Service Letters

NORTH AMERICAN AVIATION • INC.

Number	Date	Description	1) Applicable AD 2) Part kit (1) 3) Part kit (2) 4) Compliance date
1	1/01/47	Engine cowl dzus spring rework	1) 2) see SL 3) 4)
2	1/01/47	Prop control friction lock	1) 2) 3) 4)
3	5/16/47	Nose wheel vibration	1) 2) 3) 4)
4	2/10/47	Brake assembly re-work	1) 2) 3) 4)
5	2/14/47	Primer replacement	1) 2) 3) 4)
6	2/26/47	Leaking hydraulic pressure relief valve repair	1) 2) 3) 4)
7	5/16/47	Low fuel pressure	1) 2) 3) 4)
8	3/31/47	Cab heat thermostat switch cam adjustment	1) 2) 3) 4)
9	3/11/47	Starter pedal re-enforcement bracket	1) 2) 3) 4)

10	3/04/47	Hartzell prop blade pitch change correction	1) 2) see SL 3) 4)
11	3/17/47	Engine starter adjustment	1) 2) see SL 3) 4)
12	3/20/47	Carb air straightener installation	1) 2) see SL 3) 4)
13	2/04/47	Push rod & valve rocker modification	1) 2) see SL 3) 4)
13-1	3/21/47	Service manual class c equipment	1) 2) see SL 3) 4)
14		Intentionally left blank	1) 2) 3) 4)
15	3/21/47	Inspect of GE radio pwr pack	1) 2) 3) 4)
16		Intentionally left blank	1) 2) 3) 4)
17	3/28/47	Bendix service instruction	1) 2) 3) 4)
18	4/08/47	Supplement to gyro instrument panel kit	1) 2) 3) 4)
19	4/08/47	Cushion clamps for flap hydraulic lines	1) 2) 3) 4)

20	4/08/47	Flap control poppet valve replacement	1) 2) 3) 4)
21	1/23/47	Nose gear steering bellcrank replacement	1) 2) 3) 4)
21-1	4/11/47	Inspection of fuel pump bowl screws	1) 2) 3) 4)
22	4/22/47	Oil separator and hydraulic tank vent lines	1) 2) 3) 4)
23		Intentional left blank	1) 2) 3) 4)
24	5/05/47	"Etching" preparation for painting	1) 2) 3) 4)
25	5/08/47	Hartzell prop piston guide pin safe tying	1) 2) 3) 4)
26	5/15/47	Hartzell piston cylinder installation precautions	1) 2) 3) 4)
27	6/20/47	Navion field service bulletin record	1) 2) 3) 4)
28	6/03/47	Hartzell propeller servicing	1) 2) 3) 4)
29		Intentionally left blank	1) 2) 3) 4)

30		Intentionally left blank	1) 2) 3) 4)
31		Intentionally left blank	1) 2) 3) 4)
32	1/19/48	Clip added to hydraulic line	1) 2) 3) 4)
33	1/28/48	Proposed CAA AD for Hartzell prop	1) 2) 3) 4)
34	2/06/48	Wrinkling of fuselage skin near lower longeron at sta 93.438	1) 2) 3) 4)
35	2/20/48	Cabin air exit	1) 2) 3) 4)
36	2/20/48	Nose wheel shimmy	1) 2) 3) 4)
37	2/23/48	Cabin heaters-south wind Mod# 977b	1) 2) 3) 4)
38	3/08/48	Navion field service bul#23 AD mandatory note 47-31-2	1) 47-31-02 2) 3) 4)
39	3/16/48	Rigging nose gear actuating linkage	1) 2) 3) 4)

40	3/16/48	Navion field service warranty	1) 2) 3) 4)
41	3/16/48	Fuel system ser# 2-1110 fuel pump inlet line relocation &eng pump condition	1) 2) 3) 4)
42	4/16/48	Navion starter status	1) 2) 3) 4)
43	4/15/48	Adjusting carb idle mix & check fuel shut-off valve to prevent pressure loss	1) 2) 3) 4)
44		Intentionally left blank	1) 2) 3) 4)
45	4/15/48	Replacement of hydraulic pressure line	1) 2) 3) 4)
46	4/12/48	Safety washer on main gear retract link & nose gear retract cylinder mount rivet replacement	1) 2) 3) 4)
47	5/20/48	AD note for Carter carburetor diaphragm fuel pump	1) 48-29-01 2) 3) 4) see issue
48	5/10/48	Main landing gear strut trunion repair	1) 2) 3) 4)
49	8/24/48	Electrical shorting of fuse circuit breaker panel	1) 2) 3) 4)

50		Intentionally left blank	1) 2) 3) 4)
51		Intentionally left blank	1) 2) 3) 4)
52	9/27/48	Mod of Hartzell prop counter-weight & prop adjustment	1) 2) 3) 4)
53	10/20/48	Wheel and tire balancing	1) 2) 3) 4)
54	2/16/49	Cracked exhaust manifold outlet repair	1) 2) 3) 4)
55	1/03/49	Suggested operational procedures for continental E-185	1) 2) 3) 4)
56	2/16/49	Precautionary procedures for battery replacement and tire recap/retreading	1) 2) 3) 4)
57	2/07/49	Adel electric fuel boost pump modification	1) 49-09-02 2) 3) 4)
57M	2/17/49	Adel electric fuel boost pump modification foe L-17B aircraft	1) 2) 3) 4)
58	5/01/49	Navion model designation	1) 2) 3) 4)
59	4/20/49	Opening of rear seat bottom spring attaching loops caused by abnormal loads applied in concentrated areas	1) 2) 3) 4)

60	6/20/49	King safety fuel quantity indicating system	1) 2) 3) 4)
61	7/28/49	Deutsch D-51 fuel shut-off valves	1) 2) 3) 4)
62	11/18/49	Use of aluminum prop blades on E-185-3 engines with undampened crankshafts	1) 2) 3) 4)
63	1/03/50	Adjustment of solenoid operated Delco-Remy starters	1) 2) 3) 4)
64	1/05/50	Expiration of part exchange offer in field service bulletin #4	1) 2) 3) 4)
65	1/20/50	Installation of South Wind heater in 1949 Navions	1) 2) 3) 4)
66	1/23/50	Time extension for field service bulletin #4	1) 2) 3) 4)
67	2/07/50	Inspection of carb hot air duct (p/n 145-42202)	1) 50-10-02 2) 3) 4)
68B	5/12/50	Aeromatic prop changes on model Super 260 Navions	1) 2) 3) 4)
69B	5/16/50	Safety tying of throttle lever clamping screw	1) 2) 3) 4)

70B	6/01/50	Lycoming engine oil leak	1) 2) 3) 4)
71B	6/26/50	Special precautions during engine cleaning on model Super 260 Navions	1) 2) 3) 4)
72B	6/26/50	Use of carb heat	1) 2) 3) 4)
73B	7/14/50	Improved generator voltage regulation and reduction of radio interference	1) 2) 3) 4)
74	8/17/50	Instructions for RCA radio installation check out prior to filing RCA warranty return form	1) 2) 3) 4)
75	8/17/50	Recommended "Y" drive and hydraulic pump combination	1) 2) 3) 4)
76	8/30/50	Adel fuel pump installation instructions	1) 2) 3) 4)
77	10/02/50	Attachment of grid plate in carburetor air riser assembly	1) 2) 3) 4)
78	2/01/51	Fuel system accumulator tank maintenance and modification	1) 2) 3) 4)
79	11/03/52	Downdraft cooling system for Lycoming GO435-C2 engine.	1) 2) 3) 4)
79-1	12/23/58	Hydraulic system maintenance and related component rigging.	1) 2) 3) 4)

80	8/26/52	Engine cooling aids for hot weather flying	1) 2) 3) 4)
80-1	11/5/52	Cylinder head temperature gage accuracy	1) 2) 3) 4)
80-2	11/16/60	Main landing gear actuating strut -p/n 143-33153	1) 2) 3) 4)
81	3/15/55	Illustration correction	1) 63-16-06 2) 3) 4) none found
81-1	3/31/61	Hydraulic power and control shaft landing gear selector valve end fitting	1) 62-03-03 2) p/n 145-58145-3 3) 4) see issue
82	5/22/62	AN5-7A, AN5-10A engine mount attach bolts	1) 2) 3) 4)
83	2/20/63	Extreme cold weather engine breather freezing	1) 2) 3) 4)
84	4/25/63	Binding of control wheel push-pull tubes	1) 2) 3) 4)
85	1/07/64	Loose rivets through wing skin and stringers	1) 2) 3) 4)
86	7/28/64	Operation at low engine RPM	1) 2) 3) 4)
87	2/20/65	Fuel accumulator tank replacement	1) 2) 3) 4)
88	2/20/65	Wing closure strip inspection	1) 2) 3) 4) mandatory
End Of Index			

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 2

JANUARY 1, 1947

TO: NAVION DEALERS

SUBJECT: PROPELLER CONTROL FRICTION LOCK

It may be found that some propeller control friction locks allow movement of the control even when the adjustment knob is fully tightened.

If this occurs it may be due to oil on the plunger rod, damaged friction washer, or absence of friction washer.

In using the friction lock it is recommended that the knob be tightened only enough to prevent the control from creeping in flight.

The friction lock was not designed to be a positive lock because in an emergency an extra operation would be required to change the propeller setting.

Navion AIRCRAFT CORPORATION
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(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 3

REVISED MAY 16, 1947

TO: ALL NAVION OWNERS

SUBJECT: NOSE WHEEL VIBRATION

Nose wheel vibration or shimmy on the NAVION may be caused by loose linkage, improper rigging, inadequate lubrication, or imperfectly balanced tires.

To rectify such a condition the following corrections may be accomplished:

1. Check play in torque links and shim or tighten as required.

2. Check tightness of taper pins through nose gear steering link.

3. Nose gear steering arm should be rigged as stated in NAVION Service Manual, page 32, step 2. Rigging as called out on page 48 of the Service Manual is inaccurate and will be changed in a revised issue.

4. Trunnion side clearance should be .010 (shim with washers if necessary.)

5. Lubricate all zerk fittings and bearings on nose gear assembly.

6. If tire is not balanced, a sheet metal clip may be fabricated and attached to two wheel bolts. Attach lead weights to clip as required. Caution should be exercised to see that the weights do not interfere with the two stops in the nose wheel well. This should be checked by retracting the gear with the nose wheel spinning.

Navion AIRCRAFT CORPORATION
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(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 4

FEBRUARY 10, 1947

TO: NAVION DEALERS

SUBJECT: BRAKE ASSEMBLY REWORK

In some cases the Hayes Goodrich brakes have been leaking, due to ruptured expander tubes. The factory has devised a method of reinforcing the expander tubes to prevent any future failures, when new expander tubes are installed.

The reinforcement consists of a flanged steel band for the expander tube valve section, and seven steel plates which are placed around the expander tube in such a manner as to form a steel band around the tube.

A kit, No. 145-29024, with Field Service Bulletin No. 22 covering this installation will be furnished dealers as soon as possible.

Navion AIRCRAFT CORPORATION
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(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 5

FEBRUARY 14, 1947

TO: NAVION DEALERS

SUBJECT: PRIMER REPLACEMENT

Because of the unsatisfactory service of the Parker primer on the NAVION, all Parker primers should be replaced with the K2405 1/8 Kohler primer as soon as possible on the following airplanes:

NAV-4-2 thru 38, 40 thru 55, 57, 58, 60 thru 65, 68 thru 78, 80 thru 89, 91, 93, 94, 95, 97, 99 thru 103, 105 thru 111, 115, 116, 120, 192, 199, 207, 210, 214, 216, 222 thru 225, 228, 230, 231, 233 thru 236, 238 thru 242, 244 thru 251, 254, 255, 256, 258, 259, 261 thru 265, 267, 268, 269, 271, 273, 274, 278, 283, 284, 285, 288, 292, 295, 326, 327, 329, 331, 333, 335, 347.

You will be furnished sufficient Kohler primers to replace all Parker primers in your area. Please contact your owners affected and make the replacement.

Return the Parker primer to N.A.A. - Attention: NAVION Spares Receiving, with warranty adjustment application.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(formerly Guadalupe County Airport)

SERVICE LETTER NO. 6

FEBRUARY 26, 1947

SUBJECT: LEAKING HYDRAULIC PRESSURE RELIEF VALVE REPAIR

Foreign matter in the hydraulic system will cause damage to the pressure relief valve seat, and probable leakage past the valve, thereby resulting in sluggish action of the landing gear or wing flaps, or in failure of the gear or flaps to operate.

To determine if leakage is occurring in the valve, use the following procedure:

1. Install a pressure gage between the pressure line and valve.

2. Remove return line from valve to reservoir.

3. Use hand-pump to build up system pressure to 1000 psi. If oil appears at the return port to reservoir, the valve is leaking.

4. Remove the relief valve to reservoir return line, and observe if oil is flowing through relief valve at pressures below 1000 psi.

NOTE: Do not expect the pressure to "hold", as normal leakage through other units in the system, at cylinder piston "O" ring seals, may cause pressure to drop.

5. If relief valve is leaking, remove from the airplane and repair by one of the following methods:

   A. (1) Remove the poppet and cage from relief valve and examine cage seat and poppet for deep nicks. (The aid of about a 10 power magnifier is desirable.)

(2) Remove "O" rings from cage and discard if they are nicked or damaged.

(3) Install cage in circular split holder and place in lathe. Take a finish cut across the face deep enough only to remove nicks in seat. The sharper the seat, the better the valve will "hold."

(4) Put poppet in place; tap it lightly on seat and dry lap slightly. If further lapping is necessary, do so with caution. (Do not use compound heavier than 400 grit.)

(5) Clean parts thoroughly in carbon tetrachloride, immerse them in oil, and assemble.

B. (1) If the seat is not badly worn, or nicked, install a 5/16-inch steel ball on valve seat and tap lightly; if pressed deeply, material will be forced inward and the poppet guide will not pass through. If any excess material is formed, it must be removed by careful lapping. (Do not use grit heavier than 400.)

NOTE: Do not use valve as a lapping tool, use a piece of drill rod, or other suitable material. Do not allow the lapping compound to seep into the lower portion of the cage, as it will damage the poppet guides. The valve may be adjusted before placing in the airplane by connecting a hand-pump and pressure gage to pressure port. The valve should hold pressure up to 1100 (±50) psi, with hand-pump operating rapidly. Pressures in excess of 1150 psi should not occur.

(2) If adjustment is made after installation, a pressure gage should be installed in the pressure line. Pressure will not "hold" because of normal system leakage, but if valve is holding, a definite resistance (pressure of 1100 (±50)psi while flow is present) will be noted with moderate hand-pump operation.

(3) Remove gage, and safety valve; check hydraulic fluid level, and replenish if necessary.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 7

*REVISED MAY 16, 1947

TO: ALL NAVION OWNERS

SUBJECT: LOW FUEL PRESSURE

It has been found in some cases that the fuel pressure has been dropping below the minimum allowable for safe engine operation. This condition may be caused by air leaking into the suction side of the fuel system and may be corrected by the following method:

*1. When complying with Service Bulletin No. 32 ("FUEL STRAINER DRAIN COCK REPLACEMENT") be positive no air leaks exist at the fuel strainer gaskets. This may be checked by fuel pressure gage upon engine run up. Also by blowing into fuel tank vent line and checking for gas leaks at strainer.

CAUTION: Do not use air hose or over 1-1/2 psi pressure when blowing into vent line.

2. Check the engine primer.

NOTE: If Parker primer is installed, check to be sure primer packing gland is not bottoming on control panel. All Parker primers should be replaced by Kohler primers as soon as possible.

3. Check the fuel shut-off valve for possible leaks.

4. Check the six screws attaching actuator arm housing to filter screen housing of fuel pump, and make certain that these screws are secure.

5. Check the condition of the fuel pump strainer housing gaskets. Make certain gaskets are not damaged when strainer is removed, and that gaskets seal properly when housing is reassembled.

6. Check all the fuel connections and fittings between the suction side of the pumps and the accumulator tank.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE [illegible]
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 8

REVISED MARCH 31, 1947

TO: ALL NAVION OWNERS

SUBJECT: CABIN-HEATER THERMOSTAT SWITCH CAM ADJUSTMENT

Some heater kits have been delivered with improperly adjusted thermostat switch cams. This improper adjustment will be evident and may exist in heaters delivered in airplanes or heaters shipped from N.A.A. prior to February 12, 1947. Check adjustment as follows:

1. Remove right front seat.

2. The thermostat switch cam is located on the forward end of the heater "ON-OFF" switch rod leading from the knob on the dash panel.

3. Rotate the "ON-OFF" switch knob in a counterclockwise direction until it stops. The flat side of the cam on the control rod should be approximately parallel to edge of the micro-switch. There should be .005 to .010-inch clearance between the plunger on the switch and the flat side of the cam.

4. Rotate the "ON-OFF" switch knob in a clockwise direction until it stops. The plunger on the microswitch should now be depressed. Make certain it is not possible to turn the control knob far enough clockwise to allow the flat side of the cam to align with the switch plunger.

5. The switch cam can be adjusted by loosening the Allen head setscrew in the cam and rotating the cam on the shaft. The microswitch may be adjusted by loosening the two mounting screws and shifting the switch as required. (Mounting holes in bracket are elongated.)

6. Rotate the "ON-OFF" knob in a counterclockwise direction until it stops. If the marker on the knob does not align with the "OFF" position on dash panel, loosen the knob set-screw and adjust as required.

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 9

MARCH 11, 1947

STARTER PEDAL REINFORCEMENT BRACKET

On Airplanes NAV-4-2 through NAV-4-250, the starter pedal was located on the centerline of the airplane. Because of its inaccessibility in this location, the pedal tube was extended, beginning on Airplane 251, so that the pedal is now located between the pilot's rudder pedals.

In some cases, when a pilot exerts excessive pressure on the pedal, the tube may break. At the time of a tube replacement, kit No. 145-89029 may be purchased which will furnish a 145-54054 pedal tube reinforcement bracket with installation instructions. Price of this kit is $2.75 less dealer's discount.

NOSE WHEEL VALVE STEM CLEARANCE

Field Service Bulletin No. 12, issued November 27, 1946 described a nose wheel valve stem clearance rework. This rework is satisfactory, provided a Dill No. 654 valve cap, or a valve cap not exceeding 3/8 inch in length, is always used.

A longer cap will not clear the landing gear fork and will strike the landing gear stop brackets when the gear is retracted, damaging the inner tube.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 10

MARCH 4, 1947

TO: NAVION DEALERS

SUBJECT: HARTZELL PROPELLER BLADE PITCH CHANGE CORRECTION

We have been advised by the Hartzell Propeller Company that a few early HC-12X20-1 propellers were delivered with undersized hub-blade pilot tubes. This part is shown in the NAVION Service Manual, Page 66, figure 41. Normally the pilot tube is assembled with a press fit into the propeller hub and extends with a free fit of approximately 3 3/4 inches into the blade shank. Should the pilot tube become dislodged from the hub because of vibration and centrifugal force, it will bind in the propeller blade shank. This will cause the propeller pitch operation to be extremely slow in both low and high-pitch directions.

It is believed the majority of propellers have been corrected at North American Aviation. However, if this condition is reported by owners, and is not caused by overtightened blade clamps, or low oil temperatures in the propeller oil return line, please advise Field Service Department, at which time arrangements will be made to send a special tube puller, replacement tubes, and instructions for the rework.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 11

MARCH 17, 1947

TO: NAVION DEALERS

SUBJECT: ENGINE STARTER ADJUSTMENT

To prevent chipping of the starter gear teeth, the starter adjustment procedure has been revised to provide a heavier spring load that will aid in meshing the gears. When engaging the starter, it is possible for the starter pinion gear and starter drive gear teeth to butt against each other instead of meshing. If the starter is energized with the gear teeth in this position, the next tooth of the pinion gear may not engage the drive gear, but will skip several tooth and then suddenly engage. This action will damage the gear teeth.

Adjust the starter engaging mechanism as follows:

1. Turn battery disconnect "OFF," or disconnect wires at starter switch before making any adjustment.

2. Engage the starter pinion gear by pushing the starter pinion guide sleeve forward until the gear is hard against the forward stop. It may be necessary to rotate the engine crankshaft slightly to engage the gears.

   NOTE: The pinion guide sleeve must be pushed in by hand. Operating the engaging lever may only compress the spring inside the guide sleeve.

3. With the gear fully engaged, pull the starter engaging lever until the spring inside the guide sleeve is compressed 1/32 inch; then adjust the switch actuating bolt to just touch the starter switch button.

   NOTE: The contact bolt jam nut may be installed on the outside of the lever arm from the bolt head to provide more threads for adjustment

4. After completing adjustments, try the starter action to be sure the spring in the guide sleeve is compressed 1/32 inch when the actuating bolt is just touching the switch button.

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SERVICE LETTER NO. 12

MARCH 20, 1947

TO: ALL NAVION OWNERS

SUBJECT: CARBURETOR AIR STRAIGHTENER INSTALLATION

In order to obtain smoother engine operation, it has been found desirable to install a carburetor air straightener in all NAVIONS. Owners whose airplanes do not have this straightener should contact their dealer as soon as possible and have the 145-42222 straightener installed. This installation will be made at no cost to the owner.

The straightener replaces the 145-42201-42 carburetor air duct riser bolted to the bottom of the carburetor. Straighteners installed at the factory have a large yellow paint mark on the side.

Kit 145-89020, which contains the straightener and Field Service Bulletin No. 17 installation instructions, will be available for distribution approximately April 10, 1947.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 13
February 4, 1947

PUSH ROD AND VALVE ROCKER MODIFICATION

Delivered Airplanes Affected:

NAV-4-11 through 34
36 through 42
44 through 47
50, 51, 54, 56, 60, 62, 64, 65, 68, 69, 70, 72, 74,
81, 83, 100, 192, 199, 207, 211, 214, 225, 228, 231, 234,
236, 239 through 242
244, 245, 249, 255, 259, 269, 271

This modification accomplished at the factory on all other airplanes.

This bulletin comprises the rework described in Continental Motors Corporation Service Bulletin No. E-113 dated November 29, 1946, copy attached.

This rework should be accomplished not later than the first engine overhaul.

John W. Casey
Field Service Manager

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

REPRINT OF NORTH AMERICAN SERVICE LETTER

Service Letter Number 13

March 21, 1947

"SERVICE MANUALS CLASS "C" EQUIPMENT"

In accordance with our service policy, we have made contact with several manufacturers of Class "C" equipment for the Navion. We have requested from them operation and service information on their product. As we receive replies to our letters, we shall pass on the information to you as it becomes available.

Should you desire the installation and operation manual on the General Electric radio type AS-1B and AS-1C for your use and your dealers, you may obtain these manuals free of charge by writing direct to General Electric Company, Aviation Electronics Equipment, Electronics Department, Syracuse, New York, attention: H.H. Wales.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

NO. 14

MARCH 21, 1947

CANCELLATION OF FIELD SERVICE BULLETIN NO. 24

Navion Field Service Bulletin No. 24, Kit 845-89031, directing temporary removal of the hydraulic pump has been cancelled as of this date.

The existing hydraulic power system will be replaced by a new controlled relief valve system.

Kits for installation of this system will be available in the near future.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

NO. 15

MARCH 21, 1947

INSPECTION OF GENERAL ELECTRIC RADIO POWER PACK ATTACHING SCREWS

In one case some of the screws attaching the General Electric radio power pack to the shelf in the airplane have fallen out, allowing the power pack to drop from the shelf and foul the control column.

The four screws attaching the power pack to the shelf (located in left upper corner of fuselage aft of firewall) should be inspected to be certain the screws are installed with heads upwards and with the nuts firmly tightened against the lock washer.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

NO. 16

MARCH 20, 1947

"CANCELLATION OF SPECIAL INSTRUCTIONS NO. 18"

Field Service Bulletin No. 27, Starter Pedal Reinforcement Bracket Installation, will replace Special Instructions No. 18. This installation will be made, at no cost to the owner, concurrently with the accomplishment of Field Service Bulletin No. 26, Controlled Hydraulic Power System Installation.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

No. 17

MARCH 28, 1947

TO: NAVION DEALERS

BENDIX SERVICE INSTRUCTION TOUR

The following copy of a letter from Bendix Aviation Corporation is reprinted herewith for your information:

"We feel that you will no doubt, be interested in the service training program which we are putting on regarding our PS-5C carburetors. We have already distributed service and overhaul instructions covering this model to all of our own distributors as well as to your NAvion distributors, and at the present time have started our service representative, Mr. Carl Riscigno, on a tour which will cover the Eastern half of the United States during which he shall devote all of his time to this particular model and will contact all of your distributors as well as our own. We believe in this way a very good knowledge of the carburetor will be secured by all of these distributors.

"As soon as our schedules allow, we shall have a man contact the distributors in the Western part of this country. We are also working very closely with Continental Motors on any carburetor problems which they may have.

"Any comments which you may have along this line will be appreciated by us."

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS - TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

NO. 18
APRIL 8, 1947

TO: ALL NAVION DEALERS

SUPPLEMENT TO GYRO INSTRUMENT PANEL KITS

When complying with Field Service Bulletin No. 26, Controlled Hydraulic Power System, it is necessary to alter the Gyro Instrument Panel installation A supplemental 145-89008-10 Kit is required for Gyro Panel Kits that have been shipped from North American. New Gyro Panel Kits being shipped will incorporate the new parts and the 145-89008-10 kit is not required. Instructions for this change are contained in Bulletin No. 26 and are repeated as follows:

1. Remove hose between oil separator and vacuum pump.

NOTE: Clamps on left-hand firewall angle and to left fuel pump hose will be used again.

2. Remove two screws, nuts, and spacers attaching oil separator to firewall.

3. Relocate separator 1-5/8 inches outboard of present location Drill two No. 18 (.169) holes in firewall and attach oil separator, using removed screws, nuts, and spacers. Plug old holes with two AN515-8R6 screws and AN365-832 nuts.

NOTE: On early airplanes, the generator regulator condenser must be moved outboard to provide clearance for oil separator

4. Route new 1/2 x 40 hose from vacuum pump, above new hydraulic installation, to oil separator. Secure hose to left-hand firewall angle at previous position with removed clamp.

NOTE: Rotate elbow in vacuum pump in clockwise direction to obtain proper alignment with hose.

5. Clamp 1/2 x 40 hose 5 or 6 inches from top of right-hand diagonal angle on firewall with clamp, screw, and nut previously used to attach old vacuum hose to left-hand fuel pump hose

6. Remove 1/2 x 19-1/2 hose from oil separator to engine oil sump. Cut to length of 18 inches and reinstall

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

NO. 19
APRIL 8, 1947

TO: ALL NAVION DEALERS

CUSHION CLAMPS FOR THE FLAP HYDRAULIC LINES

If the flap hydraulic cylinder lines show chaffing at the point where they pass through the AN742-D4 metal clamps at the rear spar, it is suggested that the lines be burnished or replaced and a cushion type clamp (AN742-D6C or Tinnerman A3046A 4-199) be installed.

Service Bulletin #26 directs the installation of two additional cushion type clamps on the flaps lines just below the flap actuating cylinder.

JOHN W. CASEY
FIELD SERVICE MANAGER

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NO. 20
APRIL 8, 1947

TO: ALL NAVION DEALERS

FLAP CONTROL POPPET VALVE REPLACEMENT

In some cases, when wing flaps operate slowly, the trouble has been traced to wearing of the S780-1 poppet valve located in the flaps down pressure port of the master control valve. This trouble has been corrected in production by using a shorter poppet valve with a 1/8 inch steel ball as a lifter which prevents the poppet valve stem from wearing. Install the new S780-1 poppet and steel ball as follows:

1. Remove the master control unit from the airplane. If poppet valve is broken, the flap control shaft should be removed from the unit, and the passage throughly cleaned.

NOTE: Poppet valve must be removed from port before flap control shaft is removed from master control valve or control shaft will shear off poppet stem.

2. Remove the old S780-1 from the master control unit and install a new S780-1 valve without the steel ball. Operate the flap control shaft and check movement of the valve. File off the stem of poppet until operation of the shaft barely raises the valve off the seat.

3. Place the shaft in the "Flap Down" position. Lap the valve to its seat (2 or 3 revolutions) using a fine lapping compound, and holding the valve with a "Grab All" tool.

