NOTICE TO AIRCRAFT OPERATOR

The Volpar Turboliner modification kit is manufactured by:

Volpar Inc.
7929 Hayvenhurst Avenue
Van Nuys, California 91406

The current owners of the Volpar Turboliner aircraft should assure themselves of receiving the latest revisions to the Maintenance Manual, Flight Manual, Service Bulletins and Service Letters by contacting Volpar Inc. at the above address, giving the registration number of the aircraft and the Volpar Turboliner serial number. The latter number should be found on a plate adjacent to the orginal aircraft identification plate.

ISSUED TO_____

DATE_____

AIRCRAFT NO._____

COPY NO._____

LOG OF REVISIONS

TURBOLINER II MAINTANENCE MANUAL D-110

REVISION NUMBER	REVISED PAGES	DESCRIPTION OF REVISION	APPROVED BY AND DATE
1	4-2, 4-3 4-4, 4-5	ADDED PAGES DESCRIBING AILERON RUDDER INTERCONNECT SYSTEM	F. F. Taylor 2-17-71
2	7-2	CHANGED BLADE ANGLE SETTINGS TO CORRESPOND TO THOSE SPECIFIED IN STC SA2204WE	F. F. Taylor 11-12-71
3	3-4 3-4-1	ADDED PAGES 3-4-1 DESCRIBING WING SPAR STRAP TORQUE PROCEDURE, AND NOTE TO DRAIN FUEL TANKS BEFORE WING REMOVAL	F.F. TAYLOR 12-12-72
4	11-4 11-4-1	ADDED LIST OF ELECTRICAL CIRCUITS, AND APPLICABLE AIRCRAFT MODEL	F.F. Taylor 1-3-73
5	5-12-1 5-12-2	ADDED PAGES DESCRIBING RETRACT NUT INSPECTION, MAIN & NOSE LANDING GEAR.	F.F. TAYLOR 8-13-74

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INTRODUCTION

The organization of the Volpar Turboliner Shop Manual has been planned with the intent of presenting the various data in logical sequence for maximum convenience and minimum time required to locate the desired information. The user of this manual will not be inconvenienced by over-simplified and repetitious instructions. However, where relatively complex maintenance operations are involved adequate step-by-step procedures are included. Throughout the manual, ample illustrations to supplement the text are located as close as possible to the related discussion. A basic understanding of each system and familiarization with its theory of operation may be readily grasped from the description preceding each major system covered.

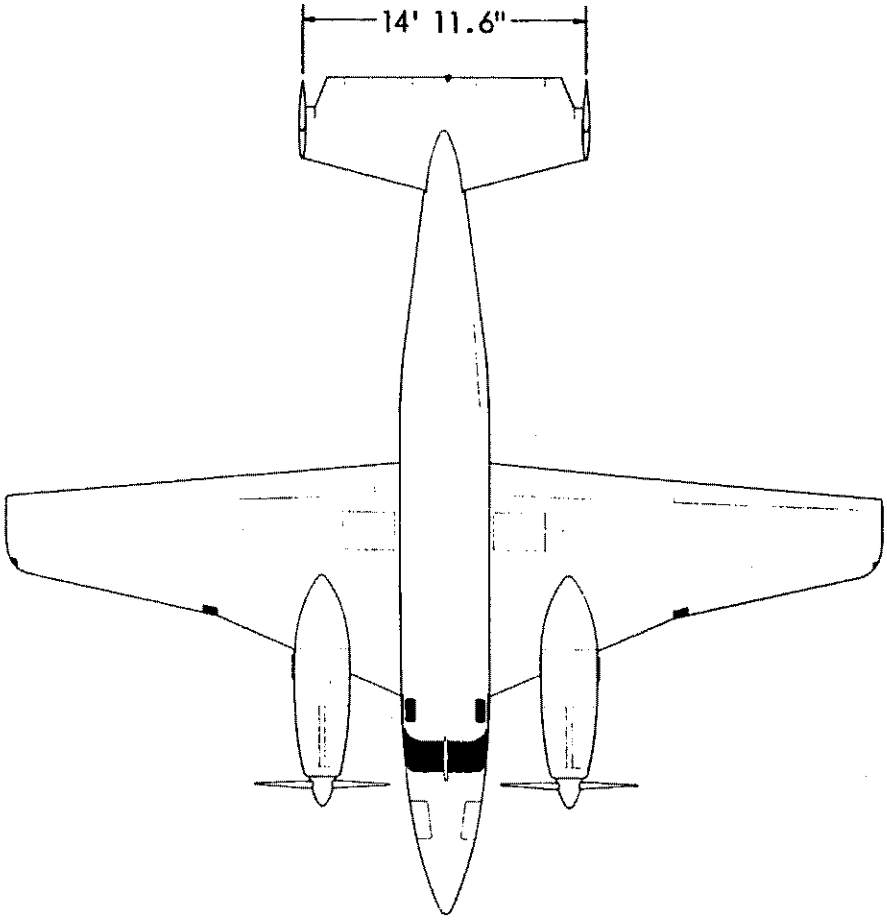
Operating instructions in the Volpar Turboliner Shop Manual are limited to those that are essential in performing the maintenance procedures described in the publication. Complete operating instructions may be found in the Volpar Turboliner Pilot's Operating Manual.

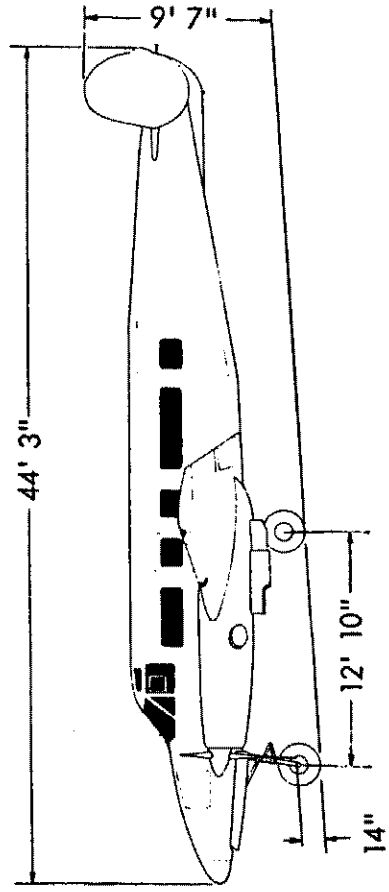
SUPPLEMENTARY PUBLICATIONS

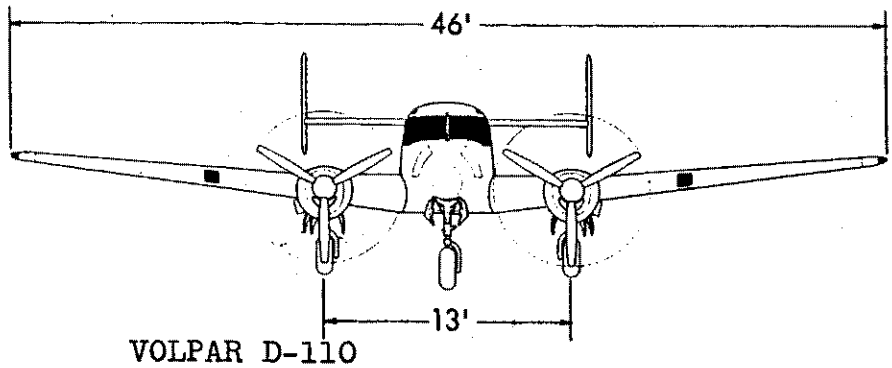
Beechcraft Model 18 Maintenance Manual
p/n 414-180161 B10 Revised 2/14/64 or later

AiResearch TPE 331-1-101B Maintenance Manual
report no. 4A-165 Revised 5/30/69 or later

B.F. Goodrich Brake Manual
no. 864 Revised 2/9/69 or later







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POWER PLANT (Specifications and Information)

TPE 331-1-101B Turboprop Engine	620 SHP @ 2000 R
Engine Type	Fixed Shaft
Type of Combustion Chamber	Annular
Prop. Shaft Rotation (looking forward)	Clockwise
Propeller Shaft Speed	2000 RPM
Dry Weight	335 lbs.

ENGINE OIL

Type	MIL-L-23699A MIL-L-7808D MIL-L-007808F
Oil Tank Capacity	6 U.S. Quarts
Oil Pressure	Approx. 90 psi
Oil Consumption (max)	0.02 lbs/hr.

PROPELLER

Hartzell Propeller Co	HC-B3TN/T10176
Type	Reversing
Deice Brush Block Replacement	Goodrich, replace brushes when 15/32 inch max. distance is measure on wire inserted thru inspection hole in suppo block.

FUEL SYSTEM

Engine Fuel	Aviation Turbine Fuels ASTM designations: Jet A, Jet A1, and Jet B Military Fuels, MIL-J-56 JP-4 and JP-5.
Alternate Fuel	80/87 octane aviation gasoline or whi gas. Not to exceed 1000 per 100 hours.
Fuel Capacity	430 gal. to 632 gal. depending on tank arrangement.

MISCELLANEOUS

Brake Fluid Reservoir	Fill to within 1½ to 2 inches of top

SERVICE

Battery	100 hours
Main Gear Tires	79 to 82 psi
Nose Gear Tire	64 to 66 psi
Oil Filter	200 hours
Oil Change	800 hours
Main Strut Extension	2.5 inches
Nose Strut Extension	2.9 inches
Fuel System Screens and Strainers	100 hours or sooner if conditions warrant.
Shimmy Damper	100 hours

FLIGHT CONTROL SURFACES

Flaps	0 deg. Full Up 45 deg. Full Down
Aileron	38½ deg. Up 21 deg. Down
Aileron Tab	22 deg. Up 19 deg. Down
Rudder	19 deg. Right 19 deg. Left
Rudder Tab	30 deg. Right 30 deg. Left
Elevator	35 deg. Up 25 deg. Down
Elevator Tab	19 deg. Nose Up 12 deg. Nose Down

FLIGHT CONTROL CABLE TENSION SETTINGS

NOTE
All cable tensions given are tensionmeter readings at 59 degrees F.

Rudder Cables	60± 10 lbs.
Elevator Cables	120± 10 lbs.
Aileron Cables	50± 10 lbs.
Rudder Tab Cables	10± 2 lbs.
Aileron Tab Cables	10± 2 lbs.
Elevator Tab Cables	10± 2 lbs.

TABLE OF TORQUES

PROPELLER

Mounting Bolts	110 to 120 ft.lbs.(when us Volpar tool no. T-004, torque wrench should be se at 73¼ ft.lbs. to obtain the proper torque)

ENGINE MOUNTING BOLTS AND COMPONENTS

Engine mount to nacelle	480 to 690 in.lbs.
Engine mount to engine	325 to 350 in.lbs.
Igniters	445 in.lbs. max.
Bleed air pad	40 to 50 in.lbs.
Starter/generator	120 to 130 in.lbs.
Starter/generator adapt. clamp	50 in.lbs.
Tachometer generator	65 to 70 in.lbs.
Propeller pitch control	20 to 25 in.lbs.
Propeller governor	65 to 70 in.lbs.
Torque transmitter	15 to 20 in.lbs.
Fuel nozzel	65 to 70 in.lbs.
Fuel control	75 to 85 in.lbs.

TOWING

With the tow bar connected the aircraft can be steered with the nose wheel when moving by hand or with a tug. When using a tug observe the turn limits marked on the shimmy damper. The aircraft brakes should never be used while the aircraft is being towed. The aircraft should never be towed by the tail skid.

PARKING

The brakes can be set for parking by pulling out the parking brake control and depressing the pilots brake pedals. Do not attempt to lock the parking brake by applying force to the parking brake handle; it controls a valve only and cannot apply pressure to the brake system. To release the brakes, push the parking brake control in.

NOTE

Do not set the parking brakes during low temperatures when an accumulation of moisture may cause the brakes to freeze, or when they are hot from severe use.

ANCHORING AND MOORING

Refer to section 2 of the Beechcraft Model 18 Maintenance Manual.

CONTROL LOCK

Refer to section 2 of the Beechcraft Model 18 Maintenance Manual.

HOISTING THE AIRCRAFT

Refer to section 2 of the Beechcraft Model 18 Maintenance Manual.

JACKING THE AIRCRAFT

The main jacking points are located on the lower surface of the wing center section between the fuselage and the nacelle. Install wing jack pad, p/n TK116, before jacking the aircraft. A tail stand must be installed prior to jacking the aircraft. Individual wheels may be lifted by the use of adapter, p/n , installed on the landing gear fork.

CAUTION

Before jacking the aircraft, the battery switches must be OFF.

LEVELING

Refer to section 2 of the Beechcraft Model 18 Maintenance Manual.

GENERAL MAINTENANCE INFORMATION

The information in the following paragraphs pertains to general maintenance procedures.

Detailed information on the engine or its systems will be found in the engine maintenance manual or in the system paragraphs in this manual.

INSTRUMENT ACCESS

The instrument panel on the Turboliner is divided into four sections: the center section contains the engine instruments while the two side sections contain the dual flight instruments, the top section contains the radio equipment.

Access to the flight instruments is provided by mounting screws in the panel section. Remove the mounting screws and tilt the panel section; the plumbing connected to the instruments is of sufficient length to provide easy access to the desired flight instument for maintenance.

The radio equipment, mounted in the top section of the panel, is the quick removable type. Each component is individually mounted in the panel. Removal of the radio components is accomplished by removing the two attaching screws from each side and sliding the entire component out of the panel. The wiring connections are of sufficient length to permit the component to slide free of the panel.

Engine instruments may be removed from the center section in the following manner: pull the post light shield off to provide clearance for the instruments. Loosen the retaining screw, located below and to the left of the instrument, and the instrument retaining clamp. Sufficient wiring is provided to allow the instrument to be pulled straight out.

SERVICING

EXTERNAL POWER

The external power receptacle is located on the left side of the nose section. The receptacle is designed for a standard AN type plug. To supply power for ground checks or to assist in starting, a ground power source capable of delivering a continuous load of 500 amperes and up to 1000 amperes for .1 second is required. Observe the following precautions when using an external power source.

a. Use only an auxiliary power source that is negatively grounded. If the polarity of the power source is unknown, determine the polarity with a voltmeter before connecting the unit to the aircraft.

b. Before connecting the external power unit, turn off all radio equipment and generator switches and battery switches.

c. If the unit dose not have a standard AN plug, check the polarity and connect the positive lead from the external power unit to the center post and the negative lead to the rear post of the aircraft's external power receptacle. The small pin of the receptacle must be supplied with 24 VDC to close the external power relay.

TIRES

CAUTION

Tires that have picked up fuel or oil film should be washed down as soon as possible with a detergent solution to prevent contamination of the rubber.

Maintaining proper tire inflation will help to aviod damage from landing shock and contact with sharp stones and ruts, and will minimize tread wear. When inflating the tires, inspect them for cuts, cracks, breaks, and tread wear. The main tires should be inflated between 79 and 82 psi and the nose tire between 64 and 66 psi.

NOSE LANDING GEAR SHOCK ABSORBER

To check the fluid level in the nose landing gear shock absorber, deflate the strut by releasing the air through the valve, then remove the cap assembly. The fluid level should be at the top of the cylinder with the strut fully compressed. If the fluid level is low add MIL-H-5606 hydraulic fluid, work the strut slightly to eliminate any trapped air, then add more fluid as necessary.

CAUTION

Release the air pressure entirely before removing the cap assembly.

With the aircraft empty except for fuel and oil, inflate the nose strut until the piston is extended 2.9 inches.

MAIN LANDING GEAR SHOCK ABSORBER

To check the fluid level in the main landing gear shock absorbers, deflate the strut by releasing the air through the valve, then remove the entire valve assembly. Compress the strut completely, then extend until .75 inch of the piston is exposed, block the strut in this position while filling. After filling fully compress the strut, the fluid level should be even with the bottom of the gage tube.

CAUTION
Release tne air pressure entirely
before removing the valve assembly.

With the aircraft empty except for fuel and oil, inflate the main gear struts until the piston is extended 2.5 inches.

FLAP ACTUATOR

Refer to section 2 of the Beechcraft Model 18 Maintenance Manual.

LANDING GEAR SHIMMY DAMPER

Check security of all connecting parts, check cylinder and seals for leaks as it is important for the proper dampening operation. Install tow bar on nose strut and turn wheel to extreme right side of aircraft. This operation moves the piston to the bottom end forcing oil and all the air to the top of filler plug end. Be sure this position is maintained during the time the plug has been removed for inspection and filling. Fill with fluid to within 3 threads of top of plug opening, use MIL-H-5606 hydraulic fluid.

BRAKE SYSTEM

Brake system servicing is limited primarily to maintaining the hydraulic fluid level in the reservoir mounted in the upper left hand corner on the aft bulkhead of the nose landing gear compartment. When the reservoir is low on fluid, add a sufficient quanity of MIL-H-5606 hydraulic fluid to fill the reservoir to within 2 inches of the top. Refer to section 5 of this manual for bleeding the hydraulic brake system. The only other requirements related to servicing involves the wheel brakes themselves. Although each brake is equipped with an automatic adjuster that eliminates the need for periodic adjustment of brakeclearance, the brake must be checked periodically for indication of excessive wear. For detailed information relating to the proper inspection and

repair procedures, refer to B.F. Goodrich Brake Manual.

ENGINE FIRE EXTINGUISHER

Access to the fire extinguisher cylinder is through the wheel wells of the main landing gear. Each cylinder is charged with $2\frac{1}{2}$ pounds of Bromotrifluoromethane ($CBrF_3$) and pressurized .08 pounds of dry nitrogen to 450 psi at 70 deg.F. Check the pressure gage on each cylinder prior to flight to ascertain that the cylinders are charged to within the pressure limits for the ambient temperature as noted in the Cylinder Pressure Limit Chart.

In addition to the foregoing check, each cylinder should be removed and weighed at six month intervals. A fully charged cylinder weighs 5.37 pounds.

Fully discharged cylinders or any cylinder weighing less than the specified amount should be returned to a recharging station certified by the vendor (Walter Kidde and Company, Inc.,Belleville 9, New Jersey or American Standard, 1401 South Shamrock Avenue, Monrvia, Calif.) for a proper charge of extinguishing agent. Such stations are located in most major cities of the country.

FIRE EXTINGUISHER CYLINDER
PRESSURE LIMITS

TEMP IN F	-40	-20	0	20	40	60	80	100	120	140
INDICATED PRESSURE IN PSI	190 to 240	220 to 275	250 to 315	290 to 365	340 to 420	390 to 480	445 to 550	525 to 635	605 to 730	700 to 840

SERVICING THE OXYGEN SYSTEM

To recharge the oxygen system, remove the protective filler cap from the filler valve and attach the hose from an oxygen recharging cart to the filler valve.

WARNING

Avoid making sparks and keep all burning cigarettes or fire away from the vicinty of the aircraft. Make sure that the oxygen shutoff valve in the cockpit is in the closed position. Inspect the filler connection for cleanliness before attaching it to the filler valve. Make sure that your hands, tools, and clothing are clean

particularly of grease or oil, for these contaminents will ignite upon contact with pure oxygen under pressure. As a further precaution against fire, open and close all oxygen valves slowly.

To prevent overheating, fill the oxygen system slowly by adjusting the recharging rate with the pressure regulating valve on the cart. Fill the cylinder until a pressure of 1800± 50 psig at a temperature of 70 deg.F. (This is a steady state condition, after the cyclinder has cooled from the recharging heat build-up) This pressure may be increased an additional 3.5 psi for each degree of increase in temperature; similary, for each degree of drop in temperature, reduce the pressure for the cylinder by 3.5 psi. When the oxygen system is properly charged, disconnect the filler hose from the filler valve and replace the protective cap on the filler valve. If at any time, in the process of servicing and purging the system or replacing the oxygen cylinder, it becomes necessary to disconnect a fitting, the threads should be sealed with MIL-T-27730 size "1" teflon tape or MIL-T-5542B sealing compound. Apply to the first three threads of the male fitting. A swage-lock fitting should be tightened one and a quarter turns from finger tight position.

PITOT SYSTEM SERVICING

The pitot system drain pet cocks should be checked for moisture collection following each washdown and each flight in atmosphere containing high humity.

OIL SYSTEM

Servicing the engine oil system primarily involves maintaining the engine oil at the proper level, changing the filter element at 200 hours intervals and changing the engine oil at 800 hour intervals.

CAUTION

Do not mix different brands of oil when adding oil between oil changes.

The oil tank is provided with an oil filler neck and quanity indicating dip stick cap. The dip stick is marked in U.S. quarts. The oil tank capacity is 6 quarts and should be a minimum of 5 quarts for flight.

BATTERY

Refer to the Sonotone Battery Manual.

LUBRICATION

Engine Controls			
Linkage (all moving parts)	MIL-G-21164	Grease	As required
Control Rod Ends	MIL-G-23827	Grease	100 hours
Propeller Hub	MIL-G-23827	Grease	100 hours
Control Column Linkage	MIL-L-7870	Oil	200 hours
Rudder Pedals and Linkage	MIL-L-7870	Oil	200 hours
Aileron Control System	MIL-L-7870	Oil	200 hours
Flap System	MIL-G-21164	Grease	1000 hours
Landing Gear Retract System			
Retract Chains	MIL-G-6711	Grease	100 hours
Shaft Bearings	MIL-G-6711	Grease	50 hours
Door Hinges	MIL-L-7870	Oil	100 hours
Door Retract System	MIL-L-7870	Oil	100 hours
Grease Fittings	MIL-G-7711	Grease	100 hours
Wheel Bearings	MIL-L-3545	Grease	100 hours

SECTION 3

AIRFRAME

The Volpar Turboliner is a non-pressurized aircraft of monocoque construction. Although the wing center section is an intergal part of the fuselage, the wing panels outboard of the nacelles are removable. To provide a convenient stairway for boarding the aircraft, the cabin entrance door on the left hand side of the fuselage swings down. Three emergency exits are installed in the cabin windows on both sides of the fuselage. Individual passenger seats are provided in a variety of optional seating arrangements.

PRIMARY STRUCTURE COMPONENTS

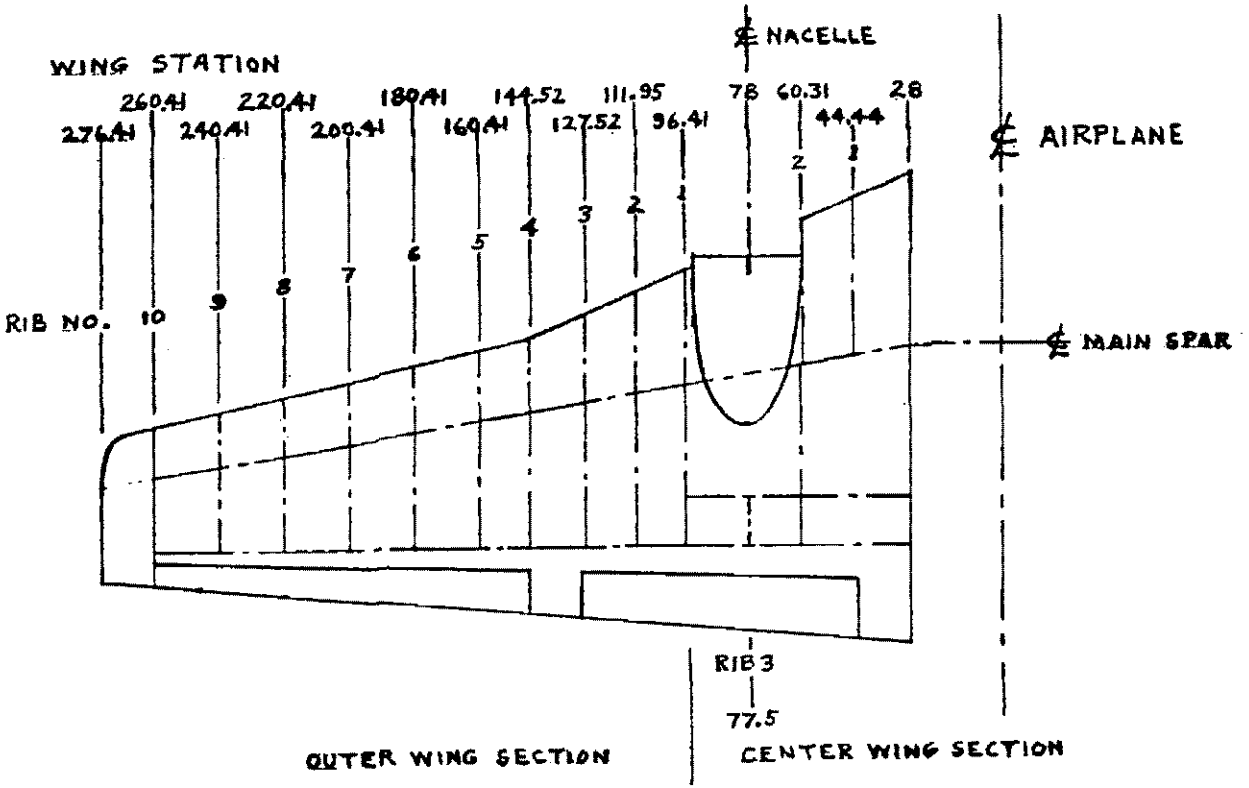
The following primary structure components are essential to the proper function of the aircraft. Failure occuring to any of the components would seriously endanger the safety of the aircraft and/or passengers.

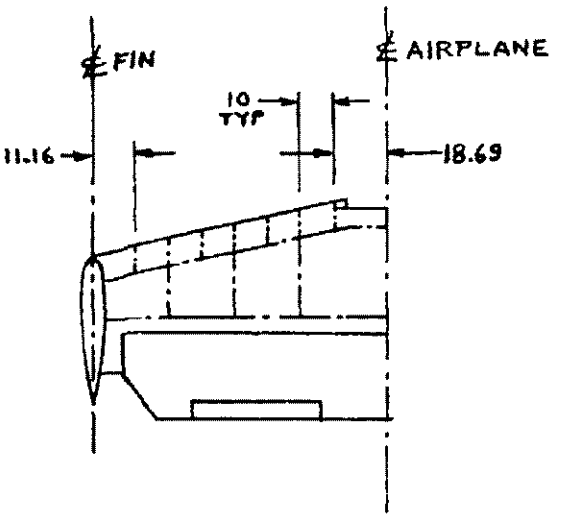
a. Control systems
b. Engine mounts
c. Fittings
d. Coverings of the fuselage, wings, tail surfaces and control surfaces
e. Wing, tail surface and control surfaces spars
f. Landing gear and support structure
g. Auxiliary members used to strengthen or support other members carrying direct loads
h. Seats and seat support structure

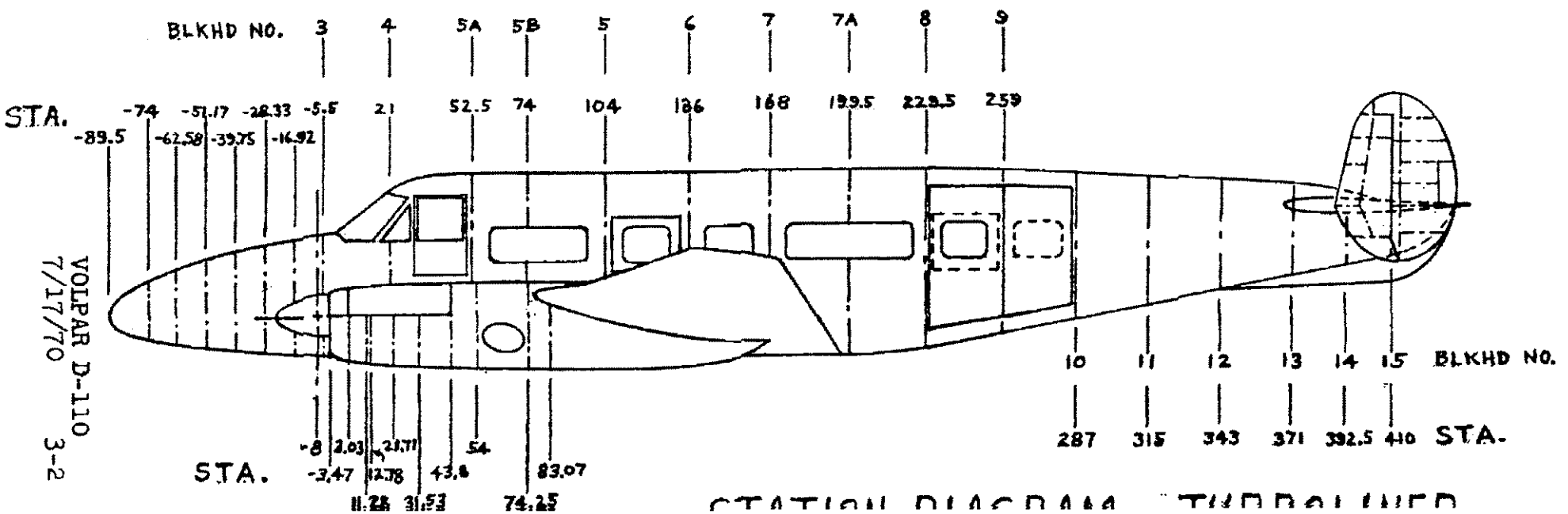
SECONDARY STRUCTURAL COMPONENTS

The following secondary structural components in the event of failure would require immediate attention, but would not necessarily endanger the safety of the aircraft and/or passengers.

a. Wing tips
b. Fairings
c. Nose cones
d. Non-structural doors and covers
e. Furnishings and upholstery (excluding seating)







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STATION DIAGRAM - TURBOLINER

CARGO DOOR

For easier handling of cargo, a cargo door may be installed just forward of the cabin entrance door on the left hand side of the fuselage. The door opens forward on two hinges, when the two aft corner locking pins are retracted, providing a large opening for loading and unloading cargo. A rubber seal installed around the door provides a tight seal when the door is in the closed position.

CARGO DOOR REMOVAL AND INSTALLATION

a. With the door in the open position, remove the securing bolts from the door hinges and remove the door.

b. Installation of the cargo door is the reverse of the removal procedure.

CABIN ENTRANCE DOOR

DOOR REMOVAL

a. Remove the hinge seal retaining strip from the door.

b. Disconnect the cables from the fuselage door frame and remove the door by sliding aft.

DOOR INSTALLATION

a. Position door on hinges.

b. Connect the cable to the fuselage door frame.

c. Reinstall the hinge seal retaining strip with the attaching screws.

WING ASSEMBLY REMOVAL AND INSTALLATION

Refer to section 3 of the Beechcraft Model 18 Maintenance Manual.

Outboard aux. fuel tank and the main fuel tank should be drained of fuel before outer wing panel is removed. The Wing spar modification strap fitting bolt should be removed before proceeding with section 3 Beech Maint. instructions.

WING ASSEMBLY REMOVAL AND INSTALLATION

The spar strap fitting bolt is located under the fairing just outboard of nacelle on the main spar line.

On installation the spar strap must be torque to 67.5 foot pounds, plus the nut torque. Alternate from the left side to the right side of the aircraft in equal sequence of approximately 25 foot pounds to insure proper alignment. Use 5 foot pounds as an average to overcome the nut friction on the new Essna EB126 3/4 nut.

If torque only is to be checked, back off both EB126 nuts until the tension is removed. Check torque required to move the EB126 nuts and add this to the basic 67.5 foot pounds torque, following the procedure above in tightening the nuts. During the torque check the fuel tanks should be empty or near empty.

EMPENAGE REMOVAL AND INSTALLATION

Refer to section 3 of the Beechcraft Model 18 Maintenance manual.

STRUCTURAL REPAIR

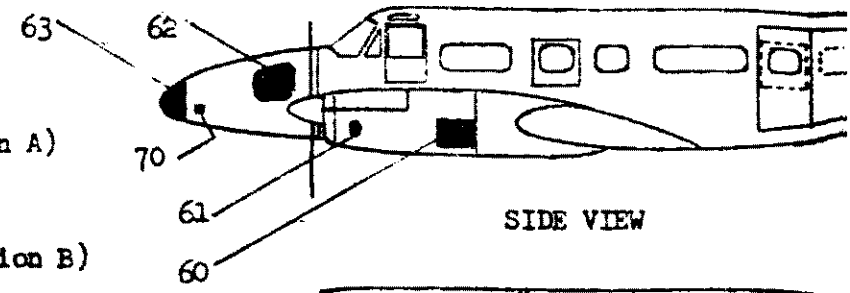
Structural repair methods used on the Turboliner should be in accordance with the Federal Aviation Agency's "Aircraft Inspection and Repair", Manual 43.13-1 and "Aircraft Alterations", Manual 43.13-2. Should a skin panel become damaged, never make a skin replacement from a material thinner than the original skin.

SPECIAL AIRFRAME INSPECTION TECHNIQUES

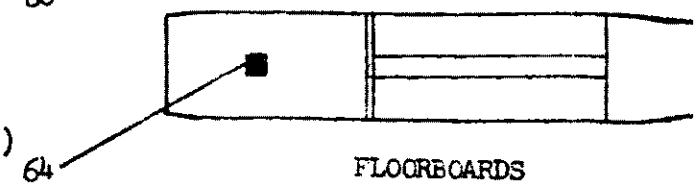
No special inspection techniques for the airframe are considered necessary. Appropriate engine, propeller and equipment inspection techniques will be found in manuals listed under Supplementary Publications, in the General Information Section of this manual. Any special techniques which are developed for the inspection of the airframe will be noted in future publications.

ACCESS PANELS

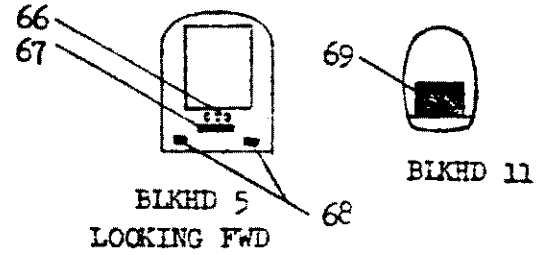
1. Main fuel tank filler
2. Main fuel tank inspection
3. Outbd fuel tank filler } (Option A)
4. Outbd fuel tank inspection }
5. Outbd fuel tank filler
6. Outbd fuel tank liquidometer
7. Outbd fuel line inspection } (Option B)
8. Outbd fuel cell inspection
9. Outbd fuel line inspection
10. Inbd aft fuel tank filler
11. Inbd aft fuel tank liquidometer
12. Inbd aft fuel tank well cover } (Option C)
13. Inbd aft fuel tank sump & strainer
14. Inbd aft fuel tank sump drain
15. Inbd fwd fuel tank filler
16. Inbd fwd fuel tank liquidometer
17. Inbd fwd fuel tank well cover } (Option D)
18. Inbd fwd fuel tank boost pump
19. Inbd fwd fuel tank sump drain
20. Wing baggage locker (Option E)
21. Windshield anti icer tank } (Optional)
22. Windshield anti icer tank filler }
23. Flux valve inspection (Optional)
24. Aileron cables
25. Aileron pulleys
26. Aileron bellcrank
27. Aileron tab actuator
28. Aileron tab mechanism (left wing only)
29. Wing attach pin
30. Aileron cable insp., deicer hoses
31. Wing interior inspection
32. Aileron control
33. Flap hinge bolts
34. Landing gear hinge bolt
35. Air conditioner (optional), fuel system inspection
36. Fuselage belly inspection
37. Control pulleys
38. Rudder control pulley inspection
39. Rudder cable inspection
40. Elevator control inspection
41. Elevator controls
42. Rudder bellcrank bolt
43. Elevator hinge bolts
44. Rudder bellcrank bolt
45. Rudder bellcrank
46. Rudder bellcrank bolt inspection
47. Rudder travel adjustment
48. Rudder cable turnbuckles
49. Rudder cable inspection
50. Elevator tab mechanism
51. Rudder pulleys
52. Stabilizer fairing
53. Stabilizer attachment
54. Rudder tab mechanism
55. Rudder tab mechanism inspection
56. Rudder hinge bolts



SIDE VIEW



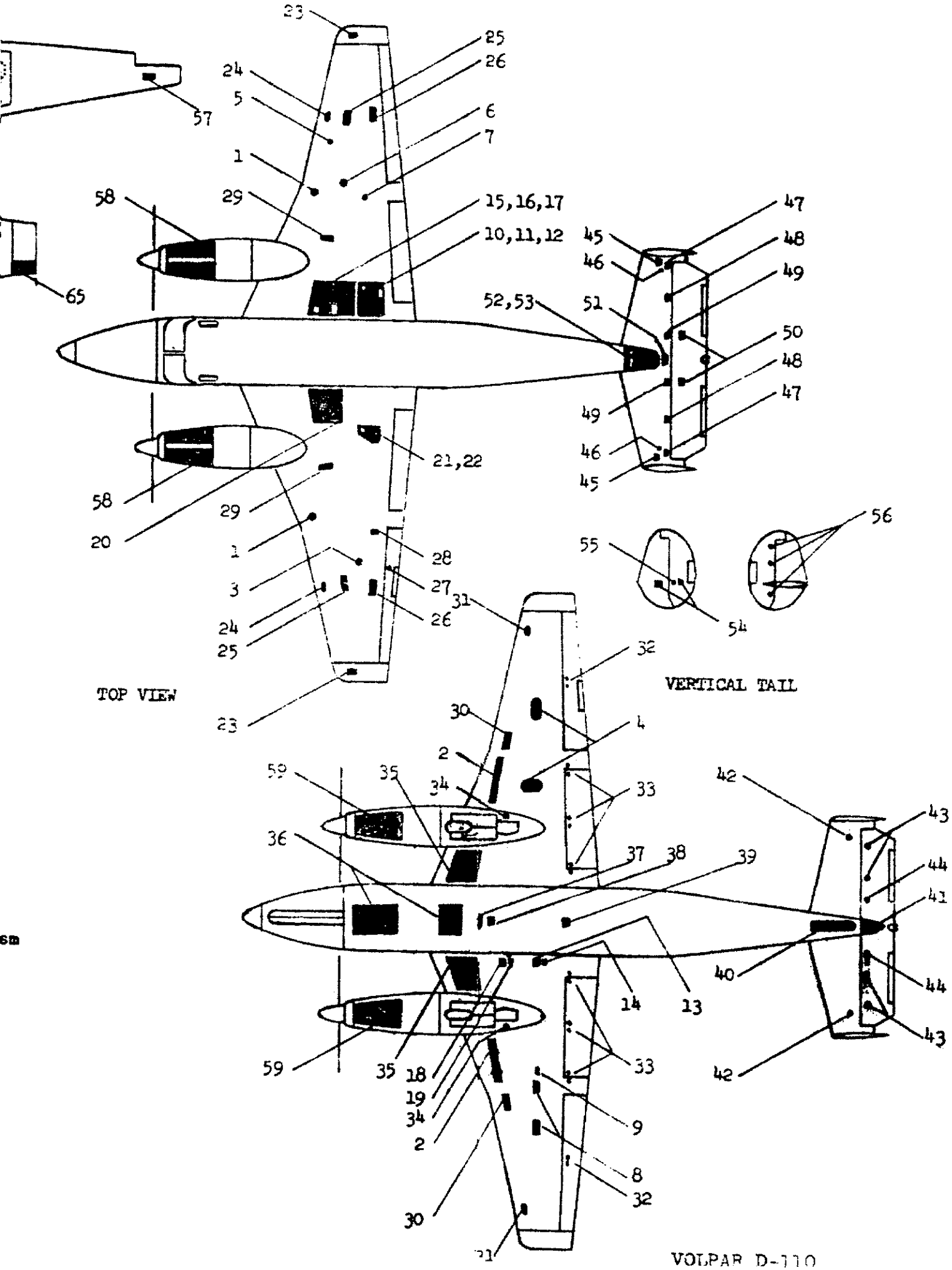
FLOORBOARDS



BLKHD 5
LOOKING FWD

BLKHD 11

57. Elevator controls inspection
58. Engine
59. Engine lower surface
60. Engine exhaust tailpipe
61. Emergency fuel shutoff control
62. Radio compartment
63. Radar antenna
64. Flap limit switches, landing gear clutch adjustment
65. Miscellaneous tools
66. Bulkhead #5 interior inspection (fwd side)
67. Aileron cable connecting links
68. Aileron cable turnbuckles
69. Aileron-rudder interconnect mechan.
70. External power receptacle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FLIGHT CONTROLS

The flight controls, with the exception of the flaps, are conventional cable operated surfaces requiring no power assistance for normal control by the pilot or co-pilot. The rudder, elevator and ailerons have cable operated flight adjustable trim tabs. The flaps are electrically powered and control by a switch on the control pedestal. Positive stops on the control surfaces limit their travel while traveling stops secured on the cables limit the trim tab movement.

With the exception of the rudder aileron interconnect and the travel the rigging, balancing and removal and installation of the flight controls and cables are the same as noted in section 3 of the Beechcraft Model 18 Maintenance Manual. The flight control surface travel is as follows:

Flaps.....	0 deg. Up 45 deg. Down
Aileron.....	38½ deg. Up 21 deg. Down
Aileron Tab.....	22 deg. Up 19 deg. Down
Rudder.....	19 deg. Right 19 deg. Left
Rudder Tab.....	30 deg. Right 30 deg. Left
Elevator.....	35 deg. Up 25 deg. Down
Elevator Tab.....	19 deg. nose Up 12 deg. nose Down

AILERON RUDDER INTERCONNECT SYSTEM:

An addition to the conventional flight control systems of the Volpar Turboliner and Turboliner II aircraft is the aileron and rudder interconnect system which mechanically connects the aileron control system to the rudder control system and limits the effective travel of the rudders.

The system consists of a slide and lever assembly, located in the aft fuselage, and accessible through a access panel at the rear of the main cabin. The right and left rudder cables are attached to the 2283-4 Lever Assembly. Two 1/8 inch Aileron Follow Up Cables are attached to the 2283-20 Slide Assembly and are routed through stainless steel conduit to the forward fuselage compartment, which is accessible through the belly access panel. The Aileron Follow Up Cables are attached to the lower Aileron Cables on the right and left side of the fuselage at a point 16.0 inches forward of the spar or at station 84.0.Rotation of the control wheel from a neutral plane will move the Aileron Follow Up Cables correspondingly, and reposition the 2283-20 slide assembly relative to the 2283-4 Lever assembly, (See Figure 4-1) thus restricting rudder travel in one direction and extending the travel in the opposite direction.

The rigging of the interconnect system should be accomplished after it has been determined that the individual aileron and rudder systems are rigged to the specifications listed section 4 page 1, and the cable tensions adjusted as noted section 3 of the Beech Model 18 Maintenance Manual.

Aileron rudder interconnect surface travel limits are as follows:

AILERON POSITION	RUDDER TRAVEL	
	LEFT	RIGHT
NEUTRAL	$12^{0} \pm 1^{0}$	$12^{0} \pm 1^{0}$
RIGHT AILERON FULL DOWN LEFT AILERON FULL UP	$19^{0} \pm 1\frac{1}{2}^{0}$	$4^{0} \pm \frac{1}{2}^{0}$
RIGHT AILERON FULL UP LEFT AILERON FULL DOWN	$4^{0} \pm \frac{1}{2}^{0}$	$19^{0} \pm 1\frac{1}{2}^{0}$

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RIGGING PROCEDURE AILERON RUDDER INTERCONNECT

1. Lock the aileron wheel or the aileron in the neutral position with suitable clamps or blocks.

2. Lock the rudder pedals or the rudders in the neutral position with suitable clamps or blocks.

3. Attach the 2314-2 clamp assemblies to the lower right and left aileron cables at a point 16.0 inches forward of sheet metal portion of the main spar assembly. Attach the AN667-4 fork at the forward end of the Aileron Followup Cable Assembly to the clamp assembly.

4. Position the 2283-20 slide assembly on its guide so that the distance between the guide bolt and the aileron followup cable attach bolt is 3.52 inches. This is the neutral position for the slide assembly, clamp in position with a "C" clamp.

5. Adjust the AN665-34R Fork End on each of the aileron follow up cables until the cable slack is removed and a positive tension* is required to align the hole in the fork end with the hole in the 2283-20 slide assembly. Install the AN4 attach bolt and secure. Lock the AN316-4 check nut against the fork.

6. Position the 2283-4 lever assembly on its pivot so that it is parallel to the slide assembly (see figure 4-1) and clamp the 2314-4 clamp assemblies to the right and left rudder cables.

7. Remove aileron wheel or control lock, and check aileron travel to determine that the 2283-20 slide has not limited aileron travel of 21° down and $38\frac{1}{2}^{\circ}$ up.

8. Remove rudder pedal or control lock, and check rudder travel to the specifications listed section 4 page 2.

*Follow up cable tension should <u>not</u> be high enough to deflect the aileron cables from there normal plane in neutral position of the control wheel.

REMOVAL AND INSTALLATION PROCEDURE AILERON RUDDER INTERCONNECT

1. The Aileron Followup Cables must be installed with one of the swagged end fittings left off, so that the cable may be passed through the ¼ inch conduit. After the cable is in position the end fitting can be swagged on to the cable with the proper tooling.

2. The removal of the follow up cable from the aircraft necessitates its cutting at one end, it should be determined that proper equipment and materials are available before the removal of this cable.

3. The installation and removal of the 2283-20 slide and 2283-4 lever are self explanitory, care should be taken to keep the numerous bushings in their proper positions.

HYDRAULIC BRAKE SYSTEM

The dual hydraulic brakes are operated by depressing either the pilot's or co-pilot's rudder pedals. A shuttle valve permits changing braking action from one set of pedals to the other. The depression of either set of pedals compresses the piston rod in the master cylinder attached to each pedal. The hydraulic pressure resulting from the movement of the pistons in the master cylinders is transmitted through flexible hoses and fixed aluminum tubing to the disc brake assemblies on the main landing gear wheels. This pressure forces the brake pistons to press against the linnings and discs of the brake assembly. Each brake assembly contains an automatic adjuster that retracts the brake linings to a preset clearance by use of compression springs upon release of the hydraulic pressure against the brake piston.

After the brake pedals have been depressed to build up pressure in the brake lines, the parking brake may be set by pulling out the parking brake control handle on the control pedestal. This closes the parking brake valve to retain the pressure that was pumped into the brake lines. The parking brake is released when the parking brake handle is pushed in and the pedals are depressed briefly to equalize the pressure on both sides of the valve, allowing it to open.

BLEEDING THE BRAKE SYSTEM

Pressure bleed the brake system from the brake assembly up through the aircraft system. This is accomplished by removing the cap from the "tee" fitting on the bottom of the aircraft hydraulic reservoir and installing a temporary line to this fitting and to the reservoir on a portable hydraulic test stand. (figure 5-1)

Bleed one master cylinder at a time, after setting the shuttle valve for the cylinder to be bled. Do not exceed 70 psi on the pump while bleeding the brake system. The master cylinder being bled should slowly be actuated as pressure is being applied by the pump to the system, master cylinder "on", master cylinder "off" etc. The parking brake must be off when bleeding the brake sytem. Continue pumping oil through the system until no bubbles are observed in the return fluid line to the portable hydraulic reservoir.

After the brake bleeding is completed on all cylinders the nose landing gear snubber may be bled. Release the pressure from the portable hydraulic test stand from the brake system. Using the pilots brake pedals set the parking brake. Pressure will now be applied to the snubber. Loosen the "B" nut on the snubber flex line on top of the nose landing gear shock strut and release any air that is traped. Repeat this process until no air is observed in the snubber line.

Remove all brake bleeding equipment and install cap on "tee" fitting on bottom of aircraft hydraulic reservoir. Fill hydraulic reservoir to within 2 inches below top using MIL-H-5606 hydraulic fluid.

NOSE GEAR SNUBBER ADJUSTMENT (figure 5-2)

a. Remove the safety wire (1) from the fillister head screw (2) which secures the adjustment link (3), located below the parking brake valves.

b. Turn the adjustment link until a measurement of approximately 1-13/16 inch is obtained between the centerline of the rocker arm eye bolt pin (9) and the centerline of the control arm bushing (7). This should fully open the two parking brake valves (8) and completly close the snubber valve (4).

c. Position the parking brake valves to the "brake on" position. This should put the two parking brake valves in the closed position and the snubber valve partially or fully open. Make further adjustments to the linkage until this adjustment is obtained.

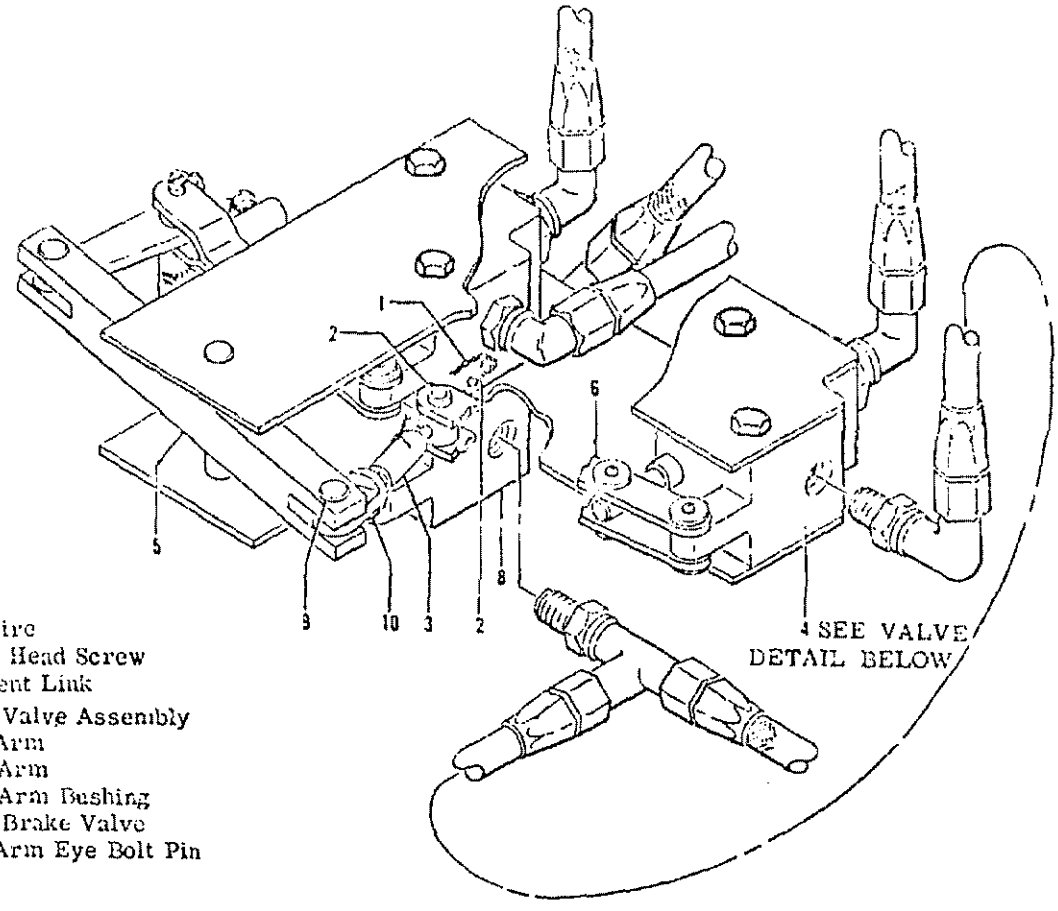
d. When practical, check out the valve assembly final adjustment on a test stand to insure the snubber stays in the fully extended position when the parking brake is set and that it will retract when the parking brake is released.

e. Resafety the adjustment link.

f. Adjust parking brake. Refer to section 3 of the Beechcraft Model 18 Maintenance Manual.

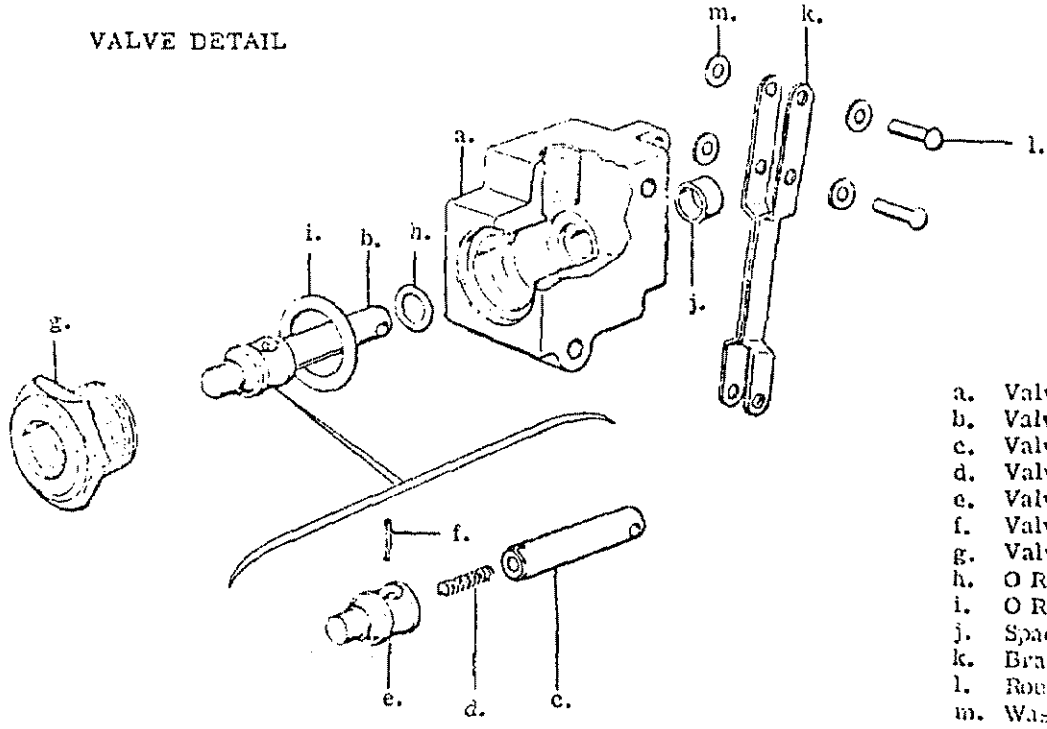
g. To check snubber operation with nose gear off the ground:
    1. Compress the strut and hold until the parking brake is set.
    2. After the parking brake is set, release the strut. The strut will stay in the locked position when the snubber is operating properly.
    3. Release snubber pressure and brakes by pushing in the parking brake handle or depressing the brake pedals.

Figure 5-2



1. Safety Wire
2. Fillister Head Screw
3. Adjustment Link
4. Snubber Valve Assembly
5. Rocker Arm
6. Control Arm
7. Control Arm Bushing
8. Parking Brake Valve
9. Rocker Arm Eye Bolt Pin
10. Eye Bolt

VALVE DETAIL



a. Valve Housing
b. Valve Stem Assembly
c. Valve Stem
d. Valve Stem Spring
e. Valve Stem Head
f. Valve Stem Spring Pin
g. Valve Seat
h. O Ring
i. O Ring
j. Spacer
k. Brake Valve Arm
l. Round Head Rivet
m. Washer

WARNING

During operational check, before releasing the parking brake, clear the area around the strut as the strut will extend rapidly.

BRAKE WEAR LIMITS

Refer to the B.F. Goodrich Manual 864

BRAKE MASTER CYLINDERS

Refer to section 3 of the Beechcraft Model 18 Maintenance Manual.

LANDING GEAR

The landing gear is operated by a split-field series-wound motor located on the forward side of the main center section spar. One field is used to drive the motor in each direction. To prevent over-travel of the gear, a relay simultaneously breaks the power circuit to the motor and makes a complete circuit through the armature and unused field winding. The motor then acts as a generator and the resulting electrical load on the armature stops the gear almost instantly.

The landing gear motor is controlled by the landing gear switch located in the control pedestal. The gear actuators are driven by the torque shafts from the motor gear box. A spring-loaded friction clutch between the gearbox and the torque shaft protects the system in the event of mechanical malfunction. A 50 ampere, remote circuit breaker located in thepower distrubution box protects the system from electrical overload. The over-center action of the gear drag brace provide positive mechanical down-locks. A jack-screw in each actuator holds the gear in the retracted position. Three indicators mounted in the control pedestal indicate the position of the landing gear. A warning horn comes on anytime the gears are not down and locked when a power lever is retarded to the Flight Idle position. The horn silence button, will silence the warning horn until the gear is recycled, however the landing gear warning horn will sound anytime the flaps are extended with the gear in the up position and a power lever is retarded to Flight Idle. The horn silence button has no control over the warning horn in this situation.

To prevent accidental gear retraction on the ground, a safety switch breaks the circuit whenever the strut is compressed.

CAUTION

Never rely on the safety switch to keep the gear down while taxiing or on landing or takeoff roll. Always check the position of the landing gear switch.

RIGGING THE LANDING GEAR

When the landing gear is determined to be out of rig the following procedure may be used:

a. Place the aircraft on jacks, allowing enough room for extension and retraction of the gear.

