

RYAN  
NAVION A

CAA APPROVED

DATE 3-24-55

CAA Identification

N- 4914 K  
~~92106~~

BY

Amerson

AIRPLANE FLIGHT MANUAL SUPPLEMENT  
FOR  
20-GALLON WING FUEL TANK INSTALLATION  
(As approved for Brittain Aircraft Enterprises  
419 E. Green Street, Inglewood, Calif.)

This aircraft equipped with Brittain Aircraft Enterprises' 20-gallon wing tip fuel tank installation must be operated in compliance with the limitations prescribed herein.

A. LIMITATIONS SECTION.

Same as prescribed in Navion A CAA Approved Flight Manual dated July 26, 1959, except:

1. GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most forward loading 93.9" (15% MAC) at 2350 lbs. or less.

Most forward loading 98.1" (21% MAC) at 2850 lbs.\*

Most rearward loading 104.0" (29.8% MAC) at 2850 lbs. or less.

NORMAL CATEGORY WITH FUEL IN TIP TANKS SAME AS ABOVE EXCEPT:

Most rearward loading 102.0" (26.9% MAC) at 2850 lbs or less

NO CATEGORY OTHER THAN NORMAL IS APPROVED

\*2850 lbs. gross wt. allowed only if landing gear meets requirements outlined in Brittain Aircraft Enterprises Installation. T1-2.

2. STALLS

A minimum of 150 feet of altitude is required to recover from power-off stalls.

B. PROCEDURES SECTION

Same as prescribed in Navion A CAA Approved Airplane Flight Manual dated July 26, 1949, except:

1. AUXILIARY TIP TANK FUEL TO BE USED IN LEVEL FLIGHT ONLY IN ACCORDANCE WITH THE FOLLOWING:

TO PRECLUDE THE POSSIBILITY OF UNSYMMETRICAL FUEL FLOW WHEN OPERATING FROM BOTH TANKS (CROSS FEED SELECTOR SWITCH ON)

SELECT EACH TANK INDIVIDUALLY FOR APPROXIMATELY ONE MINUTE PRIOR TO OPENING CROSS FEED VALVE.

2. IF UNSYMMETRICAL FUEL LOADING OCCURS IN FLIGHT, LANDING SHOULD BE MADE WITH FLAPS UP.

C. PERFORMANCE INFORMATION SECTION

This section of the Airplane Flight Manual is not necessary inasmuch as the airplane meets the take-off and balked landing climb performance requirements of CAR 3.85 (a) and (c) of Amendment 3-4.

WEIGHT AND BALANCE AND OPERATING INFORMATION, (CONT'D)

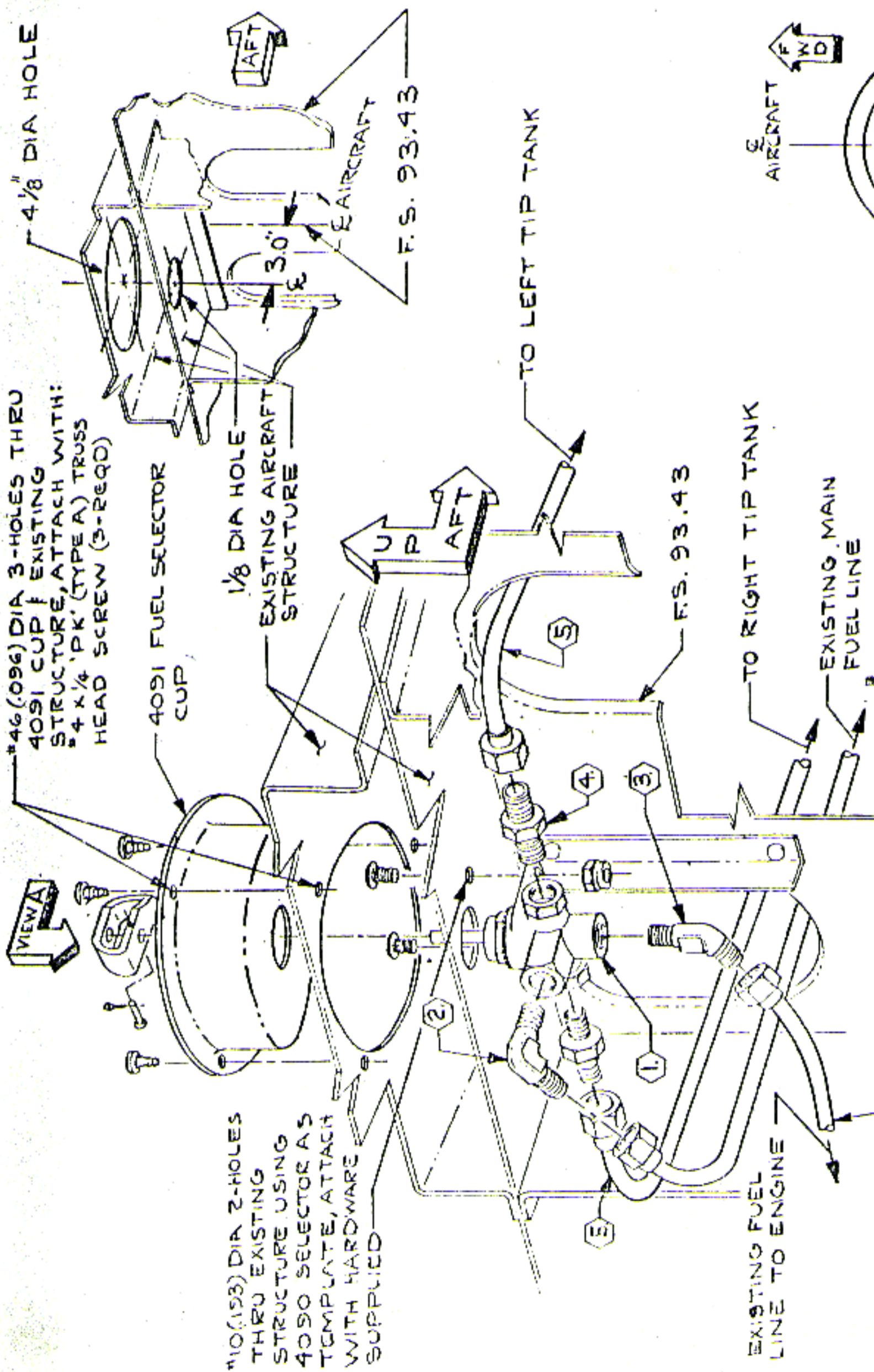
2750 POUNDS, THE LANDING GEAR MUST MEET THE FOLLOWING REQUIREMENTS: THE MAIN INNER SHOCK STRUT (RYAN PART #145-33104), MUST TEST ROCKWELL 100,000 PSI. THE MATERIAL IS 4130 CHROMIUM STEEL. ANY HARDNESS TEST CONVERTED TO PSI IS ACCEPTABLE. ALL NAVIONS SERIAL #2000 AND SUBSEQUENT HAVE RYAN PART #145-33104-7 WHICH MEETS THE REQUIRED 100,000 PSI AND NEED NOT BE CHECKED. DO NOT REMOVE STRUT FOR HARDNESS CHECK. IF IT IS NECESSARY TO CHECK, CONTACT BRITAIN INDUSTRIES AS A PORTABLE HARDNESS TESTER FOR THIS PURPOSE IS AVAILABLE ON LOAN BASIS.

