

Agilent 8890B Gas Chromatograph

## Installation and First Startup



# Notices

## Manual Part Number

G3540-90021

## Edition

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Agilent Technologies, Inc.  
2850 Centerville Road  
Wilmington, DE 19808-1610 USA  
www.agilent.com

安捷伦科技（上海）有限公司  
上海市浦东新区外高桥保税区  
英伦路 412 号  
联系电话：（800） 820 3278

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## Safety Notices

### CAUTION

**A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.**

### WARNING

**A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.**

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# 1

## Installing the GC

- Overview of Installation
- Connecting to the Browser Interface
- The 8890B GC
- Unpacking
- Place the GC on the bench
- Verify line voltage, voltage settings, and power cord
- Connect GC to LAN, Local Computer, or Tablet
- Connect the power cord and turn on the GC
- View the System Setup Wizard
- Configure the GC IP address
- Set the Date/Time
- Set the Pressure Units
- Configure Carrier Gas Types
- Connect Gases and Traps
- Leak test all connections and set source pressures
- Install inlet checkout parts
- Install ALS, if ordered
- Configuring GC-MSD communications
- Connect the external cables
- Vent ECD or uncombusted hydrogen to a fume hood
- Connect cryogenic cooling (if present)
- Connect valve actuator air (if present)
- Configure Headspace Communications
- Configure the checkout column
- Install the checkout column
- Transfer the checkout sample to a screw-top sample vial
- When the system stabilizes, run one injection
- Prepare for the Next Analysis

This section contains installation procedures for the Agilent 8890B GC. Depending on the ordered options, some steps are optional, such as “plumbing” cryogenic cooling or valve actuator gas.

Instructions for connecting cables from the GC to other instruments in a typical 8890B Series system are included here, in **Cabling Diagrams and Remote Start/Stop**.

## Overview of Installation

### Purpose of this procedure

This procedure ensures that instruments and systems are installed and functioning as designed. Correct installation is the first step in ensuring that instruments and systems operate reliably over their lifetimes.

### Customer responsibilities

1. Make sure your site meets the basic requirements, including the necessary space, electrical outlets, gases, tubing, operating supplies, consumables and other usage-dependent items, required for a successful installation. Refer to the *Agilent GC, GC/MS, HS & ALS Site Preparation Guide*.
2. If Agilent is delivering installation and introduction services, users of the instrument should be present throughout these services; otherwise, these users will miss important operational, maintenance, and safety information.

Additional information is available via the GC Touchscreen, and Browser Interface help & information suite.

### About Agilent's installation service

The installation service does not include:

- Network setup with other computers, or to the site or building LAN.
- Customization of the system.
- Method development and testing.
- Analysis of customer standards or samples.
- Testing against the instrument performance specification.

**If you need assistance beyond this installation service, please contact your local Agilent office. Assistance with installation and with user-specific services and applications is available and will be contracted separately. Contact Agilent at [www.agilent.com/en/contact-us/page](http://www.agilent.com/en/contact-us/page).**

### Tools and additional parts required

Installation requires the following tools, fittings, and hardware. **These items are not included with the instrument.**

- Precleaned copper tubing, 1/8-inch or 1/4-inch od.
- Fittings.
- Tubing cutter.
- Filters for gas supplies.
- 7/16-inch and 9/16-inch wrenches for assembling Swagelok fittings.

## Installing the GC

### Overview of Installation

- Carrier and other gas supplies.
- Pressure regulator for each gas supply.
- A computer, tablet, or other LAN capable device (for accessing GC user information and for updating GC firmware when needed).
- Any additional LAN components, such as cables and a switch or hub, for connection to the site LAN (not included in Agilent installation services).

The Agilent 8890B Gas Chromatograph *Site Preparation Guide* contains a listing of Agilent installation kits and a description of parts included with each kit. These kits contain filters, fittings, tubing, tools (wrenches, tubing cutter, drivers, and so on), and other required parts for installing a GC.

## Performing checkout

Checkout can be performed using the Browser Interface, if desired, via the **System Checkout** diagnostic test.

If using an Agilent data system, you can perform the checkout procedure from the data system. Read these GC installation instructions and the instructions for installing the data system.

## System installation

If installing an ALS, the ALS can be used for checkout. Refer to the ALS installation documentation for details.

When installed as part of a complete system including an Agilent data system (for example, Agilent OpenLab CDS), first install the GC up to the checkout column bakeout step (see **Install the checkout column**). Once the bakeout ends, configure the new GC in the data system and open the online instrument session. Use the data system to perform the checkout test.

When installed as part of other complete systems, for example in an Agilent GC/MSD or GC/MS system, refer to the installation instructions for that system.

## Configuring the GC

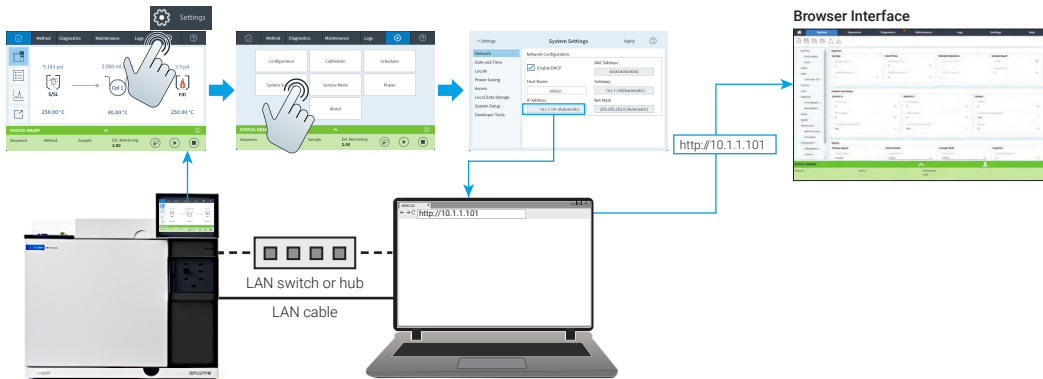
To configure the various components of your GC, you must use either the Touchscreen or access the Browser Interface from a computer on the same network as your GC. For more information about connecting to the Browser Interface, see **Connecting to the Browser Interface**.

To access the copy of this manual stored on your GC, enter **http://<your GC's IP address>/install** into the web browser of your choice.

## Connecting to the Browser Interface

To connect to the GC using a browser:

1. If you do not know the GC's IP address or host name, use the touchscreen to find it. Select **⚙ (Settings) > NETWORK**. Select **⚙ (Settings) > System Settings**



2. Open a web browser. Supported browsers include Chrome, Safari (on a tablet), and Edge. Make sure the browser version is up to date.
3. Enter **http://xxx.xxx.xxx.xxx**, where **xxx.xxx.xxx.xxx** is the GC's IP address. (If using a host name, enter it instead.) In this example, the GC IP address is **10.1.1.101**. Accessing the Browser Interface only requires that the tablet or computer be connected to the same gateway as the GC; no internet connection is required.



## The 8890B GC



Figure 1. Front of the GC

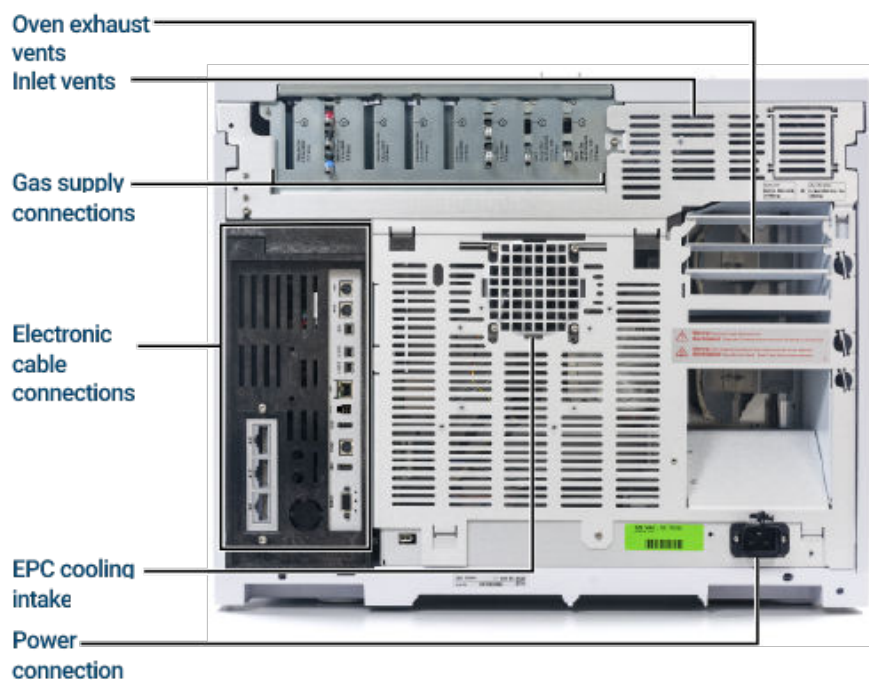
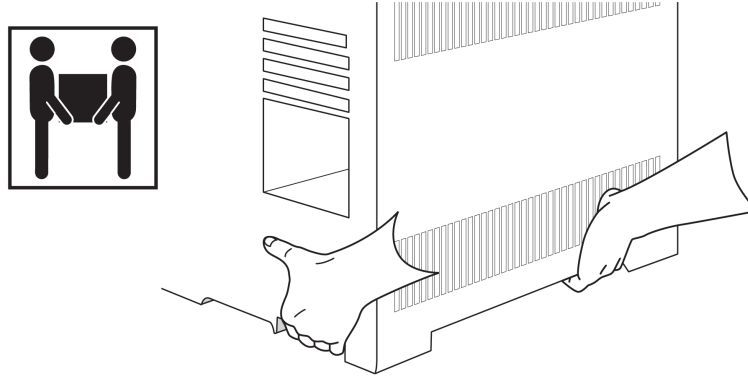


Figure 2. Back of the GC

## Unpacking

**WARNING**

Be careful when lifting the GC. Because it is heavy, two people should lift it. When moving the GC, be aware that the back is heavier than the front.

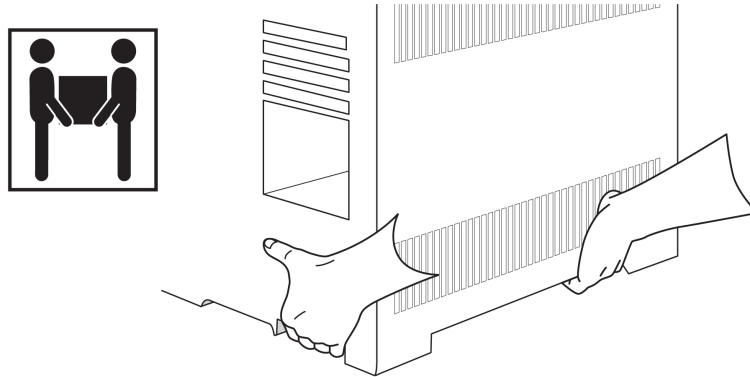


1. Inspect the shipping containers for damage.
2. If a container is damaged or shows signs of stress, do the following:
  - a. Notify both the carrier and your local Agilent sales office.
  - b. Keep all shipping materials for inspection by the carrier.
3. Check the items received against the packing lists.
4. If there are discrepancies, notify your local Agilent sales office immediately.
5. Retain the shipping containers until you check their contents for completeness and verified instrument performance.

## Place the GC on the bench

The GC requires a bench that can support its weight plus that of other equipment you will use with it. The area must be free of overhanging obstructions that might interfere with autosamplers, or that limit access to the top of the instrument. The area must include sufficient space behind the GC to allow for cooling. Refer to the *GC, GC/MS, HS & ALS Site Preparation Guide* for information.

1. Remove the GC from its shipping box.



2. Place the GC on the bench top. Make sure gas and power supplies are accessible. Place related equipment near the GC.

**WARNING**

**The GC requires a two person lift.**

**WARNING**

**The power cord is the power disconnect device. Do not position the instrument such that access to the coupler or plug is obstructed.**

**CAUTION**

**Make sure your GC has adequate distance from the wall and other instruments.**

3. If space is limited behind the GC, attach the optional oven exhaust deflector to the back of the GC as shown below. (Order Option 306 or part number G3450-81650.) The deflector hangs from the exhaust vents on four hooks.

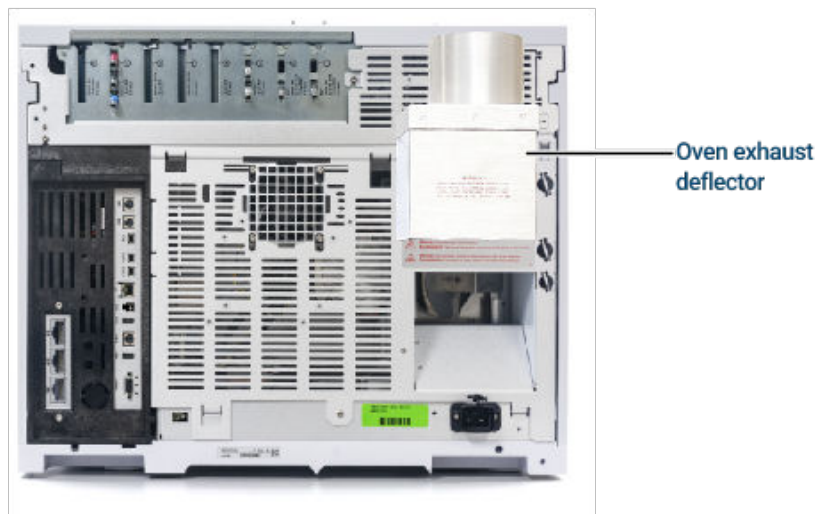


Figure 3. Correct position of the oven exhaust deflector

**Installing the GC****Place the GC on the bench**

The oven exhaust deflector accepts a 10-cm (4 in.) diameter exhaust duct, and adds about 13 cm to the depth of the GC, but this additional depth does not increase the depth required for proper ventilation.

## Verify line voltage, voltage settings, and power cord

1. Locate the power label near the power cord connector on the back of the GC. Compare the instrument power settings with the laboratory line voltage. See [Power consumption](#).
2. Verify that the power cord is correct for the voltage and location. See [Common instrument power cord plugs](#).

**WARNING**

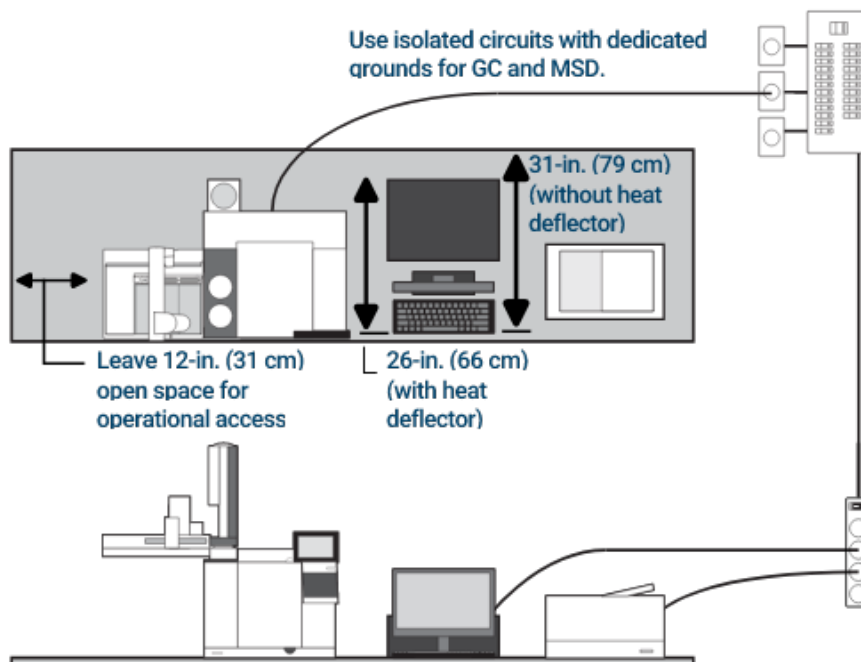
**Electrical shock hazard. To avoid injury, only a qualified person should measure line voltage.**

3. Have a qualified person measure the actual power outlet voltage and verify that it meets the tolerance requirements listed in [Line voltage](#). See also [Grounding](#).

The following sections detail the power specifications and requirements for reference.

## Line voltage

Typical GC System - 8890B GC with computer and printer.


**WARNING**

To protect users, the metal instrument panels and cabinet are grounded through the three-conductor power line cord in accordance with International Electrotechnical Commission (IEC) requirements.

A proper earth ground is required for GC operations. Any interruption of the grounding conductor or disconnection of the power cord could cause a shock that could result in personal injury.

Be sure to verify proper receptacle grounding.

**WARNING**

Do not use extension cords with Agilent instruments. Extension cords normally are not rated to carry enough power and can be a safety hazard.

## Installing the GC

Verify line voltage, voltage settings, and power cord

1. Make sure that each instrument in your GC system can be connected to a dedicated circuit with an isolated ground. (Note that ALS instruments receive their power from the GC.)
2. Power requirements are printed near the power cord attachment on the rear panel of each instrument. Although your GC should arrive ready for operation in your country, compare its voltage requirements with those listed in [Power consumption](#). If the voltage option you ordered is not suitable for your installation, contact Agilent.

