

Troubleshooting 5890 EPC Split/Splitless Inlet Problems

The purpose of this document is to outline a logical procedure for troubleshooting a 5890 series GC with EPC split/splitless inlet demonstrating problems with achieving setpoint pressure, fluctuating pressure or a problem with the measured flow not matching that of the displayed flow.

The 5890 Split/Splitless Epc Inlet system uses pressure to control flow through open tubular, capillary columns. The capillary column flow is not measured directly, but is calculated from the column dimensions, inlet and exit pressures, temperature of the column, and carrier gas type.

The 5890 Split/Splitless Epc inlet is a backpressure regulated system. This simply means that the control and feedback of the pressure comes from “back” or “upstream from” the controlling valve. If the upstream pressure momentarily drops below setpoint, a feedback signal causes the control valve to close more until the pressure rises above the setpoint, after which it will open further. The split flow rate and column flow rate are set independently of each other allowing changes in the split flow and column head pressure with changing the total flow.

The Capillary Inlet system can be run in two modes of operation—Split and Splitless. The inlet can equilibrate to pressure setpoint if the following conditions are met:

The capillary inlet system is assembled correctly and is leak free.

1. The EPC control board is configured correctly and all components are functioning.
2. There is sufficient carrier supply pressure applied to the GC and the Mass flow controller is turned on.

(80-120 psi for the standard capillary EPC system yielding at least 60 ml/min of total flow.)

3. The capillary column is installed and configured correctly.

Prior to troubleshooting a problem with the flow system of the GC it is prudent to check first the EPC control board configuration and the Zero on the EPC Channel.

NOTE: The EPC board is located on the right hand side of the GC within the main panel and it is plugged into the mainboard of the GC. If at this point you are unsure about how to check these switch settings, please call Agilent. DO NOT PROCEED.

The switch settings for the 5890 Series II EPC:

IN A1 OR IN B1 Right, currently unused PID

IN A0 OR IN B0 Left, Programmable Cool On Column (PID)/ Right, Purged Packed Inlet/ Right, (BPR) Split/Splitless Capillary Inlet

MODE A OR MODE B Left, (FPR) Programmable Cool On Column Inlet & Purged Packed Inlet /Right, (BPR) Split/Splitless Capillary Inlet

PID= Proportional/ Integral/ Differential heated zone

FPR= Forware Pressure Regulating mode

BPR= Back Pressure Regulating mode

Zeroing the EPC channel is necessary to correct for tolerances of the sensor and other electronic components. Zeroing the channel nullifies any offset that would keep a "0" setpoint from being achieved. An improperly zeroed channel will have an actual pressure that is different from the setpoint value, and flow rates will be calculated incorrectly.

[Zeroing the 5890 EPC Inlet](#)

It is also recommended that routine inlet maintenance be performed prior to beginning in-depth troubleshooting on the GC inlet. Please check the following:

1. Supply pressure is sufficient for the application.
2. The carrier gas supply manifold is free of leaks and restrictions.
3. The septum has been replaced.
4. The glass liner, o-ring and gold seal has been installed and the liner isn't cracked.
5. The insert weldment tightened.
6. Confirm that the column ferrule is installed correctly.

The following are 3 common problems to the 5890 EPC Split/Splitless Inlet:

1. The setpoint pressure is not achievable (actual pressure either lower or higher than setpoint).

Possible causes:

- a. The EPC board configuration switches are improperly set.
 - Configure the switch for the correct type of pressure control.
- b. The supply pressure to the EPC channel is less than the desired setpoint pressure.
 - Adjust the supply pressure to at least 5 psi above desired setpoint pressure.
- c. Flow control of the inlet is not sufficiently opened or closed.
 - Open the controller to increase total flow, measure at the inlet vent.
- d. Major leak is present somewhere in the system.
 - Inspect obvious seals and fittings of inlet plumbing first. Inspect other fittings on internal traps and other plumbing. Fix leaks.

[5890 Leak check EPC split/splitless inlet](#)

- e. The EPC channel is not zeroed properly.
- f. The proportional control valve may be stuck in an open or closed position due to contamination or some other fault. Call Agilent.

2. A pressure fluctuation causes flow rate/retention time variations during runs.
 - a. Small leak in the system.
 - Leak check inlet
 - b. Large restrictions in the split/splitless inlet, such as the liner, split vent tube or purge solenoid valve.
 - Disconnect the split vent tubing from the inlet and purge solenoid valve and flush with solvent. (Do Not Flush Purge Solenoid Valve!!)
 - Try a less restrictive liner.
 - Switch the purge solenoid valve on and off, if you do not hear an audible click from the left-hand side of the GC the valve could be bad. Call Agilent.
 - Clean and or replace Gold Seal inside of the injection port.
 - c. The backpressure proportional control valve may have sample deposition inside.
 - Call Agilent.
 - d. The septum purge vent is capped and is causing a dampening effect on the pressure sensor.
 - Remove the cap to see if the problem is corrected. If the septum purge must be capped for use with external sampling devices, then install the 19245G accessory to relocate the pressure sensor.
 - e. The pressure sensor board may have a fault.
 - Call Agilent.
3. Measured Flow not equal to calculated flow (display).
 - a. Check the column configuration, making sure that the internal diameter, column length and gas type is entered correctly.
 - b. A packed column is installed instead of a capillary column. Disregard calculated flow rates displayed. Adjust pressure to provide desired flow rate.
 - c. The EPC channel is not zeroed properly.
 - d. If a MSD is in use, make sure that vacuum compensation is turned on.

- e. A short (< 15 m) 0.53-0.75 mm WCOT column is being used. The total flow is set for a high flow rate, which creates some pressure in the inlet and causes column flow even with a setpoint pressure of zero.
 - With a short, 530-750 um column, keep total flow rates from the mass flow controller as low as possible (20-30 ml/min), or install a longer more restrictive column.
- f. The split vent may be partially plugged.
 - Replace or clean the split vent line.
- g. The firmware revisions may not be current.
 - Call Agilent.

If problems persist after reviewing each of these suggestions, then it is recommended that you call AGILENT.