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Agilent 7820A

Gas Chromatograph

Installation Guide

Agilent Technologies

Notices

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7820A GC Installation Guide

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The installation procedure assumes that the site has been prepared in accordance with the Site Preparation guide, available at www.agilent.com/chem. The installation requires the use of the Agilent GC and GC/MS User Manuals & Tools DVD that ships with your 7820A GC along with the available documentation for your GC (and Automatic Liquid Sampler, if purchased).

- For installing columns and consumables, see the GC maintenance information.
- For operating the GC and Sampler, see the operating information.

Tools and Parts Required for Installation

Agilent provides all specialized tools needed for installation. In addition, Agilent supplies several parts and plumbing assemblies to make installation easier. Find these tools and parts in the GC shipping container:

- Toolkit, 19199T, contains tools for installation maintenance tasks
- Tubing kit, 19199TF, contains preassembled tubing for connecting supply gases to the GC

In addition, you will need to provide the following:

- Wrenches for tightening any plumbing connections
- Adapters to connect your gas supplies to 1/8-inch male Swagelok fittings used on the GC

7820A GC Installation

Place and Prep the GC

1 Verify the site has been prepared for the GC.

- Refer to the 7820A GC Site Preparation Guide on the GC and GC/MS User Manuals & Tools DVD.
- Make sure the site meets the requirements in the guide, including power, and that clean gases and connection hardware are available.
- Installation requires a PC that meets the requirements of the Agilent Instrument Utility. Refer to the GC and GC/MS User Manuals & Tools DVD for details.
- Installation requires a PC user with administrative privileges to install software and to make LAN communications settings.
- If you purchased installation and familiarization services, make sure the GC operator is available.

WARNING **Use extreme caution when handling heavy parts. A two person lift is recommended. Failure to perform a two person lift may result in personal injury.**

2 Unpack the GC. Locate the tools, consumables, and the hardware user information & utility DVD. See Figure 1.

Big universal trap

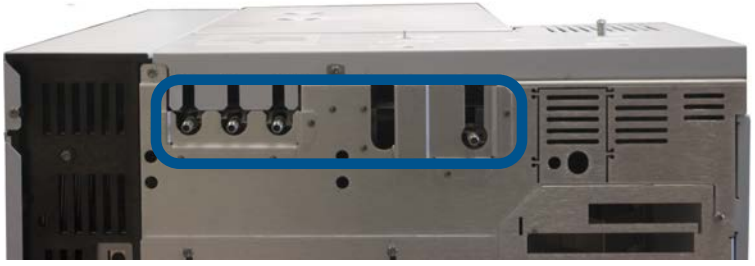
GC and GC/MS User Manuals & Tools DVD

Figure 1 User documentation, ship kits, and parts

WARNING **Use extreme caution when handling heavy parts. A two person lift is recommended. Failure to perform a two person lift may result in personal injury.**

3 Place the GC on the bench and remove the detector caps under the detector cover.

4 On the back panel, remove the caps.



5 Check the power requirements on the GC back panel. Make sure the available power meets the requirements.

Connect the checkout gases

1 Install the Big Universal Trap into the carrier gas supply. See Figure 2.

- Install near the GC.
- Follow the instructions included with the trap.
- Use the nuts and ferrules supplied with the trap.
- Purge as directed by trap instructions.
- For details on making Swagelok connections, see the Maintenance manual.

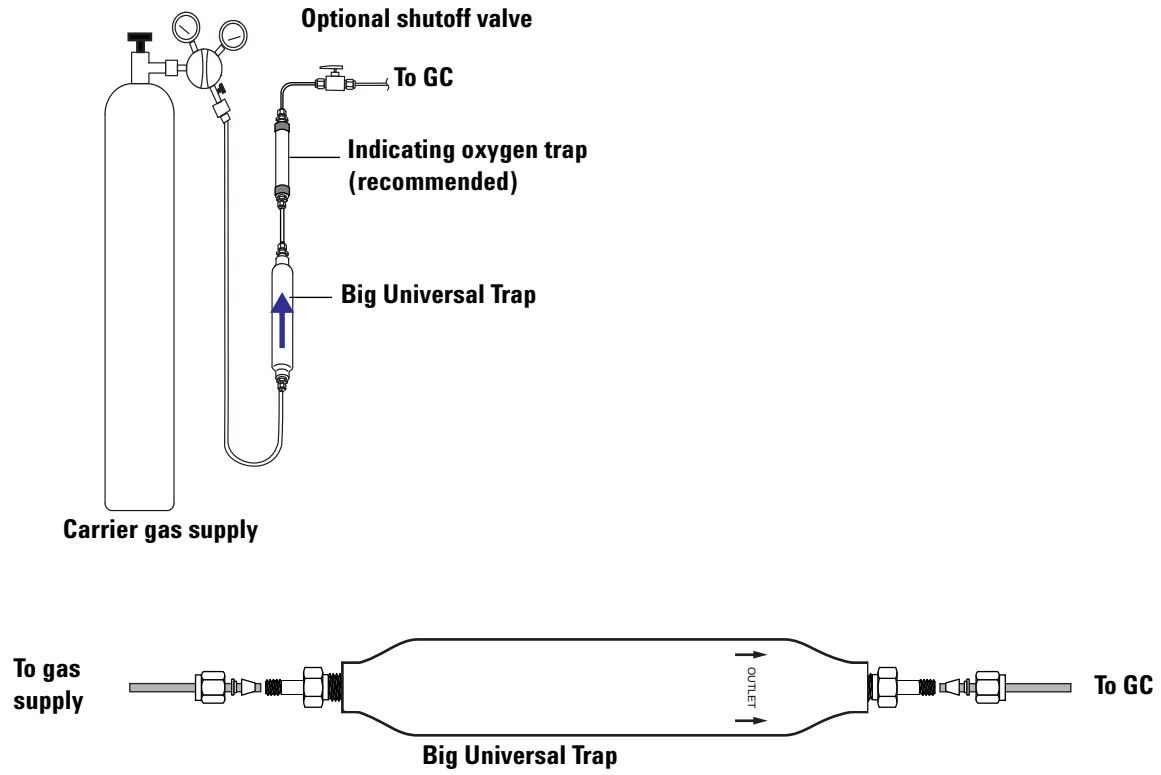
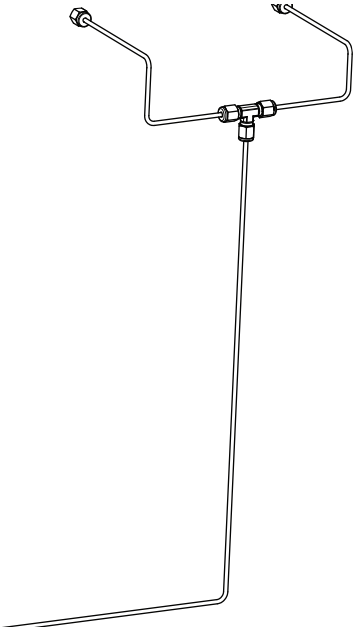


Figure 2 Trap installation

2 Select the pre-swaged gas tubing for your GC. See Figure 3.

- Use the tubing with 4 connectors for a GC with TCD.

