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**99-037F**  
**12 January, 2012**

## **TROUBLESHOOTING M701 PRESSURE PROBLEMS**

### **I. SCOPE:**

To guide you through troubleshooting pressure problems in the M701 zero air module. Typically, if you are having a problem with your M701 you are noticing that the pump does not shut off or that the pump is not capable of maintaining 30 PSIG @ the output of the M701.

**IMPORTANT NOTE:** If you are using about 5 LPM of air at the output of your M701 your pump might not cycle on & off. The reason is that we are using anywhere from 7 to 13 LPM of air for the regenerative dryer. This 7 – 13 LPM of air with the 5 LPM of air that you are using at the output of the M701 means that the pump is continually pumping 12 – 18 LPM of air. This is not a problem, as the M701 can still maintain 30 PSIG @ the output of the output of the M701.

### **II. PARTS:** NONE

### **III. TOOLS:**

KIT 60 M701 pressure checker OR a 0-150 PSIG gauge with a shutoff valve.  
7/16" wrench.  
1/2" wrench.  
9/16" wrench.  
1/4" pipe to 1/4" tube fitting.  
Phillips screwdriver  
Flat tip screwdriver  
External Dew Point Sensor

### **IV. PROCEDURE:**

1. Cap the output of the M701 & see if the pump will shut off. If the pump shuts off then generate 10 LPM of zero air from your T700 calibrator & see if the M701 can maintain 30 PSIG. If not already at 30PSI, you can adjust it using the pressure regulator on either the front panel, or just inside the front panel. If it can then your M701 works fine. If the pump does not shut off or you cannot achieve 30PSI when you have the output of the M701 capped off then go to step 2.

2. Put the M701 on a table & remove the cover from the unit.
3. For step 4 & 5 the pressure gauge (see Figure 6) should be hooked directly to the output (pressure) port of the pump as indicated in Figure 1, with the needle valve closed, so that the pump is pumping “dead head” into the gauge.
4. Put the gauge at the output of the pump so that you can measure the dead headed pressure of the pump. This should be greater than 115 PSIG. If it is below 115 PSIG then you are going to have to rebuild the pump, before continuing on with this procedure. (see Figure 1, Point A)
5. To test the relief valve, connect the gauge between the relief valve and the regenerative dryer (see Figure 1, Point B) and close the gate valve. Allow the pump to pressurize the gauge until you feel air pushing out of the vent on the pressure release valve. Note the pressure that the relief valve opens up at.
6. Open your gate valve & bleed the pressure off of the pump & notice the pressure that the valve seats at. The valve should open at about 90 PSIG & it will begin to seat at about 80-85 PSIG.
7. If the pressure relief does not open at the correct pressure, insert your Allen wrench & turn the Allen screw in or out some to set the opening pressure to the correct pressure. The closing pressure is not that critical & as long as it closes within 10 PSIG of the opening pressure then you are ok. This may take a few tries to get correct.
8. Turn the unit off & allow the pressure to drop back to zero. Hook up the pneumatics of the M701 to its original configuration.
9. If you have the new style regenerative dryer it will have two mufflers on it. Follow this step for both mufflers. Put a 10 to 15 LPM flow meter on the exhaust of the four-way valve on the regenerative dryer. You are going to have to remove the “brass” muffler that is on the exhaust of this valve & install a ¼” pipe to ¼” tube fitting (see Figure 1, Point C).
10. Cap the zero air output & turn on the M701 & allow the unit to come up to pressure (or 5 minutes whichever ever comes first). Measure the flow out of the exhaust of the four-way valve. This must be less than 14 LPM of flow @ full pressure (typically this is about 7-9 LPM @ full pressure or 10-13 LPM if you have a double headed GAST pump installed). Please note that if the pump stops, the regenerative dryer will also stop flowing air. Remove the cap from the zero air outlet to have the pump kick back on.
11. Remove the fitting at the exhaust of the four-way valve & install the muffler back into the exhaust of the valve.
12. Disconnect the output of the tank & put your gauge & shutoff valve there (see Figure 1, Point D). Turn the unit on & monitor the pressure that the pressure switch shuts off the pump. If the pressure goes higher than 80 PSIG then you are going to have to adjust the cutout pressure of the pressure switch. If the unit shuts off the pump at 80 PSIG then open your valve, & bleed off some pressure until the pump turns back on. The pump should turn back on at 35 PSIG.

