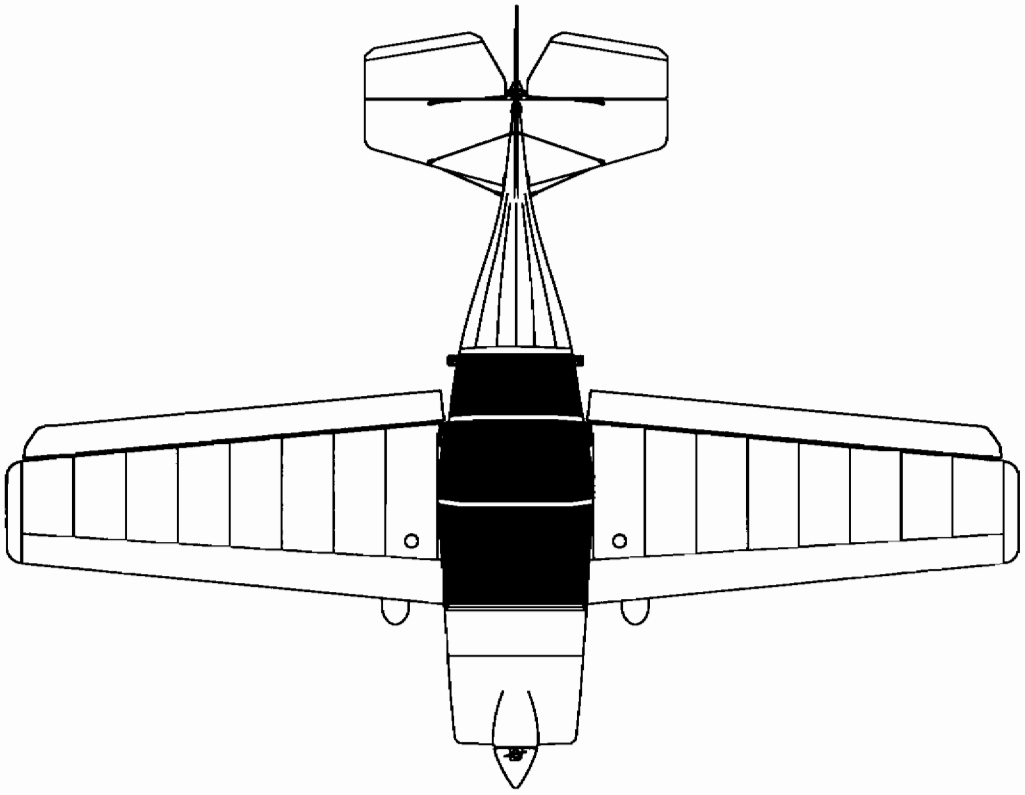
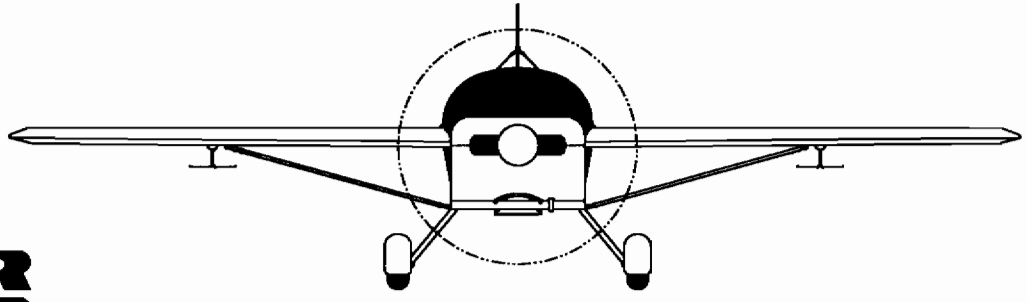
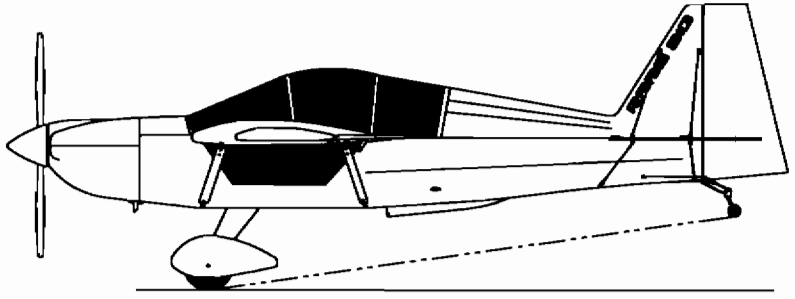
RANS S-10 SAKOTA





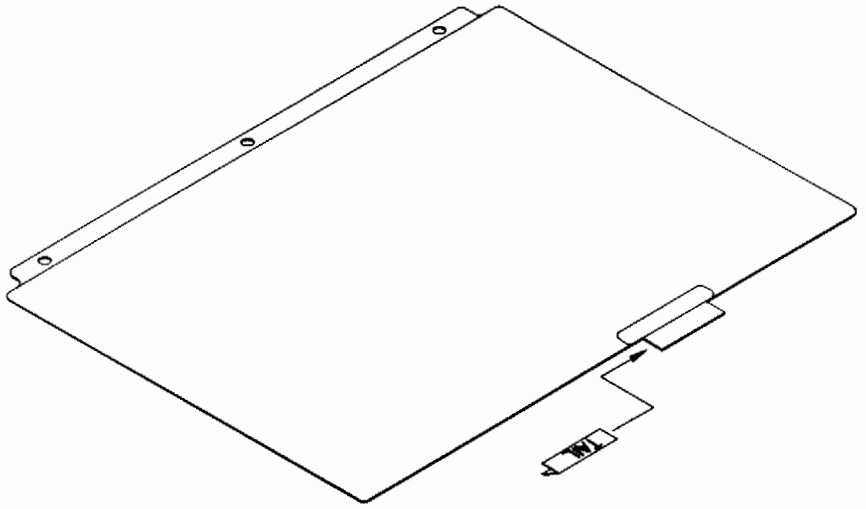


RANS
4600 Highway 183 Alternate
Hays, KS 67601
(785) 625-6346

DESIGNED BY:
RANDY SCHLITTER

S-10 SAKOTA

Your manual is ready for assembly. Separate the sections with the tab inserts listed below. Cut out, fold in half, and insert into tabs. Every section begins with the parts pages (exploded view and a part list) followed by text. Parts pages are assigned with the prefix "00", and the text pages are assigned the prefix "0". Follow the table of contents for the order that the manual should follow.



MD1316

GENERAL DATA GENERAL DATA	MAIN LANDING GEAR MAIN LANDING GEAR	CONTROL STICK CONTROL STICK	ENGINE ENGINE	CANOPY CANOPY
WING WING	LANDING / TAILWHEEL LANDING / TAILWHEEL	SEAT SEAT	ENGINE COOLING SYS. ENGINE COOLING SYS.	COVERING COVERING
WING-AILERONS WING-AILERONS	BRAKES BRAKES	SEAT BELT SEAT BELT	ENGINE MOUNT ENGINE MOUNT	FABRICATED PARTS FABRICATED PARTS
WING-STRUTS WING-STRUTS	FLOORBOARD FLOORBOARD	THROTTLE THROTTLE	COWLING COWLING	OPTIONS OPTIONS
FLAPERON LEVER FLAPERON LEVER	RUDDER RUDDER	TAIL TAIL	WINDSHIELD / SIDE GLASS WINDSHIELD / SIDE GLASS	CG/OPERATIONS CG/OPERATIONS
FUSELAGE FUSELAGE	INSTR. PANEL / FIREWALL/ELEC. INSTR. PANEL / FIREWALL/ELEC.	FUEL SYSTEM FUEL SYSTEM		

S-10 SAKOTA

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RANS INC.

4600 Highway 183 Alternate
Hays, KS 67601

Technical Support
(785) 625-0069

Parts Department
(785) 625-6346

When calling Technical Support please have the following ready:

- ❑ Aircraft Model
- ❑ Serial Number
- ❑ Engine Model
- ❑ Your Aircraft Assembly Manual

Note: Please make your questions precise and to the point so that we may assist as many customers as possible.

RANS Aircraft
Tool List

This is a partial list of tools that would be helpful when assembling a RANS airplane.

Hand Tools

Pliers
Needle nose pliers
Side cutters
Aviation snips
Hammer
Rubber mallet*
Center punch
Drift pin and punch set
Several small clamps
Cleco Pliers
24 - #30 Clecos - Copper
Wrench set SAE and metric
Ruler and tape measure
Adjustable fly cutter*
Set of drill bits
Hack saw
Safety wire pliers
Linesman pliers
Electrical wire stripers
Pop rivet tool
Click punch
Ball peen hammer
Scratch awl
Screwdriver set
Safety glasses
12 - #40 Clecos - Silver
6 - #11 Clecos - Gold
Socket set SAE and metric
2 or 4 ft. Level
Utility knife
Hole saw*
Files

Power Tools

Electric hand drill
Dremel*
Soldering gun
CD Player*
Small electric grinder*
Bench disk sander*
Heat gun*

Lubricants and Glues

Small can lithium grease
Contact cement
Super glue
Clear silicone
WD 40

* Not a necessary tool but helpful.

AN3 - AN8 AIRFRAME BOLTS

AN3-AN8 CADMIUM-PLATED STEEL BOLTS (DRILLED AND UNDRILLED)

A non-corrosion-resistant steel machine bolt which conforms to Specification MIL-B-6812. Cadmium-plated to Specification QQ-P-416.

Available with or without single hole through shank and/or single hole through head. Examples of part members for a cadmium plated steel bolt having a diameter of 1/4" and nominal length of 1".

AN4-6	For drilled shank
AN4-6A	Designates undrilled shank
AN4H-6	Drilled head, drilled shank
AN4H-6A	Drilled head, undrilled shank

NUT AND COTTER PIN SIZES

AN NUMBER — DIAMETER	PLAIN NUT AN NUMBER	CASTLE NUT AN NUMBER	COTTER PIN MS NUMBER
AN3 . . . . . 3/16	AN315-3R	AN310-3	MS24665-132
AN4 . . . . . 1/4	AN315-4R	AN310-4	MS24665-132
AN5 . . . . . 5/16	AN315-5R	AN310-5	MS24665-132
AN6 . . . . . 3/8	AN315-6R	AN310-6	MS24665-283
AN7 . . . . . 7/16	AN315-7R	AN310-7	MS24665-283
AN8 . . . . . 1/2	AN315-8R	AN310-8	MS24665-283

HOW TO DETERMINE GRIP For Steel and Aluminum Aircraft Bolts
(Subtract Fractions Shown Below From Length of Bolt)

AN 3 to AN 8	AN NUMBER, Diameter, and Threads per Inch	AN3 10 -32	AN4 1/4 -28	AN5 5/16 -24	AN6 3/8 -24	AN7 7/16 -20	AN8 ½ -20
	Grip = Length Less	13/32	15/32*	17/32	41/64	21/32	25/32

*Formula does not apply for AN4-3. Grip for AN4-3 is 1/16.

DASH NUMBER -- NOMINAL LENGTH

-3 . . . 3/8	-6 . . . 3/4	-11 . . . 1 ⅛	-14 . . . 1 ½	-17 . . . 1 7/8	-22 . . . 2 1/4	-25 . . . 2 5/8
-4 . . . ½	-7 . . . 7/8	-12 . . . 1 1/4	-15 . . . 1 5/8	-20 . . . 2	-23 . . . 2 3/8	-26 . . . 2 3/4
-5 . . . 5/8	-10 . . . 1	-13 . . . 1 3/8	-16 . . . 1 3/4	-21 . . . 2 1/8	-24 . . . 2 ½	-27 . . . 2 7/8
						-30 . . . 3

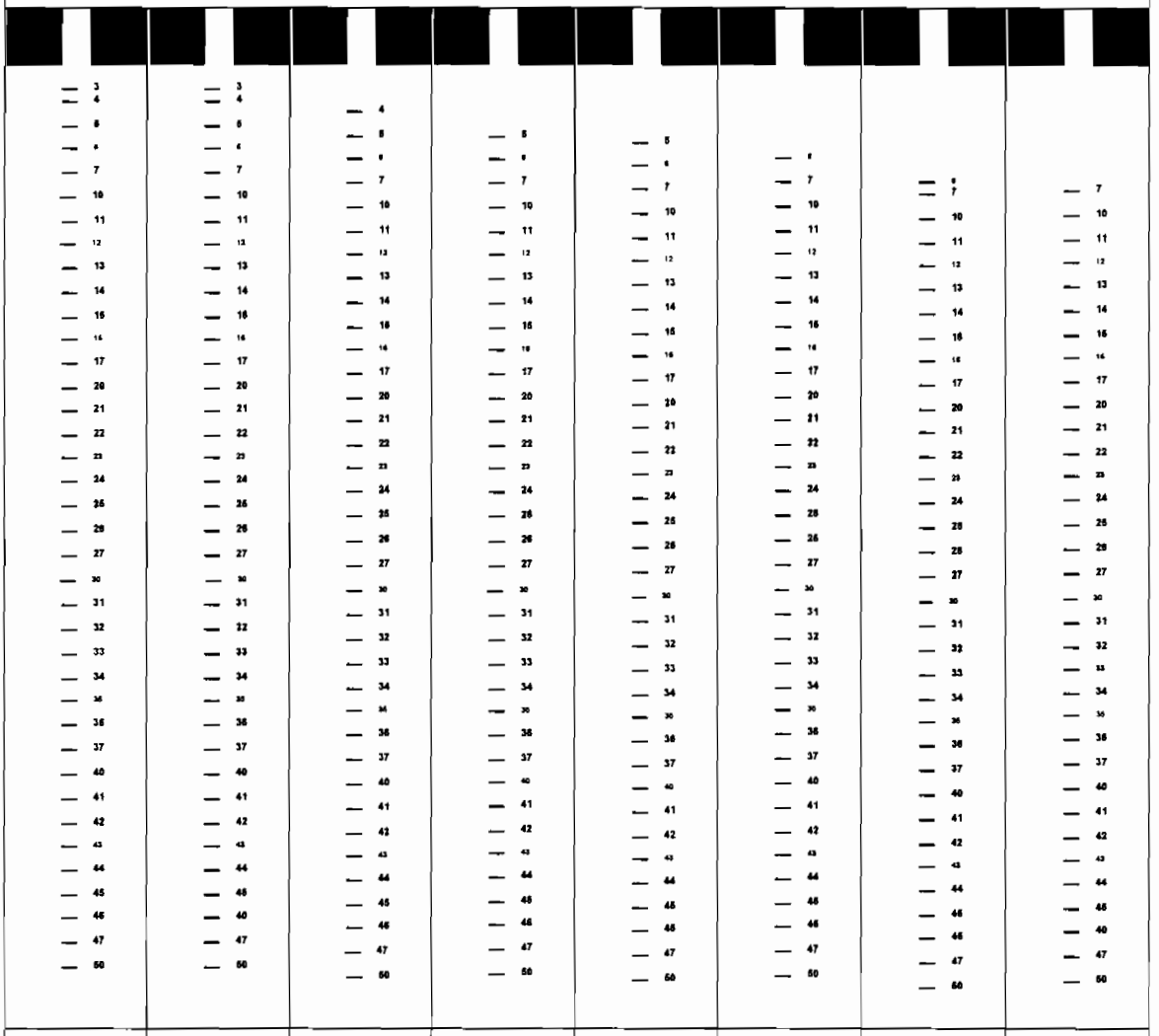
PART IDENTIFICATION

Use the above chart to determine lengths of bolts. Diameters are as follows:

AN3 = 3/16" AN4 = 1/4" AN5 = 5/16" AN6 = 3/8"

Use the parts manual for other part identification. The drawings depict a fairly accurate likeness of the real thing. Other parts are labeled by part number. Again, reference the parts manual to confirm part identity.

AN Bolt Gauge



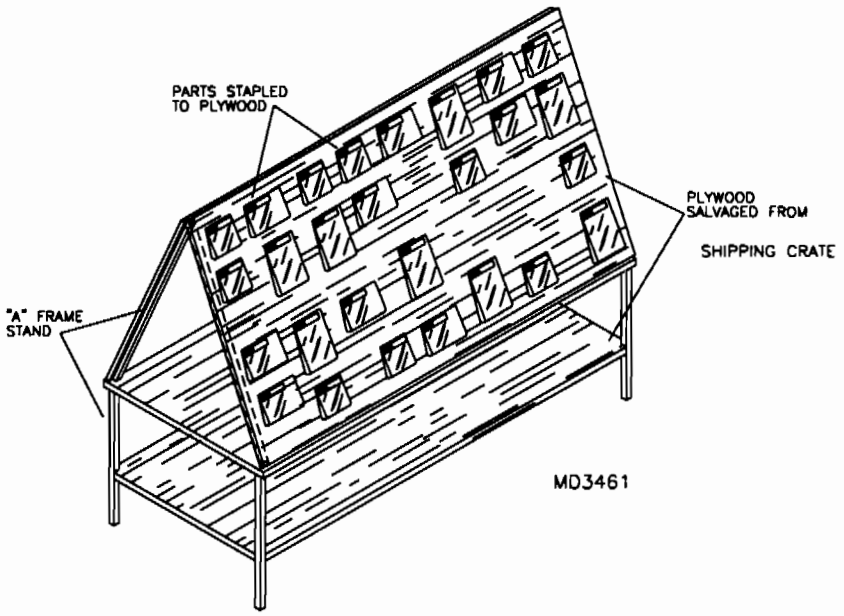
AN3	AN4	AN5	AN6	AN7	AN8	AN9	AN10
3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8

EF-116

S-10 SAKOTA
GENERAL INFORMATION

BEFORE BEGINNING:

TAKE INVENTORY: You must complete an inventory within 60 days of receiving your kit. We check and re-check and are 99.9% certain that if we say we shipped it, we did. The first task in building your kit is to inventory the parts using the packing list provided. It's your job to keep all parts organized and accounted for. We can not provide missing parts cost free after 60 days. Use the supplied pack list to verify that everything that we packed is in the box. The fast way to inventory, is to use the Priority Number that appears on the Part Number labels, these will match the pack list in numeric order. Go through the list item by item. If anything is not there that should be, please contact our parts department immediately. ***HINT:*** *Use sections of plywood from the packing crate to fabricate a part inventory board. As each part is inventoried and checked off on the pack list, staple the bag to the board. This allows for quick identification and part selection during assembly. We fabricate "A" Frame stands to support the plywood. Refer to the figure below. Plywood can also be attached to shop wall.*



PLEASE READ the manual cover to cover. This will speed up your build time considerably.

GET ORGANIZED! Prepare your workshop and be sure that what goes in the shop door will be able to come out!!!

TRIAL ASSEMBLY: We recommend a trial assembly of the airplane before covering. This assures that everything is complete and avoids the expense of re-work. This will require either a nice day for assembly outside or a good sized shop for indoor assembly.

Covering the aircraft requires aircraft covering and painting skills. You can get experience on the landing gear side formers or the elevators. These are small enough to do over without great expense or trouble.

All welded steel parts will require primer and top coating. We recommend a good two part epoxy primer. Final painting of certain components will be done after trial assembly. Include these components when designing your paint scheme. If you assemble the aircraft in a humid environment, it is best to prime

everything first. This may be added work if the parts get scratched during trial assembly but it will stop the onset of rust. If you have sea air, consider priming the aluminum parts as well. Internal protection for the aluminum can be affected by pouring tube seal inside and letting it run out coating the inner diameter for the welded steel parts. Tube seal can be injected through a small #40 hole and welded or dabbed shut with a bit of J&B weld.

Many small aluminum parts will need to be deburred. This is an **IMPORTANT** step and must be performed. Assembly of parts with burrs can cause stress risers and eventual part failure. Various tools can be used. An official deburring tool is nice, but a ½" drill bit can do a good job on most holes. Radius and smooth sharp corners with files or fine grit sanders and grinders. Edges of certain parts also need deburring.....a good file works here.

A few special tools will be needed: An air compressor, spray gun and regulator and a good respirator. These can be rented (or come with the painter). "Clecos" make trial fitting and assembly go smooth on assemblies such as windows, cowling and firewall. If this proves too expensive, pop rivets can be used and drilled out. We have included extra just for this reason.

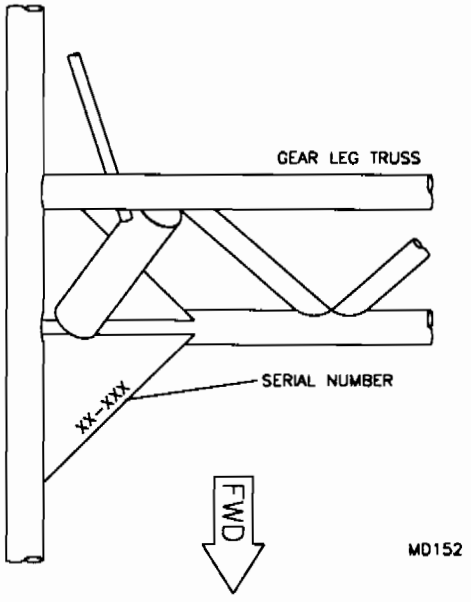
When installing rod ends and similar hardware, be certain at least ten threads are engaged, unless directed otherwise within the text.

CLECOS: These are temporary fasteners that will be used to hold things together while fitting and drilling. The clecos are color coded as to hole size. Silver #40 Copper #30 Gold #11

To use, simply set the cleco in the special pliers, squeeze closed, insert into the hole and release. (Reverse for removal). You will find the clecos to be extremely useful throughout assembly.

RIVETS: Your kit is supplied with various sizes of aluminum and stainless steel pop rivets. Even though we are careful, there is always the chance of the packages being mis-labeled. So before riveting, be sure to double check that you have the correct aluminum or stainless steel pop rivet for the particular section you are working on.

A RANS aircraft is almost as much fun to build as it is to fly and with a little care and planning your ship could be a show stopper.....Send us a picture of your work in progress or your finished plane. As always, we're here to help so give us a call if you run into a problem.



RANS S-10 SAKOTA
SERIAL PLATE LOCATION

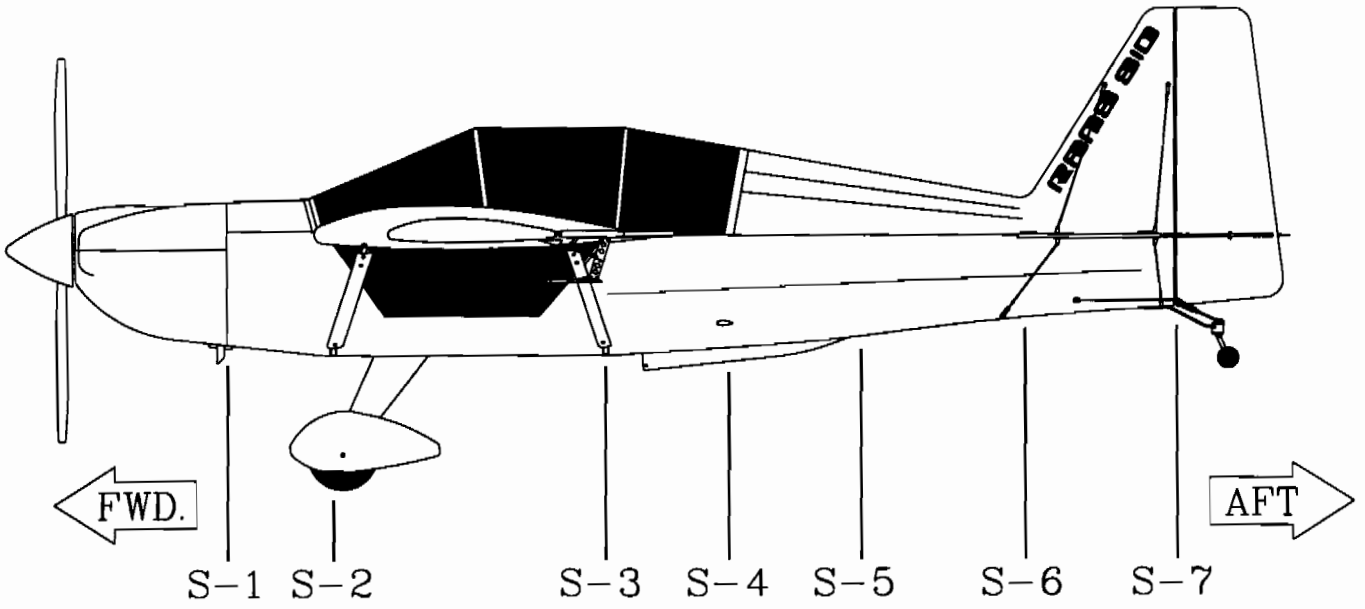
ORIENTATION

We highly recommend that you completely read through these instructions before beginning assembly of your **RANS KITPLANE**. It will help you immensely to understand the code we have used to label parts. As you can see from your packing list, each part is assigned a number. Some parts supplied by other manufactures are given the manufacturer's part name such as all the AN-Hardware and other fittings. For parts of our own manufacture, we have used word abbreviation and condensing.....Example: W-DB-1 is Wing - Drag Brace One. Some of the abbreviations used are: TG-Tail Group; W-Wing or Windshield; LG-Landing Gear; CS-Control Stick; FC-Fuselage Cover; ST-Seat, etc.

Station One (S-1) is the first structural member starting at the nose of the plane (see drawing below). As you progress towards the tail, you pass all the stations.

When a left side part is called it refers to the plane's left and your left if you were sitting in the cockpit looking forward. Fwd means toward the front; Aft means toward the tail.

Again, it is highly recommended that you study the entire instruction manual before beginning assembly. If there is any procedure that you do not fully understand, please give us a call.



MD2950

WARRANTY INFORMATION

KODIAK RESEARCH, INC.
P.O. BOX N7113
MARLBOROUGH HOUSE
CUMBERLAND ST.
NASSAU, N.P. BAHAMAS

PH: (305) 776-9904
FAX: (305) 776-9908

Attn: O.E.M.'s

Date: October 31,1991

Subject: Warranty Extension Requests

Dear Customer (RANS, Inc.),

1) In order for your customers (the builder) to receive their six month full warranty from time of first use, you must submit for extension on the enclosed form (please add your letterhead to this form). If no request is received warranty will begin from the date invoice was sent to your customer (the builder).

2) Extension will be required, for any warranty outside the original six month period. This must be submitted prior to any claim or failure and cannot be applied retro-actively.

3) Supply a copy of original customer request and reason for same as per guideline, submit with your verification on request form.

4) All request must be submitted by manufacturer only. Any request for extensions from retail customers direct will be forwarded to the O.E.M. to process in the above format.

If you have any problem understanding this policy please call for clarification.

FAA PROCEDURES

--Obtaining an "N" Number

--Registration

--Obtaining An Airworthiness Certificate

OBTAINING AN "N" NUMBER

In order to register your plane, it will be necessary to obtain an identification number for the plane. This is referred to as an "N" number.

If any number is acceptable to you, write to the FAA Aircraft Registry, Dept. of Transportation, P.O. Box 25504, Oklahoma City, OK 73125 and ask them to assign you a free U.S identification number of their choice.

If you prefer a number of your own choosing or a smaller number, you may be able to obtain the exact number you want by asking the FAA registry to assign you a specific number of your choice.

NOTE: U.S. identification numbers do not exceed 5 symbols in addition to the prefix "N". These symbols may be all numbers (N55555), one to four numbers and a suffix letter (N5555A or N5A), or one to three numbers and two suffix letters (N555AB).

If you request a special "N" number it would be best to list at least five choices in case your first choice is not available. A special number of your own choosing will cost $10.00 and you should enclose that fee with your letter.

When To Obtain Your "N" Number

If you plan to complete your kit within a very short time, it is recommended that you obtain your "N" number right away. If your project will be fairly lengthy, you will not need to obtain your number until the last several months of construction. Keep in mind that if you request a special "N" number it can be reserved for no longer than one year. If this number has not been affixed to the fuselage within this time and the registration completed, it will be necessary to pay an additional $10.00 to reserve that number for another year.

AFFIDAVIT OF OWNERSHIP FORM

Enclosed you will find an Affidavit of Ownership Form. This form should accompany your letter requesting the assignment of an "N" number.

This form must be notarized as it establishes your ownership to the airplane even though you know you did build it. It will be used by the FAA to create a file on your aircraft and will serve as a legal document and a **substitute for the Bill of Sale** (AC Form 8050-2) that a buyer gets when he buys any existing airplane.

KODIAK RESEARCH, INC.
P.O. BOX N7113
MARLBOROUGH HOUSE
CUMBERLAND ST.
NASSAU, N.P. BAHAMAS

CALCULATING WARRANTY

"When does the warranty start?"

1. The final owner should have a six (6) month period of operation to find any proven defective part in his engine or Rotax assembly.

2. There is, however, a one (1) year limit which starts on our invoice date to you. If we sold you an engine today, unless we hear from you, the warranty will end one year from today's date regardless of whether the engine was delivered to a customer of yours or not.

EXAMPLE A: We invoice an engine to you today and two (2) weeks later the engine is sold to your customer and put into service. Six (6) months from date of sale to customer the warranty period is finished. (The customer has owned the engine for six (6) months.)

EXAMPLE B: Engine is invoiced to you today but not put into service (not sold by you) for 3, 4, 5, or up to 6 months later. Your customer still has 6 months warranty as it still falls in the one period to you.

EXAMPLE C: Engine is invoiced to you today, but for some legitimate reason, either at your end or at your customer's end, the engine cannot be put into service until 7 months or up to a maximum of the 12 months after the invoice date to you. Then, before the 12 months from invoice date to you are up, you advise us that the engine still has not been used and ask us for a one time, 6 month extension together with a valid reason. We ask permission from Rotax for a 6 month extension of that particular engine. To this date, we have not been refused a **legitimate** request for extension. In this case, warranty period will elapse 18 months from our invoice date to you.

3. As you can see, it is important to properly rotate your engine stock. Never send out a newly arrived engine if you still have older engines in house.

REGISTERING YOUR AIRCRAFT

After you have written the Aircraft Registry requesting an "N" number, you will receive a form letter giving your number assignment. You will also receive a blank Aircraft Registration Form. (Sample Enclosed.) Complete the Application for Aircraft Registration (Form 8050-1) and return it to the Aircraft Registry along with the $5.00 registration fee.

Retain the **PINK** copy of the Registration and mail both the **WHITE** original and the **GREEN** copy. Your **PINK** copy is your authority to operate the aircraft, **when carried in the aircraft with an appropriate and current airworthiness certificate**.

RECEIVING AUTHORITY TO FLY YOUR AIRCRAFT

Registration alone does not authorize you to fly your aircraft. The aircraft must, after it has been properly registered, also obtain an Airworthiness Inspection by an inspector of the FAA, at which time the necessary Airworthiness Certificate may be issued. Then, and only then, is your aircraft ready for flight.

WHAT IS THE PROCEDURE FOR OBTAINING AN AIRWORTHINESS CERTIFICATE

Since the final step in obtaining an Airworthiness Certificate is to obtain an inspection of your airplane by an official of the FAA, it is a good idea to make an early contact with the FAA inspector's office nearest your home. Members of the local EAA chapter or a local flying service may be able to help direct you to this office. The purpose of such an early contact would be to discuss with the FAA representative, your proposed home built project and to generally familiarize yourself with the procedures established by the FAA for home built projects. At this time you can establish a tentative plan for inspection of the aircraft upon completion. The typical FAA inspector is interested in your project and wants to help you do a good job.

The FAA requires that everyone building an airplane must maintain a construction log of the work he does on his airplane. You can use a notebook of conventional size and keep a daily diary of the work done on your aircraft. Since all our planes come with assembly manuals, it is a good idea to also make notes in the manual as well as listing dates when certain procedures were done. It is a very good idea to take photographs of work on your plane in various stages. This helps to document that you, the builder, actually completed 51% of this kit. (Advisory Circular 20-27C available from the FAA or EAA describes the procedure used so that your logbook will be a verification of having complete at least 51% of the aircraft yourself.)

WHAT ARE THE SPECIAL REQUIREMENTS AS FAS AS ATTACHING NUMBERS AND PLACARDS TO A HOME BUILT AIRCRAFT?

10-1 DISPLAY OF MARKS (Reference is FAR Part 45.23)

After you obtain the registration for your aircraft, the Registration numbers or marks must be affixed to the aircraft in some permanent fashion. The marks must be legible and have ornamentation. They must contrast in color with the background.

The marks displayed on the aircraft shall include the letter "N" signifying U.S. Registry, followed by the registration number issued for the aircraft.

In addition, amateur-built (Experimental) aircraft must have displayed on that aircraft near each entrance to the cabin or cockpit, in letters not less than 2" nor more than 6" in height, the word, "EXPERIMENTAL"

10-2 LOCATION OF MARKS ON FIXED WING AIRCRAFT (Reference is FAR Part 45.25)

(b)(1) If displayed on the vertical tail surfaces, horizontally on both surfaces, horizontally on both surfaces of a single vertical tail or on the outer surfaces of a multivertical tail. However, an aircraft on which marks at least 3" high may be displayed and in accordance with 45.29(b)(1), the marks may be displayed vertically on the vertical tail surfaces.

(2) If displayed on the fuselage surfaces, horizontally on both sides of the fuselage between the trailing edge of the wing and the leading edge of the horizontal stabilizer. However, if engine pods or other appurtenances are located in this area and are an integral part of the fuselage side surfaces, the operator may place the marks on those pods or appurtenances.

10-3 SIZE OF MARKS

FAR 45.29(b)(1)(iii) states "Marks at least 3" high may be displayed on an aircraft for which an experimental certificate has been issued under 21.191(d) or 21.191(g) for operating as an exhibition aircraft or as an amateur-built aircraft when the maximum cruising speed of the aircraft does not exceed 180 knots Calibrated Air Speed (CAS).

And © characters must be two-thirds as wide as they are high except "1" which must be one-sixth as wide as it is high and the letters "M" and "W" which may be as wide as they are high.

(d) Characters must be formed by solid lines one-sixth as thick as the character is high.

(e) Spacing. The space between each character may not be less than one-fourth of the character width.

10-5 IDENTIFICATION PLATE (Reference is FAR Part 45.11)

In addition to affixing the aircraft's registration number to the sides of the fuselage, the builder must also identify his aircraft by attaching an identification plate to the aircraft's structure.

This identification data required to be inscribed on the plate for amateur-built aircraft shall include the following information:

a. Builder's name and address
b. Model designation
c. Builder's serial number
d. Date of manufacture

The identification plate containing these essential elements must be of fireproof material and must be secured in such a manner that it will not likely be defaced or removed during normal service, or lost or destroyed in an accident. It must be secured to the aircraft at an accessible location near an entrance, except that if it is legible to a person on the ground it may be located externally on the fuselage near the tail surface.

The identification plate information must be marked thereon by etching, stamping, engraving, or other acceptable fireproof marking.

Metal plates which comply with these requirements may be purchased from the Experimental Aircraft Association for the very nominal fee of $5.00 per each set.

AIRCRAFT INSTRUMENT MARKINGS & COCKPIT PLACARDS

Your reference is FAR Part 91.31 Civil Aircraft Operating Limitations and Marking Requirements.

8-1 GENERAL

To insure that each person operating an aircraft does so within the operating limitations prescribed for it, the FAA requires that there is available in it a current Flight Manual, appropriate instrument marking and placards, **or any combination there of.**

The purpose of the flight manual, markings and placards is to detail for the operator of the aircraft, the operational limitations prescribed for the aircraft.

In lieu of a flight manual most amateur builders prefer to mark their instruments and to affix the necessary placards to the instrument panel as the primary means for complying with these requirements.

8-2 MARKINGS AND PLACARDS

The markings and placards necessary for the safe operation and handling of the aircraft should be displayed in a conspicuous place and may not be easily erased, disfigured or obscured. Such placards and markings should include but not necessarily be limited to the following criteria: special emphasis on fuel system markings are very important; such as fuel valves-on-off fuel octane quantity, unusable fuel, minimum fuel for take-off, minimum fuel for inverted flight, etc.

8-3 POWERPLANTS INSTRUMENT MARKINGS

Each required powerplants instrument should be marked to indicate the maximum and, if applicable, minimum safe operating limit with a red radial line.

Each normal operating range is to be marked with a green arc not extending beyond the maximum and minimum continuous safe operating limits.

Each engine speed range that is restricted because of excessive vibration should be marked with a red arc.

8-4 AIRSPEED INSTRUMENT MARKINGS

The airspeed indicator should be marked with a **radial red line** to establish the never-exceed speed (Vne).

The takeoff and any precautionary range should be marked with a **yellow arc**. The normal range is marked with a **green arc**. The flap actuation range is marked with a **white arc**.

8-5 AIRSPEED PLACARDS

There should be an airspeed placard in clear view of the pilot and as close as practicable to the airspeed indicator listing:

The design maneuvering speed.
The maximum landing gear operating speed (if applicable).
The maximum flap extension operating speed (if applicable).

8-6 LANDING GEARS

If a retractable landing gear is used, an indicator should be marked so that the pilot can, at any time, ascertain that the wheels are secured in their extreme positions.

Each emergency control should be **red** and must be marked as to method of operation and identity.

8-7 CONTROL MARKINGS

Each fuel tank selector should be marked to indicate the position corresponding to each tank and to existing cross feed position.

If safe operation requires the use of any tanks in a specific sequence, that sequence must be identified.

8-8 POWERPLANT FUEL CONTROLS

Each fuel tank selector should be marked to indicate the position corresponding to each tank and to existing cross feed position.

If safe operation requires the use of any tanks in a specific sequence, that sequence must be identified.

8-9 FLIGHT MANEUVER PLACARD

For non-acrobatic category airplanes, there should be a placard in front of and in clear view of the pilot stating: "No acrobatic maneuvers, including spins, approved."

For acrobatic category airplanes, there should be a placard in clear view of the pilot listing the approved acrobatic maneuvers and the recommended entry airspeed for each. If inverted flight maneuvers are not approved, the placard must have a notation to this effect.

8-10 BAGGAGE PLACARD

The maximum baggage load permitted should be displayed in a conspicuous place adjacent to the baggage area.

8-11 PASSENGER WARNING PLACARD

A placard must be affixed to the aircraft so that it is readily seen in the cockpit. It will state: "Passenger Warning-This aircraft is amateur built and does not comply with the Federal Safety Regulations for "Standard Aircraft". This placard is part of a set available from EAA. See Section 10-5.

MY AIRCRAFT IS COMPLETED, ALL MARKING AND PLACARDS ARE IN PLACE. WHAT ELSE MUST I DO TO MY AIRCRAFT BEFORE I AM READY FOR MY PRE-CERTIFICATION INSPECTION?

Included in your manual is a weight and balance sheet. This will need to be completed before the inspection.

You will need to purchase a logbook for the aircraft, engine and propeller. These can be separate books or just one.

Have handy a copy of your Sales Invoice from us.

I FEEL I AM READY FOR INSPECTION BY THE FAA INSPECTOR, WHAT DO I DO?

If you have had prior contact with your FAA inspector, you will probably be familiar with the procedures used by that office. Different offices have slightly different procedures. Some inspectors will help you fill out the paperwork at the time of inspection. Others require that you submit the paperwork prior to inspection. If you are not sure and there are no other builders in your area to ask, you could call and ask the local office. Or you can submit the following to the Inspector's Office.

1. A letter requesting a final inspection.
2. Form 8130-12 Eligibility Statement (sample follows).
3. Form 8130-6 Application for Airworthiness Certificate (sample follows).
4. A 3-view drawing of the aircraft or photos of topside and front view. Include with this the following:

   Horsepower rating of engine and type of prop.
   Empty weight and maximum weight at which the aircraft will be operated.
   Number of seats and their arrangement (tandem, side by side).
   Whether single or dual controlled.
   Fuel capacity.
   Maximum speed at which you expect to operate the aircraft.

5. Estimated time or number of flights required. (Usually 25 hours for aircraft equipped with certified aircraft engine and prop combinations and 40 hours for those with non-aircraft engine propeller combinations.)

6. The area over which you will be testing. (Request an area encompassing a 25 mile radius for day VFR operations. Exclude congested areas and airways, but try to include nearby airports even if a few miles beyond the 25 mile radius.

Upon satisfactory completion of the necessary final FAA inspection of the aircraft and whatever ground tests may be required, the FAA Inspector will issue your amateur-built "Experimental" Airworthiness Certificate. Along with the certificate you will be given certain "**OPERATING LIMITATIONS**" under which you must operate the aircraft.

OPERATING LIMITATIONS

13-1 MANDATORY TEST FLIGHT PROVING PHASE

All amateur-built sport aircraft as well as standard aircraft have federally imposed operating limitations.

Upon satisfactory completion of the necessary final FAA Inspection of the aircraft and whatever ground tests may be required, the FAA Inspector will issue your amateur-built "Experimental" Airworthiness Certificate.

He will also issue a form letter establishing the operating limitations applicable to your aircraft during its mandatory flight proving period. These Special Airworthiness Experimental Operating Limitations must be displayed in the aircraft at all times. (See sample Operating Limitations, Figure 13-1).

The operating limitations imposed on the aircraft during its flight proving period will be more stringent than those issued later after the mandatory flight testing phase has been completed.

This phase may begin with the issuance of the aircraft's initial airworthiness certificate and the original operating limitations. At this time the FAA Inspector will acquaint you with the requirement for a mandatory flight test and proving period. This flying will be confined to an assigned flight area approved by the FAA Inspector.

The presence of the FAA Inspector is not required, by regulation, at the initial flight of the experimental amateur-built aircraft. If time permits, however, it is not unusual for him to attend.

If he deems necessary, the inspector could issue a permit for a single flight within the boundaries of the airport and, upon witnessing the safe completion of the test, issue a further permit for more extended flights within the permissible area.

A tremendous responsibility for the safe operation of the experimental aircraft rests on the FAA Inspector. If the plane has any new and unusual features he will naturally tend to treat its first flights with care. Also pilot qualification and skill is a consideration.

13-2 PURPOSE OF THE FLIGHT TEST PERIOD

A flight test period is necessary to show to the FAA that the aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed. It will also serve to prove that the aircraft has no hazardous operating characteristics or design features.

13-3 DURATION OF MANDATORY FLIGHT TEST PERIOD

For standard aircraft type engines: When an FAA approved aircraft engine/propeller combination is installed the flight test period is usually limited to 25 hours of flight time.

For non-aircraft type or automotive engines: An aircraft equipped with such an engine is required to be flown for a longer test period, usually at least 40 hours, to prove its reliability.

NOTE: It should be understood that the local FAA Inspector has the prime responsibility in determining the extent of the flight test period to be required for your aircraft. He is permitted to exercise considerable discretion in extending or in reducing the number of hours required to be flown during this period.

13-4 FLIGHT TEST AREA

The FAA Inspector will authorize the flight tests to be carried out in a designated and limited test area, usually, within a 25 mile radius of the aircraft's base of operations.

He will insure that the area selected is not over densely populated areas or in a congested airway.

In assigning the flight test area the FAA Inspector may modify the size and shape of the area to suit the best purposes of the flight test program. In some locations, particularly around bigger cities where air traffic is heavy, a flight test area may not be practical. The builder must be prepared to except that an approved flight test area may not be the one chosen to him as the most convenient.

13-5 OTHER LIMITATIONS DURING THE FLIGHT TEST PERIOD

As a rule, the carrying of passengers or other crew members will not be permitted unless necessary to the safe operation of that aircraft.

13-6 AIRCRAFT FLIGHT LOG

During the flight test period, the pilot should record the aircraft flight history in an appropriate log book. This should be in addition to any engine tachourmeter or engine hourmeter that may be installed in the aircraft.

Specifically, the duration of each individual flight should be recorded including the number of landings made.

A full description of any mishaps, however minor, or any experiences not entirely normal that occur during the flight experience period should also be duly recorded.

Although not required, it is strongly recommended that all operating data be recorded flight by flight. Such information as airspeeds, cylinder head temperatures, etc., will be very valuable and may be used to determine or establish the various performance figures and operating characteristics of the aircraft.

Although the FAA Inspector is required by law to apply certain basic restrictions permanently to the amateur-built aircraft he is certificating, he can apply whatever other limitations he deems necessary at his own discretion. Unfortunately, nothing in the regulations states that the initial restrictions are required to be removed after successful completion of the test period...they only may be modified.

After the mandatory flight test period...then what?

REPAIRMAN'S CERTIFICATION

The Repairman's Certificate is applied for using the application from 8610-2, available from the local FAA offices. You should ask for this when you apply for your final inspection on your aircraft. You should also be familiar with the Appendix D of FAR part 43. (Items included in the Annual Condition Inspection.)

The Repairman's Certificate is only available to those who have built 51% or more of the specific aircraft they are having inspected.

Every twelve calendar months a condition inspection is performed in accordance with Appendix D of FAR part 43. The repairman has to include the aircraft total time in service, the name, the signature and the certificate type number of the repairman or A & P, who does the examination.

A & P mechanics must do the Annual Condition Inspection for those who are non-builders who own an amateur-built aircraft. On those aircraft where the builder has a Repairman's Certificate, it is recommended that from time to time the Annual Condition Inspection of those aircraft be done by an A & P simply as a check on the builder/repairman's work. One legal representative recommends that every other Annual Condition Inspection for a builder holding a repairman's certificate be done by an A & P mechanic.

AFFIDAVIT OF OWNERSHIP FOR AMATEUR-BUILT AIRCRAFT

U.S. Identification Number: N12344

Builder's Name: John Q. Amateur

Model: RANS S-9 Serial Number: 1288054

Class (airplane, rotorcraft, glider, etc.): Airplane

Type of Engine Installed (reciprocating, turbopropeller, etc.): Reciprocating

Number of Engines Installed: 1

Manufacturer, Model, and Serial Number of each Engine Installed: Rotax 503 3572333

Built for Land or Water Operation: Land

Number of Seats: 1

The above-described aircraft was built from parts by the undersigned and I am the owner.

(Signature of Owner-Builder)

State of: Kansas

County of: Anywhere

Subscribed and sworn to me before this _____ day of _____ , 19_____ .

My commission expires _____.

(Signature of Notary Public)

THIS PAGE IS ONLY A SAMPLE

AC Form 8050-88 (9-75) (0052-00-559-0002) Supersedes previous edition

FORM APPROVED
OMB No. 2120-0042

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION-MIKE MONRONEY AERONAUTICAL CENTER
AIRCRAFT REGISTRATION APPLICATION

CERT. ISSUE DATE

UNITED STATES REGISTRATION NUMBER N 1234Y

AIRCRAFT MANUFACTURER & MODEL
RANS S-9

AIRCRAFT SERIAL No.
1288054

FOR FAA USE ONLY

TYPE OF REGISTRATION (Check one box)

☒ 1. Individual ☐ 2. Partnership ☐ 3. Corporation ☐ 4. Co-owner ☐ 5. Gov't. ☐ 8. Non-Citizen Corporation

NAME OF APPLICANT (Person(s) shown on evidence of ownership. If individual, give last name, first name, and middle initial.)

John Q. Amateur

TELEPHONE NUMBER: (913) 888-8888

ADDRESS (Permanent mailing address for first applicant listed.)

Number and street: #1 Build-it Road

Rural Route: P.O. Box:

CITY	STATE	ZIP CODE
Anytown	KS	67601

☐ **CHECK HERE IF YOU ARE ONLY REPORTING A CHANGE OF ADDRESS**

ATTENTION! Read the following statement before signing this application. This portion MUST be completed.

A false or dishonest answer to any question in this application may be grounds for punishment by fine and / or imprisonment (U.S. Code, Title 18, Sec. 1001).

CERTIFICATION

I/WE CERTIFY:

(1) That the above aircraft is owned by the undersigned applicant, who is a citizen (including corporations) of the United States.

(For voting trust, give name of trustee: _____), or:

CHECK ONE AS APPROPRIATE:

a. ☐ A resident alien, with alien registration (Form 1-151 or Form 1-551) No. _____

b. ☐ A non-citizen corporation organized and doing business under the laws of (state) _____ and said aircraft is based and primarily used in the United States. Records or flight hours are available for inspection at _____

(2) That the aircraft is not registered under the laws of any foreign country; and

(3) That legal evidence of ownership is attached or has been filed with the Federal Aviation Administration.

NOTE: If executed for co-ownership all applicants must sign. Use reverse side if necessary.

TYPE OR PRINT NAME BELOW SIGNATURE

EACH PART OF THIS APPLICATION MUST BE SIGNED IN INK.

SIGNATURE	TITLE	DATE
John Q. Amateur	Builder/Owner	3/16/88
John Q. Amateur		

NOTE Pending receipt of the Certificate of Aircraft Registration, the aircraft may be operated for a period not in excess of 90 days, during which time the PINK copy of this application must be carried in the aircraft.

AC Form 8050-1 (12/90) (0052-00-628-9007) Supersedes Previous Edition

AC FORM 8050-1 IS A 3-PART FORM

THIS PAGE IS ONLY A SAMPLE

Form Approved
O.M.B. NO. 2120-0018

US Department of Transportation
Federal Aviation Administration

ELIGIBILITY STATEMENT AMATEUR-BUILT AIRCRAFT

Instructions: Print or type all information except signature. Submit original to an authorized FAA representative. Applicant completes Section I thru III. Notary Public Completes Section IV.

I. REGISTERED OWNER INFORMATION

Name(s) John Q. Amateur

Address(es) #1 Build-it Road (No. & Street) Anytown (City) KS (State) 67601 (Zip)

Telephone No.(s) (913) 888-8888 (Residence) ( ) (Business)

II. AIRCRAFT INFORMATION

Model RANS S-9

Engine(s) Make Rotax 503

Assigned Serial No. 1288054

Engine(s) Serial No.(s) 3572333

Registration No. N1234Y

Prop./Rotor(s) Make Sterba

Aircraft Fabricated: Plan ☐ Kit ☒

Prop./Rotor(s) Serial No.(s)

III. MAJOR PORTION ELIGIBILITY STATMENT OF APPLICANT

I certify the aircraft identified in Section II above was fabricated and assembled by John Q. Amateur
(Name of Person(s) (Please Print))
for my (their) education or recreation. I (we) have records to support this statement and will make them available to the FAA upon request.

— NOTICE —

Whoever in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or who makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years, or both (U.S. Code, Title 18, Sec. 1001.)

APPLICANT'S DECLARATION

I hereby certify that all statements and answers provided by me in this statement form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

Signature of Applicant *(In Ink)* John Q. Amateur — Date 3/16/88

IV. NOTARIZATION STATEMENT

THIS MUST BE NOTARIZED!

THIS PAGE IS ONLY A SAMPLE

Form Approved
O.M.B. No. 2120-0018

US Department of Transportation
Federal Aviation Administration

APPLICATION FOR AIRWORTHINESS CERTIFICATE

INSTRUCTIONS — Print or type. Do not write in shaded areas, these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use an attachment. For special flight permits complete Sections II and VI or VII as applicable.

I. AIRCRAFT DESCRIPTION

1. REGISTRATION MARK	2. AIRCRAFT BUILDER'S NAME (Make)	3. AIRCRAFT MODEL DESIGNATION	4. YR MFR	FAA CODING
N1234Y	John Q. Amateur	RANS S-9	88	
5. AIRCRAFT SERIAL NO	**6. ENGINE BUILDER'S NAME (Make)**	**7. ENGINE MODEL DESIGNATION**		
1288054	Rotax	503		
8. NUMBER OF ENGINES	**9. PROPELLER BUILDER'S NAME (Make)**	**10. PROPELLER MODEL DESIGNATION**	**11. AIRCRAFT IS (Check if applicable)**	
1	Sterba	Wood 64 X 44	IMPORT	

II. CERTIFICATION REQUESTED

APPLICATION IS HEREBY MADE FOR: (Check applicable items)

A	1		STANDARD AIRWORTHINESS CERTIFICATE (Indicate category)		NORMAL		UTILITY		ACROBATIC		TRANSPORT		GLIDER		BALLOON		
B		X	SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items)														
	2		LIMITED														
	5		PROVISIONAL (Indicate class)	1		CLASS I											
				2		CLASS II											
	3		RESTRICTED (Indicate operation(s) to be conducted)	1		AGRICULTURE AND PEST CONTROL		2		AERIAL SURVEYING		3		AERIAL ADVERTISING			
				4		FOREST (Wildlife conservation)		5		PATROLLING		6		WEATHER CONTROL			
				7		CARRIAGE OF CARGO		0		OTHER (Specify)							
	4	X	EXPERIMENTAL (Indicate operation(s) to be conducted)	1		RESEARCH AND DEVELOPMENT		2	X	AMATEUR BUILT		3		EXHIBITION			
				4		RACING		5		CREW TRAINING				MKT SURVEY			
				0		TO SHOW COMPLIANCE WITH FAR											
	8		SPECIAL FLIGHT PERMIT (Indicate operation to be conducted, then complete Section VI or VII as applicable on reverse side)	1		FERRY FLIGHT FOR REPAIRS, ALTERATIONS, MAINTENANCE OR STORAGE											
				2		EVACUATE FROM AREA OF IMPENDING DANGER											
				3		OPERATION IN EXCESS OF MAXIMUM CERTIFICATED TAKE-OFF WEIGHT											
				4		DELIVERING OR EXPORT		5		PRODUCTION FLIGHT TESTING							
				6		CUSTOMER DEMONSTRATION FLIGHTS											
C	6		MULTIPLE AIRWORTHINESS CERTIFICATE (Check ABOVE "Restricted Operation" and "Standard" or "Limited," as applicable.)														

III. OWNER'S CERTIFICATION

A. REGISTERED OWNER (As shown on certificate of aircraft registration) — **IF DEALER, CHECK HERE** ⟶

NAME	ADDRESS
John Q. Amateur	#1 Build-it Road Anytown, KS 67601

B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)

AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.)	AIRWORTHINESS DIRECTIVES (Check if all applicable AD's complied with and give latest AD No.)
AIRCRAFT LISTING (Give page number(s))	SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated)

C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS

CHECK IF RECORDS IN COMPLIANCE WITH FAR 91.173.	TOTAL AIRFRAME HOURS	3	EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewed)
			0

D. CERTIFICATION I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Section 501 of the Federal Aviation Act of 1958, and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.

DATE OF APPLICATION	NAME AND TITLE (Print or type)	SIGNATURE
3/16/88	John Q. Amateur	John Q. Amateur

IV. INSPECTION AGENCY VERIFICATION

A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY (Complete this section only if FAR 21.183(d) applies)

2	FAR PART 121 OR 127 CERTIFICATE HOLDER (Give Certificate No.)	3	CERTIFICATED MECHANIC (Give Certificate No.)	6	CERTIFICATED REPAIR STATION (Give Certificate No.)
5	AIRCRAFT MANUFACTURER (Give name of firm)				

DATE	TITLE	SIGNATURE

V. FAA REPRESENTATIVE CERTIFICATION

(Check ALL applicable blocks in items A and B)

A. I find that the aircraft described in Section I or VII meets requirements for

- THE CERTIFICATE REQUESTED
- 4 AMENDMENT OR MODIFICATION OF CURRENT AIRWORTHINESS CERTIFICATE

B. Inspection for a special flight permit under Section VII was conducted by

- FAA INSPECTOR
- FAA DESIGNEE
- CERTIFICATE HOLDER UNDER
- FAR 65
- FAR 121, 127 or 135
- FAR 145

DATE	DISTRICT OFFICE	4	DESIGNEE'S SIGNATURE AND NO.	1	FAA INSPECTOR'S SIGNATURE

FINAL INSPECTION

Listed below are two checklists. One is a sample checklist for condition inspection from the FAA and the other is an EAA safety checklist. These should be very helpful in getting your airplane signed off by the FAA inspector and ensuring that your airplane is safe for operation.

APPENDIX 1. SAMPLE CHECKLIST FOR A CONDITION INSPECTION

AC 90-89

AIRCRAFT IDENTIFICATION:

TYPE/SN. _____ ENGINE MODEL/SN. _____

N NUMBER _____ PROPELLER MODEL/SN _____

A/F TOTAL TIME _____ ENGINE TOTAL TIME _____

OWNER _____ PROPELLER TOTAL TIME _____

	INSPECTOR		BUILDER	
GENERAL:	Sat	Unsat	Sat	Unsat
REGISTRATION/AIRWORTHINESS/OPERATING LIMITATIONS				
AIRCRAFT IDENTIFICATION PLATES INSTALLED				
EXPERIMENTAL PLACARD INSTALLED				
WEIGHT AND BALANCE/EQUIPMENT LIST				
WINGS:				
REMOVE INSPECTION PLATES/FAIRINGS				
GENERAL INSPECTION OF THE EXTERIOR/INTERIOR WING				
FLIGHT CONTROLS BALANCE WEIGHTS FOR SECURITY				
FLIGHT CONTROLS PROPER ATTACHMENT (NO SLOP)				
FLIGHT CONTROL HINGES/ROD END BEARINGS SERVICEABILITY				
FLIGHT CONTROLS PROPERLY RIGGED/PROPER TENSION				
INSPECT ALL CONTROL STOPS FOR SECURITY				
TRIM CONTROL PROPERLY RIGGED				
TRIM CONTROL SURFACES/HINGES/ROD END BEARINGS SERV.				
FRAYED CABLES OR CRACKED/FROZEN PULLEYS				
SKIN PANELS DELAMINATE/VOIDS (COIN TEST)				
POPPED RIVETS/CRACKED/DEFORMED SKIN				
FABRIC/RIB STITCHING/TAPE CONDITION				

LUBRICATION				
WING ATTACH POINTS				
FLYING/LANDING WIRES/STRUTS FOR SECURITY				
CORROSION				
FLIGHT CONTROL PLACARDS				
INSPECT FIREWALL FOR DISTORTION AND CRACKS				
INSPECT RUDDER PEDALS AND BRAKES FOR OPERATION AND SECURITY				
INSPECT BEHIND FIREWALL FOR LOOSE WIRES AND CHAFFING LINES				
CHECK CONTROL STICK/YOKE FOR FREEDOM OF MOVEMENT				
CHECK FLAP CONTROL OPERATION				
CHECK CABLE AND PULLEYS FOR ATTACHMENT AND OPERATION				
PERFORM FLOODLIGHT CARBON MONOXIDE TEST				
ENSURE THE COCKPIT INSTRUMENTS ARE PROPERLY MARKED				
INSPECT INSTRUMENTS, LINES, FOR SECURITY CHECK/CLEAN/REPLACE INSTRUMENT FILTER				
INSPECT COCKPIT FRESH AIR VENTS/HEATER VENTS FOR OPERATION AND SECURITY				
INSPECT SEATS, SEAT BELTS/SHOULDER HARNESS FOR SECURITY AND ATTACHMENT				
CORROSION				
EMPENNAGE/CANARD:				
REMOVE INSPECTION PLATES AND FAIRINGS				
INSPECT CANARD ATTACH POINTS FOR SECURITY				
INSPECT VERTICAL FIN ATTACH POINTS				
INSPECT ELEVATOR/STABILIZER ATTACH POINTS				
INSPECT HINGES/TRIM TABS/ROD ENDS FOR ATTACHMENT AND FREE PLAY(SLOP)				
INSPECT EMPENNAGE/CANARD SKIN FOR DAMAGE/CORROSION				
INSPECT ALL CONTROL CABLES, HINGES AND PULLEYS				
INSPECT ALL CONTROL STOPS				
ENGINE:				
PERFORM COMPRESSION TEST #1 _____ #2 _____ #3 _____ #4 _____ #5 _____ #6 _____				
CHANGE OIL AND FILTER (CHECK FOR METAL)				
INSPECT IGNITION HARNESS FOR CONDITION AND CONTINUITY				
CHECK IGNITION LEAD CIGARETTES FOR CONDITION/CRACKS				
CLEAN AND GAP SPARK PLUGS				
CHECK MAGNETO TIMING/POINTS/OIL SEAL/DISTRIBUTOR				
INSPECT ENGINE MOUNT/BUSHINGS				

CHECK LANDING LIGHT OPERATION				
CHECK POSITION LIGHTS OPERATION				
CHECK ANTI-COLLISION LIGHT FOR OPERATION				
INSPECT ALL ANTENNA MOUNTS AND WIRING FOR SECURITY				
CHECK ALL GROUNDING WIRES (ENGINE TO AIRFRAME, WING TO AILERON/FLAP, ETC)				
INSPECT RADIOS/LEADS/WIRES FOR ATTACHMENT & SECURITY				
INSPECT CIRCUIT BREAKERS/FUSES PANELS FOR CONDITION				
OPERATIONAL INSPECTION:				
VISUAL INSPECTION OF THE ENGINE/PROPELLER				
ALL INSPECTION PANELS AND FAIRINGS SECURE				
PERSONNEL WITH FIRE BOTTLE STANDING BY				
BRAKE SYSTEM CHECK				
PROPER FUEL IN TANKS				
ENGINE START PROCEDURES				
OIL PRESSURE/OIL TEMPERATURE WITHIN LIMITS				
VACUUM GAUGE CHECK				
MAGNETO CHECK/HOT MAG CHECK				
IDLE RPM/MIXTURE CHECK				
STATIC RPM CHECK				
ELECTRICAL SYSTEM CHECK				
COOL DOWN PERIOD/ENGINE SHUT DOWN				
PERFORM OIL, HYDRAULIC, AND FUEL LEAK CHECK				
PAPERWORK:				
AIRWORTHINESS DIRECTIVES				
RECORD FINDINGS AND SIGN OFF INSPECTION AND MAINTENANCE IN LOGBOOKS				

EAA Safety Check List

Spend some time with your plane and this check list before those first flights. Thirty minutes with a pencil here may be worth the rest of your life.

	Yes	No
PROPELLER		
1. Blades		
Laminations not separated?		
Breaks, scratches, nicks tipping?		
Loose rivets in tipping?		
Drain holes in tip clear?		
2. Hub		
Any cracks or corrosion?		
Hub properly seated and safetied?		
3. Control Mechanism		
Oil leaks?		
Worn bearings?		
Secure?		
4. Attachment		
All bolt & nut threads undamaged?		
All bolts & nuts secured & safetied?		
5. Spinner		
Cracks?		
Properly secured?		
Is spinner chafing into prop?		
ENGINE & ENGINE COMPARTMENT		
1. Fuel System		
All lines of approved type?		
All strainers clean?		
All lines secured against vibration?		
Gascolator bowl at low point in system when aircraft is in normal ground position?		
Fuel drains operative?		
All connections properly tightened?		
2. Oil System		
All lines of approved type?		
All lines secured against vibration?		
Oil tank has no cracks or leaks?		
Tank properly secured & safetied?		
All plugs & strainers cleaned & safetied?		
3. Ignition-Electrical System		
All wiring proper type and gauge?		
All fastenings secured & safetied?		
Magnetos properly grounded?		
Spark plugs cleaned & undamaged?		
Spark plugs properly torqued?		
Engine grounded to airframe?		
Starter/generator secured?		
4. Exhaust Manifold		
Secured and safetied?		
All gaskets in good condition?		

	Yes	No
ENGINE & ENGINE COMPARTMENT		
All stacks in good condition-no cracks or rusted-out areas?		
Carb heat and cabin heat muffs removed and manifold inspected?		
5. Controls		
All secured and safetied?		
No excessive play in any linkages?		
No interference between any control and the structure throughout the full operating range?		
Carb heater gate open & close fully?		
6. Mount		
Secured and safetied?		
All joints inspected for cracks?		
Any bends in mount tubes?		
Bushings in good condition?		
7. Cowlings		
Secured and/or safetied?		
All latches or fastenings working properly?		
Any cracks properly checked or reinforced?		
Cowlings clean?		
8. Power Plant in General		
All necessary safeties, palnuts, locknuts, etc. in place?		
No fuel or oil leaks?		
All accessories secured & safetied?		
FUSELAGE-HULL		
1. Structure		
All welds sound?		
All tubing straight and uncracked?		
No rust or corrosion?		
All attach fittings sound, no cracks, elongation of holes or worn threads?		
All rivets properly installed?		
Inspection openings for all vital areas?		
Fuselage properly drained, that is, no built-in moisture traps?		
Firewall of proper fireproof material?		
2. Cover		
Properly attached?		
No tears, distortions, or abrasions?		
Any breaks or ruptures properly repaired?		
3. Control System		
Properly secured and safetied?		
Controls stops provided & adjusted?		
All fittings of proper thread & size?		

	Yes	No
FUSELAGE-HULL		
All pulleys of proper diameter for bends, proper size for cable, and guarded?		
All cable of proper size (1/8" min) and condition?		
Any parts in system subject to rotation for any reason properly secured and safetied?		
Return springs on rudder pedals?		
No interference between any control part (cable, tube or linkage) and any other part of the structure throughout full control movement?		
Adequate room for full control throw when aircraft is occupied?		
Controls arranged to minimize danger of blocking by foreign objects?		
Grip properly secured to control stick or wheel?		
4. Electrical System		
All grommets, particularly in firewall, snug fitting and in good condition?		
All wires of proper gauge, insulated, and secured?		
Wires do not rest on abrasive surfaces?		
Battery installation of sufficient strength?		
Battery properly ventilated and drained?		
No corrosion at or around battery or its vents?		
Fuses of adequate amperage?		
5. Fuel System-Tanks		
Drains properly located to discharge clear of aircraft?		
All outlets properly screened?		
Breather inlets clear?		
Fuel shut-off valve installed?		
Fuel shut-off valve easily reached by pilot?		
All fuel lines of proper approved type?		
All fuel lines secured against vibration?		
Is tank located so that sufficient head is available in maximum climb with minimum fuel? Placard if necessary?		
Has tank sufficient expansion area?		
Any tank overflow discharge clear of hazardous areas on aircraft?		
Is tank support sufficient to meet strength requirements?		
Does tank clear surrounding structure?		
Do tank supports minimize strain and chafing?		

To insure its safe construction and operation, and to further emphasize the vital necessity for thorough consideration of every item which goes into your airplane, the following working check-list should be used, and it is suggested that it be made a part of the aircraft records.

	Yes	No
EXITS		
1. Can aircraft be cleared rapidly in case of emergency?		
Are special precautions available during test period, such as jettisonable doors or canopy?		
If parachute is to worn, does it clear all controls?		
Baggage Compartment		
1. Are walls and floors of sufficient strength to withstand flight loads?		
Can anything escape from baggage compartment by accident?		
Cabin-Cockpit		
1. Instruments		
Are all instruments functioning and accurate?		
Are all instruments marked, max pressures, temperatures, speeds?		
Are all vital instruments easily visible to pilot?		
2. Flight-Engine Controls		
Are all engine controls marked or easily identifiable?		
Are all engine controls smooth in operation, without excessive resistance, and easily available to pilot?		
Are all flight controls arranged so that jamming by dropped gloves, etc. is impossible?		
3. Fuel Systems		
Are all gas valves easily reached by pilot?		
Are all gas valves marked ON, OFF, LEFT, RIGHT?		
Are all gas valves in such a position that accidental operation is impossible or guarded in such a way that accidental operation is impossible?		
4. Seats		
Are seats of sufficient strength for maximum flight loads contemplated?		
Does seat "flex" enough at any time to interfere with flight controls?		
5. Safety Belts and Shoulder Harness		
Is installation and attachments of sufficient strength to meet 9G forward load minimum?		
Does attachment connect directly to primary structure?		
Are belts and harness in top condition?		
Is belt of correct size, that is, no long over-tongue?		
Is a separate belt and shoulder harness supplied for each occupant?		

	Yes	No
6. Heating-Ventilation		
Is cabin or cockpit in negative pressure area and liable to suck in exhaust fumes?		
Is any provision made for ventilating cabin other than normal leakage?		
7. Windshield-Windows		
Are windshield and windows of recognized aeronautical materials?		
Is windshield braced against positive or negative pressures in flight, either by design or extra bracing?		
WING-TAIL SURFACES		
Fixed Surfaces		
Are all interior fastenings secured and/or safetied?		
Is interior properly weatherproofed?		
Have any mice been inside lately?		
Movable Surfaces		
Are stops provided, either at wing or somewhere else in the control system?		
Are all hinges and brackets sound?		
Are all hinge pins secured and safetied?		
Is there any excessive play in hinges?		
Is there any excessive play in control cables or tubes?		
External Bracing		
Is the interior of all struts weather protected?		
Are all adjustable fittings locked, secured, and safetied?		
Are struts undamaged by bends or dents?		
Are all wires serviceable with proper end fittings?		
Attach Fittings		
Are bolts of proper size installed?		
Are all bolts secured and safetied?		
Have all bolts been examined for wear?		
Flight Control Mechanism		
All cables and tubes unbroken or unbent & with proper end fittings?		
All control attachments secured and safetied?		
All pulleys free from interference and guarded?		
All torque tubes and bell cranks in good condition?		
No interference with fuselage or wing structure throughout full control travel?		
Fuel Tanks		
(See Fuselage Section Also)		
Are drains supplied at low point in tank when aircraft is in normal ground position?		

	Yes	No
Fuel overflow drains clear of aircraft - no tendency for overflow to soak into aircraft structure?		
LANDING GEAR		
Properly lubricated?		
Proper oleo inflation?		
Shock cords or springs in good condition?		
All attach fittings uncracked and sound?		
All bolt holes not elongated?		
All attach bolts secured and safetied?		
Brake lines in good condition?		
Brakes operating properly?		
Correct hydraulic fluid in lines?		
Wheels uncracked?		
Tires unworn & properly inflated?		
Excessive side play in wheel bearings?		

GENERAL

ALL BOLTS WHEREVER POSSIBLE, HEAD UP AND FORWARD.

All exterior fastenings visible from cockpit or cabin should have safetied end toward pilot, wherever possible.

A complete walkaround inspection of the aircraft should be accomplished to check that every bolt visible on the exterior is secured and safetied. That there is no visible structural damage. That all inspection panels and covers are in place and attached. That all parts of the aircraft are in proper alignment.

DON'T FORGET TO PUT IN ENOUGH GAS PRIOR TO THAT FIRST FLIGHT - GROUND RUNNING AND TAXI TESTS CAN USE UP A LOT MORE THAN YOU THINK!

OK - Kick the tires, add another coat of paint and AWAY WE GO!

FUEL CAP ASSEMBLY

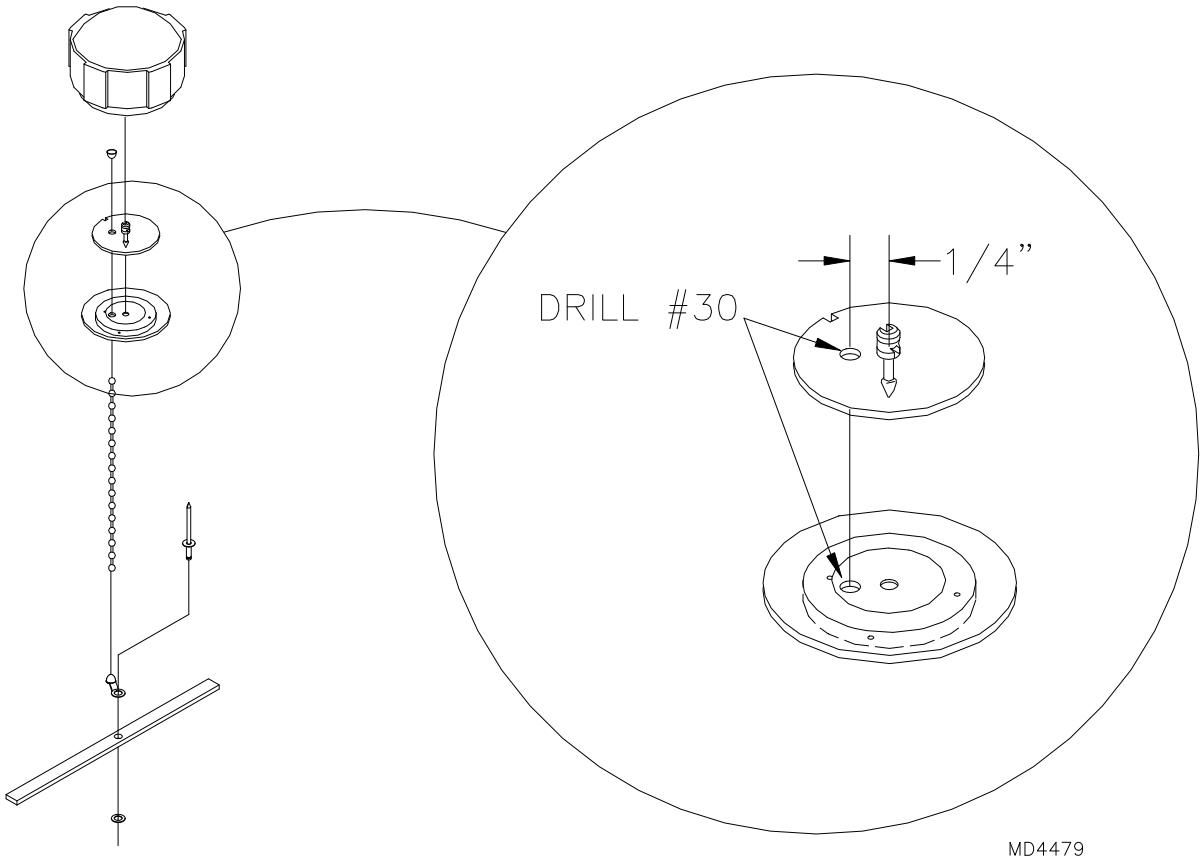
1. Remove the Rubber Gasket and Plastic Baffle from the Fuel Cap. The Plastic Baffle will “snap” out of the Fuel Cap. A screwdriver works well for the removal.

   Locate and drill a #30 hole, 1/4” from the center of the plastic baffle. Refer to **FIGURE 01-01**. Drill through the Plastic Baffle and Rubber Gasket. Deburr. Detach the Rubber Gasket from the Baffle. Note the orientation of the Rubber Gasket.

   Assemble the Bead Chain to the Bead Chain Retainer Sleeve. Install the Bead Chain and Retainer Sleeve through the topside of the Baffle and pull tight. Push the Chain though the drilled hole in the Rubber Gasket. Re-install the Rubber Gasket to the Baffle. Be sure the Chain is pulled tight. “Snap” the Rubber Gasket and Baffle back into the Fuel Cap.

   Install the Bead Chain End Coupling onto the Bead Chain. Find the center of the Plastic Retainer and drill a #30 hole. Using the 1/8” Small Brass Washer, rivet the Plastic Retainer to the Bead Chain End Coupling. See **Figure 01-01.**

FIGURE 01-01



FUEL TANK FITTING INSTALLATION

2. Locate and drill the ½" diameter holes for the fuel fittings at the locations shown in **Figure 01-02.** **IMPORTANT NOTE:** On the **right hand** tank, drill only one hole next to the filler neck for venting. See **Figure 01-02A**. Locate and drill the tank sump valve hole as shown in **Figure 01-02B**. Debur all holes. Place a wire in the fitting hole and up through the filler neck and attach a withdrawal fitting and o-ring to the wire. Make a loop in the end of the wire to keep the parts from falling off, then pull the fitting through the hole with the threaded portion out of the tank. Remove the wire. Hold the fitting with the threaded portion extended out of the tank and slide on the two washers. Apply loctite to the nut and install. **NOTE:** Use a 1/4" allen wrench to hold the tank withdrawal fitting while tightening the nut. Apply thread sealant or loctite to the straight or 90 degree fuel line fittings and screw into the tank withdrawal fitting until snug. **CAUTION:** Do not tighten to the point the tank withdrawal fitting turns into the tank. After tightening, drill up through the withdrawal fitting on the **sump valve hole only** with a 5/16" bit to allow the sump valve to be inserted. Remove **ALL** shavings and loose debris from the interior of the tank. Use a vacuum to assist in the removal.

Install the sump valve **after** covering, use loctite to seam. Use the fuel sampler cup provided to drain any accumulated water in the tanks prior to flight.

FIGURE 01-02

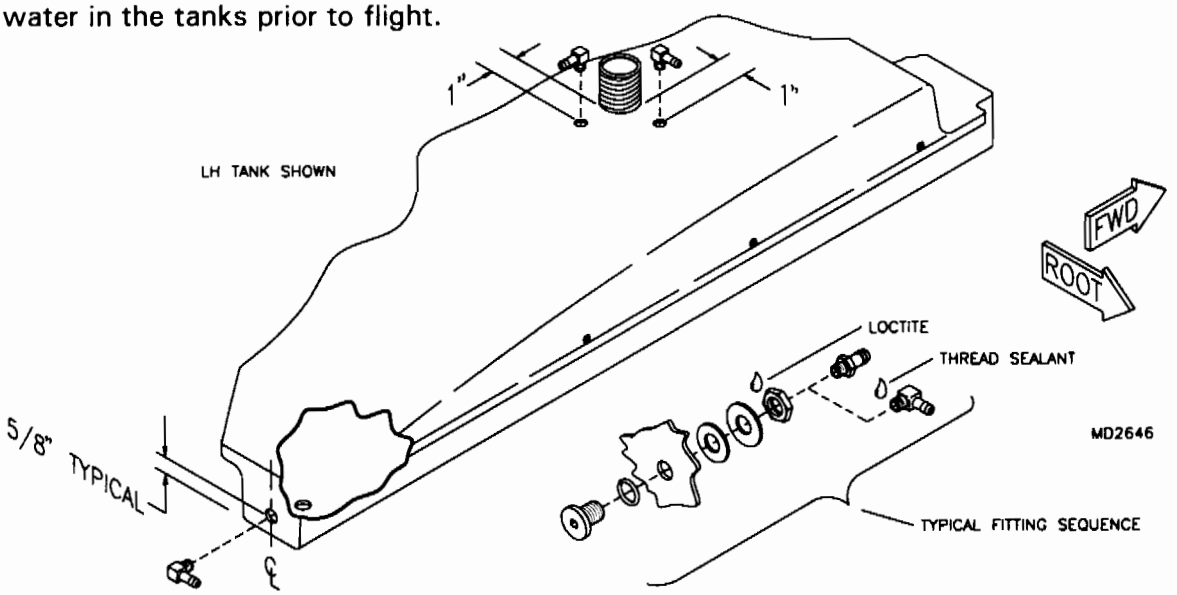


FIGURE 01-02A

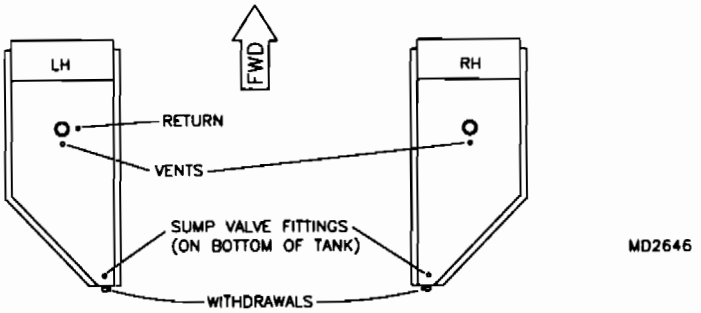
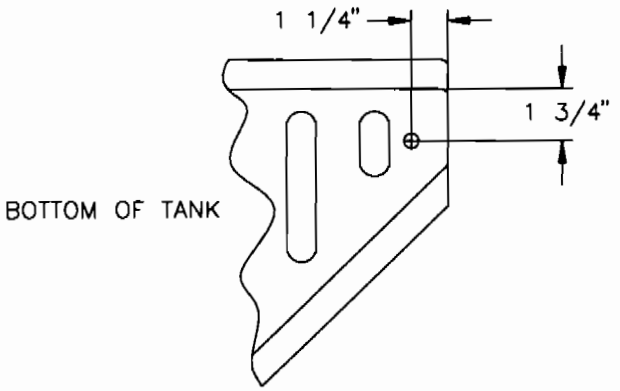


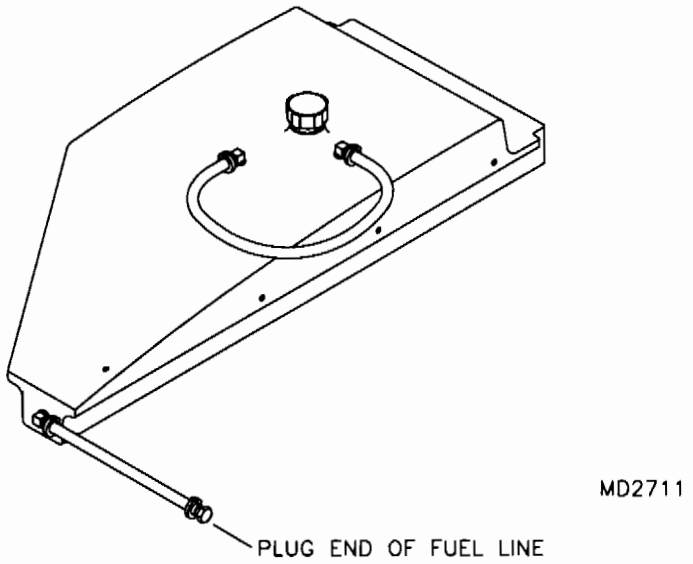
FIGURE 01-02B



LEAK TESTING

3. This method has the advantage of rinsing out the inside of the tank. Install short segments of fuel line to the tank as shown in **Figure 01-03**. Fill the tank with water and inspect for leaks. Drain and let dry.

FIGURE 01-03



S-10 SAKOTA WING ASSEMBLY

Before starting you will need two working height saw horses to support the wing assembly. Saw horses of about 36" seem to work the best.

4. Insert the root doublers flush with the spar root ends. Position the leading edge spar root doublers with the gap 90 degrees to the pre-drilled holes.

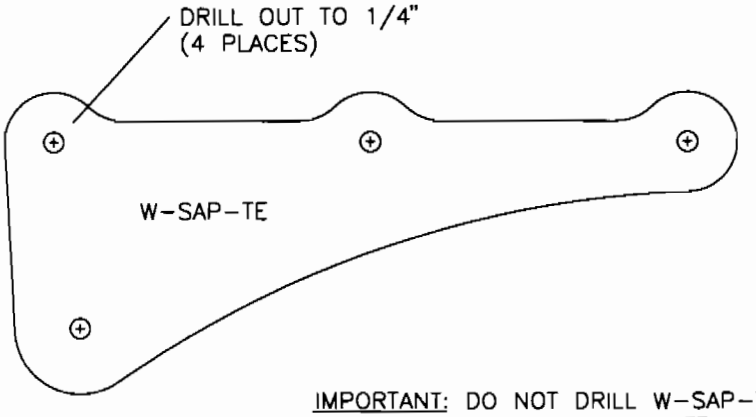
5. Drill through only the root doublers of each spar with a 3/16" drill bit. The 3/16" hole located 2 7/8" out from the root end is for bolting the S2-SAB on the **INSIDE** and riveting the doubler on the **OUTSIDE**. See parts book for details.

6. Drill out the three holes approximately midway on each spar with a 3/16" bit.

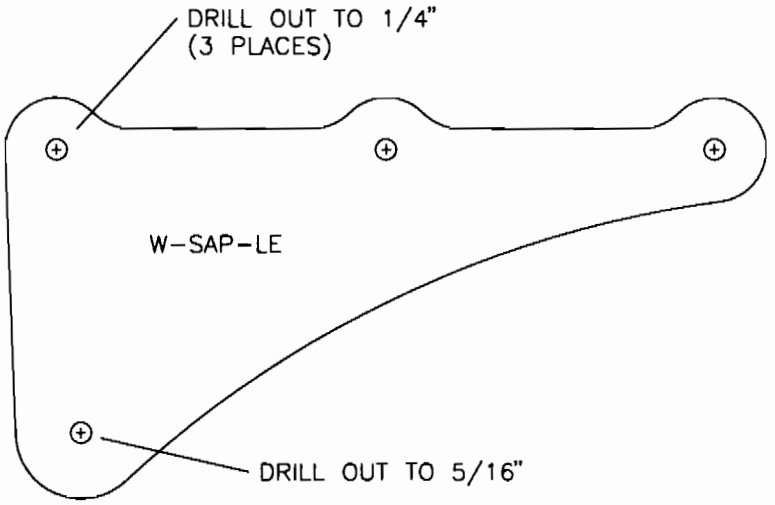
7. Manually debur all the holes using a ½" drill bit or a deburring tool.

8. Smooth the edges of the strut attach plates with sand paper or a file. Drill out the plates as per **Figure 01-08**.

FIGURE 01-08

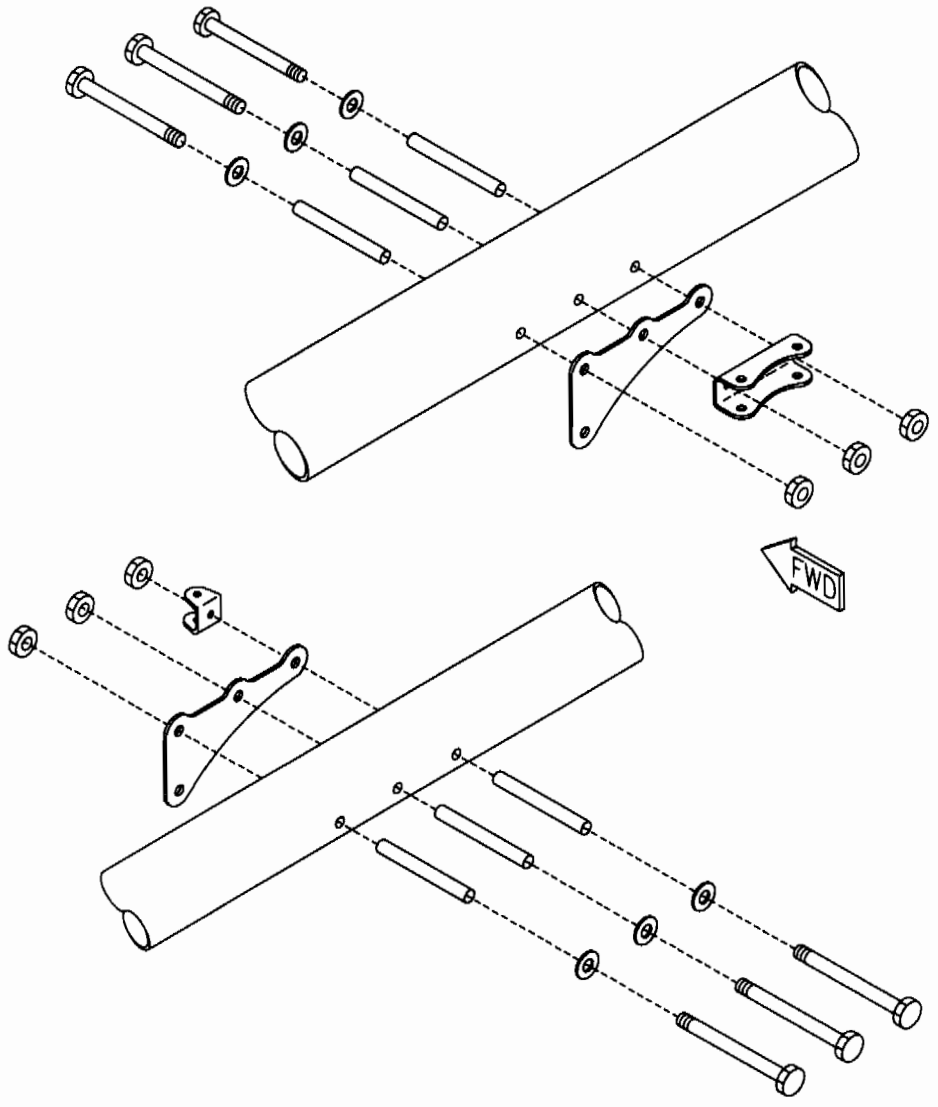


IMPORTANT: DO NOT DRILL W-SAP-TE. LEAVE 1/4" DIAMETER TO MATCH STRUT FITTINGS.



7. Assemble the finished components to each spar as shown in the parts book. NOTE: Parts MD1382 must be bolted to the inside of each spar. The holes drilled near the tip are used for riveting on the tip bow indicate the outside edge of the spar. Double check that the spars are correctly orientated. Refer to **Figure 01-07** for assembly details. When installing the wing bushings it will be necessary to drill out the spars to 3/8" diameter.

FIGURE 01-07



MD1383

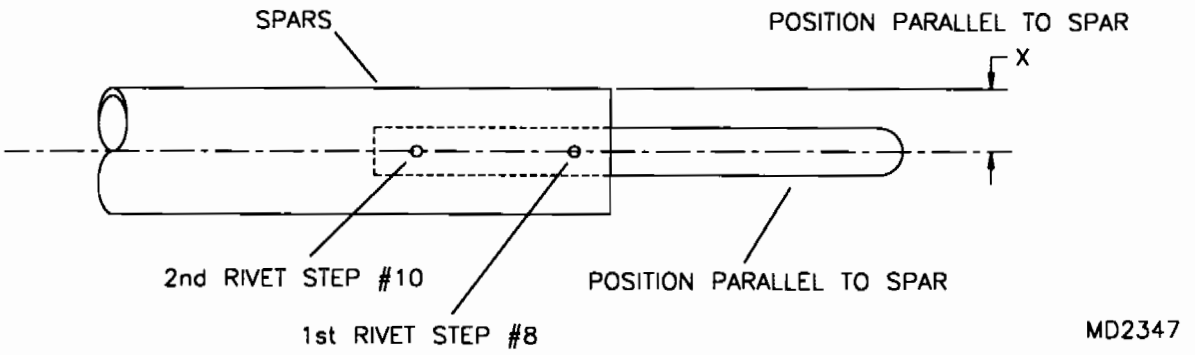
8. The four 3/16" holes through the rear spar are for attaching the bolts used for attaching the hinges. The 3/16" nut plates are riveted to the spar. Use a bolt to hold the nut plates in place while drilling. Position the nut plates in line with the spar.

9. Use 3/16" stainless steel rivets to attach the tip to the spars. Use the pre-drilled outermost holes only!

10. Bolt the anti-drag tubes in place as per the parts book. **NOTE**: The tubes will require drilling out to 1/4" diameter as well as the attach channels on the spars. **NOTE**: Do not install the nuts on the 1/4" bolts until after riveting on the nut plates and rib clips.

11. Line up the tip bow parallel to the spars. Drill and install the second rivet. See **Figure 01-11.**

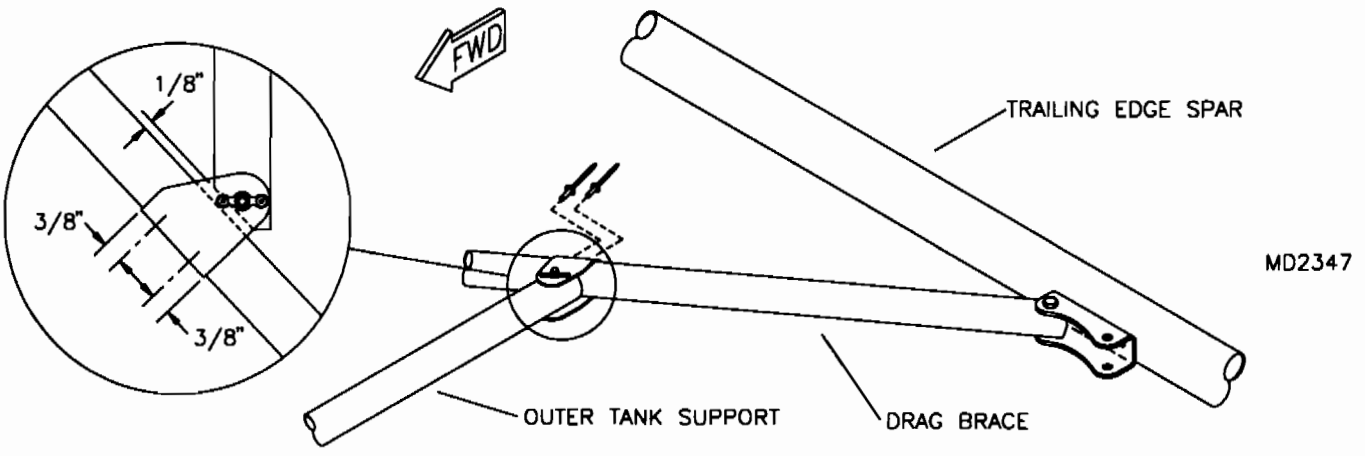
FIGURE 01-11



FUEL TANK MOUNTING

12. Drill a #11 hole 17 3/16" from the center of the inboard S2-SAB on center line with the other S2-SAB. Rivet with a 3/16" stainless steel rivet. Bolt but do not install the nut on the forward end of the outer tank support in place to the S2-SAB. Pull the outer tank support in place against the edge of the tank. Trim the outer tank support to fit against the drag brace. Drill a 3/16" hole in the aft end of the outer tank support using the "U" bracket as a guide. After bolting in the outer tank support tube, mark and drill two 1/8" holes in the aft edge of the "U" bracket and rivet. See **Figure 01-12.** Apply self-adhesive foam tape to the top of the fuel tank support tube and compression tubes.

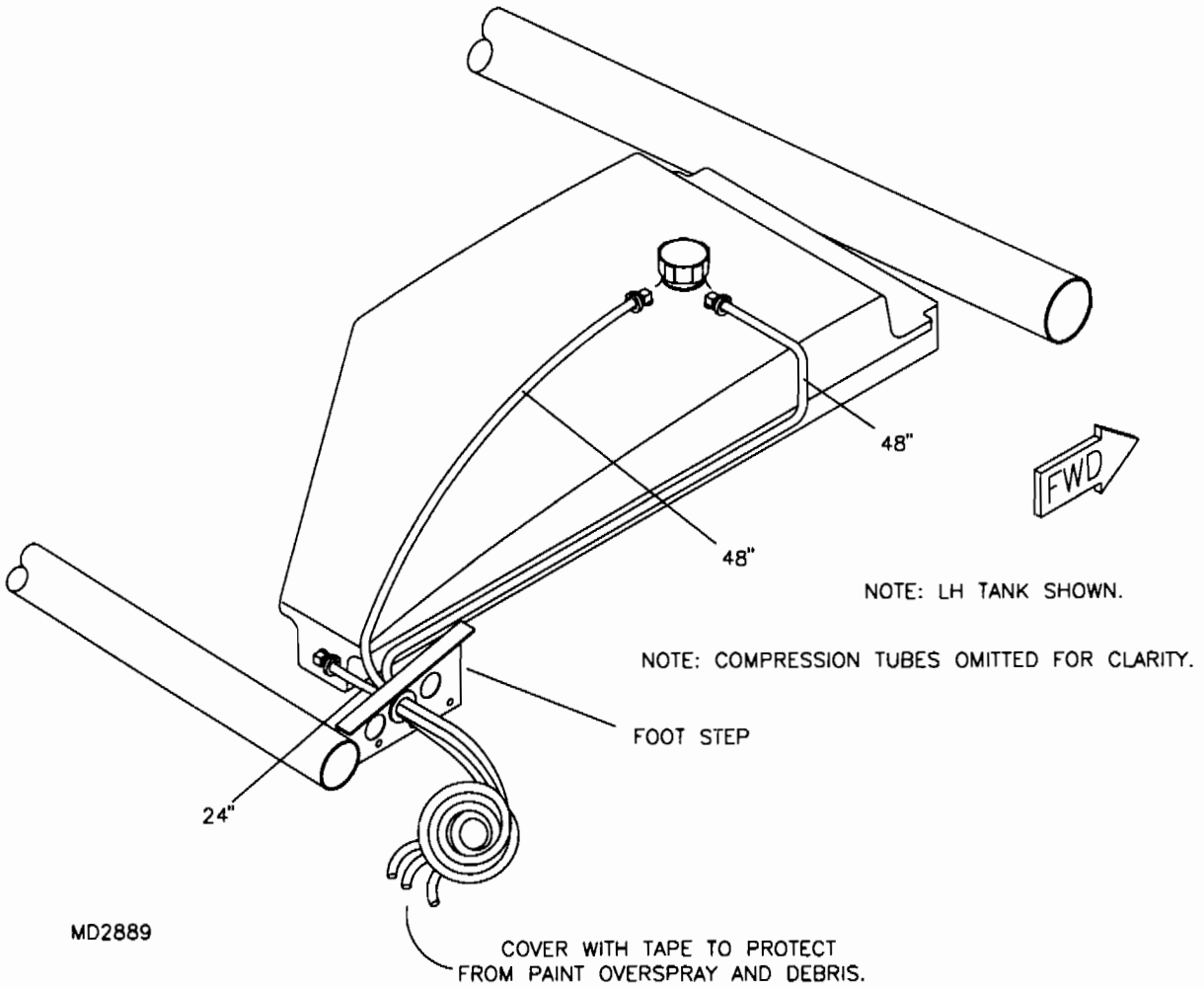
FIGURE 01-12



13. Apply loctite to the bolts that retain the fuel tank and bolt the forward tank mount brackets to the fuel tank. Place the fuel tank in the wing on the mount and compression tube. The fuel tank's outer forward corner should be touching the forward spar. Using the tank mount brackets as a guide, drill through the brackets and tubes to #30. The holes should line up on center line of the tubes, if not the foam tape may need compressed. Pop rivet as per the parts drawing.

