沪制01150234号

Agilent G3440-68011 Micro Electron Capture (µECD) 3rd Detector

For the Agilent 7890B Gas Chromatograph

Installation Instructions

Parts Supplied

Table 1 Parts supplied

Description	Quantity	Part number
Electron Capture Detector (µECD)	1	G2397-65506
µECD 3rd detector box assembly	1	G3440-60011
µECD board (included with µECD Module)	1	G3433-61020
µECD Caution label	1	19233-90730
3rd µECD supply tube weldment 200 mm	1	G3433-81000
Third detector EPC communication cable	1	G3432-60505
Third detector heated zone cable	1	G3432-60506
Third detector PCA frame assembly	1	G3430-00122
Frame 3rd EPC	1	G3430-00062
Third detector adaptor plate	1	G3497-00001
Solenoid valve bracket	1	G1580-00070
AUX Zone/VLV box cable	1	G1530-60660
MSD HTD Zone	1	G1530-60790
Nutwarmer cup assembly	1	19234-60700
Nutwarmer insulation	3	19234-60715
Scr-Mach M4X0.7 25 mm	2	0515-2712
M4 x 12 mm screws	11	0515-2496
Nameplate (attached to detector)	1	7120-1454
1/8-inch nut & ferrule set brass swagelok	1	5181-7481
Bulkhead fitting retainer, 316 SST	1	0100-0137
1/8-inch bulkhead union	1	0100-0133
M 4 captive screw	2	1390-1023

