



Title:

Investigation Report

Number:

VSE MFG010**DETAILS OF INVESTIGATION**

Unit Type	Fuel Control Unit
Part Number	3244777-6-5
Serial Number	A85159
Engine S/N	PH0869
Investigation Date	5 Nov 2024



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VSE MFG010**INSTRUCTIONS**

Following the findings review, please find below our recommendations for the next steps.

1. Prior installing the unit back on the rig, referring to the component maintenance manual (CMM), measure and record the Ng stop screw dimension.
2. With the unit on the test rig, try to reproduce the initial leakage as recorded in the test specification paragraph K. Hook the unit to the rig trying to maintain the leakage rate.
3. Run test points 2.01 to 2.06. While performing test point 2.03, record the WF output and maintain the condition for a minimum of 10 minutes. Record the WF output after the dwelling period. If there is no fluctuation, no more action is required. However, if there is a change in the output WF of more than 5-10 pound per hour (PPH), either going up or down, once the unit testing is completed, the bellows should be removed to measure the dimension "A" to see if it is still within the CMM specification and perform the governor bellows leak check.
4. Run test point 5.01. If the WF output is not within spec, increase or decrease the drive shaft speed to the required speed to bring the WF within the limits. Record the speed.
5. If the Ng stop screw was not meeting the CMM requirements at item (1), adjust the screw to the CMM requirements and run the T.P. 5.01 again. From the as received testing we should see the WF going back within limits (WF increase).
6. Prior installing the engine P3 line, carefully remove the air inlet adaptor bolts lockwire not disturbing the bolts clamping torque. Measure the bolts undo torque and remove them.
7. Remove the air inlet adaptor and inspect the bolt holes in the air inlet adaptor. They should be smooth. If there are marks left by the bolt's threads, try to determine if it could be from impact or fretting wear.
8. Inspect the adaptor mating face with the gasket.
9. Re-install the adaptor and make sure that it is not moving. Measure the leakage at the flange. Install the engine hardware, fitting and braided tube trying to connect the side of the tube as removed from the engine. From here I will let Frank how to figure out if the tube installation could have loosened the adaptor.

PARTICIPANTS

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VSE MFG010**INSPECTION RESULTS**

1. Unit and Line assembly removed from box. Reference photos: 1A through 1N.
2. Reviewed Line.

Part numbers are present on the "B" nut flats. Reference photos: 2A, 2B, 2C.
P/N MS27069-4C AF506-4C on the ferrule.
3. Line was checked for obstructions, was found to be clear.
4. Unit and line were installed on the test stand. Line was torqued to 80 in lbs.
5. Performed Test Specification paragraph K (Reference Attachment).

Results as follows (Reference Attachment):
Px-Py = 36 "Hg.
Rate of leakage would not cause leak check solution to bubble, reduced air for a visual representation of the leak. No leakage present at the line/fitting.
Note: Majority of the leakage was present on the PY side of the adaptor as compared to the PX side.
6. Ng stop screw dimension = .244.
7. Performed test points 2.01 - 2.05.

Results as follows (Reference Attachment):
2.01 Nozzle Flow, PPH = 213, P1-P2 = 37 "Hg.
2.02 Nozzle Flow, PPH = 92, P1-P2 = 33 "Hg, P2 = 90 psig.
2.03 Nozzle Flow, PPH = 370, P1-P2 = 33 "Hg, Pc - Px = .5 "Hg, Px - Py = 5 "Hg, P2 = 455 psig.
Unit was held at test point 2.03 for ten minutes. Nozzle Flow, PPH = 368.
2.04 Nozzle Flow, PPH = 458, P1-P2 = 33 "Hg.
2.05 Nozzle Flow, PPH = +10, P1-P2 = 34 "Hg.
5.01 Nozzle Flow, PPH = 150, Px - Py = 36 "Hg.
At 6675 RPM Nozzle Flow, PPH = 93
At 6240 RPM Nozzle Flow, PPH = 339, Px - Py = 17.5 "Hg.
NOTE: Maximum governor flows low possibly due to PY restrictor movement. If the gasket was loose, serrations on the gasket could move the restrictor to a position to cause air leakage.
8. NOTE: Moving the PC adaptor horizontally produced little change in fuel flow, moving PC adaptor vertically changed fuel flow by as much as -50 lbs.
9. Adjusted Ng stop screw to CMM requirements: .290.

