Engine Driven Fuel Pump
WPR13FA244

MFG: Teledyne Continental
PN 6A6212-18 SN B00HA296

Fuel Pump Functional Information (Courtesy CMI)

Since the fuel pump must deliver more fuel than the engine can use, a return line will be necessary to recirculate the excess fuel. The recirculation path will reduce the fuel pump output pressure so an orifice in the return line develops the pressure and allows the pump to maintain excess capacity. The faster the pump runs, the greater will be its output. Because the orifice in the fuel return line remains fixed, any increase in pump output will also increase pump output pressure. Since the pump is driven by the engine, the pump's output will be in direct proportion to engine RPM.

The fuel pump will actually meter fuel in direct proportion to engine RPM. The fixed orifice in the return fuel path plays an important role in fuel metering. Should the orifice become partially or completely restricted, excessive output pressure will result and upset the balance of proper fuel metering and subsequent fuel flow.

The fuel injection pump must provide adequate fuel flow and pressure at low engine speed as well as the higher ranges. Remember the output pressure of this pump will vary with engine speed. Therefore, at idle speeds the output will be considerably less. The orifice that worked for us at the higher speeds will not be able to maintain the outlet fuel pressure in the low to idle speed range.

By adding a small relief valve in series with the adjustable orifice, we can now have sufficient outlet pressure in the idle range, and without disturbing the relationship of the orifice to output pressure in the higher engine RPM ranges. This relief valve is adjustable and its adjustment is important. When set too high, excessive pressure and flow will occur at idle and throughout the entire range of engine speeds.

A vapor separator tower is also added to the fuel injection pump and inlet fuel enters near the top of the tower. The fuel enters a cylindrical chamber inside the tower. The swirling action created in this cylindrical chamber tends to centrifuge the liquid fuel causing the vapors to rise to the top of the separator tower. This process helps to insure that only liquid fuel will reach the vanes of the fuel pump. A vapor jet and return line is added to the top of the separator tower. Fuel rushing through the small orifice in the jet actually creates a small low pressure and as a result, will perform a pumping action. It will transfer any vapors and excess fuel back to the aircraft fuel tank from which the fuel was pumped.

A by-pass check valve is added. The aircraft's fuel system incorporates an electric fuel pump for starting, ground checking, and possible emergencies. For example, when priming before starting, fuel under pressure from the electric pump enters the injection pump in the usual manner. When the injection pump is at rest, the fuel by-passes the vane portion of the pump by way of the by-pass check valve to reach the metering unit.

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When fuel under pressure is being supplied by the auxiliary electric pump all of the other circuits of the injection pump continue to function. Fuel is passing through the adjustable orifice, the relief valve is functioning, the vapor ejector is at work, and fuel under pressure is leaving the injection pump for the mixture control and Fuel Metering unit.

Figure 1 - Data Plate

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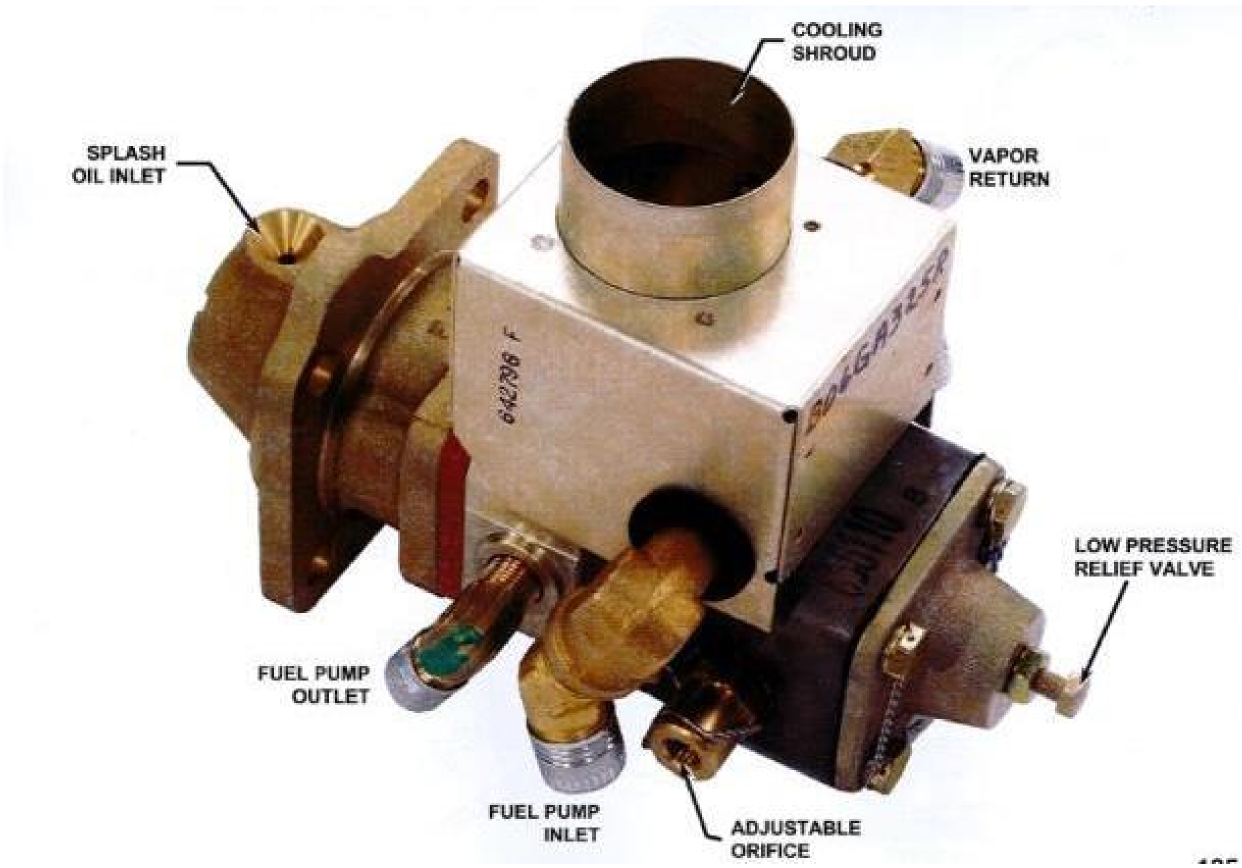