TABLE 1 - MAXIMUM ALLOWABLE GROSS WEIGHT WITH WING TIP TANKS

<u>MODEL</u>	<u>HP</u>	<u>EMPTY TIP TANKS</u>	<u>FULL TIP TANKS</u>
NAVION	185	2750 LBS.	2750 LBS.
NAVION A	205	2850 LBS.	2850 LBS.
NAVION A	225	2850 LBS.	3000 LBS.
NAVION A	240	2860 LBS.	3100 LBS.
NAVION A	250	2860 LBS.	3100 LBS.
NAVION A	260	2860 LBS.	3100 LBS.
NAVION B	260	2860 LBS.	3100 LBS.
NAVION D	240	2860 LBS.	3100 LBS.
NAVION E	250	2860 LBS.	3100 LBS.
NAVION F	260	2860 LBS.	3100 LBS.

LIMITATIONS: IN ALL INSTANCES ANY WEIGHT OVER 2860 LBS. MUST BE CARRIED AS TIP TANK FUEL LOAD.

ON NAVIONS WITH PRESSURIZED CARBURETORS, THE NORMAL QUANTITY OF FUEL RETURNED FROM THE CARBURETOR TO THE RIGHT MAIN TANK IS 3 GALLONS PER HOUR. WHEN OPERATING ON WING TIP TANKS, THE LEVEL OF FUEL IN THE MAIN TANKS MUST BE LOW ENOUGH TO ALLOW FOR THIS RETURN. IN NAVIONS POWERED BY ENGINES WITH FUEL INJECTION, THERE IS A RETURN OF 10 GALLONS PER HOUR. IN THESE AIRCRAFT, WING TIP TANKS SHOULD BE USED ONLY SO LONG AS THE MAIN FUEL QUANTITY GAGE REGISTERS BELOW 30 GALLONS. THIS WILL ALWAYS LEAVE AT LEAST 9.5 GALLONS FUEL SPACE IN THE MAIN TANK FOR THE RETURNED FUEL (THE 9.5 GALLONS BEING THAT AMOUNT OF FUEL WHICH DOES NOT NORMALLY REGISTER ON THE MAIN FUEL QUANTITY GAGE OF THE NAVION). IF THE MAIN FUEL QUANTITY GAGE REGISTERS OVER 30 GALLONS, THEN OPERATION FROM WING TIP TANKS SHOULD BE SUSPENDED AND MAIN TANKS SHOULD BE SELECTED, UNTIL NEEDLE RETURNS TO A POSITION BELOW 30 GALLONS.



