WEATHERLY AIRCRAFT COMPANY

Maintenance Manual

620-B

WEATHERLY AIRCRAFT COMPANY, INC.
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Maintenance Manual

Model: 620-B

-- INTRODUCTION –

This manual presents recommended procedures and information for the operation and general maintenance of the model 620-B aircraft. Much of the material herein may also be used as a reference for earlier models.

Successful operation of the aircraft requires that good maintenance and operational procedures be adhered to on a continuous basis. The 620-B is not a complicated aircraft and much of the required maintenance and operations techniques are of the common sense type. Sometimes however, problems in maintenance and repair may arise which are not covered by the scope of this manual; in this event we invite inquiries to the factory for assistance.

Revision Record List of Effective Pages

Chapter	Page/s	Revision	Date
X: Fuel System Fuel Level Indicator replacement, test for return to service	27a-27j	Rev. 1	3 Aug, 2021
VII: Rudder travel check & adjustment, rudder protractor D&O	15a-15d	Rev. 2	7Aug, 2021

Revision Record Maintenance Manual

Rev. No.	Issue Date	Date Inserted	Inserted By
Rev. 1	27 July, 2021	3 Aug, 2021	JMJ
Rev. 2	2 Aug, 2021	7 Aug, 2021	JMJ

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Weatherly Aircraft Company

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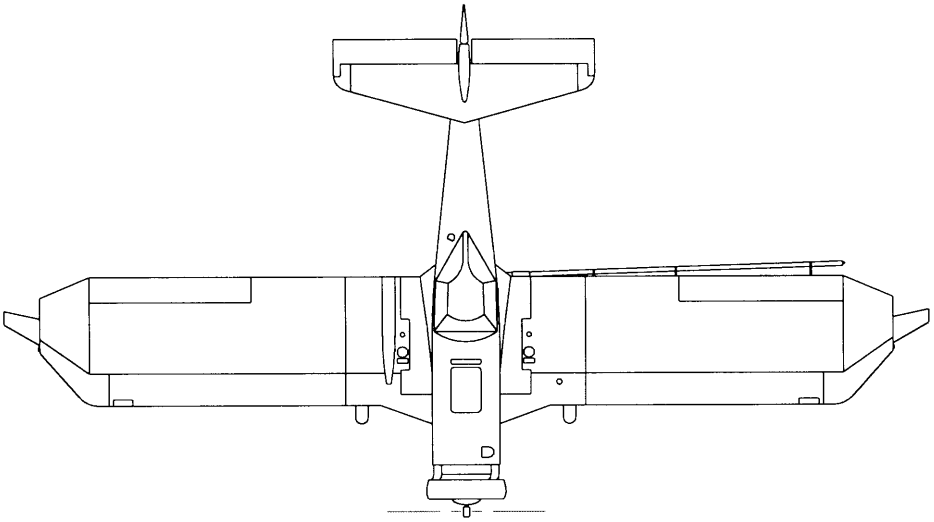

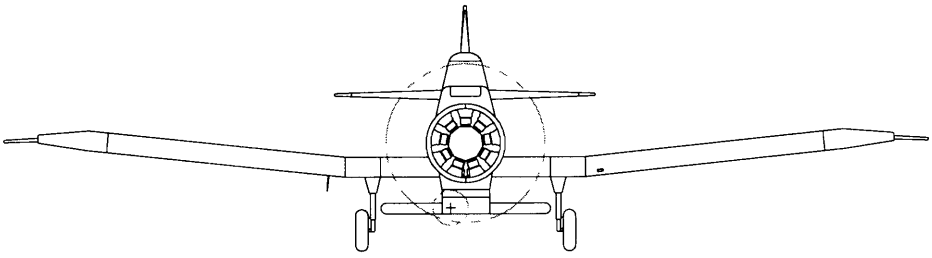

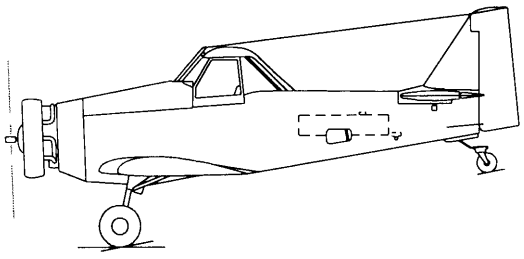

Empty Weight	2,840 lbs (1,288 kg)
Certified Gross Weight	4,000 lbs (1,814.4 kg)
Wing Span	46 ft 8 in (14.22 m)
Length	26 ft 9 in (8.15 m)
Height	8 ft 0 in (2.44 m)
Wing Area	277 sq ft (25.73 sq m)
Main Gear Tread Width	10 ft 6 in (3.2 m)

MODEL 620B

DESIGN SPECIFICATIONS

One place land monoplane
One chemical hopper - 335 gal. (1,266 liter) capacity
Engine Pratt & Whitney R985-AN-1, AN-3, or AN-14B

Fuel Cap. 97.5 gals. total, 90 gals. (340 liter) usable

Length	26 ft. 9 in. (8.10m)
Wing Area	277 sq. ft. (25.73 sq. m)
Wing Airfoil Section	NACA 4215 Modified
Wing Chord	78 in. (1.98 m)
Wing Span	46 ft. 8 in. (14.22 m)
Center Section Incidence	3.0 degrees
Wing Tip Incidence	1.2 degrees
Dihedral Angle	6 degrees
Aileron Area	12.99 sq. ft. (1.20 sq. m)
Aileron Chord	19 in. (.48 m)
Aileron Deflection	+ 11½° - 29°
Horizontal Tail Area	43.3 sq. ft. (4.02 sq. m)
Horizontal Tail Span	156 in. (3.96 m)
Airfoil Section	Symmetrical
Angle of Incidence	- .7
Dihedral Angle	0 degrees
Elevator Deflection	27° Up 15° Down
Vertical Tail Area	17.21 sq. ft. (1.59 sq. m)
Airfoil Section	Symmetrical
Fin Offset	1 degree
Rudder Deflection	20° +/- 1° left & right
Maximum Design Gross Weight	4,000 lbs. (1,814.4 kg)
Wing Loading, (w/ Spreader)	14.4 lbs./sq. ft. (70.30 kg/sq. m)
Design Maneuvering Speed (Vm)	129 m.p.h. (112 kph)
Stalling Speed at Gross Weight (Vsl) (4,000 lbs.)	57 m.p.h. (50 kph)
Stalling Speed at Gross Weight (5,500 lbs.)	68 m.p.h. (59 kph)
Never Exceed Speed (Vne)	176 m.p.h. (153 kph)
Propeller	Hartzell HC-B3R30-4B/ R10152-5.5

TABLE I

STANDARD TORQUE VALUES FINE-THREAD SERIES		
THREAD SIZE	TENSION-TYPE NUTS (AN365 & AN310)	SHEAR-TYPE NUTS (AN364 & AN320)
8-36	12-15 in. lbs.	7-9 in. lbs.
10-32	20-25	12-15
1/4-28	50-70	30-40
5/16-24	100-140	60-85
3/8-24	160-190	95-110
7/16-20	450-500	270-300
1/2-20	480-690	290-410
9/16-18	800-1000	480-600
5/8-18	1100-1300	600-780
3/4-16	2300-2500	1300-1500
7/8-14	2500-3000	1500-1800
1-14	3700-5500	2200-3300
1-1/8-12	5000-7000	3000-4200
1¼-12	9000-11000	5400-6600

TABLE II

SERVICE OILS & GREASE			
Grease, Multi-purpose	MIL-G-24139		Aeroshell 6
Engine Oil	SAE 25W60 MULTIGRADE AVIATION OIL		
Brake System Fluid	MIL-H-5606		Aeroshell Fluid 4
Landing Gear Oil	SAE 10	or	Shell Tellus #29

TABLE III

INSTRUMENT MARKINGS			
INSTRUMENT	GREEN ARC	YELLOW ARC	RED LINE
Tachometer	1800-2100	2100-2300	2300 RPM
Manifold Pressure(AN-1)	20-33"h.g.	33-37½"h.g.	37½" h.g.
Oil Temp.	30°-85°C		93°C
Oil Pressure	50-100 psi		50 & 100 psi
Fuel Pressure	2-6 psi		2 & 6 psi
Cyl. Head Temp.	100°-250°C		288°C
Air Speed	60-140 mph	140-176 mph	176 mph

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Air Speed	60-140 mph	140-176 mph	176 mph

I GENERAL MAINTENANCE

1. TIE DOWN: is accomplished through use of the tie down rings provided on the under side of the wings and tying around the tail wheel spring. If ropes are used, allow enough slack to prevent over tightening of the rope in the event of rain soakage, which might cause it to shrink. Chock the wheels and leave the parking brakes in the off position. Close the top canopy vent. Lock the control stick and attach a batten type gust lock to the rudder and fin at the rudder overhang.

2. GROUND HANDLING: The aircraft may be pushed by hand against the wing leading edge or the wing tips and guided by pushing at the retractable handles in the aft fuselage. Two rings at the main wheel axles are provided for use with a tow bar. Be sure the brakes are released and tail wheel unlocked before attempting a motorized tow.

3. HOISTING AND JACKING: The aircraft may be hoisted by passing a suitable sling under the top members of the engine mount, just forward of the firewall attach point. The tail should be lifted by the retractable handles in the aft tail cone. DO NOT lift the aircraft in this manner if the hopper is loaded. A jack may be used under each shock strut at the main wheels. The aircraft may also be jacked using two jack pads located under the center section on the main spar.

4. SERVICING AND LUBRICATION: The fuel tanks should be filled after each days operation to lessen the amount of water condensation in the tanks. Fill the left tank first. Fill slowly towards the top to allow the interconnected center tank to fill and top it off. Use 80/87 octane fuel, but 100 LL may be used if 80/87 is not available.

   Fuel drains are located under each tank and at the fuel strainer just below and aft of the firewall on the left side. Be sure that the drain under the strainer is closed tightly after use, to prevent air entry into the fuel line when the engine is running. There are two drain valves under each main tank. The forward valve drains the fuel line and the aft valve drains the sump for that tank.

   The oil tank holds 6.7 gallons. Use SAE 25W60 MULTIGRADE AV oil. If an excessive amount of oil appears under the airplane aft of the firewall, it may be desirable to keep the oil level below 6 gallons. This will reduce the amount of oil which will spill through the oil tank vent line into the engine accessory section when the nose of the aircraft is suddenly lowered in flight. Part of this excess oil may be blown out the accessory section vent line to the under side of the airplane.

Grease the main landing gear and tail wheel after each full day's operation. Grease fittings are easily visible at all grease points. Use grease meeting MIL-G-12439 requirements or a similar multi-purpose grease.

The tail wheel assembly is usually bathed in a considerable amount of spray or dust during agricultural operations and should be cleaned frequently with solvent. It should also be lubricated daily, making sure that the tail wheel locking mechanism operates freely.

5. TIRES: The main wheel tire is an 8.50 x 10, 6 ply min. tube tire. The tail wheel tire is a 12-1/2 x 4-1/2 tube type tire. Inflate both tires 45 psi.

6. BATTERIES: Two 12 volt lead-acid batteries are hooked in series to provide a 24 volt system. Electrolyte level should be kept up to the split ring at the bottom of the filler holes. Add distilled water to maintain this level. Use baking soda to clean any spilled electrolyte or corrosion around the battery box. Access to the batteries is made by removing the panel just aft of the cockpit on the right side of the tail cone.

7. WINDSHIELD AND WINDOWS: The windshield and windows should be cleaned with warm soapy water or with a good commercial cleaning compound for Plexiglass or Lucite. Do not use a dry rag.

8. CLEANING THE AIRCRAFT: After each day's operation the hopper and spray system should be flushed out with soapy water. The hopper lid should be opened slightly and the sump (gate box) door should be left wide open to ventilate the hopper. If a chemical residue, particularly a residue from chemical fertilizers has accumulated in the fuselage, it should be cleaned out thoroughly. Chemical material in the tail cone may be flushed out with a water hose, being sure that the airplane is parked so that the water completely drains. The tail cone should then be dried out using compressed air, if possible, and allow the airplane to sit with the side panels removed for a time. Any material in the cockpit may be wiped out with a moist rag.

9. WEIGHING THE AIRCRAFT: Place the aircraft on suitable scales with tail elevated to level flight position. Leveling lugs for longitudinal leveling are located on the outside of the two fuselage members to the right of the pilot seat. Remove the fuselage side panel to check level with a spirit level. The aircraft may be leveled laterally by placing a spirit level along the top of the main wing spar of the center-section.

10. BAGGAGE AND AUXILIARY LOAD: Baggage weighing up to 25 pounds may be stowed behind the pilot in the cockpit. Auxiliary equipment weighing up to 25 pounds may be installed on the rack in the tail cone, inside the large access panels. If other equipment has been added to the airplane, the weight and balance should be checked prior to using baggage or an auxiliary load, making sure that the aft c.g. limit is not exceeded.

II ENGINE AND PROPELLER

1. The 620B is powered by a Pratt-Whitney R-985-AN-1, AN-3, or AN-14B engine which develops 450 horse power for take-off. The engine mount is constructed of 4130 steel tube and is attached to the fuselage structure by four AN-6 bolts at the firewall. The engine mount may be swung out by removing the two attach bolts at the right side; disconnecting the throttle and mixture linkages and untying flexible oil lines on the right side. The engine mount ring is attached through four large rubber shock mounts.

2. The engine and mount are removed by hoisting the engine at the two lifting eyes behind the #1 cylinder. Disconnect all lines and other attachments and remove the four attach bolts at the firewall.

   PLEASE NOTE: Repairs to the engine mount may be accomplished in accordance with methods described in AC43.13-1.

3. With the carburetor heat control in the off position carburetor air is drawn through a filter located on the lower right side of the mount. This paper type filter should be replaced each 100 hours of operation, or more often if operated from dusty fields. To remove the filter, unscrew the AN-4 bolt through its center. (The filter has NAPA part No. 2240.)

4. The engine oil should be changed each 25 to 30 hours of operation. The oil is drained through a quick drain located in the right side engine compartment near the engine oil inlet and by draining the oil cooler aft of the firewall. When the oil is drained, the main engine oil screen (large plug under accessory section) and sump plugs (under the power section) should be removed and checked for uncommon deposits. Safety the engine drain plug before filling with oil. The oil system holds approximately 8 gallons of which 6.7 is in the oil tank.

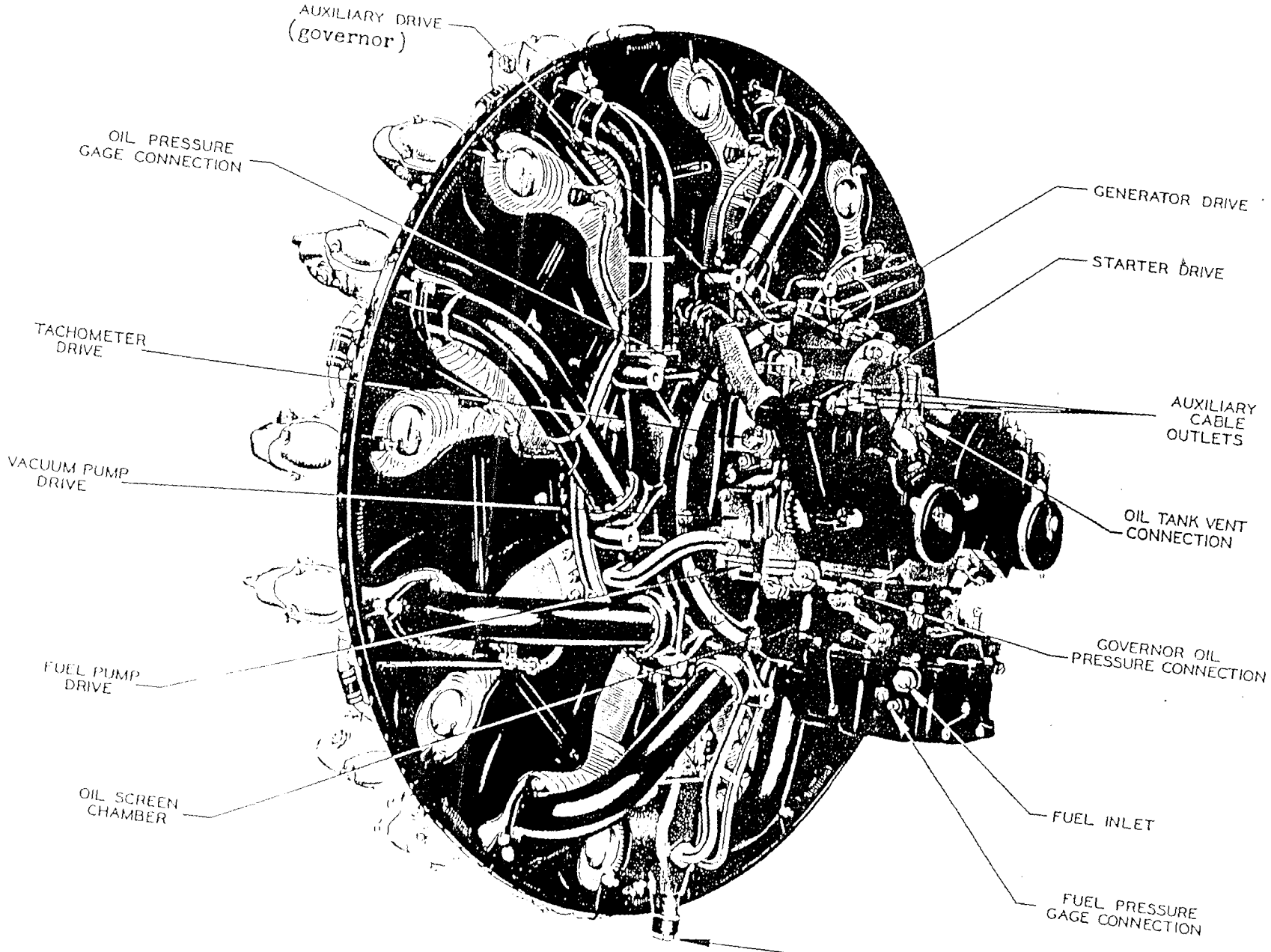
   For aircraft with the optional external oil filter installed replace the oil filter and seal at every oil change. Use only WIX #51758 oil filters, and Weatherly #10010-742 seals. Coat seal with oil before placing in filter adapter, and tighten filter one half turn past hand tight. Tighten safety clamp around filter to prevent loosening of filter.

