



**VARIAN**

# CP-3800 GC

## Pre-Installation Instructions

### Unpacking and Inspection

The GC will arrive at your site packed in one large palletized box and one or more smaller cartons.

Before unpacking, carefully inspect the exterior of the shipping carton for evidence of any damage occurring during shipment. Inspect for:

- Water stains
- Cuts, punctures, or deep indentations in the container
- Crushed corners or excessively abraded edges

If any of the above conditions are evident in either of the shipping cartons, do not proceed with unpacking of the instrument but report the condition(s) to the Carrier at time of receipt and to:

Varian Analytical Instruments  
2700 Mitchell Drive  
Walnut Creek, California 94598-1675  
Attention: Manager of Customer Service  
Phone: (925) 939-2400

Systems are shipped either FOB Walnut Creek, California, USA, or FOB Destination. The manner of shipment determines who has responsibility for filing a claim against the carrier if the system is damaged in transit. Most systems are shipped FOB Walnut Creek and in this instance any damages incurred in shipment are the responsibility of the purchaser and the carrier. However, Varian will assist with claims filing and (billable) repairs if necessary.

If the system is shipped FOB Destination, Varian will file a claim against the carrier. Note, however, that Varian will not accept liability for damage if materials are received with obvious damage and no exceptions are noted on the receiving documents.

Outside of the U.S.A., notify the nearest International Sales Office listed on the last page of this manual.

If none of the conditions listed above are evident after inspecting the shipping carton, place the shipping container on the floor near the installation site.

Before proceeding, you should make sure that the site to be used for installation has the required power and meets the space requirements described in these instructions.



**This instrument weighs approximately 95 pounds. Use proper lifting techniques to avoid possible personal injury or damage to the instrument.**

Locate the Installation Section in the Getting Started Manual, P/N 03-914647-00. This section contains the detailed information needed to install your GC. Should you experience difficulties during installation, Varian Customer Support personnel will be available to assist you by telephone. This assistance is provided with the purchase of 3800 GCs.

If Varian Customer Support installs your instrument, the Customer Support Representative will run a chromatogram using a test column and sample. Be sure the conditions are recorded on the chromatogram. Store the chromatogram for future use in analyzing possible chromatographic problems.

## Power Requirements

**A separate circuit is required for each 3800 GC.** The mating socket must have adequate amperage capacity and a reliable ground.

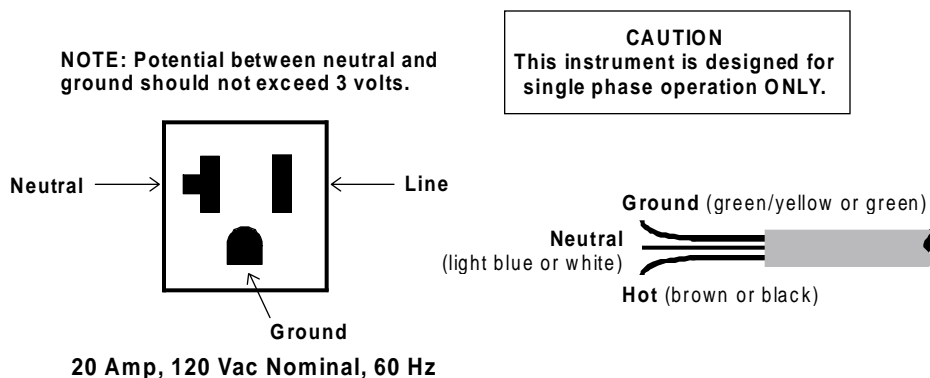
**Note:** Single phase power only. (120V, 101V)

A measured GROUND to NEUTRAL potential of greater than 3 volts ac or dc indicates grounding problems that may need correction before connecting an instrument to the power source. Any power source suspected of having noise problems should be evaluated with a recording type power line monitor prior to being used for operating instruments.