4. Remove poppet valve and file 1/16-inch (±0) off the stem end. Install 1/8-inch steel ball and poppet valve in pressure port.

5. Check the operation by operating the flap control shaft. If valve does not seat, carefully file off stem end until it seats well on steel ball.

CAUTION: Stem end must be filed off square. Seating of valve may be determined by feel, or by checking movement with a pencil eraser. With the flap shaft in the lowered position; valve will wobble slightly if it is not seating properly.

6. Check to be sure too much has not been filed off valve. Poppet should not raise from seat when NAS51-35 snap ring on aft of control shaft is 3/32 to 1/8 inch from bottoming on 145-58111 retainer in control unit body. Poppet should begin to rise when shaft is moved forward past this clearance.

7. Install the existing spring, new 145-58268 retainer, and 400 x 4 elbow in the flap dorm pressure port.

8. Install control unit in airplane and check for correct linkage adjustment. NAS51-35 snap ring on aft end of flap control shaft should bottom on 145-58111 retainer in control unit when flap is in the "Up" position.

9. Check operation of flaps and landing gear.

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SERVICE LETTER NO. 21

No. 21
January 23, 1947

NOSE GEAR STEERING BELLCRANK REPLACEMENT

As existing 145-34175 nose gear steering bellcrank assemblies, which were improperly fabricated, affect the safety of the airplane, this assembly must be replaced with an improved bellcrank assembly immediately on all airplanes.

DELIVERED AIRPLANES AFFECTED:

NAV-4-2 through NAV-4-550.

The new assembly will be installed at the factory on all undelivered airplanes.

1. Jack the airplane in the manner prescribed, and remove the retaining nut and washer from the top of 145-34175 bellcrank assembly, located on the forward side of firewall, on nose wheel torque box.

2. Disconnect the two 145-34149 nose gear steering rod assemblies from the bellcrank. (To facilitate the removal of the steering rod assemblies it may be necessary to remove the rods from the aft steering assembly.) Remove 145-34175 bellcrank assembly from the airplane.

3. Remove the two AN320-6 nuts, 145-34179 tubes, and 145-34208 bolts from bellcrank assembly and install in new 145-34175-5 bellcrank assembly which is identified by a stamp SPL and a yellow mark on the assembly. Install this assembly in airplane using previously removed washer and retaining nut.

4. Connect the steering rods to the bellcrank with the bolts and nuts previously removed.

5. No adjustment should be necessary for the rod linkage, as the rod length has remained the same.

NOTE: Time required to make this replacement should not exceed two man-hours.

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NO. 21
APRIL 11, 1947

TO: ALL NAVION DEALERS

INSPECTION OF FUEL PUMP BOWL SCREWS

After approximately five flight hours, the six screws which secure the fuel pump bowl to the upper pump casting should be checked for tightness. This is necessary because cold flow of the fuel pump diaphragm may cause the screws to loosen. These screws will be checked at the factory after final flight test.

JOHN W. CASEY
FIELD SERVICE MANAGER

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SERVICE LETTER NO. 22

APRIL 22, 1947

TO: NAVION DEALERS

SUBJECT: OIL SEPARATOR AND HYDRAULIC TANK VENT LINES

It has been found that oil coming from either the oil separator or the hydraulic reservoir vent line, blows on to the entrance step. This condition can be corrected by re-routing the lines to vent overboard at the lower inboard edge of the gill exit.

Cut the oil separator line off between the two A2980-8 clamps on the firewall. Install a 1/2 inch diameter hose between the two sections. Route the vent line to the lower inboard corner of the gill exit and secure the lower end of the line to the gill exit cowl with a A2980-8 clamp, AN515-8R8 screw and AN365-832 nut.

Re-route the hydraulic tank vent line, so that it follows the 143-31005-5 channel down the firewall and overboard next to the oil separator vent line.

SERVICE LETTER # 23 - NOT ISSUED OR CANCELLED

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS · TELEPHONE (512) FR 9-6414
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LETTER NO. 24
MAY 5TH, 1947

TO: ALL NAVION DEALERS

SUBJECT: "ETCHING" A PREPARATION FOR PAINTING

In some cases the customer may desire to paint his airplane. At such time, it will be necessary to treat the unanodized aluminum alloys to secure a maximum paint adhesion. The following procedure may be followed when painting is desired:

I MATERIALS ETCHED:

a) All unanodized, unetched aluminum and aluminum alloys which require the application of paint.

II MATERIALS EMPLOYED:

a) Alcoholic Phosphoric Cleaner - Turco Products Co. #W.O. 1 Etch.
b) Ethyl Alcohol (Denatured).
c) Diluent Naphtha or any type cleaning solvent.

III GENERAL PROCEDURE:

a) Clean:

1. Any paint or primer which was previously improperly applied or which was applied to improperly cleaned surface, or any markings shall be removed with any standard paint stripper.

2. Remove any excessive amounts of grease and dirt with cleaning solvent.

b) Etch:

1. Apply the etching solution thinned three parts of water to one part etch.
2. Use special care to brush the solution completely over areas around rivet heads and adjacent to seams and joints.
3. Allow to remain on the surface for from one to two (1 - 2) minutes.

c) Rinse:

1. Rinse the surfaces thoroughly with clear water.

d) Dry:

1. When it is desirable that the drying time be shortened, the surfaces may be swabbed with a mixture of water and denatured alcohol in equal parts by volume. This is not a required operation.
2. Use an air hose directed into all joints, seams, and other recesses to insure a complete removal of moisture. This is a required operation..
3. Finish the drying operation with a clean, dry cloth if necessary.
4. Surface must be completely dry before any coating of paint is applied.

e) Finish:

1. Paint finish shall be as required by the applicable finish applied by a standard spray painting technique.
2. Parts which become contaminated between etching and painting shall be cleaned with water or with diluent naptha, the material depending upon the need, and dried before painting.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

LETTER NO. 25

MAY 8, 1947

TO: All NAvion Owners

SUBJECT: HARTZELL PROPELLER PISTON GUIDE PIN SAFETYING

NAvion Field Service Bulletin No. 30, enclosed with this letter, is being forwarded to you personally by North American Aviation. We believe the safety of the airplane will be improved by complying with the requirements of Bulletin No. 30. If the guide pin should happen to loosen, engine oil will leek from the engine and be blown onto the windshield, impairing the pilot's vision.

North American Aviation is providing Field Service Representatives, equipment, and parts to all Factory Dealers and Sub-Dealers to assist in expediting completion of this change.

A large percentage of airplanes have had this change made at the factory. We suggest you inspect your airplane to determine if Bulletin No. 30 has been complied with. If not complied with, contact your dealer as soon as possible regarding accomplishment of this work on your NAvion.

We recommend that your airplane be grounded June 1, 1947 unless this additional safetying is accomplished. This instruction is in accordance with information given to the C.A.A. by North American Aviation.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
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LETTER NO. 26
MAY 15, 1947

TO: All NAvion Dealers

SUBJECT: HARTZELL PISTON CYLINDER INSTALLATION PRECAUTIONS

This letter is written to inform you of items to check when installing the Hartzell piston-cylinder assembly on the Continental E-185 Engine.

1. The piston-cylinder unit must fit flush against the front face of the engine crankcase. Check the fit of piston-cylinder unit against face of engine crankcase with a feeler guage. There should not be more than .008 inch gap at any place between the aft face of the propeller control cylinder and the front face of the crankcase. The 145-44014 brackets must hold the cylinder flush against the case. If the cylinder is not held secure against the engine, the jack plate links will break.

2. Due to the shape of the 145-44014 brackets, it is necessary to install a washer between the 145-44014 brackets and engine case. This washer will position the brackets out board, thereby preventing them from interfering with the cylinder installation.

3. Engine crenkcase cross bolts, which secure the 145-44014 brackets, should be torqued to 300 inch pounds.

4. The Allen head bolts should hold the cylinder flush against the brackets and must be safetied.

JOHN W. CASEY
FIELD SERVICE MANAGER

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 27

JUNE 20, 1947
REVISED, FEBRUARY 2, 1948

NAVION FIELD SERVICE BULLETIN RECORD

NO.	DATE	SUBJECT	NAA	CAA	MANDATORY DATE AD#	MANDATORY DATE DWG	KIT QUANT	E.O.
NOTE: Navion Field Service Bulletins No. 1 through 22, now out of print								
23	4-11-47	Carb Vapor Return Line Hose Replacement	8-1-47		11*	89027	850	4458
24		Cancelled						
25	5-12-47	Starter Engaging Mechanism Rework	-	-	-	89033	1200	18213
26	3-28-47	Controlled Hydraulic Power System	9-1-47	9-1-47	8	89032	623	24963
27	3-26-47	Starter Pedal Reinforcement Bracket	-	-	-	89029	744	2586
28	4-3-47	Nose Gear Hyd. Line Replacement	Next 100 Hr. Insp.	10-1-47	10*	89034	732	24967
29	4-15-47	Delco Remy Starter Modification (Cont. E-114)	-	-	-	-	-	4470
30	5-5-47	Hartzell Prop. Piston Guide Pin Safetying	6-1-47	9-1-47	9	89037	800	25627
31	5-9-47	Front Engine Mount Reinforcement	8-15-47	-	-	89035	838	25631
32	5-1-47	Fuel Strainer Drain Cock Replacement	8-1-47	9-1-47	12*	89036	802	25616
33	7-2-47	Elevator Leading Edge Rib Installation	Yes	-	-	89040	900	25707
Supp 33	11-1-47	Repair for Cracked Elevator Leading Edges	Ryan 4-28-48	-	-	89043	-	-

NO.	DATE	SUBJECT	NAA	MANDATORY DATE CAA	MANDATORY DATE ADW	DWG	KIT QUANT.	E.O.
34								
35	6-17-47	Cabin Heater Fuel Control Valve Inspection	-	-	-	89039	6	25705
Ryan No. 1	11-1-47	Nose Gear Inner Cyl. Bearing Retainer Nut.	Ryan 4-28-48	-	-	None	-	-

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 28

JUNE 3, 1947

TO: ALL NAVION OWNERS

SUBJECT: HARTZELL PROPELLER SERVICING

In order to secure the best performance from Hartzell propellers, the following remedies and service tips are offered:

1. Grease leaks at blade clamp gaskets

The correct procedure for tightening these gaskets is as follows:

a. Draw the blade clamp bolts tight.

b. With a propeller blade wrench, at 18" from hub or loss, apply 2000 inch pounds of torque to the propeller blade.

c. With the torque still applied to the blade, loosen the clamp bolts until the blade just begins to turn.

d. Using the blade wrench, return the blade to its original position in the clamps.

e. If the gaskets are in good condition and fail to seal when tightened as above, a thicker gasket should be used. If a thicker gasket is not readily available, gaskets cut from brown kraft paper can be used as shims to add thickness to the present gasket.

f. Use Permatex or Tite Seal Medium on gaskets along blade shanks.

g. Fill the bearings with recommended grease.

NOTE: When a new gasket or shims are added, the blade clamp tightness should be checked by repeating steps a, b, c, and d above.

2. Servo valve plate gasket oil leaks

Leaks occur on some servo valves at the propeller piston. If a thick gasket is used in mounting this valve, the valve assembly may loosen and result in an oil leak. Replace thick gaskets with new gasket of brown kraft paper. This will seal the oil leaks occurring at the valve plate.

3. Oil leaks at "O" rings seals in servo valve

Defective "O" ring seals will allow oil leaks at the servo valve. New rings should be installed to remedy this. The "O" ring groove in the servo valve should be .677 + 0 - .002 inches in diameter and .141 ±.005 inches in width. The servo piston should be .498 ±.001 inches in diameter. The Hartzell Propeller Company will replace incorrect parts which are returned to them. If dimensions are correct, an AN6227-10 "O" ring should be used in this location. As an emergency measure when a -10 "O" ring will not seal, the Hartzell Propeller Company suggests that an AN6227-11 "O" ring be tried.

4. Vibration due to propellers

Propeller vibration may be encountered if the blades do not change pitch freely. Propeller blades may bind on pilot tubes due to the over tightening of blade clamp bolts. This can be checked by removing the two Allen head bolts which connect the blades to the jack plate arms and checking freedom of blade movement. The blade clamps should be tightened, as explained in Paragraph 1. Propeller blades may also bind due to loose hub-blade pilot tubes. Normally the pilot tube is assembled with a press fit into the propeller hub and extends with a free fit into the blade shank. Should the pilot tube become dislodged from the hub, it may bind in the propeller blade shank. This, in turn, would restrict propeller blade movement. Loose tubes can be detected without disassembly by the following method:

a. Remove wire locks and link screws.

b. Move the counterweight on the clamps forward and backward to check the tightness of the blades on the tubes.

c. If a blade is tight, back off the nuts on the bolts in the clamp one castellation at a time and notice if the blade is becoming loose. If the blade does not loosen up then the probable reason is that the tube has slipped out and is binding the blade. In this case, replacement of the pilot tube is necessary.

Incorrect blade settings may cause rough propellers. The propeller mounted with the cylinder and piston assembly should be placed on a surface plate to properly check blade pitch. Blade pitch should be checked at Station 30. Low pitch blade angle with no gap between the propeller hub and jack plate should be 12 degrees. High pitch setting will be determined when engine R.P.M. is checked on run-up.

5. General comments

New piston and cylinder assemblies are shipped without "O" ring seals and felt wipers installed. If "O" ring seals are installed in assembled units which are idle an indefinite period of time, the "O" rings become deformed and show a tendency to vulcanize to the metal. Therefore, the first movement of the piston would tend to tear the "O" ring. Deformed "O" ring seals will allow oil leakage.
Hartzell Propeller Company is now using "O" rings manufactured by the Plastic and Rubber Co. of Dayton, Ohio. The new rings do not have identification marks, whereas the former rings were marked with a green or aluminum dot.

Piston and cylinder assemblies are matched and stamped with corresponding numbers at the factory. Piston and cylinders should be kept in matched sets whenever they are removed from the airplane.

Piston-cylinder assembly must be flush against engine case upon installation.

Blade thrust bearings have been tested by Hartzell Engineering and have found that these bearings will wear indefinitely if they are properly lubricated. The use of a gasket compound, as mentioned in Paragraph 1, will improve the grease seal around the blade bearing. The recommended greases are Hartzell lubricant, or AN-G-15.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
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LETTER NO. 29

SERVICE LETTER

May 23, 1947

TO: All NAvion Dealers

SUBJECT: CANCELLATION OF SERVICE LETTER NO. 23

NAvion Service Letter No. 23, titled "Landing Gear Up-Lock Adjustment" has been cancelled. Remove all copies of this letter from your file and destroy.

The landing gear up-lock rigging instructions in the NAvion Service Manual page 49, figure 32 will be used when checking up-lock rigging.

John W. Casey
Field Service Manager

Navion AIRCRAFT CORPORATION
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(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 30

NOVEMBER 28, 1947

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: C.A.A. AIRWORTHINESS DIRECTIVE NO. AD-782-4, MANDATORY NOTE 13, DATED OCTOBER 1, 1947.

This is to advise you that the C.A.A. has issued under an October 1st date Airworthiness Directive AD-782-4 for North American model NAVION. All of the mandatory notes which make up this directive, with the exception of Mandatory Note No. 13, have been covered previously in NAVION Field Service Bulletins, as noted in the directive.

The following is a direct quotation from the directive:

"MANDATORY NOTE 13. (October 1, 1947) (Applies to all NAvion Serial numbers NAV-4-2 through NAV-4-1110).

"TO BE ACCOMPLISHED AS SOON AS POSSIBLE, BUT IN ANY EVENT NOT LATER THAN DEC. 1, 1947.

"In order to insure that the fuel shut-off valve will open fully when the flexible control knob is pushed to the full "on" position, conduct the following inspection:

"Determine that the fuel shut-off valve flexible control is adequately supported along its length from the instrument panel to the shut-off valve to prevent buckling of the flexible control when it is moved to the "on" position while valve motion is restrained by the fingers to simulate moderate valve friction. Additional support clips may be necessary. Also determine that the control is properly rigged with respect to valve detents."

Inasmuch as no special parts are required to comply with the subject mandatory note, no further action is contemplated by the Airplane Service Department of the Ryan Aeronautical Company.

Walter K. Balch

Walter K. Balch
Airplane Service Manager

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 31

DECEMBER 12, 1947

TO: NAVION DISTRIBUTORS AND DEALERS

SUBJECT: CANCELLATION OF NAVION SERVICE BULLETIN NO. 22.

NAVION Field Service Bulletin No. 22, dated February 6, 1947, entitled "Brake Assembly Rework" is hereby cancelled and is superseded by NAVION Special Instructions No. 34, dated December 12, 1947, entitled "Installation Instructions for Hayes Goodrich Brake Reinforcements". Kit No. 145-89024 may be obtained from the Airplane Spares Section of the Ryan Aeronautical Company by ordering in the regular manner.

WALTER K. BALCH
Airplane Service Manager

Navion AIRCRAFT CORPORATION
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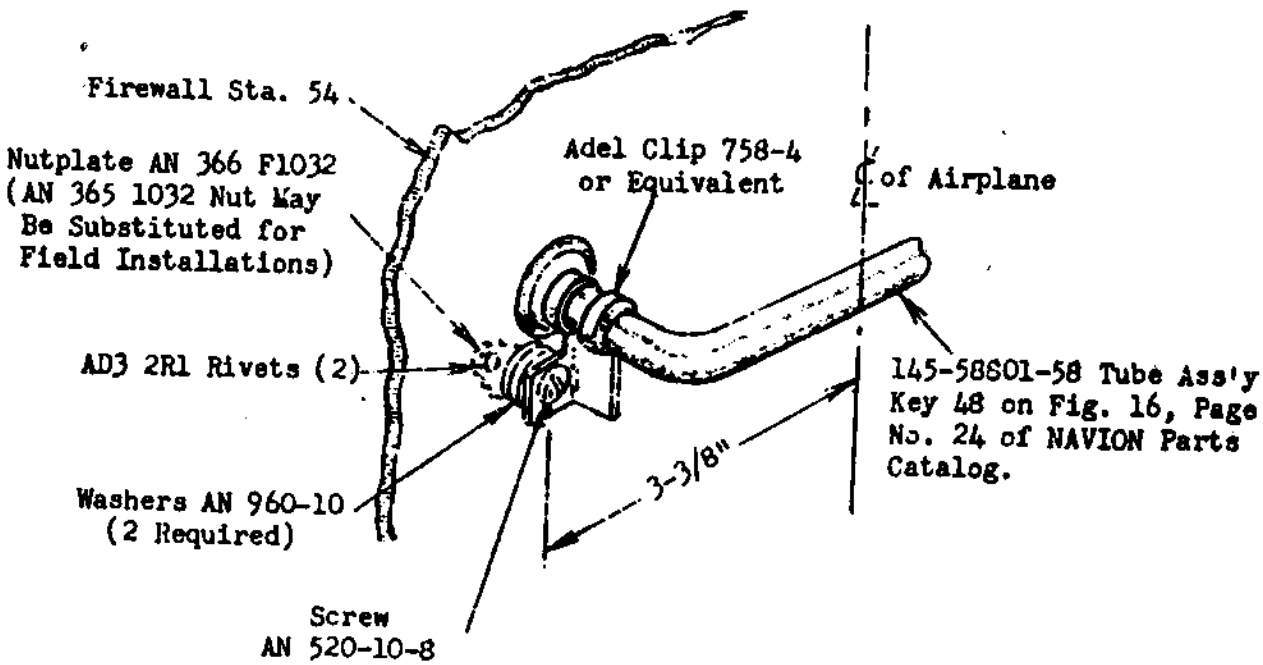
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 32
JANUARY 19, 1948

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: CLIP ADDED TO HYDRAULIC LINE, NO. 145-58801-58

It may be found that on some NAVIONS the Line (pump pressure), part number 145-58801-58, in the airplane hydraulic system, is subject to excessive vibration. When such is the case, the vibration is apt to cause the line to wear through the rubber grommet in the hole on the airplane firewall through which it passes, causing eventual failure of the line. On airplanes where this condition is noted, it is recommended that the grommet be replaced and a No. 758-4 Adel clip (or equivalent) be installed in the manner illustrated below to preclude the possibility of more serious future damage and added expense to the airplane owner. All NAVIONS factory serial number NAV-4-1151 and subsequent will have clip installed at the factory.



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SERVICE LETTER NO. 33

JANUARY 28, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: PROPOSED C.A.A. AIRWORTHINESS DIRECTIVE NOTE FOR NAVION AIRPLANES EQUIPPED WITH HARTZELL PROPELLERS

This is to advise you that the C.A.A. intends to issue the following Airworthiness Directive Note for NAVIONS equipped with Hartzell propellers:

"PROPOSED AIRWORTHINESS DIRECTIVE NOTE FOR RYAN MODEL NAVION"

"NOTE: (Applies to all Navion airplanes equi-ped with Hartzell propeller blade Models 8428, 8428C and 8428R having serial numbers below 61,000.)

"TO BE ACCOMPLISHED AS SOON AS POSSIBLE BUT NOT LATER THAN APRIL 15, 1948."

"During fabrication of certain Hartzell Model 8428 propeller blades, heavy score marks and drilled holes were made on the blade front face, approximately 4 inches outboard of the blade clamp. Such scores were filled with various fillers prior to painting of the blade. Since the extent and seriousness of the defects are unknown, the following inspections must be conducted:

"Examine all Model 8428, 8428C and 8428R blades having serial numbers below 61,000 in bright daylight or strong artificial light on the front face in the area approximately 4 inches outboard of the blade clamp. Any fillers used in the blade will be discernible to the naked eye. If fillers are found in this area, the paint should be carefully removed and the fillers removed from the blade. Defects that can be eliminated by removing material to form a shallow saucer not over 1/8 inch at its deepest point, 3/8 inch in width overall, and 1 inch in length overall, should be repaired. Following removal of the defects, the area from which paint has been removed should be repainted and the propeller rebalanced before being returned to service. Blades having defects that cannot be repaired by the above method or by methods described in the portions of CAM 18, applicable to aluminum alloy blades, should be returned to the propeller manufacturer."

Since receiving our advance notice of this proposed C.A.A. Airworthiness Directive Note, all Hartzell propellers in stock and on airplanes here at the factory have been inspected and a total of eleven propellers were found to have blades scored to some extent. The Hartzell Propeller Company advises that in their opinion not more than twenty propellers with blades having heavy score marks or drill marks near the blade shanks have been

delivered by them, hence it appears there should be very few more on airplanes now in service. We do not deem it necessary to take NAVIONS out of service to accomplish the above described inspection, but owners are encouraged to have their Hartzell propellers inspected at the next regular periodic airplane inspection or at their earliest convenience, provided such inspection is made before April 15, 1948.

To avoid needlessly taking NAVIONS out of service for an extended time, NAVION Distributors, Dealers and owners are asked not to send propeller blades to the Hartzell Propeller Company for repair or replacement unless marked to the extent specified in the Directive, as blades marked to a lesser degree, when properly repaired, are considered entirely satisfactory by the C.A.A. and no provisions have been made for the free replacement or repair of such blades by the Hartzell Propeller Company.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-4414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 34

FEBRUARY 6, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND APPROVED REPAIR STATIONS

SUBJECT: WRINKLING OF FUSELAGE SKIN NEAR LOWER LONGERON AT FUSELAGE STATION NO. 93.438.

It may be noted on some NAVIONS, not of recent manufacture, that the fuselage skin in the area between the top and bottom fuselage longerons and the fuselage frames at stations 93.438 and 106.25 is wrinkled and/or "oil canning". This condition, when present to an extent that could cause cracking of the skin as a result of constant skin flexing, is considered unsatisfactory and may be remedied as follows:

1. Remove or loosen the upholstered cabin side panel on the affected side or sides and remove the AN5 bolt attaching the two sections of the fuselage lower longeron at station 93.438. This should cause the skin wrinkles to partially disappear.

2. Insert a feeler gauge between the longeron attachment fitting and the bulkhead to determine the amount of gap. Fabricate filler blocks .010" greater in thickness than the indicated gap and the same size and shape as the longeron attachment fittings. Layout and drill a 3/8" hole in filler block for the AN5 longeron attaching bolt to pass through. Insert filler blocks between fittings and bulkhead and reinstall original longeron attaching bolt, or longer bolt if necessary.

3. In some instances, where the above described procedure does not reduce the wrinkling or "oil canning" to a satisfactory minimum, it may be necessary to install a horizontal angle stiffener to completely eliminate the possibility of an eventual skin failure.

4. In the event localized wrinkling is severe or cracks are discovered, it will be necessary to install a doubler sheet behind the skin in accordance with accepted good sheet metal repair practice as described in CAM-18.

NOTE: INSPECTION OF THE LOWER LONGERON ATTACHING BOLTS AT FUSELAGE STATION 93.438 ON BOTH SIDES OF FUSELAGE FOR PROPER TIGHTNESS SHOULD HENCEFORTH BE A PART OF THE REGULAR 100 HOUR INSPECTION PROCEDURE FOR THE NAVION.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
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SERVICE LETTER NO. 35

FEBRUARY 20, 1948

TO: NAVION DISTRIBUTORS

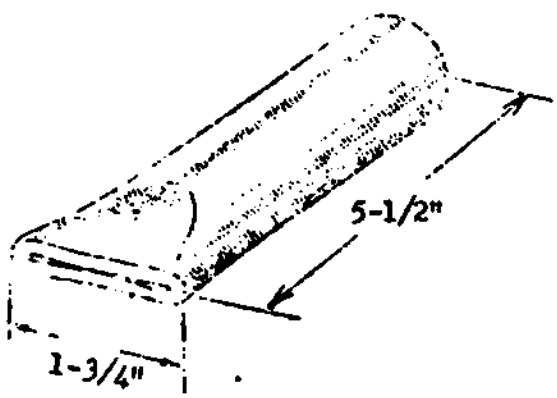
SUBJECT: CABIN AIR EXIT

Airplanes affected: All Ryan Built NAVIONS, 1111 through 1176.

The air exit louvres located on left and right hand wing fillets for improved cabin ventilation may be found to have too small an opening. For maximum cabin ventilating efficiency these louvres should extend out from the wing fillet mold line at least 1" to 1-1/8" at their widest point. We recommend that an inspection be made on Ryan built NAVIONS within the numbers mentioned above, and any openings that are undersize may be enlarged by method described below:

Using a tool which may be made from a piece of 1-1/2 inch pipe flattened on one end as shown below, insert the flattened end of tool into the vent tube opening in the fairing and by tapping on round end of tool with a hammer, the opening can be widened. This can be accomplished without removing fairing from airplane. Use extreme caution so as not to crack the corners of the louvre, while in the process of spreading the opening, if a crack starts, drill a relief hole and dress the rough edges with a small file.

Retouch louvre as necessary with paint to match original finish.



Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 36

FEBRUARY 20, 1948

TO: NAVION DISTRIBUTORS

SUBJECT: NOSE WHEEL SHIMMY

It has been determined that if the steel spacer bushings Part Nos. 145-34155 -3, -4, -5 and -6 (Ref. Page 23 of NAVION Parts Catalog for Location.) manufactured to the low end of the previously allowed manufacturing tolerance are installed in the nose wheel torque link assembly, excessive nose wheel sideplay may result. The manufacturing minus tolerance for these spacers has now been tightened up, but certain NAVIONS within the group of factory serial numbers 1111 through 1162 may have been delivered with spacers installed which were manufactured to the previous tolerances. Spacers of this kind should be replaced with parts manufactured to the high end of the tolerance.

In addition, possible causes for nose wheel shimmy may be eliminated by the following:

1. Adjust the Steering Support Assembly, part number 145-34180, located on the top of the nose wheel well in the aft part of the engine compartment, so that rollers touch nose wheel steering arm with no preload. If this adjustment is made with the airplane weight off the nose gear, it must be rechecked with the normal nose gear weight applied, as this has been known to affect this adjustment in some instances.

2. Thoroughly check all spacer and bushing fits throughout the steering linkage for proper fit, and determine that the taper pins at the lower end of the 145-34126 Tube Assembly, used to secure the 145-34136 Link to the tube, are properly installed and sufficiently tight.