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NOTE: IF YOU HAVE THE NEWER STYLE PRESSURE SWITCH YOU WILL ONLY ADJUST THE CUT IN PRESSURE. SEE FIGURE 5.

NOTE: THE HIGH END SHOULD BE SET TO AT LEAST 75 AND NOT MORE THAN 85 PSIG. ONCE THE HIGH END IS SET, THE LOW END SHOULD BE SET TO 35-45. THE LOW END PRESSURE MUST BE AT LEAST 33PSI.

13. To adjust the pressure switch, open your valve & allow the unit to bleed down until the switch cuts in & turns the pump on. If the pressure is too low when the pump turns on then turn the smaller left screw clockwise. If the cut in pressure is too high then turn the screw counter clockwise (see Figure 4). If you have the newer style pressure switch, you will only adjust 1 screw and it will adjust the cut in point.
14. Close the valve & allow the unit to build pressure again. Open your valve & allow the unit to drain down until it cuts in the pump again. If it is still not right then continue to adjust the left screw until you have the cut in pressure correct.
15. To adjust the cut out pressure, allow the unit to pump up to pressure & notice where it cuts out the pump. If the cut out pressure is too high then turn the larger right screw turn the screw counter clockwise. If the cut out pressure is too low turn the screw clockwise (see Figure 4).
16. If your unit has a dew point sensor installed, please measure the flow rate coming out of the Dew Point Sensor located on the main control PCA. This should be 0.6LPM to 1.0LPM.
17. When you get to this point your M701 should be completely adjusted with the exception of your output pressure. To adjust this pressure, hook your M701 to your T700 & generate 5 LPM of zero air. Adjust the output regulator of the M701 to 30 PSIG. We typically use the diluent pressure reading on the TEST functions on the T700 to adjust the output of the M701. If you don't have the M701 hooked to the T700 then adjust the M701 output pressure to 30 PSIG on the gauge on the front of the M701.
18. If your unit has a dew point sensor installed, connect an external dew point sensor to the Zero Air outlet of the unit. Please take care to plumb up your sensor as designed by the manufacture. Set the output of the M701 for approximately 10LPM. The dew point should be <-20degC at 10LPM.

NOTE: WHEN CHANGING THE CHARCOAL AND/OR PURAFIL SCRUBBER MEDIA, IT CAN TAKE UP TO 48 HOURS OF RUNNING FOR THE MATERIAL TO DRY OUT.

19. If you have any questions about this procedure or the any of the API family of analyzers & calibrators please contact the API service department.