All phases of the installation site preparation must conform to local safety, electrical, and building codes. These codes take precedence over any recommendations in these instructions, and compliance to them is the responsibility of the customer.

Power cords for North America and other 120V, 60 Hz, applications are terminated in a 3-prong plug that requires a matching 120 Vac receptacle as shown in Figure 1. Replacement or substitution of the power plug requires strict compliance with power cord color coding as shown in Figure 1.

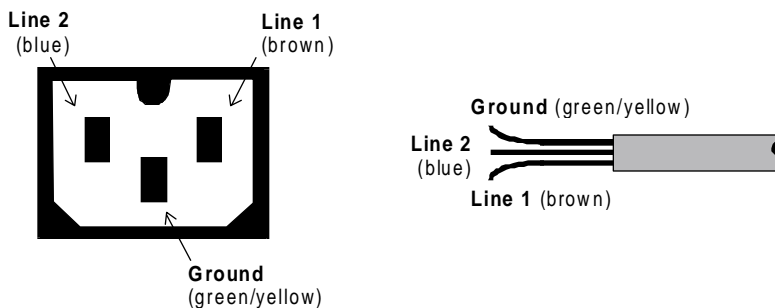


**Figure 1 Power Cord Wiring (120 Vac)**

For use in 220V, 50 Hz, countries, the instrument is supplied with a IEC 320 style socket. The power cord can be changed to suit local power requirements.

**Receptacle located on rear of GC.**

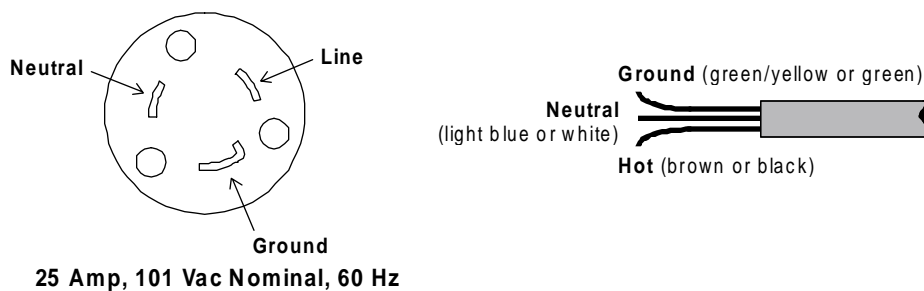
**10 Amp, 230 Vac Nominal, 50 Hz**



**Figure 2 Power Cord Wiring (230 Vac)**

**NOTE:** Potential between neutral and ground should not exceed 3 volts.

**CAUTION**  
This instrument is designed for single phase operation ONLY.



**Figure 3 Power Cord Wiring (101 Vac)**

### Electrical Source Requirements

Each 3800 GC requires a clean 50 or 60 Hz power source capable of providing up to:

101 Vac  $\pm$  10%, 50 or 60 Hz  $\pm$  2%, 25 Amps, 2.5 Kilowatts

120 Vac  $\pm$  10%, 60 Hz  $\pm$  2%, 20 Amps, 2.4 Kilowatts

230 Vac  $\pm$  15%, 50 Hz  $\pm$  2%, 10 Amps, 2.3 Kilowatts

Operation of a 3800 GC near the low limit of the permissible line voltage will increase the time required for thermal zones to reach their final setpoint temperature, and may adversely reduce the maximum usable ramp rate for programmable thermal zones.

Care must be taken to ensure that sources of radio frequency interference (RFI) and electromagnetic interference (EMI) are not placed on the same power line, or share the same ground plane, since this can degrade the performance of the GC. Equipment such as motors, solenoids, fluorescent light fixtures, and radio communication transmitters should be isolated from the instrument and connecting cables as much as possible.

## Environmental Considerations

Keeping with safe laboratory practices, the GC should not be exposed to corrosive chemicals or gases. It should not be exposed to excessive dust/particulate accumulation. For optimum performance, 3800 GCs should not be exposed to the direct venting of air conditioners, heaters, furnaces, or fans.

