Agilent 1260 Infinity II
GPC/SEC Column Thermostat

User Manual

Notices

Manual Part Number

D0029605 Rev. A

Edition 06/2023

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Agilent Technologies
Hewlett-Packard-Strasse 8
76337 Waldbronn, Germany

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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.

In this Guide….

This manual covers the Agilent 1260 Infinity II GPC/SEC Column Thermostat (G7886A).

This manual is intended for laboratory technicians who are responsible for control and day-to-day maintenance of the Column Thermostat. It is assumed that the user of this manual has basic knowledge of how to use general purpose GPC/SEC laboratory equipment and is familiar with standard laboratory terminology.

NOTE Read this manual including the safety instructions before using the Column Thermostat.

Contents

1 Introduction

This chapter provides an overview of the most important functions and options of the Column Thermostat.

Safety Instructions

In this manual, Warning / Caution messages are always indicated using the following conventions:

WARNING **A warning alerts you to situations that could cause physical injury or death.**

Do not proceed beyond a warning until you have fully understood and met the indicated conditions.

CAUTION **A caution alerts you to situations that could cause loss of data, or damage of equipment.**

Do not proceed beyond a caution until you have fully understood and met the indicated conditions.

Adhere to quality control procedures and the following equipment guidelines when using the system:

General Safety

WARNING

- The system is intended to be used in a regulated laboratory environment with trained operators following good laboratory practices.
- Use this system ONLY for its intended use. Use of the system for any other purpose may cause unsafe situations.
- Do not use the system if there is any visible damage.
- The system working environment should meet the specifications indicated in this manual.
- When installing the instrument, make sure that air circulation will not be impeded.

Site Requirements

WARNING

- Pay attention to the weight of the Column Thermostat. The instrument weighs 17 kg (37.5 lbs) or 12.5 kg (28 lbs), without cooling option. Use proper lifting techniques to avoid potential injuries. Ensure that you can handle the weight of the load.
- Consider the entire weight of the combined system including all the components. The lab table on which this instrument is installed should be sufficiently strong to support the total weight of the whole LC system. It should be level, stable and have a depth of at least 600 mm. Otherwise, the instrument could tip over or fall off the table.
- Take measures to prevent the instrument from falling in the event of an earthquake or other disaster. Strong vibrations could cause the instrument to fall over, resulting in injury and damage.
- All other equipment connected to this instrument must be approved to an appropriate safety standard and have reinforced insulation from the mains.
- Make sure the instrument is placed on a stable flat surface.
- Make sure the instrument is placed in such a way that the mains power connection can be reached easily to disconnect it from the mains power supply by removing the mains power cable.
- Use only cables provided with the instrument to prevent damage to the system.

CAUTION

- Make sure that the ventilation holes in the back panel and on the right-hand side panel of the instrument are not obstructed. Leave at least 10 cm free space on the right-hand side and at least 6 cm at the back of the instrument.
- Do not install the instrument in places subject to excessive dust, direct sunlight or shock and do not place it near a heat source, as this will influence the cooling capabilities of the instrument.
- Allow sufficient time to let the instrument reach ambient temperature before switching it ON.

Bench Space

The module dimensions and weight (see Table "Physical Specifications" on page 18) allow you to place the module on almost any desk or laboratory bench. It needs additional 10 cm (3.9 inches) space on right-hand side and approximately 6 cm (2.4 inches) in the rear for air circulation and electric connections.

If the bench shall carry a complete LC system, make sure that the bench is designed to bear the weight of all modules.

NOTE The instrument is heavy and thus it is advisable to locate the system on a sturdy bench.

NOTE Allow additional bench space for a PC if the instrument is to be computer-controlled.

Power Considerations

WARNING

- To prevent electric shock in the event of an accident or electrical discharge, the system must be connected to a suitable mains power supply with a correctly installed protective earth conductor. Never use the system without a properly connected protective earth conductor.
- Read the operating instructions before connecting the system to the mains power supply.
- Replace faulty insulation on power cords immediately.

