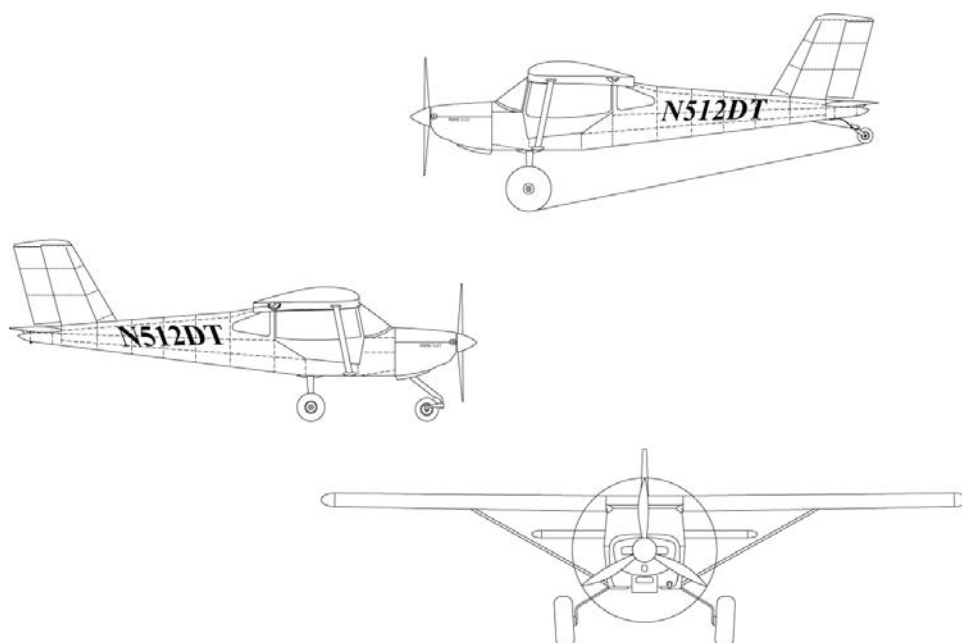


RANS



S-21 OUTBOUND

FIGURES MANUAL

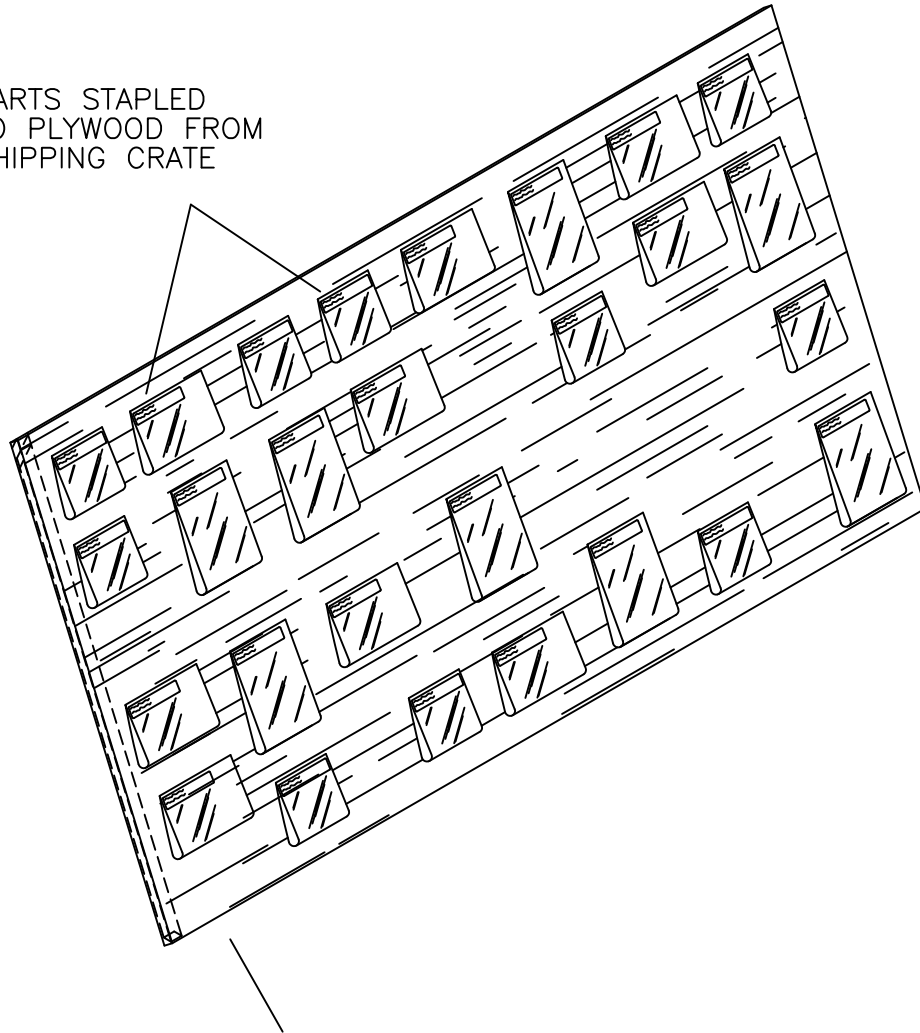


Serial Number: _____

Registration Number: _____

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RANS DESIGNS
4600 HWY 183 Alt
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785-625-6346
WWW.RANS.COM

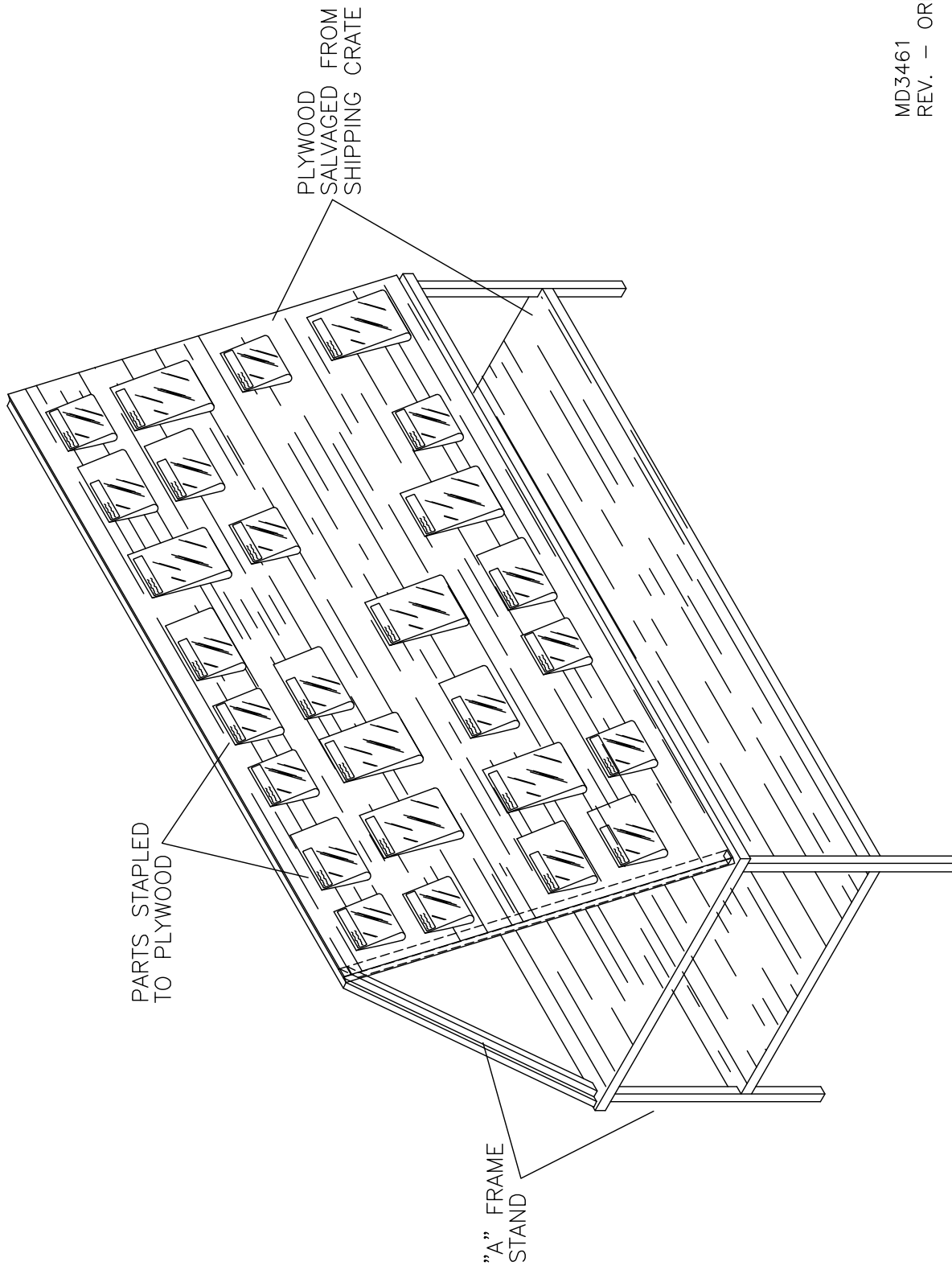
PARTS STAPLED
TO PLYWOOD FROM
SHIPPING CRATE



NAIL BOARD TO
SHOP WALL

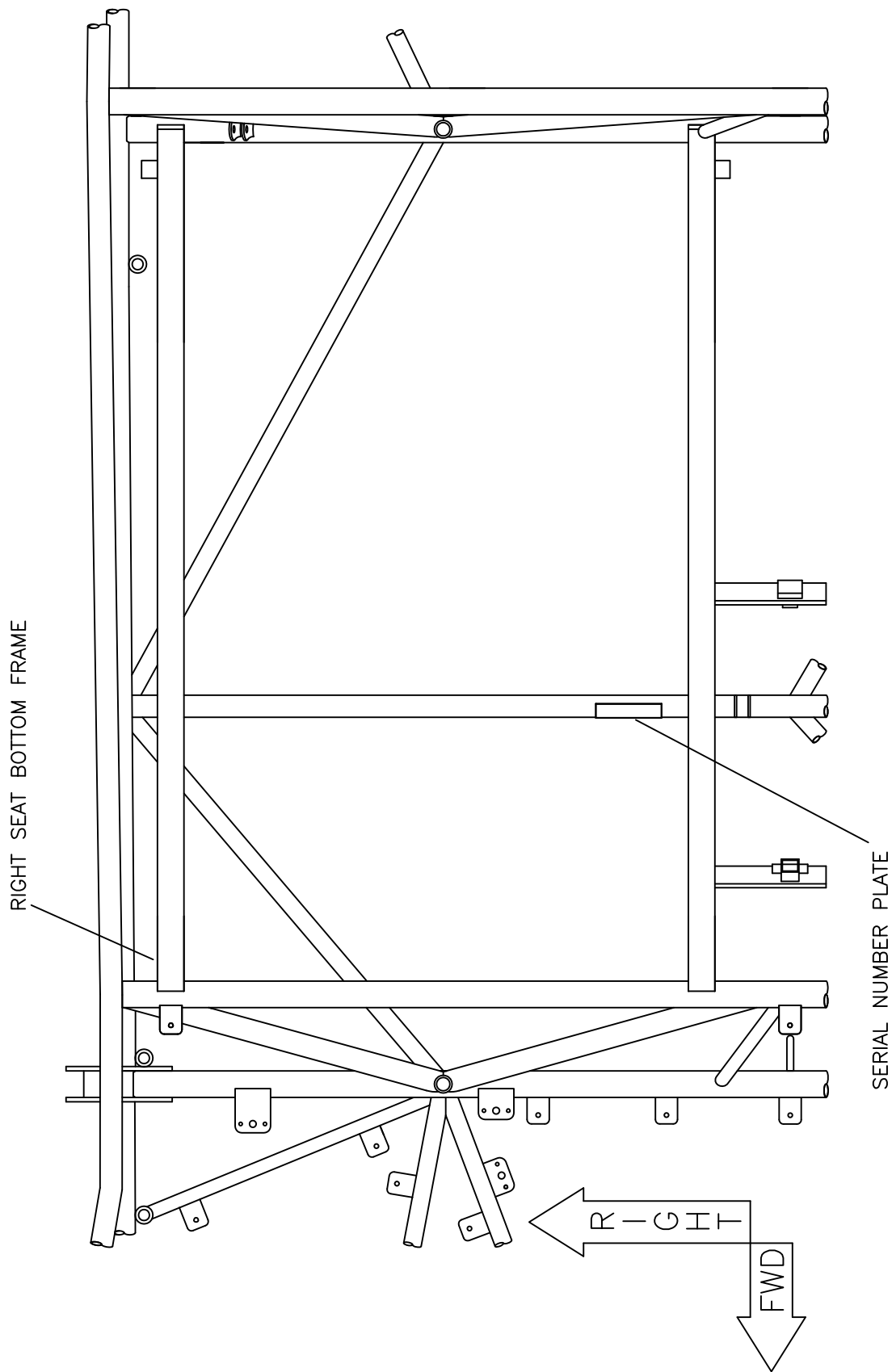
MD4363

RANS S-21 OUTBOUND
PARTS ORGANIZATION
FIGURE 00-01



MD3461
REV. — ORIG

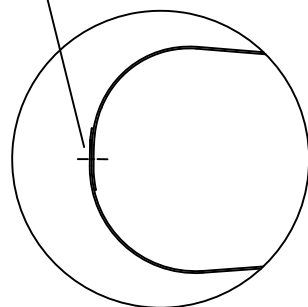
**RRR S-21 OUTBOUND
PARTS INVENTORY "A" FRAME
FIGURE 00-01A**



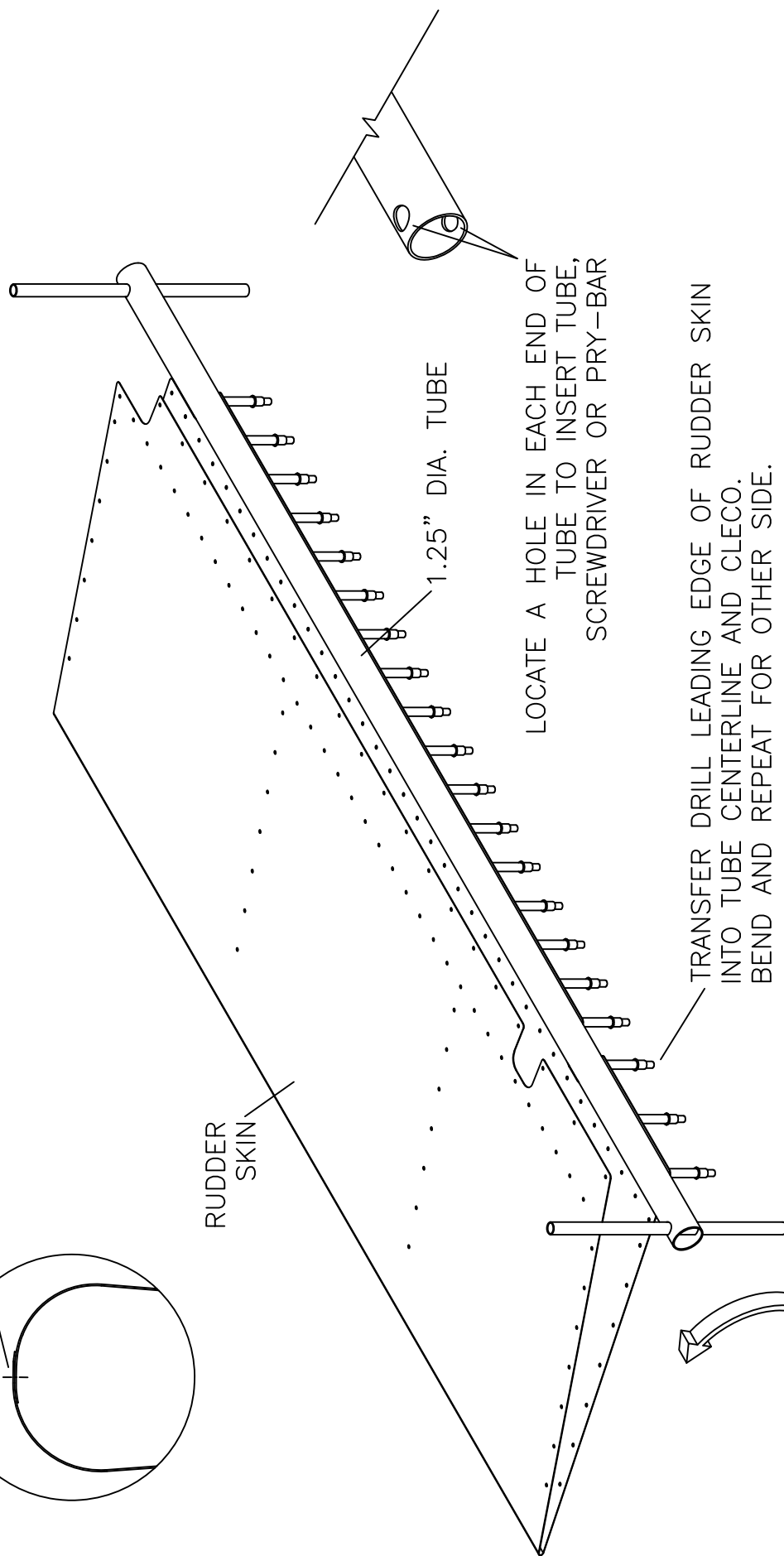
RRM S-21 OUTBOUND
SERIAL NUMBER PLATE LOCATION
FIGURE 00-03

MD5602
 REV. - ORIG

BEND BOTH SIDES TOWARD EACH OTHER.
ALIGN LEADING EDGE RIVET HOLES.



RUDDER
SKIN



ROTATE TUBE 180°

TRANSFER DRILL LEADING EDGE OF RUDDER SKIN
INTO TUBE CENTERLINE AND CLECO.
BEND AND REPEAT FOR OTHER SIDE.

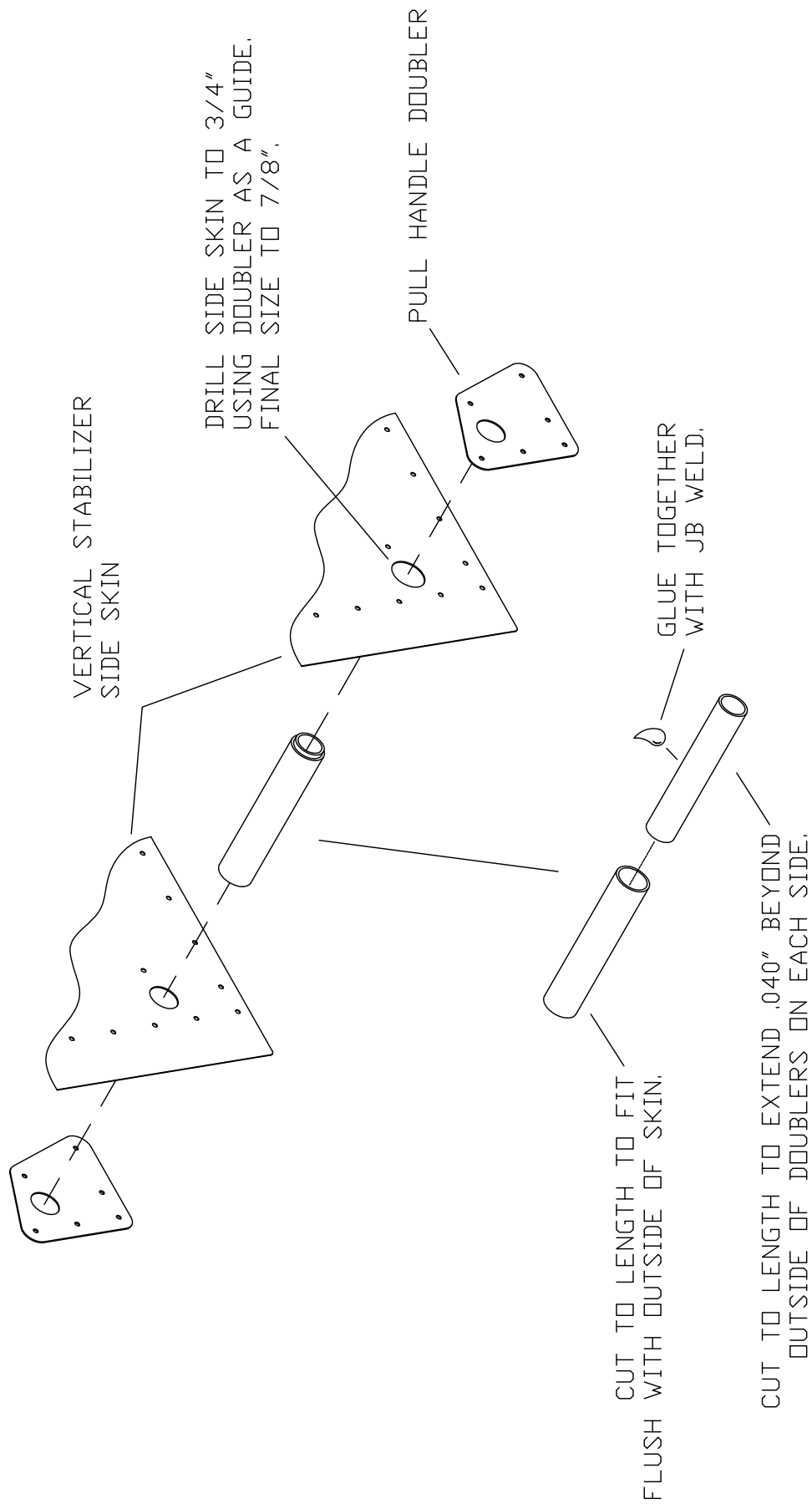
LOCATE A HOLE IN EACH END OF
TUBE TO INSERT TUBE,
SCREWDRIVER OR PRY-BAR

1.25" DIA. TUBE

RAMS S-21 OUTBOUND
RUDDER SKIN FORMING
FIGURE 02-01

This technical drawing shows a long, narrow mechanical component, likely a part of a machine or a structural element. The component has a complex internal structure, including a large central cavity with a rounded top and a series of circular holes along its length. The drawing is a top-down view, showing the component's profile and internal features. The component is symmetrical about a vertical centerline. The top part of the component has a large, rounded rectangular cavity. Below this, there is a series of circular holes arranged in a row. The bottom part of the component has a similar series of circular holes. The drawing is a technical illustration, showing the component's geometry and internal structure in a clear and precise manner.

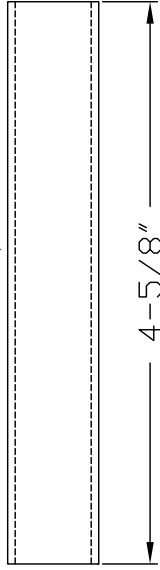
**RAMS S-21 OUTBOUND
VERTICAL STABILIZER SPAR RIVETING**
FIGURE 003-03



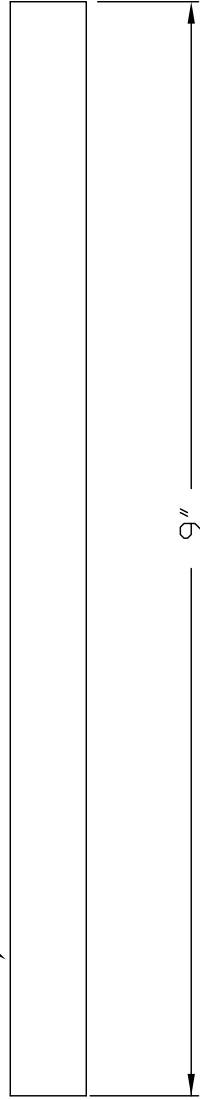
MD5651
REV. A

RRMS S-21 OUTBOUND **PULL HANDLE - VERTICAL STAB INSTALLATION** **FIGURE 003-04**

KAAC0106-2

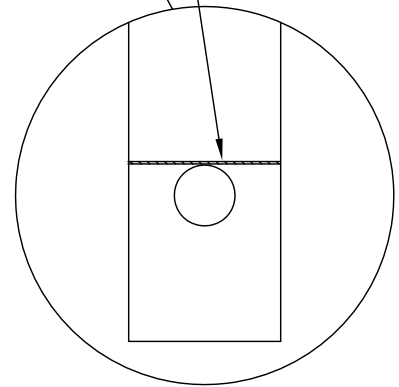
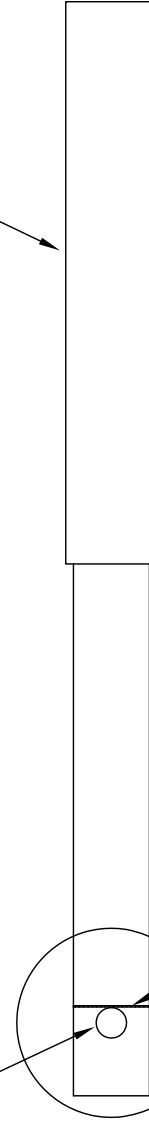


KAAC0106-1



DRILL 1/4"
(ONE SIDE ONLY)
HOLE SHOULD LINE
UP WITH OUTER SIDE
OF PULL HANDLE DOUBLER.

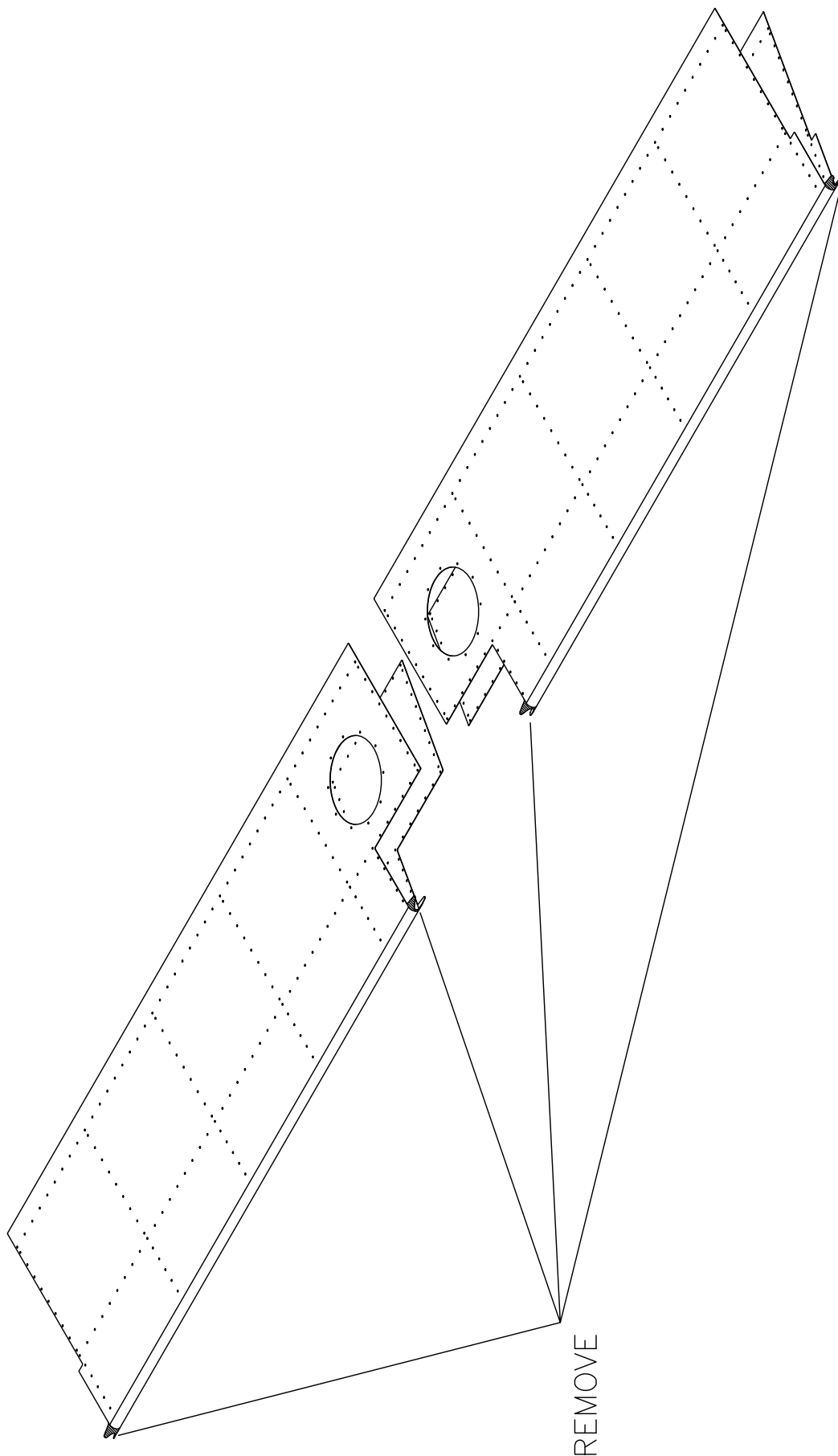
GLUE IN PLACE
WITH JB WELD



MD5651
REV. - ORIG

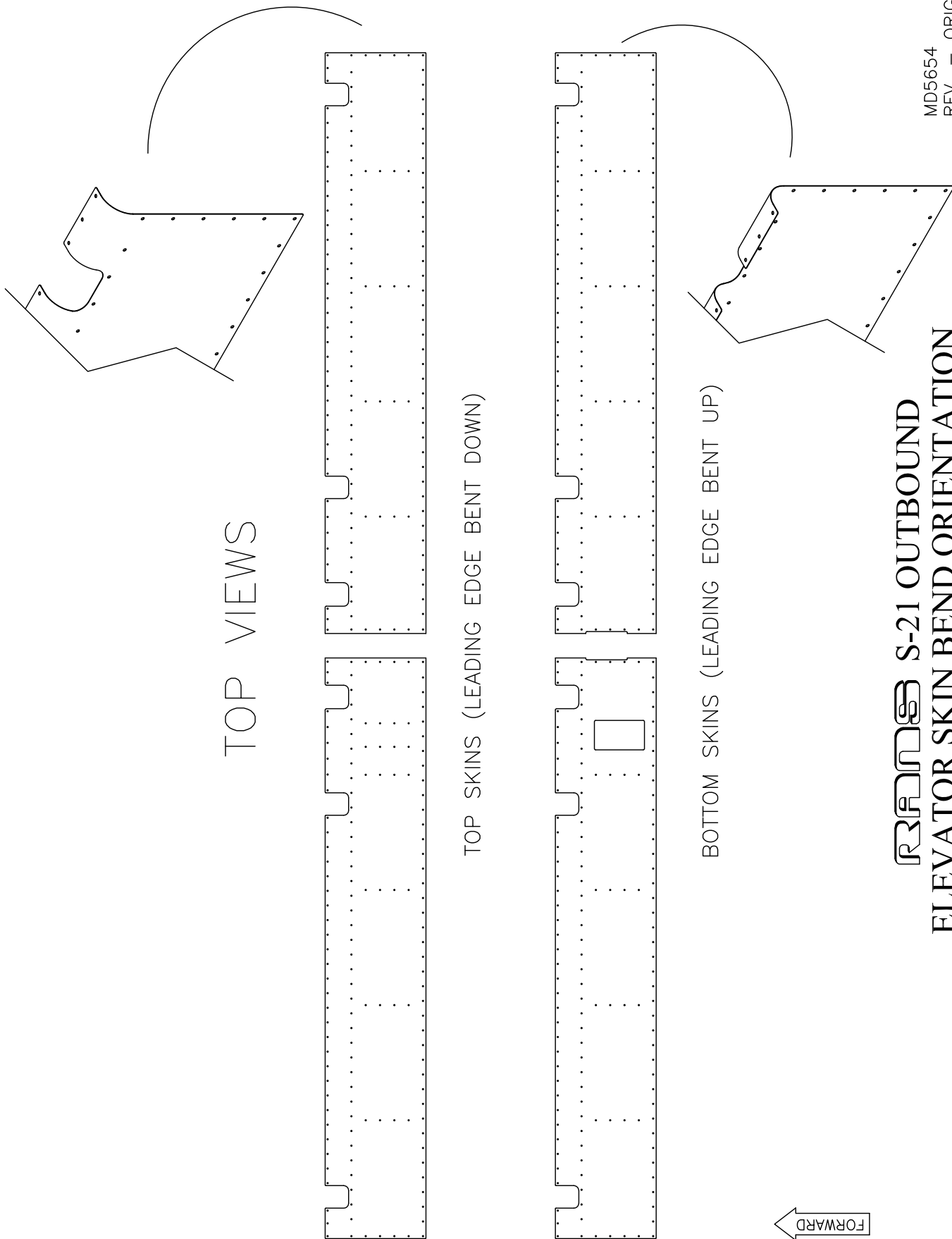
RAM S-21 OUTBOUND PULL HANDLE ASSEMBLY

FIGURE 003-05

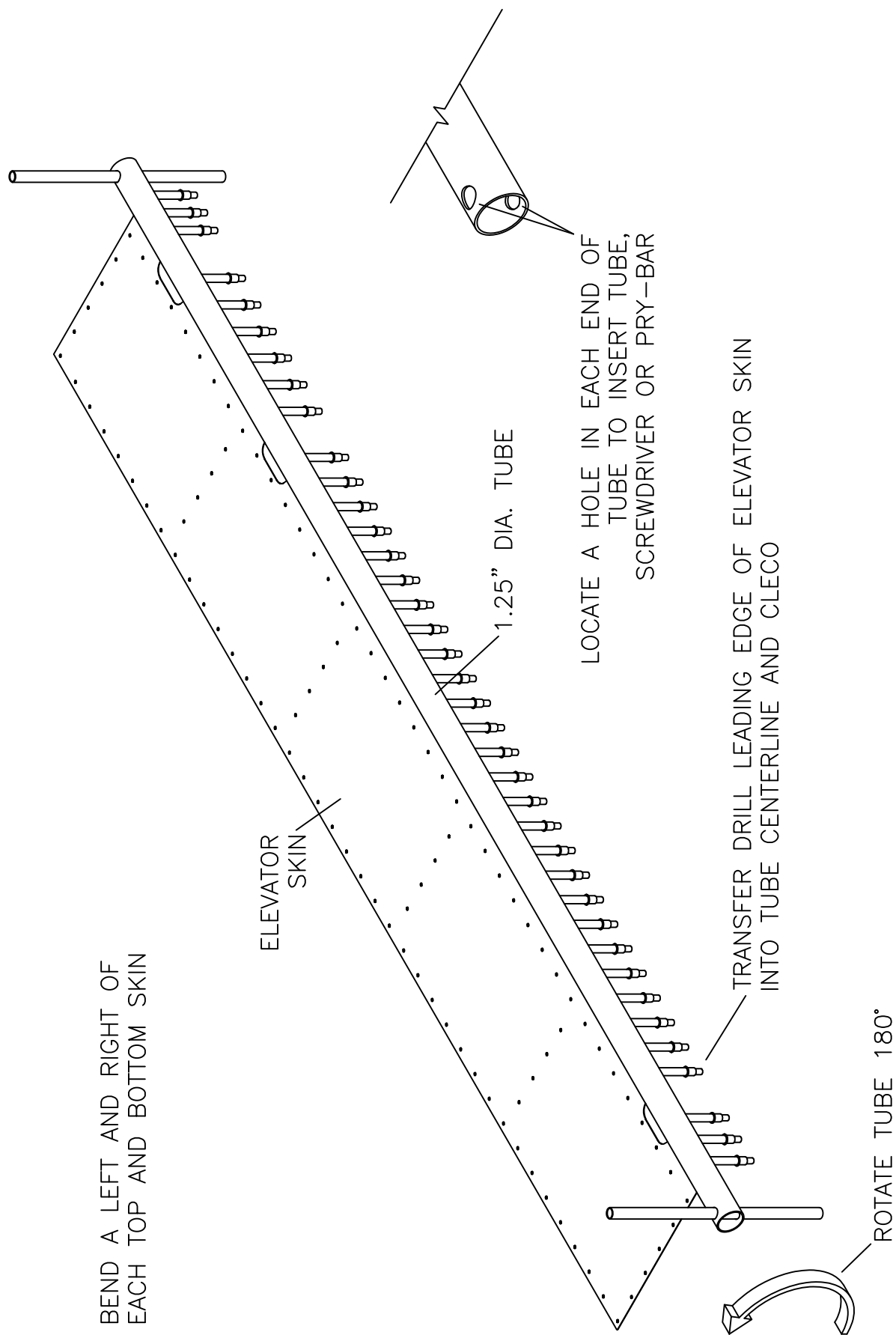


RRF S-21 OUTBOUND
HORIZONTAL SKIN MODIFICATION
FIGURE 04-01

MD5654
 REV. - A

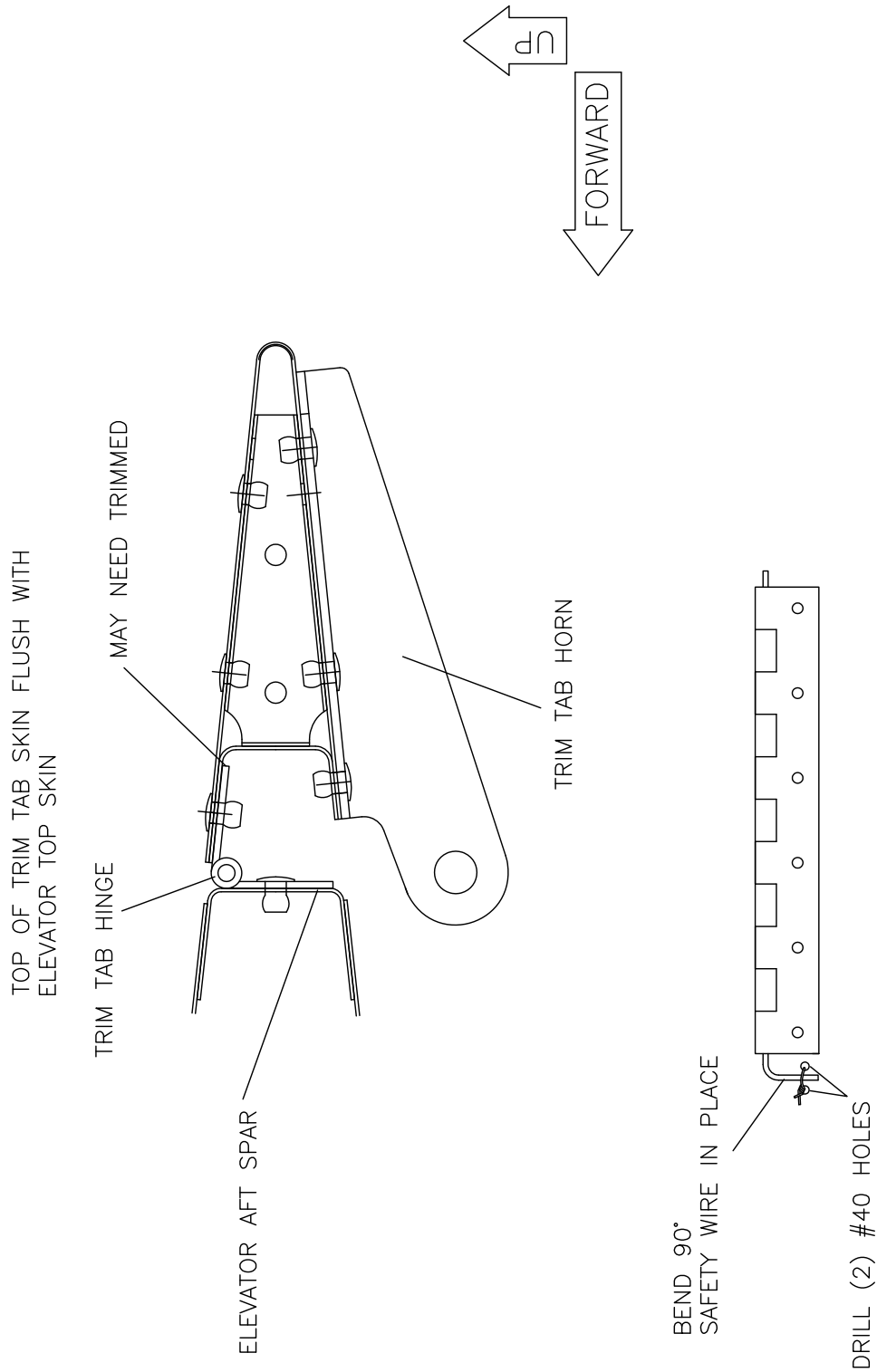


RRAMES S-21 OUTBOUND
ELEVATOR SKIN BEND ORIENTATION
FIGURE 05-01



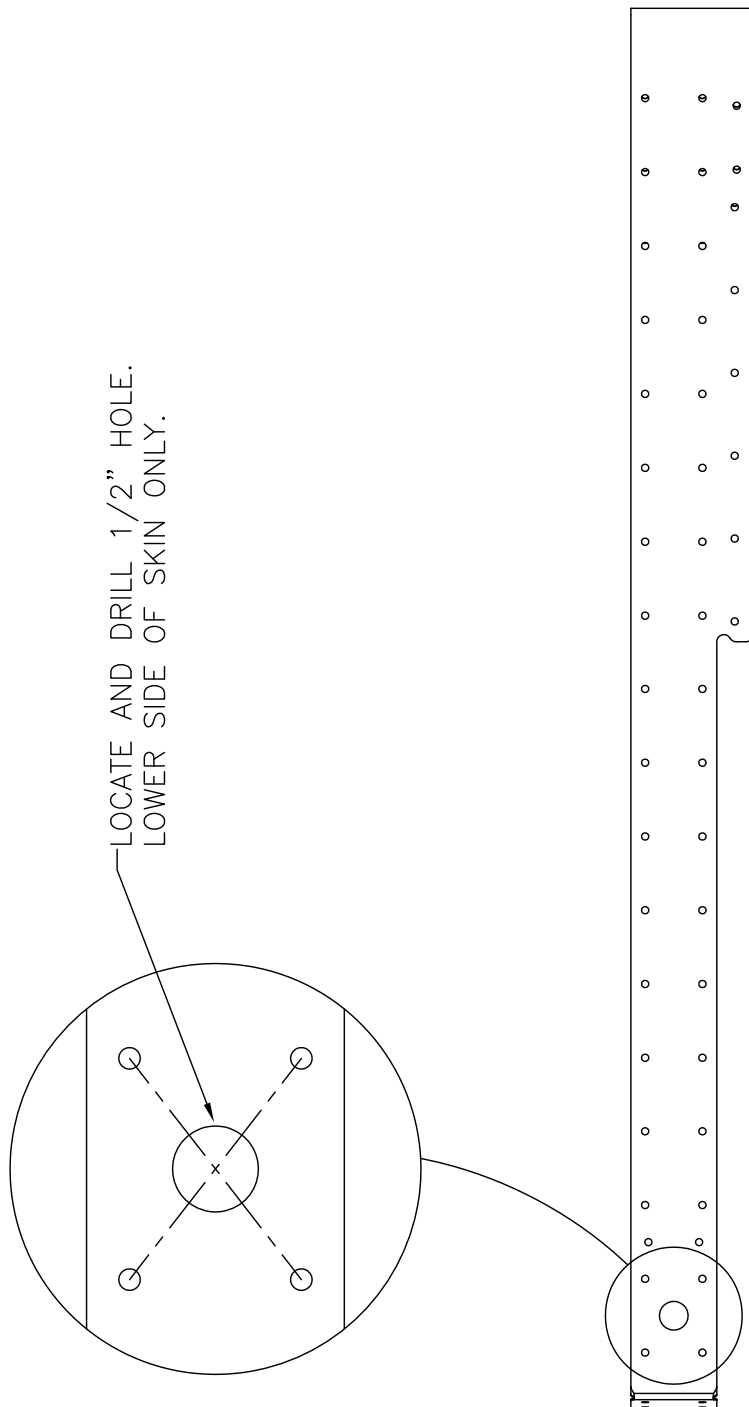
**RAMS S-21 OUTBOUND
ELEVATOR SKIN FORMING
FIGURE 05-01A**

MD5654
REV. - ORIG



RRMS S-21 OUTBOUND
ELEVATOR TRIM TAB HINGE FABRICATION
FIGURE 05-02

MD5654
 REV. - ORIG

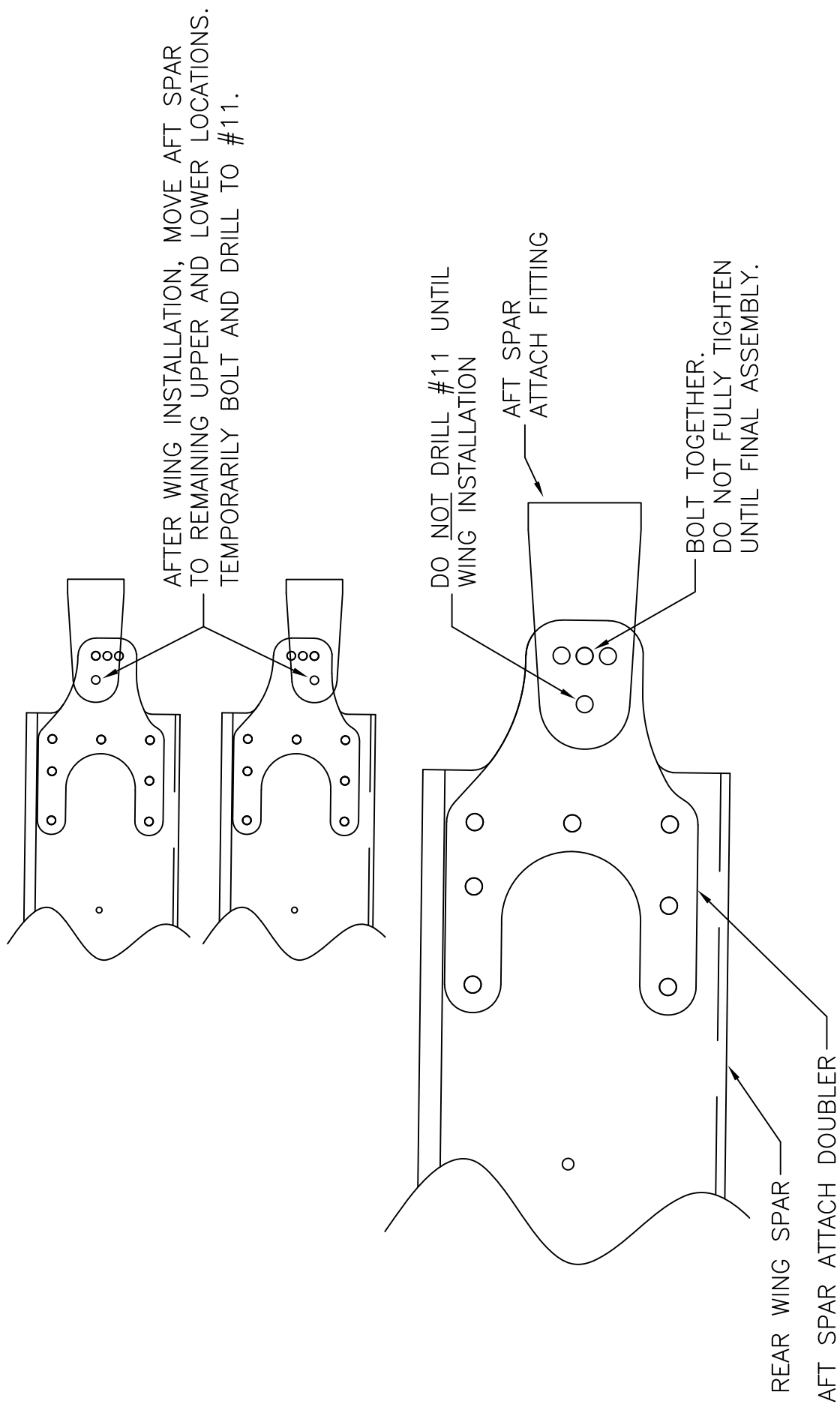


LOWER SIDE OF LEFT HAND ELEVATOR TIP SKIN SHOWN FOR REFERENCE



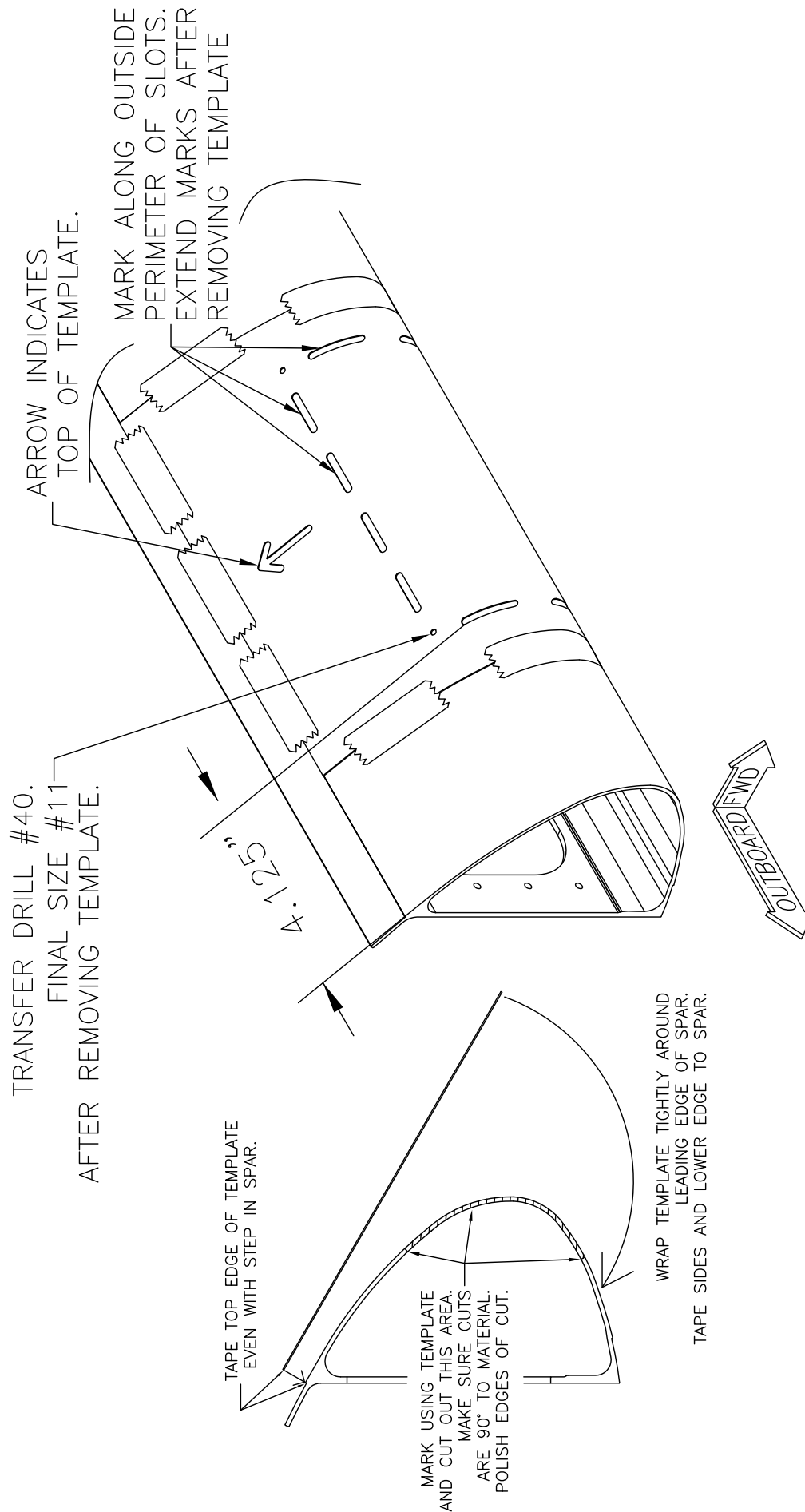
RRR S-21 OUTBOUND **ELEVATOR TIP SKIN - BALANCE HOLE DRILLING** **FIGURE 005-03**

MD5654
REV. - ORIG



MD5650
REV. A

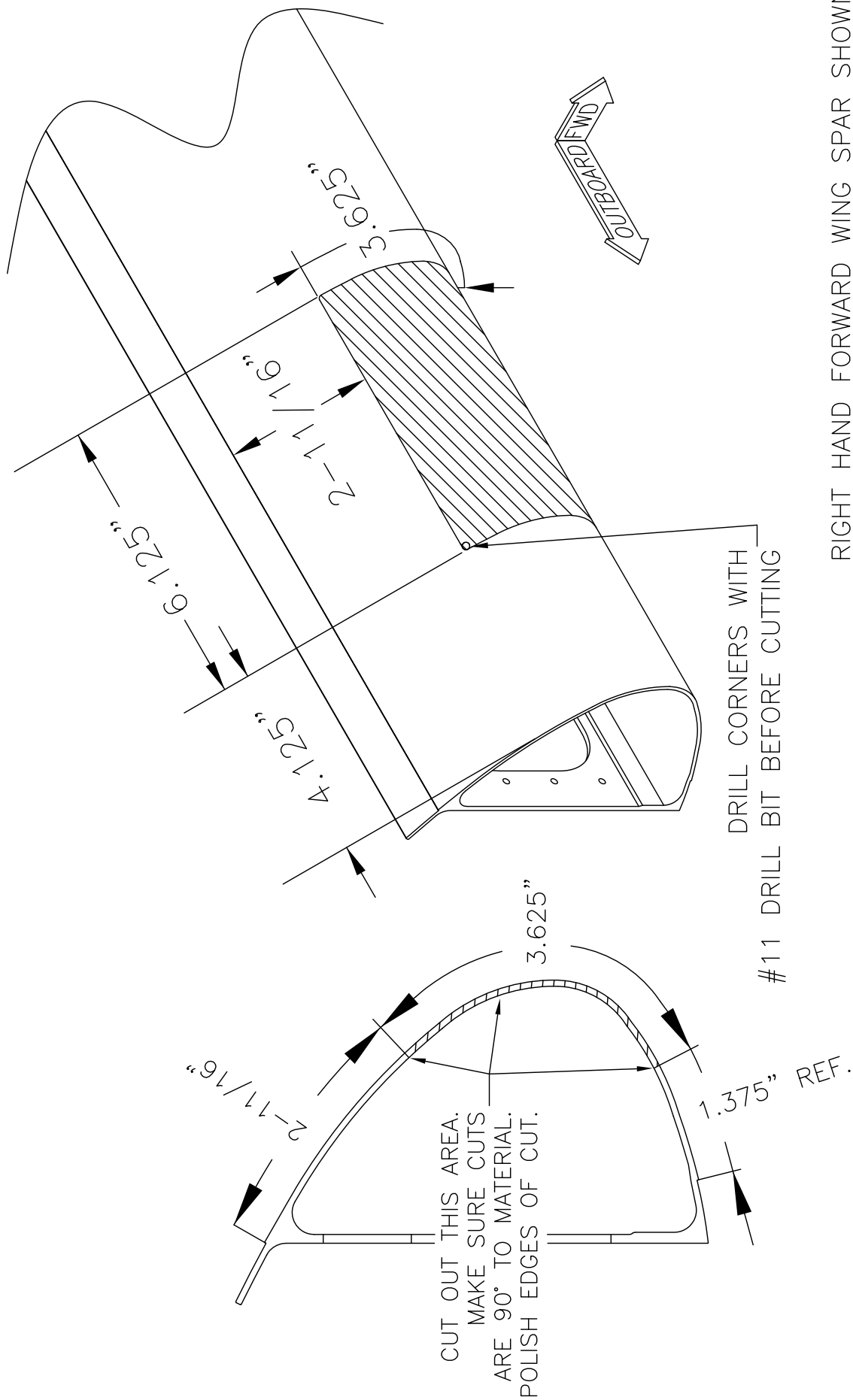
RRF S-21 OUTBOUND **REAR WING SPAR ATTACHMENT** **FIGURE 06-01A1**



RIGHT HAND FORWARD WING SPAR SHOWN

MD5650
REV. - ORIG

RRAMES S-21 OUTBOUND **141 WING - LANDING LIGHT - SPAR MODIFICATION** **FIGURE 06-01A**

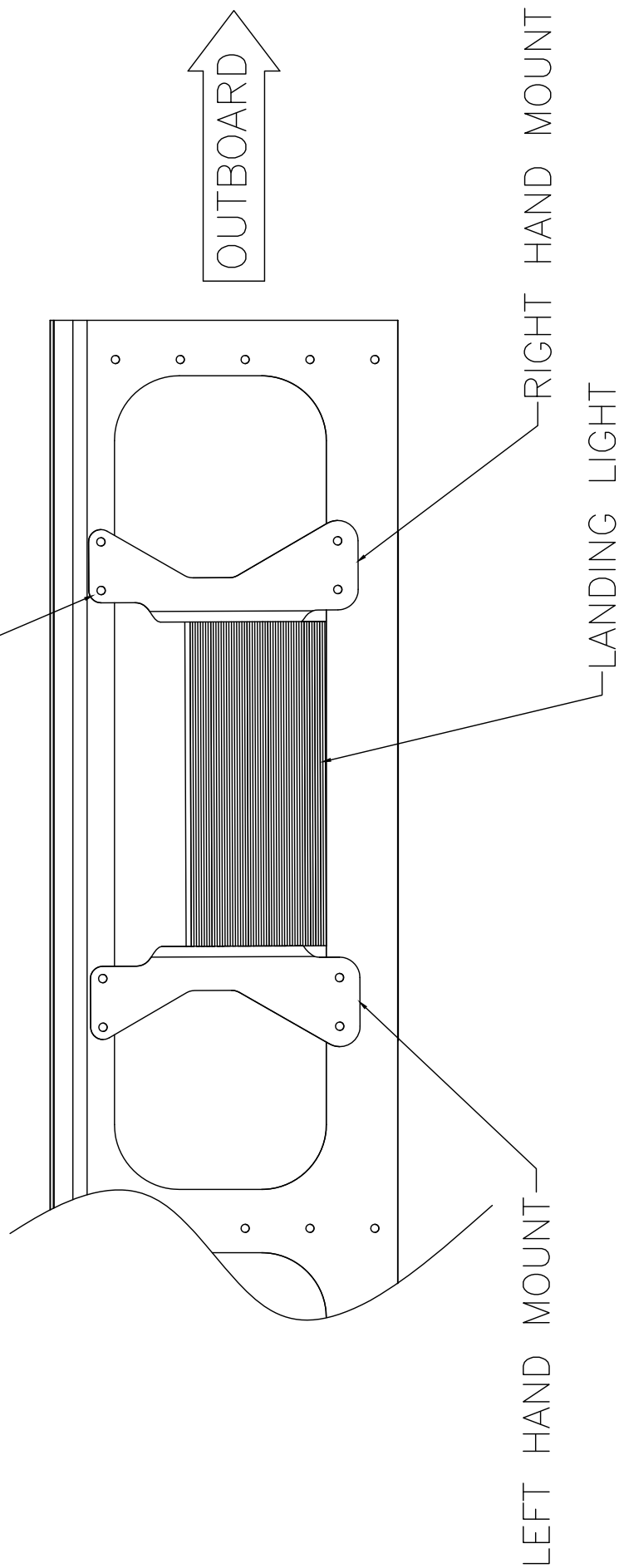


RIGHT HAND FORWARD WING SPAR SHOWN

MD5650
REV. - ORIG

RRF S-21 OUTBOUND **141 WING - LANDING LIGHT - SPAR MODIFICATION** **FIGURE 06-01B**

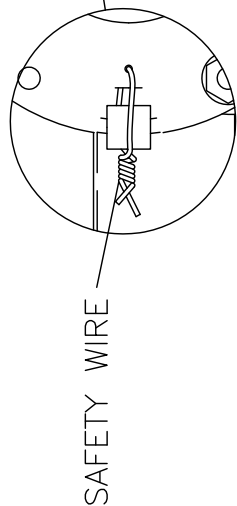
ASSEMBLE LANDING LIGHT TO MOUNTS.
 CENTER LANDING LIGHT IN SPAR OPENING.
 TRANSFER DRILL #30 (8 PLACES)
 THROUGH MOUNTS.