Figure 2 - Exemplar EDP

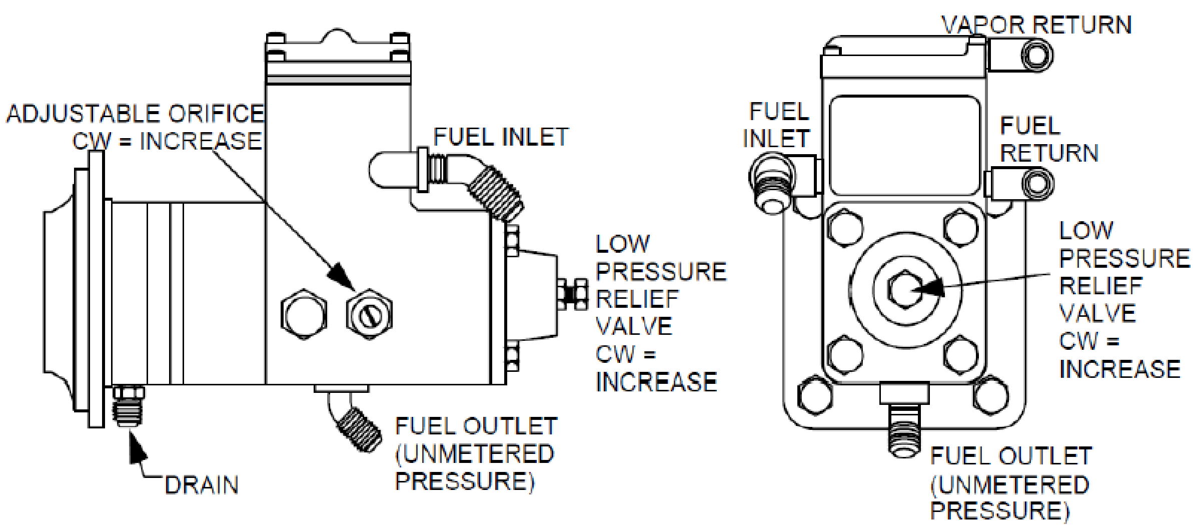

Figure 3 - Line Drawing

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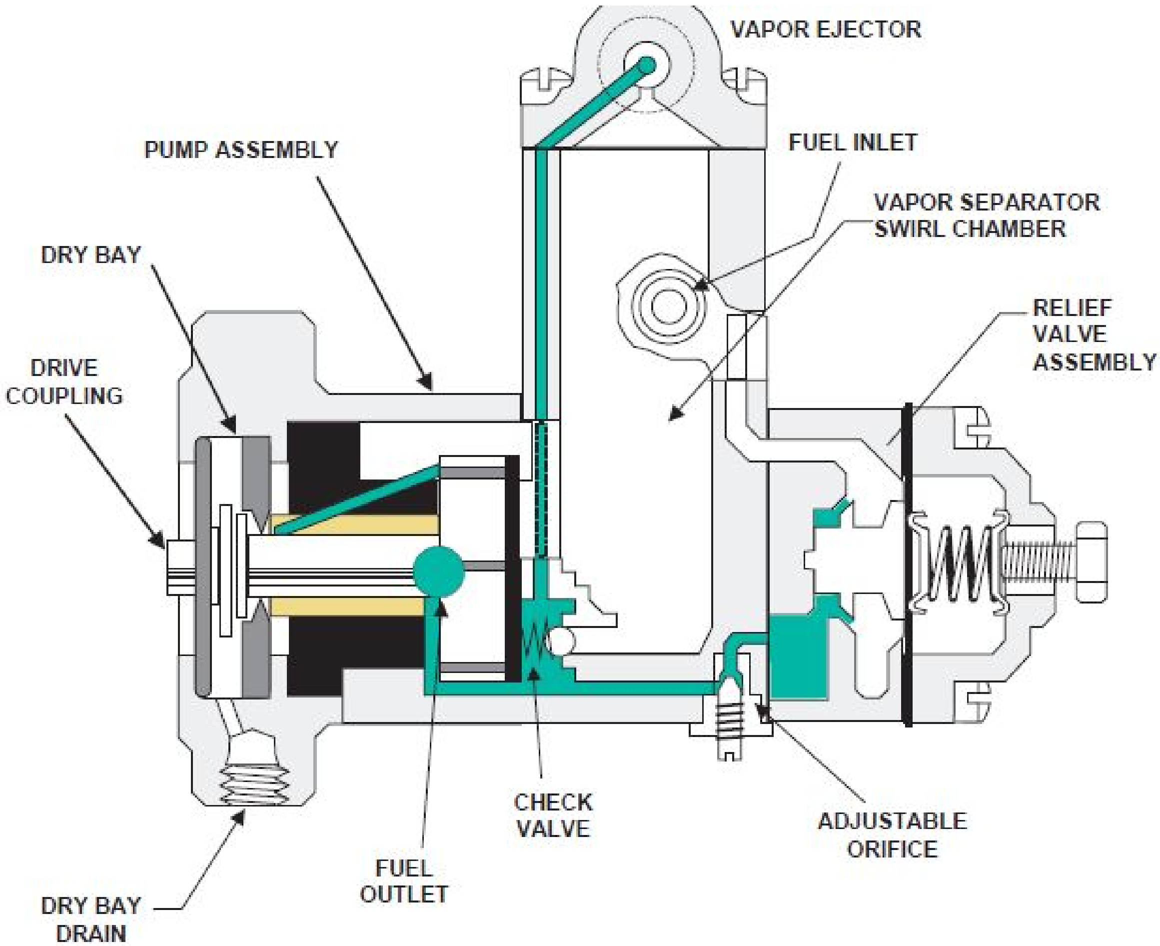

Figure 4 - Functional Schematic (Green represents pressurized fuel; courtesy CMI)

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Fuel flows from the fuel pump to the fuel control unit. The fuel then flows from the fuel control unit to the fuel manifold valve where it is distributed to the six fuel injector nozzles.

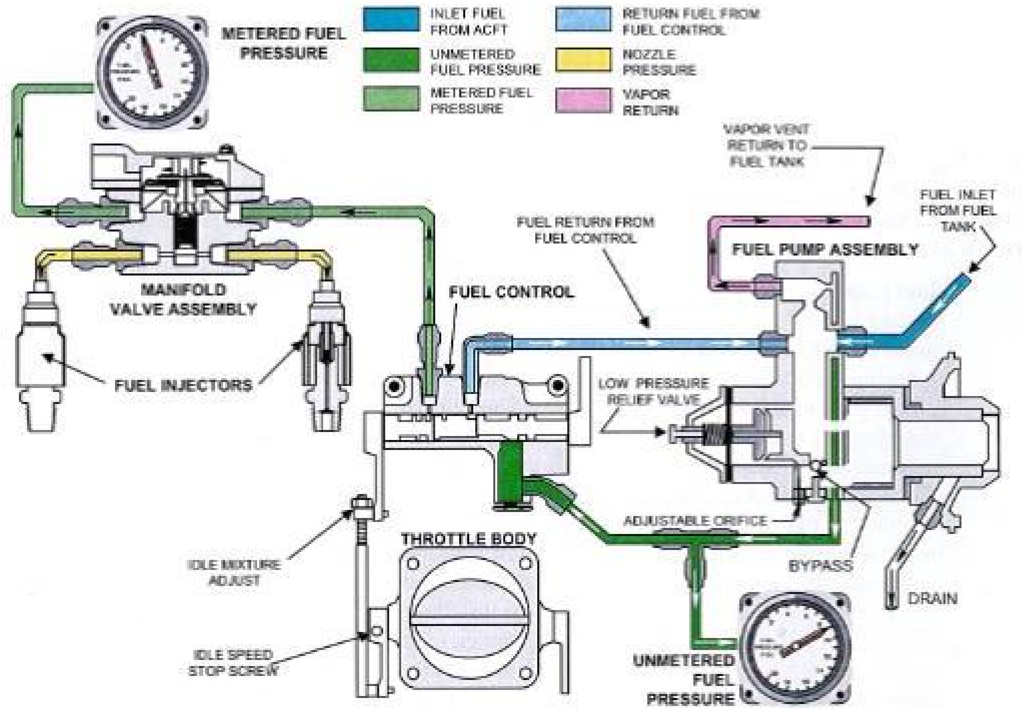

Figure 5 - Engine Fuel System Schematic (courtesy CMI)

