

InfinityLab Autoscale System Upgrade Kit

Technical Note

This note describes the capillary connections for Agilent Autoscale Preparative Systems.

Contents

Modules and Components 3

Overview 5

General Installation Notes 5

Kits 10

Autoscale Upgrade Kit 10

System Capillary Kits 12

MS-based Preparative LC Upgrade Kit 14

G7158B/G7159B Tubing Kits 16

Configurations with separate Preparative Pump and Analytical Pump 17

Configurations with Analytical and Preparative Detector (LCMSD System) 17

Configurations with Analytical Detector only (LCMSD System) 18

Configurations with Analytical and Preparative Detector (LC System) 19



Agilent Technologies

Configurations with one Pump equipped with Analytical and Preparative Pump Heads 21

Configurations with Analytical and Preparative Detector (LCMSD System) 21

Configurations with Analytical and Preparative Detector (LC System) 22

Modules and Components

Table 1 Legends for Components














Symbol	Abbreviation	Module #	Description
	BPR	5067-6840	Back pressure regulator
	LP	5043-0270	Leak Plane
	MAN	5023-3105	Manifold 5-port
	PRV	5067-6857	Pressure Relieve Valve
			Requires 5188-8053 ERI Remote and Leak Module
		5067-7021	Blank nut
		5123-3135	Fitting adapter
		0100-1259	Plastic fitting
		5062-2462	PTFE tubing
		5067-5966 (for flexible capillaries) 5067-5403 (for rigid capillaries)	Removable fitting
			Restriction
		5023-3086	Tube ESD
		5022-2133	Union
		5188-8053	ERI Remote and Leak Module
	2/14		2-pos/14-port Valve
	A		Analytical
	ALS		Autosampler
	B	G9322-68002	Bridge
	BP	G1328-44121	Base Plate
	C1...3, UV1...5, MS1...6, FM1...2, A1...9		Flow connection
	COL		Column
	CV	G9322A	Clustering Valve
	DC	G9324A	Delay Coil Organizer
	DV		Diverter Valve

Table 1 Legends for Components

Symbol	Abbreviation	Module #	Description
	FC		Fraction Collector
	FM	G7170B	MS Flow Modulator
	IN		Inlet
	MI	G1328D	Manual Preparative Injector
	MSD	G6125B/G6135B	Mass Spectrometer Detector
	OUT		Outlet
	P		Preparative
	R		Removable fitting
	R1		Restriction for detector (for flow rates < 1 mL/min, connected to capillary A 6B)
	R2		Restriction for Injector Valve (for flow rates < 1 mL/min, prior capillary A4)
	RC		Recovery Collector (optional)
	S		Swagelock fitting
	SC	5067-6871	Solvent cabinet
		G1364E	Preparative Fraction Collector
		G7110B	Isocratic Pump
		G7111A/B	Quaternary Pump
		G7114A	Variable Wavelength Detector
		G7115A	Diode Array Detector WR
		G7157A	Preparative Autosampler
		G7158B	Preparative Open-Bed Sampler/Collector
		G7159B	Preparative Open-Bed Fraction Collector
		G7161A/B	Preparative Binary Pump
		G7163B	Preparative Column Compartment
		G7165A	Multiple Wavelength Detector
		G7166A	Preparative Valve-Based Fraction Collector
		G9328A	Column Organizer

Overview

General Installation Notes

The stack configurations as shown in this technical note are mandatory. The capillary connections only fit to these stack configurations. Other configurations can destroy the instrument.

Important Information on Flow Rates

CAUTION

- Use of the Autoscale Upgrade Capillary Kit at wrong flow rates
Damage of system parts
 - Use the Autoscale Upgrade Capillary Kit only at flow rates
from 0.5 – 3.0 mL/min.
-

Installation Notes

Capillaries and Fittings

- System capillary kits are flow dependent. The proper kit needs to be selected based on the desired flow range and column size.
- The MS Upgrade kit is only one kit. It contains all capillaries for all flow ranges.
- The Autoscale Upgrade Capillary Kit is designed for flow rates in Analytical part of the system (0.5 – 3.0 mL/min).
- Five capillaries (UV 2A - 2E) are provided to connect sampler and column. The shortest capillary should be used for this connection (depending on the position of the column and configuration).
- UV 2B and UV 2C are used also for connection of the flow modulator in setups with G9328A (not in Autoscale Systems). The shortest if neither are used between injector and column.
- All capillaries with an inner diameter (ID) of 0.5 mm, 0.3 mm, and lower are flexible.

Only the MS1B capillary from column to flow modulator is always rigid. This capillary is guided between modules and needs to remain in its fixed position.

