



AIRCRAFT MODIFICATIONS INC.

**SERVICE MANUAL
SUPPLEMENT
FOR RAM WINGLET INST'L**

**MODEL
414A
CHANCELLOR**



AIRCRAFT MODIFICATIONS INC.

SERVICE MANUAL NO. 1089

REV.	DATE	DESCRIPTION
10/83		ORIGINAL
12/83		ADDED 1040-80 & -81 PLACARDS
03/85		ADDED 1088-97 THRU -100 PLACARDS
A	1/29/97	CHANGED PAGE 2-1 WINGLET MATERIAL WAS HIGH-DENSITY KLEGECELL & FIBERGLASS CLOTH. CHANGED PAGE 14-1 WINGLET WIRING DIAGRAM WAS DWG. 1040. CHANGED PAGE 3-1 REMOVAL NOTE 9 WAS NAS 1304 BOLTS ECN 1705

LIST OF SECTIONS

Section

- | | |
|----|---|
| 1 | General Information |
| 2 | Ground Handling, Servicing & Inspection |
| 3 | Airframe |
| 14 | Electrical Systems |
| 16 | Structural Repair |

INTRODUCTION

I. FOREWARD

- A. This Service Manual Supplement is intended to be a supplement to the existing Cessna Service Manual for Cessna 414A aircraft.
- B. Only aircraft that are equipped with RAM Winglet Assembly are covered by this Supplement.
- C. This Supplement Manual is divided into 5 sections. The section numbers corresponding to the section numbers of existing Cessna Service Manual.
- D. Only the sections that are noted in this Manual have had changes and/or additions, all other sections remain unchanged.
- E. For list of parts shown in this Manual see RAM Parts Catalog Supplement No. 1091.
- F. This Supplement Service Manual covers the following airplanes modified by RAM Aircraft Modifications, Inc.

<u>Model</u>	<u>Serial Numbers</u>	<u>STC No.</u>
414A	414A0001 & On	SA4943SW

Section 1

Specification Changes:

A. Airplane weight

(1.) Ramp weight	<u>7087</u>
(2.) Gross weight takeoff	<u>7087</u>
(3.) Landing weight - maximum	<u>6750</u>
(4.) Maximum zero fuel weight	<u>6200</u>

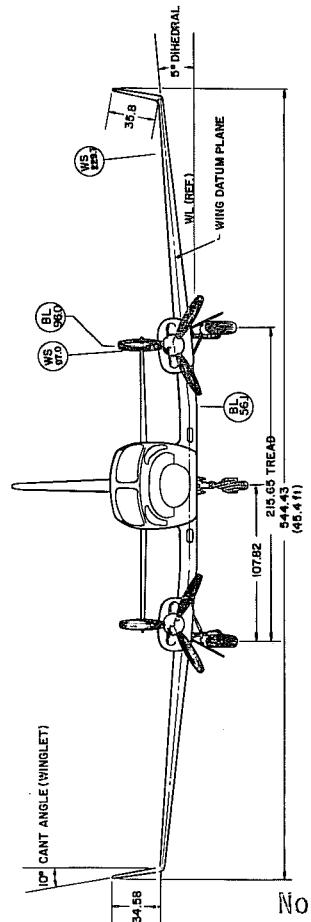
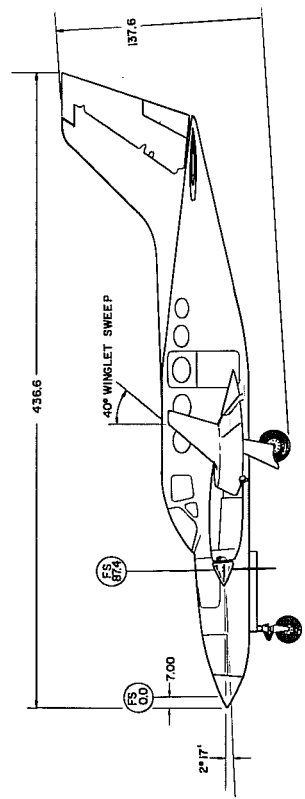
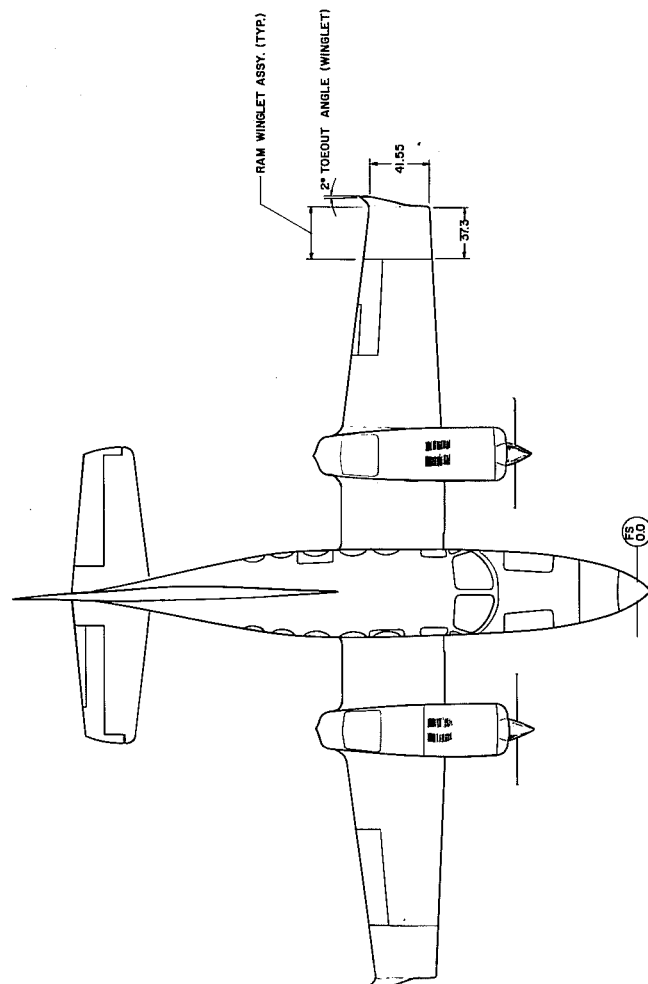
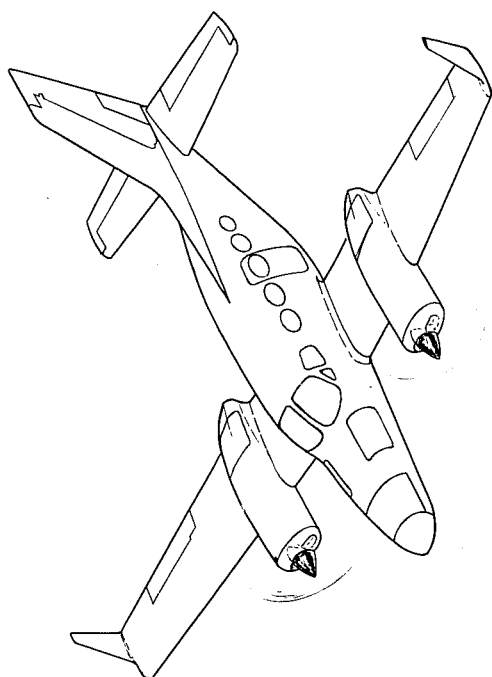
B. Airplane Dimensions:

