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HP 1050 Series Variable Wavelength Detector

Installation and Maintenance Guide

HP Part No. 79853-90009
Printed in FRG

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HP Part No. 79853-90009

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Warranty

For details of warranty, see "Warranty Statement" in Chapter 5

Safety

For details of safety, see "Safety Information" in Chapter 5



The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect the apparatus against damage.



Indicates dangerous voltages.



Indicates a protected ground terminal.

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Using This Handbook

Use this handbook when you want to *install*, *troubleshoot*, or *maintain* your HP 1050 Series Variable Wavelength Detector.

Chapter 1 describes how to install your detector and prepare it for operation. Chapter 2 contains installation instructions and information for accessories and upgrades. Go to Chapter 3 when you get a not-ready condition or error message, or other error symptom. Here you will be directed to Chapter 4, when it is necessary to replace a part. Chapter 5 gives supplementary information about your detector.

What Other Handbooks Are Available?

Your detector comes complete with 2 further handbooks.

The *User's Guide* describes each of your detector's functions.

Getting it all Together is intended for chromatographic systems comprising only HP 1050 Series modules and shows you how to connect different modules to make a complete system.

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1

Installing Your Detector

This chapter describes how to install and check out your detector. If you want to connect your detector to other HP 1050 Series modules, see *Getting it all Together*.

Choosing a Suitable Place

Check carefully before you begin that the place you have chosen to install your detector meets requirements below.

Dimensions

325 mm × 133 mm × 545 mm

(12.8 inch × 5.2 inch × 21.5 inch)

(width × height × depth)

Leave adequate space, at least 80 mm (3 inch), at rear for access to connectors.

Weight

14 kg (31 lb)

Environment

Temperature 5 to 55°C (40 to 131°F)

Humidity <95% (non-condensing)

Line Power

100 to 120 V AC, ±10% or 220 to 240 V AC, ±10%

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Line Frequency 48 to 66 Hz

Power Consumption 150 VA maximum

Do I Need Anything Else? Waste container or drain

Unpacking Your Detector

Inspect carton. If you find signs of external damage, contact Hewlett-Packard.

Check that you have the items shown in Table 1-1.

Table 1-1. Packing List

Description	Hewlett-Packard Part Number	Check
Power cord	as ordered	. . .
Signal cable	as ordered	. . .
Remote cables	as ordered	. . .
Instruction kit handbooks	79853-90008	. . .
Leak interface kit	79853-68731	. . .
Start-up kit, including:	79853-68701	. . .
One Pozidriv screwdriver #1	8710-0899	. . .
One wrench $\frac{1}{4}$ and $\frac{5}{16}$ inch	8710-0510	. . .
Three 2-amp fuses	2110-0002	. . .
Three 3-amp fuses	2110-0003	. . .

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Accessories

Table 1-2 shows accessories that are available for use with your detector.

Table 1-2. Accessories

Description	Hewlett-Packard Part Number	Check
Deuterium lamp	79883-60002	
Standard flow cell (stainless steel)	79853-60008	
Standard flow cell (titanium)	79853-60011	
Semi-micro flow cell (stainless steel)	79853-60010	
High-pressure flow cell (stainless steel)	79853-60009	
Preparative flow cell (titanium)	79853-60012	

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Table 1-2. Accessories (continued)

Description	Hewlett-Packard Part Number	Check
Parts for standard flow cell		
Standard flow cell kit, including 2 windows, 2 gaskets #1, 1 gasket #2, and 1 gasket #3	79853-68718	
Windows, quartz (pack of2)	79853-68719	
Gaskets #1, PTFE (pack of 10)	79853-68720	
Gaskets #2, PTFE (pack of 5)	79853-68721	
Gaskets #3, PTFE (pack of 5)	79853-68722	
Cell screw	79853-27201	
Cell rings (pack of 2)	79853-27202	
Springs (pack of 10)	79853-27203	
Parts for semi-micro flow cell		
Semi-micro flow cell kit, including 2 windows, 2 gaskets #1, and 2 gaskets #2	79853-68723	
Windows, quartz (pack of 2)	79853-68719	
Gaskets #1, PTFE (pack of 10)	79853-68720	
Gaskets #2, PTFE (pack of 10)	79853-68724	
Cell screw	79853-27201	
Cell rings (pack of 2)	79853-27202	
Springs (pack of 10)	79853-27203	

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Table 1-2. Accessories (continued)

Description	Hewlett-Packard Part Number	Check
Parts for high-pressure flow cell		
High-pressure flow cell kit, including 2 windows, 1 gasket #1, and 1 gasket #2	79853-68728	
Windows, quartz (pack of 2)	79853-68714	
Gaskets #1, polyimide (pack of 5)	79853-68729	
Gaskets #2, polyimide (pack of 5)	79853-68730	
Cell screw	79853-27201	
Cell rings (pack of 2)	79853-27204	
Parts for preparative flow cell		
Preparative flow cell kit, including 1 window #1, 1 window #2, 1 gaskets #1, 4 gaskets #2 (1 of each size), and 1 gasket #3	79853-68725	
Window kit, including 1 window #1 and 1 window #2	79853-68726	
Windows #1,quartz (pack of 2)	79853-68719	
Gaskets #1, PTFE (pack of 10)	79853-68720	
Gaskets #2, PTFE (1 of each size)	79853-68727	
Gaskets #3, PTFE (pack of 5)	79853-68732	
Cell screw	79853-27201	
Springs (pack of 10)	79853-27203	
Communication Interface, including HP-IB card and HP-IB cable	79853C #305 or 79853-68711	

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Setting Up Your Detector

Place detector on bench, allowing adequate space at rear for access to connectors.

WARNING **Ensure that line-power cord is disconnected before setting up your Variable Wavelength Detector.**

WARNUNG **Während der Installation Ihres Variable Wavelength Detectors darf das Netzkabel nicht angeschlossen sein.**

CUIDADO **Asegúrese que el cable de red está desconectado antes de instalar su Variable Wavelength Detector.**

ATTENTION **Assurez vous que le cable secteur n'est pas connecté avant d'installer votre Variable Wavelength Detector.**

ATTENZIONE **Assicuratevi che il cavo di alimentazione sia scollegato prima di installare il Variable Wavelength Detector.**

WAARSCHUWING **Zorg dat het netsnoer is losgekoppeld, voordat de Variable Wavelength Detector wordt geinstalleerd.**

Note If you have more than one HP 1050 Series module, see *Getting it all Together* which recommends suitable arrangements of the different modules.

Each detector is identified by a 10-digit serial number on a label attached to the rear panel.

The serial number of my detector is:

. . . . . .

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Removing the Locking Screws

To prevent damage during transport, the optical unit is secured by locking screws.

1. Place detector on side as shown in Figure 1-1.
2. Remove locking screws and spacers using a Pozidriv #1 screwdriver, see Figure 1-1.

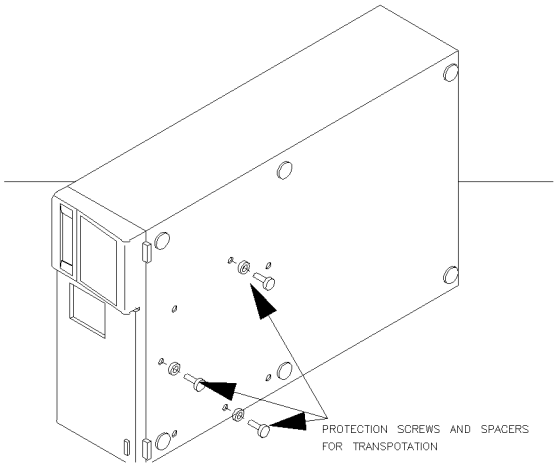


Figure 1-1. Position of Locking Screws and Spacers

3. Screw locking screws and spacers in holes on rear panel as shown in Figure 1-2. You will need the screws and spacers again if you want to transport your detector.

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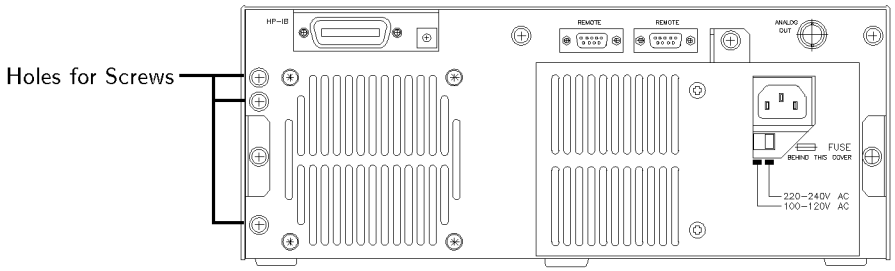


