SERVICE MANUAL
and
INSTRUCTIONS FOR
CONTINUED AIRWORTHINESS
for the
WIPLINE MODEL 3730/3900
AMPHIBIOUS AND SEAPLANE FLOATS

Revised: December, 2015

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LOG OF REVISIONS

REV	PAGES	DESCRIPTION	DATE
A	12	Added an inspection time limit and tolerances for the Nose Block Track wear.	4/1/06
B	4, 14-16	Updated TOC, added new inspection checklist.	2/23/07
C & D	TOC,6 7,8 16 17,18	Table of contents updates, expanded corrosion prevention, added steps to insp. checklist	10-31-08
E	ALL	Reformat of entire document, Add green grease as approved grease	4/16/2013
F	20, 21	Added Shear Torque Chart, PR 1440 C Sealant and Tef-Gel, Removed Warranty Claim Form	5/26/2015
G	5, 11, 20, 21	Added Dow Corning DC4, Corrosion X, and Mobil Aviation Grease SHC 100 to approved product list. Modified torque limits section.	12/4/2015

NEW CUSTOMER INFORMATION

Customer Name	
Billing Address	
Shipping Address	
Phone Number	Fax Number
Purchasing Contact	Phone Number
E-Mail	Fax Number
Accounts Payable Contact	Phone Number
E-Mail	Fax Number
Type(s) of Aircraft Owned or Maintained	
Model(s) of Floats and Skis Owned or Maintained	
FedEx and/or UPS account number (if applicable)	

Please return to Wipaire Customer Service:

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INTRODUCTION

This manual describes the general servicing and maintenance for the Model 3730/3900 float, including hull and landing gear. For services and repairs not covered by this manual contact Wipaire Customer Service.

The service products referred to throughout this manual are described by their trade name and may be purchased from Wipaire Parts Department.

To contact Wipaire for technical support or parts sales, call or email:

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1.0 GENERAL

The model 3730/3900 seaplane or amphibious float is an all aluminum constructed float with watertight compartments. The actual displacement in fresh water for each float is 3453 pounds buoyancy for the amphibian. The amphibian float is geometrically the same as the seaplane except for the addition of landing gear and internal structure for the gear.

The water rudder system is cable operated with ball bearing pulleys. Water rudder cables tie into the existing aircraft rudder system.

The main landing gear has a 5.00 x 5 6-ply tires and the nose landing gear has a 3.50 x 10 4-ply tire. The gear system is hydraulically actuated and driven by two hydraulic pumps. Brakes are hydraulic and have a caliper on each main wheel.

Steering on land is accomplished by differential braking. The nose wheels are full castering.

Access to the float interior is accomplished by removing covers on the top deck and covers inside the wheel well. When necessary, water inside the float hulls may be removed through pump out cups located on the outboard edge of each float top skin.

2.0 FLOAT HULL MAINTENANCE

2.1 GENERAL

The float structure is manufactured entirely of 6061-T6 corrosion resistant aluminum sheet and extrusions. Skins on the inside are primed with a 3M SCOTCHWELD primer after being cleaned and acid-etched. Exterior surfaces are cleaned and alodined. Surfaces are then primed with an epoxy-based primer and finished with enamel color paint.

2.2 HARD LANDING AND DAMAGE INVESTIGATION

After a thorough cleaning of the suspected damaged area, all structural parts should be carefully examined to determine the extent of damage. Frequently the force causing the initial damage is transmitted from one member to the next causing strains and distortions. Abnormal stresses incurred by shock or impact forces on a rib, bulkhead or similar structure may be transmitted to the extremity of the structural member, resulting in secondary damage, such as sheared or stretched rivets, elongated bolt holes or canned skins or bulkheads. Points of attachment should be examined carefully for distortion and security of fastenings in the primary and secondary damaged areas at locations beyond the local damage. Inspect aircraft skins in area of float fitting attach for sign of bending, or any other signs of damage.

2.3 CLEANING

The entire outside of the float should be kept clean by washing with soap and water. Special care should be taken to remove engine exhaust trail, water-line marks and barnacle type deposits. After saltwater operation, washing with fresh water should be done daily with special attention to hard to reach places such as seams, wheel wells, areas underneath strut covers etc. Float interior should be flushed if evidence of saltwater in compartments is noted. The float interior should be flushed if salt water enters the compartments; it's easy to tell by the smell inside the float lockers. At night or when the floatplane is in storage, the inspection and/or baggage covers should be opened so the interior has a chance to dry out.

THE ABOVE CLEANING TECHNIQUES ARE VITAL FOR KEEPING CORROSION TO A MINIMUM. SALTWATER OPERATIONS ARE STRONGLY LINKED TO CORROSION AND MUST BE ADDRESSED PROACTIVELY.

2.4 SEALING

The float hull has eight sealed compartments. Each compartment is equipped with a pump-out cup and inspection cover. These compartments must be pumped out before flight and after prolonged periods of sitting in water. Each compartment is individually sealed, as is wheel well halves and nose box. Water from one should not contaminate the other. If leaks are found, check by filling only one compartment at a time, water will appear on outside of hull, in adjacent compartment, nose box or wheel well. Float hull must also be inspected for leaks from damage and sealed around nose box, nose box access cover, spreader bar, fairings, water rudder boot, baggage and inspection covers. Refer to Products List for recommended sealants and caulk.

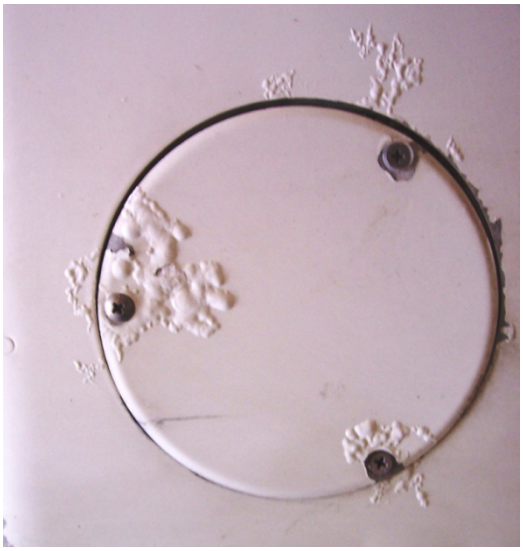
3.0 CORROSION

Corrosion is a reaction that destroys metal by an electro-chemical action and converts metal to oxide. Corrosion is accelerated when in contact with dissimilar metals such as aluminum and steel or any material which absorbs moisture like wood, rubber, etc.

After removing the corroded area, restore area to original finish (prime and enamel). BOESHIELD T9, Corrosion X, or ACF-50 may also be applied to stop corrosion. Refer to manufacturer's instructions for application instructions.

Maintaining the float inside and outside finishes by washing after saltwater operations will help protect the float from corrosion. Periodically all hardware should be covered with a waterproof grease or Paralketone. Under saltwater conditions, bolts should be removed at least once a year and grease reapplied to the shafts, heads and nuts.

THE ABOVE TECHNIQUES ARE VITAL FOR KEEPING CORROSION TO A MINIMUM. SALTWATER OPERATIONS ARE STRONGLY LINKED TO CORROSION AND MUST BE ADDRESSED PROACTIVELY.



The primary means of detection of corrosion is visual. The most obvious sign is a corrosive deposit of white powder. Other signs are discoloration of the metal surface or bubbles and blisters under the painted surface. Light corrosion may be removed by light hand sanding or chromic acid. Moderate and severe corrosion (blistering, flaking, and pitting) may be removed by heavy sanding or grinding, and applying chromic acid. No more than 1/3rd the thickness of skin material should be removed before complete replacement or reinforcement of an area is necessary.

4.0 THE HYDRAULIC SYSTEM

4.1 OPERATION

The hydraulic system consists of an electro-hydraulic power pack with a non-reversing type pump and a hand pump backup tied in between the return and pressure lines (see hydraulic schematic in figures 3 & 4). The pump and reservoir assembly is mounted in the left float.

A pressure of between 500 psi and 1000 psi is maintained in the supply line. When the pressure falls below 500 psi, a pressure switch will activate the pump solenoid, providing power to the pump. When the pressure reaches 1000 psi, the pressure switch deactivates the solenoid and the pump motor is stopped. Figures 1 & 2 show the electrical schematic of the system. A check valve on the output side of the pump retains pressure in the system while the pump is off. The pump has an internal relief valve which directs oil back to the pump reservoir when the line pressure exceeds 1200 psi. The system also has an external relief valve to protect against thermal expansion when line pressure exceeds 1900 psi.

The selection of gear-up or gear-down is accomplished by a cockpit mounted control valve. Each float gear has individual indicator lights on the control valve allowing the pilot to confirm that each gear has fully retracted or extended.

4.2 MAINTENANCE

Maintenance of the hydraulic system is very easy; keep the proper amount of oil in the reservoir. A sight glass is provided for this and the level should be kept in the upper 1/3 of the range. A screen is located in the reservoir tank around the fluid pick up pipe and can be cleaned or checked at annual inspection or every 100-hour. Check and replace if oil is dirty or if moisture is found (MIL-H-5601 Hydraulic Fluid, RED).

4.3 BLEEDING THE SYSTEM

Simply fill the reservoir with hydraulic oil and start a gear cycle. If the reservoir empties (i.e. fluid goes out of sight in the sight glass), stop the cycle and add oil and complete the cycle. Continue with approximately four more gear cycles after the fluid level in the reservoir normalizes (it will vary in level between up and down positions) and check for leaks.

5.0 MAIN LANDING GEAR AND RETRACTOR

5.1 OPERATION

The main landing gear retractor is merely a hydraulic cylinder which pushes and pulls a drag brace. The locking is accomplished using a small amount of lost motion of the hydraulic cylinder to pivot a hook on the drag brace. The first part of travel of the cylinder unlocks the lock and the last part locks it. There is a proximity switch that activates the gear panel indicator lights.

The main truss is an aluminum alloy and is connected to the drag brace through an air-oil oleo strut. The main wheels and brakes and standard Cleveland parts. Aluminum brakes are used for saltwater resistance. Interchangeable stainless steel brake discs are also available.

5.2 LUBRICATION **(see figure 5)**

A periodic cleaning and lubrication schedule is the best service there is for smooth and trouble free operation. Lubrication is also a must for saltwater operation or where steel hardware and aluminum come in contact with each other.

A lubrication chart is provided to show places of grease access and type of zerk to use. Use only waterproof grease recommended in Products Chart.

On Lubrication Chart, note 1 is a standard grease zerk. One is located on lower hook where actuating cylinder is attached, and one on end of each wheel axle. The grease zerks on axle ends allow grease to be forced into wheels. Use these to periodically add grease as it is lost and not as an alternate for repacking wheel bearings. If, on some older models, lower hook does not have grease zerk, apply grease to all mating and hinged areas and also to end of hook. Note 2 is a needle point grease hole where grease may be forced in with a needle point zerk end. Note 3 is where grease is applied by hand to lubricate other moving or hinged surfaces. These areas should include gear-up hook tip, push-rod to up-hook, down-lock hook tip, uplock hook push-rod, and any other moving surface not mentioned above.

Greasing intervals matched to the usage of aircraft will provide a long service life. Even in minimal usage it is recommended that the unit be cleaned and greased once at start of season, mid-season and end of season.

5.3 REMOVAL OF MAIN GEAR AND RETRACTOR

The landing gear is simple to remove, as there are only two pinion bolts, a drag link bolt and two brake lines holding it in. To remove the retracting mechanism, disconnect the gear light wires in the inner gear well side compartment and the two hydraulic lines. All that remains are twelve allen head cap screws which are easily accessible from the compartment behind the gear well. Occasionally the RTV sealant around the cap screw holes holds the actuator solid but is easily loosened when pried from the top.