## Power consumption

The number and type of electrical outlets required for installation depends on the size and complexity of your system. A GC system with a computer, monitor, printer, and hub requires 5 outlets.

**The outlet for the GC must be a dedicated circuit.**

Each GC has a label near the power cord connector that lists its line voltage requirements. See the examples below.



The GC power consumption and requirements depend on the type of oven that you ordered and the country the unit shipped to. Fast oven options 002 and 003 require more power than the standard oven.

See your Site Preparation Guide for a list of the power cords available for the GC. If your power cord is incorrect, order the cord appropriate for the country.

Table 1. Power requirements

| Product       | Oven type | Line voltage (VAC) | Frequency (Hz) | Power Rating (VA) | Current rating (amps) | Power outlet current rating |
|---------------|-----------|--------------------|----------------|-------------------|-----------------------|-----------------------------|
| 8890/8890B GC | Standard  | Americas: 120      | 50/60 ± 5%     | 2350              | 19.6                  | 20 Amp                      |
|               |           | single phase       |                |                   |                       | Dedicated                   |
|               |           | (-10% / +10%)      |                |                   |                       |                             |
| 8890/8890B GC | Standard  | 220/230/240        | 50/60 ± 5%     | 2350              | 10.7/10.2/9.8         | 10 Amp                      |
|               |           | single/split phase |                |                   |                       | Dedicated                   |
|               |           | (-10% / +10%)      |                |                   |                       |                             |
| 8890/8890B GC | Fast      | Japan 200          | 50/60 ± 5%     | 2950              | 14.8                  | 15 Amp                      |
|               |           | split phase        |                |                   |                       | Dedicated                   |
|               |           | (-10% / +10%)      |                |                   |                       |                             |
| 8890/8890B GC | Fast      | 220/230/240        | 50/60 ± 5%     | 2950              | 13.4/12.8/12.3        | 15 Amp                      |
|               |           | single/split phase |                |                   |                       | Dedicated                   |
|               |           | (-10% / +10%)      |                |                   |                       |                             |
| 8860 GC       | Standard  | 200                | 48-63          | 2250              | 11.2                  | 15 Amp                      |
|               |           | single phase       |                |                   |                       | Dedicated                   |
|               |           | (-10% / +10%)      |                |                   |                       |                             |

## Installing the GC

Verify line voltage, voltage settings, and power cord

| Product                     | Oven type | Line voltage (VAC)                                     | Frequency (Hz) | Power Rating (VA)                 | Current rating (amps) | Power outlet current rating |
|-----------------------------|-----------|--------------------------------------------------------|----------------|-----------------------------------|-----------------------|-----------------------------|
| 8860B GC                    | Standard  | 120<br>single phase<br>(-10% / +10%)                   | 48-63          | 2350                              | 19.6                  | 20 Amp<br>Dedicated         |
| 8860B GC                    | Standard  | 220/230/240<br>single phase<br>(-10% / +10%)           | 48-63          | 2350                              | 10.7/10.2/9.8         | 10 Amp<br>Dedicated         |
| 8860B GC                    | Standard  | 200<br>single phase<br>(-10% / +10%)                   | 48-63          | 2350                              | 11.8                  | 15 Amp<br>Dedicated         |
| <b>MSD</b>                  |           |                                                        |                |                                   |                       |                             |
| 5975 Series MSD             |           | 120<br>(-10% / +5%)                                    | 50/60 ± 5%     | 1100 (400 for foreline pump only) | 8                     | 10 Amp                      |
| 5975 Series MSD             |           | 220-240<br>(-10% / +5%)                                | 50/60 ± 5%     | 1100 (400 for foreline pump only) | 8                     | 10 Amp                      |
| 5975 Series MSD             |           | 200<br>(-10% / +5%)                                    | 50/60 ± 5%     | 1100 (400 for foreline pump only) | 8                     | 10 Amp                      |
| 5977 Series MSD             |           | 120<br>(-10% / +5%)                                    | 50/60 ± 5%     | 1100 (400 for foreline pump only) | 8                     | 10 Amp                      |
| 5977 Series MSD             |           | 220-240<br>(-10% / +5%)                                | 50/60 ± 5%     | 1100 (400 for foreline pump only) | 8                     | 10 Amp                      |
| 5977 Series MSD             |           | 200<br>(-10% / +5%)                                    | 50/60 ± 5%     | 1100 (400 for foreline pump only) | 8                     | 10 Amp                      |
| <b>MS</b>                   |           |                                                        |                |                                   |                       |                             |
| 7010 or 7000 Triple Quad MS |           | 120<br>(-10% / +5%)                                    | 50/60 ± 5%     | 1600                              | 15                    | 15 Amp<br>Dedicated         |
| 7010 or 7000 Triple Quad MS |           | 220-240<br>(-10% / +5%)                                | 50/60 ± 5%     | 1600                              | 15                    | 15 Amp<br>Dedicated         |
| 7010 or 7000 Triple Quad MS |           | 200<br>(-10% / +5%)                                    | 50/60 ± 5%     | 1600                              | 15                    | 15 Amp<br>Dedicated         |
| 7200 or 7250 Q-TOF MS       |           | 200-240<br>(-10% / +5%)                                | 50/60 ± 5%     | 1800 (1200 for foreline pump)     | 15                    | 15 Amp<br>Dedicated         |
| <b>HS</b>                   |           |                                                        |                |                                   |                       |                             |
| 7697A Headspace             |           | Americas: 120<br>single phase<br>(-10% / +10%)         | 50/60 ± 5%     | 850                               | 6.2                   | 15 Amp                      |
| 7697A Headspace             |           | 200/220/230/240<br>single/split phase<br>(-10% / +10%) | 50/60 ± 5%     | 850                               | 3.8/3.4/3.3/3.1       | 10 Amp                      |

## Installing the GC

Verify line voltage, voltage settings, and power cord

| Product                                   | Oven type | Line voltage (VAC)                                     | Frequency (Hz) | Power Rating (VA) | Current rating (amps) | Power outlet current rating |
|-------------------------------------------|-----------|--------------------------------------------------------|----------------|-------------------|-----------------------|-----------------------------|
| 8697 Headspace                            |           | 100/120<br>single phase<br>(-10% / + 10%)              | 50/60          | 850               | 6.2                   | 15 Amp                      |
| 8697 Headspace                            |           | 200/220/230/240<br>single/split phase<br>(-10% / +10%) | 50/60          | 850               | 3.8/3.4/3.3/3.1       | 10 Amp                      |
| <b>All</b>                                |           |                                                        |                |                   |                       |                             |
| Data system PC<br>(monitor, CPU, printer) |           | 100/120<br>(-10% / +5%)                                | 50/60 ± 5%     | 1000              | 10/8.3                | 15 Amp<br>Dedicated         |
| Data system PC<br>(monitor, CPU, printer) |           | 200/240<br>(-10% / +5%)                                | 50/60 ± 5%     | 1000              | 4.1-5                 | 10 Amp<br>Dedicated         |

## Notes

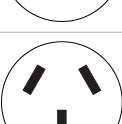
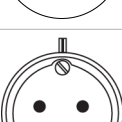
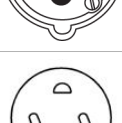
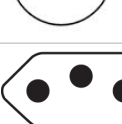
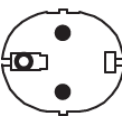
1. Some US labs have 3 phase service resulting in 208 V at the wall receptacle. It is important for a qualified person to measure the line voltage at the receptacle for the GC. Option 003, 208 V fast oven, uses a 220 V unit with operating range of 193 to 231 V.
2. Use of power line conditioners is not recommended for Agilent GC and GC-MS systems. Doing so may cause damage to the equipment. If a UPS is required due to poor power quality or as backup power, please request UPS selection guidance from Agilent.



## Common instrument power cord plugs

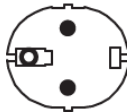
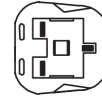
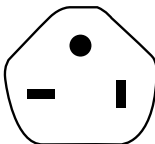
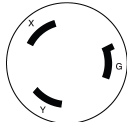
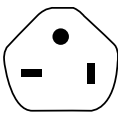
**Table 2** shows common Agilent power cord plugs.

Table 2. Power cords

| Part number | Country                  | Voltage         | Amps | Cable length (m) | GC connector type | Termination type       | Plug                                                                                  |
|-------------|--------------------------|-----------------|------|------------------|-------------------|------------------------|---------------------------------------------------------------------------------------|
| 8121-3119   | Argentina                | 220             | 16   | 2.5              | C19               | IRAM 2073              |    |
| 8121-3115   | Australia/ New Zealand   | 230             | 10   | 2.5              | C13               | AS 3112                |    |
| 8120-8619   | Australia / New Zealand  | 230             | 15   | 2.5              | C19               | AS 3112                |    |
| 8121-3321   | Brazil                   | 120/220         | 16   | 2.5              | C19               | NBR 14136 BR/3/20      |    |
| 8121-1084   | Chile/Italy              | 230/220         | 16   | 2.5              | C19               | CEI 23-50              |   |
| 8121-1766   | China                    | 220             | 16   | 2.5              | C19               | GB 1002 GB 2099        |  |
| 8121-0723   | China                    | 220             | 10   | 2.5              | C13               | GB 1002 GB 2099        |  |
| 8120-8622   | Denmark<br>Switzerland † | 230             | 16   | 2.5              | C19               | IEC60309               |  |
| 8121-3112   | Denmark                  | 230             | 10   | 2.5              | C13               | SB 107-2-D1 DK2-5a     |  |
| 8120-4416   | Switzerland              | 230             | 10   | 2.5              | C13               | SEV 1011<br>SEV 6534/2 |  |
| 8121-1222   | Europe / Korea           | 220 / 230 / 240 | 16   | 2.5              | C19               | CEE 7/7                |  |

## Installing the GC

Verify line voltage, voltage settings, and power cord

| Part number | Country                                        | Voltage         | Amps | Cable length (m) | GC connector type | Termination type | Plug                                                                                  |
|-------------|------------------------------------------------|-----------------|------|------------------|-------------------|------------------|---------------------------------------------------------------------------------------|
| 8121-3121   | Europe / Korea                                 | 220 / 230 / 240 | 10   | 2.5              | C13               | CEE 7/7          |    |
| 8121-0710   | South Africa                                   | 230             | 16   | 2.5              | C19               | SANS 164/1       |    |
| 8121-3232   | India                                          | 230             | 16   | 2.5              | C19               | IS 1293          |    |
| 8121-0161   | Israel                                         | 230             | 16   | 2.5              | C19               | SI 32            |    |
| 8121-1763   | Japan                                          | 100             | 15   | 2.5              | C19               | JIS C8303        |    |
| 8121-2569   | Japan                                          | 200             | 15   | 2.5              | C19               | NEMA L6-20 Japan |   |
| 8120-8620   | United Kingdom, Hong Kong, Singapore, Malaysia | 220/230         | 13   | 2.5              | C19               | BS1363/A SS145   |  |
| 8121-3132   | United States/South America (general)          | 120             | 20   | 2.5              | C19               | NEMA 5-20P       |  |
| 8121-0075   | United States / South America (unspecified)    | 240             | 15   | 2.5              | C19               | NEMA L6-15P      |  |
| 8121-3132   | Taiwan                                         | 110             | 20   | 2.5              | C19               | NEMA 5-20P       |  |
| 8121-2989   | Taiwan                                         | 220             | 15   | 2.5              | C19               | CNS 690          |  |

## Installing the GC

Verify line voltage, voltage settings, and power cord

| Part number | Country                  | Voltage | Amps | Cable length (m) | GC connector type | Termination type | Plug                                                                                |
|-------------|--------------------------|---------|------|------------------|-------------------|------------------|-------------------------------------------------------------------------------------|
| 8121-1764   | Thailand and Philippines | 220     | 15   | 2.5              | C19               | NEMA 5-15        |  |

† 8890B GC only

## Grounding

**To protect users, the metal instrument panels and cabinet are grounded through the three-conductor power line cord in accordance with International Electrotechnical Commission (IEC) requirements.**

When plugged into a properly grounded receptacle, the three-conductor power line cord grounds the instrument and minimizes shock hazard. A properly grounded receptacle is one that is connected to a suitable earth ground. Proper receptacle grounding should be verified.

Make sure the GC is connected to a dedicated circuit.

## Installing the GC

Connect GC to LAN, Local Computer, or Tablet

# Connect GC to LAN, Local Computer, or Tablet

If you intend to connect your system to your site's LAN network, you must have an additional shielded twisted pair network cable (8121-0940).

Use a network cable to connect the GC LAN port to your site LAN or directly to a local computer.

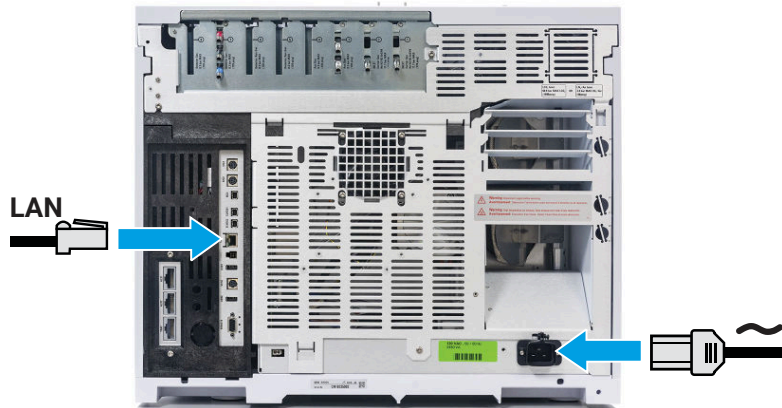


Figure 4. 8890B LAN connection

A single LAN communications cable is supplied with the GC. The switch (or hub) and other cables must be ordered separately, if needed.

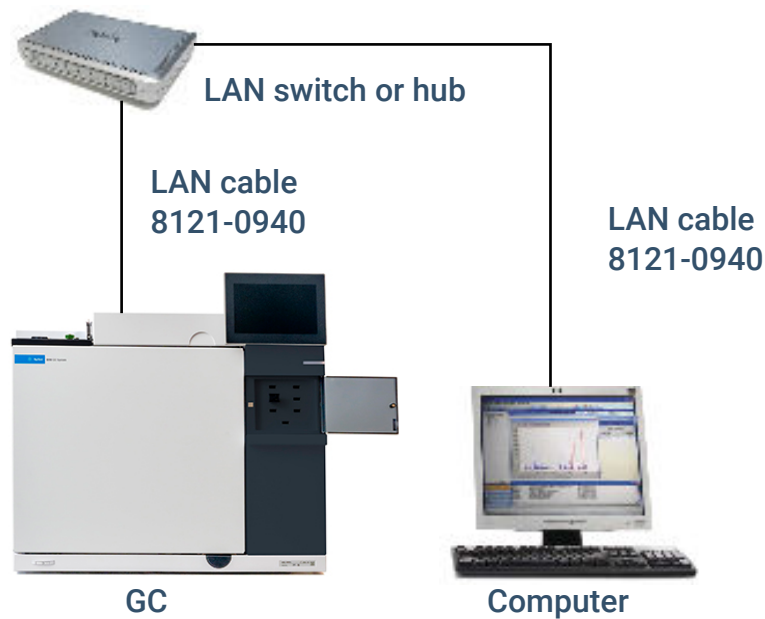


Figure 5. Simple supported LAN configuration: LAN Switch or hub

**Installing the GC**

Connect GC to LAN, Local Computer, or Tablet

**NOTE**

Agilent is not responsible for connecting to or establishing communication with your site LAN network. The Agilent representative will test the system's ability to communicate on a mini-hub or LAN switch only.

## Installing the GC

Connect the power cord and turn on the GC

# Connect the power cord and turn on the GC

1. Verify that the power switch is in the Off position.



Figure 6. Power Switch location

2. Plug the power cord into the back of the GC and the power outlet. Turn on the GC.

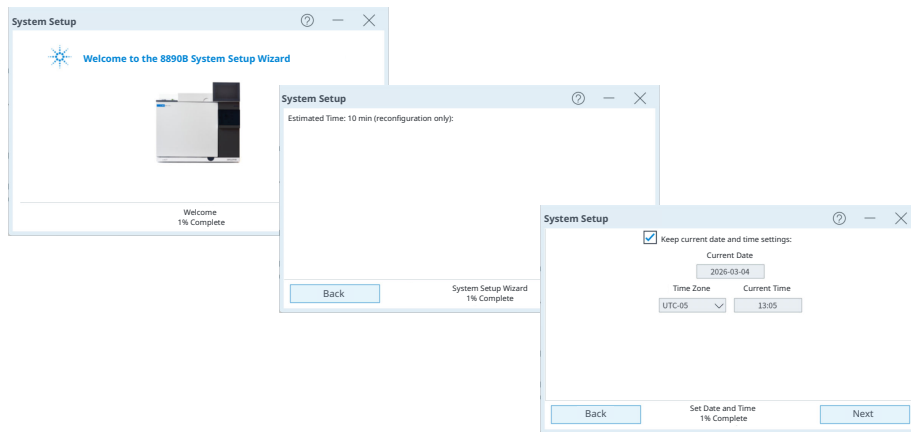


Figure 7. Power cord location

## View the System Setup Wizard

The system setup wizard walks through the most important steps needed to install and configure the GC. It provides a way to enter only the critical settings needed to get started quickly, leaving all other configuration settings at their default values. These steps include:

- Unpacking
- Setting the system date, time, and IP address
- Setting the gas units, gas types, and similar choices
- Connecting gases and checking for leaks
- Installing a sampler, if available
- Running a checkout sample



You can follow the system setup wizard, or cancel it and follow the procedures here instead. Whether using the wizard or not, this guide provides all of the supporting information needed for installation.