(The tubing with 3 connectors is not used for instrument checkout, but may be useful for a GC with NPD, FID, or FPD after you have performed the checkout test. The tubing with 4 connectors can be used for uECD after checkout, if using nitrogen carrier, anode purge, and makeup.)



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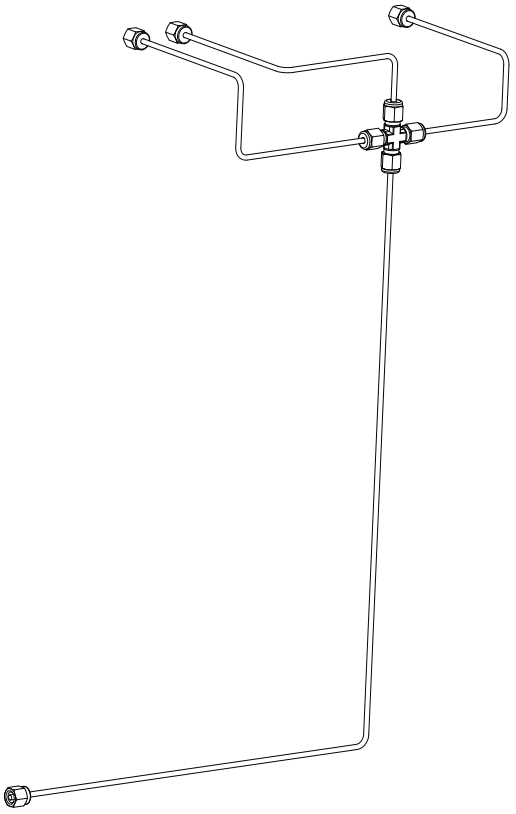
Use to connect a single supply gas as:

- Inlet carrier gas
- FID, FPD, or NPD makeup gas

FID, FPD, and NPD air and hydrogen must be supplied through separate tubing.



G4332-60004

Use to connect a single supply gas as:

- Inlet carrier gas
- TCD reference and makeup gas
- uECD anode purge and makeup gas

Figure 3 Available preswaged tubing

3 Install the tubing and connect to gas supply. See Figure 4, Figure 5, and Figure 6.

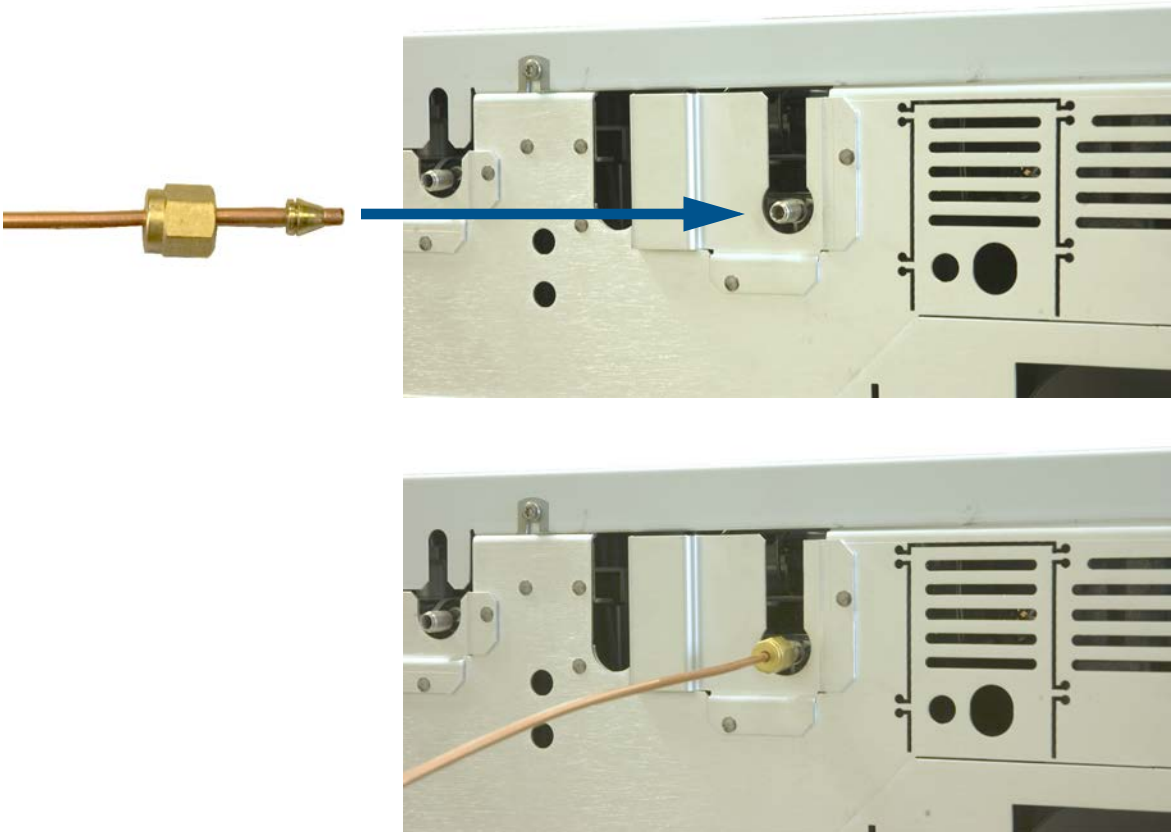
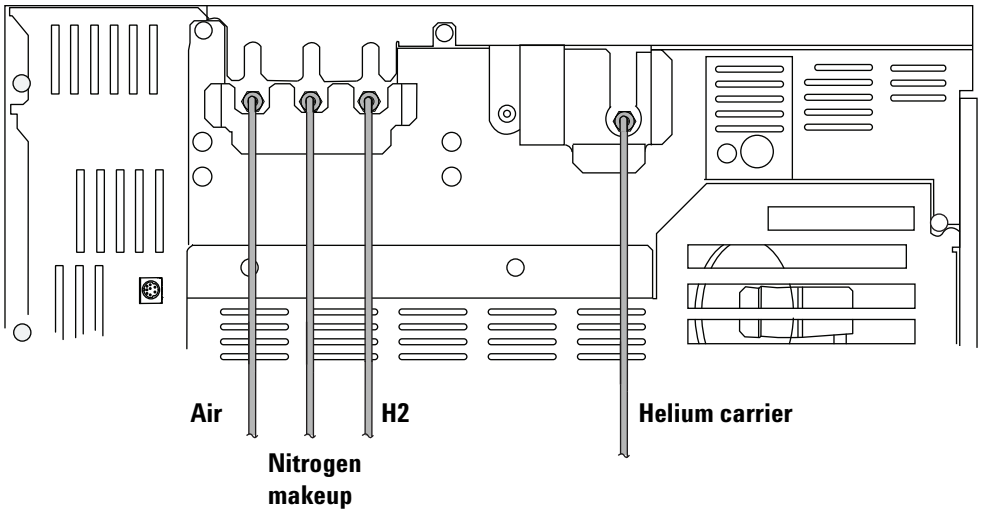