IT MAY BE NECESSARY TO EXTEND THIS LINE. HARDWARE IS PROVIDED

- SELECTOR VALVE ASSY
- ⑤ 4024-5 FUEL LINE ASSY (2-REQD)
  - ④ AN 816-6D NIPPLE (2-REQD)
  - ③ AN 823-6D 45° ELBOW
  - ② AN 822-6D 90° ELBOW
  - ① 4090 FUEL SELECTOR VALVE ASSY

VIEW A  
 VALVE OMITTED

CHANGE

BRITAIN INDUSTRIES, INC.  
HAWTHORNE CALIFORNIA

# FUEL LINE PLUMBING SCHEMATIC

2050 SH 2  
DRAWING NUMBER OF 5

CHANGE

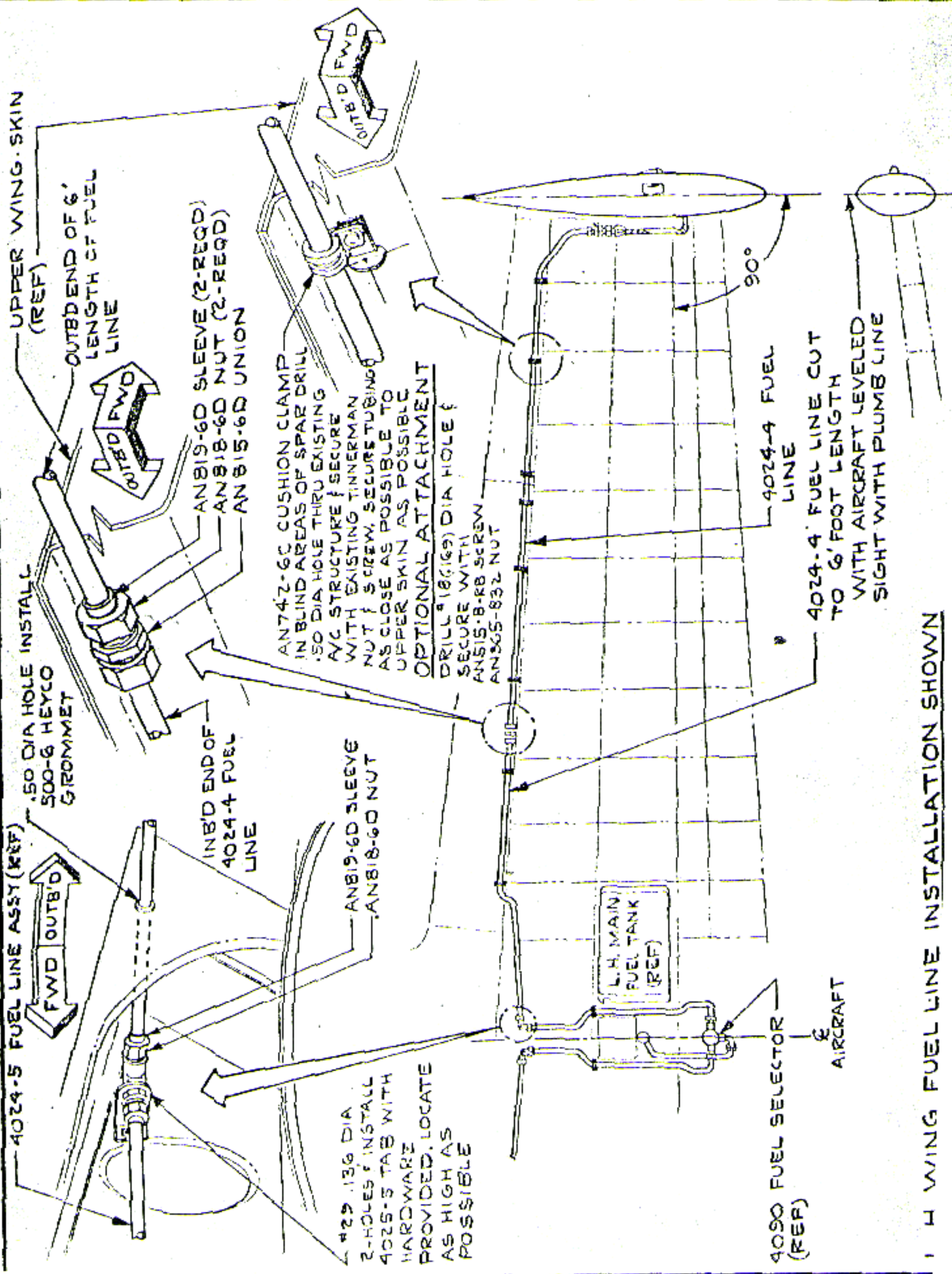
APPROVED BY: *J. M. Donaldson* DATE: 2-29-66  
 CHECKED BY: *W. J. ...* DATE: 3-25-66  
 DRAWN: J. M. DONALDSON DATE: 3-17-66

DATE: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_

ORM 81-009

2050 SH 2  
OF 5



UPPER WING SKIN (REF)

OUTBOARD END OF 6' LENGTH OF FUEL LINE

AN819-6D SLEEVE (2-REQD)  
AN818-6D NUT (2-REQD)  
AN815-6D UNION

AN742-6C CUSHION CLAMP  
 IN BLIND AREAS OF SPAR DRILL  
 .50 DIA HOLE THRU EXISTING  
 A/C STRUCTURE & SECURE  
 WITH EXISTING TINNERMAN  
 NUT & SCREW, SECURE TUBING  
 AS CLOSE AS POSSIBLE TO  
 UPPER SKIN AS POSSIBLE  
 OPTIONAL ATTACHMENT  
 DRILL #18(169) DIA HOLE &  
 SECURE WITH  
 AN515-B-88 SCREW  
 AN365-832 NUT

.50 DIA HOLE INSTALL  
 500-6 HEYCO  
 GROMMET

4024-5 FUEL LINE ASSY (REF)

