



**01-019C
2 May, 2007**

INSTALLING AN O₃ GENERATOR INTO A M700 THAT HAS NO OPTIONS

I. PURPOSE:

To guide you through installing an O₃ generator into a M700 that does not have any options.

II. TOOLS:

Philips tip screw driver
Flat tip screw driver
7/16" wrench
9/16" wrench
Diagonal cutters

III. PARTS:

KIT #141

IV. PROCEDURE:

1. Remove the power cord and the cover from the calibrator.
2. Turn off the valves that are at the tanks and remove the fittings at the rear panel of the calibrator.
3. Turn off the zero air source and disconnect the dilution air going to the rear panel of the calibrator.
4. Disconnect any contact closures going to the rear panel of the calibrator.
5. Fold down both the front and rear panels.

One word of caution, when you are installing these cables and tubes it is very important that you pay attention to the direction of the cables and their proximity to other devices. If the lines are pinched and they restrict flow it will be VERY difficult to troubleshoot. All the lines have been pre-bent and they should go right where they need to go without having to further bend them. These lines were pulled out of one calibrator and test fitted into another calibrator to ensure that they fit properly and to make this as easy as possible. If you find that you have to bend any lines something is wrong.

6. Remove the motherboard and pull the cable out from underneath it. Pull that cable up to the front of the instrument just to the left of the motherboard. Install the motherboard (Ensure the screws are tight or ground loops can occur).
7. Remove the fitting from the output of the Cal gas MFC and the DIL MFC.
8. Follow those two tubes to a Teflon cross (+).
9. Remove the tie downs that hold that tubing and the cross (+) into the chassis, put the tie downs aside for later use.
10. Follow the 1/4" tube from the cross (+) to the output valve, remove it from that valve.
11. Remove the fitting from the top of the output valve.
12. Follow that tube to the vent valve and remove that fitting and remove that tube.

Installing an O₃ Generator into a M700 that has no Options

01-019 Rev C

Page 1 of 11

13. Install the GPT valve and bracket in the front of the instrument so that the 90° fitting on top of the valve is about 3/8" from the front panel. If you don't have it in the most forward holes, the GPT chamber is not going to fit into the calibrator.
14. Connect the tube (SS fitting) from the GPT valve to the output of the DIL MFC.
15. Install the GPT volume directly behind the GPT valve. So that the cross (+) is forward and points inboard.
16. Connect the two 1/4" lines to the GPT volume
17. Locate the 1/4" line in the kit that has a TFE fitting on one end and a SS fitting on the other.
18. Connect this line from the rear fitting of the GPT volume (TFE) to the output valve (SS).
NOTE: This line makes a strange curve. It comes out of the GPT volume, goes down then outboard. It goes rear and then back in towards the flow meter. It then goes rear towards the output valve where it connects right up.
19. Install the O₃ Gen. Right behind the GPT volume with the fittings facing rear and the reference detector facing inboard. As you are putting this in you will see why the tube that you just put in makes that strange turn.
20. Plug the reference detector cable (6 pin connector) into the motherboard at J8.
21. Run the thermistor cable from the O₃ Gen. Forward to the motherboard and plug in J14, J15 and J16 into the motherboard.
22. Install the pressure regulator so that the regulator points rear and that you could adjust it from the rear of the calibrator if you pulled down the rear panel. You NOTE: will notice that there is a pressure transducer that is connected to the regulator. Just lay that aside we are going to install that later.
23. Locate the SS inlet manifold on the rear panel. On the front side of the manifold there is a 1/8" fitting that has a cap on it. Remove the cap.
24. On the input side of the regulator is a 1/8" tube that has a 1/8" SS fitting on the other end. Take that SS nut and connect it to the manifold on the rear panel that you just removed the cap from.
25. Follow the output fitting from the regulator to a 1/8" brass nut. This nut goes to a brass 90° fitting on the bottom of the O₃ generator.
26. Locate the O₃ valve and manifold from the KIT. Install it in front of the vent valve. The valve goes inboard away from the power supply module.
27. Connect the "T" fitting that is connected to the top of the O₃ valve to the input to the vent valve. This is the fitting right there on the bottom of the vent valve.
28. Connect the other end of this T fitting to the top of the output valve.
29. Connect the power for the O₃ valve to the rear panel PCB. This valve connects to J9. This is the next to the bottom valve driver on the rear panel card.
30. Follow the 1/8" tube from the O₃ valve to the other two Teflon fittings at the other end of the tubes.
31. These two 1/8" TFE fittings connect to the GPT volume at the cross (+) on the front of the GPT volume.
32. Follow the 1/8" tube from this cross (+) to the other end of the tube that has a 1/8" SS nut. Connect that nut to the output of the CAL gas MFC.
33. Install the new pressure transducer into the chassis in front of the two MFC's.
34. Connect the wire on the other end of the pressure transducer board to the motherboard (J11).
35. Install the UV lamp power supply into the chassis. Check to ensure that J1 is already plugged into the UV lamp power supply.