3. Dynamic unbalance of the nose wheel may also cause nose wheel shimmy. The use of special wheel balancing equipment, usually found in the better automotive wheel and brake shops, is necessary to properly correct this condition. Balance weights may be attached to the wheel by means of a sheet metal clip attached to two wheel bolts, as described in Item 6 of NAVICN Service Letter No. 3.

SERVICE LETTER NO. 36

The proper spacer bushings on the high tolerance side, No. 145-34155-3, -4, -5 and -6 will be supplied free of charge to Ryan NAVION Distributors upon request. These spacer bushings are to be installed at no cost to the airplane owner on only those NAVIONS that are found to have excessive play due to undersize spacer bushings, and fall within the factory serial numbers listed in this letter.

Warranty Adjustments for accomplishing the replacement of spacer bushings, on these NAVIONS only will be based on a maximum time allowance of (1) one man hour provided the work is accomplished by an authorized Ryan NAVION Distributor or Dealer and a properly executed Application for Warranty Adjustment submitted by the distributor not more than 90 days from date of issuance of this letter.

IMPORTANT: When requesting shipment of these spacer bushings please specify factory serial number of airplanes on which spacer bushings are to be installed.

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SERVICE LETTER NO. 37

FEBRUARY 23, 1948

TO: NAVION DISTRIBUTORS

SUBJECT: CABIN HEATERS - SOUTH WIND MODEL 977-B

In the interest of improving the servicing of the Stewart Warner South Wind Cabin Heaters, and eliminating possible excessive fuel consumption of NAVIONS having the above heaters installed, the Ryan Aeronautical Co. has secured a limited quantity of the South Wind Service Manuals and upon request, will forward a copy to the Distributors who do not have them for their use in the proper servicing of the heater. We wish also to recommend that in the event a NAVION owner having the above heater installed, complains of excessive fuel consumption, either with the heater in the "ON" or "OFF" position that a thorough check be made into the possibility of the heater by-passing fuel even though it is not in operation.

We trust that with information available the majority of the service complaints can be corrected for the customer. We have also been informed by the Stewart Warner Corporation, that it is their wish that all service and spare parts problems be handled directly with the factory at 1514 Drover Street, Indianapolis 7, Indiana, rather than through their Distributor organization.

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SERVICE LETTER NO. 38

MARCH 8, 1948

TO: NAVION DISTRIBUTORS AND DEALERS

SUBJECT: NAVION FIELD SERVICE BULLETIN NO. 23
C.A.A. A.D. MANDATORY NOTE 47-31-2

To prevent misunderstanding in relation to the accomplishment of North American Field Service Bulletin No. 23, we are rewording the first paragraph and thereby clarifying the intent of this bulletin.

The paragraph should read: "Airplanes NAV-4-851 and subsequent will have the metal vapor return line routed aft of the firewall in such a manner that a fire resistant hose is not required."

Formerly, the carburetor vapor return line vented into the top of the fuel sump tank, which allowed gravity flow of the fuel to fill the line into the engine compartment, necessitating the fire resistant hose. Effective on serial number 851 and subsequent, including all Ryan NAVIONS, the line is vented into the fuel tank vent system, thereby eliminating any gravity flow of fuel into the line, together with elimination of the need of a fire resistant hose.

We trust that this information will be of help to you in your contact with the owners who do not have a clear understanding of the above mentioned bulletin.

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SERVICE LETTER NO. 39

MARCH 16, 1948

TO: ALL RYAN NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: RIGGING NOSE GEAR ACTUATING LINKAGE

The following inspection should be made on all NAVIONS delivered to-date and should henceforth be a part of the regular 100 hour inspection procedure for the aircraft. The purpose of this inspection is to insure that the basic factory loading of the bungee is maintained at all times. Any decrease of the bungee load on the nose gear actuating linkage will result in the possibility of the nose gear collapsing while taxiing the airplane with hydraulic pressure control in the "OFF" position.

1. Weight tail of aircraft to take weight off of nose gear and remove Baffle R.H., Part No. 143-31001-50, on right side of fuselage just aft of engine cooling air exit duct. 104

2. Remove the NAS57-21 Bolt used to connect Link Assembly, Part No. 145-34120, to fitting on nose gear shock strut. Allow link assembly to drop down to end of 143-33160-3 Bungee travel.

3. While moving forward end of Link Assembly back up into position so that bolt hole in link aligns with bolt hole in fitting on strut, observe the movement of the small clevis pin through inner shaft of Bungee. This pin should move upward 1/8" desired, or minimum of 1/16" before aforementioned bolt holes align. Any adjustment of the Bungee that is required should be made by screwing the 143-33160-6 End Fitting on the lower end of the Bungee in or out as the case may be.

4. Reconnect Bungee and Link Assembly, safetying nuts in the approved manner and reinstall Baffle R.H., Part No. 143-31001-50.
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SERVICE LETTER NO. 40

MARCH 16, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: NAVION FIELD SERVICE BULLETIN WARRANTY

This is to inform you that the warranty provisions contained in NAVION Field Service Bulletins No. 23 to 35, inclusive, will not be valid for claims filed after April 30, 1948. This action is motivated by the necessity for establishing a definite cut-off point for the warranty coverage provided by North American Aviation, Inc. for the accomplishment of these bulletins on NAVIONS manufactured by them. The warranty on these bulletins has been kept in force by the Ryan Aeronautical Company under the terms of a NAVION warranty agreement negotiated with Ryan by North American at the time of NAVION transfer. Ryan will continue to process Applications for Warranty Adjustment for the accomplishment of bulletins No. 23 through 35, accomplished on NAVIONS up to and including April 30, 1948, provided the applications for all such work reach the Ryan factory not later than May 15, 1948.

Inasmuch as the C.A.A. and N.A.A. mandatory dates for these bulletins have all expired and it is felt sufficient time has now elapsed for all NAVION owners to arrange for the accomplishment of these bulletins on their airplanes, this arrangement is considered by both North American and Ryan to be entirely fair and equitable.

NAVION owners are urged to give their NAVION Distributor or Dealer an opportunity as soon as possible to determine what Service Bulletins, if any, need to be incorporated on their airplane and give him sufficient time to effect their accomplishment before the April 30 deadline.

NAVION Distributors and Dealers are asked to call the contents of this service letter to the attention of all NAVION owners, whose airplanes they service from now until April 30, 1948, so that all parties concerned will be informed on the matter and reminded of the necessity for having bulletins accomplished now or forfeit their right to any bulletin warranty consideration.

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 41

MARCH 16, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: FUEL SYSTEM - NAVION AIRPLANES NAV4-2 THROUGH NAV4-1110, FUEL PUMP INLET LINES RELOCATION AND ENGINE FUEL PUMP REPLACEMENT

REF: MANDATORY N.A.A. NAVION SERVICE BULLETIN NO. 36 AND CONTINENTAL BULLETIN NO. M48-1

Through the combined efforts of North American Aviation, Inc., Continental Motors Corporation and the Ryan Aeronautical Company, NAVION Field Service Bulletin No. 36 and its companion bulletin, Continental Motors Corporation Bulletin No. M48-1, have been issued. Your copies of both bulletins are attached hereto.

It is important that both these improvements be incorporated concurrently, as specified in the bulletins, in order that the full benefits of each change may be achieved. NAVION owners should make arrangements with an Authorized NAVION Distributor, Dealer or NAVION Repair Station for the accomplishment of these bulletins on their airplanes. These agencies will, in turn, arrange for procurement of NAVION Field Service Bulletin No. 36 parts from the Ryan Aeronautical Company on a no charge basis, and Continental Bulletin No. M48-1 parts from the Continental Motors Corporation under the terms and as per instructions contained in their bulletin. It should be noted that Continental's offer of a special price for the 530509-A1 kit expires on June 15, 1948. It is anticipated the C.A.A. will issue an AD Note, making the accomplishment of both bulletins mandatory at approximately this date.

Duly authorized agencies accomplishing NAVION Field Service Bulletin No. 36 will be reimbursed by the Ryan Aeronautical Company for their labor on this bulletin only on the basis of a maximum labor allowance of 1 hour, upon receipt of properly executed N.A.A. Application for Warranty Adjustment forms submitted through their NAVION Distributor. These warranty provisions will automatically expire 30 days after the AD Note mandatory date.

The instructions contained in both bulletins are not currently applicable to any NAVIONS having the Ryan designed Adel electric fuel pump system installed as standard or as per instructions contained in NAVION Special Instructions No. 29. NAVION Distributors, Dealers and Owners will be advised in a subsequent NAVION Service Letter or Bulletin what engine driven fuel pump modification, if any, will be required on these airplanes.

NOTE: NAVION Distributors and Dealers will please specify on their orders the factory serial numbers of NAVIONS for which Bulletin No. 36 kits are ordered from the Ryan Aeronautical Company.

SERVICE LETTER NO. 41 Supplement Page

To eliminate the misunderstanding and add further information to N.A.A. Bulletin No. 36, fuel strainers are only required on NAVIONS, NAV-4-2 through 250, that do not have the South Wind Heaters installed. All other NAVIONS have had strainers installed at the factory and those under 250 with heaters have had same installed with heater kit, therefore, additional strainers are not required to replace the screens deleted from the Carter Fuel Pumps.

The strainers and brackets if required for NAVIONS, NAV-4-2 through 250 that do not have a heater installed, may be obtained by request from our Spares Department at a nominal charge.

NOTE: After completing installation of Continental Bulletin No. M48-1 and N.A.A. Bulletin No. 36, a thorough check should be made of the entire fuel intake system to eliminate all air leaks, (this is very important) or the new type pump will not function properly. The most probable sources of air leaks are located in the fuel shut-off valve "O" Ring, the strainer and the primer system.

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 42
APRIL 16, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND APPROVED NAVION REPAIR STATIONS

SUBJECT: NAVION STARTER STATUS

Several instances of service difficulty were encountered with the engine starter on earlier Navions during the fore part of 1947 and several Service Letters and Bulletins were issued to provide information on proper adjustment and changes in the starting mechanism designed to correct these troubles. Service reports since have indicated comparatively infrequent cases of engine starter troubles; however, it is believed desirable at this time to review the causes of the troubles that have occurred and the methods recommended for their elimination.

The starting system of the engine with which the Navion is equipped, includes a Delco Remy starting motor driving a starting pinion gear through a clutch mechanism which is spring-loaded in both directions so that the pinion gear is normally held out of engagement with the engine starting drive gear. Engine starting is accomplished by depressing a foot pedal in the cockpit which is connected to mechanism on the starter. Initial depression of the foot pedal compresses a spring in the starter clutch assembly which moves the pinion gear into mesh with the engine starting gear if the teeth are properly aligned. Further depression of the starting pedal engages the starting motor switch, applying power to start the engine. An adjustment is provided on the starter engaging lever to properly coordinate partial compression of the clutch engaging spring before closing the starter switch. Release of the foot pedal opens the switch, disconnecting power to the starter and, by relieving pressure on the starting clutch spring, permits it to disengage the pinion gear from the engine starting gear. The clutch mechanism prevents damage by permitting free-running of the starter pinion gear in a reversed direction.

Service records have shown some cases of gear teeth breakage, usually on the engine starting drive gear which is located above other engine gears. Breakage of a tooth on this gear could thus cause considerable damage by falling into some of the lower gears. Study of possible causes of gear tooth breakage indicated several possibilities, although most of these were eliminated if system was properly adjusted and operated in accordance with Service Letter No. 11. Obviously, trouble might be expected if attempts were made to engage the starter with the engine running. Also, incorrect

adjustment of the mechanism might permit application of power to the starting motor before moving the pinion gear teeth into engagement with the starter gear. Some service trouble was also encountered due to occasional failure of the starter pinion gear to disengage from the engine starting gear. Service Bulletin No. 25 dated May 12, 1947, required the addition of an external spring in the starter control system to insure more positive disengagement of the starter mechanism when pressure was released on the foot pedal. The starter clutch and pinion gear assembly was also revised to incorporate a stronger spring as described by Service Bulletin No. 29 dated April 15, 1947. This change provided faster engagement and disengagement of the starter pinion gear and reduced the possibility of gear damage even in the event of improper adjustment of the mechanism.

Following application of these changes during the Summer of 1947, reports of engine starter gear failures as previously stated were considerably reduced; however, investigation of further possible improvements was continued. This resulted in development by the Continental Motors Corporation of a solenoid operated starting installation described by their Service Bulletin M47-18. The intent of this modification was to insure engagement of the starter pinion gear teeth with those of the engine starting gear before application of full power from the starter motor by providing initial rotation of the starter under low torque, followed by rapid meshing of the gear teeth through action of the solenoid. In order to accomplish this, a resistance coil was placed in the electrical circuit and a solenoid was provided to operate the starter clutch and pinion gear assembly. The mechanism between the starter and the foot pedal remained in its original form. This improvement is available for installation on delivered airplanes as described in Continental Service Bulletin M47-18 and may be made at the owner's option.

Shortly after initiating production of the Navion airplane, the Ryan Aeronautical Company undertook the development of a further improvement in the existing engine starting equipment the purpose of which is also to minimize the chances of maladjustment of the starter operating mechanism by insuring proper meshing of the gear teeth under low torque before application of full starting power. It is anticipated that this can be accomplished without the necessity for providing a new starter or a solenoid in order that the increased weight and cost may be held to a minimum. This development is being expedited and will be made available when proven fully satisfactory by extensive tests.

Service experience during the last six months indicates that very little service trouble should be encountered with the existing equipment, if modifications described in Service Letter No. 11, Service Bulletin No. 25 and Service Bulletin No. 29 mentioned above have been complied with. These Bulletins and Letters should be complied with unless either the Continental M-47-18 or the Ryan proposed starter modification have been installed. The Ryan Aeronautical Company policy, therefore, is to make certain by adequate tests that any further improvements which it may make available, are thoroughly proven and practical.

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SERVICE LETTER NO. 43

APRIL 15, 1948

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: ADJUSTING OF CARBURETOR IDLE MIXTURE AND CHECKING FUEL SHUT-OFF VALVE TO PRECLUDE FUEL PRESSURE LOSS

EFFECTIVITY: ALL NAVIONS HAVING THE ADEL ELECTRIC FUEL PUMP INSTALLED

A. ADJUSTING IDLE MIXTURE

The Adel Electric Fuel Pump was developed and installed on NAVIONS for emergency purposes; therefore, it is desireable to always have the Adel Pump ON for take-offs and landings to provide emergency fuel pressure in the event of an engine pump failure. The turning on of the Adel Fuel Pump will increase the fuel pressure slightly. This in turn causes leaning of the mixture in some carburetors, at low RPM, therefore, it is desireable to always set the idle mixture adjustment with the Adel Fuel Pump ON to eliminate lean mixture and possible stopping of engine. When the Adel Pump is turned OFF the engine may be on the rich side when idling, this has however no effect when the engine is turning at a greater than idling RPM.

B. CHECK OF FUEL SYSTEM TO ELIMINATE LEAKS

Make a complete check of the fuel system when an Adel Fuel System Kit No. 29 has been installed, the following checks should be made to eliminate all air leaks. Pull mixture control to idle cut-off position. Turn on Electric Fuel Pump. Examine all connections between pump and engine for any signs of leaks. (The Fuel Shut-off Valve "O" Rings have in numerous cases shown signs of leaking with pressure applied but will more often leak in the negative pressure condition, which in turn will cause pressure loss with the Carter Fuel Pump on only.) If the "O" Ring leaks it may be necessary to change Ring, in which case the next size larger "O" Ring (-13) should be installed. The primer and lines must be checked for leaks, also with Electric Pump off, check line from sump through strainer for leaks. After installation is complete, test flight airplane, then climb it to 10000 ft. with engine pump only. Pressure dropping off beyond normal, indicates either a leak in the system, in the engine driven Carter Pump, or weak diaphragms in the pump.

SERVICE LETTER # 44 NOT ISSUED OR CANCELLED

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 45

APRIL 15, 1948

TO: ALL DISTRIBUTORS, DEALERS AND APPROVED REPAIR STATIONS

SUBJECT: REPLACEMENT OF HYDRAULIC PRESSURE LINE

Effective NAV-4-2 through 1228 (1229 and subsequent will have lines installed at factory).

In the interests of constantly improving the service life of the NAVION and its accessories, The Ryan Aeronautical Company has procured an improved type Hydraulic Pressure Flex Line No. 145-58028 (connecting hydraulic pump to pressure relief valve), which should extend the service life of the line considerably.

Improved Pressure Lines for Ryan-built NAVIONS, NAV-4-1111 through 1228 will be supplied free to Distributors for installation in NAVIONS within numbers mentioned. One only will be supplied for each NAVION, please specify serial number of airplane when requesting the Line Assembly Part No. 145-58028.

Lines may be procured for all North American-built NAVIONS from our Spares Department, at a nominal charge.

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SERVICE LETTER NO. 46

APRIL 12, 1948

TO: ALL NAVION DISTRIBUTORS AND DEALERS

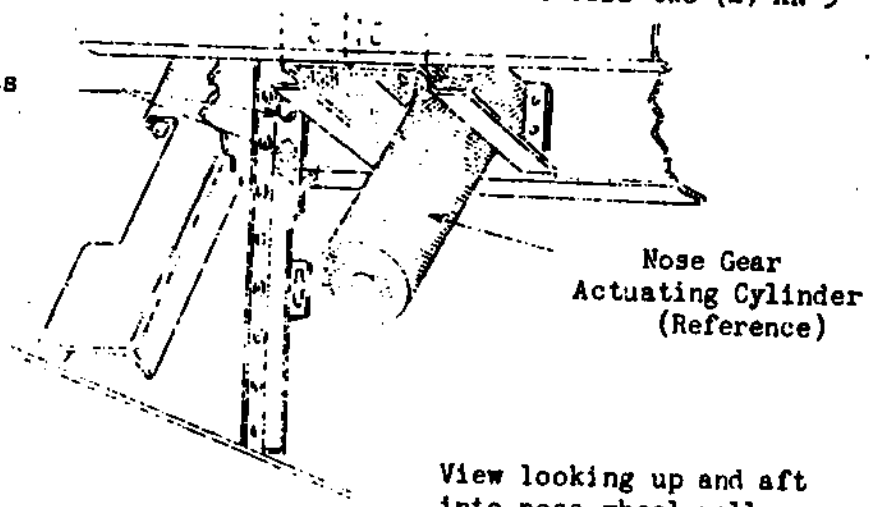
SUBJECT: SAFETY WASHERS ON MAIN GEAR RETRACTING LINKS AND NOSE GEAR RETRACTING CYLINDER MOUNTING STRUCTURE RIVET REPLACEMENT

Effective on all NAVIONS, NAV-4-2 through 1270 (1271 and subsequent will have washers installed at factory).

In order to preclude the possibility of the main landing gear retracting link working off of the swaged-in bearing located at strut attaching end, safety washers should be added in place of the present AN washers at the earliest convenience. The desired size of the washers should be 5/8" I.D., 1-3/8" O.D. by 1/16" in thickness, and may be fabricated locally from 1020 steel or equivalent. Two (2) washers are required per airplane.

At the same time an inspection of the following should be made of all NAVIONS, NAV-4-2 through 1252 (1253 and subsequent will have proper rivets installed at the factory).

At the nose gear retracting cylinder attaching cross member, where ends attach to nose wheel well side spar, right hand side, upper corner (see sketch), determine if the two (2) proper 3/16" high shear rivets are installed. If there are two (2) 1/8" rivets, they should be removed, holes drilled out with a No. 12 drill and two (2) AN 3- bolts installed. On the left hand side, upper corner, see if the two (2) proper 5/32" dural rivets are installed, if there are 1/8" rivets, remove same, drill out to 5/32" and install two (2) AN 442-AD5 (5/32) rivets or drill out with No. 12 drill and install two (2) AN 3- bolts.



View looking up and aft into nose wheel well

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SERVICE LETTER NO. 47

MAY 20, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: PROPOSED C.A.A. AIRWORTHINESS DIRECTIVE NOTE FOR ALL NAVION AIRPLANES EQUIPPED WITH CARTER DIAPHRAGM FUEL PUMPS

This is to advise you that the C.A.A. intends to issue an Airworthiness Directive Note to the effect that all NAVIONS equipped with any model of Carter Diaphragm Fuel Pumps must have a drain line installed on the diaphragm vent opening of each pump.

TO BE ACCOMPLISHED AS SOON AS POSSIBLE BUT NOT LATER THAN AUGUST 1, 1948.

All Ryan manufactured NAVIONS, using a Carter pump, were delivered with the drain line installed, however, the adapter does not completely seal the pump vent, therefore, a seal only must be installed under the present drain adapter.

All other NAVIONS must have the drain lines installed and vented out in a low pressure area, but not in the proximity of any exhaust outlet of either the engine or cabin heater. Before installing drain on pump, the fiber glass screen and snap ring must be removed from breather opening.

Ryan drain lines and adapter, Part No. 145-48056 or 145-48234-1 and -2, or similar installation will be acceptable.

Part No. 145-48056-11 Seals only for Ryan manufactured NAVIONS 1111 through 1270 will be available at no cost from Authorized Ryan NAVION Distributors for installation in these airplanes.

Complete kits of parts for North American manufactured NAVIONS will also be available from the above mentioned source at a nominal cost.

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SERVICE LETTER NO. 48

MAY 10, 1948

TO: NAVION DISTRIBUTORS AND DEALERS

SUBJECT: MAIN LANDING GEAR STRUT TRUNNION REPAIR

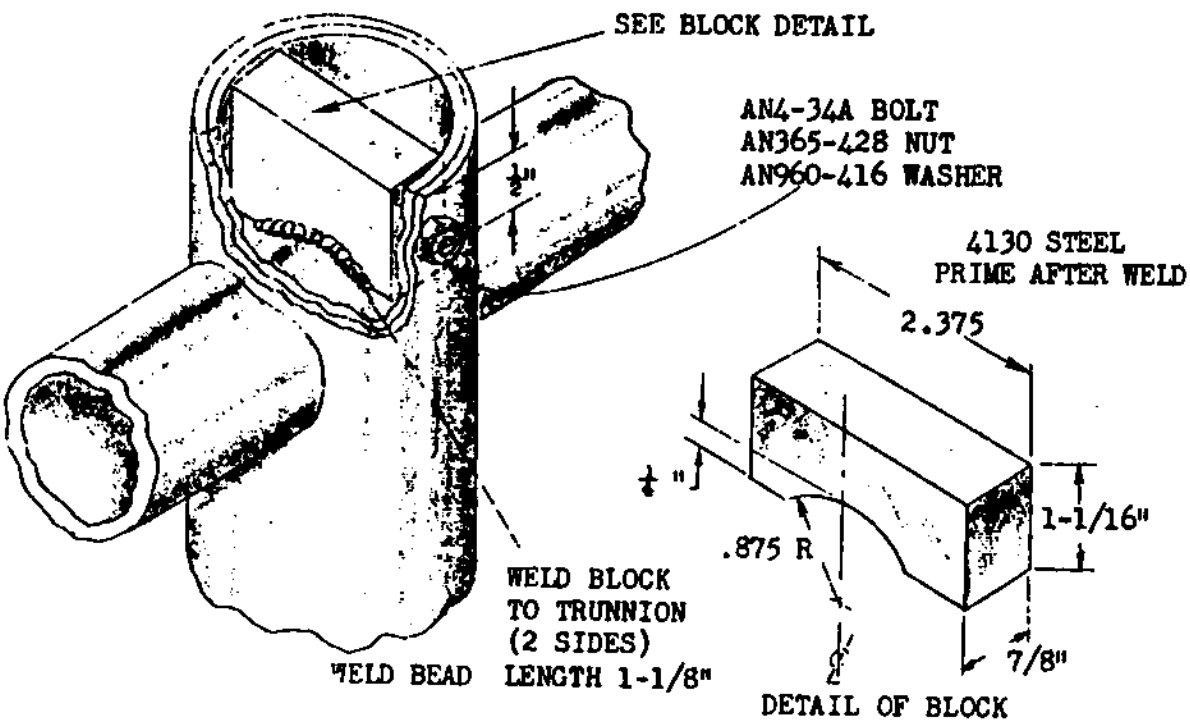
NAVION main landing gear shock struts have been manufactured by two separate methods:

1. Those that have the trunnion attached to the strut by furnace brazing only.

2. Those that have a 1-1/4" arc weld across each side of the trunnion and where the weld has been accomplished prior to the brazing operation.

The following is a factory approved repair procedure for securing the trunnion to the strut in the event of a failure where the manufacturing method was furnace brazing only without the weld.

As shown in sketch, shape a block of 4130 steel to size, insert into top of strut and arc weld. Drill and ream to .250 + .0015 - .0006 hole and install an AN4-34A Bolt, Nut and Washer.



NOTE: If any copper is evident in the area to be welded the copper must be removed prior to welding or repair will not be acceptable.

Investigation at this time has not revealed any trunnion failures on struts manufactured according to the improved method covered in Item 2 above, however, if a repair is necessitated on this type of strut the same procedure is applicable.

The repair does not impair the heat treat value of strut nor will it cause cracks in the weld from copper inclusion, both of which will occur if any other type of repair is attempted.

NOTE: Pad Cylinder with asbestos during welding operation.

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SERVICE LETTER NO. 49

AUGUST 24, 1948

TO: NAVION DISTRIBUTORS AND DEALERS

SUBJECT: ELECTRICAL SHORTING OF FUSE (CIRCUIT BREAKER) PANEL

It has been reported that on at least one early North American manufactured NAVION, service changes have created a condition whereby fuse panel bus bars and wires have caused short circuit and destroyed the insulation on several wires.

When all NAVIONS are manufactured they are carefully inspected for proper routing of all wires and connections; however, since the panel is a movable one and servicing of aircraft as well as addition of special equipment may have altered the original positions of the wires, it is suggested that as a preventive measure when NAVIONS are brought in for service the fuse or circuit breaker panel should be checked for interference when in the retracted position. The following conditions are most likely to create trouble:

1. On NAVIONS NAV-4-2 through NAV-4-250, a warped fuse panel may cause the bus bar at the bottom of the panel to come in contact with hydraulic tubing. If this condition seems to be prevalent, rivet a 1/16" x 1 x 2 micarta block on the panel in such a manner as to protect the bus bar from the possibility of such a contact.

2. On some NAVIONS, wire No. 102, on the right (looking forward) side of the circuit panel has shifted and may rub against the instrument panel support beam. To alleviate this condition, remove the screw attaching wire No. 102 to the upper bus bar, and re-install the wire terminal beneath the bus bar and 180° from the previous direction of installation. Remove the opposite end of wire No. 102 from its mounting and after re-routing the wire so that no interference occurs, re-install the terminal. Tie the wire so that vibration cannot cause wires to rub and chafe through their insulation.

3. On all NAVIONS when in for servicing, make certain that nothing interferes with any wires or bus bars on the panel. If the possibility of such interference exists, re-arrange the interferring units to provide adequate protection or clearance.

SERVICE LETTER # 50 NOT ISSUED OR CANCELLED

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 51

AUGUST 30, 1948

TO: ALL NAVION OWNERS

SUBJECT: CANCELLATION OF CONTINENTAL SERVICE BULLETIN NO. M48-1 AND NORTH AMERICAN AVIATION BULLETIN NO. 36

The Civil Aeronautics Administration has rescinded the mandatory order requiring change of NAVION fuel system to Carter Pancake pumps, consisting of Continental Service Bulletin M48-1 and North American Aviation Bulletin No. 36.

This automatically cancels Service Letter No. 41.

Navion AIRCRAFT CORPORATION
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SERVICE LETTER NO. 52 MANDATORY

September 27, 1948

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: MODIFICATION OF HARTZELL PROPELLER BLADE COUNTERWEIGHTS AND PROPER ADJUSTMENT OF PROPELLER

EFFECTIVITY: ALL NAVIONS HAVING CONTINENTAL E-185-3 ENGINES FACTORY SERIAL NO. 4221D AND SUBSEQUENT EQUIPPED WITH A HARTZELL PROPELLER AND E-185 ENGINES HAVING CONTINENTAL BULLETIN NO. M48-7 ACCOMPLISHED AT LAST OVERHAUL AND EQUIPPED WITH A HARTZELL PROPELLER

ACCOMPLISH: IMMEDIATELY

Due to a change in the type of thrust bearing used by Continental in their E-185-3 engines factory serial number 4221D and subsequent (Ref. Continental Bulletin M48-7, dated May 26, 1948.) service experience has indicated that the loads imposed on the engine crankshaft by the counterweights of the Hartzell Propeller under certain conditions may be greater than the thrust bearing is capable of withstanding; therefore, it is imperative these loads be reduced.

