Theory of operation

The auxiliary EPC channels are controlled by a pressure setpoint. To work properly, there must be adequate flow resistance downstream of the pressure sensor. The auxiliary channel pneumatics manifold provides a frit-type restrictor for each channel. Four frits are available:

Frit Marking	Flow Resistance	Part no.
Blue Dot	High	19234-60660
Red Dot	Medium	19231-60770
Brown Dot	Low	19231-60610
None (brass tube)	Zero	G1570-20540

The Red Dot frit is in all three channels when the instrument is shipped.

The figures on the next two pages show approximate pressure/flow relationships for the three Dot frits, assuming there is no significant additional resistance downstream of the frits.

If the Zero resistance frit is installed, the user must provide flow resistance downstream and generate the pressure/flow relationships.

WARNING When hydrogen is used, dangerously high flows are possible if insufficient flow resistance is provided downstream of the supply tube. Always use either the High (Blue Dot) or Medium (Red Dot) frit with hydrogen.

External flow restrictor (Type 2 manifold)

Use an external flow restrictor (part no. G1530-80380) on each auxiliary EPC channel to be used for a flammable gas (i.e., hydrogen). The restrictor prevents excessive gas flow in the event of a leak in the manifold or its input fitting.



External flow restrictor





Replacement procedures

For general replacement procedures for a Type 1 manifold, see Pneumatics Control Module.

Removing the auxiliary manifold (type 1 or type 2)

- **WARNING** Hydrogen gas is flammable and potentially explosive. Before replacing the manifold, turn off the hydrogen gas at the source.
- **WARNING** Before proceeding, turn off the oven and any heated zones and let them cool down. Turn off all detector gases at their supply, then turn off the main power switch and unplug the power cord.
 - 1. Remove the pneumatics cover, the RFI shield, the detector cover, the electronics cover, the right side cover, and the top rear panel.
 - 2. Remove the gas supply tubing from the present manifold. See Figure 360-1.









3. Remove the Torx T-20 mounting screw from the front of the manifold. See Figure 360-2.



Figure 360-2 Removing the auxiliary flow manifold

- 4. Disengage the tubing from the slots in the chassis so that the gang fitting on the manifold can be removed easily. See Figure 360-2.
- **Caution** Always hold the Type 2 manifold by its support bracket to avoid damaging board components.
 - 5. Unlock the manifold's ribbon cable from the pneumatics control board and detach the connector. The adjacent ribbon cable may have to be removed as well.
 - 6. Remove the one Torx T-20 screw holding the gang fitting on the manifold. See Figure 360-3.
- **Caution** Do not lose the O-rings when you remove the gang fitting.



Manifold, installed before January 1999

Manifold, installed after January 1999

Figure 360-3 Removing the gang fitting

Installing a type 2 manifold

If you are replacing a Type 1 manifold with a Type 2 manifold, order the accessory kit, G1570-60720. This kit contains a new pneumatics control board bracket that is required for the Type 2 manifold. See also Replacing the PCB bracket.

- **WARNING** Hydrogen gas is flammable and potentially explosive. Before replacing the manifold, turn off the hydrogen gas at the source.
- **WARNING** Before proceeding, turn off the oven and any heated zones and let them cool down. Turn off all detector gases at their supply, then turn off the main power switch and unplug the power cord.
- **Caution** Always hold the manifold as shown below to avoid damaging board components.

1. While holding the manifold by the black plastic frame as shown below, slip the label through the slot in the mounting bracket, and align the bracket holes over the gas fittings.





2. Finger-tighten three 7/16-inch hex nuts over the fittings to hold the bracket in place. It is **very important** that you do **not** tighten the nuts yet. See Figure 360-4.





Figure 360-4Bracket mounted onto the manifold

- 3. Peel the blank label from its backing and paste it on the mounting bracket over the screw heads. See Figure 360-4.
- 4. If you need to change one or more auxiliary channel frits, do so now. See the Agilent 6890 GC Operating Manual/CD-ROM.