NOTE: push all the tubes and wires that are on the floor of the calibrator up against the CAL gas MFC. When you do this be VERY careful that you don't pinch any tube between the UV lamp driver and the floor of the instrument. If you short out any wires or pinch any tubes, it is going to be very hard to trouble shoot.

36. Connect the connector that is labeled J10 to the power supply module (not UV lamp power supply). In the connector J10.
37. Trace the other side of that cable to the other end and it is going to be labeled J13. Rout this forward between the UV lamp power supply and the MFC to the motherboard to connector J13.
38. This should conclude the installation of the ozone generator into your M700. You should not have any more parts for this calibrator.
39. Leak check the calibrator. If the calibrator leaks it could potentially not make the proper amount of gas. This is especially likely when installing a GPT volume. It is very difficult to get the Teflon fittings on the GPT volume to not leak. Sealing Teflon to glass is especially tough.
40. DO NOT progress forward with this until you find all the leaks.
41. Put zero air to the rear of the calibrator and turn it on.
42. When it boots up push "SETUP-MORE-VARS-929-ENTER-NEXT" all the way to the end and you find the VAR called "FACTORY OPTION". Push "EDIT" and change this valve to 32. Push ENTER and EXIT back out to the sample menu.
43. Push the TEST button until you come to dilution pressure. This should read about 30 psig. If not adjust your M701 output pressure so that you have 30 psig on the front of the CALIBRATOR, do not trust the M701 gauge, the M700 pressure transducer is more accurate.
44. Push the TEST button until you come to regulator pressure. This should be 20 psig. If it is not fold down the rear panel and adjust the regulator pressure until the front panel reads 20 psig.
45. Remove the fitting from the output of the flow controller that is on the output of the O₃ generator.
46. Use your flow meter and measure the flow coming out of the orifice and write that down.
47. Push "SETUP-MORE-VARS-929-ENTER-NEXT" until you come to "O₃_FLOW" edit this VAR and put in the value that you measured. This value ought to be in the 100 cc/min range.
48. Goto section 9.1.4.1 of the manual and the DAC calibration instructions.
49. This is now a good time to measure the MFC's and ensure that they are working right. Goto section 9.1.4.2 and follow the MFC calibration instructions. If you would like further directions on how to calibrate the MFC's in the M700 contact your local API representative or distributor and ask for service note 99-015.
50. Goto section 9.2 and follow the O₃ generator lamp setup instructions.
51. Goto section 9.1.4.3 and follow the O₃ generator calibration instructions.

