

PROPELLER (HARTZELL) - ADJUSTMENT/TEST

1. General

- A. This section gives information necessary to do a functional test for the dynamic balancing of the propeller. This data is applicable to all Hartzell HB-B3MN-3 and Hartzell HC-B3TN-3AF series propellers installed on the Model 208.
- B. The correctable propeller imbalance is a result of variations in the respective component weight and installation. The installation of balance weights in the correct position is an effective method to reduce the effects of these physical variations.
- C. The unknown factors in this problem are the amount and location of weight to be added. The balancer equipment will indicate the amount of imbalance in velocity (inches per second - IPS). This is translated into the amount of weight to be added and the angular location of the weight. The amount and location of weight added to the propeller is found with the balancer equipment. Refer to the manufacturer manual provided with the equipment for the balancing procedures.
- D. Applicable Documents.
 - (1) Applicable Caravan I Pilot's Operating Handbook.
 - (2) Applicable Caravan I Pilot's Checklist.

2. Balancing Requirements for the Hartzell HB-B3MN-3 Series Propeller

- A. Balancing Requirements for the Dynamic Balancing and Functional Test Procedure (Refer to Figure 501).
 - NOTE:** Propeller Dynamic Balance is accomplished by using an accurate means of measuring the amount and location of the imbalance of weight.
 - NOTE:** Aircraft Engine Manufacturers may contain additional information on propeller dynamic balance limits, refer to your engine manufacturers manuals for additional information.
 - (1) Balance the Hartzell HB-B3MN-3 series propellers installed on the Model 208 after all the engine rigging is satisfactorily completed. Refer to Engine Control Rigging - Adjustment and Test.
 - NOTE:** All propellers balanced by this procedure must have logged a minimum of three hours of installed running time to adequately seat the seals and distribute the lubricating grease.
 - NOTE:** The maximum allowable vibration for Hartzell HB-B3MN-3 series propellers is 0.07 IPS. If the vibration value is greater than 2.00 IPS, the propeller must be rejected for excessive unbalance.
 - (2) Make sure to follow the most current revision of the propeller manufacturers dynamic balance instructions and instructions and specifications in this section. Refer to the Introduction, Supplier Publication List, Chapter 61 for the Hartzell Owners Manual 139 contact information.
 - (3) Remove all the dynamic balance weights from the propeller.
 - (4) Remove the propeller shaft oil seal cavity drain plug.
 - (5) Install the adapter and vibration sensor in the propeller shaft oil seal drain port.
 - (6) Position the airplane into the wind and away from buildings and blast fences.
 - NOTE:** Do not balance the propellers when it is raining or when the wind gusts are 5 knots over any prevailing, steady wind.
 - (7) Use the Aces equipment, or equivalent, to dynamically balance the propeller. Refer to the manufacturer manual provided with the equipment for the balancing procedures.

3. Initial Weight Installation

- A. Install the Initial Weight (Refer to Figure 502).
 - (1) Use the propeller balancing equipment to find the initial weight installation location. Refer to the manufacturer manual provided with the equipment for the balancing procedures.
 - (2) Remove the screw from the spinner identified for the initial weight location.
 - NOTE:** For initial weight installation, the weights can be installed on the outside of the spinner. The initial weight installation uses MS24694-XX countersunk screws in the holes located between the nutplates.
 - (3) Find the number of AN960-10 washers necessary to equal the initial correction weight found in the dynamic propeller balancing procedure plus the weight of the MS24694 screw removed from the spinner. Refer to the manufacturer

manual provided with the equipment for the balancing procedures.

- (a) Use the scale listed in the manufacturer manual to weigh the hardware used for the initial weight installation.

NOTE: The total weight of the washers and screw must not exceed 25.5 grams at any one location. If the necessary weight exceeds 25.5 grams, it must be equally distributed between adjacent locations.

- (4) Change the number of washers to adjust for the MS27039-1-XX screw necessary to attach the initial weights on the outside of the spinner.
- (5) Install the MS27039-1-XX screw and AN970-3/AN960-10 washers in the spinner attachment screw hole.
- (6) Use the propeller balancing equipment to find the weight and angle correction. Refer to the manufacturer manual provided with the equipment for the balancing procedures.