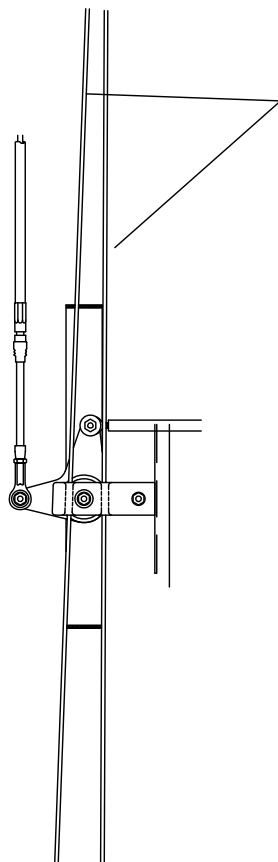
AFT SIDE OF RIGHT HAND FWD SPAR SHOWN

FLAP TELEFLEX SAFETY WIRE

AILERON BELLCRANK ASSEMBLY

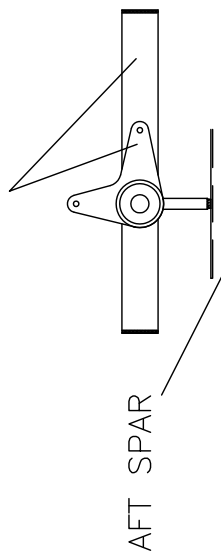


FLAP BELLCRANK ASSEMBLY



LONG ARMS TOGETHER

AILERON CABLES



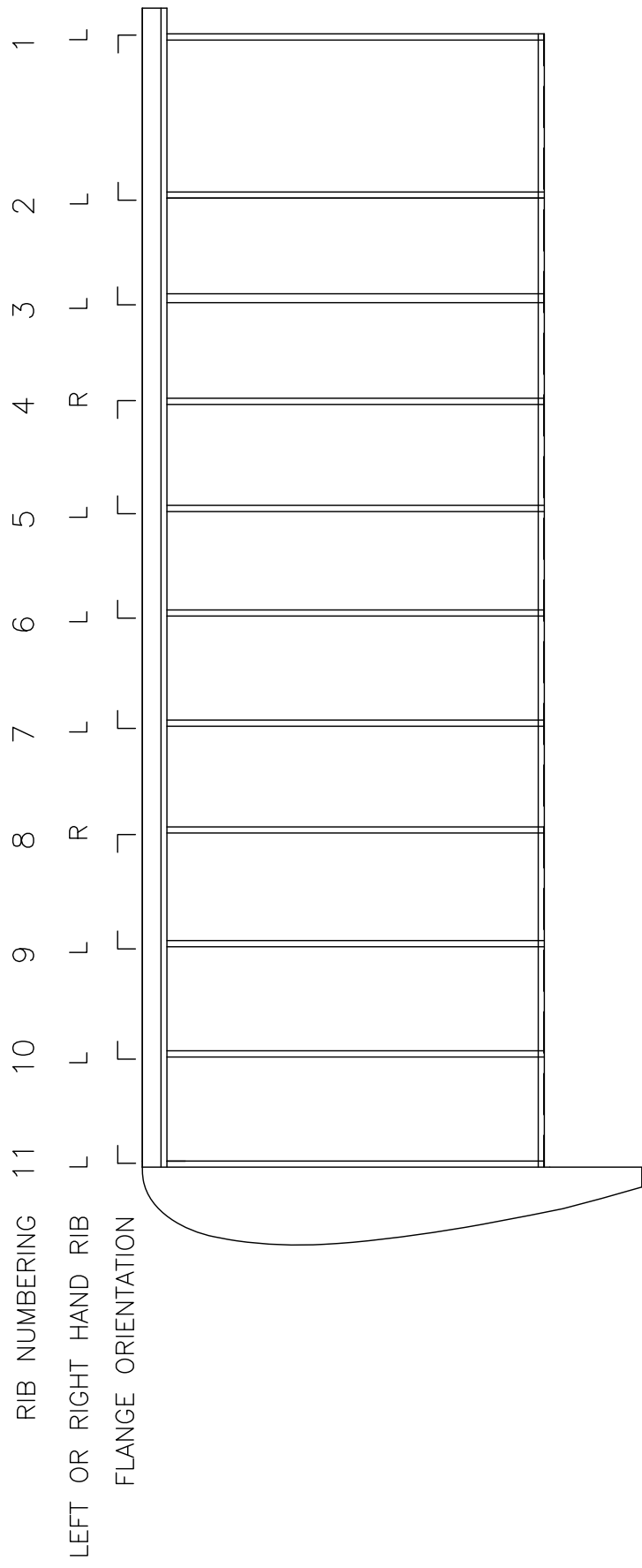
FORWARD

ROOT

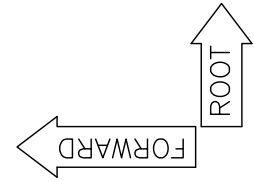
FLAP BELLCRANK ORIENTATION

MD5650
REV. - ORIG

RAMS S-21 OUTBOUND
141 WING - BELLCRANK ASSEMBLY
FIGURE 06-02

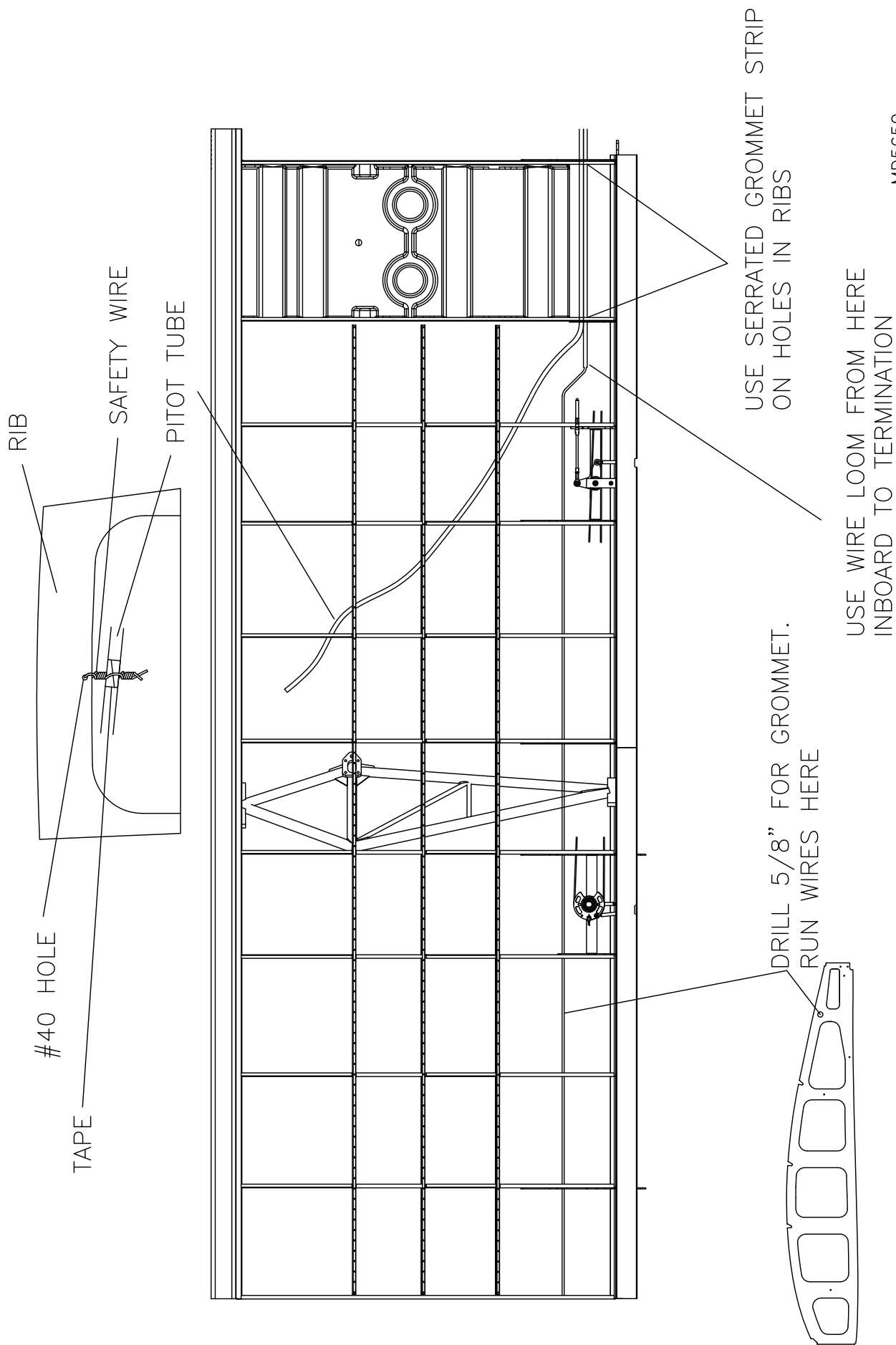


LEFT-HAND WING SHOWN
(RIGHT-HAND WING IS A MIRROR IMAGE)

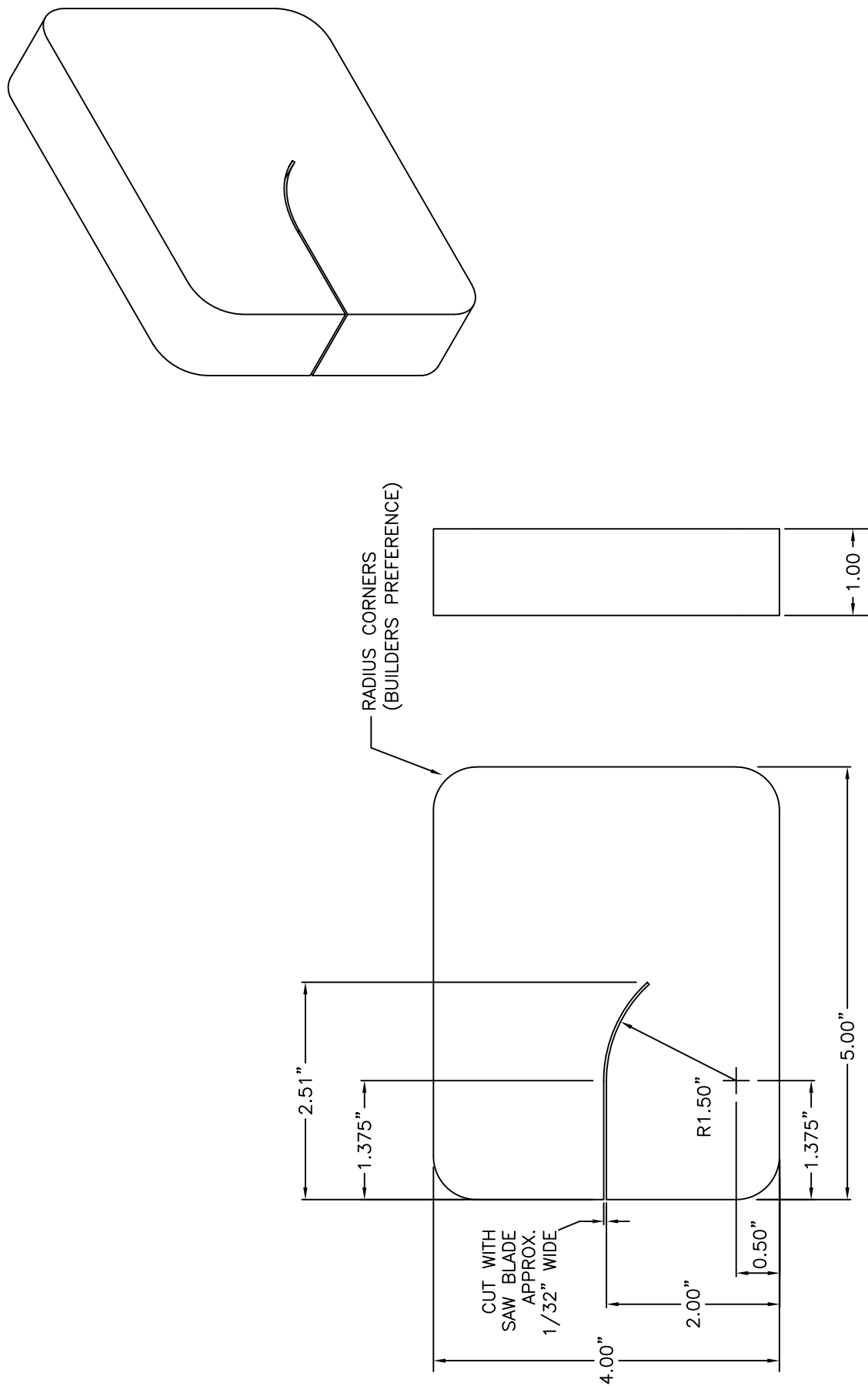


MD5650
REV. - ORIG

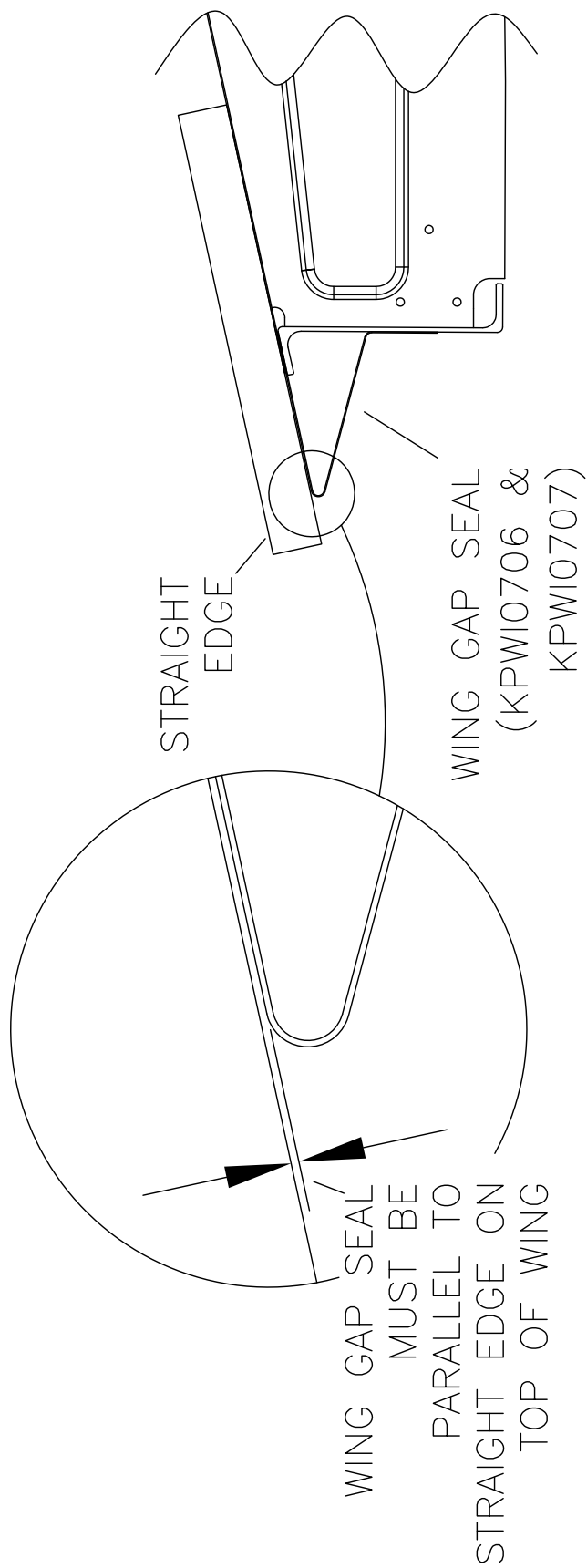
RRMS S-21 OUTBOUND
141 WING - RIB ORIENTATION
FIGURE 06-03



RAMS S-21 OUTBOUND
141 WING - WIRING & PITOT LINE ROUTING
FIGURE 06-04



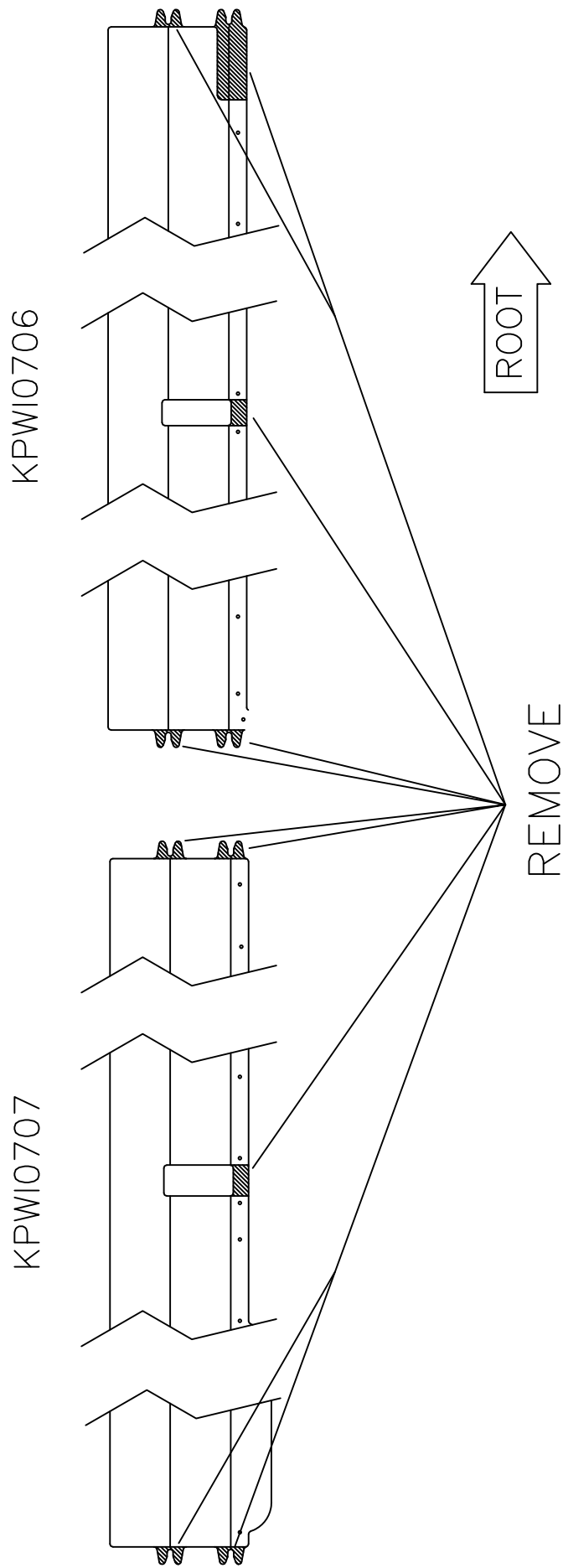
RRF S-21 OUTBOUND **WING SKIN LEADING EDGE FORMING TOOL** **FIGURE 06-04A**



MD5650
REV. A

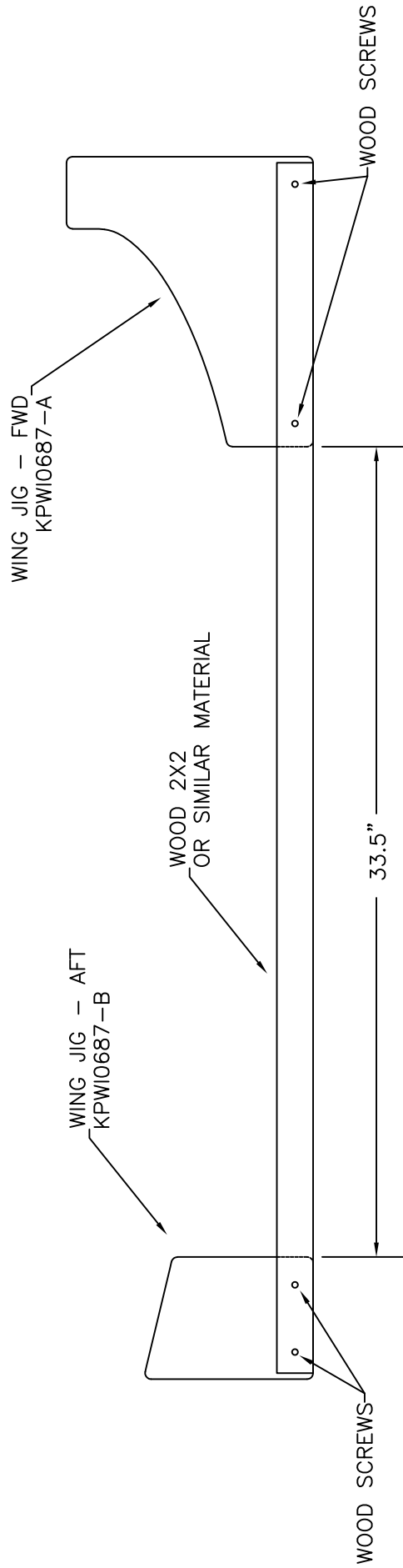
RRMS S-21 OUTBOUND
141 WING - CONFIRMING WING GAP SEAL PROFILE
FIGURE 06-05

WING GAP SEALS SHOWN UN-BENT FOR CLARITY



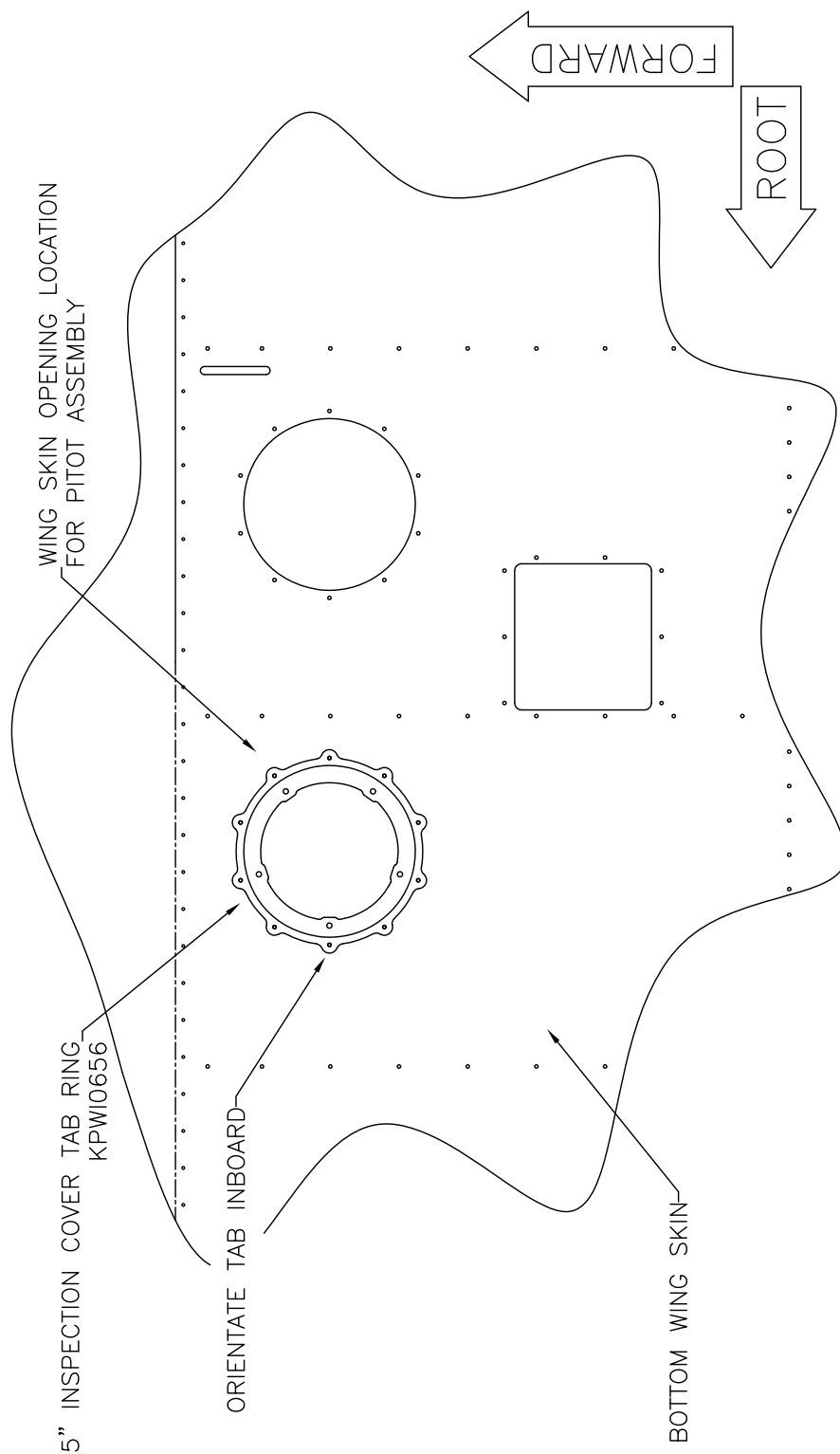
MD5650
REV. A

REMOVE S-21 OUTBOUND
141 WING - GAP SEAL MODIFICATION
FIGURE 06-05A



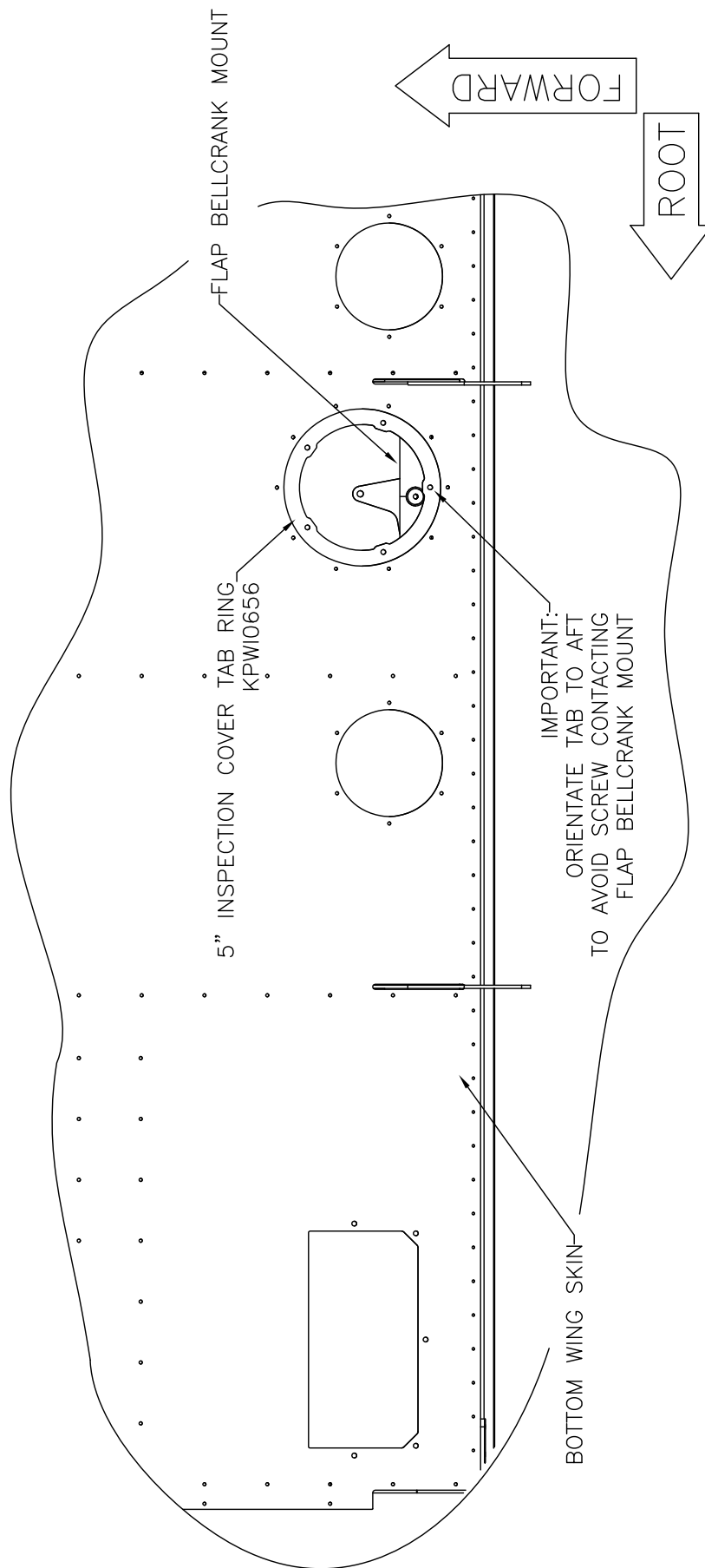
141 WING - WING JIG ASSEMBLY
FIGURE 06-06

MD5650
 REV. - ORIG



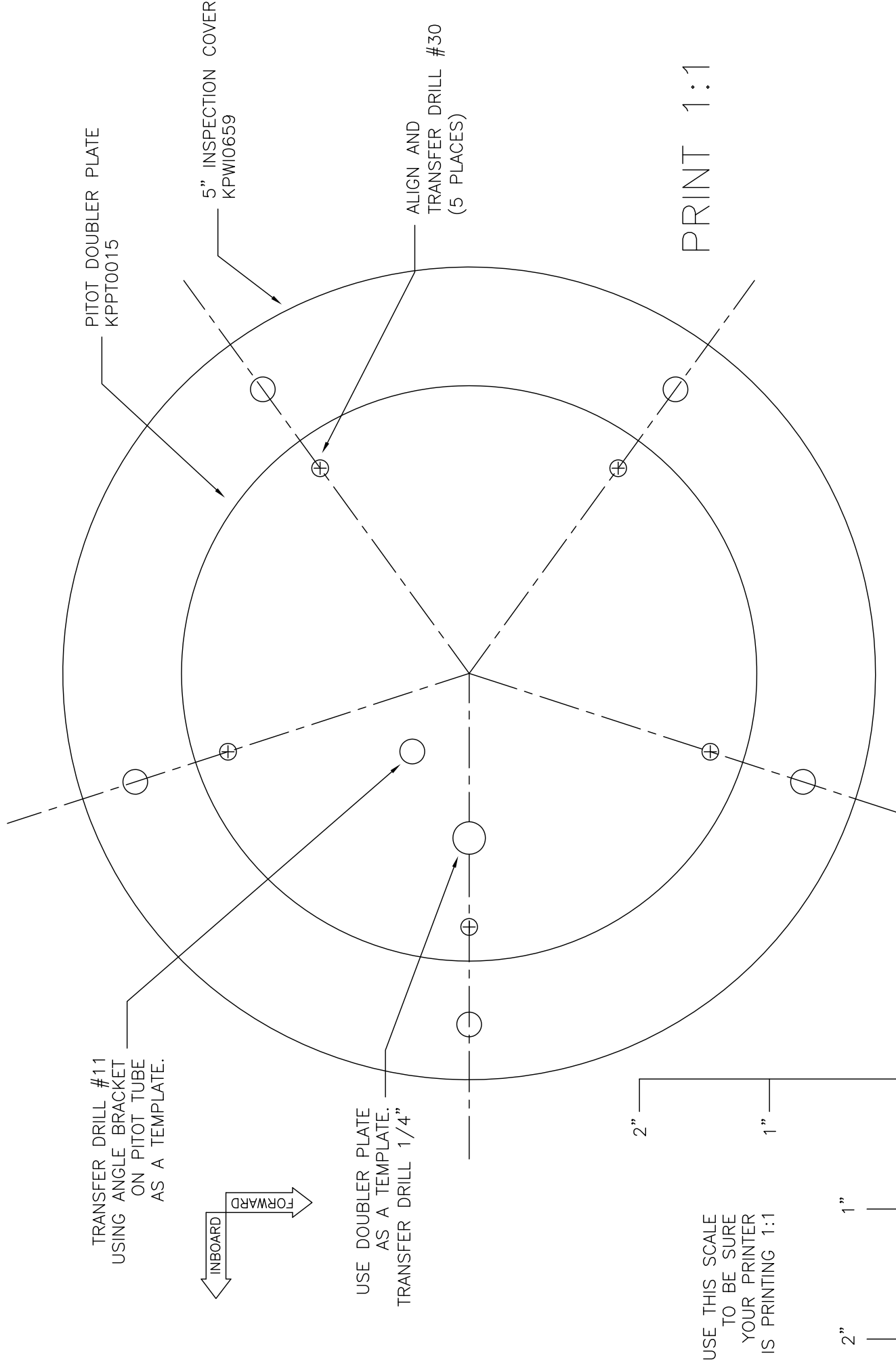
MD5650
REV. - ORIG

RRM S-21 OUTBOUND
141 WING - PITOT MOUNT RING ORIENTATION
FIGURE 06-07



MD5650
REV. - ORIG

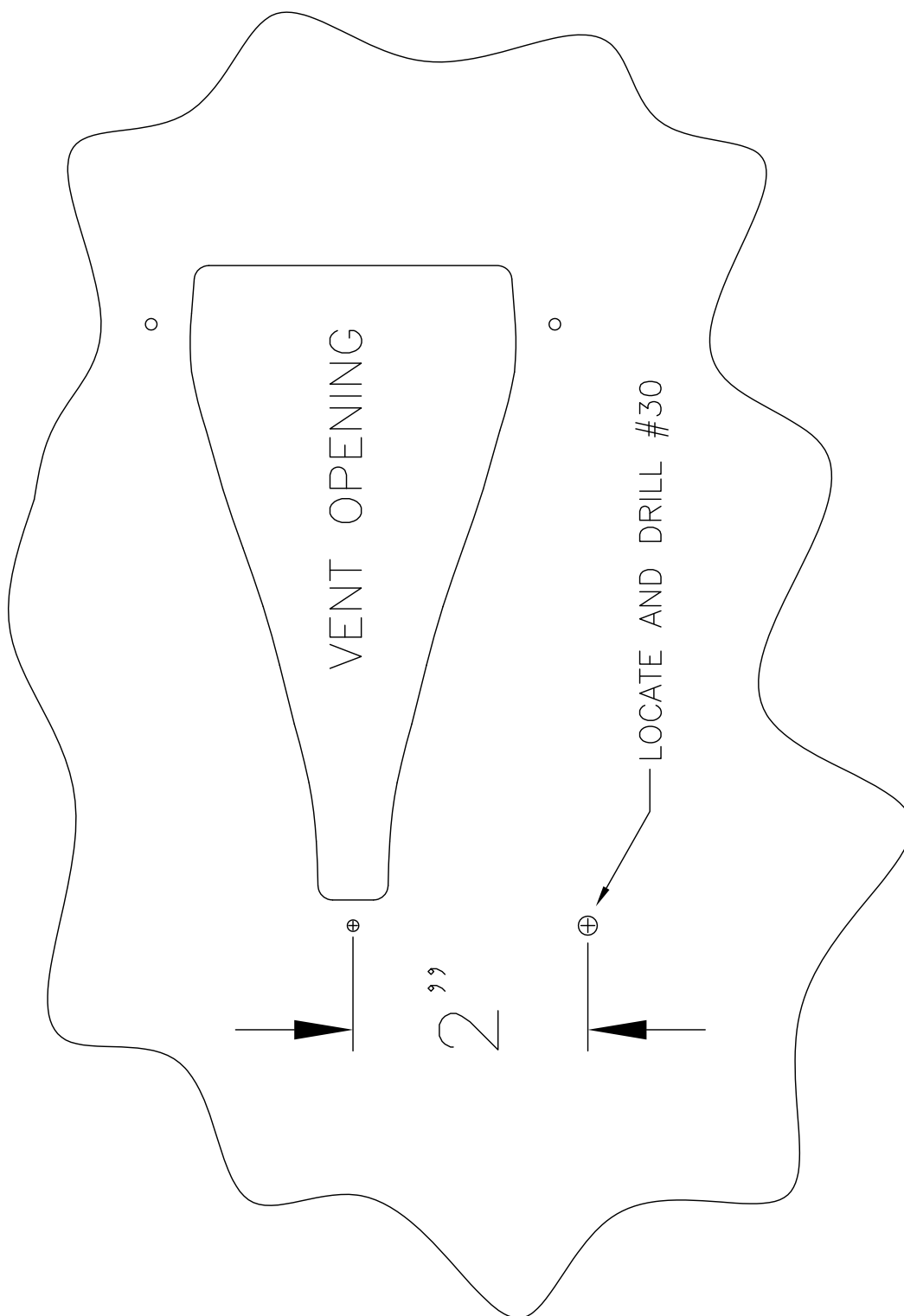
RRMS S-21 OUTBOUND
141 WING - INBOARD AFT 5" TAB RING ORIENTATION
FIGURE 06-07A

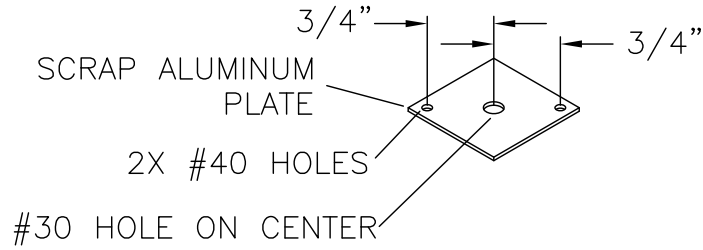


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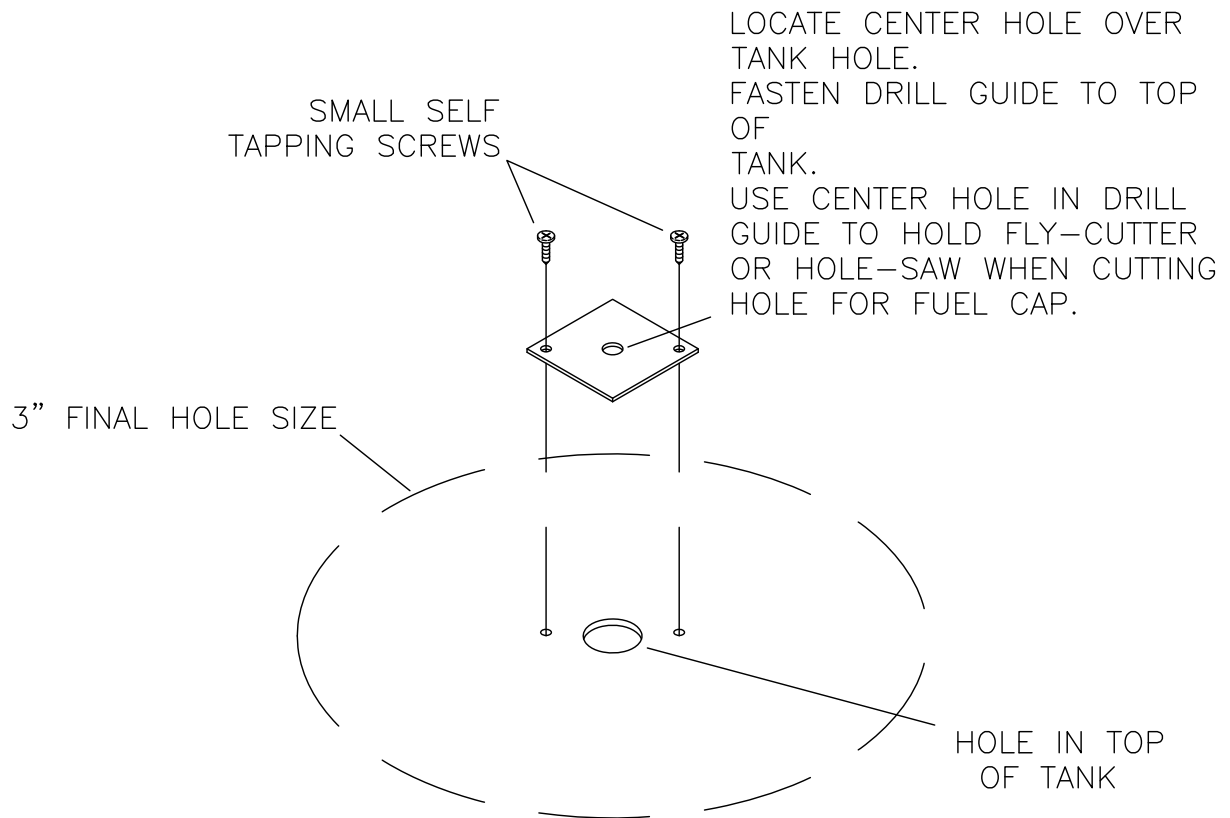
RAMS S-21 OUTBOUND PITOT MOUNT PLATE MODIFICATION FIGURE 06-08

MD5650
REV. - ORIG





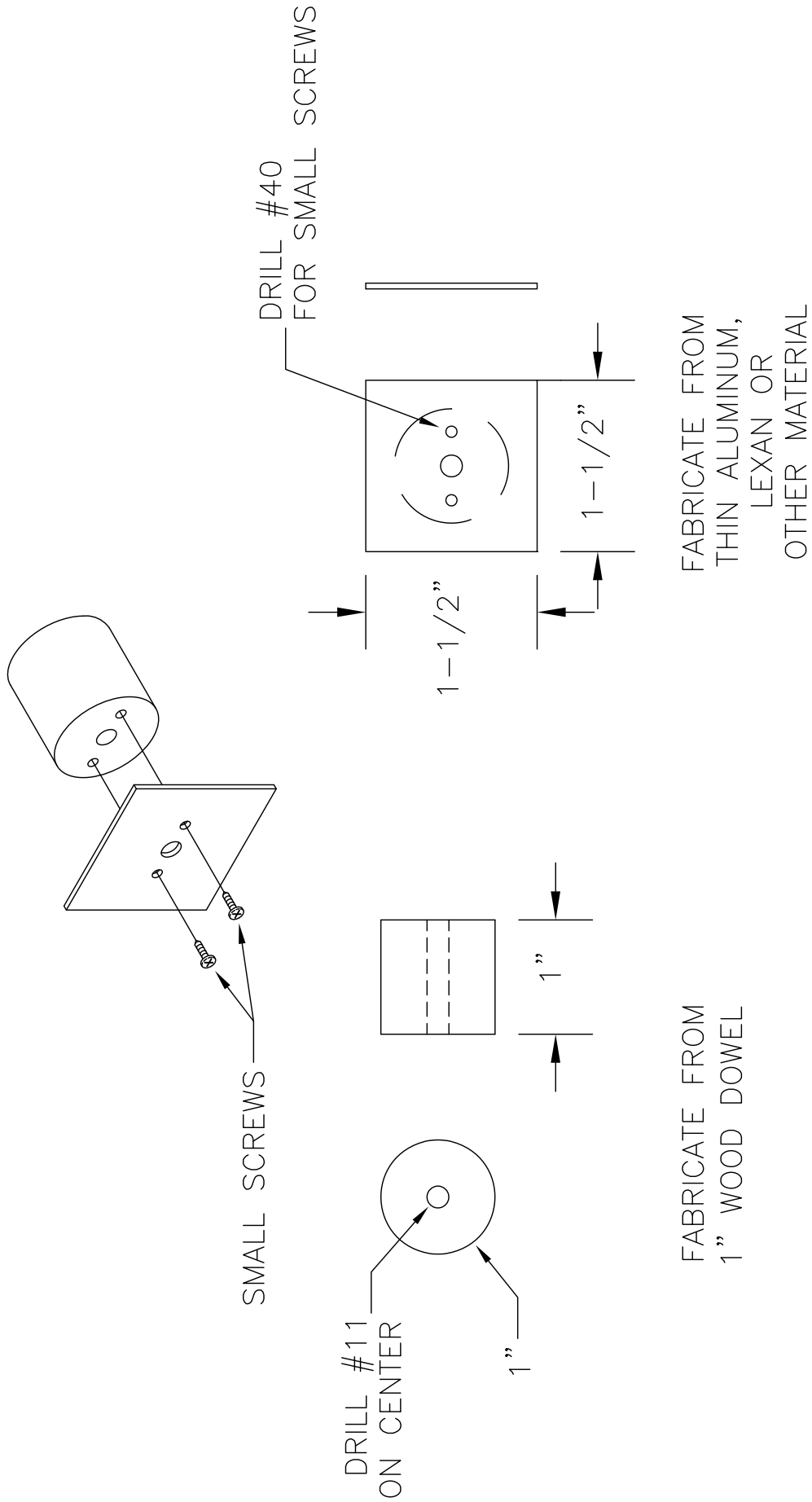
FABRICATE DRILL GUIDE



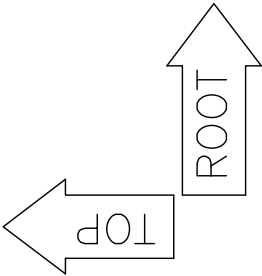
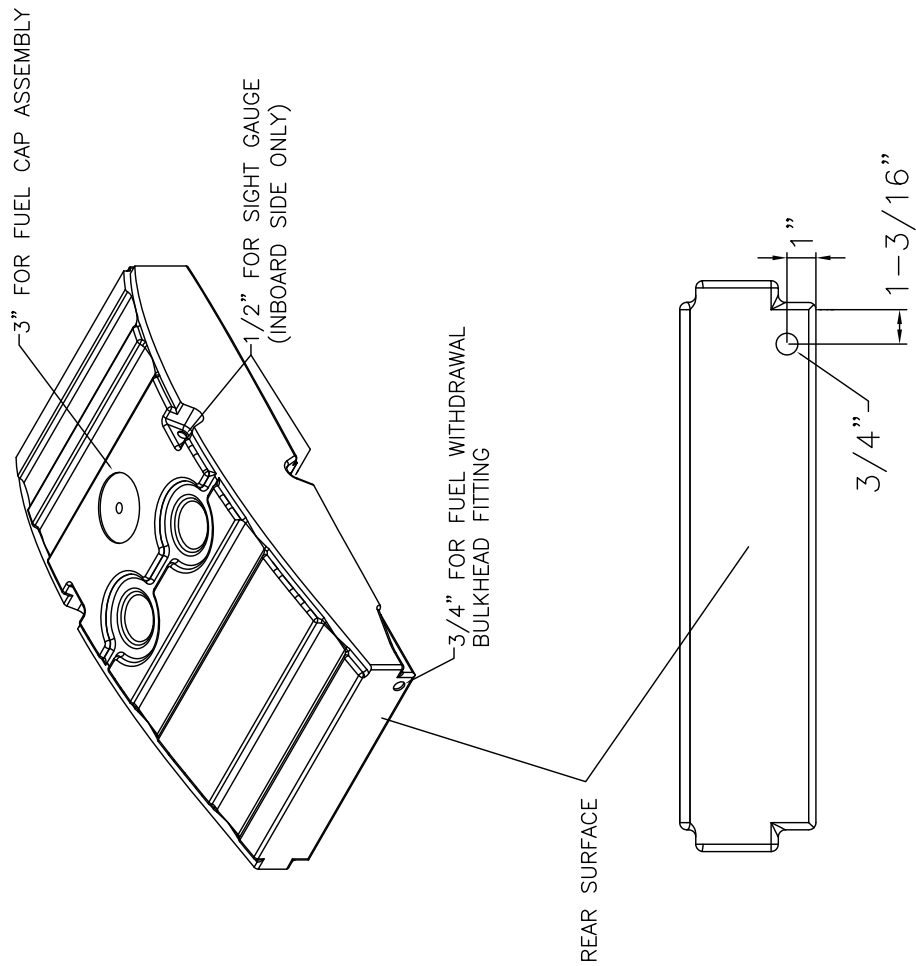
MD5650
REV. — ORIG

**RANS S-21 OUTBOUND
FUEL CAP HOLE DRILL GUIDE
FIGURE 06-11**

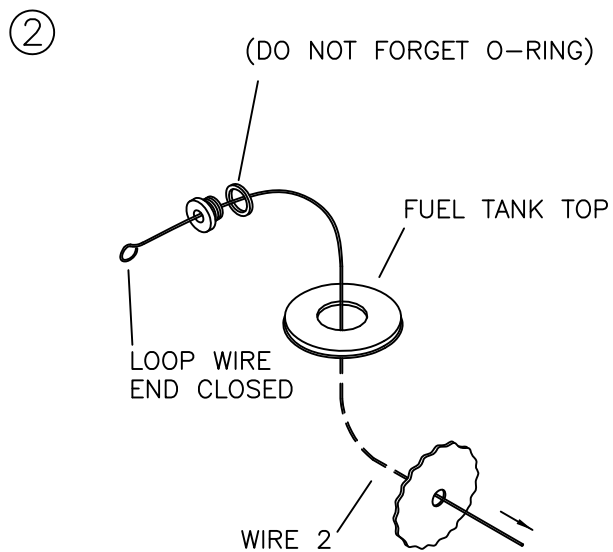
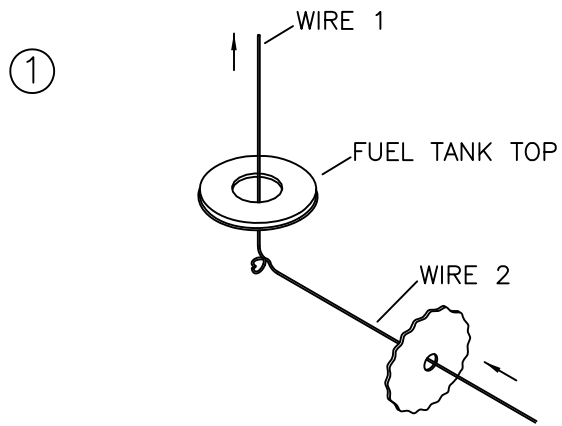
09/11/2018



**RRR S-21 OUTBOUND
SIGHT GAUGE LOCATION TOOL
FIGURE 06-12**



RRM S-21 OUTBOUND
141 WING - FUEL TANK HOLE LOCATIONS
FIGURE 06-13



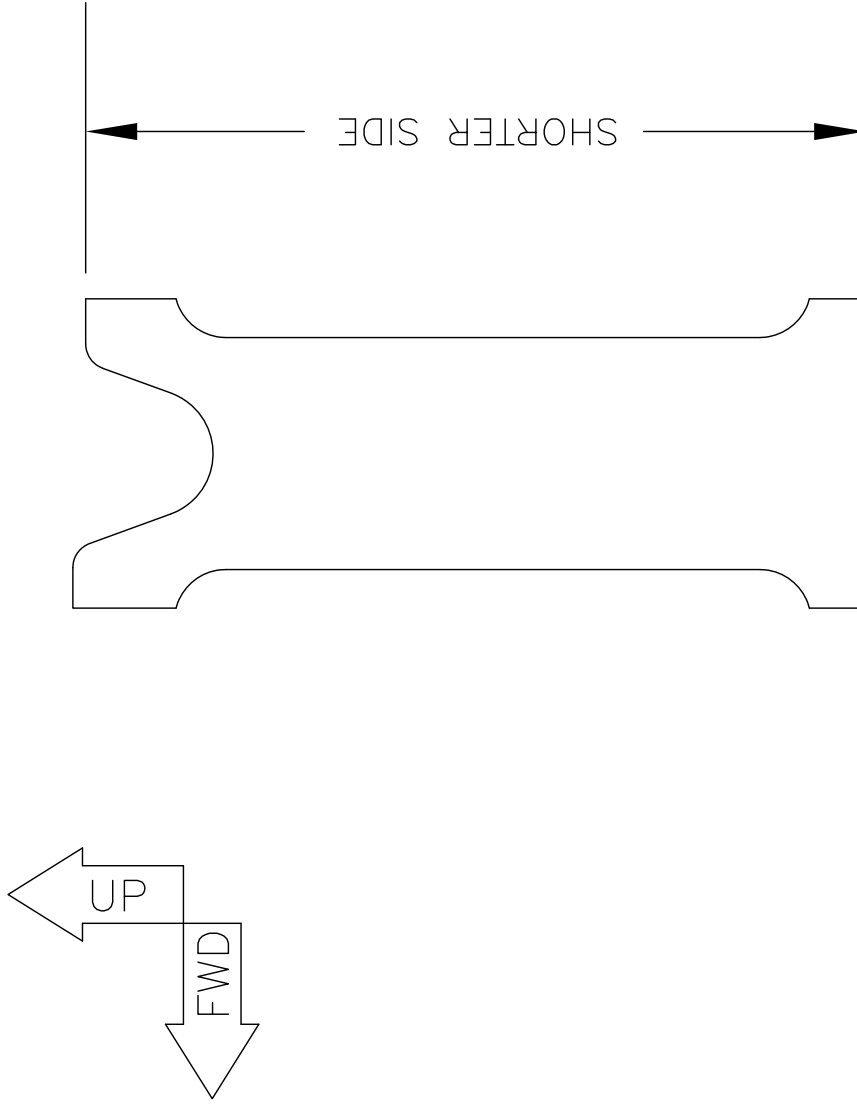
③ INSTALL RUBBER WASHER, STEEL WASHER, LOCTITE, AND NUT.

④ REMOVE WIRE.