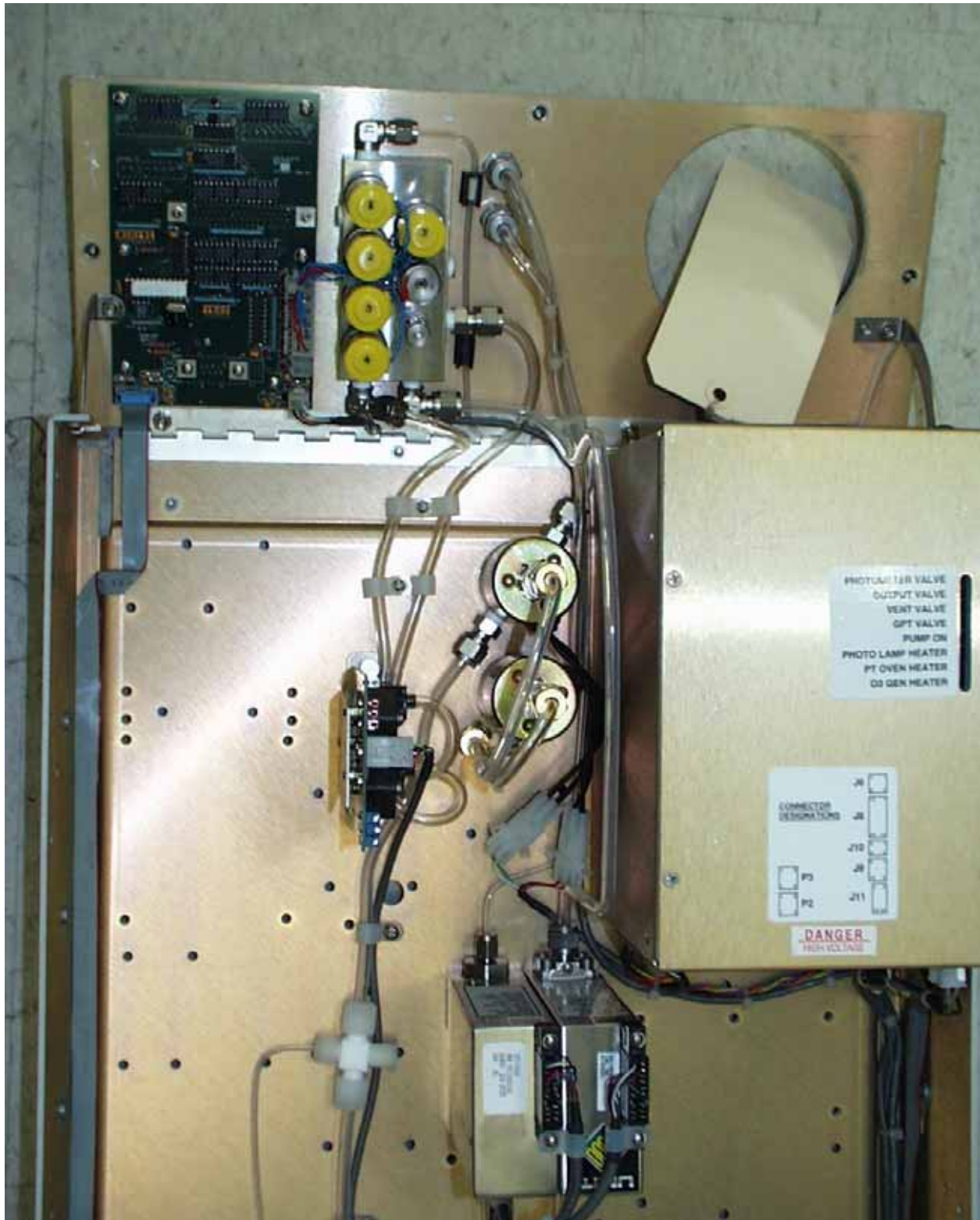
NOTE: this is going to require that you have an external way to monitor the amount of ozone that you are making.

52. If you have any problems with this procedure or any part of this procedure feel free to contact the API customer service department. Please do include the serial number of the calibrator, all the values of the test functions (you can obtain a list of these things in the customer service section of the API web site). and what specifically you are having problems with.