14. Install the fuel line segments to the tanks and route the lines through the grommet in the foot step. Coil and tape the lines to prevent entry of debris. See **Figure 01-14.**
These lines will be connected to the other lines via straight barbs.

FIGURE 01-14



15. Drill 18 of the leading edge clips and 16 of the trailing edge clips to #30 as shown in **Figure 01-15**. Locate and cleco to the spars as shown in **Figure 01-15A** and **Figure 01-15B**. Some builders have looked at **Figure 01-15** and **ASSUMED** they are to put (4) pop rivet in **ALL** the rib clips. This is not the case. Doing this will destroy the spars strength. Please only one rivet per clip unless it is the two root clips.

FIGURE 01-15

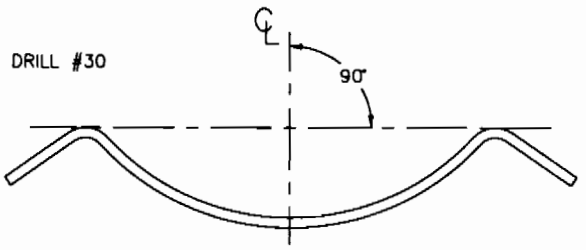


FIGURE 01-15A

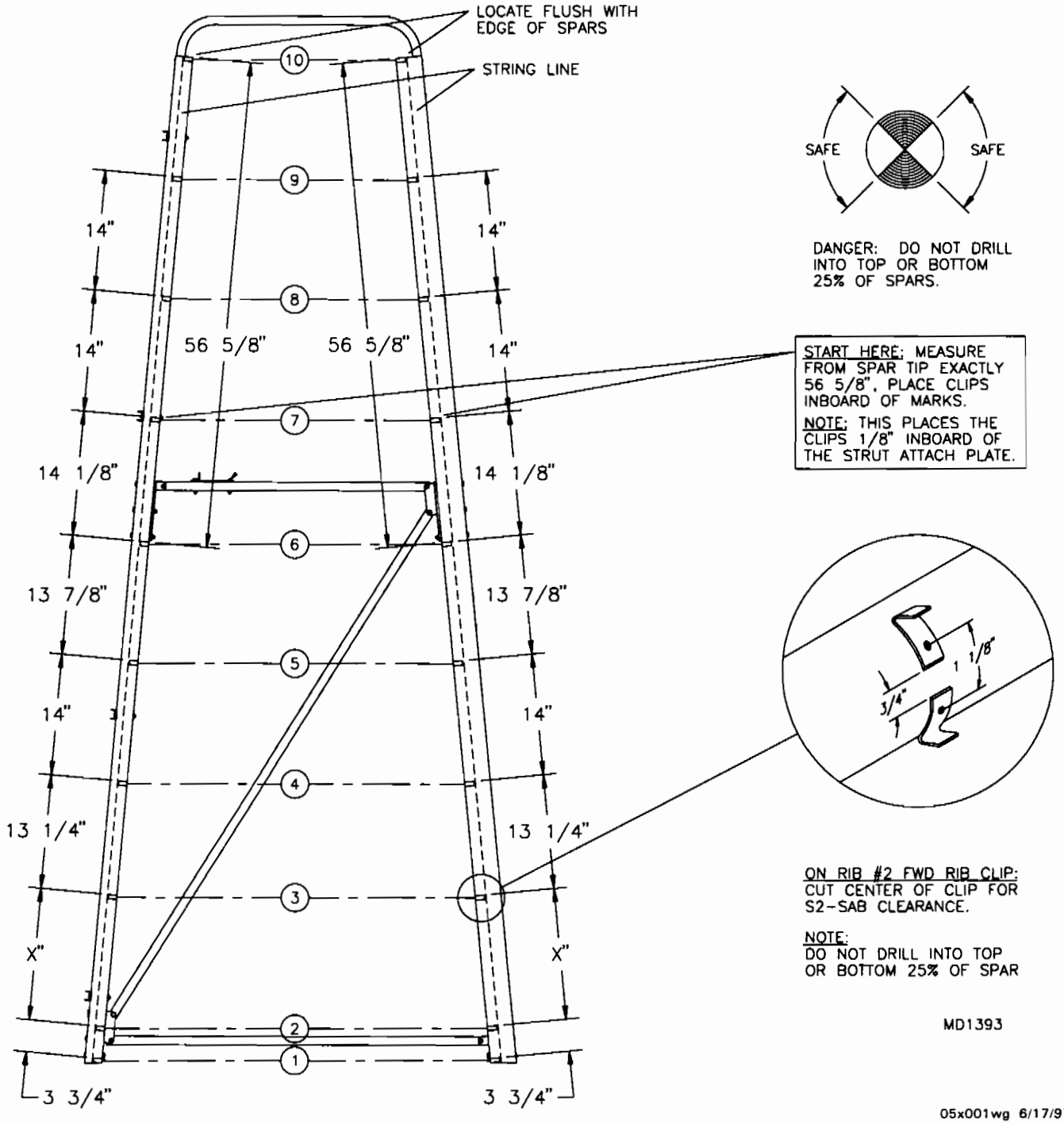
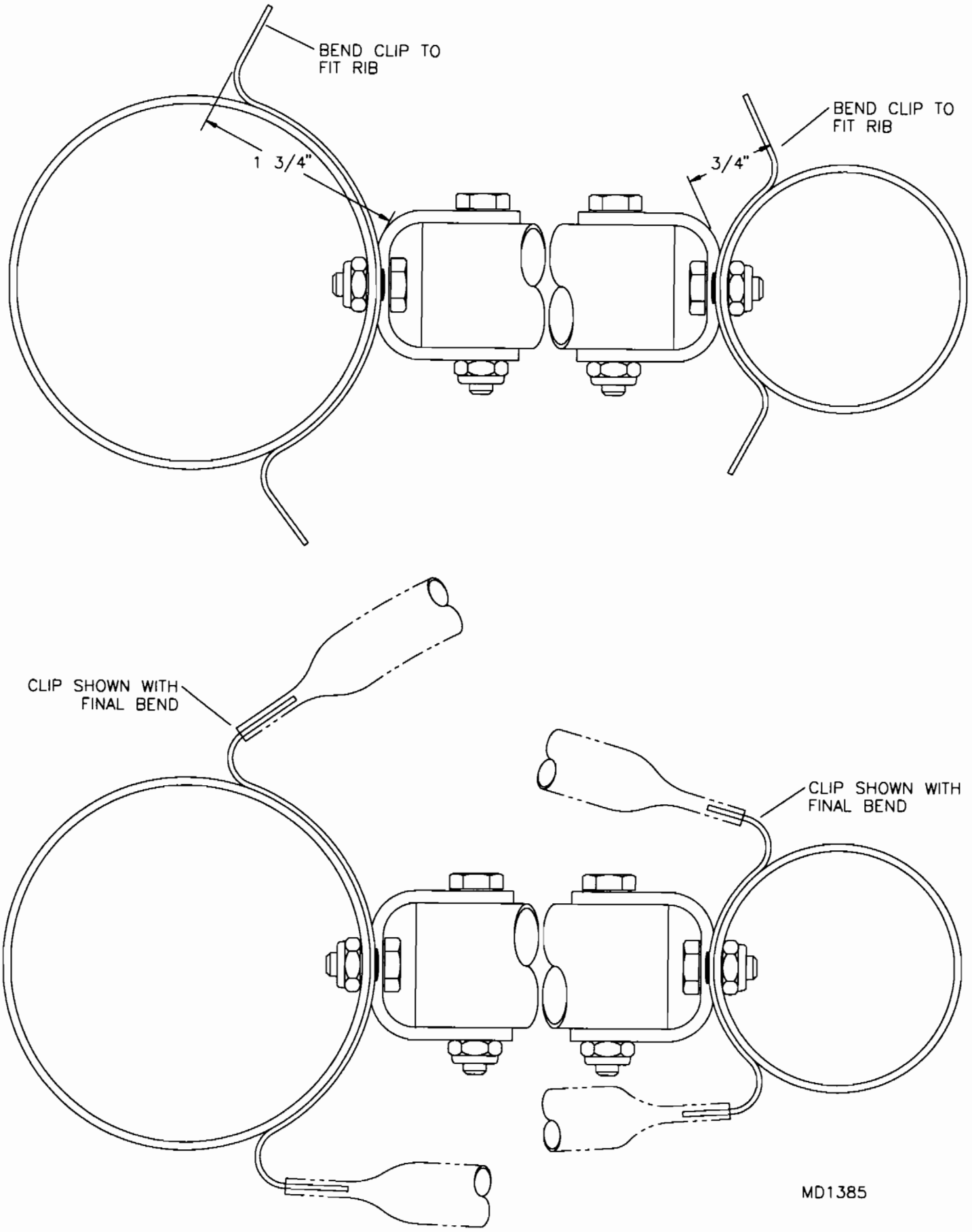
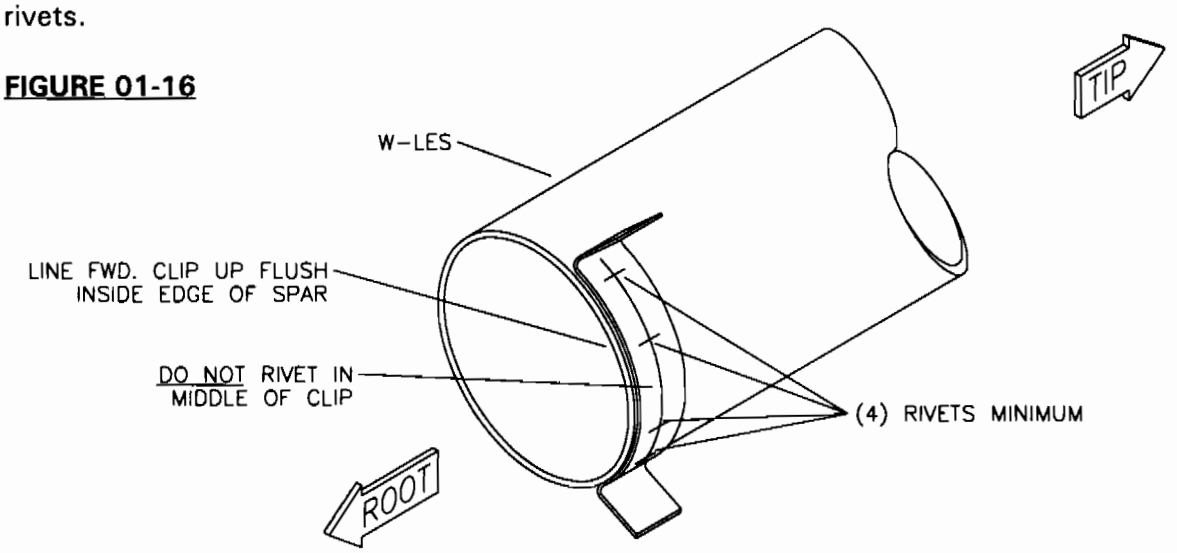


FIGURE 01-15B



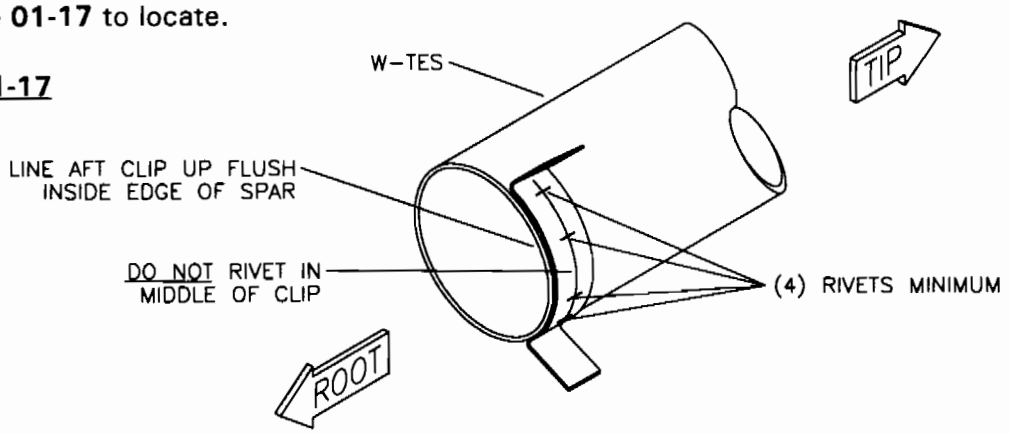
16. Locate and drill #30 holes in the 2 remaining leading edge clips as shown in **Figure 01-16**. Line the clips up flush with the inside edge of the spar. Rivet a minimum of (4) 1/8" aluminum pop rivets.

FIGURE 01-16



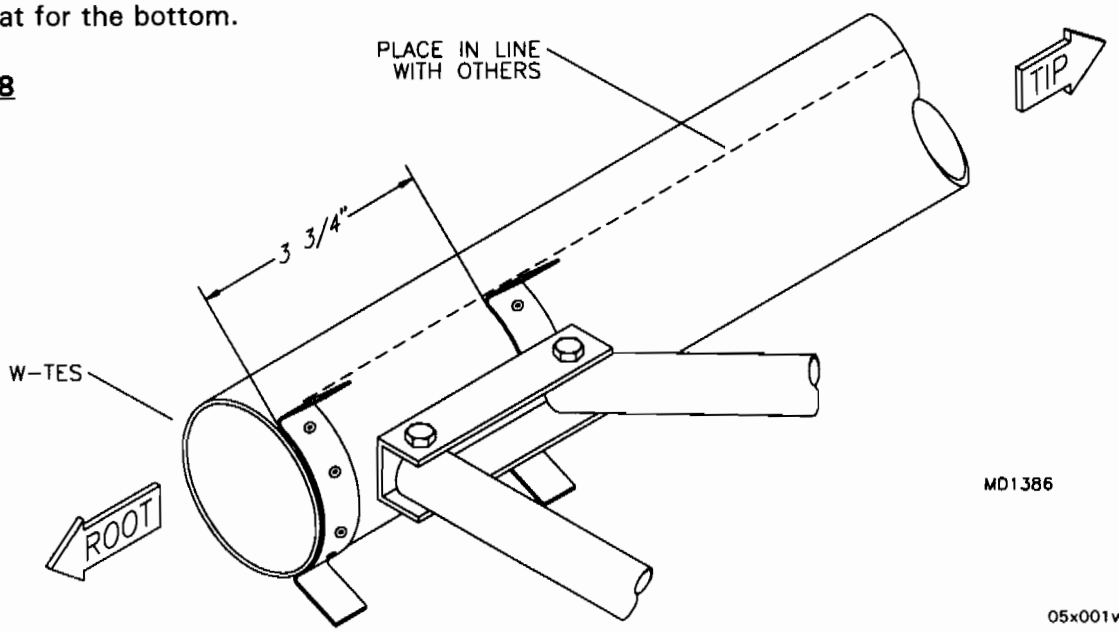
17. Following the procedure in step #14, locate, drill and rivet the inboard most trailing edge clip. Use **Figure 01-17** to locate.

FIGURE 01-17



18. Cut, locate and rivet the next most inboard trailing and leading edge clips as shown in **Figure 01-18**. Repeat for the bottom.

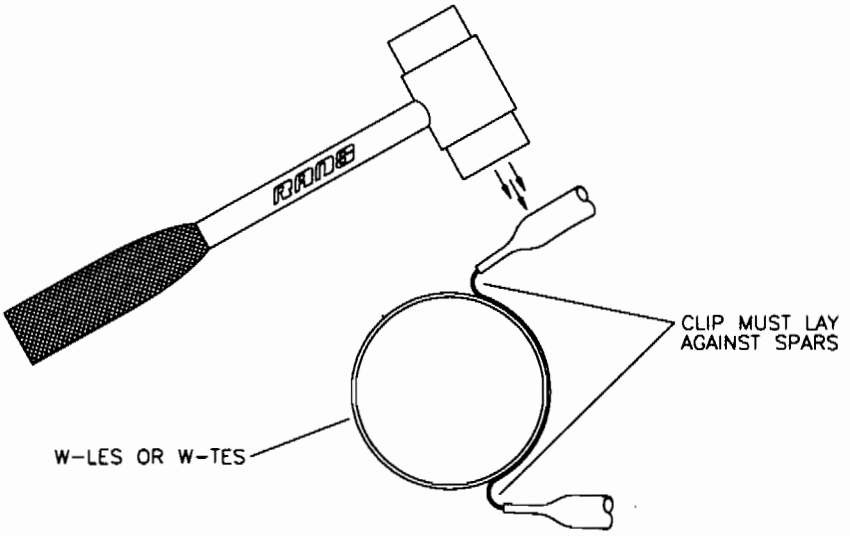
FIGURE 01-18



19. Install the drag anti-drag tube using the proper hardware.

20. After all the clips are located and clecoed in place, insert the corresponding rib by removing the cleco and assembling the rib to the clips. Pop rivet after the ribs are in place. For the clips riveted in place at the root, the ribs can be "bowed" slightly to install onto the clips. Trying to "bow" the other ribs may bend them because they get shorter toward the tip. **NOTE**: If you do not have clecos, it works to drill out the rivets and just re-rivet. After installing all the ribs, gently tap them down against the spars with a mallet. See **Figure 01-20**. The bottom ribs are marked to designate the forward end. Place the ribs with the mark **FORWARD** and the "bow" of the rib **DOWN**.

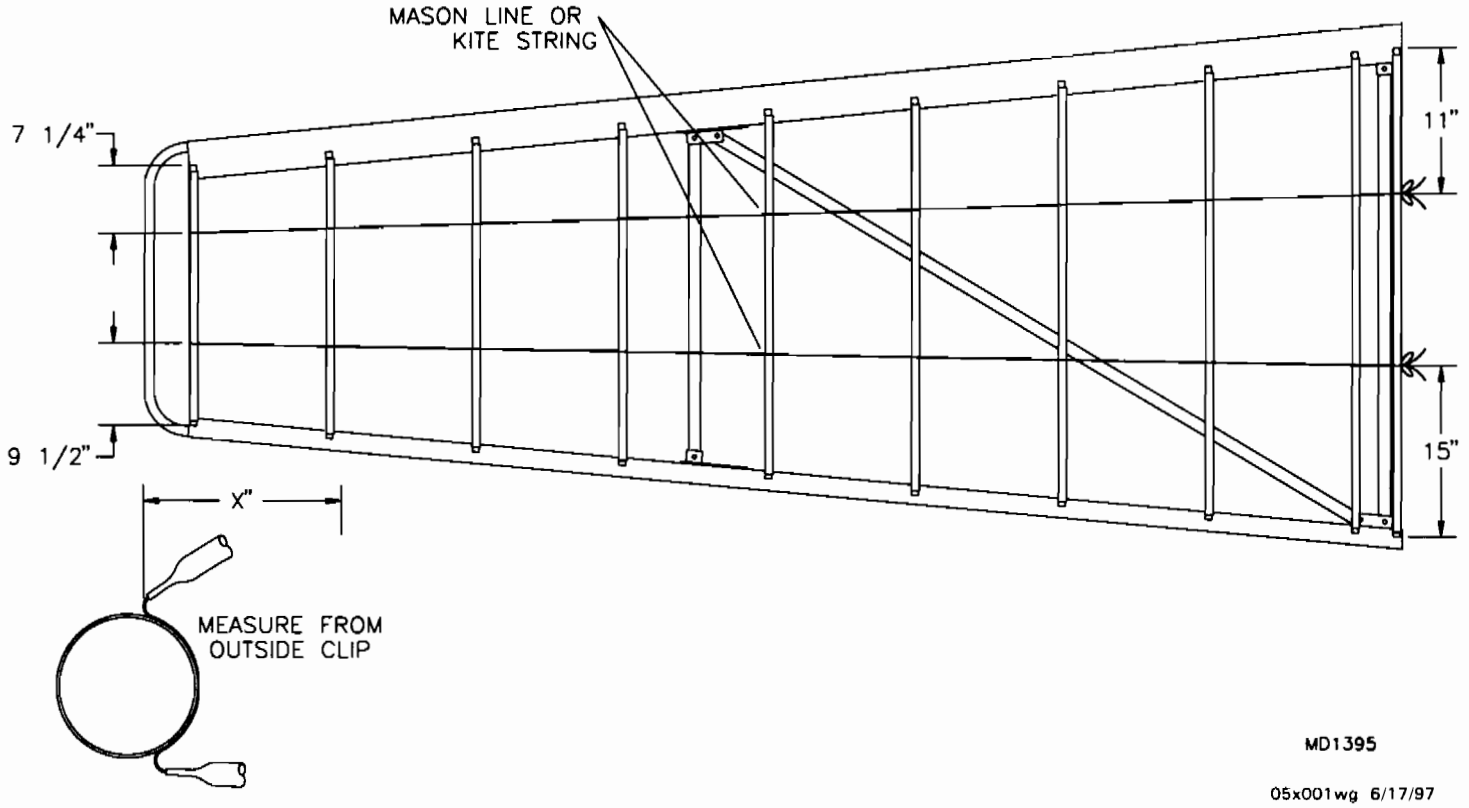
FIGURE 01-20



21. Check and adjust the rib profiles by sighting from the tip to the root. Ribs that rise above the others may require more mallet work or hand forming.

22. String a mason line or kite string as shown in **Figure 01-22** to aid in installing the vertical rib tubes. The rib compression tubes will be located centered underneath the lines. The lines will also indicate the high and low ribs.

FIGURE 01-22



05x001wg 6/17/97

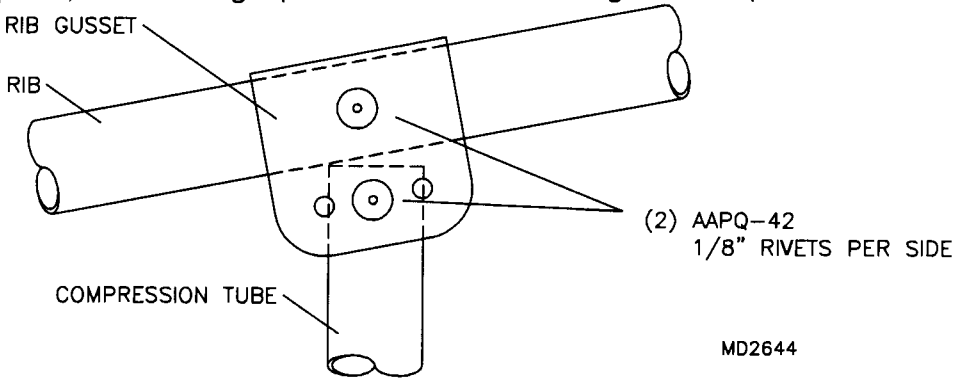
23. Cut the rib compression tubes to the lengths as specified in the chart below. Use the 1/2" x .035 aluminum tube stock. There is a little extra material in case you cut it off twice and it is "still too short". The dimension is critical for airfoil profile accuracy.

TOP RIB #	(A) FWD TUBE	(A) AFT TUBE
1	6 ½"	5 1/8"
3	6 3/8"	4 7/8"
4	6 1/4"	4 3/4"
5	6 1/8"	4 3/4"
6	6"	4 5/8"
7	5 5/8"	4 ½"
8	5 3/8"	4 3/8"
9	5 1/8"	4 1/4"
10	4 11/16"	4 1/8"

NOTE: Rib #2 does not use forward compression tube due to the location of the fuel tank. Special instructions to follow.

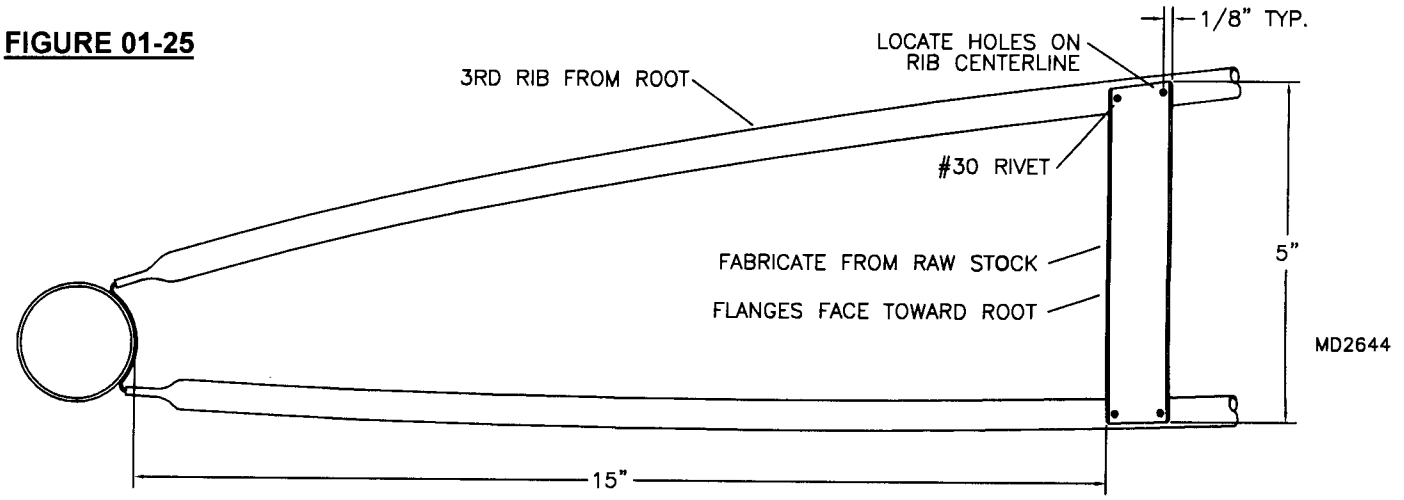
24. Place each wing rib compression tube centered and vertical under the string line. Make sure the rib tubes actually rest against the rib. **Figure 01-24** shows details of the rib gusset installation. **HINT:** For holding the rib gussets in place, use masking tape. Drill and rivet the rib gussets in place.

FIGURE 01-24



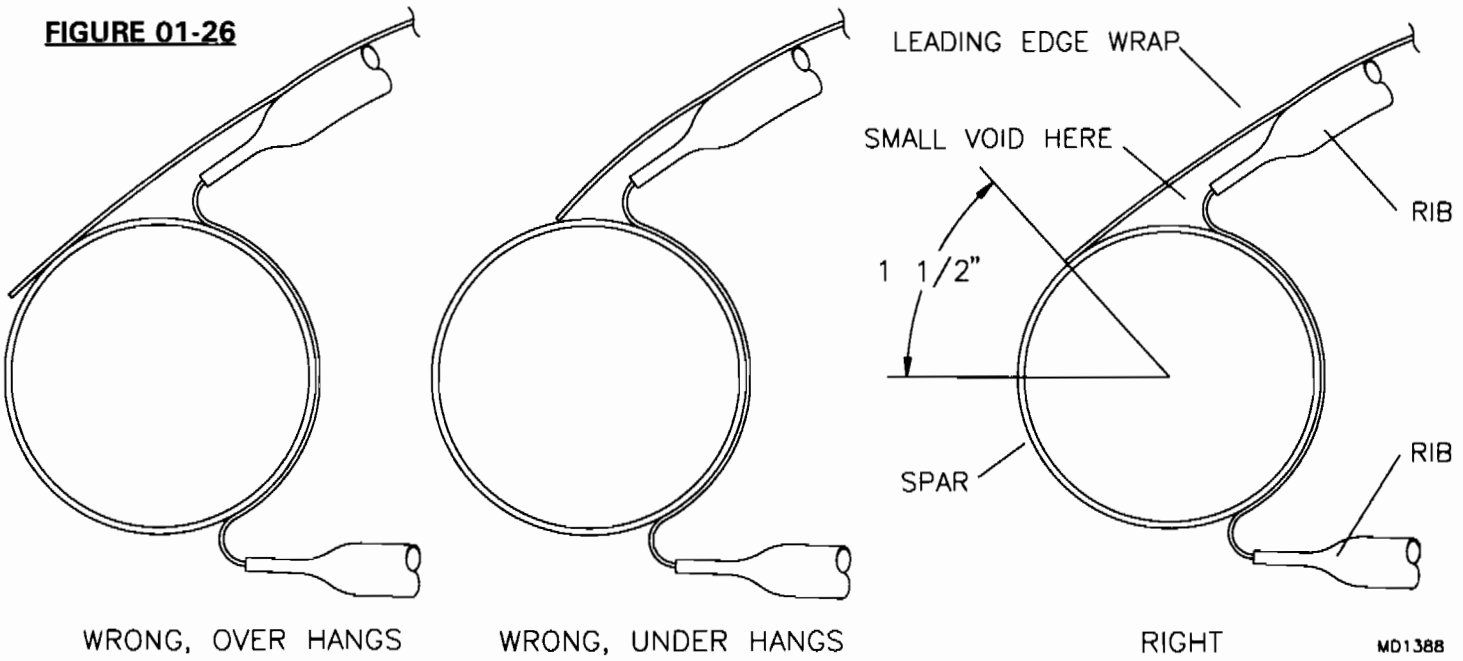
25. On the 3rd rib from the root, locate the rib channels and cut, fit, drill and rivet in place. The channels installs on the **ROOT** side of the rib. See **Figure 01-25**.

FIGURE 01-25



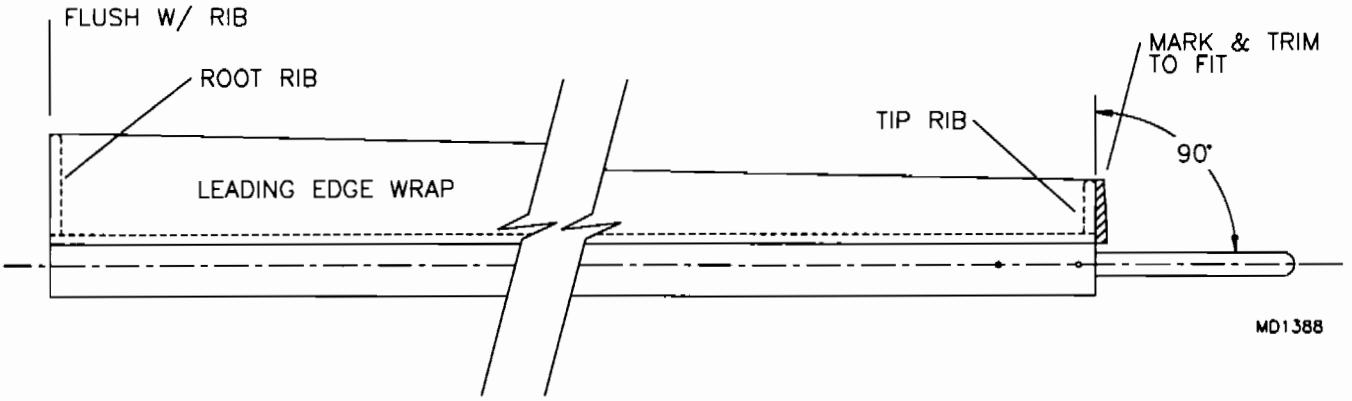
26. Carefully unroll a leading edge wrap and position on the wing with an even amount of overhang on each end. **Figure 01-26** details the proper positioning on the leading edge spar. Use masking tape or lightly clamped vise grips to hold the leading edge wrap in place. Be careful when working with sheet metal. **BE SUPER CAREFUL!!!** These sharp edges can cut quick and deep. Also, handle the sheet metal gently to prevent wrinkles.

FIGURE 01-26



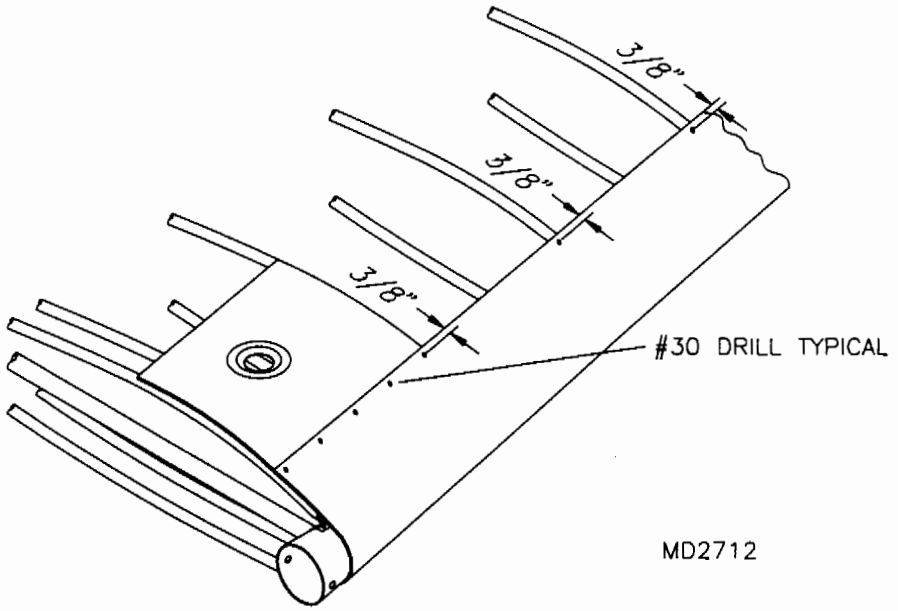
27. Rotate the root rib and the tip rib perpendicular to the spar. See **Figure 01-27**. Mark the wrap from the underside with a flair pen. Remove and trim the ends with an aviation tin snips. File the edges of the wrap smooth by draw filing with a file. Tape the rear edge of the wrap with electrical tape. Re-position the wrap where it will be installed and temporarily tape in place. Select parts as per the parts drawing to build the root ribs.

FIGURE 01-27



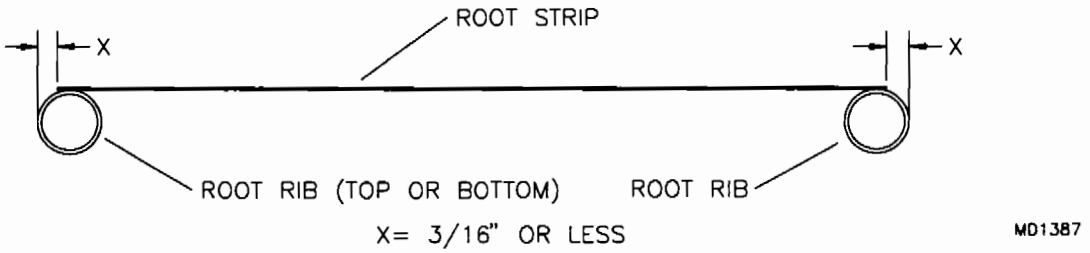
28. Locate and drill #30 holes at 3/8" from the top edge of the wing at each rib. Before drilling make sure all ribs are 90 degrees to the spar. Drill and cleco. See **Figure 01-28.**

FIGURE 01-28



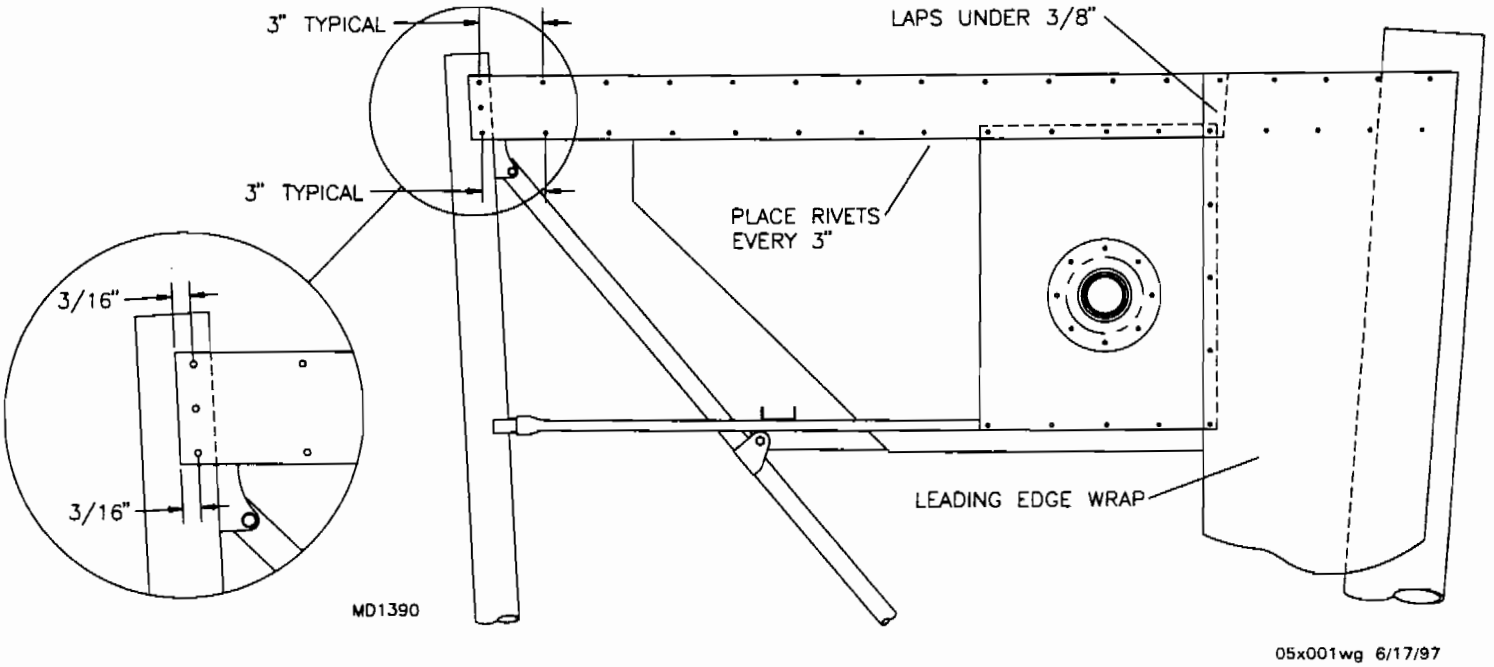
29. Position the top root strip on top of the two root ribs with 3/8" tucked under the leading edge wrap. See **Figure 01-29.**

FIGURE 01-29



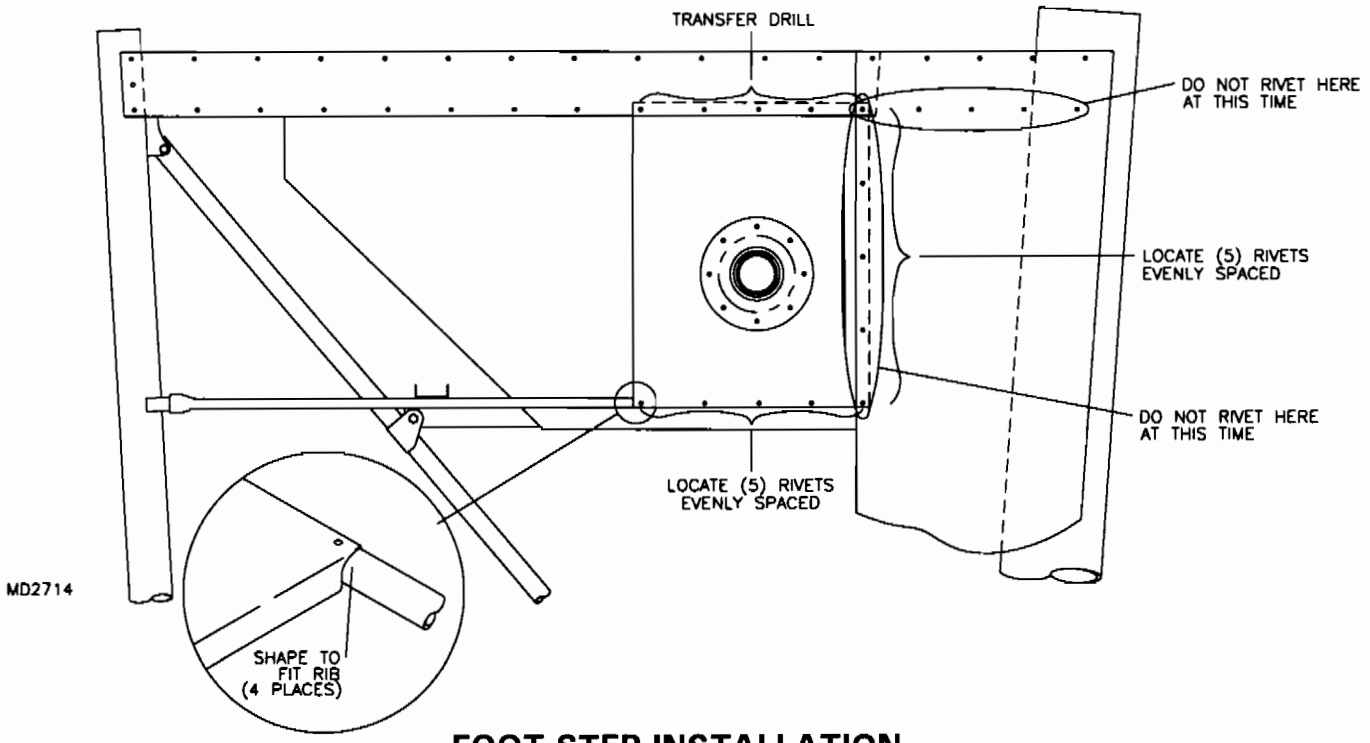
30. Trim the top root strip to the taper of the wing. Lay out holes every 3" on the center of the rib tubes. Center punch and drill to #30. Cleco in place. See **Figure 01-30.**

FIGURE 01-30



31. Rivet with 1/8" aluminum pop rivets the filler neck scupper to the scupper panel. Place the assembly over the filler neck. The edges against the root strip and leading edge wrap lap **UNDER**. Locate and drill holes as per **Figure 01-31**. Trim the aft flange of the scupper panel to clear the ribs. Rivet everywhere **BUT** the leading edge wrap. It will need to be removed to prepare the bonding zone on the spar.

FIGURE 01-31



FOOT STEP INSTALLATION

INSTALL ON BOTH WINGS

32. Position the foot web in place on the underside of the root strip. See **Figure 01-32**. Use **Figure 01-32A** to lay out and drill the sub plate and the wear plate. Position the wear plate to be even with the root strip on the spar. **DO NOT** rivet the wear plate on until the wing is covered and painted. Glue the sub plate in place with JB weld.

FIGURE 01-32

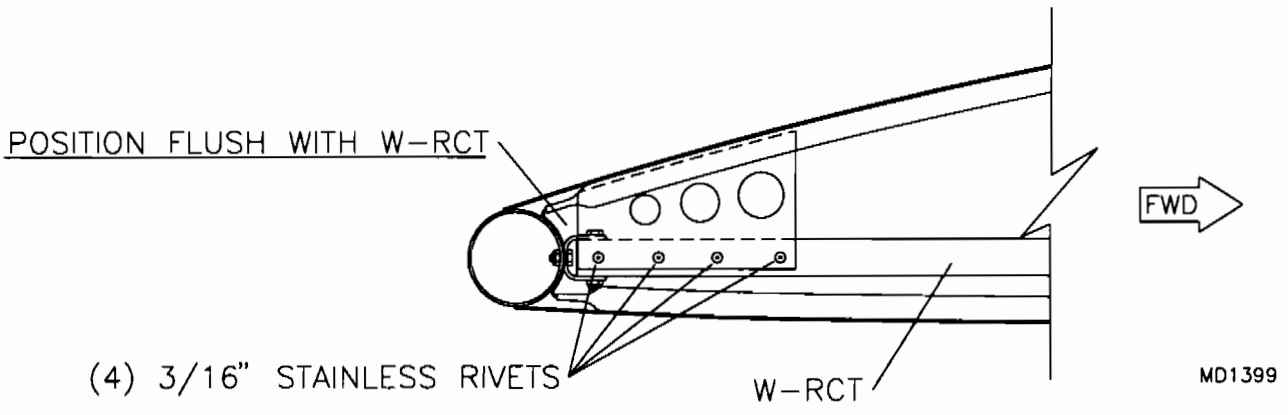
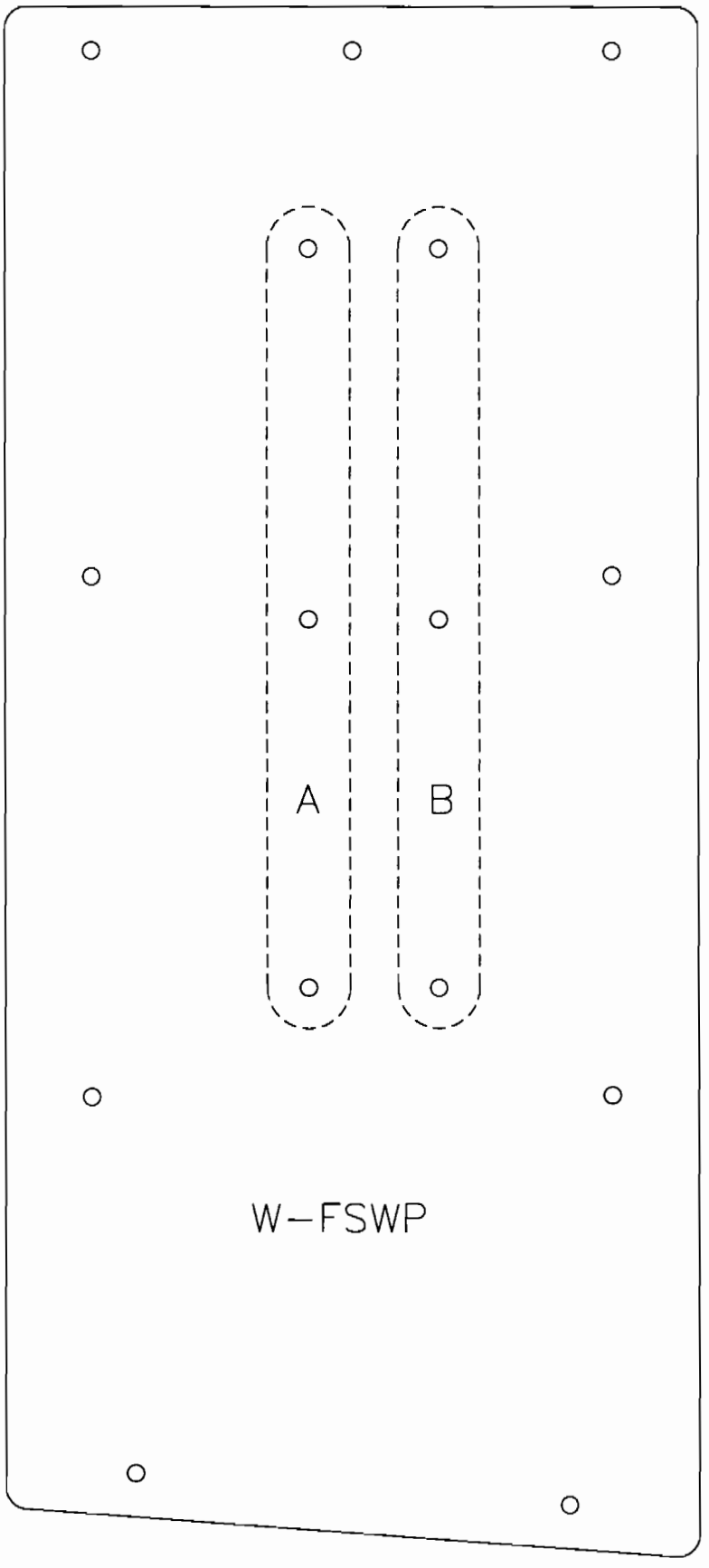


FIGURE 01-32A

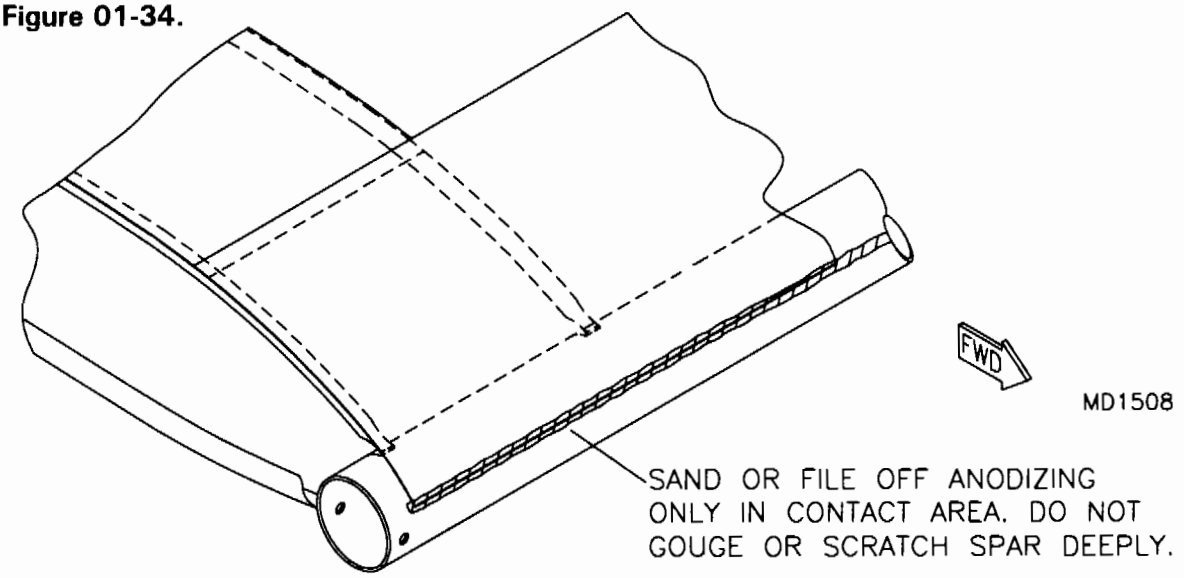


LEFT HAND WING, DRILL HOLES "B" OMIT HOLES "A"
RIGHT HAND WING, DRILL HOLES "A" OMIT HOLES "B"

33. With the foot step web in place, mark the location of rivets. Remove the center, punch and drill the web. Re-position, drill and rivet with 3/16" stainless steel pop rivets. **HINT:** Snap in the grommet before permanently installing.

34. Carefully sand or file away the anodizing where the wrap bonds to the spar. After preparing the bonding zone, re-install the leading edge wrap. Rivet the wrap to the ribs and scupper panel prior to bonding. See **Figure 01-34.**

FIGURE 01-34



35. Prepare the clamps and boards and use the J&B epoxy to glue the wrap. Clamp with a long straight board and several "C" clamps. See **Figure 01-35.** After the J&B weld cures, body putty the jog between wrap and spar. Sand smooth. **HINT:** Put putty mix in a plastic bag. Squeeze out of a small hole (like icing on a cake). Smooth out with a putty knife. Apply the body putty so it rolls around the leading edge for a smooth blend of leading wrap and spar. See **Figure 01-35A.**

FIGURE 01-35

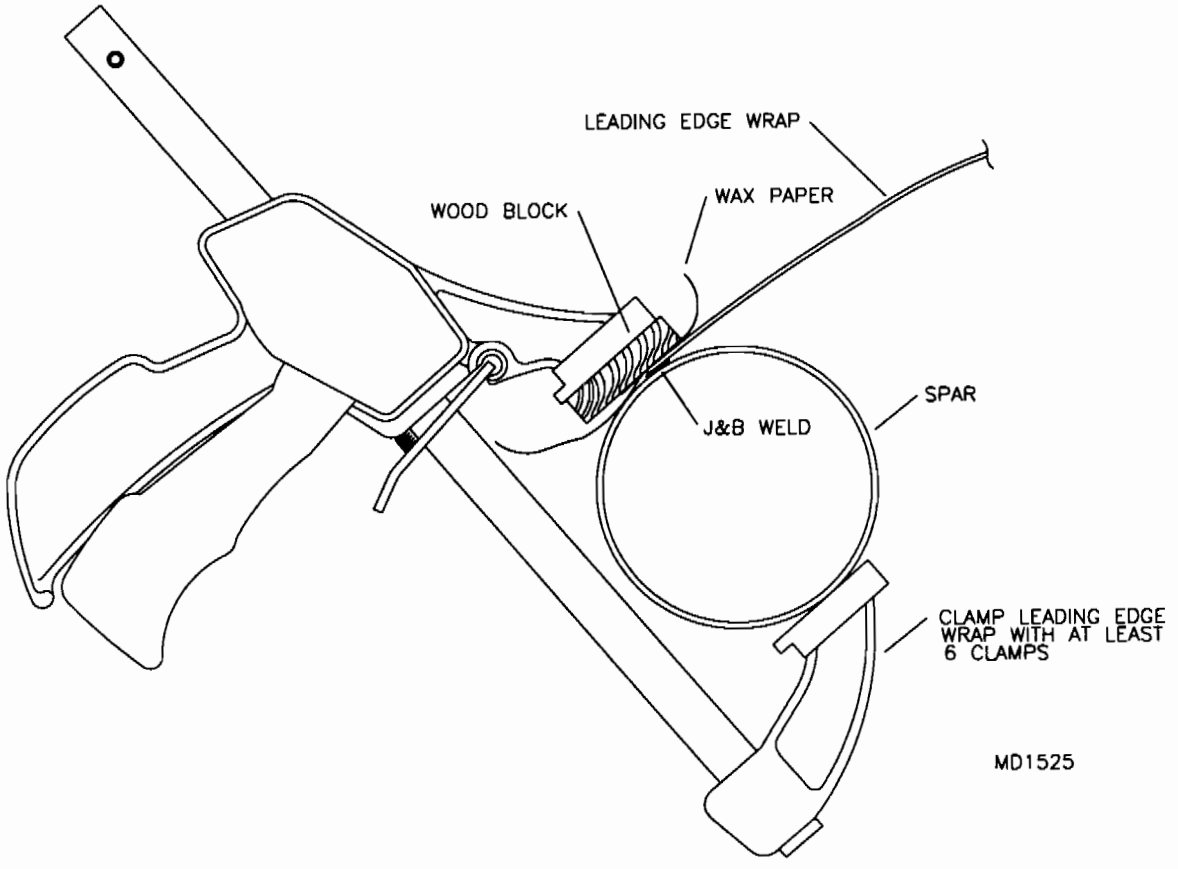
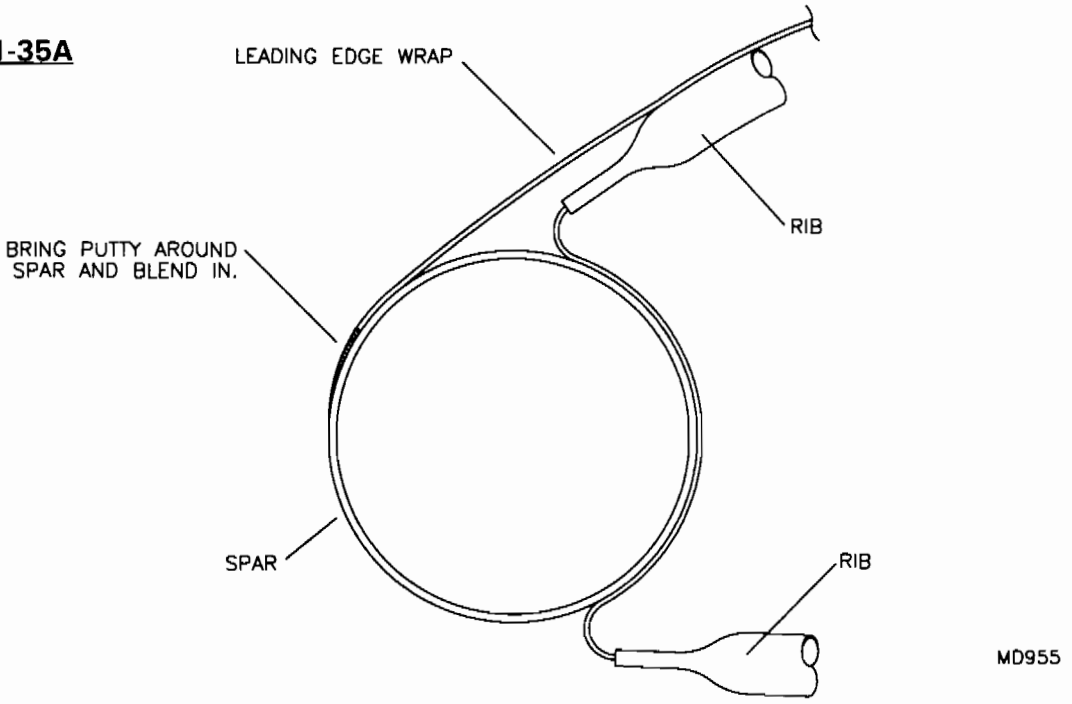


FIGURE 01-35A



36. Install the two "tension" straps at the wing tip as per **Figure 01-36 & 36A**. The straps are riveted in place after pulling tension of the leading edge wraps top edge. Use a small rope or cord wrapped around the tip and rib to apply and hold the tension. Rivet the leading edge wrap top tip corner with (3) rivets after straps are installed.

FIGURE 01-36

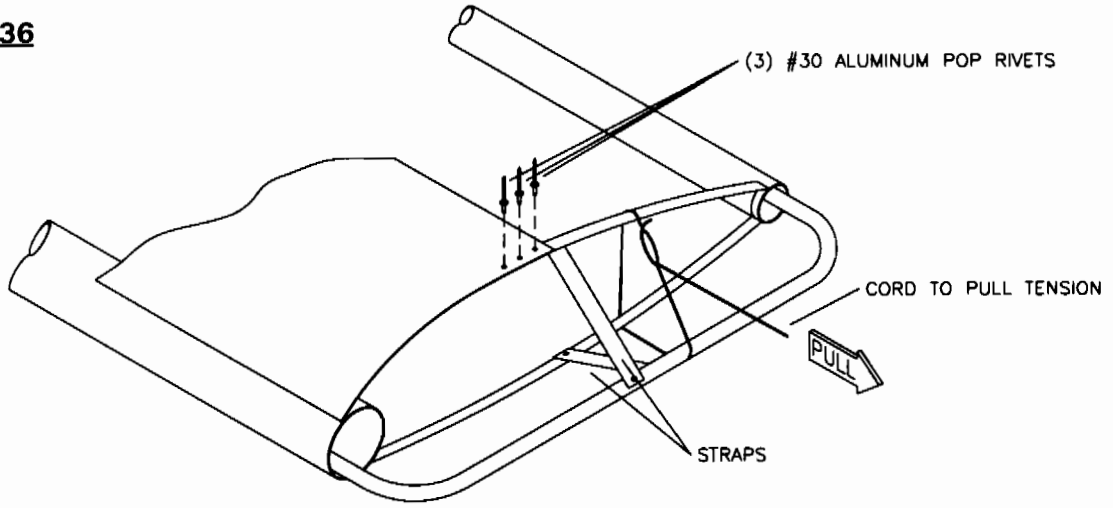
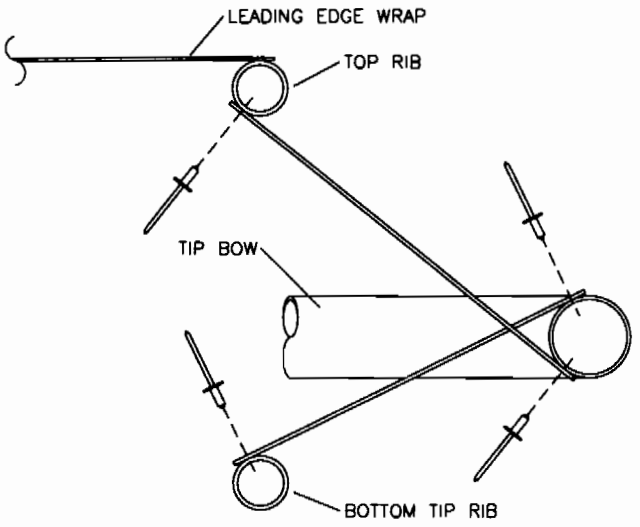
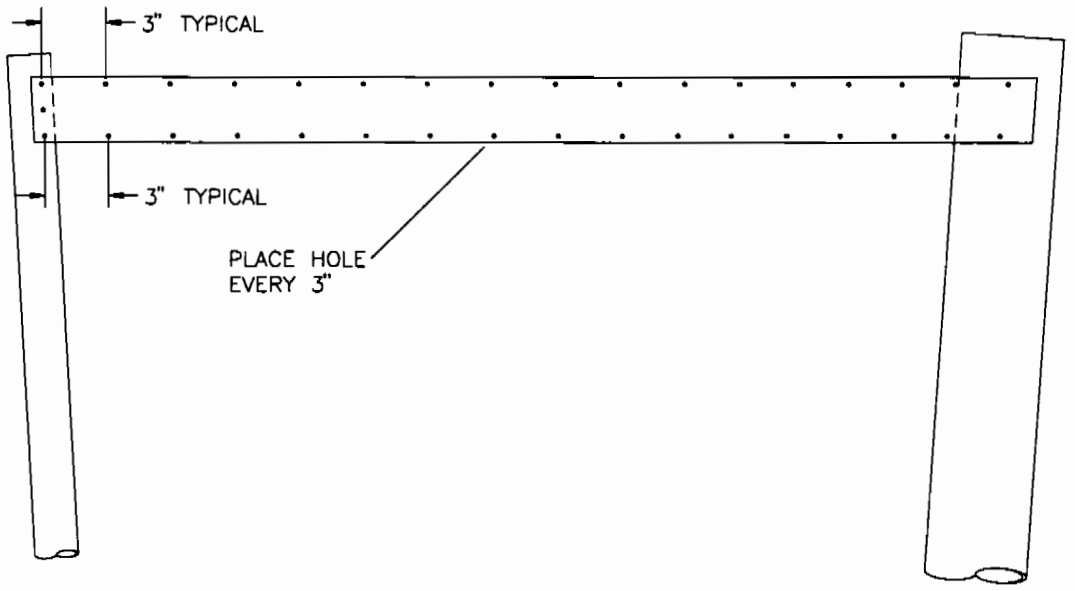


FIGURE 01-36A



37. Flip the wing inverted then layout, drill and rivet on the root strip to the bottom side of the root ribs using 3" spacing. See **Figure 01-37.**

FIGURE 01-37

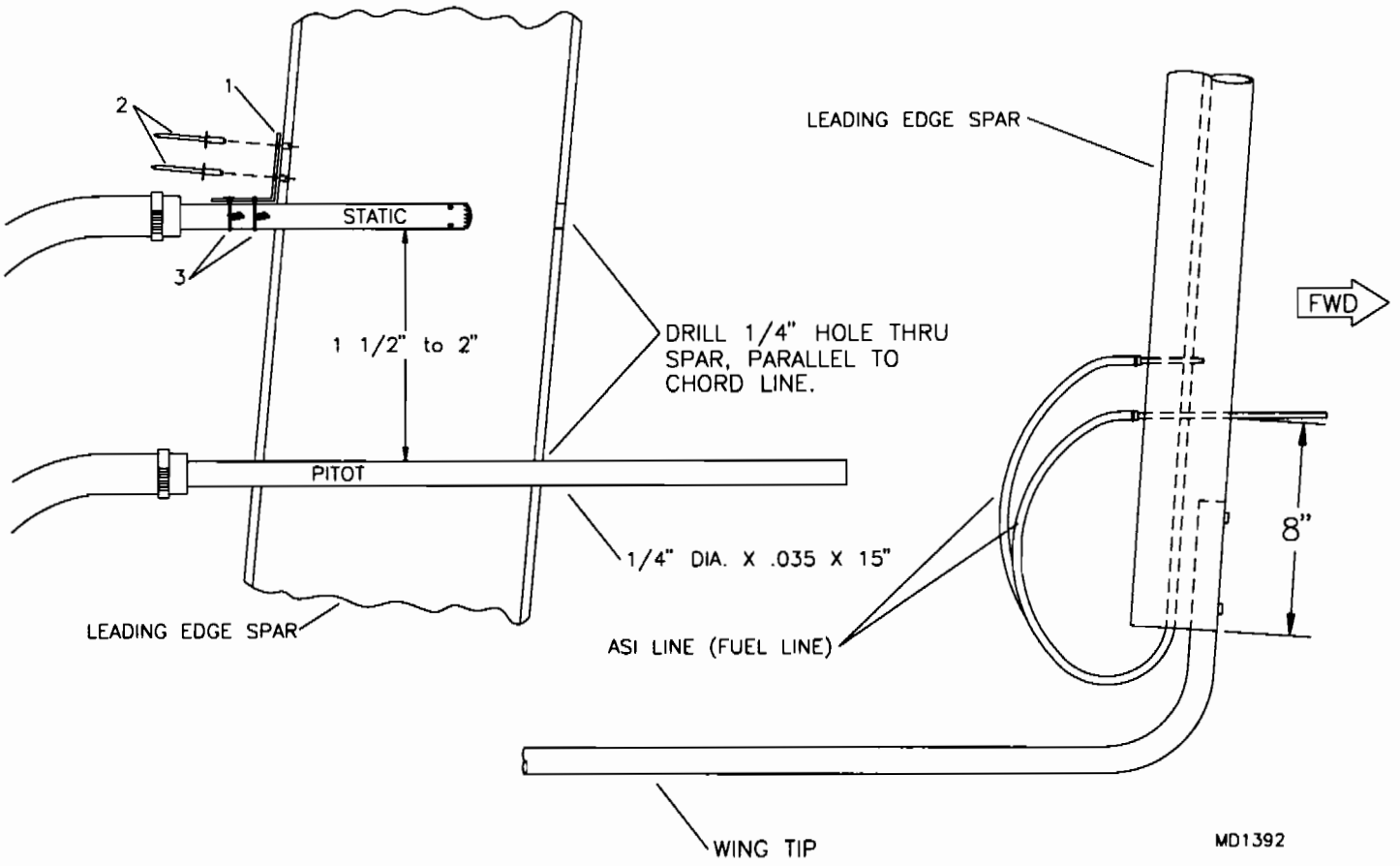


INSTALLING THE AIRSPEED PITOT AND LINE

NOTE: Reference the parts catalog. **PLEASE NOTE:** Static and Pitot are options that come with airspeeds.

38. Drill through the right wing's leading edge spars as shown in **Figure 01-38** with a 1/4" bit for the pitot. Push the ASI line to the root end of the front spar and loop it around and connect it to the pitot with a nylon zip tie.

FIGURE 01-38



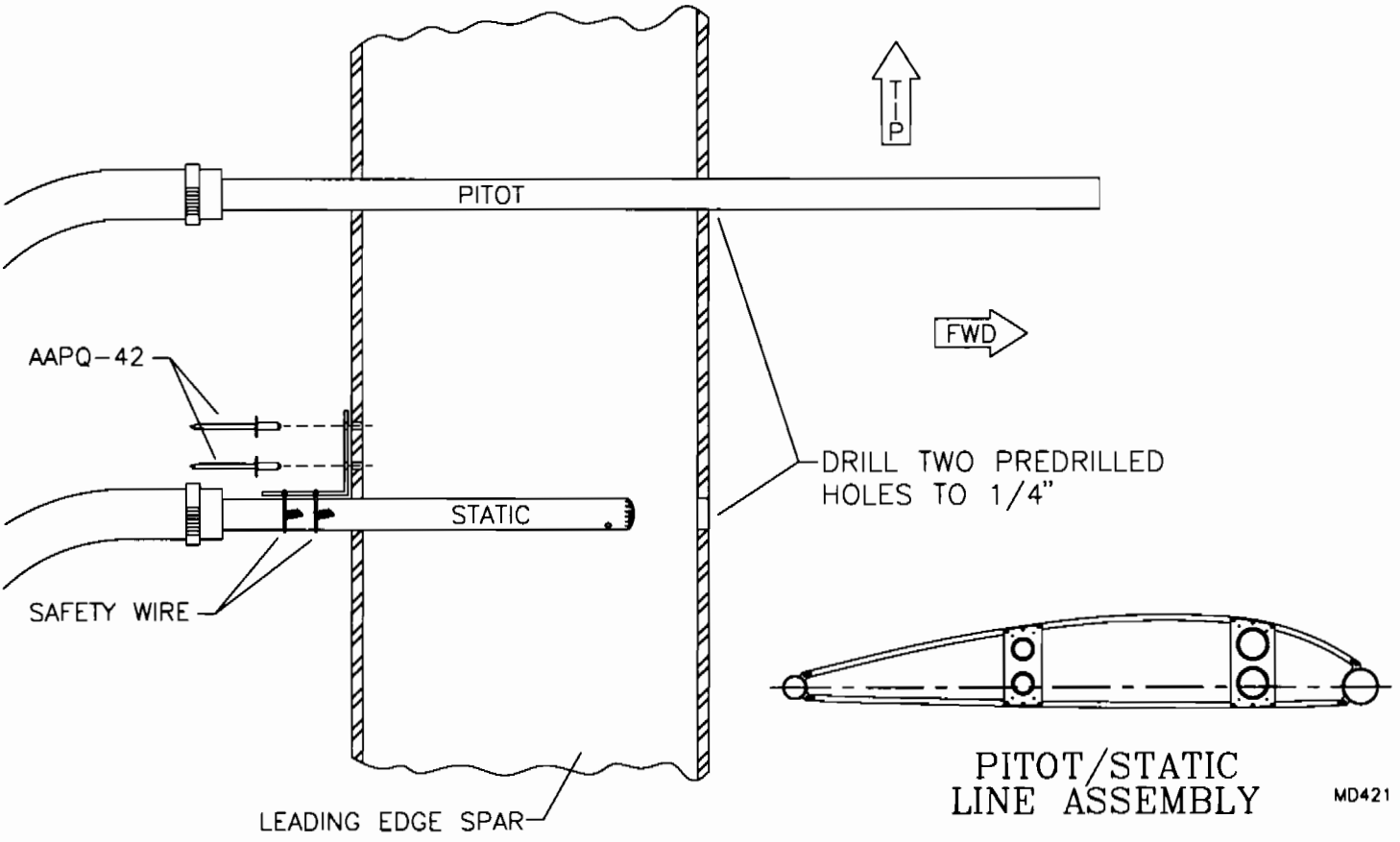
39. Inspect the wings and review all the assembly steps. If everything is proper, the wings are ready for covering. If you do not plan on covering the wings now, place extra masking tape on the leading edge wrap to hold the front edge down. Remove this extra tape prior to covering. **PLEASE NOTE:** Teleflexes will not be installed until **AFTER** covering.

OPTIONAL PITOT STATIC INSTALLATION METHOD

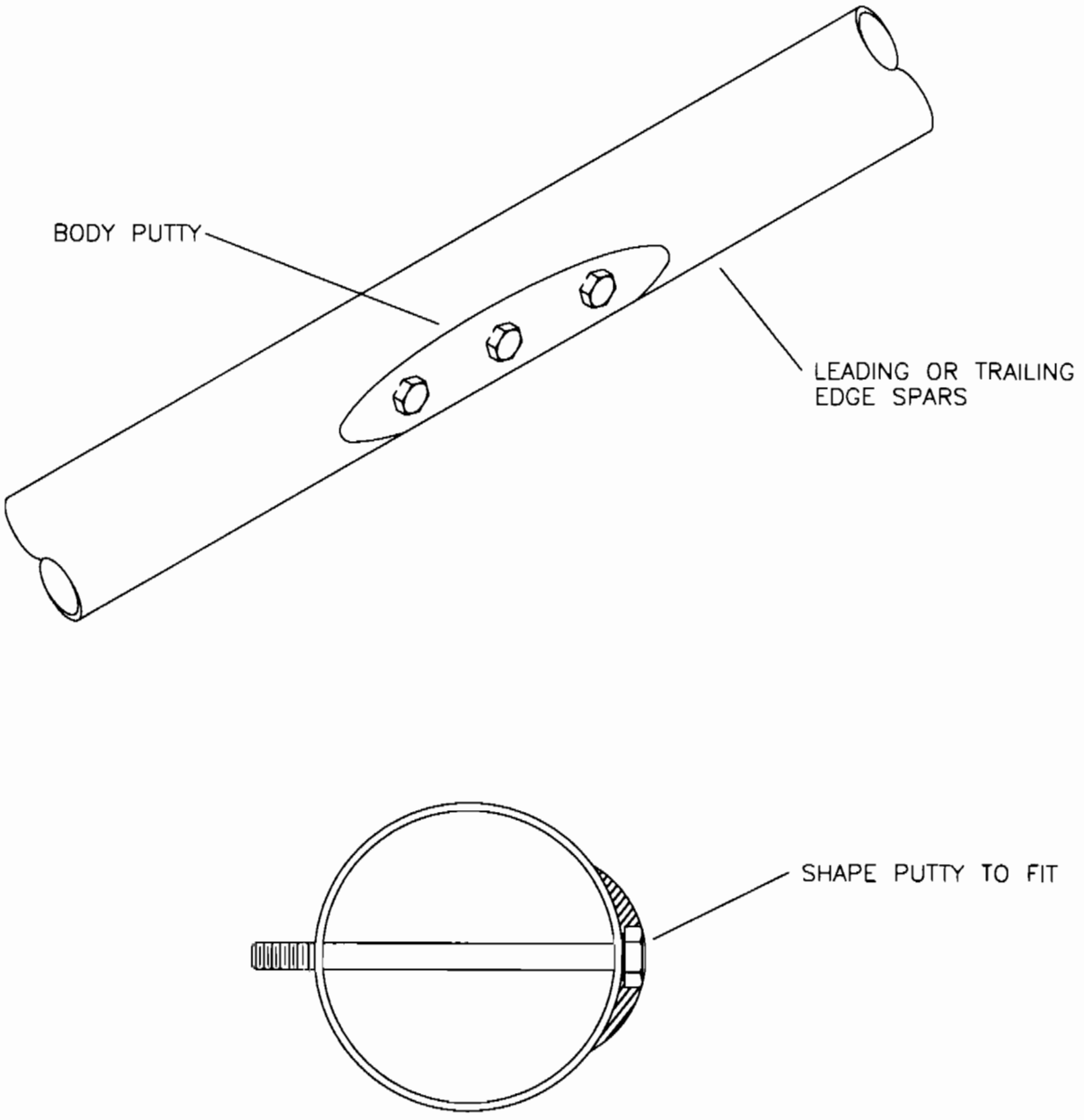
Recessing the static line into the wing will not adversely affect the airspeed reading. Flight testing of the RANS aircraft with this setup has given acceptable performance at all airspeeds. To attach the static line as shown use the following parts:

1. Angle, .050 X 1.00" X 1.00"
2. #30 pop rivets
3. Safety wire **NOTE:** These are builder obtained items.

Make an aluminum angle from .050 raw stock. Drill two holes for the pop rivets, in one side of the angle. Drill four #40 holes (two per side) for safety wiring to the static tube in the other angle.



BODY PUTTY METHOD OF FAIRING IN BOLT HEADS



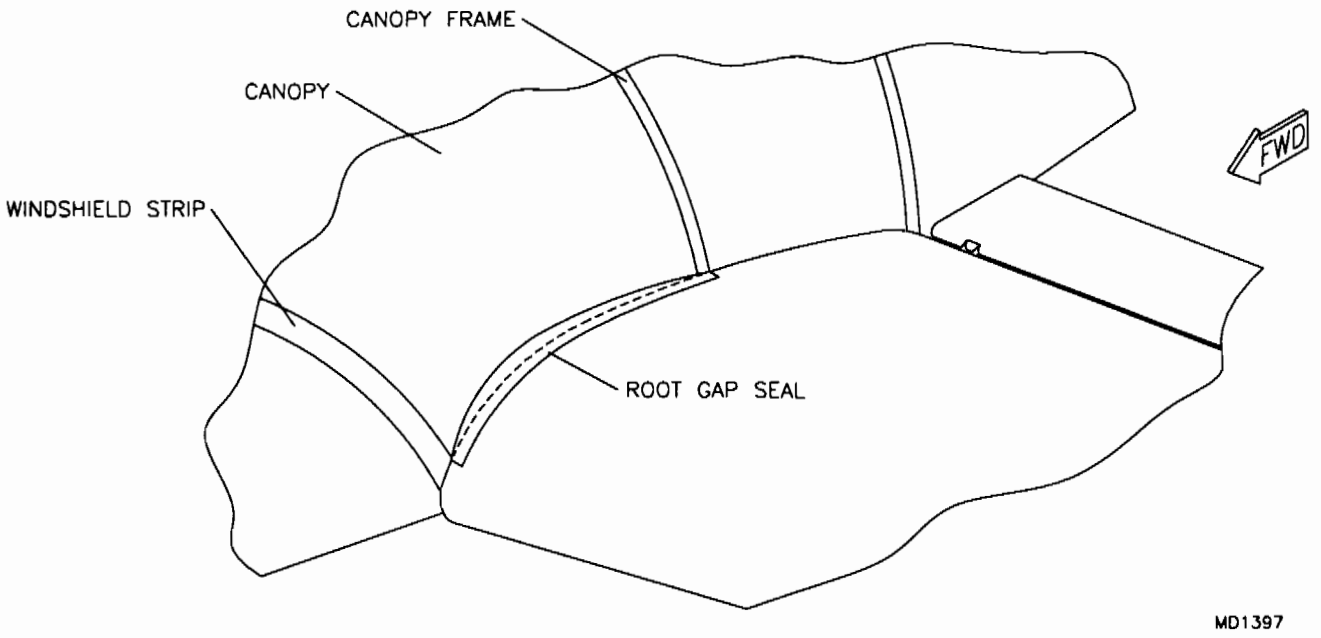
MD1381

WING ROOT TOP SIDE GAP SEALS FOR THE S-10 SAKOTA

Provided in the kit are two strips of ½" x .020 x 26" aluminum. These are used to gap seal the wing roots top side. The wings must be covered (although they do not need to be painted) and attached to the fuselage with the canopy in place.

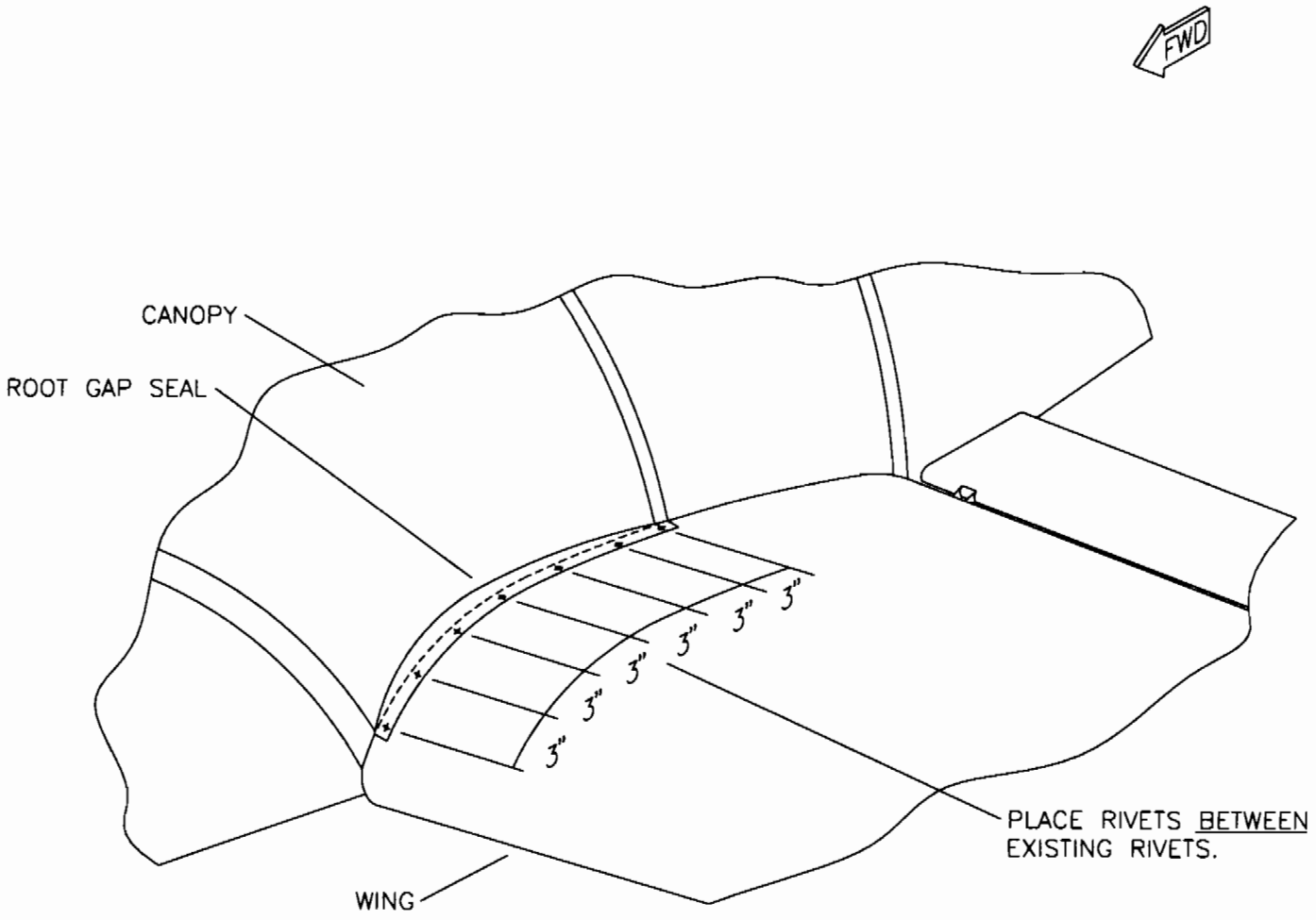
40. The strips are located from the windshield strip to the canopy frame. See **Figure 01-40**. Tape them in place with masking tape parallel to the wing ribs and touching against the canopy lexan. You will note the inboard edge of the strip does not touch the lexan along its length. The strip needs to be trimmed to contour. To mark the contour, tape a flair or similar marker to a 3/4" thick wood block. Trace the contour by placing the block against the windshield with the marker to the outside and touching the strip. Remove and trim.

FIGURE 01-40



41. After the gap strips are trimmed, tape them in position. Locate, drill and cleco the strips in place as shown in **Figure 01-41**. **BE CAREFUL:** The holes must go through the top of the root rib, it is easy to get off to the side. Mark the root ribs top line by locating off the rivets used to hold on the root strips. The root gap rivet holes should fall exactly **"BETWEEN"** the existing root strip rivets. Remove for painting and apply trim loc to the root gap inside edge prior to riveting to the wing.

FIGURE 01-41



MD1398

S-10 SAKOTA AILERON ASSEMBLY & COVERING PREPARATION

1. Select the parts depicted in the parts drawing. Fabricate the aileron horn attach angles as per print FAB-3. Make sure to make left and right's. Also, make up (2) spacer bushings, 1/4" X 1/2".

2. Drill and rivet in place (4) K-1000-3 nut plates to each of the aileron spars at each hinge hole. Place the nut plates on the spar's backside, use #40 aluminum pop rivets.

3. Using a file or disc sander, profile the aileron's rib tubes to the spar tube. The rib tube should be flush with the spar. Take care not to gouge the spar.

4. Assemble the horn parts and eyebolts to the aileron and trial assemble it to the wing. **NOTE:** Locate the aileron clip approximately 67" from the 90 degree end. See **Figure 01A-01**.

5. With the aircraft fully assembled, wings and ailerons, set up the ailerons as described in this section. Chances are this preliminary rigging will be near the settings you will fly on, so accuracy is important.

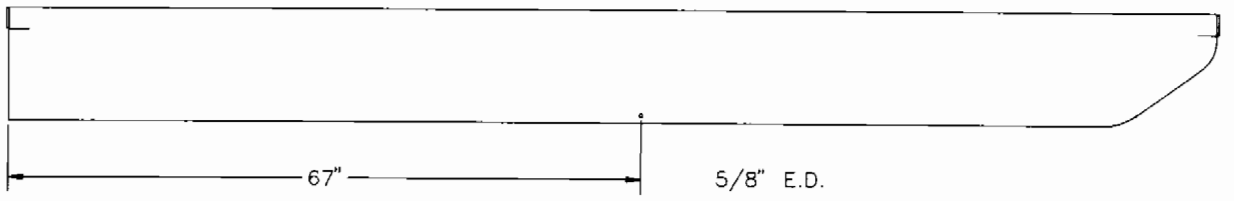
6. Mark the left hand aileron teleflex with a colored tag such as blue or yellow. Mark the control sticks right side horn with the same colored tag. Now during assembly you will have a color coded marker telling you they must CROSS in order to function properly. Always check for proper aileron movement prior to flight. Push the stick to the left, the left hand aileron should be up, etc.

AILERONS

ATTACHING & INSTALLING THE AILERONS

1. Using an awl or ice pick punch a hole through the fabric as shown in **Figure 01A-01**. For fabric covered only.

FIGURE 01A-01



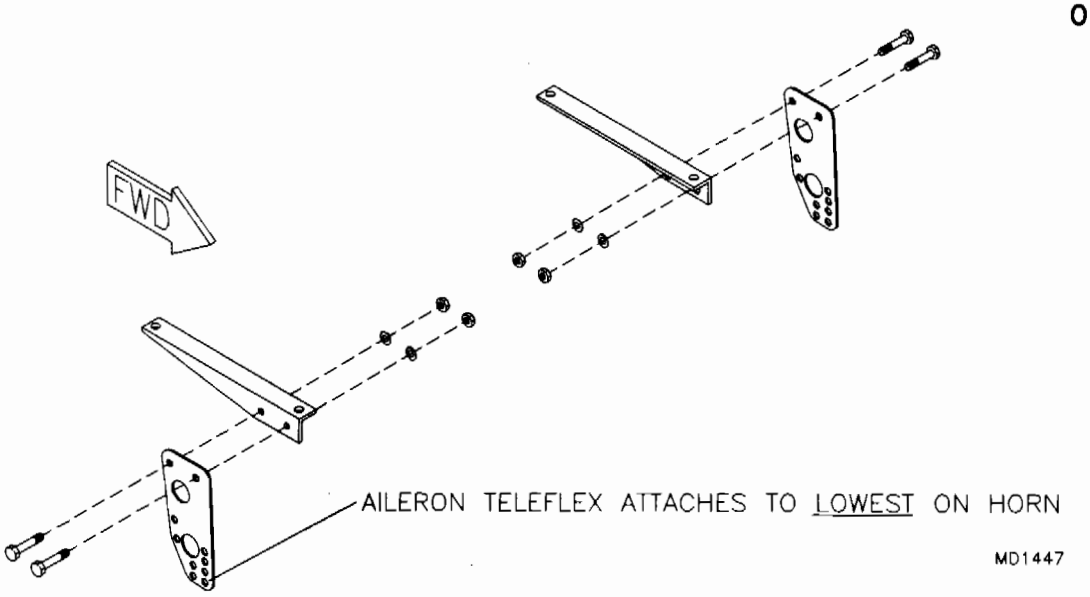
MD1446

2. Fabricate a pair of aileron horn attach angles as per print FAB-3.

3. Make 2 bushings 1/4" diameter X 1/2" long. Drill out the inside diameter to #11.

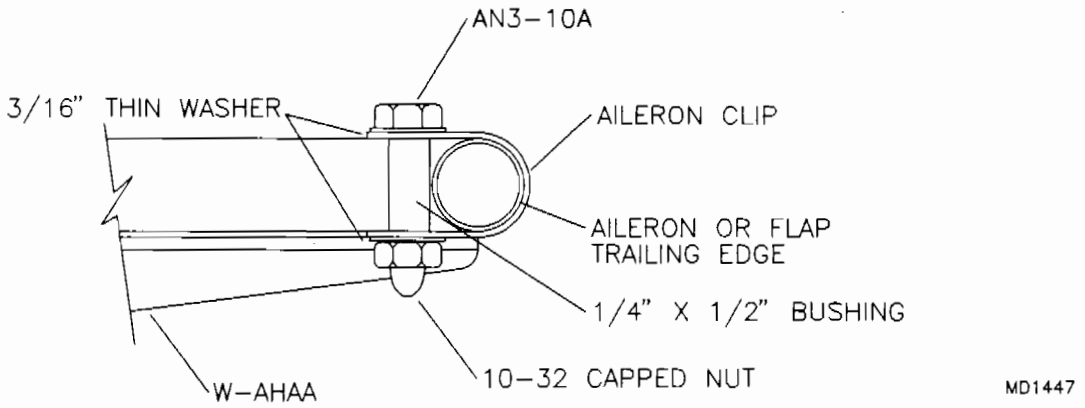
4. Bolt the horns to the angles as per Figure 01A-04.

FIGURE 01A-04



5. Attach the horn assembly to the proper aileron as per the parts drawing. Slip the 1/4" X 1/2" bushing into the hole, slip the aileron clip over the trailing edge and bolt as per **Figure 01A-05.**

FIGURE 01A-05



6. Bolt the ailerons to the wing with the hardware shown in the parts drawing. Do not use the cotter key if this is not the final assembly.

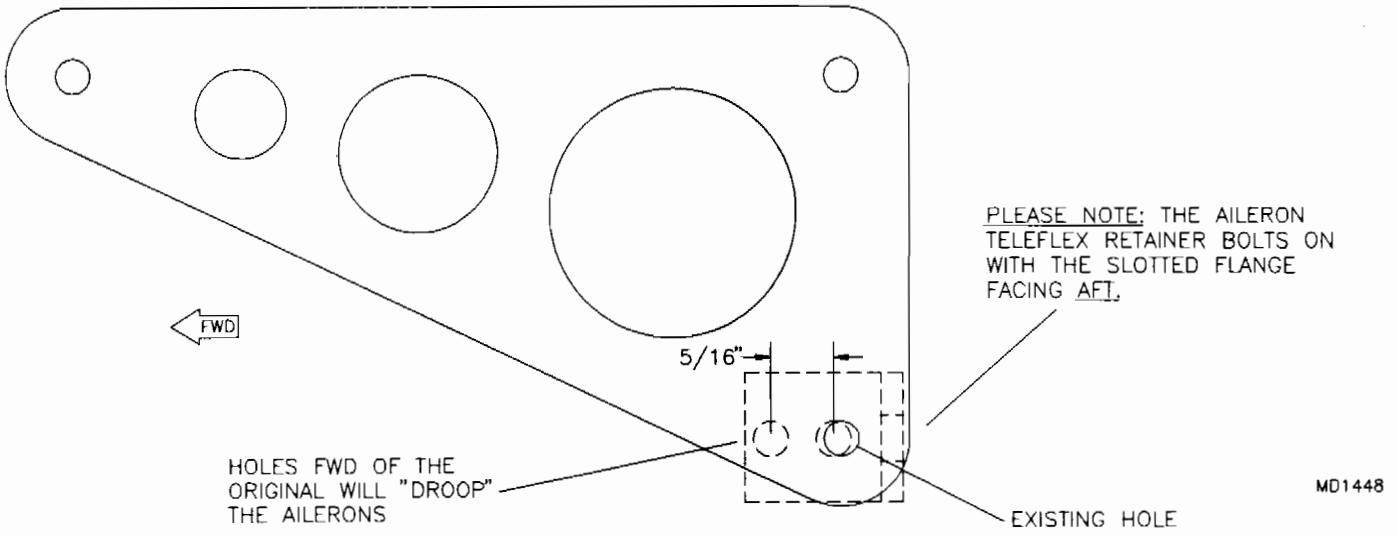
7. Bolt the rod end coming from the wing to the outside of the horn.

SETTING UP AND ADJUSTING THE AILERONS

8. Assuming the aileron teleflex retainer has been properly fabricated, installed and the teleflexes are in place, screw the four female rod ends onto the teleflex ends. Bolt the rod ends to the appropriate horns in the control system. **DANGER:** Aileron teleflexes **CROSS** the teleflex coming from the left wing, attaches to the right hand horn on the torque tube and vise versa. **DANGER II:** Be sure to use the PW-3 plastic washers on the outside of the rod end. In event of a rod end bearing failure this washer will not allow disconnection.

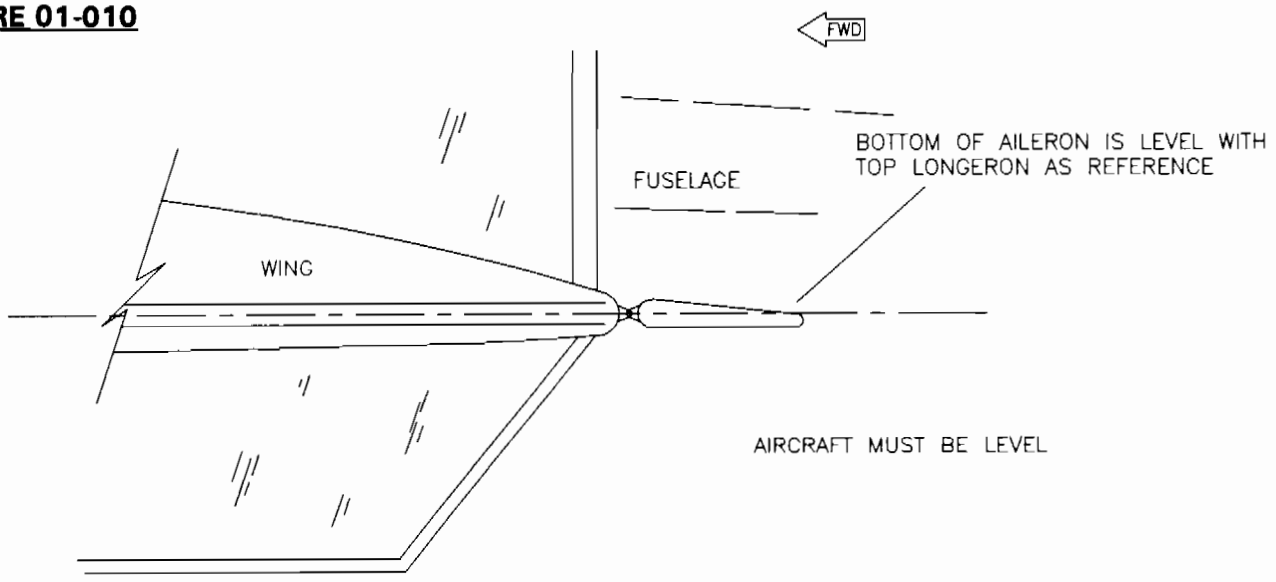
9. Hold the stick centered, each aileron should be neutral. Fly with this setting if the stick is not centered. Adjustements can be made three ways; (1) drill another hole on the mount bracket at the aileron teleflex wing exit, see **Figure 01A-09** or (2) cut off 1/4" threaded portion of each teleflex rod or (3) screw in or out the rod end.

FIGURE 01A-09



10. The aileron setting we use is illustrated in **Figure 01A-010**. This gives the best roll and cruise without hurting the stall. The tendency is to droop the ailerons too much. This can induce a slower cruise, lower stall and sluggish roll. Experiments can reveal the setting that suits your type of flying.

FIGURE 01-010



S-10 SAKOTA PVC GAP SEAL

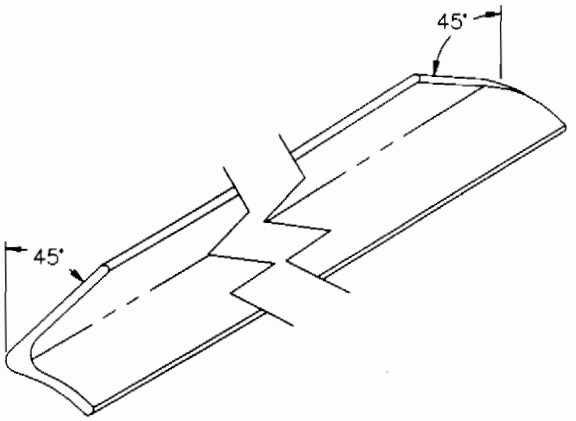
The wings should still be on the wing stands. If not, please set the wings on the stands for convenient assembly of the gaps seals. The PVC gap seal material can be used in it's natural white color or painted. Use the same paint and primer as used on the fabric. If you plan on painting the gap seals, use small self tapping screws to fit. The screws can be used in place of the rivets for permanent assembly. If you want to use rivets for final assembly, be sure to use a screw smaller in diameter that the rivet.

1. Install the ailerons and the flaps. Locate the control surface to the side of the hinge that allows clearance between them. Use washers as needed to shim the surface side to side.

2. Measure the distance between the hinges. **NOTE:** A handy way to figure required length is to measure center to center of the bolt hole. With the hinge bracket subtract 1 1/4" from the total length between bolt centers.