After exiting the system setup wizard, you can re-launch it at any time. On the GC touchscreen, navigate to **⚙️ (Settings) > System Setup** and touch **Run System Setup**.

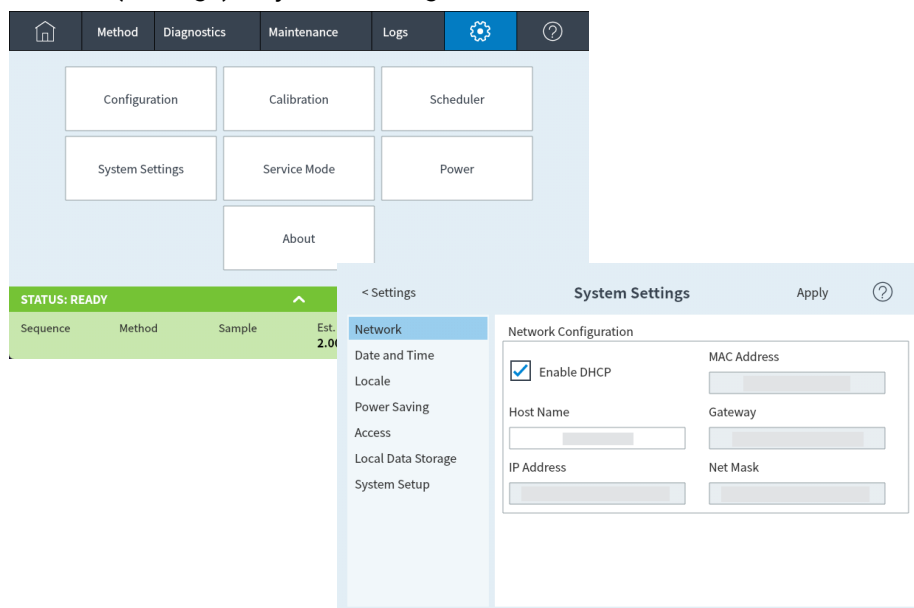
## Configure the GC IP address

If you intend to connect your system to your site's network, each piece of equipment must have a unique IP address assigned to it. For an isolated LAN installation, see **Table 3** for typical IP addresses.

Table 3. Typical IP addresses for an isolated LAN

|             | GC            | Computer      |
|-------------|---------------|---------------|
| IP address  | 10.1.1.101    | 10.1.1.100    |
| Subnet mask | 255.255.255.0 | 255.255.255.0 |

1. Select **⚙️ (Settings) > System Settings > Network**.



2. Manually enter the GC **Host Name** or **IP address**, **Gateway**, and **Net Mask** (subnet mask), or enable DHCP to populate these fields.



## Set the Date/Time

Select ⚙️ (**Settings**) > **System Settings** > **Date and Time** and set the GC clock.

- The **Current Time** is based on a 24 hour clock.
- The time set here is important for the time and date stamps used when collecting data and recording log entries (such as maintenance tasks and errors). The GC time also controls resource conservation for connected samplers.

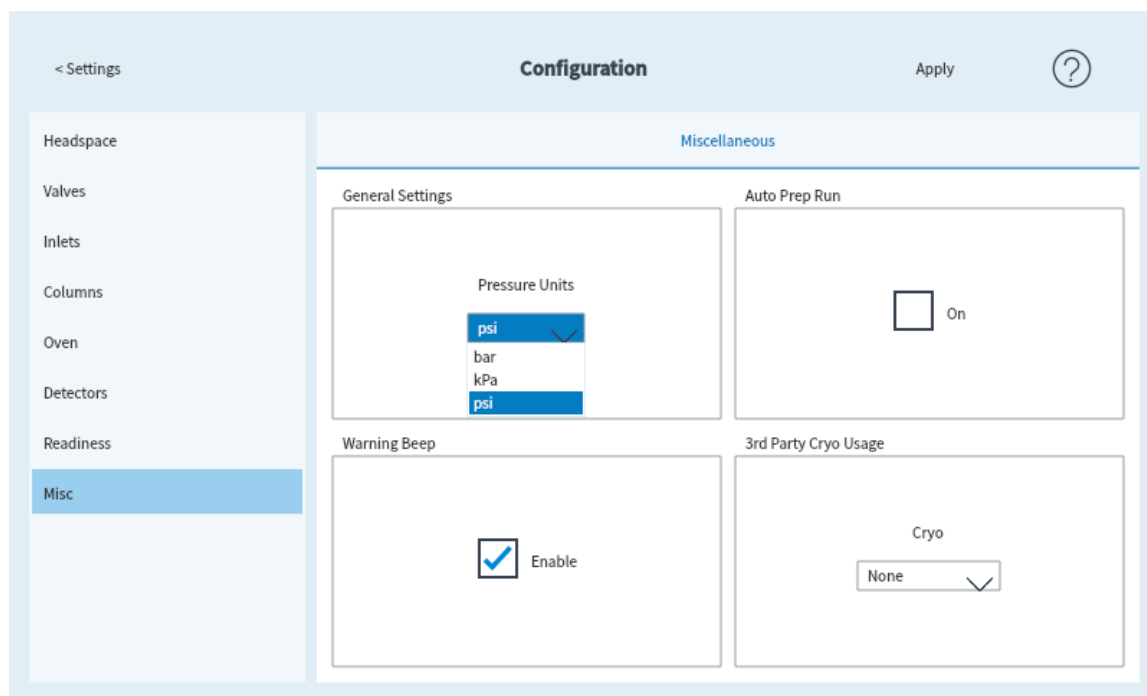
The screenshot shows the 'System Settings' interface with the 'Date and Time' option selected in the left sidebar. The main area is titled 'System Date and Time' and contains three input fields: 'Current Date' (2026-03-04), 'Current Time' (12:13), and 'Time Zone' (UTC-05). The 'Time Zone' dropdown menu is open, showing a list of options from UTC-0430 to UTC-04, with UTC-05 highlighted. The interface includes a back arrow, an 'Apply' button, and a help icon.

| Current Date | Current Time | Time Zone |
|--------------|--------------|-----------|
| 2026-03-04   | 12:13        | UTC-05    |

Time Zone options: UTC-0430, UTC-12, UTC-11, UTC-10, UTC-09, UTC-08, UTC-07, UTC-06, UTC-05, UTC-04

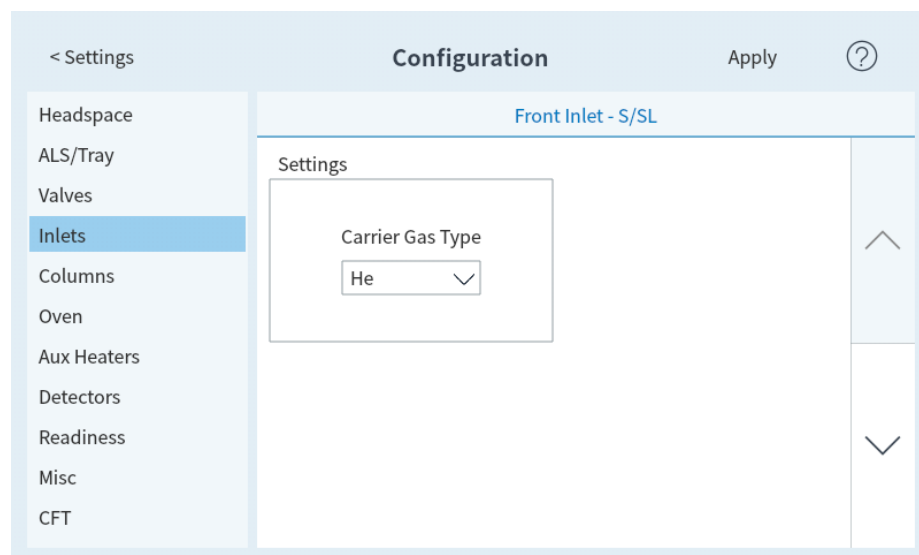
## Set the Pressure Units

To set the pressure units, select ⚙️ (Settings) > Configuration > Misc, and select the desired pressure units to use in methods.



## Configure Carrier Gas Types

Select ⚙️ (**Settings**) > **Configuration** > **Inlets** and use the dropdown menu to select the Carrier Gas Type connected to the selected inlet. Repeat for any additional inlets installed in your GC.



## Connect Gases and Traps

Plumb the gas sources to the filters and flow modules. Swagelok fittings are used to make leak-tight connections. If you are not sure how to make a Swagelok connection, see [Making Swagelok Connections](#) for instructions.

### WARNING

**Hydrogen is a flammable gas. If hydrogen or any other flammable gas is used, periodic leak tests should be performed. Be sure that the hydrogen supply is off until all connections are made, and ensure that the inlet fittings are either connected to a column or capped at all times when hydrogen gas is present in the instrument.**

**Substituting parts or performing any unauthorized modification to the instrument may result in a safety hazard.**

**The insulation around the inlets, detectors, valve box, and the insulation cups is made of refractory ceramic fibers (RCF). To avoid inhaling RCF particles, we recommend these 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 RCFs.**

## Install the gas regulators

1. Select the appropriate CGA regulator for each gas type. (In other countries, refer to local standards. See the GC's *Site Preparation Guide* for requirements.)

Table 4. Gas regulators, 1/8-inch, U.S. only<sup>1</sup>

| Description                                             | Part number |
|---------------------------------------------------------|-------------|
| CGA 346, 125 psig max (8.6 bar), Air                    | 5183-4641   |
| CGA 350, 125 psig max (8.6 bar), H <sub>2</sub> , Ar/Me | 5183-4642   |
| CGA 540, 125 psig max (8.6 bar), O <sub>2</sub>         | 5183-4643   |
| CGA 580, 125 psig max (8.6 bar), He, Ar, N <sub>2</sub> | 5183-4644   |
| CGA 590, 125 psig max (8.6 bar), Air                    | 5183-4645   |

<sup>1</sup>For 1/4-inch tubing, purchase a 1/4-inch to 1/8-inch adapter, U.S. only.

### CAUTION

Never use a liquid thread sealant on gas fittings. Liquid thread sealants introduce contamination into the GC plumbing.

2. Confirm that the outlet fitting of the regulator is 1/8-inch Swagelok. If not, install the appropriate adapter fitting. Wrap the fitting threads using PTFE tape. Wrap the tape in a clockwise direction so that the adapter threads do not unwrap the tape. Be careful to keep the tape away from the end of the fitting. Two to three tightly wound wraps are sufficient. Tighten the Swagelok adapter fitting securely to the NPT pipe thread fitting.

## Installing the GC

### Connect Gases and Traps



3. Install the regulator onto the compressed gas cylinder main fitting.
  - Check the thread type. Some regulators use left-hand thread fittings. For left-handed threads, the nut will have a groove in it.

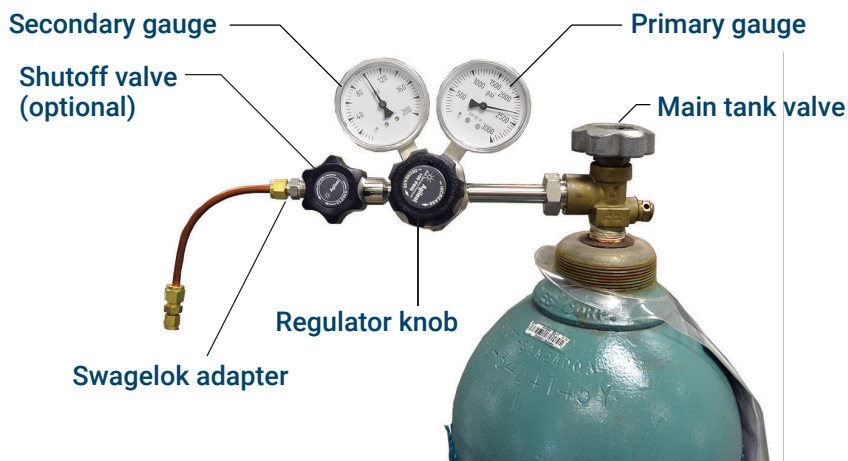


4. Purge the air from the regulator by repeating the following procedure 5 times:
  - a. Fully close the regulator knob, then open the main tank valve.
  - b. Turn the regulator knob fully counter-clockwise to open the tank main valve, pressurizing the primary side of the regulator.
  - c. Turn OFF the tank main valve.
  - d. Slowly turn the regulator knob clockwise to release ("bleed off") the gas pressure.
  - e. Close the regulator knob.

The image below illustrates a typical pressure regulator installation. In the example shown below, which uses an optional shutoff valve, open the shutoff valve and leave open during purging.

## Installing the GC

### Connect Gases and Traps



## Connect the tubing to the gas source

### NOTE

If you need more than 4.5 m (15 feet) of supply tubing to connect to a gas source, use 1/4-inch tubing with appropriate hardware. See the GC's *Site Preparation Guide* for part numbers.

1. Turn off all gases at their sources. Measure the length of tubing needed to connect the gas supply outlet to the inlet fitting on the GC. Take into account any traps or tees you will need.

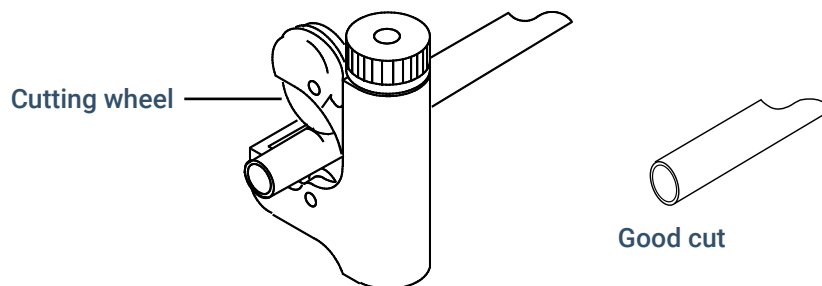


Figure 8. Typical tubing cutter

2. Cut the tubing to length with a tubing cutter. See [Figure 8](#).
3. Connect the tubing to the gas source with a Swagelok fitting. See [Making Swagelok Connections](#).

## Install traps

1. Determine where you will install the traps in your supply tubing line. [Figure 9](#) shows the recommended trap order for the carrier gas and the recommended locations for On/Off valves. Also see the *Site Preparation Guide*.

## Installing the GC

### Connect Gases and Traps

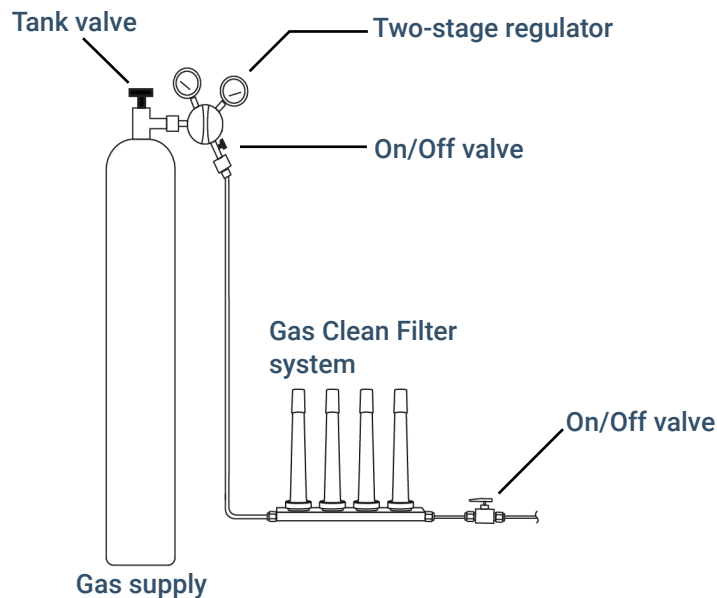


Figure 9. Plumb the gas supplies

2. Cut the tubing to length with a tubing cutter.
3. Connect the traps and tubing. On/Off valves are not essential, but are very useful when a tank or trap must be changed. (If purchasing Agilent compliance services, an on/off valve must be installed for each inlet gas supply.)

## Plumb to EPC flow modules

Inlet and detector EPC flow modules are mounted very close together across the back of the GC. See [Figure 10](#).

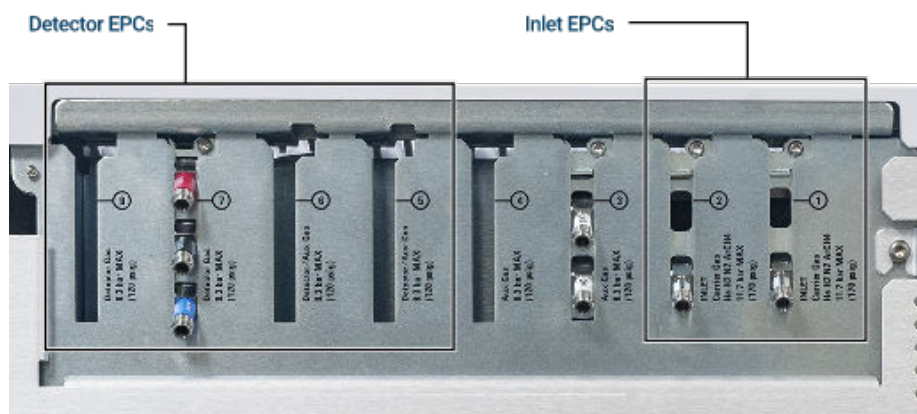


Figure 10. Plumb flow modules

Purge the supply lines for a few minutes before connecting them to the GC flow modules.