Figure 4 Connecting Swagelok tubing

FID, NPD, FPD



TCD

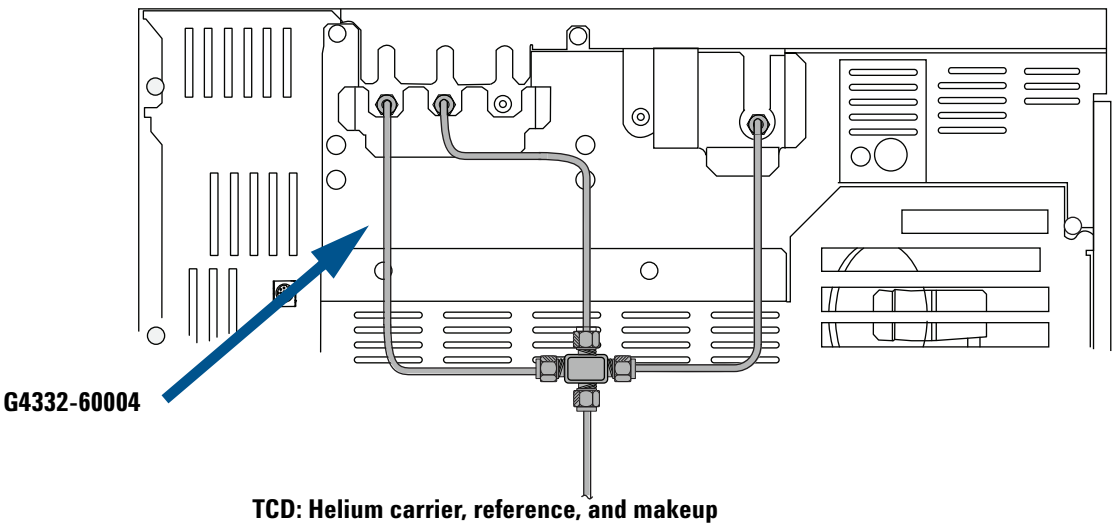


Figure 5 Proper plumbing configurations for instrument checkout (FID, NPD, TCD)

uECD

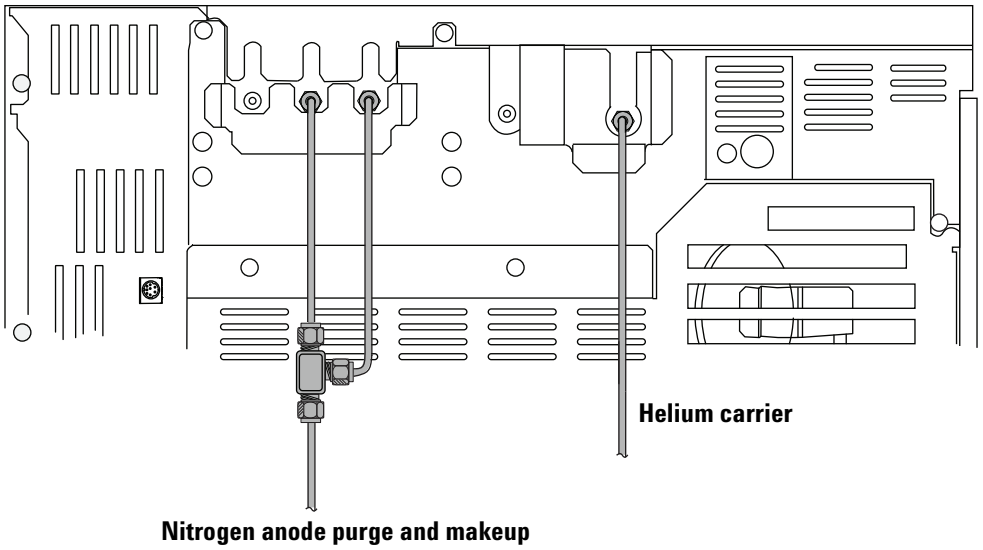


Figure 6 Proper plumbing configuration for instrument checkout (uECD)

4 Set the gas source pressures.

Gas	Recommended	Maximum
Helium	400 kPa (60 psi)	690 kPa (100 psi)
Hydrogen	400 kPa (60 psi)	690 kPa (100 psi)
Air	550 kPa (80 psi)	690 kPa (100 psi)
Nitrogen	400 kPa (60 psi)	690 kPa (100 psi)

5 Check for external leaks.

- **a** Maintain pressure for 5 minutes.
- **b** Turn off gas supplies.
- **c** Wait 10 minutes.
- **d** The pressure in the supply lines should remain constant. If not, check for and fix any leaks.
- **e** Restore supply pressures when leak-free.

See Figure 7 for typical external leak points.

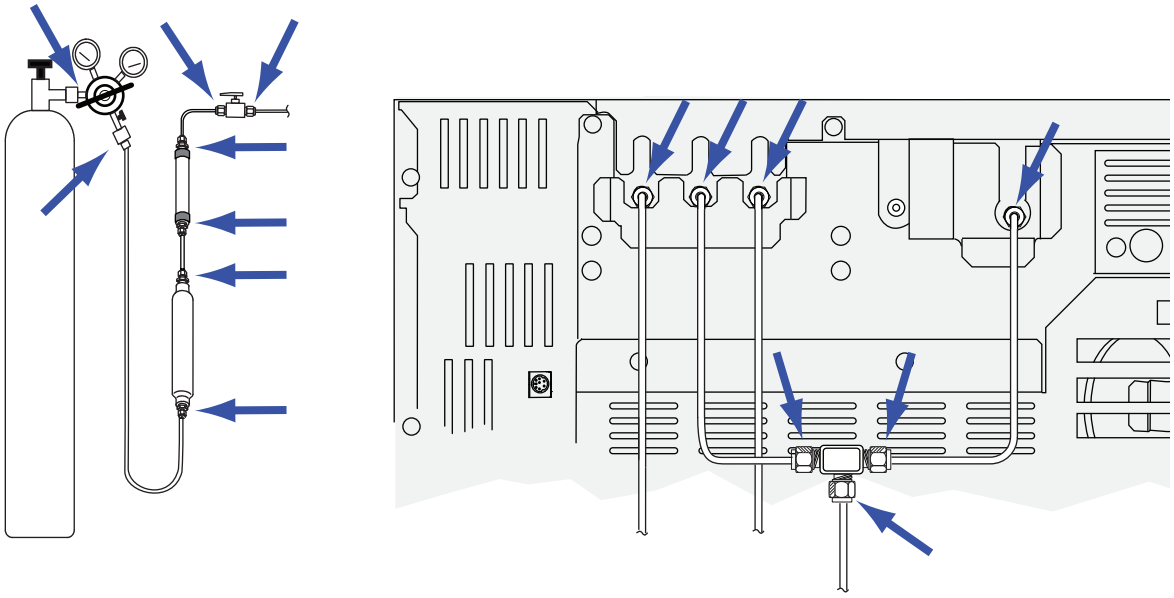


Figure 7 Example external leak points

Connect the cabling

1. Connect the power cord to the GC and the wall outlet. See Figure 8.
2. Connect the LAN cable (part number 8121-0940) between the GC and PC. Installation requires a direct connection. Do not connect to a site LAN, hub, or switch for initial checkout.