Ran test point 5.01, results:
Nozzle Flow, PPH = 155, Px - Py = 36 "Hg.
10. PC adaptor lockwire wire appears to be in a neutral configuration. Reference Photo: 3A.

Witness marked screws. Reference Photos: 3A, 3B. Removed adaptor screw lockwire, No "undo" torque registered on the torque wrench.
11. Removed adaptor, visually inspected adaptor screw holes. Holes do not appear to be smooth. Screws appear to have marks on the threads. Adaptor appears to have metallic looking particles in the housing. Fretting was observed on the gasket, housing and the body. Reference Photos: 4A through 4G.



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VSE MFG010**INSPECTION RESULTS**

12. Appears to be a mark on the mounting pad extending from mounting hole to Py restrictor.
Photo 4H.
13. Adaptor/Gasket was re-installed on unit and torqued IAW the CMM.
14. Unit/Line were installed on stand.
15. Performed Test Specification paragraph K (Reference Attachment).
Results as follows (Reference Attachment):
Px-Py = 10 "Hg.
16. Performed test points 2.01 - 2.05 and 5.01.
Results as follows (Reference Attachment):
2.01 Nozzle Flow, PPH = 227, P1-P2 = 35 "Hg.
2.02 Nozzle Flow, PPH = 91, P1-P2 = 32 "Hg, P2 = 90 psig.
2.03 Nozzle Flow, PPH = 400, P1-P2 = 32.5 "Hg, Pc - Px = 0 "Hg, Px - Py = 1.5 "Hg. P2 = 455 psig.
2.04 Nozzle Flow, PPH = 516, P1-P2 = 32.5 "Hg.
2.05 Nozzle Flow, PPH = 0, P1-P2 = 34 "Hg.
5.01 Nozzle Flow, PPH = 126.
17. Reset Ng stop screw dimension to .290.
18. Performed test point 5.01.
Results as follows (Reference Attachment):
5.01 Nozzle Flow, PPH = 155, Px - Py = 36 "Hg.
19. Additional observations: Moving the PC adaptor lowered the leak rate (Px- Py). Tapping on the P3 line resulted an increase in Px - Py.
20. Removed unit from test stand, loosened PC adaptor (to prevent damage to unit). Using a wrench on the "B" nut (line) (no back up wrench on the elbow), was able to move the PC adaptor.