SECTION I METHOD OF REDUCING COUNTERWEIGHT LOADS

Reduction of these loads must be accomplished by shortening the propeller counterweights 3/8 inch in the following manner:

1. Scribe a line entirely around each counterweight 3/8 inch from the end.

2. Saw off end of each counterweight leaving a small amount of stock above scribed line.

3. Using a mill file, carefully file off material down to scribed line.

4. Prime and silver paint exposed metal.

NOTE: If desired, machine milling may be used instead of the hand sawing method in which case weights should be identified and reinstalled on the same blade clamp from which they were removed with 500 inch pounds torque on the 7/16-20 - 1-1/2 inch hollow head screws to secure weight to clamp. Safety screws as in original installation.

SECTION II PROPELLER INSTALLATION AND ADJUSTMENT

PART A. -1, -3 and -5 Propeller

When reinstalling the propeller on the airplane after having accomplished the counterweight modification, the following precautions should be taken.

1. Measure length of rear cone. These cones should be 1-15/32 inches long. If cone is found to be shorter than this, a spacer of proper thickness to make up the difference in length should be used behind it.

2. After completing installation of the earlier model Hartzell propellers (-1, -3, and -5) as per instructions in the Hartzell Propeller Manual for the particular type, a ground run of the engine should be made to adjust propeller for proper maximum static engine rpm (2025 rpm).

3. Run engine for as short a time as possible with the propeller control in the full increase rpm position and shut down engine with the control in this position. The position of the propeller jack plate in relation to the hub assembly should then be determined to insure a minimum clearance of 1/16 inch between these two units of the assembly to prevent an excessive preload being put on the engine crankshaft by the propeller hydraulic element during maximum rpm operation of the engine.

4. If the jack plate to hub clearance is found to be less than the required 1/16 inch, a spacer washer may be used behind the rear cone to position hub out farther on shaft and so increase the clearance ON -1, -3, and -5 HARTZELL PROPELLERS ONLY.

PART B. -7, -7A and -7B Propellers

See Sketch.

1. Measure length of rear cone as in Step 1 of Part A, if a spacer is found behind a cone that measures 1-15/32 inches, remove spacer and do not use. The use of varying thickness shims behind the rear cone as described above may position the -7 propeller hub out too far on the engine shaft and so preload the propeller diaphragm and effect its deflection during propeller operation. If proper length cone is used (1-15/32 inch) and the Hartzell installation instructions carefully followed the required 3/16 inch maximum deflection of the diaphragm each side of neutral can be maintained. Control of diaphragm deflection is essential to prevent an unnecessary strain being put on the diaphragm. Propellers having been in service with a full length cone and additional spacer should have the hydraulic element disassembled and the diaphragm inspected for possible rupture or signs of weakness in area near clamping rings. If signs of rupture or weakness are found, diaphragm must be replaced before propeller can be put back in service.

2. Install propeller on engine in accordance with instructions contained in Supplement Section X of the Hartzell Propeller Manual, third printing, dated August, 1948, exercising the utmost care in adjusting propeller control cable before attaching it to the A-117 servo valve control lever. In this regard, we quote from the Hartzell Manual. "When connecting wire to lever A-117, position piston in forward position and servo valve body 3/8 inch from valve plate (near mid position); also push pull control should be pulled out from dash approximately 1/8 inch".

3. Check for 3/16 inch maximum deflection of diaphragm each side of neutral by determining that the front face of the element piston is 1/16 inch behind front edge of diaphragm clamping ring when diaphragm is in neutral. When diaphragm is in maximum allowable forward position, the front face of piston should extend beyond front edge of clamping ring 1/8 inch.

4. In the full forward position of the diaphragm, (maximum rpm) with engine running, there must be a minimum of 1/16 inch clearance between the front edge of the jack plate and propeller hub. Clearance may be observed from side of airplane while engine is running. It is important this jack plate to hub clearance be maintained to preclude any possibility of overloading engine thrust bearing with propeller. If desired maximum rpm cannot be obtained with this basic adjustment, the blade setting in the hub must be changed rather than use a spacer back of the rear cone as is some times done in the case of a -1, -3, or -5 Hartzell propeller.

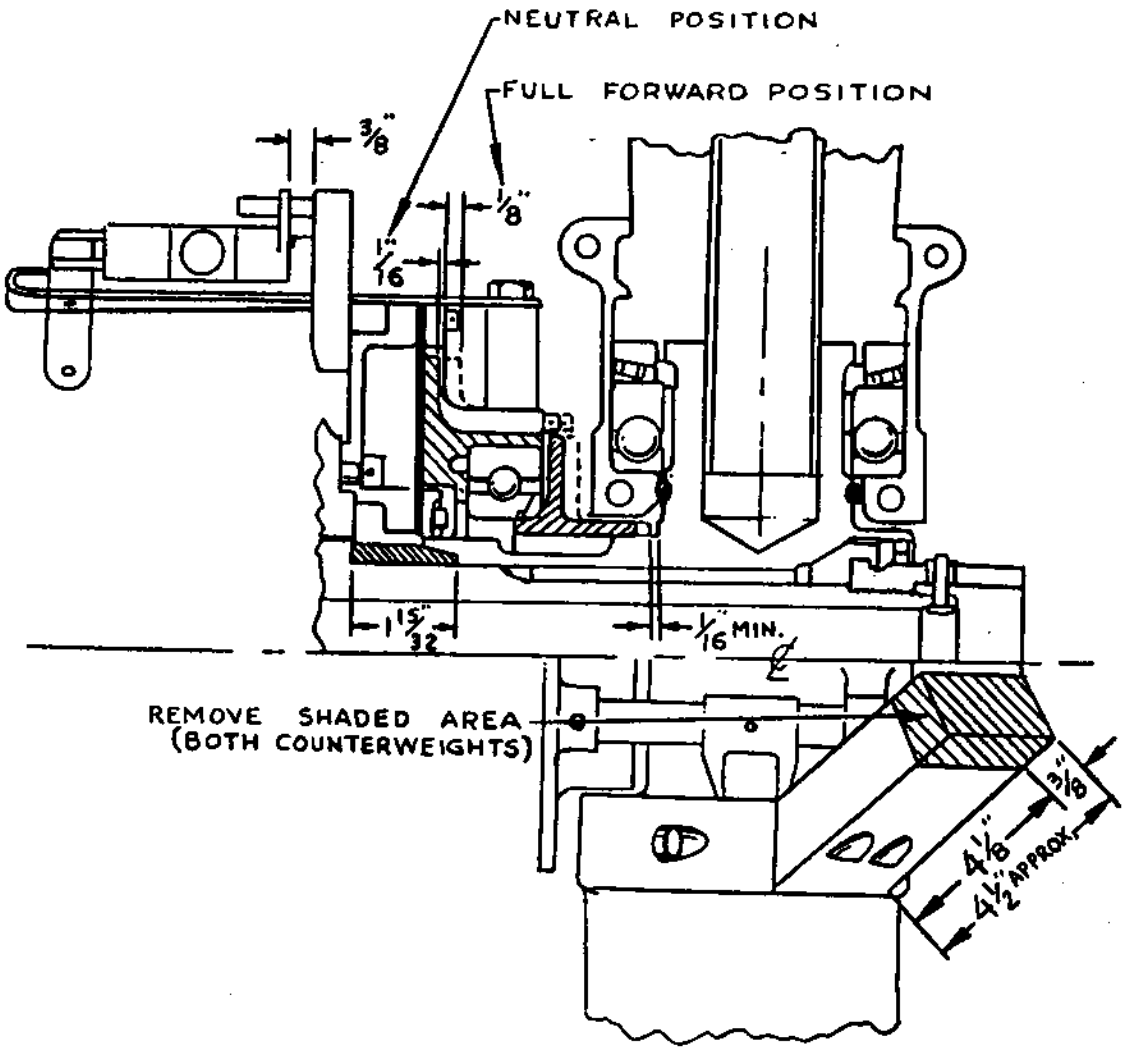
5. If the foregoing instructions are fully complied with, the maximum static rpm will be approximately 2025. This adjustment should give a maximum sea level take-off rpm of 2300 with approximately a 400 rpm control range when the propeller control is moved from full increase to a full decrease rpm.

   DO NOT attempt to increase this control range, as it will cause over-deflection of the diaphragm with potential failure.

   DO NOT attempt to increase the maximum take-off rpm above 2300 as the engine, airplane and propeller combination is not approved for any setting in excess of 2300 rpm and any attempt made to so adjust the propeller will result in a decreased clearance between the propeller hub and jack plate with subsequent possible overloading of the thrust bearings.

ILLUSTRATION

HARTZELL -7, -7A and -7B PROPELLER



Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 53

OCTOBER 20, 1948

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: WHEEL AND TIRE BALANCING (STATICALLY AND DYNAMICALLY)

EFFECTIVE: NAV-4-1500 AND SUBSEQUENT

In the interest of further improving the Navion and its accessories, and utilizing modern methods of manufacture and assembly, The Ryan Aeronautical Company wishes to inform all Navion Distributors, Dealers, and Owners that they now use in production a machine for statically and dynamically balancing the wheel and tire assemblies used on the Navion.

The cold patch method of inserting weight as necessary inside of the tire is used. This eliminates use of excess steel or lead on the wheel to arrive at a proper balance.

To identify wheels and tires that have been statically and dynamically balanced, look for a green paint mark on the wheel rim and on the tire. Whenever it is necessary to dismantle and re-assemble wheel and tire, always line up the tube red dot with tire red dot and the green mark on the wheel with the green mark on the tire. This will insure the proper balance combination and should not require re-balancing; however, after tires have become worn they may eventually require re-balancing.

This service is available to all Navion owners who wish to have their wheels and tires balanced by this method through our customer service department at a nominal charge.

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NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 54

FEBRUARY 16, 1949

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: REPAIR - CRACKED EXHAUST MANIFOLD OUTLET CLUSTER

EFFECTIVITY: ALL NAVIONS

Should a condition arise wherein the exhaust manifolds crack adjacent to the attaching weld of the outlet cluster; use the following, approved, repair procedure. Ryan part No. 145-89094-2, which is necessary to accomplish this repair, may be procured from the Spare Parts Department of the Ryan Aeronautical Company.

1. Remove manifold assembly from airplane. See Navion Service Manual, page 59.

2. Cut cluster shell and attaching material from manifold as shown in illustration.

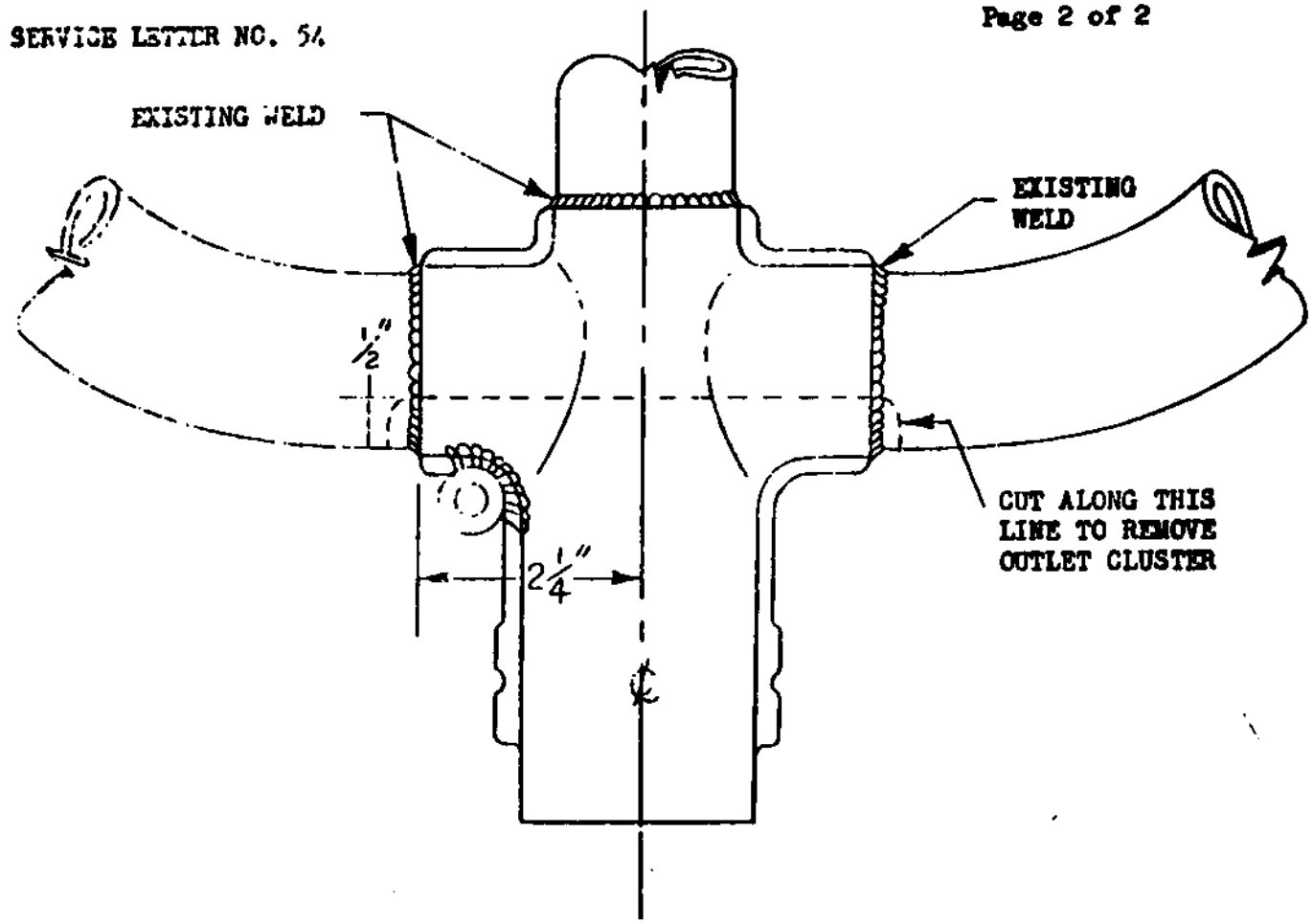
3. Place new 145-89094-2 cluster shell over the manifold cut-out. Clamp the shell to the manifold in such a manner as to line up the shell with the manifold. This alignment is critical to maintain tail pipe to cowling clearance.

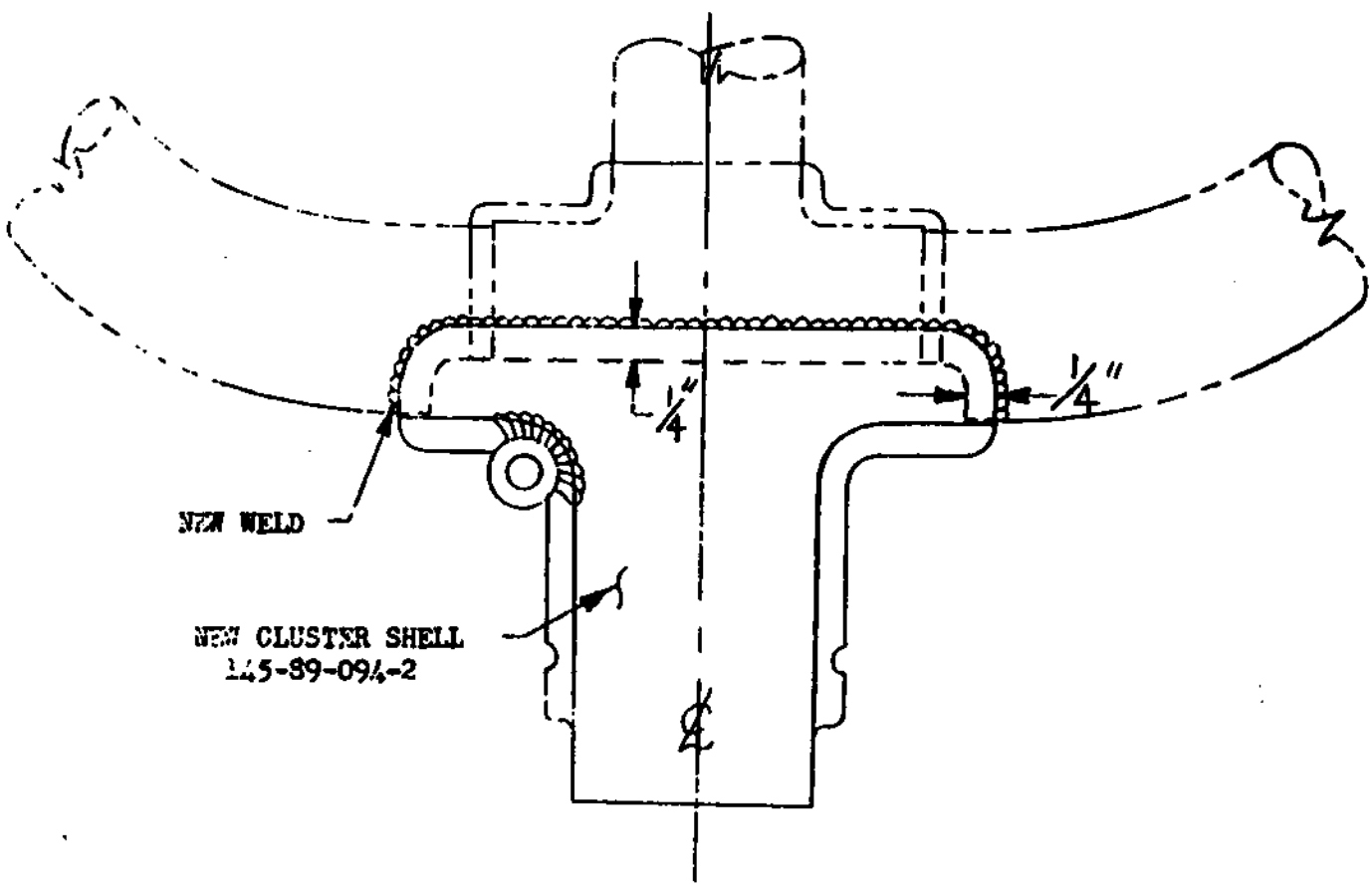
4. Weld shell to manifold by using arc or gas welding rod. The weld should be gas tight.

   NOTE: Use rod specification equivalent to AAF specification AC10286, Type I, Grade 3E for arc welding; or Type II, Grade 3G for gas welding.

5. Clean weld, preferably by sandblasting, and inspect for flaws.

6. Reinstall manifold assembly.


EXISTING WELD
EXISTING WELD
1/2"
CUT ALONG THIS LINE TO REMOVE OUTLET CLUSTER
2 1/4"
℄


1/4"
1/4"
NEW WELD
NEW CLUSTER SHELL
145-89-094-2
℄

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 55

JANUARY 3, 1949

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: SUGGESTED OPERATIONAL PROCEDURES AND GENERAL INFORMATION ON THE CONTINENTAL E-185 ENGINE

This letter will review certain operating difficulties with the E-185 engine of which some cases have been noted during the past year. This information is being made available to all Navion owners to assist them in following the best operating practices in the use of their engines.

1. Any owner who may not be fully familiar with the facts relating to the thrust bearing subject will be interested in the following history:

Continental Motors Corporation produced one group of engines during [illegible] on which they changed the thrust bearing design from a silver alloy to bronze. Some of these bearings "burned out" during shakedown flight tests, at which time Ryan immediately suspended all airplane deliveries, and Continental effected prompt corrective action before deliveries were again resumed. Investigation of the bearing design and installation indicated the bronze type to be satisfactory when "worn in" and properly seated, a condition which could be better insured by reducing the thrust loads created by the counterweights of the Hartzell propeller. No bearing difficulty was experienced with Aeromatic propeller installations; however, this is no reflection on the Hartzell propeller due to necessary basic design differences. After extensive testing, it was determined that the corrective action taken resulted in satisfactory functioning of the bearing. The owners of the limited number of airplanes that had been delivered before this situation was discovered and corrected were contacted immediately at that time and given instructions through Service Bulletins. Fortunately, only a very few experienced actual trouble and in these cases Continental made arrangements for replacements. All engines except those between serial numbers 42890 and 51100, inclusive, have the silver alloy type bearings which were at no time subject to any such trouble. All engines within the above group are bronze equipped and service experience proves that if such an engine operates satisfactorily for 50 hours without developing excessive crankshaft end clearance, it indicates the bearing is normally worn in and properly seated and should give satisfactory service for an indefinite period.

The established major overhaul point for the E-185 engine is 600 hours, at which time, according to Continental Motors Corp. Service Bulletin No. M48-30, dated November 23, 1948, all bronze thrust bearings must be replaced with the silver type, which type is now incorporated in all new current production engines. These bearings are also available in limited quantities for earlier replacement should your engine be disassembled sooner than the major overhaul point. If your engine is within the referenced serial numbers for bronze bearings, and any doubt exists regarding its condition, we recommend that you have your service facility check the crankshaft end clearance. If it does not exceed .026", it is within the normal limits as recommended by Continental, and there is no reason to expect excessive or continued wear. If the clearance is in excess of .026", please contact Ryan and Continental with full information, including serial number of your engine, total hours, etc.

2. The present Continental engine is one of the finest aircraft engines in light plane operation today; but in common with all aircraft engines, its performance and length of satisfactory service is dependent upon proper operation. Listed below are four suggestions for operational procedure which will enable every owner to obtain the maximum satisfactory service for which this engine was designed. These suggestions are not offered to the professional pilot as an absolute guide but rather to the amateur pilot as a sensible yardstick directory.

   (a) <u>Slow-Time Operation for New or Overhauled Engines</u>.

   Excessive power loads during the period immediately following engine overhaul or manufacture result in premature wear and eventual failure. Sound operational judgement prescribes that the engine should be flown at reduced power settings for a minimum period of 20 hours. During this time, it is recommended that extensive climbs to high altitudes be avoided or accomplished at settings not to exceed 26" manifold pressure and 2200 rpm. An airspeed of not less than 100 mph under these climb conditions would aid in keeping cylinder temperatures low. Level flight cruise settings in excess of 23" and 2100 rpm should be avoided until the slow-time period has been passed.

   (b) <u>Normal Climb Procedure</u>.

   The normal efficient climb airspeed for the Navion is approximately 95 mph. A throttle setting of not more than 26" and 2200 rpm will produce a very satisfactory

vertical speed, and can be flown for an indefinite period of time at that airspeed without injury to the engine. A higher rate of climb can be executed at 78 - 80 mph with increased power settings, but continued operation at that speed and increased power without frequent leveling off periods will result in over-heating and consequent damage to the engine.

(c) Leaning Procedure.

Judicious use of the mixture control for climb or level flight must be employed to obtain maximum range and engine performance. Improper use of the mixture control will result in poor economy or overheating. Since the mixture control on the Navion is rather sensitive, adjustment for proper air-fuel ratio must necessarily be executed carefully. For flights above 5000 feet satisfactory mixture can be obtained by pulling the control out until a slight increase (approximately 25) in rpm is noted. Leaning beyond this point is apt to be detrimental. Proper adjustment by visually checking the tachometer can further be aided by engine sound and engine roughness. If the engine sounds as though it were laboring abnormally, or if roughness is indicated by excessive vibration, the control should be advanced until these conditions are eliminated. Should any doubt exist as to the proper setting, a slightly rich mixture is preferable to a slightly lean mixture.

(d) Throttle-Propeller Coordination.

Early verbal instructions issued by the former manufacturer of the Navion led many North American Navion owners to erroneously believe that the engine should be operated under full throttle conditions at all times, and that the power output of the engine should be controlled by adjusting the rpm with the propeller alone. These instructions were later modified, but engine malfunction was subsequently reported which indicated that the engines were being operated with high manifold pressure at lower rpm's. In effect full throttle operations at low rpm's at altitudes below 5000 feet imposes power loads upon the engine which are detrimental to its service life.

A comparison can be drawn in the automotive field by keeping the foot accelerator fully open while attempting to climb a long steep hill in high gear. The engine will have a tendency to "lug" with consequent detonation and overheating. While the combination of high manifold pressure and low rpm's can be applied to supercharge military type aircraft engines, in aircraft with considerably higher speeds, to obtain maximum range; this procedure applied to engines of lower horsepower is not recommended. To insure lower temperatures and consequent longer life expectancy from the engine, it is recommended that the propeller rpm's be increased with increased throttle settings and that overall horsepower output of the engine be reduced by both throttle and rpm reduction.

Improper procedure in any one of the above mentioned operations can result in engine malfunction due to overheating, which in turn can cause piston failure with its attendant damage. Sensible application of power and the realization that an aircraft engine will give service comparable to automotive equipment only if properly handled, will assure hundreds of hours of trouble-free flying. Since the cost and weight of instruments to thoroughly analyze engine conditions in flight limits their use to airline equipment, the performance of the engine in the Navion will rely, for a large part, on the knowledge and care of its operator. For the owner-pilot who questions his ability to analyze engine performance or who is desirous of more accurately determining engine temperatures, a cylinder head temperature gauge could be installed at a reasonable cost. A manifold pressure gauge (formerly optional equipment) will also be a decided aid in proper engine operation.

The Ryan Aeronautical Company earnestly desires that you receive the best possible service from your engine and believes the most important factors to assure this service, are proper operation and top maintenance. We are desirous of giving you utmost assistance by keeping you well informed and thereby enabling you to follow the best operating practices at all times to obtain the long and faithful service of which this engine is capable of giving.

Navion AIRCRAFT CORPORATION
NAVION FIELD SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(North Guadalupe County Airport)

SERVICE LETTER NO. 56

FEBRUARY 10, 1949

TO: ALL NAVION OWNERS

SUBJECT: PRECAUTIONARY MEASURES

(1) BATTERY REPLACEMENTS
(2) TIRE RECAPPING OR RETREADING

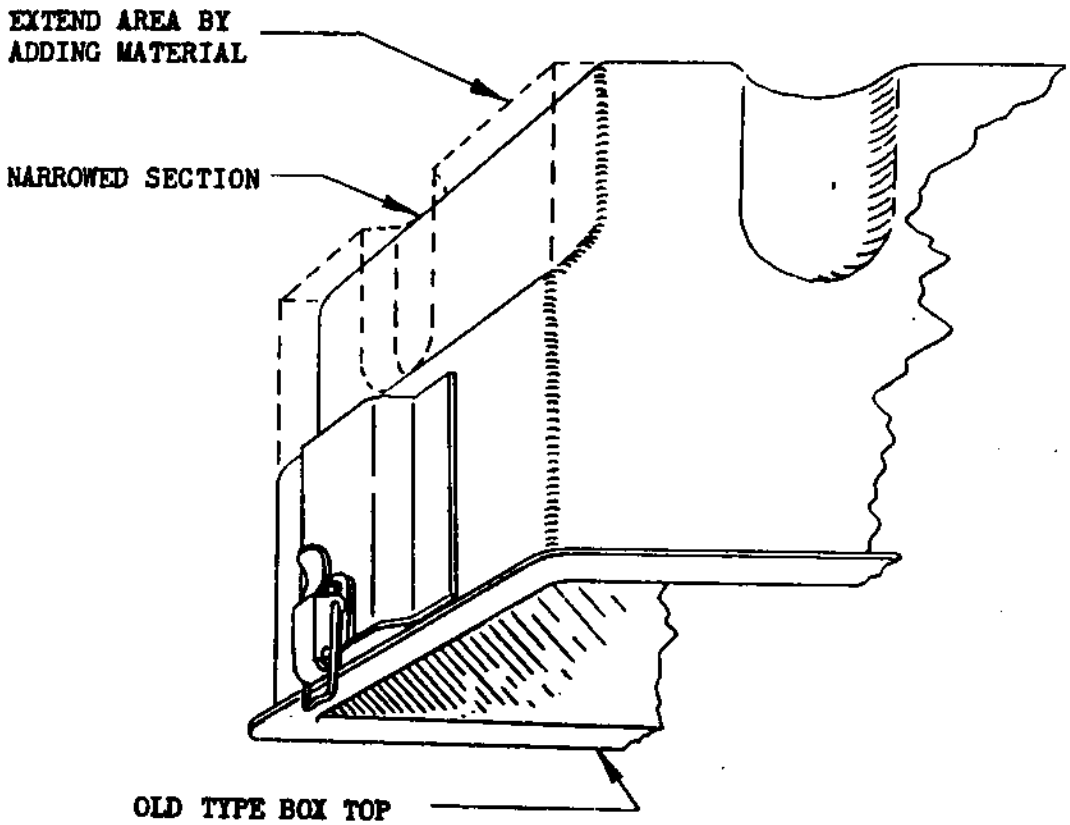
1. When replacing batteries in earlier North American manufactured Navions, particular attention must be paid to the terminal positions of the replacement battery. Because the positions of the positive and negative posts on the later model Exide batteries have been changed, installation of a new-type battery in an old case having the narrowed down ends frequently results in the terminals contacting the case; shorting of the battery and subsequent damage to the aircraft.

