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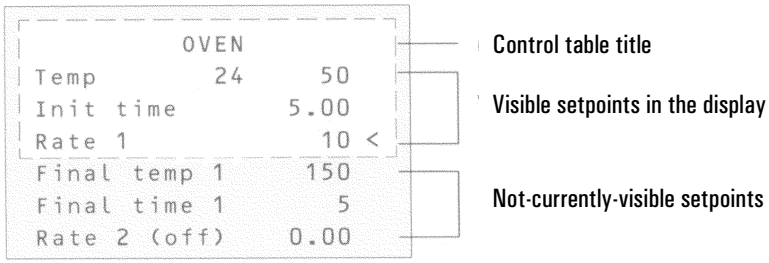
The 6890 Series Gas Chromatograph

The 6890 Series Gas Chromatograph is referred to as “the GC” throughout this manual.

Control tables

This GC is controlled by a lengthy list of setpoints (temperatures, times, choice of signal, and so on) that are organized into control tables. This is a typical oven control table:



- Control table title—This line identifies the table. It does not move when the rest of the table moves up or down.
- Visible setpoints in the display—The display has four lines. The title uses one line leaving three to show setpoints and, in the `Temp` line, the current actual value.
- Not-currently-visible setpoints—This table contains six setpoint lines. The lower three can be moved into the viewing window when needed.

Installed equipment

Your instrument only displays control tables for items that are physically present. There is no way to see a control table for an inlet, detector, or other device that is not installed.

Control tables that list many instrument functions, such as [Status] or [Config], only show items that are installed. Therefore, the sample displays in this manual may be somewhat different than those on your instrument.

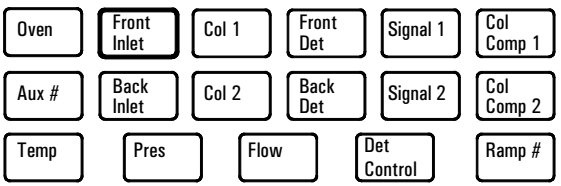
Using control tables

The general procedure for setting up the instrument is:

1. Press a key to call up a control table. It appears in the display. The first line is a title that identifies the table.
2. Inspect the setpoints in the table (you may have to scroll up or down if it is a long table).
3. Edit selected setpoints in the table.
4. Repeat this process with other tables until you have what you want.
5. Analyze the sample.

The advantage of a table is that it contains groups of related setpoints. You can inspect them and alter them easily and quickly without having to execute key sequences for each.

For example, to set up the front inlet, press [Front Inlet]



The control table for the type of inlet in the front position appears in the display. Control tables for three inlet types, all with Electronic Pneumatic Control (EPC), are shown in Figure 1.

Cool on-column

```
   FRONT INLET (COC)
Mode:    Track oven
Temp        53     53
Pressure 10.0   10.0 <
```

Purged packed

```
   FRONT INLET (PP)
Temp        250    250 <
Pressure  10.0    10.0
Total flow          5.0
```

Split/Splitless

```
Mode:  Split
Temp        250    250 <
Pressure  10.0    10.0
   FRONT INLET (S/SL)
Split ratio         100
Split flow         76.6
Tot flow  80.4    80.4
Gas saver            On
Saver flow         20.0
Saver time          2.0
```

The top of the table. Use the scroll keys (page to move it into the display).

The title line does not move.

You can view three lines of the table in the display

The bottom of the table. Use the scroll keys to move it into the display.

Figure 1 Some inlet control tables

Use the cursor keys (▲ and ▼) to move the cursor (<) to the line you wish to change, type the new value, and press [Enter]. Repeat until the table is as you want it.

Tables change depending on the modes you select and the instrument configuration. Your tables are probably somewhat different from these.

Some specifics

Gas control

The GC can control all gas streams—inlets, detectors, and three auxiliary flows—from the keyboard using Electronic Pneumatic Control (EPC). EPC allows flow and pressure setting plus a variety of program modes.

Some nonEPC inlets and detectors are also available. They function in the conventional manner using flow controlers, pressure regulators and a separate flow meter. Only on/off control is available from the keyboard.

Columns

You can control the behavior of the carrier gas in the column, specifying constant or ramped flow or constant or ramped pressure. EPC inlet systems maintain this behavior for the entire run, even with temperature programming.

The column should be set up before the inlet!

Signals

Signals are the data streams that exit the GC for processing by some other device. There is a wide selection, both analog and digital.

Automation

The run time table executes commands at specified times after injection. The clock time table executes commands at specified times of day.

Methods and sequences

The active method is the set of control tables and values that is presently controlling the GC. Up to five methods can be stored in memory.

A sequence is a list of sample locations and the stored methods to be used to run them. Up to five sequences can be stored. Samples may come from either an automatic liquid sampler or a sampling valve with a stream selector valve. Sequences can be interrupted to run urgent samples.

Valves

Switching valves can be used for various column operations. Gas sampling valves can be used either manually or with a multiposition stream selection valve. If the multiposition valve is used, it can be combined with a sequence to control the sample selection and analysis.

Strategy

The GC is organized around a set of control tables, each containing a group of related setpoints. It is controlled by viewing and editing the tables to meet your analytical needs. Some suggestions for doing this are:

- The content of many tables depends on what equipment is present. While the GC can sense many of its components, some information (such as what carrier gas is in use) must be entered by you. Always configure (define) instrument elements before trying to use them.
- When setting up for analysis, configure the carrier gas first, then the column mode, and finally the inlet. Detectors can be set up at any time.
- Use the [Config] key routinely to verify that the configuration is what you believe it to be.
- Use the [Info] key for help with setpoint ranges, next action to perform, and other advice.
- Many setpoints require that you select from a list of choices. The [Mode/Type] key opens these lists. If a setpoint seems to call for an entry other than a number or [On] or [Off], try [Mode/Type] to see if there is an underlying menu.