- The bypass of the flow modulator is part of accessory kit G7170-68705.
- All capillaries going to the *ports of the flow modulator need UHP-FF fittings*.

NOTE

Do not use nonremovable (preswaged) fittings for the flow modulator, the ports can be damaged.

-
- The Multiple Wavelength Detector (G7165A) is not depicted in the drawings. The same principles as for the Diode Array Detector (G7115A) apply.
 - *Only* removable fittings are used for columns.
 - Either Quick Turn Fittings for flexible capillaries, or
 - UHP-FF for rigid capillaries.

General rules

- If the height of the stack configuration exceeds the safety limit, the solvent cabinet has to be placed next to the stack on the base plate.
Some of the stack configurations exceed 0.85 m from the table top to the top of the solvent cabinet, these configurations are labeled.
- The base plate is needed in the case the Solvent Cabinet is placed on a bench by itself, and has to be ordered separately (p/n G1328-44121).

Pressure Relieve Valve (PRV, 5067-6857) and Back Pressure Regulator (BPR, 5067-6840)

- PRV must be installed with every configuration.

NOTE

The PRV is required for safety reasons.

-
- The PRV and BPR come with each fraction collector.
 - If the PRV is installed at the outlet of the Delay Coil Organizer, the following measures are required:
 - The PRV has to be connected to the outlet of the Delay Coil Organizer.
 - The short waste tubing is used for PRV to lead leaking solvents to the leak plate of the Delay Coil Organizer.
 - If the PRV is used as a single item, the following measures are required:
 - The PRV has to be connected with system tubing from the detector. This connection requires union 10-32 to ¼-28 (5023-2875).
 - The PRV has to be fixed to the column organizer using S holders.
 - The PRV has to be placed on the upper part of the extrusion.

NOTE

The length of the capillary from the detector to the PRV is intentionally limited.

-
- The long PRV waste tubing is guided to the leak plate by S holders.
 - The BPR needs to be installed ahead of the Recovery Collector at the outlet of the fraction collector tubing.

- The use of BPR is recommended only for certain flow rates, check for operating instructions.

NOTE

Check for the proper installation of the BPR. The arrow on the BPR housing shows the flow direction.

- The BPR can be fixed at any position on the extrusion using S holders or on the leak plate of the G7166A using Velcro Tape (5043-1812).
- Use the provided 3 m long tube, of OD2.5 and ID1.6 (5023-3086) to connect the outlet of the BPR to waste barrel or the recovery collector. For installation of BPR the tubing needs to be cut to needed lengths. Use tubing cutter (8710-1930). The fittings are provided separately as either single piece (5023-2871) or 6 pack (5023-2883).

Columns and Column Holders

- To keep the capillary from column to detector as short as possible, the column needs to be mounted at the highest possible position, and in the front of the column organizer.
- UV 2A-2E are used to connect injector to column.
- Fix columns with the following column holders:
 - M size holders (5067-6849) for 9.4 mm/10 mm, 21.2 mm and 30 mm columns,
 - L size holders (G7163-60002) for 50 mm columns.
L size holders have to be ordered separately,
 - S size holders (5043-1356) for 4.6 mm or other analytical size columns.
- The 25 cm columns require two M size holders, shorter columns need only one M size holder.
- One M/S size holder can be used for pre-column.

Installation Notes for the 1290 Infinity II Column Compartment (G7163B)

- The Delay Coil Organizer must be installed at the highest valve position.
- The Flow Modulator must be installed at the second highest valve position.
- 2/14 System Valve (for Autoscale Systems only) needs to be positioned at the third highest position of the Column Compartment.
- The Recovery Collector can be installed at any available free valve position.
- Column Selection Valve 6/14, if used, must be installed at the fourth highest valve position.

Flow rate dependent restrictions for Autoscale Setups

- If the pressure on the analytical pump is lower than 35 bar at any operating conditions:
 - For flow rates < 1 mL/min:
Connect R2 prior to capillary A4
 - For flow rates > 1 mL/min:
Connect R1 prior to capillary A4 (MSD systems), or
A8 capillary prior A4 capillary (UV/LC systems)
- To achieve sufficient pressure on detector cell for UV/LC systems with analytical and preparative detector only, for flow rates < 1 mL/min:
 - Connect capillary A6B to restriction R1
 - Connect union (PN 5022-2133) prior waste line

Kits

Autoscale Upgrade Kit

Table 2 Autoscale Upgrade Kit (PN 5067-7019)