Figure 1-2.
Holes on Rear Panel for Locking Screws and Spacers

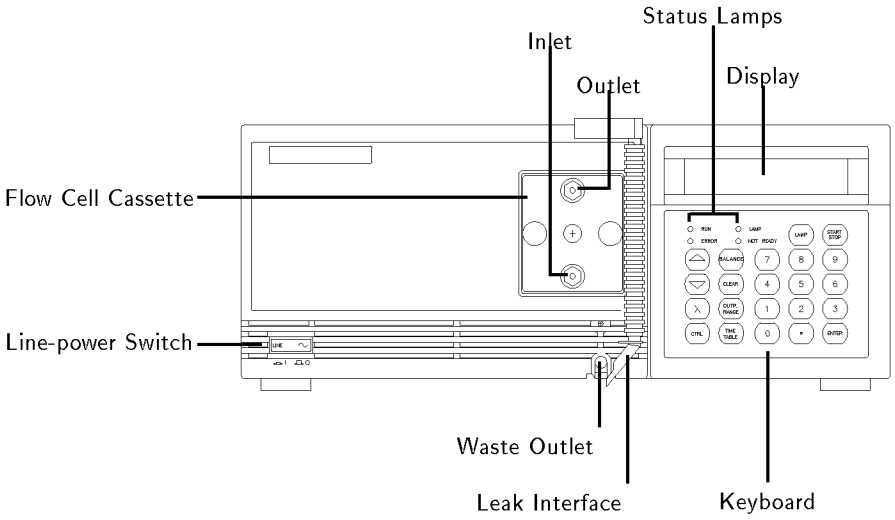


Figure 1-3. Front of Detector

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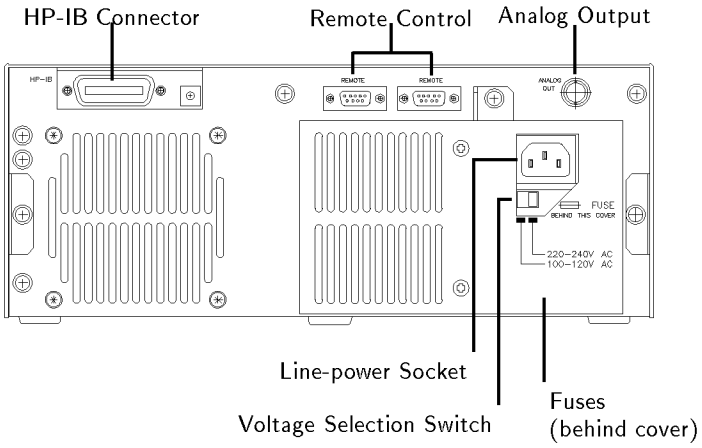


Figure 1-4. Rear of Detector

Waste Drain

The waste drain is located on the detector front panel as shown in Figure 1-5.

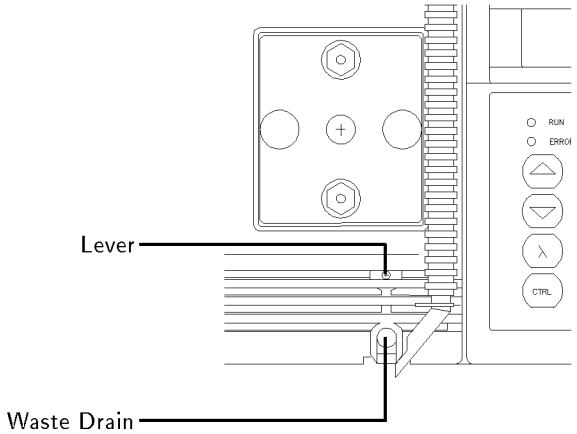


Figure 1-5.
Position of Waste Drain and Lever

The waste line of your detector contains a small reservoir with a leak sensor (thermistor) to detect leaks. When a leak is detected a shut down signal is sent from the REMOTE connector which is used to stop your pump.

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Before you re-start your analysis, empty the reservoir by pushing lever, see Figure 1-5 and ensure that the leak sensor is dry.

If your detector is in a stack of HP 1050 Series modules, connect the leak interface to the front of the detector, see Figure 1-3. Any solvent leaking from a module on top of the detector will be led safely to the module underneath the detector.

WARNING

When you stack the modules make sure the feet of the upper module fit properly in the groove of the lower module. If the modules are not aligned properly, waste or leaking solvent may flow into the electronic parts of the modules.

WARNUNG

Achten Sie beim Stapeln der Module darauf, daß die Standflächen des oberen Moduls richtig in der Nut des unteren Moudls sitzen. Wenn die Module nict richtig ausgerichtet sind, kann Lösungsmittelabfall oder durch ein Leck austretendes Lösungsmittel zu den elektronischen Teilen der Module gelangen.

CUIDADO

Al apilar los módulos, asegúrese de que las superficies de apoyo del módulo superior se asienten correctamente en la ranura del módulo inferior. Si los móulos no están bien alineados, pueden penetrar sobrantes o fugas de disolvente en las partes electrónicas de los módulos.

ATTENTION

Lors de l'empilement des modules, veiller à ce que les surfaces d'appui du module supérieur soient bien engagées dans la rainure du module inférieur. Si les modules ne sont pas alignés correctement, le liquide usagé ou du solvant peut s'écouler sur les comosants électroniques.

ATTENZIONE

Impilando i moduli fare attenizone che le superfici di apoggio del modulo superiore vengano alloggiate correttamente nella scanalatura del modulo inferiore.

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Se i moduli non sono allineati correttament, lo scarico o il solvente fuoriuscito può fluire nei componenti ellettronici dei moduli.

WAARSCHUWING

Wanneer de modules worden gestapeld, zorg er dan voor dat de voet van het bovenste moduul precies in de groef van het onderste moduul past. Wanneer de modules niet precies boven elkaar staan, kunnen gemorste of weglekkende oplossingen in de elektronische delen van de modules lopen.

Solvent Inlet and Outlet

1. Connect the inlet capillary of the flow cell to the column outlet connection of your liquid chromatograph.
2. Place the outlet capillary of the flow cell in a suitable waste container.

Analog Output

The ANALOG OUT connector provides either a 100 mV or a 1 V maximum signal output. To select the output voltage, use the control 11 function, see *User's Guide*.

Check that you have the correct signal cable. The part number is in a sheath around the cable.

Table 1-3. Signal Cables

From Detector To:	Part Number	Check
HP 3390A/HP 3392A/		
HP 3393A Integrator	01040-60101	. . .
HP 3394A/HP 3396A Integrator	35900-60750	. . .
Non-HP Integrator	01046-60105	. . .
HP 35900A Dual Channel Interface	35900-60750	. . .
HP 18652 A/D Converter	01046-60103	. . .
HP 1084 Liquid Chromatograph	8120-1840	. . .

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Connect the signal cable to the ANALOG OUT connector and connect the other end to the analog input on your integrator or recorder.

Remote Control

The APG (Analytical Product Group) REMOTE connectors give access to the remote bus. The remote bus comprises lines to start an analysis (start request line, prepare line, ready line), lines to synchronize start and stop (start line, stop line) and a line for emergency stop if a leak occurs (shut down line).

The APG REMOTE connectors are identical: you can connect the other modules in your system to either one.

Check that you have correct remote control cables. The part number is in a sheath around the cable.

Table 1-4. APG Remote Control Cables

From Detector To:	Hewlett-Packard Part Number	Check
Any HP 1050 Series module	5061-3378	. . .
HP 3390A Integrator	01046-60203	. . .
HP 3392A or HP 3393A Integrator	01046-60206	. . .
HP 3394A Integrator	01046-60210	. . .
HP 3396A Integrator	03394-60600	. . .
HP 18652A A/D Converter	01046-60204	. . .
HP 35900A A/D Converter	5061-3378	. . .
Universal	01046-60201	. . .

Push the metal plug of the remote control cable into one of the REMOTE connectors on the rear panel. There is only one way to position the plug. Tighten the two screws to secure the plug. Connect the other end of the remote control cable to a REMOTE connector on another HP 1050 Series module or a data handling device.

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If you have a non-Hewlett-Packard module, connect the crimp contacts on the end of the remote control cable (part number 01046-60201) to connectors on your non-HP module. Figure 1-6 shows the functional parts of the REMOTE connector.

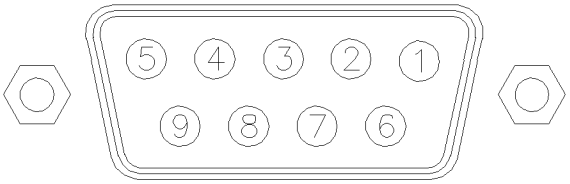


Figure 1-6. APG REMOTE Connector

To help you make the correct connections, the signals carried on each pin are shown in Table 1-5. The colors refer to wires of the remote cable (part number 01046-60201).

Table 1-5.
APG Remote Control Connector Functions

Pin	Signal	Wire Color	Activity
1	Digital ground	white	none
2	Prepare run	brown	low
3	Start	gray	low
4	Shut down	blue	low
5	Not used	pink	none
6	Power on	yellow	high
7	Ready	red	high
8	Stop	green	low
9	Start request	black	low

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Line Voltage

Check that the line-voltage selector is set to the correct line voltage for operation in your laboratory.

WARNING **Ensure that line-power cord is disconnected before changing line-voltage setting.**

WARNUNG **Wenn der Netzspannungswahlschalter betätigt wird, darf das Netzkabel nicht angeschlossen sein.**

CUIDADO **Asegúrese que el cable de red está desconectado antes de cambiar el selector de voltaje.**

ATTENTION **Assurez vous que le cable secteur n'est pas connecté avant de changer la tension d'alimentation.**

ATTENZIONE **Assicuratevi che il cavo di alimentazione sia scollegato prima di spostare il selettore di voltaggio.**

WAARSCHUWING **Zorg dat de voedingskabel losgekoppeld is, voordat de voedingsspanning wordt veranderd.**

To change setting:

1. Insert tip of small screwdriver in slot on switch.
2. Slide switch to correct position.

Fuses

Check that the correct fuse is installed for the voltage operation you have selected. The fuses are behind the power supply cover. Remove the cover to access the fuses.

