

9 Maintenance and Repair

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This chapter provides general information on maintenance and repair of the detector.

Introduction to Maintenance

The module is designed for easy maintenance. Maintenance can be done from the front with module in place in the system stack.

NOTE

There are no serviceable parts inside.
Do not open the module.

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, flammable and hazardous solvents, samples and reagents

The handling of solvents, samples and reagents can hold health and safety risks.

- When working with these substances observe appropriate safety procedures (for example by wearing goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet supplied by the vendor, and follow good laboratory practice.
 - The volume of substances should be reduced to the minimum required for the analysis.
 - Do not operate the instrument in an explosive atmosphere.
-

CAUTION

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

- Be sure to hold the board by the edges, and do not touch the electrical components. Always use ESD protection (for example, an ESD wrist strap) when handling electronic boards and components.
-

CAUTION

Safety standards for external equipment

- If you connect external equipment to the instrument, make sure that you only use accessory units tested and approved according to the safety standards appropriate for the type of external equipment.
-

Overview of Maintenance

On the following pages maintenance procedures are described that can be carried out without opening the main cover.

Table 11 Maintenance Procedures

Procedure	Typical Frequency	Notes
Flow cell flushing	If flow cell is contaminated.	
Leak sensor drying	If leak has occurred.	Check for leaks.
Leak handling System replacement	If broken or corroded.	Check for leaks.
Replacing the detector's Firmware	If not up to date or corrupted.	

Cleaning the Module

To keep the module case clean, use a soft cloth slightly dampened with water, or a solution of water and mild detergent.

WARNING

Liquid dripping into the electronic compartment of your module can cause shock hazard and damage the module

- Do not use an excessively damp cloth during cleaning.
 - Drain all solvent lines before opening any connections in the flow path.
-

Storage of the Detector

NOTE

In case the detector is not used for some time (stored), then fill the flow cell (sample and reference side) with isopropanol.

Remove and Install Doors

Parts required	p/n	Description
	5067-5745	Door Assembly Infinity 180 Left
	5067-5746	Door Assembly Infinity 180 Right

NOTE

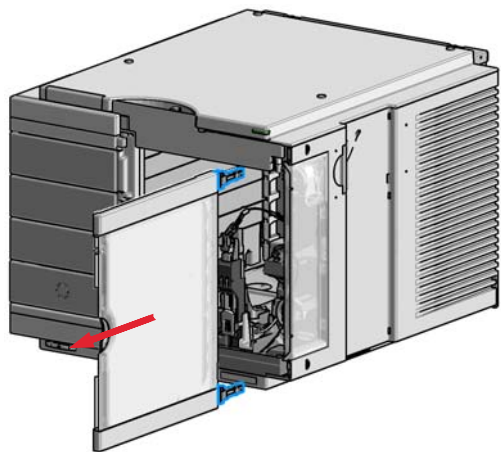
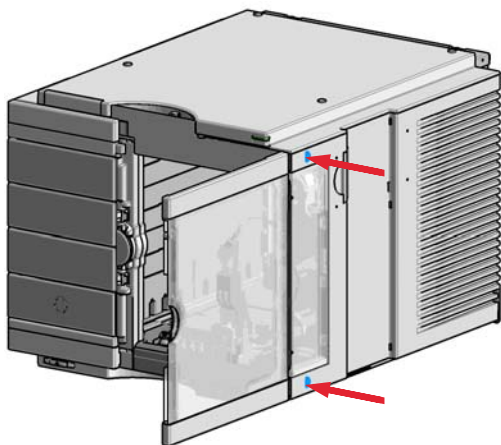
The figures in this procedure show the Infinity II Multisampler module as an example.

The principle of how to remove and/or install doors works in the same way for all Infinity II modules.

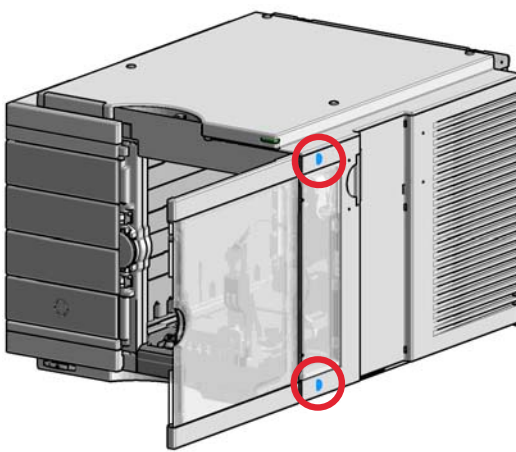
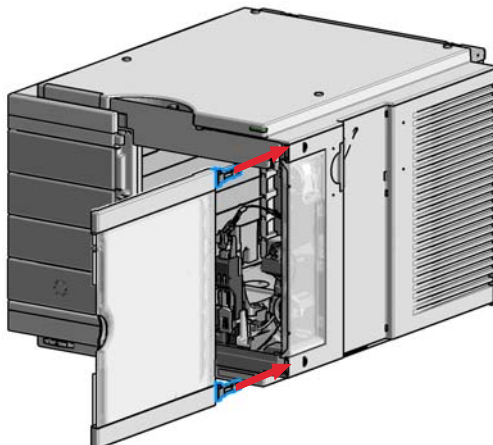
9 Maintenance and Repair

