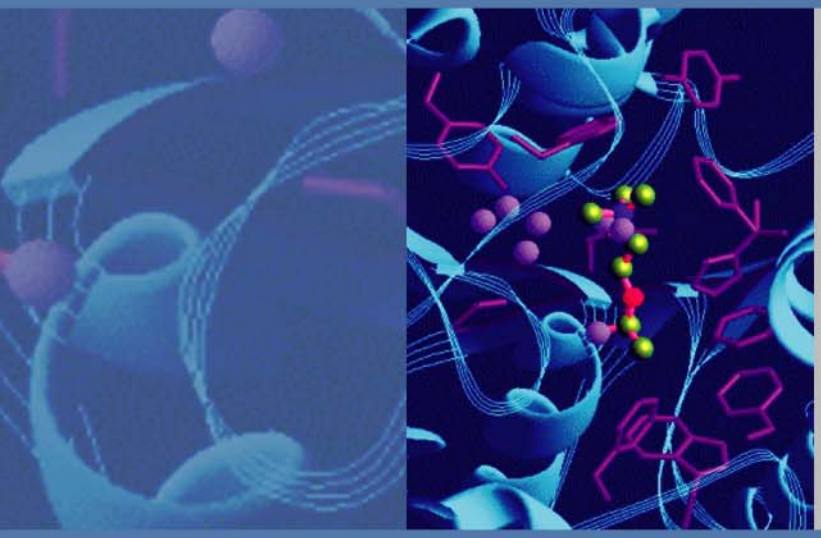

Accela UHPLC System

Getting Connected Guide

60057-97001 Revision F March 2011

DOCUMENTATION SURVEY

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

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Release history: Revision A, September 2006; Revision B, March 2008; Revision C, February 2009; Revision D, October 2009; Revision E, March 2010; Revision F, March 2011

Revision F includes information about the latest addition to the Accela product line, the Accela Open Autosampler.

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Accela Pump and Accela Autosampler

EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC

EMC compliance has been evaluated by TUV Rheinland of North America, Inc.

EN 61326: 1997; A1, 1998; A2, 2001; A3, 2003

EN 61000-3-2: 2000

EN 61000-3-3: 1995; A1, 2001

EN 61000-4-2: 2001

EN 61000-4-3: 2002

FCC Class A, CFR 47 Part 15 Subpart B: 2005

EN 61000-4-4: 1995; A1, 2000; A2, 2001

EN 61000-4-5: 2001

EN 61000-4-6: 2003

EN 61000-4-8: 2001

EN 61000-4-11: 2001

Low Voltage Safety Compliance

Low Voltage Safety Compliance has been evaluated by TUV Rheinland of North America, Inc.

This device complies with Low Voltage Directive 73/23/EEC and harmonized standard EN 61010-1:2001, IEC 61010-1:2002, UL 61010 A-1:2004, CAN/CSA 22.2 61010-1:2004.

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Accela Open Autosampler

EMC Directive 2004/108/EC

EMC compliance has been evaluated by CTC Analytics for the HTC PAL™ autosampler.

IEC 61326-1:2005

EN 61326-1: 1997, A1:1998

FCC Class A, CFR 47 Part 15: 2003

IEC 61326-2-6: 2005

CISPR 22:2005, A1:2005, A2:2006

Low Voltage Safety Compliance

Low Voltage Safety Compliance has been evaluated by CTC Analytics for the HTC PAL autosampler.

This device complies with Low Voltage Directive 2006/95/EC and harmonized standard EN 61010-1:2001, IEC 61010-1:2001, ANSI/UL 61010 A-1:2004, CAN/CSA 22.2 61010-1:2004.

Accela 600 Pump

EMC Directive 2004/108/EC

EMC compliance has been evaluated by TUV Rheinland of North America Inc.

EN 61326-1: 2006

EN 55011: 2007

EN 61000-3-2: 2006

EN 61000-3-3: 1995, A1: 2001, A2: 2005

EN 61000-4-2: 1995, A1: 1999, A2: 2001

FCC Class A: CFR 42, Part 15: 2007

EN 61000-4-3: 2006

EN61000-4-4: 2004

EN61000-4-5: 2005

EN61000-4-6: 2007

EN61000-4-11: 2004

Low Voltage Safety Compliance

This device complies with Low Voltage Directive 2006/95/EC and the following harmonized standards: EN 61010-1: 2001, IEC 61010-1: 2002, UL 61010A-1: 2004, CAN/CSA 22.2 61010-1: 2004.

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Accela 1250 Pump

EMC Directive 2004/108/EC

EMC compliance has been evaluated by TUV Rheinland of North America Inc.

EN 55011: 2007
EN 61000-3-2: 2006
EN 61000-3-3: 1995, A1: 2001, A2: 2005
EN 61000-4-2: 1995, A1: 1999, A2: 2001
EN 61326-1: 2006
FCC Class A: CFR 47, Part 15: 2009
EN 61000-4-3: 2006
EN 61000-4-4: 2006
EN 61000-4-5: 2005
EN 61000-4-6: 2007
EN 61000-4-11: 2004

Low Voltage Safety Compliance

This device complies with Low Voltage Directive 2006/95/EC and the following harmonized standards: EN 61010-1: 2001, IEC 61010-1: 2002, UL 61010A-1: 2004, CAN/CSA 22.2 61010-1: 2004.

Accela PDA Detector

EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC

EMC compliance has been evaluated by TUV Rheinland of North America, Inc.

EN 61326:1997; A1, 1998; A2, 2001; A3, 2003
EN 61000-3-2: 2000
EN 61000-3-3: 1995; A1, 2001
EN 61000-4-2: 2001
EN 61000-4-3: 2002
FCC Class A, CFR 47 Part 15 Subpart B: 2005
EN 61000-4-4: 1995; A1, 2000; A2, 2001
EN 61000-4-5: 2001
EN 61000-4-6: 2003
EN 61000-4-8: 2001
EN 61000-4-11: 2001

Low Voltage Safety Compliance

Low Voltage Safety Compliance has been evaluated by TUV Rheinland of North America, Inc.

This device complies with Low Voltage Directive 73/23/EEC and harmonized standard EN 61010-1:2001, IEC 61010-1:2002, UL 61010 A-1:2004, CAN/CSA 22.2 61010-1:2004.

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Accela PDA Detector (80 Hz version)

EMC Directive 2004/108/EC

EMC compliance has been evaluated by TUV Rheinland of North America, Inc.

EN 61326-1: 2006
EN 55011: 2007, A2: 2007
EN 61000-3-2: 2006
EN 61000-3-3: 1995, A1: 2001, A2: 2005
EN 61000-4-2: 1995, A1: 1999, A2: 2001
FCC Class A, CFR 47 Part 15: 2007
EN 61000-4-3: 2006
EN 61000-4-4: 2004
EN 61000-4-5: 2005
EN 61000-4-6: 2007
EN 61000-4-11: 2001

Low Voltage Safety Compliance

Low Voltage Safety Compliance has been evaluated by TUV Rheinland of North America, Inc.

This device complies with Low Voltage Directive 2006/95/EC and harmonized standard EN 61010-1:2001, IEC 61010-1:2002, UL 61010 A-1:2004, CAN/CSA 22.2 61010-1:2004.

Accela RI Detector

EMC Directive 2004/108/EC

EMC compliance has been evaluated by TÜV Rheinland of North America, Inc.

EN 55011: 2007
EN 61000-3-2: 2006
EN 61000-3-3: 1995, A1; 2001, A2; 2005
EN 61326-1: 2006
EN 61000-4-2: 1995, A1; 1999, A2; 2001
FCC Class A, CFR 47 Part 15: 2009
EN 61000-4-3: 2006
EN 61000-4-4: 2004
EN 61000-4-5: 2005
EN 61000-4-6: 2007
EN 61000-4-11: 2004

Low Voltage Safety Compliance

Low Voltage Safety Compliance has been evaluated by TUV Rheinland of North America, Inc.

This device complies with Low Voltage Directive 2006/95/EC and harmonized standard EN 61010-1:2001, IEC 61010-1:2002, UL 61010 A-1:2004, CAN/CSA 22.2 61010-1:2004.

Accela UV/Vis Detector

EMC Directive 2004/108/EC

EMC compliance has been evaluated by TÜV Rheinland of North America, Inc.

EN 55011: 2007
EN 61000-3-2: 2006
EN 61000-3-3: 1995, A1; 2001, A2; 2005
EN 61326-1: 2006
EN 61000-4-2: 1995, A1; 1999, A2; 2001
FCC Class A, CFR 47 Part 15: 2008
EN 61000-4-3: 2006
EN 61000-4-4: 2004
EN 61000-4-5: 2005
EN 61000-4-6: 2007
EN 61000-4-11: 2004

Low Voltage Safety Compliance

Low Voltage Safety Compliance has been evaluated by TUV Rheinland of North America, Inc.

This device complies with Low Voltage Directive 2006/95/EC and harmonized standard EN 61010-1:2001, IEC 61010-1:2002, UL 61010 A-1:2004, CAN/CSA 22.2 61010-1:2004.

FCC Compliance Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

CAUTION Read and understand the various precautionary notes, signs, and symbols contained inside this manual pertaining to the safe use and operation of this product before using the device.

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Notice on the Susceptibility to Electromagnetic Transmissions

Your instrument is designed to work in a controlled electromagnetic environment. Do not use radio frequency transmitters, such as mobile phones, in close proximity to the instrument.

For manufacturing location, see the label on the instrument.

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Preface

This guide describes how to set up and interconnect the modules of the Accela™ LC system and how to make contact closure between the LC system and a Thermo Scientific MS detector.

Related Documentation

In addition to this guide, Thermo Fisher Scientific provides the following documents as PDF files for the Accela system:

- *Accela Preinstallation Requirements Guide*
- *Accela Autosampler Hardware Manual*
- *Accela Open Autosampler Hardware Manual*
- *Accela Open Autosampler User Guide*
- *Accela Pump Hardware Manual*
- *Accela 600 Pump and Accela 1250 Pump Hardware Manual*
- *Accela PDA Detector Hardware Manual*
- *Accela PDA Detector (80 Hz Version) Hardware Manual*
- *Accela UV/Vis Detector Hardware Manual*
- *Accela RI Detector Hardware Manual*
- Accela user guide for each data system

The data system also provides Help.

Safety and Special Notices

Make sure you follow the precautionary statements presented in this guide. The safety and other special notices appear in boxes.

Safety and special notices include the following:

CAUTION Highlights hazards to humans, property, or the environment. Each CAUTION notice is accompanied by an appropriate CAUTION symbol.

CAUTION Highlights information necessary to prevent personal injury caused by touching a hot surface.

LIFTING HAZARD Highlights information necessary to prevent personal injury caused by incorrect lifting of a heavy object.

CAUTION Highlights information necessary to prevent personal injury caused by potential chemical hazards.

CAUTION Highlights potential fire hazards.

IMPORTANT Highlights information necessary to prevent damage to software, loss of data, or invalid test results; or might contain information that is critical for optimal performance of the system.

Note Highlights information of general interest.

Tip Highlights helpful information that can make a task easier.

Contacting Us

There are several ways to contact Thermo Fisher Scientific for the information you need.

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Phone	800-532-4752
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Knowledge base	www.thermokb.com

Find software updates and utilities to download at mssupport.thermo.com.

❖ To contact Customer Service for ordering information

Phone	800-532-4752
Fax	561-688-8731
E-mail	us.customer-support.analyze@thermofisher.com
Web site	www.thermo.com/ms

❖ To get local contact information for sales or service

Go to www.thermoscientific.com/wps/portal/ts/contactus.

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Go to mssupport.thermo.com, agree to the Terms and Conditions, and then click **Customer Manuals** in the left margin of the window.

❖ To suggest changes to documentation or to Help

- Fill out a reader survey online at www.surveymonkey.com/s/PQM6P62.
- Send an e-mail message to the Technical Publications Editor at techpubs-lcms@thermofisher.com.

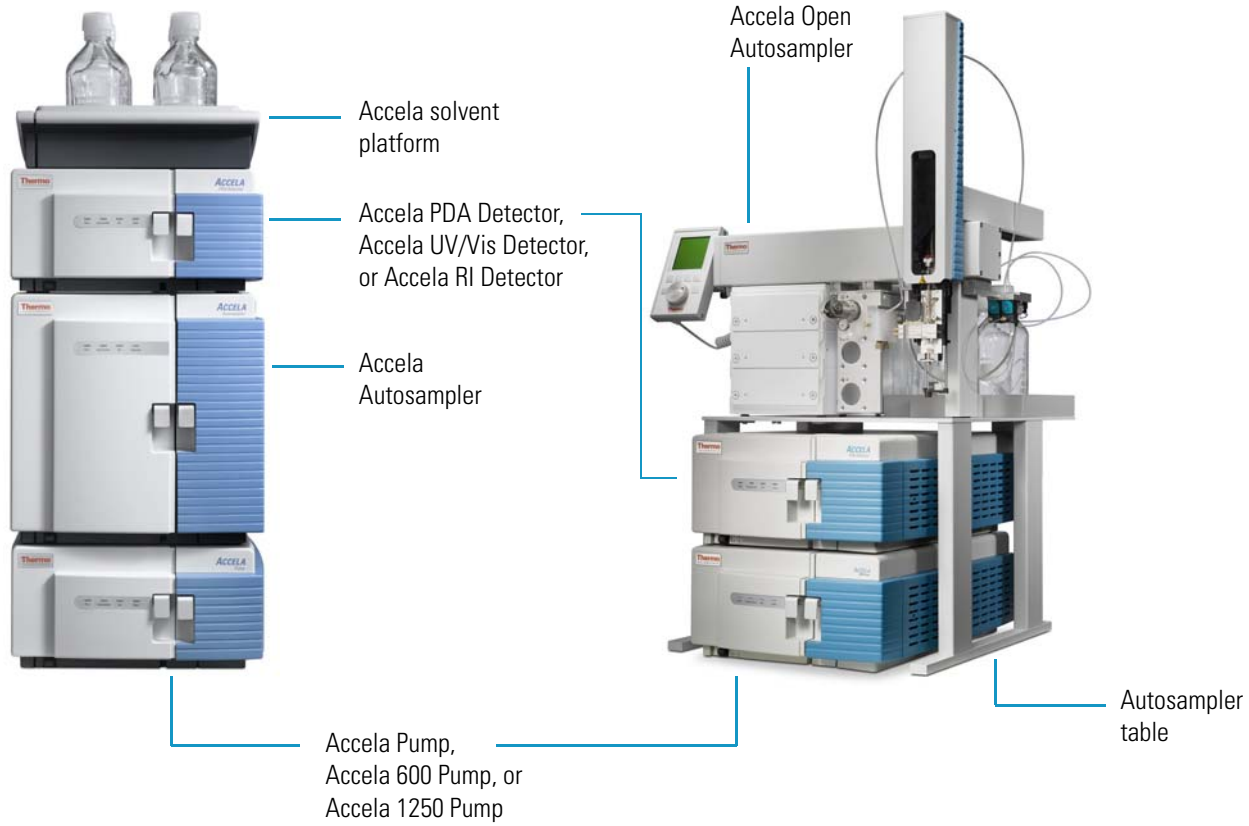
Introduction to the Accela LC System

The Accela ultra-high-performance liquid chromatography (UHPLC) system (see Figure 1) consists of an analytical pump, an autosampler, and an optional photodiode array (PDA) detector, ultra-violet/visible (UV/Vis) detector, or refractive index (RI) detector. You can control these devices from a Thermo Scientific data system.

Contents

- Overview
- Lifting and Carrying the Accela System Modules

Figure 1. Accela LC systems with an Accela Autosampler or an Accela Open Autosampler



Overview

The system layout depends on the autosampler model. For systems that include an Accela Autosampler, the autosampler sits above the analytical pump, followed by the detector. The Accela solvent platform, containing the solvent reservoir bottles, is located on the top of the stack. For systems that include an Accela Open Autosampler, the autosampler is installed on its own table. The analytical pump and detector stack fit below the table (see Figure 1 on page 1).

Four 1/8 in. OD, fluorinated ethylene propylene (FEP) solvent lines carry solvent from the reservoir bottles down to the vacuum membrane degasser built into an Accela pump. Four high-precision solenoid valves in the pump proportion the solvents to create the requested mobile phase composition. If the pump has the optional dynamic mixer installed, the liquid displacement assembly (LDA) delivers mobile phase to the inlet port of the dynamic mixer. As the mixed mobile phase exits the mixer, it flows into the autosampler heat exchanger where it equilibrates to the temperature specified in the chromatographic method before it reaches the autosampler injection valve.

Note Accela pumps shipped before March 2008 do not have a built-in dynamic mixer. Call your local Thermo Fisher Scientific field service representative for information on upgrading these pumps. Adding the dynamic mixer to the Accela Pump ensures mixing of complex or relatively incompatible solvents and reduces the chromatographic baseline noise for applications using proportioned mobile phases. The integrated dynamic mixer also increases the accuracy and reproducibility of complex ternary and quaternary gradients. The dynamic mixer adds 35 µl of gradient delay volume to the system.

The Accela 600 and Accela 1250 pumps ship with a placeholder module that connects the flow path between the liquid displacement assembly and the autosampler. The placeholder module is a block of stainless steel with an internal bore for the solvent flowpath and inlet and outlet ports. The dynamic mixer is an add-on hardware option that provides solvent mixing and physically replaces the placeholder module.

The Accela autosampler draws a sample from a sample vial or well and meters it into an isolated sample loop attached to the injection valve. The injection valve switches to the inject position, which places the sample loop in line between the pump and column. Mobile phase backflushes the sample from the sample loop into the LC column.

As compounds elute from the LC column, they pass through a short length of tubing into the detector's flow cell. In the Accela UV/Vis and Accela PDA detectors, each component in turn absorbs light according to its molar absorptivity and concentration. The detectors measure the reduction in light intensity due to the absorbance of each component, and the data system reports the absorbance as a function of wavelength and time.

In the Accela RI Detector, which is a differential refractive index detector, eluting compounds pass through the sample compartment of the detector's flow cell. The RI detector measures the deflection of a light beam caused by the refractive index difference between the contents of the sample compartment and that of the reference compartment, which contains mobile phase. The data system reports the signal in refractive index units (RIU) as a function of time.

CAUTION The pressure rating for the flow cell of the Accela RI Detector is 517 kPA (75 psi). When you connect two detectors in series, place the refractive index detector at the end of the solvent path.

When the Accela system is connected to a mass spectrometer, the liquid-phase mixture of analyte components and mobile phase exits the LC column and travels through another length of 0.005 in. ID, red tubing (supplied in the accessory kit for the MS detector) to the mass spectrometer. The mass spectrometer's ion source nebulizes and ionizes the liquid-phase mixture, its ion optics transmit the ions into the mass analyzer, and the mass analyzer separates the ions according to their mass-to-charge ratios (*m/z*). As the ions sequentially exit the mass analyzer, they impinge upon a conversion dynode/electron multiplier detector, which sends a signal to the data system computer. The data system reports the ion abundance as a function of the *m/z* ratio of the ions.

Lifting and Carrying the Accela System Modules

Because each Accela module weighs more than 18 kg (40 lb), attempting to lift any of these modules without assistance can cause personal injury. In accordance with international safety regulations, lifting or moving objects heavier than 18 kg (40 lb) requires a team effort.

