

## ENGINE CONTROL ADJUSTMENT - ADJUSTMENT/TEST (PT6A-140)

### 1. General

- A. This section gives the engine rigging procedures for the PT6A-140 engine. For more engine rigging data refer to, Pratt and Whitney Model PT6A-140 Maintenance Manual found in the List of Publications.

### 2. Low Idle Adjustment

- A. Do the Low Idle Adjustment (Refer to Figure 501).
- (1) Make sure that the adjustments that follow are correct:
    - (a) Power control and condition control. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140).
    - (b) The idle deadband. Refer to Deadband Width Adjustment.
  - (2) Start engine, observing all operating limitations. Refer to Pilot's Operating Handbook and Approved Flight Manual.
    - (a) Operate engine at idle for five minutes, allowing temperatures to stabilize.
    - (b) Advance power lever as required to get between 55.5 and 57 percent  $N_G$ .
  - (3) Position generator switch to ON and adjust electrical load to 40 Amperes.
  - (4) Position BLEED AIR HEAT switch to ON.
  - (5) Rotate CABIN HEAT TEMP control to full HOT.
  - (6) Position fuel condition control lever to LOW IDLE.
  - (7) Position power control lever to IDLE position, forward and against detent gate.
  - (8) If the percent  $N_G$  is not between 55.5 and 56.5 percent  $N_G$ , do the steps that follow:

**NOTE:** The idle speed adjustment is very sensitive. 1/6 of a turn increases or decreases the idle speed by approximately 1%.

- (a) Remove the safety wire from the low idle adjustment screws.
- (b) Loosen the clamping screw.
- (c) To increase idle, loosen the forward idle adjustment screw.
- (d) To decrease idle, loosen the aft idle adjustment screw.

**CAUTION:** Make sure you do not tighten the screw too much or the tang will bend.

- (e) When correctly adjusted, torque the opposing screw to 13 to 16 inch-pounds (1.47 to 1.80 Nm).
- (f) Torque the clamping screw to 32 to 45 inch-pounds (3.62 to 5.08 Nm).
- (g) Safety the screw with wire. Refer to Chapter 20, Safelying - Maintenance Practices

- (9) Shut down engine. Refer to Pilot's Operating Handbook and Approved Airplane Flight Manual.

### 3. High Idle Adjustment

- A. Do the High Idle Adjustment (Refer to Figure 501).

**NOTE:** Low idle adjustment also affects the high idle setting. Adjust the low idle first and make sure that it is correct before you do the high idle adjustments.

- (1) Start engine, observing all operating limitations. Refer to Pilot's Operating Handbook and Approved Airplane Flight Manual.
- (2) Operate at idle for five minutes, allowing temperatures to stabilize.
- (3) Position power control lever to IDLE.
- (4) Position generator to ON and adjust electrical load to 40 Amperes.
- (5) Position BLEED AIR HEAT switch to OFF.
- (6) To adjust the high idle, do the steps that follow:

**NOTE:** One turn of the jam nut changes the high idle speed by approximately 1.5 percent.

- (a) Remove the safety wire from the high idle cam follower jam nuts.
- (b) To increase the high idle, loosen the forward jam nut and tighten the aft jam nut.
- (c) To decrease the high idle, loosen the aft jam nut and tighten the forward jam nut.

- (d) Make sure that the roller is aligned correctly with the cam.
- (e) Torque the jam nuts to 56 to 70 inch-pounds (6.33 to 7.90 Nm).
- (f) Safety the jam nuts with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
- (7) Shut down engine. Refer to Pilot's Operating Handbook and Approved Airplane Flight Manual.

#### 4. Deadband Width Adjustment

- A. Do the Deadband Width Adjustment (Refer to Figure 502).

**NOTE:** There should be a deadband of .15 inch minimum when the power lever is moved forward from the idle position and before  $N_g$  begins to increase.

- (1) Make sure that the power control system rigging is correct. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140).

**NOTE:** Only do this procedure if the forward deadband is set correctly and the reverse deadband width is too long or too short.

- (2) If it is necessary to adjust the deadband width do the applicable steps that follows:

**NOTE:** When you adjust the deadband stop screw, the low idle and high idle must be adjusted again. Refer to Low Idle Adjustment and High Idle Adjustment.

