

ATCD PARTNERSHIP

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR THE

TURBOPLUS INTERCOOLER SYSTEM PA28-9000

ON

PIPER TURBOCHARGED PIPER ARROW

PA-28-201T

PA-28R-201T

PA-28RT-201T

The information in this document is FAA approved material which, together with the basic Piper PA28 Airplane Flight Manual is applicable and must be carried with the basic manual when the airplane is modified by the installation of a Turboplus induction air intercooler system on Continental TS10-360 engines in accordance with Turboplus, Inc. Installation Instructions No: PA-28-9000-1-AD as specified in Supplemental Type Certificate SA2145NM.

The information in this document supercedes the FAA Approved Airplane Flight Manual only where covered in the items contained herein.

FAA Approved


H.E. Waterman
Manager, Seattle Aircraft
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I. OPERATING LIMITATIONS

Engine: Continental TSIO-360-FB(C)

Fuel: 100/130 Aviation grade fuel (prior to Serial 28R-8031031).

Engine * For 5 minute take-off 2800 RPM and 40.0 in.
Limits Hg. MAP (220 HP) Sea Level to 16,000 feet
Altitude.

For maximum continuous operation 2600 RPM and 40.0 in. Hg MAP (200 HP) Sea Level to 16,000 feet altitude.

NOTE: * INTERCOOLER OPERATION - To maintain constant power within the above limits, correct M.P. in accordance with the operating procedures of Section II of this AFM.

II. NORMAL OPERATING PROCEDURES

There are three contributing factors to engine damage on turbo-charged engines over which the pilot has control: DETONATION, SHOCK COOLING and LOW M.P./HIGH R.P.M. OPERATION.

DETONATION is caused by excessive heat and pressure in the combustion chamber. This can be the result of overboosting, mixture too lean, operating the engine in a warm environment, or any combination of the above.

One of the main causes of detonation is high inlet air temperature due to inlet air compression by the turbocharger. This problem is greatly reduced by INTERCOOLING. AT ANY ENGINE POWER, AN INTERCOOLER REDUCES ALL ENGINE OPERATING TEMPERATURES. (Inlet Air, Cylinder Heads, Pistons, Valves, Oil, EGT and CDT).

This Intercooler installation incorporates an "Engine Air Cooling Gauge" (mounted in view of the pilot). The gauge indicates three Intercooler temperatures; "IN", "DIFFERENTIAL", and "OUT". "DIFFERENTIAL" is the temperature drop across the Intercooler and it indicates the amount of Manifold pressure reduction from chart. "IN" and "OUT" temperatures can be used to trouble shoot turbo-charger and induction system problems.

To achieve the desired H.P. the following procedures should be followed:

. TAKE OFF POWER

The Intercooled charge air, being more dense, results in more Fuel being burned and thus more H.P. for a given Manifold Pressure and R.P.M. Therefore, for takeoff it is necessary to set the Manifold Pressure below red line so as not to exceed the rated engine H.P.

• **POWER SETTING AND LEAN PROCEDURES**

I To calculate the correct Manifold Pressure for takeoff rated H.P., make the following adjustments below red line Manifold Pressure:

1. Set the Engine Air Cooling Gauge switch in the middle position (Diff). Anticipate 30 degrees C of cooling during takeoff. Subtract 2" from red line Manifold Pressure (1" Manifold Pressure for every 15 degrees of cooling).
2. For every 15°C / 27°F below standard outside air temperature subtract 1" Manifold Pressure.
- For every 15°C/27°F above standard outside air temperature add 1" Manifold Pressure.

By anticipating and reducing Manifold Pressure 2" for 30°C Intercooling on takeoff roll and adjusting for OAT above or below standard, rated H.P. will be achieved.

• **MANAGEMENT OF THROTTLE DURING TAKEOFF**

Slowly move throttle to calculated Manifold Pressure. After arriving at the calculated Manifold Pressure make any fine adjustments necessary for any variance from 30 degrees C., or increase Manifold Pressure, if cooling is less than 30 degrees C. (1" for every 15°C/27°F).

MAX CONTINUOUS (200HP) Adjust maximum allowable M.P. the same as described above for takeoff, adjust Piper chart M.P. values for degrees of cooling. 1" M.P. per 15 degrees C.

- **CLIMB AND CRUISE:** Obtain M.P. for desired H.P. from Piper Power Setting Tables, then reduce M.P. approximately 1% for every 6°C/11°F of intercooling. (See Power Setting Table in Pilots Operating Handbook).

LEAN DURING CLIMB ONLY IF ALL TEMPERATURES ARE WITHIN LIMITS.

- **PLACARD:** The following placard must be displayed in full view of the pilot:



III. **PERFORMANCE:** With the above engine and intercooler combination installed are equal to or better than the data in the FAA approved Flight Manual.