5.4 ADJUSTMENT – MAIN GEAR

If for any reason the main gear retractor must be disassembled or need replacement of the hydraulic cylinder, it may be accomplished as follows:

With entire unit assembled except for the bolt securing the lower end of the retracting cylinder, put the drag brace in the retracted position (against stops) with up lock hooked. We now set the travel of the cylinder by extending it until it is bottomed and observing through the anchor bolt hole on its base and retractor body. The lock nut on the ram should be loosened and the ram turned (thus adjusting total length) until it is about 1/32" too long. This will allow the drag brace to bottom on its up stops before the hydraulic ram bottoms out when gear is retracted. Re-tighten lock nut and install the cylinder bolt. There should be enough travel left on the other end to amply hook the down lock—this can now be checked.

The next item to be adjusted is the up-lock release rod. When the gear is in the up position and starts down the pivot should push against the release rod to raise the hook just high enough to let it snap over the bar (in the drag brace) and need not be adjusted to raise so high as to miss the rod completely, as this can cause the pivot to hit the rod while the gear is being retracted. Usually if a gear has been retracted while the aircraft was on the ground, this rod will be bent because the pivot is in the wrong position (pull instead of push) when the drag brace comes up.

With this done, the only thing left is to adjust the down micro switch (the up can be adjusted in the float) and this is accomplished by bending the probe. On newer models this switch is a magnetic proximity type and is located in the compartment behind the wheel well and can be adjusted after actuator installation. It can be noted that the down lock hook contacts an aluminum spring containing the magnet and positions it near the bulkhead where the proximity switch senses it through the bulkhead. It is a good idea to attach an ohmmeter to the switch to see that it functions and use a hand hydraulic system to operate the unit as they have been known to "click" without an actual contact or to "click" and get a contact and to lose it again when the hydraulic pressure is built up against the lock. Before installing the unit, a dab of waterproof grease should be put on all contacting surfaces such as lock hooks, pivot, etc.

5.5 INSERTION

Installing the actuator is almost as simple as removing it. Before installing, a small dab of sealant such as RTV silicone rubber or chromate paste should be applied around each hole on the mounting flange. The unit is then inserted and held in place while a second person starts a couple of the allen head cap screws. The procedure is then just the opposite of the removal. Be careful to draw up the pivot bolts on the main gear casting only lightly as the tab can be easily broken or cracked. This also applies to oleo and drag link bolts

5.6 SERVICING OLEO STRUT

The oleo is easy to service if the following steps are followed:

1) If the oleo is removed from the float, hold in an upright position similar to when mounted in float.
2) Release air pressure and extend oleo.
3) Remove entire plug from top of air chamber and fill with Mil-H-5606 red hydraulic oil using pump can.
   Get air to come out as you pump in oil.
4) Completely compress oleo and let excess oil run out.
5) Reinstall plug and let aircraft weight down on gear.
6) Inflate cylinder 1 7/8 inches of exposed piston with empty aircraft.

5.7 TIRE SIZE

1) 5:00 – 5 6ply
2) PSI 38 lbs.

6.0 NOSE GEAR AND RETRACTOR

6.1 OPERATION

The nose gear uses a spring leaf leg very similar to a Cessna style with a hydraulic driven truck-track retracting mechanism. A hydraulic ram is connected directly to the truck to which the spring leaf is mounted. The rear two rollers on the truck assembly which make up the over-center lock section follow a deeper groove in the track casting and for this reason do not go around the corner but straight ahead to make the over-center down lock. The upside has no mechanical lock and uses only friction and air pressure and the hydraulic lock to hold the gear in. Magnetic proximity switches located on the right side of the actuating cylinder sense a magnet mounted in the hydraulic ram. These can easily be adjusted from the front compartment access covers, as per Figure 6 in the appendix. On older floats (Serial Numbers 37390 and under) the magnetic proximity switches are located on top at the front and rear of the gear well housing and sense a magnet mounted on the hydraulic ram. These can be easily adjusted from the front compartment access covers.

6.2 WHEEL AND CASTOR

The nose wheel and fork pivot 360 degrees around the fork shaft and use no shimmy damping devices. A spring loaded cam rides in a groove in the fork shaft and serves the purpose of holding the shaft in the housing and centering the wheel during flight by means of a “flat” in the circumference of the groove. A nylon thrust washer is located on top of the castoring pin.

6.3 LUBRICATION

Needle type grease fittings are also used in the nose gear and retracting mechanism. There are two-needle style and two normal styles in each nose gear. The needle styles are on the truck pivots and the standard fittings are on the nose wheel pivot shaft housing and wheel axle.

The nose wheel main bearings should be greased using the same procedure as the main gear. A long greasing stick or brush should be made and used to spread grease along each track in addition to the gun greasing.

6.4 REMOVAL

The whole nose gear and retracting assembly is removed by removing the nose bumper and both hydraulic lines. There are then six ¼ inch bolts through the nose bulkhead and two ¼ inch allen head cap screws through the #2 bulkhead into the track castings that must be removed and the end unit should slide out. Sealant must be cut between nose box and bulkheads.

6.5 ADJUSTMENT

The nose gear retractor travel is preset and does not require adjustment. Side play in the gear leg can be taken up by slightly tightening the side-play take-up bolt. **Caution:** be careful not to over-tighten. It is recommended that a gear check on the ground be accomplished afterwards to make sure gear operates smoothly. The switches are the magnetic proximity type and their adjustment is self explanatory and can be done with the unit installed in the float.

6.6 TIRE SIZE

1) 4:10 NHS 4ply
2) PSI 38 lbs.

6.7 INSERTION

Insertion of the nose gear retractor is simply the reverse of the removal. When reinstalling the nose box, be sure to remove all old deposits of RTV. Apply new RTV sealant between bulkheads and nose box. **Note:** Be sure access hole on top of nose box is covered and sealed before installation.

6.8 NOSE BOX TRACK WEAR

Due the wear over time the roller/slide block places on the track as the gear are retracted, the block needs to be measured for the amount of wear. The tolerance for wear is .050 inches. If the wear is, or is less than the limit, it can still be used. If the wear in the track is greater than .020 inches, the block must be replaced. This check is to be done every 200 hours.

On the 3730 Series Floats Gear Track P/N 3A07349 (-001 LT -002 RT)

7.0 THE ELECTRICAL SYSTEM

The electrical system consists of the following components:
Pump motor, pressure switch, solenoid contractor, 20 amp circuit breaker and the separate system of indicating lights and switches as per the electrical schematic of Figure 1 and 2.

8.0 REPAIRS AND MAINTENANCE

8.1 FLOAT HULL MAINTENANCE – GENERAL

The float structure is manufactured entirely of corrosion resistant aluminum sheet and extrusion material. Skins on the inside are primed with a 3M Scotchweld primer after being cleaned and acid etched. Exterior surfaces are cleaned and alodined then primed with an epoxy-based primer and painted with enamel.

8.2 REPAIRING FLOAT HULL SKINS

The float hull skins are manufactured from the following aluminum alloys: Side, top and afterbody skins - .032 2024-T3. Bottoms - .040 6061-T6. Bulkheads, nose - .100 6061-T6. Aft wheel well – .050 2024-T3. Afterbody - .040 2024-T3. All remaining bulkheads - .032 2024-T3.

Damage to the skins may be repaired per Figures 7, 8 & 9 or any acceptable repair method listed in FAA Advisory Circular 43.13.1.

Any portion of skins or complete skins may be purchased from Wipaire to aid in repair. These skins are pre-cut to shape from proper material and all holes are drilled to match the float.

All outside hull skins are bonded to corner extrusions, chines, keel, etc., with a special heat-pressure 3M adhesive. This bond adheres skins to inside of all extrusions.

Skins may be reattached to extrusions by method shown in Figures 10, 11, & 12. If skin bond must be broken from extrusion for a large distance, heating extrusion with a propane torch until bond starts to loosen and slide apart is the simplest method. **CAUTION** must be taken not to heat and loosen bonds not needing replacement.

8.3 REPAIRING FLOAT HULL EXTRUSIONS

All extrusions in the float hull are formed 6061-T6 aluminum alloy. Extrusions have channels on both sides which the hull skins are bonded to.

All extrusions may be repaired by splicing as shown in Figure 13 and 14 or capped as shown in Figure 15. Splicing is normally done when both inside and outside of extrusion is damaged. Capping is done when outside of extrusion is damaged such as the keel on gear-up landings on pavement. Capping is also done when original skin is still bonded to the inside of the extrusion. Sections of extrusion for splicing or capping may be purchased from Wipaire in full or desired lengths. Stub skins can also be bonded on extrusion sections, if desired, to simplify installation.

There are many ways to repair Wipline floats and each method, of course, depends on degree and location of damage. Qualified assistance is readily available by calling the factory on repairs which require special attention.

8.4 SERVICE SCHEDULE

As coded in the Inspection Time Limits chart in this section, there are items to be checked each 25, 50, 100, and 200 hours. Also, there are notes on special items which may require servicing at more frequent intervals.

- When conducting an inspection at 25 hours, all items marked for 25 hours would be accomplished.
- When conducting an inspection at 50 hours, the 25 and 50-hour items would be accomplished.
- When conducting an inspection at 100 hours, the 25, 50, and 100-hour items would be accomplished.
- When conducting an inspection at 200 hours, the 25, 50, 100, and 200-hour items would be accomplished.
- A complete inspection (Annual Inspection) would include all 25, 50, 100, and 200-hour items.

When servicing float hull and amphibian components, below is list of recommended lubricants and “protection” products. This lists products used by Wipaire during assembly of the floats.

There may be equivalent products that are just as satisfactory for protection. It is recommended if trying different products, to inspect them frequently so as to determine their effectiveness.

Protection of nuts, bolts, hydraulic lines or metal surfaces
Zip D-5029NS Corrosion Inhibiting Compound
Zip Chemical Company

CRC – SP400 Soft Seal
CRC Industries

General Lubricants
LPS 1, LPS 2 and LPS 3
LPS Industries

Wheel Bearings
*HCF Grease, P/N 605
HCF Industries

*Aeroshell 22
Shell Global Solutions

*Green Grease, Multi-Purpose
Green Grease Inc.

Rust Protection
Boeshield T9 Rut Protection
Boeing Company

ACF-50 Rust Protection

Corrosion X
Corrosion Technologies Corporation

Tef-Gel
Ultra Safety Systems, Inc.

Electrical Insulating Compound
Dow Corning 4 (DC4)
Dow Corning Corporation

Float Sealant
890 B2 or B4
Pro Seal Company

PR 1440 C
PPG Aerospace

1422 B2, B4 or B6
Pro Seal Company

RTV Silicones
General Electric

SIKAFLEX 201 or 252
Sika Manufacturing

Telflon Spray
6P-730A
Comet Industries

* If existing grease cannot be identified you must lubri-flush all float grease fittings until visibly exhausting all old grease and new grease is coming out. Additionally if you cannot determine existing grease in wheel bearings, completely clean and repack bearings with new grease.

Hydraulic Fluid
Mil-H-5606

As general inspection guidelines, each of the following areas should be inspected for their own unique attributes:

Movable Parts
For lubrication, servicing, security of attachment, binding, excessive wear, safetying, proper operation, proper adjustment, correct travel, cracked fittings, security of hinges, defective bearings, cleanliness, corrosion, deformation, sealing, and tension.

Fluid Lines and Hoses
For leaks, cracks, dents, kinks, chafing, security, corrosion, and deterioration.

Metal Parts
For security of attachment, cracks, metal distortion, broken welds, corrosion, condition of paint, and any other apparent damage.

Wiring
For security, chafing, burning, defective insulation, loose or broken terminals, corroded terminals.