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Table 1-6. Fuses

Voltage	Fuse	Hewlett-Packard Part Number
220 to 240 V AC	F 2 AMP	2110-0002
100 to 120 V AC	F 3 AMP	2110-0003

WARNING **Ensure that line-power cord is disconnected before installing or replacing a fuse.**

WARNUNG **Sicherungen dürfen nur bei nicht angeschlossenem Netzkabel ersetzt oder gewechselt werden.**

CUIDADO **Asegúrese que el cable de red está desconectado antes de instalar o cambiar un fusible.**

ATTENTION **Assurez vous que le cable secteur n'est pas connecté avant de changer un fusible.**

ATTENZIONE **Assicuratevi che il cavo di alimentazione sia scollegato prima di installare o sostituire un fusibile.**

WAARSCHUWING **Zorg dat de voedingskabel losgekoppeld is, voordat een zekering wordt geplaatst of vervangen.**

To install a fuse:

1. Loosen screw that secures power supply cover and remove cover.
2. Use a screwdriver to push fuse cap inwards and then turn counterclockwise.
3. Place new fuse in fuse cap.
4. Insert fuse and cap into fuse receptacle, pressing and turning clockwise until cap locks in place.
5. Replace power supply cover.

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Power Cord

Insert power cord into line-power socket at rear of detector. Connect other end of power cord to a suitable power source, as specified in "Choosing a Suitable Place".

WARNING

The Variable Wavelength Detector panels and cabinet must be grounded during operation. The Variable Wavelength Detector, and any other instruments connected to it, must be operated from a three-contact power source, with the ground contacts securely connected to ground. Get an electrician to check and verify ground at the source.

WARNUNG

Um den Benutzer zu schützen, muß der Variable Wavelength Detector geerdet sein. Ihr Variable Wavelength Detector ist mit einem 3-adrigen Netzkabel und einem 3-poligen Stecker ausgestattet, der Ihren Variable Wavelength Detector mit der Schutzerde verbindet, sobald der Stecker in eine passende Steckdose gesteckt wird.

CUIDADO

El Variable Wavelength Detector debe ser conectada a una toma de tierra para protegerle durante su operación. El Variable Wavelength Detector y cualquier otro instrumento conectado a ella deben operar desde una fuente de energía de tres contactos, con el contacto de tierra conectado con certeza a tierra. Pídale a un electricista que compruebe la tierra de la fuente.

ATTENTION

Le Variable Wavelength Detector doivent avoir leurs panneaux et chassis mis à la terre pour votre protection pendant l'utilisation. Le Variable Wavelength Detector et tous les instruments qui lui sont connectés doivent être alimentés à l'aide d'un cable à trois fils avec les contacts terre fermement reliés à la terre. Demandez à un électricien de verifier la mise à la terre.

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ATTENZIONE

Per proteggere l'operatore i pannelli dello strumento e la struttura esterna devono essere collegati a terra. Il sistema il rivelatore ed ogni alto strumento connesso ad essa deve lavorare con un cavo di alimentazione a tre conduttori, con il filo di terra adeguatamente collegato a terra. Verificate la vostra linea di terra prima di installare lo strumento.

WAARSCHUWING

De panelen en de behuizing van de Variable Wavelength Detector moeten gedurende de werking geaard zijn. De Variable Wavelength Detector en alle andere instrumenten die hierop zijn aangesloten, moeten worden gevoed door een drie-aderige voeding, waarvan de aardielding op de juiste manier is aangesloten. Schakel een elekticien in om te controleren of de voeding op de juiste wijze geaard is.

Ground Connector

If you have a measuring instrument that has a safety ground connector, connect the grounding cable from your instrument to the ground connector on the rear panel of your detector.

Installing HP-IB Board

The HP-IB board allows communication between your detector and a ChemStation controller.

WARNING

Ensure that line-power cord is disconnected before installing a board.

WARNUNG

Stecken Sie das Netzkabel aus, bevor Sie eine Karte installieren.

CUIDADO

Asegurese que el cable de red esta desconectado antes de instalar la tarjeta.

ATTENTION

Assurez vous que le cordon d'alimentation est déconnecté avant d'installer la carte.

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ATTENZIONE	**Assicuratevi che il cavo di alimentazione sia scollegato prima di installare la scheda.**
WAARSCHUWING	**Zorg dat het netsnoer is losgekoppeld, voordat een board wordt geinstalleerd.**
CAUTION	The board contains electronic parts that are sensitive to electrostatic discharge. Do not attempt to install the board, unless you use a portable grounding kit (part number 9300-0794). Do not touch any of the components on the board. Do not place the board on any plastic or plastic-coated surface.
ACHTUNG	Die Karte enthlält elektronische Bauteile, die gegen elektrostatische Entladung empfindlich sind. Verwenden Sie daher bei der Installation der Karte immer ein Elektrostatisches Erdungskit (Teilenummer 9300-0794). Fassen Sie keine Bauteile auf der Karte an. Legen Sie die Karte nicht auf Plastikoberflächen.
PRECAUCION	La tarjeta contiene componentes electrónicos que son sensibles a las eléctricas. No intente instalar esta tarjeta a no ser que utilize un equipo portable de puesta a tierra. No toque ninguno de los componentes de la tarjeta. No coloque la tarjeta sobre ninguna superficie de plastico o plastificada.
ADVERTISSEMENT	La carte porte des composants électroniques qui sont sensibles aux decharges électrostatiques. N'essayez pas d'installer cette carte sans l'ensemble portable de mise à la terre. Ne touchez aucun des composants. Ne posez pas la carte sur une surface plastique ou recouverte de plastique.
ATTENZIONE	La scheda contiene parti elettroniche sensibili alle scariche elettriche. Non toccate i componenti della

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scheda. Non posate la scheda sopra superfici di plastica. Installate la scheda solo con un kit di messa a terra.

VOORZICHT

Het board bevat elektronische onderdelen die gevoelig zijn voor elektronische ontlading. Probeer niet om het board te installeren, tenzij u gebruik maakt van een verplaatsbare aardingsset (onderdeelnummer 9300-0794). Geen van de componenten van het board mag ooit worden aangeraakt. Het board mag nooit op een plastic of een met plastic gecoate ondergrond worden geplaatst.

1. Remove detector top cover, see "Changing Deuterium Lamp" in Chapter 4.
2. Remove HP-IB cover plate from rear panel, see Figure 1-4.
3. Insert HP-IB board and connect HP-IB ribbon cable to J12 on DCB board.
4. Replace detector top cover.

Checking Out Your Detector

The noise and drift specifications of your detector are $<1.5 \times 10^{-5}$ AU and 5×10^{-4} AU/h respectively.

Note

Allow a minimum time of one hour for the detector to stabilize before verifying the performance.

To check this specification you need:

- a pump that can deliver bidistilled water at rate of up to 1 ml/min against a back-pressure of about 200 bar;
- a column: we recommend our 100 x 2.1 mm i.d., 5 μm, Hypersil ODS column (part number 79916OD-552) or our 100 x 4.6 mm i.d., 5 μm, Hypersil ODS column (part number 79916OD-554);

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- a recording device that can accept the output signal from the absorbance detector and that has attenuation set to about 100 to 200 μV full scale.

Preparing the Detector

1. Turn on line power.
2. Turn on deuterium lamp,

   press [LAMP ON/OFF] [ENTER].
3. Set wavelength to 254 nm,

   press [λ] [2] [5] [4] [ENTER].
4. Set response time to 1 second,

   press [CTRL] [7] [ENTER] [ENTER] [▼] [ENTER].
5. Set output voltage to 1 V, press

   [CLEAR] [CTRL] [1] [1] [ENTER] [ENTER] [1] [ENTER].

Preparing the Pump

1. Prime the pump and ensure there are no air bubbles in the system.
2. Thoroughly degas about 300 ml of bidistilled water.
3. Set pump to deliver bidistilled water at a flow rate of 1 ml/min.

Preparing the Recording Device

1. Set the attenuation to about 100 to 200 μV full scale.
2. Set analysis time to 6.0 minutes.

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Starting a Run

To start a run, press START STOP.

The baseline noise should not exceed 7.5 μV (1.5×10^{-5} AU) equivalent to 4.5 mm at attenuation −3 on an HP 3390/2/3 integrator and equivalent to 9 mm at attenuation −3 on an HP 3394/6 integrator.

Table 1-7 shows the scaling factors for the HP 339XA family of integrators. The HP 3390A, HP 3392A, and HP 3393A have a full scale deflection of 75 mm. The HP 3394A and the HP 3396A have a full scale deflection of 150 mm, they also have an attenuation range between −8 and 36.

Table 1-7. Integrator Scaling Factors

Attenuation	mV/Full Scale	mAU/Full Scale
−3	0.125	0.25
−2	0.25	0.5
−1	0.5	1
0	1	2
1	2	4
2	4	8
3	8	16
4	16	32
5	32	64
6	64	128
7	128	256
8	256	512
9	512	1024
10	1024	2048

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2

Installing Accessories

This chapter contains installation instructions and information for accessories and upgrades.

- Installing the Leak Interface
- High-Pressure Flow Cells

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3

Troubleshooting Your Detector

In this chapter we have organized the error conditions and malfunctions together, starting from the point where the condition can occur. This organization gets you to the source of a problem fast, without having to read through long lists of error messages.

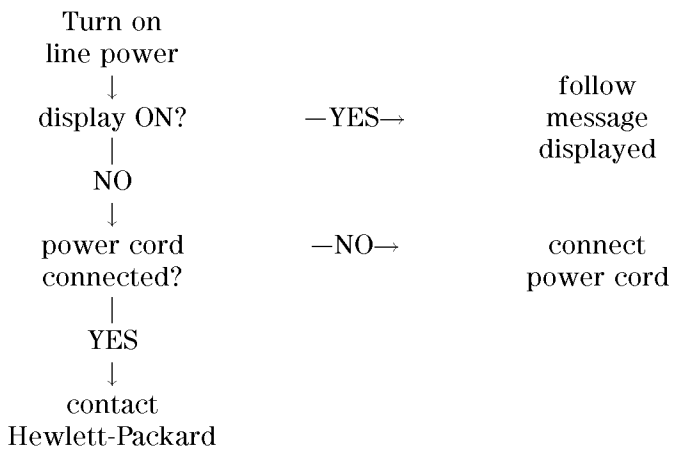
Whenever you must make a repair or replace a part, we will reference the appropriate procedure in Chapter 4.