- (a) If it is necessary to increase idle deadband width, turn the deadband stop screw clockwise.
- (b) If it is necessary to decrease idle deadband width, turn the deadband stop screw counterclockwise.
- (3) Check the forward deadband setting and adjust if necessary. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140), Power Lever Deadband Adjustment.
- (4) Make sure the reverse deadband adjustment is set correctly.
- (5) Start the engine and observe all operating limitations. Refer to the Pilot's Operating Handbook and the Approve Airplane flight Manual.
  - (a) Make sure the low idle speed is correct.
  - (b) If necessary, adjust the low idle.
- (6) Shut down the engine and observe all operating limitations. Refer to the Pilot's Operating Handbook and the Approve Airplane flight Manual.

#### 5. Reverse Power Adjustment

- A. Do the Reverse Power Adjustment (Refer to Figure 503).

**NOTE:** When the power lever is slowly moved from idle to reverse, the propeller speed  $N_p$  should increase to a peak and then drop by 10 to 50 rpm before any  $N_g$  increase occurs. The reverse power adjustment screw must be set correctly to achieve this.

- (1) Make sure that the power control system rigging is correct. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140).
- (2) Start engine, observing all operating limitations. Refer to Pilot's Operating Handbook and Approved Airplane Flight Manual.
- (3) Operate engine at IDLE for five minutes, allowing temperatures to stabilize.
- (4) Place propeller speed control lever in MAX forward position.
- (5) Move power control lever from IDLE, then slowly aft to REVERSE position.
  - (a) Make sure that the propeller rpm increases to peak, then decreases 10 RPM to 50 RPM before gas generator  $N_g$  begins increasing from idle.
- (6) If  $N_p$  pickup drops more than 10 to 50 RPM as the lever is moved back, correct the reverse power adjustment as follows:
  - (a) Cut and remove the safety wire on the beta valve jam nut.
  - (b) Adjust the beta valve clockwise or counterclockwise to get a minimum torque at MAX REVERSE of 900 foot-pounds (1220.23 Nm).
  - (c) If a large adjustment is necessary:
    - 1 At the beta cable terminal end, remove and discard the cotter pin.

- 2 Remove the nut and washers that attach the cable end to the reversing cam.
  - 3 Move the beta terminal end down one hole in the reversing cam.
  - 4 Install the nut and washers that attach the cable end to the reversing cam.
  - 5 Install a new cotter pin in the terminal end nut.
- (7) If  $N_g$  pickup increases before  $N_p$  has dropped 10 to 50 RPM as the lever is moved back, correct the reverse power adjustment as follows:
- (a) Cut and remove the safety wire on the beta valve jam nut.
  - (b) Adjust the beta valve clockwise or counterclockwise to get a MAX REVERSE minimum torque of 900 foot-pounds (1220.23 Nm).
  - (c) If a large adjustment is necessary:
    - 1 At the beta cable terminal end, remove and discard the cotter pin.
    - 2 Remove the nut and washers that attach the cable end to the reversing cam.
    - 3 Move the beta terminal end up one hole in the reversing cam.
    - 4 Install the nut and washers that attach the cable end to the reversing cam.
    - 5 Install a new cotter pin in the terminal end nut.
- (8) Make sure at MAX REVERSE there is a minimum torque of 900 foot-pounds (1220.23 Nm).
- (9) Shut down the engine. Refer to Pilot's Operating Handbook and Approved Flight Manual.

## 6. Maximum Propeller RPM Adjustment

- A. Do the Maximum Propeller RPM Adjustment (Refer to Figure 503).

**NOTE:** The maximum propeller speed must be 1900 +10 rpm or -10 rpm. You can adjust the maximum propeller rpm stop to get the correct speed. Due to the sensitivity of the G1000 EICAS, propeller rpm must be adjusted to minimize warning indications for a normal flight.

- (1) Make sure that the propeller is rigged correctly. Also make sure that the MAX RPM stop on the governor is contacted when cockpit lever is in MAX position. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140), Propeller Speed Control Lever Adjustment.
- (2) Start engine, observing all operating limitations. Refer to Pilot's Operating Handbook and Approved Airplane Flight Manual.
- (3) Operate engine at IDLE for five minutes, allowing temperatures to stabilize.
- (4) Place propeller speed control lever in MAX forward position.
  - (a) Make sure that the propeller rpm does not exceed 1900 +10 rpm or -10 rpm.
- (5) If the propeller rpm needs adjustment do the steps that follow:
 

**NOTE:** One turn will cause approximately 5 to 25 rpm of change.

  - (a) Turn the propeller governor MAX RPM stop clockwise to decrease the maximum propeller rpm.
  - (b) Turn the propeller governor MAX RPM stop counterclockwise to increase the maximum propeller rpm.
- (6) Shut down the engine. Refer to the Pilot's Operating Handbook and Approved Flight Manual.

