

Cary
100/300/4000/
5000/6000i

Pre-Installation Manual



Agilent Technologies

Notices

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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.

Request for Installation

All preparations have been completed. Please arrange for the installation to be completed as soon as possible. I understand that if the installation site is not prepared in accordance with the enclosed instructions, additional installation charges may apply.

Company name: _____

Company address: _____

Name: _____

Position: _____

Telephone: _____

Preferred installation date: _____

Signed: _____

Date: _____

Pre-Installation Checklist

Your site must meet all requirements before you request installation. Before unpacking the boxes, complete each requirement listed in the table. After completing each requirement, place a check in the appropriate checkbox. Ensure you compare each item inside the boxes with the packing list supplied with the boxes.

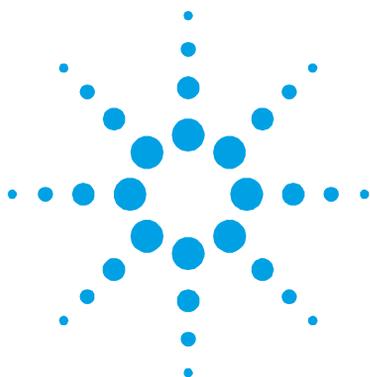
Requirements	<input checked="" type="checkbox"/>
The work area is prepared and meets requirements (see Chapter 3).	<input type="checkbox"/>
The power supply meets requirements (see Chapter 4).	<input type="checkbox"/>
A nitrogen gas supply for optics path purging is ready (Cary 100/300 needs the Extended Sample Compartment option) (see Chapter 5).	<input type="checkbox"/>
The Cary instrument and accessories are on site and unpacked (see Chapter 6).	<input type="checkbox"/>
The computer meets requirements (see Chapter 7). Computer type: _____	<input type="checkbox"/>
The Microsoft® Windows® operating system is installed (see Chapter 7).	<input type="checkbox"/>
Operator training is required (see Chapter 8).	<input type="checkbox"/>

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1. Introduction

The range of Agilent Cary spectrophotometers are complete analysis systems that have been fully tested and proven to specification before dispatch from the manufacturing plant.

This manual contains general information relevant to the preparation of an installation site, and details the facilities that must be provided to ensure that the system can be effective. Detailed operating procedures are provided in the operation manual that is supplied with the spectrophotometer.

For installations that are to be carried out by Agilent personnel, you should complete the pre-installation checklist on Page 4, then send a copy of the checklist to the Agilent sales and service office or local Agilent agent dealing with the supply of the equipment. On receipt of this document, the Agilent representative will contact you and arrange a convenient time for installation.

As a guide to the time required for installation by an Agilent representative, a typical Cary system will be completed and ready for use within four hours. This time may be extended if the system includes accessories. The installation time can be kept to a minimum by ensuring proper preparation of the site and arrangement of all units to allow for easy access.

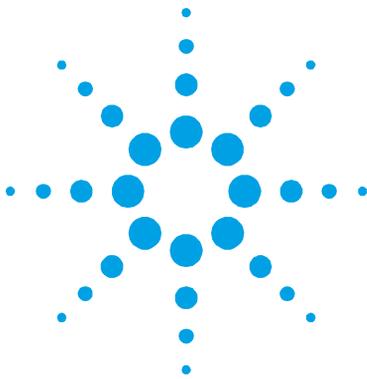
Introduction

NOTE

The remainder of this manual contains information such as the environmental requirements and technical specifications for the Cary spectrophotometer, and it should not be discarded — keep this manual for future reference.

Your local Agilent office is:

Agilent office card to be attached here.



2. Safety Practices and Hazards

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Warning and caution messages

Carefully read all warnings and cautions and observe them at all times.

A Warning message is used in the text when failure to observe instructions or precautions could result in death or injury. Warnings have the following format:

WARNING



Hazard Type

Nature of the hazard, information on how to avoid the hazard, and possible consequences if you don't.