Maintenance information

Fuses and batteries

The GC requires fuses and batteries for proper operation. These should only be accessed by Agilent service personnel.

Table 1. Mainboard Fuses and Batteries

Fuse designation	Fuse rating and type
F1, F2, F3, F4	8A, 250 Vac, IEC 127 type f (non-time delay), glass body
Battery designation	**Battery rating and type**
BT1	3-volt lithium battery, Panasonic BR3032

Table 2. AC Board Fuses

Fuse designation	Line voltage	Fuse rating and type
F1, F2	120 V	20 A, 250 Vac, IEC 127 type f (non-time delay), ceramic body
F1, F2	200 V - 240 V	15 A, 250 Vac, IEC type f (non-time delay), ceramic body
F3, F4	All	8 A, 250 Vac, IEC type f (non-time delay), glass body

Maintenance schedule

The frequency of maintenance depends upon:

- The level of usage of the GC
- The type of samples injected
- Whether injections are manual or automatic
- Whether the instrument is used for multiple applications or dedicated to one
- Other environmental factors, such as dirt, ambient temperature, etc.

Table 3. Maintenance Schedule

Maintenance frequency	Items
Daily	Change septa, run a calibration sample, check the tightness of liner and column nuts[1]
Weekly	Change glass liners and O-rings, if applicable
Monthly	Clean the split/splitless inlet vent line trap Perform a leak check for hydrogen. Check all the connections from the initial supply. At the GC, leak check the inlet and the column connections to the inlet and detector.
Quarterly	Renew gas cylinders[2]
Semiannually	Clean detectors, perform wipe test on μ-ECD
Annually	Recondition or replace internal and external traps and chemical filters

[1] Very important for temperature programming using Vespel or Vespel/graphite ferrules

[2] With typical usage, A-size cylinders will supply two dual-channel chromatographs for about three months. Replace the cylinder when its pressure drops below 500 psig.

General warnings

Many internal parts of the GC carry dangerous voltages

If the GC is connected to power sources, even if the power switch is off, potentially dangerous voltages exist on:

- The wiring between the detector power cord and power switch
- The wiring between the GC power cord and the AC power supply, the AC power supply itself, and the wiring from the AC power supply to the power switch.

With the power switches on, potentially dangerous voltages also exist on:

- All electronics boards in the instrument
- The internal wires and cables connected to these boards.

WARNING All these parts are shielded by covers. With the covers in place, it should be difficult to accidentally make contact with dangerous voltages. Unless specifically instructed to, never remove a cover unless the detector, inlet, or oven are turned off.

If the power cord insulation is frayed or worn, the cord must be replaced. Contact your Agilent service representative.

Electrostatic discharge is a threat to GC electronics

The printed circuit (PC) boards in the GC can be damaged by electrostatic discharge. Do not touch any of the boards unless it is absolutely necessary. If you must handle them, wear a grounded wrist strap and take other antistatic precautions. Wear a grounded wrist strap any time you must remove the electronics side panel.

Many parts are dangerously hot

Many parts of the GC operate at temperatures high enough to cause serious burns. These parts include but are not limited to:

- The inlets
- The oven
- The detectors
- The column nuts attaching the column to an injection port or detector

You should always cool these areas of the GC to room temperature before working on them. They will cool faster if you first set the temperature of the heated zone to room temperature. Turn the zone off after it has reached the setpoint. If you must perform maintenance on hot parts, use a wrench and wear gloves. Whenever possible, cool the part of the instrument that you will be maintaining before you begin working on it.

WARNING Be careful when working behind the instrument. During cooldown cycles, the GC emits hot exhaust which can cause burns.

The insulation around the inlets, detectors, valve box, and the insulation cups is made of refractory ceramic fibers. To avoid inhaling fiber particles, we recommend the following safety procedures: ventilate your work area; wear long sleeves, gloves, safety glasses, and a disposable dust/mist respirator; dispose of insulation in a sealed plastic bag; wash your hands with mild soap and cold water after handling the insulation.

Shutting down the GC

For less than one week

In general you can always leave the GC power on when not in use. If you will not use the GC for up to approximately one week, conserve gases and energy as follows:

- Reduce detector, inlet, and column temperatures to 150–200°C to save energy.
- Turn off corrosive or potentially hazardous gas flows, such as oxygen and hydrogen.
- Reduce flows of carrier and makeup gases.
- Turn off coolant supplies at their sources.

WARNING Never leave flammable gas flows on if the GC will be unmonitored for long periods of time. If a leak develops, the gas could create a fire or explosion hazard.

Maintaining the instrument with a lowered temperature and reduced carrier and makeup gas flows keeps impurities from building in your column, inlet, and detector.

For more than one week

1. Set all heated zones to ambient temperature and turn off the detector support gas flows. Leave the carrier gas flow on.
2. When the GC is cool, turn it off.
3. Turn off all gas and coolant supplies at their sources.
4. Remove the column and cap its ends to prevent contamination. Store the column in a cool, dry place.
5. To prevent contamination, cap the inlet and detector column fittings.
6. If gas connections are removed from the GC, cap the intake fittings on the back panel of the GC and on the inlet manifold.
7. If desired, replace the split vent trap filter cartridge (if present).