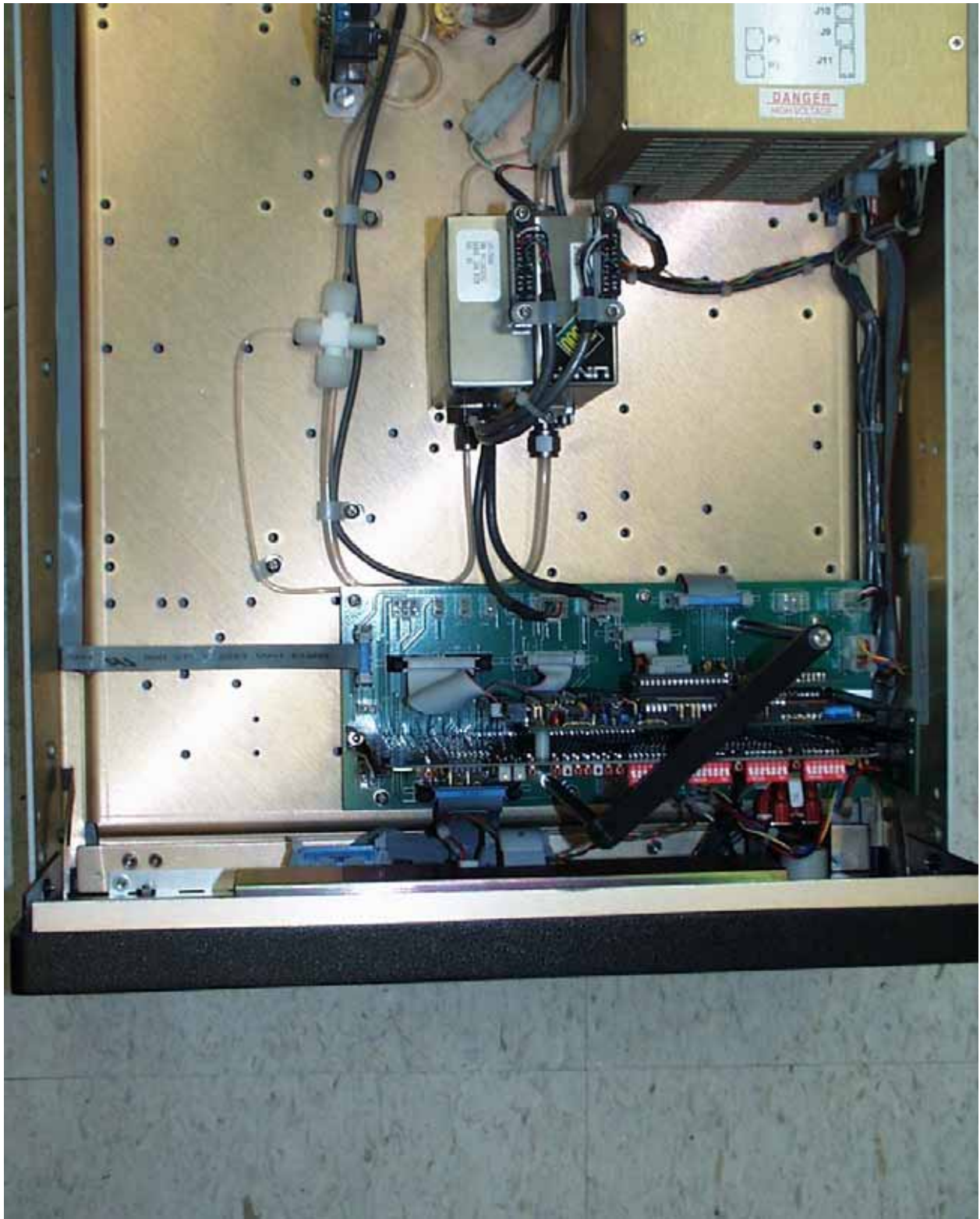
COMMENT: when troubleshooting the M700 calibrator we have found that there are a number of problems that we have encountered. By far the most common problems are leaks in the pneumatics. and by far the most common place for the pneumatics to leak is at the GPT volume where the Teflon fittings connect. If you have to remove the GPT volume from the circuit and bypass it to prove or disprove the existence of a leak there. If you can not find the leak via the normal bubble solution method, try removing systems from the calibrator until you find the leaks.