Parts Identification

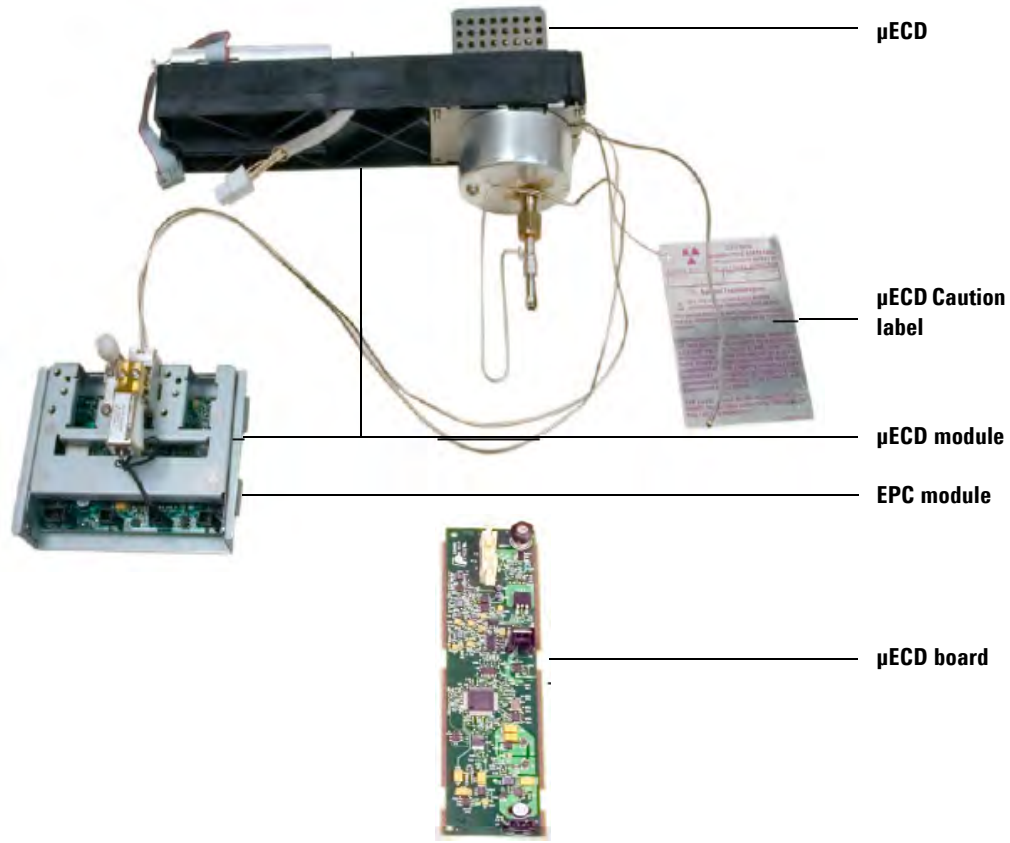


Figure 1 µECD Parts identification

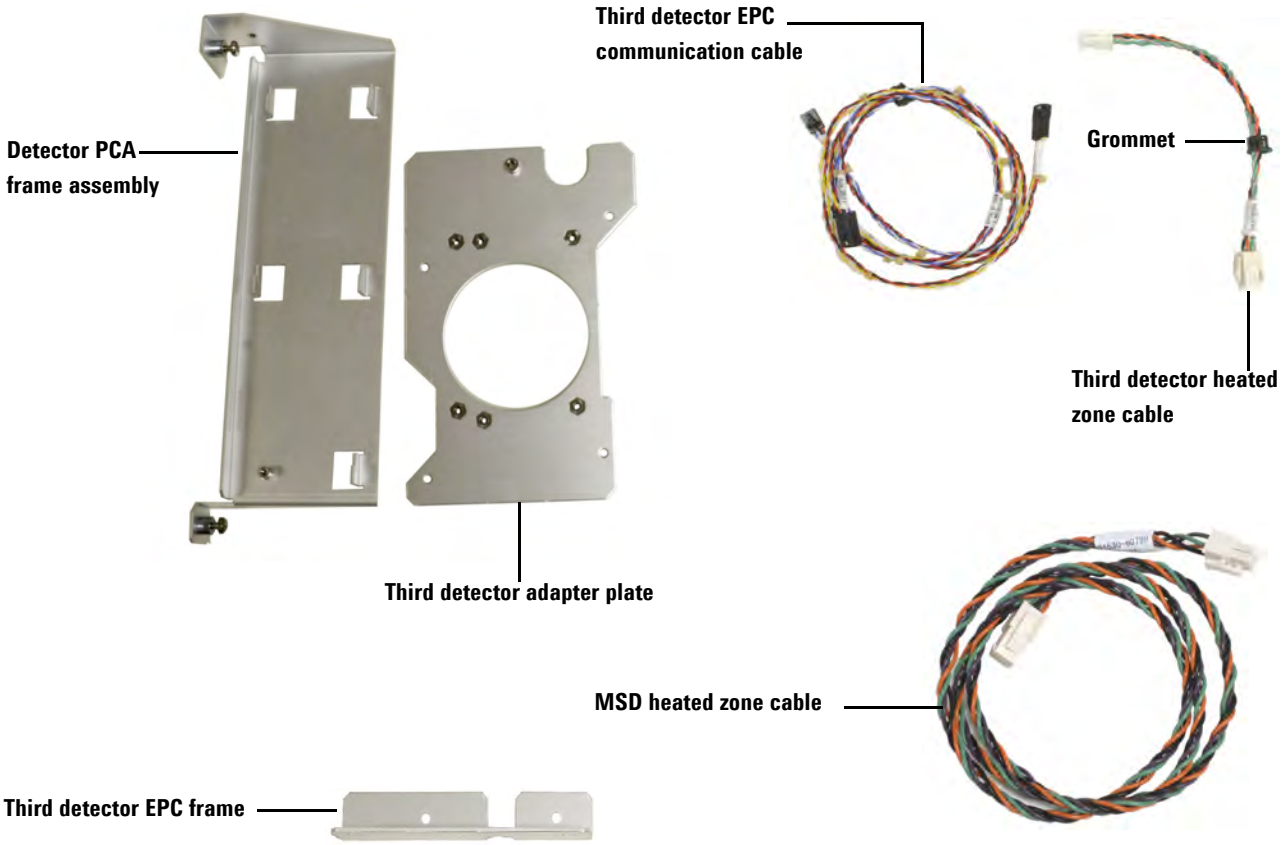


Figure 2 Brackets and cables

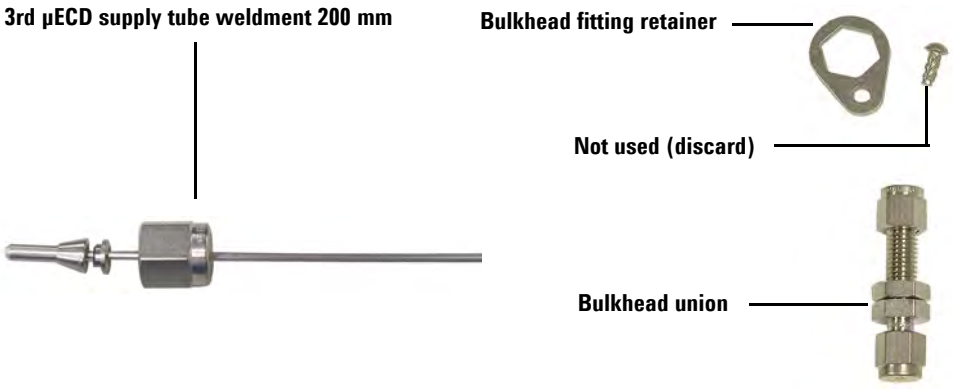


Figure 3 Pneumatic parts

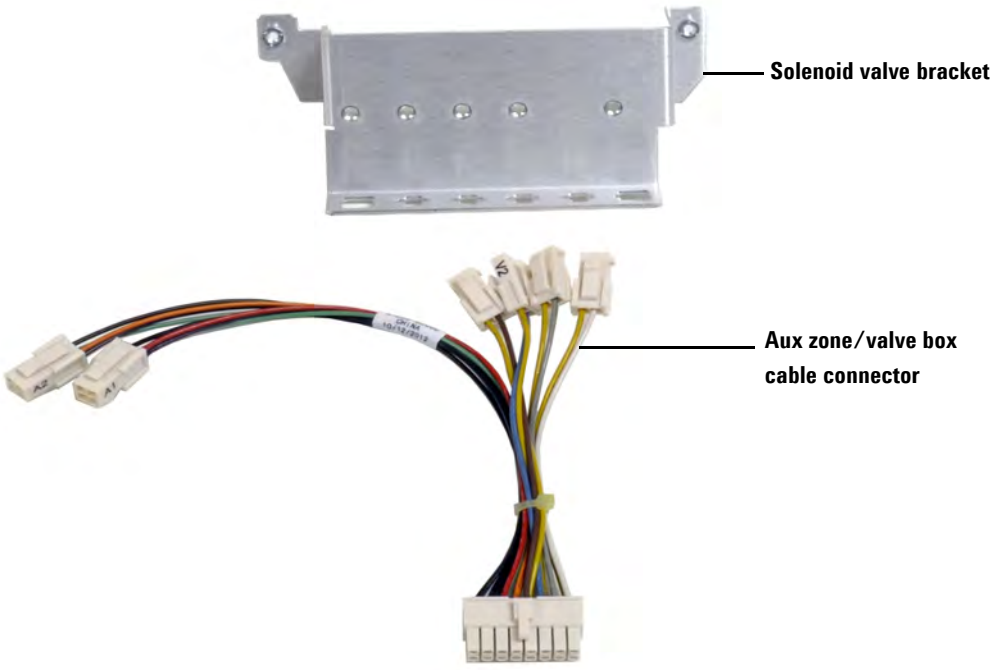


Figure 4 Solenoid valve bracket and aux zone/valve box cable

Tools Required

- T-20 Torx driver
- Flat screwdriver
- 7/16-inch and 1/2-inch Open-end wrench
- Phillips head screwdriver
- ESD wrist strap

Installation Procedure

This procedure explains how to install the Side-Mounted Electron Capture Detector (µECD) accessory on the Agilent 7890B Gas Chromatograph (GC).

WARNING **Refer to the Safety Manual that came with your Agilent 7890B Gas Chromatograph for hazards that may exist when maintaining your instrument.**

WARNING **All versions of µECD cells contain radioactive material. Exposure to radioactive material is hazardous to human health. Under no circumstances should an µECD cell be disassembled, as this is in violation of the General License agreement. µECDs must be returned to a licensed facility. Agilent will accept only µECDs manufactured by either Hewlett-Packard or Agilent Technologies, Inc.**

WARNING **Before proceeding, turn off the column heater and other heated zones and let them cool down. When they have cooled, turn off any detector gases at their supply, then turn off the main power switch and unplug the power cord.**

CAUTION Always allow time for the column heater and other heated zones, to cool before turning off the gas supplies. Failure to allow cooling may damage the flow path.

CAUTION Make sure you are properly grounded with an ESD wrist strap before continuing.

Prepare the GC

1. If the GC is connected to a mass spectrometer (MS), vent the MS and shut it down. Refer to the MS Operation manual.
2. If a headspace sampler (HS) is installed to a GC inlet, disconnect it. Refer to the HS documentation.
3. Set the GC oven temperature to 40 °C. Turn off the inlet, detector, valve box, and other heaters.
4. When the oven cools, turn off the GC and unplug the power cord.
5. Allow time for the detector(s) and other heated zones to cool.
6. Remove the pneumatics cover. Two large buttons on each side of the GC secure the cover to the detector frame. Press both buttons and lift the cover off.

7 Remove the detector cover by raising the cover vertically (until it is perpendicular to the GC oven) and then firmly lifting up on the right side of the cover to free it from the hinge pin. Slide the cover's hinge pin out of the hole on the inlet side and set the cover aside.

8 Remove the electronics cover. Loosen the screw on the left side of the electronics cover. Open the cover 90 degrees and lift up on the right side. Slide the cover off of the left side hinge.

9 Remove the GC right side cover. Loosen the single top screw, then slide the cover towards the back of the GC and remove.

10 Remove the top back cover by loosening the four screws. Slide the top back cover to the left until free, gently tilting out the lower end of the cover as needed for removal.

11 Remove the GC left side cover by loosening the top screw, sliding the panel towards the back, and lifting off the cover.

12 Put on an ESD wrist strap, and attach the ground to the GC sheet metal frame for electrostatic protection.

Install the solenoid valve bracket and cables

1 Skip to step 6 if the solenoid valve bracket is already installed on your GC.

2 Insert the four smaller valve plugs and two larger aux heater plugs into the slots in the solenoid valve bracket. Match the labels on each plug to its correct location as shown in Figure 5.

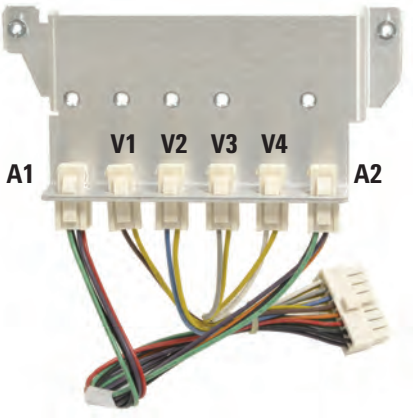


Figure 5 Connector installation for the solenoid valve bracket

3 Connect the aux zone/valve box cable connector into the analog and power (A&P) board at P22. See Figure 6.

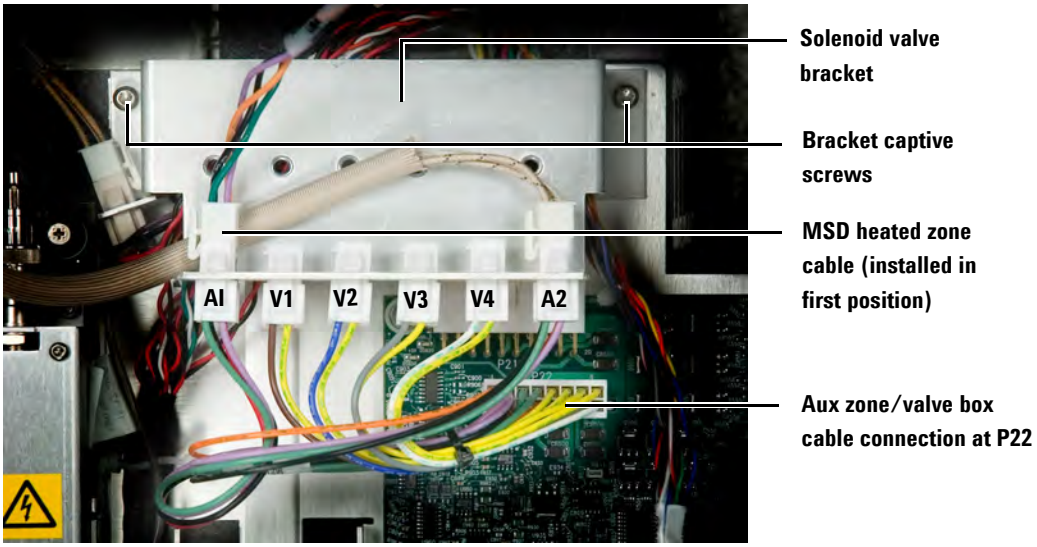


Figure 6 Aux zone/valve box cable and solenoid valve bracket install

4 Align the solenoid valve bracket so the cables are coming from the bottom of the bracket and the screws are located at the top over the screw holes in the frame. See Figure 6.

5 Tighten the captive screws into the frame.

6 Connect the MSD heated zone cable (long) to the bracket in the first (A1) or last (A2) position. Record its position for use during configuration.

7 Route the MSD heated zone cable (long) across the top of the GC oven. Pass it under any detector gas lines and through the channels to the right side of the instrument. See Figure 7.