**RANS S-21 OUTBOUND
FUEL TANK FITTING INSTALLATION
FIGURE 06-14**

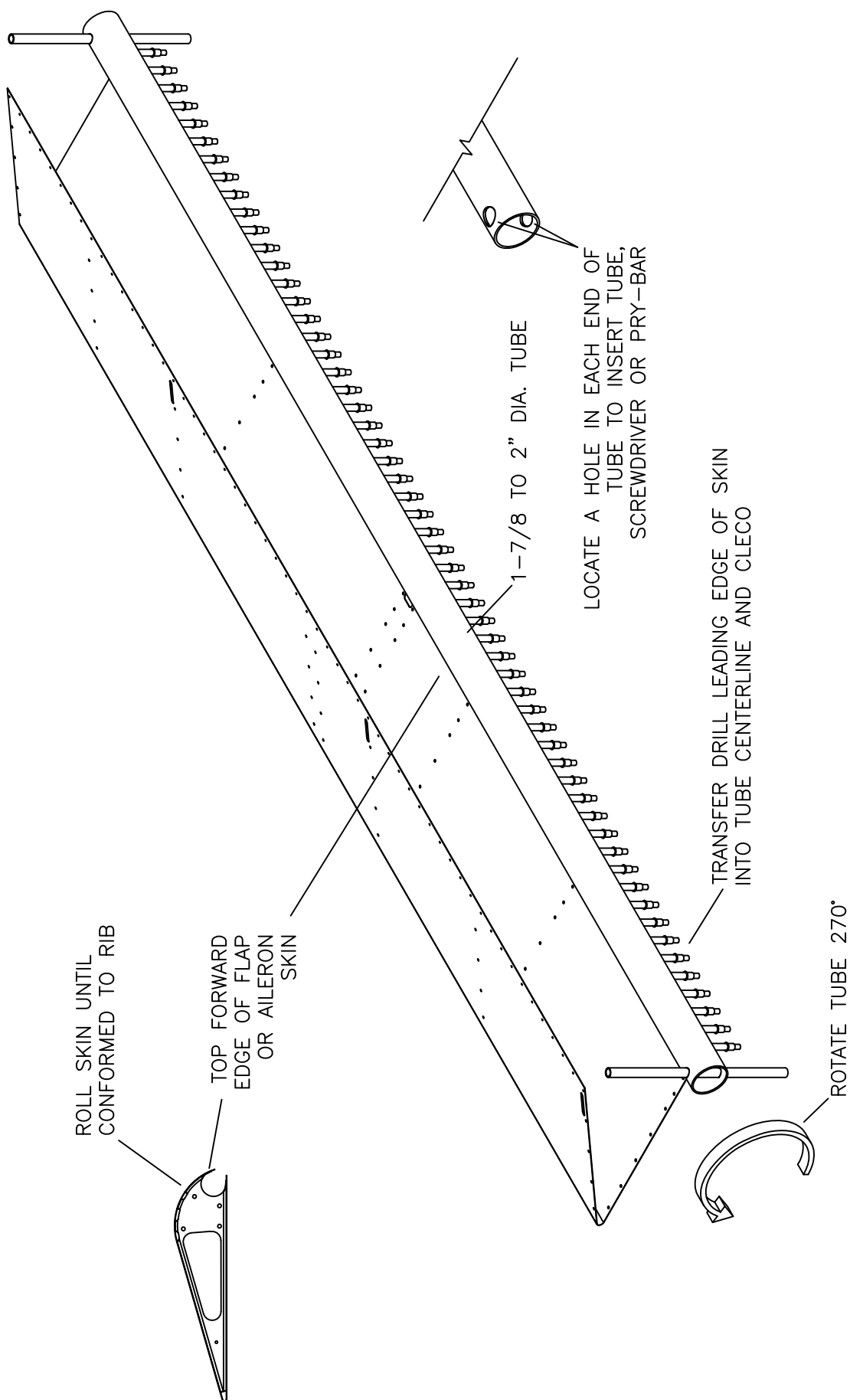
MD5650

09/11/2018



MD5650
REV. - ORIG

141 WING - FUEL TANK SUPPORT ORIENTATION
FIGURE 06-14A



**RAMS S-21 OUTBOUND
FLAP & AILERON SKIN FORMING**
FIGURE 06-14B

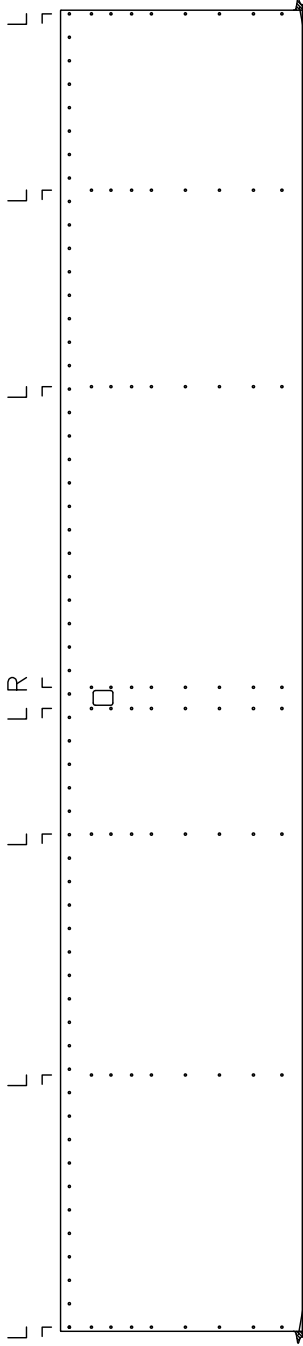
MD5654
REV. - ORIG

LEFT FLAP
TOP VIEW

ACTION RIBS



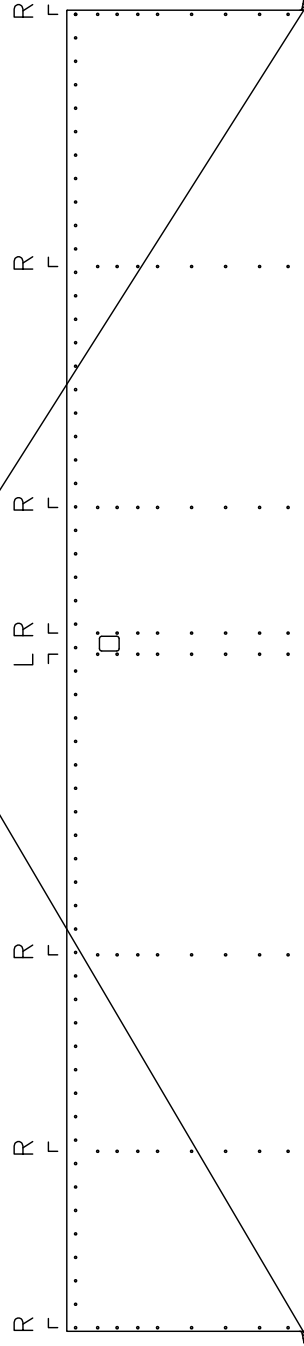
FLANGE ORIENTATION



ROOT

FORWARD

REMOVE

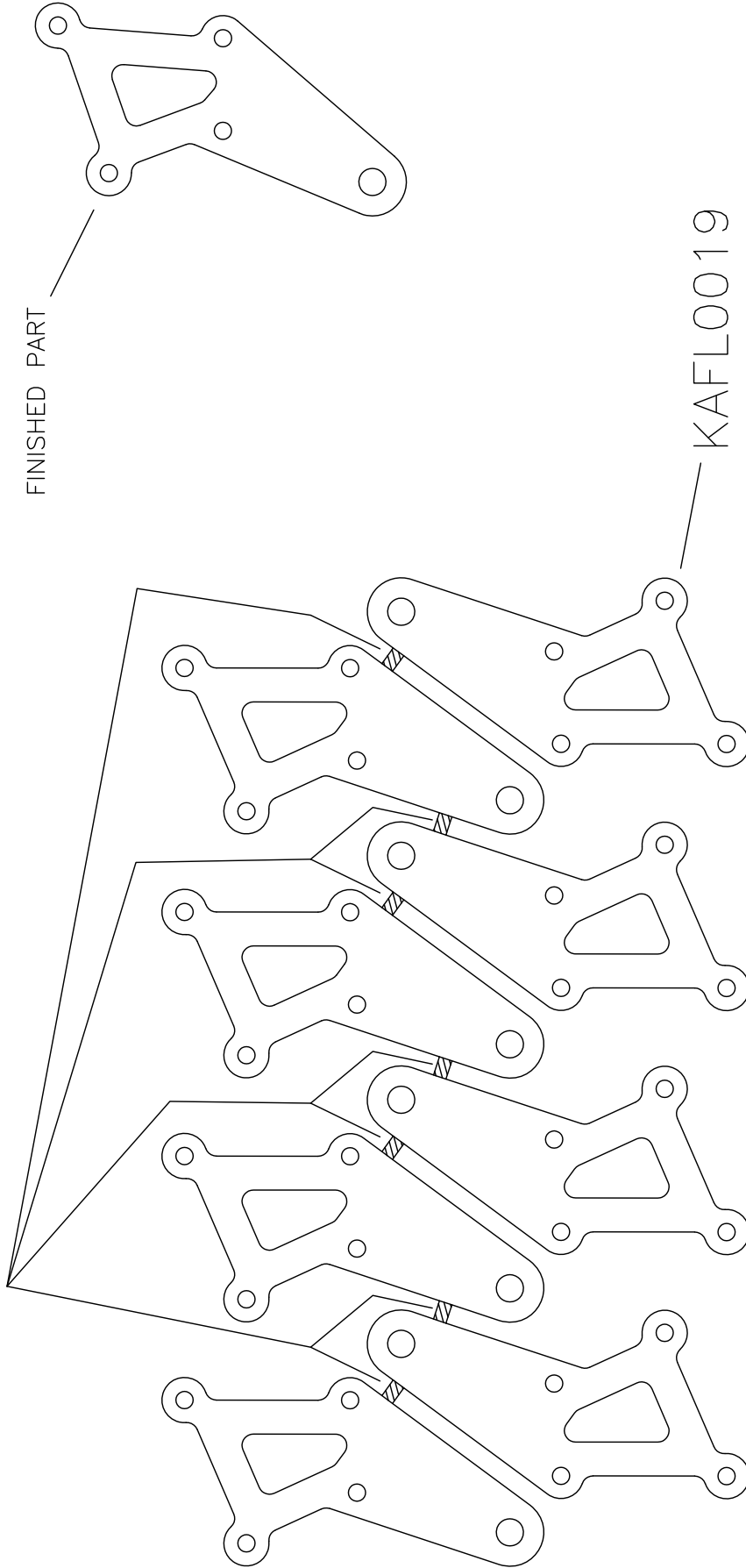


RIGHT FLAP
TOP VIEW

MD5650
REV. - ORIG

REMOVE S-21 OUTBOUND
141 WING - FLAP ORIENTATION
FIGURE 06-15

REMOVE ATTACHMENT TABS
TO MAKE 8 INDIVIDUAL PARTS

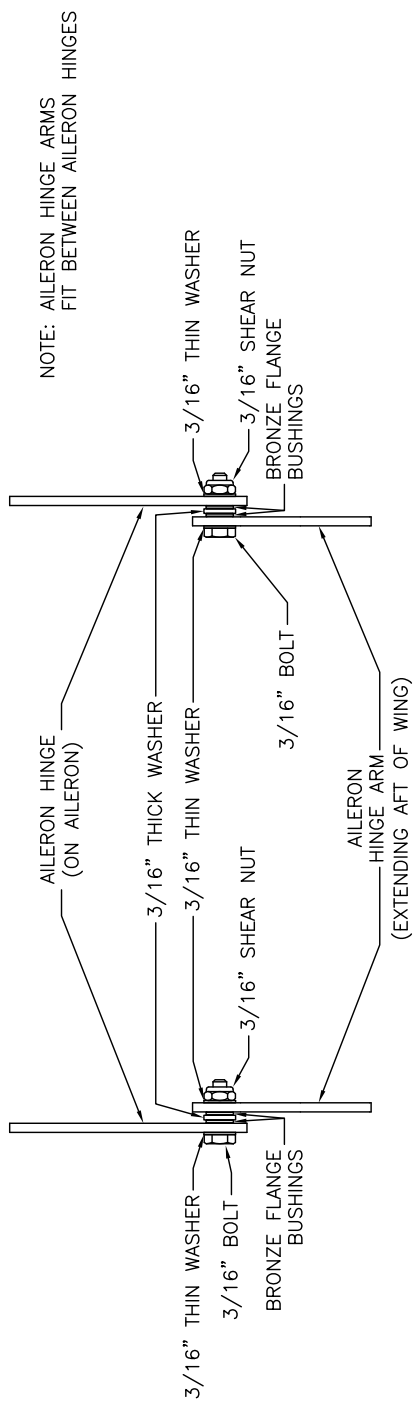


MD5650
REV. - ORIG

141 WING - FLAP HINGE - PART ASSEMBLY MODIFICATION
FIGURE 06-15A

09/11/2018

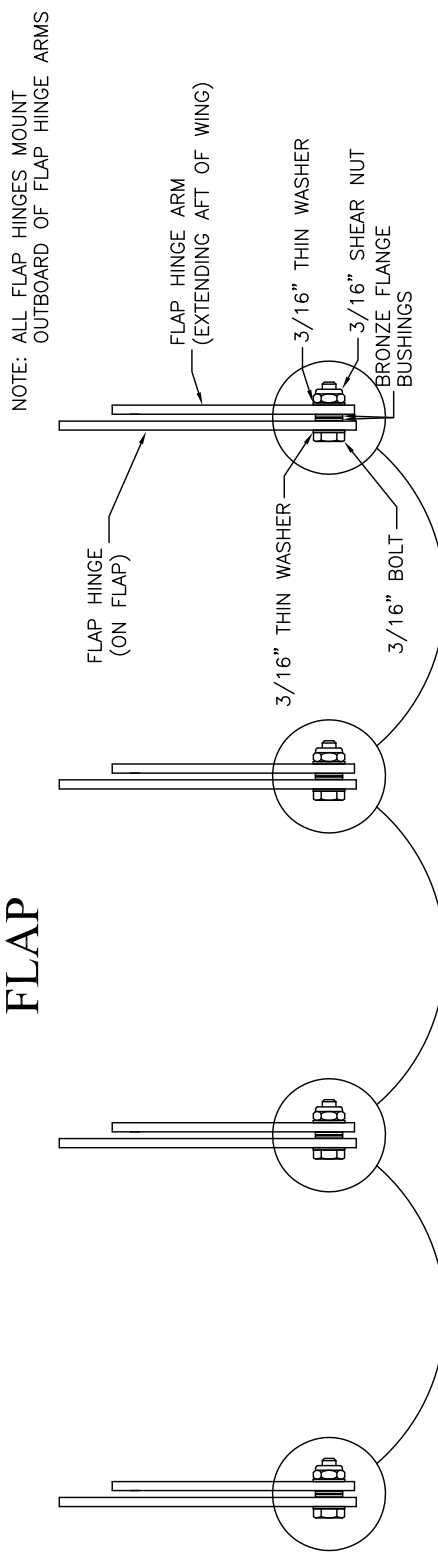
AILERON



OUTBOARD

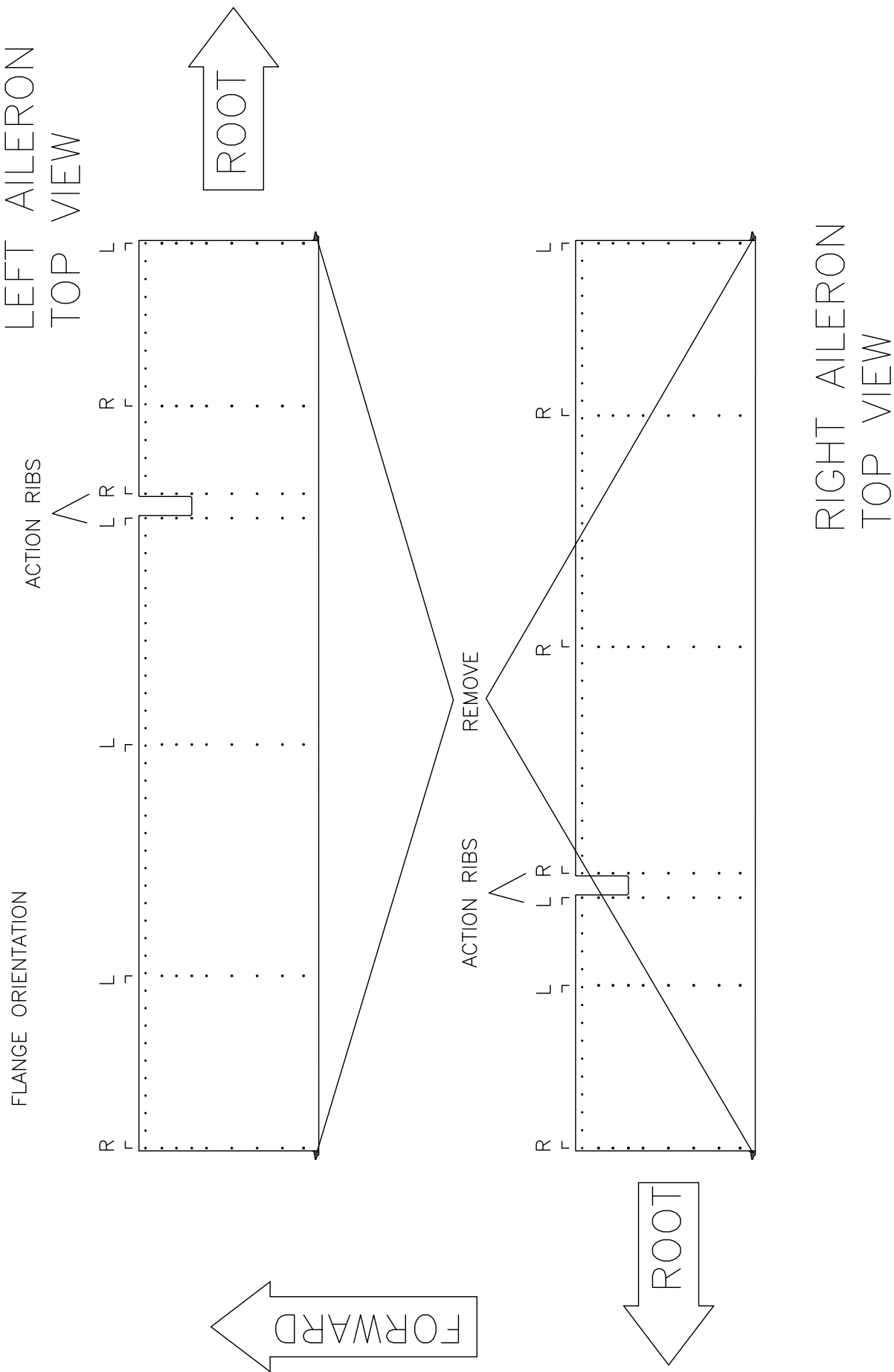
ROOT

FLAP



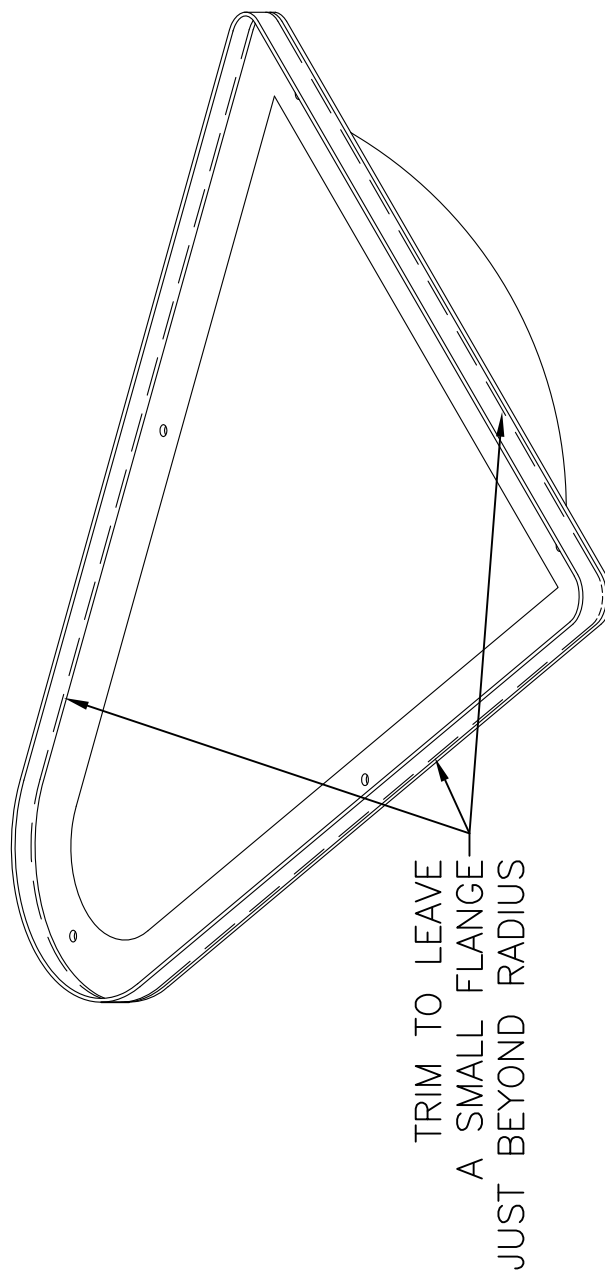
MD5650
REV. A

RAMS S-21 OUTBOUND
141 WING - TYPICAL AILERON/FLAP HINGE ASSEMBLY
FIGURE 06-16



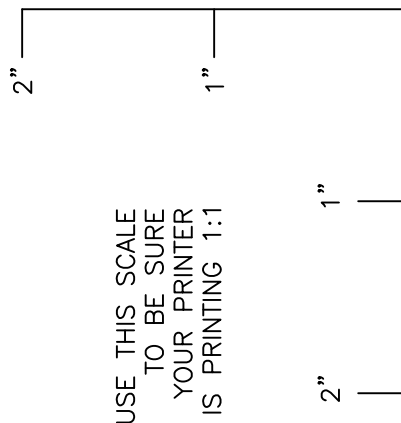
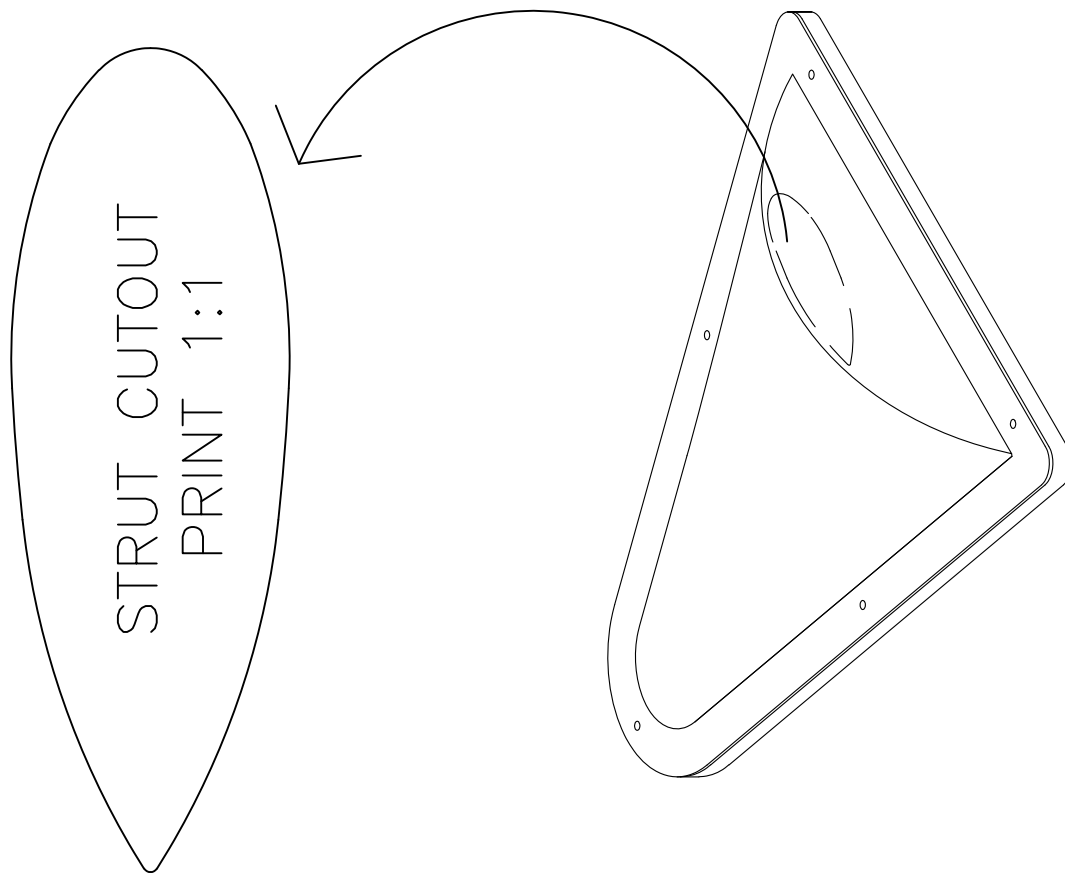
MD5650
REV. - ORIG

141 WING - AILERON ORIENTATION
FIGURE 06-17



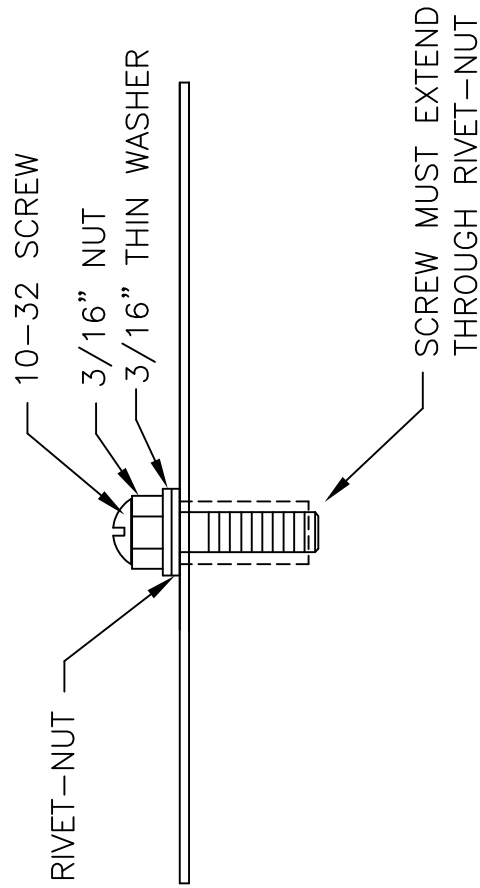
MD5650
REV. - ORIG

RRR S-21 OUTBOUND
UPPER LIFT STRUT FAIRING TRIMMING
FIGURE 06-18



USE THIS SCALE
TO BE SURE
YOUR PRINTER
IS PRINTING 1:1

RAMMS S-21 OUTBOUND
LIFT STRUT CUT-OUT TEMPLATE
FIGURE 06-19

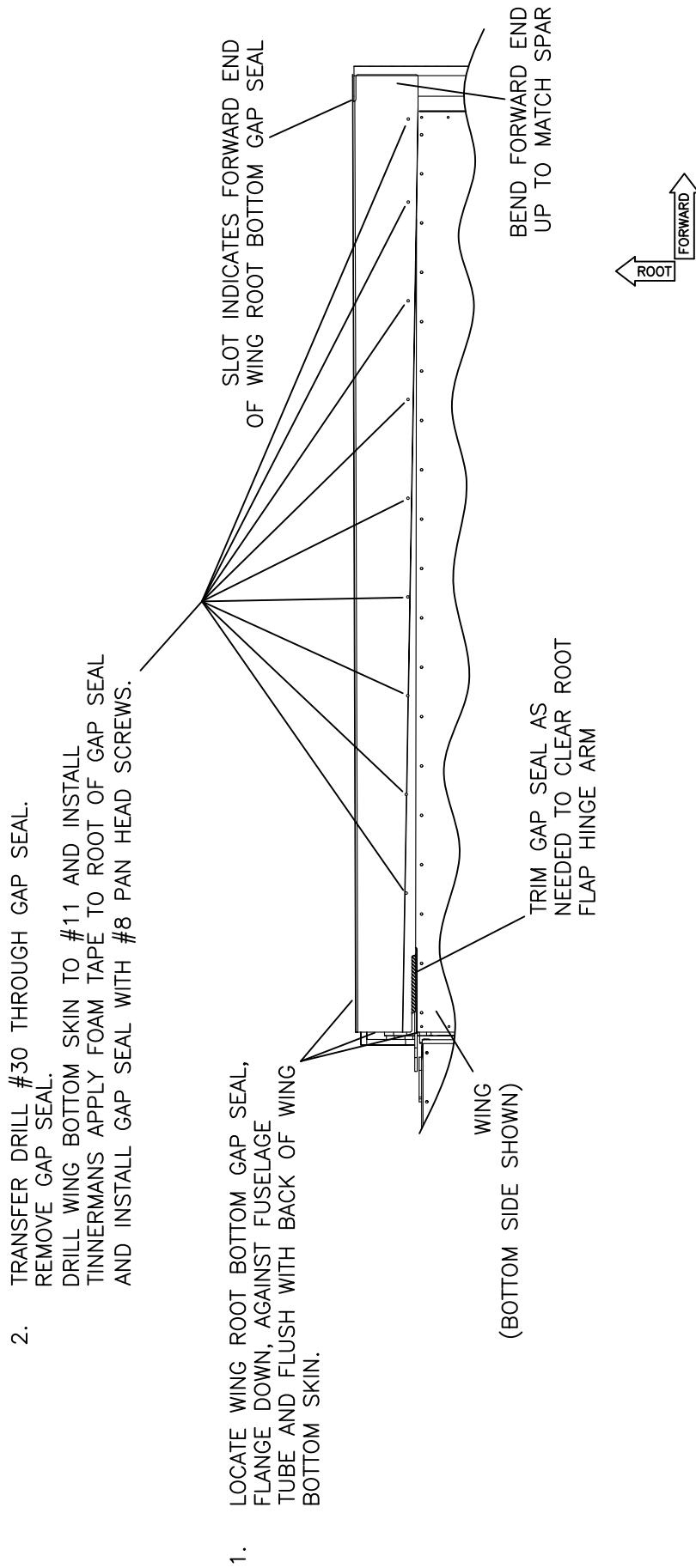


PROCEDURE BELOW MAY BE USED WHEN A RIVET-NUT PULLER IS NOT AVAILABLE.

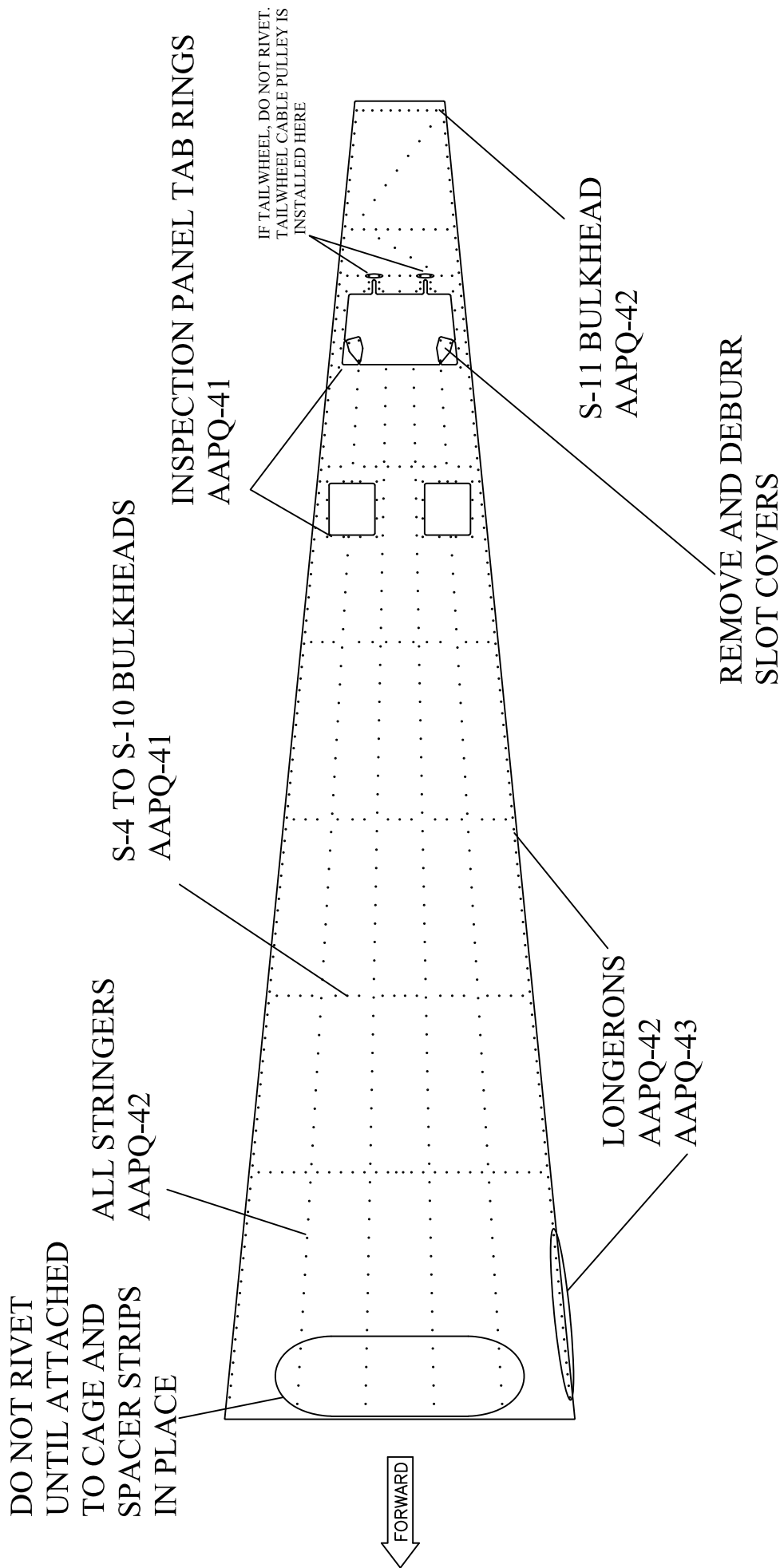
1. FINGER TIGHTEN NUT AND RIVET-NUT ONTO SCREW.
2. INSERT RIVET-NUT INTO 1/4" HOLE.
3. TURN NUT 3 COMPLETE TURNS CLOCKWISE WHILE HOLDING SCREW STATIONARY.
4. BACK NUT OFF 1/2 TURN AND REMOVE SCREW.

RRM S-21 OUTBOUND
RIVET-NUT INSTALLATION
FIGURE 06-20

MD343
 REV. - ORIG



RAMS S-21 OUTBOUND **WING ROOT BOTTOM GAP SEAL INSTALLATION** **FIGURE 06I-19**

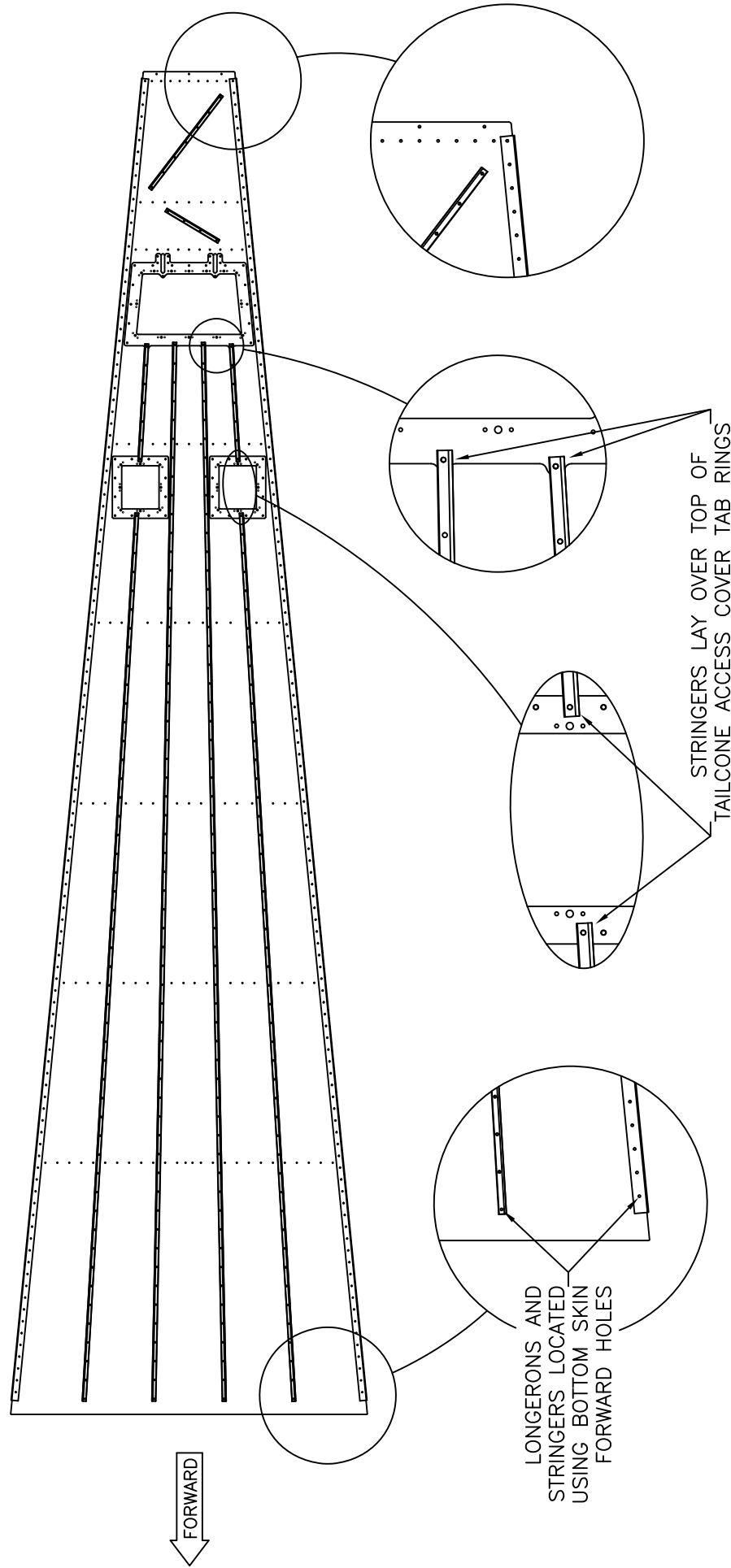


VIEWED FROM UPPER SIDE

MD5654
REV. - ORIG

R3R S-21 OUTBOUND
TAILCONE BOTTOM SKIN RIVET SCHEDULE
FIGURE 07-01

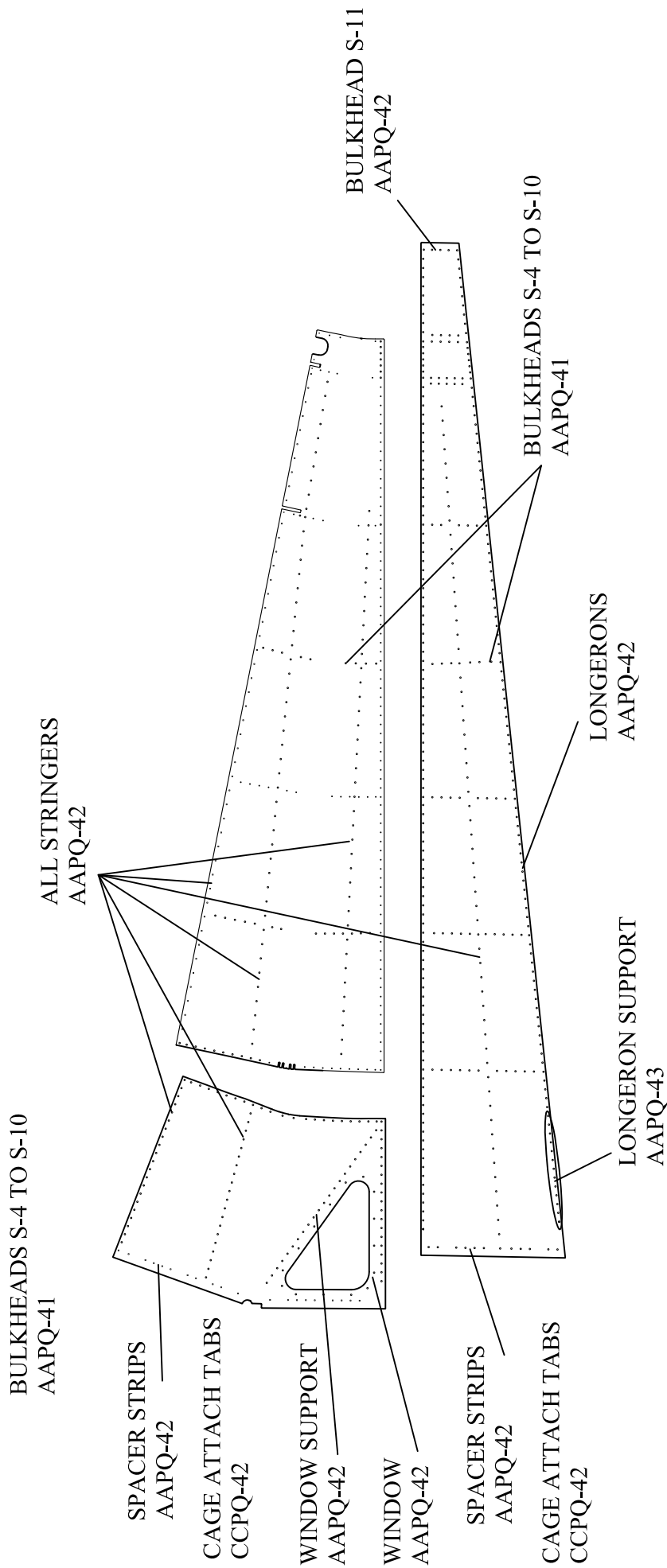
POSITION LONGERONS AND STRINGERS AS SHOWN



VIEWED FROM UPPER SIDE

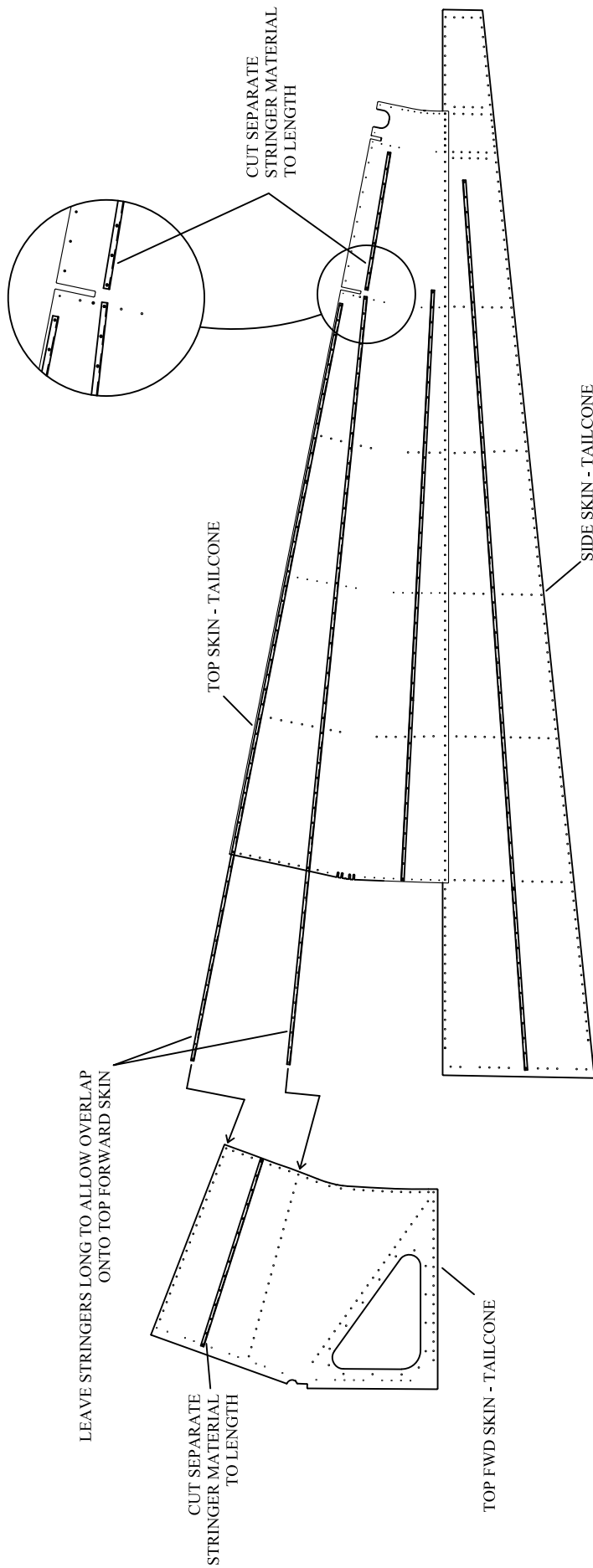
MD5654
REV. - ORIG

RAVEN S-21 OUTBOUND
TAILCONE BOTTOM SKIN LONGERON / STRINGER DETAIL
FIGURE 07-01A



RRR S-21 OUTBOUND
TAILCONE SIDE/TOP RIVET SCHEDULE
FIGURE 07-02

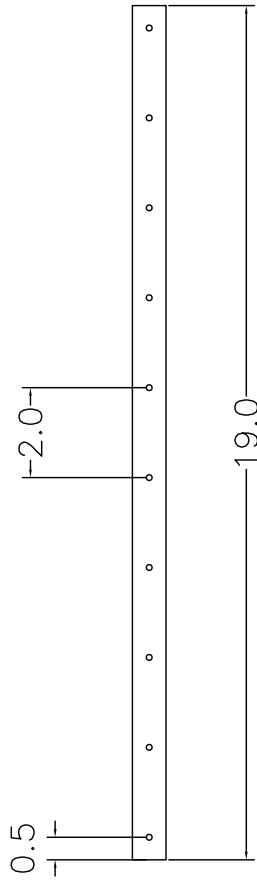
MD5654
REV. B



MD5654
REV. A

RRR S-21 OUTBOUND
TOP & SIDE STRINGER DETAIL
FIGURE 07-02A

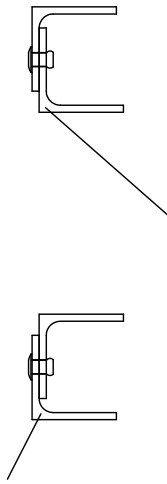
FABRICATE FROM KPFU0748



LEFT

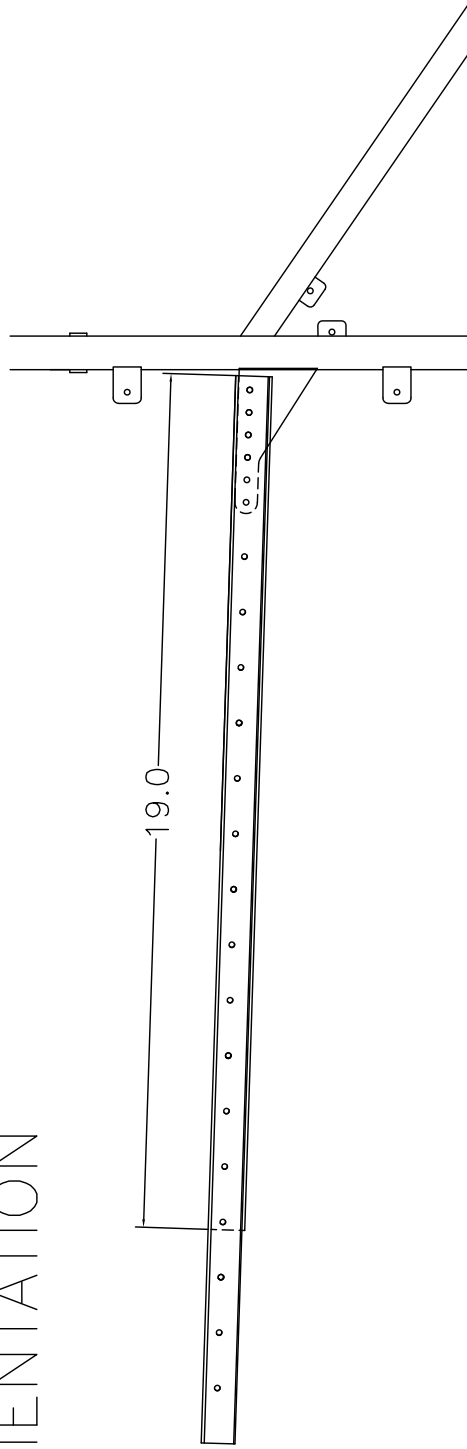
RIGHT

MIDDLE LONGERON



SUPPORT

ORIENTATION



STATION 3



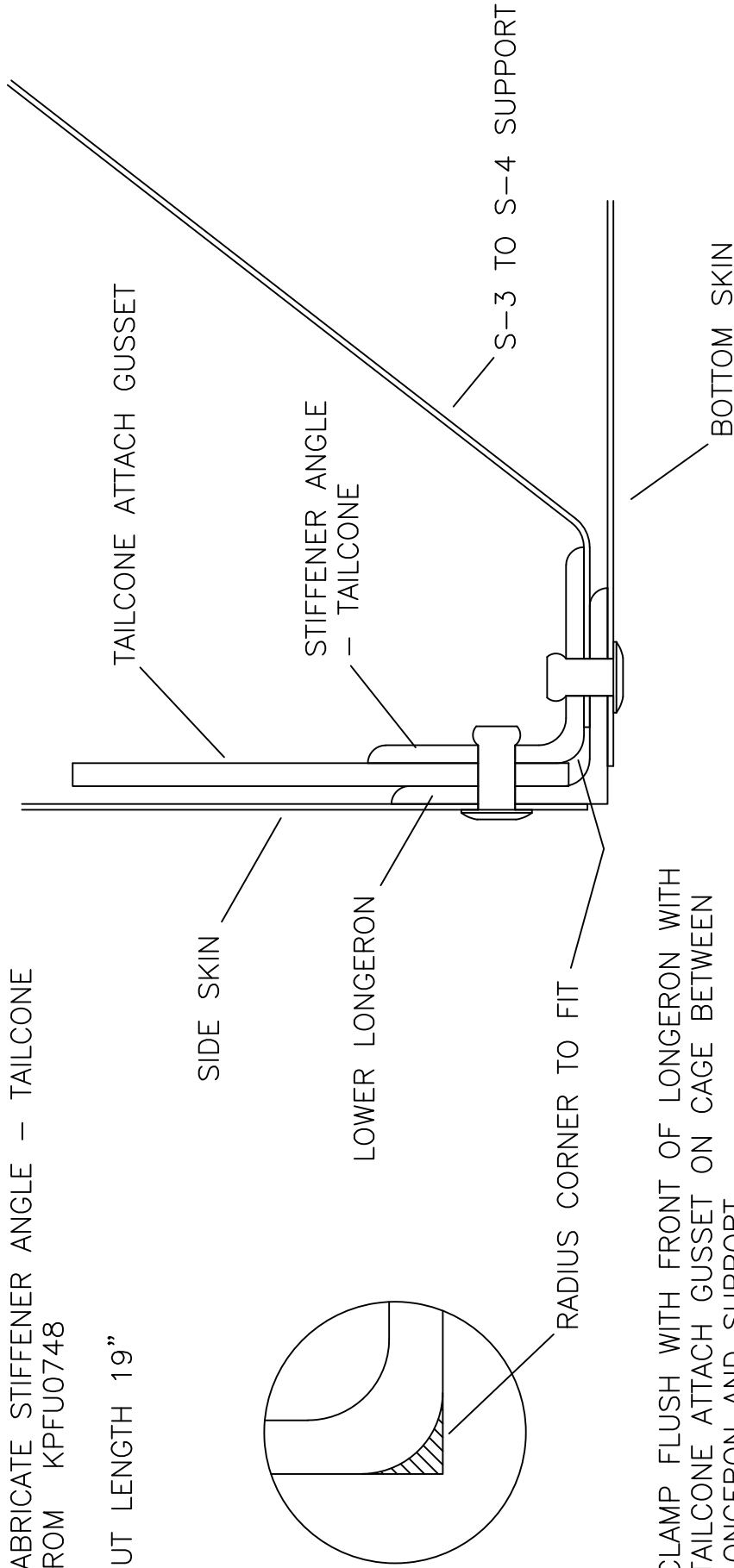
09/11/2018

MD5654
REV. - ORIG

RRMS S-21 OUTBOUND
MIDDLE LONGERON SUPPORT FABRICATION
FIGURE 07-03

FABRICATE STIFFENER ANGLE - TAILCONE
FROM KPFU0748

CUT LENGTH 19"



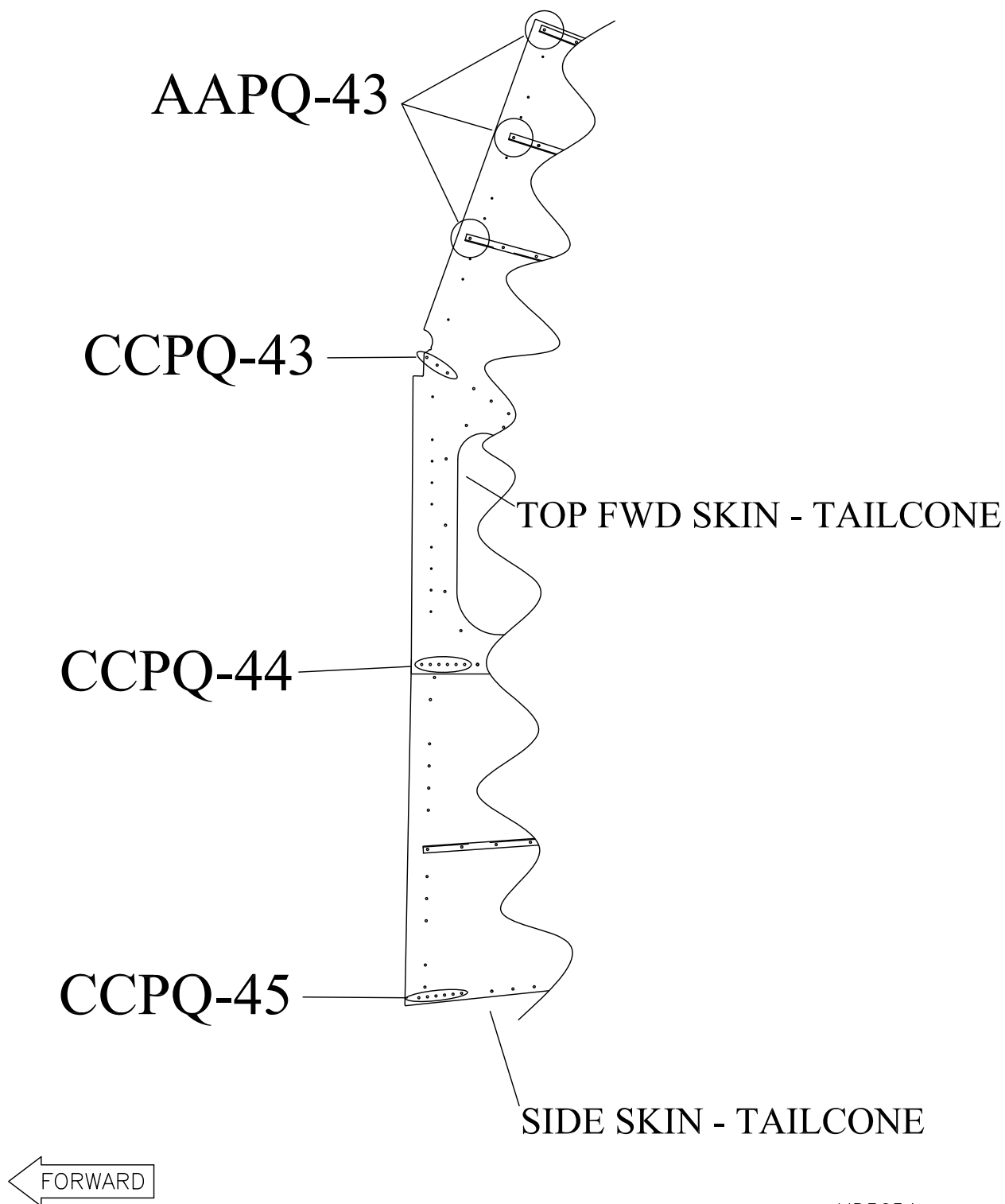
CLAMP FLUSH WITH FRONT OF LONGERON WITH
TAILCONE ATTACH GUSSET ON CAGE BETWEEN
LONGERON AND SUPPORT.

ALSO, CLAMP TIGHT TO LOWER LONGERON AFT OF
TAILCONE ATTACH GUSSET.

TRANSFER DRILL FROM SKIN/LONGERON

MD5654
REV. A

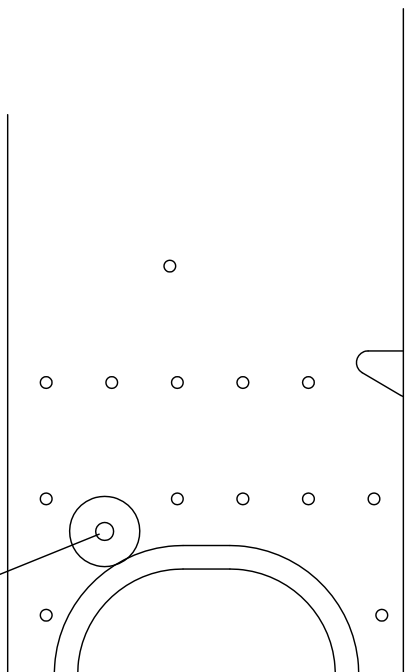
RAMS S-21 OUTBOUND STIFFENER ANGLE - TAILCONE FABRICATION AND INSTALLATION FIGURE 07-04



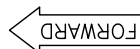
MD5654
REV. - ORIG

RANS S-21 OUTBOUND
SIDE AND TOP FWD TAILCONE RIVET DETAIL
FIGURE 07-04A

DRILL TO 5/8" FOR RUDDER CABLE
INSERT GROMMET



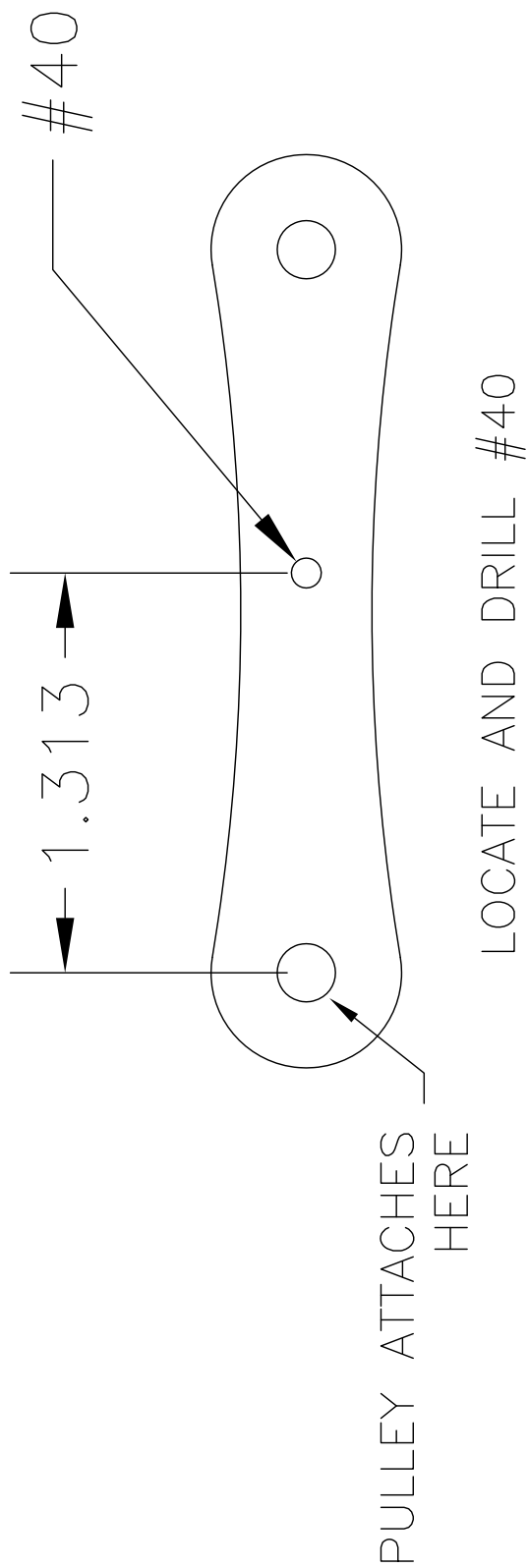
STATION 4 BULKHEAD
KPFU0707



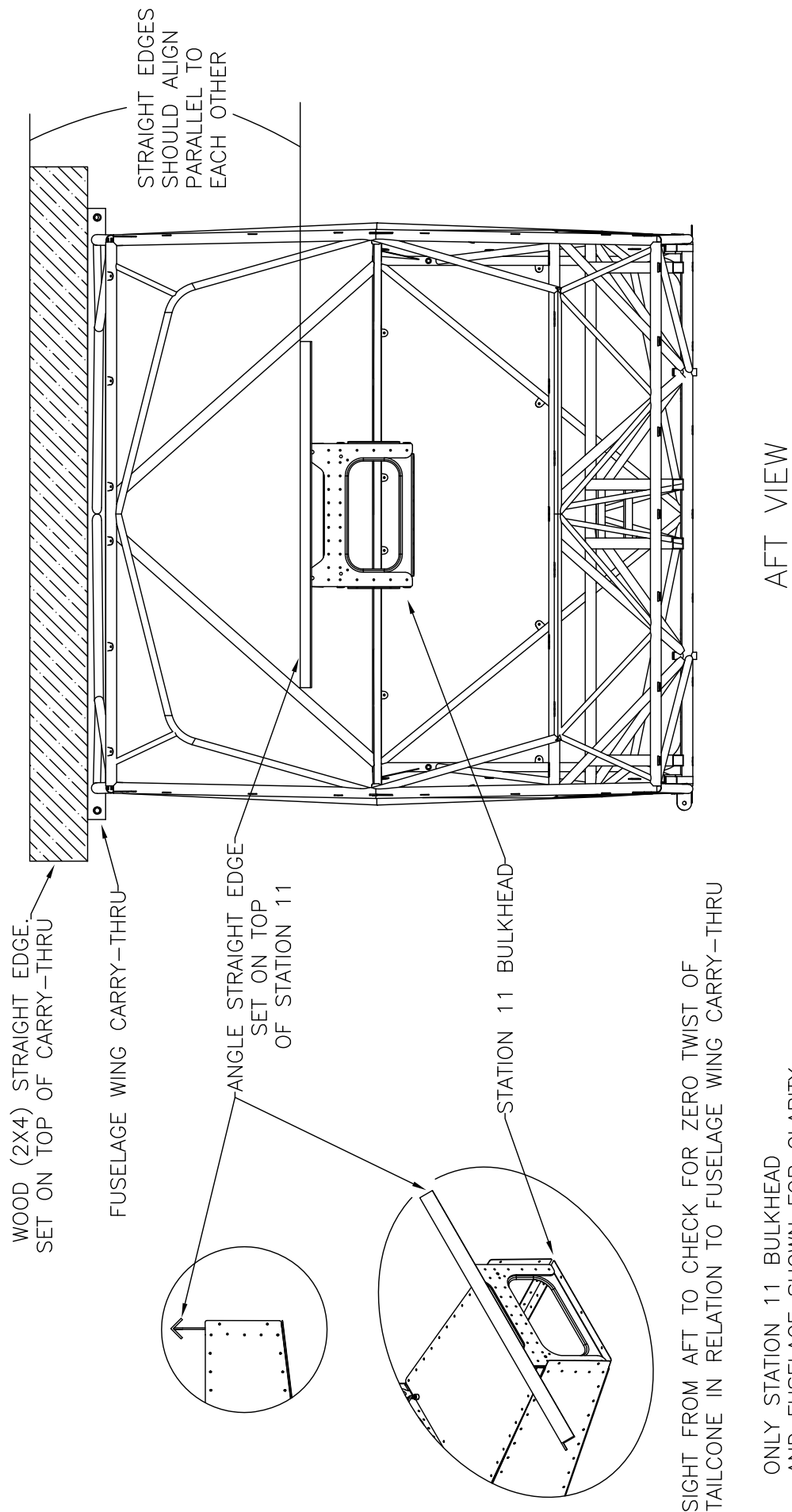
09/11/2018

RRR S-21 OUTBOUND
STATION 4 RUDDER CABLE GUIDE
FIGURE 07-05

MD5654
REV. - ORIG



INSERT APPROPRIATE COTTER PIN TO
RETAIN CABLE IN PULLEY



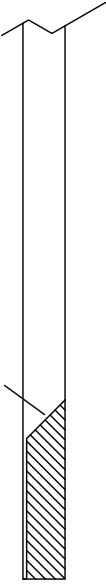
MD5654
REV. - ORIG

RRR S-21 OUTBOUND TAILCONE ALIGNMENT FIGURE 07-06A

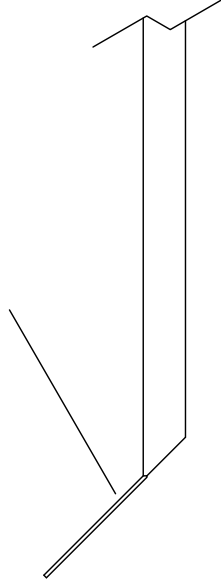
FABRICATE FROM KPFU0748

CUT LENGTH 33.5"

MATCH ANGLE ON FUSELAGE AND MARK TO LEAVE A 2.5" TANG WHEN FINISHED
REMOVE MATERIAL AND LEAVE TANG IN PLACE



FILET ALL CORNERS BEFORE BENDING TO PREVENT CRACKING AT BEND LINE
BEND TO MATCH FUSELAGE (CLAMP TANG IN VICE, BEND TO DESIRED ANGLE)



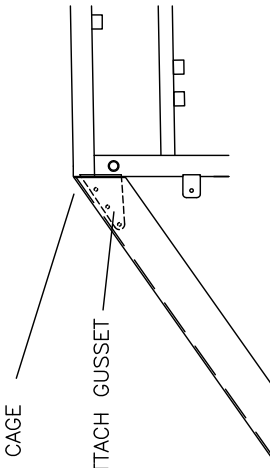
TEST FIT

CLAMP IN PLACE WITH FLAT FACE FLUSH WITH BULKHEAD
MARK AND TRIM TO TOP ATTACH GUSSET ON CAGE
CLAMP BACK IN PLACE WITH THE ANGLE RESTING ON THE OUTSIDE OF THE ATTACH GUSSET

DRILL (3) HOLES IN TANG AND RIVET IN PLACE

ALIGN TOP EDGE WITH TOP OF CAGE

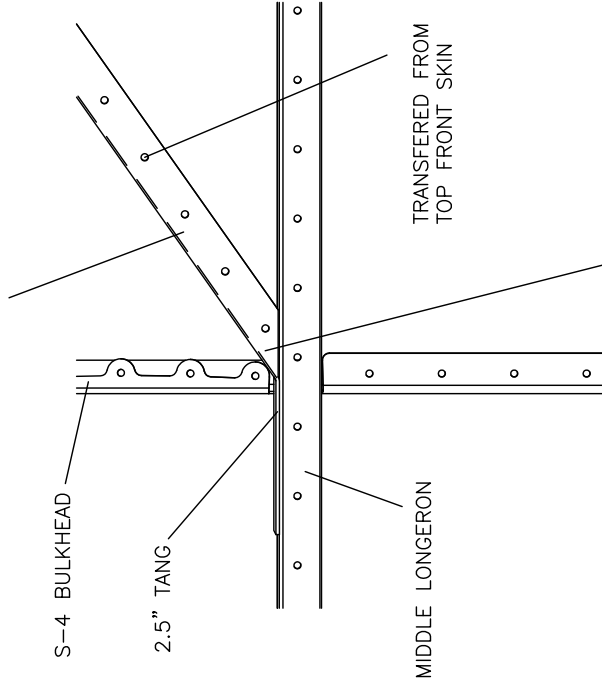
TRANSFER DRILL FROM THE TOP ATTACH GUSSET



STATION 3

MD5654
REV. - ORIG

SIDE FLUSH WITH SIDE SKIN
FLANGE ON TOP POINTING INWARDS



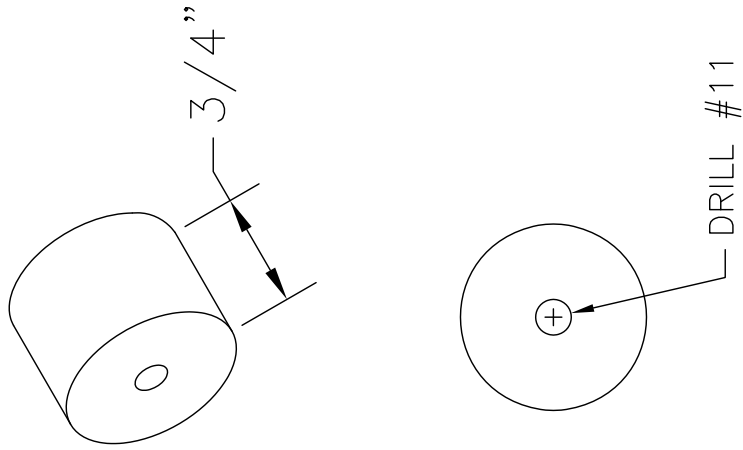
TRANSFERRED FROM
TOP FRONT SKIN

TANG SLIDES THROUGH BULKHEAD WITH LONGERON.
SLIDE FORWARD JUST ENOUGH TO PREVENT WINDOW SUPPORT
FROM OVERLAPPING THE FLANGE ON S-4 BULKHEAD