Bolts in Critical Area
For corrosion, correct torque when installed, or when visual inspection indicates a need for a torque check.

Nut torque should be applied depending on the hardware application, unless the torque is specified for a certain joint in this manual or installation drawings.

****Tension Application**

Nut-Bolt Size	Torque Limits In-lbs	
	Min.	Max.
8-36	12	15
10-32	20	25
1/4-28	50	70
5/16-24	100	140
3/8-24	160	190
7/16-20	450	500
1/2-20	480	690
9/16-18	800	1,000
5/8-18	1,100	1,300
3/4-16	2,300	2,500
7/8-14	2,500	3,000
1-14	3,700	4,500
1 1/8-12	5,000	7,000
1 1/4-12	9,000	11,000

****Shear Application**

Nut-Bolt Size	Torque Limits In-lbs	
	Min.	Max.
8-36	7	9
10-32	12	15
1/4-28	30	40
5/16-24	60	85
3/8-24	95	110
7/16-20	270	300
1/2-20	290	410
9/16-18	480	600
5/8-18	600	780
3/4-16	1,300	1,500
7/8-14	1,500	1,800
1-14	2,200	3,300
1 1/8-12	3,000	4,200
1 1/4-12	5,400	6,600

**A Torque of 80% should be used when Tef-Gel is applied to the bolt.

Some additional general maintenance areas are as follows:

Nose and Main Gear Tracks
Clean and lubricate with a dry teflon coating spray.

Joints
Spray all joints with light penetrating oil such as LPS 3 to ensure lubrication at all times.

Electrical Connections
Apply SP-400 SOFT SEAL or LPS 500 to all electrical connections to prevent corrosion.

Hydraulic Fluid
For use in all hydraulic systems, including brakes: MIL-H-5606.

INSPECTION TIME LIMITS & MAINTENANCE CHECKLIST

INSTRUCTIONS/PROCEEDURES			HOURLY LIMITS				MECHANIC		INSP.
			25	50	100	200	Right	Left	
General	Placards: Check the AFM, POH, and /or drawings for correct placard				X				
Hulls and Struts	Float Installation	Float exterior - inspect for damage, wrinkled metal, corrosion, paint loss, etc.		X					
		Struts and attach fittings			X				
		Spreader bars			X				
		Float structure (interior)				X			
	Baggage compartment covers and seals - inspect for condition, security operation, and excessive wear.				X				
	Pumper Tube Installation - inspect for condition, security, routing of hoses					X			
Water Rudder System	Water Rudder Boots - inspect for cuts, tears, and condition.		X						
	Water Rudder Steering and retract systems - inspect the following: cables for broken wire; cable fittings for cable slippage, cracks and distortion; cable pulleys for freedom of rotation and cable guard pins for presence; rigging. Check cable tensions.				X				
	Water Rudder blades and posts - inspect for damage, security of attachment, corrosion, paint, rigging.				X				
Electrical System	Pump and indicator light wiring - inspect for chafing, broken or loose terminals and general condition.				X				
	Solenoids - inspect wiring, mounting and general condition.				X				

INSPECTION TIME LIMITS & MAINTENANCE CHECKLIST

INSTRUCTIONS/PROCEEDURES			HOURLY LIMITS				MECHANIC		INSP.
			25	50	100	200	Right	Left	
	Pump motors - inspect wiring, mounting and general condition.				X				
	Pressure switches - inspect wiring, mounting and general condition.				X				
Landing Gear Systems	Lubricate nose gear tracks and pivot.		X						
	Nose Gear Box/Block Tracks measured at slide route for wear, .050 inches or less wear tolerance.					X			
	Nose gear pivot blocks and forks - inspect for condition, lubrication, corrosion, paint.		X						
	Nose and main wheel bearing - grease Zerk fittings.		X						
	Hydraulic Fluid Level			X					
	Wheels and tire - inspect for wear, pressure, condition.			X					
	Brake Assemblies - inspect for wear, corrosion, leakage.			X					
	Hydraulic Fluid Screen - clean and inspect. NOTE: if floats sit for extended periods of time (I.e. if removed during winter months), screen should be cleaned before putting floats back into service. Hydraulic fluid in reservoir should be checked for moisture or other contaminates and changed if necessary.				X				
	Main and nose gear actuator, assemblies - inspect for condition, lubrication, leakage, corrosion and cleanliness.				X				

INSPECTION TIME LIMITS & MAINTENANCE CHECKLIST

INSTRUCTIONS/PROCEEDURES			HOURLY LIMITS				MECHANIC		INSP.
			25	50	100	200	Right	Left	
	Nose gear springs - scotch-ply springs, inspect for cracks, delamination and paint.				X				
	Main gear drag link garlock bushings - inspect for condition, lubrication, corrosion.				X				
	Main gear oleos - inspect for evidence of leakage, proper extension, check cylinder for corrosion, pitting, cleanliness and security.			X					
	Hydraulic lines and fittings - inspect for leaks, condition and security.					X			
	Hydraulic manifolds (if equipped) - inspect for condition, security and leaks.					X			
	Brake system plumbing - inspect for leaks, condition and security.					X			
	Main gear oleos - service (fluid-pressure)				X				
Landing Gear Systems	Perform retraction test:	Inspect main gear up and down hooks for proper engagement				X			
		Inspect nose gear trolley for proper travel.				X			
		Inspect nose gear for excessive side play in the down position.				X			
		Perform emergency gear extension (if equipped)				X			
	Nose and main wheel bearings - disassemble and inspect					X			

9.0 TROUBLE SHOOTING

1. PROBLEM – Powerpack does not run after gear selection.

Probable cause:

a. Circuit breaker out.
b. Pressure switch not pulling in at low cut-in.
c. Solenoid switch not pulling in.
d. Faulty pump motor or motor ground.

Verification and Remedy:

a. Reset Circuit Breaker
b. Short across pressure switch leads and see if motor runs.
c. Short across main solenoid leads and see if motor operates. If it operates—replace pressure switch.
d. If c above does not produce results, and it is verified that voltage was actually applied to the motor, it can be assumed that the motor is bad.

2. PROBLEM – Powerpack does not shut off after gear reaches position.

Probable cause:

a. Faulty pressure switch
b. Faulty or dirty pressure relief valve allowing insufficient pressure buildup.

Remedy:

a. Replace pressure switch
b. Clean and check relief valve.

3. PROBLEM – Powerpack shuts off before gear reaches position.

Probable cause:

a. Binding or jammed gear retractor which causes pressure to build up (and stay up), and pressure switch shuts off powerpack.

Remedy:

a. Repair retractor.

4. PROBLEM – Powerpack cycles on and off after gear is in position.

Probable cause:

a. Internal hydraulic leak.
b. External hydraulic leak.

Remedy:

a. Verify leak is not external by checking fluid level in reservoir and looking at couplings for oil leaks—then disconnect and cap off hydraulic actuators one at a time, and find the leaky one by process of elimination. If isolating entire system still indicates internal leak, powerpack check valve (located in pressure part of pump) is bad and needs replacement
b. Visually inspect lines, cylinders and hoses and replace as necessary.

PROBLEM – Powerpack cycles on and off during gear cycle.

Probable cause:

a. Binding retraction unit.
b. Pressure switch cut off limit too low.

Remedy:

a. Investigate for free operation gear that retracts last.
b. Replace pressure switch.

6. PROBLEM – Slow gear operation cycle (considerably longer than 23 seconds).

Probable cause:

b. Plugged oil screen.
c. Poor electrical connection to motor.
d. Poor motor.
e. Worn pump gears.

Remedy:

a. Clean intake screen located inside reservoir tank.
b. Connect motor direct to 24-volt source and note its operation—if good, wire connection is bad---if operation poor, motor needs overhaul.

7. PROBLEM – Circuit breaker pops during cycle.

Probable cause:

b. Wire connections bad or corroded.
c. Motor brushes are bad.

Remedy:

a. Clean and protect terminals with insulating grease.
b. Overhaul motor.