IMAGES



Photo 1A



Photo 1B



Photo 1C



Photo 1D



Photo 1E



Photo 1F

IMAGES

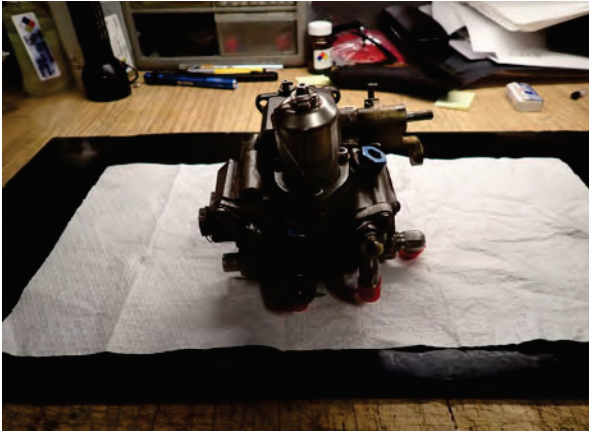


Photo 1G

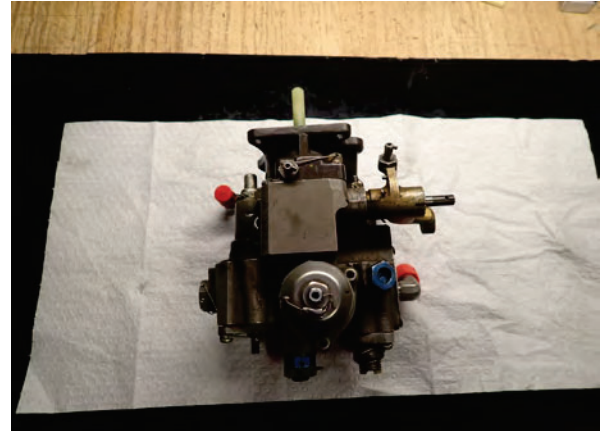


Photo 1H

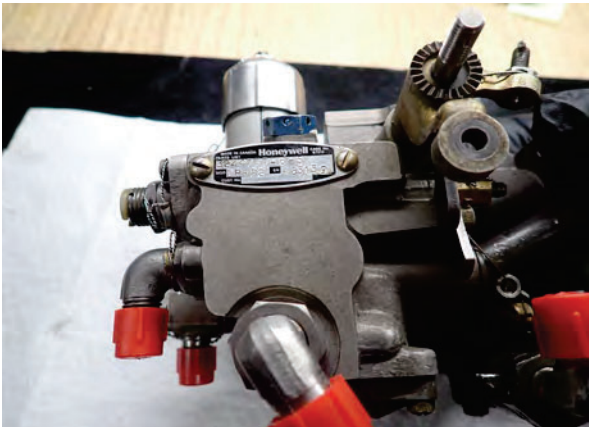


Photo 1I



Photo 1J



Photo 1K



Photo 1L



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Photo 1M