FORWARD

RAMS S-21 OUTBOUND WINDOW SUPPORT FABRICATION FIGURE 07-07

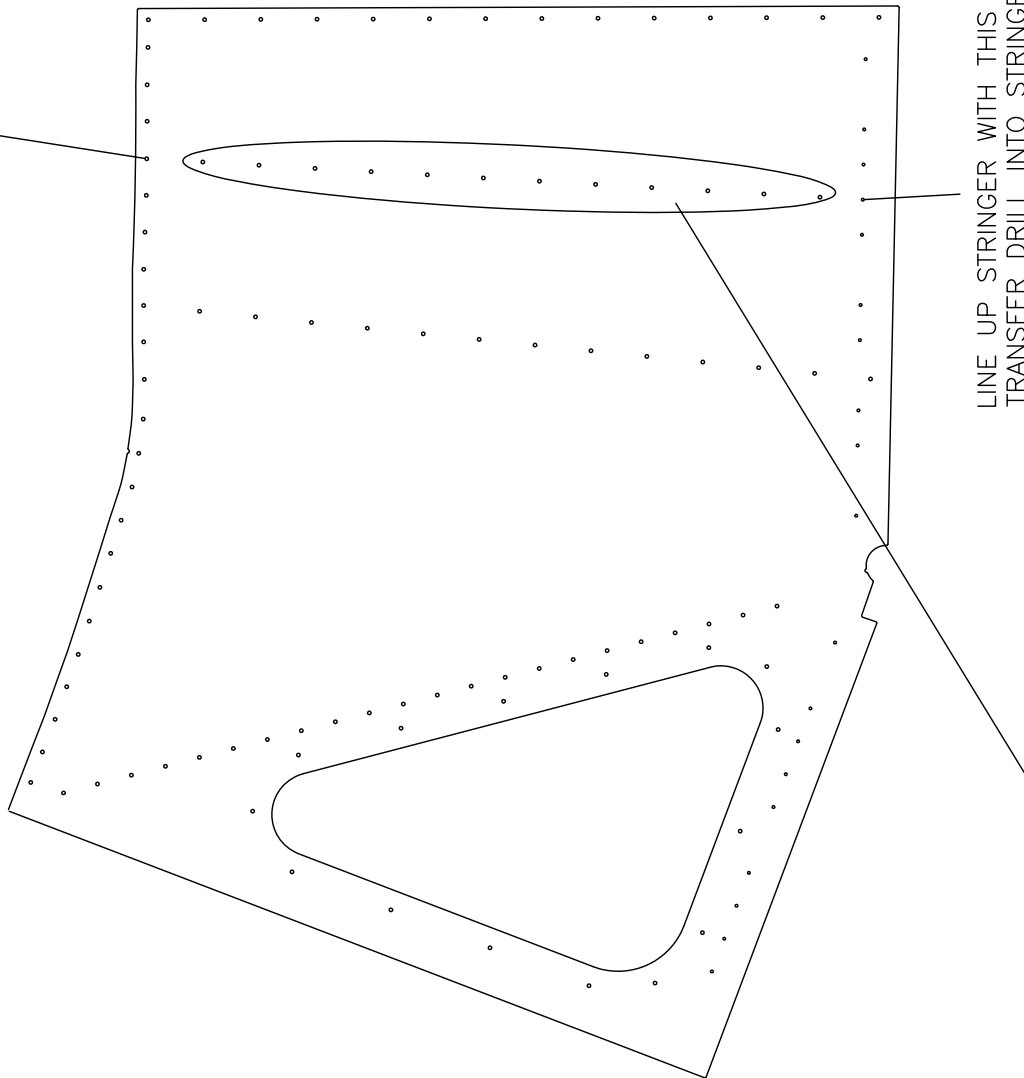


FABRICATE 2 SPACERS
FROM PROVIDED SPACER MATERIAL

MD5593
REV. - ORIG

STATION 4 CLOSEOUT SPACER FABRICATION FIGURE 07-07A

CLECO STRINGER TO THIS HOLE
THE STRINGER DOES NOT PROTRUDE THROUGH THE BULKHEAD

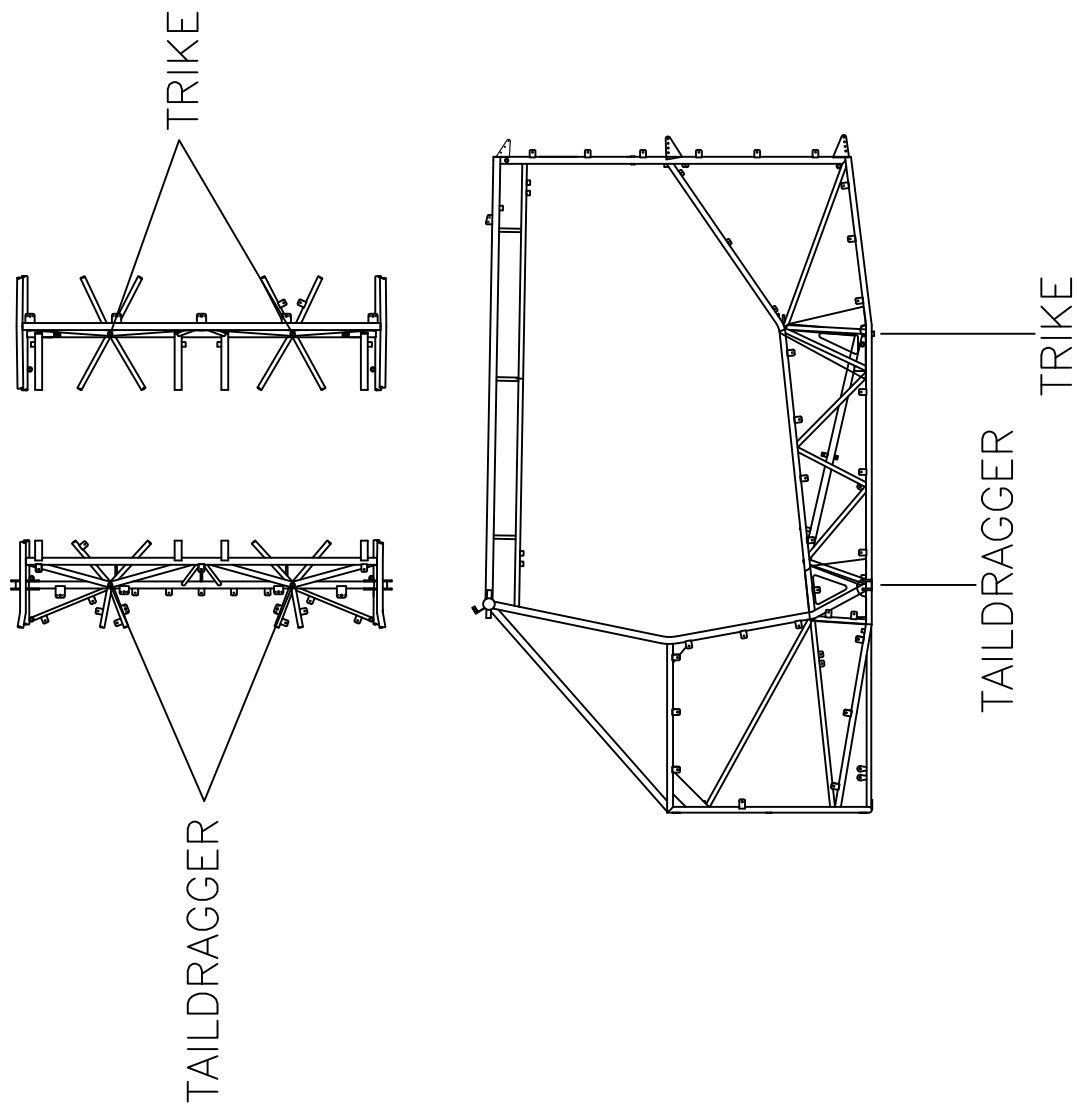


LINE UP STRINGER WITH THIS HOLE
TRANSFER DRILL INTO STRINGER AND TRIM TO LENGTH

TRANSFER DRILL FROM STRINGER TO SKIN

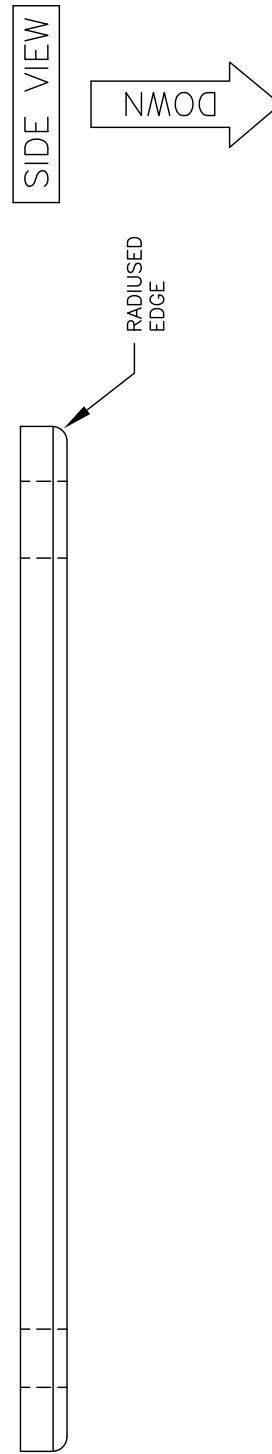
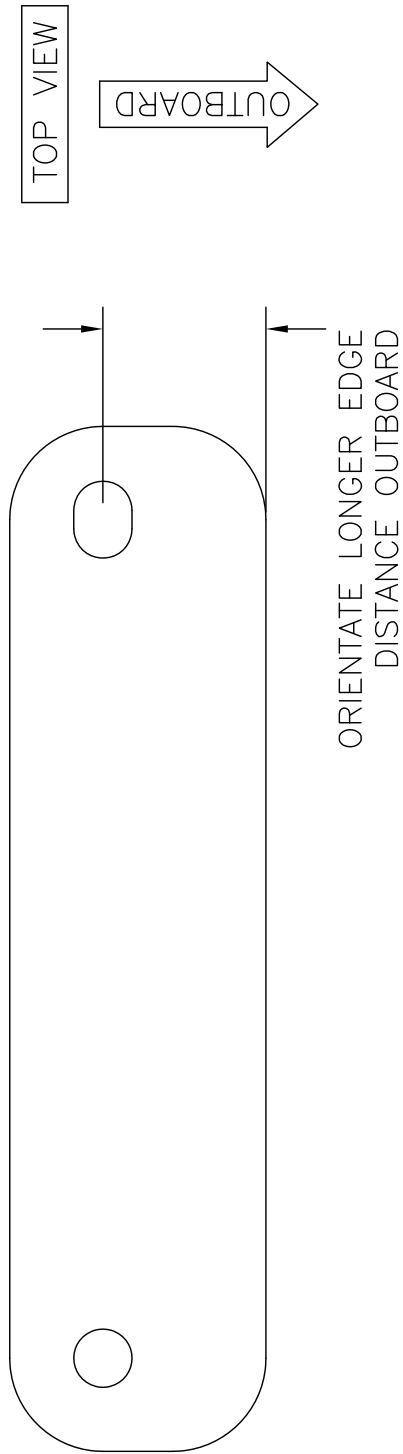
RAMS S-21 OUTBOUND
TOP FRONT SKIN STRINGERS
FIGURE 07-08

MD5654
REV. - ORIG



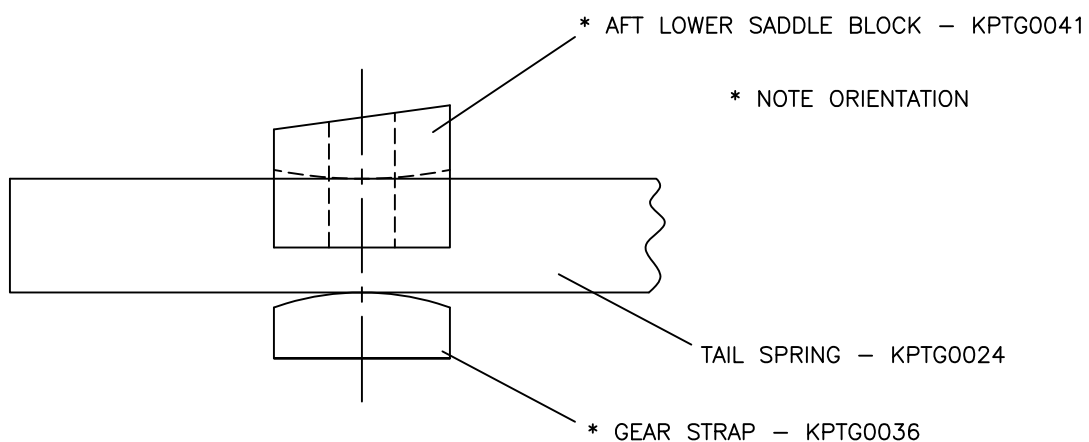
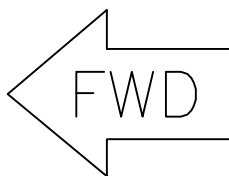
S-21 OUTBOUND
MAIN LANDING GEAR LOCATIONS
FIGURE 08-04

MD5603
 REV. - ORIG



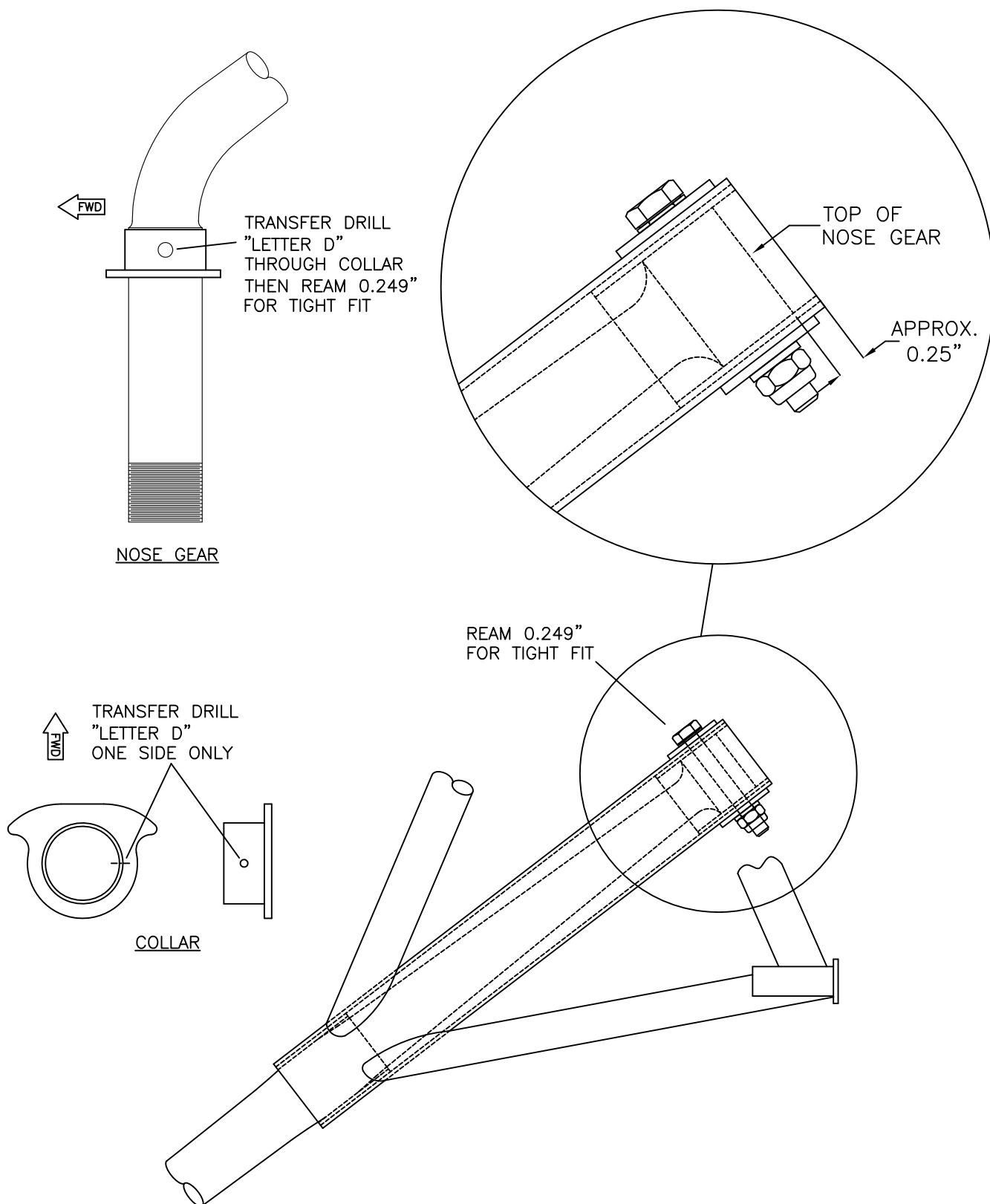
MD5600
REV. - ORIG

RRR S-21 OUTBOUND
TOP MAIN GEAR CLAMP PLATE ORIENTATION
FIGURE 08-05



MD5054
REV. — ORIG

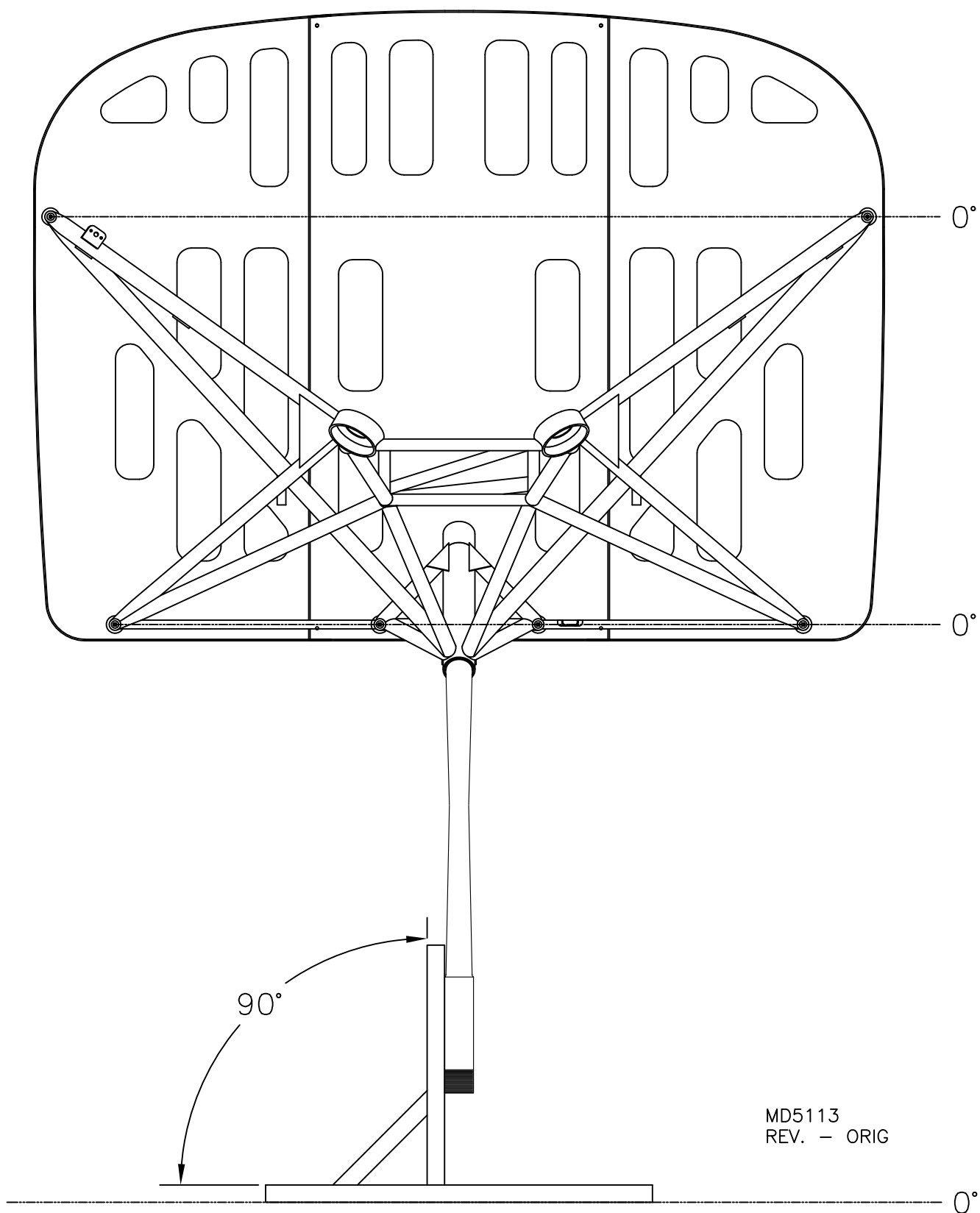
**RANS S-21 OUTBOUND
TAIL SPRING INSTALLATION
FIGURE 08A-02**



RANS S-21 OUTBOUND
NOSE GEAR INSTALLATION
FIGURE 08A-10

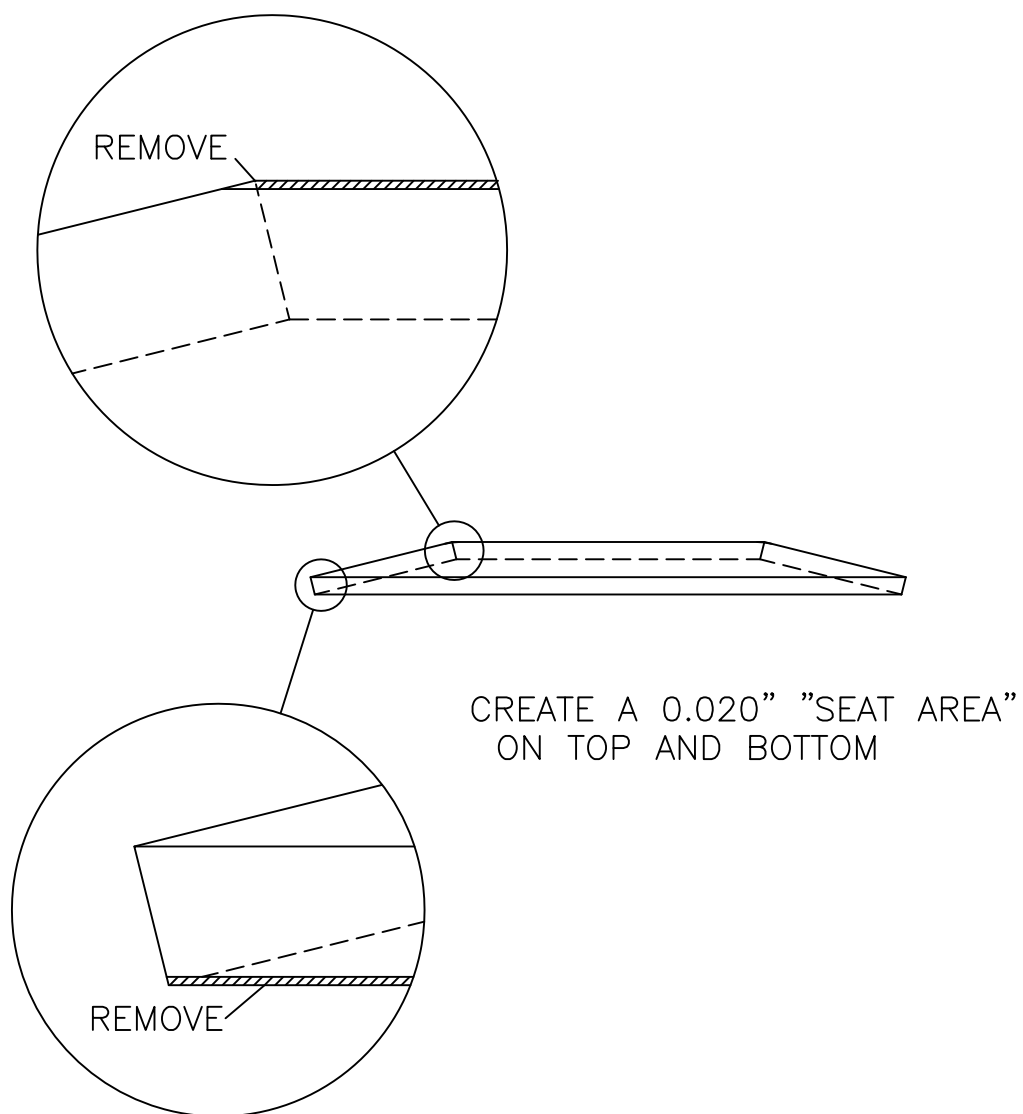
MD5112
 REV. — ORIG

09/11/2018



RANS S-21 OUTBOUND
NOSE GEAR ALIGNMENT
FIGURE 08A-12

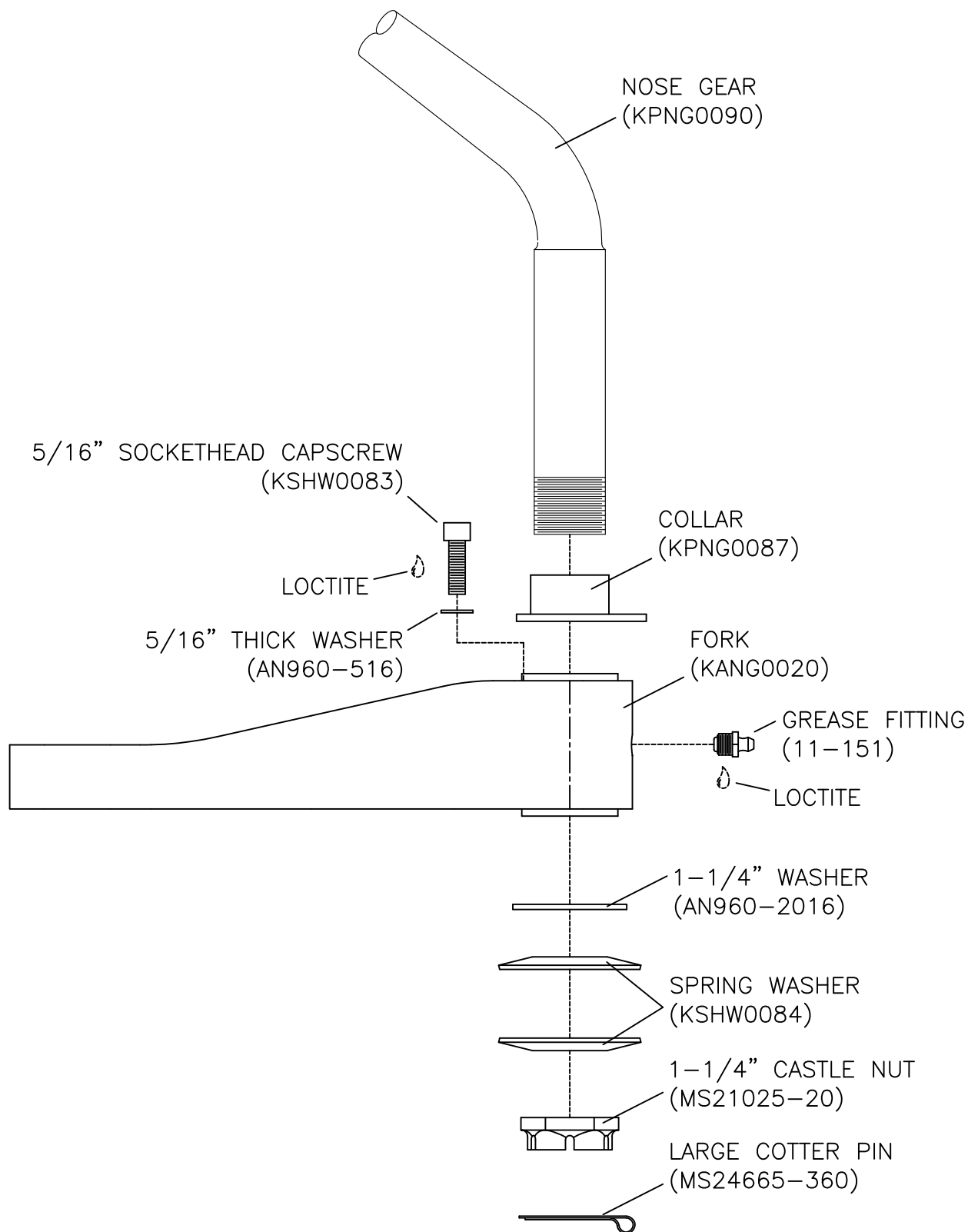
09/11/2018



RANS S-21 OUTBOUND
SPRING WASHER MODIFICATION
FIGURE 08A-20

MD5220
 REV. — ORIG

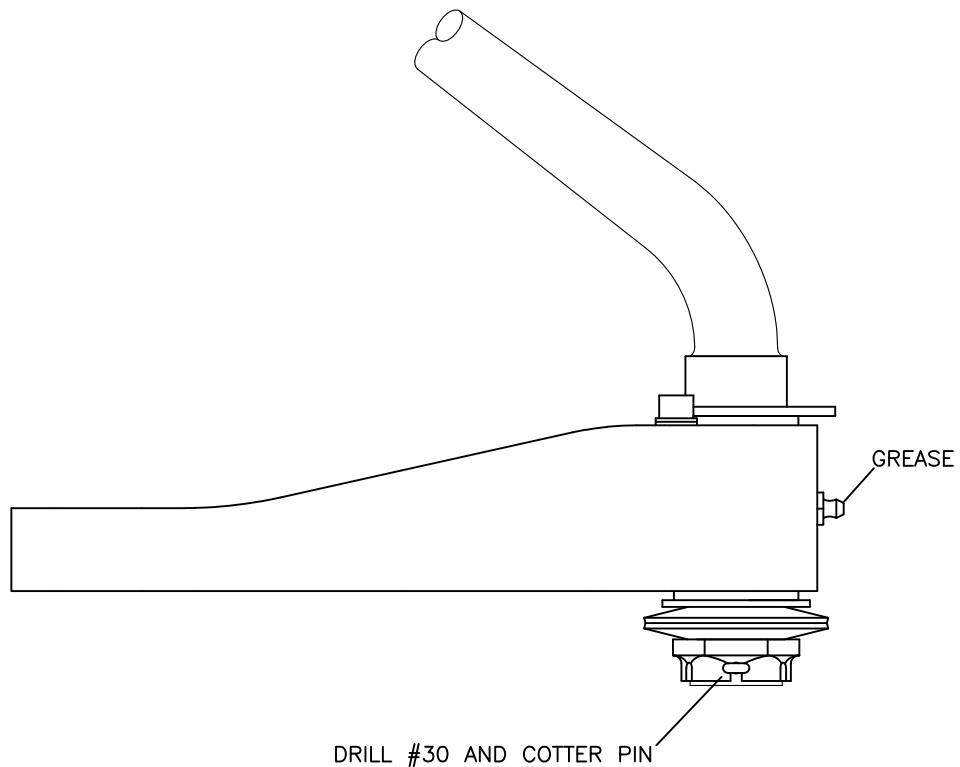
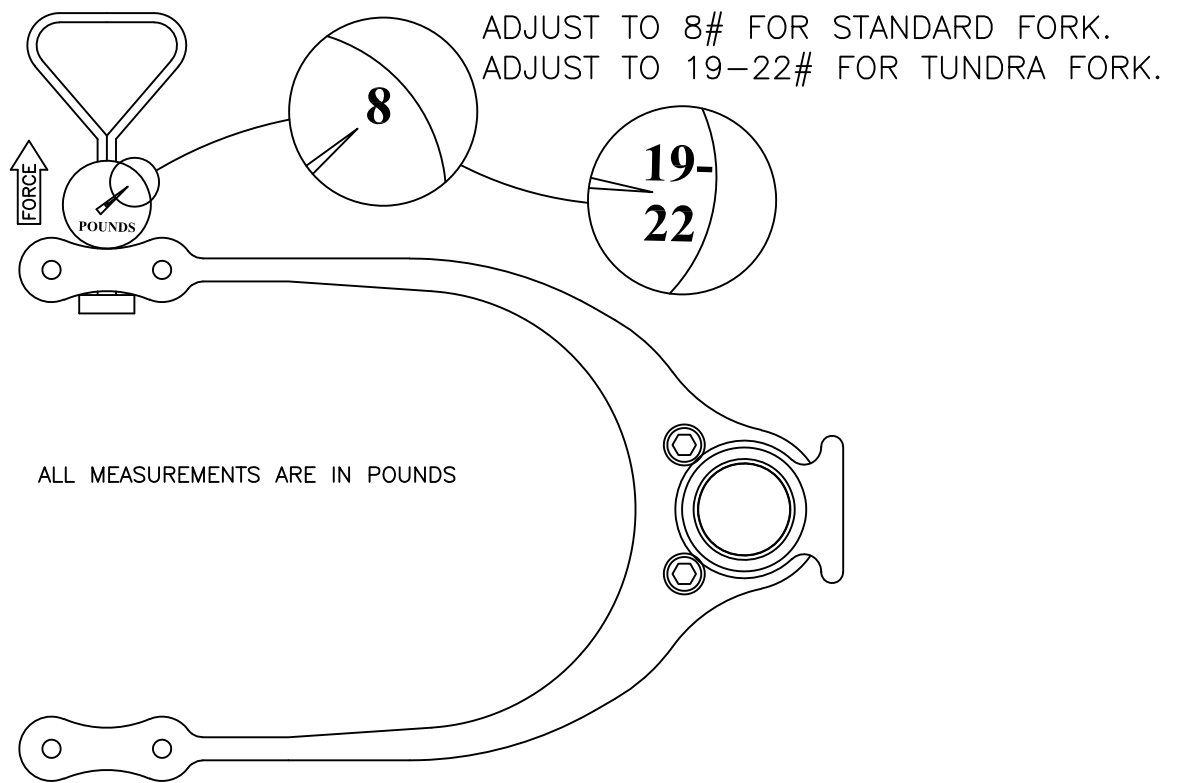
09/11/2018



MD5086
REV. - ORIG

**RANS S-21 OUTBOUND
NOSE GEAR/FORK INSTALLATION
FIGURE 08A-21**

09/11/2018



MD5111
REV. - ORIG

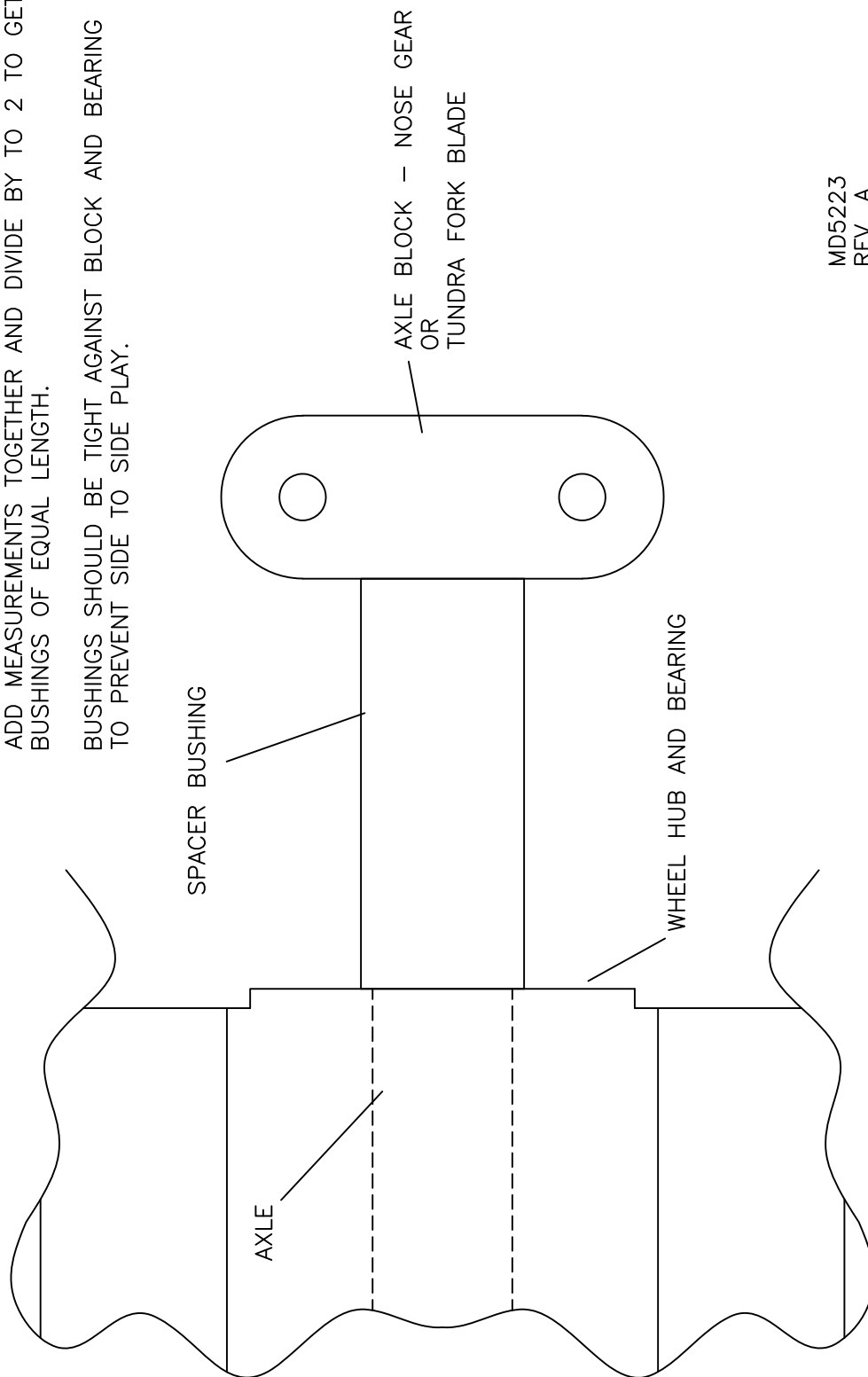
RANS S-21 OUTBOUND FORK TENSION ADJUSTMENT FIGURE 08A-22

09/11/2018

CUT SPACER BUSHING TO CENTER WHEEL BETWEEN ARMS OF NOSE GEAR FORK.

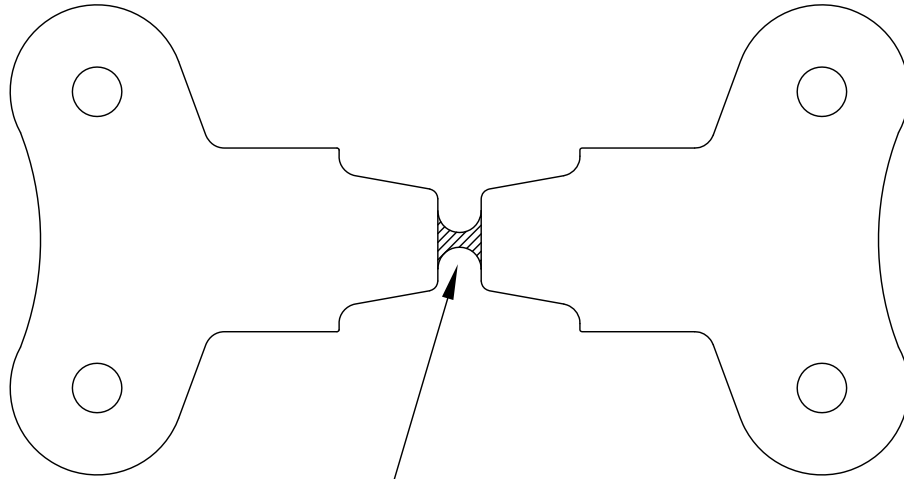
NOTE: MEASURE DISTANCE BETWEEN BEARING AND AXLE BLOCK ON EACH SIDE.
ADD MEASUREMENTS TOGETHER AND DIVIDE BY 2 TO GET BUSHINGS OF EQUAL LENGTH.

BUSHINGS SHOULD BE TIGHT AGAINST BLOCK AND BEARING TO PREVENT SIDE TO SIDE PLAY.

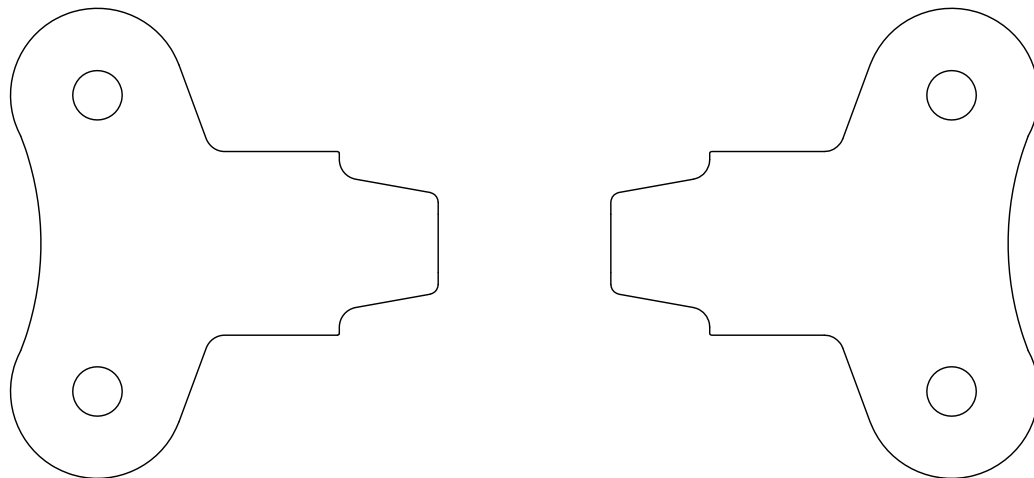


MD5223
REV. A

RAM S-21 OUTBOUND
NOSE WHEEL SPACER BUSHING MODIFICATION
FIGURE 08A-25



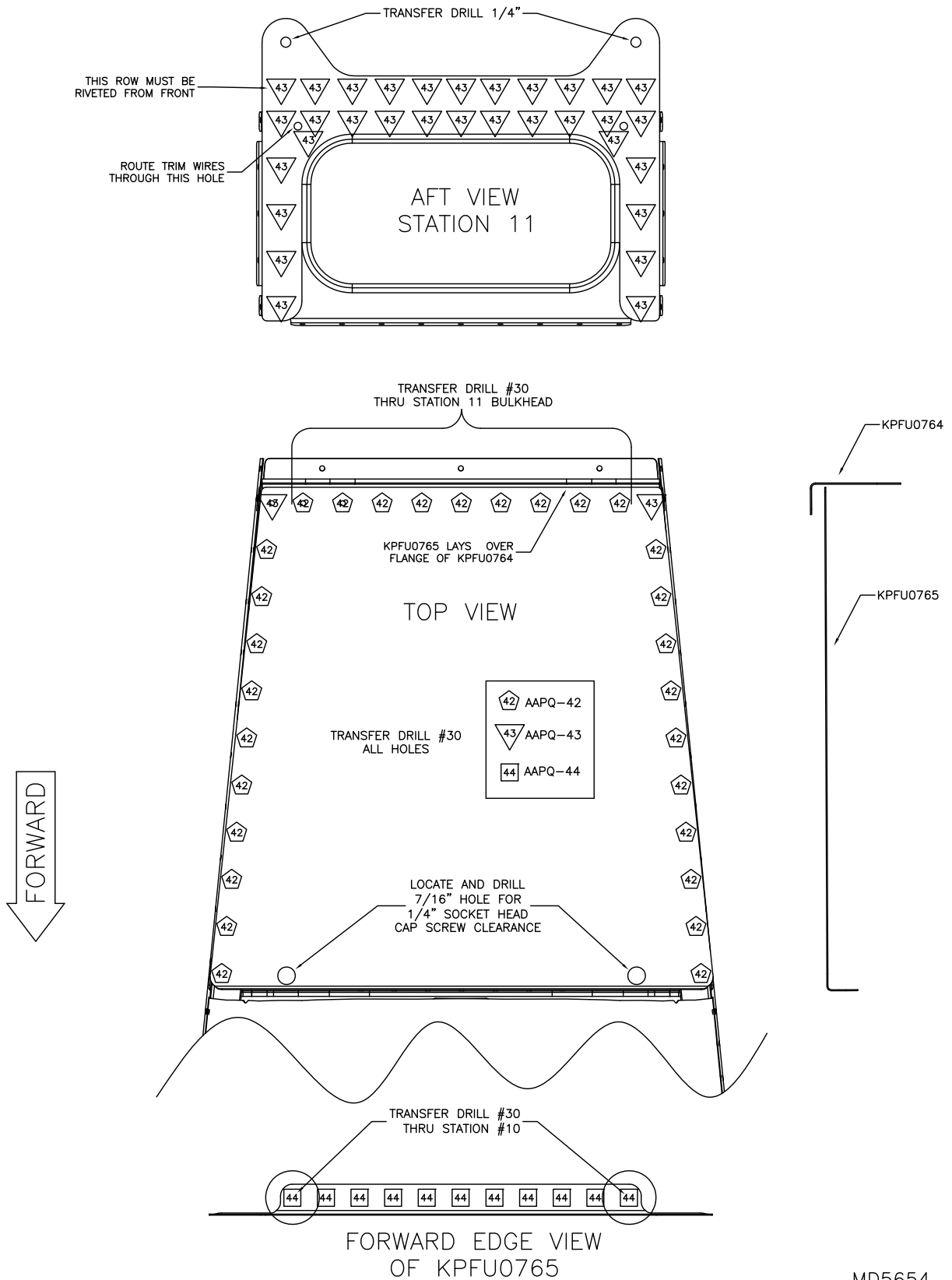
REMOVE THIS AREA
TO MAKE 2 PARTS



RANS S-21 OUTBOUND
NOSE GEAR TOW PLATE MODIFICATION
FIGURE 08A-31

MD5497
REV. — ORIG

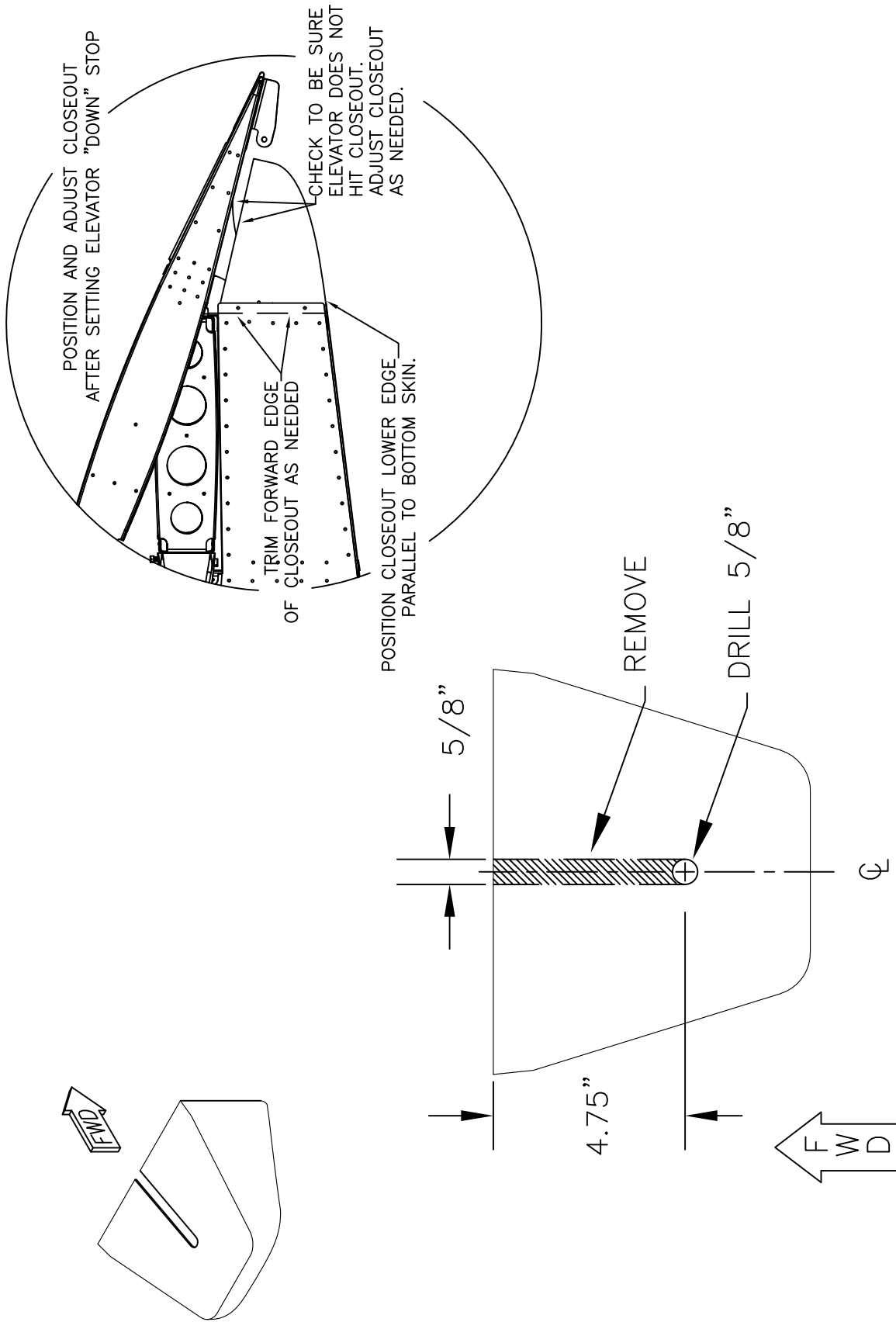
09/11/2018

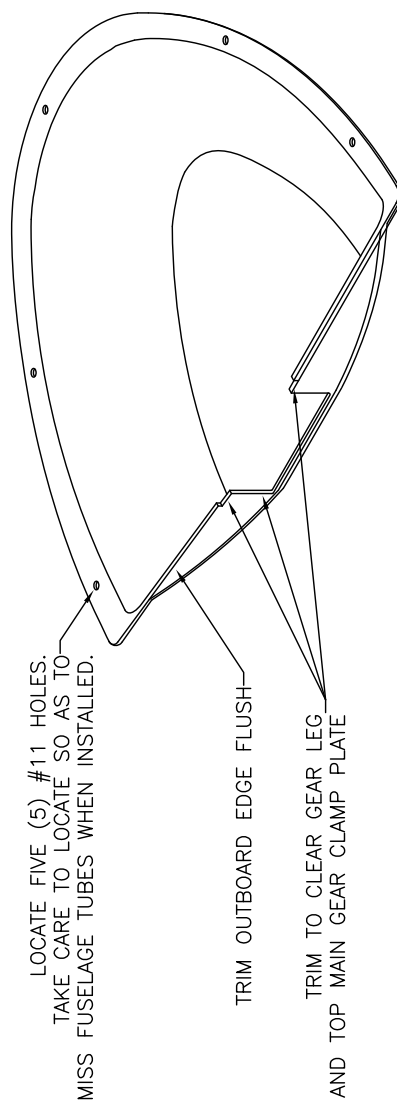
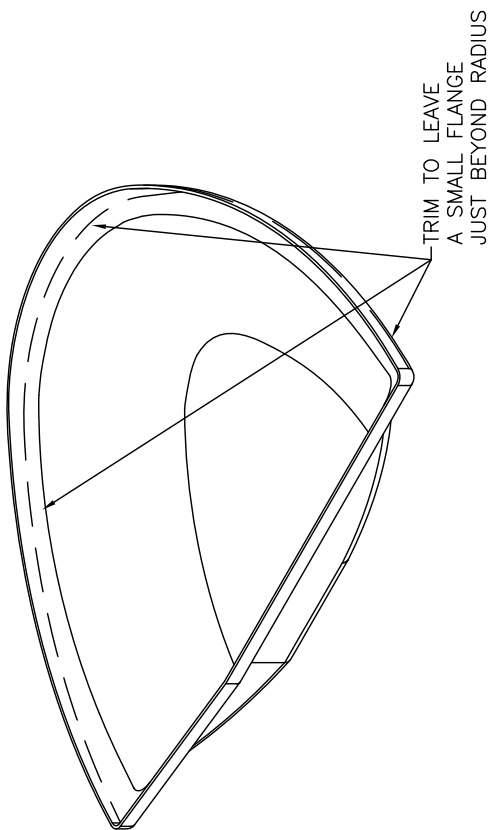


MD5654
REV. - ORIG

RANS S-21 OUTBOUND STATION 10/11 CLOSEOUT DETAIL FIGURE 08A-31A

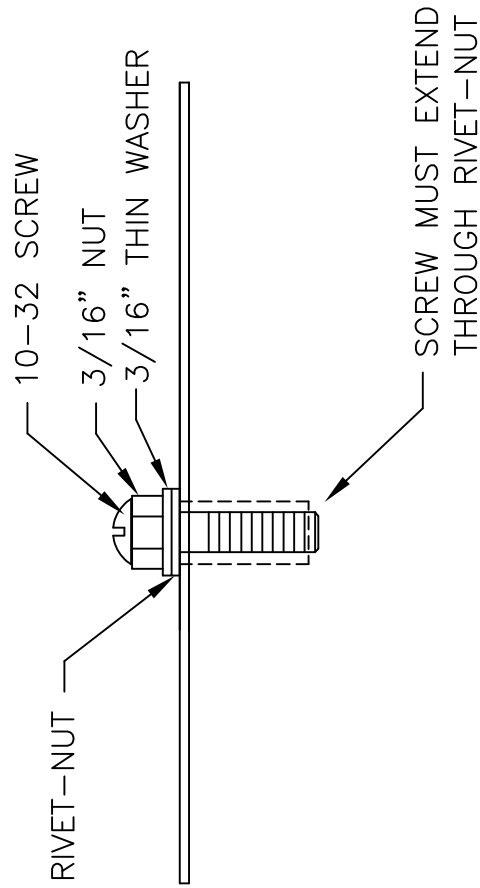
RRR S-21 OUTBOUND **TAILCONE AFT CLOSEOUT MODIFICATION** **FIGURE 08A-32**





MD5654
REV. - ORIG

RAMS S-21 OUTBOUND BELLY FAIRING TRIMMING FIGURE 08B-01



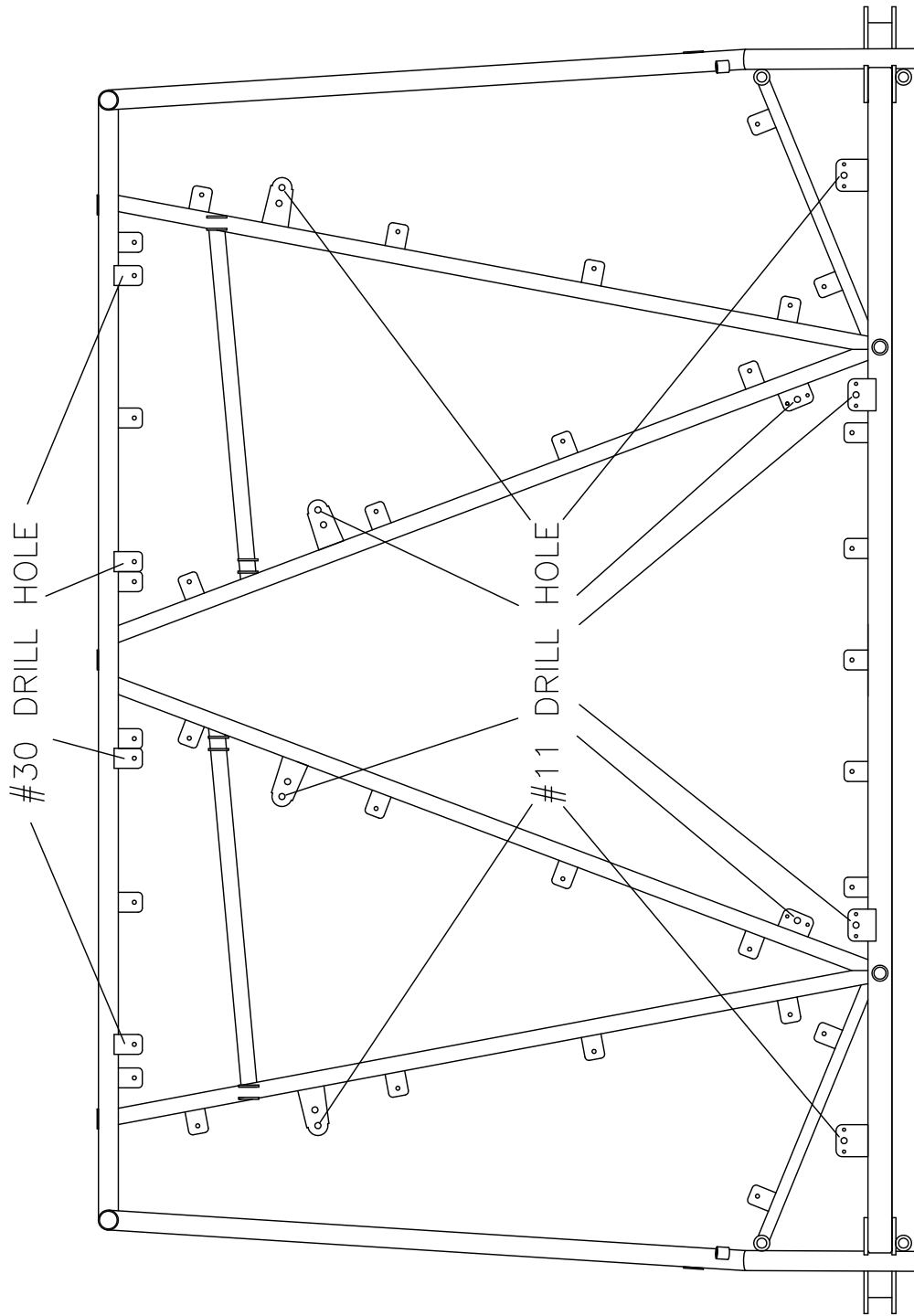
PROCEDURE BELOW MAY BE USED WHEN A RIVET-NUT PULLER IS NOT AVAILABLE.

1. FINGER TIGHTEN NUT AND RIVET-NUT ONTO SCREW.
2. INSERT RIVET-NUT INTO 1/4" HOLE.
3. TURN NUT 3 COMPLETE TURNS CLOCKWISE WHILE HOLDING SCREW STATIONARY.
4. BACK NUT OFF 1/2 TURN AND REMOVE SCREW.

