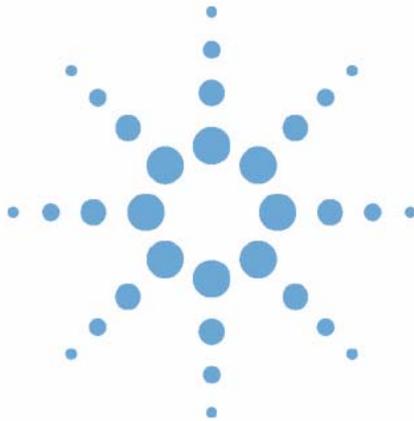




Agilent 1200 Series Thermostatted Column Compartment G1316A/G1316B/G1316C



User Manual



Agilent Technologies

Notices

© Agilent Technologies, Inc. 1995, 1996-2008

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

G1316-90011

Edition

09/2008

Printed in Germany

Agilent Technologies
Hewlett-Packard-Strasse 8
76337 Waldbronn

Research Use Only

Not for use in Diagnostic Procedures.

Manual Structure

The *User Manual G1316-90011* (English) and its localized versions contain a subset of the Service Manual and is shipped with the Thermostatted Column Compartment in printed matter.

Latest versions of the manuals can be obtained from the Agilent web.

Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as “Commercial computer software” as defined in DFAR 252.227-7014 (June 1995), or as a “commercial item” as defined in FAR 2.101(a) or as “Restricted computer software” as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies’ standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will

receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

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 1200 Series Thermostatted Column Compartments (TCC)

- *G1316A* Agilent 1200 Series TCC
- *G1316B* Agilent 1200 Series TCC SL
- *G1316C* Agilent 1200 Series TCC SL Plus

1 Introduction to the Column Compartment

This chapter gives an introduction to the TCC, instrument overview and internal connectors.

3 Installing the Column Compartment

This chapter describes the installation of the Thermostatted Column Compartment.

4 How to optimize the Column Compartment

This chapter provides information on how to optimize the Thermostatted Column Compartment.

5 Troubleshooting and Diagnostics

Overview about the troubleshooting and diagnostic features.

6 Test Functions

This chapter describes the TCC's built in test functions.

In This Guide...

7 Maintenance

This chapter describes the maintenance of the TCC.

8 Parts and Materials for Maintenance

This chapter provides information on parts for maintenance.

9 Appendix

This chapter provides addition information on safety, legal and web.

Contents

1	Introduction to the Column Compartment	9
	Main Features	10
	System Overview	11
	Column-Identification System	13
	Column Switching Valve (Optional for G1316A/G1316B SL)	15
	Electrical Connections	18
	Instrument Layout	21
	Agilent Diagnostic Software	22
2	Site Requirements and Specifications	23
	Site Requirements and Specifications	24
	Physical Specifications	27
	Performance Specifications	28
	Extended Specifications on G1316B SL/G1316C SL Plus	30
3	Installing the Column Compartment	33
	Unpacking the Column Compartment	34
	Optimizing the Stack Configuration	35
	Installing the Column Compartment	38
	Installing Valve Heads (G1316C SL Plus)	42
	Flow Connections of the Column Compartment	44
	Installation of Heater and Cooling Devices	47
	Placing Columns	49
4	How to optimize the Column Compartment	51
	Optimizing the Performance of your Column Compartment	52
	Using Additional Heater and Cooling Devices	53

5	Troubleshooting and Diagnostics	55
	Overview of the Column Department's Indicators and Test Functions	56
	Status Indicators	57
	Available Tests depending on User Interfaces	59
	Agilent Diagnostic Software	60
6	Test Functions	61
	Thermostat Function Test	62
	Pressure Test	65
	Column Thermostat Temperature Calibration	66
7	Maintenance	71
	Introduction to Maintenance and Repair	72
	Warnings and Cautions	73
	Overview of Maintenance	75
	Cleaning the Column Compartment	76
	Changing Column Identification Tags	77
	Replacing Head Parts of Column Switching Valve (G1316A/G1316B SL)	79
	Adding Heater and Cooling Devices (G1316B SL/G1316C SL Plus)	82
	Correcting Leaks	84
	Replacing the Column Compartment's Firmware	85
	Replacing Valve Heads (G1316C SL Plus)	86
	Preparing the G1316C SL Plus for Transportation	89
8	Parts and Materials for Maintenance	91
	Valve Options Overview	92
	Heater and Cooling Devices for G1316B SL/G1316C SL Plus	93
	Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)	95
	Column Switching Valve 8 Position-9 Port (G1316C SL Plus)	97
	Micro Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)	99
	Micro Column Switching Valve 2 Position/10 Port (G1316A/G1316B SL)	100
	Accessory Kits	102
	Plastic Parts	109
	Leak Parts	110

9 Appendix 113

Safety Symbols 114

The Waste Electrical and Electronic Equipment Directive 117

Lithium Batteries Information 118

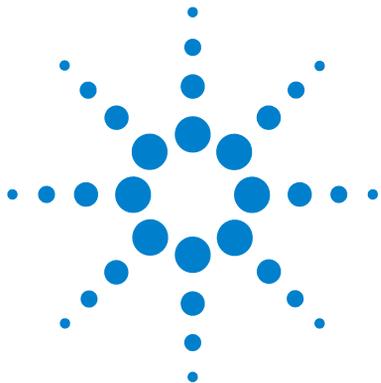
Radio Interference 119

Sound Emission 120

Solvent Information 121

Agilent Technologies on Internet 123

Contents



1 Introduction to the Column Compartment

Main Features	10
System Overview	11
Column-Identification System	13
Column Switching Valve (Optional for G1316A/G1316B SL)	15
Electrical Connections	18
Serial Number Information	20
Instrument Layout	21
Agilent Diagnostic Software	22

This chapter gives an introduction to the TCC, instrument overview and internal connectors.



Main Features

The Agilent 1200 Series thermostatted column compartments are stackable temperature-controlled column compartments for LC. They are available as standalone modules or as a component of a Agilent 1200 Series system. They are used for heating and cooling to meet extreme requirements of retention time reproducibility.

The main features are:

- Peltier heating and cooling from 10 degrees below ambient up to 80 °C(G1316A) or 100 °C (G1316B SL/G1316C SL Plus) with high heating and cooling speeds for maximum application flexibility and stability,
- holds up to three 30-cm columns and optimized design gives minimum dead volumes and maximum efficiency,
- two independently programmable heat exchangers contribute volumes of only 3 and 6 µl,
- G1316B SL features additional heating and cooling devices for low flow rates, which reduce the risk of additional dispersion,
- G1316B SL and G1316C SL Plus can be supplemented by a kit to install a small heat-exchanger with 1.6 µl delay volume to reduce the delay volume. In addition a cooling device with 1.5 µl is available,
- electronic column-identification module as standard for GLP documentation of column type, and major column parameters,
- optional high-quality Rheodyne[®] column switching valves with ceramic stator-face assemblies for prolonged lifetime.

For specifications, see “[Performance Specifications](#)” on page 28.

System Overview

The Concept of Heating and Cooling

The design of this thermostatted column compartment uses column heating and cooling devices with Peltier elements. The solvent entering the column compartment is heated up or cooled down to a settable temperature with two low-volume heat exchangers (3 μl on left side, 6 μl on right side), made of a short piece of capillary 0.17 mm i.d. leading through a heat exchanger. The heat exchanger is designed such that it can function simultaneously as an air heater. The shape of the heat exchanger surface allows the area around the column to be kept at a similar temperature level as the liquid running through the column. This is done by thermal convection and radiation between the heat exchanger fins. This design ensures that the column and the solvent flowing through it are almost at the same temperature.

Actual temperature control is accomplished at the heat exchanger. The solvent cools down or heats up on its transfer from the heating block to the column inlet. This depends on several factors: flow rate, setpoint temperature, ambient temperature and column dimensions.

In a flow-through temperature regulation system, there are necessarily slightly different temperatures at different positions. If, for example, the temperature set by the user is 40 °C, then the heat exchanger is regulated to a temperature 40.8 °C which is different by a certain offset (here. 0.8 °C). The solvent temperature at the column entry would be about 39 °C.

The actual temperature displayed on the user interface is always the derived temperature taken at the heat exchanger, corrected by the offset explained above.

Any type of heated column compartment brings one important consequence for column temperature equilibration. Before an equilibrium is reached, the whole mass of column, column packing, and solvent volume inside the column has to be brought to the selected temperature. This depends on several factors: flow rate, setpoint temperature, ambient temperature and column dimensions. The higher the flow rate, the faster the column equilibrates (due to thermostatted mobile phase).

1 Introduction to the Column Compartment System Overview

“Column Thermostat Temperature Calibration” on page 66 shows a setpoint temperature of 40 °C. Some time after entering the setpoint the heat exchanger has reached its temperature and the control activity starts. The **TEMPERATURE NOT READY** signal will be cancelled 20 seconds after the sensed temperature was within a range of ± 0.5 °C of the setpoint (other values can be set via the user interface). However this does not necessarily mean that the column has already reached the correct temperature. The equilibration of the column may take longer. Stability of the pressure signal is a good indication for equilibrium.

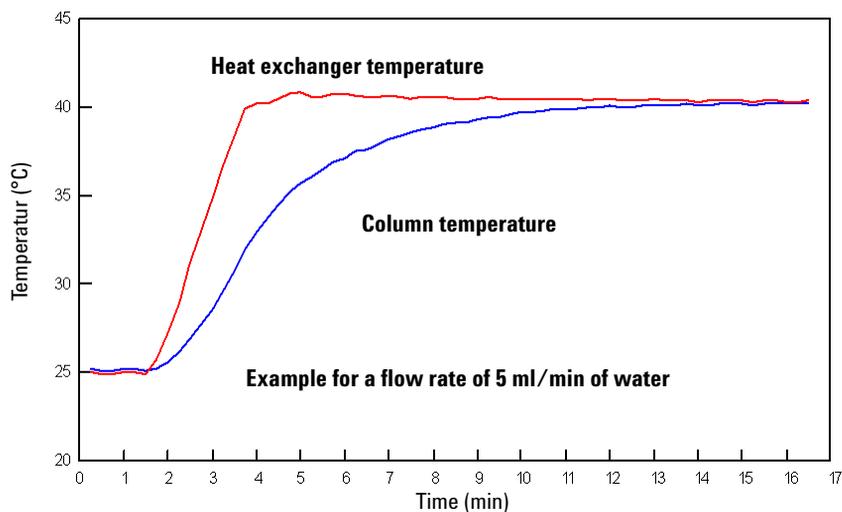


Figure 1 Equilibration of Heat Exchanger and Column Temperature

The temperature calibration and verification is described in the Service Manual.

Column-Identification System

The Agilent 1200 Series thermostatted column compartment is equipped with a column-identification system. It allows to read and write column-specific information to and from the column-identification tag.

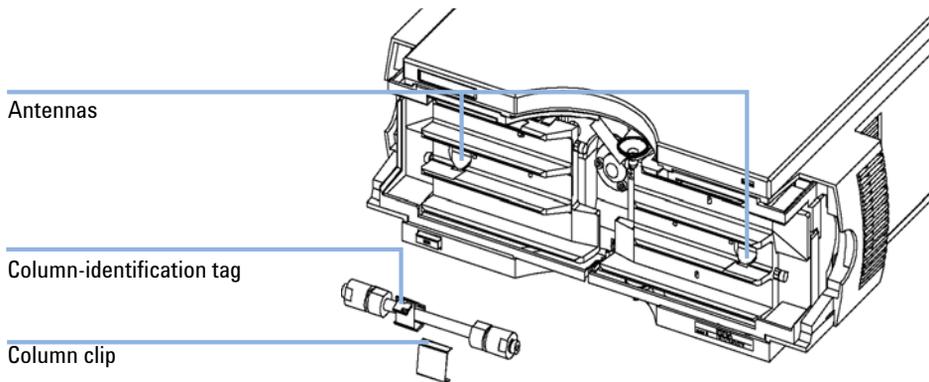


Figure 2 Column-Identification System

Table 1 on page 13 shows the information that can be stored. The information fields can be edited via the user interface.

Table 1 Column-Identification Module Information

Item	Example	Comment
Product number	799160D-552	
Serial number	950522	Date of manufacturing
Batch number	1675	
Geometry [mm]	100 × 2.1	
Stationary phase	ODS Hypersil	
Particle size	10 μm	
Number of injections	1267	See Note below.
Maximum pressure allowed [bar]	400	

1 Introduction to the Column Compartment

Column-Identification System

Table 1 Column-Identification Module Information

Item	Example	Comment
Maximum temperature recommended [°C]	70	
Maximum pH recommended	12	
Column void volume [ml]		

The number of injections will be updated each run to create a column lifecycle (history). The user interface allows to edit all information.

NOTE

If a column switching valve (see “[Column Switching Valve \(Optional for G1316A/G1316B SL\)](#)” on page 15) is installed in the module, the update of the number of injections depends on the position of the column switching valve. For example, if the left column is selected, the right column is not updated, and vice versa. If no column switching valve is installed both sides are updated at the same time.

Column Switching Valve (Optional for G1316A/G1316B SL)

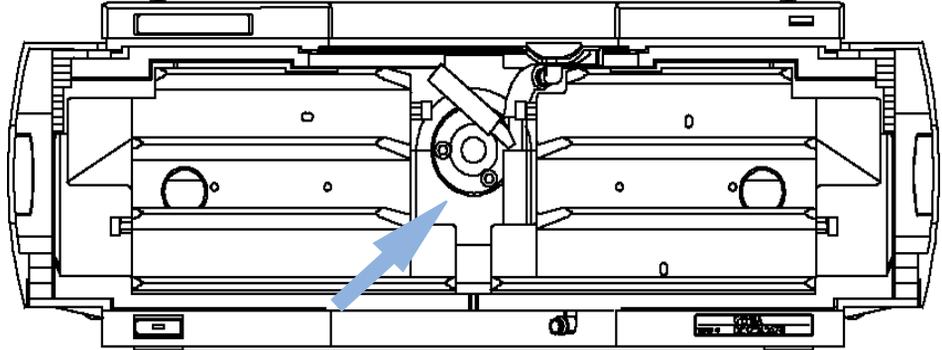


Figure 3 Location of Column Switching Valve

1 Introduction to the Column Compartment

Column Switching Valve (Optional for G1316A/G1316B SL)

Two Column Selection

The valve can select either column 1 or column 2. The offline column is sealed by connecting head to tail. Switching should be done when the flow is off and the pressure is zero.

NOTE

Before switching the valve, switch off the pump or set the flow to zero. Keeping the flow on while the valve is switched can cause exceeding the maximum pressure. This will stop method or sequence execution.

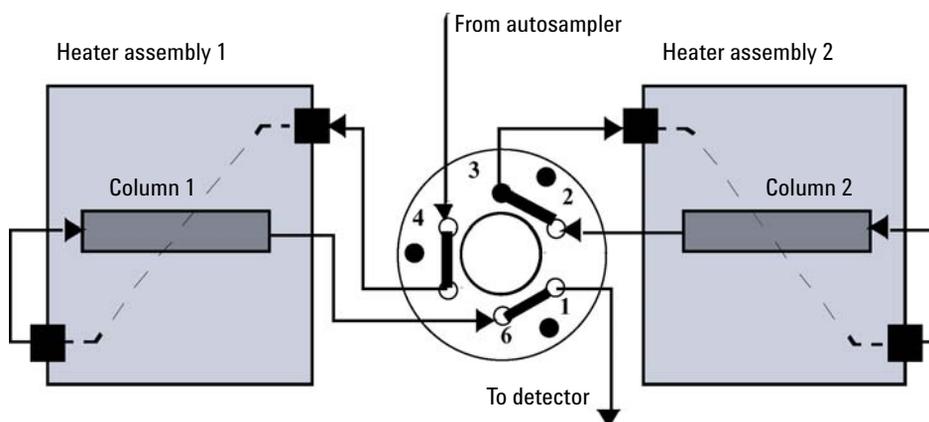


Figure 4 Column 1 Active

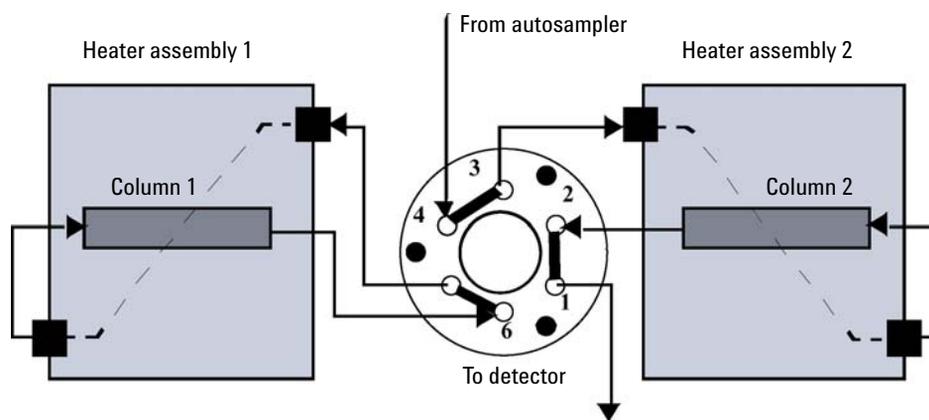


Figure 5 Column 2 Active

Precolumn Back-flushing

The sample is injected into series-connected precolumn and analytical column. After the valve has switched, the analytical column flow continues in normal direction. Only the precolumn is back-flushed, eluting highly retained peaks directly to the detector.

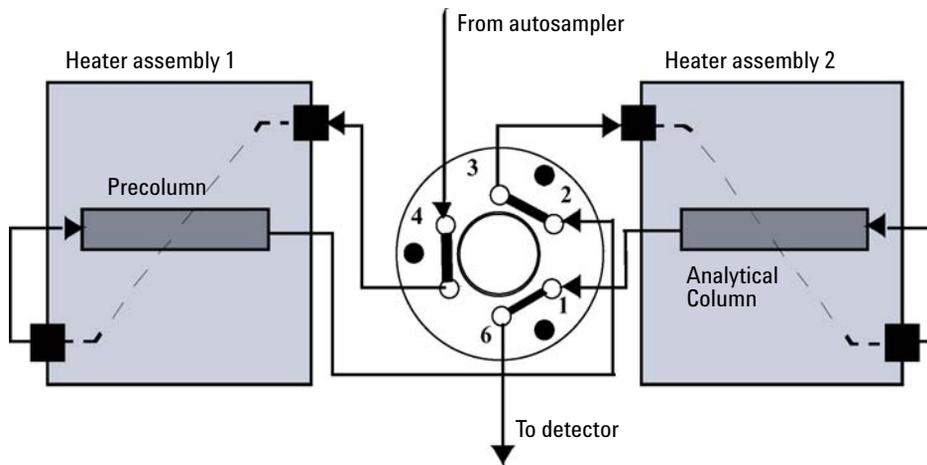


Figure 6 Precolumn Back-flushing

Electrical Connections

- The CAN bus is a serial bus with high speed data transfer. The two connectors for the CAN bus are used for internal Agilent 1200 Series module data transfer and synchronization.
- One analog output provides signals for integrators or data handling systems.
- The REMOTE connector may be used in combination with other analytical instruments from Agilent Technologies if you want to use features such as start, stop, common shut down, prepare, and so on.
- With the appropriate software, the RS-232C connector may be used to control the module from a computer through a RS-232C connection. This connector is activated and can be configured with the configuration switch. See your software documentation for further information.
- The power input socket accepts a line voltage of 100 – 240 volts AC \pm 10% with a line frequency of 50 or 60 Hz. Maximum power consumption is 220 VA. There is no voltage selector on your module because the power supply has wide-ranging capability. There are no externally accessible fuses, because automatic electronic fuses are implemented in the power supply. The security lever at the power input socket prevents the module cover from being taken off when line power is still connected.

NOTE

Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.