5. The engine and propeller should be kept clean. In ag operations from dusty fields, frequent wash downs with petroleum cleaning solvents or other agents will help the engine run cooler and will aid in detecting engine

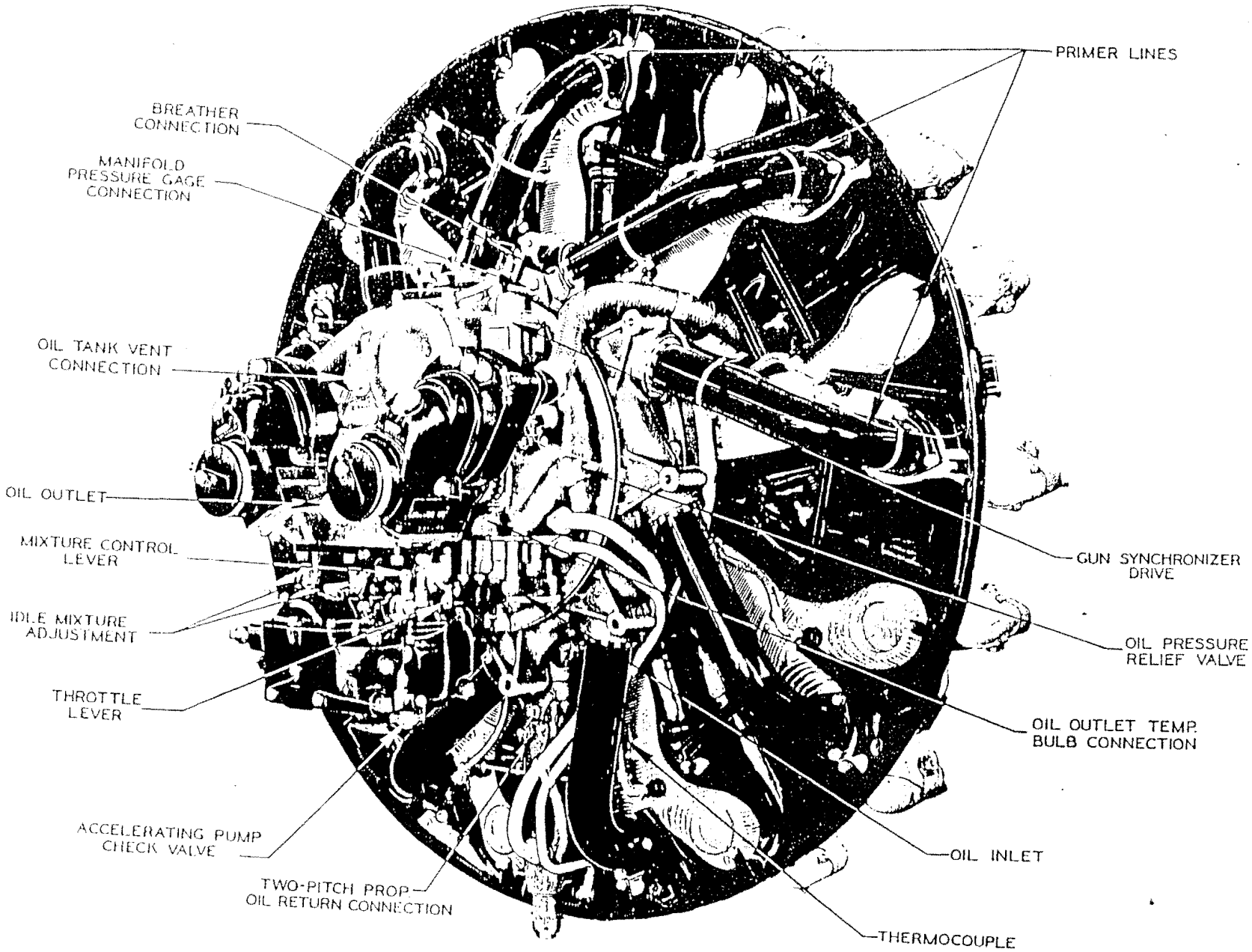
troubles.

6. The propeller is a Hartzell HC-B3R30-4B with R10152-5 1/2 blades. Propeller maintenance should be done in accordance with the Hartzell manual furnished with the airplane.

   The Hartzell HC-B3R30-4B is a constant speed, non-feathering, non-counterweighted propeller. These propellers use the reverse sensing type C-4 governor. Engine oil pressure forces the blades to high pitch position and blade centrifugal force reduces pitch as the oil is pumped from the propeller dome in the reverse direction through the governor.



Left Rear View



Right Rear View

III FUSELAGE FRAME

1. The basic fuselage frame consists of a welded 4130 steel tube structure, from the cockpit forward and a semi- monocoque tail cone with a small tubular assembly bolted to the rear of the cone. The tubular structures are oiled internally with hot linseed oil and coated on the outside with urethane paint. These structures are not heat treated and may be repaired in accordance with standard procedures of AC 43.13-1. A small amount of residual oil may occur in some portions of the frame so care should be taken in welding a damaged tube so that burning oil will not contaminate the weld.

2. The tail cone is manufactured in two separate assemblies and then bolted together with stainless steel bolts. The belly assembly may be unbolted by removing the 3/16" stainless steel bolts along the bottom longerons. Before the belly section is bolted back on, a light coating of gasket sealer should be applied along mating surfaces of the aluminum angles so that water and other foreign matter will be excluded from the bolted joint.

3. The aluminum sheet is clad 2024-T3 of .032 thickness. The extruded angle longerons are of 6061-T6 material. Repairs may be made according to the standards of AC 43.13-1.

4. The tail frame is unbolted and reattached in a similar manner using gasket sealer between the mating parts.

5. The forward fuselage frame has an outer shell which consists of removable panels attached with quarter turn Dzus fasteners. These panels are made of 5052 H34 or 6061-T6 aluminum of .032" thickness.

IV WING

1. The wing is made up of three major assemblies; the center-section and the two outer wings. Each of these assemblies is made up of a basic wing body and the leading edge assemblies. The leading edges are attached to the main body by means of an extruded aluminum hinge with a stainless steel hinge pin. The ends of the hinge pin are left exposed at the ends of the section and may be removed by chucking the end of the pin in an electric drill and pulling the pin out as it rotates. The outer wing leading edges have 4 hinge pins. Two pins are inserted from each end. If the pin has become lodged in the hinge and will not rotate, carefully drill out the row of rivets immediately ahead of mating joint in the leading edge skin, detaching the hinge from the skin. The pin may then be removed from the hinge. The hinge should be riveted back to the leading edge and assembled to the main body by using

the drill to insert the pin back in the mating halves of the hinge. Lubrication of the hinge pin before insertion and use of bungees or web belts to pull the leading edge in place will help in the assembly process.

2. All wing parts made of aluminum sheet are of 2024-T3 alloy. The wing may be repaired in accordance with procedures of AC 43.13-1. The extruded spar caps (flanges) are not normally repaired, but should be replaced if damaged.

3. The wing hinge fittings (center-section to outer wing attach fittings) are made from 4130 steel which is heat treated. In the event of major damage to the wing, these fittings should be inspected for cracks by Magnaflux or similar methods. The attach bolts and main wing attach pins should be replaced if damaged.

4. Access to the fuel tanks in the wing center-section is made by removing the cover panels on the under side of the wing.

5. The wing joint cover is removed by unscrewing the long threaded bolt at the bottom rear of the cover.

6. Access to the leading edge landing lights, is made by removing the plexiglass cover.

7. The wing tip-leading edges are made of fiberglass cloth and polyester resin. Repairs may be made using common hand lay up methods.

V ASSEMBLY AND RIGGING

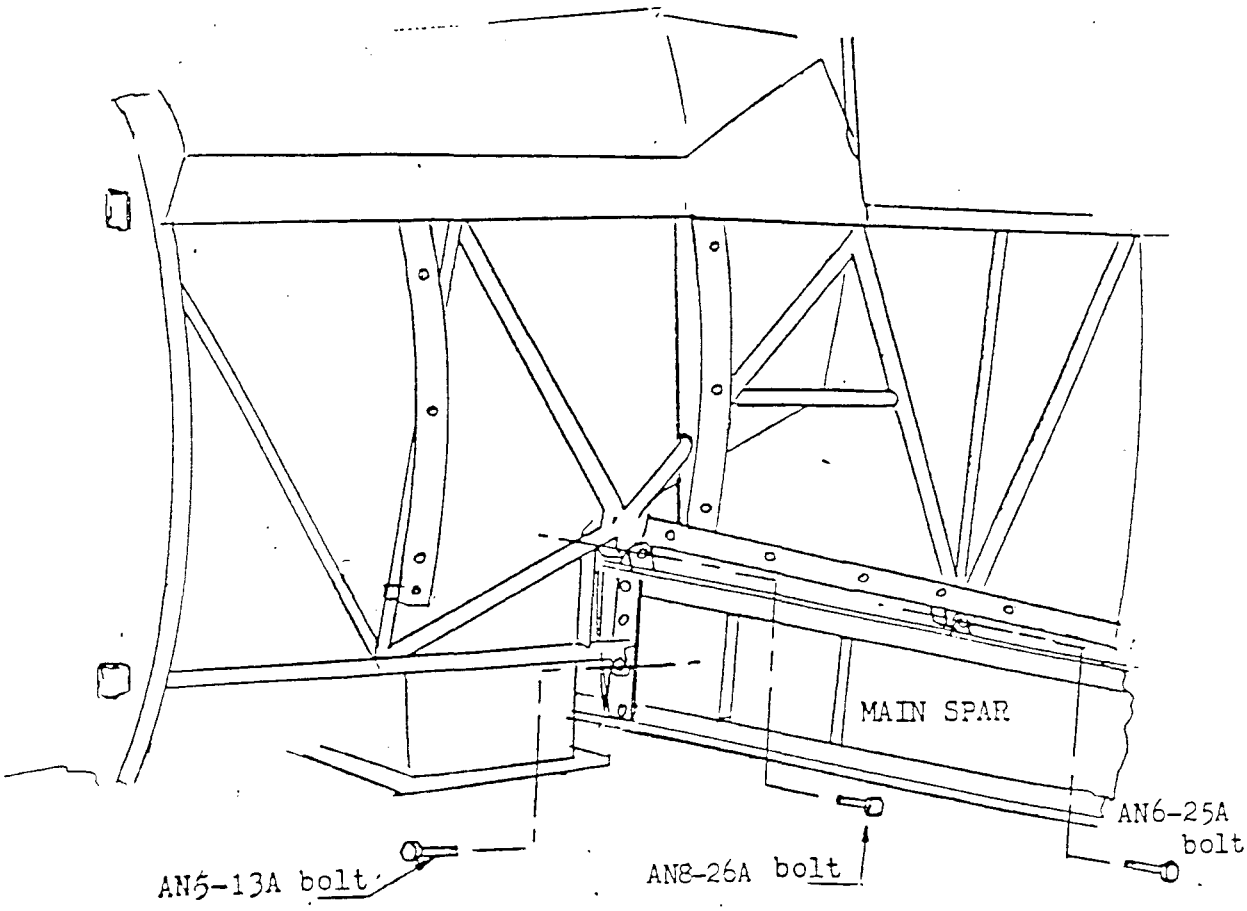
When the fuselage panels are removed and the wing root and tail group fairings are removed, the means of assembly or disassembly of major components are generally obvious and special instruction is not required, however the following information is provided to assist in these operations.

1. TO JOIN THE FUSELAGE AND WING CENTER-SECTION:

Center-section should be set somewhat horizontal, resting on the main wheels with saw horses or other supports, under the trailing edge of the wing. This trailing edge support should be padded and the support distributed across at least 2 adjacent ribs. The fuselage may be set into the 4 attach fittings on top of the wing.
Align the holes with a drift punch and install the attach bolts from the outside. Lubricate the bolts before installation. Install the (2) AN5 bolts which attach the forward lower longeron to the middle of the front spar, on each side. These bolts are installed through the spar web and extruded angle, from the forward side. Reach in through the large hole in the first rib in the center-

section to tighten the nuts.

When mating the fuselage to the wing center-section, the leading edge assemblies for the center-section should be left off and the center fuel tank cover should be removed from the bottom side of the wing. This is necessary in order to install the AN5 attach bolt through the front spar web. Install the leading edges and tank cover after all bolt attachments have been secured. (**Note:** It is advisable to put a drop of oil on the screw threads before installing the screws in the tank covers. DO NOT use excess force in pushing the screws up into the gang channel anchor nuts, they can be forced out of the retaining channels.



BOLTING FUSELAGE TO WING CENTER - SECTION

3. TO INSTALL THE OUTER WINGS:

With two persons on each end of the wing panel, bring the wing into position and align the bottom fittings of the front and rear spars with a drift pin. Raise the wing tip to align the top fittings and install the top pin in the front spar fittings from the front side. Next, install the 2 bolts at the rear spar fittings, Then the bottom pin in the front spar fittings.

These are close tolerance pins and fittings. The bolts and pins should be installed carefully so as to prevent binding or galling. Lubricate the bolts with oil before installation. Prevent the fittings on the back side of spar from spreading, by using a clamp or back up bar as support to the fitting when the bolt or pin is being driven into place. Use an aluminum or brass drift to drive these bolts. Install caps on the ends of main spar pins and tighten cap bolts to allow the pin to center itself. Safety wire cap bolts. Torque the rear spar bolts 480- 690 inch pounds.

4. INSTALLING THE AILERONS:

The ailerons are normally rigged with the top surface of the ailerons flush with the top surface of the wing at the inboard trailing edge with the stick in neutral position.

The aileron is supported at 3 hinge points with KP3A sealed bearings. Washers (AN960-10 and AN970-3) are installed, as shims to make up the difference between bearing width and width of the inboard aileron bracket.

Aluminum push-pull tubes operate the aileron through a bell-crank. This bell-crank is located just forward of the inboard support. The bell-crank is mounted in its bracket with the long arm to the top and the short arm angled inboard.

Ailerons	29° ± 1½° up	11½° down ± 1°
Elevators	27° up ± 1°	15° down ± 1°
Rudder	20° rt. ± 1°	20° lt. ± 1°

VI LANDING GEAR

1. **ASSEMBLY OF MAIN LANDING GEAR:** The main landing gear assembly can be broken down into the following sub-assemblies: The wheel, tire and tube, the brake assembly, the lower shock strut, including axle, and the upper housing assembly.

The lower shock strut is assembled by dropping the two taxi springs into the lower strut, then inserting the piston down on top of them, then installing the cap with seal, using (4) AN509-10R-8 screws, installed from the outside. After these screws are installed, use a mill file to dress the heads down smooth with the outside of the strut. This is done to prevent scoring the bronze bushings in the upper housing.

