High Pressure Settings.

a. After adequate engine warm-up, with oil temperature at upper third of green arc, accelerate the engine gradually to maximum RPM. Manifold pressure at maximum RPM should be 36.0 +0.5 in. Hg. (414-0001 to 414-0801), 38.0 ∓0.5 in. Hg. (414-0801 and On).

CAUTION

DISCONTINUE ACCELERATION IF MANIFOLD PRESSURE EXCEEDS 38 IN. HG. (414-0001 TO 414-0801), 40.0 IN. HG. (414-0801 AND ON).

h. If maximum manifold pressure does not conform with the limits defined above, reduce power to idle, and loosen the high setting screw locknut. Hold the screw while loosening the locknut to prevent change of setting.

c. During adjusting, the fork and pin arrangement should displace in the direction of the markings stamped at the edge of the cam arm, UP to increase manifold pressure, and DN to decrease manifold pressure. Approximately one turn of the adjusting screw should provide a 1-inch Hg. variation of manifold pressure.

d. Repeat adjustments as required to obtain a setting within the limits specified in step c with the high setting screw locknut properly tightened. Shut down engine.

Low Pressure Setting.

a. Align the index marks on the side of the cam arm and edge of cast bearing support by moving the engine throttle lever. Tighten the control quadrant friction knob to prevent control movement.

b. Loosen the low pressure setting screw locknut and adjust the screw so that the cam needle bearing just starts to contact the cam follower. This can best be determined by rotating the needle bearing with the fingers to detect the point of initial drag. Tighten the low setting screw locknut.

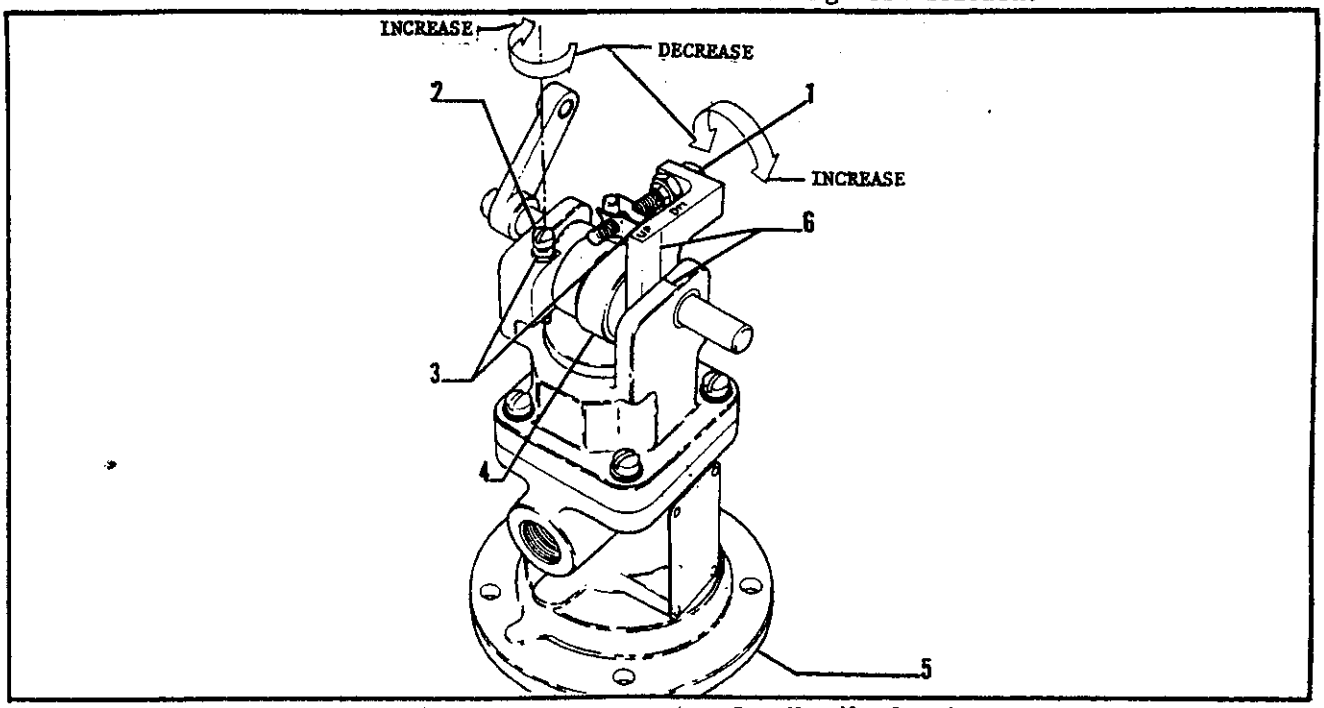
Low Pressure Setting and Cam Angle Verification Procedure.

