the aircraft circuit at between 12.7 and 12.9 volts. When returning throttle toward idle RPM or below generator "coming in speed", the reverse current flow across the cut out points should show a momentary dip at the ammeter toward discharge of 10 amperes maximum before reverse current relay opens.

STARTER

The starter switch is incorporated in the ignition switch. When in the start position, the right mag is grounded automatically.

The starter clutch must be adjusted to 225 to 250 foot lbs. torque.

RADIO

Radio equipment is optional.

D. HEATING AND VENTILATING SYSTEM

Hot or cold air enters the cabin through stainless steel valves mounted on the forward side of the firewall. Temperature regulation is obtained by use of the control knobs on the instrument panel.

Hot air is obtained by passing cold outside air around one of the exhaust stacks equipped with a muff. The exhaust stack muff must be inspected every 25 hours.

If defroster is installed, hot air may be deflected from the cabin heat vent to windshield by pulling out both heat and defrost knobs. A/C S/N 1201 and up offer the additional ability of hot or cold or a mixture of hot and cold air to the defroster by pulling the defroster knob and using the hot and cold air knobs to adjust the temperature desired.

E. BRAKE SYSTEM

See Page 47 for diagram of brake system installation - Single.
See Page 48 for diagram of brake system installation - Dual*.
Each rudder pedal on the pilot's side is equipped with a toe brake. The brakes are hydraulic, each pedal actuating a hydraulic piston.

The parking brake handle locks hydraulic pressure in the master cylinders. Actuating the parking brake control locks the fluid between the brake and the master cylinders. This system utilizes a reservoir located forward of the pilot rudder pedals and secured to the aft side of the firewall.

The brake fluid to be used is MIL-H-5606.

F. ENGINE CONTROL SYSTEM

Controls are provided for the throttle, mixture control, cowl flaps and carburetor heat. All are designed so that they are pushed forward for takeoff conditions, except the cowl flaps, which must be pulled to open.

G. PROPELLER CONTROL

The propeller is a Hartzell Constant Speed, with a push-pull flexible cable incorporating a vernier type control which operates a constant speed unit on the forward end of the engine. Minor pitch adjustments can be made by repositioning the mechanical stop set screw on the constant speed unit. The propeller should be adjusted as follows:

LOW PITCH

1. Adjust propeller governor speeder spring to fully compressed position.

2. Adjust propeller blade angle to obtain 3400 rpm @ full throttle.
   Pitch in degrees: Low 11.8 High 30.8 @ 30 inch station.

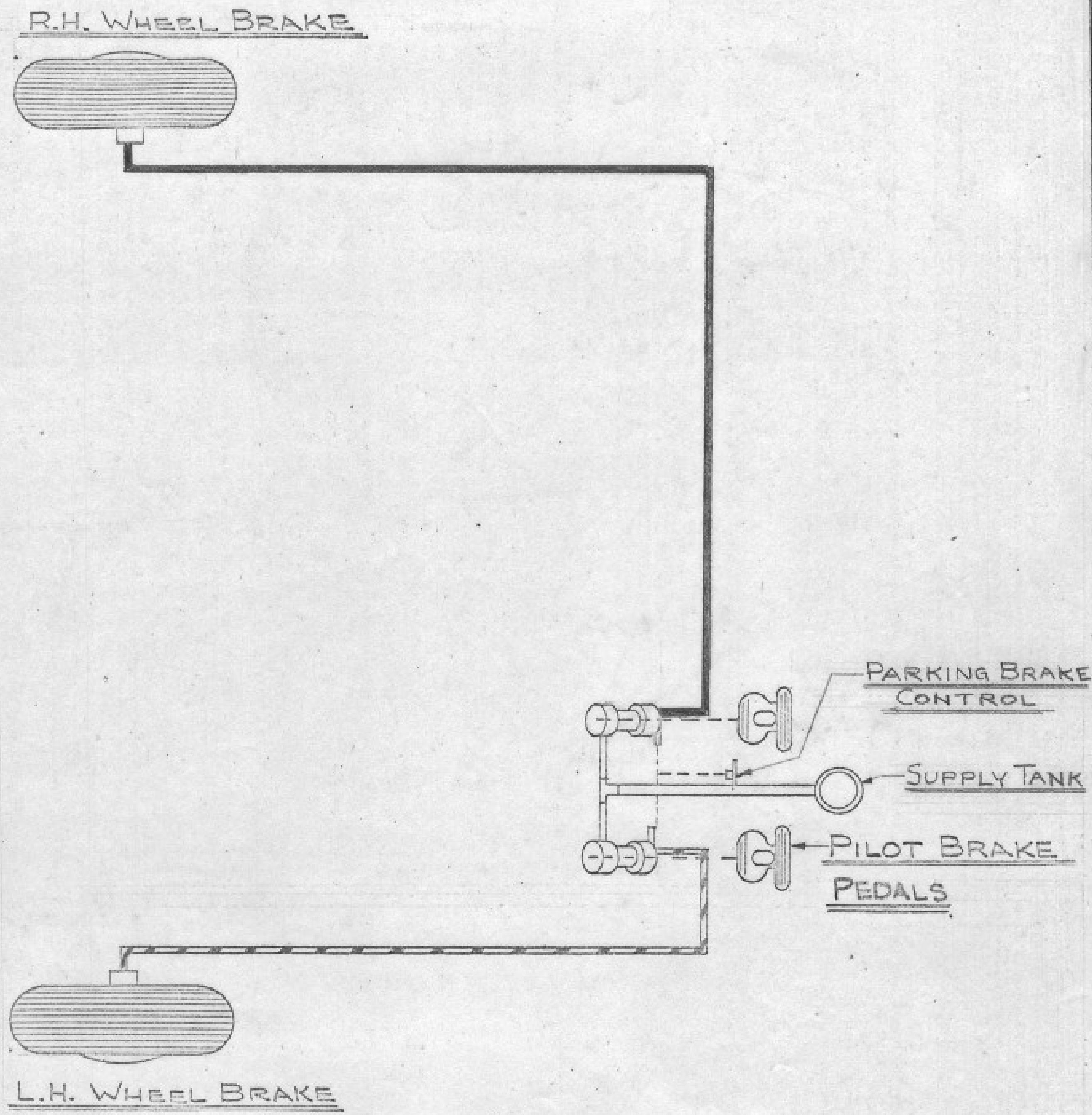
3. Adjust propeller governor speeder spring stop to obtain 3400 rpm at full throttle.

H. LANDING GEAR

1. Main and Tail shock systems - Diagrams provide sufficient servicing information to maintain the main and tail wheel landing gear systems.

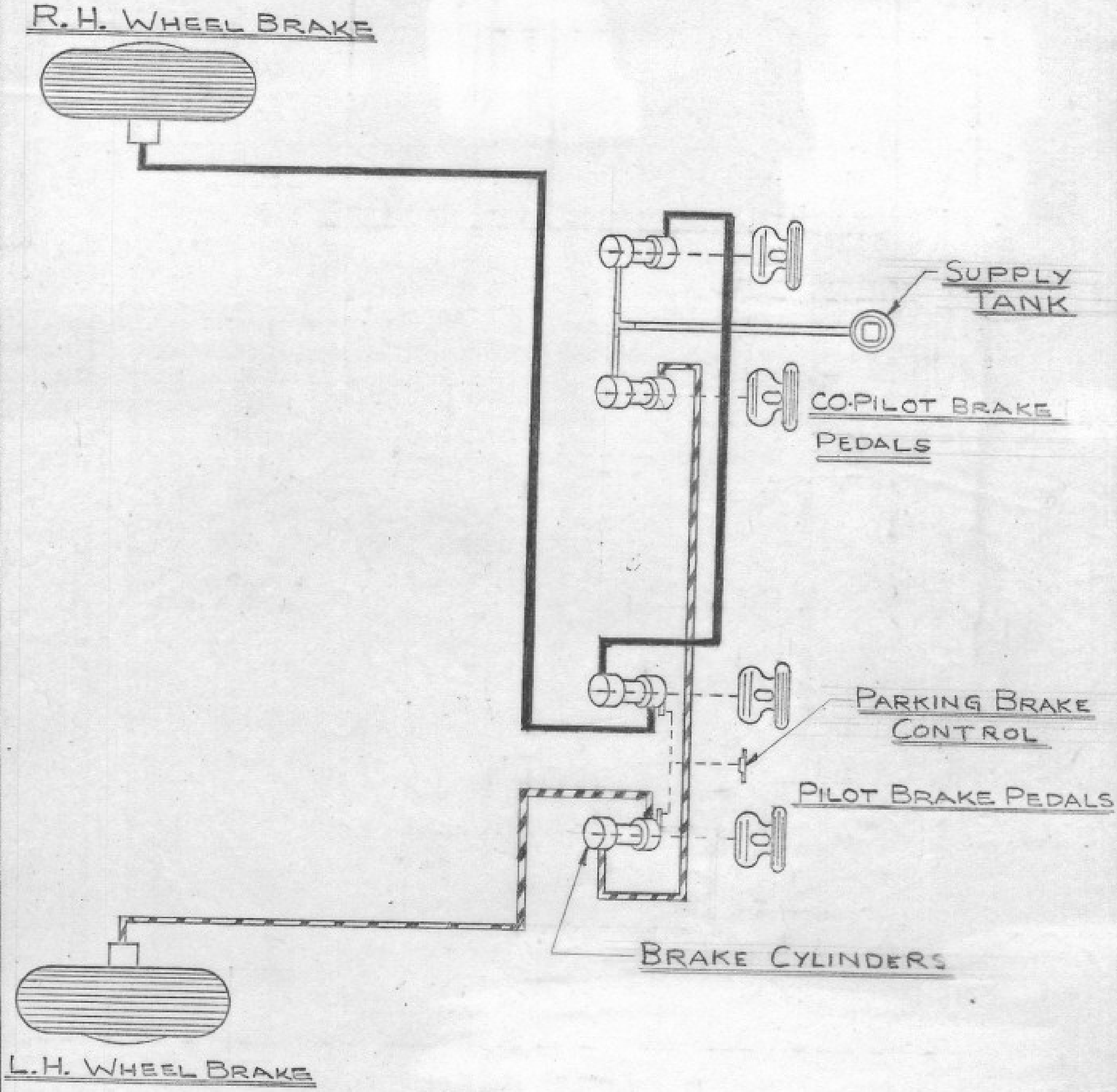
2. Tire Pressures: Main Tires - 800 x 6 - 28 psi - Goodyear Fixed Wheel
   Main Tires - 650 x 8 - 28 psi - Goodyear Cross Wind Wheel
   Main Tires - 800 x 6 - 35 psi - Cleveland Fixed Wheel
   Tail Tire - 10:00 - 55 psi - Goodyear Tail Wheel