FWD OUTB'D

INB'D END OF 4024-4 FUEL LINE

AN819-6D SLEEVE  
AN818-6D NUT

#29 .136 DIA  
 2-HOLES & INSTALL  
 4025-5 TAB WITH  
 HARDWARE. LOCATE  
 PROVIDED. LOCATE  
 AS HIGH AS  
 POSSIBLE

4050 FUEL SELECTOR (REF)  
 AIRCRAFT

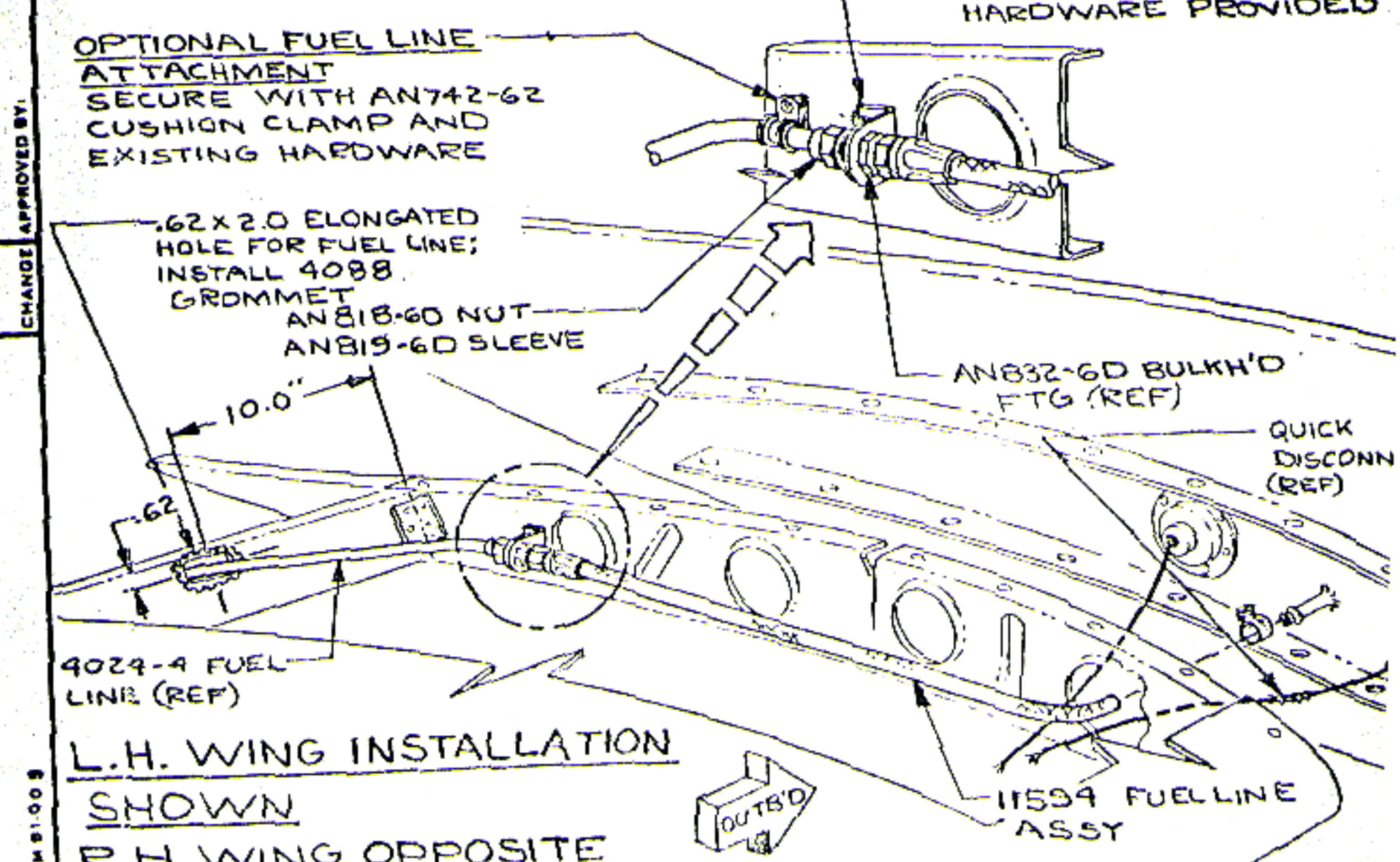
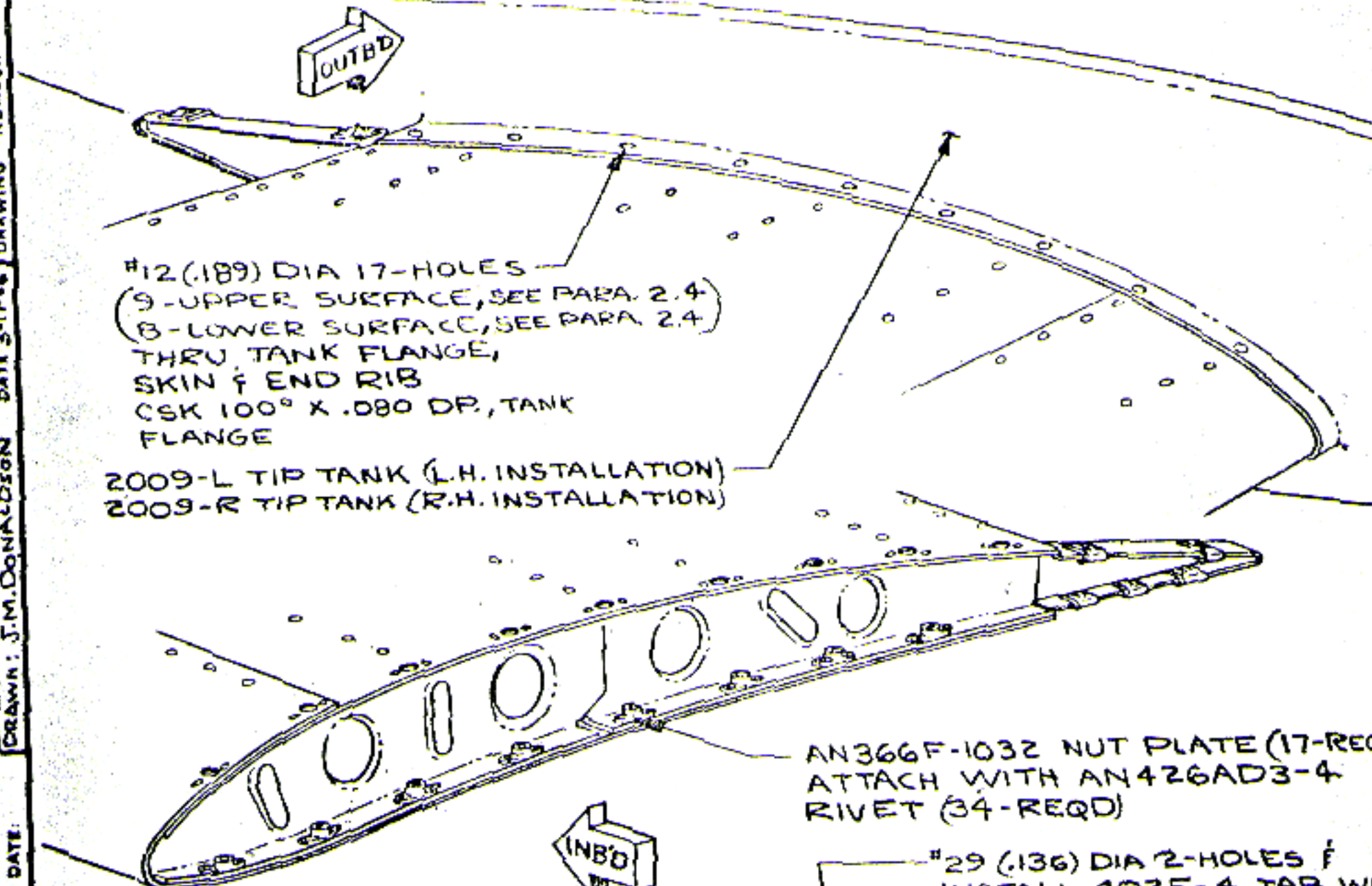
L.H. MAIN FUEL TANK (REF)