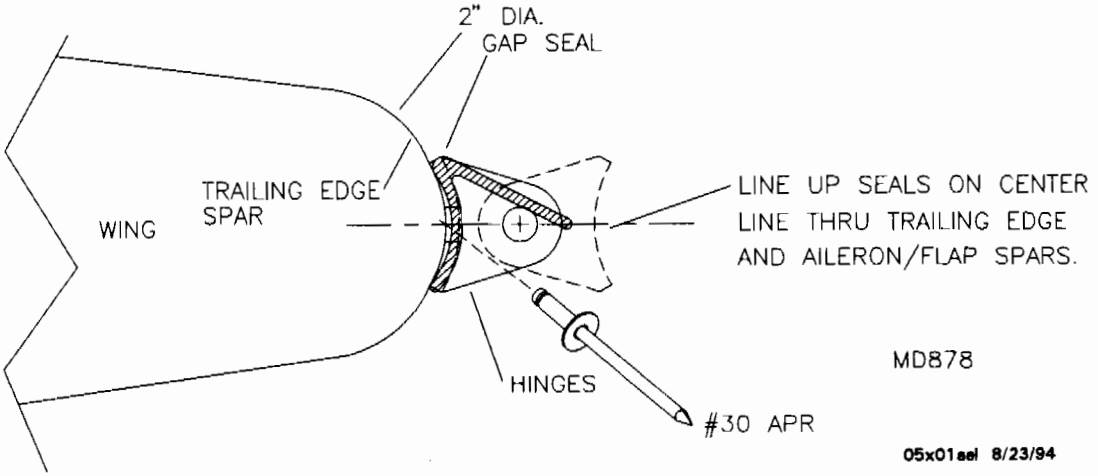
3. Cut the gap seal to this length with 45° miters on each end. This will open the gap seal so it can be riveted to the spar. See **Figure 01A-03.**

FIGURE 01A-03



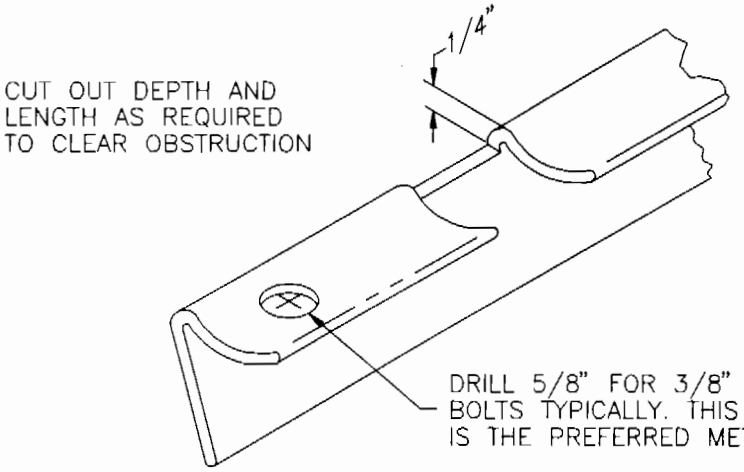
4. Unbolt the control surfaces linkage and let the surface hinge out of the way. Position and pre-cut gap seal centered between hinge points and lined up with the hinge line. See **Figure 01A-04.** **HINT:** If you have two-way tape apply it to the gap seal and use it to hold it in position.

FIGURE 01A-04



5. Cut away the concave side of the gap seal where the bolt heads prevent installation. Either drill a 5/8" diameter hole where the bolt heads contact or cut out the area. See **Figure 01A-05.**

FIGURE 01A-05



6. With the gap seal fitted and taped or held in position, drill each end and center #30, remove any burr's and fasten with #30 aluminum pop rivets.

7. Install the gap seal even in the short segments at the wing root and tip. It will increase performance, which is always worth the hassle.

8. The surfaces must move freely without rubbing the gap seals. Fit the gap seal by filing, sanding, or plane until proper clearance is obtained. A miniature wood plane works great to shave off excess material. Do not tighten the hinge bolts. They must turn freely for best feel. Install the castlated nuts and **COTTER PIN** all hinge bolt nuts.

INSPECTION OF THE AIRFOIL LIFT STRUTS

RANS airfoil lift struts are made of extruded aluminum. Extrusions of this nature are sensitive to deformation. Cracks and splits can occur along the length of the strut if the ends are compressed beyond the material limits. Over tightened bolts can cause cracking. A compression bushing or fitting large enough to equal the struts inside diameter should be used. Remove any of the burrs that may be on the ends of the tubing before cutting bushings to fit.

Each and every piece of airfoil strut material is inspected two times before shipment to assure you of a quality product. However, we are not infallible, therefore, we encourage you to inspect the material for any form of deformation and surface imperfection. Deeply grooved struts should not be used and returned to the factory for replacement. The surface should look and feel smooth.

Dents and nicks can occur during shipping. The strut material is very thick skinned and resistant to dents. If dents are present they will usually be large enough to require rejection of the material.

Minor nicks and scratches can and should be sanded out with 250, 350 and then finally 400 grit wet or dry sandpaper. Sanding out such defects is an effective way of restoring the strut to a safe full strength status. Any nicks or scratches that need more than light sanding are cause for rejection.

Once the struts are in service, continued inspection is the only required maintenance action. Anodized strut material is resistant to corrosion and needs little care. However, non-anodized material will corrode in a salt air environment and it should be protected inside and out. External protection can be effected using epoxy paints or other high grade finishes. The inside of the strut can be protected with paint by pouring a quantity of paint inside the tube and rotating to cover the entire surface.

Include strut inspection in your pre-flight check.

S-10 SAKOTA AIRFOIL STRUT, WING INSTALLATION & RIGGING

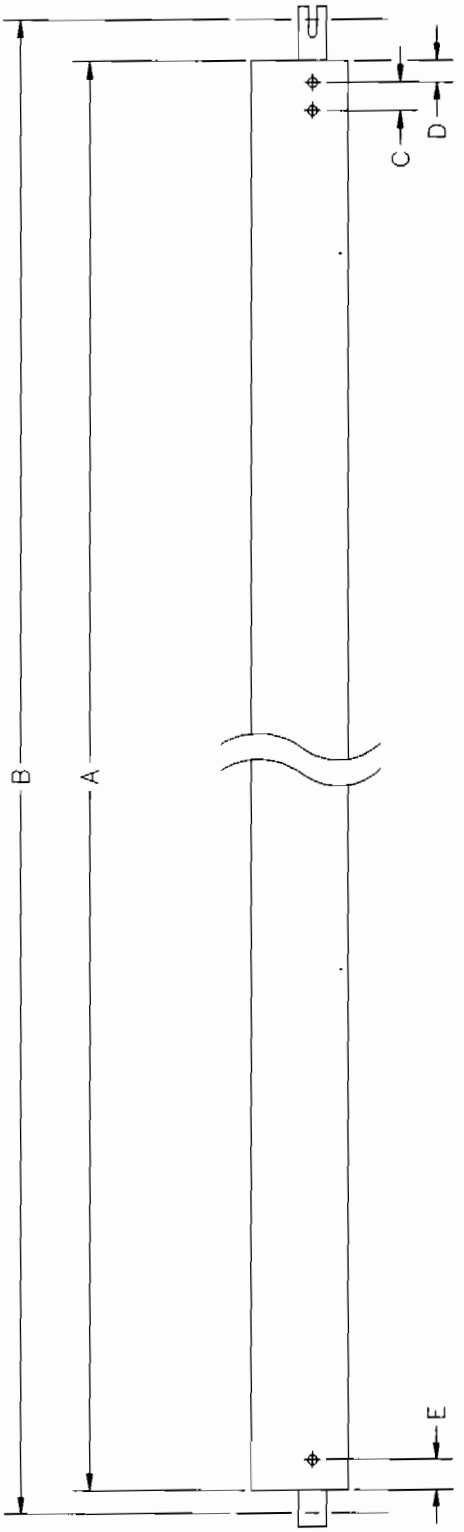
NOTE: First build the tool illustrated in the back of this section. The tool shown allows rigging before or after covering.

The S-9 and S-10 need to be rigged exact, in order to fly straight and fall wings level in stalls. **NO** wash out is used. The high lift airfoil at the tips is the sole means of preventing tip stalls. This method is quite successful and results in no performance loss due to "wash out". However, be careful to assure the wings are rigged zero degrees and not washed in. Make your rigging tools carefully to assure accuracy and check and re-check your work before drilling.

1. Chock the wheels and level the fuselage side to side and nose to tail. Once leveled, pin the wings to the fuselage using the (4) 3/8" diameter clevis pins. Install pins from the inside so the lock rings will be on the outside. The carry through connectors must be ground and fitted to the inside of the spars. Grind or file a little at a time and test fit often. Once spars slip over these "T-Bones" drill 3/8" through the spars. The T-Bone tube will act as a guide. Drill through the front spars forward edge. Pin it with a 3/8" clevis pin, then drill all the way through the aft spar. Now finish drilling the front spar. **IMPORTANT:** Support the tip or hole elongation may occur.

2. Refer to **Figure 01B-02**. Drill the front strut (the large one) as per the diagram. Please note the difference in length between the S-9 and the S-10. Be sure you are making the right type of strut for your model. Struts must be cut to the right length **BEFORE** drilling. Use the templates to locate the holes chordwise on the struts as per **Figure 01B-02A**. The aft struts wing to strut fitting will be used to adjust the wash out. Cut the strut to proper length and drill only the lower end. Due to dimensional variation in extruded material, it may be required to shim the fittings. No gap should exist between the fittings and struts. The struts should not be tightened down with the bolts. If a gap exists this may crack the struts. Use the shim material to make a tight fit. See **Figure 01B-02B**. Shim only as required. Bolt the forward struts in place. This will automatically set the dihedral. Bolt the aft struts in place with the strut to wing fitting inserted loosely inside the end of the strut.

FIGURE 01B-02



IMPORTANT: PRIOR TO DRILLING THE STRUT CHECK DIMENSION B. THIS MUST BE VARIATIONS OF A, D, AND E MAY BE REQUIRED TO HOLD B.

DIM.	S-9 FWD.	S-9 AFT	S-10 FWD.	S-10 AFT
A**	62 1/8"	62 3/8"	62 1/8"	62 1/4"
B	63 9/16"	LOA*	63 7/16"	LOA*
C	1"	LOA*	1"	LOA*
D**	3/8"	LOA*	1/2"	LOA*
E**	5/8"	5/8"	5/8"	5/8"

STRUT LENGTH

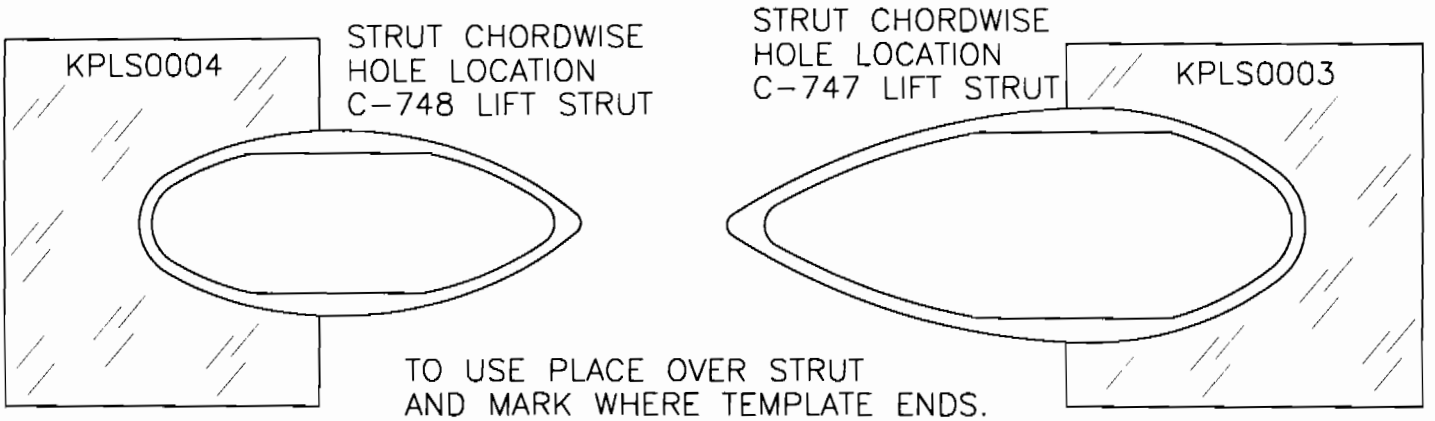
TOTAL DISTANCE BETWEEN HOLE CENTERS

* LOCATE ON ASSEMBLY, REFER TO INSTRUCTIONS FOR PROCEDURE.

** CHECK BEFORE DRILLING, THESE MAY VARY. ALLOW NO E.D. LESS THAN 1/4" FROM EDGE OF HOLE TO THE END OF STRUT.

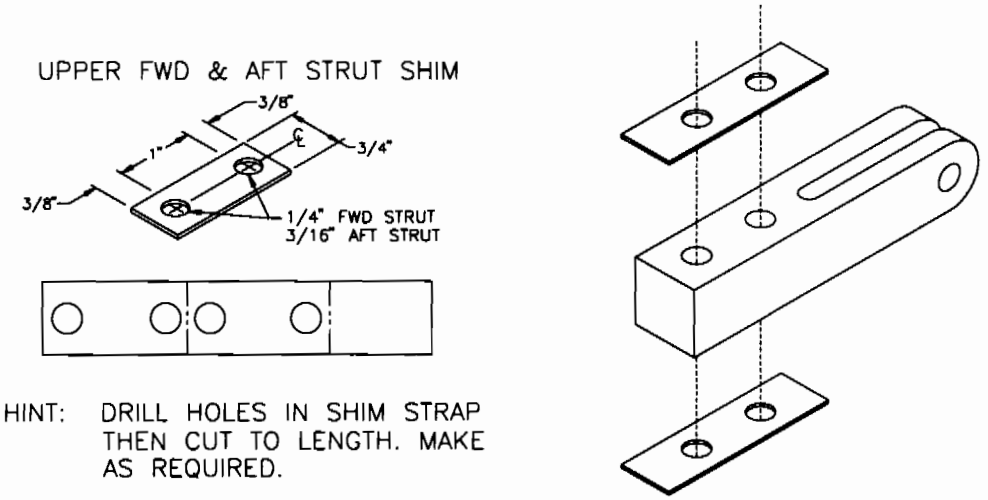
MD1604

FIGURE 01B-02A



MD1605

FIGURE 01B-02B



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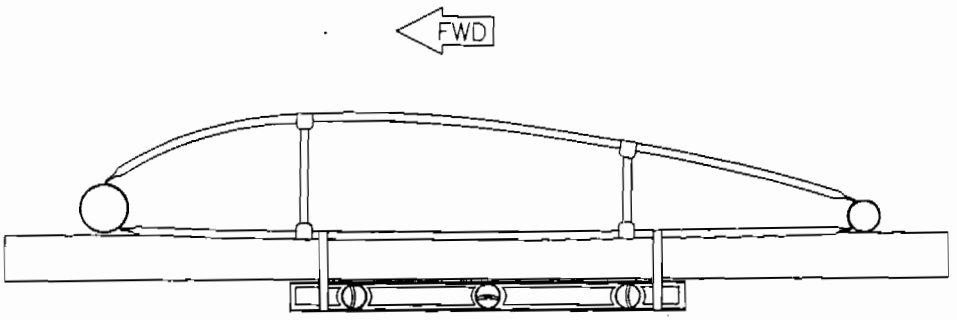
3. Re-check for level by placing your rigging device under the RH wing root spar to spar. See **Figure 01B-03**. (A slight lowering of the tail should be required.)

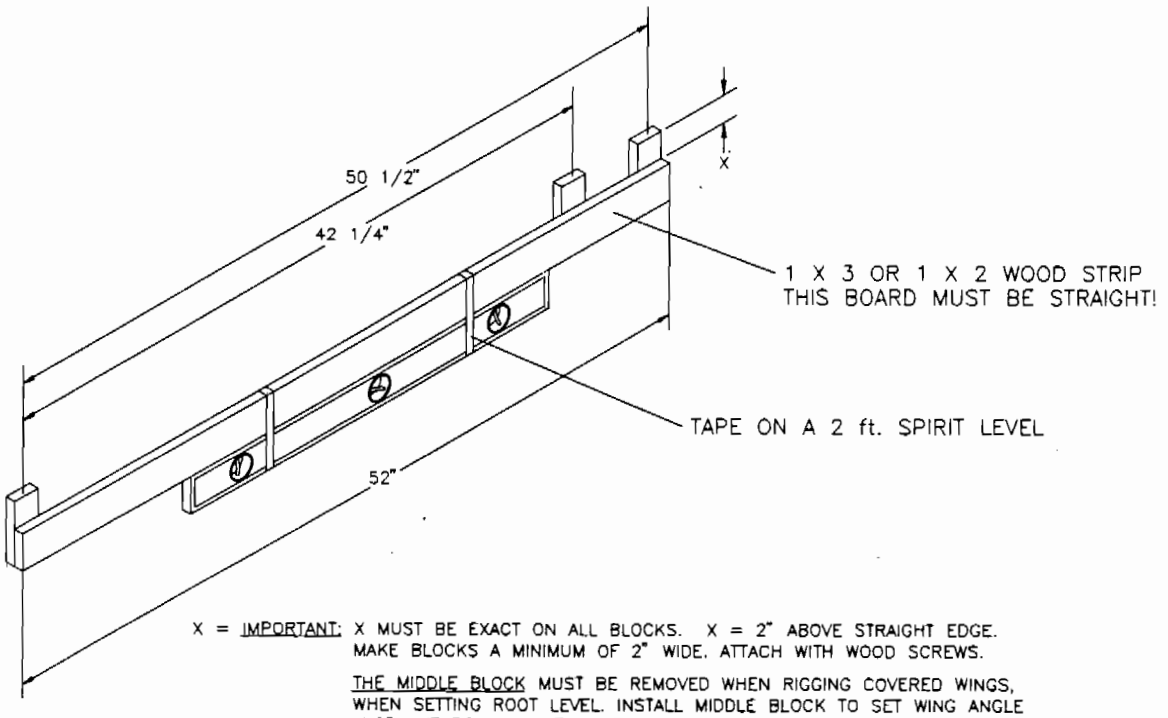
FIGURE 01B-03



4. Place the rigging device just outboard of the right wing's struts. Move the aft spar up or down as required to obtain a level reading. Use a vice grip type "C" clamp to hold the setting. Mark on the fitting with a pencil* where the end of the strut is. Remove and use the fitting to line up on the mark and the chordwise marks to drill the bolt holes. Drill #11, then assemble and drill 1/4". Check the setting. If you happen to botch it, order a blank fitting from us for a second chance. *Remove the pencil marks afterwards or the graphite will cause corrosion.

5. Go directly to the left wing's outboard strut location and set the wing to level, same as RH side. It is not required and can even result in an improper setting if another level reference is taken from the LH wing root.

6. If everything was done accurately the aircraft will not have any tendency to drop a wing in a stall or not hold heading. If these bad manners are prevalent and it is discovered that the wings are not set at zero degrees, then it's a simple matter of installing and drilling a new aft lift strut connector.



S-10 SAKOTA ADJUSTABLE LIFT STRUT

1. Set up the forward strut as per the instruction for the standard struts.

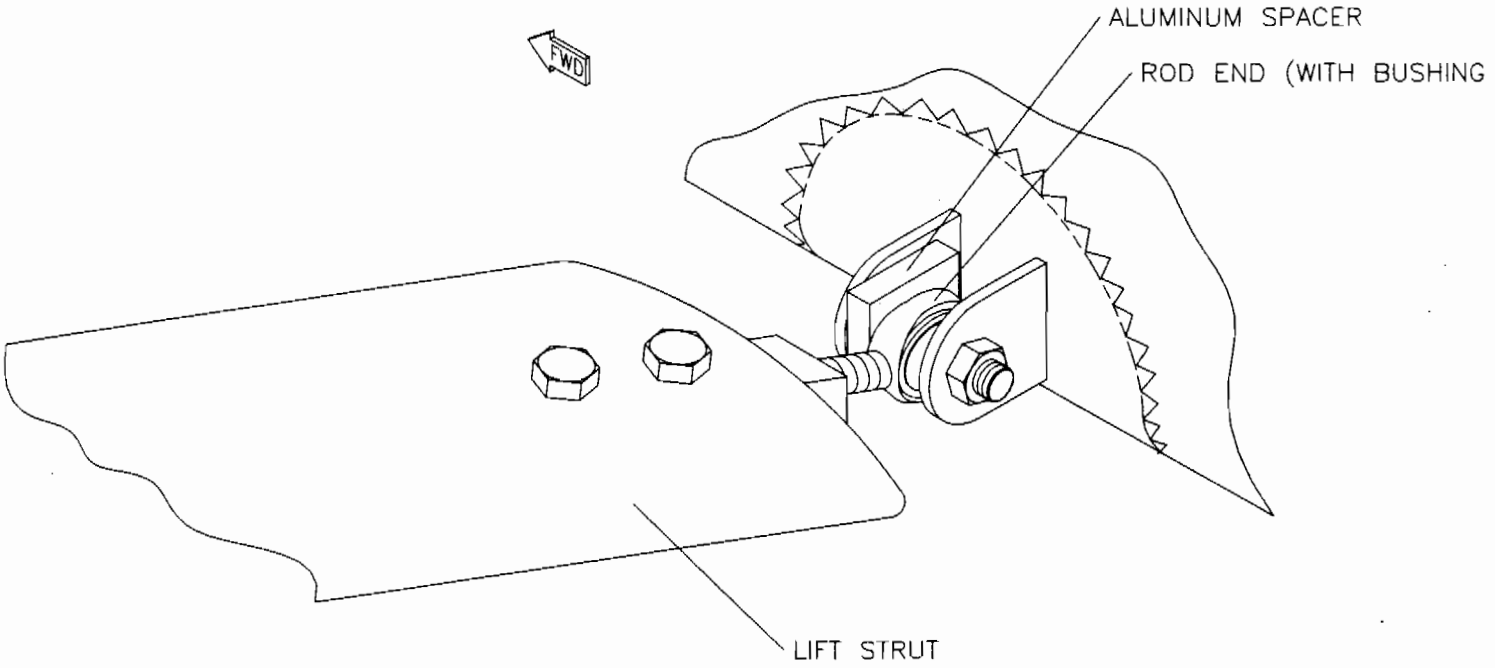
2. On the AFT strut locate the upper lift strut connectors first hole (measurement "D" in **Figure 01B-02**) 1/2" in from the end of the strut. Using the strut connector as a drill guide, drill the second hole and bolt in place.

3. Cut and install the 3/8" X 1/2" bushings in the rod ends. Screw the rod ends into the adjuster end 15 turns.

4. Level the wings as per the manual instructions. Attach the adjuster set up to the plane. Slide the strut onto the adjuster end and bolt the strut to the wing. Recheck for zero wash out. There should be an 1/8" gap between the strut and the strut attach point on the plane, it not cut or sand the end of the strut. **NOTE:** The square spacer may need to be sanded to fit exactly.

5. Measure the depth of the adjuster block from the end of the strut. Disassemble the strut and center the adjuster block on the strut that distance from the end of the strut. Use the block as a drill guide. Reassemble and recheck wash out. Readjust if necessary by turning the rod end in or out.

6. Repeat this process for the other wing.



MD1631

S-10 FLAPERON LEVER ASSEMBLY REFER TO PARTS CATALOG 001C-01

1. Prior to assembly debur and paint parts as desired. We usually burnish the aluminum parts and paint the handle flat black.

2. Assemble the unit as per the parts drawing. Pay close attention to parts routing.

3. ASSEMBLY NOTES:

   A. The 3/16" thick washers are used to space the handle (PN-FAL-FL) in the center of the side plates. Assemble this first.

   B. The handle should move freely without scraping between the side plates. Adjust 7/8" x 3/8" spacer bushings accordingly.

   C. Some filing of the handle slot may be required. Roller bolt must move freely in slot. Use grease to lube mechanism.

   D. Tighten down the AN3-13A bolt hard to keep the cable stop block in alignment.

   E. During final assembly install the flap mechanism with the LH bolt last before bolting down to nut plates. (More on this in floorboard).

S-10 FLAPERON MIXER

PLEASE NOTE: At this point the seat and floorboard should be installed on the UNCOVERED fuselage. If this is not so please go to seat section.

1. Refer to the parts catalog drawing to select and assemble the mixer. NOTE: Please fabricate the teleflex retainer prior to assembly. (See fabricated parts) Clamp the angle in place so the tabs fit even on the aluminum angle and drill through the aluminum angle with a 3/16" or #11 bit. Be sure to grease the sliders for ease of operations.

2. Bolt the Aileron Telefelex Retainer to the slider. Include the bushings and cable as per the parts drawing.

3. Drill a 1/8" diameter hole in the teleflex retainer as shown in Figure 001D-03 for each of the return springs. Debur the holes and install the springs.

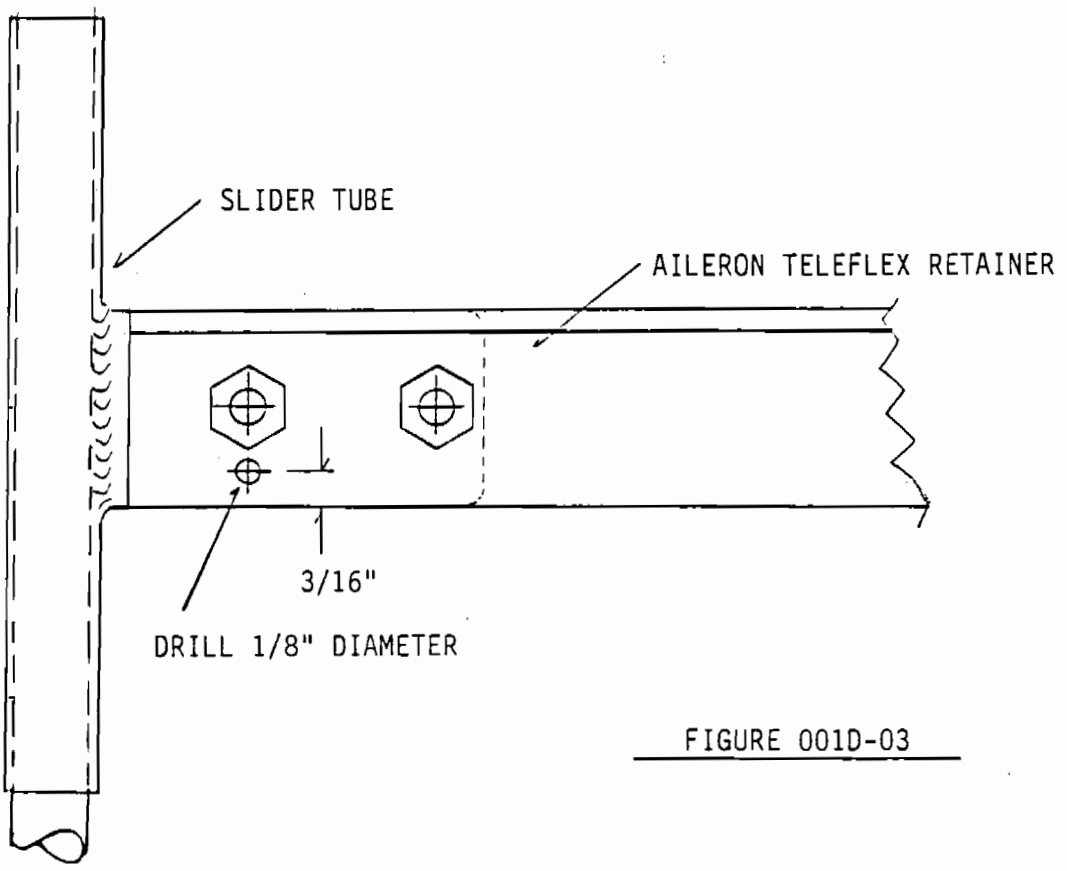


FIGURE 001D-03

4. Screw on the 1/4" plain nut (6) to the cable adjustor (5) and screw cable adjustor to the slider assembly.

5. The slider assembly is installed on the forward side of Station-3 (S-3). Using tube clamps bolt in this position to the bottom carry through centered over the control stick torque tube.

6. The top of the slider is drilled in place. Slip the 1" tube clamps in place on the top carry through. Use them as hole locators. Drill through #11, debur and bolt.

7. The flap lever is located on the floorboard's left side. Use the left inboard floorboard tab (Figure 001D-07) to hold down the lever's right side. Line the lever even with the seat and screw into it from the bottom with (4) #8 x 1/2 PHS. Drill through the levers's lower left tab and bolt to the floorboard.

8. Run the cable from the lever to and through the adjustor on the slider and attach it to the cable retainer. PLEASE NOTE: Cable retainer (15) should be attached to the retainer cable (12) with the lever in lower position. Pull the cable tight and snug it down to the retainer. Check flaperon action by pulling up on the lever. It should click twice and stay in each position selected. The system needs a lot of tension, use the adjustor to dial in the tension to make it slack free. During flight testing if the system doesn't seem to "lower" the ailerons in proportion to lever movement it means there is not enough pre-tension on the cable . Again tune this in with the adjustor.

If the lever pops out of a slot (usually the top) try more spring inside the lever or filing the slot deeper.

OPERATIONAL NOTES

9. The Flaperon's are going to add more lift than drag and effectively reduce the stall as much as 10 mph. Do not deploy flaperons above 80 mph. Use of full flaperons will reduce the aileron throw by 36%, more than adequate roll authority remains. Be advised though, the stick throw is changed!

The flaperons will cause the S-10 to float longer during landings. Retraction of the flaps when in the flare will effectively kill the float and shorten the landing roll.

Not using flaperons on either take off or landing will increase distances and speeds significantly, therefore it is standard practice to use them every take off and landing. Use your own judgement and adopt a procedure you're comfortable with.

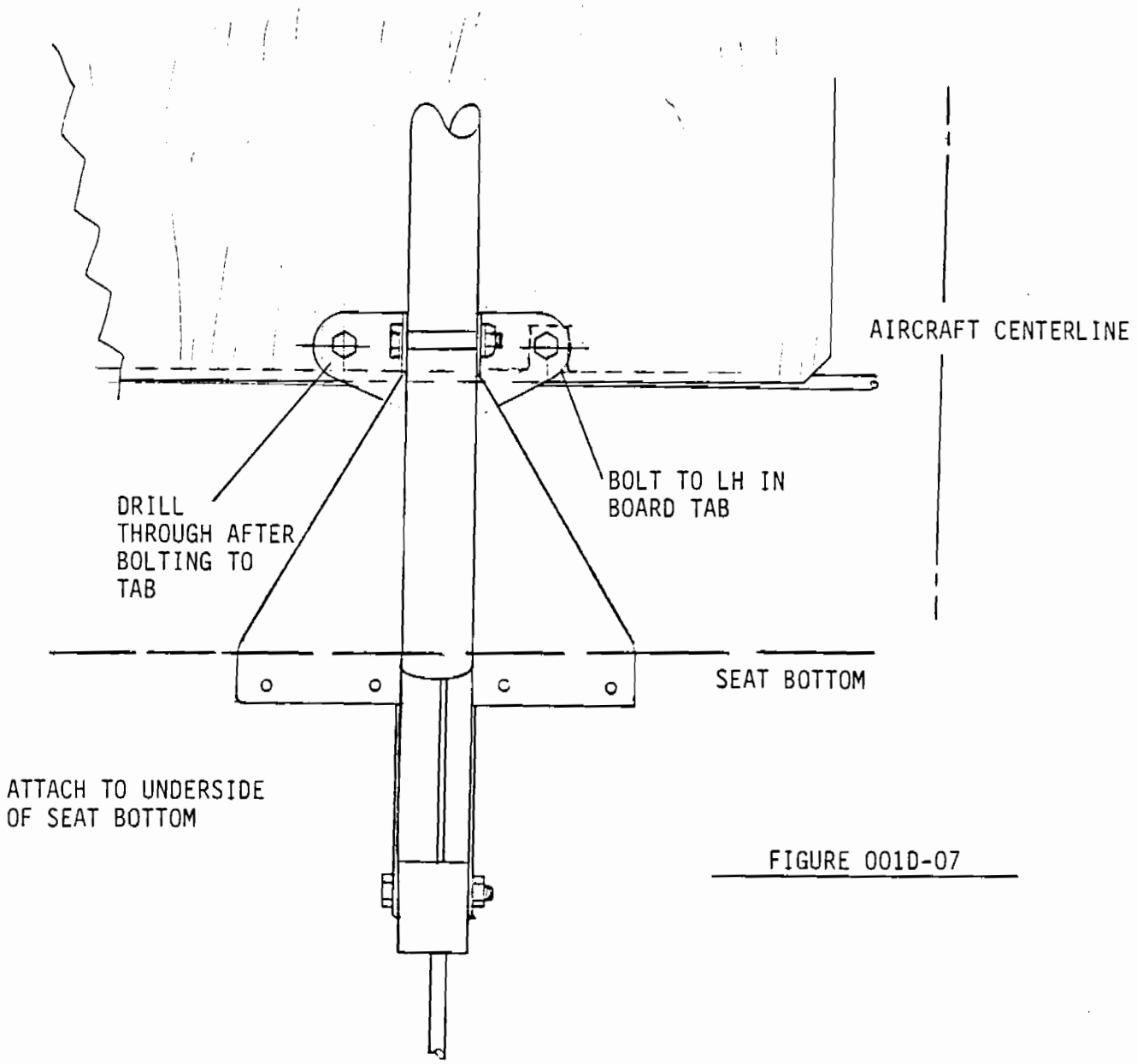
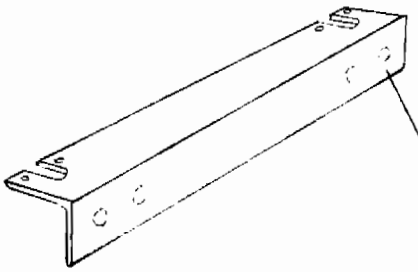
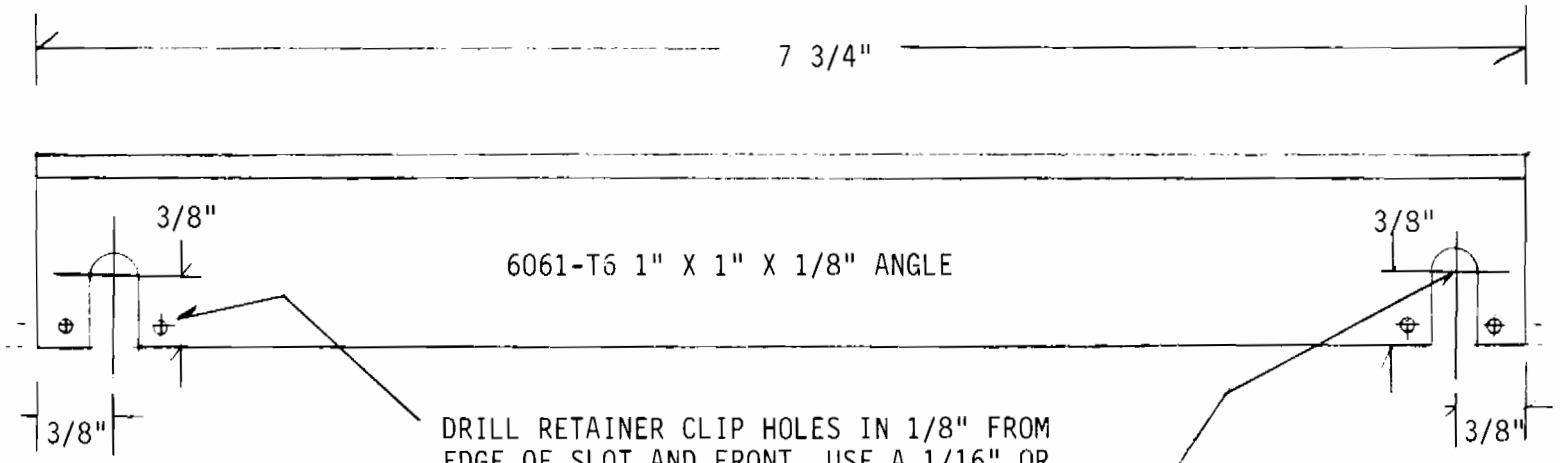


FIGURE 001D-07



TRANSFER DRILL THE (4) BOLT HOLES IN THE TELEFLEX RETAINER BY CLAMPING IN POSITION ON THE SLIDER TABS.



DRILL RETAINER CLIP HOLES IN 1/8" FROM EDGE OF SLOT AND FRONT. USE A 1/16" OR #40 DIAMETER BIT.

TO MAKE A SLOT LOCATE AND DRILL A 1/4" DIAMETER HOLE 3/8" IN FROM EACH EDGE. USE A HACK SAW TO CUT OUT SLOT. FILE TO FINISH. TEST FIT THE TELEFLEX PRIOR TO ASSEMBLY.

SUBJECT: AILERON TELEFLEX RETAINER	**NO.** W-AIL-TEL-R	**MODEL:** S-10
MATERIALS: 1"X1"x1/8" 6061-T6 ALUMINUM ANGLE	**FINISH** FILE, SAND AND POLISH	
DATE: 5-6-88	**DRAWN BY:** RJS	**SCALE:** FULL
PROPERTY OF: RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:**

S-10 TURTLE DECK ASSEMBLY

PLEASE NOTE: This procedure is for **FINAL** assembly, with the fuselage primed. The aluminum turtle deck parts can be primed either attached or apart, however, being attached will make it more difficult to paint. Use clecos where it states to use rivets if you plan to remove for painting.

1. Locate the exact top of each WS-CF. **HINT:** Measure from each end for accuracy. Cut the formers in half on each center mark.

2. Assemble the formers using parts shown in Figure 02-02. Do not rivet on the "buttons" if you are building the low back version. Refer to parts catalog pages 002-2 and 0013-1. Match the two halves marked "A". These must be used for the rear former. **HINT:** It helps to oval the 3/4" splice tubes before inserting.

3. Drill the roll over tube saddle as shown in Figure 02-03. **NOTE:** Drill #30 first then after the former is in place and pilot drilled, ream out to #11. Cleco and rivet later during pre-covering assembly with 3/16" aluminum pop rivets.

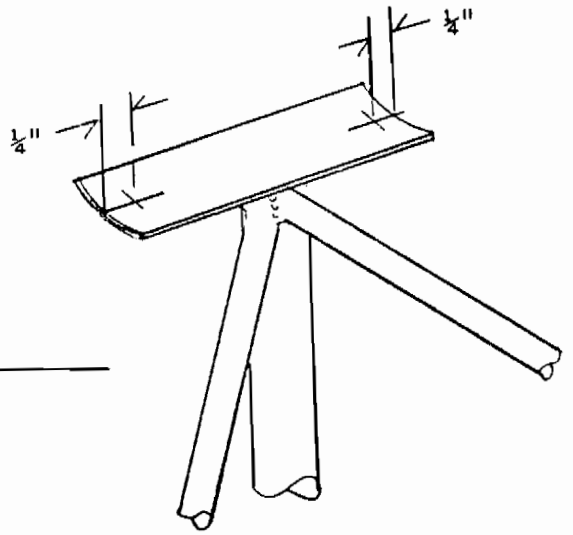
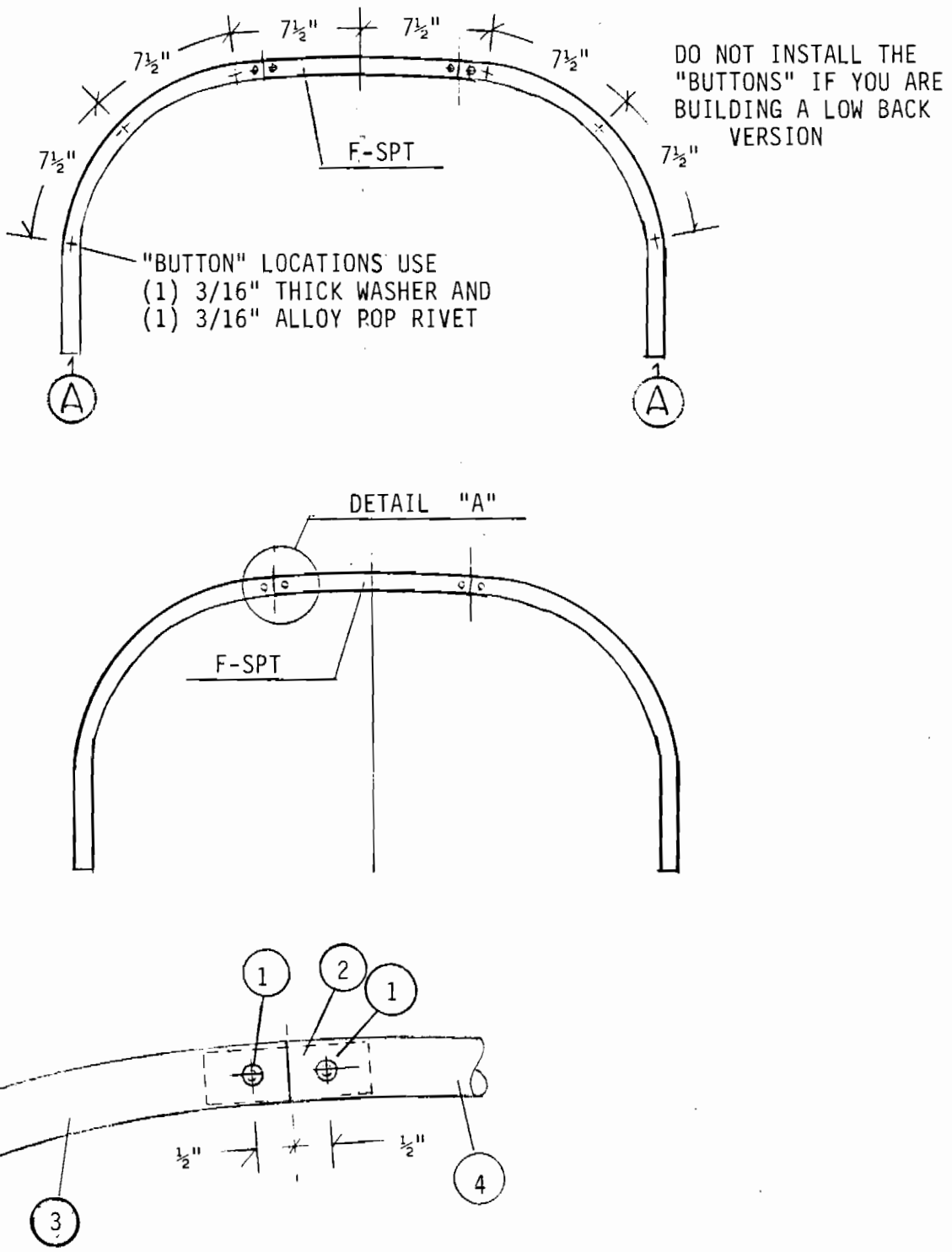


FIGURE 02-03

4. Slip the aft former in place onto the stubs and roll over structure.

5. Install the front former to the remaining stubs. Check for correct height as shown in Figure 02-05 and align the former so it is level with the aft one.



DETAIL "A"
1. Aluminum Pop Rivet 3/16"
2. Splice Tube
3. Canopy Former
4. Canopy Former Expander Tube

FIGURE 002-02

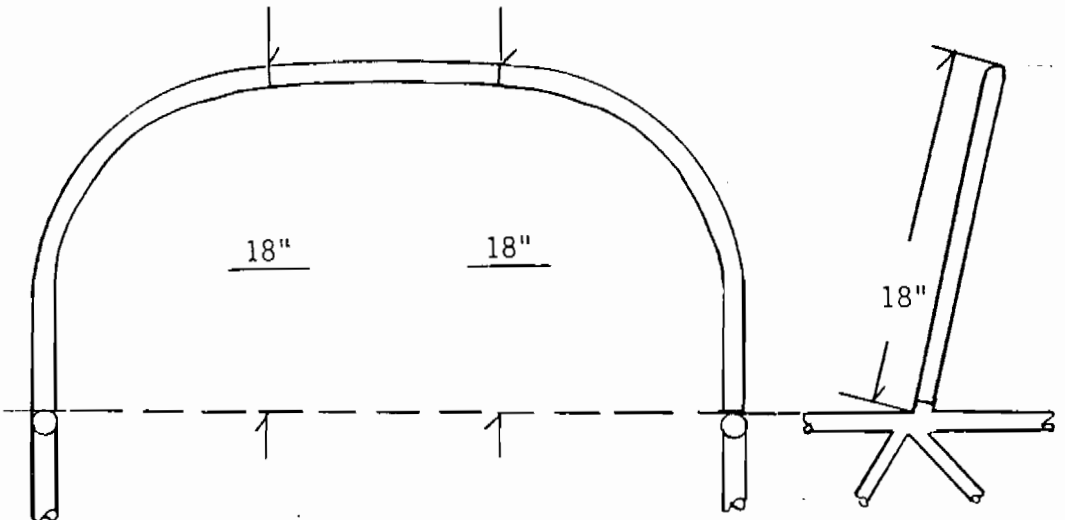


FIGURE 02-05

6. Drill #30 and rivet the formers to each stub. See Figure 02-06.

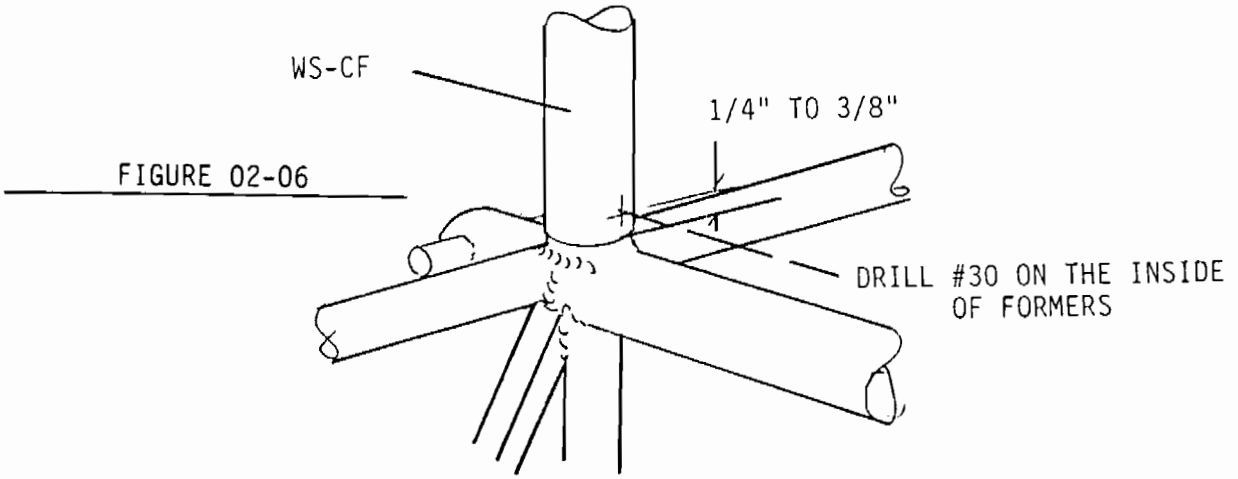


FIGURE 02-06

7. **BEFORE** bending the tabs on formers "A" and "B", locate and drill a #30 hole 1/4" in on center. See Figure 02-07. **NOTE:** Do not drill former "A"'s tabs if you are building a low back.

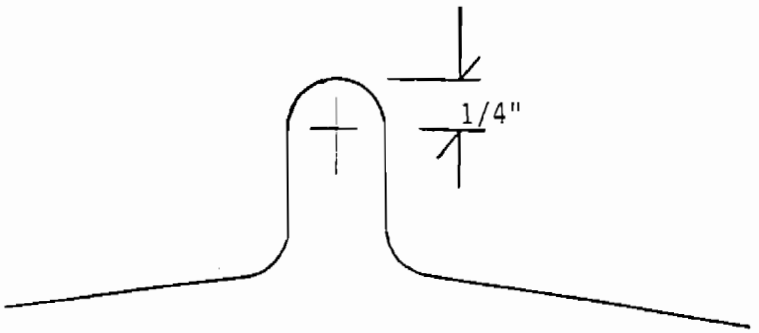
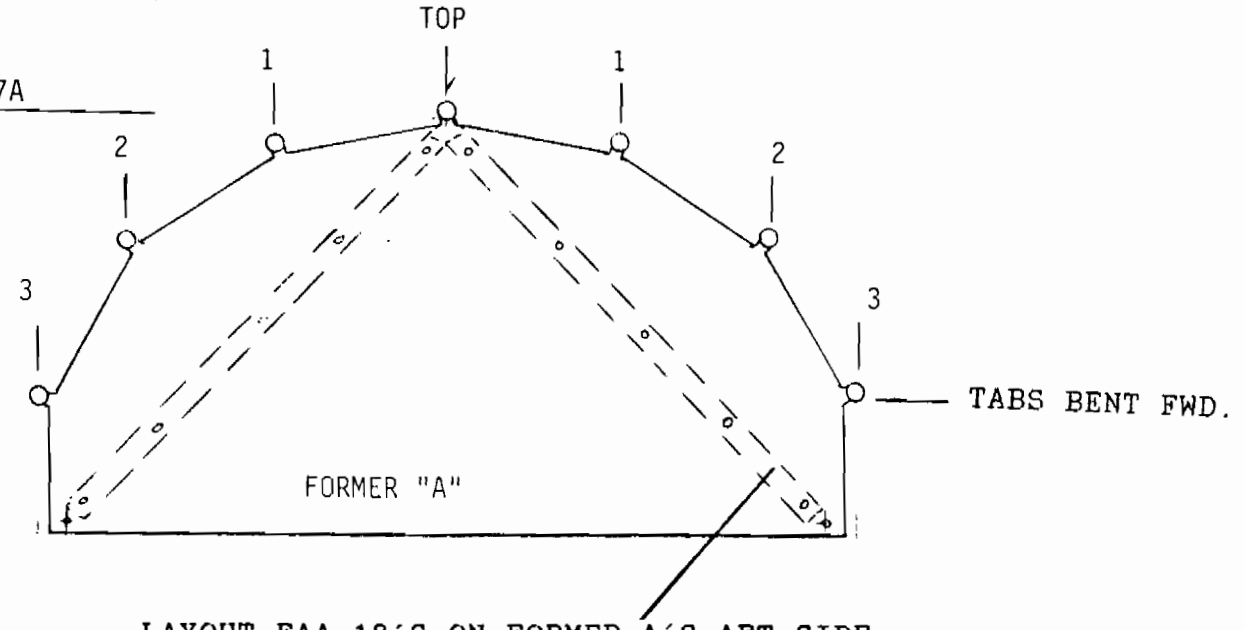


FIGURE 02-07

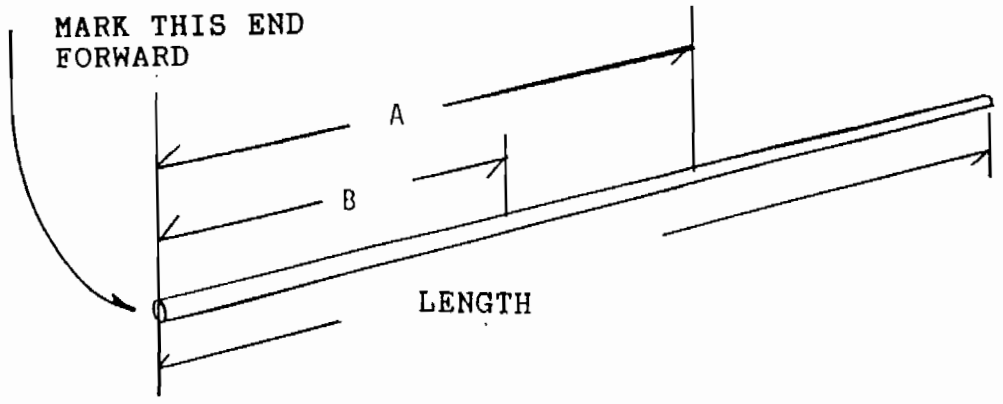
7. (Cont.) The tabs are designed to be bent by hand only, using a pliers will upset the fit up of the parts. Install formers "A" and "B" with the tabs pointing forward on the front side of the welded on tabs on the fuselage. **IMPORTANT:** On **LOW BACK** versions bend tabs on former "A" to point aft. At this point turn to the low back assembly instructions if your kit is so equipped. **DO NOT** rivet with stainless steel rivets until after priming the fuselage. You will most likely want to remove the turtle deck assembly to prime the fuselage. Attach the reinforcing angles to the **BACKSIDE** of former "A". See Figure 02-07A.

FIGURE 02-07A



LAYOUT FAA-18'S ON FORMER A'S AFT SIDE.
ATTACH EACH WITH (5) 1/8" POP RIVETS EVENLY
SPACED ON BACK SIDE

8. From the 1/2" x .035 aluminum tubing provided, cut and drill the tubes as shown in Figure 02-08.



HIGH BACK STRINGER DIMENSIONS

For high back only. **DO NOT** cut to these lengths for low back. See low back stringer dimensions at the end of this section.

NO.	LENGTH	A	B	QTY
TOP	61"*	40 7/8"	18"	1
1	67"	41 3/8"	18 1/4"	2
2	67"	42 1/8"	19"	2
3	67"	42 15/16"	19 13/16"	2

USE 1/2" X .035 6061-T6 TUBE

FIGURE 02-08

*This is a rough cut and will need trimming.

9. Attach onto the forward side of each fuselage tab the turtle deck formers "A" and "B". Use 3/16" stainless steel pop rivets. Note the former "A" will have to be riveted from the rear. Attach the (2) 18" aluminum angles as shown in Figure 02-07A prior to installing.

10. Ream out the forward ends of the stringers so they fit over the "buttons". Attach the stringers to the formers as shown in Figure 02-07A. If the stringers tend to pop off the "buttons" try holding them temporarily in place with masking tape. The fabric after shrinking will hold the stringers securely against the buttons.

11. This should complete assembly of the turtle deck. Prior to covering be sure to remove any markings on the aluminum tubing, otherwise they will come through the finish.

12. Fabricate two side stringers 1/2" x .035 x 68". Smash one end so it will slip onto the small tab welded to the S-3 upright. With the stringer inserted on this tab, align it with the other two aft tabs. Curl the aft end. Rivet the stringers in place with 1/8" aluminum pop rivets. See Figure 02-012.

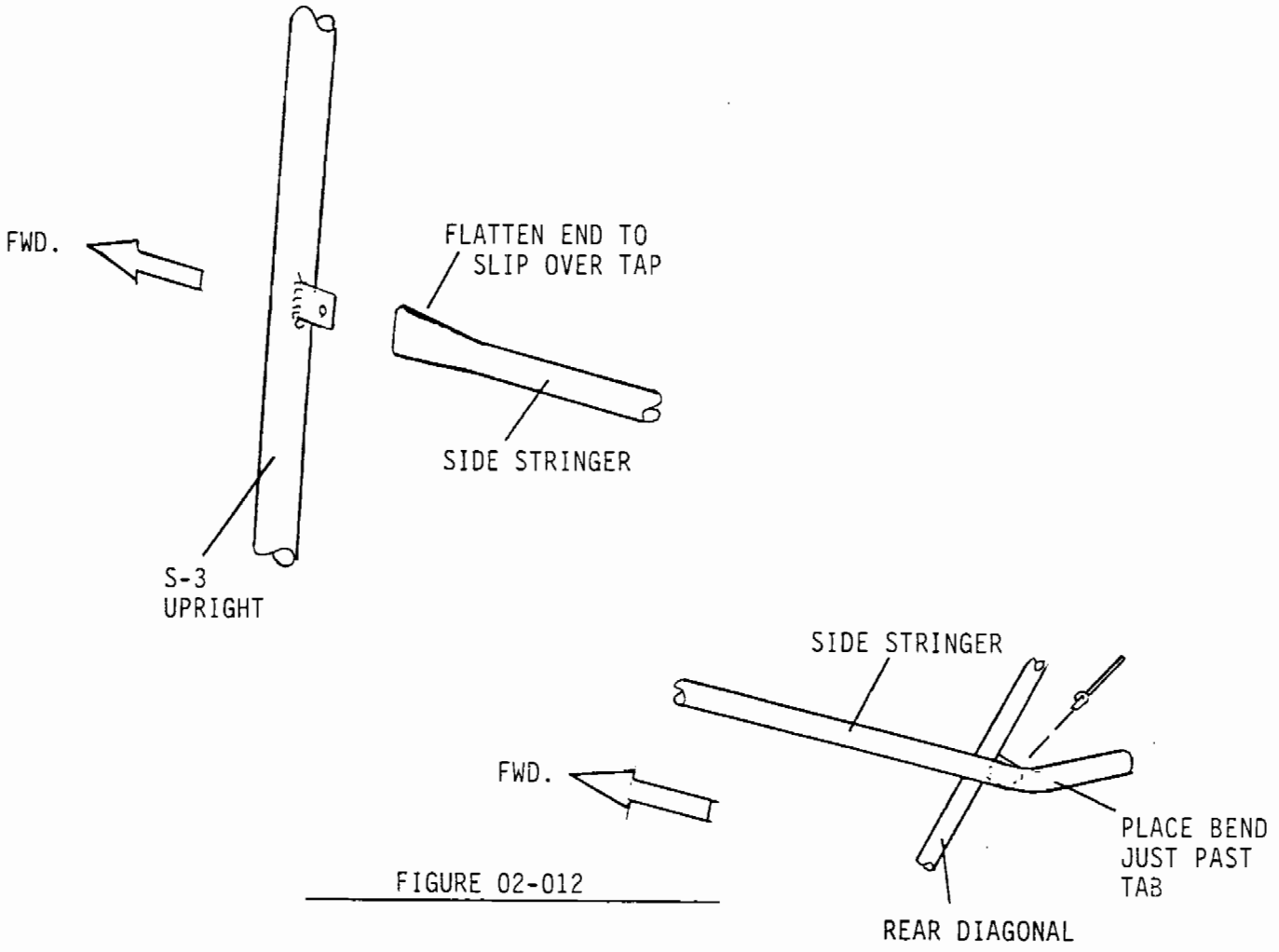


FIGURE 02-012

S-10 LOW BACK ASSEMBLY

LOW BACK STRINGER DIMENSIONS

PLEASE NOTE: These are approximate lengths. Final trimming of the center stringer will be required.

NO.	LENGTH	A	B	QTY
TOP	43"	DETERMINE ON AIRCRAFT	DETERMINE ON AIRCRAFT	1
1	48"			2
2	48"			2
3	48"			2

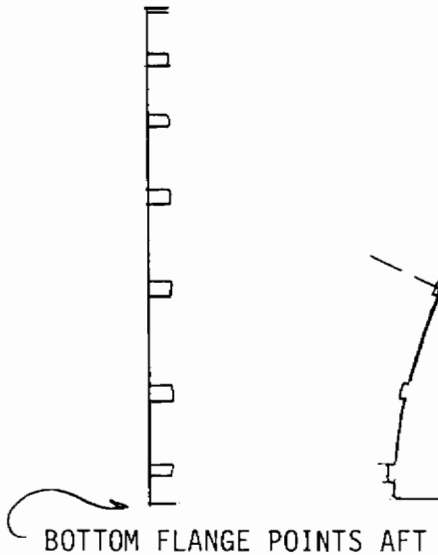
13. The former "A" should be attached to the fuselage using clecos or aluminum pop rivets to the front side of the tabs at station 4. Permanent attachment to the former is done after painting the fuselage with a self sealing primer. As stated earlier the tabs are bent over by hand on the low back former "A" and must be bent to point aft. The bottom of the former has a flange that also faces aft. Drilling of the tabs is done after bending.

14. Locate and drill the tabs on former "B" before bending them over. See Figure 02-07 for hole location. Bend the tabs to point forward. Attach former "B" to the front side of the tabs at station 5, again use cleco or aluminum pop rivets if you plan on removing the turtle deck to paint the frame.

15. The former "A" is positioned at 90 degrees to the fuselage top longerons. The top stringer should be around 43" in length to get the 90 degree setting. Trim to fit. The stringers are attached to former "A" using the small #40 pop rivets. Counter sink the tab to allow the head of the rivet to be flush. This will eliminate bumps from the rivets in the sheet metal deck wrap. Attach the stringers to the tabs as shown in Figure 02-015.

16. Rivet the stringers to the fuselage and former "B" tabs with 1/8" aluminum pop rivets. Cleco if you got 'em. Rivets will be installed after everything is fitted up.

SIDE VIEW

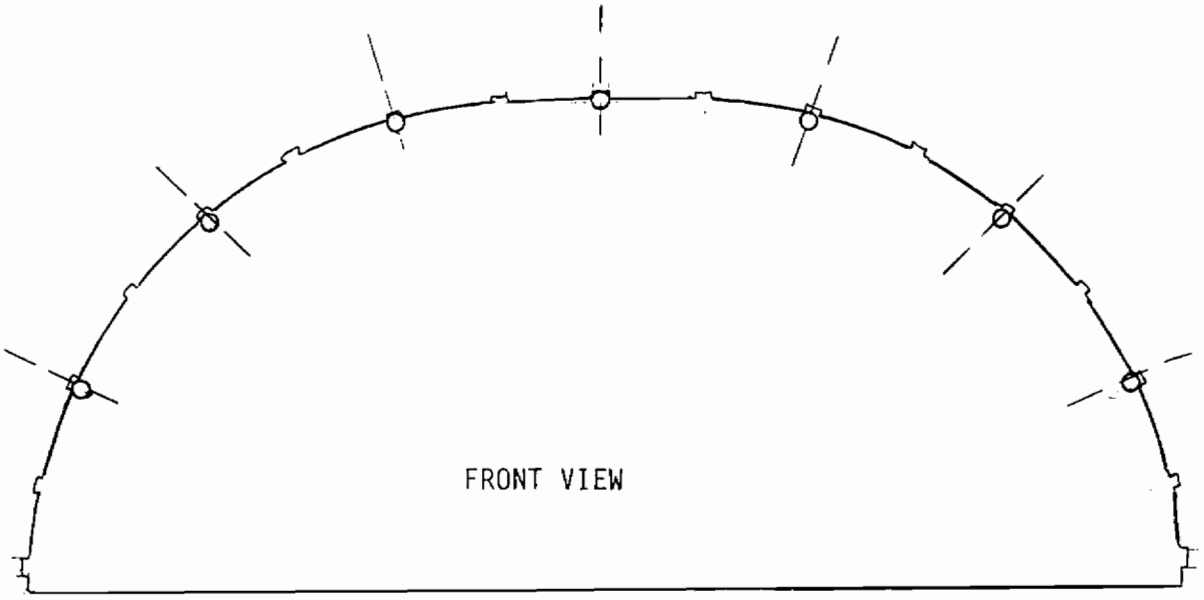


BOTTOM FLANGE POINTS AFT

FWD.

PLEASE NOTE:

BEND TABS AFT LIKE BOTTOM FLANGE.



LOW BACK FORMER "A"
STRINGER PLACEMENT

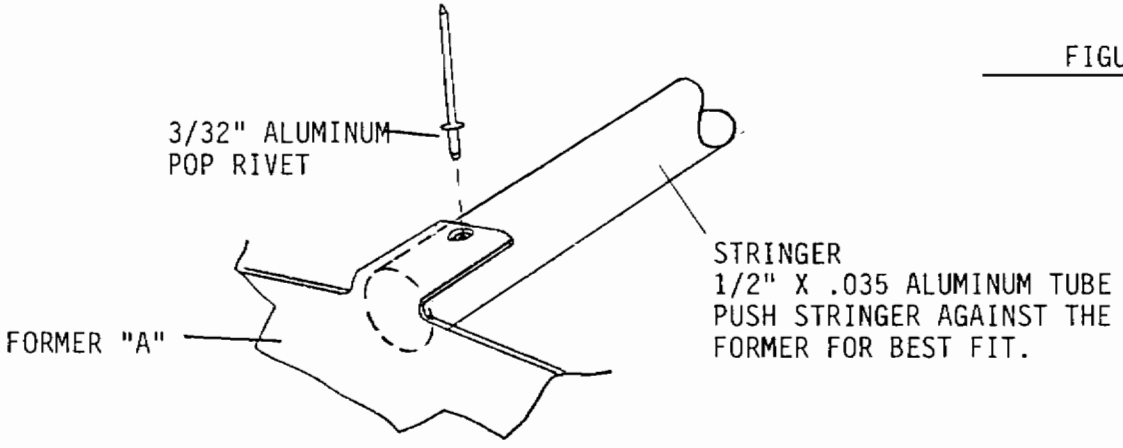


FIGURE 02-015

17. The window receiver strip that wraps around the former "A" is fitted and attached to the stringers. This receiver strip will be covered over with fabric upon covering the fuselage. To achieve a nice fit, lay the receiver strip over the former flush with the forward edge, and clamp in place with a little down tension. This will help the wrap lay tight against the stringers. Mark the forward underside edge of the receiver strip where it meets with former "A". Remove, trim and re- fit to former "A". Drill and cleco the receiver strip to the stringers by locating an 1/8" hole about 3/8" in from the front edge of the former. See Figure 02-017.

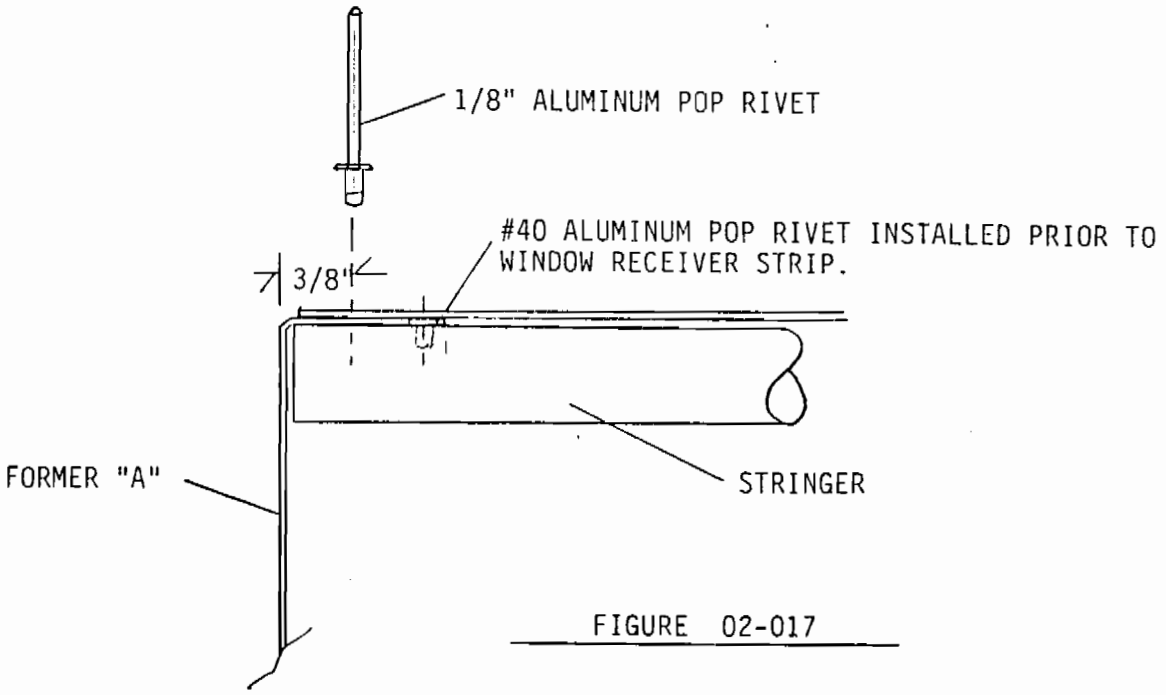


FIGURE 02-017

18. Without peeling off the protective paper set the rear window centered on the canopy former and receiver strip. Pull the Lexan down around the former and strip and clamp with tension like the receiver strip. The window should fit tight all around its edges. It will need final trimming on the front edge where it attaches to the canopy former. Final trimming will be done after the window is fitted, drilled and celcoed in place. Layout the rivet locations in the canopy former. Start at the top center and mark every 3" for a total of 10 rivets per side, not counting the center. See Figure 02-018 for details. Please locate the rivets on the former tube to allow for the canopy leafs. The aft window should rest tight against the receiver strip. There is no need to rivet the aft window to the receiver strip. The aft molding strip will hold the aft window in place.

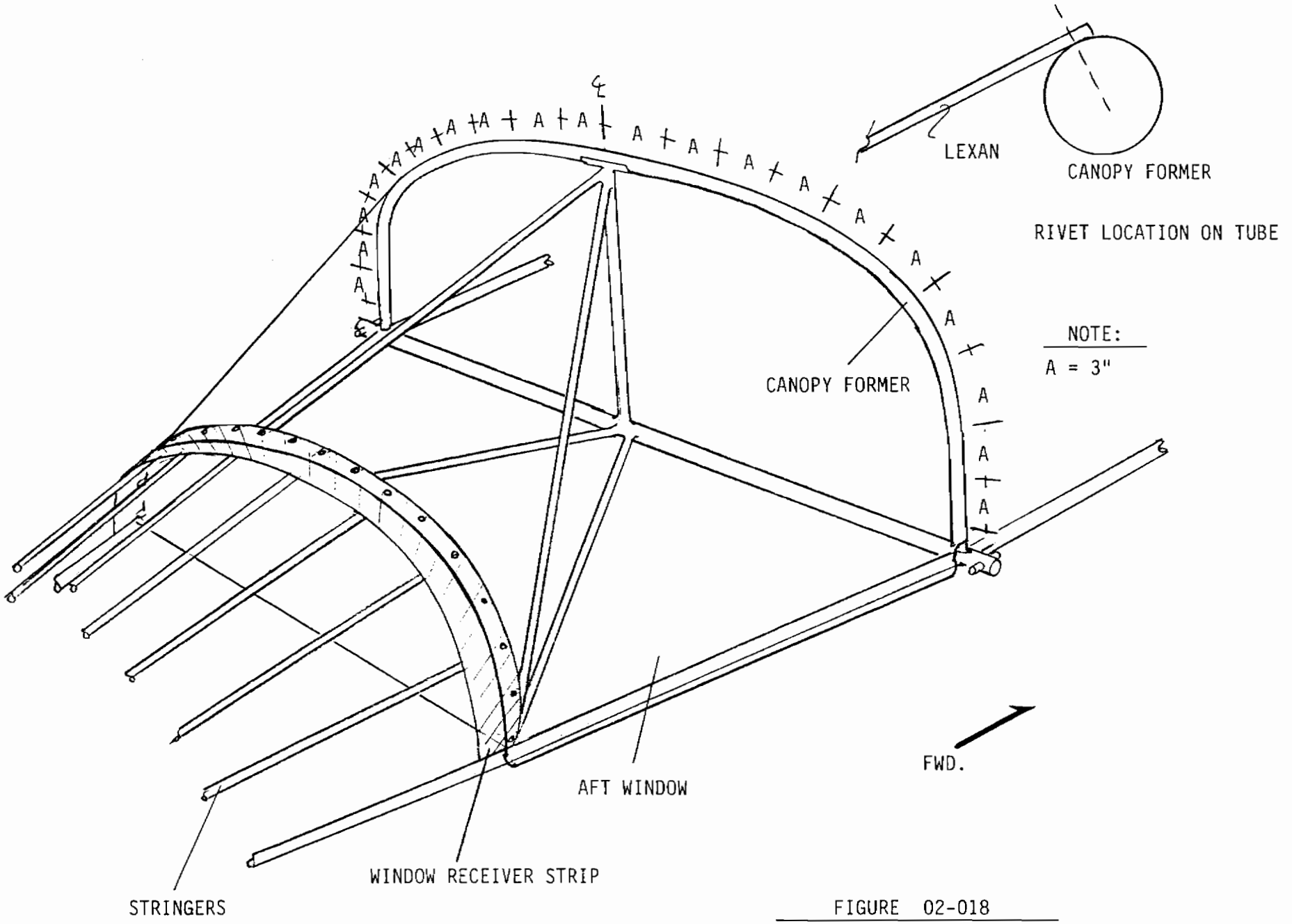


FIGURE 02-018

19. With the aft window in place, layout and drill the aft window "Z" strips as shown in Figure 02-019. Locate the aft "Z" strip centered fore and aft on the top longeron. Drill from the inside out using the "Z" strip to locate the hole through the Lexan. Cleco the "Z" strip in place.

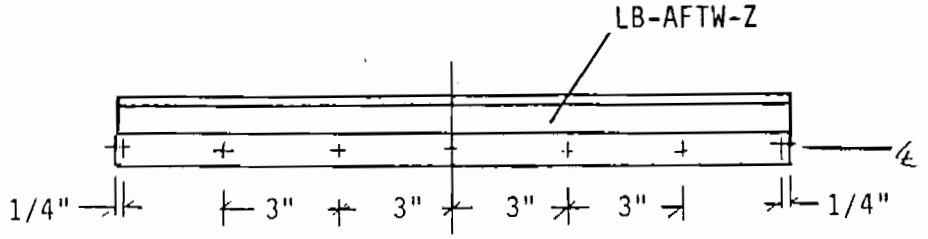


FIGURE 02-019

20. Position the aft window molding strip so the width of the strip overlaps half on the Lexan. Clamp in place with tension. The strip will need some hand bending to make it fit better against the window. See Figure 02-020. Layout the rivet locations as shown in Figure 02-020. Please note the three rivets in the window's lower end. This is the only place the window is riveted. During final assembly use silicon to seal the window. Apply a silicon bead along the rivet line and the molding strips front edge about 1/2" inside the edge. Remove the window before covering and painting of the frame. Leave the paper on until it is permanently installed.

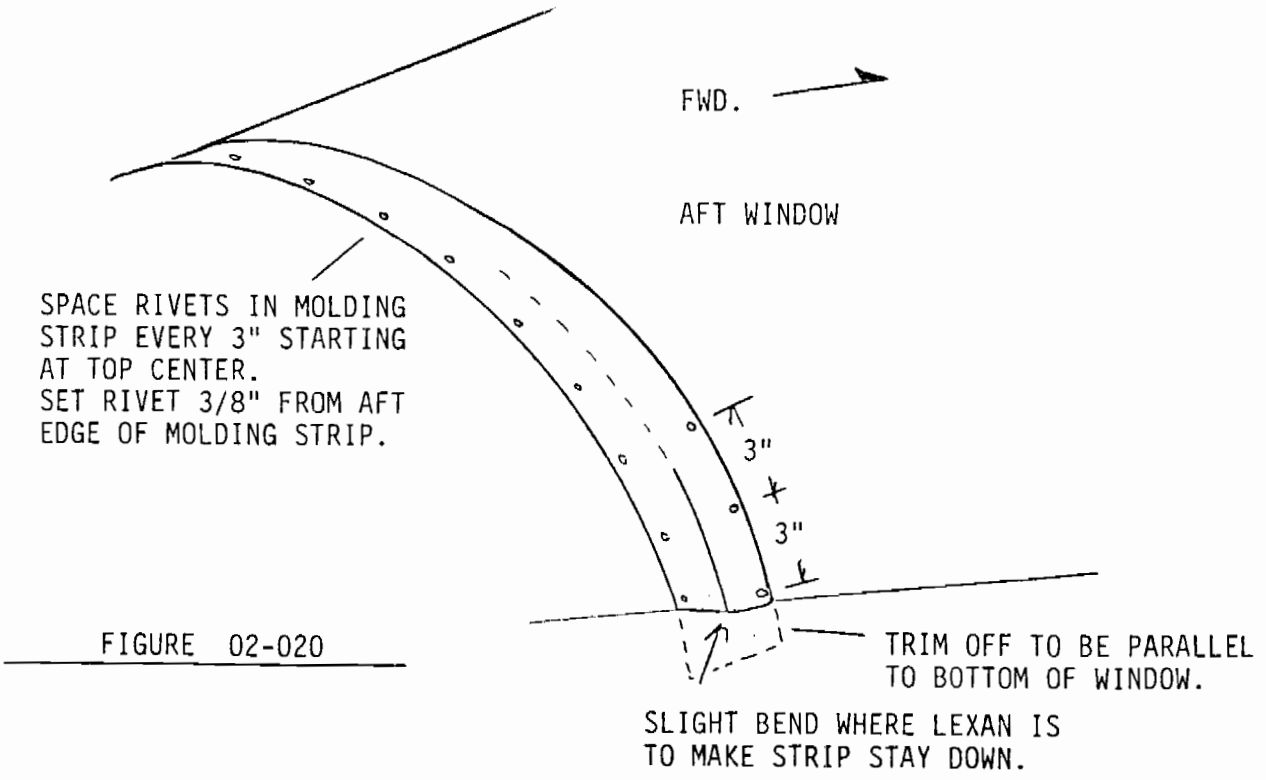


FIGURE 02-020

S-10 MAIN GEAR ASSEMBLY

NOTE: It is recommended that the landing gear be assembled prior to any additional assembly or covering.

1. Using the parts drawing and parts list, collect the required components for main gear assembly.

2. Observe the gear legs closely. You will notice a slight curve to the tubes. The tubes must be placed so that they bow upwards. To mark the tubes for proper orientation, lay on a flat surface and affix a strip of masking tape to the curved out side. At this time, mark one LH (Left Hand) and one RH (Right Hand) to prevent later confusion.

3. With the fuselage cage upside down, insert the gear legs into each socket (with the curves toward the airplane's top). Measure each gear leg. If the tubes are completely inserted, the measurements should be equal. Mark each leg from both sides using the pre-drilled holes in the sockets for a guide. Remove the gear leg and drill from each side. Bolt the gear leg into the socket. **NOTE:** During final assembly apply clear silicon to the inserted portion of the gear leg. **HINT:** A coat of wax applied to the gear leg will allow easier removal of a damaged gear leg if the need arises.

4. Good design practice states that a taildragger should have a slight amount of **TOE IN**. However, actual experience has shown that 1° of toe out is best. Do so by building the plywood jig as shown in **FIGURE 03-04**, and aligning the gear with the jig. This completes the main gear assembly. For wheel and brake assembly turn to **BRAKES**.

PLACE WOOD JIG BETWEEN WHEELS WITH ONE END PLATE UNATTACHED. ATTACH END AFTER FITTING JIG SNUG BETWEEN WHEELS. CRITICAL: THE PLATES MUST LINE UP PARALLEL TO CROSSING BOARD.

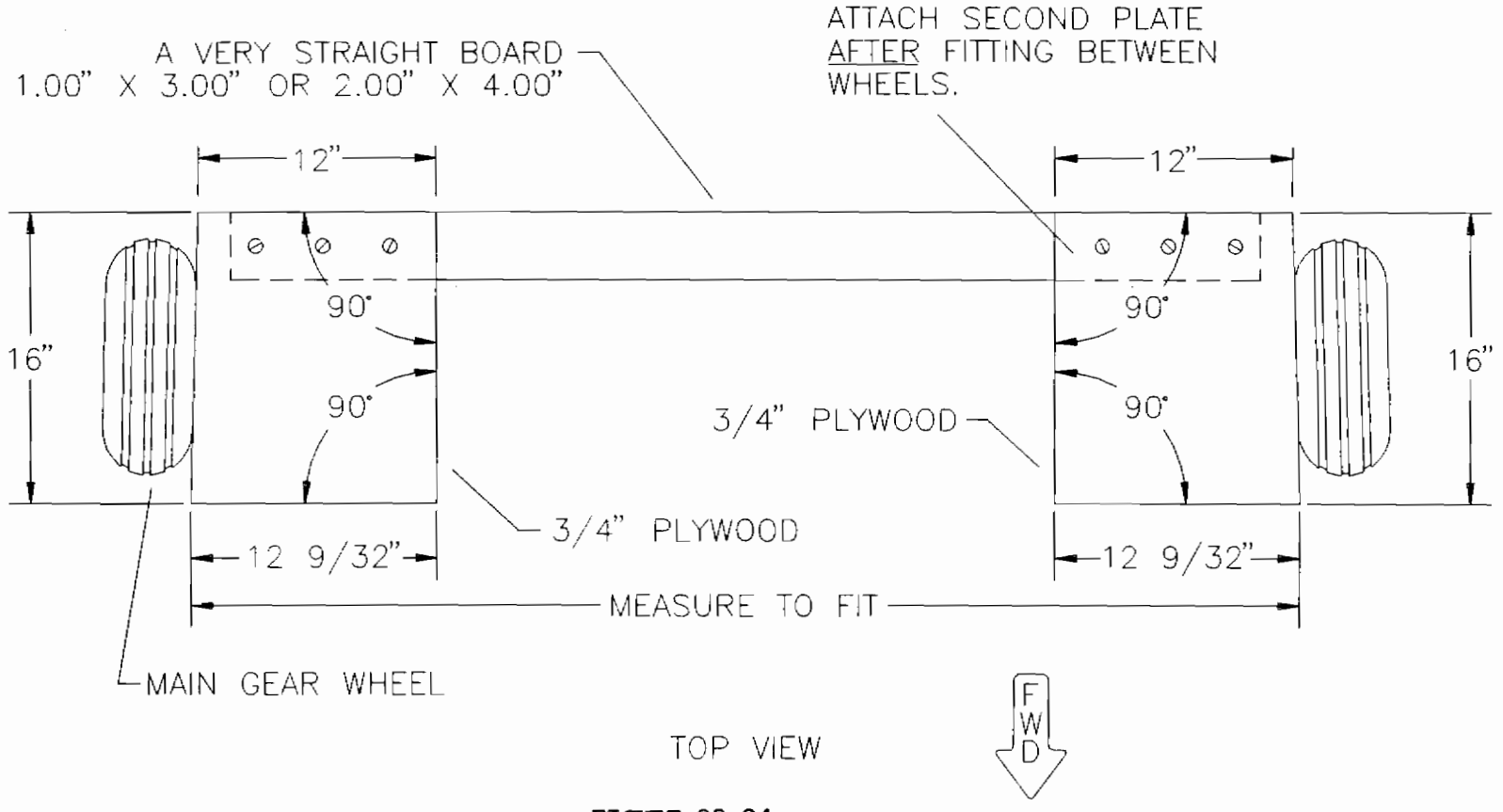
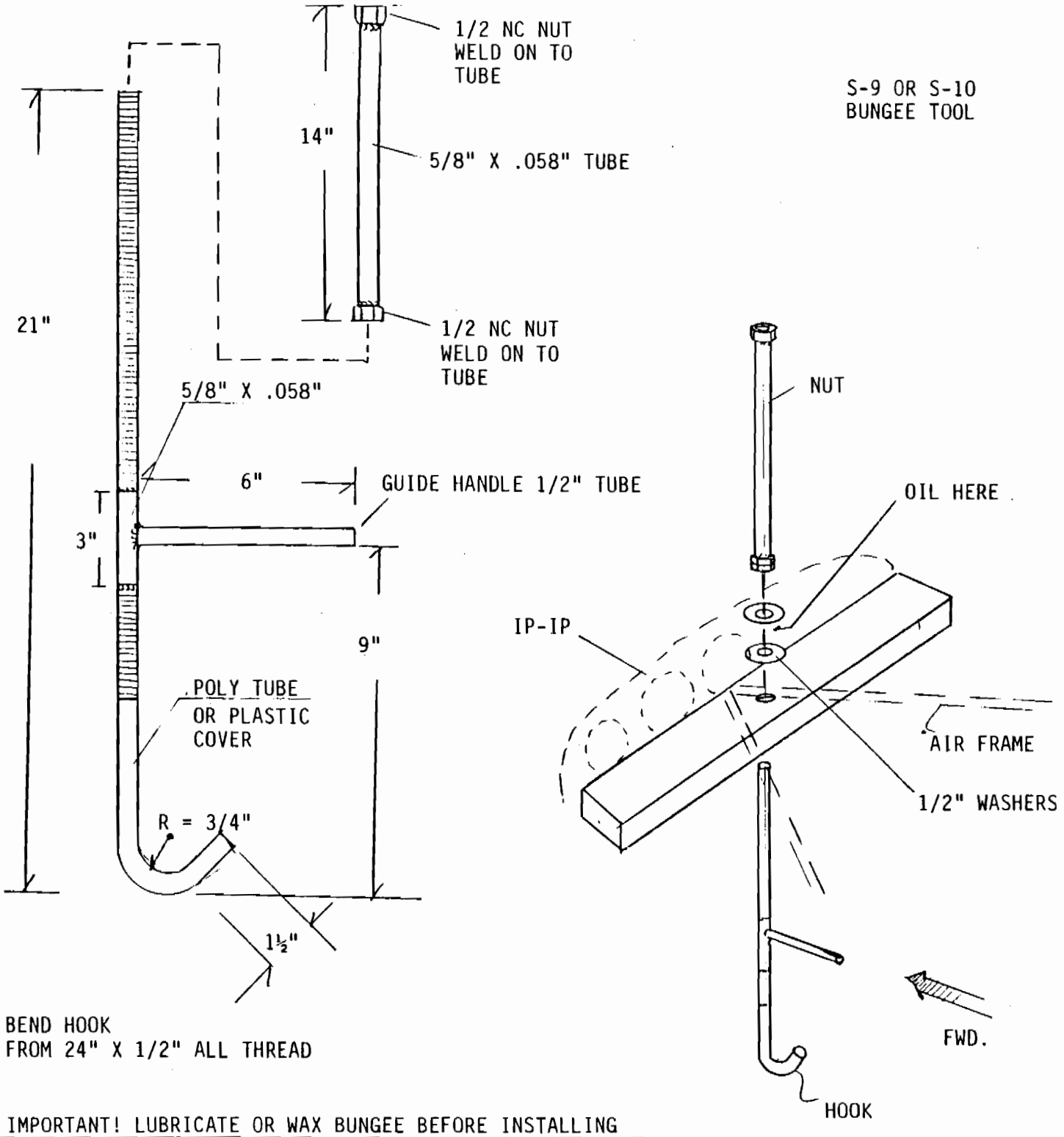


FIGURE 03-04

MD262



IMPORTANT! LUBRICATE OR WAX BUNGEE BEFORE INSTALLING

USE VASELINE, CANDLES OR SOAP.

FIGURE 003-08

9. Hook the bungee on the forward stub, push it through the belly hole and push the tool's hook through the bungee's free end. Thread the hook through the board, install washers and "nut" and run down with a big wrench. As you pull up the bungee use the handle on the hook to steer it. Keep the hook riding centered on the stub. Once it is above the stub start lowering the hook and forcing it to one side with a big flat screw driver. After the hook is below the stub and the bungee is installed undo the tool from the aircraft.

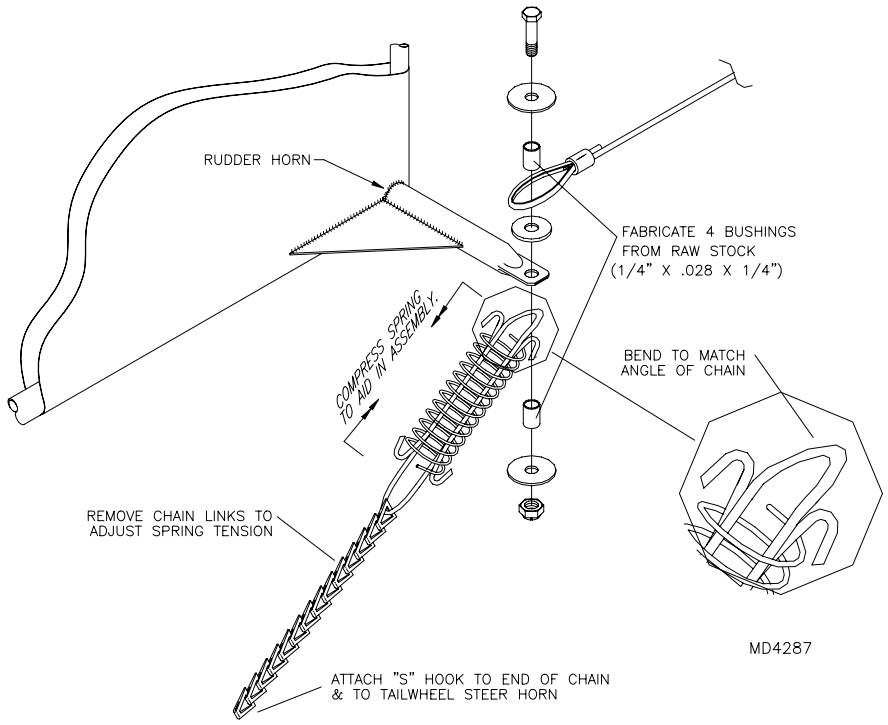
10. Route the safety loop like the bungee. Use the 3/16" diameter bungee cord tied in a loop around the cable and front side to "vee" tubes (directly in front of the Instrument Panel) to hold the cable tight. Later when the header tank is installed the bungee will be "pushed" forward for the header.

11. For replacing worn bungee follow the exact same procedure except remove the windshield and canopy for access. **DO NOT** use the tool on the **FRONT** side of the panel.

S-10 SAKOTA TAILWHEEL ASSEMBLY

1. Select the parts depicted in the parts drawing.
2. Assemble the Tailwheel components as shown in the parts drawing. ***IMPORTANT:*** *Space centerline of Tailwheel even with centerline of Fork pivot tube. Use 5/8" Washers as shims.*
3. Line up Steer Horn parallel to Fork axle, drill through #11, and bolt. ***NOTE:*** *Trimming off the top of the Fork pivot tube may be required. Trim flush with top of Steer Horn.* Break off 2 adjacent tabs on the 7/8" End Cap to allow clearance with the Steer Horn bolt. The Tail Spring may need grinding to allow it to slip into the Swivel Stub groove. Use Loctite to retain Grease Fitting.
4. After the Tailwheel is assembled to the aircraft, check it for proper steerage and alignment. The Return Springs should be connected with approximately 4 chain links per side (depending on the tension desired and link size) and move with Rudder inputs. Bend the end of the Return Spring to help align with the Steer Horn. Refer to **FIGURE 03A-04**. The Return Springs should be about half their resting length when installed. In addition, the Wheel should line up with the Rudder both from the top and vertically. Any lean will cause a slight tendency to drift into the lean during taxi. Correct this by removing the Tail Spring and Swivel Stub and twisting it into proper alignment in a vise. Use a large adjustable wrench set to the Tail Spring thickness as a lever.

FIGURE 03A-04



5. Keep the Fork well greased. Any common grease gun and grease will suffice. Work the Tailwheel side to side to allow the lubrication to spread.
6. After an hour of flight operations it may be required to re-torque the Tail Spring mounting bolts to 15 to 20 ft/lbs. ***CAUTION:*** *Be sure this assembly uses* ***1/4" Tensile Nuts***.

S-10 SAKOTA - FLOORBOARD, HYDRAULIC BRAKE & RUDDER PEDAL INSTALLATION

S-10 SAKOTA FLOORBOARD INSTALLATION

1. Sand, stain and varnish the floorboard prior to installation. This pre-finish will avoid smudges that are practically impossible to sand out later.

2. Slip the floorboard, finish side up, into position. The floorboard should be centered side to side as well. Clamp into position for drilling.

3. Using the floorboard tabs welded to the airframe, locate and drill from the bottom up (6) 3/16" holes. Use a block of wood positioned over the hole and pressed firmly against the plywood to prevent splitting.

4. Remove the floorboard and select (6) 3/16" nut plates (K-1000-3) and (12) 3/32" aluminum pop rivets. Refer to section 002. Install the nut plates to the floorboard tabs undersides, transfer drill the rivet locations by placing a 3/16" bolt through the tab hole to hold the nut plate in position. Deburr all holes and rivet the nut plates on from the top side.

5. Slip in the floorboard and bolt in place using (6) AN3-6A's and (6) AN970-3's (refer to section 004). If the alignment is a problem drill out the holes through the floorboard to 1/4".

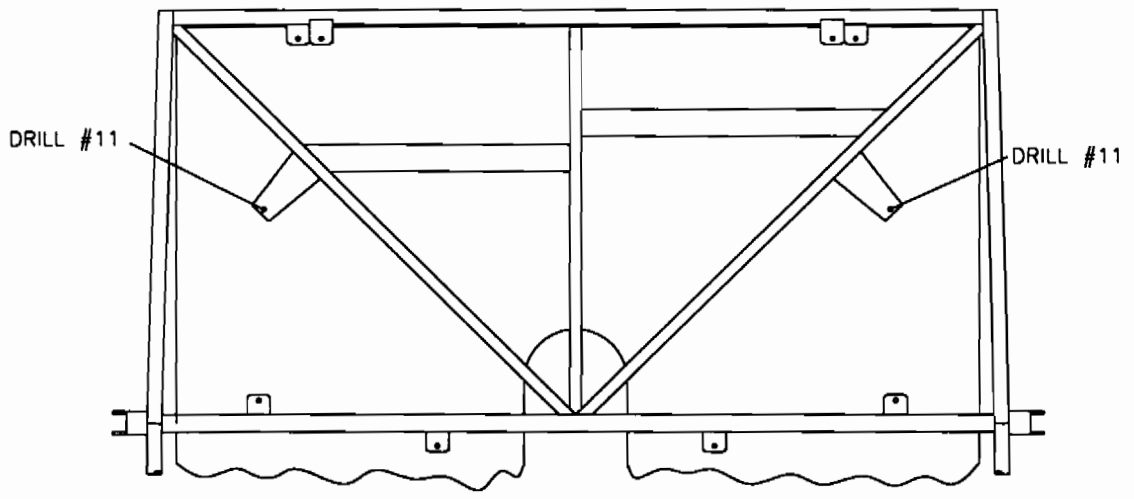
6. This completes installation of the floorboard. Turn to the rudder pedals for installation details.

NOTE: During final assembly you must assemble the flaperon lever to the floorboard prior to installing into the aircraft.

S-10 SAKOTA - RUDDER PEDAL INSTALLATION

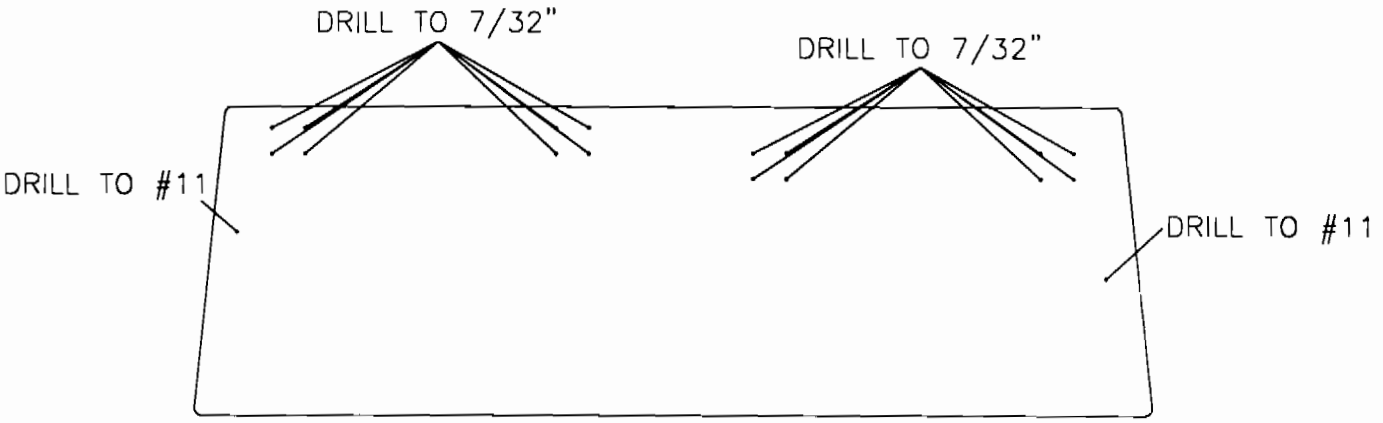
1. Drill up through the floorboard at the two outer tab locations as shown in **Figure 04-1** with a #11 drill bit.

FIGURE 04-1



2. Drill wear plate as shown in **Figure 04-2**. Temporarily bolt the wear plate in place using the two outer #11 holes. They should match to the tabs on the frame, if not, slot the wear plates to fit with a file , keeping the wear plate centered between the tab holes. Bolt the welded rudder pedal assemblies into place using the two outer tabs. Line up the welded rudder pedal parallel to each other and drill through the floorboard, wear plate and into the "U" channels welded to the airframe.

FIGURE 04-2



3. Cut (4) brake saddles from the raw stock provided. Cut sadles to length of bushing.

4. Drill through the floorboard 7/32" in the 16 locations on the wear plate. Remove the welded rudder pedals and wear plate. Drill out the (16) 7/32" holes to ¼" and press in the Tee-nuts from the bottom.