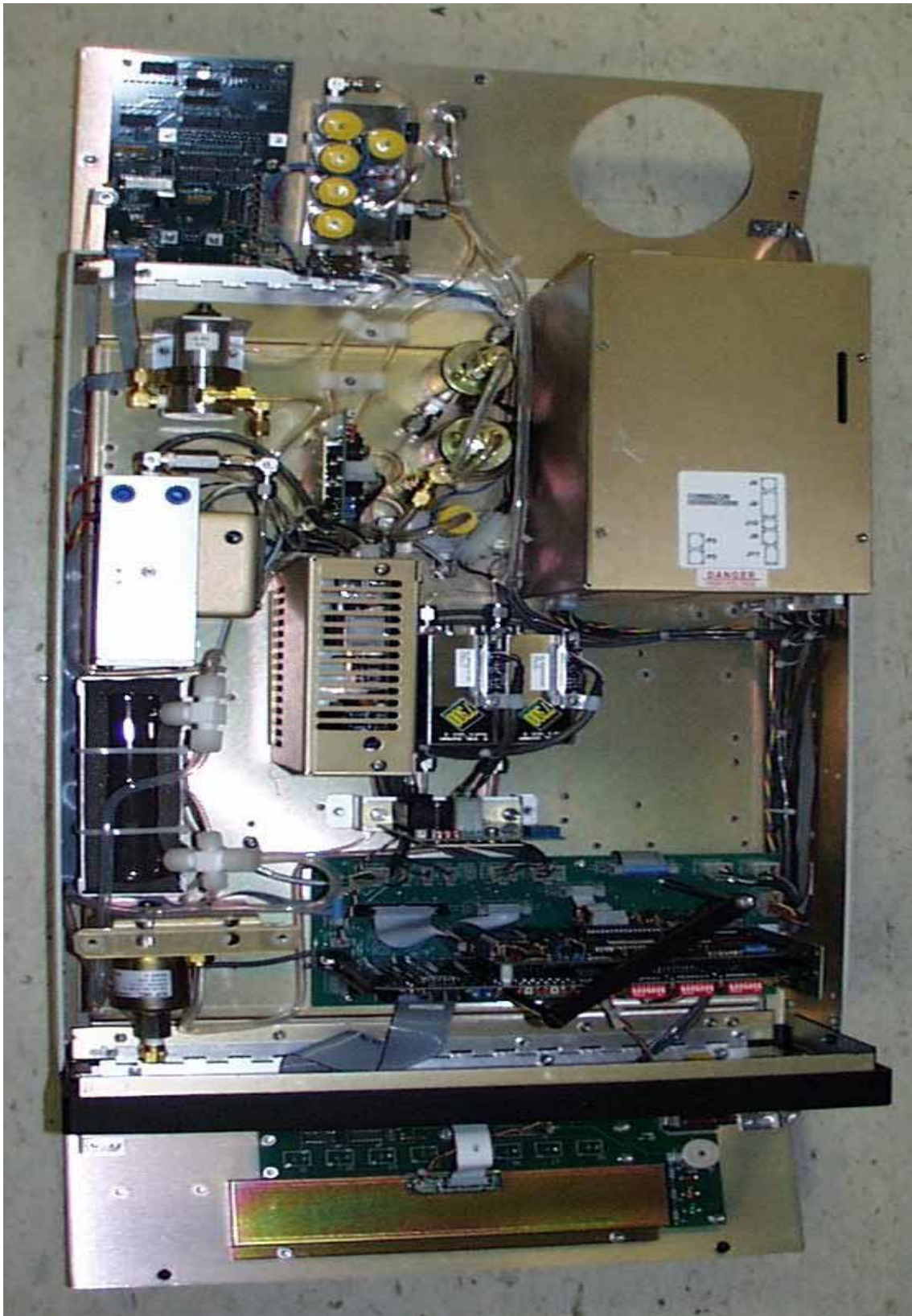
Installing an O₃ Generator into a M700 that has no Options
01-019 Rev C
Page 4 of 11



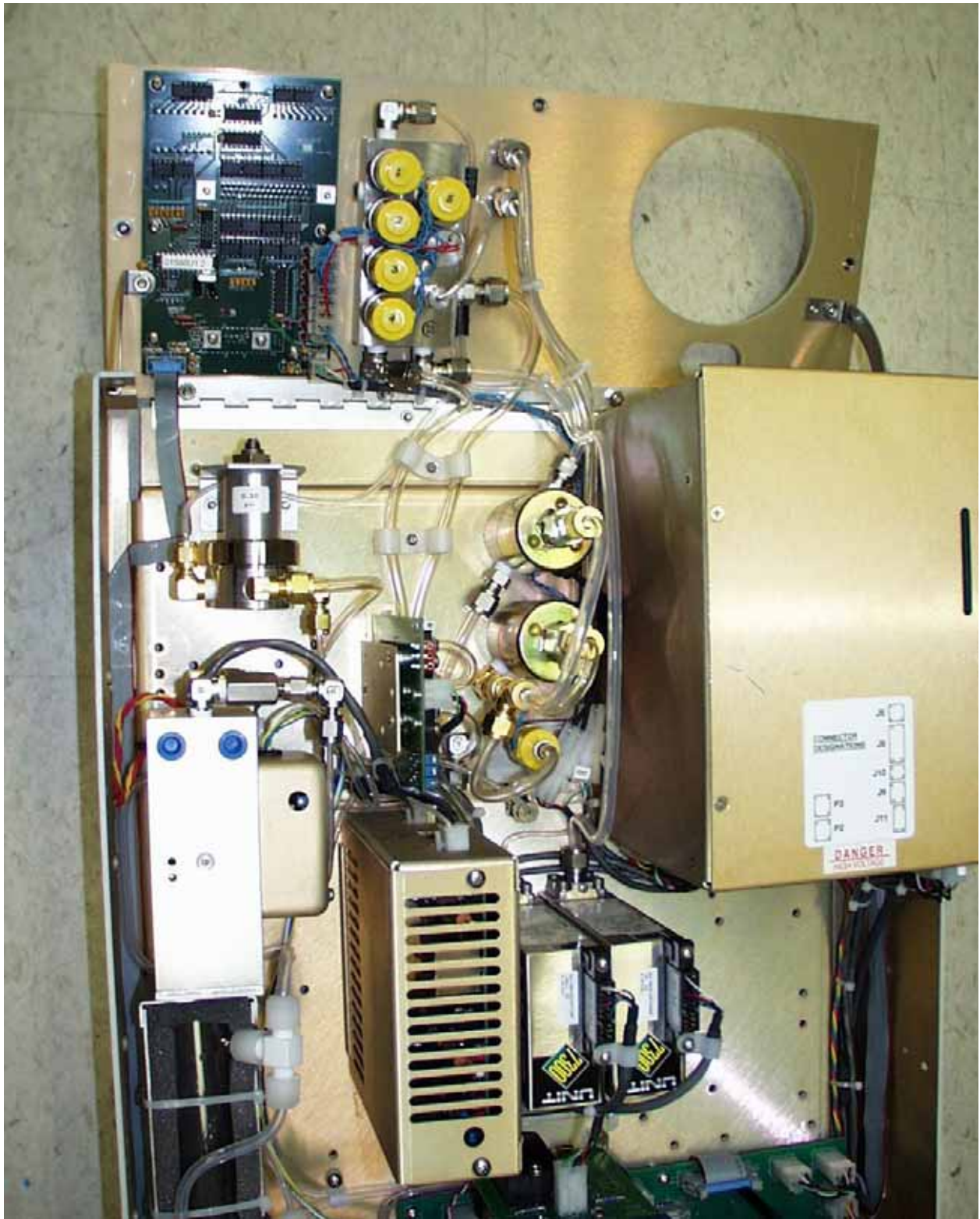
Installing an O₃ Generator into a M700 that has no Options
01-019 Rev C
Page 5 of 11



