

McRaney

TPE-331

Suggested engine controls rigging and operational checkout procedures.

VOLPAR TURBO BTCH
TURBO PORTER PC6/C - H2

Forward

Information contained herein describes rigging and operational check out procedures to be used on both the VOLPAR BTCH and TURBO-PORTER aircraft. Special attention should be given to assure that only the values specified for the given aircraft are used. In brief - When rigging or performing an operational checkout on a VOLPAR BTCH, use only that information specified for that specific aircraft.

I. Aircraft Controls Check

- A. Move the speed control to the high RPM position and assure that both propeller governor and underspeed fuel governor high speed stops are making positive contact with their respective adjustable stops.
- B. Move the speed control to the low RPM position and assure that both propeller governor and under speed fuel governor low speed stops are making positive contact with their respective adjustable stops.

NOTE

Do not attempt to adjust stops or engine linkage until engine had been run. However, if the aircraft rigging, linkage, or stops in the cockpit quadrant prevent the engine controls from contacting their respective stops, correct this problem before proceeding.

- C. Retard power lever to the full reverse position. Verify that rigging pins can be inserted through holes in the arms of the propeller pitch servo and manual fuel valve and into the reverse slots of their respective rigging plates.
- D. Advance the power lever to the maximum power position. Verify that both the propeller pitch control and manual fuel valve are at their maximum positions.
- E. Move the power lever rapidly back to the flight idle position. Verify that rigging pins can be inserted through holes in the arms of the propeller pitch servo and manual fuel valve and into the flight idle slots of their respective rigging plates.

IMPORTANT

Power lever adjustment at the flight idle position considered to be critical. Careful attention should be given to adjusting the power lever control system so that the flight idle rig pin position is exactly aligned when the power lever is placed against the flight idle stop in the cockpit. In the case of the VOLPAR, particular attention should be given to exact alignment of both power levers at the flight idle position and matched alignment of the respective rig pin positions.

(2)

- F. Slowly move the levers (VOLPAR) or "T-Handle" (PORTER) which shuts down the engine and feathers the propeller. Continue moving towards the emergency shutdown position and observe that the main fuel shut-off valve arm moves to the "manual off" position prior to the actuation of the propeller feathering valve. Return the control to its normal position and observe that the manual fuel valve arm moves back to its normal position.

II. Propeller Transfer (BETA) Tube adjustment.

- A. The propeller should be installed and its blades left in the full feather position.
- B. Install the beta tube carefully, assuring that the tube enters the propeller servo sleeve smoothly and without binding or sticking. Screw threaded portion of tube into tube adapter until end is flush with adapter.
- C. Locate the reference station mark on the propeller blades at the 30-inch radius from the hub.
- D. Zero the propeller protractor on the flat of the propeller dome assembly and lock outer scale.

CAUTION

Do not attempt to zero the propeller protractor and/or make propeller blade angle adjustments unless aircraft is out of the wing and personnel traffic into or out of the aircraft is minimized.

- E. Measure the full feather blade angle at the number one blade 30-inch station mark. This blade angle should be: VOLPAR BFECH $86.5^{\circ} \pm .5^{\circ}$
TURBO-PORTER $86.5^{\circ} \pm .5^{\circ}$
- F. Advance the power lever to the maximum power position, then pull it back sharply against the flight idle stop.
- G. Insert rig pin through the manual fuel valve arm into its rigging plate flight dial slot.
- H. Actuate the propeller unfeathering pump. When the propeller blades cease rotation, and with the unfeathering pump operating, measure the blade angle of the number one blade at the reference station mark. When the blade angle has been measured, de-energize the unfeathering pump. This blade angle should be: VOLPAR BFECH $11.7^{\circ} \pm .5^{\circ}$
TURBO-PORTER $5^{\circ} \pm .5^{\circ}$

NOTE

The propeller oil transfer tube (beta tube) may be turned in (CW) or out (CCW) as required to decrease or increase propeller blade angles respectively. One full turn of the tube will change propeller blade angles approximately 2° . Secure beta tube after adjustment.

(3)

- I. Remove rigging pin from manual fuel valve arm.
- J. Raise power lever and retard to full reverse position.
- K. Insert rig pin through manual fuel valve arm into reverse slot in rigging plate.
- L. Energize and leave propeller unfeathering pump on until the blade angle of number one blade is measured - This blade angle should be:

VOLPAR BITCH -9.5°

TURBO-PORTER $-9.5 \pm .5^{\circ}$

NOTE

If unfeathering pump runs out of oil during these checks, pull propeller through by hand or motorize engine with the starter to scavenge oil from engine gear box and return it to the oil tank.

- M. Remove rig pin from manual fuel valve arm.
- N. Advance power lever forward of the flight idle position to ensure that propeller start locks are engaged.
- O. Measure propeller blade angles on all blades and mark each blade with its respective angle. If blade angle on start lock of any blade exceeds the specified tolerance, adjust the start lock for that blade/ blades. The start lock blade angle should be:

VOLPAR BITCH $3.25^{\circ} \pm .25^{\circ}$

TURBO-PORTER $2^{\circ} \pm .25^{\circ}$

NOTE

The start lock blade angle is critical. Excessive deviation from prescribed blade angle will cause hot starts. Gross difference in respective blade angles will result in excessive engine vibration during start cycle.

III. Engine Operational Checkout

- A. Using an authorized check list, start engines in accordance with the airframe manufacturers recommendations.
- B. Operate engine until oil temperature reached the normal operating range.
- C. Overspeed Governor Check

Slowly advance the power lever toward the maximum or take off position, while closely observing engine RPM. When the overspeed governor setting is reached, the engine speed will not increase with further movement of the power lever. **UNDER NO CIRCUMSTANCES SHOULD THE ENGINE RPM BE ALLOWED TO EXCEED 105%.** Engine RPM should stabilize between 102% - 104%.