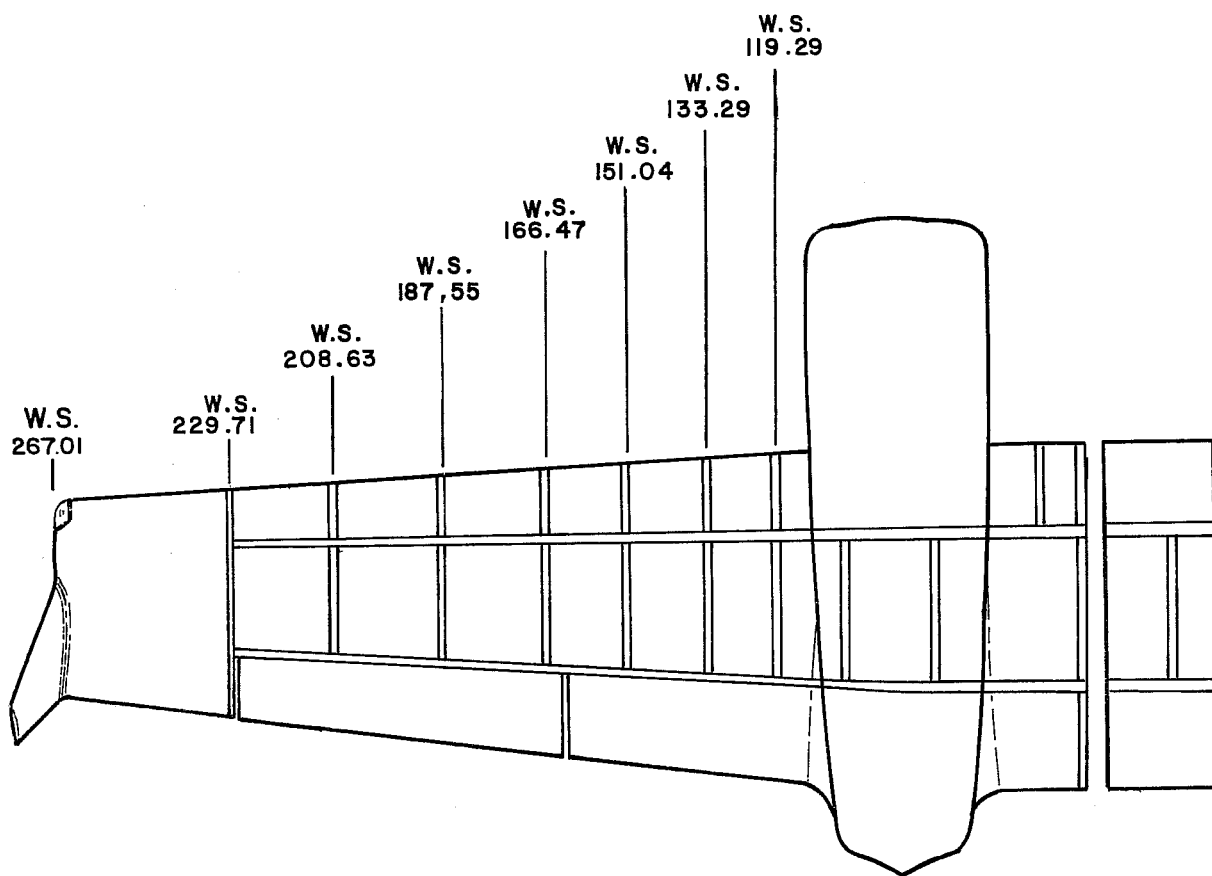
- (1.) Wing span-overall approx. 544.43 inches

BOLT TORQUE SPECIFICATIONS

Winglet main spar bracket bolts (NAS 144-13)	90-100 in.-lbs.
Winglet main spar bolts (NAS 1004-18)	90-100 in.-lbs.
Winglet rear spar bolts (AN3-14A)	20- 25 in.-lbs.
Winglet main spar screws (NAS 220-13)	25- 30 in.-lbs.


2 3 4 5 6 7 8






"WING RIB LOCATIONS"
STATION DIAGRAM

REQUIRED PLACARDS

	AIRCRAFT MODIFICATIONS INC. WACO, TEXAS
P/N	<input type="text"/>
S/N	<input type="text"/>
AIRCRAFT ELIGIBILITY	<input type="text"/>
DATE OF MANUFACTURE	<input type="text"/>
FAA PMA	

1040-30
WINGLET DATA PLATE
LOCATED ON MAIN SPAR
AS VIEWED THRU FWD
INSPECTION HOLE
FOR ALL WINGLET INSTALLATIONS

SWITCH MUST BE IN THE ON POSITION FOR TAIL STROBE OPERATION
ON ← 

1041-11
TAIL STROBE PLACARD
LOCATED ON AFT BULKHEAD SUPPORT FS289
SEE DWG 1041 SHEET 2
FOR ALL WINGLET INSTALLATIONS

**WARNING: With Visible Ice Accumulation
on the Aircraft DO NOT EXCEED 185 KIAS**

1040-75

Ice accumulation placard located
on instrument panel
For All Winglet Installations

TURBO LIMITATIONS	
ALT. x1000	MAX. M.P.
13	40.0
20	38.0
22	35.2
24	32.3
26	29.8
28	27.4
30	25.0

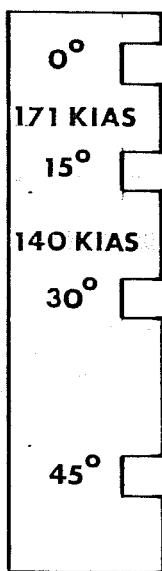
1011-11

Manifold Pressure
located on instru-
ment panel.
For engines rated
at 325 HP only.

TURBO LIMITATIONS	
ALT.X 1000	MAX M.P.
20.0	38.0
22.0	35.2
24.0	32.3
26.0	29.8
28.0	27.4
30.0	25.0

N1033

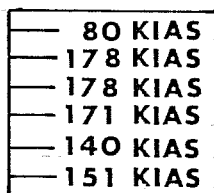
Manifold pressure located
on instrument panel. For
engines rated at 310 HP only.



1040-80

Flap Placard
Located on Flap Selector

For Winglet Aircraft
Without Robertson STOL Kit



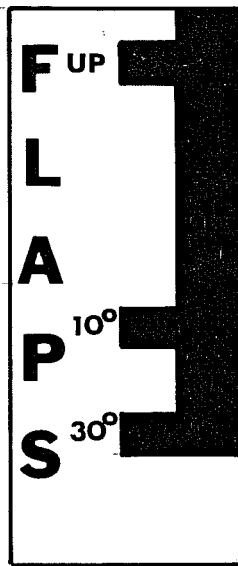
1040-81

Operational Limits Placard
Located on the Left FWD Side Panel

or

on Pilot's Sun Visor

For Winglet Aircraft
Without Robertson STOL Kit



* P/N 1088-97
 Flap Placard
 Located On Flap Selector

**FOR PROPER WEIGHT AND BALANCE
 CONSULT THE REVISED CG ENVELOPE
 PER STC SA892NW AND STC SA4943SW**

* P/N 1088-98
 Weight & Balance Placard
 Located On Instrument Panel & Nose Com-
 partment Baggage Door

—	79 KIAS
—	178 KIAS
—	178 KIAS
—	168 KIAS
—	121 KIAS
—	145 KIAS

* P/N 1088-99
 Operational Placard
 Located On The Left Forward Side
 Panel Or Pilot's Sun Visor
 S/N 414A0201 And On

AIR MINIMUM CONTROL SPEED
FLAPS UP - 79 KIAS
FLAPS 10° - 73 KIAS
FLAPS 30° - 67 KIAS

* P/N 1088-100
 Stall Placard
 Located On Instrument Panel

* All Placards Shown On This Page Are For Winglet Aircraft That Are Equipped
 With Robertson STOL Kit.

Section 2

PAINTING

The skin of the Winglet assembly is made of Divynycell foam sandwiched between glass and carbon cloth with epoxy resin.

A surfacer is applied to the fiberglass skin to provide a surface the polyurethane paint will adhere to.

Before painting, refer to Cessna Service Manual, Section 2, "Ground Handling, Servicing & Inspection", Topic: "Preparing Kevlar and Fiberglass Surface for Painting".

CAUTION: Never use any form of paint stripper on Winglet assembly.

PAINT RESTRICTIONS

- A. The Winglets should be painted only light colors, example: white, off-white or beige.
- B. Only paints that provide ultraviolet barrier protection should be used. See recommended paints.

RECOMMENDED SURFACER

U.S. Paint
Awl Grip
Base D8003/60W72
Hardener D-9001/60-Y-35

or

Koppers Co., Inc.
801 E. Lee
Irving, Texas 75060
Base P-900
Hardener Thinner C-916
Hardener C-918
Thinner T262

RECOMMENDED PAINT

U.S. Paint
Alumigrip Urethane
Base AA-92
Catalyst AA-92-C-39
Thinner T-732A

or

Sterling Paint
Base U-1000 Series
Catalyst U-1001
Thinner U-1275

Both of these paints provide ultraviolet barrier protection.