CAUTION

Before retracting the landing gear, release the parking brake to disengage the nose strut snubber, as the nose gear will not retract properly into the wheel well when the snubber is engaged.

b. Run the gear full up and full down manually to ascertain that the retraction system operates properly without interference or binding.

c. Disconnect the right hand nose wheel door actuator from the door and secure the door to permit access to the nose wheel well.

d. Lower the landing gear electrically to the full down and locked position.

e. Adjust the nose gear until a pull of from 40 to 50 pounds raises the walking beam off of the drag link. (figure 5-3) If the joint is too rigid, the nose gear down limit switch can be adjusted by means of slots in the switch retaining bracket. If the nose gear dose not extend completely and the motor appears to be overloaded at the end of the extension, check the main gear joints for excessive rigidity. There should be a slight "give" when moderate pressure (40 to 50 pounds) is applied in the direction of retraction. This condition may be obtained as follows:

(1) Remove the six bolts securing the nose gear retract nut (1, figure 5-4) to the push-pull tube. Rotate the retract nut clockwise (looking aft), reinstall two attaching bolts, and recheck the main landing gear joints. Continue to adjust the nose gear retract nut until a slight "give"

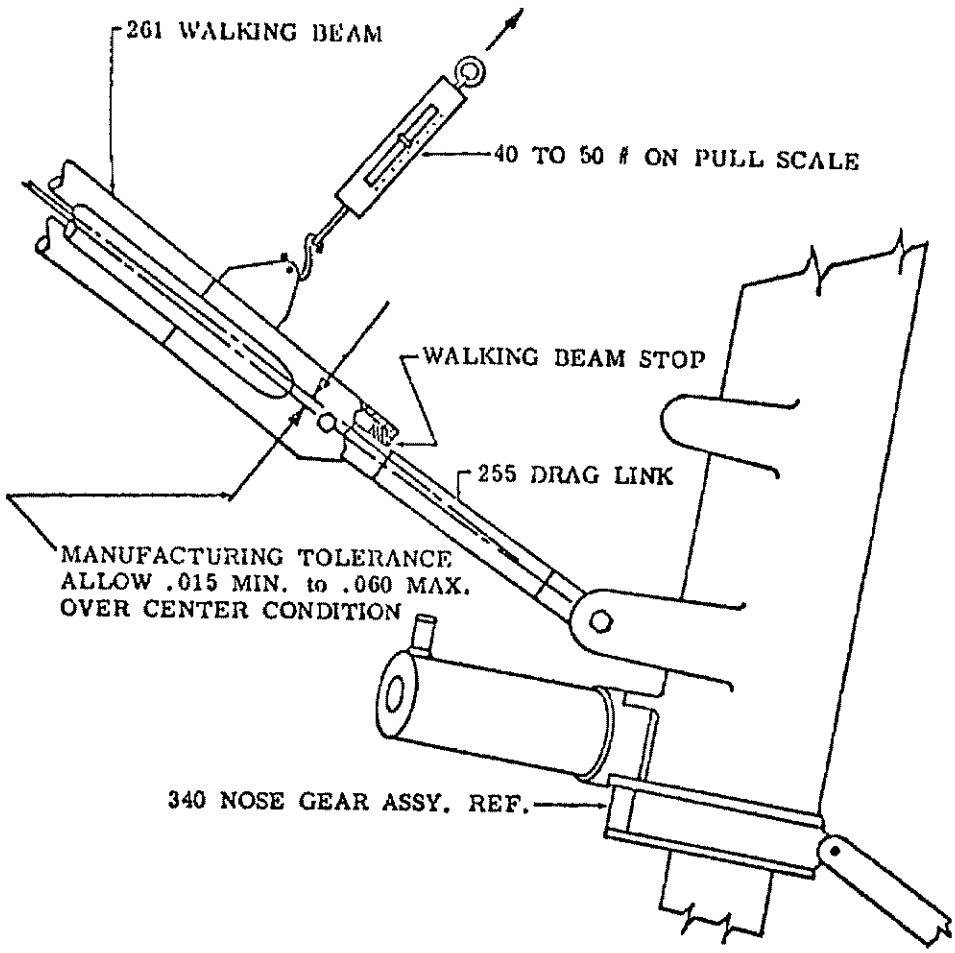

261 WALKING BEAM
40 TO 50 # ON PULL SCALE
WALKING BEAM STOP
255 DRAG LINK
MANUFACTURING TOLERANCE
ALLOW .015 MIN. to .060 MAX.
OVER CENTER CONDITION
340 NOSE GEAR ASSY. REF.

Figure 5-3

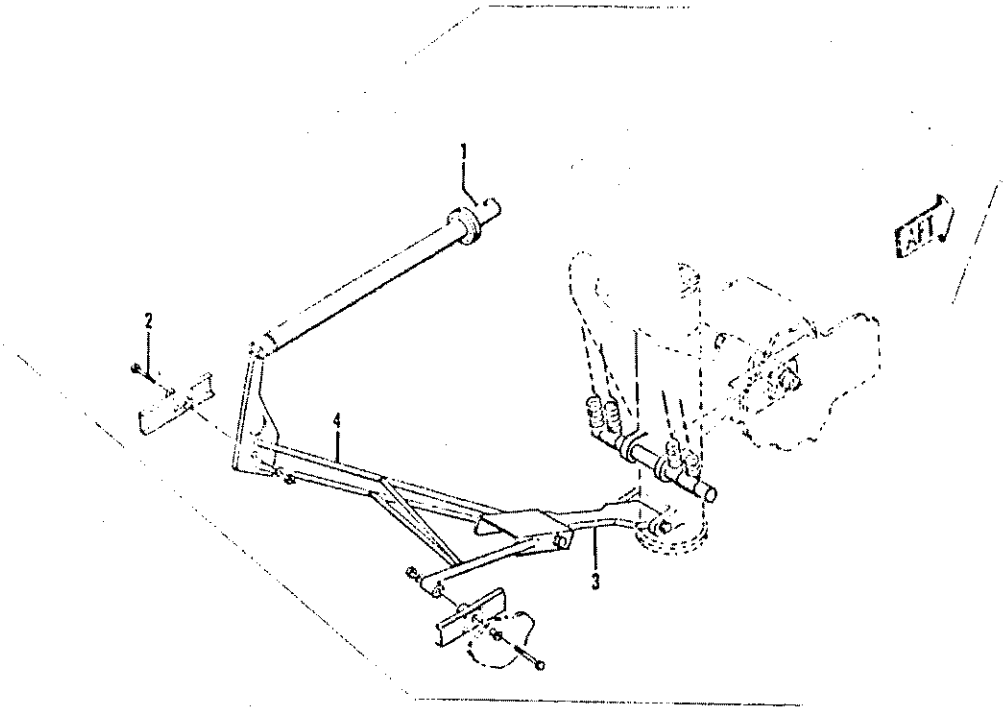


Figure 5-4

in each main gear can be achieved by applying equal pressure to each gear.

(2) When excessive tension on the main gear joints has been relieved, by the means outlined in the preceding step, procede to adjust the nose gear down limit switch as described.

f. If the gear boxes are not synchronized, one gear will lead the other and the adjustments described cannot be obtained. If this condition exists, it will be necessary to remove the retract chain from the gear box sprocket on the lagging gear and rotate the sprocket as necessary.

(1) On the gear that is leading, use the emergency handcrank to obtain .002 inch clearance (measured with a feeler gage) between the knee pads of the drag link and the walking beam (figure 5-5).

(2) On the opposite gear, loosen the retract chain and remove the chain from the gear box sprocket.

(3) Rotate the gear box sprocket to obtain .002 inch clearence on the correponding main gear.

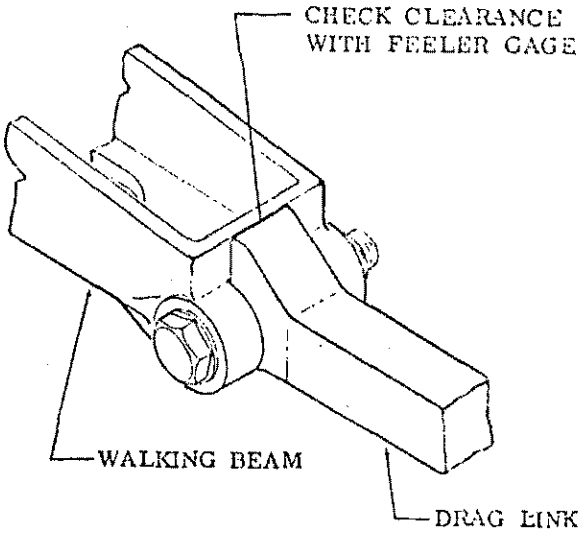


Figure 5-5

(4) Reinstall and tighten the retract chain until the longest exposed section of the chain can be deflected a maximum of 1/4 to 3/8/ inch.

(5) Proceed with the nose gear down switch adjustment as outlined in step "e".

g. Check the landing gear clutch for preloading as followa:

(1) Retract the landing gear to a point between full up and full down position.

(2) Remove the two pipe plugs from the sides of the gear box housing.

(3) Install a 5/16 bolt through the gear box housing to lock the gear (figure 5-6).

(4) With the landing gear hand crank parallel to the floor attach a large spring scale to the handle. Pull up steadily on the scale until the clutch slips. The clutch should slip between 101 and 115 pounds. If the clutch dose not slip within the allowable scale reading an adjustment should be made. Refer to section 3 of the Beechcraft Model 18 Maintenance Manual.

h. Check each main gear for over-center condition as follows (refer to figure 5-7):

(1) Place one end of a straight edged bar on top of the nut (1) securing the walking beam (2) to the

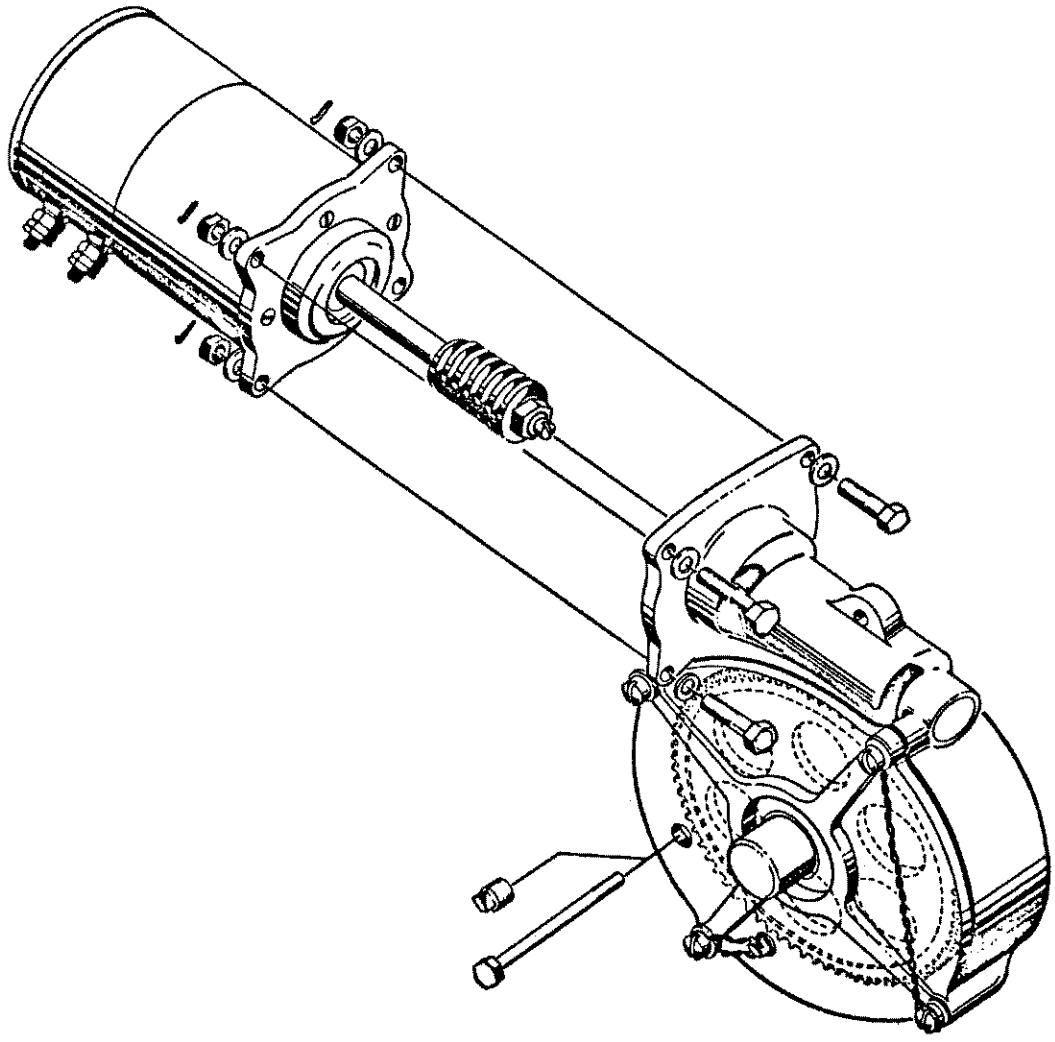


Figure 5-6

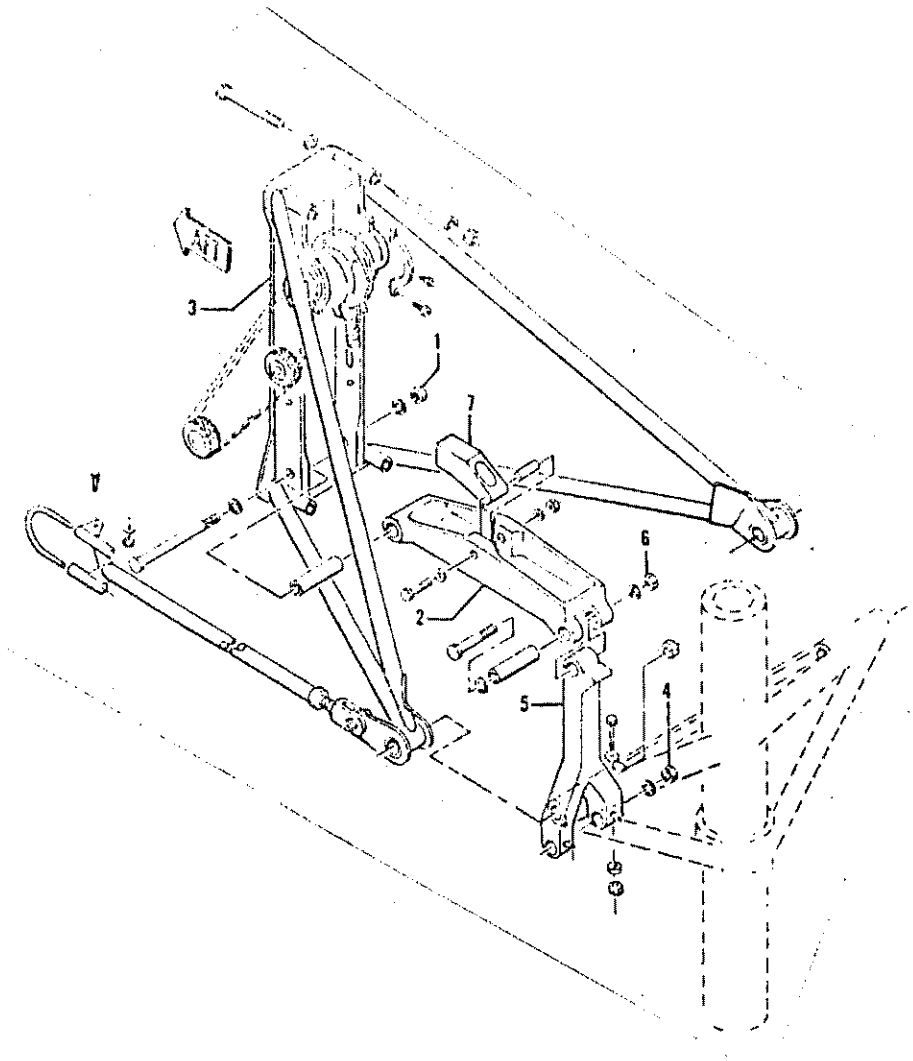


Figure 5-7

assembly (3).

(2) Place the other end of the bar on top of the nut (4) securing the drag link (5) to the strut assembly.

(3) For the proper over-center condition, the top of the nut (6) securing the drag link to the walking beam should be from 0 to .068 inch below the bottom edge of the bar.

(4) If an adjustment is required to achieve the correct over-center dimension, it will be necessary to mill the stop horn on the drag link.

i. Check the nose gear for an over-center condition as follows:

(1) Clamp a straight edged bar to the nose gear drag link.

(2) On the right hand side of the retract system extend a length of thread from the center of the walking beam horn bolt (2, figure 5-4) past the center of the bolt end of the drag link (3, figure 5-4) and strut assembly connection.

(3) With a tri-square, check to see that the thread passes .015 to .060 inch above the center of the bolt end at the drag link and walking beam (4, figure 5-4) connection.

(4) If an adjustment is required to achieve the correct over-center dimension, it will be necessary to mill the nose gear down stop block.

j. With the landing gears in the full down and locked position, make certain that the nose gear retract nut (1, figure 5-4) does not contact the face of the bearing block.

k. Reinstall the remainder of the existing bolts, washers, and nuts on the nose gear retract nut.

l. Run the landing gears to the full up position. Make certain that each main gear retract nut (7, figure 5-5) does not contact the face of the gear box. It will be necessary to have the inboard door disconnected when making this check.

m. Check the nose gear up stop. The strut should contact the rubber stop but should break loose from the stop when moderate pressure is applied.

n. Check the landing gear position indicators for proper operation and adjust the position indicator switch if necessary.

o. Check the main gear retract chains for the correct installation on the sprockets and proper operation.

p. Check the main landing gear retract nut P/N 703 and the nose landing gear retract nut P/N 221-4 for wear as follows.

(1) Retract the landing gear to a point between full up and full down position.

(2) Pull landing control circuit breaker out to prevent inadvertent operation of the landing gear retract motor

(3) Smoothly apply pressure against the wheel assy. towards the up (retract) and down (extend) position of the land gear assembly being inspected, note the movement between the retract nut and the P/N 183-8 screw.

(4) If excessive play is noted between screw and nut, a measurement should be made with either a dial indicator or a depth gage.

(5) Measurements is excess of .020 end play, or .050 side play indicate replacement of nut should be accomplished. It should be noted that in some cases excessive wear of the P/N 183-8 screw will give indications of a worn retract nut. A cross check should be accomplished by re-checking with a new retract nut.

(6) See figure 5-7-1 and 5-7-2 page 5-12-2 for wear and test points.

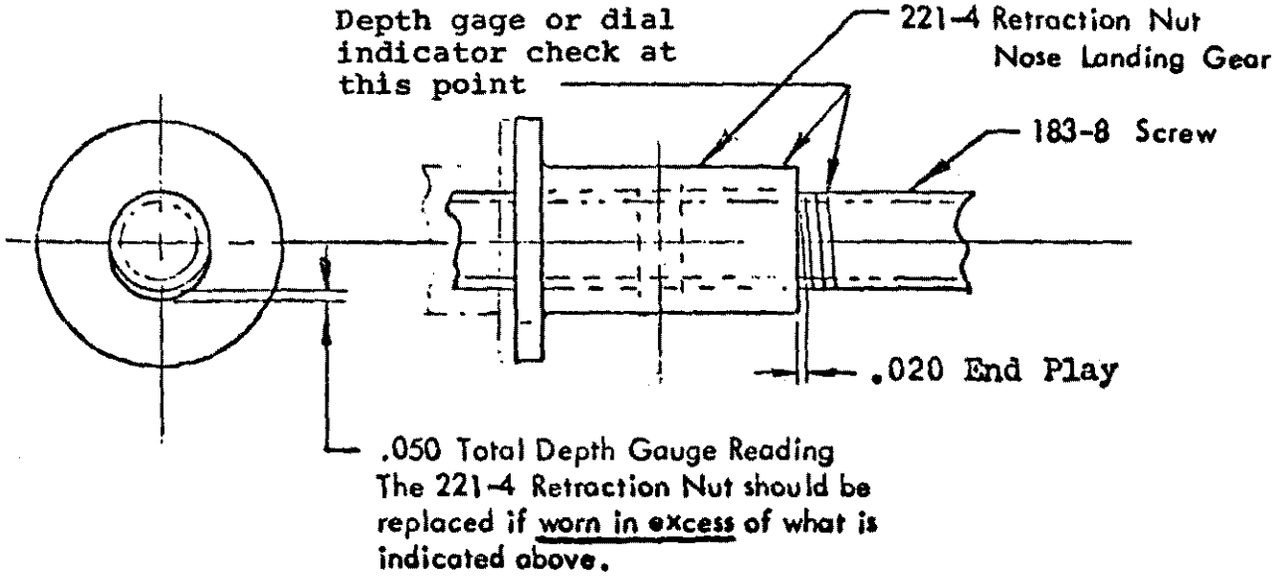
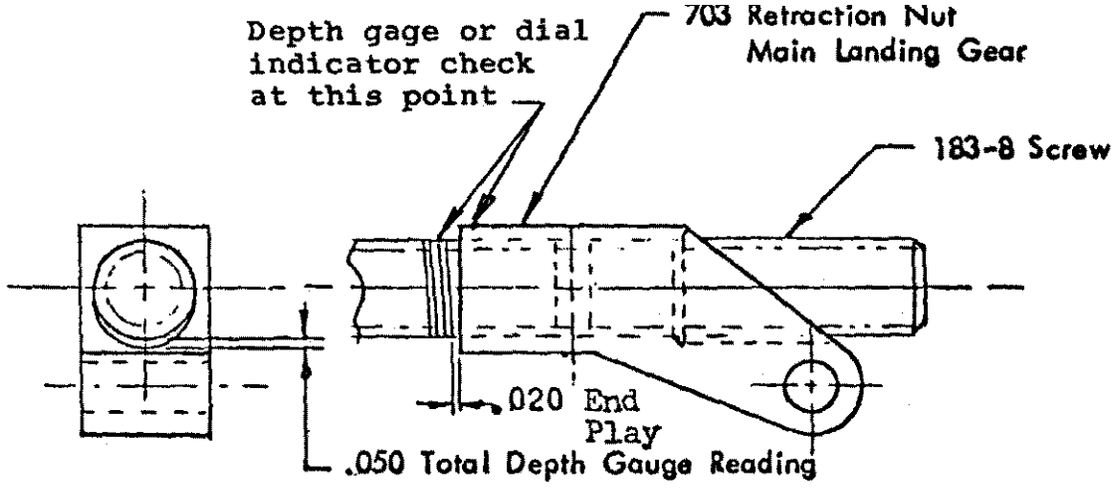


FIGURE 5-7-1



The 703 Retraction Nut should be replaced if worn in excess of what is indicated above.

LANDING GEAR DOOR RIGGING

MAIN LANDING GEAR DOORS (Figure 5-8)

a. Connect the inboard door linkage (2) and disconnect the outboard door.

b. Adjust the stop bolts (3) in the torque tube bracket to position on the torque tube arm (4) and link (2) .25 inch minimum over center when the door is in the open position (doors may snap shut if the over center position is not maintained).

c. Adjust the inboard door linkage (2) for the inboard door so the gear will clear the doors (the door is approximately vertical in the open position). Adjust the "door closed stop bolt" so that the door closes properly and completely seals the opening.

d. Observe that the roller in the door retract fitting (attached to the landing gear fork) engages properly with the guide fork (1) on the torque tube.

e. Disconnect the inboard door link and connect the outboard link. Adjust the outboard link so the door opens and closes to the stops as outlined for the inboard door.

f. Hook up the door springs (7) with the door in the closed position and then open (door will snap shut if there is not a positive over center position on the linkage).

g. Check the aft inboard door panel (1). (See figure 5-9) The main door should overlap this panel when the door is in the closed position.

h. Adjust the linkage (2) to the rear door (3) so that the door is almost perpendicular when open. As the gear retracts forward the door linkage moves into a horizontal position, therefore, the door will close tighter and open wider when the linkage is shortened and will not close as tight and will open less when the linkage is lengthened.

i. When the main door linkage is adjusted to position the doors properly back off the door up-stop one turn.

NOSE LANDING GEAR DOORS (Figure 5-10)

a. Connect link assembly (1) to doors(2). Adjust stops (3) attached to block on torque tube assembly (4) so that an over center locking condition (minimum .25 inch) exists at the torque tube arm (5) and link attachment.

b. Disconnect the linkage to one door and retract the landing gear manually and observe that the roller (7) in the door retract fitting (attached to the walking beam) is positioned correctly in the slots to engage the guide fork (6) on the torque tube. The roller should not bottom out in the fork when the retract position is reached by the nose wheel.

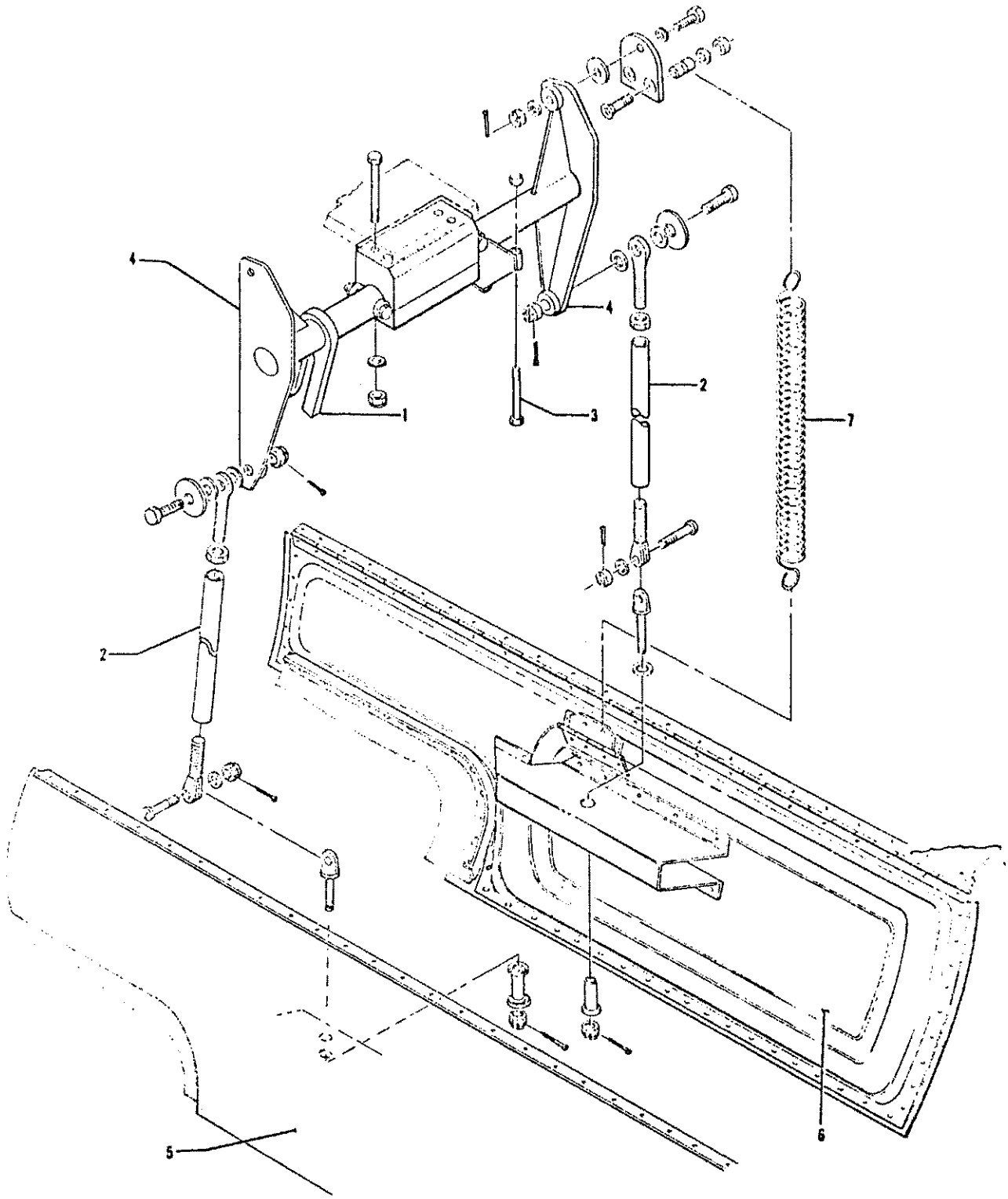
c. Adjust the length of door linkage and position roller in the actuator assembly, as required, to close the door securely. Avoid excessive door openings.

d. Connect the linkage to the opposite door and adjust linkage as required to close the door securely. Place the landing gear in the full retracted position and check the stop assembly on the nose bulkhead center for contact against the nose wheel fork. Reconnect the linkage.

e. Operate the gear and make any final adjustments to close the doors.

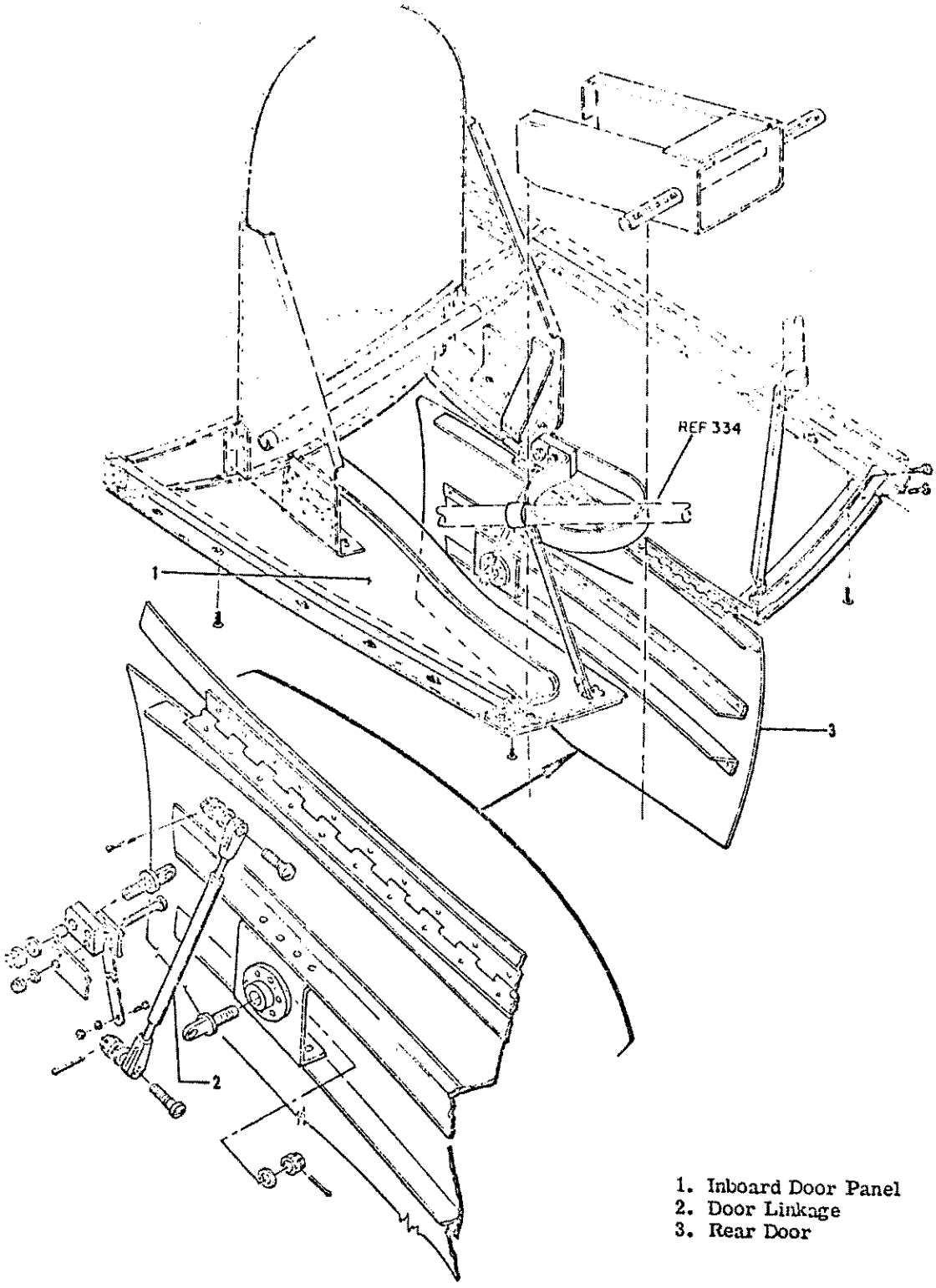
f. Remove the aircraft jacks.

Figure 5-8



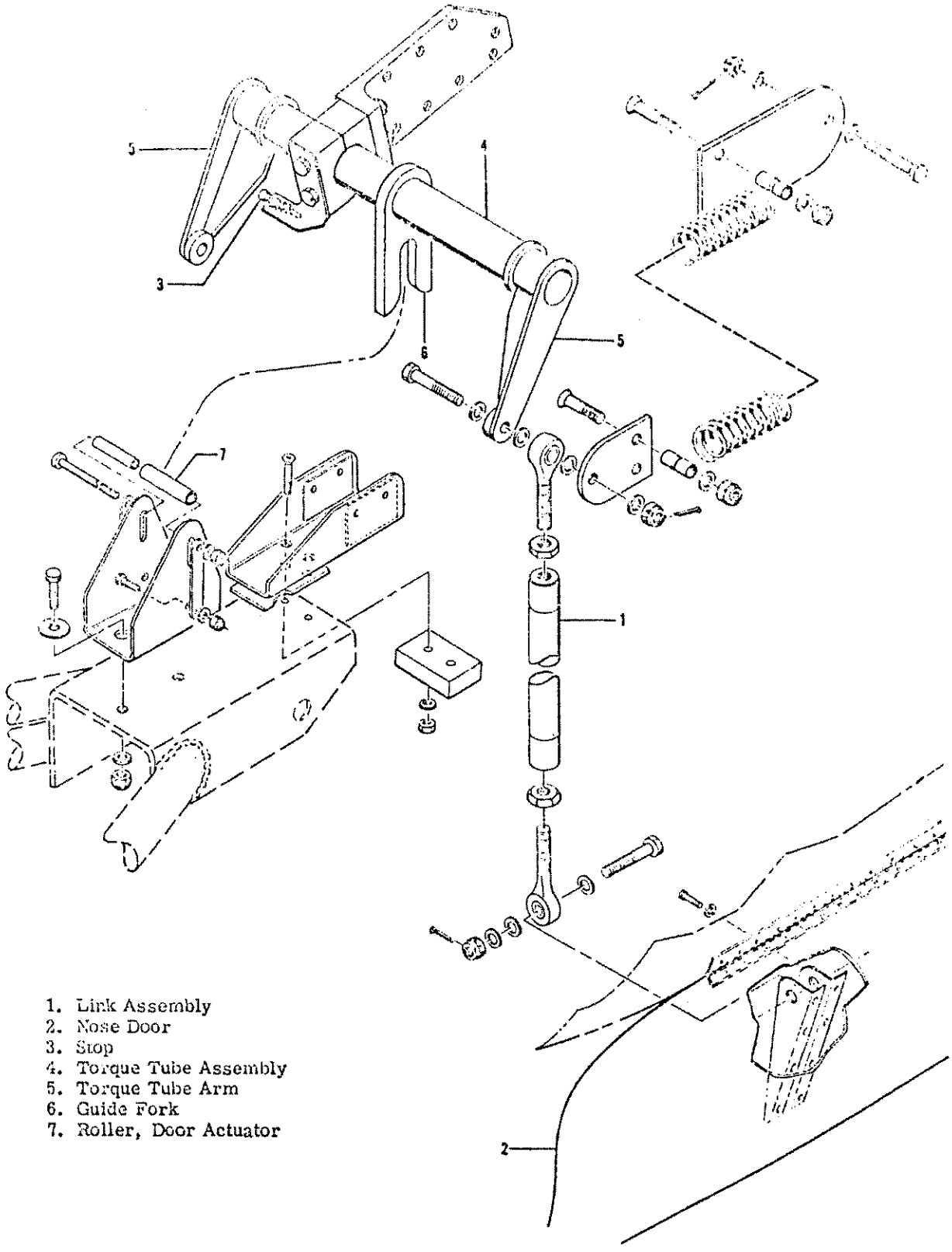
1. Guide Fork
2. Door Linkage
3. Stop Bolt
4. Torque Tube Arm
5. Outboard Door
6. Inboard Door
7. Door Spring

Figure 5-9



1. Inboard Door Panel
2. Door Linkage
3. Rear Door

Figure 5-10



1. Link Assembly
2. Nose Door
3. Stop
4. Torque Tube Assembly
5. Torque Tube Arm
6. Guide Fork
7. Roller, Door Actuator

MAIN LANDING GEAR REMOVAL AND INSTALLATION (Figure 5-11)

a. Place the aircraft on jacks.

b. Remove the rear landing gear door, door supports and door fairings.

c. Retract the landing gears to relieve tension on the bungee springs and remove the screws securing cleats and springs to the lower bungee springs.

d. Remove the cotter pin through the bungee rod and fastener clip, then remove the lower bungee rod and release the lower bungee springs.

e. Extend the landing gears to full down position.

f. Disconnect the brake line on the gear and remove the hydraulic hose clamp.

g. Disconnect the electrical wiring from the safety switch.

h. Remove the bolt securing the drag link (1) to the walking beam (2).

i. Remove the bolt securing the actuator screw support (3) (retraction nut) and release the actuator. Do not change the position of the screw in the nut or rerigging of the actuator will be necessary.

j. Remove the screws and plate covering the landing gear hinge bolt (5) opening on the outboard side of the nacelle.

k. Remove the retaining bolts (4) that secure the hinge pin bolts (5) inside the nacelle.

l. Remove the nuts from the hinge pin bolts and remove the hinge pin bolts.

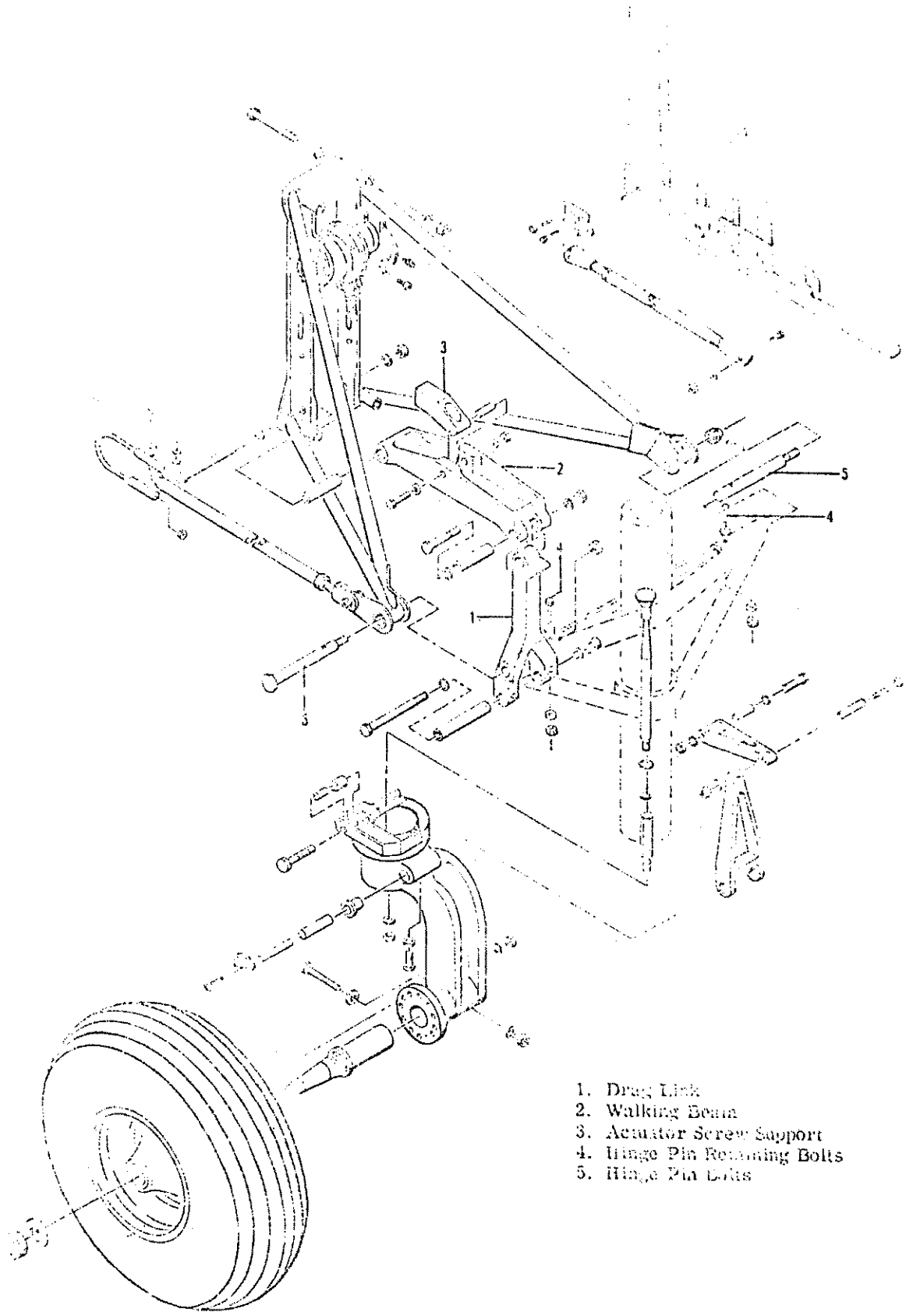
CAUTION

Support the gear as the hinge pin bolts are being removed. Damage to the nacelle may occur if the gear is allowed to fall.

m. Remove the landing gear from the nacelle.

n. Reinstall the main landing gear by reversing the above removal procedures.

Figure 5-11



1. Drag Link
2. Walking Beam
3. Actuator Screw Support
4. Hinge Pin Retaining Bolts
5. Hinge Pin Bolts

o. Bleed the brake system.

DISASSEMBLY OF THE MAIN LANDING GEAR SHOCK STRUT

a. Deflate the shock strut and remove the air valve assembly.

WARNING

Do not remove the air valve assembly until all pressure has been released.

b. Remove the upper and lower torque links.

c. Remove the brake lines from the shock strut.

d. Remove the cylinder cap assembly.

e. Use a 3/4 inch socket wrench on the upper nut on the rebound control assembly and turn the rebound assembly rod out of the stud located in the base of the piston assembly support.

f. Pull the inner cylinder and the rebound control assembly out of the top outer cylinder assembly.

g. Slide the piston assembly out the lower end of the cylinder assembly.

h. Remove the snap ring, scraper ring and wiper ring from the bottom of the cylinder assembly.

i. Remove the felt lubricating pad from inside the cylinder assembly.

j. Remove the "O" ring seals from the center brazed bearing inside the cylinder assembly.

k. To disassemble the rebound control assembly remove the upper retaining nut, secured with a roll pin and washer. The rebound control valve head and valve poppet are lapped to fit very snugly and should not be separated by a screwdriver or anything which might mar the mating surfaces.

MAIN LANDING GEAR SHOCK STRUT REPAIRS

The instructions in the Beech Aircraft Maintenance Manual for repairs of the main landing gear shock strut are applicable to the repair of the tricycle landing gear shock strut.

ASSEMBLY OF MAIN LANDING GEAR SHOCK STRUT

a. If the rebound control assembly was disassembled, fit the valve head and valve poppet together carefully, checking to insure a firm fit. The retainer should be tightened to a torque of 450 to 500 inch-pounds. If the nut will not line up with the roll pin openings in the rebound control assembly rod within these torque limits try washers of different thicknesses under the nut until the alignment is made within the torque limits. Insert the roll pin.

b. Insert the "O" ring seal in the slot in the center brazed bearing inside the barrel assembly.

c. Wash the felt lubricating pad in solvent and dry. Immerse the felt in SAE 10 engine oil and squeeze out excess.

d. Insert the felt pad into the barrel assembly, fitting it between the center brazed bearing and lower end fitting.

e. Slip snap ring, scraper ring, and wiper ring over the piston and slide down to the end, being careful not to score the piston. Make sure that the scraper ring is put on with its flange uppermost and that the wiper ring has its flat side uppermost.

f. Slide the barrel assembly down over the piston assembly.

g. Insert the inner cylinder, with the rebound control assembly installed, into the top of the outer cylinder assembly. Make sure that the "O" ring and lock washer are in place at the top of the lower threaded portion of the rebound control rod before inserting into the stud located in the base of the piston assembly support.

h. Using a 3/4 inch socket wrench on the rebound control assembly nut, insert the lower threaded portion of the rebound control rod into the stud and torque to 556 inch-pounds.

CAUTION

Overtorquing the rebound control rod may cause the lock washer to over-ride the shoulder on the rod and lose its locking force at the stud.

i. Extend the piston about 3/4 inch and secure it in this position. Fill the inner cylinder with hydraulic fluid, MIL-H-5606.

j. Install the cap assembly loosely and move the barrel assembly up and down several times to eliminate trapped air in the system.

k. Compress the strut until approximately 3/4 inch of the piston is exposed. Fill the cylinder to the bottom of the filler gage.

NOTE

Omitting this step will trap air between the piston and the barrel assembly.

l. Completely compress the strut and adjust the fluid level so it is even with the bottom of the filler gage.

m. Tighten the cap assembly and install the air valve assembly. Safety wire the cap assembly screws and the air valve assembly nut.

n. Inflate the strut and test for air leaks by spreading soap suds over the valve assembly and cap assembly.

o. Slide the wiper ring, scraper ring, and snap ring up the piston and into the barrel assembly.

p. Install the torque knee.

q. Install the wheel and brake assembly. Reconnect brake lines.

NOSE LANDING GEAR REMOVAL AND INSTALLATION

a. Place the aircraft on jacks.

b. Remove the screws and cleats securing the bungee springs to the lower bungee rod.

c. Release the four bungee springs from the bungee rod.

CAUTION

Partially retract the nose gear, when removing the bungee springs. Extend each spring only the minimum distance required for removal or springs may be damaged by permanent set.

d. Disconnect the drag link from the walking beam and fasten the walking beam to the upper structure to avoid interference during nose strut removal.

e. Disconnect the snubber hydraulic line at the fitting on top of the nose strut. Plug the fitting and cap the line to prevent excess loss of hydraulic fluid.

f. Disconnect and plug the shimmy dampener hydraulic line at the tee-fitting attached to the cross member above the nose strut. Cap the tee-fitting immediately upon release of the hydraulic line to prevent excess of fluid from the supply tank.

g. Remove the left and right and hinge bolt cover plates from the aircraft.

h. Remove the landing gear hinge bolts and remove the gear from the aircraft.

i. Reinstall the nose landing gear by reversing the above removal procedures.

j. Bleed nose gear snubber as outlined under Brake Bleeding Procedure.

DISASSEMBLY OF NOSE LANDING GEAR SHOCK STRUT (Figure 5-12)

a. Deflate the shock strut and remove the air valve assembly (1).

WARNING

Do not remove the air valve assembly (1) until all air pressure has been released.

b. Remove the screws and cylinder head (2) from the cylinder (3).

c. Invert the strut and drain out the hydraulic fluid.

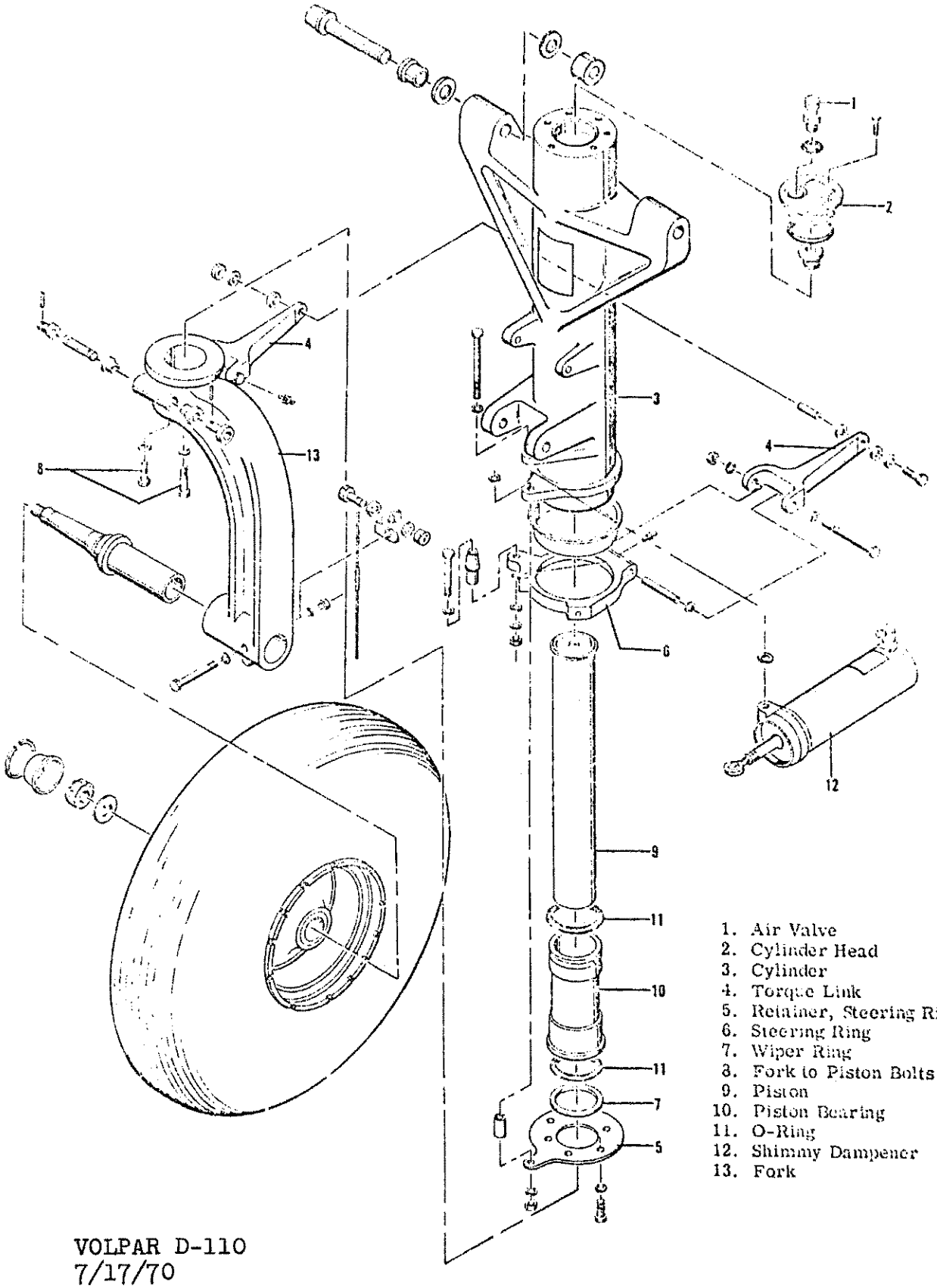
d. Disconnect and remove the torque links (4).

e. Remove the fork bolts (8) securing the piston (9) to the fork (13) then tap the fork away from the piston.

NOTE

The force required to release the fork from the piston may vary with individual assemblies because of the dimensional tolerance difference between the fork and the piston. A tolerance of .000 inch to .002 inch may exist between the fork and piston assembly. A wheel puller attached to the fork and rigged to a longer center bolt in the fork should provide sufficient pulling force to release the fork from the piston.

Figure 5-12



1. Air Valve
2. Cylinder Head
3. Cylinder
4. Torque Link
5. Retainer, Steering Ring
6. Steering Ring
7. Wiper Ring
8. Fork to Piston Bolts
9. Piston
10. Piston Bearing
11. O-Ring
12. Shimmy Dampener
13. Fork

f. Remove the shimmy dampener (12) from the steering ring (6).

g. Remove the bolts from the steering ring retainer (5) and remove the retainer and steering ring (6). Remove the wiper ring (7) from the piston bearing (10).

h. Slide the piston (9) and piston bearing (10), as a unit, out of the cylinder (3) then slide the bearing off the piston.

REPAIR OF NOSE GEAR SHOCK STRUT

Clean all parts with solvent Federal Specifications P-D-680 and inspect for cracks, breaks in the welded aresa, distortion and excessive wear. Replace all unservicable parts. Replace piston wiper ring (7) and all "O" rings. Lubricate the parts with hydraulic fluid, MIL-H-5606, before assembly.

ASSEMBLY OF NOSE LANDING GEAR SHOCK STRUT

a. Install the "O" rings (11) and wiper ring (7) on the piston bearing (10).

b. Place the piston (9) into the bearing (10) and install the piston and bearing, as a unit, into the cylinder (3).

c. Install the steering ring (6) and steering ring retainer (5) to the cylinder (3) and secure the screws.

d. Install and secure the shimmy dampener (12) to the steering ring (6).

e. Install the fork (13) to the piston (9) and secure the attaching bolts.

NOTE

In most instances, due to manufacturing tolerance differences between the outside diameter of the piston and the inside diameter of the fork, the assembly of the piston to the fork will be a press fit. Application of heat to the nose fork on reducing the temperature of the piston to 32° F., or both, will facilitate the assembly of the piston to the fork.

f. Install the torque links (4).

g. Install the cylinder head (2) to the cylinder (3).

h. With the gear fully compressed fill the cylinder (3) with MIL-H-5606 hydraulic fluid and exercise the shock strut through several cycles to remove all air from the lower areas. Complete filling the cylinder to within 1.21 inch from the top of the cylinder with the gear fully compressed.

i. Install the air valve (1) and inflate the strut with nitrogen gas or air until the top surface of the fork is approximately 2.9 inches below the bottom surface of the retainer (5) under static wheel load.

LANDING GEAR MOTOR AND GEAR BOX

Refer to Beechcraft Model 18 Maintenance Manual.

LANDING GEAR RETRACT GEAR BOXES

No attempt should be made to overhaul these units in the field. Gear boxes should be removed and returned to Volpar, Inc. for maintenance or overhaul.

SHIMMY DAMPER

Check security of all parts, check cylinder and seals for leaks as it is important for the proper dampening action. Install tow bar on nose strut and turn wheel to extreme right side of aircraft. This operation moves the piston to the bottom end forcing oil and all air to the top of filler plug end. Be sure this position is maintained during the time the plug has been removed for inspection and filling. Fill with fluid to within 3 threads of top of plug opening, use MIL-H-5606 hydraulic fluid.

DISASSEMBLY OF SHIMMY DAMPER (Figure 5-13)

a. Remove shimmy damper from aircraft.

b. Remove rod end (1) and attaching parts.

c. Remove snap rings (2) and seals.

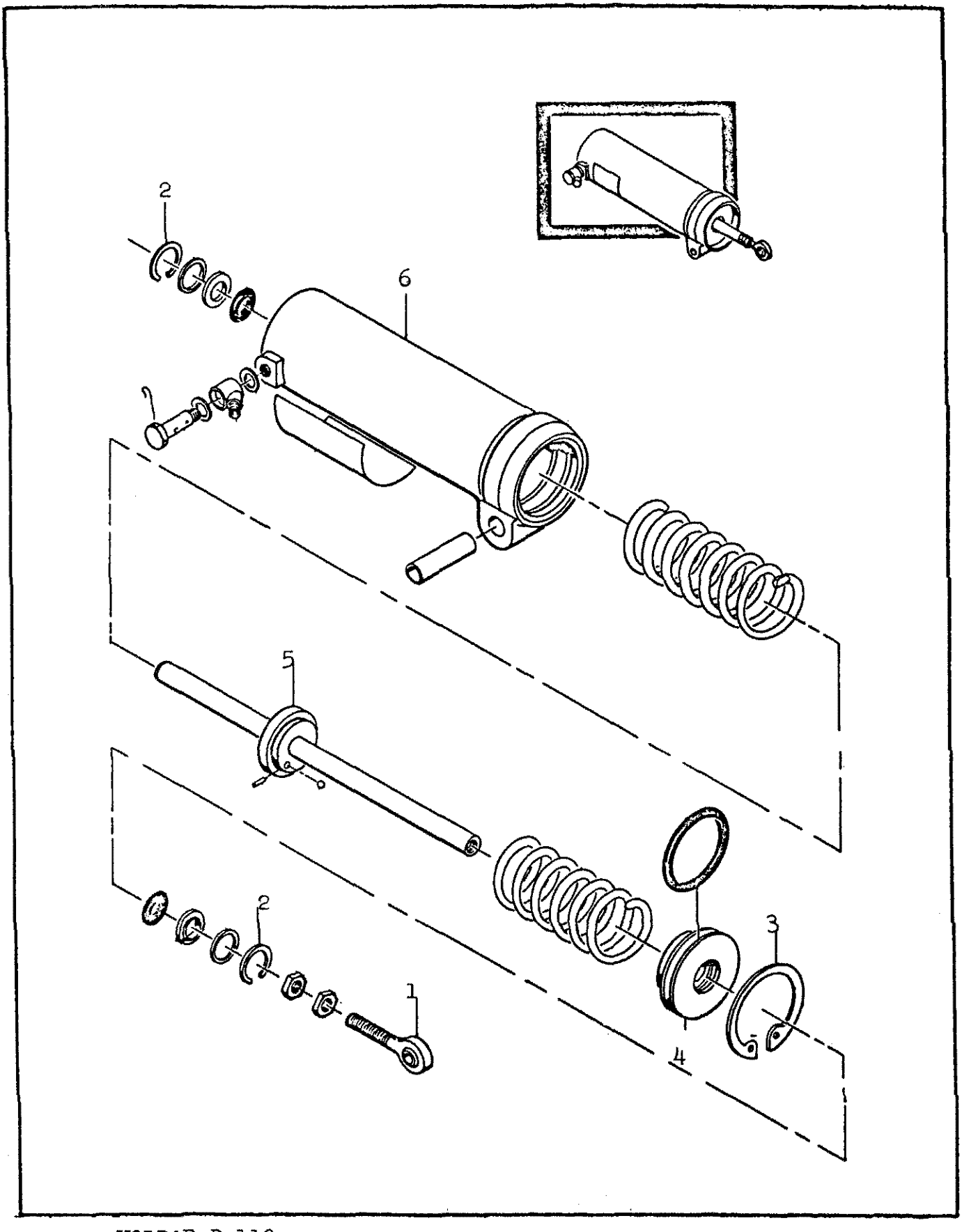
d. Remove snap ring (3) and head (4).

e. Remove springs and piston (5). Check piston for signs of excessive wear. Check housing (6) for signs of wear.

f. Replace all "O" rings, seals, and scrapers.

g. Assembly of shimmy damper is the reverse of the above procedures.