S-21 OUTBOUND RIVET-NUT INSTALLATION

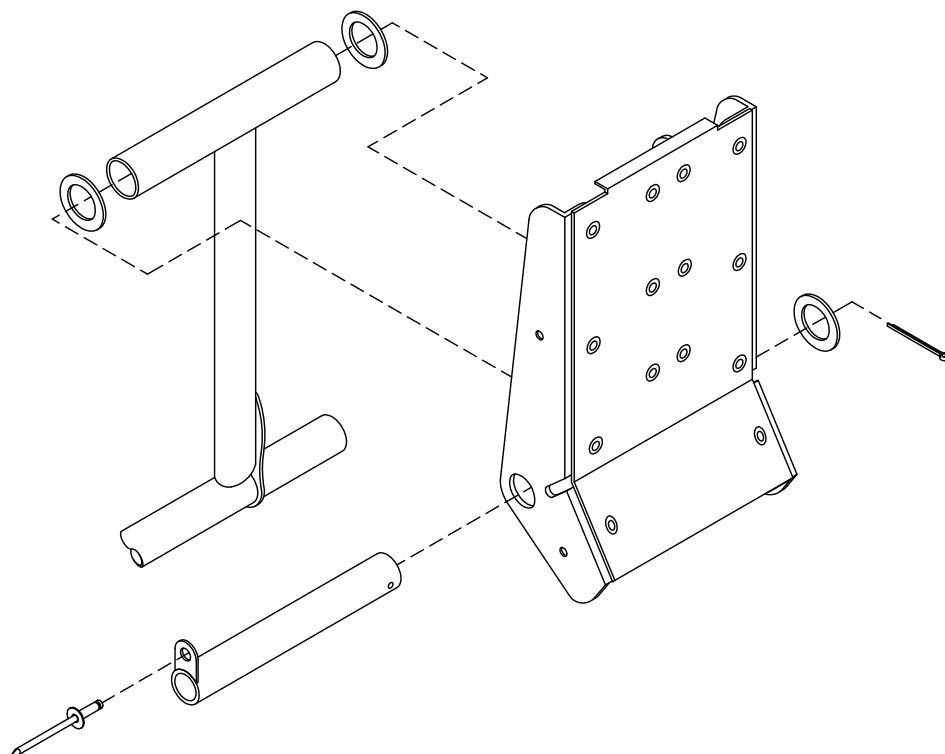
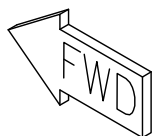
FIGURE 08B-06

MD343
REV. - ORIG



MD5604
REV. — ORIG

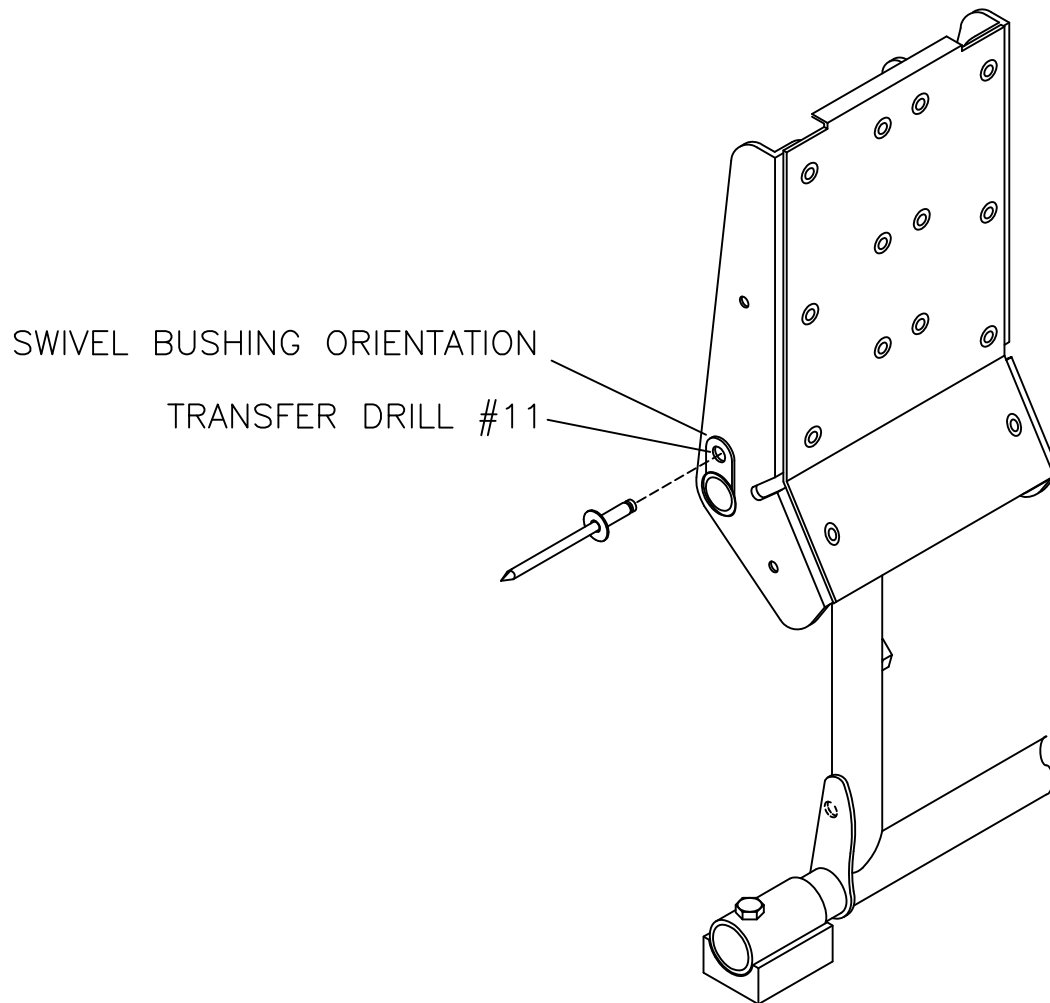
RAMP S-21 OUTBOUND
FLOORBOARD DRILL SCHEDULE
FIGURE 09-01



MD2266
REV. — ORIG

**RANS S-21 OUTBOUND
TOE PEDAL INSTALLATION
FIGURE 09A-02**

09/11/2018

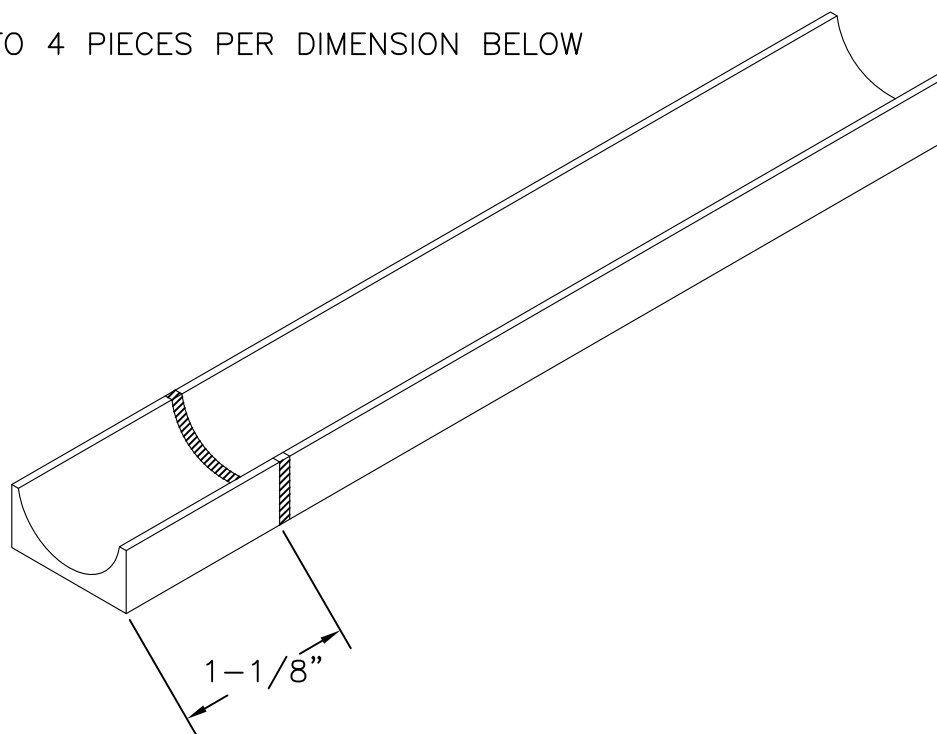


MD2267
REV. — ORIG

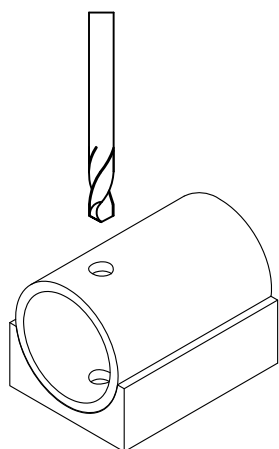
**RANS S-21 OUTBOUND
TOE PEDAL INSTALLATION
FIGURE 09A-03**

09/11/2018

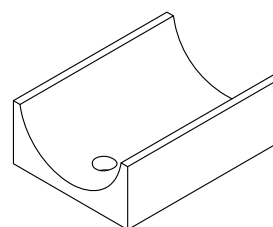
CUT PART INTO 4 PIECES PER DIMENSION BELOW



ALIGN END OF CUT BRAKE SADDLE WITH END OF RUDDER PEDAL BUSHING.
USING A DRILL PRESS, DRILL #11 THROUGH BUSHING



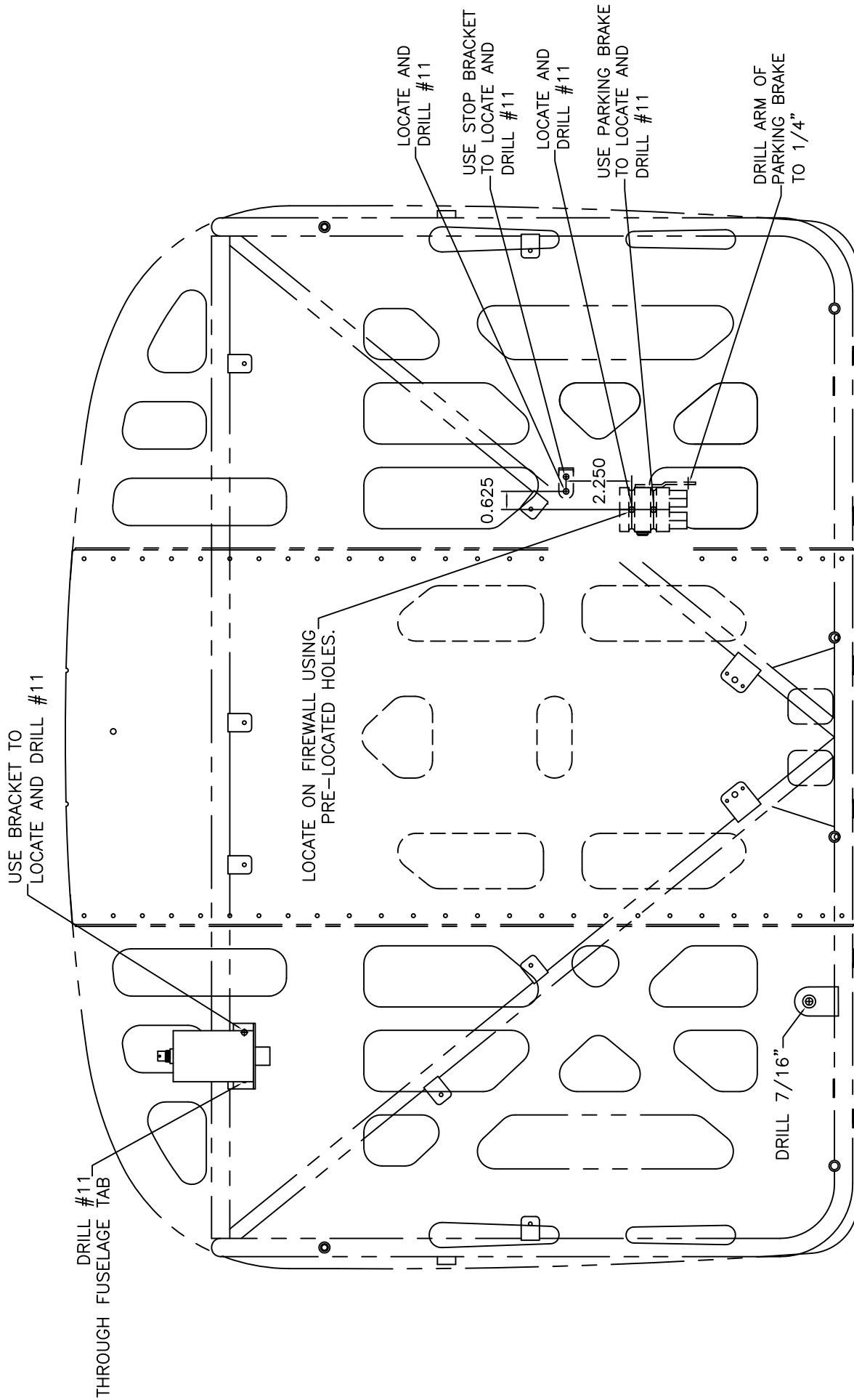
FINISHED PART



MD2267
REV. - ORIG

**RANS S-21 OUTBOUND
BRAKE SADDLE MODIFICATION
FIGURE 09A-05**

09/11/2018



VIEWED FROM FRONT

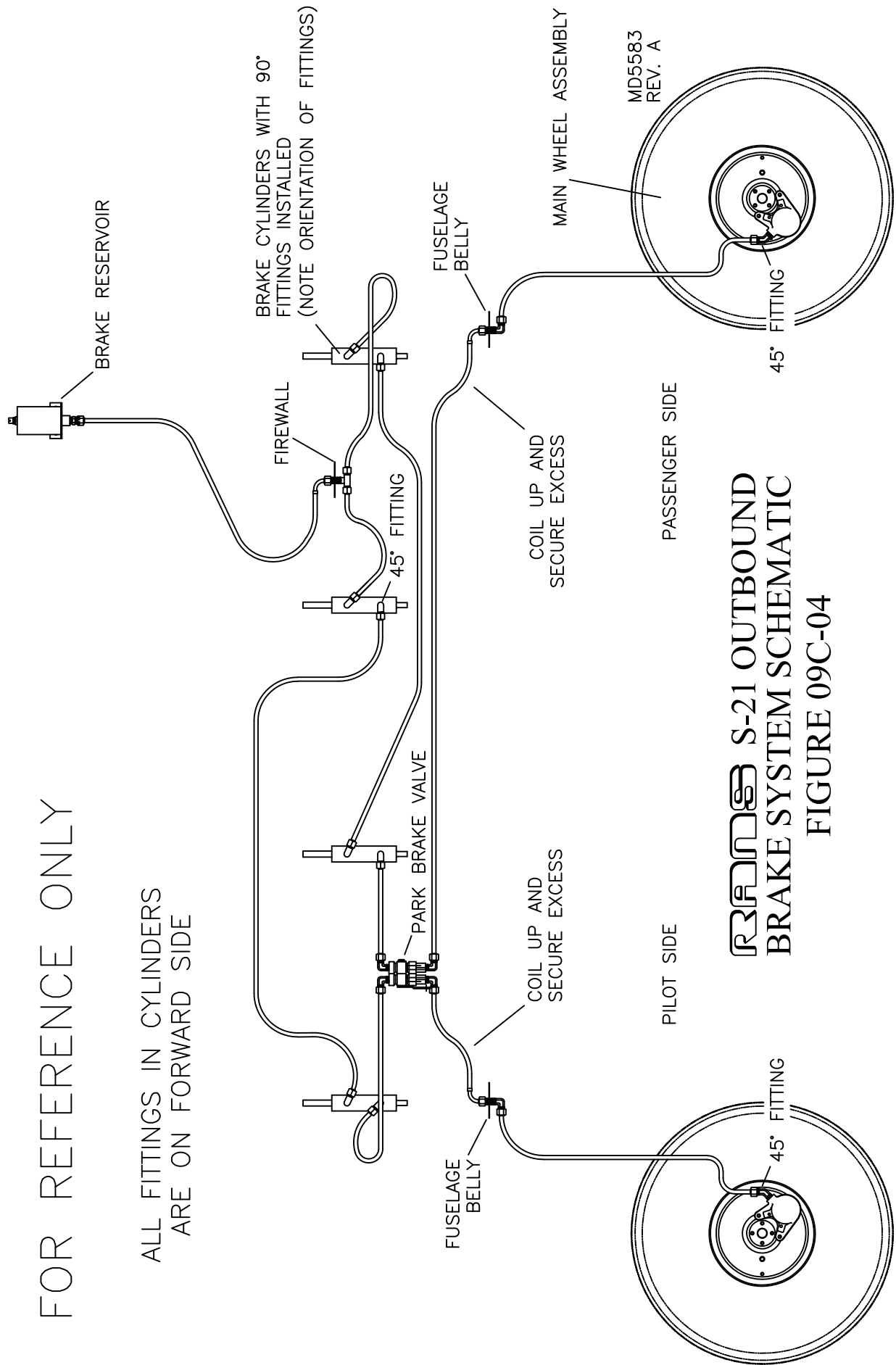
MD5575
REV. -- ORIG

RRR S-21 OUTBOUND
FIREWALL MODIFICATION FOR HYDRAULIC BRAKE INSTALL
FIGURE 09C-03

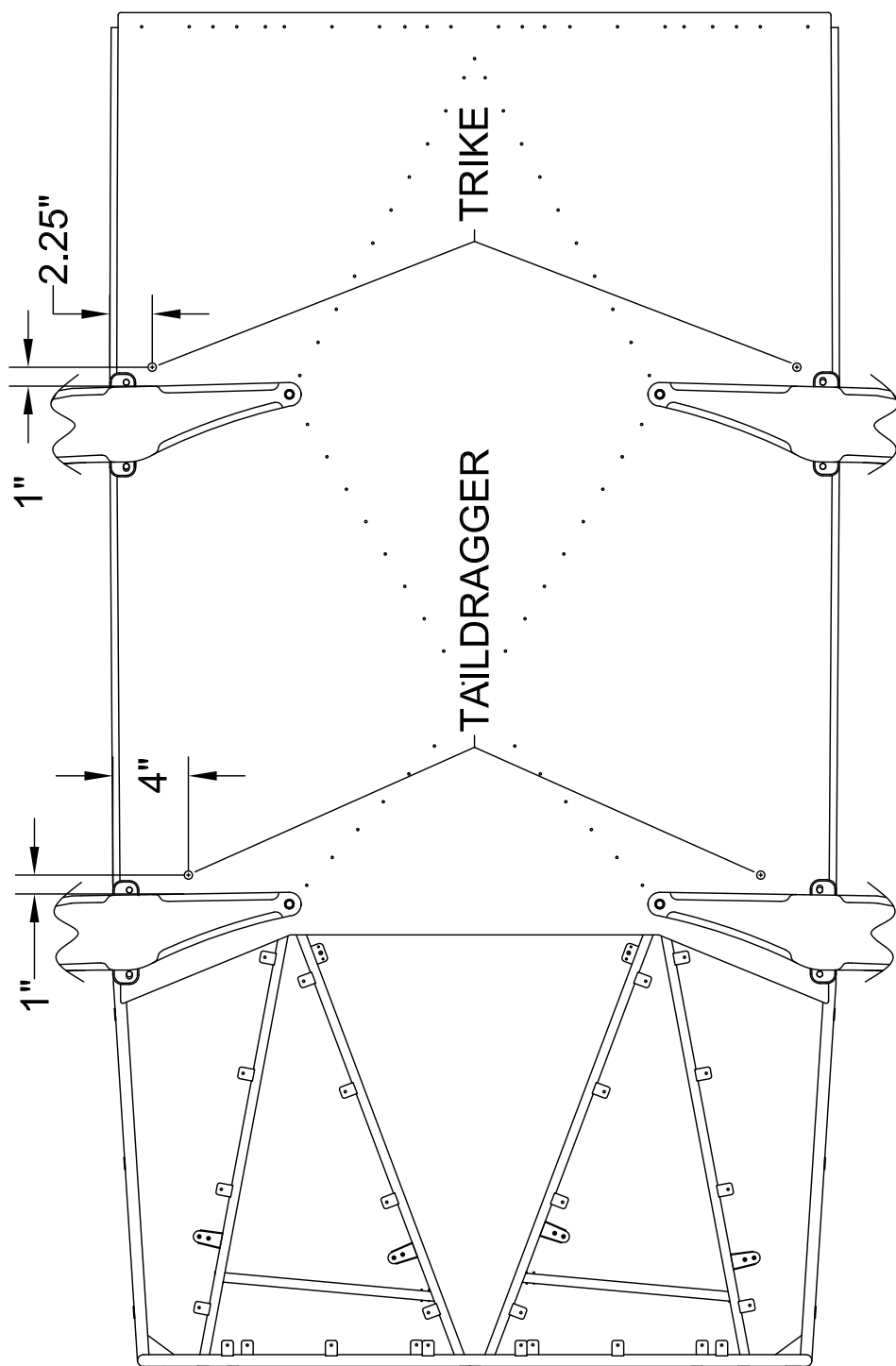
NOT TO SCALE

FOR REFERENCE ONLY

ALL FITTINGS IN CYLINDERS
ARE ON FORWARD SIDE



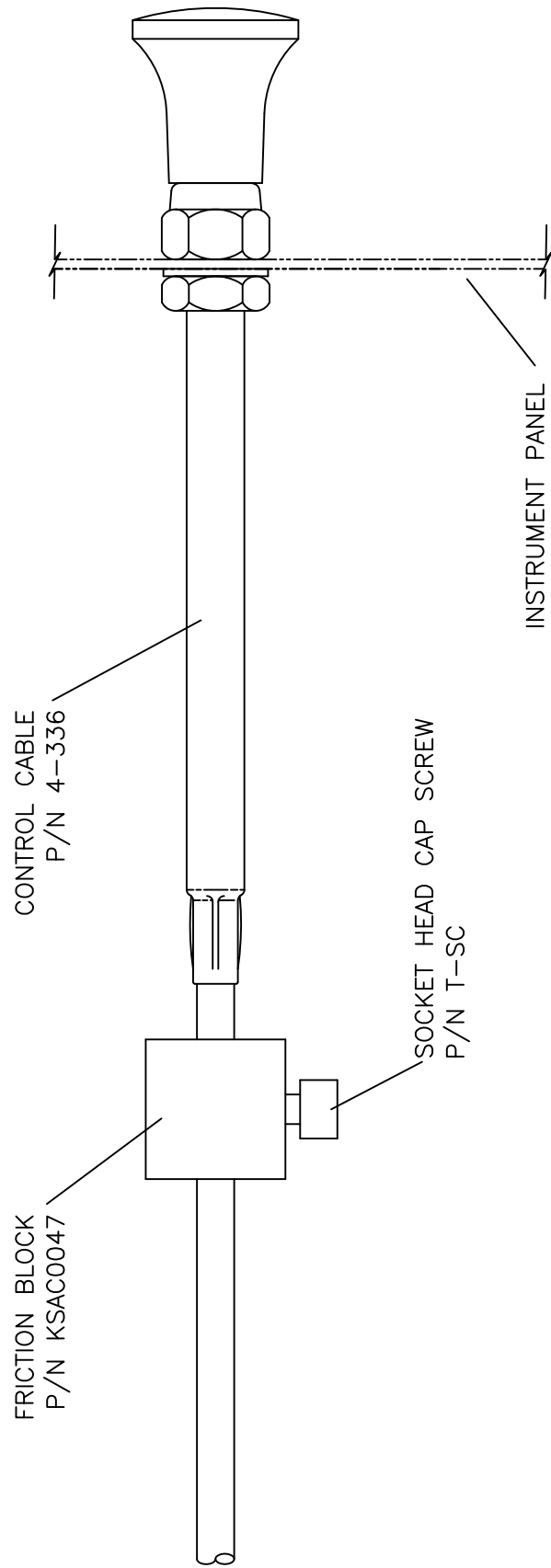
**RAMS S-21 OUTBOUND
BRAKE SYSTEM SCHEMATIC**
FIGURE 09C-04



DRILL APPROPRIATE
LOCATIONS TO 7/16"

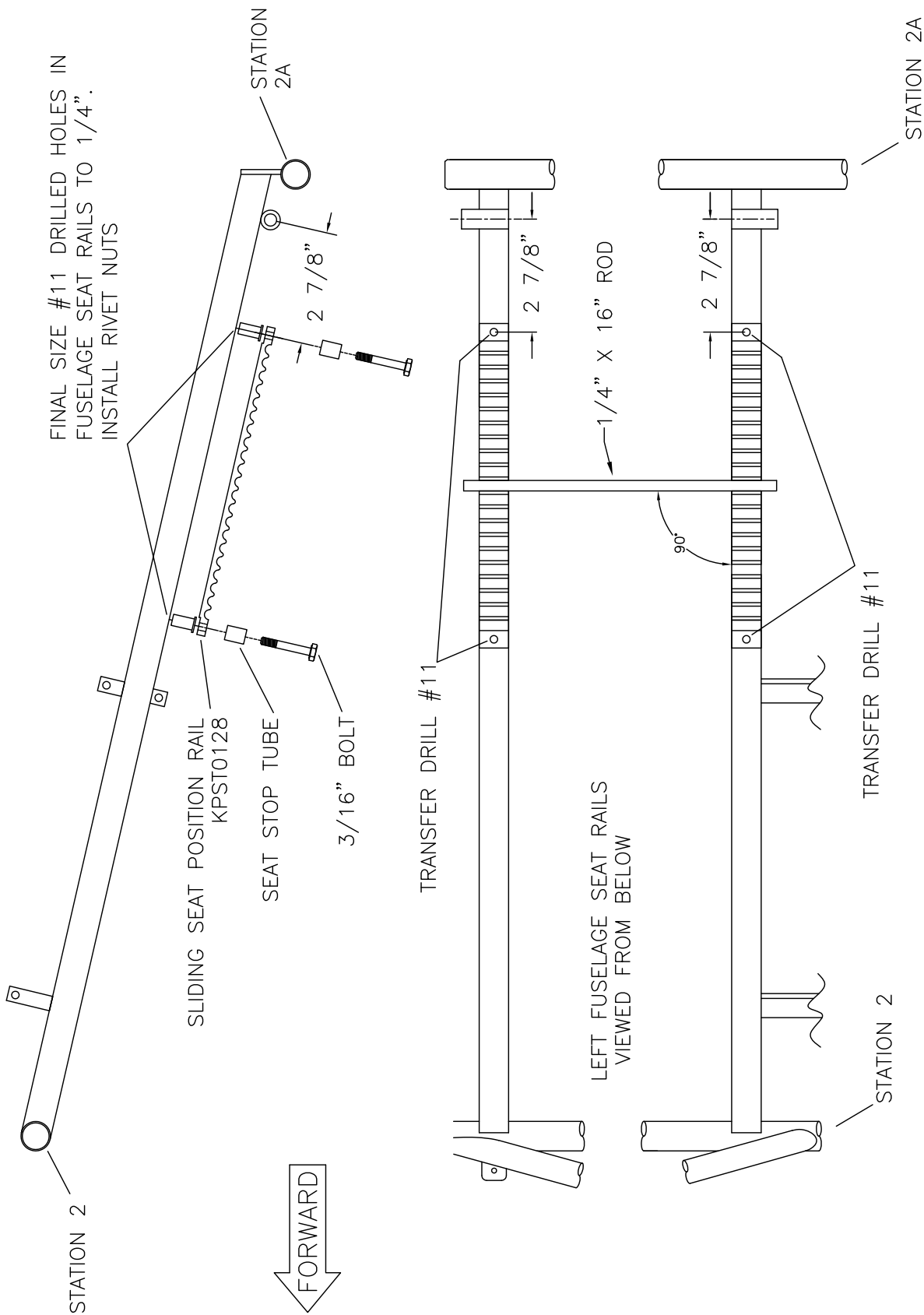
**RRR S-21 OUTBOUND
BRAKE LINE EXIT LOCATION
FIGURE 09C-08**

MD5587
REV. - ORIG



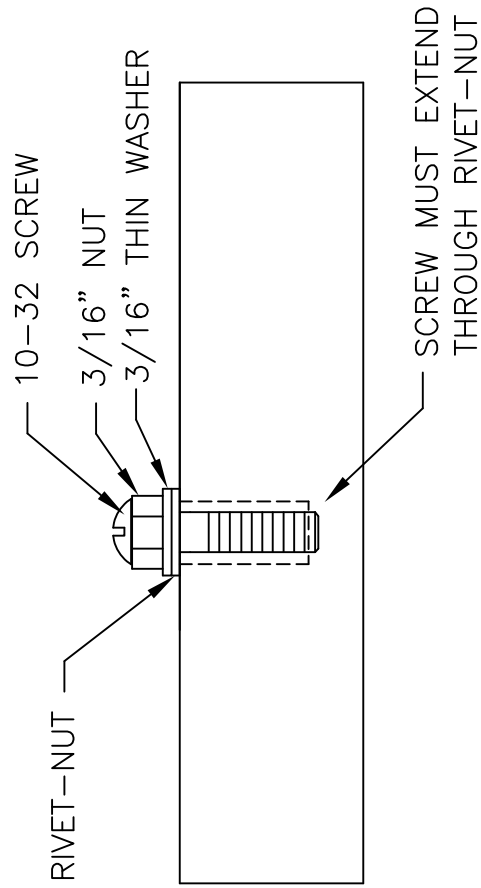
MD4423
REV. - ORIG

RRM S-21 OUTBOUND CONTROL CABLE INSTALLATION FIGURE 09C-12



MD5615
REV. - ORIG

RR S-21 OUTBOUND
SLIDING SEAT POSITION RAIL LOCATION
FIGURE 09D-01

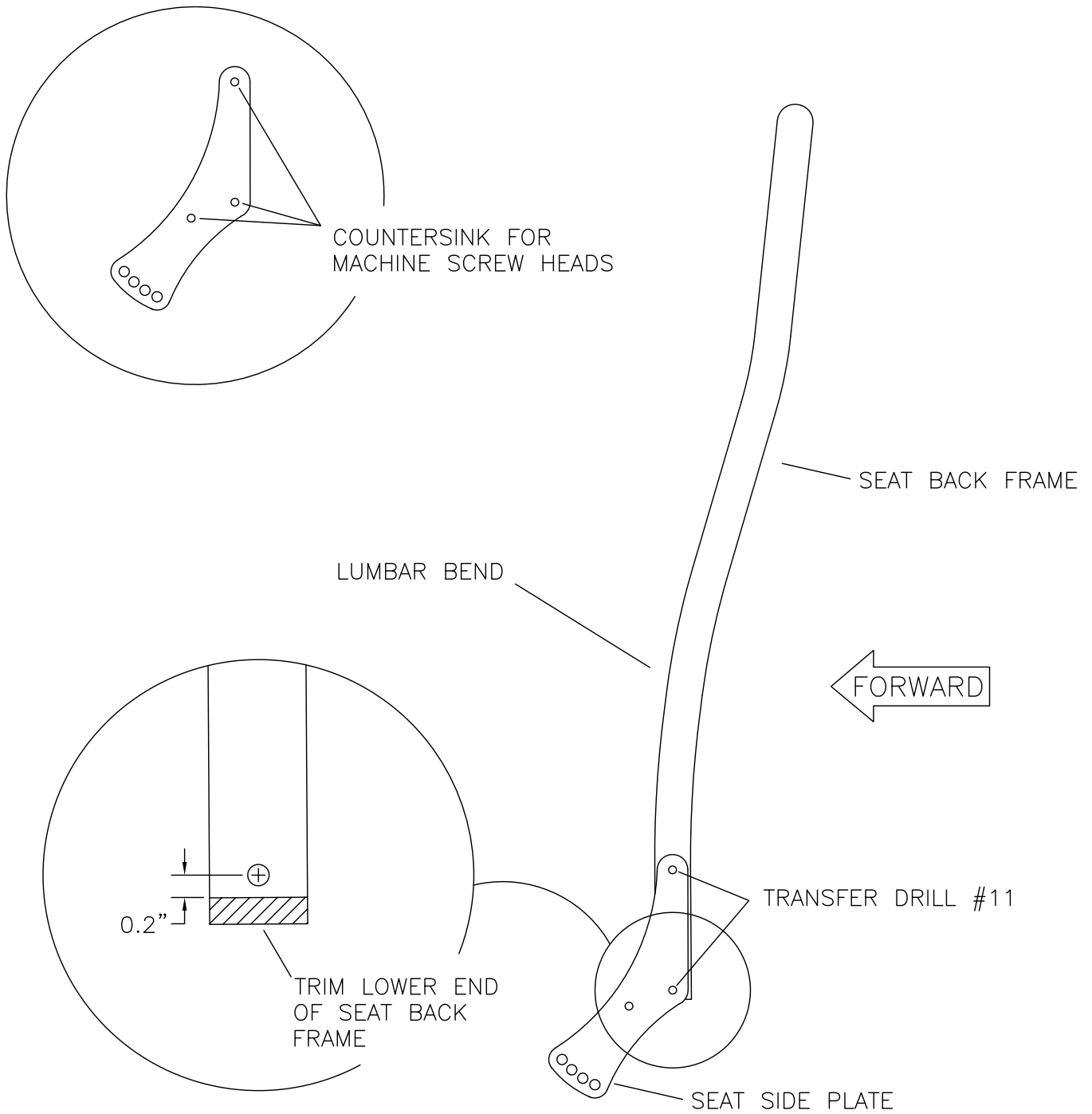


PROCEDURE BELOW MAY BE USED WHEN A RIVET-NUT PULLER IS NOT AVAILABLE.

1. FINGER TIGHTEN NUT AND RIVET-NUT ONTO SCREW.
2. INSERT RIVET-NUT INTO 1/4" HOLE.
3. TURN NUT 3 COMPLETE TURNS CLOCKWISE WHILE HOLDING SCREW STATIONARY.
4. BACK NUT OFF 1/2 TURN AND REMOVE SCREW.

RAMS S-21 OUTBOUND
RIVET-NUT INSTALLATION
FIGURE 09D-02

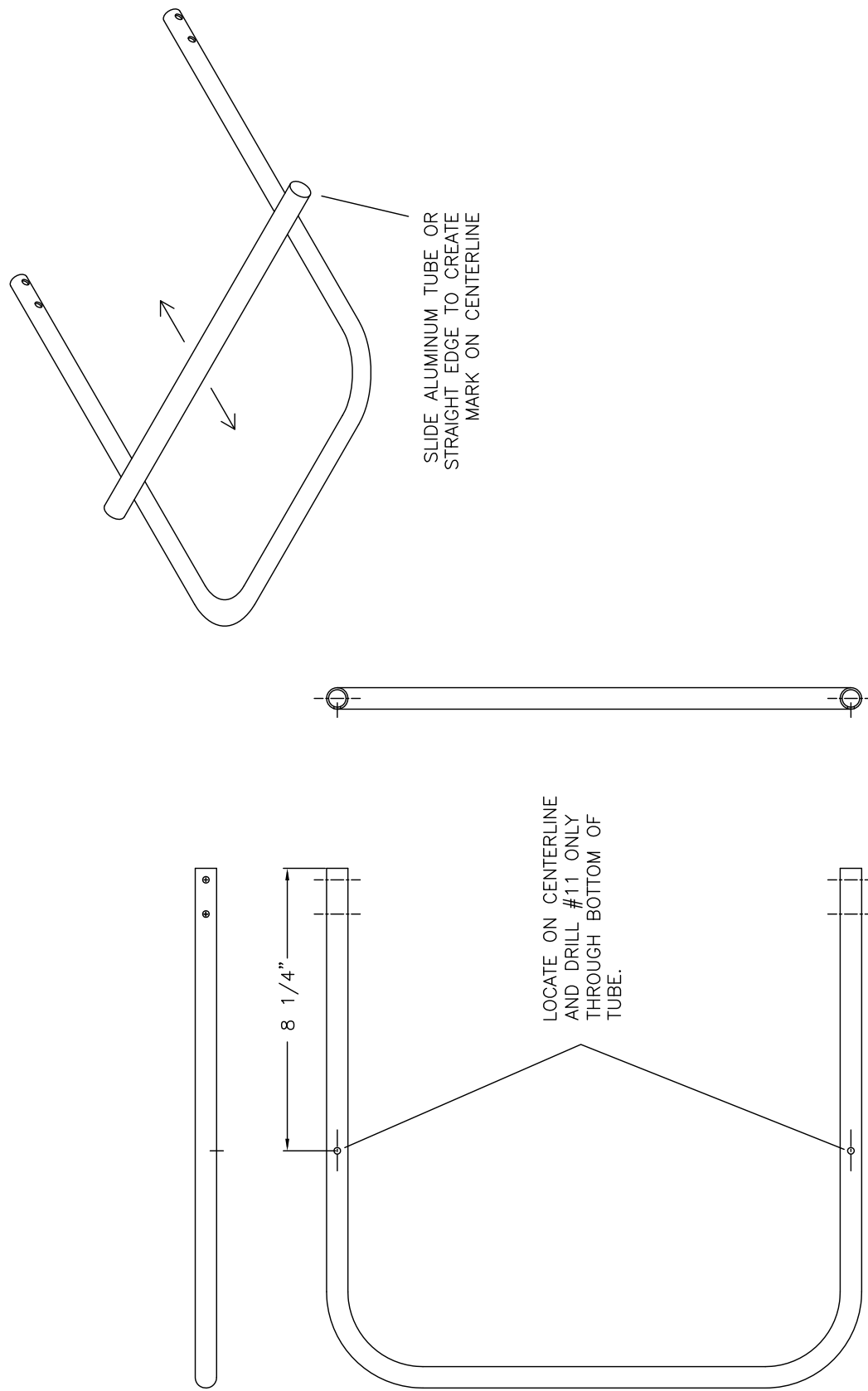
MD343
 REV. - ORIG



RANS S-21 OUTBOUND
SEAT BACK ORIENTATION
FIGURE 09D-04

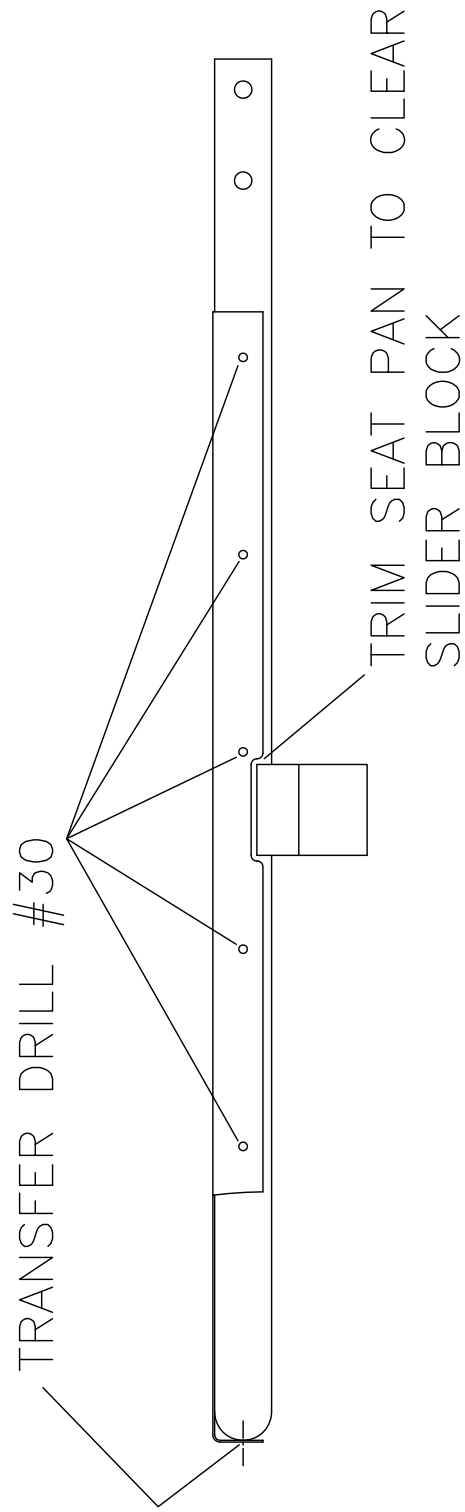
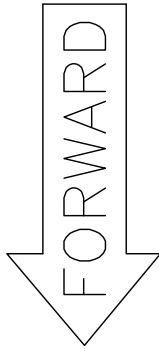
MD5534
 REV. - ORIG

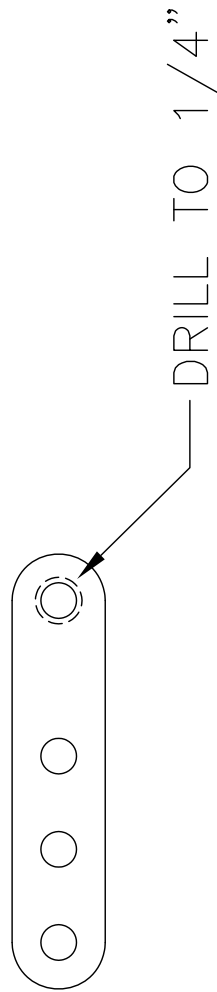
09/11/2018



MD5615
REV. - ORIG

RRR S-21 OUTBOUND **SLIDING SEAT BOTTOM FRAME MODIFICATION** **FIGURE 09D-05**

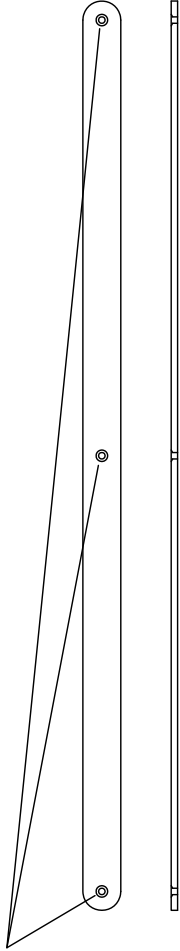




MD5614
REV. - ORIG

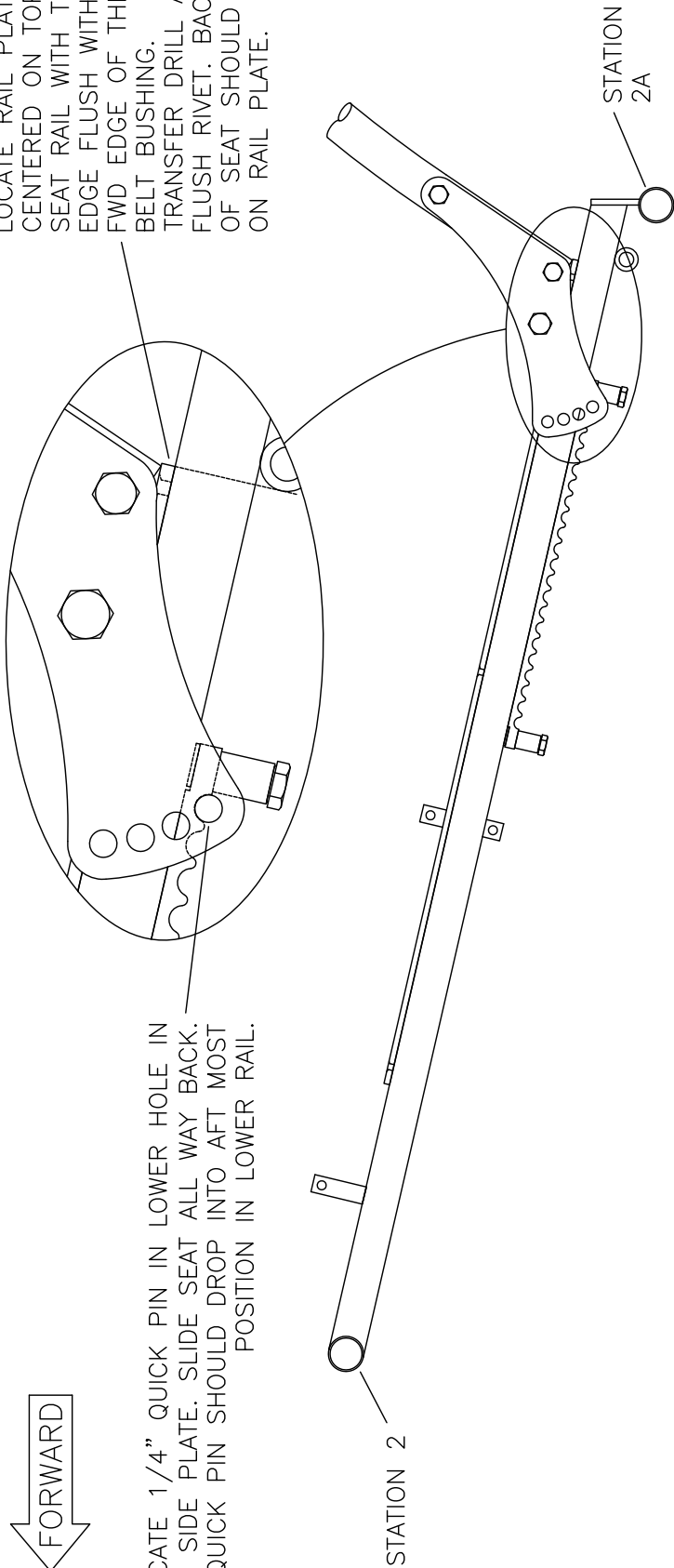
REVISIONS S-21 OUTBOUND
MULTI-HOLE TANG MODIFICATION
FIGURE 09D-08

COUNTER SINK (120°) TO ALLOW
FLUSH STAINLESS STEEL RIVETS TO
SET FLUSH WITH TOP SURFACE



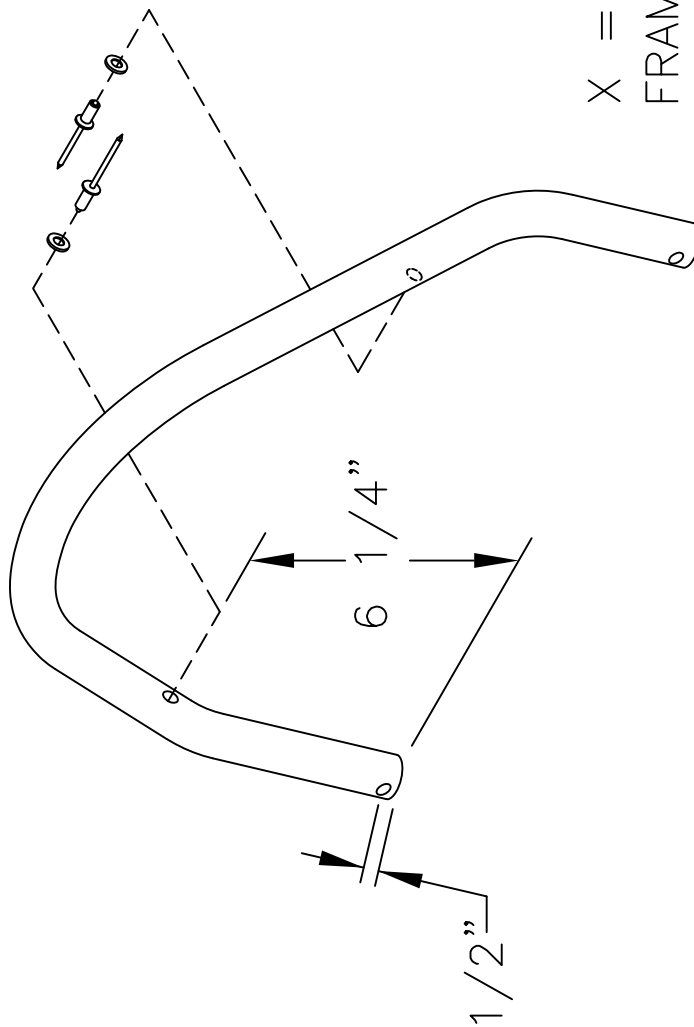
LOCATE 1/4" QUICK PIN IN LOWER HOLE IN
SIDE PLATE. SLIDE SEAT ALL WAY BACK.
QUICK PIN SHOULD DROP INTO AFT MOST
POSITION IN LOWER RAIL.

LOCATE RAIL PLATE
CENTERED ON TOP OF
SEAT RAIL WITH THE BACK
EDGE FLUSH WITH THE
FWD EDGE OF THE SEAT
BELT BUSHING.
TRANSFER DRILL AND
FLUSH RIVET. BACK EDGE
OF SEAT SHOULD REST
ON RAIL PLATE.



MD5615
REV. - ORIG

RAMS S-21 OUTBOUND
SLIDING SEAT RAIL PLATE LOCATION
FIGURE 09D-12



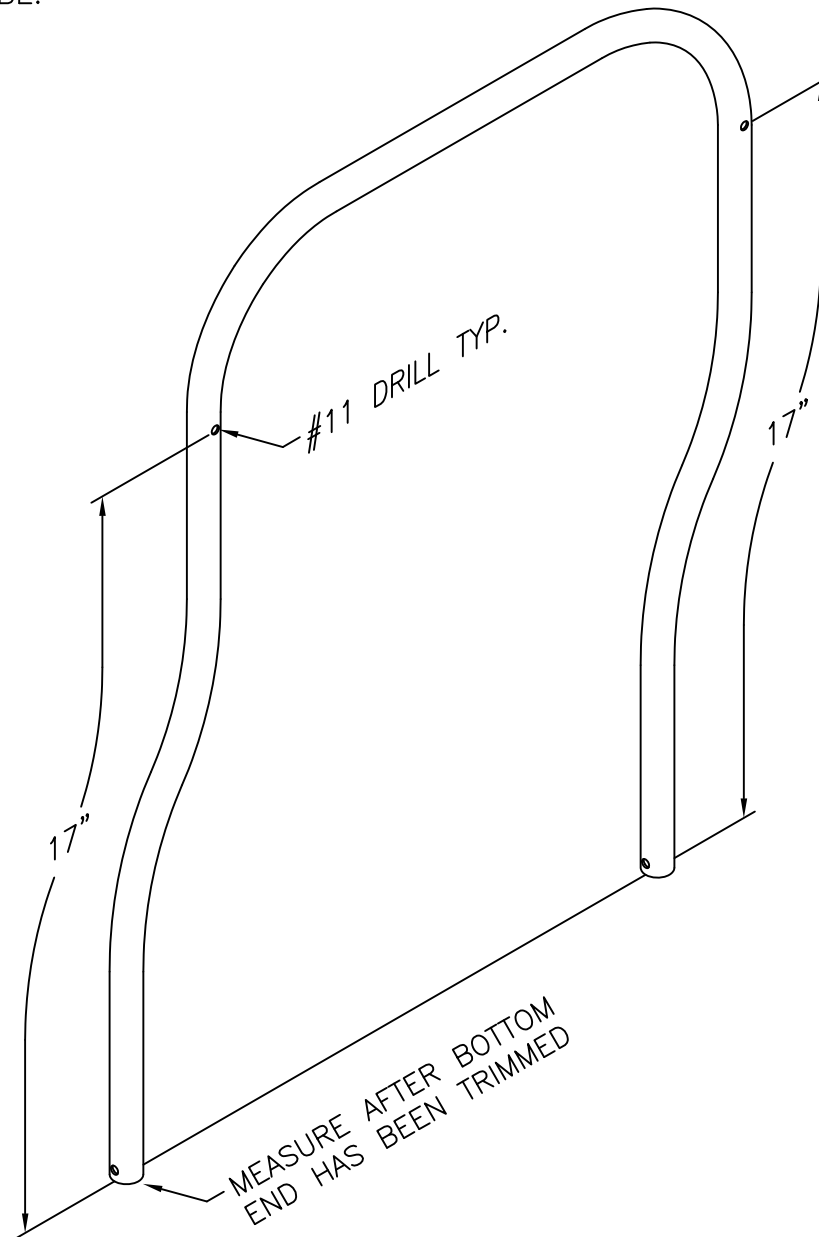
X = WIDTH OF HEADREST
FRAME AT RIVET (BUTTON)
LOCATION AFTER
INSTALLATION ON SEAT BACK.

RRR S-21 OUTBOUND
OPTIONAL HEADREST - DRILLING
FIGURE 09D-24

MD5109
REV. - ORIG



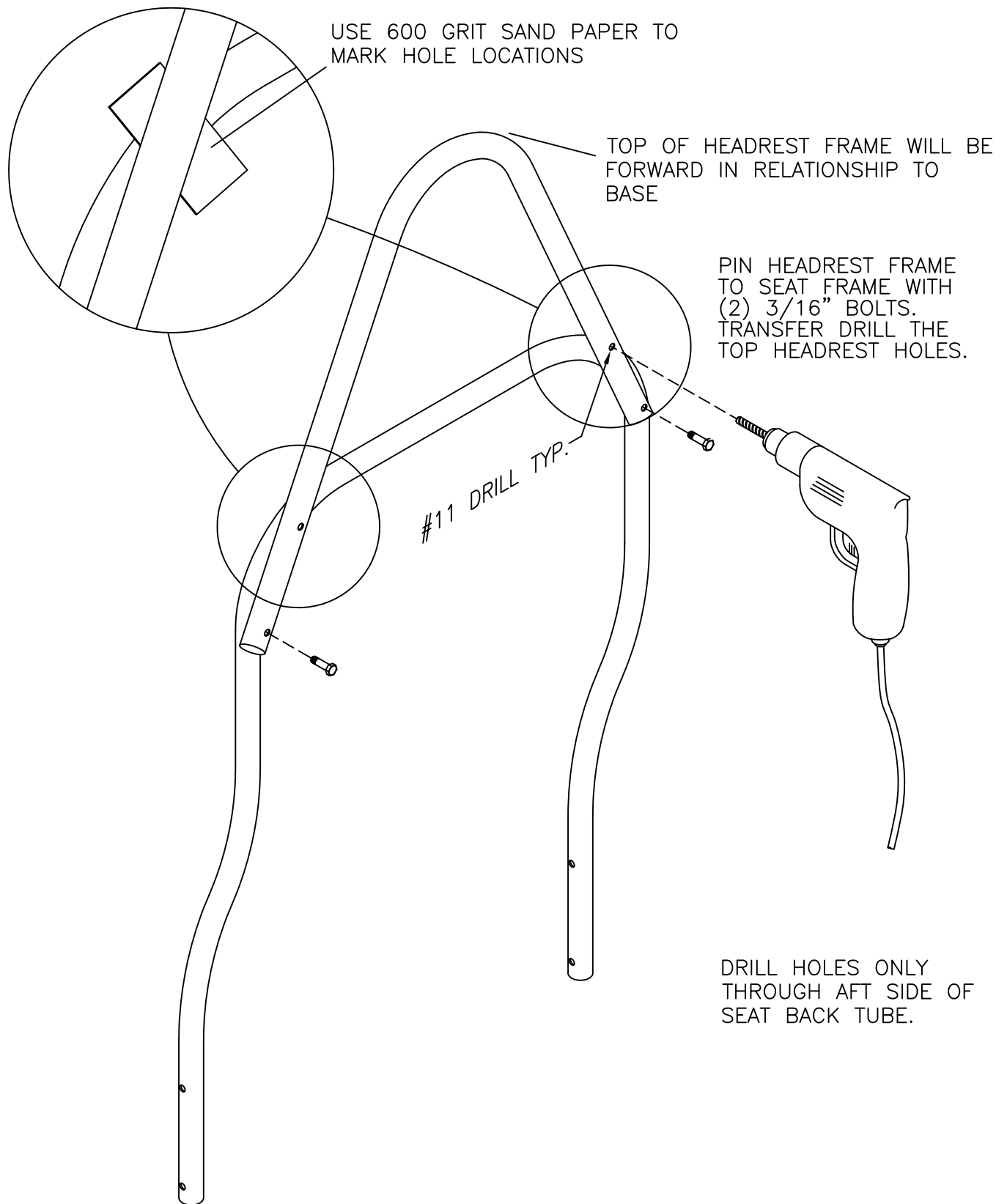
DRILL HOLES ONLY
THROUGH AFT SIDE OF
TUBE.



**RANS S-21 OUTBOUND
SEAT BACK FRAME DRILLING
FIGURE 09D-25**

MD5109
REV. — ORIG

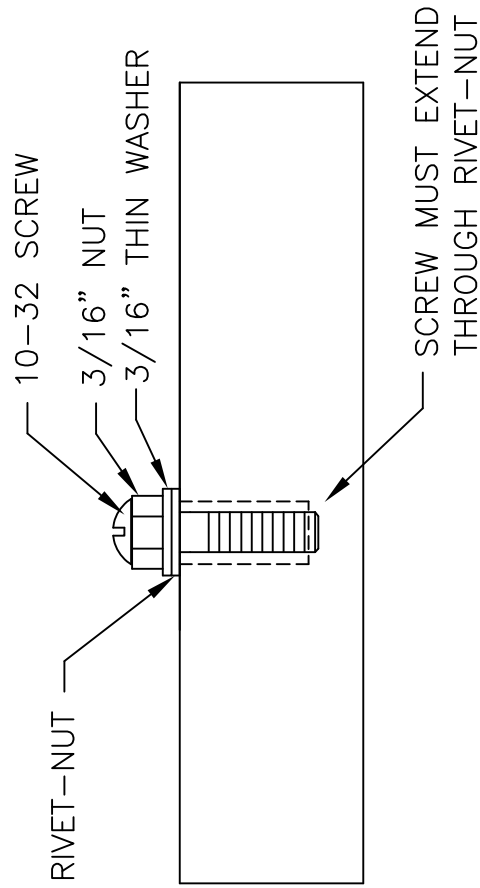
09/11/2018



RANS S-21OUTBOUND
SEAT HEADREST TO SEAT BACK FRAME DRILLING
FIGURE 09D-26

MD5109
 REV. - ORIG

09/11/2018



PROCEDURE BELOW MAY BE USED WHEN A RIVET-NUT PULLER IS NOT AVAILABLE.

1. FINGER TIGHTEN NUT AND RIVET-NUT ONTO SCREW.
2. INSERT RIVET-NUT INTO 1/4" HOLE.
3. TURN NUT 3 COMPLETE TURNS CLOCKWISE WHILE HOLDING SCREW STATIONARY.
4. BACK NUT OFF 1/2 TURN AND REMOVE SCREW.

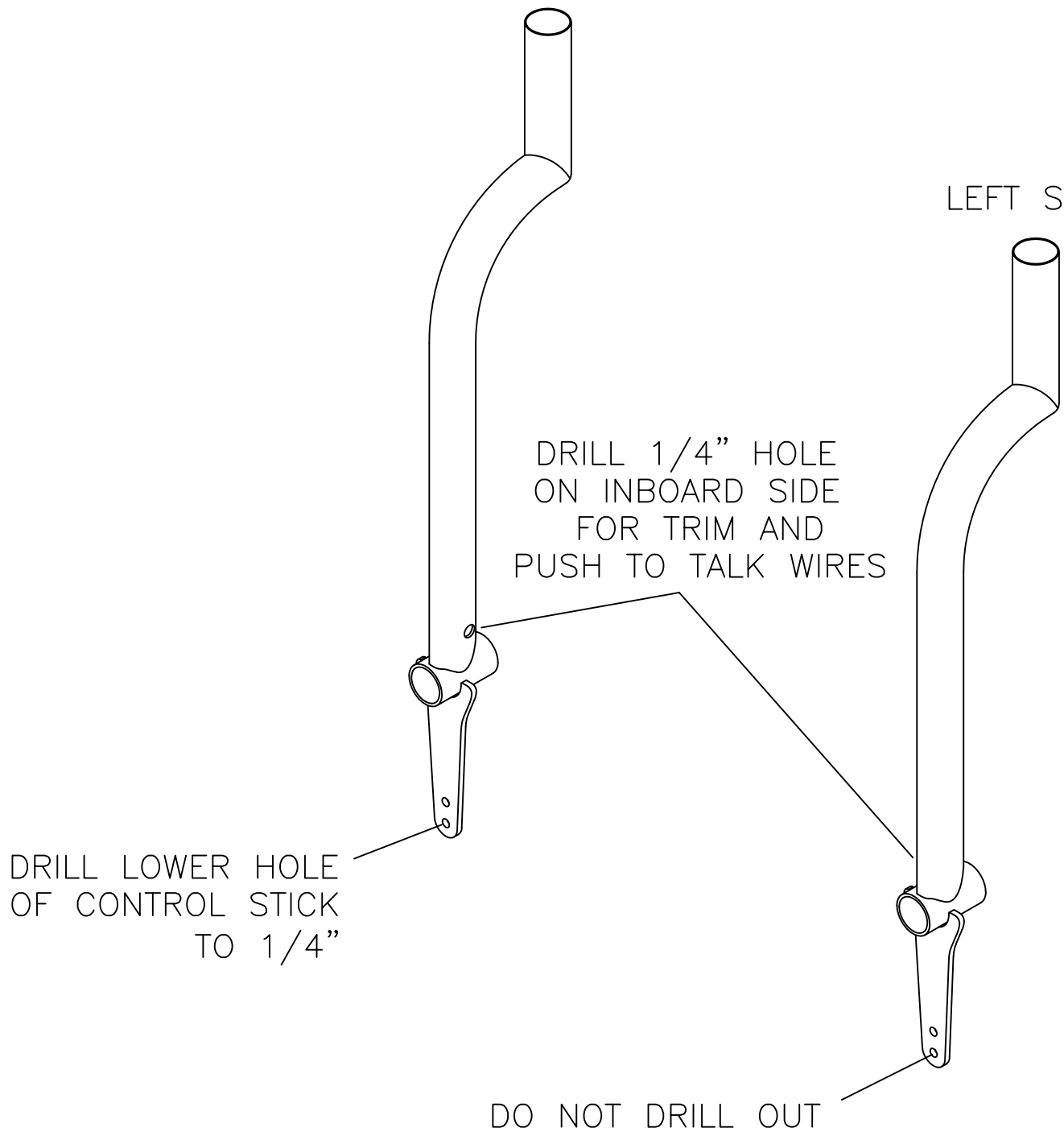
S-21 OUTBOUND RIVET-NUT INSTALLATION

FIGURE 09D-27

MD343
REV. - ORIG

RIGHT SIDE

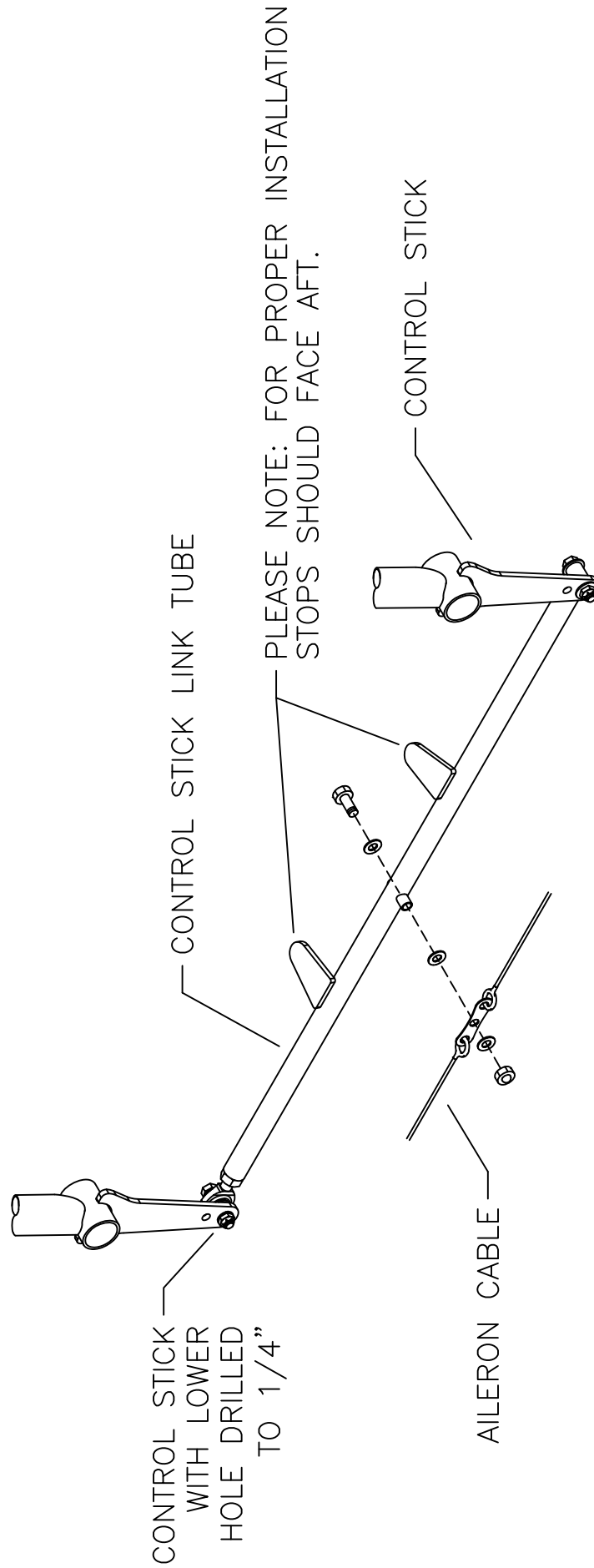
LEFT SIDE



MD510
REV. - ORIG

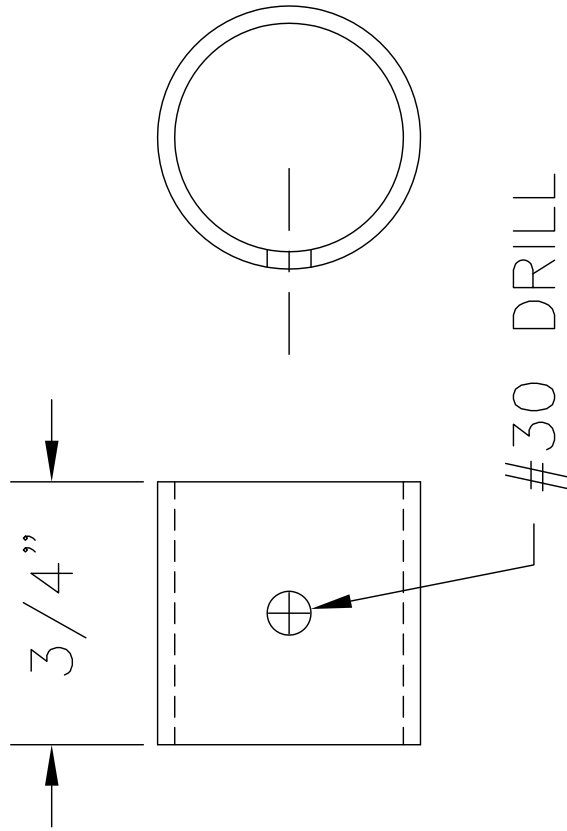
**RANS S-21 OUTBOUND
CONTROL STICK MODIFICATION
FIGURE 10-02**

09/11/2018



MD510
REV. - ORIG

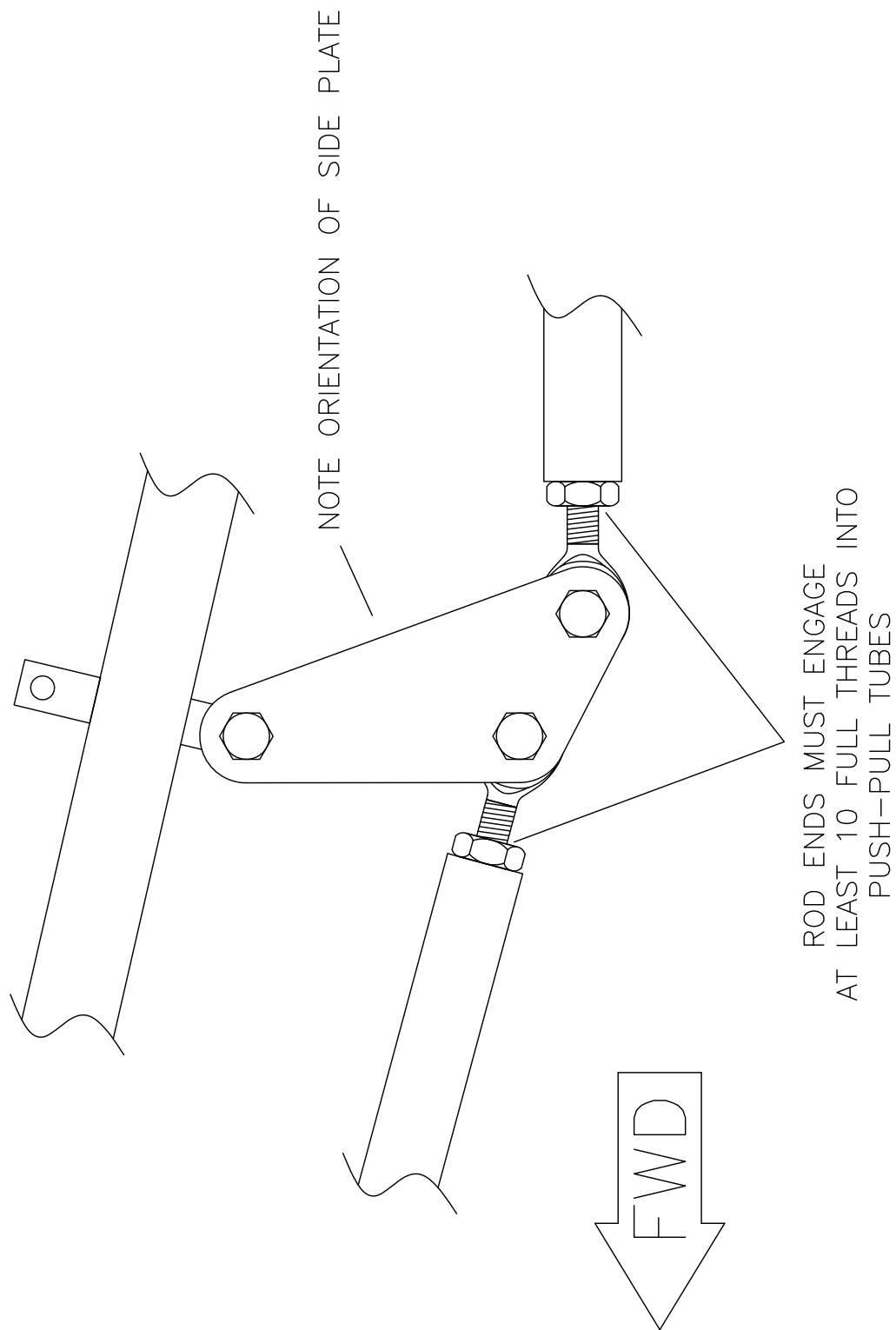
**S-21 OUTBOUND
CONTROL STICK LINK TUBE**
FIGURE 10-05