Flow range:		4 - 8 mL/min		15 - 40 mL/min		40 - 80 mL/min		80 - 200 mL/min	
From module	To module	Leng th [cm]	ID [mm]/type P/N	ID [mm]/type P/N	ID [mm]/type P/N	ID [mm]/type P/N	ID [mm]/type P/N	Fittings	
A 1	A-Pump	Injector	220	0.25/r 5500-1425					Swage-Swage
A 2	A-Pump	2/14 System Valve	120	0.25/f 5500-1424					Swage-Swage
A 3	2/14 System Valve	Injector	110	0.25/f 5500-1422					Swage-Swage
A 4	Injector	Column	115	0.17/f 5500-1423					Swage-(Removable)
A 5	Column	A UV Detector	80	0.17/f 5500-1430					Swage-(Removable)
A 6A	A UV Detector	2/14 Valve	80	0.25/f 5500-1461	Flow independent capillaries				Swage-Swage
A 6B	A UV Detector	2/14 Valve	80	0.17/f 5500-1431					Swage-Swage
A 7	Flow Modulator	2/14 Valve	30	0.12/f 5500-1432					Swage-Swage
A 8	2/14 Valve	MS	120	0.17/f 5500-1462					Swage-Swage
R1	Restriction for detector		35	0.12/f 5500-1433					Swage - welded union
R2	Restriction for System Valve		200	0.12/f 5500-1434					Swage - welded union

Autoscale Accessories

Table 3 Accessories for Autoscale Upgrade Kit

Blank Nut cone 10-32 SW4-Screw ST (6 pieces)	5067-7021
Plastic Fitting (blank nut) (5 pieces)	0100-1259
Quick Turn LC Fitting (2 pieces)	5067-5966
Fitting Fingertight PEEK for 1/16in	0100-1516
High FLOW UNION SS	5022-2133
PTFE tubing 0.7mm id, 1.6mm od, 5m	5062-2462
Autoscale System Upgrade TechNote ENG	G7161-90203

System Capillary Kits

Table 4 System Capillary Kits

P/N				5067-7015	5067-7016	5067-7017	5067-7018		
Flow range:				4 - 8 mL/min	15 - 40 mL/min	40 - 80 mL/min	80 - 200 mL/min		
Name	From module	To module	Length [cm]	ID [mm]/type P/N	ID [mm]/type P/N	ID [mm]/type P/N	ID [mm]/type P/N	Fittings	
UV 1A	Prep Pump	Injector	145	0.3/f 5500-1436	0.5/f 5500-1439	0.6/r 5500-1442	0.94/r 5500-1445	Swage-Swage	
UV 1B	Prep Pump	Injector	65	0.3/f 5500-1308	0.5/f 5500-1309	0.6/r 5500-1318	0.94/r 5500-1390	Swage-Swage	
UV 2A	Injector	Column	50	0.3/f 5500-1316	0.5/f 5500-1317	0.6/r 5500-1320	0.94/r 5500-1391	Swage-(Removable)	
UV 2B	Injector	Column	65	0.3/f 5500-1314	0.5/f 5500-1315	0.6/r 5500-1319	0.94/r 5500-1393	Swage-(Removable)	
UV 2C	Injector	Column	80	0.3/f 5500-1406	0.5/f 5500-1384	0.6/r 5500-1387	0.94/r 5500-1392	Swage-(Removable)	
UV 2D	Injector	Column	100	0.3/f 5500-1407	0.5/f 5500-1385	0.6/r 5500-1388	0.94/r 5500-1394	Swage-(Removable)	
UV 2E	Injector	Column	115	0.3/f 5500-1435	0.5/f 5500-1438	0.6/r 5500-1441	0.94/r 5500-1444	Swage-(Removable)	
UV 3	Column	Detector	65	0.3/f 5500-1314	0.5/f 5500-1315	0.6/r 5500-1319	0.94/r 5500-1393	(Removable) -Swage	
UV 4A	Detector	Delay Coil Box	55	0.3/f 5500-1408	0.5/f 5500-1386	0.7/r 5500-1389	0.94/r 5500-1395	Swage-Swage	
UV 4B	Detector	Delay Coil Box	75	0.3/f 5500-1437	0.5/f 5500-1440	0.7/r 5500-1443	0.94/r 5500-1446	Swage-Swage	
UV 5	Detector	Pressure relieve valve	65	0.3/f 5500-1308	0.5/f 5500-1309	0.6/r 5500-1318	0.94/r 5500-1390	Swage-Swage	