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Troubleshooting During Start-Up

When you hold down the CTRL key and turn on line power, your detector does a series of self-tests followed by initialization. The following errors can occur:

Detector Down



ROMTEST FIM failed at U4	ROM test failed.	Contact Hewlett-Packard.
RAMTEST CMP failed at XXXXH	RAM test failed.	Contact Hewlett-Packard.

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Error Messages

Error messages are generated when an error occurs in your detector. The error message is written in the logbook.

If an error occurs, the operation of your detector is stopped and is not continued until the error is corrected.

Not Ready Conditions

Not ready conditions indicate the present condition of the detector. The not ready conditions are written after the nRdy: prompt in the status display. For example, `nRdy: leak` is displayed if a leak is detected.

If a not ready condition occurs, the detector makes a connection between pins 1 and 7 of the REMOTE connector. The detector makes this connection for as long as the not ready condition exists. When the not ready condition is removed the connection is broken and the detector operates again.

A not ready condition can pause automated operation which will only continue when the not ready condition is removed.

Troubleshooting During Operation

The following errors messages can occur at any time during operation. The ERROR lamp on the front panel will be on and the error message shown in the left margin will be shown in the display.

If the error still remains after you have checked or replaced the parts described, contact Hewlett-Packard.

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LEAK DETECTED	Flow cell fittings loose.	Tighten flow cell fittings, see “Cleaning Standard Flow Cell” in Chapter 4.
	Flow cell gaskets deteriorated.	Exchange flow cell gaskets, see “Cleaning Standard Flow Cell” in Chapter 4.
	Flow cell window broken.	Exchange flow cell window, see “Cleaning Standard Flow Cell” in Chapter 4.
LAMP ERROR	Deuterium lamp not connected.	Connect deuterium lamp, see “Changing Deuterium Lamp” in Chapter 4.
	Deuterium lamp has not ignited.	Exchange deuterium lamp, see “Changing Deuterium Lamp” in Chapter 4.
LOW ILLUMINATION	Deuterium lamp deteriorated.	Check if cell is clean. Exchange deuterium lamp, see “Changing Deuterium Lamp” in Chapter 4.
DATA UNDERFLOW	Flow cell window dirty.	Clean flow cell window, see “Cleaning Standard Flow Cell” in Chapter 4.
DATA OVERFLOW	Flow cell incorrectly positioned.	Adjust flow cell position.
ADC DATA OVERFLOW	Too much light through cell.	Press (BALANCE). Check correct order of cell parts.
EEROM DATA LOST 0	Parameters lost and set to default values.	Re-enter wavelength, response time or timetables.

The following error messages are also possible. If you see any of these messages, turn off the line power and then turn on the line power again. If the error message still remains, contact your local Hewlett-Packard office.

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	(blank display) Display failed.
ROM FAILURE	ROM (Read Only Memory).
RAM FAILURE	RAM (Random Access Memory).
L.SENSOR TROUBLE	Leak sensor or leak detection circuit.
VOLTAGE ERROR	Voltage for the digital and analog electronics.
ADC TROUBLE	ADC (Analog to Digital Converter).
DAC TROUBLE	DAC (Digital to Analog Converter).
RELAY FAILURE	Output voltage selection relay.
λ SET TROUBLE	Wavelength setting mechanism.
EEROM DATA LOST 1	Data lost from EEROM 1.
EEROM DATA LOST 2	Data lost from EEROM 2.
EEROM DATA LOST 3	Data lost from EEROM 3.
FILTER ERROR	Beam cut filter.

Troubleshooting the Chromatogram

The quality of your chromatographic results depends on the performance of all modules in the chromatographic system (pump, injector, column, detector, etc.). If all the modules in your system perform according to the manufacturer's specification, an application problem might be preventing good chromatographic results. Use the following guide to help identify the source of the fault.

Retention Times Not Reproducible

Unstable flow.	Check flow system to improve flow stability.
Gas bubbles in pump.	Shake all bubbles from solvent inlet filters, degas thoroughly and prime pump.
Leaks.	Disconnect detector and check pressure tightness of other modules.

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	Unstable column temperature.	Check stability of column temperature.
	Impurities on column.	Flush column with solvent of high elution strength.
	Column not conditioned:	
	1. Conditioning time too short;	Condition column (for ion-pair chromatography, conditioning times can be long).
	2. Water content (in adsorption chromatography on silica) not constant;	Add defined amount of water to solvent or change to reversed phase chromatography.
	3. New column loses polymeric material (chemically modified silica);	Flush column with solvent of high elution strength.
	4. Chemical reaction between sample and stationary phase.	Use another type of column.
Areas Not Reproducible	Unstable flow.	Check flow system to improve flow stability.
	Gas bubbles in pump.	Shake all bubbles from solvent inlet filters, degas thoroughly and prime pump.
	Leaks.	Disconnect detector and check pressure tightness of other modules.
	Injection not reproducible.	Check performance of your injector.
	Impure solvents cause baseline drift in gradient elution.	Use pure solvents. Make sure conditioning times before analysis are equal.
	Solvent absorbs at analysis wavelength.	Change wavelength.

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Baseline Noise	Flow rate too high.	Reduce flow.
	Unstable flow.	Check flow system to improve flow stability.
	Non-miscible solvents.	Use suitable solvents.
	UV-absorbing solvents.	Change wavelength.
Baseline Wander	Unstable column temperature.	Check stability of column temperature. Thermally insulate detector inlet capillary.
	Gas bubbles in pump.	Shake all bubbles from solvent inlet filters, degas thoroughly and prime pump.
	Solvents not mixed completely.	Use suitable solvents or add a mechanical mixer.
Baseline Drift	Non-conditioned or new column.	Flush column with solvent of high elution strength.
	Sample impurities that elute slowly.	Flush column with solvent of high elution strength.
	Gradient with dirty or UV-absorbing solvents.	Use pure solvents or change wavelength.
	Leaks.	Disconnect detector and check pressure tightness of other modules.
	Detector flow cell contaminated.	Flush flow cell.
Baseline Offset	Solvents or buffers not totally miscible over wavelength range.	Change solvents.

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Tailing Peaks	Poor column.	Check column performance. Check top of column for voids, repack if necessary.
	Non-thermodynamic interaction between stationary phase and sample.	Use modifiers or change stationary phase.
Heading Peaks	Column overloaded.	Reduce sample concentration of injection volume.
Double Peaks of One Substance	Poor column.	Check column performance.
	High sample volume injected in solvent with higher elution strength than mobile phase.	Use solvent for sample with lower elution strength than mobile phase.
Excessive Baseline Disturbance After Injection	High pressure drop after injection.	Check performance of your injector.
Air Bubbles in Flow Cell	Before you start to check the other modules, we recommend you check the flow cell of your detector. Air bubbles in the flow cell are a common cause of chromatogram problems and can generally be recognised by the baseline shape, see Figure 3-1.	

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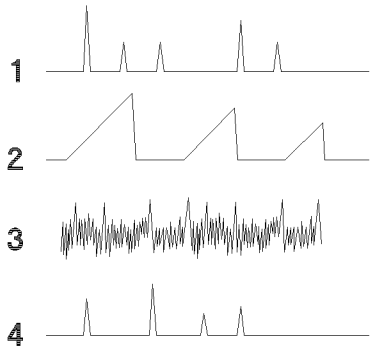


Figure 3-1. Baseline Shapes

1. Temporary spiking caused by occasional bubbles passing through the flow cell.
2. Sawtooth baseline caused by bubbles expanding in the flow cell and then being removed.
3. Continuous spiking with high baseline noise caused by bubbles continually passing through the flow cell.
4. Continuous spiking occuring at each pump stroke caused by trapped bubbles in the flow cell.

Removing Air Bubbles

You can remove air bubbles from the flow cell by increasing the flow to 5 ml/min. Ensure that the maximum flow cell pressure does not exceed 20 bar and the increased pressure does not affect your column.

If an air bubble is in the flow cell, the sample photocurrent is lowered because the light passes through the bubble, so reducing the amount of light reaching the photodiode.

Using the control 16 function you can check the sample photocurrent. When the air bubble is removed the sample photocurrent increases and the baseline is stable.

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4

Maintaining Your Detector

This chapter describes the maintenance tasks you can do on your detector. Do only the maintenance specified in this chapter. Other maintenance or repairs must be done by Hewlett-Packard trained personnel. Unauthorized maintenance can be dangerous. Damage caused by unauthorized maintenance is not covered by warranty.

CAUTION

The board contains electronic parts that are sensitive to electrostatic discharge. Do not attempt to install the board, unless you use a portable grounding kit (part number 9300-0794). Do not touch any of the components on the board. Do not place the board on any plastic or plastic-coated surface.

ACHTUNG

Die Karte enthlält elektronische Bauteile, die gegen elektrostatische Entladung empfindlich sind. Verwenden Sie daher bei der Installation der Karte immer ein Elektrostatisches Erdungskit (Teilenummer 9300-0794). Fassen Sie keine Bauteile auf der Karte an. Legen Sie die Karte nicht auf Plastikoberflächen.

PRECAUCION

La tarjeta contiene componentes electrónicos que son sensibles a las eléctricas. No intente instalar esta tarjeta a no ser que utilize un equipo portable de puesta a tierra. No toque ninguno de los componentes de la tarjeta. No coloque la tarjeta sobre ninguna superficie de plastico o plastificada.

ADVERTISSEMENT

La carte porte des composants électroniques qui sont sensibles aux decharges électrostatiques. N'essayez pas d'installer cette carte sans l'ensemble portable de mise

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à la terre. Ne touchez aucun des composants. Ne posez pas la carte sur une surface plastique ou recouverte de plastique.