Humidity: 5% to 95% RH

Temperature: 10° to 40°C operating; -20° to 65°C non-operating

## Space Requirements

Allow sufficient bench space to permit installation of recorders, workstations, autosamplers, and other peripheral GC equipment. Table 1 lists the physical dimensions and weight of the GC and the peripheral instruments which may be installed near it. Allow at least two inches of space at the sides and rear of the GC to permit free air circulation. For optimum column oven cooldown performance, six inches is required at the rear.

Power cord, gas inlets, and the power switch are located at the rear of the Instrument. Signal output connectors for peripheral instrumentation are located under the top cover of the GC.

**Table 1 Physical Dimensions of the 3800 GC System Components**

<i>Instrument</i>	<i>Height</i>		<i>Width</i>		<i>Depth</i>		<i>Weight</i>	
	<i>in.</i>	<i>cm</i>	<i>in.</i>	<i>cm</i>	<i>in.</i>	<i>cm</i>	<i>lb.</i>	<i>kg</i>
3800 GC	20	51	26	66	22	56	95	43
8200 AutoSampler	20	51	6	16	16	41	24	11
Tekmar 3000 Purge and Trap	19	48	9	23	18	46	37	16.8
Archon Purge and Trap AutoSampler	17	43	21.5	55	21	53	80	36
Tekmar ALS-2016	27	69	15	38	15	38	35	13.1
Genesis Headspace AutoSampler	22	56	28	72	18	46	110	50
Star Chromatography Workstation (computer with monitor, approximate values)	17	43	17	43	21	53	35	16

## Gas Requirements

Fuel and carrier gases are chosen based on the type of detector used.

Table 2 lists the gases commonly used with GC detectors. Table 3 lists gases that may be required for other GC purposes. Refer to Table 4 for regulator connector and gas line fittings.

**Table 2 Instrument Gas Requirements**

<b>Detector</b>	<b>Inlet Pressure</b>	<b>Purity</b>	<b>Notes</b>
<b>TCD</b>			
Carrier Gas to injector: He, N <sub>2</sub> , H <sub>2</sub> , Ar	80 psig	99.999%	He: 3 ppm H <sub>2</sub> O; 5 ppm O <sub>2</sub> . Carrier gas filter recommended.
Makeup Gas: He, N <sub>2</sub> , H <sub>2</sub> , Ar			
<b>ECD</b>			
Carrier Gas to injector: He, N <sub>2</sub>	80 psig	99.999%	N <sub>2</sub> : 0.02 ppm H <sub>2</sub> O; 1 ppm O <sub>2</sub> . Carrier gas and oxygen filters recommended.
Makeup Gas: N <sub>2</sub>			
<b>FID</b>			
Carrier Gas to injector: He, N <sub>2</sub> , H <sub>2</sub>	80 psig	99.999%	Carrier gas filter recommended.
Detector Gas: H <sub>2</sub>	40 psig	99.999%	
Air	60 psig	Breathing Quality	
Makeup Gas: He, N <sub>2</sub>			
<b>TSD</b>			
Carrier Gas to injector: He, N <sub>2</sub>	80 psig	99.999%	Carrier gas filter recommended.
Detector Gas: H <sub>2</sub>	40 psig	99.999%	
Air	60 psig	Breathing Quality	
Makeup Gas: N <sub>2</sub>			
<b>PFPD</b>			
Carrier Gas to injector: He, N <sub>2</sub> , H <sub>2</sub>	80 psig	99.999%	Carrier gas filter recommended.
Detector Gas: H <sub>2</sub>	40 psig	99.999%	
Air	60 psig	Breathing Quality	
Makeup Gas: N/A			

**Important Note:** Obtain gases for chromatographic use from a supplier who is aware of your requirements. An analysis of selected impurities is used to determine the purity rating for a given gas. If your supplier does not establish purity based on a analysis of appropriate chromatographic contaminants, a purity rating of 99.999% may not be suitable for GC use. A quality supplier of gas and the regular use of filters will minimize system contamination problems.