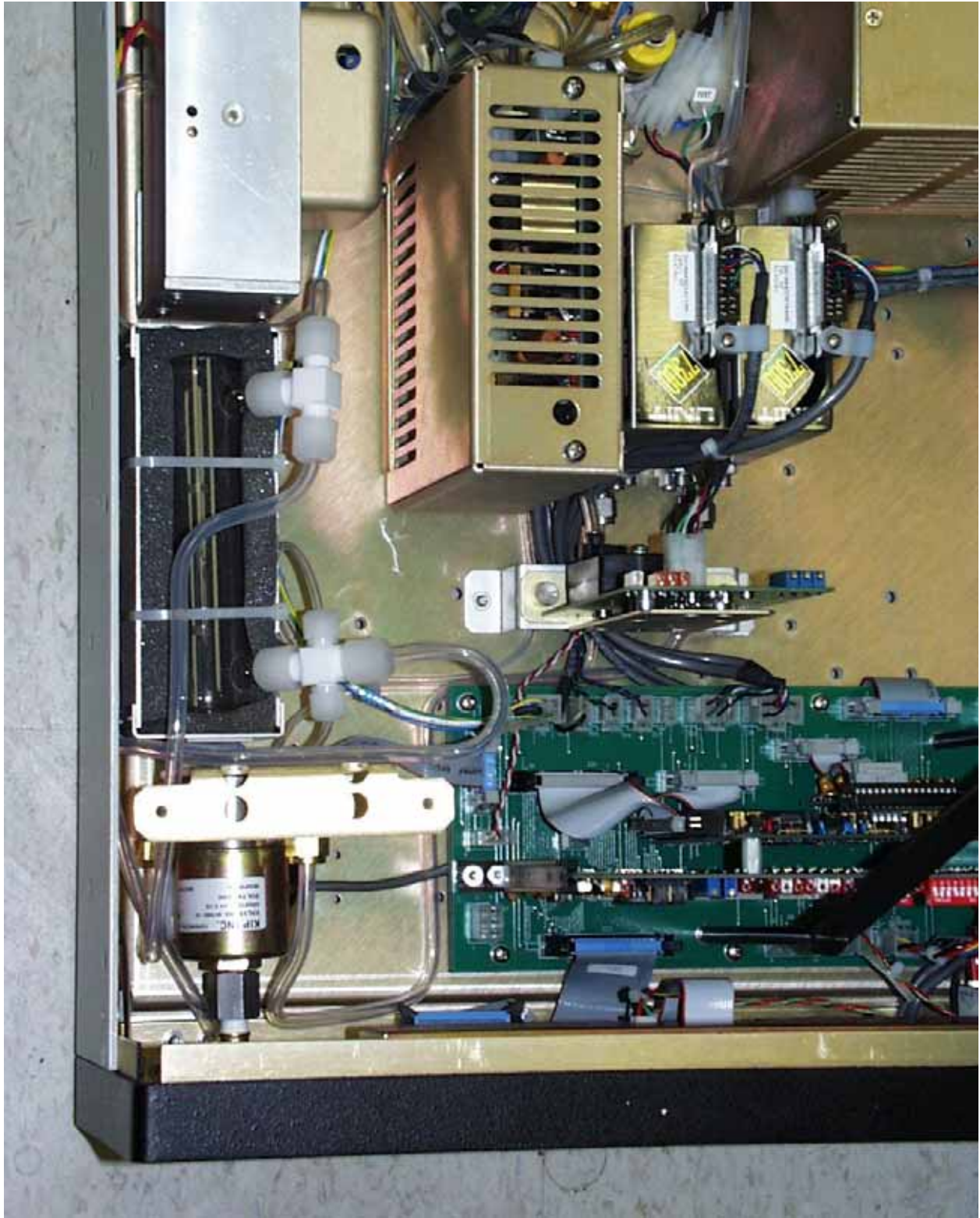
Installing an O₃ Generator into a M700 that has no Options
01-019 Rev C
Page 6 of 11