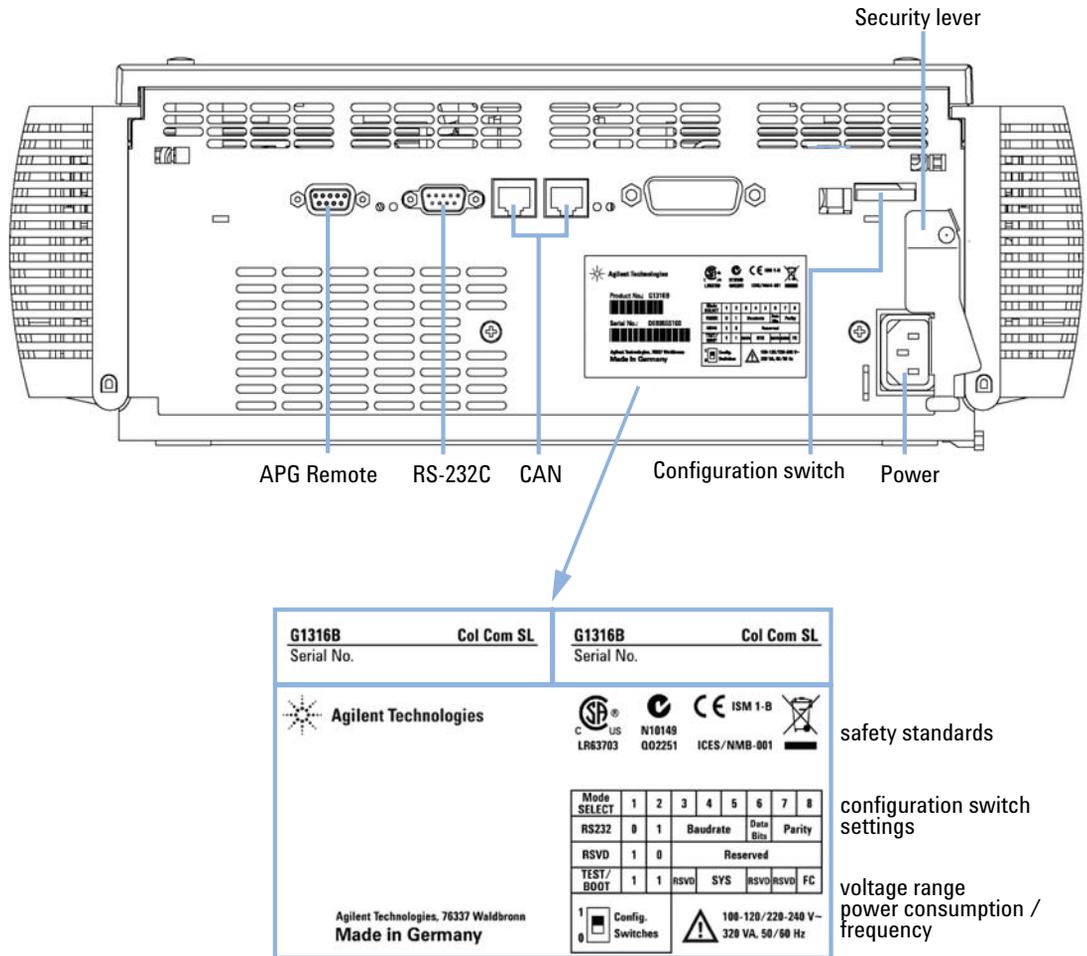


Figure 7 Rear View of Oven - Electrical Connections and Label

Serial Number Information

The serial number information on the instrument labels provide the following information:

CCYWWSSSSS	Format
CC	country of manufacturing <ul style="list-style-type: none">• DE = Germany• JP = Japan• CN = China
YWW	year and week of last major manufacturing change, e.g. 820 could be week 20 of 1998 or 2008
SSSSS	real serial number

Instrument Layout

The industrial design of the module incorporates several innovative features. It uses Agilent's E-PAC concept for the packaging of electronics and mechanical assemblies. This concept is based upon the use of expanded polypropylene (EPP) layers foam plastic spacers in which the mechanical and electronic boards components of the module are placed. This pack is then housed in a metal inner cabinet which is enclosed by a plastic external cabinet. The advantages of this packaging technology are:

- virtual elimination of fixing screws, bolts or ties, reducing the number of components and increasing the speed of assembly/disassembly,
- the plastic layers have air channels molded into them so that cooling air can be guided exactly to the required locations,
- the plastic layers help cushion the electronic and mechanical parts from physical shock, and
- the metal inner cabinet shields the internal electronics from electromagnetic interference and also helps to reduce or eliminate radio frequency emissions from the instrument itself.

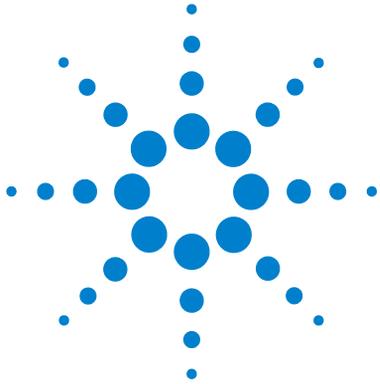
Agilent Diagnostic Software

The Agilent Diagnostic Software is a standalone product that can be used with or without data system. Agilent Lab Advisor helps to manage the lab for high quality chromatographic results and can monitor in real time a single Agilent LC or all the Agilent GCs and LCs configured on the lab intranet.

Agilent Lab Advisor provides diagnostic capabilities for all Agilent 1200 Series HPLC modules. This includes tests and calibrations procedures as well as the different injector steps to perform all the maintenance routines.

Agilent Lab Advisor also allows users to monitor the status of their LC instruments. The Early Maintenance Feedback (EMF) feature helps to carry out preventive maintenance. In addition, users can generate a status report for each individual LC instrument. The tests and diagnostic features as provided by the Agilent Lab Advisor Software may differ from the descriptions in this manual. For details refer to the Agilent Lab Advisor help files.

This manual provides lists with the names of Error Messages, Not Ready messages, and other common issues.



2 Site Requirements and Specifications

Site Requirements and Specifications	24
Power Consideration	24
Power Cords	25
Bench Space	26
Environment	26
Physical Specifications	27
Performance Specifications	28
Extended Specifications on G1316B SL/G1316C SL Plus	30



Site Requirements and Specifications

A suitable environment is important to ensure optimal performance of the instrument.

Power Consideration

The module power supply has wideranging capability (see [Table 2](#) on page 27). It accepts any line voltage in the range described in the above mentioned table. Consequently there is no voltage selector in the rear of the module. There are also no externally accessible fuses, because automatic electronic fuses are implemented in the power supply.

WARNING

Incorrect line voltage at the instrument

Shock hazard or damage of your instrumentation can result, if the devices are connected to a line voltage higher than specified.

→ Connect your instrument to the specified line voltage.

WARNING

Module is partially energized when switched off, as long as the power cord is plugged in.

Repair work at the module can lead to personal injuries, e.g. shock hazard, when the cover is opened and the module is connected to power.

→ Remove the power cable from the instrument before opening the cover.

→ Do not connect the power cable to the Instrument while the covers are removed.

CAUTION

Unaccessible power plug.

In case of emergency it must be possible to disconnect the instrument from the power line at any time.

- Make sure the power connector of the instrument can be easily reached and unplugged.
 - Provide sufficient space behind the power socket of the instrument to unplug the cable.
-

Power Cords

Different power cords are offered as options with the module. The female end of all power cords is identical. It plugs into the power-input socket at the rear of the module. The male end of each power cord is different and designed to match the wall socket of a particular country or region.

WARNING

The absence of ground connection and the use of an unspecified power cord can lead to electric shock or short circuit.

Electric Shock

- Never operate your instrumentation from a power outlet that has no ground connection.
 - Never use a power cord other than the Agilent Technologies power cord designed for your region.
-

WARNING

Use of unsupplied cables

Using cables not supplied by Agilent Technologies can lead to damage of the electronic components or personal injury.

- Never use cables other than the ones supplied by Agilent Technologies to ensure proper functionality and compliance with safety or EMC regulations.
-

Bench Space

The column compartment dimensions and weight (see “[Physical Specifications](#)” on page 27) allow to place this module on almost any desk or laboratory bench. It needs an additional 2.5 cm (1.0 inches) of space on either side and approximately 8 cm (3.1 inches) in the rear for the circulation of air and electric connections.

If the bench should carry a complete Agilent Series system, make sure that the bench is designed to carry the weight of all the modules.

The module should be operated in a horizontal position.

Environment

Your column compartment will work within specifications at ambient temperatures and relative humidity as described in “[Physical Specifications](#)” on page 27.

Physical Specifications

Table 2 Physical Specifications

Type	Specification	Comments
Weight	10.2 kg (22.5 lbs)	
Dimensions (width × depth × height)	410 × 435 × 140 mm (16.1 × 17 × 5.5 inches)	
Line voltage	100 – 240 VAC, ± 10%	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5%	
Power consumption	320 VA / 150 W / 512 BTU	Maximum
Ambient operating temperature	0 – 55 °C (32 – 131 °F)	
Ambient non-operating temperature	-40–70 °C (-4–158 °F)	
Humidity	< 95%, at 25–40 °C (77–104 °F)	Non-condensing
Operating Altitude	Up to 2000 m (6500 ft)	
Non-operating altitude	Up to 4600 m (14950 ft)	For storing the module
Safety standards: IEC, CSA, UL	Installation Category II, Pollution Degree 2	For indoor use only. Research Use Only. Not for use in Diagnostic Procedures.

Performance Specifications

Table 3 Performance Specifications Thermostatted Column Compartment

Type	Specification	Comments
Temperature range	10 degrees below ambient to 80 °C	G1316A
	10 degrees below ambient to 100 °C	G1316B (SL)/G1316C (SL Plus)
	up to 80 °C: flow rates up to 5 ml/min up to 100 °C: flow rates up to 2.5 ml/min	G1316A/G1316B (SL)/G1316C (SL Plus) G1316B (SL)/G1316C (SL Plus)
Temperature stability	± 0.15 °C	G1316A
	± 0.05 °C	G1316B (SL)/G1316C (SL Plus)
Temperature accuracy	± 0.8 °C	With calibration
	± 0.5 °C	
Column capacity	Three 30 cm	
Warm-up/cool-down time	5 minutes from ambient to 40 °C	
	10 minutes from 40 – 20 °C	
Dead volume	3 µl left heat exchanger	i.d. 0.17 mm, see “Extended Specifications on G1316B SL/G1316C SL Plus” on page 30
	6 µl right heat exchanger	
Communications	Controller-area network (CAN), GPIB, RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN via other 1200 series module	no GPIB on G1316B (SL)/G1316C (SL Plus)
Safety and maintenance	Extensive diagnostics, error detection and display (through control module and Agilent ChemStation), leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas.	

Table 3 Performance Specifications Thermostatted Column Compartment

Type	Specification	Comments
GLP features	Column-identification module for GLP documentation of column type, see "Column-Identification System" on page 13	
Housing	All materials recyclable.	

NOTE

All specifications are valid for distilled water at ambient temperature (25 °C), set point at 40 °C and a flow range from 0.2–5 ml/min.

Extended Specifications on G1316B SL/G1316C SL Plus

The 1200 series G1316B SL/G1316C SL Plus thermostatted column compartment is usable from 10 °C below ambient up to 80 °C for flow ranges up to 5 ml/min and up to 100 °C for flow ranges up to 2.5 ml/min. Additional heating and cooling devices are available for the G1316B SL/G1316C SL Plus to reduce the risk of additional dispersion at low flow rates see [Figure 8](#) on page 30. These devices can be installed in any position in the column compartment, see “[Installation of Heater and Cooling Devices \(G1316B SL\)](#)” on page 47.

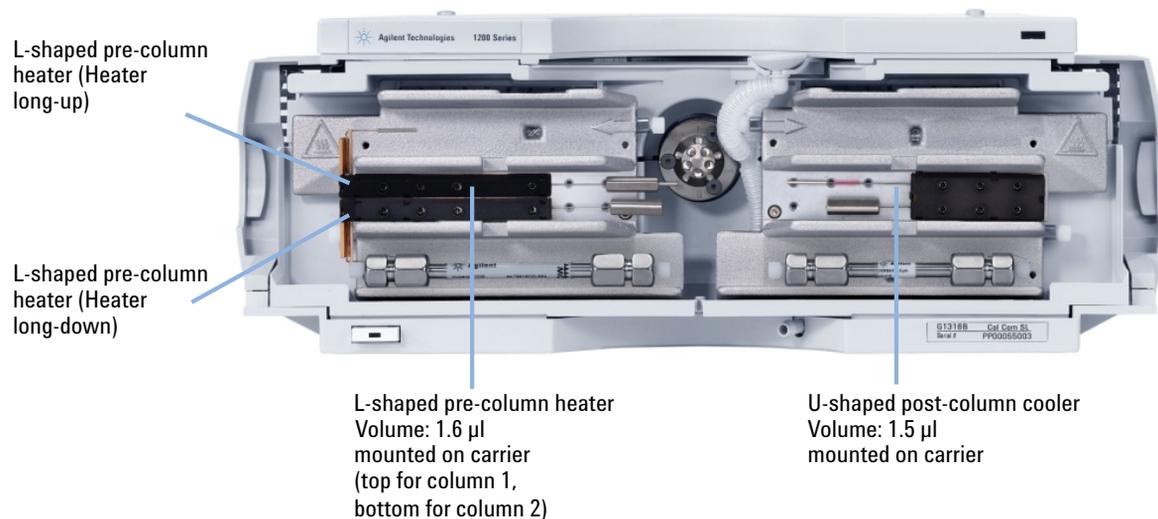


Figure 8 New additional heater and cooling devices

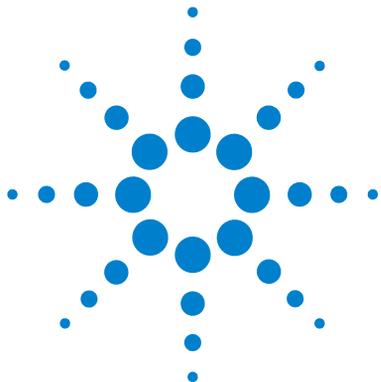
The standard column compartment is equipped with a 3 µl and 6 µl heater or cooler. Both can be set at the same or different temperature. To reduce the delay volume, a kit (“[G1316B SL/G1316C SL Plus Capillary System Kit](#)” on page 104) has been set up for installing a small heaters with 1.6 µl internal delay volume and also a new cooling device with 1.5 µl internal volume is available.

NOTE

If the additional heater and cooling devices are used as shown in [Figure 8](#) on page 30, the column identification system cannot be used. If the column identification system is required, fix the heater and cooling devices in the upper or lower locations or fix them right/left of the current location.

2 Site Requirements and Specifications

Extended Specifications on G1316B SL/G1316C SL Plus



3 Installing the Column Compartment

Unpacking the Column Compartment	34
Delivery Checklist	34
Optimizing the Stack Configuration	35
Installing the Column Compartment	38
Installing Valve Heads (G1316C SL Plus)	42
Flow Connections of the Column Compartment	44
Installation of Heater and Cooling Devices	47
Placing Columns	49
Column-Identification Tag	49
Column Clip	50

This chapter describes the installation of the Thermostatted Column Compartment.



Unpacking the Column Compartment

If the delivery packaging shows signs of external damage, please call your Agilent Technologies sales and service office immediately. Inform your service representative that the module may have been damaged during shipment.

CAUTION

"Defective on arrival" problems

If there are signs of damage, please do not attempt to install the module. Inspection by Agilent is required to evaluate if the instrument is in good condition or damaged.

- Notify your Agilent sales and service office about the damage.
- An Agilent service representative will inspect the instrument at your site and initiate appropriate actions.

Delivery Checklist

Ensure all parts and materials have been delivered with the module. The delivery checklist is shown below. Please report missing or damaged parts to your local Agilent Technologies sales and service office.

Table 4 Column Compartment Delivery Checklist

Description	Quantity
Thermostatted column compartment	1
Power cable	1
CAN cable	1
Column switching valve	optional
User Manual	1
Accessory kit (see "Accessory Kits" on page 102)	1

Optimizing the Stack Configuration

If your column compartment is part of a Agilent 1200 Series system, you can ensure optimum performance by installing the following configuration. This configuration optimizes the system flow path and ensures minimum delay volume.

For installations of the G1316C SL Plus as part of the Method Development Solution, please refer to the Method Development Solution User and Installation Guide **part number: G4230-90000**.

3 Installing the Column Compartment Optimizing the Stack Configuration

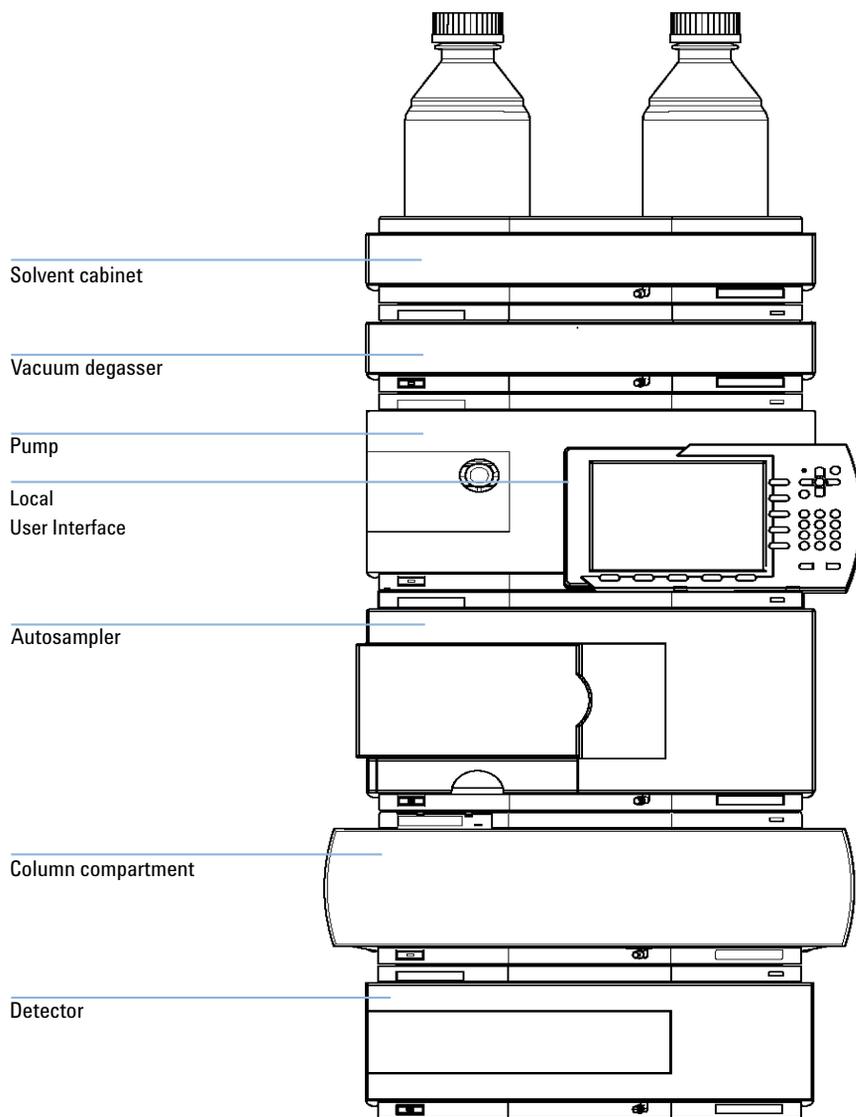


Figure 9 Recommended Stack Configuration (Front View)

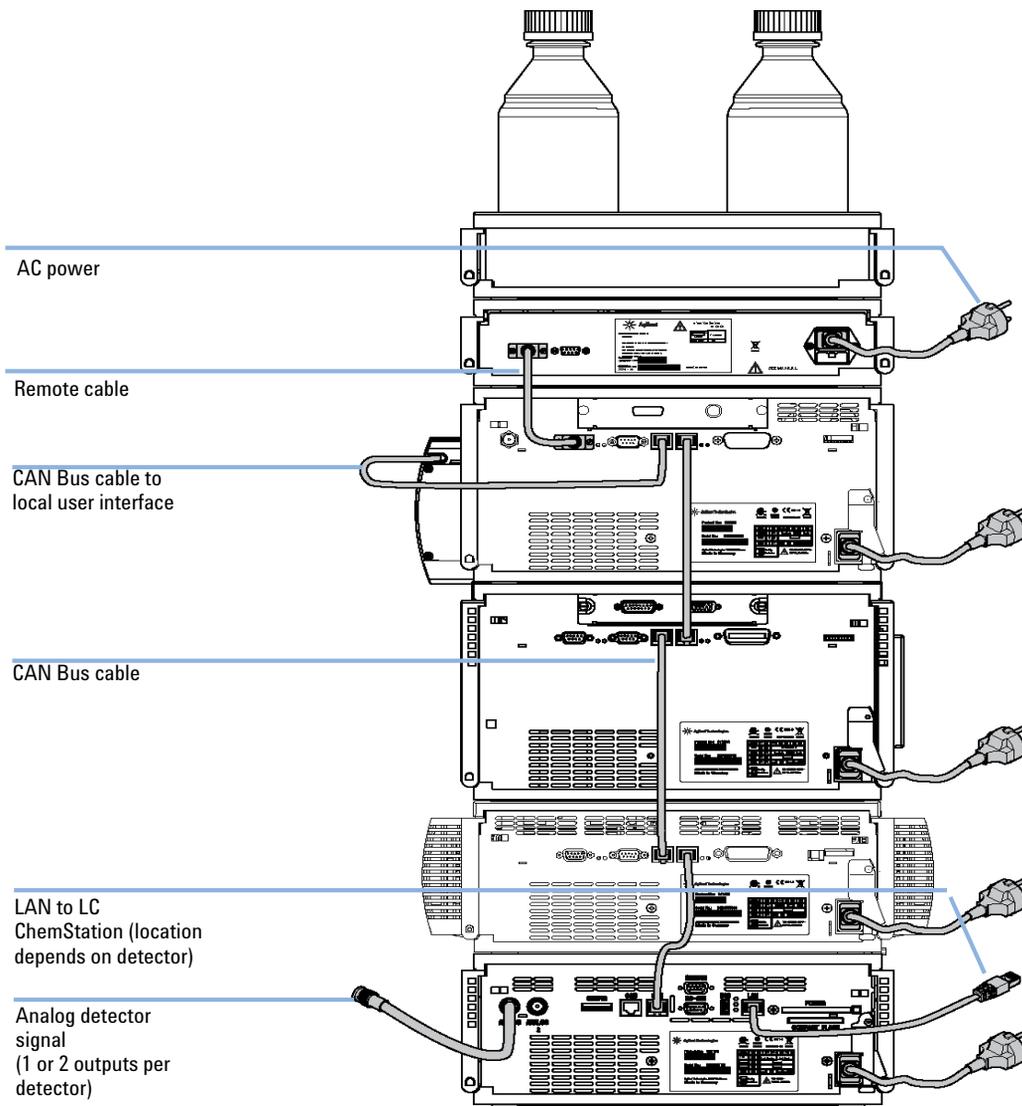


Figure 10 Recommended Stack Configuration (Rear View)

Installing the Column Compartment

Parts required	#	Description
	1	Column compartment
	1	Power cord
		For other cables see text below

Preparations

Locate bench space.
Provide power connections.
Unpack the Column compartment.