**Table 3 Operating Gases**

<b>Purpose</b>	<b>Recommended Gas</b>	<b>Inlet Pressure</b>
8200 AutoSampler	Air or N <sub>2</sub>	40-60 psig
Valve Actuators	Air	60 psig
Subambient (LCO <sub>2</sub> *)	LCO <sub>2</sub> *	850-1000 psig
Subambient LN <sub>2</sub>	LN <sub>2</sub>	20-50 psig

\*Requires an eductor tube in the tank.

## Proper Handling of Gas Cylinders

Observe safe laboratory practice in the transportation, storage, and usage of gas cylinders under high pressure.

- Never move a cylinder with a regulator installed. Make sure safety cap is in place over valve when transporting cylinder.
- Always chain or strap cylinders in the laboratory and in storage.
- Always use cylinder condition labels to show whether tank is FULL, IN USE, or EMPTY.
- Always leave at least 100 psig residual gas in a depleted cylinder. Always store in empty tank storage area with tank valve closed. Empty cylinders should be clearly marked as such and dated.
- Do not expose cylinders to temperatures above 125°F (50°C).

## Regulator Installation

Carrier gases, air, and H<sub>2</sub> supplied from a cylinder must have a two-stage regulator having a zero (0) to 100 psig low-pressure stage. The inlet pressure for He, N<sub>2</sub>, Ar/CH<sub>4</sub>, or other carrier gases is normally 80 psig. Air is supplied at 60 psig, and H<sub>2</sub> is usually supplied at 40 psig. H<sub>2</sub> may be supplied from a cylinder or a hydrogen generator. If H<sub>2</sub> is used for the carrier gas, it should be at 80 psig.

## Gas Connections

All instrument gases connect to 1/8-inch Swagelok fittings on the rear of the instrument. (The exception is liquid nitrogen, which requires 1/4-inch fittings.) All fittings are labeled for specific gases with provision for auxiliary and cryogenic coolant supplies. Table 4 lists the part numbers of hardware that may be required to connect gases to the instrument.

**Table 4 Gas Line Fittings**

<b>Description</b>	<b>Part Number</b>
Pressure Regulator	57-000180-00
<i>Specify connector:</i>	
CGA 350 Connector (H <sub>2</sub> or Ar/CH <sub>4</sub> )	16-000207-00
CGA 580 Connector (N <sub>2</sub> or He)	16-000197-00
CGA 590 Connector (Air)	16-000196-00
LCO <sub>2</sub> Connector (for 1079 injector or column oven)	28-207304-00
1/4" to 1/8" pipe bushing	28-202012-00
1/8" pipe to 1/8" tubing union	28-694205-00
1/8" ferrule, front	28-694027-01
1/8" ferrule, back	28-694028-01
1/8" nut	28-694029-00
1/8" tubing (25' coil)	03-918326-00
Teflon tape*, 1 roll (1/2" x 520")	88-189610-00

*\*For use on pipe fittings ONLY. Never use Teflon tape on Swagelok® fittings.*

An 1/8-inch line with brass fittings (such as Copper Carrier Gas Kit, P/N 02-000034-00) is required to connect the carrier gas supply cylinder to the instrument bulkhead fitting. However, additional tubing may be required to connect the GC to the required gas supplies.



**DO NOT USE UNCLEARED TUBING.** Use of plastic tubing or improperly cleaned tubing or impure gases may result in severe contamination of the GC pneumatics and may void the warranty.

Premium-grade 304 stainless steel, fully annealed, cleaned, and capped is recommended for column use.