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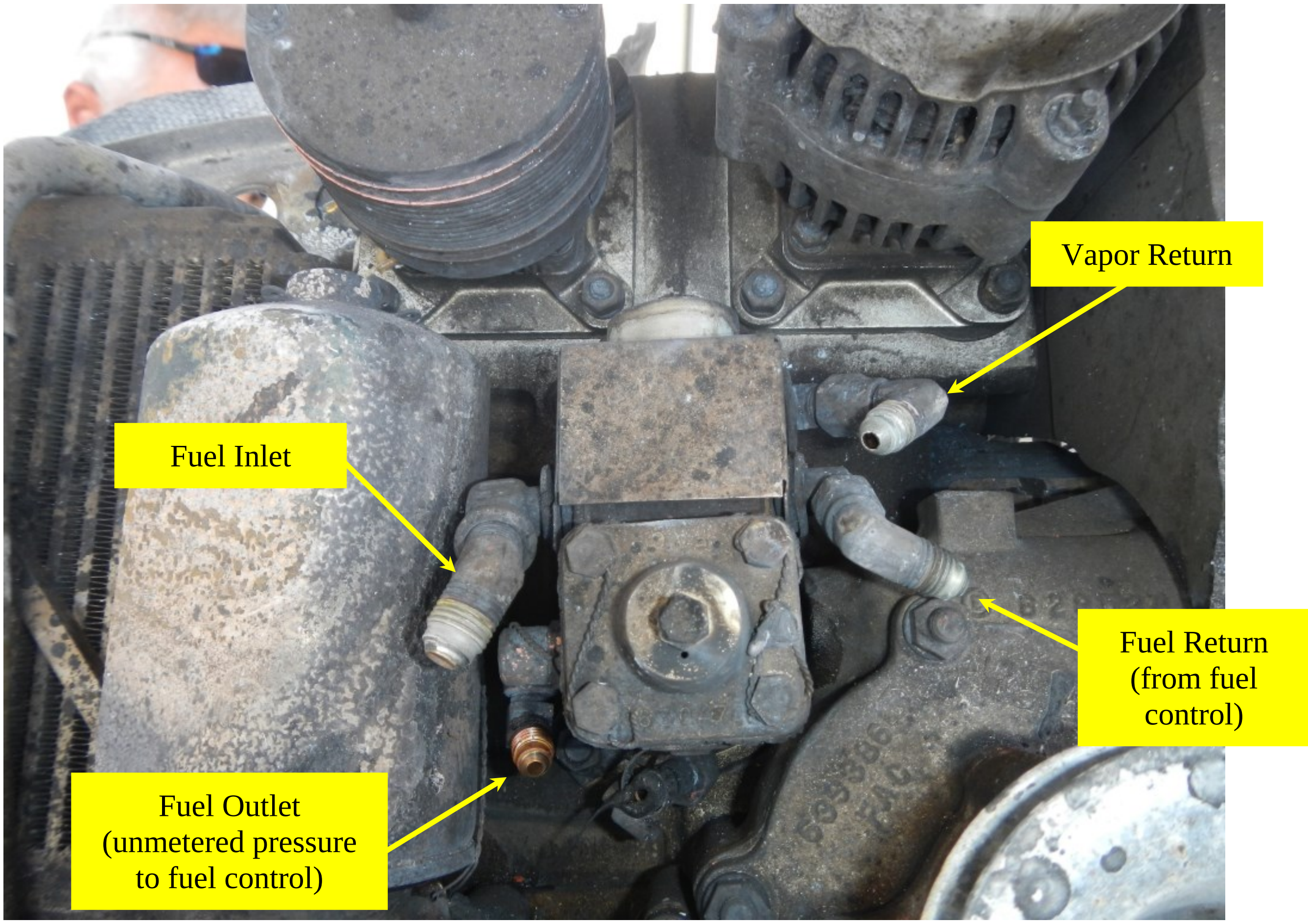

Figure 6 - Pump on Engine, Looking Forward (Photo top is engine/airplane 'up')

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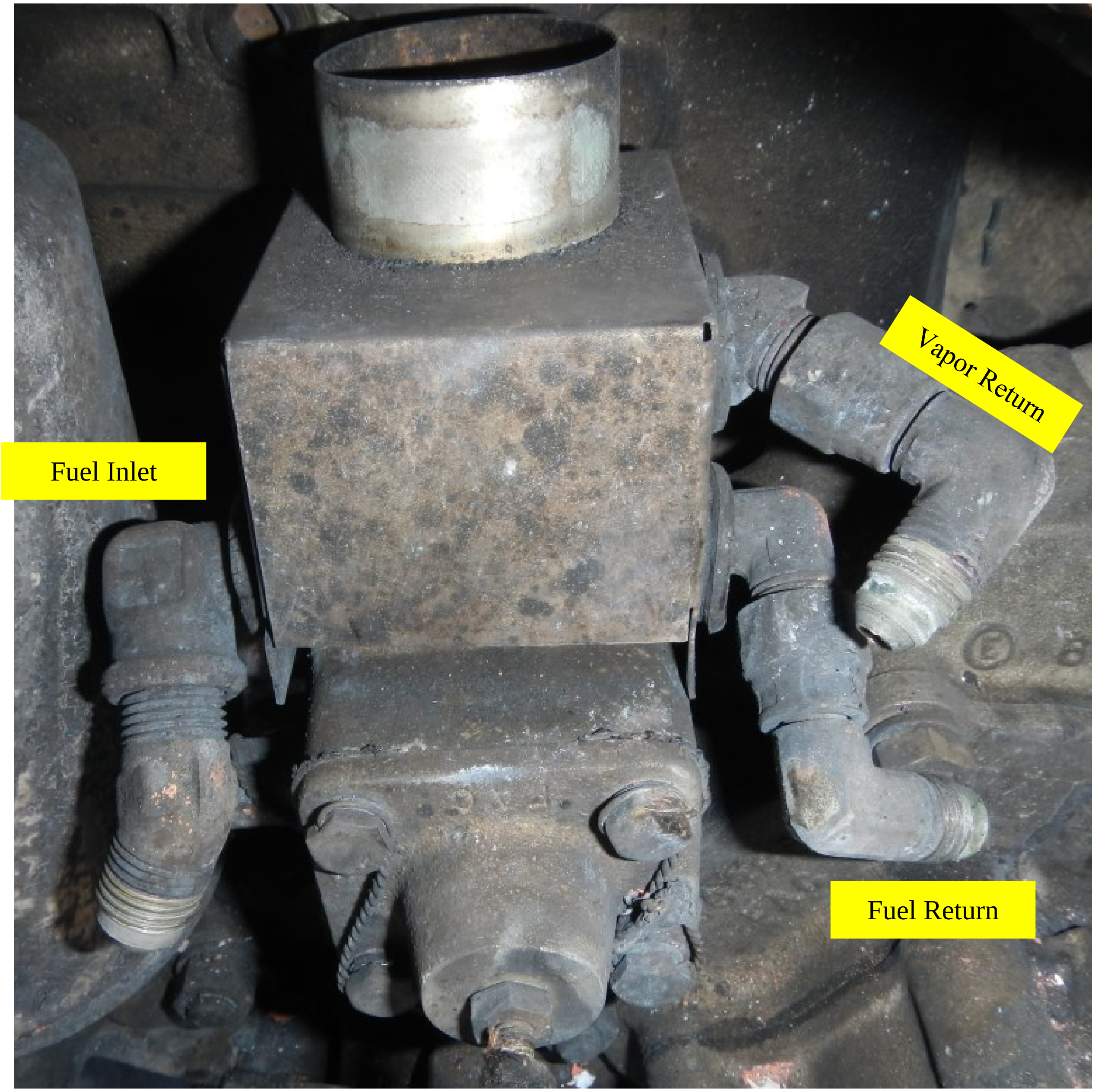