Figure 5-13



TURBOPROP AIRCRAFT ENGINE
Model No. TPE331-1-101B

The turboprop aircraft engine consists of three main sections and four main systems: a two stage centrifugal flow compressor section, a three stage axial flow turbine section, a reduction gear section, a fuel system, a propeller governing system, a lubrication system, and an electrical system. A detailed description of the components of each section is included in the AiResearch Maintenance Manual.

The turboprop engine produces shaft power to drive a propeller and to drive the components necessary for engine operation. The engine produces power by converting the energy from burning fuel to mechanical energy. Air is drawn through the aircraft compressor inlet into a two-stage centrifugal compressor. The compressed air flows into an annular combustion chamber, is mixed with fuel spray, and the mixture ignited. After ignition cutout, combustion is self-sustaining. The resultant combustion gases are directed to the three-stage axial turbine, imparting energy to the turbine wheels which drive the engine. Spent gases discharge through a turbine exhaust pipe assembly at the rear of the engine.

ENGINE SPEED CONTROL

The operating RPM range of the turboprop engine, as compared to a reciprocating engine is very limited, being 65% to 96% RPM for ground operations and 96% and above for flight operations. The RPM is maintained by governors, either the engine overspeed governor, the underspeed governor or the propeller governor. The propeller governor functions similary to a constant speed propeller governor on a reciprocating engine.

The relatively high operating RPM level of the engine provides one of its most attractive features; a precise control of forward, reverse, or zero thrust in landing and taxiing operations. The RPM control levers (referred to as the Condition Levers), provide control of the engine RPM. At 96% RPM and above control is through the propeller governor, below 96% RPM control is through the governors in the fuel control.

POWER CONTROL

To the pilot the power control levers function as do the throttles of a conventional reciprocating engined aircraft. Like other aircraft providing reverse thrust there are two ranges of operation, with special action required to move the levers into aft or reverse range.

When the power levers are brought back from their forward position, they reach a stop at the Flight Idle position. A finger grip is located below the knob on each power lever, an upward pull on the finger grip releases the stop and allows the lever to be moved back into the aft or BETA range.

Pointers connected to the power levers and extending forward indicate the position at which the levers are set. Reading aft from the forward setting the positions indicated are: TAKEOFF, CRUISE, FLIGHT IDLE, GROUND START, and REVERSE THRUST.

From the Flight Idle position forward to the Takeoff position the power levers control the fuel flow to the engine, while the propeller governors control the RPM. The pilot must monitor the torquemeters and the EGT gauges to establish the desired power. Fuel flow is also an indication of power, however the limits are those of troque and EGT.

Access to the ground operating range of the power levers is by releasing the flight idle stops as previously described, and moving the levers aft. In the range movement of the power levers directly controls the blade angle of the propellers while the fuel control varies the fuel flow to maintain RPM selected. This gives immediate control of forward, reverse or zero thrust as desired. Control in this range is known as BETA CONTROL. Indication that the propellers are being controlled in this manner is given by the green Beta Warning Lights located on the instrument panel.

The engine produces its greatest power at lower outside air temperature, OAT. As the OAT increases or the air density decreases, as with altitude, the power of the engine drops off. In cold, dense air conditions the engine will be able to produce more than its rated 620 shaft horsepower for takeoff. This power is limited to 2 min. max. and may be obtained only with 100% RPM. The EGT limit is not constant as it changes with the OAT. The aircraft has been equipped with a special OAT indicator which indicates the EGT limits for the existing OAT.

Maximum continuous power is limited by torque and EGT; the EGT limit being shown by the OAT gauge. The torque limit for maximum continuous power is based on 500 shaft horsepower at 100% RPM. The power levers are set so as not to exceed the torque or EGT limits. As there is some lag between the positioning of the power levers and the stabilization of the EGT gauge to the resultant reading, it is helpful to make the initial takeoff power setting by observing the fuel flow and then correcting this setting as necessary to obtain the desired EGT.

NEGATIVE TORQUE SENSING

A system is incroporated within the engine which automatically moves the propeller blades toward high pitch if negative torque is sensed, thus preventing excessive propeller drag in case of an engine failure. If the negative torque is eliminated before combustion is lost normal operation is automatically resumed, if not the propeller moves to a pitch at which the engine will windmill at 20-30% RPM. At any time during this sequence the pilot may elect to feather the propeller with the manual control. The NTS system removes the urgency from the feathering procedure in the event of an engine failure, allowing ample time to be taken for the identification of the malfunctioning engine.

TORQUE SENSING SYSTEM

The torque sensing system includes a torque sensor, regulator, signal compensator, oil pressure transducer and a torquemeter. The system senses the output torque of the engine, modifies the received signal and provides a corrected output to the transmitter and meter.

FUEL CONTROL SYSTEM

The fuel control system consists of a fuel control unit, pressure pumps, filters, valves, fuel nozzels and manifold assembly. The system provides fuel of proper pressure, weight, flow and spray characteristics to the combustion chamber to satisfy the speed and power demands of the engine. The system automatically compensates fuel flow for variations in compressor inlet temperature, pressure and engine acceleration requirements and for underspeed and overspeed conditions.

ENGINE OPERATION

In the start cycle the starter is energized and starts driving the engine. When engine speed reaches approximately 10% RPM, the light-off relay in the speed switch assembly closes. The ignition system and the fuel solenoid are energized. Fuel flows to the combustion chamber, mixes with compressed air and is ignited. The combustion gases flow into the turbine section to impart energy to the turbine wheels. Acceleration continues under the combined torque of the starter-generator and the turbine.

Fuel flow is scheduled by elements in the fuel control unit which compensates for variations in attitude, inlet temperature, compressor discharge pressure, and speed. The fuel nozzels incorporate both the primary and secondary flow paths. During starting and low power operation, only the primary nozzels are in use thus providing good spray characteristics at low fuel flow.

As fuel requirements increase with the increasing power, the fuel relief valve senses the added fuel pressure and opens the secondary nozzle flow paths.

After the solenoid valve is actuated to the OPEN position, the solenoid is de-energized but the valve remains mechanically latched in the OPEN position. If the light-off does not occur in approximately 10 to 15 seconds after start, abort start to protect the starter and possibly the engine.

When enginge speed reaches approximately 50% RPM the starter cutout relay in the speed switch assembly opens which in turn de-energizes the starting and ignition systems. Combustion in the engine is now self-sustaining and the engine continues to ground idle RPM.

When the engine speed reaches ground idle RPM (approximately 65% RPM.), the propeller can be unlocked preparatory to taxi and other ground operations. The fuel pump delivers fuel at the flow selected by the aircraft power lever. The power lever settings between REVERSE and FLIGHT IDLE constitute the ground range of operation where fuel flow and propeller pitch are controlled by the position of the aircraft power levers.

During conditions of flight operation, engine power is normally established by the fuel flow for a selected power lever position between FLIGHT IDLE and FULL POWER. The power lever position within this range constitute the flight range of operation where the propeller pitch is controlled by the propeller governor. Fuel flow is set at a specific amount by the power lever setting; engine speed is maintained at the fixed value for the set fuel flow by the action of the propeller governor. The propeller governor varies propeller blade angle to absorb the power available from the engine and still maintain selected engine speed.

NOTE

Refer to the aircraft flight manual for details of operation in the flight range.

The engine is normally stopped by placing the STOP-START switch in the STOP position, which energizes the fuel solenoid valve to the off position, shutting off the fuel flow to the engine. Emergency shutdown is accomplished by actuation of the feather handle which feathers the propeller and returns the fuel solenoid to the closed position, shutting off fuel to the engine.

ADJUSTMENTS

Overspeed	One turn counterclockwise	4.7% reduction
Underspeed Governor		
Low Speed Stop	One turn counterclockwise	3.0% reduction
High Speed Stop	One turn counterclockwise	2.4% increase
Propeller Governor		
Low Speed	One turn counterclockwise	1.0% reduction
High Speed	One turn counterclockwise	1.0% increase
Flight Idle Adjustment	1/6 turn counterclockwise	2.0% reduction
Beta Tube	One turn counterclockwise	2.0% blade angle increase

LUBRICATING OIL SYSTEM SERVICEING

The oil system should be drained when the engine is removed from the aircraft, at oil change intervals; every 800 hours of engine operation, and whenever required as follows.

NOTE

If possible, oil should be changed while the engine is still warm from operations.

a. Position propeller in feather position to ensure maximum drainage of control oil into engine oil pump and oil tank assembly.

b. Remove nose cowl and intake scoop.

c. Remove drain plug from bottom of gear section housing and allow oil to drain. Check plug for chips and drained oil for contamination which could indicate damage to engine.

d. Remove acess covers on bottom of nacelle.

e. Open drain cock on bottom of oil tank assembly and allow oil to drain. Check drained oil for contamination which could indicate damage to the engine.

f. Remove oil filter element observing procedures given in AiResearch manual. Inspect for contamination and discard element.

g. Install replacement oil filter element in engine.

h. Install drain plug in bottom of gear section housing.

i. Attach electrical wire to plug.

j. Close drain cock on bottom of oil tank assembly.

k. Install acess covers on bottom of nacelle.

l. Install air scope and nose cowling.

m. Remove cap from oil tank assembly. Fill tank with oil, capacity is 6 qts.

n. Start engine observing normal start procedures and operate for at least one minute.

CAUTION

Shut down engine immediately if oil pressure is not indicated within 10 seconds.

o. Shut down engine and recheck oil level, add oil if necessary.

ENGINE OPERATIONAL CHECK

a. Low Speed Taxi RPM. Place power lever in START position and engine speed condition lever in LOW speed position. Observe engine speed, which should be 84 to 86% RPM.

CAUTION

Power lever movement with condition lever in low should be used with caution. Engine speed must not drop below 65% RPM.

b. High Speed Taxi RPM. Place power lever in START position and condition lever in TAKEOFF position. Observe engine speed, which should be 97 to 98% RPM.

NOTE

Normal condition lever movement should be accomplished in 1 to 2 seconds under all operating conditions.

c. Reverse Power. Place condition lever in TAKEOFF position and slowly move power lever aft toward REVERSE position. Observe engine speed and fuel flow; engine speed should not decrease below 96% RPM at full REVERSE position.

CAUTION

Use reverse power cautiously if BETA light does not come on in the ground operating range. Condition lever must be in TAKEOFF position for the reverse power check. If engine speed drops below 95.5% RPM.,

do not use full reverse beyond the point that gives 95.5% RPM. until condition is corrected.

d. Maximum Power. Place condition lever in TAKEOFF position, check that interstage bleed valve is closed, and slowly move power lever forward to TAKEOFF position until EGT or torque reaches limit. Observe engine speed, which should be 100% RPM, plus 1% minus 0.5% RPM at an oil temperature of 83°C (180°F). The governing speed will increase slightly for a decrease in oil temperature and will decrease for an increase in oil temperature.

e. Engine Speed for Cruise. Place power lever in GROUND IDLE position. Place condition lever in Cruise position and slowly move power lever forward until propeller governor (indicated when further movement of the power levers does not increase the RPM). Observe engine speed, which should be 95.5 to 97% RPM.

FLIGHT IDLE FUEL FLOW ADJUSTMENT

a. Check that aircraft and engine rigging is correct and that propeller flight idle blade angle is correct.

b. During the test flight, preform simulated landings at a safe altitude but below 7000 feet. Place condition lever in TAKEOFF position and move power levers to FLIGHT IDLE position. Check for asymmetrical thrust and for abnormal rate of descent, normal rate of descent is 1500 ft./min. If neither condition occurs, propeller blade angle, control rigging, and flight idle fuel flow are correct.

c. If adjustment is indicated, after test flights, again check rigging and propeller blade angle before attempting to adjust flight idle fuel flow.

d. When condition has been isolated to flight idle fuel flow, remove plug on rear of fuel control assembly.

e. Hold adjusting screw and loosen locknut. Turn adjusting screw clockwise to increase fuel flow or counterclockwise to decrease fuel flow. One-quarter turn produces a power change of approximately 100 horsepower and a fuel flow change of 50 pounds per hour.

WARNING

Do not turn adjustment screw more than 15 degrees before rechecking flight characteristics.

f. Hold adjusting screw and tighten locknut snugly, (25 to 30 inch-pounds torque). Replace plug.

WARNING

Do not over tighten locknut or fuel flow may be changed.

ENGINE REMOVAL

a. Remove propeller

b. Disconnect oil lines from oil cooler.

c. Disconnect wires from fire warning bulb.

d. Remove screws from the center cowling support.

e. Disconnect the cowling brace assembly from the nacelle.

f. Lift off the cowl door assembly.

g. Remove the upper and lower nose cowling.

h. Remove all acess doors from the nacelle.

i. Remove exhaust panel.

j. Remove tailpipe assembly.

k. Remove exhaust nozzel.

l. Remove exhaust elbow.

m. Disconnect all fuel lines, oil lines, and electrical connections from engine.

n. Remove starter/generator.

o. Remove engine control cables and push pull tubes from engine.

p. Remove top section of the cylindrical firewall.

q. Remove all drain lines from the engine.

r. Attach engine sling to engine.

s. Attach hoist to engine sling. Remove some of the weight of the engine from the engine mount by lifting the engine slightly.

t. Remove engine mounting bolts and lift engine clear of the nacelle, being sure that there is nothing still attached to obstruct its removal.

u. Install dust covers on engine.

v. Cap all lines in nacelle.

ENGINE INSTALLATION

Reverse procedure for engine removal.

NOTE

Torque engine mounting bolts to 480 to 690 inch-pounds.

RECOMMENDED MOUNTING TORQUES

ITEM	NUT SCREW OR THREAD	TORQUE RECOMMENDED
Starter Generator	MS21044C6	120-130 inch-pounds
Aircraft Accessory	MS21044C5	65-70 "
Compressor Air Inlet	MS21044C3	15-20 "
Tachometer Generator	1/4-28NF3	65-70 "
Prop Pitch Control	MS16996-11	20-25 "
Prop Governor	5/16-24UNF3B	65-70 "
Torque Sensor Transmitter	AND501D10	15-20 "
Bleed-Air Pad	10-32NF3	40-50 "
Mounting Pads (engine mount to engine)	7/16-UNF3	325-350 "
Fuel Nozzle	1/4-28NF3	65-70 "
Fuel Control	MS21043-4	75-85 "
Propeller Mounting Bolts	A2042 HEX Head Bolt	110-120 feet-pounds
Mounting Bolts (engine mount to nacelle)	AN8-42A Bolt	480-690 inch-pounds
Adapter Clamp Starter	1032	50 inch-pounds

OIL SYSTEM

There is a seperate system for each engine, consisting of a six quart stainless steel tank, oil cooler, oil to fuel heat exchanger and a propeller unfeathering pump.

The oil tank is located on the right side of each nacelle. This tank supplies the lubricating oil for the engine as well as the oil to the propeller unfeathering pump. The unfeathering pump is located adjacent to the oil tank. A dipstick is attached to the oil tank filler cap and is calibrated to six quarts. To provide proper cooling the oil level should be a minimum of five quarts for flight.

Oil flows from the engine to the thermostatic control valve, on the oil cooler, which either directs it through the oil cooler and back through the valve or directly to the oil to fuel heat exchanger and then to the oil tank. Flow from the oil tank is directly to the engine.

The oil system is completely automatic, requiring only monitorying of the oil temperature and pressure.

OIL TANK REMOVAL

a. Drain oil from the oil tank.

b. Remove all lines from the tank and cap.

c. Remove oil tank mounting bolts and remove tank.

OIL TANK INSTALLATION

a. Clean tank thoroughly.

b. Check condition of tank.

c. Install oil tank and tighten mounting bolts.

d. Install all lines.

e. Fill tank with oil.

Three bladed flange mounted propellers are used. They are of the constant speed, full feathering, reversible pitch type. Blade angle changes are accomplished by oil pressure, spring and counterweight forces. Control in the flight regime is by a constant speed governor; however from the flight idle position of the power levers on back through the taxi and reverse range the propeller blade angle is controlled directly by the pilot through a hydraulic servo system in the engine.

The propeller incorporates start locks which are normally engaged at engine shutdown in order to provide low propeller drag for engine starting. Engagement is accomplished by moving the power levers to the reverse position as the engine is shut down. If this is not done the propellers will automatically feather, which in some cases may be desired. In this event the propellers must be unfeathered with the unfeathering pump before starting the engine. This procedure is given in the Pilots Operating Manual.

PROPELLER GOVERNING SYSTEM

The propeller governing system includes the propeller pitch control and the propeller governor. The propeller governor regulates the RPM as set by the pilot when operating in the flight range. The capability of varying RPM from 96% to 100% is provided through the condition levers so that the optimum conditions can be selected for cruise, climb or takeoff.

The propeller pitch control serves as a hydraulic back up to the propeller governor in the flight range by providing a varible hydraulic blade angle stop. This stop is scheduled to prevent a large overspeed in the event of a combined negative torque and governor failure. In the ground operating range the propeller blade angle is directly selected by the propeller pitch control through the power levers.

PROPELLER REMOVAL

a. Battery switch OFF.

b. Remove spinner.

c. Position power lever to takeoff position.

d. Position feather lever to feather position.

e. Using propeller blade beam decrease blade angle until stop pins are clear of the stop plates. Release blade beam and propeller will go to the feathered position.

f. Remove bolt from end of oil transfer tube.

g. Remove oil transfer tube.

h. Remove safety wire from A2042 bolts attaching propeller flange to engine flange.

j. Support propeller assembly in sling and remove bolts.

k. Remove propeller assembly from engine.

m. Install dust cover on engine mounting flange.

n. Return feather lever to the unfeathered position.

p. Position the power lever to the flight idle position.

BLADE ANGLES - Model T10178 (Dia. 93½ to 96 inches)

Blade angles measured at the 30 inch station.

High (feather)	$86.5^{\circ} \pm .25^{\circ}$
Starting	$2.5^{\circ} \pm .2^{\circ}$
Flight Idle	$10.5^{\circ} \pm .2^{\circ}$
Reverse	$8.5^{\circ} \pm .2^{\circ}$

PROPELLER INSTALLATION

a. Clean propeller hub mounting flange and engine mounting flange.

b. Install PRP-909-8 "O" ring on the engine mounting flange.

c. Install propeller assembly onto the engine mounting flange.

d. Install the A2042 bolts and AN960-16 througn the engine mounting flange and into propeller mounting flange.

e. Using Volpar tool P/N T004 and proper torque wrench, torque mounting bolts to 110 to 120 foot pounds.

f. Using propeller blade beam decrease blade angle manually to unload pressure from high pitch stop pins.

g. Depress high pitch stop pins and insert safety wire to retain stop pins.

h. Release pressure on blade beam and blades will go into a feathered position.

j. Rotate blades with blade beam through complete travel checking that there is a positive clearance between the ends of the mounting bolts and the high pitch stop plates.

k. Remove blade beam.

m. Safety bolts in groups of two.

n. Install oil transfer tube, into forward end of propeller piston unit. Check that "O" ring is installed on the threaded end of the oil transfer tube.

p. Thread oil transfer tube clockwise until flush with forward end of the propeller piston unit.

q. Remove safety wire from stop pins, being sure that blades are in the feathered position.

GROUND CHECK AND ADJUSTMENTS

a. With propeller blade protractor establish 0^{o} angle on the propeller piston assembly.

b. Check propeller full feather angle.

c. Check oil tank for full condition.

d. Clear propeller.

e. Position the power control lever in the cockpit of the aircraft to the flight idle position.

f. Place AIR START-GROUND switch to the AIR START position.

g. Place FUEL INGNTION circuit breaker to OFF position.

h. Place BATTERY switches to the ON position.

j. Hold START-STOP switch to the START position.

k. Unfeathering pump will start to operate and propeller blades will move from the feathered position to the flight idle position and stop.

m. Measure flight idle blade angle using propeller protractor.

n. If blade angle is incorrect screw oil transfer tube counterclockwise to increase blade angle and clockwise to decrease blade angle. Three holes is equal to 1^{o} angle change.

p. Position power levers to the reverse position.

q. Measure reverse blade angle using propeller protractor.

r. Release STOP-START switch.

s. Push power levers forward to starting position.

t. Measure starting blade angle with propeller protractor.

u. Install bolt and nut through pilot tube and oil transfer tube forward end of propeller piston assembly.

GROUND RUN AND ADJUSTMENTS

Engine run must be made prior to first flight, or prior to first flight after engine change.

a. Start engine observing normal starting procedures.

b. While the propellers are still on the start locks advance the power levers to the takeoff position. RPM will increase to 103 to 104% maximum. If RPM exceeds 104% an adjustment to the overspeed governor will have to be made, refer AiResearch manual.

c. Move power levers aft to the point where a minimum fuel flow is reached.

d. Move condition lever aft to stops. RPM should stabilize at 65%. If RPM does not stabilize at 65% an adjustment to the fuel control underspeed governor, refer AiResearch Manual.

e. Advance power levers beyond flight idle stops and then back to the flight idle position.

f. Assuming that the flight idle blade angles are set the same the RPM should be the same on both engines.

g. If the RPM's are not the same an adjustment of the flight idle fuel flow will have to be made, refer AiResearch Manual.

h. Move power levers aft to the point where the minimum fuel flow is reached.

j. Move condition levers to the takeoff position. The RPM should stabilize between 97% and 98%. If the RPM is not correct an adjustment must be made to the high speed stop of the underspeed fuel governor, refer AiResearch Manual.

k. Shut down engine and make necessary adjustments if needed.

m. Install spinner.

PROPELLER CARE

Avoid running up or shutting down of the engine over loose stones or gravel. This can cause nicks that can create fatigue cracks. It is important that nicks be removed as soon as possible, for detailed service instructions refer to Hartzell manual No. 106F.

DAILY INSPECTION

Inspect blades, spinners and hub for damage. Inspect for grease or oil leakage.

100 HOUR INSPECTION

a. Remove spinner.

b. Inspect blades for nicks and cracks. Remove any nicks per Hartzell manual No. 106F.

c. Inspect hub parts for any cracks or damage.

d. Check all visible parts for wear and safety.

e. Check for oil and grease leaks.

f. Grease blade clamps. Care should be taken to avoid blowing out clamp gasket. Stop pumping grease when it starts to ooze from between clamp and hub.

g. Check blades to determine whether they turn freely on the hub. If the blades are tight the propeller should be removed and disassembled.

1000 HOUR INSPECTION

Same as the 100 hour inspection.

1500 HOUR INSPECTION

Remove propeller and overhaul per Hartzell manual No. 106F.

CALIBRATION CHART FOR USE OF VOLPAR TOOL P/N TOO4

SET WRENCH TO:	TO OBTAIN:
63 2/3 ft. lbs.	100 ft. lbs.
66 7/8 "	105 "
70 "	110 "
73 1/4 "	115 "
76 1/2 "	120 "
79 2/3 "	125 "

The Turboliner has a dual fuel system, the fuel supply to each engine being essentially a seperate system. The two systems are interconnected by a crossfeed system. Under normal operating conditions each engine draws fuel from its own system.

The standard fuel system in the Turboliner consists of two main tanks of 50 U.S. gallon capacity located in the leading edge of each outer wing panel, two 76 U.S. gallon and two 25 U.S. gallon tanks located in the center section.

For normal operation the main tank is replenished from the selected auxiliary tank by an electrically driven vane type fuel transfer pump which is turned on and off by a float operated switch in the main tank. The switch is set to turn the pump on when the fuel level drops to 35 gallons and off when the fuel level reaches 40 gallons.

The main tank by-pass valves, operated by levers on the control pedestal, allow the fuel to be pumped directly from a selected auxiliary tank to the engine. With the crossfeed valve turned on the fuel may be pumped to the engine from a tank on the opposite side. Fuel may not be pumped into an auxiliary tank by the transfer system, as check valves prevent back flow into these tanks.

An auxiliary tank of 165 U.S. gallons capacity is installed as an option in the outer wing panels. An aircraft with this optional tank installed is operated in the same manner as one with the standard fuel system.

On aircraft with the optional center wing baggage lockers installed, the only auxiliary fuel tank is the 165 gallon tanks in the outer wing panels. With this system installed the fuel system is completely automatic, the auxiliary tank refilling the main tank as required. The by-pass valves are used to feed the engine fuel directly from the auxiliary tank and the crossfeed system makes it possible to feed an engine from the opposite side of the aircraft.

MAIN TANK REMOVAL

WARNING

Before removing any part of the fuel system, make sure that all master battery and ignition switches are in the OFF position and the aircraft is completely grounded.

a. Drain fuel from main and auxiliary tanks.

b. Disconnect all fuel lines from tank.

c. Disconnect all electrical connections from tank.

d. Remove fuel tank access doors.

e. Remove oval access door on rear web of fuel tank.

f. Remove bolts in rear web of tank.

g. Remove attaching screws in upper and lower surfaces and at the outboard rib.

h. Remove tank assembly.

MAIN TANK INSTALLATION

a. Clean tank thoroughly.

b. Install tank and attaching screws in upper and lower surface and at the outboard rib.

c. Install bolts through rear tank web. These bolts must be installed with washers and "O" rings under heads to prevent leakage.

d. Install oval access door on rear web of fuel tank. These bolts must be installed with washers and "O" rings under heads to prevent leakage.

e. Seal tank using _____ sealant.

f. Install fuel tank access door. No sealant is necessary when installing access door, a new gasket is sufficient to prevent fuel leakage.

g. Connect all fuel lines and vent lines and all electrical wiring to tank.

h. Fill tank with fuel and allow tank to stand for twelve hours to check for leaks.

CENTER SECTION AUXILIARY FUEL TANKS

Refer to Beechcraft Model 18 Maintenance Manual for servicing these tanks.

OUTBOARD AUXILIARY FUEL TANKS

The only maintenance that should be required on these tanks is inspection of the two oval inspection plates on the bottom of the tanks for leakage and the replacement of the gasket if leakage occurs.

BOOST PUMP REMOVAL

a. Make sure all electrical power to the aircraft is disconnected.

b. Drain the fuel from the main tank.

c. Disconnect the electrical leads to the pump.

d. Disconnect fuel lines from the pump.

e. Remove retaining bolts and boost pump.

BOOST PUMP INSTALLATION

Reverse the above procedures.

TRANSFER PUMP REMOVAL AND INSTALLATION

The removal and installation of the fuel transfer pumps are the same as the procedures in removing and installing the boost pumps.

FUEL SHUT-OFF AND BY-PASS VALVES

The fuel shut-off valves and the by-pass valves are located in the main landing gear wheel wells. When removing these valves follow these procedures:

a. Drain fuel system.

b. Disconnect control linkage from valve to be removed.

c. Disconnect fuel lines.

d. Remove retaining bolts and remove valve.

e. For installation reverse the preceding.

FUEL SELECTOR AND CROSS FEED VALVES

The fuel selector valves and the cross feed valve are located in the center section. The cross feed valve and one selector valve are located in the right side of the center section inboard of the nacelle. The remaining selector valve is located on the left. Removal of these valves is accomplished by the following:

a. Drain fuel system.

b. Remove access panel from under side of wing center section.

c. Disconnect control linkage from valve to be removed.

d. Disconnect all fuel lines.

e. Remove retaining bolts and remove valve.

f. For installation reverse the preceding.

ENVIRONMENTAL CONTROL SYSTEM

The environmental control system is such that the cabin and flight deck can be controlled independently. This allows for variations in cooling or heating due to ambient effects, passenger loading and solar effects. Another feature of the system is that the airflow can be controlled by the pilot, thus allowing for minimum penalty to the aircraft.

During maximum refrigeration operation, high pressure and high temperature air from the engine compressor passes through the mass flow valve, (mounted on the aft side of the engine compartment firewall) which also acts as a shutoff valve, and pressure regulator and then through a flow limiting venturi. The mass flow valve can be controlled to any flow desired from zero to the maximum allowable by the flow limiting venturi by means of a cockpit mounted needle valve. The engine bleed air then passes through an air-to-air heat exchanger which cools the bleed air to within a few degrees of the ram air which is used as a heat sink. The bleed air is then expanded through a radial turbine which extracts power from the air, thus further reducing the air temperature. The power output of the turbine is absorbed by the fan which draws ram cooling air across the heat exchanger and discharges it overboard. The cold turbine discharge air passes through an anti-ice screen and into the water seperator where the moisture is removed and into the cabin.

The temperature control valve, in addition to functioning as an anti-ice valve also controls the flow of heating air to the cabin. The heating air flows from the engine through the mass flow valve and flow limiting venturi to the heat exchanger. When the heating mode is selected the temperature control valve opens and allows the bleed air to bypass the heat exchanger and cooling turbine and flow through the water seperator and into the cabin.

The cabin and cockpit control systems are electric-pneumatic. Each system consists of a pneumatically controlled temperature control valve, an electric-pneumatic pressure modulator and a compartment temperature controller with its associated temperature sensors and selector.

During normal automatic operation, the two environmental control systems are electrically and pneumatically independent. The control system operates on 24 volts D.C. and a regulated air source of 13 psig. A loss of

either of these will cause the temperature control system to go to full cold. In the event of a failure of the control system on one of the environmental control systems the output of the opposite control system may be switched to control both of the environmental control systems.

HEAT EXCHANGER AND COOLING TURBINE ASSEMBLY

REMOVAL AND INSTALLATION

a. Remove access panels on lower surface of wing center section.

b. Remove the flexible duct from the ram air inlet.

c. Remove the flexible duct from the cold air discharge.

d. Remove bleed air line from heat exchanger.

e. Remove mounting bolts and unit.

f. For installation reverse the preceding.

REPLACEMENT OF COOLING TURBINE (Refer to Figure 9-2)

a. Remove nuts (1), washers (2), and screws (3). Separate clamps (7) and remove washer (4), seal (5), and spring (6). Seal may be left on flange of exchanger assembly (20); it is not necessary to replace seal each time clamps are separated, unless seal is damaged.

b. Remove nuts (13), washers (14), screws (15), and washer (16) and carefully rock cooling turbine (8) out of exchange assembly.

c. Install replacement cooling turbine (8) into exchanger assembly (20) making certain new gasket (17) is in place.

NOTE

Install gaskets (17) as required to remove all end-play between cooling turbine and heat exchanger assembly.

d. Secure cooling turbine (8) in plenum of exchanger assembly (20) with nuts (13), washers (14), screws (15), and washers (16).

e. Position cooling turbine (8) and exchanger assembly (20) ducts and install spring (6) and secure with washer (4), screws (3),washers (2), and nuts (1).

THIS PAGE RESERVED

THIS PAGE RESERVED

COOLING TURBINE LUBRICATION (Refer to Figure 9-2)

a. Reach into discharge duct of cooling turbine (8) with pliers, hold retainer (9), and remove screw (11) and packing with retainer (10).

b. Using a syringe, add 2.5 cc of oil through the hole in retainer (9). Allow a minute or two for the wicks and washers to absorb oil.

c. Hold retainer (9) and install packing with retainer (10) and screw (11).

MASS FLOW VALVE REMOVAL AND INSTALLATION

a. Remove acess panel from the inside of the nacelle.

b. Remove $\frac{1}{4}$ inch aluminum line from mass flow valve.

c. Loosen and remove clamps from 1 inch stainless steel bleed air lines.

d. Remove mass flow valve.

e. Clean gasket surfaces thoroughly to prevent leakage.

f. For installation reverse the preceding and install new gaskets.

TEMPERATURE CONTROL VALVE REMOVAL AND INSTALLATION

a. Remove acess panel from lower surface of wing center section.

b. Remove all $\frac{1}{4}$ inch aluminum lines from temperature control valve and cap all lines and ports on valve.

c. Remove 1 inch stainless steel bleed air line from valve and cap line and port on valve.

d. Loosen clamps on flexible duct between temperature control valve and cooling turbine.

e. Remove the four bolts in flange of temperature control valve and remove valve.

f. Clean all gasket surfaces thoroughly.

g. For installation reverse the preceding using new gaskets.

MODULATOR REMOVAL AND INSTALLATION

a. Remove electrical connection to valve.

b. Remove and cap all $\frac{1}{4}$ inch aluminum lines from valve.

c. Remove retaining bolts and modulator.

d. For installation reverse the preceding.

TROUBLESHOOTING INFORMATION

Refrigeration unit discharge temperature too high.	Leaking joint or connection at discharge side.	Tighten loos joint or connection.
Oil mist in turbine	Defective cooling turbine	Replace
Cabin or cockpit temperature below that selected	Damaged or loose ducting	Tighten or repair ducting
	Loose or damaged electrical connections	Check connections
	Internal malfunction of temperature selector	Replace
	Internal malfunction of temperature sensor	Replace
	Internal malfunction of temperature control	Replace
	Internal malfunction of modulating valve	Replace
No control of cockpit or cabin temperature	No power to control system	Check power supply
	Loose electrical connection	Check
	Internal malfunction of Selector switch	Replace

HEATING SYSTEM

The heating system as installed in the Volpar Turboliner is a manually controlled system. The heating system consists of two independent systems, one on each side of the aircraft. The airflow is controlled by the pilot by means of two cockpit mounted needle valves.

During the heating cycle high pressure and high temperature air from the engine compressor passes through the mass flow valve, (mounted on the aft side of the engine compartment firewall) which also acts as a shutoff valve, and pressure regulator and then through a venturi and into the cabin. The venturi acts as a pump and draws air from the cabin and mixes it with the bleed air from the engine, the air is then recirculated through the cabin.

This system requires little or no maintenance at all. When maintenance is required it usually is the tightening of loose ducts or the replacement of the mass flow valve. Procedures for the removal and installation of the mass flow valves are found in the environmental control system section.

ENGINE BLEED AIR PNEUMATIC SYSTEM

The engine bleed air pneumatic system is operated with pressure obtained by bleeding air from the engine compressors. The engine bleed air is used to operate the environmental control system; the heater system; the instrument air system; and the de-icer system. Each system is controlled by its respective pressure regulator. The regulators are preset at the factory and should not require any adjustment.

ELECTRICAL SYSTEM

The turboliner is an electrical airplane; therefore to maintain it properly, a thorough knowledge of its electrical system is essential. The electrical schematics furnished with this manual should be studied thoroughly and refered to whenever electrical work is attempted. They will be particulary usefull in troubleshooting, since by studying them you may eliminate many possible sources of a given malfunction and concentrate your actual investigation on the most likely sources.

In addition to the specific information in the schematics, you should have a good general knowledge of the turboliner system and the way it operates. Basically, it is a single wire, ground return system operating at 24 volts dc. The two engine driven starter/generators are connected in parallel with individual voltage regulators and a paralleling circuit. Power from both generators is fed to a distribution post in the belly, under the pilot's floorboards, and from the distribution post to the bus bars in the pilot's compartment subpanels, where the power for most of the individual circuits is distributed through circuit breakers or circuit breaker switches. Two heavy amperage circuits are supplied directly from the distribution post: the landing gear motor and the right engine starter. The left engine starter takes its power directly from the battery relay, as does the radio circuit breaker bus. The stall warning system, since it is necessary to have it energized at all times, is connect to the battery terminal of the battery relay through its own circuit breaker.

To provide an added margin of safety and shorten the length of the necessary heavy cables, the engine starter/generators, landing gear and flap motors are controlled through relays. Thus, each of these items has two circuits: the power supply proper, through the relay, and the control circuit with its own circuit breaker, which actuates the relay.

The standard battery system in the turboliner consists of two 24 volt, 75 ampere hour batteries in parallel, carried in the forward portion the nose section. Each battery is relay connected to the system through an individual switch on the pilot's subpanel. The bus bars are "hot" with external power connected, regardless of the position of the battery switches.

SCHEMATICS

In the schematics furnished with this manual, each wire is identified by the number which it actually bears in the aircraft, so that it may be located and traced down.

Since the purpose of the schematics is to show the terminals wire numbers and items in a manner which will make the operation of each component easily understandable, wire bundles and harnesses are not indicated and the arrangement of the components in the diagram was choosen for clarity without attempting to indicate their actual location in the aircraft. Also, for sake of simplification, the inter-relationship of the several circuits in most cases is not shown.

No radio wireing diagrams have been included in this manual. Radio installations in the Turbo 18 series have been largely as specified by individual customers; many radio installations have been made by the radio manufacturers themselves or by other firms who specialize in aircraft radio work, so that a detailed coverage of radio equipment in a manual of this kind is virtually impossible. A blueprint of the radio equipment installed, indicating the units installed, power supply and output connections and incidental wireing was included with the aircraft.

BATTERY SERVICE

General Care. To obtain continued peak performance, a Sonotone battery should be kept in a clean dry state. Keep metal objects, such as tools, etc., away from the exposed parts of the battery. If objects are accidentally dropped across the terminals, these might cause a short circuit that could damage a cell or cells.

Should the battery accumulate dust or a white deposit which sometimes forms around the tops of the cells, it is advisable to flush the top of the battery with ordinary tap water.

CAUTION

Do not attempt to clean battery tops with solvents, acids or any chemical solution. Sonotone batteries are primarily constructed with plastic or nylon cells. The plastic may be injured by introducing solvents, etc..

While flushing the batteries with tap water it is permissible to use a bristle brush to loosen any stubborn dirt particles.

CAUTION

Do not use wire brushes.

After cleaning, any excess water should be drained and the batteries permitted to dry. Where possible this drying may be accelerated by the use of compressed air.

LIQUID LEVEL ADJUSTMENT

During the normal operation of the battery it may be necessary

to add liquid. The proper liquid level of the battery is just above the tops of the plates or plastic inserts. Use only distilled or demineralized water.

DWG. NO.	TITLE	APPLICATION		
		TURBO 18	TURBOLINER I	TURBOLINER II
1922	DEICING SYSTEM INSTALLATION	X	X	X
2016	ANTI-ICING INSTALLATION PROP	X	X	X
2036	STICK SHAKER INSTALLATION	X	X	X
2080	SCHEMATIC FUEL BOOST PUMP	X	X	X
2081	SCHEMATIC FIRE EXTINGUISHER	X	X	
2082	SCHEMATIC MAIN FUEL GAGE	X	X	X
2083	SCHEMATIC BETA, NTS, CHIP DETECT.	X	X	
2085	SCHEMATIC LUBE OIL TEMP, TACH, EGT.	X	X	
2086	SCHEMATIC START FUEL IGNITION	X	X	
2087	SCHEMATIC PRIMARY PWR, GEN. CONTROL	X	X	
2089	SCHEMATIC TORQUE INDICATOR	X	X	X
2090	SCHEMATIC FUEL FLOW INDICATOR	X	X	X
2091	SCHEMATIC ALTERNATE STARTING	X	X	
2180	SCHEMATIC FUEL BOOST PUMP	X	X	X
2214	SCHEMATIC WARNING LIGHT MODULE	X	X	
2216	SCHEMATIC AIR CONDITIONER AIRESEARCH	X	X	X
2377	SCHEMATIC AUX FUEL GAGE	X	X	X
2427	SCHEMATIC PRIMARY PWR. & GEN. CONTROL			X
2428	SCHEMATIC LANDING GEAR CONTRO	X	X	X
2429	SCHEMATIC WARNING CIRCUITS			X
2430	SCHEMATIC FIRE EXTINGUISHER			X
2431	SCHEMATIC OIL TEMP, TACH., EGT			X

DWG. NO.	TITLE	APPLICATION	
		TURBO 18	TURBOLINER I II
2432	SCHEMATIC ENG. ANTI-ICE, PITOT		X
2433	SCHEMATIC BETA, NTS,		X
2434	SCHEMATIC START FUEL IGNITION		X
2435	SCHEMATIC ANNUNCIATOR		X
2438	SCHEMATIC GYRO HORIZON	X	X
2523	SCHEMATIC INVERTER		X
2531	SCHEMATIC CABIN, ENTRANCE, EMERG LITES		X
2532	*SCHEMATIC ALTERNATE ENGINE START		X

* ALTERNATE START CIRCUIT PER 2532 IS OPTIONAL AND NOT INSTALLED ON ALL TURBOLINER II AIRCRAFT

ENGINE FIRE WALL CANNON PLUGS

28-21

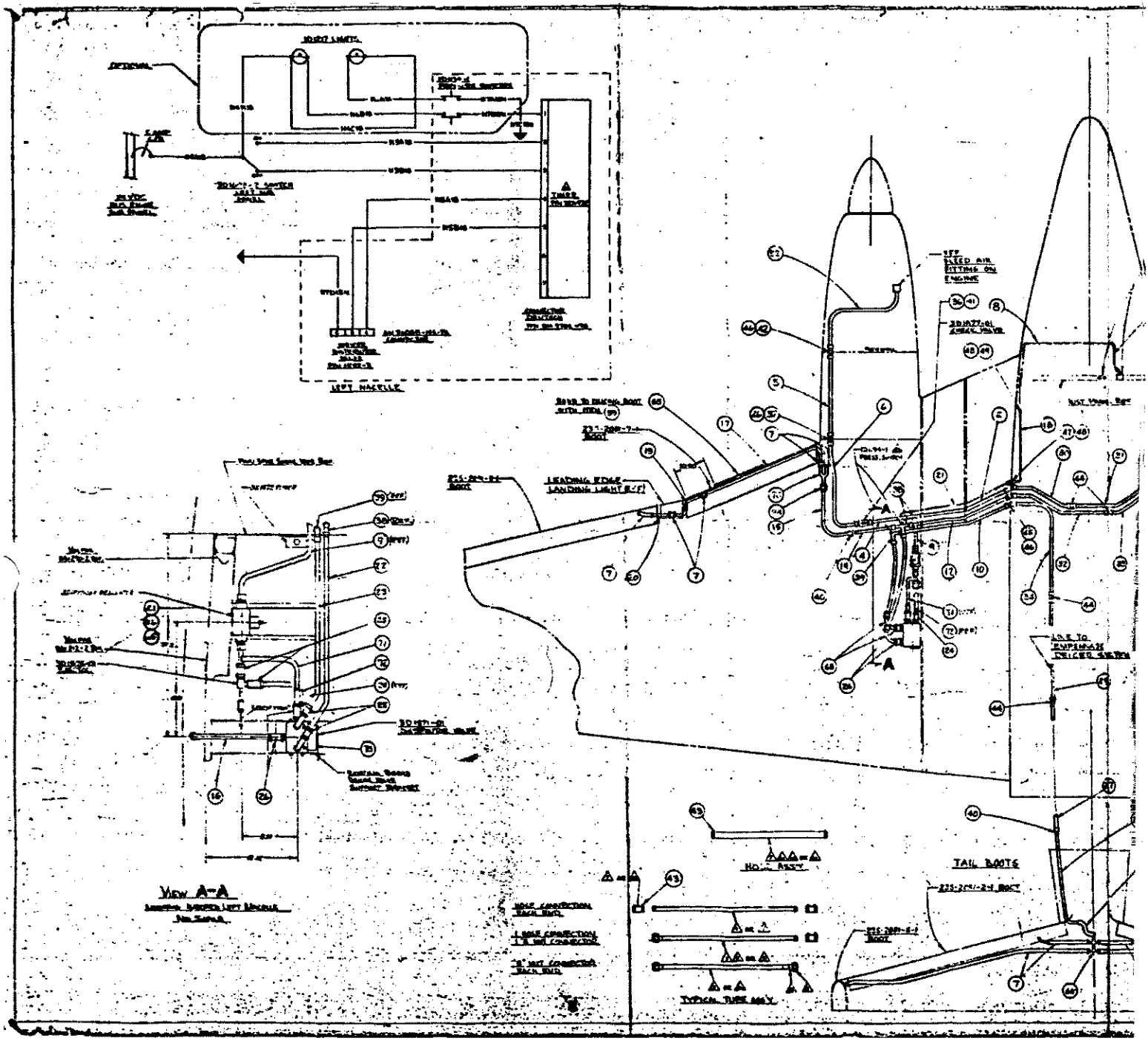
PIN LETTER	COMPONENT	PIN
A	FUEL VALVE	A
K	IGNITION	A
L	FUEL VALVE	B
	ENVIRONMENTAL CAN	B
P	OIL VENT	A
R	OIL VENT	B
S	IGNITION	B
T	FUEL VALVE	C
	ENVIRONMENTAL CAN	A
W	TACH GEN	A
X	TACH GEN	B
a	ANTI-ICE	A
b	ANTI-ICE	C
c	BETA	B
d	START FUEL	A
e	OIL TEMP	A
g	ANTI-ICE	B
j	OIL TEMP	B
n	START FUEL	B
p	ANTI-ICE	E
s	BETA	A

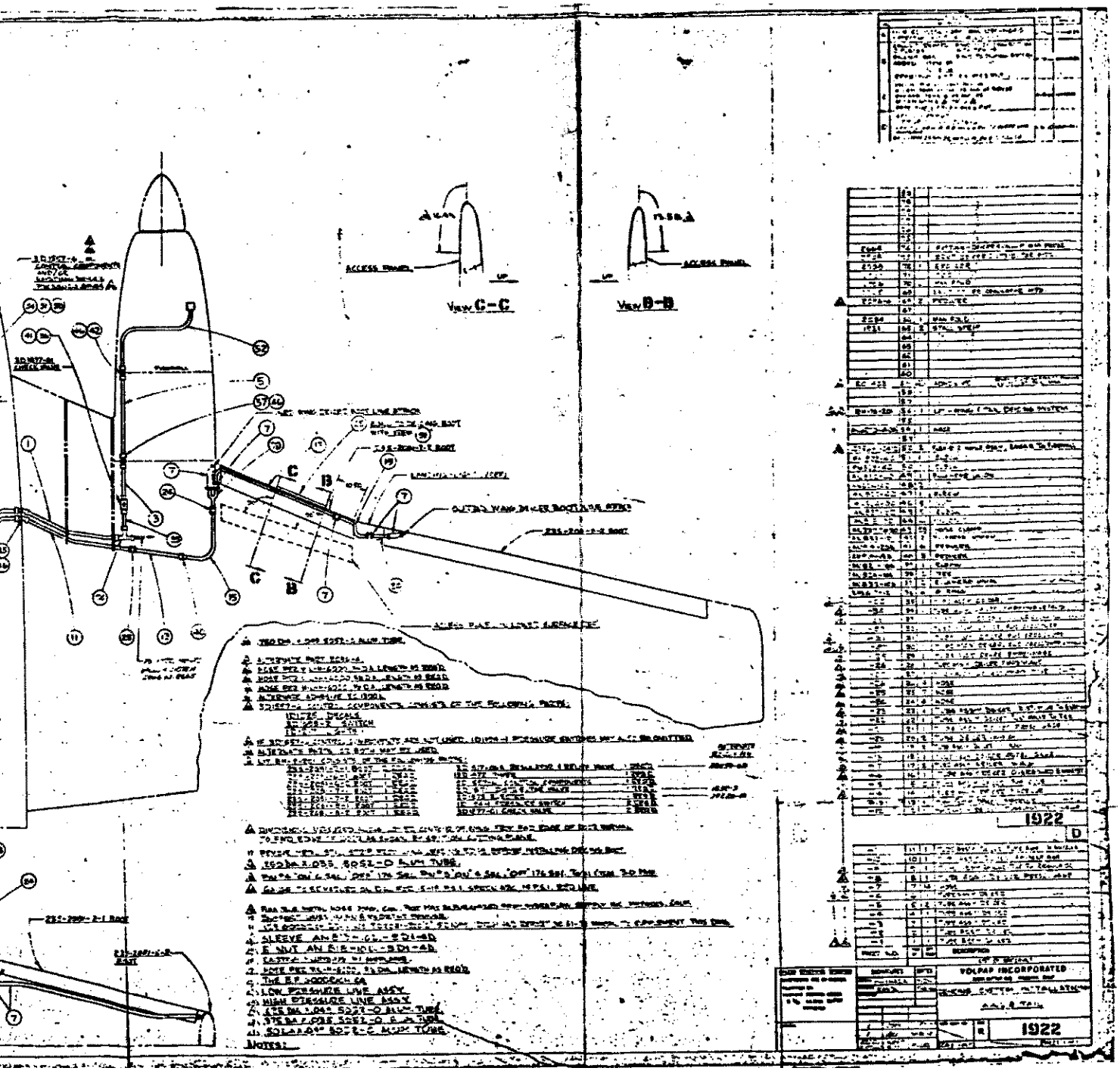
18-1

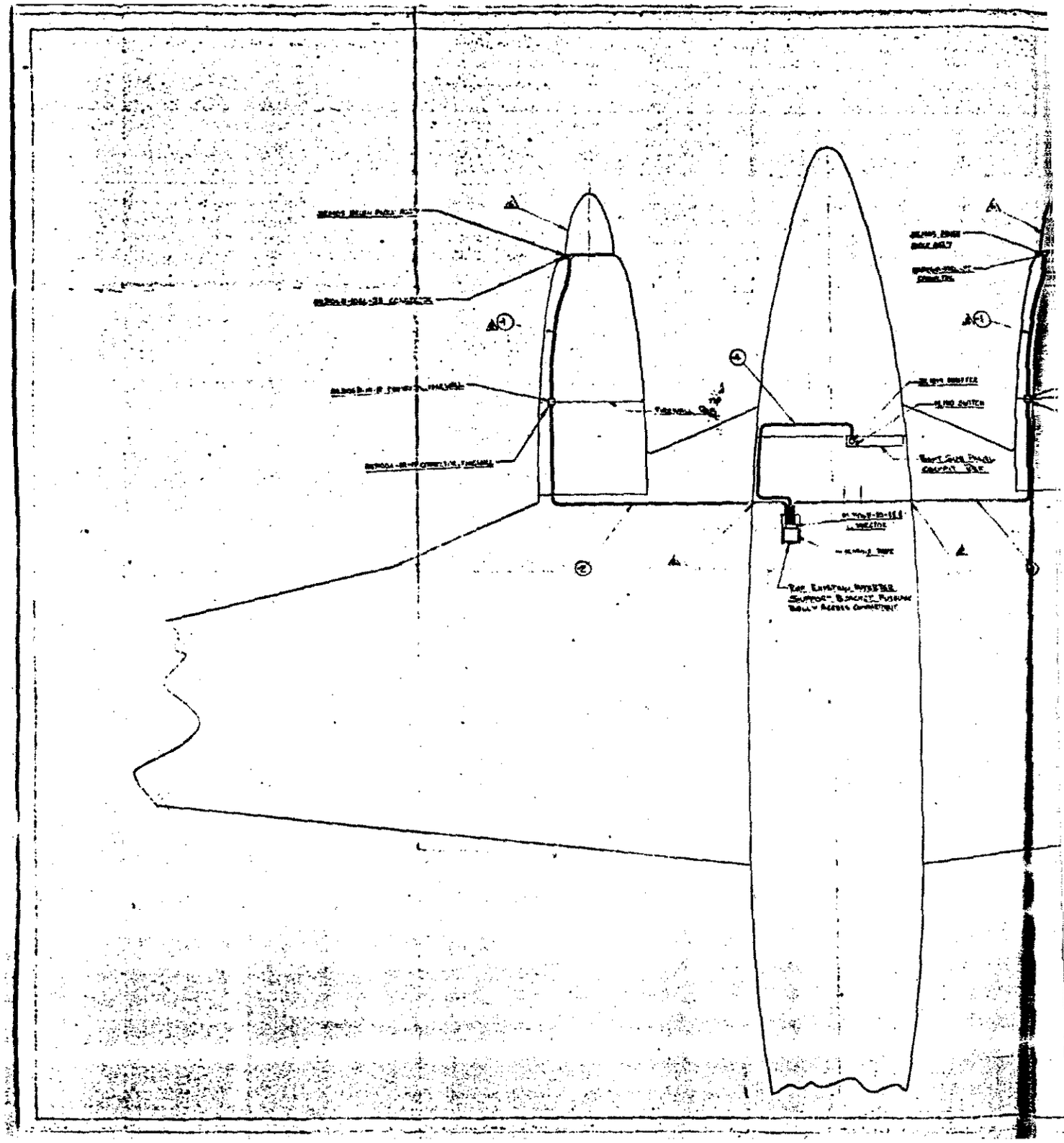
PIN LETTER	COMPONENT	PIN
A	PROP DE-ICE	A
B	PROP DE-ICE	B
E	PROP PITCH CONTROL	C
F	PROP PITCH CONTROL	B
G	FUEL FLOW	A
H	FUEL FLOW	B