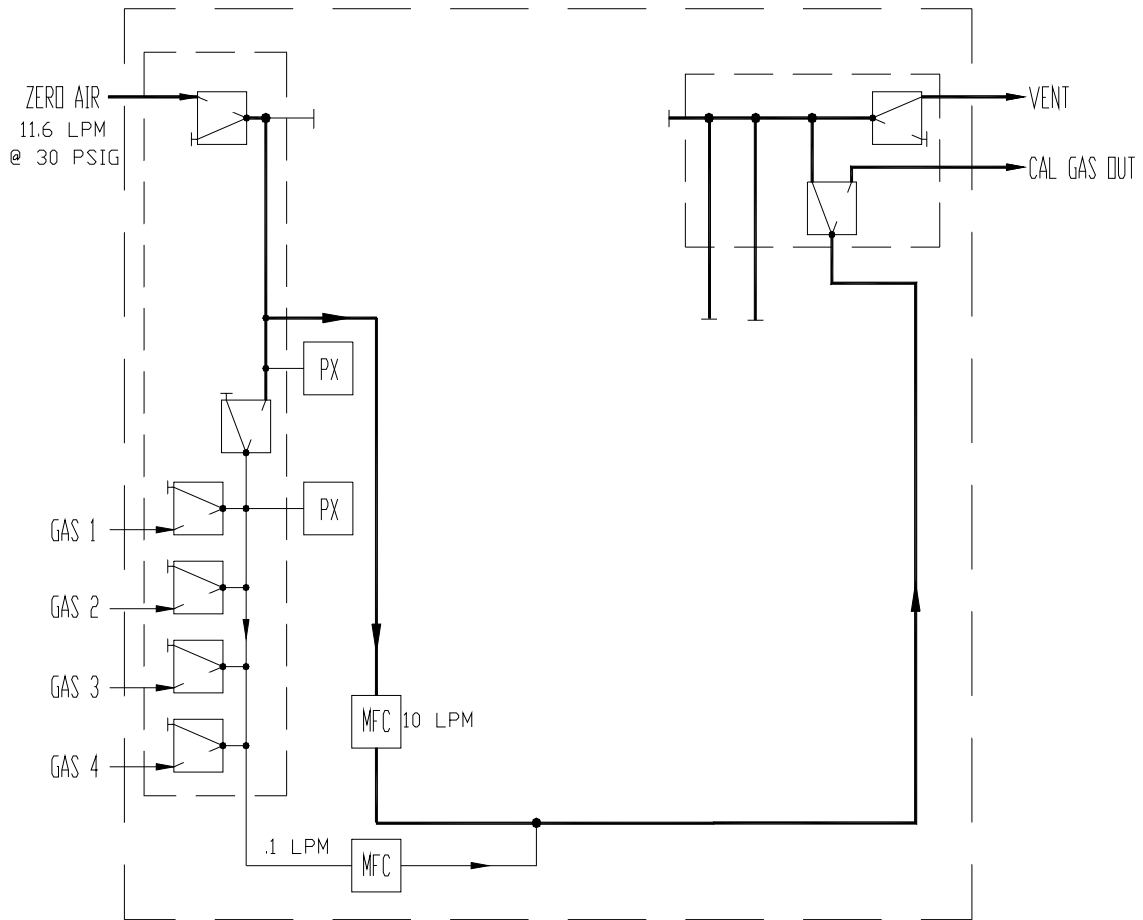
Installing an O₃ Generator into a M700 that has no Options
01-019 Rev C
Page 7 of 11