* Dual brakes are optional equipment.

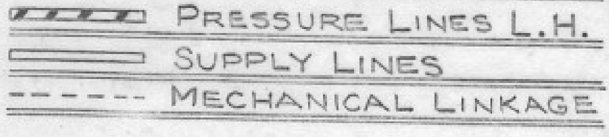


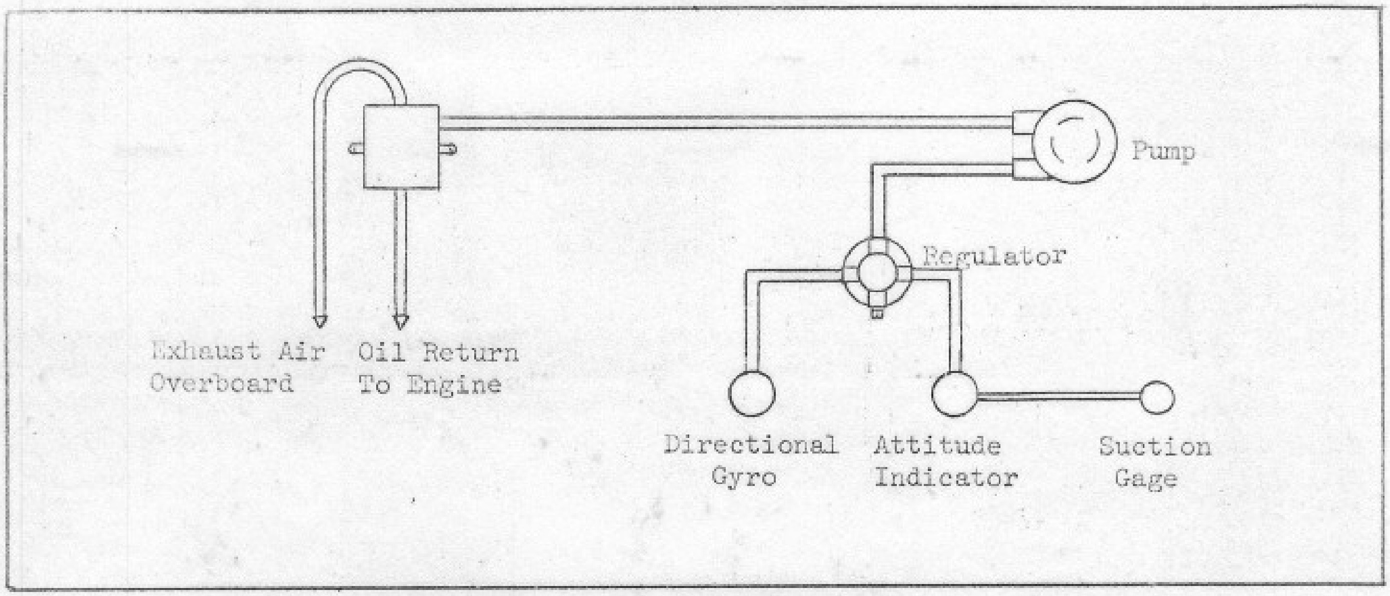
Single Brake Schematic

Pressure Lines R.H.
Pressure Lines L.H.
Supply Lines
Mechanical Linkage

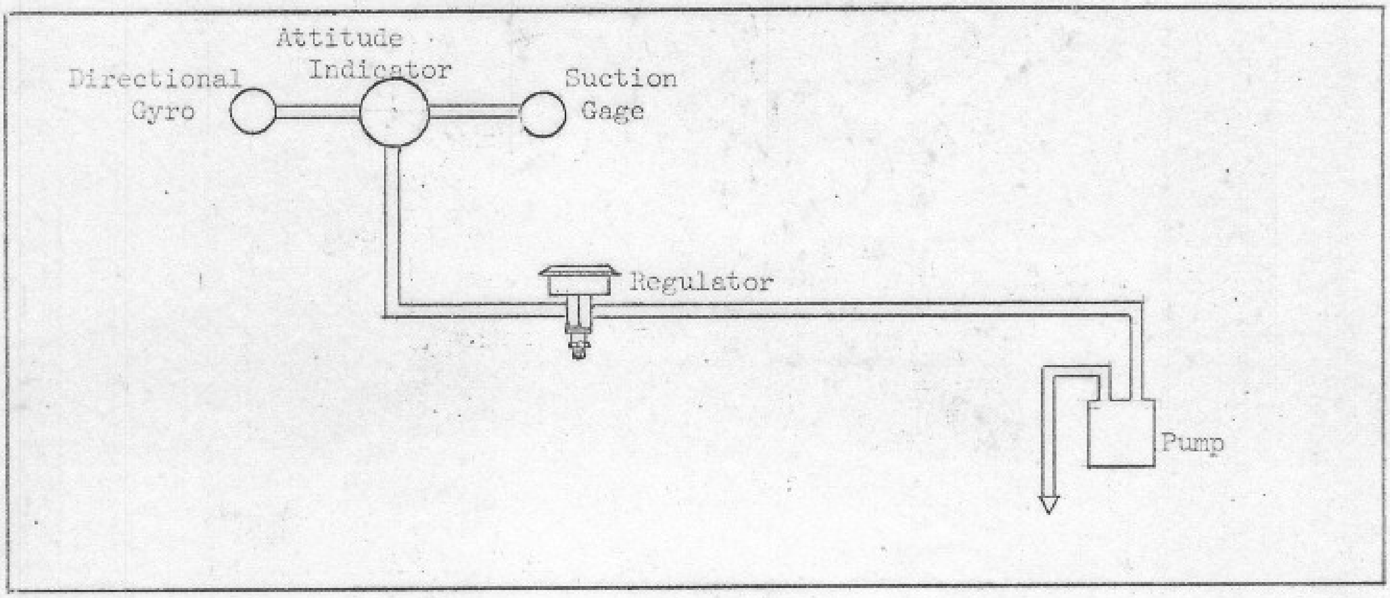


DUAL BRAKE SCHEMATIC

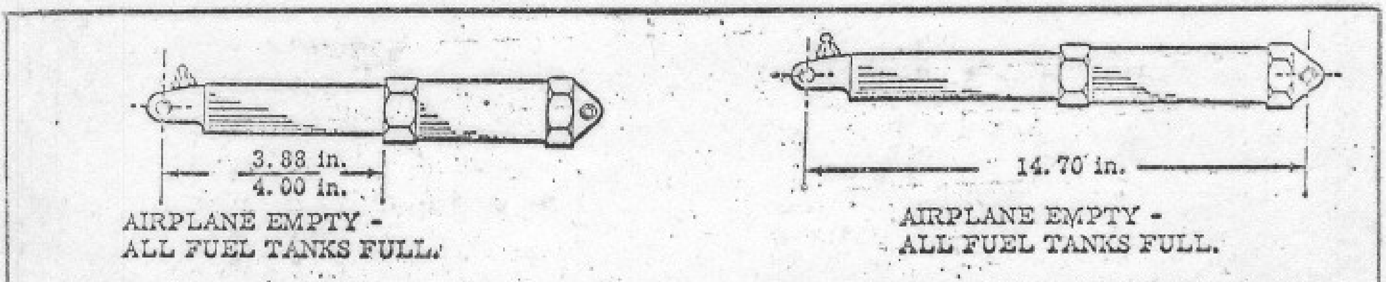




Wet Pump Vacuum System
Effective A/C 2501-2514, 2516-2521.