Be sure to vent uncombusted hydrogen to a fume hood or other safe location.

When two inlets use the same carrier gas, we recommend using a Tee fitting that includes shutoff valves for performing leak tests.

## Installing the GC

### Connect Gases and Traps

When two detectors use the same gases, we recommend using a Tee fitting. Shutoff valves are not required.

### TCD connections

The carrier gas and reference gas must come from the same source. Because of the close spacing of the EPC modules, the simplest way to do this is to attach lengths of tubing to each input to bring the ends outside the back panel, then join them with a Tee.

### Side mounted detector connections

If the GC is equipped with a side-mounted detector, attach the carrier gas to the single gas connection at the back of the side mount enclosure. (An internal Tee feeds the reference gas and input.)

## Install Aux EPC module frits for your application

Skip this section if an Aux EPC module is not installed.

The AUX EPC module ships with brown (FID air) restrictors in all channels. For certain applications, you will have to replace this restrictor (frit) so the EPC module can provide flows in the correct ranges. Also refer to the other instrument's or application's documentation.

Table 5. G3526-60502 Aux EPC restrictor kit

| Description   | Qty | Part number | Marking         | Flow                                           | Resistance  | Often used with                                          |
|---------------|-----|-------------|-----------------|------------------------------------------------|-------------|----------------------------------------------------------|
| O-rings, 6/pk | 1   | 5181-3344   |                 |                                                |             |                                                          |
| Frit          | 0   | G3430-80061 | 1 ring<br>Brown | 400 ± 30<br>SCCM air @<br>40 psig              | Low         | FID air, purged split-<br>ters, Deans switch             |
| Frit          | 3   | G3430-80062 | 2 rings<br>Red  | 30 ± 1.5<br>SCCM H <sub>2</sub> @<br>15 psig   | Medium      | FID hydrogen                                             |
| Frit          | 3   | G3430-80063 | 3 rings<br>Blue | 3.33 ± 0.3<br>SCCM H <sub>2</sub> @<br>15 psig | High        | NPD hydrogen                                             |
| Frit          | 0   | G3430-20011 | None            |                                                | Zero (none) | Purged splitter, Deans<br>switch when using<br>backflush |

### Notes for this table

- Frit G3430-80061 ships in each AUX channel.
- Restrictor kit G3526-60502 is included in the AUX module ship kit.
- Always use new O-rings (orderable part number 5180-4181, O-rings, 12/pk, or part number 5181-3344 (6/pk) in EPC restrictor kit).
- Install tubing and connectors as needed for each additional gas supply required.
- Do not install an external flow restrictor.

## Install hydrogen sensor calibration gas

If a G6598A hydrogen sensor is installed in the GC, connect the hydrogen sensor calibration gas (5190-6890). This gas is 2% hydrogen in air. The hydrogen sensor ship kit includes a pressure



## Installing the GC

### Connect Gases and Traps

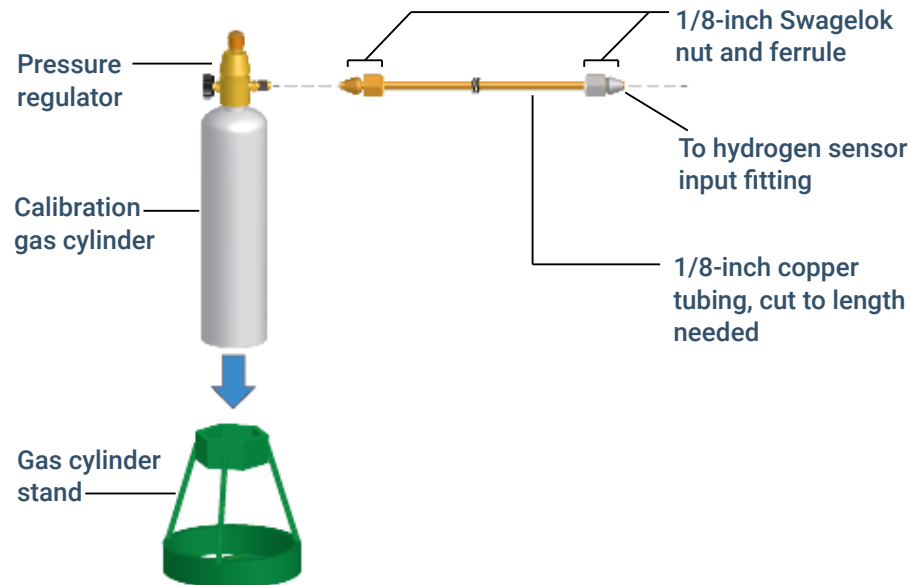
regulator (G3440-80216) that installs directly onto the calibration gas cylinder. Agilent also provides sufficient copper tubing and hardware to connect the pressure regulator to the hydrogen sensor assembly calibration gas input fitting.

### Install the calibration gas

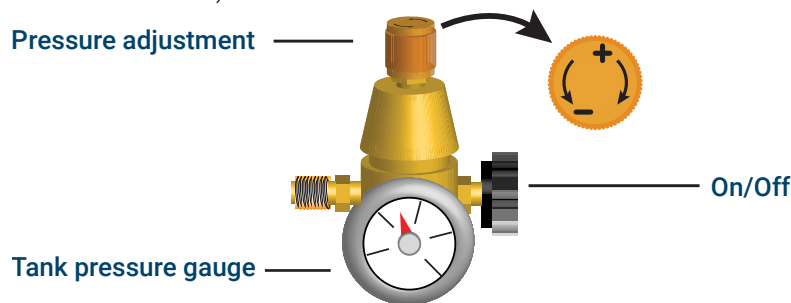
1. Set the gas cylinder stand upright on the lab bench near the GC.

#### WARNING

**The gas cylinder is pressurized. Do not place the cylinder on its side or behind the oven exhaust vent!**



2. Turn the pressure regulator completely off and set the output pressure as low as possible (full counterclockwise).



3. Install the pressure regulator onto the calibration gas cylinder (it screws on).
4. Connect the calibration gas cylinder output tubing to the hydrogen sensor module.
  - Use the tubing, nuts, and ferrules provided in the hydrogen sensor kit.
  - See the figure under **step 1**.
5. Install the calibration gas cylinder into the stand and secure using the screw.
6. Turn on the supply pressure at the pressure regulator. (You will adjust it later.)
7. Check for leaks in the fittings using a leak detection fluid. Be careful not to let any fluid contact GC electronics. Use leak detection fluid only on connections outside of the GC. Correct any leaks.

## Calibrate the hydrogen sensor

1. Select **⚙ (Settings) > Calibration > H2 Sensor > Start**.
2. When prompted to set the calibration flow, click **Set Flow** to confirm.
3. Allow the oven to cool to the set point before continuing with the calibration. Actual oven temperature will display. Select **Continue** when the temperature setpoint has been met.
4. Open the GC oven door and connect a flowmeter tube to the sensor tube in the oven.

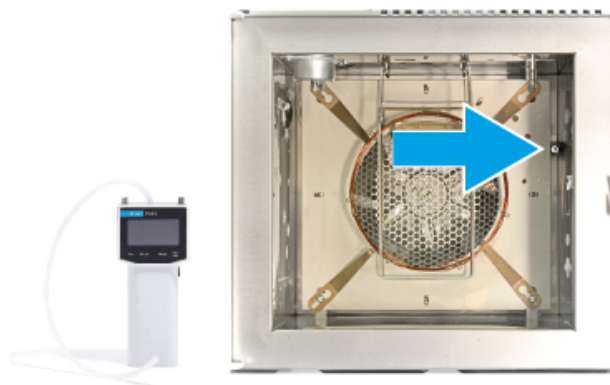


Figure 11. GC oven (front view of oven shown)

5. Select **Turn On**. The calibration cycle begins. The hydrogen sensor module will begin to send calibration gas across the sensor.
6. While continuing to measure the flow rate from the tube, adjust the pressure regulator on the calibration gas cylinder until the flow rate is approximately 30 mL/min (+/- 3mL/min). Remove the flowmeter and close the oven door.



7. Allow the calibration cycle to complete (approximately 5 minutes total time).  
If calibration fails, check the gas supply. Is the calibration gas cylinder being used? Is the gas type correct? Are there any leaks? See [Leak test all connections and set source pressures](#)
8. Turn off the calibration gas. You may disconnect the gas from the GC, if desired.

## Leak test all connections and set source pressures

Liquid leak detectors, such as soapy water, are not recommended, especially in areas where cleanliness is very important. If there is a leak, these liquids can contaminate the plumbing and affect your analyses. If you do use leak detection fluid, immediately rinse the fitting to remove the soapy film.

When checking for leaks of hydrogen or helium, Agilent recommends the G6693A leak detector, or similar.

**WARNING**

**To avoid a potential shock hazard when using liquid detection fluid, turn the GC off and disconnect the main power cord. Be careful not to spill leak solution on electrical leads.**

Perform a pressure decay test.

1. Turn off the GC.
2. Set the regulator pressure to 415 kPa (60 psi).
3. Fully turn the regulator pressure adjustment knob counterclockwise to shut the valve.
4. Wait 10 min. If there is a pressure loss greater than 7 kPa (1 psi), there is a leak in the external connections. Use the leak detector to check each fitting for leaks. See [Figure 12](#).

## Installing the GC

Leak test all connections and set source pressures

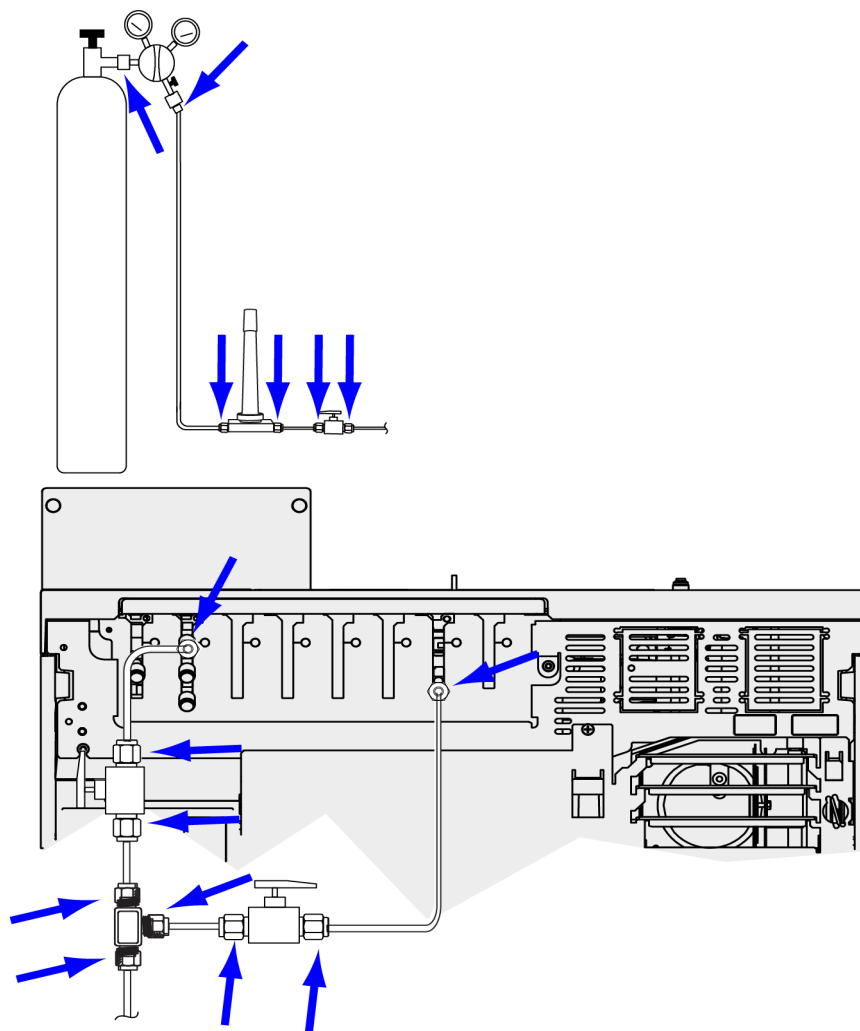


Figure 12. Locations to check for leaks

5. Correct leaks by tightening the connections and then retest the connections.

## Set source gas pressures

The pressure set at a tank regulator depends on these factors:

- The inlet pressure needed to achieve the highest column flow rate required by your method. The pressure/flow relationship depends on the column or device involved. The best way to address this is to begin at a moderate pressure level and adjust upward as needed.
- The number of flow control devices (for example, pressure regulators) in the line. A GC flow module counts as one device. The pressure delivered at the GC should be at least 170 kPa (25 psi) higher than the maximum pressure required for your method. A pressure difference of about 170 kPa (25 psi) across flow controlling devices enables them to work properly.
- The pressure limit of the weakest part of the supply system. Swagelok fittings and copper tubing are more than adequate for the highest pressures used in gas chromatography.

## Installing the GC

### Leak test all connections and set source pressures

We recommend a maximum continuous operating pressure of 1170 kPa (170 psi) to avoid excessive wear and leaks.

Traps are often the weakest part of the system. They should be labeled, either on the trap itself or in accompanying literature, with a maximum operating pressure. Source pressure must not exceed the lowest maximum operating pressure in the supply system.

**Table 6** suggests starting values of source pressure.

**Table 6. Suggested starting pressures**

| Gas                     | Use               | Source pressure  |
|-------------------------|-------------------|------------------|
| Carrier                 | Packed column     | 410 kPa (60 psi) |
|                         | Capillary columns | 550 kPa (80 psi) |
| Air for FID, FPD        | Detectors         | 550 kPa (80 psi) |
| Hydrogen                | Detectors         | 410 kPa (60 psi) |
| Makeup gas              | Detectors         | 410 kPa (60 psi) |
| TCD Reference           | TCD               | 410 kPa (60 psi) |
| Air for valve actuators | Valves            | 345 kPa (50 psi) |

## Install inlet checkout parts

If using a split/splitless or multimode inlet, install the liner and O-ring needed for checkout. See the GC's *Operation* manual, and the procedures listed in the GC's *Maintaining Your GC* manual.

If installing a GC/MS system, refer to the GC/MS installation manuals for the correct inlet hardware to install.

## Install ALS, if ordered

If installing an ALS, install it now. Refer to its instructions.

Prepare the sampler for checkout. See the checkout procedures and information in the GC's *Operation Manual*.

1. Prepare a 2-mL screw-top sample vial with checkout sample.
2. Prepare 4-mL waste vials and place them into the turret.
3. Prepare fresh solvent solutions as needed for the checkout sample for your detector type. Place the solvent vials into the injector turret. For details on the solvent needed, see the GC's *Operation Manual*.

## Configuring GC-MSD communications

If connected to an MSD or MS such as 5977A/B/C or 7000C/D, use the GC touchscreen to identify the connected MSD's IP address and to select the part information (for example, source type, and pump type). If connected to a 7000E or 7010C/D, the GC will learn the MS IP address automatically (if on the same subnet). Select **⚙ (Settings) > Configuration > Detectors**, then select the tab for the MSD. The MSD IP address entered here must exactly match the IP address entered in the data system and at the MSD keyboard.

Once the instruments have IP addresses and are connected to the LAN, complete the GC/MS configuration and enable enhanced communications, Parts Finder data, and MS-friendly features such as the MS Vent method as follows:

1. Select **⚙ (Settings) > Configuration > Detectors**.
2. If configuring a 5977B/C MSD, select **LCOMM** from the dropdown menu under **Connection Type**, and input the MSD's IP Address, Gateway, and Net Mask. Otherwise, select **DCOMM** and input the MSD's IP address.
3. Select **Enable Communication**.
4. Enter details for the MSD.



## Connect the external cables

In addition to the LAN cable as referenced in **“Connect GC to LAN, Local Computer, or Tablet”**, other cables may be installed for control of the GC’s automatic liquid sampler (ALS), connecting signal output to integrators, synchronizing the start and end of a run between various instruments, sensing conditions external to the GC, and controlling devices external to the GC.

### Back panel connectors

The figure below shows the connectors on the back panel of the GC.