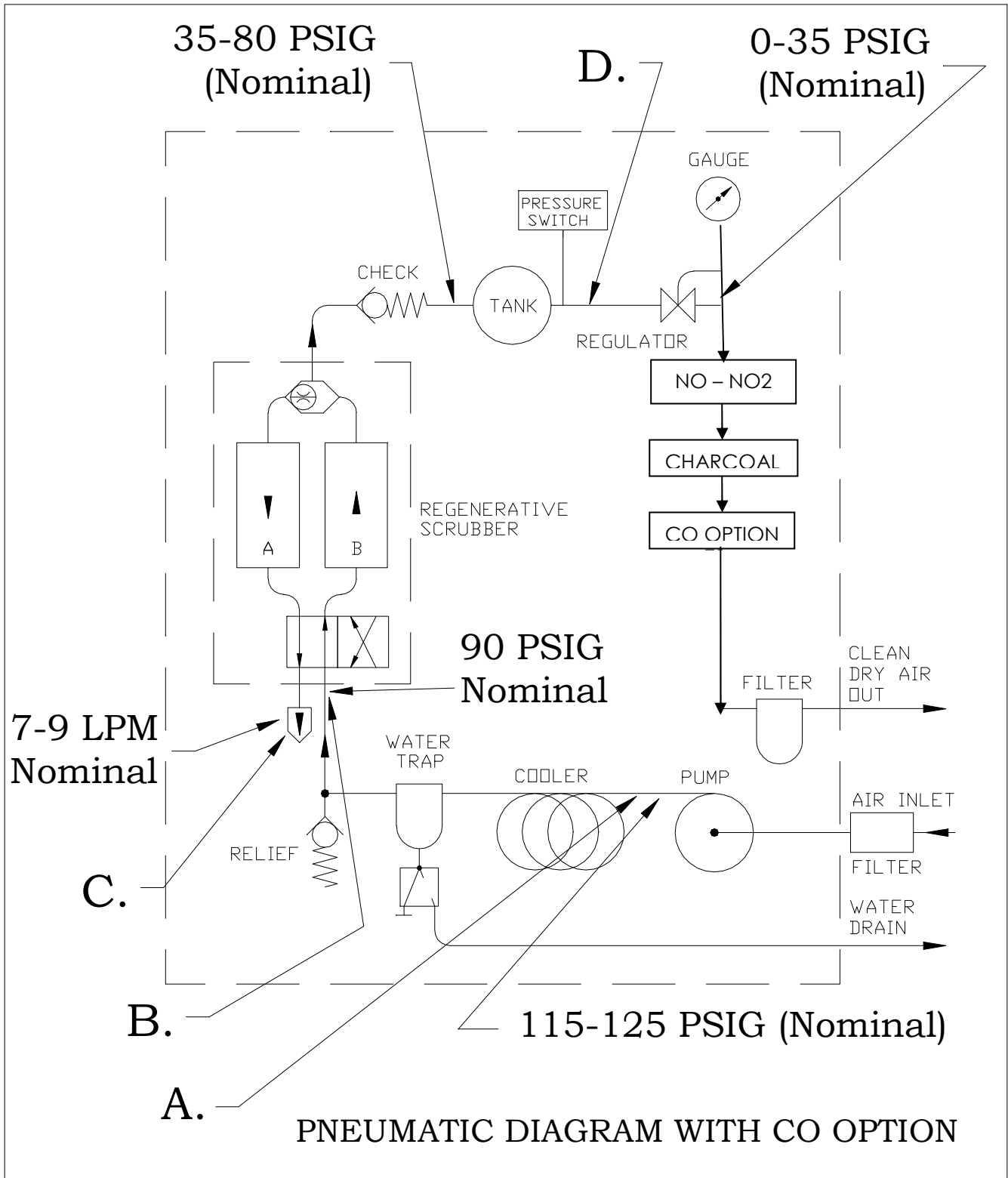
858-657-9800, or 1-800-324-5190. Email [api-customerservice@teledyne.com](mailto:api-customerservice@teledyne.com)

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**Figure 1 – Old Style M701**