Figure 7 - Close Up, Pump on Engine

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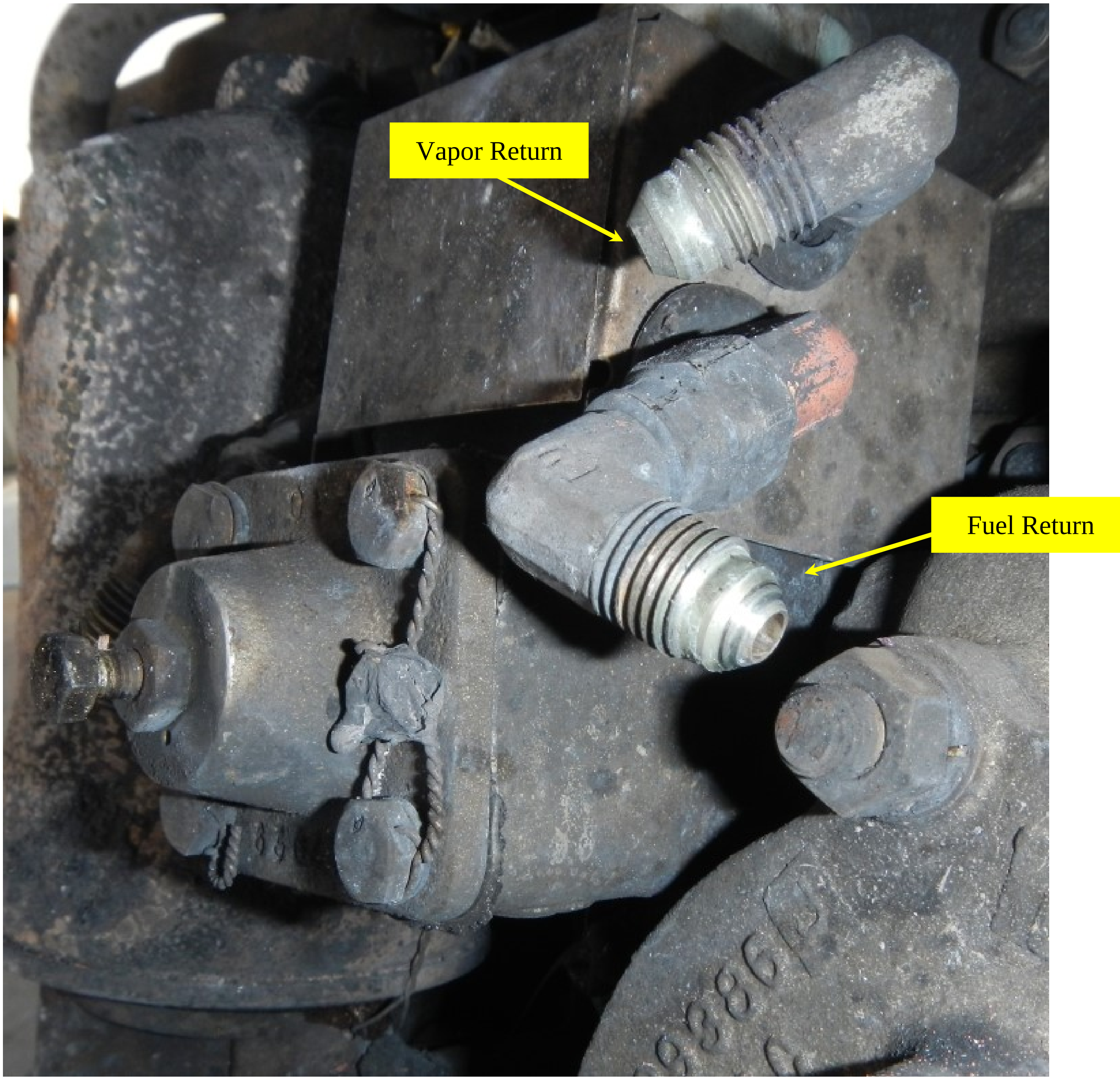

Figure 8 - Looking Left

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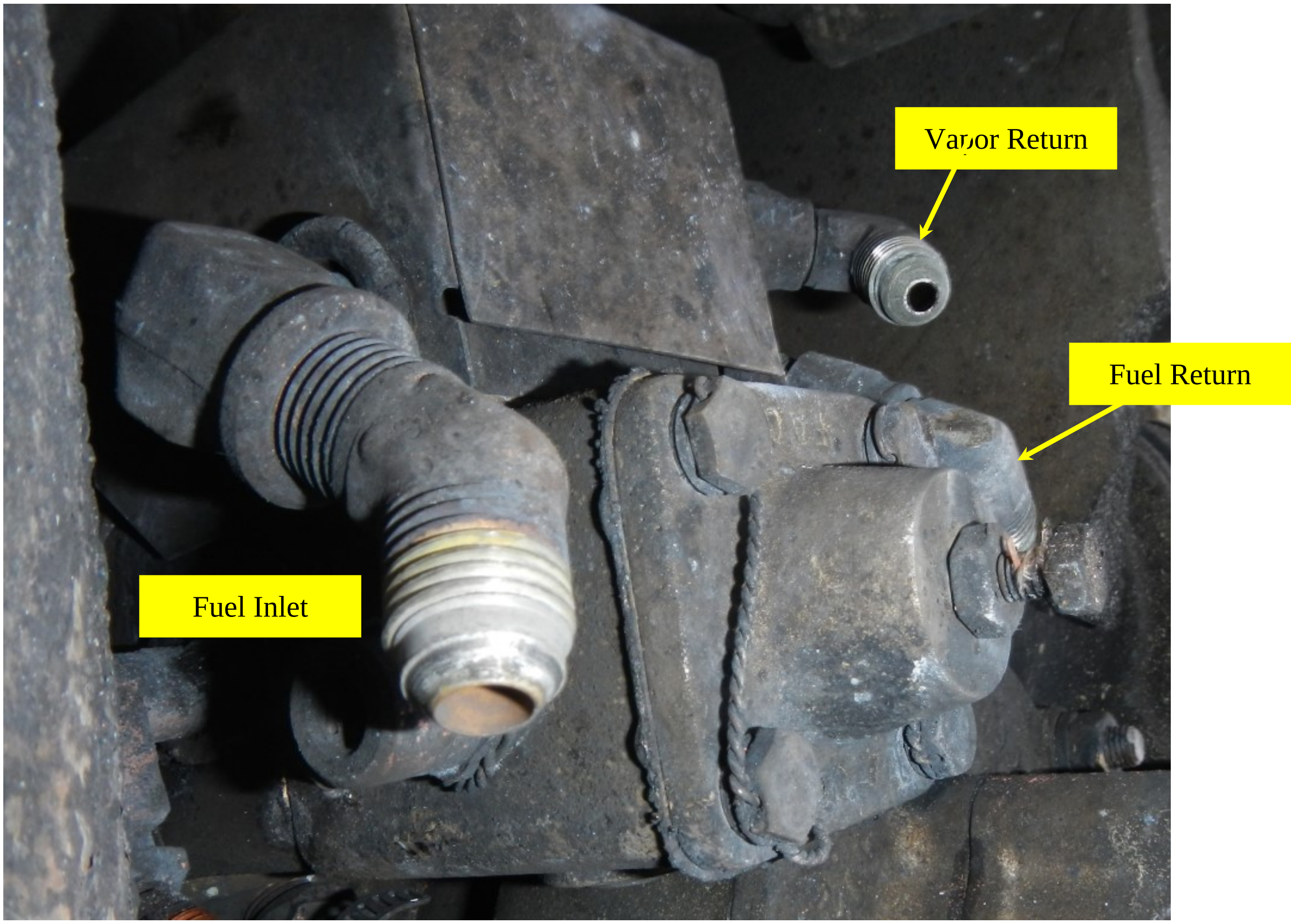

