FIELD SERVICE BULLETIN

Navion

RYAN AERONAUTICAL COMPANY, LINDBERGH FIELD, SAN DIEGO 12, CALIFORNIA

FIELD SERVICE BULLETIN NO. 5 - MANDATORY

JANUARY 3, 1949

TO: ALL NAVION DISTRIBUTORS, DEALERS AND OWNERS

SUBJECT:
SECTION I. COUNTERWEIGHTS, MODIFICATION OF PROPELLER
SECTION II. ADJUSTMENT OF PROPELLER
SECTION III. REWORK OF 4-1/8 INCH COUNTERWEIGHTS
SECTION IV. INSPECTION OF ENGINE

CANCELS: NAVION SERVICE LETTER NO. 52, DATED SEPTEMBER 27, 1948

ACCOMPLISH: IMMEDIATELY

EFFECTIVITY: ALL NAVIONS WITH CONTINENTAL E-185-3 ENGINES EQUIPPED WITH HARTZELL PROPELLERS AS FOLLOWS:

1. Engine Serial Numbers 4289D through 5110D
2. All Reworked Engines which were equipped with Bronze Thrust Washers at Overhaul

REFERENCES: CONTINENTAL MOTORS CORPORATION BULLETINS NOS.:

1.	M48-7	Dated	May 26, 1948
2.	M48-J	Dated	May 17, 1948
3.	M48-10	Dated	May 27, 1948
4.	M48-30	Dated	Nov. 23, 1948 (Copy attached)

HARTZELL PROPELLER COMPANY BULLETIN NOS.:

1.	11	Dated	Dec. 1, 1948 (Copy attached)

PURPOSE: Under certain conditions, the force created by the original 4-1/2 inch counterweights on the Hartzell Propeller in combination with the Continental bronze thrust washer is great enough to cause engine thrust bearing failures. It is necessary to shorten the weights to decrease this force. An excess force will also be applied to the thrust washer if improper adjustment of the propeller decreases the jack to hub clearance, allowing the jack assembly to bottom on the hub.

SECTION I. REDUCTION OF COUNTERWEIGHT FORCES

In order to reduce the forces created by the present counterweights, they must be reduced to a length of $4\frac{1}{4}$ inches. See sketch.

1. Scribe a line completely around the counterweight and saw off material as necessary to shorten the weight to $4\frac{1}{4}$ inches. A small amount of stock should be left above the scribed line when sawing to permit filing down to the line in the interest of accuracy.

   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 used to secure weight to clamp. Safety screws as in original installation.

2. Steel stamp a numeral "4" on the forward face, near the root, of all counterweights modified according to the above instructions.

3. Prime and silver paint unplated surface.

SECTION II. PROPELLER INSTALLATION AND ADJUSTMENT

PART A. -1 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 shorter, a spacer should be used to make up the difference in length.

2. After completing installation as per instructions in the Hartzell Propeller Manual, a ground run of the engine should be made to adjust for proper static engine rpm (2025 rpm maximum).

3. Run engine for as short a time as possible with the propeller control in full increase rpm position, if rpm exceeds 2025, pull-out control until 2000 rpm is reached, 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. If 1/16 inch clearance is indicated, then adjust low pitch stop bolt so that it touches the stop. Recheck maximum static rpm and clearance.

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. Inasmuch as moving the hub forward on the shaft increases blade pitch by approximately 1° per 1/32 inch movement of the hub, it may be necessary to reduce the pitch in order to obtain the prescribed 2025 static rpm. (See Part B2 for details describing pitch change.)

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

1. When the counterweight modification is accomplished, inspect hydraulic element prior to reinstalling propeller. Propellers which have been in service with a full length cone and 1/8 inch 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 returned to 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. Check position of element piston to ascertain that clearance is available to allow a 3/16 inch deflection of the diaphragm to either side of neutral as follows. By pushing or pulling the propeller counterweights, move the piston flush with the face of the outer diaphragm clamping ring. With the piston in this position, there should be a minimum clearance of 1/4 inch between the jack plate collar and the propeller hub. If there is less than 1/4 inch clearance at this point, the rear propeller cone must be shimmed up, as necessary, to attain this clearance. This will require an additional 1/16 inch spacer on all -7 Hartzell propeller assemblies previously installed, as the original 1/16 inch minimum jack plate collar to propeller hub clearance MUST NOW BE INCREASED TO 1/8 INCH. See sketch.

NOTE: In some cases it will be necessary to install a 3/16" lock pin in lieu of present 1/4" pin. In no case shall there be less than five (5) full threads of the hub nut in contact with the propeller shaft threads.