UV Accessories

Table 5 Accessories for kits 5067-7015, 5067-7016, 5067-7017, 5067-7018

A-Line Quick Turn LC Fitting for Column 2 pcs for kits 5067-7015 and 5067-7016	5067-5966
UHP-FF FITTING for Column 2 pcs for kits 5067-7017 and 5067-7018	5067-5403
3m Tube ESD PTFE OD2.5 ID1.6	5023-3086
ESD-Fitting OD-2.5mm (3 pieces)	5023-2871
Union Flat-Bottom 1/4-28 ESD	5023-2508
Plastic and PEEK tubing cutter	8710-1930
Fitting-Handle	5043-1471
Sealtight-Handle	5043-0915

MS-based Preparative LC Upgrade Kit

Table 6 MS-based Preparative LC Upgrade Kit

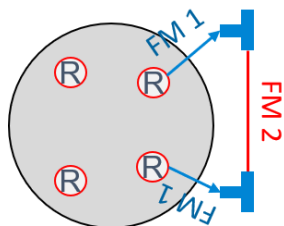
P/N		5067-7023						
Flow range:			4 - 8 mL/min	15 - 40 mL/min	40 - 80 mL/min	80 - 200 mL/min	Fittings	
	From Module	To Module	length [cm]	ID [mm] / type P/N	ID [mm] / type P/N	ID [mm] / type P/N	ID [mm] / type P/N	
MS1A	Column	Flow modulator	90	0.3/r 5500-1450	0.5/r 5500-1453	0.6/r 5500-1456	0.94/r 5500-1459	(Removable)- (Removable)
MS1B	Column	Flow modulator	50	0.3/f 5500-1448	0.5/f 5500-1451	0.6/r 5500-1454	0.94/r 5500-1457	(Removable)- (Removable)
MS2	Flow modulator	VWD/DA D	55	0.3/f 5500-1449	0.5/f 5500-1452	0.6/r 5500-1455	0.94/r 5500-1458	(Removable)- Swage
MS3	Make up	Flow modulator	120	0.12/f 5500-1398	flow independent			Swage- Swage
MS4	Flow modulator	MS	120	0.12/f 5500-1398				Swage- Swage
MS5	MS restriction capillary		7	0.12/f 5500-1329				Swage- Swage
MS6	MS waste capillary		70	0.25/f 5500-1330				Swage-

MS Accessories

Table 7 Accessories

3 m Tube ESD PTFE OD 2.5 ID 1.6	5023-3086
UHP FF fitting (4 pieces)	5067-5403
ESD-Fitting OD-2.5 mm (2 pieces)	5023-2871
Fitting adapter 10-32 to 1-4-28 SST	5023-2875
TEE-LOW DEAD VOLUME	0100-1818
Fitting-Handle	5043-1471
Sealtight-Handle	5043-0915

Flow modulator Accessory Kit, G7170-68705



	Length/cm	ID/mm	Part No.	Fittings
FM1	8	0.25	5067-6820	Removable-Swage
FM2	10	0.12	5067-6821	Swage-Swage

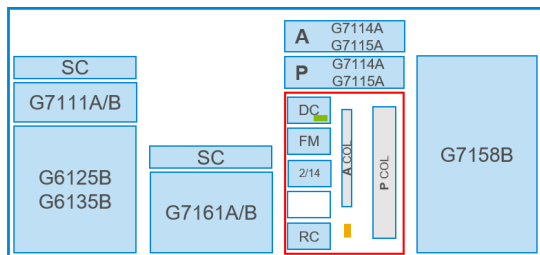
G7158B/G7159B Tubing Kits

The following tubing kits are for the in- and outlet tubings of the Fraction Collector (FC IN, FC OUT).

Table 8 G7158B/G7159B Tubing Kits

Flow range	P/N
< 8 mL/min	G9321-60953
< 50 mL/min	G9321-60952
< 150 mL/min	G9321-60954
< 200 mL/min	G9321-60951

Configurations with separate Preparative Pump and Analytical Pump Configurations with Analytical and Preparative Detector (LCMSD System)