Figure 9 - Looking Right

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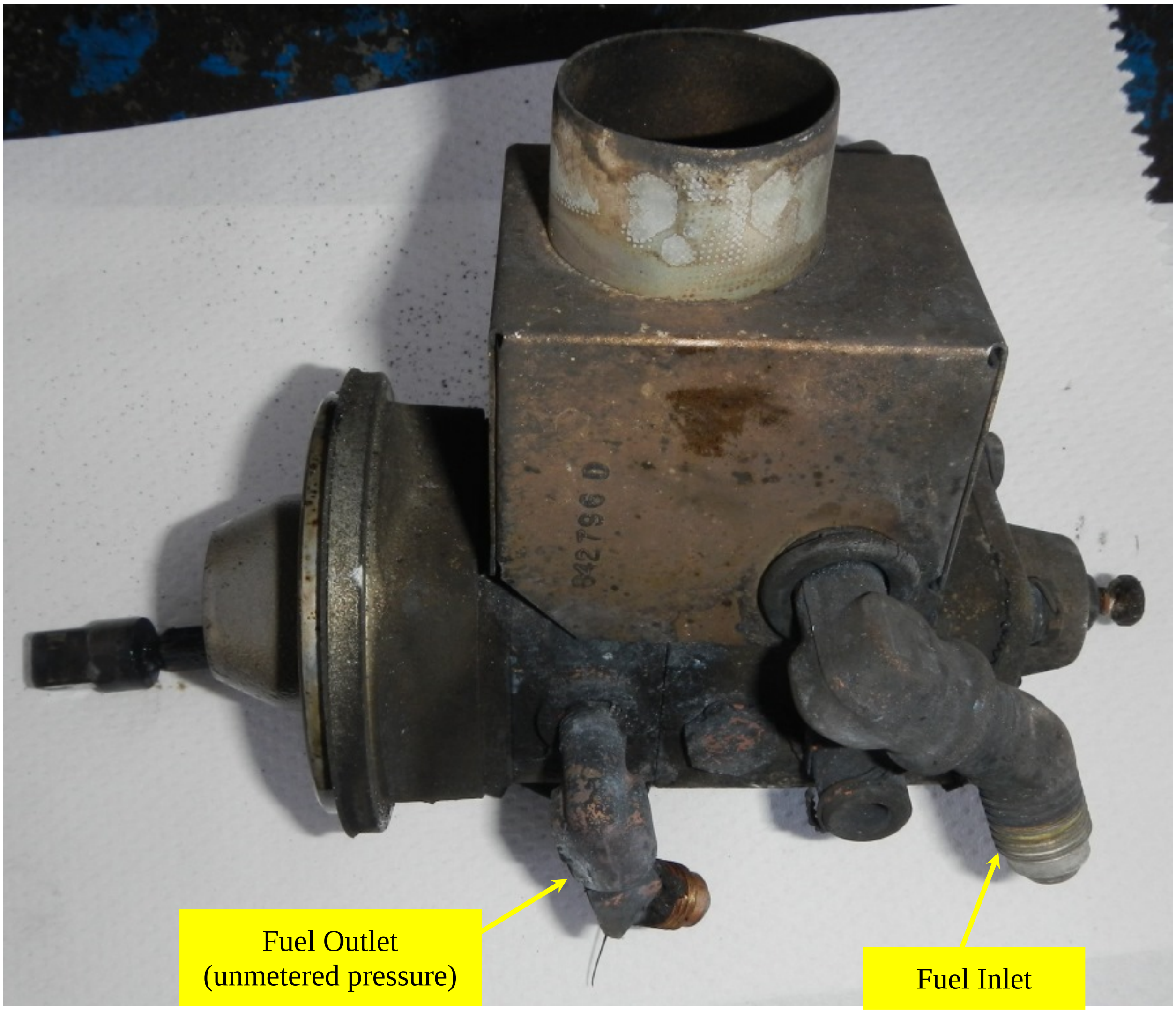

Figure 10 - Pump Removed

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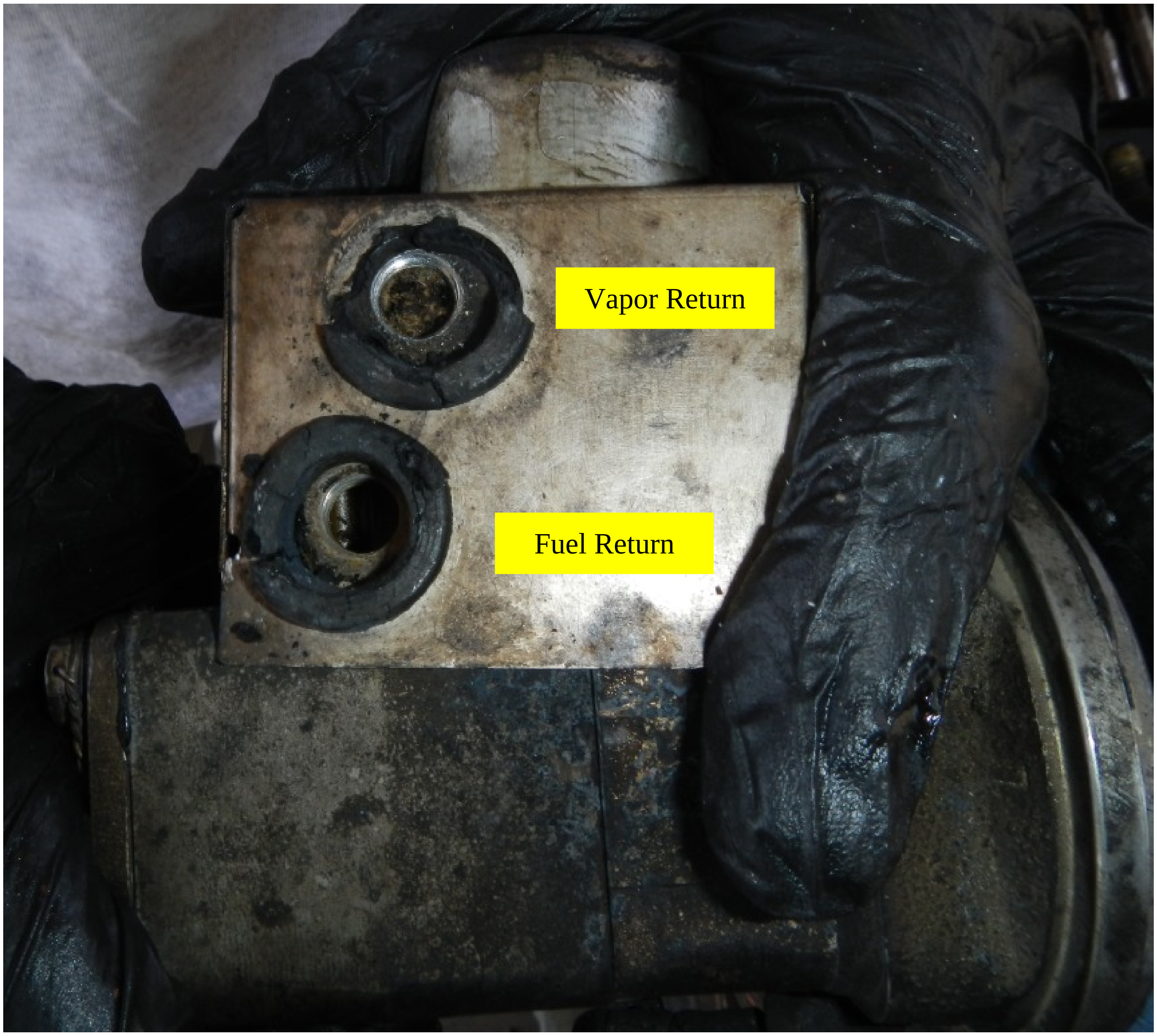