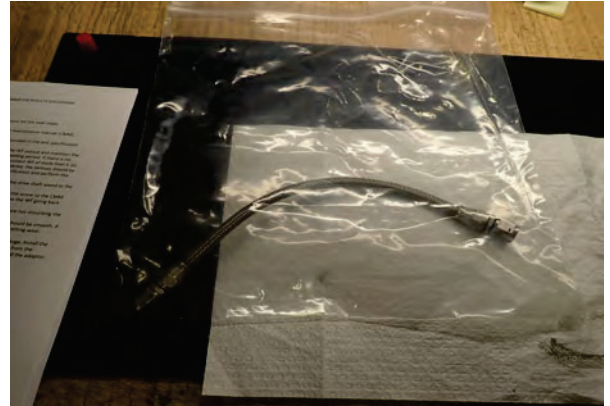


Photo 1N

IMAGES

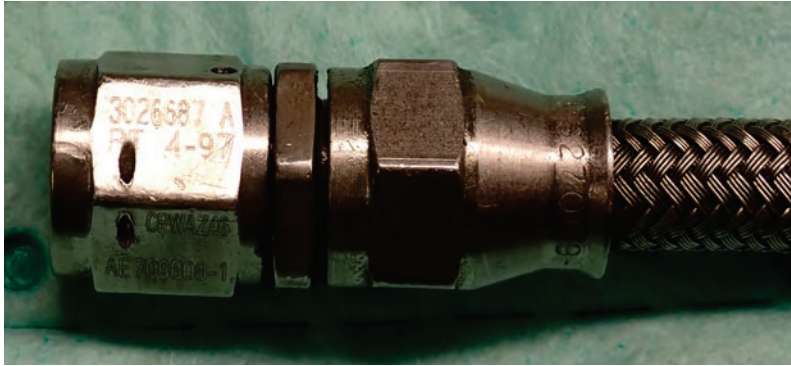


Photo 2A



Photo 2B



Photo 2C

IMAGES



Photo 3A



Photo 3B

IMAGES

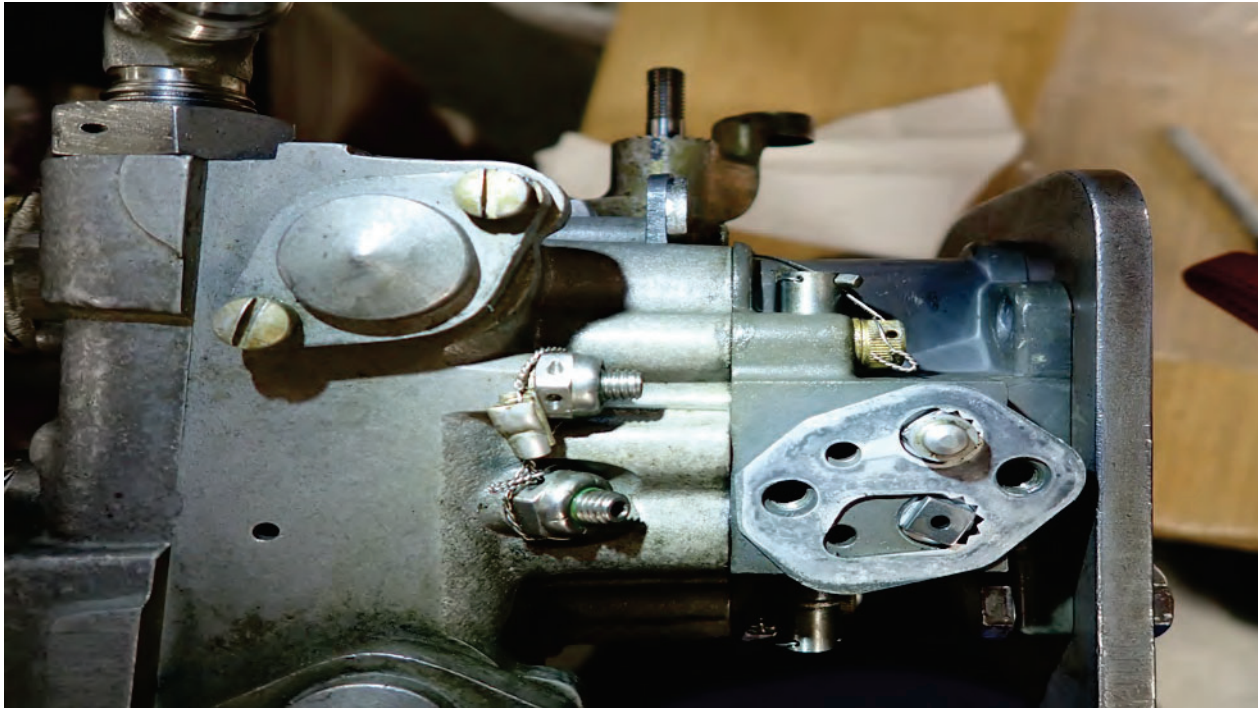


Photo 4A

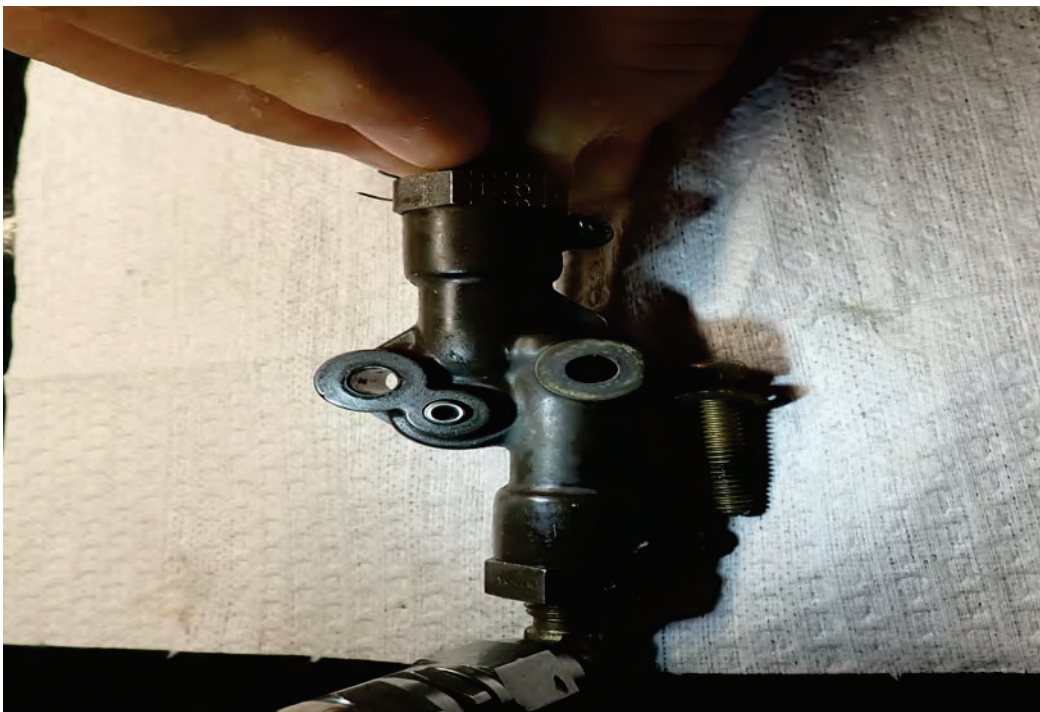


Photo 4B

IMAGES



Photo 4C



Photo 4D

IMAGES