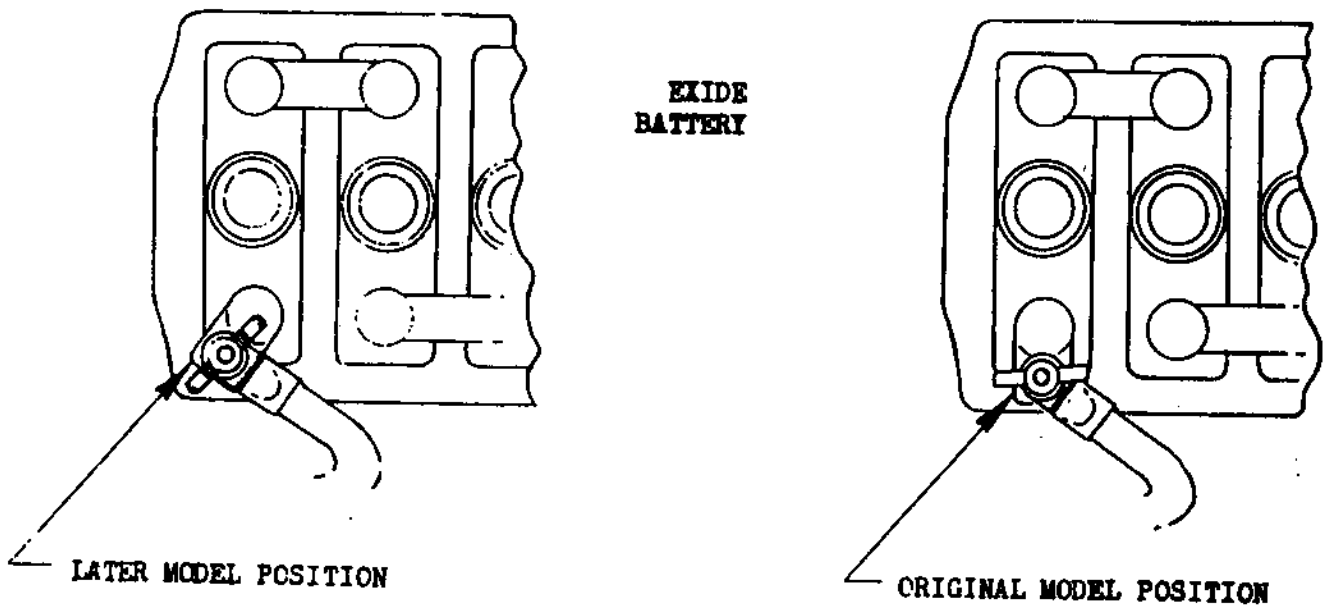
   Whenever this condition is apt to occur, either a new later type BOX TOP should be installed or the corners of the box top extended out to the same width as the mid section of the box to provide the added clearance necessary. See sketch on back of page.

   NOTE: Do not extend entire end as the narrowed down section was designed to hold the battery down by contacting the edges.

2. When recapping or retreading main wheel tires it is suggested that excessive rubber tread should not be installed so as to leave inadequate clearance between tire and wheel well flange.

   NOTE: Clearance must be adequate for tire expansion at altitude and any foreign matter that may attach to the tire such as mud and ice; otherwise faulty gear extension may result.


EXTEND AREA BY
ADDING MATERIAL
NARROWED SECTION
OLD TYPE BOX TOP


EXIDE
BATTERY
LATER MODEL POSITION
ORIGINAL MODEL POSITION

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 57

FEBRUARY 7, 1949

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: ADEL ELECTRIC FUEL PUMP MODIFICATION

ACCOMPLISH: IMMEDIATELY

REFERENCE: ADEL PRECISION PRODUCTS ACCESSORIES SERVICE BULLETIN NO. 147-49 (ATTACHED)

EFFECTIVITY: ALL NAVIONS HAVING ADEL PUMPS WITH SERIAL NO'S AS INDICATED IN REF. BULLETIN

PURPOSE: TO REMOVE POSSIBILITY OF AIR LEAKS THROUGH SHAFT SEAL

Through the combined efforts of the Adel Precision Products Corp. and the Ryan Aeronautical Co. the attached bulletin and kit has been prepared by Adel and is being distributed by Ryan to all Ryan manufactured Navion owners and bulletin (less kit) to all North American manufactured Navion owners, factory serial No's. NAV-4-2 through 1110. Kits for owners in this group having had the Adel system installed as a modification will be available to them through their Distributor for accomplishment of the Adel bulletin.

It is imperative that these improvements be incorporated as soon as possible as the Civil Aeronautics Authority has indicated it intends to issue an Airworthiness Directive making accomplishment of the bulletin mandatory.

In some instances after modification a slight drip of fuel may be evident from the pump drain line when pump is in operation. This is caused by the plugging of the shaft seal area scavanging hole. This should cause no alarm as the fuel loss will be slight with no hazard involved. It was found through service experience that the scavanging action was so great that in many cases it caused the shaft seal to run dry and chatter with subsequent air leakage into the system, therefore; by plugging the hole, scavanging action and possible air leakage is eliminated.

When accomplishing this modification extreme care must be exercised to keep all foreign matter out of the fuel system. Service experience has indicated that often a fuel system which has been working satisfactorily, then has had some line or fitting removed thereafter will not operate as before. This usually indicates that dirt or other foreign material has been allowed to enter into the system and may cause improper seating of the pressure relief valve.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 57M

FEBRUARY 7, 1949

TO: USAF FIELD FORCES

SUBJECT: ADEL ELECTRIC FUEL PUMP MODIFICATION ON L-17B AIRCRAFT

ACCOMPLISH: IMMEDIATELY

REFERENCE: ADEL PRECISION PRODUCTS ACCESSORIES SERVICE BULLETIN NO. 147-49 (ATTACHED)

EFFECTIVITY: L-17B USAF SERIAL NUMBERS 48-921, 922, 923, 925 THRU 958 959, 969, 970, 971, 972, 974, 975, 978 THRU 985

PURPOSE: TO REMOVE POSSIBILITY OF AIR LEAKS THROUGH SHAFT SEAL

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Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 58

APRIL 1, 1949

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: NAVION MODEL DESIGNATION

ACCOMPLISH: IMMEDIATELY

EFFECTIVITY: NAVIONS THAT HAVE BEEN DELIVERED FROM THE FACTORY, NAV-4-1790 THROUGH 1821, 1823 THROUGH 1833, 1835, 1840 THROUGH 1842, 1844 THROUGH 1850, 1858 AND 1859. ALL OTHERS WILL BE ACCOMPLISHED AT THE FACTORY PRIOR TO DELIVERY

PURPOSE: TO CLARIFY CAA MODEL SPECIFICATION

In order to clarify the new CAA model specification for the Navion airplane, it has become necessary to assign a new model to the 1949 Navion.

All North American manufactured Navions, serial numbers NAV-4-2 through 1110 and Ryan manufactured Navions, serial numbers 1111 through 1627 known as 1948 model Ryan Navions will remain as model "Navion". All military Navions, serial numbers 1628 through 1789 known as L-17 B aircraft and all 1949 Navions, serial numbers 1790 and subsequent will be designated as "Navion-A".

In order to accomplish the above model change on those airplanes that are listed in the effectivity group, it will be necessary to stamp an "-A" after the word "Navion" on all 1949 Navion model designation plates. This can be accomplished with a metal stamp running the letter "A" over into the black area of the name plate. Also an entry be made on the title page of the "CAA Approved Airplane Operating Limitations" manual changing the model from "Navion" to "Navion-A"; this may be accomplished in ink.

On your 1949 Navion, and others that you have sold, The Ryan Aeronautical company requests that you have the above accomplished at your earliest convenience.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS · TELEPHONE (512) FR 9-6414
(formerly Guadalupe County Airport)

SERVICE LETTER NO. 59

APRIL 20, 1949

TO: ALL DISTRIBUTORS AND DIRECT DEALERS

SUBJECT: OPENING OF REAR SEAT BOTTOM SPRING ATTACHING LOOPS CAUSED BY ABNORMAL LOADS BEING APPLIED IN CONCENTRATED AREAS OF SEAT

PURPOSE: TO PROVIDE A METHOD TO PREVENT LOOPS FROM SPREADING AND ALLOWING SPRINGS TO DETACH AND DAMAGE UNDERSEAT AUXILIARY TANK WHEN INSTALLED

EFFECTIVITY: ALL NAVIONS HAVING THE UNDERSEAT AUXILIARY FUEL TANK INSTALLED OR WHEN INSTALLING UNDERSEAT AUXILIARY TANK KIT

To prevent rear seat bottom springs from becoming detached and resting on underseat auxiliary tank with subsequent damage, the following method of providing additional support should be accomplished at the earliest convenience or when installing the auxiliary underseat tank kit.

1. Remove the rear seat bottom from the airplane.

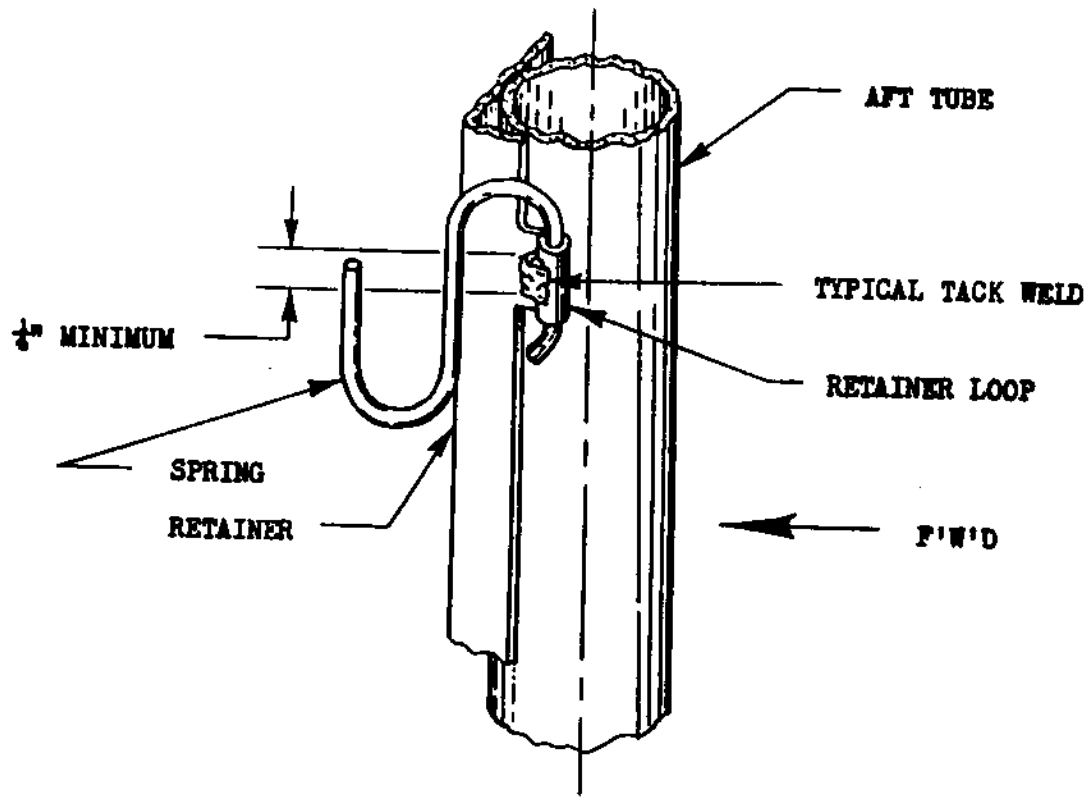
2. Check all spring retainer loops on both fore and aft tubes, bending back in place any that are found to be open.

3. Place two or more layers of asbestos sheet between spring retainer loop area and seat padding.

4. Using an arc weld set with a low carbon, mild steel or stainless steel rod, tack each loop on both the fore and aft tube. This will close loop and prevent spreading. Clean off scale and prime all welded areas. See sketch.

5. Reinstall seat in airplane.

NOTE: Arc weld only is recommended due to the close proximity of seat fabric; however, the weld is not critical so any type of arc weld set such as is used in most automobile garages should be able to accomplish the job in 15 to 20 minutes.


AFT TUBE
TYPICAL TACK WELD
1/4" MINIMUM
RETAINER LOOP
SPRING
RETAINER
F'W'D

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 60

JUNE 20, 1949

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS OF NAVIONS EQUIPPED WITH KING-SEELY FUEL GAUGES.

SUBJECT: KING-SEELY FUEL QUANTITY INDICATING SYSTEM

PURPOSE: TO AVOID ERRONEOUS INTERPRETATION OF FUEL QUANTITY GAUGE READINGS

EFFECTIVITY: NAVION SERIAL NUMBERS 1565 THROUGH 1948

It is well recognized by experienced pilots that aircraft fuel quantity gauges are not precision instruments. The degree of error varies with existing conditions. For that reason it is not considered good practice or advisable to rely solely on these instruments for determining fuel quantity in flight. The calculation of remaining fuel, by deducting the rate of fuel consumption, for a specific power setting and aircraft, multiplied by the time in flight, plus a suitable allowance for warm up, take-off and climb from the original supply, is a more sound practice.

The King-Seely fuel gauge used on the Navion is considered a good indicator. This company has developed a new procedure for calibrating and setting this gauge which reduces to a minimum the error in its reading. This method is being used on all new airplanes now being produced.

The procedure is described below and is quite simple. It is recommended that you have the instrument in your Navion recalibrated in the manner described.

1. Drain all fuel from the fuel system.

2. Put five (5) gallons of gasoline in the wing tanks.

3. Remove cap on fuel level transmitter and adjust so that fuel level indicator reads two (2) gallons. Refer to Figure 1.

4. Replace cap and allow at least three (3) minutes for temperature to stabilize and recheck two (2) gallon reading on the gauge. It is very important to replace the cap on the transmitter securely during this check as when the cap is left off any slight air movement will affect the gauge reading. If the two (2) gallon reading is in error, remove cap, readjust and recheck as above.

5. Add thirty (30) gallons of fuel to the tanks, making a total of thirty-five (35) gallons in the tanks.

6. Record fuel level before removing any fuel. Remove fuel in five (5) gallon increments and record gauge reading after each five (5) gallon removal. In each instance the gauge reading should be taken after a minimum wait of three (3) minutes.

7. The gauge should indicate three (3) gallons less than the actual quantity in the tank for each reading. Tolerances on gauge readings are as follows; with five (5) gallons in the tank ± one (1) gallon, this tolerance can expand linearly to a maximum tolerance of ± three (3) gallons when there are thirty-five (35) gallons of fuel in the tanks.

8. After this procedure when there are five (5) gallons remaining in the tank, the fuel gauge should read two (2) gallons ± one (1) gallon.

NOTE: When flying in rough air, estimate fuel quantity approximately six (6) gallons less than the indicator reads.

NOTE: LEVEL AIRPLANE BEFORE RECALIBRATING FUEL QUANTITY GAUGES PER THESE INSTRUCTIONS

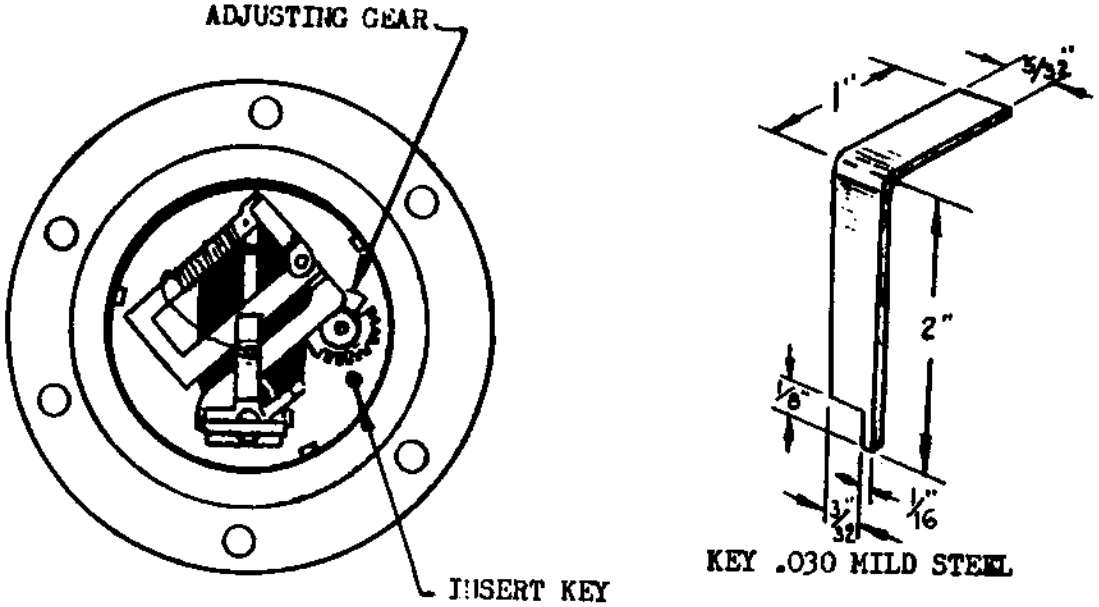


Figure 1. Fuel Quantity Transmitter

NOTE: Turn adjusting gear clockwise to increase indicator reading or counter-clockwise to decrease indicator reading.

This is a zero adjustment only, DO NOT BEND FLOAT ROD.

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SERVICE LETTER NO. 61

JULY 28, 1949

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS OF NAVIONS EQUIPPED WITH DEUTSCH D-51 FUEL SHUT-OFF VALVES

SUBJECT: DEUTSCH D-51 FUEL SHUT-OFF VALVES

PURPOSE: TO ELIMINATE AIR AND FUEL LEAKS AT SUBJECT VALVE

EFFECTIVITY: NAVIONS, SERIAL NUMBERS 2 THROUGH 1400

Reports have been received indicating fuel and air leaks at the Deutsch D-51 fuel shut-off valve. In order to eliminate this difficulty, the following three alternatives are proposed:

1. On Navions, serial No. 2 through 1400 equipped with either a Carter-Adel or Romec-Adel fuel system, but still using the D-51 valve, Ryan optional equipment kit, No. 756 "Direct Control Fuel Shut-off Valve", will supply the necessary parts and instructions for replacement of the D-51 valve. Kit No. 754, "Romec-Adel Fuel System Complete", will completely modernize the Dual Carter Pump Fuel System to the latest configuration, using the Adel-Romec pump combination and direct control fuel shut-off valve. Kit No. 756 or 754 may be ordered through your nearest Navion Distributor or Dealer.

2. Navions <u>not</u> equipped with the Adel auxiliary fuel pump may have a W-7000-2D Whittaker valve and a 145-48232 fitting installed in place of the D-51 valve in the following manner:

   (a) Disconnect fuel lines and flexible control to D-51 valve and remove D-51 valve.

   (b) Fabricate a lever to replace existing valve handle and install new lever on W-7000-2D Whittaker valve. See Figure 1.

   (c) Install 145-48232 fitting and the W-7000-2D valve.

   (d) Shorten fuel inlet line to valve and re-flare, then connect fuel inlet to W-7000-2D valve, and fuel outlet to 145-48232 fitting.

   (e) Connect flexible control to W-7000-2D valve handle and rig with 1/4" cushion from the full forward position

when the valve is turned on. Be sure valve works freely and completely turns to the "ON" and "OFF" positions.

3. Install two (2) oversize "O" ring seals, Part No. AN6227-13 in the D-51 valve in the following manner:

   (a) Remove D-51 valve from airplane.

   (b) Unscrew "ON-OFF" control arm from valve core and disassemble D-51 valve in two halves.

   (c) After removing the valve core, replace the two (2) "O" ring seals with AN6227-13 seals.

   (d) Lubricate valve, then assemble and reinstall in airplane, pressure test fuel system and check D-51 valve for leaks.

NOTE: Alternates one (1) or two (2) are preferable to alternate three (3). In the event alternate one or two is used, "Repair and Alteration Form ACA337", must be completed. Weight changes in the above are negligable, except kit No. 754, which has weight and balance information given in the kit instructions.

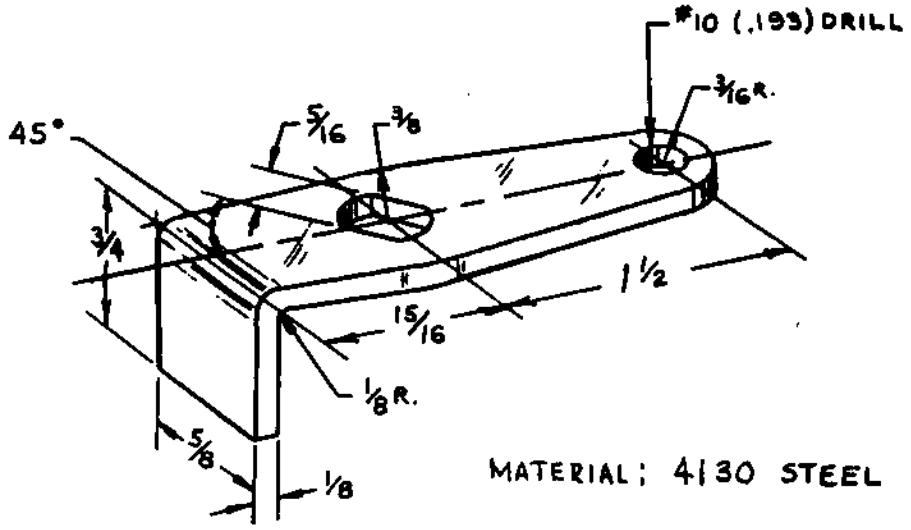

FIGURE NO. 1

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SERVICE LETTER NO. 62

NOVEMBER 18, 1949

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: USE OF ALUMINUM PROPELLER BLADES ON E185-3 CONTINENTAL ENGINES WITH UNDAMPENED CRANKSHAFTS

EFFECTIVITY: VERY EARLY NORTH AMERICAN BUILT NAVIONS STILL EQUIPPED WITH ORIGINAL E185-3 ENGINES HAVING UNDAMPENED CRANKSHAFTS

Two recent reports of Hartzell propeller hub or blade failures on propellers equipped with the No. 8433 metal blades installed on early Continental E185-3 engines not having dampened crankshafts, have prompted the issuance of this safety letter. The first report received was, that on September 13, 1949, a section of one metal propeller blade tip was lost during flight from the Hartzell propeller installed on an undampened crankshaft engine in Navion NC-91667. A second and more recent report notified us of a propeller hub failure on Navion NC-91431 equipped with a similar propeller and engine combination.

Because of these two reports and in the interest of safeguarding the welfare of all Navion owners, the Ryan Aeronautical Company recommends that no airplane equipped with a Continental E185-3 engine with undampened crankshaft together with metal bladed Hartzell propeller be flown, and requests that distributors notify all owners of airplanes so equipped in their territory. The metal blades should be removed and the Hartzite plastic blades installed on such airplanes until further notice. This action is recommended until a CAA investigation into the two known cases of trouble can be completed. It is suggested that Navion distributors and dealers loan any spare plastic blades they may have on hand to the owners of Navions equipped with the engine-propeller combination described herein, so that their flying activity will not be interrupted.

Continental Motors Corporation advises that all E185-3 engines manufactured prior to engine serial No. 1469 were <u>not</u> equipped with crankshafts having dynamic dampeners. In that group of engines between serial Nos. 1469 and 1500, there were nine engines without crankshaft dampeners. All engines, serial Nos. 1500 and subsequent are equipped with dampened crankshafts. Any engine not having a letter "D" stamped on the nameplate after the engine serial number, or type designation; i.e. 1001D or E185-3D, is not equipped with a dampened crankshaft. A few engines in this category were installed in early North American Aviation built Navions; therefore, it is only to these early airplanes that this Service Letter will apply.

All Navion distributors and dealers will be promptly advised of any changes in these recommendations.

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SERVICE LETTER NO. 63

JANUARY 3, 1950

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: ADJUSTMENT OF SOLENOID OPERATED DELCO-REMY STARTER LINKAGE

PURPOSE: TO PREVENT STARTER MALFUNCTION

EFFECTIVITY: ALL NAVIONS EQUIPPED WITH SOLENOID OPERATED DELCO-REMY STARTERS

REFERENCE: CONTINENTAL MOTORS SERVICE BULLETIN M46-23 AND SUPPLEMENT NO. 1 THERETO.

In order to establish full current flow through the starter armature and field coils for maximum cranking power, it is necessary to adjust the starter solenoid linkage as follows:

1. Make sure that the master battery and ignition switches are turned "off".

2. Make a pencil mark on the clutch shaft exactly 9/16 inches aft of the starter adapter plate rear face.

3. Push the solenoid plunger into the solenoid as far as possible. (It may be necessary to rotate the propeller slightly so starter gears will mesh.)

4. Watch pencil mark on clutch shaft. Travel should stop when pencil mark reaches the surface of the starter adapter.

5. While holding the solenoid plunger full in, attempt to push the starter clutch further forward. Measure the clearance between the end of the clutch shaft and the shift lever while holding solenoid and clutch both fully bottomed. Minimum clearance is .010 inches, maximum is .050 inches. (See Figure No. 1.)

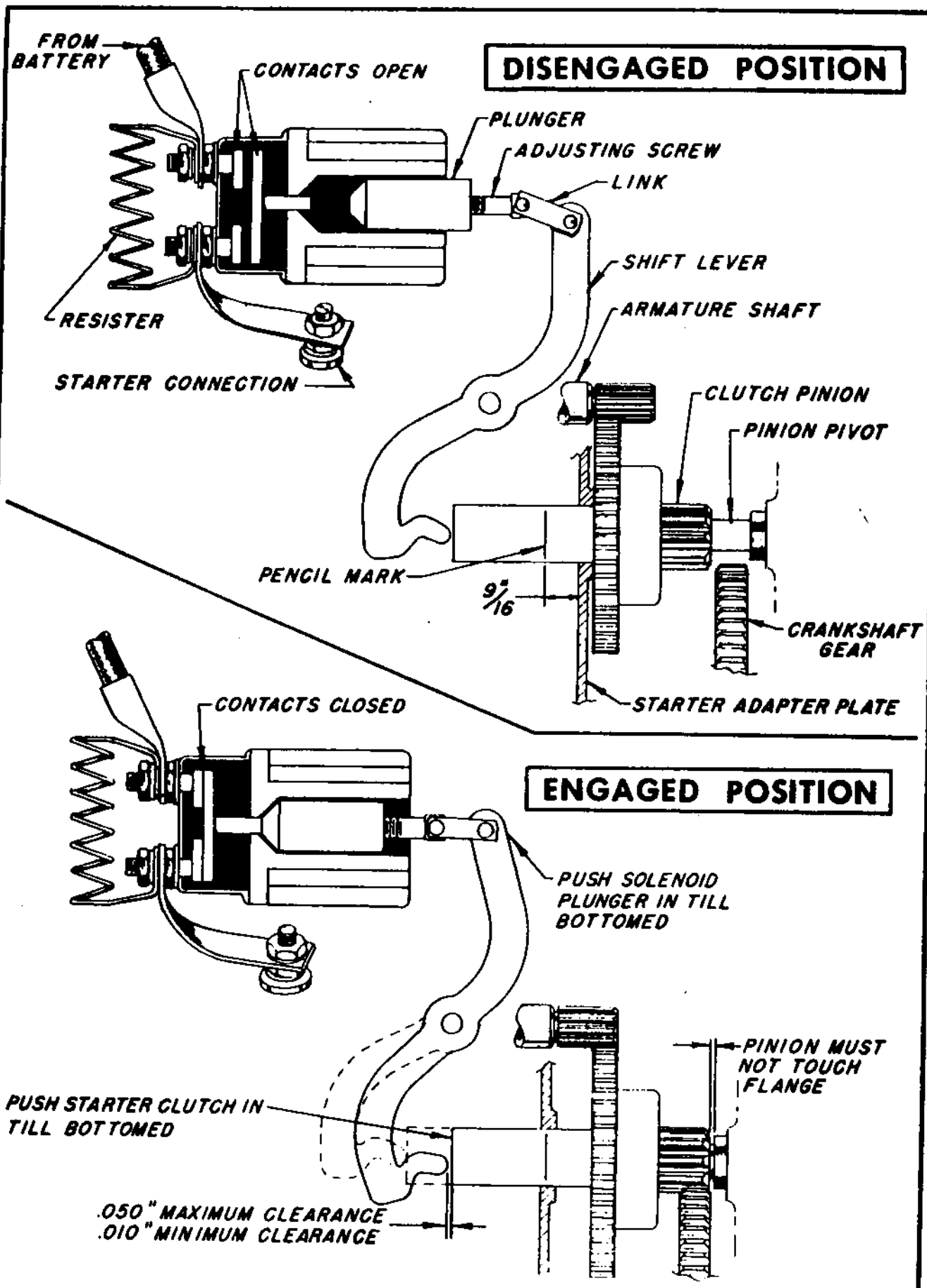
6. If no additional clutch forward movement is possible in step No. 5, it is possible the clutch pinion has bottomed on the pivot flange and will prevent the solenoid points from closing, thus preventing proper starter operation. It will then be necessary to adjust the solenoid linkage by removing adjusting screw link pin and turning adjusting screw "in" to increase clutch travel and "out" to decrease clutch travel.