WARNING

Module is partially energized when switched off, as long as the power cord is plugged in.

Risk of stroke and other personal injury. Repair work at the module can lead to personal injuries, e. g. shock hazard, when the module cover is opened and the instrument is connected to power.

- Never perform any adjustment, maintenance or repair of the module with the top cover removed and with the power cord plugged in.
- The security lever at the power input socket prevents that the module cover is taken off when line power is still connected. Never plug the power line back in when cover is removed.

CAUTION

Valve properties are read from the valve head RFID tag during initialization of the module. Valve properties will not be updated, if the valve head is replaced while the module is on.

Selection of valve port positions can fail, if the instrument does not know the properties of the installed valve.

- Always switch off the instrument when replacing the valve head.

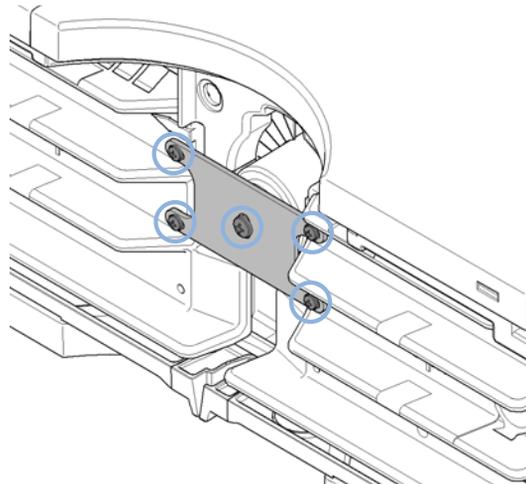
CAUTION

The valve actuator contains sensitive optical parts, which need to be protected from dust and other pollutions. Pollution of these parts can impair the accurate selection of valve ports and therefore bias measurement results.

→ Always install a valve head for operation and storage. For protecting the actuator, a dummy valve head (part of transportation lock kit **part number: G1316-67001**) can be used instead of a functional valve. Do not touch parts inside the actuator.

If the Thermostatted Column Compartment SL Plus (G1316C SL Plus only) includes the valve drive option, it is shipped with a transportation lock, which needs to be removed during installation.

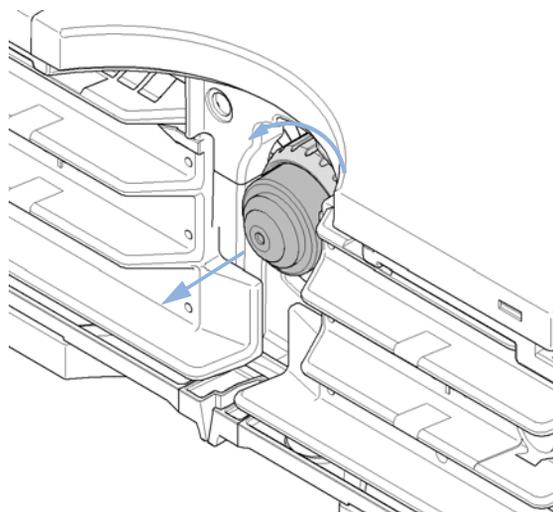
1 Remove the 5 screws, which hold the lock in position (G1316C SL Plus only).



2 Remove the dummy valve head by unscrewing the cap nut and removing it from the valve drive (G1316C SL Plus only).

3 Installing the Column Compartment

Installing the Column Compartment



- 3 Place the column compartment in the stack or on the bench in a horizontal position.
- 4 Ensure the power switch at the front of the column compartment is OFF.

Status indicator
green/yellow/red

Line power switch
with green light

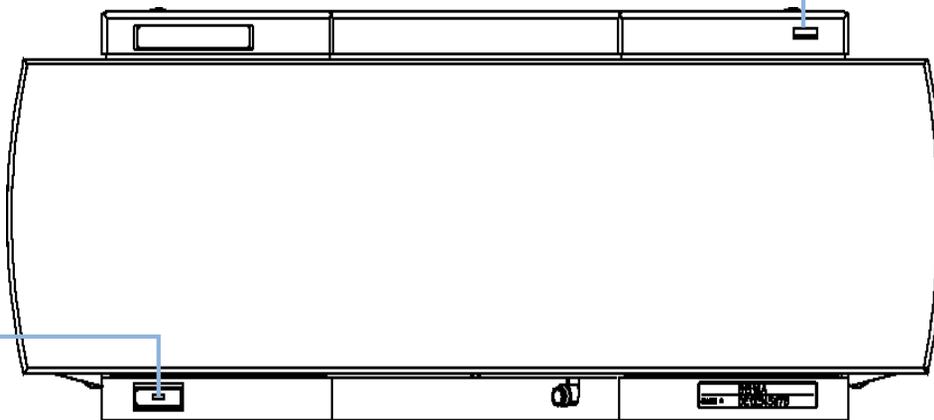


Figure 11 Front View of the Thermostatted Column Compartment

- 5 Connect the power cable to the power connector at the rear of the column compartment.
- 6 Connect the CAN cable to other Agilent 1200 Series modules.
- 7 If Agilent ChemStation is the controller, connect either

- the LAN connection to the LAN interface board in the module or
- the GPIB cable to the module.

NOTE

If a Agilent DAD/MWD/FLD is in the system, the LAN/GPIB should be connected to the DAD/MWD/FLD (due to higher data load).

- 8 Connect the APG Remote cable (optional) for non-Agilent 1200 Series instruments.
- 9 Turn ON power by pushing the button at the lower left side of the column compartment. The status LED should be green.

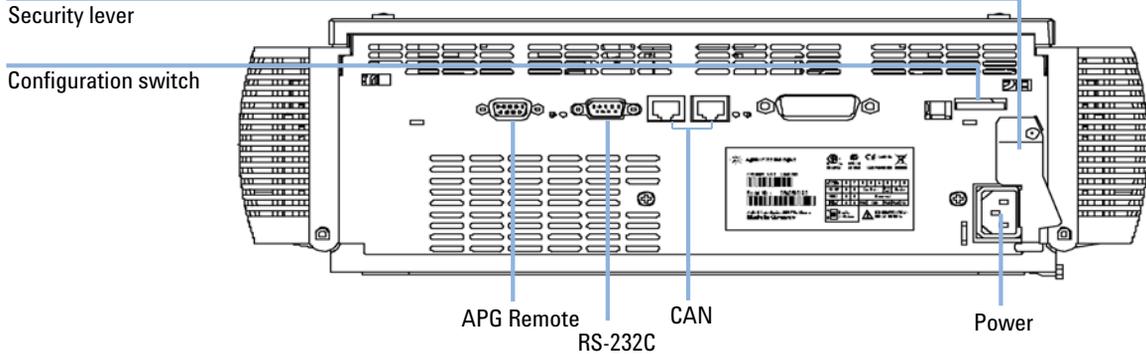


Figure 12 Rear View of the Thermostatted Column Compartment

NOTE

The column compartment is turned on when the line power switch is pressed and the green indicator lamp is illuminated. The column compartment is turned off when the line power switch is protruding and the green light is OFF.

Installing Valve Heads (G1316C SL Plus)

Several optional valve heads are available for the G1316C SL Plus, which can be installed and exchanged easily.

Parts required	#	Part number	Description
	1	5067-4107	8pos/9prt valve head high pressure and/or
	1	5067-4108	8pos/9prt valve head low pressure

CAUTION

Valve Damage

Using a low pressure valve on the high pressure side can damage the valve.

- When using multiple column compartments as part of a method development solution, make sure that the high pressure valve head is connected to the autosampler and the low pressure valve head is connected to the detector.
- For details, please refer to the Method Development Solution User and Installation Guide (**part number: G4230-90000**).

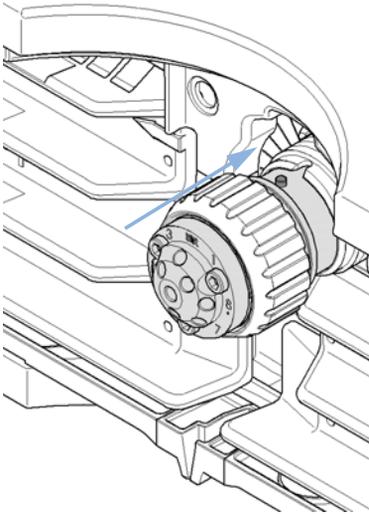
CAUTION

Column Damage or Bias Measurement Results

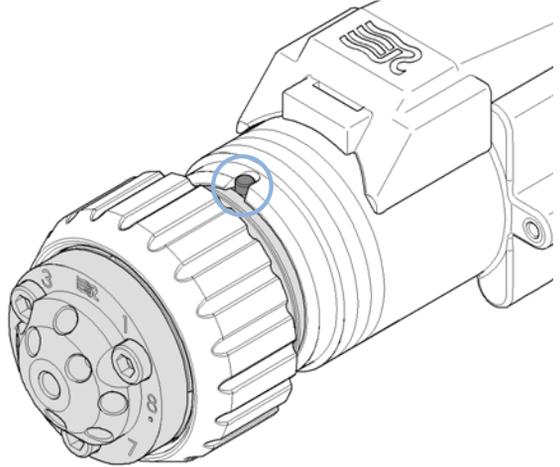
Switching the valve to a wrong position can damage the column or bias measurement results.

- Fitting the lobe to the groove is essential for making sure the valve is switched to the correct position.

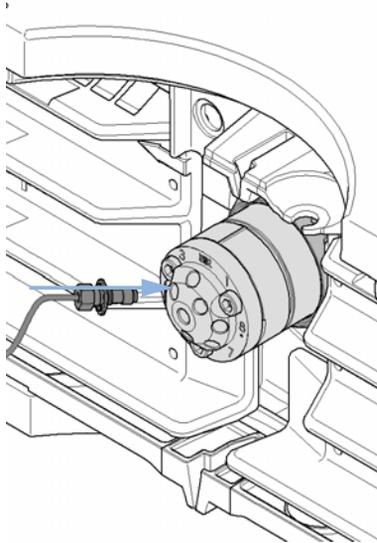
1 Put the valve head onto the valve drive such that the lobe fits to the groove.



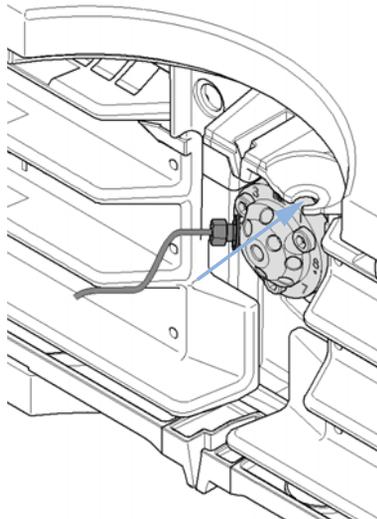
2 Screw the valve head onto the valve drive using the union nut.



3 Install all required capillary connections to the valve head.



4 Push the valve head until it snaps in and stays in the rear position.



3 Installing the Column Compartment

Flow Connections of the Column Compartment

Flow Connections of the Column Compartment

Parts required	Description
	Other modules
	Parts from accessory kit, see “Accessory Kits” on page 102
	Two wrenches 1/4 – 5/16 inch for capillary connections

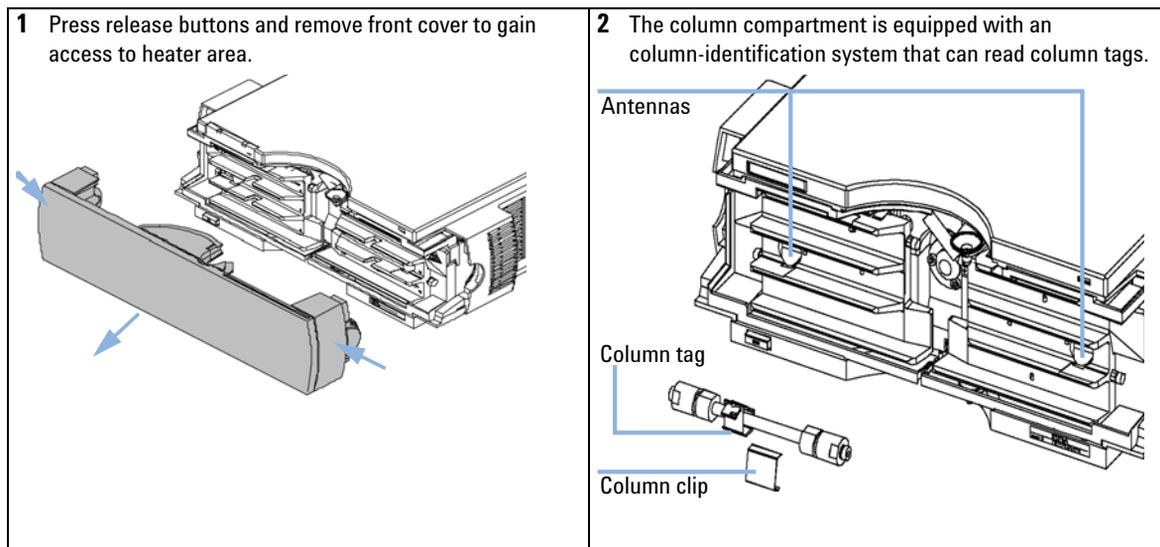
Preparations Install the column compartment

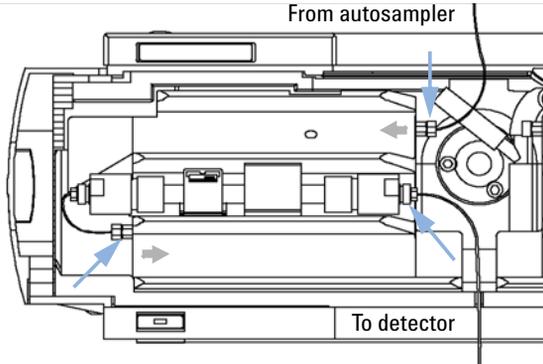
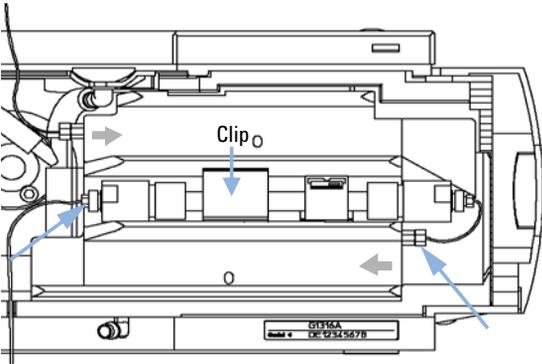
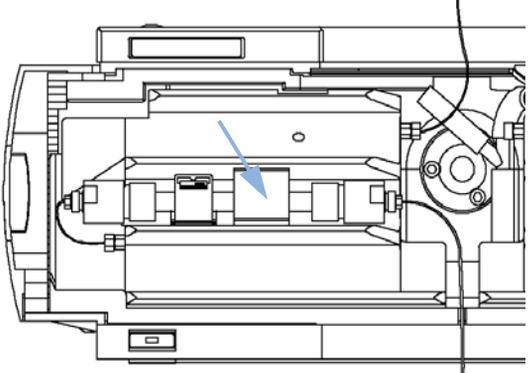
WARNING

Toxic and hazardous solvents

The handling of solvents and reagents can hold health risks.

- When working with solvents observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used.

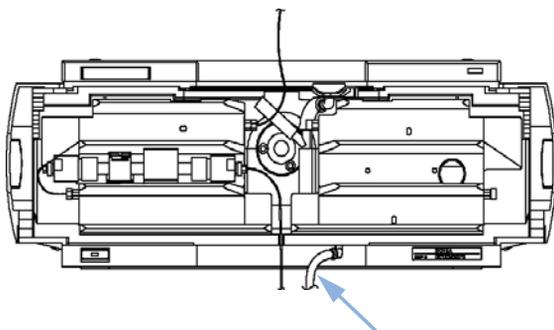


<p>NOTE</p> <p>For more information on column identification, see “Column-Identification System” on page 13 .</p>	<p>NOTE</p> <p>The internal volumes of the heat exchanger assemblies comprise a volume of 3 µl (left) and 6 µl (right). The internal capillary diameter is 0.17 mm.</p>
<p>3 Place the column on the left heat exchanger assembly and connect the capillaries to the column.</p> 	<p>4 Or place the column on the right heat exchanger assembly and connect the capillaries to the column.</p> 
<p>NOTE</p> <p>See “Column Switching Valve (Optional for G1316A/G1316B SL)” on page 15. on how to connect the column selection valve.</p>	<p>5 Fix the column with the column clip from the accessory kit.</p> 

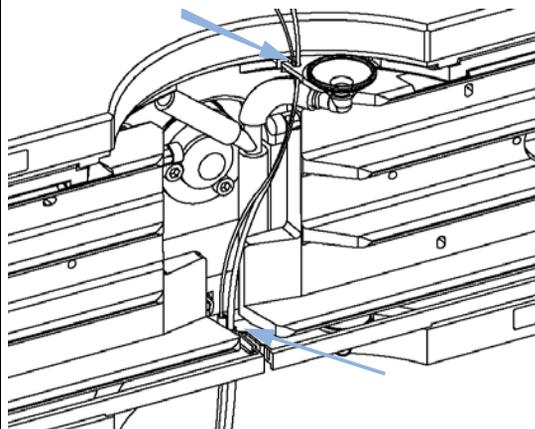
3 Installing the Column Compartment

Flow Connections of the Column Compartment

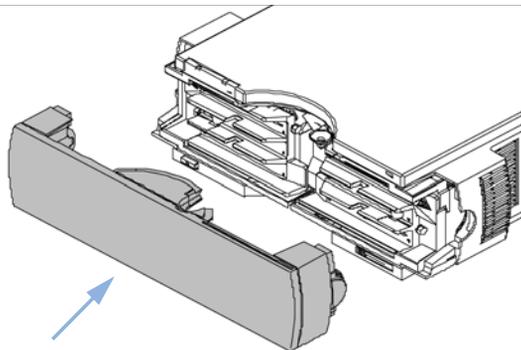
- 6** If the column compartment is not part of a Agilent 1200 Series system, or if an Agilent 1200 Series Autosampler is located on top, connect the corrugated tubing to the waste outlet.