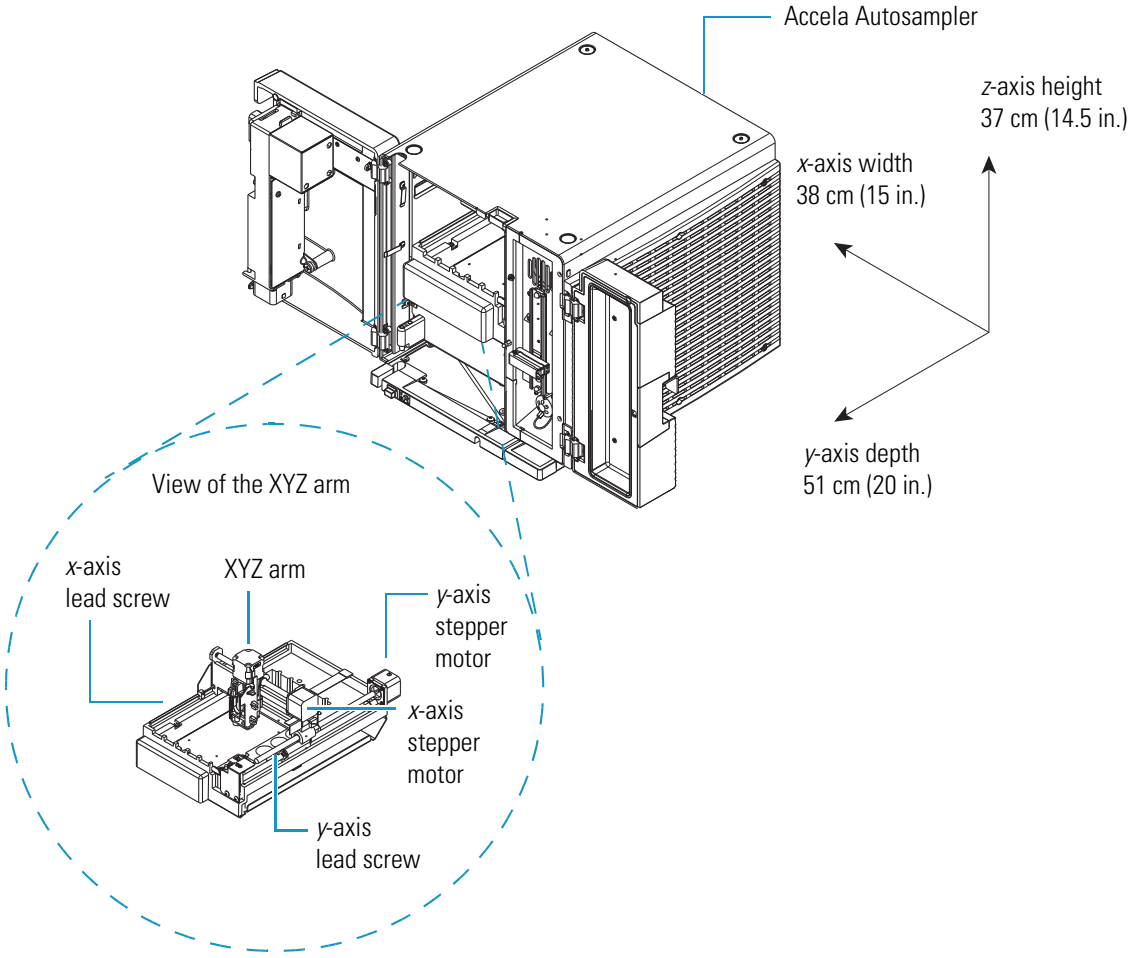
CAUTION Because each Accela module weighs more than 18 kg (40 lb), in accordance with international safety regulations, lifting or moving any of these modules **requires a team effort**.

The autosamplers are the largest and heaviest modules in the Accela system.

Accela Autosampler

The Accela Autosampler (see Figure 2), at 30 kg (66 lb) and with a height, width, and depth of 37 × 38 × 51 cm (14.5 × 15 × 20 in.), is too heavy and too bulky for one person to safely lift or move alone. In addition, any jarring or uneven movement can cause misalignment of the autosampler's XYZ arm.

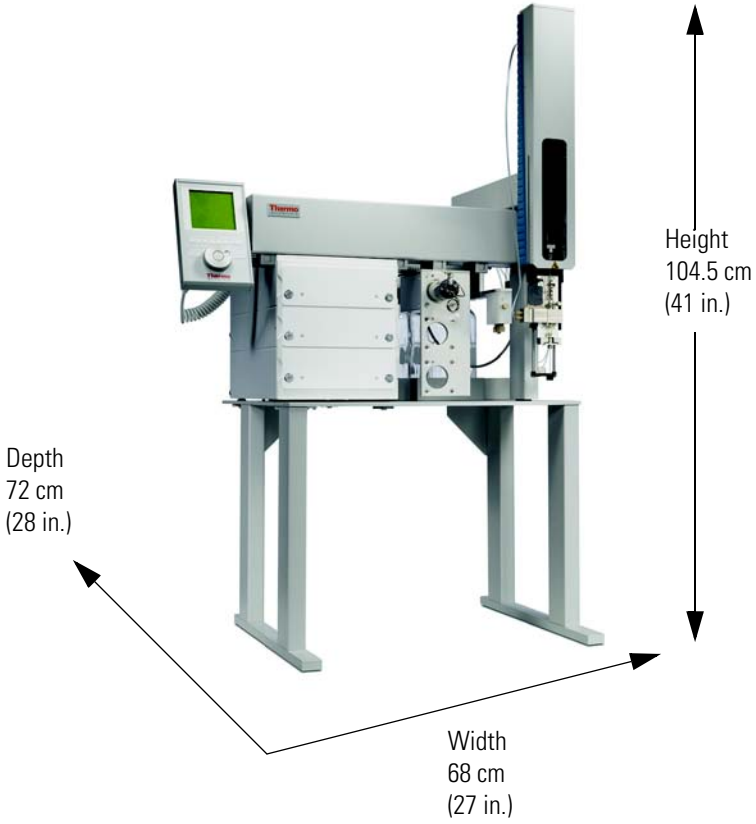
Figure 2. Accela Autosampler dimensions



Accela Open Autosampler

The Accela Open Autosampler with its table (see Figure 3) weighs 38.5 kg (85 lbs) and is too heavy and bulky for one person alone to lift or move.

Figure 3. Accela Open Autosampler with table



Back Panel Connections

Before you can operate the Accela modules, you must connect them to line power and the data system computer. In addition, you must connect the contact closure cables to synchronize the LC pump and the autosampler during an injection sequence and to trigger the detector when the autosampler releases the injection.

Contents

- System Synchronization Connections
- Communication Connections to the Data System Computer
- Line Power Connections

System Synchronization Connections

The system synchronization (contact closure) connections for an Accela LC system depend on whether the LC system includes an Accela Autosampler or an Accela Open Autosampler.

To make the system synchronization connections for your LC or LC/MS system, go to the appropriate topic:

- Accela Autosampler System Synchronization Connections
- Accela Open Autosampler System Synchronization Connections

Accela Autosampler System Synchronization Connections

To make the system synchronization connections for a stand-alone Accela LC system or an Accela LC system with a Thermo Scientific mass spectrometer, follow these procedures:

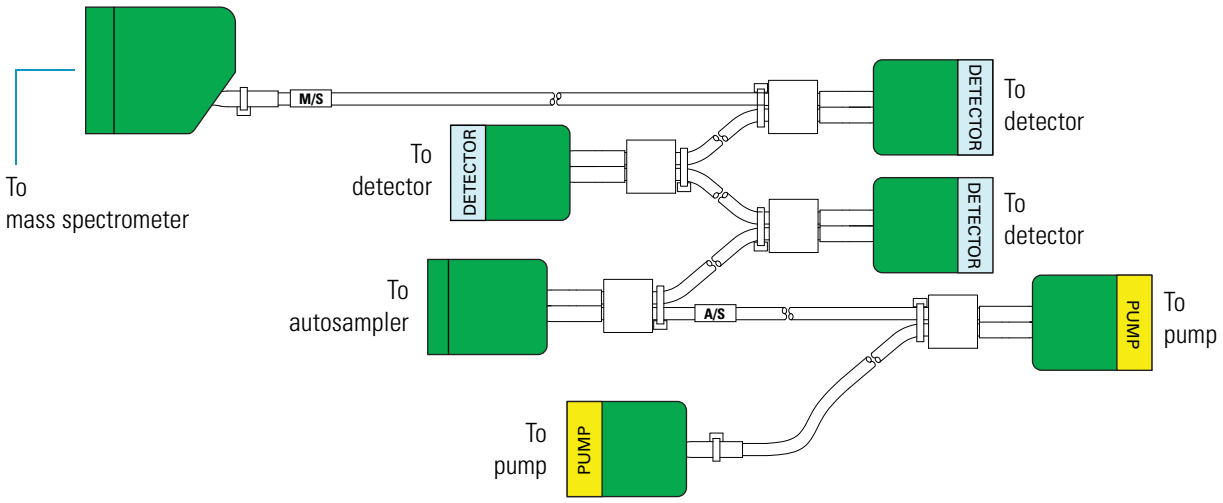
- Connecting the System Interconnect Cable to the LC Modules
- Connecting the System Interconnect Cable to the Mass Spectrometer

Note The Accela System Kit contains the system interconnect cable for systems that include the Accela Autosampler. An Accela system that is ordered with a Thermo Scientific data system includes this kit. Otherwise, when you order an instrument separately from a Thermo Scientific data system, you can order the Accela System Kit as an option.

Connecting the System Interconnect Cable to the LC Modules

If your Accela LC system contains an Accela Autosampler, use the system interconnect cable shown in Figure 4 to coordinate the timing of the Accela system modules during an injection. This cable is shipped in the Accela System Kit. See "System Connection Parts and Kits" on page 63.

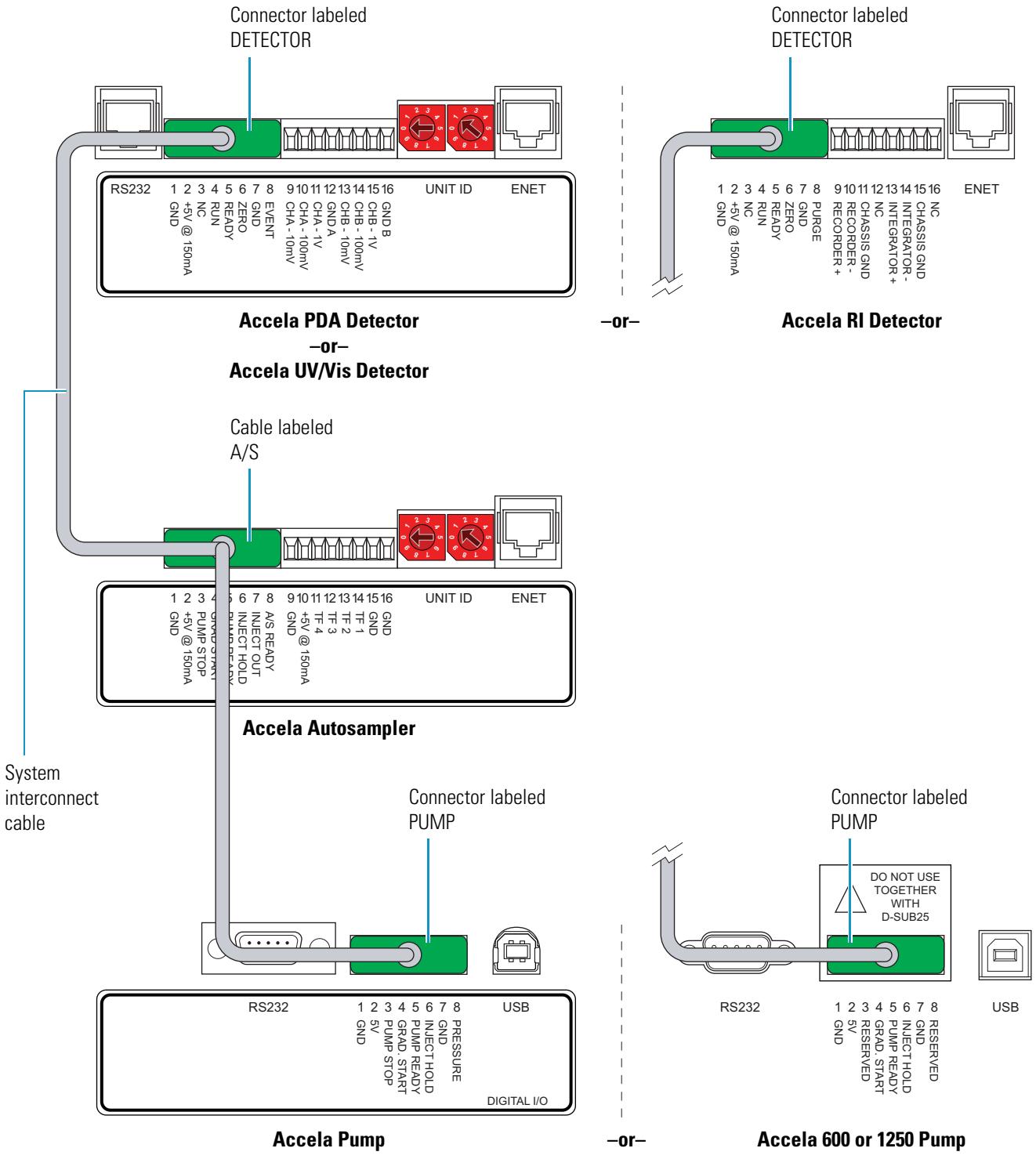
Figure 4. System interconnect cable (P/N 60053-63034)



❖ To connect the Accela LC modules

1. Plug one of the three connectors labeled DETECTOR into the receptacle located on the back panel of an Accela detector (see Figure 5).
2. Plug the unlabeled connector with the cable labeled A/S into the receptacle on the back panel of the autosampler.
3. Plug a connector labeled PUMP into the receptacle on the back panel of the pump.

Figure 5. System interconnect cable connections for an Accela UHPLC system with an Accela Autosampler



Connecting the System Interconnect Cable to the Mass Spectrometer

To connect a mass spectrometer to an Accela LC system with an Accela Autosampler, follow the procedure for your mass spectrometer:

- MSQ Plus Mass Detector Connection
- Legacy LCQ Series Connection
- LTQ Series Connection
- TSQ Series Connection

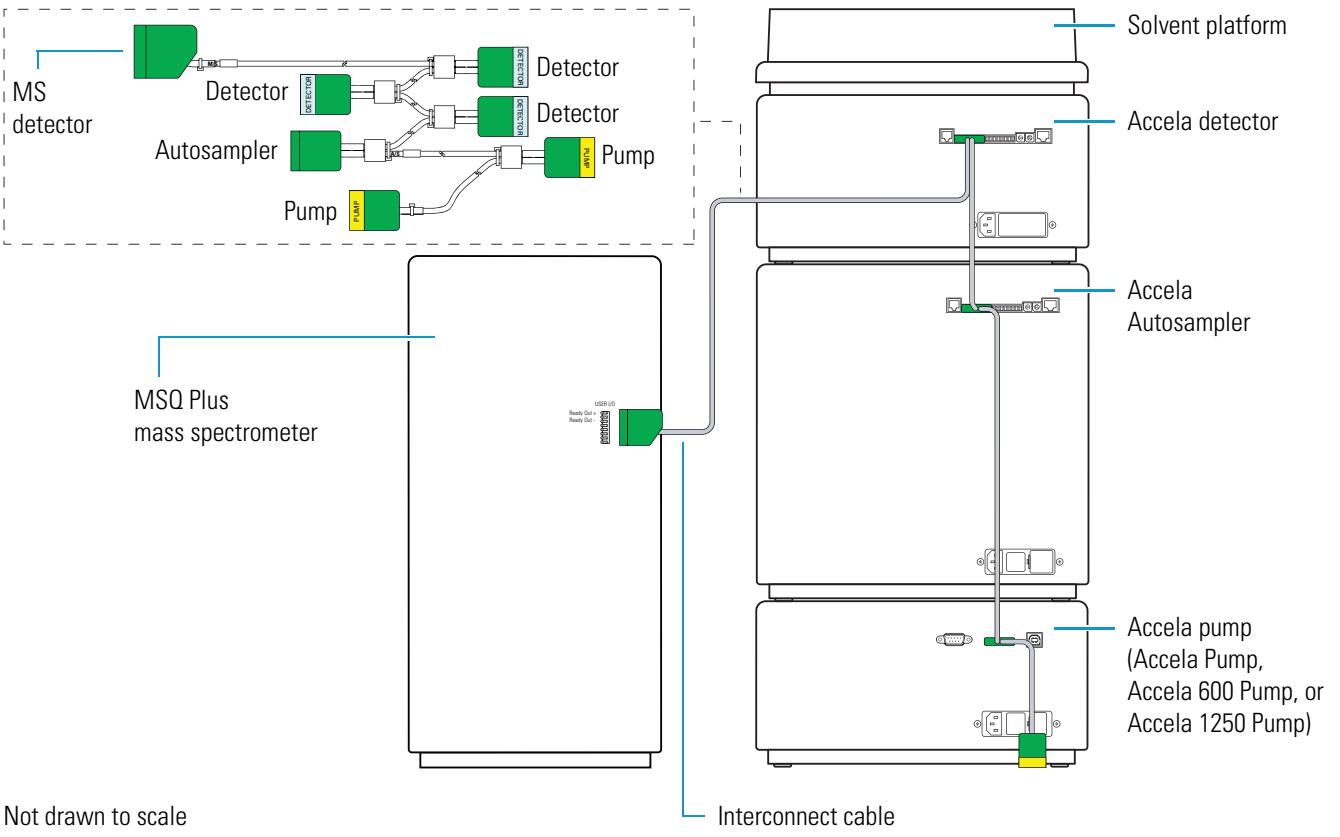
MSQ Plus Mass Detector Connection

The system interconnect cable connector labeled MS detector connects directly to the back panel of the MSQ Plus Mass Detector.

❖ **To connect an MSQ Plus Mass Detector**

Plug the connector with the cable labeled M/S into the User I/O connector (8-pin port) located on the back panel of the MSQ Plus™ Mass Detector (see Figure 6).

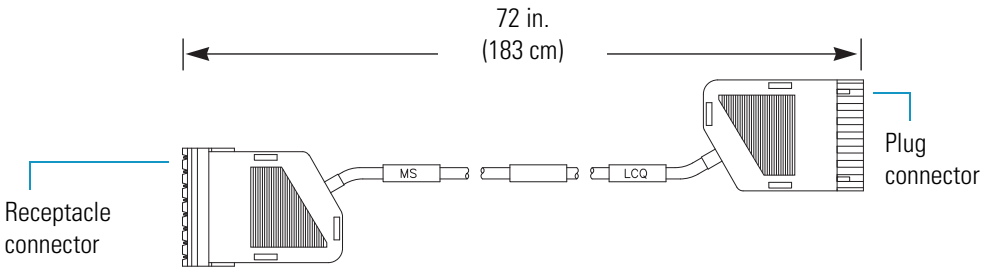
Figure 6. MSQ Plus Mass Detector trigger connection to an Accela Autosampler



Legacy LCQ Series Connection

To connect a legacy LCQ™ Series mass spectrometer, use the LCQ Series adapter cable (see Figure 7) and the system interconnect cable.