The triangular symbols that appear in conjunction with warnings are outlined in the next section.

A Caution message is used when failure to observe instructions could result in damage to equipment (Agilent supplied and/or other associated equipment). Cautions have the following format:

CAUTION

Caution information appears here.

Information symbols

The following triangular symbols appear in conjunction with warnings on the spectrometer and associated documentation. The hazard they depict is shown below each symbol:



Broken glass



Corrosive liquid



Ejecting parts



Electrical shock



Eye hazard



Fire hazard



*Heavy weight
(danger to feet)*



*Heavy weight
(danger to hands)*



Hot surface



Moving parts



Noxious gas

The following symbol may be used on warning labels attached to the instrument. When you see this symbol, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.



The following symbols also appear on the instrument or in the documentation:

	Mains power on.
	Mains power off.
	Fuse.
	Single phase alternating current.
	Direct current.
	When attached to the rear of the instrument, indicates that the product complies with the requirements of one or more EU directives.
	Focus.
	Vertical adjustment.
	Horizontal adjustment.

Color coding

The various indicator lights appearing on Agilent instruments and associated accessories are color-coded to represent the status of the instrument or accessory.

- A green light indicates the instrument is in normal or standby mode.
- An orange light indicates that a potential hazard is present.
- A blue light indicates that operator intervention is required.
- A red light warns of danger or an emergency.

US FCC advisory statement

The following is a United States Federal Communications Commission advisory statement:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

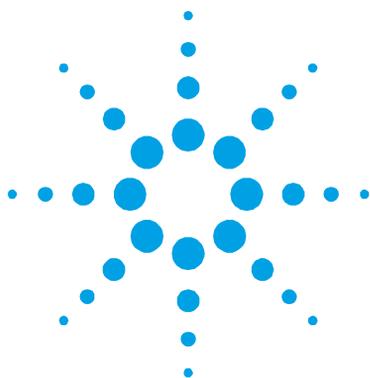
CE compliance

Cary UV-Vis-NIR instruments have been designed to comply with the requirements of the Electromagnetic Compatibility (EMC) Directive and the Low Voltage (electrical safety) Directive (commonly referred to as the LVD) of the European Union. Agilent has confirmed that each product complies with the relevant directives by testing a prototype against the prescribed EN (European Norm) standards.

Proof that a product complies with the directives is indicated by:

- The CE marking appearing on the rear of the product.
- The documentation package that accompanies the product, containing a copy of the Declaration of Conformity. This declaration is the legal declaration by Agilent that the product complies with the directives and also shows the EN standards to which the product was tested to demonstrate compliance.

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3. Work Area

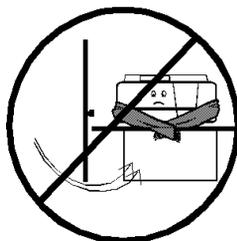
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Suitability

The instrument is suitable only for indoor use. It is suitable for these categories:

- Installation category II
- Pollution degree 2
- Safety class 1 (EN 61010-1)

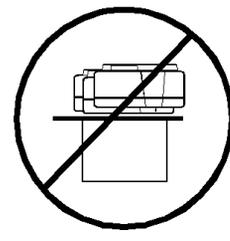
Environmental conditions



No drafts



No corrosive fumes



No vibration

Sample preparation areas and materials storage facilities should be located in a separate room.

Work Area

For optimum performance the area should have a dust-free, low humidity atmosphere. Air conditioning is recommended. The room should be temperature-controlled if your analyses are particularly sensitive.

CAUTION

The Cary instrument is designed for operation in clean air conditions. The work area must be free of all contaminants that could have a degrading effect on the instrument components. Dust, acid and organic vapors, such as acetone, must be expelled from the work area. The instrument warranty will be void if the equipment is operated in substandard conditions.

The instrument will deliver best analytical performance if the ambient temperature of the work area is maintained between 20 and 25 °C and is held constant to within ± 2 °C through the working day.