Remove and Install Doors

- 1** Press the release buttons and pull the front door out.



- 2** For the Installation of the front door. Insert the hinges into their guides and move the door in until the release buttons click into their final position.



Flow Cell Flushing

When If flow cell is contaminated

Tools required

Description
Glass syringe
Adapter

Parts required

#	Description
1	Strong solvent
1	Tubings to waste

WARNING

Dangerous solvents

The strong solvents used in this procedure are toxic and flammable and proper precautions are necessary.

→ Wear protective gloves and goggles.

→ Don't expose yourself to the vapors.

NOTE

Aqueous solvents can build up algae and therefore should do not be left in the flow cell for long periods. Add a small percentage of organic solvents (e.g. acetonitrile or methanol ~ 5 %).

NOTE

The strong solvent should dissolve any potential contaminants in the flow cell. For example water for aqueous mobile phase buffers, chloroform or tetrahydrofuran for not water soluble contaminants.

NOTE

Do not exceed the flow cell pressure limit of 5 bar (0.5 MPa).

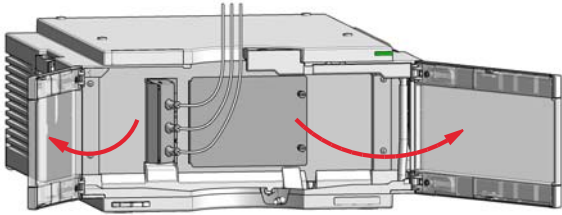
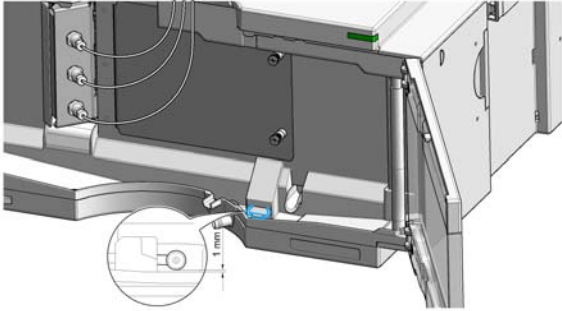
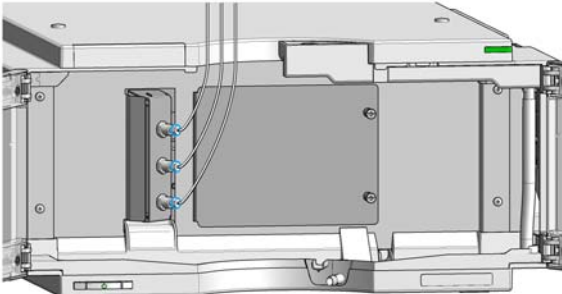
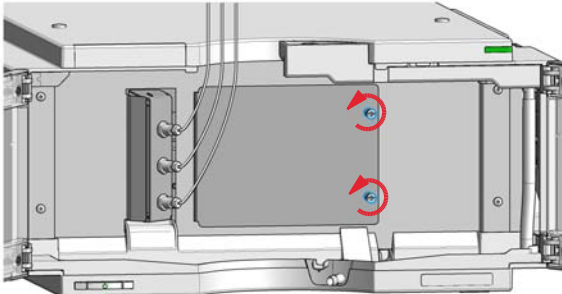
In case the cell is contaminated, follow the procedure below.

- 1 Use the purge mode and flush with the strong solvent.
- 2 Leave this solution in the cell for about one hour.
- 3 Flush with mobile phase.