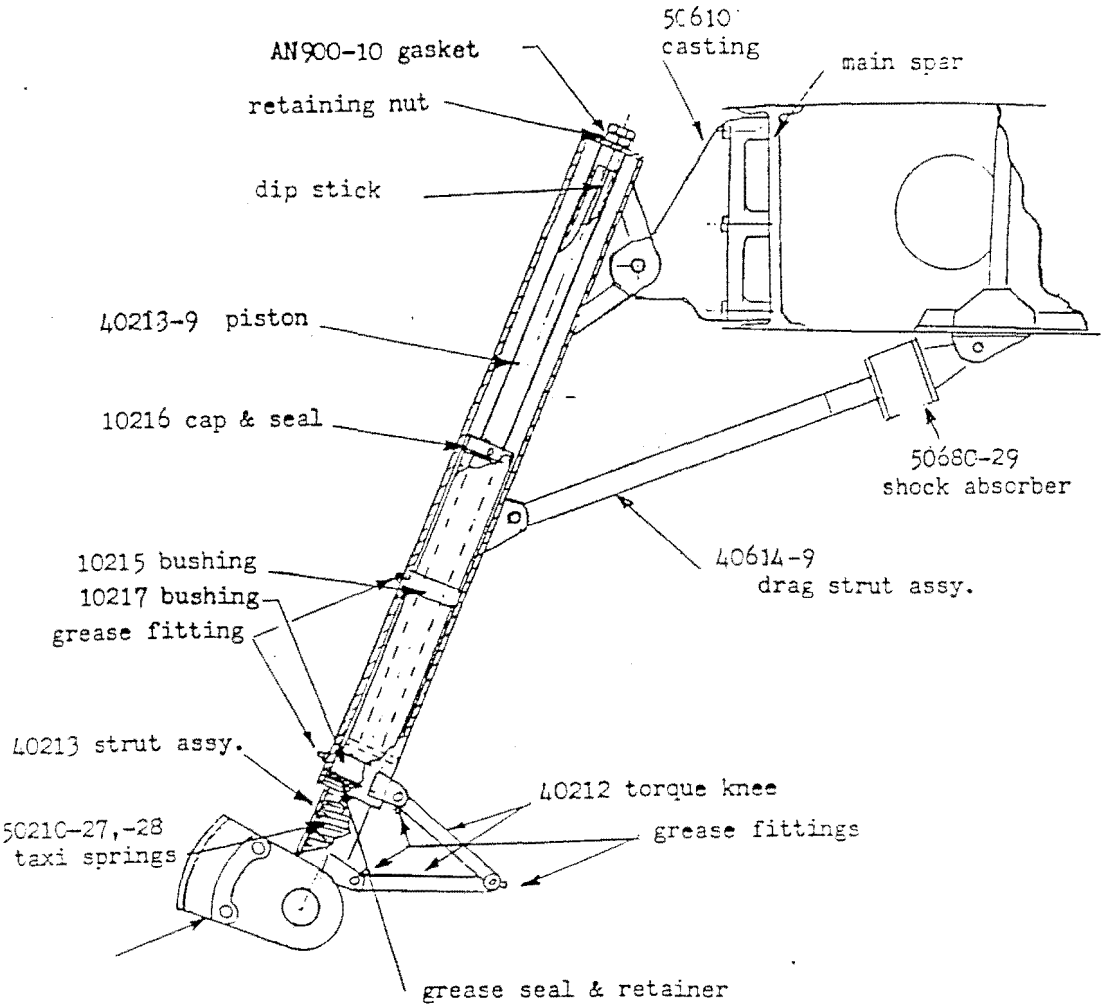
NOTE: All of the parts of the lower shock strut assembly are heat treated and are not normally repaired.

The upper gear housing is a welded tube assembly with 2 bronze bushings inserted in the large tube. These may be replaced by removing the grease fittings and the retaining screws, then remove the bushings with a suitable puller.

NOTE: The upper gear housing is not heat treated and may be repaired by welding in accordance with AC 43.13-1. If welds are made in an area where the smaller truss work tubes attach to the large tubes of the main housing; preheat the large tube in the weld area prior to welding. This welding should be done by TIG weld process.

2. Fore and aft loads imposed upon the landing gear are carried into the structure by the drag link assembly at the aft side of the upper gear housing. This drag link incorporates a shock absorber which makes use of polyurethane elastomer discs. When the aircraft is sitting empty in 3 point position a gap between the back anchor plate and the compression plate of from 0 to 1/8" is normal. In time, compression of the discs will cause this gap to increase. The elastomer discs should be replaced if this gap exceeds 3/16".

3. The upper gear mount casting is attached to the center-section spar by two AN6 bolts and four AN7 bolts. Torque the retaining nuts on the AN6 bolts to 160-190 inch pounds. Torque the AN7 bolts to 520-630 inch pounds. The AN7 bolts must have an AN916-716 washer installed under the head and should be installed with a light coating of moly-sulfide grease. Tap these bolts lightly. The anchor nuts for these bolts are riveted in place, in a bracket, on the aft side of the spar. Hard driving of the bolts may force the anchor nuts out of position. Two AN8-22A bolts attach the upper housing to the mount casting. These bolts should be installed with a light coating of moly-sulfide grease and should not be over tightened. Avoid squeezing the steel lugs against the casting.



MAIN LANDING GEAR

Grease the lower strut and insert it up into the upper housing. The top threaded portion of the piston assembly extends through the 5/8" diameter hole in the top of the upper housing. Install an AN960 washer and AN315 nut. Install the torque knee assembly and hook up the brake line. The AN8 bolts should be greased before installation in the torque knees. Fill the shock strut with SAE 10 oil. Use a small funnel in the hole in the top of the piston. Fill to the "FULL" mark on the dip stick. Install the AN900-10 crush washer under the dip stick and tighten the dip stick nut.

4. TAIL WHEEL GEAR INSTALLATION: The tail gear assembly is attached to the aft fuselage frame by one AN7-21A bolt at the forward end of the spring beam and two AN5-24A bolts. The casting, which supports the tail wheel assembly is bolted to the spring beam by an AN6C-22A on the forward side and an AN6C-3A bolt in the rear side. These bolts should all be tightened to the high side of the torque values of Table 1. When installing the 40374-9 spindle, lubricate it with a light coating of multi-purpose grease.

5. RIGGING THE TAIL WHEEL ASSEMBLY: With the tail fairing and access panels removed, support the tail under the 50375-17 retainer plate. With the elevator set at full down position adjust the length of the 50490-1 spring (which attaches to the 50375-57 locking arm) so that the locking pin is clear of the plate approximately 1/8". Adjust the pressure on the short coil spring (at the top of the spindle) by tightening the AN320-1016 nut. This should be tightened enough to prevent any free play between the lock plate and the bottom spindle housing bushing (40372-1).

6. INSTALLING THE TAIL WHEEL: Install the bearings and 50375- 9 sleeve in the wheel hub. Place the 50375-7 spacers on the sleeve outside the bearings and put the wheel in position in the fork. Slip the large area washers up into place (to the outside of the spacers). Put an AN960 washer and AN365-816 nut on one end and insert the axle. The axle and sleeve should be lubricated with a light coat of grease before installation.

VII ASSEMBLING THE TAIL GROUP

1. The horizontal stabilizer is installed first using (4) AN4 bolts through the fittings. Install the elevators next, using AN3 bolts at the hinges. The elevators are actuated by push-pull tubes from the stick. All bearings, including the control rod-end bearings, are sealed and do not require lubrication. The vertical fin is installed next, with one AN4 bolt at the front fitting and (4) AN4 bolts through the spar to the fuselage. Check the alignment of the bottom bearing, for the rudder by sighting from the top down through the two bearings on the fin. Shim the bottom bearing if required, to bring it into alignment. Install the rudder with (3) AN4 bolts. The bolts are installed with the heads up.

2. Stainless steel control cables (1/8" diam.) are used to operate the rudder. These are attached to the outboard sides of the rudder pedal hangers through a steel link which allows for an adjustment of the pedal position. The rudder is normally rigged in alignment with the vertical fin when the rudder pedals are in neutral position. The metal trim tab attached to the rear edge of the rudder may

620B Rudder Travel Check:

- Remove the lower rudder fairing
- Remove the Left & Right lower aft frame fairings
- Remove the tail cone to tail wheel spring fairing
- Install the Rudder Protractor Tool Number 30001 to the lower Rudder attach hinge bracket

  NOTE: The top attach strap center should be flush to the hinge bracket. This ensures that the Rudder Protractor is installed correctly for the proper indicated rudder angle degree.

- Once the rudder protractor is aligned properly, tighten the 2 mounting screws hand tight.

  NOTE: Do not overtighten the mounting screws, the aluminum threads could strip, damaging the Rudder Protractor

- Once the Rudder Protractor is installed, align the center of the trailing edge of the rudder over the 0° (degree) on the protractor degree surface.
- Have a second person go to the cockpit area and check that the rudder pedals are centered.
- Manually, push the rudder to the left stop. Look down the trailing edge of the rudder and ensure that it aligns with the 20° (degree) mark on the left side of the rudder protractor scale.
- Manually, push the rudder to the right stop. Look down the trailing edge of the rudder and ensure that it aligns with the 20° (degree) mark on the right side of the rudder protractor scale.
- If the center of the trailing edge of the rudder does not line up with the 20°, when checking the left or right rudder travel limits, adjust the rudder stops as follows:
- Move the rudder back to the 0° (degree) mark.
- Loosen the left or right rudder stop bolt jam nut as required.
- Move the rudder to the position needing adjusted, toward the stop bolt.
- Adjust the bolt length, by tightening or loosening the selected rudder stop bolt until it contacts the rudder horn when the rudder is at the 20° mark on the rudder protractor.
- Move the rudder away from the stop position and tighten the jam nuts (p/n AN316-428) to 50-70 inch lbs. per the maintenance manual standard torque values (Table 1).
- Manually, push the rudder to the left stop. Look down the trailing edge of the rudder and ensure that it aligns with the 20° (degree) mark on the left side of the rudder protractor scale.
- Manually, push the rudder to the right stop. Look down the trailing edge of the rudder and ensure that it aligns with the 20° (degree) mark on the right side of the rudder protractor scale.
- Check the rudder travel has been set to 20° (left and right) stops as required
- Install the tail cone to tail wheel spring fairing
- Install the Left & Right lower aft frame fairings
- Install the lower rudder fairing

Rudder Protractor Description and Use:

The rudder protractor is used to check the rudder travel limits when required. The rudder protractor is attached by using a top attach strap (see Fig.1), that is installed over the top of the lower rudder hinge bracket and the leading edge is placed up against the attach bracket angle as shown below in Fig. 2:

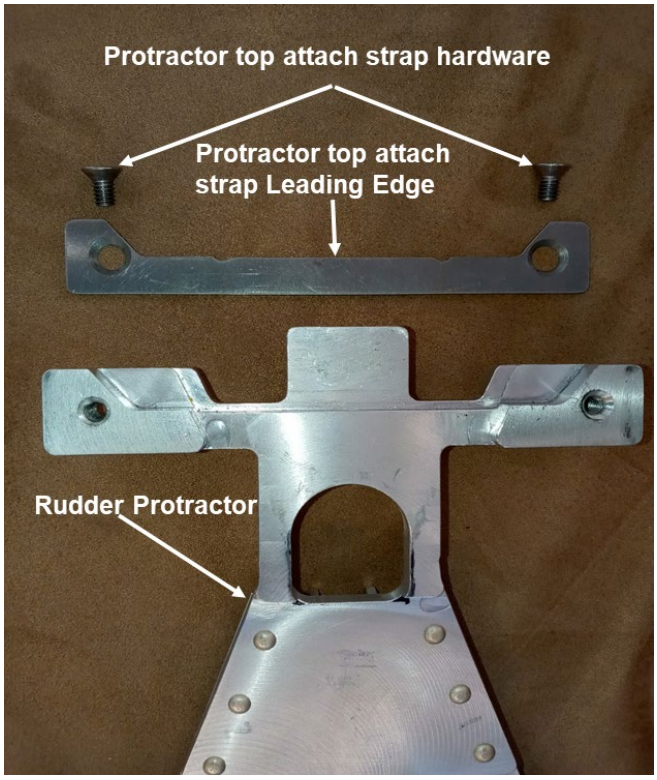


Fig.1

Fig. 2

Once attached to the lower rudder hinge bracket as described above, hand tighten the screws to clamp to the hinge bracket. Ensure that the strap forward edge is against the hinge bracket as shown in Fig.3 below.

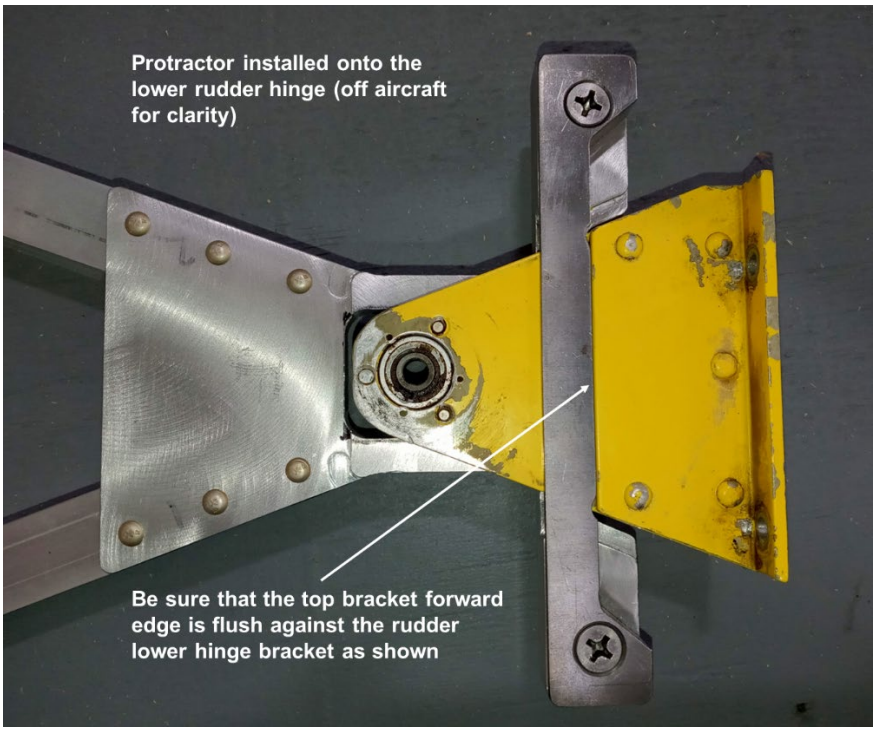


Fig. 3

With the rudder protractor installed, it is used to align the trailing edge of the rudder to the correct degree position for 0° (degrees) Center & 20° (degrees) Left & Right Rudder stops, to set rudder travel.

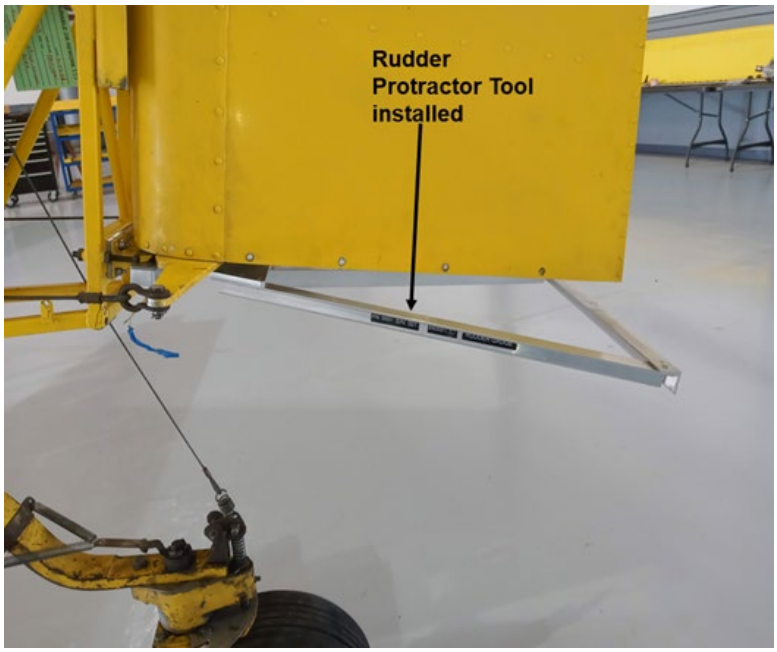


Fig. 4

To confirm the rudder travel settings, manually push the rudder to the left or right stop. Look straight down the trailing edge of the rudder and ensure that it aligns with the 20° (degree) mark on the left or right side of the rudder protractor scale. Alignment with the left 20° mark example shown below:

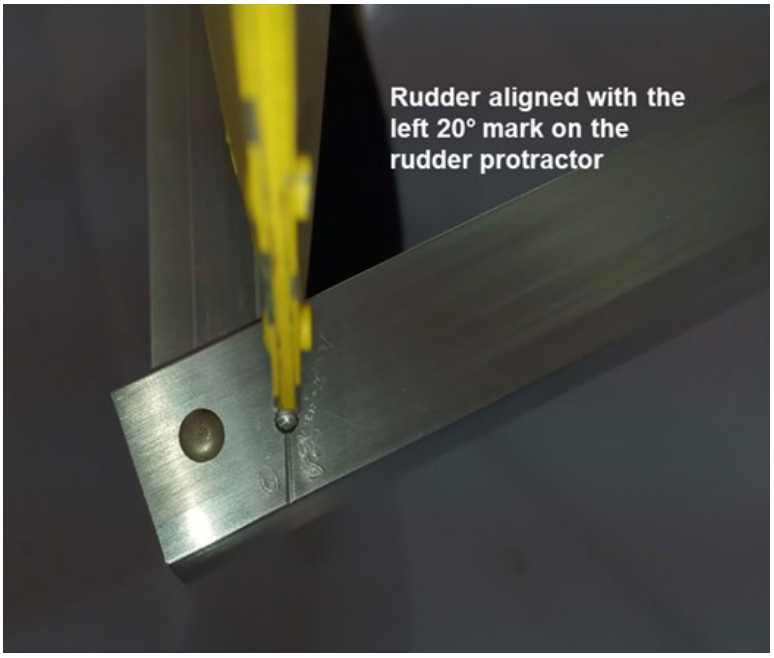


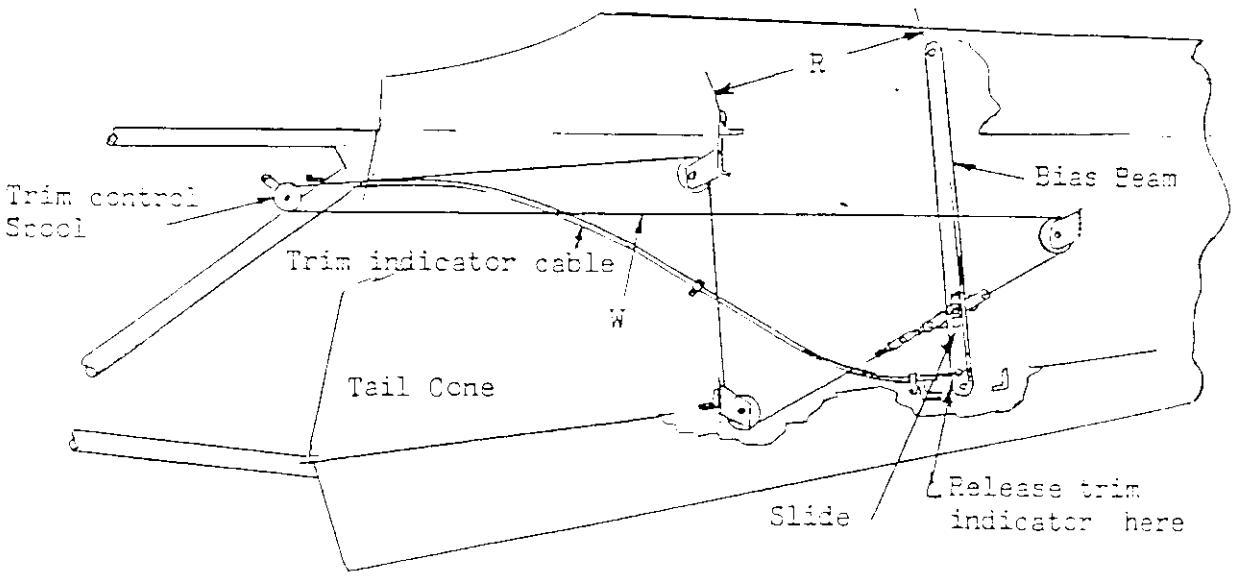
Fig. 5

be bent to correct trim in flight. Set the rudder control stops for 20 (± 1).