FABRICATE QTY: 2

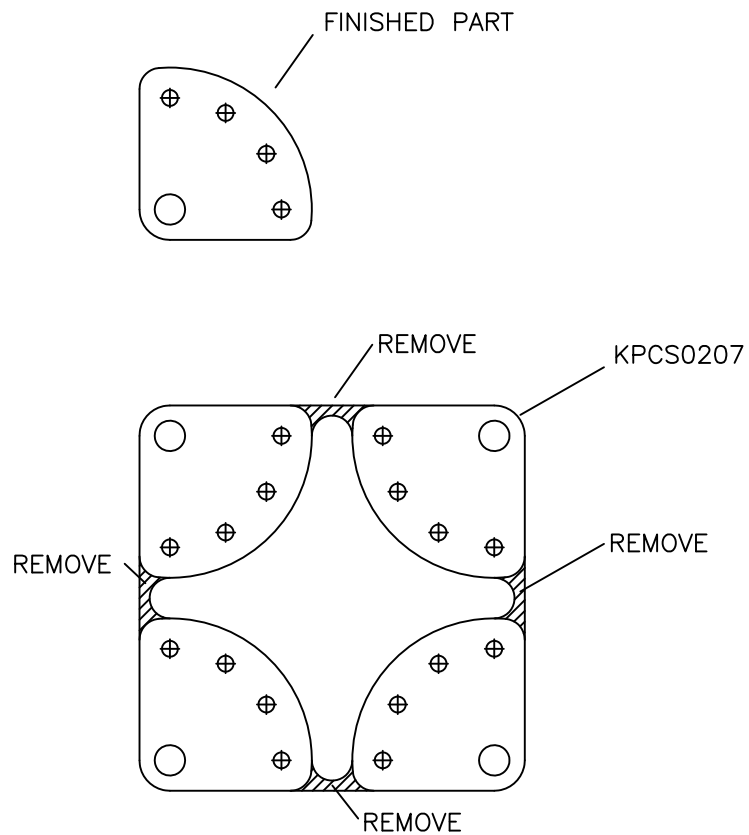
MD3650
REV. - ORIG

RRR S-21 OUTBOUND
ALUMINUM STOP SLEEVE FABRICATION
FIGURE 10A-02



MD3650
REV. - ORIG

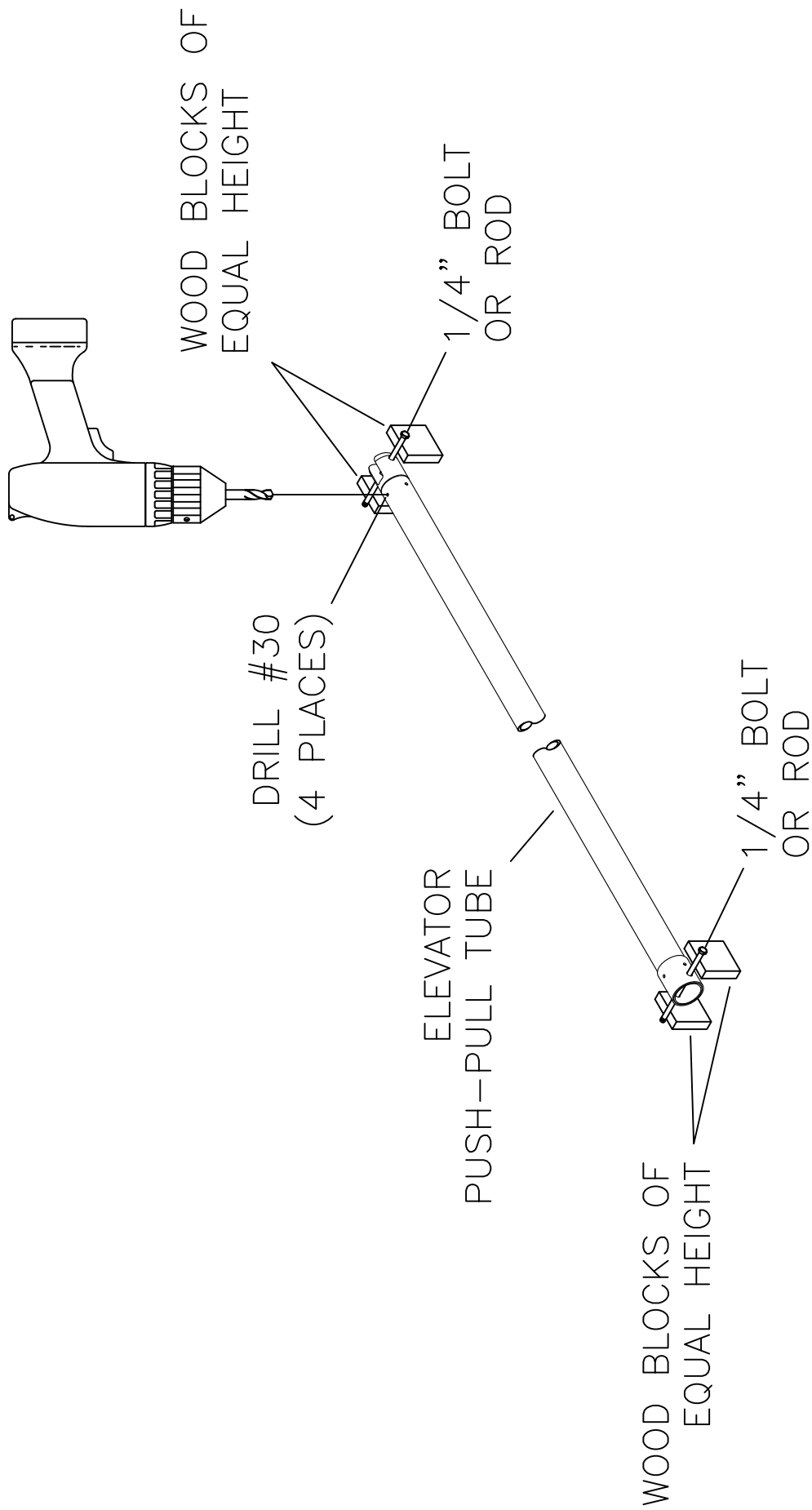
**RRMS S-21 OUTBOUND
SIDE PLATE INSTALLATION**
FIGURE 10A-03



REMOVE SHADED AREA, MAKES 4 PARTS

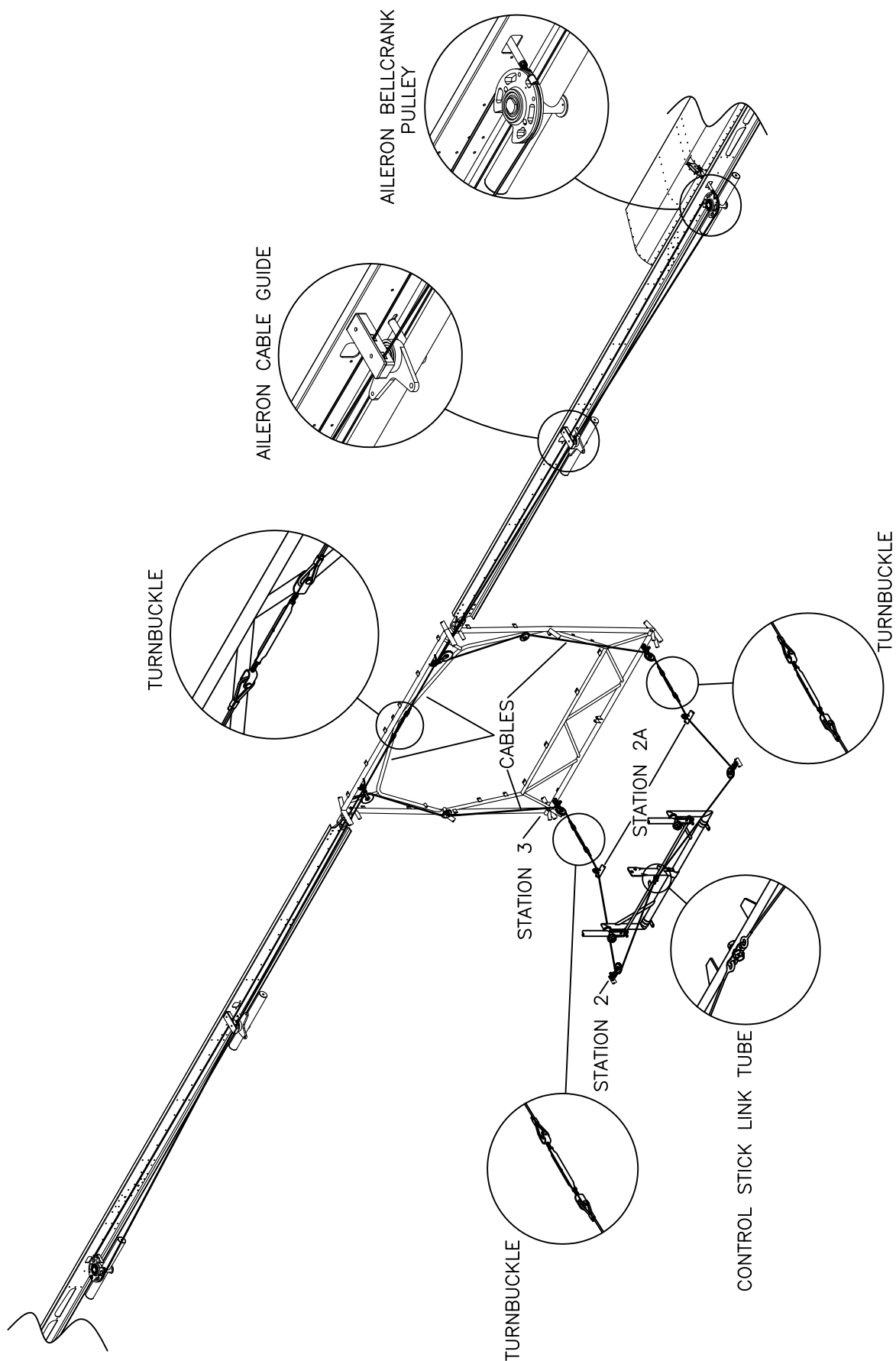
MD4390
REV. — ORIG

RANS S-21 OUTBOUND CABLE KEEPER MODIFICATION FIGURE 10A-05



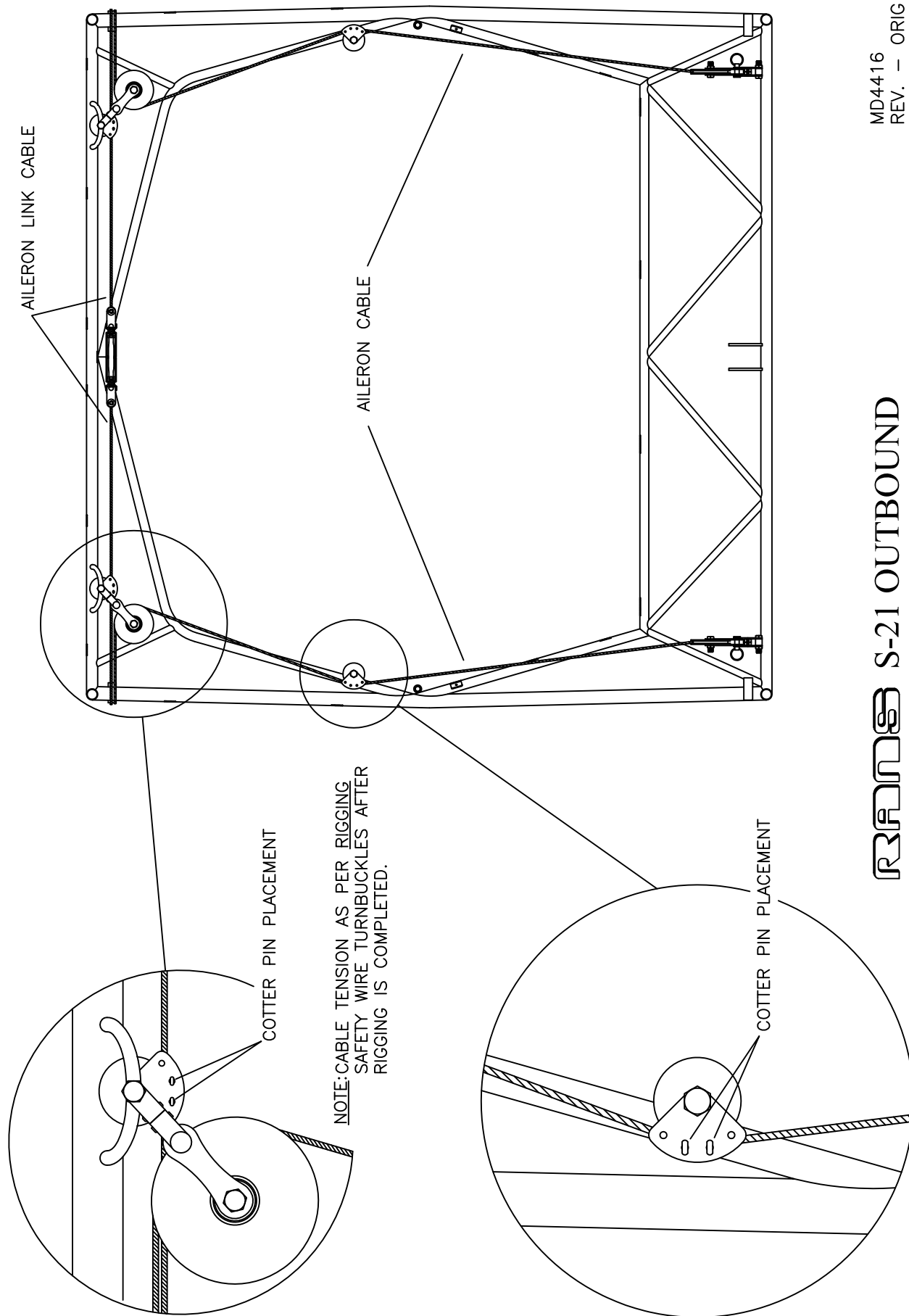
MD565
REV. - ORIG

RRR S-21 OUTBOUND
ELEVATOR PUSH-PULL TUBE FITTING ORIENTATION
FIGURE 10B-04



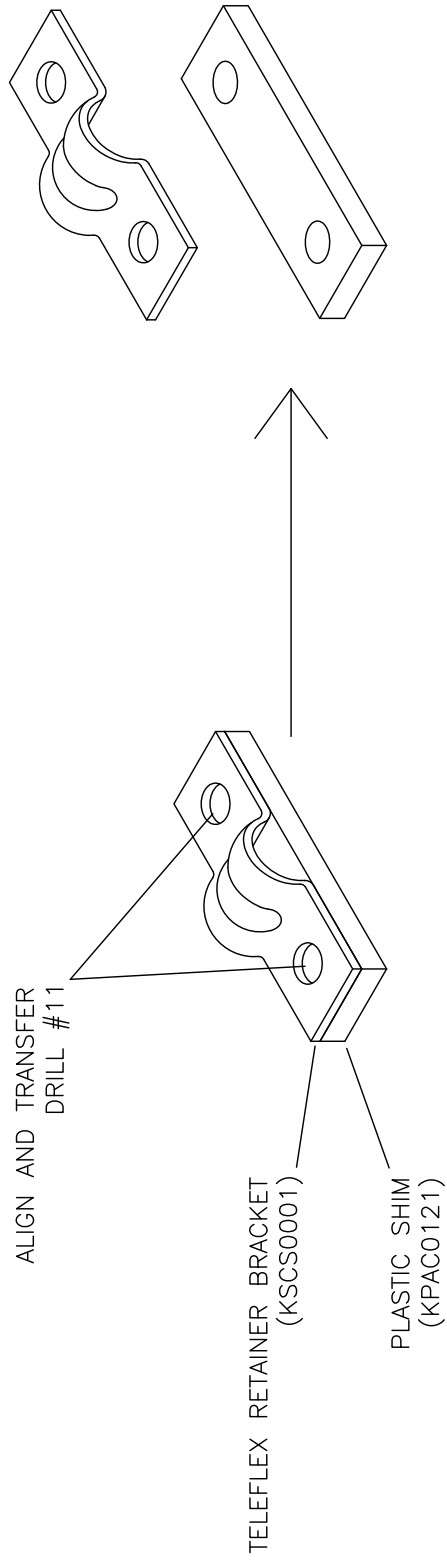
MD4415
REV. - ORIG

RRM S-21 OUTBOUND
AILERON CONTROL SYSTEM OVERVIEW
FIGURE 10C-06



MD4416
REV. - ORIG

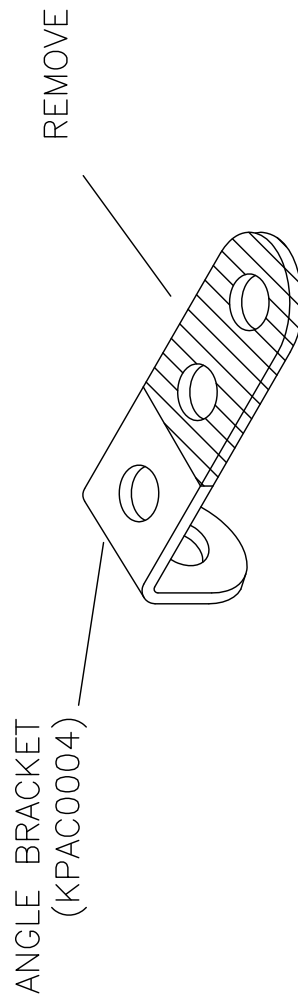
RAVEN S-21 OUTBOUND
AILERON CONTROL SYSTEM - STATION 3
FIGURE 10C-07



MODIFY 2 PLASTIC SHIMS

MD5617
REV. - ORIG

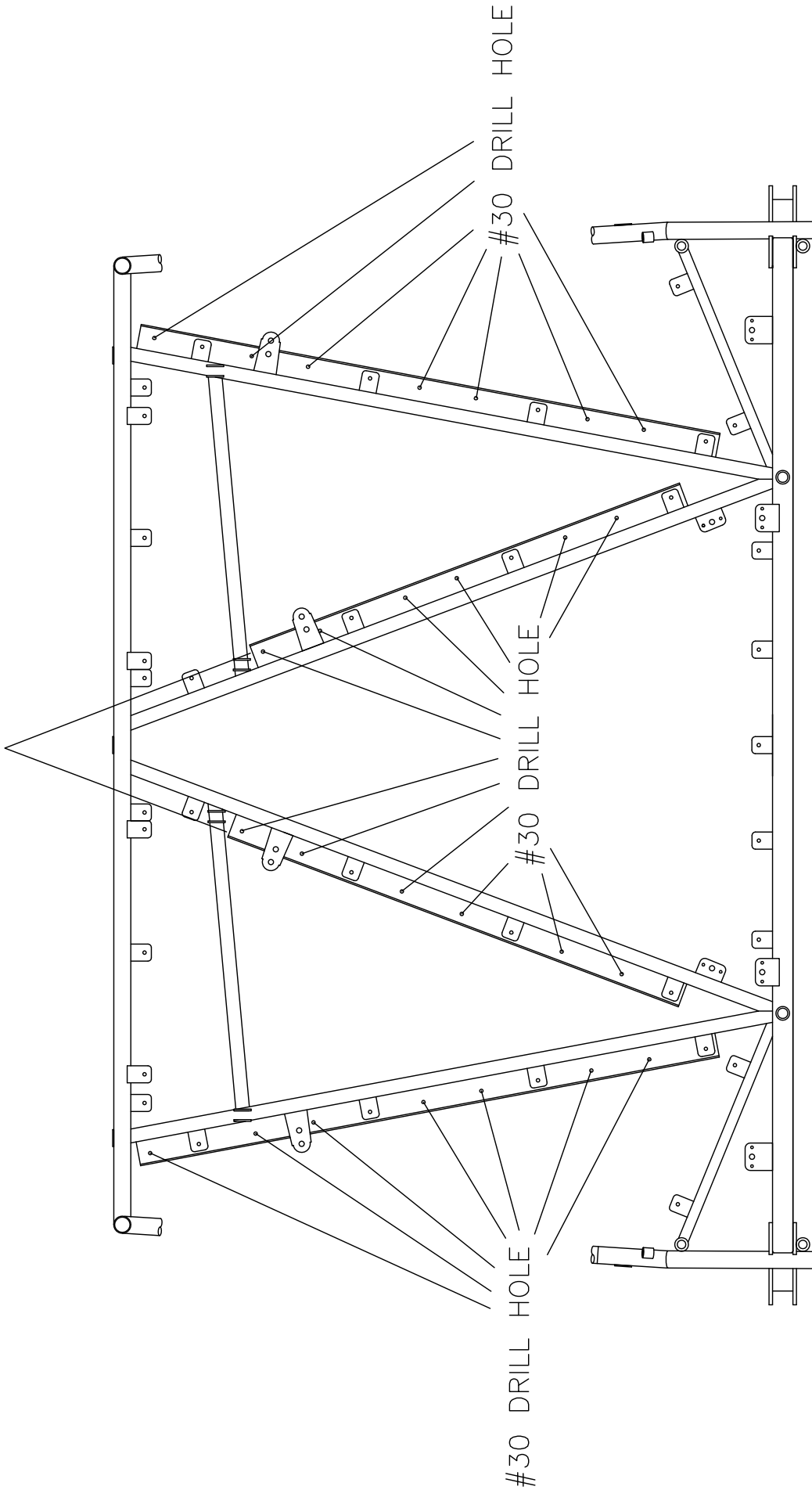
RRF S-21 OUTBOUND
FLAP LEVER PLASTIC SHIM MODIFICATION
FIGURE 10D-08



MD5617
REV. - ORIG

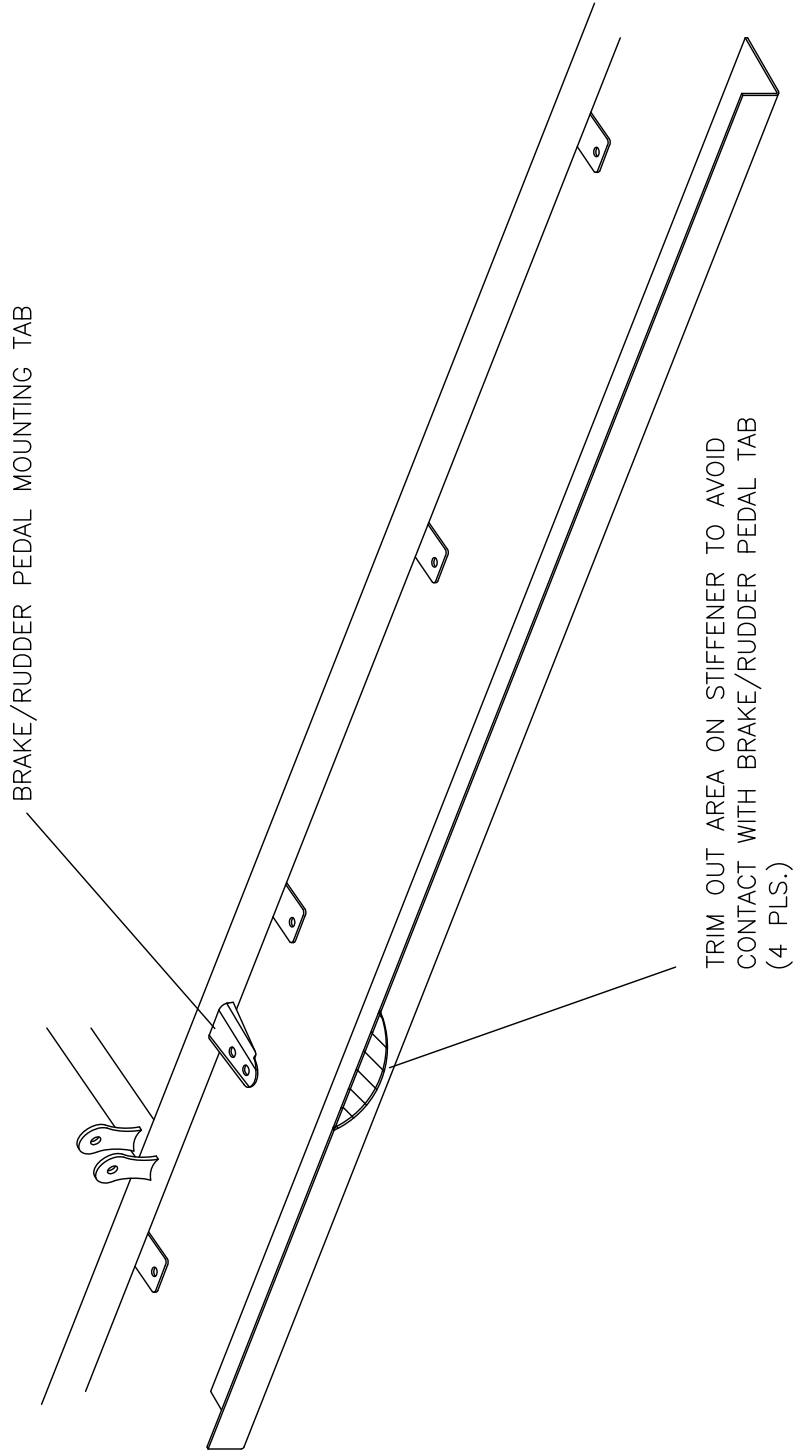
RRMS S-21 OUTBOUND
ANGLE BRACKET MODIFICATION
FIGURE 10D-09

TRIM STIFFENER LENGTH TO
CLEAR FUSELAGE TUBES



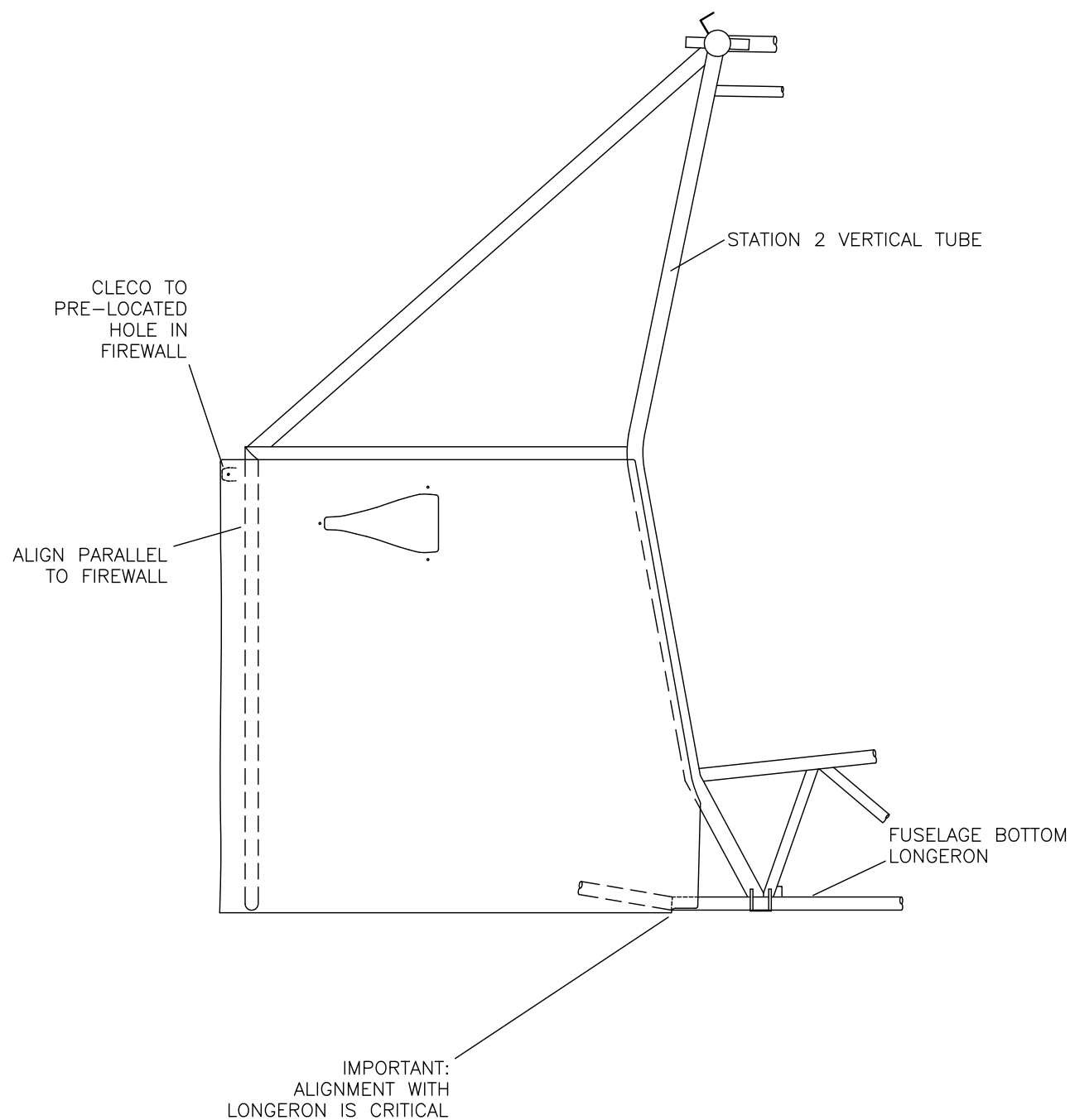
MD5606
REV. - ORIG

RAMS S-21 OUTBOUND
BOOT COWL STIFFENER LOCATION
FIGURE 10E-07



MD5605
REV. - ORIG

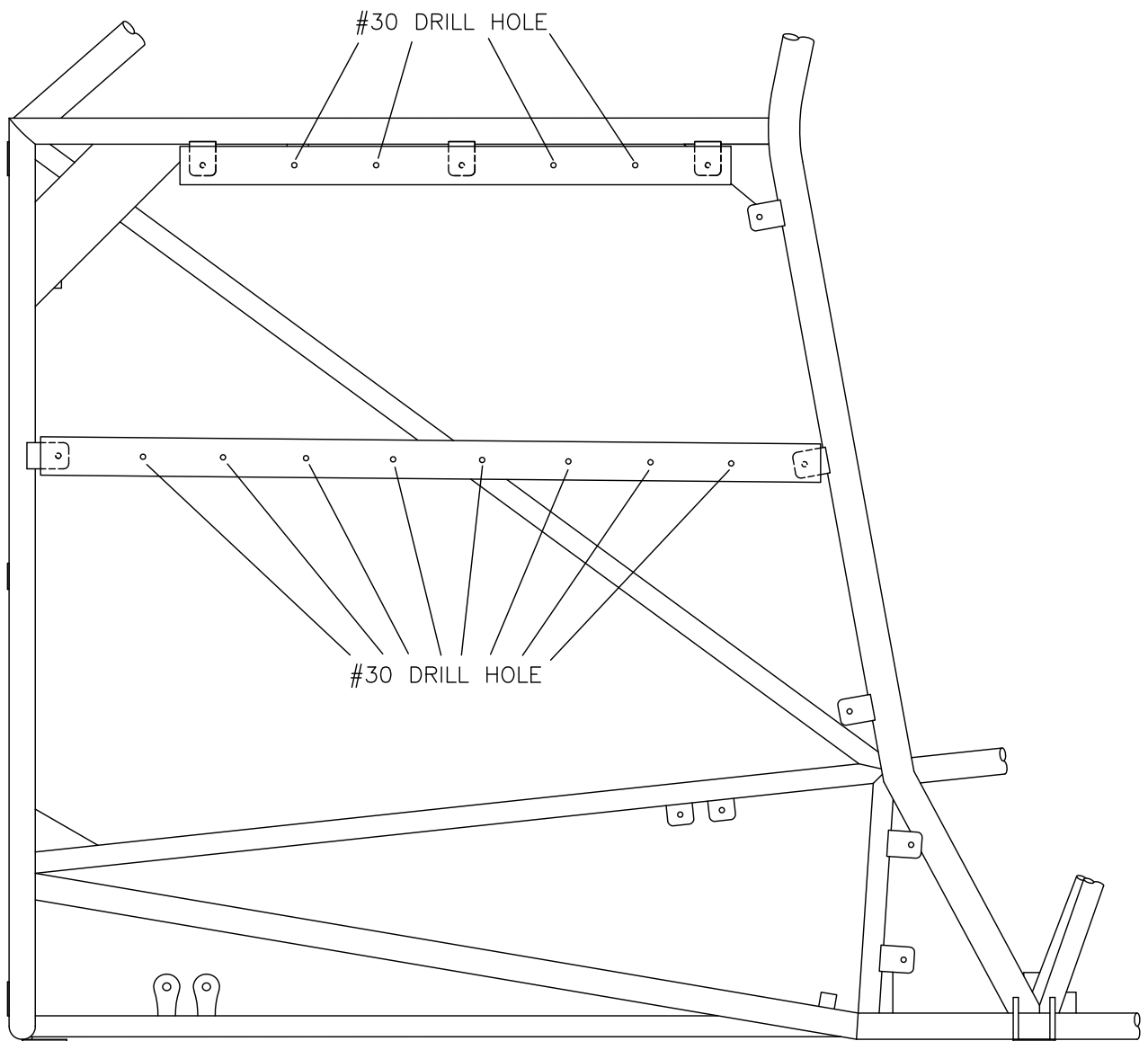
**RAMS S-21 OUTBOUND
BOOT COWL STIFFENER TRIMMING
FIGURE 10E-08**



MD5607
REV. — ORIG

**RANS S-21 OUTBOUND
SIDE BOOT COWL INSTALLATION
FIGURE 10E-11**

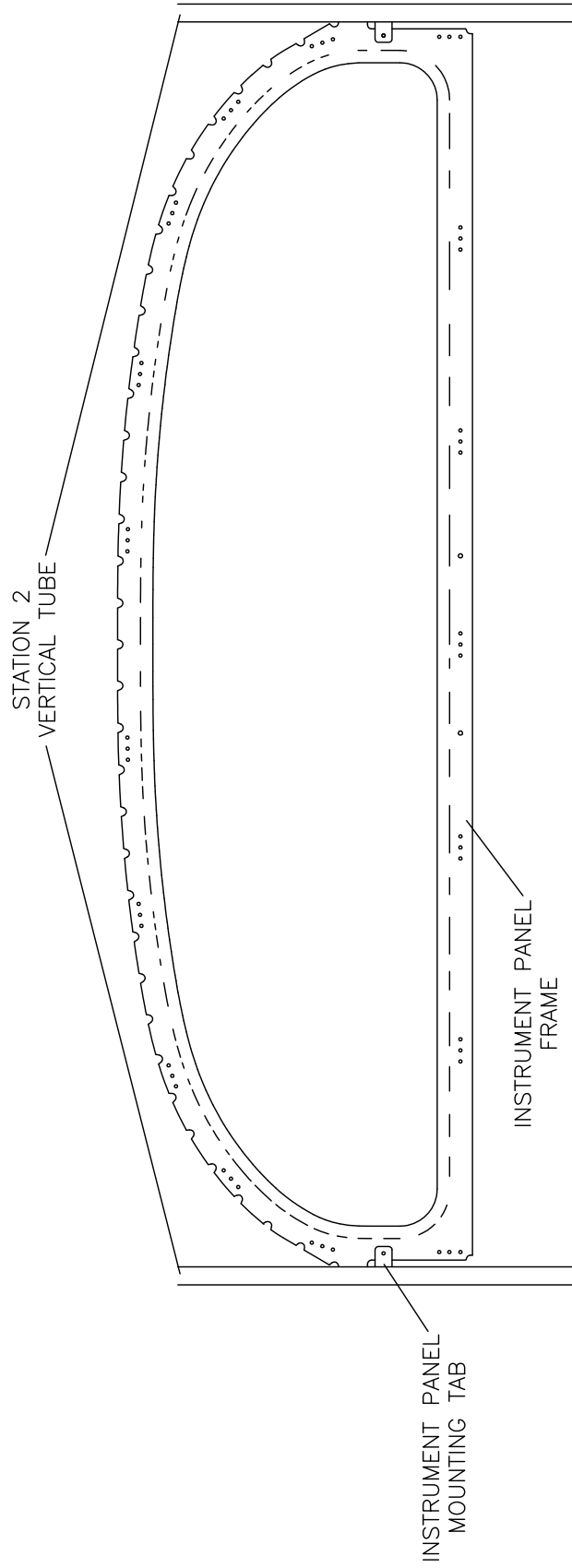
09/11/2018



MD5608
REV. — ORIG

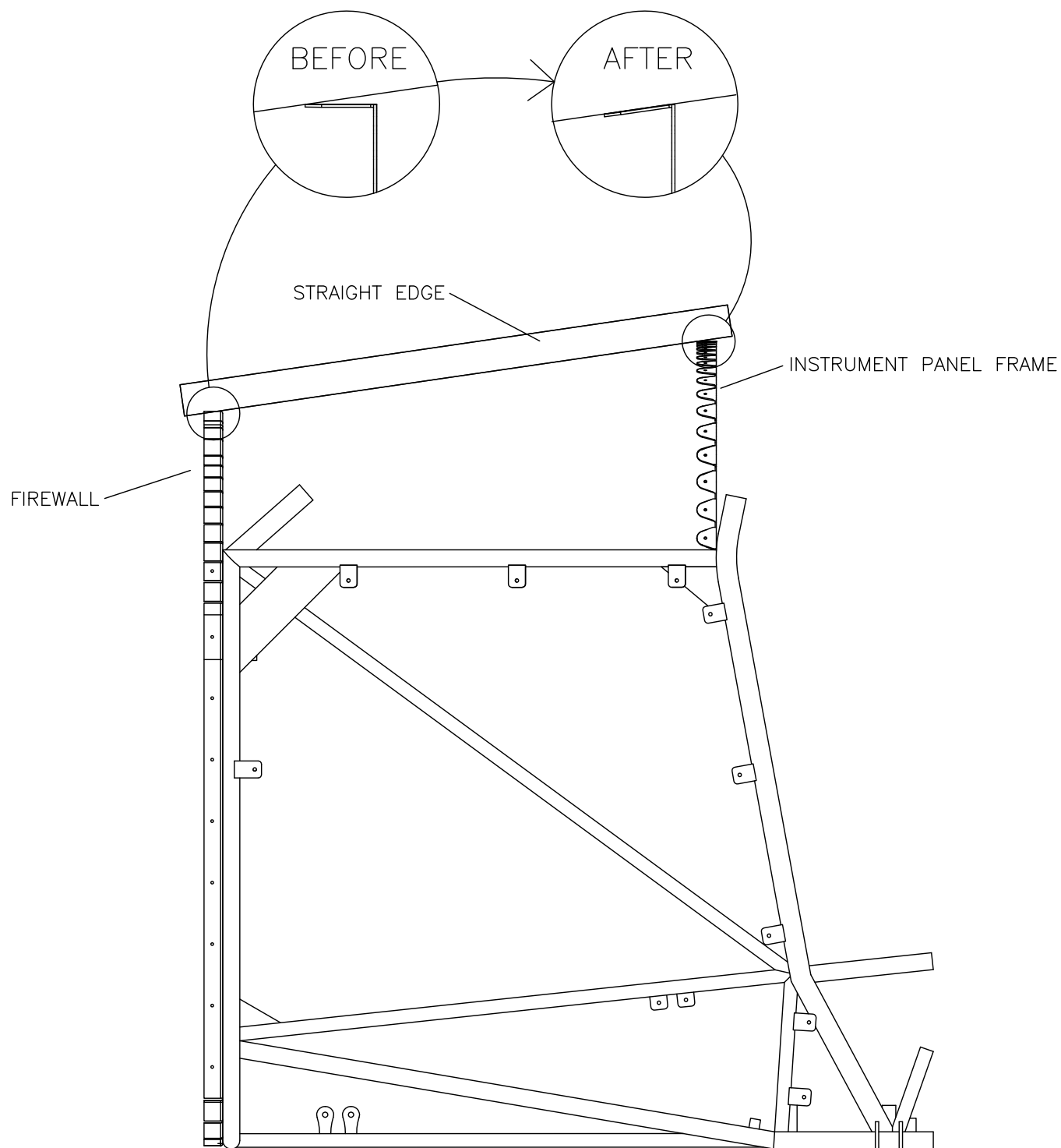
**RANS S-21 OUTBOUND
SIDE BOOT COWL STIFFENER LOCATION
FIGURE 10E-13**

09/11/2018



MD5609
REV. - ORIG

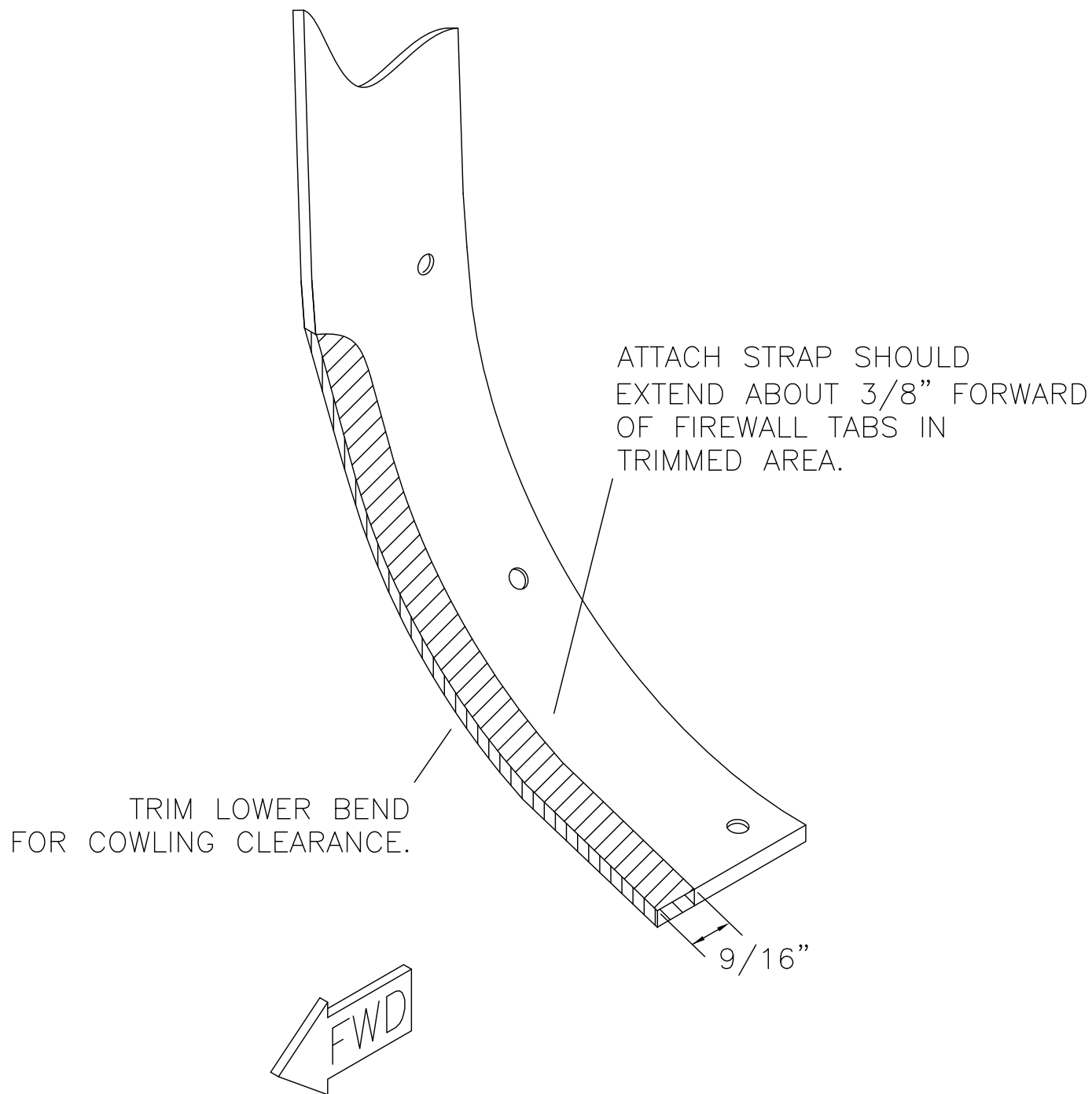
RRMS S-21 OUTBOUND
INSTRUMENT PANEL INSTALLATION - BOOT COWL
FIGURE 10E-18



MD5610
REV. — ORIG

**RANS S-21 OUTBOUND
TAB ALIGNMENT
FIGURE 10E-19**

09/11/2018



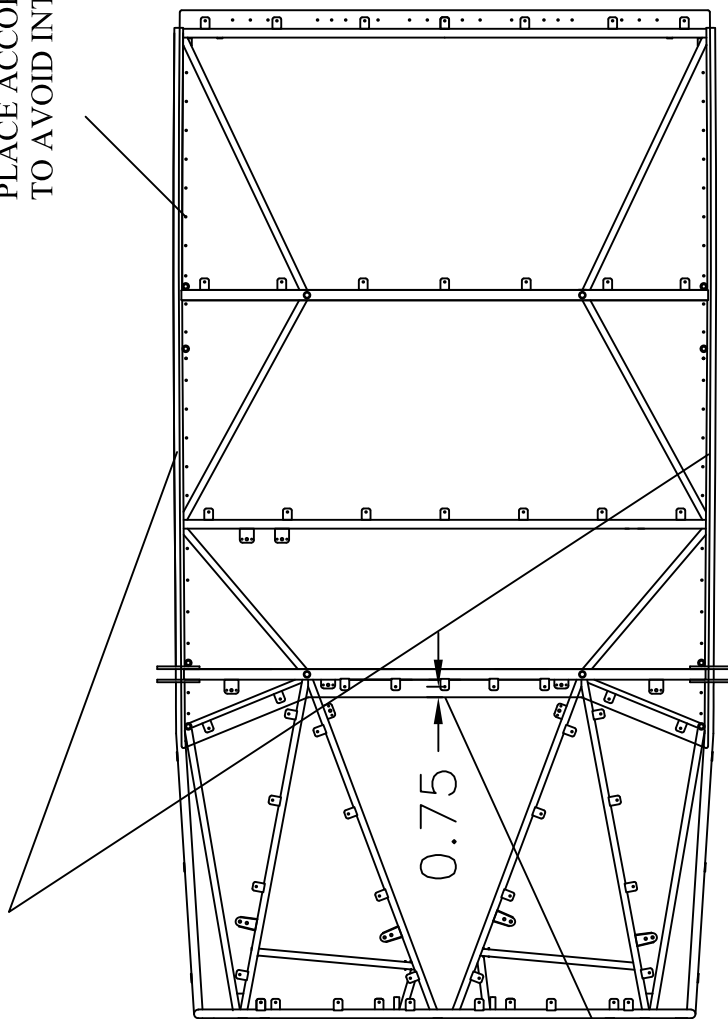
MD5611
REV. — ORIG

**RANS S-21 OUTBOUND
COWLING ATTACH STRAP TRIMMING
FIGURE 10E-29**

09/11/2018

LOCATE AND DRILL #30
2" SPACING THROUGH SIDE SKINS
PLACE ACCORDINGLY
TO AVOID INTERFERENCE

CENTER BETWEEN SIDE TUBES

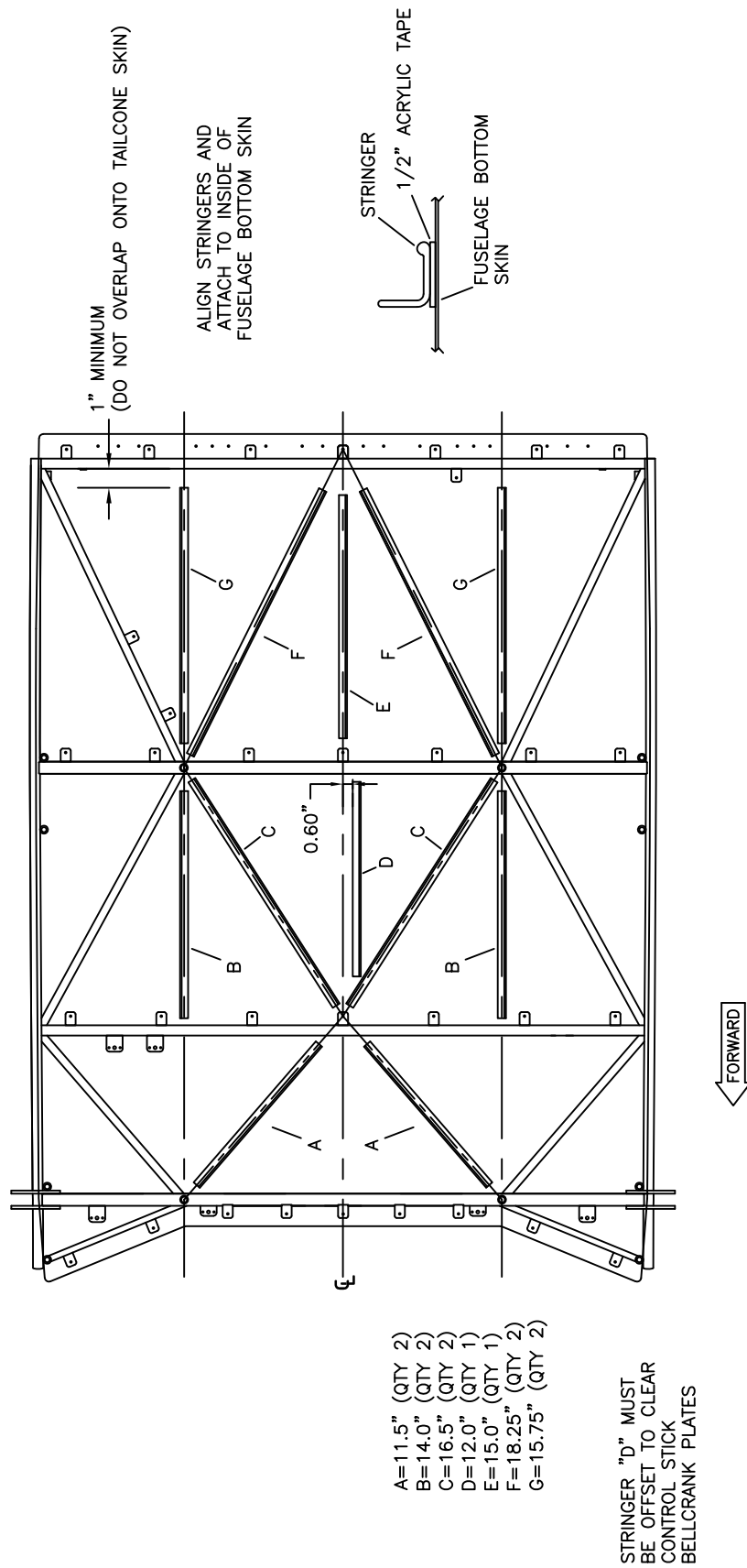


POSITION FORWARD EDGE
3/4" FORWARD OF
CENTER TAB HOLE



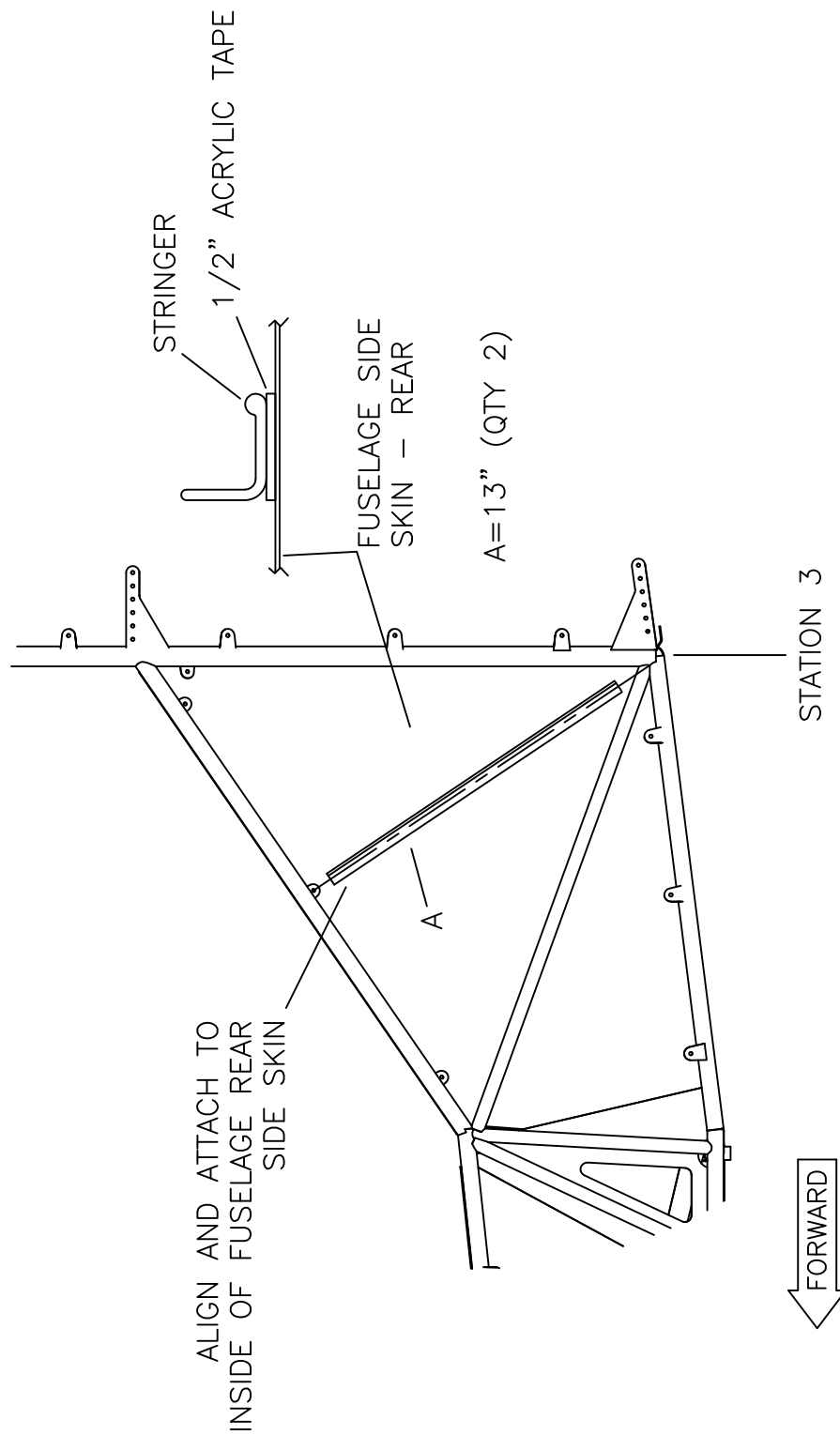
MD5654
REV. A

RRMS S-21 OUTBOUND
FUSELAGE BOTTOM SKIN ORIENTATION
FIGURE 10E-30



RAMS S-21 OUTBOUND
FUSELAGE BOTTOM SKIN STRINGER LOCATION
FIGURE 10E-30A

MD5654
 REV. - ORIG

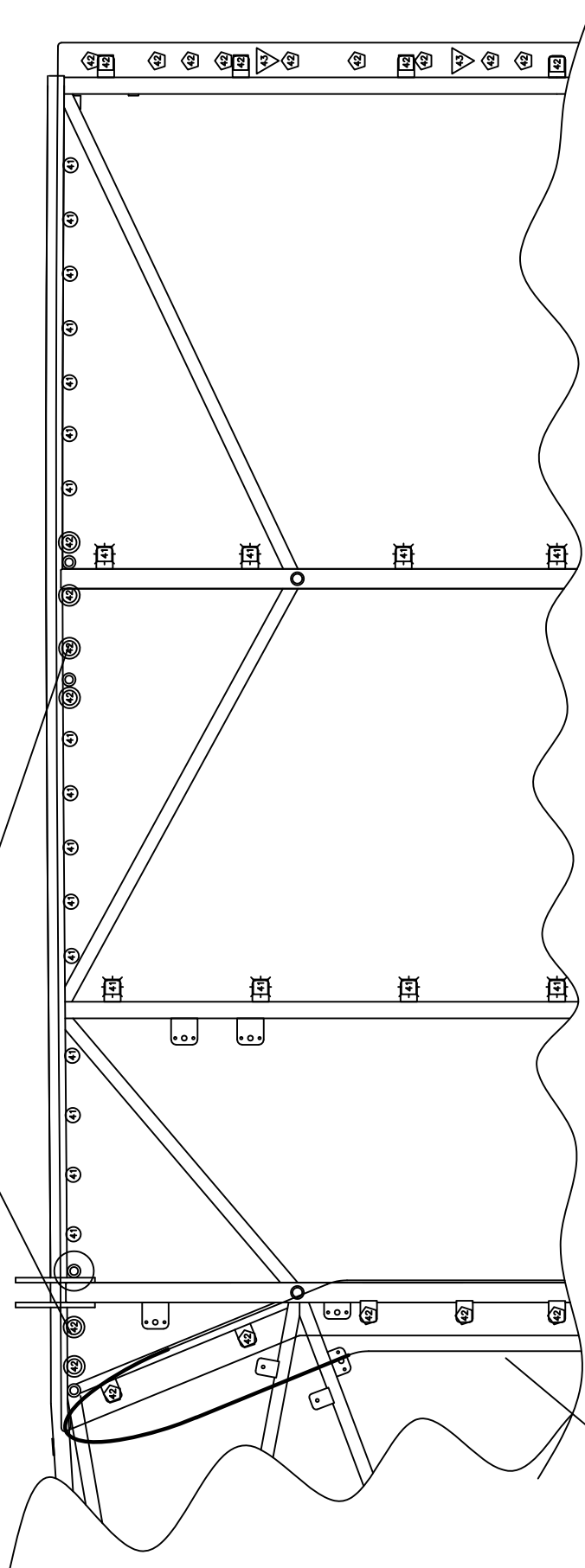


RRF S-21 OUTBOUND
FUSELAGE REAR SIDE SKIN STRINGER
FIGURE 10E-30B

MD5654
 REV. - ORIG

FLUSH RIVETS REQUIRED UNDER
TOP MAIN GEAR CLAMP PLATE LOCATIONS

ONLY LOWER RH SIDE
SHOWN FOR CLARITY



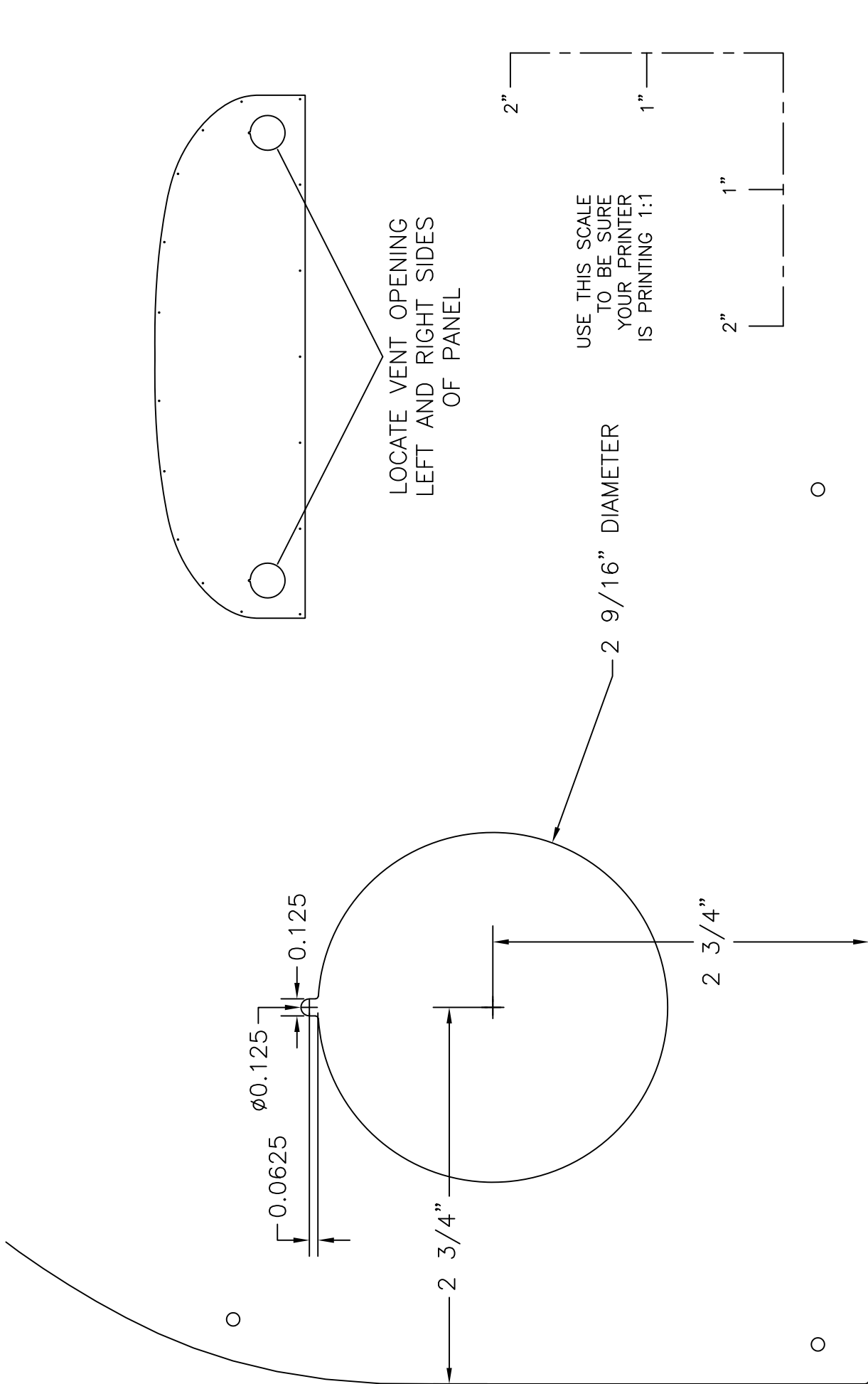
CCPQ-41	CCPQ-42	AAPQ-41	AAPQ-42	AAPQ-43	AACQ-42
---------	---------	---------	---------	---------	---------