7. If it is not possible to secure a full 9/16 inches of clutch travel and yet maintain a minimum of .010 inches clearance between shift lever and clutch with both solenoid and clutch bottomed, it will be necessary to adjust for the .010 inches minimum clutch to shift lever clearance and reduct the clutch travel to slightly less than 9/16 inches.

8. In the event clutch to lever clearance with both solenoid and clutch fully bottomed is over .010 inches, the solenoid linkage need not be readjusted unless the clutch to lever clearance exceeds .050 inches. Clearance in excess of .050 inches may permit only partial engagement at the starter clutch pinion gear with the engine crankshaft gear with resultant gear mutilation a good possibility.

NOTE

In order to achieve maximum cranking power from the starter, it is necessary to have good electrical contact between the engine and engine mount, through the ground straps at the forward engine mount legs. A good electrical bond must also exist between the forward engine mount crossbar and engine mount as well as between the engine mount attachment fittings and firewall. This bonding may be checked with a bonding meter if available. The resistance should not exceed .0025 ohms.



STARTER SOLENOID ADJUSTMENT
FIGURE 1

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SERVICE LETTER NO. 64

JANUARY 5, 1950

TO: ALL NAVION OWNERS

SUBJECT: EXPIRATION OF PART EXCHANGE OFFER IN FIELD SERVICE BULLETIN NO. 4.

REFERENCE: NAVION FIELD SERVICE BULLETIN NO. 4

At the time Navion Field Service Bulletin No. 4 was revised on August 5, 1949, a Ryan mandatory date of January 1, 1950 was established for accomplishment of the nose gear link modification described therein. Notification of this fact was printed in the right hand upper corner of the bulletin title page and in a note at the bottom of page two.

Since the bulletin's mandatory date has now passed, we wish to advise all Navion owners that the $8.00 part exchange offer made in Revised Bulletin No. 4 is no longer valid. All replacement nose gear links required after January 1, 1950 must be procured on the regular list price basis, with no trade-in allowance for the old links.

IMPORTANT NOTE

The link change described in Bulletin No. 4 is still mandatory on all Navions equipped with nose gear links having butt welds, as described in figure No. 1 of the bulletin. It should be understood that expiration of the link exchange offer does not alter in any way the importance of making the link change on those Navions still requiring this modification.

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SERVICE LETTER NO. 65
JANUARY 20, 1950

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: INSTALLATION OF SOUTH WIND HEATER IN 1949 MODEL NAVIONS

Heretofore, installation of the Stewart-Warner South Wind heater in Navions equipped with the Ryan Muffler-Heater Exhaust System, or the so called "hidden exhaust stacks", has been considered impractical because of difficulty in obtaining sufficient clearance between the heater exhaust tube and engine exhaust tail pipe. However, reports have been received from the field that heater installations have been made in Navions of this configuration by making slight modifications to the heater exhaust stack installation. Since Navion owners operating their airplanes during extremely cold weather may wish more cabin heat than the standard muffler heater is capable of furnishing, a brief description of the required changes, as reported from the field, is given below for your consideration.

1. Remove the 145-42122SA11 valve assembly - cabin air mixture, located in the engine accessory section of the engine compartment. (Ryan Muffler-Heater installations.)

2. After removal of the air valve, the short section of flexible tubing, which formerly connected to the air valve dump outlet, must be connected to the hot air outlet on the muffler heater to insure a continuous flow of cooling air through the heater shroud. This airflow is necessary to prevent overheating of the right hand muffler assembly.

3. Install South Wind heater in space formerly occupied by cabin air valve, as per instructions in Navion Special Instructions No. 5.

4. Install 145-53303 heater exhaust stack after reworking the outlet end of the stack as necessary to obtain sufficient clearance between it and the engine exhaust tail pipe. This rework to consist of a slight flattening of the outlet ends of the tubes and/or shortening the tubes at the outlet end.

IMPORTANT NOTES

1. Heater operation will be adversly affected if the heater exhaust stack outlet is not flush with aft edge of cowling gill.

2. Since heater installations made according to the above instructions do not conform to the present CAA approved installation, local CAA approval of these installations must be obtained.

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SERVICE LETTER NO. 66
JANUARY 23, 1950

TO: ALL NAVION OWNERS, DISTRIBUTORS AND DEALERS

SUBJECT: TIME EXTENSION FOR FIELD SERVICE BULLETIN NO. 4

REFERENCES: NAVION FIELD SERVICE BULLETIN NO. 4
NAVION SERVICE LETTER NO. 64

Since the issuance of Service Letter No. 64 on January 5, 1950, reminding distributors, dealers and owners that the part exchange offer in Service Bulletin No. 4 had expired, numerous letters have been received indicating there is a sizeable group of owners, who due to circumstances beyond their control, have not been able to have the bulletin accomplished on their Navions. In view of this fact, the factory is extending the expiration date of the $8.00 nose gear drag link exchange offer to March 1, 1950.

Due to the fact this time extension will probably result in a sudden influx of link orders, it should be realized that the combined service and production requirements for the new type nose gear link might result in a delivery delay on some orders until after the new March 1st expiration date. The factory will, however, protect those owners who contact their Navion distributor or dealer <u>now</u> and have him file an order with the factory for a new type link to be installed on their particular Navion. This means, links will be furnished on the $8.00 exchange basis for all orders received between now and March 1, 1950, in spite of the fact shipment of some parts may not be made until after this date.

The success of this effort to culminate the nose gear drag link exchange program, without penalizing any owners, will depend upon wholehearted cooperation between Navion owner, distributor, dealer and factory. The factory is pledged to do its part - please do yours.

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SERVICE LETTER NO. 67
FEBRUARY 7, 1950

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: INSPECTION - CARBURETOR HOT AIR DUCT, PART NO. 145-42202

It has recently come to our attention that in one instance, on a low serial number North American built Navion, the 145-42202 Flexible Tube, which is the hot air duct from the exhaust manifold shroud to the air mixing chamber on the carburetor, became softened and deteriorated to the point where it collapsed, blocking off hot air flow to the carburetor, and so causing a forced landing.

The hot air tubes used on all Navions, factory serial No. 1790 and subsequent, were of the steel wire reinforced type, while the tubes on earlier Navions, with a few exceptions, were moulded without wire reinforcement. A tube not equipped with the steel wire reinforcement is apt to become oil soaked and softened to such an extent that the suction created in the line by the application of carburetor heat may cause its collapse, resulting in a hot air shut-off. This could cause rough engine operation or complete stoppage if conditions at the time were such that carburetor heat was absolutely essential to proper engine operation.

In the interest of maximum safety, the carburetor heat air duct should first be inspected to determine the type tube (wire reinforced or unreinforced). On those Navions equipped with the unreinforced tube, inspect the condition of the tube and if it seems very soft and can be easily collapsed with finger pressure - replace immediately with the wire reinforced type. If the tube still has considerable rigidity and does not appear to be oil soaked or deteriorated in any other way, it may be continued in service provided it is inspected regularly and changed to the wire reinforced type at the first sign of softening. Wire reinforced tubing is preferred to the unreinforced type and may be continued in service with no inspection other than that ordinarily given a part of this kind. The later type tubing may be purchased from the factory through any authorized Navion Distributor or Dealer.

It is our understanding that the C.A.A. will soon issue an Airworthiness Directive, making change-over to the wire reinforced type tube mandatory by September of 1950.

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SERVICE LETTER NO. 68 B

May 12, 1950

TO: NAVION DISTRIBUTORS AND DEALERS TO WHOM EFFECTED SUPER 260 MODEL NAVIONS HAVE BEEN DELIVERED

SUBJECT: AEROMATIC PROPELLER CHANGES ON SUPER 260 MODEL NAVIONS

The following is a description of the changes to be made in the field on Aeromatic propellers installed on early Navion B airplanes already delivered.

1. The Aeromatic propeller hydraulic actuating cylinder and its mounting brackets must be modified as follows:

   (a) On Navion B airplanes, factory serial No's. 2028 through 2032, remove lower Oilite clamp-up bushing from propeller hydraulic cylinder yoke and replace with steel clamp-up bushing, Part No. NAS75-6-106, to be furnished by Aeromatic.

   (b) On the same group of Navion B airplanes referred to above, remove rivet adjacent to cylinder attaching hole in small angle bracket riveted to propeller control arm and replace rivets with AN3-6A bolt and AN365-1032 stop nut. Spot face bottom surface of control arm to provide a flat surface for nut and washer. This change is necessary to eliminate any possibility of the rivet failing under tension loads imposed on it during part of the operating cycle.

   (c) On Navion B airplanes, factory serial No's. 2028 through 2032 and 2048 through 2062 install a new replacement propeller actuating cylinder to be furnished by the Aeromatic Propeller Company on an exchange basis. This cylinder will have a greater "O" ring to cylinder wall pressure which reduces the possibility of oil leakage past the piston. The Aeromatic Company will ship replacements directly to the Navion distributors requiring them on or about May 26, 1950.

2. All Navion B models prior to factory serial No. 2063, except 2058 and 2059 were delivered with propellers which had blade phase angles set at 20-1/2 degrees. The propellers on these airplanes functioned satisfactorily when delivered and unless reported unsatisfactory need not be changed. If unsatisfactory reports are received, refer the owner making the report to the nearest Aeromatic Service Station for modification of the phase angle. The purpose of the phase angle change is to obtain consistent results on all propellers in both controlled and aeromatic operation without the use of an excessive number of counterweights. Airplanes 2058, 2070 and subsequent will have a phase angle of 19-1/2 degrees.

3. Service experience has indicated that the material, currently being used in the manufacture of dowel pins for the Aeromatic propeller control unit, does not possess the desired wear resistance qualities. The Aeromatic Propeller Company is therefore immediately shipping replacement dowel pins made of a more wear resistant material to the owners of Navion B airplanes, factory serial No's. 2028 through 2032 and 2048 through 2062. The Ryan Aeronautical Company will start incorporating the improved dowel pins on all new Navions subsequent to factory serial no. 2062. At the time the new dowel pins are installed it is also recommended that the sides of the cam slots, in which the dowel pins ride, be smoothed out with emery cloth and the outside edges of the slots burred so as to eliminate all sharp edges.

4. On Navion B airplanes, factory serial No.'s 2028 through 2032 and 2048 through 2057, some oil leakage from the propeller control valve may be experienced. Due to an airflow pattern in the engine compartment, oil from this unit will run through the inside of the looped seal strip material on the inside of the cowling up to the front end of the engine. This often leads mechanics to believe the oil leak is coming from the front section when in reality the leak may be at the propeller control valve. This information is offered for the guidance of mechanics endeavoring to locate oil leaks on Lycoming powered Navions. All propeller control valves on Navions delivered to date will be replaced on an exchange basis by the Aeromatic Company, with modified valves designed to improve high altitude performance of the propeller control unit. The oil leakage experienced with some of the earlier valves will also be eliminated by modifications being accomplished on these new valves. Aeromatic has promised to make shipment of replacement valves directly to Ryan Navion Distributors and Dealers on or about May 26, 1950.

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SERVICE LETTER NO. 69 B

May 16, 1950

TO: ALL NAVION DISTRIBUTORS TO WHOM EFFECTIVE SUPER 260 MODEL NAVIONS HAVE BEEN DELIVERED

SUBJECT: SAFETYING OF THROTTLE LEVER CLAMPING SCREW

It is possible the screw which clamps the throttle lever to the serrated throttle shaft on the carburetor may not have been safetied, on some of the first group of Super 260 Model Navions delivered. Therefore, it is requested that you inspect this screw for proper safetying on Navion B models below factory serial number 2056. The screw has a drilled head and is easily safetied to the throttle lever by means of safety wire.

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SERVICE LETTER NO. 70B

JUNE 1, 1950

TO: ALL NAVION DISTRIBUTORS AND DEALERS TO WHOM SUPER 260 MODEL NAVIONS HAVE BEEN DELIVERED

SUBJECT: LYCOMING ENGINE OIL LEAKAGE

The following is recommended corrective action to eliminate the oil leakage tendencies of some Lycoming engines in Super 260 Model Navions, factory Serial No. 2028 through 2057.

1. Since there has been some tendency for the push rod housing seals to leak on these engines, it is recommended that the inboard seals be lubricated with a graphite paste made of powdered graphite and engine oil. This lubricant can be effectively applied to the seal area without removing the push rod housings from the engine; however, in some cases it has been necessary to replace the original push rod housing seals and the lubricant can then be more effectively applied in a larger quantity to the area of the push rod housing that slides in and out of the seal. This free sliding action is necessary so that the push rod housings will follow cylinder growth as cylinder temperatures increase during engine operation. Lycoming engineers are now at work on a redesign of the push rod housing seals which, if proven satisfactory, will be used on future production engines; however, the corrective measures described in this letter will provide immediate effective relief for the oil leakage.

2. Tests have shown that the static air pressure in the crankcases of the engines in the Navions to which this letter is applicable was in excess of the desired maximum. Therefore, the engine breather tube was recently redesigned by Ryan so as to locate the outlet in a low pressure area that will provide a lower crankcase pressure. This lowered crankcase pressure has been found to have a marked effect in reducing oil leakage from around the push rod housing seals and other places on the engine. New type breather tubes will automatically be furnished gratis for these engines by the Ryan Aero-

nautical Company. The new type breather tube has been installed on all recently delivered Super 260 Navions prior to factory delivery.

3. Another source of leakage has been the hose connections between the rockerbox oil return lines and the crankcase. Tightening the clamps on these hoses will usually stop such leaks. Looseness of the oil return line elbows in the rockerbox casting has also been known to cause leakage in a few isolated cases; therefore, it is recommended these elbows be checked for proper tightness on engines where leakage is being experienced and if found loose, the elbows should be removed and a suitable sealing compound applied to the threads before reinstallation.

   CAUTION: Do not overtighten elbows as cracking of the head casting may result.

4. If signs of oil leakage in the engine compartment are noticed after all the above recommended corrective action has been tried, then the possibility of propeller control system oil leakage as described in Service Letter No. 68B, dated May 12th, should be investigated.

Your cooperation, in regard to reporting all Navion Super 260 difficulties promptly to the Field Service Department of the Ryan Aeronautical Company, is solicited, as we are determined to make this the finest, most trouble free four place airplane on today's market.

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SERVICE LETTER NO. 71B
JUNE 26, 1950

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS OF SUPER 260 MODEL NAVIONS

SUBJECT: SPECIAL PRECAUTIONS TO BE TAKEN DURING ENGINE CLEANING OPERATION ON SUPER 260 MODEL NAVION

A recent case of difficult starting trouble on a Super 260 Model Navion was found to be caused by the presence of moisture in the magnetos.

The airplane and engine had been washed down with a steam cleaner just prior to the occurrence of the trouble without the magneto vent openings being covered. This resulted in moisture being instroduced into the magnetos, causing them to malfunction electrically.

To avoid this type of trouble, it is recommended that the two vent openings in each magneto be sealed with masking tape or some like material during all washing operations.

CAUTION

It is very important the sealing material be removed from the magneto vent openings after the washing operation is completed, as venting of the magnetos is necessary to their proper operation.

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SERVICE LETTER NO. 723
JUNE 26, 1950

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS OF SUPER 260 MODEL NAVIONS

SUBJECT: THE USE OF CARBURETOR HEAT.

Many Super 260 Navion owners, who previously owned Continental-powered Navions equipped with the high pressure type carburetor, have discovered that it is necessary to use carburetor heat more frequently on the Super 260 than was the case with their previous Navion. Below are some reasons why this is true, together with several recommendations on how to use carburetor heat to the best advantage on the Super 260.

I. THE CAUSE AND EFFECT

With the low-pressure, float type carburetor used on the Super 260 Model Navion, the vaporization which occurs when fuel is drawn from the carburetor jets, drops the temperature at the carburetor venturi 20 to 60 degrees F. This refrigeration effect is the result of the pressure drop at the venturi plus the cooling effect of high octane fuel vaporization. When the temperature of the fuel-air mixture falls below 32 degrees F, ice is almost certain to form if there is water vapor in the incoming air. This ice collects on the walls of the induction system, venturi throat and the throttle valve, with a definite effect on carburetor and engine operation.

A high outside air temperature is not always a sure sign that icing will not occur, as icing may be encountered with an OAT as high as 35 degrees F, if the relative humidity is very high. Clouds and over-casts are indications of high humidity and carburetor icing is apt to occur when flying near them if the OAT is less than 35 degrees. Icing is not apt to occur at an OAT of 20 degrees F or below, because there is usually little chance of there being water vapor in the air at these lower temperatures.

II. HOW TO USE CARBURETOR HEAT

The Super 260 Model Navion is equipped with a well engineered and efficient carburetor heat system, consisting of a shroud assembly around the left exhaust muffler and two left rear exhaust stacks. Air passes through this shroud where it is warmed by the heat from the stacks and muffler and thence to

the carburetor air intake through a control valve in the air induction system. Full heat should be applied at the first indication of a drop in manifold pressure, or at the first sign of engine roughness - this means closer attention should now be paid to the manifold pressure gauge reading as its indications have taken on a new significance, which is a forewarning of the formation of carburetor ice. If the initial drop in manifold pressure was caused by the formation of carburetor ice, the application of heat will clear the carburetor and cause the manifold pressure to rise again. This drop in manifold pressure usually occurs almost immediately upon the beginning of ice formation and well in advance of the time any actual engine roughness begins, therefore, it serves as an advance warning of what is taking place in the carburetor throat. If the drop in manifold pressure recurs within a matter of minutes, it indicates that the OAT and humidity combination is right to cause carburetor icing. Under these conditions, the carburetor heat knob should be pulled out to "Full Heat" until ice is melted away as indicated by a rise in manifold pressure to normal and then readjust control to an intermediate position sufficient to prevent the formation of additional carburetor ice. Reduce amount of carburetor heat periodically to determine if minimum amount is being used to prevent icing.

Carburetor icing should not be considered critical with the Super 260 Navion, as tests have been run where ice was permitted to form almost to complete engine stoppage, after which the carburetor was cleared of all ice within a matter of seconds by the application of full carburetor heat. The Ryan Aeronautical Company feels that the increased reliability of the low pressure fuel system and simplicity of maintenance on the float type carburetor, outweigh the inconvenience of having to make occasional carburetor heat control adjustments.

It is anticipated that practice, resulting in more familiarity with the use of carburetor heat control, will erase any existing pilot skepticism regarding the low pressure fuel system and carburetor on the Super 260 Navion.

NOTE

When carburetor heat is used, it is often necessary to lean out the carburetor mixture to compensate for the reduction in air density caused by the increased temperature of the air entering the carburetor. The more carburetor heat used, the greater the amount of mixture leaning needed.

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SERVICE LETTER NO. 73B
JULY 14, 1950

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS OF SUPER 260 MODEL NAVIONS

SUBJECT: IMPROVED GENERATOR VOLTAGE REGULATION AND REDUCTION OF RADIO INTERFERENCE

The following is a description of changes to the existing generator grounding circuit on Navion B airplanes, factory serial No. 2028 thru 2101, except 2094, which tests show will improve generator voltage regulation and reduce radio interference from erratic voltage regulator operation.

1. Remove and discard the small copper washer from the A- terminal on the generator terminal strip.

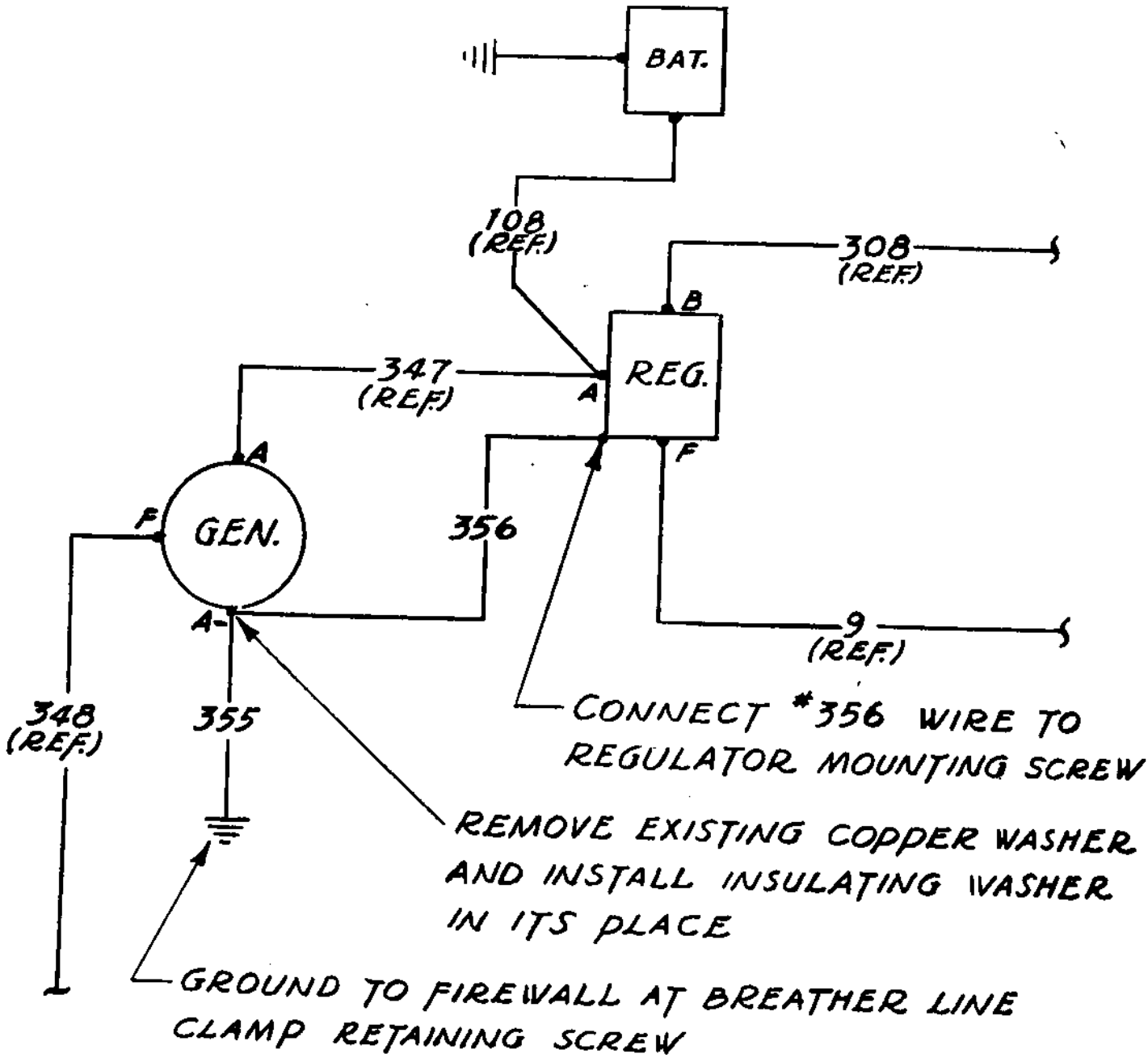
2. Install, Ryan furnished, micarta insulating washer and one end of new wires, No. 355 and 356 on A- terminal. See sketch.

3. Route wire No. 356 from generator across firewall with existing wire bundle and connect to upper right hand voltage regulator mounting screw.

4. Ground loose end of wire No. 355 to airplane firewall by means of nearest engine breather tube clamp retaining screw.

5. Check voltage regulator adjustment during flight by connecting one lead from a precision voltmeter to the Turn and Bank Indicator fuse block on the ship's circuit breaker panel and the other to ground on some part of the airframe structure. Battery switch must be OFF when taking the voltmeter reading and the radio, navigation lights and cabin dome light must be ON to give correct generator load. If voltage regulator is adjusted correctly the voltmeter reading during flight will be between 14.25 and 14.75 volts. Any reading below 14.25 volts will cause a constant make and break of the reverse current relay points in the regulator. This causes radio interference and eventual burning out of the relay coil due to overheating. Adjusting the volt-

age regulator on the ground to give a generator output of from 14.50 to 14.75 volts, with load applied as described above, will usually give correct in-flight voltage regulation.
IMPORTANT: If it is found necessary to readjust voltage regulator to bring voltage up into the correct range, use only the adjustment method described on pages 82, 83 and 85 of the Basic Navion Service Manual.



REVISED GENERATOR WIRING CIRCUIT

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 74
AUGUST 17, 1950

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS OF NAVIONS EQUIPPED WITH RCA RADIOS

SUBJECT: INSTRUCTIONS FOR RCA MODEL 116 RADIO INSTALLATION CHECK-OUT PRIOR TO FILING RCA SUPPLEMENTAL WARRANTY RETURN FORM

The following instructions are designed to assist with the installation check-out of the RCA Model 116 radio in order to avoid unnecessary expense in ascertaining whether radio malfunctions are installation or radio set difficulties.

1. To check speaker - pull plug from bottom of set and check from pin No. 1 to ground, using an ohmeter. This reading should be 2 - 3 ohms. Any reading lower than 2 or higher than 3 indicates an open wire or speaker.

2. To check microphone and cord - substitute a microphone of known condition for the one in the airplane and test the operations of the radio. A faulty microphone will cause loss of modulation or output.

3. To check headset and cord - substitute a headset of known condition and test operation of the radio.

4. To check antenna and leads - remove the receiving antenna plug in bottom of radio and check from plug to ground with continuity meter. If continuity is present the antenna circuit is grounded and will cause radio malfunction. Next, check between the receiving antenna and receiving antenna plug for continuity. Loss of continuity in this circuit will also cause radio malfunction. The transmitter or marker antenna may be checked in a similar manner.

5. To check receiver, loop and transmitter - turn set on, allow a suitable warm-up period and test the reception on both bands on several stations, if location will permit. Turn the function selector to loop and test reception and turning to a null. If a radio range station or control tower is within the range of operation, place the transmitter control on the proper frequency and test its operation, modulation and strength of signal. If such a radio station is not available and there is no test radio convenient, test the transmitter

by observing the output indicator light on the front of the radio panel. When the transmitter is on, the light will indicate a yellowish color but when you press the microphone button the color should change to a reddish color which should increase in intensity if you blow into the microphone.

6. To check aircraft battery supply voltage - fly airplane at cruising R.P.M. and allow a suitable period for the generator voltage regulator to gain operating temperature then, using a voltmeter, place one test prod on the clip of the turn-and-bank fuse and the other to ground. The voltage reading should not be above 14.2 or below 14 volts. A voltage reading above 14.8 or below 11 volts may cause serious damage to the radio set.