**Table 5 Stainless Steel and Copper Tubing**

	<i>OD, in.</i>	<i>ID, in.</i>	<i>Length, ft (m)</i>	<i>Part Number</i>
<b>Stainless Steel</b>	1/16	0.046	10 (3)	37-000241-02
	1/16	0.046	50 (15)	37-000241-01
	1/8	0.093	50 (15)	37-000119-01
<b>Copper</b>	1/8	0.065	25 (7.6)	03-918326-00
	1/4	0.190	50 (15)	37-000146-00*

*Note: Fully annealed and specially heat-cleaned copper tubing is recommended for ease of plumbing. This tubing will usually appear discolored due to the heat-cleaning process.*

*\*Not heat cleaned*

Use these plastic closures to keep metal tubing interiors clean during storage.

**Table 6 Tubing Closures**

<i>Tubing OD, in</i>	<i>Part Number</i>
1/16	28-996023-00
1/8	28-995806-00
1/4	28-995808-00

## Gas Filters

Carrier gas purity can be improved with filters. (See Table 7.) Both the carrier gas and oxygen filter are installed at the rear of the instrument. The mini filters are located inside the pneumatics compartment. Filters should always be installed in the vertical position. Carrier gas should pass through carrier gas filter then through the oxygen filter.

**IMPORTANT NOTE:** Filters are used to remove small amounts of contaminants from high purity gases. They are not capable of removing all of the contaminants from low purity gases. The purity specifications listed in Table 2 are minimum acceptable values.



The oxygen filter removes oxygen from the carrier gas and will rapidly deplete its scrubbing capability in the presence of room air. When installing or replacing the oxygen filter, leave the plugs on either end in place until ready to connect into the system. Set the carrier gas flow at 50 to 100 mL/min through the supply line. Remove the inlet plug on the filter and connect to the tubing assembly from the carrier gas filter. Leave the outlet plug

on; this will pressurize the filter. Then tighten the inlet fitting. Remove the outlet plug and make the final connection quickly.

### Tagging and Replacement of Gas Filters

Filters will require removal and replacement at specified intervals. (See Table 7.) The operator should tag each filter with the installation date and record pertinent information, such as the number of gas cylinders used with each filter and the number required before filter change. Abrupt changes in system performance, e.g., ghost peaks, excessive baseline offset, etc., may indicate the need for filter replacement.

**Table 7 Standard and Optional Filters**

<b>Filter</b>	<b>Purpose</b>	<b>Comments</b>	<b>Location</b>
Carrier Gas Filter (Inlet Filter) 03-949862-00	Protects against hydrocarbon and moisture contamination from the supply cylinder.	Capacity approximately eight 200 ft <sup>3</sup> cylinders of gas; impurity levels up to 10 ppm	Rear of GC
Oxygen Filter 03-949770-02	Reduces oxygen and water in inert carrier gases.	Capacity approximately four 200 ft <sup>3</sup> cylinders at 10 ppm oxygen	Rear of GC
Mini Filter 03-918959-01	A final filter designed to trap impurities.	Change when detector signal indicates filters are no longer removing impurities.	Inside GC pneumatics compartment

## Main International Sales Offices

### Australia

Tel. (61) (3) (9) 566-1133

### Belgium

Tel. (32) (2) 721-4850

### Brazil

Tel. (55) (11) 820-0444

### Canada

Tel. (905) 819-8181

### Austria, Central & Eastern Europe

Tel. (43) (1) 695-5450

### France

Tel. (33) (1) 6986-3838

### Germany

Tel. (49) 06151-7030

### Great Britain

Tel. (44) (1932) 898000

### Italy

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### Japan

Tel. (81) (3) 5232-1211

### Mexico

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### The Netherlands

Tel. 31 30 6435 09 09

### Norway

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### Southeast Asia

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Tel. (34) (1) 472-7612

### Sweden

Tel. (46) (8) 445 1620

### Switzerland

Tel. (41) (61) 2958000

### Other Countries in Africa, Near and Middle East

Tel. (415) 493-4000

### United States

Tel. (281) 240-7330

<http://www.varian.com>

*For GC/MS and GC*

**1-800-926-3000**

*For HPLC*

**1-800-FOR-HPLC**