   See "Cables and Back Panel Connectors" on page 32 for more information about making connections to the GC.

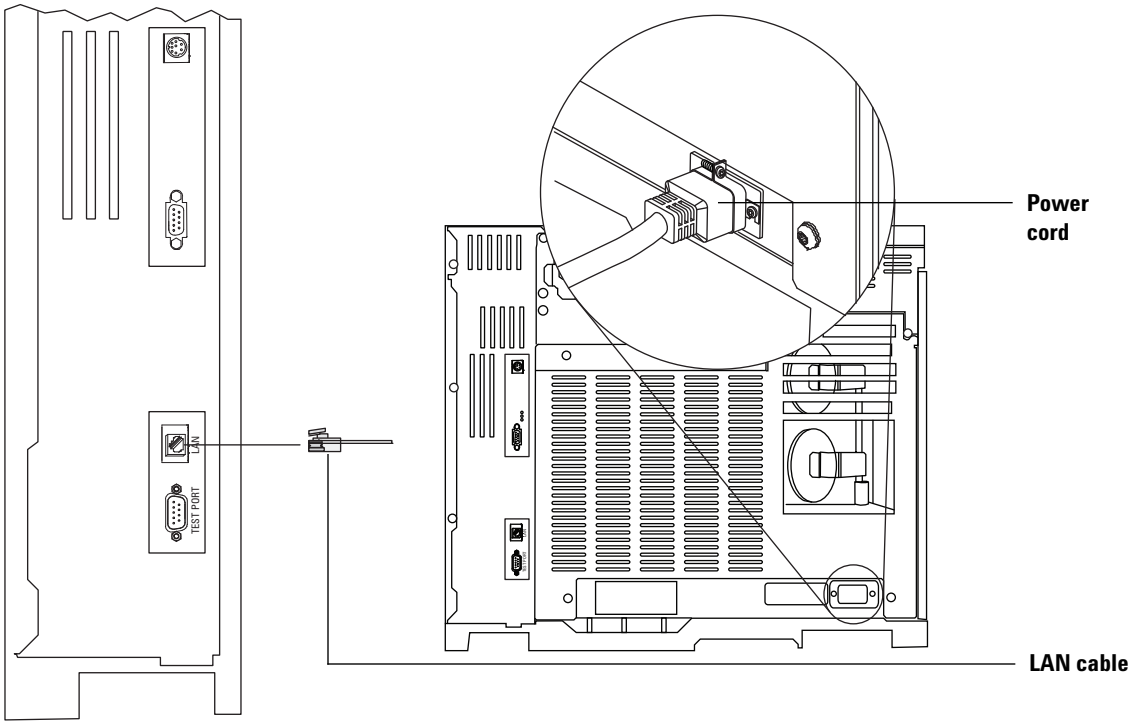


Figure 8 Connecting cables

7693A Automatic Liquid Sampler installation

If available, install the 7693A injector as shown below.

1 Install the G4513-20561 mounting posts on the inlet cover plate. See Figure 9.

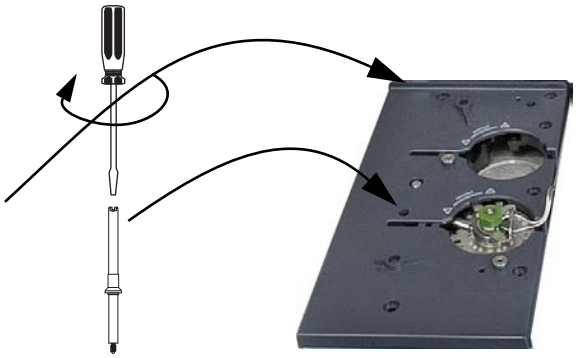


Figure 9 Mounting post installation

2 Install the injector on the mounting post. See Figure 10.

NOTE The GC may include a small cover plate, G3450-00152. This cover sits over the sampler cable connectors on the rear panel of the GC. Retain this cover for future use. If the ALS controller is removed from the GC, use this plate to cover the ALS controller opening in the GC back panel.

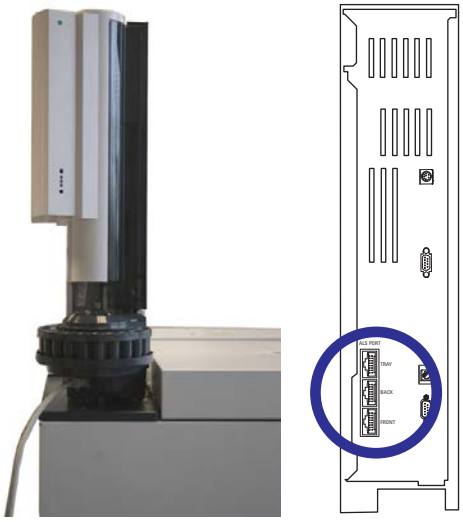


Figure 10 Sampler installation and cable connection

3 Connect the sampler control cable. See “Cables and Back Panel Connectors" on page 32 for more information about making connections to the GC.

4 If using a G4513A injector, prepare it for use. (See the 7693A Installation, Operation, and Maintenance manual for instructions provided on the sampler.)

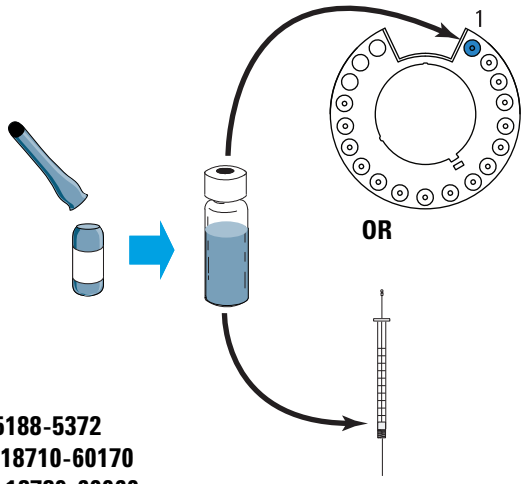
   a Install the standalone (16 sample) turret (G4513-40532) into the injector.

   b Install the 10 uL syringe (5181-3354).