5. Install wear plate, rudder pedals and left and right hand brake mount brackets, as perthe parts manual for exploded views.

6. Rivet together the upper toe pedal assembly as shown in the parts manual. Size drill to 1/8" as required. Be sure to debur all holes before final assembly of the upper toe pedal. Install the lower end of the Cleveland cylinder into the brake mount brackets using the hardware shown. Attach the "U" bracket to the rudder pedal-cylinder attach brackets using the hardware shown.

7. Install the toe pedal assembly to the rudder pedals by sliding the swivel bushings in place. See **Figure 04-7.** Be sure to include the ½" plastic washers between the rudder pedals and the toe pedal assembly. **NOTE:** The outside swivel bushings contain a insert nut. Make sure these swivel bushings face the outside of the airframe on the outermost pedals. Line up the tangs on the end of each swivel bushing with the toe pedal assembly and drill the edge of the toe pedal to 3/16" using the swivel bushings as a guide. See **Figure 04-7A** for orientation of the swivel bushings.

FIGURE 04-7

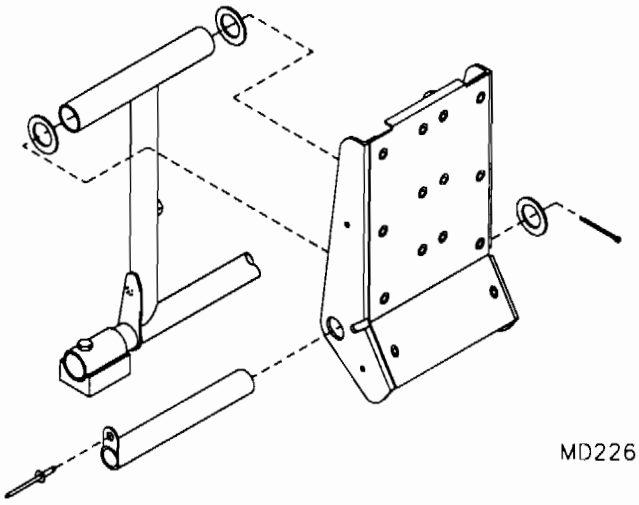
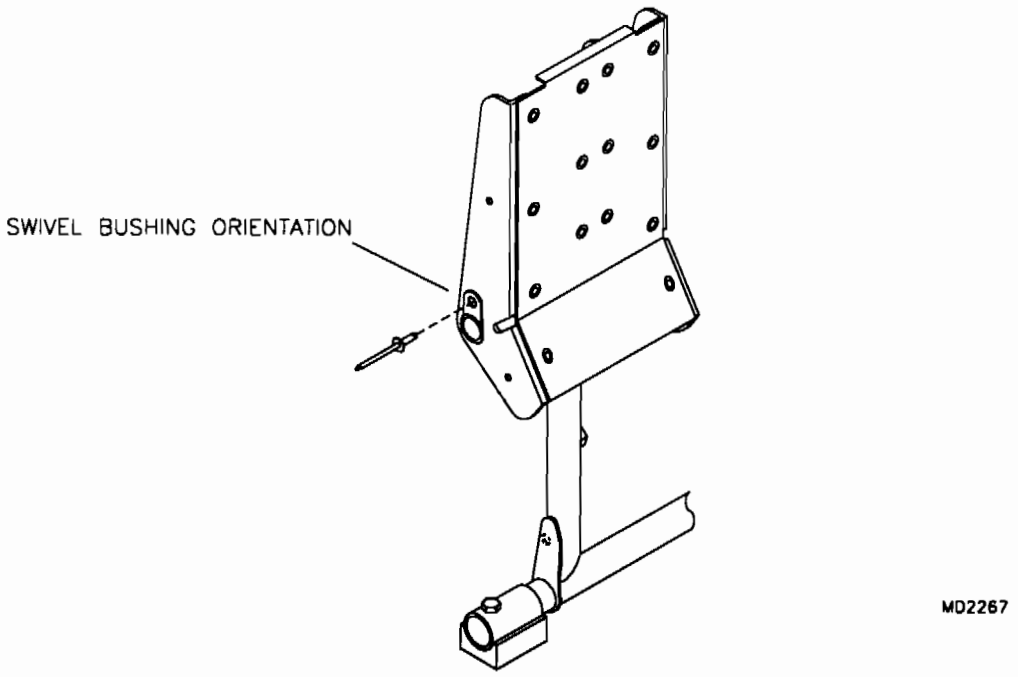


FIGURE 04-7A

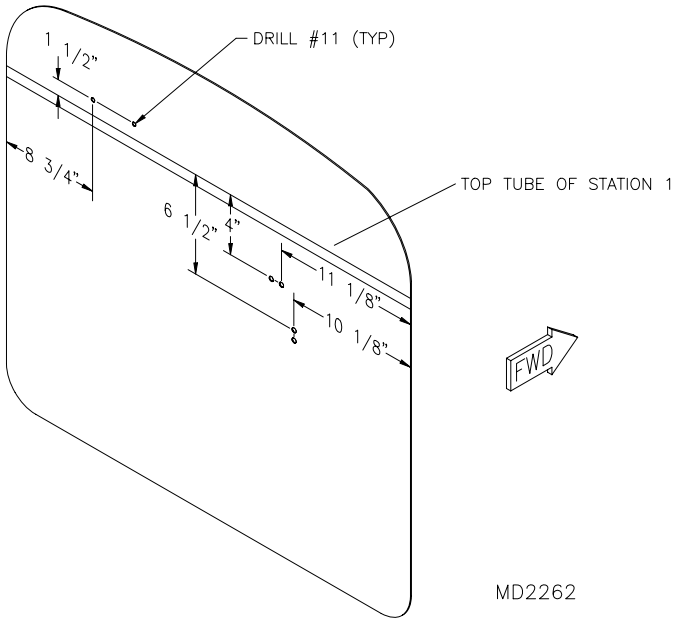


8. Drill out the insert nut in the swivel bushing to #11. This is the location of the rudder cable attachment (See Rudder Assembly in parts manual).

INSTALLATION OF HYDRAULIC ACCESSORIES

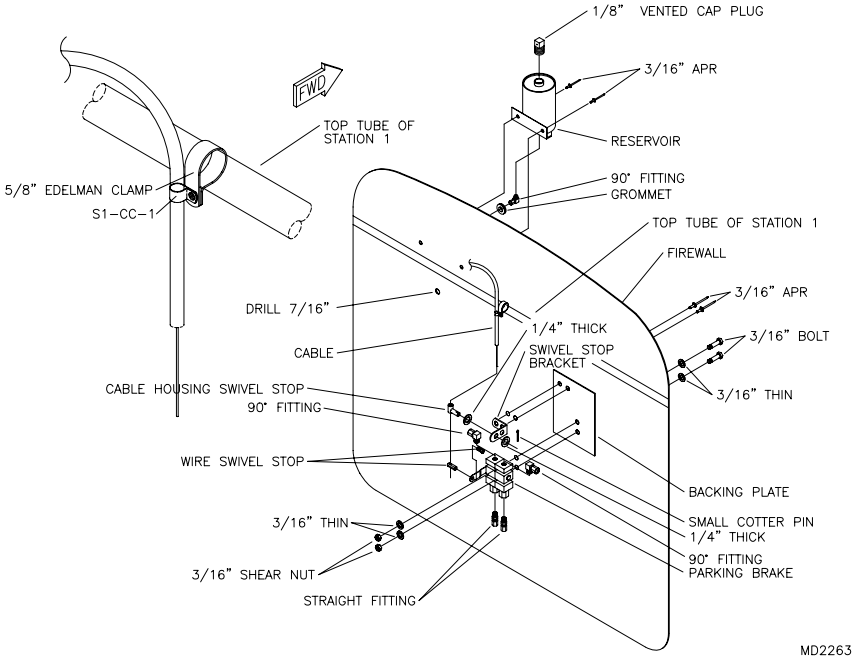
1. Installation of the firewall accessories should be performed when the firewall is test fit in the next section of the manual. The locations of the accessory mounting holes are shown in **Figure 04-1**, these are approximate. Use the firewall as a guide to locate the required holes on the park brake backing plate, test locate before drilling.

FIGURE 04-1



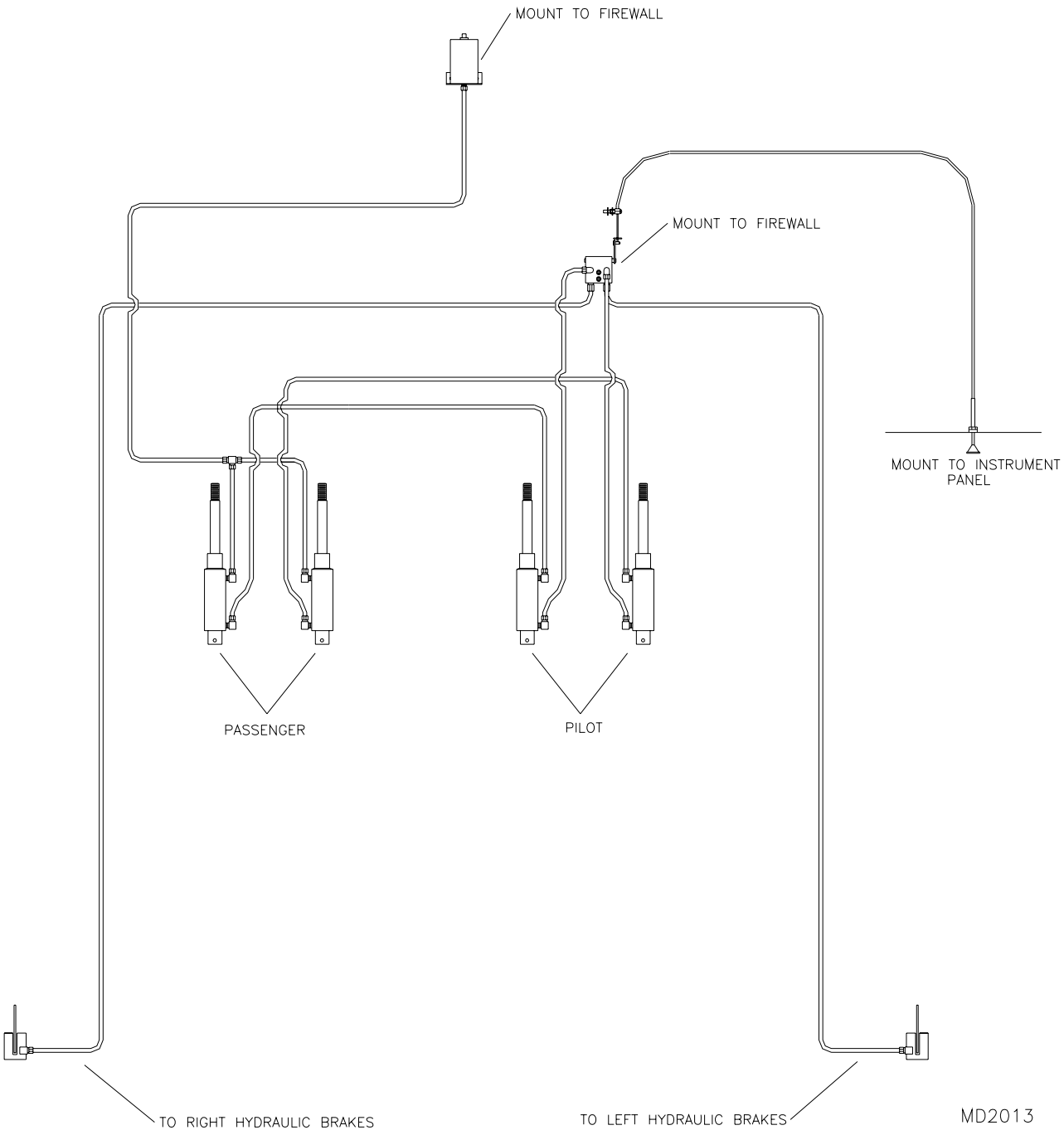
2. During final assembly install the parking brake, park brake backing plate, park brake control cable, and the aluminum hydraulic reservoir as shown in **Figure 04-2.**

FIGURE 04-2



3. See **FIGURE 04-3** for hydraulic brake line routing.

FIGURE 04-3



FILLING OF THE HYDRAULIC BRAKE SYSTEM

NOTE: These steps should be done during final assembly after floorboards, firewall, and instrument panel are installed. It may be necessary to move one of the bleed valves to the opposite side of the caliper assembly. Both bleed valves should be on the bottom side of the caliper. Wrap Teflon tape on the bleeder screw to minimize leakage during bleeding. **IMPORTANT***: Use only standard aircraft* ***MIL-H-5606 Red Hydraulic Fluid****. Improper brake fluid will ruin the brake system seals.* ***Never use Automotive Brake Fluid!***

1. Open the lower left bleed valve. With the reservoir cap removed, start filling the system from the bottom. **NOTE:** *A small hand held oil pumping can with a short piece of 1/8" ID clear hose (blue primer line works well) attached works well to fill the system.* Fill the system until reaching just above the "T". Close the left bleed valve. Open the right bleed valve and fill the system until the air is removed from the right line. Close the right bleed valve.

2. Check your work by insuring that the reservoir has fluid and that you have a "hard pedal".
If you have a "soft pedal", pump the brakes several times. Many times that will fix the problem. Bleed any accumulated air from the system. Tighten the bleeder valves and replace the rubber cap.

3. When satisfied fill the reservoir to approximately 3/4 full by pouring directly into the reservoir.

4. Test the brakes **THOROUGHLY** before flying. All air bubbles should be removed from the lines. Any size air bubble could cause insufficient braking. Please taxi test completely before flying.

5. The non-asbestos organic composition brake pads require a thin layer of glazed material at the lining friction surface in order to provide maximum braking performance. This glazed layer is produced by the heat generated during normal braking operations, and is maintained during the life of the lining. Since new brake pads do not have this layer, it must be created by the following process:

- Heat the pads by performing a full stop from 30 mph. ***CAUTION:*** *Only perform once comfortable with the aircraft.*
- Allow brakes to cool for 5-10 minutes.
- Test the brakes at a high static rpm run-up. If the brakes hold, break-in is complete. If they fail to hold, repeat above steps until they do.

S-10 SAKOTA RUDDER ASSEMBLY

1. Fabricate the inner and outer pulley brackets from the 1/2" wide strip of .050 aluminum provided. See fabricated parts.

2. Select the parts illustrated on the parts page for the rudder. **PLEASE NOTE:** Fabricate the guide keeper (R-GK) from the 1/2" X .020 X 18" strip of aluminum provided in the raw materials kit. This is a "keeper" strap and strengthens the cable guide. Cable guide failure will result if this is not installed at the designated locations. Fabricate by cutting to length of 3", drill a #11 hole in one end. Drill through the guide's bolt hole. Wrap the strip around with the drill inserted and drill through. The strap should fit tight. Try again if this is not so (you will have enough material for 4 attempts). Also, fabricate (6) 1/4" X 1/4" bushings from the 1/4" aluminum tube provided. Drill out inside diameter of the tube prior to cutting to length so 3/16" bolts will pass through.

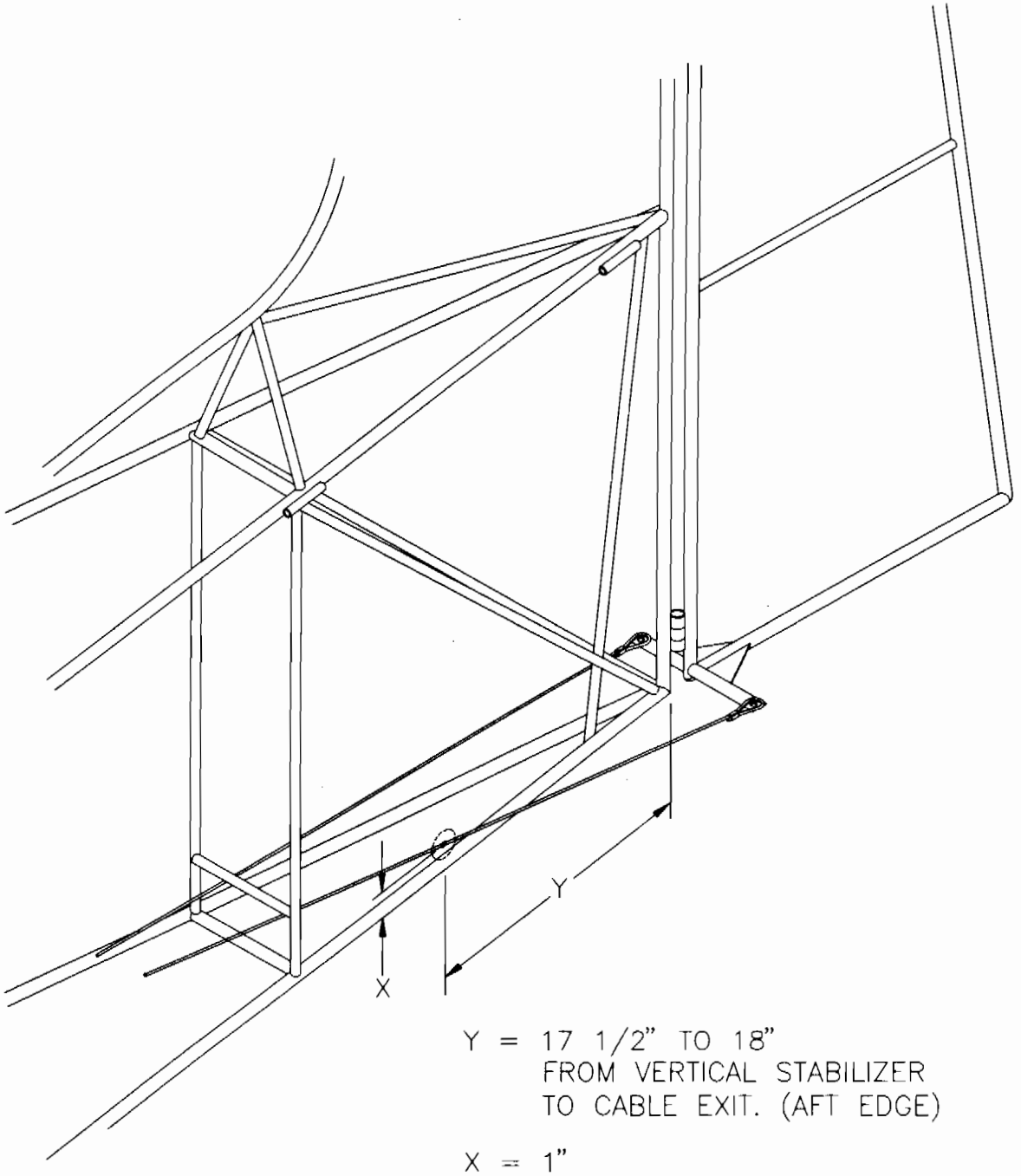
3. Bolt together the pulley assemblies, but do not install the cotter pins. Bolt the assemblies to the floorboard using the two outer tabs on the S-2 carry through. The pulley tops should tilt inward. **DO NOT** drill the second bolt hole location until after the cables are hooked up. The pulley position will be "fine tuned" with the cable installed in a later step.

4. Bolt the cables to the rudder pedals as per the parts drawing. Route the cable through the pulleys and guides. Bolt the cables to the rudder horns. See the parts drawing for assembly details and guide locations. **NOTE:** Tab **UNDER** the seat is for the guide. **PLEASE NOTE:** While attaching the rudder frame to the vertical fin, drilling out of the hinge bushings may be required.

5. With the cables properly routed, it is now possible to "fine tune" the pulley locations. Move the pulleys so they align perfectly with the cable. Test the alignment by moving the pedals. Drill and bolt once you are satisfied with the position.

6. Push the rudder return bungees through the 1/4" hole in the firewall. Pull a fair amount of tension before tying a single knot to retain. The bungees should provide enough tension to keep the cables tight.

7. Check the operation of the system to complete.



Y = 17 1/2" TO 18"
FROM VERTICAL STABILIZER
TO CABLE EXIT. (AFT EDGE)

X = 1"
FROM BOTTOM OF BOTTOM
LONGERON TO CABLE EXIT.

MD1422

MEASURE AND RECORD RUDDER
EXIT FOR LOCATION OF PATCH
ON FABRIC.

INSTRUMENT PANEL/FIREWALL ASSEMBLY
(REFER TO SECTION 005 IN THE PARTS CATALOG)

1. Before bending any of the instrument panel tabs, lay out, cut and drill the holes for your particular instrument package. See Figure 005-01 for the lay out we use. Be sure to pre-drill all the tabs.

2. Using only your fingers bend the instrument panel and firewall tabs approximately 90 degrees.

3. Center the instrument panel on the main spar carry through per Figure 005-03. Drill and rivet or use 3/16" clecos on center 1" from each outside end.

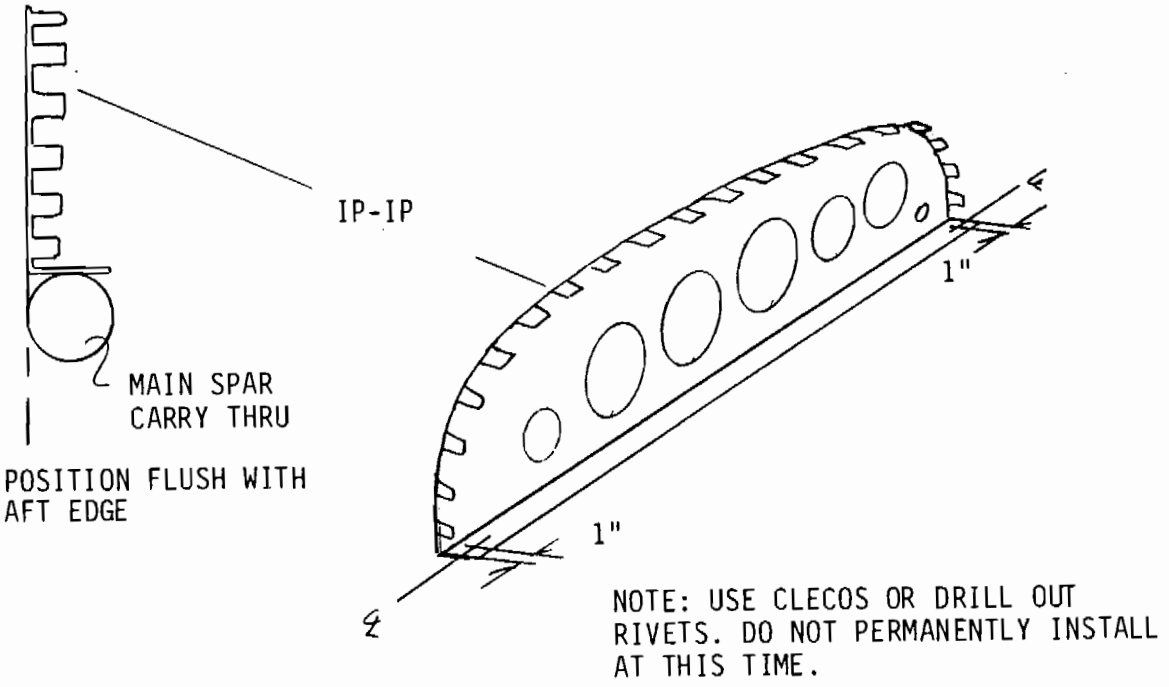
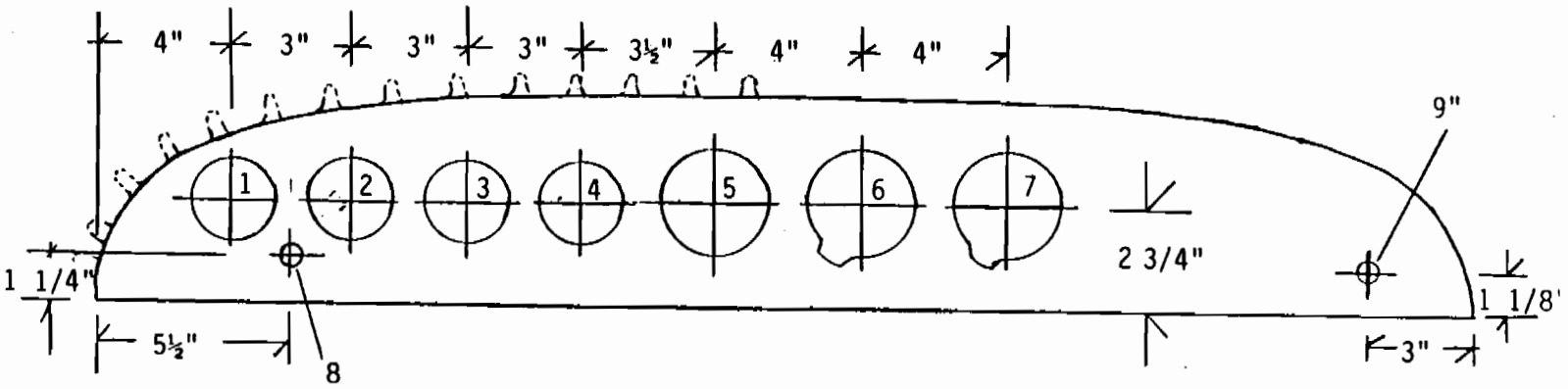
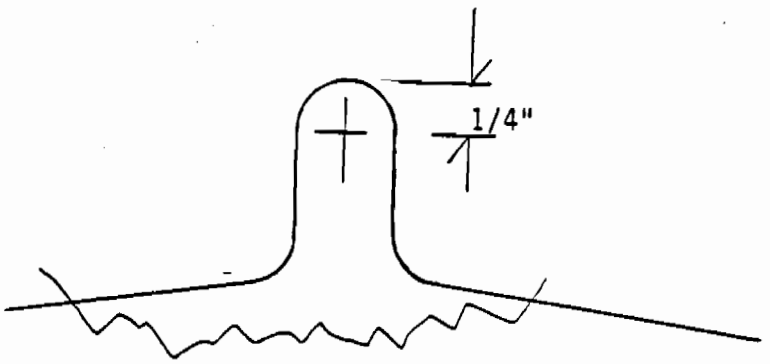


FIGURE 005-03

S-10 PROTOTYPE INSTRUMENT PANEL LAYOUT





	ITEM	HOLE SIZE
1.	HOUR METER	2 1/8"
2.	H2O TEMP	2 1/8"
3.	RPM	2 1/8"
4.	EGT	2 1/8"
5.	ASI	3 1/8"
6.	ALTIMETER	3 1/8"
7.	VSI	3 1/8"
8.	IGNITION SWITCH	1/2"
9.	PRIMER	3/4"

FIGURE 005-01

4. Clamp the firewall in place with the sides and bottom square and flush with the airframe. Check the firewall alignment by viewing it head on. It should look level with the instrument panel as shown in Figure 005-04. Adjust accordingly. IMPORTANT: For proper cowling fit the FW-FW must be flush on the bottom with the steel tube.

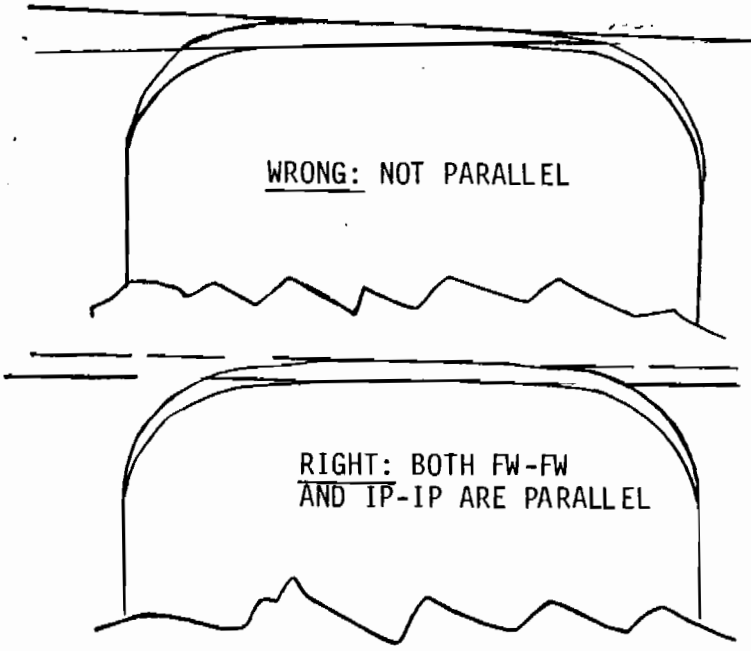


FIGURE 005-04

5. When the firewall (FW-FW) is properly aligned locate and drill #30 holes (cleco or sparsely rivet) as shown in Figure 005-05. DO NOT final rivet FW-FW until the final assembly. See Figure 005-05. The firewall must be removed to cover the fuselage.

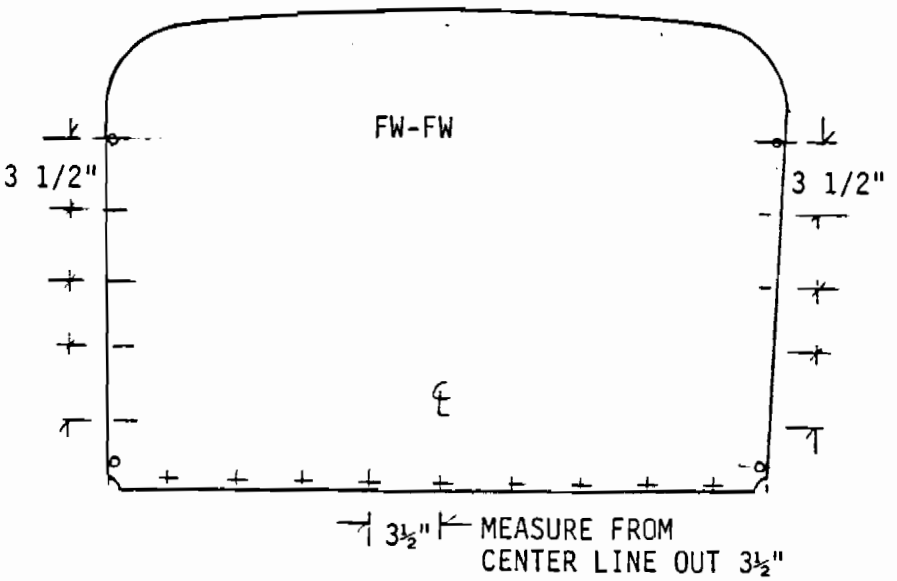


FIGURE 005-05

6. Locate and drill all of the other holes in FW-FW as per Figure 005-06.

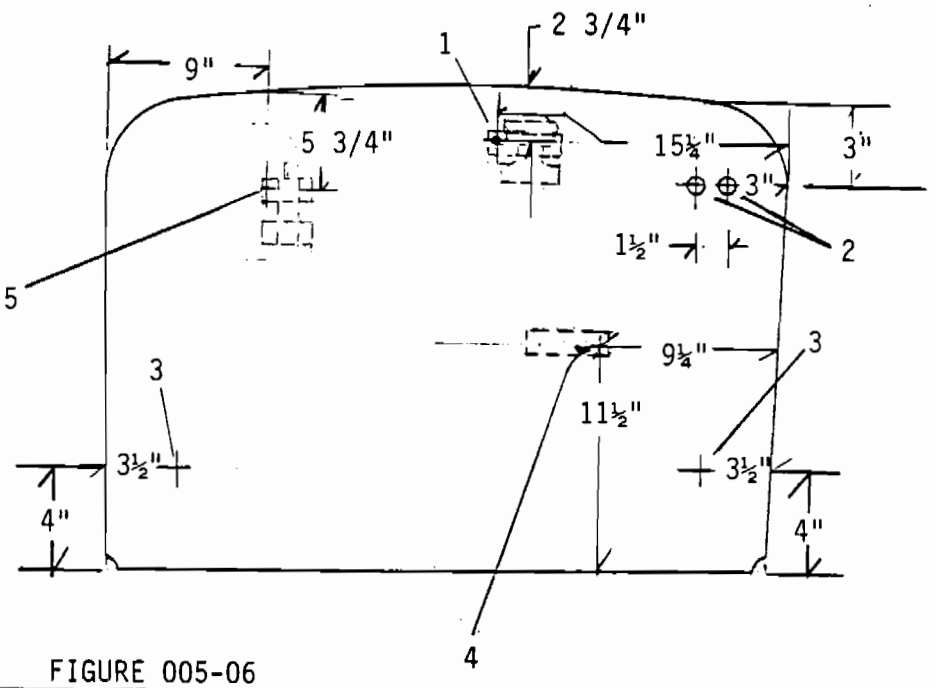


FIGURE 005-06

(1). #11 hole for LH hole for filler tank bracket. Drill, cleco and locate the other (1) hole.

(2). 7/8" diameter holes for rubber grommets for fuel and throttle lines.

(3). 1/4" holes for rudder return bungees.

(4). #11 hole for starter pulley. Use pulley cover plate to locate slot and the #11 hole.

(5). #11 hole for overflow bottle. Locate lower hole using bracket.

7. Use a straight edge to mark the exact centers of the FW-FW and instrument panel. Locate and mark the forward section top wrap's exact center of the front and back edges. See Figure 005-07. PLEASE NOTE: Install the top wrap channel underneath the center tabs of the IP-IP and FW-FW. During final assembly use silicon caulk between the channel and top wrap. DO NOT rivet except at each end.

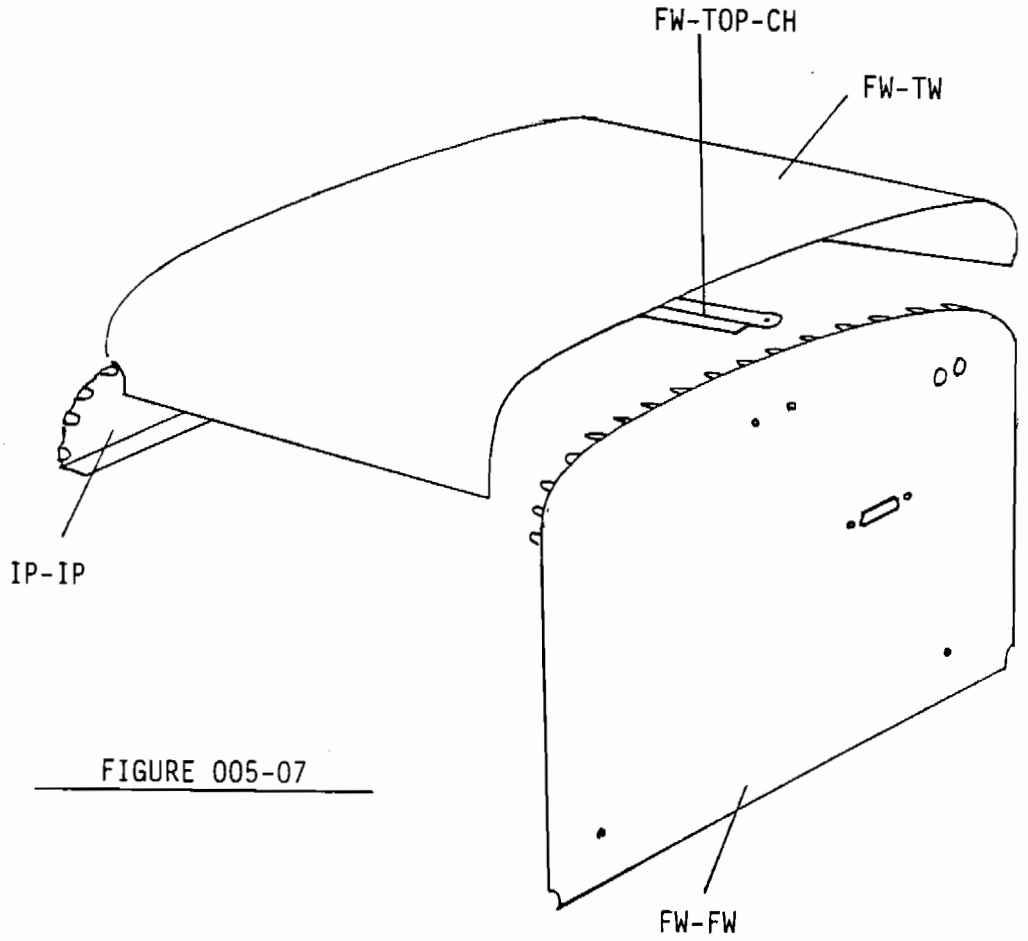


FIGURE 005-07

8. Place the FW-TW centered on the FW-FW and IP-IP with each edge flush. See Figure 005-08. Pull the FW-TW down against the firewall and panel and clamp in place with small vise grips to the small longeron tabs.

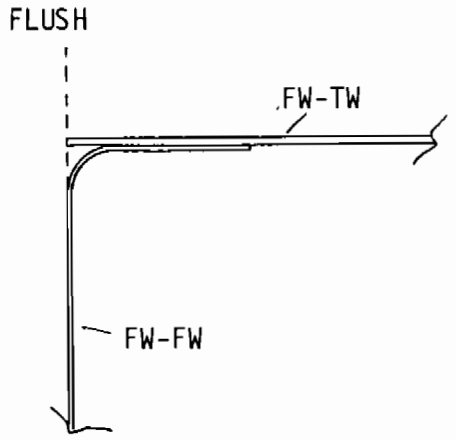


FIGURE 005-08

9. Starting at the center tabs, drill through and cleco or temporarily rivet the FW-TW to the IP-IP and FW-FW. Center the drill on the tabs by viewing from the front or back. Locate the holes approximately 3/8" from the FW-TW's edge.

10. Drill from the inside out with a #30 bit all the top longeron tabs (welded to fuselage). Use a wood block to support the outside of the sheet metal at the tab when drilling through. Cleco or temporarily rivet the top wrap in place.

11. Drill a 3/8" hole in the location shown in Figure 005-011 for ASI pressure and static line exit. Keep them inside of the spar diameter.

This completes the installation of the IP-IP, FW-TW and FW-FW. Remove for covering after the test assembly is complete. NOTE: Rivet the starter pulley in place during final assembly. At that time the firewall soundproofing material will also be sandwiched between fuselage and firewall.

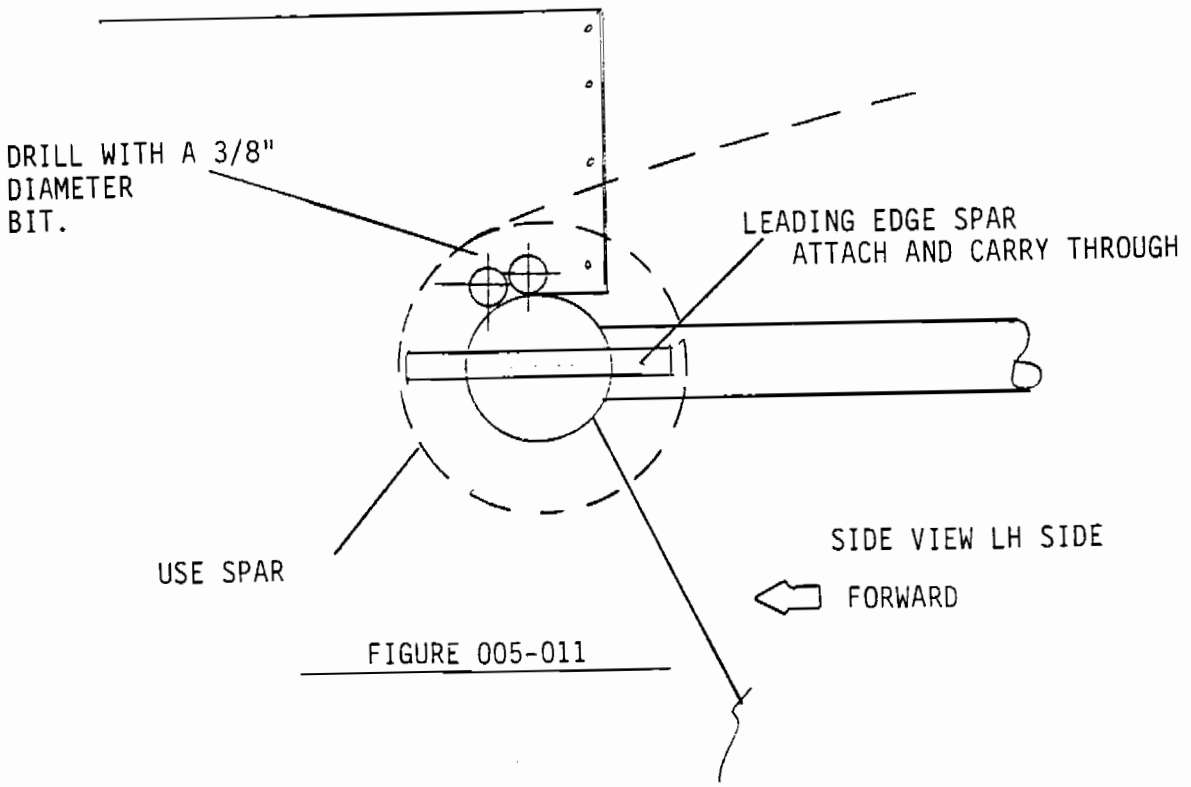


FIGURE 005-011

S-10 BATTERY BOX INSTALLATION

1. Drill one hole in the support angles and the corresponding hole in the side plate to #30 and rivet the support angles to the side plate. Chase drill through the second hole of the side plate and support angle and rivet. Refer to the parts drawing.

Position one side of the side plate flush with the mount plate. Using a #30 drill bit and using the mount plate as a guide, transfer drill through the three side holes in the mount plate into the side plate. Rivet the side plate to the mount plate through the #30 hole(s) only. Slide the battery into the box and pull the opposite (loose) side of the side plate in tight to the battery. Using the mount plate as a guide transfer drill through the mount plate into the side plate with a #30 bit and rivet.

2. Install the cushioned clamps as shown in the parts drawing. Note the orientation of the cushioned clamps. Mark the mount hole locations onto the box using the clamps as a guide. Drill the mount holes to #11 and bolt in place.

3. Install the battery, battery bar and cotter pins. Refer to the instruments and electrical section for wiring.

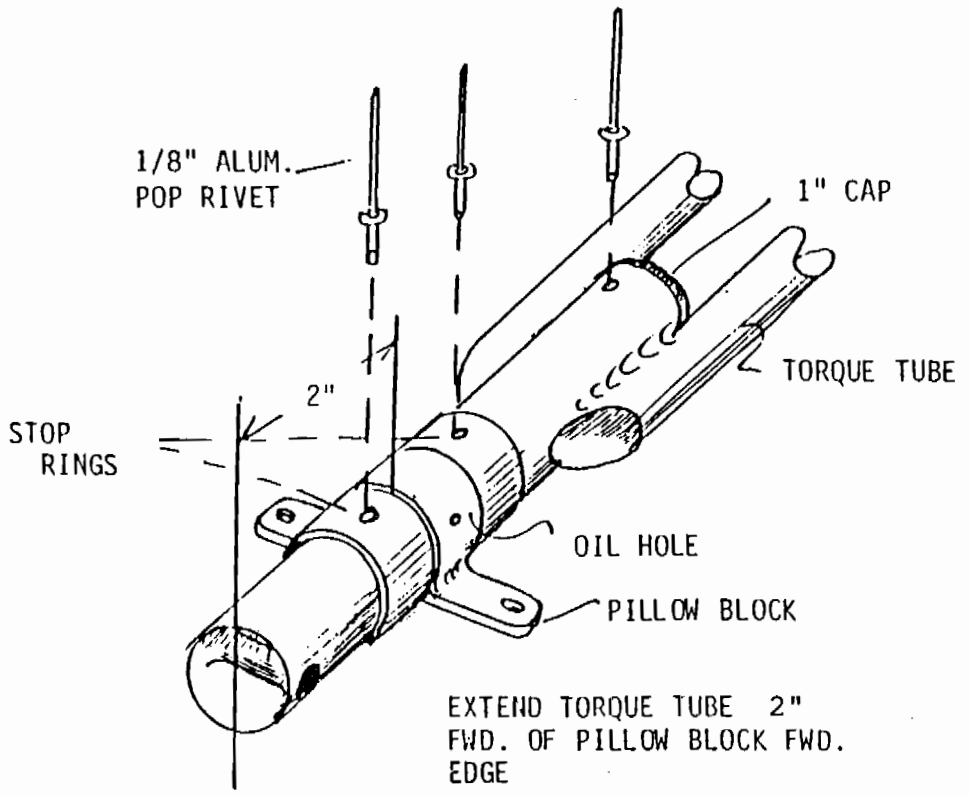
CONTROL STICK ASSEMBLY
(PLEASE REFER TO SECTION 006 IN PARTS CATALOG

1. Assemble the control stick by referring to the Control Stick Diagram in the Parts Catalog. **NOTE:** Stack (3) 3/16" washers on each side of the 5/8" push pull tube to center the tube on the S2-SAB. **CAUTION:** Make sure the 1/4" nut used is a castle nut. **DO NOT** over tighten. The (2) S2-SAB's must swivel freely, but not be loose or the elevator will have "play". Also, note that **the head** of the 1/4" bolt inserts into the end of the **5/8" push pull tube.** Be sure to cotter pin or safety wire the bolt after assembling the swivel joint. If this nut works loose and comes off the bolt, loss of pitch control will result.....so be sure it is safetied.

2. Find the control stick torque tube (CS-TT). Inspect it, then assemble the following:

(2) Stop Rings (CS-SR)
(1) Pillow Block Fwd. (CS-PB)
(1) 1" End Cap (1"-CAP)
(3) 1/8" Aluminum Pop Rivets

Install the parts as shown in Figure 006-02. There must be 2" of torque tube extending beyond the forward edge of the pillow block (not the stop ring). Grease the pillow block and tube **BEFORE** sliding over the torque tube. Rivet the stop rings in place without binding against the pillow block. Also rivet in place the 1" end cap.



3. Slip the rear pillow block (CS-PB) over the opposite end of the torque tube.

4. Insert the gray plastic glides (CS-GL) into the ends of the torque tube. The forward glide may need to be ground to clear the 5/8" tubes adjacent to the insertion point. Use a chunk of wood and a hammer to drive the glides in place. Safety the glides by drilling #40 holes and inserting a cotter key. Make sure the keys do not rub on the 5/8" push pull tube (Figure 006-04). **DANGER:** The 5/8" push pull tube must slide freely in the glides. File or ream until this is the case. If the 5/8" PPT does not slide freely it may **JAM** with dirt or swell with moisture.

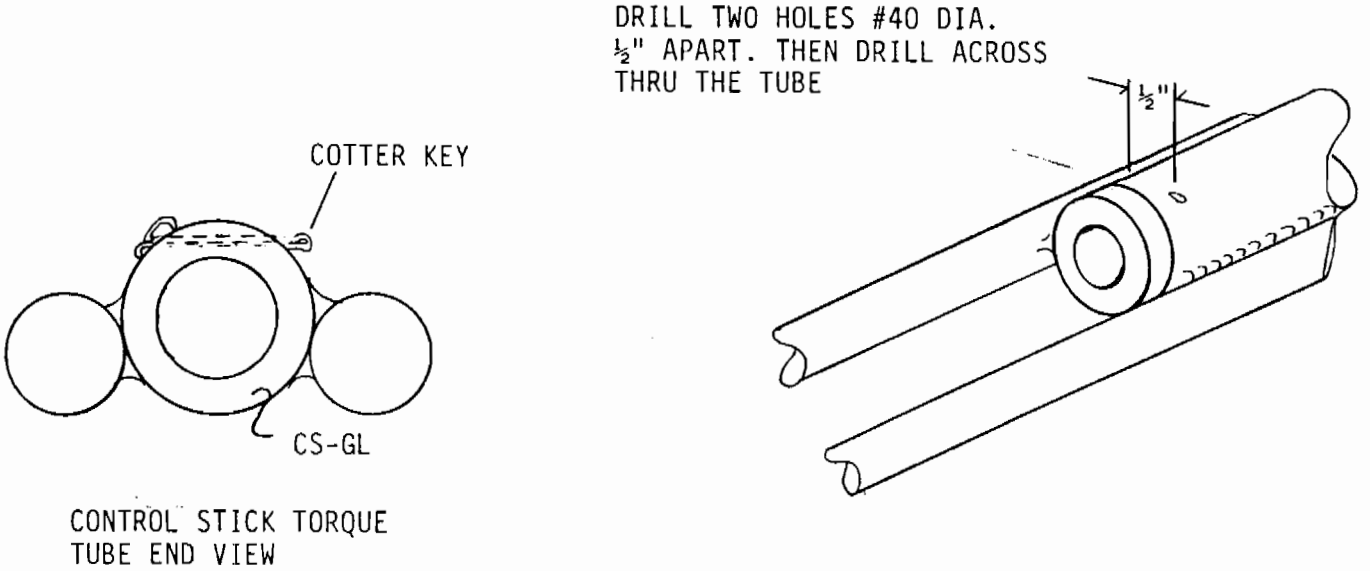


FIGURE 006-04

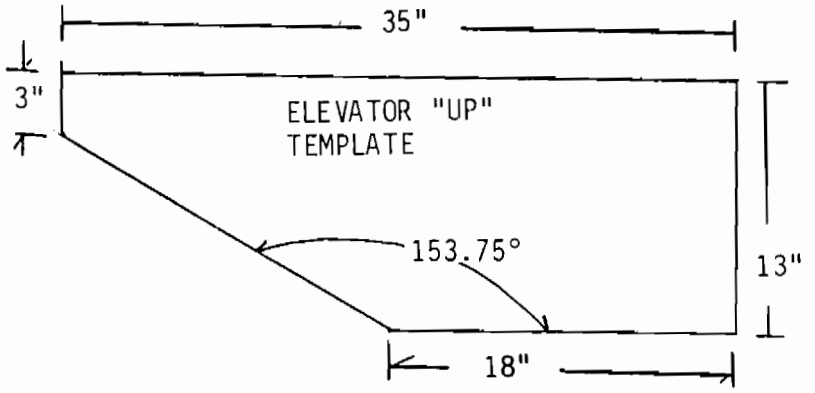
5. Slip the 5/8" push pull tube into the aft glide and out through the forward glide with the swivel joint facing aft.

6. Insert the control stick into the connector with the control stick lined up 90 degrees to the 1/4" bolt hole bushings. Insert until stick clears cockpit structure when moved full travel range. Drill through the stick 1/4" at the top of the connector. Using a 1/4" bolt (AN4-25A) and (2) 1/4" thin washers and (1) 1/4" shear nut, fasten the control stick connector to the torque tube. Coat the bolt and wear bushing with a heavy oil before installing. Snug down the bolt so there is no play between parts but is free to pivot. **HINT:** Paint may have accumulated in the connector tube's 1/4" wear bushing.....Use a 1/4" drill to clean out.

7. Attach the linkage to the control stick and 5/8" push pull tube eyebolts using the appropriate hardware. Refer to the parts catalog for the assembly sequence. Safety tie the bolt with the cotter pins after tightening.

8. Install the control stick assembly to the fuselage. Check for freedom of movement. **NOTE:** Over tightening may cause binding of the pillow block.

9. Using rope or seat belt (if installed) tie the stick back in the full up position. Be sure the stick is against the aft stop. (Glide touching eyebolt). Make a cardboard template as shown in Figure 006-09 to set elevators in full up position. **HINT:** Clamp the elevators in the full up position.



LAY OUT AND CUT FROM CARDBOARD OR WOOD - USE ON TOP SIDE OF ELEVATORS

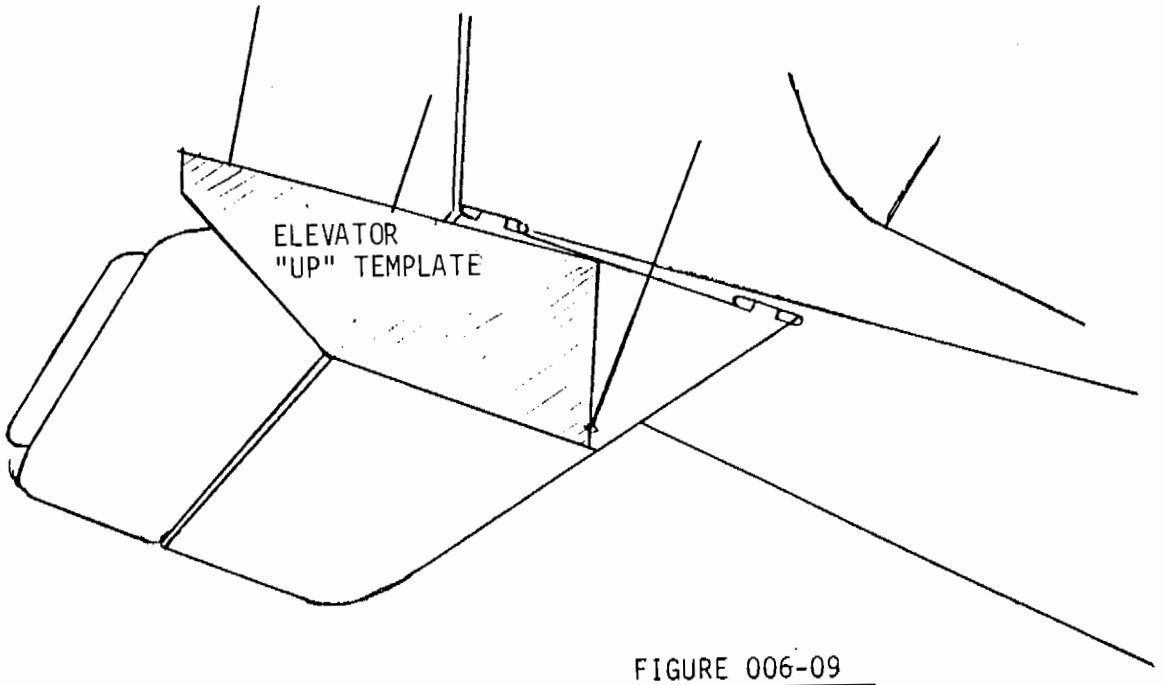


FIGURE 006-09

10. Drill the elevator horns remaining #11 hole out to 1/4" diameter. Bolt the yoke assembly in place with approximately 1/2" to 5/8" of threaded portion of rod end showing. In no case should there be **NO LESS** than 6 full turns of the rod end into the yoke. Bolt the rod ends to the inside of the elevator horns with AN4-7's. Use a 1/4" castle nut and loc rings to secure.

11. Cut the elevator 1 1/4" push pull tube to a total length of 80". **BE SURE** to cut off the undrilled end. Insert this end into the yoke, bolt the opposite end into the control stick. Re-check the elevator and stick settings, cut off 1" tube as required, then drill through the yoke #11 from top and then from the bottom and bolt. The elevator should move up and down freely and return to full down when stick is released. The bolt must be placed vertically or it will not allow free movement of the push pull tube.

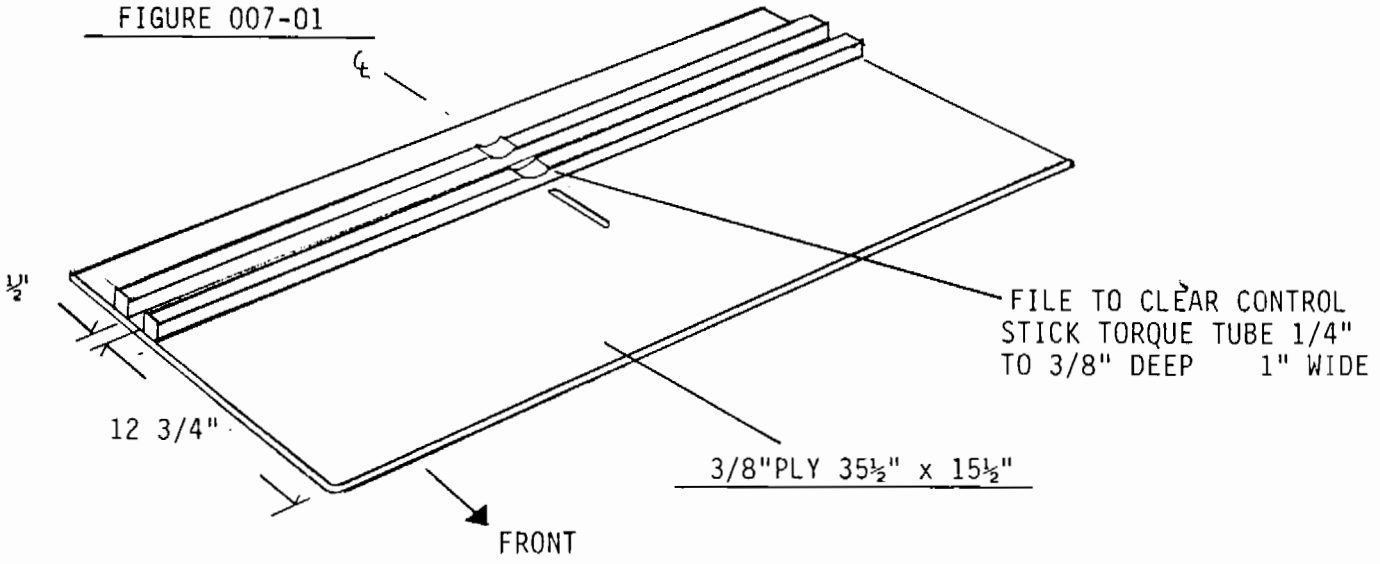
12. Remove primer and paint components as desired. Re-assemble post covering and painting.

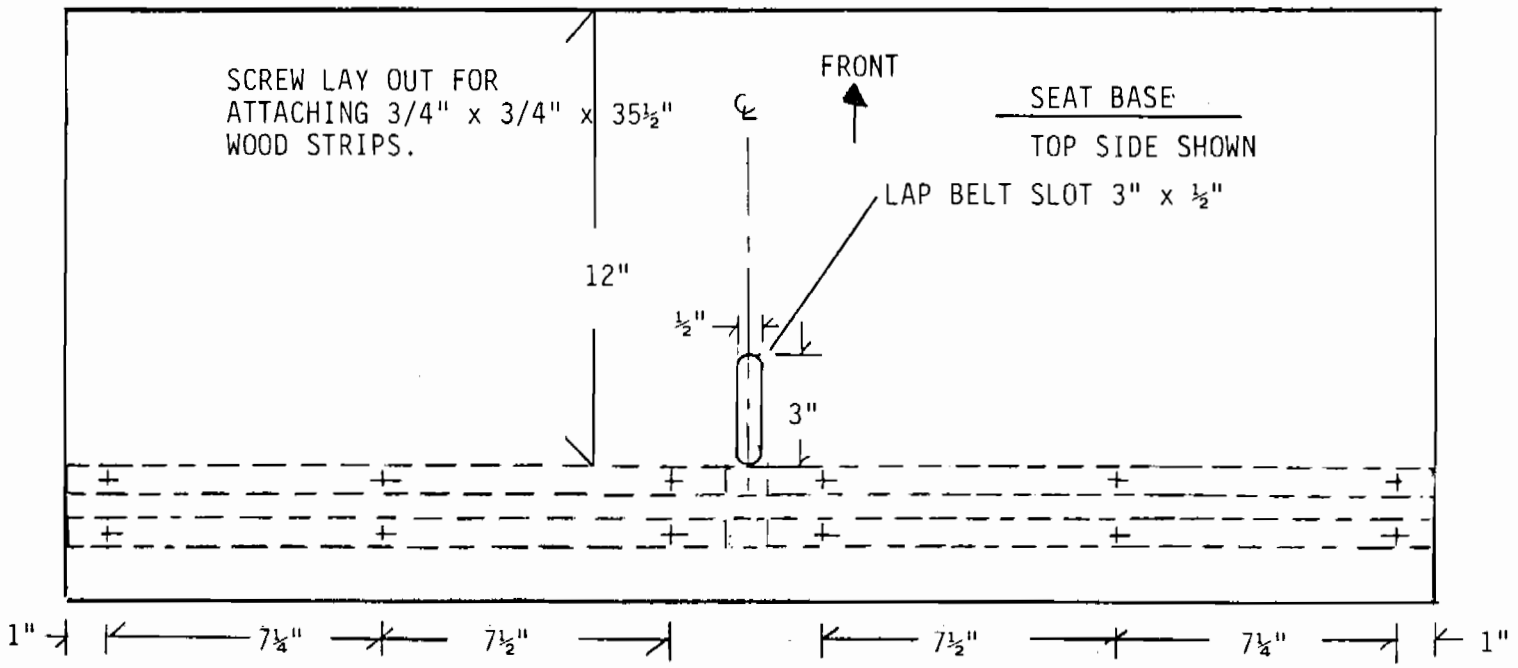
S-10 SEAT FABRICATION ASSEMBLY AND INSTALLATION

1. Cut safety belt exit slot in seat base. See Figure 007-01.

2. Glue and screw the (2) 3/4" x 3/4" x 35 1/2" strips to the seat bottom. (3/8" x 35 1/2" x 15 3/8") As per Figure 007-01. **NOTE:** Screw placement.

FIGURE 007-01





3. Glue and clamp 1/2" x 1/4" wood strip and 3/4" x 3/4" stringers to seat back's bottom backside edge as per Figure 007-03.

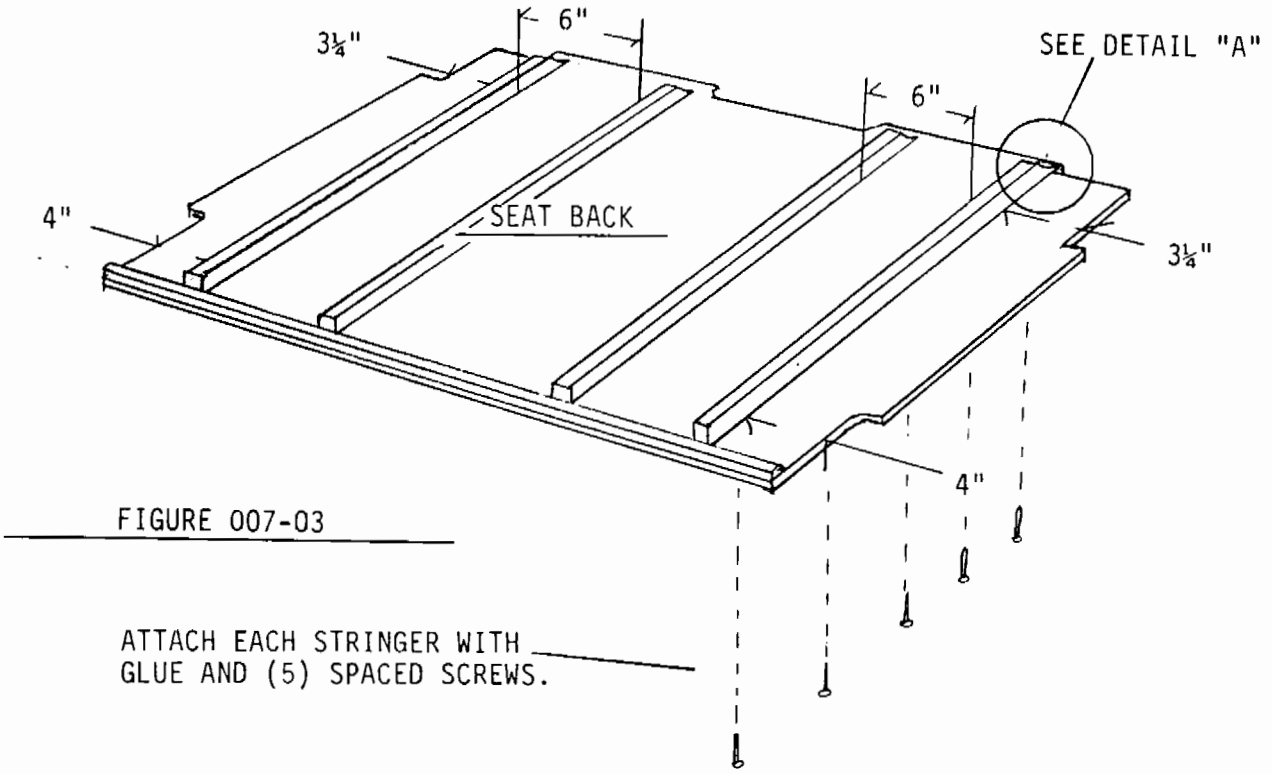
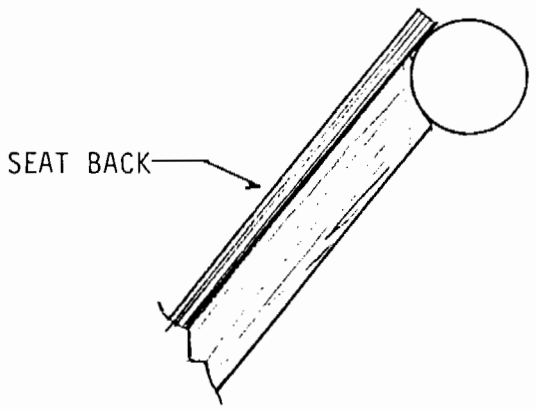


FIGURE 007-03

DETAIL "A"

SHAPE THE 3/4" x 3/4" WOOD STRIPS TO ALLOW THEM TO REST ON THE 1" FUSELAGE TUBE.



4. Sand and varnish the seat back and bottom and let dry.

5. Pre-drill and install the 30" piano hinge to the seat bottom. Line up the hinge flush with the seat bottom as per Figure 007-05. **HINT:** To make pilot holes for the screws, use an awl or ice pick. Please use the small bolts provided to fasten the ends.

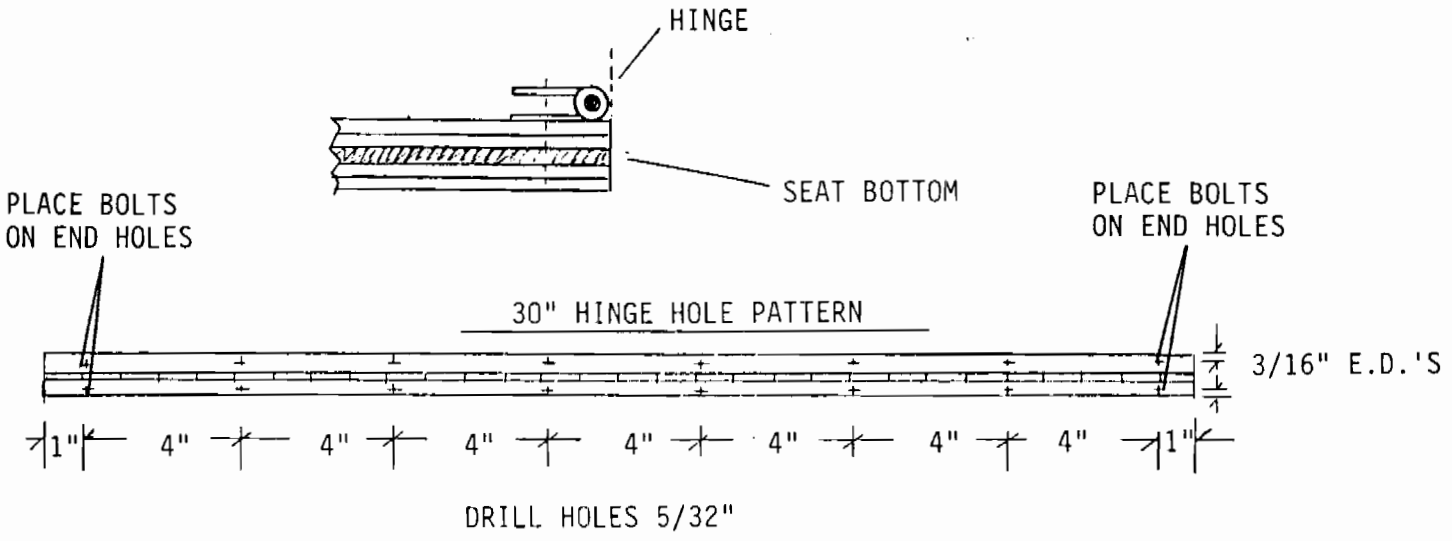


FIGURE 007-05

6. Set seat bottom in place and screw front down to tabs with (2) #8 x 1/2" Pan Head Screws. (Tabs are located on the forward seat truss).

7. Clamp the seat back in place and screw on the other half of the piano hinge. Check for freedom of movement. The seat back should fold forward and rest against the fuselage side tubes. Check to see if seat is square with the airframe.

8. Remove the seat and attach the upholstery with tacks or staples (We recommend 1/4" Bostitch Staples and a model T-5 gun). See options section for installation of our seat upholstery kit.

S-10 SEAT BELT INSTALLATION

1. Refer to the parts drawing to select the hardware and components.

2. Bolt the belts to the tabs welded to the bottom longerons as shown in Figure 007A-02. Attach shoulder harness per side to the single tab at station S-4 topside. This arrangement will allow a pilot to sit centered and buckled in. Simply clip the lap belt buckle from the left to RH clip and snug. Have the shoulder harness looped through the lap belt and snug with each adjustor.

For dual use, the shoulder harness for each side is laced through each individual lap belt.

IMPORTANT! ALWAYS FLY WITH THE LAP BELT SNUG AROUND YOUR BODY. SHOULDER HARNESS IS RECOMMENDED ALTHOUGH THE FLAPERON HANDLE IS NOT ACCESSIBLE WITH THE SHOULDER HARNESS SNUG.

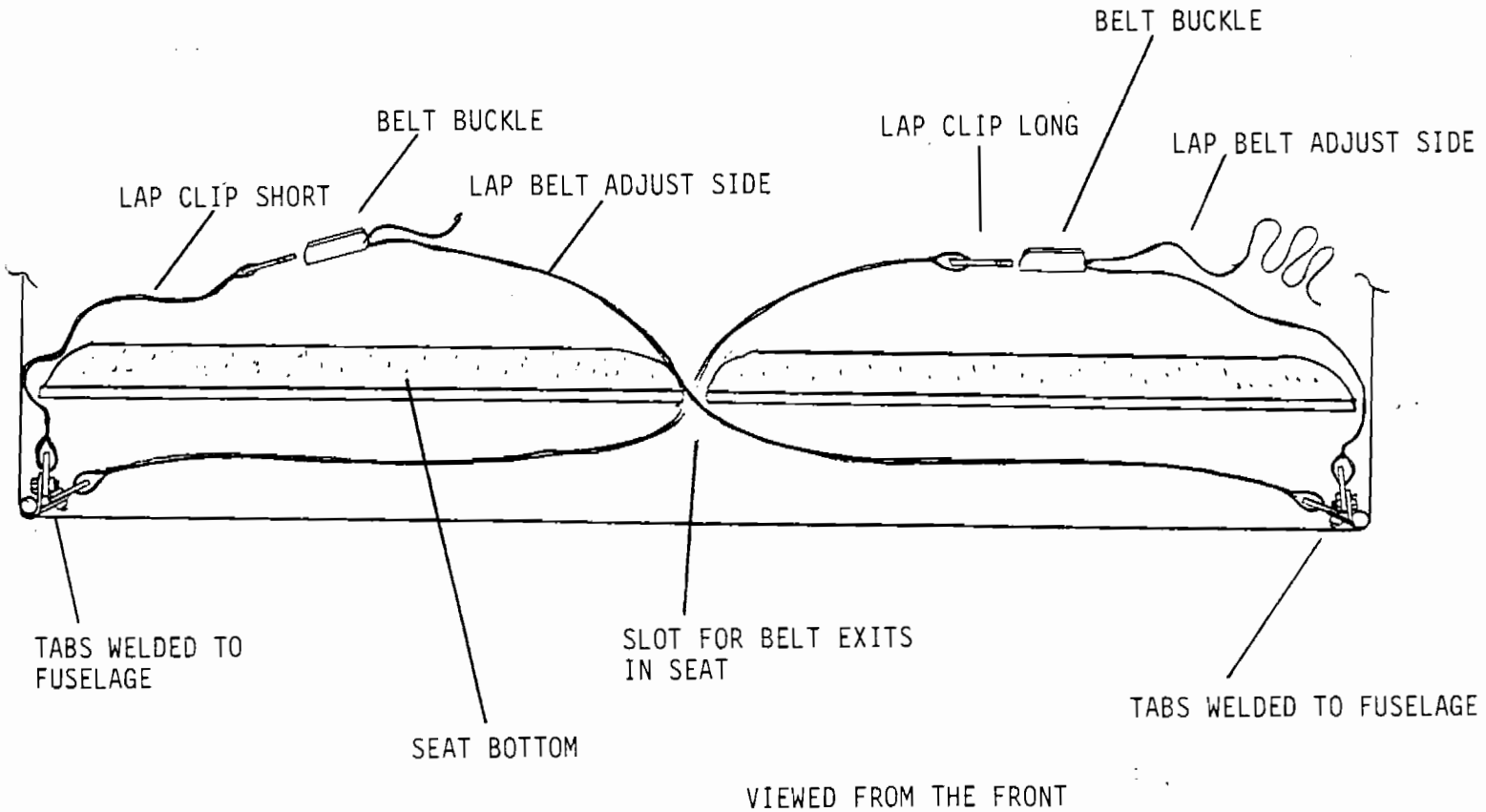
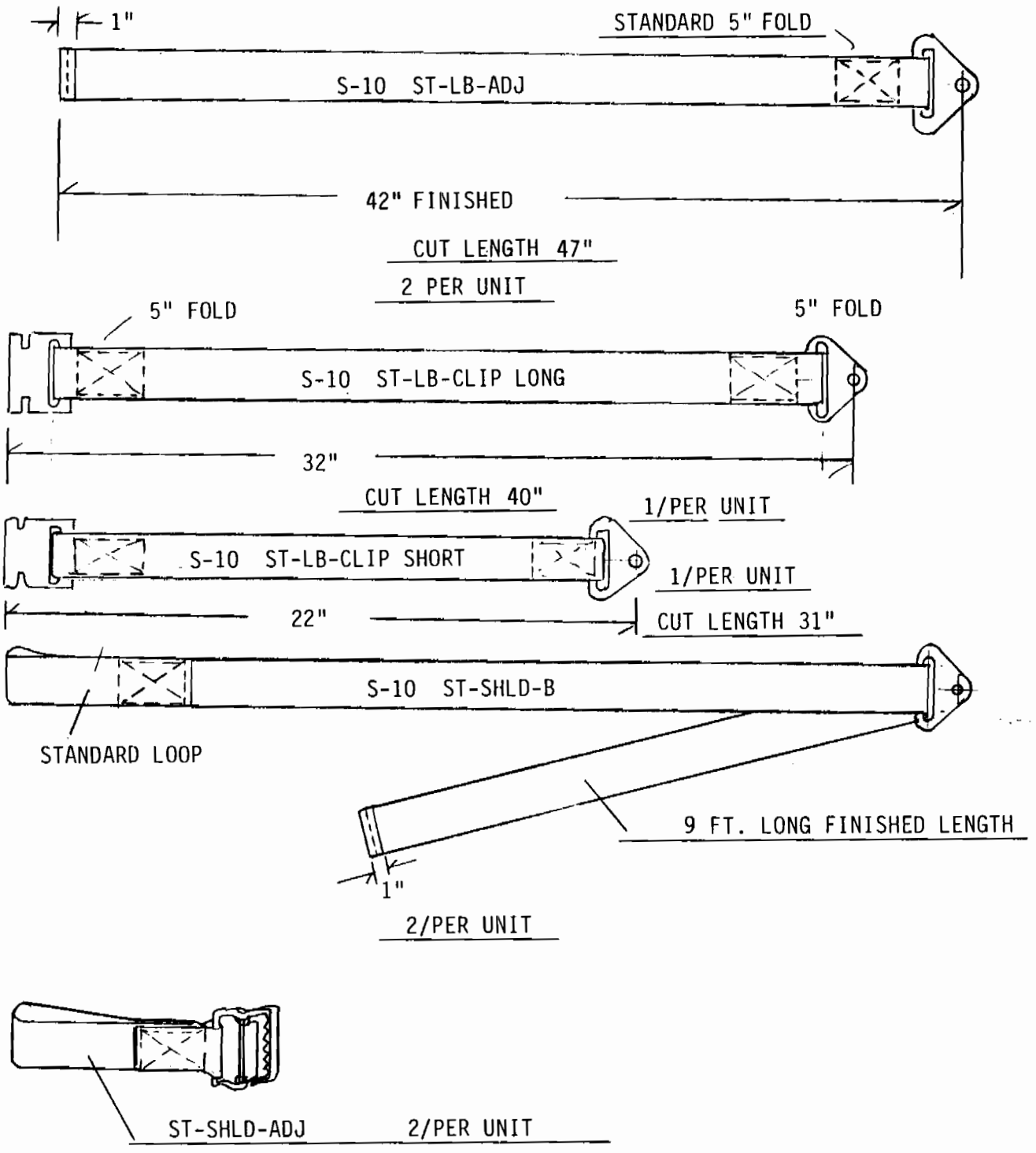


FIGURE 007A-02



ST-SHLD-ADJ 2/PER UNIT

SUBJECT: S-10 PILOT RESTRAINT SYSTEM		NO. SEE DRAWING	MODEL: S-10
MATERIALS: AS PER DRAWING		FINISH N/A	
DATE: 10-25-87	DRAWN BY: RJS		SCALE: N/A
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		PAGE:

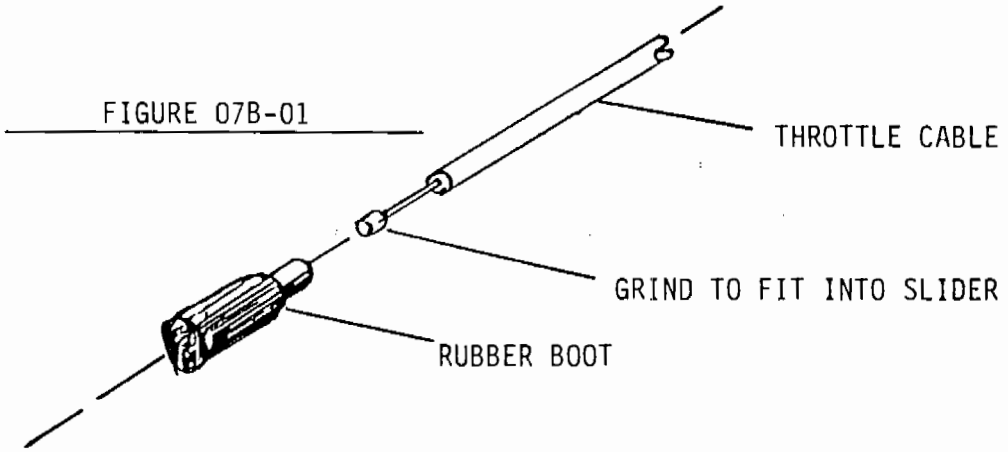
CONNECTING THE S-10 THROTTLE

1. To hook up the throttle cables you need to unscrew the carb's top plate. Take care not to let the spring inside jettison the plate onto the floor. The throttle cables will need a little sanding on the barrel end to insert into the carb slider retainer. Do this on a small bench grinder with a fine stone. Check the fit as you go.

Remove the spring and cap and place aside. Look closely at the slider...see the white plastic fitting on the bottom?

Underneath this should be the cer-clip that holds the fuel metering pin. Be sure when re-assembling, the cer-clip is **UNDER** the white plastic. Close examination will reveal where the cable terminates but before hooking up the throttle cable, slip that little rubber boot over the end first. See Figure 07B-01. During re-assembly note where the throttle exits the cap is not on center. Position the cap so the cable is directly over its slider position. The oil injection cable runs with the throttle cables and attaches in the cockpit the same way. The cable terminates at the oil injection pump using an adjustable fitting. See parts drawing. The wire swivel retains the cable at the pump. A 1/4" plain nut is used on the top and bottom side of the cable stop at the pump to retain the adjustable cable ferrule.

FIGURE 07B-01



2. Pull on the free end of the cable to seat the housing into the fitting on top of the carb plate. Then route the cables as follows: Out the top of the carb and down over the forward side under the carb straight back to the firewall; gently curve along the firewall and into the upper grommet; down along the inside of the forward cockpit and into the throttle stop. (Located on the LH side of S-2). Drill front side of stop tube to 3/16" diameter. See Figure 07B-02. Double check to see if everything is curving gently, no sharp turns allowed..... that will bind the cable. Check to see if the housing is into the carb's top plate fitting. Then pull the housing away from the carburetor so the cable's free end will be inside past your cut off mark. Now cut off the excess housing and push the cable back out.

IMPORTANT: Check closely the housing where you've cut it. A clean cut is a must...the metal coil inside the housing can rub the cable and cause it to break. An unclean cut of the throttle cable housing can also result in sticking of the controls due to the added friction.

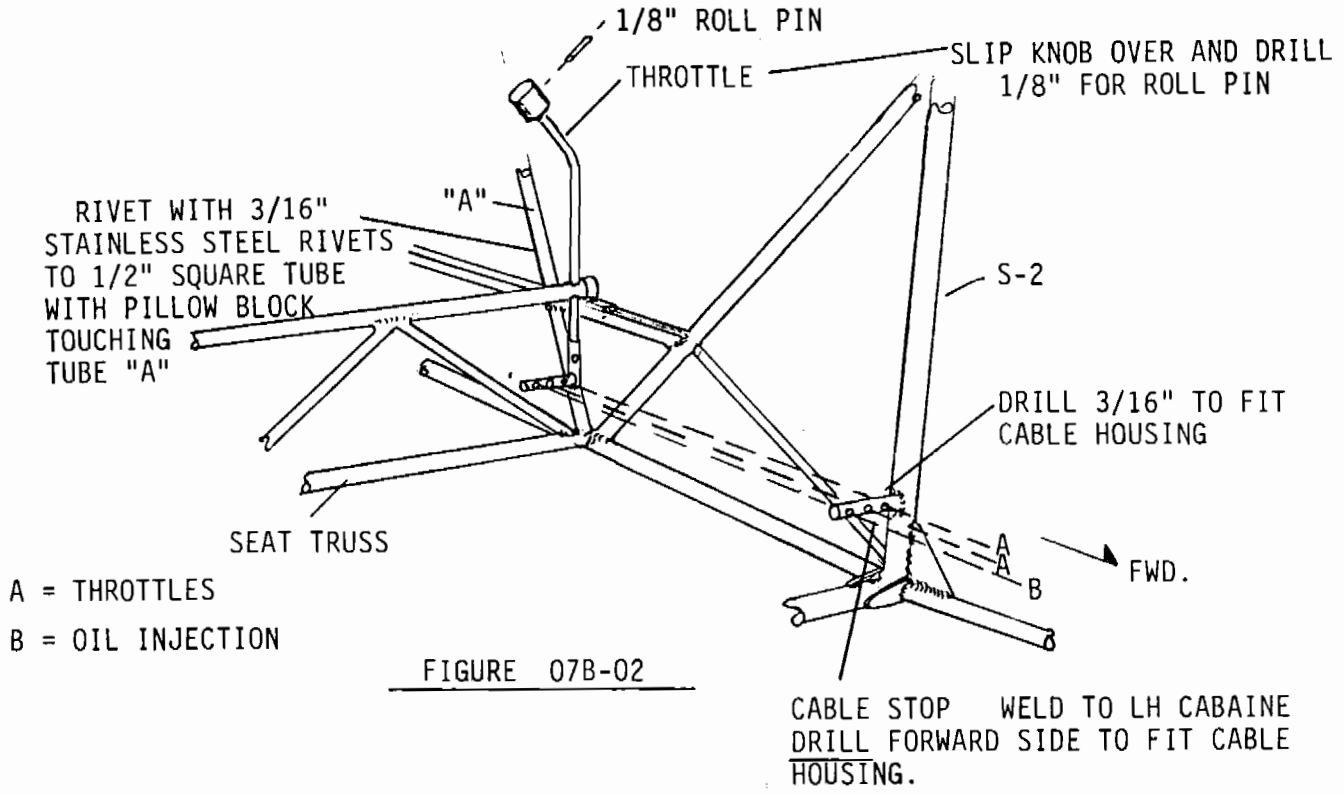


FIGURE 07B-02

3. Next slide the cable through the stop then insert the housing. Insert cable through throttle lever (**NOTE** the big hole is on the throttle's forward stop side to eliminate wear) and attach a wire stop (#15). Use Loctite to safety. Adjust throttles to be in perfect sync. They must move exactly the same to assume smooth operations.

Assemble friction rod assembly to the throttle lever as shown in the parts drawing. Set stops to allow full carb slider travel but no more.

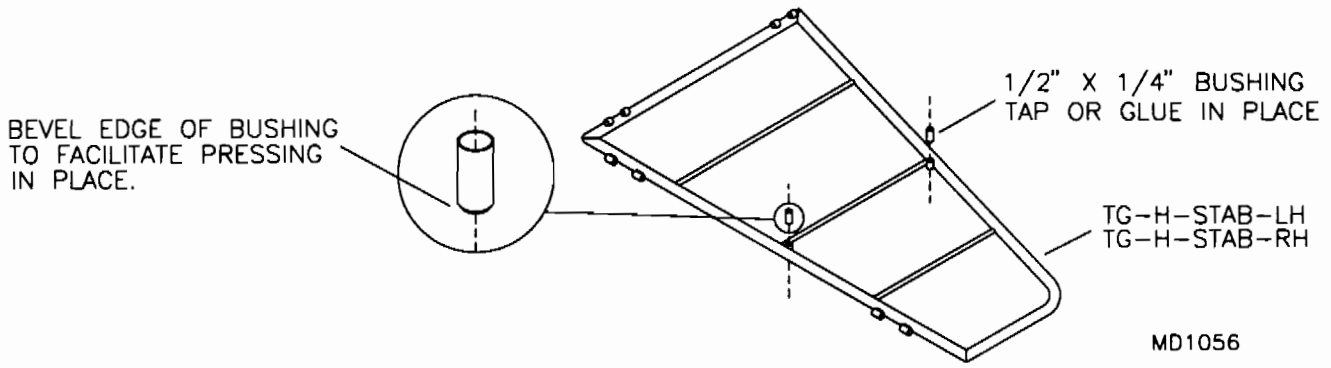
Just run double cables for duel carb equipped engines.

S-10 SAKOTA TAIL ASSEMBLY

1. From 1/4" x .035 aluminum tube bushing stock, cut (7) 1/2" long bushings.

2. Lay the horizontal stabilizers flat on the floor and tap the bushings into place with a hammer. Drill through with a 3/16" bit once they are installed. The holes in the welded on bushings may need reaming out to 1/4" for ease of installation. See **Figure 08-02**. If the bushings slide in without force, use J & B Weld to hold them in place, then drill out to #11.

FIGURE 08-02



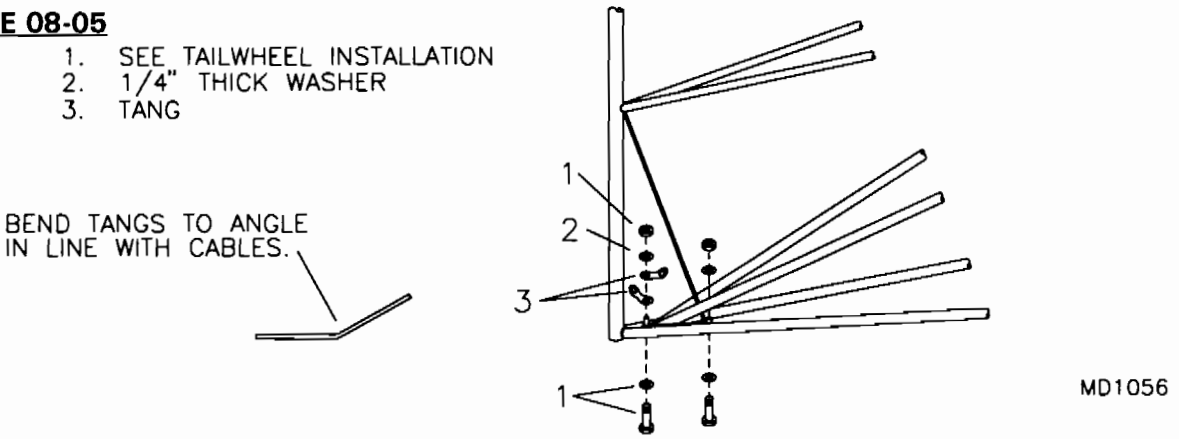
3. Repeat for the other three locations on the vertical fin, except use a backing bar, such as another hammer. **HINT:** A small C-clamp and a shot of lubricant can also be used to set the bushings in place.

4. Hinge stabilizers to the fuselage with 1/4" x 3 1/8" clevis pins. **DO NOT** install cotter pins until final assembly. Check for freedom of movement. It is necessary to ream all hinge points on the tail assembly. Use a 1/4" diameter drill bit 7" to 8" long. Reducing the pin diameter will also help the hinges work better.

5. Drill one hole in each stainless steel tang to 1/4" diameter and place on the rear tail wheel. Bolt as shown in **Figure 08-05**. Bend the tang to match the angle of the cables as they come off the stabilizer.

FIGURE 08-05

1. SEE TAILWHEEL INSTALLATION
2. 1/4" THICK WASHER
3. TANG



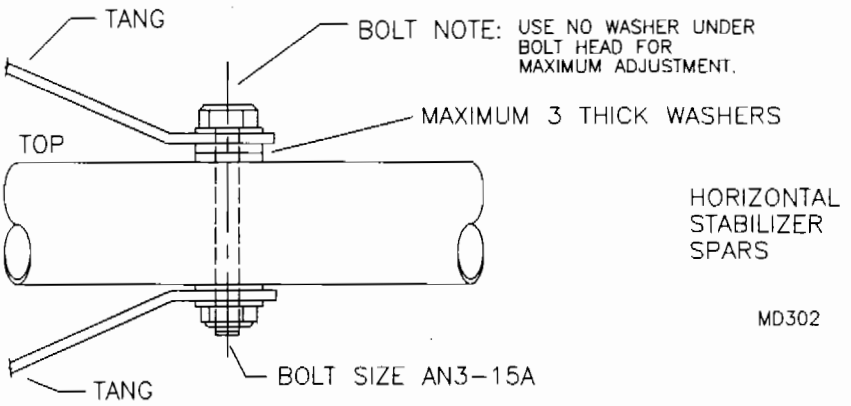
6. The tail cables use a custom made cable tang that has several holes in one end. These holes are used to adjust the set of the tail and tension the cables. Bolt the cables to their proper locations using the same washer stacking as shown in **Figure 08-05**. Before the tail cables can be set and tensioned you will need to bend the tangs so they line up with the cables. Do so by bolting them on, using the inner most hole, and bending to the exact angle with your hand. Avoid using a pliers as this may cause stress

may cause stress risers. **IMPORTANT**: Attach the cables with the adjustor tangs bolted to the horizontal tail and **NOT** the fuselage or vertical fin. The reason for attaching the adjuster tangs to the horizontal tail is that when the tail is folded, the single hole tang is disconnected from the two lower attach points on each side. If the multi-hole tangs were used you would have to remember which hole was used to set the rigging of the tail.

7. With the tangs bent to the proper angles, loosely bolt the cables in place using the outer most hole on the adjustor tangs. About a hundred pounds of pressure can be applied by simply pressing down on the tail at the cable attach points with your hand. Have a helper or use a ballast weight to push down on the other side of the tail. Adjust cable tension and tail rigging by selecting the correct hole in the multi hole tang.

8. With cables under mild tension the horizontal stabilizer tips will be approximately 1/2" higher than the root. An acceptable setting is level to 1/2" dihedral. If more adjustment than what the tangs allow is required, try using more washers and the next length of bolt. See **Figure 08-08**. If your tail requires more than three (3) thick washers under any top side cable tang, return the cables for longer ones. The cable tension should be enough so that they have a nice ring to them when strummed. If you are installing plastic cable fairings, the tension is critical to insure the fairings will not flutter. The tail is in rig when the cables are tight and the tail is straight. It is best to check for straightness again once the wings are installed. **PLEASE NOTE:** When folding the tail, push down on the cable attach point to releive tension and remove bolts from the lower tangs.

FIGURE 08-08



9. Drill and rivet the K-1000-3 nut plates to the inside of each elevator. Then attach an elevator horn to each side as shown in **Figure 08-09**.

FIGURE 08-09

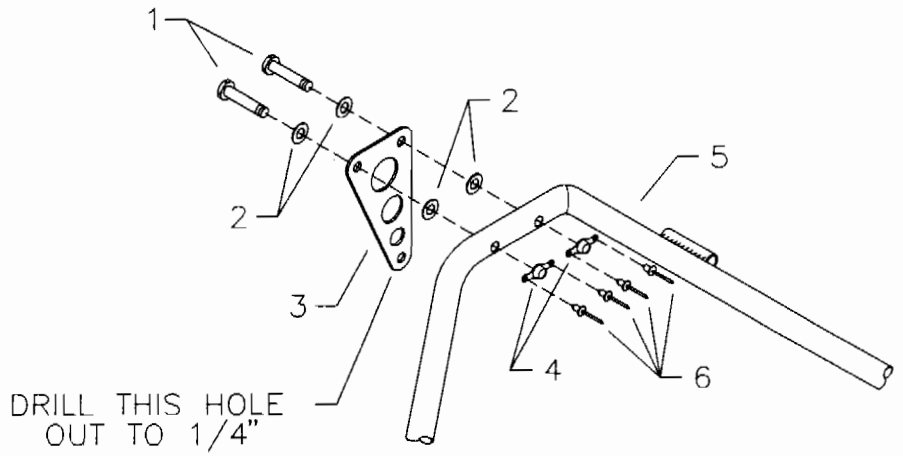
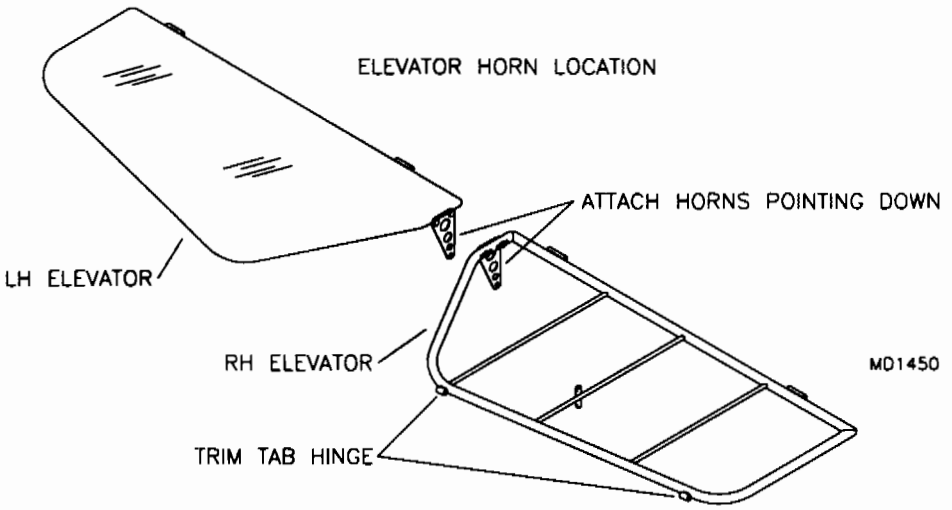


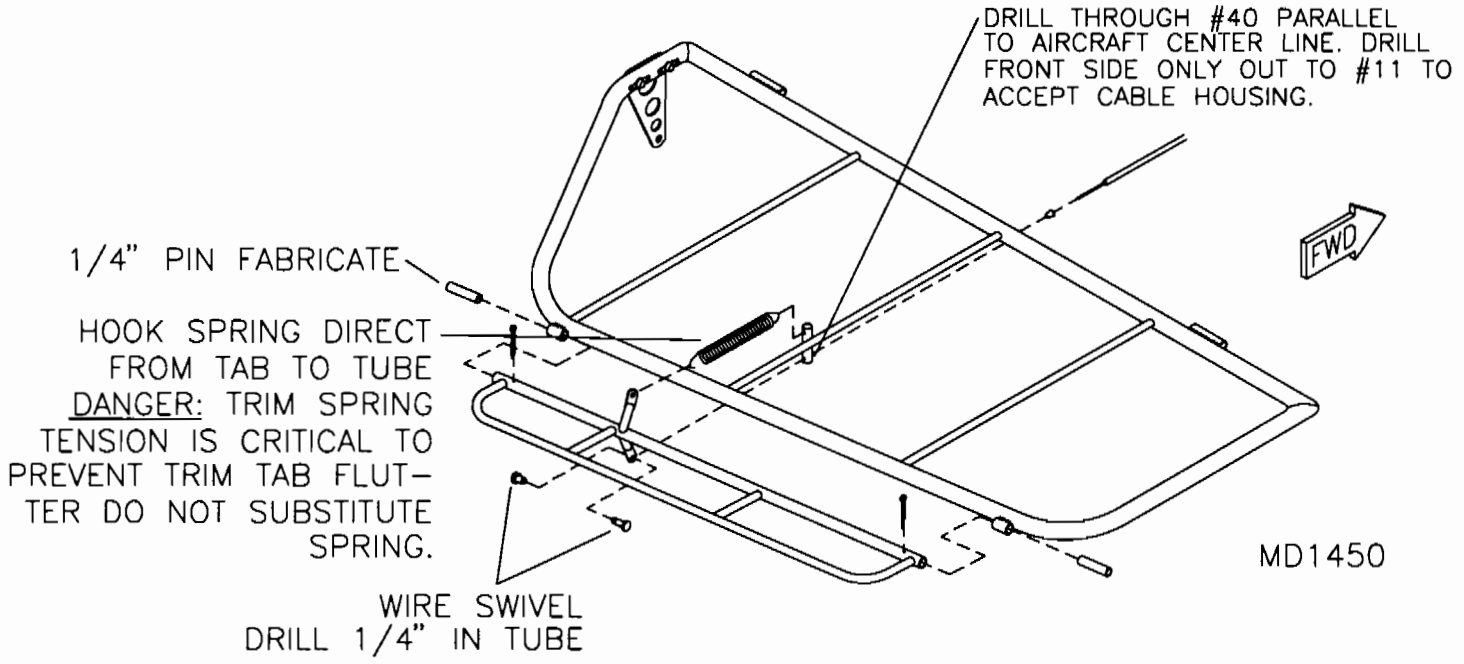
FIGURE 08-09A



10. Pin the elevator to the horizontal stabilizers using (4) 2 3/8" pins. Do not cotter pin until final assembly.

11. Attach the trim tab to the right elevator as shown in **Figure 08-011**. Insert small cotter pins. Drill out the trim cable stop tube to allow cable housing to insert and for the attaching of the trim spring.