- 7** Route tubings from modules above through the openings in the funnel holder (top) and the plastic bottom part. Remove small plastic plugs first.



- 8** Put the front cover back in place.



The installation of the column compartment has now been completed.

NOTE

Always operated the TCC with the front cover in place for proper thermostating conditions and to protect the column area against strong drafts from the outside.

Installation of Heater and Cooling Devices (G1316C SL Plus)

For the G1316C SL Plus, additional heat exchanger and cooling devices can be installed on the carrier **part number: G1316-89200** using 3 screws (**part number: 0515-1052**), included to part number for carrier) as shown in figure below.

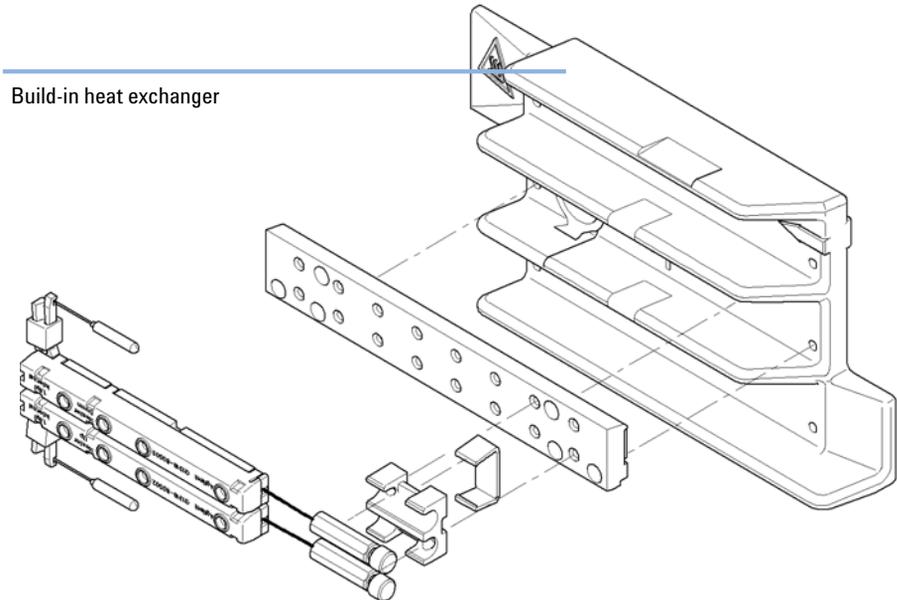


Figure 14 Installing the low dispersion heat exchangers

Placing Columns

Column-Identification Tag

When correctly placed on the heat exchanger, the distance between the column-identification tag and antenna is 1–2 mm. This is the optimum distance for proper function. The identification tag can be easily removed from the column.

NOTE

For columns with small diameter, a cable tie wrap should be used to fix the column identification tag to the column. Assure that the tie wrap does not block the front cover.

NOTE

The tag needs to be placed differently, depending on whether the column is installed at the left or right heat exchanger, see [Figure 15](#) on page 49 and [Figure 16](#) on page 50. The Agilent logo should always be at front.

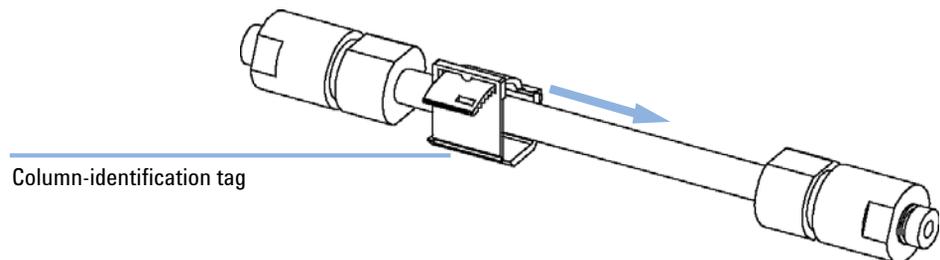


Figure 15 Column-Identification Tag for Left Heat Exchanger

3 Installing the Column Compartment

Placing Columns

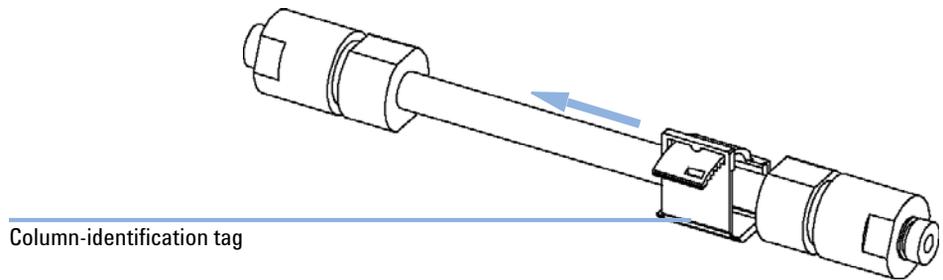


Figure 16 Column-Identification Tag for Right Heat Exchanger

Column Clip

For better positioning of the column on the heat exchanger a column clip is available (see “[Accessory Kits](#)” on page 102).

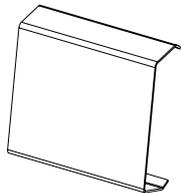
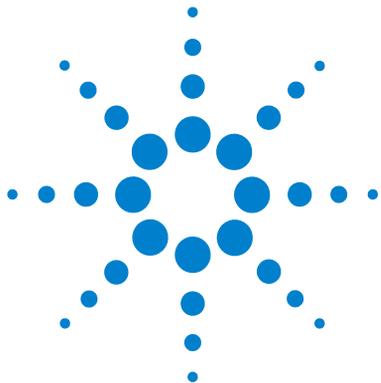


Figure 17 Column Clip (part number 5063-6526, pack of 6)



4 How to optimize the Column Compartment

Optimizing the Performance of your Column Compartment 52

Using Additional Heater and Cooling Devices 53

This chapter provides information on how to optimize the Thermostatted Column Compartment.



Optimizing the Performance of your Column Compartment

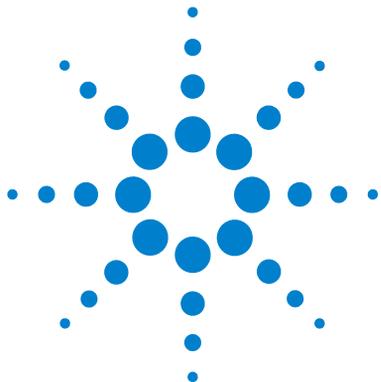
For best performance results of the column compartment:

- Use short connection capillaries and place them close to the heat exchanger. This will reduce heat dissipation and external band-broadening.
- Use the left heat exchanger for small volume columns, for example, 2–3 mm i.d. columns at flow rates of less than 200 $\mu\text{l}/\text{min}$.
- For even lower band-broadening, the heat exchanger can be by-passed and the column is placed well between the heat exchanger fins.
- Keep the left and right heat exchanger temperature the same unless you do specific applications.
- Assure that the front cover is always closed.

Using Additional Heater and Cooling Devices

The optimization, installation, interconnection, and specific settings when using additional heating and cooling devices are described in the Agilent 1200 Series Rapid Resolution LC System manual (G1312-90300).

4 How to optimize the Column Compartment **Using Additional Heater and Cooling Devices**



5 Troubleshooting and Diagnostics

Overview of the Column Department's Indicators and Test Functions 56

Status Indicators 57

Power Supply Indicator 57

Module Status Indicator 57

Available Tests depending on User Interfaces 59

Agilent Diagnostic Software 60

Overview about the troubleshooting and diagnostic features.



Overview of the Column Department's Indicators and Test Functions

Status Indicators

The instrument is provided with two status indicators which indicate the operational state (prerun, run, and error states) of the instrument. The status indicators provide a quick visual check of the operation of the instrument.

Error Messages

In the event of an electronic, mechanical or hydraulic failure, the instrument generates an error message in the user interface. The following pages describe the meaning of the error messages. For each message, a short description of the failure, a list of probable causes, and a list of suggested actions to fix the problem are provided.

Thermostat Diagnostic Test

The thermostat diagnostic test evaluates the heating and cooling efficiency of the two peltier elements.

Temperature Calibration and Verification

The temperature calibration and verification procedure enables the instrument temperature to be measured against an external, calibrated measuring device. Normally, temperature calibration is not required throughout the lifetime of the instrument. However, in order to comply with local regulatory requirements, calibration and verification may be required.

The following sections describe these functions in detail.

Status Indicators

Two status indicators are located on the front of the module. The lower left indicates the power supply status, the upper right indicates the instrument status.

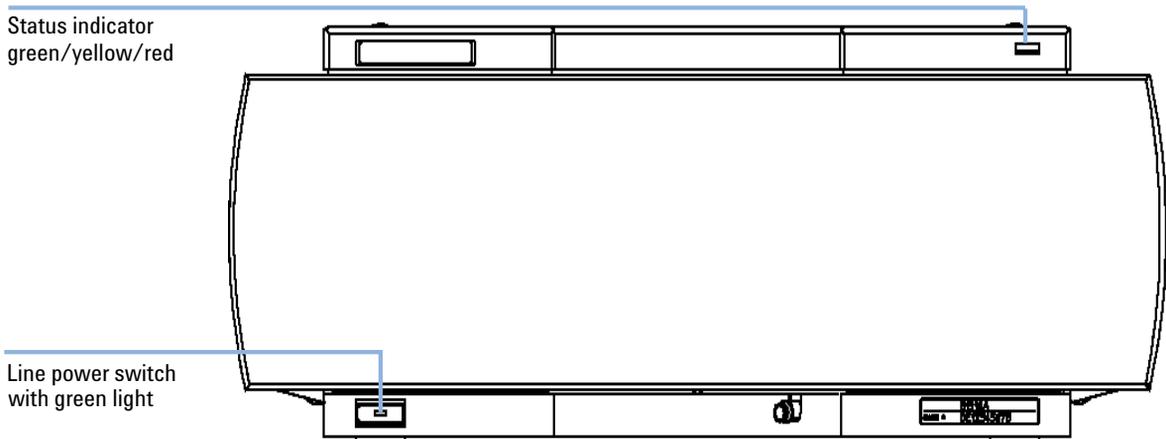


Figure 18 Location of Status indicators

Power Supply Indicator

The power supply indicator is integrated into the main power switch. When the indicator is illuminated (*green*) the power is ON.

Module Status Indicator

The module status indicator indicates one of four possible instrument conditions:

- When the status indicator is OFF (and power switch indicator is on), the instrument is in a **prerun** condition, and is ready to begin an analysis.

5 Troubleshooting and Diagnostics

Status Indicators

- A *green* status indicator, indicates the module is performing an analysis (**run mode**).
- A *yellow* indicator indicates a **not-ready** condition. The module is in a not-ready state when it is waiting for a specific condition or action to be completed (for example, immediately after changing a setpoint), or while a self-test procedure is running.
- An **error** condition is indicated by a *red* status indicator. An error condition indicates the module has detected an internal problem which affects correct operation of the instrument. Usually, an error condition requires attention (for example, leak, defective internal components). The error state is propagated through the system to all connected modules, so the error might come from a different module. Check the error log of your user interface for the originating module. For safety reasons, an error condition always interrupts the analysis.

Available Tests depending on User Interfaces

NOTE

Depending on the used interface, the available tests and the screens/reports may vary. Preferred tool should be the Agilent Lab Advisor Software, see [“Agilent Diagnostic Software”](#) on page 22.

Screenshots used in this document are based on the Agilent ChemStation. In future, the user interface may not show the Diagnostics/Tests anymore. In this case use the Agilent Lab Monitor Diagnostic (LMD) Software.

The Agilent ChemStation may not include any maintenance/test functions.

Table 5 Test Functions available vs. User Interface - TCC

Test	Agilent ChemStation	Instant Pilot G4208A	LMD Software
Thermostat Function Test	Yes	No	Yes
Temperature Calibration	Yes	Yes ¹	Yes

¹ section Maintenance

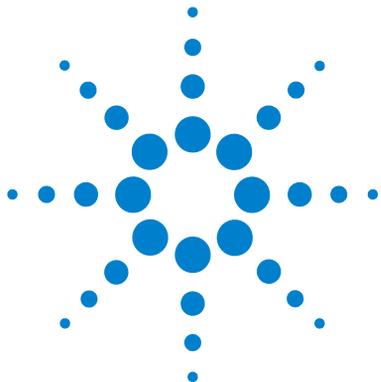
Agilent Diagnostic Software

The Agilent Diagnostic Software is a standalone product that can be used with or without data system. Agilent Lab Advisor helps to manage the lab for high quality chromatographic results and can monitor in real time a single Agilent LC or all the Agilent GCs and LCs configured on the lab intranet.

Agilent Lab Advisor provides diagnostic capabilities for all Agilent 1200 Series HPLC modules. This includes tests and calibrations procedures as well as the different injector steps to perform all the maintenance routines.

Agilent Lab Advisor also allows users to monitor the status of their LC instruments. The Early Maintenance Feedback (EMF) feature helps to carry out preventive maintenance. In addition, users can generate a status report for each individual LC instrument. The tests and diagnostic features as provided by the Agilent Lab Advisor Software may differ from the descriptions in this manual. For details refer to the Agilent Lab Advisor help files.

This manual provides lists with the names of Error Messages, Not Ready messages, and other common issues.



6 Test Functions

Thermostat Function Test	62
Pressure Test	65
Column Thermostat Temperature Calibration	66
Column Thermostat Temperature Calibration Procedure	68
Column Thermostat Calibration Problems	69
Installing the Temperature Sensor	69

This chapter describes the TCC's built in test functions.



Thermostat Function Test

Heater Function Test Description

The heater function test is used to evaluate the cooling and heating performance of the two peltier elements.

When the test is started, both heat exchangers are cooled initially to 25 °C. This temperature is held for 12 seconds, and then the setpoint is changed to 20 °C. The time required to reach 20 °C is a measure of the cooling efficiency of the peltier elements. At 3.5 minutes, the setpoint is changed to 30 °C, and both elements begin heating. The time required to reach 30 °C is a measure of heating efficiency.

Heater Function Test

Thermostat Function Test Result

A typical thermostat function test profile is shown in [Figure 19](#) on page 63.

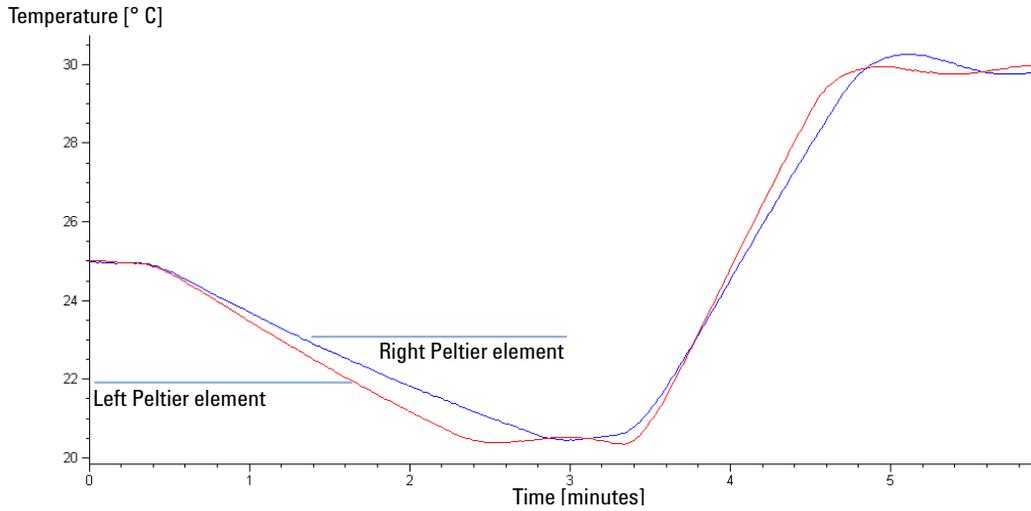


Figure 19 Typical Thermostat Function Test Profile

Evaluating the Thermostat Function Test

During the cooling phase, the Peltier elements should cool at a rate of >2 °C/minute. During the heating phase, the temperature change should be >3 °C/minute. Defective thermostat components may cause cooling or heating rates to fall outside these limits.

Function Test Failed

Probable Causes

- Column compartment cover not installed correctly (bad insulation).
- Air intake blocked (insufficient air flow for cooling).
- Poor peltier efficiency (if setpoint temperatures can still be reached, and are stable, there is no requirement to exchange the heater assembly).
- Defective sensors on flex board.
- Defective heater assembly.

Suggested Actions

- ✓ Ensure cover is installed correctly.
- ✓ Ensure sufficient space is available for air circulation see [“Bench Space”](#) on page 26.
- ✓ Exchange the heater assembly.

Pressure Test

For running a pressure test, please refer to the corresponding pump manual. The pressure test may be used for testing the tightness of a valve installed in the TCC.

CAUTION

Wrong use of pressure test may damage valve.

The current implementation of the pressure test automatically uses the maximum pressure generated by the pump used by that system.

- Do not use the test for modules having a lower maximum pressure than the pump as this will damage the valve. For example do not use 400 bar valve in a TCC in combination with a 600 bar pump.
-

Column Thermostat Temperature Calibration

Temperature Calibration Principle

The actual temperatures of the column heat exchangers (left and right) depend on the column setpoint temperature. For setpoint temperatures above (36 °C), the heat exchangers are heated to a temperature slightly above the setpoint temperature. Conversely, for setpoint temperatures below (36 °C), the heat exchangers are kept at a temperature slightly below the setpoint temperature. This fine temperature correction compensates for the small amount of heat exchange through the instrument housing, and ensures the column is always kept at the setpoint temperature.

At (36 °C), the column setpoint and heat-exchanger temperatures are equal (temperature cross-over point). This is the temperature at which a calibrated measuring device can be used to calibrate the column thermostat.

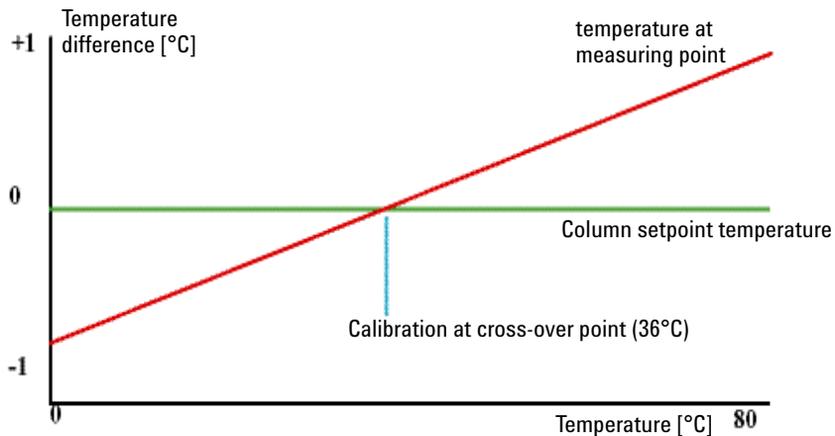


Figure 20 1-Point Calibration at the Temperature Cross-Over Point

The column thermostat is calibrated correctly when the measured temperature (using the external measuring device, “[Column Thermostat Temperature Calibration Procedure](#)” on page 68) and the cross-over temperature (36 °C) of both heat exchangers (left and right) are within a range of ± 0.5 °C.

Column Thermostat Temperature Calibration Procedure

Tools required Temperature measuring device (see note below)

Parts required **Description**
Calibrated temperature measuring device

NOTE

For the measuring and calibration process Agilent Technologies recommends a thermometer with 0.1 °C precision. Contact the local Agilent Technologies support representative for ordering information.