4. Final Weight Installation

- A. Install the Final Weight (Refer to Figure 502 and Figure 503).

NOTE: For final weight installation, the spinner must be removed. The final weights are installed on the inner side of the spinner bulkhead. The final weight installation uses MS24694-XX countersunk screws in the holes between the nutplates.

- (1) Remove the MS27039-1-XX screw and washers installed during the initial weight installation.
- (2) Remove the screws and fiber washers from the spinner.
- (3) Put index marks on the spinner and the spinner bulkhead.

NOTE: Index marks are used to make sure the spinner is installed on the spinner bulkhead in its initial position.

- (4) Remove the spinner from the airplane.
- (5) Change the total weight of the removed washers and MS27039-1-XX screw, to adjust for the weight of the removed MS24694 screw, and the attaching MS24694-XX screw and MS21044-N3 nut.
- (6) Install the final weight hardware inside the spinner bulkhead in the countersunk hole nearest to the location found in the weight and angle correction.

NOTE: The total weight of washers, screw and nut must not exceed 25.5 grams at any one location. If the necessary weight exceeds 25.5 grams, it must be equally located between adjacent locations.

- (7) Put the spinner in position against the spinner bulkhead.
- (8) Use the index marks to make sure the spinner is in its initial position.
- (9) Install the screws and fiber washers in the spinner bulkhead.
- (10) After the final installation of the weights, do a test of the propeller balance to make sure the propeller is within permitted balance limits. Refer to the manufacturer manual provided with the equipment for the balancing procedures.
- (11) Remove the adapter and vibration sensor from the propeller shaft oil seal drain port.
- (12) Install the propeller shaft oil seal cavity drain plug.

5. Balancing Requirements for the Hartzell HC-B3TN-3AF Series Propeller

- A. Balancing Requirements for the Dynamic Balancing and Functional Test Procedure (Refer to Figure 501).

NOTE: Propeller Dynamic Balance is accomplished by using an accurate means of measuring the amount and location of the imbalance of weight.

NOTE: Aircraft Engine Manufacturers may contain additional information on propeller dynamic balance limits, refer to your engine manufacturers manuals for additional information.

- (1) Balance the Hartzell HC-B3TN-3AF series propellers installed on the Model 208 after all the engine rigging is satisfactorily completed. Refer to Engine Control Rigging - Adjustment and Test.

NOTE: All propellers balanced by this procedure must have logged a minimum of three hours of installed running time to adequately seat the seals and distribute the lubricating grease.

NOTE: The maximum allowable vibration for Hartzell HC-B3TN-3AF series propellers is 0.07 IPS. If the vibration value is greater than 2.00 IPS, the propeller must be rejected for excessive unbalance.

- (2) Make sure to follow the most current revision of the propeller manufacturers dynamic balance instructions and instructions and specifications in this section. Refer to the Introduction, Supplier Publication List, Chapter 61 for the Hartzell Owners Manual 139 contact information.
- (3) Record the number and location of all balance weights and matchmark spinner dome to spinner bulkhead orientation.
- (4) Lubricate the propeller with Aeroshell 6.
- (5) Use a Stoddard solvent (or equivalent) to completely remove any grease on the blades or inner surface of the spinner dome.
- (6) Remove the propeller shaft oil seal cavity drain plug.
- (7) Install the adapter and vibration sensor in the propeller shaft oil seal drain port.
- (8) Position the airplane into the wind and away from buildings and blast fences.

NOTE: Do not balance the propellers when it is raining or when the wind gusts are 5 knots over any prevailing, steady wind.

- (9) Use the Aces equipment, or equivalent, to dynamically balance the propeller. Refer to the manufacturer manual provided with the equipment for the balancing procedures.

NOTE: Do not take balance measurements at full power. It can cause excessive airframe buffet and produce irregular vibration data. Setting power at approximately 1000 ft-lbs (360 hp @1900 RPM) for balance runs is acceptable on PT6A-140 engine installations.