90°  
4024-4 FUEL LINE

4024-4 FUEL LINE CUT  
 TO 6' FOOT LENGTH  
 WITH AIRCRAFT LEVELED  
 SIGHT WITH PLUMB LINE

L.H. WING FUEL LINE INSTALLATION SHOWN

APPROVED BY: *[Signature]* DATE 3-29-66  
CHECKED BY: *[Signature]* DATE 7-29-66  
DRAWN: J.M. DONALDSON DATE 3-17-66  
DRAWING NUMBER 2050 OF 5



CRM 81-008

OHM 81-00 3

CHANGE APPROVED BY: DATE:

APPROVED BY: *H. H. ...* DATE: 7-19-66  
CHECKED BY: *M. P. ...* DATE: 7-27-66  
DRAWN: J. M. DONALDSON DATE: 3-17-66

2050 H T  
OF 5  
DRAWING NUMBER

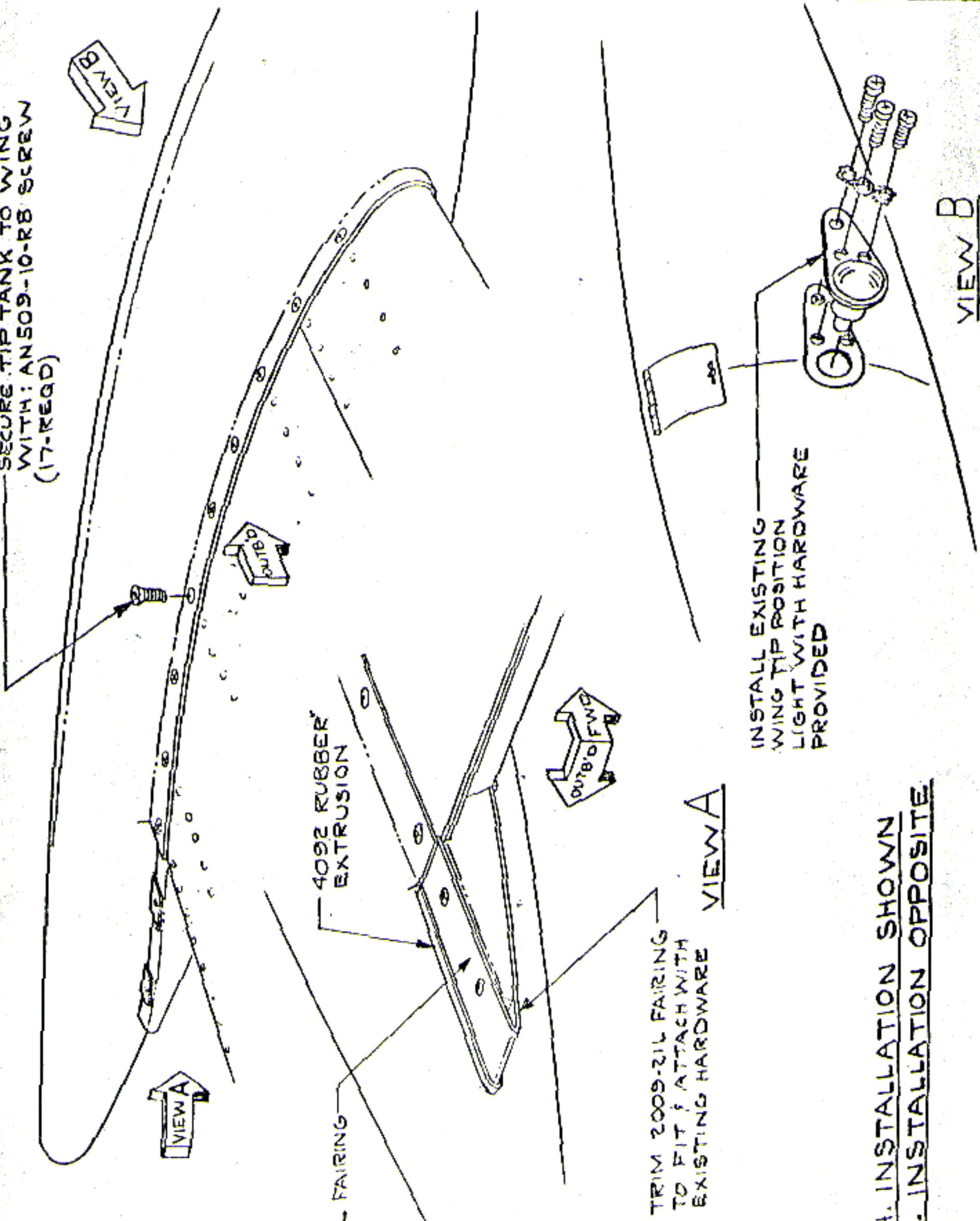
CHANGE

BRITAIN INDUSTRIES, INC.  
HAWTHORNE CALIFORNIA

# TIP TANK INSTALLATION NAVION

2050 SH 4  
DRAWING NUMBER OF 5  
CHANGE

SECURE TIP TANK TO WING  
WITH: AN509-10-RB SCREW  
(17-REQD)