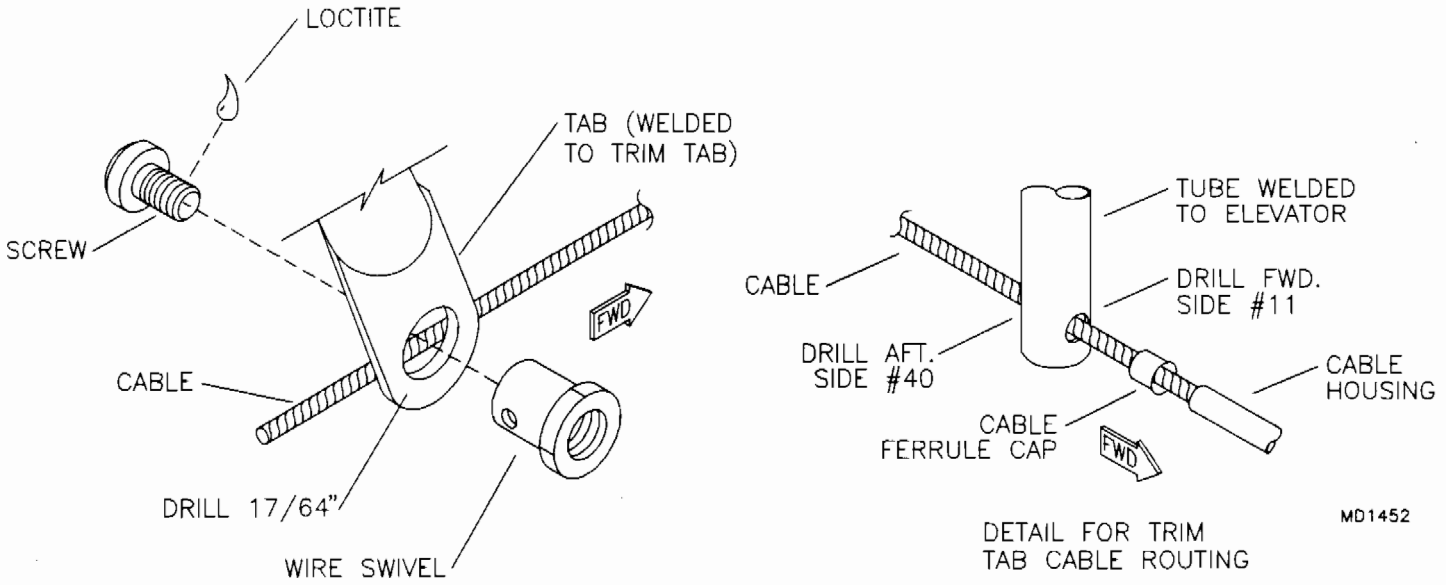
FIGURE 08-011



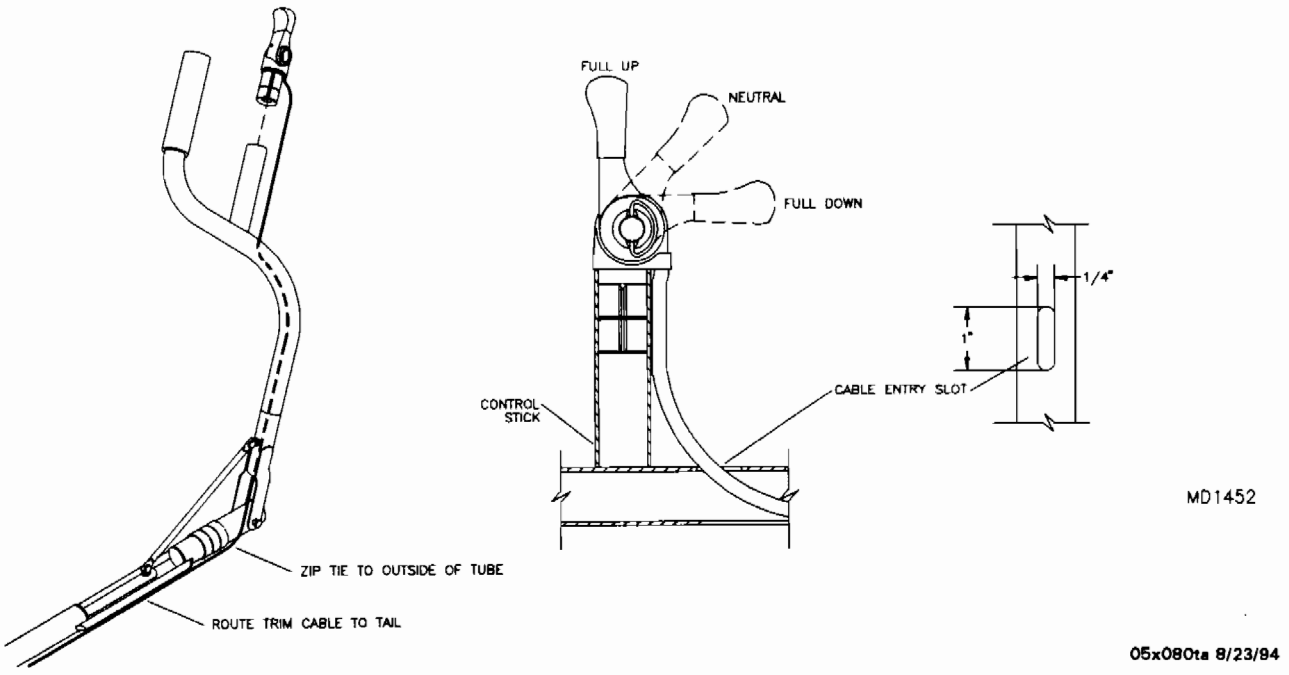
*Fabricate as required.

12. The elevator trim cable and housing should be routed through the control stick as shown in **Figure 08-012**. It will be required to cut a small slot in the control stick to allow the cable housing to run inside the control stick. Run the cable down the inside of the tailcone along the right hand side stringer. Exit through the small tube welded to the frame at the tail.

FIGURE 08-012



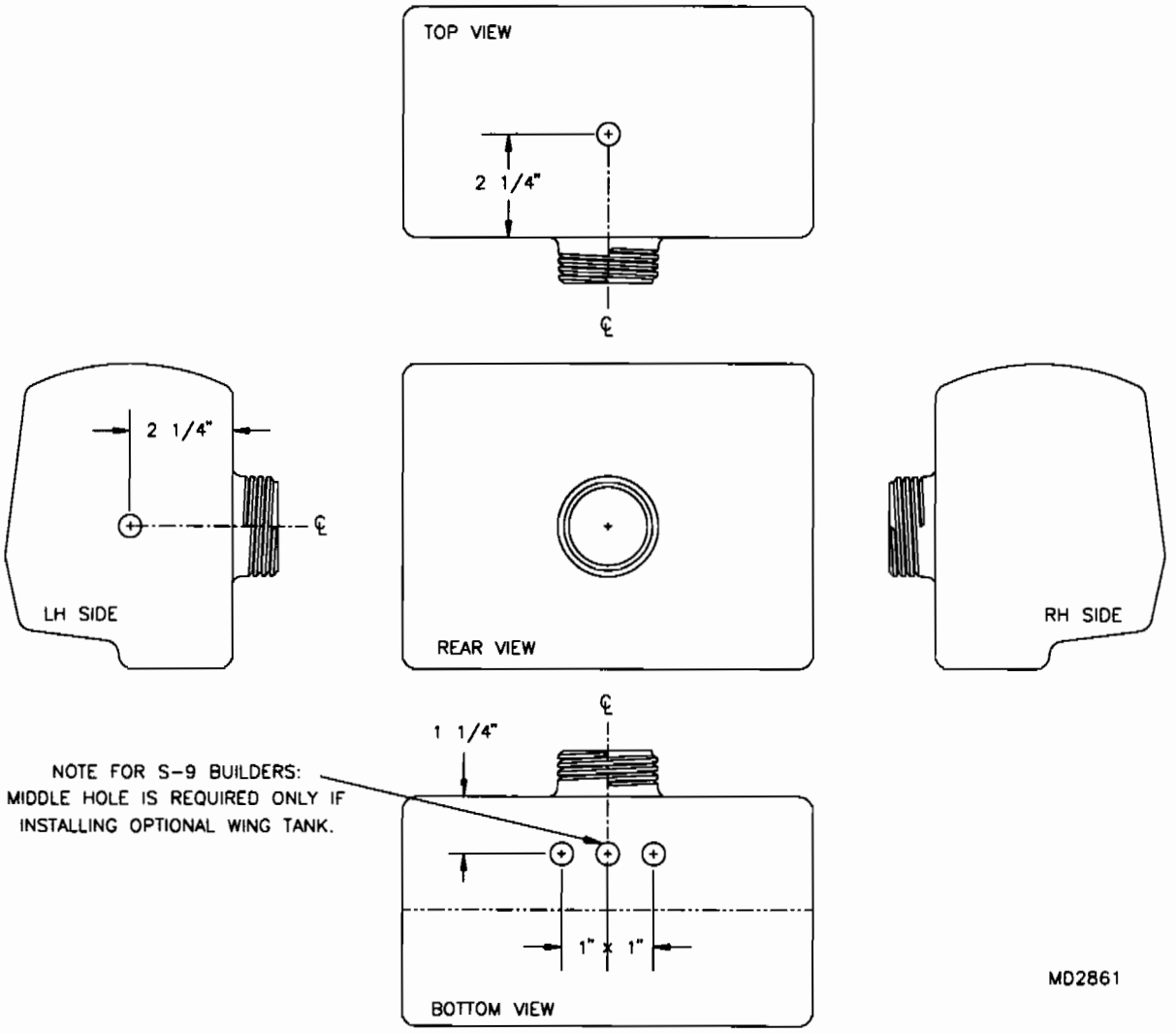
13. **Refer to the control stick assembly for rigging the elevator.**



S-10 HEADER TANK & FUEL LINE ROUTING INSTALLATION

1. Refer to **Figure 09-01** for locations of the holes for the withdrawal fittings. Drill the holes with a 1/2" diameter bit. Remove the burrs from drilling prior to installing the fittings. **IMPORTANT:** On the S-9, if installing a single wing tank only refer to the parts drawing for the correct number of holes to drill for the fittings.

FIGURE 09-01

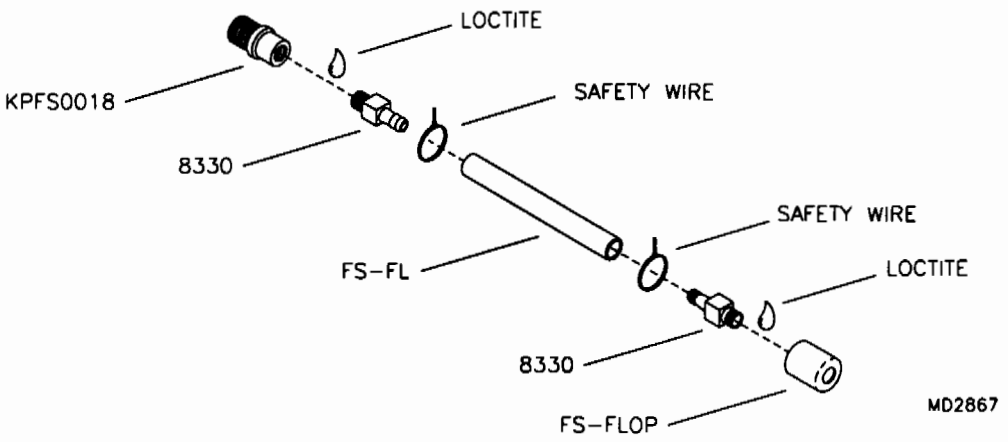


HEADER TANK FITTING INSTALLATION

2. Placing a wire in the fitting hole and up through the filler neck, attach a withdrawal fitting and o-ring to the wire. Make a loop in the end of the wire to keep the parts from falling off, then pull the fitting to the hole with the threaded portion out of the tank. Remove the wire. Holding the fitting with the threaded portion extended out of the tank, thread on the rubber washer, ½" washer and nut with loctite. **NOTE:** Use a 1/4" allen wrench to hold the tank withdrawal fitting while tightening the nut. Apply loctite to the straight or 90 degree fuel line fittings, and screw into the tank withdrawal fitting until snug. **CAUTION:** Do not tighten to the point the tank withdrawal fitting turns in the tank.

3. Assemble the klunker as per **Figure 09-03**.

FIGURE 09-03

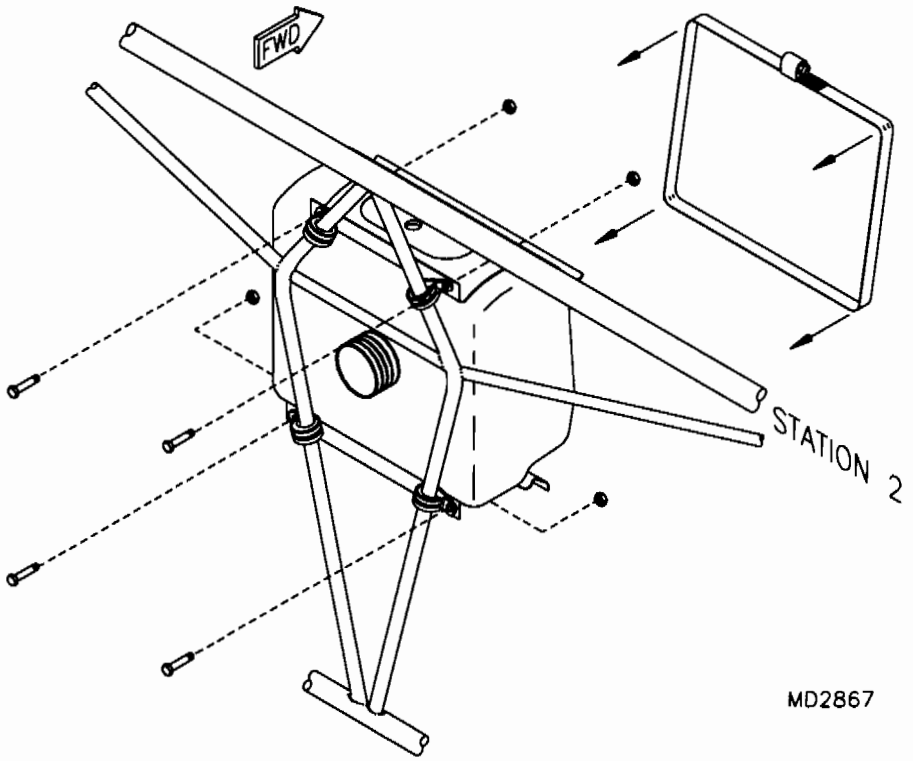


4. After installing the fittings, throughly clean the inside of the header tank with a vacuum cleaner.

5. Drill a #40 hole in the edge of the cap. Screw on the cap and tighten. Using the hole in the cap, safety wire the cap against rotation to the airframe after the header tank is installed.

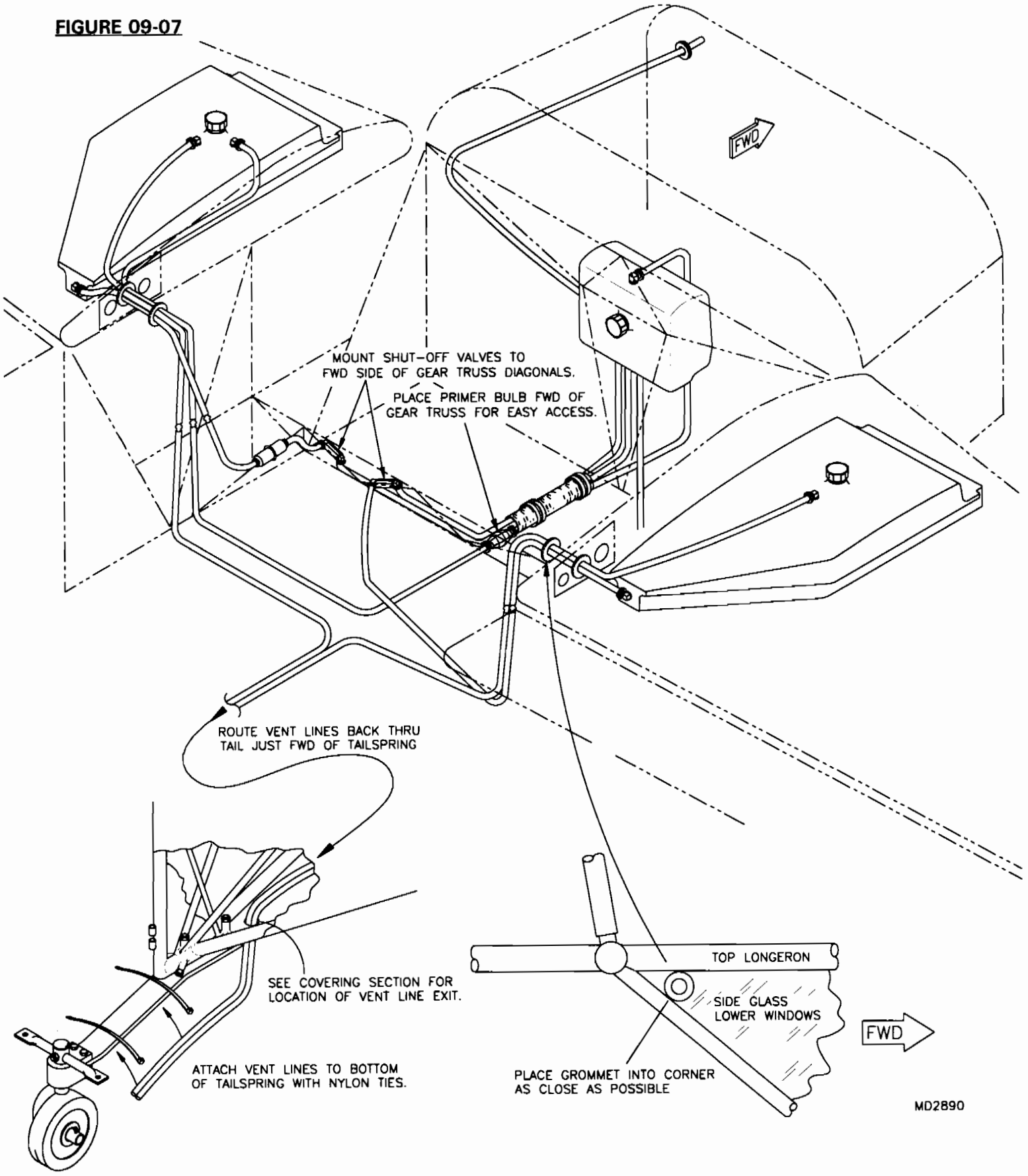
6. The header tank mount is made from two formed sheet metal parts. Paint or finish as required prior to mounting. Assemble the mounts to the header tank by holding the assembly up to the airframe as shown in **Figure 09-06**. Install the hose clamp to retain the tank to the mounts.

FIGURE 09-06



7. Route the fuel lines to the proper fittings to plump in header tank to the fuel system as per **Figure 09-07**. During operations, use the header tank drain as a sump valve to void water from the system.

FIGURE 09-07



S-10 SAKOTA ENGINE INSTALLATION

CARBURETION & EXHAUST FOR 582

1. Remove the choke levers from the carbs. (Leave the plunger assembly intact).

2. Install the carbs to the engine. Secure 90 degrees to the crankcase split line.

3. Route the primer lines to the primer nipples on the carbs, pump, and T's as required. Keep all fuel lines away from heat sources such as the muffler. Safety all the connections to prevent leakage. Plastic tie lines prevent movement.

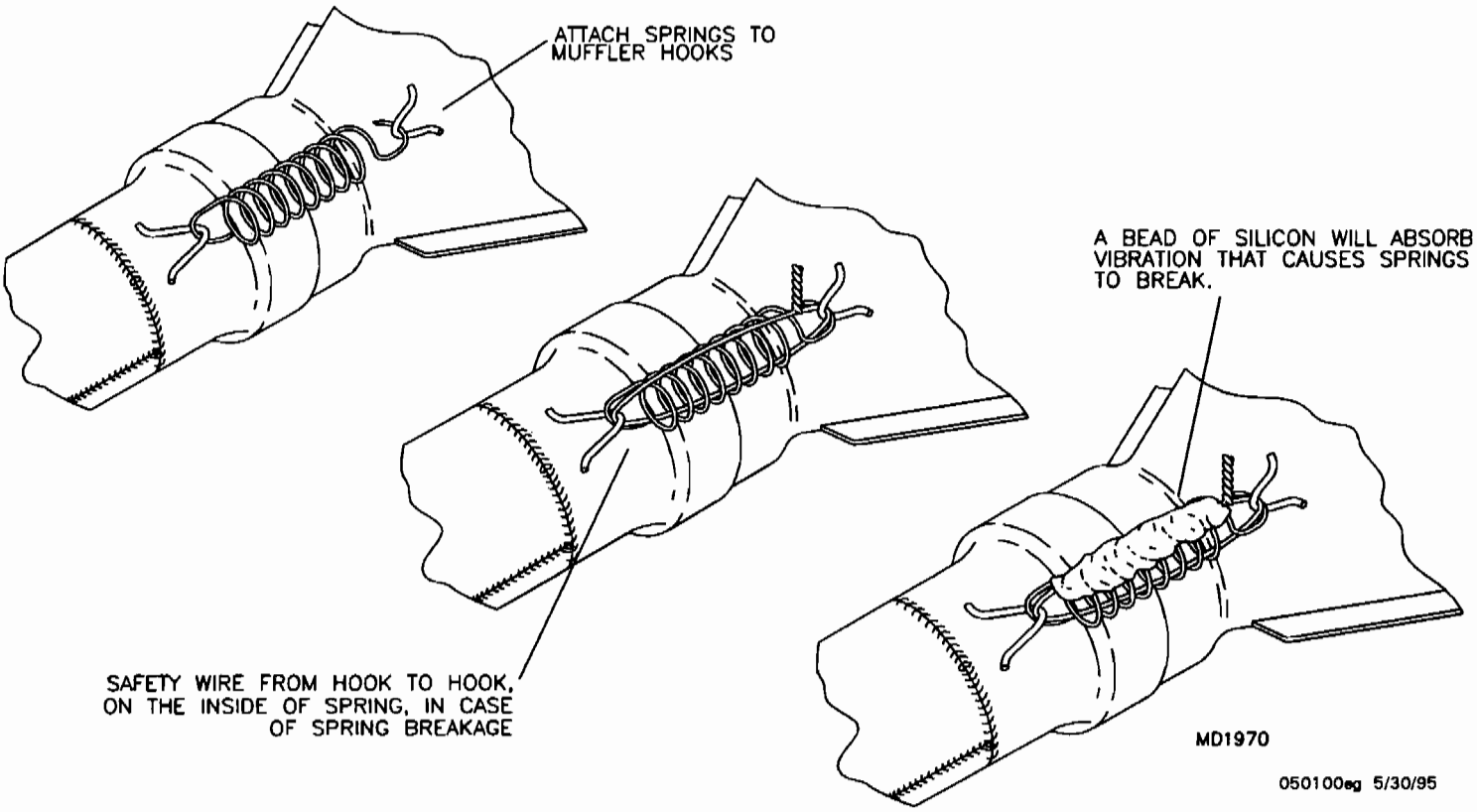
4. Bolt the fuel pump to the tabs welded to the engine mount. Route lines in close to the engine so the impulse line is no longer than 15". Run fuel lines in a manner so they are far from heat sources and secured but not crimped to prevent shifting or kinking. Clamp or safety all fuel line connections.

5. Follow the Rotax manual for throttle and other carburetor installation tips.

MUFFLERS

6. Install the muffler and manifolds appropriate to model type and cowling cut outs. Torque down the exhaust "Y" pipe evenly. Adjust the spring tension by bending the loops wider or narrower. Try not to over tension the springs or they will break. Safety wire the springs to the loops. Run a bead of silicon lengthwise along the springs to dampen vibration. See **Figure 010-06.** **NOTE:** The muffler's rubber mountings vary from model to model but the concept is the same. To allow enough freedom of movement so the engine vibration is absorbed without damaging the muffler. Regular inspections of the muffler should be conducted. Cracks may develop and should be welded. A severe loss in performance may occur when a muffler comes apart. Keep the engine compartment clean! New sources of dirt, oil and grime can be early warnings of trouble.

FIGURE 010-06



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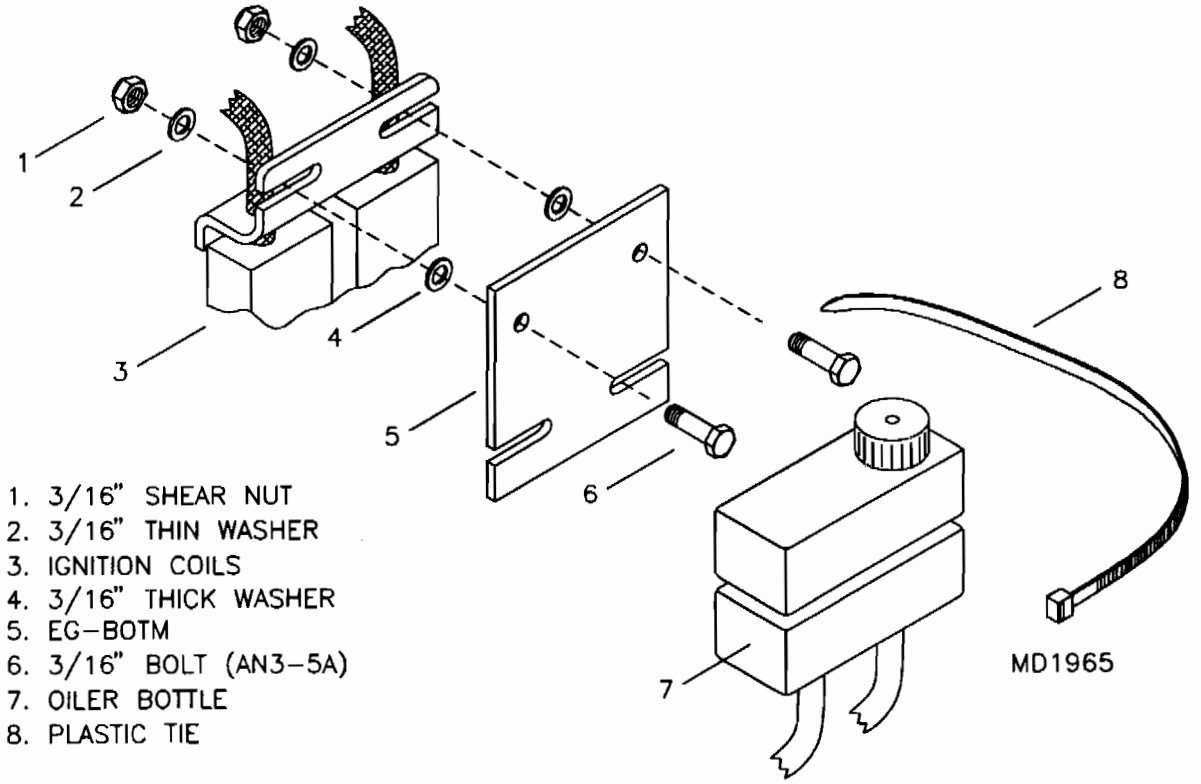
SPECIAL INSTRUCTIONS FOR 582 ENGINE INSTALLATIONS

1. The oil bottle must be moved on the 582 in order to allow cowling clearance. This is done by removing the bottle and installing the bottle mount as shown in the **Figure 010-01.** This will lower the bottle enough to gain cowling clearance.

FIGURE 010-01



1. 3/16" SHEAR NUT
2. 3/16" THIN WASHER
3. IGNITION COILS
4. 3/16" THICK WASHER
5. EG–BOTM
6. 3/16" BOLT (AN3–5A)
7. OILER BOTTLE
8. PLASTIC TIE

S-10 SAKOTA OIL INJECTION TANK INSTALLATION USING THE ROTAX 582

The Rotax 582 features oil injection. The obvious advantage to this system is you no longer have to mix the oil into the fuel. So now once and for all you can re-fuel just like all the other planes. Only now you must remember to check the oil level in the injector tank! You may want to fabricate an access door over the oil cap. We simply remove the cowl, and check everything including the oil.

The tank gravity feeds to the pump. The pump is a metering pump and is not capable of drawing in the oil without the gravity feed. As you can see in all cases the tank is mounted **ABOVE** the oil injection pump. Someday we may have an aerobatic oil injection tank with its own pump. Until then those wanting to fly inverted will have to continue to pre-mix the oil into the fuel.

1. The oil injection tank mounts to the magneto side of the 582 engine. Look closely at the engine housing, you will see two sets of two holes on each side. These are threaded to 8mm and used to attach the mount.

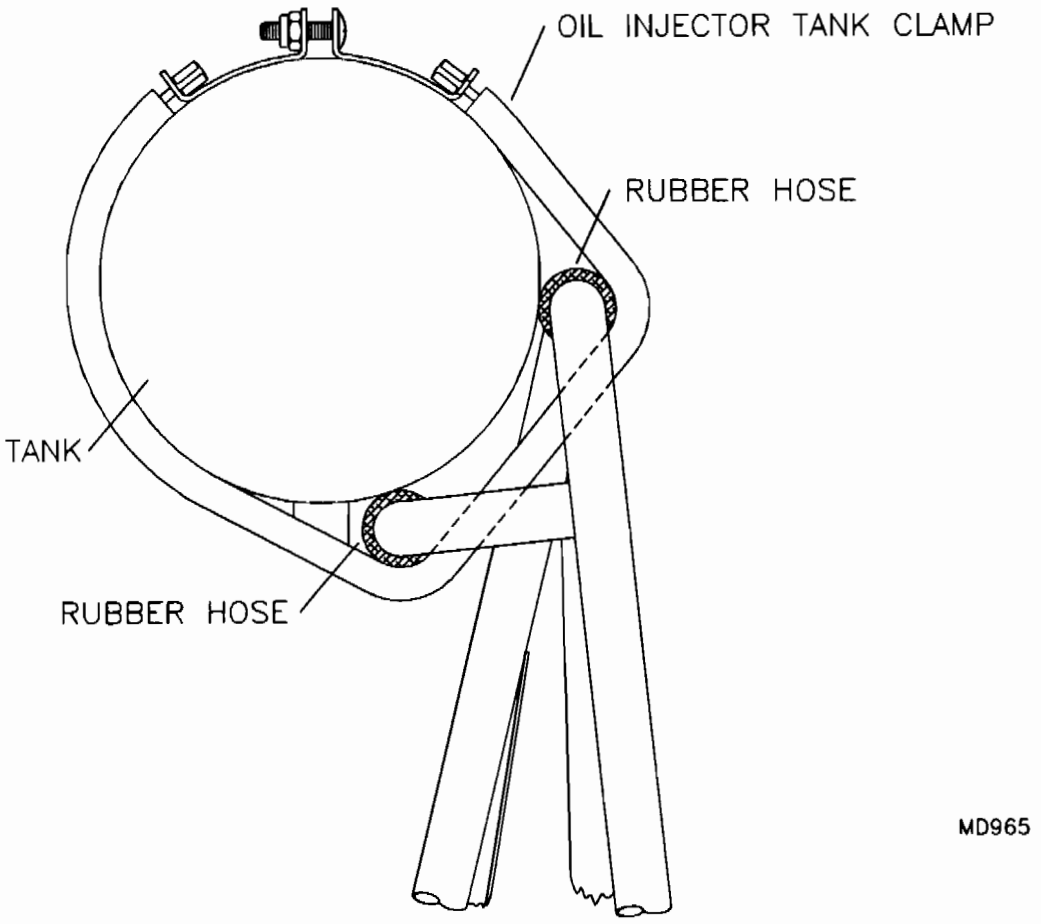
2. Cut the rubber hose provided into four 1" segments. Slip these into each of the mounting holes. Place the mount in position on the engine. Apply loctite to the 8mm bolts. Slip a washer over the bolts and insert them into the mount and engine holes. Tighten the 8mm bolts to 10 to 15 ft. lbs.

3. Apply a drop of blue loctite to the oil tank fittings and install as per the parts drawing.

4. Cut the black rubber hose in half to form two 6" lengths. Split the hoses length wise and place over the mount where the tank will contact.

5. Place clamp as shown in **Figure 010-05**.

FIGURE 010-05



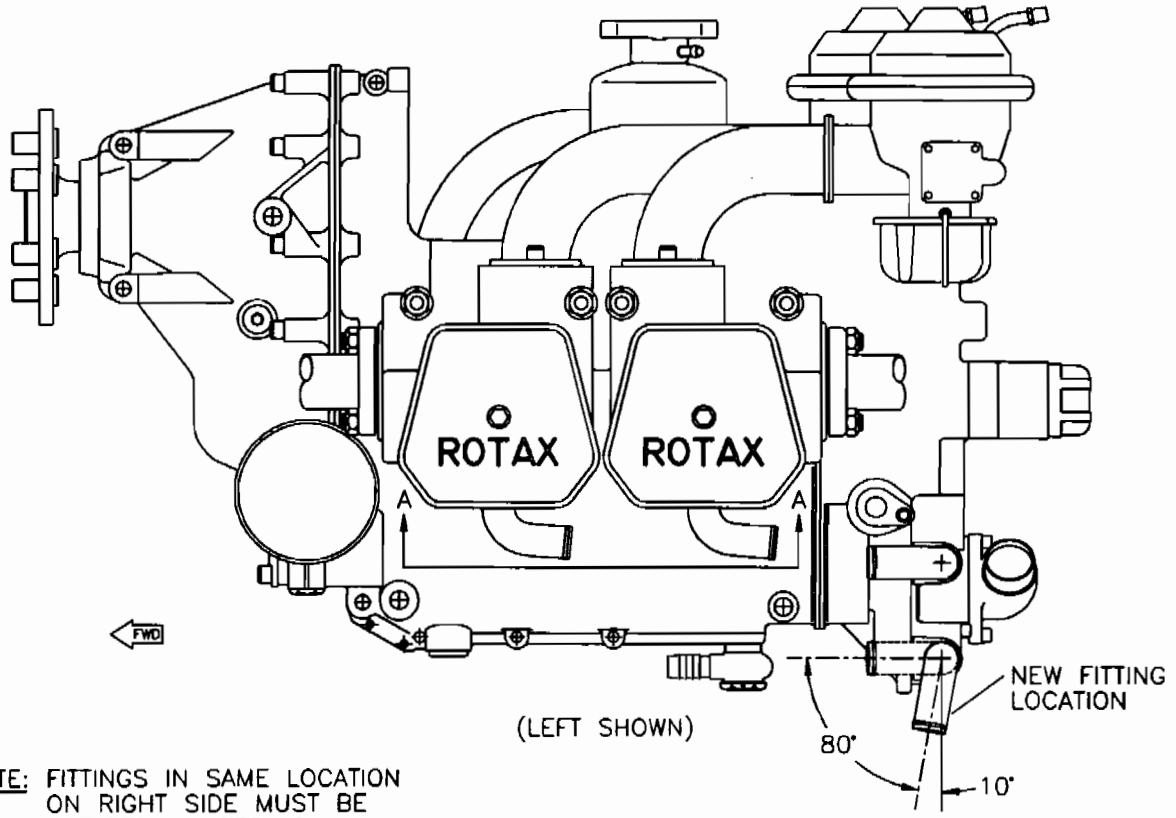
6. Install the oil filter between the bottom fitting of the oil tank and oil pump using 5/16" line. The top fitting on the tank is the vent.

7. Check all the lines and fittings for security before filling the tank. Be sure to check the oil level before each flight. Replenish the oil with each fill up. **IMPORTANT:** Always check the security and the oil level of the oil tank and mount before each flight.

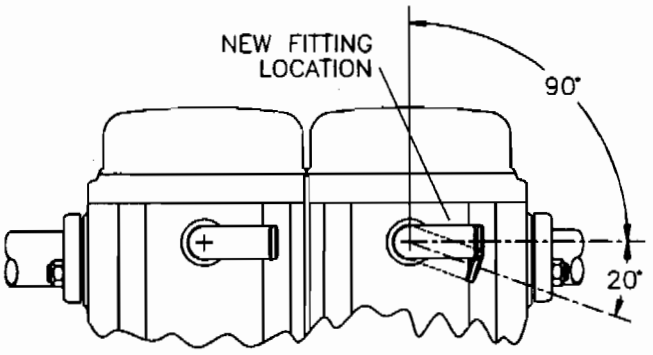
INSTALLATION OF 912 ACCESSORIES

1. The water fittings must be angled to fit the specific S-10 installation. To turn the fittings, heat the head at the point where the fitting enters. Excessive heat is not required. Use a piece of tubing to turn the fitting. Once turned, clean the area where the fitting enters the head with acetone or something similar. Then J&B Weld the fitting in place. The same is also done with the water pump fittings. See **Figure 010-01**.

FIGURE 010-01



NOTE: FITTINGS IN SAME LOCATION ON RIGHT SIDE MUST BE ROTATED ACCORDINGLY.



MD1033

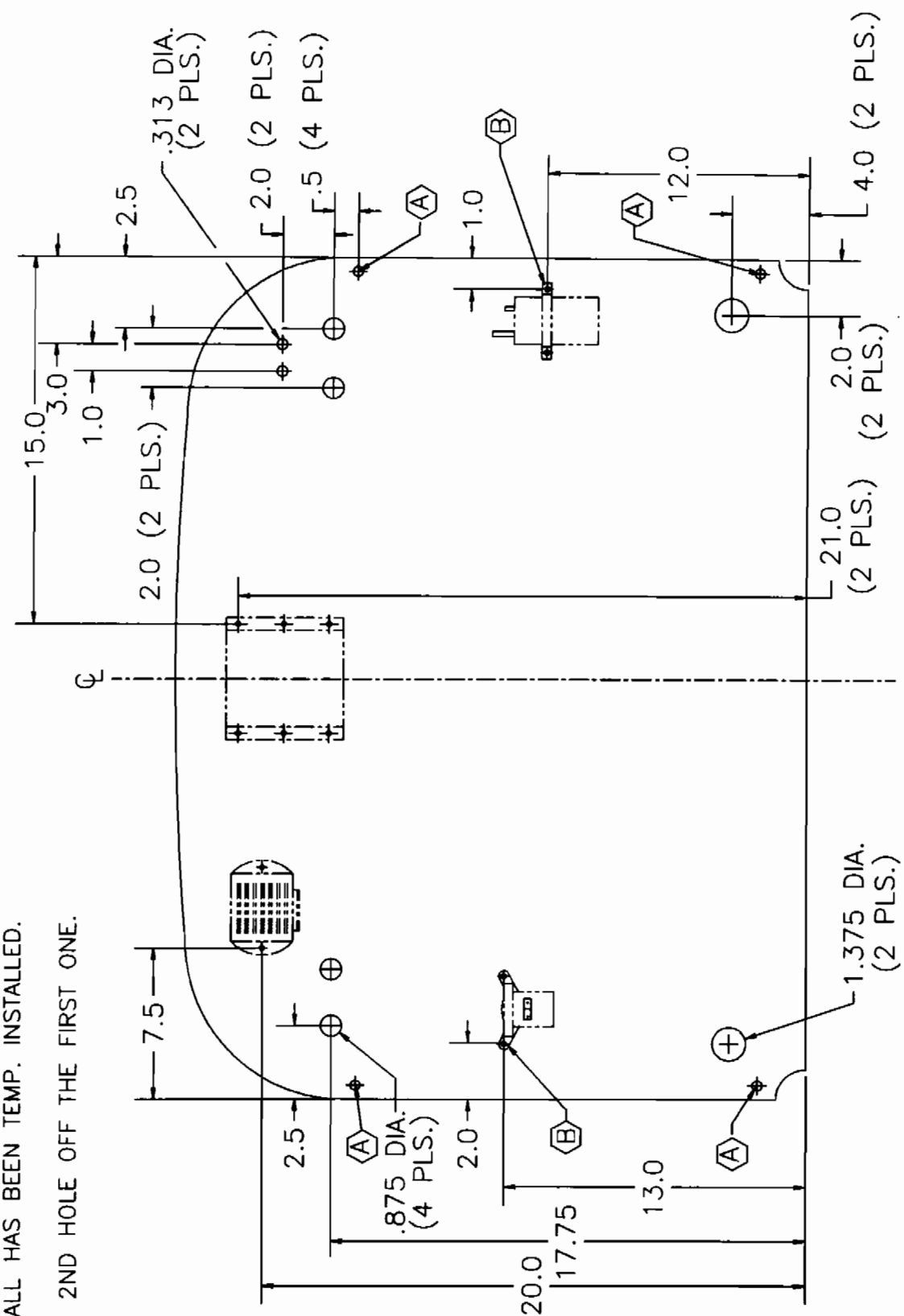
VIEW A–A
(BOTTOM LEFT SHOWN)

2. Gather the parts for installing the oil tank, coolant bottle, regulator, and solenoid.

3. For installation of the accessories, use measurements from **Figure 010-03.** The oil bottle has a metric drain plug in the bottom. Safety wire the plug using the hole drilled through a corner of the nut and attach the other end of the wire to a convenient location.

4. The coolant bottle is attached using 3/16 aluminum pop rivets. The coolant bottle and clamp are called out in the cooling system. The oil tank mount is attached using 1/8" SSPR'S. Back up the 1/8" stainless steel rivets with the 1/8" brass washers.

FIGURE 010-03



Ⓐ LOCATE ENGINE MOUNT HOLES AFTER FIRE WALL HAS BEEN TEMP. INSTALLED.

Ⓑ LOCATE 2ND HOLE OFF THE FIRST ONE.

5. The regulator mounts a short distance from the oil tank using 3/16" X ½" aluminum pop rivets with washers under the head. Install the solenoid on the right side.

6. For installation of the carburetor, throttle, and choke cable see 912 choke system, and 912 throttle/choke cable hookups To prepare the carbs for use on the S-10, complete the following steps.

7. Remove Bing choke cable housing guides. See 912 throttle/choke cable hook up drawing and parts list.

8. Bolt the throttle cable mount to carbs as shown in the parts illustration. Re-install the choke cable housing **NOTE:** The choke cable guide does not have a retaining nut, since the top of the carburetor is threaded.

9. Route the choke cable from the left carb up to the reduction drive. Use the holes in the top of the drive and tie wrap. The right carb choke guide should turn towards the left carb 45° to relieve any binding. These two cables fit into the ferrules on the left hand side of the firewall. The cables route through these two housings and to the mixer ring. The single cable from the instrument panel routes to the mixer ring attached to the cables in the firewall. Keep this cable as straight as possible.

S-10 SAKOTA 912 MUFFLER INSTALLATION

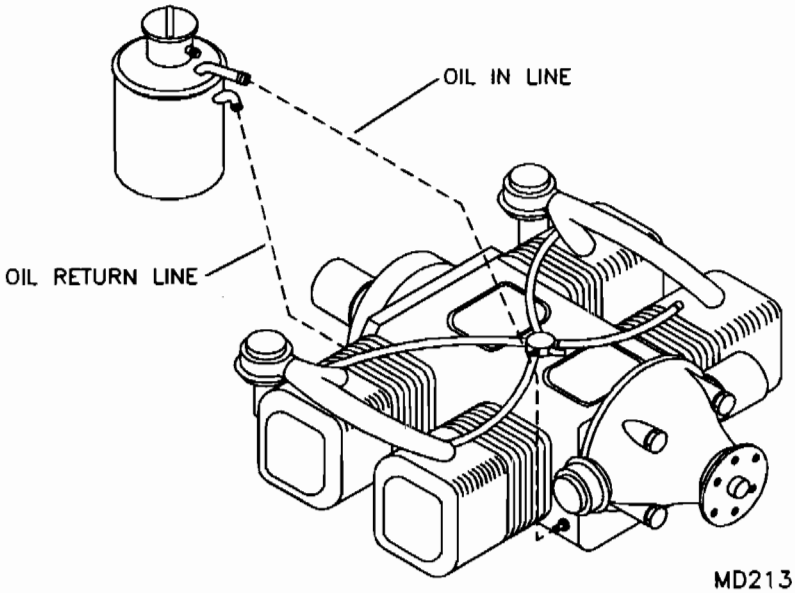
10. Select the parts depicted in the parts drawing. Remove the nuts from the engine and install as per the parts drawing. The nuts may be close to the weld and may in some cases even hit the weld. Carefully grind the minimum amount possible to give the clearance needed to tighten the retaining nuts for the exhaust manifolds. Place the muffler in the space between the mount and the aft of the engine. Bolt the rubber isolators to the bottom of the muffler. Run a bead of silicon lengthwise along the springs to dampen vibration. Refer to **Figure 010-06** in the 582 muffler section for an example of silicone application.

INSTALLATION OF OIL LINES

11. Locate the oil lines provided in the 912 engine shipping container. Cut and fit the oil lines to route from the top of the oil tank over the engine and down to the oil pump on the front of the engine (this line is oil feed). Fit the other line to route from the oil tank canister down to the oil pick up on the bottom of the engine. See **Figure 010-011.**

The oil temperature sender is on the gear box side near the bottom (it looks like a small disk on a stem). See instruments and electrical section for hook up to instruments.

FIGURE 010-011



MD213

582 PROPELLER INSTALLATION

1. Bolt on the propeller using the hardware shown on the 582 engine assembly drawing. **NOTE:** For optional spinner assembly and installation refer to spinner installation. Use 10 ft. lbs. for proper propeller torque. Make sure to install the tensile loc-nuts on the back side of the prop flange. See 582 engine assembly drawing.

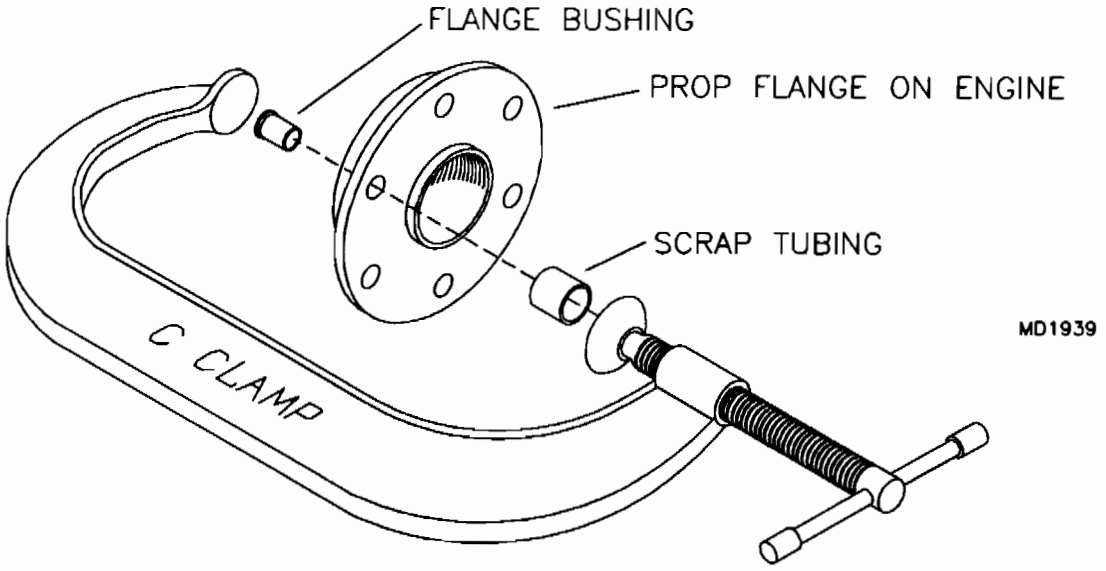
2. Check the propeller for balance by inserting a 1" tube through the prop center. Open a bench vise slightly wider than the prop. Position the prop horizontal with tube resting in the vise's jaws. If it is balanced it will remain level or any position it is set at. (Provided your vise is level across the prop and the jaws are smooth.) If the prop drops at tip balance by coating the light tip with a urethane spray varnish. **PLEASE NOTE:** According to the F.A.A. a propeller is still within acceptable balance if the difference is no more than the weight of a nickel. If you tape a nickel to the light end and the other tip still drops, the prop needs balancing.

3. Check prop tracking by placing a marker next to the back of the prop. **HINT:** A 5 gallon bucket works well as a marker. Let the marker touch the back of the prop. Make sure the plane is completely stationary with the wheels chocked and rotate the prop through **WITH THE IGNITION OFF!** If the prop is tracking correctly the other blade should touch the marker also. If tracking is off, loosen the bolts and try re-torquing the bolts until proper tracking is achieved.

912 PROPELLER INSTALLATION

1. Insert flange bushings into the prop flange of the engine. Insert the flange bushings from the aft side of the prop flange. Use a "C" clamp to completely seat the bushings into the flange. Use a small wood piece between the mouth of the clamp and the aluminum flange bushing to protect them from being damaged. **HINT:** A heavy layer of tape on the mouth of the clamp may be used instead of a wooden block. On the forward side of the prop flange use a piece of tubing approximately 1" long over the flange bushings to allow them to seat as the "C" clamp is tightened. See **Figure 014-01.**

FIGURE 010-01



2. For Tennessee propeller installation see the 912 Tennessee prop assembly drawing. If installing a Warp Drive propeller see the 912 Warp Drive prop assembly drawing. Place the prop (Prop hub - in the case of the Warp Drive) forward side down on a solid surface. Lubricate the bushings protruding from the prop extension assembly and the holes in the prop hub with a spray lubricant such as silicone or WD-40. Line up the prop extension with the prop hub and drive in place using a mallet. To ensure a proper fit, flip the prop over and remove the prop extension using a driving mandrel through the center hole. Repeat this process 2 to 3 times to achieve the intended fit. Install the prop using the hardware shown on the corresponding drawing. **NOTE:** For spinner assembly and installation refer to spinner installation. Use 10 ft. lbs. for proper propeller torque. Make sure to install the tensile loc-nuts on the back side of the prop flange.

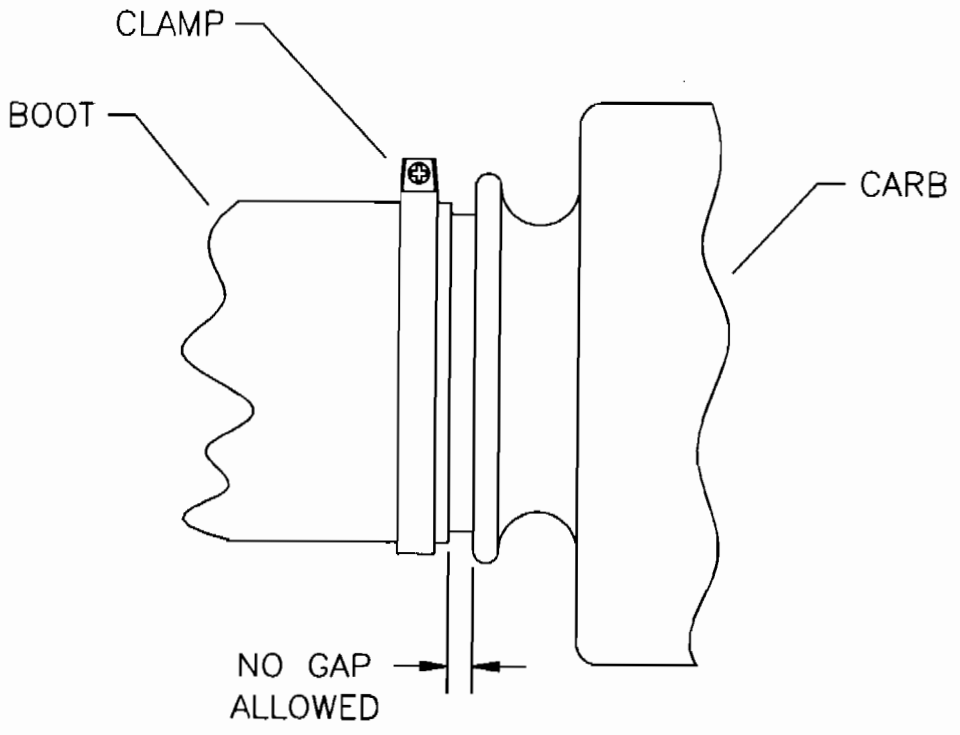
3. Check the propeller for balance by inserting a 1" tube through the prop center. Open a bench vise slightly wider than the prop. Position the prop horizontal with tube resting in the vise's jaws. If it is balanced it will remain level or any position it is set at. (Provided your vise is level across the prop and the jaws are smooth.) If the prop drops at tip balance by coating the light tip with a urethane spray varnish. **PLEASE NOTE:** According to the F.A.A. a propeller is still within acceptable balance if the difference is no more than the weight of a nickel. If you tape a nickel to the light end and the other tip still drops, the prop needs balancing.

4. Check prop tracking by placing a marker next to the back of the prop. **HINT:** A 5 gallon bucket works well as a marker. Let the marker touch the back of the prop. Make sure the plane is completely stationary with the wheels chocked and rotate the prop through **WITH THE IGNITION OFF!** If the prop is tracking correctly the other blade should touch the marker also. If tracking is off, loosen the bolts and try re-torquing the bolts until proper tracking is achieved.

912 ENGINE NOTES

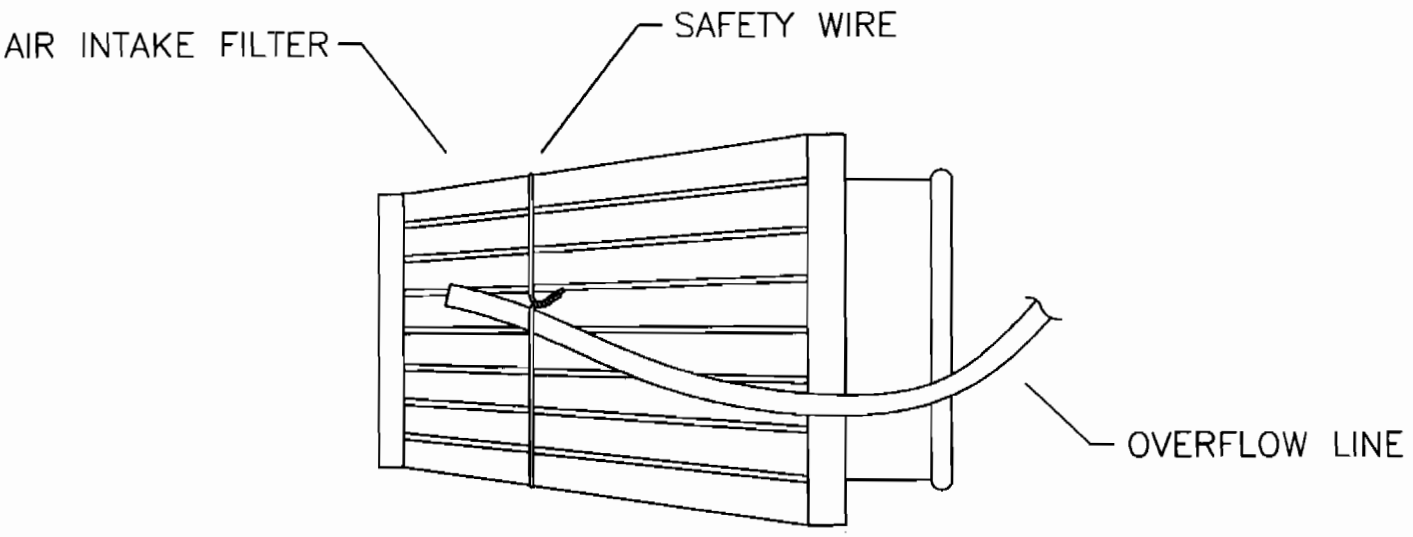
1. Even with the carb clamps tightened, the intake manifold boot may allow the carburetors to slip off of the rubber boots if the carbs are not completely seated. Both carbs **MUST** be fully on the boot to assure a secure fit to the manifold. See **Figure 010-01**.

FIGURE 010-01



2. Safety the overflow line to the air intake filter. This will keep the carbs balanced and eliminate any possibility of fuel overflow on the exhaust manifold. See **Figure 010-02.**

FIGURE 010-02



MD223

COOLANT SYSTEM GENERAL NOTES

A. Before installing the cooling system on a **582** engine remove the head outlet fitting and pump housing from the engine. File and sand the casting ridges smooth and re-install. See **FIGURE 010A-A.**

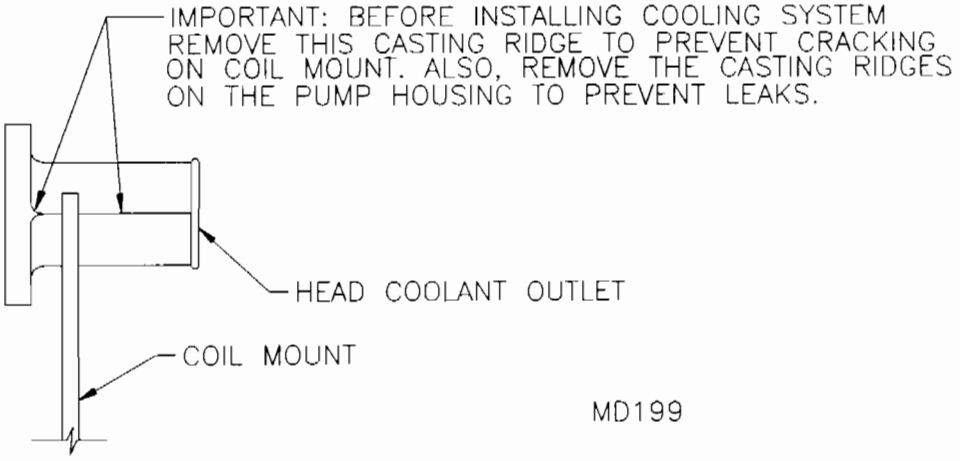


FIGURE 010A-A

B. Make sure all hose clamps and fittings are tight prior to adding coolant. Cut a short length of radiator hose and split it lengthwise. Use this as chaffing material through the firewall and secure with zip ties.

C. Add a 50-50 mixture of "For Aluminum Engines" anti-freeze and water. Fill through filler tank opening.

D. Remove the set screw on top of the engine to fill system to engine level. **HINT:** A piece of fuel line will "screw" right into this hole and allow a no mess overfill. Reinstall set screw. **NOTE: 582 engine only.**

E. With the filler neck or reservoir open, depending upon engine, continue filling the system until coolant runs out at the highest point of this fitting. Re-tighten and install the radiator cap. Raise and lower the nose to burp the engine and add coolant until the system is full.

F. The recovery bottle does not need any fluid. If your system ever gets warm enough some fluid may overflow into the recovery vessel.

G. Add more coolant after engine break-in. Re-tighten all the clamps and fittings.

H. Replace the coolant annually and inspect the system for wear. Replace hoses every 2 years.

I. Route hoses as shown in the photo below.

PHOTO 1

J. In photo 2 details of the filler tee and overflow bottle are apparent. Later model overflow bottles (coolant recovery) are aluminum with two strip clamps to attach them to the firewall. The recovery bottle rivets to the firewall with (4) 3/16" aluminum pop rivets. Use a double wrap of safety wire to clamp the overflow hose to recovery bottle and filler tee. **PLEASE NOTE:** The muffler is the earlier cut and re-welded unit. Current S-10's have the engine 3/8" more forward making cutting and welding the muffler un-needed.

PHOTO 2

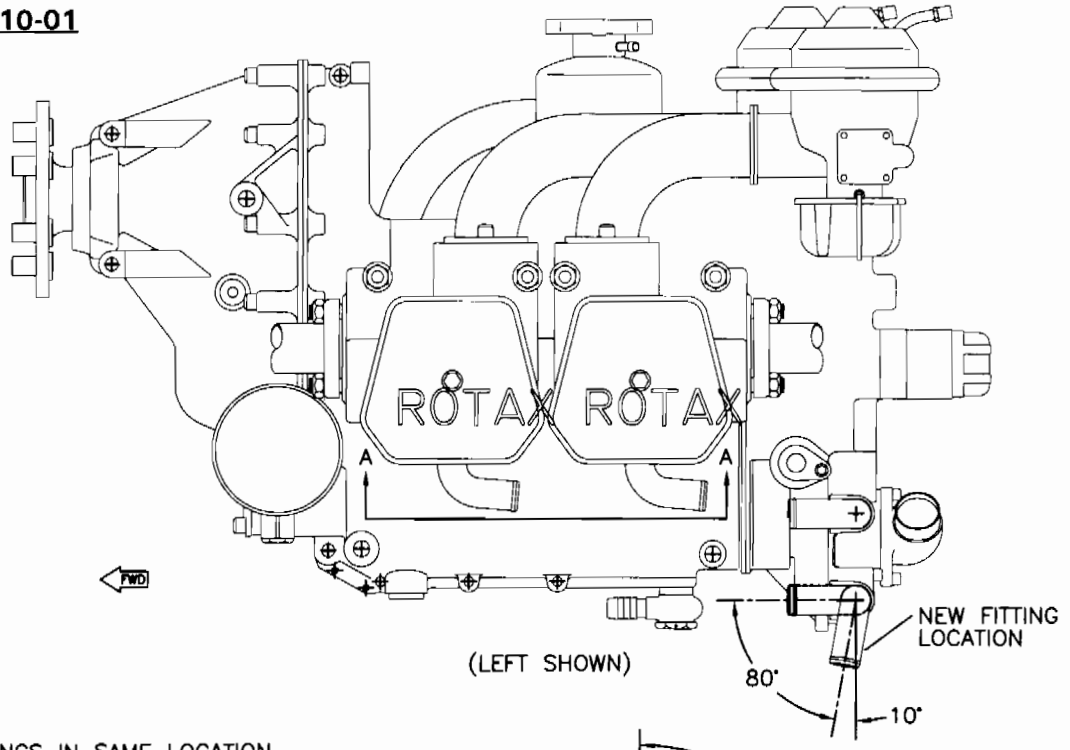
S-10 912 ENGINE MOUNT ASSEMBLY & INSTALLATION

NOTE: Please exercise logic and common sense while installing your engine. Keep in mind that many of the engine components will easily reach three hundred degrees plus, Fahrenheit. Exhaust components can reach six hundred plus degrees Fahrenheit. Avoid routing or securing any objects near these high heat areas, i.e. fuel lines, coolant hoses, oil lines, wiring, etc... Avoid installing any flammable materials or objects. We strongly suggest installing fire sleeve on ALL lines and hoses. Fire sleeveing can be purchased from almost any aircraft supply house. Electrical wiring should be isolated from fuel sources. Check all wiring, lines and hoses for wear or chaffe areas. Apply anti chaffe and secure accordingly.

1. Bolt the engine mount to the fuselage as shown in the parts drawing. During final assembly it is important that the engine mount bolts are tight. **NOTE:** It may be necessary to have to place washers between the left hand engine mount legs and the fuselage to obtain the correct engine offset. This will be determined after the engine has been installed.

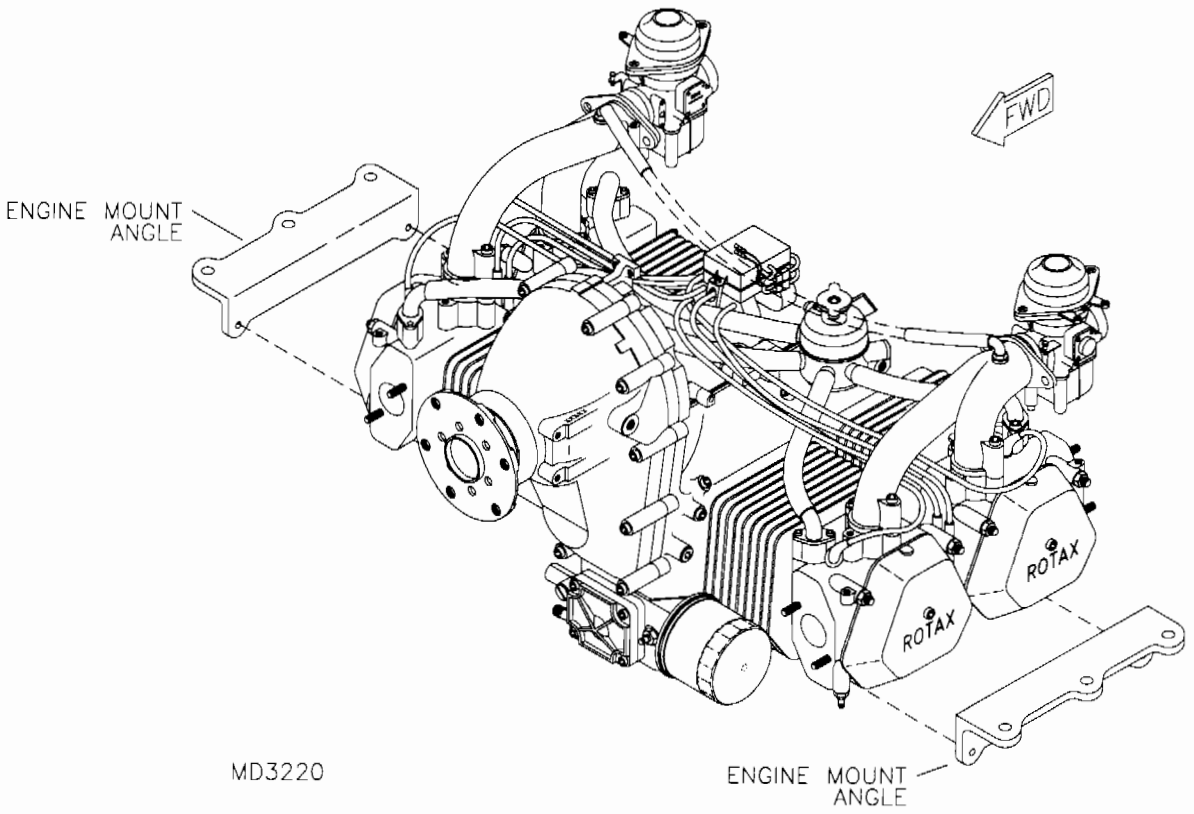
2. The coolant hose fittings on the bottom of the cylinder heads must be repositioned to fit the S-10 installation. Remove the coolant hoses from the fittings. To turn the fittings, heat the head at the point where the fitting enters. Excessive heat is not required. Use a piece of tubing to turn the fitting. When turned, clean the area where the fitting enters the head with acetone or something similar. Then J&B Weld the fitting in place. The same is also done with the water pump fittings. See **FIGURE 010-01**.

FIGURE 010-01



3. Apply loctite to the bolts and attach the engine mount angles to the engine. See **FIGURE 010-03**. Note the orientation of the mount angles. Check bolts for tightness after the first several hours of operation.

FIGURE 010-03



4. With the mount angles attached to the engine, insert the barry mounts and aluminum bushings into the angles as shown in the parts drawing. **HINT:** Use a small amount of soapy water on the barry mounts to aid in inserting them into the angles. Place the aluminum washers on top of the barry mounts and slide the mount bolts through the washers and barry mounts. Note that the forward bolt on each side is shorter. Place the lower aluminum washers over each hole on the bed of the engine mount. With the help of a friend install the engine to the mount. Check for proper installation of the bolts, aluminum washers and aluminum bushings. Refer to the parts drawing. Install the high heat tensile nuts and tighten until the aluminum washers have bottomed against the aluminum bushings. Check bolts for tightness after the first several hours of operation.

5. Clamp a straight edge to the prop flange and level horizontally. Measure from the center of the prop flange out both directions 18" and mark. Measure from the aft side of the straight edge at the mark to the lift strut attach bracket on the fuselage. The left hand side should measure 1/4" greater than the right. Place washers between the engine mount and the fuselage as necessary to achieve this. **IMPORTANT:** The firewall/engine mount bolts must have three threads or more showing past the nuts after tightening

S-10 912 ENGINE

1. Rotax supplies an operators manual, a parts manual and an installation manual with the 912 engine. Refer to these manuals for specific questions, problems and data on the 912 engine. Rotax also supplies a number of the accessories with the 912 engine. Refer to the following list and inventory these parts. Notify the factory or dealer about missing parts.

ROTAX 912 ENGINE ACCESSORIES

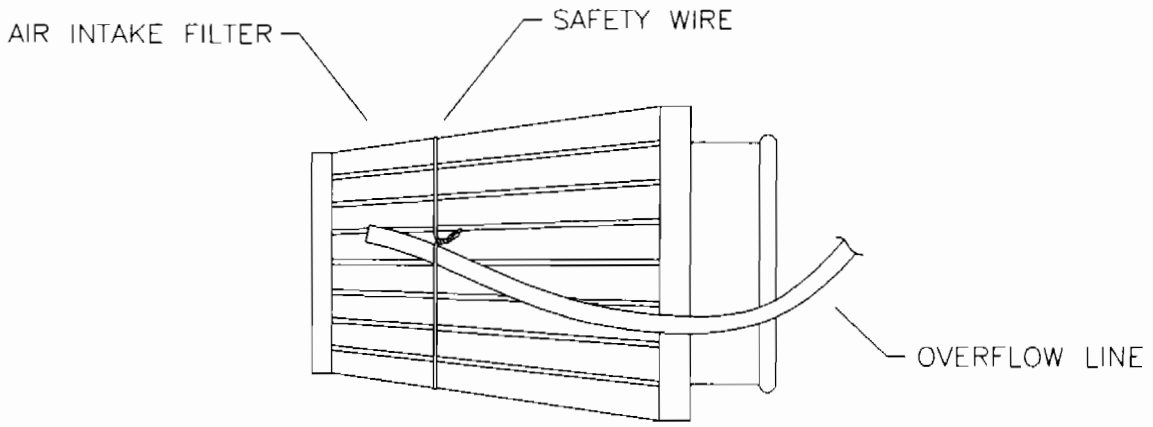
(supplied with the Rotax engine)

(1) OIL BOTTLE
(2) OIL BOTTLE FITTINGS
(1) OIL LINE
(1) STARTER SOLENOID
(1) REGULATOR/RECTIFIER
(1) REGULATOR/RECTIFIER WIRE HARNESS CLIP
(2) MAG WIRE BULLET CONNECTORS & RUBBER BOOTS
(2) TACH WIRE SPADE CONNECTORS
(1) TACH WIRE PLASTIC PLUG
(1) STARTER SOLENOID SPADE CONNECTOR & PLASTIC PROTECTOR
(1) PROP CRUSH PLATE
(1) TOOL KIT
SEVERAL FEMALE SPADE CONNECTORS & HOSE CLAMPS

2. Install the air filters onto the carburetors as shown in the parts drawing. Orientate so that the safety wire tabs on the filters are pointing up. Tighten the hose clamps and safety wire the filters to the carburetors. A small hole is drilled on the aft side of the carburetors to accept the safety wire.

3. Safety wire the carburator overflow line to the top side of the air filter. This will keep the carbs balanced and eliminate the possibility of fuel overflow on the exhaust maifold. Do not alter the length of the overflow tube. Refer to **FIGURE 010A-03**.

FIGURE 010A-03



S-10 912 FUEL SYSTEM - HEADER TANK FORWARD

1. Install the fuel filter just forward of the firewall. Stand offs made from short segments of fuel line and zip ties work well for attaching the fuel filter to the upper left hand engine mount leg. See **FIGURE 010B-01**. Cut to length and install the segment of fuel line from the header tank to the filter and from the filter to the **INLET** port on the fuel pump. See **FIGURE 010B-01A**. Note that the fuel line and the hose clamps used from the header tank forward are different then those used in the rest of the system. **NOTE:** The installation of fire sleeve is recommended.

FIGURE 010B-01

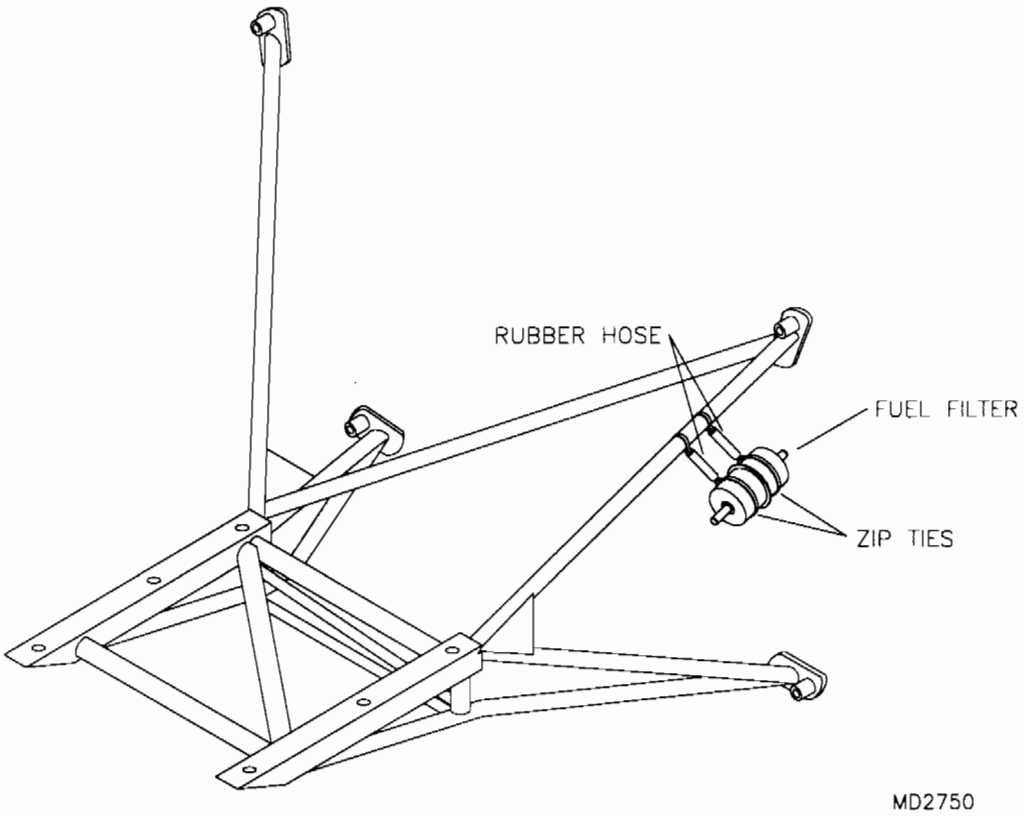
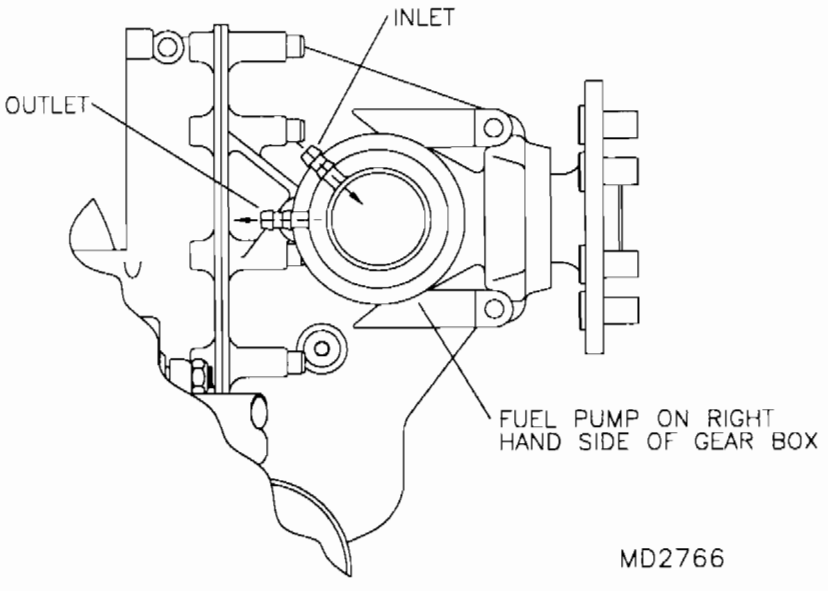


FIGURE 010B-01A



2. Apply loctite or thread sealant to the threads of the fittings and install the fittings into the brass tee as shown in the parts drawing. Position the tee assembly on top of the engine between the carburetors. Stand offs work well for securing the tee. **CAUTION:** Position the tee and fuel lines with a sufficient space between them and the engine to guard against heat and prevent vapor lock. Cut to length and install the fuel lines and hose clamps from the fuel pump to the tee and from the tee to each carburetor. Rotate the carburetor banjo fittings for best fuel line routing. Secure all fuel lines and apply anti chafe where necessary.

S-10 912 THROTTLE HOOKUP - CARBURETOR SIDE

1. Remove the choke cable guides and brass throttle cable housing retainer plates from the top side of each carburetor. Note that there is a left and right throttle cable mount supplied with the kit. Install the respective throttle cable mounts to each carburetor. See **FIGURE 010C-01**. **IMPORTANT:** Install the washers between the throttle cable mounts and the carburetors. Remove the throttle cable housing adjuster ferrules from the brass mounts and install them into the cable mounts on the carburetors. Set the adjuster ferrules at midpoint to allow for equal adjustment both directions. Remove the jam nuts from the choke cable guides, apply loctite to the threads of the guides and install onto the carburetors. Reverse the throttle lever springs position as shown in **FIGURE 010C-01A.**

FIGURE 010C-01

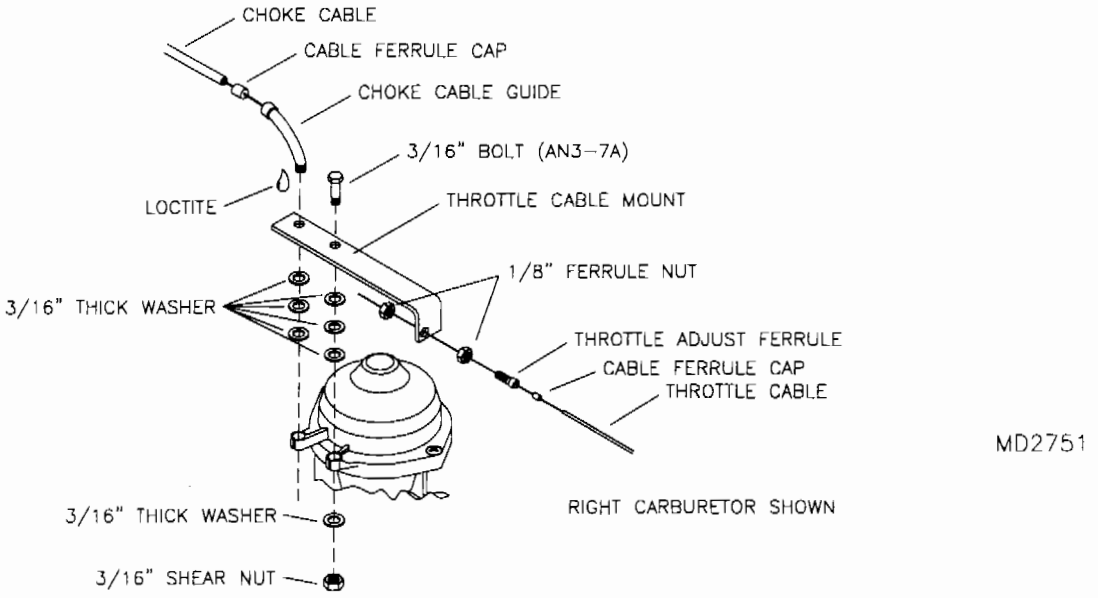
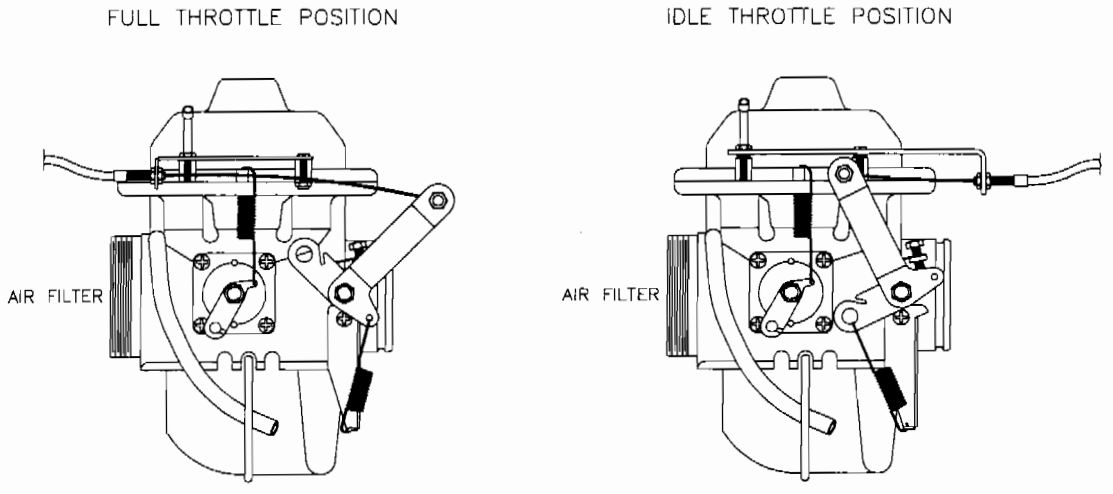


FIGURE 010C-01A



FACTORY SPRING AND CABLE SETTING
(RIGHT HAND CARBURETOR SHOWN)

RRDS SPRING AND CABLE SETTING
(RIGHT HAND CARBURETOR SHOWN)

2. Refer to the firewall section for the exit location of the throttle cables through the firewall. Install the grommets into the firewall. Cut the throttle cable housing to length and slide the cable housing through the grommets. Use a file or grinder to dress (clean up) each end of the housing. Any rough edges or burrs on the housings may result in excessive cable wear and eventual failure. Route the housings to each carburetor. Use wide flowing arcs when routing cable housing to prevent binding of the cable in the housing. Install the cable ferrule caps onto the ends of the housings and insert them into the adjuster ferrules on the carburetors. Refer to the parts drawing.

Cut the larger of the two swagged ends off of the throttle cables. Loosen the cable retaining screws in the carburetor throttle arms. Refer to Rotax installation and parts manuals. Slide the cut ends of the cables through the retaining screws and through the throttle cable housings. Refer to the throttle lever installation for attachment to the throttle lever. Pull the excess length through the housings and throttle lever until the swagged cable ends bottom against the retaining screws in the carburetor throttle levers and tighten the retaining screws. With the fuselage throttle lever in idle position and the carburetor levers in idle position, synchronize both cables. Apply loctite to the wire stop screws and tighten. Safety wire the throttle cable housings to the adjuster ferrules. Apply anti chafe appropriately and secure the housings.

S-10 912 CHOKE SYSTEM

1. Locate and drill the choke exit holes in the firewall. Refer to the firewall section for hole locations. Install the plastic washers and adjustable ferrules into the firewall as shown in the parts drawing. Note that the firewall soundproofing needs to be installed before final installation of the adjustable ferrules. Set the firewall ferrules and the ferrules in the carburetor choke cable guides at there midpoint position. Cut to length and route the choke cable housing as shown in the parts drawing. Use a file or grinder to dress (clean up) each end of the housing. Any rough edges or burrs on the housings may result in excessive cable wear and eventual failure.

Operate the carburetor choke levers to verify free movement. It is important that the chokes operate smoothly and completely return to their run position. If any drag is noticed or if the choke levers do not return completely, remove the choke lever and arm and apply a light film of grease to the arm. Consult the Rotax parts manual for a break down of the choke system.

Cut the "T" shaped swagged end off of each choke cable. **CAUTION:** The barrel end must remain in place. See **FIGURE 010D-01**. Install the barreled end of the cables into the levers. It may be necessary to lightly file the perimeter of the barrels. The barrels should rotate freely within the levers. See **FIGURE 010D-01A**. Feed the cable up through the choke cable guide and cable housing. Pull all slack out of the cable where it exits the aft side of the firewall.

FIGURE 010D-01

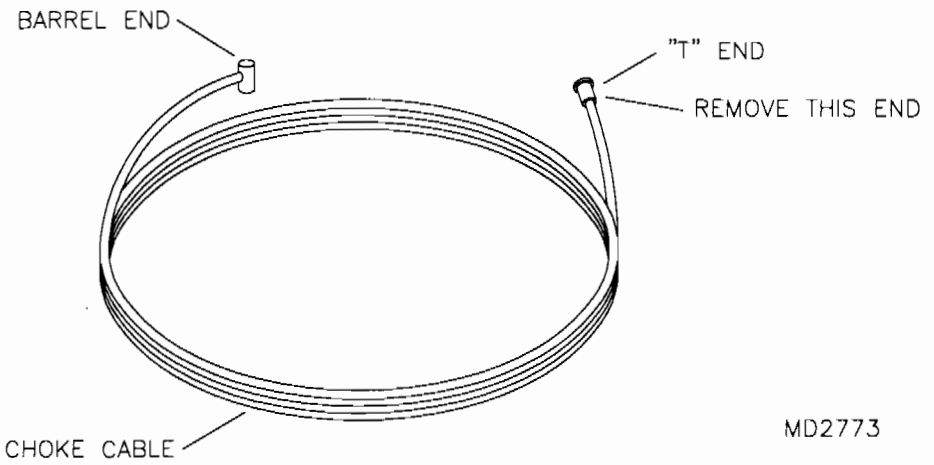
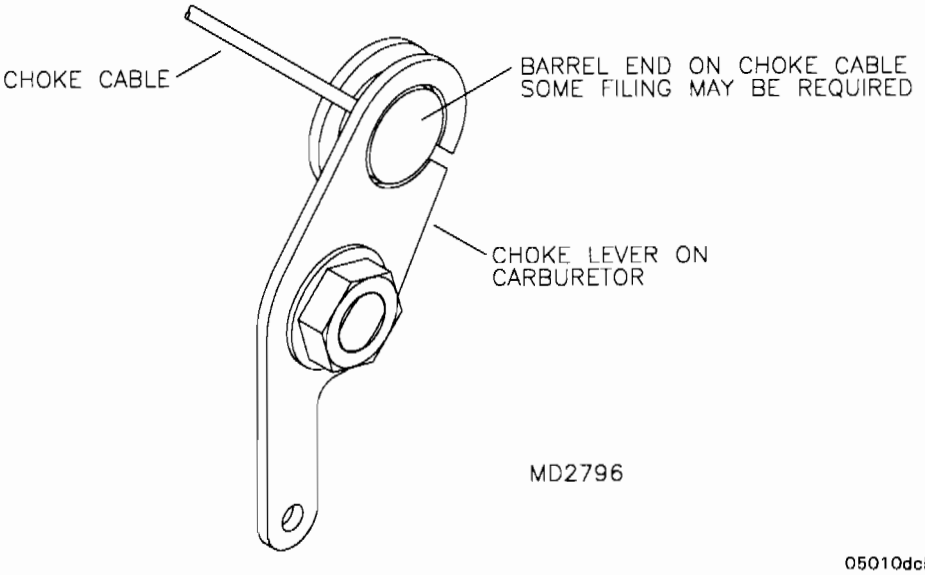


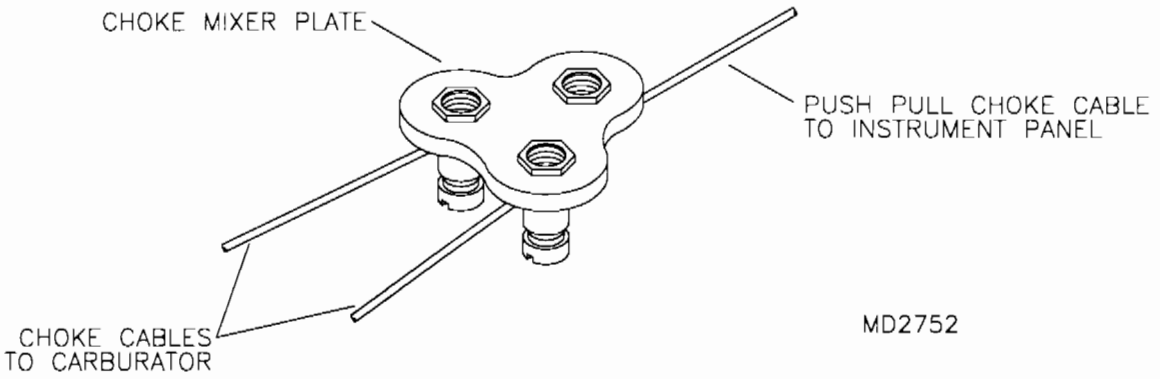
FIGURE 010D-01A



POST INSTRUMENT PANEL INSTALLATION

2. Refer to the instrument panel installation section for instructions on installing the instrument panel. Install the control cable into the instrument panel. The location of the control cable is left to the builders preference. The choke mixer plate should be located approximately 1 ½" aft of the firewall. Cut the choke cables from the carburetors to length and attach them to the mixer plate using the wire swivel stops. Leave plenty of cable length for adjustment. Remove the inner cable from the control cable housing and cut the housing to length. The housing should be cut short enough to allow for full travel of the mixer plate. Install the push pull cable and cut to length. Leave plenty of length for adjustment. Attach the control cable to the mixer plate. With the control cable knob pushed completely in, adjust all slack out of the cables at the mixer plate. Loctite the set screws in the wire swivel stops. See **FIGURE 010D-02**. Safety wire the cable housings into the adjustable ferrules. Secure all cable housings and install anti chafe where necessary.

FIGURE 010D-02



S-10 912 OIL SYSTEM INSTALLATION

NOTE: We strongly recommend using fire sleeve on all oil lines, including the overflow line. Fire sleeve is a builder supplied part.

1. Remove the top from the bottle and inspect the interior for any debris or foreign material. Verify the tightness of the oil drain plug and safety wire. Using the hose clamps provided, clamp the oil bottle to the mount bracket as shown in the parts drawing. Tighten the clamps to form the mount bracket around the oil bottle. This will spread the mount legs out, allowing for attachment to the firewall. Refer to the firewall section for the location of the oil bottle mount and clamp the oil bottle/mount assembly onto the firewall. Use the pre-drilled holes in the mount legs as guides to transfer drill into the firewall. Rivet the bracket to the firewall with the appropriate rivets and backing washers. Refer to the parts drawing.

2. **IMPORTANT:** The pickup fitting is the straight fitting on the oil bottle and **MUST** route to the oil pump just below the gear box. The return fitting is the angled fitting on the oil bottle and **MUST** route to the fitting on the bottom of the engine. Failure to route the oil lines properly will result in engine failure. Install the 90 degree fittings onto the oil bottle. Use a back up wrench on the bottle when tightening the fittings.

Refer to the parts manual for oil line routing. Note that there are two types of oil line used. It is important to use the correct line in the correct location to prevent oil pump drive pin damage. Cut the oil line to the length required and install with hose clamps. Avoid routing oil line near high heat sources.

Apply anti chafe where necessary and secure all lines.

3. Fabricate the aluminum overflow tube as indicated on the parts page. Attach the overflow tube to the firewall with two conduit clamps. The location of the overflow tube is left to the builders discretion. Avoid routing the overflow line near high heat sources. Cut to length and install the segment of overflow line from the oil bottle filler neck to the aluminum overflow tube. Secure ends with safety wire or hose clamps.

PRE ENGINE START UP

4. Prior to starting the engine for the first time, install a new oil filter and fill the oil bottle to the full line on the dip stick. Refer to the Rotax manuals for oil specifications. Remove the top spark plugs on all four cylinders. Verify the mag switch positions to **OFF** (mags grounded). Turn the prop through several revolutions by hand. With the spark plugs out and from the pilots seat, turn the key switch to the start position and crank the engine for several seconds. Check for an oil pressure indication on the gauge. If after several seconds there is no sign of oil pressure, stop cranking the engine. Remove the oil pick up line at the oil bottle. Using a funnel prime the oil line to the pump. Attach the pick up line to the oil bottle and crank the engine. When an oil pressure indication is achieved, stop cranking. Install the spark plugs and start the engine. Watch the oil pressure gauge as the engine starts. At the moment the engine starts, allow 10 seconds for oil pressure to come up. If there is no pressure indication within 10 seconds shut the engine off and repeat the previous procedures. The engine will change sound (quieter) as the oil starts pumping. After running the engine for a few minutes, check the oil level and check for any leaks in the system.

S-10 912 COOLING SYSTEM ASSEMBLY & INSTALLATION

1. Rivet the radiator scoop side plates to the radiator scoop bottom and bolt the radiator into the scoop as per the parts drawing.

2. Clamp the radiator scoop to the tabs on the belly of the fuselage at station 4 and station 5. The forward edge of the radiator scoop mount flange should be flush with the forward side of the station 4 cross tube. See **FIGURE 010F-02**. Center and square the scoop with the fuselage. With a #11 drill bit, transfer drill through the mount tabs and into the flange on the radiator scoop. **NOTE:** It may be necessary to spread or compress the side walls of the radiator scoop to match the holes in the tabs in order to maintain a 1/4" flange E.D. See **FIGURE 010F-02A**.

FIGURE 010F-02

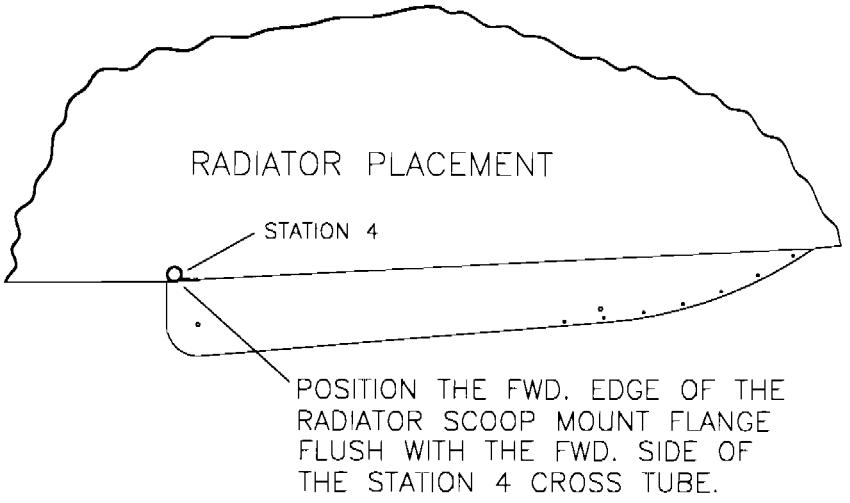
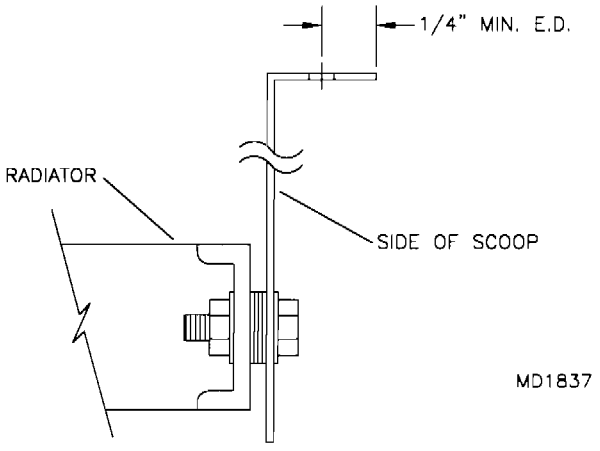


FIGURE 010F-02A



3. Remove the radiator scoop assembly and nut plate the mount tabs. Bolt the radiator and scoop to the fuselage and install the short segments of 1 1/4" radiator hose. Measure and record where the hoses will pass thru the skin for skin doubler patches. Refer to these measurements during covering.