3. "Oilite" bushings are installed in the rudder control horn when attaching the rudder cable shackles to the horn, allow the bolt to turn freely in this bushing. DO NOT OVER-TIGHTEN.

4. Rig the "Bias Beam" with dimension "R" equal to 11 3/4" (± 1/8) when the spool is in neutral position. (3 wraps of cable showing on top of inside groove and 3 wraps showing on bottom outside groove. Adjust the cable tension so that the cable reflects 5/8" (± 1/16) with a 1 lb. weight suspended from the trim cable at point "W" (about half way between 2 pulleys).

   Maintain a light coating of moly-sulfide grease under the slide on the Bias Beam. If the trim indicator cable becomes sticky, detach it at the Bias Beam and pull it out of the housing for cleaning and lubrication. Use moly-sulfide grease to relubricate.



BIAS BEAM RIGGING AND ADJUSTMENT

VIII CLEANING AND INSPECTION OF BRAKE ASSEMBLY

1. Clean all metal parts and O-rings with denatured alcohol (gasoline and dry cleaning fluids will damage O-rings). If O-rings are damaged or worn excessively, they should be replaced.

2. Inspect brake cylinder for cracks, nicks, corrosion, damaged threads, etc. Inspect inlet and outlet hydraulic ports for foreign contaminates. Examine cylinder walls for scoring or excessive wear. Blend and polish light scratches in piston cavities with fine emery cloth (600 grit). Castings that are cracked or have damaged threads should be replaced.

3. Inspect anchor bolts for cracks, corrosion, permanent set, and excessive wear. Replace bolts that are bent, cracked or severely corroded.

4. Inspect pistons for cracks, nicks, burrs, or excessive wear. Remove burrs and blend out nicks, using fine emery cloth (600 grit), and clean thoroughly.

5. Inspect pressure plate assembly for cracks, damaged rivets and excessive warpage. Replace if cracked or severely deformed. Replace cracked or deformed rivets.

6. Inspect brake cylinder bolts for cracks, thread damage, and self-locking feature. Replace bolts that are cracked, bent or have damaged threads.

7. Inspect brake linings for radial cracks around rivets and surface deterioration. Linings should be replaced when worn to a thickness of .100 inch. Worn linings are removed by drilling out rivets, using a 5/32 drill. Install new linings in place, using 105-00200 rivets.

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

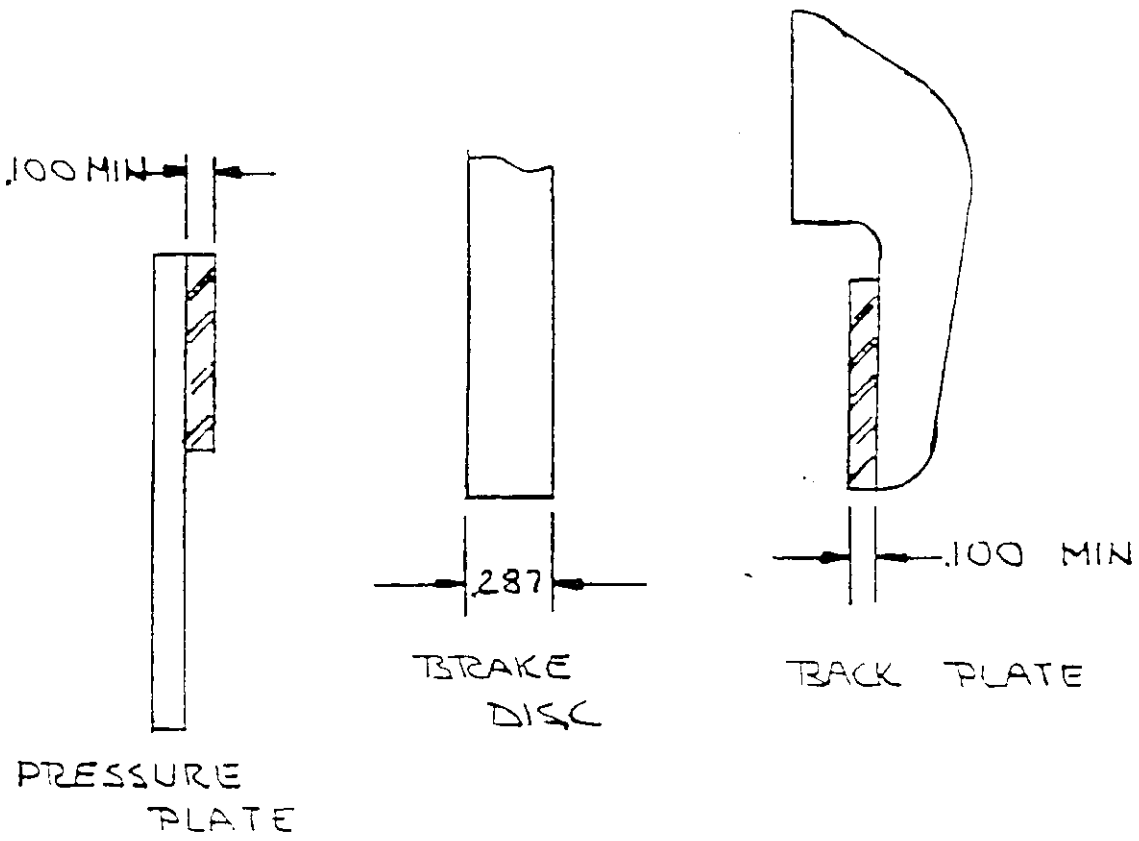
REPAINTING OF BRAKE ASSEMBLY:

1. Thoroughly clean repaired surfaces and areas of the brake assembly from which paint has been removed.

2. Paint exposed areas with one coat of primer and one coat of aluminum lacquer.

CAUTION

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



RECOMMENDED WEAR LIMITS FOR DISC AND LINING

CLEVELAND AIRCRAFT PRODUCTS
PARTS LIST

30-89B Brake Assembly

Old P/N	Part Number	Description	Quantity
30-89B	030-08900	Brake Assembly	1
91-77	091-7700	Cylinder Assembly	1
61-58	061-15800	Cylinder	1
92-29	092-02900	Piston Assembly	3
62-27	062-02700	Piston	3
MS28775-132	101-00232	"O" Ring	3
73-30	073-03000	Pressure Plate Assy	1
63-13	063-01300	Plate - Pressure	1
66-108	066-10800	Lining	3
105-2	105-00200	Rivet	6
74-26	074-02600	Back Plate Assembly	3
64-16	064-01600	Plate - Back	3
69-4	069-00400	Bolt - Anchor	2
AN365-428	094-10300	Nut	2
LP4-20AM	103-11700	Bolt	6
AN960-416L	095-10200	Washer	8
183-1	183-00100	Cap - Bleeder	1
79-3	079-00300	Screw - Bleeder	1
81-2	081-00200	Seat - Bleeder	1
MS28775-012	101-50342	"O" Ring	1
75-100	075-10000	Torque Plate Assembly	1

IX CLEANING AND INSPECTION OF MAIN WHEEL ASSEMBLY

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

WARNING

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

2. Visually inspect bearing cones for nicks, scratches, water staining, spalling, heat discoloration, roller wear, cage damage, cracks or distortion. Replace if defective or worn.

3. Inspect wheel bearing grease for contamination and solidification at each periodic maintenance inspection. DO NOT exceed 500 wheel miles between repacking intervals. Repack wheel bearings with Mobil Bearing Grease (Mobil grease 77 or Mobilus EP2) or equivalent.

4. Inspect wheel halves for cracks, corrosion, and other damage.

CAUTION

NEVER PAINT WORKING SURFACES OF BEARING CUPS.

CLEVELAND AIRCRAFT PRODUCTS

PARTS LIST

40-101 Wheel Assembly 7:50 x 10 Type III

Old P/N	Part Number	Description	Quantity
40-101	040-10100	Wheel Assembly	1
161-36	161-3600	Inner Wheel Half Assy	1
151-34	151-03400	Wheel Half - Inner	1
LM29710	214-10300	Cup - Bearing	1
162-34	162-03400	Outer Wheel Half Assy	1
152-32	152-03200	Wheel Half - Outer	1
LM29710	214-01300	Cup - Bearing	1
67-11	067-01100	Spacer	1
164-30	164-03000	Brake Disc Assembly	1
AN-40A	103-11300	Bolt	9
AN365-42B	094-10300	Nut	9
AN960-416	095-10400	Washer	9
153-9	153-00900	Ring-Grease Seal	2
154-14	154-01400	Felt - Grease Seal	1
3023	155-00100	Ring - Snap	2
LM29749	214-01400	Cone - Bearing	2
3026	158-00300	Cap - Hub	1
166-12	166-01200	Name Plate	1
166-14	166-01400	Name Plate	1

FUEL SYSTEM

1. The fuel system consists of 5 interconnected tanks; a three-way selector valve; fuel strainer; gascolator assembly; electrically driven fuel boost pump; and engine driven fuel pump.

2. The fuel tanks are of aluminum construction and are located in compartments in the main body of the center section, one on either side of the fuselage. They are accessible from the bottom of the wing by removing a structural panel which is held in place by AN509-10R-10 screws and gang channel lock nuts. The right tanks hold 40 gallons of which 37.5 are useable, the left tanks and inter-connected center tank holds 57.5 gallons of which 52.5 gallons are usable. Each tank has a sump and an internal compartment which traps about 1 gallon of fuel in the inboard rear corner. The rear drain valve drains the sump, the front drain valve drains the fuel line. The fuel line enters the tank above the front drain fitting. A finger type strainer is installed above the fuel outlet.

3. The electric fuel gauges located in the instrument panel are driven by senders in the main wing tanks of the wing center section.

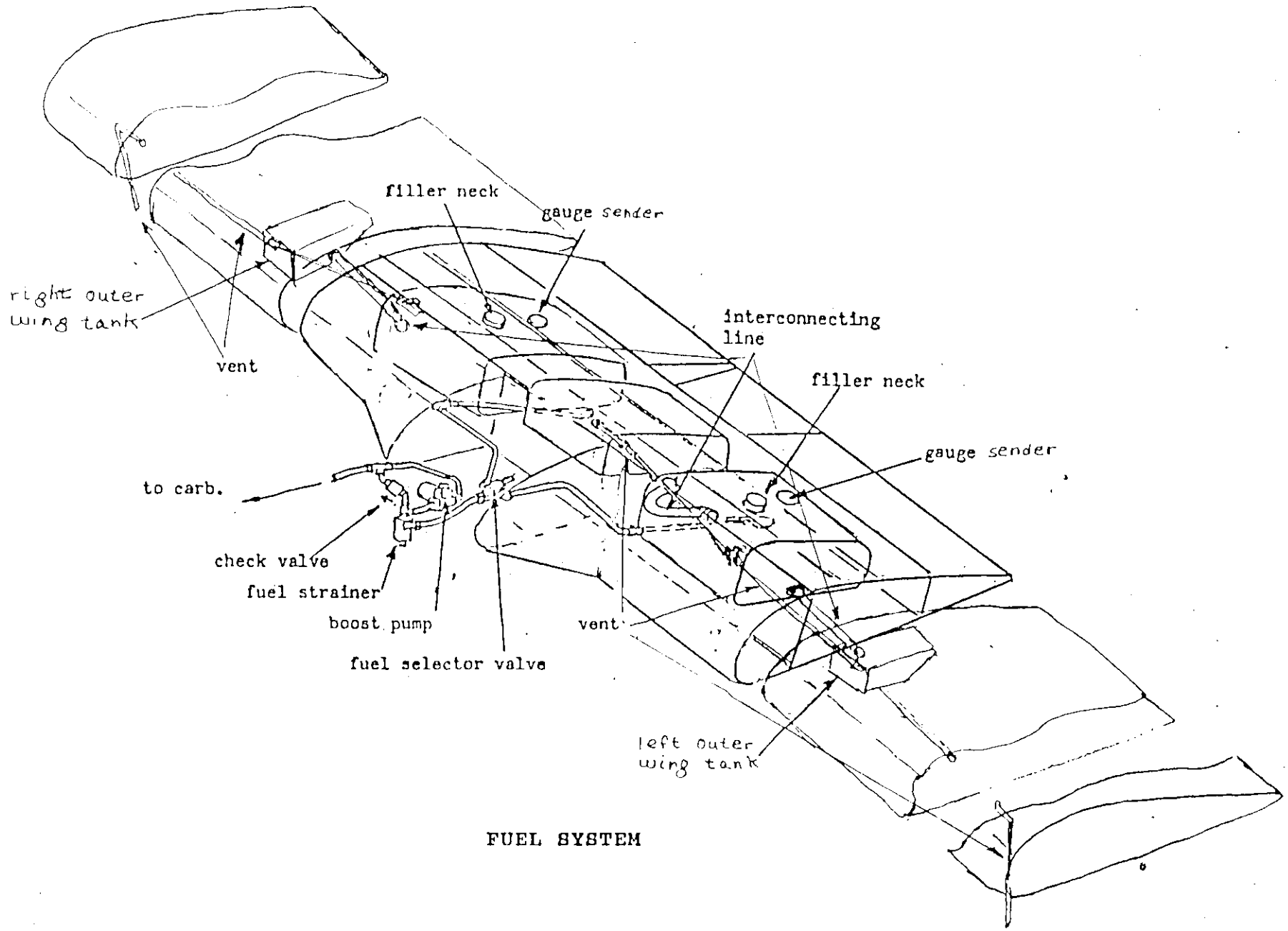
4. The selector valve will select either right or left tank or "off". It will not allow fuel to be used from both tanks at once. The valve core can be removed by unscrewing the gland nut over the shaft.

5. The fuel strainer is located aft of the firewall on the left side. The screen may be removed by unfastening the retainer bar and dropping it out the bottom. There is a quick drain at the bottom of the strainer. This valve should always be closed tightly or air may be drawn up into the fuel line, resulting in improper fuel flow.

6. The fuel boost pump is located above the fuel strainer. This pump is used to pump fuel in emergency situations and for supplying fuel to the carburetor any time the engine driven pump is not operating.

7. The engine driven fuel pump is the same type as the electrically driven boost pump. A bypass system at the top of the pump is adjusted to maintain proper fuel pressure. The large retaining nut is loosened and the slotted screw head is turned to adjust the pressure. Turned clockwise pressure increases. The fuel pressure should be set at 3 - 5 psi; the retaining nut must be tightened and safety wired after any adjustment.