Prepare for checkout

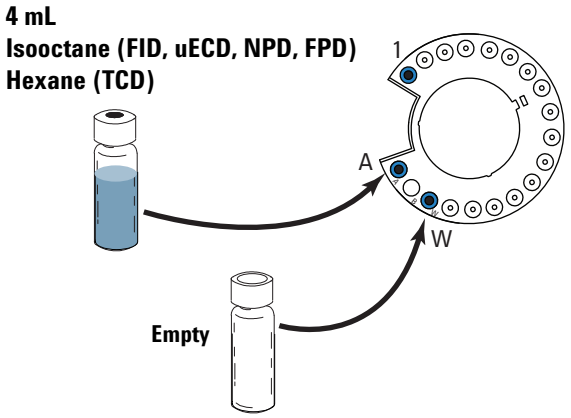
NOTE Complete checkout instructions for all inlets and detectors are available in the 7820 Operation manual.

1 Prepare the checkout sample.



FID: 5188-5372
TCD: 18710-60170
NPD: 18789-60060
FPD: 5188-5953
uECD: 18713–60040 or 5183-0379 (Japan)

2 If using a sampler, prepare solvent and waste vials.



3 Turn on the GC.

4 If purchased, install the NPD bead and configure the NPD. Refer to the 7820A Maintenance manual or the instructions that come with the bead.

Set the PC IP address

From the factory, the GC is set to:

IP address	192.168.0.26
Subnet Mask	255.255.255.0
Gateway	192.168.0.1

The installation **requires** that you connect **directly** to the GC using this address. However, after installation you should change the GC IP address or set it to use DHCP.

1. If needed, install the PC.
2. Record the PC's current LAN address (either the IP address, subnet mask, and gateway; or that the PC uses DHCP).
3. Set the PC IP address to 192.168.0.1 and the subnet mask to 255.255.255.0.
   - See your Windows® help for instructions for setting the PC IP address. You may need administrator privileges on the PC.
4. Open a command prompt in Windows. Type **ping 192.168.0.26**, then press **Enter**. The GC should respond. See Figure 11.
   - For help in using the **ping** command, see Windows help.
   - If **ping** fails, use the scroll keys to view the current GC IP address on the GC display. If needed, change the PC IP address or reset the IP address in the GC (see the Operating Guide.)

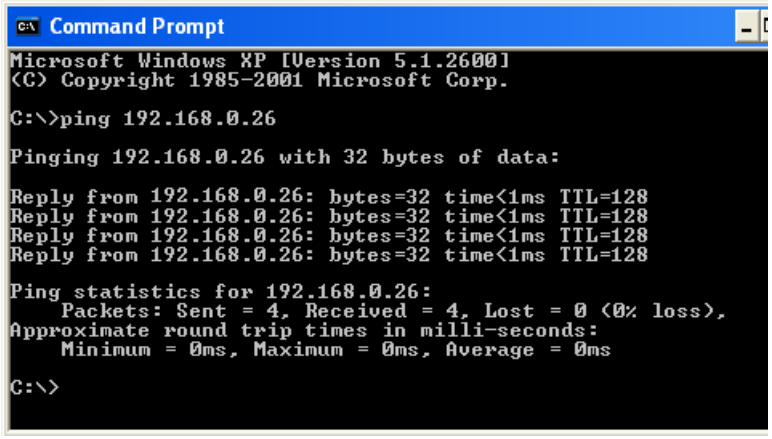


Figure 11 Successful **ping** reply

Install required documentation and software

If you do not have the instrument utility, software keypad, and all 7820A and sampler documentation installed, install them now.

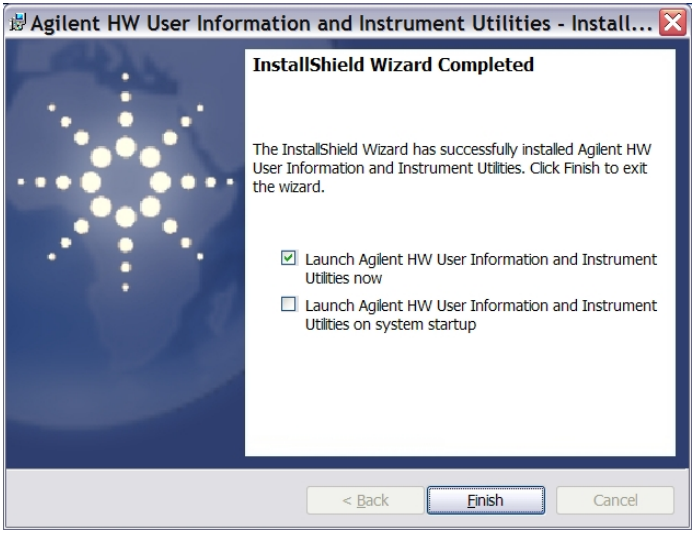
CAUTION Be sure to install the files in the default location! The Instrument Utility uses the documentation files to provide instruction and troubleshooting information.

1 Install the GC documentation (and sampler documentation, if purchased) from the GC and GC/MSD Hardware User Information & Utilities DVD. Click on **Install GC and GC/MSD Documentation**, then follow the instructions for installing the online manuals.

   Installing the 7820A GC documentation also installs the software keypad.

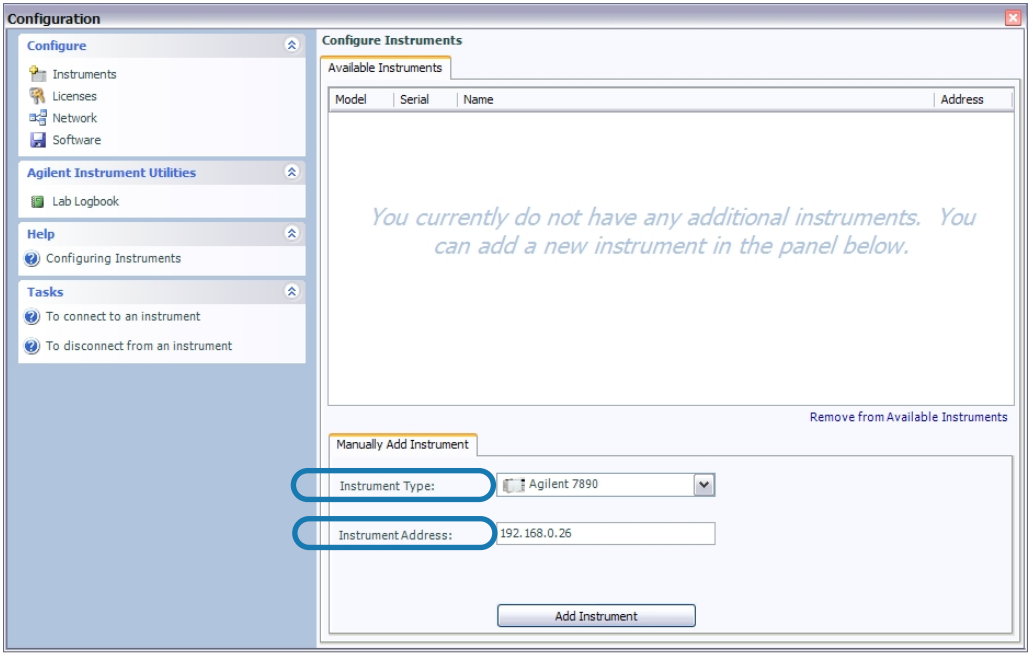
2 Install the Instrument Utility software.