Table 1. Suitable conditions during instrument transportation, non-operation and operation

Condition	Altitude (m, ft)	Temperature (°C, °F)	Relative humidity, non-condensing (%)
Non-operating (transport)	0–2133, 0–7000	5–45, 41–113	20–80
Non-operating and meeting dielectric strength tests	Sea level	40, 104	90–95
Operating but not necessarily meeting performance specifications	0–2000, 0–6562	5–31, 41–88 31–40, 88–104	≤ 80 $\leq [80 - 3.33(t-31)]$
Operating within performance specifications	0–853, 0–2800 853–2133, 2800–7000	10–35, 50–95 10–25, 50–77	8–80

CAUTION

Operating specifications for the computer, monitor and printer/plotter may differ from those for the Cary spectrophotometer. You must check in the literature provided with these units and arrange the operating environment to suit the complete system.

Workbench

The workbench must be stable and strong enough to support the total weight of equipment to be used.

Table 2. Equipment weights and dimensions

System unit	Weight (kg, lb)	Width (cm, in.)	Depth (cm, in.)	Height (cm, in.)
Cary 100/300	45, 99	64, 25	65, 26	32, 13
Cary 4000/5000/6000i	91, 200	102, 40	71, 26	38, 15
Printer (typical)	5.5, 12	38, 15	30, 12	12, 5
Computer (typical)	20, 44	52, 20	52, 20	40, 16

The bench tops should be large enough to permit a free circulation of air around each unit in the system. Remember to provide space for the computer, monitor and printer.

The workbench should be about 90 cm (36 in.) high.

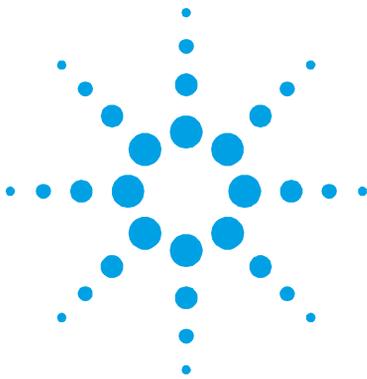
To avoid damage through spillage of the samples being analyzed, the worktops should be covered with a material that is corrosion-resistant and impervious to liquids.



After the work area requirements have been met, check the checklist box: *The work area is prepared and meets requirements.*

Work Area

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4. Electrical Specifications

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Mains supply

The installation of electrical power supplies must comply with the rules and/or regulations imposed by local authorities responsible for the supply of electrical energy to the workplace.

WARNING



Electrical Shock Hazard

Good electrical grounding is essential to avoid potentially serious shock hazards. A 3-wire outlet with ground connection must be provided for the instrument. Ensure that power outlets are earth-grounded at the grounding pin.

All power supplies must be single phase AC (alternating current) voltage, three wire system (active, neutral, earth) and should be terminated at an appropriate power outlet receptacle that is within reach of the instrument power cord assembly. For safety reasons, a separate power outlet receptacle should be provided for each unit in the system. Do not plan to use extension cords or outlet adaptors.

All Cary 100/300/4000/5000/6000i instruments are supplied with a 2 meter (6 ft. 6 in.) long power cord and three-pin plug assembly that is compatible with common standards applicable in the local area.

Avoid using power supplies from a source that may be subject to electrical or RF interference from other services; for example, large electric motors, elevators, and welders.

Table 3. Mains voltage requirements

System unit	Required supply voltage	Power rating (typical)
Cary 100/300	100, 120, 220, 240 $\pm 10\%$ VAC 230 +14–6%, 230 +6–14% VAC 50/60 ± 1 Hz	270 VA
Cary 4000/5000/6000i	85–264 $\pm 10\%$ VAC 47–63 Hz	300 VA
Computer	100, 120, 220, 240 $\pm 10\%$ VAC 50/60 ± 1 Hz	100 VA

NOTE

For the computer, the table above is indicative only. Refer to the literature provided with the computer for details of individual power requirements.