4. **NOTE:** Prior to installing the coolant lines it is recommended to have the floorboard, rudder pedals, and firewall installed.

Install the reducer elbows into the short 1 1/4" radiator hose segments. Position the forward radiator line in each lower corner of the fuselage just aft of the firewall. Position the aft end of the forward line between the gear leg socket and the fuselage side frame. Determine the length of 1" radiator hose needed to route from the reducer elbows to the aft end of the forward line and cut to length. Refer to **FIGURE 010F-04** for a general guideline. Exact line routing is left to the builders discretion. Project a line forward from the forward coolant line and locate and cut the exit holes in each corner of the firewall. Note that during final assembly, serrated grommet strips will be bonded into the hole to prevent the firewall from cutting into the coolant hose. Allow for the grommet strip when figuring hole diameter. Also note that rubber coolant hose extends through the firewall, not the aluminum line. The coolant hose should fit tight inside the hole when the grommet strip is installed.

Remove the scoop assembly from the fuselage and the radiator from the scoop for painting. Drill the #30 hole for the drain closure to #11 and install the tinnerman and drain closure. See **FIGURE 010F-04A**. Remove all coolant lines and hoses from the fuselage for covering and painting.

FIGURE 010F-04

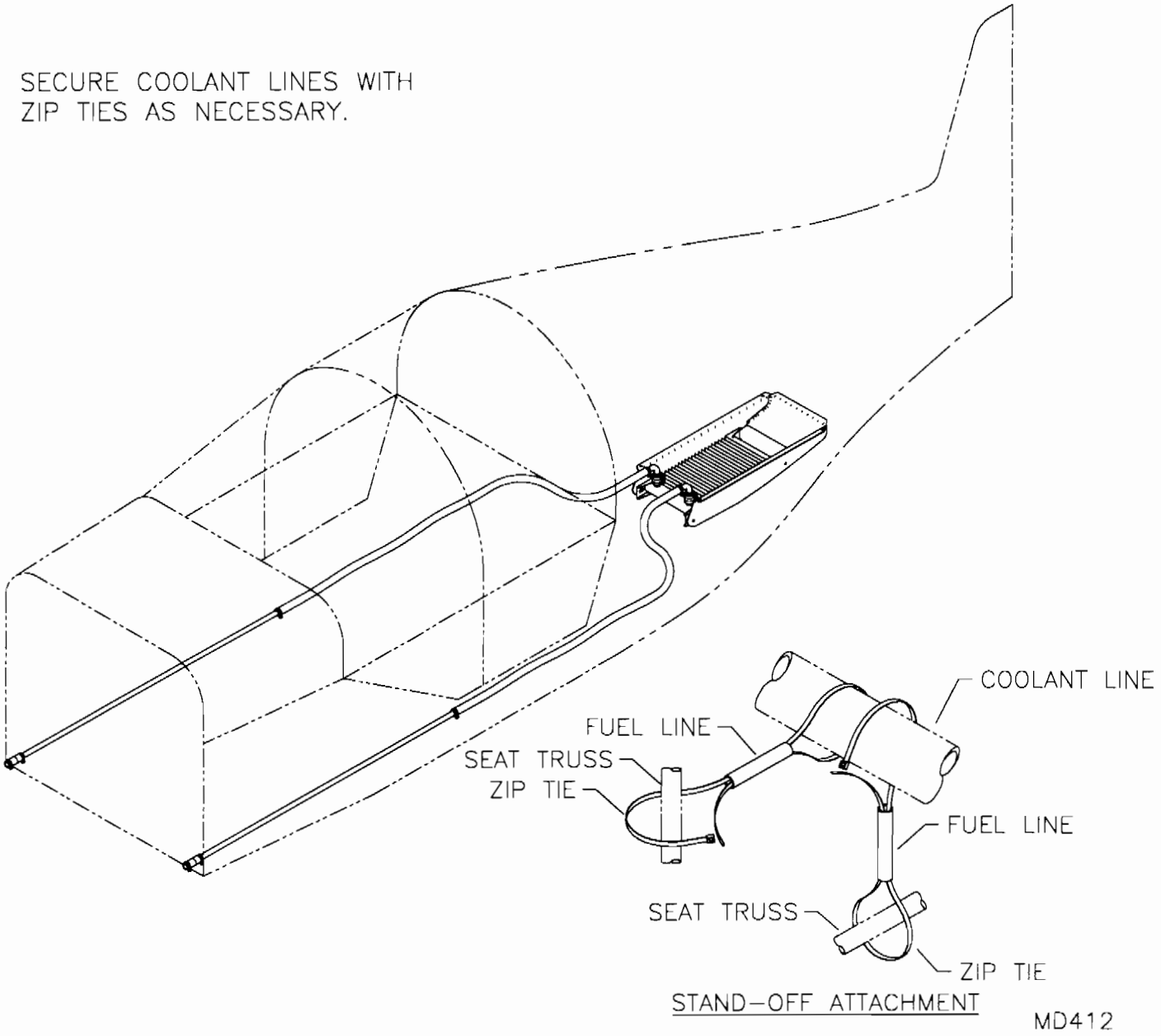
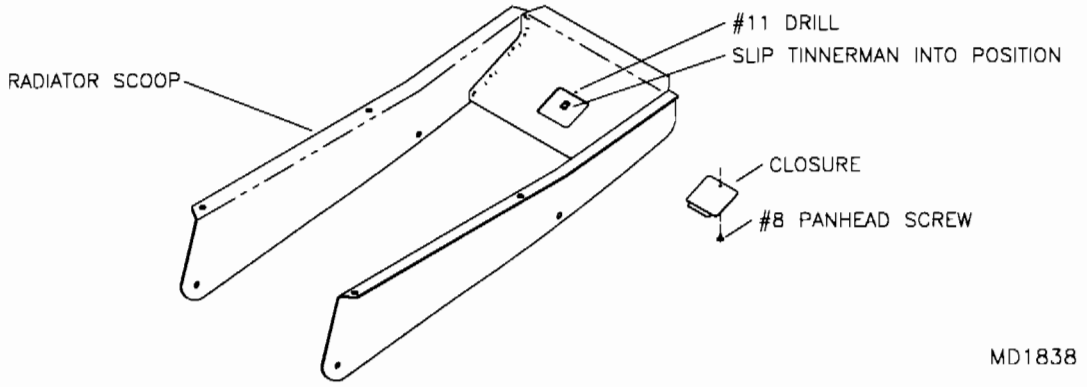


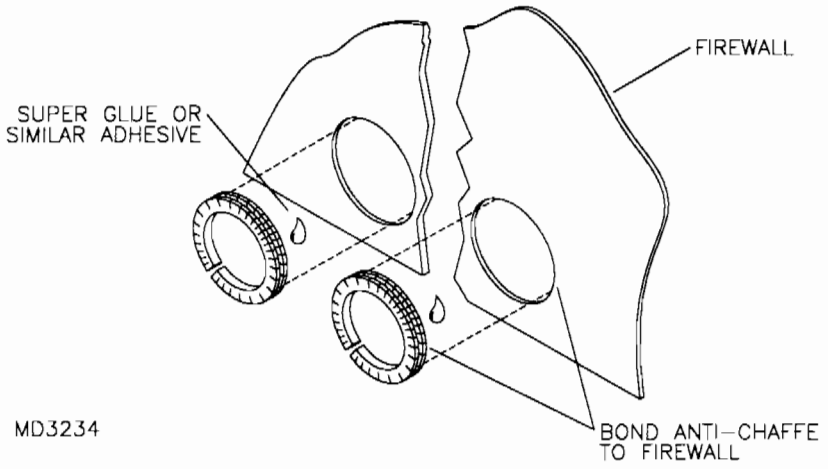
FIGURE 010F-04A



FINAL ASSEMBLY

5. Install the radiator into the painted scoop. Attach the foam tape to the top side of the scoop flange. Attach the scoop/radiator assembly to the fuselage. Locate and cut the holes in the skin for the inlet lines. Install the 1 1/4" radiator lines and hose clamps. Refer to the floorboard and firewall sections and install both the floorboard and firewall. Install the serrated grommet strip to the inside of the coolant line exit holes in the firewall. See **FIGURE 010F-05**. Install all of the previously cut coolant hoses, lines and clamps. Double check all hose clamps for tightness and secure all lines and hoses. Refer to **FIGURE 010F-04** one method of securing.

FIGURE 010F-05



6. Refer to the parts drawing and install all hoses and fittings from the right hand forward coolant line to the water pump. **NOTE:** The water pump fitting can be rotated for best positioning and coolant hose routing. Refer to the Rotax manual. Install all hoses and fittings from the filler cap/expansion chamber to the left hand aluminum coolant line. Refer to the parts drawing. Install the coolant temperature and pressure gauge. Refer to the parts drawing and to the instruments and electrical section. Apply anti chafe where necessary and secure all hoses.

7. Determine the placement location of the coolant recovery bottle and the aluminum overflow tube. Fabricate the overflow tube to the dimensions specified on the parts page and attach both the recovery bottle and tube to the firewall with the hardware called out in the parts drawing. **NOTE:** Cut a 45 degree angle on the lower end of the overflow tube and orientate so that the opening is pointing forward. Extend the overflow tube below the cowling by approximately 3/8". Install the appropriate overflow lines and hose clamps.

S-10 912 MUFFLER ASSEMBLY & INSTALLATION

NOTE: If you are installing the optional 912 muffler heater system, refer to the options section and install the heater wrap prior to installing the muffler system.

1. Cut two segments, each 1 3/8" long from the 1 1/4" O.D. rubber hose provided in the 912 muffler raw stock kit. Locate the center of each segment lengthwise and drill or punch a 1/4" hole through the top and bottom wall. Install the 6mm bolts and formed washers from the inside of each segment. Refer to the parts drawing and **FIGURE 010G-01**. Cut two segments, each 1 3/8" long from the 3/4" O.D. rubber hose. Insert the smaller diameter segments between the bolt heads in the isolator assembly until flush on each end. Safety wire the inner hose in place as shown in **FIGURE 010G-01A**. **NOTE:** In order to tighten the bolts, it may be necessary to wait with installing the inner segments and safety wire until after the isolators have been installed on both the muffler and engine mount.

FIGURE 010G-01

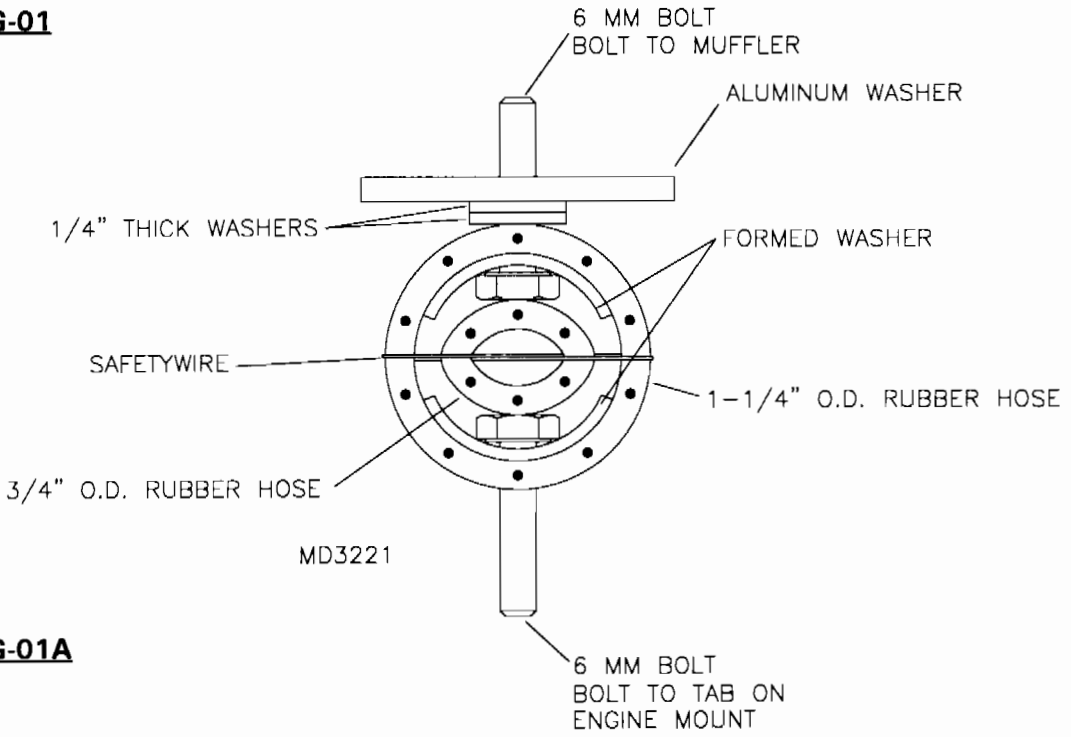
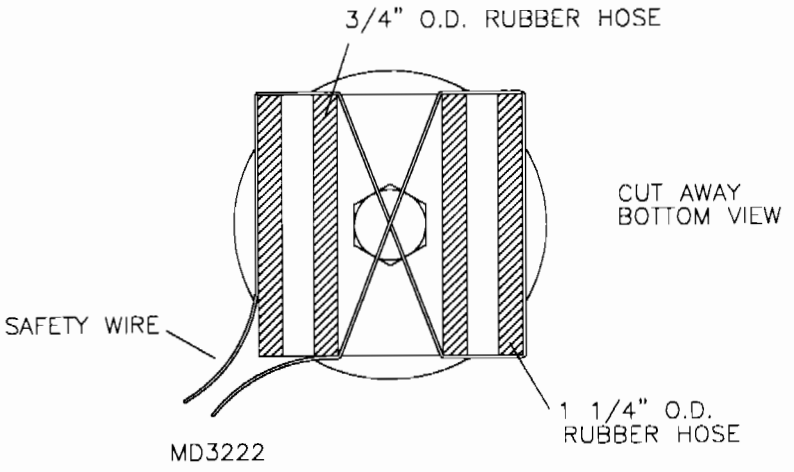


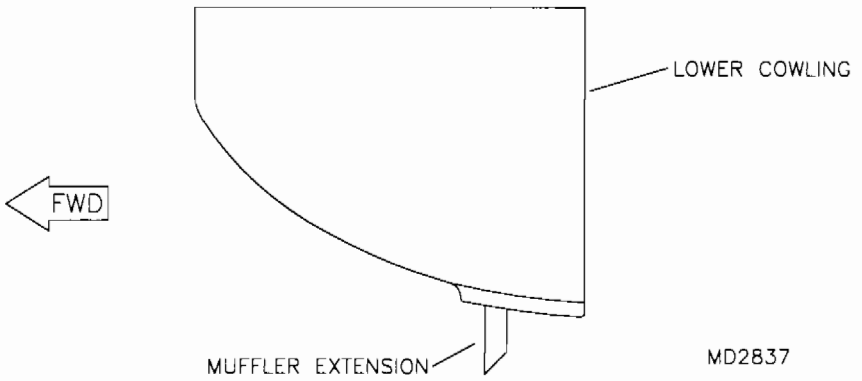
FIGURE 010G-01A



2. Apply loctite to the threads of the top bolt and attach the rubber isolators, aluminum washers and thick washers to the muffler as shown in the parts drawing. Install the muffler/isolator assembly to the two tabs on the lower legs of the engine mount. Attach the forward sections of the forward and aft manifolds to the engine. Finger tighten the nuts at this time to allow for adjustment of the manifolds. Slip the aft sections of the forward and aft manifolds into place and install all retaining springs. Leave the manifold nuts loose until the cowling has been installed and proper positioning has been verified.

3. Slide the muffler extension over the exhaust port on the muffler until bottomed. Position so that the opening is pointing aft. See **FIGURE 010G-03**. It will be necessary to locate and cut an exhaust hole in the bottom cowling for the muffler extension. Locate a #11 hole through the top flange of the muffler extension and through the flange on the muffler. Locate and drill a #30 hole in the hose clamp and install the stainless steel rivet. Install the hose clamp on the muffler extension with the pop rivet extending into the #11 hole in the extension and muffler and tighten.

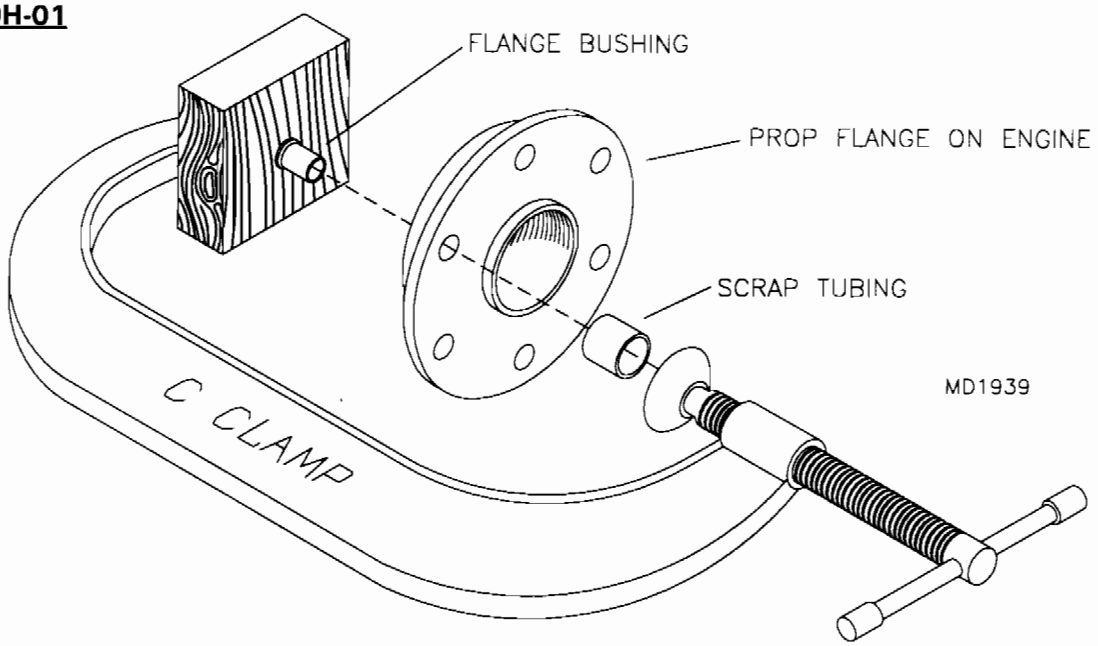
FIGURE 010G-03



S-10 912 TENNESSEE PROP INSTALLATION

1. Install the flange bushings into the prop flange on the engine from the aft side. Use a "C" clamp to completely seat the bushings into the flange. Place a small wood block between the pad of the clamp and the aluminum bushing to protect them from being damaged. Use a piece of tubing approximately 1" long over the flange bushings to allow them to seat as the "C" clamp is tightened. See **FIGURE 010H-01**.

FIGURE 010H-01



2. Check the propeller for balance by inserting a 1" tube through the prop center. Open a bench vise slightly wider than the thickness of the prop. Position the prop horizontal with tube resting on the vise's jaws. If the prop is in balance it will remain level or any position it is set at. If the prop drops a tip, balance by coating the light tip with a urethane spray varnish. **PLEASE NOTE:** According to the F.A.A. a propeller is still within acceptable balance if the difference is no more than the weight of a nickel. If you tape a nickel to the light end and the other tip still drops, the prop needs balancing.

3. Install the spinner backing plate on the prop flange. Using the crush plate supplied with the engine, install the prop with the appropriate hardware. Refer to the parts drawing. Using a criss cross tightening pattern, torque the prop bolts to 15ft pounds.

4. Check prop tracking by placing a marker next to the back of the prop. **HINT:** A 5 gallon bucket works well as a marker. Position the marker to touch the back of the prop. With the plane completely stationary, rotate the prop through **WITH THE IGNITION OFF!** If the prop is tracking correctly the opposite blade will touch the marker at the same location. If the prop does not track correctly, loosen the prop bolts and try re-torquing until proper tracking is achieved.

5. Bolt the spinner dome to the backing plate. Refer to the spinner section.

S-10/582 ENGINE MOUNT

1. Install engine mount to firewall with associated hardware, per parts drawing. **NOTE:** Establish initial engine offset by adding two 1/4" thick washers at both right side attach points, *between engine mount and firewall.* (Offset counters right-turning tendency caused by P-factor, torque and spiraling slipstream. Only flight testing will determine adequacy of offset and may reveal need to add or delete washers. ***Bolts at these locations must have minimum of three threads exposed beyond tensile nuts.***)

2. Deburr spacer bushings and mount plates. Smooth corners of mount plates with file or sandpaper. *Close inspection of mount plates reveals that inner holes are offset; plates must be installed with inner holes forward.* Install mount plates and associated hardware to engine mount, per parts drawing.

3. Install engine to mount. Three thick washers must be installed between engine and mount plates. Refer to parts drawing.

S-10/582 CARBURETOR AND EXHAUST SYSTEMS

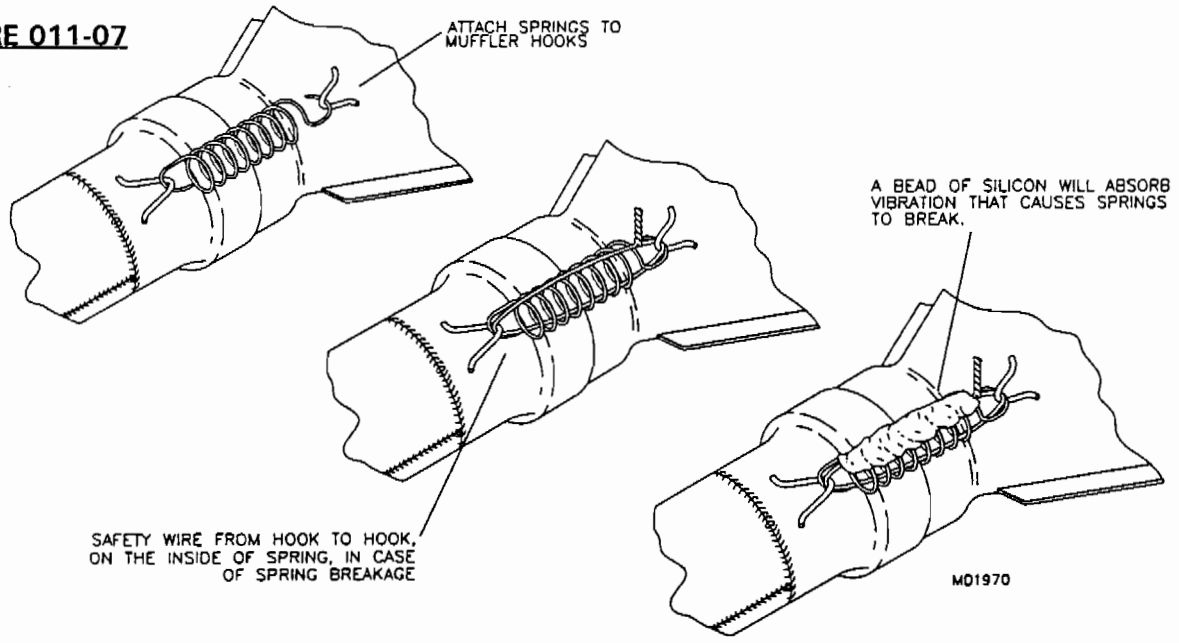
4. Remove choke levers from carburetors; *leave plunger assembly intact.* Install carburetors to engine; secure ninety degrees to crankcase split line.

5. Route primer lines to primer nipples on carburetors, pump and tees, as required. Keep fuel lines away from heat sources, such as muffler. Safety all connections to prevent leaks.

6. Bolt fuel pump to welded tabs of engine mount. Route fuel lines close to engine so impulse line is no longer than fifteen inches. Secure lines sufficiently far from heat sources; *avoid crimping or kinking.* Clamp or safety all fuel line connections. *See Rotax manuals for throttle and carburetor installation tips.*

7. Install manifold and muffler per parts drawing. Torque down exhaust "Y" pipe evenly. Adjust spring tension by bending loops as required. *Applying too much tension to springs may break them.* Safety-wire springs to loops and run bead of silicon along springs to dampen vibration; see **Figure 011-07.**

FIGURE 011-07

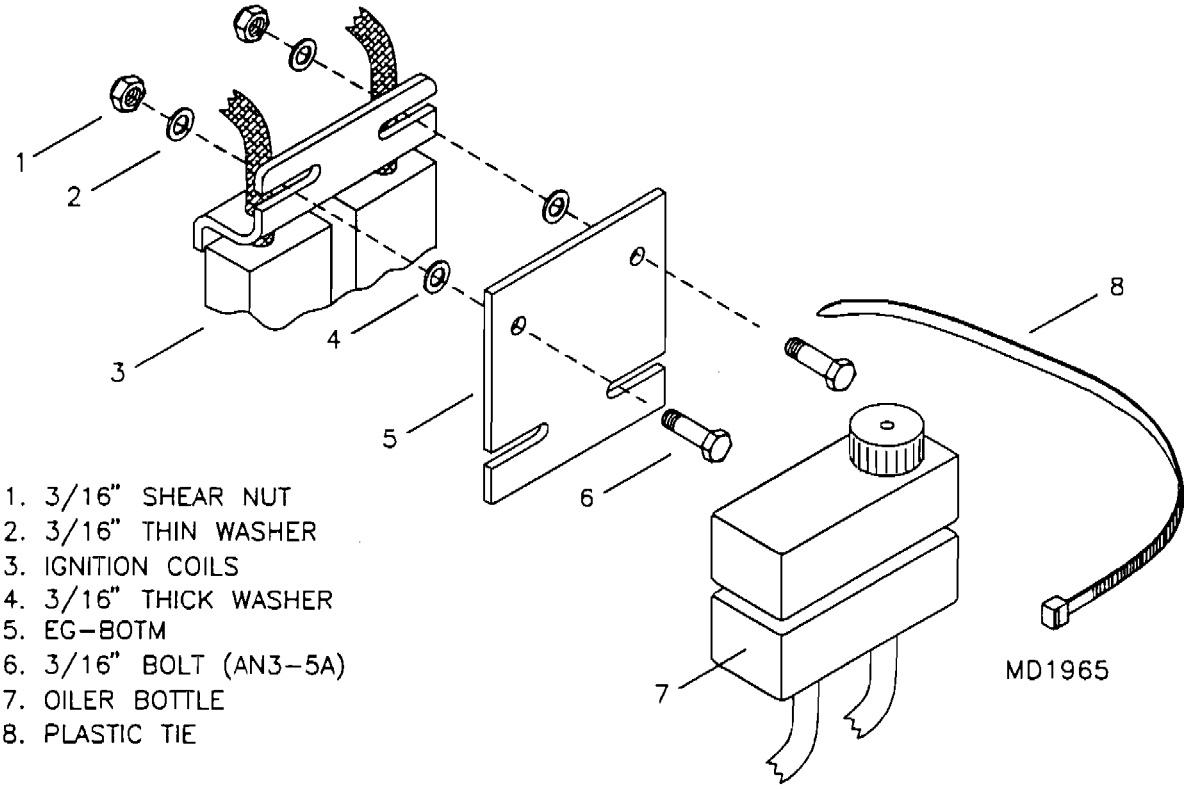


Mounting allows movement to absorb vibration, thereby protecting muffler. ***Muffler should be inspected regularly; severe loss of performance may occur if muffler fails.*** *If cracked, muffler must be repaired or replaced. Keep engine compartment clean; accumulations of oil and grime may indicate imminent failure!*

S-10/582 OILER INSTALLATION

8. 582 oiler bottle must be relocated to fit within S-10 cowl. Remove bottle and install with mount, per **Figure 011-08.**

FIGURE 011-08



S-10/582 OIL INJECTION SYSTEM

Oil injection eliminates need to mix oil and gasoline prior to fueling; while very convenient, especially for cross-country flying, it requires operator to check and maintain an addition system. Builder may wish to install optional oil check door to cowl, allowing quick access to oil tank during pre-flight inspection.

Oil is gravity-fed to oil metering pump. Metering pump cannot draw oil without gravity feed, so must be mounted *below* oil tank. *This installation is not adequate for sustained inverted flying.*

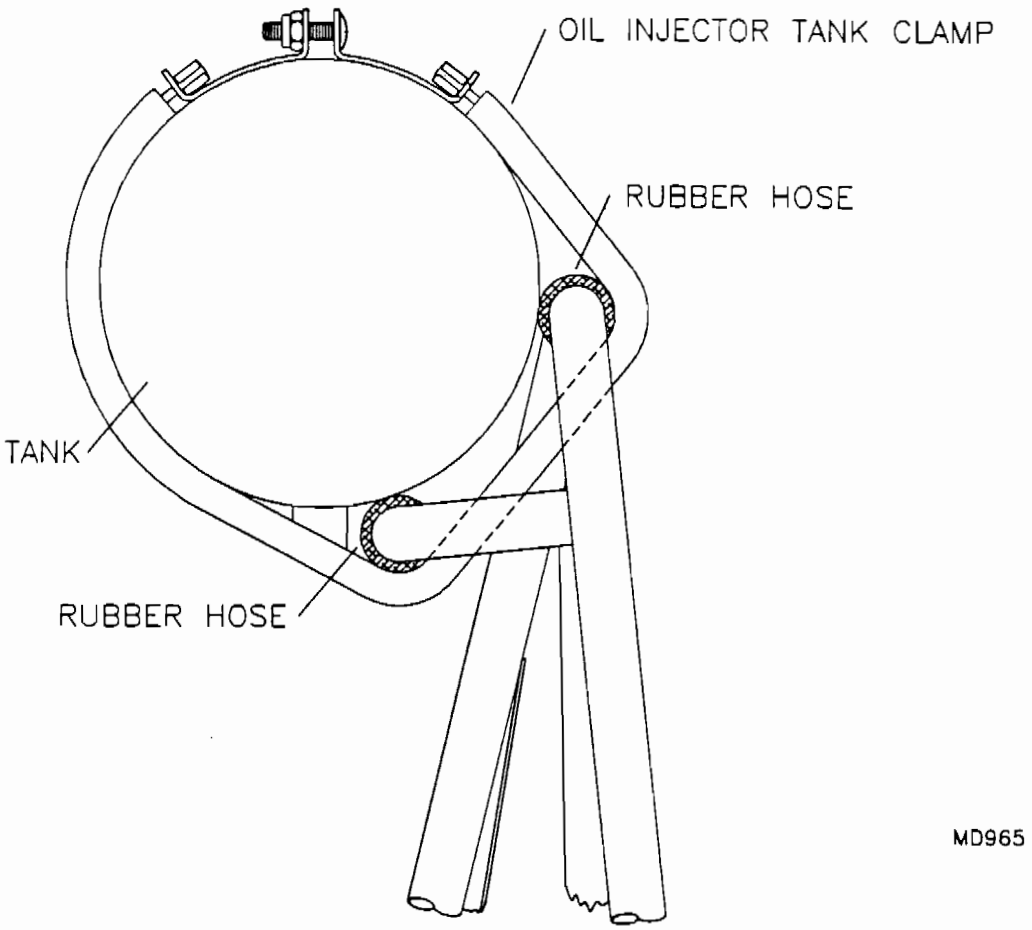
9. Trim segments from rubber hoses to fit sockets of oil tank mount; refer to parts drawing.

10. Install hose segments to sockets. Locate two pairs of 8mm threaded bosses near back of engine; apply Loc-tite to bolts and install oil tank mount to bosses per parts drawing.

11. Cut two 6" segments from black fuel line. Split segments lengthwise and install as cushions to mount. Refer to parts drawing.

12. Cut two segments of equal length from neoprene strip. Install oil tank to mount and clamp in place with neoprene segments as cushions. Refer to parts drawing and **Figure 011-12.**

FIGURE 011-12



13. Install oil line, filter and associated hardware between tank and engine. Install withdrawal fitting and vent line to oil tank. Refer to parts drawing. Check all connections for security before filling oil tank.

Include oil system in pre-flight inspection: check oil quantity and security of all components prior to flight.

S-10/582 PROPELLER INSTALLATION

14. Install propeller and associated hardware per parts drawing; refer to propeller manufacturer's instructions for recommended torque values. See cowling section for spinner assembly and installation.

15. Check propeller balance. Locate scrap aluminum tube several inches long with diameter equal to that of hole in propeller hub. Insert tube through hub and support propeller by placing ends of tube atop jaws of open bench-mounted vise (two chairs of equal height placed back to back also will do). If properly balanced, neither blade will drop when propeller is placed horizontally and released. If a blade is heavy, apply a coating of urethane spray varnish to lighter blade. Propeller is within acceptable balance if difference between blades is no greater than the mass of a nickel (e. g., if builder tapes a nickel to lighter tip and other tip still drops, propeller requires balancing).

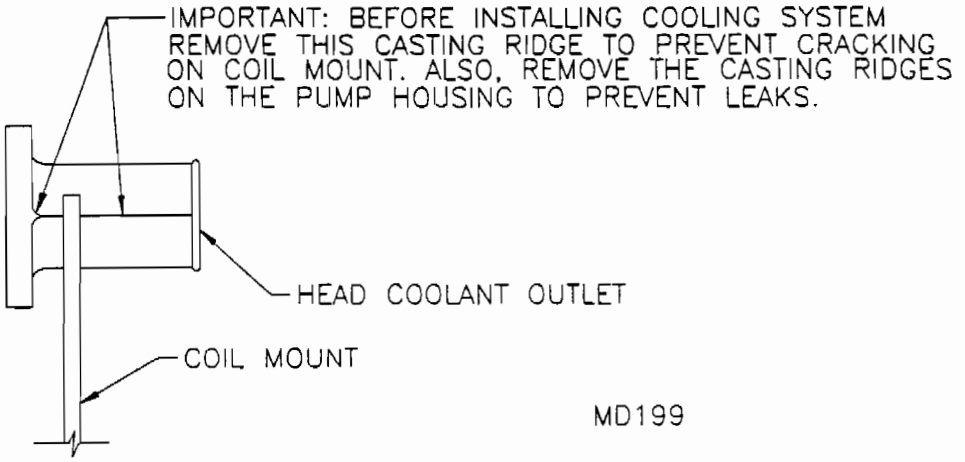
16. Once installed to aircraft, check propeller tracking. ***First, check that engine ignition is off.*** Rotate propeller so blades are vertical. For reference, place an object on the floor, behind propeller, so it just touches back of low blade's tip; a typical five-gallon bucket works well. If propeller is tracking properly, the other blade should graze the reference object when rotated to the same position. If tracking is off, loosen bolts at hub and re-torque as required.

Typical engine offset places right side of propeller disk 1/4" farther forward than left side; this may be measured by rotating propeller to horizontal and carefully measuring from leading edge of each wing to respective propeller tip. Offset should not exceed 5/8"; such factors as wing, tail and control surface rigging influence plane's ability to fly straight and must be considered during flight test phase.

S-10/582 COOLANT SYSTEM

17. Remove head outlet fitting and coolant pump housing from engine. Remove casting ridges by filing and sanding smooth; re-install outlet fitting and pump. See **Figure 011-17.**

FIGURE 011-17



18. Assemble and route coolant system per parts drawing. Check that lines, clamps and fittings are properly installed and tightened sufficiently before adding coolant.

19. Remove set screw atop engine and "screw" in a spare segment of fuel line. This helps avoid spills while verifying that coolant level has reached top of engine. When coolant reaches this point, remove fuel line and re-install set screw.

20. Fill system through filler tee; this should be highest point of system. Use 50/50 solution of anti-freeze and distilled water; anti-freeze must be compatible with aluminum engines.

21. Raise and lower aircraft tail several times to "burp" system. Continue filling system until coolant has run into and partially filled recovery bottle. Cap filler tee.

22. Typically, some air remains trapped; this is worked through coolant system during initial engine operation and collects in filler tee. *Builder must open filler tee and add coolant periodically during initial engine operation to purge remaining air. Even a small amount of air can cause high temperature indications.*

Check all clamps, fittings and connections after engine break-in. Replace coolant annually. Replace hoses biannually.

Include coolant system in pre-flight inspection: check coolant quantity and security of all components prior to flight.

S-10 SAKOTA COWLING

PLEASE NOTE: It is assumed the engine mount, engine, muffler and radiator have been installed. Also, the spinner has been trimmed, drilled and ready to install. On 582 models, the oiler bottle must be lowered prior to fitting the cowling. See engine installation.

1. Trim the cowling top half to the scribed lines. **IMPORTANT: DO NOT** trim past the lines on the top half horizontal edges. Trim the back edges and bottom half to the mold line (where the gel coat stops).

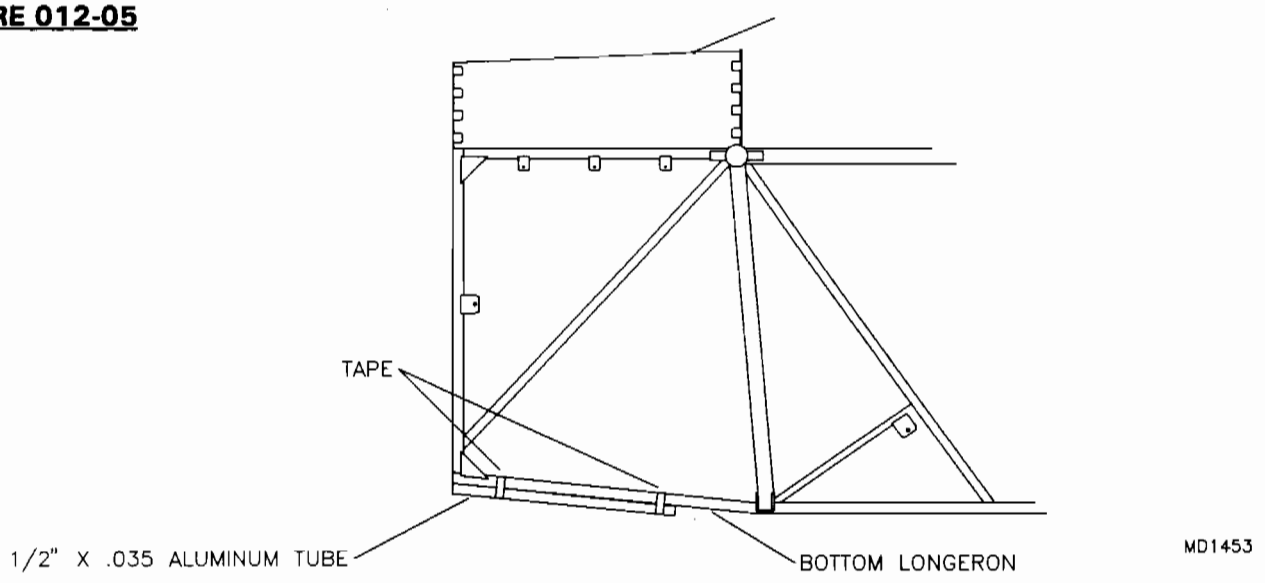
2. Drill through the bottom half's flange where the markers are with a #30 bit. **DO NOT DRILL THROUGH AFT MOST MARKER, THIS HOLE OVERLAPS THE FUSELAGE, OR THE ONES ON THE SPINNER FACE ON THE FRONT OF THE COWLING.**

3. Clamp the (2) halves together then check the fit up. The top should lay flush against the joggle edge of the lower half. Some re-contouring of the front overlaps may be required, especially in the front. File and sand as required. Trim inlets to have 3" of flange at the spinner and 2" of flange on the outside.

4. Once satisfied with the fit, drill #30 from **INSIDE** out. Cleco as you go. Use a wood block to keep seams together as you drill and avoid drilling yourself!

5. Tape a 1/2" aluminum tube to each forward bottom longeron as in **Figure 012-05** to maintain the correct bottom gap.

FIGURE 012-05



6. Slide on the clecoed together cowling so the rear vertical edges are flush with the side tabs.

7. Roughly center the cowling and lightly clamp in place with the small C-clamp type vise grips.

8. Install the spinner (less prop) to the prop flange with at least (2) 1/4" bolts.

9. Center the cowling side to side and vertically, using the spinner as a reference. Establish approximately a 3/8" to 1/2" gap between the spinner and cowling. The forward spark plug may be lightly touching the cowl (the spark plug should be protected with a scrap of rubberized fabric zip tied in place) and the top AFT edge should be snug against the top wrap. Pushing up on the front will gain plug clearance and a tighter back edge fit. View the cowl, the side of the spinner and cowl lines should flow together. The cowling spinner face should be approximately even up and down wise to the spinner.

10. With the cowl clamped firmly and correctly in place, drill through the side and bottom tabs and bolt. **NOTE:** The bottom tabs will be some what tricky to locate. Sight from the side and rear to drill. Use a small drill #30. Use a scrap of 5/8" long fuel line to make a spacer for the bottom bolts.

11. From the top underside of the panel find the center tabs. Count over 5 tabs to each side from center and drill up through the spacer between tabs, 5/8" away from the firewall centered in the space. Use #30. Later with the cowling removed, 3/16" nut plates will be attached to the undersides.

PLEASE NOTE: Steps 12, 13 & 14 are for 532 models only!

12. Reach inside and draw (with a magic marker) around the small oiler bottle cap. This will be used to locate a 1 ½" diameter clearance hole.

13. Remove the top cowling. Observe the markings locating the cap. Remove the cap and lay against the marks to completely draw the circle. Find the circle's center and drill out 1 ½" outside diameter. This will need to be made oblong 3/4" lengthwise to the front to allow for engine movement.

14. Re-install the top to check the fit and file as required.

15. Again remove the top cowling. Reach inside and mark the two front corners of the radiator. **DO NOT** include headers, only the radiator fins. This should make a front width of approximately 19 1/2". The depth is 12 3/4" which can be marked after removed. **PLEASE NOTE:** The muffler will exit through the AFT most bottom cowling opening.

16. Remove the bottom cowling. Use a carpenter's square mark the radiator opening using the two front corner references. The opening should be 19 ½" across by 3" deep. Drill a ½" hole at each corner. (This will form nice round corners.) See **Figure 012-016**. Cut to each corner hole on all four sides with a portable jig saw. True up edges with a sanding block and files. Install cowling lip with 1/8" aluminum pop rivets as per **Figure 012-016A**. Space rivets so there are 5 on front flange and 3 per side.

FIGURE 012-016

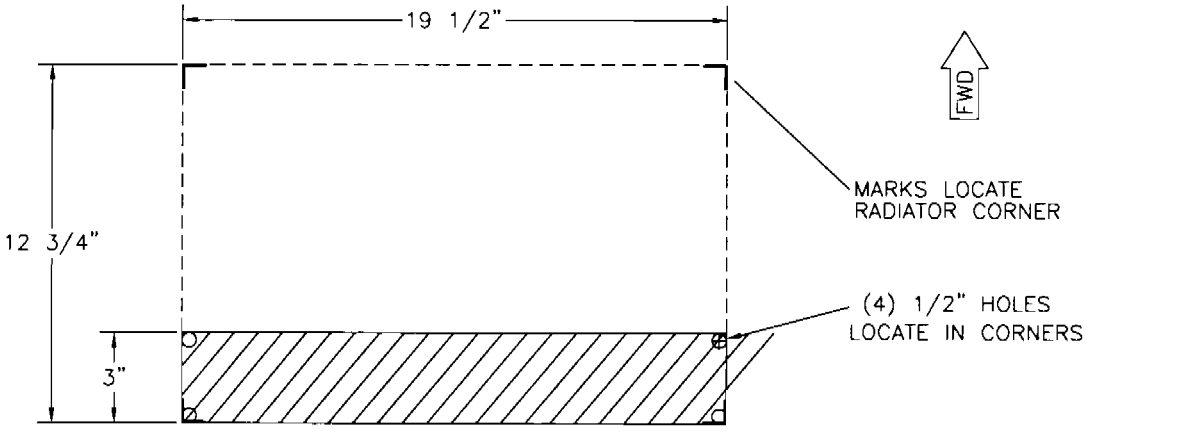
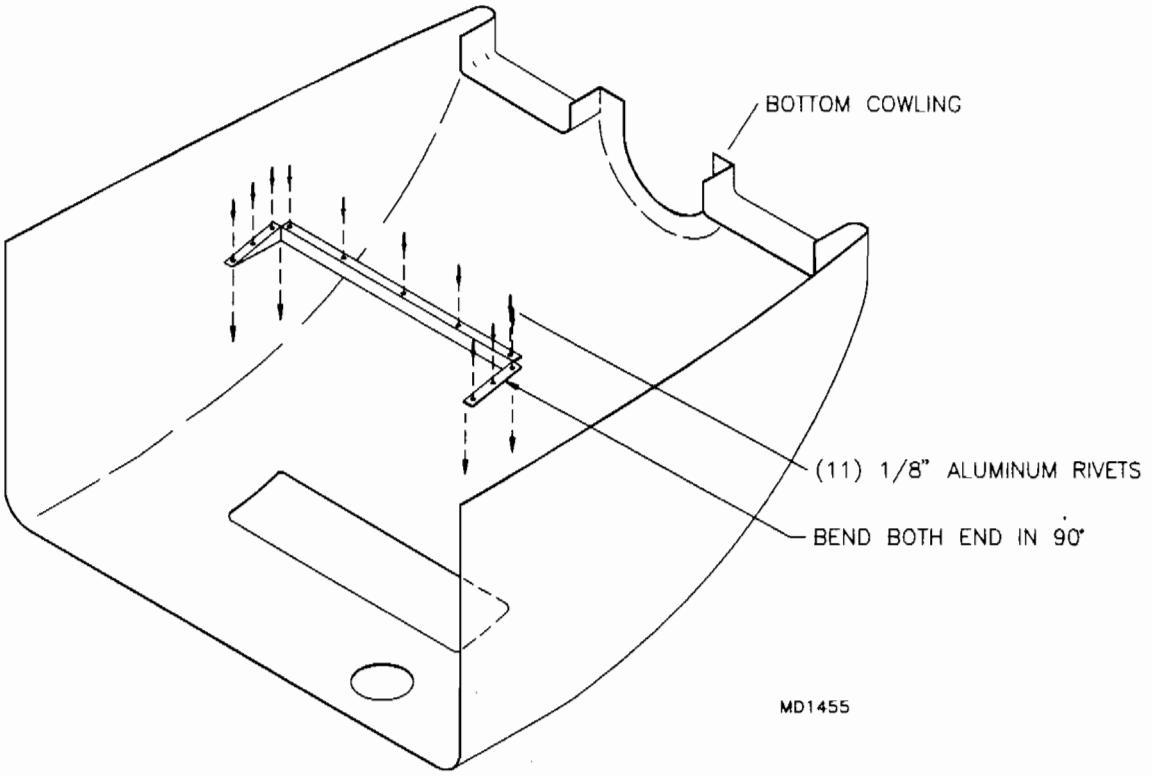
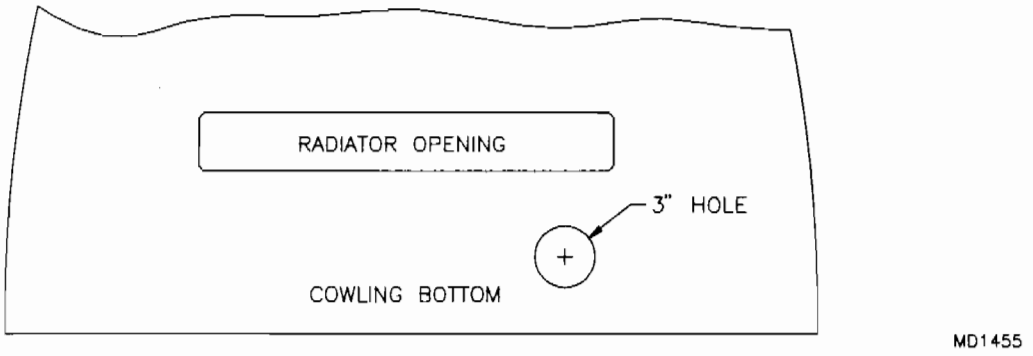


FIGURE 012-016A



17. Locate the point where the muffler will exit and cut a 3" diameter hole. Use a jig saw and sand smooth. Cut out the bottom air outlet as shown in **Figure 012-017**.

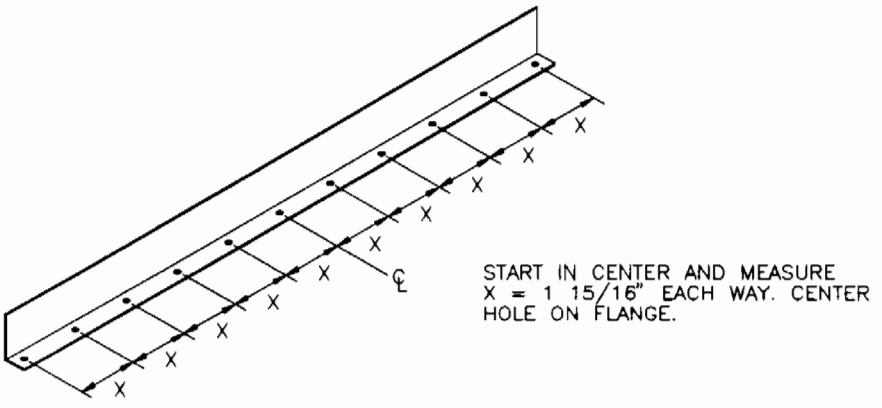
FIGURE 012-017



18. Re-install only the bottom half cowling.

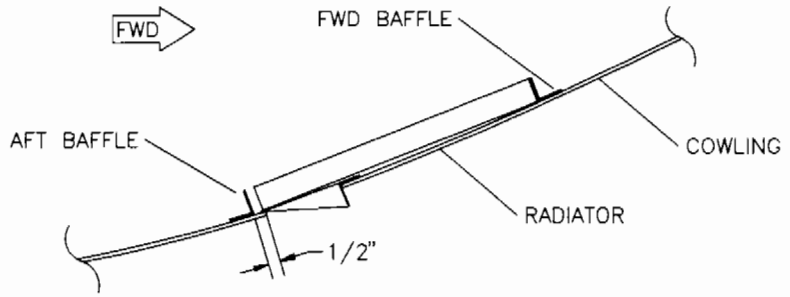
19. Drill the forward and AFT radiator baffles as shown in **Figure 012-019**. Space 1 15/16" from center out for a total of 11 rivets per baffle.

FIGURE 012-019



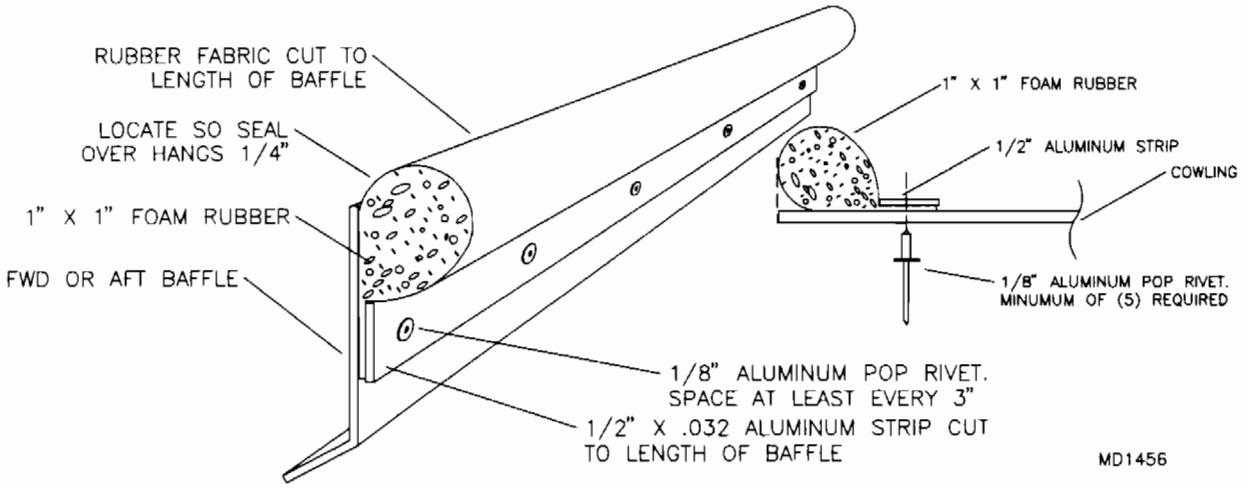
20. The front baffle is set a 1/4" away from the radiator and drilled from the **INSIDE** and clecoed in place. The AFT baffles needs to be located approximately 1/2" from the back edge of the opening. Do this later when the cowling is off. See **Figure 012-020**.

FIGURE 012-020



21. Re-install the cowling and final check the fit up. Make any adjustments as required. Remove the sand with 350 wet/dry production paper and lots of water. Rivet the forward and AFT baffles in place prior to painting. Prime and paint as desired. Install fabric and foam seals as shown in **Figure 012-021**. **IMPORTANT:** These seals play an important roll in cooling. Make sure they are done properly.

FIGURE 012-021



Cut the aluminum strip foam and fabric to length of each baffle for the front and back seals. The side seals will be the measured distance **BETWEEN** the front and rear baffles. Rivet them in place as shown below. **HINT:** Use some of the 2-way tape to stick the fabric together with the foam encased inside.

S-10 SAKOTA COWLING FASTENERS ASSEMBLY

1/4 TURN INSTRUCTIONS

1. Select the parts as per the parts drawing.

2. Align and drill cowling to #30 and cleco.

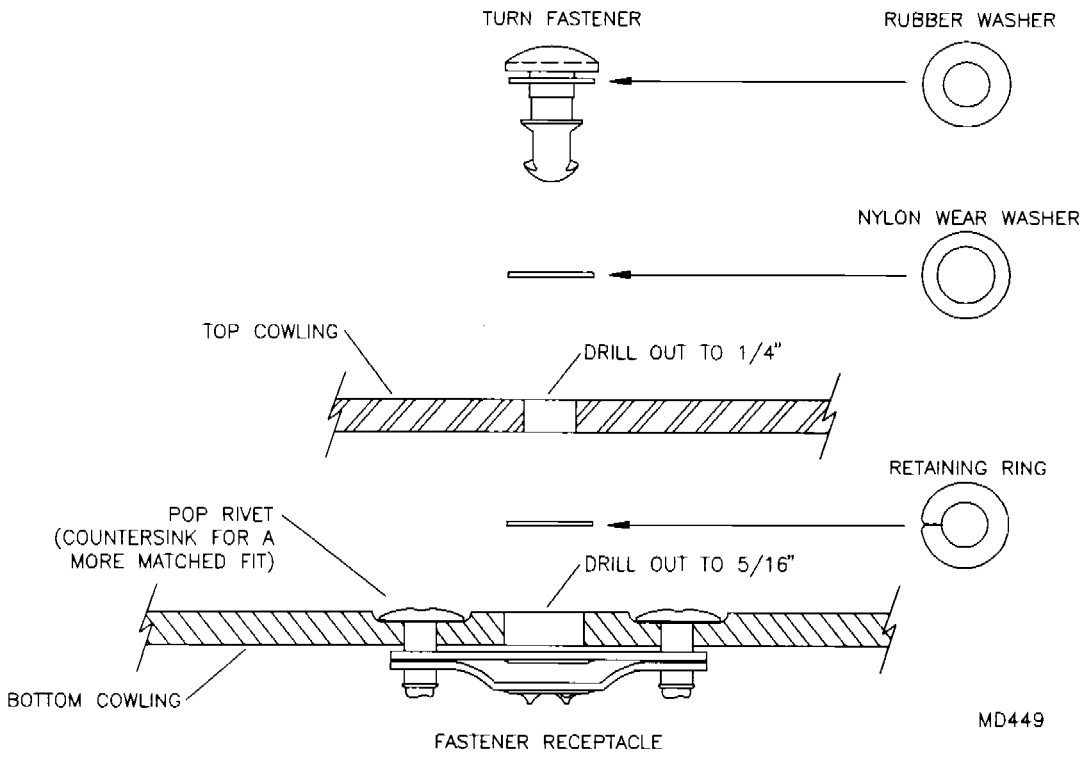
3. Disassemble and drill lower cowling holes out to #11.

4. Cleco a 1/4 turn receptacle into the holes and use as a drill gide for the 3/32 rivets. **NOTE:** Do not rivet at this time.

5. Drill out the fastener or middle hole to 5/16" and rivet in the receptacles.

6. Drill the holes in the top cowling out to 1/4" and install 1/4 turns as per **Figure 012-06.**

FIGURE 012-06



SPINNER ASSEMBLY

NOTE: To properly fit the cowling the spinner must first be installed.

1. Refer to the spinner parts page for selection of components and hardware.

2. The spinner and backing plate comes ready to trim and drill. Observe the scribe lines and trim to these lines. Be especially careful to trim and sand the edges evenly. Check for trueness by setting on a flat surface. The center hole is 1" for 582's and 1 3/8" for 912's. Holes are redrilled. It may need a little sanding to fit over the prop flange. Test fit as you go. Wet sand with 350 grit sand paper.

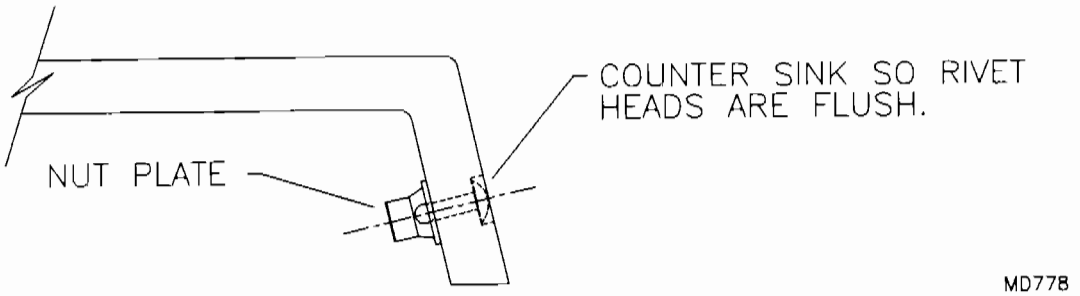
3. Insert the 1" or 1 3/8" aluminum tube scrap into the prop, then install on the backing plate. Prop **MUST** be flat against the plate. Drill six (6) 1/4" holes through the backing plate using the prop as a drill guide. **IMPORTANT:** After drilling the first hole insert a 1/4" bolt to prevent shifting. **NOTE:** The slight dip in the plate is used to "pre-load" the plate against the prop.

4. Set the prop and backing plate on a flat surface. **NOTE:** To assure accuracy bolt the backing plate to the prop with (3) bolts. (AN4-32A will work if washers are used.)

5. Cut out the spinner to match the prop type. Place the template exactly 180° apart. Test fit the openings and file to an exact fit. Once the dome is fitted, mark the hole locations on the spinner's perimeter with (5) screws evenly spaced on each side. Drill through at these locations with a #30 bit, cleco as you go. Be sure the spinner and backing plate are flat against the table.

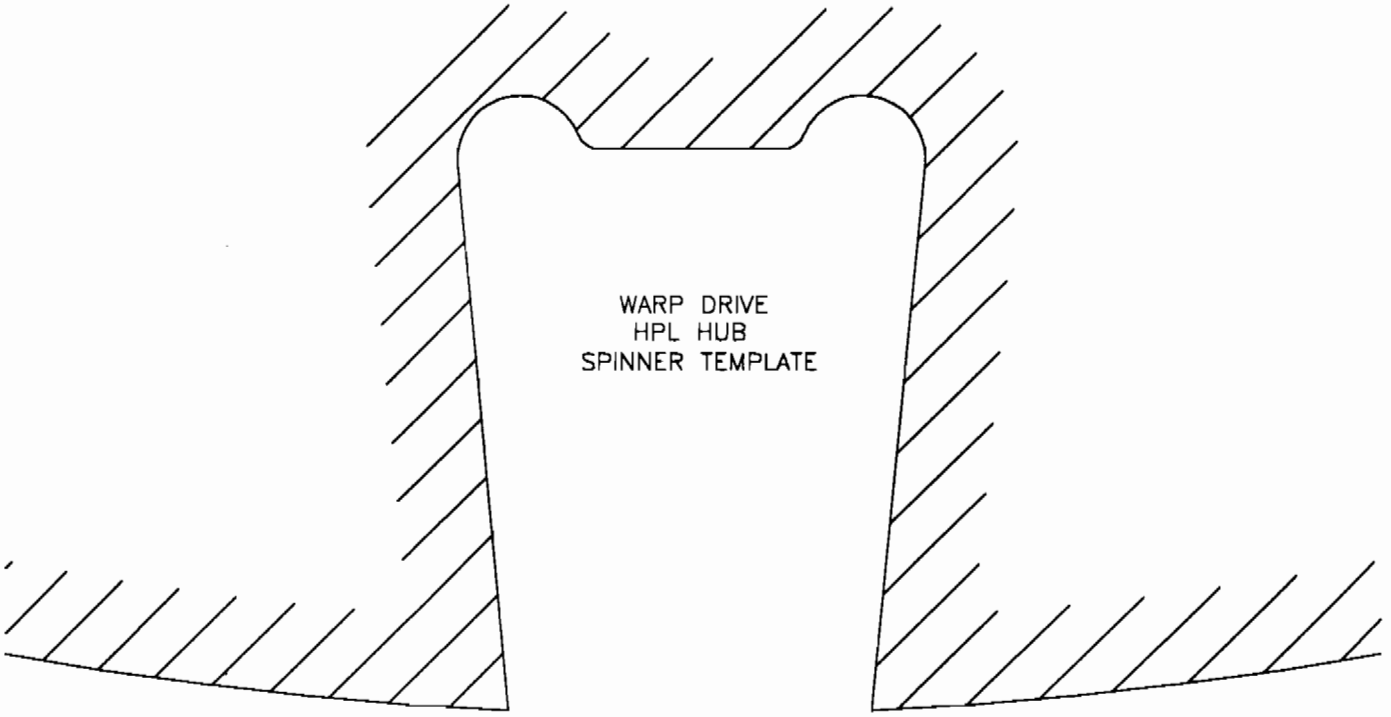
6. Disassemble and drill out the #30 holes to #11. Install the nut plates using a bolt to hold the nut plate in place and drilling from the inside. The rivets heads need to be "counter sunk", do so by drilling a slight depression with a #11 bit. See **Figure 012-06**.

FIGURE 012-06

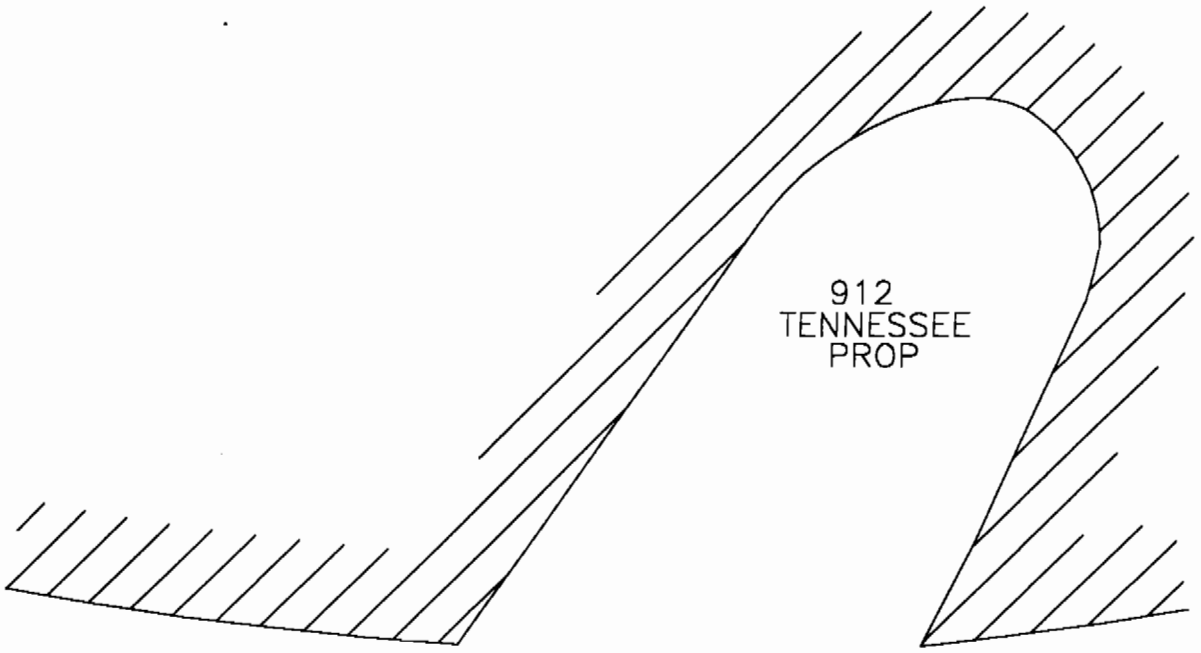


7. Sand the spinner with 350 wet/dry paper. Paint to match aircraft.

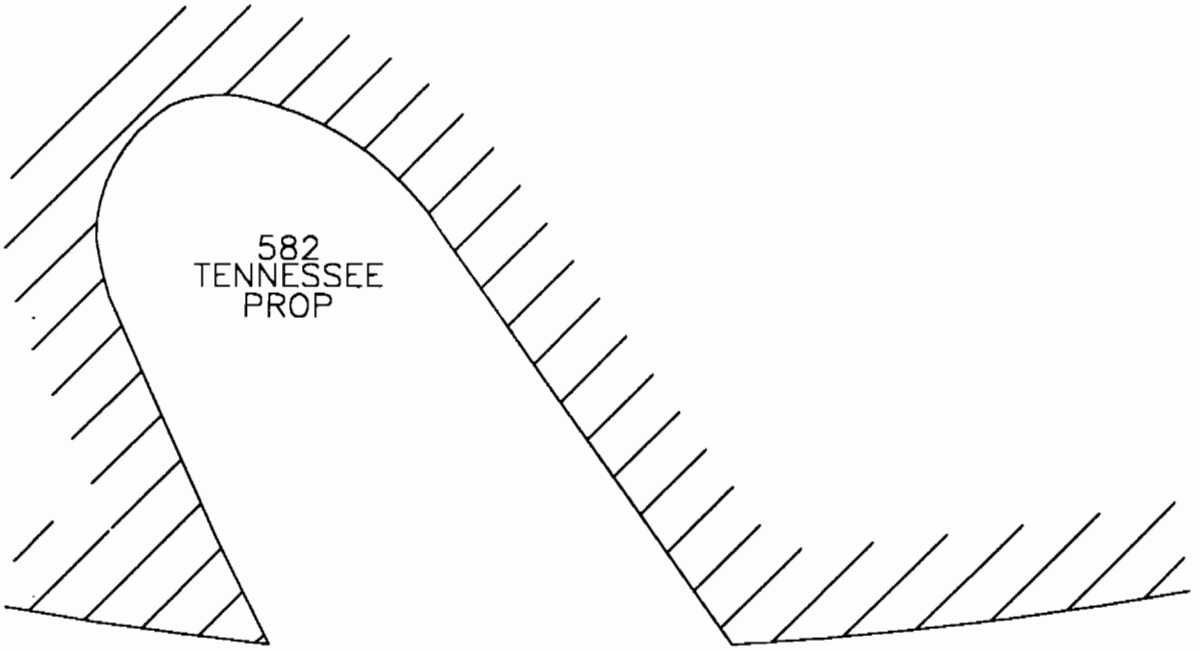
8. Bolt the backing plate and spinner to the engine. The spinner is used to line up the cowling. The spinner and prop should be balanced and no adjustment required. However, the ultimate test is in the running. If you have a lot of vibration it could be caused by out of balance or misalignment. Use a good prop balancer. Check both the prop and backing plate, if the misalignment is not correctable then a new spinner may be required. Misalignment occurs through improper trimming of the parts. A slight amount of "wobble" is acceptable and may disappear at higher RPM's. Always pre-flight your spinner.



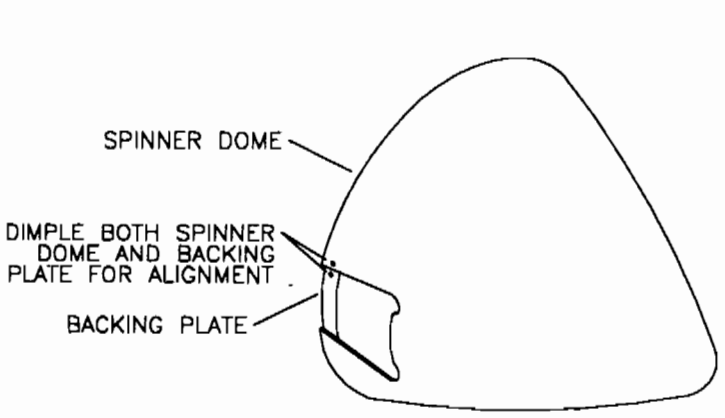
MD3031

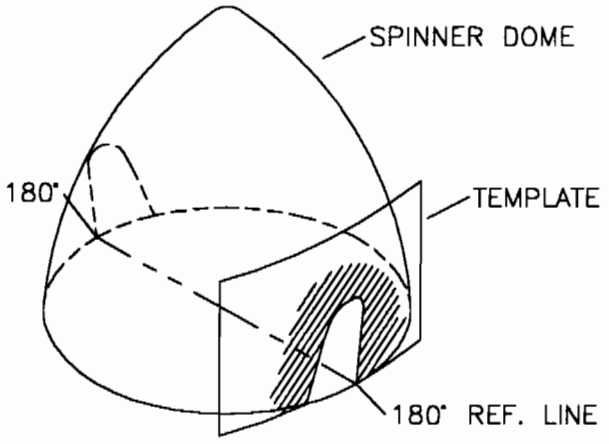


MD3020



MD3022





MD3035

NOTE: The spinner and backing plate should be edge trimmed.

1. Mark a straight line across the center of the spinner backing plate. Mark the edges of the backing plate on this line.

2. Insert the backing plate, mark the spinner dome for 180° reference point.

3. Line up templates on the marks.

S-10 WINDSHIELD AND SIDE GLASS INSTALLATION (REFER TO SECTION 013 IN THE PARTS CATALOG)

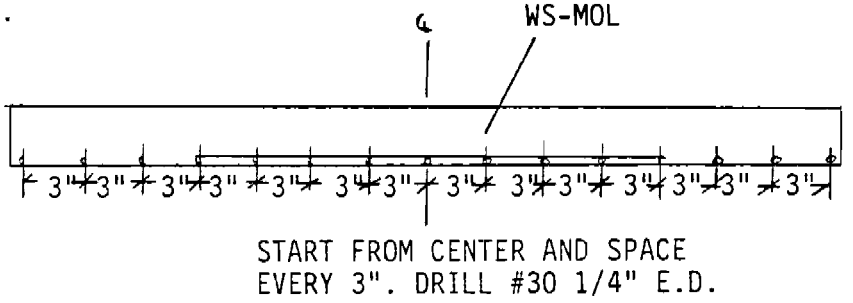
NOTE: Before installing the windshield it assumed the formers are installed and the canopy spreader tube. It is VERY important the canopy spreader in installed.

1. Lay out, drill and cleco (2) WS-SGZ in position on the windshield as shown in Figure 013-01. NOTE: You may want to radius, debur and paint the WS-SGZ's prior to permanently riveting.

2. Temporarily attach the WS-SGZ's to the windshield using clecos. Peel the paper on both sides along the canopy former edge at least 2" back. Snap the windshield in place by slipping "Z" strips over the longerons.

3. Lay out and drill the WS-STRIP as per Figure 013-03. Place the trimmed WS-STRIP into position on the windshield's front edge. The strip should fit centered and tight against both the windshield and sheet metal with no gaps. Hold in correct position, drill and cleco as shown in Figure 013-03.

NOTE: Later after painting, during final assembly use some silicon sealant between the windshield and strip for a water proof seal.



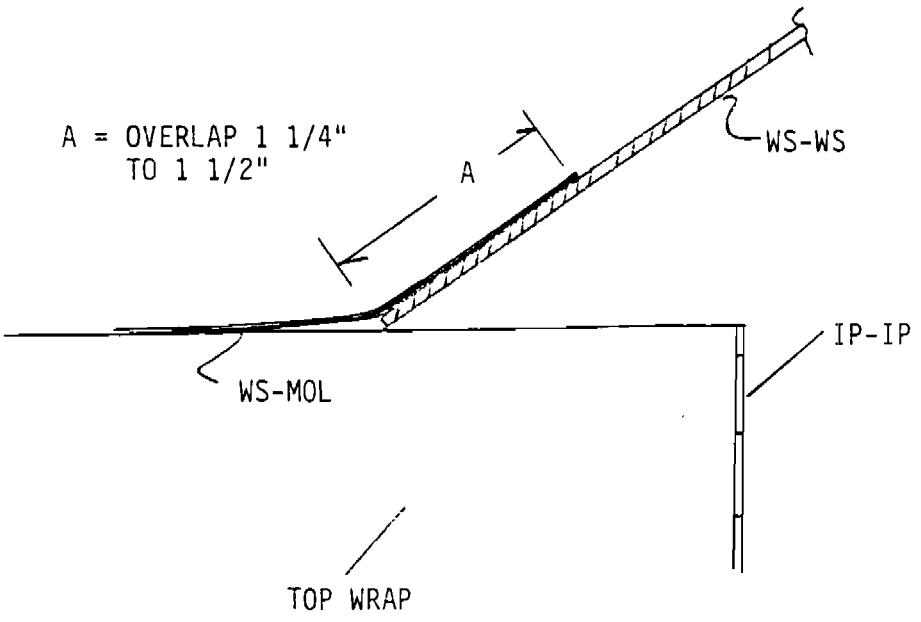
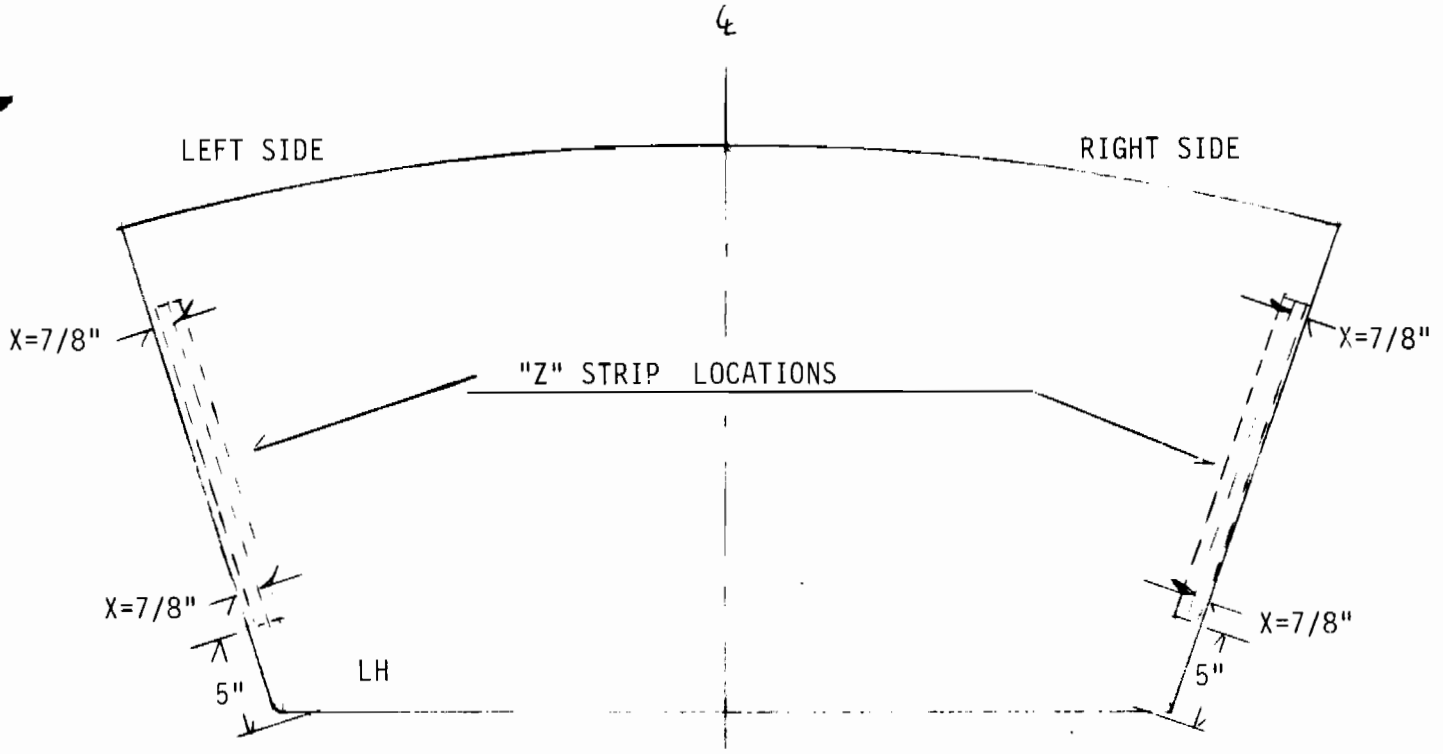
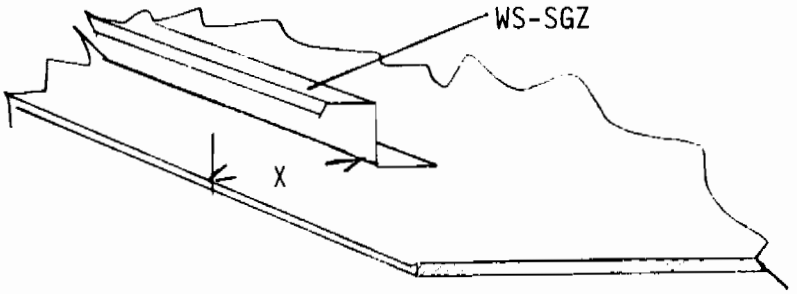
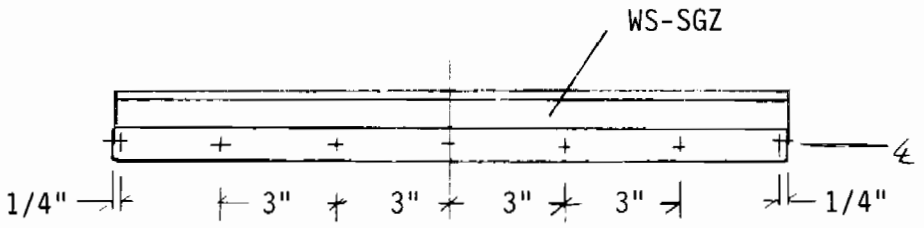


FIGURE 013-03



SHOWN LAID DOWN FLAT WITH INSIDE FACING UP. PANEL IS MARKED WHICH SIDE IS LEFT. FOR BEST FIT ORIENTATE LH ON LH.





DRILL #30 ALL HOLES

FIGURE 013-01

4. Establish exactly where the windshield and canopy former meet. Locate, drill and cleco #30 holes as per Figure 013-04. See Figure 013-05. Trim the edges back to be flush with the edge of the clecos. Trim support channel to shape as per print FAB-8.

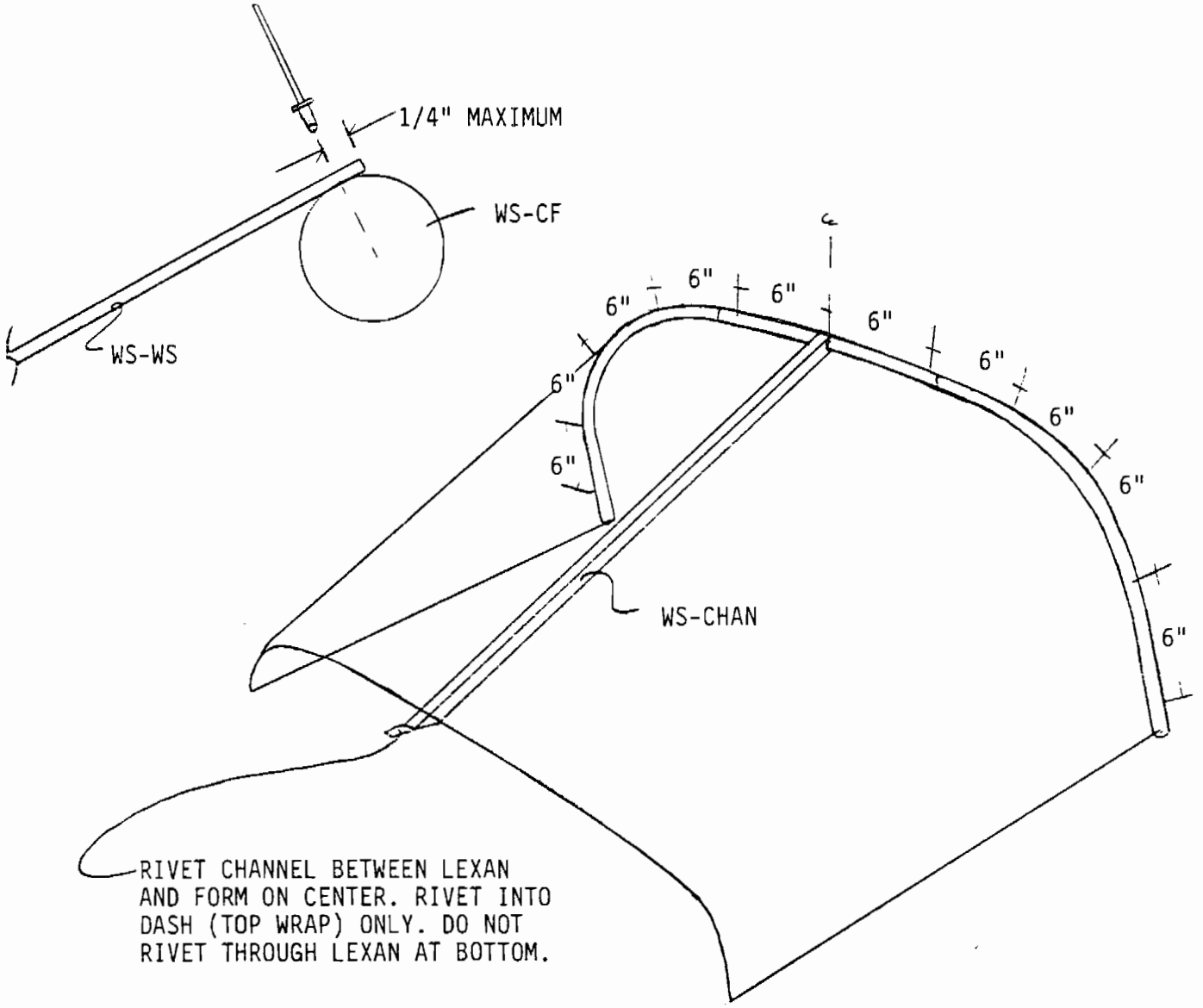
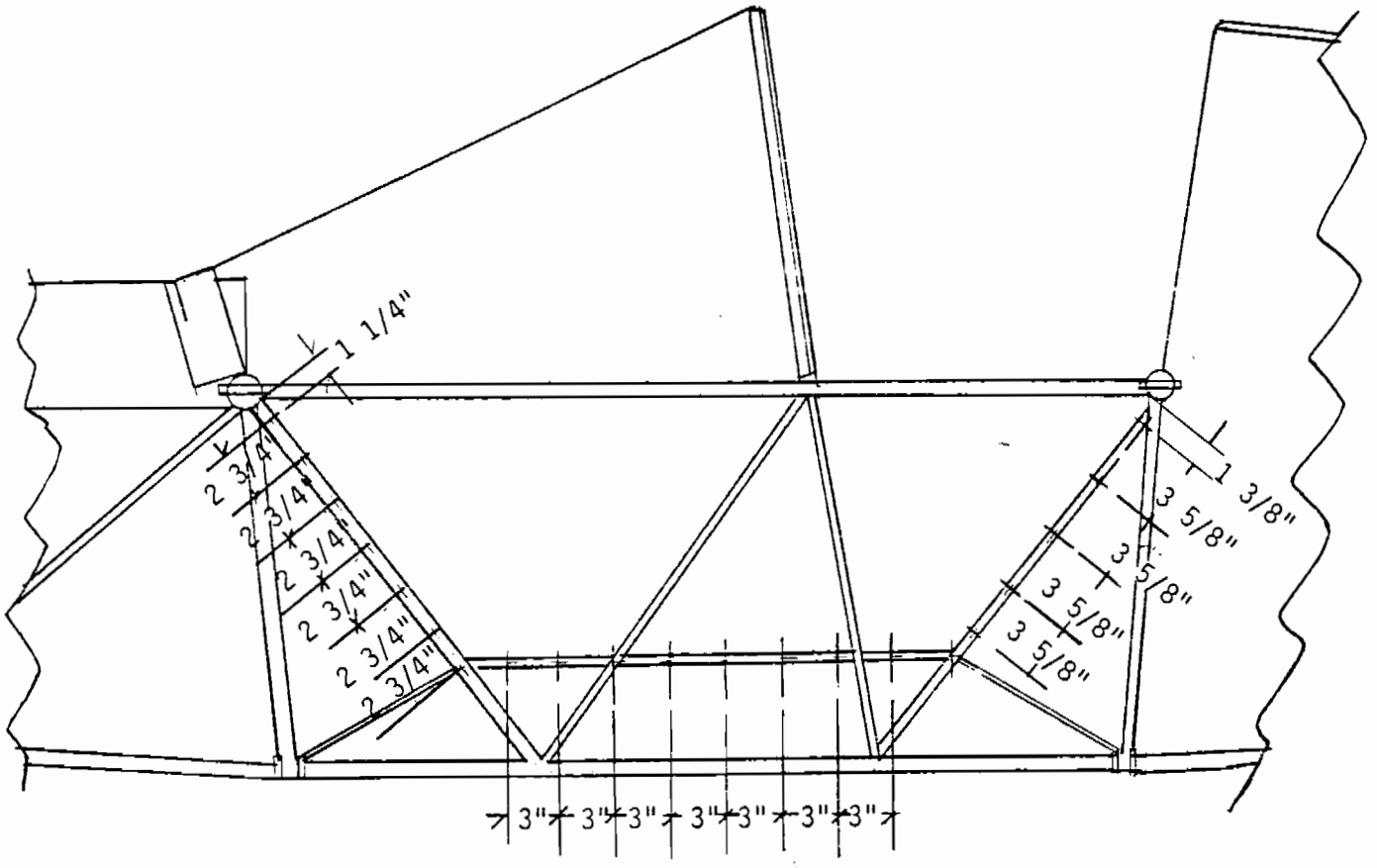


FIGURE 013-04

5. Locate the #30 holes in the airframe tubes making up the window frame. Drill as per Figure 013-05



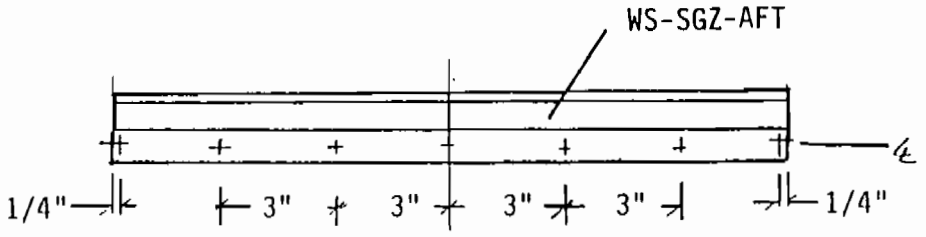
CENTER LINE HOLES ON TUBES
DRILL ALL HOLES #30

FIGURE 013-05

6. Peel back the paper for 2" on all edges both sides. Clamp the side glass panels in place so the bottom and rear edges line up flush with the 1/2" square tube. Drill through the Lexan #30 holes.

7. Clamp and drill the remaining WS-SGZ-AFT and WS-LC strips centered between formers and transfer drill, cleco or rivet in place. (See Figure 013-07). Then locate the latch channel over the top longeron (See Figure 013-07A). Transfer drill through the "Z" strip holes to locate on the Lexan. Place the channel exactly over the "Z" strip.

8. For a quieter cabin, prior to final assembly, apply foam tape between the structure and the glass.



DRILL #30 ALL HOLES

FIGURE 013-07

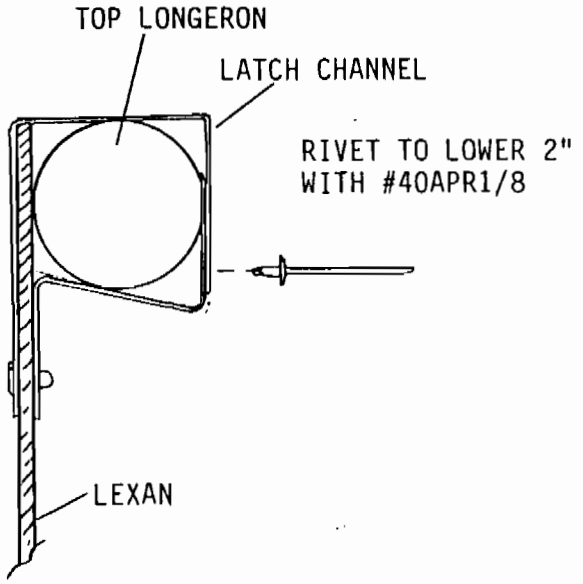


FIGURE 013-07A

9. Position the two inside windshield supports on the panel as shown in Figure 013-09. The bottom edges should be parallel across each support. Drill and cleco #30. Remove for painting. During final assembly install trim lock on the support's top edges. The trim lock will make for a good snug fit and will not mar the Lexan. Rivet with 1/8" aluminum pop rivets.

10. This should complete the installation of the windshield and side glass panels. Remove moldings, Lexan, formers and "Z" strips for sanding and final finish.

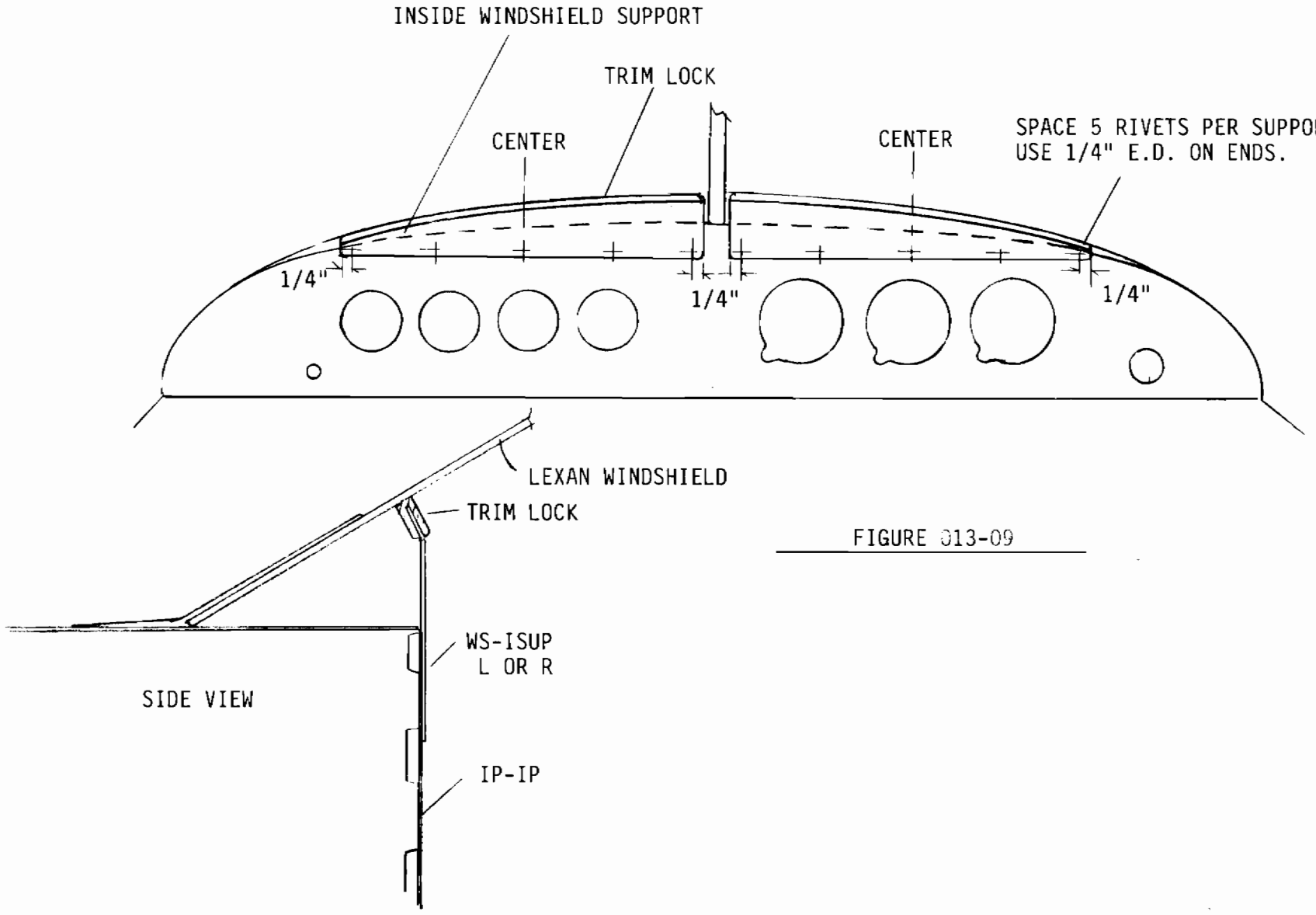
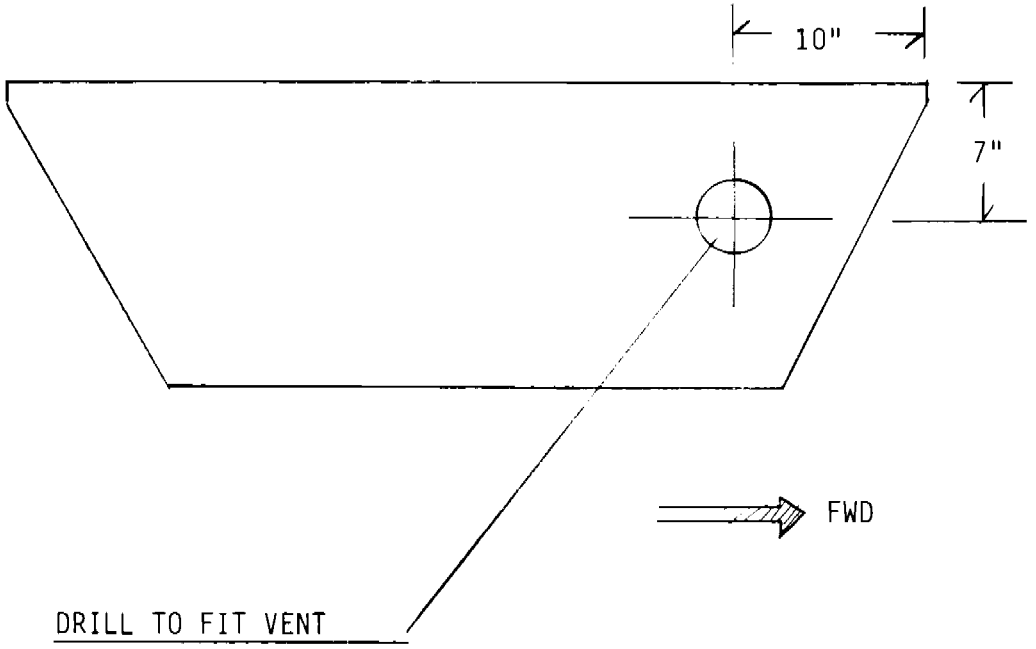


FIGURE 013-09



VENT IS STANDARD AND CAN BE PURCHASED THROUGH RANS OR ANY OF THE AIRCRAFT SUPPLY HOUSES. (2) RECOMMENDED ON S-10.
(1) RECOMMENDED ON S-9.

SUBJECT: 3 1/4 AIR VENT LOCATION SIDEGLASS	**NO.**	**MODEL:** S-9 S-10
MATERIALS: NONE	**FINISH** NONE	
DATE: 3-2-88	**DRAWN BY:** RJS	**SCALE:** NONE
PROPERTY OF: RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:**

S-10 CANOPY

1. Select the parts and hardware as depicted on the parts page.

2. Place the spreader in the center of the formers. Drill through #30 as shown in Figure 013A-02. Remove the spreader tube and drill out the holes in the ends 5/32". Re-install and attach with the four (4) #8 pan head screws.