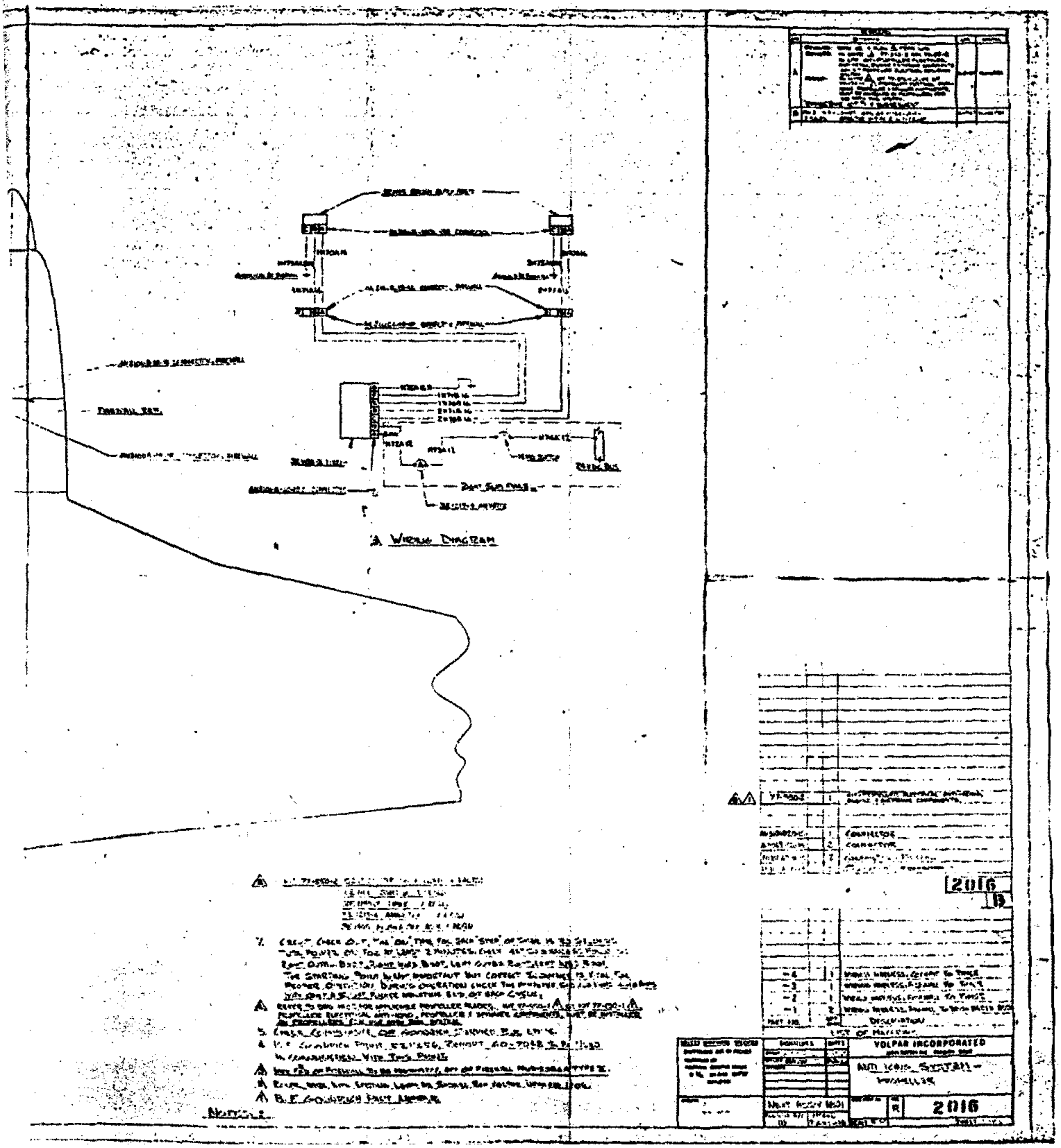
14-6

A	UNFEATHERING PUMP	
B	GEN P1A16	A
C	GEN P4A16	D
D	FIRE DETECTOR	
E	FIRE DETECTOR	
F	CHIP DETECTOR	

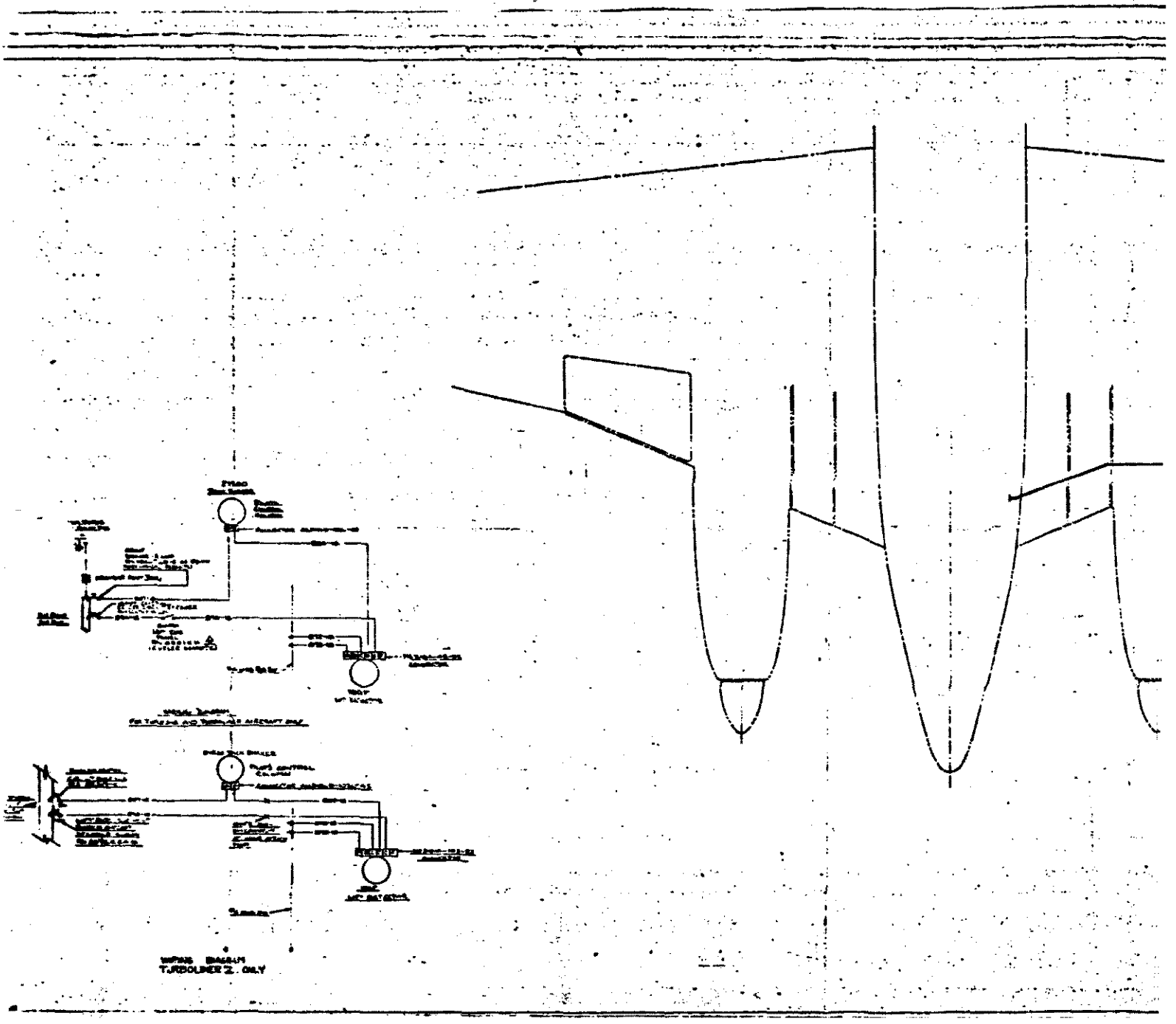

LEFT NACELLE
LEADING EDGE LANDING LIGHT DUCT
TAIL BOOTS
VIEW A-A

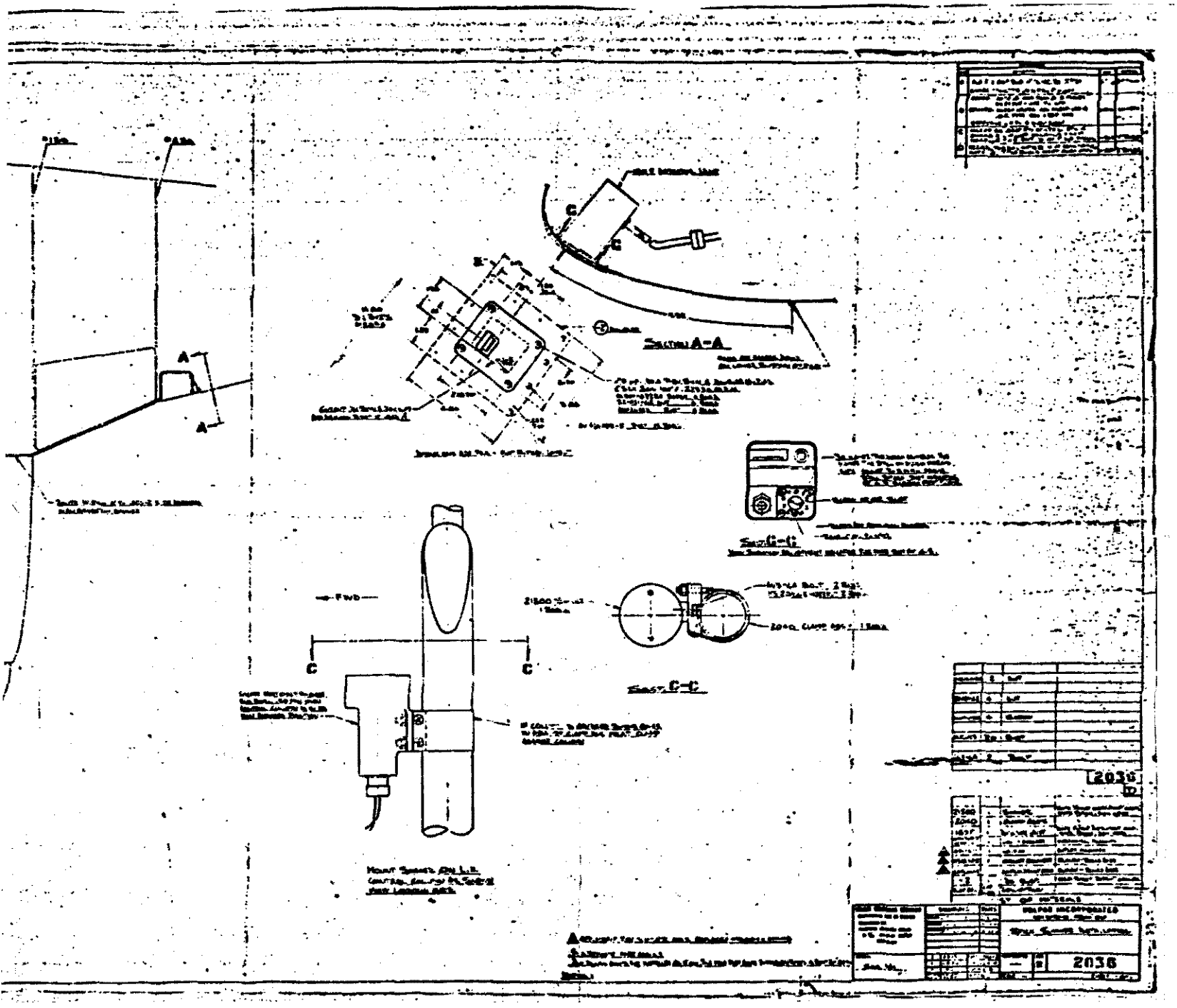

View C-C
View B-B
ACCESS PANEL
NOTES:
VOLPAP INCORPORATED
1922

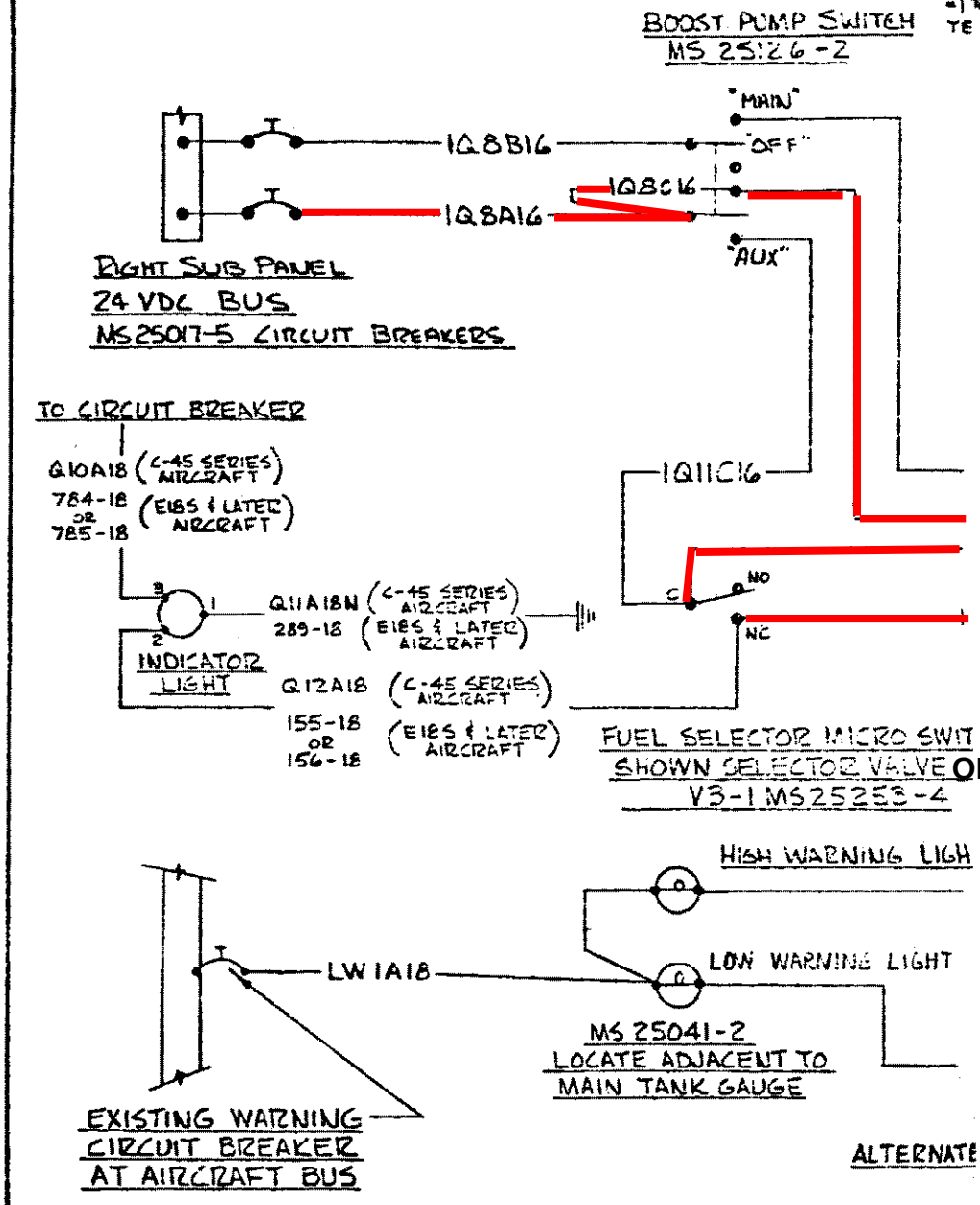




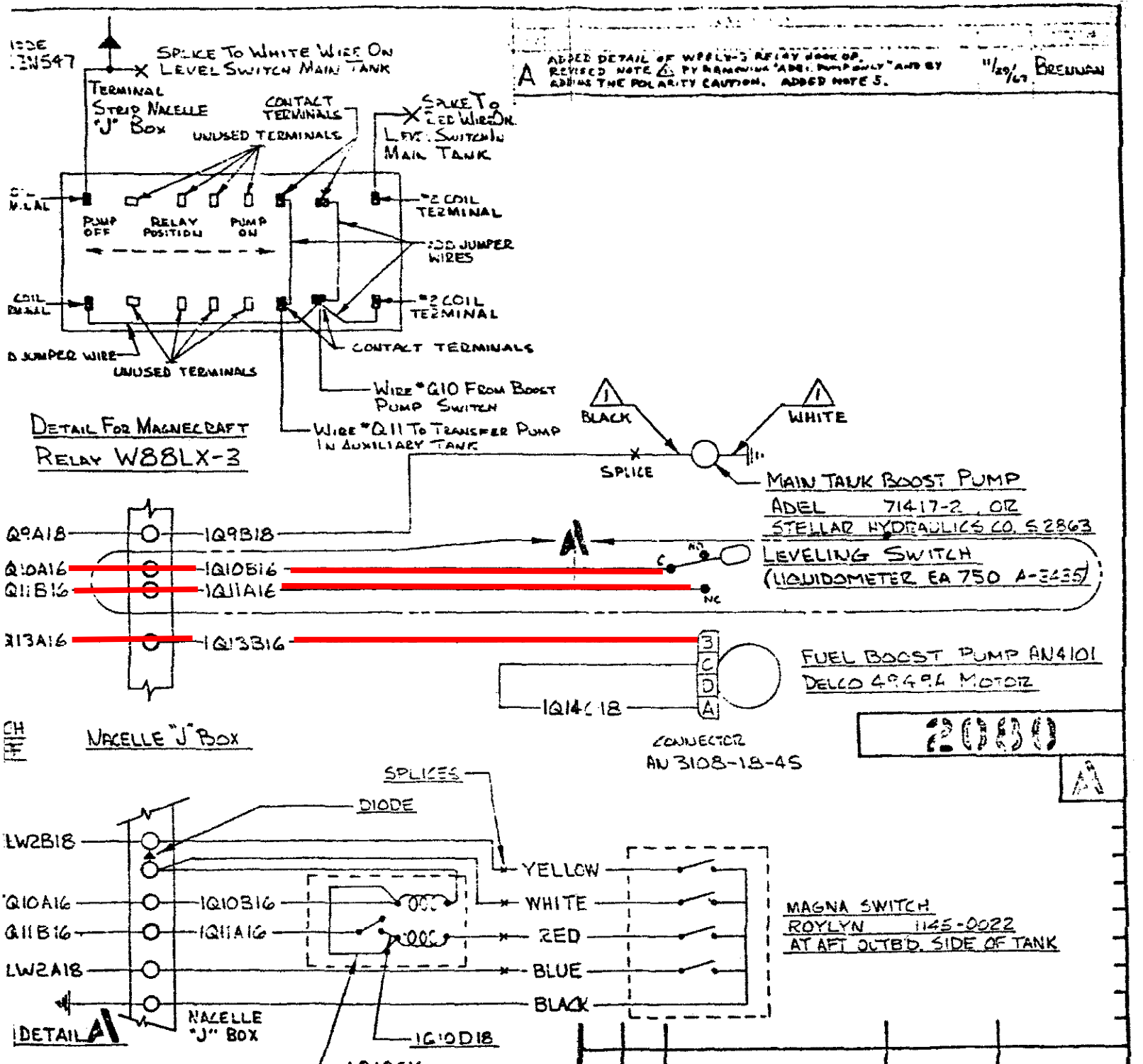
WIRING DIAGRAM
LIST OF MATERIAL
DESCRIPTION
VOLPAR INCORPORATED
2016




A
A
C
C
Section A-A
Fwd
C
C
Section C-C
2036



1. BOOST PUMP WIRE CODE WHITE—, BLACK+
   CAUTION: POLARITY TO BOOST PUMP MUST NOT BE REV
2. WIRE MIL-W-5086A TYPE II.
3. DELETE FUEL PRESSURE WARNING SWITCH 94-32
   AS INSTALLED ON ORIGINAL AIRCRAFT. REROUTE WIRI
   Q12A18, Q10A18 AND Q11A18N ON C-45 SERIES AIRCRAFT MOI
   OR WIRES 155-18, 156-18, 289-18, 784-18, 785-18 ON E
   LATER AIRCRAFT MODELS AS PER WIRING DIAGRAM.
4. LEFT CIRCUIT SHOWN, RIGHT CIRCUIT SAME EXCEPT WIRE NUMBERS PRE
5. THIS DRAWING APPLIES TO AIRPLANES WITH FUEL TANK SELEC
   DRAWING 2150 APPLIES TO AIRPLANES WITHOUT FUEL TANK SELE



A ADDED DETAIL OF WIRING AT RELAY DOOR OF. REVISED NOTE 4 BY REMOVING "ADEL PUMP ONLY" AND BY ADDING THE POLARITY CAUTION. ADDED NOTE 5. 11/29/67 BRENNAN

20880

A

ITEM NO.	QTY REQD	DESCRIPTION	MATERIAL	SPECIFICATION

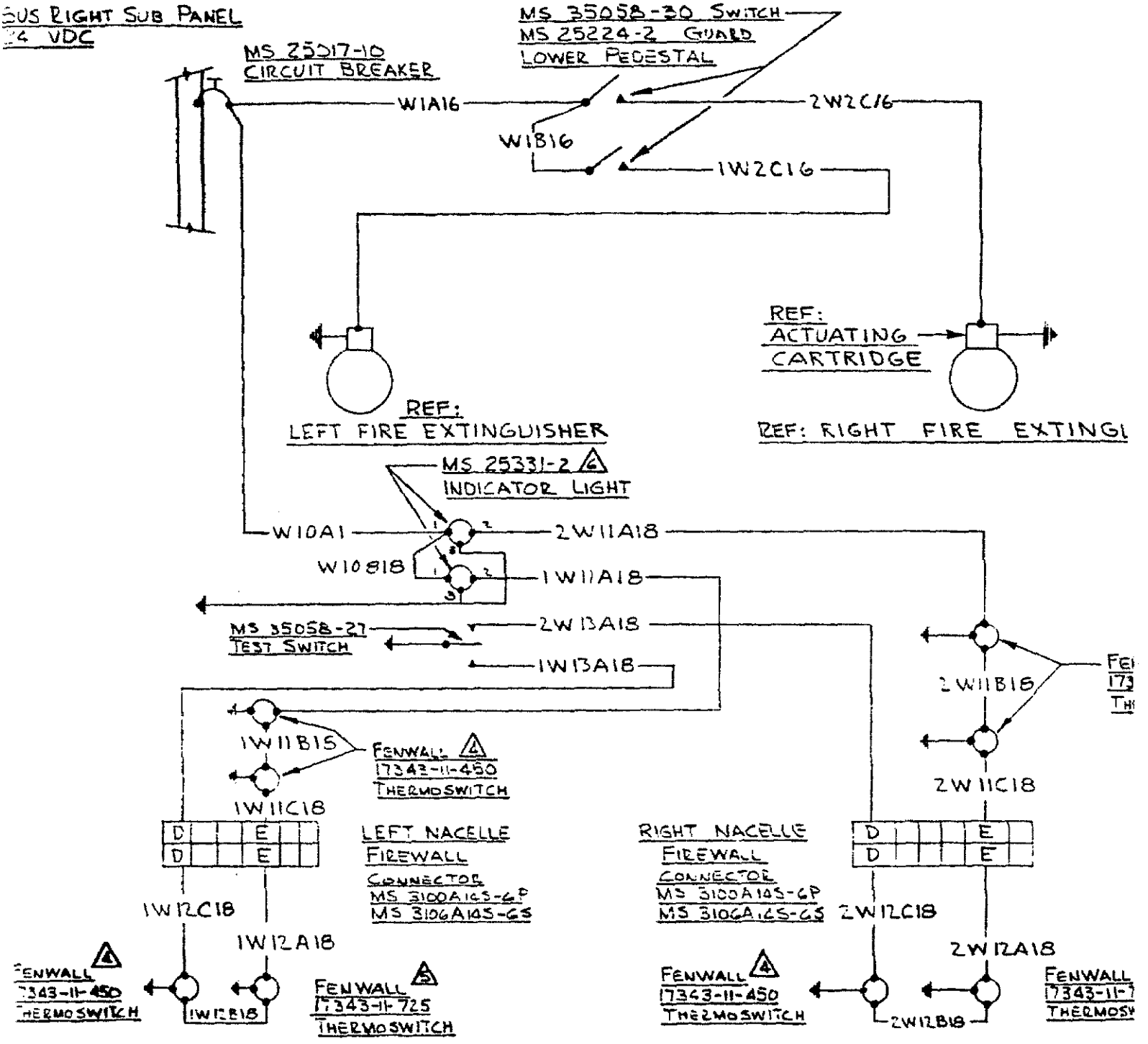
LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATES
DIMENSIONS ARE IN INCHES	DRAWN TRUHLS	1-11-65
TOLERANCES ON: FRACTIONS ± 1/16, DECIMALS XX ± .03, XXX ± .010, ANGLES ± 0°30'	CHECKED	
	APPROVED	

VOLPAR INC.
11035 SUTTER AVE. PACOIMA, CALIF.

SCHEMATIC – ELECTRICAL SYSTEM, FUEL BOOST PUMP

MATERIAL	NEXT ASS'Y 1801	CODE IDENT. NO.	SIZE	20880
	MODEL TURBO 18	SCALE:	C	SHEET 1 OF 1



6. LENS, NON-DIM TYPE
5. 725°F THERMOSWITCH LOCATED IN HOT SECTION ENGINE.
4. 450°F THERMOSWITCH LOCATED AT FIREWALL & ACCESSORY SECTION.
3. WIRE AFT OF FIREWALL MIL-W-5086 A II
2. WIRE FORWARD OF FIREWALL MIL-W-8777
1. FIRE DETECTORS MUST HAVE POSITIVE GROUND

NOTES: (UNLESS OTHERWISE SPECIFIED.)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS DECIMALS ANGLES
± 1/16 XX ± .03 ± 0°30'
XXX ± .010

MATERIAL

REV	DESCRIPTION	DATE	APPROVED
A	CHANGED WARNING LIGHTS TO MS 25231-2 (WAS AN3127). ADDED LIGHT TEST CIRCUIT. MS35058-27 SWITCH WAS AN3021-7. MS35058-30 SWITCH WAS AN3021-8	11-18-65	MDC ENG

SHER

VALL
3-11-450
MD SWITCH

2081

A1

CH

ITEM NO.	QTY REQD	DESCRIPTION

LIST OF MATERIALS

SIGNATURES	DATES
DRAWN THOMPSON	2-18-65
CHECKED [illegible]	[illegible]
APPROVED [illegible]	[illegible]

VOLPAR INC.
11035 SUTTER AVE. PACOIMA, CALIF.

SCHEMATIC - ELECTRICAL SYSTEM,
FIRE EXTINGUISHER & DETECTOR

NEXT ASS'Y 1801

MODEL TURBO 18

CODE IDENT. NO.

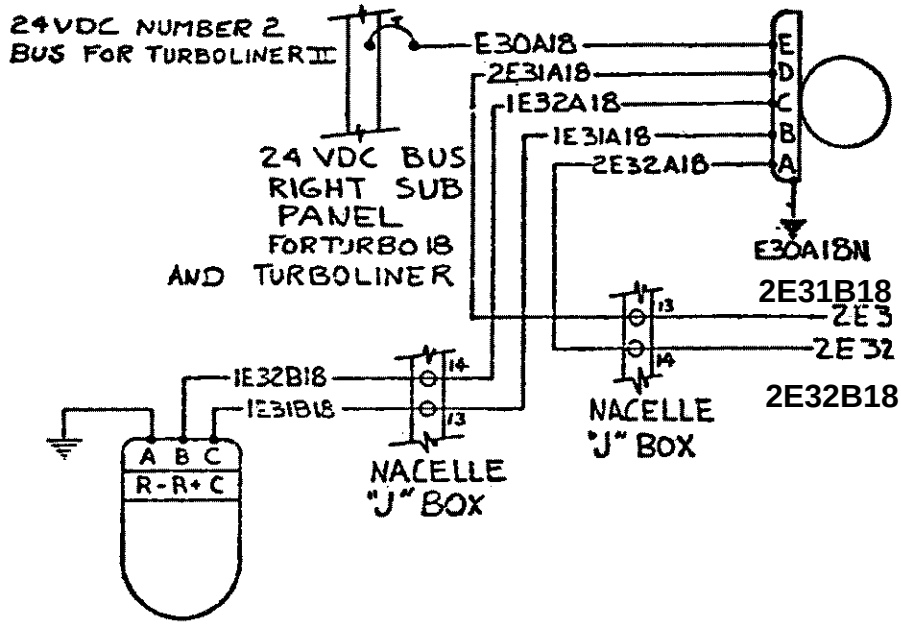
SIZE C

2081

SCALE: NONE

SHEET 1 OF 1

MS 25017-5 : FOR TURBOLINER II.
MS25017-10 FOR TURBO 18 AND TU
CIRCUIT BREAKER



LEFT MAIN TANK
TRANS P/N EA 515A-1848
LIQUIDOMETER CORP.
MS 3106A 14S-7S CONNECTOR

R
T
L
N

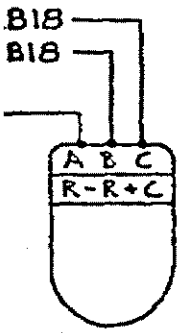
1. WIRE TO MIL-W-5086A TYPE II.

NOTES: (UNLESS OTHERWISE SPECIFIED.)

A	ADD: GROUND WIRE E30A18N CHANGE: Δ1.2.3. WAS □1.2.3, 10 AMP C/B WAS 5 AMP C/B, Δ WAS 4986768-5 CIRCUIT BREAKER	7-18-67	BRENNAN
B	ADDED NACELLE "J" BOX TERMINAL STRIPS. ADDED CIRCUIT BREAKER PART NO. MS 3062A18S-7P WAS AN3106A18-7P. MS3106A14-7S WAS AN3106A14-7S	11/25/69	BECKMAN
C	ADDED CIRCUIT BREAKER AND BUS CALL OUT FOR TURBOLINER II AIRCRAFT	4-9-70	TAYLOR
D	ADDED WIRES 12 & 14 AT NACELLE "J" BOXES	5-21-70	MASON

BOLINER.

INDICATOR
P/N EA148-AN-128H
LIQUIDOMETER CORP.
MS 3106A14S-5S CONNECTOR



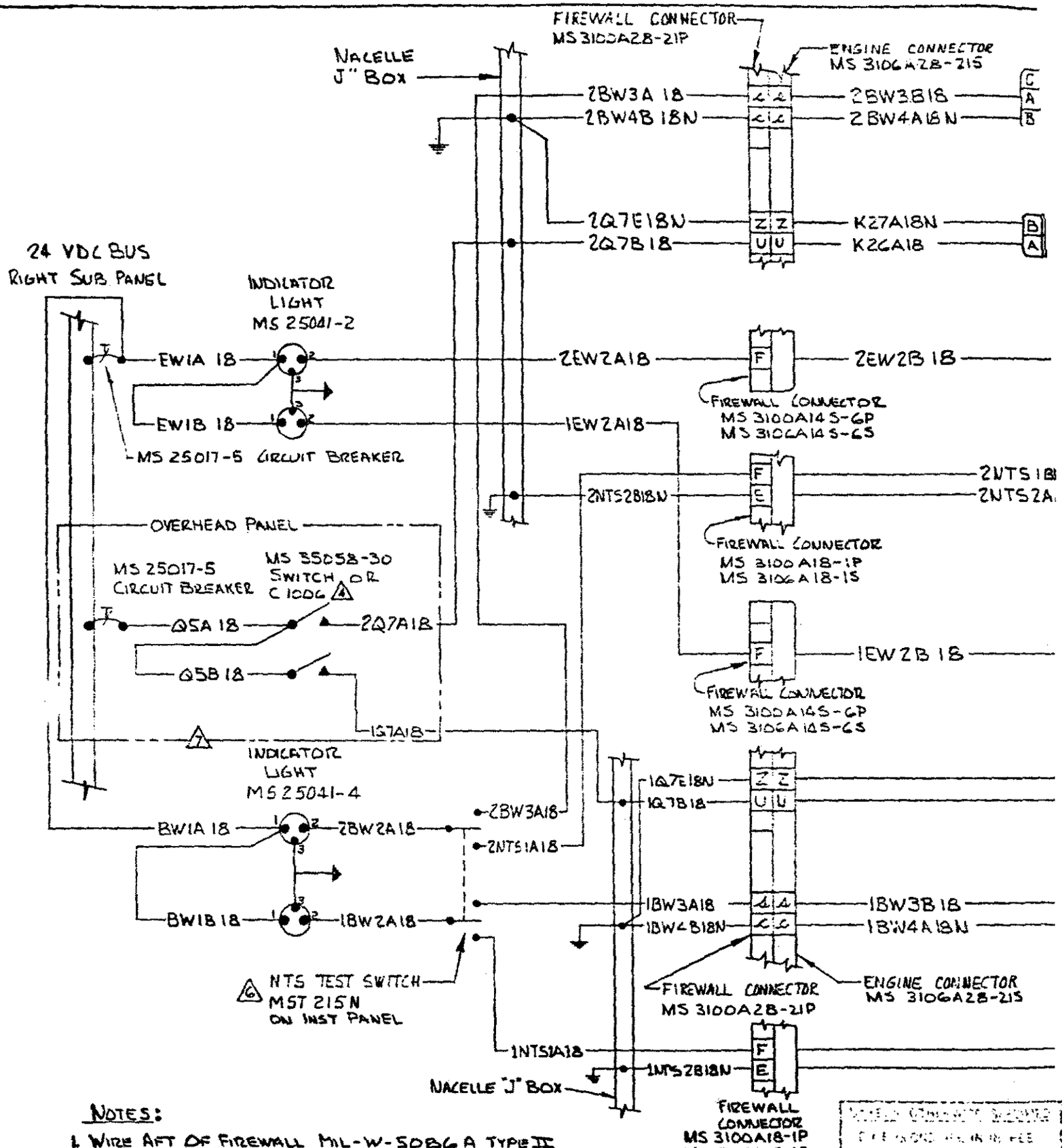
IGHT MAIN TANK
RANS. P/N EA 515A-1848
IQUIDOMETER CORP.
IS 3106A14S-7S CONNECTOR

20832
D

ITEM NO.	QTY REQD	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED	SIGNATURES		DATES	VOLPAR INC. 21035 SUTTER AVE. PACOIMA, CALIF.
DIMENSIONS ARE IN INCHES	DRAWN THOMPSON		7-13-65	SCHEMATIC-ELECTRICAL SYSTEM
TOLERANCES ON: FRACTIONS DECIMALS ANGLES ± 1/16 XX ±.01 ±0°30' XXX ±.010	CHECKED			MAIN FUEL TANK GAGE
	APPROVED			
	2515	TURBOLINER II		
MATERIAL	2370	TURBOLINER	CODE IDENT. NO.	SIZE C 20832
	1801	TURBO 18		
	NEXT ASSY.	MODEL	SCALE: NONE	SHEET 1 OF 1



NOTES:

1. WIRE AFT OF FIREWALL MIL-W-5086A TYPE II
2. WIRE FORWARD OF FIREWALL MIL-W-8777
3. BETA SWITCH, CUSTOM COMPONENTS, SWITCH PRESSURE GAGE PN 86300

4. PART NO. OF CUTLER HAMMER, MILWAUKEE, WIS.
   PART NO. OF CUSTOM COMPONENT SWITCHES, INC., CHATSWORTH, CALIF.

5. PART NO. OF ALCOSWITCH, LAWRENCE, MASS.
6. FOR TPE 331-47-A,-47-B, & -1-101B ENGINE INSTALLATIONS, OMIT THE FUEL ENRICH CIRCUIT FROM BUS TO FUEL ENRICH VALVE

A	MS 25041-2 WAS AN 3157, MS25041-4 WAS AN3157, ENGINE CONNECTOR WAS FIREWALL CONNECTOR, 2 PLCS ADDED GEN NOTE #6, NTS TEST SWITCH MST 215 N, AND FIREWALL CONNECTOR AN3100A-28-21P, 2 PLCS. REMOVED ENGINE CONNECTOR AN3108-28-21S, 2 PLCS, AN 3100A-28-21P, 2 PLCS, 207D18N, 207C18, 1073B8N, AND 1G7C1R. EFFECTIVE KIT #1 E SUBSEQUENT.	11-8-67	SCHNEIDER
B	ADDED TEST CIRCUIT FOR INDICATOR LIGHTS. ADDED NOTE 7. (E.O. No 250 INCORPORATED).	11-28-67	MORENO
C	CHANGED NOTE 7 TO INCLUDE -1-101B ENGINE. ADDED CALLOUT FOR CONNECTOR AT CHIP DETECTOR.	10-4-68	MORENO

BETA SWITCH

FUEL ENRICH

△7

MAGNETIC CHIP DET.

MS 3106E-8S-1S CONNECTOR FOR TPE 331-1-101B ENGINE ONLY.

18 — B NTS
8N — C SWITCH

MS 3106E-8S-1S CONNECTOR FOR TPE 331-1-101B ENGINE ONLY

MAGNETIC CHIP DET.

2083
C

K27A 18N — B FUEL
K26A 18 — A ENRICH

△7

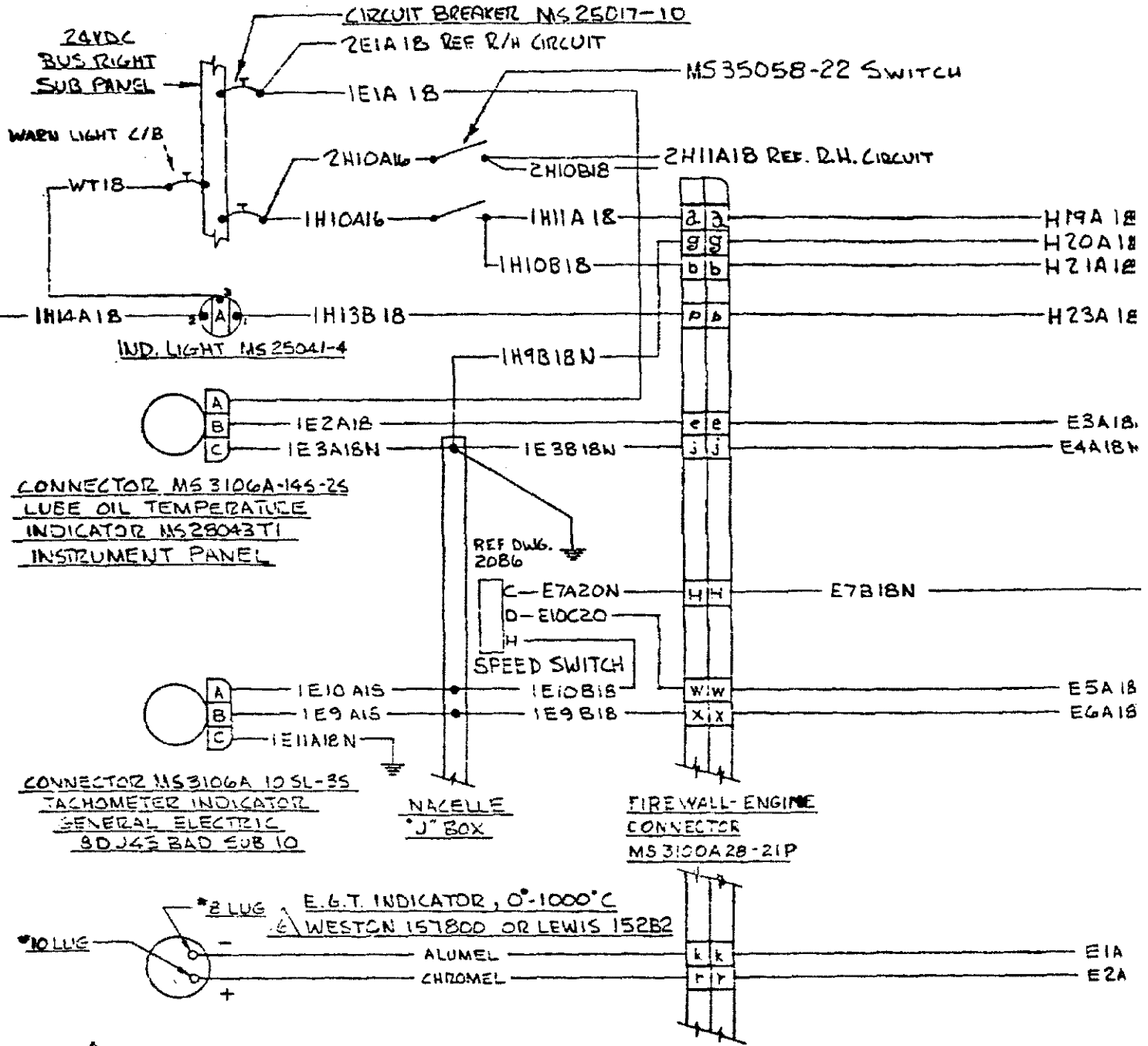
C BETA
A SWITCH
B

BG300 △5

INTS 1B 18 — B NTS
INTS 2A 18N — C SWITCH

86425 △5

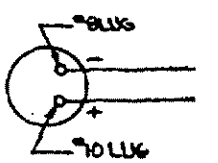
DRAWN	DATE	VOLPAR INCORPORATED
TRUHLS	3-9-66	
APPROVED		SCHEMATIC-ELECTRICAL SYSTEM
		BETA WARNING, FUEL ENRICH, MAGNETIC CHIP DETECTOR
NEXT ASS'Y. 1801		C 2083
MODEL TURBO 18		1 OF 1



8 FOR TPE 331-1-101B ENG INSTALLATION - CIRCUIT 4 OHM IND TO ENG COMPENSATING RESIST

7. LEFT CIRCUIT SHOWN. RIGHT CIRCUIT SAME EXCEPT NUMBER PREFIX IS 2.

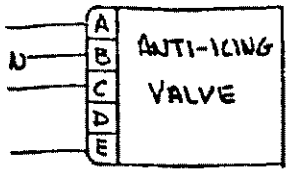
6 FOR TPE 331-47-8 ENGINE INSTALLATION, CIRCUIT 4 OHMS, INDICATOR TO FORWARD SIDE OF FIREWALL CONNECTOR. APPROXIMATE LENGTH OF HARNESS 30FT. LWAC-1/2 WIRE, LEWIS ENGINEERING CO., NAUGATUCK, CONN. FOR EARLIER MODEL ENGINE INSTALLATIONS, TOTAL CIRCUIT 8 OHMS, INDICATOR TO ENGINE PROBE. APPROXIMATE LENGTH OF AIRCRAFT HARNESS 30 FT., MATCHED TO ENGINE AT INSTALLATION. LWAC-2 WIRE, LEWIS ENGINEERING CO., NAUGATUCK, CONN.

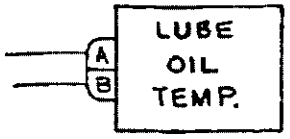


5. COLOR CODE: CHROMEL = WHITE AND ALUMEL = GREEN.
4. SEPARATE E.G.T. WIRE FROM MAIN WIRE LOOM BETWEEN INSTRUMENT AND FIREWALL CONNECTOR.
3. ALUMEL, CHROMEL WIRE MIL-W-5846 TYPE II
2. WIRE FWD OF FIREWALL MIL-W-8777
1. WIRE AFT OF FIREWALL MIL-W-5086A TYPE II

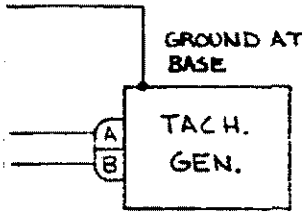
NOTES:

A	UP DATED SCHEMATIC TO CIRCUITS CURRENTLY BEING USED IN AIRCRAFT	11/28/67	BRENNAN
B	CHANGED NOTE 6 TO COVER TPE 331-47-B ENGINE INSTALLATION - CHG NOTE 3	2/13/68	BEAN
C	ADDED THERMOCOUPLE SCHEMATIL FOR TPE 331-1-101B ENGINE INSTALLATION. ADDED NOTE 8.	10/4/68	BRENNAN

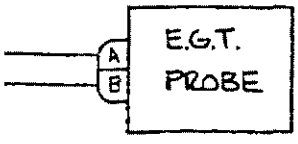




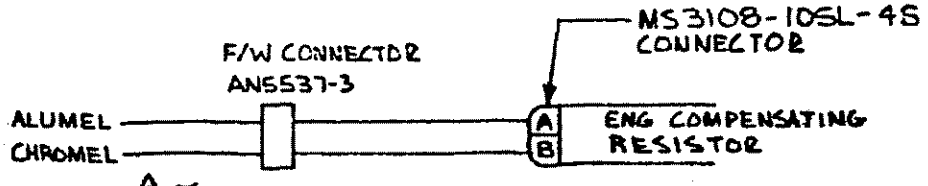
PROBE
MS28034-3



2085
C



OR.



8 TPE 331-1-101B INST ONLY

VOLPAR INCO, PORTLD

ISHIHARA 3-9-65
EXTAYLOR 6-24-65

SCHEMATIC - ELECTRICAL SYSTEM,
LUBE OIL TEMPERATURE, TACHOMETER,
EXHAUST GAS TEMPERATURE

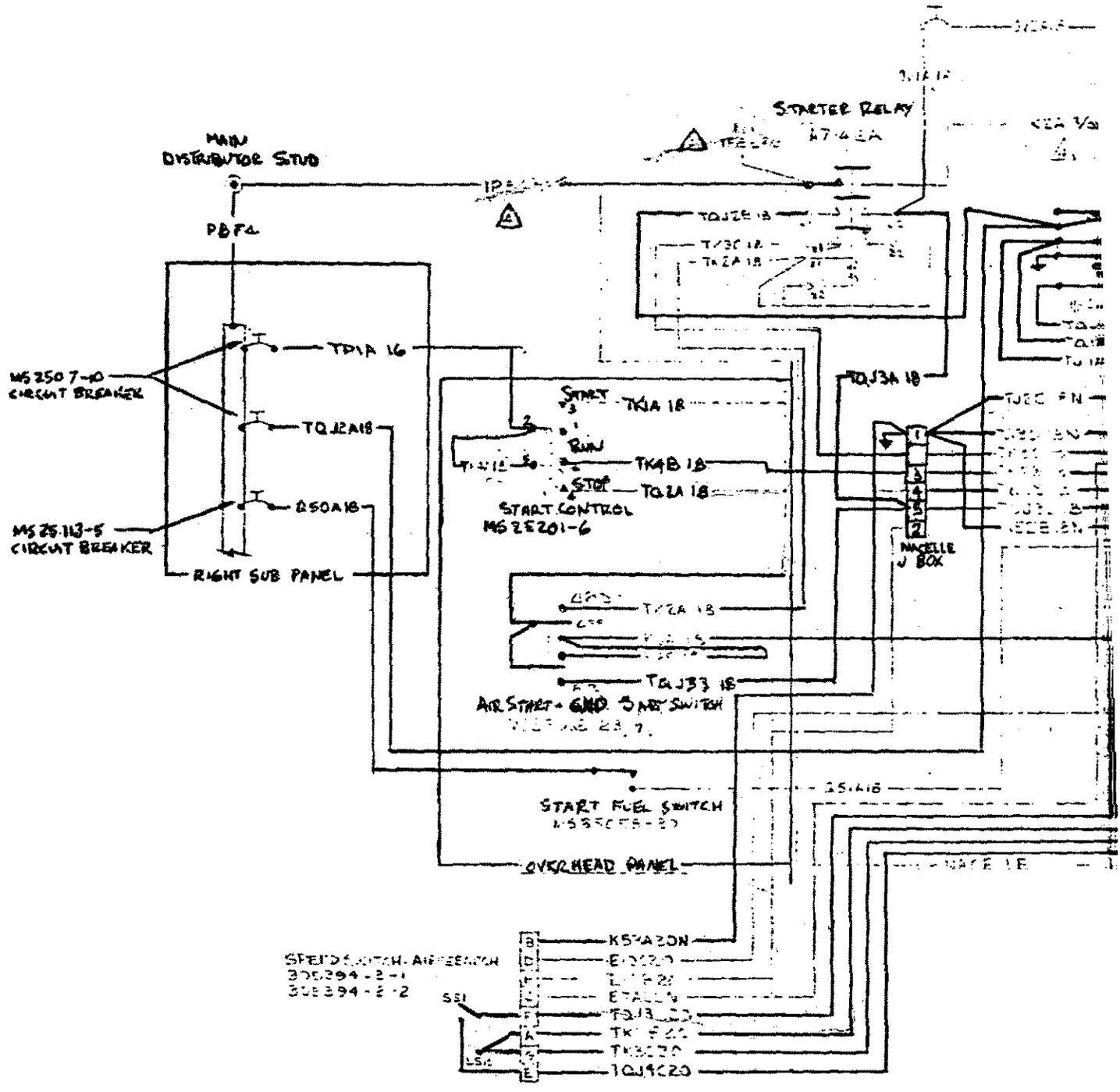
NEXT ASS'Y. 1801

C 2085

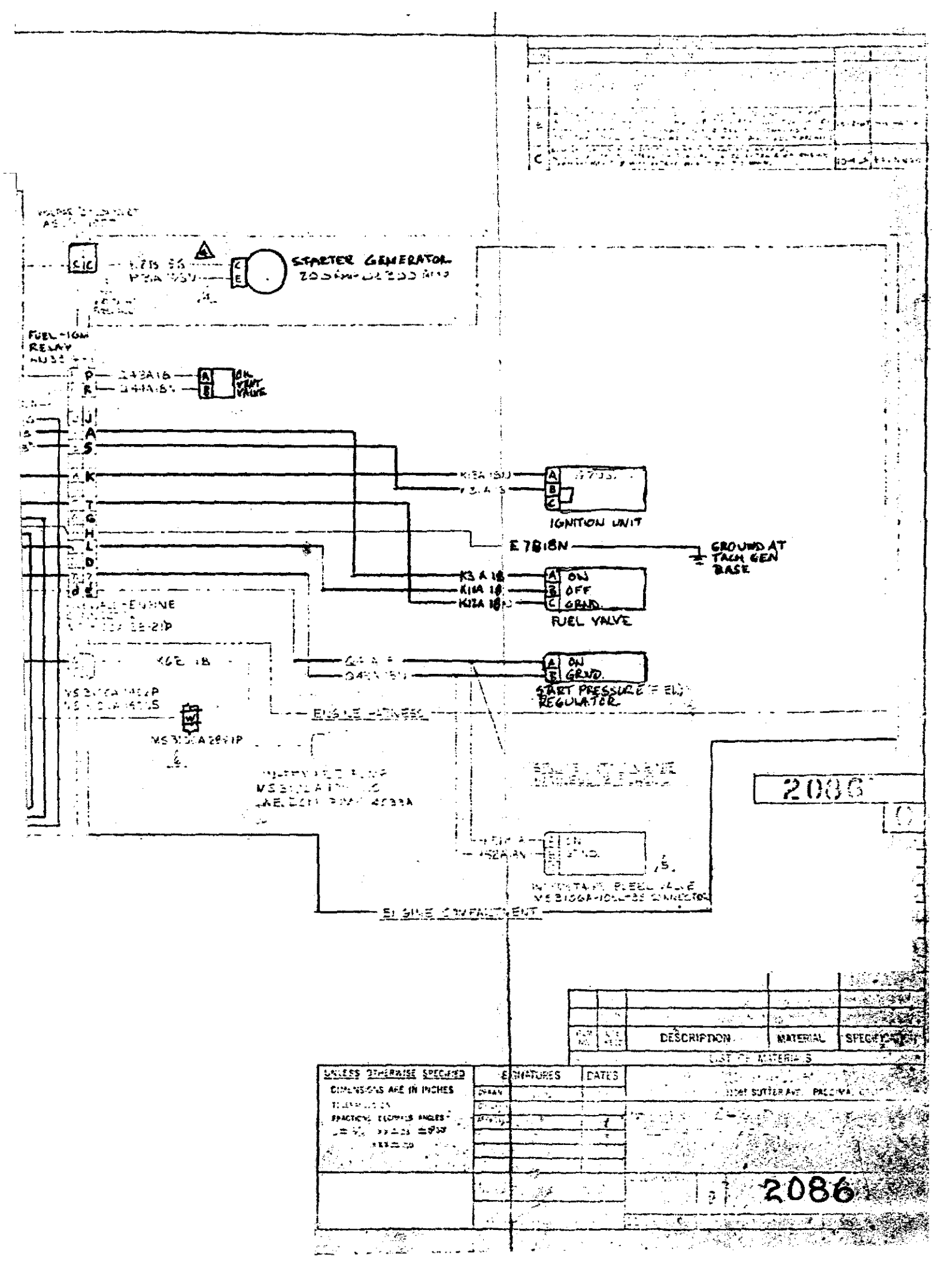
MODEL TURBO 18

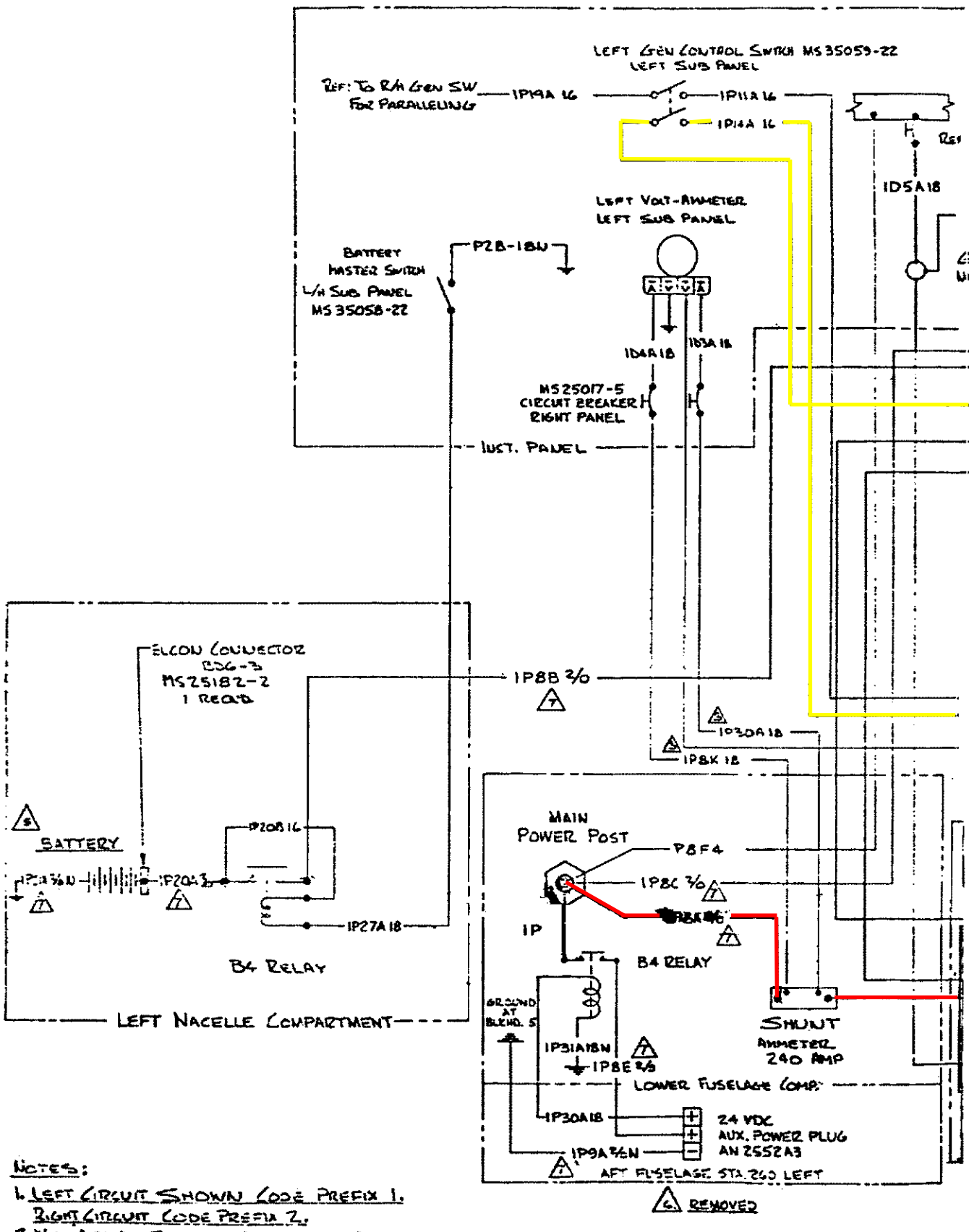
NONE

1 OF 1



1. WIRE LOOSE ENDS TO INDICATE LEFT CIRCUIT
2 INDICATES LEFT CIRCUIT

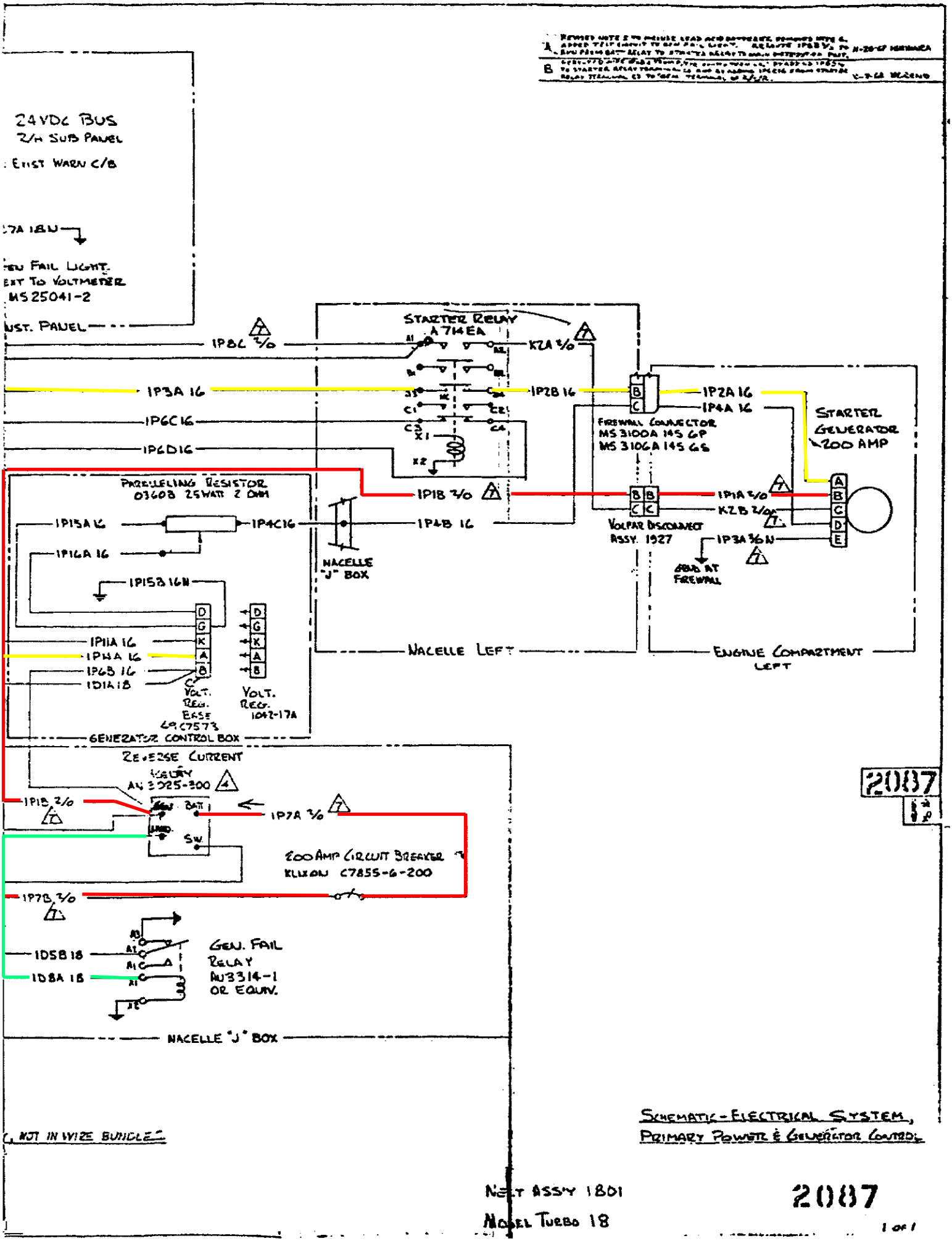

STARTER GENERATOR
FUEL-IGN RELAY
IGNITION UNIT
E7B8N
GROUND AT TACH GEN BASE
K3A1B
K1A1B
K2A1B
ON
OFF
GRND.
FUEL VALVE
ON
GRND.
START PRESSURE (FUEL) REGULATOR
ENGINE HARNESS
ENGINE COMPARTMENT
2086
DESCRIPTION
MATERIAL
LIST OF MATERIALS
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
SIGNATURES
DATES
2086