4092 RUBBER  
EXTRUSION

2009-21L FAIRING

TRIM 2009-21L FAIRING  
TO FIT & ATTACH WITH  
EXISTING HARDWARE

INSTALL EXISTING  
WING TIP POSITION  
LIGHT WITH HARDWARE  
PROVIDED

L.H. INSTALLATION SHOWN  
R.H. INSTALLATION OPPOSITE

VIEW A

VIEW B

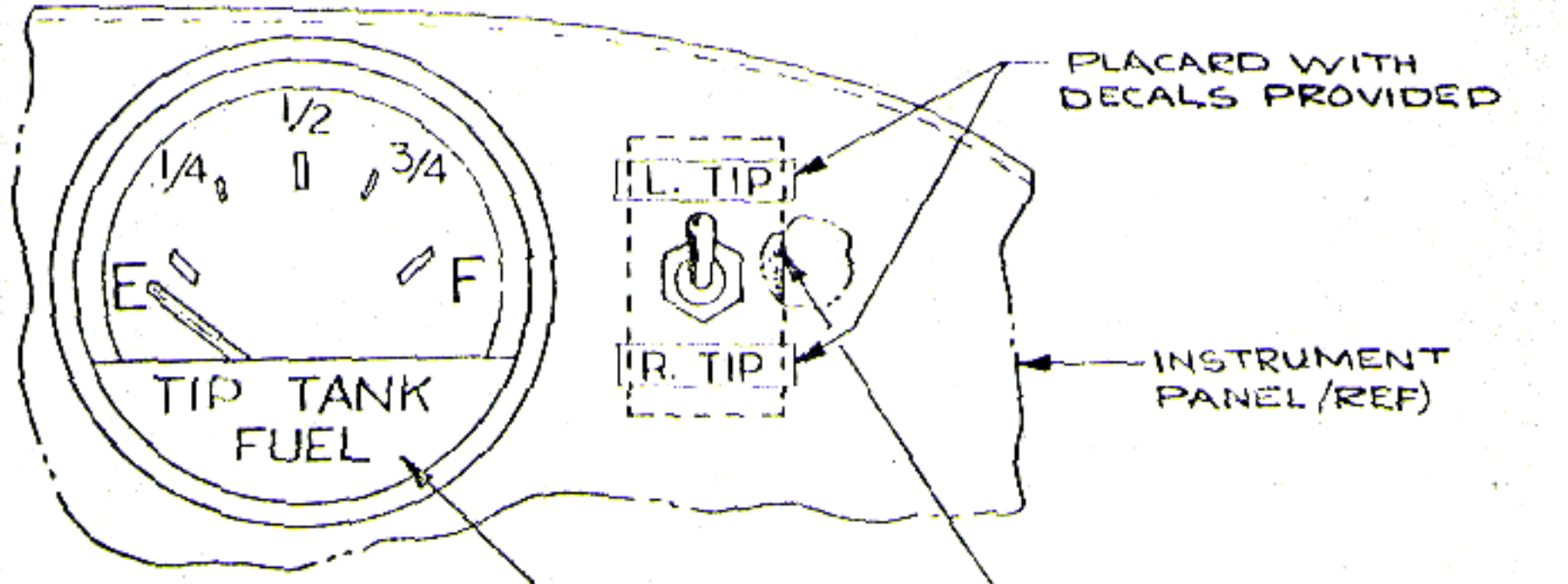
OUTB'D FWD

VIEW B

APPROVED BY: *M. J. ...* DATE: 7-1-64  
 CHECKED BY: *M. J. ...* DATE: 3-27-64  
 DRAWN: J. M. DONALDSON DATE: 3-7-66

DATE: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_

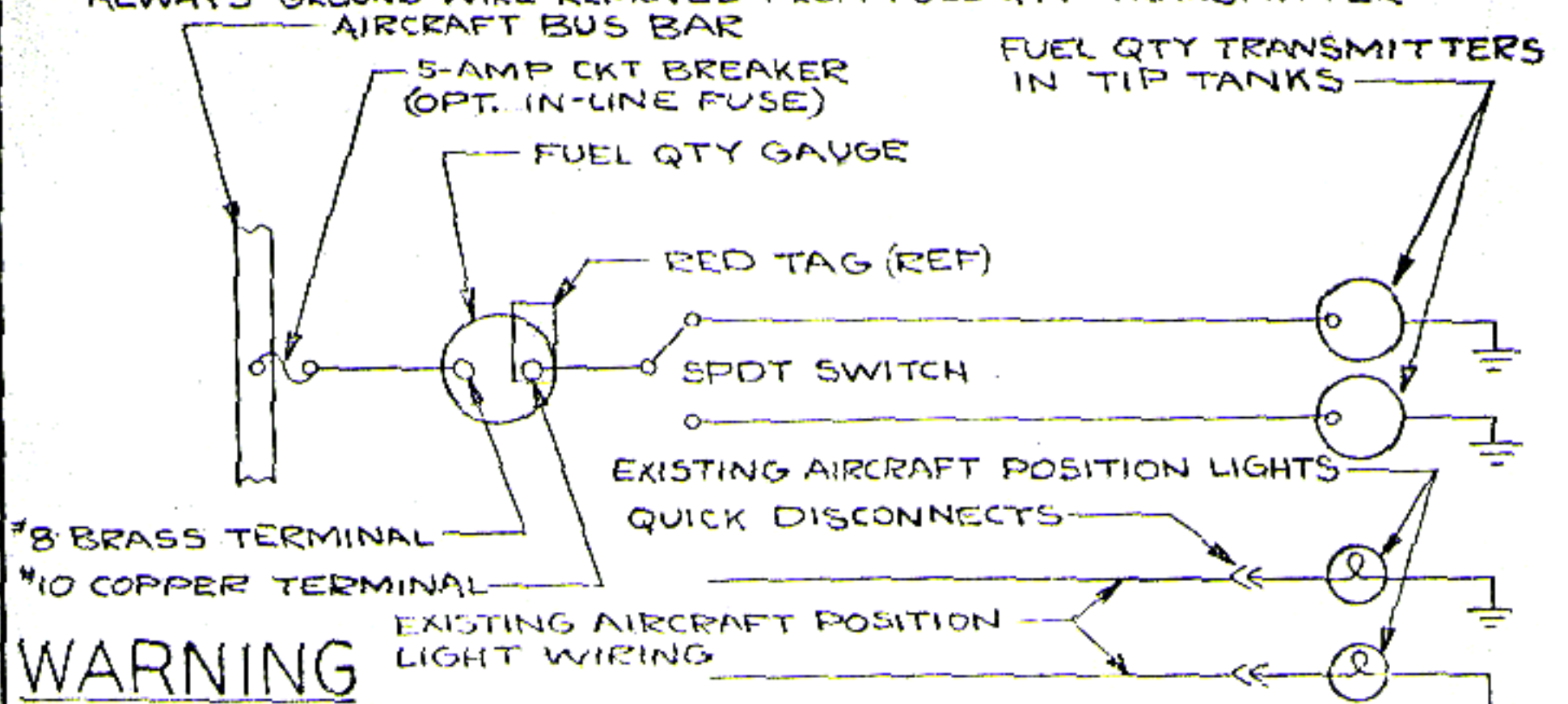
FORM 81-00 8



55027 FUEL QTY GAUGE  
 SECURE WITH HARDWARE  
 PROVIDED

**NOTES:**

1. ALL NEW WIRING TO BE #20 GAUGE AN-J-C-48A OR EQUIV.
2. FUEL QTY GAUGE TO BE PANEL MOUNTED IN SPARE CUT-OUT WHERE EASILY SEEN BY PILOT.
3. SWITCH (SPDT) TO BE ON ELECTRICAL SUB-PANEL OR MAIN INSTRUMENT PANEL NEXT TO FUEL QTY GAUGE.
4. WARNING DO NOT CONNECT 12-VOLTS DIRECTLY TO TIP TANK ASSEMBLIES OR DIRECTLY TO #10 COPPER TERMINAL ON THE FUEL QTY GAUGE.
5. WARNING FUEL QTY GAUGE WILL BURN OUT IF POWER IS ON, CKT BREAKER (OPTIONAL IN-LINE FUSE) INSTALLED & CIRCUITS NOT COMPLETED. KEEP GAUGE DISCONNECTED UNTIL ALL OTHER WIRING IS COMPLETED. WHEN REMOVING TANK FROM AIRCRAFT ALWAYS GROUND WIRE REMOVED FROM FUEL QTY TRANSMITTER