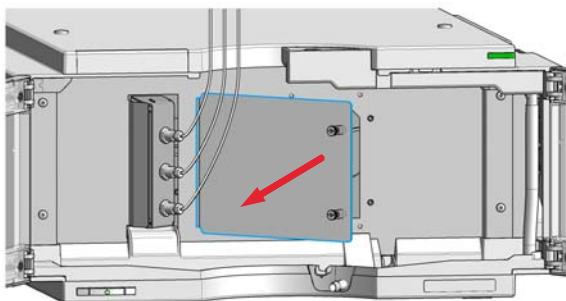
Correct Leaks

When If a leakage has occurred in the valve area or at the capillary connections

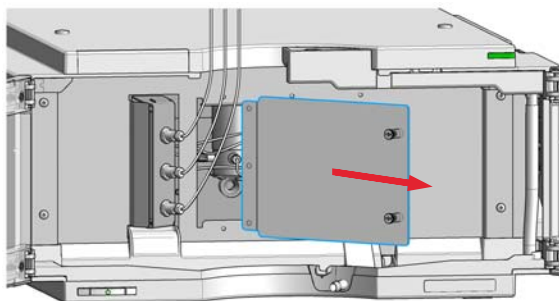
Tools required	Description
	Tissue
	Wrench, 1/4 inch for capillary connections

<p>1 Open the doors.</p> 	<p>2 Observe the leak sensor area for leaks and correct, if required.</p> 
<p>3 Observe the interface ports for leaks and correct, if required.</p> 	<p>4 Unscrew the screws of the Service Door.</p> 

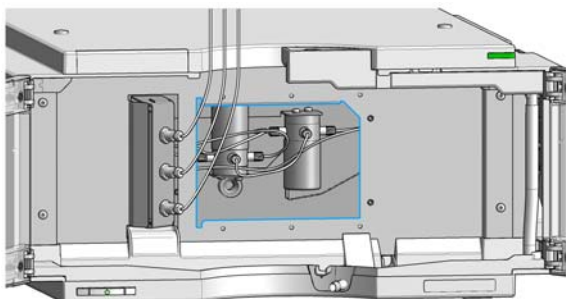
5 Open the Service Door.



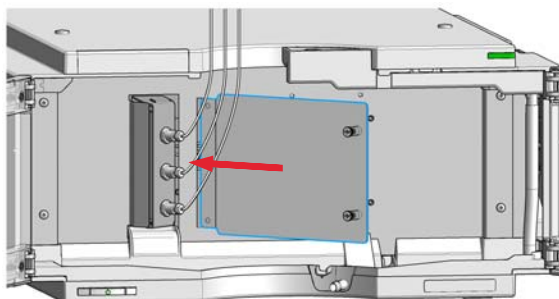
6 Remove the Service Door.



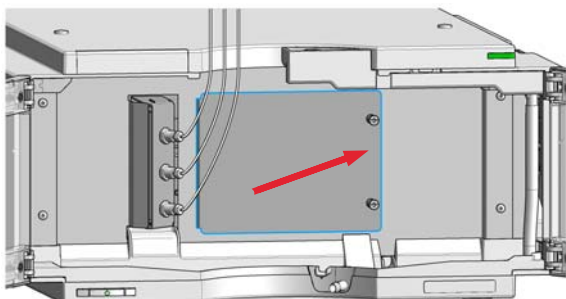
7 Observe the valve area for leaks and correct, if required.



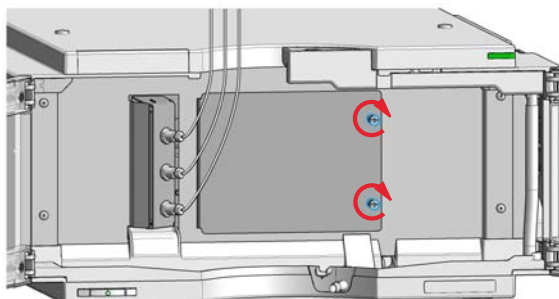
8 Install the Service Door.



9 Close the Service Door.



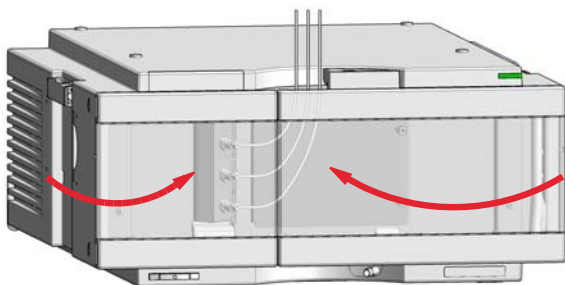
10 Fasten the screws of the Service Door.



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Correct Leaks

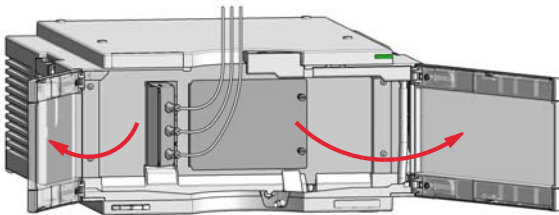
11 Close the doors.