NOTE

Your Navion Distributor is authorized by RCA to perform the required inspection and handle all other phases of this new RCA warranty and service policy.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 75
AUGUST 17, 1950

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: RECOMMENDED "Y" DRIVE AND HYDRAULIC PUMP COMBINATION

Service experience has demonstrated that the multiple cylinder, New York Air Brake, hydraulic pump makes a more satisfactory installation in conjunction with the Navion "Y" drive than does the early type single cylinder Navion hydraulic pump. The reason for this being that the single cylinder pump may under certain conditions over-stress some "Y" drive components causing breakage. Therefore, the Ryan Company recommends that only the later type improved multiple cylinder hydraulic pump be used on the present "Y" drive for the Navion.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 76
AUGUST 30, 1950

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: ADEL FUEL PUMP INSTALLATION INSTRUCTIONS

The Adel Precision Products Corporation has advised Ryan that some pumps being returned to them from the field as inoperative, test satisfactorily when received at the Adel factory. The following is an explanation of why this has been true in some instances.

The Adel electrically driven fuel pump used on the Navion is composed of three parts; the motor housing; pump housing; and manifold. Tubing from the airplane attaches to these pumps on the manifold, while the pump mounts on the airplane by means of a mounting pad on the motor housing. This means the distance from the point of tubing attachment is several inches from the point at which the pump is mounted. It is therefore, very easy for a mechanic to create a twist between the manifold, pump housing and motor housing, at the time the tubing connector nuts are being tightened. It is very essential that this turning, or twisting action be eliminated, by securely holding the manifold housing while the tubing nuts are being tightened.

It is obvious that if a misalignment is created by the act of tightening the tubing nuts, the entire unit could be put into such a bind that it would fail to operate. Upon disassembly of the unit, in order to return it to Adel, the opposite twisting action takes place, thereby relieving the bound up condition of the pump and the pump tests as if it were perfectly O.K.

We are therefore requesting you to instruct your mechanics to securely hold the body of the manifold, while the tubing connections are being tightened.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

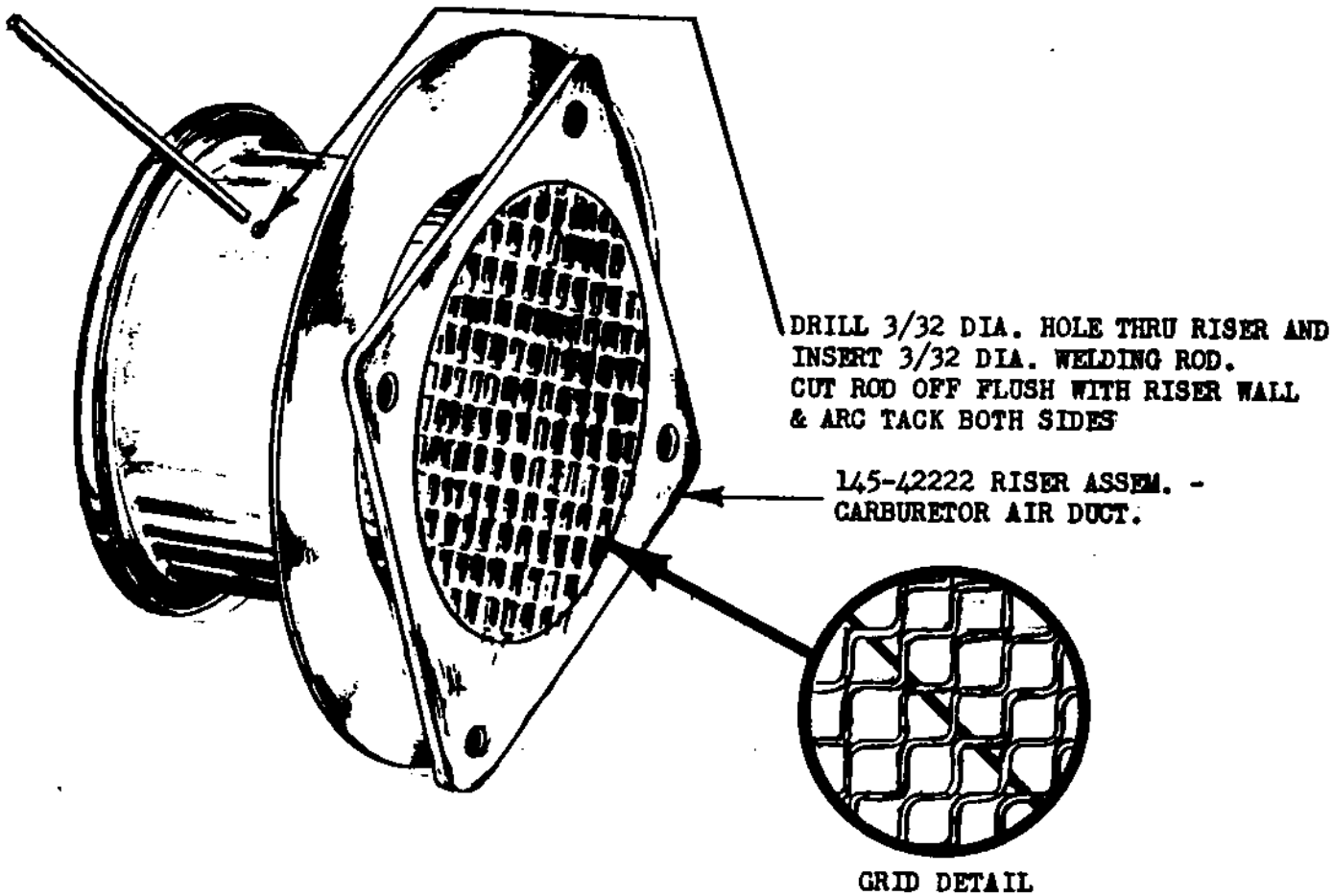
SERVICE LETTER NO. 77
OCTOBER 2, 1950

TO: ALL NAVION DISTRIBUTORS AND DEALERS

SUBJECT: ATTACHMENT OF GRID PLATES IN CARBURETOR AIR RISER ASSEMBLY

It has come to the factory's attention, that in one instance on an early model Continental powered Navion, the grid plates in the carburetor air Riser Assembly, part No. 145-42222, became loose during flight and jammed into the carburetor throat in such a way as to restrict carburetor air-flow.

To preclude the possibility of this trouble recurring, it is recommended that the grid plates in the riser be inspected for security of attachment at next engine or carburetor overhaul and a section of 3/32 diameter welding rod installed through the center of the grid and riser sidewalls as shown in sketch below.



GRID DETAIL

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9 6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 78
FEBRUARY 1, 1951

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT: FUEL SYSTEM ACCUMULATOR TANK MAINTENANCE AND MODIFICATION

An investigation prompted by reports from the field has revealed that some cases of accumulator tank leakage have been caused by corrosion on the inside of the tank bottom. A series of small pin holes will appear on the bottom of any tank subject to this corrosion; therefore, frequent (at least every 30 days) inspection of all Navion accumulator tanks is recommended so that the difficulty will be detected before leakage reaches any serious proportions. The presence of a red stain on the bottom of the tank is one of the early signs of fuel seepage.

The corrosion, referred to above, can be effectively prevented by regular periodic draining of all water and foreign matter from the accumulator by opening the drain cock adjacent to the outlet on the bottom of the tank. At least one quart of fuel should be allowed to run out the drain, or fuel should be allowed to run until all water bubbles disappear. Daily draining of both the accumulator tank and main fuel strainer has long been considered good service practice and in no case should an airplane be permitted to set idle over 48 hours without draining these two items before the next flight. Tank corrosion is almost certain to occur on any airplane that is held out of commission for long periods of time without periodic draining of the accumulator tank. Keeping the main fuel tanks full at all times when the airplane is not in use is also very effective in keeping condensation within the tanks to a minimum.

To improve the draining efficiency of the accumulator tank on the Navion, all future replacement accumulator tanks shipped by Ryan will have the drain fitting located at the back of the tank. This places the drain outlet at the lowest point in the tank when the airplane is at rest on the ground. It will be necessary to cut a 2 inch diameter hole in the lower wing skin for access to this relocated drain valve whenever one of these replacement tanks is installed.

NOTE

The new type tank will pass through the lightening hole in the front spar of the left wing located in the aft end of the nosewheel well. Remove all hydraulic lines passing through this hole to permit passage of the tank. It is therefore unnecessary to remove and separate the wings when making an accumulator tank change.

PROCEDURE FOR CHANGING FUEL SYSTEM ACCUMULATOR TANK IN A NAVION -

WITHOUT SEPARATING THE WINGS

FOR USE WITH THE SERVICE LETTER NO. 78

Shop experience has proven that it is possible by the following procedure to remove the accumulator tank from within the wings of a Navion and install a late type replacement tank without removing or separating the two wing panels.

1. Drain fuel system.

2. Remove curtain or metal cover from back wall of nose wheel well.

3. Remove fuel strainer from right hand wall of nose wheel well.

4. Remove all hydraulic lines passing through lightening hole in front spar of right wing. (This is the large hole to a mechanics left as he looks at the aft end of the nose wheel well.)

5. Remove the two micarta fairleads that support the right rudder cable through the wing.

6. Loosen all hose connections to tank and detach tank from support bracket.

7. Work tank toward front of wing and try getting it out through right wing lightening hole by rotating tank to several positions. (On all North American built Navions and on early Ryan models it will be necessary to saw off the tank inlet tubes and the small tube at the top of the tank before it will come out through the hole. The tanks on late 49 models and all subsequent Navions should come out without any cutting on the tank.

8. Insert late type tank through same wing lightening holes and connect into fuel system as before. Reconnect all hydraulic lines that were disconnected; reinstall cable fairleads using small bolts and nuts instead of rivets and reinstall fuel strainer in place on right nose wheel well wall.

9. Check system for leaks after fuel tanks have been serviced with fuel.

NOTE

It will be necessary to install a new type tank mounting bracket on some of the older Navions in order to accomodate the later type accumulator tank - refer to your latest Navion parts Catalog for details.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 79
NOVEMBER 3, 1952

TO: ALL NAVION DISTRIBUTORS AND DEALERS AND SUPER 260 OWNERS

SUBJECT: DOWNDRAFT COOLING SYSTEM FOR LYCOMING GO435-C2 ENGINE IN THE NAVION

The Ryan Company has just completed running extensive flight tests on a Super 260 Navion equipped with several variations of a downdraft cooling system designed to improve engine cooling. Configurations tested included various nose intake openings, ranging from the standard nose intake with an inner baffle to deflect the air over the top of the engine to large "bugeye" cutouts in the upper half of the nose cowl. Several types of inner cowl and intercylinder baffles were also tried. During the process of conducting these tests, it was discovered that variations in carburetion and distribution had considerable influence on the cooling results obtained. It was finally determined that a "tunnel type" cover over the top of the engine, with the lower nose intake and a separate scoop inlet for the oil radiator gave the most effective results consistent with ease of modification and cost. The prototype of this installation has now been approved by the CAA on a Form 337.

Patterns for the manufacture of parts suitable for a field installation kit have been made and an initial kit fabricated and shipped to Lycoming for further tests on another Navion. It is our intention to produce kits for sale to owners who may desire to so modify their planes, but we feel it is advisable to await the results of further service tests, plus Lycoming's tests and recommendations, before releasing an additional quantity. Super 260 Navion owners will be notified by special letter when Ryan downdraft cooling kits are available for general distribution to the field.

Consideration was given to a possible ejector stack type system, but it was decided that the compromises necessary to adapt this system to the present Navion configuration, plus the desirability of retaining the muffler-heater assembly, definitely limited the practicability of such an installation.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

"THIS LETTER FAA APPROVED"

SERVICE LETTER NO. 79

December 23, 1958

TO: ALL NAVION OWNERS

SUBJECT: HYDRAULIC SYSTEM MAINTENANCE AND RELATED COMPONENT RIGGING

It has been brought to the factory's attention that in the past, several failures have occurred on hydraulic actuating cylinders (landing gear and flap) and it is the intent of this letter to point out probable causes of these malfunctions and corrective action to prevent their continuance.

1. Hydraulic system pressure was set at the factory to the correct value before your airplane was delivered; however, all models prior to the Model Navion D did not incorporate a hydraulic pressure gauge. Since the newest Navion to date (excluding Model D) is in excess of seven years old, it is a good probability that the hydraulic pressure on your airplane has been reset numerous times in service without the use of a gauge.

If the pressure has been reset for any reason, it is possible that, without the use of a gauge, the operating pressure may be in excess of the factory recommended 1125 (+25/-0) psi. Excessive pressure could cause severe damage to the system, such as bursting O-rings, seals or even actuating cylinders.

2. Linkage adjustments of landing gear bungee springs and flap stops could be out in some cases where field disassembly and reinstallation of these items were not accomplished in accordance with factory recommendations. This could cause, in the case of the landing gear, bottoming of the piston in the actuating cylinder which, in turn, under continued usage could rupture the cylinder.

3. Restrictors and restrictor assemblies serve an important function in the Navion hydraulic system. A restrictor assembly in the flap down line was effective on the original and subsequent production Navions. A restrictor assembly (orifice type) in the nose gear actuating cylinder up line connection to the cylinder was made effective on Serial No. 1271 and subsequent and also

Serial No. NAV-4-2 thru 1270 by Field Service Bulletin No. 2 dated March 22, 1948 A restrictor assembly in the main gear down line was made effective on Serial No. 1790 and subsequent and available for installation on all previous Navions. These restrictors, although incorporated in one line only, function in both extension and retraction of the related component. Elimination of these restrictors and continued use of the system thereafter produce undue shock loads and subsequent failure of the actuating cylinders.

Factory recommended maintenance, servicing, and rigging of the aforementioned systems on the Navion airplane are thoroughly detailed on pages 35 through 49 in the Navion Service Manuals and should be adhered to at all times to insure extended service life without unnecessary malfunctions

Therefore, the following should be checked at the earliest possible convenience and at each periodic inspection thereafter of your Navion.

1. Hydraulic pressure by means of a gauge (if not installed) connected to the pressure line at the pressure relief valve by means of a tee or suitable connection.

2. All landing gear bungee and flap rigging dimensions as given in the Service Manual.

3 Installation of restrictor assemblies.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

"THIS LETTER FAA APPROVED"

SERVICE LETTER NO. 80

DATE: November 18, 1960

TO: All Navion Owners

SUBJECT: PART NO. 143-33153 SHAFT-MAIN LANDING GEAR ACTUATING STRUT

EFFECTIVE: NAV-4-2 AND SUBSEQUENT

In the past few years several fatigue type failures have occurred in the area of the cotter pin holes adjacent to the landing gear actuator attach yoke on P/N 143-33153 (Shaft-Main Landing Gear Actuating Strut) which in some cases resulted in failure of the main landing gear to extend and lock in the down position.

The following action should be taken: At the earliest possible convenience but no later than the next twenty-five hours of operation and each 100 hours of operation thereafter, visually inspect P/N 143-33153 via means of the access plate just aft of the main wheel well to determine that no cracks are present. If cracks are present, P/N 143-33153 should be replaced immediately by P/N 143-33153-3. On installation of the -3 shaft no further inspection is necessary.

These -3 parts are available for immediate delivery from the factory.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

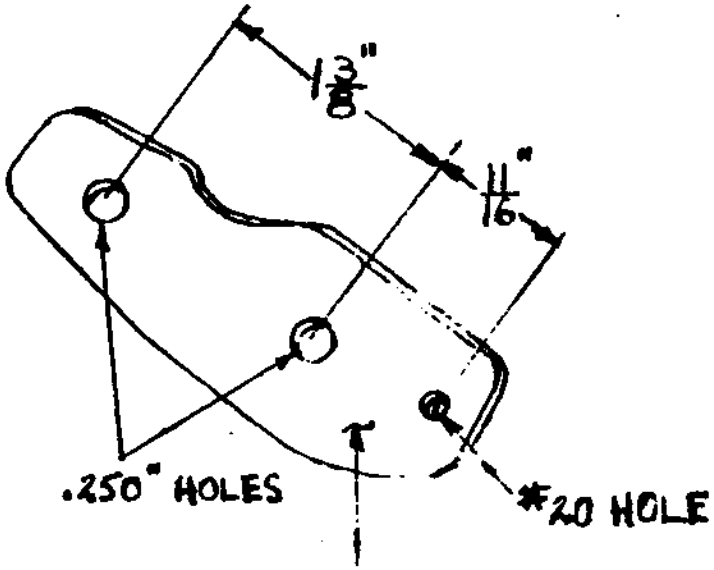
SERVICE LETTER NO. 80
AUGUST 26, 1952
TO: ALL OWNERS OF SUPER 260 MODEL NAVIONS
SUBJECT: ENGINE COOLING AIDS FOR HOT WEATHER FLYING

Recent tests conducted at the Ryan Factory with the assistance of a Lycoming Engineering Representative have shown that the GO-435-C2 engine in the Super 260 Navion can be made to run cooler during very hot weather by increasing the amount of cowl flap opening and maintaining a slightly higher airspeed during initial climb.

The extra degrees of cowl flap opening are easily obtained by installing a dural "link" between the door and the clevis end on the control shafts for the flaps. (See sketch for detail of link). The flexible control should then be checked to be sure it is locking properly so the flaps will not close from air pressure. The use of these links will prevent full closing of the cowl flaps; however, this should not be objectionable as some cowl flap opening is desirable during cruising flight in hot summer weather and airspeed reduction is negligible. The links may be removed at the end of the summer flying season if desired.

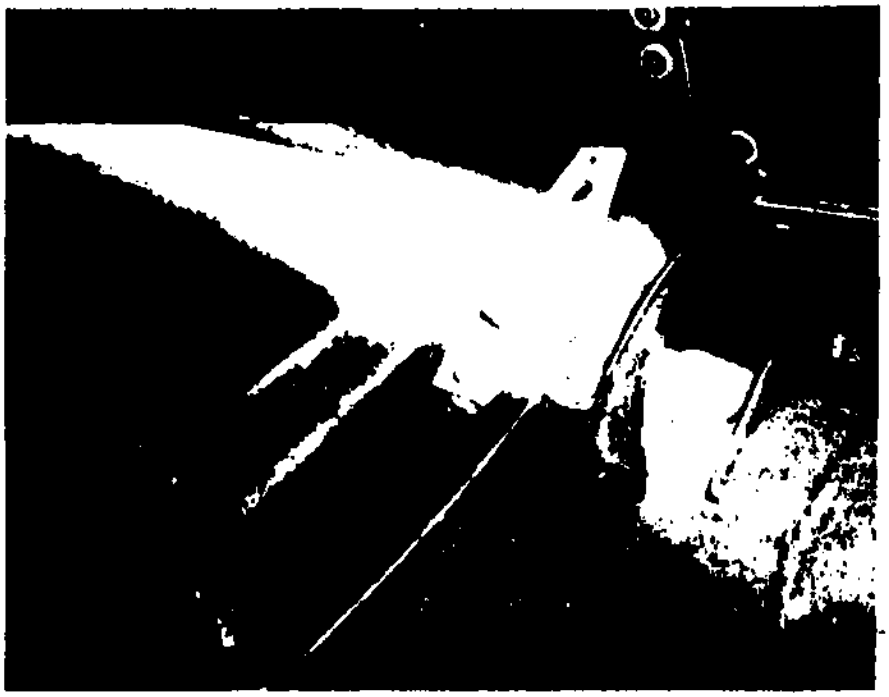
The matter of air speed in a climb is also very important, as too low an airspeed during the initial climb when considerable power is being used can cause a sudden rise in cylinder head temperature that may result in engine damage. Therefore, Ryan and Lycoming recommend that whenever terrain and other conditions permit a minimum indicated airspeed of approximately 120 miles per hour be maintained during the initial climb after retraction of the landing gear in very hot weather. The extra air packed into the engine cowling due to this higher airspeed plus the increased negative pressure created by the larger cowl flap opening gives the additional cooling desired to improve engine operation during the hot summer months.

It is also recommended that the calibration of the cylinder head temperature gauges in all Navions be checked at the earliest opportunity, since it has been discovered that the indicator may become inaccurate over a period of time. Any C.A.A. Certificated Instrument Shop can perform this check, which will insure maximum accuracy of the gauge in your plane. Correct cylinder head temperature indications are absolutely essential if the safest and most efficient power plant operation is to be obtained.



MAKE LINK OF .125 in. THICK 24ST DURAL

FULL SIZE SKETCH OF COWL FLAP CONTROL LINK



TYPICAL COWL FLAP LINK INSTALLATION

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SUPPLEMENT NO. 1 TO SERVICE LETTER NO. 30

NOVEMBER 5, 1952

TO: ALL NAVION DISTRIBUTORS, DEALERS AND SUPER 260 OWNERS

SUBJECT: CYLINDER HEAD TEMPERATURE GAGE ACCURACY

As stated in Service Letter No. 80, the accuracy of cylinder head temperature gages may diminish with service and since the original gages now in use on Navions in the field have been in service for considerable time, the Ryan Instrument Laboratory recommends they be checked for erroneous indications at the earliest possible date. This work should be performed only by C.A.A. Approved Instrument Repair Stations equipped for meter repairing.

Experience has shown that false indications are commonly caused by lint or fuzz which sticks to the coil or hairsprings, or by paramagnetic particles which becomes locked between the core and moving coil. Dirty pivots and jewels are also contributing factors.

The importance of the above recommendation should not be minimized.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 81

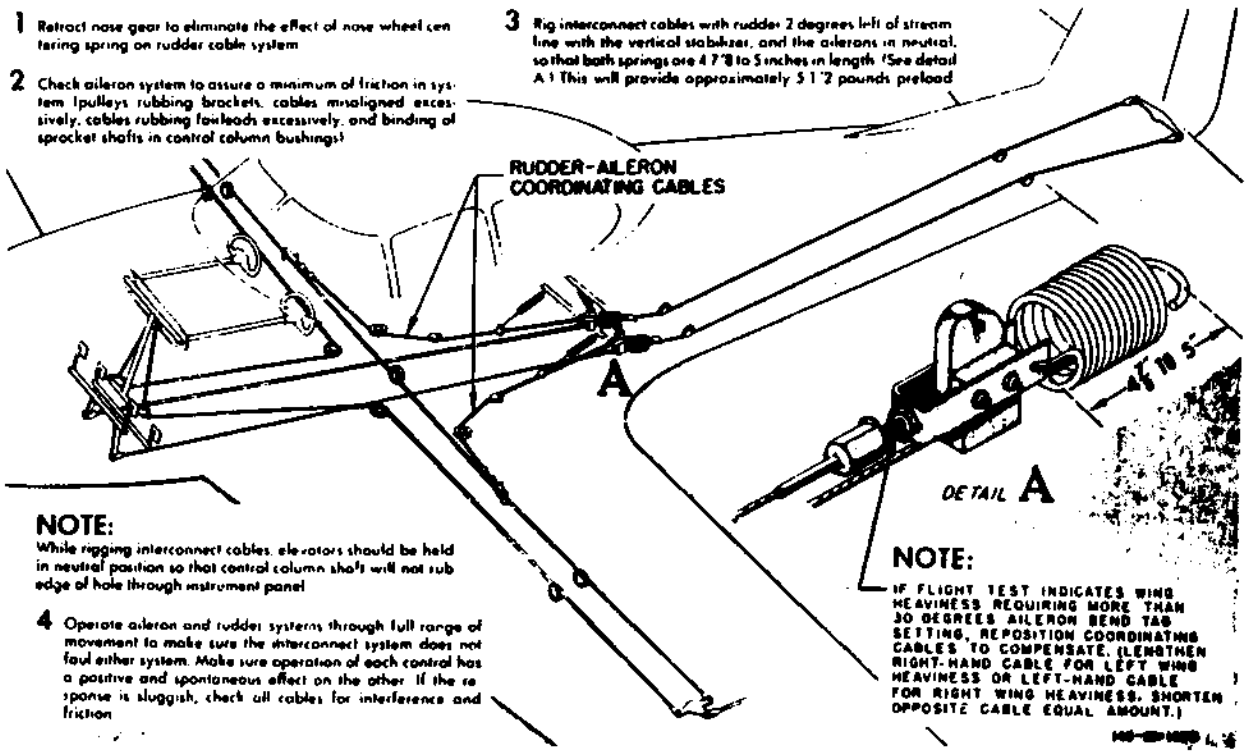
MARCH 14, 1955

TO: ALL NAVION OWNERS, DEALERS, AND DISTRIBUTORS

SUBJECT: ILLUSTRATION CORRECTION

REFERENCE: NAVION SERVICE MANUAL FIGURE 21

In the Navion Service Manual, all editions, Figure 21, showing the installation of the Aileron-Rudder interconnect cable is in error. The illustration shows the interconnect cable attaching to the wrong aileron cable. Though this cannot happen in practice, as the aileron cable shown has no provisions for attaching the interconnect cable, a revised illustration is provided below. Please paste this illustration over existing illustration in your manual.



Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6614
(Formerly Guadalupe County Airport)

"THIS LETTER FAA APPROVED"

SERVICE LETTER NO. 81

DATE : MARCH 31, 1961

TO : ALL NAVION OWNERS

SUBJECT : PART NO. 145-58145-3 END FITTING-HYDRAULIC POWER AND CONTROL SHAFT-LANDING GEAR SELECTOR VALVE

EFFECTIVE : NAV-4-2 AND SUBSEQUENT

An investigation prompted by field reports has revealed that in some instances the heat-treated end fitting (Part No. 145-58145-3) has failed during attempts to extend the landing gear.

Detailed evaulation of the landing gear up-lock system disclosed that loads sufficient to cause failure of this fitting may result from: 1.) Maladjustment of the up-lock cable system; 2.) Excessive friction between the up-lock latches and latch rollers on the gear, which may often be attributed to excessive paint thereon; and 3.) Inadvertently selecting gear-down with hydraulic power "off", wherein excessive pressure is required on the gear selector handle to overcome gear weight hanging on the up-latches.

Consequently, the following inspection should be accomplished at the earliest possible convenience but no later than the next twenty-five hours of operation and each periodic inspection thereafter of your Navion.

1.) Inspect Part No. 145-58192 Bellcrank Assy. - Hydraulic Landing Gear Control Handle, Part No. 145-58233 Spacer - Hydraulic Control Valve Handle Linkage, and Part No. 145-58145-3 End - Hydraulic Power & Control Unit Shaft for excessive wear or deformation. Defective parts should be replaced immediately.

2.) Inspect the up-lock rollers and hook assemblies on each gear for excessive grime or paint, freedom and smoothness of operation, and excessive wear that may cause binding.

3.) Inspect rigging of the landing gear up-lock system in accordance with Section I of Navion Field Service Bulletin No. 8 dated 7-11-49 or the illustrated instructions of Fig. 32 of the Navion Service Manual.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

" THIS LETTER FAA APPROVED"

SERVICE LETTER NO. 82

DATE: May 22, 1962

TO: ALL NAVION OWNERS

SUBJECT: AN5-7A (TWO EACH AT FUSELAGE STATION 54)
AN5-10A (TWO EACH AT FUSELAGE STATION 40.5)
ENGINE MOUNT ATTACH BOLTS

EFFECTIVE: NAV-4-2 THROUGH NAV-4-2350

In the past several years, three failures of the AN5 Engine Mount Attach Bolts, where the engine support structure attaches to the fuselage at the fire wall, have been reported. It was apparent that one of these failures was caused by excessive torquing, whereas it was apparent that the other two cases were a shear type failure.

The following action should be taken. At the earliest possible convenience, but not later than the next 25 hours of operation and each engine change thereafter, remove and visually inspect these bolts for any signs of distortion or excessive wear. It should also be determined that the correct length bolt and number of washers are properly installed (at station 54, AN5-7A bolt, one AN960-516 washer under the bolt head and two under the AN365-524 nut; at station 40.5, AN5-10A bolt, one AN960-516 washer under the bolt head and one under the AN365-524 nut).

If any signs of wear or distortion are apparent, the bolts should be replaced with new ones immediately. It is hereby recommended that these bolts be replaced by new ones at each engine change thereafter.