System Operation and Maintenance

WARNING

- Temperatures inside the Column Thermostat may be high. Touching the panels inside the Column Thermostat may cause burns. Make sure the actual temperature inside the Column Thermostat has decreased to a safe value of, for example, 25°C before you open the front door to prevent injuries.
- Use of biological materials, viral samples and needles may carry a significant health risk. Always wear protective goggles and gloves when handling toxic and biological infectious samples.
- Removal of panels may expose users to lethal voltages.
- Do not remove protective panels.
- To prevent electric shock, disconnect power before servicing the instrument.

CAUTION

- To keep up the specified performance of the system, maintenance must be carried out as indicated in this manual.
- Service contracts and preventive maintenance services are available. Please contact your local dealer or the nearest sales office for more information.

Solvent Information

WARNING

- The solvents used may be flammable and toxic and may carry a significant health risk. Therefore, the room in which the system is installed should be well ventilated to prevent that solvent vapors cause a fire.
- Do not allow solvents to accumulate in the system.
- Perform periodic leak checks on fluid lines.
- When you use or analyze toxic fluids you need to take all possible precautions and treat all specimens as potentially toxic. Leaking solvent connections can cause vapor accumulation in the Column Thermostat. These vapors can be toxic. Make sure you do not breathe in vapors while opening the door.
- When you analyze biological fluids, you need to take all possible precautions and treat all specimens as potentially infectious.
- Always wear protective goggles and gloves when handling toxic and biological infectious samples.

CAUTION

When handling solvents always observe good laboratory practices. Know the properties of the solvents used. This information can be found in Material Safety Data Sheets (MSDS) supplied by the vendor. Avoid the use of the following solvents when using a steel containing flow path:

- Solvents containing strong complexing agents like EDTA.
- Strongly acidic mobile phases (pH <1).
- Halogenated solvents or additives that form radicals and/or acids.
- Solvents able to form peroxides like chromatographic grade ether and non-stabilized THF, dioxane, and diisopropyl ether. In case use of these solvents is unavoidable, they need to be filtered through dried aluminum oxide in order to remove the peroxides.

Handling Leak and Waste

WARNING

Liquids associated with this instrument may be classified as carcinogenic, biohazardous, flammable, or radioactive. Dispose of waste (samples, solvents, device) in accordance with a regulated waste disposal program.
Follow a regulated, approved waste disposal program and never dispose of solvents through the municipal sewage system.

Applications: Quality Control

NOTE

It is recommended that you routinely run several quality control samples.

Quality control samples should represent low, average and high levels of a compound. Make sure that quality control sample results are within an acceptable range, and evaluate precision from day to day and run to run.

Data collected when quality control samples are out of range may not be valid. Do not report this data until you are certain that system performance is acceptable.

Apart from use of quality control samples, we recommend that you use blanks. The blanks will help you assess whether carry-over is within an acceptable range, and they will help you in monitoring the integrity of your data.

It is also recommended that you use a proper internal standard.

If the system runs into an error state, the results for the processed sample should not be trusted.

Safety Symbols

The following safety symbols are attached to the cover on the back of the instrument. They are intended to alert you to the following safety information.

Table 1 Safety Symbols

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect risk of harm to the operator and to protect the apparatus against damage.
	The hot surface sign calls attention to parts in the instrument that must not be touched, as they may cause burns.
	Confirms that a manufactured product complies with all applicable European Community directives. The European Declaration of Conformity is available at: http://regulations.corporate.agilent.com/DoC/search.htm

About the Column Thermostat

Almost every parameter defining a chromatographic separation is temperature dependent. For that reason, the Column Thermostat offers a stable and precise temperature control. The Column Thermostat optimizes your GPC/SEC assay by using forced air.

The Column Thermostat features:

- quick heating
- quick cooling (optional)
- use of multiple columns (optional)

The Column Thermostat is compatible with most Agilent GPC/SEC instruments.

The instrument is controlled via a PC using LAN interface.

NOTE

Procedures for use of control software are not included in this manual. Refer to the documentation supplied with the software for more information.

Identification of Parts

WARNING

The temperature inside the Column Thermostat may be hot!

Make sure the temperature in the Column Thermostat has decreased to a safe value before opening the front door.