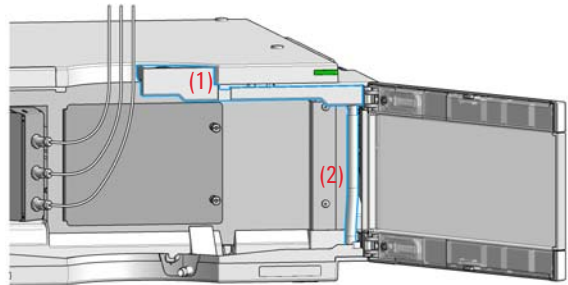
Replace Leak Handling System Parts

Parts required	p/n	Description
	5043-0856	Leak Adapter
	5063-6527	Tubing assembly, i.d. 6 mm, o.d. 9 mm, 1.2 m (to waste) approximately 85 mm required

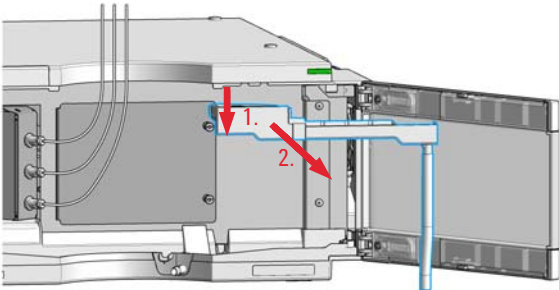
1 Open the doors.



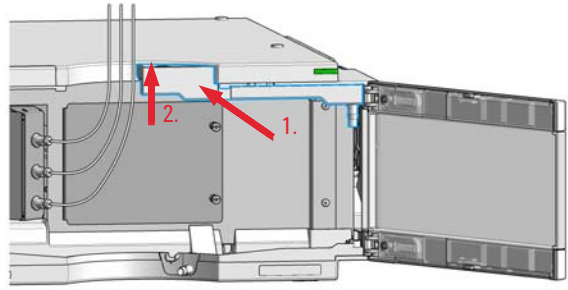
2 Locate the Leak Adapter (1) and Tubing (2).



3 Press the Leak Adapter down and remove it together with the tubing.



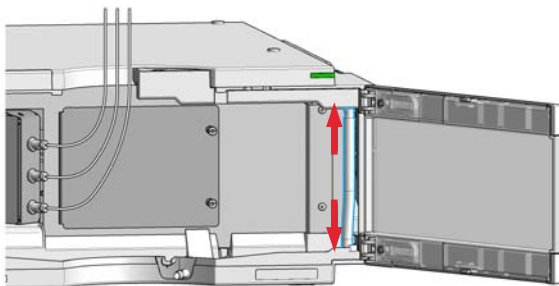
4 Install the Leak Adapter by pressing it into the Main Cover.



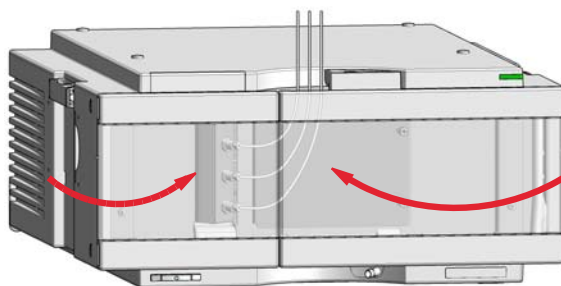
9 Maintenance and Repair

Replace Leak Handling System Parts

- 5** Insert the Tubing (approximately 115 mm required for replacement) between Leak Adapter outlet and Leak Panel.



- 6** Close the doors.



Replace the Module Firmware

When	<p>The installation of newer firmware might be necessary</p> <ul style="list-style-type: none"> • if a newer version solves problems of older versions or • to keep all systems on the same (validated) revision. <p>The installation of older firmware might be necessary</p> <ul style="list-style-type: none"> • to keep all systems on the same (validated) revision or • if a new module with newer firmware is added to a system or • if third party control software requires a special version.
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Tools required	Description
	Agilent Lab Advisor software
OR	Instant Pilot G4208A (only if supported by module)

Parts required	#	Description
	1	Firmware, tools and documentation from Agilent web site

Preparations	Read update documentation provided with the Firmware Update Tool.
---------------------	---

To upgrade/downgrade the module's firmware carry out the following steps:

- 1 Download the required module firmware, the latest FW Update Tool and the documentation from the Agilent web.
http://www.chem.agilent.com/_layouts/agilent/downloadFirmware.aspx?whid=69761
- 2 For loading the firmware into the module follow the instructions in the documentation.