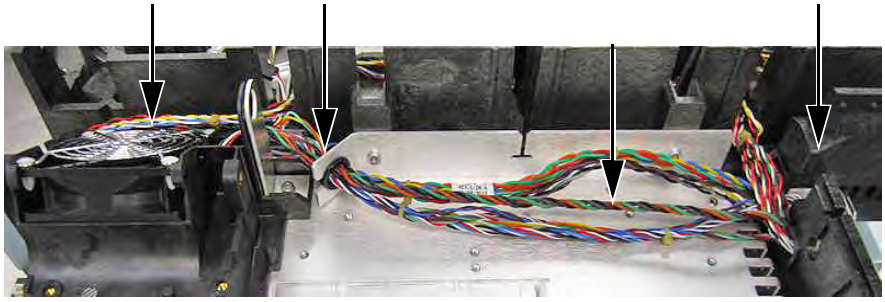


Figure 7 Route the MSD heater cable across the GC oven top (view from front of GC)

8 On the left side of the oven top, unfasten the grommet and include the MSD heated zone long cable. See Figure 8. Refasten the grommet.

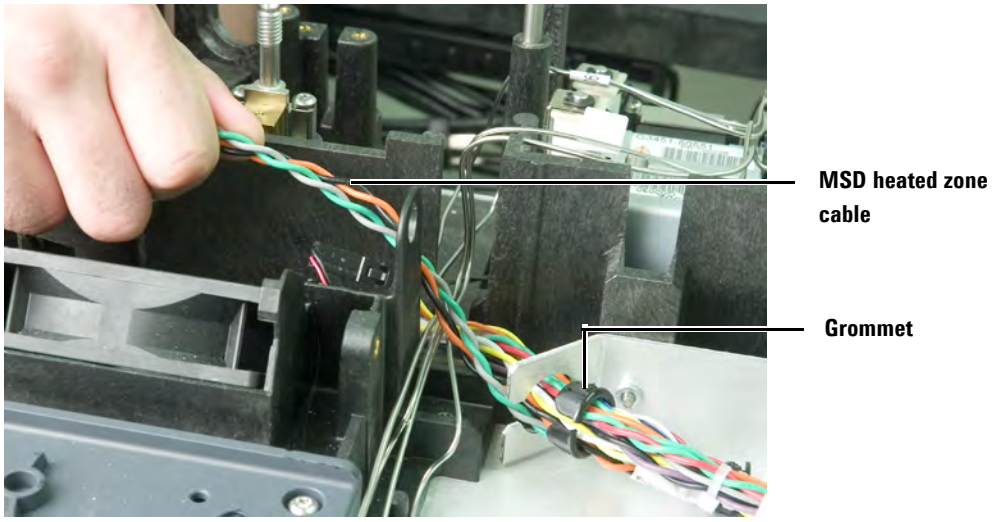


Figure 8 MSD heated zone cable included in main communication grommet

9 Route the MSD heated zone cable behind the inlet fan and down the left side of the GC. Include it in the grommet as shown in Figure 10 on page 10.

10 Connect the third detector heated zone cable to the open end of the MSD heated zone cable (on the side of the GC). See Figure 10 on page 10.

11 Connect the **EPC5** female connector of the third detector communications cable to the matching **EPC5** connector on the main communications harness. The **EPC5** connector is typically located in EPC bay 5. See Figure 9 on page 9. You may need to lift any PCM or Aux EPC module to access **EPC5** on the main harness.

12 Connect the **Aux Det1** female connector of the third detector communications cable to the matching **Aux Det1** connector on the main communications harness. **Aux Det1** is located in the back inlet EPC bay.

As an example, shown in Figure 9, is a TCD EPC communications cable connection and routing.

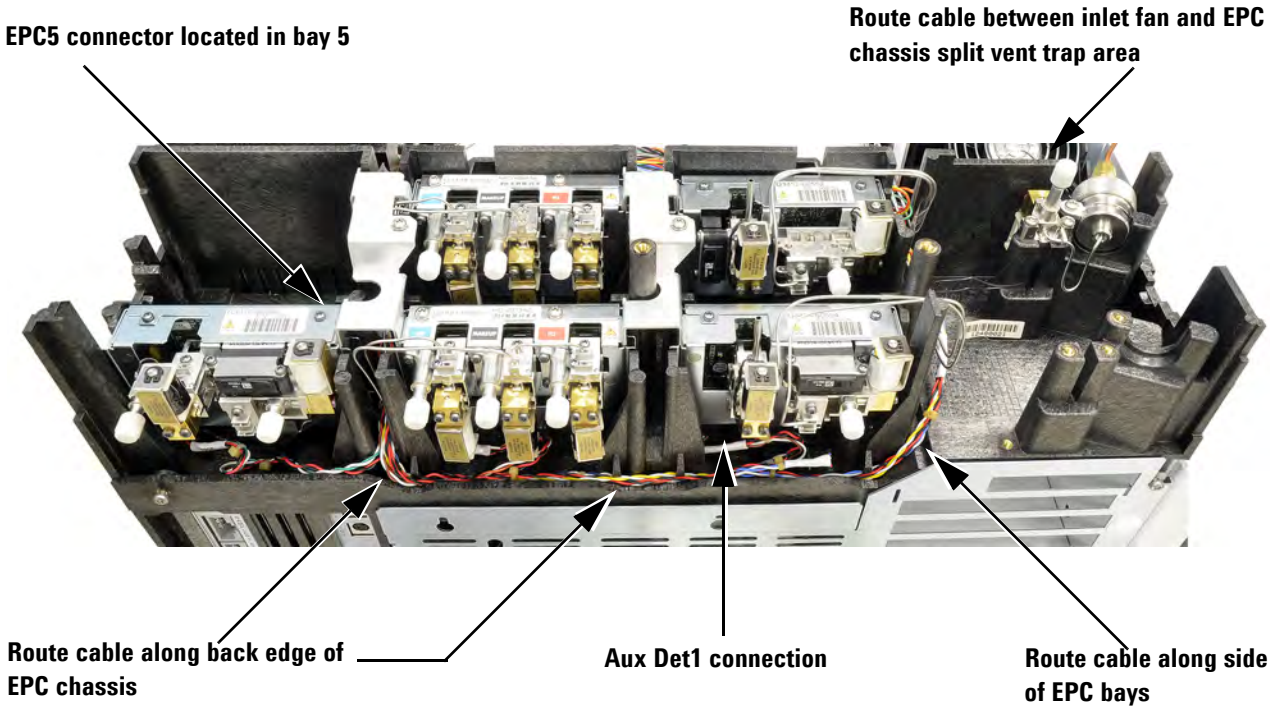


Figure 9 Third detector EPC communications cable connections and routing

13 Route the third detector EPC communications cable along the outside edge of the EPC carrier, back and through the slot near the inlet fan, then behind the inlet fan and down the left side of the GC. See Figure 9 and Figure 10.