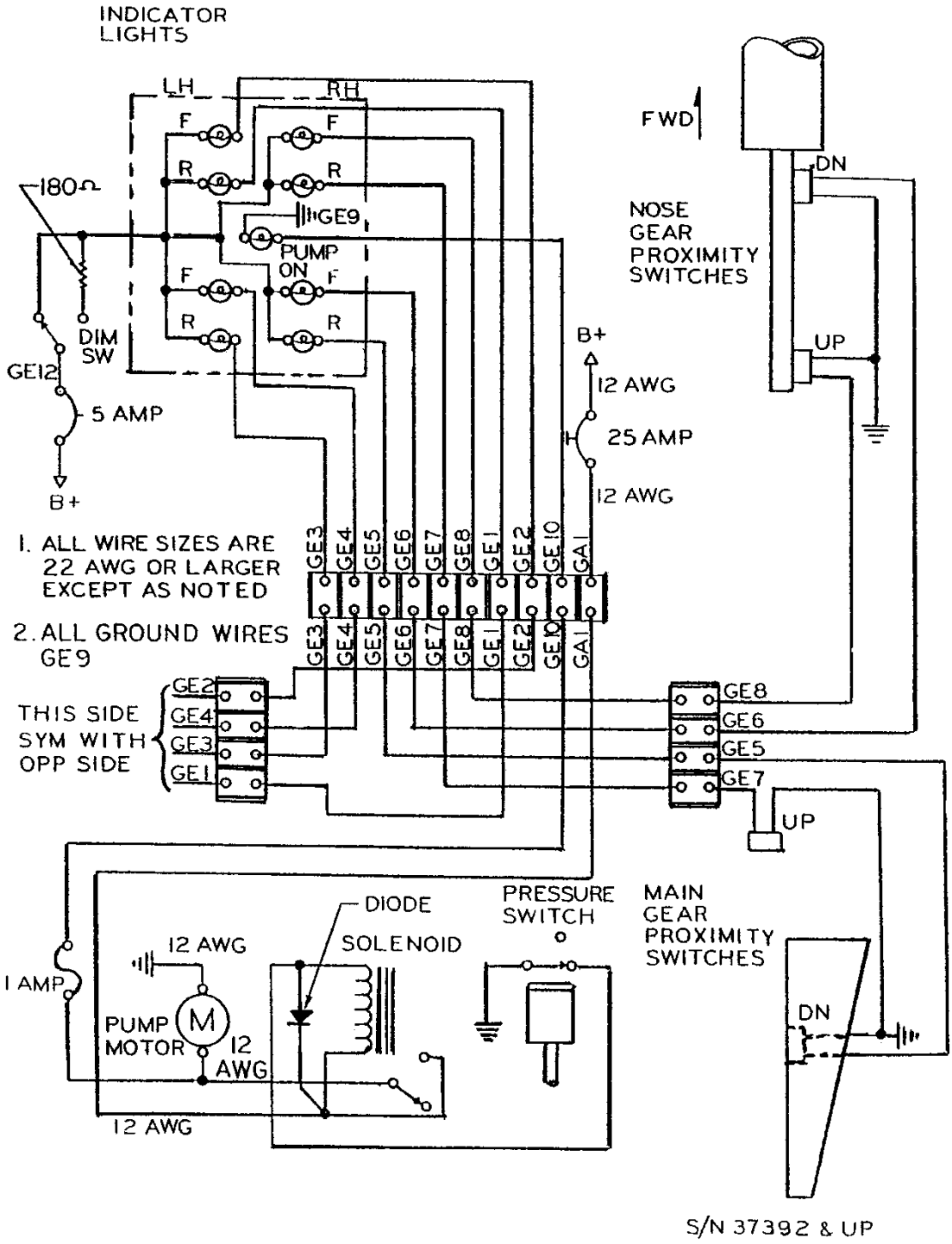


FIGURE 1
SCHEMATIC, LANDING GEAR ELECTRICAL SYSTEM

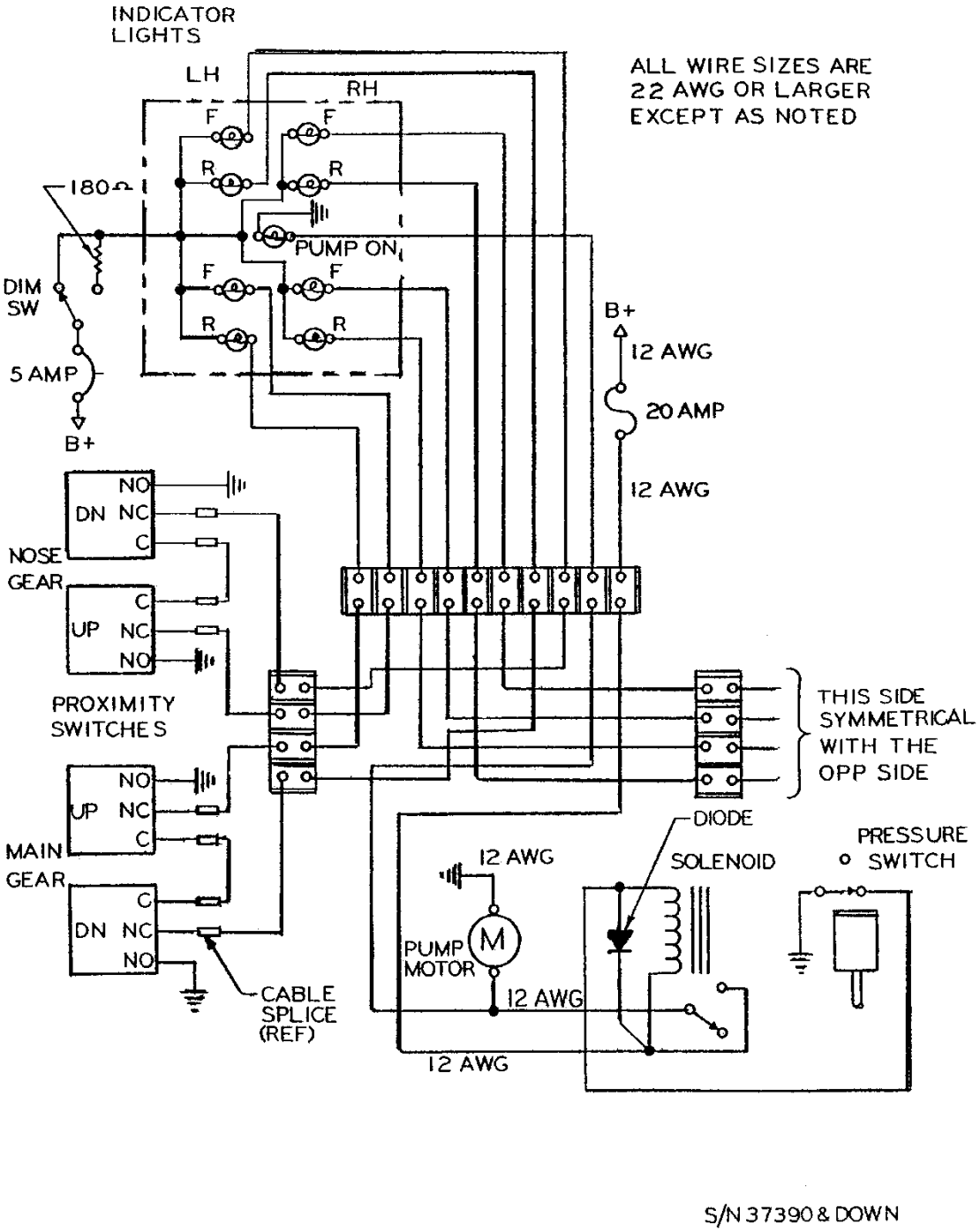


FIGURE 2
SCHEMATIC, LANDING GEAR ELECTRICAL SYSTEM

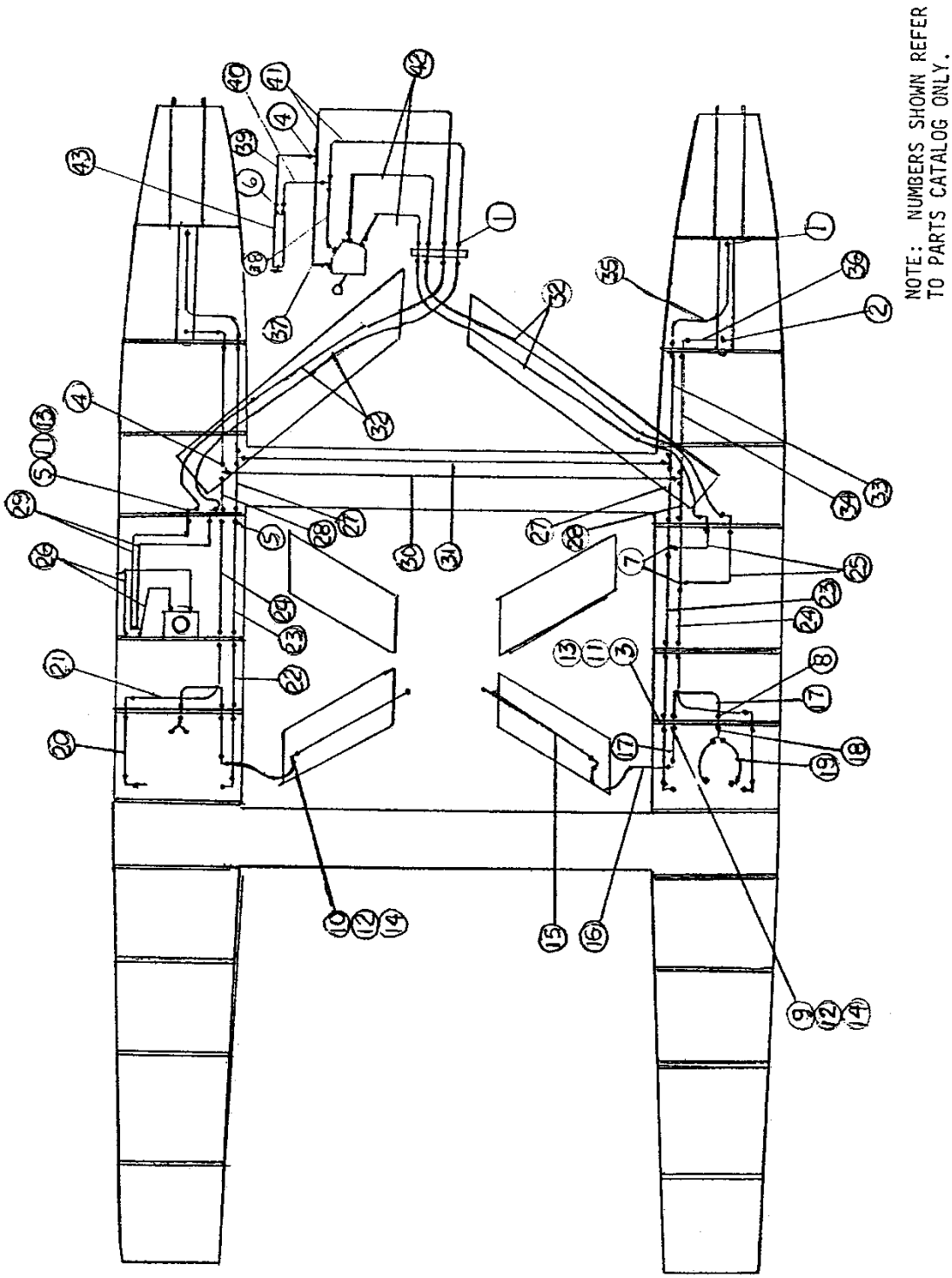


FIGURE 3
HYDRAULIC SYSTEM 206

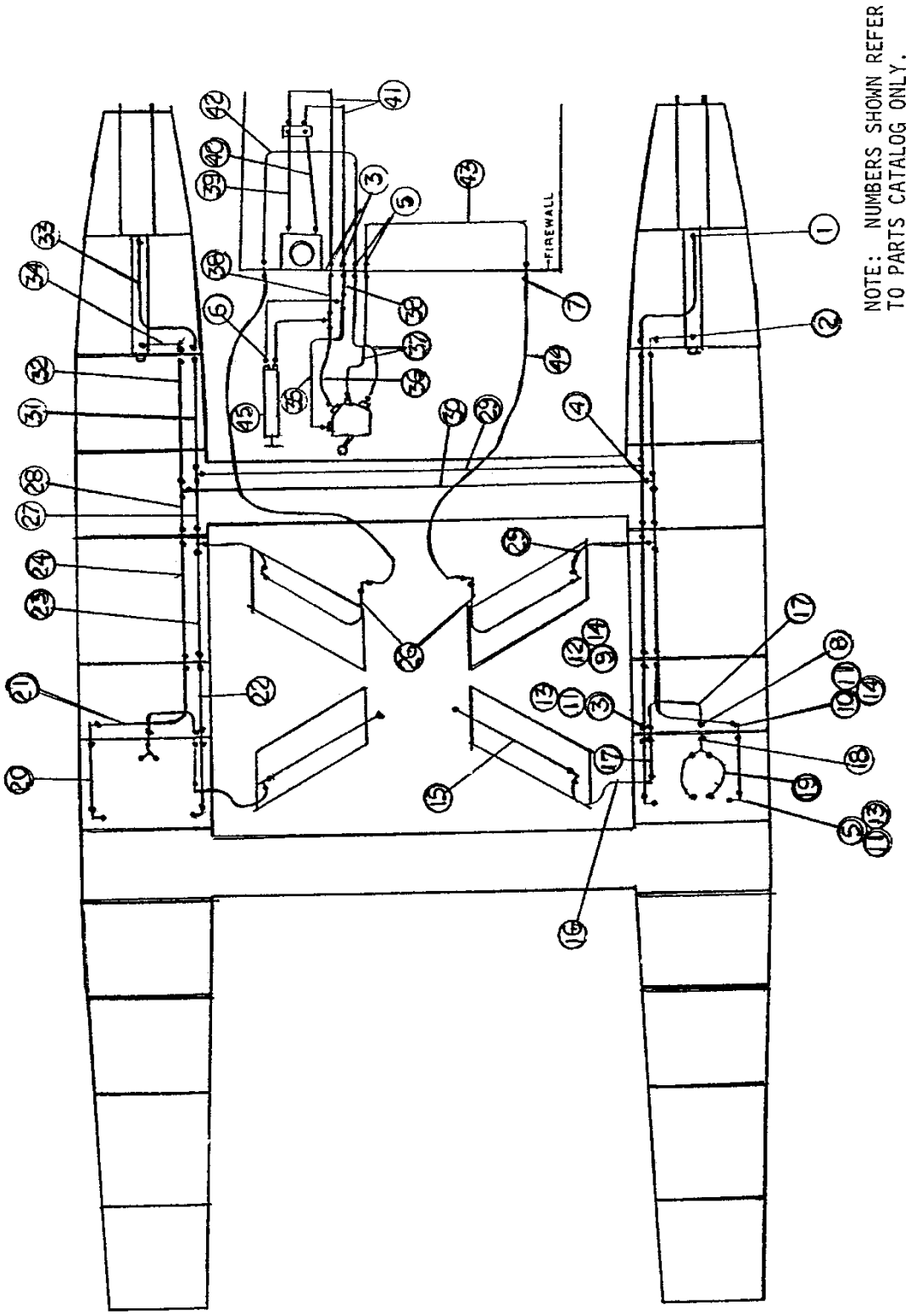