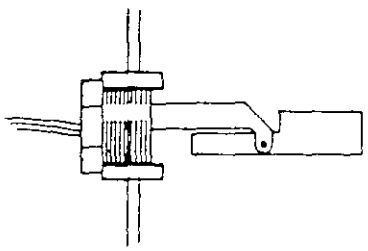
8. The fuel lines are made from 5052-0 aluminum tubing and are fitted to AN standard fittings. If fuel line replacements are made in the field, note that these fittings require 37 flare.


filler neck
gauge sender
right outer wing tank
vent
interconnecting line
filler neck
gauge sender
to carb.
check valve
fuel strainer
boost pump
fuel selector valve
vent
left outer wing tank

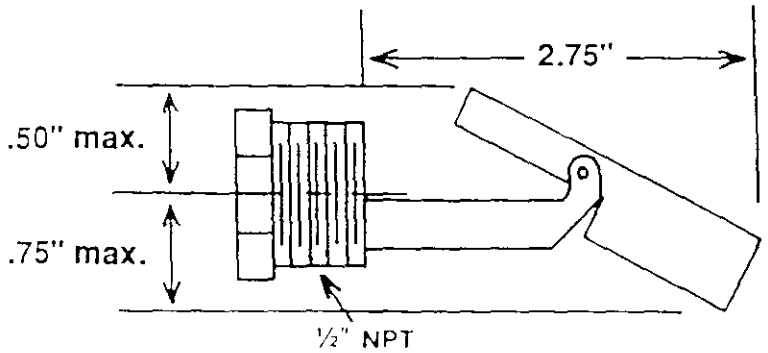
FUEL SYSTEM

Side Mounted Switches

Approvals: E54633 LR56150

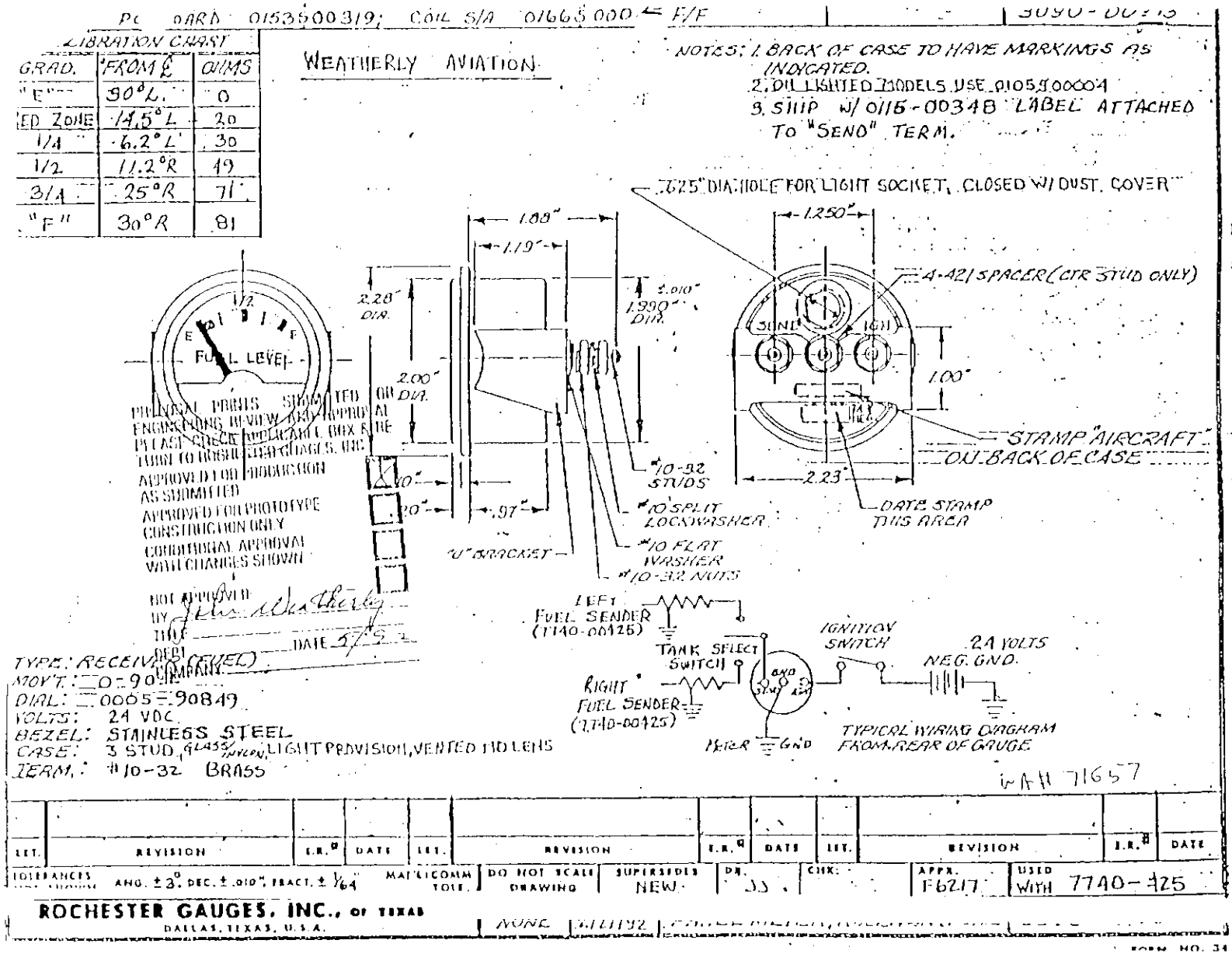


Outside Mounting
(shown normally closed)



M7750

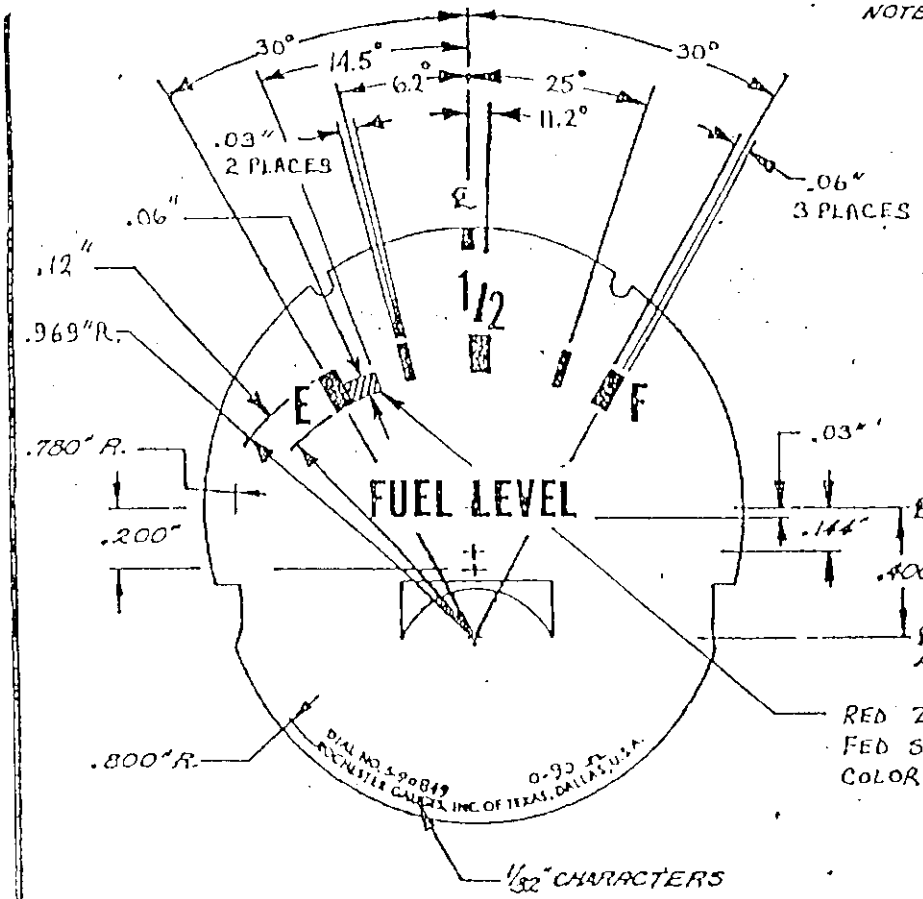
LOW FUEL LEVEL SENSOR



FUEL LEVEL GAUGE

.12" ±.005" THICK ALUMINUM, 1100 ALLOY

COLOR 2 - COLOR | DRAWING 0005-1 | 349



NOTES: DO NOT PRINT OUTSIDE .780" R., UNLESS SPECIFIED OTHERWISE.

FOR BLANKING DIMENSIONS SEE 0005-90007 DRAWING.

PRINT BOLD WHT. CHARACTERS ON A BLK. BACKGROUND, UNLESS SPECIFIED OTHERWISE.

DIAL FINISH MUST WITHSTAND BENDS AS SHOWN ON 5-90007.

CHARACTERS TO BE 12 PT. ALTERNATE GOTHIC NO. 2

PROPOSAL PRINTS: SUBMITTED FOR ENGINEERING REVIEW AND APPROVAL PLEASE CHECK APPLICABLE BOX & RETURN TO ROCHESTER GAUGES, INC.

- [X] APPROVED FOR PRODUCTION AS SUBMITTED
- [ ] APPROVED FOR PROTOTYPE CONSTRUCTION ONLY
- [ ] CONDITIONAL APPROVAL WITH CHANGES SHOWN.
- [ ] NOT APPROVED

BY _____ DATE 5/12/92

TITLE _____

DEPT _____

COMPANY _____

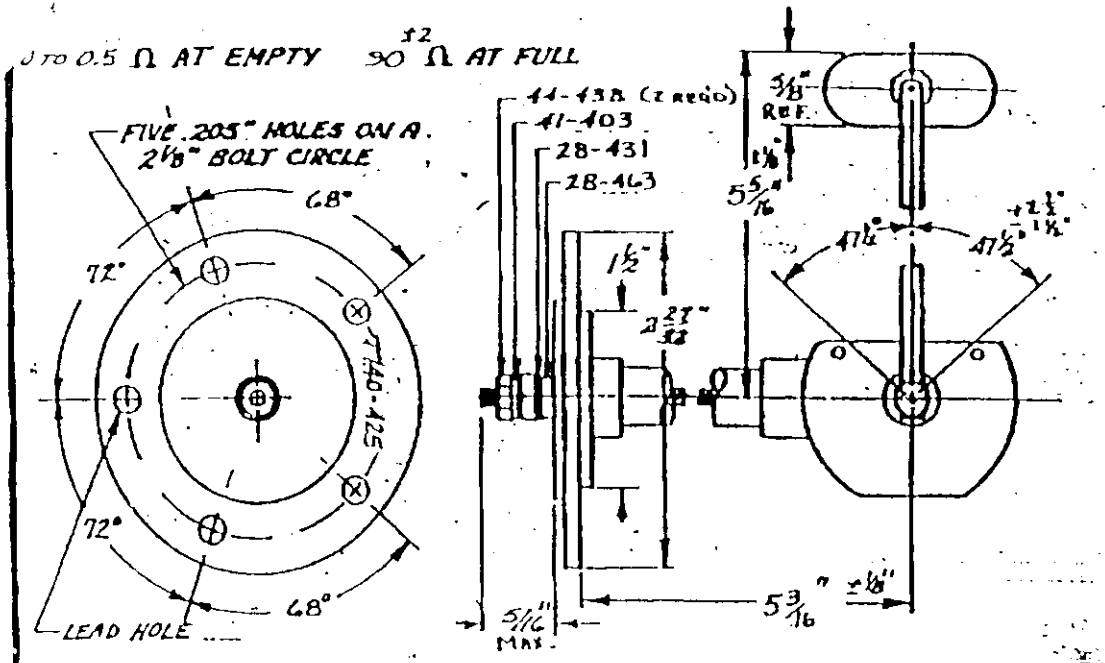
LET.	REVISION	E.R.#	DATE	LET.	REVISION	E.R.#	DATE	LET.	REVISION	E.R.#	DATE

TOLERANCES ANG. ± 1, DEC. ± .005", FRACT. ± 1/64" | MATL: COMM | DO NOT SCALE | SUPERSEDES | DR. | CHK. | APPR. | USED 3090

ROCHESTER GAUGES, INC. OF TEXAS DALLAS, TEXAS, U.S.A. | 2"=1" | 2/27/92 | PANEL METER DIAL, 0-90Ω | 0005-90849

105 Ω MUST BE CAPABLE OF INSTALLATION

0 TO 0.5 Ω AT EMPTY 90 +2 Ω AT FULL



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- ☐ CONDITIONAL APPROVAL WITH CHANGES SHOWN
- ☐ NOT APPROVED

BY [signature] TITLE _____ DEPT _____ DATE 9/15/91 COMPANY Weatherly Aviation Co. Inc.

TUBE CUT LENGTH	STUD CUT LENGTH	JIG NO.
4 9/32"	5 3/16"	-95

REPLACEABLE PARTS
GASKET NO. 15-716 (BUNA "N")
NUT NO. 44-438 (2 REQ'D.)
LOCK WASHER NO. 41-403
FLAT WASHER NO. 28-431

GAUGE MATERIALS
HEAD & COIL HOUSING: DIECAST ALUMINUM
SUPPORT TUBE & FLOAT ROD: TEMP. ALUM.
FLOAT: NITROPHYL
CROSS STUD - STAINLESS STEEL

PRODUCTION NOTES:
1. USE 61565 06319 FLOAT P/A.
2. INSTALL STOPS TO GIVE TRAVEL SHOWN.
3. USE HEAD ROTATION SHOWN
4. STAMP R.G. P/N ON HEAD AS SHOWN.
5. USE HARDWARE SHOWN

LET.	REVISION	E.R.#	DATE	LET.	REVISION	E.R.#	DATE	LET.	REVISION	E.R.#	DATE

TOLERANCES NOT SHOWN ANG. ±3°, DEC. ±.010 FRACT. ±1/64 MATL: COMM TOL.

DO NOT SCALE DRAWING | SUPERSEDES 7980-1 | DR. JJ | CHK CAB | APPD. F9976 | USED LEFT & RIGHT ON FUEL TANKS

ROCHESTER GAUGES, INC., OF TEXAS | SCALE 3/8=1- | DATE 9/27/91 | PART NAME LIQUID LEVEL SENDER | DRAWING NUMBER 7740-00425

Fuel Indication System

Calibration Test on the Weatherly 620B Electric Fuel Indicator

Description and Operation Fuel Indicating System:

Both Left and Right Fuel Quantity Indicators are located right of center, in the instrument panel. The Electric Fuel Indicating system uses a Fuel Gauge, a fuel Level Sensor (variable Resistor) that is actuated by a moveable arm and Float assembly. This provides a variable resistance value to ground for accurate Fuel Level indication.

Fuel Level Indicator:

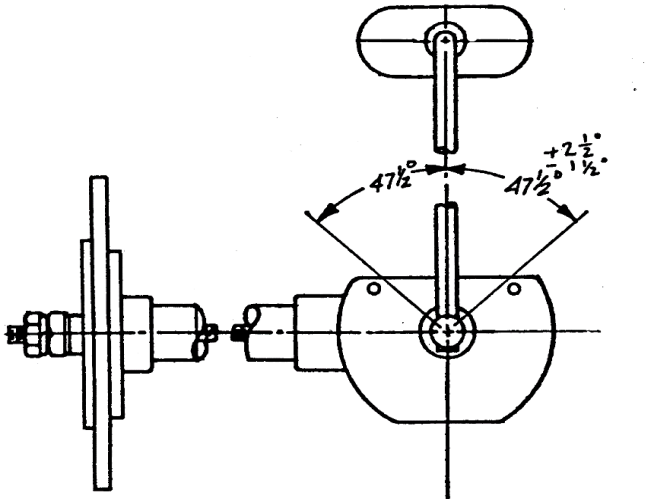
The Fuel Gauge is a D'Arsonval movement indicator (electrical analog meter) with a back lighting option and powered by 24 VDC. It receives a variable resistance to ground, from the Fuel Sending Unit that acts as a variable resistor, to indicate the fuel level.

Fuel Level Indicator Fig. 1

Fuel Level Indicator (rear view) Fig. 2

Fuel Level Sender:

The Fuel Level Sender, is a variable resistor (potentiometer) that is actuated by a moveable arm and Float assembly. The moveable Arm and Float are attached to the variable resistor mechanically. The Arm and Float assembly are limited to 95 deg. of total travel (± 47.5 deg. (+ 2.5 deg. and – 1.5 deg.)) from the 90 deg. position to the Fuel Level Sender assembly as shown below in Fig. 2.



Fuel Level Sender Fig. 3

Fuel Level Sender Fig. 4

Fuel Level Indicator Functional test:

- Ensure the BATT switch is in the OFF position.
- Remove the “SEND” terminal nut from the Fuel Level Indicator terminal stud
- Remove the Fuel Level Sender wire terminal that is installed on the “Send” terminal stud.

    - **NOTE:** Ensure that the Fuel Level Sender Wire terminal is not contacting the terminal stud on the Fuel Indicator “SEND” terminal stud while completing this Functional Test. This could cause the indicator to receive the incorrect resistance to ground during the test.

- Remove the “Ground” terminal nut (center terminal stud) from the Fuel Level Indicator terminal stud.
- Install the “Fuel Indicator Test Box” test lead marked “ + ”, red spiral wrapped end, (POS) to the SEND terminal stud and install the retaining nut on the Fuel Level Indicator.
- Install the “Fuel Indicator Test Box” (Fig. 5) test lead marked “ - ” (NEG) to the Ground (center) terminal stud and install the retaining nut on the Fuel Level Indicator.
- Ensure the Fuel Indicator Test Box switches are all in the **center position**, accept for the switch marked “GRD”. The GRD switch should be in the down position, pointing towards the “GRD” label.