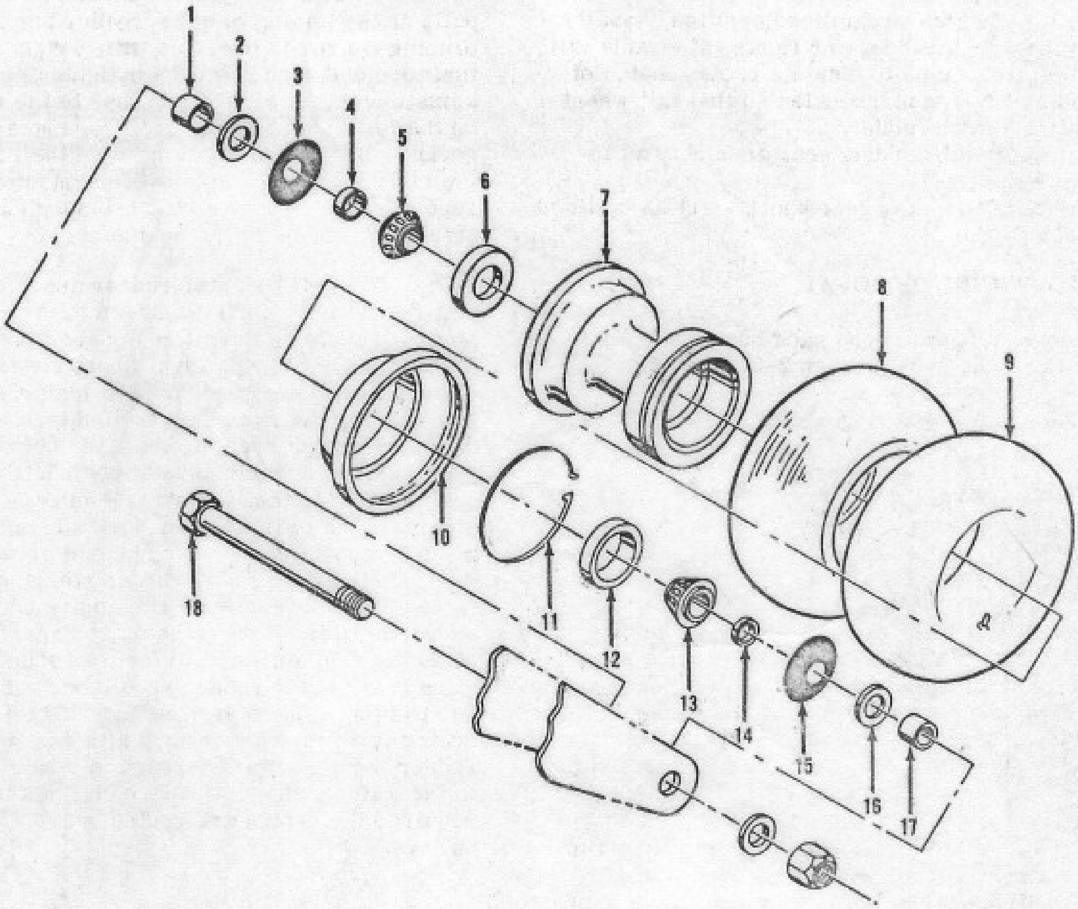


Dry Pump Vacuum System
Effective A/C 2515, 2522. and on



SHOCK STRUT - MAIN LANDING GEAR.

SHOCK STRUT - TAIL WHEEL LANDING GEAR



1. SPACER
2. WASHER
3. DUST SEAL
4. SPACER
5. BEARING CONE
6. CUP
7. WHEEL SUBASSEMBLY
8. TIRE
9. TUBE
10. FLANGE
11. FLANGE RETAINING RING
12. BEARING CUP
13. BEARING CONE
14. SPACER
15. DUST SEAL
16. WASHER
17. SPACER
18. BOLT

Tail Landing Gear Wheel Assembly

7b

I. PITOT STATIC SYSTEM

On aircraft prior to Serial #1400 the pitot head of the airspeed system is located on the wing; the static vents are located on each side of the fuselage about two feet aft of the circular window. The static vents must be kept clean. Erratic operation of the airspeed indicator occasionally occurs. It is usually due to water in the static line. It is easily corrected by removal of the static line at the instruments and blowing air through the system.

On the 1400 Series airplanes, the pressure and static parts are located in the left wing boom. An auxiliary static source valve is available as optional equipment, and when installed is located overhead to the left of the trim tab indicator.

NOTE: A heated pitot head is available as extra equipment.

SECTION IV - MISCELLANEOUS PROVISIONS

A. AIRPLANE TIE DOWN

One tie down ring is provided on each wing panel. The aft end of the fuselage should be secured by tying down the tailwheel.

When tying down, leave tailwheel in fore and aft position.

Use at least a 5/8 inch manila rope.

If control locks are used on the control surfaces, be sure that they are conspicuous to the pilot on his ground check.

Flaps must be in the full up position.

B. PARKING

The parking brake control is operated in conjunction with the toe brakes. To operate, press the toe brakes to the desired pressure, then pull out the parking brake control located ON THE INSTRUMENT PANEL. Release toe brakes.

To release the parking brake, depress toe brakes and hold until pushing the parking brake control all the way in.

Note: Avoid heavy pulling forces on parking brake handle; the cable merely actuates a small lock, a mechanical mechanism, on the master brake cylinder.

C. TOWING

The airplane may be towed with use of a long rope tied around each axle. A tow-bar that attaches to the tailwheel axle is available as optional equipment.

CAUTION: When towing, the tailwheel must be unlocked when tailwheel lock is installed.

D. LIFTING AND JACKING

The airplane may be jacked on the main wheel axles and lifted on the fuselage just forward of the tail surfaces with the aid of a rod put through the hole covered with snap type covers one inch in diameter and/or if ground handling bars are installed, a sling could be adapted for same.

In addition, when the upper portion of the engine cowling is removed, ropes (or wire) may be passed around the tube cluster of the engine mount at the firewall in order to hoist the airplane.

E. AIRPLANE LEVELING

Means for leveling the airplane are provided at the lower sill of the rear door frame. Two AN-4 bolts may be inserted in the two sockets provided, and a straight edge and/or levelset across both bolts in a fore and aft position.

F. <u>HEAT TREATED STEEL PARTS</u>

The following steel parts of the H-295 are heat treated. Re-welding of welded heat treated parts is not recommended by the factory.

1. Main Spar Carrythru Assembly over fuselage, 391-030-401-30

2. Main Landing Gear Leg Assembly, 250-040-451-50 and -51.

3. Main Landing Gear Pin, 391-040-430-2.

4. Tail Wheel Fork Assembly, 391-040-4111.

5. Tail Wheel "A" Frame Assembly, 391-040-491.

6. Slat Support Tubes, 391-010-431.

7. Flap Tracks, 391-010-414.

8. Lower Main Spar (Front) Attaching Fittings, 391-010-443.

9. Flap Hinge Bearing Housing, 391-011-401-2.

10. Upper Wing Fitting Thrust Washers, HS-15.

11. Upper Wing Fitting Barrel Nut, 391-010-447.

TORQUE CHECK SHEET

Item & Bolt Callout	No. of Places	Torque Value (in pounds)
Carry Thru - Main		
AN-178-31A	4	480 - 520
AN-179-27A	2	800 - 1000
Carry Thru to Fuselage		
NAS-144-28	1	50 - 70
NAS-147-45	2	850 - 920
Fuselage to Tail Cone		
Top - AN 6 H20A	2	220 - 240
Btm - AN 6-25	2	220 - 240
Engine to Motor Mount		
AN-7	4	350 - 450
Motor Mount to Fuselage		
Top - AN7-34	2	500 - 600
Saddle - AN 7-24	1	500 - 600
Saddle to Fuselage		
Ends AN5-13	2	180 - 225
Center AN5-30	1	180 - 225
Fin to Tail Cone		
AN 175-7A	2	100 - 140
Fin to Rear Fitting		
AN 174-5A	1	50 - 70
Stabilator to Fin		
AN 174-11A	2	50 - 70
Tail Wheel "A" Frame to Fuselage		
AN5-25	2	120 - 150
Wing Spar Fittings		
Top Vertical-AN 525-4	18	50 - 70
Btm Vertical-AN 525-4	14	50 - 70
-AN 525-3	4	20 - 25
Slat to Tomahawks		
AN 502 416-14	8	60 - 80
Wing to Fuselage		
Top - NAS 150-DH28	2	2700 - 2900
Btm - 391-010-434-2	2	1300 - 1800
Rear - AN 178-12A	2	480 - 680
Stabilator Hinge		
AN 4-5A	8	50 - 70

TORQUE CHECK SHEET (Cont'd)

Item and Bolt Callout	No. of Places	Torque Value in pounds
Fin & Stabilator Attach Hinge AN 4-7A	8	50 - 70
Fin and Rudder Attach Hinges	4	20 - 25
Propeller Hub Nut	1	450 Ft. Lbs.