Figure 11 - Return Side

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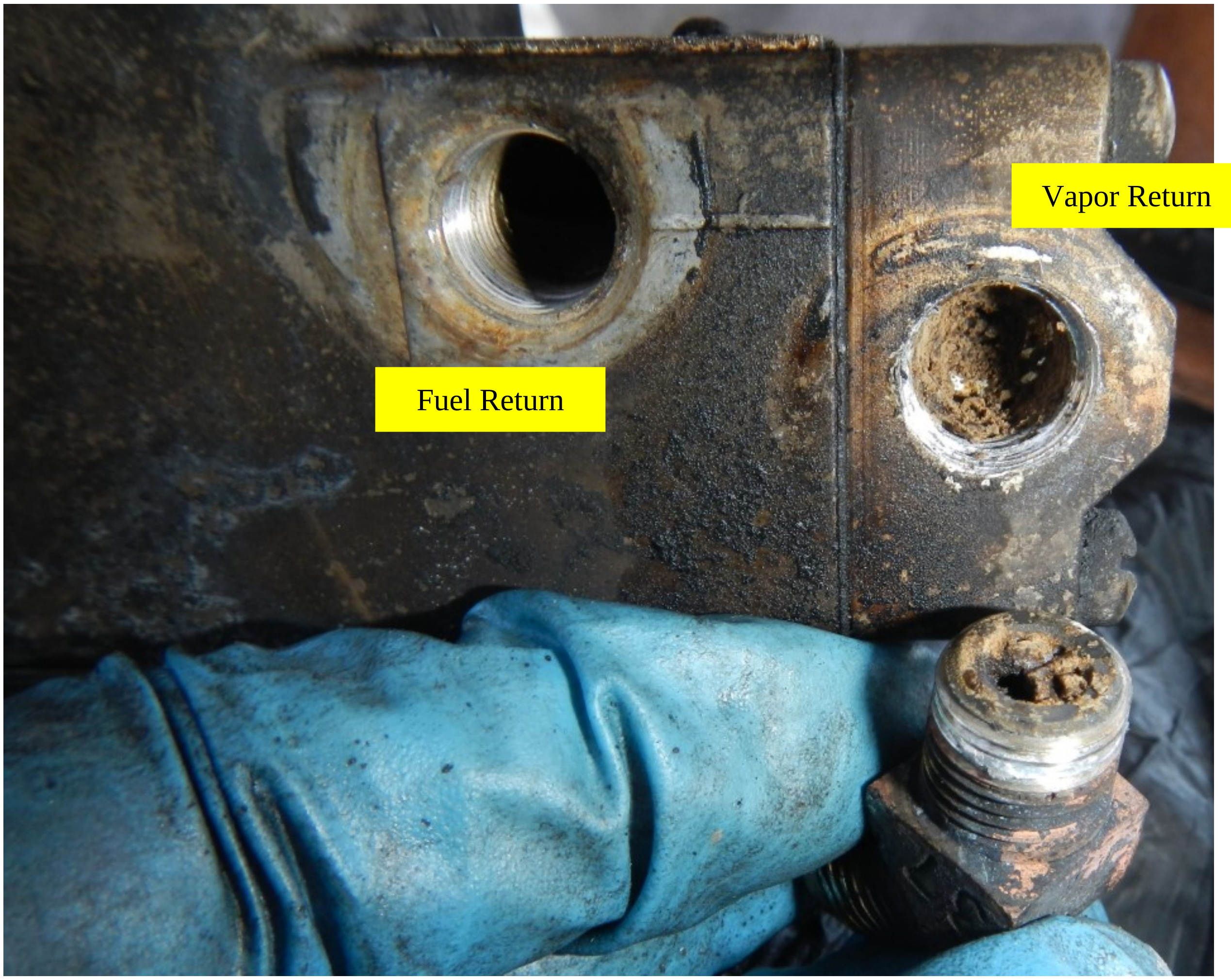

Figure 12 - Return Side, Ports Opened

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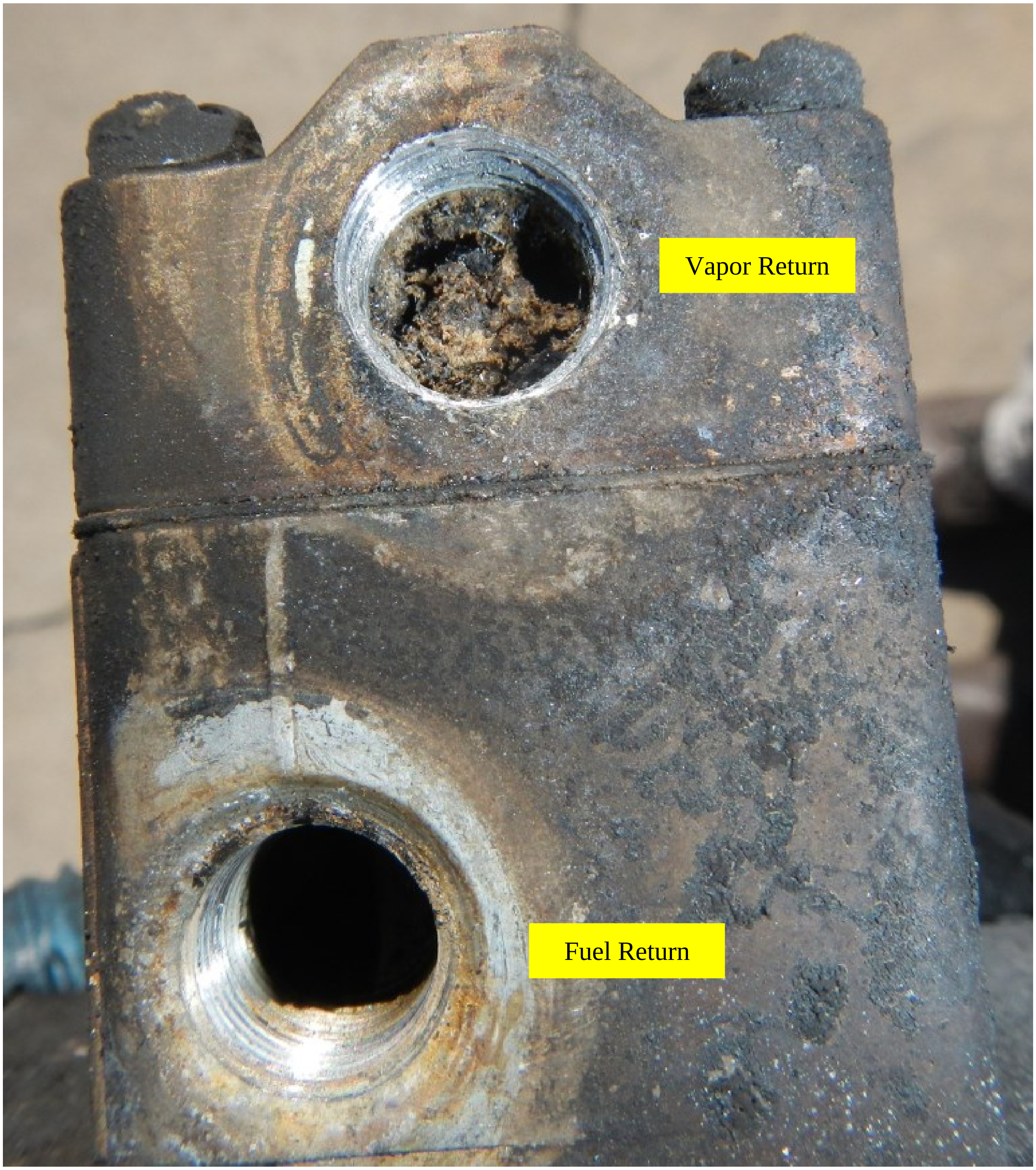