ATTENZIONE

La scheda contiene parti elettroniche sensibili alle scariche elettriche. Non toccate i componenti della scheda. Non posate la scheda sopra superfici di plastica. Installate la scheda solo con un kit di messa a terra.

VOORZICHT

Het board bevat elektronische onderdelen die gevoelig zijn voor elektronische ontlading. Probeer niet om het board te installeren, tenzij u gebruik maakt van een verplaatsbare aardingsset (onderdeelnummer 9300-0794). Geen van de componenten van het board mag ooit worden aangeraakt. Het board mag nooit op een plastic of een met plastic gecoate ondergrond worden geplaatst.

Note

Any adjustments, calibrations or maintenance described in this handbook are not covered by warranty.

Changing Deuterium Lamp

When: as necessary.

(Deuterium lamp part number 79883-60002).

Stage 1: Removing Lamp

1. Turn off line power.

WARNING

Ensure that line-power cord is disconnected.

WARNUNG

Stellen Sie sicher, daß das Netzkabel ausgesteckt ist.

CUIDADO

Asegúrese que el cable de red está desconectado.

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ATTENTION **Assurez vous que le cable secteur n'est pas connecté.**

ATTENZIONE **Assicuratevi che il cavo di alimentazione sia scollegato.**

WAARSCHUWING **Zorg dat het netsnoer is losgekoppeld.**

2. Remove detector top cover by removing screws (A) and then pulling backwards (1) and lifting up (2) as shown in Figure 4-1.

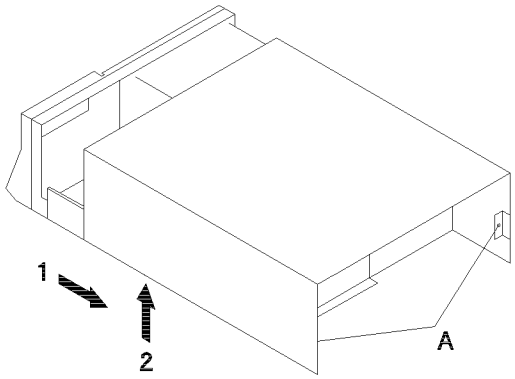


Figure 4-1. Removing Detector Top Cover

WARNING **If detector has been in use, the lamp may be hot. If so, wait for 5 to 10 minutes until lamp cools.**

WARNUNG **Wenn die Detektorlampe eingeschaltet war, kann die Lampe sehr heiß sein. Lassen Sie bitte die Lampe 5 bis 10 Minuten abkühlen, bevor Sie diese anfassen.**

PRECAUCION **Si el detector se ha estado usando, la lámpara puede estar caliente. Espérese 5 - 10 minutes hasta que la lámpara se enfrie.**

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ATTENTION

Si le détecteur a été utilisé, la lampe peut être encore chaude, si c'est le cus attendez 5 à 10 minutes qu'elle refroidisse.

ATTENZIONE

Se il rivelatoore e'stato usato poco prima, la lampada puo'essere molto calda: in questo caso attendere 5 - 10 minuti perche'si raffreddi.

WAARSCHUWING

Wanneer de detector werd gebruikt is het mogelijk dat de lamp heet is. Wacht in dat geval vijf tot tien minuten, dat de lamp is afgekoeld.

3. Disconnect lamp connector.
4. Unscrew two screws on lamp and remove lamp.

Stage 2: Inserting New Lamp

1. Insert lamp into lamp housing and secure it with the screws.
2. Connect lamp connector.
3. Replace top cover.

Stage 3: Calibrating Zero-Order Light

1. Turn on line power.
2. Turn on lamp, press (LAMP ON/OFF) (ENTER).
3. Select control function 20 to calibrate the zero-order light of the grating.

   Press (CTRL) (2) (0) (ENTER) (ENTER)

   to display `200step CHANGE?` .
4. Press (ENTER) to continue the calibration and then wait about 20 seconds.
5. Press (ENTER) and the detector will store the step number in its electronic memory.
6. Press (CLEAR).

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Calibrating Wavelength Accuracy

1. Select control function 21 to calibrate the wavelength accuracy of the grating.

   Press CTRL 2 1 ENTER NETER

   to display `656nm 1978 step`.

2. Press ENTER to continue the calibration and then wait about 30 seconds.
3. Press ENTER and the detector will store the step number in its electronic memory.
4. Press CLEAR

Removing the Flow Cell

When: as necessary.

1. Unscrew screws on flow cell cassette and remove cassette, see Figure 4-2.

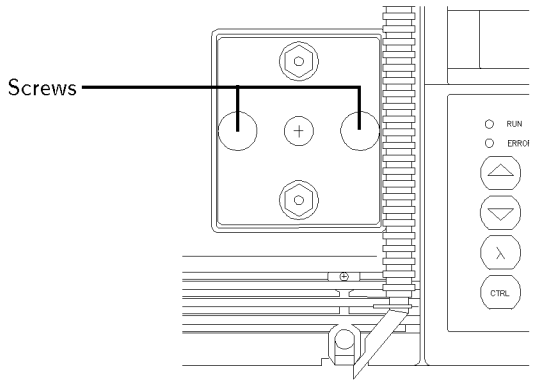


Figure 4-2.
Position of Flow Cell Cassette Screws

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Cleaning Standard Flow Cell

When: as necessary.

Removing Standard Flow Cell

Remove flow cell as described in “Removing the Flow Cell”.

Disassembling Standard Flow Cell

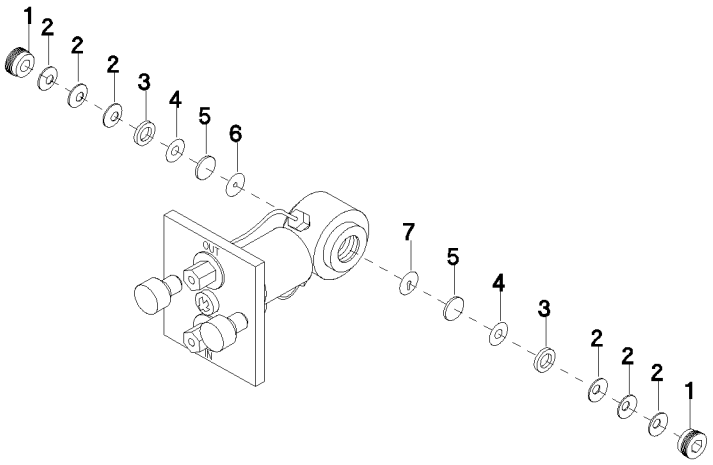


Figure 4-3. Standard Flow Cell

1. Cell screw
2. Spring
3. Ring
4. Gasket #1
5. Window
6. Gasket #2
7. Gasket #3

1. Unscrew cell screw using a flat blade screwdriver see Figure 4-3.
2. Remove springs, O-ring and gasket #1 using a pair of tweezers.
3. Attach adhesive tape to window and remove window by lifting tape.

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Note

Do not use tweezers to remove windows as the surfaces are easily scratched.

4. Remove gasket #2 and gasket #3.
5. Repeat steps 1 through 4 for other window.

Cleaning Parts of Standard Flow Cell

1. Pour isopropanol in cell hole and wipe clean with a piece of lint-free cloth.
2. Clean windows with ethanol or methanol using an ultrasonic cleaner for several minutes, dry them with a piece of lint-free cloth.

Note

Replace old gaskets with new gaskets supplied in standard flow cell kit.

Reassembling Standard Flow Cell

1. Hold flow cell cassette horizontally and place gasket #3 in position. Ensure both cell holes can be seen through slot of gasket #3.
2. Place gasket #2 on gasket #3.
3. Place window on gasket #2.
4. Place gasket #1 on window.
5. Place ring on gasket #1.
6. Place springs on ring.

Note

Make sure conical springs point towards window. Otherwise tightening cell screw might break window.

7. Screw cell screw into flow cell.
8. Repeat steps 1 through 7 for other window.

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Cleaning Semi-Micro Flow Cell

When: as necessary.

Removing Semi-Micro Flow Cell

Remove flow cell as described in "Removing the Flow Cell".

Disassembling Semi-Micro Flow Cell

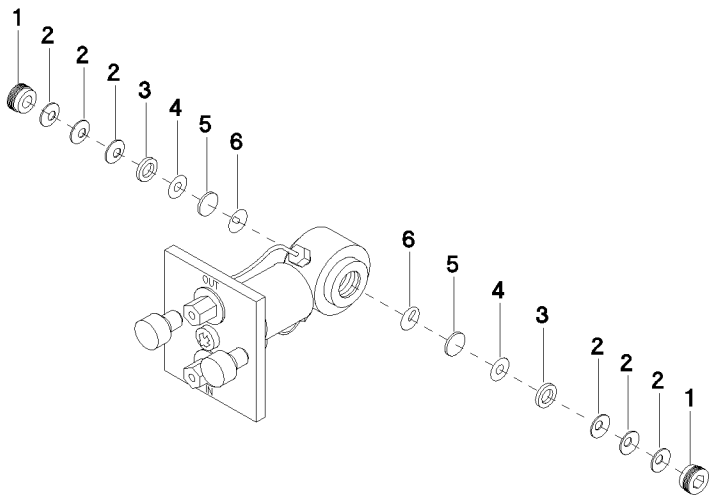


Figure 4-4. Semi-Micro Flow Cell

1. Cell screw
2. Spring
3. Ring
4. Gasket #1
5. Window
6. Gasket #2

1. Unscrew cell screw using a flat blade screwdriver see Figure 4-4.
2. Remove springs, ring and gasket #1 using a pair of tweezers.

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3. Attach adhesive tape to window and remove window by lifting tape.