Instrument – Front

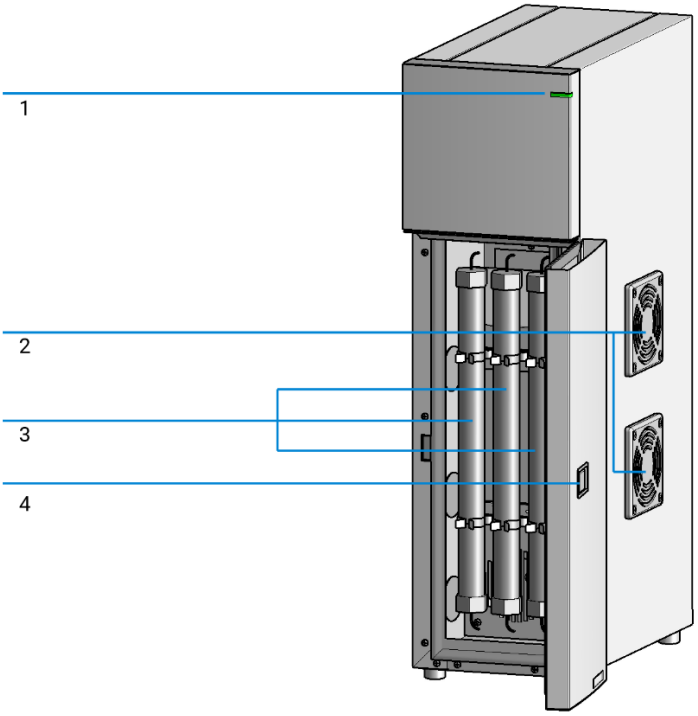


Figure 1 Column Thermostat – front (multiple column setup)

1	Status LED
2	Fans; do not obstruct!
3	Columns
4	Door handle

Instrument – Rear

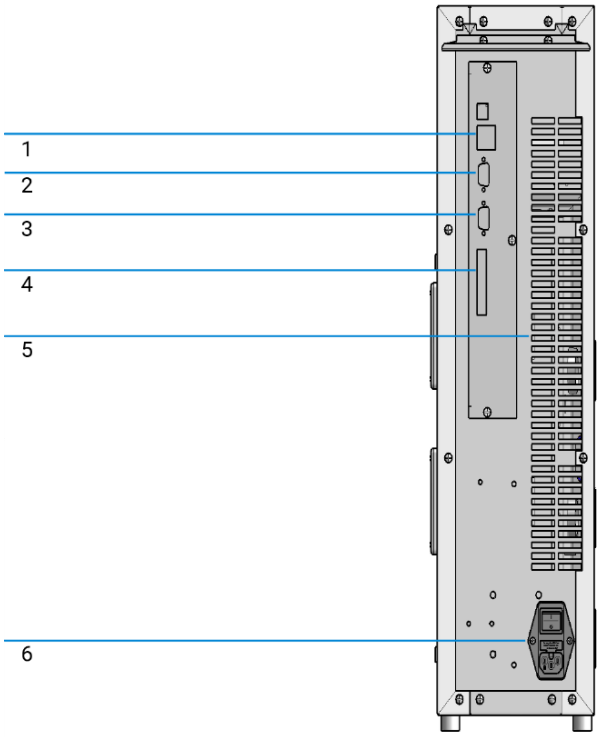


Figure 2 Column Thermostat – rear

1	Ethernet
2	OUT (serial) (not used)
3	IN (serial) (not used)
4	I/O connector
5	Ventilation holes; do not obstruct!
6	Fuse box, power connector, voltage selector, ON/OFF switch: "**I**" indicates Power ON, "**O**" indicates Power OFF

WARNING

Any other instruments connected to this instrument must be approved to a suitable safety standard and must include reinforced insulation from the mains.

Options

The following options are available for the Column Thermostat:

Cooling Option

- Temperature range from 5°C up to 90°C.

Without cooling option

- Temperature range from ambient +10°C up to 90°C.