DO NOT RIVET FORWARD EDGE
UNTIL BOOT COWL INSTALLATION



RAMS S-21 OUTBOUND
FUSELAGE BOTTOM SKIN RIVET SCHEDULE
FIGURE 10E-31

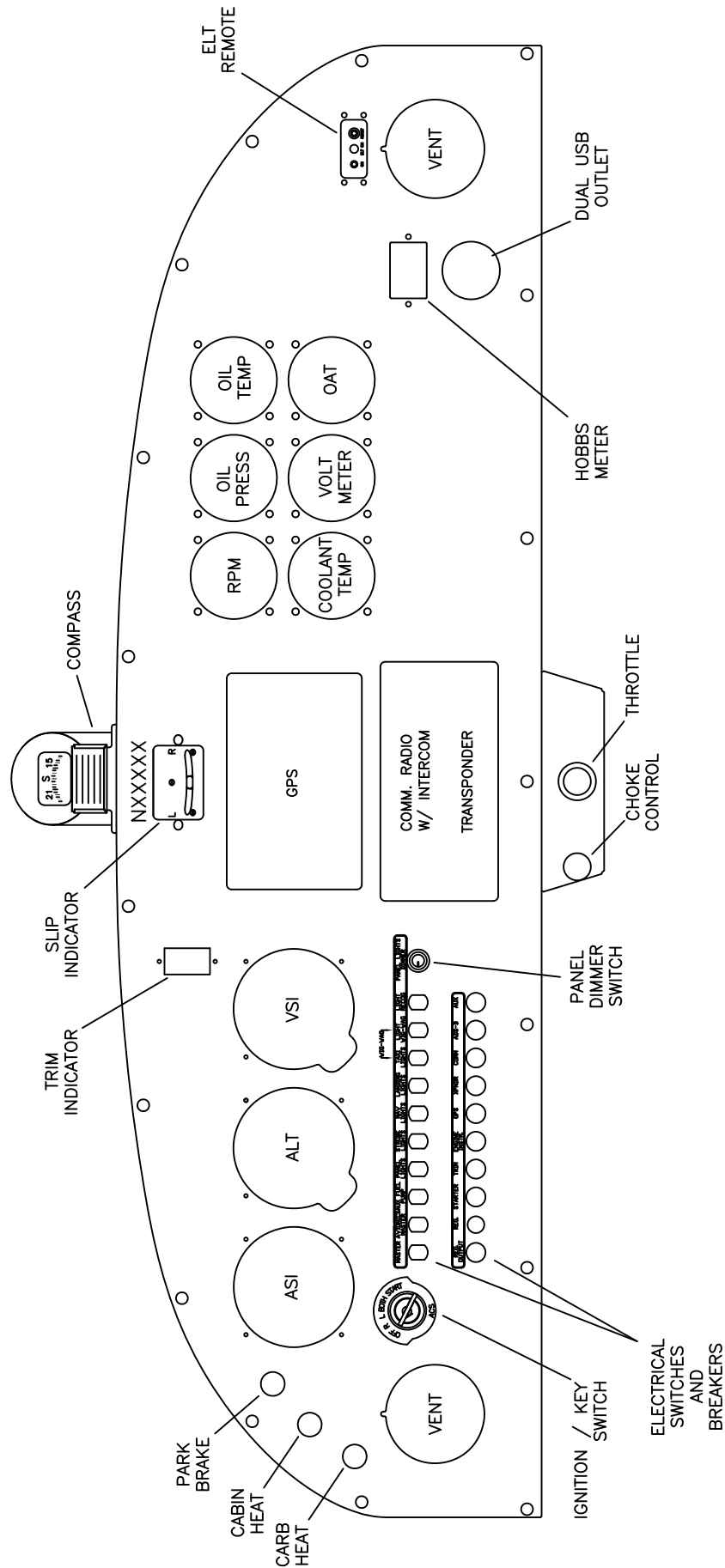
MD5654
REV. A



MD5618
REV. - ORIG

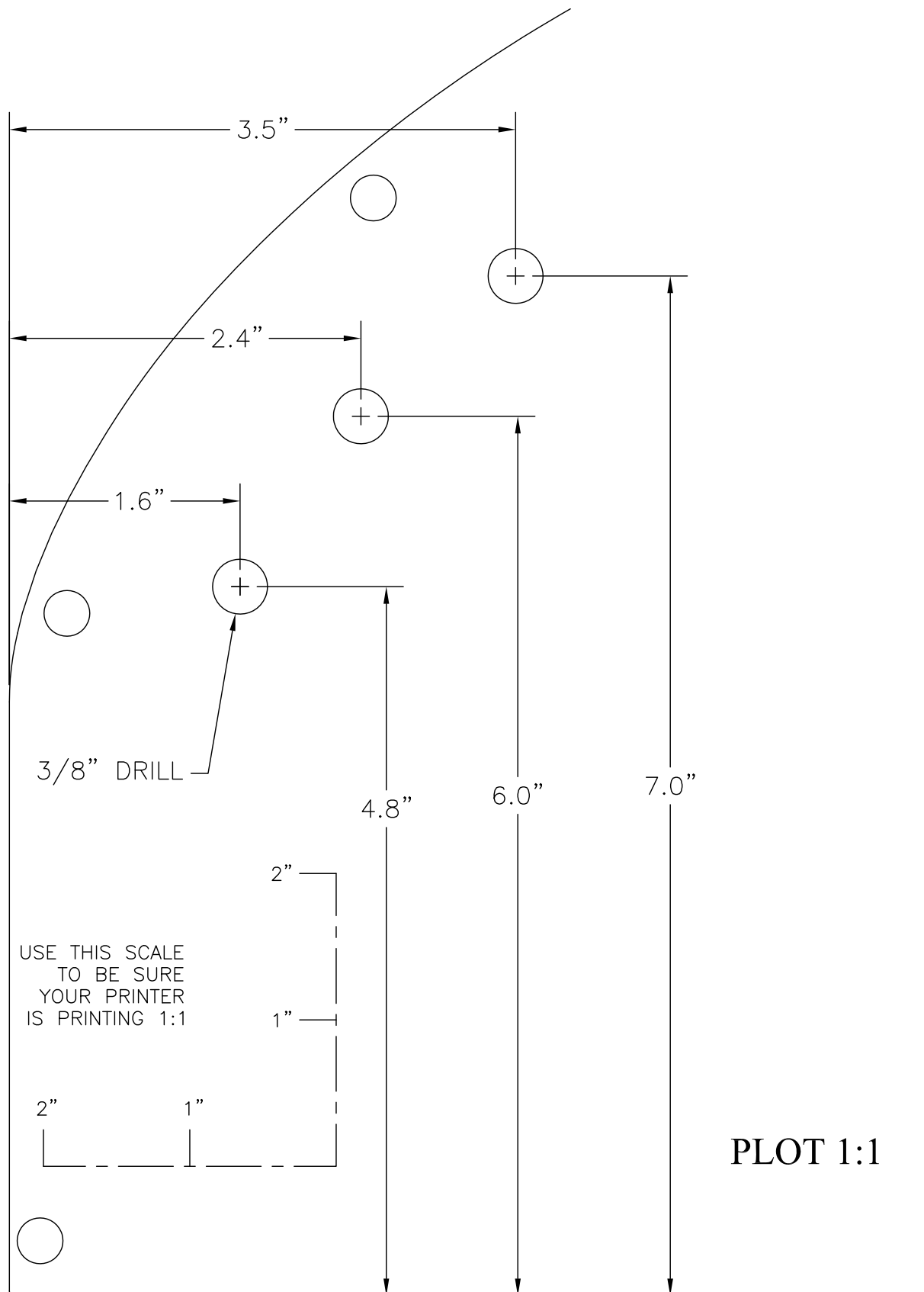
VENT SYSTEM - INSTRUMENT PANEL MODIFICATION

FIGURE 10E-37



MD5618
REV. - ORIG

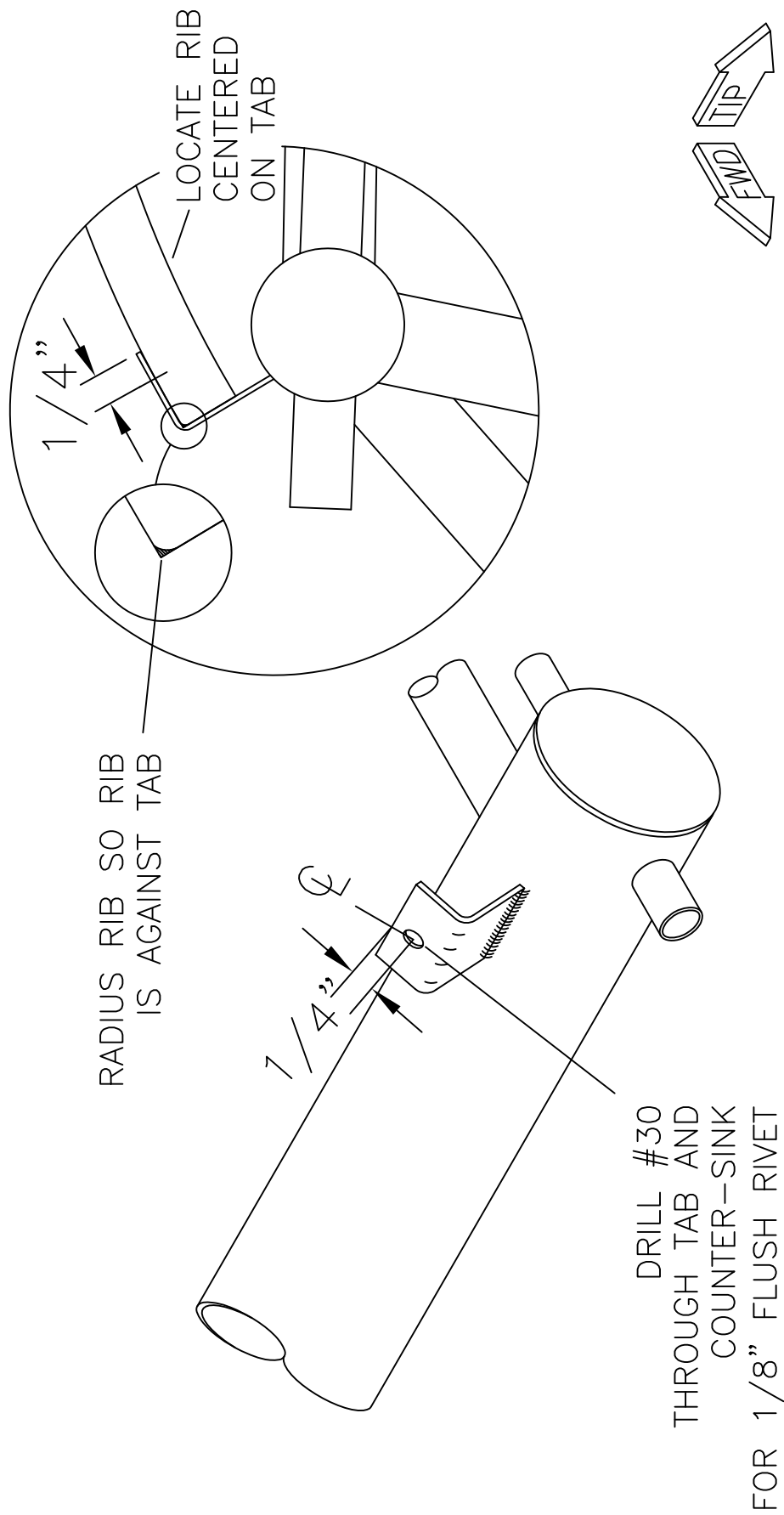
RRR S-21 OUTBOUND
SAMPLE ANALOG INSTRUMENT PANEL LAYOUT
FIGURE 10F-01



MD5618
REV. - ORIG

**RANS S-21 OUTBOUND
CONTROL CABLE - INSTRUMENT PANEL**
FIGURE 10F-02

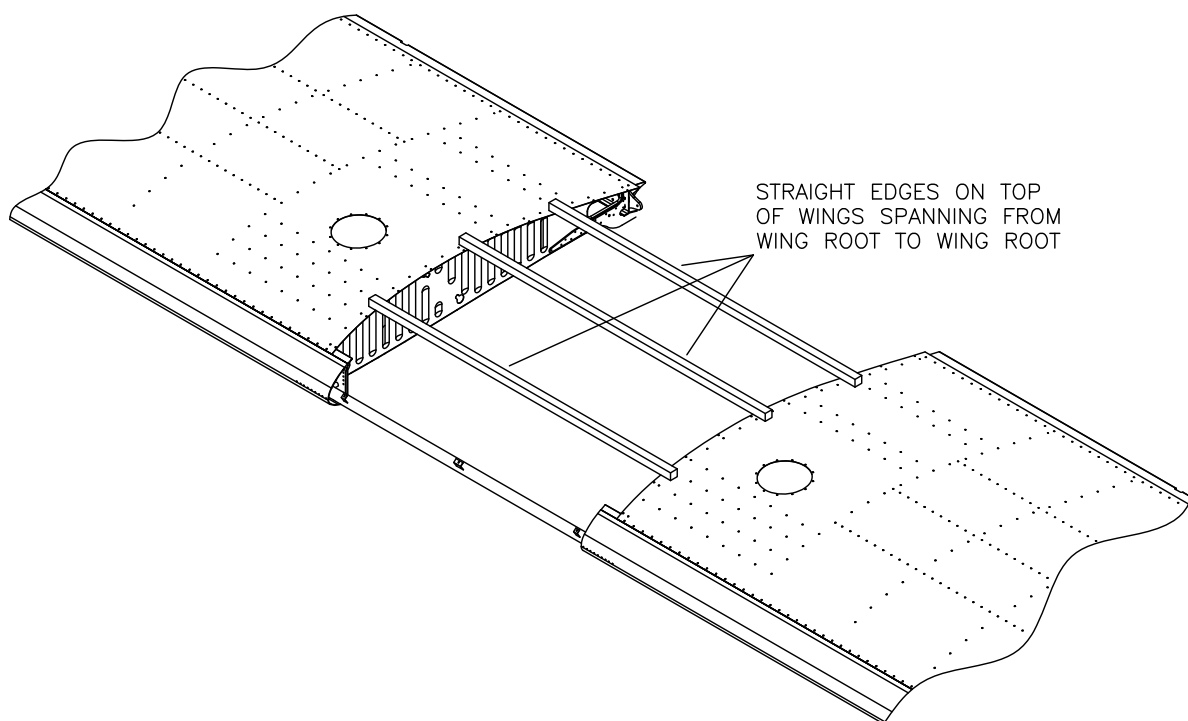
09/11/2018



NOTE: LOCATE AND DRILL FOR
ALL 3 TABS ON CARRY-THRU

MD4408
REV. - ORIG

RRR S-21 OUTBOUND
WINDSHIELD MOUNTING TAB MODIFICATION
FIGURE 10G-02

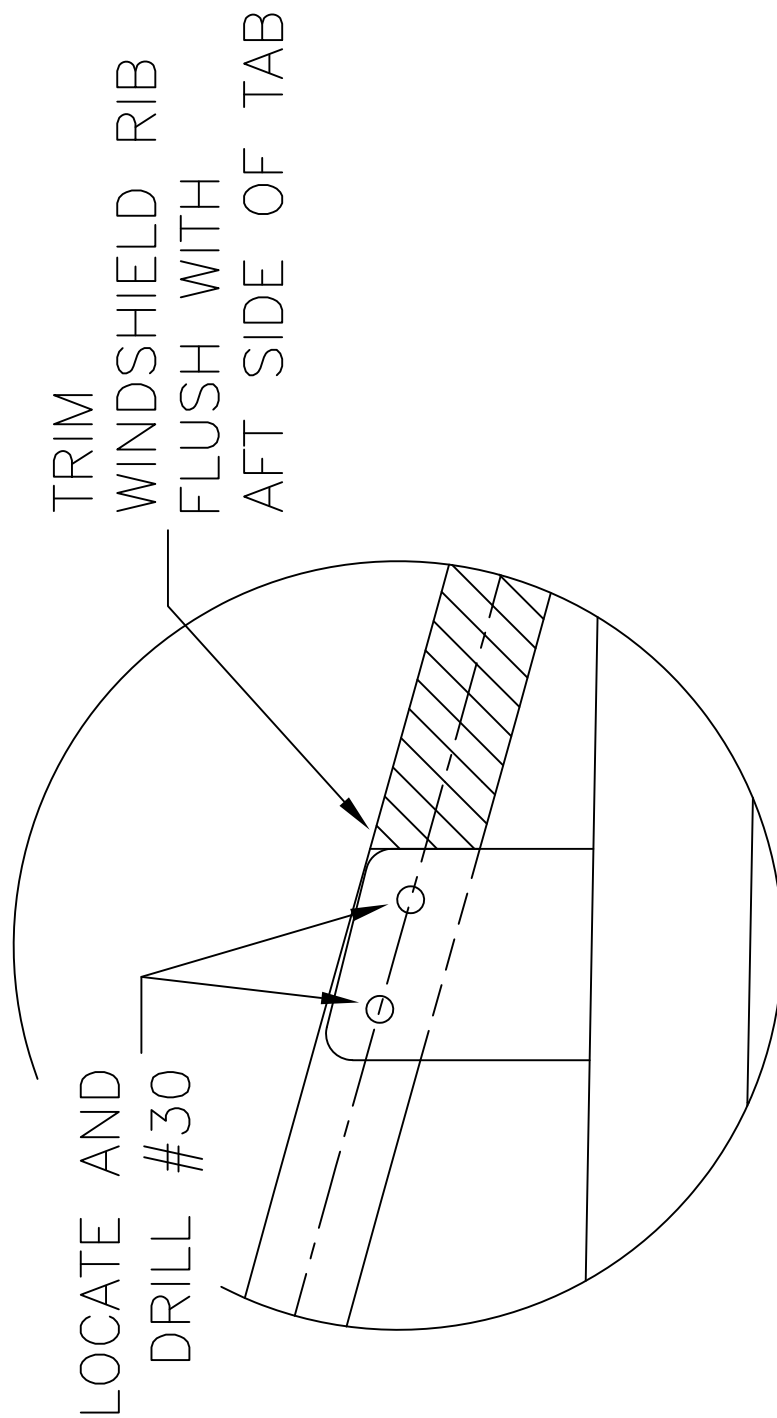


MD3354
REV. — ORIG

RANS S-21 OUTBOUND
RIB HEIGHT ADJUSTMENT - FUSELAGE
FIGURE 10G-03

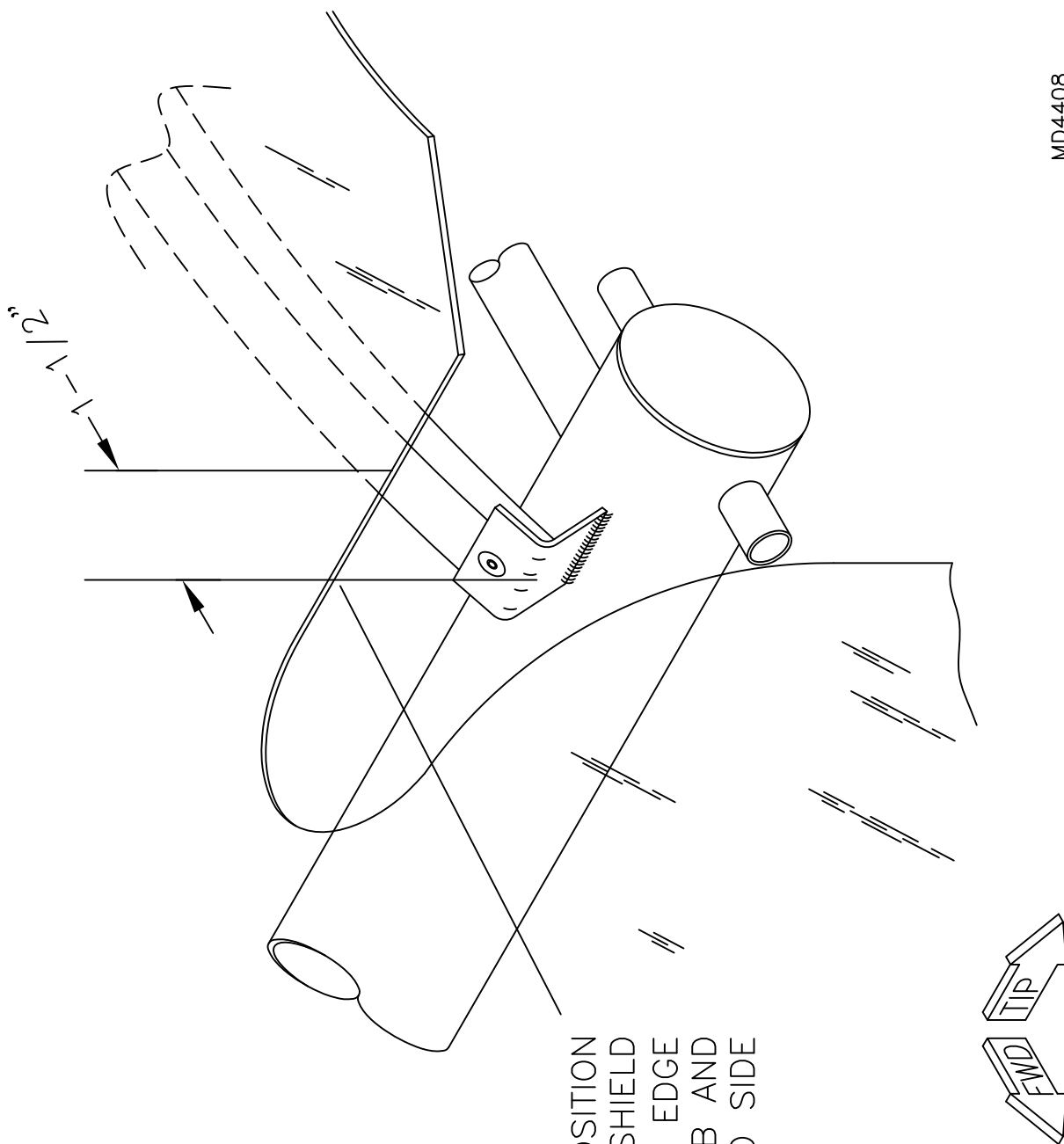
09/11/2018

RIB MOUNTS TO OUTBOARD
SIDE OF ATTACH TAB



MD2580
REV. A

RRR S-21 OUTBOUND
OUTER WINDSHIELD RIB - AFT ATTACH DETAIL
FIGURE 10G-06



POSITION
FWD. EDGE OF WINDSHIELD
1-1/2" AFT OF FWD EDGE
OF TAB AND
CENTERED SIDE TO SIDE

MD4408
REV. - ORIG

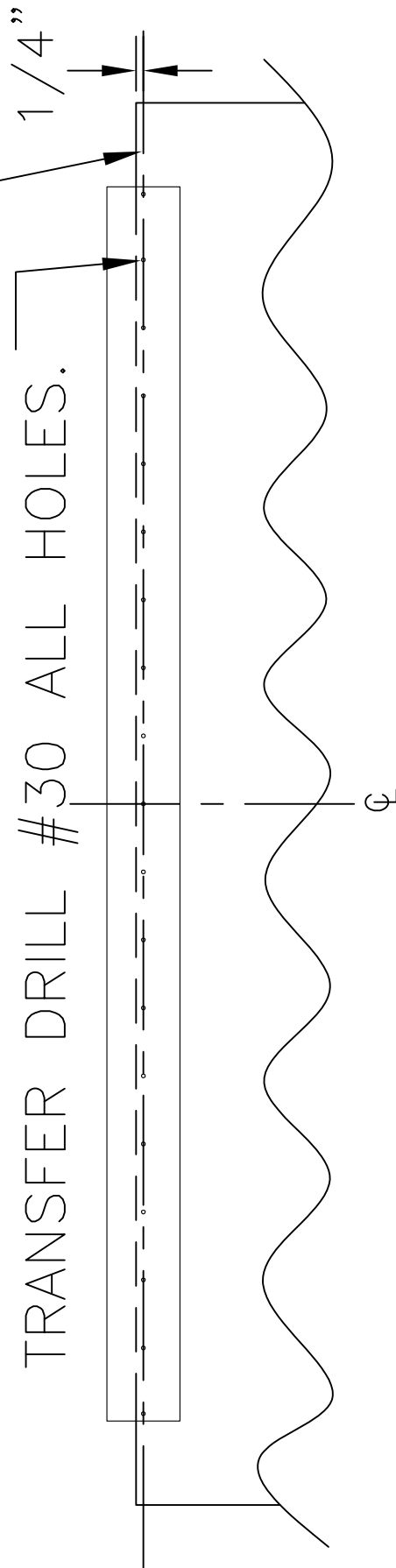
RRR S-21 OUTBOUND
WINDSHIELD LOCATION
FIGURE 10G-09



1. MARK LINE ON SKYLIGHT

2. USE MATING STRIP AS GUIDE.

TRANSFER DRILL #30 ALL HOLES.



3. REMOVE MATING STRIP.
TRANSFER DRILL ONLY
SKYLIGHT HOLES TO #28. DEBUR.

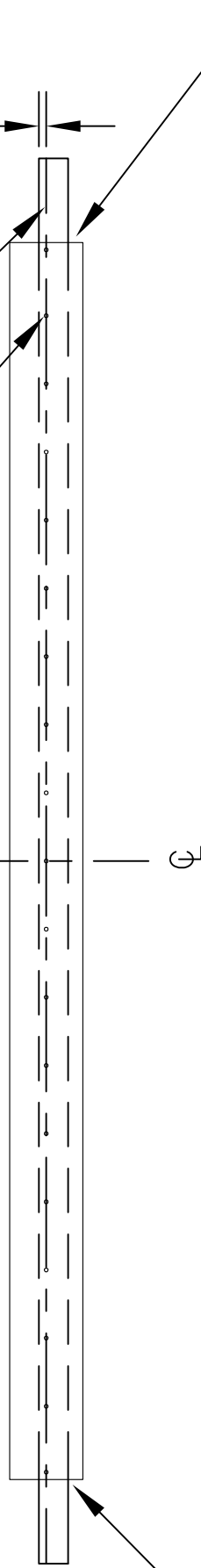
MD4408
REV. - ORIG

RAMS S-21 OUTBOUND
SKYLIGHT DRILLING
FIGURE 10G-10

1. MARK LINE ON BOTH SKYLIGHT
SPACER STRIPS

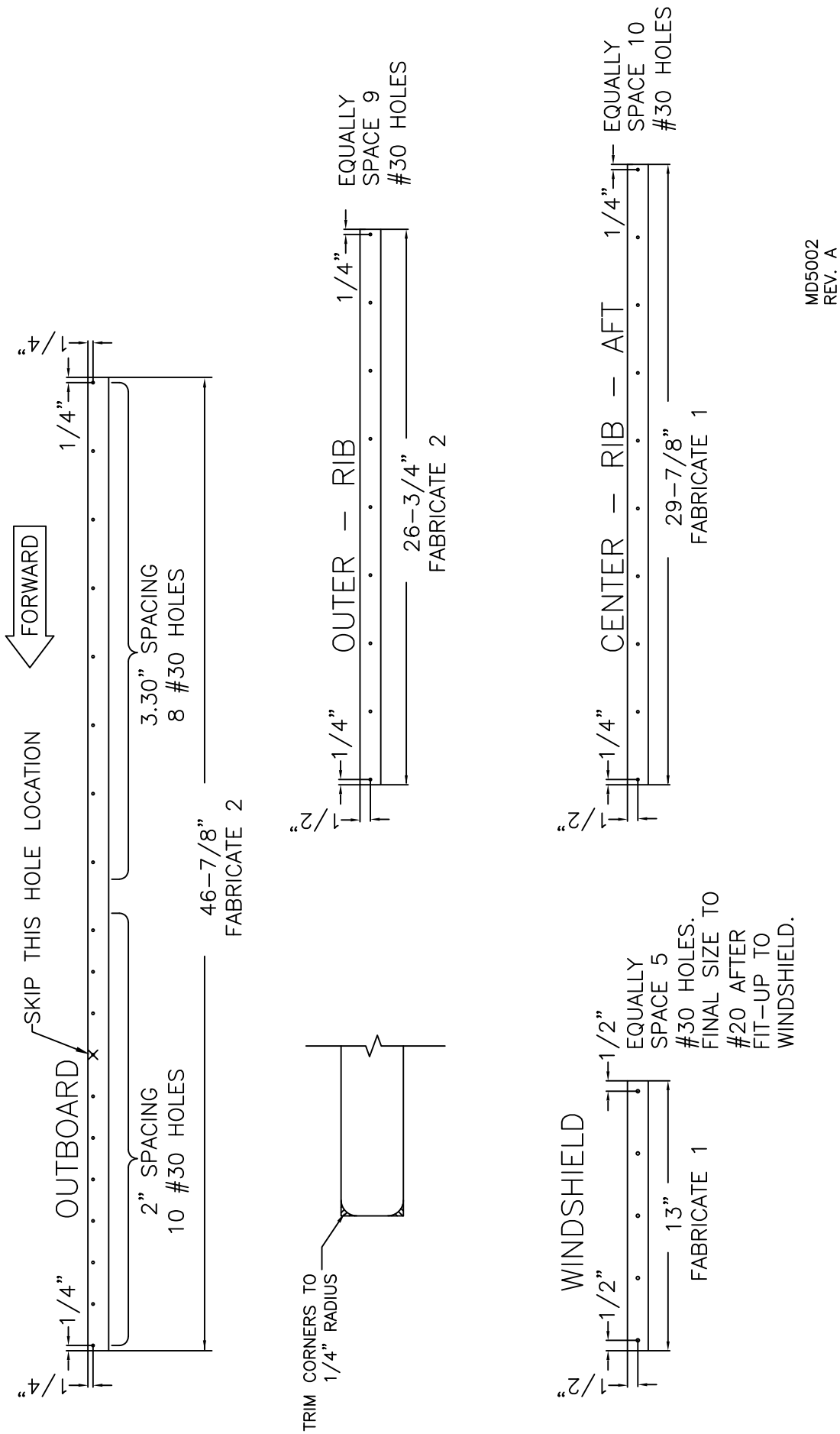
2. USE MATING STRIP AS GUIDE.
TRANSFER DRILL #30 ALL HOLES.

3. TRIM ENDS OF SPACER STRIPS TO MATCH ENDS
OF MATING STRIP. DEBUR.

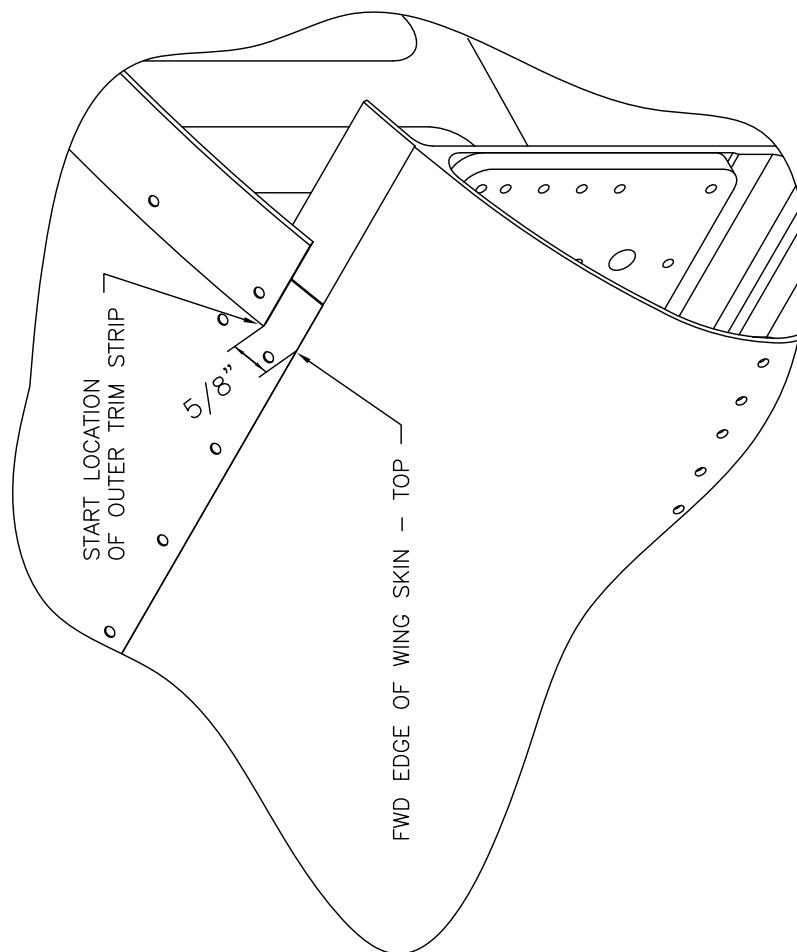
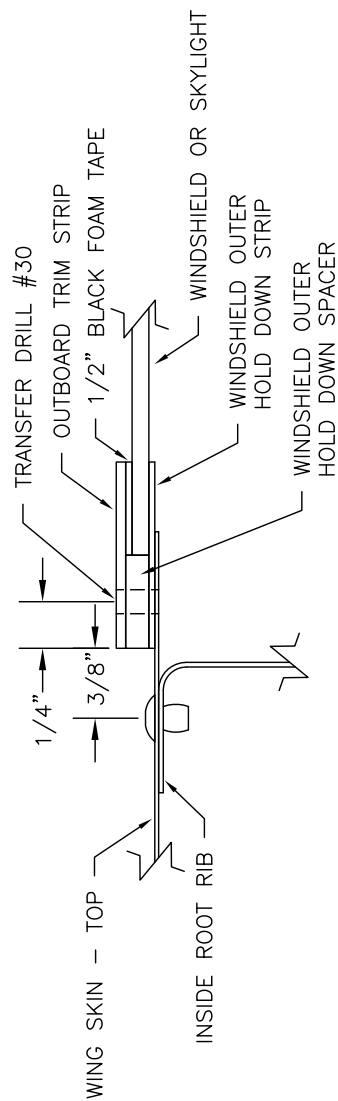


MD4408
REV. - ORIG

RRR S-21 OUTBOUND
SKYLIGHT SPACER STRIP DRILLING
FIGURE 10G-10A

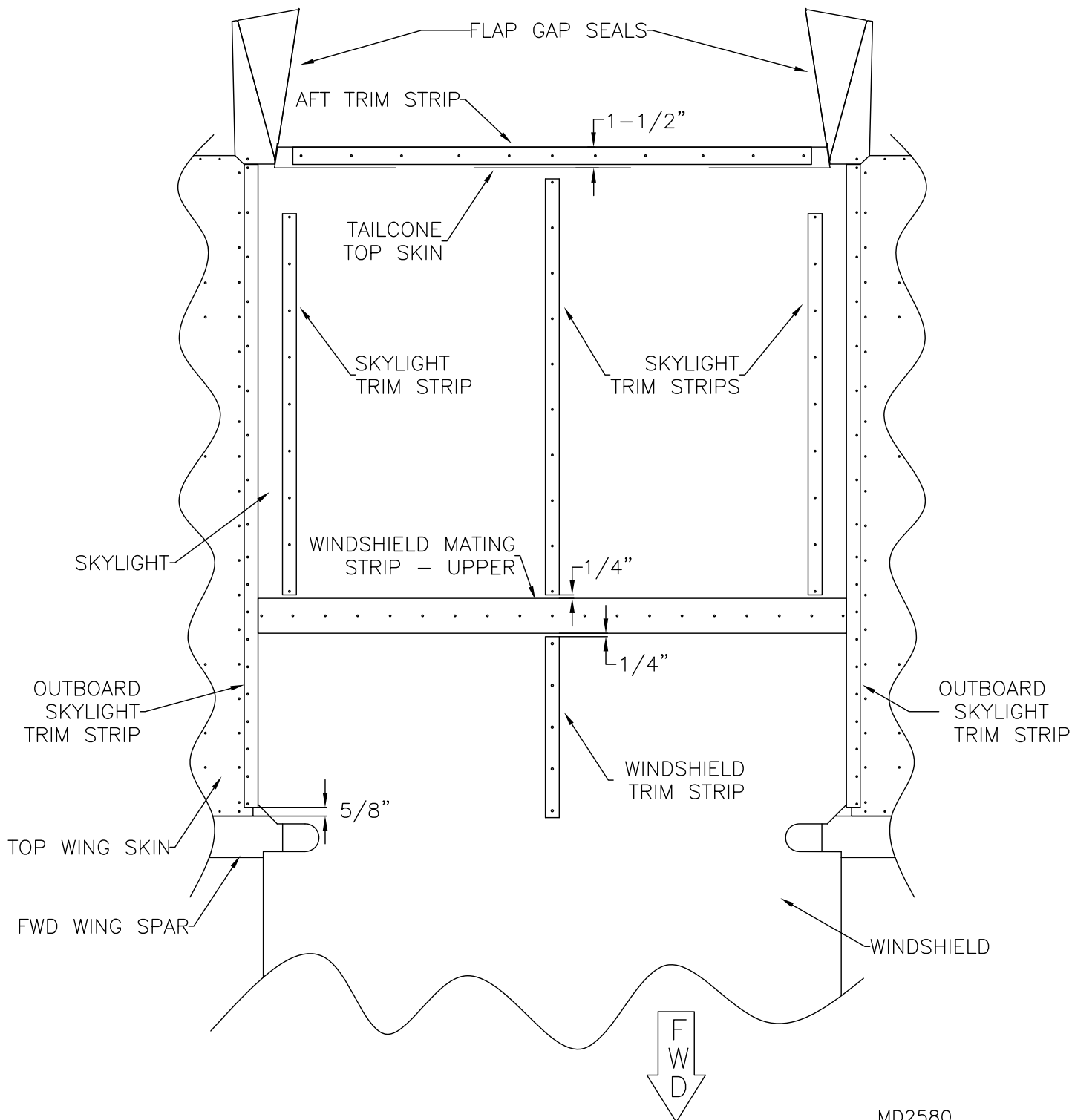


**RRMS S-21 OUTBOUND
SKYLIGHT & WINDSHIELD TRIM STRIP MODIFICATION
FIGURE 10G-11**



MD2580
REV. - ORIG

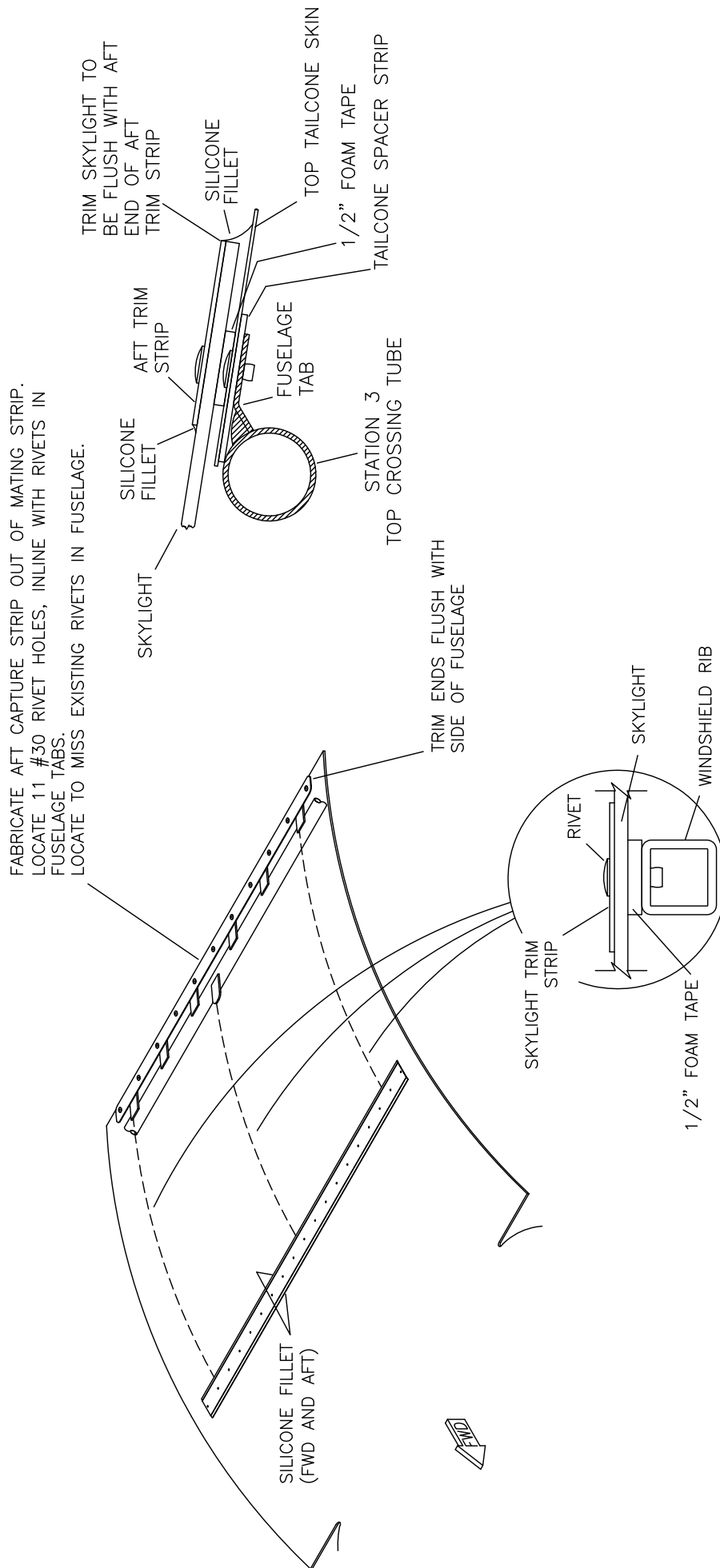
**RRR S-21 OUTBOUND
OUTERBOARD TRIM STRIP LOCATION
FIGURE 10G-12**



MD2580
REV. - ORIG

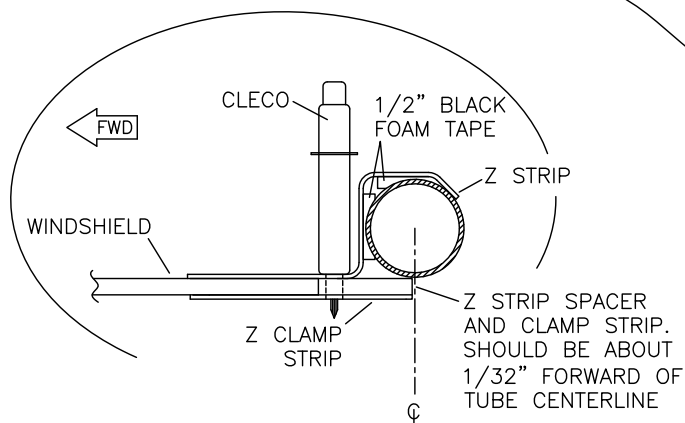
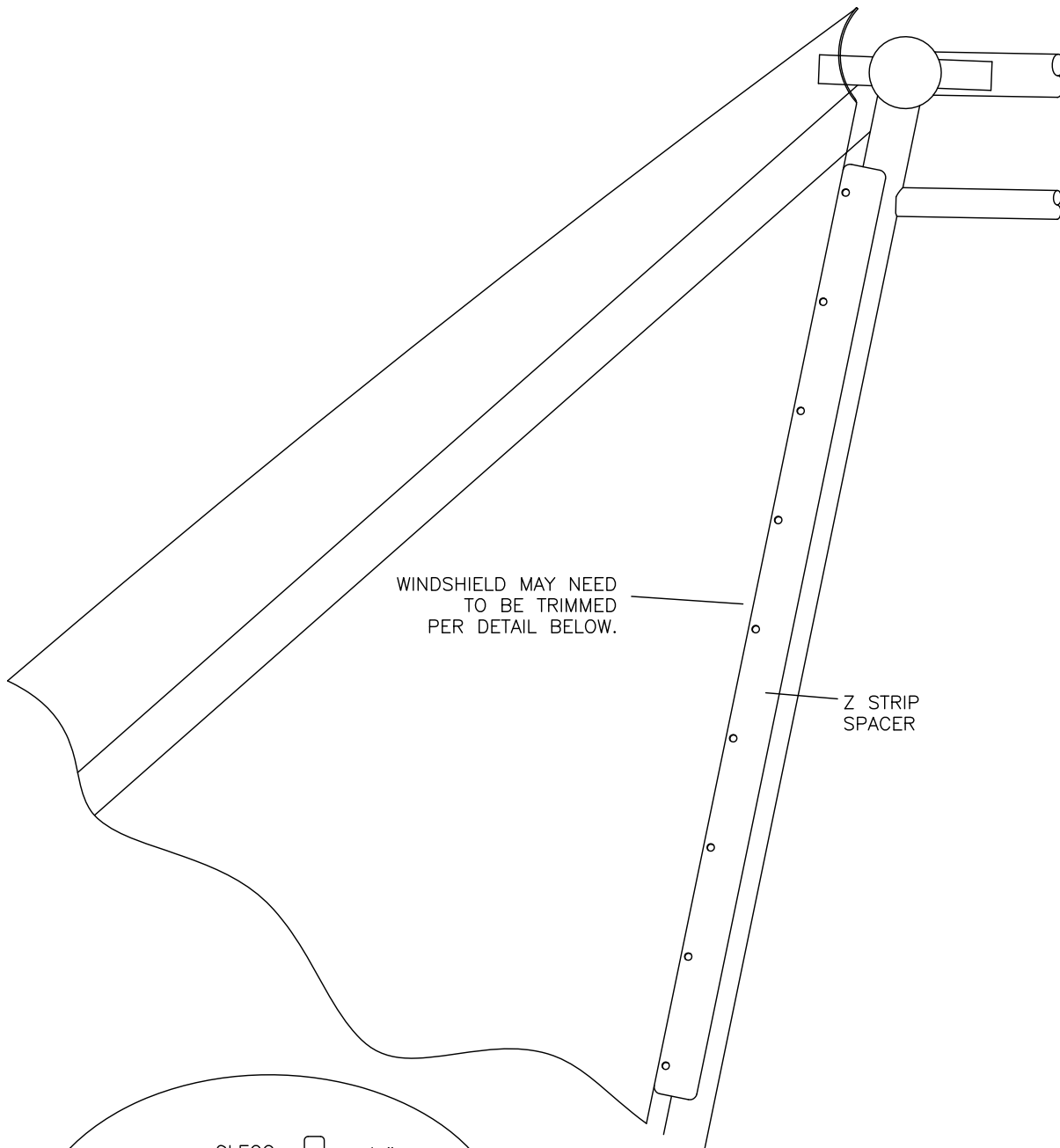
**RANS S-21 OUTBOUND
WINDSHIELD & SKYLIGHT - TOP VIEW
FIGURE 10G-17**

09/11/2018



MD2580
 REV. - ORIG

**RRR S-21 OUTBOUND
 WINDSHIELD - TOP DETAIL
 FIGURE 10G-19**

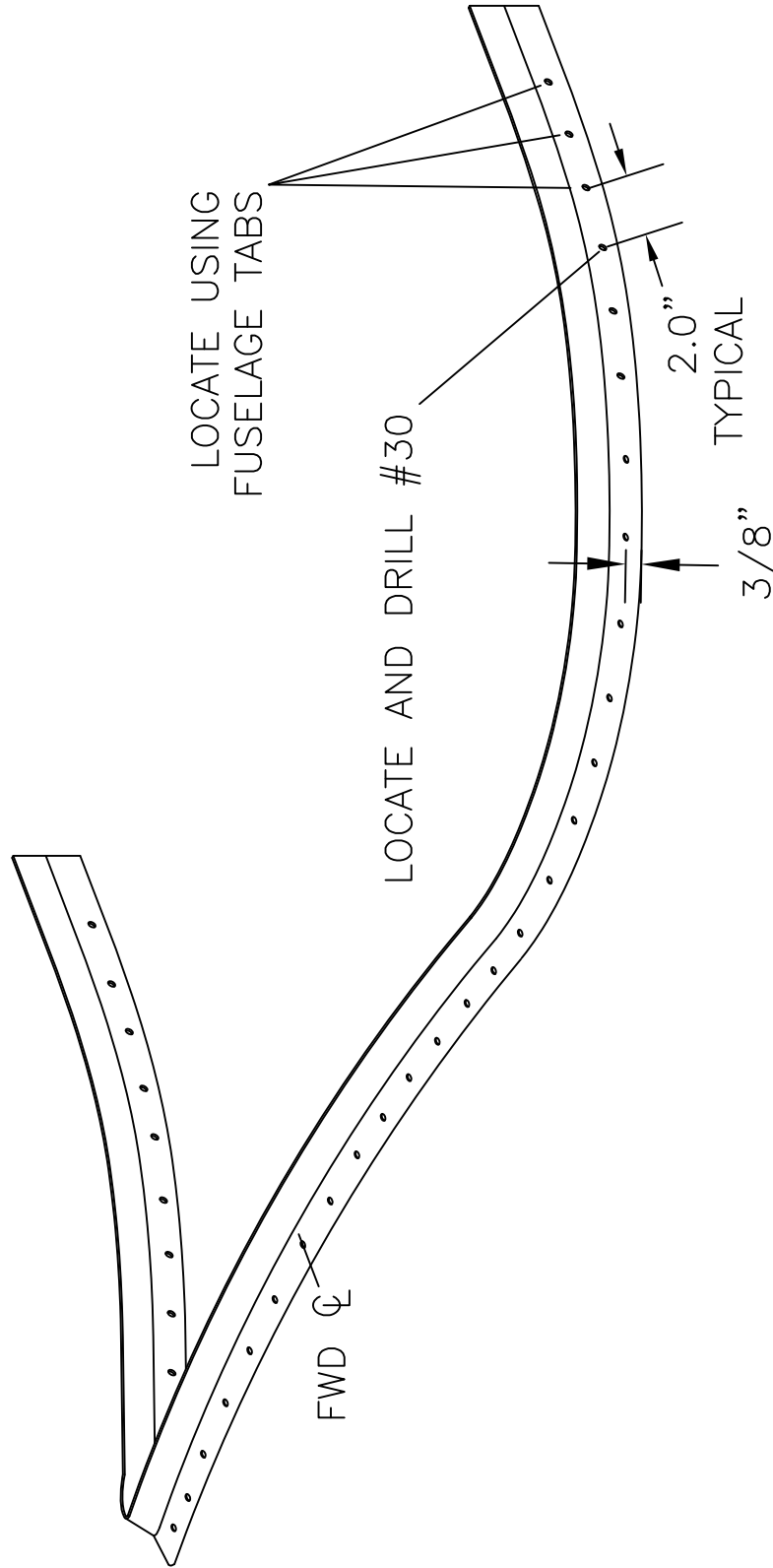


CLECO THE Z STRIP (KPWS0070), Z CLAMP STRIP (KPWS0068) AND THE Z STRIP SPACER (KPWS0069) TOGETHER AFT OF WINDSHIELD. Z STRIP SPACER SHOULD ALIGN FLUSH WITH AFT OF WINDSHIELD.

MD1428
REV. — ORIG

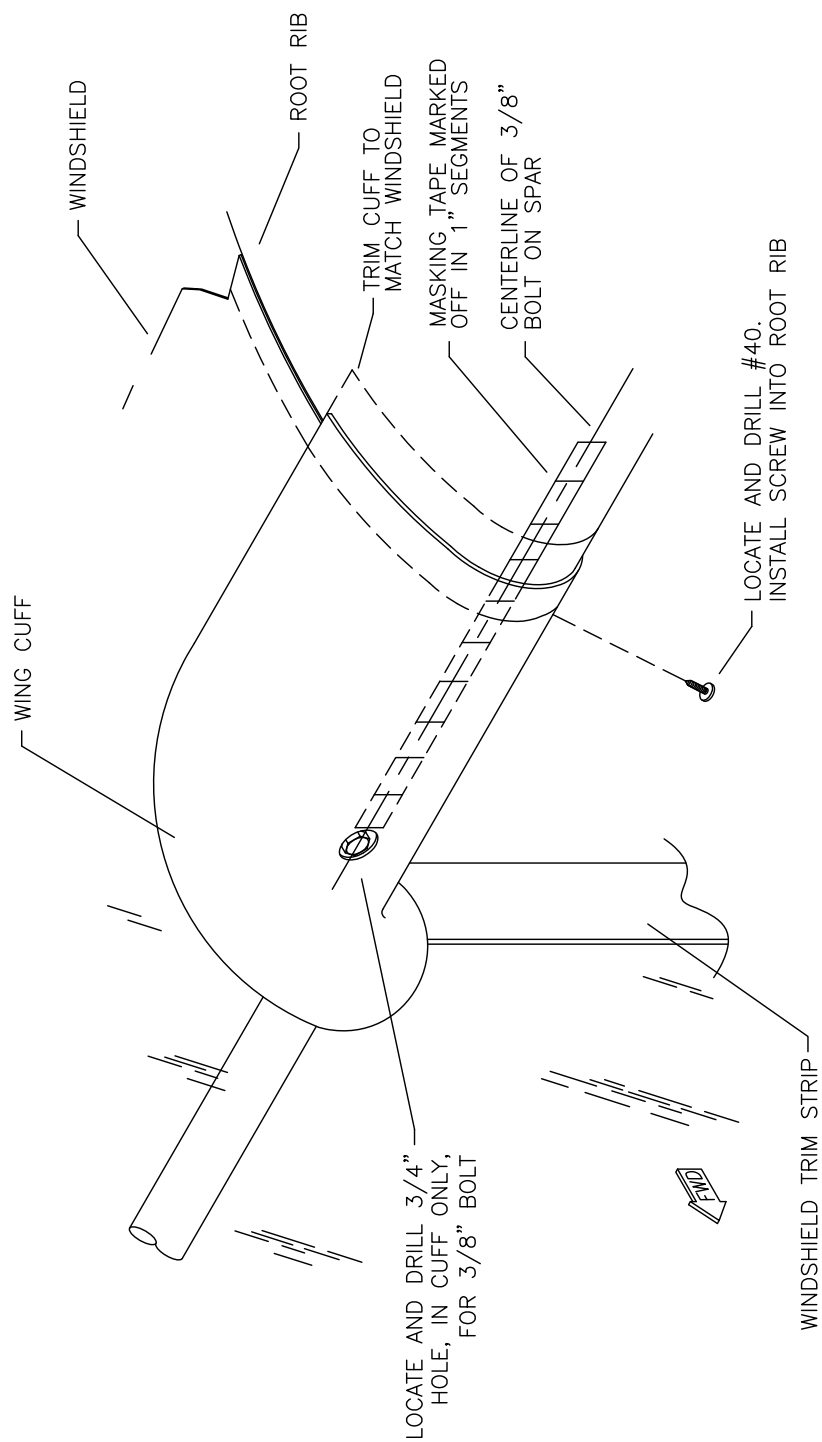
RANS S-21 OUTBOUND WINDSHIELD SIDE FIT-UP FIGURE 10G-20

09/11/2018



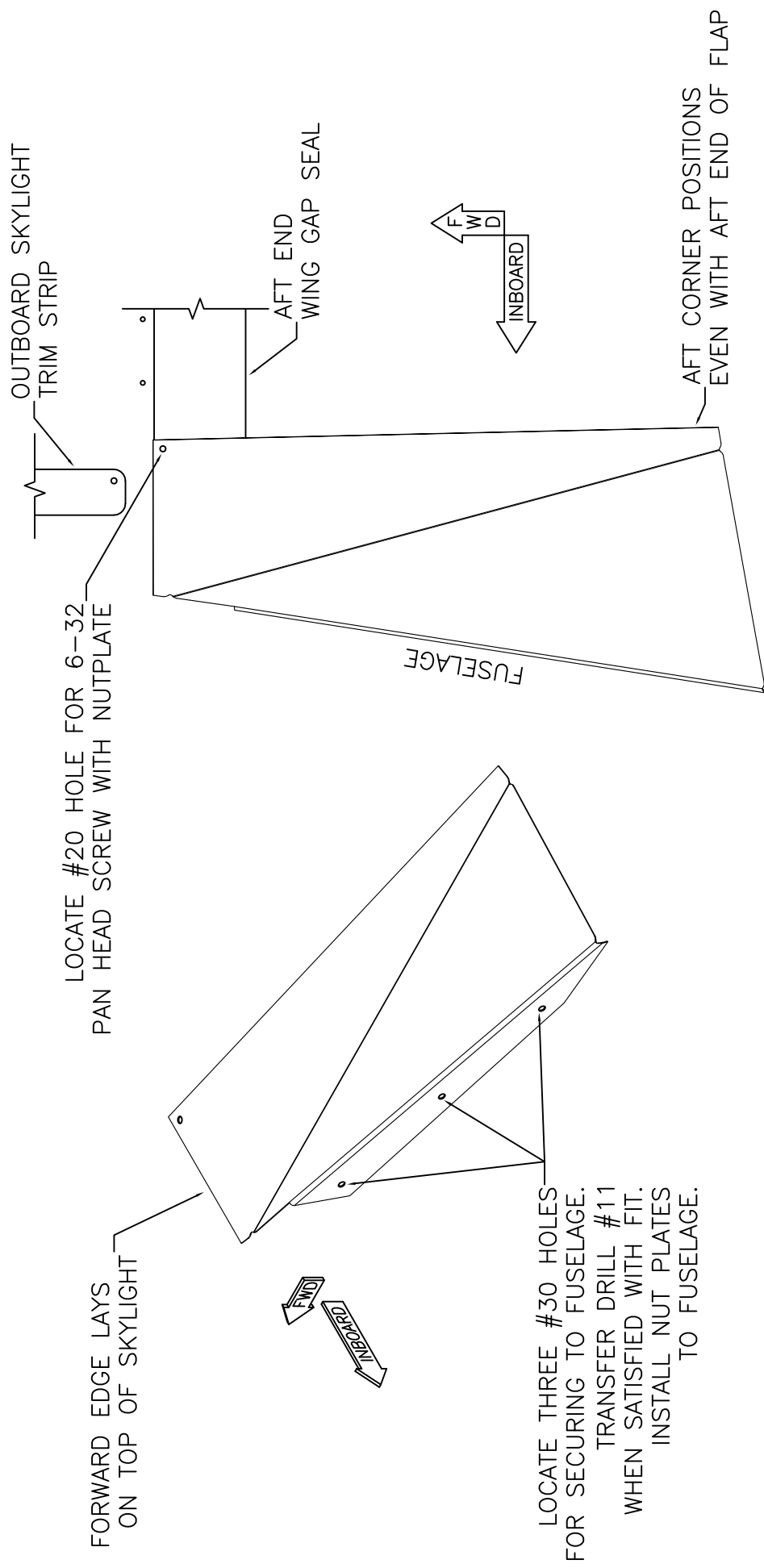
MD4408
REV. - ORIG

RRR S-21 OUTBOUND
WINDSHIELD HOLD DOWN STRIP DRILLING
FIGURE 10G-23



MD571
REV. — ORIG

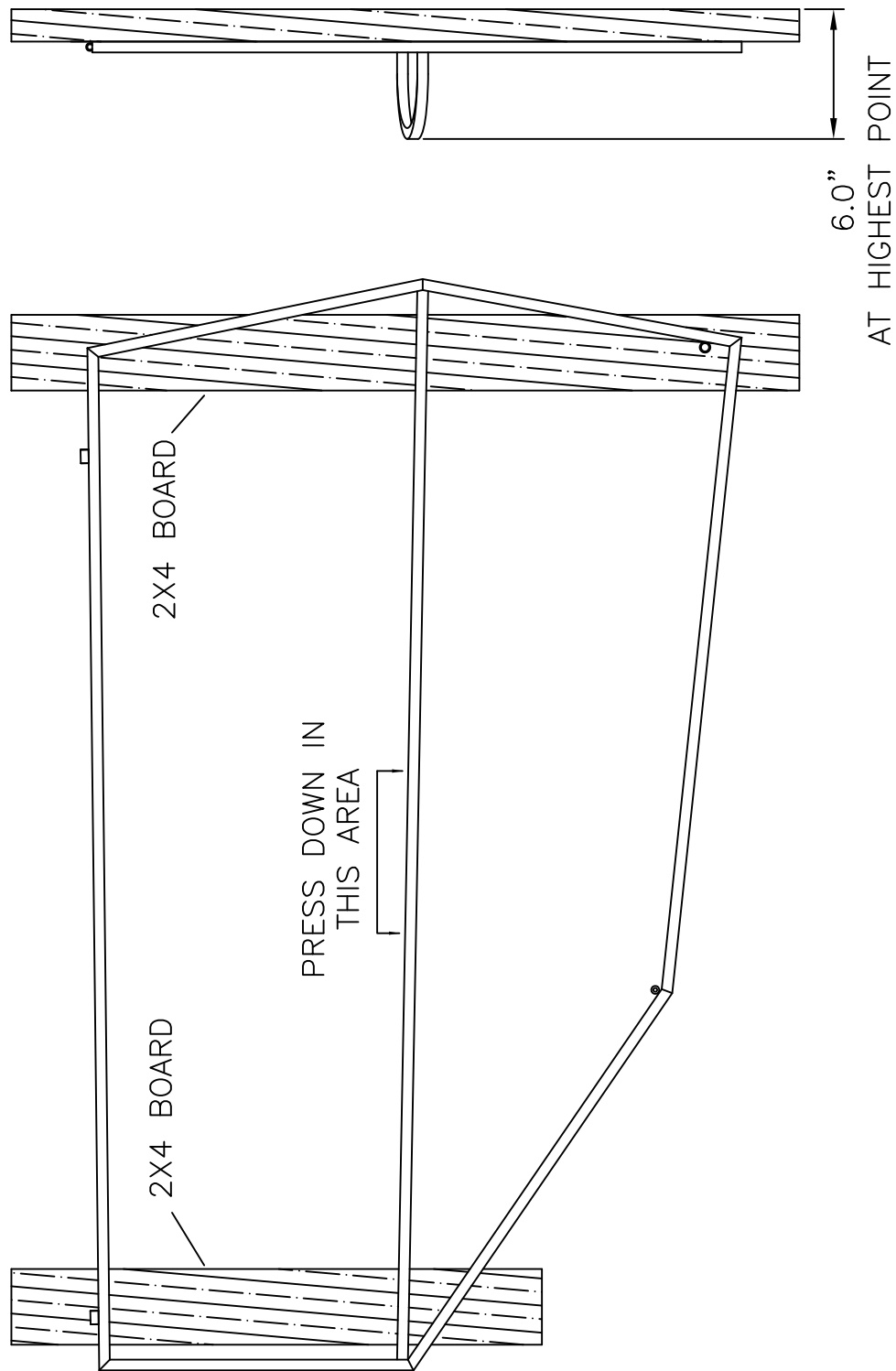
**RRMS S-21 OUTBOUND
WING CUFF INSTALLATION**
FIGURE 10G-37