Section 2

INSPECTION

A. INSPECTION GUIDE LINES:

1. Metal parts for: security of attachment, cracks, metal distortion, broken welds, corrosion and any other apparent damage.
2. Wiring for: security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration and corroded terminals.
3. Bolts in critical areas for: correct torque in accordance with torque values given in the chart in Section 1, when installed or when visual inspection indicates the need for a torque check.
4. Fiberglass for: cracks, delamination, deterioration, and any other apparent damage.

B. INSPECTION FREQUENCY:

- | | |
|--------------------------------------|----------|
| 1. Wire bundles | 200 hrs. |
| 2. Winglet electric ground | 200 hrs. |
| 3. Fiberglass | 100 hrs. |
| 4. Spar fittings (ALL) | 100 hrs. |
| 5. Spar attaching bolts | * |
| 6. Spar fittings
attaching screws | * |
- * Check torque first 100 hrs., then every 100 hrs. thereafter check for security, looseness & working.

DO NOT TORQUE

NOTE: All spar fittings inspection frequency same as basic aircraft.

Section 3

REMOVAL & INSTALLATION OF WINGLET ASSEMBLY

A. REMOVAL

1. Ensure aircraft electrical power is turned OFF.
2. If airplane is equipped with wing de-ice boots, see Cessna Service Manual, Section 13 "Utility and Optional Systems", for de-ice boot removal.
3. Remove the three inspection access doors from bottom of Winglet.
4. Remove screws in skin securing Winglet to wing at w.s. 229.
5. Unplug electrical connection on aft side of rear spar.
6. Disconnect ground wire from end rib, w.s. 229.
7. Remove the two bolts that attach the rear spar.
8. Support Winglet assembly with padded supports to prevent damage to painted skins
9. Remove the seven NAS 1004 bolts that attach the main spar.
10. While supporting the Winglet assembly, pull Winglet outboard.

B. INSTALLATION OF WINGLET ASSEMBLY

1. Position supported Winglet assembly to wing.
2. With Winglet assembly supported, install the seven bolts that attach main spar. snug bolts.
3. Install the two bolts that attach rear spar. snug bolts.
4. Reconnect the electrical plug and ground wire.
5. Install screws securing Winglet to wing at w.s. 229.
6. Torque Bolts on main and rear spars. Bolt torque specifications in Section 1 of this manual.
7. Check Winglet alignment with wing with straight edge at trailing edge of Winglet assembly. Winglet assembly trailing edge to be in alignment with wing and aileron trailing edge.

8. Before installing inspection access doors, check to see that all bolts have been installed and torqued. Check the bolts that hold the main spar bracket are tight. Torque specifications in Section 1 of this manual. Check to insure that the wiring is not chafing. Install all three of the inspection access doors.
9. Re-install wing de-ice boots per Cessna Service Manual, Section 13 "Utility and Optional Systems".

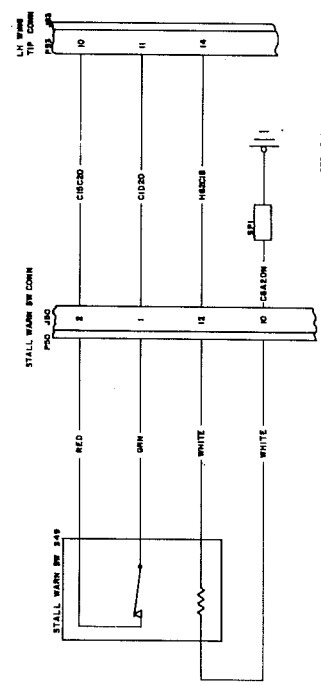
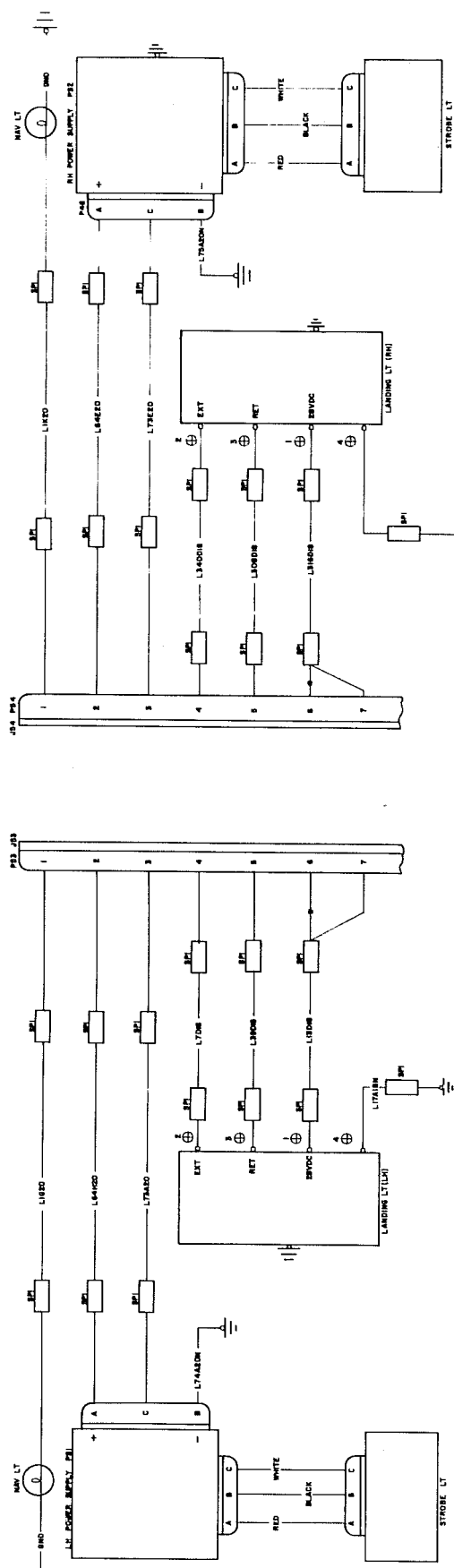
C. MAIN SPAR LOCK NUTS

1. The nuts that attach the main spar bracket are sealing locknuts. If a fuel leak develops, DO NOT seal over nuts with fuel tank sealant. New sealing locknuts may be ordered from RAM.
2. Install new sealing locknuts with sealing insert next to spar fitting plate.