Fuses

Cary 100/300

T 4 AH 250 V, IEC 127 sheet 5, 5 x 20 mm (220–240 VAC)
T 5 AH 250 V, IEC 127 sheet 5, 5 x 20 mm (100–120 VAC)

Cary 4000/5000/6000i

T 2.0 AH 250 V, IEC 127 sheet 5, 5 x 20 mm (220–240 VAC)
T 2.5 AH 250 V, IEC 127 sheet 5, 5 x 20 mm (100–120 VAC)

NOTE

For safety reasons, any other internal fuse or circuit breaker is not operator accessible, and should be replaced only by Agilent authorized personnel.

NOTE

Fuse information on the rear of the instrument is the most up-to-date.

External connections

Mains inlet coupler

3/2 A 120/250 VAC 50–60 Hz IEC type

Mains power cord

Country	Mains power cord	Plug
Australia	10 A 250 VAC	Complies with AS3112
USA	10 A 125 VAC	Complies with NEMA 5–15P
Europe	6 A 250 VAC	Complies with CEE7 sheet vii or NFC61.303 VA

Rear

IEEE 488 (GPIB Cary system connection)

Sample compartment

15-pin D-range connector with two high voltage pins: -1000 V DC, +125 V DC (Cary 100/300)
+ 85 V DC (Cary 4000/5000/6000i)

With the Accessory Controller Board fitted to the Cary 100/300 (accessory control electronics is standard with the Cary 4000/5000/6000i):

- Four connectors for accessories in the sample compartment (Low voltage DC and AC, two HV low power supplies, and digital lines).
- One connector for accessories on the front panel (identical to one of the connectors described above).

NOTE

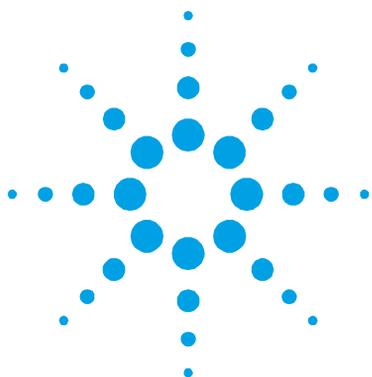
For more information, refer to the Cary 100/300 Accessory Controller information in the Cary WinUV software online Help.



After the power requirements have been met, check the checklist box: *The power supply meets requirements.*

Electrical Specifications

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5. Optional Nitrogen Supply

The Cary 4000/5000/6000i instruments are fitted with connection points for purging the optical system with nitrogen to enhance the performance of each instrument at extremes of its range. More details are provided in the Cary Hardware manual (publication number 8510197200) supplied with the instrument.

Nitrogen supplies are not available from Agilent but may be obtained from commercial suppliers. Liquid nitrogen (in conjunction with a heat exchanger) is recommended because it is generally less costly than compressed nitrogen and is of better quality. Where compressed nitrogen must be used, the gas must be dry, oil-free and uncontaminated.

CAUTION

Do not use compressed nitrogen from a supplier who uses oil or water in the compression process. These methods leave fine particles of oil or water suspended in the nitrogen that may be deposited on the instrument optics. Only use nitrogen from a supplier who fills containers from immersion pumps that are lubricated with liquid nitrogen.

NOTE

The instrument warranty will be void if damage is caused by the use of contaminated nitrogen.

Optional Nitrogen Supply

All gas supply installations must comply with the rules and/or regulations that are imposed by the local authorities responsible for the supply of compressed gas energy to the workplace.

Cylinders containing gas under pressure should be firmly secured to a rigid structure and the storage area must be well ventilated. Never locate gas cylinders near a source of ignition or in a position that is subject to direct heat. Gas storage cylinders often incorporate a pressure relief device, which will discharge the gas at a pre-determined temperature, usually around 52 °C (125 °F).