FIGURE 4
HYDRAULIC SYSTEM 185

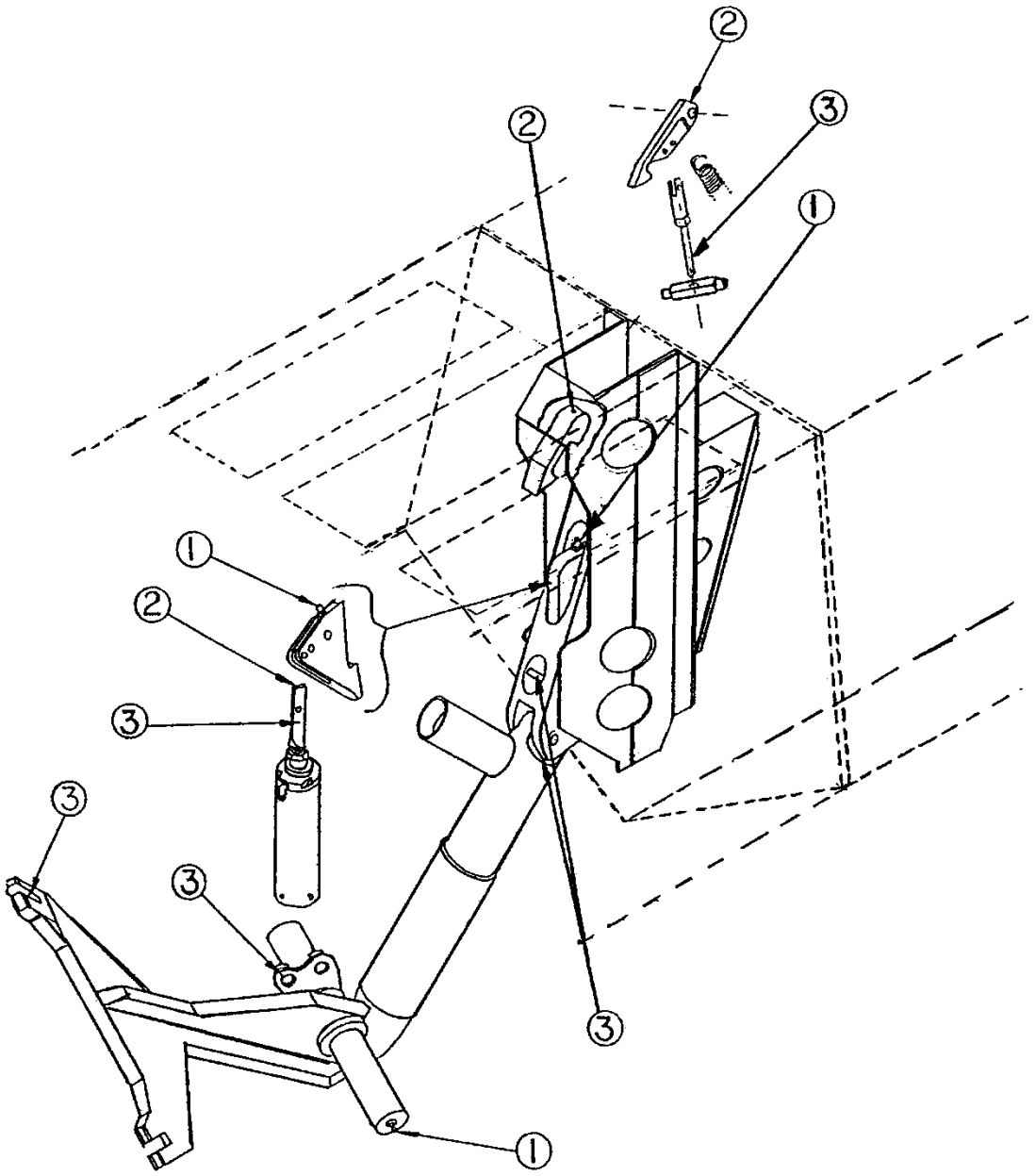


FIGURE 5
LUBRICATION CHART MAIN GEAR 3730

1. **STANDARD GREASE ZERK**
2. **NEEDLE POINT GREASE HOLE**
3. **APPLY GREASE THESE SURFACES**

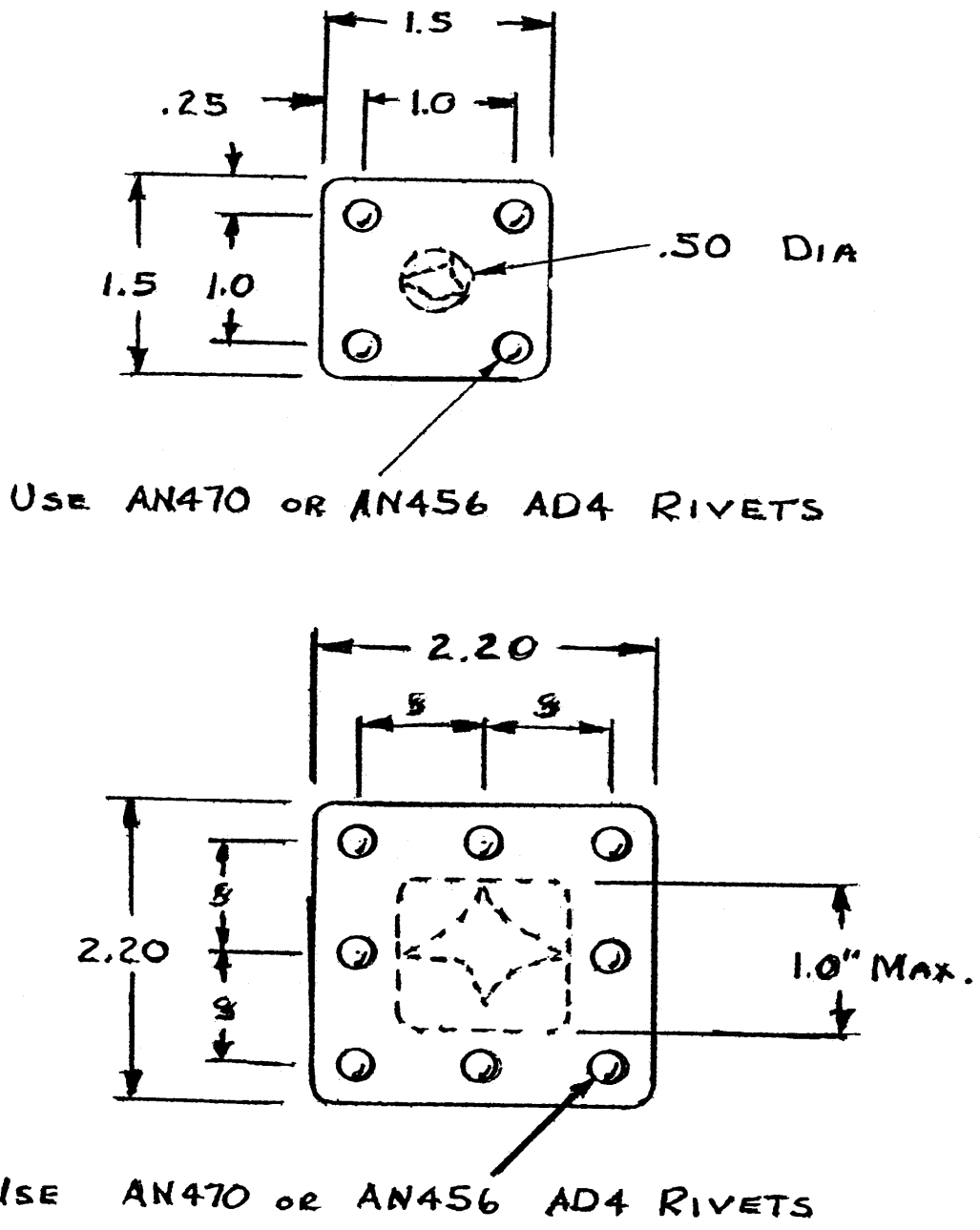
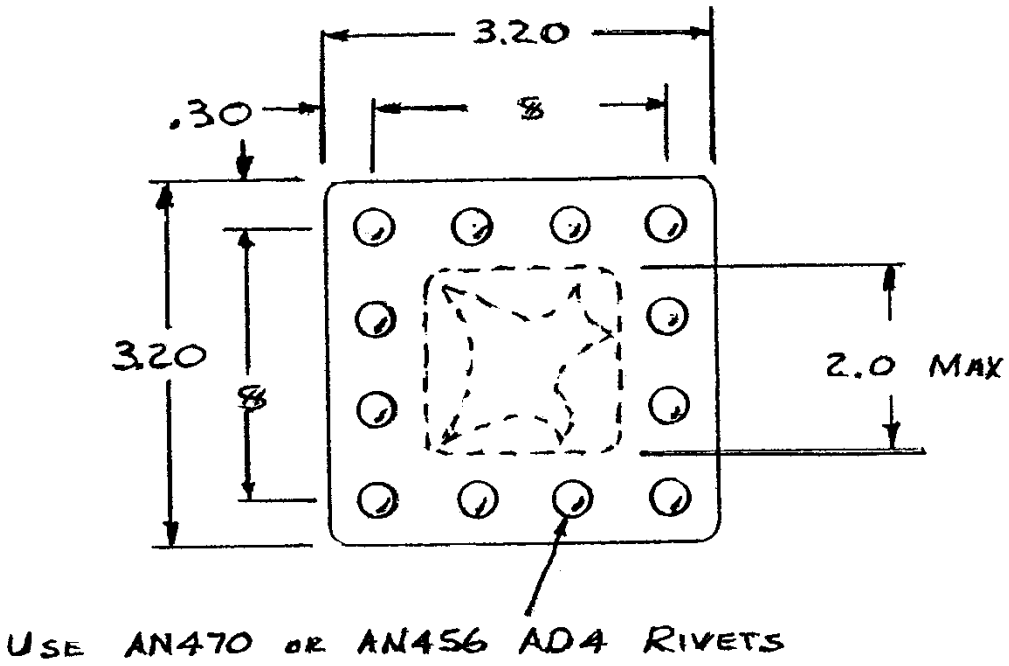