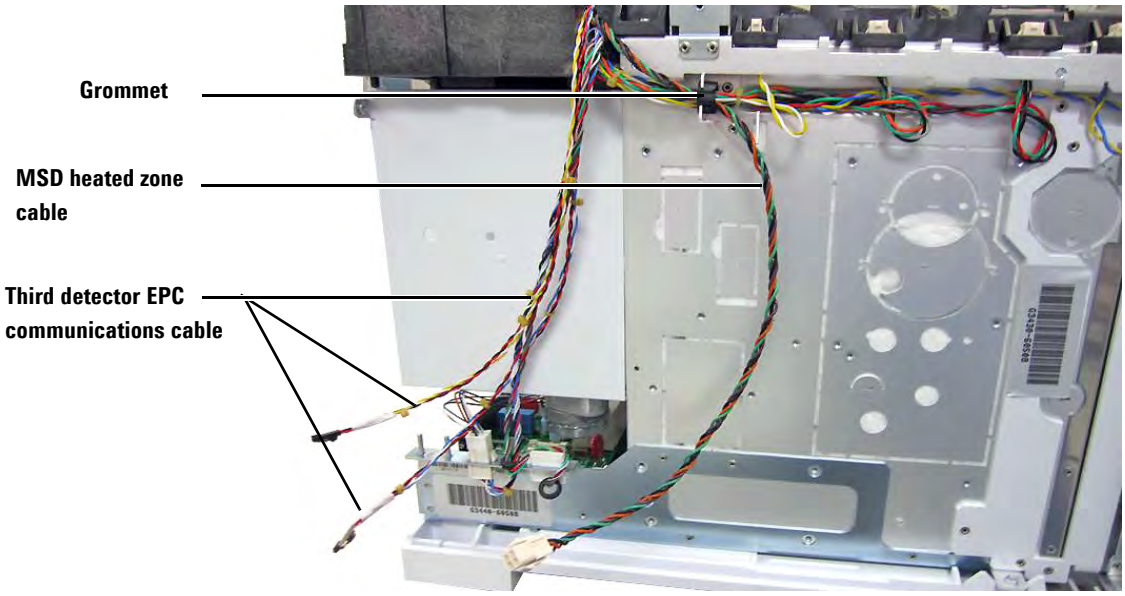


Figure 10 Route the third detector EPC communications cable

Prepare the GC left side

1 Use a flat-head screwdriver to remove the sheet metal knockout on the left side of the GC. See Figure 11.

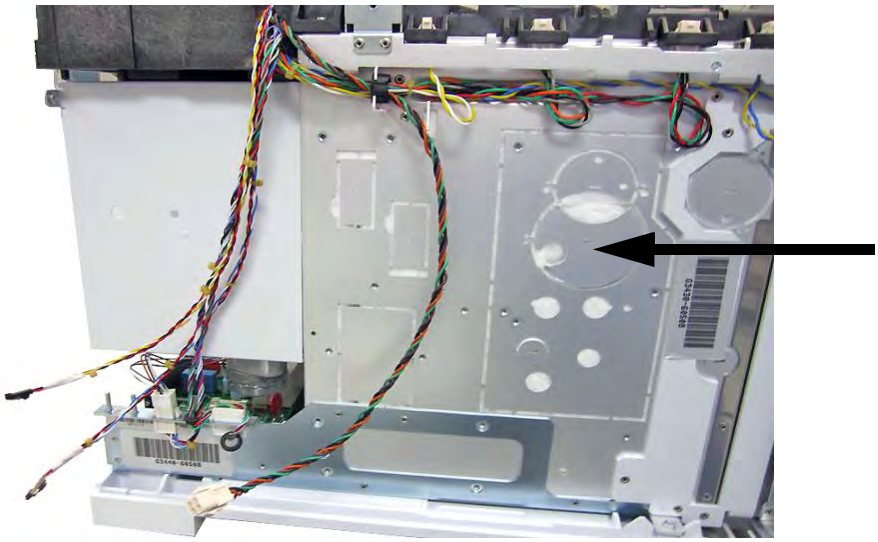


Figure 11 Remove sheetmetal knockout

2 Remove the circular insulation plug and any excess insulation. Use a flat-bladed screwdriver to create a 1/4-inch hole through the oven insulation and into the oven. See Figure 12.

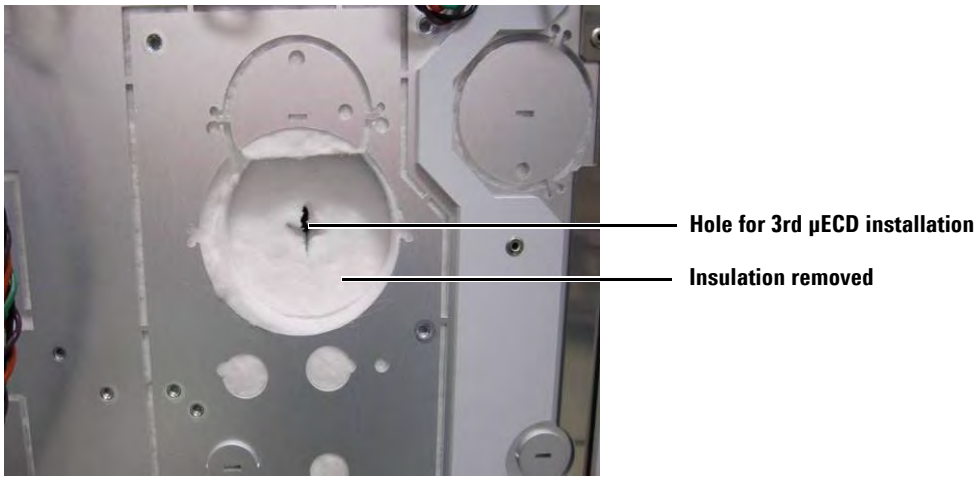


Figure 12 Prepare mounting hole for the µECD

3 Install the 3rd detector adaptor plate to the side of the GC using four 12 mm M4 screws. See Figure 13.

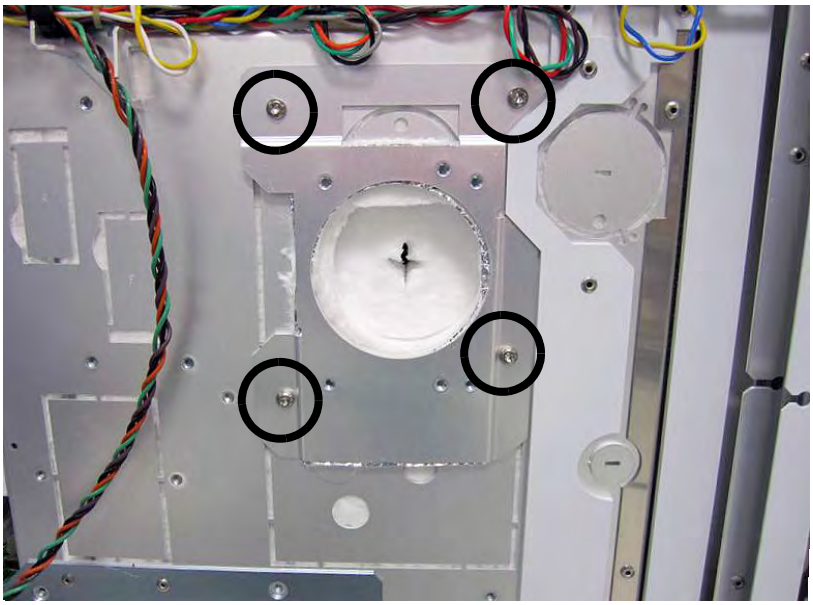


Figure 13 3rd detector adaptor plate installed using four 12 mm M4 screws

4 Use a T-20 Torx driver to remove the two screws that secure the side cover onto the third detector box assembly and remove the cover. Set the cover and screws aside and keep them for later use. See Figure 14.

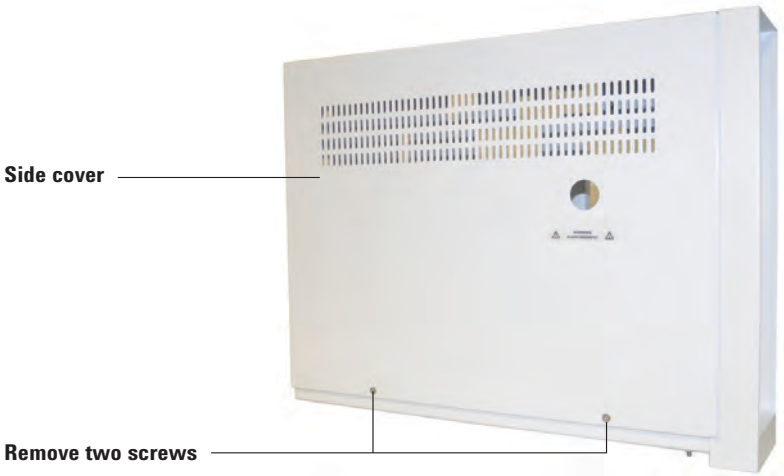


Figure 14 Remove the two screws from the side cover

5 Align the third detector box assembly frame against the side of the GC so that the mounting holes align as shown below. Install two M4 x 25 mm screws at the top, and use four M4 x 12 mm screws for the bottom. Be sure you can access the third detector heated zone cable. See Figure 15.

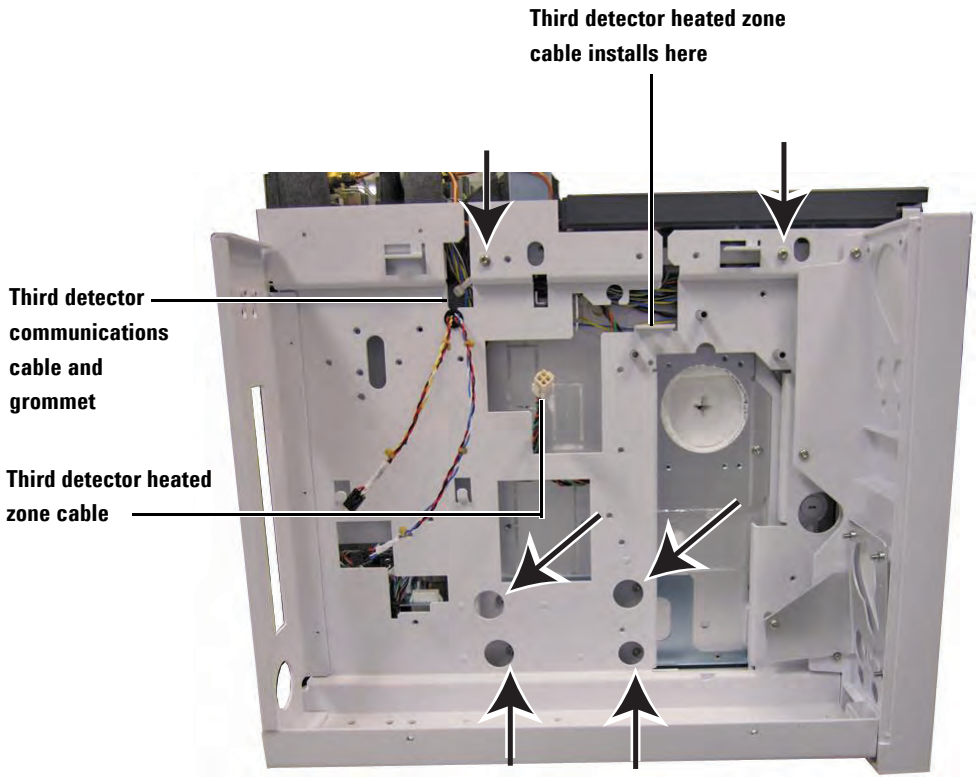


Figure 15 Install the third detector box assembly frame to the GC

6 Route the third detector EPC communication cable through the third detector box assembly frame as shown in Figure 15. Install the supplied grommet in the frame.