G7163B

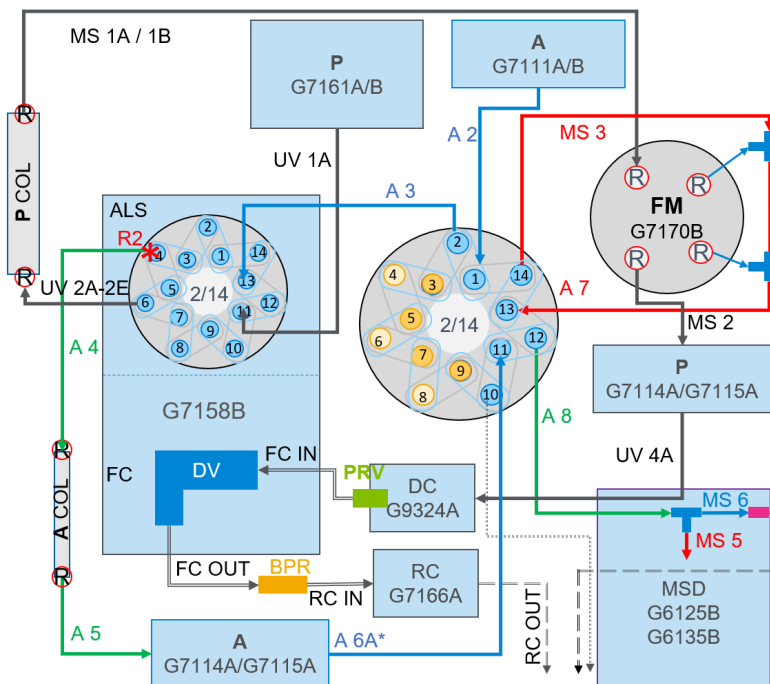


Figure 1 1290 Infinity II Autoscale Preparative LC/MSD System, Analytical and Preparative Detector Setup, mandatory stack configuration (top), and schematic flow connections (bottom).

A6A* For flow rates lower than 1 mL/min use capillary A6B

*R2 For flow rates lower than 1 mL/min use R2 prior to capillary A4

Configurations with Analytical Detector only (LCMSD System)

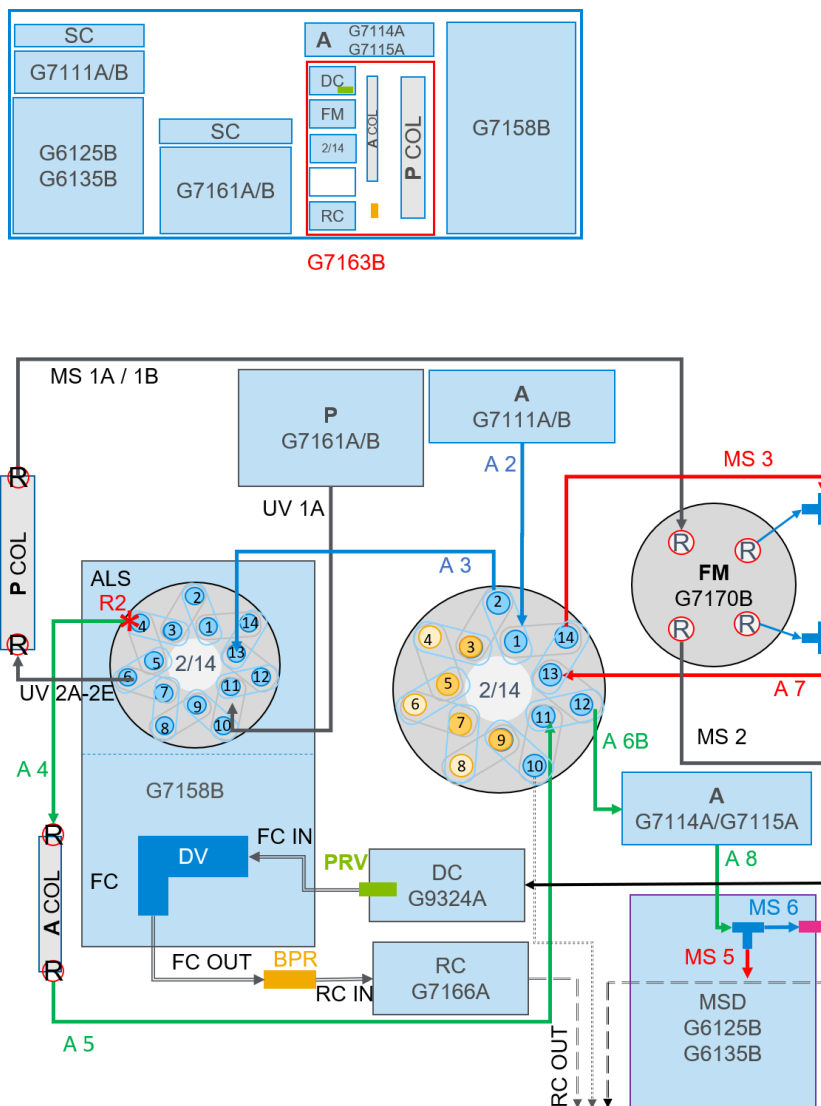
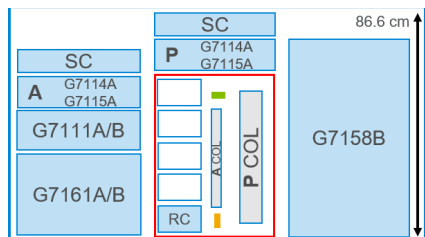


Figure 2 1290 Infinity II Autoscale Preparative LC/MSD System Analytical Detector Only Setup, mandatory stack configuration (top), and schematic flow connections (bottom).