If gases are to be plumbed from a remote storage area to the instrument site, ensure that the local outlets are fitted with shut-off valves and suitable regulators that are easily accessible to the instrument operator.

Nitrogen supply tubing should be clean, flexible plastic tubing of 6 millimeters (1/4 inch) internal diameter (Tygon polyvinylchloride or equivalent).

CAUTION

Do not use rubber tubing, as this is usually treated internally with talc, which will be carried into and contaminate the instrument optics.

Operating pressure for the nitrogen purging system is 83 to 172 kPa (12 to 25 psi). Use a suitable regulator and gauge assembly to ensure that the nitrogen supply is maintained at the correct pressure.

The nitrogen system should include a manifold assembly with inlet from the supply and two outlets for connection to the instrument. Manifold outlets should each be fitted with a stop valve and flow meter for control of gas flow to the instrument. Flow meters should be adjustable for flow rates of 0 to 30 liters per minute (0 to 64 cubic feet per hour). Refer to Figure 1 for more details.

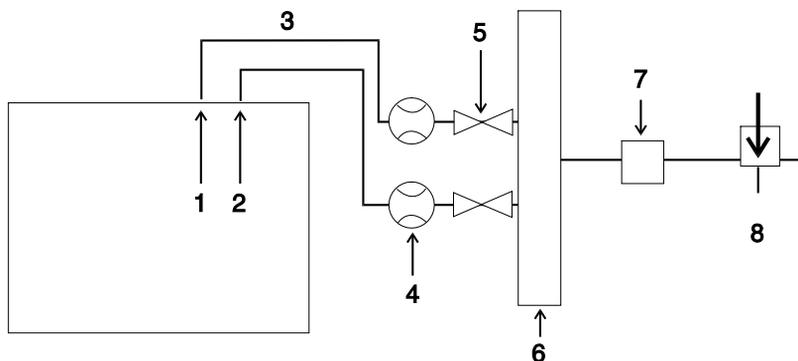


Figure 1. The position of flow meters when purging with nitrogen

- | | | |
|-----------------------|---------------------------|-------------|
| 1. Instrument | 2. Sample compartment | 3. Tubing |
| 4. Flow meters | 5. Shut-off valves | 6. Manifold |
| 7. Pressure regulator | 8. Nitrogen control valve | |

NOTE

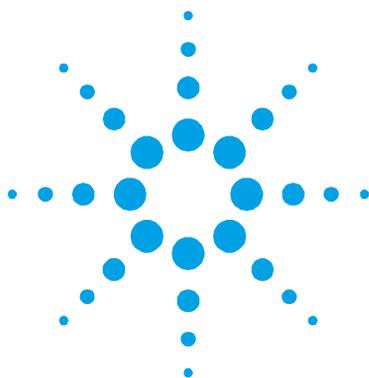
The sample compartment of the Cary 100/300 instruments can be purged if the optional Extended Sample Compartment is fitted. Refer to the Extended Sample Compartment section of the Cary WinUV online Help for specifications and instructions for use.



After the gas requirements have been met, check the checklist box: *A nitrogen gas supply for optics path purging is ready (Cary 100/300 needs the Extended Sample Compartment option).*

Optional Nitrogen Supply

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6. Equipment On Site

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Insurance

As the carrier's liability ceases when the equipment is delivered, Agilent recommends that the instrument owner arranges separate insurance to cover transportation from the delivery point to the installation site. The delivery point will vary according to the carrier, the shipping method and in some cases the terms of sale. Some carriers will deliver only to their own distribution centre, while others may deliver to your off-loading bay. Very few carriers will deliver to the actual installation site.

In-house transit routes

In-house transit routes must be carefully considered. Vertical, horizontal and turning clearances should be calculated from the shipping carton dimensions of the spectrophotometer, which is the largest unit in any system configuration.