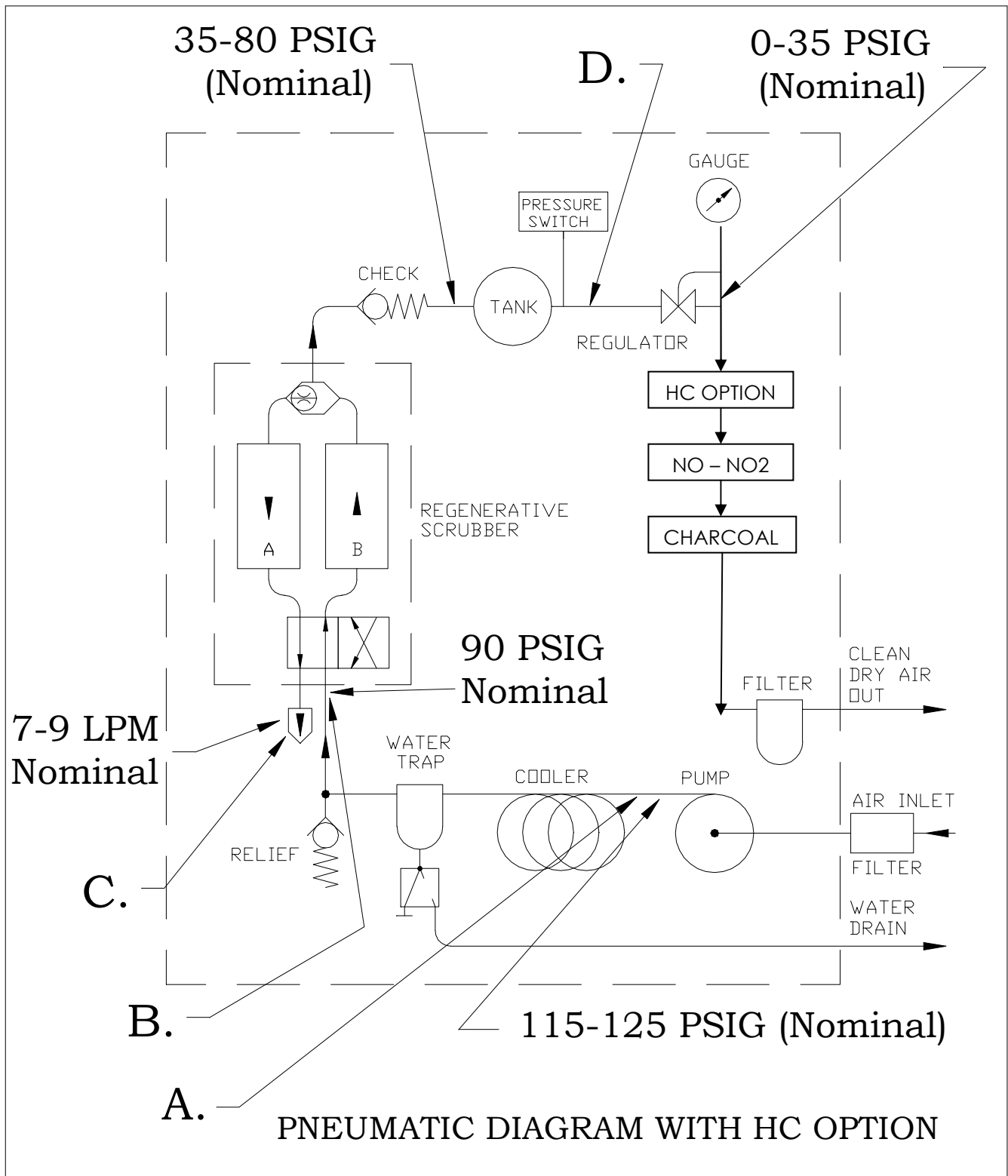


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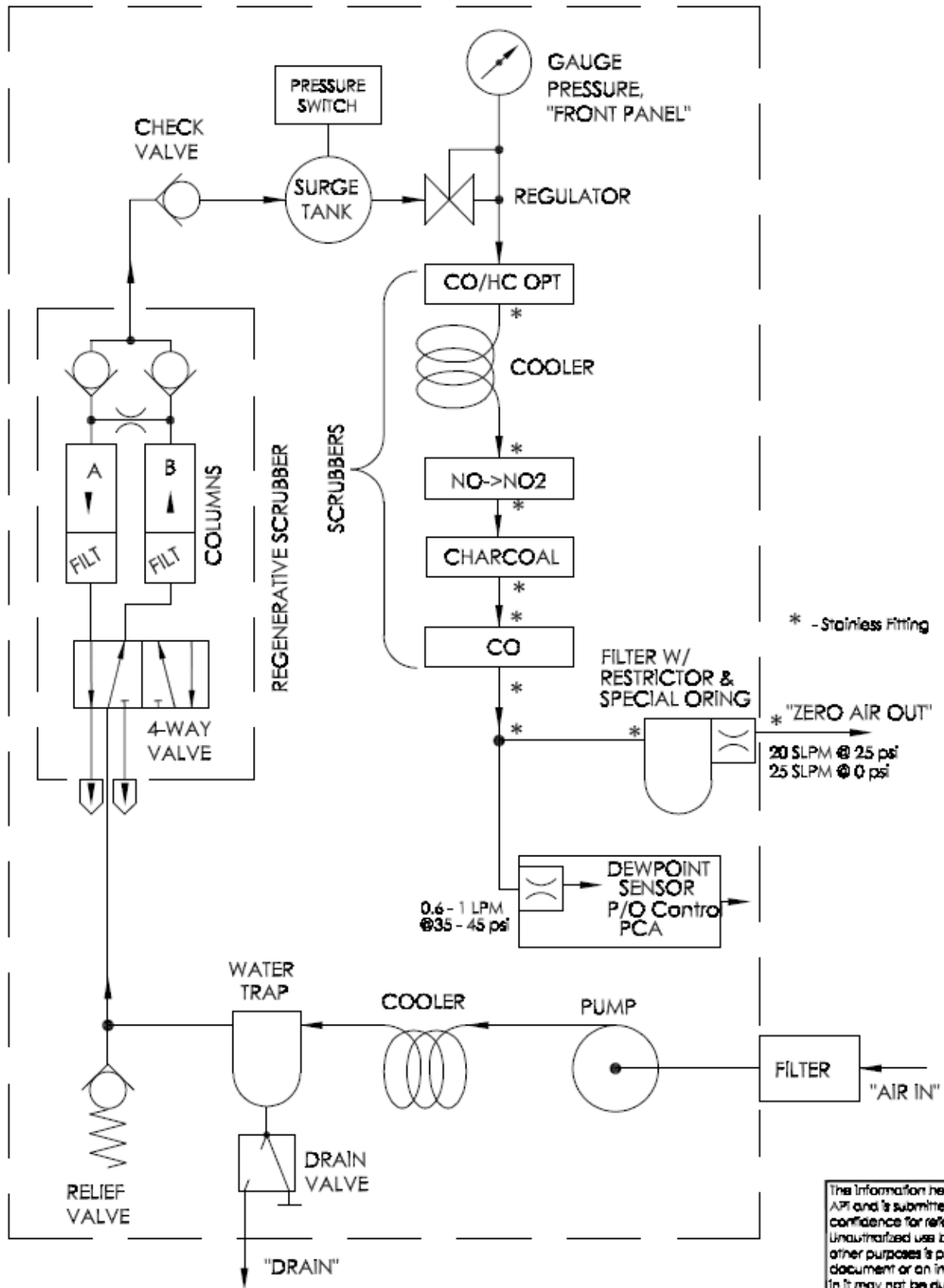
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**Figure 2 – Old style M701**