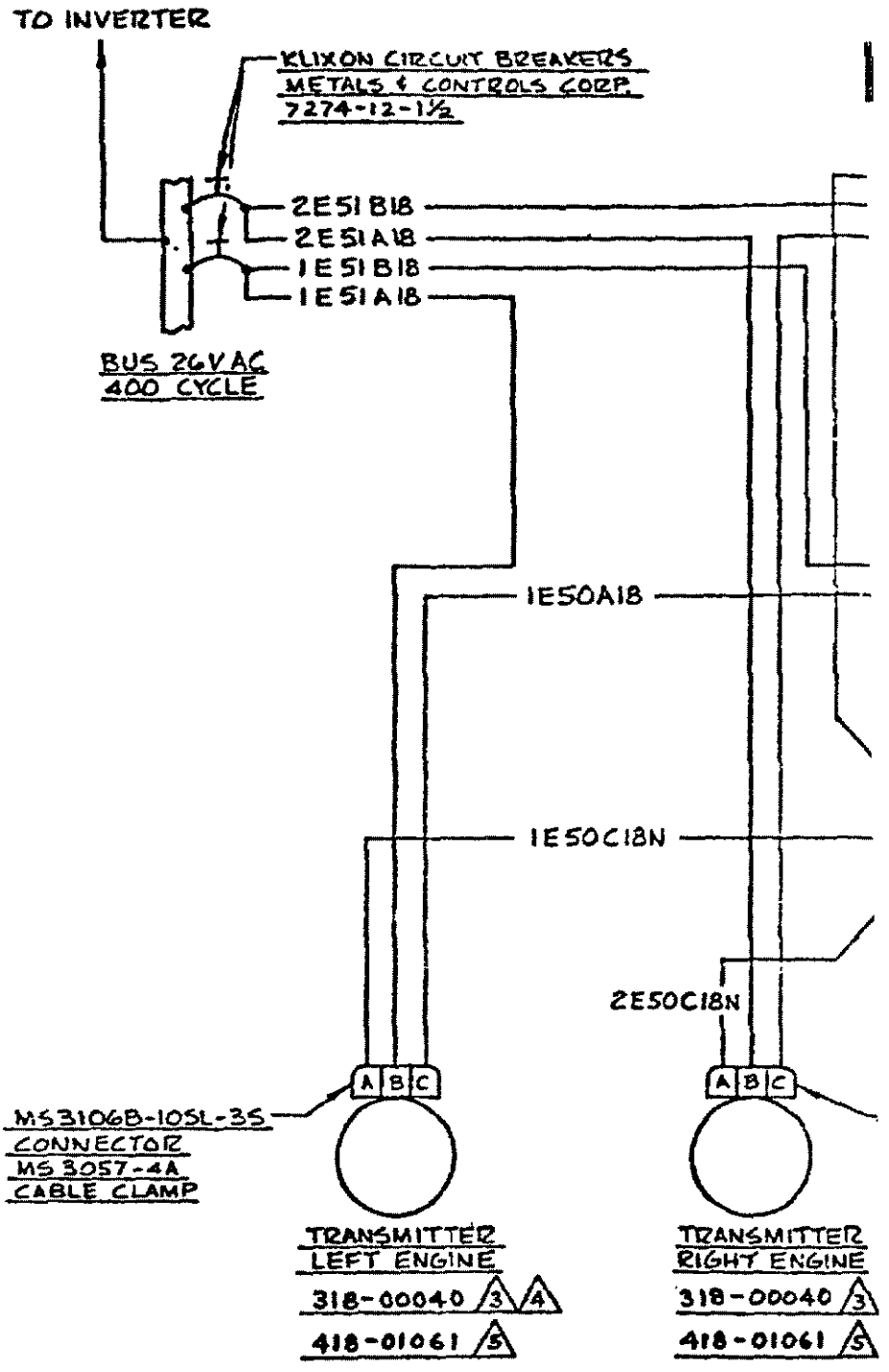


NOTES:

1. LEFT CIRCUIT SHOWN CODE PREFIX 1.
   RIGHT CIRCUIT CODE PREFIX 2.
2. WIRE AFT OF FIREWALL MIL-W-5086A TYPE II.
   WIRE FWD OF FIREWALL MIL-W-8777.
3. SEPARATE AMMETER WIRES FROM MAIN WIRE LOOM
   SHUNT TO CIRCUIT BREAKERS.
4. IF NO "IND." TERMINAL ON RELAY USE GEN. TERMINAL
   FOR WIRE "1D5A18"
5. BATTERY 12ZOH, SONOTONE CORP, ELMSFORD, NEW YORK.
   ALTERNATE NICKEL CADMIUM BATTERIES OR LEAD ACID BATTERIES OF EQUIVALENT RATING ARE ACCEPTAB

7. THESE WIRES TO BE ROUTED SEPARATE


24 VDC BUS
R/H SUB PANEL
EXIST WARN C/B
FAIL LIGHT
TO VOLTMETER
MS 25041-2
INST. PANEL
STARTER RELAY
A 714 EA
1P8L 3/0
K2A 3/0
1P3A 16
1P2B 16
1P2A 16
1P4A 16
1P6C 16
1P6D 16
FIREWALL CONNECTOR
MS 3100A 14S 6P
MS 3106A 14S 6S
STARTER GENERATOR
200 AMP
PRORELING RESISTOR
03608 25WATT 2 OHM
1P18 3/0
1P1A 3/0
K2B 3/0
1P15A 16
1P4C16
1P4B 16
VOLPAR DISCONNECT
ASSY. 1927
1P3A 16N
1P16A 16
1P15B 16N
NACELLE
"J" BOX
GROUND AT
FIREWALL
1P11A 16
1P14A 16
1P6B 16
1D1A 18
VOLT.
REG.
BASE
69C7573
VOLT.
REG.
1042-17A
GENERATOR CONTROL BOX
NACELLE LEFT
ENGINE COMPARTMENT
LEFT
REVERSE CURRENT
RELAY
AN 3925-300
1P18 3/0
1P7A 3/0
BATT
SW
200 AMP CIRCUIT BREAKER
KLIXON C7855-6-200
1P7B 3/0
1D5B 18
1D8A 18
GEN. FAIL
RELAY
NU3314-1
OR EQUIV.
NACELLE "J" BOX
NOT IN WIRE BUNDLE
2087
SCHEMATIC - ELECTRICAL SYSTEM,
PRIMARY POWER & GENERATOR CONTROL
NEXT ASSY 1801
MODEL TURBO 18
2087
1 OF 1



5 APPLICABLE TO AIRPLANES HAVING AIRESEARCH TPE 331

4 WHEN THE ALTERNATE 332-00140 INSTRUMENT IS USED
ARE PER DRAWING 1808, IT IS APPLICABLE TO AIRPLA

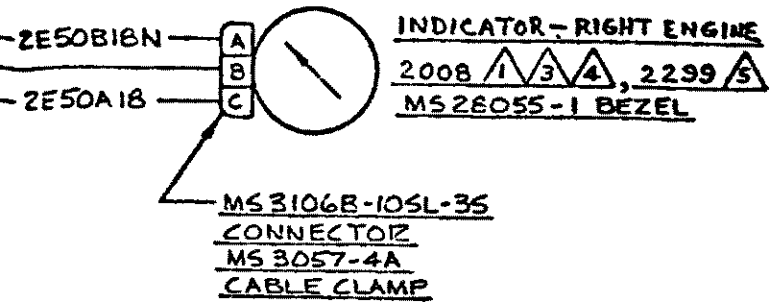
3 APPLICABLE TO AIRPLANES HAVING AIRESEARCH TPE

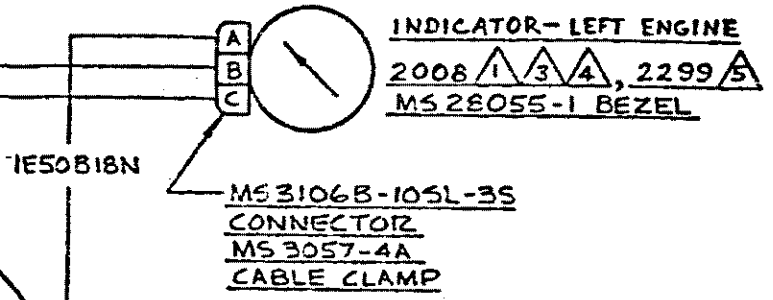
2. WIRE — MIL-W-5087A TYPE II.

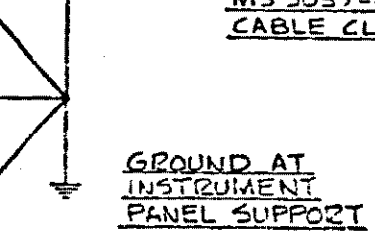
1 ALTERNATE INSTRUMENT (3" DIA.) 332-0014
THOMAS A. EDISON INDUSTRIES, McGRAW-EDISON C

NOTE:

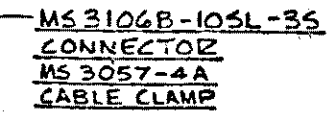
A	ADDED NOTES 3, 4, & 5. ADDED 2299 TO INDICATOR CALLOUTS. ADDED 418-0106 TO TRANSMITTER CALLOUTS.	1-7-70	MASON







2089
A



4

-101B ENGINES.

ND COLORED MARKINGS FOR TORQUE

ES ALSO HAVING AIRESEARCH TPE331-1-101B ENGINES.

31-47-B OR EARLIER MODEL ENGINES.

PART NO.	APPROVED	NAME	MATERIAL	SPECIFICATION
		LIST OF MATERIALS		

SIGNATURES	DATE
ISHIHARA	6-14-67
MASON	7-12-67
MASON	

VOLPAR INCORPORATED
[illegible] EXPORT, CALIF.

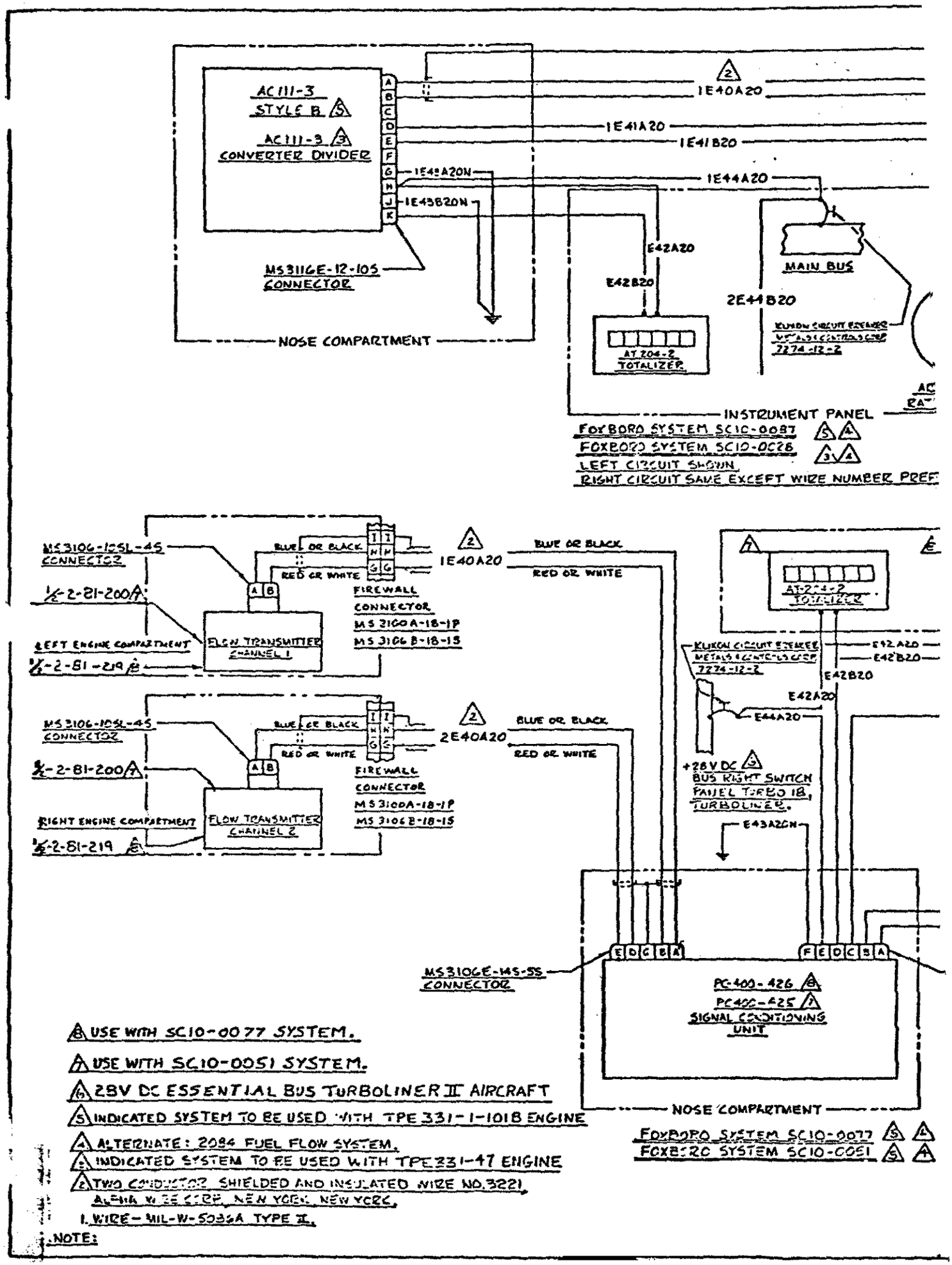
SCHEMATIC - ELECTRICAL SYSTEM, TORQUE

, WEST ORANGE, N.J.

ELECTRONIC ONLY	1801	TURBO 18

SIZE	SCALE	NONE
C	SHEET 1 OF 1	

2089



(8) USE WITH SC10-0077 SYSTEM.

(7) USE WITH SC10-0051 SYSTEM.

(6) 28V DC ESSENTIAL BUS TURBOLINER II AIRCRAFT

(5) INDICATED SYSTEM TO BE USED WITH TPE 331-1-101B ENGINE

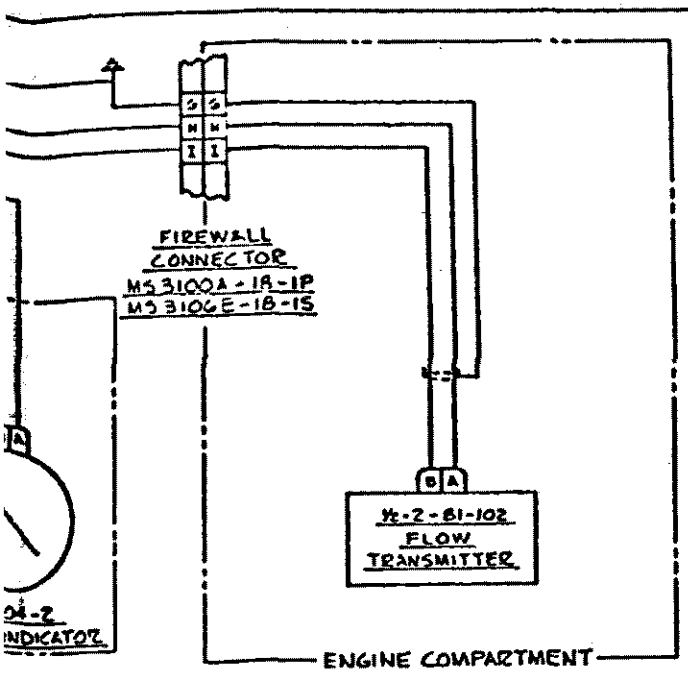
(4) ALTERNATE: 2084 FUEL FLOW SYSTEM.

(3) INDICATED SYSTEM TO BE USED WITH TPE 331-47 ENGINE

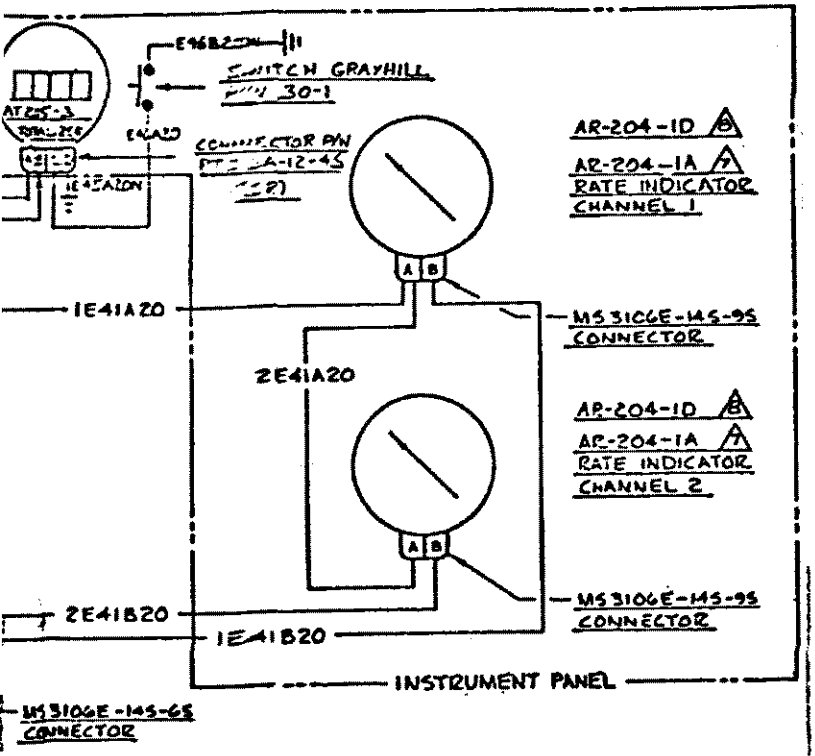
(2) TWO CONDUCTOR SHIELDED AND INSULATED WIRE NO. 3221 ALPHA WIRE CORP. NEW YORK, NEW YORK.

1. WIRE - MIL-W-5086A TYPE II.

NOTE:



A	ADDED △A AT 1E40A20 & AT 2E40A20	10-30-67	MASAOKA
B	ADDED GROUND WIRES & FIREWALL CONNECTORS ON AT LEFT & RIGHT ENGINE COMPARTMENTS ON SC10-0057 SYSTEM. ADDED GROUND WIRE FROM SHIELD ON 1E40A20 WIRES FROM NOSE COMPARTMENT ON SC10-0088 SYSTEM.	12-21-67	MASAOKA
C	ADDED: WIRE COLOR CODE FOR 1E40A20 & 2E40A20 REVISED: G AND I TERMINALS REVERSED ON FIREWALL CONNECTORS, 4 PLACES	6-8-68	ISHIHARA
D	ADDED: FOXBORO CO FUEL FLOW SYSTEMS NO. SC10-0077 AND SC10-0087, AND THE COMPONENT PART NO. ADDED: NOTES 5,6,7,8. REVISED: NOTE 3 TO SHOW ENGINE MODEL	5-15-70	TAYLOR



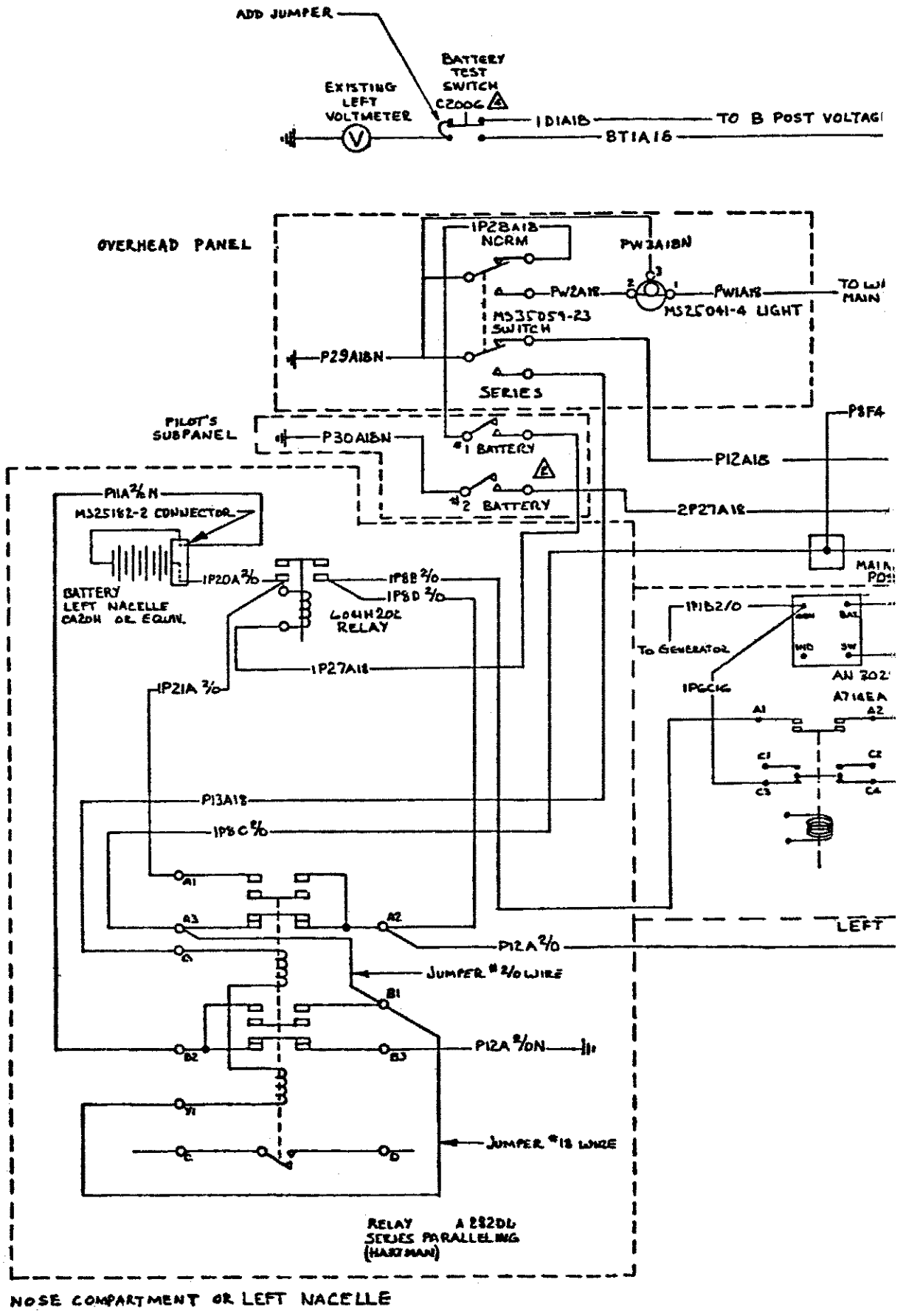
2090
D

PART NO.	QTY	ITEM	MATERIAL	SPECIFICATION

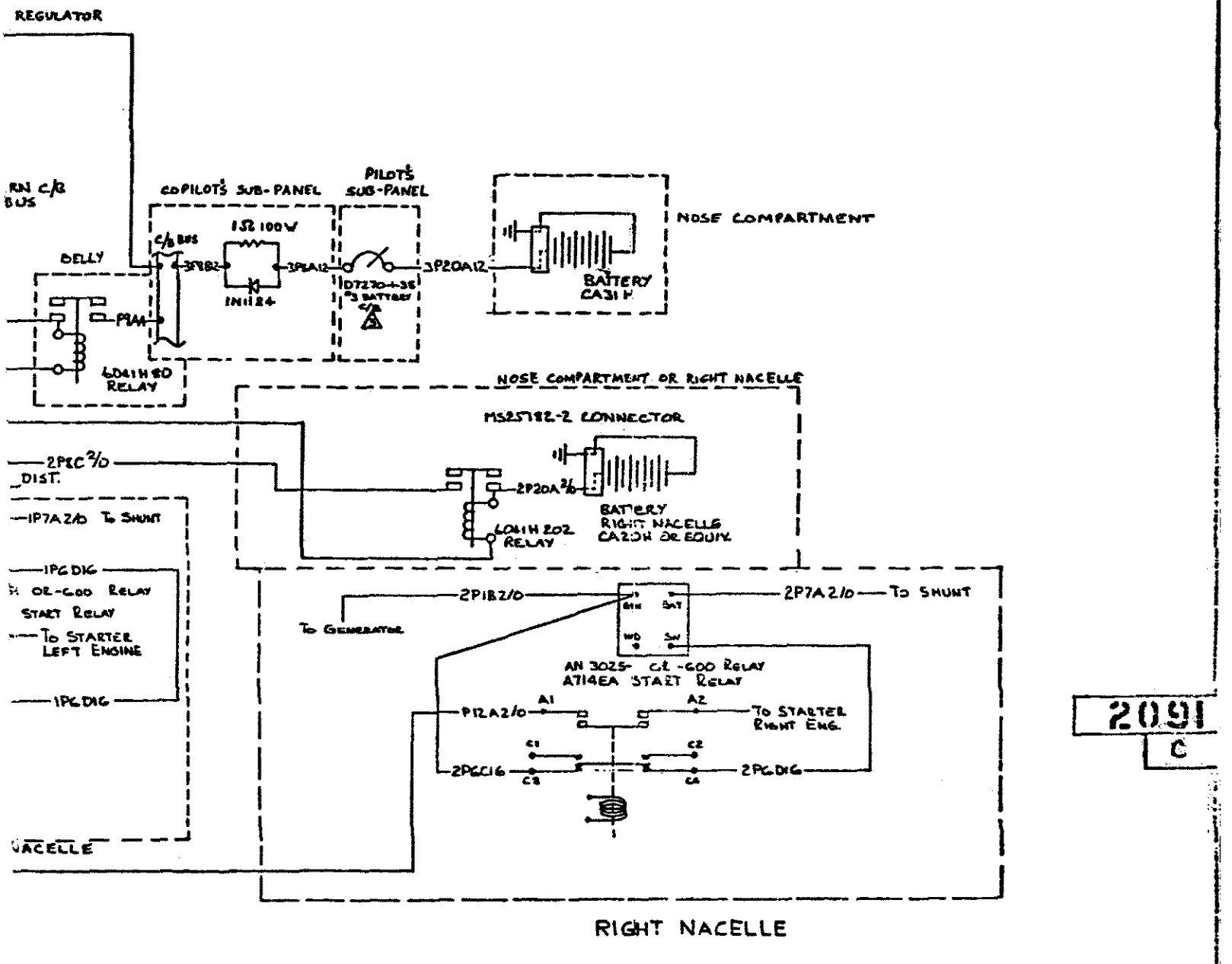
LIST OF MATERIALS

DESIGNED	DATE	VOLPAR INCORPORATED
DRAWN ISHIHARA	6-8-67	
TRACED		SCHEMATIC – ELECTRICAL SYSTEM
CHECKED MASAOKA	7-12-67	FUEL FLOW, FOXBORO
APPROVED		SIZE NONE / D / 1 / 1 — 2090

REF DWG CODE	2515	
REF DWG CODE	2370	
REF DWG CODE	1801	


ADD JUMPER
BATTERY TEST SWITCH C2006
EXISTING LEFT VOLTMETER
1D1A1B
TO B POST VOLTAGE
BT1A1B
OVERHEAD PANEL
1P28A1B NORM
PW3A1BN
PW2A1B
PW1A1B
TO WI MAIN
MS25041-4 LIGHT
MS35059-23 SWITCH
P29A1BN
SERIES
P8F4
PILOT'S SUBPANEL
P30A1BN
#1 BATTERY
#2 BATTERY
P12A1B
2P27A1B
P11A 2/0 N
MS25182-2 CONNECTOR
1P20A 2/0
BATTERY LEFT NACELLE CA20H OR EQUIV.
1P8B 2/0
1P8D 2/0
604H20L RELAY
1P27A1B
1P21A 2/0
1P16Z 2/0
TO GENERATOR
1P6C1G
AN 202
A7145A
P13A1B
1P8C 2/0
P12A 2/0
JUMPER #2/0 WIRE
P12A 2/0N
JUMPER #18 WIRE
RELAY A282DL SERIES PARALLELING (HARTMAN)
LEFT
NOSE COMPARTMENT OR LEFT NACELLE

A	DWG REVISED		MASON
B	"NOSE COMPARTMENT OR LEFT NACELLE" WAS "LEFT NACELLE". "NOSE COMPARTMENT OR RIGHT NACELLE" WAS "RIGHT NACELLE". ADDED PW2A18N.	8-19-47	MASON
C	"C2006" WAS "2006" AT BATTERY TEST SWITCH. ADDED CALLOUT "ADD JUMPER". "1D1A18" WAS "2D1A18".	10-3-47	MASON



RIGHT NACELLE

2091
C

NOTES:

1. THIS ALTERNATE SYSTEM MODIFIES PORTIONS OF THE SCHEMATIC DRAWINGS 2086 AND 2087.

△ BATTERY SWITCH MS 25058-22

△ KLIXON CIRCUIT BREAKER, METALS & CONTROLS CORP.

△ CONTROLS CO. OF AMERICA

PART NO.	DWG NO.	NAME	MATERIAL	SPECIFICATION NO.

USE OF MATERIALS

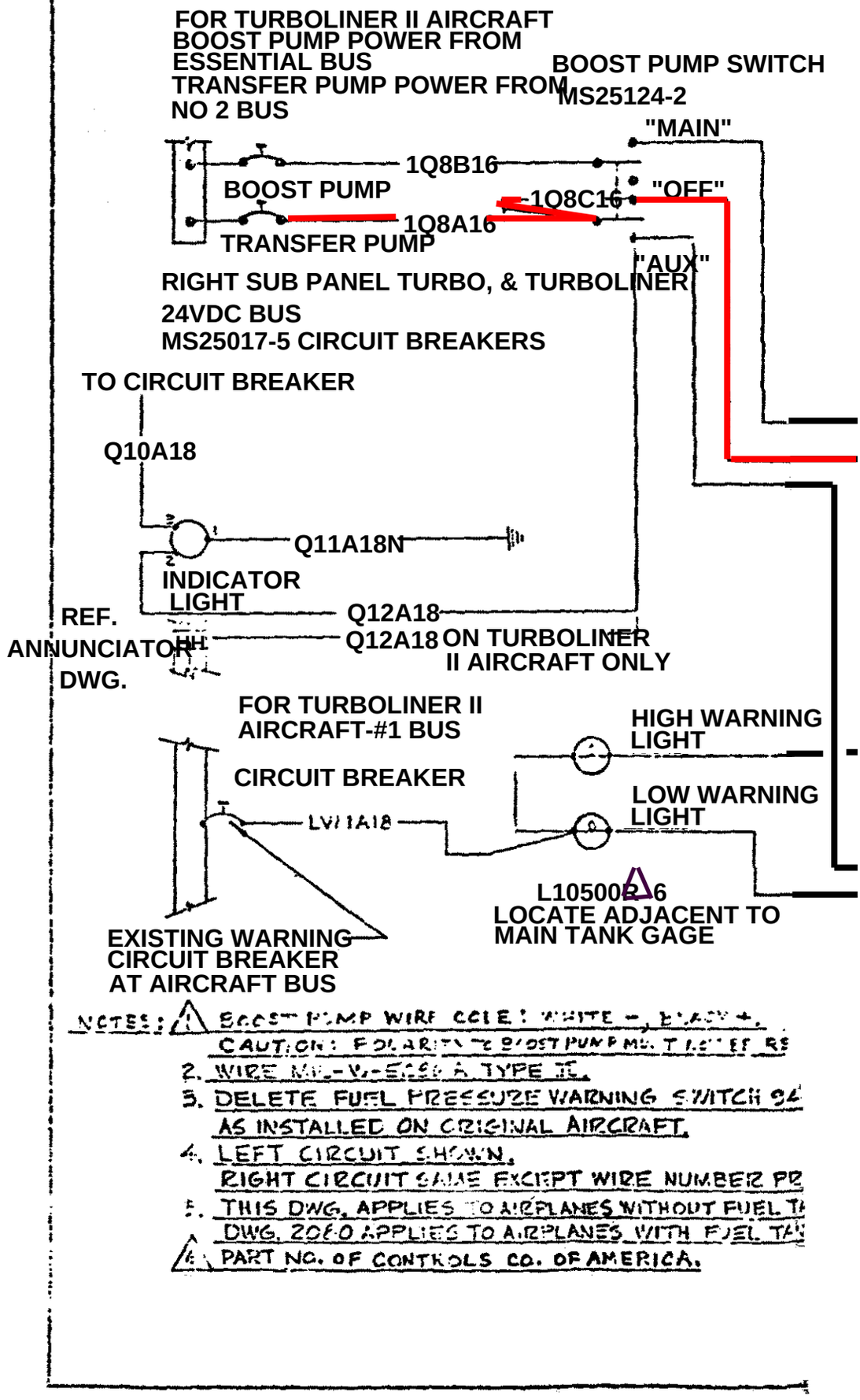
T. NIXON	8-15-47
Taylor	8-8-47
MASON	8-12-47

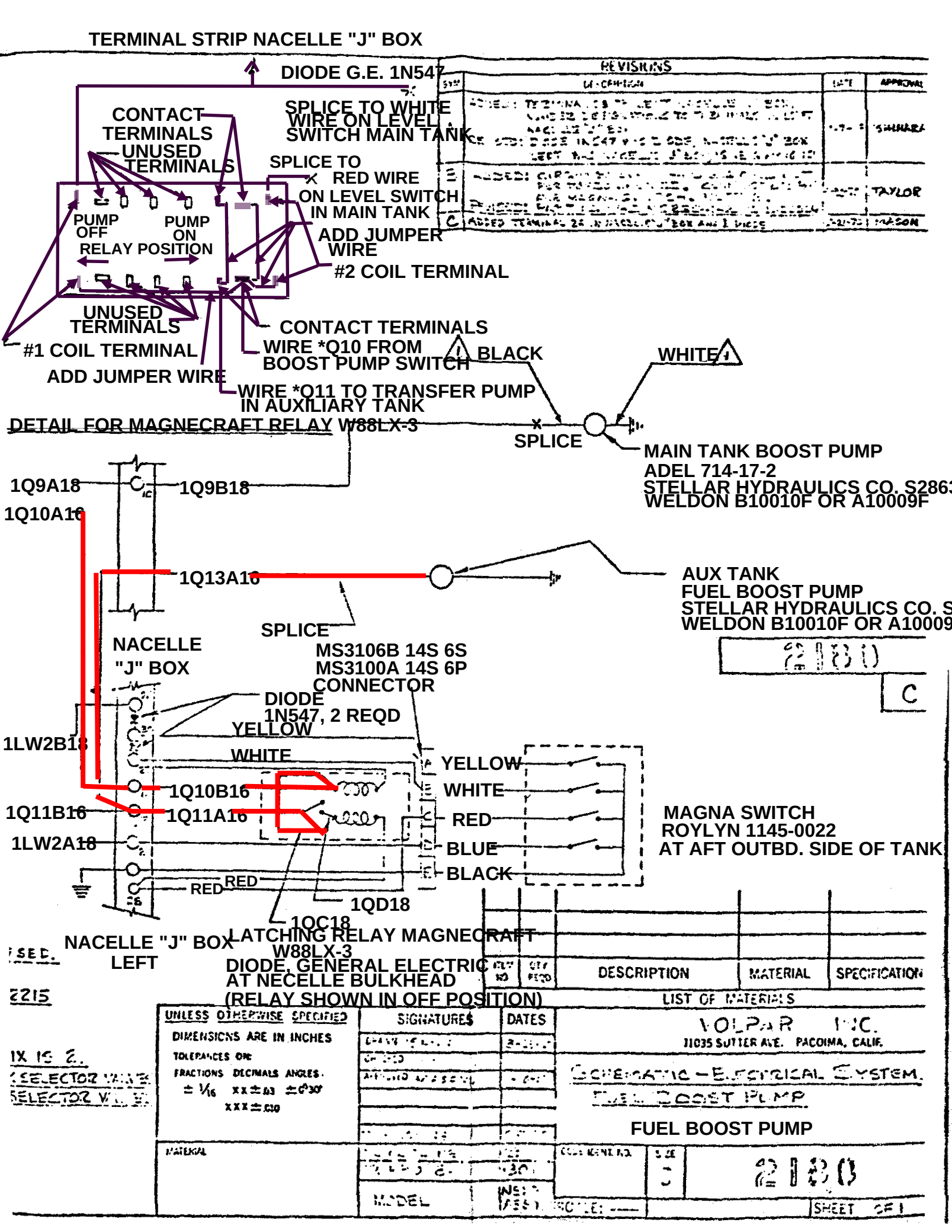
VOUGHT AIRCRAFT INCORPORATED

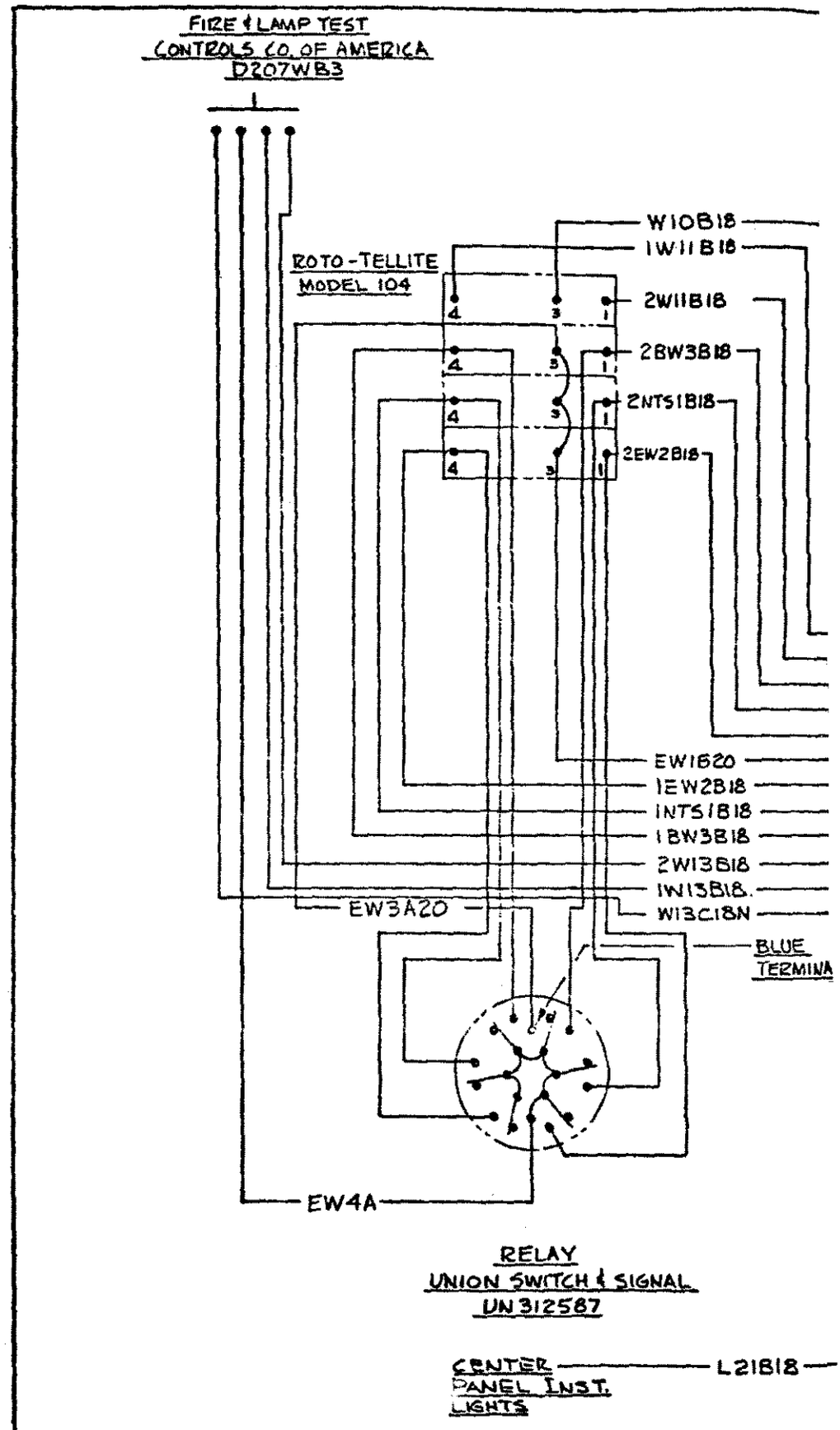
SCHEMATIC-ELECTRICAL SYSTEM, ALTERNATE STARTING CIRCUIT

NONE

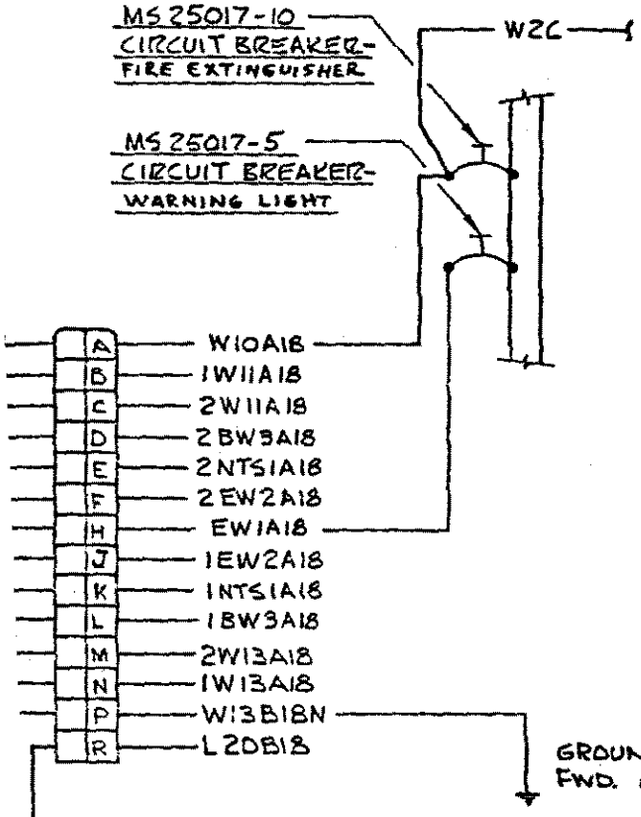
2091


FOR TURBOLINER II AIRCRAFT
BOOST PUMP POWER FROM
ESSENTIAL BUS
TRANSFER PUMP POWER FROM
NO 2 BUS
BOOST PUMP SWITCH
MS25124-2
"MAIN"
"OFF"
"AUX"
1Q8B16
BOOST PUMP
1Q8C16
1Q8A16
TRANSFER PUMP
RIGHT SUB PANEL TURBO, & TURBOLINER
24VDC BUS
MS25017-5 CIRCUIT BREAKERS
TO CIRCUIT BREAKER
Q10A18
Q11A18N
INDICATOR
LIGHT
Q12A18
REF.
ANNUNCIATOR
DWG.
Q12A18
ON TURBOLINER
II AIRCRAFT ONLY
FOR TURBOLINER II
AIRCRAFT-#1 BUS
CIRCUIT BREAKER
LVI 1A18
HIGH WARNING
LIGHT
LOW WARNING
LIGHT
L10500B6
LOCATE ADJACENT TO
MAIN TANK GAGE
EXISTING WARNING
CIRCUIT BREAKER
AT AIRCRAFT BUS
NOTES:
1. BOOST PUMP WIRE CODE: WHITE -, BLACK +.
CAUTION: POLARITY OF BOOST PUMP MOTOR
2. WIRE MIL-W-5088 A TYPE II.
3. DELETE FUEL PRESSURE WARNING SWITCH 94
AS INSTALLED ON ORIGINAL AIRCRAFT.
4. LEFT CIRCUIT SHOWN.
RIGHT CIRCUIT SAME EXCEPT WIRE NUMBERS
5. THIS DWG. APPLIES TO AIRPLANES WITHOUT FUEL
DWG. 20F0 APPLIES TO AIRPLANES WITH FUEL
4. PART NO. OF CONTROLS CO. OF AMERICA.


TERMINAL STRIP NACELLE "J" BOX
DIODE G.E. 1N547
SPLICE TO WHITE WIRE ON LEVEL SWITCH MAIN TANK
CONTACT TERMINALS
UNUSED TERMINALS
SPLICE TO RED WIRE ON LEVEL SWITCH IN MAIN TANK
PUMP OFF
PUMP ON
RELAY POSITION
ADD JUMPER WIRE
#2 COIL TERMINAL
UNUSED TERMINALS
CONTACT TERMINALS
#1 COIL TERMINAL
WIRE *Q10 FROM BOOST PUMP SWITCH
BLACK
WHITE
ADD JUMPER WIRE
WIRE *Q11 TO TRANSFER PUMP IN AUXILIARY TANK
DETAIL FOR MAGNECRAFT RELAY W88LX-3
SPLICE
MAIN TANK BOOST PUMP
ADEL 714-17-2
STELLAR HYDRAULICS CO. S2863
WELDON B10010F OR A10009F
1Q9A18
1Q9B18
1Q10A16
1Q13A16
AUX TANK
FUEL BOOST PUMP
STELLAR HYDRAULICS CO. S2863
WELDON B10010F OR A10009F
SPLICE
NACELLE "J" BOX
MS3106B 14S 6S
MS3100A 14S 6P
CONNECTOR
DIODE
1N547, 2 REQD
YELLOW
WHITE
1LW2B18
1Q10B16
1Q11B16
1Q11A16
1LW2A18
RED
RED
YELLOW
WHITE
RED
BLUE
BLACK
MAGNA SWITCH
ROYLYN 1145-0022
AT AFT OUTBD. SIDE OF TANK
1QD18
1QC18
NACELLE "J" BOX
LEFT
LATCHING RELAY MAGNECRAFT W88LX-3
DIODE, GENERAL ELECTRIC
AT NECELLE BULKHEAD
(RELAY SHOWN IN OFF POSITION)
REVISIONS
DESCRIPTION
MATERIAL
SPECIFICATION
LIST OF MATERIALS
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
SIGNATURES
DATES
VOLPAR INC.
11035 SUTTER AVE. PACOIMA, CALIF.
ELECTRO-MECHANICAL SYSTEM
FUEL BOOST PUMP
FUEL BOOST PUMP
MODEL
SIZE
C
SHEET OF 1


FIRE & LAMP TEST
CONTROLS CO. OF AMERICA
D207WB3
ROTO-TELLITE
MODEL 104
W10B18
1W11B18
2W11B18
2BW3B18
2NTS1B18
2EW2B18
EW16Z0
1EW2B18
1NTS1B18
1BW3B18
2W13B18
1W13B18.
W13C18N
EW3A20
BLUE
TERMINA
EW4A
RELAY
UNION SWITCH & SIGNAL
UN312587
CENTER
PANEL INST.
LIGHTS
L21B18

A	ADDED: TERMINALS M,N,P,R, REVISED: EW4A WAS EW4A2D D10TWB3 WAS D7D7 TERMINALS 4 WERE 1 TERMINALS 1 WERE 4	10-7-67	MORENO



2214

A

PART NO.	QTY REQD	NAME	MATERIAL	SPECIFICATION	ZONE

LIST OF MATERIALS

SIGNATURES	DATE
DRAWN ISHIHARA	10-26-67
CHECKED	11-6-67
APPROVED MASON	11-6-67

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS ± 1/16 DECIMALS X ± .1 XX ± .03 XXX ± .01 ANGLES ± 1°30'

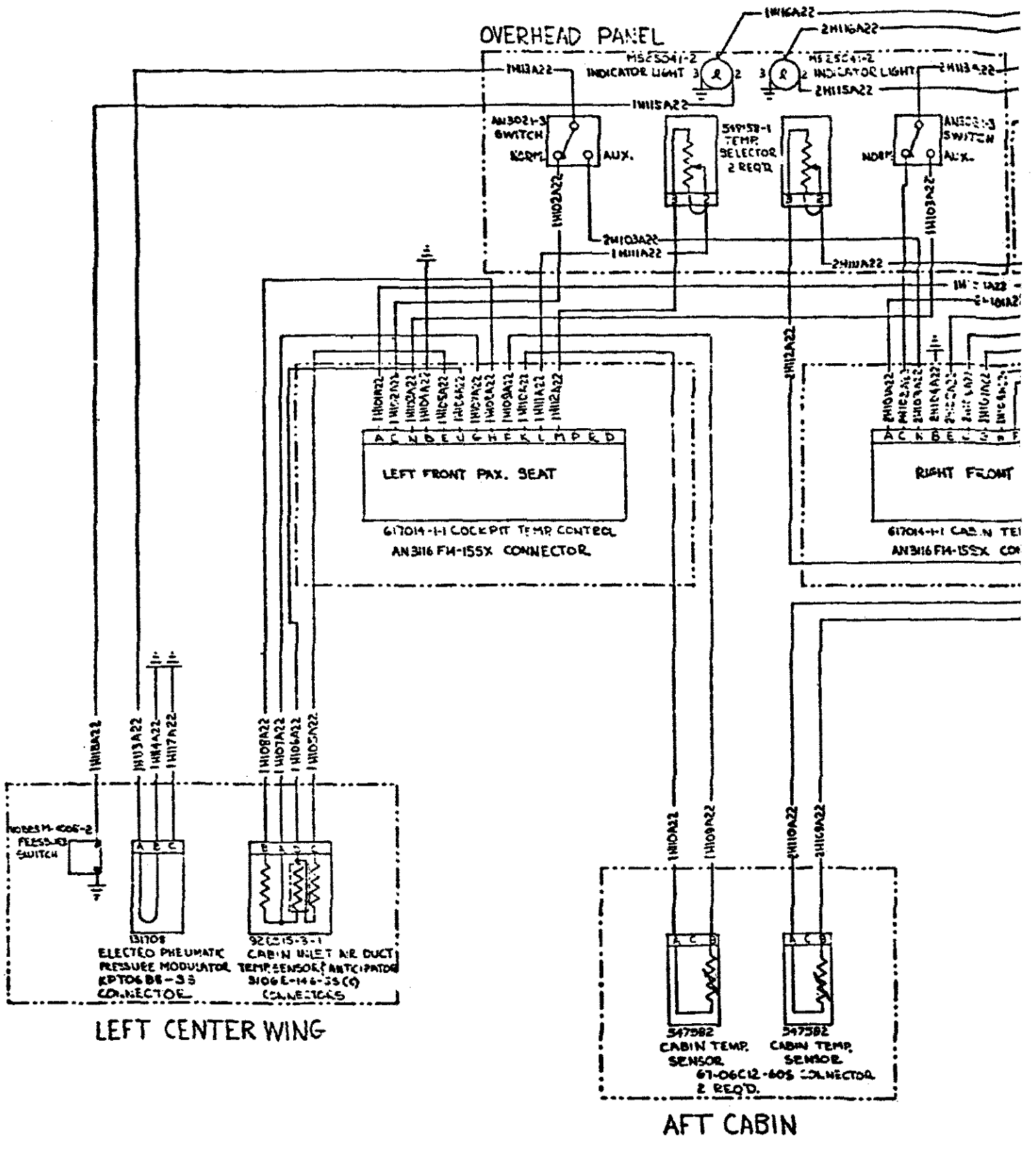
VOLPAR INCORPORATED
11035 SUTTER AVE. PACOIMA, CALIF.