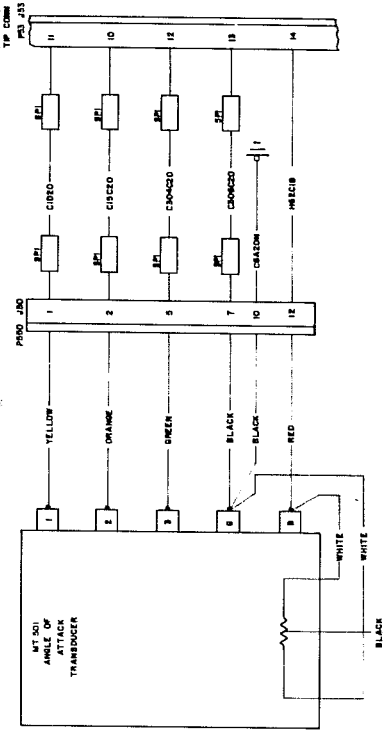
Section 14
ELECTRICAL SYSTEMS

Dwg. 1088	Winglet Wiring Diagram
Dwg. 1041	Tail Strobe Installation

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



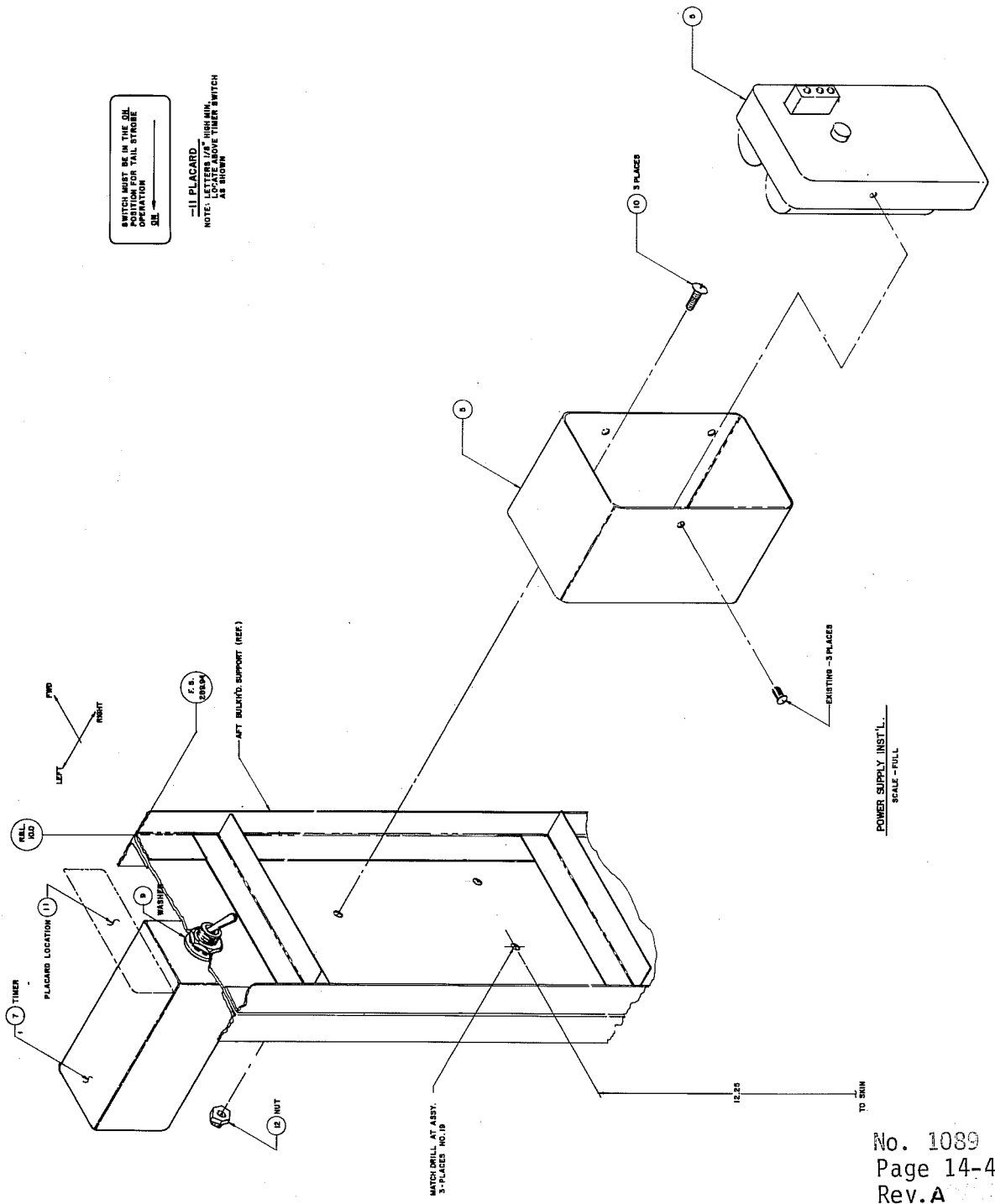
NOTE - FOR AMOUNT WITH ANGLE OF ATTACK TRANSUCER



NOTE:
5 JUMPER DELETED
4 JUMPER B ON
4 JUMPER B ON

WINGLET WIRING DIAGRAM
STROBE, MAY, LANDING LTR B STALL, WARNING SW

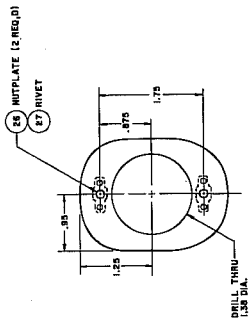
1 2 3 4 5 6 7 8



SWITCH MUST BE IN THE OIL
 FOR TAIL STANGE
 OPERATION
 OIL

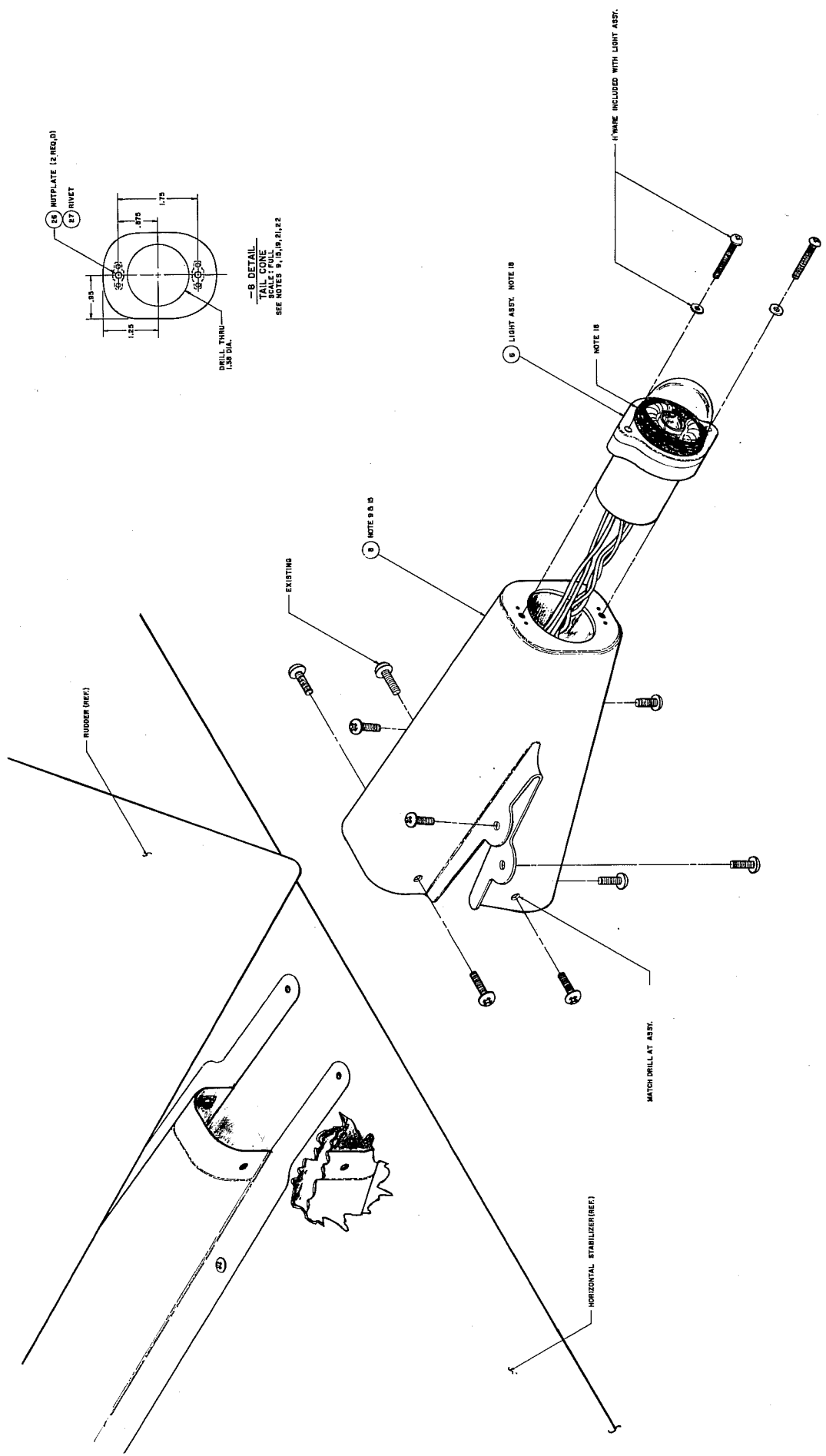
— II PLACARD.
 NOTE: LETTERS "A/B" HIGH MIN.
 AND "C/D" LOW TIME SWITCH
 AS SHOWN