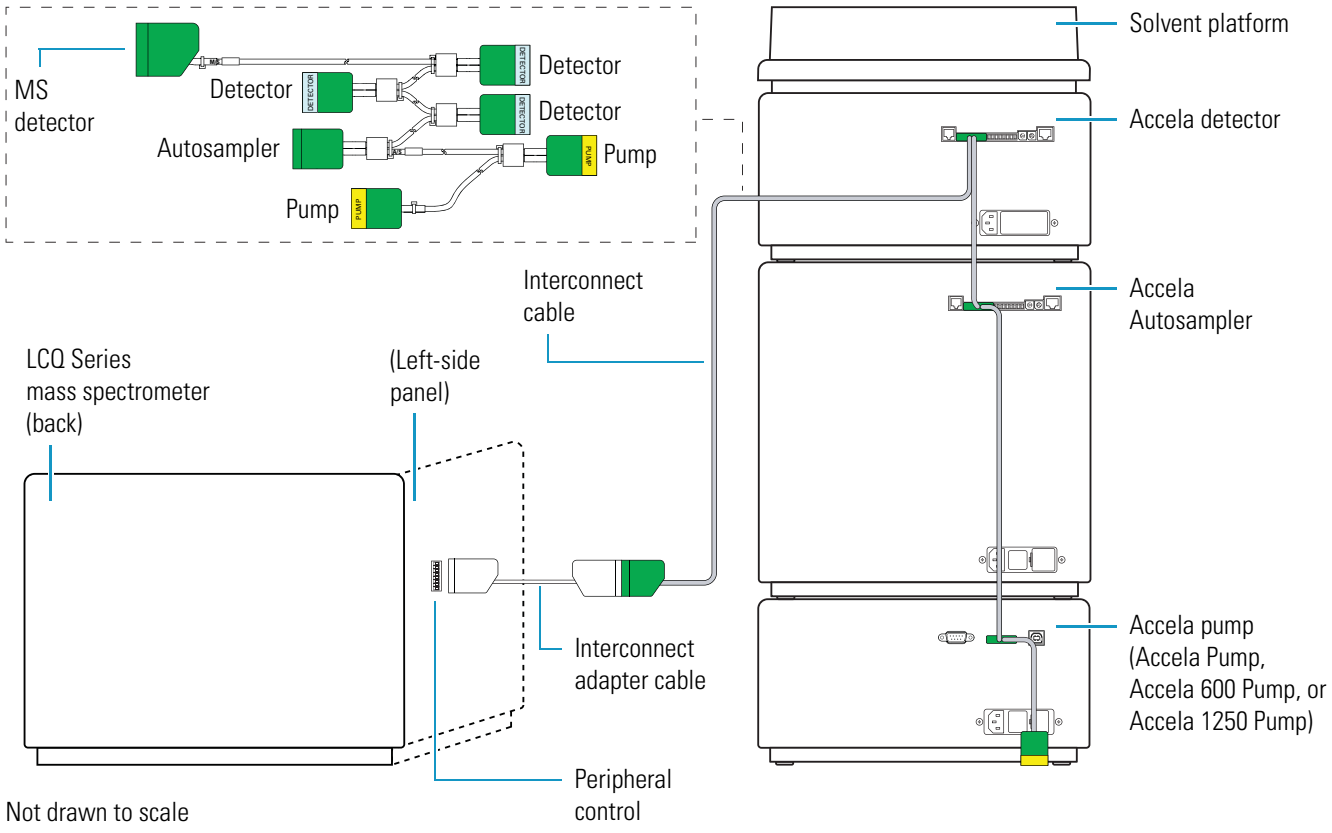
Figure 7. LCQ Series adapter cable (P/N 60053-63036)



❖ To connect an LCQ Series mass spectrometer

1. Attach the receptacle connector on the LCQ Series interconnect adapter cable to the system interconnect cable connector with the cable labeled M/S.
2. Connect the plug connector on the adapter cable to the green, 8-pin connection (labeled Peripheral Controls) located on the upper left side of the LCQ Series mass spectrometer (see Figure 8).

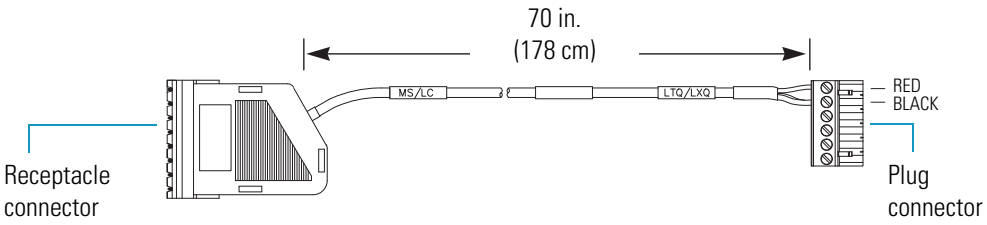
Figure 8. LCQ Series mass spectrometer trigger connection to an Accela Autosampler



LTQ Series Connection

To connect an LTQ Series (LCQ Fleet™, LXQ™, LTQ XL™ or LTQ Velos™) mass spectrometer, use the LXQ/LTQ adapter cable (see Figure 9) and the system interconnect cable.

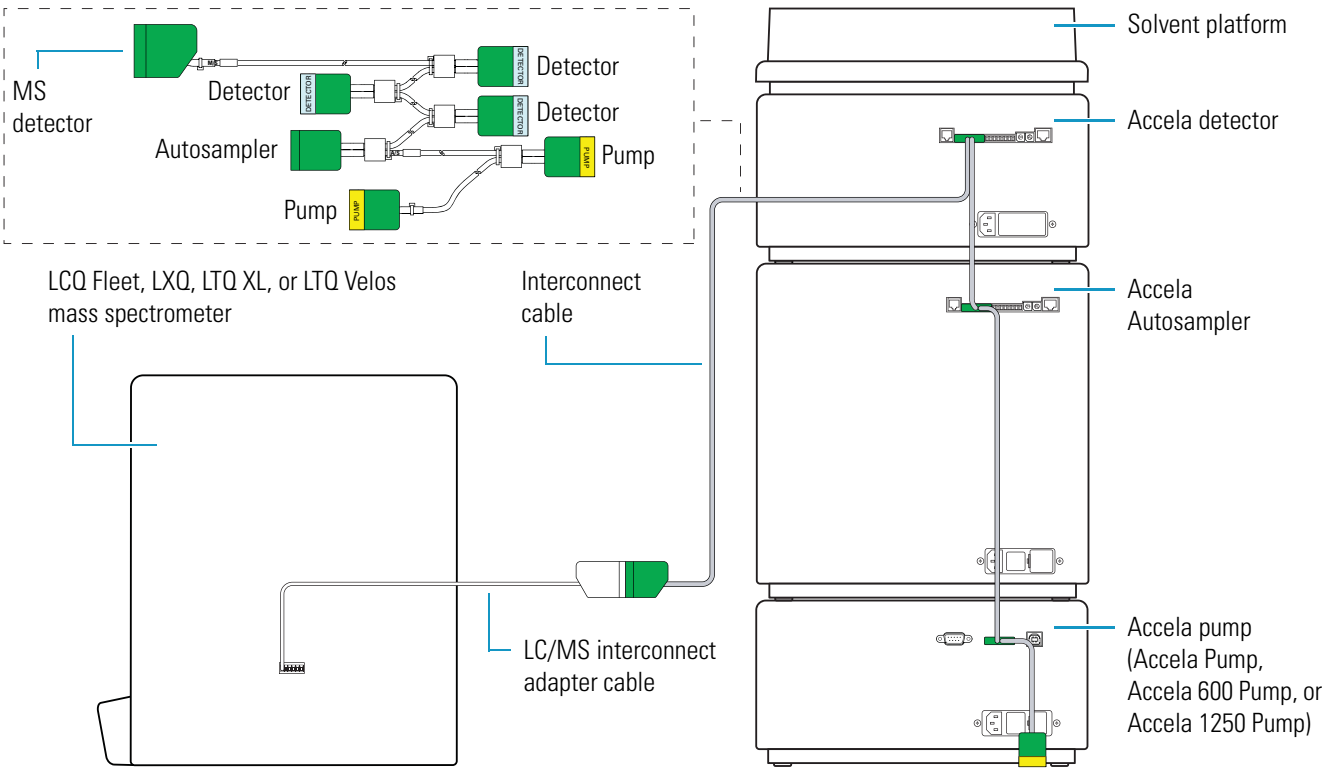
Figure 9. LXQ/LTQ adapter cable (P/N 60053-63037)



❖ To connect an LTQ Series MS detector to the Accela LC system

1. Attach the receptacle connector on the LTQ/LXQ interconnect adapter cable to the system interconnect cable connector with the cable labeled M/S.
2. Connect the connector end of the LXQ/LTQ interconnect adapter cable to the green, 6-pin connection (labeled Peripheral Control) on the lower right side of the mass spectrometer (see Figure 10).

Figure 10. LTQ Series mass spectrometer trigger connection to an Accela Autosampler

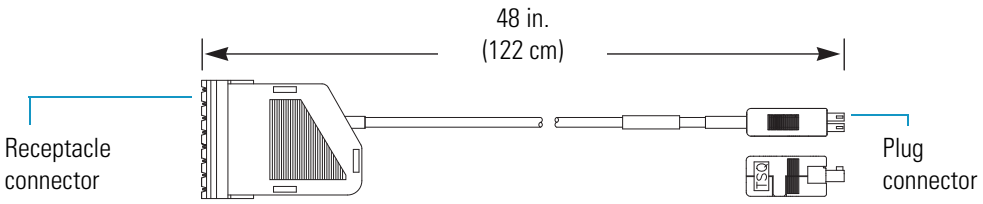


Not drawn to scale

TSQ Series Connection

To connect a TSQ™ Series mass spectrometer, use the adapter cable (see Figure 11) and the system interconnect cable.

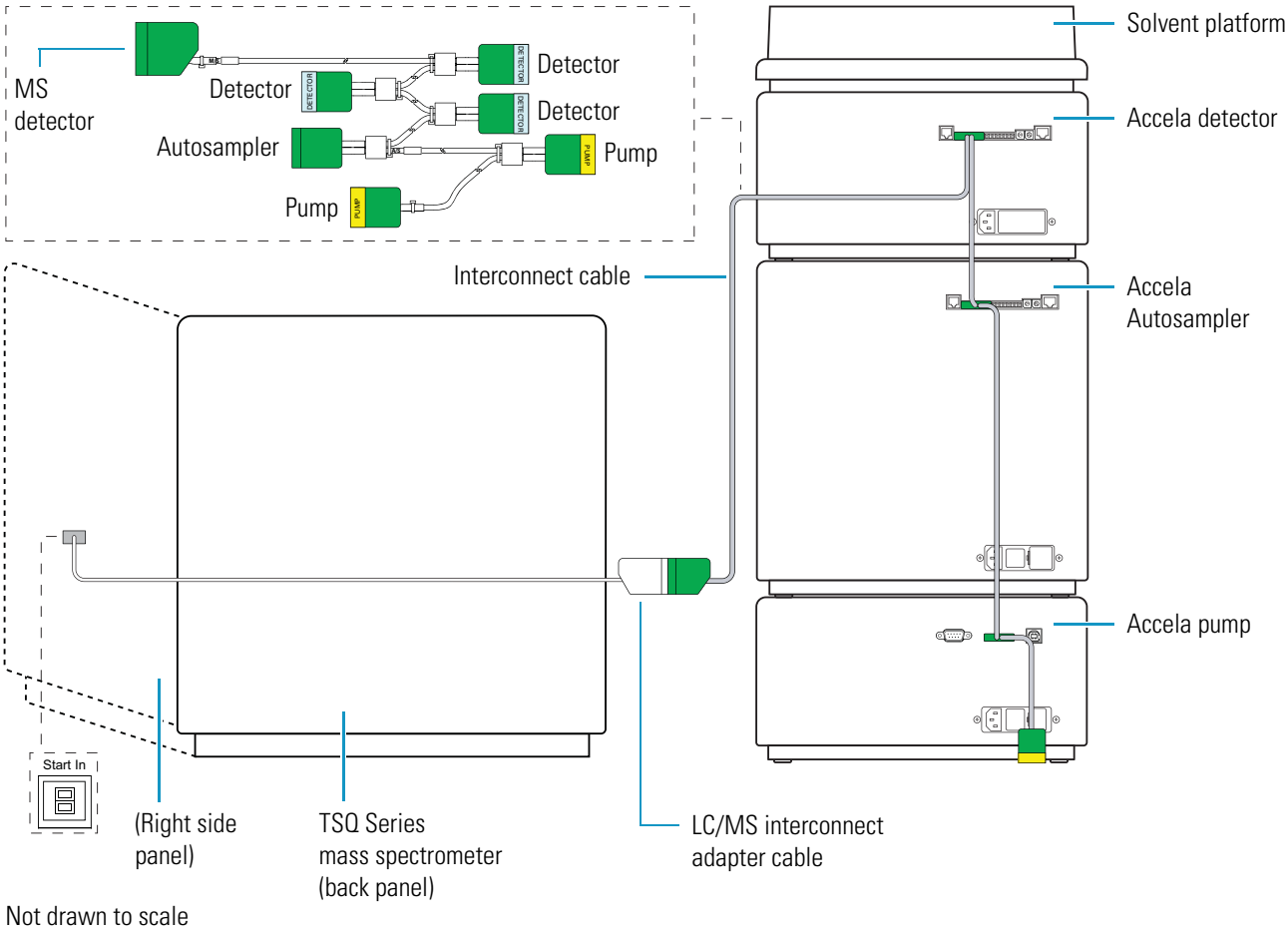
Figure 11. TSQ interconnect adapter cable (P/N 60053-63035)



❖ To connect a TSQ Series mass spectrometer to the Accela LC system

1. Attach the receptacle connector on the TSQ interconnect adapter cable to the system interconnect cable connector with the cable labeled M/S.
2. Connect the connector end of the TSQ adapter cable to the receptacle (labeled Start In) on the lower right side of the TSQ Series mass spectrometer (see Figure 12).

Figure 12. TSQ Quantum Series mass spectrometer trigger connection to an Accela Autosampler



Accela Open Autosampler System Synchronization Connections

The system interconnect cables and adapter cables that synchronize the run signals for an LC or LC/MS system with an Accela Open Autosampler depend on the Accela pump model, the mass spectrometer model, and whether the LC system includes an Accela detector.

Table 1 lists the system interconnect and adapter cables that Thermo Fisher Scientific supplies for the Accela Open Autosampler by special order.

Tip An unlabeled cable equivalent to the Accela Open Autosampler interconnect cable (P/N 60157-63024) ships with the autosampler.

This unlabeled cable has three connectors:

- The DB15 connector plugs into the Interface 1 port on the back panel of the autosampler.
- The DB25 connector plugs into the D-Sub 25 port on the back panel of an Accela 600 or 1250 Pump.
- The 2-socket connector connects to the Start In pins of an MSQ or LTQ Series mass spectrometer.

Table 1. Accela Open Autosampler contact closure and adapter cables

Cable description	Part number	Use
Accela Open Autosampler system interconnect cable	60157-63024	Required for all hardware configurations
Accela detector and MS detector adapter cable	60157-63026	Required for hardware configurations that include one or more of the following: • Accela detector (UV/Vis, PDA, or RI detector) • TSQ or Exactive mass spectrometer
Accela Pump adapter cable	60157-63022	Required for the discontinued Accela Pump

Note Thermo Fisher Scientific has discontinued the Accela Pump. The Accela family of LC pumps currently includes the Accela 600 Pump and the Accela 1250 Pump.

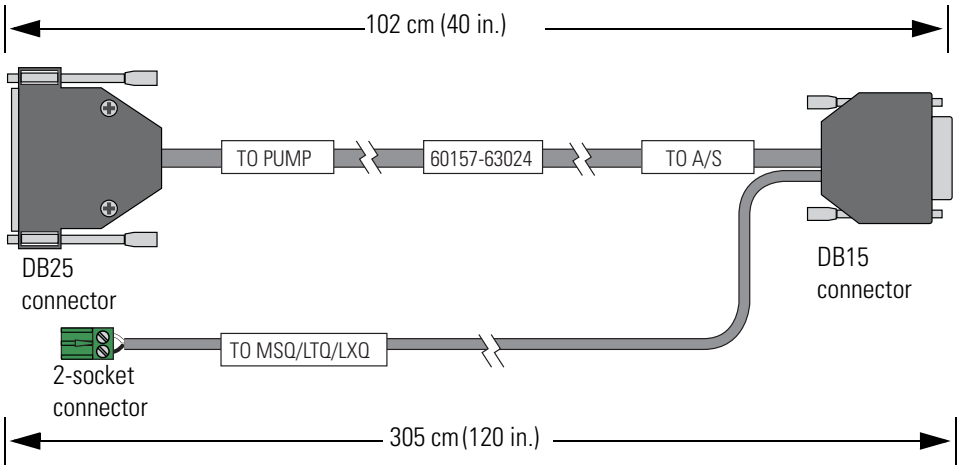
To make the contact closure connections, follow these procedures as appropriate:

- Connecting the Accela Open Autosampler Interconnect Cable
- Connecting the Adapter Cable for an Accela Detector or TSQ Series MS Detector
- Connecting the Accela Pump Adapter Cable

Connecting the Accela Open Autosampler Interconnect Cable

Figure 13 shows the Accela Open Autosampler interconnect cable (P/N 60157-63024). An equivalent cable (with unlabeled connectors) ships with the autosampler.

Figure 13. Accela Open Autosampler interconnect cable (P/N 60157-63024)



❖ **To connect the Accela Open Autosampler interconnect cable (or equivalent) to the LC or LC/MS system modules**

1. Plug the DB15 connector into the Interface 1 receptacle on the back panel of the Accela Open Autosampler (see Figure 14).
2. Depending on the Accela pump model, do one of the following:
   - If your LC system includes an Accela 600 or 1250 Pump, plug the DB25 connector into the D-Sub25 receptacle on the back panel of the pump (see Figure 14).

     Tip For a dual-pump system, connect the 25-pin connector to the eluting pump. Do not connect a contact closure cable to the loading pump.

     For information about setting up the configuration for the device drivers, refer to the *Accela 600 Pump and Accela 1250 Pump Hardware Manual*. For information about setting up the trigger signal for the loading pump (typically pump 2) and the pump programs for both pumps, refer to the Accela user guide for your data system. The dual-pump configuration is not supported by every Thermo Scientific data system.

   –or–

   - If your LC system includes an Accela Pump, go to "Connecting the Accela Pump Adapter Cable" on page 22.

3. Depending on the LC detector or MS detector setup, do one of the following:

   - If your LC or LC/MS system includes an Accela detector or a TSQ Series or Exactive mass spectrometer, go to "Connecting the Adapter Cable for an Accela Detector or TSQ Series MS Detector" on page 18.