Specifications

Table 2 Physical Specifications

Type	Specification	Comments
Dimensions (height × width × depth)	600 x 170 x 345 mm	
Weight	17 kg / 12.5 kg without cool option (37.5 lbs / 28 lbs)	
Operating altitude	up to 2000 m	
Operating temperature	5 - 40°C	
Operating humidity	20 – 80 % RH	
Transport and storage temperature	-29 - 60°C	
Transport and storage Humidity	Max. 85 % RH	
Sound pressure level	LAeq <70 dB	
Overvoltage category	II	For indoor use only
Pollution degree	2	
Power requirements	100–120 V~ / 220–240 V~ ± 10 %, 50/60 Hz	
Power consumption	550 VA maximum	
Fuses	2 x T5AH, 250 V~, 1500 A	breaking capacity IEC60127-2, UL recognized
ISM Classification	ISM Group 1 Class B	According to CISPR11

Table 3 Performance Specifications

Type	Specifications
Temperature range	With cool option: 5°C - 90°C, with 1°C increments 5°C - 75°C Without cool option: Ambient +10°C - 90°C, with 1°C increments NOTE Note that ambient temperature and humidity influence the lower temperature limit of the Column Thermostat. When the temperature and/or humidity go up, the lower temperature limit will also go up. Typically, a ΔT of 18°C is feasible.
Temperature accuracy	Better than 0.1°C, measured at 30°C in the center of the Column Thermostat
Temperature stability	Better than 0.1°C, measured at 30°C in the center of the Column Thermostat
Temperature reproducibility	Better than 0.1°C, measured at 30°C in the center of the Column Thermostat
Temperature change*	With cool option: Typically, Up: 6°C/min from 40° to 60°C Down: 2°C/min from 60°C to 40°C Without cool option: Up: 5°C/min from 40° to 60°C
Interfaces	
Digital input and output (TTL I/O)	2 programmable inputs, TTL 5 V 2 relay outputs, Vmax = 28 V, Imax = 0.25 A
Communication ports	Ethernet 10/100 Mb

* Tested for the 115/230 V AC ± 10 % voltage setting, usage ≤ 115 V AC will result in a lower temperature change rate

Maximum length for IO cables is 3 m.

Table 4 Options

Type	Specifications
Cool / No-cool version	For details, see Table "Performance Specifications" on page 19.

2 Using the Column Thermostat

This chapter explains the status of the Column Thermostat when the device is initialized.

Setup Mains Power Connection

WARNING Before plugging in the power cable:
Check the voltage setting of the Column Thermostat!

WARNING Power supply and protective earth

The system must be connected to a suitable mains power supply with a correctly installed protective earth conductor. Never use the system without a properly connected protective earth conductor.

The Column Thermostat must be supplied with mains power of a voltage and current capacity that meets the values specified in section "Physical Specifications" on page 18. Check the voltage setting at the input socket, on the rear panel of the instrument (see "Instrument – Rear" on page 16, no. 7)

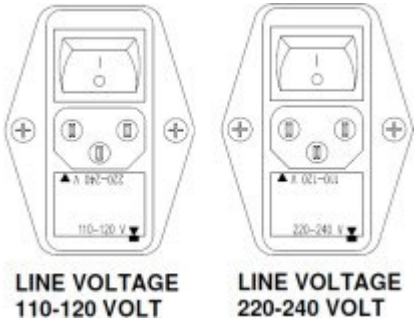


Figure 3 Line voltage

If the selected voltage is not correct, change to the proper voltage setting by removing, inverting, and then re-entering the voltage selector cartridge.

Setup Solvent Connections

Make the required solvent connections. The solvent lines can be lead to the outside of the instrument, between the door and door sealing.

Setup Nut and Ferrule Connections

CAUTION

Connect tubing that transports acidic solvents always with the provided tubing fixators!

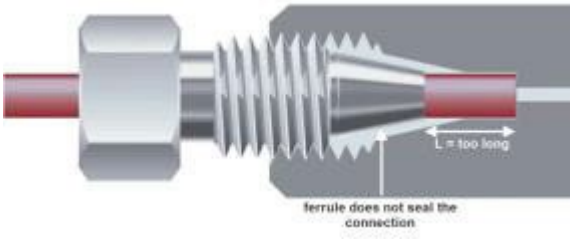
Only use the provided nuts and ferrules; these are suitable for the installed column(s).

Please note that the tubing length (length **L** below) that is required to make a good connection differs for each brand of connection.
If length **L** is not correct, this will result in faulty peaks and carry-over.

Essentially, when you create a connection, the ferrule on the tubing is compressed into the port to make sure that the connection is leak-tight.