FIGURE 6
TYPICAL SKIN REPAIR



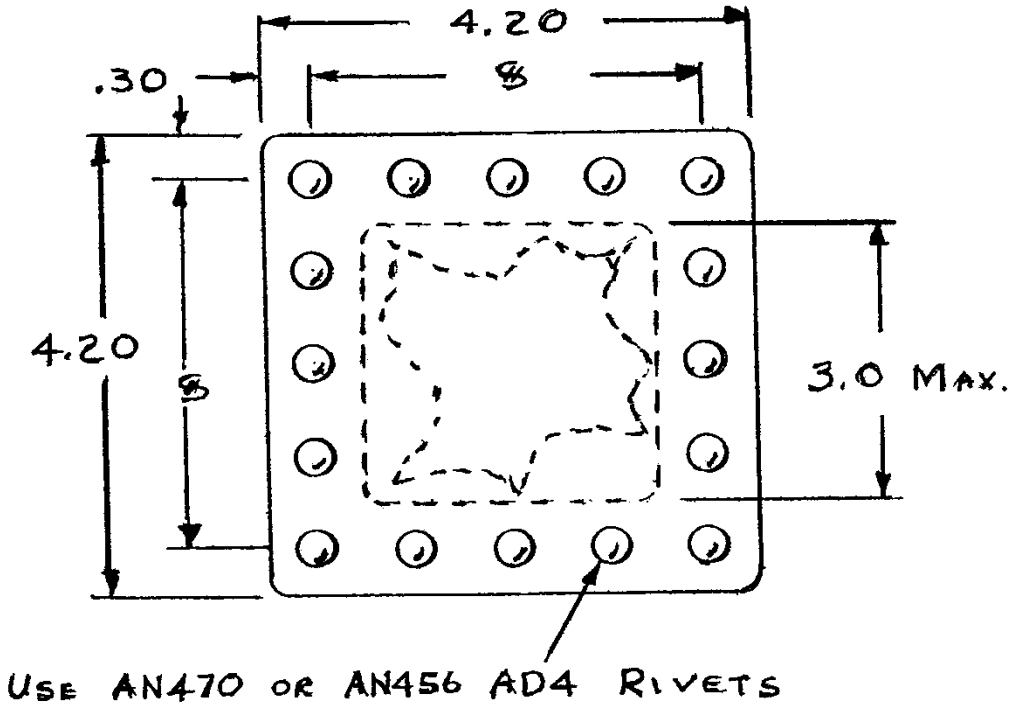


FIGURE 7
TYPICAL SKIN REPAIR

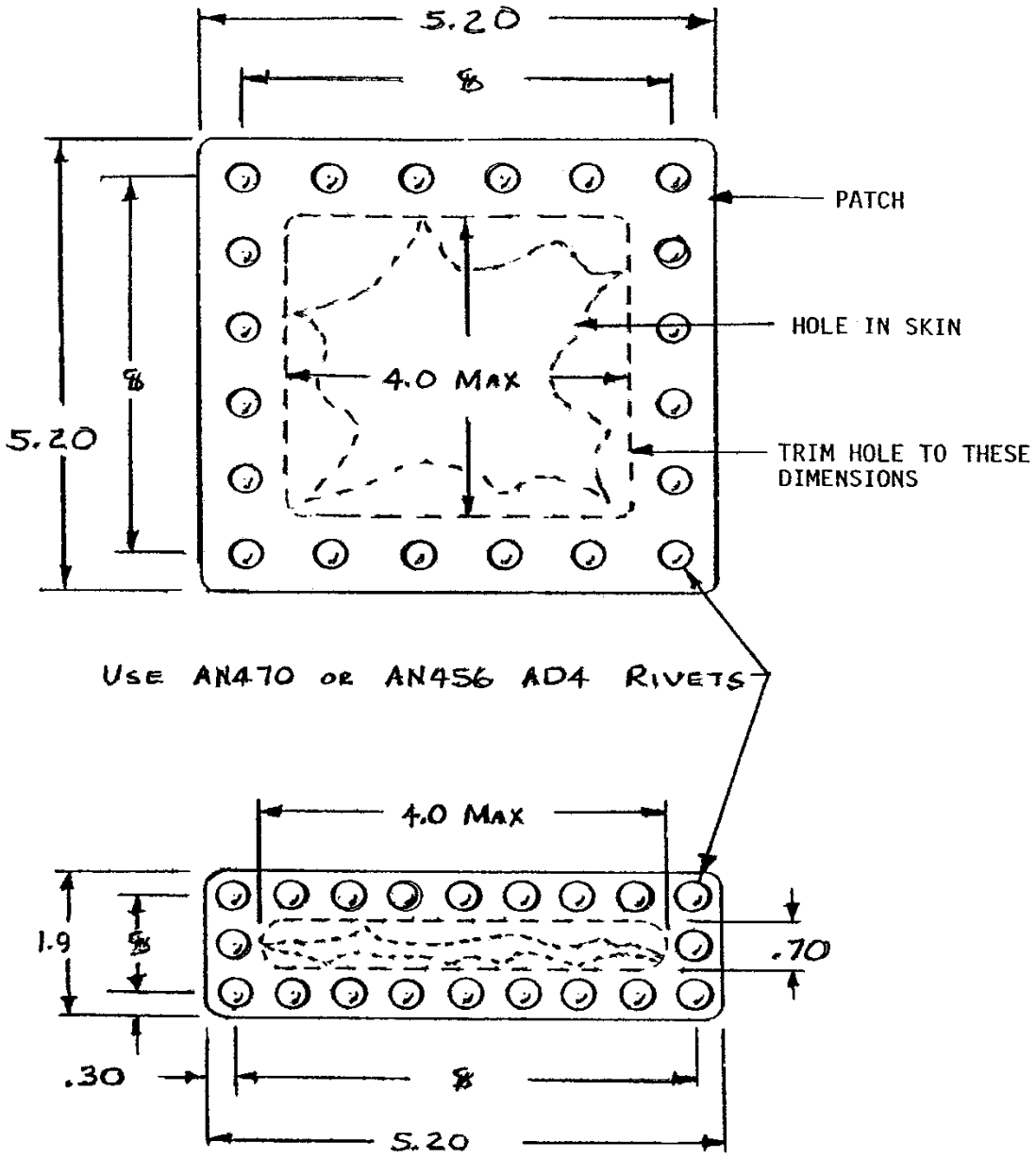


FIGURE 8
TYPICAL SKIN REPAIR

1. **TRIM HOLE AS SHOWN BY DOTTED LINE**
2. **PATCH MATERIAL TO BE AT LEAST SAME THICKNESS AS ORIGINAL SKIN.**
3. **PRIME ALL BARE SURFACES.**
4. **SEAL BETWEEN PATCH AND SKIN.**
5. **RIVET IN PLACE.**

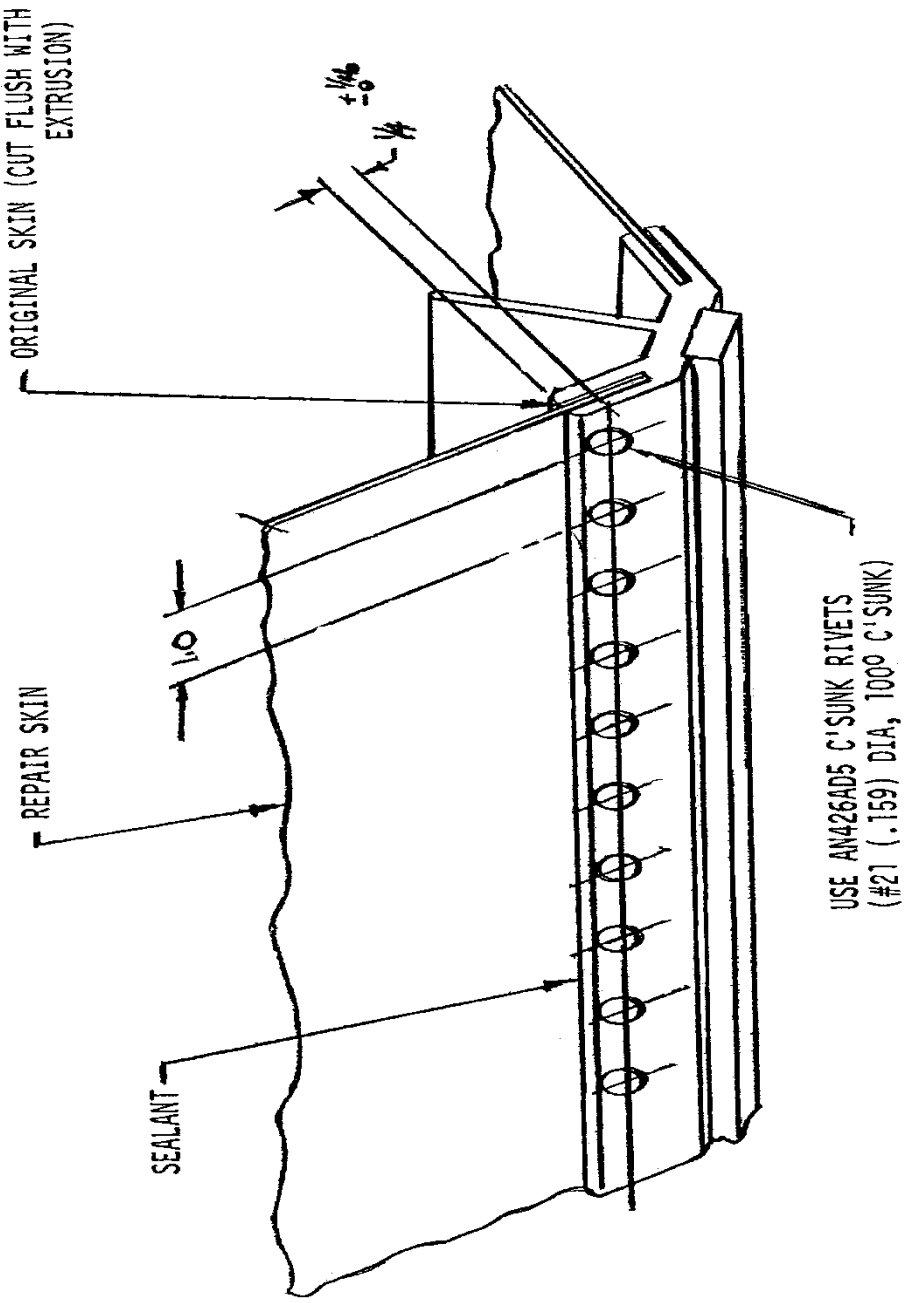


FIGURE 9
TYPICAL REPAIR BOTTOM SKIN TO KEEL INSTRUCTIONS
(PREFERRED METHOD)

1. **REMOVE ORIGINAL DAMAGED SKIN CUT FLUSHE WITH EXTRUSION.**
2. **REMOVE CAULKING FROM GROOVE OF EXTRUSION.**
3. **APPLY SEALANT IN GROOVE. (BE SURE TO USE PLENTY OF SEALANT!)**
4. **INSERT REPAIR SKIN INTO EXTRUSION.**
5. **DRILL AND COUNTERSINK HOLES AND RIVET INTO PLACE.**

