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CHECKING THE MPi
UPPER DECK PRESSURE CONTROL

INTRODUCTION

The Merlyn Products "MPi" upper deck pressure control is a pneumatic actuated differential pressure device. The unit is designed to compare upper deck pressure with manifold pressure at part throttle, and adjust the wastegate according to a predetermined schedule.

The material in this advisory is one approach, based on a process of elimination, to trouble shooting the MPi control.

PROPER CONTROL OPERATION

In order for the control to function properly, it must have representative differential pressure signals. The following are common areas that interfere with proper control operation.

1. **Leaks in the Manifold Pressure Sense Line**

   a. PIPER PRODUCTS

   The manifold pressure sense line begins at the front of the throttle body "y" just behind the propeller spinner.

   This #4 copper line, on Piper products, is routed over the left cylinder bank to a tee fitting on the left rear engine baffle.

One branch of this tee goes to the firewall, and subsequently to the manifold pressure gage.

The other branch of the tee goes to the small, 1-5/8 inch, diameter end of the Merlyn control.

b. MOONEY PRODUCTS

The Mooney's manifold pressure sense line is a aeroquip low pressure hose that is routed from the throttle body "y" along the right cylinder bank through the firewall, and then to the manifold pressure gauge.

c. PIPER PUSH-TO-DRAIN-VALVE

In the Piper installations, a push to drain valve is plumbed into the manifold pressure sense line, and is located on the rear of the manifold pressure gauge. This valve allows for purging the system.

In addition, sometimes a drilled AN913 plug will be placed in the tee on the back of the manifold pressure gauge, adjacent to the drain valve.

While the control will tolerate a small leak, about equal to the AN913 plug with a 0.032 in diameter hole, a larger leak will tend to increase the sensitivity of the control.

If the leak is sufficient enough, it will decrease available manifold pressure, particularly at altitude.

d. RECOMMENDED WAY TO CHECK MANIFOLD PRESSURE

The recommended way to check the manifold pressure line is to:

i. Disconnect it right at the throttle body "y."
ii. Next, check and see if it will hold a vacuum.
    - Attaching a short hose and fittings sufficient to allow for convenience in doing the test usually does this.

- Your lungs are sufficient to make the vacuum check.
- This is done by sucking down the sense line and "sticking" it to your tongue for five or so seconds.

iii. If a vacuum cannot be maintained, the offending source must be found.

iv. If the leak is in the control unit, it must be sent to Merlyn Products, Inc. for service.

2. **Leaks in the Upper Deck System**

The upper deck pressure sense line comes from the upper left fitting on the throttle body. This is the only source for sensing upper deck pressure that is compatible with the MPi control.

a. PIPER PRODUCTS

This line on Piper products is routed to a tee on the left rear baffle, with one branch going to the fuel flow gauge vent, and the other to the MPi control.

It is not acceptable to use the line to the MPi control as a source of air to pressurize the magnetos.

It should also be noted, that only the control and the fuel flow gauge vent should be connected to the left upper throttle body pressure port.

b. MOONEY PRODUCTS

On the Mooney, the source is routed directly to the MPi control.

Again, ***it is not acceptable to use the line to the MPi control as a source of air to pressurize the magnetos.***

c. RECOMMENDED WAY TO CHECK UPPER DECK SENSING SYSTEM

To check the upper deck sensing system:

i. Apply vacuum at the line to the upper left of the throttle body.

ii. However, you must first put an AN806-4 plug in the upper deck sense line where it attaches to the MPi control.
   - This can be found on the large, or 4 inch diameter, side of the control. This is always next to the 7/8 inch diameter exhaust bypass elbow.

iii. It is necessary to conduct the test in this manner since the control has a calibrated leak on the upper deck side, and, therefore, will not hold a vacuum.

3. **Fixed wastegate adjustment exceeding critical altitude performance.**

Occasionally, an upper deck pressure control is installed on an engine where the fixed wastegate was adjusted more to the closed position in order to enhance high altitude performance.

This in essence increases the upper deck pressure to the fuel pump, which increased fuel flow. This increased fuel flow was subsequently corrected by adjusting the fuel pressure down.

When the Merlyn control is installed, the upper deck pressure can be reduced so much that the engine will have little temperature rise from the full rich position to peak turbine inlet temperature.

This can be corrected by adjusting the fuel pressures according to the factory recommended specifications.

No changes in unmetered, or metered, fuel pressures from factory specifications are required when installing the Merlyn control.