In order to establish an adequate low pressure adjustment, the following concurrent ground and flight tests must be conducted.

a. Ground Test.

After completion of the adjustment defined by the high pressure setting and low pressure setting, connect a standard dual manifold pressure gauge to the test ports provided at the corresponding compressor discharge connections of the fuel flow gauge. This test gauge provides compressor discharge pressure readings required on the following verification tests:

1. Start the engine and after adequate warm-up, adjust the propeller control to maintain a constant 2250 RPM during the following verification.



1. High Pressure Setting Adjustment
2. Low Pressure Setting Adjustment
3. Locknut
4. Cam Needle Bearing
5. Variable Absolute Pressure Controller
6. Low Pressure Setting Reference Marks

Figure 9-19. Controller Adjustments

2. With the manifold pressure setting at 29.0 inch Hg., the compressor discharge pressure should read 32.0 to 32.5 inch Hg.

NOTE

To attain the above manifold pressure settings, it will be necessary to adjust the throttle control along with the propeller control.

4. (See Figure 9-19.) To increase compressor discharge pressure, loosen the low pressure setting screw locknut and turn screw clockwise as shown. To decrease compressor discharge pressure, the reverse process should be adopted. Tighten locknut holding adjusting screw stationary after adjustment.

b. Flight Check.

1. The dual pressure test gauge must be connected to the right and left compressor discharge pressure connections at the fuel flow gauge test ports during the flight tests.

2. Flight verification for the low pressure adjustment to be conducted at a pressure altitude of 12,000 feet and at 2450 RPM. Adjust the throttle to a manifold pressure of 23.0 inch Hg., and the corresponding compressor discharge pressure should be 31.8 ±.3 inch Hg.

3. After low setting flight verification is complete, remove compressor discharge pressure test gauge and reinstall caps.

Removal of Waste Gate and Actuator (See Figure 9-14).

NOTE

The waste gate and actuator are considered as a matched set and must be removed and replaced as sets.

a. Remove upper cowl in accordance with removal procedures.

b. Loosen clamp and remove exhaust overboard pipe.

c. (See Figure 9-12.) Disconnect drain line (21) and oil lines (16) and (17).

d. Loosen tailpipe clamp from exhaust wye and remove waste gate, actuator and tailpipe as an assembly.

e. Disassemble waste gate from tailpipe by removing eight nuts and bolts.

Installation of Waste Gate Actuator (See Figure 9-14).

a. Before installation of waste gate and actuator, check adjustments in accordance with adjustment procedures in Turbocharger and Controls Service/Parts manual, Section 3.

b. Attach waste gate to tailpipe using eight bolts and nuts.

NOTE

Apply Fel-Pro C-5, or equivalent, on all bolts in extreme high heat area.

c. Install tailpipe, waste gate and actuator as an assembly and secure with clamp to exhaust wye.

NOTE

See Figure 9-18 for torque value of clamps.

d. Connect oil lines (16 and 17) and drain line (21).

e. Connect overboard exhaust pipe to turbocharger.

f. Refer to Section 2 and make inspection check.

Adjustment of Waste Gate and Actuator.

a. See Garrett AiResearch Turbocharger and Controls Service/Parts Manual.

Turbocharger Operational Flight Check Procedure.

The flight check procedure details the method of checking the turbocharger and variable absolute pressure controller. This procedure is to be used for airplanes suspected of improper turbocharger operation in order for the discrepancy to be correctly diagnosed. To aid in recording the necessary flight readings, a sample form, as shown in Figure 9-21, is provided. This sample form, or one with similar content, should be used in conjunction with the flight check procedure. To determine at which conditions bootstrapping is most likely to occur, refer to the Bootstrapping Tolerance Chart in Figure 9-20.