REFER TO 141 WING - ROOT SEAL INSTALLATION FOR PARTS LISTING

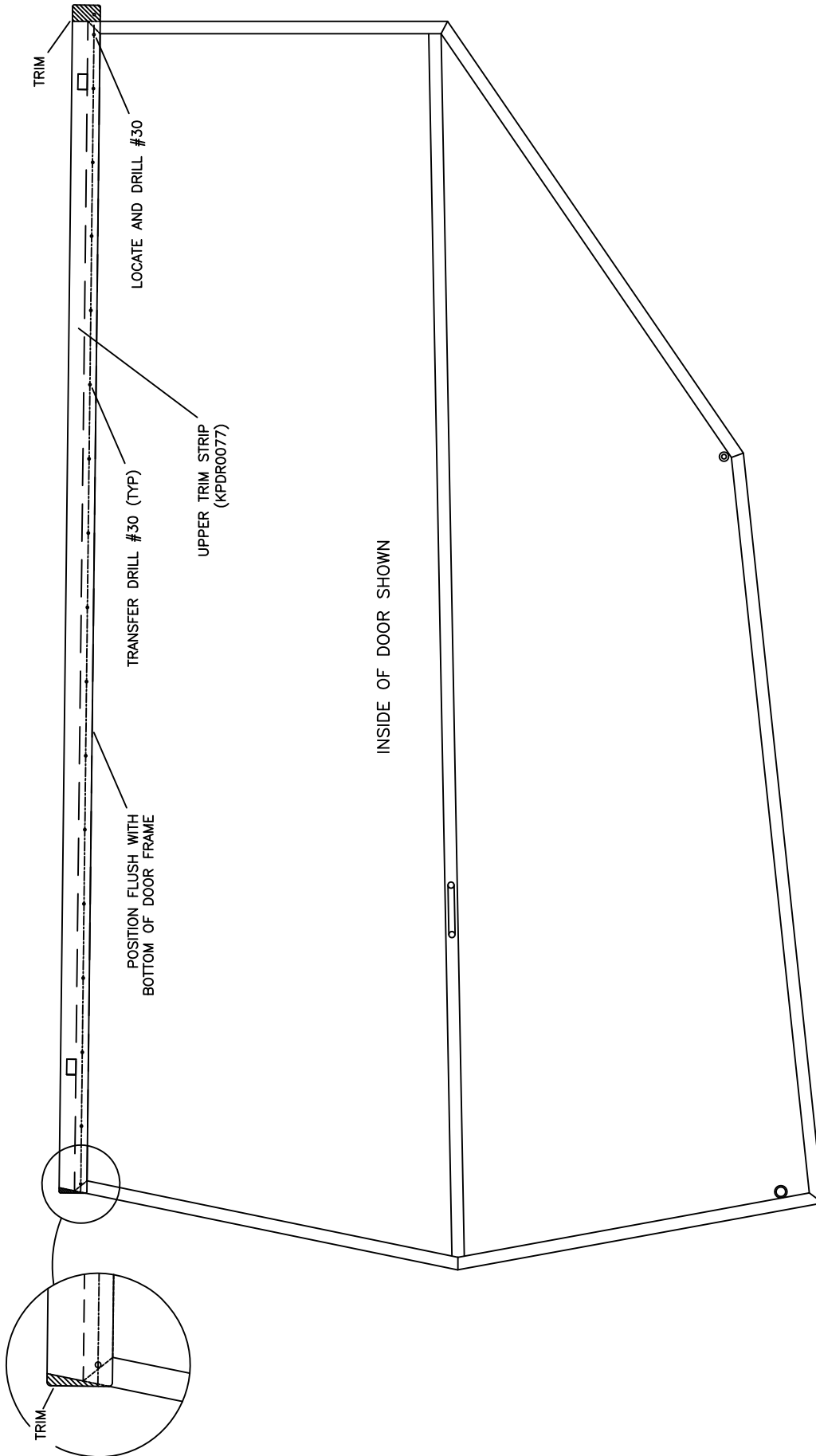
MD5083
REV. B

**RRM S-21 OUTBOUND
FLAP GAP SEAL MODIFICATION
FIGURE 10G-45**



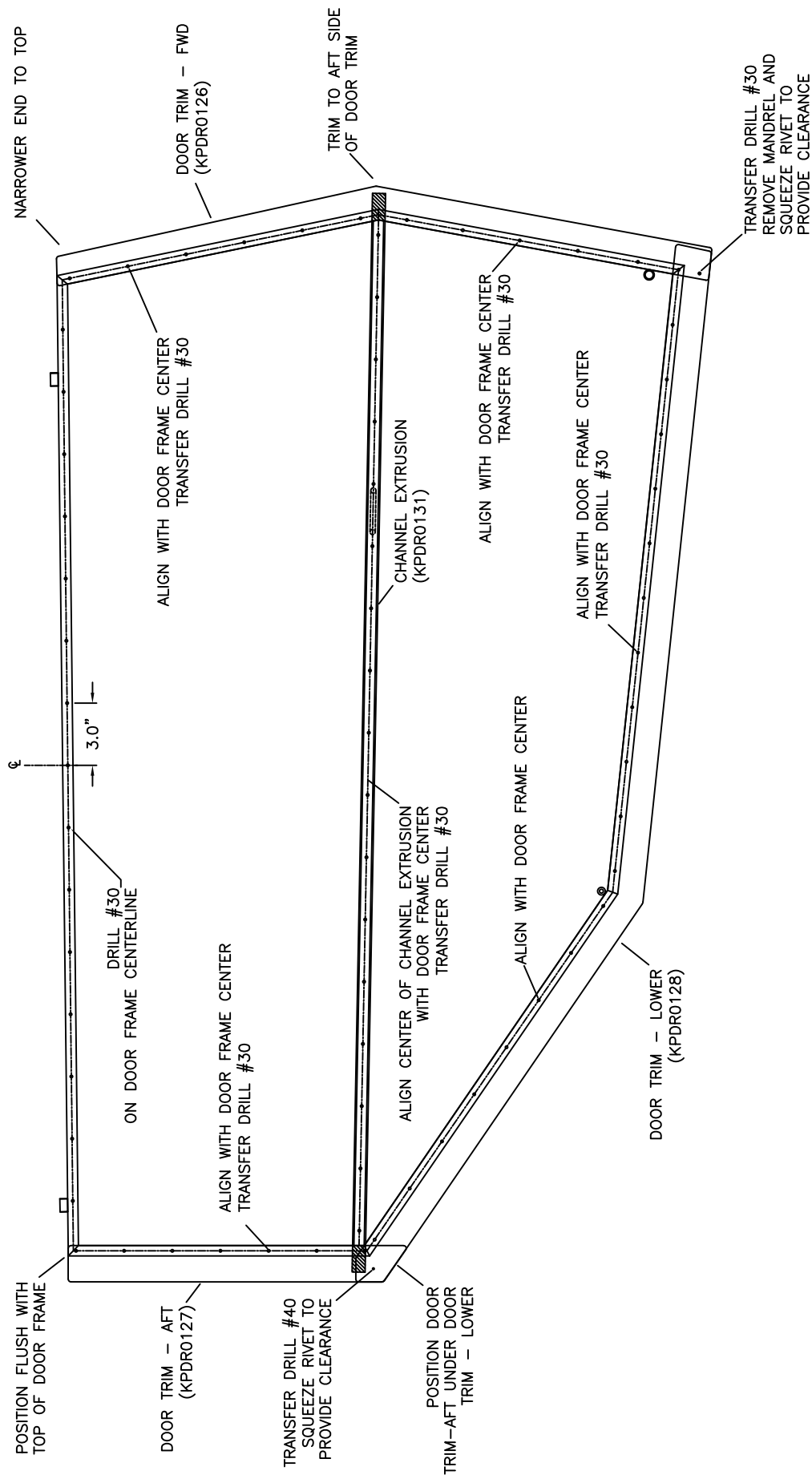
MD5621
REV. A

RRR S-21 OUTBOUND **DOOR FRAME CHECK** **FIGURE 10H-01**



MD5621
REV. A

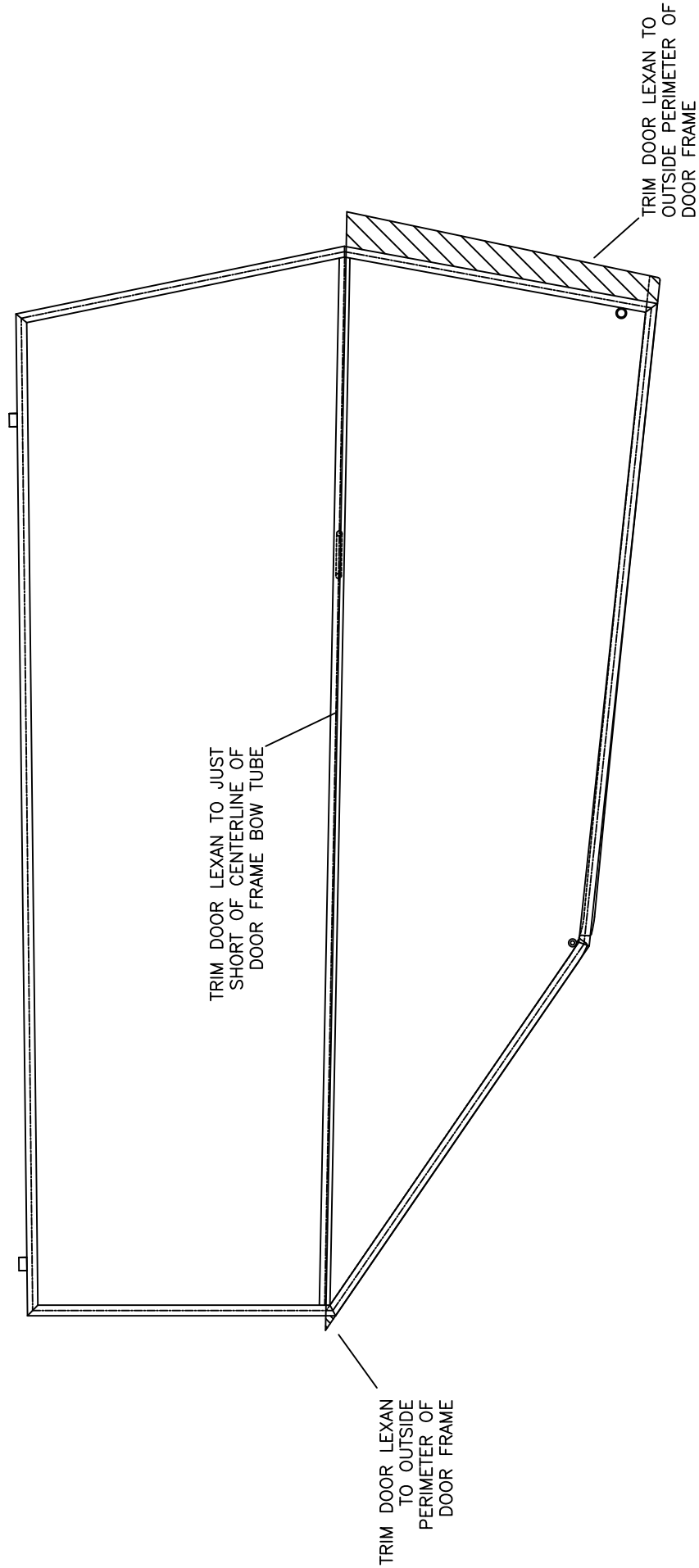
RRM S-21 OUTBOUND UPPER TRIM STRIP MODIFICATION FIGURE 10H-03



09/11/2018

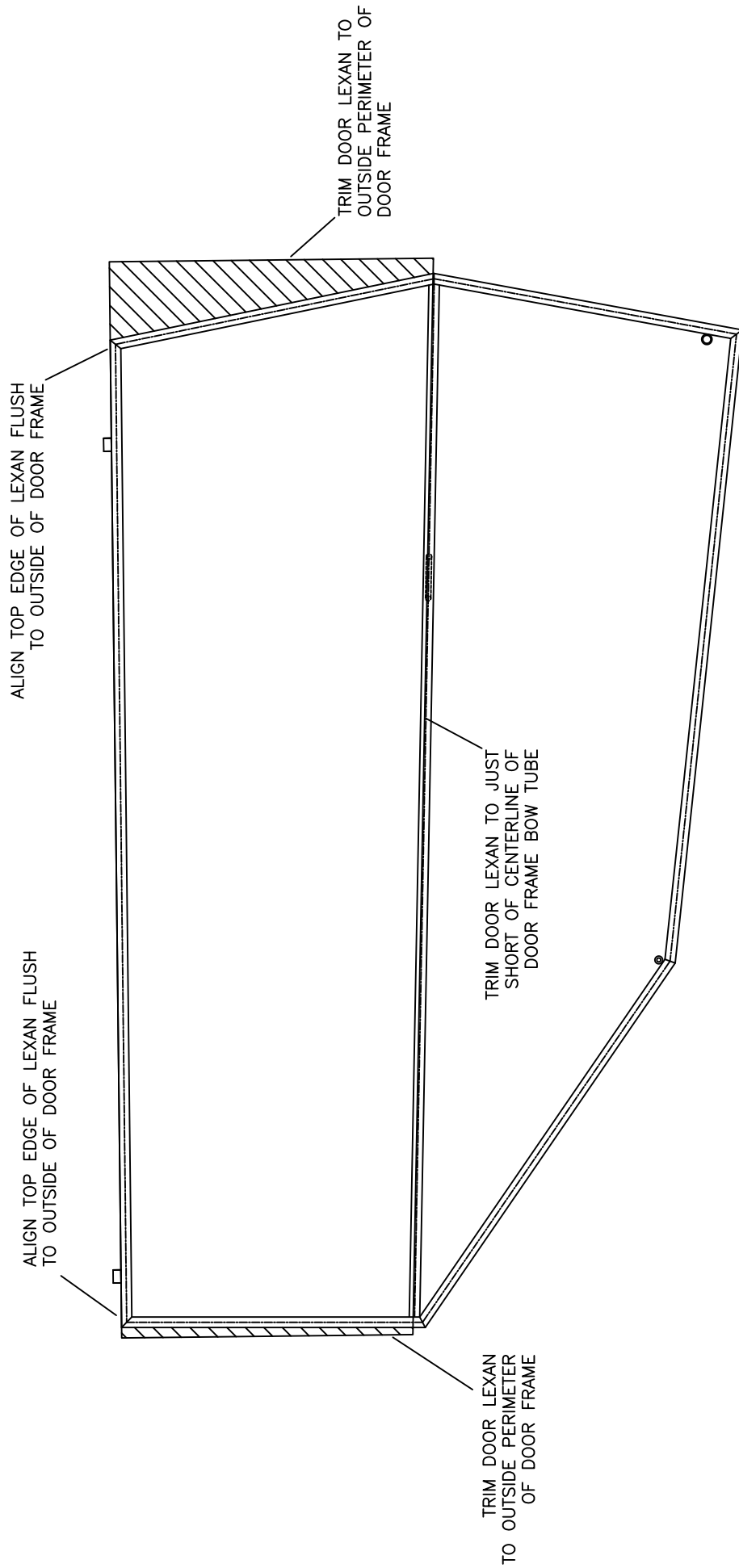
RRR S-21 OUTBOUND **DOOR TRIM ASSEMBLY** **FIGURE 10H-04**

MD5621
REV. A



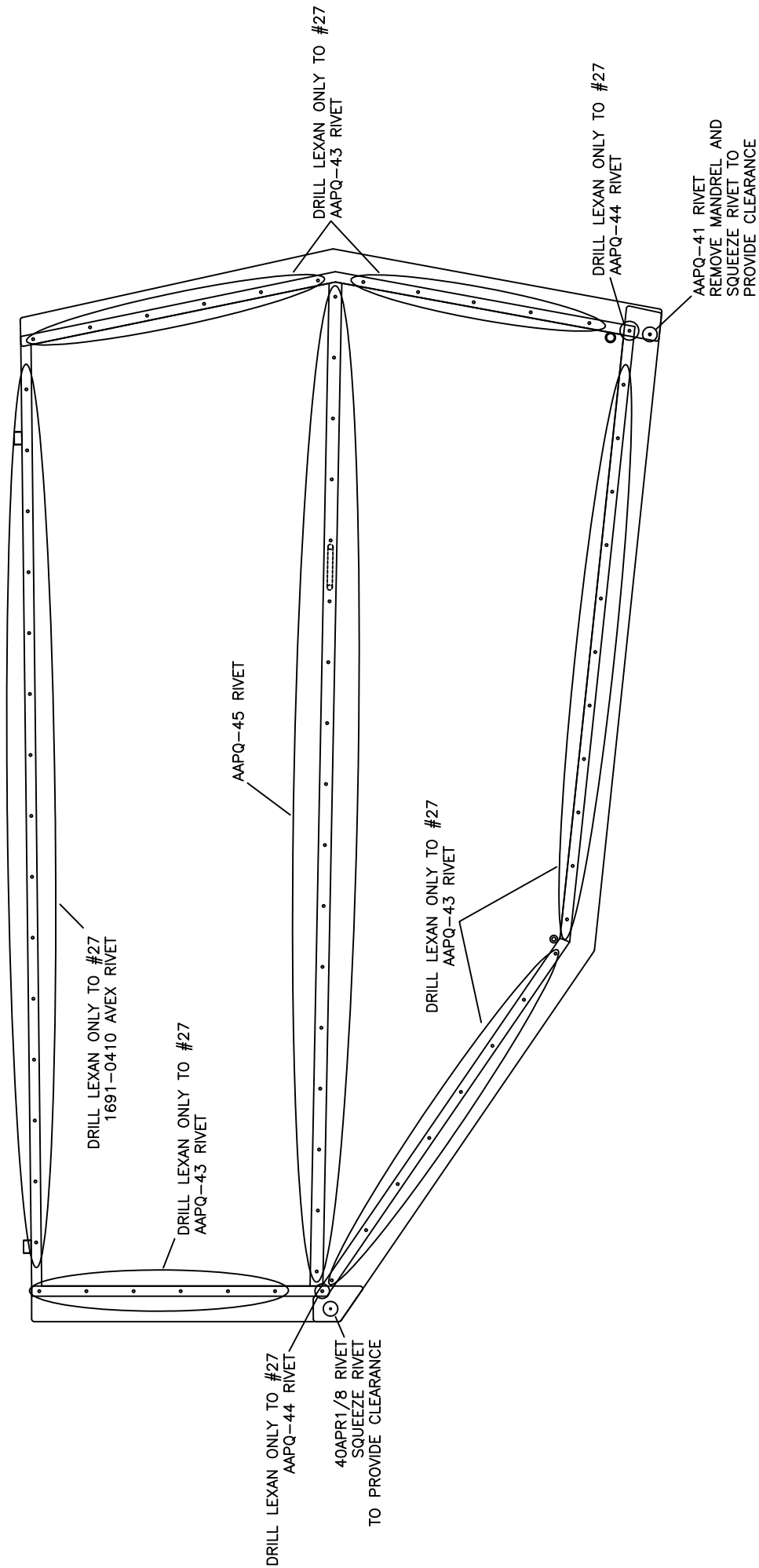
MD5621
REV. A

RAMS S-21 OUTBOUND LOWER DOOR LEXAN TRIMMING FIGURE 10H-13



MD5621
REV. A

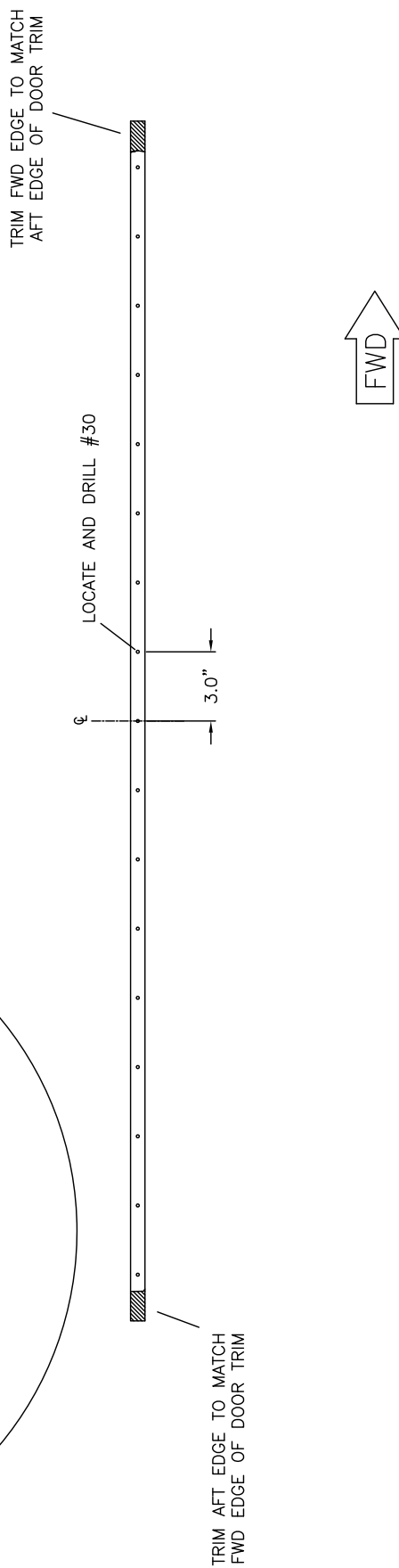
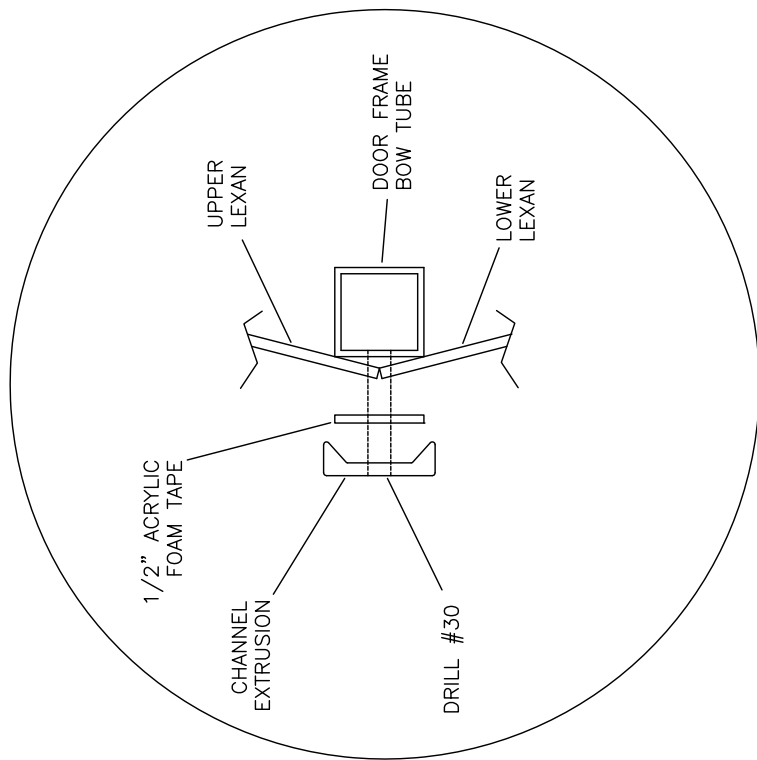
RAMS S-21 OUTBOUND UPPER DOOR LEXAN TRIMMING FIGURE 10H-14



MD5621
REV. A

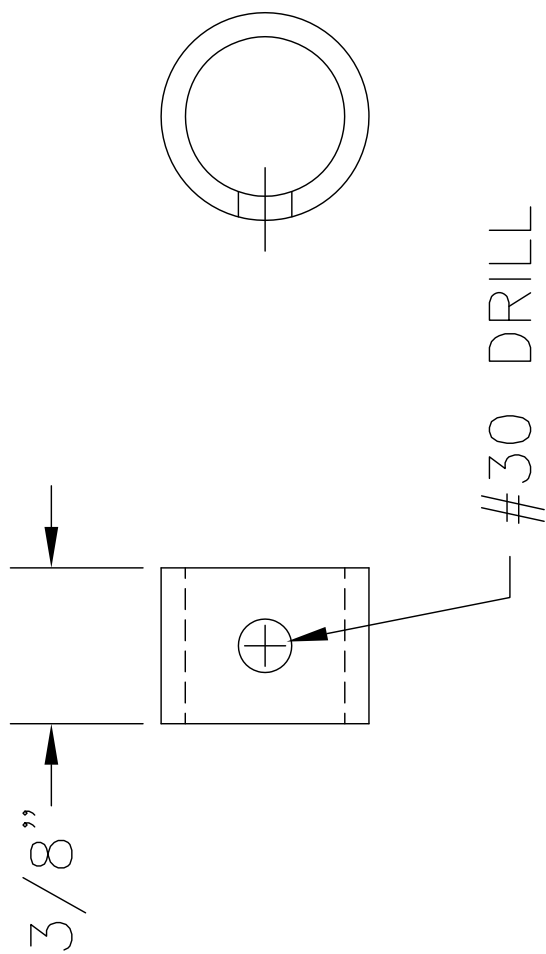
R3A S-21 OUTBOUND DOOR RIVETING FIGURE 10H-17

09/11/2018



RRR S-21 OUTBOUND
CHANNEL EXTRUSION MODIFICATION
FIGURE 10H-18

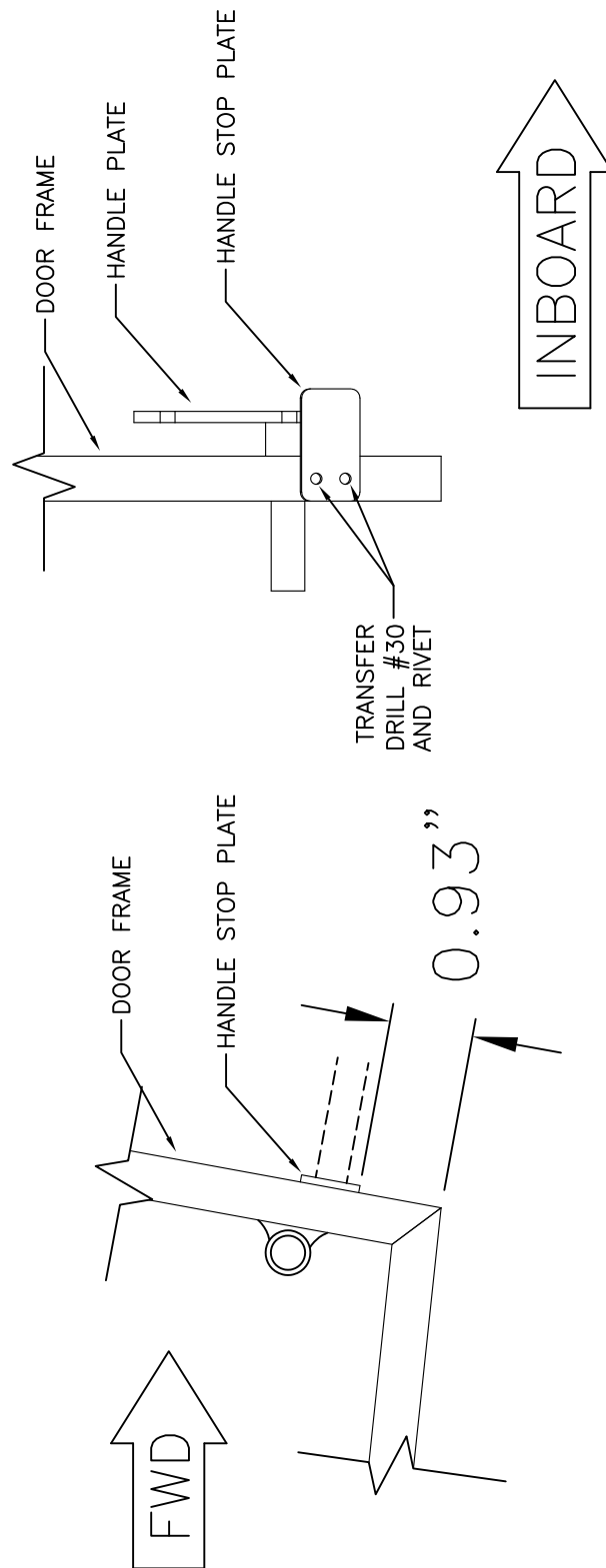
MD5621
 REV. A



FABRICATE 2

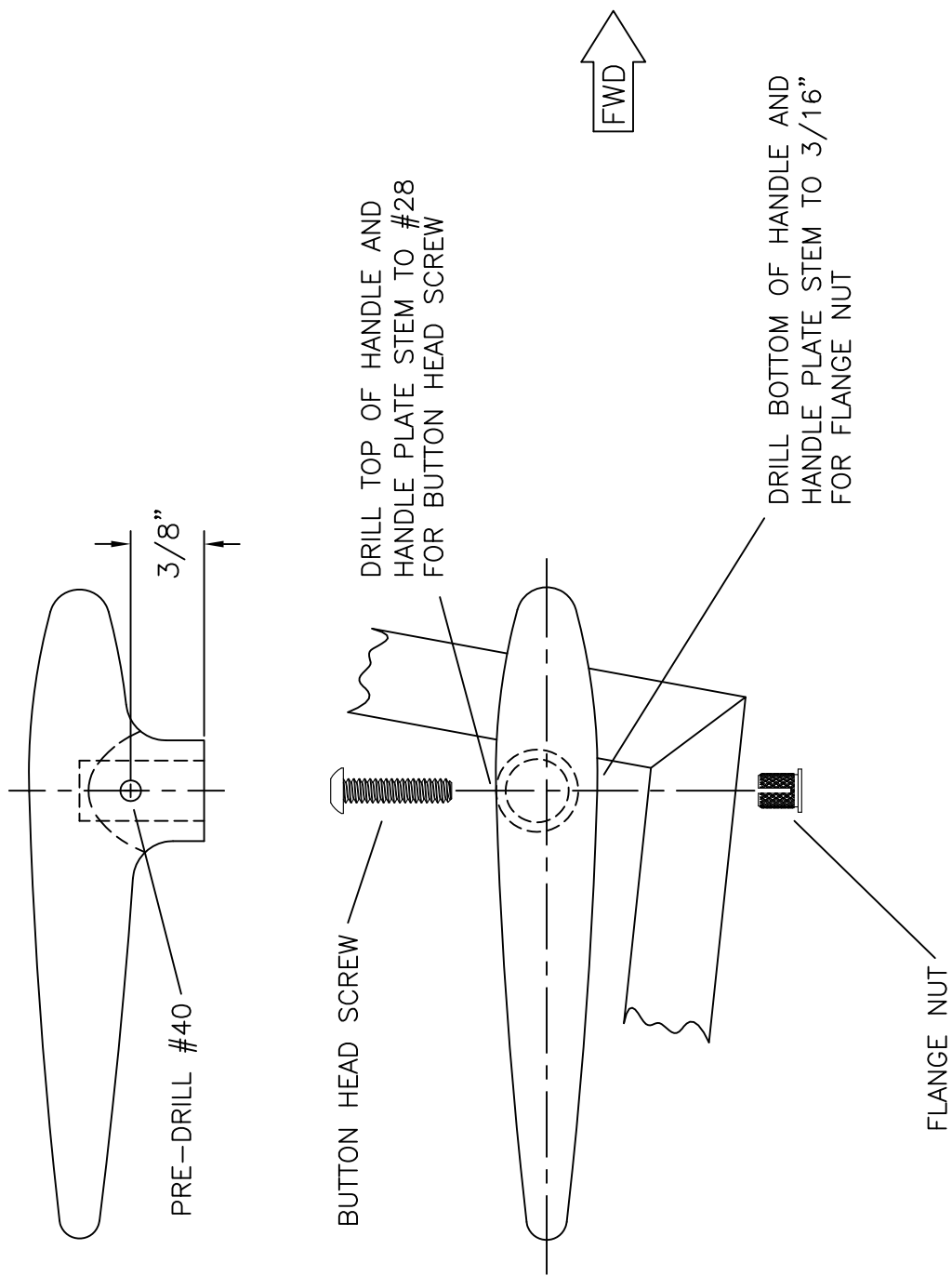
MD3650
REV. - ORIG

**RRR S-21 OUTBOUND
DOOR SPACER BUSHING
FIGURE 10H-24**



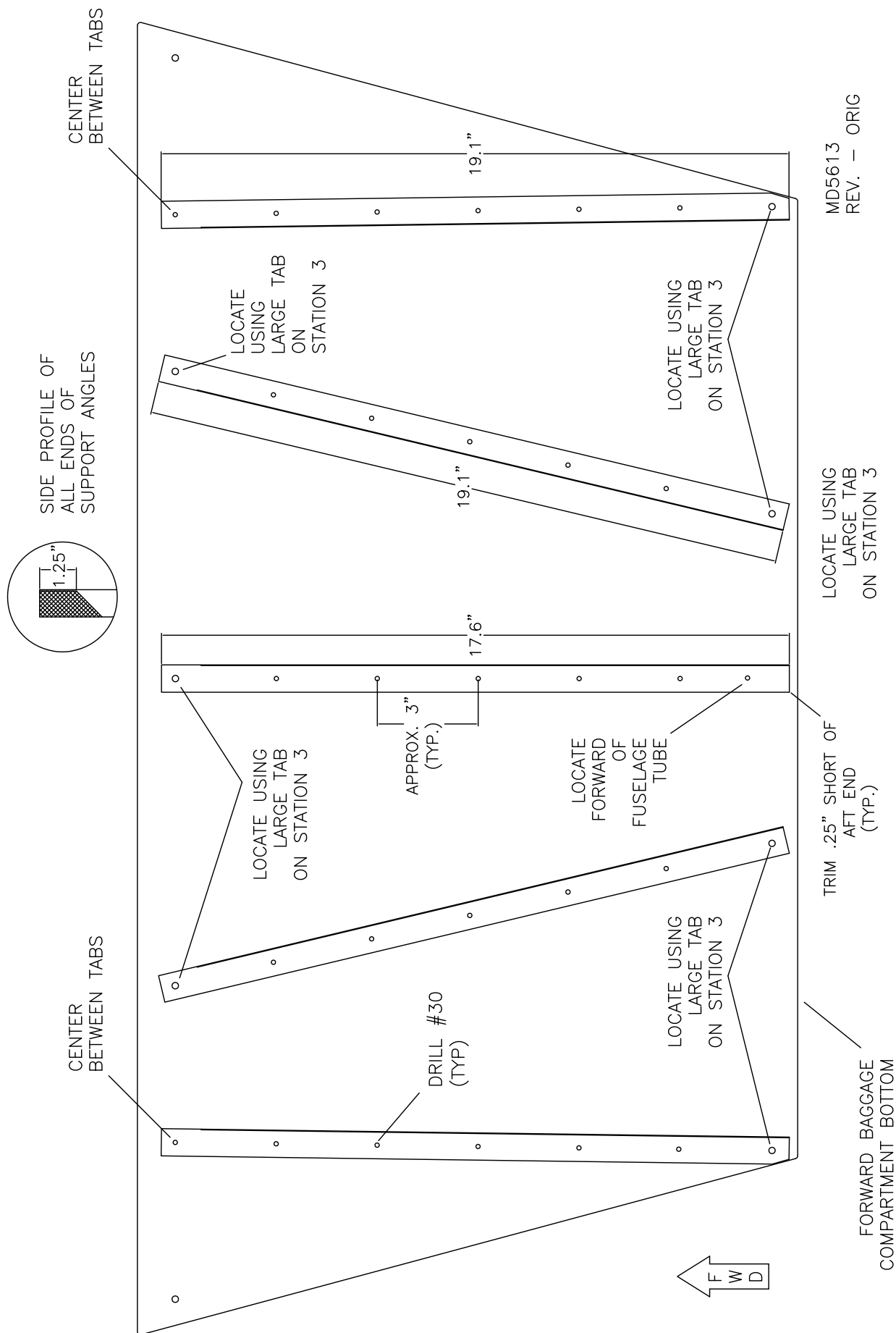
MD5621
REV. A

**S-21 OUTBOUND
DOOR STOP PLATE LOCATION**
FIGURE 10H-25

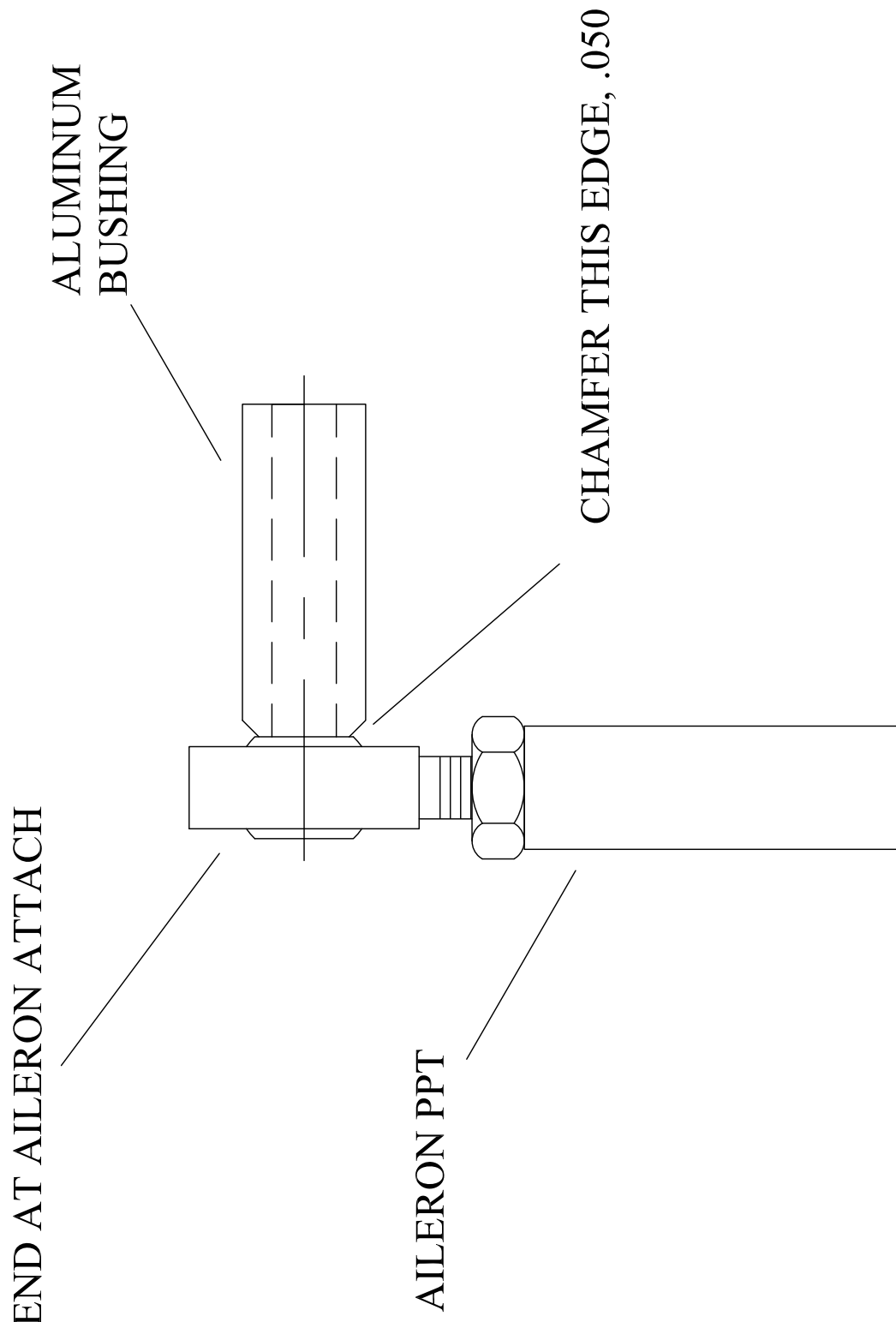


MD4404
REV. - ORIG

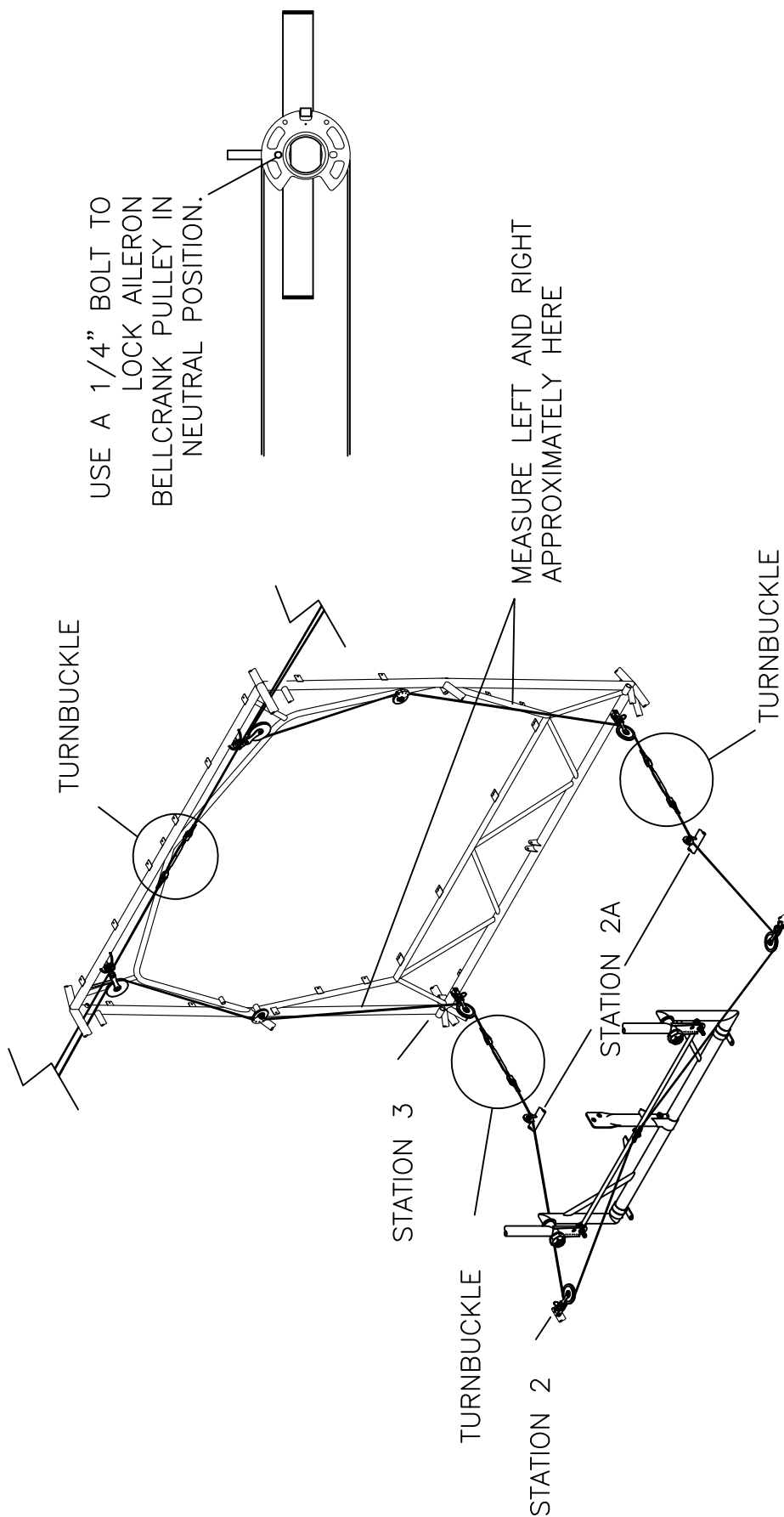
**RRR S-21 OUTBOUND
DOOR HANDLE DETAIL
FIGURE 10H-32**



RRR S-21 OUTBOUND
FORWARD BAGGAGE COMPARTMENT - BOTTOM
FIGURE 10I-03

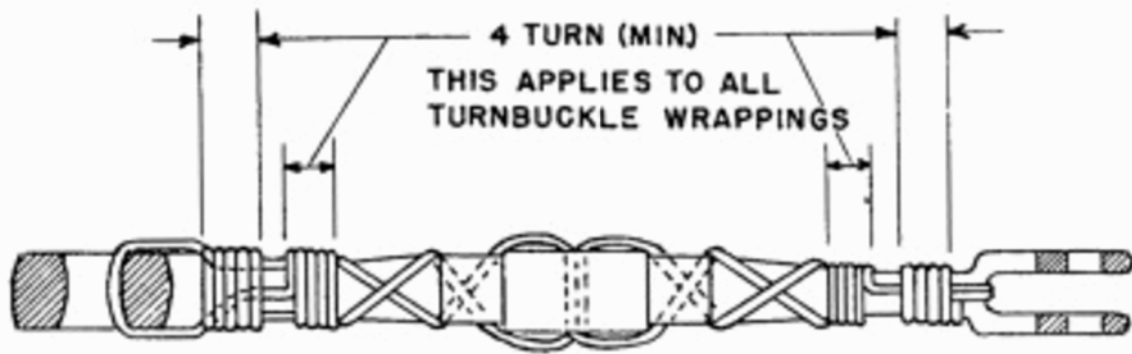


CENTER FORWARD CONTROL STICK (AILERON NEUTRAL) AND FIX IN THIS POSITION.
 ADJUST AILERON CABLE LENGTH AND CABLE TENSION AND CHECK THAT BOTH AILERON
 BELL CRANKS ARE IN NEUTRAL POSITION (VISUAL INSPECTION) WITH STICK CENTERED.
 ADJUST CABLE TENSION TO 20-25 LB. - 0.0 + 5 LBS (2 PLS)



MD4427
 REV. - ORIG

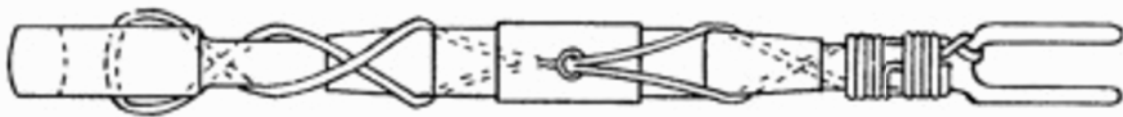
RAVEN S-21 OUTBOUND
AILERON RIGGING
FIGURE 12A-03A



(A) DOUBLE WRAP (SPIRAL)



(B) DOUBLE WRAP



(C) SINGLE WRAP (SPIRAL)

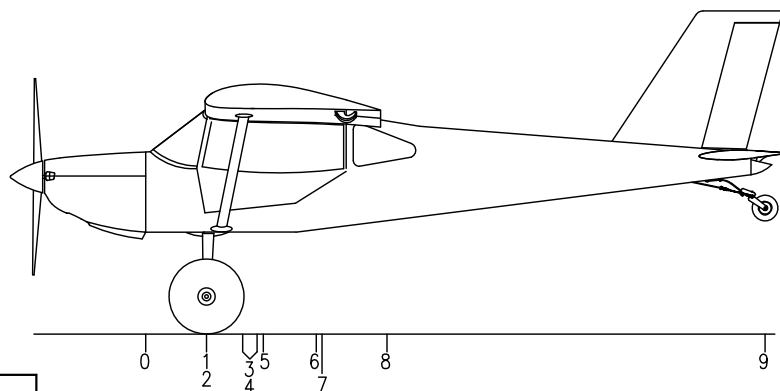


(D) SINGLE WRAP

**RANS S-21 OUTBOUND
TURNBUCKLE SAFETY WIRE
FIGURE 12A-04**

MD4427
REV. - ORIG

09/11/2018



N _____	
DATE WEIGHED	
ENGINE TYPE	ROTAX 912ULS
C.G. CONDITION	
EMPTY WEIGHT	lbs.
GROSS WT. ROTAX 912ULS	1320 lbs.
GROSS WT. TITAN X-340	1800 lbs.

RANS S-21 OUTBOUND (Taildragger)

ACCEPTABLE C.G. 31.72" TO 41.92" FROM DATUM 0.
 DATUM = FRONT OF FIREWALL; AIRCRAFT IN
 LEVEL ATTITUDE. (LEVEL REFERENCE 90° TO
 FUSELAGE AFT DOOR FRAME)

#	ITEM	WEIGHT	ARM	MOMENT
1	MAIN – RH	380	22.0"	8360
2	MAIN – LH	380	22.0"	8360
3	PILOT	200	37.0"	7400
4	PASSENGER	0	37.0	0
5	FUEL – WINGS	258	41.7"	10758.6
6	FUEL – HEADER TANK *	16.5	60.0"	990
7	BAGGAGE – FWD **	0	60.5"	0
8	BAGGAGE – AFT ***	0	84.5"	0
9	TAILWHEEL	83	210.0"	17430
TOTAL=		1317.5	TOTAL=	53298.6

range 34.5" to 39.5"

range 34.5" to 39.5"

MAX. 43 GALLON

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.} \quad \frac{53298.6}{1317.5} = 40.45"$$

* ROTAX 912ULS – MAXIMUM 2.75 GALLON
 TITAN X-340 – MAXIMUM 6.9 GALLON

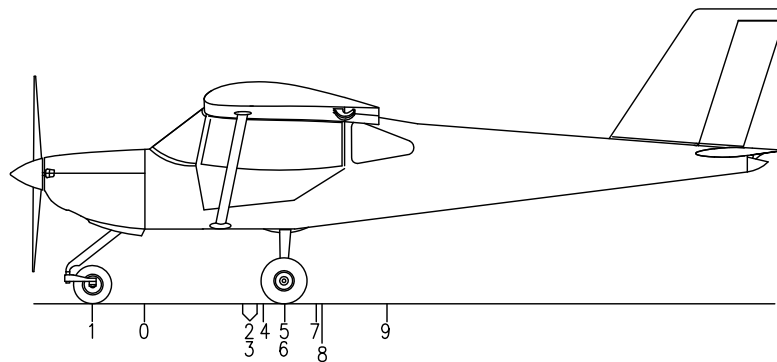
** ROTAX 912ULS – MAXIMUM OF 50 LBS IS ALLOWED FWD OF STATION 3.
 TITAN X-340 – MAXIMUM OF 113 LBS IS ALLOWED FWD OF STATION 3.

*** ROTAX 912ULS – MAXIMUM OF 30 LBS IS ALLOWED AFT OF STATION 3.
 TITAN X-340 – MAXIMUM OF 67 LBS IS ALLOWED AFT OF STATION 3.

RANS S-21 OUTBOUND EXAMPLE - WEIGHT & BALANCE STANDARD RANS TAILWHEEL FIGURE 13-01

MD5655
 REV. – ORIG

09/11/2018



N _____	
DATE WEIGHED	
ENGINE TYPE	ROTAX 912ULS
C.G. CONDITION	
EMPTY WEIGHT	lbs.
GROSS WT. ROTAX 912ULS	1320 lbs.
GROSS WT. TITAN X-340	1800 lbs.

RANS S-21 OUTBOUND (Trike)

ACCEPTABLE C.G. 31.72" TO 41.92" FROM DATUM 0.
 DATUM = FRONT OF FIREWALL; AIRCRAFT IN
 LEVEL ATTITUDE. (LEVEL REFERENCE 90° TO
 FUSELAGE AFT DOOR FRAME)

#	ITEM	WEIGHT	ARM	MOMENT
1	NOSE WHEEL	120	-17"	-2040
2	PILOT	200	37"	7400
3	PASSENGER	0	37"	0
4	FUEL - WINGS	258	41.7"	10758.6
5	MAIN - RH	360	49.1"	17676
6	MAIN - LH	360	49.1"	17676
7	FUEL - HEADER TANK *	16.5	60.0"	990
8	BAGGAGE - FWD **	0	60.5"	0
9	BAGGAGE - AFT ***	0	84.5"	0
TOTAL=		1314.5	TOTAL=	52460.6

range 34.5" to 39.5"

range 34.5" to 39.5"

MAX. 43 GALLON

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.}$$

$$\frac{52460.6}{1314.5} = 39.91"$$

* ROTAX 912ULS - MAXIMUM 2.75 GALLON
 TITAN X-340 - MAXIMUM 6.9 GALLON

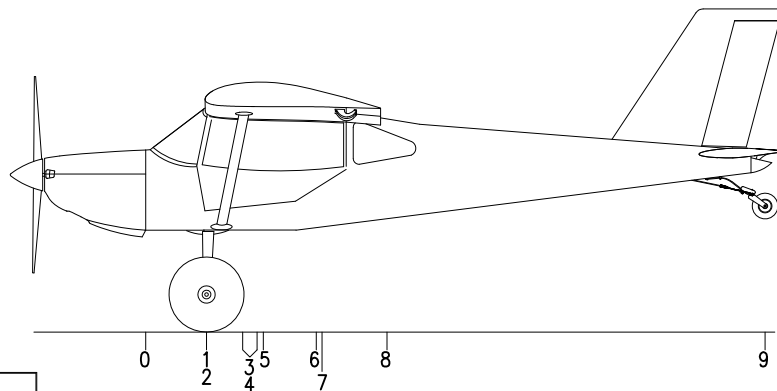
** ROTAX 912ULS - MAXIMUM OF 50 LBS IS ALLOWED FWD OF STATION 3.
 TITAN X-340 - MAXIMUM OF 113 LBS IS ALLOWED FWD OF STATION 3.

*** ROTAX 912ULS - MAXIMUM OF 30 LBS IS ALLOWED AFT OF STATION 3.
 TITAN X-340 - MAXIMUM OF 67 LBS IS ALLOWED AFT OF STATION 3.

RANS S-21 OUTBOUND EXAMPLE - WEIGHT & BALANCE TRIKE FIGURE 13-01A

MD5655
 REV. - ORIG

09/11/2018



N _____	
DATE WEIGHED	
ENGINE TYPE	
C.G. CONDITION	
EMPTY WEIGHT	lbs.
GROSS WT. ROTAX 912ULS	1320 lbs.
GROSS WT. TITAN X-340	1800 lbs.

RANS S-21 OUTBOUND (Taildragger)

ACCEPTABLE C.G. 31.72" TO 41.92" FROM DATUM 0.
 DATUM = FRONT OF FIREWALL; AIRCRAFT IN
 LEVEL ATTITUDE. (LEVEL REFERENCE 90° TO
 FUSELAGE AFT DOOR FRAME)

#	ITEM	WEIGHT	ARM	MOMENT
1	MAIN - RH		22.0"	
2	MAIN - LH		22.0"	
3	PILOT		37.0"	
4	PASSENGER		37.0	
5	FUEL - WINGS		41.7"	
6	FUEL - HEADER TANK *		60.0"	
7	BAGGAGE - FWD **		60.5"	
8	BAGGAGE - AFT ***		84.5"	
9	TAILWHEEL		210.0"	
TOTAL=			TOTAL=	

range 34.5" to 39.5"

range 34.5" to 39.5"

MAX. 43 GALLON

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.} \quad \text{_____} =$$

* ROTAX 912ULS - MAXIMUM 2.75 GALLON
 TITAN X-340 - MAXIMUM 6.9 GALLON

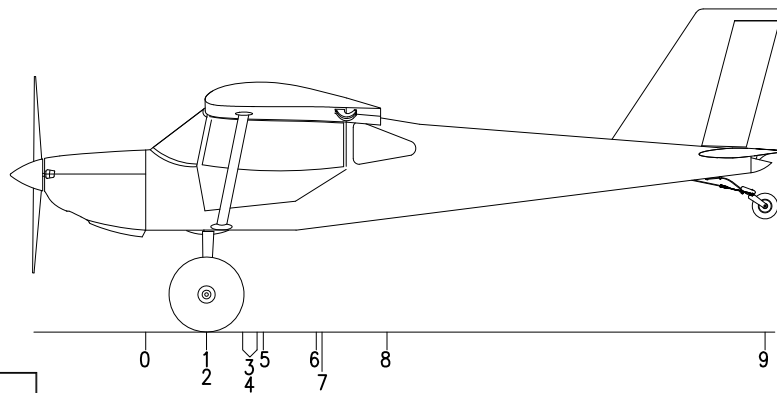
** ROTAX 912ULS - MAXIMUM OF 50 LBS IS ALLOWED FWD OF STATION 3.
 TITAN X-340 - MAXIMUM OF 113 LBS IS ALLOWED FWD OF STATION 3.

*** ROTAX 912ULS - MAXIMUM OF 30 LBS IS ALLOWED AFT OF STATION 3.
 TITAN X-340 - MAXIMUM OF 67 LBS IS ALLOWED AFT OF STATION 3.

RANS S-21 OUTBOUND WEIGHT & BALANCE STANDARD RANS TAILWHEEL FIGURE 13-02

MD5655
 REV. - ORIG

09/11/2018



N _____	
DATE WEIGHED	
ENGINE TYPE	
C.G. CONDITION	
EMPTY WEIGHT	lbs.
GROSS WT. ROTAX 912ULS	1320 lbs.
GROSS WT. TITAN X-340	1800 lbs.

RANS S-21 OUTBOUND (Taildragger)

ACCEPTABLE C.G. 31.72" TO 41.92" FROM DATUM 0.
 DATUM = FRONT OF FIREWALL; AIRCRAFT IN
 LEVEL ATTITUDE. (LEVEL REFERENCE 90° TO
 FUSELAGE AFT DOOR FRAME)

#	ITEM	WEIGHT	ARM	MOMENT
1	MAIN - RH		22.0"	
2	MAIN - LH		22.0"	
3	PILOT		37.0"	
4	PASSENGER		37.0	
5	FUEL - WINGS		41.7"	
6	FUEL - HEADER TANK *		60.0"	
7	BAGGAGE - FWD **		60.5"	
8	BAGGAGE - AFT ***		84.5"	
9	TAILWHEEL		210.4"	
TOTAL=			TOTAL=	

range 34.5" to 39.5"
 range 34.5" to 39.5"
 MAX. 43 GALLON

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.} \quad \text{_____} =$$

* ROTAX 912ULS - MAXIMUM 2.75 GALLON
 TITAN X-340 - MAXIMUM 6.9 GALLON

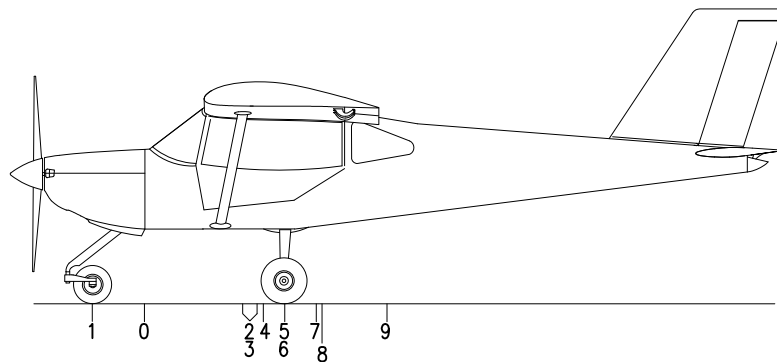
** ROTAX 912ULS - MAXIMUM OF 50 LBS IS ALLOWED FWD OF STATION 3.
 TITAN X-340 - MAXIMUM OF 113 LBS IS ALLOWED FWD OF STATION 3.

*** ROTAX 912ULS - MAXIMUM OF 30 LBS IS ALLOWED AFT OF STATION 3.
 TITAN X-340 - MAXIMUM OF 67 LBS IS ALLOWED AFT OF STATION 3.

RANS S-21 OUTBOUND WEIGHT & BALANCE OPTIONAL 10" TAILWHEEL FIGURE 13-02A

MD5655
 REV. - ORIG

09/11/2018



N _____	
DATE WEIGHED	
ENGINE TYPE	
C.G. CONDITION	
EMPTY WEIGHT	lbs.
GROSS WT. ROTAX 912ULS	1320 lbs.
GROSS WT. TITAN X-340	1800 lbs.

RANS S-21 OUTBOUND (Trike)

ACCEPTABLE C.G. 31.72" TO 41.92" FROM DATUM 0.
 DATUM = FRONT OF FIREWALL; AIRCRAFT IN
 LEVEL ATTITUDE. (LEVEL REFERENCE 90° TO
 FUSELAGE AFT DOOR FRAME)

#	ITEM	WEIGHT	ARM	MOMENT
1	NOSE WHEEL		-17"	
2	PILOT		37"	
3	PASSENGER		37"	
4	FUEL - WINGS		41.7"	
5	MAIN - RH		49.1"	
6	MAIN - LH		49.1"	
7	FUEL - HEADER TANK *		60.0"	
8	BAGGAGE - FWD **		60.5"	
9	BAGGAGE - AFT ***		84.5"	
TOTAL=			TOTAL=	

range 34.5" to 39.5"

range 34.5" to 39.5"

MAX. 43 GALLON

$$\frac{\text{TOTAL MOMENTS}}{\text{TOTAL WEIGHT}} = \text{C.G.} \quad \text{_____} =$$

* ROTAX 912ULS - MAXIMUM 2.75 GALLON
 TITAN X-340 - MAXIMUM 6.9 GALLON

** ROTAX 912ULS - MAXIMUM OF 50 LBS IS ALLOWED FWD OF STATION 3.
 TITAN X-340 - MAXIMUM OF 113 LBS IS ALLOWED FWD OF STATION 3.

*** ROTAX 912ULS - MAXIMUM OF 30 LBS IS ALLOWED AFT OF STATION 3.
 TITAN X-340 - MAXIMUM OF 67 LBS IS ALLOWED AFT OF STATION 3.

RANS S-21 OUTBOUND WEIGHT & BALANCE TRIKE FIGURE 13-03

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(CONTINUOUS HISTORY OF CHANGES IN STRUCTURE OR EQUIPMENT AFFECTING WEIGHT AND BALANCE)

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