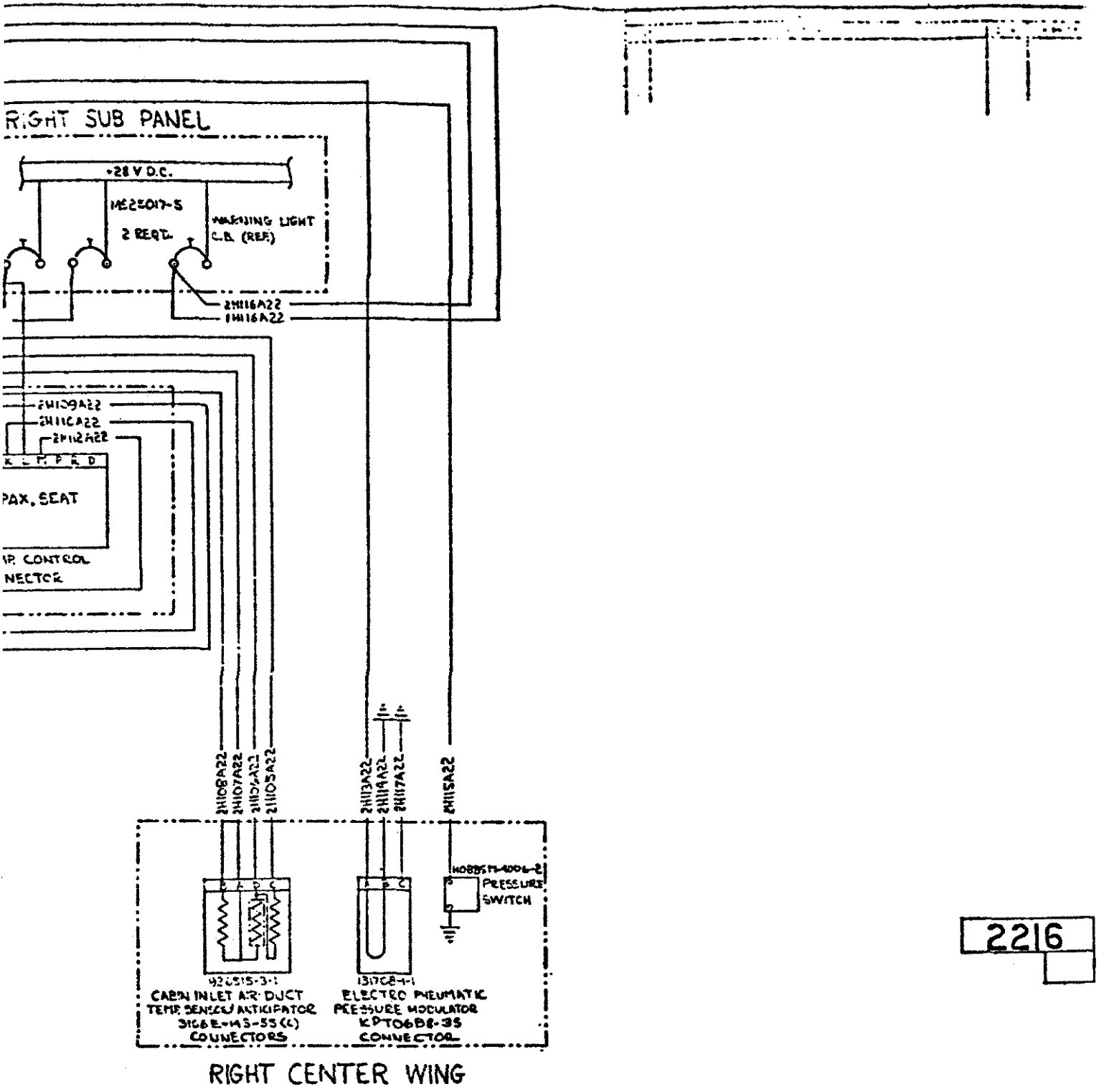
SCHEMATIC — ELECTRICAL SYSTEM,
WARNING LIGHTS MODULE

REF. DWG. ONLY	2370 TORBOLINER
NO. REQD	NEXT

DWG SIZE C | SCALE: NONE | SHEET 1 OF 1

2214


OVERHEAD PANEL
1W16A22
2W16A22
MS25241-2
INDICATOR LIGHT
1W13A22
1W15A22
2W13A22
2W15A22
AN3021-3
SWITCH
NORM.
AUX.
549158-1
TEMP.
SELECTOR
2 REQ'D.
1W02A22
2W03A22
1W11A22
2W11A22
1W10A22
2W10A22
LEFT FRONT PAX. SEAT
617014-1-1 COCKPIT TEMP CONTROL
AN3116 F14-15SX CONNECTOR
RIGHT FRONT
1W12A22
1W08A22
1W07A22
1W04A22
1W03A22
1W01A22
1W02A22
1W09A22
1W10A22
1W11A22
1W12A22
A C N B E J G H E K L M P E D
1W01A22
1W03A22
1W04A22
1W07A22
1W08A22
1W09A22
1W10A22
1W11A22
1W12A22
2W01A22
2W03A22
2W04A22
2W07A22
2W08A22
2W09A22
2W10A22
2W11A22
2W12A22
1W08A22
1W07A22
1W04A22
1W08A22
1W03A22
1W01A22
1W09A22
1W10A22
2W10A22
2W08A22
NORMAL-406-2
PRESSURE
SWITCH
A B C
131708
ELECTRO PNEUMATIC
PRESSURE MODULATOR
KPT06B8-3S
CONNECTOR
92C15-3-1
CABIN INLET AIR DUCT
TEMP SENSOR ANTICIPATOR
3106E-14S-5S(C)
CONNECTORS
LEFT CENTER WING
A C B
547582
CABIN TEMP.
SENSOR
67-06C12-6OS CONNECTOR
2 REQ'D.
AFT CABIN



RIGHT CENTER WING

2216

E. FORD 2-28-68

VOUGHT INCORPORATED

ELECTRICAL SCHEMATIC -

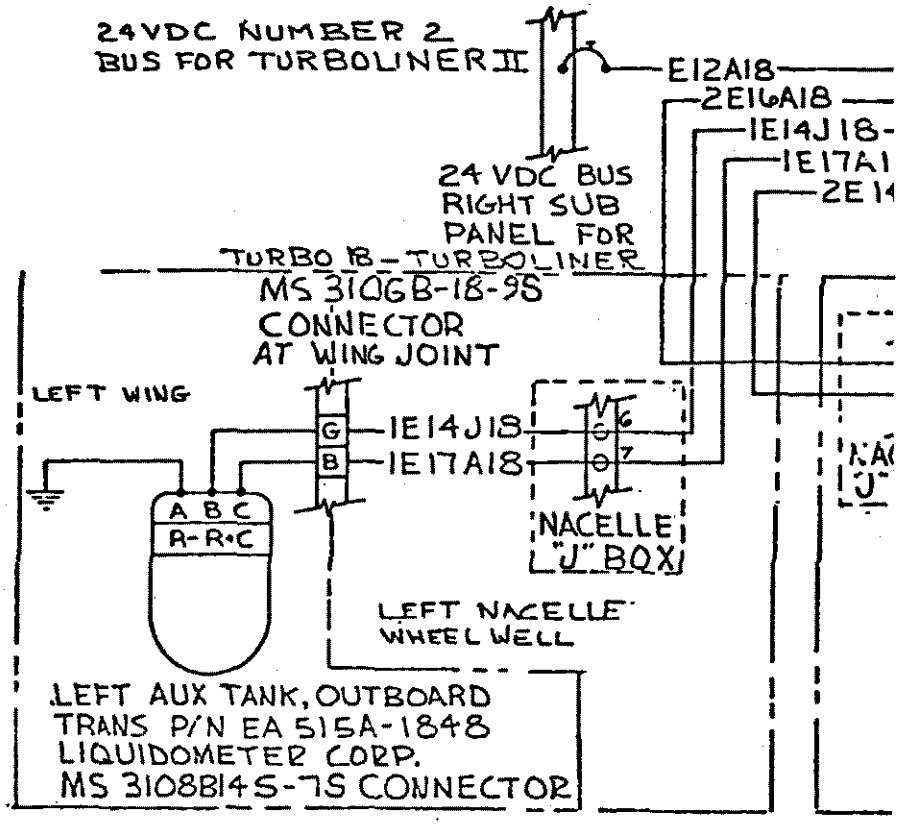
DUAL SYSTEM

NONE

D

2216

MS25017-5 FOR TURE
MS25017-10 FOR TUR
CIRCUIT BREAKER

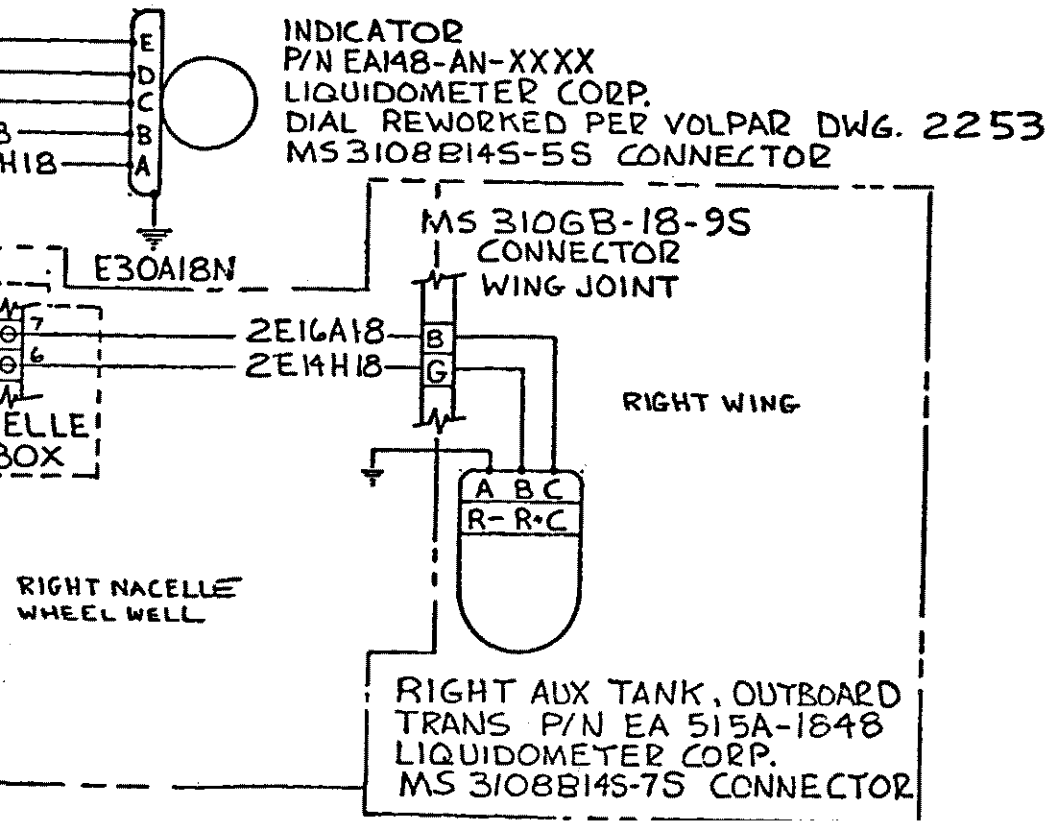


2. THIS SYSTEM FOR USE WITH 4 TANK INST
(2 MAIN AND 2 AUX).
1. WIRE TO MIL-W-5086A TYPE II.

NOTES:

REVISIONS			
	DESCRIPTION	DATE	APPROVED
A	ADDED CIRCUIT BREAKER AND PLUG CALL-OUT FOR TURBOLINER II AIRCRAFT	4-22-70	F.F. TAYLOR

BOLINER II.
BO 18 AND TURBOLINER



2377
A

LLATION

PART NO.	QTY REQ'D	NAME	MATERIAL	SPECIFICATION	ZONE

LIST OF MATERIALS

SIGNATURES	DATE
DRAWN BRENNAN	9-6-68
CHECKED MASON	9-17-68
APPROVED MASON	9-24-68

VOLPAR INCORPORATED
[illegible] SUTTER AVE. PACOIMA, CALIF.

SCHEMATIC - ELECTRICAL SYSTEM,
AUX FUEL TANK GAGE,
OUTBOARD

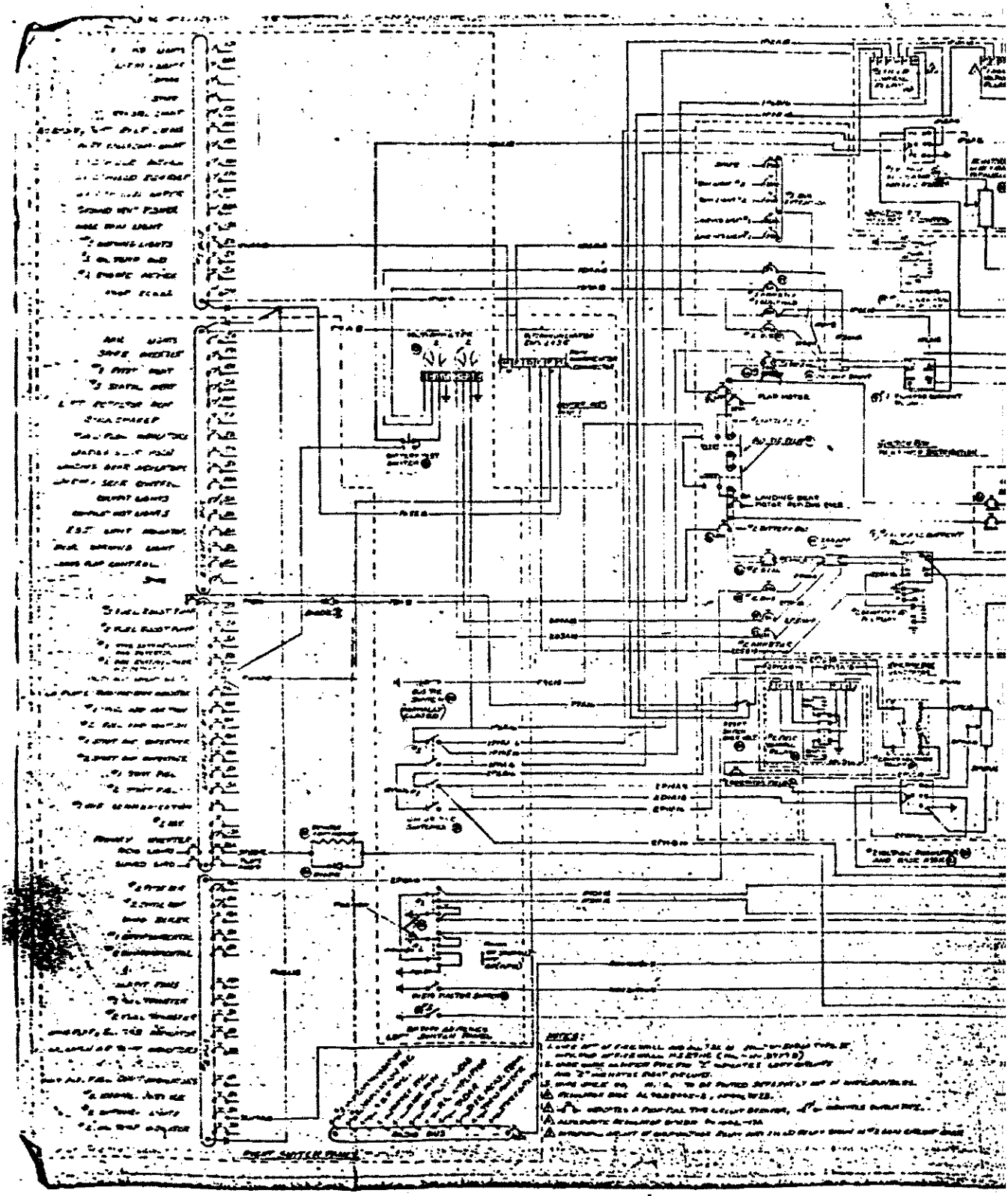
REF DWG ONLY	2515	TURBOLINER II
REF DWG ONLY	2270	TURBOLINER
REF DWG ONLY	1801	TURBO 18
USED ON SEE REVISIONS	NEXT ASSY	MODEL

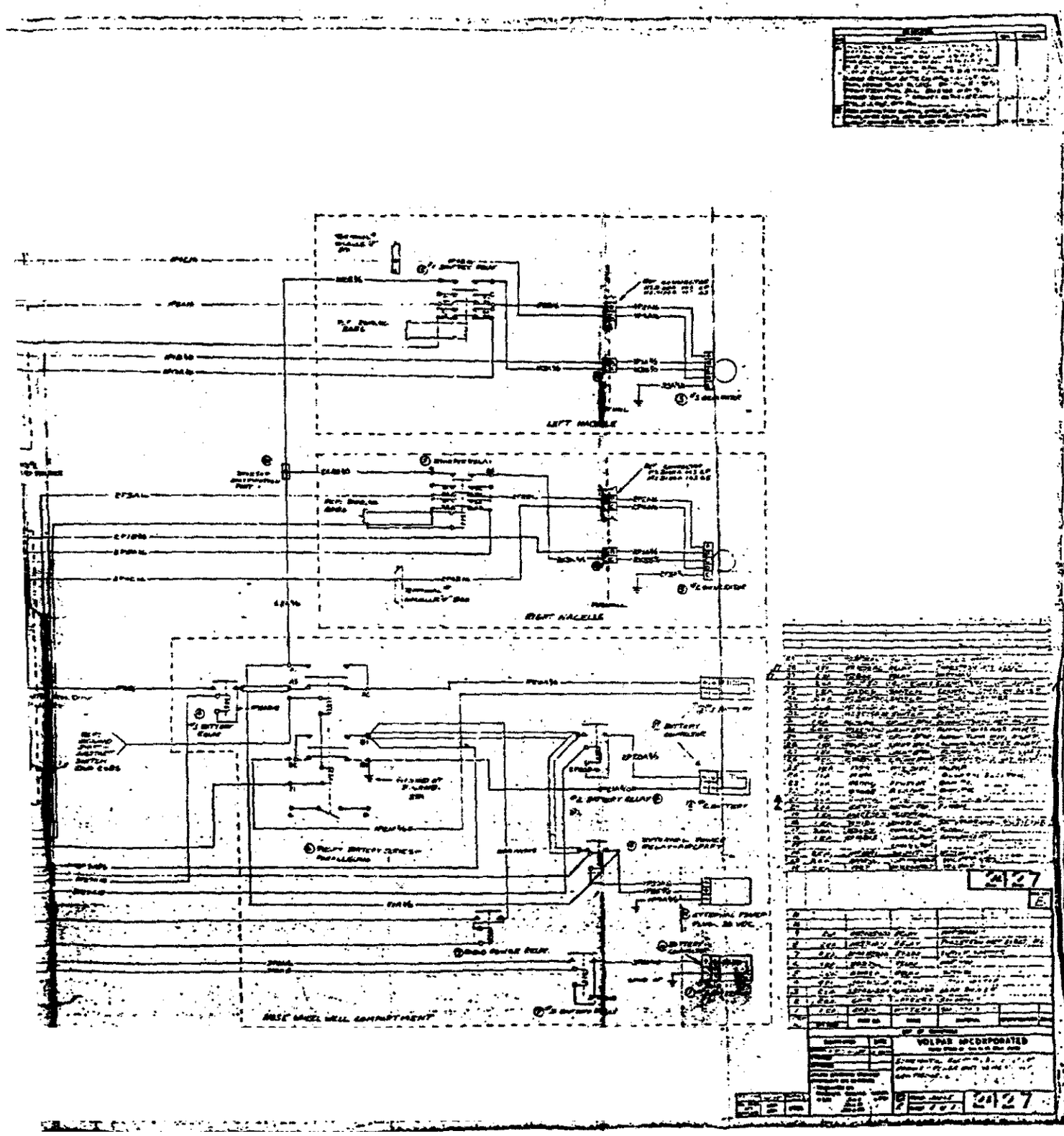
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DEC MALS ANGLES
X ± .1 ± 30'
XX ± .03
XXX ± .010

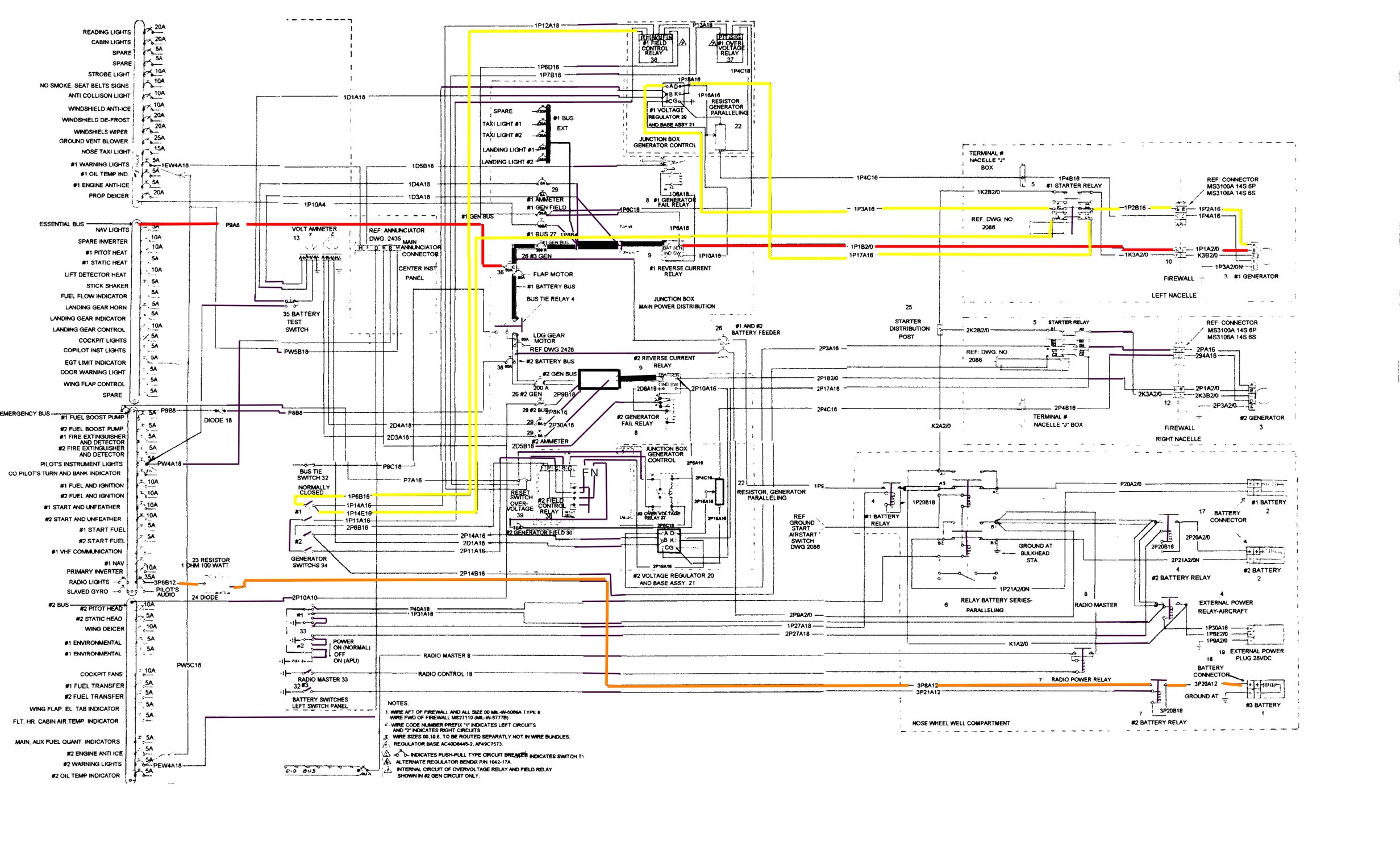
SCALE NONE
SHEET 1 OF 1

C

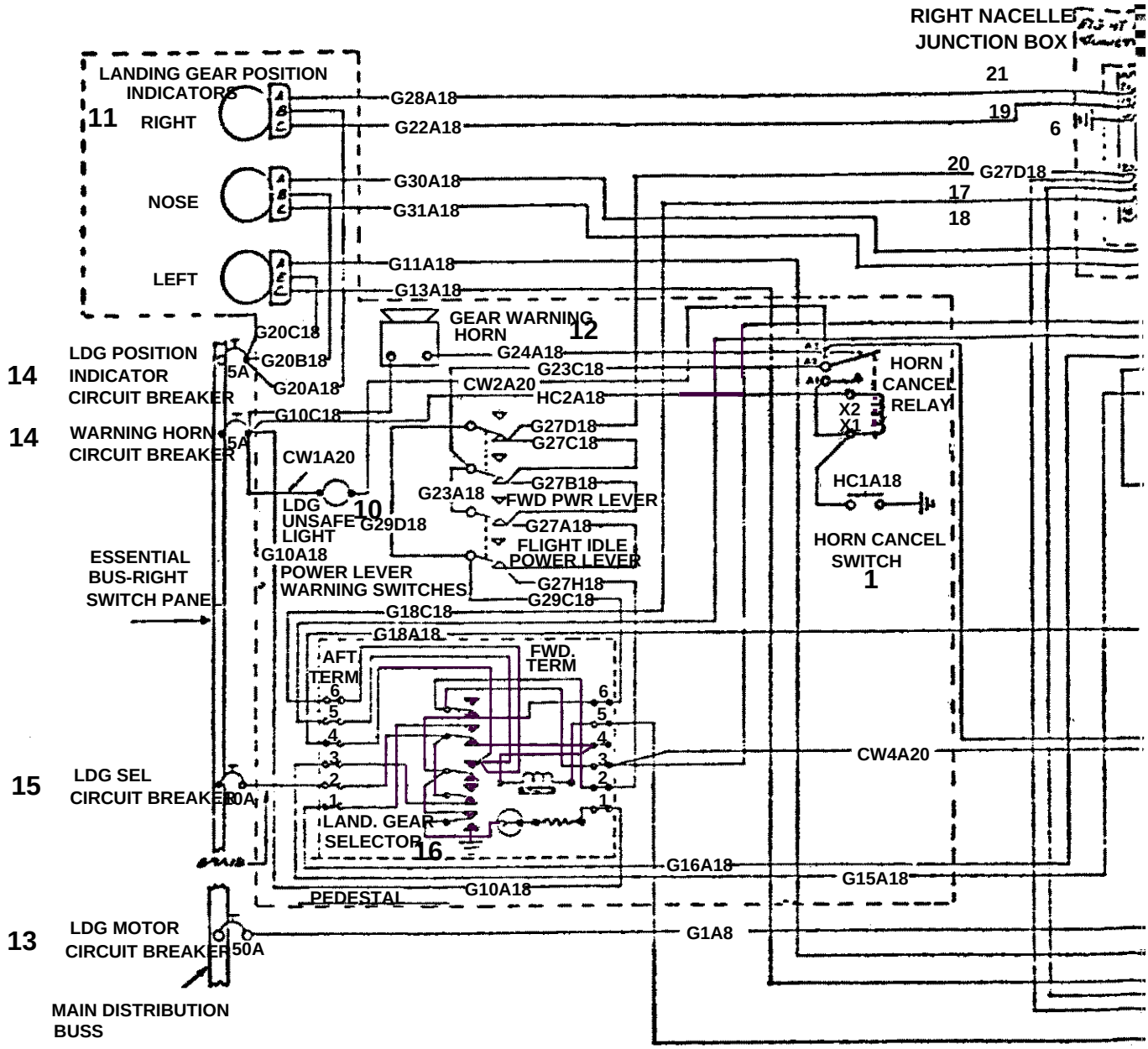
2377




LEFT NACELLE
RIGHT NACELLE
BASE MODEL WELL COMPARTMENT
VOLPAR INCORPORATED
2427

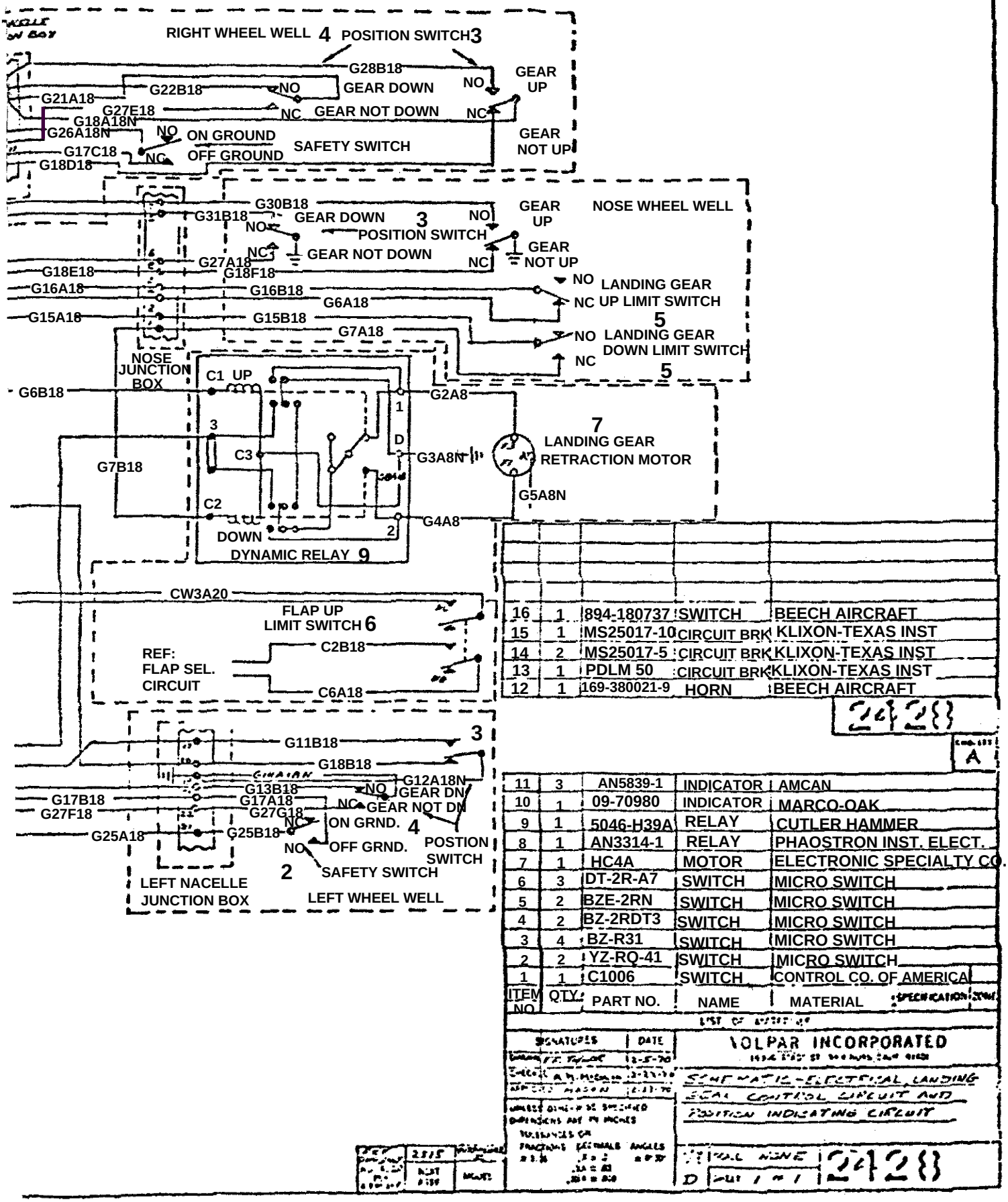

READING LIGHTS
CABIN LIGHTS
SPARE
SPARE
STROBE LIGHT
NO SMOKE, SEAT BELTS SIGNS
ANTI COLLISON LIGHT
WINDSHIELD ANTI-ICE
WINDSHIELD DE-FROST
WINDSHIELS WIPER
GROUND VENT BLOWER
NOSE TAXI LIGHT
#1 WARNING LIGHTS
#1 OIL TEMP IND.
#1 ENGINE ANTI-ICE
PROP DEICER
ESSENTIAL BUS
NAV LIGHTS
SPARE INVERTER
#1 PITOT HEAT
#1 STATIC HEAT
LIFT DETECTOR HEAT
STICK SHAKER
FUEL FLOW INDICATOR
LANDING GEAR HORN
LANDING GEAR INDICATOR
LANDING GEAR CONTROL
COCKPIT LIGHTS
COPILOT INST LIGHTS
EGT LIMIT INDICATOR
DOOR WARNING LIGHT
WING FLAP CONTROL
SPARE
EMERGENCY BUS
#1 FUEL BOOST PUMP
#2 FUEL BOOST PUMP
#1 FIRE EXTINGUISHER AND DETECTOR
#2 FIRE EXTINGUISHER AND DETECTOR
PILOT'S INSTRUMENT LIGHTS
CO PILOT'S TURN AND BANK INDICATOR
#1 FUEL AND IGNITION
#2 FUEL AND IGNITION
#1 START AND UNFEATHER
#2 START AND UNFEATHER
#1 START FUEL
#2 START FUEL
#1 VHF COMMUNICATION
#1 NAV
PRIMARY INVERTER
RADIO LIGHTS
SLAVED GYRO
PILOT'S AUDIO
#2 BUS
#2 PITOT HEAD
#2 STATIC HEAD
WING DEICER
#1 ENVIRONMENTAL
#1 ENVIRONMENTAL
COCKPIT FANS
#1 FUEL TRANSFER
#2 FUEL TRANSFER
WING FLAP, EL. TAB INDICATOR
FLT. HR. CABIN AIR TEMP. INDICATOR
MAIN, AUX FUEL QUANT. INDICATORS
#2 ENGINE ANTI ICE
#2 WARNING LIGHTS
#2 OIL TEMP INDICATOR
1EW4A18
PEW4A18
PW4A18
PW5C18
P9A8
P8B8
P8C18
P7A16
1P6B16
1P14A16
1P14E18
1P11A16
2P6B16
2P14A16
2D1A18
2P11A16
2P14B16
3P8B12
2P10A10
P40A18
1P31A18
1D1A18
1D5B18
1D4A18
1D3A18
1P10A4
1P12A18
1P13A18
1P6D16
1P7B18
1P4C18
1P18A16
1P16A16
RESISTOR GENERATOR PARALLELING
22
#1 VOLTAGE REGULATOR 20
AND BASE ASSY 21
JUNCTION BOX GENERATOR CONTROL
SPARE
TAXI LIGHT #1
TAXI LIGHT #2
LANDING LIGHT #1
LANDING LIGHT #2
#1 BUS EXT
29
#1 AMMETER
#1 GEN FIELD
#1 GEN BUS
#1 BUS 27
1P8A16
1P9C18
1P6A16
26 #3 GEN
200 A
1D8A18
8 #1 GENERATOR FAIL RELAY
9
#1 REVERSE CURRENT RELAY
1P10A16
1P4C16
1P3A16
1P1B2/0
1P17A16
1K3A2/0
1P4B16
#1 STARTER RELAY
1K2B2/0
REF. DWG. NO. 2086
1P2B16
1P2A16
1P4A16
REF. CONNECTOR MS3100A 14S 6P MS3106A 14S 6S
1P1A2/0
K3B2/0
1P3A2/0/N
10
3 #1 GENERATOR
FIREWALL
LEFT NACELLE
TERMINAL # NACELLE "J" BOX
REF. ANNUNCIATOR DWG. 2435
MAIN ANNUNCIATOR CONNECTOR
CENTER INST PANEL
VOLT AMMETER
13
35 BATTERY TEST SWITCH
FLAP MOTOR
#1 BATTERY BUS
BUS TIE RELAY 4
JUNCTION BOX MAIN POWER DISTRIBUTION
LDG GEAR MOTOR
REF DWG 2426
#2 BATTERY BUS
#2 GEN BUS
26 #2 GEN
2P9B18
28 #2 BUS
2P8K18
2P30A18
#2 AMMETER
2D5B18
#2 REVERSE CURRENT RELAY
2D8A18
#2 GENERATOR FAIL RELAY
2P10A16
#1 AND #2 BATTERY FEEDER
25
STARTER DISTRIBUTION POST
2K2B2/0
5 STARTER RELAY
REF. DWG. NO. 2086
2P3A16
2P1B2/0
2P17A16
2P4C18
2P4B16
TERMINAL # NACELLE "J" BOX
K2A2/0
2K3A2/0
2P1A2/0
2K3B2/0
2P3A2/0
12
#2 GENERATOR
3
FIREWALL
RIGHT NACELLE
REF. CONNECTOR MS3100A 14S 6P MS3106A 14S 6S
2PA16
2P4A16
DIODE 18
P8B8
2D4A18
2D3A18
BUS TIE SWITCH 32
NORMALLY CLOSED
RESET SWITCH OVER-VOLTAGE
#2 FIELD CONTROL RELAY
39
#2 OVER VOLTAGE RELAY 37
2P8A16
2P4C16
2P18A16
2P15A16
2P8C18
#2 GENERATOR FIELD 30
JUNCTION BOX GENERATOR CONTROL
#2 VOLTAGE REGULATOR 20 AND BASE ASSY. 21
GENERATOR SWITCHS 34
23 RESISTOR 1 OHM 100 WATT
24 DIODE
33
POWER ON (NORMAL) OFF ON (APU)
RADIO MASTER 33
32 #3
BATTERY SWITCHES LEFT SWITCH PANEL
RADIO MASTER 8
RADIO CONTROL 18
2P9A2/0
1P27A18
2P27A18
K1A2/0
RESISTOR, GENERATOR PARALLELING
1P8
1P20B18
#1 BATTERY RELAY
REF GROUND START AIRSTART SWITCH DWG 2086
GROUND AT BULKHEAD STA.
1P21A2/0N
RELAY BATTERY SERIES-PARALLELING
6
8
RADIO MASTER
P20A2/0
#1 BATTERY
2
17 BATTERY CONNECTOR
2P20A2/0
2P20B16
2P21A2/0N
#2 BATTERY
#2 BATTERY RELAY
4
EXTERNAL POWER RELAY-AIRCRAFT
1P30A18
1PBE2/0
1P9A2/0
19 EXTERNAL POWER PLUG 28VDC
16
BATTERY CONNECTOR
3P20A12
GROUND AT
#3 BATTERY
1
7 RADIO POWER RELAY
3P8A12
3P21A12
3P20B18
#2 BATTERY RELAY
NOSE WHEEL WELL COMPARTMENT
NOTES:
1. WIRE AFT OF FIREWALL AND ALL SIZE 00 MIL-W-5086A TYPE II WIRE FWD OF FIREWALL MS27110 (MIL-W-8777B)
2. WIRE CODE NUMBER PREFIX "1" INDICATES LEFT CIRCUITS AND "2" INDICATES RIGHT CIRCUITS.
3. WIRE SIZES 00,10,6, TO BE ROUTED SEPARATLY NOT IN WIRE BUNDLES.
4. REGULATOR BASE AC40D8445-2, AF49C7573.
5. INDICATES PUSH-PULL TYPE CIRCUIT BREAKER INDICATES SWITCH TY
6. ALTERNATE REGULATOR BENDIX P/N 1942-17A.
7. INTERNAL CIRCUIT OF OVERVOLTAGE RELAY AND FIELD RELAY SHOWN IN #2 GEN CIRCUIT ONLY.

	2427			
39	1 EA	MS35058-30	SWITCH	CULTER HAMMER
38	2 EA	PR9502AC	RELAY	PHAOSTRON INST. ELECT
37	2 EA	TD800	RELAY	HARTMAN
36	2 EA	PDLM 50	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
35	1 EA	C2006	SWITCH	CONTROL CORP. OF AMERICA
34	2 EA	MS35059-2	SWITCH	CULTER HAMMER
33	3 EA	MS25126-2	SWITCH	CULTER HAMMER
32	3 EA	MS35058-22	SWITCH	CULTER HAMMER
31	1 EA	PDLM 80	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
30	2 EA	MS25017-10	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
29	6 EA	MS25017-5	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
28	1 EA	PDLM 35	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
27	1 EA	PDLM 105	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
26	4 EA	C7855-6	CIRCUIT BREAKER	KLIXON TEXAS INST. INC.
25	1 EA	1939	POST. DIST.	VOLPAR
24	1 EA	IN1184	DIODE	GENERAL ELECTRIC
23	1 EA	0600C	RESISTOR	OHMITE
22	2 EA	0360B	RESISTOR	OHMITE
21	2 EA	2001-2	BASE	AVIA PRODUCTS
20	2 EA	E1597-1	VOLTAGE REG.	BENDIX
19	1 EA	AN2552A3	RECEPTICAL	
18	1 EA	70H10A	DIODE	INTERNATIONAL RECTIFIER
17	2 EA	BD6-3	CONNECTOR	ELCON
16	1 EA	CA16813	CONNECTOR	CANNON(I.T.T.)
15			CONNECTOR	
14	2 EA	NAF1091	SHUNT	WESTON INST.
13	2 EA	2098-2	VOLT-AMMETER	VOLPAR
12	2 EA	1927	DISCONNECT	VOLPAR
11				
10				
9	2 EA	AN3025-600	RELAY	HARTMAN
8	2 EA	AN3314-1	RELAY	PHAOSTRON INST. ELECT
7	4 EA	6041-H201A	RELAY	CULTER HAMMER
6	1 EA	882DL	RELAY	HARTMAN
5	2 EA	A7145A	RELAY	HARTMAN
4	4 EA	6041-H202A	RELAY	CULTER HAMMER
3	2 EA	23046-007	GENERATOR	LEAR SIEGLER
2	2 EA	CA-9	BATTERY	SONOTONE
1	1 EA	CA31H	BATTERY	SONOTONE



3. CIRCUIT SHOWN: WING FLAPS UP, GEAR DOWN, AIRCRAFT ON GROUND. (STRUTS STATIC HEIGHT)
2. APPLICABLE TO ALL C45 SERIES AIRCRAFT ONLY.
1. ALL WIRE MIL-W-5086A TYPE II.

STEP.



ITEM NO	QTY.	PART NO.	NAME	MATERIAL	SPECIFICATION
16	1	894-180737	SWITCH	BEECH AIRCRAFT	
15	1	MS25017-10	CIRCUIT BRK	KLIXON-TEXAS INST	
14	2	MS25017-5	CIRCUIT BRK	KLIXON-TEXAS INST	
13	1	PDLM 50	CIRCUIT BRK	KLIXON-TEXAS INST	
12	1	169-380021-9	HORN	BEECH AIRCRAFT	
11	3	AN5839-1	INDICATOR	AMCAN	
10	1	09-70980	INDICATOR	MARCO-OAK	
9	1	5046-H39A	RELAY	CUTLER HAMMER	
8	1	AN3314-1	RELAY	PHAOSTRON INST. ELECT.	
7	1	HC4A	MOTOR	ELECTRONIC SPECIALTY CO.	
6	3	DT-2R-A7	SWITCH	MICRO SWITCH	
5	2	BZE-2RN	SWITCH	MICRO SWITCH	
4	2	BZ-2RDT3	SWITCH	MICRO SWITCH	
3	4	BZ-R31	SWITCH	MICRO SWITCH	
2	2	YZ-RQ-41	SWITCH	MICRO SWITCH	
1	1	C1006	SWITCH	CONTROL CO. OF AMERICA	

LIST OF MATERIAL

SIGNATURES	DATE
F.F. TAYLOR	12-5-70
A.H. MCCOLLUM	12-11-70
R. MASON	12-11-70

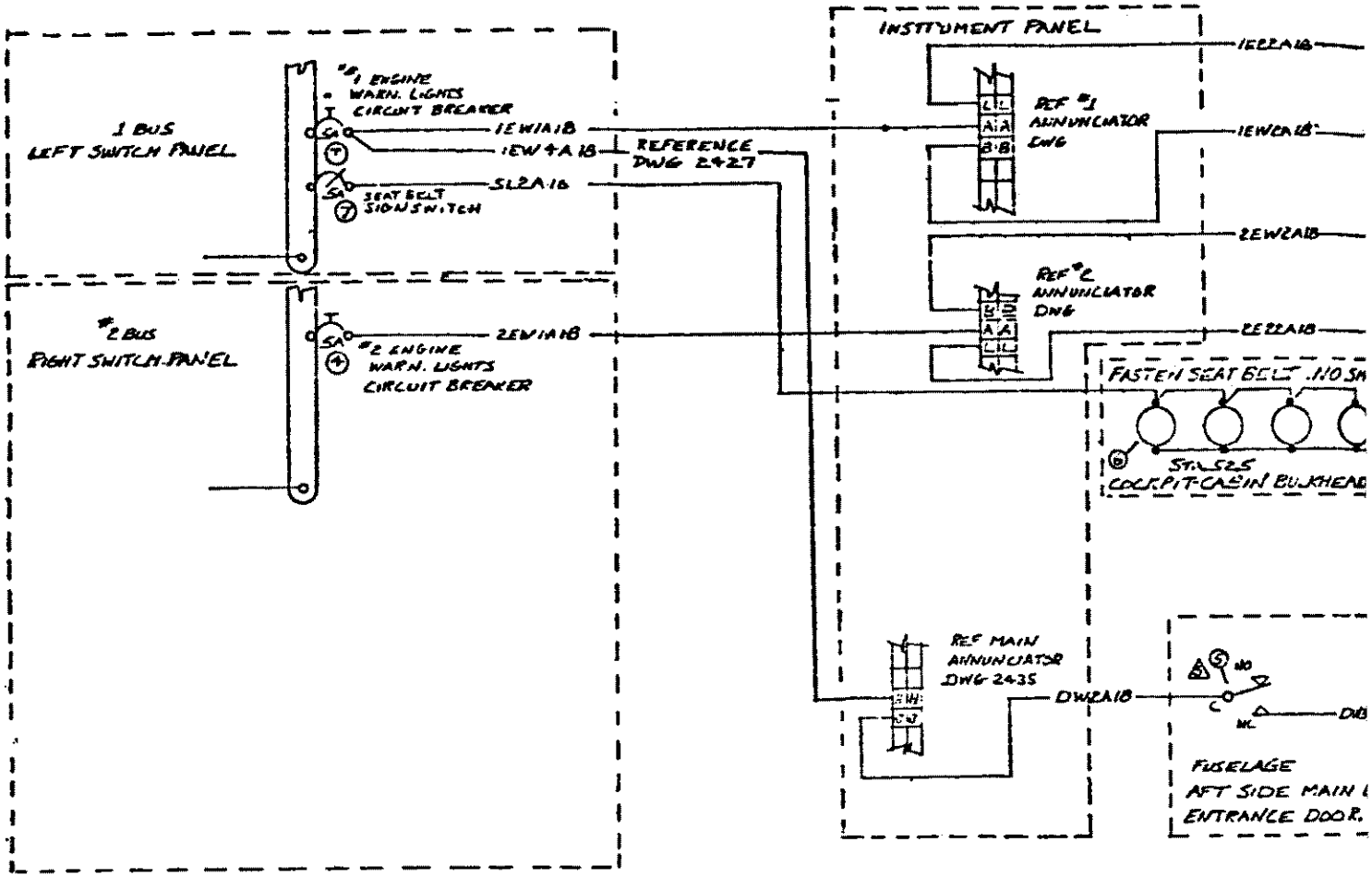
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
.X = ±.1 ±1°
.XX = ±.03
.XXX = ±.010

VOLPAR INCORPORATED

SCHEMATIC-ELECTRICAL LANDING GEAR CONTROL CIRCUIT AND POSITION INDICATING CIRCUIT

SIZE D | DWG. NO. 24213 | REV. A

SCALE NONE | SHT 1 OF 1



△ ALTERNATE FOR THIS SWITCH CIRCUIT BREAKER IS KLIXON P/N 7270-1-5

△ SWITCH DEPICTED MAIN ENTRANCE CLOSED AND LATCHED.

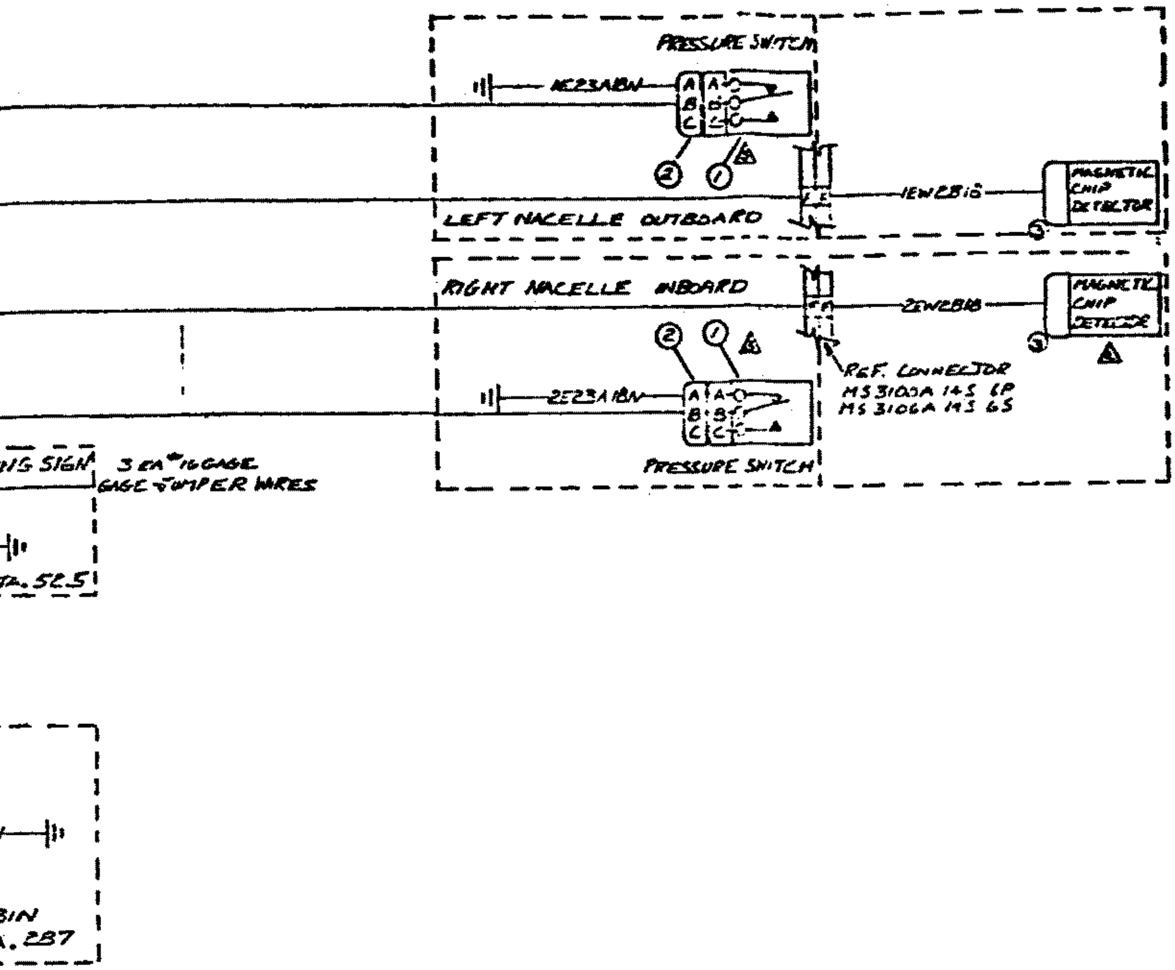
4 ACTUATION POINTS ON 76272 SWITCH ARE: INCREASING PRESSURE BY 30PSI, DECREASING PRESSURE

△ SWITCH DEPICTED WITH PRESSURE PORT AT STANDARD SEA LEVEL PRESSURE.

△ COMPONENT FURNISHED WITH ENGINE.

NOTES: 1. ALL WIRE MIL W5088A TYPE II.

A	INCORP ED293, DOOR WARN CIRCUIT POWER SOURCE FROM #1 BUS. ADDED ARE [illegible] AND REF DWG 2427 (DUE TO NEW [illegible] DESIGN).	[illegible]	[illegible]



2429

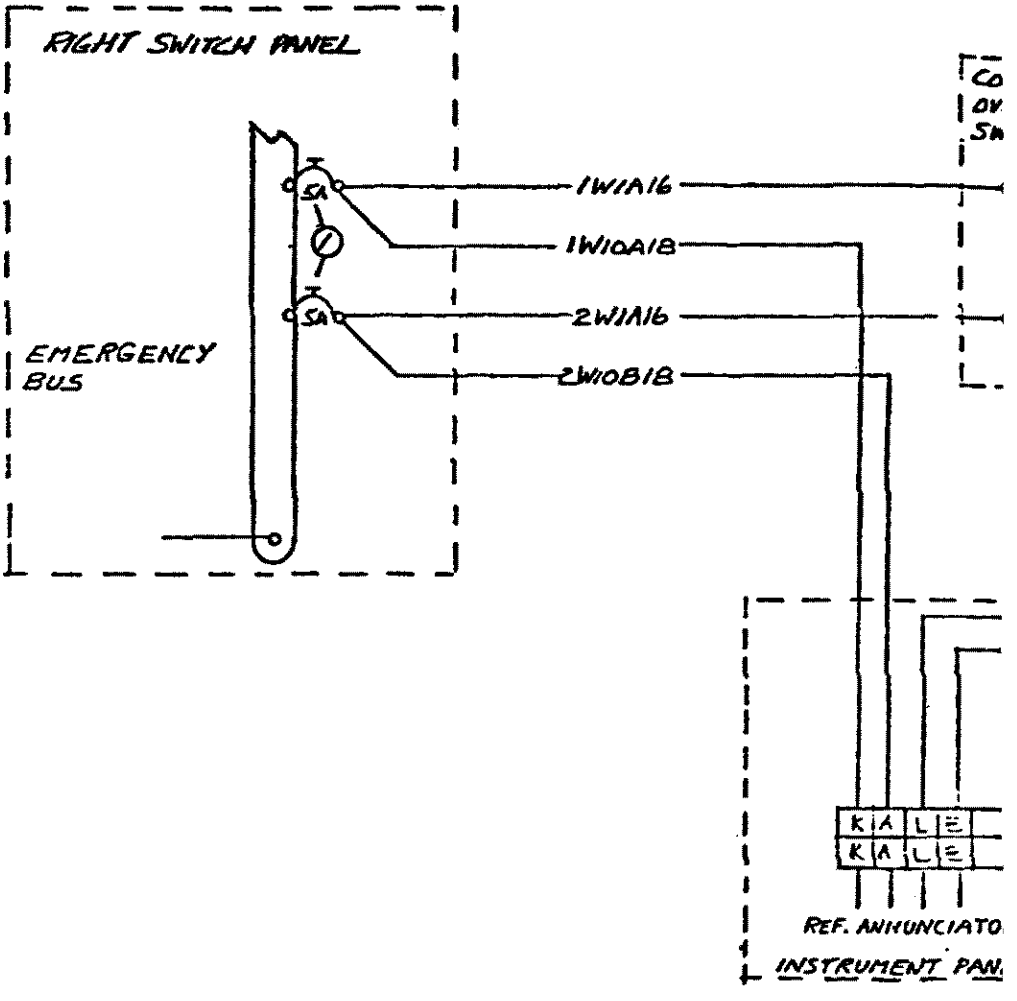
A

ITEM	QTY.		NAME	
7	1	20TC2-EA-5	CIRCUIT BRKR	KLIXON TEXAS INST. INC.
6	4	303	LIGHT BULB	GENERAL ELECTRIC
5	1	BZ-R31	SWITCH	MICRO SWITCH
4	1	MS25[illegible]-5	CIRCUIT BRKR	KLIXON TEXAS INST. INC.
3	2	MS3106[illegible]	CONNECTOR	CANNON I.T.T.
2	2	MS3106[illegible]	CONNECTOR	CANNON I.T.T.
1	2	76272	SWITCH	CUSTOM COMPONENT SWITCHES

[illegible] INCORPORATED

SCHEMATIC-ELECTRICAL SYSTEM WARNING CIRCUITS: ENGINE LOW OIL PRESSURE, ENTRANCE DOOR UNLATCHED; NO SMOKING-FASTEN BELT S[illegible]

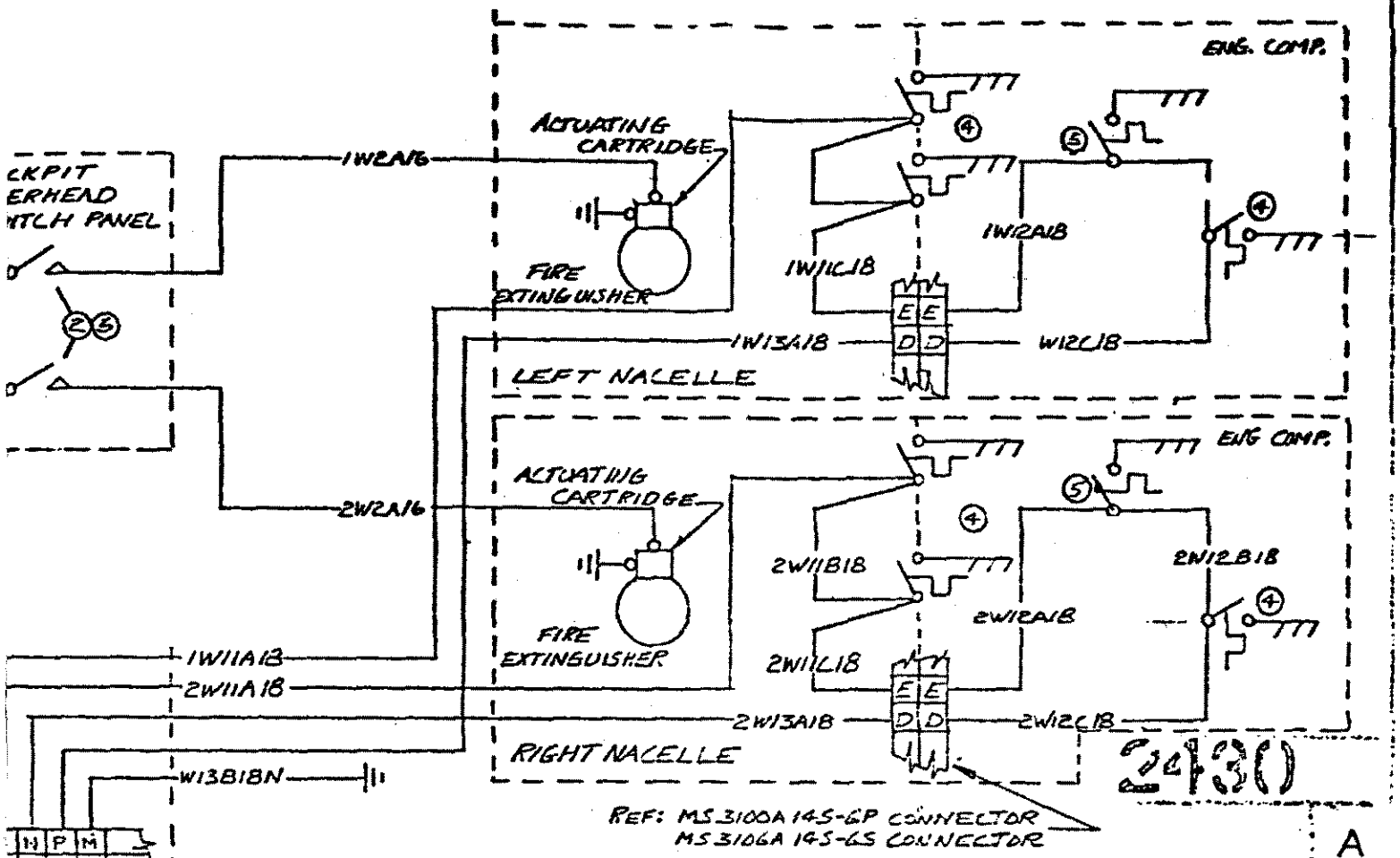
2429



5. 1 EACH 600°F THERMOSWITCH LOCATED IN ENGI
4. 2 EACH 450°F THERMOSWITCHES LOCATED ON F
3. WIRE AFT OF FIREWALL MIL W 5086A TYPE II.
2. WIRE FORWARD OF FIREWALL MIL. W 25038B.

NOTES: 1. FIRE DETECTORS CASE MUST HAVE POSITIVE GROUND

A	IN LIST OF MTL, 17343-61-600°F WAS 17343-11-725 AND 17343-61-450°F WAS 17343-11-450. IN NOTE 5, 600° WAS 725°. REMOVED IN 547 DIODE AND REVISED CIRCUIT TO DELETE DIODE. REMOVED A-14-103 TEST SWITCH, THE MS3106A-14S-1P CONNECTORS AND ANNUNCIATOR CIRCUIT DETAIL. ADDED "REF. ANNUNCIATOR DWG 2435"	SM-10	TAYLOR



ITEM NO.	QTY. REQ'D	PART NO.	NAME	MATERIAL	SPECIFICATION
5	2	17343-61-600°F	THERMOSWITCH	FENWALL	
4	6	17343-61-450°F	THERMOSWITCH	FENWALL	
3	2	MS25224-3	GUARD	VAN DUSEN AIRCRAFT SUPPLY	
2	2	MS35058-30	SWITCH	CUTLER HAMMER	
1	2	MS25017-5	CIRCUIT BRKR.	KLIXON-TEXAS INST. INCORP.	

LIST OF MATERIALS

NE HOT SECTION.

IRE WALL, 1EA AT ACCESSORY SECT.