Table 4. Shipping weights and dimensions

System unit	Weight (kg, lb)	Width (cm, in.)	Depth (cm, in.)	Height (cm, in.)
Cary 100/300	75, 165	86, 34	77, 30	65, 26
Cary 4000/5000/6000i	141, 310	143, 56	80, 31	67, 26
Printer (typical)	7.5, 17	58, 23	55, 22	41, 17
Computer (typical)	34, 75	122, 48	60, 24	58, 23

Inspecting for transit damage

Transit damage can be obvious or concealed and in either case will be admitted by the carrier only if it is reported within the terms of the carrier's agreement. For any claims against damage in transit, the following general rules apply:

- Before accepting delivery, you must inspect the packages for signs of obvious damage. The nature of any obvious damage must be noted on the carrier's waybill, which then must be countersigned by a representative of the carrier.
- Within the time limit stated in the terms and conditions of carriage, a further inspection must be made for concealed damage. If any damage is found at this stage, the carrier must be notified in writing. You must retain all packaging material for subsequent inspection by a representative of the carrier.
- A copy of any damage report must be forwarded to the Agilent sales office dealing with the supply of your equipment.

WARNING



Heavy Weight Hazard

As many of the packages are heavy, use mechanical lifting devices when possible to avoid the chance of injury to personnel or accidental damage to the equipment. If manual lifting is unavoidable, always use two or more people to handle packages and lift equipment into position. Never attempt to lift the packages alone.

Unpacking

After accepting delivery, take the equipment to the installation site, then unpack and check the contents. Agilent instruments are inherently robust, and the packaging is designed to prevent internal damage. However, the contents form part of a precision measuring system and all packages should be handled with care. In transit, sharp jolts must be avoided and the packages should not be inverted or tilted unnecessarily. Markings on the shipping cartons generally indicate which side of the package should be kept on top.

WARNING**Heavy Weight Hazard**

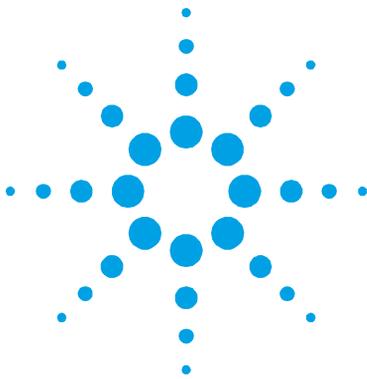
Many of the packages are large and heavy. To avoid the chance of injury to personnel or accidental damage to the equipment, always use two or more people when handling the packages or lifting equipment into position. Never attempt to lift the packages alone.

Unpacking of the equipment is your responsibility and instructions are provided with the spectrophotometer. As the packages are opened, the contents should be checked against the enclosed packing lists, and any differences from the original order should be referred immediately to your Agilent sales office. All contents of the shipping packages should be assembled together when installation is to be carried out by Agilent service personnel. Do not discard any packaging components or filler materials.



After the unpacking requirements have been met, check the checklist box: *The Cary instrument and accessories are on site and unpacked.*

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7. Computer System Requirements

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Recommended configuration

The recommended configuration should be followed when buying a new computer. The recommended configuration is:

- IBM compatible
- Intel Pentium III processor
- 128 MB RAM
- 10 GB hard drive
- Video card supporting 800 x 600 pixels resolution, high color (16 bit) mode
- Super VGA screen
- 8 x CD-ROM drive
- 16 bit sound card
- PCI slot for IEEE card
- Windows 101 key keyboard
- Microsoft or compatible mouse
- Microsoft Windows 2000 or Windows XP
- Microsoft Internet Explorer 5*

Computer System Requirements

* The Cary WinUV software uses functionality provided by Microsoft Internet Explorer 5.0. You do not need to use Internet Explorer 5 as your Web browser. If your company rules prevent the installation of Internet Explorer 5 you can use another browser, with some loss in functionality.