NOTE

If the overspeed fuel governor does not operate within the above limits, shutdown the engine and adjust the overspeed governor before continuing with engine operational checkout. Turning the overspeed adjustment screw in will increase engine RPM - Turning the screw out will decrease RPM.

D. Disengaging Propeller Start Locks

Move the speed control to the high RPM Position, then move the power lever slowly towards reverse, observing the beta light. If the beta light goes out, stop movement of the power lever until the beta light re-illuminates, then move the power lever slowly towards reverse until 20 psi torque is indicated. Move the power lever back to the start position.

E. Propeller governor Check - High RPM

Move the speed control the high RPM position, then slowly advance the power lever towards the take off position. The beta light will go out and engine RPM should stabilize at:

VOLPAR EFFCH 100% - 101%
TURBO-PORTER 100% - 101%

NOTE

If the propeller governor does not control engine RPM within the limits specified above, adjust the high speed stop on the propeller governor. Turning the adjustable stop screw in will reduce engine RPM - Turning the screw out will increase RPM. Recheck rigging between propeller governor and underspeed governor for proper operation after adjustment of propeller governor stop.

F. Propeller Governor Check - Low RPM

1. With the power lever remaining in the same position as stated in the previous check, move the speed control slowly toward low RPM. Engine speed should stabilize at: VOLPAR EFFCH 96% - 96.5%
TURBO-PORTER 96% - 96.5%
2. Repeat the above step and stop moving the speed control as soon as the specified RPM is indicated. Move power lever rapidly back to the flight idle position. Engine speed should now stabilize at:
VOLPAR EFFCH 92.5% - 93.5%
TURBO PORTER 92.5% - 93.5%

NOTE

If the propeller governor does not control engine RPM within the limits specified in paragraph F-1 above, adjust the low speed stop on the propeller governor. Turning the adjustable stop screw in will increase engine RPM - Turning the screw out will decrease RPM. Recheck rigging between propeller governor and underspeed governor for proper operation after adjustment of the propeller governor stop.

3. If the engine RPM does not fall within the limits specified in paragraph F-2 above, and adjustment of the propeller governor lever length screw and inter connecting link to the lower end of the concentric shaft will be required. If engine RPM is higher than the specified limits, lighten the propeller governor lever length adjustment screw and shorten the inter connect link. If RPM is too low, reverse the procedure. Refer to maintenance manual for illustration of components.

G. Underspeed Governor Check - High RPM

Move the speed control to the high RPM position. Move the power lever slowly towards reverse, observing fuel flow indication. When minimum fuel flow is indicated, tighten friction lock on power lever. RPM should stabilize at:

VOLPAR BEECH	97% - 97.5%
TURBO PORTER	96% - 96.5%

NOTE

If engine RPM does not stabilize within the limits specified above, adjust the maximum stop on the underspeed governor. Turning the adjustment screw in will reduce engine RPM - Turning the screw out will increase RPM. Recheck rigging between underspeed governor and propeller governor for proper operation after adjusting the underspeed governor.

H. Underspeed Governor - Low RPM

With the power lever remaining in the same position as in the previous check, move the speed control to the low RPM position. Engine RPM should stabilize at:

VOLPAR BEECH	85% - 86%
TURBO PORTER	85% - 86%

NOTE:

If engine RPM does not stabilize within the limits specified above, adjust the minimum stop on the underspeed governor. Turning the adjustment screw in will increase engine RPM - Turning the screw out will reduce RPM. Recheck rigging between underspeed governor and propeller governor after adjustment of the underspeed governor.

I. Flight Idle Check - High RPM

Move the speed control to the high RPM position, then advance the power lever until the beta light goes out. Move the power lever rapidly back to the flight idle position. Engine RPM should stabilize at:

VOLPAR BEECH	97% - 97.5%
TURBO PORTER	96% - 96.5%

NOTE

The stabilized engine RPM should be identical to that specified in paragraph "G" above.

J. Flight Idle Check - Low RPM

Move the speed control to low RPM and advance the power lever slowly until engine speed reaches approximately 95% RPM. Retard the power lever rapidly to the flight idle position. Engine RPM should stabilize at:

VOLPAR BEECH	88% - 88.5%
TURBO PORTER	87% - 88%

Important: Both engines on the VOLPAR BEECH must stabilize at the same, exact RPM on this check.

NOTE

If correct engine RPM is not obtained in the above check, an adjustment of the flight idle fuel flow will be required. To adjust, remove plug in rear cover of fuel control and insert special tool. Turn adjustment screw in 1/8 turn increments. Turning the adjustment screw in will increase engine RPM. Turning the screw out will decrease RPM.

K. Reverse Power Check - High RPM

Move the speed control to the high RPM position. Move power lever towards the full reverse position and monitor engine RPM. In the full reverse position, engine RPM and torque should be:

VOLPAR BEECH	95% minimum
TORQUE	25 PSI minimum

TURBO PORTER	94% minimum
TORQUE	40 PSI minimum

NOTE

If engine RPM drops below the specified limits in the above check, recheck flight idle propeller blade angle and repeat the check outlined in paragraph "G" above.

L. Flame - Out Check

Move the speed control to high RPM position and the power lever to the flight idle position. Move the speed control rapidly (1 second) to the low RPM position. Engine should not flameout.

NOTE

If engine flames out during the above check, notify an Airsearch Tech. Rep. or change the fuel control.