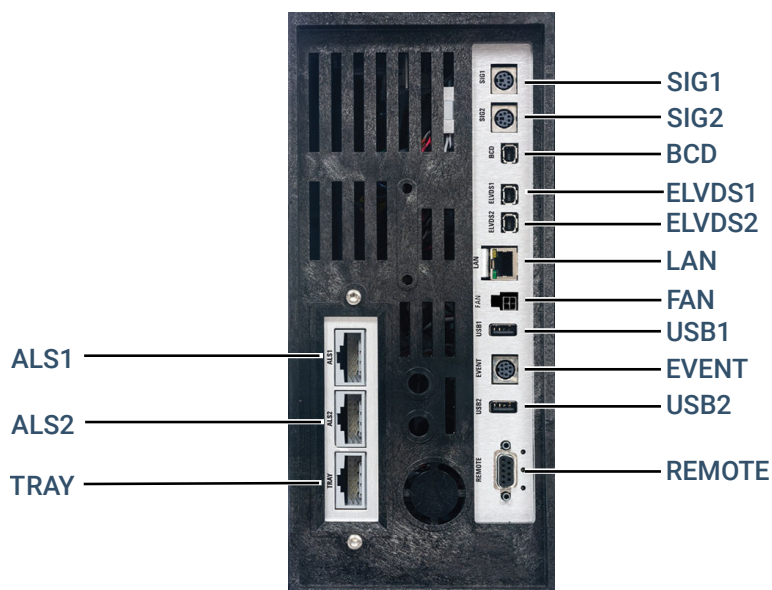


Figure 13. Back panel

See also **“Cable Diagrams”**.

### Sampler connectors

If using an ALS, connect it to the GC using the following connectors:

**ALS 1** Optional. A 16-position injector or 50-position injector.

**ALS 2** Optional. A 16-position injector or 50-position injector.

**TRAY** Optional. The 150-position sample tray (includes optional barcode reader/heater/mixer control, if purchased). Not compatible with a 50-position injector.

(The GC can have only one 50-position injector.)

### The SIG (analog output) connectors

Optional. Use SIG1 and SIG2 for analog output signals.

## Installing the GC

### Connect the external cables

#### REMOTE connector

Provides a port to remotely start and stop other instruments using the APG protocol. A maximum of 10 instruments can be synchronized using this connector. See [“Using the Remote Start/Stop Cable”](#) for more detail.

#### EVENT connector

This connector provides two passive contact closures and two 24-volt outputs for controlling external devices. The outputs are controlled by valve drivers 5 through 8.

#### BCD input connector

This connector provides two control relays and a BCD input for a stream selection valve or a BCD generating device.

#### USB connectors

These connectors are reserved for specific Agilent accessories only.

#### LAN connector

Standard Local Area Network (LAN) connector, for communication with data systems and other devices via TCP/IP.

#### FAN connector

Connector for the optional Rapid Cooling Fan accessory.

## Connecting cables

Use the supplied LAN cable to connect the GC to a LAN switch or hub as shown below in [Figure 14](#). Other LAN configurations are possible. Refer to your Agilent data system documentation for details about its supported LAN configurations.

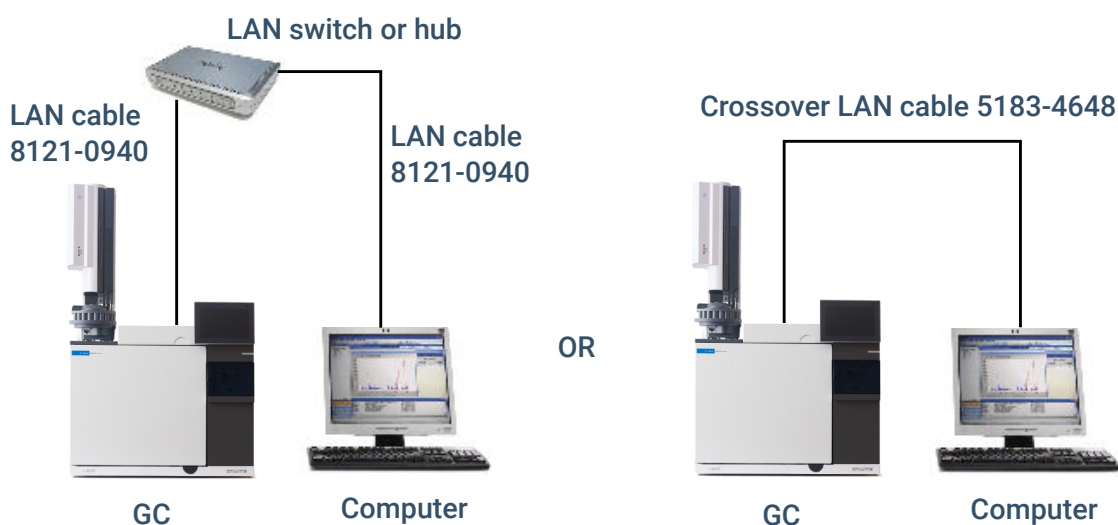


Figure 14. Simple supported LAN configurations: LAN switch or hub (left) and direct connection (right)

## Installing the GC

### Connect the external cables

Table 7. Typical IP addresses for an isolated LAN

|             | GC            | Computer      |
|-------------|---------------|---------------|
| IP address  | 10.1.1.101    | 10.1.1.100    |
| Subnet mask | 255.255.255.0 | 255.255.255.0 |

A single LAN communications cable is supplied with the GC. The switch (or hub) and other cables must be ordered separately, if needed. See [Table 8](#) and [Table 9](#) for cabling requirements for other configurations.

Table 8. Cabling requirements

| 8890B Series GC connected to:                                                                        | Required Cable(s)                                                   | Part number                                                     |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>Samplers</b>                                                                                      |                                                                     |                                                                 |
| 7693A Automatic Liquid Sampler                                                                       | Injector cable or tray cable                                        | G4514-60610                                                     |
| 7650 Automatic Liquid Sampler                                                                        | Injector cable                                                      | G4514-60610                                                     |
| 7683 Automatic Liquid Sampler                                                                        | Injector cable is integral                                          | G2614-60610                                                     |
|                                                                                                      | Tray cable                                                          |                                                                 |
| 7697A Headspace Sampler                                                                              | Remote, 9-pin male/9-pin connector                                  | G1530-60930                                                     |
| G1289B/G1290B Headspace Sampler                                                                      | Remote, 9-pin male/9-pin connector                                  | G1530-60930                                                     |
| PAL3/CTC automatic sampler                                                                           | Cable, 4 conductor, remote start                                    | G6500-82013                                                     |
| <b>Mass Spectrometers and MS systems</b>                                                             |                                                                     |                                                                 |
| Mass Selective Detector                                                                              | Y-Cable, remote start/stop, 2-m, 9-pin male/9-pin male              | G1530-61200                                                     |
| Mass Selective Detector                                                                              | MS to GC communications cable, 1.1 m, 9-pin male/ELVDS              | G3450-60019                                                     |
| GC / Agilent external sampler / MS or MSD system (for example, GC/HS/MSD or GC/Thermal Desorber/MSD) | Y-Cable, remote start/stop                                          | G1530-61200                                                     |
| GC / TMS-9800/ MS or MSD system                                                                      | Y-Cable, remote start/stop                                          | G1530-61200                                                     |
|                                                                                                      | Interface cable for Agilent 6890/7890/8890 to P&T                   | 14-6689-086                                                     |
| <b>Integrators</b>                                                                                   |                                                                     |                                                                 |
| 3395B/3396C Integrator                                                                               | Remote, 9 pin/15 pin                                                | 03396-61010                                                     |
|                                                                                                      | Analog, 2 m, 6 pin                                                  | G1530-60570                                                     |
| Non-Agilent Integrator                                                                               | General purpose analog signal cable 2 m, 6 pin                      | G1530-60560                                                     |
| Non-Agilent data system                                                                              | General use remote, 9-pin male/spade lugs (various lengths)         | 35900-60670 (2 m),<br>35900-60920 (5 m),<br>35900-60930 (0.5 m) |
| <b>Other devices</b>                                                                                 |                                                                     |                                                                 |
| Non-Agilent instrument, unspecified                                                                  | External event, 8 pin/spade lugs                                    | G1530-60590                                                     |
| Valco pulser module (used with PDHID)                                                                | Valve pulser module power supply cable (includes green EVENT label) | G1580-60730                                                     |
| Stream selection valves                                                                              | See documentation accompanying the valve                            | G3450-60570                                                     |
|                                                                                                      | BCD to MPV Cable                                                    |                                                                 |

## Installing the GC

### Connect the external cables

| 8890B Series GC connected to:  | Required Cable(s)                                 | Part number |
|--------------------------------|---------------------------------------------------|-------------|
| Gas sampling valves (external) | External valve cable (includes green EVENT label) | G1580-60710 |
| <b>LAN</b>                     |                                                   |             |
| LAN                            | Cable, networking CAT 5, 25 feet                  | 8121-0940   |
|                                | Cable, LAN, crossover                             | 5183-4648   |

Table 9. Cabling for other instruments in a 8890B Series GC system

| Instrument 1            | Instrument 2                                         | Type of cable                                                              | Part number |
|-------------------------|------------------------------------------------------|----------------------------------------------------------------------------|-------------|
| Mass Selective Detector | Purge & trap, thermal desorber, or headspace sampler | Splitter ("Y") cable for remote start/stop, 1 male and 2 female connectors | G1530-61200 |
|                         |                                                      | Splitter ("H") cable for APG remote, 2 male and 2 female connectors        | 35900-60800 |

## GC / MS / Agilent data system / ALS

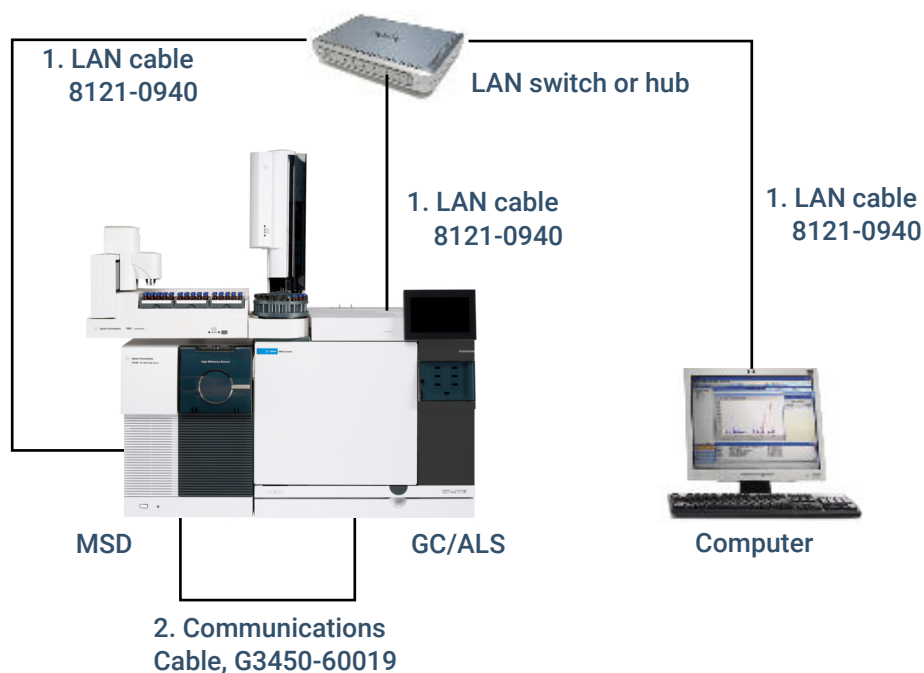


Table 10. Cables for a typical GC/MSD or GC/MS system

| Number | Part number and description                                        |
|--------|--------------------------------------------------------------------|
| 1      | 8121-0940, Cable, LAN, 25 foot                                     |
| 2      | G3450-60019, 1.1-m MS to GC communications cable, 9-pin male/ELVDS |

## Additional cabling configurations

For additional cabling configurations, see [Cabling Diagrams and Remote Start/Stop](#).

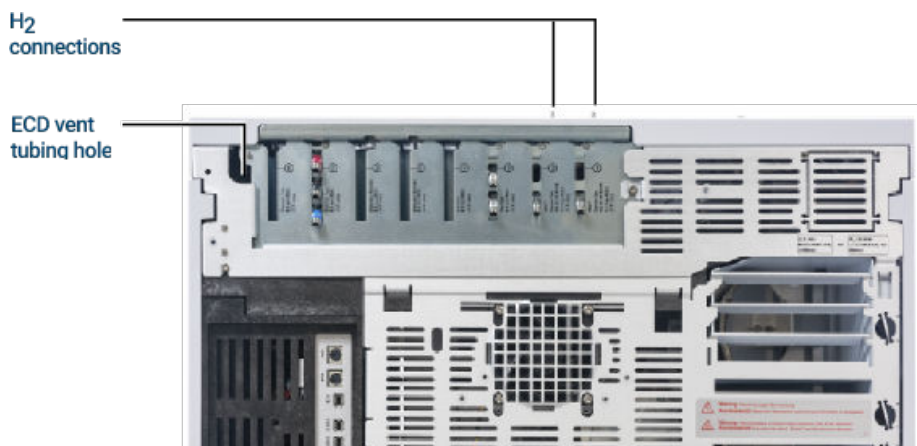
## Installing the GC

Vent ECD or uncombusted hydrogen to a fume hood

### Vent ECD or uncombusted hydrogen to a fume hood

If using a ECD, or if using hydrogen carrier gas that will be uncombusted, you must either safely vent the exhaust or operate the GC inside a fume hood. For example, if using hydrogen carrier gas the GC would vent uncombusted hydrogen from a thermal conductivity detector (TCD) and from the inlet split vent and septum purge vent.

The ECD exhaust vents through a coiled tube. Connect tubing from the tube fitting at the end of this tubing to an exhaust hood via a hole in the back panel.



For a TCD, you must supply vent tubing and fittings to connect to the detector exhaust tube on the top of the detector. Route the tubing out the back of the GC, following the same path as for the ECD vent tubing.

The other detectors (FID and FPD) combust any hydrogen carrier gas.

## Connect cryogenic cooling (if present)

Cryogenic cooling allows you to cool the oven or inlet, including cooling to setpoints below ambient temperature. A solenoid valve controls the flow of coolant to the inlet or oven. The oven can use either liquid carbon dioxide (CO<sub>2</sub>) or liquid nitrogen (N<sub>2</sub>) as a coolant. All inlets except the multimode inlet must use the same coolant type as the oven. The multimode inlet can use a different coolant than configured for the oven, and can also use compressed air as a coolant.

CO<sub>2</sub> and N<sub>2</sub> coolants require different hardware on the GC. (You can use air cooling on a multimode inlet with the N<sub>2</sub> solenoid valves and hardware.)

Flared or AN tubing fittings are commonly used to connect the liquid supply tubing to the cryo coolant tank. Check with the supplier of the coolant before plumbing to be sure you have the correct fittings.

### Connecting liquid carbon dioxide

**WARNING**

Do not use copper or thin-wall stainless steel tubing! Either presents an explosion hazard.

**CAUTION**

Do not use padded tanks for CO<sub>2</sub> supplies. The cryogenic valve is not designed to handle the higher pressures padded tanks generate.

The tank must be equipped with an eductor tube (dip tube) that reaches to the bottom of the tank, so that liquid (rather than gaseous) CO<sub>2</sub> is drawn.

### Materials needed

- 1/8-inch heavy-wall, stainless steel tubing

### Procedure

1. Locate the inlet for liquid CO<sub>2</sub> on the rear of the GC. Prepare enough tubing to reach from the supply tank to this fitting. See **Figure 15**.



Figure 15. Location of cryogenic cooling valve

## Installing the GC

### Connect cryogenic cooling (if present)

2. Connect the supply tubing to the liquid CO<sub>2</sub> tank outlet with the fitting recommended by the supplier.
3. Use a Swagelok fitting to connect the supply tubing to the cryogenic valve inlet.

## Connecting liquid nitrogen

### Materials needed

- 1/4-inch insulated copper tubing

### Procedure

1. Position the nitrogen tank as close to the GC as possible to insure that liquid and not gas is delivered to the inlet.
2. Locate the inlet for liquid N<sub>2</sub> on the rear of the GC. Prepare enough tubing to reach from the supply tank to this outlet. See **Figure 16**.

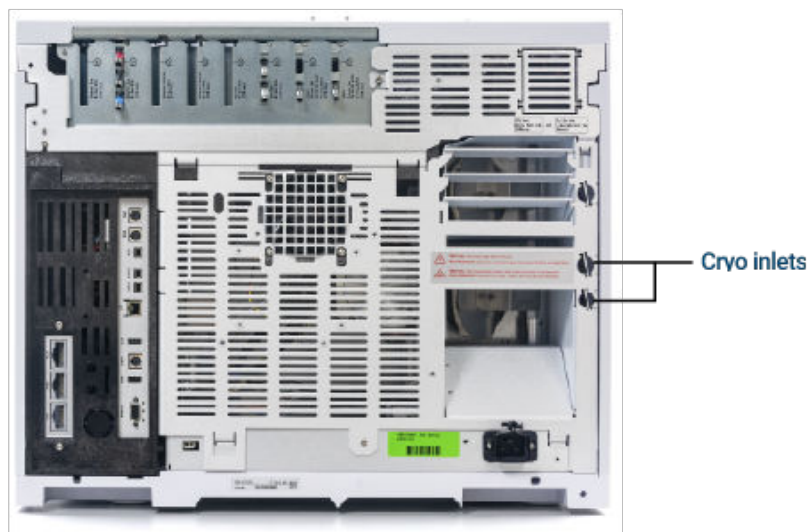


Figure 16. LN<sub>2</sub> cryogenic cooling valve connections

3. Connect the supply tubing to the liquid N<sub>2</sub> tank outlet with the fitting recommended by the supplier.
4. Use a Swagelok fitting to connect the supply tubing to the cryogenic valve inlet.