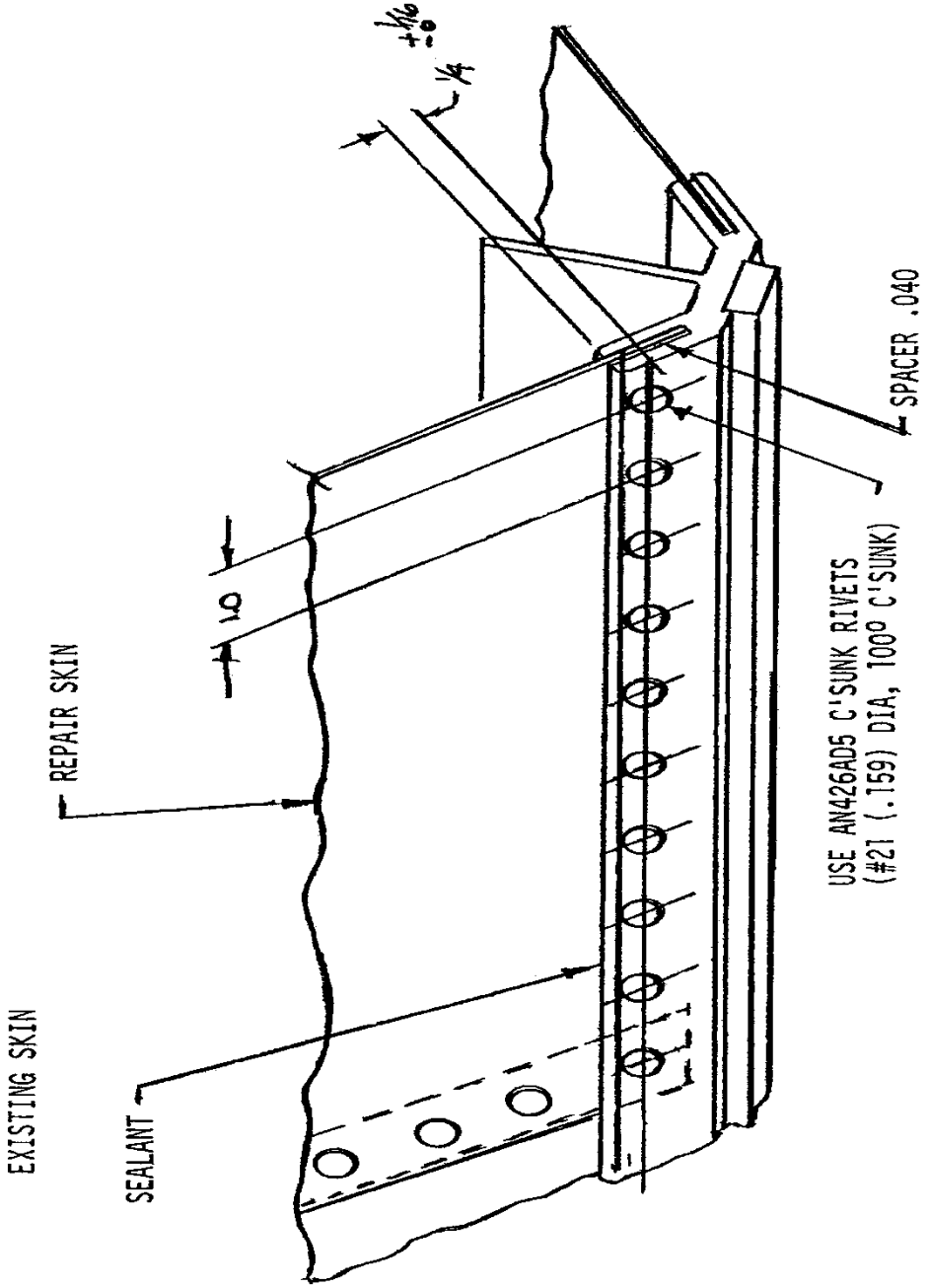


FIGURE 10
TYPICAL REPAIR BOTTOM SKIN TO KEEL INSTRUCTIONS

1. **REMOVE ORIGINAL DAMAGED SKIN FROM EXTRUSION.**
2. **REMOVE CAULKING FROM GROOVE OF EXTRUSION**
3. **APPLY SEALANT IN GROOVE. (Be sure to use plenty of Sealant!)**
4. **INSERT REPAIR SKIN INTO EXTRUSION.**
5. **INSTALL SPACER BETWEEN REPAIR SKIN AND EXTRUSION.**
6. **DRILL AND COUNTERSINK HOLES AND RIVET INTO PLACE.**

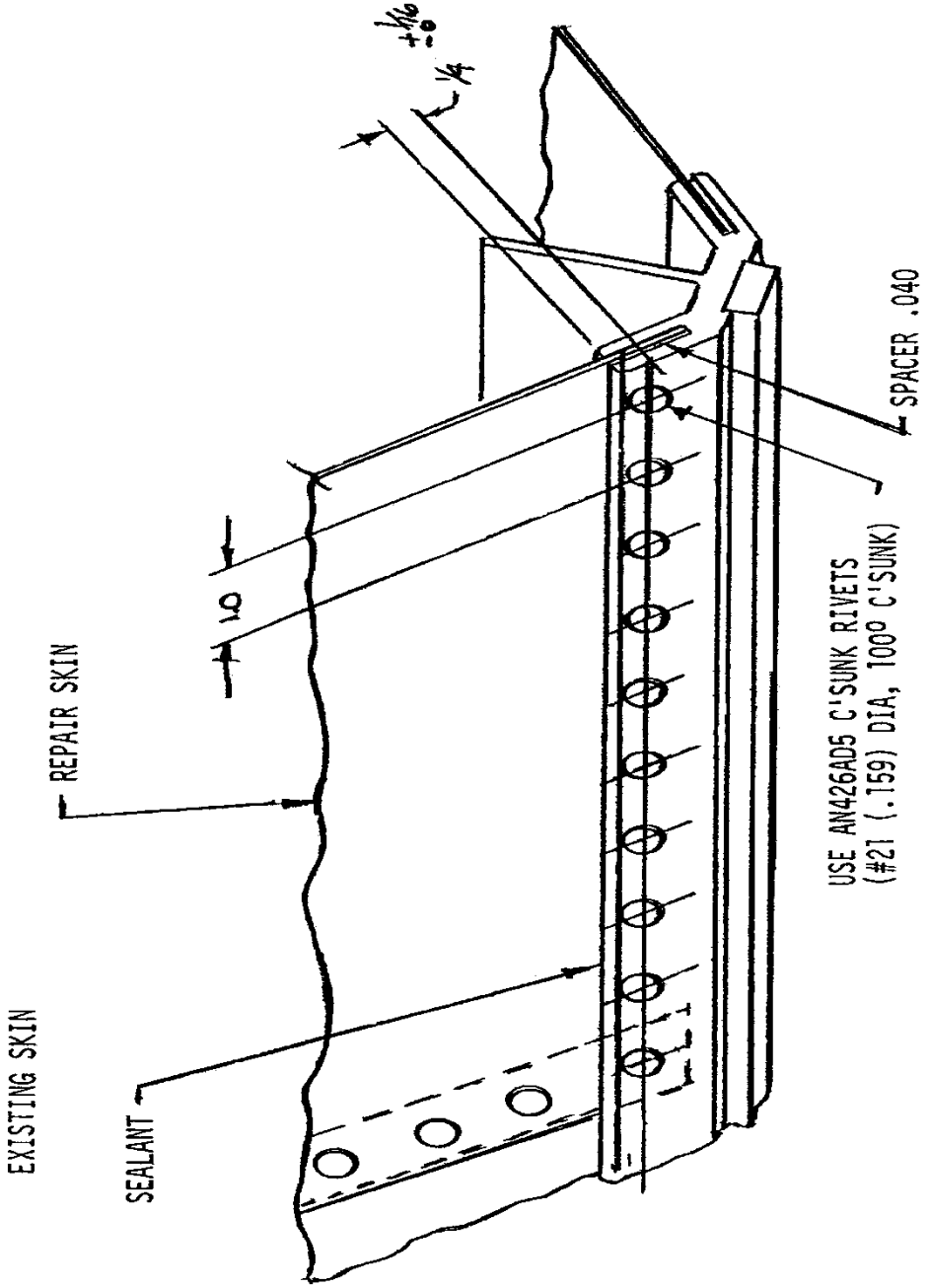


FIGURE 10
TYPICAL REPAIR BOTTOM SKIN TO KEEL INSTRUCTIONS

1. **REMOVE ORIGINAL DAMAGED SKIN FROM EXTRUSION.**
2. **REMOVE CAULKING FROM GROOVE OF EXTRUSION**
3. **APPLY SEALANT IN GROOVE. (Be sure to use plenty of Sealant!)**
4. **INSERT REPAIR SKIN INTO EXTRUSION.**
5. **INSTALL SPACER BETWEEN REPAIR SKIN AND EXTRUSION.**
6. **DRILL AND COUNTERSINK HOLES AND RIVET INTO PLACE.**

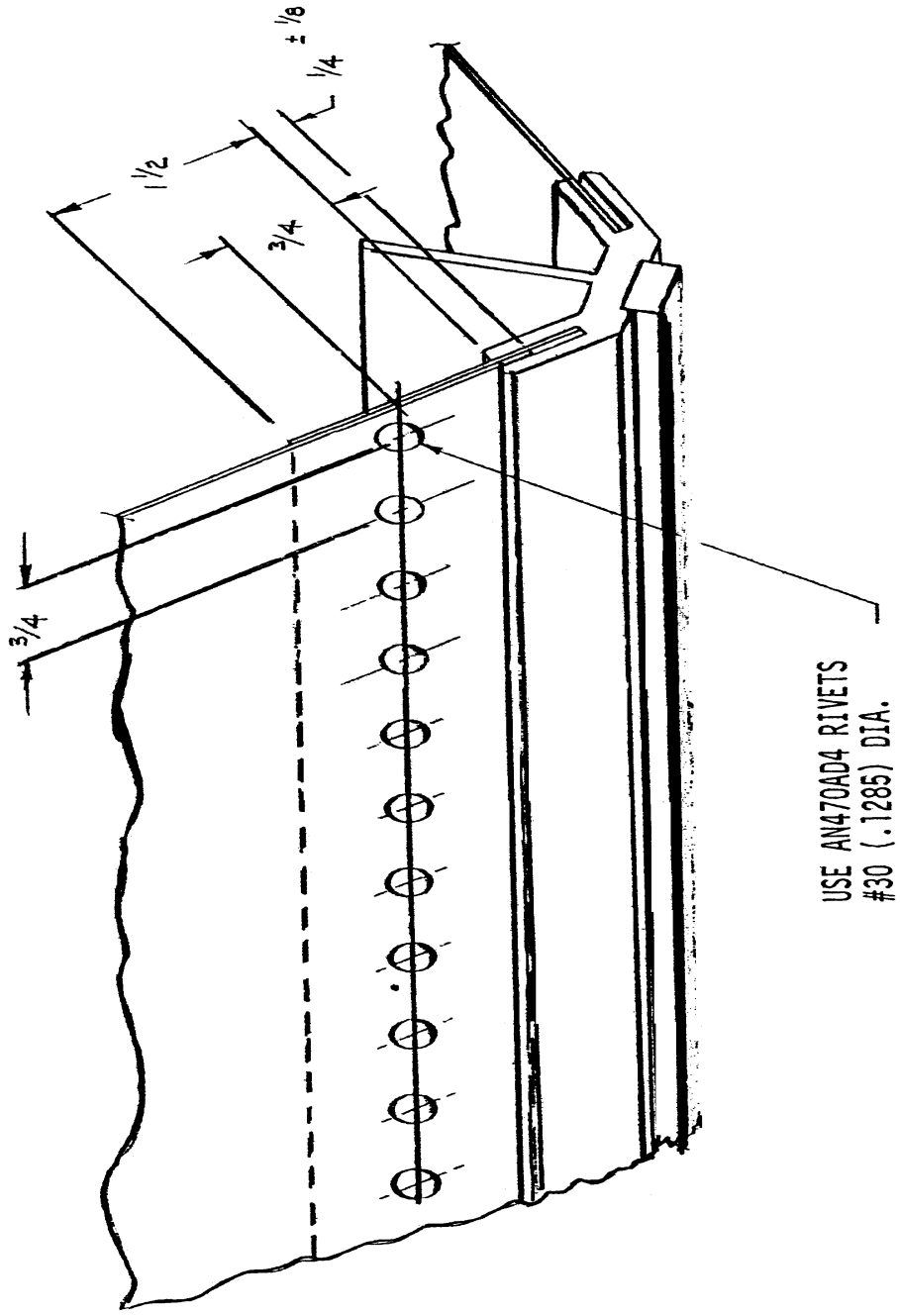


FIGURE 11
TYPICAL REPAIR BOTTOM SKIN TO KEEL (ALT) INSTRUCTIONS

1. **REMOVE ORIGINAL DAMAGED SKIN LEAVING APPROXIMATELY 1½" OF SKIN PROTRUDING FROM EXTRUSION.**
2. **REMOVE CAULKING FROM GROOVE IN EXTRUSION.**
3. **INSTALL SEALANT IN GROOVE. (BE SURE TO USE PLENTY OF SEALANT!)**
4. **INSERT REPAIR SKIN IN GROOVE APPROXIMATELY ¼".**
5. **LAYOUT HOLE PATTERN, DRILL, DE-CHIP, SEAL AND RIVET.**