Note

Do not use tweezers to remove windows as the surfaces are easily scratched.

4. Remove gasket #2.
5. Repeat steps 1 through 4 for other window.

Cleaning Parts of Semi-Micro Flow Cell

1. Pour isopropanol in cell hole and wipe clean with a piece of lint-free cloth.
2. Clean windows with ethanol or methanol using an ultrasonic cleaner for several minutes, dry them with a piece of lint-free cloth.

Note

Replace old gaskets with new gaskets supplied in semi-micro flow cell kit.

Reassembling Semi-Micro Flow Cell

1. Hold flow cell cassette horizontally and place gasket #2 in position. Ensure both cell holes can be seen through slot of gasket #2.
2. Place window on gasket #2.
3. Place gasket #1 on window.
4. Place ring on gasket #1.
5. Place springs on ring.

Note

Make sure conical springs point towards window. Otherwise tightening cell screw might break window.

6. Screw cell screw into flow cell.
7. Repeat steps 1 through 6 for other window.

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Cleaning Preparative Flow Cell

When: as necessary.

Removing Preparative Flow Cell

Remove flow cell as described in “Removing the Flow Cell”.

4

Disassembling Preparative Flow Cell

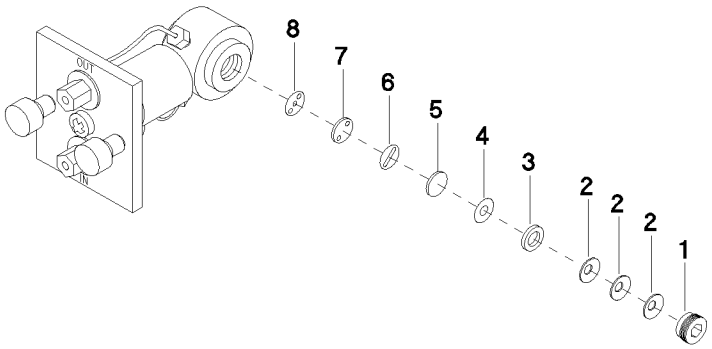


Figure 4-5. Preparative Flow Cell

1. Cell screw
2. Spring
3. Ring
4. Gasket #1
5. Window #1
6. Gasket #2
7. Window #2
8. Gasket #3;

1. Unscrew cell screw using a flat blade screwdriver see Figure 4-5.
2. Remove springs, ring and gasket #1 using a pair of tweezers.
3. Attach adhesive tape to window #1 and remove window by lifting tape.

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Note

Do not use tweezers to remove windows as the surfaces are easily scratched.

4. Remove gasket #2.
5. Attach adhesive tape to window #2 and remove window by lifting tape.
6. Remove gasket #2.
7. Repeat steps 1 through 6 for other window.

Cleaning Parts of Preparative Flow Cell

1. Pour isopropanol in cell hole and wipe clean with a piece of lint-free cloth.
2. Clean windows with ethanol or methanol using an ultrasonic cleaner for several minutes, dry them with a piece of lint-free cloth.

Note

Replace old gaskets with new gaskets supplied in standard flow cell kit.

Reassembling Preparative Flow Cell

1. Hold flow cell cassette horizontally and place gasket #3 in position. Ensure both cell holes can be seen through holes of gasket #3.
2. Place window #2 on gasket #3. Ensure both cell holes can be seen through holes of window #2.
3. Place gasket #2 on window #2. Ensure both cell holes can be seen through slit of gasket #2.
4. Place window #1 on gasket #2.
5. Place gasket #1 on window #1.
6. Place ring on gasket #1.
7. Place springs on ring.

Note

Make sure conical springs point towards window. Otherwise tightening cell screw might break window.

8. Screw cell screw into flow cell.

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9. Repeat steps 1 through 8 for other window.

Cleaning High-Pressure Flow Cell

When: as necessary.

Removing High-Pressure Flow Cell

Remove flow cell as described in “Removing the Flow Cell”.

Disassembling High-Pressure Flow Cell

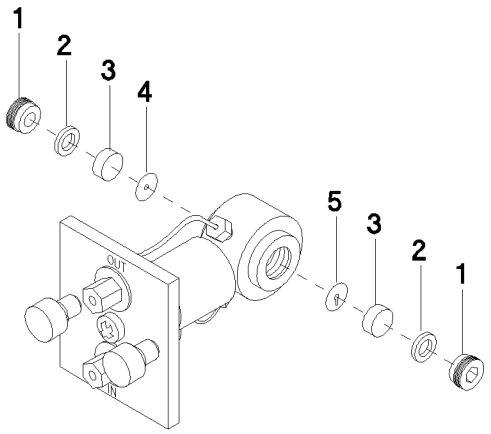


Figure 4-6. High-Pressure Flow Cell

1. Cell screw
2. Ring
3. Window
4. Gasket #1
5. Gasket #2

1. Unscrew cell screw using a flat blade screwdriver see Figure 4-5.
2. Remove ring using a pair of tweezers.

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3. Attach adhesive tape to window and remove window by lifting tape.

Note

Do not use tweezers to remove windows as the surfaces are easily scratched.

4. Remove gasket #1 and gasket #2.
5. Repeat steps 1 through 4 for other window.

Cleaning Parts of High-Pressure Flow Cell

1. Pour isopropanol in cell hole and wipe clean with a piece of lint-free cloth.
2. Clean windows with ethanol or methanol using an ultrasonic cleaner for several minutes, dry them with a piece of lint-free cloth.

Note

Replace old gaskets with new gaskets supplied in standard flow cell kit.

Reassembling High-Pressure Flow Cell

1. Hold flow cell cassette horizontally and place gasket #2 in position. Ensure both cell holes can be seen through holes of gasket #2.
2. Place gasket #1 on gasket #2.
3. Place window on gasket #1.
4. Place ring on window.
5. Screw cell screw into flow cell.
6. Repeat steps 1 through 5 for other window.

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5

Supplementary Information

This chapter contains supplementary information for your HP 1050 Series Variable Wavelength Detector.

Warranty Statement

All Analytical Products

Hewlett-Packard (HP) warrants its Analytical Products against defects in materials and workmanship for the period specified in Table 5-1. During the warranty period, HP will, at its option, repair or replace products which prove to be defective. Products that are installed by HP are warranted from the installation date, all others from the ship date.

If Buyer schedules or delays installation more than 30 days after delivery, then warranty period starts on 31st day from date of shipment (60 and 61 days, respectively for products shipped internationally).

HP warrants that its software and firmware designed by HP for use with a CPU will execute its programming instructions when properly installed on that CPU. HP does not warrant that the operation of the CPU, or software, or firmware will be uninterrupted or error-free.

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Limitation of Warranty

On-site warranty services are provided at the initial installation point. Installation and on-site warranty services are available only in HP service travel areas, and only in the country of initial purchase unless Buyer pays HP international prices for the product and services. Warranties requiring return to HP are not limited to the country of purchase.

For installation and warranty services outside of HP's service travel area, HP will provide a quotation for the applicable additional services.

If products eligible for installation and on-site warranty services are moved from the initial installation point, the warranty will remain in effect only if the customer purchases additional inspection or installation services, at the new site.

The foregoing warranty shall not apply to defects resulting from:

1. Improper or inadequate maintenance, adjustment, calibration or operation by Buyer;
2. Buyer-supplied software, hardware, interfacing or consumables;
3. Unauthorized modification or misuse;
4. Operation outside of the environmental and electrical specifications for the product;
5. Improper site preparation and maintenance; or
6. Customer induced contamination or leaks.

THE WARANTY SET FORTH IS EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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Limitation of Remedies and Liability

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL HP BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFITS) WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

Responsibilities of the Customer

The customer shall provide:

1. Access to the products during the specified periods of coverage to perform maintenance.
2. Adequate working space around the products for servicing by Hewlett-Packard personnel.
3. Access to and use of all information and facilities determined necessary by Hewlett-Packard to service and/or maintain the products. (Insofar as these items may contain proprietary or classified information, the customer shall assume full responsiblity for safeguarding and protection from wrongful use.)
4. Routine operator maintenance and cleaning as specified in the Hewlett-Packard Operating and Service Manuals.
5. Consumables such as paper, disks, magnetic tapes, ribbons, inks, pens, gases, solvents, columns, syringes, lamps, septa, needles, filters, frits, fuses, seals, detector flow cell windows, etc.

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Responsibilities of Hewlett-Packard

Hewlett-Packard will provide warranty services as described in Table 5-1.

Table 5-1. Warranty Services

Services During Warranty[1]	Warranty Period[2]	Type
Spectrophotometers, Gas and Liquid Chromatographs, Integrators, Lab Automation Systems, Samplers and Injectors	90 Days	On-site
GC, LC, UV-VIS, and LAS supplies and accessories	90 Days	On-site
Columns and Consumables[3]	90 Days	Return to HP
Gas Discharge and Tungsten Lamps	30 Days	Return to HP
Repairs performed on-site by HP[4]	90 Days	On-site

1 This warranty may be modified in accordance with the law of your country. Please consult your local HP office for the period of the warranty, for shipping instructions and for the applicable wording of the local warranty.

2 Warranty services are included as specified for Analytical products and options purchased concurrently provided customer is located within a HP defined travel area. HP warranty service provides for 8 am to 5 pm on-site coverage Monday through Friday, exclusive of HP holidays.

3 Columns and Consumables are warranted to be free from defects for a period of 90 days after shipment and will be replaced on a return-to -HP basis if unused.

4 HP repair warranty is limited to only the item repaired or replaced.

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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. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

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, etc.) are used for replacement. The use of repaired fuses and the short-circuiting of fuseholders 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 as much as possible. When inevitable, this should be carried out by a

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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.

Safety Symbols

Below you will find some symbols that are used on the instrument and throughout the documentation.