- 5. If the tubing from the gang fitting bends to the left, reshape it so that it bends up and back from the block as shown in Figure 360-6.
- 6. Insert the gang fitting through the cutout in the manifold bracket and install it onto the new manifold assembly so that the tubing runs back and away from the fitting.
 - Be sure that the three O-rings are in place.
 - Be sure the left tube clears the inner edge of the bracket. See Figure 360-6.

Tighten the screw on the gang fitting until the gang fitting touches the manifold.

7. Route the ribbon cable to the right side of the manifold assembly as shown in Figure 360-5. Then, slide the manifold and bracket assembly into the Aux slot until the bracket seats flush against the end of the rails. See Figure 360-6.



Figure 360-5 Routing the ribbon cable



Figure 360-6 Manifold, after installation

- 8. Route the gas tubing behind the manifold, over the top of the chassis, and through the slots as shown in Figure 360-2 and Figure 360-6.
- 9. Connect the ribbon cable to the mating connector on the pneumatics board. This is behind the connector for the back detector and faces up. See Figure 360-7.
- 10. Secure the manifold in place using the Torx T-20 mounting screw. See Figure 360-2.



Figure 360-7 Auxiliary and back detector connectors

11. If the detector cable is in the way, remove it temporarily while you connect the Aux cable. Arrange the cable to keep it away from the valves and keep it from being pinched against the manifold.

- **Caution** Overtightening may cause hazardous leaks. Tighten the hex nuts exactly as described below.
 - 12. Use a wrench to tighten the 7/16-inch hex nuts 3/4 turn only.
 - 13. Using a pair of needle-nosed pliers, remove the top rear panel cutout for Auxiliary. Also remove any cutouts needed to access other manifolds or accessories installed in the GC. See Figure 360-8.



14. Place the new top rear panel on its left-most mounting screw. Use the screw as a hinge and angle the panel while sliding each manifold ID tag through its cutout in the panel, working from left to right. When all the tags are through the panel, finish installing the panel on the GC.

15. Attach the Aux EPC label to the top of the pneumatics chassis as shown in Figure 360-9 below.



Figure 360-9 Attaching the Aux EPC label

- 16. Install the RFI shield, the pneumatics cover, and the detector top cover.
- 17. If using hydrogen or other flammable gases, install an external flow restrictor, part no. G1530-80380, on each fitting that will be used for a flammable gas.



18. Check for leaks.

Restore the GC to operating condition

1. Plug in the GC and turn it on.

2. Press [Aux #][3], [Aux #][4], or [Aux #][5] to access the desired channel. If your manifold is correctly installed, you will see the following display:



[†] An actual flow value is displayed when the gases are off or not connected. This is not an error. After the gases are connected and the detector is operational, the actual flow values will be equal to the setpoint values.

- 3. If the display reads Aux not installed, recheck your cable connections.
- 4. Zero the pressure sensors:
 - a. Make certain that no gases are connected to your manifold.
 - b. Press [Options] and scroll to Calibration $\rightarrow Aux$ pressure.
 - c. Scroll to Aux 3 zero and press [On].
 - d. Scroll to Aux 4 zero and press [On].
 - e. Scroll to Aux 5 zero and press [On].



5. Connect the source gas lines to the manifold. See Figure 360-10.

Figure 360-10 Gas line connections

6. Restore gas pressures and leak check all fittings.

Changing an auxiliary channel frit

- 1. Locate the block that connects the three gas outlet tubes for the auxiliary channels to the pneumatics module.
- 2. Remove the screw that holds the block to the pneumatics module. Pull the block free of the module and rotate it so that the frits are on top.



- 3. Pull the frit to be changed out of the block. Also remove the O-ring that seals it.
- 4. Place an O-ring on the new frit. Place the O-ring/frit combination in the block.
- 5. Reconnect the block to the pneumatics module. Tighten the screw firmly.