6. Weight Installation

- A. Use only stainless or plated steel hardware as dynamic balance weights on the spinner bulkhead.
- B. The total weight must not exceed 25.5 grams at any one location. If the necessary weight exceeds 25.5 grams, it must be equally distributed between adjacent locations.

NOTE: This is approximately equal to six AN970-3 washers (0.203 inch ID, 0.875 inch OD, 0.063 inch thickness).

7. Initial Weight Installation

- A. Install the Initial Weight (Refer to Figure 502).
 - (1) Use the propeller balancing equipment to find the initial weight installation location. Refer to the manufacturer manual provided with the equipment for the balancing procedures.
 - (2) Remove the screw from the spinner identified for the initial weight location.

NOTE: For initial weight installation, the weights can be installed on the outside of the spinner. The initial weight installation uses MS24694-XX countersunk screws in the holes located between the nutplates.

- (3) Find the number of washers necessary to equal the initial correction weight found in the dynamic propeller balancing procedure plus the weight of the screw removed from the spinner. Refer to the manufacturer manual provided with the equipment for the balancing procedures.

NOTE: At least one NAS620 or similar reduced outside diameter washer is required, other airworthy #10 washers such as AN960, NAS1149, or S1450 washers may be added to the stack.

- (a) Use the scale listed in the manufacturer manual to weigh the hardware used for the initial weight installation.

NOTE: The total weight of the washers and screw must not exceed 25.5 grams at any one location. If the necessary weight exceeds 25.5 grams, it must be equally distributed between adjacent locations.

- (4) Change the number of washers to adjust for the MS27039-1-XX screw necessary to attach the initial weights on the outside of the spinner.
- (5) Install the MS27039-1-XX screw and washers in the spinner attachment screw hole.
- (6) Use the propeller balancing equipment to find the weight and angle correction. Refer to the manufacturer manual provided with the equipment for the balancing procedures.

8. Final Weight Installation

- A. Install the Final Weight (Refer to Figure 502 and Figure 503).

NOTE: For final weight installation, the spinner must be removed. The final weights are installed on the

inner side of the spinner bulkhead. The final weight installation uses MS24694-XX countersunk screws in the holes between the nutplates.

- (1) Remove the MS27039-1-XX screw and washers installed during the initial weight installation.
- (2) Remove the screws and fiber washers from the spinner.
- (3) Put index marks on the spinner and the spinner bulkhead.

NOTE: Index marks are used to make sure the spinner is installed on the spinner bulkhead in its initial position.

- (4) Remove the spinner from the airplane.
- (5) Change the total weight of the removed washers and MS27039-1-XX screw, to adjust for the weight of the removed MS24694 screw, and the attaching MS24694-XX screw and MS21044-N3 nut.
- (6) Make sure that sufficient reduced diameter washers (NAS620 or similar) are at the bottom of the washer stack to prevent interference with the edge of the washers and the radius of the bulkhead flange.
- (7) Install the final weight hardware inside the spinner bulkhead in the countersunk hole nearest to the location found in the weight and angle correction.

NOTE: The total weight of washers, screw and nut must not exceed 25.5 grams at any one location. If the necessary weight exceeds 25.5 grams, it must be equally located between adjacent locations.

- (8) Balance weight bolts attached to the spinner bulkhead must protrude through the self-locking nuts a minimum of one thread and a maximum of four threads.

NOTE: It may be necessary to alter the number and/or location of the static balance weights in order to achieve dynamic balance.

- (9) If reflective tape is used for dynamic balancing, remove the tape immediately upon completion. Tape that remains on the blade will permit moisture to collect under it, and cause corrosion that can permanently damage the blade.
- (10) Record the number and location of dynamic balance weights and static balance weights, if they have been reconfigured, in the propeller logbook.
- (11) Put the spinner in position against the spinner bulkhead.
- (12) Use the index marks to make sure the spinner is in its initial position.
- (13) Install the screws and fiber washers in the spinner bulkhead.
- (14) After the final installation of the weights, do a test of the propeller balance to make sure the propeller is within permitted balance limits. Refer to the manufacturer manual provided with the equipment for the balancing procedures.
- (15) Remove the adapter and vibration sensor from the propeller shaft oil seal drain port.
- (16) Install the propeller shaft oil seal cavity drain plug.