- **CAUTION:** With battery power applied to the indicator, do not move any switches without the "GRD" switch in the "GRD" position. If the GRD switch is in the center or pointing up (not pointing to the GRD position) damage could occur to the indicator.

Fig. 5 Fuel Indicator Test Box

- Place the Fuel Indicator “Degree Plate” over the face of the indicator (see figures 6 and 7). Align the CL line (on the Degree Plate) with the White line on the outer edge of the Indicator Face (at the 12:00 position) and the lower alignment target should align with the Indicator Needle Motor center (See figure 8 below)

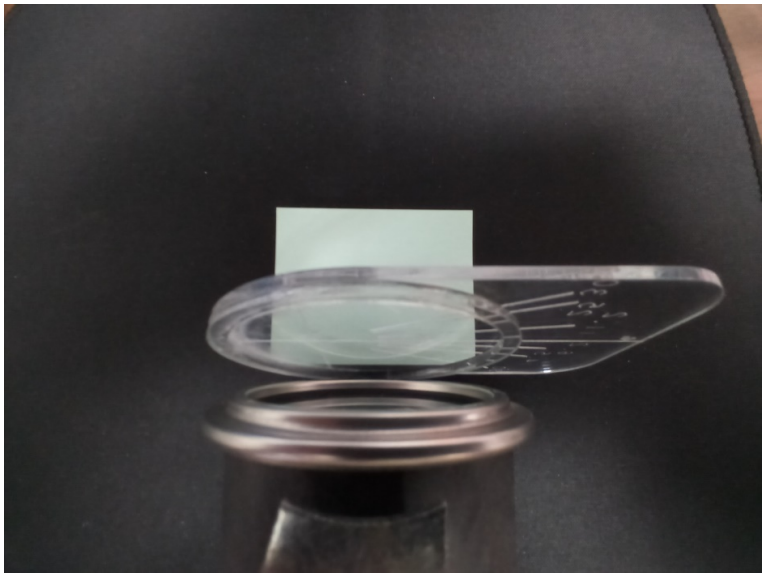


Fig. 6 Degree Plate installation

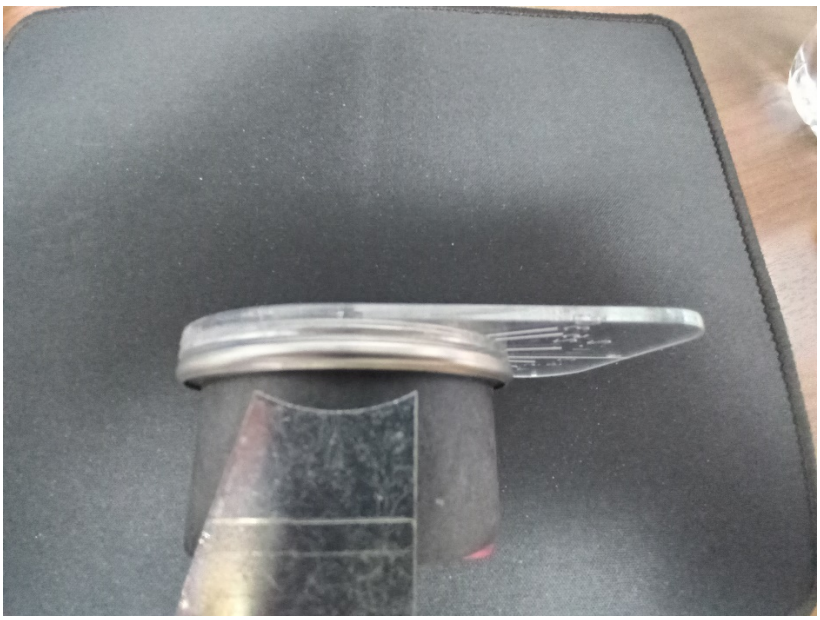


Fig. 7 Degree Plate installed

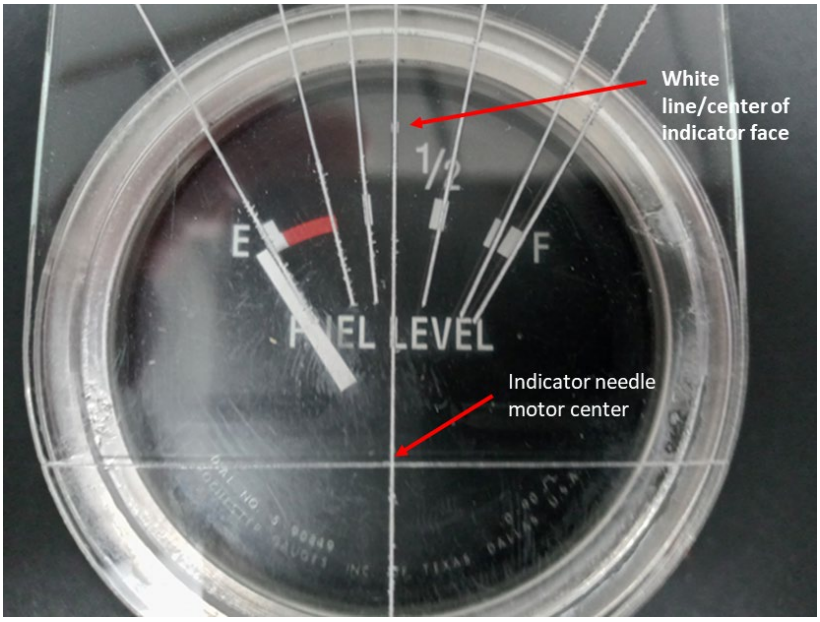


Fig. 8 Fuel Indicator Degree Plate alignment

- **NOTE:** Ensure that once the Degree Plate is aligned, it is not moved while testing is being completed. Tape can be used to secure it to the Indicator.

- Turn the BATT switch to the on position, this will supply 24VDC to the Fuel Level Indicator. Power must be applied to the indicator to operate.
- With the Fuel indicator test box switches in the center position and the GRD switch in the GRD position, place the 0/20 switch in the '0' position, then push the GRD switch to the center position.

- View the indicator through the Degree Plate and verify the Fuel Level Indicator needle aligns with the 30 deg. line on the Degree Plate; Left of the Center Line (CL) and the "E" (Empty) on the Indicator.
- Place the GRD switch to the GRD position.
- Place the 0/20 switch to the '20' position, then place the GRD switch to the center position.
- View the indicator through the Degree Plate and verify the Fuel Level Indicator needle aligns with the 14.5 deg. on the Degree Plate; left of the Center Line (CL) and the "Red Zone" on the Indicator.
- Place the GRD switch to the GRD position.
- Return the 0/20 switch to the center position and place the 30/49 switch to the '30' position, then place the GRD switch to the center position.
- View the indicator through the Degree Plate and verify the Fuel Level Indicator needle aligns with the 6.2 deg. on the Degree Plate; left of the Center Line (CL) and the "1/4" on the Indicator.
- Place the GRD switch to the GRD position
- Place the 30/49 switch to the '49' position then place the GRD switch to the center position.
- View the indicator through the Degree Plate and verify the Fuel Level Indicator needle aligns with the 11.2 deg. on the Degree Plate Right of the Center Line (CL) and the "1/2" on the Indicator.
- Place the GRD switch to the GRD position.
- Return the 30/49 switch to the center position.
- Place the 71/81 switch to the '71' position, then place the GRD switch to the center position.
- View the indicator through the Degree Plate and verify the Fuel Level Indicator needle aligns with the 25 deg. on the Degree Plate; Right of the Center Line (CL) and the "3/4" on the Indicator.
- Place the GRD switch to the GRD position.
- Place the 71/81 switch to the '81' position, then place the GRD switch to the center position.
- View the indicator through the Degree Plate and verify the Fuel Level Indicator needle aligns with the 30 deg. on the Degree Plate Right of the Center Line (CL) and the "F" (Full) on the Indicator.

- Place the GRD switch to the GRD position.
- Place the 71/81 switch to the center position.
- Turn the BATT switch to the off position.
    - **NOTE:** Before reinstalling the aircraft wire terminals below to the indicator, inspect the terminal connection for security, corrosion and cleanliness.
- Remove the Ground Terminal Stud Nut (center stud) from the Indicator, remove the test box terminal and reinstall the nut on the terminal.
- Removed the "Send" Terminal Stud Nut from the indicator, remove the test box terminal, reinstall the "Send" wire terminal, previously disconnected and reinstall the nut on the terminal.
- Turn the BATT switch to on, verify the Fuel Level Indicator is working.

Fuel Level Indicator Test Kit:

Description and Operation:

The Fuel Level Indicator Test Kit contains a test box with switchable resistance circuits. The operator has the ability to change the resistance to the “Send” Fuel Level Indicator terminal to verify 6 indicator readings vs degree positions on the Degree Plate.

Fig. 1

The two Leads will be installed on the “Send” and “Ground” terminals on the back of the Fuel Level Indicator. The terminal with the RED wrap around the end is the (+) terminal, which is installed on the Fuel Level Indicator “Send” terminal. The Black terminal is the (–) terminal, which is to be installed on the Fuel Level Indicator Center terminal. The DPDT, Center off switches, are connected to 1% or lower tolerance resistors in the following values:

0Ω ± 1%

20Ω ± 1%

30Ω ± 1%

49Ω ± 1%

71Ω ± 1%

81Ω ± 1%

GRD switch: This switch is used to ensure that no resistance to ground is being provided to the Fuel Level indicator. This switch is used to protect the indicator during testing.

CAUTION: This switch has to be used as described in the
Fuel Level Indicator Functional test, or damage may occur to the gauge.

0 / 20 switch: 0Ω is a direct connection to ground and the 20Ω position will present a 20Ω resistance to the Send terminal.

30 / 49 switch: 30Ω position will present a 30Ω resistance to the Send terminal. The 49Ω position will present a 49Ω resistance to the Send terminal.

71 /81 switch: 71Ω position will present a 71Ω resistance to the Send terminal. The 81Ω position will present an 81Ω resistance to the Send terminal.

Fuel Level Indicator Gauge Degree Plate:

The Fuel Level Indicator Gauge Degree Plate is an acrylic Indicator overlay with the required reference lines to calibrate the indicator to a specific resistance to ground.

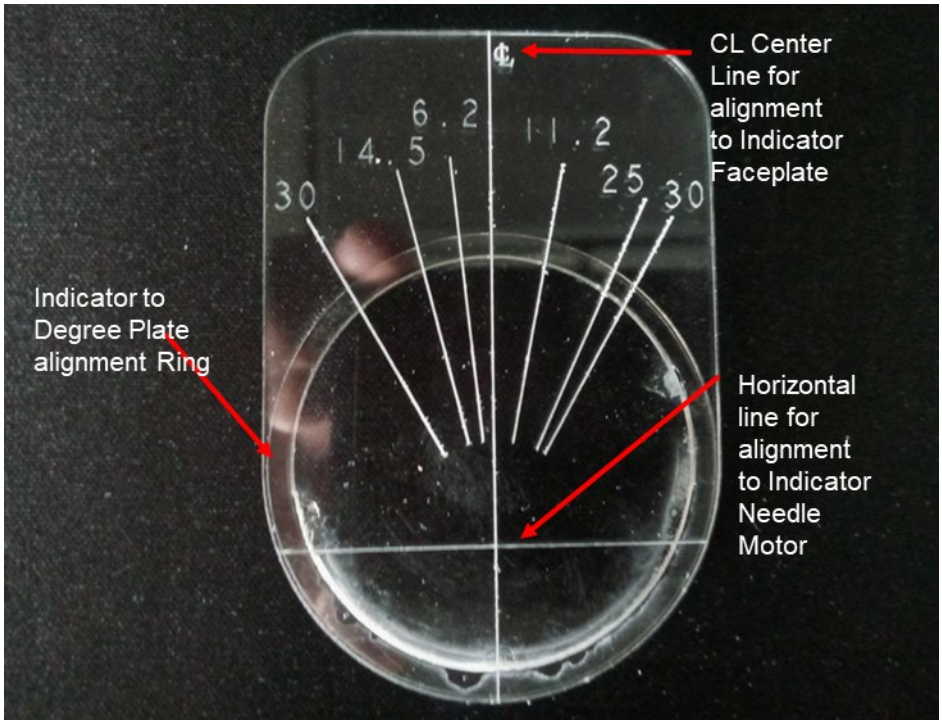


Fig. 1 Fuel Level Indicator Degree Plate

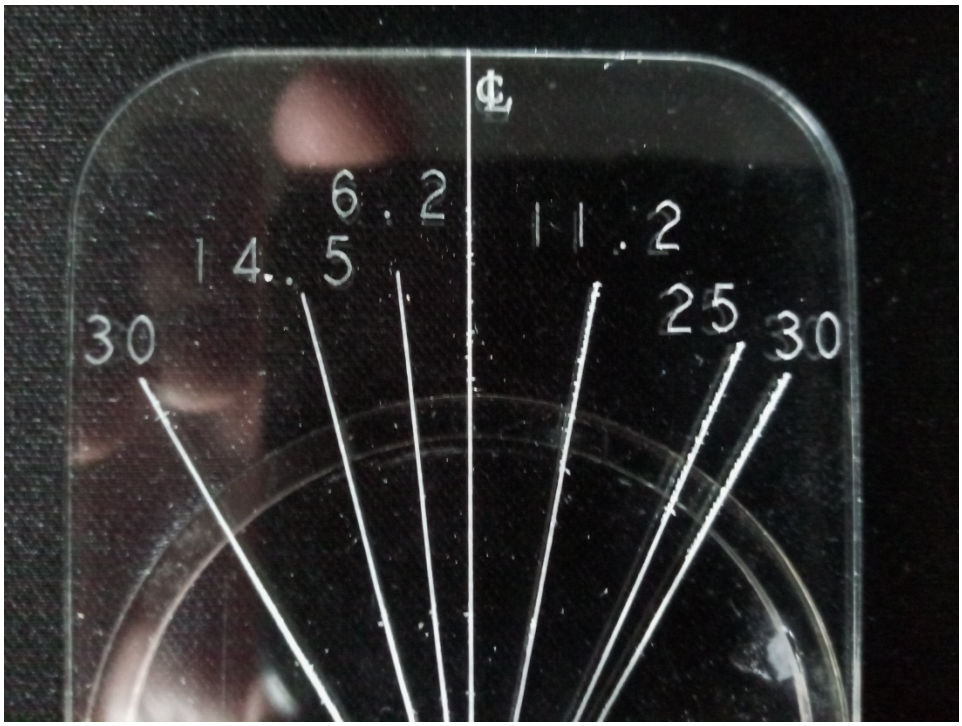


Fig. 2 Degree Plate Reference lines

The **CL** in Fig. 2 is to be aligned with the Indicator Faceplate center reference at the 12:00 position on the face plate. Where the CL line crosses the Horizontal line, on the lower face of the Degree Plate, this should aligned with the Indicator Needle Motor center. The alignment should resemble Fig. 3 below:

Fig. 3 Indicator to Degree Plate alignment

XI ELECTRICAL SYSTEM

1. The electrical system is made up of the following: 24 volt 45 amp. (standard) alternator; (2) 12 volt batteries hooked in series; a battery relay and starter relay; navigation lights, cockpit lights, landing lights, starter, stall warning light, agitator motor (optional), fuel boost pump motor, amp meter, switches and fuses.

2. The alternator used in the standard (-9) system is of the Motorola 8E series. It is rated at 45 amperes maximum, under test conditions. It is driven by the engine through a coupling consisting of a splined quill end and keyed sleeve. The two are connected by a 3/16" diameter steel shear pin. The shear pin is installed to protect the engine accessory gears. The alternator has a 1000 mfd. capacitor connected from the ground terminal to the auxiliary terminal to protect the diodes from transient voltages. The voltage regulator is integrated with the alternator.

3. The batteries are (2) 12 volt Gill G-25, or equivalent, connected in series. The aluminum battery box is coated with acid resistant paint inside and is vented overboard by a tube from the bottom of the box.

4. The landing lights are located in the outboard leading edges of the wings. The cockpit lights are the Grimes 15- 0007 lights which may be removed from their mounts for use out of their normal position. The lighting intensity is controlled by the rheostat switch on each unit.

5. The ammeter and the main bus fuses are located in the small panel at the right side of the cockpit.
   All of the electrical switches are located at the bottom of the instrument panel. They are installed so that they are in the "off" position when the toggle is down. The landing light lamps are controlled through two 25 amp. circuit breaker switches in the panel.

   The battery relay is located adjacent to the battery box and the starter relay is located behind the firewall on the right side.

6. The electric system which is provided as an option for night Agricultural operations uses a larger alternator and has additional lights.

ELECTRICAL SYSTEM TROUBLESHOOTING

Symptom No. 1 ALTERNATOR FAILS TO CHARGE AND MAIN FUSE IS O.K.

Check the following:

A. Alternator fails to rotate.
B. Open or high resistance in charging or ground return circuit or battery connection.
C. Excessively worn, open or defective brushes.
D. Open excitation resistor.
E. Regulator Inoperative.
F. Open rotor (field coil).

Symptom No. 2 LOW OR UNSTEADY CHARGING RATE:

Check the following:

A. Intermittent or high resistance charging or ground return circuit or battery connections.
B. Excessively worn, sticky or intermittent brushes.
C. Faulty regulator.
D. Shorted or open rectifier diode.
E. Grounded or shorted turns in rotor (field coil).
F. Open, grounded or shorted turns in stator.