...V - WEIGHT AND BALANCE

A. WEIGHING INSTRUCTIONS TO DETERMINE EMPTY WEIGHT

1. Drain oil from engine with the airplane in a 3-point att
2. Drain all fuel from both wing tanks. The empty weight sh include unusable fuel. Therefore, after draining tanks, 2.5 gallons.
3. Forward weighing points are the main wheels.
4. Aft weighing point is the lift tube or the tailwheel, whic is most convenient to use, depending on the weighing equip
5. Level airplane, using leveling lugs.
6. Refer to Section IV for jacking instructions.

B. DETERMINATION OF EMPTY WEIGHT C.G. LOCATION

Measure distance D_1 or D_2 (depending on aft weighing point used) distance "A" along ground line with the aid of a plumb bob. (Ref diagram below).

$$C.G. = \frac{D \times W_t}{W_W} = Y \text{ inches aft of main wheels}$$

A = Distance along ground between wing leading edge (slats clos and main wheels.

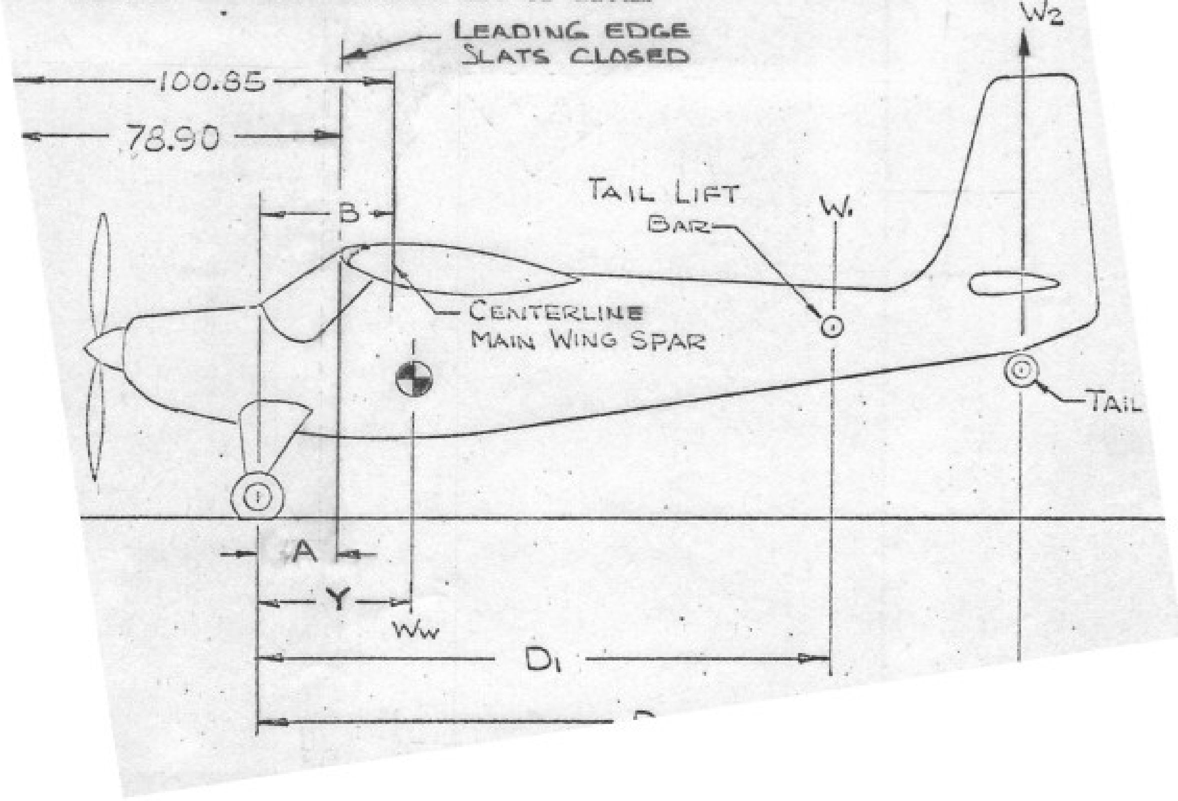
B = Distance along ground between main wheels and centerline ma spar.

D = Distance between main wheels and aft weighing point. $D = D_1$ lift tube and $D = D_2$ for tailwheel (Ref. diagram below)

W_t = Weight at lift tube or tail wheel. $W_t = W_1$ for lift tube and $W_t = W_2$ for tail wheel (Ref. diagram below)