**WARNING**

KEEP AIRCRAFT MASTER SWITCH OFF DURING WIRING OPERATION

NAVION  
NAVION A, B, D, E, F,  
(Circle appropriate Model)

FAA APPROVED

DATE December 22, 1959

FAA Identification \_\_\_\_\_

BY W.A. Kelly  
VF

BRITAIN AIRCRAFT ENTERPRISES  
AIRPLANE FLIGHT MANUAL SUPPLEMENT  
FOR  
20-GALLON WING TIP FUEL TANK INSTALLATION

This aircraft is equipped with Mark II Wing Tip Tanks, (Part #2009), 20 gallons each, and must be operated in compliance with the limitations prescribed herein.

A. LIMITATIONS SECTION

Same as prescribed in appropriate CAA (FAA) Approved Airplane Flight Manual except:

1. NO CATEGORY OTHER THAN NORMAL IS APPROVED.

2. STALLS

A minimum of 150 feet of altitude is required to recover from power-off stalls.

3. INCREASE IN GROSS WEIGHT ALLOWANCES ALLOWED ONLY IF LANDING GEAR MEETS REQUIREMENTS OF INSTALLATION MANUAL TT2-1. INCREASED GROSS WEIGHT MUST BE IN ACCORDANCE WITH TABLE I, INSTALLATION MANUAL TT2-1, AND WHERE APPLICABLE, ANY INCREASE IN GROSS WEIGHT MUST BE CARRIED AS WING TIP TANK FUEL LOAD.

4. NAVION

Same as prescribed in CAA (FAA) Approved Airplane Flight Manual dated June 3, 1947.

NAVION A

Same as prescribed in appropriate CAA (FAA) Approved Airplane Flight Manual except:

GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most forward loading 93.9" (15%MAC) at 2350 lbs or less.

Most forward loading 93.1" (21%MAC) at 2850 lbs.

Most rearward loading 104.0" (29.8%MAC) at 2850 lbs or less

NORMAL CATEGORY WITH FUEL IN TIP TANKS SAME AS ABOVE EXCEPT:

With 205 H.P Engine - Most rearward loading 102.0" (26.9%MAC) at 2850 lbs or less.

With 225 H.P. ENGINE - Most rearward loading 102.0" (26.9%MAC) at 3000 lbs or less.



BRITAIN AIRCRAFT ENTERPRISES  
AIRPLANE FLIGHT MANUAL SUPPLEMENT  
FOR  
20-GALLON WING TIP FUEL TANK INSTALLATION

NAVION B

Same as prescribed in appropriate CAA (FAA) Approved Airplane Flight Manual except:

GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most forward loading 93.9" (15% MAC) at 2350 lbs or less

Most forward loading 98.1" (21% MAC) at 2860 lbs.

Most rearward loading 103.5 (29% MAC) at 2860 lbs or less

NORMAL CATEGORY WITH FUEL IN TIP TANKS SAME EXCEPT:

Most rearward loading 102.0" (27% MAC) at 3100 lbs or less

NAVIONS D, E, & F

Same as prescribed in appropriate CAA (FAA) Approved Flight Manual except:

GROSS WEIGHT AND C.G. LIMITATIONS:

NORMAL CATEGORY NO FUEL IN TIP TANKS:

Most rearward loading 103.5" at 2860 lbs or less

NORMAL CATEGORY WITH FUEL IN TIP TANKS:

Most rearward loading 102.0" at 3100 lbs or less

B. PROCEDURE SECTION

Same as prescribed in respective (CAA) FAA Airplane Flight Manual except:

1. AUXILIARY TIP TANK FUEL TO BE USED IN LEVEL FLIGHT ONLY IN ACCORDANCE WITH THE FOLLOWING:
  - a. TO PRECLUDE THE POSSIBILITY OF OVERFLOWING THE MAIN TANK BY EXCESS FUEL RETURNED FROM CARBURETOR, WING TIP TANKS SHOULD BE USED ONLY WHILE MAIN GAGE REGISTERS BELOW 30 GALLONS.
2. WITH STANDARD INSTALLATION, THAT IS, NO CROSSFEED, RIGHT AND LEFT TIP TANKS SHOULD BE SELECTED ALTERNATELY AT INTERVALS TO PREVENT EXCESSIVE FUEL ASYMMETRY.
3. IF UNSYMMETRICAL FUEL LOADING OCCURS IN FLIGHT, LANDING SHOULD BE MADE WITH FLAPS UP.

C. PERFORMANCE INFORMATION SECTION

Revision of this section of the Airplane Flight Manual is not necessary inasmuch as the airplane meets the take-off and balked landing climb performance requirements of CAR 3.85 (a) and (c) of Amendment 3-4.