Figure 501 : Sheet 1 : Vibration Sensor

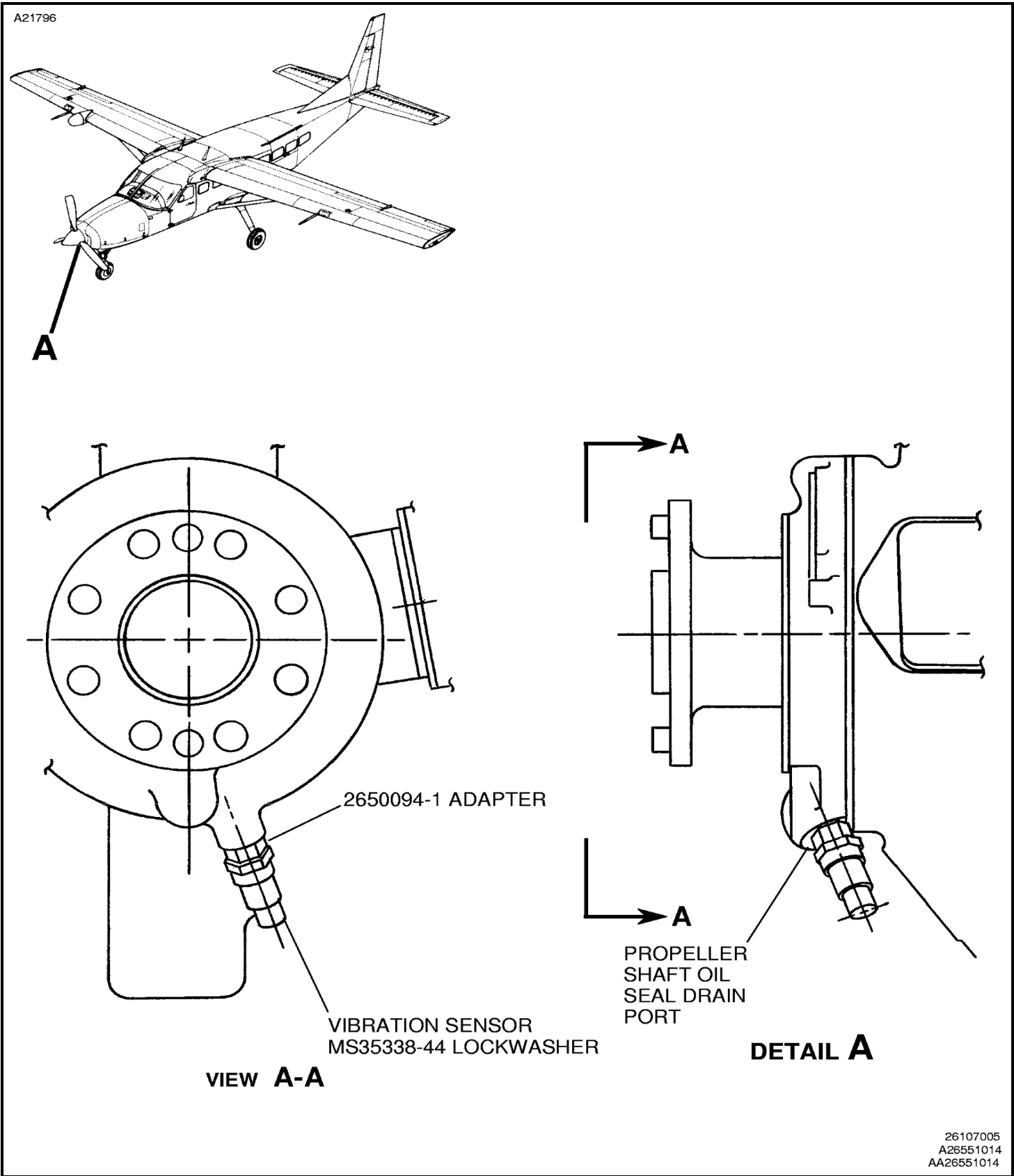


Figure 502 : Sheet 1 : Balance Weight Location