W_W = Total Weight

...G. = 100.25 - B + Y = Inches aft of datum

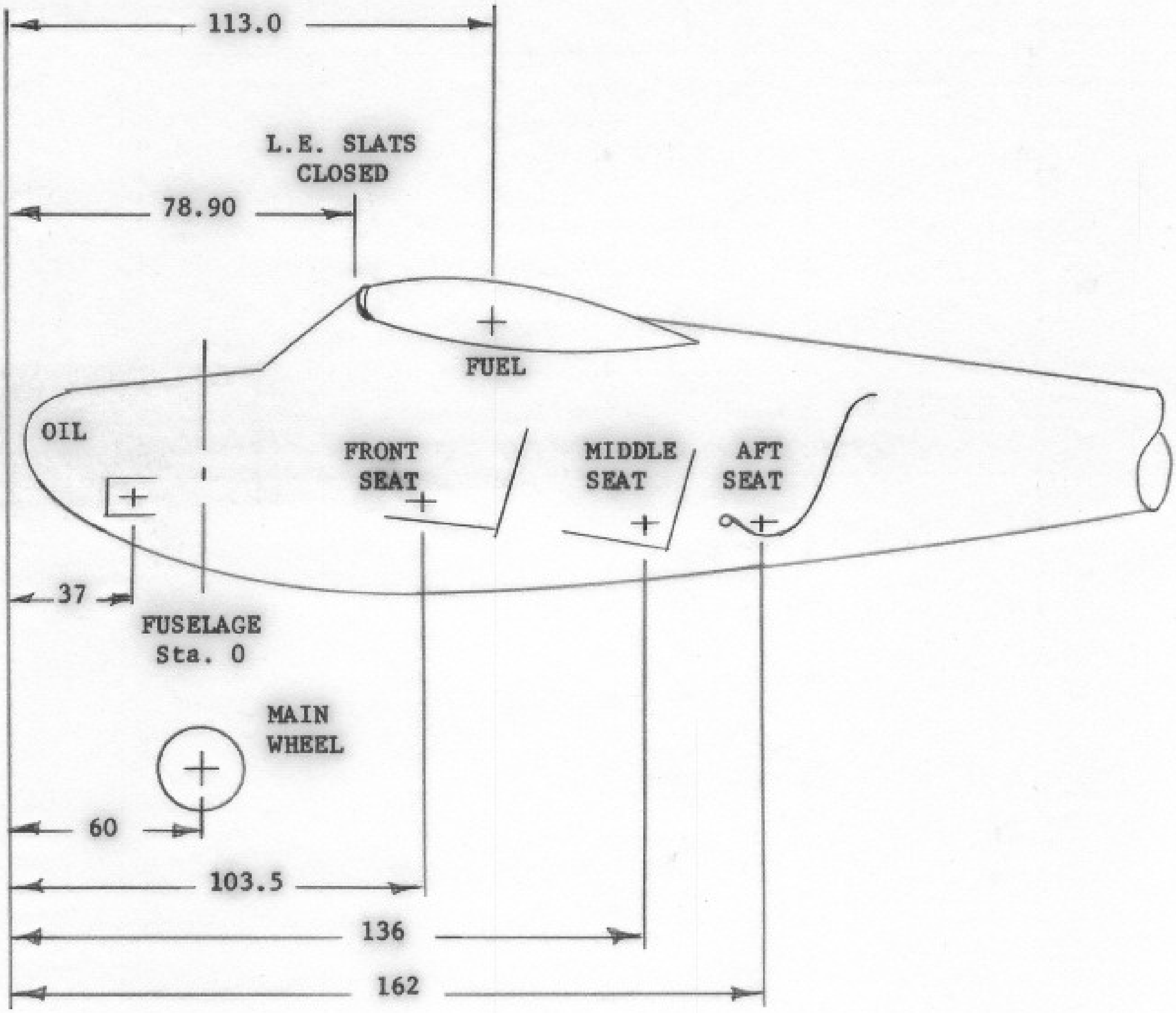


LOADING INSTRUCTIONS

1. The loading diagram with the location of the useful load items is shown below.

2. C.G. range at 2330# is 97" to 110" aft of Datum Line.

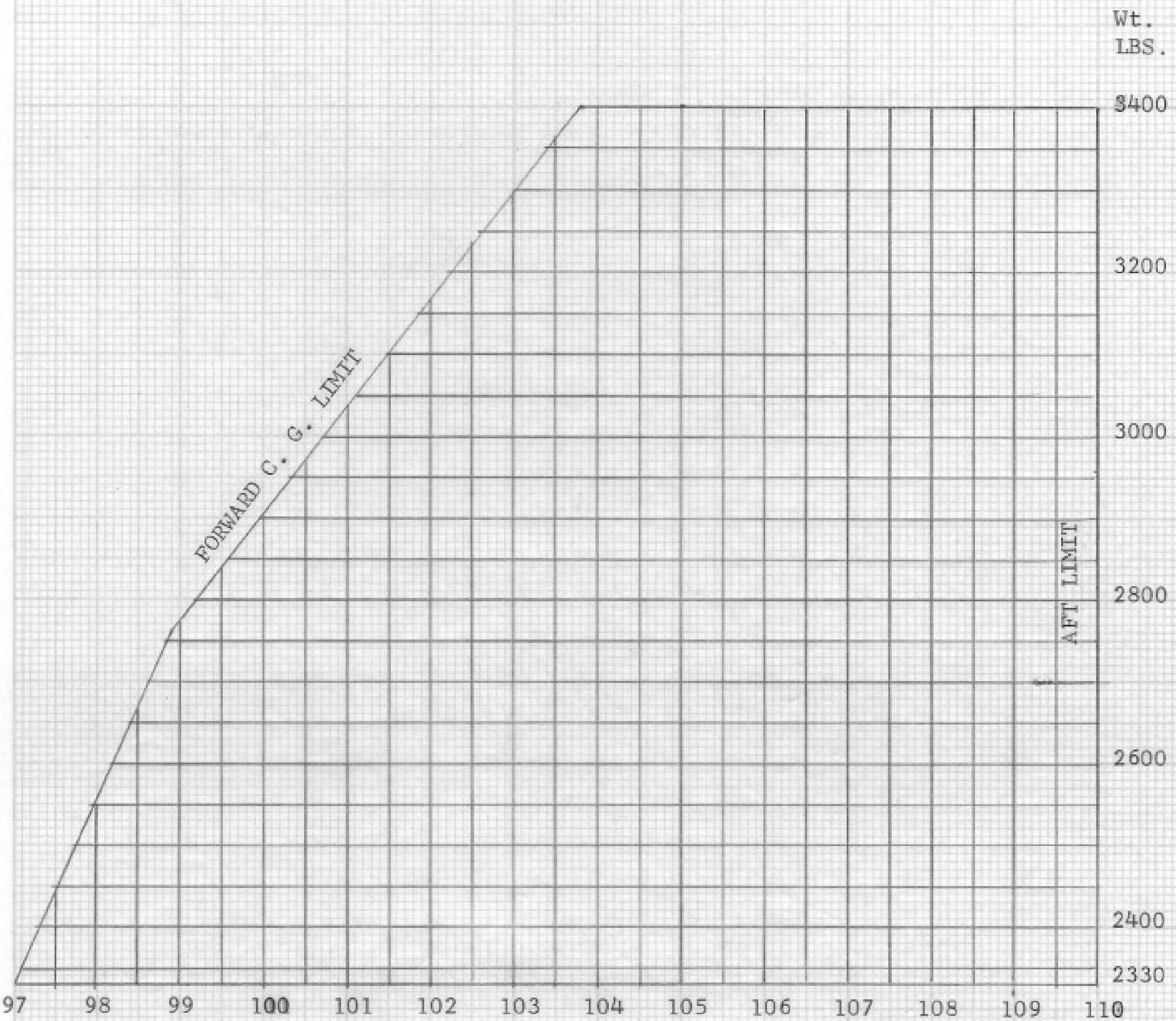
3. C.G. range at 3400# gross weight is 103.8" to 110" aft of Datum Line.



HELIO STOL SUPER COURIER

MODEL H-295

C. G. - WEIGHT ENVELOPE

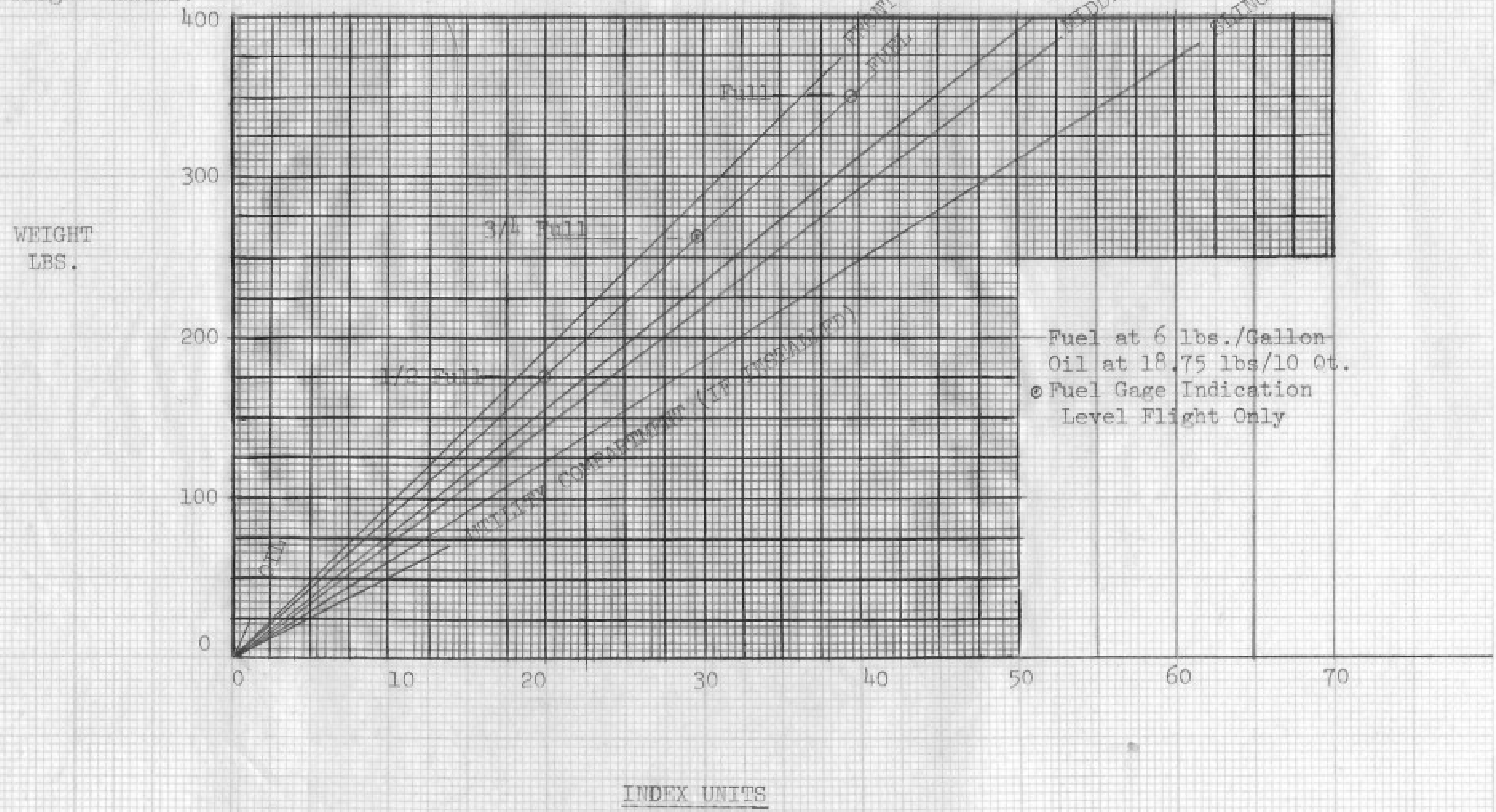


INCHES AFT OF DATUM

HELIO STOL SUPER COURIER
MODEL H-295
LOADING GRAPH

FIG. 7.1

PROCEDURE:
1. Find total index units for all useful load items.
2. Add index units for empty weight.
3. Enter Fig. 7.2 to determine allowable limit on Wt. & C.G.
4. See example in FAA approved flight manual.