2 3 4 5 6 7 8



-B DETAIL
 FULL SCALE
 SCALE: FULL
 SEE NOTES 9, 10, 11, 12

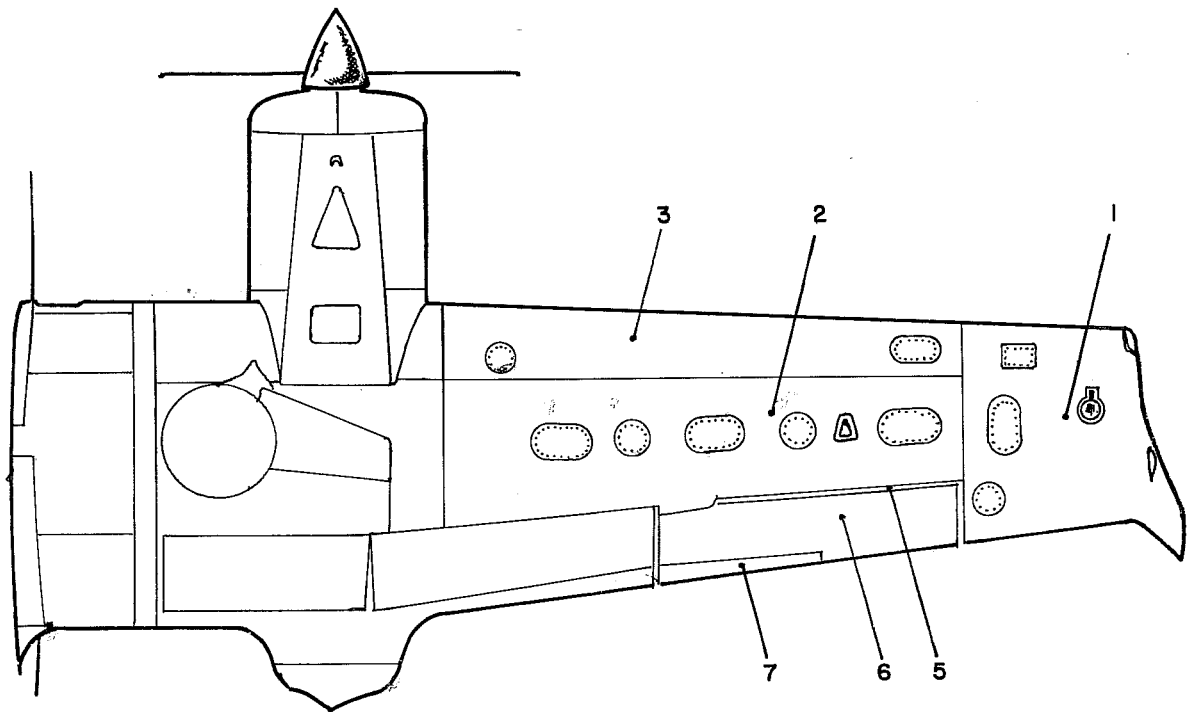
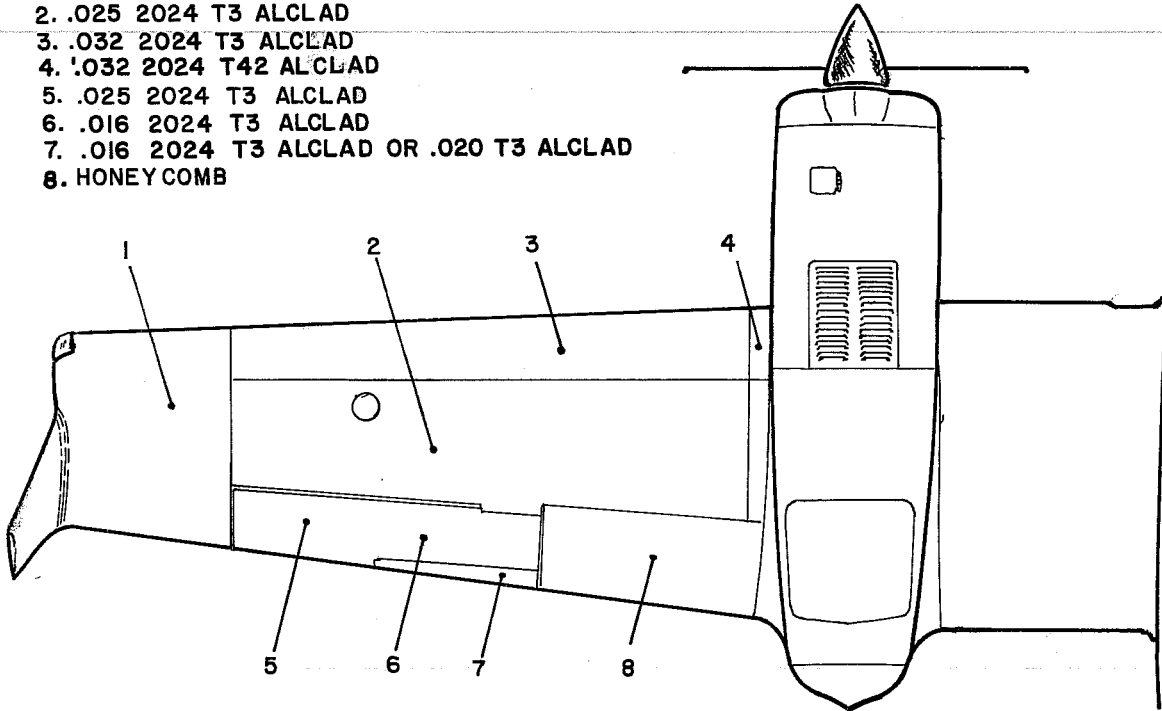
DRILL THRU
 1.38 DIA.



LIGHT INSTR.
 SCALE - FULL

" WING SKIN"

- 1. FIBERGLASS (WINGLET)
- 2. .025 2024 T3 ALCLAD
- 3. .032 2024 T3 ALCLAD
- 4. .032 2024 T42 ALCLAD
- 5. .025 2024 T3 ALCLAD
- 6. .016 2024 T3 ALCLAD
- 7. .016 2024 T3 ALCLAD OR .020 T3 ALCLAD
- 8. HONEY COMB



Section 16

STRUCTURAL REPAIR

I. Fiberglass Parts

Note: If Winglet Assembly has sustained damage refer to Cessna Service Manual, Section 16 "Structural Repair", Topics: "Definition of Damage" and "Fiberglass Parts".

A. Negligible Damage

Any small scratches which can be polished or sanded out, may be considered as negligible damage.

B. Repairable Damage

- (1) Damaged fiberglass skin must be repaired as shown in Figure 1. Cut & trim the area just beyond the noticeable damage. If the parts are painted, remove paint & sand clean an area at least two inches beyond the edge of the cutout. Prepare the necessary size & number of patches of glass cloth. Mix a sufficient amount of resin in accordance with the manufacturer's instructions. See Section E.

WARNING: ALWAYS FOLLOW THE MANUFACTURER'S MIXING INSTRUCTIONS CAREFULLY AS THE MIXING OF PEROXIDE & COBALT TOGETHER WILL RESULT IN A SPONTANEOUS FIRE.

- (2) Be sure that your hands are free from oil, grease & dirt. Apply an even coat of resin on the sanded area. Impregnate all the glass cloth patches by laying them on a clean paper & working the resin through the fabric with a small brush. Place the larger patch over the cutout area, working out all air bubbles & wrinkles. If the cutout is large enough to cause the patch to sag, place a suitable support behind the repair area. Coat the support with automobile wax or wax paper to prevent the resin from adhering to the support. Apply a second patch over the first patch, etc., working out all wrinkles & air bubbles. After all the patches have been applied, brush the area with an even coat of resin and allow to cure. Smooth the patch area with fine sandpaper until the desired finish is obtained. Repaint the finished area with matching paint.

C. Repairable Damage per RAM

- (1) Call RAM Aircraft Modifications, Inc., Waco, Texas, for repair instructions and advice; if main spar, rear spar or ribs are cracked or the bond between skin and spar has been broken.