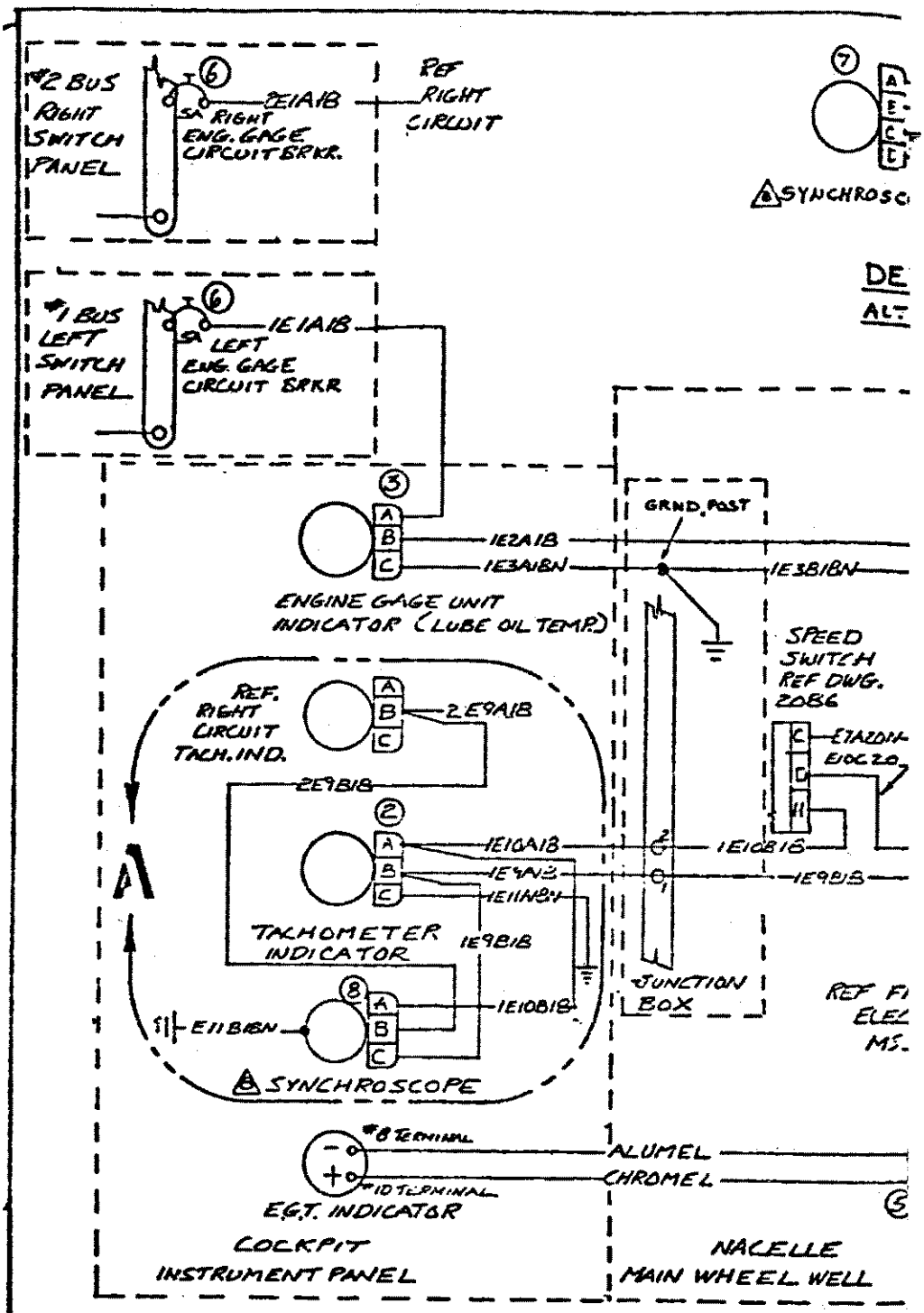
TO AIRFRAME.

F.F. TAYLOR	2-17-70	VOLPAR INCORPORATED
A.H. HIGGINS	2-22-70	
MASON	2-23-70	SCHEMATIC-ELECTRICAL SYSTEM, FIRE EXTINGUISHER AND FIRE DETECTOR

REF DWG FWD. 2515 TURBO LINER

NONE

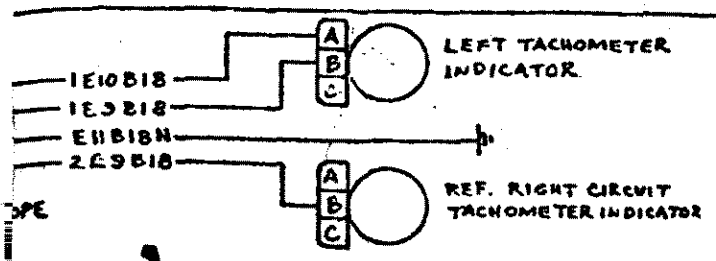
24130



SYNCHROSCOPE CIRCUIT OPTIONAL.

7. LEFT CIRCUIT SHOWN, RIGHT CIRCUIT SAME
6. EGT CIRCUIT RESISTANCE 4 OHMS ±.05 INDIC
5. EGT WIRE COLOR CODE: CHROMEL = WHITE.
4. ROUTE E.G.T. WIRE SEPARATE FROM MAIN WIRE
3. E.G.T. WIRE ALUMEL-CHROMEL MIL-W-5846
2. WIRE FWD. OF FIRE WALL MIL-W-8777.

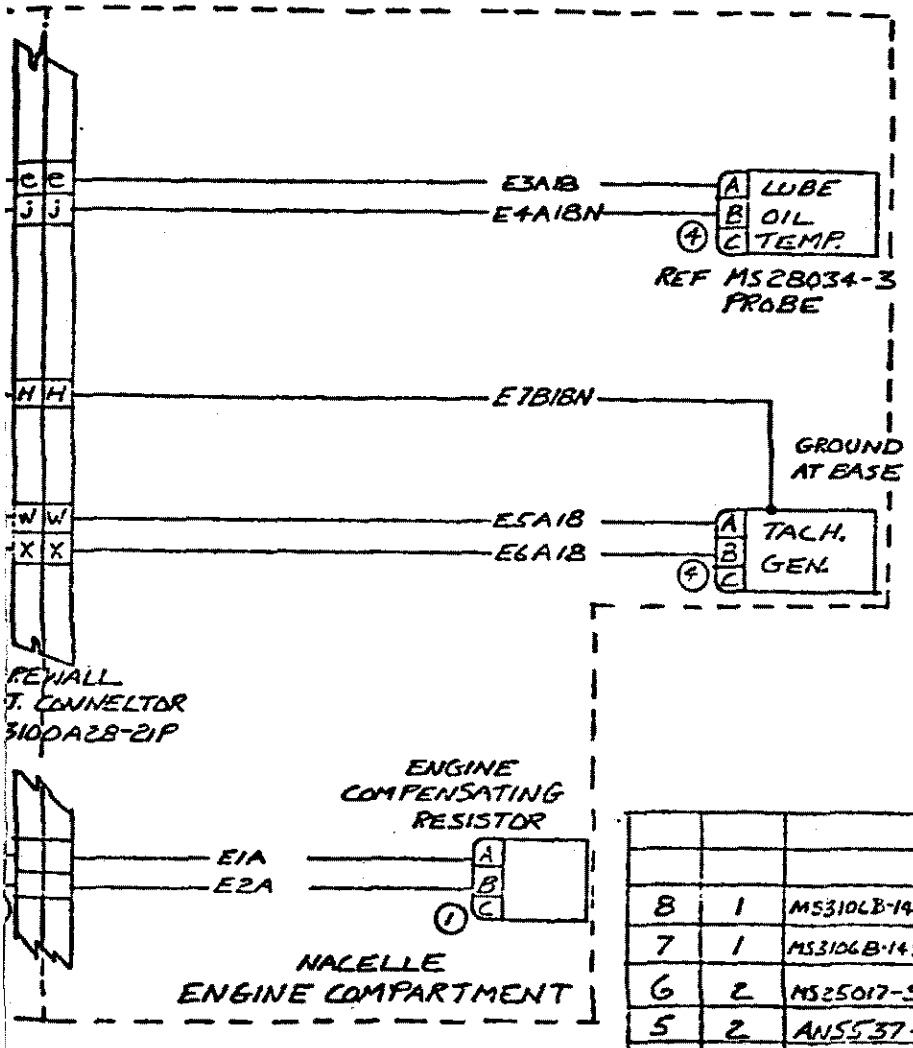
NOTES: 1. WIRE AFT OF FIRE WALL MIL-W-



REVISIONS			
LTR	DESCRIPTION	DATE	APPVD
A	(8) WAS (7). ADDED DETAIL A.	5-11-70	MASON

DETAIL A

ALTERNATE SYNCHROSCOPE WIRING



2631

A

ITEM	QTY.	PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION
8	1	MS3106B-14S-7S	CONNECTOR	CANNON I.T.T.	
7	1	MS3106B-14S-2S	CONNECTOR	CANNON I.T.T.	
6	2	MS25017-5	CIRCUIT BRKR	KLIXON TEXAS INST INC.	
5	2	AN5537-3	CONNECTOR	LEWIS ENGINEERING CO.	
4	4	MS3108B-12S-3S	CONNECTOR	CANNON I.T.T.	
3	2	MS3106A-MS-2S	CONNECTOR	CANNON I.T.T.	
2	2	MS3106A-10SL-2S	CONNECTOR	CANNON I.T.T.	
1	2	MS3108B-10SL-4S	CONNECTOR	CANNON I.T.T.	

DRAWN	DATE
F.F. TAYLOR	4-6-70

VOLPAR INCORPORATED

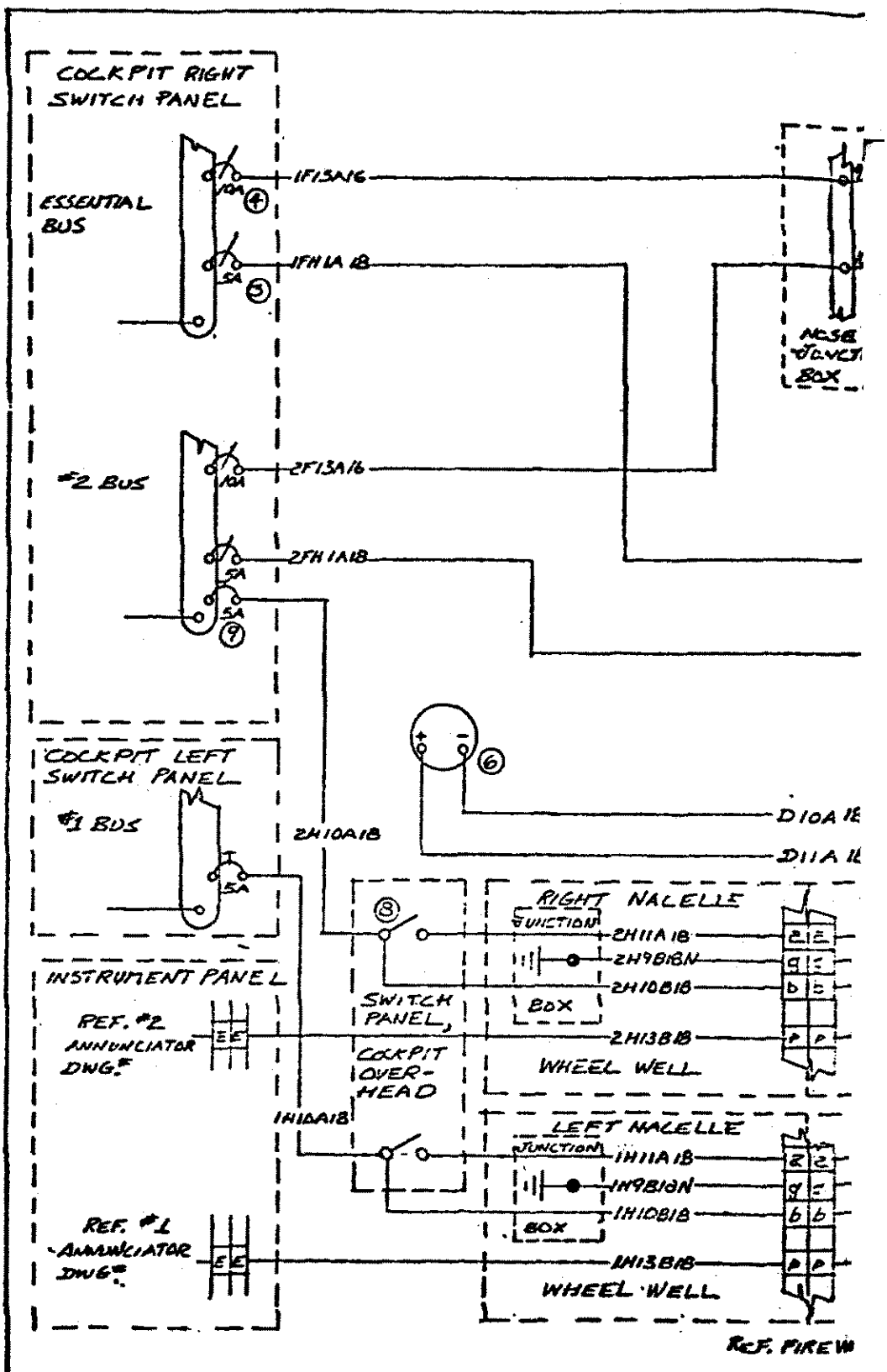
SCHEMATIC-ELECTRICAL SYSTEM ENGINE INSTRUMENTS: LUBE OIL TEMPERATURE, TACHOMETER, SYNCHROSCOPE, EXHAUST TEMPERATURE

EXCEPT AS NOTED AND CODE PREFIX IS 2.
ATOR TO COMPENSATOR RESISTOR.
ALUMEL = GREEN.
HARNESS, INSTRUMENT TO FIRE WALL.
YPE II.

REF. DWG 2515

SIZE: C | SCALE: NONE | SHEET 1 OF 1

2631



5. STATIC ANTI-ICER HEATER TO BE OPERATED ONLY DUR... ARE LESS THAN 50°F. TO PREVENT OVERHEATING, CI...

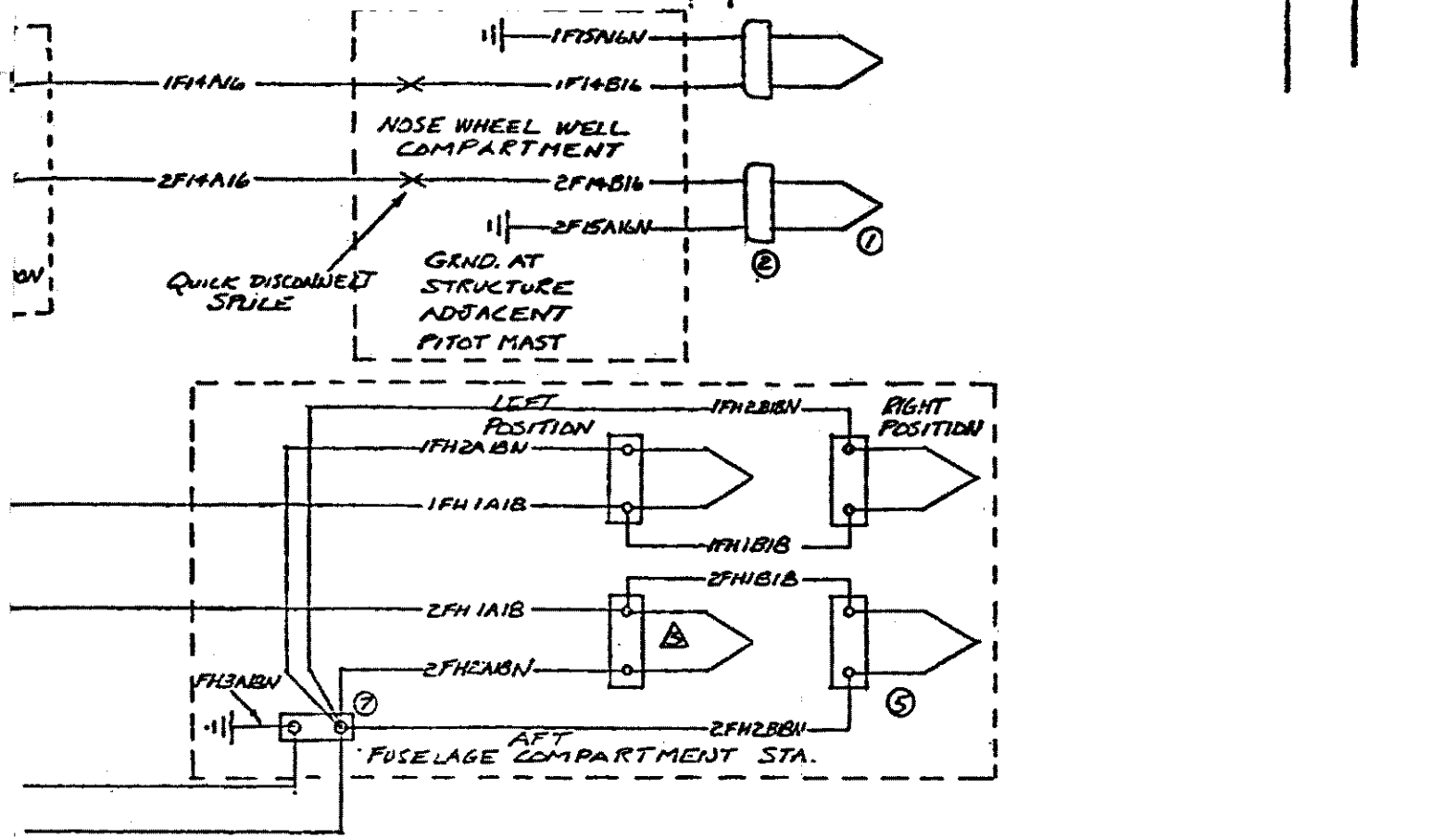
4 50 MV SHUNT 0-5 AMPS.

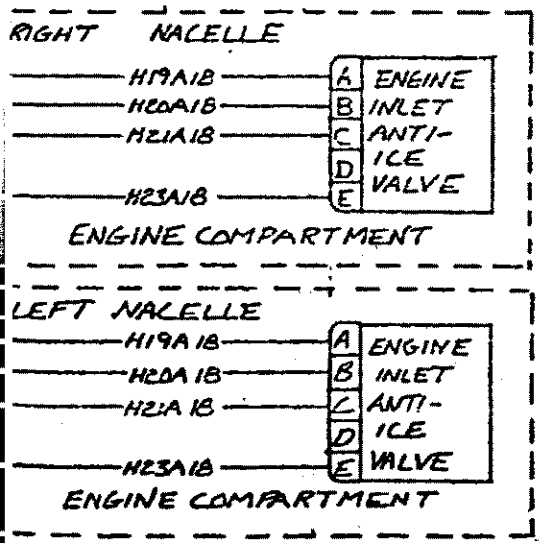
3 TOTAL POWER 20.5 WATTS AT 26 VDC AND .78A E...

2 DIVISION OF B.F. GOODRICH CO.

NOTES: 1. ALL WIRE MIL-W-5086A TYPE II.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	1H10B1B & 2H10B1B WIRES CHANGED FROM ATTACH POST OF SWITCHES 5-11-70		MASON





LL CONNECTOR

ITEM	QTY	PART NO.	NAME	MATERIAL	NOMENCLATURE OR DESCRIPTION
9	2	MS25017-5	CIRCUIT BRKR		KUXON TEXAS INST. INC.
8	2	MS35058-22	SWITCH		CUTLER HAMMER
7	1	6703	SHUNT		
6	1	J-1	LOADMETER		DE-JUR AMSCO CORP.
5	4	3E1756	ANTI-ICER PROBE		AEROSPACE & DEFENCE PROD.
4	2	20TC2-EA10	CIRCUIT BRKR.		KUXON TEXAS INST. INC.
3	2	20TC2-EA5	CIRCUIT BRKR		KUXON TEXAS INST. INC.
2	2	AN3115-1	CONNECTOR		
1	2	AN5812-1	PITOT TUBE		

6 FLIGHT WHEN AMBIENT TEMPERATURES
CUIT TESTS MUST BE LIMITED TO 5 SEC.

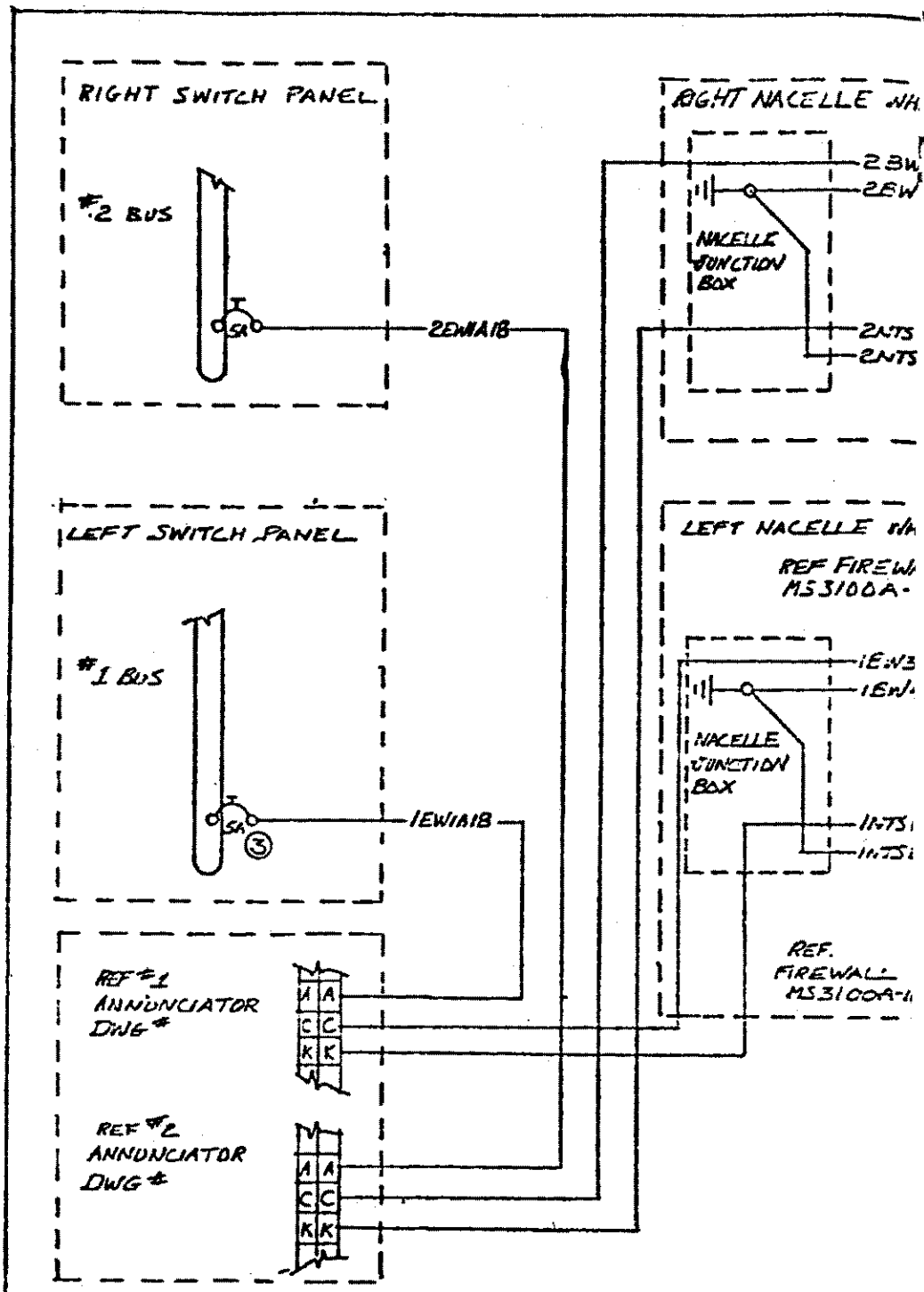
CH.

DRAWN	DATE	VOUGHT INCORPORATED
F.F. TAYLOR	4-1-70	
CHECKED		SCHEMATIC-ELECTRICAL
		SYSTEM: PITOT HEAT, STATIC AIR PROBE ANTI-ICER, ENGINE INLET ANTI-ICER
REF DWG 2515	TURBOMOTOR	SCALE NONE
NEXT ASSY		SHEET 1 OF 1

2432

ENG A

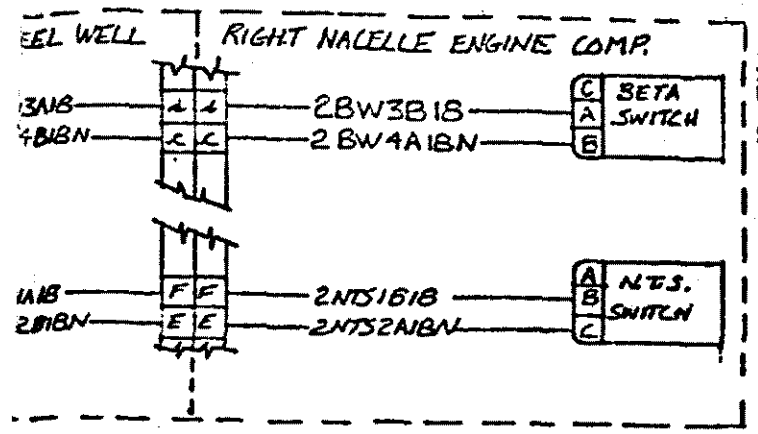
2432

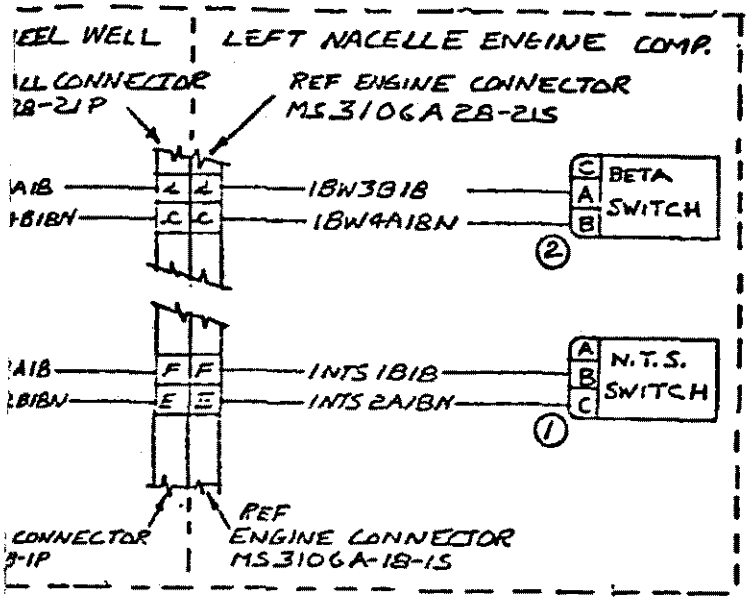


2. WIRE FWD OF FIREWALL MIL-W-8777.

NOTES: 1 WIRE AFT OF FIREWALL MIL-W-5086A TYPE II

A	WIRE 2NTS2A1BN WAS 2NTS2B1BN	3-12-70	MASON





24133

A

ITEM	QTY.			
3	2	MS25017-5	CIRCUIT BRKR.	KLIXON TEXAS INST. INC.
2	2	MS3106F-8-3S	CONNECTOR	CANNON I.T.T.
1	2	MS3106-10SL-3S	CONNECTOR	CANNON I.T.T.

R.F. TAYLOR 1-10-70

VOLPAR INCORPORATED

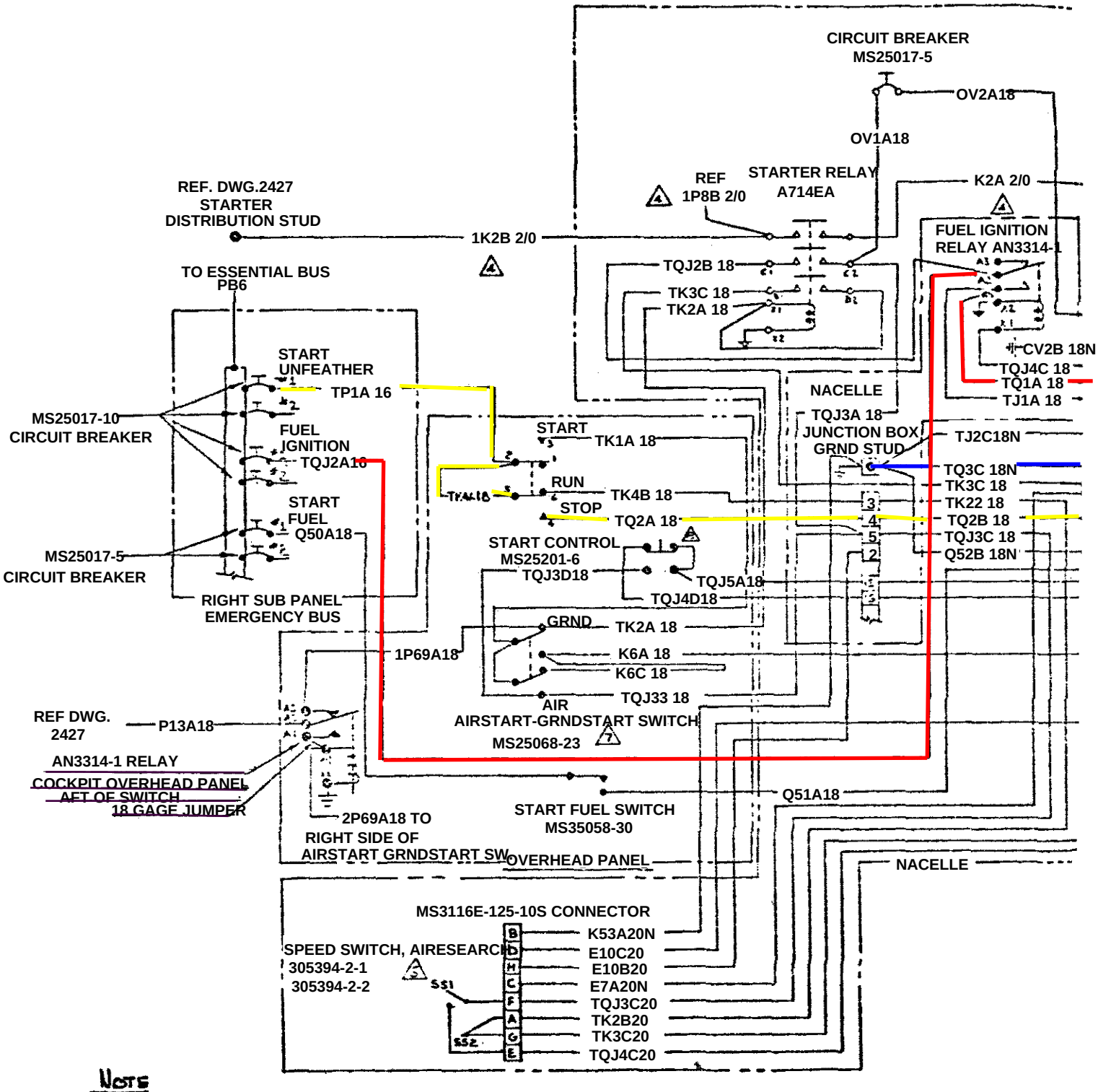
SCHEMATIC-ELECTRICAL SYSTEM,
BETA,
NEGETIVE TORQUE SENSE TEST

REF DWG 2515 TRACER

NONE

C

24133



NOTES

1. WIRE CODE PREFIX: 1 INDICATES LEFT CIRCUIT
   2 INDICATES RIGHT CIRCUIT
2. WIRE AFT OF FIREWALL MIL W 5086 A TYPE II.
3. WIRE FORWARD OF FIREWALL MIL W 4777.

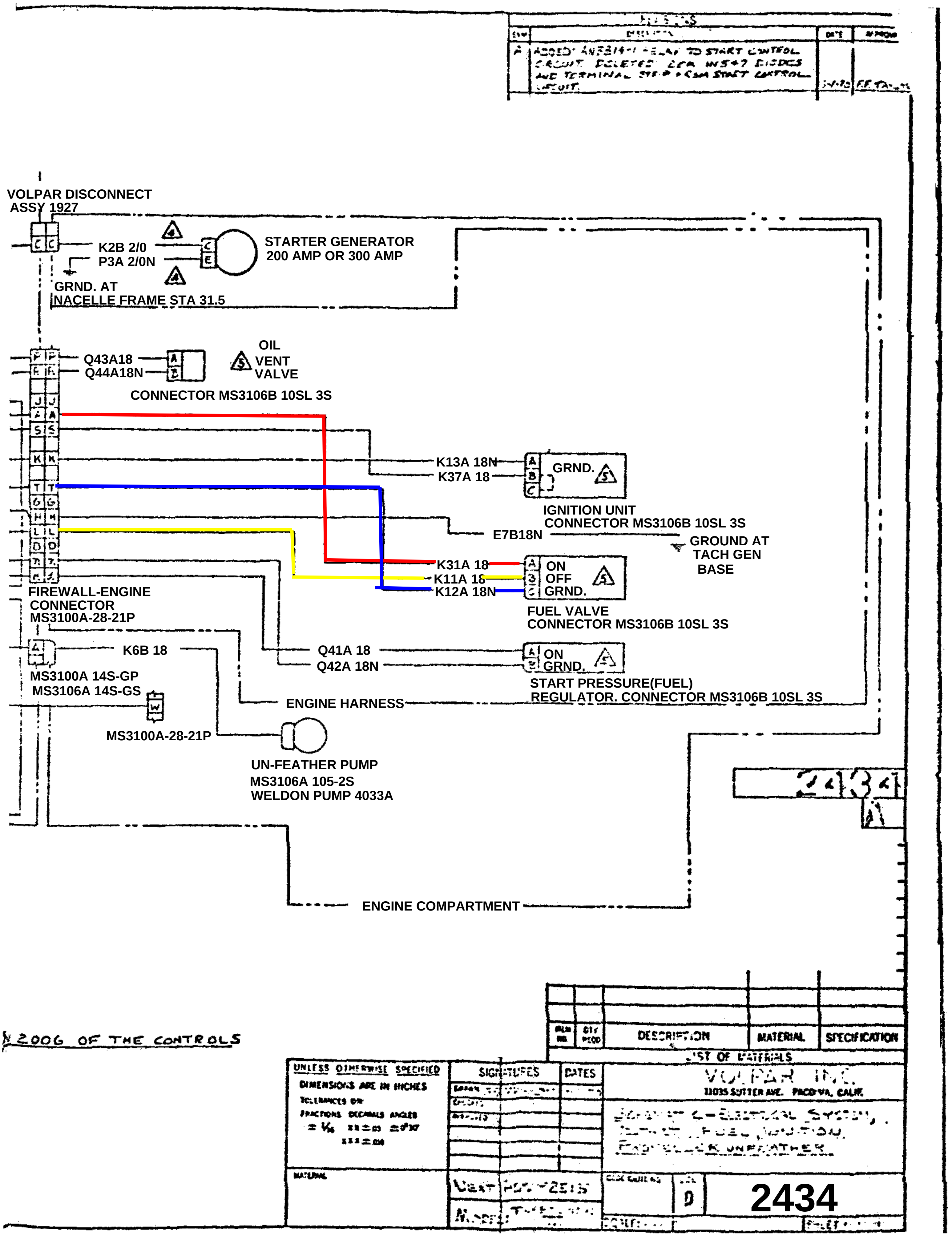
⚠ THESE WIRES TO BE ROUTED SEPARATELY, NOT IN WIRE BUNDLES.

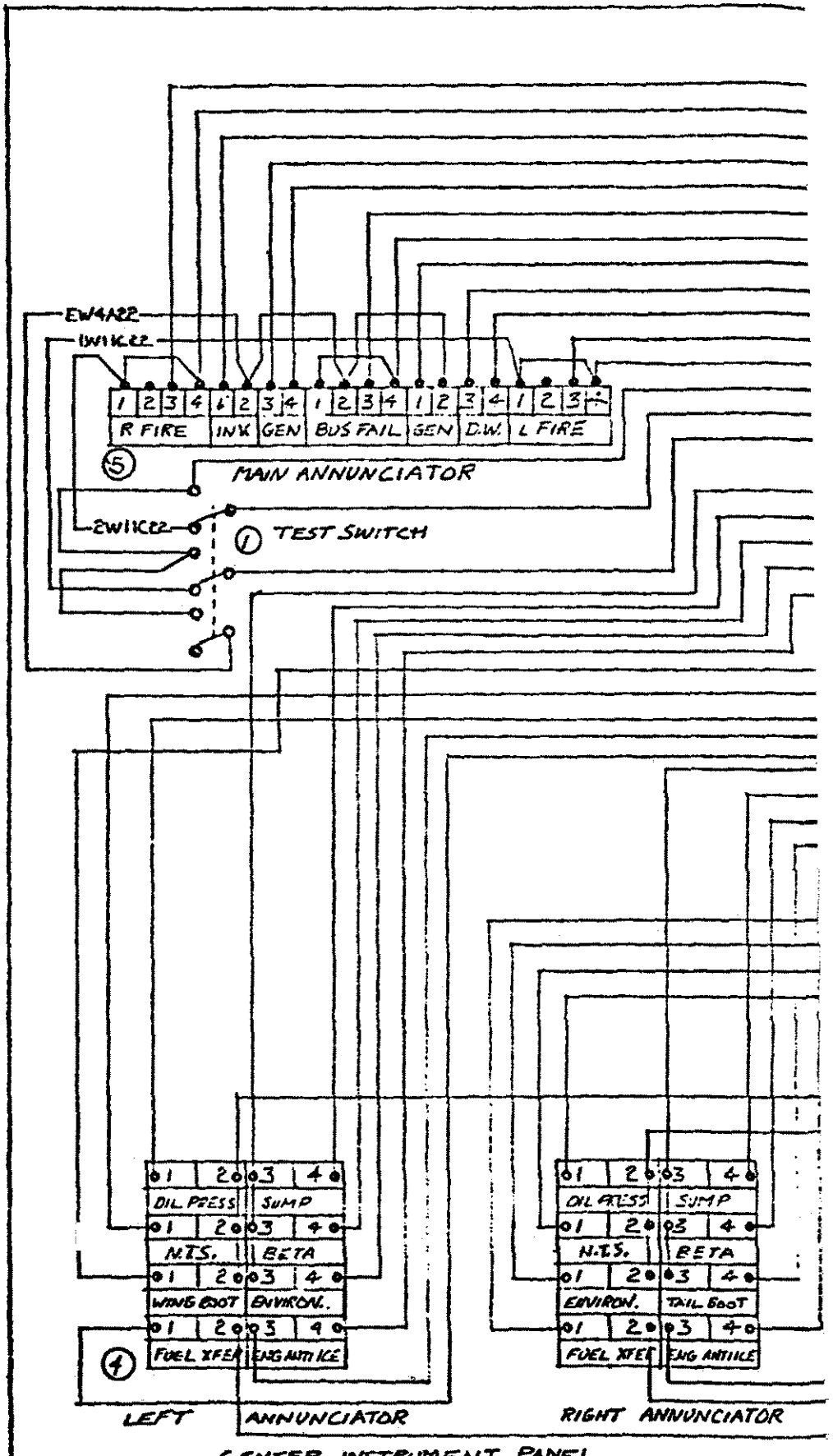
⚠ FIGURE COMPONENT FURNISHED WITH ENGINE.

6 LEFT CIRCUIT SHOWN RIGHT CIRCUIT SAME EXCEPT AS NOTED.

⚠ ONE HALF OF 4 POLE SWITCH SHOWN.

⚠ MANUAL START SWITCH B
CO. OF AMERICA


VOLPAR DISCONNECT ASSY 1927
K2B 2/0
P3A 2/0N
STARTER GENERATOR 200 AMP OR 300 AMP
GRND. AT NACELLE FRAME STA 31.5
Q43A18
Q44A18N
OIL VENT VALVE
CONNECTOR MS3106B 10SL 3S
K13A 18N
K37A 18
GRND.
IGNITION UNIT CONNECTOR MS3106B 10SL 3S
E7B18N
GROUND AT TACH GEN BASE
K31A 18
K11A 18
K12A 18N
ON
OFF
GRND.
FUEL VALVE CONNECTOR MS3106B 10SL 3S
FIREWALL-ENGINE CONNECTOR MS3100A-28-21P
K6B 18
MS3100A 14S-GP
MS3106A 14S-GS
Q41A 18
Q42A 18N
ON
GRND.
START PRESSURE(FUEL) REGULATOR. CONNECTOR MS3106B 10SL 3S
ENGINE HARNESS
MS3100A-28-21P
UN-FEATHER PUMP
MS3106A 105-2S
WELDON PUMP 4033A
ENGINE COMPARTMENT
2434
DESCRIPTION
MATERIAL
SPECIFICATION
LIST OF MATERIALS
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
SIGNATURES
DATES
VOLPAR INC.
MATERIAL
D
2434



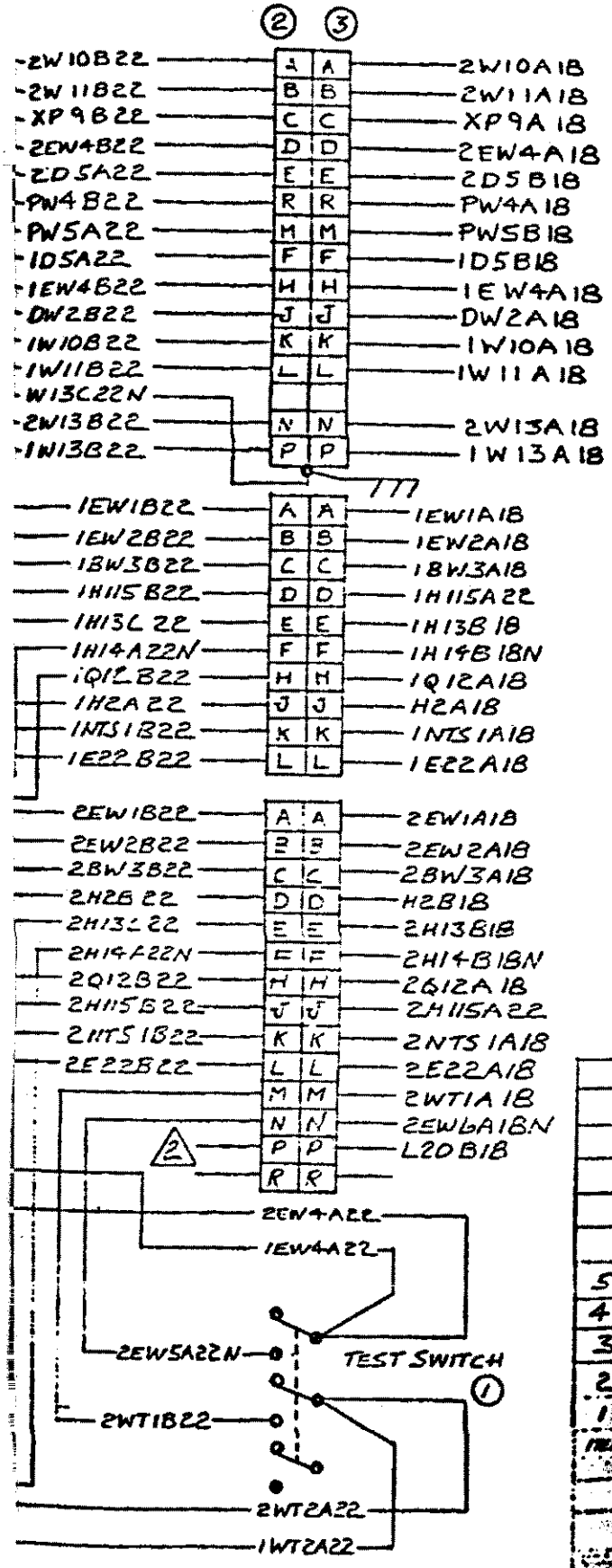
CENTER INSTRUMENT PANEL

4 ALL ANNUNCIATORS ARE WIRED INTERNALLY PER MASTER SI
EXCEPT FOR FUEL TRANSFER, ENGINE ANTI ICE, OF THE RIGH
ARE WIRED PER MASTER SPECIALTIES CO. CIRCUIT 8 (2

3 ANNUNCIATORS VIEWED FROM TERMINAL SIDE

2 SEE INSTRUMENT PANEL LIGHTS DWG.

NOTE: 1. WIRE MIL W 5086A TYPE II.



SYM		DATE	APPD.
A	ADD WIRES PW4B22 PW4A22 PW5A22 AND PW5B22. ADD PIN LTR "R" TERMINATE WIRE W13C22 AT CONNECTOR SHELL-SHOW GRND CONNECTION. DELETE WIRE W13B18N	5-20-70	F.F.TAYL
B	INCORP. E.O. 413 ADD NOTE 4 REMOVED JUMPER WIRE ON ENG. ANNUNCIATOR TEST SW.	11-28-71	F. TAYLO

2485

B

ITEM	QTY.	PART NO.	NAME	DESCRIPTION
5	1	100 - 501	ANNUNCIATOR	MASTER SPECIALTIES CO.
4	2	100 - 104	ANNUNCIATOR	MASTER SPECIALTIES CO.
3	3	MRA14S	CONNECTOR	WINCHESTER ELECT. [illegible] MOUNT.
2	3	MRA14P	CONNECTOR	WINCHESTER ELECT. [illegible] MOUNT.
1	2	A4-16-103	SWITCH	CONTROL

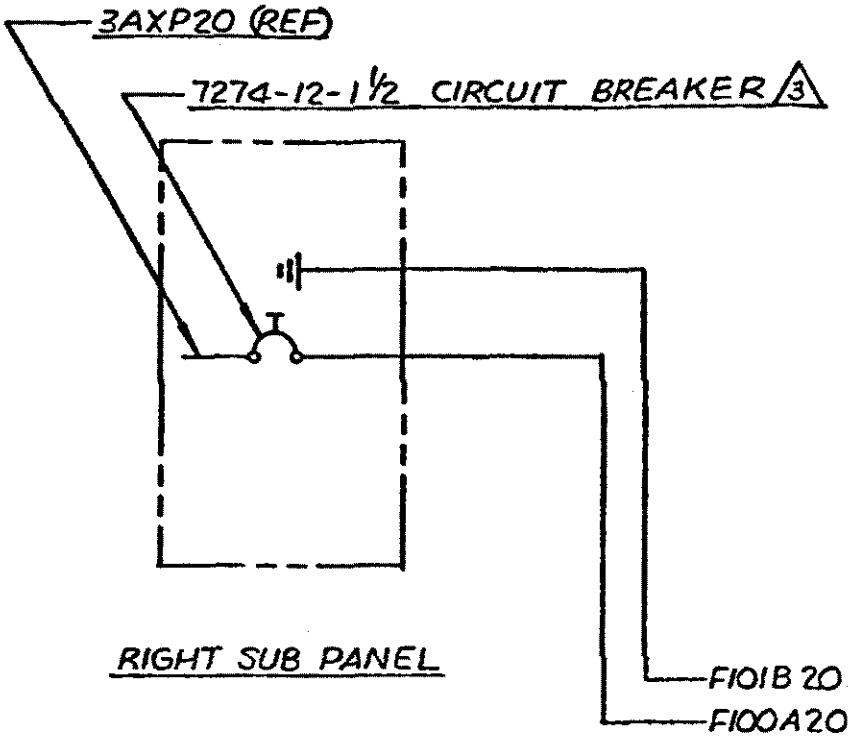
SPECIALTIES CO. CIRCUIT 14 (NEG. DC IMPUT), T AND LEFT ANNUNCIATORS, THESE ITEMS ITIVE DC IMPUT)

SIGNATURES	DATE
F.F. TAYLOR	4-23-70
A.M. HIGGINS	4-28-70

VOLPAR INCORPORATED

SCHEMATIC-ELECTRICAL SYSTEM: ANNUNCIATOR PANELS RIGHT, LEFT

REF DWG ONLY | C515 | TURBOPROP | SCALE: NONE | SIZE C



(5) AMPH 165-34 CONNECT(

(3) AMPHENOL CORP, CHATSWORTH, CAL(

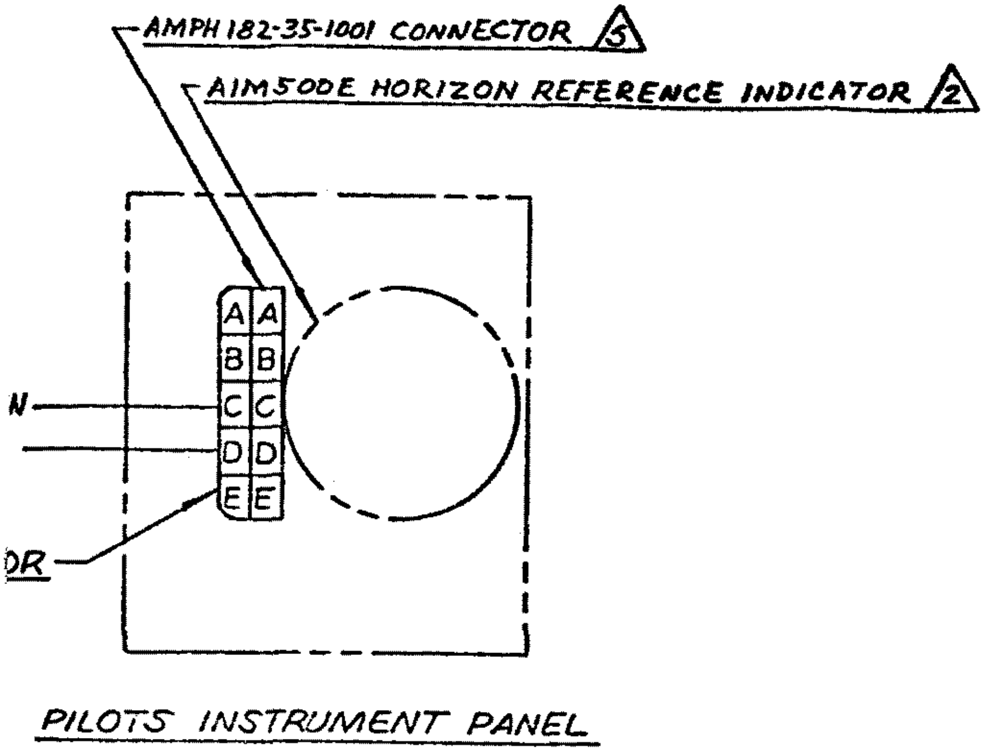
4. USE WIRE PER MIL-W-5086 TYPE II.

(3) KLIXON DIVISION, TEXAS INSTRUMEN

(2) AVIATION INSTRUMENT MANUFACTUR
HOUSTON, TEXAS.

1. POWER 115V AC 400~ 1Φ

NOTES



2438

F, OR EQUIV.

TS INC.

ING CORP.