NOTE

The figures in this procedure refer to a specific type of temperature sensor (Heraeus, Quat340, quartz surface-temperature measurement sensor). Other sensors may require a different fixing.

- 1 Install the temperature sensor (“[Installing the Temperature Sensor](#)” on page 69).
- 2 Select the column-compartment temperature calibration mode in the user interface.
- 3 Wait for the temperature to stabilize at the calibration temperature (36 °C).
- 4 Measure the temperature of the heat exchanger.
- 5 If the measured temperature deviates by more than ± 0.5 °C from the actual temperature, enter the measured value in the measured-temperature field for the left heat exchanger.
- 6 Install the sensor at the measurement point on the right heat exchanger. Repeat the calibration procedure for the right heat exchanger.

NOTE

Limits

After calibration, the measured temperature and the calibration temperature should be within ± 0.5 °C. The maximum deviation which can be adjusted is ± 1.6 °C. If the measured value and the calibration value differ by more than ± 1.6 °C, this is an indication that a problem exists, “[Column Thermostat Calibration Problems](#)” on page 69.

Column Thermostat Calibration Problems

If the temperature cannot be calibrated, check the following:

- Has the thermostat front cover been closed correctly?
- Is the measuring device functioning correctly, and is calibrated according to the manufacturers instructions.

Hardware Failures

Probable hardware failures that can lead to a failed calibration procedure are:

- Defective or wrongly calibrated measuring device.
- Defective heater assembly.
- Defective ambient-temperature sensor.
- Defective CCM board.

Installing the Temperature Sensor

Installation of the temperature sensor is required for the temperature calibration and temperature verification procedures.

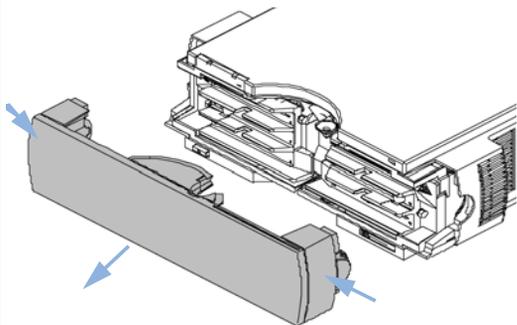
NOTE

The figures below refer to a specific type of temperature sensor (Heraeus, Quat340, quartz surface-temperature measurement sensor). Other sensors may require a different fixing.

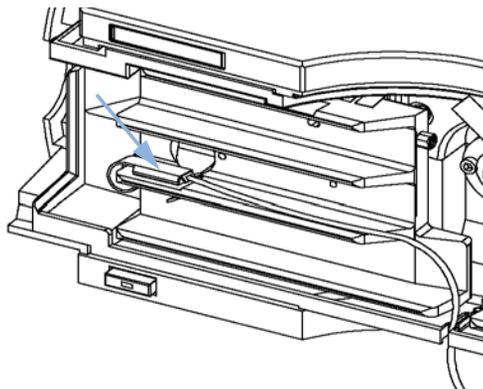
6 Test Functions

Column Thermostat Temperature Calibration

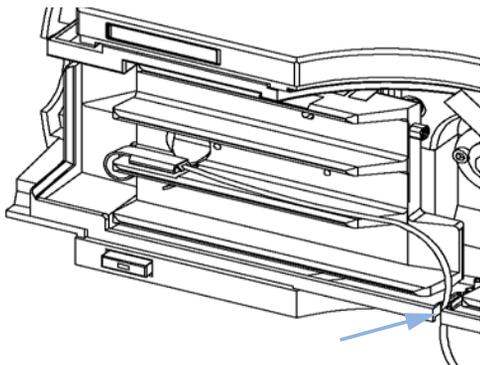
1 Remove the front cover.



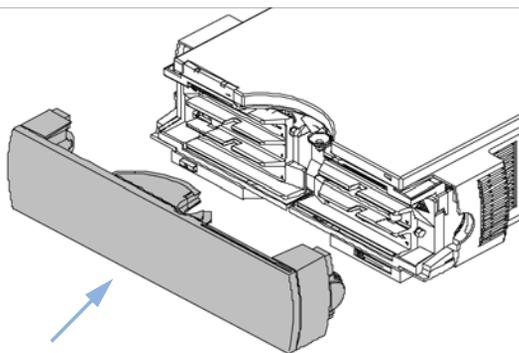
2 Install the temperature sensor at the measurement position on the left heat exchanger.

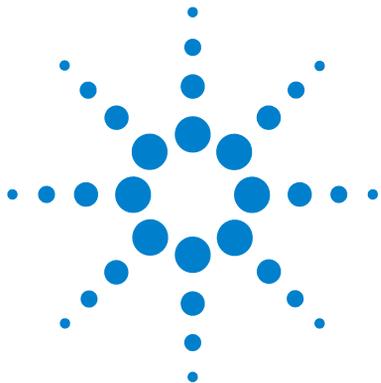


3 Route the sensor wire through the slit in the leak tray.



4 Re-install the front cover.





7 Maintenance

Introduction to Maintenance and Repair	72
Warnings and Cautions	73
Overview of Maintenance	75
Cleaning the Column Compartment	76
Changing Column Identification Tags	77
Replacing Head Parts of Column Switching Valve (G1316A/G1316B SL)	79
Adding Heater and Cooling Devices (G1316B SL/G1316C SL Plus)	82
Correcting Leaks	84
Replacing the Column Compartment's Firmware	85
Replacing Valve Heads (G1316C SL Plus)	86
Preparing the G1316C SL Plus for Transportation	89

This chapter describes the maintenance of the TCC.



Introduction to Maintenance and Repair

Simple Repairs

The column compartment is designed for easy repair. The most frequent repairs such as change of column and column switching valve head parts can be done from the front of the column compartment without removing the TCC from the HPLC stack. These repairs are described in “[Maintenance](#)” on page 71.

Exchanging Internal Parts

Some repairs may require exchange of defective internal parts. Exchange of these parts requires removing the column compartment from the stack, removing the covers, and disassembling the column compartment. The security lever at the power input socket prevents that the column compartment cover is taken off when line power is still connected.

These repairs are described in the Service Manual.

Warnings and Cautions

WARNING

Module is partially energized when switched off, as long as the power cord is plugged in.

Risk of stroke and other personal injury. Repair work at the module can lead to personal injuries, e. g. shock hazard, when the module cover is opened and the instrument is connected to power.

- Never perform any adjustment, maintenance or repair of the module with the top cover removed and with the power cord plugged in.
 - The security lever at the power input socket prevents that the module cover is taken off when line power is still connected. Never plug the power line back in when cover is removed.
-

WARNING

Sharp metal edges

Sharp-edged parts of the equipment may cause injuries.

- To prevent personal injury, be careful when getting in contact with sharp metal areas.
-

WARNING

Toxic and hazardous solvents

The handling of solvents and reagents can hold health risks.

- When working with solvents observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the solvent vendor, especially when toxic or hazardous solvents are used.
-

7 Maintenance

Warnings and Cautions

CAUTION

Electronic boards and components are sensitive to electrostatic discharge (ESD). ESD can damage electronic boards and components.

→ In order to prevent damage always use ESD protection when handling electronic boards and components.

CAUTION

Hot heat exchangers 

The column compartment has two heat exchanger assemblies that might be hot.

→ Allow them to cool down before starting repairs.

Overview of Maintenance

The following pages describe maintenance procedures (simple repairs) that can be done without opening the main cover.

Table 6 Simple Repairs

Procedure	Typical Frequency	Notes
“Changing Column Identification Tags” on page 77	When column performance or new application requires a change	
“Replacing Head Parts of Column Switching Valve (G1316A/G1316B SL)” on page 79	If the valve performance shows indication of leakage or wear	
“Correcting Leaks” on page 84	If a leak has occurred	Check for leaks

Cleaning the Column Compartment

The column compartment case should be kept clean. Cleaning should be done with a soft cloth slightly dampened with water or a solution of water and a mild detergent. Make sure not to let liquid drip into your module.

WARNING

Liquid dripping into the electronic compartment of your module.

Liquid in the module electronics can cause shock hazard and damage the module.

- Do not use an excessively damp cloth during cleaning.
 - Drain all solvent lines before opening any fittings.
-

Changing Column Identification Tags

The column compartment is equipped with an column-identification system, that stores column specific information. Two identification antennas are incorporated in the heat exchanger assemblies.

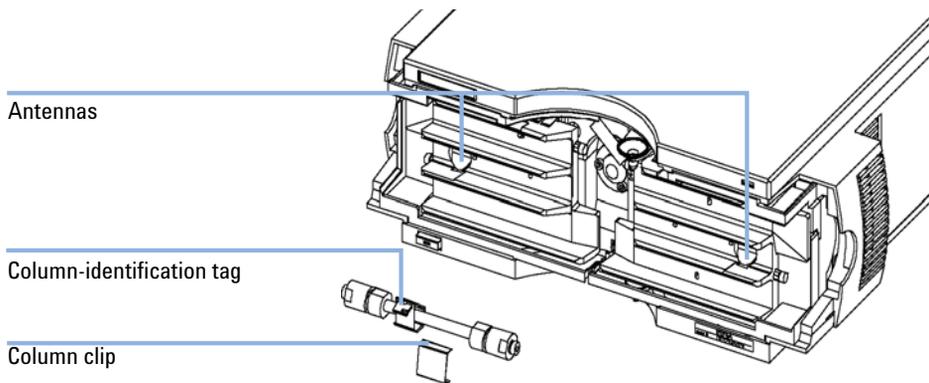


Figure 21 Column-Identification System

When If column is used on the opposite heat exchanger or a tag is added to a new column.

Parts required	#	Part number	Description
	1	5062-8588	Column identification tag, pack of 3

- 1 The identification tag can be easily removed from the column.
- 2 The tag needs to be placed differently, depending on whether the column is installed at the left or right heat exchanger, see [Figure 15](#) on page 49 and [Figure 16](#) on page 50. The Agilent logo should always be at front.

When correctly placed on the heat exchanger, the distance between tag and antenna is 1–2 mm. This is the optimum distance for proper function.

7 Maintenance

Changing Column Identification Tags

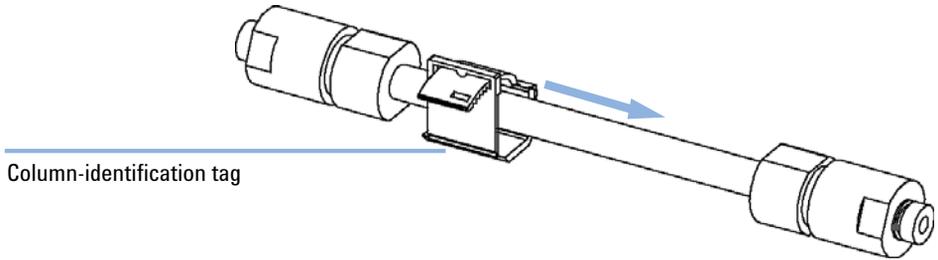


Figure 22 Column-Identification Tag for Left Heat Exchanger

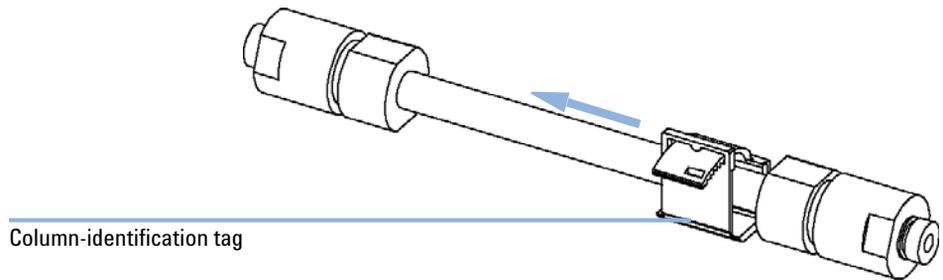


Figure 23 Column-Identification Tag for Right Heat Exchanger

- 3 For columns with small diameter, a cable tie wrap should be used to fix the column identification tag to the column. Assure that the tie wrap does not block the front cover.

Replacing Head Parts of Column Switching Valve (G1316A/G1316B SL)

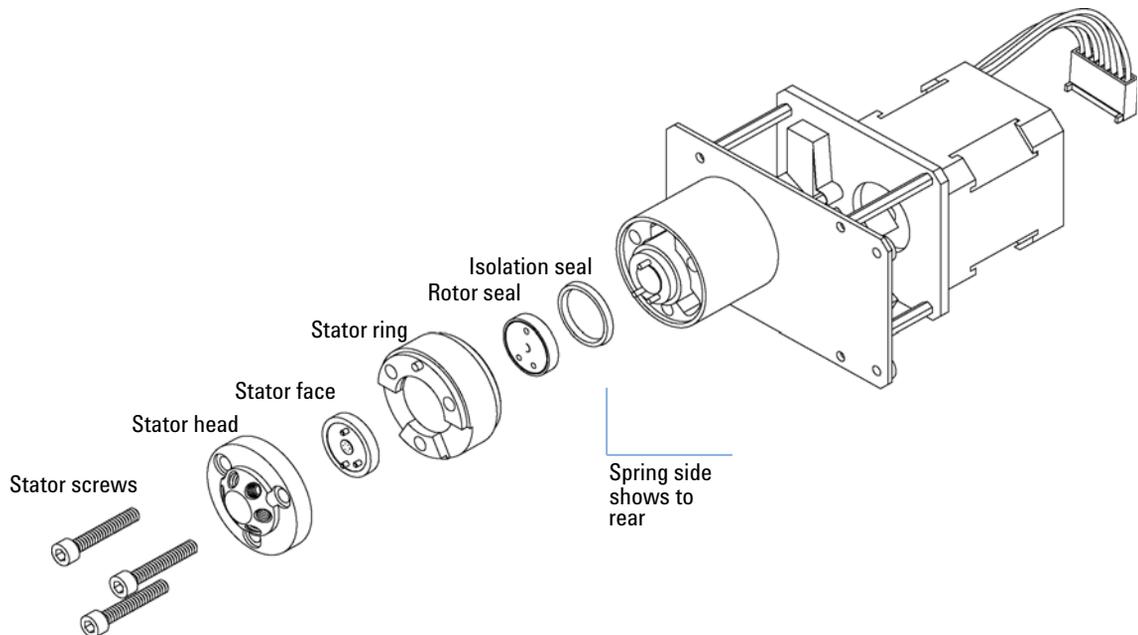


Figure 24 Column Switching Valve Parts

When If valve leaks.

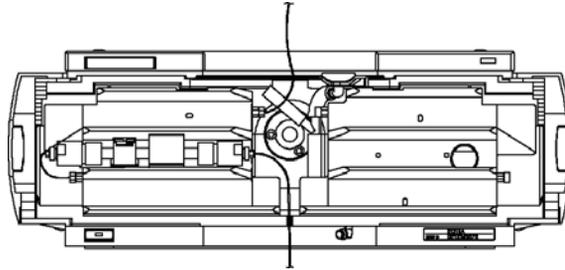
Tools required 1/4 inch wrench
9/64 inch hex key

Parts required **Description**
For parts refer to [“Valve Options Overview”](#) on page 92.

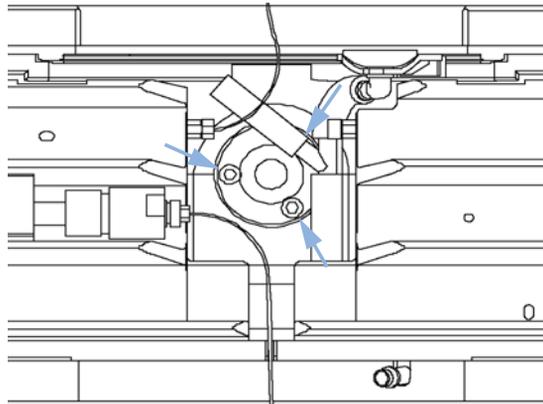
1 Remove capillaries from ports 1, 5, and 6.

7 Maintenance

Replacing Head Parts of Column Switching Valve (G1316A/G1316B SL)



- 2 Loosen each fixing stator screw two turns at a time. Remove bolts from head.



- 3 Remove the stator head and the ceramic stator face.

NOTE

Valve Head, 8 Position/9 Port, High Pressure **part number: 5067-4107** has no stator face.

- 4 Remove the stator ring.
- 5 Remove the rotor seal (and isolation seal if damaged or contaminated).
- 6 Install the new isolation seal (if required). Ensure the metal spring inside the ring faces towards the valve body.
- 7 Install the new rotor seal.
- 8 Replace the stator ring. Ensure the stator ring is flush with the valve body.
- 9 Place the new (if required) ceramic stator face in place on the stator head. Reinstall the stator head.

Replacing Head Parts of Column Switching Valve (G1316A/G1316B SL)

NOTE

Valve Head, 8 Position/9 Port, High Pressure **part number: 5067-4107** has no stator face.

10 Insert the stator screws in the stator head. Tighten the screws alternately two turns at a time until the stator head is secure.

11 Reconnect the pump capillaries to the valve ports. Slide the waste tube into the waste holder in the leak tray.

CAUTION

Wrong use of pressure test may damage valve.

The current implementation of the pressure test automatically uses the maximum pressure generated by the pump used by that system.

→ Do not use the test for modules having a lower maximum pressure than the pump as this will damage the valve. For example do not use 400 bar valve in a TCC in combination with a 600 bar pump.

12 Perform a pressure-tightness test to ensure the valve is pressure tight to 400 bar.

Adding Heater and Cooling Devices (G1316B SL/G1316C SL Plus)

The additional heater and cooling devices can be arranged in the G1316B SL in various locations depending on the application needs. Some examples are shown below.

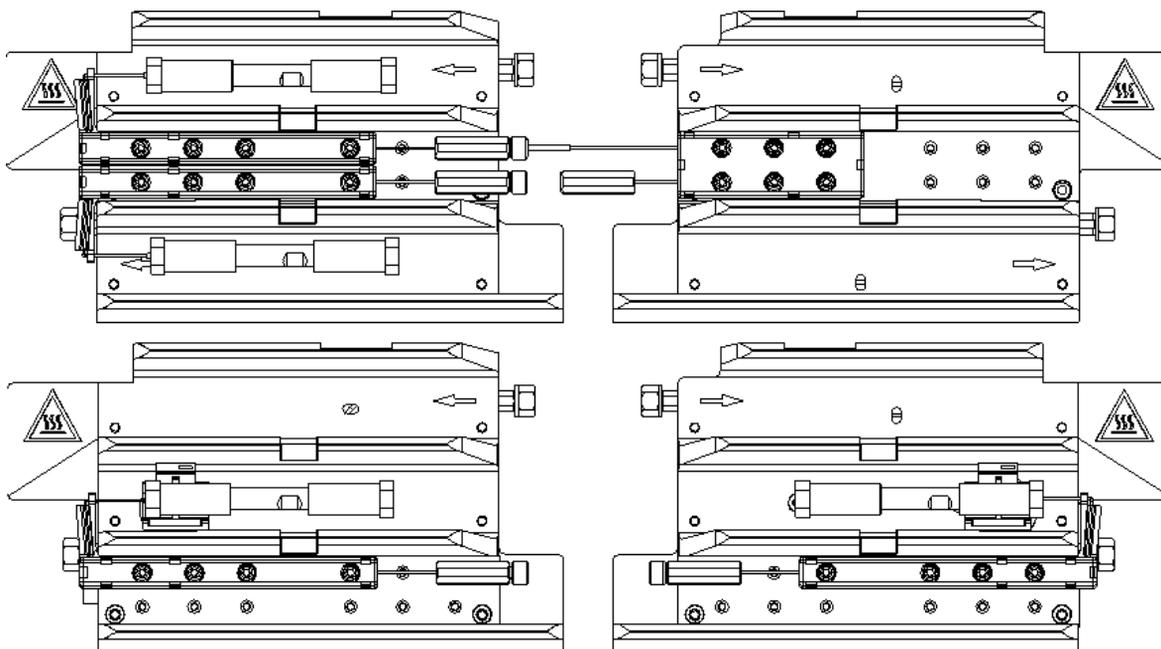


Figure 25 Arrangements of Heater and Cooling Devices (G1316B SL/G1316C SL Plus)

NOTE

If the additional heater and cooling devices are used as shown above, the column identification system cannot be used. If the column identification system is required, fix the heater and cooling devices in the upper or lower locations or fix them right/left of the current location.