* R2 For flow rates lower than 1 mL/min use R2 prior capillary A4

Configurations with Analytical and Preparative Detector (LC System)

Configuration without Delay Coil Organizer



G7163B

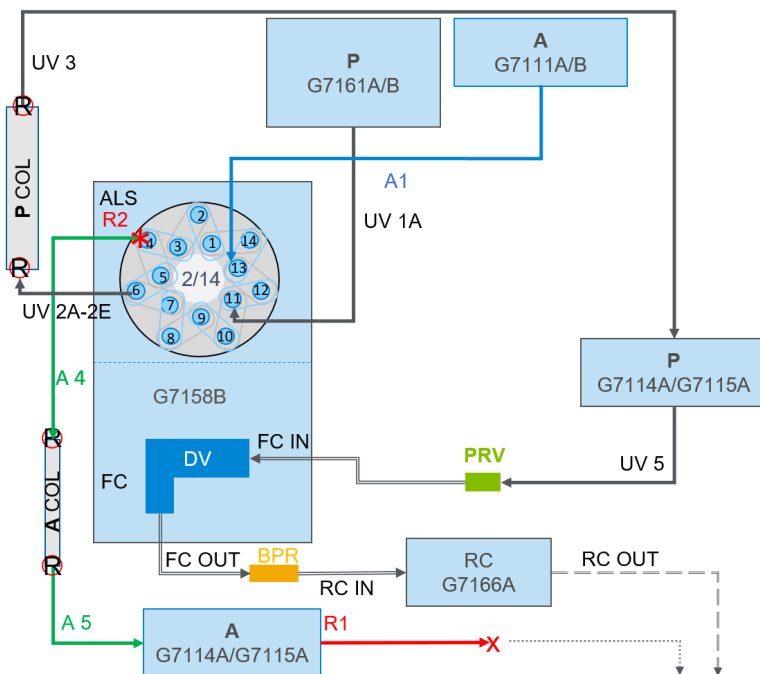
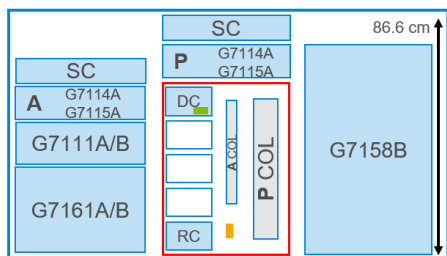


Figure 3 1290 Infinity II Autoscale Preparative LC System, mandatory stack configuration (top), and schematic flow connections (bottom).

* R2 For flow rates lower than 1 mL/min use R2 prior A4 capillary

R1 X For flow rates lower than 1 mL/min connect capillary A6B to R1 and for connection of waste line use provided union (PN 5022-2133)

Configuration with Delay Coil Organizer (G9324A)



G7163B

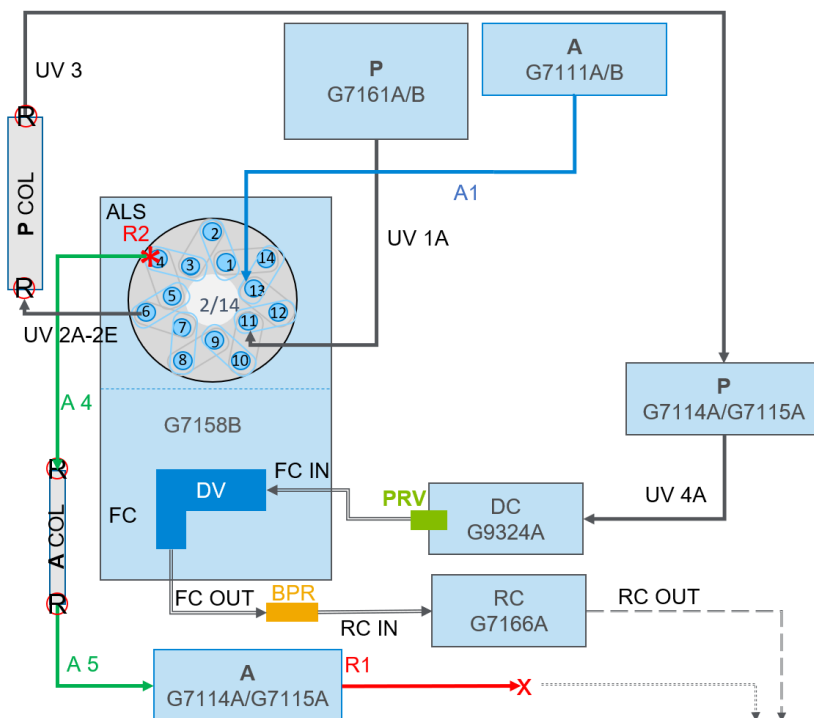
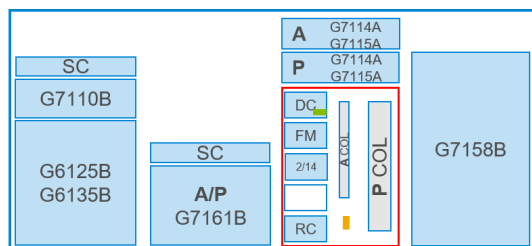