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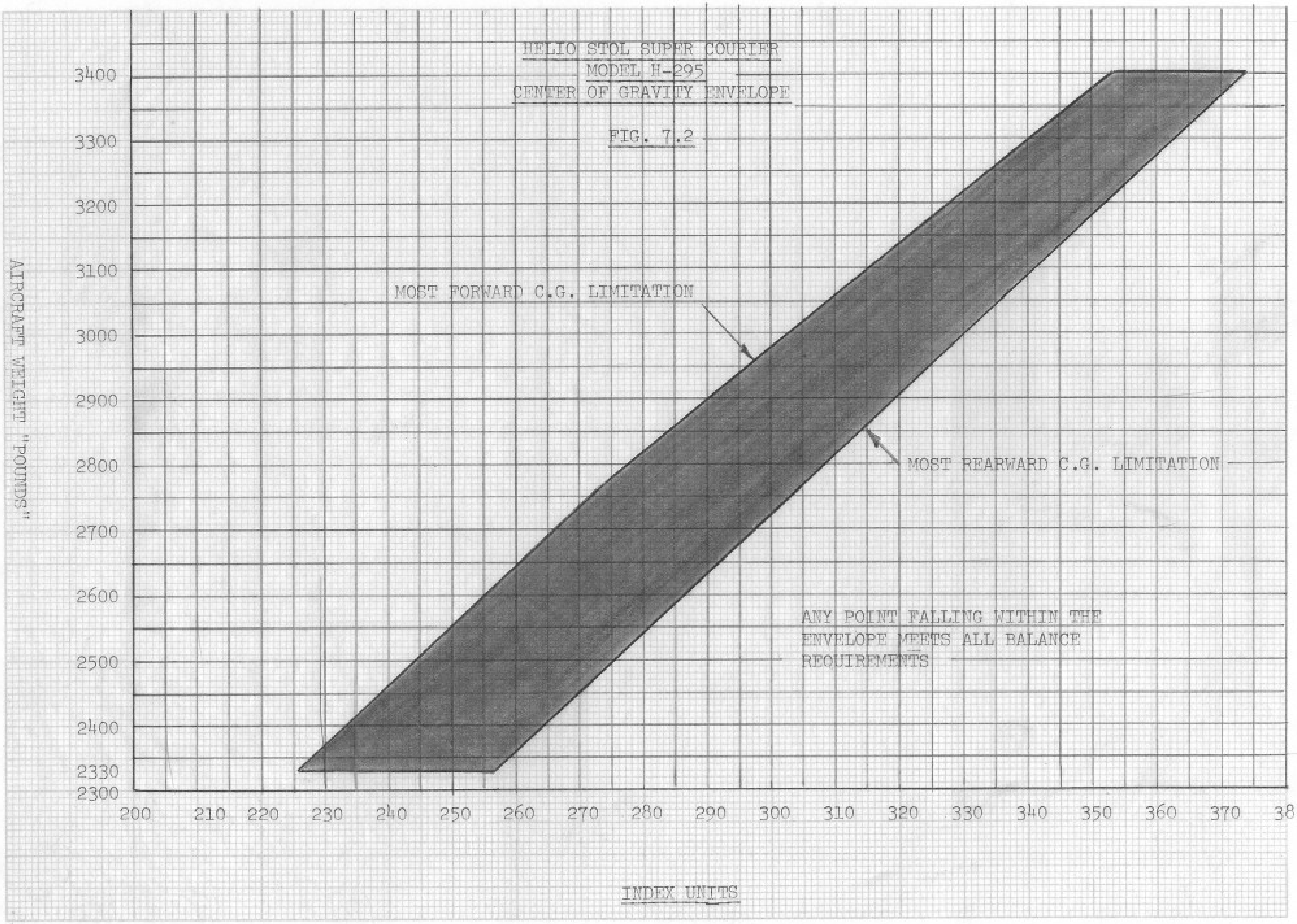


HELIO STOL SUPER COURIER
MODEL H-295
CENTER OF GRAVITY ENVELOPE

FIG. 7.2

SECTION VI - INSPECTION GUIDE - 100 HOUR INSPECTION

SECTION 1 - WINGS

1. Remove all cover plates on bottom of wings.
2. Remove wing butt gap covers; check fuel line between butt & top deck rib.
3. Check spar fittings and carrythru and fittings for elongation, distortion, cracks or corrosion.
4. Check top, bottom and rear attachment bolts for tightness.
5. Check for any play between fittings by having a helper move wing tips up and down and feeling between fittings.
6. Inspect all internal wing structure for cracking, distortion or corrosion.
7. Check actuation of slat gear, torque tube and play, roll pin tightness through torque tube and slat levers, safetying of slat support tube rollers, slat lever bumpers and link bolts.
8. Check tightness of attaching screws retaining slats to support tubes. ("Tomahawks").
9. If "tomahawks" show any rust, wipe off with a cleaning fluid -- do not oil surface.
10. Slats should operate with the slightest of help.
11. Check clearance between slat lever arms and aileron cables; slats in full "out" position.
12. Check actuation and condition of flap gear.
13. Check flap operating lever clearances with slat torque tubes.
14. Check lock nuts on all push pull tube ends.
15. Check "flap track" attachments to ribs.
16. Check safety and condition of flap bearing retainer bolts.
17. With flaps in full up position, exerting an up and down pressure on trailing edge, there should be NO play.
18. Check that travel between Right and Left flaps is coordinated and hitting ends of track travel together.
19. In cabin, remove overhead cover (over pilot's head) and check flap jack screws for bends or binding.
20. Check condition of universals and safetying of universals to jack screws and mechanism drive shaft.
21. Check both flap actuator shafts for end play; there should be no play.

SECTION 1 - WINGS (Cont'd)

22. Check flap actuator assembly for side play; check bracket and braces for condition and tightness of attachment to carrythru.

23. Check the carrythru structure for distortion, cracks and corrosion.

24. Check the attachment of carrythru to fuselage (3 places) by having a helper move the wing tips up and down, and feel between bushing attach points. Check tightness of bolts.

25. Check condition and operation of trim tab controls, pulleys and cable runs. Check condition and operation of trim tab indicator and wire.

26. Check safetying of aileron balance cable turnbuckle. Check aileron cross-over pulleys and fairlead.

27. Check aileron cables condition and routing through wing butt and entire span of wing to bellcranks. Check cable tension. Check safety of turnbuckles.

28. Check installation of aileron push pull tube and tightness of end lock nut.

29. Check condition at aileron of push pull attach bolt and condition of doubler plates and hole in aileron center ribs.

30. Check that aileron hinge bolts do not rotate.

31. Check that there are two washers each side between aileron and wing attach points and that there is clearance.

32. Check condition of aileron fabric covering and check attachment of balance weights in leading edge.

33. Check condition and attachment of arms to interceptor blades and torque tubes.

34. Check torque tube for end play.

35. Check blade clearance with wing slots.

36. Check condition and bolting of actuating arm and push pull tube.

37. Check condition of pitot tube and attachment.

38. Check navigation lights and wiring.

39. Check condition and attachment of tips.

40. Check overall external surfaces of wing for signs of cracking, wrinkling or deep canning.

41. Check fuel tank strainers, through hand holes on the lower surfaces of the wing aft of the rear spars right next to the root ribs.

42. Check condition and attachment of aileron bellcrank.

43. Check all castings and fittings for cracks and corrosion.

SECTION 2 - FUSELAGE CABIN

1. Check step for security.

2. Check pilot's window latch and door latch.

3. Check rear door latch and/or if installed litter door lock bolts/pins.

4. Check both door top leading edge latches for proper operation.

5. Check particularly around the window area of the plastic door frame shell for any signs of cracking or separation of the laminate or the laminate to the sheet metal skin.

6. Check condition of seat belts and retainer bolts.

7. Check seat security and condition of covering.

8. Check over entire inside trim for security and cleanliness.

9. Open headliner (zipper) or remove if not equipped with zipper; check fuel lines for leaks or abrasions, and for security.

10. Check fuel tank cross vent line for low spot (a low spot could house fuel and prevent a tank from feeding).

11. Check trim tab cables and fairleads; check that overhead insulation is secure and away from cable runs.

12. Check security of antenna and navigation light wires.

13. Remove kickpans each side of rudder pedals; turn back carpet and remove front floorboards.

14. Check lower control yoke attach bolts. Check yoke for full travel. Check location and condition of forward control yoke <u>secondary</u> stop (fwd. of instrument panel). Check for clearance with flexible cable controls running forward from instrument panel.

15. Check safety of bolts attaching sprockets and universals to yoke bearings.

16. Check tightness and travel of chain between sprockets.

17. Check safety of chain ends to links. Check four hole link for bend.

18. Check attachment of control wheels to shafts and shafts to universals.

19. Check trunion bracket attachments, adjustment screws and nuts. There should be no binding or stiffness in this system.