Symptom No. 3 EXCESSIVE CHARGING RATE: (as evidenced by lights and fuses burning out frequently, battery requires too frequent refilling).

Check the following:

A. Make certain all connections on alternator and regulator are tight.
B. Regulator faulty.

BATTERY

The aircraft storage battery circuit represents a continuous, although variable, electrical load to the alternator. If the circuit, positive or negative, is opened or broken while the alternator is charging, the loss of the battery will result in the charging voltage rising to unsafe levels.

High voltage will damage the alternator and regulator and may damage other electrical accessories or instruments.

LTERNATOR TEST

This test excludes the regulator from the alternator system, thereby isolating the problem to either the regulator or alternator.

CAUTION: DO NOT UNDER ANY CIRCUMSTANCES DISCONNECT ALTERNATOR FIELD TERMINAL WIRE WHILE ALTERNATOR IS OPERATING.

A. Disconnect field terminal wire.
B. Connect a rheostat (40 ohm, 3 amp) from output terminal to field terminal (test points A & B, Figure below).

NOTE: A fully charged battery does not present a load to the alternator. If maximum field current is applied to the alternator field with no load on the alternator, the output voltage of the alternator will exceed the safe maximum value and overcharging of the battery and possible damage to the alternator may occur. Therefore, it is imperative that the field resistor be set at maximum resistance at the beginning of the test and that some load (turn on lights) be presented to the alternator. Wiring directly from the output terminal to the field terminal without the rheostat is permissible if the engine RPM is kept below 1200 RPM, and if the engine run is just for a few seconds to verify that the alternator is working.

C. With "Field Resistor" set at maximum resistance, start engine and observe current output at ammeter in cockpit.

D. If the alternator does not produce current flow at the ammeter during the above test, remove the alternator for repair or replacement.

E. If the alternator does produce current in the above test, then the trouble must lie with the voltage regulator or some other item in the system. The voltage regulator may be replaced with a spare. If this does not remedy the problem check the master switch for proper operation and continuity; check the 300 ohm resistor on the forward side of the firewall.

The following rule applies to the alternator charging system:

CAUTION: IF A BATTERY IS BEING INSTALLED, MAKE CERTAIN THAT THE GROUND POLARITY OF THE BATTERY AND THE GROUND POLARITY OF THE ALTERNATOR ARE THE SAME. REVERSE POLARITY WILL DESTROY RECTIFIER DIODES IN THE ALTERNATOR.

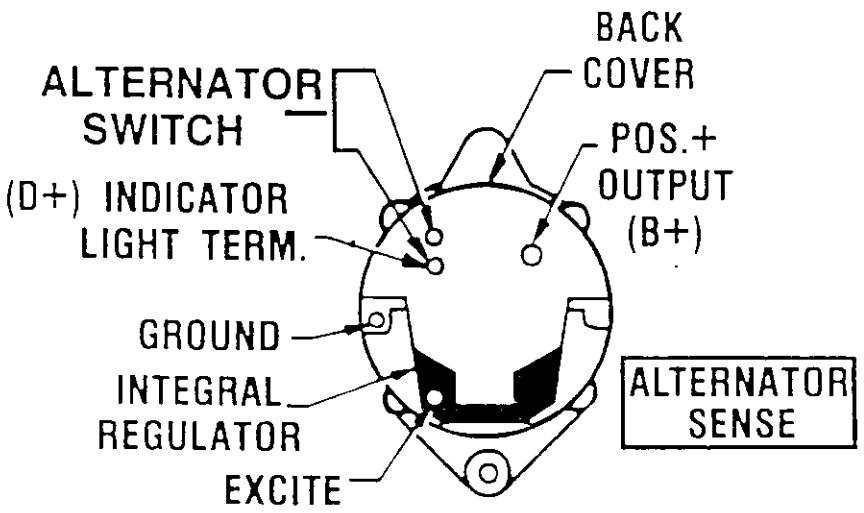
TESTING PRECAUTIONS

DO NOT under any circumstances, short FIELD terminal of alternator to ground.

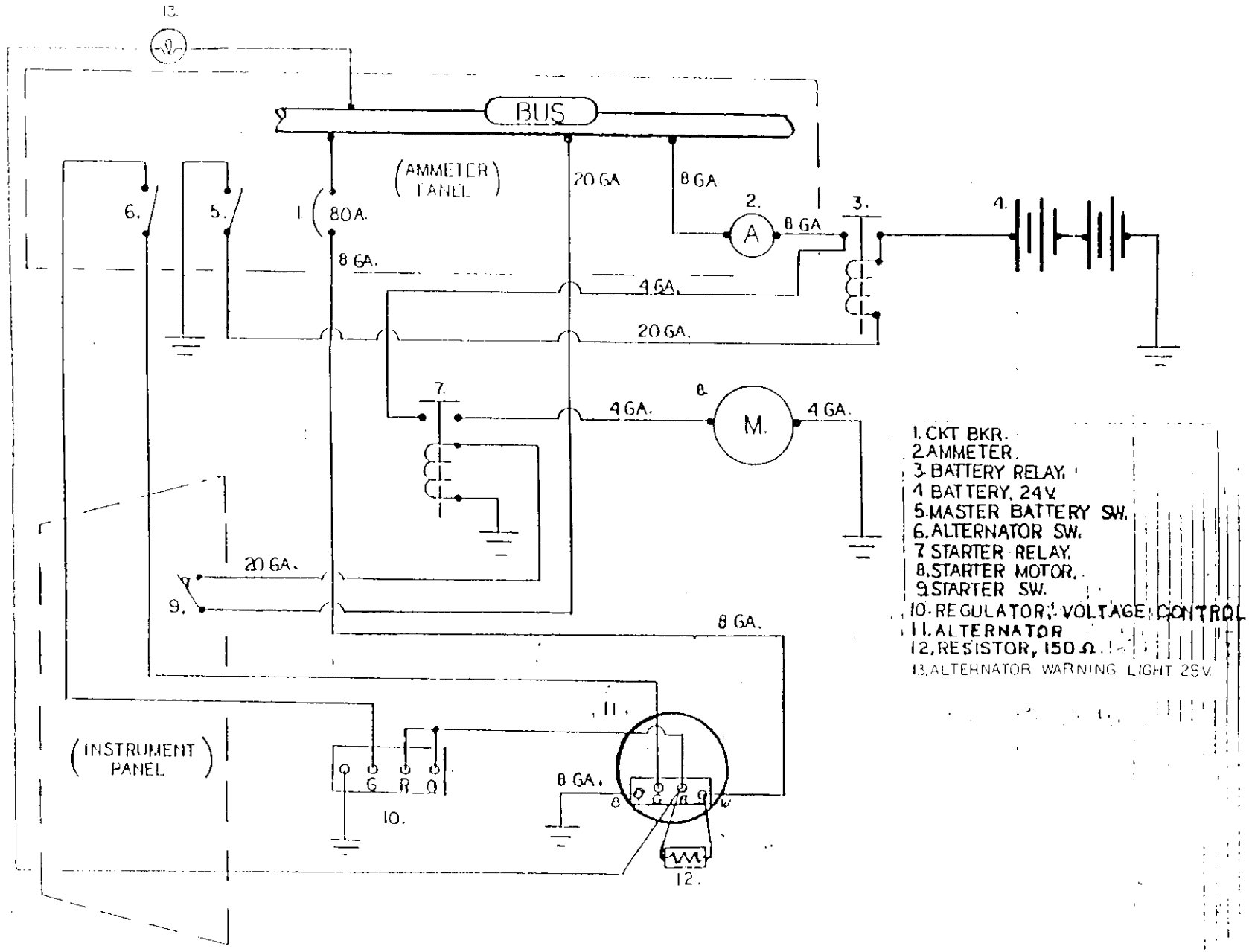
DO NOT disconnect voltage regulator while alternator is operating.

DO NOT disconnect load (alternator output lead) from alternator while alternator is operating.

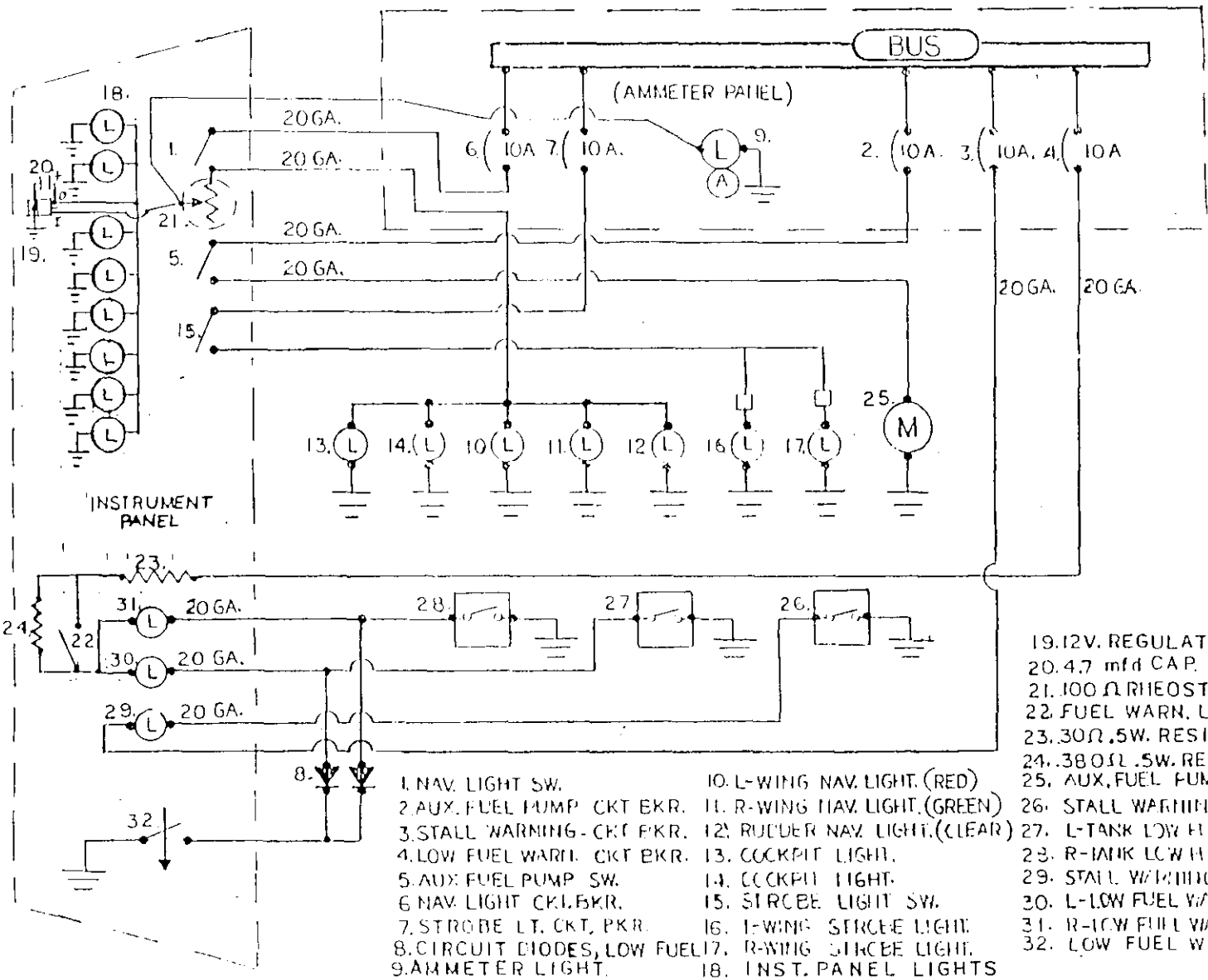
MAKE SURE that the master switch is off or that the battery is disconnected before making any wire connection.