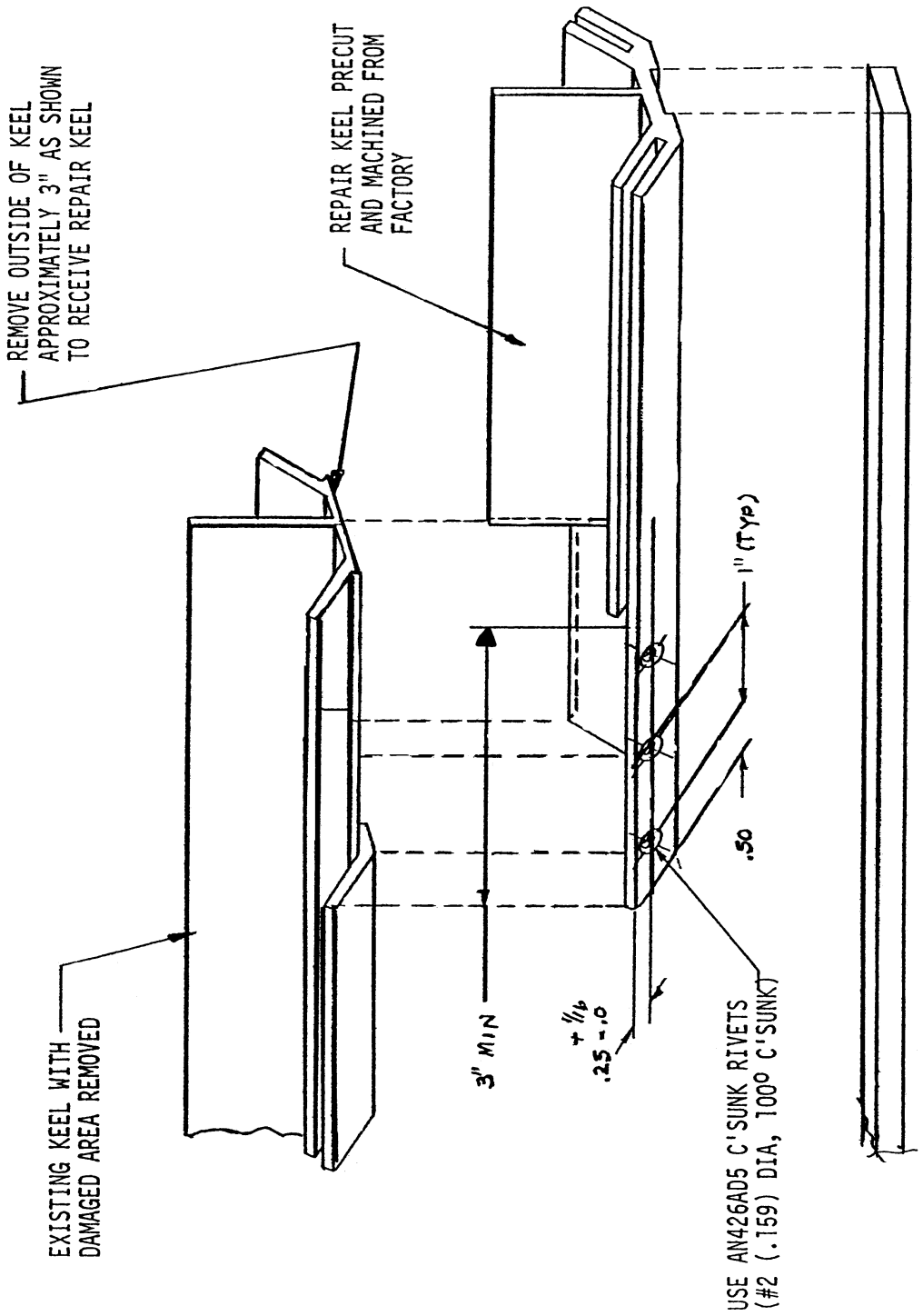


FIGURE 12
TYPICAL REPAIR SPLICE OF KEEL

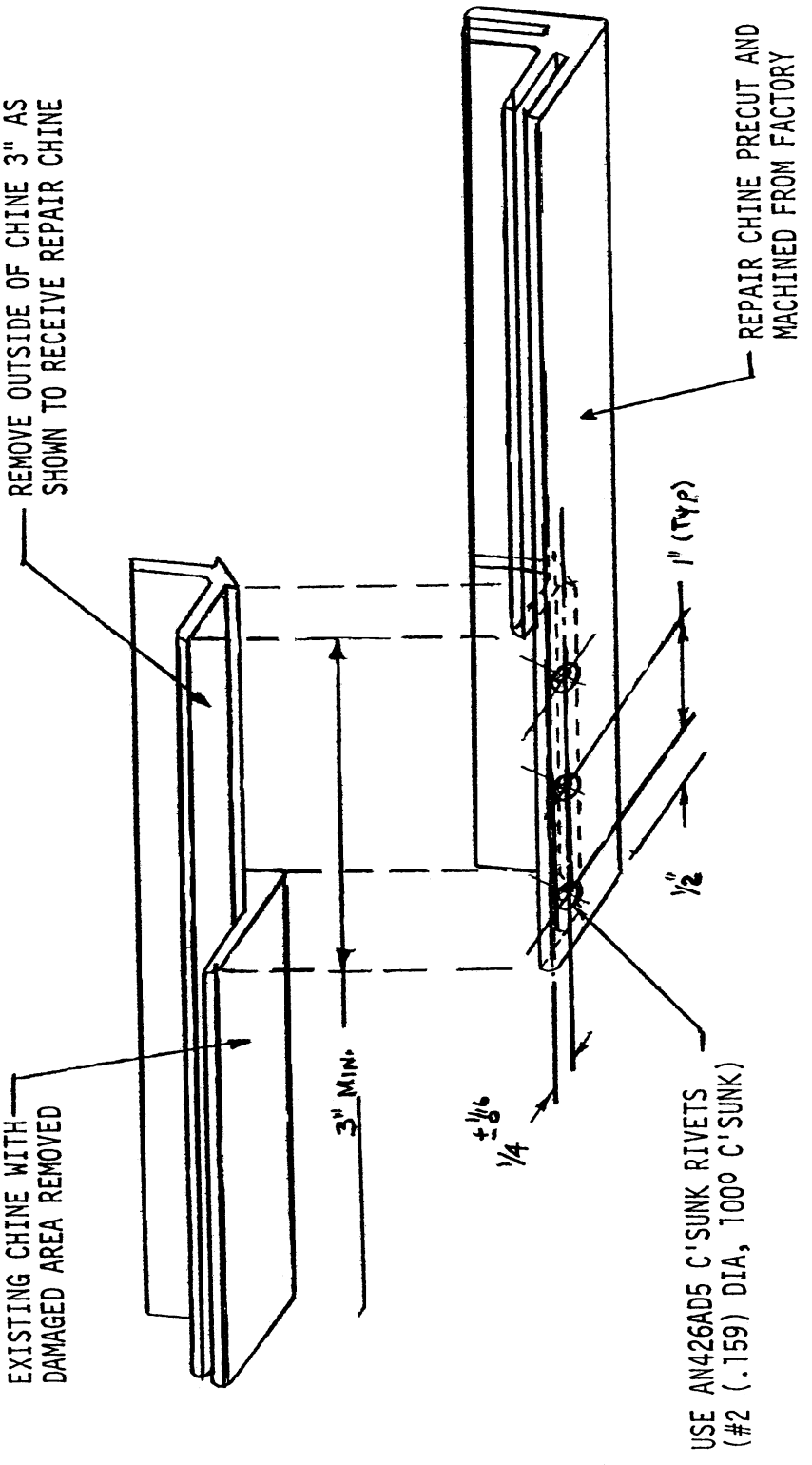


FIGURE 13
TYPICAL REPAIR SPLICE OF CHINE

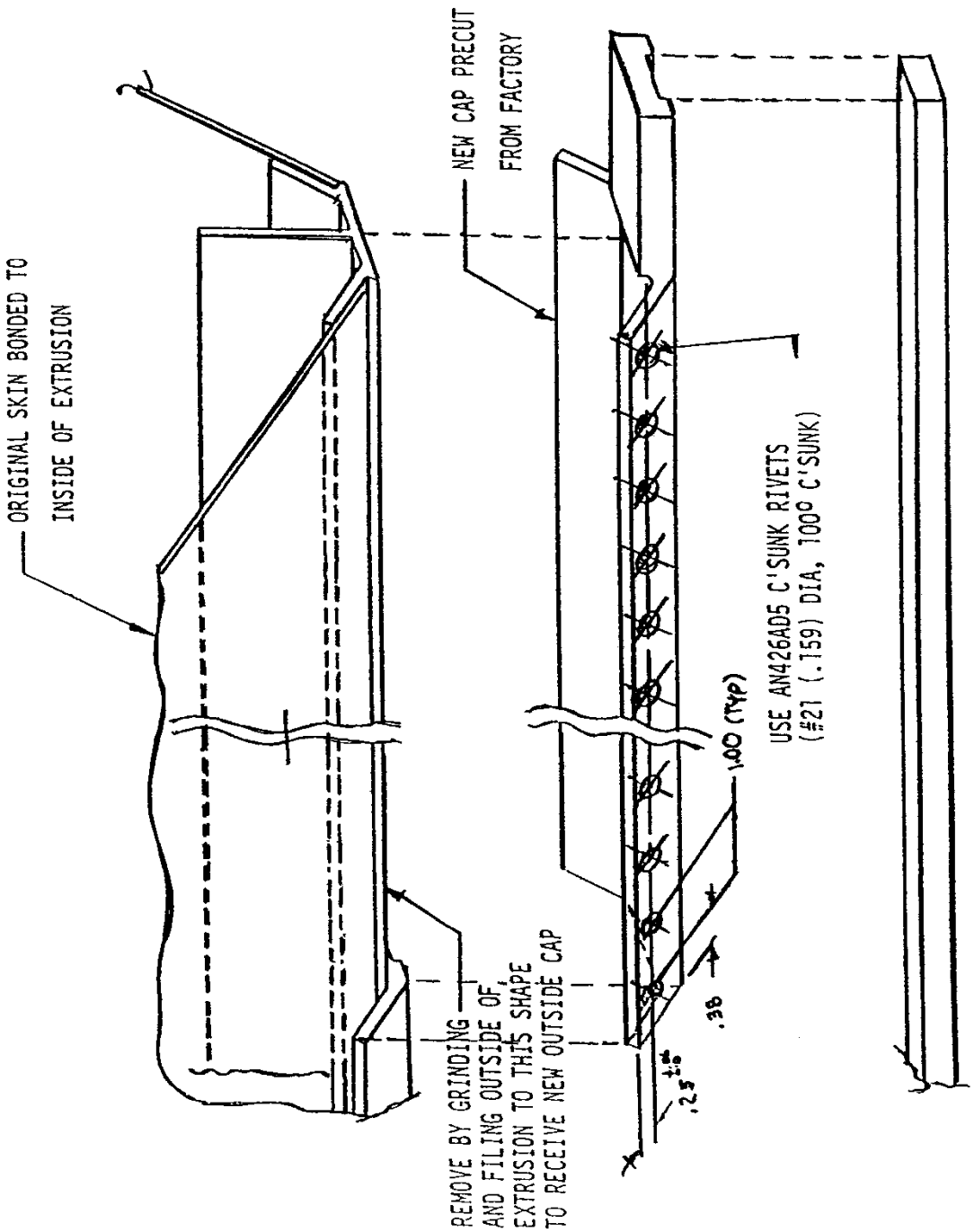


FIGURE 14
TYPICAL CAP SPLICE TO KEEL

1. **LAYOUT NEW REPAIR CAP ON DAMAGED EXTRUSION.**
2. **REMOVE OUTSIDE OF DAMAGED EXTRUSION BY FILING OR GRINDING TO INSIDE SHAPE OF REPAIR CAP.**
3. **MATCH DRILL OR LAYOUT AND DRILL HOLE PATTERN AS SHOWN.**
4. **RIVET OUTSIDE CAP TO EXISTING INSIDE EXTRUSION.**
5. **APPLY KEEL WEAR STRIP WITH ANY GOOD 2-PART APOXY.**