3 After installation completes, let the installer launch the Instrument Utility.



Run the Installation Wizard

1 When run for the first time, the Instrument Utility will open to the **Configure Instruments** window.

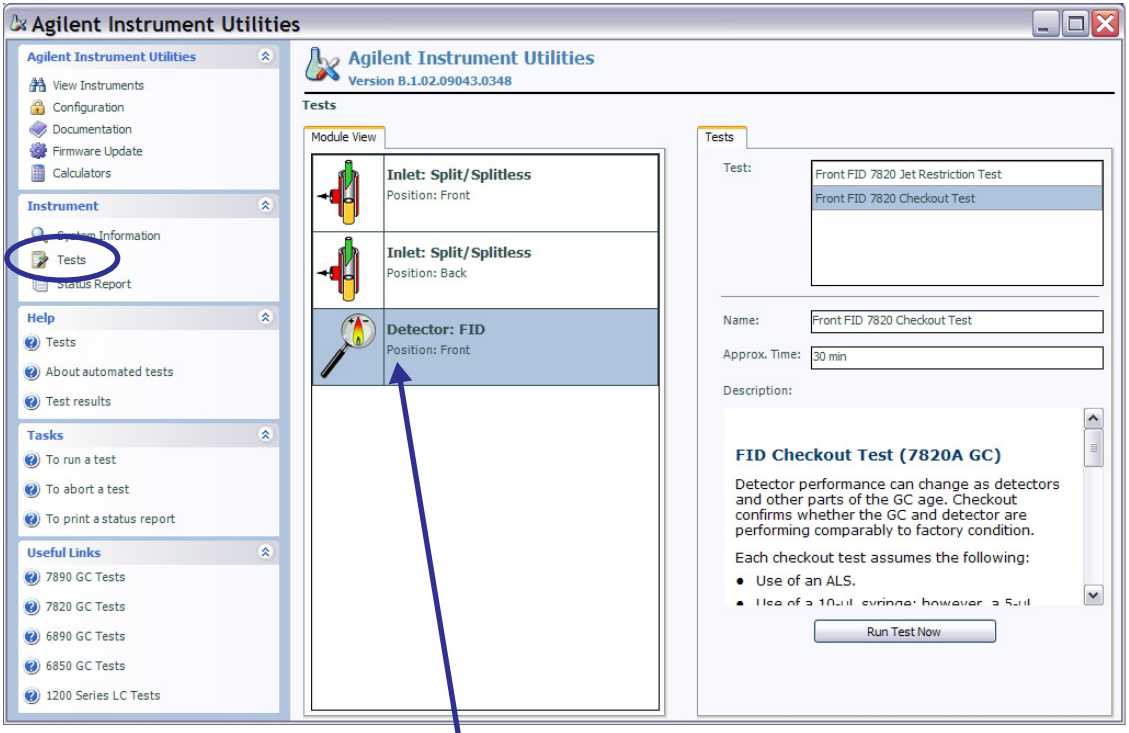


2 Select Instrument Type **Agilent 7820**. The default IP address (192.168.0.26) displays. Click **Add Instrument** to connect to the GC. Close the **Configuration** window.

(If the Instrument Utility was already installed on the PC, open it and go to **Configuration > Instruments**, then select **Add to My Instruments**. From the **Instrument Type** drop-down list, select GC type **Agilent 7820**, then enter GC IP address **192.168.0.26**. Click **Add Instrument**.)

3 In the left hand pane, click **Tests**.

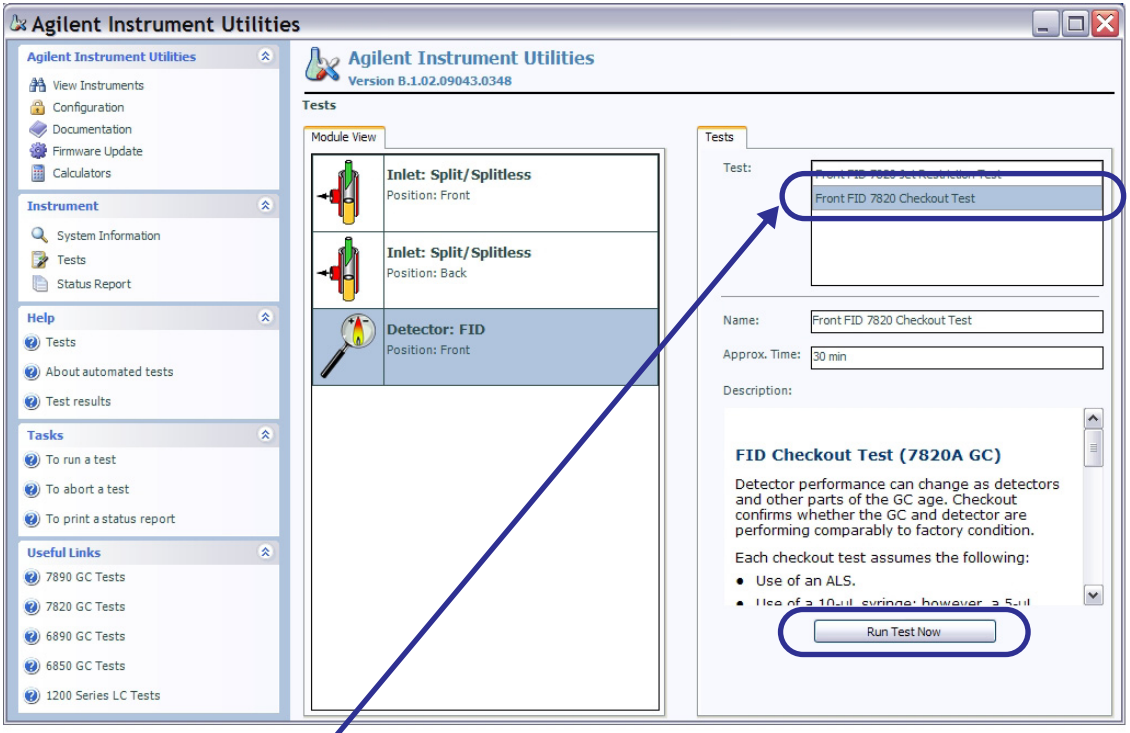
4 Select your detector type from the **Module View** tab.



Select your detector from the list.

5 Select the checkout test for the detector, then click **Run Test Now**.

- If using an FPD, refer instead to the Advanced User Guide. Perform the procedure as described in the manual for the checkout sample supplied with your instrument.



Select the checkout test for the detector. For example, **Front FID Checkout Test**.

6 The test will prompt you to first purge and bake out the GC. Perform the bakeout. Watch the detector's signal output. When bakeout ends, the detector output should meet the criteria listed below.