The heater and cooling devices are mounted on a carrier that can be fitted to the left and/or right heat exchangers.

Adding Heater and Cooling Devices (G1316B SL/G1316C SL Plus)

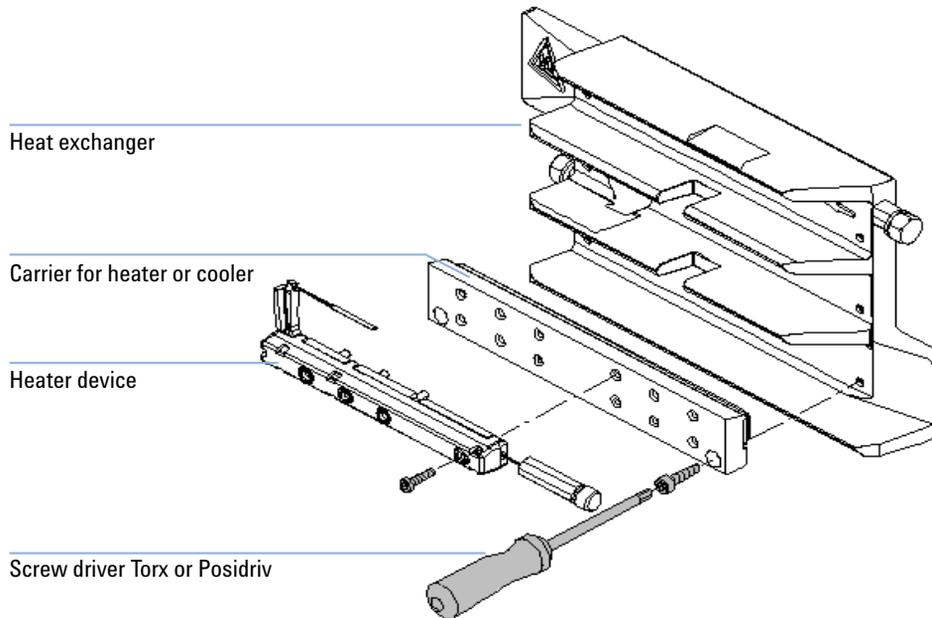
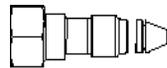


Figure 26 Fixing Heater or Cooling Devices (G1316B SL)

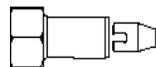
For the heater device inlet capillary choose fittings which are compatible to your column.

Swagelock compatible columns (5065-4454, pk of 10, with ferrules)



Fitting screw long

Swagelock compatible columns, removable (0100-2086)



Nut seal tight

Figure 27 Fitting type depends on column type

Correcting Leaks

When If a leakage has occurred at the heat exchanger or at the capillary connections or at the column switching valve.

Tools required Tissue, pipette
Wrench 1/4 – 5/16 inch for capillary connections

NOTE

Depending on the column position or the use of additional heat-exchanger assemblies, the view of [Figure 28](#) on page 84 may vary.

- 1 Remove the front cover.
- 2 Use a pipette and tissue to dry the leak sensor area.
- 3 Observe the capillary connections and the column switching valve for leaks and correct, if required.
- 4 Re-install the front cover.

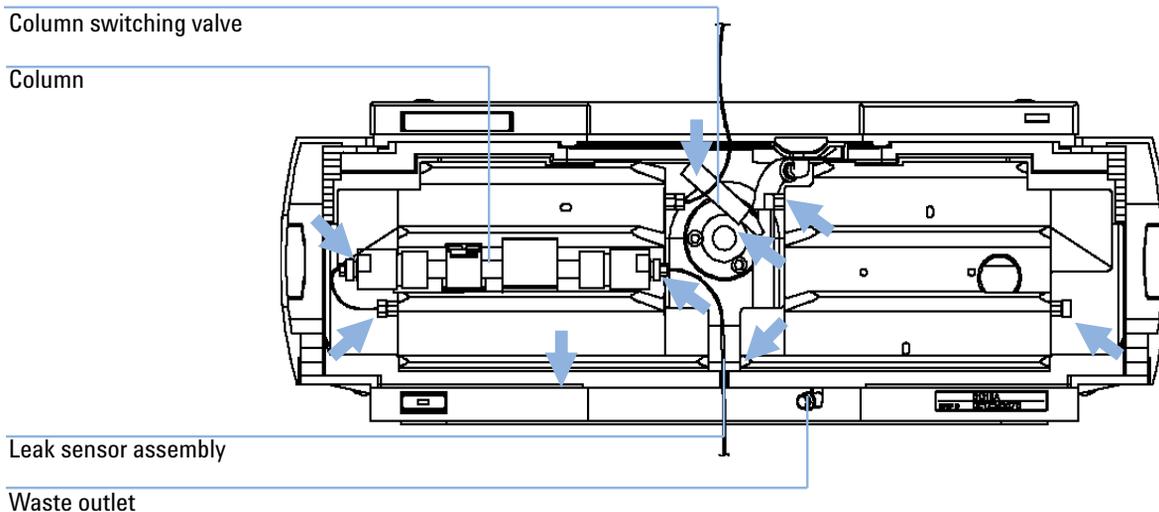


Figure 28 Possible Leak Areas

Replacing the Column Compartment's Firmware

The installation of *older* firmware might be necessary:

- to keep all systems on the same (validated) revision, or
- if third part control software requires a special version.

To upgrade/downgrade the TCC's firmware the following steps have to be performed:

When	If new version solves problems of currently installed version or after exchange of the TCC main board (CCM) the version on board is older than previous installed one.
Tools required	LAN/RS-232 Firmware Update Tool, or Instant Pilot G4208A or Control Module G1323B
Parts required	<p>Description</p> <p>Firmware, tools and documentation from Agilent web site</p>
Preparations	<p>Read update documentation provided with the Firmware Update Tool.</p> <ol style="list-style-type: none"> 1 Download the module's firmware, the LAN/RS-232 FW Update Tool Version 2.10 or above and the documentation from the Agilent web http://www.chem.agilent.com/scripts/cag_firmware.asp. 2 Load the firmware into the TCC as described in the documentation.
NOTE	<p>The G1316B SL requires firmware revision A.06.02 or higher (main and resident).</p> <p>The G1316C SL Plus requires firmware revision A.06.10 or higher (main and resident).</p>

Replacing Valve Heads (G1316C SL Plus)

Several optional valve heads are available for the G1316C, which can be installed and exchanged easily.

Parts required	#	Part number	Description
	1	5067-4107	8pos/9prt valve head high pressure and/or
	1	5067-4108	8pos/9prt valve head low pressure

CAUTION

Valve Damage

Using a low pressure valve on the high pressure side can damage the valve.

- When using multiple column compartments as part of a method development solution, make sure that the high pressure valve head is connected to the autosampler and the low pressure valve head is connected to the detector.
- For details, please refer to the Method Development Solution User and Installation Guide (**part number: G4230-90000**).

CAUTION

Column Damage or Bias Measurement Results

Switching the valve to a wrong position can damage the column or bias measurement results.

- Fitting the lobe to the groove is essential for making sure the valve is switched to the correct position.

CAUTION

Valve properties are read from the valve head RFID tag during initialization of the module. Valve properties will not be updated, if the valve head is replaced while the module is on.

Selection of valve port positions can fail, if the instrument does not know the properties of the installed valve.

- Always switch off the instrument when replacing the valve head.

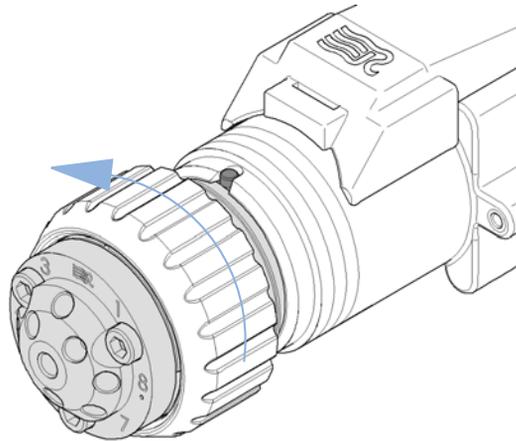
CAUTION

The valve actuator contains sensitive optical parts, which need to be protected from dust and other pollutions. Pollution of these parts can impair the accurate selection of valve ports and therefore bias measurement results.

→ Always install a valve head for operation and storage. For protecting the actuator, a dummy valve head (part of transportation lock kit **part number: G1316-67001**) can be used instead of a functional valve. Do not touch parts inside the actuator.

- 1 Switch off the module.
- 2 Push the valve head for bringing it to its outer position and unscrew all capillary connections from the valve head.

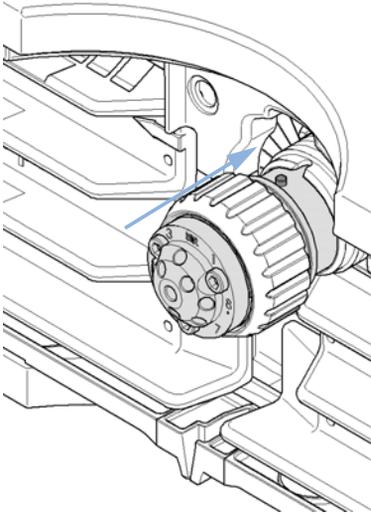
- 3 Unscrew the valve head.



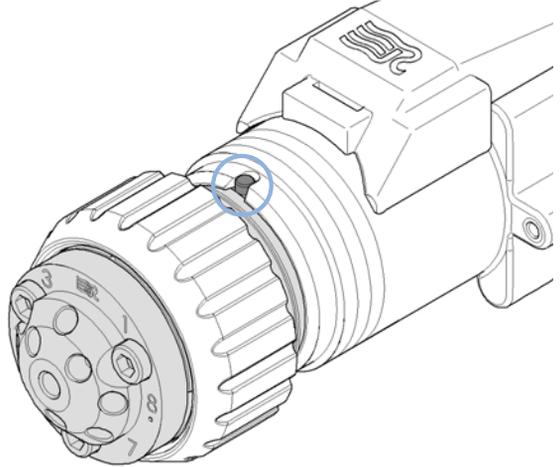
7 Maintenance

Replacing Valve Heads (G1316C SL Plus)

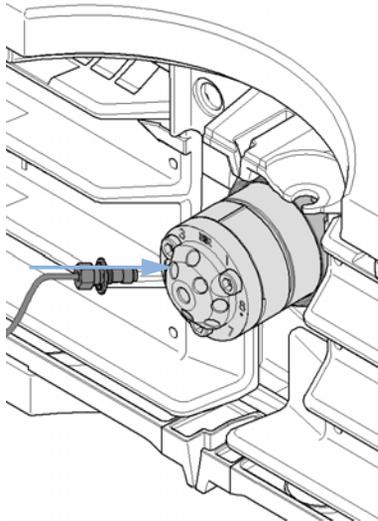
4 Put the new valve head onto the valve drive such that the lobe fits to the groove.



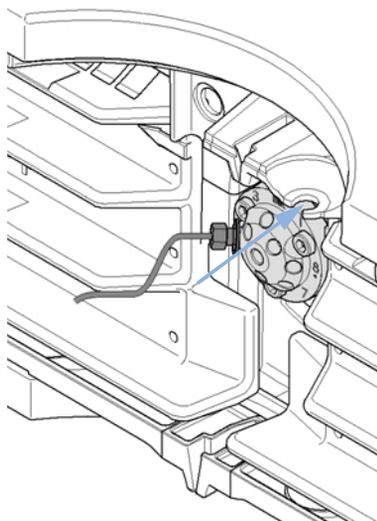
5 Screw the valve head onto the valve drive using the union nut.



6 Install all required capillary connections to the valve head.



7 Push the valve head until it snaps in and stays in the rear position.



8 Switch on the module.

Preparing the G1316C SL Plus for Transportation

When If the Thermostatted Column Compartment SL Plus G1316C shall be transported

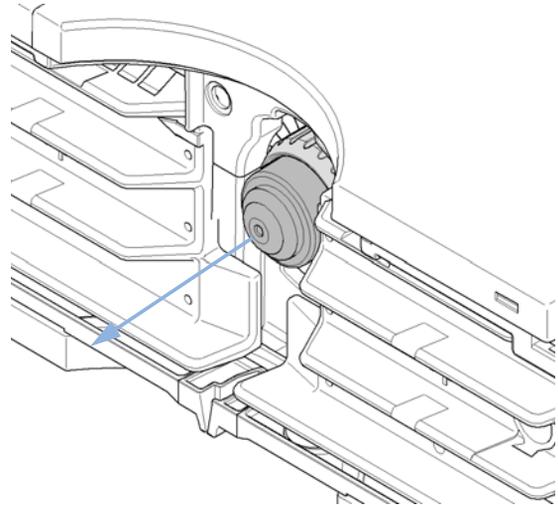
Tools required Screwdriver Pozidriv 1 PT3

Parts required	#	Part number	Description
	1	G1316-67001	Transportation Lock Kit

The module has been shipped with transportation locks, which must be used for transportation protection. A transportation lock kit can be re-ordered using

1 Remove the valve head as described in [“Replacing Valve Heads \(G1316C SL Plus\)”](#) on page 86.

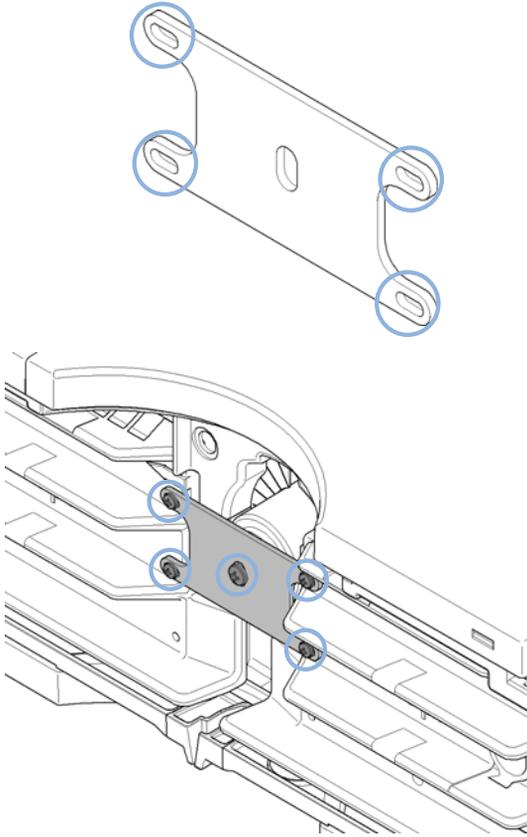
2 Replace the valve head by the transportation valve head. Bring the transportation valve head to the outer position.



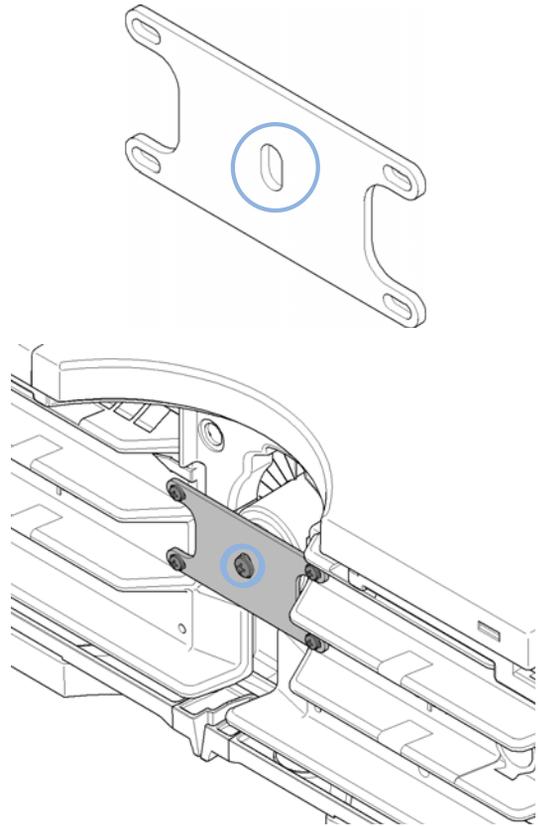
7 Maintenance

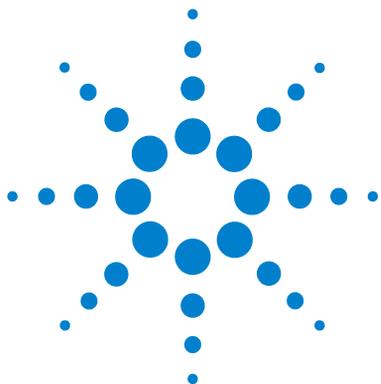
Preparing the G1316C SL Plus for Transportation

- 3** Use 4 screws M3x8 (**0515-0897**) for fixing the lock plate (**G1316-03701**) to the heat exchangers in the outer positions of the plate.



- 4** Use a screw (**2680-0128**) for fixing the lock plate to the transportation valve head (**G1316-40002**) in the central position of the plate.





8 Parts and Materials for Maintenance

Valve Options Overview	92
Heater and Cooling Devices for G1316B SL/G1316C SL Plus	93
Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)	95
Column Switching Valve 8 Position-9 Port (G1316C SL Plus)	97
Micro Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)	99
Micro Column Switching Valve 2 Position/10 Port (G1316A/G1316B SL)	100
Accessory Kits	102
G1316A Accessory Kit (Standard)	102
G1316A Accessory Kit (2PS/10PT modules)	103
G1316B SL/G1316C SL Plus Accessory Kit (Standard)	103
G1316B SL/G1316C SL Plus Capillary System Kit	104
G1316B SL Micro Valve Kit 2 Position/10 Port	106
Column Regeneration Kit (G1316A/G1316B SL)	107
Accessories (G1316C SL Plus)	108
Plastic Parts	109
Leak Parts	110

This chapter provides information on parts for maintenance.



Valve Options Overview

This overview gives a summary of the main parts and assemblies. More details are available with each valve option in this chapter.

Table 7 Valves for G1316A and G1316B SL

Module	Valve Description	Valve	Rotor Seal	Stator
G1316A (#055) G1316-68700	"Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)" on page 95	0101-0920 ¹	0100-1855 (Vespel) 0100-1854 (Tefzel) 0100-2233 (PEEK)	0100-1851 (Face) 0100-1850 (Head) 0100-1852 (Seal)
G1316A (#056)	"Micro Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)" on page 99	0101-1051	0100-2087 (Vespel)	0101-2089
G1316A (#057) G1316-68709	"Micro Column Switching Valve 2 Position/10 Port (G1316A/G1316B SL)" on page 100	0101-1343 ²	0101-1360	0101-1362
G1316B (#055)	"Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)" on page 95 (600 bar)	0101-1420	0101-1409	0101-1417
G1316B (#057)	"Micro Column Switching Valve 2 Position/10 Port (G1316A/G1316B SL)" on page 100 (600 bar)	0101-1419	0101-1415	0101-1421

¹ re-build kit 0101-1258 includes 3-groove rotor seal, stator face assy, isolation seal, instructions.

² re-build kit 0101-1360 includes PEEK rotor seal, PEEK stator face, hex key.

Table 8 Valves for G1316C SL Plus

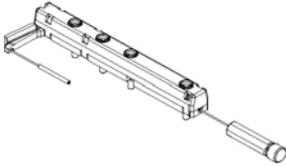
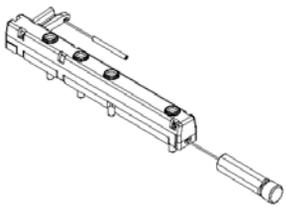
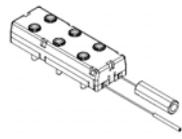
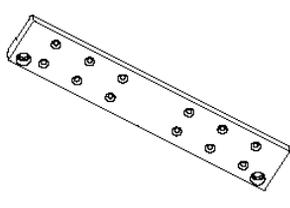
Kit	Kit Description	Valve Head	Rotor Seal	Stator
G4230A	Method Development Valve Kit, low pressure, includes 8pos/9port valve	5067-4108	5067-4113 ¹	5067-4112
G4230B	Method Development Valve Kit, high pressure, includes 8pos/9port valve	5067-4107	5067-4111	5067-4110

¹ kit with stator face and rotor seal

Heater and Cooling Devices for G1316B SL/G1316C SL Plus

The use of these heater and cooling devices is described in Technical Notes or in the Agilent 1200 Series Rapid Resolution LC System (1200 RRLC System) manual.