# Figure 3 - New Style M701 With Dew Point Sensor



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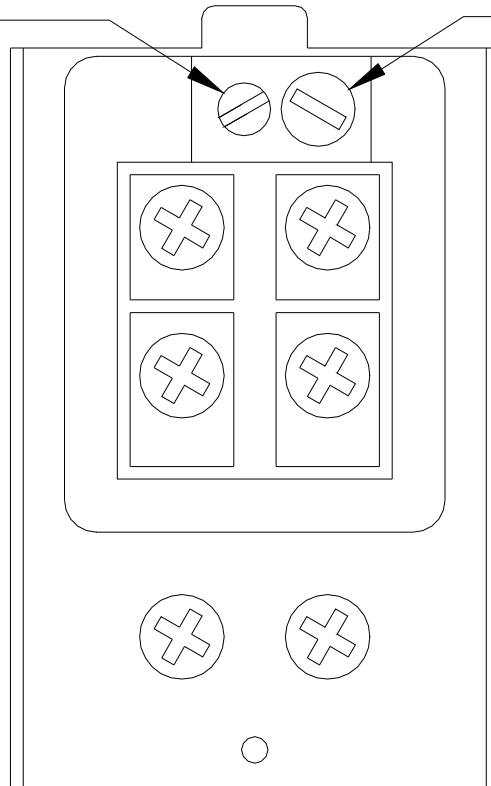
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**Figure 4**