QTY REQD	PART NO.	NAME	MATERIAL	SPECIFICATION	ZONE

LIST OF MATERIALS

SIGNATURES	DATE
DR KEN WILCOX	3-6-69
CHECKED	
MASON	9-24-69

VOLTAIR INCORPORATED

SCHEMATIC–

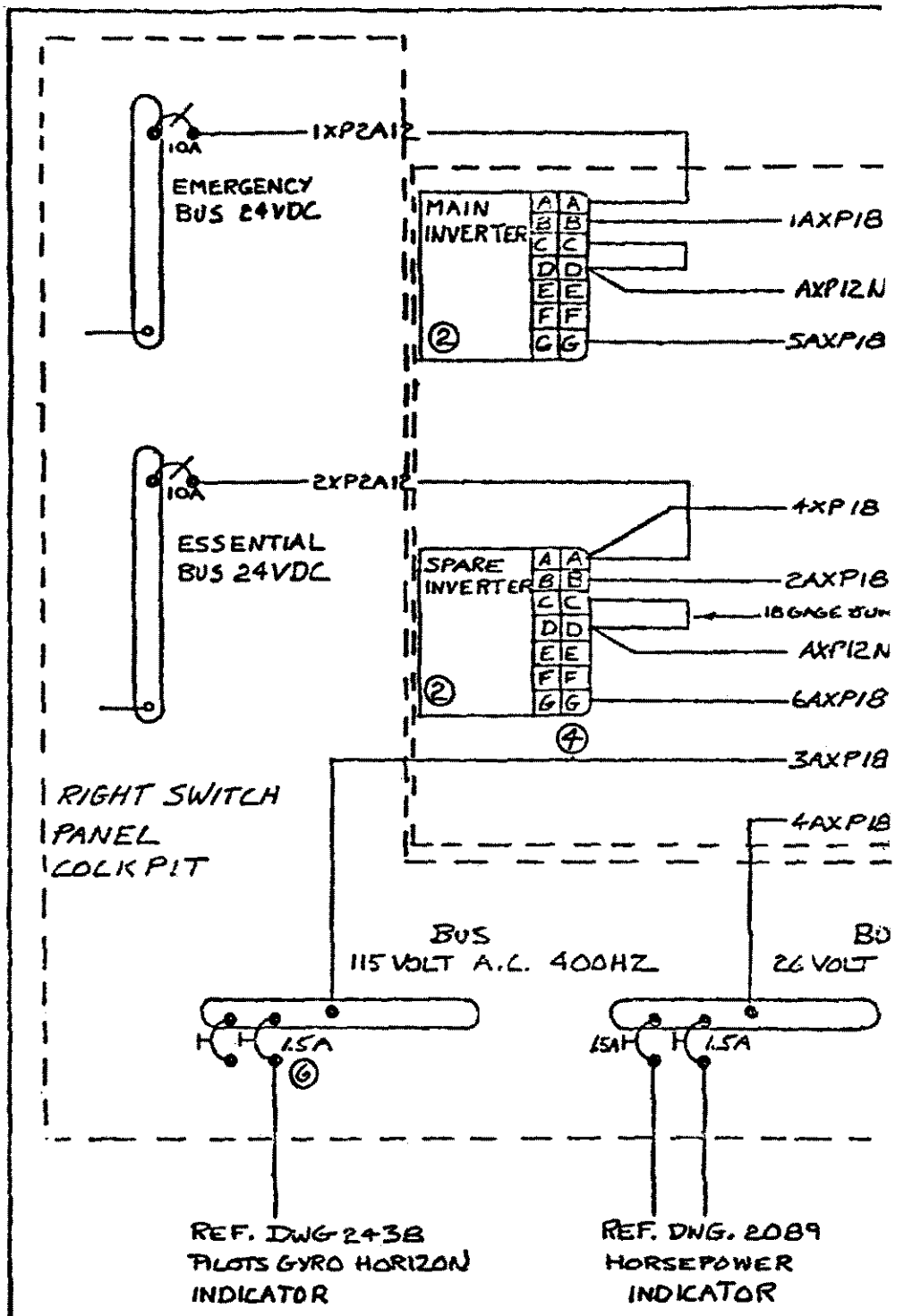
ELECTRICAL SYSTEM, GYRO HORIZON

REF DWG ONLY 2370

SCALE NONE

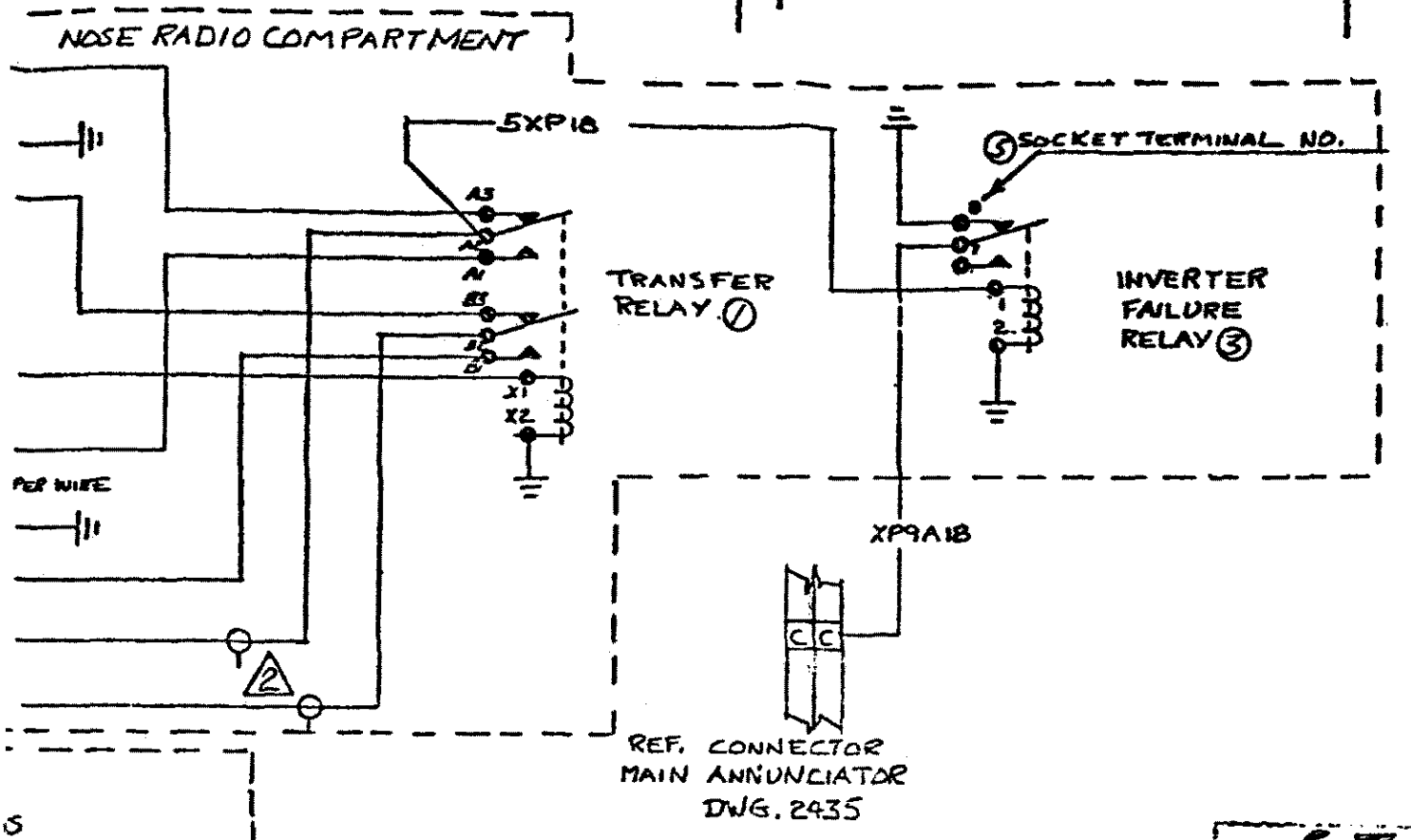
C SHEET 1 OF 1

2438



2 SINGLE CONDUCTOR SHIELDED + JACKETED MIL

NOTE 1. ALL WIRE MIL W 5086A TYPE II EXCEPT AS



2523

ITEM	QTY.	PART NO.	NAME	MATERIAL
7	2	20TC2-EA-10	CIRCUIT BRKR.	KLIXON – TEXAS INST. INC.
6	3	7074-1-1½	CIRCUIT BRKR.	KLIXON – TEXAS INST. INC.
5	1	UN37184-3	SOCKET-RELAY	UNION SWITCH AND SIGNAL
4	2	MS3106B-18-9S	CONNECTOR	CANNON ELECT. I.T.T.
3	1	UN379311	RELAY	UNION SWITCH AND SIGNAL
2	2	PC15A	INVERTER	FLITETRONICS
1	1	AN3315	RELAY	

DRAWN	F.F. TAYLOR 5-4-70
CHECKED	A.M. HIGGINS 5-7-70

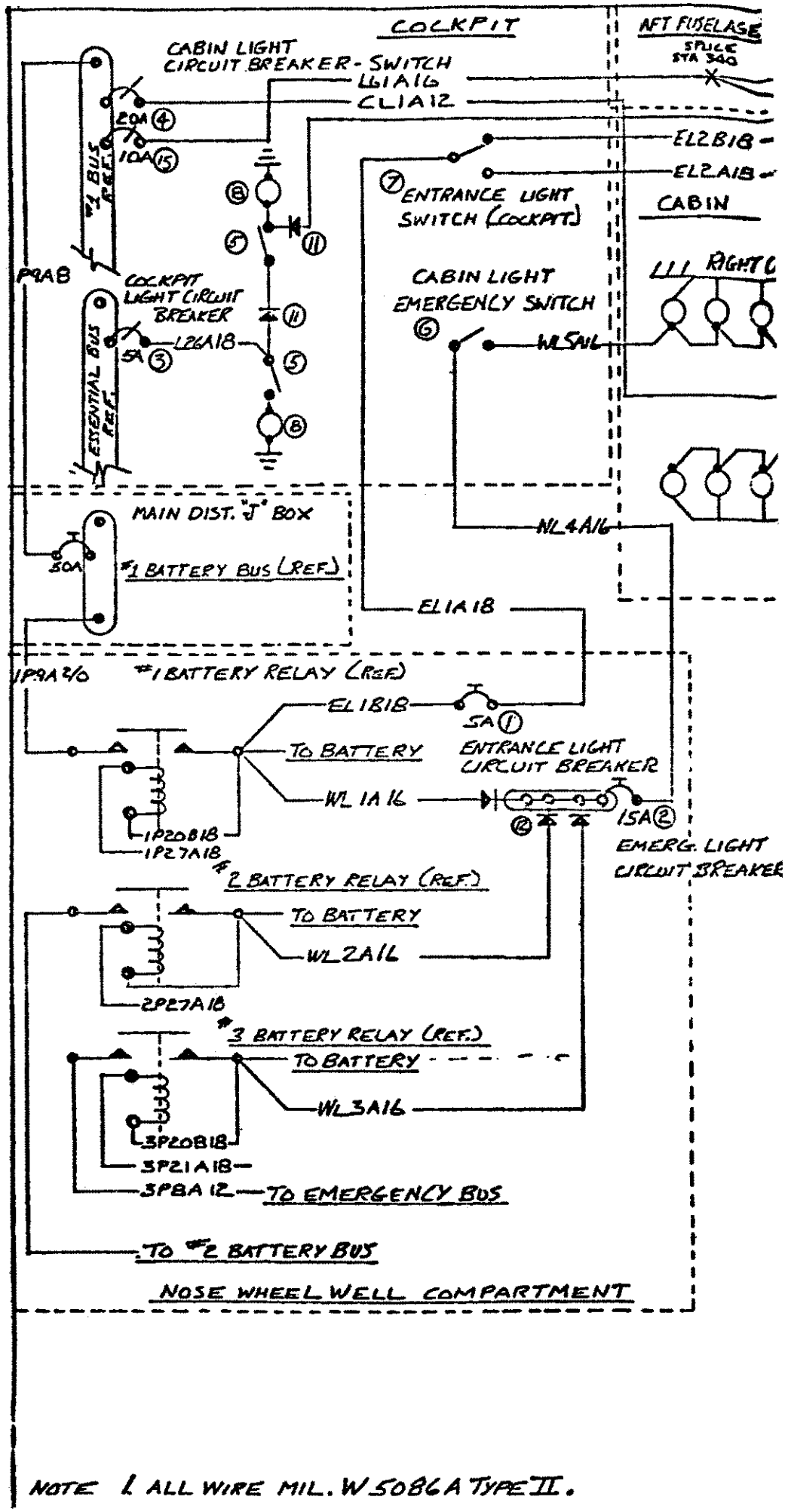
VOLPAR INCORPORATED

SCHEMATIC-ELECTRICAL SYSTEM: INVERTER MAIN AND SPARE

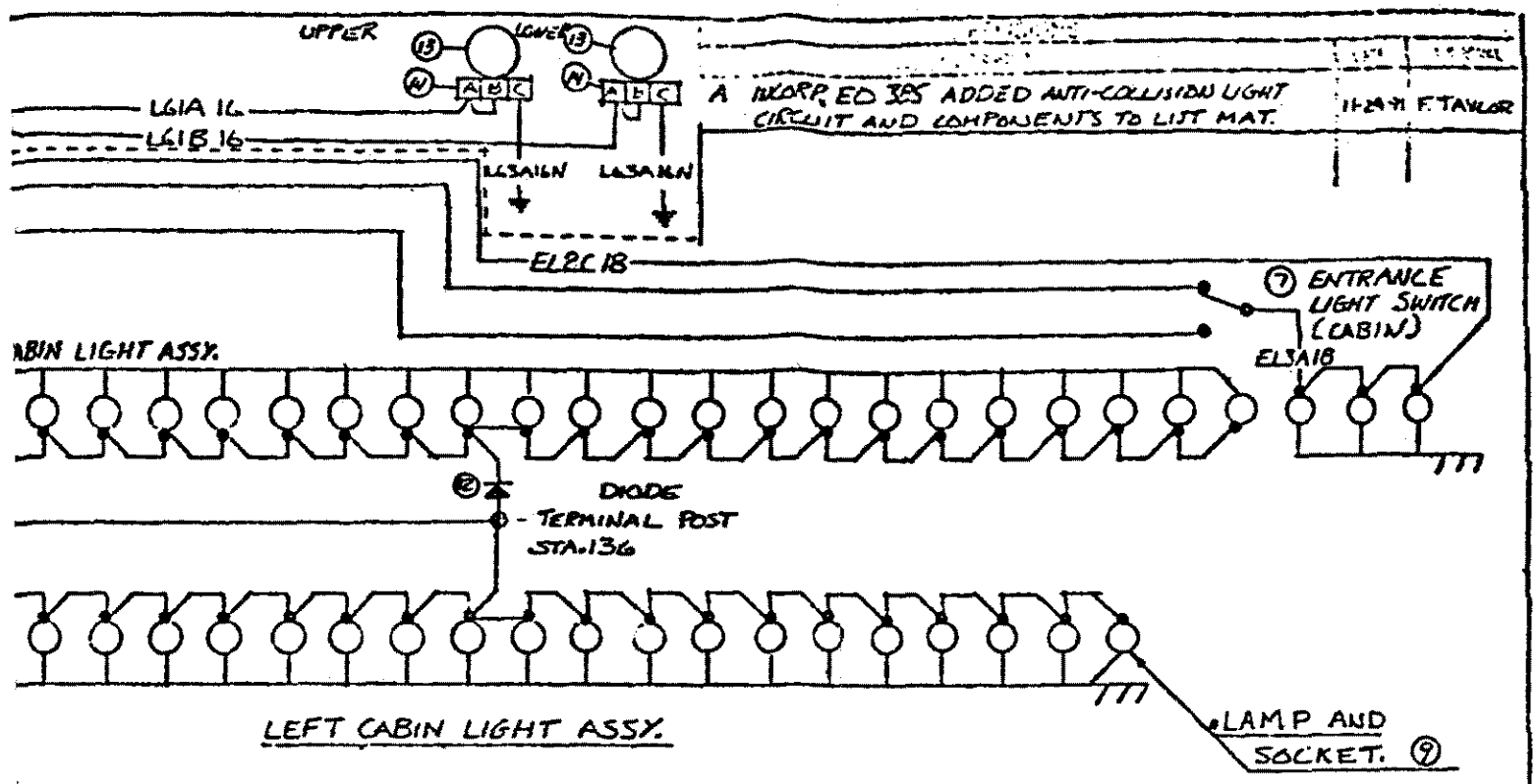
NONE

2523

C 7078A II.
NOTED.



NOTE 1 ALL WIRE MIL. W5086A TYPE II.



15	1	20TC-EA10	CIRCUIT BREAKER	KUXON TEXAS INST.
14	2	MS3106B10SL3S	CONNECTOR	CANNON I.T.T.
13	2	GB400A	LIGHT ASSY.	GRIMES MFG. CO.
12	4		DIODE	GENERAL ELECTRIC

2531

A

11	2	IN547	DIODE	GENERAL ELECTRIC
10	49	303	LAMP	GENERAL ELECTRIC
9	49	10-06	SOCKET	LEE CRAFT
8	2	1847	LIGHT ASSY.	WEMAL CO.
7	2	8482-K2	SWITCH	CUTLER HAMMER
6	1	MS3505B22	SWITCH	CUTLER HAMMER
5	2	679	SWITCH	LEVITON
4	1	20TC-EA-20	CIRCUIT BREAKER	KUXON TEXAS INST. INC.
3	1	20TC-EA-5	CIRCUIT BREAKER	KUXON TEXAS INST. INC.
2	1	MS25017-15	CIRCUIT BREAKER	KUXON TEXAS INST. INC.
1	1	MS25017-5	CIRCUIT BREAKER	KUXON TEXAS INST. INC.
ITEM.	QTY.			

F.T. TAYLOR 6-10-70

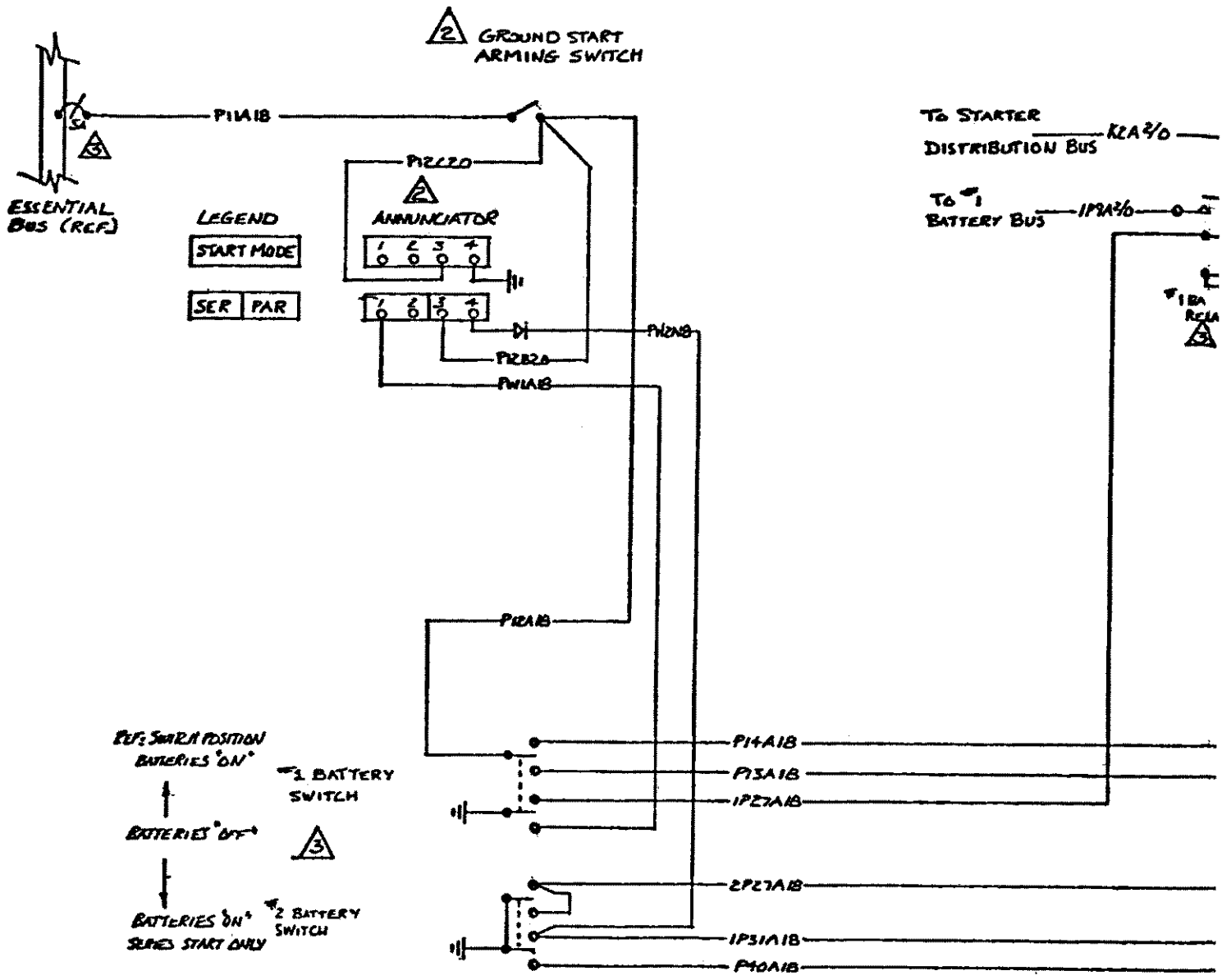
VOLPAR II CONFIGURATED

SCHEMATIC-ELECTRICAL SYSTEM, CABIN LIGHTING, ENTRANCE LIGHTS, EMERGENCY LIGHTING

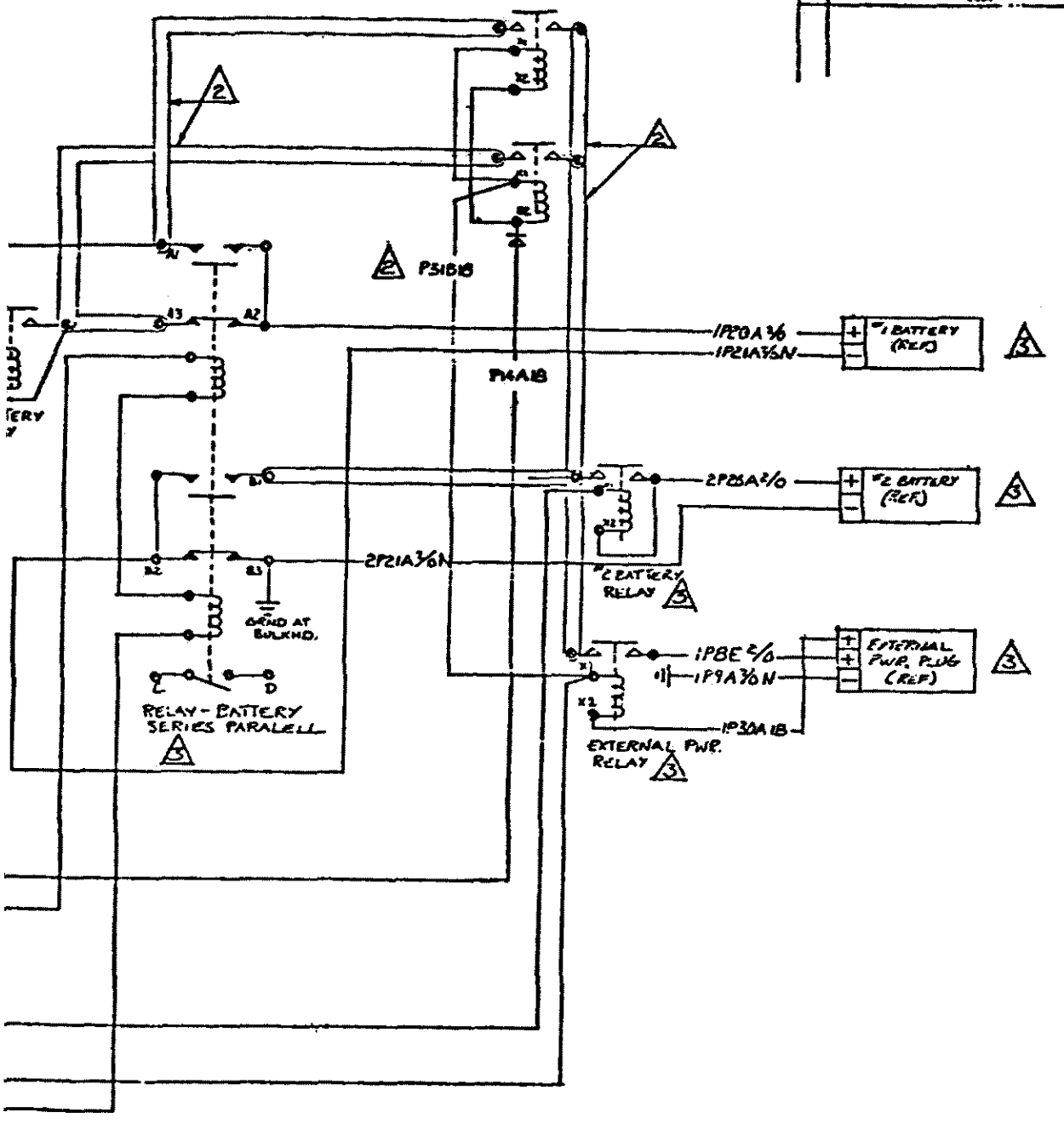
NEXT ASSY. 2515 TURBULENCE SEC.

NONE

2531



5 THE FOLLOWING WIRES ARE
FOLLOWING WIRES ARE ADDE
4. THIS SYSTEM SUPPLE
GIVES THE OPTION OF
AT NOMINAL 48VDC
3 EXISTING COMPONENTS
2 COMPONENTS ADDED
NOTES: 1. ALL WIRE MIL. W5088



2532

DELETED FROM 2427 SYSTEM SCHEMATIC, K1A3/6, PM1A1BN. THE
O P2.5B, PM1A1B, PS1A1B, PW1A1B, PW2A1B, P21A1B, P12B1B, P22L1B, P11A1B.
IENTS EXISTING STARTING SYSTEM (REF. 2427) AND
STARTING ENGINES WITH BATTERIES IN SERIES
R BATTERIES IN PARALLEL AT NOMINAL 24 VDC.
F DWG 2427 REFERENCED ONLY FOR CLARITY.
O SYSTEM AS SHOWN ON DWG. 2427.
4 TYPE II

1	MS35058-22	SWITCH	CUTLER HAMMER	
2	SERIES 120	ANNUNCIATOR	MASTER SPECIALTIES CO	
2	6091 HFDA	RELAY	CUTLER HAMMER	
QTY REQ	PART NO.	NOMENCLATURE	MATERIAL	SPECIFICATION

LIST OF MATERIAL

SIGNATURES	DATE
DRAWN F. TAYLOR	7-25-67
CHECKED	
APPROVED	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES .XX ± .01 .XXX ± .005 ANGLES ± 1°

VOLPAR INCORPORATED

SCHEMATIC ELECTRICAL SYSTEM ALTERNATE ENGINE STARTING

SIZE D | NONE | SHEET 1 OF 1

2582

The terminology pertaining to the inspection procedures and their use as explained in this manual are in accordance with Federal Aviation Regulations, Patts 1, 43, and 91, issued by the Federal Aviation Agency. These terms are defined as follows:

Detailed Inspection - Detailed inspection consists of a thorough examination of the appliances, the aircraft, and components and systems with such disassembly as necessary.

Maintenance - Means inspection, overhaul, repair, preservations, and the replacement of parts, but excludes preventive maintenance.

Pilot in Command - Pilot in command shall mean the pilot responsible for the operation and safety of the airplane during the time defined as flight time.

Preventive Maintenance - Meams simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.

Progressive Inspection - A progressive inspection is a continuing airworthiness inspection of an airplane and its various components and systems at scheduled intervals in accordance with procedures prescribed by the Administrator of the Federal Aviation Agency.

Routine Inspection - Routine inspection consists of visual examination or check of the appliances, the aircraft and its components and systems insofar as is practicable without disassembly.

Time in Service - Time in service, as used in computing maintenance and inspection time records, is the time from the moment the airplane leaves the ground until it touches the ground at the end of the flight.

FORMS & RECORDS

The forms and records used with the Progressive Inspection Program consist of a Routine Inspection form, four seperate 50 Hour Interval Inspection forms, Progressive Inspection Work Sheets, and Aircraft and Engine Flight Logs.

Routine Inspection Work Sheet- This work sheet lists the airplane components which are to be checked at each 30 hour interval of service time. At each 50 hour interval inspection, this form will be completed in addition to the 50 Hour Interval Inspection form.

50 Hour Interval Inspection Form - Four separate and individual 50 Hour Interval Inspection forms are used with the Progressive Inspection Program. Each form covers only one portion of the airpland and are designated as 1st, 2nd, 3rd, and 4th 50 Hour Interval Inspections, and are to be used in that order. Completion of the 4th 50 Hour Interval Inspection will provide a complete airworthiness inspection of the aircraft.

Progressive Inspection Work Sheet - This form is used in conjunction with each of the inspection forms to provide a list of all discrepancies which are found during the inspection and their corrective action. This form also provides a record of items which are replaced or serviced during the inspection.

Flight Logs, Part B - Logs are to be kept in the aircraft and will be used by the pilot in command to list any discrepancy which occurs during a flight. When the day is completed, this form will then be forwarded to the Product Support Department for proper disposition.

FAA Form 2350, Aircraft Use & Inspection Report
Before beginning a Progressive Inspection Program for an aircraft, a complete inspection of the airplane must be performed. The person performing the inspection must forward FAA Form 2350 to the Local General Aviation District Office within 48 hours after the aircraft is returned to service, and thereafter once in January of each year.

If the aircraft is not approved as being airworthy, the person performing the inspection must forward FAA Form 2350 to the local General Aviation District Office within 48 hours after the completion of the inspection.

If the Progressive Inspection Program is discontinued, FAA Form 2350 is forwarded, with the word "DISCONTINUED" written in the box preceding "Progressive Inspection", within 48 hours after discontinuance of the program.

For specific regulations governing the use of FAA Form 2350, refer to Federal Aviation Regulations, Part 43.

Flight Log Part C - This form shall be kept in the aircraft and shall be used to note discrepancies and/or maintenance items which do not affect the airworthiness of an aircraft, and are being deferred until the next inspection period or convenient time.

INSPECTION PROCEDURES

Routine Inspections (30 Hour Intervals)
A routine inspection of the airplane shall be conducted, maximum, each 30 hours of time the airplane is in service. This inspection consists mainly of a visual inspection of the major components of the airplane. The only parts of the airplane

which are opened are the engine cowlings so that the general condition of the engine and propeller can be checked. This inspection may be conducted by persons qualified to do preventive maintenance as authorized by the shop foreman or members of the flight crew. Complete instructions for conducting a routine inspection are contained in Section II of this manual.

Detailed Inspections (50 Hour Intervals)
Four separate and individual Detailed Inspections of the Airplane are required to accomplish one complete inspection. Only a portion of the airplane's components or system are inspected at each 50 hour interval, thus accomplishing a complete inspection of the airplane once every 200 hours of time in service. Items requiring attention at periods of less than 200 hours are duplicated on the appropriate Detailed Inspection form. These inspections are to be conducted by the Product Support foreman in charge of Maintenance, or by a properly qualified mechanic under his supervision. Complete instructions for conducting the 1st, 2nd, 3rd, and 4th Detailed Inspections are contained in Section III of the manual.

Discrepancies
Discrepancies found on the aircraft during an inspection will be listed on the "Progressive Inspection Work Sheet" Two lines are provided on the work sheet for each item. The discrepancy will be entered on the top line of the entry space, and the corrective action which is taken will be noted on the bottom line. If more than one line is required to state the discrepancy, as many entry spaces as are necessary may be used. The same method should be used for corrective action explanations which require more than one line, except the bottom lines of the extra spaces will be used. Each separate entry on the sheet will be numbered in the "Item # " block 1,2,3,4, etc. As many work sheets as necessary will be used to list all discrepancies with the entry numbers in the ITEM block continuing in sequence on each of the additional pages. All discrepancies listed must be corrected before the work sheet is routed to the aircraft file.

Discrepancies that affect the airworthiness of the aircraft will require the necessary corrective action to be accomplished before the aircraft is returned to service.

Discrepancies that do not affect the airworthiness of the airplane may, at the discretion of the Product Support Foreman, be carried over to the next inspection period. All discrepancies thus carried over will be retained in the Shop File until corrected, and will also be reflected on the Status Board and Part C of the Aircraft Flight Log.

Discrepancies which occur during a flight will be entered on the Aircraft or Engine Flight Log, Part B, by the pilot in command or other responsible person. At the end of the day, the Flight Log will be reviewed by the Product Support Foreman.

As discrepancies are corrected, the appropriate notations will be made on the Flight Log, Part C, the Aircraft and Engine Logs, Part B, and the Progressive Inspection Work Sheets, where applicable.

Away-From-Station Inspections

If the airplane is to be away from the home location at the time an inspection is due, the pilot in command of the flight will take with him all forms which will be required for the inspection, and a copy of this manual. The detailed inspection will be conducted or supervised by one of the following:

1. A certificated airframe repair station.
2. An appropriate rate certified mechanic with inspection authorization.
3. A qualified representative of Volpar, Inc. or AiResearch Manufacturing Company.

The results of the inspection will be noted on the proper forms which are then brought back to the base facility. The pilot will be responsible for all inspection form and work sheet entries with inspectors and/or mechanics signature and identification.

Away-From-Station Discrepancies

Discrepancies affecting the airworthiness of the airplane, when the airplane is away from the local station, will be corrected by one of the following:

1. A certificated airframe repair station
2. An appropriately rated certified mechanic.
3. A qualified representative of Volpar, Inc. or AiResearch Manufacturing Company.

The discrepancy and the corrective action taken is to be listed on the Aircraft Flight Log, Part B. The pilot will be responsible for all work sheet entries with mechanics and/or inspectors signature and identification.

Inspection Time Limitations

Inspection intervals called out in the inspection schedule shall not be exceeded by more than ten (10) hours.

A complete detailed inspection (all four 50 hour interval inspections) must be accomplished within a 12 month period. Any part of the inspection which has not been accomplished will become due immediately. Completion of the 1st, 2nd, and 3rd 50 hour inspections and a routine inspection shall not be considered as a complete inspection.

Procedures for Extending Inspection Periods

If, as a result of experience, it is found that any particular inspection item or items do not consistently reveal defects

at the time of inspection, or defects are consistently revealed at longer periods of time than the inspection procedures call for that item or items to be inspected, the inspection time on that item or items may be extended as experience dictates. In no case, however, will the inspection times be extended beyond the average minimum time between failure for that item or items.

VOLPAR TURBOLINER
PROGRESSIVE INSPECTION SCHEDULE OUTLINE

A/C TIME (HOURS)	TYPE OF INSPECTION	COMPONENTS INSPECTED
30	Routine Inspection	
50	1st Detailed Inspection	Power Plant (Oil Filters and Fuel Filters) Environmental Systems, Wings, Wing Center Section, Rear Fuselage and Empennage. NOTE: Wing Bolts must be checked for proper torque at the aircraft's first 100-hour inspection and at the first 100-hour inspection after a wing has been installed.
80	Routine Inspection	
100	2nd Detailed Inspection	Pilots Compartment, Cabin Section, Landing Gear Retraction.
130	Routine Inspection	
150	3rd Detailed Inspection	Power Plant, Operational Inspection.
180	Routine Inspection	
200	4th Detailed Inspection	Nose Section, Main Gear and Brakes, Nose Gear, Landing Gear Retraction.

ROUTINE INSPECTION PROCEDURE

Forms Required

1. Volpar Turboliner Routine Inspection
2. Progressive Inspection Work Sheet

NOTE: The Volpar Turboliner Routine Inspection form will be used for all Routine Inspections whether the inspections are conducted at 25 hour (Maximum) intervals, or in conjunction with a Detailed Inspection.

Reference Material

1. Beechcraft E-18-S Shop Manual
2. Inspection Procedures Manual
3. Volpar Shop Manual
4. AiResearch Engine Service Manual

Inspection Procedures

1. Fill out the heading on each form in its entirety.
2. As each item is inspected, the responsible person will make entries as required and will initial in the space provided.
3. List all discrepancies found on the Progresseve Inspection Work Sheet.
4. When the inspection is complete, the person making the inspection will sign the form in the space provided.

NOTE: Any repairs made during the Routine Inspection will be noted on the Progressive Inspection Work Sheet and attached to the completed routine inspection form. (See step #3)

ROUTINE INSPECTION - VOLPAR TURBOLINER

A/C NUMBER: A/C TIME: DATE:

	MECHANIC/PILOT	
AIRFRAME	LEFT	RIGHT
1. Check all antennas for security of attachment and damage . . .		
2. Check fuselage, empennage and wings for visual damage.		
3. Check all control surfaces for security and visual damage. . .		
4. Check all inspection plates for being in place and secure. . .		
5. Check main gear wheel well for leaks, security of components and general conditions		
6. Check brakes for thickness of discs, leaks, and fluid level. .		
7. Check strut for proper inflation		
8. Check tires for condition and inflation.		
9. Check nose gear wheel well for leaks, security of components and general condition		
10. Check navigation lights, beacon, landing lights for operation.		
11. Check all cockpit lights, including warning lights for operation		
12. Check all cabin and baggage compartment lights for operation .		
13. Check pitot heaters.		
14. Check stall warning.		
15. Check all flight controls including the tabs for freedom of operation		
16. Check cabin and cockpit for cleanliness and general condition.		
17. All flight log discrepancies cleared or carried forward to Part C.		
18. Check service instructions for conformity.		
ENGINES		
1. Check prop for nicks and general condition		
2. Check deicer brushes and slip rings for general condition. . .		
3. Check engines thru front cowl, cowl doors and inspection openings for fuel, oil, and exhaust leaks and general condition		
4. Check oil cooler for leaks, security, and damage		
5. Check all engine controls for freedom of operation		
6. Check engine cowling and inspection plates for security and general condition		
7. Engine oil tanks serviced to proper level.		
8. All flight log discrepancies cleared or carried forward to Part C.		
9. Anti-ice valve for operation		
10. First stage inlet compressor-check for damage.		
11. Spin propeller by hand and listen for any unusual internal noises.		

FIRST 50-HOUR INTERVAL DETAILED INSPECTION

Detailed Inspection Procedures

Forms Required

1. First 50- Hour Interval Detailed Inspection form.
2. Volpar Turboliner Routine Inspection form.
3. Progressive Inspection Work Sheet

NOTE: A Routine Inspection must be conducted in conjunction with each Detailed Inspection to comply with Progressive Inspection Regulations.

Reference Material

1. Beechcraft E-18-S Shop Manual
2. Progressive Inspection Procedures Manual
3. AiResearch Environmental Systems Maintenance Manual
4. Volpar Service Manuals
5. AiResearch Engine Service Manual.

Inspection Procedures

1. Fill out the heading on each form in its entirety.
2. The mechanic checks each item on the inspection form and initials the form in each space provided.
3. List all discrepancies found during the inspection on the Progressive Inspection Work Sheet.
   NOTE: Check Flight Log, Parts B and C for discrepancies that have not yet been worked off.
4. Each discrepancy is to be signed off by the mechanic and inspector when the discrepancy has been corrected.
5. The mechanic is to list all components which are removed from the airplane for overhaul or replacement, and the Part Number and Serial Number of the components removed and reinstalled on the inspection form.
6. The inspector will initial each item on the inspection form to complete the inspection.
7. When the inspection has been completed, the mechanic and inspector will sign the "INSPECTION COMPLETED" block at the end of the inspection sheet.

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

FIRST 50-HOUR INTERVAL DETAILED INSPECTION

INSPECTION DATE:_____ AIRCRAFT N-_____

AIRFRAME HOURS:_____ L.H. ENGINE HOURS:_____ R.H. ENGINE HOURS:_____

A. WINGS	MECH	INSP
1. SKIN - Inspect skin for condition and loose or missing rivets. If damage is found, check adjacent structure.		
2. STRUCTURE - Check for cracks, loose rivets and concealed damage.		
3. CABLES AND PULLEYS - Check control cables, pulleys and associated equipment for condition, attachment, alignment, clearance and proper operation.		
4. AILERON AND TAB - Inspect skin for condition and loose or missing rivets. Check surfaces for proper attachment and freedom of movement. Check trim tab actuator for proper operation smoothness and attachment.		
5. LIGHTS - Check navigation and landing lights for broken lenses or bulbs.		
6. FUEL TANKS, VENTS, AND CAPS - Inspect fuel tanks for leaks and vents for obstruction.		
7. FUEL LIQUIDOMETERS - Check for leaks at points of attachment.		
8. ELECTRICAL WIRING AND EQUIPMENT - Check for security, chafing, damage and attachment.		
9. PLUMBING - Check for leaks, chafing or damage, and proper attachment.		
10. WING BOLTS - Check for condition and security. Check for proper torque at the aircraft's first 100-hour inspection or at the first 100-hour inspection after a wing has been installed. Refer to Shop Manual for torque values and procedures.		
11. DEICER BOOTS - Check for condition and attachment.		
12. ACCESS DOORS - Check for fit and attachment.		

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

FIRST 50-HOUR INTERVAL DETAILED INSPECTION (CONT'D)

	MECH	INSP
B. WING CENTER SECTION		
1. SKIN AND FAIRINGS - Inspect for condition and loose or missing rivets. If damage is found, check adjacent structure.		
2. STRUCTURE - Check for cracks, loose rivets and concealed damage.		
3. WING SPAR - Inspect carefully for linoil leaks and other indications of cracks or damage.		
4. FLAPS AND ACTUATORS - Inspect flap drive and actuator for condition and attachment. Check skin and structure for condition and loose or missing rivets.		
5. PLUMBING AND WIRING - Check for chafing, damage security and leaks.		
6. CABLES AND PULLEYS - Check control cables, equipment, and associated equipment for condition, attachment, alignment, clearance, and proper operation.		
7. LANDING GEAR TORQUE SHAFTS - Inspect shafts and universal joints for condition attachment and visible change.		
8. ANTI-ICER LIQUIDOMETER - Check for leakage or visible damage.		
9. ANTI-ICER TANK - Check for leakage, corrosion, or other damage.		
10. ACCESS DOORS - Check for fit and attachment.		
11. EJECTOR AND DEICER DISTRIBUTER VALVE - Check equipment and plumbing for condition and attachment.		
12. EJECTOR VACUUM SYSTEM - Check equipment and plumbing for condition and attachment.		
C. REAR FUSELAGE AND EMPENNAGE		
1. SKIN - Inspect skin for condition and loose or missing rivets. If damage is found, check adjacent structure.		
2. STRUCTURE - Check for cracks, loose rivets and concealed damage.		
3. CABLES AND PULLEYS - Check control cables, pulleys and associated equipment for condition, attachment, alignment, clearance and proper operation.		

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

FIRST 50-HOUR INTERVAL DETAILED INSPECTION (CONT'D)

	MECH	INSP
4. PLUMBING - Inspect plumbing for condition and attachment.		
5. WIRING - Check for chafing and security.		
6. DEICER BOOTS - Check for condition and attachment.		
7. STATIC PORTS - Check and clean as necessary.		
8. NAVIGATION LIGHTS AND ROTATING BEACONS - Check for cracked or broken lenses.		
9. CONTROL SURFACES AND TABS - Inspect control surfaces for damage and excessive play. Inspect the attaching brackets for cracks, loose or missing rivets and pins, broken bondings, and specified safetying. Check actuators, universal joints, bearing screws, torque tubes, chains, and connecting rods for corrosion, cracks, wear, binding, and security of fixtures. Check hinges and attachment fittings for cracks, wear, and security of installation.		
D. POWER PLANT		
1. ENGINE OIL FILTERS - Remove and inspect for metal particles Install new oil filters.		
2. FUEL FILTERS - Inspect the high pressure pump fuel filter for evidence of foreign matter, corrosion, or microbiological growth. Clean as required.		
3. OIL - Retain sample for oil analysis.		
E. ENVIRONMENTAL SYSTEM		
1. DUCTS - Check for cracks, leakage, and security of attachment.		
2. TURBINE - Lubricate.		
3. CONDENSOR FILTER BAG - Inspect and clean as required.		
4. WIRING AND PLUMBING - Check for chafing and security.		

INSPECTION COMPLETED

DATE: _____ AIRCRAFT S/N: _____

HOURS: _____ MECHANIC: _____

INSPECTOR: _____

SECOND 50-HOUR INTERVAL DETAILED INSPECTION

Detailed Inspection Procedures

Forms Required

1. Second 50-Hour Interval Detailed Inspection Form
2. Volpar Turboliner Routine Inspection Form
3. Progressive Inspection Work Sheet

NOTE: A Routine Inspection must be conducted in conjunction with each Detailed Inspection to comply with Progressive Inspection Regulations.

Reference Material

1. Beechcraft E-18-S Shop Manual
2. Progressive Inspection Procedures Manual
3. AiResearch Environmental Systems Maintenance Manuals
4. Volpar Service Manuals
5. AiResearch Engine Service Manual

Inspection Procedures

1. Fill out the heading on each form in its entirety.
2. The mechanic checks each item on the inspection form and initials the form in each space provided.
3. List all discrepancies found during the inspection on the "Progressive Inspection Work Sheet".

   NOTE: Check Flight Log, Parts B and C for discrepancies that have not yet been worked off.

4. Each discrepancy is to be signed off by the mechanic and inspector when the discrepancy has been corrected.
5. The mechanic is to list all components which are removed from the airplane for overhaul or replacement, and the Part Number and Serial Number of the components removed and reinstalled on the inspection form.
6. The inspector will initial each item on the inspection form to complete the inspection.
7. When the inspection has been completed, the mechanic and inspector will sign the "INSPECTION COMPLETED" block at the end of the inspection sheet.

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

SECOND 50-HOUR INTERVAL DETAILED INSPECTION

INSPECTION DATE:_____ AIRCRAFT N-_____

AIRFRAME HOURS:_____ L.H. ENGINE HOURS:_____ R.H. ENGINE HOURS:_____

A. PILOT'S COMPARTMENT	MECH	INSP
1. CABLES AND PULLEYS - Check control cables, pulleys and associated equipment for condition, attachment, alignment, clearance and proper operation.		
2. BRAKE SYSTEM - Check brake system components for leakage. Inspect brake master cylinder for proper operation, brake line plumbing for condition and attachment, brake pedals and linkage for condition, attachment and proper operation. Check for proper pedal travel and parking brake release.		
3. RUDDER PEDALS - Check rudder pedal condition, clearance and attachment.		
4. INSTRUMENT PLUMBING AND WIRING - Inspect instrument panel, subpanels, placards, shock mounts, instruments, and instrument plumbing and wiring for condition, attachment, chafing, etc.		
5. CONTROL COLUMN - Check condition, attachment and operation.		
6. RADIO INSTALLATION - Check headsets, speaker microphones, and related equipment for proper operation. Check the associated cordage and plugs for signs of damage and for correct stowage.		
7. CONTROL SURFACE TAB WHEELS, HANDLES, AND INDICATORS - Check for freedom of movement and for proper response of control surfaces to controls. Check indicators for proper operation.		
8. ELECTRICAL EQUIPMENT - Check switches, knobs and circuit breakers for looseness and operation. Check all wiring and equipment for condition, attachment, chafing, security, etc.		
9. EMERGENCY STATIC AIR SOURCE - Check operation and security.		
10. ENGINE AND PROPELLER CONTROLS - Check for freedom of movement, full travel and proper friction lock operation.		

SECOND 50-HOUR INTERVAL DETAILED INSPECTION (CONT'D)

	MECH	INSP
11. SEATS AND SEAT BELTS - Inspect seats for proper operation and security, determine that seat belts are satisfactory.		
12. WINDOWS AND WINDSHIELD - Inspect for cracks, seal, and general condition.		
13. INSTRUMENT AIR FILTERS - Inspect and replace on condition.		
14. FLAP DYNAMIC BRAKE - Check that the dynamic brake operates properly (instantly stops flap motor when down limit switch is actuated).		
B. CABIN SECTION		
1. SKIN - Inspect skin for condition and loose or missing rivets. If damage is found, check adjacent structure.		
2. STRUCTURE - Check for cracks, loose or missing rivets, and concealed damage.		
3. CABLES AND PULLEYS - Check control cables, pulleys and associated equipment for condition, attachment, alignment, clearance and proper operation.		
4. LANDING GEAR GEARBOX - Check for security and leakage; lubricate as necessary.		
5. FLAP MOTOR AND DRIVES - Inspect for condition and attachment; lubricate as necessary.		
6. WINDOWS - Inspect windows and window seals for general condition.		
7. AIR STAIR DOOR - Inspect door, seals, latching mechanism, cables and safety chain and hook for condition and security of attachment.		
8. FIRE EXTINGUISHER - Check for fill and proper operation. Check nozzle for obstructions or evidence of leakage. Check for security of attachment.		
9. ELECTRICAL WIRING AND EQUIPMENT - Inspect wiring and electrical equipment for condition and attachment.		
10. HEATER DUCTS - Check cabin hot and cold air outlets and valves for condition obstructions and proper operation. Inspect heating and cooling ducts for condition and attachment.		

	MECH	INSP
11. SEATS AND SEAT BELTS - Check seats and seat belts for condition and attachment.		
12. ACCESS DOORS - Check for fit and attachment.		
C. LANDING GEAR RETRACTION		
1. GENERAL OPERATION - Check retraction system for operation of all components through at least two complete cycles. Check for unusual noises or binding. Check that main gears are synchronized with one another and with the nose gear. Check gears for down-lock. Check that nose gear retract nut does not contact face of gearbox with gears in full down and locked position. Check that main gear retract nut does not contact gearbox with gears full up.		
2. SWITCHES - Check up-limit, safety switch and position switches for proper adjustment and operation. Check wiring of switches for condition, security, and tightness of connections.		
3. INDICATORS - Check for proper operation and for condition, security, and connection of wiring.		
4. CLUTCH ADJUSTMENT - Check clutch for preload. Check gears for mesh and tension.		
5. DOOR RIGGING/NOSE AND MAIN GEARS - Check fit, fair, and rig of all doors. Check down-stop bolts on door retract bracket for adjustment and that an over-center condition exists on door connecting rod. On main gear doors check up-stop screw adjustment for signs of interference with door operation. On nose gear doors check door actuator roller adjustment for engagement with fork of torque tube. Check bushings, bolts, and tubes for wear or other damage and for proper operation. Check actuating linkage of main gear doors for binding, corrosion, and lubrication.		
6. RETRACT CHAINS - Check for proper operation and correct installation on sprockets. Check for adequate tension.		
7. GEAR DYNAMIC BRAKE - Check for proper operation (instantly stops gear motor when switch is actuated).		
8. WHEEL BEARINGS - Check for condition and lubricate.		
9. EMERGENCY EXTENSION - Check system for freedom of operation and proper rig.		
10. LUBRICATE LANDING GEAR		

INSPECTION COMPLETED

DATE: _____ AIRCRAFT S/N: _____

HOURS: _____ MECHANIC: _____

INSPECTOR: _____

THIRD 50-HOUR INTERVAL DETAILED INSPECTION

Detailed Inspection Procedures

Forms Required

1. Third 50-Hour Interval Detailed Inspection Form
2. Volpar Turboliner Routine Inspection Form
3. Progressive Inspection Work Sheet

NOTE: A Routine Inspection must be conducted in conjunction with each Detailed Inspection to comply with Progressive Inspection Regulations.

Reference Material

1. Beechcraft E-18-S Shop Manual
2. Progressive Inspection Procedures Manual
3. Volpar Service Manuals
4. AiResearch Environmental Systems Maintenance Manuals
5. AiResearch Engine Service Manual

Inspection Procedures

1. Fill out the heading on each form in its entirety.
2. The mechanic checks each item on the inspection form and initials the form in each space provided.
3. List all discrepancies found during the inspection on the "Progressive Inspection Work Sheet".

   NOTE: Check Flight Log, Parts B and C for discrepancies that have not yet been worked off.

4. Each discrepancy is to be signed off by the mechanic and inspector when the discrepancy has been corrected.
5. The mechanic is to list all components which are removed from the airplane for overhaul or replacement, and the Part Number and Serial Number of the components removed and reinstalled on the inspection form.
6. The inspector will initial each item on the inspection form to complete the inspection.
7. When the inspection has been completed, the mechanic and inspector will sign the "INSPECTION COMPLETED" block at the end of the inspection sheet.

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

THIRD 50-HOUR INTERVAL DETAILED INSPECTION

INSPECTION DATE:_____ AIRCRAFT N-_____

AIRFRAME HOURS:_____ L.H. ENGINE HOURS:_____ R.H. ENGINE HOURS:_____

A. POWER PLANT	MECH	INSP
1. COWLING - Check adjustment of latches. Inspect for cracks and repair as necessary.		
2. ENGINE OIL FILTERS - Remove and inspect oil filter for metal particles. Oil filter and oil sample to be retained for spectrographic oil analysis. Install new oil filters.		
3. DRAIN PLUGS - Check and drain plugs for security.		
4. FUEL FILTERS - Inspect the high pressure pump fuel filter for evidence of foreign matter, corrosion, or microbiological growth. Clean as required.		
5. EXHAUST SYSTEM - Inspect for cracks.		
6. OIL COOLER AND VANE ASSEMBLY - Check cooler for leakage and security. Check vane assembly for freedom of operation and wear.		
7. PLUMBING - Inspect for condition and attachment.		
8. ENGINE MOUNTS AND SHOCK ISOLATORS - Inspect for condition and attachment.		
9. ENGINE CONTROLS - Check for condition, attachment and rig. Lubricate as necessary.		
10. ENGINE ACCESSORIES - Inspect all accessories for condition, attachment and leakage.		
11. ELECTRICAL WIRING AND COMPONENTS - Inspect for condition, chafing and attachment.		
12. STARTER/GENERATOR - Check for attachment. Inspect brushes and commutator for wear. Vacuum carbon brush dust from brush compartment.		
13. OIL LEAKAGE - Check for oil leakage at gear section and turbine section.		
14. THERMOCOUPLE - Check visually, the thermocouple and harness assemblies through exhaust pipe for security and evidence of damage from excessive heat.		

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

THIRD 50-HOUR INTERVAL DETAILED INSPECTION

	MECH	INSP
15. IMPELLER - Check first stage impeller for nicks, cracks, or other damage.		
16. ENGINE FIRE EXTINGUISHER - Check pressure of supply, Check plumbing for condition, leakage, and security. Check electrical wiring.		
17. FIRE DETECTORS - Check for secuirty. Check wiring.		
18. FUEL HEATER - Inspect for condition, security, and evidence of leakage.		
19. MAGNETIC DRAIN PLUG - Electrically check for magnetic particles.		
20. FUEL FILTER - Remove, inspect, clean, or replace filter element in flow divider valve.		
B. PROPELLERS		
1. BLADES - Check for nicks or cracks, and repair as necessary.		
2. HUB - Check for cracks.		
3. LINK ARMS - Check for wear or damage.		
4. SPINNER - Check for deformation or damage.		
5. LEAKAGE - Check for oil or grease leakage.		
6. PROPELLER BLADES - Lubricate propeller blades through Zerk fitting on clamps.		
7. SLIP RINGS AND BRUSHES - Check general condition and security.		
8. START LOCKS - Check attachment, freedom of operation, and general condition.		
9. DEICER BOOTS - Check condition and attachment. Check current draw with engine running during power check.		
C. OPERATIONAL INSPECTION AND POWER CHECK		
1. OPERATIONAL CHECK-OUT - In accordance with AiResearch Engineering Report number OE-5022, Rev. 1, record information Engine Ground Check Form		

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

THIRD 50-HOUR INTERVAL DETAILED INSPECTION

	MECH	INSP
2. FUEL GAUGES - Check operation.		
3. FLAPS - Check for noisy or erratic operation.		
4. ENGINE ANTI-ICE VALVE - Check for operation.		
5. STARTERS - Check for proper operation.		
6. ENGINE INSTRUMENTATION - Check operation.		
7. EGT LIMIT GAUGE - Check operation.		
8. OIL - Check for proper pressure and temperature.		
9. GENERATORS - Check voltage and output.		
10. VACUUM SYSTEM - Check proper limits.		
11. GYRO INSTRUMENTS - Check for noisy or erratic operation.		
12. SURFACE DEICER - Check operation and cycling.		
13. FUEL BOOST PUMPS, CROSSFEED, FIRE WALL SHUTOFF VALVES - Check for proper operation and pressure.		
14. ENVIRONMENTAL SYSTEM - Check for proper operation and defrosting.		
15. FEATHER CHECK - Check for proper fuel shutoff prior to feather.		
16. LEAKS - Check for oil and fuel leaks after shutdown.		
17. WINDSHIELD ANTI-ICE SYSTEM - Check if installed.		
18. WINDSHIELD WIPERS - Check operation.		

INSPECTION COMPLETED

DATE: _____ AIRCRAFT S/N: _____

HOURS: _____ MECHANIC: _____

INSPECTOR: _____

FOURTH 50-HOUR INTERVAL DETAILED INSPECTION

Detailed Inspection Procedures

Forms Required

1. Fourth 50-Hour Interval Detailed Inspection Form
2. Volpar Turboliner Routine Inspection Form
3. Progressive Inspection Work Sheet

NOTE: A Routine Inspection must be conducted in conjunction with each Detailed Inspection to comply with Progressive Inspection Regulations.

Reference Material

1. Beechcraft E-18-S Shop Manual
2. Progressive Inspection Procedures Manual
3. Volpar Service Manuals
4. AiResearch Environmental Systems Maintenance Manuals
5. AiResearch Engine Service Manual

Inspection Procedures

1. Fill out the heading on each form in its entirety.
2. The mechanic checks each item on the inspection form and initials the form in each space provided.
3. List all discrepancies found during the inspection on the "Progressive Inspection Work Sheet".

   NOTE: Check Flight Log, Parts B and C for discrepancies that have not yet been worked off.

4. Each discrepancy is to be signed off by the mechanic and inspector when the discrepancy has been corrected.
5. The mechanic is to list all components which are removed from the airplane for overhaul or replacement, and the Part Number and Serial Number of the components removed and reinstalled on the inspection form.
6. The inspector will initial each item on the inspection form to complete the inspection.
7. When the inspection has been completed, the mechanic and inspector will sign the "INSPECTION COMPLETED" block at the end of the inspection sheet.

VOLPAR TURBOLINER PROGRESSIVE INSPECTION REQUIREMENTS

FOURTH 50-HOUR INTERVAL DETAILED INSPECTION

INSPECTION DATE:_____ AIRCRAFT N-_____

AIRFRAME HOURS:_____ L.H. ENGINE HOURS:_____ R.H. ENGINE HOURS:_____

	MECH	INSP
A. NOSE SECTION		
1. SKIN - Inspect skin and structure for condition and loose or missing rivets.		
2. STRUCTURE - Check for cracks, loose rivets and concealed damage.		
3. RADIO EQUIPMENT - Inspect radio rack structure. Check security of units in their mounts. Check for evidence of water leakage.		
4. STATIC AND PITOT SYSTEM - Check pitot system.		
5. DOORS, FASTENERS, AND SEALS - Inspect seals for deterioration, doors, and latches for proper adjustment.		
6. BATTERIES - Remove and check levels. Check for leakage and corrosion. Check for electrical leakage. Inspect vents.		
B. MAIN GEAR AND BRAKES		
1. BRAKES - Check brake discs, linings and lines for wear, damage, corrosion and security of all units.		
2. WHEELS AND TIRES - Check wheels for condition and tires for wear, condition and proper inflation.		
3. ACTUATOR - Check actuator and support brackets for visible damage and condition. Inspect bracket for loose or missing rivets.		
4. LANDING GEAR STRUTS - Inspect shock struts and components for condition, attachment, proper inflation and leakage. Deflate and check fluid level if signs of leakage are apparent.		
C. NOSE GEAR WHEEL WELL		
1. WHEEL AND TIRE - Check wheel for security of installation and condition. Check tires for damage, excessive wear, and proper inflation. Check wheel hub for cracks.		

	MECH	INSP
2. NOSE GEAR STRUT - Check for fluid and lubrication.		
3. TORQUE LINK ASSEMBLIES - Check for wear and damage.		
4. SHIMMY DAMPER AND ATTACHMENTS - Check for tightness and leakage.		
5. LUBRICATION FITTINGS - Check condition and lubrication.		
6. LANDING GEAR DRIVE - Check for grease and attachment.		
7. NOSE GEAR DOOR ACTUATING MECHANISM LINKAGE - Check for operation and lubricate.		
8. ATTACHING HARDWARE - Check for tightness but do not overtighten and distort tube.		
9. LANDING GEAR RETRACTION NUTS - Check for wear.		
10. STRUT SNUBBER - Check for condition and operation.		
11. BRAKE RESERVOIR - Check for leakage, fill, and attachment.		
D. LANDING GEAR RETRACTION		
1. GENERAL OPERATION - Check retraction system for operation of all components through at least two complete cycles. Check for unusual noises or binding. Check that main gears are synchronized with one another and with the nose gear. Check gears for down-lock. Check that nose gear retract nut does not contact face of gearbox with gears in full down and locked position. Check that main gear retract nut does not contact gearbox with gears full up.		
2. SWITCHES - Check up-limit, down-limit, safety switch and position switches for proper adjustment and operation. Check wiring of switches for condition, security, and tightness of connections.		
3. INDICATOR LIGHTS - Check for proper operation and for condition, security, and connection of wiring.		
4. CLUTCH ADJUSTMENT - Check clutch for preload. Check gears for mesh and tension.		
5. DOOR RIGGING/NOSE AND MAIN GEARS - Check fit, fair, and rig of all doors. Check down-stop bolts on door retract brackets for adjustment and that an over-center condition exists on door connecting rod. On main gear doors check up-stop screw adjustment for signs of interference with		

		MECH	INSP
	door operation. On nose gear doors check door actuator roller adjustment for engagement with fork of torque tube. Check bushings, bolts, and tubes for wear or other damage and for proper operation. Check actuating linkage of main gear doors for binding, corrosion, and lubrication.		
6.	RETRACT CHAINS - Check for proper operation and correct installation on sprockets. Check for adequate tension.		
7.	GEAR DYNAMIC BRAKE - Check for proper operation (instantly stops gear motor when switch is actuated).		
8.	Wheel Bearings - Check for condition and lubricate.		
9.	EMERGENCY EXTENSION - Check system for freedom of operation and proper rig.		
10.	LUBRICATE LANDING GEAR		

INSPECTION COMPLETED

DATE: _____ AIRCRAFT S/N: _____

HOURS: _____ MECHANIC: _____

INSPECTOR: _____

ENGINE GROUND CHECK

AIRCRAFT N-_____ DATE_____

NO.	TEST CONDITIONS	LIMITS	LEFT	RIGHT
1	Red Levers Exercise			
2	NTS System			
3	Start Fuel Flow	10%		
4	Light Off	10-20%		
5	Start EGT	788 MAX		
6	Overspeed Governor	102% 104%		
7	Underspeed Governor High	97% 97.5%		
8	Reverse Full Power	95% MIN		
9	Prop Governor High	99.5% 100.5%		
10	Prop Governor Low			
11	Flight Idle Low			
12	Underspeed Governor Low	64% 66%		
13	Fuel Flow Min. Power			

SIGNED: _____