Table 9 Heater and Cooling Devices for G1316B SL

Item	Description	Part Number
	Heater long-up (0.12 mm i.d., 1.6 µl internal volume) (G1316B SL/G1316C SL Plus) Part of "G1316B SL/G1316C SL Plus Capillary System Kit" on page 104.	G1316-80002
	Heater long-down (0.12 mm i.d., 1.6 µl internal volume) (G1316B SL/G1316C SL Plus) Part of "G1316B SL/G1316C SL Plus Capillary System Kit" on page 104.	G1316-80003
	Post-column cooler, (0.12 mm i.d., 1.5 µl internal volume) (G1316B SL/G1316C SL Plus) Part of "G1316B SL/G1316C SL Plus Capillary System Kit" on page 104.	G1316-80004
	Carrier for Heater and Cooler (G1316B SL), includes 3 screws SKT-HD-CAP, M3 x 0.5, 12 mm long Part of "G1316B SL/G1316C SL Plus Capillary System Kit" on page 104.	G1316-83200 0515-1052

8 Parts and Materials for Maintenance

Heater and Cooling Devices for G1316B SL/G1316C SL Plus

Table 10 Consumables (G1316C SL Plus)

Description	Part Number
Column Clip Set, 8 Colors	5042-9918
Carrier for Heat Exchanger G1316C SL Plus	G1316-89200
Fitting Holder Assy, includes following items:	G1316-68706
<ul style="list-style-type: none"> • Fitting Fork • Fitting Clip • Screws (Pack of 4) 	

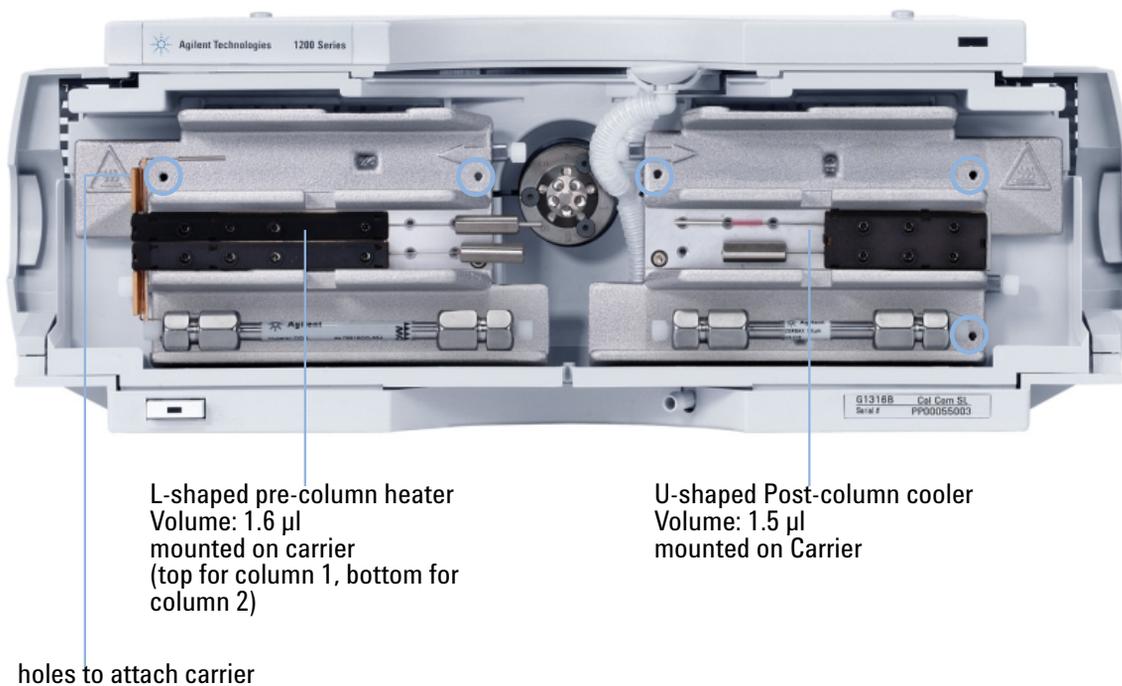


Figure 29 Heater and Cooling Devices for G1316B SL

Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)

Table 11 Column Switching Valve 2PS/6PT for G1316A/G1316B SL

Item	Description	Part Number
	Column switching valve kit, includes all parts required for installation	G1353-68700
	Column switching valve (complete assembly)	0101-0920
	Cover plate (when switching valve is not installed)	G1316-44103
	Capillary Kit Column Switching includes two capillaries (0.17mm i.d., 180 mm) and three capillaries (0.17 mm i.d., 90 mm)	G1316-68708 G1313-87305 G1316-87300
	Rhebuild kit for 7750-030 valve, includes: 3-groove rotor seal, stator face assy, isolation seal, instructions	0101-1258
1	Stator screws	1535-4857
2	Stator Head	0100-1850
3	Stator face	0100-1851
4	Stator ring	
5	Rotor seal 3 grooves (Tefzel)	0100-1854
	Rotor seal 3 grooves (Vespel)	0100-1855
	Rotor seal 3 grooves (PEEK)	0100-2233
6	Isolation seal	0100-1852

8 Parts and Materials for Maintenance
Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)

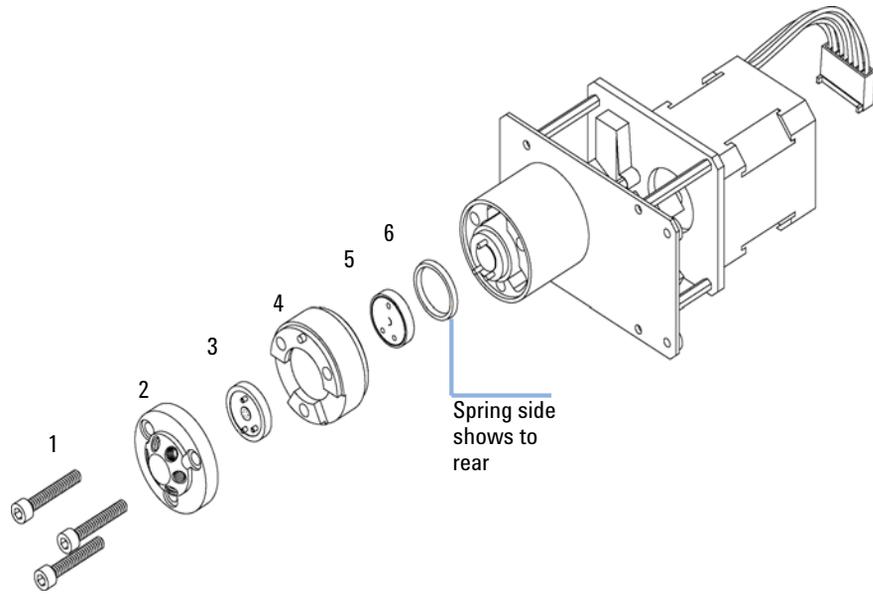


Figure 30 Column Switching Valve Parts

Column Switching Valve 8 Position-9 Port (G1316C SL Plus)

Column Switching Valve Parts High Pressure (G1316C SL Plus)

Table 12 Valve 8 Position/9 Port, High Pressure (G1316C SL Plus)

Item	Description	Part Number
	Valve Head, 8 Position/9 Port, High Pressure	5067-4107
1	Stator Screws	1535-4857
2	Stator Head	5067-4110
3	Rotor Seal High Pressure	5067-4111
4	Isolation Seal	0100-1852

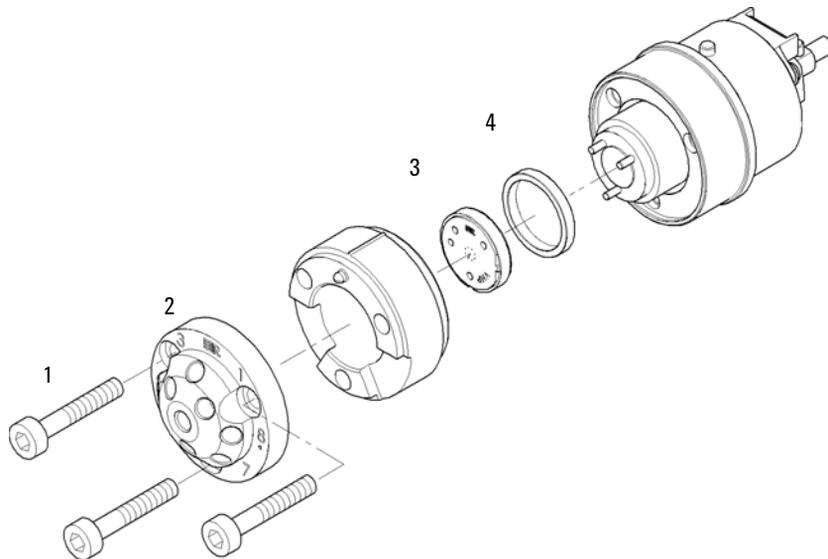


Figure 31 Column Switching Valve Parts (5067-4107)

8 **Parts and Materials for Maintenance**
Column Switching Valve 8 Position-9 Port (G1316C SL Plus)

Column Switching Valve Parts 400 bar (G1316C SL Plus)

Table 13 Valve 8 Position/9 Port, 400 bar (G1316C SL Plus)

Item	Description	Part Number
	Valve Head, 8 Position/9 Port, 400 bar	5067-4108
1	Stator Screws	1535-4857
2	Stator Head	5067-4112
3, 4	Stator Face/Rotor Seal 400 bar	5067-4113
5	Isolation Seal	0100-1852

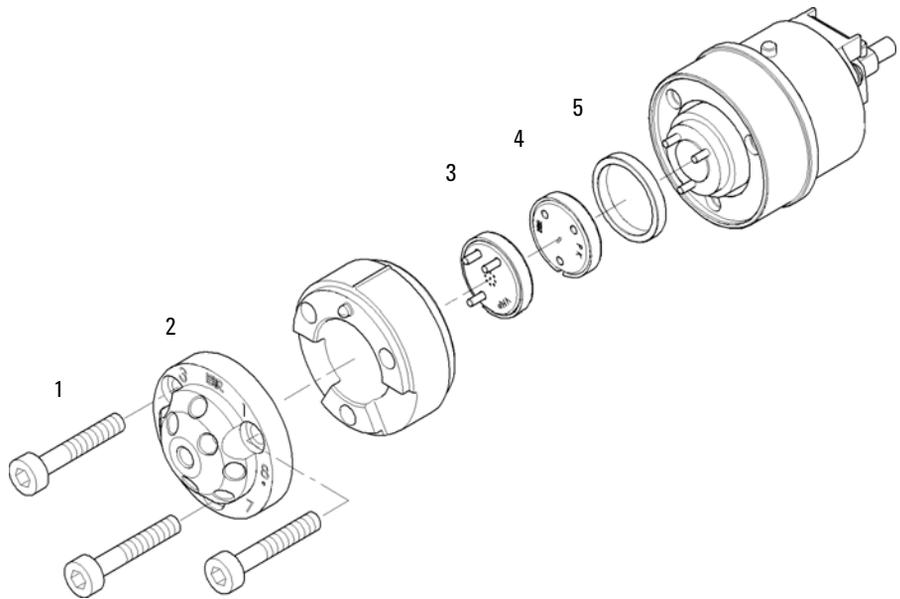


Figure 32 Column Switching Valve Parts (5067-4108)

Micro Column Switching Valve 2 Position/6 Port (G1316A/G1316B SL)

Table 14 Micro Column Switching Valve 2PS/6PT for G1316A/B, 400 bar

Item	Description	Part Number
	Micro Column Switching Valve 2PS/6PT, 400 bar	0101-1051
	Stator face	0100-2089
	Rotor seal 3 grooves	0100-2087

Table 15 Micro Column Switching Valve 2PS/6PT for G1316B SL, 600 bar

Item	Description	Part Number
	Micro Column Switching Valve 2PS/6PT, 600 bar	0101-1420
	Stator, 600 bar	0101-1417
	Rotor seal 3 grooves, 600 bar	0101-1409

Micro Column Switching Valve 2 Position/10 Port (G1316A/G1316B SL)

NOTE

Technical details can be found in the Technical Note that is supplied with the kit.

Table 16 Micro Column Switching Valve 2PS/10PT for G1316A/B, 400 bar

Item	Description	Part Number
	2PS/10 PT Valve kit, includes all parts required for installation	G1316-68709
	Rebuild kit, includes PEEK rotor seal, PEEK stator face, hex key	0101-1360
	2PS/10 PT valve	0101-1343
	Rotor seal (Vespel)	0101-1361
	Stator face	0101-1362
	Capillary kit, see Table 18 on page 100	G1316-68711

Table 17 Micro Column Switching Valve 2PS/10PT 600 bar for G1316B SL, 600 bar

Item	Description	Part Number
	Column Switching Valve 2PS/10PT for μ -LC System, 600 bar	0101-1419
	Stator, 600 bar	0101-1421
	Rotor seal 5 grooves, 600 bar	0101-1415

Table 18 Capillary Kit (G1316-68711)

From	To	ID [mm]	Length [mm]	Qty	Part number	Remark
Capillaries						
ALS ¹	Valve (port 2)	0.17	700	1	5065-9932	

Micro Column Switching Valve 2 Position/10 Port (G1316A/G1316B SL)

Table 18 Capillary Kit (G1316-68711)

From	To	ID [mm]	Length [mm]	Qty	Part number	Remark
Valve (port 3)	TCC 3 µl (In)	0.17	105	1	5021-1816	
TCC ² 3 µl (Out)	Column 1	0.17	105	1	5021-1816	
Column 1	Valve (port 6)	0.17	105	1	5021-1816	for long column
Column 1	Valve (port 6)	0.17	200	1	5065-9931	for short column
Valve (port 7)	Detector (In)	0.17	280	1	5021-1818	
Valve (port 1)	TCC 6 µl (In)	0.17	105	1	5021-1816	
TCC ^{**} 6 µl (Out)	Column 2	0.17	105	1	5021-1816	
Column 2	Valve (port 8)	0.17	105	1	5021-1816	for long column
Column 2	Valve (port 8)	0.17	200	1	5065-9931	for short column
Valve (port 5)	Valve (port 10)	0.17	105	1	5021-1816	
Regeneration pump	Valve (port 4)	0.25	800	1	5065-9930	
Valve (port 9)	Waste	0.6	2000		5062-2463	PTFE
Ferrules, screws, fingertight fittings, etc.						
1/16" fittings and ferrules				2	5062-2418	10/pk
fingertight fitting long				1	5062-8541	10/pk
fitting screw long				10	5065-4454	10/pk
fitting screw extra long				10	5065-9967	10/pk
front ferrule				1	5180-4108	10/pk
back ferrule				1	5180-4114	10/pk
Peek tubing 1/16"		0.18	1500	1	0890-1763	
Plastic tubing cutter				1	8710-1930	
Hex key 3/32"				1	8710-2462	
Rheotool Socket wrench 2 x 1/4"				1	8710-2391	

¹ ALS - Autosampler² TCC - Thermostatted Column Compartment (heat exchanger: 3 µl left or 6 µl right)

Accessory Kits

The accessory kits (for G1316A, G1316B SL or G1316C SL Plus) contain accessories and tools needed for the installation and maintenance.

G1316A Accessory Kit (Standard)

Table 19 G1316A Accessory Kit (Standard)

Item	Description	Part Number
	G1316A Accessory Kit (Standard)	G1316-68705
	Column identification tag (blank) for re-ordering use (pack of 3)	5062-8588
	Column clip, qty=2, for re-order use (pack of 6)	5063-6526
	Corrugated tubing (to waste), re-order 5 m	5062-2463
	CAN cable 0.5 m	5181-1516
	Wrench open end 1/4 – 5/16 inch	8710-0510
	Wrench open end, 5/16 – 3/8 inch	8710-2409
	Capillary column-heat exchanger 90 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87300
	Ferrule front SST, qty=2	1
	Ferrule back SST, qty=2	*
	Fitting SST, qty=2	*

¹ re-order 5062-2418, pack of 10 each of fittings, front- and back ferrule

G1316A Accessory Kit (2PS/10PT modules)

Table 20 G1316A Accessory Kit (2PS/10PT modules)

Item	Description	Part Number
	G1316A Accessory Kit 2PS/10PT	G1316-68725
	Column identification tag (blank) for re-ordering use (pack of 3)	5062-8588
	Column clip, qty=2, for re-order use (pack of 6)	5063-6526
	Corrugated tubing (to waste), re-order 5 m	5062-2463
	CAN cable 0.5 m	5181-1516
	Wrench open end 1/4 – 5/16 inch	8710-0510
	Wrench open end, 5/16 – 3/8 inch	8710-2409
	PEEK Capillary 280 mm lg, 50 μ i.d., qty=4	G1316-87309
	MIC Valve Fitting, qty=2	5022-2186
	Column holder for μ -LC columns, qty=2	5001-3702

G1316B SL/G1316C SL Plus Accessory Kit (Standard)

Table 21 Accessory Kit (Standard) G1316B SL and G1316C SL Plus

Item	Description	Part Number
	G1316B SL/G1316C SL Plus Accessory Kit (Standard)	G1316-68735
	Column identification tag (blank) for re-ordering use (pack of 3)	5062-8588
	Column clip, qty=2, for re-order use (pack of 6)	5063-6526
	Corrugated tubing (to waste), re-order 5 m	5062-2463
	CAN cable 0.5 m	5181-1516
	Wrench open end 1/4 – 5/16 inch	8710-0510
	Wrench open end, 5/16 – 3/8 inch	8710-2409

Table 21 Accessory Kit (Standard) G1316B SL and G1316C SL Plus

Item	Description	Part Number
	Screwdriver Torx TX8	8710-2509
	Screwdriver Hexagonal 2.5 mm	5965-0028
	Capillary column-heat exchanger 90 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87300
	Capillary column-heat exchanger 115 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87321
	Capillary column-heat exchanger 170 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87323
	Ferrule front SST, qty=2	1
	Ferrule back SST, qty=2	*
	Fitting SST, qty=2	*

¹ re-order 5062-2418, pack of 10 each of fittings, front- and back ferrule

G1316B SL/G1316C SL Plus Capillary System Kit

G1316B SL/G1316C SL Plus Capillary System Kit

Table 22 G1316B SL Capillary System Kit G1316-68744 (G1316B#060)

Item	Description	Part Number
*	2 Carriers for Heater or Cooling Devices	G1316-83200
*	Heater long-up (0.12 mm i.d., 1.6 µl internal volume)	G1316-80002
*	Heater long-down (0.12 mm i.d., 1.6 µl internal volume)	G1316-80003
*	Post-column cooler (0.12 mm i.d., 1.5 µl internal volume)	G1316-80004
	Capillary System Kit, see Table 23 on page 105 for details	G1316-68716

For items * see also “Heater and Cooling Devices for G1316B SL/G1316C SL Plus” on page 93.