Figure 13 - Close Up, Return Side

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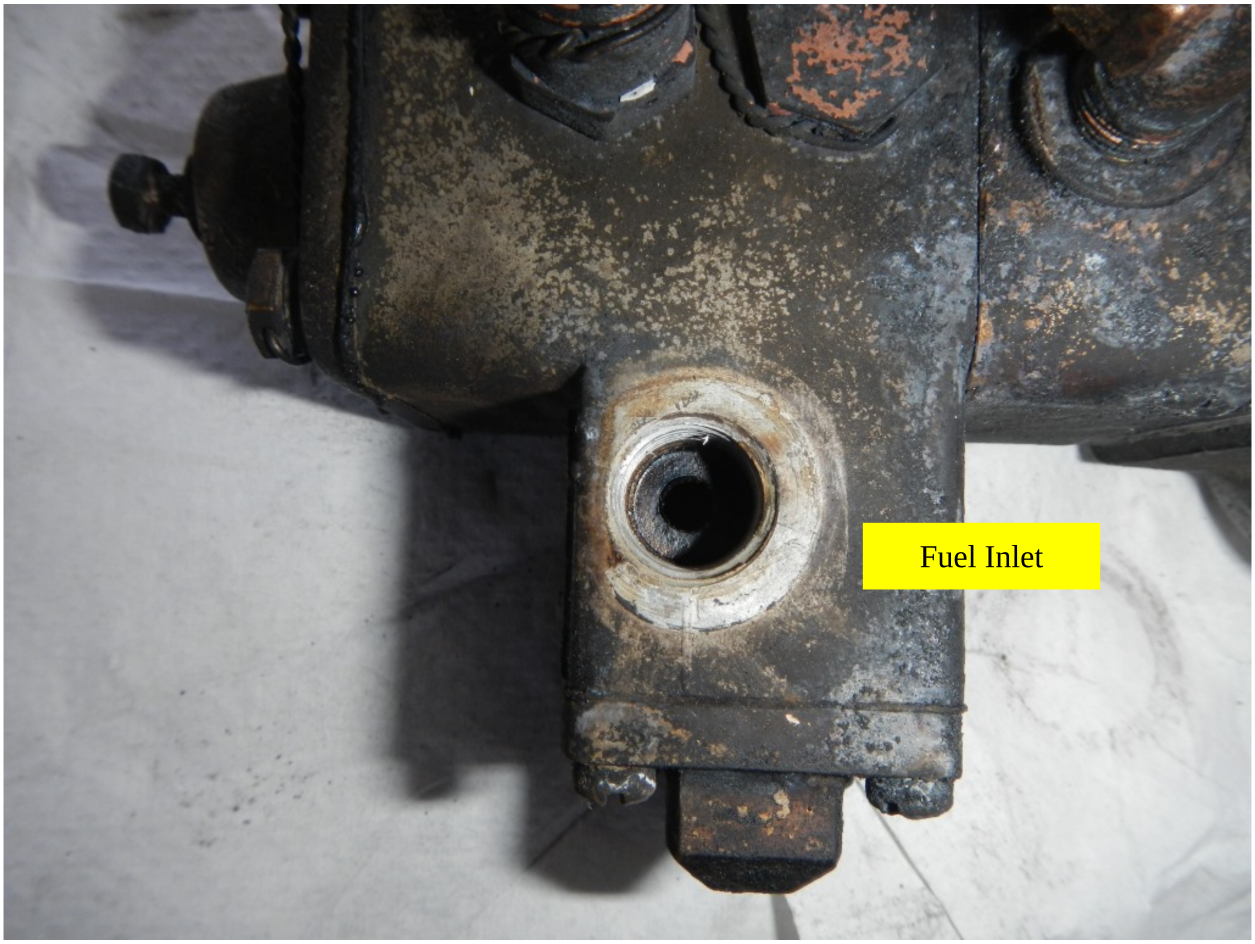