   –or–

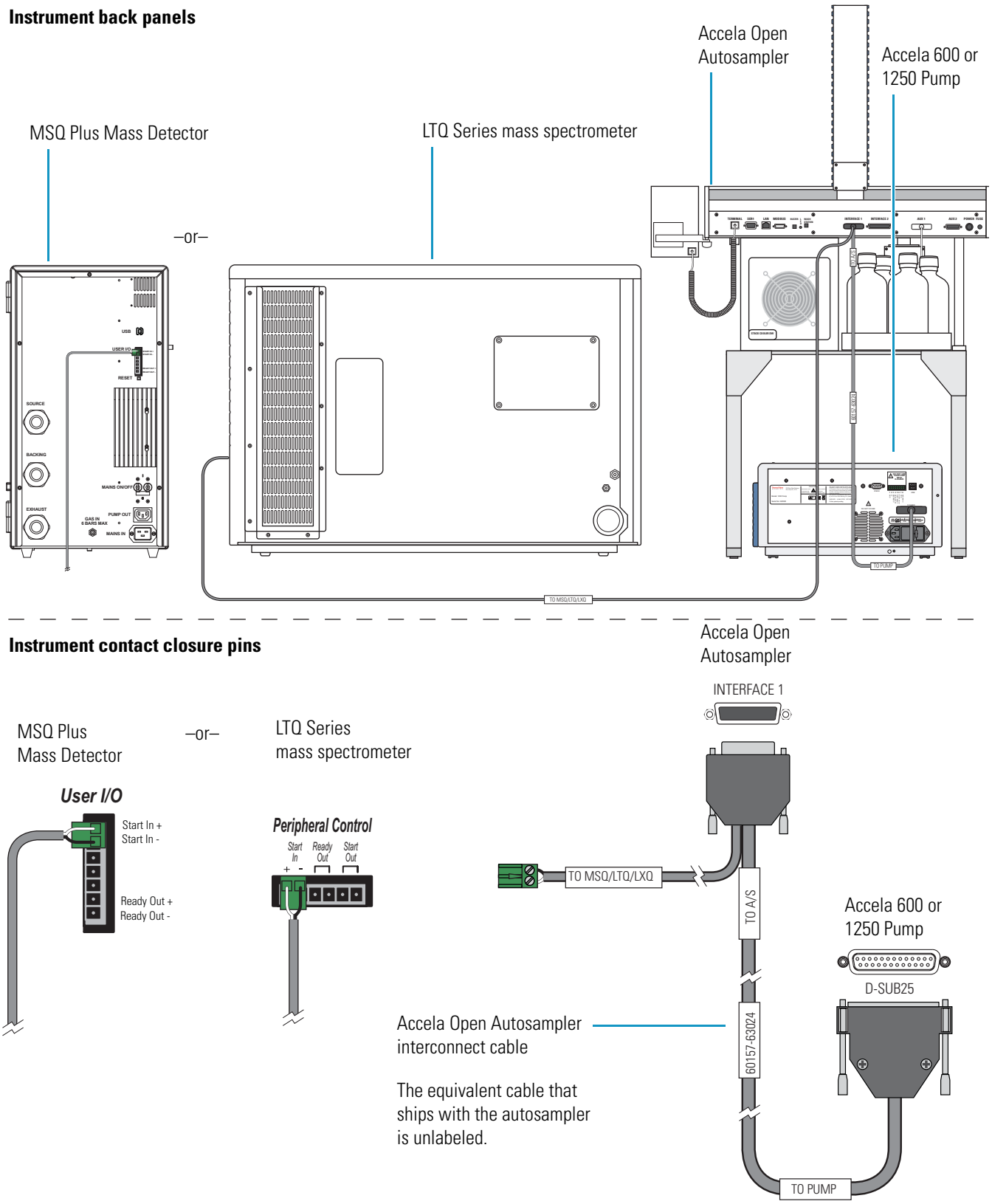
   - If your LC/MS system includes an MSQ Plus Mass Detector or an LTQ Series mass spectrometer, but does not include an Accela detector, go to step 4.

4. Connect the 2-socket connector to the mass spectrometer as follows:

   - For the MSQ Plus Mass Detector, connect the cable to the User I/O Start In pins on the MS detector's back panel (see Figure 14).

   - For the LTQ Series mass spectrometer, connect the cable to the Peripheral Control Start In pins on the MS detector's right panel (see Figure 14).

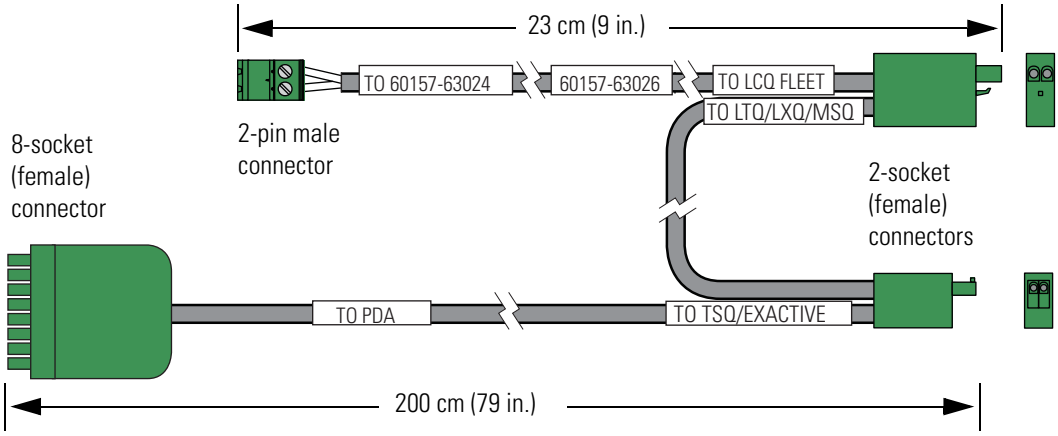
Figure 14. Accela Open Autosampler interconnect cable connections (back panel view of the LC/MS modules)



Connecting the Adapter Cable for an Accela Detector or TSQ Series MS Detector

Use the Accela detector and MS detector adapter cable (see Figure 15) to connect the Accela Open Autosampler to an Accela detector, a TSQ or Exactive™ mass spectrometer, or both.

Figure 15. Adapter cable for an Accela detector and a TSQ Series MS detector (P/N 60157-63026)

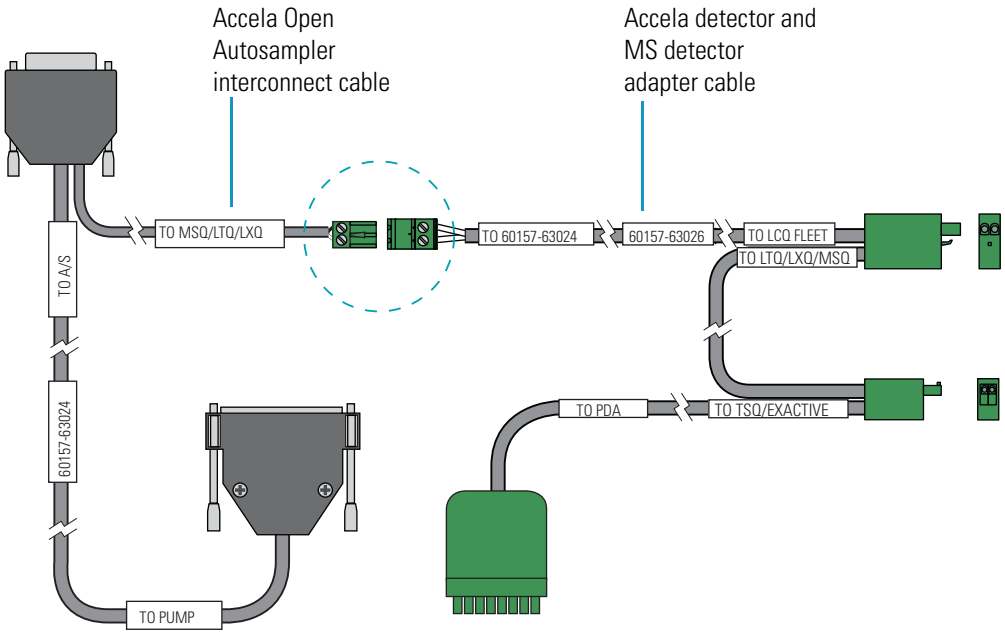


❖ To connect the LC detector and MS detector adapter cable

1. If you have not already done so, connect the Accela Open Autosampler interconnect cable to the autosampler and the Accela 600 or 1250 Pump (see "Connecting the Accela Open Autosampler Interconnect Cable" on page 15).
2. Connect the adapter cable to the interconnect cable by plugging the 2-pin (male) connector labeled **TO 60157-63024** on the adapter cable into the 2-socket (female) connector on the interconnect cable (see Figure 16).

> **Tip** The Accela Open Autosampler interconnect cable that is available by special order has three labeled connectors. The 2-socket (female) connector is labeled **TO MSQ/LTQ/LXQ**.
>
> An equivalent interconnect cable ships with the Accela Open Autosampler, but its three connectors are not labeled.

Figure 16. Accela Open Autosampler interconnect cable to detector adapter cable connection



3. Using the adapter cable connectors, make the appropriate connections to an Accela detector, a Thermo Scientific mass spectrometer, or both as follows:

   - For an Accela detector (UV/Vis, PDA, or RI), connect the 8-socket connector attached to the cable labeled **TO PDA** to pins 1 through 8 on the detector's back panel.
   - For an MSQ Plus Mass Detector, connect the 2-socket connector attached to the cable labeled **TO LTQ/LXQ/MSQ** to the Start In pins on the mass spectrometer's back panel.
   - For an LTQ Series mass spectrometer, connect the 2-socket connector attached to the cables labeled **TO LTQ/LXQ/MSQ** and **TO LCQ FLEET** to the Start In pins on the right side of the mass spectrometer.
   - For a TSQ or Exactive mass spectrometer, connect the 2-socket connector attached to the cable labeled **TSQ/EXACTIVE** to the Start In pins on the right side of the mass spectrometer.

Figure 17 and Figure 18 show the contact closure connections for a stand-alone Accela LC system and an LC/MS system, respectively.

Figure 17. Contact closure connections (back panel) for a stand-alone Accela LC system with an Accela Open Autosampler

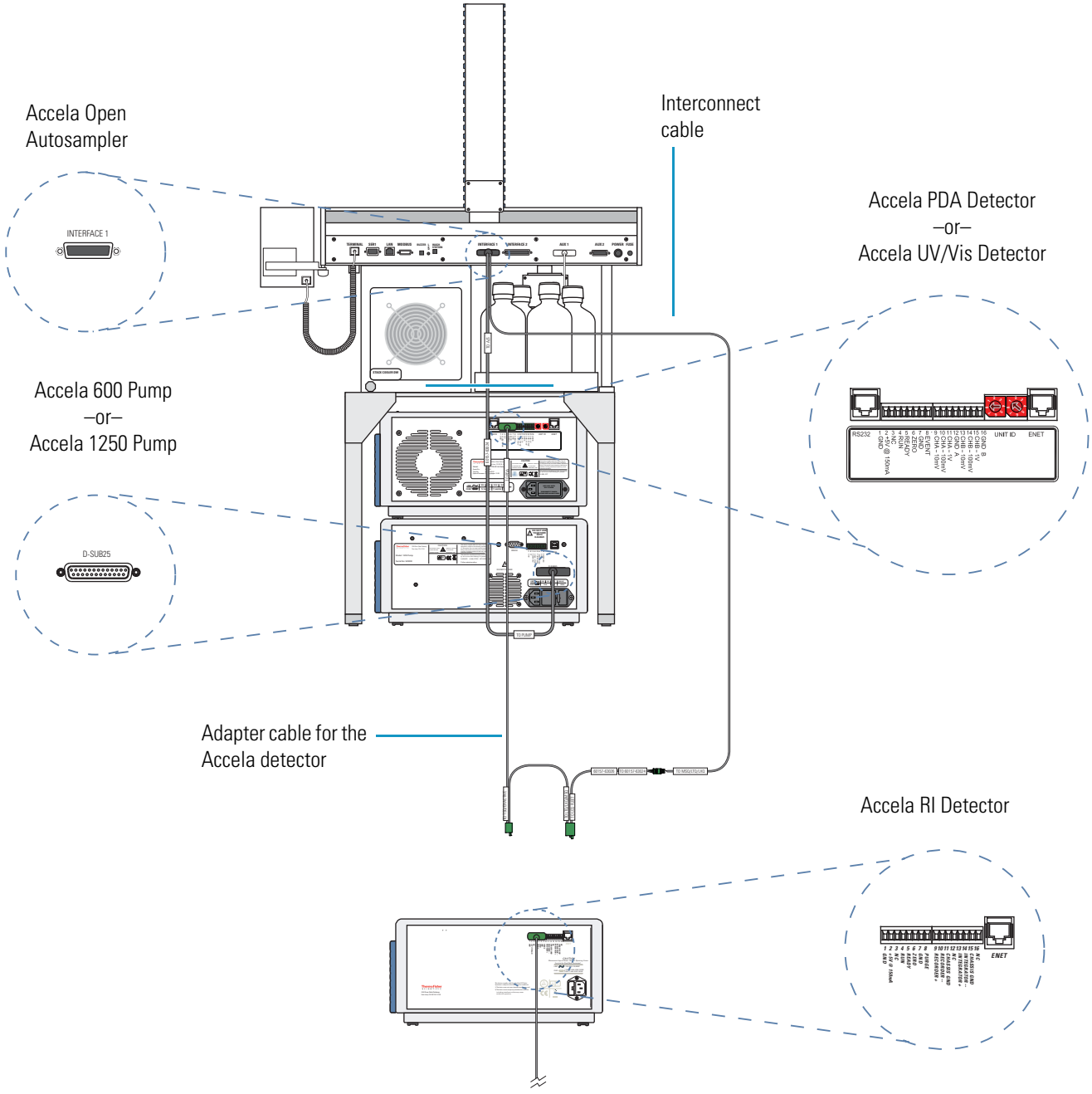
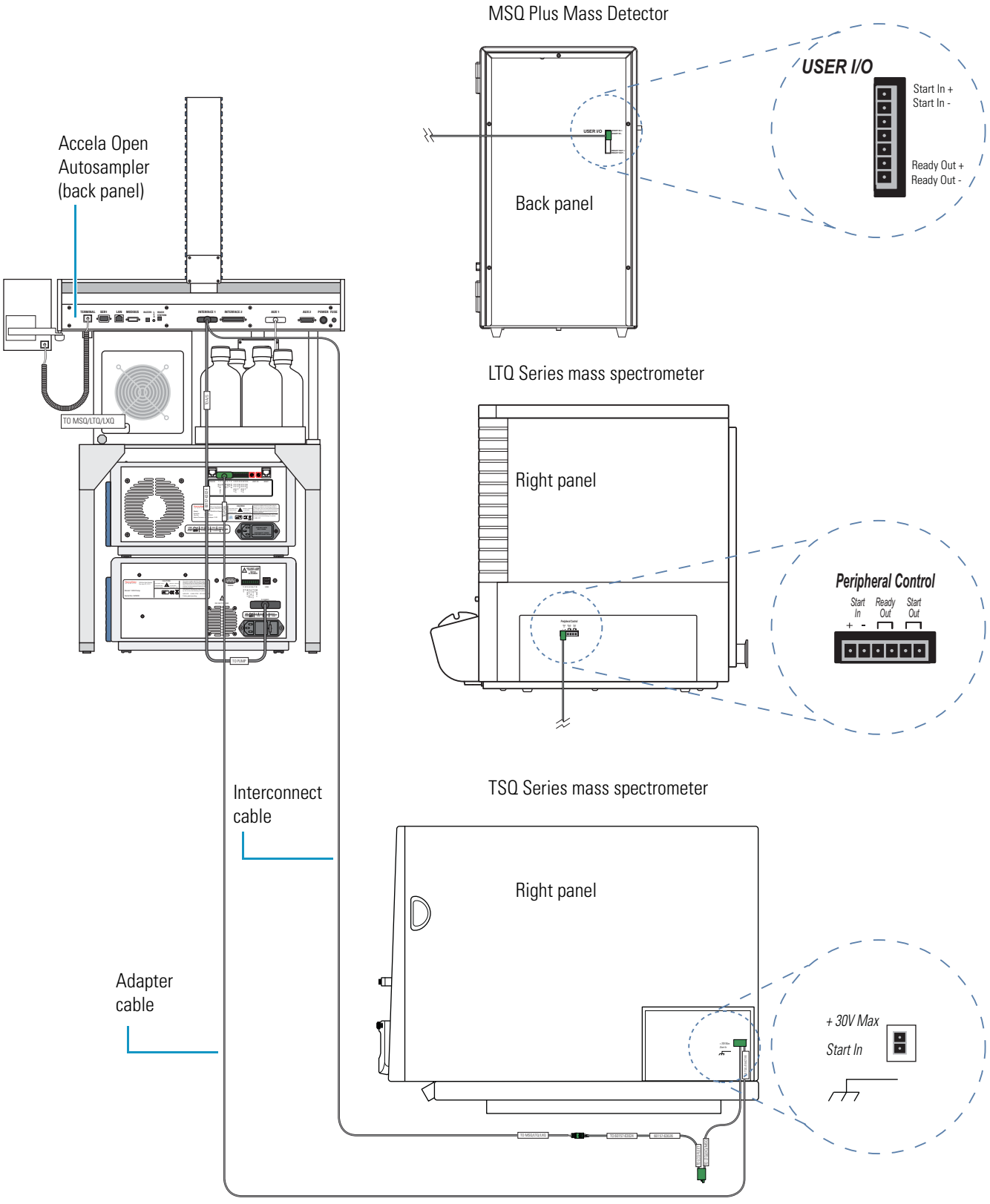


Figure 18. Accela Open Autosampler interconnect cable and detector adapter cable connections

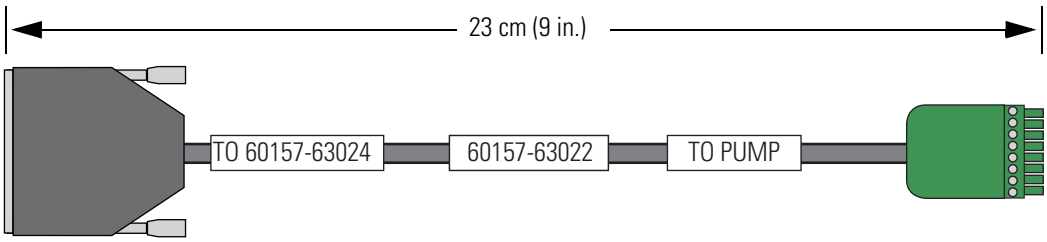


Connecting the Accela Pump Adapter Cable

Use the Accela Open Autosampler interconnect cable (see Figure 13 on page 15) and the Accela Pump adapter cable (see Figure 19) to interconnect the system modules for these hardware configurations:

- Accela Open Autosampler, Accela Pump, and MSQ Plus Mass Detector
- Accela Open Autosampler, Accela Pump, and an LTQ Series (LCQ Fleet, LXQ, LTQ XL, or LTQ Velos) mass spectrometer