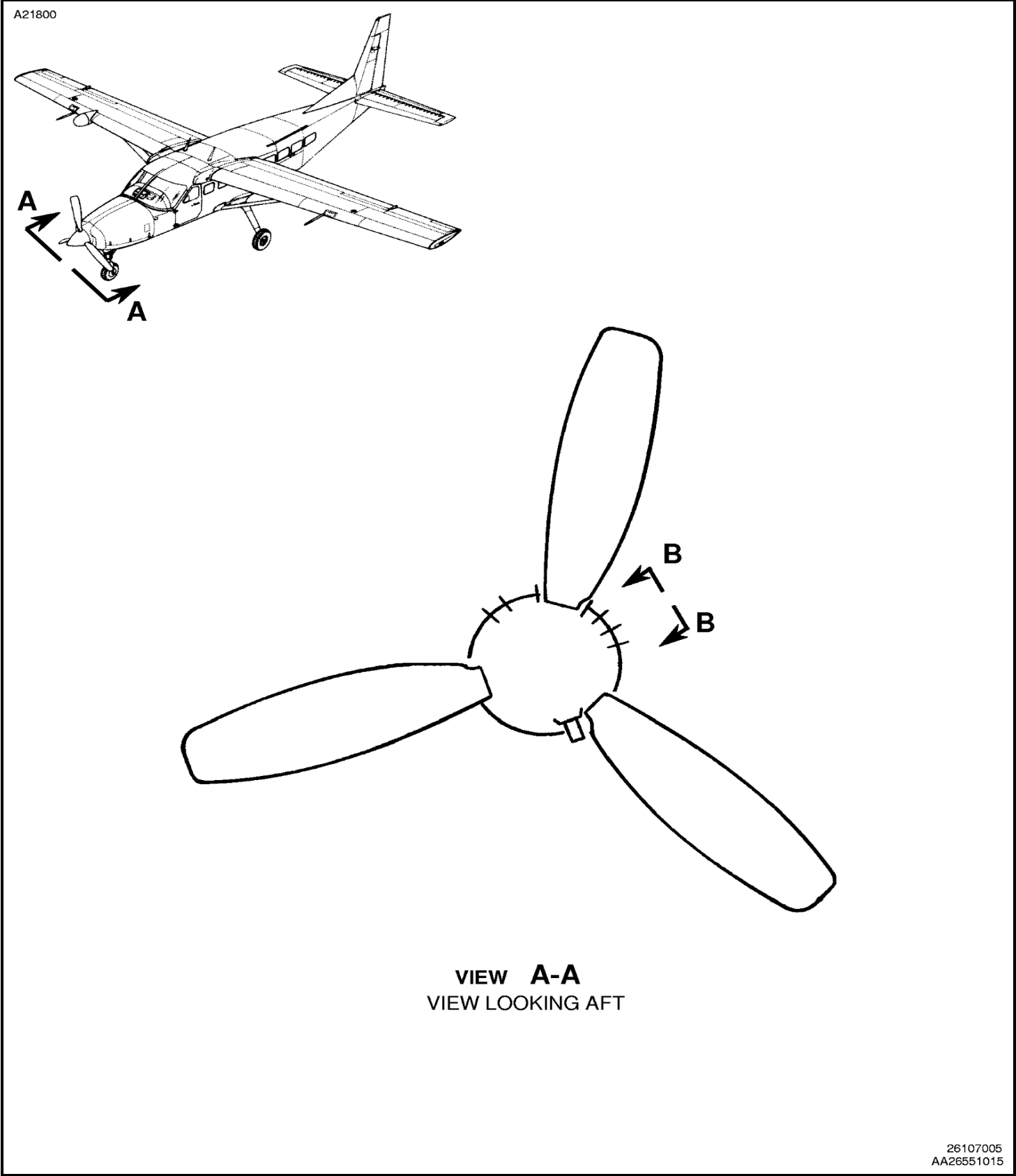
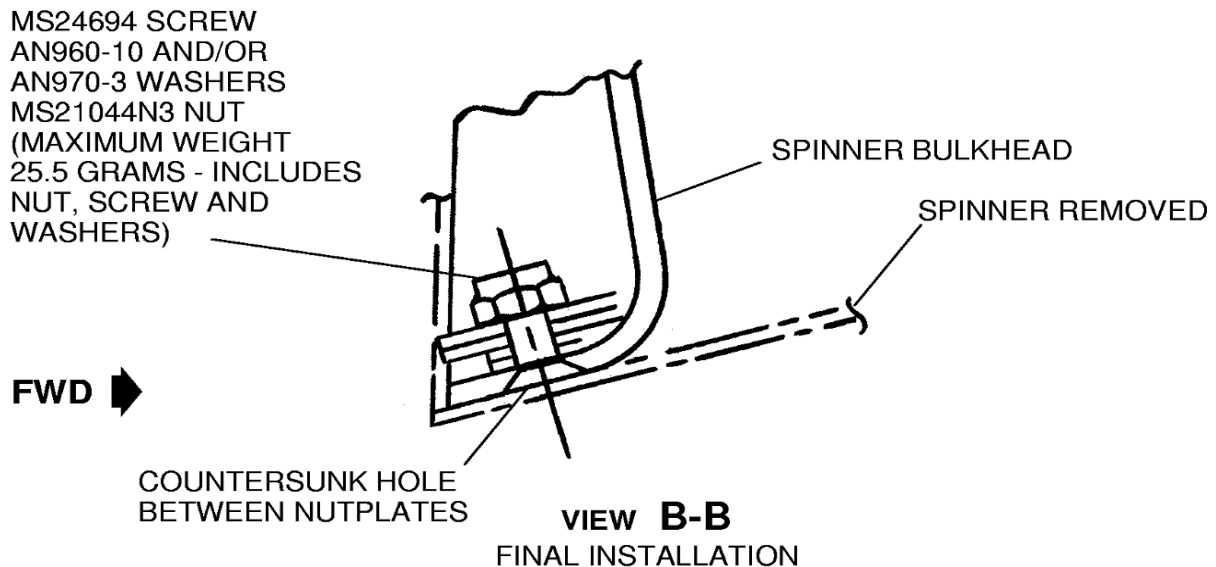
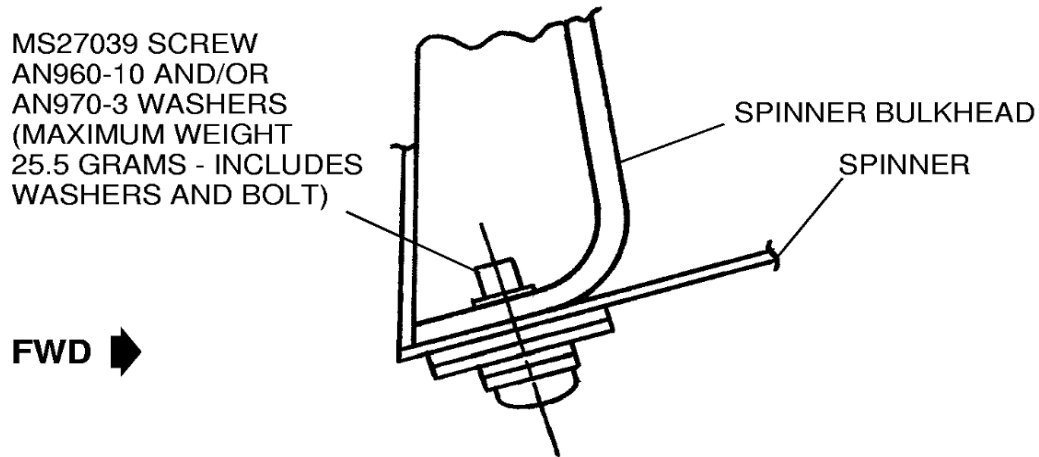


Figure 502 : Sheet 2 : Balance Weight Location

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Figure 503 : Sheet 1 : Hartzell Spinner