9 **Maintenance and Repair**
Replace the Module Firmware

Module Specific Information

	G7162A/B
Initial firmware	D.06.76
Compatibility with 1100 / 1200 series modules	When using the G7162A/B in a system, all other modules must have firmware from set 6.50 or above (main and resident). Otherwise the communication will not work.
Conversion to / emulation	Not available



10 Parts for Maintenance

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Accessory Kit [138](#)

Leak Handling Parts [140](#)

This chapter provides information on parts for maintenance.



Overview of Maintenance Parts

Item	p/n	Description
1	5067-5745	Door Assembly Infinity 180 Left
2	5067-5746	Door Assembly Infinity 180 Right
3	5043-0856	Leak Adapter
4	5063-6527	Tubing assembly, i.d. 6 mm, o.d. 9 mm, 1.2 m (to waste) for Waste and Leak Adapter (ca. 85 mm required)
5	5043-1013	Tubing Clip
	G1362-68706	Interface tubing kit
	G1362-87300	Interfacing capillary
	G1362-87301	Restriction capillary
	G7162-87300	Waste Tube Kit (recycle/waste)

For cables, see “[Cable Overview](#)” on page 144.

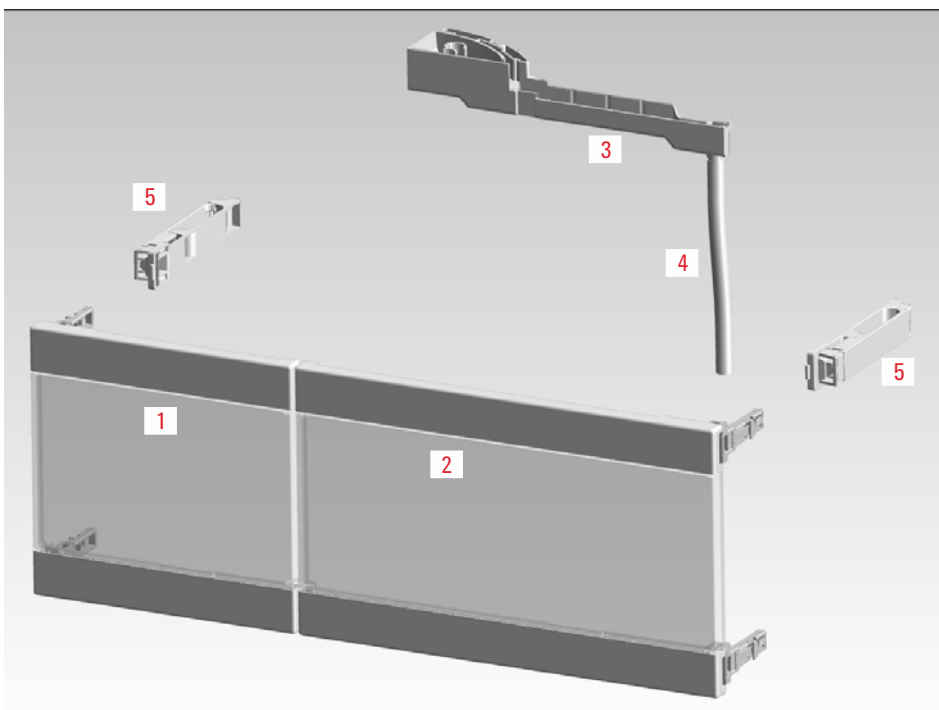


Figure 20 Maintenance Parts

Accessory Kit

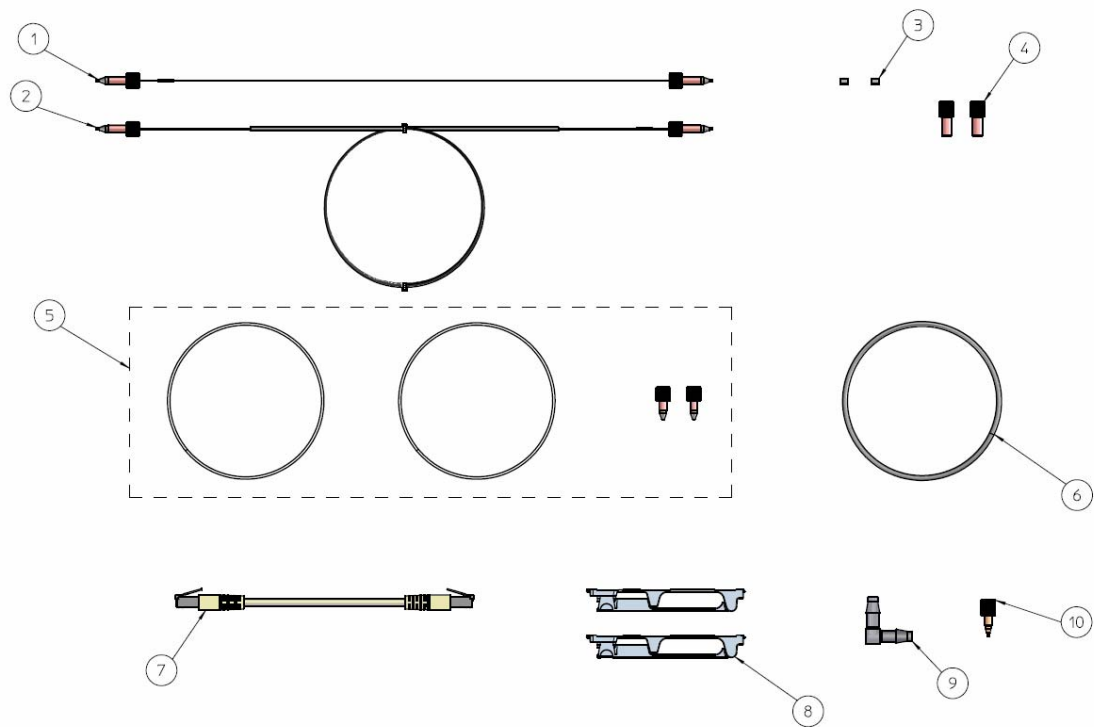


Figure 21 Accessory Kit

Accessory Kit for G7162A

Accessory kit (G7162-68755) contains some accessories needed for the installation of the G7162A RID.

Item	#	p/n	Description
1	1	G1362-87300	Interfacing capillary
2	1	G1362-87301	Restriction capillary
3	2	0100-1700	FERRULE-AY-18IN
4	2	0100-1708	Nut 1/8 PPS
5	1	G7162-87300	Waste Tube Kit (recycle/waste) includes: Fitting, PK (2x), Tubing 2 m (2x)
	1	5042-6449	Flex-Tube OD 1.6 mm
	1	0100-1516	Fitting, PK, 1/16" x 10-32, SH, male nut, 2/pk
6	1	0890-1760	Tubing Flexible 1 ea / 1 meter
	1	5181-1519	CAN cable, Agilent module to module, 1 m
8	2	5043-1013	Tubing Clip
9	1	5500-1155	Tube Connector, 90 degree, ID 6.4
10	1	0100-1847	PEEK adapter 1/4-28 to 10-32 (Adapter AIV to solvent inlet tubes)

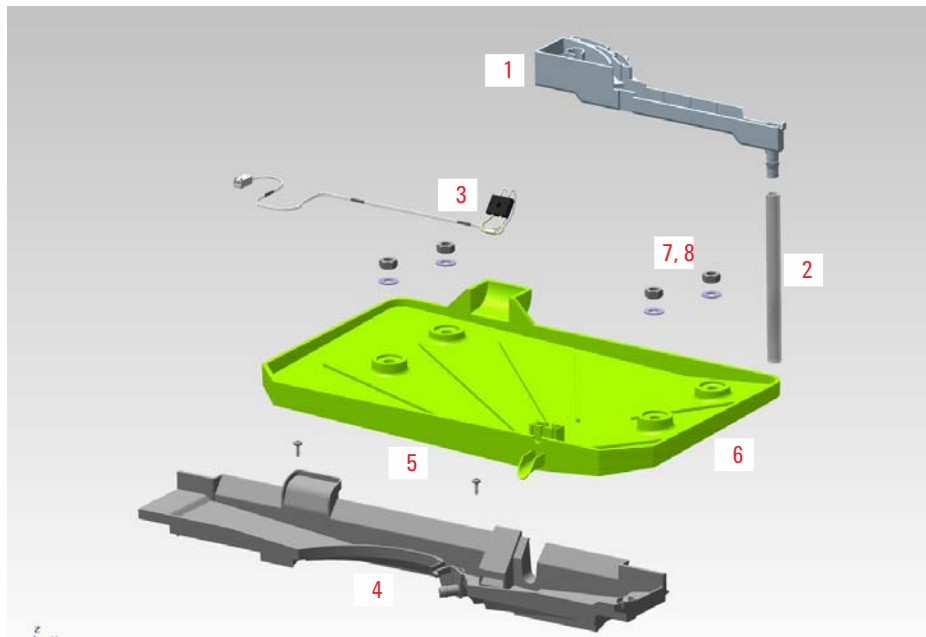
Accessory Kit for G7162B

Accessory kit (G7162-68765) contains some accessories needed for the installation of the G7162B RID.