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect the apparatus against damage.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.

WARNING

The "WARNING" sign denotes a hazard. It calls attention to a procedure, practice or the like, which, if not correctly done or adhered to, could result in injury or loss of life. Do not proceed beyond a "warning sign" until the indicated conditions are fully understood and met.

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WARNUNG	**Das "WARNUNG" Zeichen weist auf eine Gefahr für den Menschen hin. Wenn die Anweisungen und Verfahrensweisen oder ähnliches nicht befolgt und korrekt ausgeführt werden, könnte das eine erhebliche Verletzungsgefahr oder Lebensgefahr zur Folge haben. Solange die neben dem "Warnung Zeichen" angegebenen Anweisungen nicht vollständig verstanden und ausgeführt sind, sollten keine weiteren Schritte unternommen werden.**
CUIDADO	**El signo de "CUIDADO" denota un riesgo. Remite a un procedimiento o práctica que de no ser llevada a cabo correctamente, podría resultar en un daño o pérdida de vida. No continue cuando exista un "signo de advertencia" hasta que las condiciones indicadas hayan sido completamente entendidas y satisfechas.**
ATTENTION	**Le signe "ATTENTION" dénote un risque. Il appelle une précaution quant à une procédure ou une pratique qui, si elle n'est pas correctement suivie, peut résulter en une blessure ou même en un risque pour la vie. S'assurer d'avoir rempli toutes les conditions indiquées avant de continuer.**
ATTENZIONE	**La scritta "ATTENZIONE" indica un pericolo. Essa richiama l'attenzione su una situazione che può portare a danni anche gravi per le persone. Non proseguire oltre tale indicazione senza aver ben compreso il rischio ed aver seguito le istruzioni per evitarlo.**
WAARSCHUWING	**Het teken "WAARSCHUWING" wijst op gevaar. Indien de aanwijzingen, procedures etc. niet opgevolgd en korrekt uitgevoerd worden, kan dat een aanzienlijk risiko en zelfs levensgevaar met zich mee brengen. Zolang de naast het "waarschuwingsteken" aangegeven aanwijzingen niet volledig begrepen en opgevolgd zijn, dienen geen verdere stappen ondernomen te worden.**

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CAUTION

The "CAUTION" sign denotes a hazard. It calls attention to an operating procedure, practice or the like, which, if not correctly done or adhered to, could result in damage to or destruction of part or all of the equipment. Do not proceed beyond a "caution sign" until the indicated conditions are fully understood and met.

ACHTUNG

Das "ACHTUNG" Zeichen weist auf eine mögliche Beschädigung der Geräte hin. Wenn Anweisungen und Verfahrensweisen oder ähnliches nicht befolgt und korrekt ausgeführt werden, könnte das eine Beschädigung oder Zerstörung eines Teils oder des gesamten Gerätes zur Folge haben. Solange die neben dem "Achtung Zeichen" angegebenen Anweisungen nicht vollständig verstanden und ausgeführt sind, sollten keine weiteren Schritte unternommen werden.

PRECAUCION

El signo de "PRECAUCION" denota un riesgo. Remite a un procedimiento o práctica que de no ser llevada a cabo correctamente podría resultar en un daño o destruccion parcial o total del equipo. No continue cuando exista un "signo de precaución" hasta que las condiciones indicadas hayan sido completamente entendidas y satisfechas.

ATTENTION

Le signe "ATTENTION" dénote un risque. Il appelle une précaution quant à une procédure ou une pratique qui, si elle n'est pas correctement suivie, peut résulter en un dommage ou même une destruction du matériel. S'assurer d'avoir rempli toutes les conditions indiquées avant de continuer.

PRECAUZIONE

La scritta "PRECAUZIONE" indica un pericolo. Essa richiama l'attenzione su una situazione che può portare a danni anche permanenti dello strumento. Non proseguire oltre tale indicazione senza aver ben compreso il rischio ed aver seguito le istruzioni per evitarlo.

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VOORZICHTIG

Het teken "VOORZICHTIG" wijst op gevaar voor een mogelijke beschadiging van de instrumentatie. Het vraagt de aandacht voor een praktijk, werkwijze etc. welke, indien niet opgevolgd en korrekt uitgevoerd, kan leiden tot beschadiging of vernieling van de apparatuur of een deel ervan. Zolang de naast het teken "voorzicht" aangegeven aanwijzingen niet volledig begrepen en opgevolgd zijn, dienen geen verdere stappen ondernomen te worden.

Solvent Information

Observe the following recommendations on the use of solvents.

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.

Solvents

Always filter solvents—small particles can permanently block the capillaries. 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 nitric acid, sulfuric acid especially at higher temperatures (replace, if your chromatography method allows, 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:

  $2CHCl_3 + O_2 \longrightarrow 2COCl_2 + 2HCL$

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

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- 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.
- Solutions of organic acids (acetic acid, formic acid, and so on) in organic solvents. For example, a 1% solution of acetic acid in methanol will attack steel.
- Solutions containing strong complexing agents (for example, EDTA, ethylene diamine tetra-acetic acid);
- Mixtures of carbon tetrachloride with 2-propanol or THF.

5

Use of Solvents

This section describes the use of solvents for the HP 1050 Stainless Steel Series and HP 1050 Ti Series of HPLC Modules.

The HP 1050 Stainless Steel Series is recommended for mobile phases with pH between 1.0 and 9.5. Solvents with pH below 2.3 should not contain acids which attack stainless steel. The materials in contact with the mobile phase include stainless steel, titanium, gold, sapphire, ruby, quartz, filled Teflon®, Teflon® and ceramic. The HP 1050 Stainless Steel Series autosampler also contains a VESPEL® rotor seal. An optional TEFZEL® rotor seal is available to extend the pH range to 12.5.

The HP 1050 Ti Series is recommended for high salt or corrosive mobile phases. The flow path contains titanium, tantalum, gold, sapphire, ruby, quartz, ceramic, polyether ether ketone (PEEK), filled Teflon® and Teflon®. There are no VESPEL® or stainless steel parts. The manual injector valve rotor seal and autosampler rotor seal are made of TEFZEL®. The recommended pH range for HP 1050 Ti Series pumping systems and autosampler is 1 to 14.

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Important Hewlett-Packard will not honor warranty costs resulting from the use of steel-corrosive (HP 1050 Stainless Steel Series) or quartz-attacking solvents (HP 1050 Stainless Steel or Ti Series). Use of such solvents is left to the user's discretion. Observe the following precautions to prevent excessive corrosion.

Acids Acids such as dilute sulfuric, phosphoric, acetic and formic acid generally cause no problems. Avoid using hydrochloric acid. We do not recommend using high concentrations of inorganic acids with the HP 1050 Stainless Steel Series, especially at higher temperatures. Solvents with a pH less than 2.3 must not contain acids which attack stainless steel.

Bases Organic amines (for example, triethylamine, TEA) and phosphate buffers generally cause no problems. If you use solutions of pH > 9.5, we recommend you replace the VESPEL® rotor seal of the injection valve in the HP 1050 Stainless Steel Series with a TEFZEL® rotor seal. No modifications are necessary with the HP 1050 Ti Series. Solutions of pH > 11 may also attack quartz, impairing optical properties of flow cells.

Salts Alkali halides (for example, sodium chloride, lithium iodide) attack stainless steel in the presence of oxygen. If you use such halide salt solutions with the HP 1050 Stainless Steel Series, thoroughly degas the solution with helium to remove traces of oxygen and keep solvents under helium when in use. This will greatly reduce the corrosive properties of the solution. When using the HP 1050 Ti Series, this is not a problem.

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Organic Solvents

Organic solvents such as aliphatics, chlorinated hydrocarbons, ketones and alcohols generally cause no problems. When using radical-forming solvents such as ethers that form peroxides, remove the peroxides by filtering through dry basic aluminum oxide. Mixtures of carbon tetrachloride with 2-propanol or tetrahydrofuran (THF) should not be used with the HP 1050 Stainless Steel Series as they have been shown to rapidly attack stainless steel.

Buffer Solutions

Always use fresh buffer solutions. Buffers can provide an ideal medium for growth of bacteria. Adding traces of sodium azide can inhibit this growth. We recommend filtering buffer solutions through a 0.5 μm membrane filter.

If you are using gradient elution with buffers and organic solvents, check that buffer concentrations never exceed the maximum solubility of the buffer in the organic solvent/buffer blend. Mix the solvents in batch experiments and look for precipitation. Do not operate at or near the solubility limit determined in this way. Oversaturated solutions are easily obtained in a batch experiment and will crystallize quickly on a suitable crystallization seed (for example, a capillary connection). Moreover, solubility might decrease with increasing temperature causing plugging of the capillaries in the heated parts of your chromatographic system. We recommend not to exceed 90% of the blend composition that starts crystallization.

Note

Buffer or modifier concentrations given in the literature are often unnecessarily high and similar chromatographic results can be obtained using lower concentrations (for example, 0.005 molar).

Caution

If you use high salt concentrations or stainless steel corrosive solutions in an HP 1050 Stainless Steel Series module, do not leave the solution in an idle module. Flush the solvent channel delivering that solution with distilled water after your analyses are finished. If salt

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solutions are used frequently, we recommend that the continuous seal wash option is installed.

If an HP 1050 Ti Series module is in routine daily use, it is permissible to leave it in salt or buffer overnight, but ensure that the seal wash reservoir contains wash solvent.

If the HP 1050 Stainless Steel or Ti Series modules are left idle for a long period of time, flush all solvent channels with distilled water and then with propanol or other alcohol.