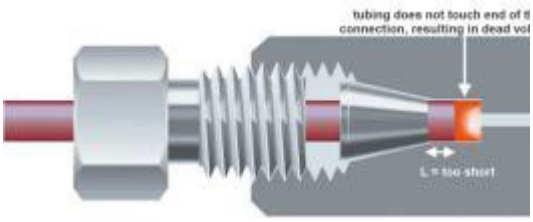
Take the following into account when creating the connection:

If **L is too long**, the ferrule cannot form a seal in the connection. This may cause irreparable damage.



If **L is too short**, this may result in

- Leakage
- Dead volume at the end of the ferrule (a 'mixing chamber').



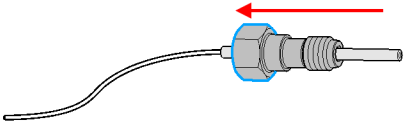
Every ferrule type needs an appropriate length of tubing to connect it to the column, depending on the depth of the connection port. Refer to documentation provided by the manufacturer for specific information.

NOTE Do not interchange already assembled connections between different columns!

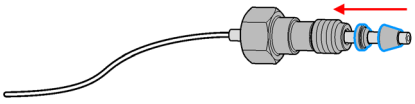
To create a connection with stainless steel or peek nuts and ferrules:

1 Select a nut that is long enough for the fitting you'll be using.

2 Slide the nut over the end of the tubing or capillary.



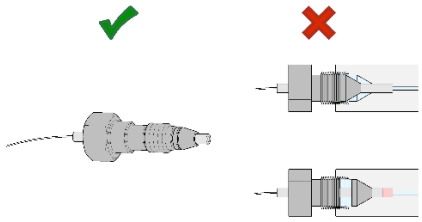
3 Carefully slide the ferrule components on after the nut and then finger-tighten the assembly while ensuring that the tubing is completely seated in the bottom of the end fitting.



4 Use a column to gently tighten the fitting which forces the ferrule to seat onto the tubing or capillary.

NOTE Don't overtighten. Overtightening will shorten the lifetime of the fitting.

5 Loosen the nut and verify that the ferrule is correctly positioned on the tubing or capillary.



NOTE The first time that the swagelock fitting is used on a column, the position of the ferrule is permanently set. If changing from a column to another, the fitting may leak or decrease the quality of the separation by contributing to band broadening.

Setup Waste Connection

CAUTION

Make a connection from the Column Thermostat leakage drain to a waste bin.

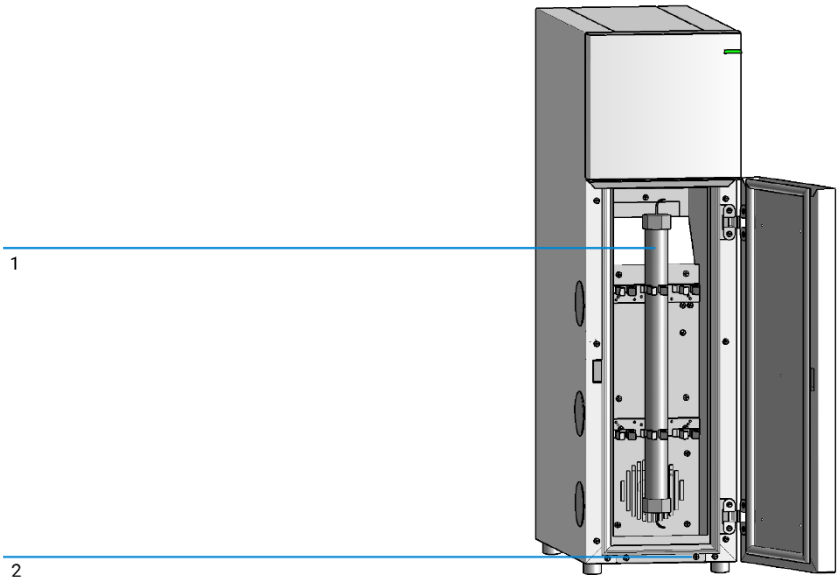


Figure 4 Column Thermostat – front (single column setup)

1	Column
2	Leakage Drain

Start the Column Thermostat

The following properties can be found when initializing the Column Thermostat:

- Instrument is controlled remotely by the software,
- the control LED: on,
- heating/cooling: off,

Status LED:

- Green = normal operation
- Red blinking= error condition

Error Message:

If an error occurs, a message is displayed by the software.

NOTE The vapor sensor is not active in the first 2 minutes after power up.