## Connecting air to the multimode inlet

The multimode inlet can also use compressed air cooling with the liquid N<sub>2</sub> inlet cooling option. Requirements for compressed air cooling:

- The compressed air should be free of particulate material, oil, and other contaminants. These contaminants could clog the inlet's cryo valve and expansion orifice or impact the proper operation of the GC.
- The required air supply pressure depends on the installed solenoid valve type. For a multimode inlet with LN<sub>2</sub> cooling, set the air supply pressure to 138 to 276 kPa (20 and 40 psig).

**Installing the GC****Connect cryogenic cooling (if present)**

- Use 1/4-inch copper or stainless steel tubing for supply tubing to the LN<sub>2</sub> valve.

While air supplied from tanks can meet these criteria, the consumption rate of air can be 80 L/min, varying based on supply pressure.

**NOTE**

A noise reduction kit, G3510-67001, is available for users of compressed air cooling with a multi-mode inlet.

**Materials needed**

Installation of a compressed air line to the inlet cryo coolant valve requires the hardware (and appropriate fittings) noted below:

- Use 1/4-inch copper or stainless steel tubing for supply tubing to the LN<sub>2</sub> valve.

**Procedure**

1. Locate the inlet for liquid N<sub>2</sub> on the rear of the GC. Prepare enough tubing to reach from the supply tank to this outlet.
2. Connect the supply tubing to the air supply outlet with the fitting recommended by the supplier.
3. Use a Swagelok fitting to connect the supply tubing to the cryogenic valve input fitting.





## Configure Headspace Communications

The 7697 and the 8697 headspace sampler can be configured to communicate with the connected GC. This feature requires a 7697 HS with firmware A.01.08.4 (or greater) or 8697 HS with firmware 1.3.0.59 (or greater). With communications configured, the HS knows GC method timings and programs, and can synchronize with the GC clock and follow the GC instrument schedule.

To configure GC-HS communications:

1. Select **⚙️ (Settings) > Configuration > Headspace**.
2. Use this page to enter details for, and control, the headspace sampler.
3. Select **Apply**. The entered changes are saved to the GC.

If communications fails, check the IP addresses. Verify that the GC's IP address is correct in the headspace sampler, and that the headspace sampler's IP address is correct in the GC. Also check that both instruments are turned on and connected to the LAN. Verify all LAN cable connections.

After GC installation, complete HS configuration. Refer to the HS control software help and the HS manuals for information on the configuration options.

## Configure the checkout column

The GC provides an automated procedure, available from the touchscreen and the browser interface, to install a column in the GC. On the touchscreen, go to **Maintenance > Column > Perform Maintenance > Install Column > Start Maintenance**. If using the automated procedure, column configuration is included. Skip to **“Transfer the checkout sample to a screw-top sample vial”**.

The instructions below describe how to install and condition the column manually, if not using the automated procedure.

You must configure the consumable items (such as the checkout column).

If your checkout column has a Smart ID Key, Insert the key into one of the six Smart ID key slots on the front of the GC. Input which number column (1-6) the key corresponds to in the dialog that appears.

### Checkout column

The column length, inside diameter, and film thickness are on a metal tag attached to the column.

1. Select **⚙ (Settings) > Configuration > Columns > Column #** to be configured and choose **Column Type**.
2. In the **Inlet connection** field, choose the **Inlet** to select a gas pressure control device for this end of the column. Selections include the installed GC inlets, and installed Aux and PCM channels.

The screenshot shows the 'Configuration' screen for 'Column 1'. On the left is a sidebar menu with options: Headspace, ALS/Tray, Valves, Inlets, Columns (highlighted), Oven, Aux Heaters, Detectors, Readiness, Misc, and CFT. The main area is titled 'Configuration' and has tabs for Column 1 through Column 6. Below the tabs, a message says 'No Smart Key is present.' Under 'Settings', there are four dropdown menus: 'Column Type' (set to 'Capillary'), 'Heated By' (set to 'GC Oven'), 'Inlet connection' (set to 'Front Inlet'), and 'Outlet connection' (set to 'Front Detector'). At the bottom, there are three input fields: 'Length' (30.00 m), 'Diameter' (320.00 µm), and 'Film Thickness' (0.25 µm). An 'Apply' button and a help icon are in the top right.

3. In the **Length** field, type the column length, in meters.
4. In the **Diameter** field, type the column inside diameter in microns.
5. In the **Film thickness** field, type the film thickness in microns. The column is now defined.
6. In the **Outlet connection** field, select a gas pressure control device for this end of the column. Selections include the installed Aux and PCM channels, and detectors. When a detector is selected, the outlet end of the column is controlled at 0 psig for the FID, TCD, FPD, NPD, and ECD or vacuum for the MSD.

## Installing the GC

### Configure the checkout column

- If necessary, select the **Heated By** thermal zone. In most cases this will be **GC oven**, but you may have an MSD transfer line heated by an auxiliary zone, valves in a separately-heated valve box or other configurations.

The screenshot shows the 'Configuration' window for a GC system. On the left is a sidebar with a list of components: < Settings, Headspace, ALS/Tray, Valves, Inlets, Columns (highlighted), Oven, Aux Heaters, Detectors, Readiness, Misc, and CFT. The main area is titled 'Configuration' and has tabs for Column 1 through Column 6. Column 1 is selected. Below the tabs, a message states 'No Smart Key is present.' Under the 'Settings' section, there are three main fields: 'Column Type' (set to 'Capillary'), 'Inlet connection' (set to 'Front Inlet'), and 'Heated By' (a dropdown menu with 'GC Oven' selected). Below these are three input fields: 'Length' (30.00 m), 'Diameter' (320.00 µm), and 'Film Thickness' (0.25 µm). An 'Apply' button and a help icon (?) are in the top right corner.

- Press **Apply**.

This completes configuration for a single capillary column. Also see the Operation manual for more information about configuring columns.

## Install the checkout column

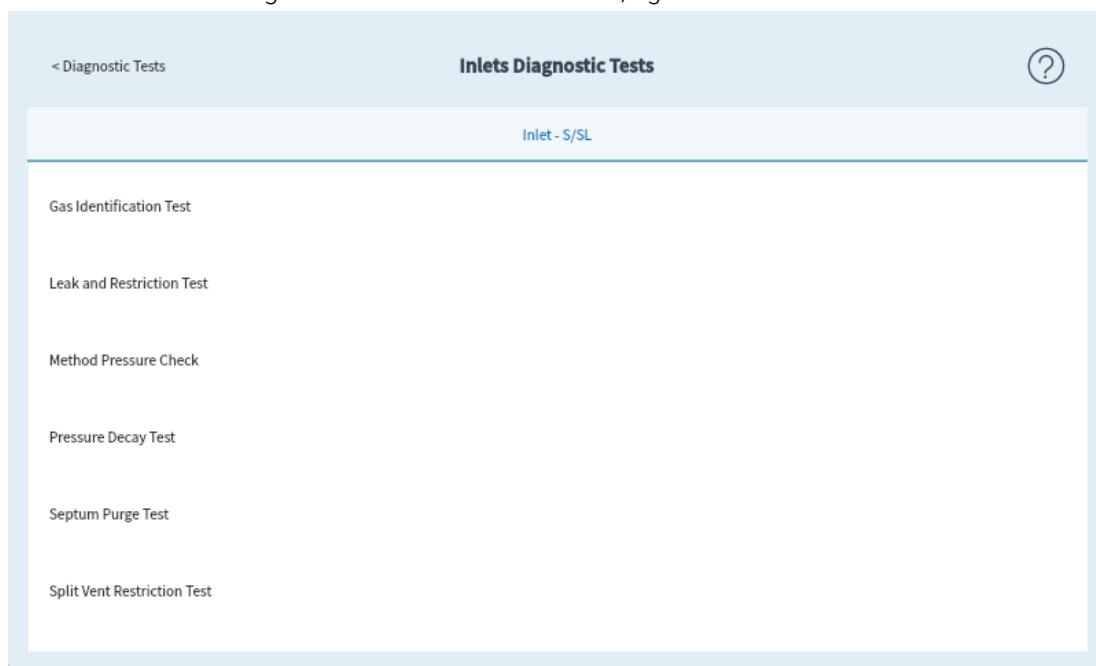
A capillary column was shipped with the GC to be used to confirm proper operation. Agilent suggests that it be used only for that purpose.

Before use, the column must be conditioned to remove any contaminants.

The GC provides an automated procedure, available from the touchscreen and the browser interface, to install a column in the GC. On the touchscreen, go to **Maintenance > Column > Perform Maintenance > Install Column > Start Maintenance**. When the procedure finishes, skip to **“Transfer the checkout sample to a screw-top sample vial”**.

The instructions below describe how to install and condition the column manually, if not using the automated procedure.

1. Locate the installation instructions for the column, inlet, and detector you will use. Refer to the *Maintaining Your GC* manual. See the sections on your specific inlet and detector types.
2. Install the column in the inlet.
3. Connect the free end of the column to the detector, as described in *Maintaining Your GC*.
4. Turn on the carrier gas.
5. If using a split/splitless, multimode, or cool on-column inlet, perform an Inlet Leak Check. Select **Diagnostics > Diagnostic Tests**, select **Inlets**, then select **Leak and Restriction Test**. Press **Start Test** to begin the check. If the check fails, tighten connections.



Front Inlet : Leak and Restriction Test

Testing

Primary sample flow path.

Description

1. Verify the inlet can control to a pressure setpoint, validating the basic operation of the inlet and flow path.

2. Hold the pressure and monitor the flow error between actual and target column flow. If the actual is larger than the target, a leak exists in the flow path. If the actual is less than the target, a restriction exists in the flow path.

Parameter

Error between the actual and the target column flow

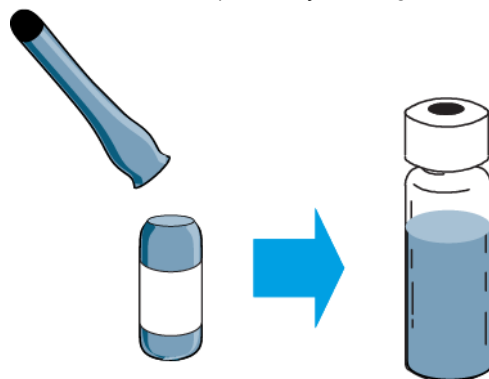
Test for leak or restriction

Start Test

6. Set the oven temperature and inlet flow conditions specified for conditioning the column. Select **Method** to access current GC temperatures and flows.
  - Set the oven temperature to 20 °C higher than the highest checkout method temperature (do not exceed the column maximum temperature). For example, for FID checkout set the oven temperature to 210 °C.
  - Set the detector temperature to 20 °C higher than the checkout method temperature. For example, for FID checkout set the detector temperature to 320 °C.
7. Turn the detector gases on. Light the flame, if appropriate.
8. Heat the detector to the temperature given in the bakeout instructions, and hold at temperature for the time given in the instructions.

## Transfer the checkout sample to a screw-top sample vial

1. The checkout sample is contained in sealed glass vials. Wrap a piece of cloth or a paper towel around the vial to protect your fingers and snap the top off.



2. Use a pipette to transfer the sample to a 2-mL screw-top vial. (If using an ALS, use a vial suitable for the ALS turret or tray, as applicable.)

## When the system stabilizes, run one injection

Perform the checkout procedure by selecting **Diagnostics > Instrument > System Checkout**, or perform it as described below and in the Operation Manual.

1. Enter the parameters for the checkout procedure.
  - If using an Agilent data system, use it to create a checkout method.
  - If not using a data system, enter the setpoints using the GC touchscreen or the Browser Interface.
2. When the GC is ready to begin a run (the touchscreen status shows **STATUS: READY**), make the injection and start the run. (When a component of the GC is not ready to begin a run, the touchscreen shows **STATUS: NOT READY**.)

For a manual injection, wait until the status shows **STATUS: WAITING FOR PREP RUN**, then touch **Prep Run** . When the status shows **Ready**, inject the sample and touch  (start).

| STATUS: NOT READY             |                        |                         |                               | GCUser@OpenLABCDS                                                                   |                                                                                     |                                                                                     |
|-------------------------------|------------------------|-------------------------|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Sequence<br><b>Sequence01</b> | Method<br><b>FID01</b> | Sample<br><b>Sample</b> | Est. Remaining<br><b>2.00</b> |  |  |  |

| STATUS: READY                 |                        |                         |                               | GCUser@OpenLABCDS                                                                   |                                                                                     |                                                                                     |
|-------------------------------|------------------------|-------------------------|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Sequence<br><b>Sequence01</b> | Method<br><b>FID01</b> | Sample<br><b>Sample</b> | Est. Remaining<br><b>2.00</b> |  |  |  |

3. Evaluate results by comparing the chromatogram you generated with the one in the checkout procedure. There should be a close resemblance.



## Prepare for the Next Analysis

After evaluating the GC under the checkout conditions, installation checkout is complete. The next step is to prepare the GC for your next analysis. Be sure to cool the GC before making changes.

Most consumables have automated procedures for installation. Navigate to **Maintenance > Perform Maintenance**, then select and run each procedure needed. Alternatively, follow the steps below.

1. Cool all heated zones to < 40 °C, and set safe gas flows. Place the GC in maintenance mode: **Maintenance > Instrument > Perform Maintenance > Maintenance Mode > Start Maintenance** and wait for the GC to become ready.
2. Shut off all gas valves at the gas source.
3. If you are using cryogenic cooling, shut off the cryo coolant valve at the source.
4. When the GC is cool, do the following:
  - Install the appropriate inlet hardware (can include septum, liner, liner-O-ring, inlet gold seal, inserts, and so on).
  - Install the appropriate detector hardware (wavelength filter for FPD+, jet for FID or NPD).
  - Change to any alternate gas sources as needed for the new analysis.
  - Install the desired column and condition it per the manufacturer's recommendations.
  - Configure the GC to match any hardware or gas type changes (columns, liners, carrier or makeup gas types, and so on).
  - Load or create the desired method.



## 2

# Making Swagelok Connections

### **Making Swagelok Connections Using a Swagelok Tee**

The gas supply tubing is attached with Swagelok fittings. If you are not familiar with Swagelok connections, review the following procedures.

# Making Swagelok Connections

## Objective

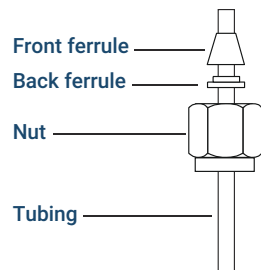
To make a tubing connection that does not leak and that can be taken apart without damaging the fitting.

## Materials needed

- 1/8-inch (or 1/4-inch, if used) preconditioned copper tubing
- 1/8-inch (or 1/4-inch, if used) Swagelok nuts
- Front and back ferrules
- Two 7/16-inch (for 1/8-inch nuts) or 9/16-inch (for 1/4-inch nuts) wrenches

## Procedure

1. Place a Swagelok nut, back ferrule, and front ferrule on the tubing as shown in **Figure 18**.



**IMPORTANT!**  
The narrow end of the back ferrule fits into the rear of the front ferrule.

Figure 18. Swagelok nuts and ferrules

2. Push the tubing into the stainless steel fitting.
3. Make sure that the front ferrule is fully engaged. Slide the Swagelok nut over the ferrule and thread it onto the plug.
4. Push the tube fully into the plug, then withdraw it approximately 1 to 2 mm. See **Figure 19**.

## Making Swagelok Connections

### Making Swagelok Connections

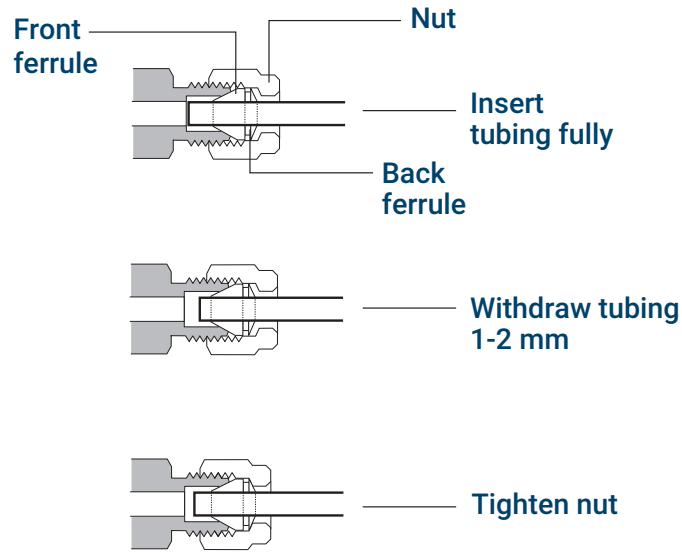


Figure 19. Insert the tubing

5. Finger-tighten the nut.
6. Mark the nut with a pencil line. See [Figure 20](#).

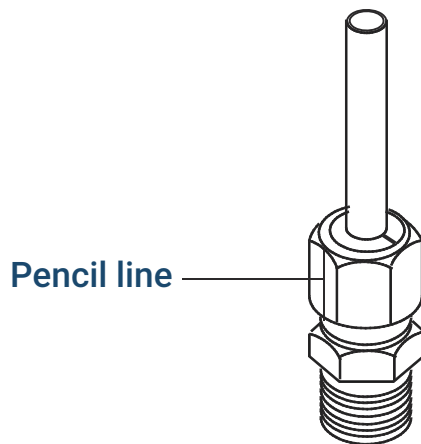


Figure 20. Marking the fitting

7. For 1/8-inch Swagelok fittings, use a pair of wrenches to tighten the fitting 3/4 of a turn. See [Figure 21](#).

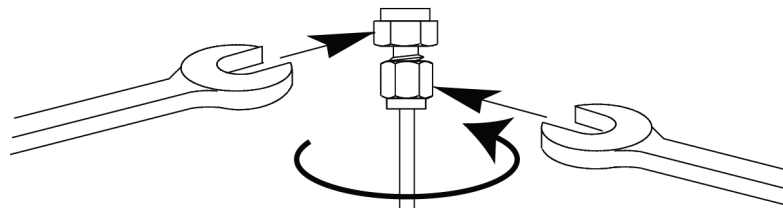


Figure 21. Final tightening

8. Remove the plug from the fitting. To connect the tubing, with nut and ferrules, to another fitting, finger-tighten the nut, then use a wrench to tighten it 3/4 (1/8-inch fittings) of a turn.