Figure 14 - Opened Inlet Port

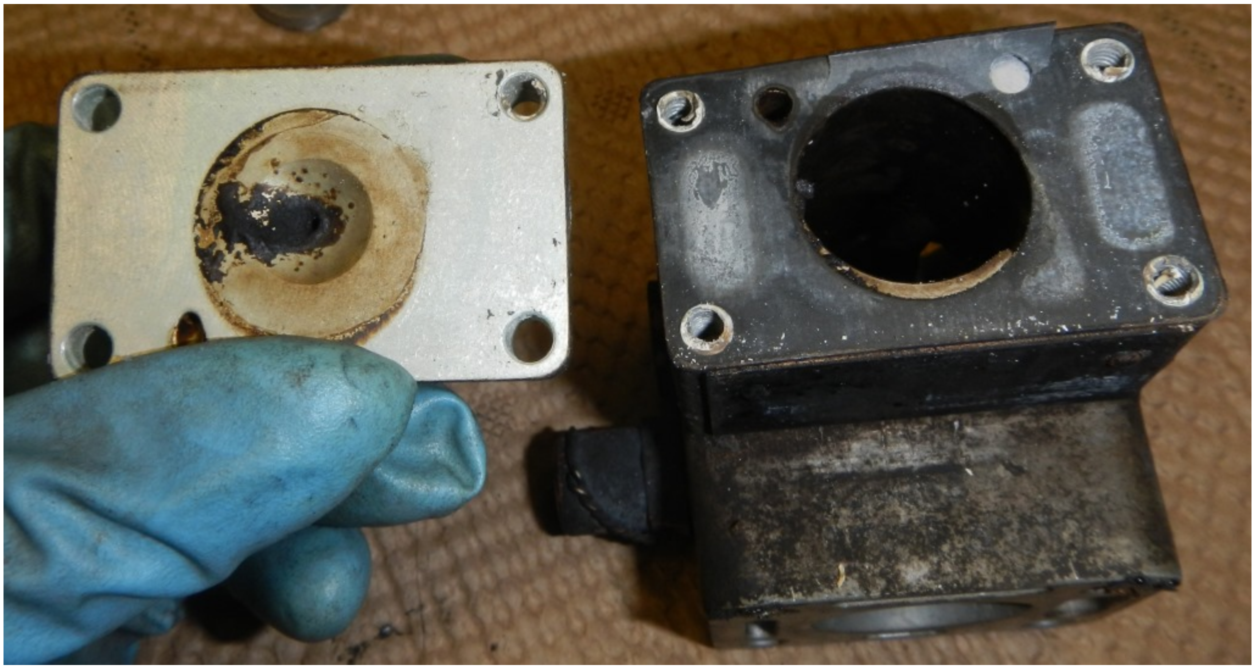

Figure 15 - Cap Removed from Swirl Chamber

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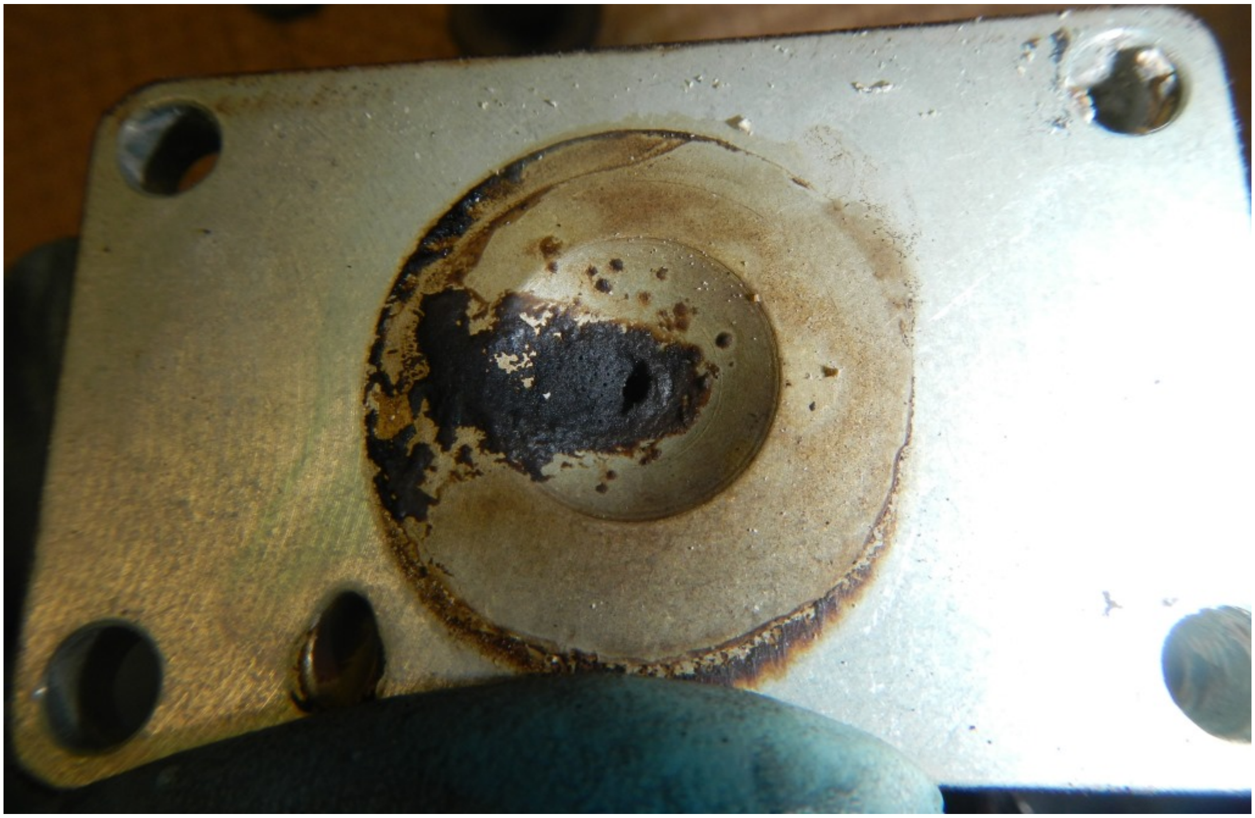

Figure 16 - Swirl Chamber Cap

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Figure 17 - Swirl Chamber

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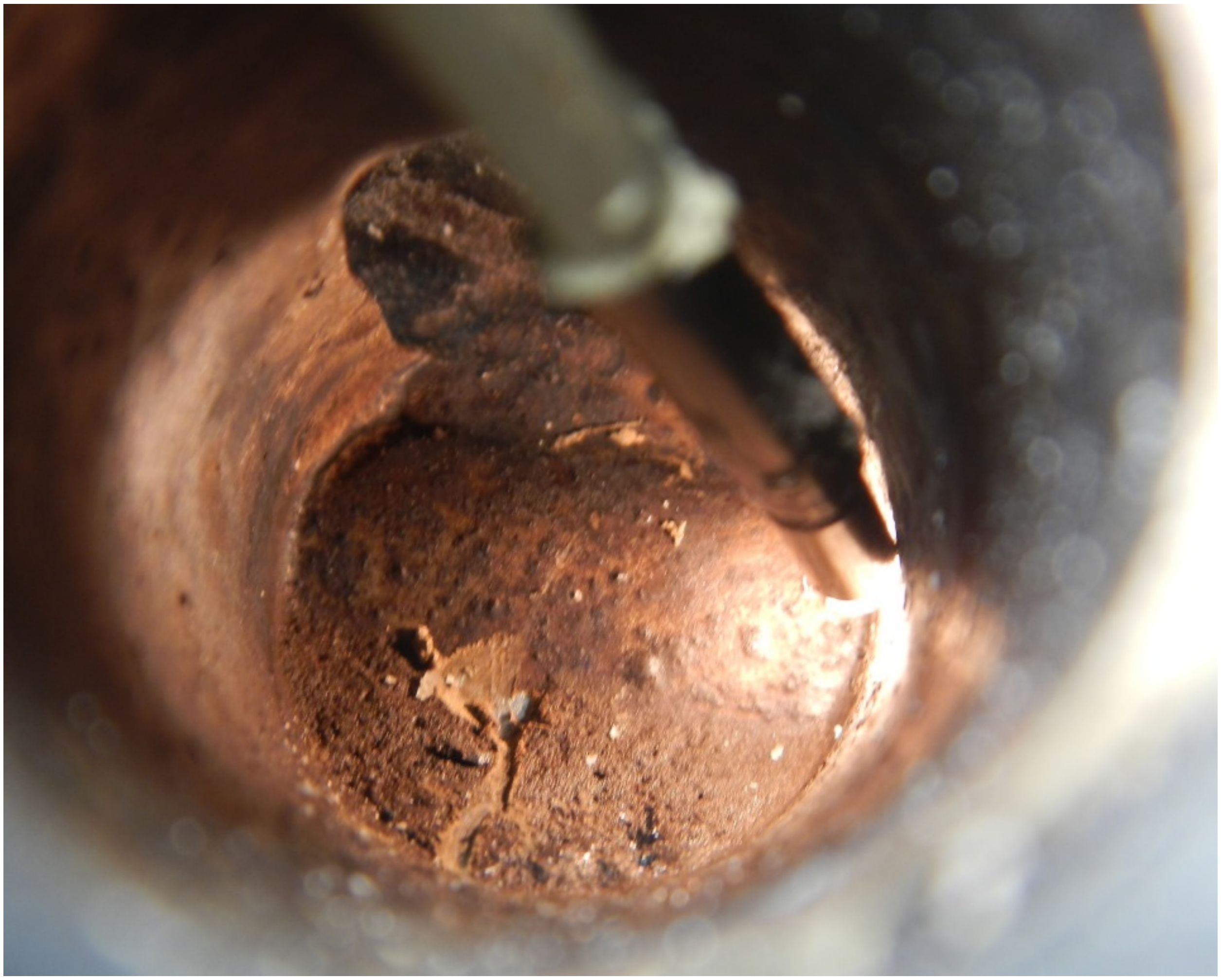

Figure 18 - Swirl Chamber

Figure 19 – Relief Valve Chamber with Gasket

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Figure 20 – Relief Valve Chamber with Gasket Thermal Deposits