## 7. Propeller Control Lever Adjustment

- A. Make sure that the propeller control lever is adjusted correctly. If necessary, adjust the propeller control lever. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140), Propeller Speed Control Lever Adjustment.

**NOTE:** When the cockpit propeller control lever is moved back toward feather, it should be approximately one-half lever width over the detent before the propeller feathers.

## 8. Fuel Condition Control Lever Adjustment

- A. Do the Fuel Condition Control Lever Adjustment

- (1) Make sure the fuel control system is rigged correctly. If necessary, adjust the fuel control system. Refer to Engine Controls Rigging - Adjustment/Test (PT6A-140), Fuel Condition Lever Adjustment.

## 9. Beta Switch Adjustment

**NOTE:** Continue with these procedures only if the beta system is installed on airplane you are servicing.

A. Do the Beta Switch Adjustment

- (1) Refer to Chapter 61 Propeller Beta Indicating System - Maintenance Practices, Adjustment/Test.

Figure 501 : Sheet 1 : Low and High Idle Adjustment

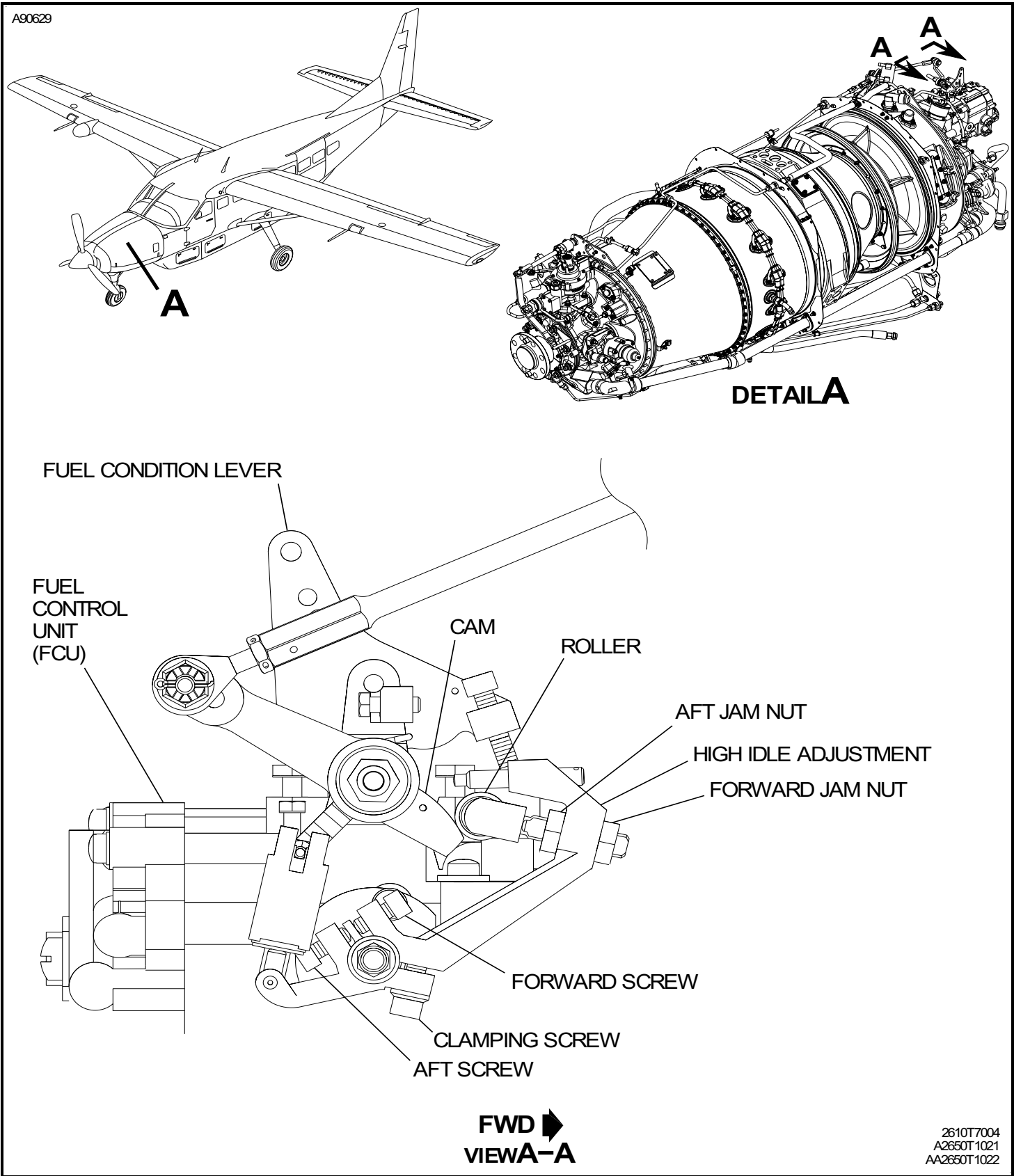


Figure 502 : Sheet 1 : Deadband Width Adjustment

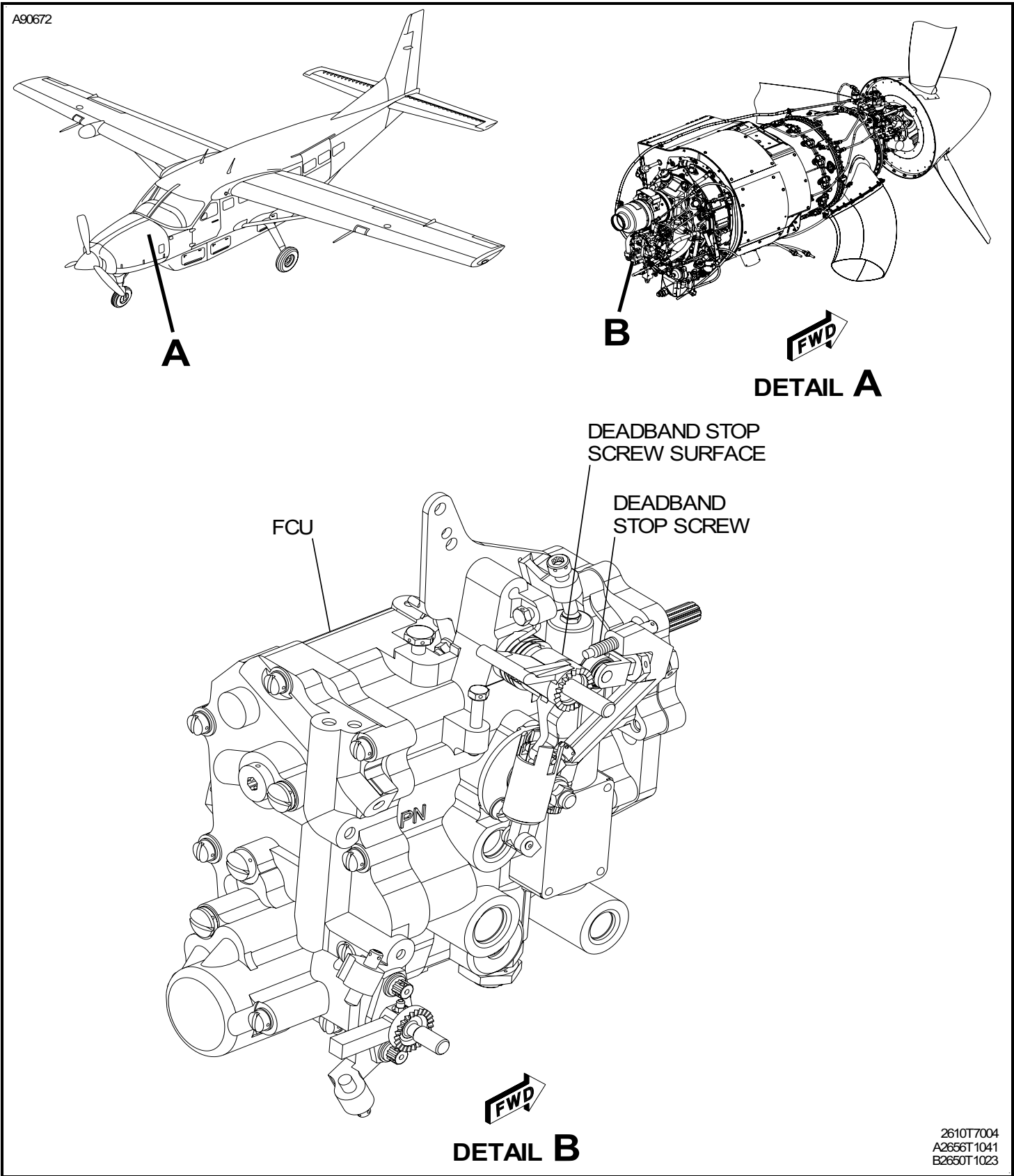


Figure 503 : Sheet 1 : Ng Pickup Adjustment

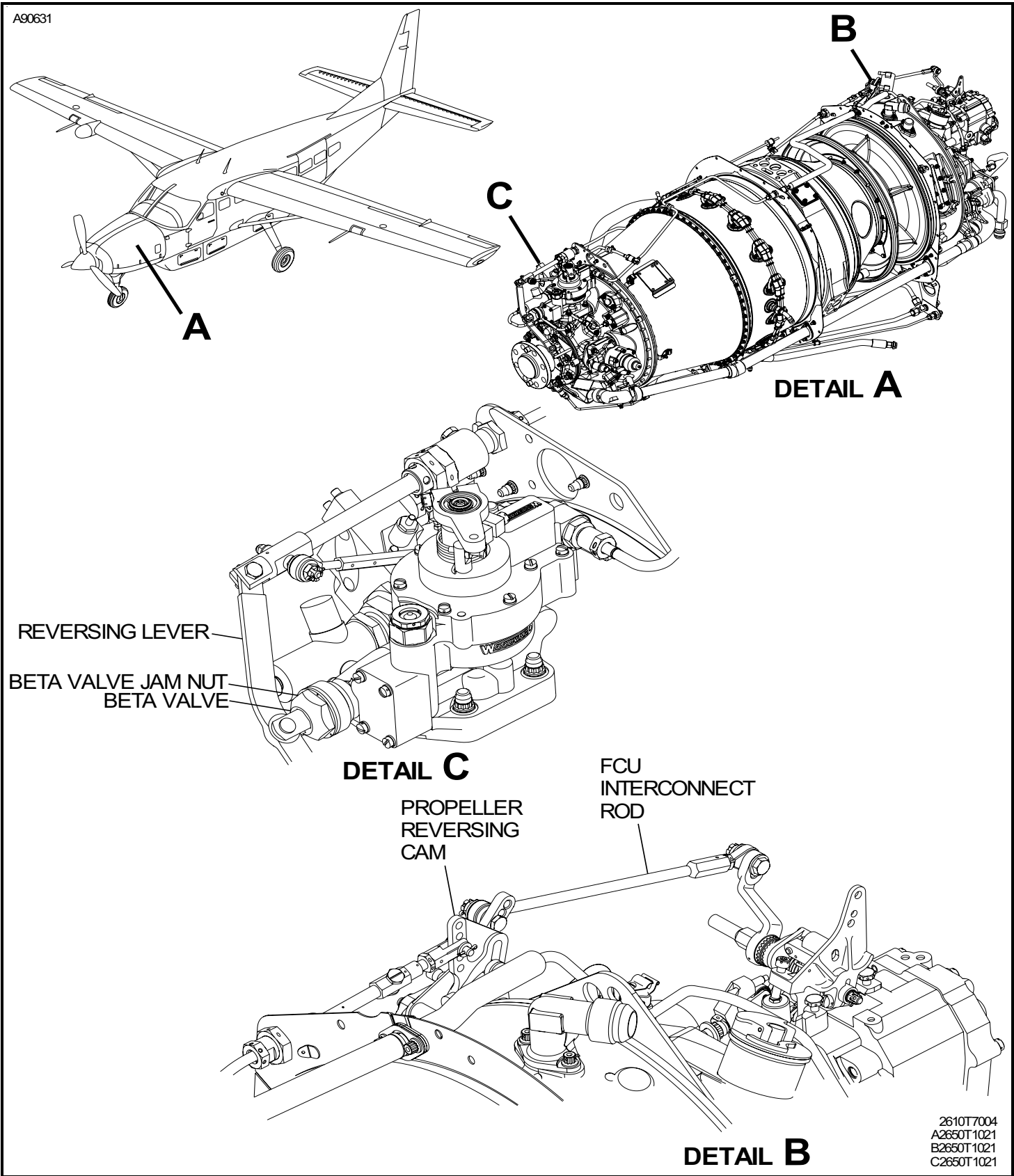


Figure 504 : Sheet 1 : Maximum RPM Adjustment