**Old Style Pressure Switch**

TURN CLOCKWISE  
TO INCREASE BOTH  
CUT-IN AND CUT-OUT  
PRESSURE



TURN CLOCKWISE  
TO INCREASE  
CUT-OUT PRESSURE  
WITHOUT AFFECTING  
CUT-IN PRESSURE

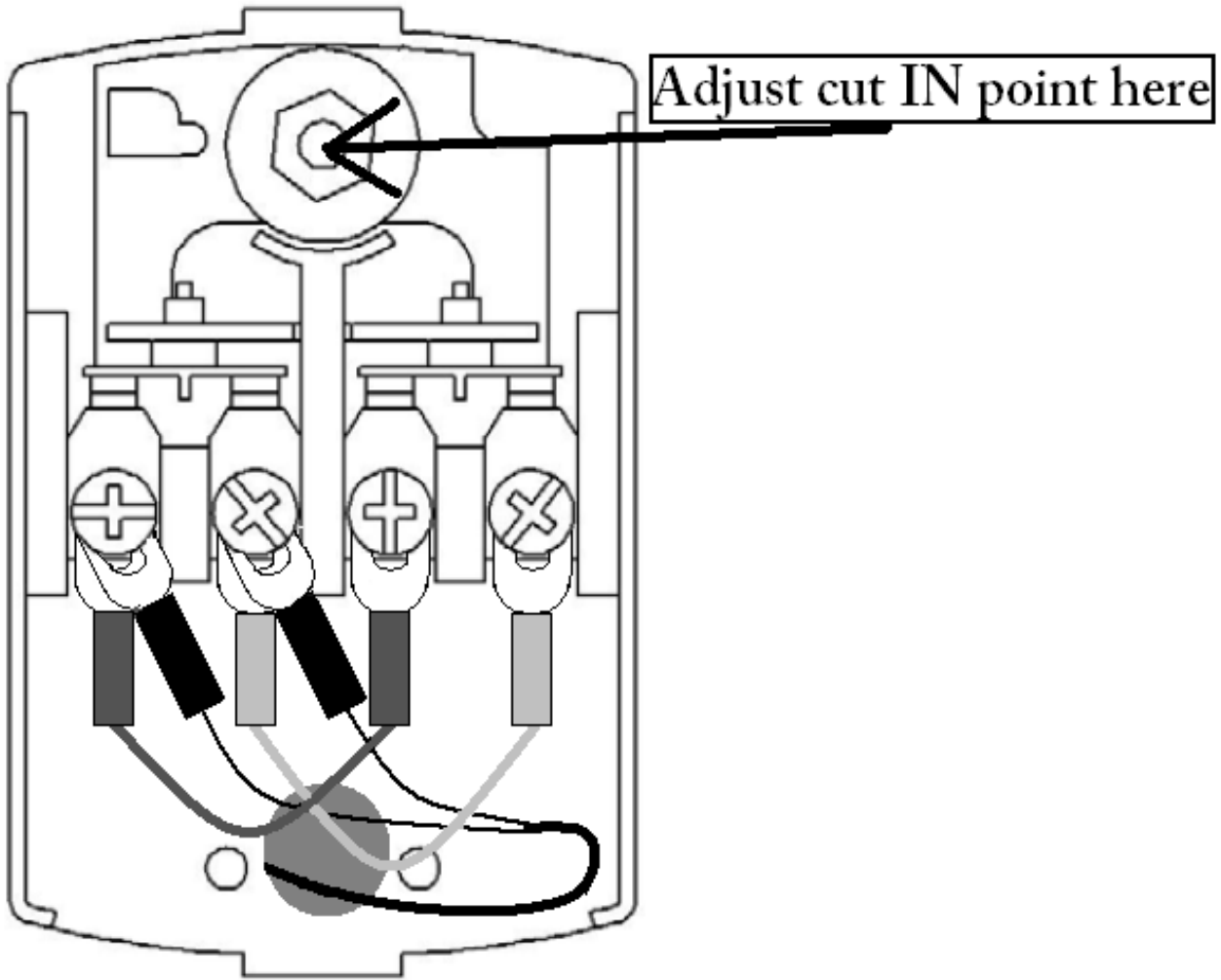
PRESSURE SWITCH ADJUSTMENT