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 83

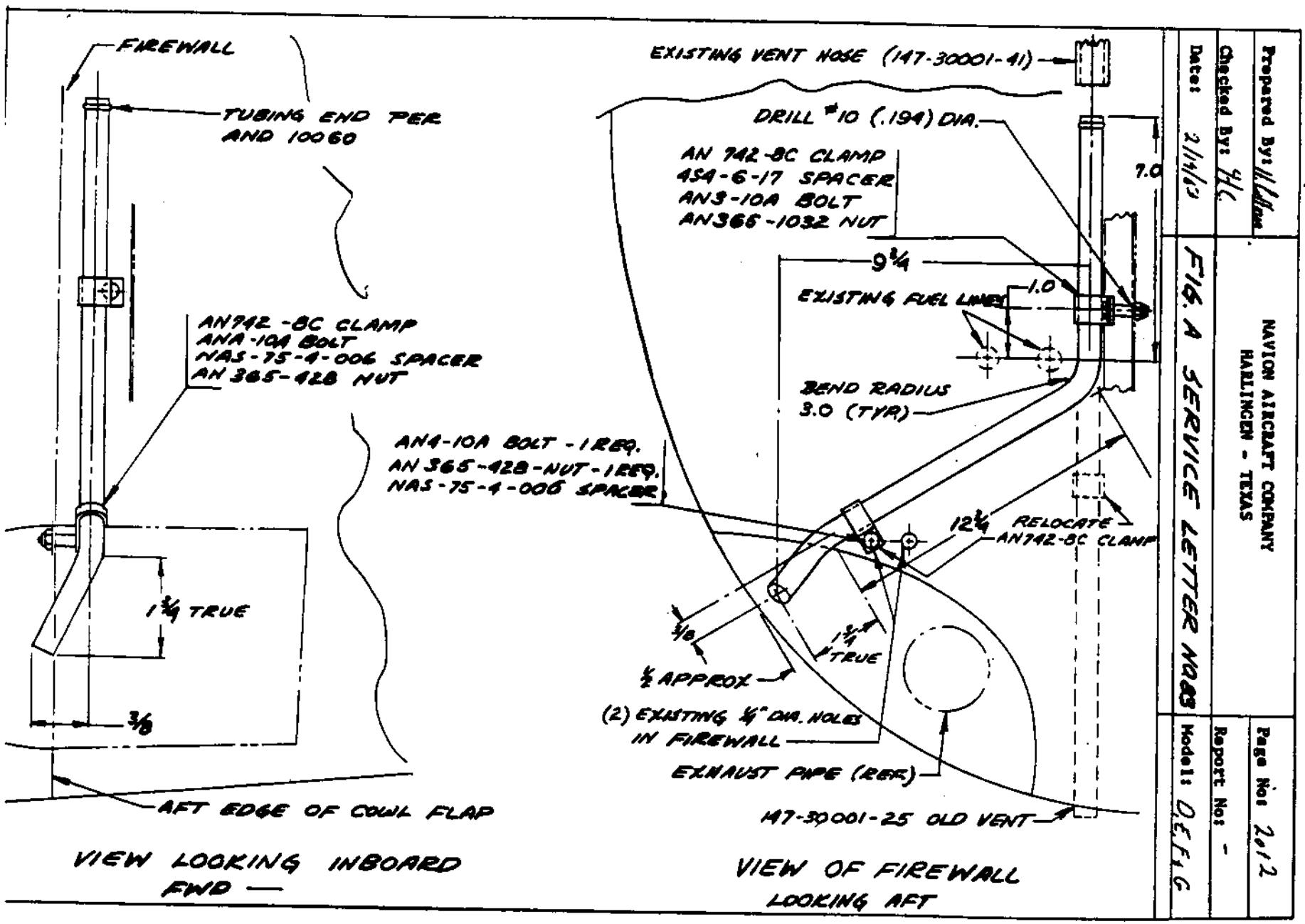
FEBRUARY 20, 1963 THIS LETTER FAA APPROVED

TO: All Owners of Model Navion B (with IO-470-H engine only), D, E, F and G.

SUBJECT: Engine Breather Line Freezing In Extreme Cold Weather Operation

The factory has been advised that recently during extreme cold weather operation ice has formed in the overboard end of the engine breather line, resulting in the loss of engine oil. In order to minimize the possibility of this happening, it is recommended that the 147-30001-25 tube be replaced by 147-30001-207 tube, per figure A of this letter, which would insure engine down stream cooling air keeping the lower section of the breather line warm at all times.

NOTE: Those Models B, D, E and F modified at the factory which incorporate Symons cowl flap doors already conform to this configuration and no further action is necessary on these aircraft.



Prepared By: W. Latham
Checked By: HC
Date: 2/14/63

NAVION AIRCRAFT COMPANY
HARLINGEN - TEXAS

FIG. A SERVICE LETTER NO. 63

Model: O-E-F-G

Report No: -

Page No: 2 of 2

Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 84

APRIL 25, 1963

THIS LETTER IS FAA APPROVED

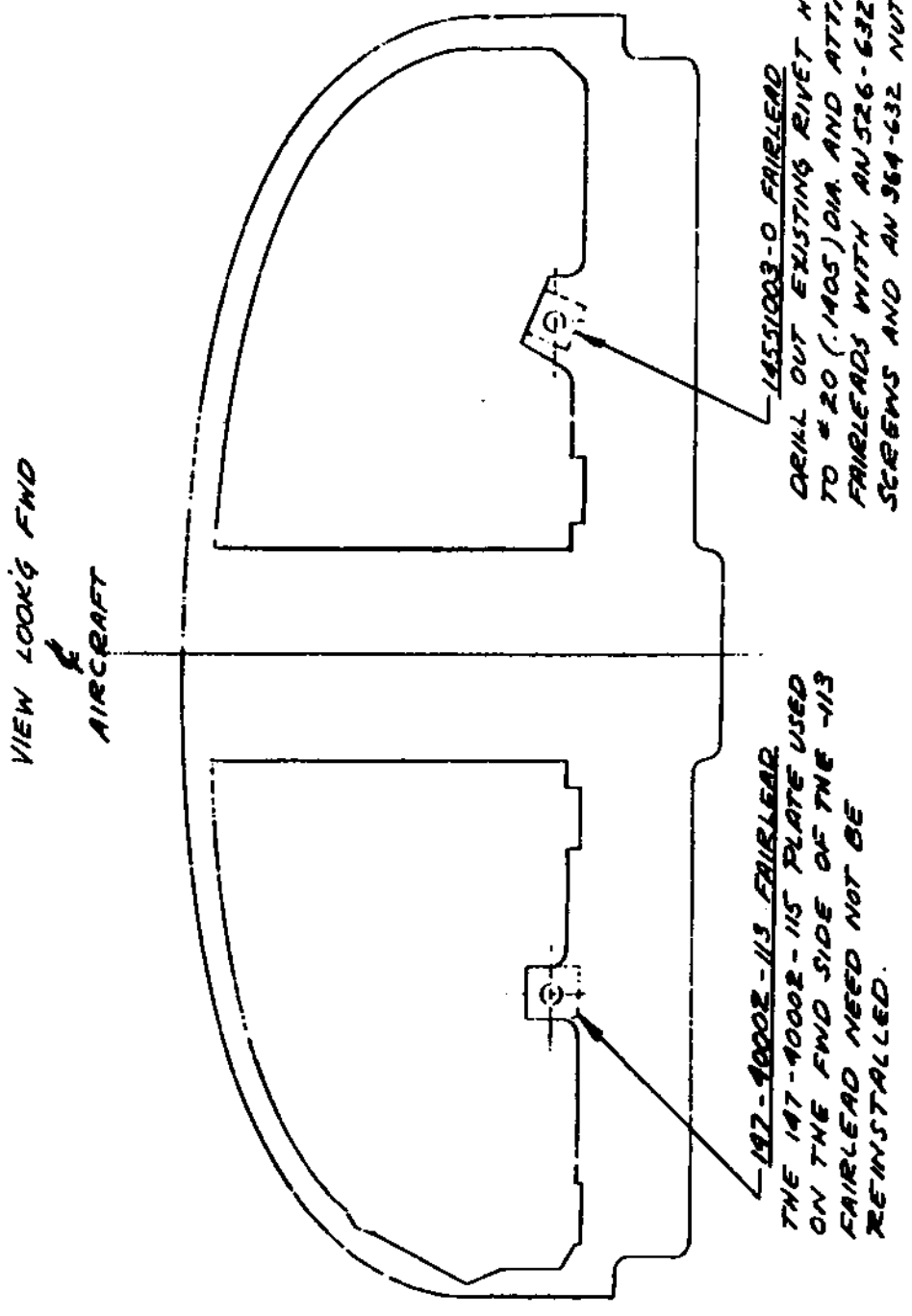
TO: All Owners of Navion Model G

SUBJECT: Binding of Control Wheel Push-Pull Tubes

EFFECTIVITY: Ser. No. NAV 4-2351 and up.

Field experience indicates that there is a possibility of the control wheel push-pull tubes binding at the instrument panel. The lower portion of the instrument panel should be inspected for out of plane distortion by placing a straight edge horizontally just below the push-pull tube fairleads on both right and left sides. The vertically projecting tabs evidence of distortion. If distortion is found it should be corrected by straightening the effected area. The right and left hand phenolic fairleads, P/N's 145-51003-8 and 145-40002-113, respectively, should be inspected to insure that they have 3/32 inch radii on the 57/64 inch dia. hole. Should the fairleads not be sufficiently radiused they should be removed from the aircraft by drilling out the attaching rivets. The fairleads may be reworked to a 3/32 inch radius or replacement fairleads installed. To preclude damage to the instruments when reinstalling the fairleads it is permissible to enlarge the mounting holes to #28 (.1405) dia. and install the fairleads with AN 526-632R4 screws and AN 364-632 nuts. Refer to Figure No. 1, attached.

Prepared By: CPHF1	NAVION AIRCRAFT COMPANY HARLINGEN - TEXAS	Page No. 2 of 2
Checked By: P O C		Report No:
Date: 4/15/61	FIG. NO. 1 SERVICE LETTER NO. 89	Model: G



Navion AIRCRAFT CORPORATION
NAVION FIELD SEGUIN, TEXAS • TELEPHONE 512- FR 9 6414
Formerly Guadalupe County Airport

SERVICE LETTER NO. 85

JANUARY 7, 1954

THIS LETTER IS FAA APPROVED

TO: All Owners of Navion Models D, E, F & G

SUBJECT: Loose rivets through wing skin and stringers

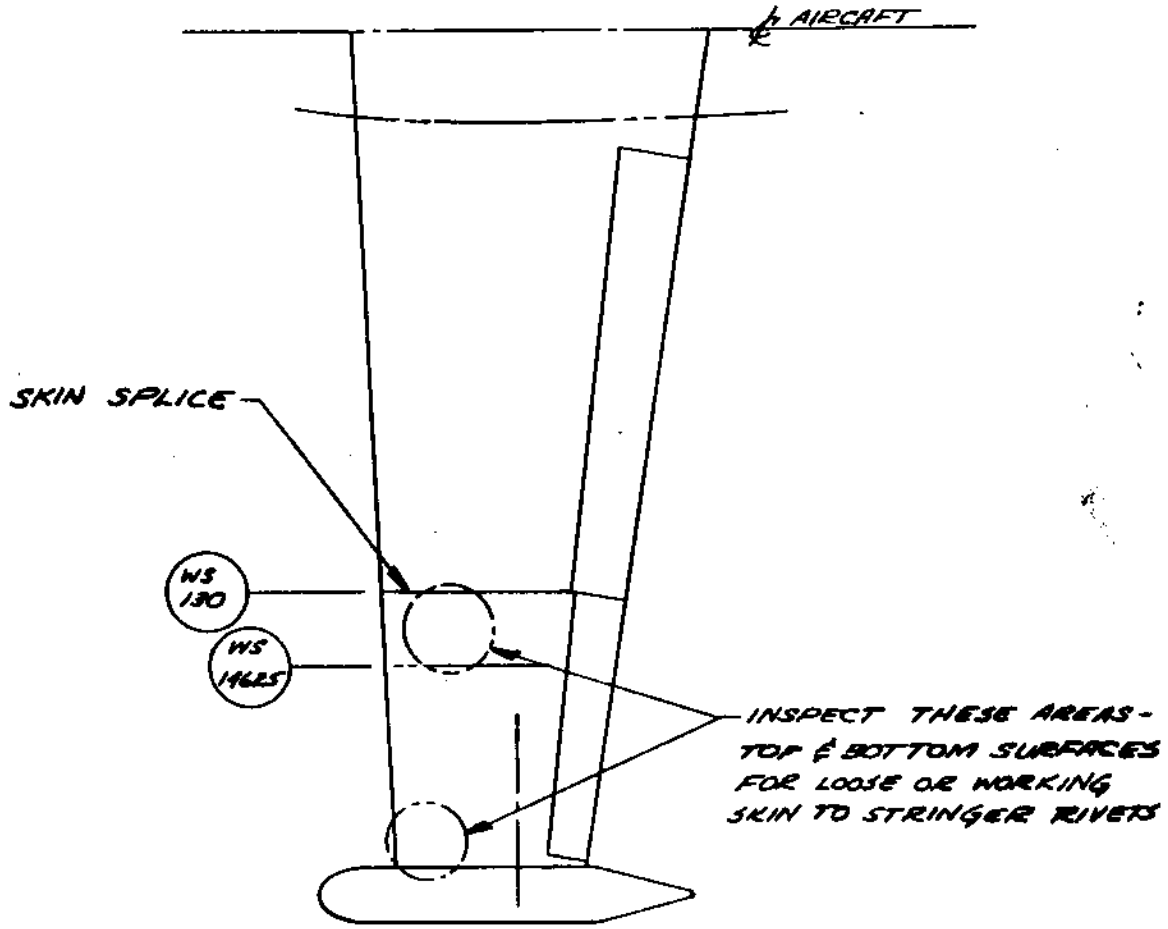
EFFECTIVITY: Ser. No. NAV 4-2 & UP; NAV 4-2351 & UP

Field reports indicate several occurrences of wing skin to stringer rivet loosening in some areas. This loosening may possibly be caused by hard landings with full tip tanks.

The areas indicated on attached Fig. 1, should be visually inspected for working rivets. Loose rivets should be removed and the next larger size rivet installed. If it is impracticable to install the next larger rivet, due to lack of edge distance or interference, the number of rivets should be increased through the affected area, by adding an additional rivet between each loose rivet and the next adjacent rivet. It is recommended that the additional rivets be of the protruding head type.

In addition to the foregoing inspection, the Tip Tank installation should be inspected for obvious deformation or looseness. If tip tank deformation or looseness is found, it is requested that Form 1226-Malfunction or Defect Report be filed with the nearest FAA GSDO.

Prepared By: Craft Checked By	NAVION AIRCRAFT COMPANY HARLINGEN - TEXAS	Page No. 2 of 2 Report No. -
Date: 1/9/64	FIG. NO. 1 SERVICE LETTER NO. 85	Model: Navion D, E, F, G



Navion AIRCRAFT CORPORATION
NAVION FIELD, SEGUIN, TEXAS • TELEPHONE (512) FR 9-6414
(Formerly Guadalupe County Airport)

SERVICE LETTER NO. 8C

JULY 28, 1964

THIS LETTER IS FAA APPROVED

TO: All Owners of Navion Models, D, E, F & G

SUBJECT: Operation at Low Engine R.P.M.

EFFECTIVITY: Ser. No. NAV 4-2 & UP; NAV 4-2351 & UP.

Operation at low engine RPM tends to induce excessive airframe vibration. This phenomena is more pronounced on aircraft with wing tip fuel tanks than on those which are not so equipped.

Operators are cautioned against operating below the lower end of the green arc, 2200 rpm. Power settings shown in the Owner's Handbook below 2200 rpm should not be used. In reading the engine tachometer, the operator should consider the effect of parallax caused by viewing the tachometer at an angle.

Since the natural frequency at which the wing tends to vibrate varies as fuel is drawn from the tip tank, excessive or uncomfortable vibrations could possibly occur without the changing of power settings. In the event that such vibration should occur, it is recommended that an increase or decrease of 50 rpm be made to the existing power setting.

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NAVION SERVICE LETTER # 87
FEBRUARY 20, 1965

(Formerly Service Information Letter # 1.)

DER APPROVED SW 192

MANDATORY

SUBJECT: Fuel Accumulator Tank - Replacement
EFFECTIVITY: All Model Navions
REFERENCE: Ryan Service Letter #78
DRAWING: Tanks experienced corrosion - Item #2307 - P/N 145-48004
Replacement Tanks - Item #2307-10 P/N 145-48006

Reason for Publication: Early model tanks have corroded thereby creating a hazardous condition.

Parts Required: (Refer to work instructions)

FUEL SYSTEM ACCUMULATOR TANK MAINTENANCE AND MODIFICATION

An investigation prompted by reports from the field has revealed that some cases of accumulator tank leakage have been caused by corrosion on the inside of the tank bottom. A series of small pin holes will appear on the bottom of any tank subject to this corrosion; therefore, frequent (at least every 30 days) inspection of all Navion accumulator tanks is recommended so that the difficulty will be detected before leakage reaches any serious proportions. The presence of a red stain on the bottom of the tank is one of the early signs of fuel seepage.

The corrosion, referred to above, can be effectively prevented by regular periodic draining of all water and foreign matter from the accumulator by opening the drain cock adjacent to the outlet on the bottom of the tank. At least one quart of fuel should be allowed to run out of the drain, or fuel should be allowed to run until all water bubbles disappear. Daily draining of both the accumulator tank and main fuel strainer has long been considered good service practice and in no case should an airplane be permitted to set idle over 48 hours without draining these two items before the next flight. Tank corrosion is almost certain to occur on any airplane that is held out of commission for long periods of time without periodic draining of the accumulator tanks. Keeping the main fuel tanks full at all times when the airplane is not in use is also very effective in keeping condensation within the tanks to a minimum.

To improve the draining efficiency of the accumulator tank on the Navion, all future replacement accumulator tanks shipped by Navion will have the drain fitting located at the back of the tank. This places the drain outlet at the lowest point in the tank when the airplane is at rest on the ground. It will be necessary to cut a 2 inch diameter hole in the lower wing skin for access to this relocated drain valve whenever one of these replacement tanks is installed.

NOTE

The new type tank will pass through the lightening hole in the front spar of the left wing located in the aft end of the nosewheel well. Remove all hydraulic lines passing through this hole to permit passage of the tank. It is therefore unnecessary to remove and separate the wings when making an accumulator tank change.

PROCEDURE FOR CHANGING FUEL SYSTEM ACCUMULATOR TANK IN A NAVION WITHOUT SEPARATING THE WINGS

Shop experience has proven that it is possible by the following procedure to remove the accumulator tank from within the wings of a Navion and install a late type replacement tank without removing or separating the two wing panels.

1. Drain fuel system.
2. Remove curtain or metal cover from back wall of nosewheel well.
3. Remove fuel strainer from right hand wall of nosewheel well.
4. Remove all hydraulic lines passing through lightening hole in front spar of right wing. (This is the large hole to a mechanics left as he looks at the aft end of the nosewheel well.)
5. Remove the two micarta fairleads that support the right rudder cable through the wing.
6. Loosen all hose connections to tank and detach tank from support bracket.
7. Work tank toward front of wing and try getting it out through right wing lightening hole by rotating tank to several positions. (On all North American built Navions and on early Ryan models, it will be necessary to saw off the tank inlet tubes and the small tube at the top of the tank before it will come out through the hole.) The tanks on late 49 models and all subsequent Navions should come out without any cutting on the tank.
8. Insert late type tank, P/N 145-48006, through same wing lightening holes and connect into fuel system as before. Reconnect all hydraulic lines that were disconnected; reinstall cable fairleads using small bolts and nut instead of rivets and reinstall fuel strainer in place on right nosewheel well wall.
9. Check system for leaks after fuel tanks have been serviced with fuel.

NOTE

It will be necesaary to install a new type tank mounting bracket on some of the older Navions in order to accomodate the later type accumulator tank - refer to your latest Navion parts Catalog for details.

INSPECTION AND REWORK OF REPLACEMENT WING ACCUMULATOR TANK BRACKETS

Navion airplanes prior to factory serial number NAV-4-1251 have the fuel accumulator tank supported by two 145-48008 brackets riveted to the 143-14010-20 center rib. Airplanes subsequent to NAV-4-1251 have the fuel accumulator tank supported by one 145-48007 bracket, riveted to the bolting angle of the left wing.

SEE FIGURE 1

A. Airplanes NAV-4-2 through NAV-4-1250

1. Inspect inside the root section to see if fuel accumulator tank bracket 145-48007 is installed. If the 145-48007 bracket is installed, remove it from the wing as follows:

   a. Drill out the three AN442AD5-9 rivets which attach one end of 145-48007 bracket to the wing bolting angle. This is the 12th row of rivets aft of forward edge of the wing.

   b. Drill out one 2R1AD4-4 rivet attaching the outboard end of the 145-48007 bracket, and remove bracket from wing.

   c. Replace the first three removed rivets with AN442AD5-8 rivets. Replace the removed outboard rivet with one 2R1AD4-3 rivet.

B. Airplanes NAV-4-1251 and subsequent

1. Inspect the inside root section of left wing to see if the 145-48007 fuel accumulator tank bracket is installed. If bracket is not present, install the new 145-48007 bracket, received as a loose part, as follows:

   a. Drill out three AN442AD5-8 rivets which run spanwise in the bolting angle. This is the 12th row of rivets aft of the forward edge of wing.

   b. Clamp 145-48007 bracket in the wing with the flange of bracket over holes just drilled. Drill through bolting angle holes and bracket flange with a No. 21 (.159) drill.

      CAUTION: Do not elongate holes in bolting angle.

   c. Attach bracket to bolt angle with three AN442AD5-9 rivets.

   d. Drill through rib, wing skin, and pilot hole on outboard flange of bracket with No. 30 (.128) drill, and install one 2R1AD4-4 rivet.

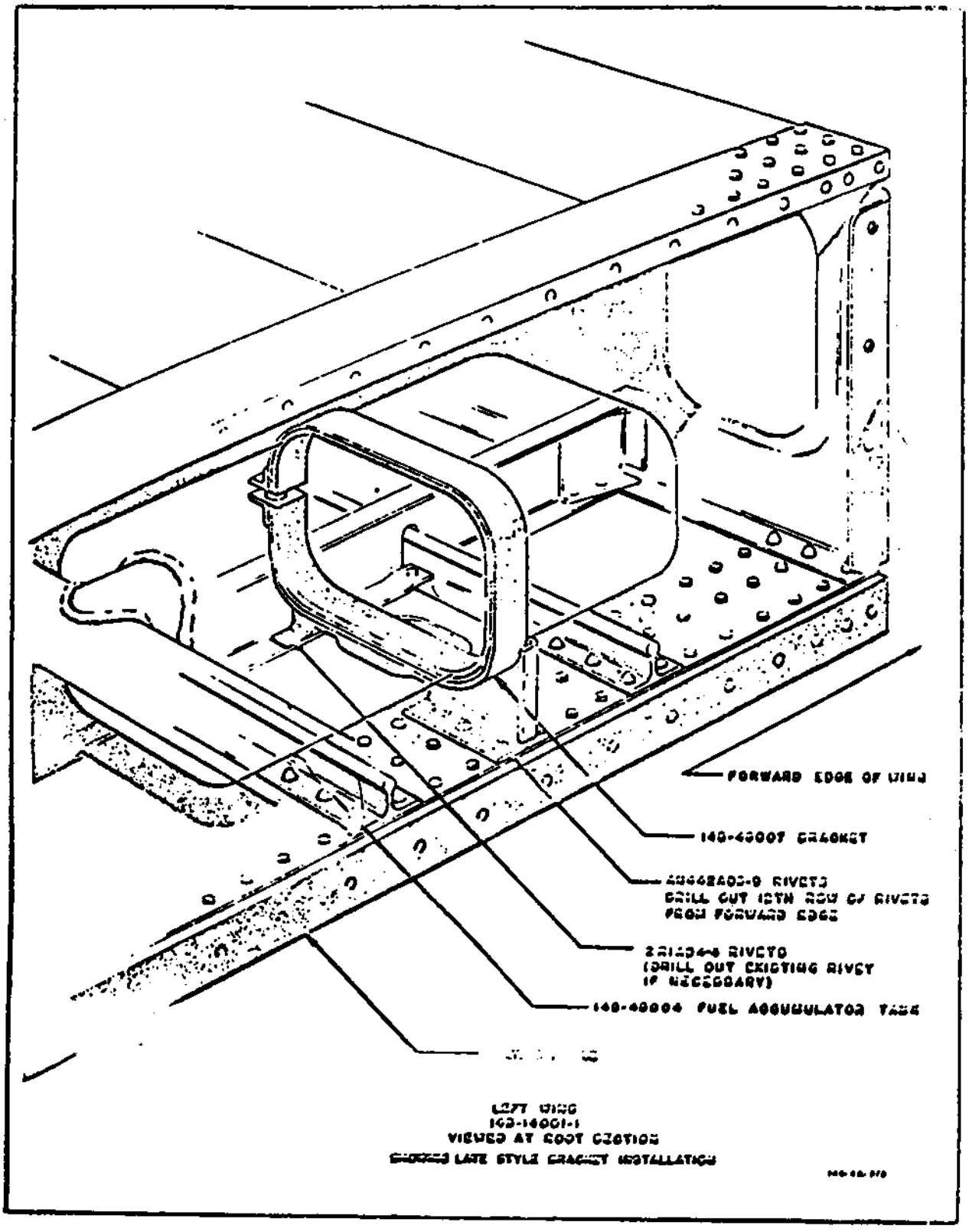

Figure 1 - Accumulator Tank Bracket

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NAVION SERVICE LETTER NO. 88 (Formerly Service Information Letter
FEBRUARY 20, 1965

DER APPROVED: SW 192 MANDATORY

SUBJECT: Wing Closure Strip - Inspection
EFFECTIVITY: All Navions with 34 gallon Tip Tanks
DRAWING: 143-14001-1, -2

Reason for Publication: Mandatory inspection of closure strip bottom of wing Station 162.5 - 178.25 for proper attachments or loose attachments.

Parts Required: As required after inspection

Reports have been received concerning the attachments of the 143-14001-95 and -96 closure strip skin to the bottom of the wing in the two bays inboard of the tip tank. When the tip tanks were installed, access was required to the fuel lines and tank attachments. Therefore, the access strip was installed with screws for easy access for service and inspection. Cases have been found where the wrong type screws were installed. Only structural screws should be used. If you find screws threaded all the way to the head, they are wrong. Install only AN525 or AN521 or AN523 screws. Caution: do not use screws that are too long because they will damage the nut plates. Torque the screws to maximum tightness for security.

If your aircraft possibly has tip tanks and rivets in the closure strip, inspect the rivets for loose condition. They may be replaced with 830 nut plates and the above screws. Contact the factory for details.

A comparison can be drawn in the automotive field by keeping the foot accelerator fully open while attempting to climb a long steep hill in high gear. The engine will have a tendency to "lug" with consequent detonation and overheating. While the combination of high manifold pressure and low rpm's can be applied to supercharge military type aircraft engines, in aircraft with considerably higher speeds, to obtain maximum range; this procedure applied to engines of lower horsepower is not recommended. To insure lower temperatures and consequent longer life expectancy from the engine, it is recommended that the propeller rpm's be increased with increased throttle settings and that overall horsepower output of the engine be reduced by both throttle and rpm reduction.

Improper procedure in any one of the above mentioned operations can result in engine malfunction due to overheating, which in turn can cause piston failure with its attendant damage. Sensible application of power and the realization that an aircraft engine will give service comparable to automotive equipment only if properly handled, will assure hundreds of hours of trouble-free flying. Since the cost and weight of instruments to thoroughly analyze engine conditions in flight limits their use to airline equipment, the performance of the engine in the Navion will rely, for a large part, on the knowledge and care of its operator. For the owner-pilot who questions his ability to analyze engine performance or who is desirous of more accurately determining engine temperatures, a cylinder head temperature gauge could be installed at a reasonable cost. A manifold pressure gauge (formerly optional equipment) will also be a decided aid in proper engine operation.

The Ryan Aeronautical Company earnestly desires that you receive the best possible service from your engine and believes the most important factors to assure this service, are proper operation and top maintenance. We are desirous of giving you utmost assistance by keeping you well informed and thereby enabling you to follow the best operating practices at all times to obtain the long and faithful service of which this engine is capable of giving.