Figure 4 1290 Infinity II Autoscale Preparative LC System with Delay Coil Organizer, mandatory stack configuration (top), and schematic flow connections (bottom).

* R2 For flow rates lower than 1 mL/min use R2 prior A 4 capillary

R1 X For flow rates lower than 1 mL/min connect capillary A6B to R1 and for connection of waste line use provided union (PN 5022-2133)

Configurations with one Pump equipped with Analytical and Preparative Pump Heads Configurations with Analytical and Preparative Detector (LCMSD System)



G7163B

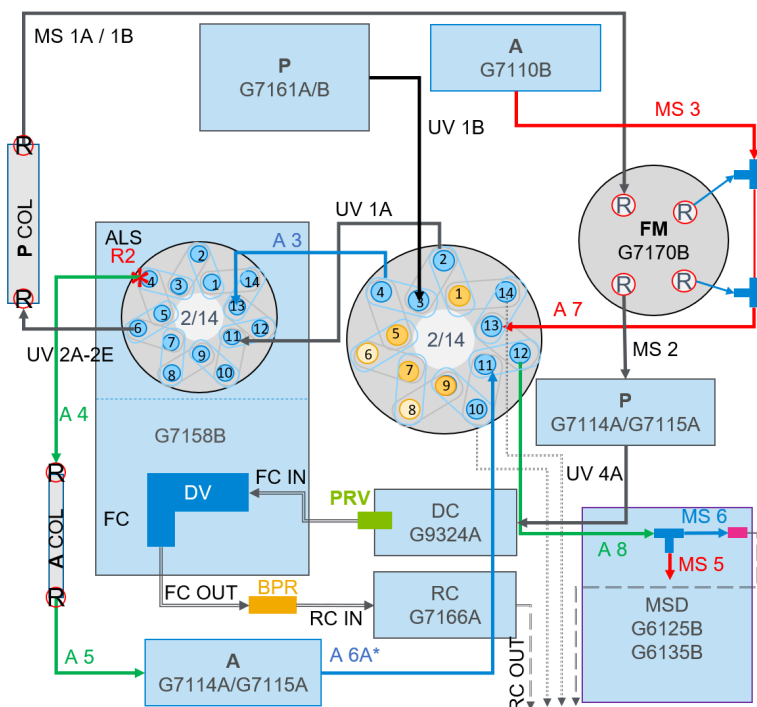


Figure 5 1290 Infinity II Autoscale Preparative LC/MSD System with analytical and preparative UV detector and A/P pump, mandatory stack configuration (top), and schematic flow connections (bottom).

* R2 For flow rates lower than 1 mL/min use R2 prior capillary A4

A6A* For flow rates lower than 1mL/min use A6B

Configurations with Analytical and Preparative Detector (LC System) Configuration without Delay Coil Organizer