Item	#	p/n	Description
1	1	5067-4784	Capillary ST 0.075 mm x 220 mm (Sampler to TCC/MCT)
1	1	5067-4783	Capillary ST 0.075 mm x 340 mm (Column to RID)
2	1	G1362-87301	Restriction capillary
3	2	0100-1700	FERRULE-AY-18IN
4	2	0100-1708	Nut 1/8 PPS
5	1	G7162-87300	Waste Tube Kit (recycle/waste) includes: Fitting, PK (2x), Tubing 2 m (2x)
	1	5042-6449	Flex-Tube OD 1.6 mm
	1	0100-1516	Fitting, PK, 1/16" x 10-32, SH, male nut, 2/pk
6	1	0890-1760	Tubing Flexible 1 ea / 1 meter
	1	5181-1519	CAN cable, Agilent module to module, 1 m
8	2	5043-1013	Tubing Clip
9	1	5500-1155	Tube Connector, 90 degree, ID 6.4
10	1	0100-1847	PEEK adapter 1/4-28 to 10-32 (Adapter AIV to solvent inlet tubes)

Leak Handling Parts

Item	p/n	Description
1	5043-0856	Leak Adapter
2	5063-6527	Tubing assembly, i.d. 6 mm, o.d. 9 mm, 1.2 m (to waste)
3	5061-3356	Leak sensor
4	G7162-44111	Leak Plane
5	0515-2529	Screw Tapping PAN-HD-TORX T10 3x8 ST-ZN
	5043-1013	Tubing Clip (not shown)
6	G1362-44110	Leak Pan
7	0535-0030	Nut M 14
8	3050-0900	Washer



10 Parts for Maintenance

Leak Handling Parts



11 Identifying Cables

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This chapter provides information on cables used with the Agilent 1200 Infinity Series modules.



Cable Overview

NOTE

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

Analog cables

p/n	Description
35900-60750	Agilent 35900A A/D converter
01046-60105	Analog cable (BNC to general purpose, spade lugs)

Remote cables

p/n	Description
5188-8029	ERI to general purpose
5188-8044	Remote Cable ERI – ERI
5188-8045	Remote Cable APG – ERI
5061-3378	Remote Cable to 35900 A/D converter
01046-60201	Agilent module to general purpose

CAN cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

RS-232 cables (not for FUSION board)

p/n	Description
G1530-60600	RS-232 cable, 2 m
RS232-61601	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

USB cables

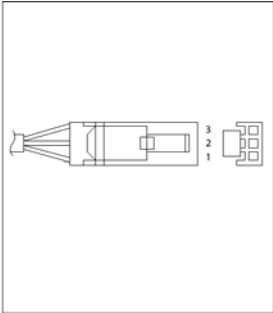
p/n	Description
5188-8050	USB A M-USB Mini B 3 m (PC-Module)
5188-8049	USB A F-USB Mini B M OTG (Module to Flash Drive)

Analog Cables




One end of these cables provides a BNC connector to be connected to Agilent modules. The other end depends on the instrument to which connection is being made.

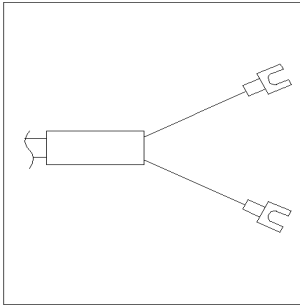
Agilent Module to 35900 A/D converters

p/n 35900-60750	35900	Pin Agilent module	Signal Name
	1		Not connected
	2	Shield	Analog -
	3	Center	Analog +

Agilent Module to BNC Connector

p/n 8120-1840	Pin BNC	Pin Agilent module	Signal Name
	Shield	Shield	Analog -
	Center	Center	Analog +

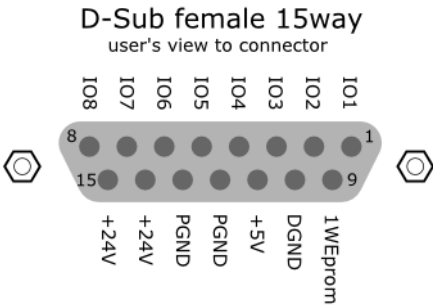
Agilent Module to General Purpose

p/n 01046-60105	Pin	Pin Agilent module	Signal Name
	1		Not connected
	2	Black	Analog -
	3	Red	Analog +

Remote Cables


ERI (Enhanced Remote Interface)

5188-8029 ERI to general purpose


p/n 5188-8029	pin	Color code	Enhanced Remote	Classic Remote	Active (TTL)
	1	white	I01	START REQUEST	Low
	2	brown	I02	STOP	Low
	3	green	I03	READY	High
	4	yellow	I04	POWER ON	High
	5	grey	I05	NOT USED	
	6	pink	I06	SHUT DOWN	Low
	7	blue	I07	START	Low
	8	red	I08	PREPARE	Low
	9	black	1wire DATA		
	10	violet	DGND		
	11	grey-pink	+5V ERI out		
	12	red-blue	PGND		
	13	white-green	PGND		
	14	brown-green	+24V ERI out		
	15	white-yellow	+24V ERI out		
	NC	yellow-brown			