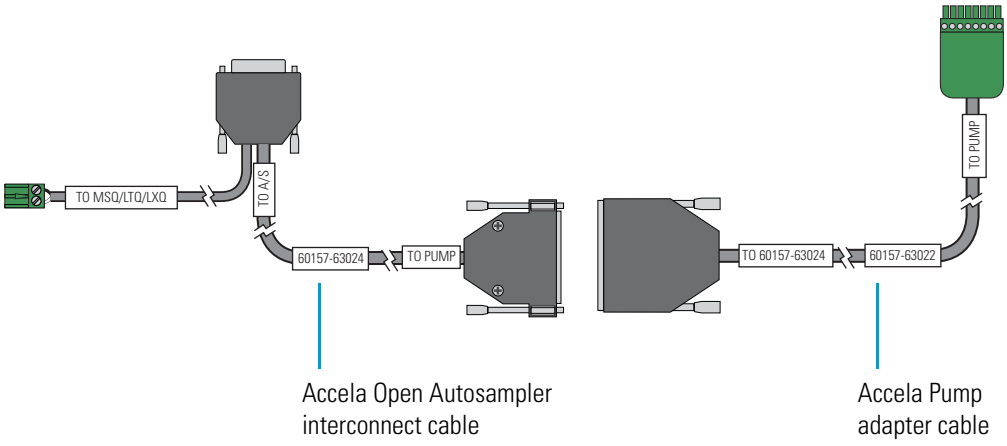
Figure 19. Accela Pump adapter cable



❖ To connect the Accela Pump adapter cable

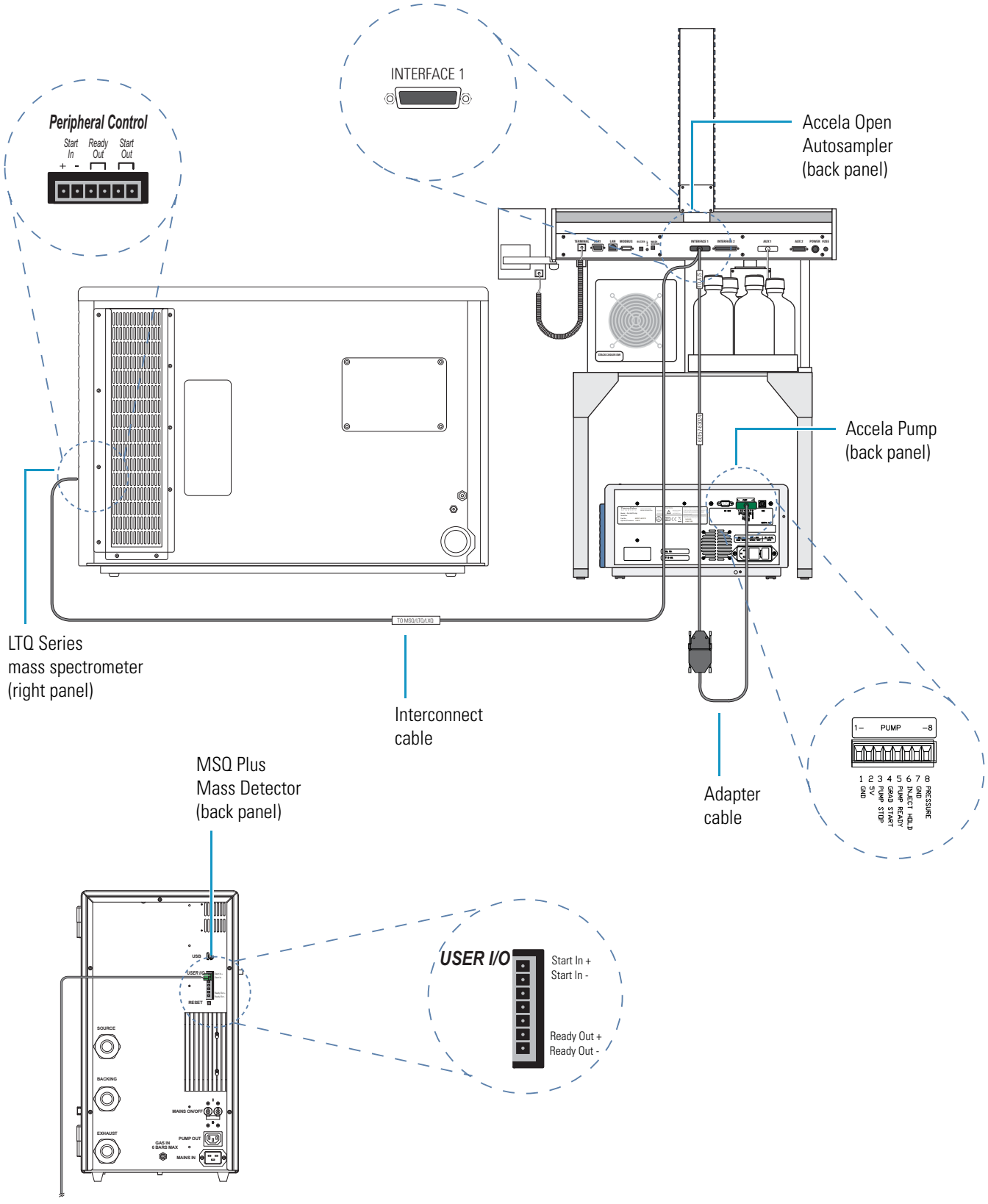
1. If you have not already done so, plug the DB15 connector of the Accela Open Autosampler interconnect cable into the Interface 1 port of the Accela Open Autosampler.
2. Connect the 25-pin connector of the Accela Pump adapter cable to the 25-pin connector of the Accela Open Autosampler interconnect cable (see Figure 20).

   Figure 20. Accela Open Autosampler Interconnect cable to Accela Pump adapter cable connection



3. Connect the 8-pin connector of the Accela Pump adapter cable to pins 1 through 8 on the back panel of the Accela Pump (see Figure 21).
4. Connect the 2-pin connector of the Accela Open Autosampler interconnect cable to the mass spectrometer (see "Connecting the Accela Open Autosampler Interconnect Cable" on page 15).

Figure 21. Accela Open Autosampler interconnect cable and Accela Pump adapter cable connections



Communication Connections to the Data System Computer

To connect the Accela modules to the data system computer, follow these procedures:

- Connecting the Accela Autosampler and Detector to the Data System Computer
- Connecting the Pump to the Data System Computer
- Connecting the Accela Open Autosampler to the Data System Computer

Connecting the Accela Autosampler and Detector to the Data System Computer

The Accela Autosampler and Accela detector (UV/Vis, PDA, or RI) communicate with the data system computer through an Ethernet connection (see Figure 22) routed through an Ethernet switch connected to the data system computer.

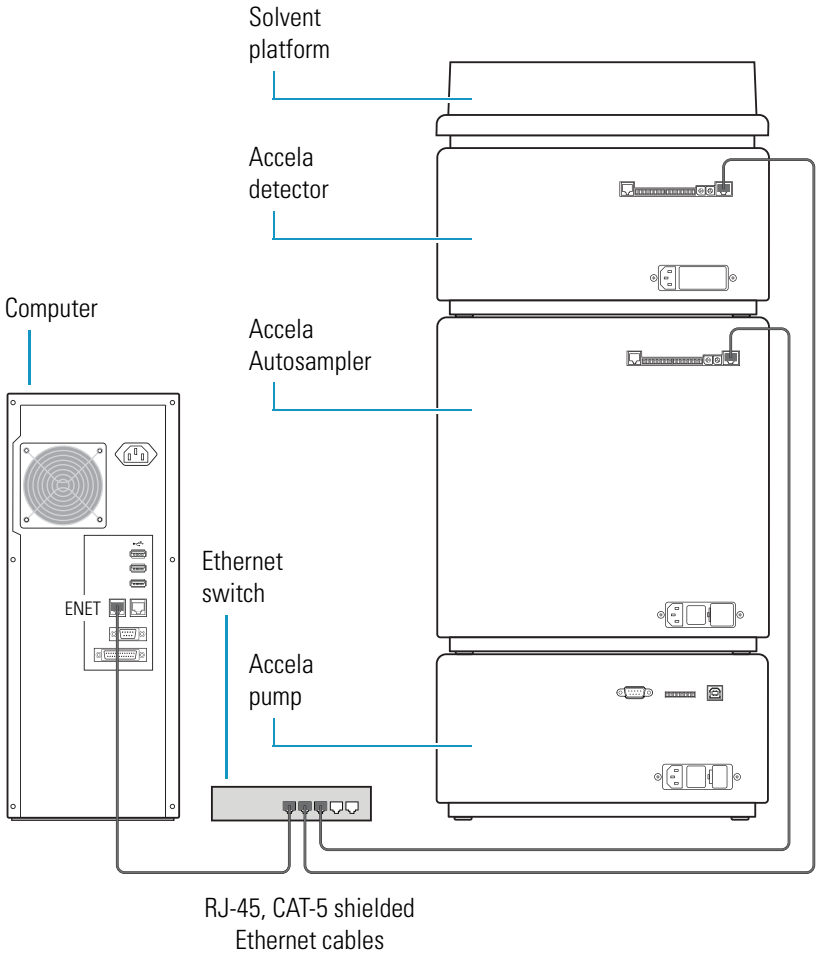
To make the Ethernet connections, use the RJ-45, CAT-5 shielded Ethernet cables provided in the instrument accessory kits. These cables are 2 m (7 ft) long.

When you order the Accela LC system with a Thermo Scientific mass spectrometer, the Ethernet card for the LC/MS system is preset to the appropriate IP address (172.16.0.101). While installing the LC or LC/MS system, your local Thermo Fisher Scientific checks the IP address setting.

❖ To connect the Ethernet cables

1. To connect an Accela Autosampler or Accela detector (UV/Vis, RI, or PDA) to the Ethernet switch (see Figure 22), do the following:
   a. Plug an Ethernet cable into the Ethernet port on the back panel of the module.
   b. Plug the other end of the cable into the Ethernet switch.

Figure 22. Ethernet connections



2. To connect the Ethernet switch to the data system computer (see Figure 22), do the following:

   a. If necessary, verify that the IP address for the dedicated Ethernet card is set to 172.16.0.101.

   b. Plug one end of an RJ-45, CAT-5, 2 m (7 ft) Ethernet cable into the appropriate Ethernet port in the data system computer.

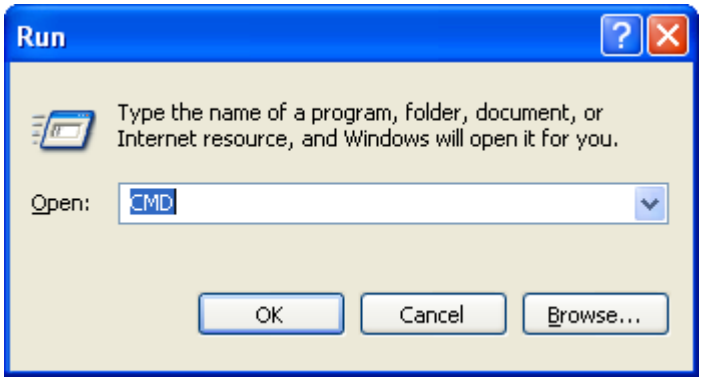
   c. Plug the other end of the cable into the Ethernet switch.

❖ To troubleshoot the Ethernet connection for an Accela device

1. From the Windows XP desktop, choose **Start > Run**.

   The Run dialog box appears (see Figure 23).

Figure 23. Run dialog box



2. In the Open list, type or select **CMD**.

   The Command Prompt window appears.

3. At the command prompt, type **ping**, press SPACEBAR, and type the IP address for the Accela device:

   172.16. ***x*** **.*y***

   Where:

   x = the stack setting with a range from 1 to 99

   y = a defined value

Device	IP address
Accela PDA Detector	172. 16. x. 162
Accela UV/Vis Detector	172. 16. x. 171
Accela Autosampler	172. 16. x. 111

4. Press ENTER.

   When you type the correct IP address, the ping statistics for the IP address appear.

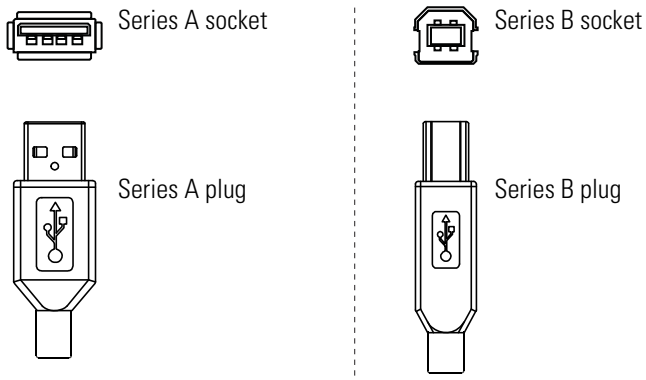
Connecting the Pump to the Data System Computer

The Accela pump (Accela Pump, Accela 600 Pump, or Accela 1250 Pump) communicates with the data system computer through a USB cable.

❖ To connect the USB cable to the Accela pump

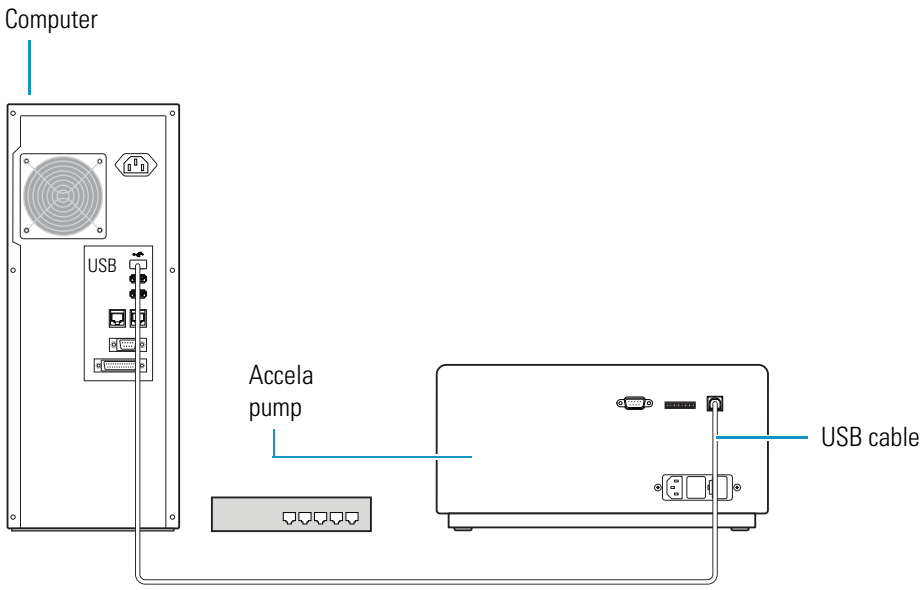
1. Locate the USB cable, consisting of a series A plug on one end and a series B plug on the other end (see Figure 24).

   Figure 24. USB cable connection plugs



2. Connect the series B plug to the port marked USB on the back of the Accela pump.
3. Connect the series A plug to a USB slot on the data system computer (see Figure 25).

   Figure 25. USB connection between an Accela pump and the data system computer



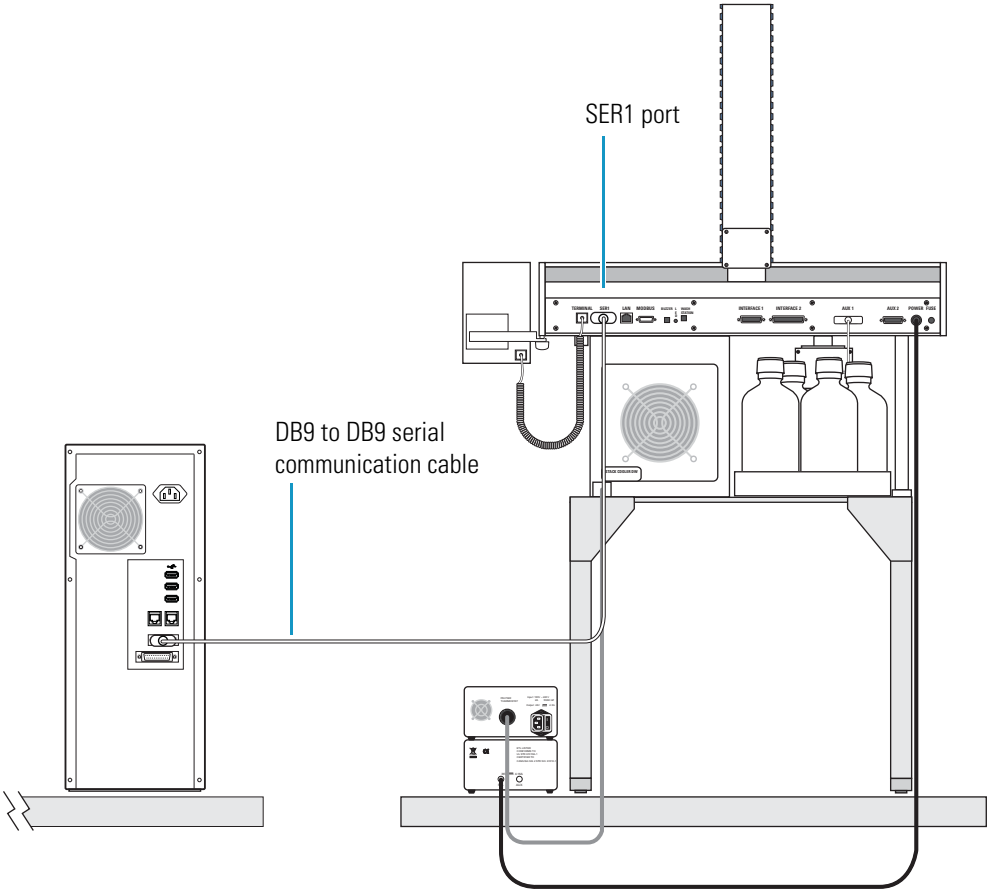
Connecting the Accela Open Autosampler to the Data System Computer

The Accela Open Autosampler communicates with the data system computer through a serial connection (see Figure 26).

❖ To connect the serial communication cable

1. Connect one end of the DB9 to DB9 serial communication cable to the SER 1 port on the back panel of the Accela Open Autosampler.
2. Connect the other end of the cable to the serial port on the back panel of the data system computer.

Figure 26. Accela Open Autosampler connection to the data system computer



Line Power Connections

For information about the power entry module and fuses for the Accela modules, refer to the hardware manual for each module.

To connect your Accela system to line power, follow these procedures:

- Connecting the Accela Autosampler, Detector, and Pump to Line Power
- Connecting the Accela Open Autosampler to Line Power

Connecting the Accela Autosampler, Detector, and Pump to Line Power

With the exception of the Accela Open Autosampler, the Accela modules require one line power outlet each.

Although these Accela modules ship with power cords appropriate to their shipping destination (see Table 2), local codes in your area might require you to install another type of plug and receptacle. The Thermo Fisher Scientific field service engineer for your country will provide the appropriate power plugs.

Table 2. Power cords supplied according to shipping destination

Destination	Plug type	Voltage rating	Current rating	Part number
United Kingdom	BS 1363	250 Vac	5 A	6003-0810
Switzerland	SEV 1011	250 Vac	10 A	6003-0620
Europe	CEE 7/7	250 Vac	10 A	6003-0330
United States and Canada	NEMA 5-15P	125 Vac	10 A	6003-0160
China	C13 connector	250 Vac	10 A	00302-99-00026

❖ To connect the Accela Autosampler, Accela detector, and Accela pump to line power

1. For the discontinued Accela PDA (20 Hz) Detector and the Accela UV/Vis Detector, check the voltage selector setting by looking through the cut-out window on the power entry module.

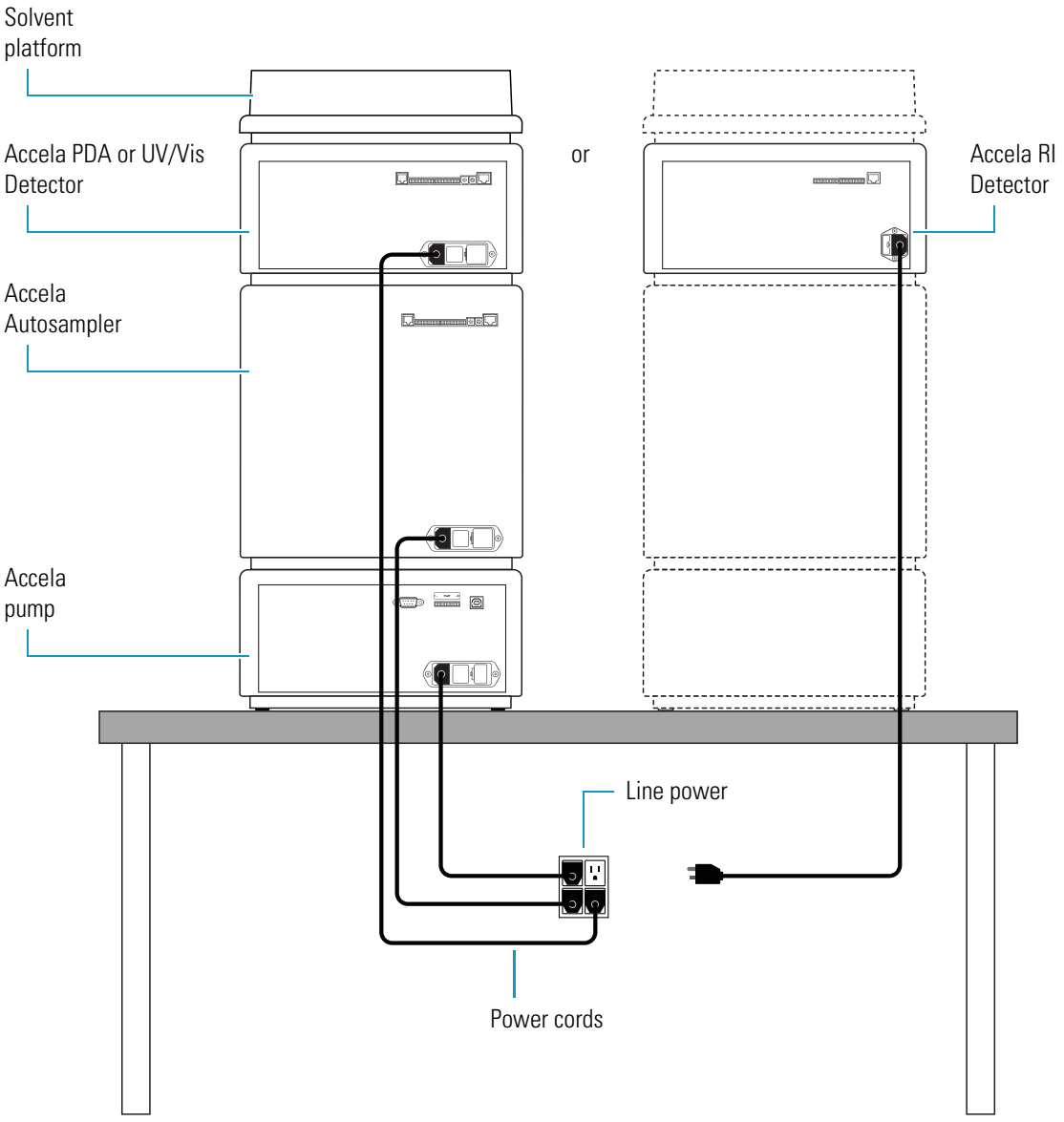
   For information about checking the voltage selector, refer to the hardware manuals for those products.