20. Check condition of rudder pedals and tightness of bolts retaining them in control tubes.

21. Check rudder pedal assembly and support bearings. Check carefully for cracks in bearings.

22. There are 15 pulleys behind or below instrument panel; check their attachments.

SECTION 2 - FUSELAGE CABIN (Cont'd)

23. Make a thorough inspection of all control cables, especially of aileron cables at double pulley points located at bottom outboard ends of the instrument panel. Also where rudder cables make bend around first pulley under the floor boards beneath pilot's seat.

    All cables should be thoroughly greased with heavy duty grease where they ride over the pulleys in order to reduce the possibility of fraying. If frayed, check CAM 18 for requirements for replacements.

24. Check that brakes are "high". Check condition and attachment of master cylinders.

25. Check hydraulic lines and fittings.

26. Grease rudder pedal assembly.

27. Check fuel line right side.

28. Check all tubular structure in this area, particularly lower longerons near forward and aft landing gear attachments.

29. Check back of control panel for security of locknuts on controls and check tube connections on primer.

30. Check all instruments are secure and that tube connections are good.

31. Check all electrical terminals for security, wiring security, chafing or indications of shorting.

32. Check instrument faces for rotation mis-alignment. (Alignment of white dot on glass and case).

33. Check security of radio gear.

34. Reinstall floor boards, carpet and side panels.

35. Check condition of pedal boots (No holes).

36. Outside A/C right side for fuel leak indicated at drain hole at rear corner of gascolator box.

37. Check, and if necessary, clean gascolator.

38. Check security and condition of all windows and windshield.

39. Check attachment of antennas to top overhead cabin skin.

SECTION 3 - TAILCONE

1. Remove bulkhead back of rear seat.

2. Check four tie-in bolts, cone to steel tube structure, for torque and re-safety bolts.

3. Check overall conditions of skin, formers and stringers, <u>particularly the aft 3 formers</u> of tailcone.

4. Check condition of all pulleys, fairleads and attachment brackets and safetying of bolts.

5. Check rudder, stabilator and trim tab cables and their runs. Check cables at stabilator sector groove to see that they do not rub side to side in operation. Check that bushing spacers are used at cable attachments to sector.

6. Check all cable tensions (35 to 40 lbs) and safety turnbuckles.

7. Check condition and run of trim tab indicator wire.

8. Check trim tab cable run, operation of drive barrel, and attachment of flexible push-pull trim tab control. Check attachment of barrel brackets. Check attachment of trim tab indicator wire.

9. Check tail gear "A" frame attachment fittings.

10. Check radio power pack installation.

11. Check belly of cone for dents or deep scratches.

12. Check entire cone skin for cans, wrinkles or cracks.

13. On aircraft prior to Serial #1400 remove battery. Check condition of battery and water level. Check box and drain for excess corrosion and condition of insulators and grommets. Check platform, brace and hold-down bolts. On installation, do not forget to reinstall drain. Check condition of positive and ground cables and the attachment of them.

SECTION 4 - EMPENNAGE

1. Remove plastic forward and metal side fin fairings.

2. Check 2 bolts attaching front spar of fin to tailcone; check attachment and condition of fittings.

3. Check rear fin spar attach bolt and fittings.

4. Check 8 bolts attaching stabilator hinge fittings to fin front spar. Check condition of fittings for cracks.

5. Check two "close tolerance" AN pivot bolts attaching stabilator to fin. There should be no play between bolts and fittings and bearings. The bolts should be tight enough to bind outer hinge fittings to inner race of bearings.

6. Check condition of stabilator box spar splice and attachment of sector horn; check bolt tightness. Check leading edge rivets attaching balance weights for looseness.

7. Check 3 hinge bolts attaching rudder to fin and rudder to tailcone. Check for proper spacer washers and adequate clearance between rudder to fin and tailcone brackets.

8. Check attachment and condition of phenolic rudder and stabilator stops.

9. Check rudder leading edge clearance to fin skins and fairings.

10. Check trim tab and anti-balance tab to stabilator hinge points. Check for clearance between tab leading edge skins and stabilator skins.

11. Check attachment of actuating arm to tabs. Check anti-balance arm for slot wear and clearance to fin fairing. Check for bolt hole elongation in trim tab actuating arm.

12. Check trim tab push-pull control for slippage at clamp on stabilator butt rib.

13. Check lock nut on control fork end of trim tab push-pull control.

14. Check "free play" of both tabs. The free play should not exceed 1/8 inches overall as measured at the trailing edge of the tab. Only sufficient pressure should be used to take out slack.

15. Check routing of navigation wire and tail light condition.

16. Check rudder cables to rudder horn attach bolts for wear and safetying. Check for elongation of horn bolt holes.

SECTION 5 - TAIL GEAR

1. Remove inspection cover left side. Remove tail gear boot. Repair or replace if worn through.

2. Check two pivot bolts attaching "A" frame to tail cone fittings. Remove "A" frame pivot bushings; clean and grease. Bolts should be tight, binding inner bushings to tailcone bushings.

3. Check safety of shock strut attach bolts. Check for bolt wear, elongation in upper and lower attach brackets and upper bushings.

4. Check attachment and general area of upper tail shock strut attach brackets.

5. Check shock strut inflation (See placard on inspection cover). If there are signs of excess leakage, check fluid level.

6. Repack tail wheel bearings.

7. Check tightness and safety of axle bolt - no side play in wheel.

8. Check tire condition and inflation - 55 lbs.

SECTION 6-MAIN LANDING GEAR AND WHEELS

1. Remove gear fairing and root fillets. Remove lower engine cowl.

2. Visually inspect entire landing gear assembly for cracks (clean up any corrosion).

3. Check forward main leg attachment pins; there should be no space between main pivot bushing and engine mount and fuselage attach bushings. Check safety of pivot pin retainer bolts.

4. Check condition and safety of rear pivot bolt - grease through Zerk fittings.

5. Check condition and safety of upper and lower shock strut attach bolts.

6. Check shock strut inflation (see placard on firewall). If there are signs of excess leakage, check fluid level.

7. Check wheel axle installations for looseness. Check tightness of retainer bolts.

8. Check hydraulic brake lines for wear at fairing and through fuselage grommets. Check universal fittings and line connections at wheel cylinders.

9. Check tires for wear and cuts; check inflation, Goodyear 28 lbs., Cleveland 35 lbs.

10. Check condition of brake linings, discs or drums.

11. Check condition of wheels; remove cover and torque wheel half bolts to 120 in/lbs.

(See Goodyear Operation and Service Manuals; Cross-wind Landing Wheels and Single Disc Brakes; and Wheels for Light Airplanes for more detailed information.)

SECTION 7 - ENGINE COMPARTMENT

1. Check tightness and safety of engine mount top bolts. Check lower pins (See Sec. 6, Item 3). Check two center attach bolts to mounting spacer block. Check three bolts attaching center mounting block to fuselage center tube.

2. Check condition of mount tubes for bends, cracks or corrosion. Remove diagonal tube lagging; check for or clean away corrosion, if any, and re-lag.

3. Check condition of cowl flap torque tube plain bearings and actuating arms.

4. Check condition of "sandwich mount" rubber for excess cracking or sagging.

5. Retorque (400 to 450 in/lbs) and safety 4 engine-to-mount attach bolts.

6. Check condition of oil coller clamps and brace; check hose connections, clamps and condition of lines.

7. Check exhaust stacks and brace for cracks and 3 lower exhaust clamp bolts. Check flange gaskets and nuts. Remove heater muff wrap - check for cracks and loose baffles (every 25 hours). Check condition and securing of heater flex lines. Check support tubes, ball joint and slip joint clamps and bolts.

8. Check tightness and safety of screws attaching carburetor air box to carburetor. Check condition of box and box drain, carburetor heat valve.

9. Check security and condition of engine baffling, magnetos, generator and rubber seal along top of baffles.

10. Check the attachment of the vacuum pump separator, drain lines and clamps.

11. Check that the starter and master solenoid and generator control box are mounted securely.

12. Check the mounting of the auxiliary fuel pump and check through <u>all</u> fuel lines and fittings to and from carburetor and fuel pumps.

13. Check the operation of cabin cold and hot air valves and controls.

14. Check all lines, controls, fittings and grommets at the firewall.

15. Check attachments of all electrical wiring and the condition of insulation.

16. Check ease of operation, stops and attachments of all engine controls, throttle, mixture, carburetor heat, cowl flap, prop governor control and parking brake control.

17. Remove, clean and oil carburetor Air Maze Filter (located in forward section of lower nose cowl). Blow dust out from aft side with compressed air, wash with solvent and re-install. When operating in extremely dusty conditions, clean at least every 20 hours. If a spare filter is available, dip in light oil (SAE # 10 or equivalent) and hang up to drip for at least 48 hours before re-installing.