D. Damage Necessitating Replacement of Parts

- (1) When the fiberglass parts are torn or cracked over a large area or show signs of strain through the appearance of small cracks or shows signs of loss of rigidity, the parts shall be replaced.

E. Approved Cloth and Resin

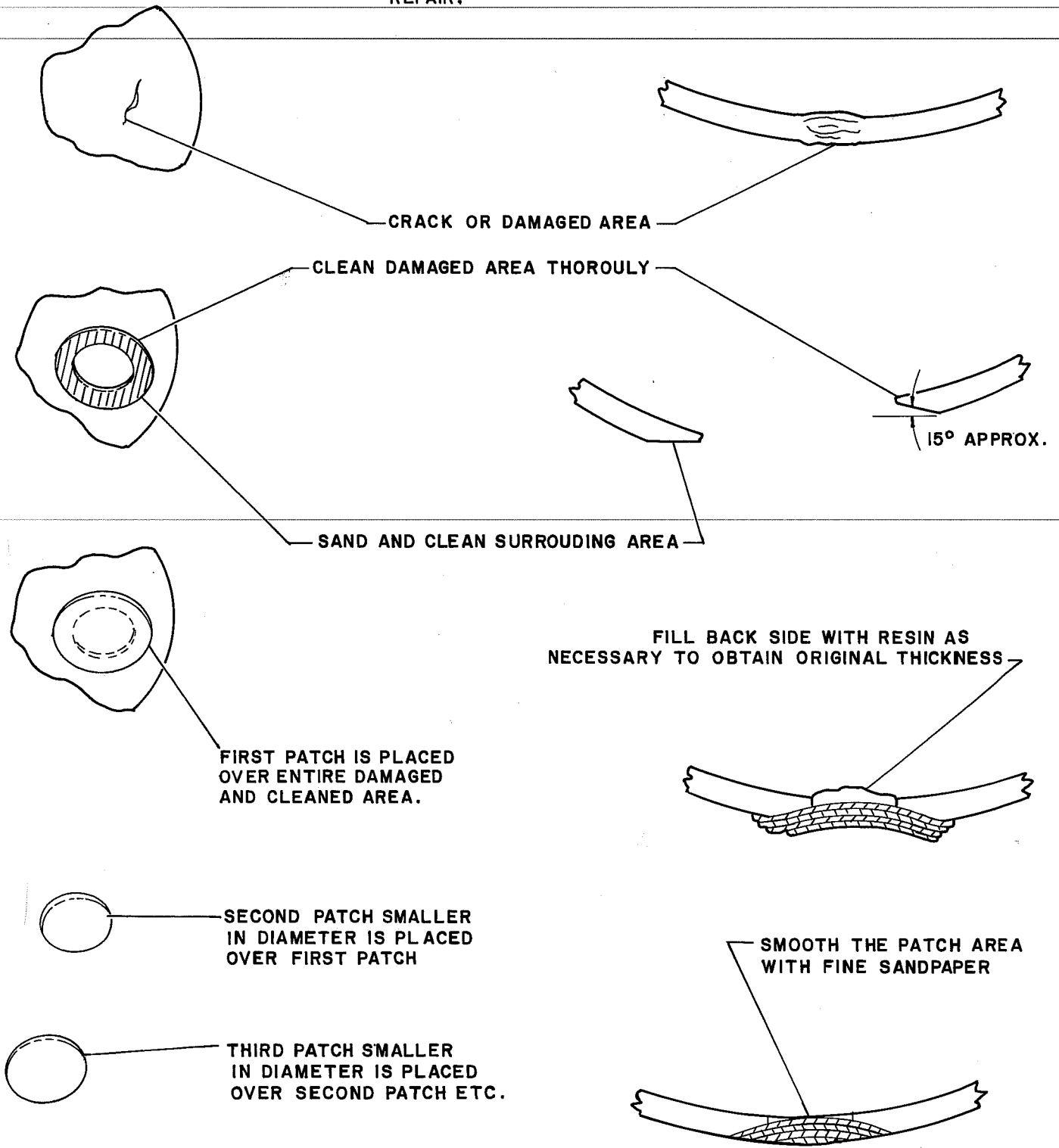
- (1) Fiberglass cloth - No. 7781 or equivalent aircraft quality cloth.

SOURCE: Hexcel Corporation
11711 Dublin Blvd.
Dublin CA

- (2) Safe-T-Poxy - No. 2410 Epoxy Resin
No. 2183 Hardener

SOURCE: (APCO) Applied Plastics Co., Inc.
612E Franklin Ave.
El Segundo CA 90245

NOTE: SEE FIBERGLASS PARTS PARAGRAPH BEFORE ATTEMPTING A FIBERGLASS REPAIR.



FIBERGLASS REPAIR
FIGURE I

Section 16

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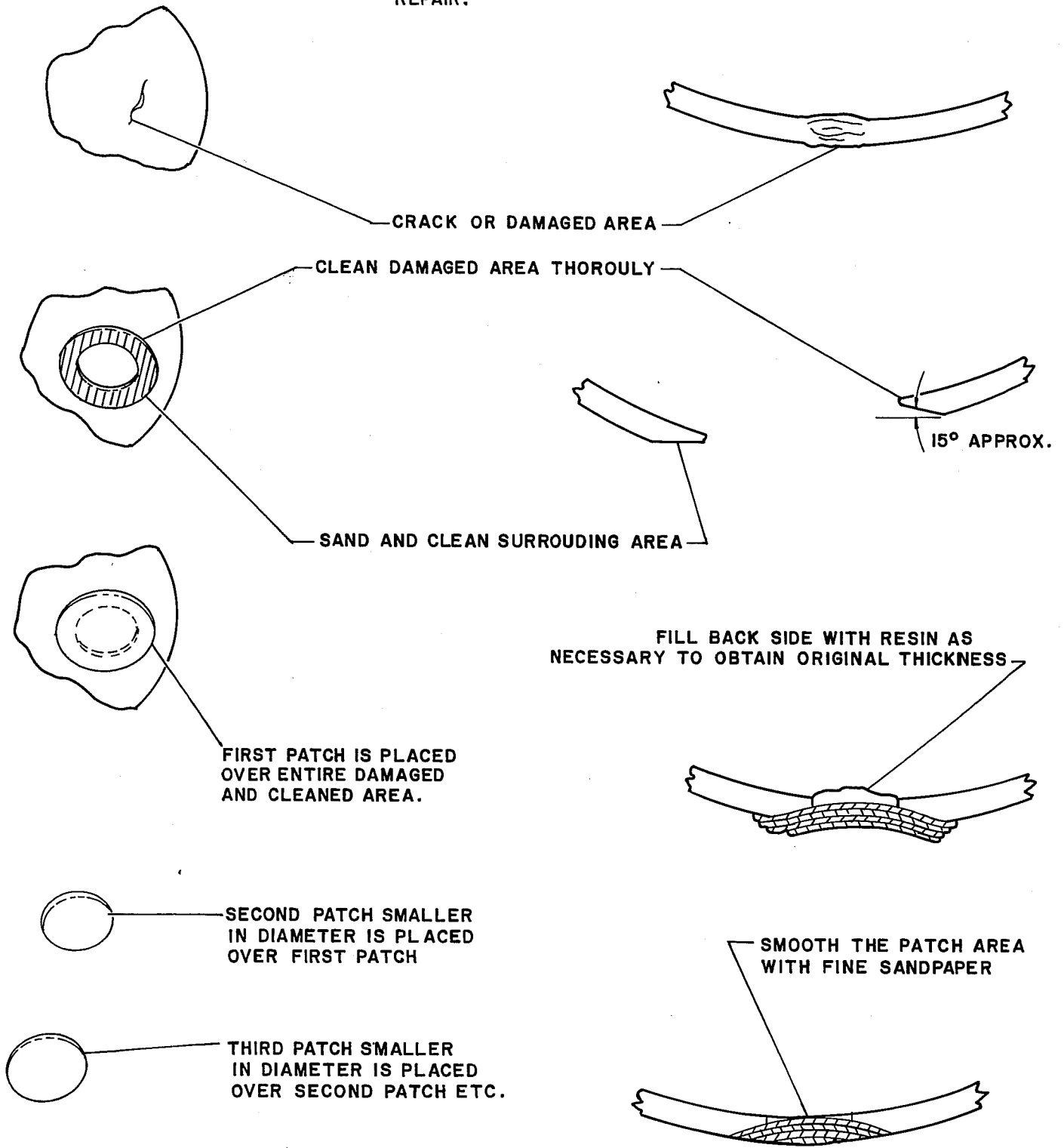
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FIBERGLASS REPAIR
FIGURE 1

E. Approved Cloth and Resin

- (1) Fiberglass cloth - No. 7781 or equivalent aircraft quality cloth.