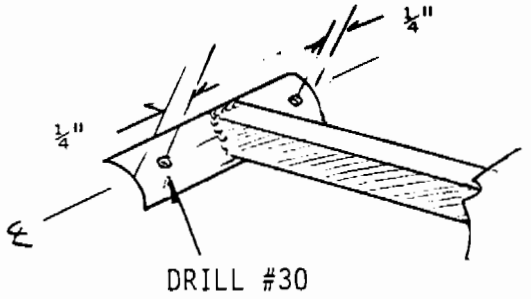


FIGURE 013A-02

3. Locate the wood dowel in the raw stock kit. Cut into (4) 6" pieces. Insert the dowels into each top end where the hinge bolt will go. Push the dowel in until it is flush with the ends. Drill out the #11 pre-drilled hole through the tube and dowel to 1/4". Cut (4) bushings, 1/4" diameter and 1/2" long. (HINT: Prior to cutting the 1/4" aluminum tube bushing material to length it is much easier to drill the I.D. to #11. This avoids having to clamp little bushings in a vice). Mix up a little J&B Weld and glue the bushings into the canopy hinge points. See Figure 013A-03. Hold each canopy frame in place to determine which is RH or LH. Bolt the frames in place after determining best fit. If bending to fit is required, do so prior to drilling holes for Lexan. Please install bolts as shown in the parts book. Peel the paper back on both sides 4" on all edges (8" on the bottom).

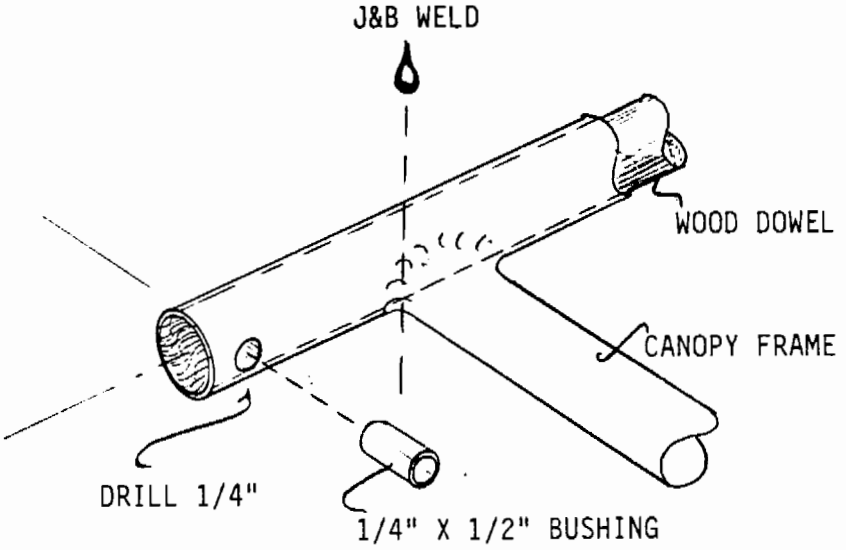


FIGURE 013A-03

4. Clamp the Lexan leaf to either side (The procedure will be the same both sides) with enough overhang front and rear to lap over the windshield and turtle deck former. The notch on the Lexan's narrow end denotes the lower AFT corner. NOTE: There should be approximately 1 3/8" on the forward side of the canopy frame. Also the Lexan should be even with the frame's top crossing tube. Once you are satisfied with the fit, lay out and drill #30 for the 1/8" pop rivets. DO NOT rivet, cleco in place. See Figure 013A-04

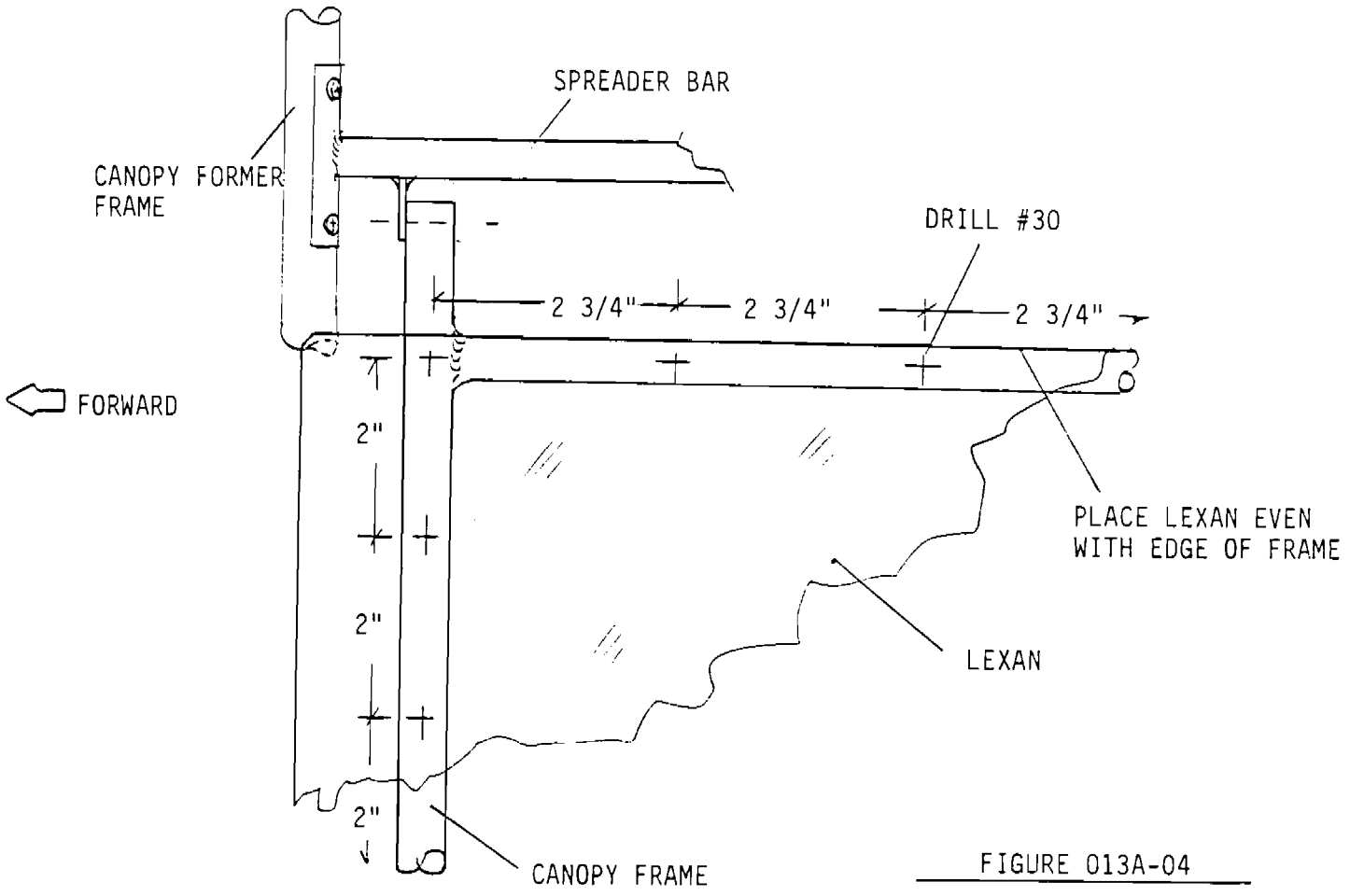


FIGURE 013A-04

5. Mark with a utility knife where the Lexan should be trimmed to achieve a match fit with the windshield. Mark and trim the aft edge to overlap the turtle deck former evenly. Deepen the mark to cause a heavy score, then snap off the excess. HINT: A "duck-bill" pliers helps to grip the trimmed off edge. Sand to a smooth edge. (Removal may be required.)

6. With the Lexan firmly clecoed in place, drill the canopy edging strip as per Figure 013A-06. Clamp the rest of the parts together as in Figure 013A-06A and transfer drill.

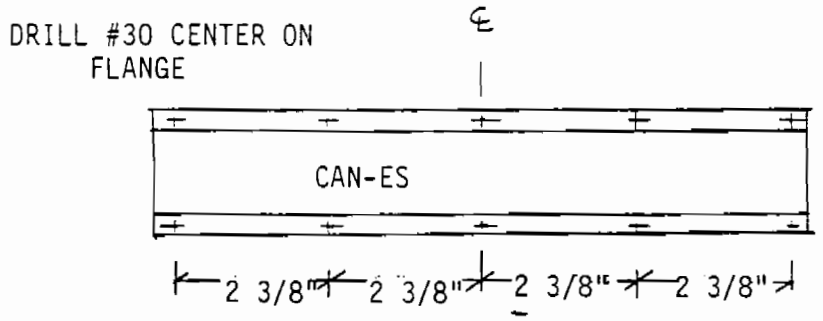


FIGURE 013A-06

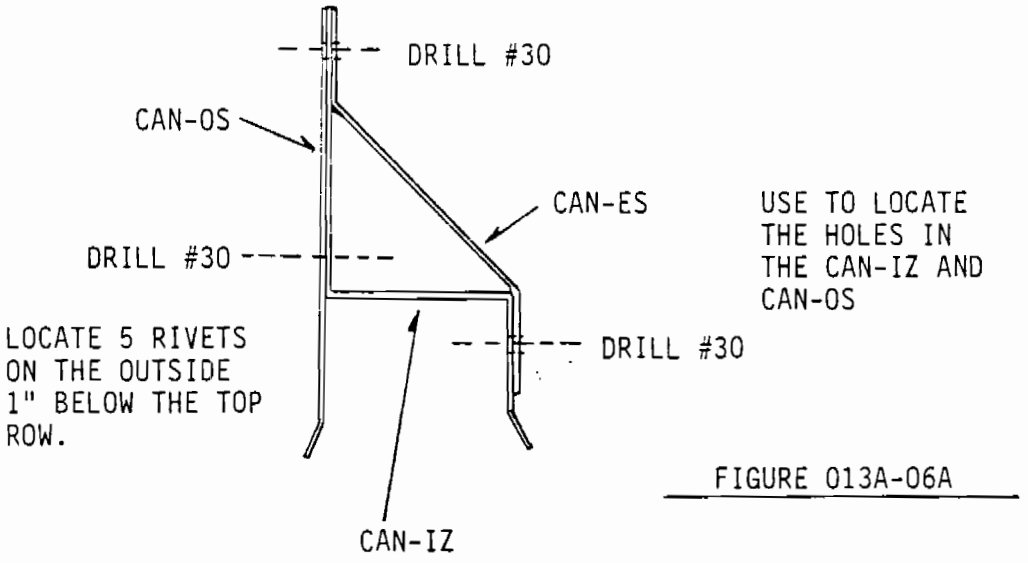
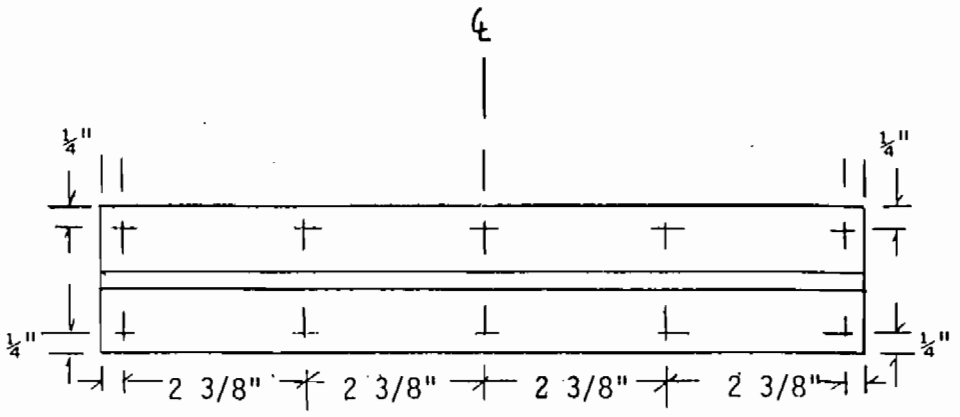


FIGURE 013A-06A

7. Pre-drill the hinge the same as the CAN-ES in Figure 013A-07. Position the hinge with it's center hole into the center hole of the other parts LOWER edge. See Figure 013A-07A.



LOCATE THE CENTER, THEN WORK OUT

FIGURE 013A-07

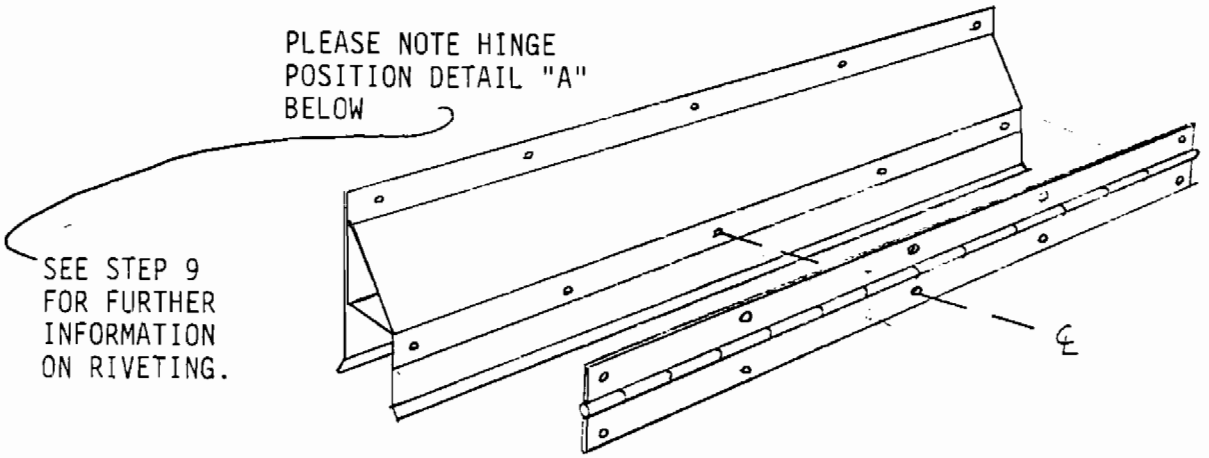
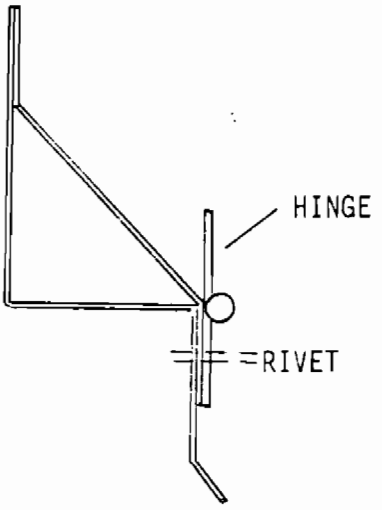
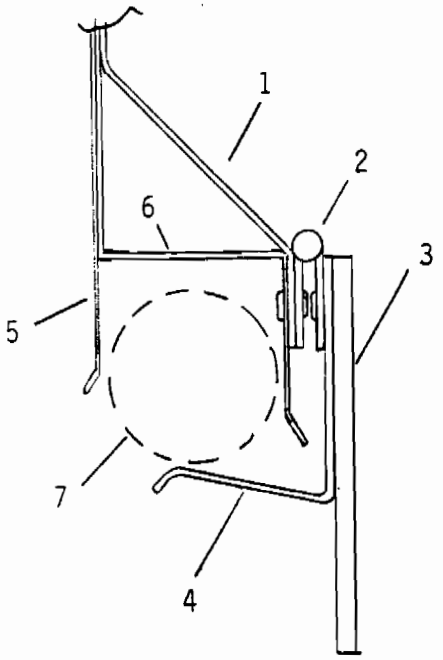


FIGURE 013A-07A



DETAIL "A"

8. Drill the catch to match the unattached hinge side as in Figure 013A-08. Cleco to hold the assembly together.



1. CAN-ES
2. HINGE
3. FINGER TAB (1" X 1/8" ALUMINUM)
4. CATCH
5. CAN-OS
6. CAN-IZ
7. TOP LONGERON

FIGURE 013A-08

9. Final rivet the hinge and bottom edge of the Inside "Z". Place rivets with head to the inside. After riveting, flatten the rivets with a small hammer and appropriate anvil. This will create the required clearance between the side glass "Z" strip. See Figure 013A-07A and Detail "A".

10. Locate the finger tabs on the most forward end of each catch. Leave approximately 1 1/4" extending past the bottom of the catch. Rivet with (2) 3/16" aluminum pop rivets. Space approximately 1/2" apart on center line. This will complete the inside of each catch assembly. This will rivet to the Lexan leafs along with the outer strip. See step #11.

11. The canopy leafs should be clecoed to the hinges and trimmed to fit. Force the Lexan to contour the formers. Hold it in place while a friend holds the catch assembly on the top of the longeron. A 3/8" thick wood strip should be placed between longeron and catch assembly. Locate the catch assembly on the longeron 3 3/4" from the forward canopy former. You can see where to drill by looking through the Lexan. Cleco as you go. NOTE: DO NOT have catch over longeron. IT MUST BE OPEN.

12. Remove burrs and rivet the catch assembly and outer strip with 1/8" pop rivets from the outside.

13. Remove each Lexan leaf and use the top edge to determine the hole locations and length of the canopy cap strip. The strip should extend the full width of the Lexan. This strip is used to hold on the rubber fabric rain seal as well as distribute the stress of the rivets. If you opt to omit the seal, please use the strip anyway. See Figure 013A-013 for strip position.

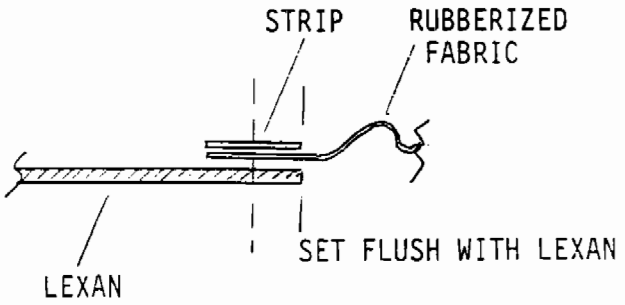


FIGURE 013A-013

14. Cut the rubberized fabric to fit. General dimensions should be 25" x 4". HINT: If you open one canopy slightly, pull out the slack and rivet, the fabric will stretch tight when closed.

15. Rivet end of the cap strip where it goes beyond the hinges. Back up rivets with the 1/8" brass washers provided.

16. Drill from inside the cockpit with the canopy closed and LATCHED a #11 hole on either side. of each finger tab (See Figure 013A-016) through the SIDE GLASS Lexan. Locate these holes up high, the safety latch bungee is tied through these holes. The bungee must not slip off the finger tab and must be tight to put on. This is what holds the canopy closed in flight. WARNING: Not latching this bungee prior to flight will result in the canopy opening. Spare parts business will result!!

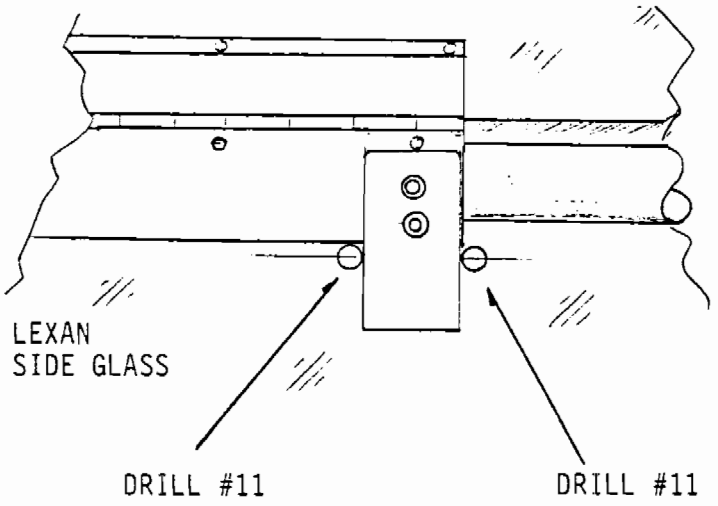
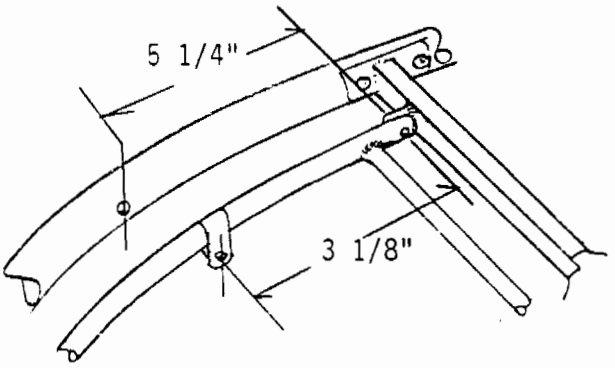


FIGURE 013A-016

17. Fabricate the "over center catch" from the raw materials provided. See print no. FAB-5. HINT: For smooth operation of the canopy catch WAX the wear points. Also catch must "kink" over center to lock. File to fit as required. Locate the clip to allow for maximum opening. The clip wraps around the canopy frame tube and is retained in its optimum position with two 1/8" pop rivets. Drill and rivet these after locating. NOTE: Clip will slip under Lexan, there is no need for removal. NOTE: Be sure the bushing is in place prior to tightening the clip bolt. Locate a #11 hole for the AN3-17A in the turtle deck former as in Figure 013A-017.



HOLE LOCATIONS ARE
FROM BOLT CENTER

FIGURE 013A-017

18. Check the operation of the canopy. It should snug down when the catch is locked. The canopy up catch should operate smoothly and freely but be firmly over center with lock open.

COOPER PAINTING PRODUCT USEAGE FOR AN S-10 SAKOTA

ITEM	S-10 SAKOTA
PRIMER DPU 35 (A)	1 1/2 GALLON
PRIMER THINNER DTU-870	1 GALLON
PRIMER CATALYST DPU-301	3/4 GALLON
FLEX DX 369	2 PINTS
PAINT DU 8000	1 GALLON
THINNER DTU	1/2 GALLON
CATALYST DU-5	1 GALLON
FLEX DX 369	2 PINTS
RED DU-72355	1/2 GALLON
THINNER DTU	1/2 GALLON
CATALYST DU-5	1/2 GALLON
FLEX DX 369	1 PINT
POLY BRUSH	2 GALLON

STITS PAINTING PRODUCT USEAGE PER MODEL

MODEL	POLY BRUSH	POLY SPRAY	POLY TONE	PT-100
S-10 SAKOTA	5 GALLON	6 GALLON	6 GALLON	4 GALLON

THINNERS: 3 Gallons per job typical.

NOTES:

1. First coat of Poly Brush is hand brushed.
2. Poly Spray allows for 2 coats.
3. Poly Tones may vary as much as a gallon due to color selection.
4. PT-100 is a clear coat. These quantities are 2 light coats "fogged" on.
5. Thinner type varies with temperatures in the paint booth. Use a low cost lacquer thinner for gun clean up to save poly thinners for the paints.

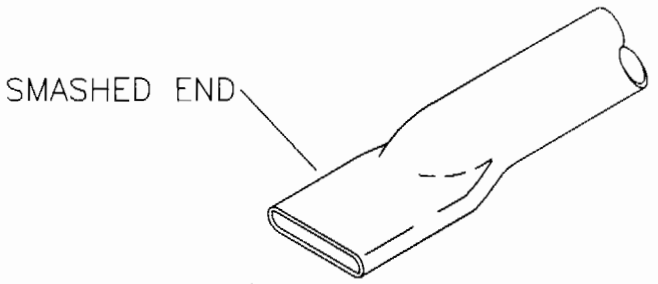
S-10 SAKOTA COVERING THE FUSELAGE

IMPORTANT: Before covering the fuselage, the wing fabric must be cut from the roll. See section on wing covering, page 014-8 step #14.

1. Rivet the turtle deck formers and tubes in place as per the directions. Be sure to use the stainless steel pop rivets to fasten the A and B formers to the airframe.

2. **NOTE:** The fuselage side former tubes need to have the end smashed flat. This is done so it will slip **OVER** the tab welded midway up on Station 3. Tap with a mallet against a hard surface to flatten. See **Figure 014-02**.

FIGURE 014-02



MD1217

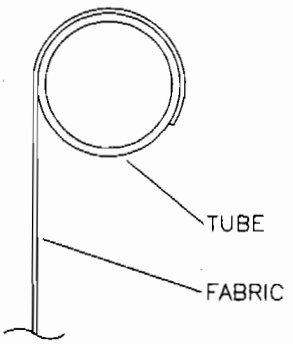
3. Bolt the two rudder cable guides to the tab in the AFT most point in the tail cone. (It's much harder with the covering on.)

4. Cut (2) sections of cloth the length of the aircraft plus 4".

5. Drape one piece of fabric from the tail to the firewall as per **Figure 014-05**(depending upon material width). Hold in place with the oversized plastic clothes pins. Trim to fit with at least 1 1/2" over hang after both sides are cut. Place them aside. The sides will be covered after the bottom.

6. Turn the fuselage upside down. Using scraps from the side cuts, trim, fit and glue the bottom fabric in place. Start at the rear and work forward. Make seams as needed by wrapping fabric around the nearest crossing or diagonal tube. As with any first fabric being glued to a frame, make sure the cloth wraps at least more than halfway around the tube. See **Figure 014-06.**

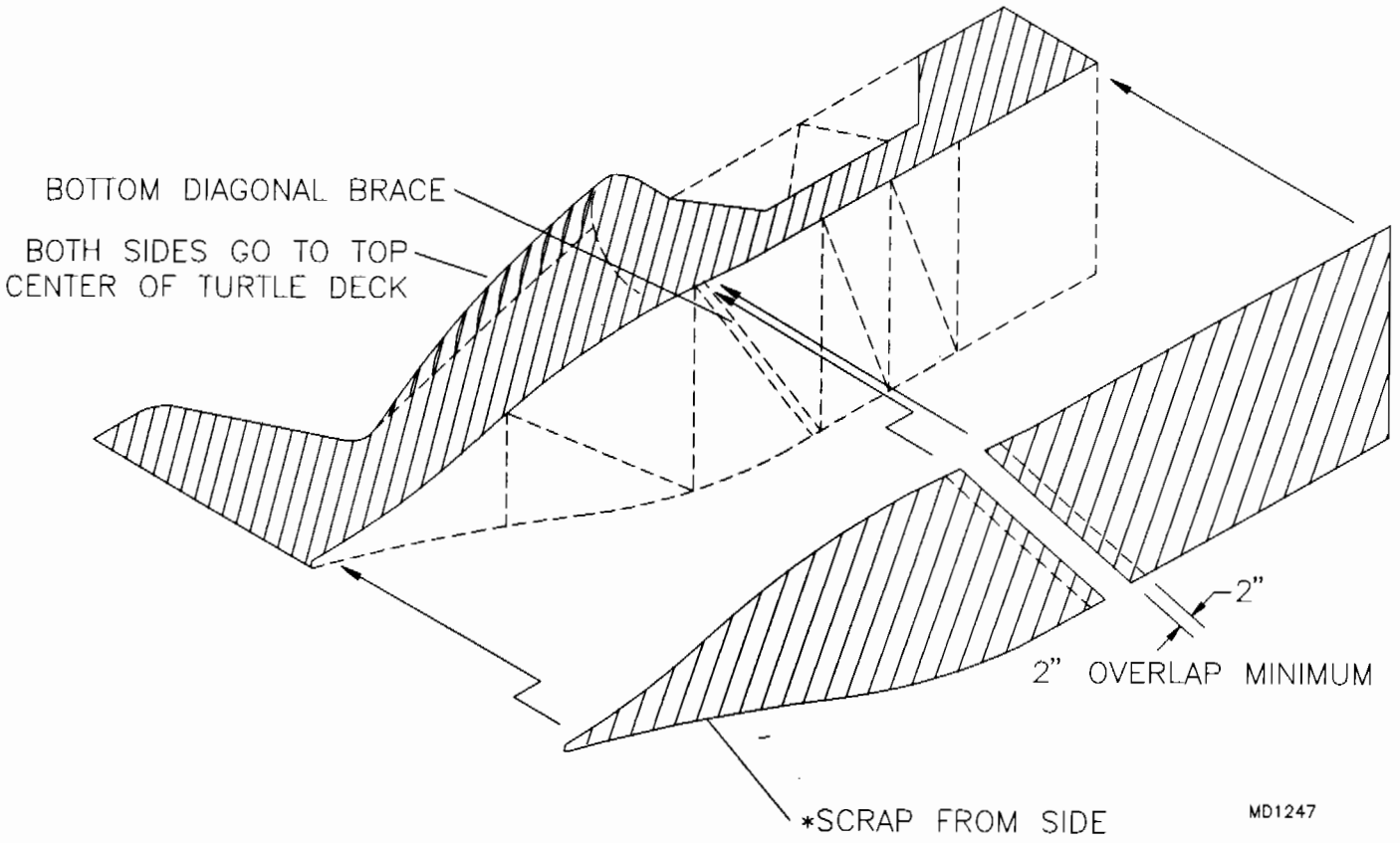
FIGURE 014-06



MD1218

CUT OUT 54" FABRIC WIDTH

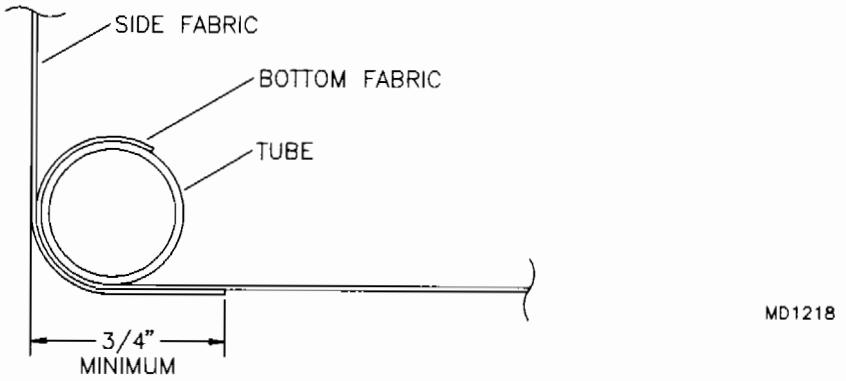
FIGURE 014-05



7. After the bottom fabric is glued in place and dry, heat shrink it tight (275°) with an iron (final heat of 350° is used when all fabric is on). **NOTE:** Hot air guns can be used but be careful to move on as you see the material shrink. Also, try to use a heavy iron. The aluminum units tend to loose so much heat when used continuously.

8. Next glue a side panel in place. Let dry, then shrink very lightly. **CAUTION:** Do not over shrink where the fabric is attached to the turtle deck top stringer or it will become crooked. Look at **Figure 014-08** for bottom longeron joint details.

FIGURE 014-08



9. Glue on remaining side panel to the very top of the stringer. Do not attempt to glue down the 2" overlap. Wait till the glue dries, then shrink the overlap portion (which should be dry and loose) to accomplish a pucker free lay down. Cement in place with Poly Brush. Be careful not to soften the area previously glued.

10. When dry, final shrink skin (350°).

11. Using the locator chart and the template prints, refer to nomenclature chart following **Figure 014-011** to apply detail work to the fuselage.

12. When all the details are completed re-check your work using the nomenclature chart.

13. The next step is painting, starting with sealing the fabric. Following the STITS manual will yield excellent results but only for STITS products. Whatever system you've chosen be sure everything is compatible and the directions are followed to the letter...unless you have experience on your side, deviations will be costly.

S-10 SAKOTA FUSELAGE COVERINGTAPES, EXITS AND REINFORCEMENT LOCATIONS

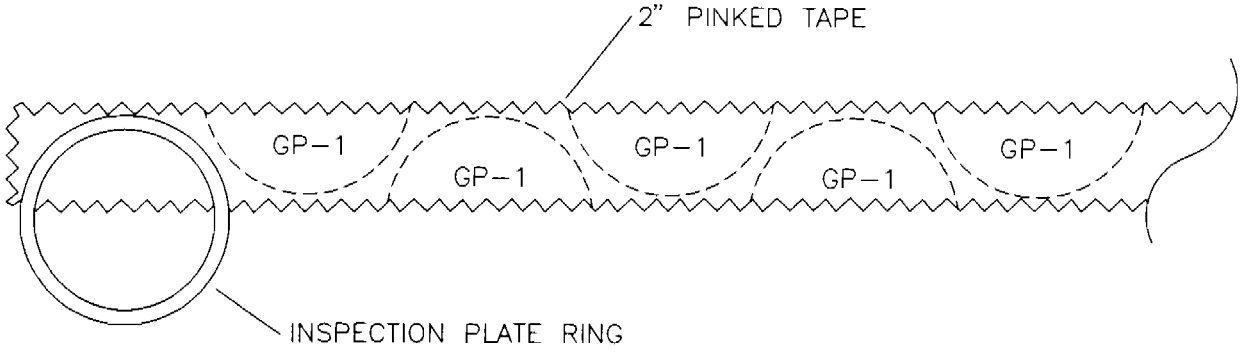
See the diagram showing details. **PLEASE NOTE:** All patches of fabric should be cut out with a pinking shears unless otherwise noted.

1. **2" Tape Covers:** Overlap the seam of each side panel. Place offset on one side of top stringer.

2. **Bias Tape:** Make 6" X 2" cut fabric scraps 45 degrees to wrap/weave of fabric.

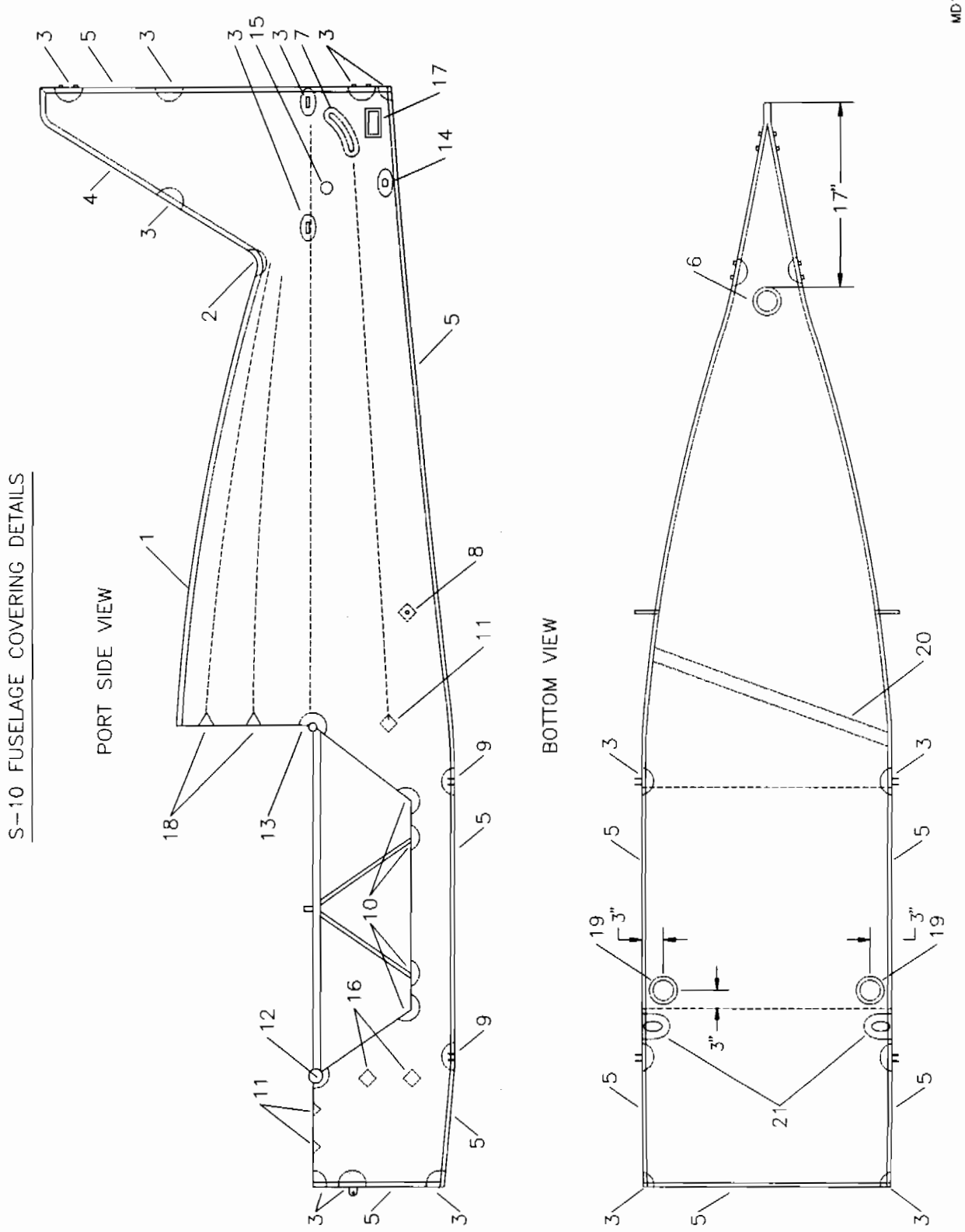
3. **GP-1 (See Prints):** This is a common patch used in many places. The patch is cut from 2" pinked tape. Use an inspection plate reinforcing ring as a template. See **Figure 014-03**. About 80 will be required.

FIGURE 014-03



MD1216

FIGURE 014-011



4. **2" Pinked Tape:** Glue centered edge on the edge using a small amount of Poly Tak. Poly Brush the areas where the tape will lay. When this is dry, press the tape down with a hot iron (moderate heat) on either side of the bend. Use this method on all outside corners on the tail group.

5. **2" Pinked Tape:** These tapes should be glued on with Poly Brush on one side and left to dry. Be sure tapes are glued on so they wrap the edges evenly. Glue down the other side when the first edge has dried. This method eliminates the "spring back" tendency of the tape when trying to glue it all down at once. Use this trick throughout the covering process.

6. **Inspection Plate Rings:** See print for exact locations.

7. **Elevator Exit:** See print for exact locations and fabrication template. It is made from .060 lexan scrap. Cut a fabric cover patch 1" larger all round.

8. **4" X 4" Square Patch:** Cut from lexan scrap material. Center hole should fit tight over the foot peg.

9. **Strut Tang Exits:** It is made from the thin lexan sheet provided. Simply tape down the print, peel off the plastic coating on the lexan, tape down the lexan over the print and cut out with a razor. A deep score with a razor knife is sufficient to simply "snap" the part out. Cutting clear through with the razor is not only difficult but unnecessary.

Once the lexan part is cut out, check it for fit. Next, cut a patch of fabric approximately 1" larger (see print). Soften and glue the lexan to the tang exits with Poly Brush. Then Poly Brush down the fabric patch.

10. **2" Circle Patch:** These are 2" diameter circles cut in half or to fit and Poly Brush on at the side window junctures. (6 required)

11. **2" Square Patch:** Cut from 2" pinked tape, then cut in half. Lay over tabs for attaching the top wrap and where the side stringer ends forward. (6 required)

12. **S-2 Wing Attach:** Use print for pattern. Poly Brush in place.

13. **S-3 Wing Attach:** Use print for pattern. Poly Brush in place.

14. **Rudder Cable Exit:** Rudder cable exit cover. Glue direct to the fabric. Cut a patch 3/4" larger with center out for exit "bump". Locate the center of the slot 16" from the end and 1" up.

15. **Trim Exit:** This is on the aircraft's starboard side and is simply a 2" X 2" patch. Poly Brush in place.

16. **Muffler Attach Bushings:** These are 2" X 2" patches. Poly Brush in place on **BOTH** sides of fuselage.

17. **Tail Spring Bolt Access:** See print. 5" X 7".

18. **4" Square Patch:** For S-10's only. Apply to reinforce stringer to former intersections. See print.

19. **Brake Cable Exits:** Locate 3" inboard and 3" AFT if forward seat truss. Use a 2" diameter lexan disc sandwich with fabric.

20. Wrap the fabric to a convenient tube to make the fabric scraps work for covering the belly.

21. **Gear Socket Patch:** Cut a fabric patch 2" greater than gear socket hole, apply to the bottom over the hole.

*Poly Brush is a STITS product used to seal the fabric. A similar material is ok if it heat bonds.

GENERAL NOTES:

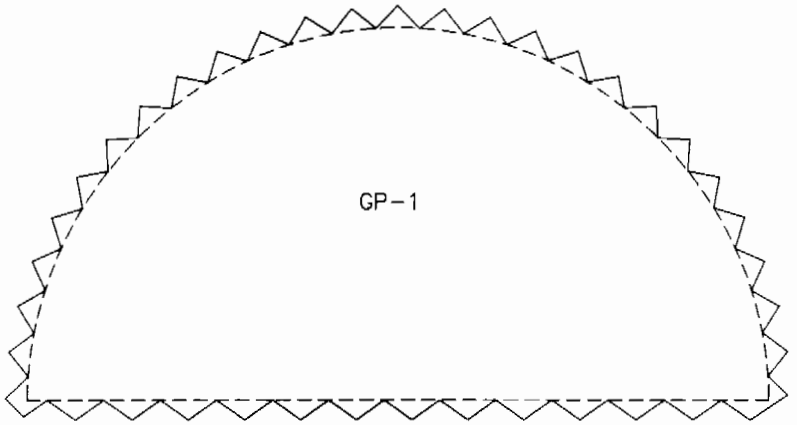
1. Poly Brush **ONLY** where the patches and tapes will lay. Excess will show up even with the final clean coat.

2. Melt in loose pinked edges with the iron.

3. Typically pink all edges of patches.

4. Do not "over brush", it can cause roping, the rolling up of the Poly Brush or Poly Tak into a gooey mess!

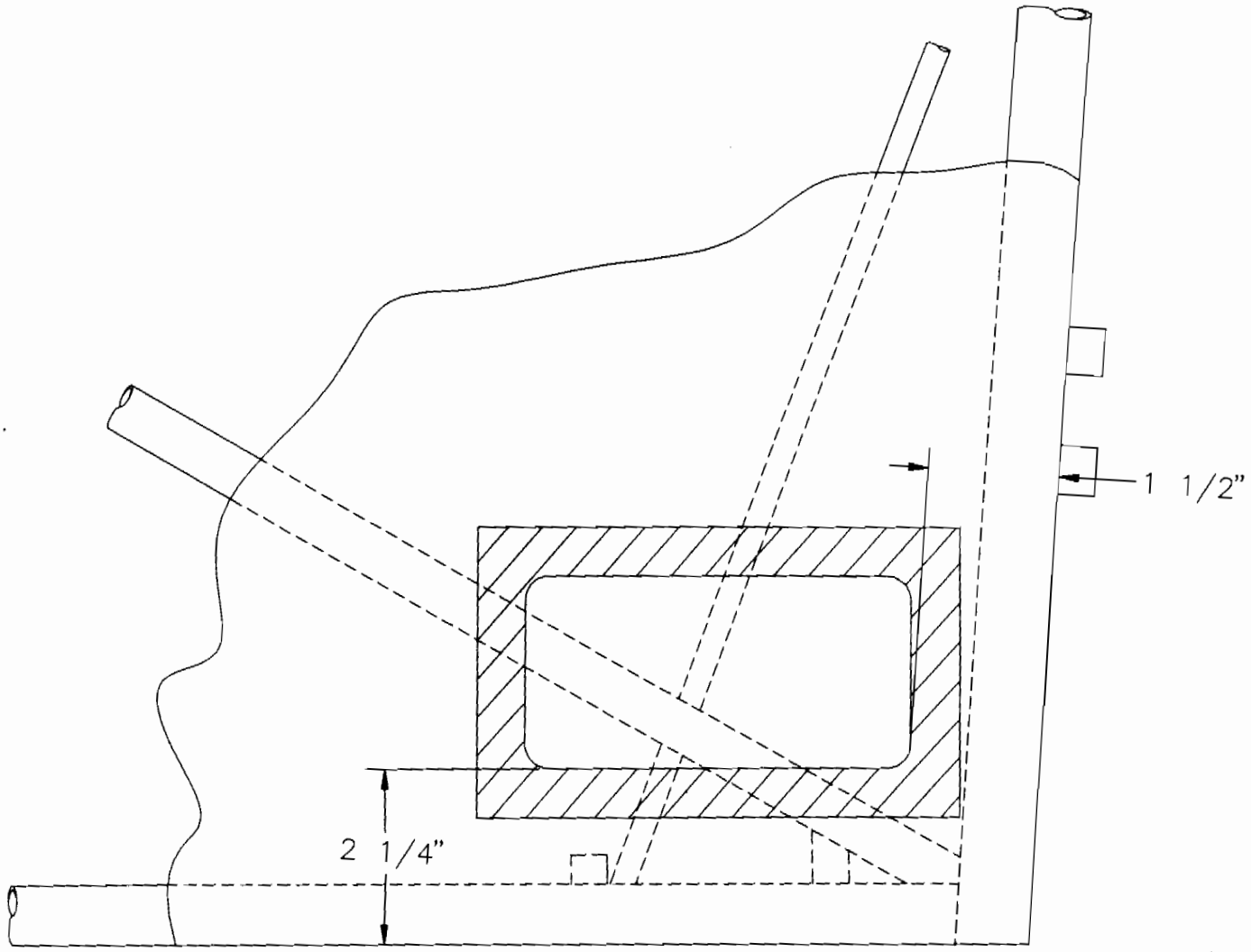
5. Make sure all tapes and patches are evenly top coated with Poly Brush or whatever sealer you are using prior to spraying.



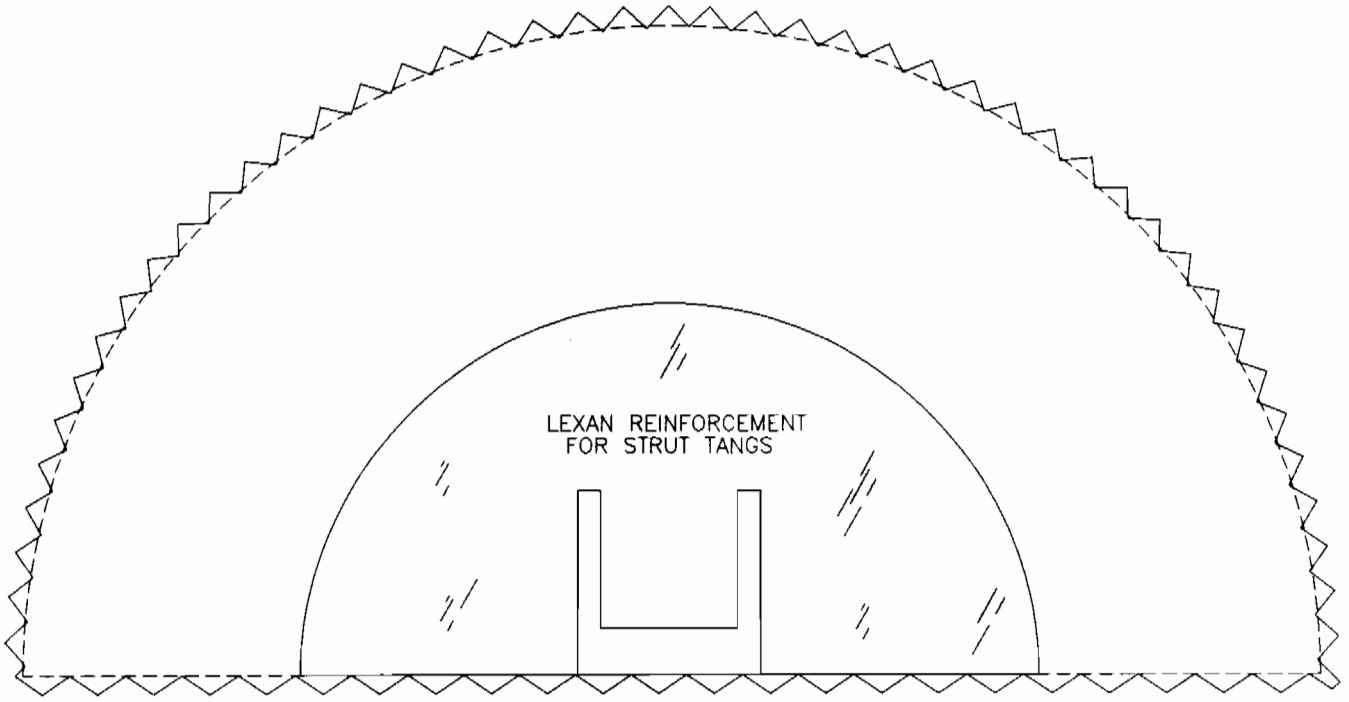
NOTE: MAKE AT LEAST 86 GP-1'S

MD1357

TAIL SPRING BOLT ACCESS LOCATION



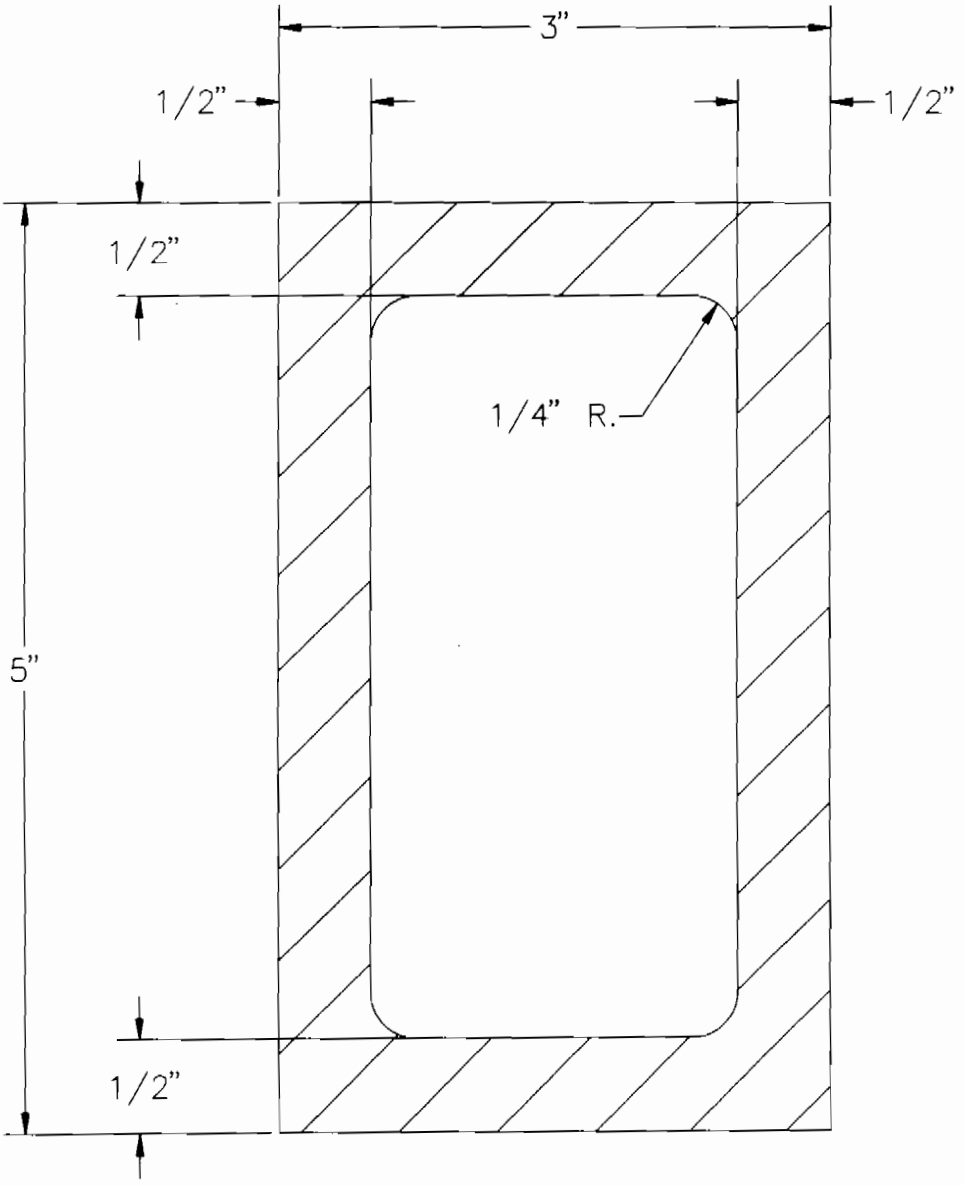
LOCATE INSPECTION HOLE ON LH SIDE OF TAIL AS SHOWN ABOVE.



NOTE: MAKE FROM .020 LEXAN
QTY. 4

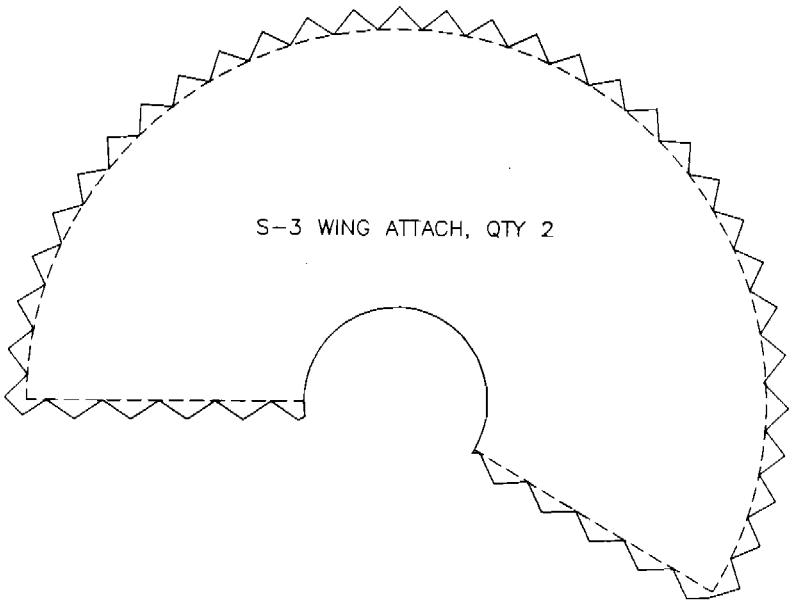
MD1359

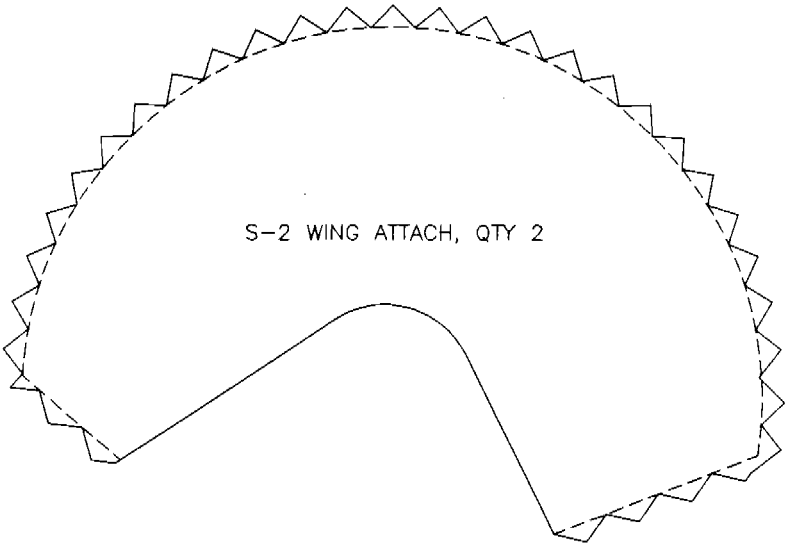
TAIL SPRING BOLT ACCESS



.06 SCRAP LEXAN

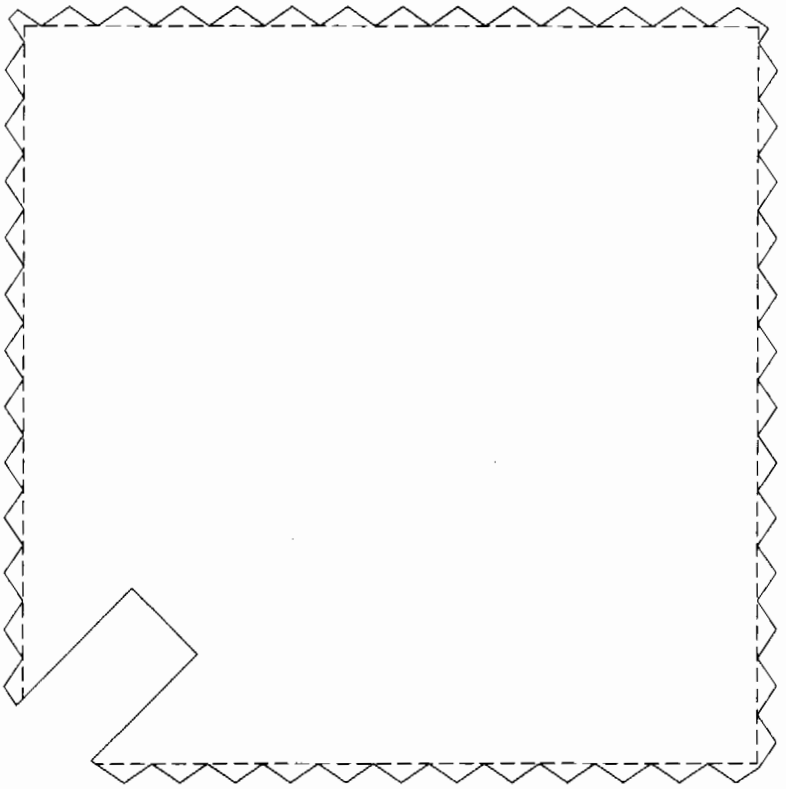
MD1226



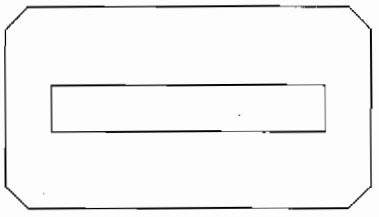


NOTE: MAKE FROM SCRAP CLOTH

MD1358

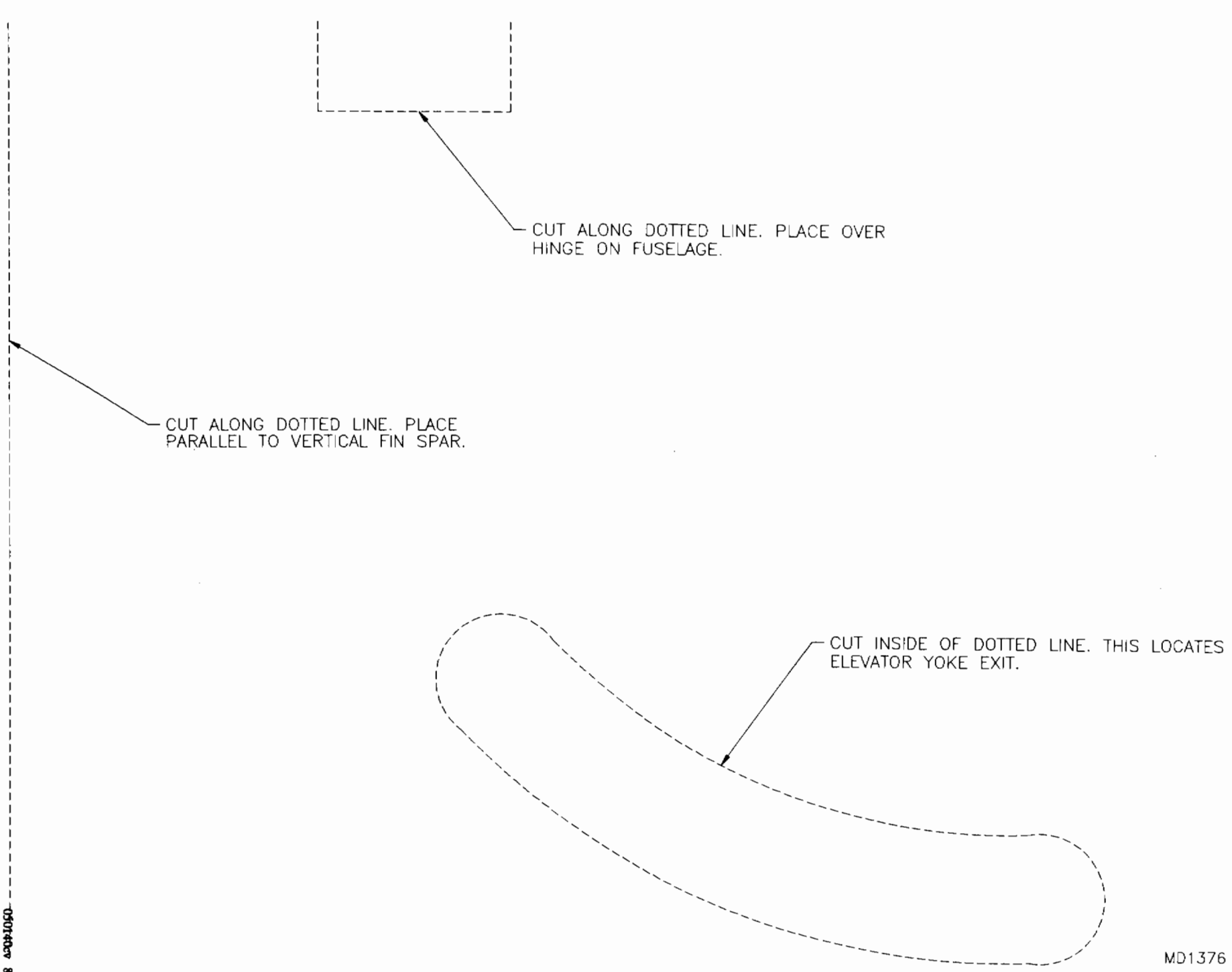


TURTLE DECK PATCH, 4" SQUARE TAPE

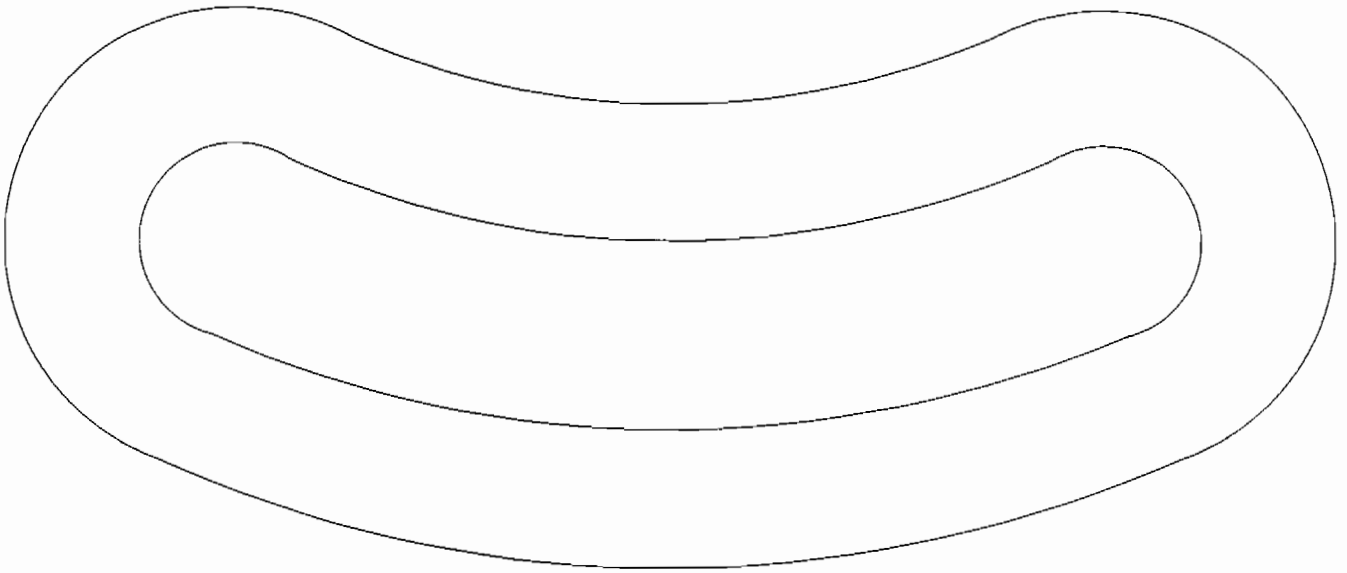


RUDDER CABLE EXIT, .020 LEXAN, QTY.2

MD1360


CUT ALONG DOTTED LINE. PLACE OVER HINGE ON FUSELAGE.
CUT ALONG DOTTED LINE. PLACE PARALLEL TO VERTICAL FIN SPAR.
CUT INSIDE OF DOTTED LINE. THIS LOCATES ELEVATOR YOKE EXIT.

MD1376



ELEVATOR YOKE EXIT

2 REQ'D. .060 LEXAN SCRAP

MD982

S-10 FUSELAGE COVERING CHECKLIST

USE THIS CHECKLIST AFTER COMPLETING THE FUSELAGE COVERING PRIOR TO PAINTING.

1. ____ Elevator Exits, See Template
2. ____ Rudder Exits, See Template
3. ____ Trim Cable Exit, 2" Square
4. ____ Vertical Fin Hinges, GP-1
5. ____ Foot Peg Patch, 4" Square
6. ____ Stabilizer Hinge Patches, GP-1
7. ____ Strut Attach Lexan & Patch, See Template
8. ____ AFT Carry Through Exit, See Template
9. ____ Forward Carry Through Exit, See Template
10. ____ Muffler Exit Patches, 2" Square
11. ____ Bungee Exit Lexan & Patch, See Template
12. ____ Cowl Tab Patch, GP-1
13. ____ Radiator Tab Patch, 2" Square
14. ____ Sea Plane Exit Patch, (If Applicable)
15. ____ Side Former to S-3 Patch, 2" Square
16. ____ Surface Tapes on All Seams, 2" on Top Turtle Deck
17. ____ 2" Tape on Front Wrap Tabs
18. ____ Vertical Fin Seam 2" Tape
19. ____ 2" on Bottom Seam
20. ____ 2" Around Ballastic Exit
21. ____ Drain Grommets
22. ____ Inspection Hole on Bottom & Side of Tailcone, See Location Drawing.
23. ____ Bottom Cable Hole on Vertical Fin, GP-1
24. 2" Tape from Radiator to Nose for Bushing Exits

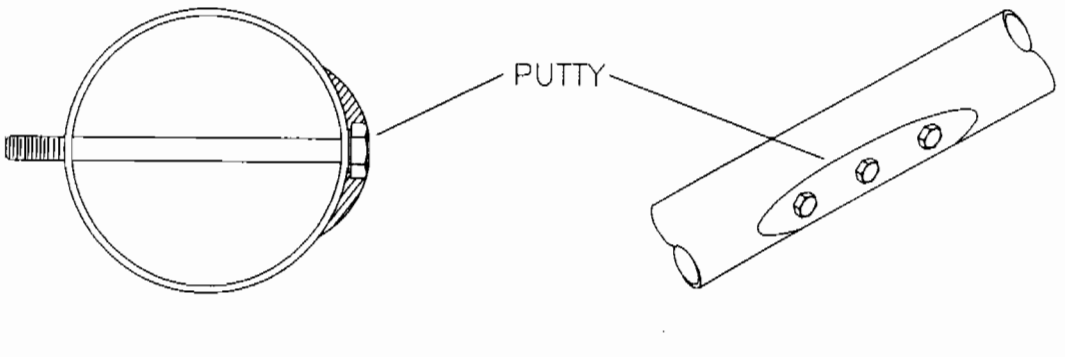
COVERING THE S-10 SAKOTA WING

HINT: Drill a hole horizontally through the middle of the tip bow, use a pivot point.

1. The very first thing before covering any part of the aircraft is to cut (4) 125" lengths of cloth from the roll. These will be used to cover the wings and the ailerons.

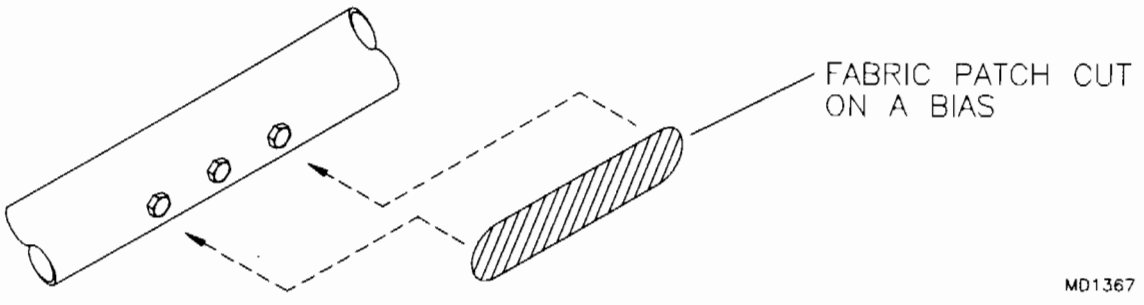
2. Prior to covering, it is recommended to body putty over the 1/4" bolt heads protruding through the spars at the strut plates. Shape and sand smooth as in **Figure 014-02**.

FIGURE 014-02



CAUTION: Use 80 grit or finer sandpaper. Avoid sanding aluminum. An alternate method is to cut a fabric patch on the bias. This will shrink smoothly around the bolt heads. See **Figure 014-02A**. Apply the patch first, **THEN** cover the wing.

FIGURE 014-02A



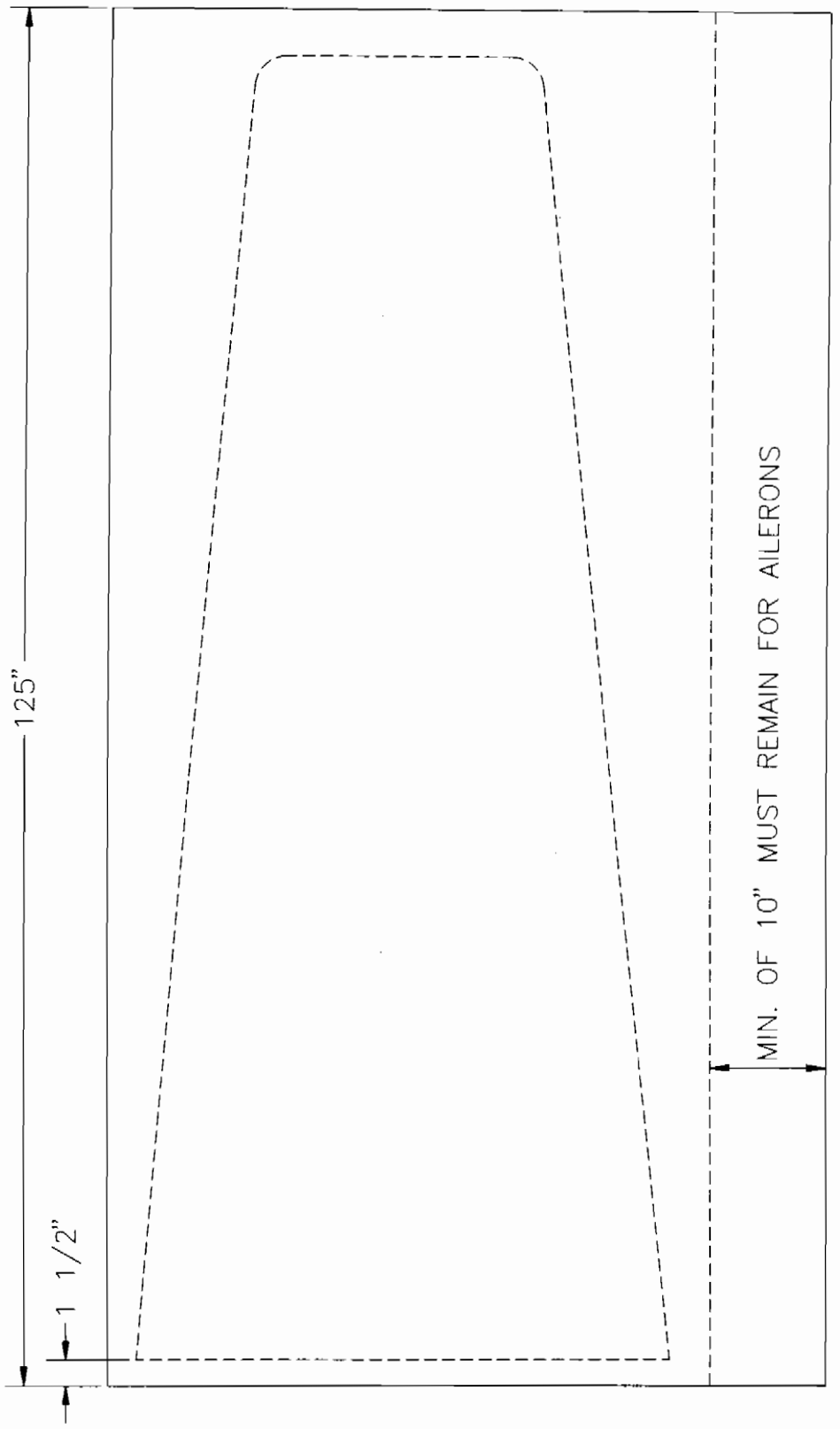
3. Using big plastic clothes pins, position a pre-cut fabric panel on the top of the wing as shown in **Figure 014-03**. Pay close attention to overhangs. Remember the ailerons are covered from these scraps!

4. Below is a pre-covering inspection. Perform this inspection and compliance before proceeding to Step #5.

5. Attach the fabric to the top first. Establish overlaps as shown in **Figure 014-05**. Shrink around the edges when the glue is dry. Cut reliefs on the wing tip corners as shown in **Figure 014-05A** (both the top and the bottom). Wrap the root ends (both the top and the bottom) as shown in **Figure 014-05B**.

FIGURE 014-03

MD1366



S-10 SAKOTA WING PRE-COVERING INSPECTION & CHECKLIST

_____ Root Rib Clips (4) Rivets?

_____ Step Web, Sub Plate in place?

_____ Nut Plates on Aileron Hinge Points?

_____ Bolt Heads Puttied and Shaped?

_____ All Bolts Properly Secured?

_____ All Rivets Seated?

_____ All Rib Compression Tubes in Place and Secure?

_____ Tip Bow Riveted?

_____ ASI Line in Place?

_____ Pitot in Place?

_____ Tip Rib Tension Straps Installed?

_____ Leading Edge Wrap Riveted, Taped Down and Puttied?

_____ Root Strips Riveted?

_____ Fuel System Installed?

_____ Vent Line Run?

_____ Tank Fitting Glued In?

_____ 1/4" Bolts in Anti-Drag Tube?

_____ Wing Channels Secured?

_____ Teleflex Bracket Installed?

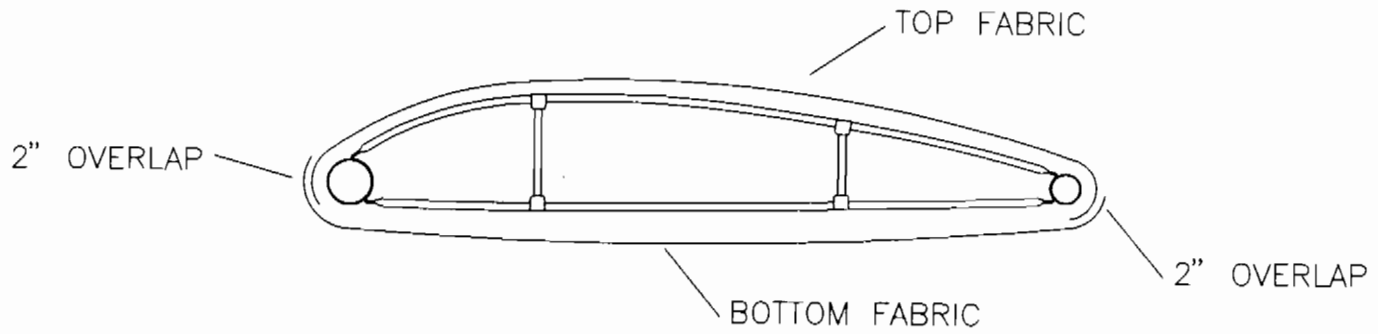
_____ Wipe Off Any Paint That Could Come Through the Fabric?

_____ 1/4" Plastic Washer on Pitot and Static?

If the wing has passed inspection, clean off with a dust cloth, then proceed to covering.

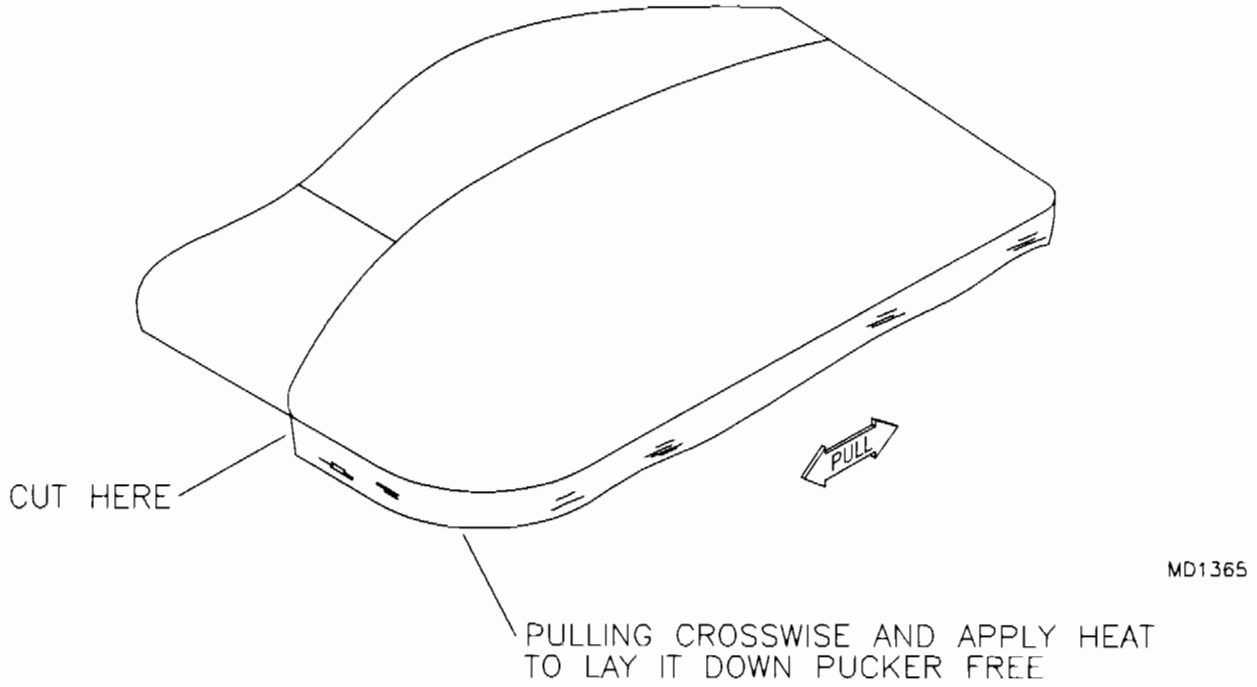
NOTE: The aileron teleflexes are installed **AFTER** covering and painting. This allows for replacement in the future when they are worn (500 to 1,000 hours). **DO NOT** tie in place.

FIGURE 014-05



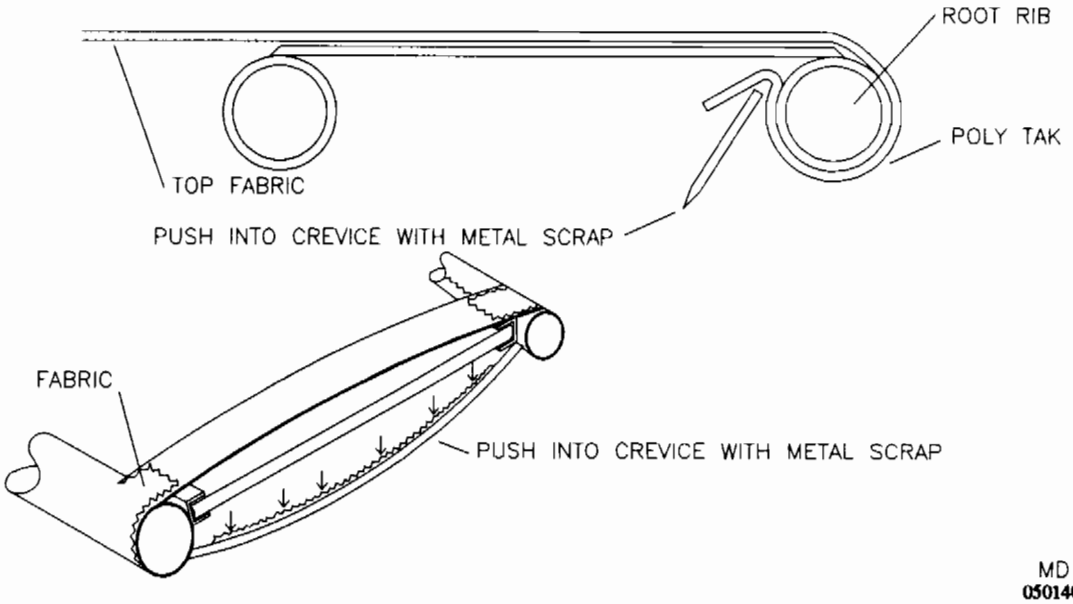
MD1365

FIGURE 014-05A



MD1365

FIGURE 014-05B

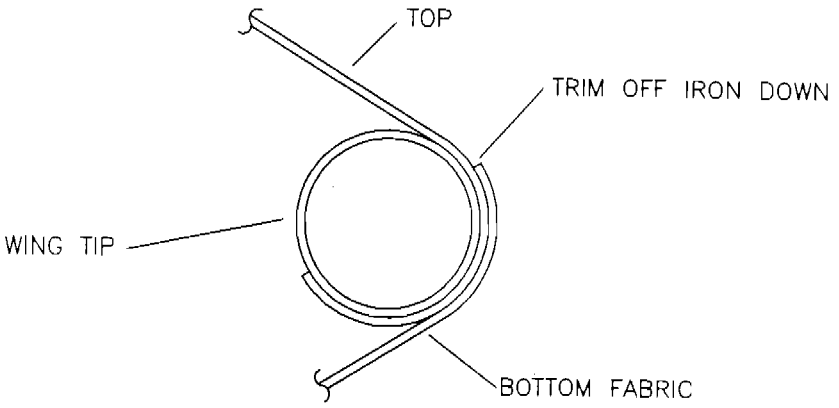


MD1377

6. Cover the bottom of the wing. Refer to **Figure 014-05** for overlaps.

7. Neatly trim the excess off the wing tip as per **Figure 014-07.**

FIGURE 014-07



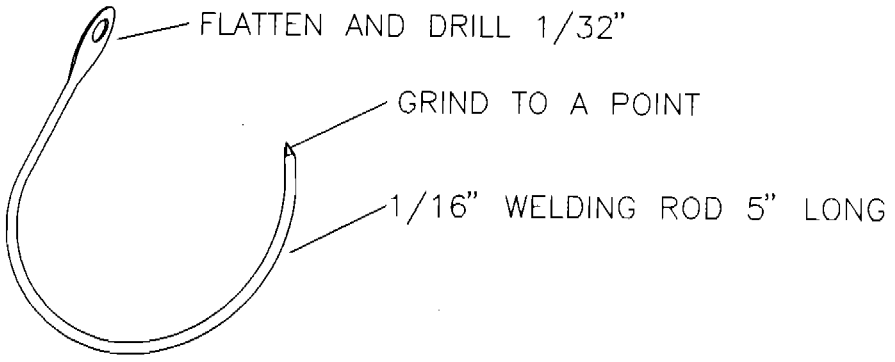
MD1377

8. Check the areas of overlaps and iron out any puckers and/or wrinkles. Shrink to final tautness, cut with a razor where the strut plates and fuel tanks protrude.

9. Apply the 1/4" wide rib stitch re-inforcing tape to the very peak of the ribs. Start at the leading edge wrap and trim off within 3" of the AFT spar. For the bottom, run tape from 4" back from leading to 3" from trailing edge. Mark off every 2" and fabricate. Needle and stitch as described and illustrated in **Figures 014-09, 014-09A, 014-09B** and **014-09C.**

PLEASE NOTE: If you plan on cruising over 110 mph, please rib stitch the tail and ailerons.

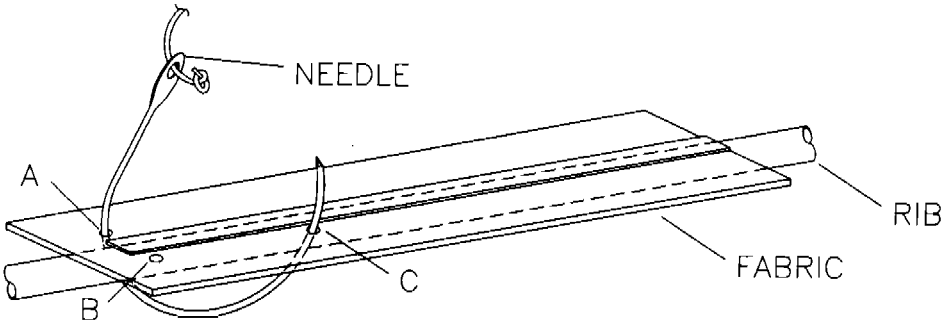
FIGURE 014-09



MD884

A. Route the needle through the pre-punched holes from one side of the rib to the next.

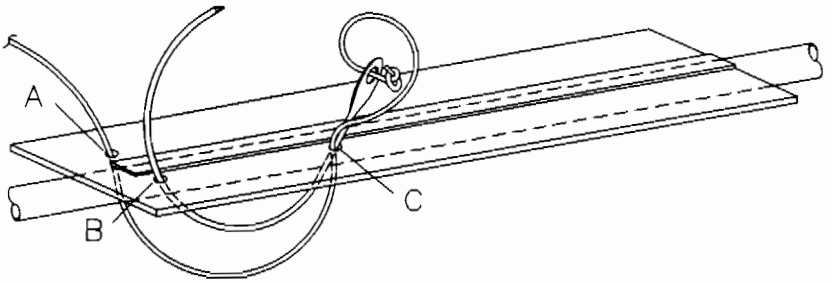
FIGURE 014-09A



MD884

B. Re-insert the needle into hole "C" then back out through "B".

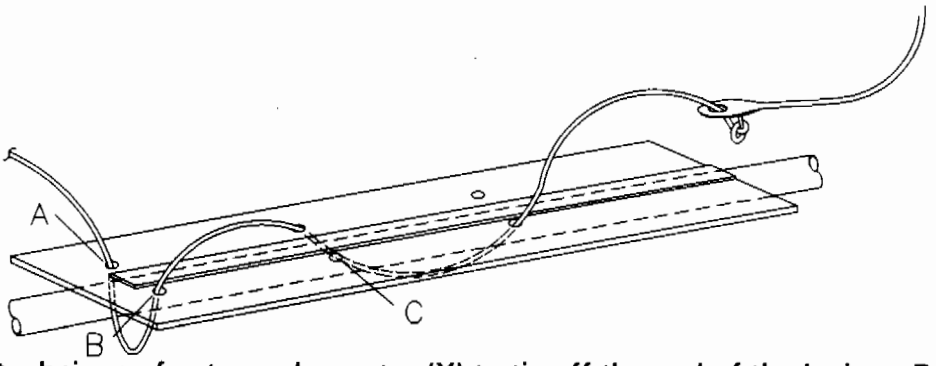
FIGURE 014-09B



MD884

C. Lace up the rib spacing laces as required. The first stitch should enter across from hole "C".

FIGURE 014-09C

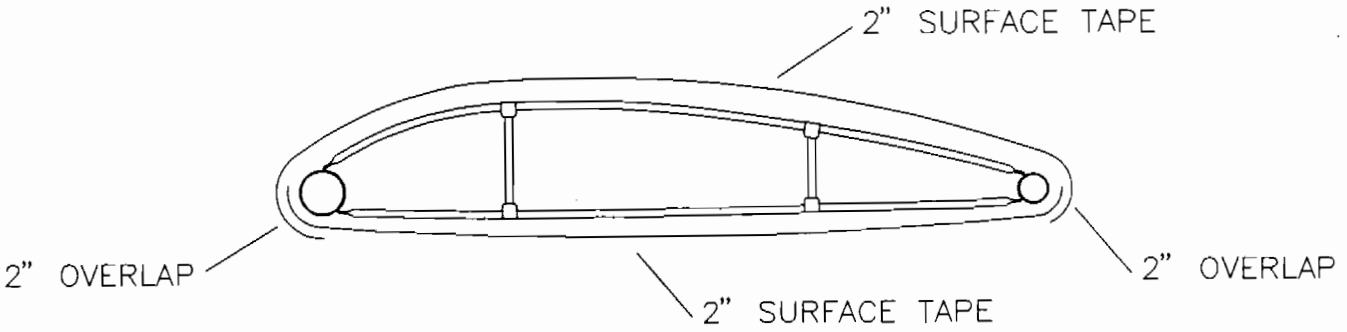


MD884

D. Use the same technique of entry and re-entry (X) to tie off the end of the lacing. Pull the lacing tight back to start and tie off. Snip the lacing cord close to the knots.

10. Apply 2" surface tape centered over the AFT edge of the leading edge wrap running spar wise. Next apply 2" surface tapes as per **Figure 014-010** to cover the bottom ribs first.

FIGURE 014-010

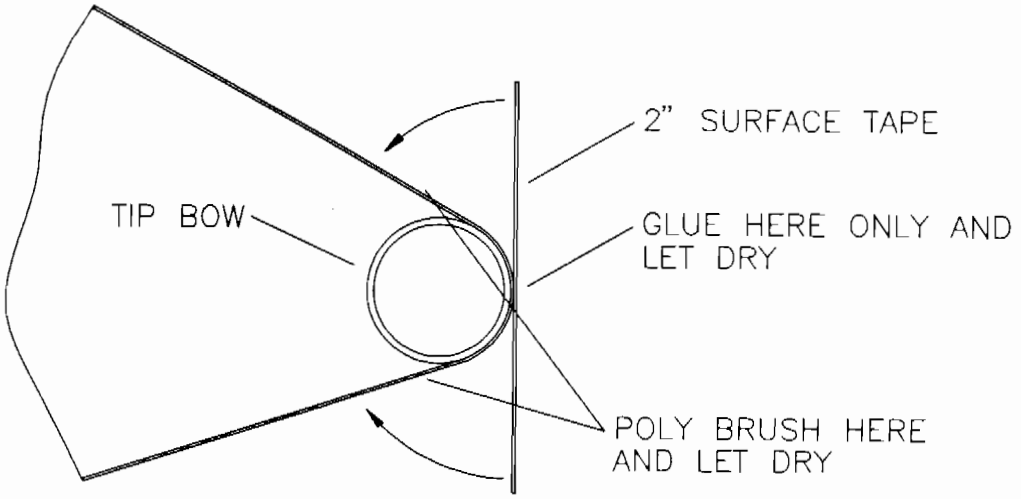


MD1364

11. Apply 2" surface tape over the root rib edges and second outboard rib to cover the rivets. Do the top and the bottom.

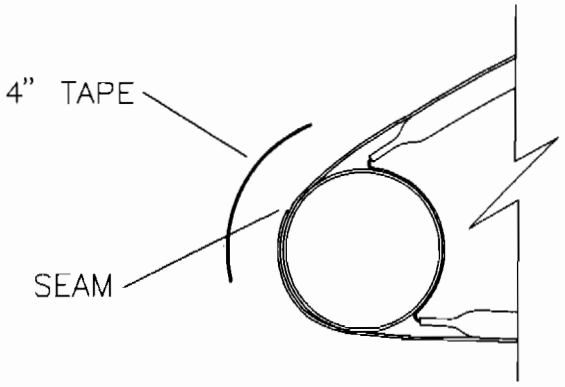
12. Glue with Poly Tak, 2" surface tape to the middle of the tip bow. Apply Poly Brush 1" on either side. When dry, iron down flat. See **Figure 014-012**. Overlap the 2" tape at least 2" onto the front and rear spars.

FIGURE 014-012



13. Apply the 4" wide surface tape across the leading edge seam. From the root up to but not including the tip bow. See **Figure 014-013**.

FIGURE 014-013



14. Apply 2" surface tape over the seam on the trailing edge spar.

15. At this time, it is a good idea to punch through the 6 eyebolt holes along the rear spar. Once the paint is on, they are hard to find.

16. Cut from the thin lexan (2) each of the strut attach plate re-inforcements. Use a razor and snap apart. See **Figure 014-016** and **Figure 014-016A**.

FIGURE 014-016A

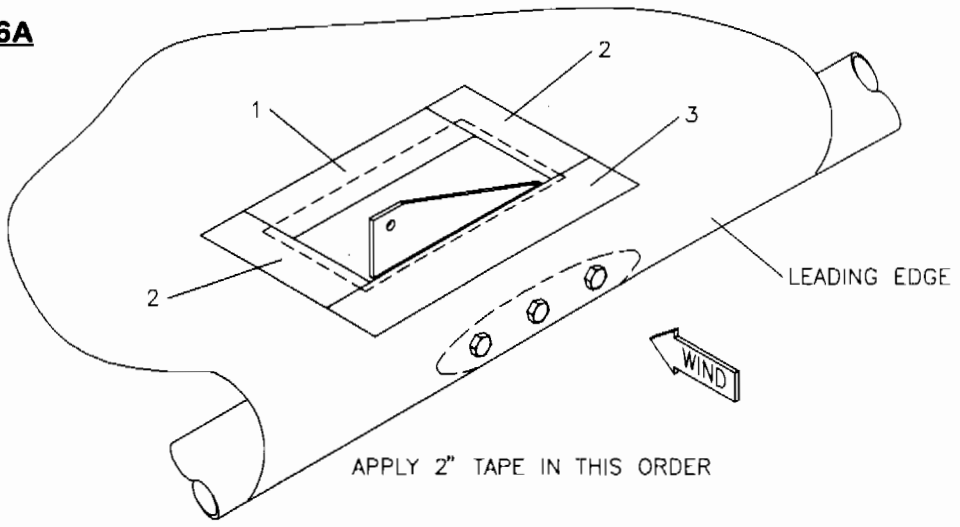
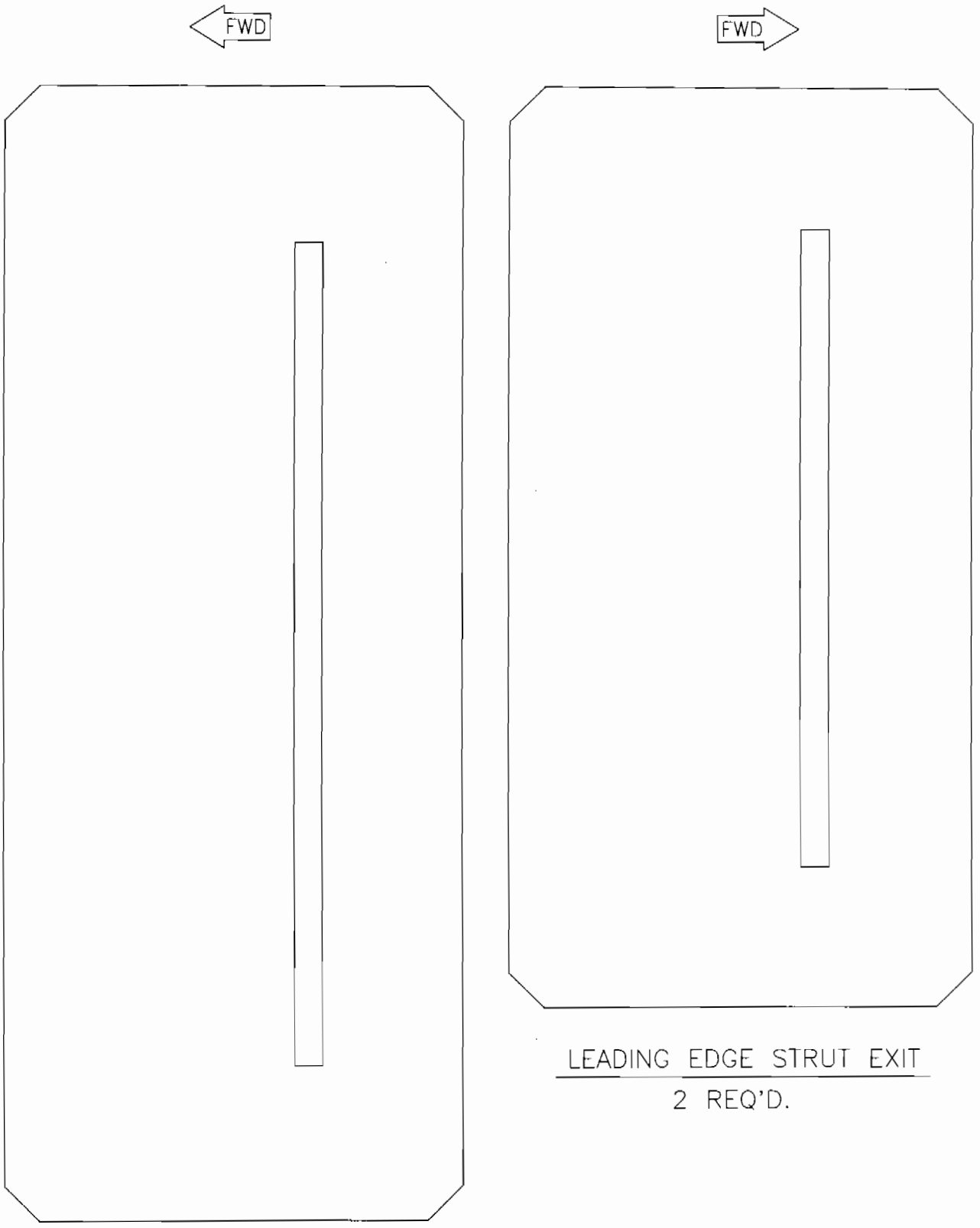


FIGURE 014-016



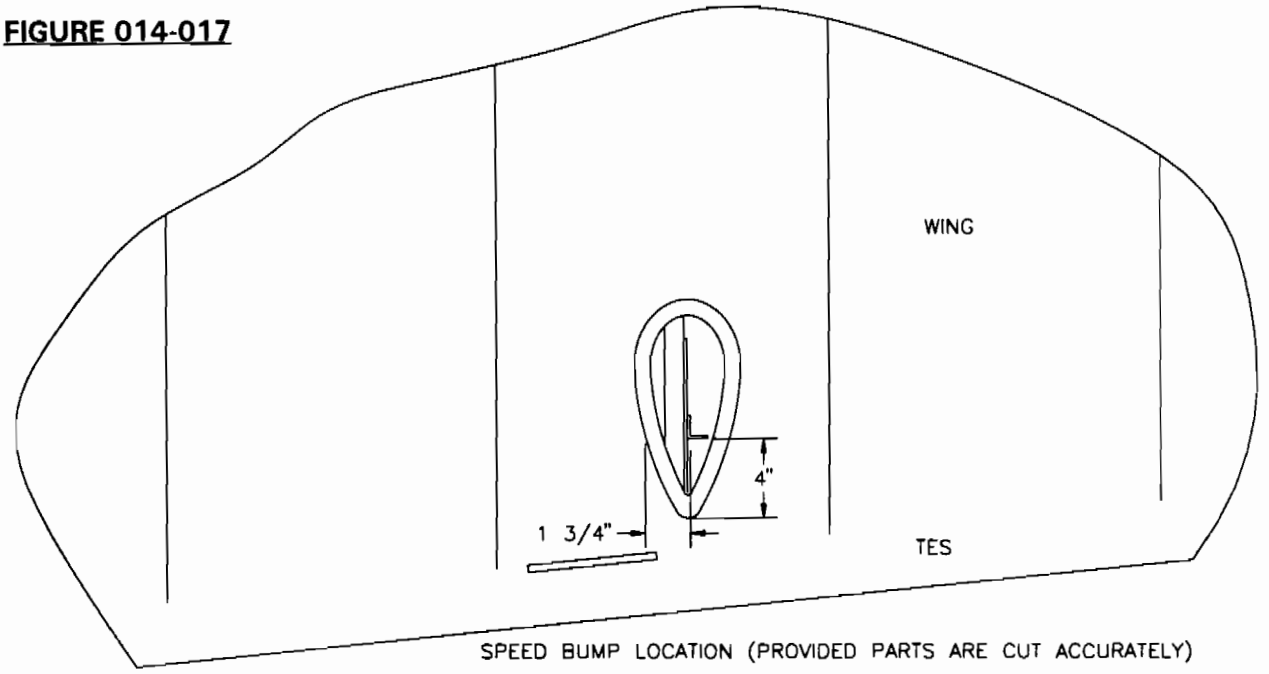
LEADING EDGE STRUT EXIT
2 REQ'D.