## Making Swagelok Connections

### Making Swagelok Connections

9. Both correctly and incorrectly swaged connections are shown in **Figure 22**. Note that the end of the tubing in a correctly swaged fitting is not crushed and does not interfere with the action of the ferrules.

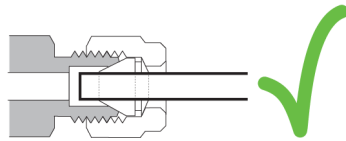
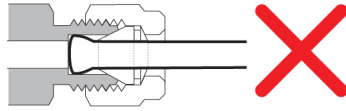


Figure 22. Completed fitting

## Using a Swagelok Tee

To supply gas from a single source to more than one input, use a Swagelok Tee.

Do not combine valve actuator air with flame ionization air. The valve action will cause major upsets in the detector signal.

Materials needed:

- 1/8-inch preconditioned copper tubing
  - Tubing cutter
  - 1/8-inch Swagelok nuts and front and back ferrules
  - 1/8-inch Swagelok Tee
  - Two 7/16-inch wrenches
  - 1/8-inch Swagelok cap (optional)
1. Cut the tubing where you want to install the Tee. Connect the tubing and Tee with a Swagelok fitting. See **Figure 23**.

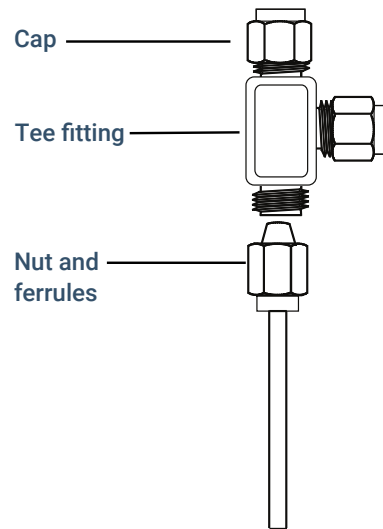


Figure 23. Swagelok tee

2. Measure the distance from the Tee to the instrument fittings. Attach copper tubing to the open Tee ends with Swagelok fittings.



## 3

# Cabling Diagrams and Remote Start/Stop

**Using the Remote Start/Stop Cable**  
**Multi-instrument Cabling Examples**  
**Cable Diagrams**

This section lists cabling requirements and connection diagrams that apply to less common or specialized GC installations.

## Using the Remote Start/Stop Cable

Remote start/stop is used to synchronize two or more instruments. For example, you might connect an integrator and the GC so that the Start/Stop buttons on either instrument control both of them. You can synchronize a maximum of ten instruments using Remote cables.

### Connecting Agilent products

If connecting two Agilent products with Remote cables, the sending and receiving circuits will be compatible—just plug in both ends of the cable.

### Connecting non-Agilent products

If connecting to a non-Agilent product, the following paragraphs contain information you will need to ensure compatibility.

#### APG Remote signal electrical specifications

The APG signals are a modified open collector type. The signal levels are generally TTL levels (low voltage is logic zero, high voltage is logic one) but the open circuit voltage will be between 2.5 and 3.7 V. The typical voltage is 3 V. A voltage over 2.2 V will be interpreted as a high logic state while a voltage below 0.4 V will be interpreted as a low logic state. These levels provide some margin over the specifications of the devices used.

The pull-up resistance, connected to the open-circuit voltage, is in the range of about 1 kOhms to 1.5 kOhms. For a logic-low state, for a single device on the bus, the minimum current you must be able to sink is 3.3 mA. Since devices are connected in parallel, when you have multiple devices this minimum current must be multiplied by the number of devices attached on the bus. The maximum voltage for a low-input state is 0.4 V.

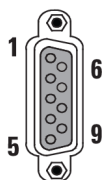
The bus is passively pulled high. Leakage current out of a port must be less than 0.2 mA to keep the voltage from being pulled lower than 2.2 V. Higher leakage current may cause the state to be interpreted as a low.

Over-voltage protection: APG Remote connections are clamped by a zener diode to 5.6 V. Exceeding this voltage will damage the circuit (GC logic board).

#### APG Remote - Suggested drive circuits

A signal on the APG bus may be driven by another APG device or by one of the following circuits:

- A relay, with one side connected to ground, when closed will set a logic-low state.
- An NPN transistor, with the emitter connected to ground and the collector connected to the signal line will set a logic-low state if proper base current is supplied.
- An open-collector logic gate will perform this same function.
- A low-side drive IC will also work, but Darlington-type drivers should be avoided as they will not meet the low-side voltage requirement of less than 0.4 V





## APG Remote connector

| Pin | Function       | Logic              |
|-----|----------------|--------------------|
| 1   | Digital ground |                    |
| 2   | Prepare        | LOW true           |
| 3   | Start          | LOW true (output)  |
| 4   | Start relay    |                    |
| 5   | Start relay    |                    |
| 6   | Not used       |                    |
| 7   | Ready          | HIGH true (output) |
| 8   | Stop           | LOW true           |
| 9   | Not used       |                    |

## APG Remote signal descriptions

### Prepare (Low True)

Request to prepare for analysis. Receiver is any module performing pre-analysis activities. For example, shorting pin 2 to ground will put the GC into Prep Run state. This is useful for Splitless Mode to prepare the inlet for injection or when using Gas Saver. This function is not needed by Agilent autosampler systems.

### Ready (High True)

If the Ready line is high (> 2.2 VDC) then the system is ready for next analysis. Receiver is any sequence controller.

### Start (Low True)

Request to start run/timetable. Receiver is any module performing runtime-controlled activities. The GC requires a pulse duration of at least 500 micro-seconds to sense a start from an external device.

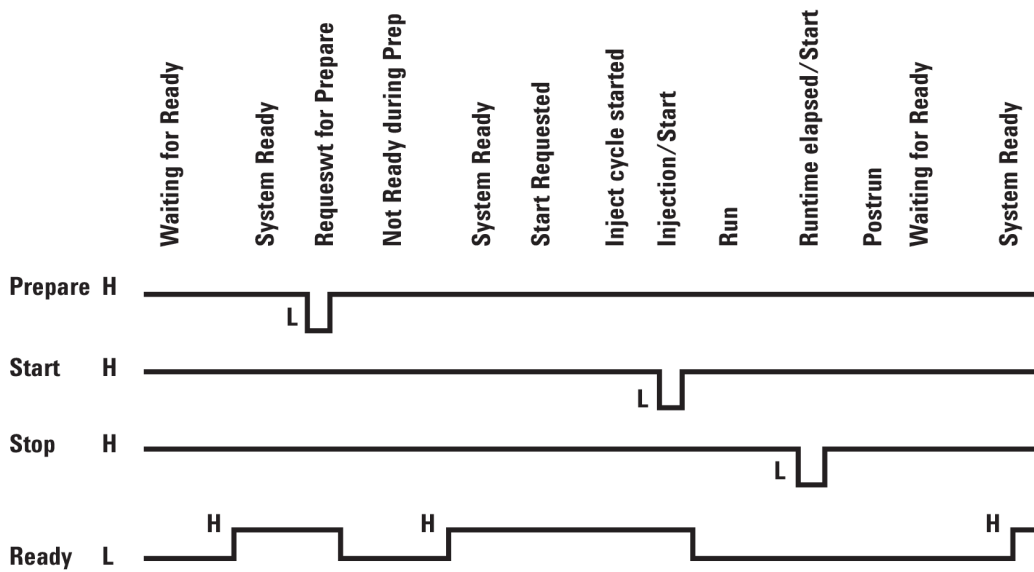
### Start Relay (Contact Closure)

A 120 millisecond contact closure used as an isolated output to start another device that is not compatible or connected with APG Remote pin 3.

### Stop (Low True)

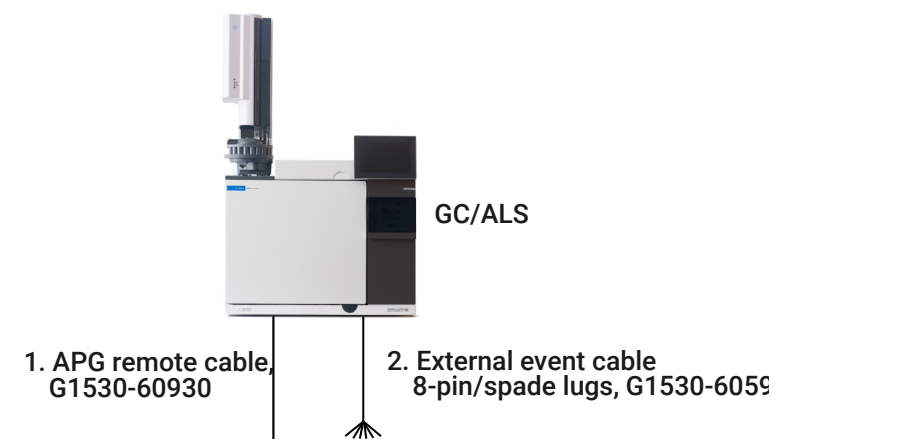
Request to reach system ready state as soon as possible (for example, stop run, abort or finish, and stop injection). Receiver is any module performing runtime-controlled activities. Normally this line is not connected, if the GC oven program is used to control the method Stop time.

APG Remote timing diagram



# Multi-instrument Cabling Examples

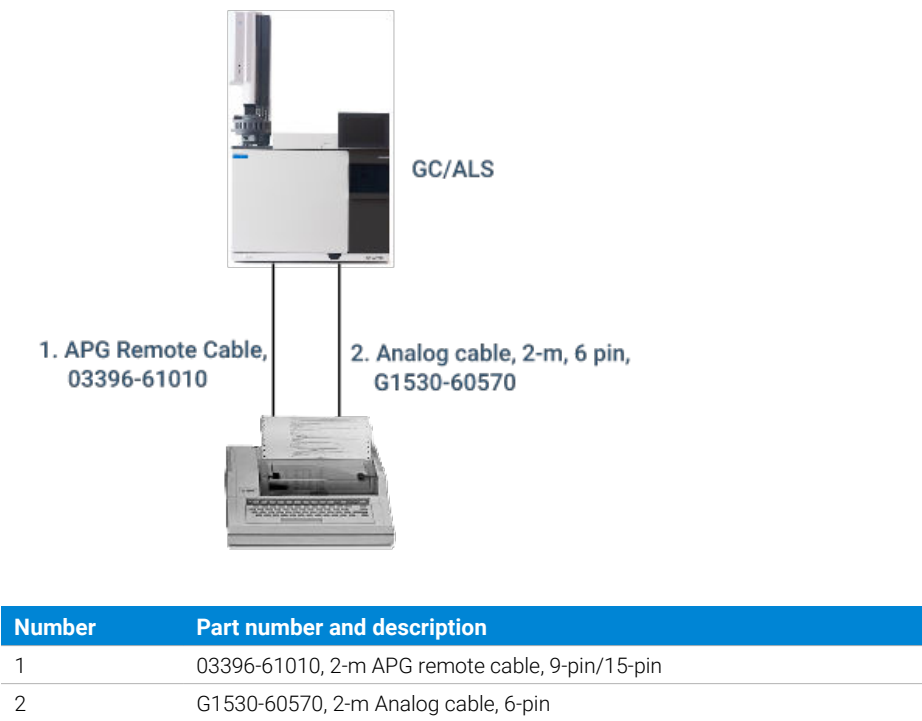
## GC / ALS / Non-Agilent Data System



| Number | Part number and description                                            |
|--------|------------------------------------------------------------------------|
| 1      | G1530-60930, General use APG remote cable, 9-pin male/spade lug (0.5m) |
| 2      | G1530-60590, External event cable, 8-pin/spade lugs                    |

| G1530-60930 APG remote         |               |             | G1530-60590 External event     |        |            |
|--------------------------------|---------------|-------------|--------------------------------|--------|------------|
| cable spade lug identification |               |             | cable spade lug identification |        |            |
| Connector 1                    | Signal name   | Connector 2 | Pin                            | Color  | Signal     |
| 9 pin (male)                   |               | spade lugs  |                                |        |            |
| 1                              | GND           | Black       | 1                              | Yellow | 24 V Out   |
| 2                              | Prepare       | White       | 2                              | Black  | 24 V Out 2 |
| 3                              | Start         | Red         | 3                              | Red    | Ground     |
| 4                              | Shut down     | Green       | 4                              | White  | Ground     |
| 5                              | Reserved      | Brown       | 5                              | Orange | Contact 1  |
| 6                              | Power on      | Blue        | 6                              | Green  | Contact 1  |
| 7                              | Ready         | Orange      | 7                              | Brown  | Contact 2  |
| 8                              | Stop          | Yellow      | 8                              | Blue   | Contact 2  |
| 9                              | Start Request | Violet      | 9                              |        |            |

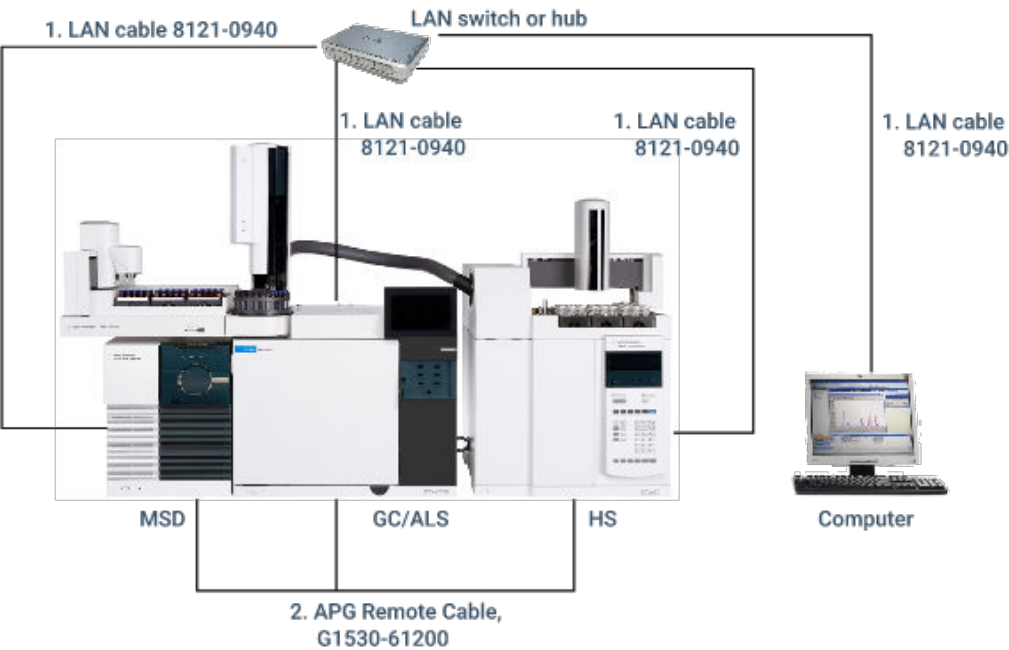
GC / 3395A/3396B Integrator / ALS



GC / 3396C Integrator / ALS

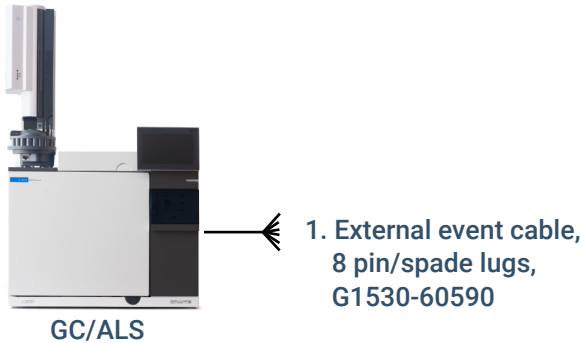


Example: Using a Y-Cable in a setup (GC/MSD/Data System/Headspace Sampler)



| Number | Part number and description                 |
|--------|---------------------------------------------|
| 1      | 8121-0940, Cable, LAN, 25 foot              |
| 2      | G1530-61200, 2-m Y-cable, remote start/stop |

GC / External Events (unspecified, non-Agilent instrument)



| Number | Part number and description                          |
|--------|------------------------------------------------------|
| 1      | G1530-60590, External events cable, 8-pin/spade lugs |

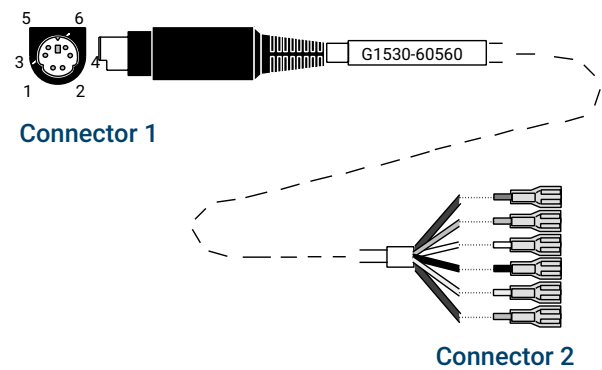
| Connector              | Signal name | Maximum rating | Wire color | Corresponds to valve # |
|------------------------|-------------|----------------|------------|------------------------|
| 24 volt control output |             |                |            |                        |

| Connector                              | Signal name       | Maximum rating     | Wire color      | Corresponds to valve # |
|----------------------------------------|-------------------|--------------------|-----------------|------------------------|
| 1                                      | 24 volt output 1  | 150 mA output      | Yellow          | 9                      |
| 2                                      | 24 volt output 2  | 150 mA output      | Black           | 10                     |
| 3                                      | Ground            |                    | Red             |                        |
| 4                                      | Ground            |                    | White           |                        |
| Relay contact closures (normally open) |                   |                    |                 |                        |
| 5                                      | Contact closure 1 | 48 V AC/DC, 250 mA | Orange          | 7                      |
| 6                                      | Contact closure 1 |                    | Green           | 7                      |
| 7                                      | Contact closure 2 | 48 V AC/DC, 250 mA | Brown or violet | 8                      |
| 8                                      | Contact closure 2 |                    | Blue            | 8                      |

# Cable Diagrams

## Analog signal cable, general use, G1530-60560

Connects GC signal outputs to non-Agilent products. Also used for the Analog Input Board (AIB).