7 Install the third detector heated zone cable with grommet into the box assembly frame as shown in Figure 16. Install the connector into its slot in the frame.

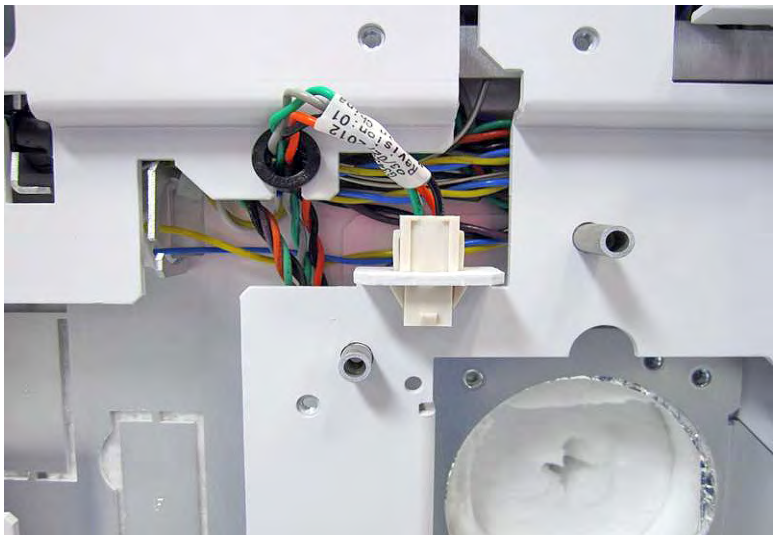


Figure 16 Install the third detector heater cable into the frame

Install the detector

1 Install the interface board onto the detector PCA frame assembly. Slide the board along the frame so that all hooks in the frame engage the slots in the board, then secure the board to the frame using the thumbscrew.

Note that there are three sets of hooks on each side of the board. All hooks must be engaged for the board to be installed securely. See Figure 17.

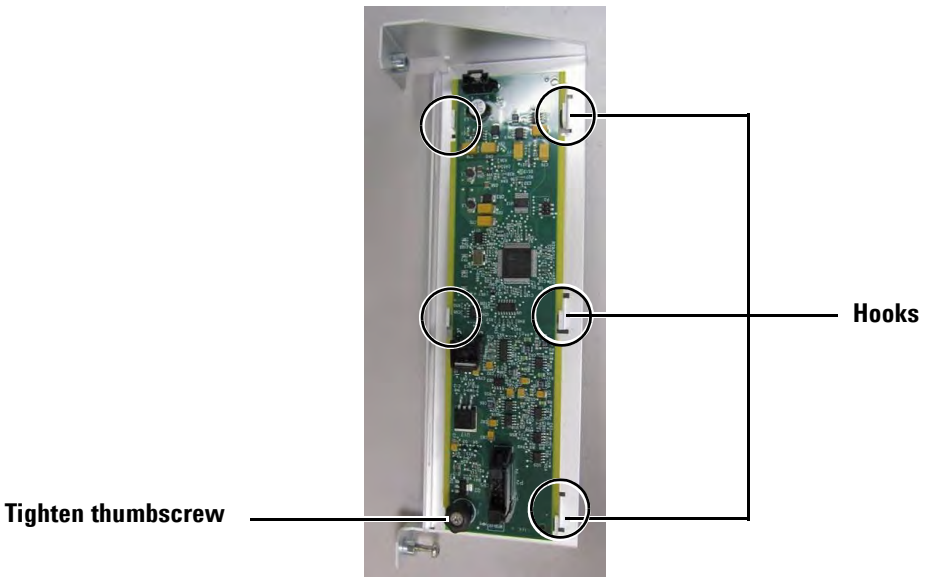


Figure 17 Hooks and thumbscrew

2 Install the third EPC frame onto the EPC module. Remove the two T-20 Torx screws, place the frame onto the EPC module as shown in Figure 18, and secure using the same two screws.

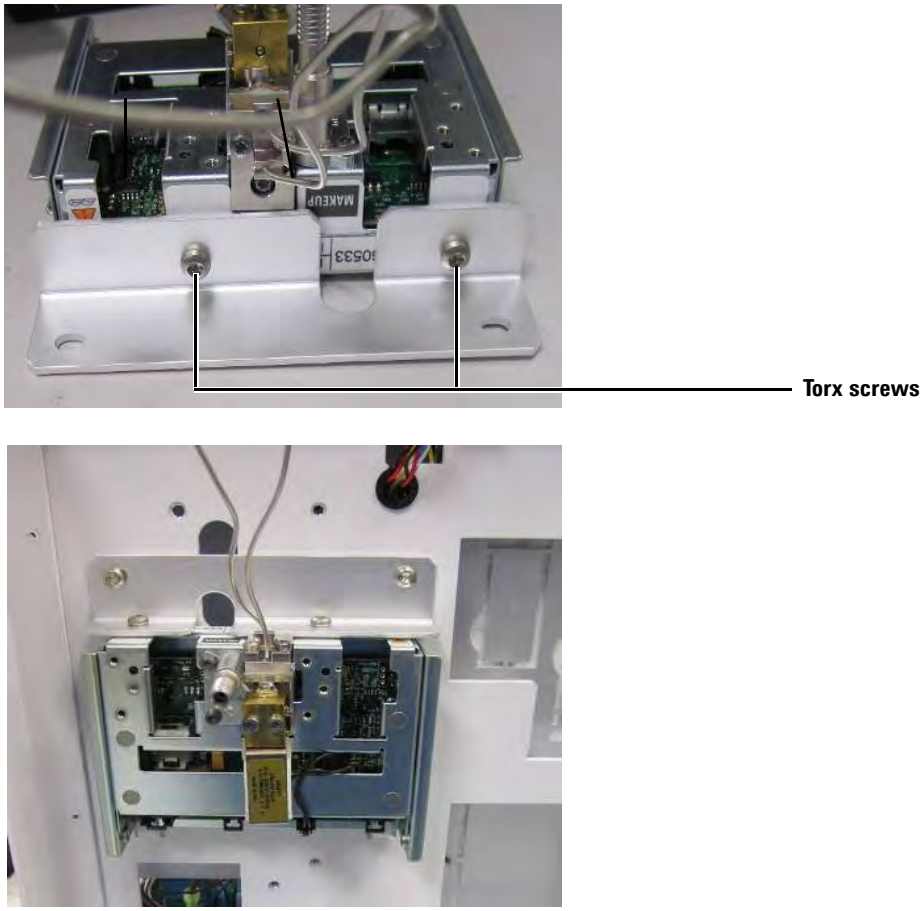


Figure 18 Assemble the third EPC frame to the EPC module

3 Install the µECD module on the side of the GC by tightening the four captive screws using a T20 screw driver and finish tightening the screws with the T20 torque driver. Figure 19.

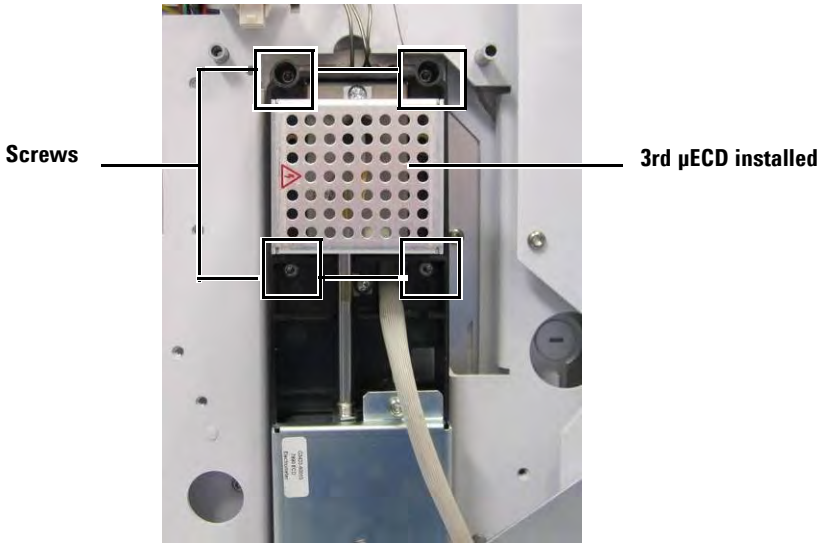


Figure 19 Install the 4 captive screws

4 Install the detector PCA frame and interface board assembly into the third detector box assembly frame using the two captive screws. See Figure 20.