Installing an O₃ Generator into a M700 that has no Options
01-019 Rev C
Page 8 of 11

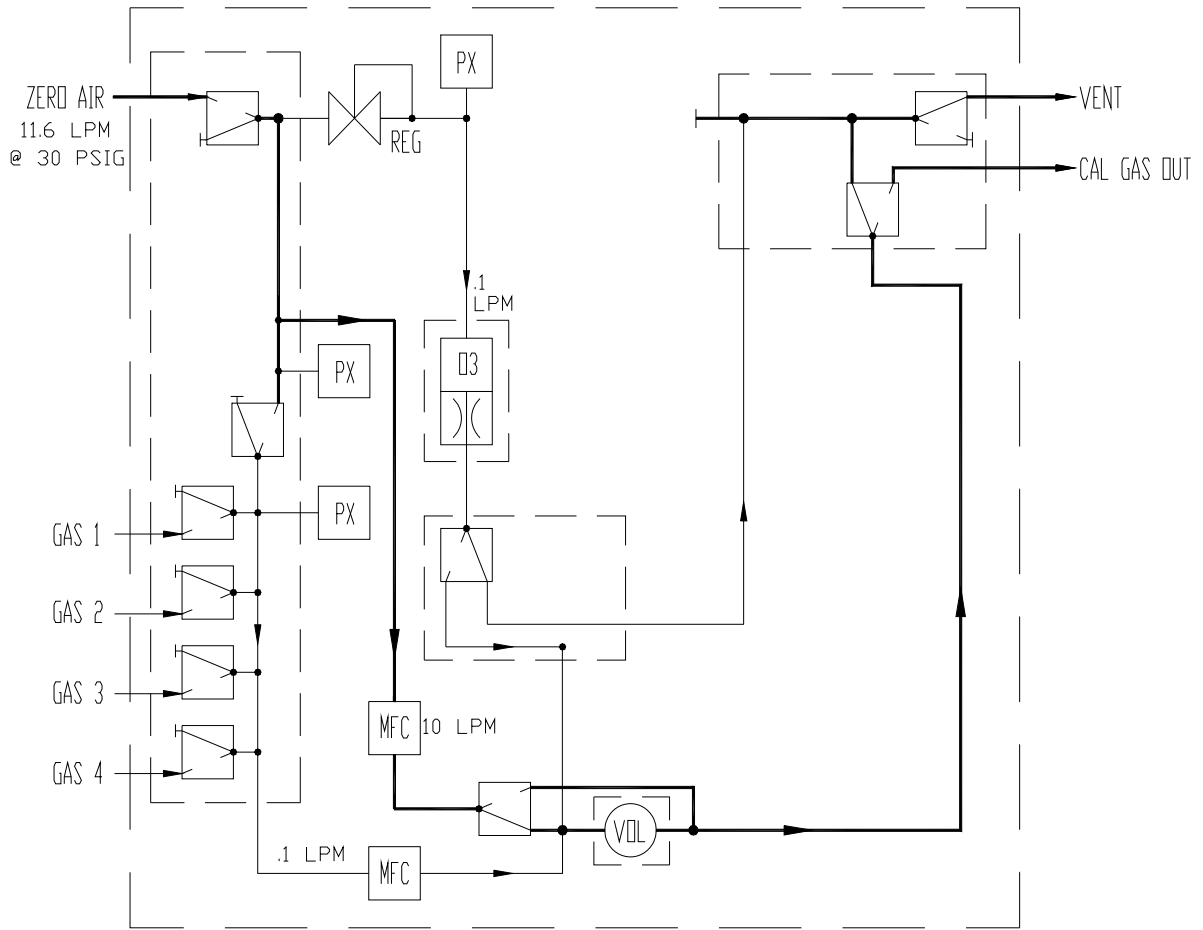


Installing an O₃ Generator into a M700 that has no Options
01-019 Rev C
Page 9 of 11



M700 PNEUMATIC DIAGRAM (Dilution Only)

Installing an O₃ Generator into a M700 that has no Options
 01-019 Rev C
 Page 10 of 11



M700 PNEUMATIC DIAGRAM (ozone option only)

Installing an O₃ Generator into a M700 that has no Options
 01-019 Rev C
 Page 11 of 11