   Note The Accela PDA (80 Hz) Detector has an auto-sensing power entry module that uses 250 V fuses.

2. Ensure that the power switch at the front of the module is in the Off position (that is, released or out).

3. Plug the power cord into the power receptacle on the back panel of the module and connect the other end to line power (see Figure 27).

Figure 27. Accela Autosampler, Accela pump, and Accela detector line power connections



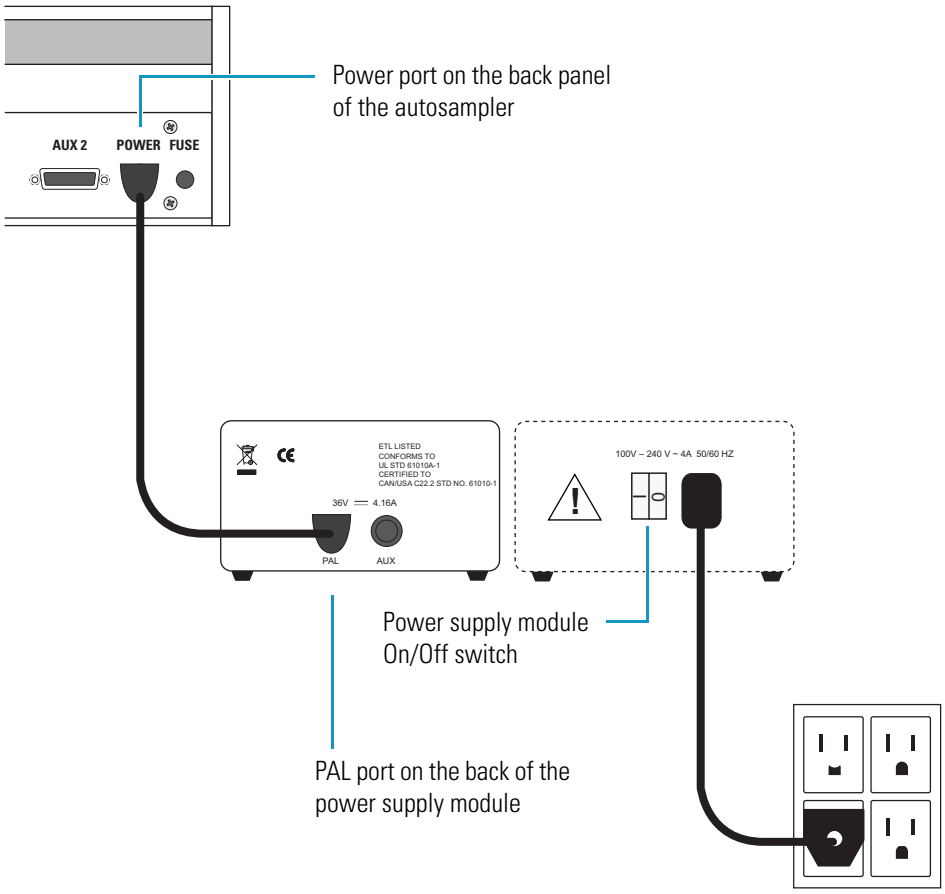
Connecting the Accela Open Autosampler to Line Power

The Accela Open Autosampler requires two line power outlets: one for the power supply module and one for the stack cooler.

❖ To connect an Accela Open Autosampler to line power

1. To connect the power supply module (see Figure 28), do the following:
   a. Turn the power supply module's power switch to the Off position.
   b. Connect one end of the DC power cable to the Power port on the back panel of the Accela Open Autosampler and the other end to the PAL port on the back of the power supply module.
   c. Plug the female end of the power cord into the receptacle on the front of the power supply module and the male end of the power cord into the line power outlet.

Figure 28. Accela Open Autosampler power supply module connections



2. To connect the stack cooler (see Figure 29), do the following:
   a. Turn the temperature control unit's power switch to the Off position.

b. Connect the cable that extends from the back of the stack cooler to the Peltier Thermostat port on the back of the temperature control unit.

c. Plug the female end of the power cord into the receptacle on the back of the temperature control unit and the male end of the power cord into the line power outlet (see Figure 29).

Figure 29. Accela Open Autosampler stack cooler connections

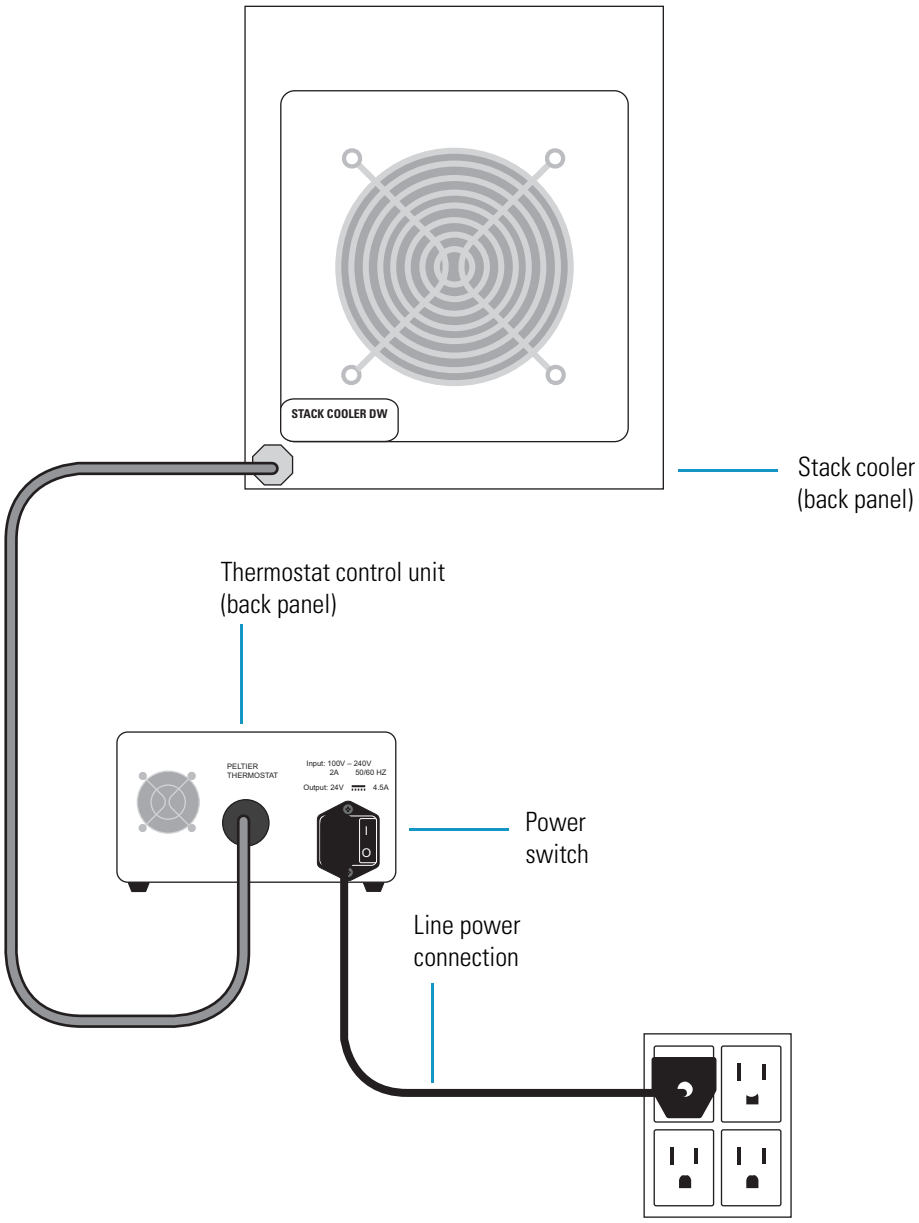
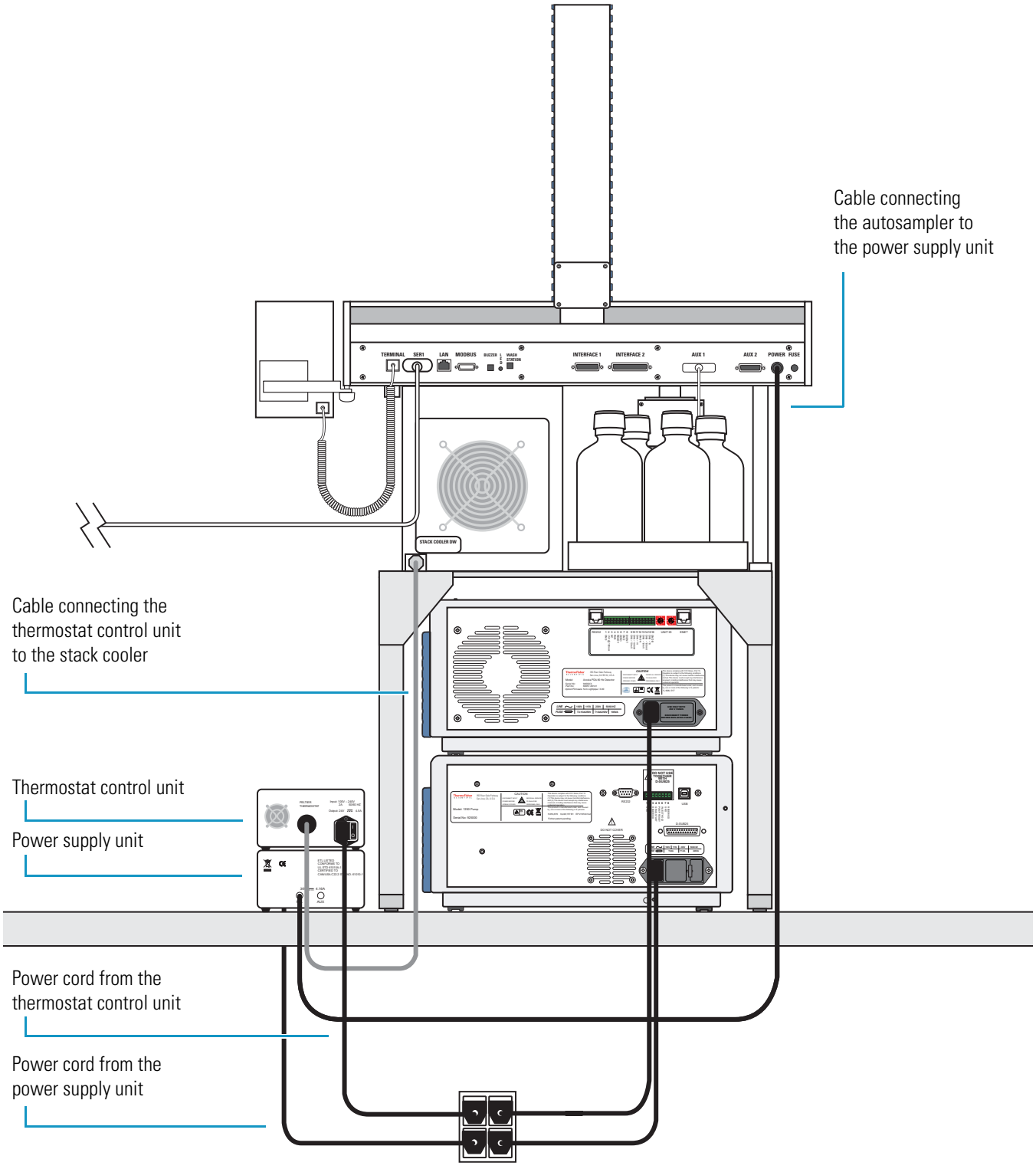


Figure 30 shows the line power connections for an Accela LC system with an Accela Open Autosampler.

Figure 30. Accela Open Autosampler line power connections



Solvent Line Connections

To connect the low- and high-pressure solvent lines for the Accela UHPLC system, follow the procedures in this chapter.

Contents

- Routing the Tubing
- Connecting the Wash Bottle Tubing to the Syringe Valve
- Connecting the Needle Tubing to the Syringe Valve
- Low-Pressure Solvent Reservoir Line Connections
- High-Pressure Connection between the Pump and the Autosampler
- LC Column Installation
- Connecting the RI Detector Outlet to Waste

Routing the Tubing

The enclosures and drip trays for the Accela modules are designed to hold the low-pressure and high-pressure solvent lines out of view behind the module doors.

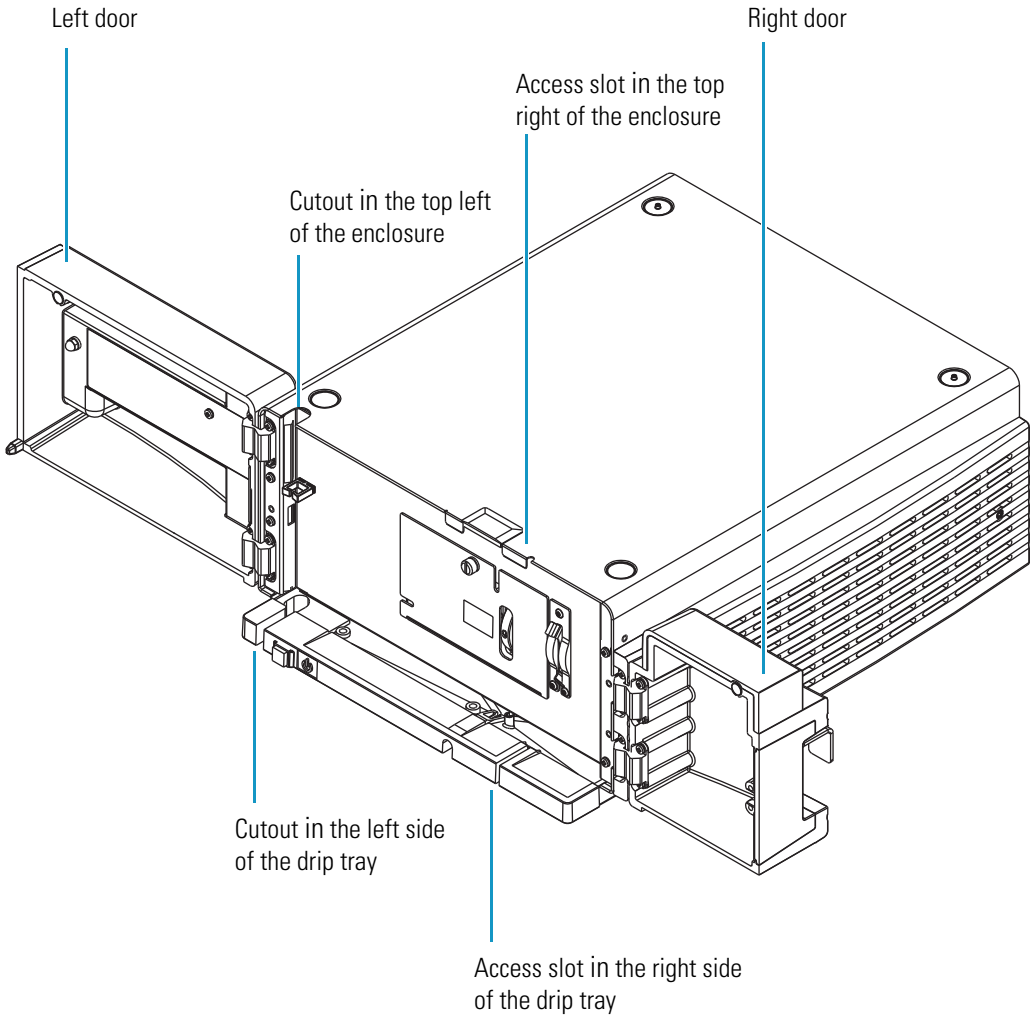
❖ **To secure the solvent lines behind the module doors**

Do the following:

- Route the low-pressure solvent lines through the cutouts on the top-left side of the enclosures and the left side of the drip trays.
- Route the high-pressure solvent lines through the access slots on the top-right side of the enclosures and the right side of the drip trays.

Figure 31 shows the cutouts in the Accela PDA Detector enclosure and drip tray.

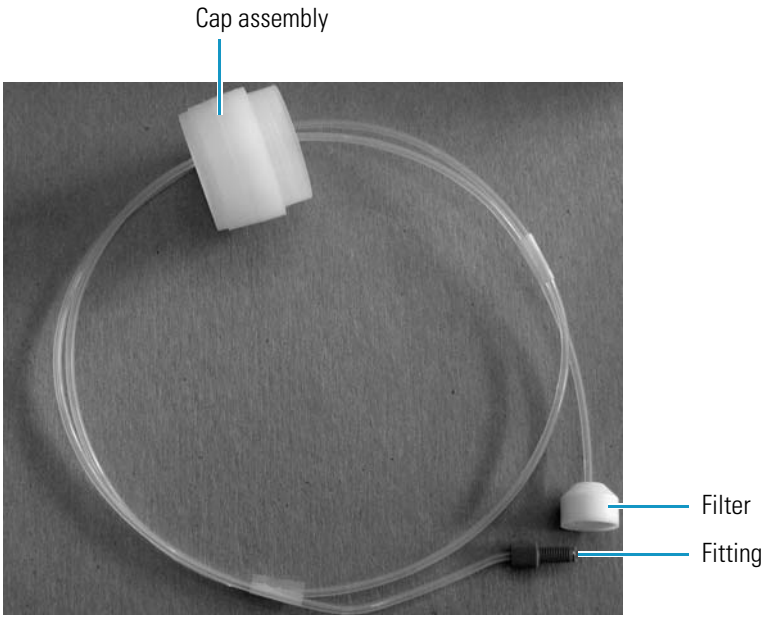
Figure 31. Cutouts in the enclosure and drip tray



Connecting the Wash Bottle Tubing to the Syringe Valve

The Wash Bottle Kit contains a 1 L bottle and the wash bottle tubing assembly. A Teflon™ solvent filter is attached to one end of the tubing, and a nut and ferrule fitting is attached to the other end of the tubing (see Figure 32).