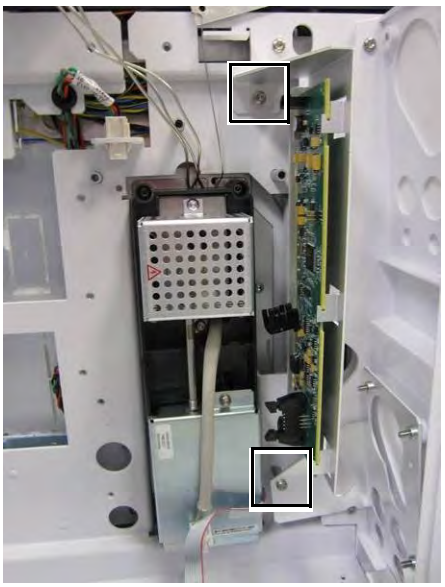


Figure 20 3rd detector box assembly

5 Plug the electrometer from the µECD onto the µECD Logic PCA as shown in Figure 21.

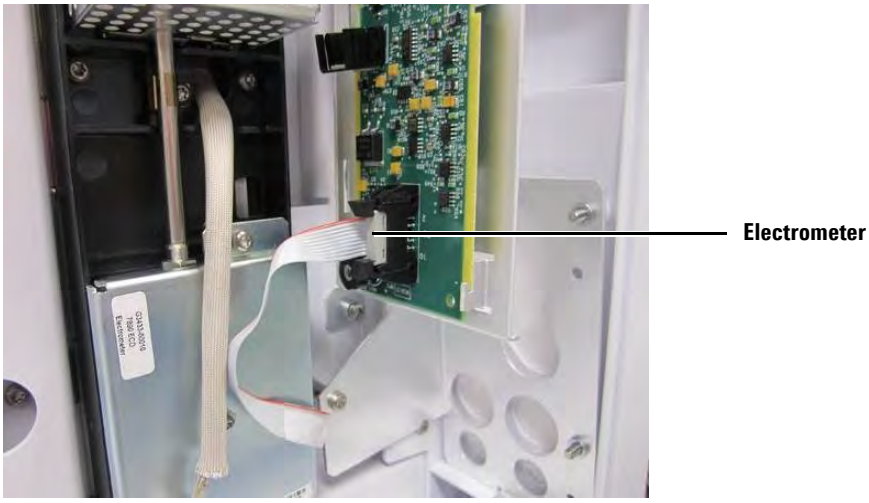


Figure 21 Plug the electrometer ribbon into the µECD logic PCA

6 Connect the heater sensor form the µECD to the third detector heated zone cable as shown in Figure 22.

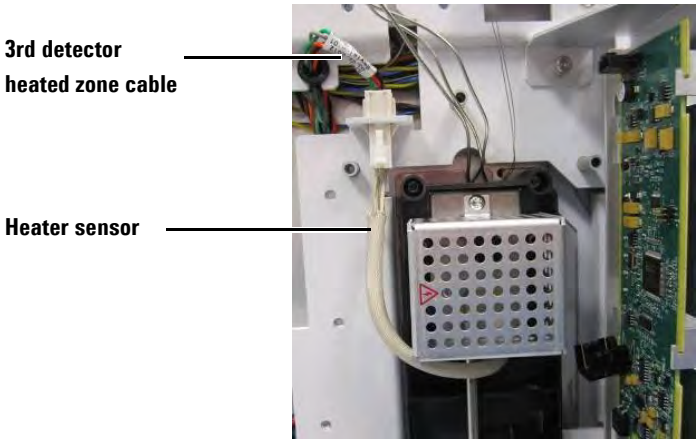


Figure 22 Heater sensor plugged into third detector heated zone cable

7 Connect the EPC module to the µECD EPC board P5 using the third detector EPC communication cable as shown in Figure 23.

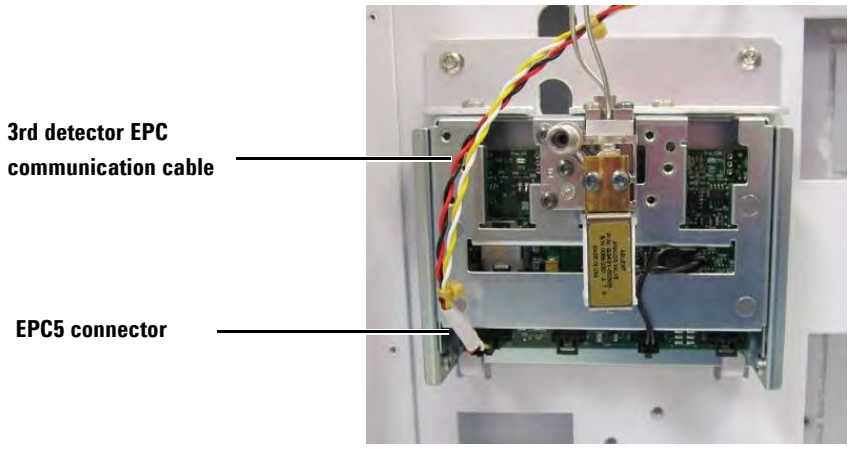


Figure 23 Connect the EPC5 connector

8 Connect the Aux Det1 connector from the third detector the µECD logic board as shown in Figure 24.

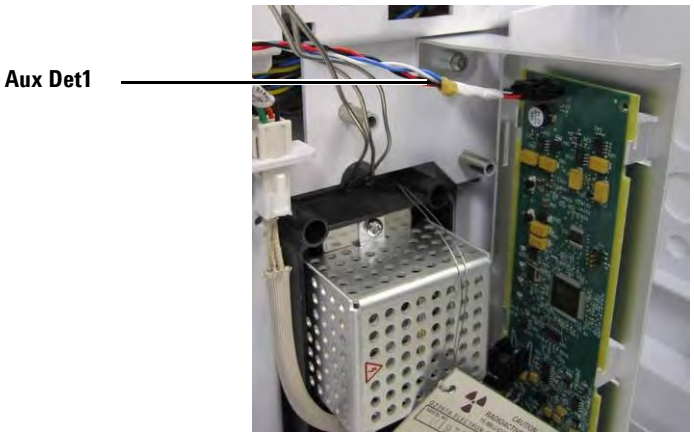
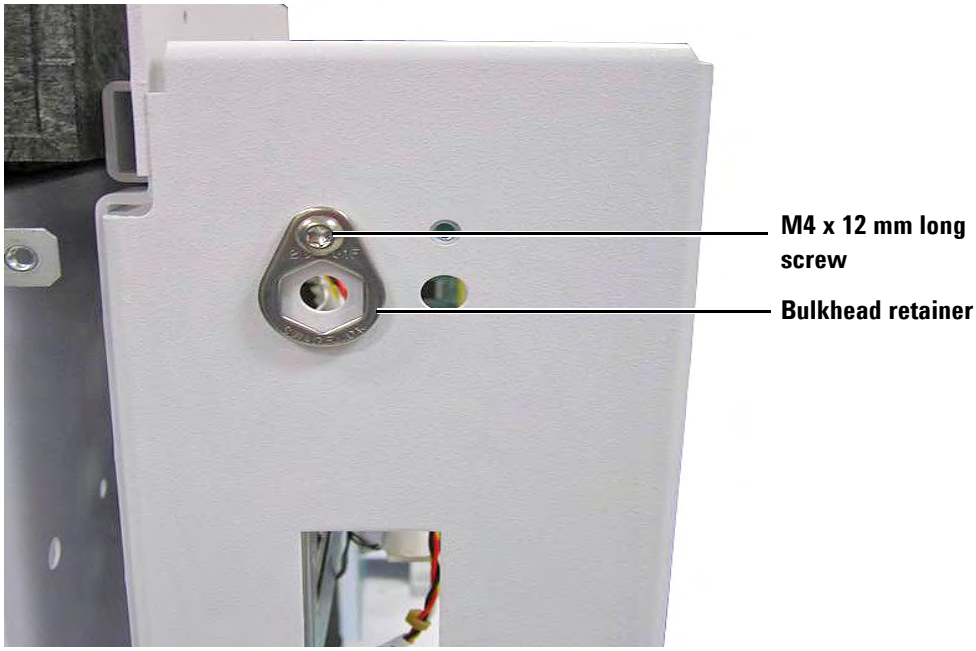


Figure 24 Connect the Aux Det1 connector to the µECD logic board

Make the gas connections

1 Place the bulkhead fitting retainer onto the back of the third detector box assembly frame as shown and install using a 12 mm long M4 screw. See the figure below.

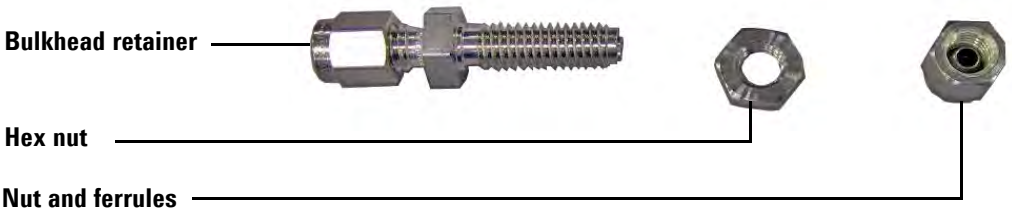


WARNING

The effluent gas stream from the detector must be vented to a fume hood to prevent possible contamination of the laboratory with radioactive material.