Table 23 Capillary System Kit G1316-68716

Item	Description	Part Number
	Seat Capillary 100 mm x 0.12 mm, 0.8 OD	G1367-87303
	DAD Heat Exchanger Capillary 310 mm x 0.12 mm	G1315-87339
	SST Capillary 340 mm x 0.12 mm, m/m	G1316-87319
	SST Capillary 300 mm x 0.12 mm, m/m	G1316-87318
	SST Capillary 210 mm x 0.12 mm, m/m	G1316-87317
	SST Capillary 170 mm x 0.12 mm, m/m	G1316-87316
	SST Capillary 130 mm x 0.12 mm, m/f	G1316-87315
	SST Capillary 90 mm x 0.12 mm, m/f	G1316-87314
	SST Capillary 70 mm x 0.12 mm, m/f	G1316-87313
	SST Capillary 50 mm x 0.12 mm, m/f	G1316-87312
	SST Capillary 170 mm x 0.12 mm, m/f	G1316-87327
	SST Capillary 500 mm x 0.12 mm, m/m	G1316-87309
	SST Capillary 500 mm x 0.12 mm, m/m	G1315-87307

G1316C SL Plus Capillary System Kits

Table 24 G1316C Capillary System Kits

Description ¹	Part Number
Solvent selection tubing kit, 4 solvents	5067-4601
Method Development Capillary Kit, low dispersion, short column	5067-1595
Method Development Capillary Kit, low dispersion, long column	5067-1596
Method Development Capillary Kit, general purpose	5067-1597
RRHT Selectivity Method Development Kit, 2.1 mm ID	5190-1431
RRHT pH Method Development Kit, 2.1 mm ID	5190-1432
RRHT Selectivity Method Development Kit, 4.6 mm ID	5190-1433
RRHT pH Method Development Kit, 4.6 mm ID	5190-1434

Table 24 G1316C Capillary System Kits

Description ¹	Part Number
Rapid Resolution Selectivity Method Development Kit	5190-1435
Rapid Resolution pH Method Development Kit	5190-1436

¹ for capillary kit contents, please refer to the Method Development Solution User and Installation Guide (**G4230-90000**)

G1316B SL Micro Valve Kit 2 Position/10 Port

Table 25 G1316B SL Micro Valve Kit 2PS/10PT

Item	Description	Part Number
	G1316B SL Micro Valve Kit 2PS/10PT	G1316-68745
	Column identification tag (blank) for re-ordering use (pack of 3)	5062-8588
	Column clip, for re-order use (is pack of 6)	5063-6526
	Corrugated tubing (to waste), re-order 5 m	5062-2463
	Wrench open end 1/4 – 5/16 inch	8710-0510
	Wrench open end, 5/16 – 3/8 inch	8710-2409
	Screwdriver Torx TX8	8710-2509
	Screwdriver Hexagonal 2.5 mm	5965-0028
	2 Column holders for μ -LC columns	5001-3702
	Column Regeneration Kit for μ -LC columns, see Table 26 on page 107	G1316-68721
	Capillary column-heat exchanger 90 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87300
	Capillary column-heat exchanger 115 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87321
	Capillary column-heat exchanger 170 mm lg, 0.17 i.d. (not assembled) contains items 2, 3 and 4	G1316-87323

Column Regeneration Kit (G1316A/G1316B SL)

Refer to [Figure 33](#) on page 108 for connection diagram.

Table 26 Column Regeneration Kit

Description	where used	Part Number
Column Regeneration Kit		G1316-68721
SST Capillary, 700 mm x 0.17 mm, 1/32 - 1/32	column to cell	G1312-87304
SST Capillary, 100 mm x 0.12 mm, 1/32 - 1/32	switching capillary	G1316-27301
SST Capillary, 100 mm x 0.12 mm, male/female 1/32 - 1/16	adapter capillary	G1316-87304
SST Capillary, 340 mm x 0.12 mm, male/female 1/32 - 1/16	WPS to valve	G1316-87305
SST Capillary, 70 mm x 0.12 mm, male/female 1/32 - 1/16, qty=2	valve to heatexchanger	G1316-87306
SST Capillary 50 mm x 0.12 mm, male/female	column to cell	G1316-87312
SST Capillary 70 mm x 0.12 mm, male/female	column to cell	G1316-87313
SST Capillary, 75 mm x 0.12 mm, male/female 1/32 - 1/16	valve to detector	G1316-87326
Seat Capillary, 100 mm x 0.12 mm, qty=2		G1367-87303
PEEK fitting, special for Chip-LC		G4240-43200
Flexible PEEK Tubing, 450 mm x 0.4 mm, =1	valve to waste	5022-6503

8 Parts and Materials for Maintenance

Accessory Kits

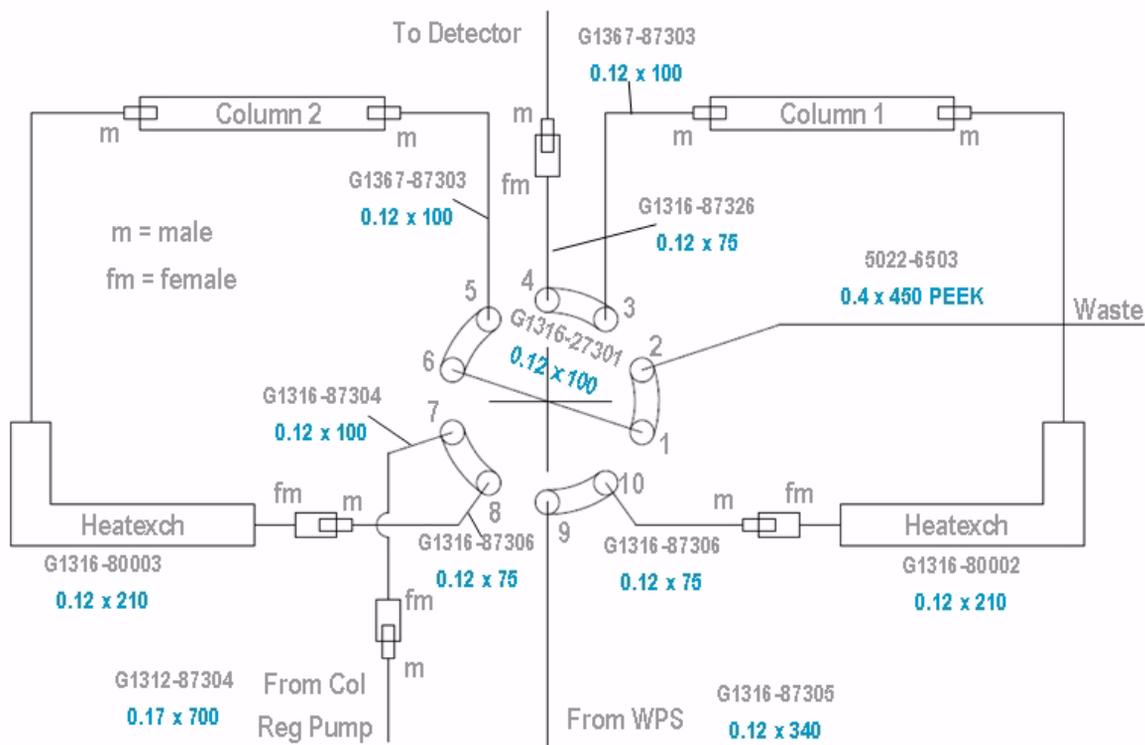


Figure 33 Connection Diagram for Column Regeneration

Accessories (G1316C SL Plus)

Table 27 Accessories (G1316C SL Plus)

Description	Part Number
Transportation Lock Kit G1316C SL Plus, includes following items:	G1316-67001
• Lock Plate	
• Screw M4	
• Screw M3x8 (pack of 4)	
• Spring Washer	
• Transportation Valve Head	

Plastic Parts

Table 28 Plastic Parts

Item	Description	Part Number
2	Front cover G1316A (1200 Series)	G1316-68714
2	Front cover G1316B SL (1200 Series)	G1316-68724
2	Front cover G1316C SL Plus (1200 Series)	G1316-68754
3	Name plate Agilent (1200 Series)	5042-8901

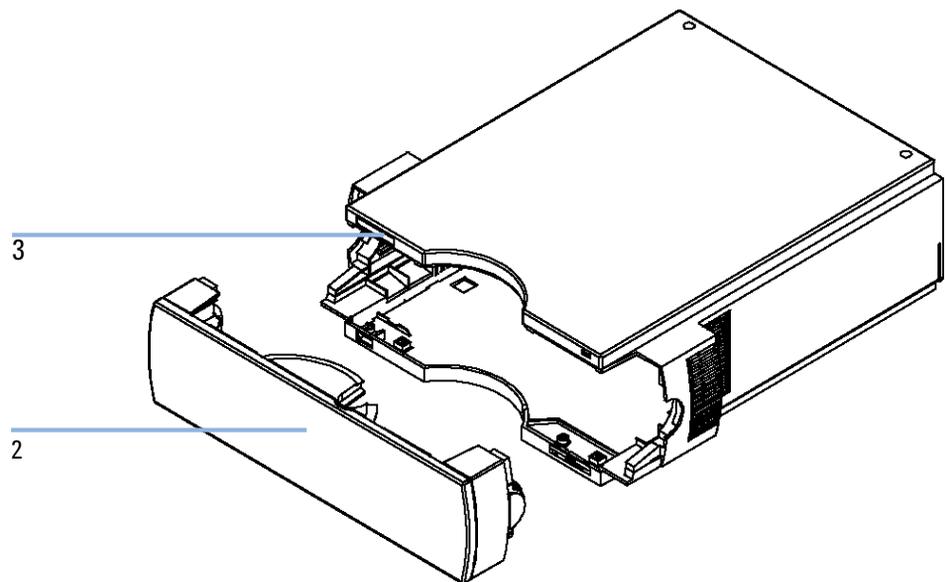


Figure 34 Plastic Parts

Leak Parts

Table 29 Leak Parts G1316A/G1316B SL

Item	Description	Part Number
1	Leak funnel	5041-8388
2	Leak funnel holder	G1316-42300
3	Waste assembly, includes complete Y-tubing assembly with leak funnel	G1316-60002
	Corrugated waste tube (reorder pack), 5 m	5062-2463

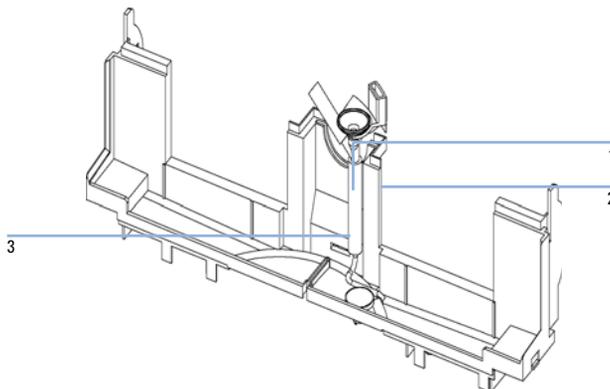


Figure 35 Leak Parts

Table 30 Leak Parts G1316C SL Plus

Item	Description	Part Number
	Leak Panel Kit, includes following items: • Leak Panel Top • Leak Panel Base	G1316-68722
	Leak Tube Kit, includes following items: • Funnel Holder G1316C SL Plus • Tubing-flex polyethylene • Leak Funnel	G1316-67000
1	Capillary Guide	G1316-42303

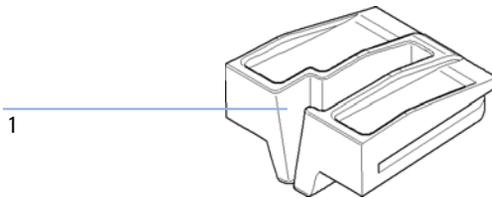
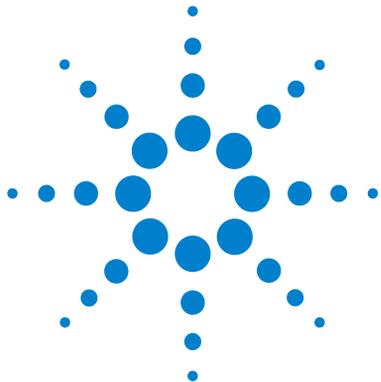


Figure 36 Capillary Guide

8 Parts and Materials for Maintenance

Leak Parts



9 Appendix

Safety Symbols	114
The Waste Electrical and Electronic Equipment Directive	117
Lithium Batteries Information	118
Radio Interference	119
Sound Emission	120
Solvent Information	121
Agilent Technologies on Internet	123

This chapter provides addition information on safety, legal and web.



Safety Symbols

Safety Symbols

Table 31 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.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.
	Indicates eye damage may result from directly viewing the light produced by the deuterium lamp used in this product.
	The apparatus is marked with this symbol when hot surfaces are available and the user should not touch it when heated up.

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.

General Safety Information

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

WARNING

Ensure the proper usage of the equipment.

The protection provided by the equipment may be impaired.

→ The operator of this instrument is advised to use the equipment in a manner as specified in this manual.

General

This is a Safety Class I instrument (provided with terminal for protective earthing) and has been manufactured and tested according to international safety standards.

Operation

Before applying power, comply with the installation section. Additionally the following must be observed.

Do not remove instrument covers when operating. Before the instrument is switched on, all protective earth terminals, extension cords, auto-transformers, and devices connected to it must be connected to a protective earth via a ground socket. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in serious personal injury. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any intended operation.

Make sure that only fuses with the required rated current and of the specified type (normal blow, time delay, and so on) are used for replacement. The use of repaired fuses and the short-circuiting of fuse holders must be avoided.

Some adjustments described in the manual, are made with power supplied to the instrument, and protective covers removed. Energy available at many points may, if contacted, result in personal injury.

Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided whenever possible. When inevitable, this has to be carried out by a skilled person who is aware of the hazard involved. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present. Do not replace components with power cable connected.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Do not install substitute parts or make any unauthorized modification to the instrument.

Capacitors inside the instrument may still be charged, even though the instrument has been disconnected from its source of supply. Dangerous voltages, capable of causing serious personal injury, are present in this instrument. Use extreme caution when handling, testing and adjusting.

When working with solvents please observe appropriate safety procedures (e.g. goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet by the solvent vendor, especially when toxic or hazardous solvents are used.

The Waste Electrical and Electronic Equipment Directive

Abstract

The Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC), adopted by EU Commission on 13 February 2003, is introducing producer responsibility on all electric and electronic appliances starting with 13 August 2005.

NOTE

This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category:

With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a "Monitoring and Control Instrumentation" product.

NOTE



Do not dispose off in domestic household waste

To return unwanted products, contact your local Agilent office, or see www.agilent.com for more information.

Lithium Batteries Information

WARNING

Lithium batteries may not be disposed-off into the domestic waste. Transportation of discharged Lithium batteries through carriers regulated by IATA/ICAO, ADR, RID, IMDG is not allowed.

Danger of explosion if battery is incorrectly replaced.

- Discharged Lithium batteries shall be disposed off locally according to national waste disposal regulations for batteries.
 - Replace only with the same or equivalent type recommended by the equipment manufacturer.
-



WARNING

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.

Udskiftning må kun ske med batteri af samme fabrikat og type.

- Lever det brugte batteri tilbage til leverandøren.
-

WARNING

Lithiumbatteri - Eksplosionsfare.

Ved udskiftning benyttes kun batteri som anbefalt av apparatfabrikanten.

- Brukt batteri returneres apparatleverandøren.
-

NOTE

Bij dit apparaat zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

Radio Interference

Cables supplied by Agilent Technologies are screened to provide optimized protection against radio interference. All cables are in compliance with safety or EMC regulations.

Test and Measurement

If test and measurement equipment is operated with unscreened cables, or used for measurements on open set-ups, the user has to assure that under operating conditions the radio interference limits are still met within the premises.

Sound Emission

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive of 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB.

- Sound Pressure $L_p < 70$ dB (A)
- At Operator Position
- Normal Operation
- According to ISO 7779:1988/EN 27779/1991 (Type Test)

Solvent Information

Flow Cell

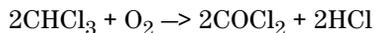
To protect optimal functionality of your flow-cell:

- Avoid the use of alkaline solutions (pH > 9.5) which can attack quartz and thus impair the optical properties of the flow cell.
- If the flow cell is transported while temperatures are below 5 degree C, it must be assured that the cell is filled with alcohol.
- Aqueous solvents in the flow cell can built up algae. Therefore do not leave aqueous solvents sitting in the flow cell. Add a small % of organic solvents (e.g. acetonitrile or methanol ~5%).

Use of Solvents

Observe the following recommendations on the use of solvents.

- Brown glass ware can avoid growth of algae.
- Small particles can permanently block capillaries and valves. Therefore always filter solvents through 0.4 µm filters.
- Avoid the use of the following steel-corrosive solvents:
 - Solutions of alkali halides and their respective acids (for example, lithium iodide, potassium chloride, and so on),
 - High concentrations of inorganic acids like sulfuric acid and nitric acid, especially at higher temperatures (if your chromatography method allows, replace by phosphoric acid or phosphate buffer which are less corrosive against stainless steel),
 - Halogenated solvents or mixtures which form radicals and/or acids, for example:



This reaction, in which stainless steel probably acts as a catalyst, occurs quickly with dried chloroform if the drying process removes the stabilizing alcohol,

9 Appendix

Solvent Information

- Chromatographic grade ethers, which can contain peroxides (for example, THF, dioxane, di-isopropylether) such ethers should be filtered through dry aluminium oxide which adsorbs the peroxides,
- Solvents containing strong complexing agents (e.g. EDTA),
- Mixtures of carbon tetrachloride with 2-propanol or THF.

Agilent Technologies on Internet

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

<http://www.agilent.com>

Select Products/Chemical Analysis

It will provide also the latest firmware of the Agilent 1200 Series modules for download.

Index

A

- Agilent
 - Diagnostic Software 22, 60
 - Lab Advisor Software 22, 60
 - on internet 123
- algae 121, 121
- ambient operating temperature 27
- ambient non-operating temperature 27

B

- battery
 - safety information 118
- bench space 26

C

- calibration
 - temperature 56, 66
- column switching valve (optional)
 - description 15
 - precolumn backflushing 17
- column switching valve (optional)
 - two column selection 16
- column clip 50
- column identification 13
 - tag 49
- column
 - changing column and tags 77
- cool-down time 28
- cooling concept 11
- cooling device
 - post column 30

D

- dead volume 28
- delivery checklist 34
- Diagnostic
 - software 22, 60
- dimensions 27

E

- electrical connections
 - descriptions of 18
- electronic waste 117
- electrostatic discharge (ESD) 74
- environment 26
- error messages 56
- external measuring device
 - information 68

F

- features
 - GLP 28, 29
 - instrument layout 21
 - safety and maintenance 28
- flow cell 121
 - solvent information 121
- frequency range 27
- function test
 - failed 64
 - result 62

G

- GLP features 28

H

- heat exchanger
 - pre-column 30
- heating concept 11
- humidity 27

I

- installation
 - bench space 26
 - capillaries and waste tubings 46
 - column 45, 45
 - flow connections 44
 - module 38
 - power cords 25
 - temperature sensor 69
 - unpacking 34
- instrument layout 21
- internet 123
- introduction
 - concept of heating and cooling 11
 - system overview 11

L

- Lab Advisor
 - software 22, 60
- leaks, correcting 84
- line frequency 27
- line voltage 27
- lithium batteries 118

N

- non-operating altitude 27
- non-operating temperature 27

Index

O

- operating Altitude 27
- operating temperature 27
- optimization 51
- optimizing the performance 52

P

- parts identification
 - leak panels 110
- parts identification
 - plastics 102
- performance
 - Optimization 51
 - optimizing 52
 - specifications and features 28
- physical specifications 27
- physical specifications 27
- post-column
 - cooling device 30
- power consideration 24
- power consumption 27
- power cords 25
- pre-column
 - heatexchanger 30

R

- radio interference 119
- repairs
 - changing the column 77
 - cleaning the instrument 76
 - column switching valve parts 79
 - correcting leaks 84
 - introduction 72
 - overview 75
 - types simple/internal 72
 - warnings and cautions 72

S

- safety class I 115
 - safety information
 - lithium batteries 118
 - safety
 - general information 115
 - standards 27
 - symbols 114, 114
 - serial number
 - information 20
 - site requirements
 - environment 26
 - solvent information 121
 - solvents 121
 - sound emission 120
 - specification
 - physical 27
 - specifications 28
 - stack configuration 35
 - status indicators 56, 57
 - system overview 11
- ### T
- tag
 - installation 49
 - temperature verification
 - principle 69
 - temperature calibration
 - description 66
 - problems 69
 - procedure 68
 - temperature verification
 - external measuring device 68
 - temperature
 - range 28
 - tests
 - available tests vs interface 59
 - test
 - thermostat function test failed 64

- thermostat function test result 62
- thermostat function test 56
- troubleshooting
 - available tests vs interface 59
 - error messages 56
 - status indicators 56, 57

U

- unpacking 34
- User Interfaces
 - diagnostic tests 59

V

- verification
 - temperature 56
- voltage range 27

W

- warm-up time 28
- waste
 - electrical and electronic equipment 117
- WEEE directive 117
- weight 27

In This Book

This manual contains technical reference information about the Agilent 1200 Series thermostatted column compartment.

The manual describes the following:

- introduction and specifications,
- installation,
- using and optimizing,
- troubleshooting and diagnose,
- maintenance and repair,
- parts identification,
- hardware information,
- safety and related information.

© Agilent Technologies 1995, 1996-2008

Printed in Germany
09/2008



G1316-90011



Agilent Technologies