FID	Stable output ≤ 20 pA
TCD	Stable output between 12.5 and 750 µV (inclusive)
uECD	Stable output < 200 Hz (new detector)
NPD	not applicable

- To see the detector signal output on the GC, press ▲ or ▼ to scroll to the **Signal** line in the display.

If the signal did not stabilize below the limit, there is probably a leak in the gas supply fittings. Abort the test. Fix the leak(s), then retest. If the gas supply is leak free, see the Troubleshooting manual.

7 Next, the test will load and run the checkout method.

- If performing an ALS injection, the run starts automatically.
- If performing a manual injection, when prompted simultaneously make the injection and press **[Start]** on the GC.
- To learn about good manual injection technique, see the Fundamentals of Gas Chromatography manual.

8 Examine the test results on the **Signal** tab.

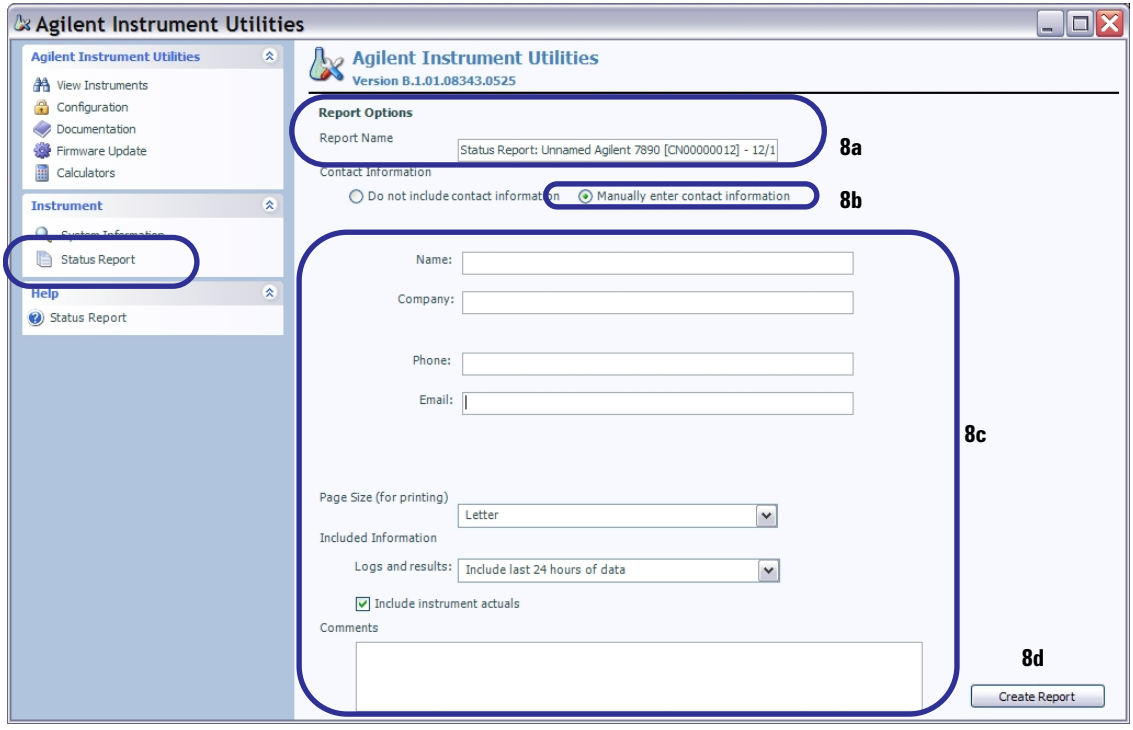
9 Generate a Status report.

a If desired, change the **Report Name**.

b Select **Manually enter contact information**.

c Enter the appropriate contact information or change as needed.

d Click **Create Report**.



10 Print or create a PDF version .

11 Send the results to Agilent.

At this point, GC installation is complete.

Set Permanent GC and PC IP Addresses

Your PC and GC are currently connected directly through a LAN cable. If this PC runs your data system, and you have no other GCs, you can leave the system as-is. However, to connect to more than one GC, or to connect the GC and computer to a site network, you must:

1. Change the GC IP address to be compatible with your site LAN. Refer to the GC Operating Guide for details.
2. Restore or change the PC IP Address to be compatible with the site LAN and the GC.

Install the Data System

The PC and GC are now installed and ready for use on your site LAN. The next step is to install your Agilent data system. Install the software, configure it to communicate with the GC, then make sure it is operating correctly. Refer to the installation instructions that came with the data system.

Cables and Back Panel Connectors

Some parts of an analysis system are connected to the GC by cables. These cables and the back panel connectors to which they connect are described in this section.

Figure 12 shows the connectors on the back panel of the GC:

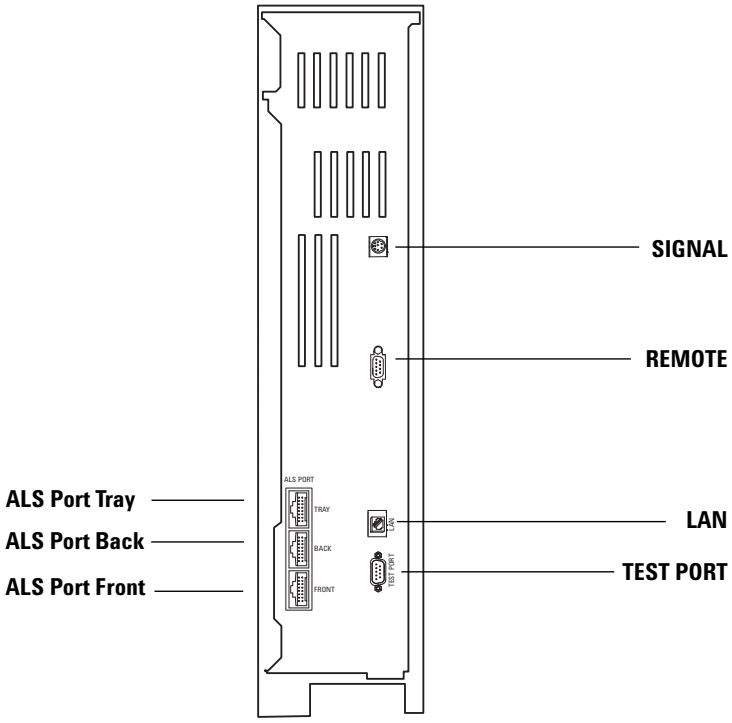


Figure 12 Back panel connectors

Sampler connectors

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

ALS PORT Tray

The sampler tray, if equipped.

ALS PORT Front

An injector, typically mounted over the front inlet.

ALS PORT Back

An injector, typically mounted over the back inlet.

Signal connector

The two analog output signal.

REMOTE connector

Provides a port to remotely start and stop other instruments. A maximum of 10 instruments can be synchronized using this connector. See “Using the Remote Start/Stop cable" on page 34 for more detail.

TEST PORT connector

This connector is reserved for future development.

LAN connector

Standard Local Area Network connector, for communication with data systems and other devices.