ACHTUNG

Falls Sie mit einem Modul der Edelstahlserie stark salzhaltige oder korrosive Lösungmittel verwenden müssen, lassen Sie das Lösungsmittel nicht in einem Modul stehen, das außer Betrieb ist. Spülen Sie nach Beendigung der Analyse den Lösungsmittelkanal, der dieses Lösungsmittel enthält, mit destilliertem Wasser. Falls häufig Salzlösungen verwendet werden, empfehlen wir den Einbau der Option für die kontinuierliche Hinterkolbenspülung.

Falls Sie ein Modul der Ti Serie täglich verwenden, ist es vertretbar, die Pufferlösung über Nacht stehen zu lassen. Vergewissern Sie Sich aber, daß die Waschflasche Lösungsmittel enthält.

Falls Module der Edelstahl- oder Ti Serie für eine längere Zeit außer Betrieb sind, sollten Sie die Lösungsmittelkanäle mit destilliertem Wasser und dann Propanol oder einem anderen Alkohol spülen.

PRECAUCION

Si usted tiene que utilizar disolventes con gran concentración salina o corrosivos en un módulo de la serie de acero inoxidable (HP 1050 Stainless Steel Series), no deje el disolvente en un módolo que esté fuera de servicio. Una vez terminado el análisis, enjuague con agua destilada el canal por el que haya pasado dicho disolvente. Si se utilizan con frecuencia soluciones salinas, recommendamos instalar la opción para enjuague continuado de juntas.

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Si se utiliza diariamente un módulo de la serie HP 1050 Ti, se permite dejarlo durante la noche en una solución salina o tampón. Sin embargo es necessario asegurarse de que el recipiente del dispositivio de enjuangue de juntas contenga disolvente.

Si los módulos de las serie HP 1050 Stainless Steel o Ti no se utilizan durante un tiempo prolongado, enjuague todos los canales del disolvente con agua destilada y a continuación con propanol o con otro alcohol.

ADVERTISSEMENT

S'il est nécessaire d'utiliser des solutions salines à concentration élevée ou des solutions corrodant l'acier inoxydable dans un module HP 1050 Stainless Steel Series, ne pas laisser la solution dans un module non utilisé. Au terme des analyses effectuées, rincer à l'eau distillée le canal par lequel a été versé le solvant. Si des solutions salines sont souvent utilisées, il es conseillé d'installer un système de rinçage permanent de piston.

Si le module HP 1050 Ti Series est utiliséquotidiennement, il est permis de le laisser pendant la nuit dans une solution saline ou une solution tampon. Il convient cependant de contrôler dans ce cas que le réservoir de rinçage de piston contienne un agent de rinçage.

Si les modules HP 1050 Stainless Steel ou Series Ti ne sont pas utilisés pour une durée prolongée, tous les canaux de solvant doivent être rincés à l'eau distillée puis au propanol ou un autre alcool.

ATTENZIONE

Se si rende necesssario l'impiego di soluzioni saline di elevata concentrazione o di soluzioni che attaccano l'acciaio inossidabile in un modulo HP 1050 Stainless Steel Series, non lasciare le soluzioni in um modulo non utilizzato. Lavare con acqua distillata il canale nel quale viene inviato questo solvente al termine delle analisi effettuate. Se le soluzioni saline vengono impiegate frequentemente, si sonsiglia di installare, in via opzionale, il lavaggio continuo con pistone posteriore.

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Se un modulo HP 1050 Ti Series viene impiegato regolarmente ogni giorno, é ammessa la conservazione in una soluzione salina o tampone durante la notte. Accertarsi tuttavia che il serbatoio della macchina a pistone posteriore contenga il solvente di lavaggio.

Se i moduli HP 1050 Stainless Steel o Ti Series vengono utilizati per un periodo prolungato, lavare tutti i canali dei solventi con acqua distillata e successivamente con propanolo o un altro alcol.

VOORZICHT

Indien hoge zoutconcentraties of oplossingen die de corrsie van roestvrij staal tot gevolg hebben, in een HP 1050 Stainless Steel Serie moduul moeten worden gebruikt, laat de oplossing dan nooit achter in een inactief moduul. Spoel de buis, waardoor de vloeistof wordt aangevoerd, zorgvuldig schoon met gedistilleerd water, nadat de analyse is beëindigd. Indien regelmatig zoutoplossingen worden gebruikt, adviseren wij de permanente afsluitspoelvloeistof (optie) te installeren.

Indien een moduul uit de HP 1050 Ti Serie dagelijks wordt gebruikt, is het toegestaan deze gedurende de nacht in zout of een buffer te laten liggen. Wees er echter van overtuigd, dat het afsluitspoelvloeistofreservoir voldoende spoeloplossinge bevat.

Indien de HP 1050 Stainless Steel of Ti Serie modules gedurende een langere periode inactief zijn, spoel dan alle buizen met gedistilleerd water en vervolgens met propanol of een ander soort alcohol.

Degassing Solvents

Degassing solvents is an important part of solvent preparation. Gases dissolved in solvents can affect flow stability and UV absorption, causing baseline drift and random noise. By degassing solvents you minimize dissolved gases and reduce the adverse affect they can have on the performance of your chromatographic system.

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The methods of degassing we recommend are helium sparging and vacuum degassing. Refer to the appropriate handbook for details of how to use helium sparging or vacuum degassing. Note that volatile modifiers can be evaporated from your solvent by helium sparging, especially if the sparge rate is not reduced after the first few minutes of degassing.

Radio Interference

Manufacturer's Declaration

This is to certify that this equipment is in accordance with the Radio Interference Requirements of Directive FTZ 1046/1984. The German Bundespost was notified that this equipment was put into circulation, the right to check the series for compliance with the requirements was granted.

Test and Measurement.

If test and measurement equipment is operated with equipment unscreened cables and/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.

Hersteller-bescheinigung

Hiermit wird bescheinigt dass dieses Gerät/System in Übereinstimmung mit den Bestimmungen von Postverfügung 1046/84 funkentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes/Systems angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Test– und Messgeräte.

Werden Mess– und Testgeräte mit ungeschirmten Kabeln und/oder in offenen Messaufbauten verwendet, so ist vom Betreiber sicherzustellen, daß die

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Funk-Entstörbestimmungen unter Betriebsbedingungen an seiner Grundstücksgrenze eingehalten werden.

Sound Emission

Manufacturer's Declaration

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

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

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

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit dem Anforderungen der Maschinenlärminformationsverordung vom 18 Januar 1991.

- Schalldruckpegel Lp < 70 dB (A).
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach ISO 7779:1988/EN 27779/1991 (Typprüfung).

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Declaration of Conformity

According to ISO/IEC Guide 22 and EN 45014

Hewlett-Packard GmbH
Hewlett-Packard-Strasse 8
W-7517 Waldbronn 2
Federal Republic of Germany

Hewlett-Packard declares that the product:

HP 1050 Series
Variable Wavelength Detector

conforms to the following product specifications:

Safety:	IEC 348 CSA C22.2 No. 151
EMC:	EN50082-1 (1991): IEC 801-2 ±10kV AD IEC 801-3 3V/m IEC 801-4 2kV (power lines) 1kV (signal lines)
RFI:	EN 55011 Class B Group 1

Supplementary information:

Waldbronn	December 1991	
Location	Date	Signature QA Manager

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Specifications

HP 1050 Series *productname;

Detection Type Double beam photometer.

Noise $<1.5 \times 10^{-5}$ AU peak-to-peak, at 254 nm, flowing water at 1 ml/min, response time 1 s (10 to 90%), standard flow cell.

Drift $<5 \times 10^{-4}$ AU/hr, at 254 nm, after warm up.

Wavelength Range 190 to 600 nm, in 1 nm increments.

Wavelength Accuracy 2 nm

Wavelength Reproducibility 0.3 nm

Bandwidth 6.5 nm

Linear Absorbance Range Better than 1% up to 1.5 AU, using acetone at 254 nm.

Response Time 0.25, 1, or 4 s (10 to 90%); user-selectable.

Spectra One spectrum at a time during a run; scan rate 10 nm/sec; range from 190 to 600 nm, selectable, plotting speed selectable from 1 to 50 nm/s; background-corrected spectrum.

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Light Source Deuterium lamp

Flow Cells Standard 14 μl volume, 8 mm pathlength cell with 40 bar (588 psi) pressure maximum. Optional micro, preparative and high-pressure cells available.

Control Integrated keyboard with function keys; parameter editing during run possible; keyboard lock; optional control by computer or HP 3396 Series II integrator.

Parameters Wavelength, output range, response time, zero offset, balance, spectra acquisition. Time-programmable: wavelength, output range and zero; storage of up to 5 time-programs.

Analog Output One output user-configurable as recorder or integrator. For recorder: 100 mV or 1 V, output range from 0.001 to 4 AU, user-selectable. For integrator: 100 mV for every 2 AU full scale or 1 V for every 2 AU full scale, user-selectable.

Communications Outputs: ready signal and two external outputs (one 24 V relay and one 100 Vmax contact closure, both with 0.1 A). Inputs and outputs: start, stop and shut down signals. Optional interface for HP-IB.

Safety Aids Extensive diagnostics, error detection and display via front-panel LEDs. Leak detection, safe leak handling, leak output signal for shutdown pumping system. Low voltages in major maintenance areas.

Environment 0 to 55°C constant temperature at <95% humidity (non-condensing).

Dimensions 133 mm (5.2 inch) × 325 mm (12.8 inch) × 545 mm (21.5 inch)
(height × width × depth)

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Printing History

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Printed in Federal Republic of Germany

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This handbook is for the "C" revision of the HP 1050 Series Variable Wavelength Detector and corresponds to model number "79853C" (see label on rear panel of detector).

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HP 1050 Series Variable Wavelength Detector
Installation and Maintenance Guide
HP Part No. 79853-90009 October 1992 Printed in FRG

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