ALTERNATOR TEST CONNECTIONS

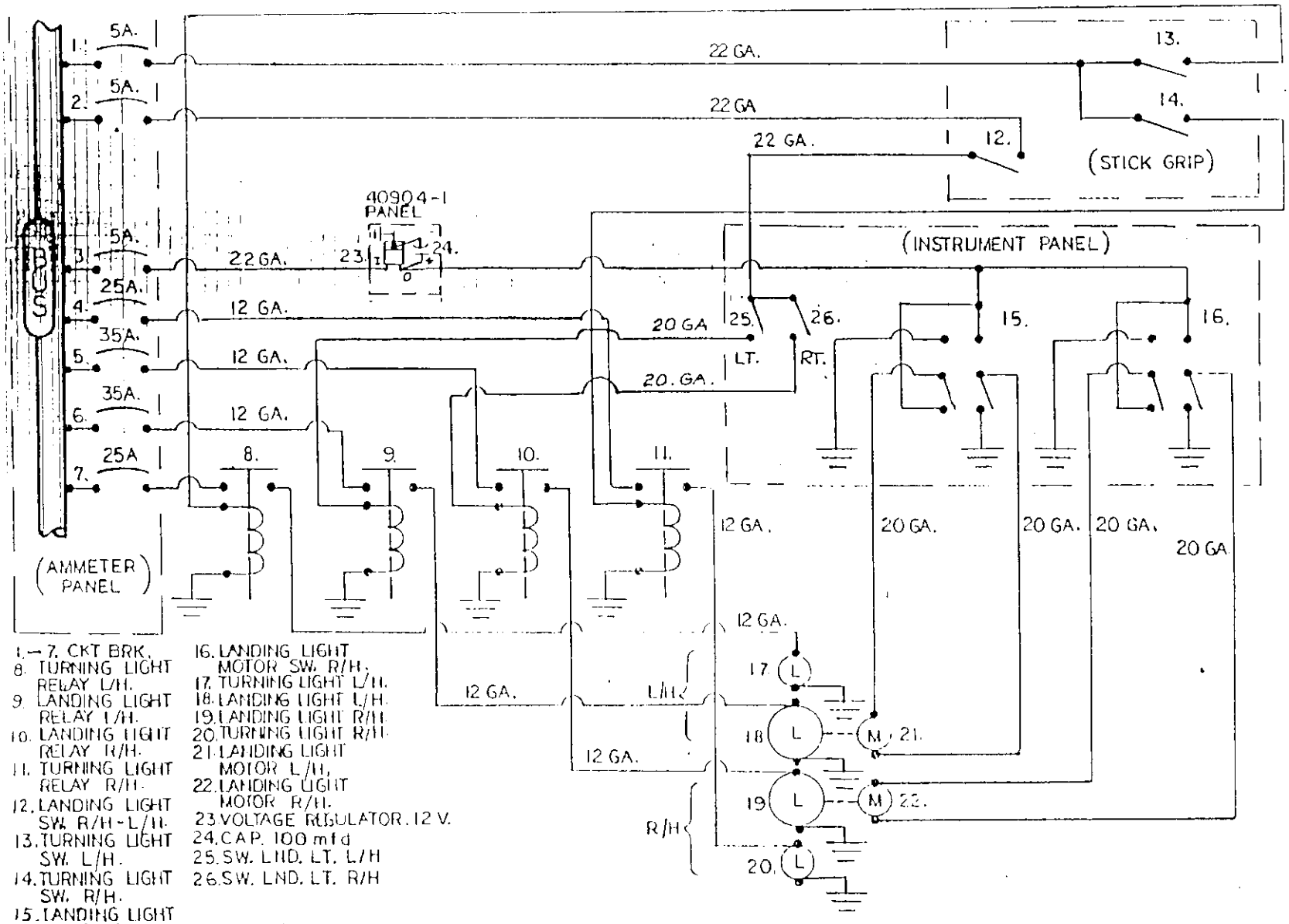


BATTERY-STARTER-ALTERNATOR



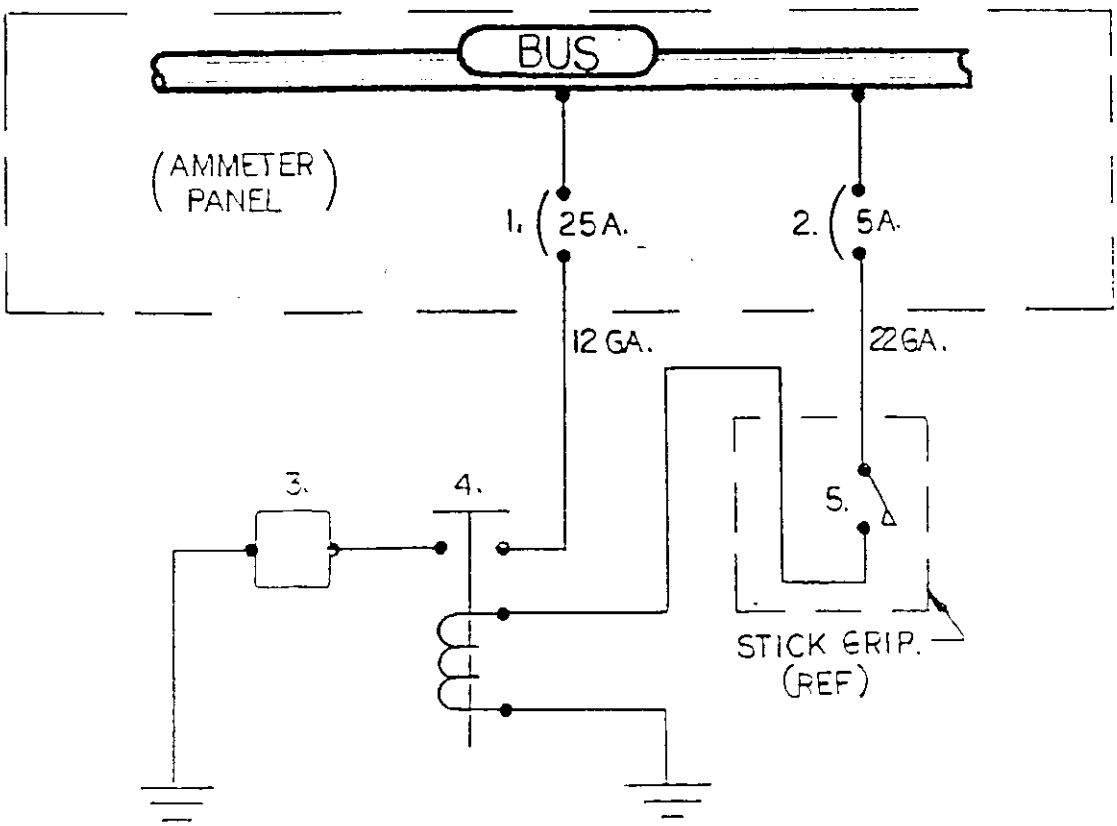
1. NAV. LIGHT SW.
2. AUX. FUEL PUMP CKT BKR.
3. STALL WARNING - CKT BKR.
4. LOW FUEL WARN. CKT BKR.
5. AUX FUEL PUMP SW.
6. NAV. LIGHT CKT. BKR.
7. STROBE LT. CKT. BKR.
8. CIRCUIT DIODES, LOW FUEL
9. AMMETER LIGHT.
10. L-WING NAV. LIGHT. (RED)
11. R-WING NAV. LIGHT. (GREEN)
12. RUDDER NAV. LIGHT. (CLEAR)
13. COCKPIT LIGHT.
14. COCKPIT LIGHT.
15. STROBE LIGHT SW.
16. L-WING STROBE LIGHT
17. R-WING STROBE LIGHT.
18. INST. PANEL LIGHTS
19. 12V. REGULATOR
20. 4.7 mfd CAP.
21. 100 Ω RHEOSTAT
22. FUEL WARN. LT. DIM. SW.
23. 30Ω .5W. RESISTOR
24. 380Ω .5W. RESISTOR
25. AUX. FUEL PUMP MOTOR
26. STALL WARNING SW.
27. L-TANK LOW FUEL FLOAT SW.
28. R-TANK LOW FUEL FLOAT SW.
29. STALL WARNING LIGHT
30. L-LOW FUEL WARNING LIGHT.
31. R-LOW FUEL WARNING LIGHT
32. LOW FUEL WARN. TEST SW.

NAV. LIGHTS, AUX FUEL PUMP & STALL WARNING.



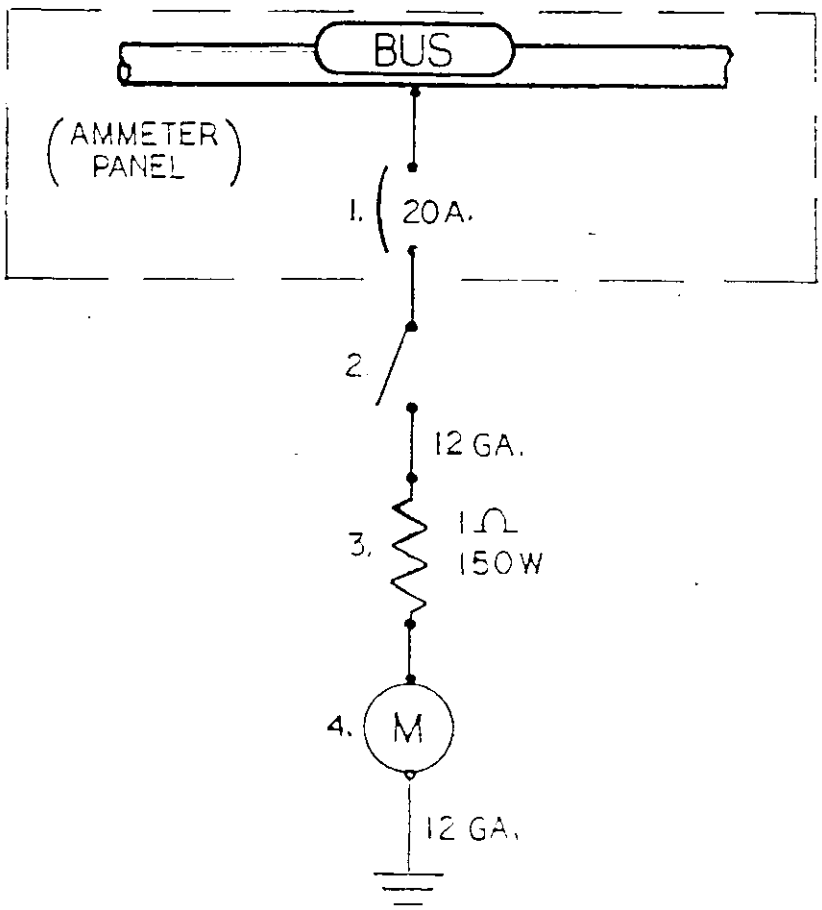
1.—7. CKT BRK.
8. TURNING LIGHT RELAY L/H.
9. LANDING LIGHT RELAY L/H.
10. LANDING LIGHT RELAY R/H.
11. TURNING LIGHT RELAY R/H.
12. LANDING LIGHT SW. R/H-L/H.
13. TURNING LIGHT SW. L/H.
14. TURNING LIGHT SW. R/H.
15. LANDING LIGHT MOTOR SW. L/H.
16. LANDING LIGHT MOTOR SW. R/H.
17. TURNING LIGHT L/H.
18. LANDING LIGHT L/H.
19. LANDING LIGHT R/H.
20. TURNING LIGHT R/H.
21. LANDING LIGHT MOTOR L/H.
22. LANDING LIGHT MOTOR R/H.
23. VOLTAGE REGULATOR. 12 V.
24. CAP. 100 mfd
25. SW. IND. LT. L/H
26. SW. IND. LT. R/H

NIGHT OPERATING LIGHTS.



1. CKT BRK.
2. CKT BRK.
3. SOLENOID.
4. RELAY.
5. SWITCH, MOMENTARY.

AUTO FLAG



1. CKT BKR.
2. SWITCH.
3. RESISTOR.
4. MOTOR, AGITATOR.

AGITATOR

XIII DISPERSAL SYSTEM

1. The dispersal system consists of the following: A fiberglass hopper of approximately 335 gallons; a wind driven centrifugal spray pump, a three way valve, and spray boom with nozzles.

2. The hopper is made of fiberglass cloth and fiberglass laminates with ATLAC polyester resin. Repairs to the fiberglass may be made by ordinary hand lay up methods using plain weave fiberglass cloth and ATLAC resin. If patching is required be sure that the area to be repaired is thoroughly cleaned using alcohol or methyl ethyl ketone (MEK). In some instances, light sand blasting may be advisable to provide a surface condition for thorough bonding. Follow resin manufacturers recommendations for proper mix and cure.

3. The sump is made of type 304 stainless steel, with an aluminum door. The door seal is neoprene rubber. The door adjustment nuts should be tightened evenly to seal and should not be tightened more than is necessary to be liquid tight. If the rubber seal shows signs of compaction along the line of contact with the door opening, the seal should be replaced.

4. Grease the hopper agitator shaft bearings (If aircraft is so equipped) on both sides of the sump approximately once every 25 hours of operation. Water proof grease is preferred.

5. The spray pump is removed by loosening the clamps on the hose connections to the sump and uncoupling the quick disconnect.

6. To install the optional Weatherly spreader: Hook up the rear support guides first, then raise the front in place and with the door slightly open, attach to the sides of the sump and fasten Dzus fasteners on the rear supports. Install two 1/4" dia. bolts to sides of sump and spreader. The adjustable rods that operate the sump door should be adjusted in order to relieve the door seal pressure, when solid materials are being dispersed. Move the spray control handle in the cockpit all the way forward so that the valve by-pass opening to the sump, is closed.

XIV MAINTENANCE OF THE F100AA WINDMILL

WEATH-AERO CO.
HOLLISTER, CALIF.

Routine service and maintenance of the F100AA windmill following accepted aeronautical practices will assure a long and productive life for this assembly.

At lease every 30 hours of operation check the hub for security on the pump shaft, also check the blades in the hub for excessive free play.

Minor nicks or abrasions in the blades can be smoothed out with a file or sandpaper. Check the blades for damage whenever the pump has been removed and reinstalled on the aircraft. Although the blades are made of high strength materials, accidental dropping of the pump and windmill on a hard surface may create a crack in a blade which could result in subsequent failure.

If excessive vibration is felt in the aircraft from operation of the windmill, check the blades for excessive looseness and obvious out of balance condition. Check the main pitch change bearing for roughness.

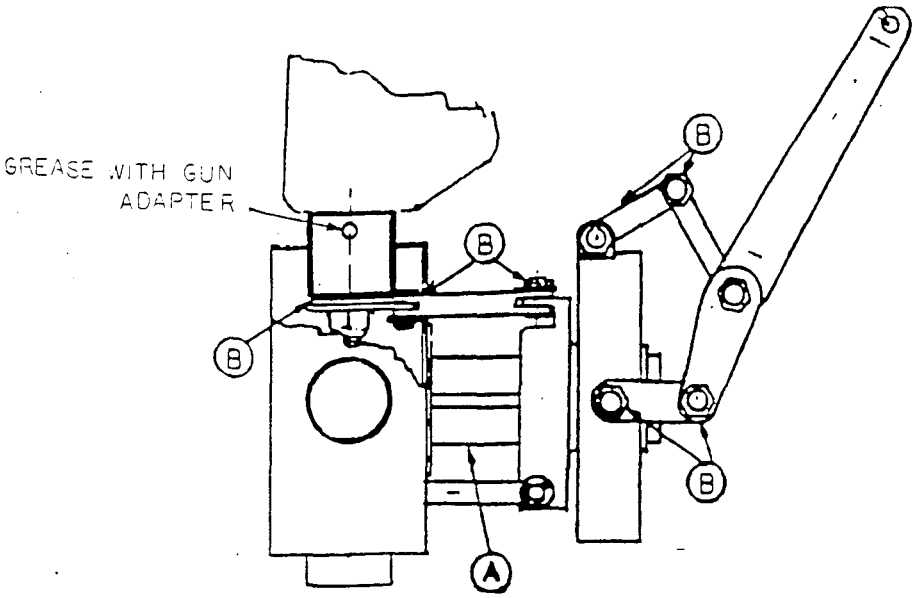
KEEP THE WORKING PARTS CLEAN AND LUBRICATED. The following is a suggested schedule, however operation in a particularly dirty environment may require more frequent attention. The Morse control cable assembly should not require lubrication. DO NOT USE STEAM CLEANER OR PRESSURE WASHER. These methods will wash out lubrication in the assembly and will greatly shorten the service life of the unit. Use cleaning solvent and wipe or brush clean. See illustration on following page.

A. Maintain light coating of moly-sulfide grease.

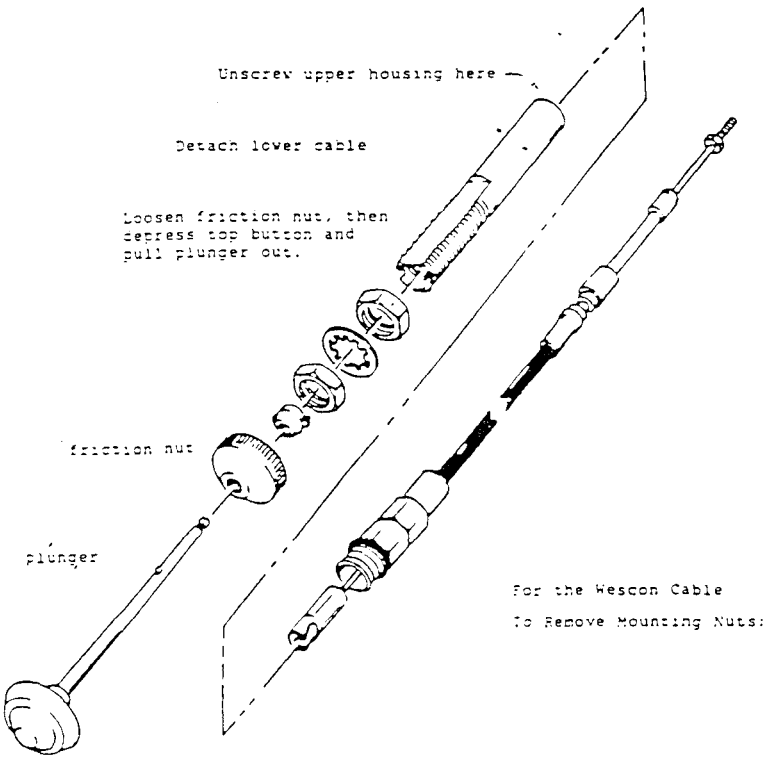
B. Lubricate pins and bolts as needed with moly-sulfide grease.

C. Lubricate thrust bearings and needle bearings annually with light bearing grease. When reinstalling blades, tighten retaining nut until slight drag is felt in bearing, then back nut off slightly to free movement.

NOTE: To reduce blade damage: Take-off and land with blades in feathered position.



WINDMILL LUBRICATION POINTS



WINDMILL VERNIER TYPE COCKPIT CONTROL

XV PERIODIC AIRCRAFT INSPECTIONS

1. DAILY. Check general condition and cleanliness. Drain fuel tank sumps. Grease tail wheel and main landing gear at grease fittings. Flush out hopper and spray equipment with soapy water after each day's use. Leave sump door open. Grease agitator shaft as outlined in section XI.

2. 25 HOURS. Daily inspection plus oil change. Remove and check main engine oil screen and sump plugs. Fill brake reservoir.

3. 100 HOURS. 25 hour inspection plus following:

(a.) Remove main wheels and check condition of brake discs and brake shoes. Pack wheel bearings.

(b.) Remove tail wheel and pack tail wheel bearings. Check condition and movement of tail wheel locking pin. Check wear and general condition of the vertical spindle assembly. Check tail wheel fork for cracks or deterioration. Check condition of centering springs and locking cable. Check tail wheel assembly bolt attachments. Check tail wheel spring for cracks.

(c.) Clean engine and adjust valve clearances. Check magneto breaker points. Check general condition of engine. Change carburetor air filter. Check alternator drive and cooling fan for wear or looseness. After first 100 hours (after overhaul) check torque on cylinder hold down nuts.

(d.) Check general condition of propeller and service as required. (See Section II 6)

(e.) Remove panels and fairings and conduct inspection from any applicable standard annual inspection form.

(f.) Check elevator trim system for condition and operation. Check the 1/16" cable for condition and tension. Set tension by suspending a one pound weight on the horizontal cable near the top of the access opening aft of the cockpit. Cable deflection with the weight applied should be 5/8 inch. To increase friction at the trim control spool in the cockpit, merely tighten the nut on the bolt which mounts the spool and trim control wheel. Check condition and wear of bias beam bushings and other moving parts. Lubricate slides and slots with moly-sulfide grease.

(g.) Clean out chemical and other residue from inside aircraft.

(h.) Check oil level in main gear shock struts ("FULL" mark

on dip stick). Service with SAE 10 oil.

(i.) Check main landing gear mount casting bolt attachment. Remove landing gear cuff and inspection hole cover. Preferably, the aircraft must be raised so that weight is off the gear. Check the top and bottom bolts for tightness. Tighten to 41 Ft/Lbs with torque wrench.

(j.) Check for excessive wear in bottom bushings of landing gear shock strut. Check wear of torque knee bushings. Weight should be off the wheels for these inspections. With the weight off the strut, excessive wear will be evident by movement of the lower gear. If free movement at the axle of 1/8" or more in any direction, or if rotation of 1/4" or more at the end of the axle occurs, the bushings should be replaced.

(k.) Inspect wing to fuselage. Attach brackets and wing spars around bolt holes for cracks in the fittings and possible loosening of rivets.

(l.) With fairings removed, inspect attachment of the bottom fuselage member to forward side of the front spar (through the spar web).

(m.) Inspect tail group, including all attach points and hinges. Particularly check outboard hinges on elevators and top hinge on rudder (nearest to mass ballast weights). Shake rudder to check for looseness of the ballast weight in rudder overhang.

(n.) Remove wing bands and inspect wing hinge fittings.

(o.) Check aileron and aileron support arms.

(p.) Check condition of all control tubes and rod end bearings. Check aileron control tube trunion and bearings through inspection holes in bottom of center section. Remove access cover and check aileron bell-cranks and bearings at inboard end of ailerons. Check control stick bottom bushings and torque tube bearings.

(q.) Check tightness of bolts along the bottom longerons, which hold the belly assembly to the upper assembly of the tail cone. Check tightness of bolts holding the tail frame assembly to the aft end of the tail cone. Visually inspect frame for cracks.