Figure 32. Wash bottle tubing assembly



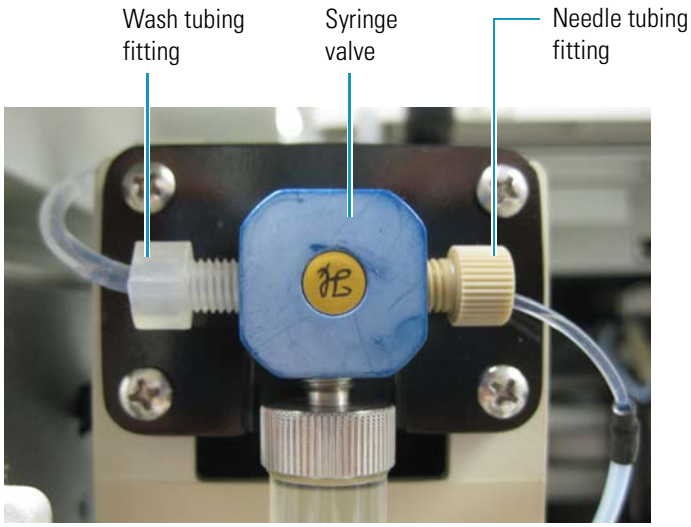
❖ **To connect the wash bottle tubing to the syringe valve**

1. Fill the wash bottle with the appropriate solvent.

   Note The autosampler uses the solvent in the wash bottle as the transfer solvent for injections. Unless you specify otherwise, the autosampler also uses this solvent as the flush solvent at the end of an injection cycle.

2. Place the end of the tubing with the Teflon solvent filter into the bottom of the bottle.
3. Snap the two cap sections together, and then screw the bottle cap onto the wash bottle.
4. Screw the fitting into the left side of the syringe valve (see Figure 33).

Figure 33. Wash bottle tubing connection to the syringe valve



Connecting the Needle Tubing to the Syringe Valve

The Accela Autosampler ships with the needle tubing attached to the needle assembly. The tubing is routed through a bracket on the XYZ arm, a bracket on the left side of the tray compartment wall, and a bracket on the tray compartment door. In addition, the two-pronged needle guide is connected to the *x*-axis positioning frame, and the PVC cap is pushed below the metal runner for the *x*-axis positioning frame.

❖ **To complete the installation of the needle tubing**

Connect the externally-threaded fitting to the right side of the syringe valve (see Figure 33).

Low-Pressure Solvent Reservoir Line Connections

Four low-pressure solvent lines connect the solvent bottles held by the solvent platform to the inlet ports of the pump's built-in vacuum degasser.

To connect the solvent reservoir lines to the pump, follow the instructions in the section for your pump:

- Connecting the Solvent Reservoir Lines to the Accela Pump
- Connecting the Solvent Reservoir Lines to the Accela 600 or Accela 1250 Pump

Connecting the Solvent Reservoir Lines to the Accela Pump

To assemble the solvent bottles and then attach the solvent lines to the inlet ports of the built-in vacuum degasser of the Accela pump, follow these procedures:

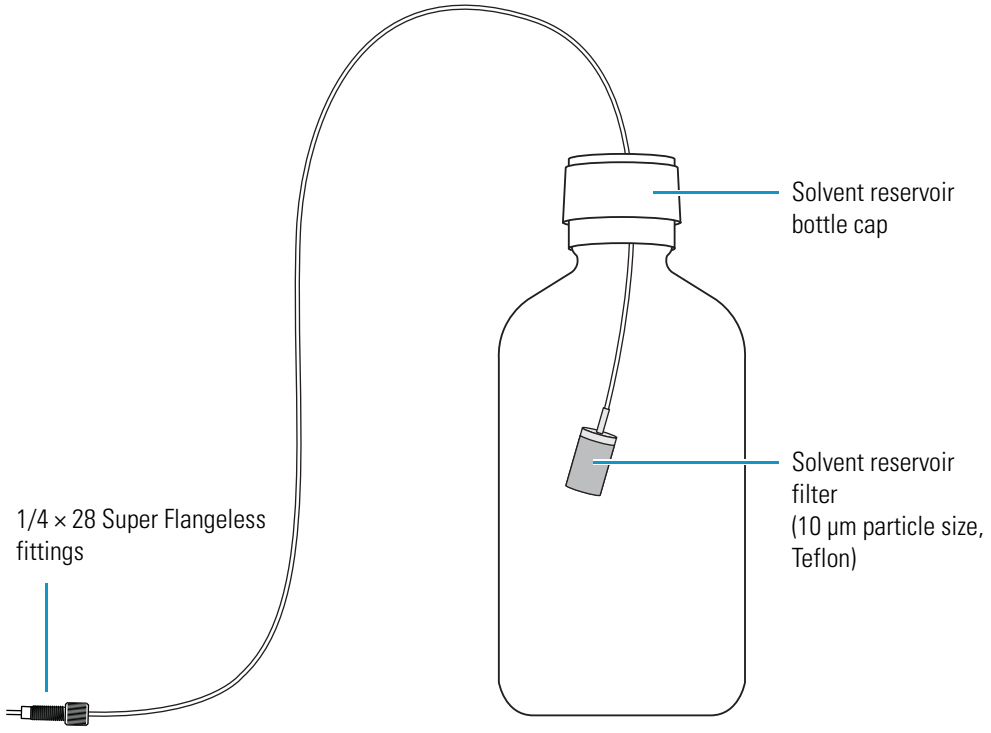
- Assembling the Solvent Bottles for the Accela Pump
- Connecting the Solvent Lines to the Accela Pump Degasser

Assembling the Solvent Bottles for the Accela Pump

❖ **To assemble the solvent reservoir bottles**

1. Cut the 6 m (20 ft) length of FEP tubing provided in the Solvent Interconnect Kit into four 1.5 m (5 ft) lengths.
2. Label one of the four solvent reservoir bottle caps "A."
3. Pass the tubing through the solvent reservoir bottle cap labeled A.
4. Connect the 10 µm Teflon™ filter to the end of the solvent line (see Figure 34).

Figure 34. Solvent reservoir cap assembly with the solvent line assembly



5. Insert the solvent reservoir filter and inlet line into one of the solvent reservoir bottles, and screw the cap onto the solvent reservoir bottle until it is secure.

Tip The cap is a two-piece assembly. The upper section snaps onto a threaded section. You can screw the threaded section onto the bottle and snap on the upper section after installing the tube, or, if you are replacing existing tubing, you can unscrew the entire cap from the bottle.

The ID of the upper section is 44 mm (1.75 in.). If necessary, you can use this section alone for wide-mouth solvent bottles.

6. Position the bottle in the solvent bottle holder, allowing the solvent inlet line to hang down along the left side of the system.
7. Repeat steps 1 through 5 for solvents B, C, and D if applicable.

Connecting the Solvent Lines to the Accela Pump Degasser

Use Super Flangeless™ fittings to connect the solvent lines to the inlet ports of the Accela pump's built-in vacuum degasser. The Super Flangeless fitting consists of three components: a nut, a ferrule, and a stainless steel compression ring (see Figure 35). The compression ring has two sides: a flat side and an angled side (see Figure 36). The flat side of the ring faces the nut, and the angled side of the ring faces the narrow end of the ferrule.

Figure 35. Super Flangeless fitting components

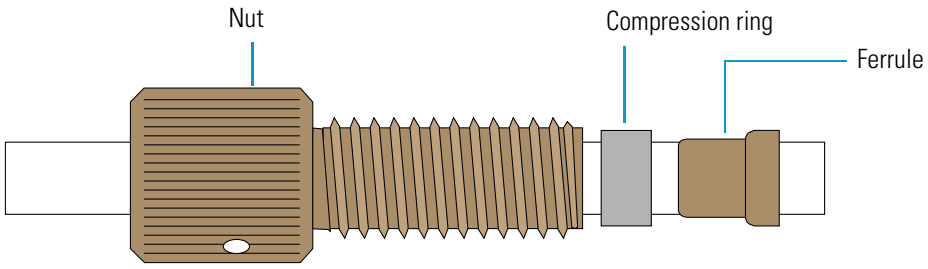
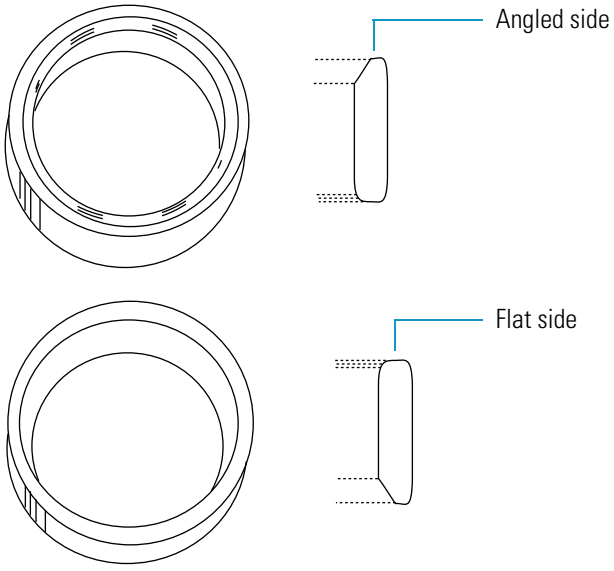


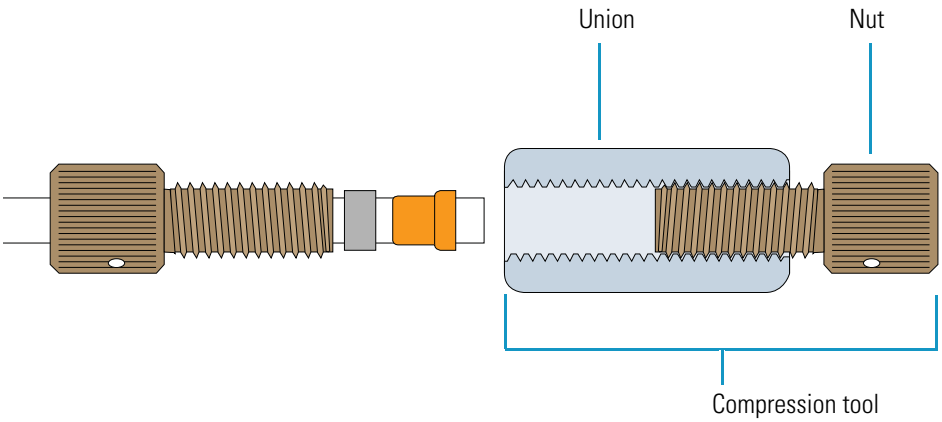
Figure 36. Flat and angled sides of the steel compression ring



❖ To connect the solvent lines to the degasser inlets of the Accela Pump

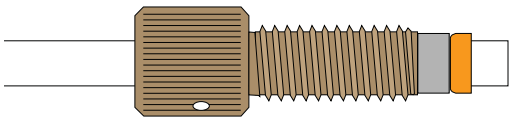
1. Slide the three components of the Super Flangeless fitting onto the remaining end of the solvent line (see Figure 35):
   a. Slide the nut onto the end of the tubing.
   b. With the flat side of the compression ring facing the nut, slide the compression ring onto the end of the tubing.
   c. With the narrow end of the ferrule facing the compression ring, slide the ferrule onto the end of the tubing.
2. Swage the Super Flangeless fitting onto the tubing:
   a. Create a compression tool by screwing a Super Flangeless nut into one end of a 1/4 in. × 28 thread internal union (see Figure 37).

      Figure 37. Compression tool created by screwing a Super Flangeless nut into a union



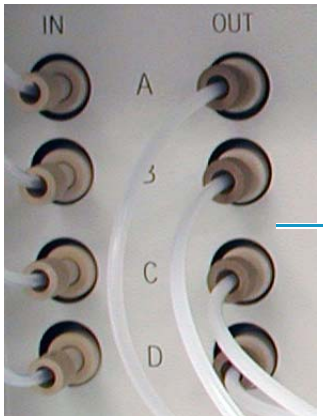
   b. Insert the tubing with the fitting assembly into the other end of the union.
   c. Hold the tubing to the bottom of the tool while tightening the nut.
   d. Unscrew the swaged fitting from the compression tool and verify the following:
      - The end of the square-cut tubing is flush with the end of the ferrule (see Figure 38).
      - The steel compression ring is seated over the ferrule (see Figure 38).

      Figure 38. Super Flangeless fitting swaged onto the tubing



3. Insert the tubing with the properly swaged fitting into inlet port A (see Figure 39), and then tighten the nut fingertight. Be careful not to cross-thread the fitting, which can cause solvent leakage.

Figure 39. Vacuum degasser connections



4. To complete the installation, route the solvent line through the cutouts along the left side of each Accela module.
5. Repeat the above steps for the B, C, and D solvent inlet lines, if applicable.

Connecting the Solvent Reservoir Lines to the Accela 600 or Accela 1250 Pump

The Accela 600 or Accela 1250 Pump Inlet Tubing Kit (see "Accela 600 and Accela 1250 Pump Inlet Tubing Kit" on page 65) contains preassembled, low-pressure solvent lines that have a stainless steel filter at one end and a flangeless fitting at the other end. The Solvent Interconnect Kit (see "Solvent Interconnect Kit" on page 65) contains the solvent reservoir bottles, the solvent bottle caps and adapters, the solvent bottle labels, and the solvent line clip-on markers.

To install the solvent reservoir lines for the Accela 600 or Accela 1250 pump, follow these procedures:

- Assembling the Solvent Bottles for the Accela 600 or Accela 1250 Pump
- Connecting the Solvent Bottles to the Accela 600 or Accela 1250 Pump Degasser

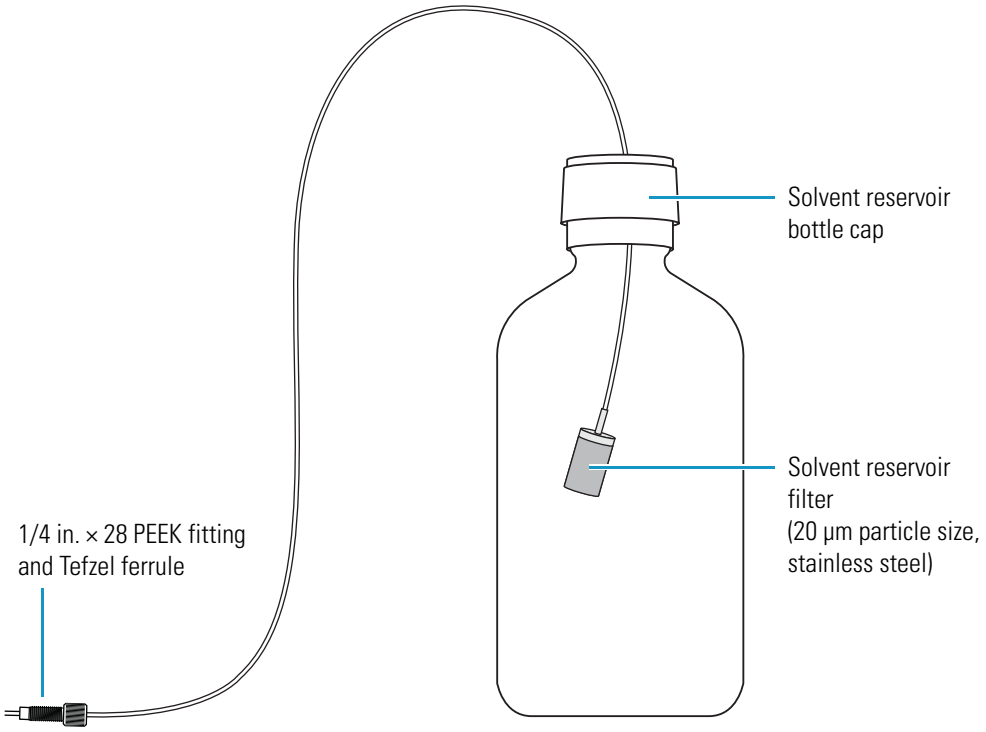
Assembling the Solvent Bottles for the Accela 600 or Accela 1250 Pump

❖ **To assemble the solvent reservoir bottles**

1. Label one of the four solvent reservoir bottle caps "A."
2. Pull the filter off the end of the solvent line, and then pass the tubing through the solvent reservoir bottle cap labeled A.
3. Reconnect the filter to the end of the solvent line (see Figure 40).

IMPORTANT Use only stainless steel, 20 µm particle size sinker frits to terminate the solvent reservoir lines, as provided in the accessory kit.

Figure 40. Solvent reservoir cap assembly with the solvent line assembly



Note Each solvent line has a different color fitting. The colors are yellow, green, orange, and blue. Matching the color of the inlet line fitting to the outlet line fitting is important for ensuring that the correct solvent goes into and out of the degasser lines and into the inlet ports of the pump proportioning valve.

4. Insert the solvent reservoir filter and inlet line into one of the solvent reservoir bottles, and screw the cap onto the solvent reservoir bottle until it is secure.

Tip The cap is a two-piece assembly. The upper section (see Figure 40) snaps onto a threaded section. You can screw the threaded section onto the bottle and snap on the upper section after installing the tube, or, if you are replacing existing tubing, you can unscrew the entire cap from the bottle.

5. Position the bottle in the solvent bottle holder, allowing the solvent inlet line to hang down along the left side of the system.

6. Repeat steps 1 through 5 for solvents B, C, and D, if applicable.

Connecting the Solvent Bottles to the Accela 600 or Accela 1250 Pump Degasser

Use HPLC-grade solvents that are free of particulate matter and terminate the solvent reservoir lines with the stainless steel, 20 µm particle size sinker frits provided in the Accela 600 Pump Inlet Tubing Kit.

CAUTION Do not use solvents containing Freon™ or perfluorinated solvents, such as Fluorinert™, FC-75, FC-40, and Fomblin™ perfluoro polyether solvents from Solvay Solexis, Inc. They adversely affect the Teflon AF degassing membrane.

CAUTION To prevent personal injury, observe good laboratory practice when handling solvents or changing tube lines. Consult the pertinent material safety data sheets for the solvents used for HPLC analysis.

❖ **To connect the solvent lines to the degasser inlets of an Accela 600 or Accela 1250 Pump**

Connect the solvent lines with their colored flangeless fittings (see Figure 41) to the inlet ports of the pump's built-in degassing unit (see Figure 41), matching the color of the fitting to the color of the adjacent outlet port (see Figure 42).

Figure 41. Low-pressure solvent line with flangeless fitting

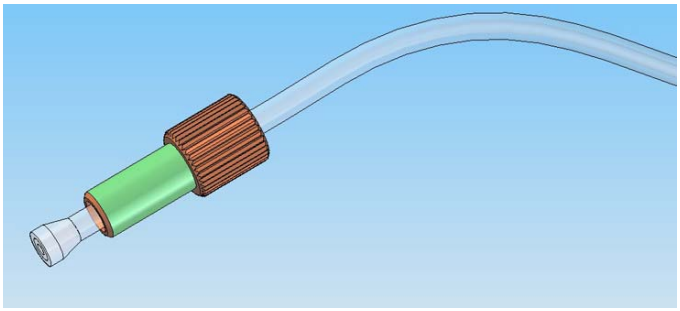
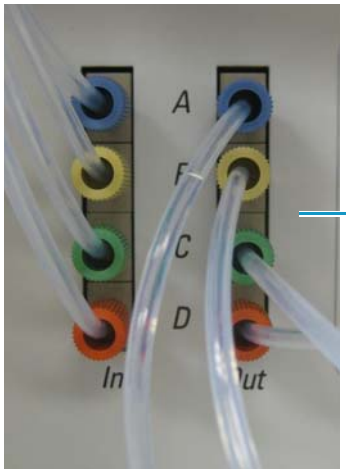


Figure 42. Vacuum degasser connections



High-Pressure Connection between the Pump and the Autosampler

When you are operating the LC pump at pressures above 276 bar (4000 psi), you must use stainless steel tubing and fittings to connect the solvent path from the pump outlet to the autosampler inlet.