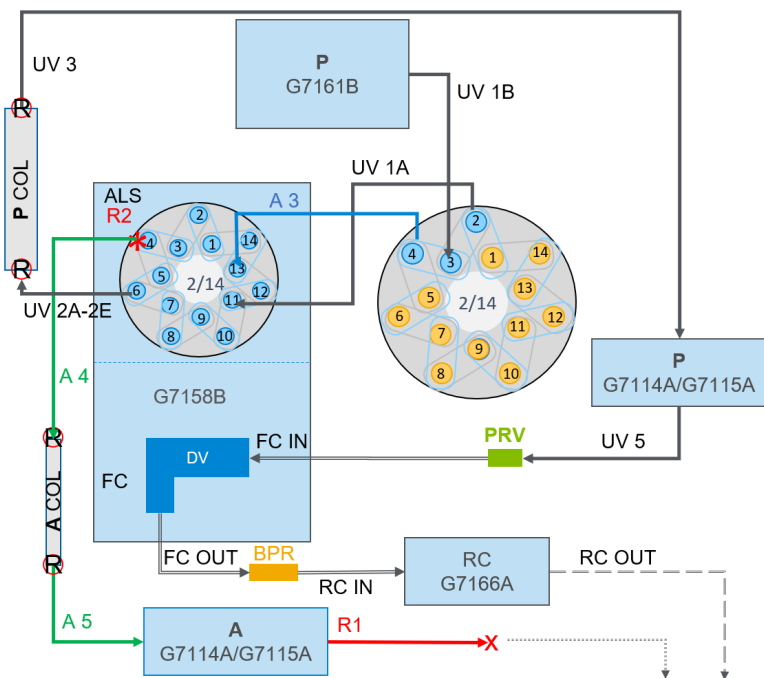
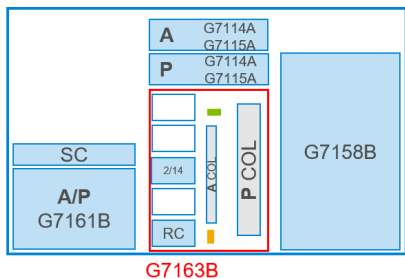
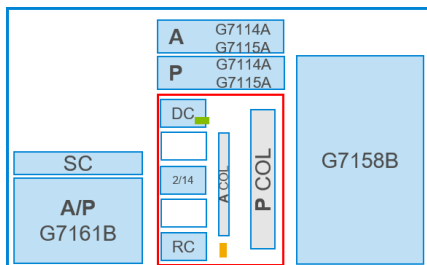


Figure 6 1290 Infinity II Autoscale Preparative LC System with analytical and preparative UV detector and A/P pump, mandatory stack configuration (top), and schematic flow connections (bottom).

* R2	For flow rates lower than 1 mL/min use R2 prior A4 capillary
R1 X	For flow rates lower than 1 mL/min connect capillary A6B to R1 and for connection of waste line use provided union (PN 5022-2133)

Configuration with Delay Coil Organizer (G9324A)



G7163B

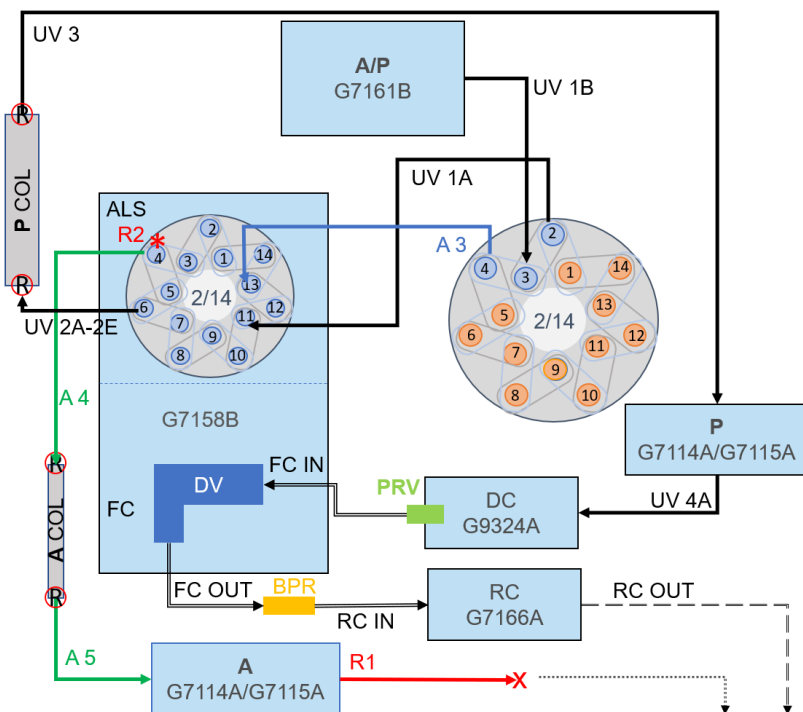


Figure 7 1290 Infinity II Autoscale Preparative LC System with analytical and preparative UV detector, A/P pump, and Delay Coil Organizer, mandatory stack configuration (top), and schematic flow connections (bottom).

* R2 *For flow rates lower than 1 mL/min use R2 prior A4 capillary

R1 X For flow rates lower than 1 mL/min connect capillary A6B to R1 and for connection of waste line use provided union (PN 5022-2133)



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