3 Maintenance

This chapter describes the maintenance of the Column Thermostat.

Note that this section only describes basic maintenance procedures. Do not attempt to service the Column Thermostat beyond the scope of maintenance described in this manual.

WARNING The temperature inside the Column Thermostat may be high.

Make sure the actual temperature inside the Column Thermostat has decreased to a safe value of e.g. 25°C before you open the front door to prevent injuries.

CAUTION Do not attempt to service the Column Thermostat beyond the scope of maintenance described in this manual.

Maintenance procedures not described in this section should be executed by authorized service personnel only.

General Cleaning

Clean the outside and compartment of the Column Thermostat using a dry cloth or damp cloth with isopropyl alcohol or water. Make sure that no liquid enters the inside of the Column Thermostat.

Check for Leaks

Regularly check connections for signs of leakage. If leakages are visible, a connection may have come loose.

For more information about the setup of nut and ferule connections, see section "Setup Nut and Ferrule Connections" on page 22.

Replace Fuses

WARNING If you need to replace fuses, disconnect the instrument from the power source by removing the mains power cord.

Make sure that you install fuses of the same type and rating (for details, refer to section "Physical Specifications" on page 18).

Never re-connect the line power before having the power input socket closed.

Fuses are in the fuse box at the rear of the instrument (see "Instrument – Rear" on page 16, no. 6).

1. Switch off the instrument. The power switch is located at the rear of the instrument.
2. Disconnect the power cable from the power input socket at the rear of the instrument.
3. To access the fuse drawer, gently lift the outer plastic housing of the power inlet socket using a flat screwdriver.
4. Pull out the fuse drawer.
5. Replace the defect fuse(s).
6. Slide in the fuse drawer and push till it fits tightly.
7. Close the fuse drawer housing.
8. Connect the power cable to the power connector at the rear of the module.

NOTE To power cycle the module (necessary for example after a leak sensor installation), wait for at least 10 s before repowering.

If problems with fuses are recurring, contact your Agilent representative.

Service

The Column Thermostat must be serviced in case:

- It has been subjected to severe shock(s).
- Solvent has been spilled into the instrument.
- It does not operate as specified.
- It shows a change in performance.

CAUTION

Do not attempt to service the Column Thermostat beyond the scope of maintenance described in this manual.

Maintenance procedures not described in this section should be executed by authorized service personnel only.

4 Parts for Maintenance

This chapter provides information on parts material required for the Column Thermostat.

Columns Thermostat

The following spare parts are available for the Column Thermostat:

Table 5 Options

p/n	Description
1400-3863	Column clip large
1400-3864	Column clip medium
1400-3864	Column clip micro
2110-1674	Fuse 5AT, IEC 60127-2, UL/CSA approved

5 Appendix

This chapter provides additional information on storage, legal, and web.

Storage, Packaging and Recycling

If the Column Thermostat needs to be stored, or if it must be shipped to a different location, proceed as follows:

1. Switch off the Column Thermostat when no measurement is running and it is set to ambient temperature.
2. Disconnect the column from the tubing.
3. Close the front door.
4. If the Column Thermostat needs to be dispatched: use the original packaging materials to package the Column Thermostat and dispatch the package; make sure any tax/import/export requirements are met.

Decontamination

The instrument shall be decontaminated before decommissioning and all local regulations shall be followed with regard to scrapping of the equipment.

General Instructions for Disposal

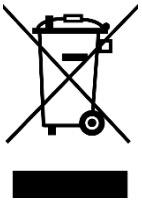
When taking the instrument out of service, the different materials must be separated and recycled according to national and local environmental regulations.

Hazardous Substances

The instrument contains hazardous substances. Contact the manufacturer for more detailed information.

Waste Electrical and Electronic Equipment (WEEE) Directive

This product complies with the European WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.



NOTE

Do not dispose of in domestic household waste.
To return unwanted products, contact your local Agilent office, or see http://www.agilent.com for more information.

Agilent Technologies on Internet

For the latest information on products and services visit our worldwide web site on the Internet at:

https://www.agilent.com

In This Book

The manual describes the following:

- Product Description
- Specifications
- Start of the Column Thermostat
- Maintenance Procedures
- Spare Parts

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Edition 06/2023

D0029605 Rev. A

Agilent