NOTE

Bootstrapping check must be accomplished at 23,000 feet, and manifold pressure of 30 in. Hg.

1. TAKEOFF - VARIABLE ABSOLUTE CONTROLLER.
   a. Cowl flaps - open.
   b. Airspeed - 91 KIAS.
   c. Oil temperature - upper 1/3 of green arc.
   d. RPM 2700 ±25 RPM.
   e. Fuel flow - full rich.
   f. Full Throttle M.P. - 36.0 ±0.5 in. Hg. (414-0001 to 414-0801), 38.0 ±0.5 in. Hg. (414-0801 and On).

2. CLIMB - VARIABLE ABSOLUTE CONTROLLER.
   a. Cowl flaps - open.
   b. Airspeed - 109 KIAS.
   c. Pressure altitude - 20,000 feet.
   d. RPM - 2700 ±25 RPM.
   e. Fuel flow - full rich.
   f. Maximum M.P. - 36.0 +0.5 in. Hg. (414-0001 to 414-0801), 38.0 ±0.5 in. Hg. (414-0801 and On).
3. CRUISE - MANIFOLD PRESSURE RELIEF VALVE.
   a. Cowl flaps - closed.
   b. Airspeed - level flight.
   c. Pressure altitude - 20,000 feet.
   d. RPM - 2700 ±25 RPM.
   e. Fuel flow - full rich.
   f. Throttle (one engine at a time).
      (1) Idle until M.P. stabilizes.
      (2) Rapidly advance to full throttle.
      (3) Engine should not overboost by more than 2.0 in. Hg.
4. CRUISE - BOOTSTRAPPING DETERMINATION.
   a. Cowl flaps - closed.
   b. Airspeed - level flight.
   c. Pressure altitude - 23,000 feet.
   d. RPM - 2450 RPM.
   e. Fuel flow - lean.
   f. Throttle - 30.0 in. Hg.
   g. Prop control (one engine at a time).
      (1) Slowly decrease RPM until M.P. drop indicates waste gate is closed.
      (2) The M.P., RPM, OAT and Hp at the instant of waste gate closing should be recorded.
      (3) The actual power being developed is shown in Figure 9-20.
   h. RPM - Increase 50 RPM.
   i. Mixture - normal lean.
   j. Engine should not bootstrap.

MANIFOLD PRESSURE RELIEF VALVE.

A manifold pressure relief valve is provided to prevent engine damage from excessive intake manifold pressure. On the left engine, it is mounted in a vertical position to the throttle body extension. On the right engine, it is mounted horizontal to the end of the throttle body. The nonadjustable manifold pressure relief valve will be actuated if the compressor discharge pressure exceeds 39.5 in. Hg. (414-0001 to 414-0801), 41.5 in. Hg. (414-0801 and On).

Removal of the Manifold Pressure Relief Valve (See figure 9-22).

a. Remove engine cowl in accordance with the removal procedure.
b. Remove bolts (5) attaching manifold pressure relief valve (1) to throttle body adapter pad (3) or throttle body extension adapter pad (7) and remove manifold pressure relief valve (1) with O-ring (6).

Adjustment of the Manifold Pressure Relief Valve.

For adjustment of the manifold pressure relief valve, refer to the Cessna Turbocharger and Controls Service/Parts Manual.

Installation of the Manifold Pressure Relief Valve.

a. Install the manifold pressure relief valve by reversing the removal procedure.

CAUTION

Be sure that O-ring remains in groove on relief valve when installing to adapter pad.

Troubleshooting Turbocharger Induction System.

TROUBLE	PROBABLE CAUSE	CORRECTION
AIRPLANE PERSISTENT BOOTSTRAPPING	Induction system leaks.	Check for loose hose connections, delaminated flexible induction elbows, damaged intercooler seals and other similar sources of air leakage.
	Improper pressurization bleed venturi.	Disconnect venturi at throat end, check to ensure that throat diameter does not exceed 0.570 inches. If so, replace venturi.
	Improper or defective intake manifold drain valves.	Verify that 1H19-5 manifold drain valves are installed. If wrong part number, replace drain valves. If correct valve is installed, ensure drain valves are closing at pressures higher than one inch of mercury above ambient pressure.