USA Owners: Detector venting must be in conformance with the latest revision of the Title 10, Code of Federal Regulations, Part 20 (including Appendix B).

2 Remove the nut, ferrules, and hex nut from the bulkhead union.



3 Insert the bulkhead union threaded stud through the back of the frame (and the bulkhead fitting retainer). Use the hex nut and 1/2-inch wrench to secure in place.

4 Remove the protective caps from the EPC module.

5 Install a 1/8-inch brass nut and ferrule set onto the other 3rd µECD gas supply tube and connect this end of the 3rd µECD gas supply tube to the µECD manifold as shown in Figure 25.

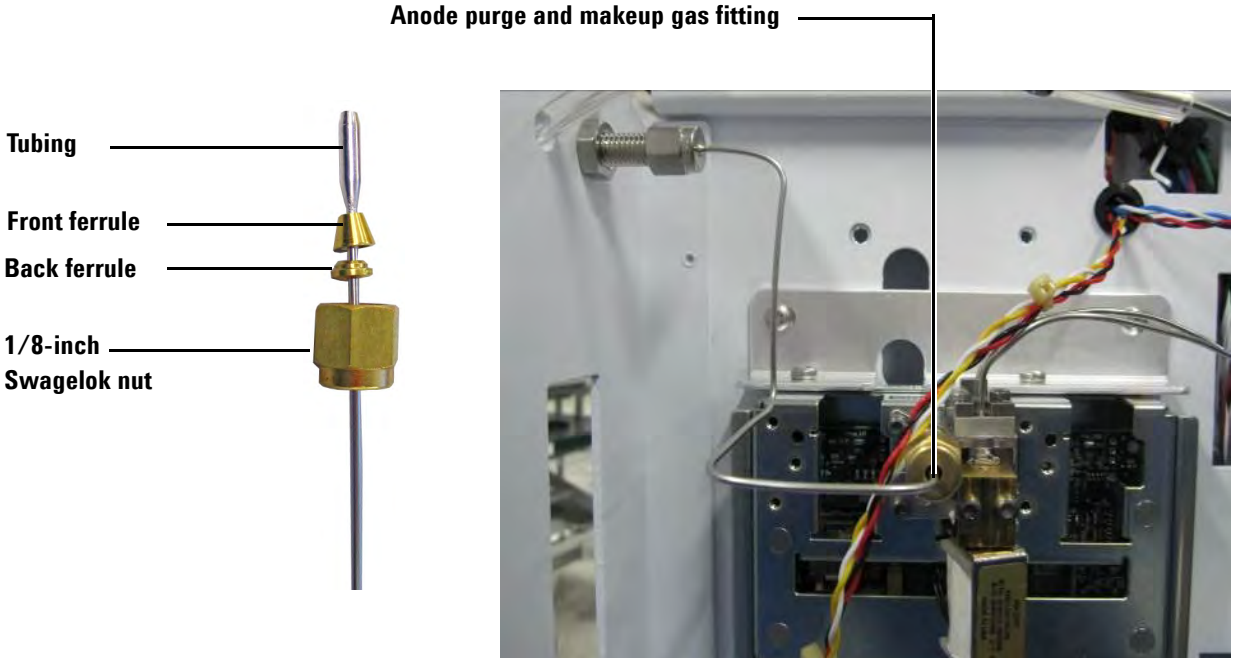


Figure 25 Complete EPC tubing connections

6 Install the swagelok nut, back ferrule, and front ferrule from the bulkhead union onto the 3rd µECD gas supply tube as shown below and gently bend the tubing as needed into the shape shown in figure Figure 25 and Figure 26. The tubing should have bends with a radius > 1 cm and should not extend out from the EPC module beyond the box assembly frame.

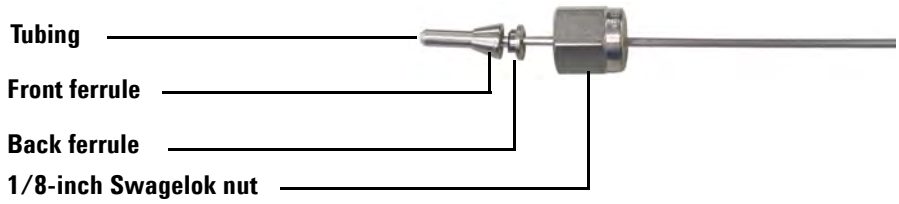


Figure 26 Ferrules and nut placement

7 Install the µECD vent tube onto the µECD module and route the µECD gas tubing to the detector body as shown in Figure 27.

8 Route the µECD vent tube out the back of the 3rd detector box assembly. See Figure 27.

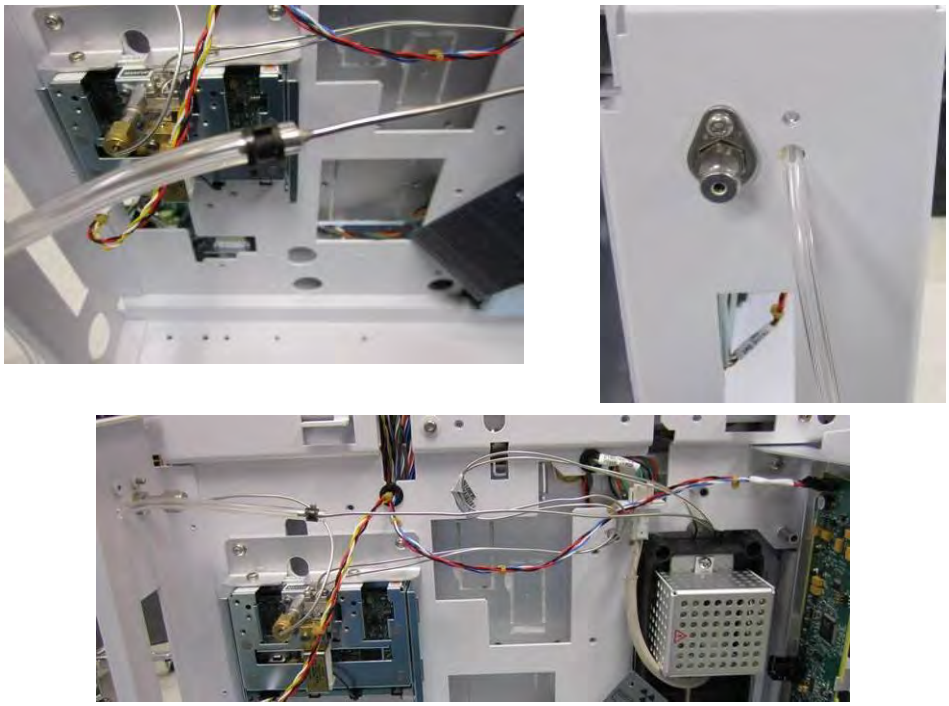


Figure 27 Install µECD vent tube

9 Route the gas tubing so that it does not interfere with any other parts inside the box frame. Use gentle bends with a large radius. Do not kink or pinch the tubing.