18. On aircraft serial #1400 and on remove battery. Check condition of battery and water level. Check box and drain for excess corrosion and condition of insulators and grommets. Check platform, brace and hold-down bolts. On installation, do not forget to reinstall drain. Check condition of positive and ground cables and the attachment of them.

SECTION 8 - COWLING

1. Check condition of cowling and landing gear fairings. Inspect cowl stiffeners and hinges for cracks and looseness of rivets at ends. Repair dents, cracks and elongated holes.

2. Check condition of protection chafe strips around cowl opening.

3. Check condition and attachment of cowl flaps, spreader and actuating rods.

4. Check rivet tightness attaching cowl flap hinges for excessive wear between hinge and hinge pin.

5. After completing 100 hour engine inspection according to Lycoming Operator's Manual, reinstall cowl and gear fairings, making double check on all retainer screws with washers.

6. Check back over the engine compartment, Section 7, and hook up the cowl flap control rods. Recheck the cabin heat and cold air flex tubes to be sure that they were not disturbed in re-installing cowling. Check that engine breather, carburetor air box, vacuum system, auxiliary and engine fuel pump drains are through their grommets and fastened securely at all attachment points.

SECTION 9 - PROPELLER

1. A. Check condition of spinner and spinner attachement bulkhead.
   B. Check for loose rivets between web of spinner bulkhead and bulkhead boss by pushing up and down on spinner.
   C. Remove spinner from adaptor and check for cracks around rivets.
   D. Check for loose bolts that secure spinner bulkhead to engine.

2. A. Check tightness of low pitch stop nuts.
   B. Check tightness of high pitch screws.
   C. Check blade pitch section against high and low stops.

3. Check hub bolt tightness to blade.

4. Check security of balance weights.

5. Grease Zerk fittings equal amounts of lubriplate 630AA.

6. Reinstall spinner, check screw tightness and check clearance of spinner to nose bowl opening.

7. Dress out blade nicks.

8. Check out prop during engine run-up (See section 3, item G).

LONG RANGE MAINTENANCE RECOMMENDATIONS

1. Attachment Bolt Assemblies and Attachment Fitting Assemblies

   A. Visually inspect every 500 hours and replace if necessary.
      Note: It is not necessary or recommended to remove bolts or assemblies for detailed inspection unless there is evidence of looseness, distortion, corrosion, etc. (Also see note under 12 below).

      1. Attach bolts of tailcone to cabin.
      2. Engine attach bolts - replace at normal engine change or 1000 - 1200 hours.
      3. Main landing gear shock strut bolts (Upper and lower) - Replace at normal engine change or 1000 - 1200 hours.
      4. Engine mount attach bolts - replace at normal engine change or 1000 - 1200 hours.
      5. Bottom front and rear spar wing attach bolts.
      6. Top main spar wing attach bolts - replace at 1000 - 1200 hours.
      7. Fin, Rudder and stabilator attach bolts.
      8. Main landing gear pivot pins (-430) - replace at 1000 - 1200 hours.
      9. Main wheels and tail wheel assemblies.
      10. Tail gear and tail shock strut attach bolts - replace bolts and lubricate forward "A" frame bushings if not accomplished at previous 100 hour periodic inspection or annual inspection.
      11. Aileron and flap attach bolts.
      12. Carry through to fuselage.

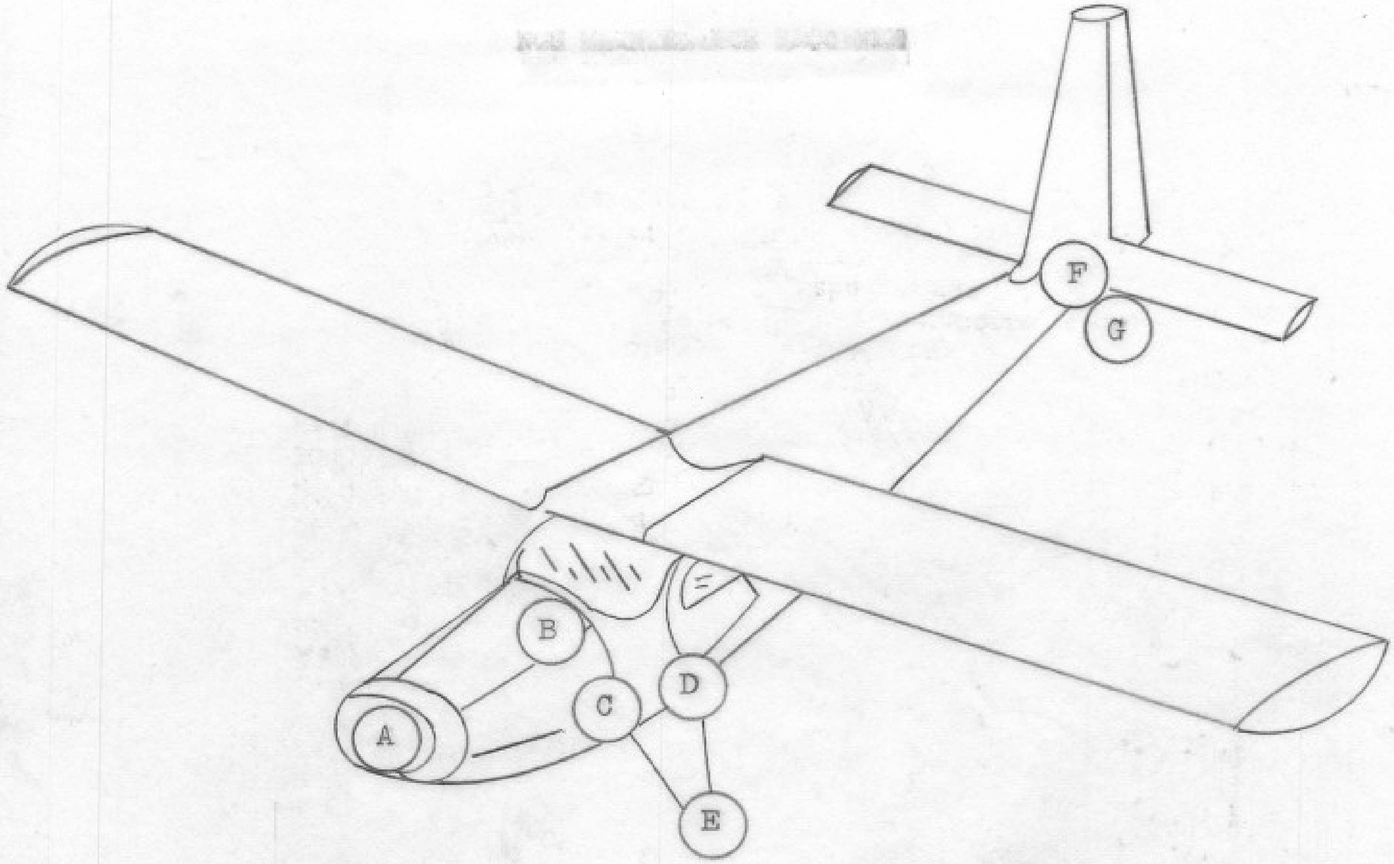
      Note: In the event aircraft has been subjected to crash damage, extremely hard landings, or severe turbulance where skin wrinkling, buckling or other deformation is evident, then all of the above bolts should be removed, inspected, magnafluxed or replaced.

   B. Replace brushes when 50% wear is evidenced on:

      1. Starter
      2. Generator
      3. Aux. fuel pump (where applicable H-295 models)

   C. Inspect voltage regulator for burned points at 500 hours (by qualified personnel only) otherwise best left undisturbed.

2. No detailed inspection of main or aux. fuel cells is necessary unless there is evidence of leaks. (Discoloration, fumes, etc.)



ZONE	PART	ACCESS	NO. ZERKS	LUBRICANT
A	Propeller Hub	Remove Spinner Dome	4	Lubriplate 630AA Friske Bros; Toledo
B	Rudder Torque Tube Assy.	Remove 391-030-731 Copilot's rudder pedal boot assy & raise floor carpets. If applicable.	2	General Purpose Chassis Lube AN-G-5
C	Main Ldg. Gear Pivot Pin	Raise Cowl doors and remove 395-030-322 ldg. gear boot doubler	2	"
D	Main Ldg. Gear Drag Strut Ftg.	Remove 391-030-528-51 & -52 ldg. gear boot assy	2	"
E.	Goodyear Std. & Crosswind Wheel	Disassemble wheel	-	Long Fiber Wheel Bearing Grease
F	Stabilator Hinge Attach Assy	Remove 391-031-503 Tailcone Fillet	2	General Purpose Chassis Lube AN-G-5
G	Steerable Tail-Wheel (Head Assy)	Remove 391-010-333 Tailwheel Inspection Cover Plate If applicable	2	"

Lubrication Chart