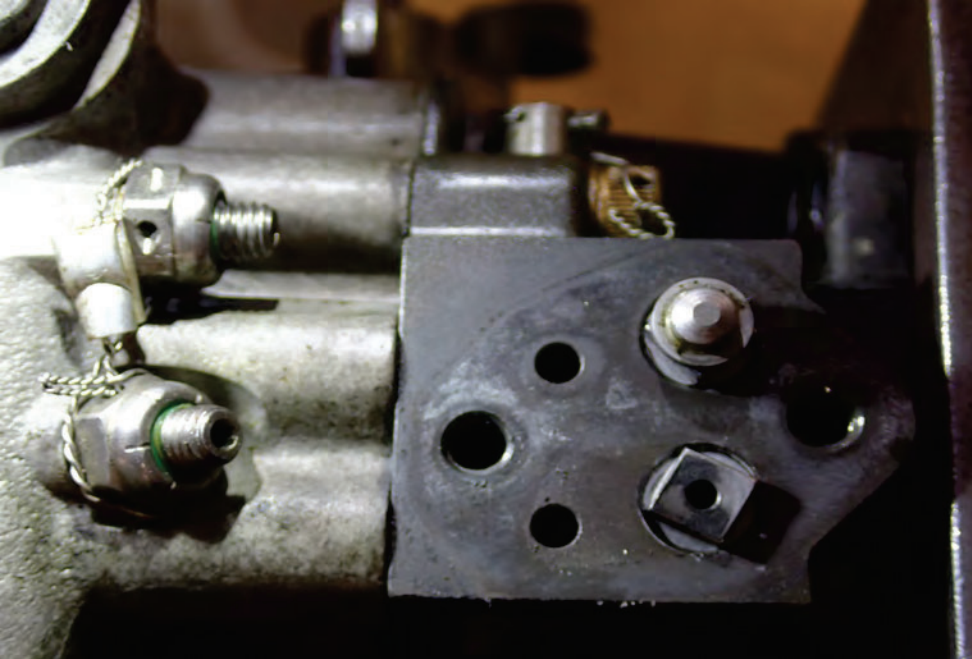


Photo 4E



Photo 4F



Photo 4G

IMAGES

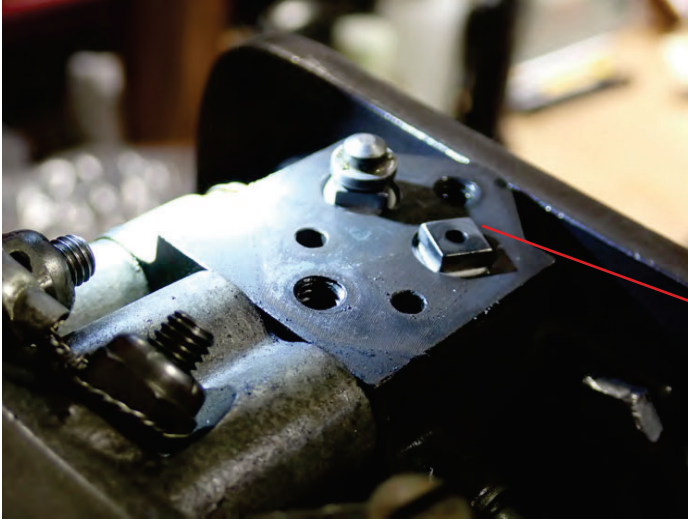


Photo 4H



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VSE MFG010**ATTACHMENT 1****CEN24LA193 FCU PWCRF24-093 ESN PH0869 VSE RESULTS DISCUSSION**

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