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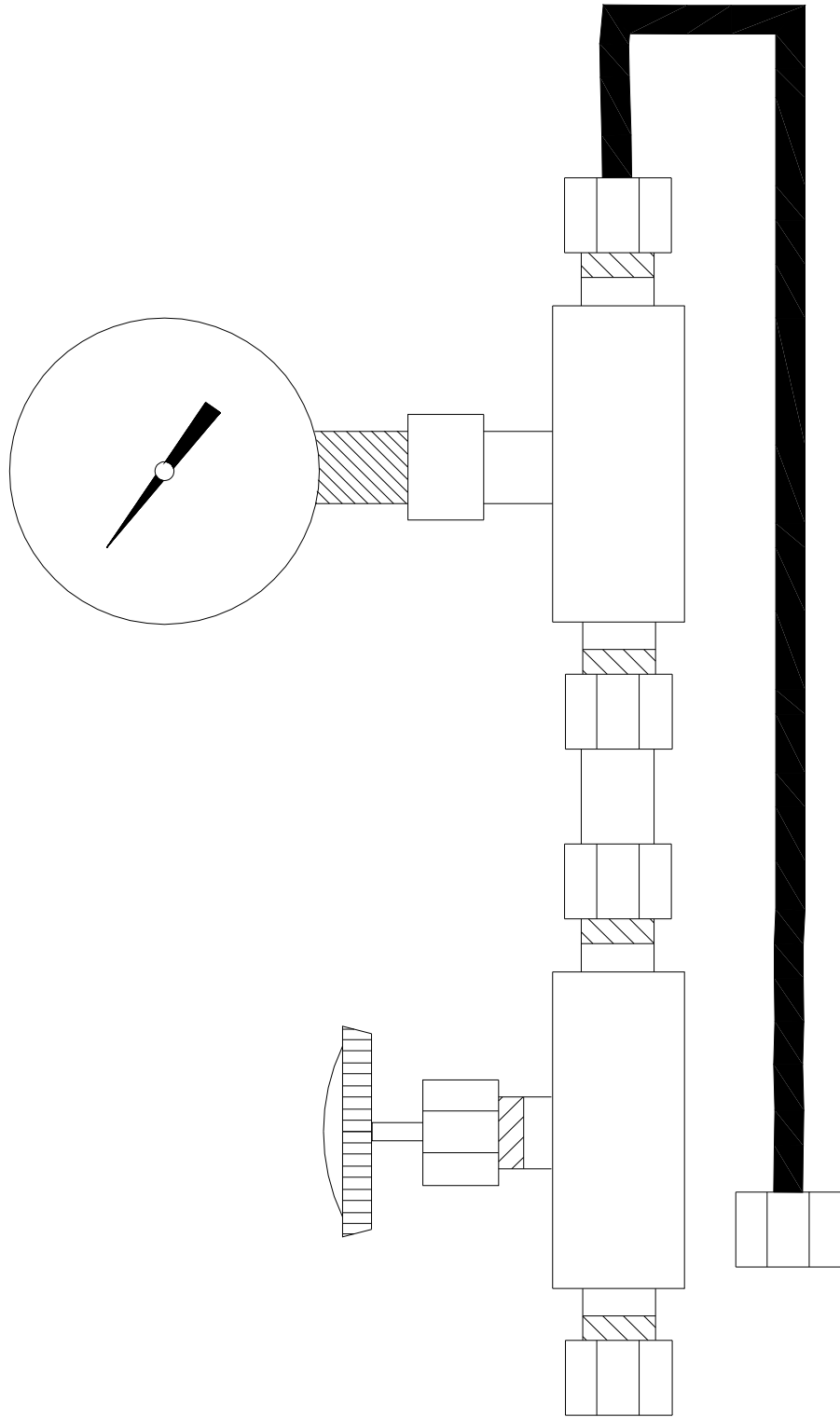
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**Figure 5**  
New Style Pressure Switch





# Figure 6



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