Agilent can supply a computer for the Cary WinUV software in the recommended configuration (part number 7910026300). The computer will be formatted, partitioned and loaded with its operating system. All software disks and manuals will be supplied.

NOTE

Computers supplied with Letter of Credit orders will be an international brand and will be the recommended configuration or better.

Better computer components, for example, processor type, amount of memory, screen size and resolution, operating system version, and so on, can be substituted for those listed above.

Recommended printer

You can use any printer/plotter supported by your Microsoft Windows operating system.

IEEE 488 interface

The Cary instruments require an IEEE/GPIB card to be fitted in the computer. They are available by ordering the following part number (one will usually be included in your instrument order as a separate line item):

- Agilent AT IEEE-GPIB Card, part number 0210127490
- NI PCI-IEEE Card, part number 9910102100

NOTE

The NI (National Instruments) AT-GPIB card will not work with the Cary WinUV software.

The Agilent representative will install the GPIB card in your computer. If you are supplying your own computer, you will need to install the card yourself. Refer to the Cary Hardware manual supplied with the instrument, for installation instructions.

Interconnecting cables

The monitor, printer/plotter, keyboard and spectrophotometer are connected to the computer via cables that plug into the back of the computer. The spectrophotometer is connected via a shielded IEEE 488 cable provided with the instrument. Consult your monitor, printer/plotter and keyboard manuals for details of their individual cabling requirements.



After the computer requirements have been met, enter the computer type and then check the checklist box: *The computer meets requirements.*

Setting up your computer

When setting up your computer for use with the Cary WinUV software, ensure that:

- Windows 2000 or Windows XP is installed and all devices such as sound card and CD-ROM are working.
- Internet Explorer 5 or later has been installed.
- You have set your computer screen desktop area resolution to at least 800 x 600 pixels and have set the color palette to at least High Color.

NOTE

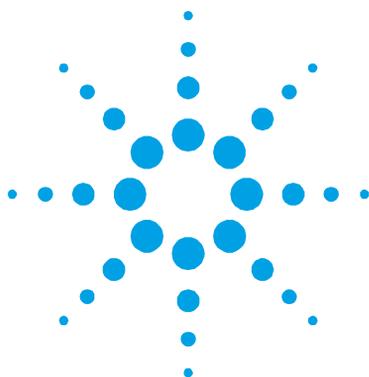
The Agilent customer service representative will install the Cary WinUV software. However, installation of a Windows operating system is not included as part of the standard instrument installation.



After the operating system installation requirements have been met, check the checklist box: *The Microsoft Windows operating system is installed.*

Computer System Requirements

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8. Operator Training

If the Cary instrument is installed by Agilent field service, the Agilent representative will demonstrate the basic operating procedures while conducting the installation performance tests during the installation procedure. The representative however, is not necessarily experienced in complex analytical routines and is not authorized to conduct extensive training.

To ensure that your operators benefit the most from witnessing the installation performance tests, operator training should be completed before your equipment is installed. It is strongly recommended that you take advantage of the special training courses that are conducted at various locations by the Agilent customer support and sales organization.

In some areas it may be possible to arrange for operator training to be carried out after the installation, using your own instrument. To investigate this possibility, contact your local Agilent sales and service office.

Operator Training

The initial software installation and elementary performance tests will take around thirty minutes. There is then a period of two hours that must be allowed for warm-up before the detailed instrument tests for conformance to specification can be carried out, and during this time the representative will demonstrate some of the basic system operating procedures. If you will be installing the instrument yourself you should use this time to become familiar with the software, following the instructions in the software manual provided with the instrument. An automated software process that takes around one hour to complete performs the detailed tests for instrument performance to specification.

NOTE

You must have a working knowledge of the computer operating system, as this type of instruction is not provided by Agilent. The literature supplied with the spectrophotometer provides step-by-step instructions for setting up the system and detailed operating instructions for the analysis procedures — it does not include instructions for operation of the computer.



If operator training is required, check the checklist box: *Operator training is required.*