5188-8044 ERI to ERI (Connector D_Subminiature 15 pin)

Table 12 5188-8044 ERI to ERI

p/n 5188-8044	Pin (ERI)	Signal	Pin (ERI)	Active (TTL)
	10	GND	10	
	1	Start Request	1	Low
	2	Stop	2	Low
	3	Ready	3	High
	5	Power on	5	High
	4	Future	4	
	6	Shut Down	6	Low
	7	Start	7	Low
	8	Prepare	8	Low
	Ground	Cable Shielding	NC	

5188-8045 ERI to APG (Connector D_Subminiature 15 pin (ERI),
Connector D_Subminiature 9 pin (APG))

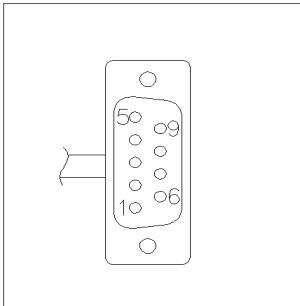
p/n 5188-8045	Pin (ERI)	Signal	Pin (APG)	Active (TTL)
	10	GND	1	
	1	Start Request	9	Low
	2	Stop	8	Low
	3	Ready	7	High
	5	Power on	6	High
	4	Future	5	
	6	Shut Down	4	Low
	7	Start	3	Low
	8	Prepare	2	Low
	Ground	Cable Shielding	NC	

11 Identifying Cables
Remote Cables

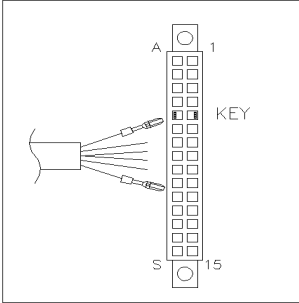


One end of these cables provides a Agilent Technologies APG (Analytical Products Group) remote connector to be connected to Agilent modules. The other end depends on the instrument to be connected to.

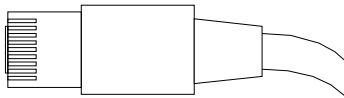
Agilent Module to Agilent 35900 A/D Converters

p/n 5061-3378	Pin 35900 A/D	Pin Agilent module	Signal Name	Active (TTL)
	1 - White	1 - White	Digital ground	
	2 - Brown	2 - Brown	Prepare run	Low
	3 - Gray	3 - Gray	Start	Low
	4 - Blue	4 - Blue	Shut down	Low
	5 - Pink	5 - Pink	Not connected	
	6 - Yellow	6 - Yellow	Power on	High
	7 - Red	7 - Red	Ready	High
	8 - Green	8 - Green	Stop	Low
	9 - Black	9 - Black	Start request	Low

Agilent Module to General Purpose

p/n 01046-60201	Wire Color	Pin Agilent module	Signal Name	Active (TTL)
	White	1	Digital ground	
	Brown	2	Prepare run	Low
	Gray	3	Start	Low
	Blue	4	Shut down	Low
	Pink	5	Not connected	
	Yellow	6	Power on	High
	Red	7	Ready	High
	Green	8	Stop	Low
	Black	9	Start request	Low

CAN/LAN Cables



Both ends of this cable provide a modular plug to be connected to Agilent modules CAN or LAN connectors.

CAN Cables

p/n	Description
5181-1516	CAN cable, Agilent module to module, 0.5 m
5181-1519	CAN cable, Agilent module to module, 1 m

LAN Cables

p/n	Description
5023-0203	Cross-over network cable, shielded, 3 m (for point to point connection)
5023-0202	Twisted pair network cable, shielded, 7 m (for point to point connection)

Agilent Module to PC

p/n	Description
G1530-60600	RS-232 cable, 2 m
RS232-61601	RS-232 cable, 2.5 m Instrument to PC, 9-to-9 pin (female). This cable has special pin-out, and is not compatible with connecting printers and plotters. It's also called "Null Modem Cable" with full handshaking where the wiring is made between pins 1-1, 2-3, 3-2, 4-6, 5-5, 6-4, 7-8, 8-7, 9-9.
5181-1561	RS-232 cable, 8 m

USB Cables

To connect a USB Flash Drive use a USB OTG cable with Mini-B plug and A socket.

p/n	Description
5188-8050	USB A M-USB Mini B 3 m (PC-Module)
5188-8049	USB A F-USB Mini B M OTG (Module to Flash Drive)