This positions the propeller hub forward by 1/16 inch. To compensate for this repositioning and change of blade angle, it will require reducing the pitch angle of each blade by approximately 2°. To accomplish this change, mark a line on the propeller blade 1/16 inch (this equals 2° change) to the low pitch side of the index mark on the blade clamp. Remove cotter pins and loosen the outboard clamp bolts.

NOTE: Mark bolts and nuts with a center punch before loosening in order to tighten to the same tension. Using a plastic mallet and placing a cloth over root of blade, tap heel of blade lightly to effect pitch change until the new mark on blade lines up with index mark on the blade clamp. Tighten nuts on the clamp bolts to the same position as before according to the center punch marks.

3. Exercise the utmost care in adjusting propeller control cable before attaching it to the A-117 servo valve control lever. When connecting the control cable to lever A-117, position piston in forward position as shown in sketch, and servo valve body 3/8 inch from plate (near mid position); also, push-pull control should be pulled out from dash approximately 1/8 inch for spring back cushion.

4. After installation is completed, run up engine and set low pitch stop to provide proper ground (static) rpm (1975 - 2025).

5. Make an operational check of the jack plate clearance. In the full forward position of the diaphragm, (maximum rpm) with engine running, there must be a minimum of 1/8 inch clearance between the jack plate collar and propeller hub. Clearance may be observed from the side of the airplane while the engine is running.

NOTE: This clearance must be observed while the engine is running, as the propeller counterweights will cause a change in the propeller pitch as the engine is stopped. It is realized that no measurement can be taken while the engine is running; however, if the clearance obviously is less than 1/8 inch, low pitch stop must be adjusted to provide clearance.

6. It is important that this jack plate to hub clearance be maintained to preclude any possibility of overloading engine thrust bearing with propeller. If the desired maximum rpm cannot be obtained with this basic adjustment, the blade settings in the hub must be changed rather than use additional spacers back of the rear cone as is sometimes done in the case of -1 or -5 Hartzell Propeller.

7. 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 full decrease rpm.

DO NOT attempt to increase this control range as it will cause over deflection of the diaphragm of more than 3/16 of an inch forward.

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.

8. To preclude the possibility of anyone making a change in the propeller adjustment screw setting which is not in accordance with the preceding instructions; the adjustment screw must be safetied and sealed at this time with a wire lead seal; insert end of wire through hole in screw then around screw support, through lead end and squeeze seal.

SECTION III. REWORK OF PROPELLER COUNTERWEIGHTS ORIGINALLY MODIFIED ACCORDING TO SERVICE LETTER NO. 52 DATED SEPT. 27, 1948

Propeller counterweights previously modified, according to Navion Service Letter No. 52, should at this time be steel stamped with a numeral "6" for future identification purposes. Stamp on forward face near root of counterweight.

Propellers having sluggish action and/or abnormal rpm pull-down, due to the counterweights having been shortened to 4-1/8 inch as per original Service Letter No. 52 dated Sept. 27, 1948, may have this condition improved by increasing the lengths of the counterweights according to the following procedure.

1. Cut a slug of steel stock to fit the end of the counterweights. Enough stock should be cut to increase the length of each counterweight to 4-1/4 inches. Care should be taken that the cross sectional form of the plates is the same as that of the counterweights. The plates should be cut in pairs from the same piece of plate stock.

   NOTE: Hartzell Propeller Company has already mailed a small supply of 1/16 inch plates and screws to each Distributor. More may be had by writing to Hartzell Propeller Company, Piqua, Ohio.

2. Drill two (2) 3/16 inch holes in each plate; locating the holes according to the dimensions in the sketch.

3. Place the drilled plates over the ends of the counterweights and locate the drill points in the counterweights with a center punch.