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 Volts. The typical voltage is 3 Volts. A voltage over 2.2 volts will be interpreted as a high logic state while a voltage below 0.4 volts 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 1K ohms to 1.5K ohms. For a logic-low state, for a single device on the bus, the minimum current you must be able to sink is 3.3 milliamps. 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 = 0.4V.

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

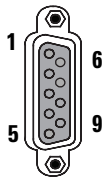
Over-voltage protection - APG Remote connections are clamped by a zener diode to 5.6 Volts. Exceeding this voltage will damage the circuit (main board).

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 0.4V

APG Remote connector

Figure 13 shows the pin-out details of the APG Remote connector.



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

Figure 13 APG Remote connector pin-out details

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 the **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 7820A 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

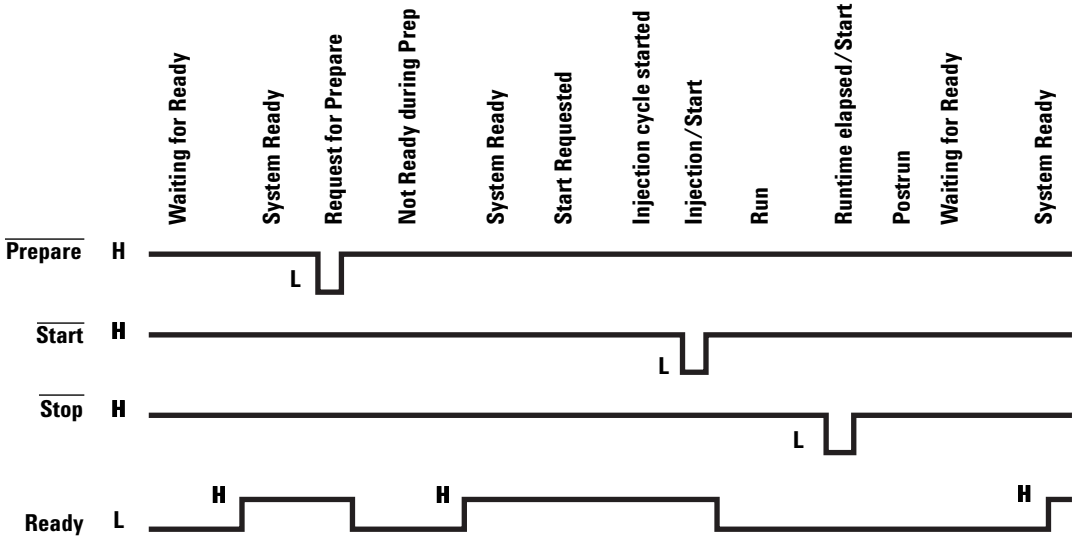


Figure 14 APG Remote timing diagram

Connecting Cables

Connect a GC to an Agilent data system computer using LAN communications using a LAN cable. See Figure 15 below.

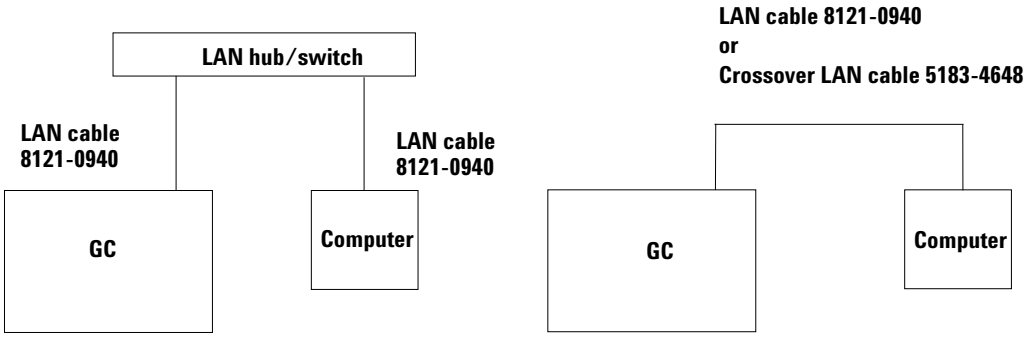


Figure 15 Connecting the GC and computer with a hub/switch (shown at left) or a crossover cable (shown at right).

Table 1 Typical IP addresses for an isolated LAN

	GC	Computer
IP address	192.168.0.26	192.168.0.1
Subnet mask	255.255.255.0	255.255.255.0

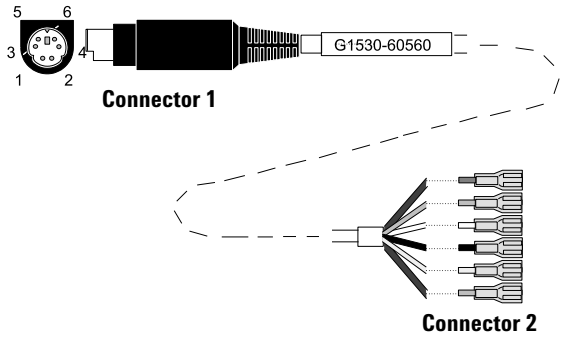
A single communications LAN cable is supplied with the GC. The switch (or hub) and other cables must be ordered separately, if needed. See Table 1 and Table 2 for cabling requirements for other configurations.

Table 2 Cabling requirements

7820A GC connected to:	Required Cable(s)	Part number
7693A Automatic Liquid Sampler	Injector cable	G4514-60610
7697A Headspace Sampler	Remote, 9-pin male/6-pin connector	G1530-60930
3395B/3396C Integrator	Remote, 9 pin/15 pin Analog, 2 m, 6 pin	03396-61010 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), 35900-60920 (5 m), 35900-60930 (0.5 m)
LAN	Cable, networking CAT 5, 25 feet Cable, LAN, crossover	8121-0940 5183-4648

Cable Diagrams

Analog cable, general use

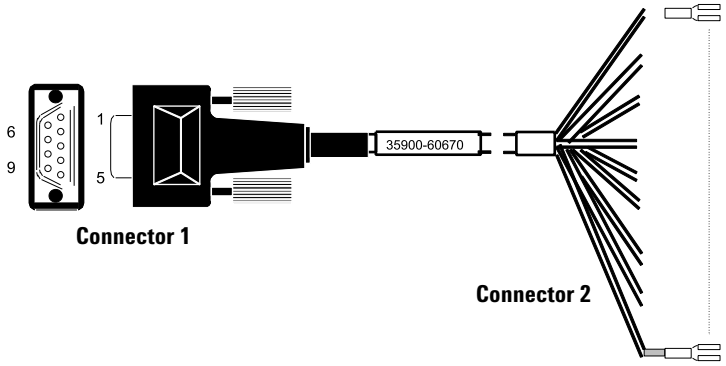


The pin assignments for the general use analog out cable are listed in Table 3.

Table 3 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

Remote start/stop cable



The pin assignments for the remote start/stop cable are listed in Table 4.

Table 4 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

For More Information

The GC and data system installation is now complete. For more information refer to:

- GC Operating Guide for familiarization and everyday operating instructions
- GC Safety guide

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