Source: Hexcel Corporation
11711 Dublin Blvd.
Dublin CA

- (2) Polyester Resin - Dion FR6604T or equivalent

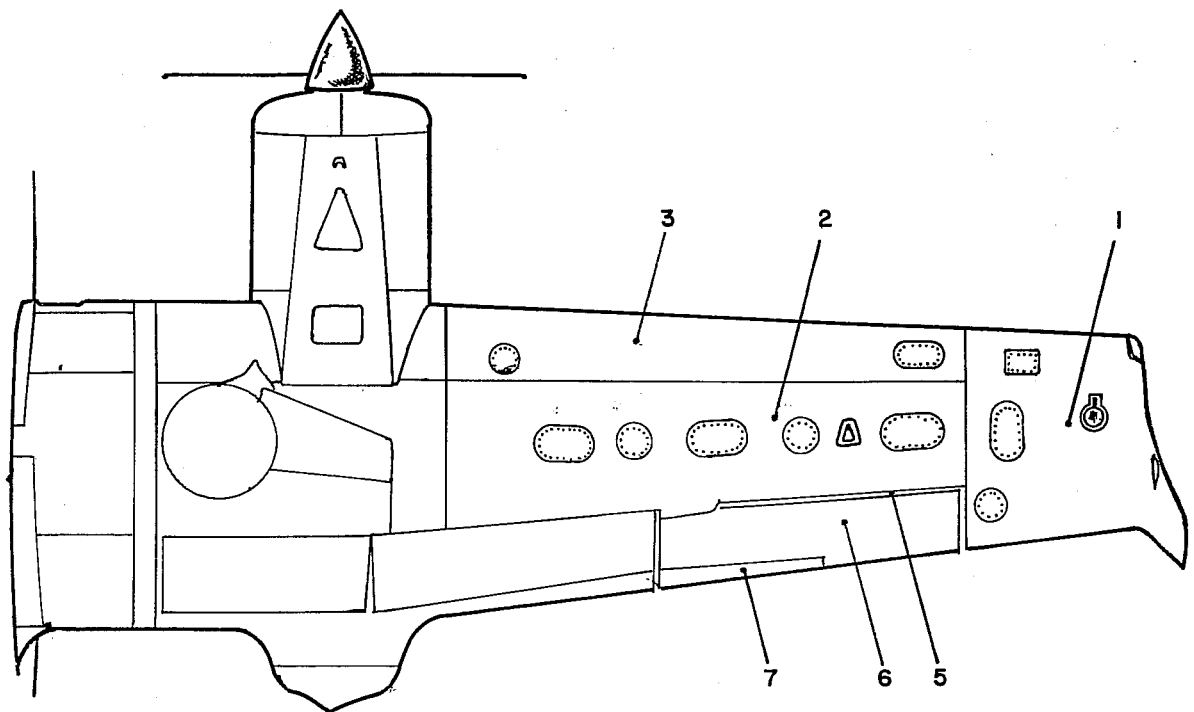
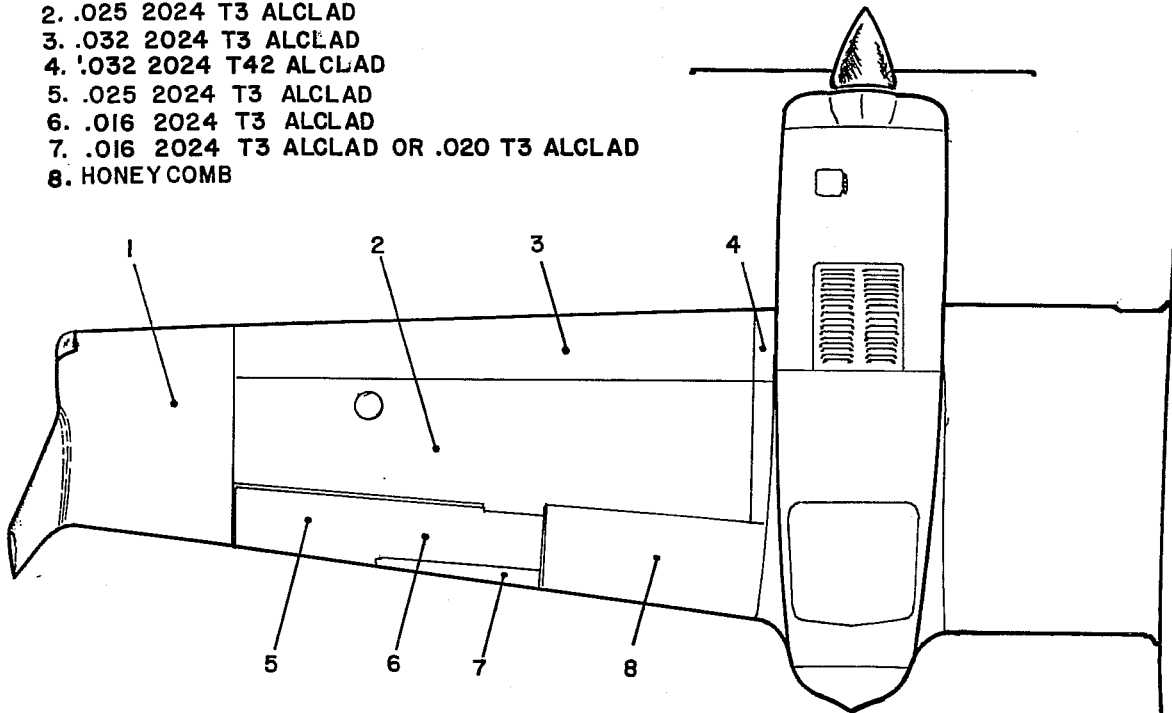
Source: Koppers Co., Inc,
Organic Material Division
P.O. Box 60348, Terminal Annex
Los Angeles CA