4. Drill the counterweights (No. 21 drill) to a depth of 1/2 inch.

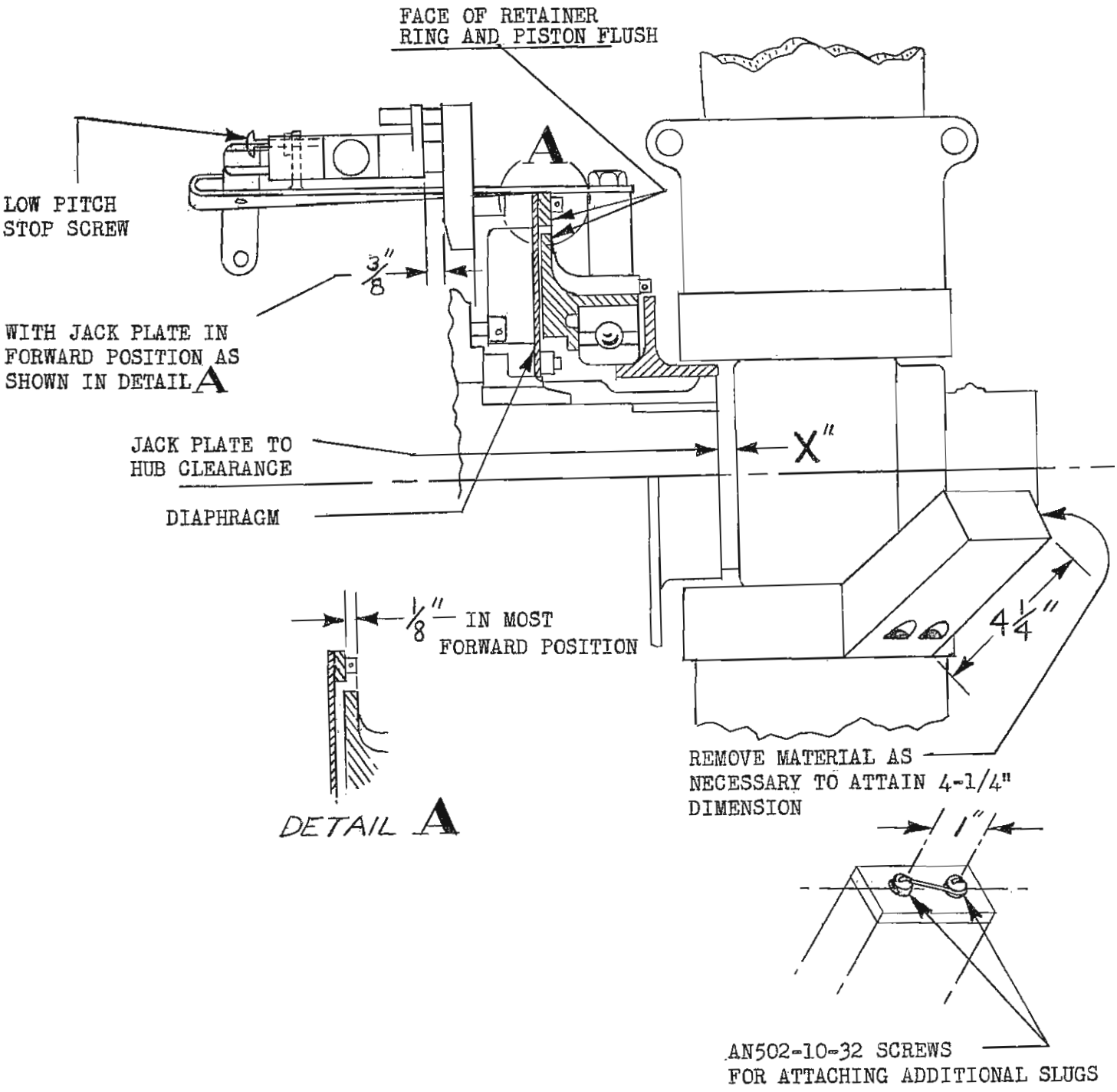
5. Tap the drill holes, in the counterweights, with a 1032 tap; use EXTRA CAUTION to prevent the tap from breaking off in the counterweight.

6. Secure the plates to the counterweights with two (2) 1/2 inch AN502-10-32 screws. Safety the screw heads together as shown in sketch.

7. Upon completion of the installation, prime and silver paint all exposed metal.

SECTION IV. ENGINE INSPECTION

Inspect oil screen and screen housing for bronze particles. Minute flakes or "gold dust" in screen is a normal condition and will exist until the thrust washers are completely seated. These indications are no cause for alarm and no corrective action is necessary. However, if the screen shows a substantial quantity of bronze chips, the crankshaft end clearance should be checked immediately. If this clearance exceeds .026 thousandths, the airplane is to be grounded and Continental Motors Corporation should be contacted for further instructions.



WITH FACE OF PISTON AND RETAINER RING FLUSH
Dimension X = 1/4" on -7, -7A or -7B Propellers

WITH PISTON IN FULL FORWARD POSITION (SEE DETAIL "A")
Dimension X = 1/8" on -7, -7A, or -7B Propellers

NOTE: WITH HYDRAULIC ELEMENT PISTON IN FULL FORWARD POSITION DIMENSION "X" SHOULD BE 1/16" MINIMUM ON -1 or -5 HARTZELL PROPELLERS