TRAILING EDGE STRUT EXIT
2 REQ'D.

MD980

17. Sand the speed bump reinforcements to rough up for gluing. See **Figure 014-017**. Also, cut from scrap cloth a patch approximately 1" to 2" bigger than the rings. Remember all patches should be pinked. The lexan is used as a base to screw the speed bump in place. Use the small screws provided to attach the speed bumps. Space the screws so at least 8 to 10 screws are used per bump. Cover over the lexan with a patch of cloth at least 1" to 2" wider than the lexan to secure the fabric.

FIGURE 014-017



SPEED BUMP LOCATION (PROVIDED PARTS ARE CUT ACCURATELY)

MD1380

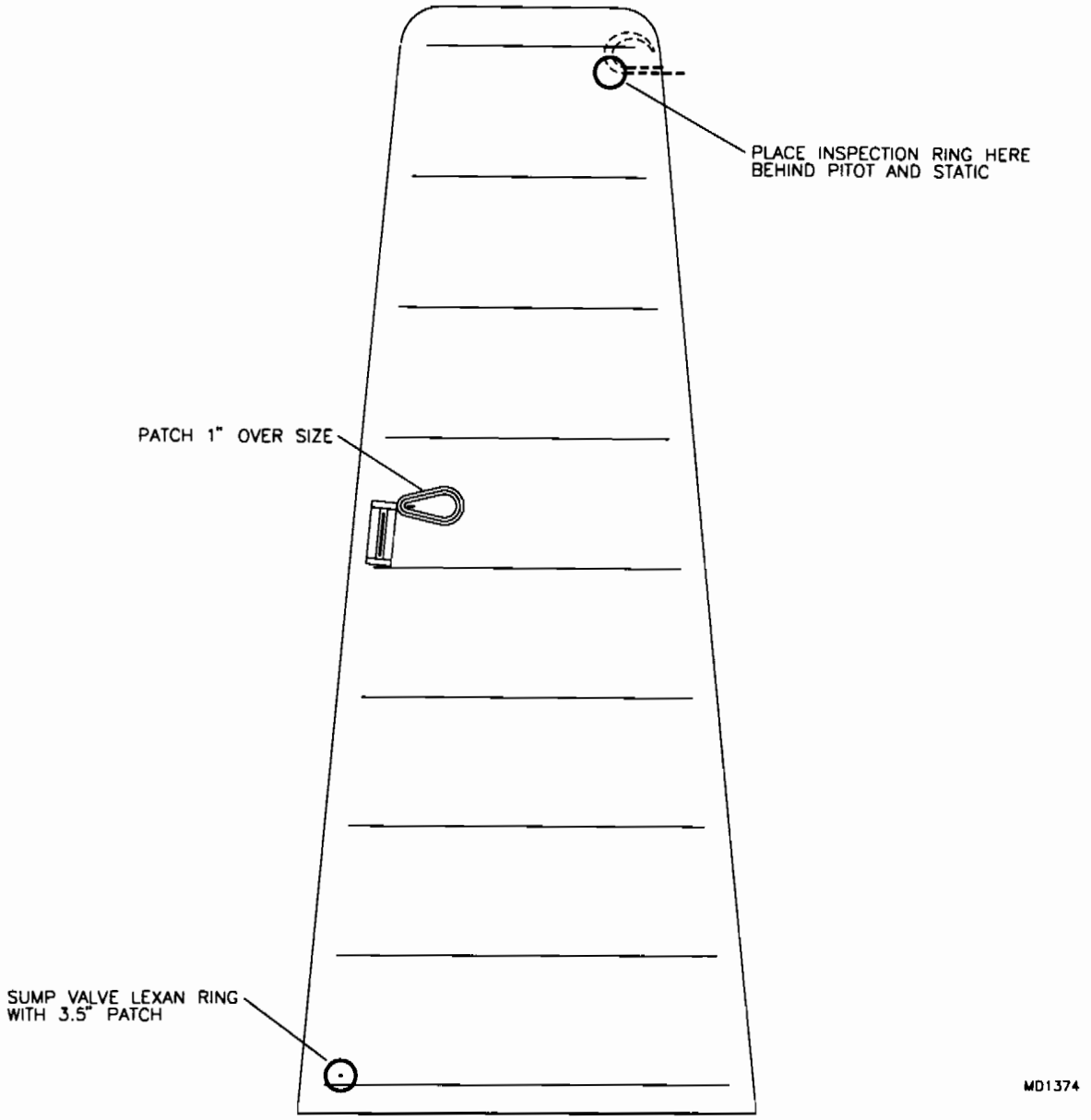
18. Cut 2 circles from .020 lexan 2" in diameter with a 3/4" hole for the fuel sump valve grommet. Cut a 3 ½" diameter fabric patch to attach the grommet. Cut open the sump valve after painting.

19. Apply Poly Brush to the areas where these parts will be placed. Let dry. Glue parts in position followed by the cloth patches with Poly Brush. **HINT:** Poly Brush the lexan parts and let them "tack-up" a bit prior to applying. See **Figure 014-019** for locations of the inspection rings.

20. Second coat all tapes and patches with Poly Brush being careful not to brush anywhere but on the patch or tape itself. Apply a generous amount of Poly Brush on the pinked edges to assure saturation.

21. Iron down any puckers, wrinkles or dry pinked edges once the Poly Brush is dry. This should ready the wing for painting. Store in a dust free room or wrap in plastic until it is time to paint.

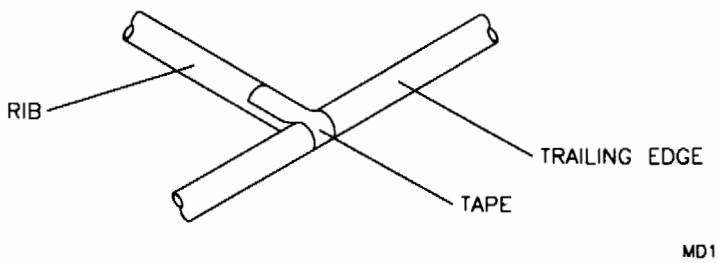
FIGURE 014-019



COVERING THE AILERONS

22. Prepare the aileron frames for covering by filing the rib tubes to contour the leading edge spars. Then rivet the (K-1000-3) 3/16" nut plates to the inside of each spar. Align with the hinge holes. Use #40 aluminum pop rivets and a 3/16" bolt through the hole to line up. Use masking tape to tape the "buttons" on the trailing edge to the ribs. See **Figure 014-022**. Check for burrs and clean.

FIGURE 014-022

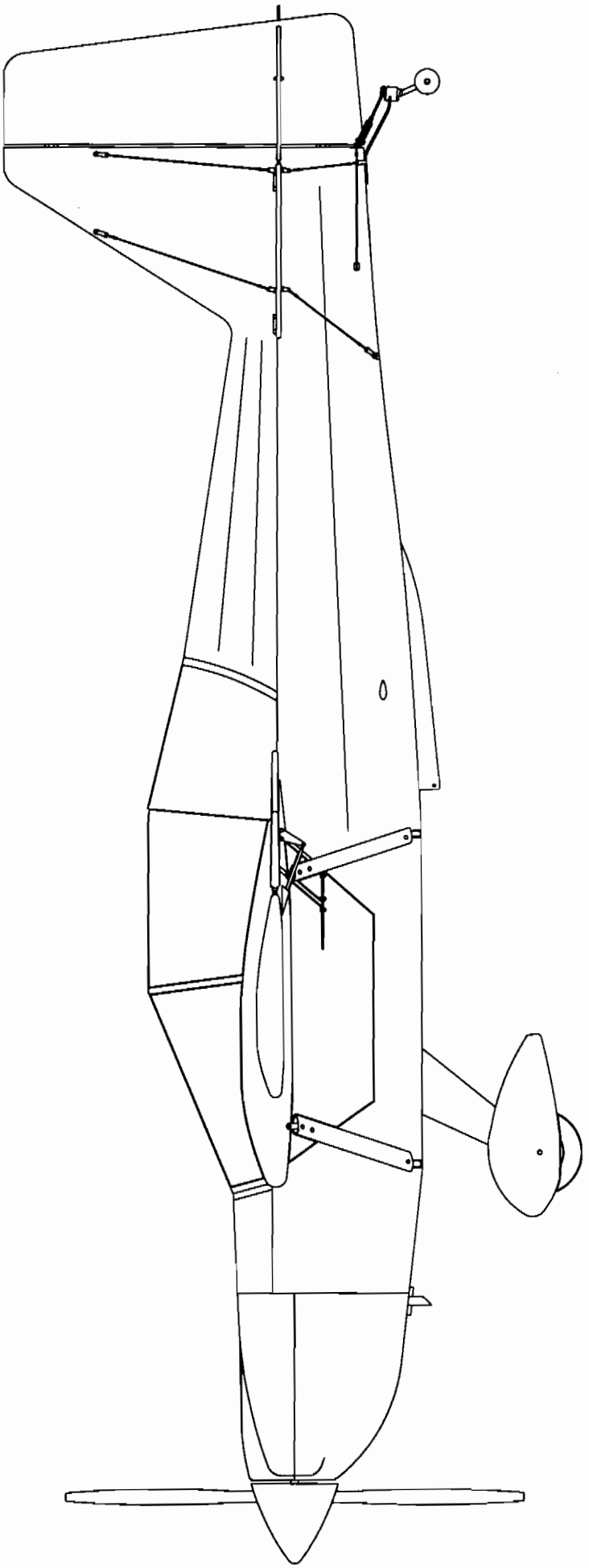


23. On a clean table, lay out the scraps of fabric from the wing. Lay an aileron frame over the fabric. Trace an outline at least 1" bigger all around. Cut and glue the fabric to the frame, wrapping around at least halfway. Let the glue dry.

24. Trim off excess and shrink lightly to pull out edge puckers.

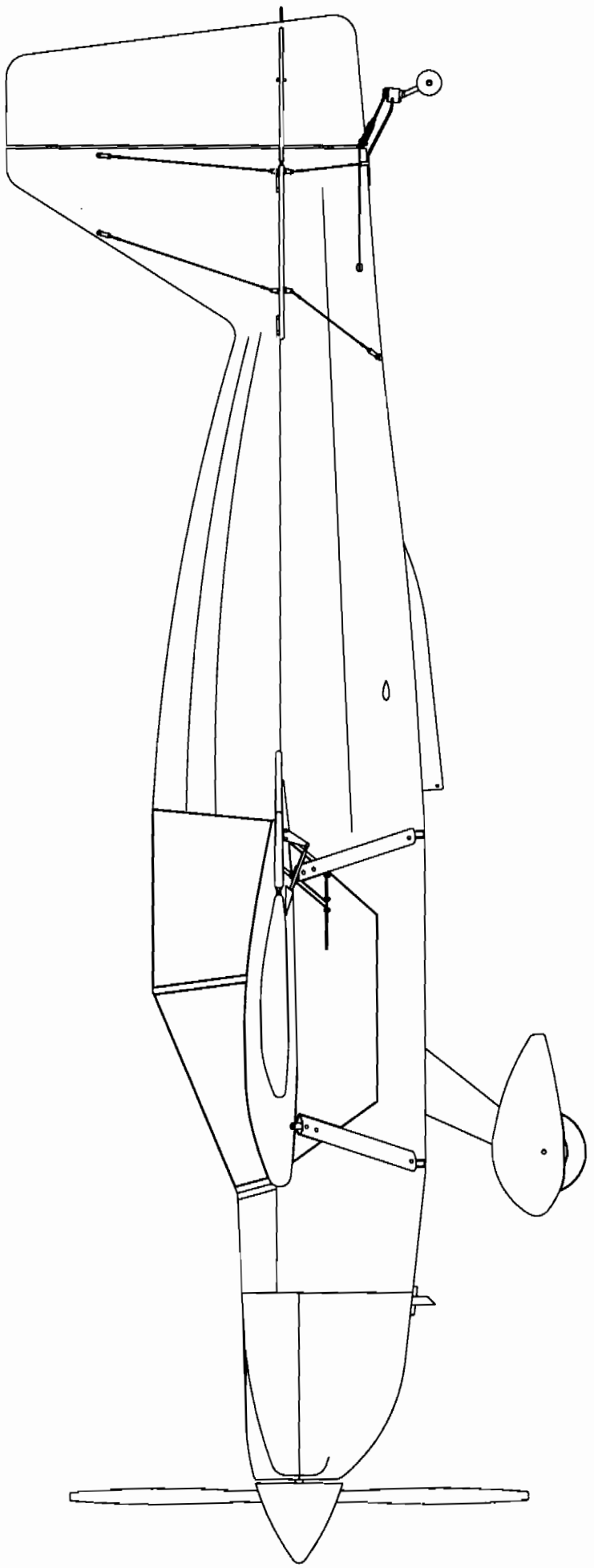
25. Glue another parcel of fabric to the other side with at least 3/4" to 1" overlap. Trim neatly and shrink.

26. Iron out any puckers and final shrink the fabric. Apply Poly Brush and 2" surface tapes centered over the seams. Glue the round corners with tapes on edge as done on the wing tips. Poly Brush tapes with a final top coat to complete. The ailerons are now ready to paint.



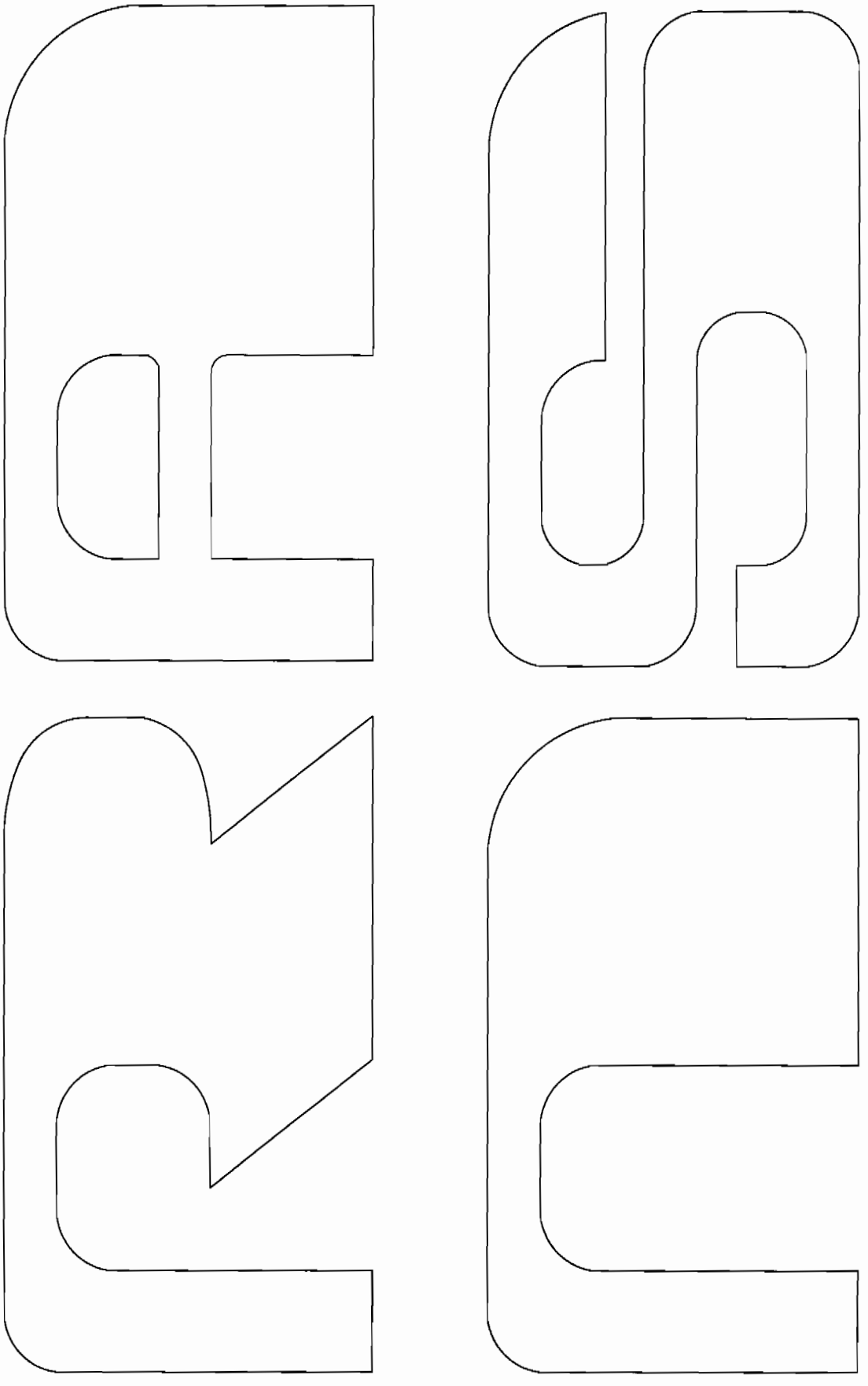
S-10 LOW BACK SIDE VIEW
SCALE: 1.00 = .05
USE FOR PAINT SCHEME LAYOUT

MD1370

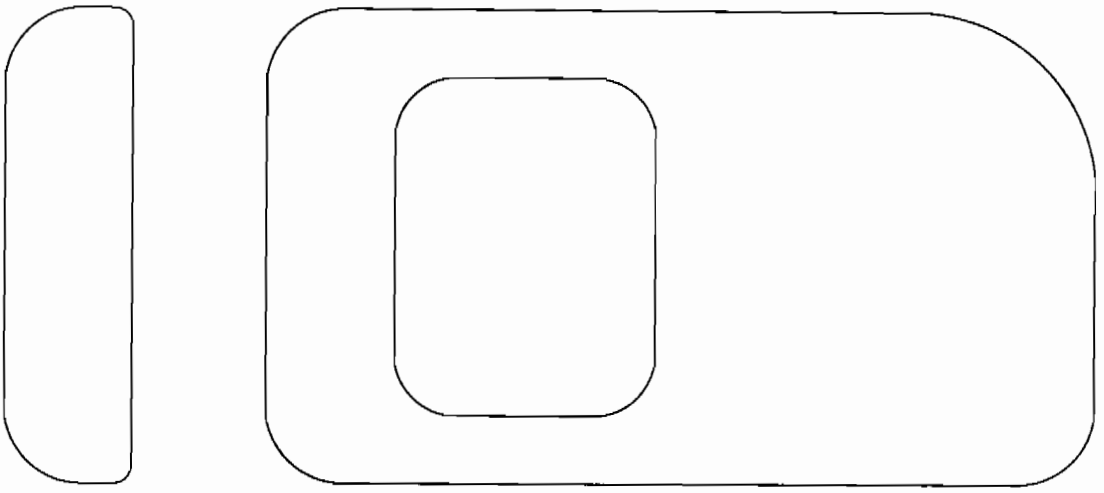


S-10 SIDE VIEW
SCALE: 1.00 = .05
USE FOR PAINT SCHEME LAYOUT

MD1369



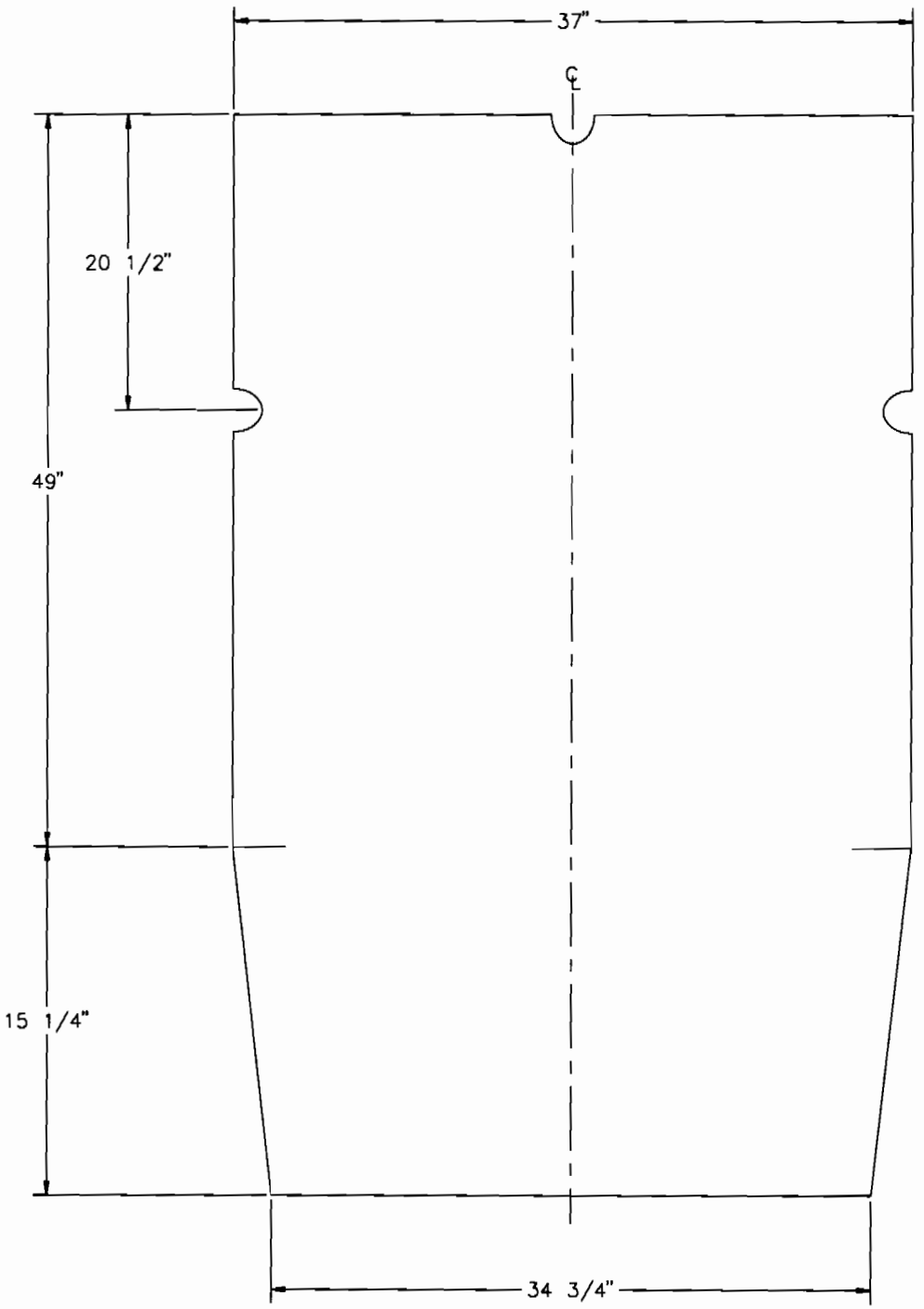
MD1361



USE AS A TRACING TEMPLATE FOR CLEAR "CONTACT" PAPER AS A MASKING FOR PAINTING ON THE LOGO.

WHITE DECALS OF THE RANS S-10 ARE PROVIDED FOR USE AS A SURFACE GRAPHIC. DO NOT USE THESE AS A MASKING. THEY ARE TO THIN AND STICKY AND WILL NOT PEEL OFF WHEN PAINTED OVER.

MD1363



MD1375

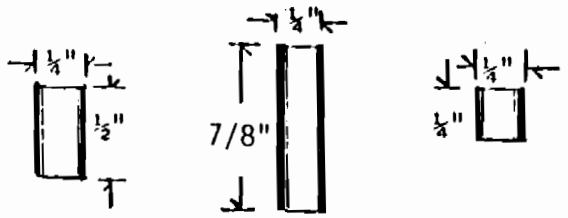
Material: 1/4" x .035 6061-T6

Fabricate the Following:

--(9) Pieces 1/2" Long
   (2) Will Be Used For Part #19 On The Ailerons
   (7) Will Be Used For Part #28 On The Tail

--(1) Piece 7/8" Long
   Will Be Used For Part #6 On The Canopy

--(10) Pieces 1/4" Long
   (8) Will Be Used For Part # 6 On The Rudder*
   (2) Will Be Used For Part #11 On The Rigid Canopy



*Drill Out To #11 Before Cutting

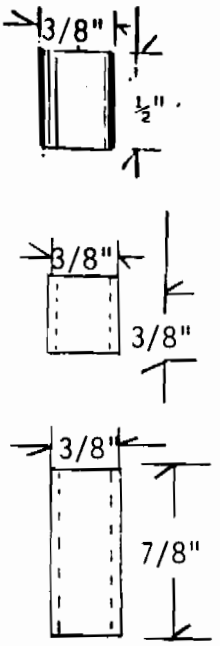
Material: 3/8" x .058 4130 Steel

Fabricate The Following:

--(8) Pieces 1/2" Long
   Will Be Used For Part #20 On The Landing Gear

--(2) Pieces 3/8" Long
   Will Be Used For Part #20 On Flaperons

--(1) Piece 7/8" Long
   Will Be Used For Part #5 On Flaperons



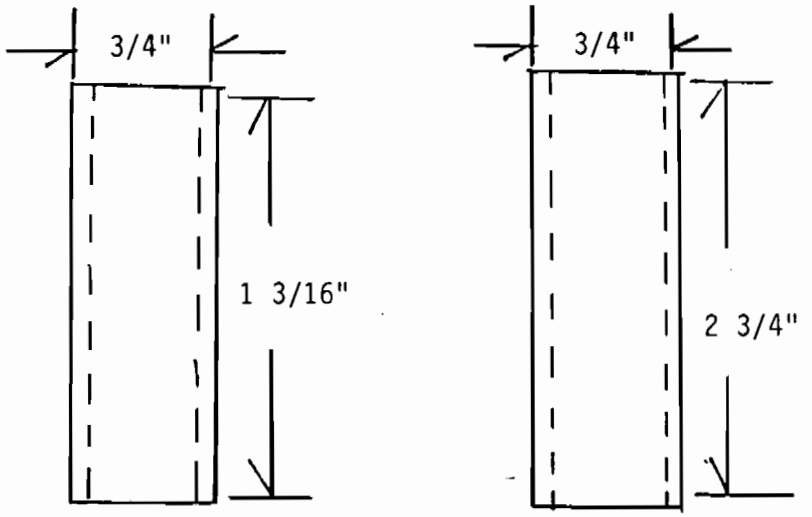
SUBJECT: PINS AND SPACER BUSHINGS		**NO.** SEE DRAWING	**MODEL:** S-10
MATERIALS:		**FINISH**	
DATE:	**DRAWN BY:** RJS		**SCALE:** N/A
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:** FAB-1

Material: 3/4" X .058 Aluminum

Fabricate The Following:

--(2) Pieces 1 3/16" Long
Will Be Used For Part #14 On The Drum Brakes

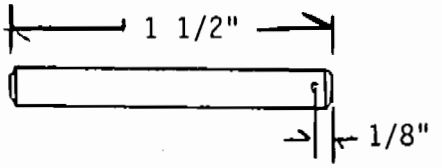
--(2) Pieces 2 3/4" Long
Will Be Used For Par #15 On The Drum Brakes.



Material: 1/4" Stainless Steel Rod

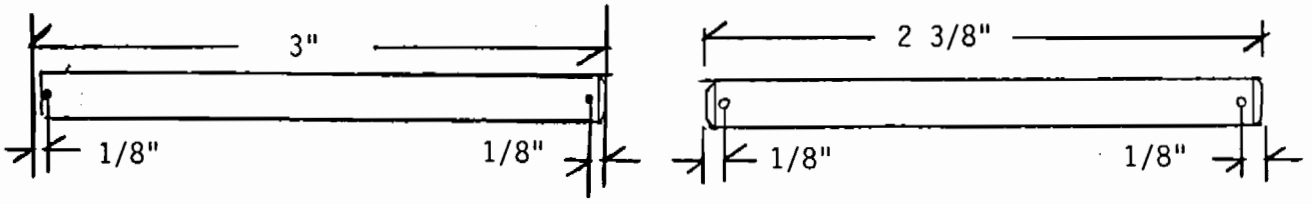
Fabricate The Following: Bevel All Ends

--(2) Pieces 1 1/2" Long
Will Be Used For Part #16 On The Tail.

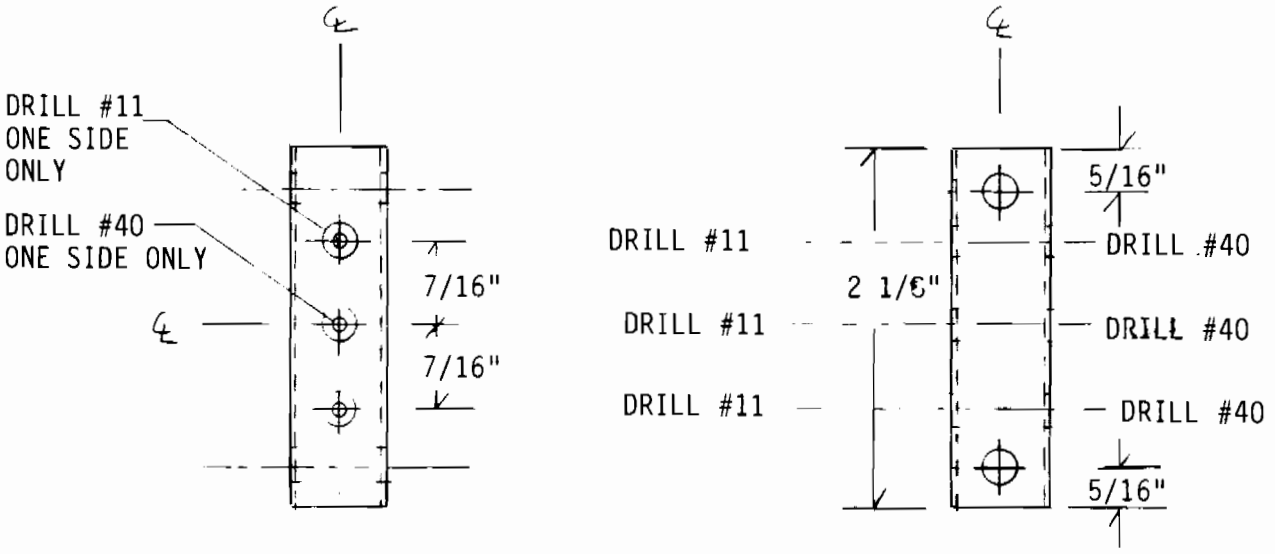


--(4) Pieces 2 3/8" Long
Will Be Used For Part #18 On The Tail.

--(4) Pieces 3" Long
Will Be Used For Part #26 On The Tail.



SUBJECT: PINS AND SPACER BUSHINGS		NO. SEE DRAWING	MODELS-10
MATERIALS:	FINISH		
DATE:	DRAWN BY: RJS	SCALE: N/A	
PROPERTY OF: RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		PAGE: FAB-1A	

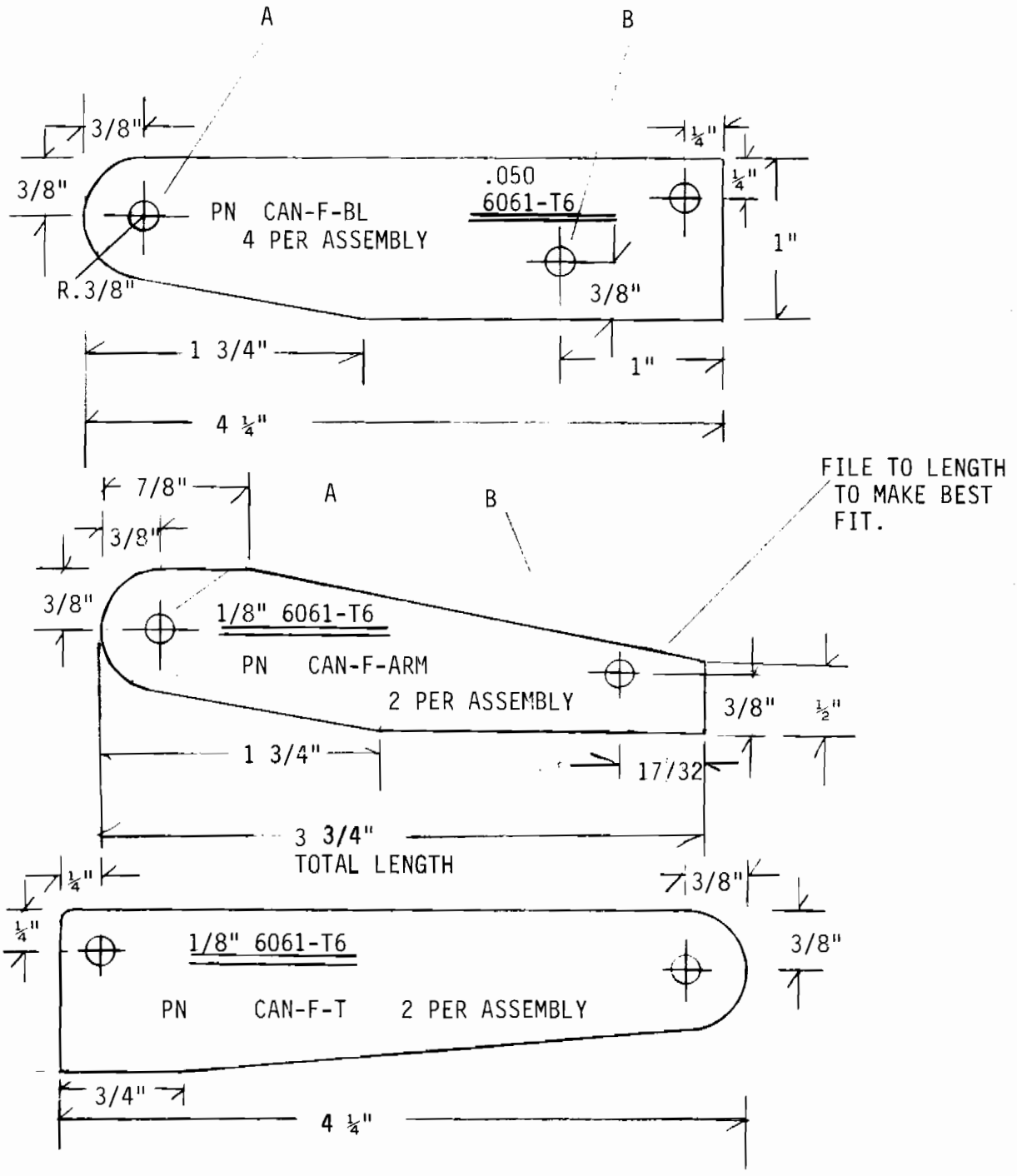


4 REQUIRED PER AIRCRAFT

SUPPLY 10" OF STOCK WITH BRAKE OPTION

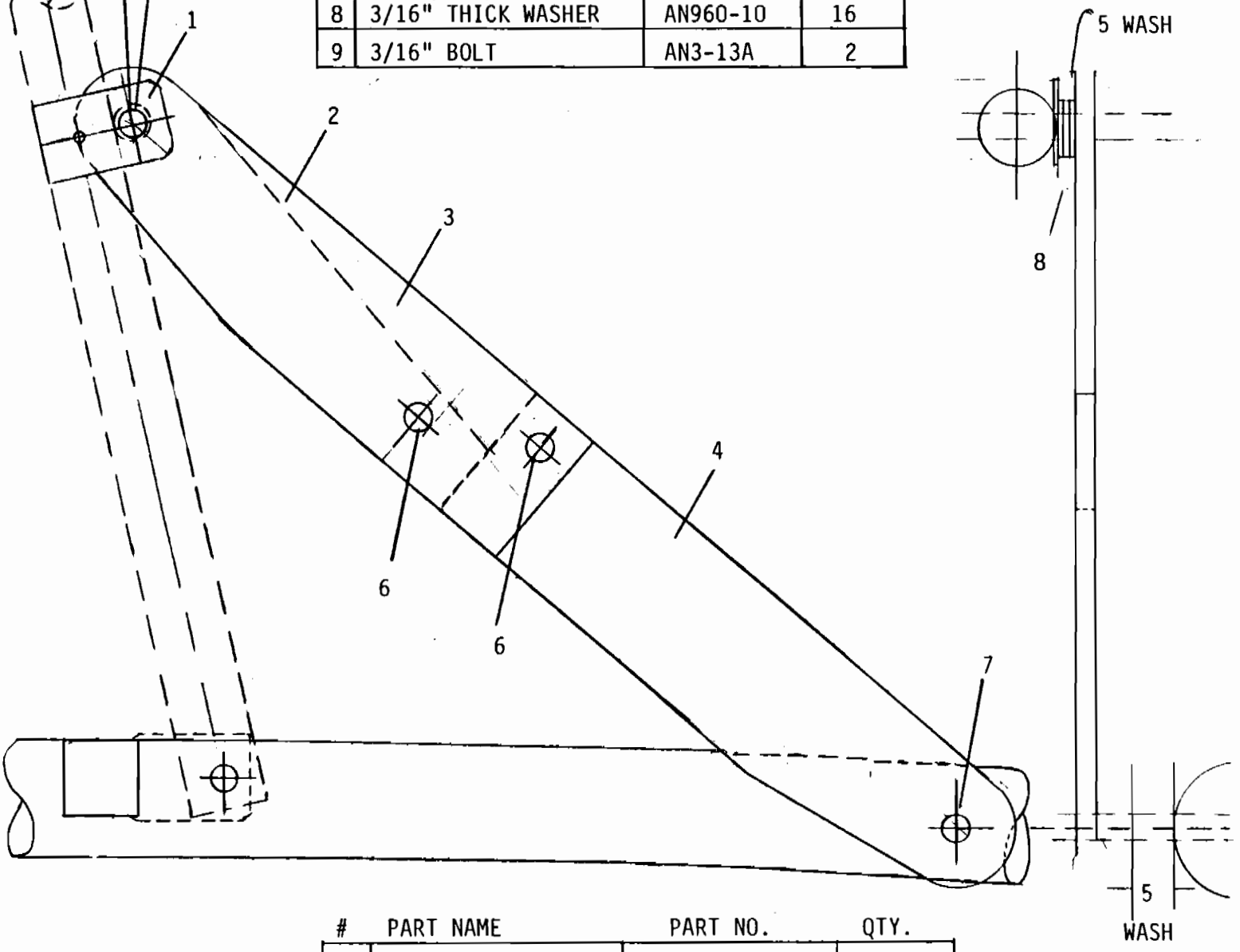
SUBJECT: BRAKE CABLE STOP BLOCKS		**NO.** B-SB-3H	S-6 **MODEL:** S-10
MATERIALS: 1/2" X 1/2" X .035 4130		**FINISH** N/A	
DATE: 6-8-88	**DRAWN BY:** RJS		**SCALE:** FULL
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:** FAB-4

HOLES A AND B MUST MATCH



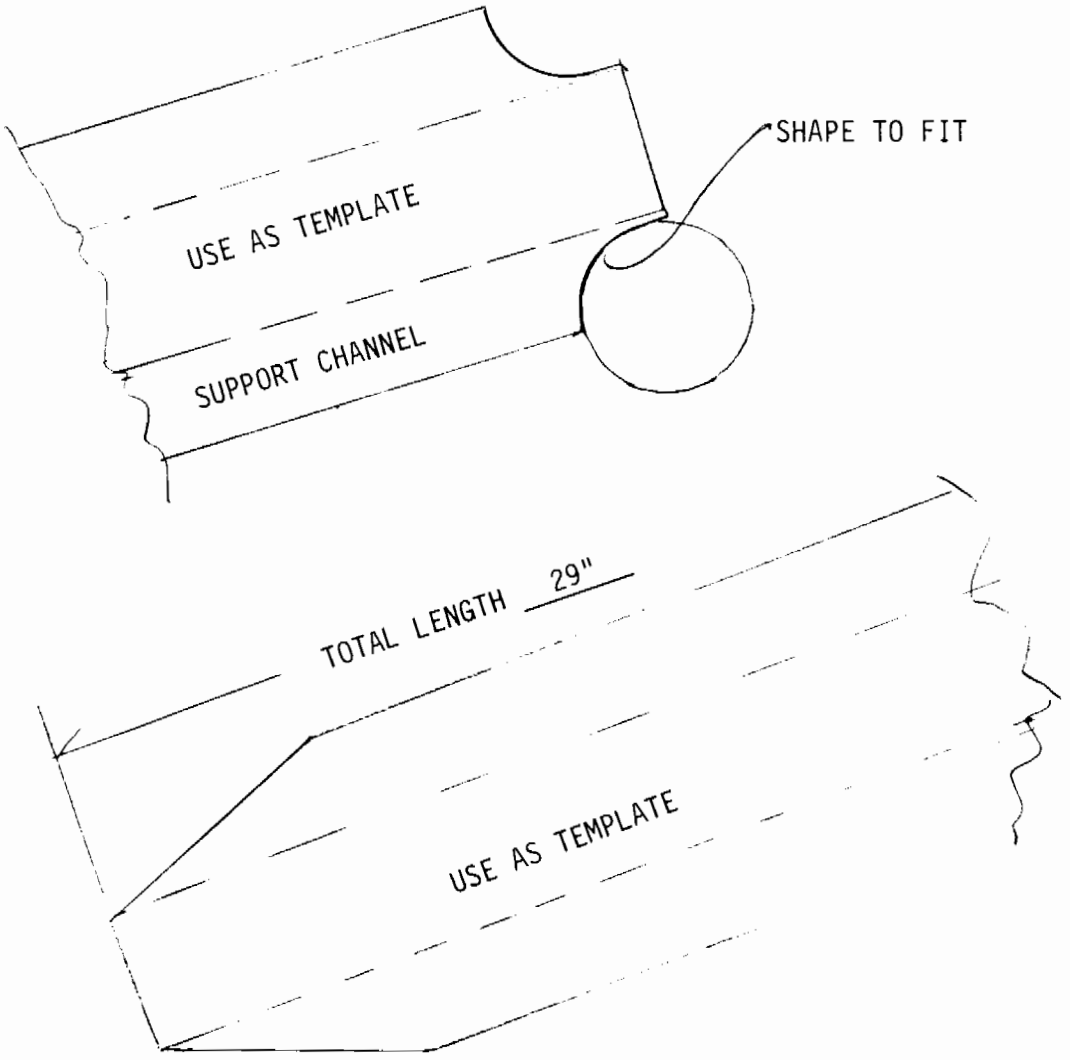
SUBJECT: CANOPY UP LATCH		**NO.** SEE ABOVE	**MODEL:** S-10
MATERIALS: 1/8" AND .050 6061-T6		**FINISH** NONE	
DATE: 8-16-88	**DRAWN BY:** RJS		**SCALE:** Not to scale
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:** FAB-5

#	PART NAME	PART NO.	QTY
5	1/4" X 1/2" BUSHING		2
6	3/16" BOLT	AN3-3A	4
7	3/16" BOLT	AN3-17A	2
8	3/16" THICK WASHER	AN960-10	16
9	3/16" BOLT	AN3-13A	2



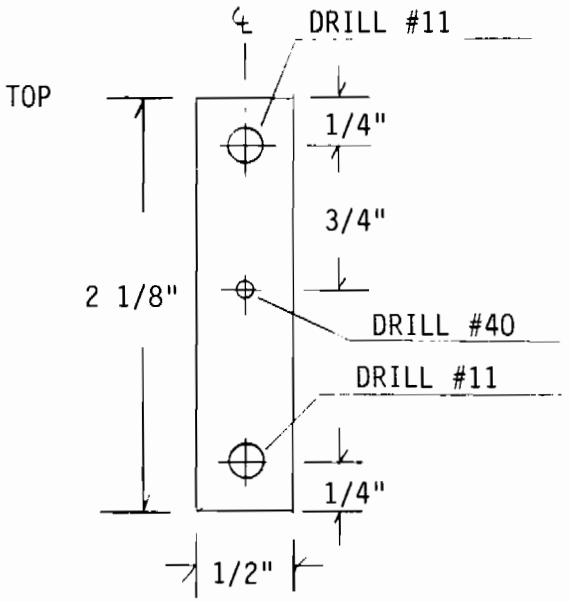
#	PART NAME	PART NO.	QTY.
1	AILERON CLIPS	W-W-A-CLIP	2
2	FORK ARM	CAN-F-ARM	2
3	FORK BLADES	CAN-F-BL	2
4	TONGUE	CAN-F-T	2

SUBJECT: CANOPY UP CATCH LATCH	CAN-UPL-RH **NO**CAN-UPL-LH	**MODEL:** S-10
MATERIALS: SEE OTHER SHEET	**FINISH** NONE	
DATE: 3-17-88	**DRAWN BY:** RJS	**SCALE:** FULL
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346	**PAGE:** FAB- 6

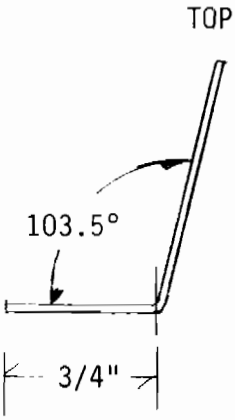


LOWER END SHAPE

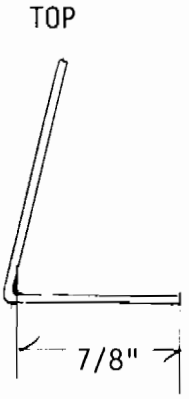
SUBJECT: S-10 WS-SUPPORT CHANNEL	**NO.** WS-CHAN	**MODEL:** S-10
MATERIALS: .020 2024-T3	**FINISH** N/A	
DATE: 2-2-88	**DRAWN BY:** RJS	**SCALE:** FULL
PROPERTY OF: RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:** FAB- 7



MAKE (4) AND BEND (2) INTO R-PMB-O
AND (2) INTO R-PMB-I

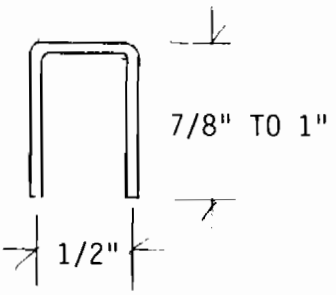


R-PMB-O



R-PMB-I

SUBJECT: PULLEY BRACKETS INNER AND OUTER		R-PMB-O **NO.** R-PMB-I	**MODEL:** S-10
MATERIALS: 1/2" X .050 6061-T6	**FINISH** NONE		
DATE: 8-23-88	**DRAWN BY:** RJS		**SCALE:** FULL
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:** FAB-8



2/AC

SUBJECT: RETAINER CLIP		**NO.** TEL-CLIP	**MODEL:** ALL
MATERIALS: 1/16" BRASS WIRE		**FINISH** N/A	
DATE: 11-3-88	**DRAWN BY:** RJS		**SCALE:** FULL
PROPERTY OF:	RANS 1104 E. Highway 40 By-Pass Hays, Kansas 67601 (913) 625-6346		**PAGE:** FAB- 9

S-10 SAKOTA GEAR LEG FAIRING INSTALLATION

Refer to the parts page for selection of the components.

1. Cut the rubber trim to fit over the designated areas clearly illustrated on the parts page. This must be done to both gear leg fairings.

2. Remove the gear leg assembly from the fuselage (gear leg sockets).

3. Gently slide each fairing over the gear leg in the proper orientation.

4. Install gear leg assembly into fuselage (gear leg sockets).

5. Check for a snug fit against the airframe, some trimming of the top edge may be necessary.

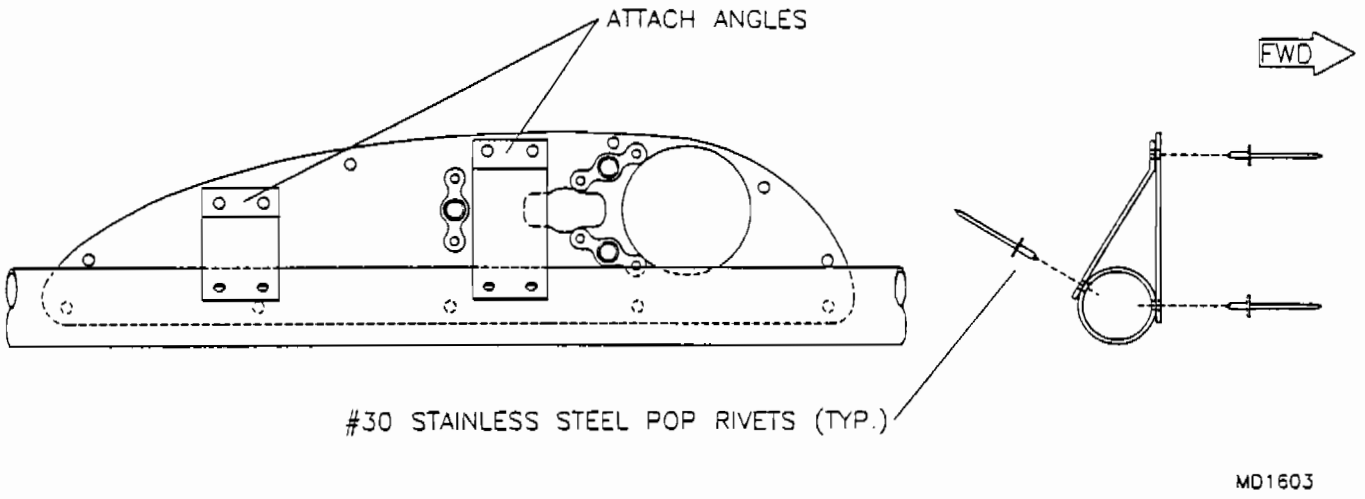
S-10 SAKOTA STROBE INSTALLATION

1. Collect the parts depicted in the parts drawing for assembly.

2. Attach the three nut plates to the light mount plate using the 40APR1/8 pop rivets. The light will be screwed to the mount plate after covering. Drill 3 #11 holes in the back plate of the light and test fit against the mount plate. **NOTE:** On the S-9 and S-10's with fiberglass wing tips, nut plate the fiberglass wing tip and mount the light directly to it.

3. Locate the mount plate on the tip 6" back from the leading edge using #30 stainless steel pop rivets. Rivet the attach angles in place with #30 stainless steel pop rivets; trim the angles as required to join the plate and bow properly. See **Figure 016C-03.**

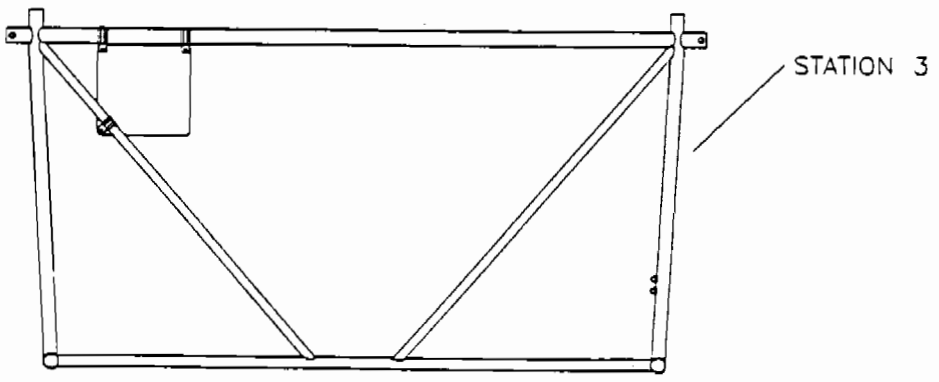
FIGURE 016C-03



4. Unroll the gray strobe wire, then cut it in half. Cut two 20' pieces of the 14 gauge yellow wire. Run the gray and yellow wire thru the trailing edge spar to the mount plate. Tape the wires to the inside edge of the wing tip to keep them secure while covering. Be sure to leave enough to work with while wiring.

5. Mount the strobe power box on the Station 3 crossing tube and diagonals using 3 tube clamps. The box is generally mounted with the connections pointing down. See **Figure 016C-05**. The strobe box has high voltage and should be kept clear of the fuel lines.

FIGURE 016C-05



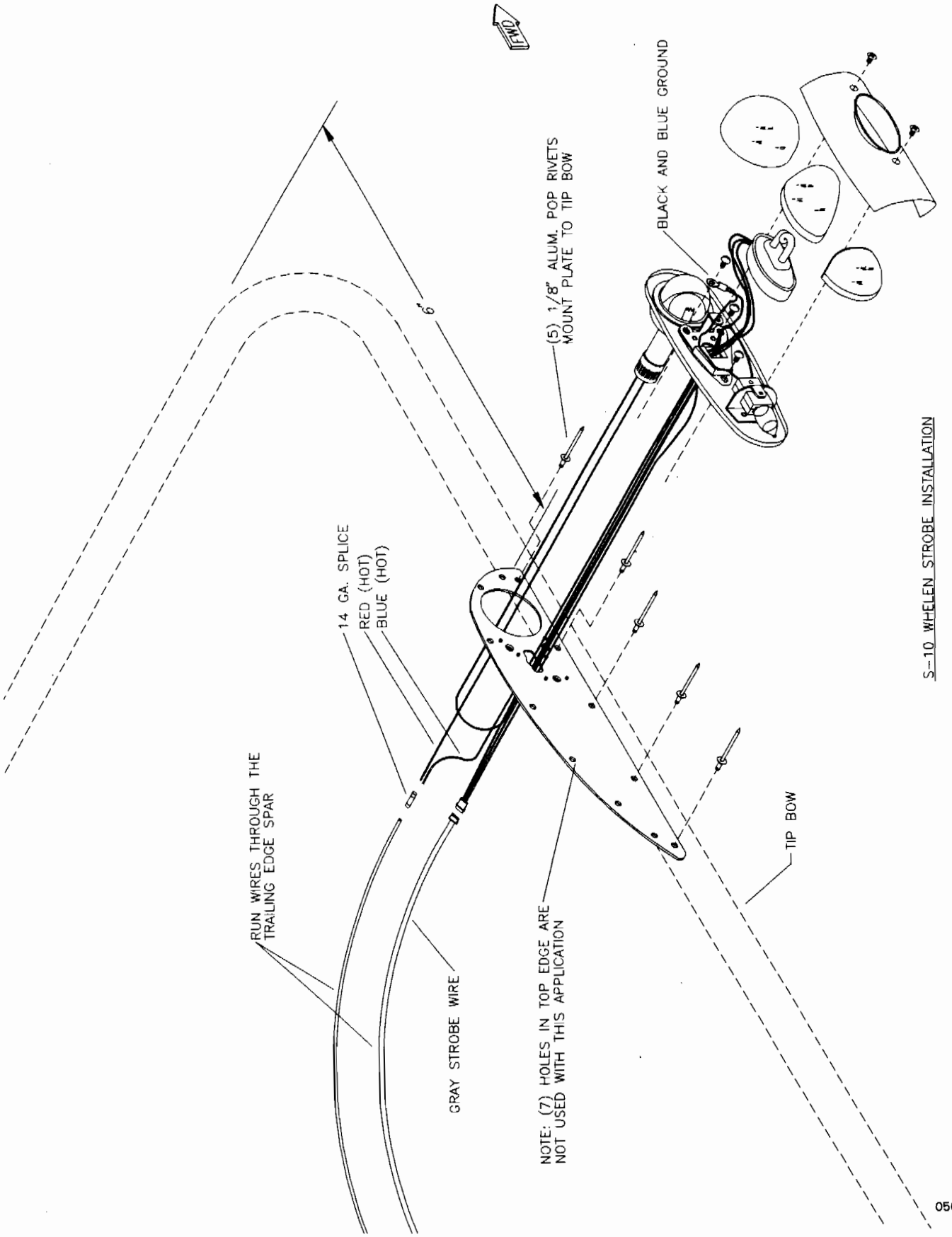
6. Run a 14 gauge yellow wire from the nav. switch to the strobe box. Connect a brass "Y" to the end of the wire. The yellow wire from each wing will connect to the "Y". Run a 14 gauge red wire from the strobe switch back to the strobe box, then connect it to the red wire coming out of the box. Run the black wire coming out of the box to ground.

7. Connect the ends (provided in the strobe kit) to the 3 wires coming out of the gray wire. The kit has instructions on how they go into the connector. The unprotected wires are run to a brass "Y" and then connected to ground using a short piece of 14 gauge black wire.

8. With the wings finished, cut out the 2 large holes and the 3 nut plate holes in the strobe mount. Connect the wires on the strobe light to the ones in the wing. Connect one of the blue wires and the black wire to ground using a single "I" connector placed under one of the mount screws. Connect the other blue wire and the red wire to the yellow wire in the wing using a 14 gauge butt connector. Connect the 2 plastic connectors together. Wrap the two wing connections with electrical tape to prevent disconnection due to vibration. See **Figure 016C-08**.

9. Attach the strobe to the mount plate and reassemble the strobe. Check all connections and test the lights.

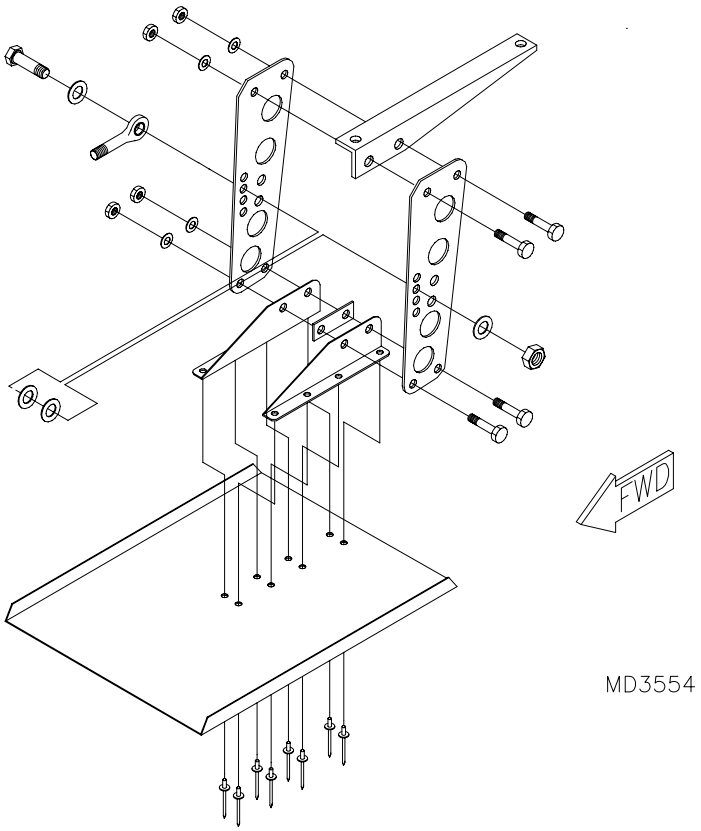
FIGURE 016C-08



S-10 SAKOTA - OPTIONAL AILERON SPADE ASSEMBLY & INSTALLATION

1. Assemble the aileron spade assembly as per **PARTS PAGES** and **FIGURE 016I-01**. Attach the spade assembly to the aileron using the hardware called out in the parts drawing. The spade is designed to allow angle adjustment. The spade will be adjusted during initial flight tests. Extra holes for the push tube attach allow various feels. Use lower holes for lighter feel & slower roll.

FIGURE 016I-01



2. Thread the male rod end and jam nut onto the end of the push pull tube. Attach the push pull tube to the aileron control horn. Remember to install the 2 plastic washers between the control horns. ***HINT:*** *Tape the washers to a piece of masking tape to allow easy insertion between the horns.*

3. Place wheel chocks under the main wheels and raise the tail until the top longerons in the cockpit are level. Position the ailerons so they are neutral. Hold the control stick in place with the safety belt.

4. Be sure the ailerons are in neutral; check them across from each other with a protractor. Check the spade for level. Adjust spades as needed. When adjusted properly the spade should be parallel to the line of flight (level with the horizon) when in level cruise.

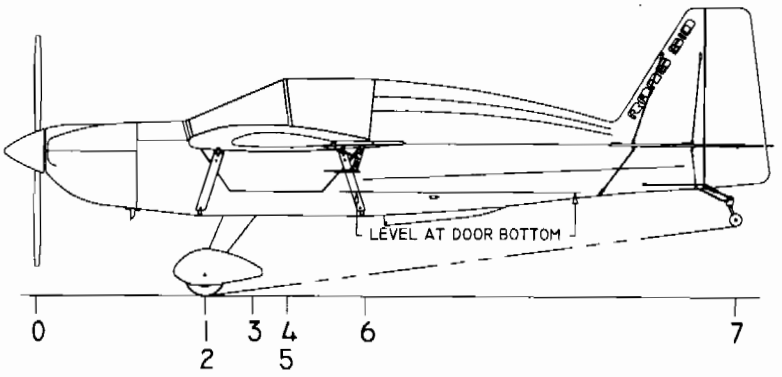
S-9 AND S-10
STREAMLINE FOOTSTEP INSTALLATION

The streamline footsteps are to be installed after the aircraft is covered and painted. No finish is required for the footsteps since they have a natural burnished aluminum finish.

1. Using a razor blade scrape off the paint on the foot peg. The paint must be removed in order for the plastic adapter block to slide on.

2. Slide on the plastic adapter block with the hole to the bottom (Figure 2) until it is 1/16" away from the fabric. Turn the block so the top surface is parallel to the top longeron. Slip the airfoil shaped step over the block and check it for alignment with the longeron by viewing from the side a few feet back. Repeat these steps for the other side BEFORE drilling and riveting either step. View the steps from the tail. From this view it is easy to see if both steps are in line with each other. Adjust as required.

3. With the steps set at the proper angle locate and drill #30 holes as shown in Figure 3. These holes are on the BOTTOM of the step. Be sure you are going into the middle of the step tube. It is very easy not to hit the tubes middle. A trick we use is to view the tube where it goes into the step. Do this by pushing back the fabric a little to see the tube. Drill the first hole and cleco. Drill the second hole. Drill out the second hole to #11 if it is on target. If not, try again. A small #30 hole can be filled with J&B weld much easier then a #11. Rivet with a 3/16" stainless steel pop rivet. Remove the cleco and drill and rivet the second hole. Repeat for the other side to complete the installation.



MD2314
REV B

RANS S-10 SAKOTA
WEIGHT AND BALANCE

N_____	
DATE WEIGHED	
ENGINE TYPE	
C.G. CONDITION	
EMPTY WEIGHT	
MTOW (582)	960 LBS.
MTOW (912)	1010 LBS.

ACCEPTABLE C.G. 60" TO 65" FROM DATUM 0.
DATUM = BACKSIDE OF PROP: AIRCRAFT IN LEVEL ATTITUDE. (LEVEL REFERENCE TO BOTTOM OF DOOR.)

#	ITEM	WEIGHT	ARM	MOMENT
1	LH MAIN	219	45"	9855
2	RH MAIN	210	45"	9450
3	FUEL	96	63"	6048
4	PILOT	192	69.6"	13363
5	PASSENGER	192	69.6"	13363
6	BAGGAGE *	30*	102"	3060
7	TAILWHEEL	43	191"	8213
	TOTAL=	982	TOTAL=	63352

$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}}$ = C.G. $\frac{63352}{982}$ = 64.5"

#	ITEM	WEIGHT	ARM	MOMENT
1	LH MAIN		45"	
2	RH MAIN		45"	
3	FUEL		63"	
4	PILOT		69.6"	
5	PASSENGER		69.6"	
6	BAGGAGE *		102"	
7	TAILWHEEL		191"	
	TOTAL=		TOTAL=	

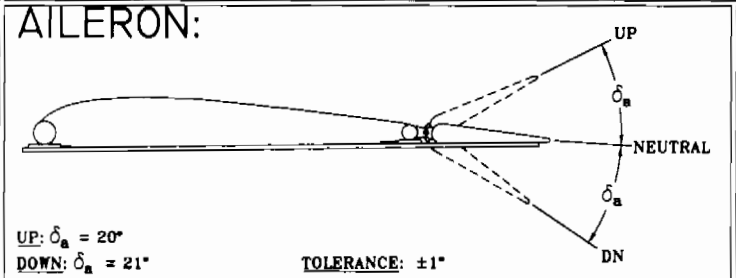
$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}}$ _____ =

* 30 LBS. MAXIMUM BAGGAGE

3/6/00

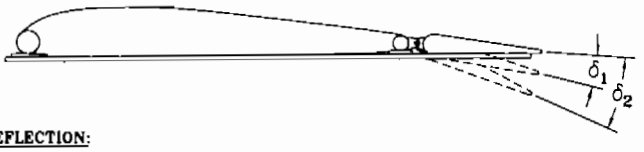
S-10 SAKOTA

AILERON:



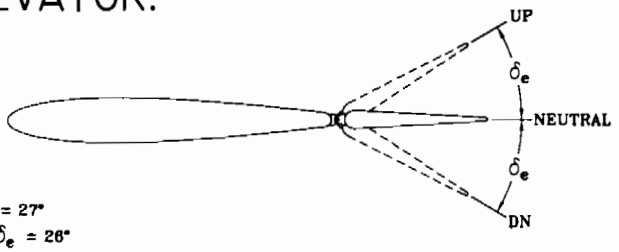
UP: δ_a = 20°
DOWN: δ_a = 21°
TOLERANCE: ±1°

FLAP:



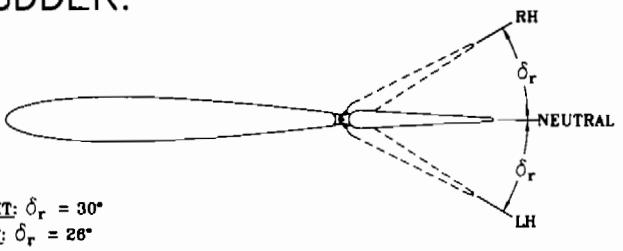
DEFLECTION:
δ_1 = 4°
δ_2 = 10°
TOLERANCE: ±1°

ELEVATOR:



UP: δ_e = 27°
DOWN: δ_e = 26°

RUDDER:

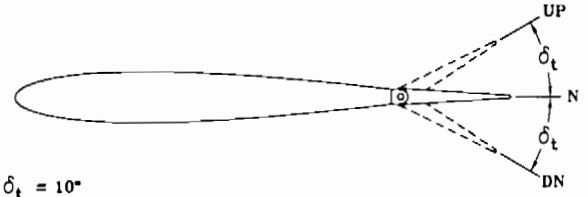


RIGHT: δ_r = 30°
LEFT: δ_r = 26°

WING INCIDENCE:

i: = .2°

TRIM TAB:

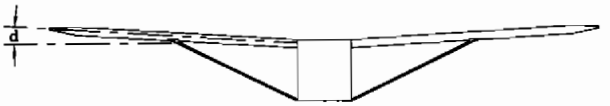


UP: δ_t = 10°
DOWN: δ_t = 19°

TAIL INCICENCE:

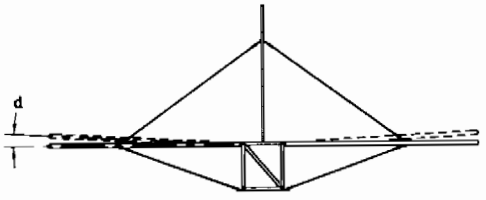
i: = 0°

WING DIHEDRAL:



d: = 0°

TAIL DIHEDRAL:

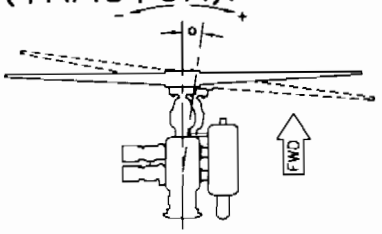


d: = 0°

WING WASH-OUT:

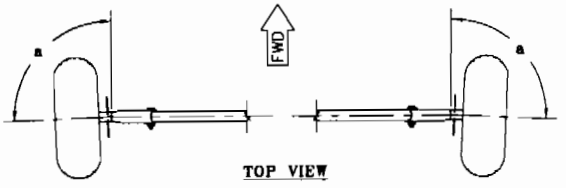
w: = 0°

ENGINE (TRACTOR):



o: = -1° (582)

LANDING GEAR TOE-OUT:



a: = 90.5°

S-10 SAKOTA FUEL SYSTEM OPERATIONS

Drain the tank's sump valve and header (if applicable) prior to each flight. Use a clear plastic cup to catch the fuel for inspection. Always store your aircraft with full fuel to eliminate water contamination due to condensation.

Inspect the fuel filter prior to each flight. Depending on how much debris is in the system, it may require replacement in less than 20 hours. As careful as you may have been debris still may accumulate in the fuel filter and severely restrict or shut off fuel flow.

Inspect the fuel system for leaky fittings and wear on lines prior to each flight. Replace fuel lines every 2 years or sooner if exposed to sunlight often.

Always mix the oil into the fuel immediately after fueling. In the case of two tanks and only one if topped, the one fuel tank will slowly drain into the other creating an undetermined amount of fuel in the other tank. Adding the oil right away to the just filled tank eliminates any possibility of flying on fuel without oil added.

NON-INVERTED FUEL SYSTEMS

Operation of a dual wing tank fuel system is quite simple. Fill the tanks to within ½" of being topped off. Add the required 2 stroke oil for the fuel and close the fuel cap. Open the main fuel valve and pump the primer bulb until the bulb feeds full of fuel. The system is now charged and ready. Use the panel mounted pump to prime the engine for start up.

The dual system will probably feed unevenly. Usually the RH tank empties first down to about 1" of fuel then the LH tank starts feeding. This, however, may differ in your aircraft. The point is there is no need for valves to switch tanks and the system will use all but a pint or so of the onboard fuel.

INVERTED FUEL SYSTEMS: DUAL TANKS

The dual tank inverted fuel system used in the S-9's is of a random feed design requiring no fuel tank switching. As in the non-inverted system, the tank of least resistance feeds first (usually the RH). The header tank does, however, introduce an operational caution. Due to the negative attitudes occurring during aerobatics the header vent line will fill with fuel and cause a hydraulic lock of the vent. This results in a pressure in the header tank that does not allow it to fill completely. The primer bulb is installed to clear out the line and allow the pressure to vent, then the header will refill. This is more prone to occur when fuel levels in the main tanks are low. **IMPORTANT**: Prior to each take off the header tank must be full. Use a vent line primer bulb to clear the system. **NOTE**: Please install the bulb so the fuel is pumped **AWAY** from the header tank to the main tank.

GENERAL DESCRIPTION AND OPERATION

The S-9 and S-10's are equipped with one or two wing tanks. These tanks hold 9 gallons per side. The fuel systems gravity feeds into a header tank. Individual shut off valves control the flow of fuel to the header tank from each tank. Inside the header tank is a "klunker", which keeps the end of a short segment of flexible fuel line in the fuel no matter the aircraft's attitude. The header also features a fuel drain. This drain is the lowest point in the fuel system and makes it handy to drain any water that may have collected in the fuel. The header is barely lower than the main tanks in level flight. This makes for very low head pressure. The low head pressure is sometimes overcome by a fluid lock in the header tank vent line. Fuel can randomly enter these lines during flight due to negative flight or turbulence. When this happens, the fuel flow into the header tank can stop. To assure a positive fuel flow to the engine during aerobatics, an electric boost pump is recommended. A boost pump in the left tank withdrawal line and a shut off on the right tank will allow the header to fill and stay full.

NORMAL AND AEROBATIC OPERATIONS

Put 5 to 6 gallons in the LH tank and 2 gallons in the RH. Make sure the fuel caps are tight.

Turn on the boost pump and open the LH tank valve and close the RH tank valve. Prior to take off, check the header tank for the fuel level. It should at least be within 1" to 2" from the top for normal flight and full for aerobatics. During aggressive aerobatic operations, it is advised to periodically check the level of fuel in the header tank. In the event of a boost pump failure, the header tank will show an increasingly lower level. If such occurs, switch to the RH tank.

If you are performing at an aerobatic competition or air show, you will most likely have the least amount of fuel on board as possible. Even in this case, if the boost pump fails it will not be a problem. The header tank will provide enough time to get back to the runway.

During normal cruise, it is best to feed from both tanks and monitor the fuel level in the header tank. Be careful when barnstorming around the neighborhood. Watch the fuel situation closely. It is easy to forget about the fuel when in the throws of a mock dog fight or a buzz job (neither of which I encourage, but beware the S-9 or S-10 can be quite the temptress).

AEROBATICS S-10 STYLE

Doing aerobatics in the S-10 is a curious blend of conventional and unique properties. We call it low energy aerobatics which is an excellent name. The low wing loading and gross weight contribute to the high energy bleed, providing a structural and physiological safety valve. Try as you may it is rare to pull over 4 G's in even botched maneuvers, yet the fairly clean aerodynamics allows for acceptable vertical penetration. The net result is a airplane that can perform a routine in an extremely small "box" (Loops are 300' or smaller in diameter!).

Good aerobatics in an S-10 requires a smooth precision as well as authority. The exact execution of some maneuvers will vary as with gross weights. Anticipate this with "altitude insurance", it's cheap and pays big dividends. 3,000 feet AGL is a good starting point.

Be extremely thorough with your pre-flight and equipment checks. Because of its low cost your S-9 will bring you a unique opportunity to perform aerobatics. Do not abuse this opportunity by short changing your maintenance program. **STAY ON TOP** of the **FLYING** and the **FIXING**.

PLEASE NOTE: If you're using a bowl carb and not a pumper, fly with 2,000 to 3,000 feet AGL with a landing site below. Your engine will quit is sustained negative G's occur. The restart will require time for the bowl to fill (20 seconds) or pump the primer. **CAUTION: FLOODING MAY OCCUR:** 4 point rolls, Cuban 8's, Hammerheads and vertical down rolls can induce brief negative G's that cause a momentary power "skip". Pull throttle back to idle and smoothly open to let power return.

ASI MARKINGS

Apply the appropriate colored arcs on your ASI for the following speeds:

White Arc	35 mph to 80 mph (stall to maximum flap extension speed)
Green Arc	45 mph to 100 mph
Yellow Arc	100 mph to 130 mph
Red Line	130 mph

ENTRY SPEEDS AND TECHNIQUE

ALL AEROBATICS TO BE PERFORMED SOLO!!!

CHANDELLE: 95 mph
Execution: Normal, smooth stick required to maximize altitude gain

LAZY 8: 95 mph
Execution: Normal, watch RPM on the down side

"RANS ROLL": 95 mph
Execution: This is an excellent roll to start with. It is a safe roll due to the almost impossible tendency to split "S". At entry speed, smoothly pull the aircraft vertical or nearly so (anything above 60 degrees works). Push brisk RH stick and rudder. Hold slightly up stick too. Feed out as horizon appears. The plane will do a combo barrel snap. It is very gentle and easy. Properly done the nose will drop through and you will end up slightly nose high. Of course, the higher the nose on completion the better!

AILERON ROLL: 80 to 90 mph
Execution: Dive to entry speed. Pull 30 degrees nose up neutral pitch, neutral rudder, hard over RH aileron (LH is a little slower). Feed down stick as you go inverted as required. **CAUTION:** This requires an invert fuel and restraint system.

BARREL ROLL: 80 to 90 mph
Execution: Normal

SLOW ROLL: 95 mph
Execution: Normal

***4 and 8 POINT ROLLS:** 80 to 90 mph
Execution: Normal

VERTICAL ROLL: 120 mph
Execution: Dive to speed. Pull up without excess speed to loss to vertical. Must have 85 mph when vertical. Neutral pitch, hard RH aileron. Push over at the top to prevent tail slide or flop over.

SNAP ROLL: 50 to 75 mph
Execution: While bringing in back pressure and as the nose leaves the line, briskly apply full rudder in desired direction of snap. (Ailerons Neutral).

SPLIT "S": 45 mph
Execution: Normal

LOOP: 100 to 110 mph
Execution: Normal

CUBAN 8: 100 to 110 mph
Execution: Normal

***OUTSIDE CUBAN 8:** 100 to 110 mph
Execution: Normal

HAMMERHEAD TURNS: 80 to 110 mph
Execution: Normal

SPINS: Stalled. Recovery. Apply full opposite rudder to stop rotation, release elevator to unstall. DANGER: Do not spin past 3 turns with gross weight above 760 lbs. or with baggage and aft C.G. loading. There is potential for a flat spin to develop. Recovery from such may require 3 turns or more. Learn the spin properties of your S-10 by going to altitude (4,000 AGL minimum) with a parachute. Approach the spin in steps:

1. Stall
2. Falling Leaf
3. ½ Turn Spin
4. 1 Full Turn Spin
5. 1 ½ Turn Spin
6. 2 Turn Spin

Every airplane is different when it comes to spins. Be aware of this during your flight testing and stack the odds in your favor by following the above procedure.

FALLING LEAF: Stalled

*All outside or negative maneuvers require inverted carb and fuel system.

S-10 OPERATIONS

PRE-FLIGHT

See following page

PRE-TAKE OFF CHECK LIST

Fuel on?
Oil mixed in fuel?
Lap belt secure?
Altimeter secure?
Canopy latched and safetied?

STARTING

Brakes on?
Prime system 3 solid pumps
Mags on?
Pull starter through until engine fires
Pump primer if engine starts to drop RPM until it picks up fuel.
Advance throttle to 3,000 RPM for 20 to 30 seconds
Clear to taxi?

TAXIING

Taxi slowly with light brake pressure and minimum power. Avoid high speed downwind taxiing! Keep stick forward downwind and up into the wind.

TAKE-OFFS

Add power evenly. Do not "jab" the throttle. Hold slight up elevator. Aircraft will auto-rotate at 50 mph.
Climb out at 70 mph IAS for best cruise climb;
at 55 mph IAS for best rate
at 50 mph IAS for best angle

STALL SPEED

35 mph is typical stall speed with no flaps, 30 mph with flaps.

FLAP OPERATIONS

Use flaps for normal T.O. and landings. Extend below 80 mph IAS.

CRUISE DATA (NOTE: These are cold weather values)

RPM	SPEED	RANGE*
5500	80	3 HOUR
5750	85	2.2 HOUR
6100	100	1.75 HOUR

*1/2 hour reserve excluded.

LANDING

Normal approach @ 60 mph with flaps
Best glide speed, engine off -- 60 mph
Short field --- 50 mph
DANGER!!! When braking above 50 mph, directional control is difficult.

S-10 PRE-FLIGHT

LH WING & RH WING

____ Inspect all control surface hinges
____ Control linkages
____ Integrity of wing spars (bend, dented?)
____ Look under wing for missing inspection plates
____ Check if fuel vent lines are open
____ Pitot clear?
____ Strut bolts secure?
____ Fuel cap secure? Desired fuel on board?
____ Oil in fuel?

ENGINE CHECKS

____ Cowling secure?
____ Prop tight? Check gear box. (See note below)
____ Shake engine by moving prop to check for "normal" feel. This checks the integrity of the engine mount.
____ View inside exhaust port for
    A) Coolant leaks
    B) Fuel leaks
    C) Exhaust leaks
____ Check under belly for radiator condition as well as coolant hoses.

TAIL

____ Check control surface motion and hinges
____ Check tailwheel. Springs okay?

COCKPIT

____ Seat, seat belts and controls secure?
____ Freedom of movement on stick, rudders, throttles and trim?

NOTE: A routine inspection of the prototype S-10 at 250 hours revealed a black residue about the gear box to engine seam. This is a sure indication of movement. Disassembly revealed a broken shoulder bolt. Extraction was made using an improvised easy out and the bolt replaced.

It is possible the extensive amount of aerobatics, especially snap rolls, have caused this failure. Please inspect for the tell tale sign of movement in the form of black residue between surfaces. Also, during pre-flight check for abnormal gear box movement.

RANS S-10 SAKOTA: GENERAL DESCRIPTION AND FLIGHT PROPERTIES*

(*Flight properties are unique to each aircraft. Use this information as a guideline of what to expect, not as a rule.)

DESCRIPTION

The RANS S-10 is a mid-wing tractor mono-plane with conventional landing gear. It's strut braced wings utilize aluminum tubes for spars, compression, anti-drag, tip bows and ribs. The fuselage is of welded 4130 chromoly steel. The design features aerobatic capability at or below 670 lbs, fully enclosed cockpit, bungee landing gear, steerable tailwheel, in-flight elevator trim tab and full span ailerons.

FLIGHT PROPERTIES

The S-10 flight properties are conventional in respect to general aviation aircraft in the areas of control and response. There is a slightly higher rate of speed decay in zero thrust mode and potential for high sink rates due to the 9.4 lb. wing loading. In pitch, the S-10 is neutral. You can in calm air adjust the trim and fly hands off... for a while. But unless you make minor corrections such as leaning your body fore and aft it will not remain in trim. I have flown my S-10 for many hours hands off keeping in trim by merely leaning forward and backward now and then. Pitch rate is fast at cruise and lessens as the plane slows down. During the first few flights the S-10 will seem too fast in pitch, but as you gain experience you will grow accustomed and eventually enjoy this exceptional control response.

STALLS

Are preceded by a pronounced buffet cause by the wings root section turbulent air flow over the tail. During this root stall the plane will continue to fly indefinitely with good control in all axis. Additional power will be required to maintain attitude. A very slight pitch over occurs once the wing stalls, if entered in no greater than 20 degrees nose high. The nose will drop through the approximate equivalent angle of entry above 20 degrees as in whip stalls or tail slides. Tip stalls do not occur even though the tapered wing is a 0 degree wash out. This is due to the air foils gradual change from **13%** thick at the root to **17%** thick at the tip. With the aircraft stalled it can be held in a "Falling Leaf" with authoritative rudder work. Simply holding neutral rudder will produce a tight spiral to the RH or LH (usually RH because of "P" factor). During a falling leaf, the aircraft will pitch gently in 10 degrees to 15 degrees nose high attitude. If left to a rudder free state, the S-10 will enter tight spiral again, either LH or RH. This spiral will, however, be more quickly entered than the rudder held neutral spiral. Power on stalls result in much buffet, no altitude loss (sometimes a gain) and good control in all axis. Use of ailerons in a Falling Leaf will aggravate the Dutch Roll. Neutral aileron is best.

SPINS

Are possible in the S-10 only after fully stalling. Once fully stalled, full rudder is applied. Anything shy of full defection of elevator and rudder will result in a spiral or flattened spin. The spin itself is 70 degrees nose down with 180 degrees to 240 degrees per second rotation at 1700 to 2500 FPM sinks. Recovery is crisp with 90 degrees to 180 degrees of lead out. No inverted spins have been attempted. Recovery is typical opposite rudder then release the stall.

SNAP ROLLS

Snap Rolls are performed by "loading up" the aircraft positive with back pressure, then brisk application of rudder but entry speed on snaps is critical for precision. A speed between 60 to 70 produces a tight quick snap. **DO NOT** "snap" the stick or the plane will try to loop instead of snap. Only "loading up" is required to snap.

INVERTED FLIGHT

The S-10 has been flown inverted with power. The attitude is about 2 degrees nose high with forward stick at a minimum. Control is good, outside loops and rolling 360's are easily performed. The inverted system adds 100 to 200 feet to the up line on hammerheads and allows perfect round loops.

TAKE OFFS

The S-10 departs in the 3 point attitude. This yields the shortest ground roll. The power loading on the S-10 is around 13.4 lbs per hp at gross. This results in S.T.O.L. like performance. The rapid acceleration leaves little time to go astray on the roll out. This makes the S-10 a low demand taildragger, but not unsensitive. The effective controls can lead to over control but pitch is properly dampered so PIO's are rare and to-date unwitnessed.

LANDINGS

If touch down speeds are modest (below 50 mph) the landing is very undemanding. At above 50 mph, if the S-10 is forced onto the runway the excess energy will cause moderate demand on directional control. Fortunately the energy is quickly dissipated once wheels have touched and the "twitchy" moment will be brief. Again, no "twitchyness" is evident when the proper touch down speed is allowed. To set up a normal landing, an approach speed of 60 to 65 mph is maintained down to the threshold. The aircraft is then allow to slowly sink into the runway in the 3 point attitude. No flare is recommended as the energy retained is high enough to cause a swoop up to 20 feet and then a tail first mush into the runway results! Even 45* mph approaches are possible but it is flying on the prop (usually 5,000 RPM) in a nose high attitude and not recommended unless required for landing field access.

CROSSWINDS

The S-10 has little difficulty operating in 25 plus crosswinds even at 90 degrees. Proper technique and authoritative flying is required. **HINT**: After touchdown, retract the flaps. This will help more firmly plant the aircraft on the ground and increase aileron authority.

* With a light load, solo or around 800 lbs. gross.

SUMMARY

The S-10 demonstrates acceptable handling in all areas and performance is consistent in varied conditions.

The margins for error are above average, perhaps due to the bulbous airfoil, low drag, lightness and low power loading. Stall recovery affords little altitude loss.

As a learner's mount, only if the instructor has gone before. As with any plane, one should not teach thyself to fly but be rightly guided.

The S-10 yields a type of flying sought after, respected and cherished. It is a high performance machine with the manners of a saint!

**Flight properties are unique to each aircraft. Use this information as a guideline of what to expect, not as a rule.

S-10 ENGINE OPERATIONS

Provided with the aircraft is an engine manual authorized by the engine distributor. This is a well written manual explaining many specifics for continued safe and reliable operation of your engine. We urge you to read and fully understand this manual. In addition, please find the data below helpful in obtaining the most out of your aircraft.

STARTING

Position the aircraft into the wind and chuck the main wheels to prevent rolling. To maneuver the aircraft into position, lift the tail at the strut connect points. Avoid lifting at the tips of control surfaces. **CAUTION:** Winds above 20 mph may cause the aircraft to lift off when empty. Have an assistant sit in the plane or help hold it down at the wing strut connect points. Never hold a strut in the middle!!!

It is best to start the plane from inside the cockpit. The S-10 can be entered easily by standing on the seat then sitting down.

Drain the fuel sump. Prime (if first start or if it has been 30 minutes since the last start) 3 solid pumps. Close the throttle (pull back to close). Flip ignition switch up for on. Move the control stick to the left. Grab the start handle and pull briskly. Several pulls may be needed. Be sure the ignition is on (switch up). Let it idle a moment and then advance the throttle slowly. **NOTE:** After the engine warms up (2 minutes), close the throttle. It should idle at 2,000 RPM. If not, refer to the engine manual for details on setting the idle. If you encounter starting difficulties, refer to the engine manual for probable cause and solutions. **CAUTION:** In cold weather, allow at least a 2 minute warm-up before applying take-off power.

Check throttle action. There should be no sluggish response from mid-range to top end. Don't rapidly pump the throttle. This is not a motorcycle. It is a airplane with a big fly wheel, the propeller. Jockeying the throttle will only accelerate wear on the engine and make its reliability questionable. Be smooth with the throttle and it will respond when you need it.

REASONS FOR POWER LOSS

Never take off if a **PLUG IS FOULED**. This will be indicated by a sluggish throttle, lack of RPM and rough running. Two strokes do not unfoul their plugs. They only get worse. So flying to "clear it out" may result in a power loss and a forced landing.

WORN PLUG

Again, throttle and RPM are not normal. Replace with a fresh, properly gapped plug. Plugs should be replaced every 25 hours.

CLOGGED AIR FILTERS

Spit back--The tendency at low RPM's for the engine to throw fuel out of the carb and into the air filter causing the engine oil to eventually clog the filter. The situation worsens rapidly because the more clogged the air filter becomes the more fuel that spits back. This can occur on an S-9 about every 40 hours. Therefore, it is recommended to clean and re-oil (with air filter oil only) the filter on a periodic basis. Soak the filter in clean, raw gas. Then rinse and let dry thoroughly. Re-oil when dry as per the air filter oil instruction. **NOTE:** The filter oil is K & N brand and it available at most motorcycle shops.

OBTAINING MORE RPM

Due to variations in propellers and engines, you may not obtain proper T.O. RPM's. We recommend at least 6000 plus RPM's. If this is not the case, a simple modification to the prop can be made which will usually gain 300 RPM. Cut the tip profile to the shape shown in the tip modification pattern.

CHECKING STATIC RPM

Prior to the first flight, determine the engine's static RPM; this is the speed it develops when stationary and fully throttled. An acceptable static RPM indicates that the engine is operating at or near full potential and should not over-speed during the first flight.

First, calibrate the engine tachometer to make certain it's accurate. Determine the propeller's RPM with a *light tach* (a hand-held device which measures propeller rotation with infrared pulses) and compare the reading to the tachometer's, taking into account the engine's gear reduction ratio. The tachometer supplied with your RANS kit is equipped with a calibration knob; refer to the manufacturer's instructions.

Once satisfied with the tachometer, run the engine with the throttle fully open; be certain the tail is tied down and the main gear is chocked. For the two-stroke Rotax 503 and 582, acceptable static RPM is usually about 6000 to 6200; for the four-stroke 912, it's usually 5000 to 5200. (A number of factors influence this, including the number of propeller blades, their length and pitch.) Ideal static RPM would render an *in-flight* RPM just below red line with the throttle fully open at sea level.

A high static RPM may indicate that the propeller is pitched too finely (the blades take too small a bite of air). This prevents the propeller from performing most efficiently and may allow the engine speed to exceed red line in flight. If the blades are adjustable, increase pitch; refer to the manufacturer's instructions. If the blades are fixed, contact the manufacturer.

A low static RPM may indicate that the propeller is pitched too coarsely (the blades take too large a bite). This also prevents the propeller from performing most efficiently and induces excessive load on the engine. If the blades are adjustable, decrease pitch; if fixed, contact the manufacturer. If finer pitch does not raise maximum engine speed to an acceptable RPM, another problem may be indicated.

WARNING: Attempting flight with too much or too little propeller pitch may have severe consequences. Conduct flights only with sufficient power output!

Knowing the ideal static RPM allows you to check the health of the engine during a full-throttle run-up prior to takeoff. Once you've become familiar with the in-flight performance of the engine and have adjusted the propeller, you'll know better what the tachometer should indicate during run-up.

CREATING A PILOT OPERATING HANDBOOK

Most pilots are accustomed to flying light planes with comprehensive pilot operating handbooks. This is a result of the standardization required by FAA certification, the fruit of which is fleets of identical aircraft for which specific checklists, procedures and performance figures may be published.

This section includes much information on the operation, limitations and performance of RANS aircraft; however, the nature of kit-built aircraft makes it impossible to publish *specific* checklists and procedures applicable to *all* examples of a particular model. This is because the builder, as manufacturer of the aircraft, has the freedom to assemble, equip and modify his machine as he wishes. The result is fleets of aircraft that share the same name and designation, but vary somewhat in operation and performance.

The builder should consider carefully all aspects of the engine, airframe and equipment when developing checklists and procedures for his plane. For example, he might begin the preflight inspection by opening the cabin and checking that the magnetos are off; this would ensure the engine cannot start if the propeller were moved. With the cabin open, he also might drain fuel from the sump, allowing any water trapped in the system to escape. He then might begin a walk-around, moving about the ship in a logical, straightforward manner, checking the presence, security and condition of hardware and components.

With the walk-around completed, he might seat himself in the aircraft and consider the checks necessary for a safe and mechanically sound engine start. This will depend largely on the specifics of the engine, fuel, ignition and electrical systems he has installed. Again, a straightforward, logically-flowing checklist should be developed that addresses the particulars of his machine.

The same care should go into development of a pre-takeoff checklist. Of particular importance is a proper engine run-up to check the health of the power plant. An essential checklist item often given short shrift is that of free and correct movement of control surfaces; this is particularly important for aircraft that fold or disassemble.

Considerable forethought should be given to potential emergencies. What steps should be taken to deal with balked landings, engine failures or fires? How might these steps vary according to the phase and conditions of flight? Consideration of contingencies now is likely to mean faster, more appropriate reaction to urgent or emergency situations, should they arise.

Since each kit-built aircraft is unique, each builder should expect his aircraft's performance to be unique. The prudent builder will determine carefully the weight and balance parameters of his plane before its first flight. He'll familiarize himself with its flying characteristics during the flight test phase, cautiously exploring its capabilities and limitations while heeding the designer's words of advice. The U. S. Government, the Experimental Aircraft Association and other publishers offer a wealth of information on flight preparation and testing. As a first step, the builder might refer to the FAA's AC-90-89A, "Amateur-Built Aircraft Flight Testing Handbook."

By applying suitable checklists and procedures to his plane and operating it within reasonable limits, the builder helps ensure his safety as well as the reliability and longevity of his airframe, power plant and components.

CORROSION and WASHING YOUR PLANE

Using the garden hose to wash the outside of your plane may seem like a great idea, however this is a practice avoided at the factory. We simply never let the plane get to the point it needs hosing. Instead, the exterior of the plane is cleaned using a product called Brilliance. This mild cleaner works great on all surfaces including the Lexan. For the oil or exhaust stains, we use 409 or Fantastic. These clean very effectively without apparent damage to the paint.

If your plane is open air like an Airaile or Stinger and you do use a hose to wash it down, you may be causing a future corrosion problem. In the case of any open cockpit plane with the tail sitting low, it is possible for water to collect inside the elevator push pull tube. This will rust away the elevator yoke and corrode the push pull tube also.

Even leaving the plane in the rain can allow moisture to collect in the elevator yoke. Please avoid the practice of spraying water into the cockpit area of your plane, open cockpit or not, this is a practice that will lead to corrosion problems and part replacement.

If you suspect your aircraft of corrosion problems, inspect all areas where water may collect, such as the elevator yoke area.