- (3) Catalyst - Methyl Ethyl Ketone Peroxide Catalyst or equivalent

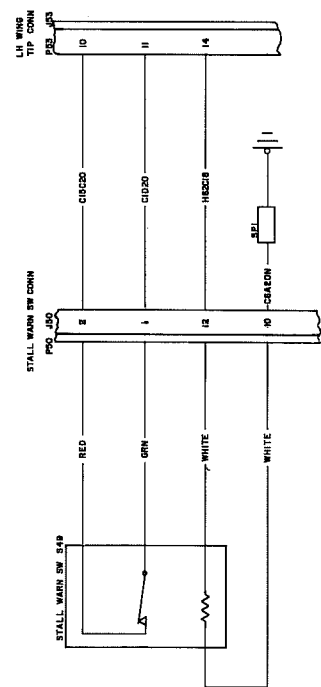
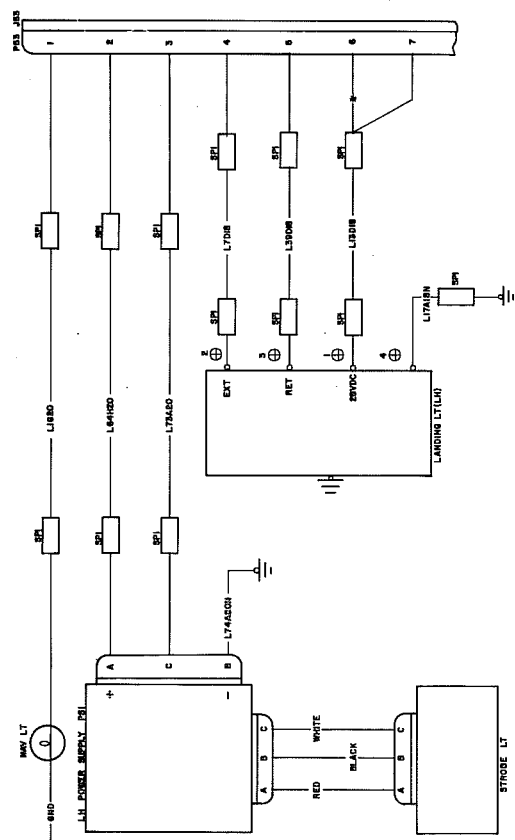
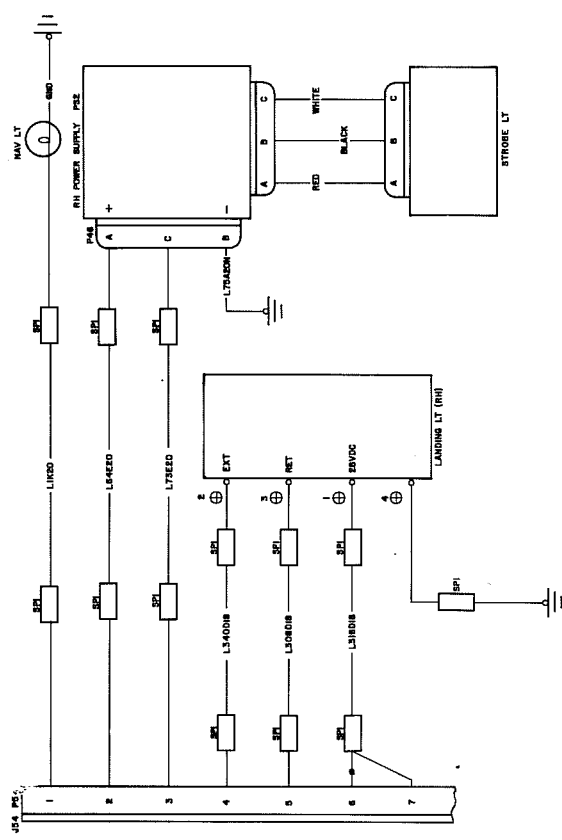
Source: Noral Co., Inc.
405 S. Motor Ave.
Azusa CA

" WING SKIN"

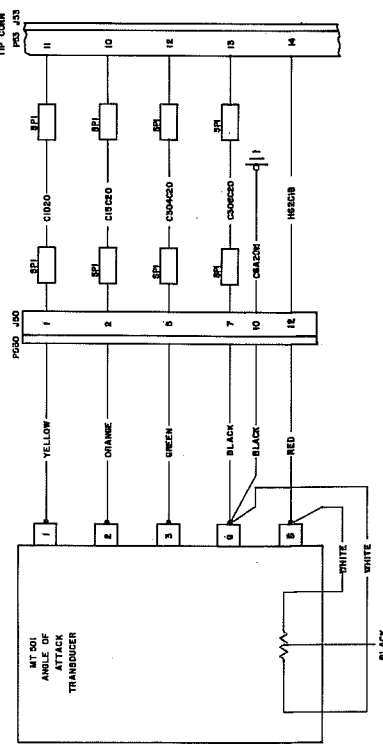
1. FIBERGLASS (WINGLET)
2. .025 2024 T3 ALCLAD
3. .032 2024 T3 ALCLAD
4. .032 2024 T42 ALCLAD
5. .025 2024 T3 ALCLAD
6. .016 2024 T3 ALCLAD
7. .016 2024 T3 ALCLAD OR .020 T3 ALCLAD
8. HONEY COMB



1 2 3 4 5 6 7



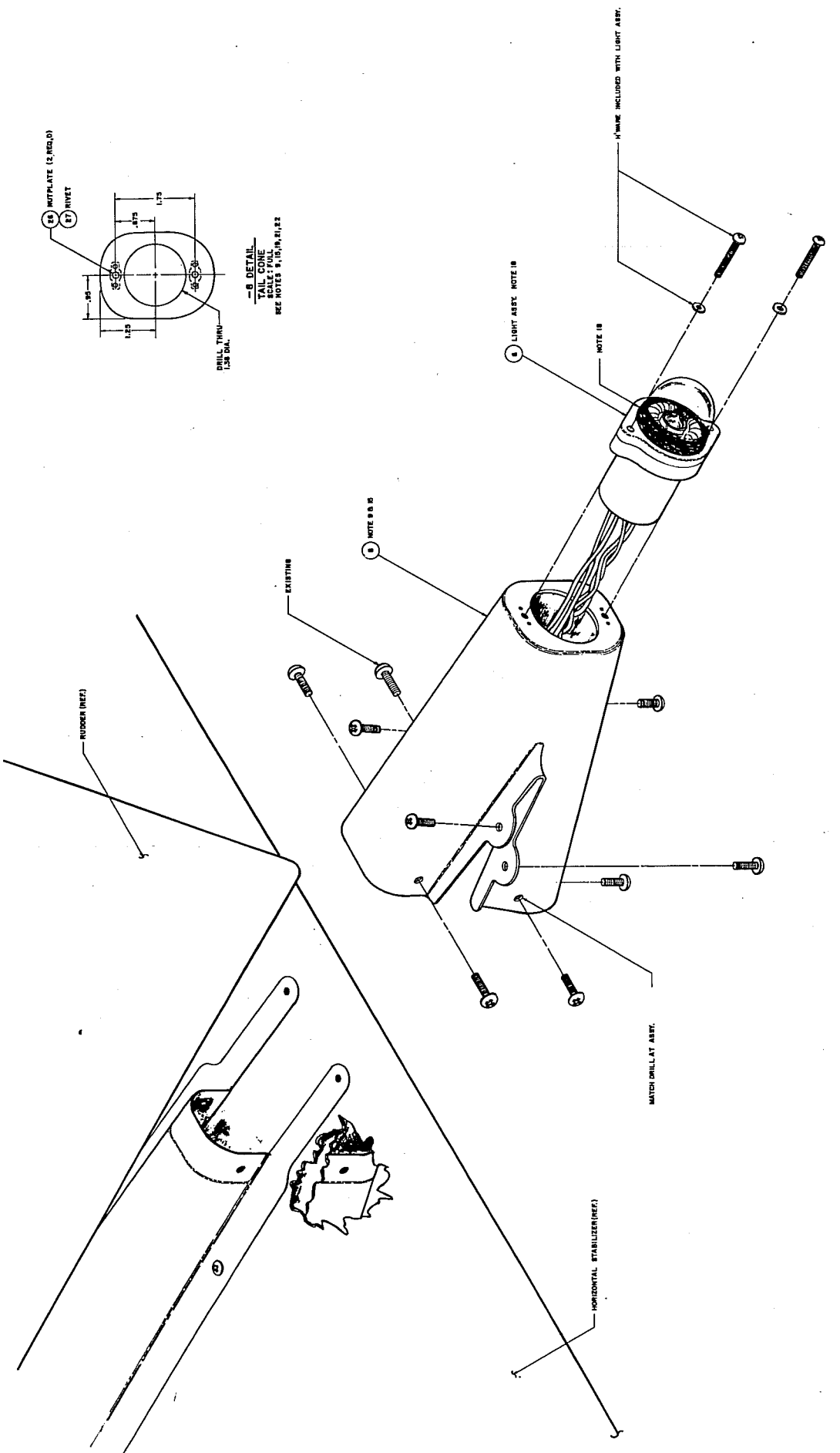
NOTE - FOR AIRCRAFT WITH ANGLE OF ATTACK TRANSDUCER



NOTE:
 * JUMPER DELETED 4140493 AND ON

WINGLET WIRING DIAGRAM
 STROBE, NAV, LANDING LTR. & STALL WARNING SW

1
2
3
4
5
6
7
8



—B DETAIL
TO GOVERN
MILL SCALE FULL
SEE NOTES 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

—LIGHT INST'L
SCALE—FULL