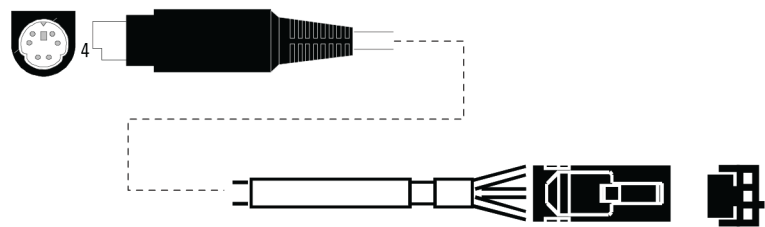
The pin assignments for the general use analog out cable are listed in [Table 11](#).

Table 11. Analog cable, general use, output connections

| Connector 1 | Connector 2, wire color | Signal                  |
|-------------|-------------------------|-------------------------|
| 1           | Brown or violet         | Not used                |
| 2           | White                   | 0 to 1 V, 0 to 10 V (–) |
| 3           | Red                     | Not used                |
| 4           | Black                   | 1 V (+)                 |
| 6           | Blue                    | 10 V (+)                |
| Shell       | Orange                  | Ground                  |

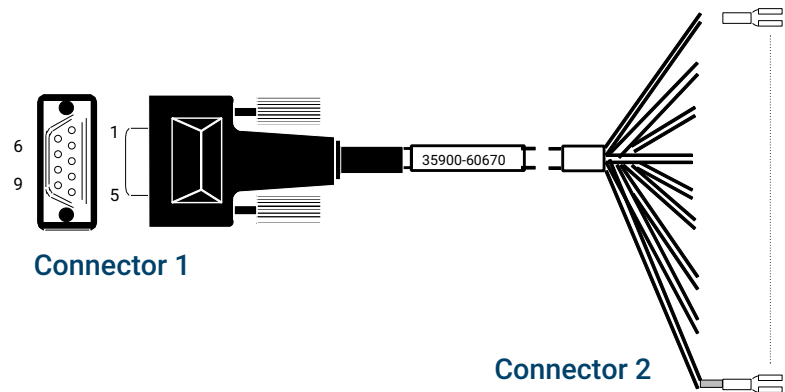
## Agilent analog signal cable, G1530-60570

This cable connects an Analog out port to an external data system. Both 0 to 1 volt and 0 to 10 volts are provided. Connects both GC signal outputs to Agilent 3395B/3396C integrators, and the 35900 A/D.



Analog output cable to an Agilent product

Remote start/stop cable, general use, 35900-60670



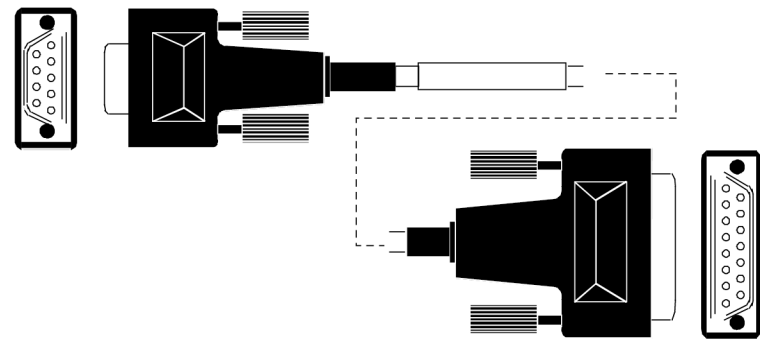
The pin assignments for the remote start/stop cable are listed in [Table 12](#).

Table 12. Remote start/stop cable connections

| Connector 1, 9-pin male | Connector 2, wire color | Signal                            |
|-------------------------|-------------------------|-----------------------------------|
| 1                       | Black                   | Digital ground                    |
| 2                       | White                   | Prepare (low tone)                |
| 3                       | Red                     | Start (low tone)                  |
| 4                       | Green                   | Start relay (closed during start) |
| 5                       | Brown                   | Start relay (closed during start) |
| 6                       | Blue                    | Open circuit                      |
| 7                       | Orange                  | Ready (high true input)           |
| 8                       | Yellow                  | Stop (low tone)                   |
| 9                       | Violet                  | Open circuit                      |

Agilent APG remote start/stop cable, 03396-61010

Synchronizes the GC with an Agilent integrator. Additional cables may be used to add more instruments (up to 10 total).

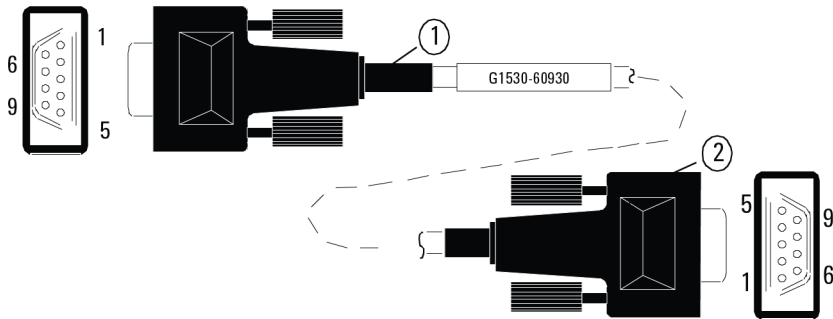


Remote start/stop cable, GC to Agilent integrator



Agilent APG remote start/stop cable, G1530-60930

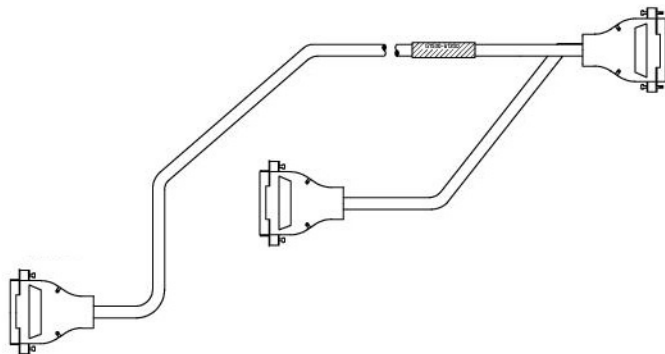
Synchronizes the GC with another Agilent instrument. Additional cables may be used to add more instruments (up to 10 total).



Remote start/stop cable, GC to Agilent instrument

Agilent remote start/stop Y-cable, G1530-61200

Synchronizes the GC with another 2 Agilent instruments.



Remote start/stop cable, GC to Agilent instrument

BCD cable, G3450-60570

The BCD cable connector has eight passive inputs that sense total binary-coded decimal levels. The pin assignments for this connector are listed in [Table 13](#).

Table 13. BCD cable connections

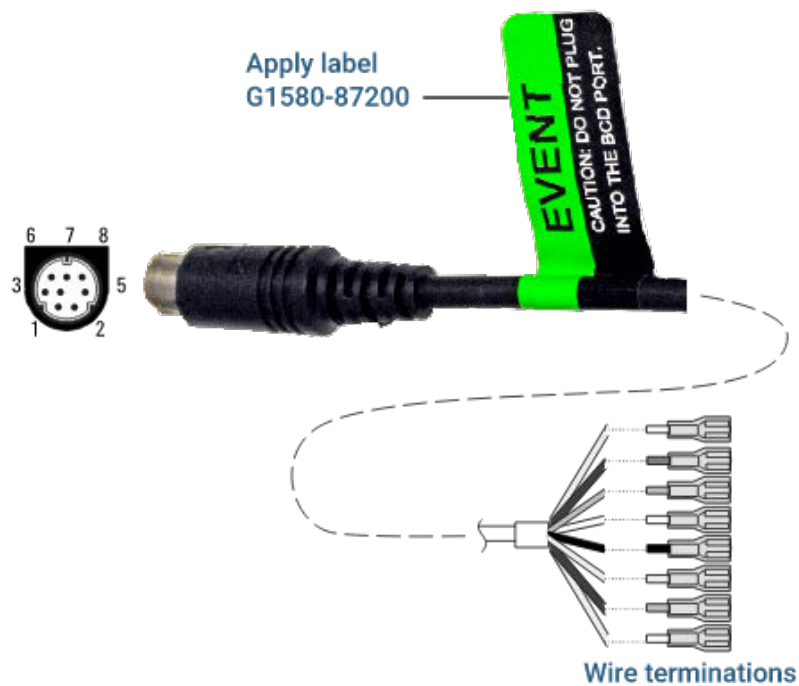
| Connector 1 Pin | Connector 2 Pin | Ribbon Cable Wire Color |
|-----------------|-----------------|-------------------------|
| 1               | 1               | Brown                   |
|                 | 2               | Red                     |
|                 | 3               | Orange                  |
|                 | 4               | Yellow                  |

## Cabling Diagrams and Remote Start/Stop

### Cable Diagrams

| Connector 1 Pin | Connector 2 Pin | Ribbon Cable Wire Color |
|-----------------|-----------------|-------------------------|
|                 | 5               | Green                   |
|                 | 6               | Blue                    |
|                 | 7               | Violet                  |
|                 | 8               | Gray                    |
|                 | 9               | White                   |
| 2, 8            | 10              | Black                   |
|                 | 11              | Brown                   |
| 6               | 12              | Red                     |
|                 | 13              | Orange                  |
| 5               | 14              | Yellow                  |
|                 | 15              | Green                   |
| 4               | 16              | Blue                    |
| 7               | 17              | Violet                  |
| 3               | 18              | Gray                    |
|                 | 19              | White                   |
|                 | 20              | Black                   |
|                 | 21              | Brown                   |
|                 | 22              | Red                     |
|                 | 23              | Orange                  |
|                 | 24              | Yellow                  |
|                 | 25              | Green                   |
|                 | 26              | Blue                    |

### External event cable, G1530-60590



Cabling Diagrams and Remote Start/Stop  
Cable Diagrams

The external event cable has two passive relay contact closures with two 24-volt control outputs. Devices connected to the passive contact closures must be connected to their own power sources.

The pin assignments for this cable are listed in [Table 14](#).

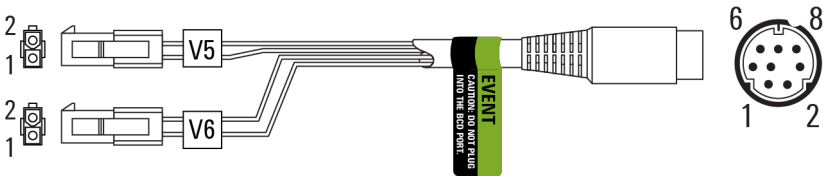
Table 14. External events cable

| Connector 1 pin                               | Signal name   | Maximum rating     | Connector 2, wire color | Controlled by valve # |
|-----------------------------------------------|---------------|--------------------|-------------------------|-----------------------|
| <b>24 volts output</b>                        |               |                    |                         |                       |
| 1                                             | 24 V output 1 | 150 mA             | Yellow                  | 9                     |
| 2                                             | 24 V output 2 | 150 mA             | Black                   | 10                    |
| 3                                             | Ground        |                    | Red                     |                       |
| 4                                             | Ground        |                    | White                   |                       |
| <b>Relay contact closures (normally open)</b> |               |                    |                         |                       |
| 5                                             | Closure 1     | 48 V AC/DC, 250 mA | Orange                  | 7                     |
| 6                                             | Closure 1     |                    | Green                   | 7                     |
| 7                                             | Closure 2     | 48 V AC/DC, 250 mA | Brown or violet         | 8                     |
| 8                                             | Closure 2     |                    | Blue                    | 8                     |

When used for external event control, apply label G1580-87200 to identify the cable for EVENT use.

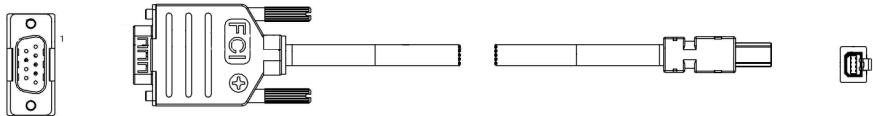
External valve cable, G1580-60710

Supplies power for certain valve applications.



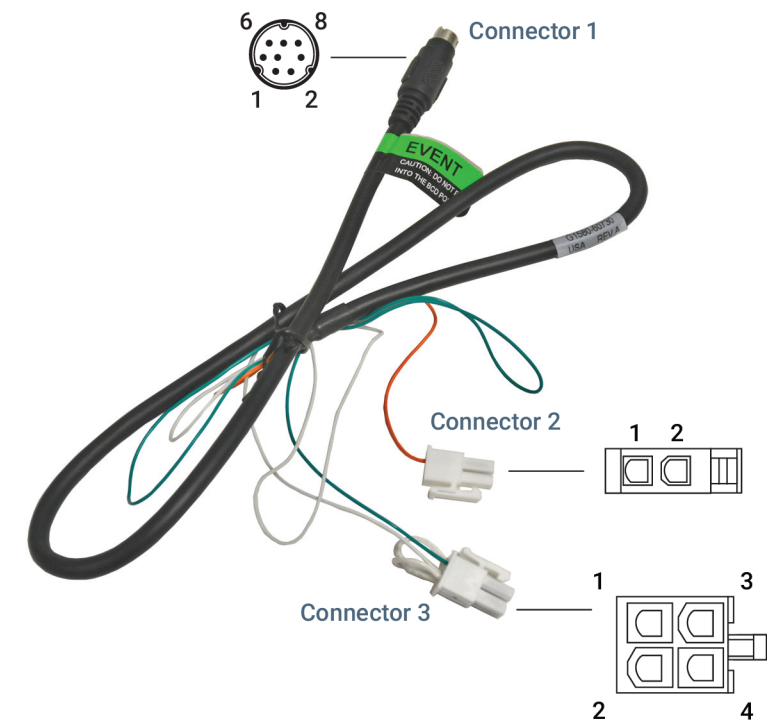
| Connector 1 pin | Wire color | Connector and pin | Function          |
|-----------------|------------|-------------------|-------------------|
| 1               | Yellow     | V5 pin 1          | 24 V, 150 mA max. |
| 2               | Black      | V6 pin 1          | 24 V, 150 mA max. |
| 3               | Red        | V5 pin 2          | Ground            |
| 4               | White      | V6 pin 2          | Ground            |
| 5               |            |                   |                   |
| 6               |            |                   |                   |
| 7               |            |                   |                   |
| 8               |            |                   |                   |

GC to MSD LVDS Cable G3450-60019



Pulser module power supply cable, G1580-60730

Supplies power for a PDHID pulser module.



| Connector 1 pin | Wire color | Connector and pin              | Function                              |
|-----------------|------------|--------------------------------|---------------------------------------|
| 1               | Yellow     |                                |                                       |
| 2               | Black      |                                |                                       |
| 3               | Red        |                                |                                       |
| 4               | White      | Connector 3 pin 1 <sup>1</sup> | Ground                                |
| 5               | Orange     | Connector 2 pin 1              | Contact closure 1, 48 V AC/DC, 250 mA |
| 6               | Green      | Connector 3 pin 3              | Contact closure 1                     |
| 7               | Brown      |                                |                                       |
| 8               | Blue       |                                |                                       |

<sup>1</sup>Connector 3: Pin 1 is jumpered to pin 2. Pin 2 is jumpered to pin 4.

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