10 Secure the µECD serial tag to the 3rd detector box assembly using a tie wrap as shown in Figure 28.

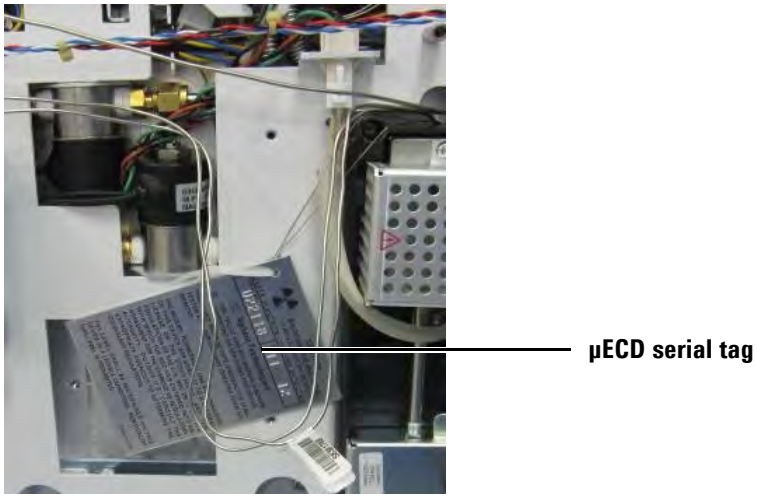


Figure 28 µECD serial tag

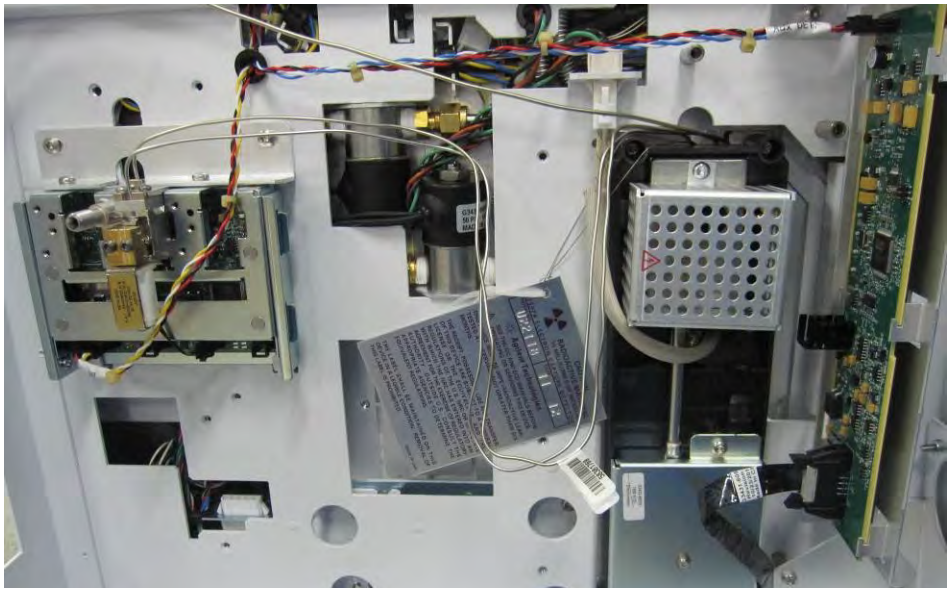


Figure 29 Installation is complete

Reinstall the cover, and install the label and nameplate

1 Slide the 3rd detector box cover over the 3rd detector box and secure with M4 flathead screws using the T20 torque driver. See Figure 30.

2 Place the µECD caution label on the 3rd detector box cover. See Figure 30.

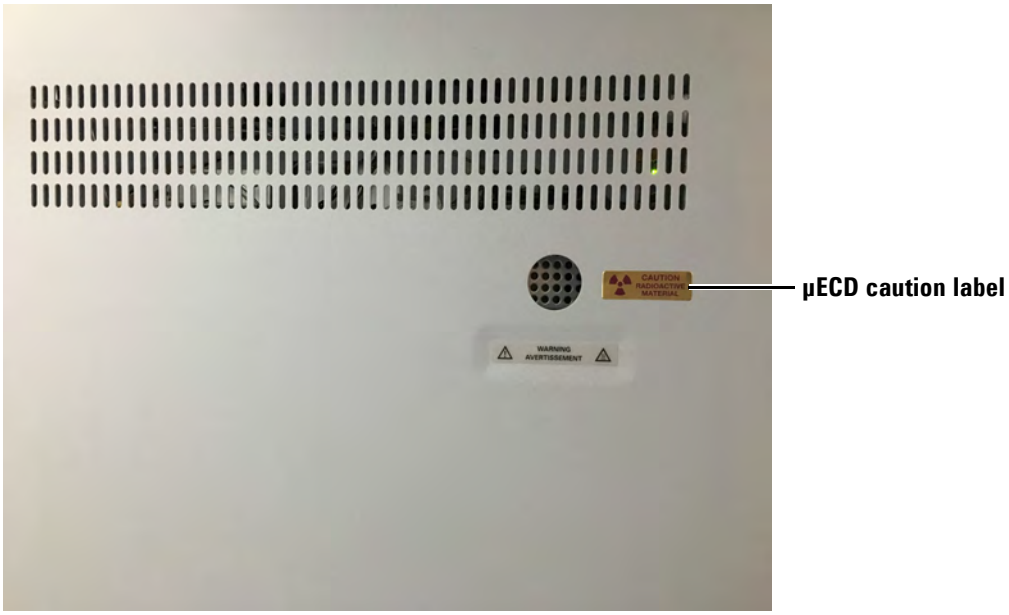


Figure 30 Slide the cover back on and attach the µECD caution label

3 Place an µECD nameplate on the back of the 3rd detector box assembly next to the vent tube as shown in Figure 31.

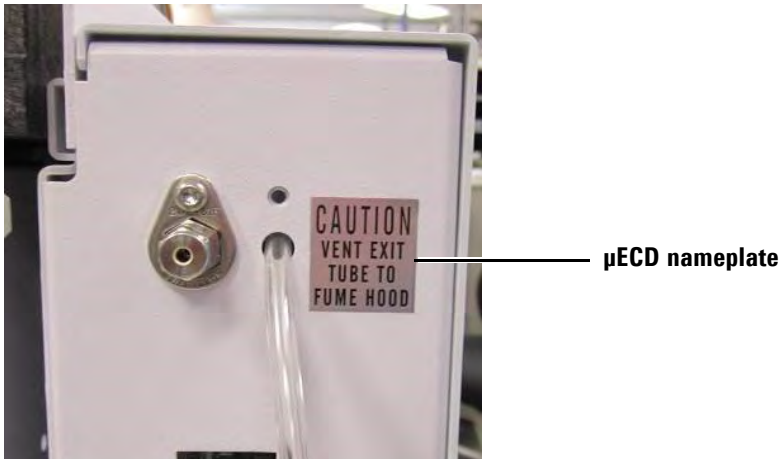


Figure 31 µECD nameplate

Install nutwarmer cup

1 Insert three nut warmer insulation pieces into the nutwarmer cup and align the cut of the insulation with the slot of the cup. See Figure 32.

Figure 32 Insert insulation pieces into the nutwarmer cup

2 Install the nutwarmer cup into the nutwarmer cup assembly and install over the mug adapter on the µECD inside the oven. See Figure 33.

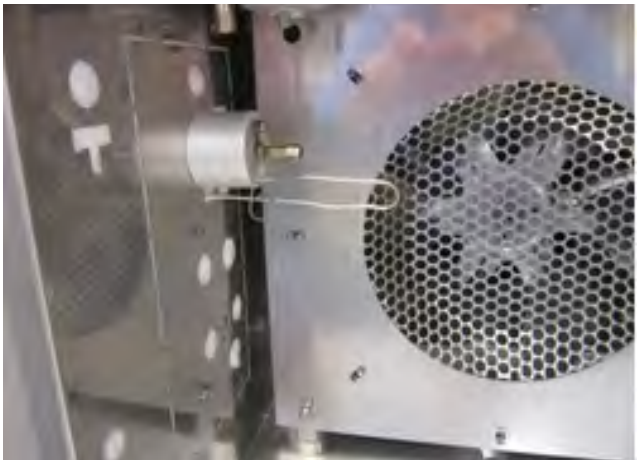


Figure 33 Install nutwarmer cup over the mug adapter inside the oven

Restore the GC to operating condition

1. Install the top back cover, GC right side cover, electronics cover, pneumatics cover, and detector cover.
2. Clean up any residual insulation in the oven or third detector box frame assembly.
3. Plug in the GC and turn on the power.
4. Unlock the GC configuration. Press **[Options]**, select **Keyboard & Display**, and press **[Enter]**. Scroll to **Hard Configuration Lock** and press **[Off/No]**.
5. On the GC keypad, press **[Configure]** then **[MS/Aux Det]**.
6. Select the new Aux Detector and press [**Enter**].
7. On the **Unconfigured** parameter, press **[Mode/Type]**.
8. Scroll to select the **Aux detector** and press [**Enter**]. Select **Aux 1** if you attached the MSD heated zone cable to plug A1, or select **Aux 2** if you used plug A2.
9. Press **[Enter]**. A caution message will appear instructing you to reboot.
10. Reboot the GC.
    a. Press **[Options]**.
    b. Scroll to **Communications** and press **[Enter]**.
    c. Scroll to **Reboot the GC?** and press **[On/Yes]** twice to reboot the GC and have the changes take effect.
11. Configure the detector gas type. Press [**Config**] [**MS/Aux Det**], select the detector, then press [**Enter**]. Scroll to **Makeup gas type**. If the gas type is incorrect, press [**Mode/Type**] to change it.
12. Zero the pressure sensors in the EPC module.
    a. On the GC keypad, press **[Options]**.
    b. Scroll to **Calibration** and press **[Enter]**.
    c. Scroll to select the new aux detector and press **[Enter].**
    d. Scroll to **Zero** line and press [**Info**]. The GC will remind you of the conditions necessary for zeroing the sensor.
    e. Press [**On/Yes**] to zero or [**Clear**] to cancel.

13 Connect the source gas line to the bulkhead fitting using the provided 1/8-inch nuts and ferrules.

14 Turn on gas pressures and leak-check all fittings. In general, set the source gas pressure to 410 kPa (60 psi). Correct any leaks.

15 Reinstall the side cover onto the third detector box assembly.

16 Check the µECD paperwork to make sure it is safely complete. See Figure 34.

Figure 34 µECD paperwork

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Verify Performance

Verify the new detector's performance. See the 7890B GC *Operation Manual* for details.

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