IMPORTANT Avoid using PEEK™ tubing and fittings with system pressures above 276 bar (4000 psi). Thermo Fisher Scientific ships precut 1/16 in. OD stainless steel tubing and two-piece compression fittings with the Accela Autosampler and Accela Open Autosampler.

The high-pressure solvent lines between the pump's liquid displacement assembly and its outlet are installed at the factory:

- For the Accela Pump, these solvent lines connect the liquid displacement assembly (LDA) outlet to the inline filter and the inline filter to the dynamic mixer.

  Note The inline filter captures particulate matter before it reaches the autosampler heat exchanger.

- For the Accela 600 or Accela 1250 Pump, these solvent lines connect the LDA to the static mixer and the static mixer to the placeholder module.

  Note The static mixer provided with the Accela 600 and Accela 1250 Pumps contains a 10 µm particle size filter, so an additional inline filter is not necessary.

CAUTION To prevent personal injury caused by skin contact with hazardous solvents, turn off the pump flow before you connect the high-pressure solvent line between the LC pump and the autosampler.

To connect the high-pressure solvent line between the pump and the autosampler, follow these procedures:

- Connecting the High-Pressure Solvent Line to the Pump Outlet
- Connecting the High-Pressure Solvent Line to the Autosampler

Connecting the High-Pressure Solvent Line to the Pump Outlet

When you operate the Accela pump at high pressures, use high-pressure, stainless steel tubing and fittings.

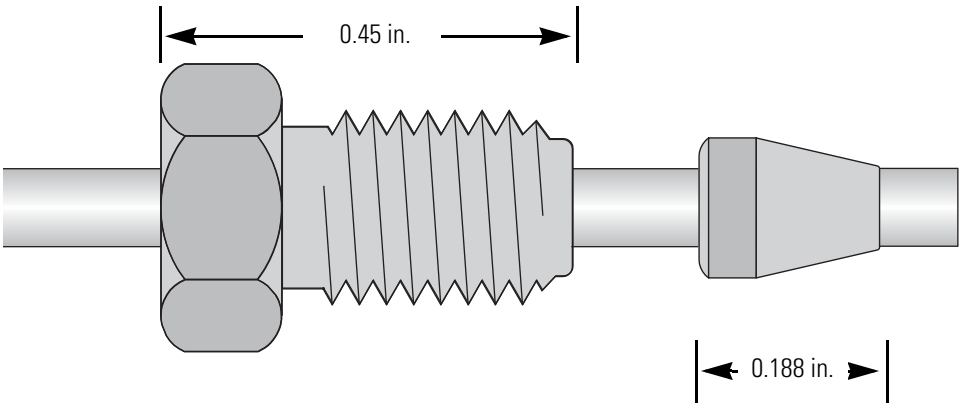
Tip To identify the tubing ID, the precut tubing has a color-coded band:

- Red = 0.005 in.
- Blue = 0.010 in.
- Black = 0.007 in.
- Yellow = 0.020 in.

Figure 43 shows the two-piece compression fitting supplied with the Accela Accessory Kit. The lengths of the nut and ferrule are 0.45 inches and 0.188 inches, respectively.

Tip The Accela autosamplers have UHPLC Valco injection valves. You can use the 1/16 in. fittings for the Valco Cheminert UHPLC injection valve to connect the pump outlet to the autosampler inlet. The lengths of the nut and ferrule are 0.43 in. and 0.188 in., respectively.

Figure 43. Two-piece compression fitting



❖ To connect the high-pressure solvent line to the LC pump outlet

1. Using the supplied two-piece compression fitting (see Figure 43), connect a length of 0.005 in. ID × 1/16 in. OD tubing to the pump outlet.

   The tubing length depends on the pump and autosampler models:

   - To connect an Accela pump to the Accela Autosampler, use these precut tubing lengths:
     - For the Accela Pump, connect a 20 cm (8 in.) length of precut tubing to the outlet of the dynamic mixer.
     - For the Accela 600 Pump or Accela 1250 Pump, connect a 26 cm (10 in.) length of precut tubing to the outlet of the placeholder module or the optional dynamic mixer.
   - To connect an Accela pump (Accela Pump, Accela 600 Pump, or Accela 1250 Pump) to the Accela Open Autosampler, use the 0.6 m (2 ft) length of precut tubing supplied with the Accela Open Autosampler.

2. Using a 1/4 in. open-ended wrench, tighten the nut.

Connecting the High-Pressure Solvent Line to the Autosampler

To connect the high-pressure solvent line to the autosampler, go to the appropriate procedure:

- Connecting the Solvent Line to the Accela Autosampler Heat Exchanger
- Connecting the Solvent Line to the Accela Open Autosampler Injection Valve

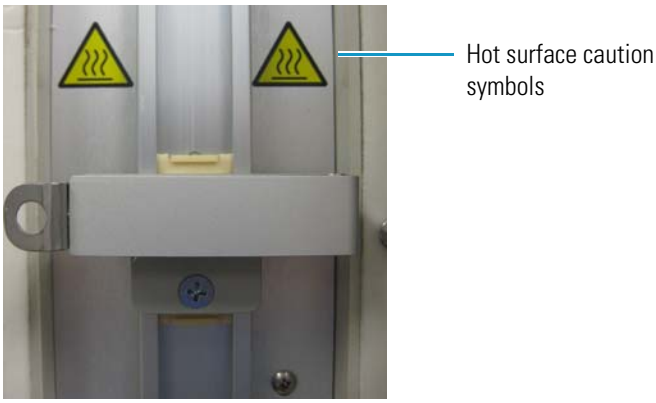
Connecting the Solvent Line to the Accela Autosampler Heat Exchanger

Before you connect the solvent line to the Accela Autosampler's heat exchanger inlet, check the column oven temperature. The metal plate in front of the Accela Autosampler heat exchanger can reach temperatures as high as 95 °C (203 °F).

CAUTION To prevent personal injury, before installing the LC column or connecting the pump to the autosampler, ensure that the column oven compartment is at room temperature. The column oven compartment can reach temperatures as high as 95 °C (203 °F).

Figure 44 shows the Hot Surface caution symbols on the column oven surface.

Figure 44. Hot surface cautions on the surface of the Accela Autosampler column oven



❖ To connect the solvent line to the heat exchanger inlet

1. Ensure that the column oven compartment is at room temperature and that the pump flow is turned off.
2. Route the high-pressure tubing through the access slot in the autosampler drip tray.
3. Using a two-piece compression fitting (see Figure 43 on page 46), connect the tubing to the heat exchanger inlet.
4. Using a 1/4 in. open-ended wrench, tighten the nut.

Figure 45 and Figure 46 show the high-pressure connection between the autosampler and the Accela Pump or the Accela 600 Pump or Accela 1250 Pump, respectively.

Figure 45. Connection between the Accela Pump and the autosampler

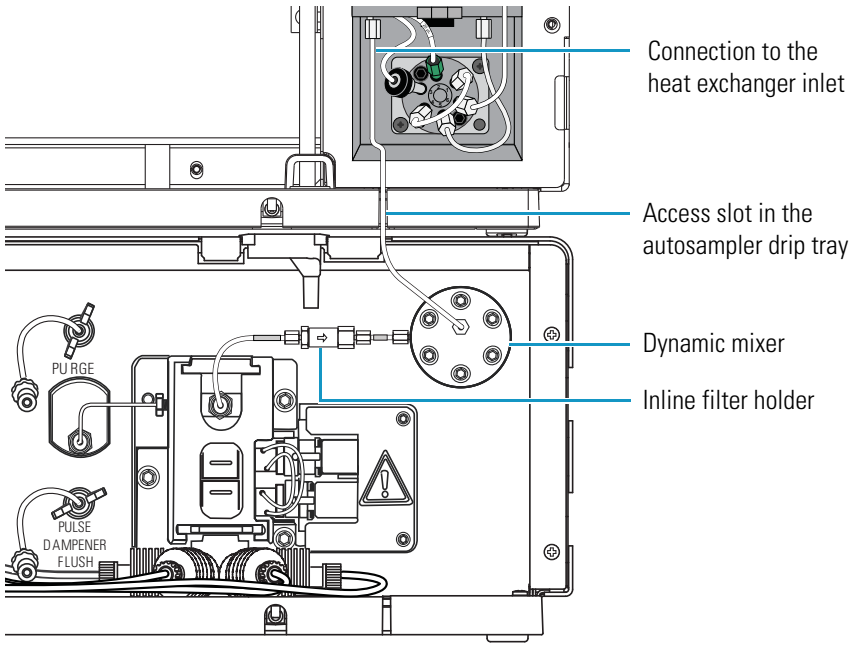
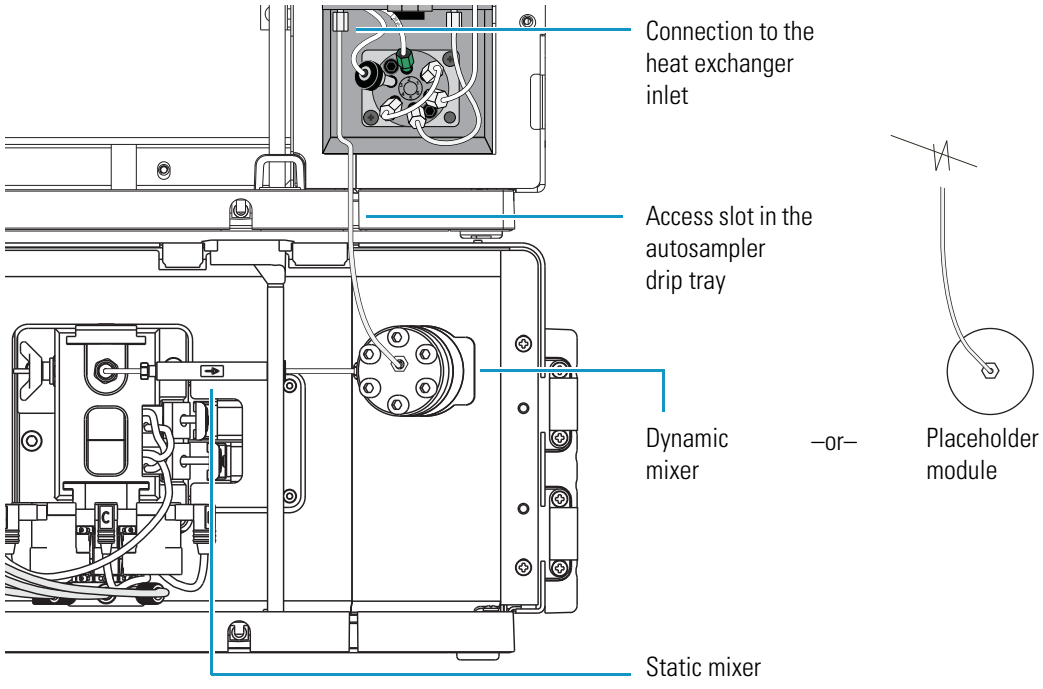


Figure 46. Connection between the Accela 600 or Accela 1250 Pump and the Accela Autosampler



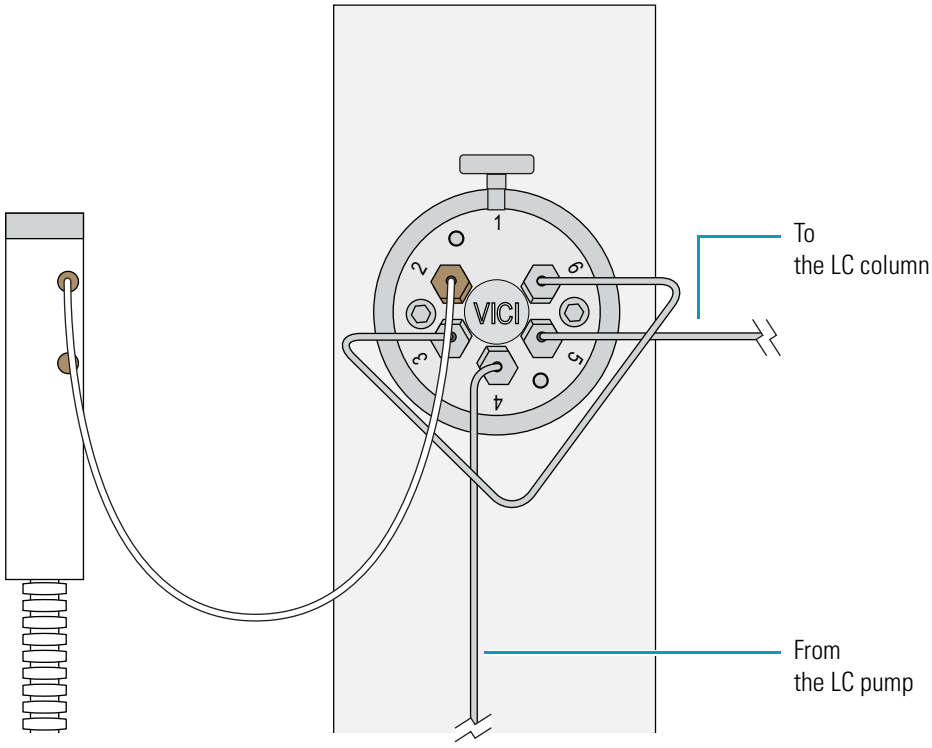
Connecting the Solvent Line to the Accela Open Autosampler Injection Valve

The Accela Open Autosampler has a high-pressure Valco™ injection valve (18 500 psi). To make connections to this valve, use two-piece, stainless steel, compression fittings.

❖ To connect the high-pressure solvent line to the injection valve

1. Route the stainless steel tubing connected to the LC pump outlet upward through the access slot on the top right of the pump enclosure.
2. If your LC system includes an Accela detector, route the tubing through the access slots on the right side of the detector drip tray and the top right of the detector enclosure.
3. Using a two-piece compression fitting, connect the tubing to port 4 of the injection valve (see Figure 47).

Figure 47. Accela Open Autosampler injection valve with the solvent line from the pump connected to port 4



4. Using a 1/4 in. open-end wrench, tighten the fitting.

LC Column Installation

To install the LC column, follow these procedures:

1. Connecting the LC Column Inlet to the Autosampler Injection Valve
2. Connecting the LC Column Outlet to the Detector Inlet
3. (Accela Autosampler only) Mounting the LC Column to the Column Support

If your LC system has an Accela Autosampler, make sure that the column oven compartment is at room temperature before you connect the LC column.

CAUTION To prevent personal injury, before you install or remove the LC column, ensure that the column oven compartment is at room temperature. The column oven compartment can reach temperatures as high as 95 °C (203 °F). Figure 44 shows the Hot Surface caution symbols on the column oven surface.

Connecting the LC Column Inlet to the Autosampler Injection Valve

Both the Accela Autosampler and the Accela Open Autosampler have high-pressure Valco injection valves; however, the valve models differ.

IMPORTANT The connection to the LC column inlet is under high pressure. When you are operating the Accela UHPLC system at pressures above 276 bar (4000 psi), use 0.005 in. ID × 1/16 in. OD stainless steel tubing and two-piece compression fittings to make this connection.

To connect the LC column inlet to the autosampler injection valve, go to the appropriate procedure:

- Connecting the Column Inlet to the Accela Autosampler Injection Valve
- Connecting the LC Column Inlet to the Accela Open Autosampler Injection Valve

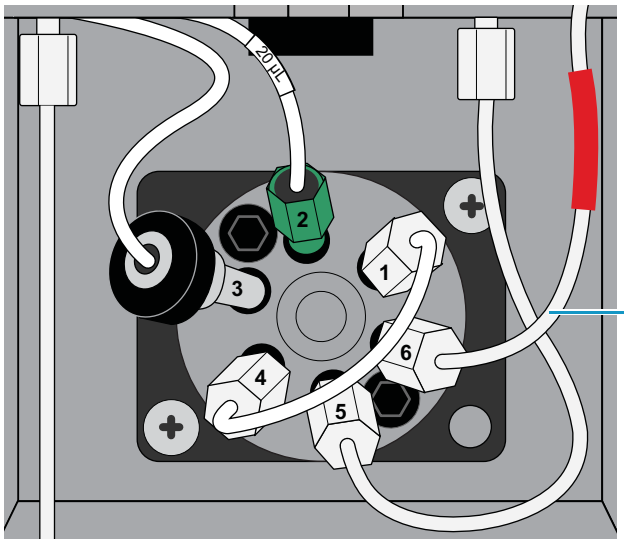
Connecting the Column Inlet to the Accela Autosampler Injection Valve

For the Accela Autosampler, connect the LC column inlet to port 6 of the injection valve as described in the following procedure.

❖ To connect the LC column inlet to port 6 of the autosampler injection valve

1. Using a two-piece compression fitting (see Figure 43 on page 46), connect a length of 0.005 in. ID × 1/16 in. OD, stainless steel tubing to port 6 of the autosampler injection valve (see Figure 48).

   Figure 48. Accela Autosampler injection valve with solvent line connections

2. Using a two-piece compression fitting (see Figure 43 on page 46), connect the other end of the 0.005 in. ID × 1/16 in. OD, stainless steel tubing to the LC column inlet.

Connecting the LC Column Inlet to the Accela Open Autosampler Injection Valve

For the Accela Open Autosampler, connect the LC column inlet to port 5 of the injection valve as described in the following procedure.

❖ To connect the LC column inlet to port 5 of the autosampler injection valve

Using two compression fittings (see Figure 43 on page 46), do the following:

- Connect a length of 0.005 in. ID × 1/16 in. OD, stainless steel tubing to port 5 of the autosampler injection valve (see Figure 47 on page 49).
- Connect the other end of the tubing to the LC column inlet.

Connecting the LC Column Outlet to the Detector Inlet

The Accela family of LC detectors includes the Accela PDA Detector, the Accela UV/Vis Detector, and the Accela RI Detector.

The PDA and UV/Vis detectors have LightPipe™ flow cells. For information about how to connect the inlet and outlet tubing to the LightPipe flow cell and install it in the Accela detector, refer to the hardware manual for that detector.

Tip Once the mobile phase exits the LC column, it is no longer under high pressure. For the UV/Vis and PDA detectors, use PEEK fittings and tubing to connect the LC column outlet to the detector inlet.

❖ To connect the LC column outlet to the PDA or UV/Vis detector inlet

1. Route the tubing from the inlet port of the detector flow cell as follows:
   - For the Accela Open Autosampler, route the tubing downward through the cutout on the top left side of the detector enclosure.
   - For the Accela Autosampler, route the tubing upward through the access slots on the top right side of the autosampler enclosure and the right side of the detector drip tray.
2. Connect the tubing to the detector inlet as follows:
   - For a UV/Vis or PDA detector with a LightPipe flow cell, use a 1/16 in. PEEK fitting to connect the inlet port tubing (red PEEK, insulated, 0.005 in. ID × 1/16 in. OD) that is attached to the LightPipe flow cell to the outlet port of the LC column.
   - For an RI detector, do one of the following:
     – If the RI detector is the only detector in the LC system, use the 1/16 in. OD, stainless steel tubing with fittings (supplied in the RI detector accessory kit) to connect the outlet of the LC column to the IN port of the RI detector.
     – If the system contains both a PDA detector or UV/Vis detector and an RI detector, use 0.005 in. ID × 1/16 in. OD (red) or 0.010 in. ID × 1/16 in. OD (blue) PEEK tubing and fittings to connect the outlet of the LightPipe flow cell to the IN port of the RI detector.

Mounting the LC Column to the Column Support

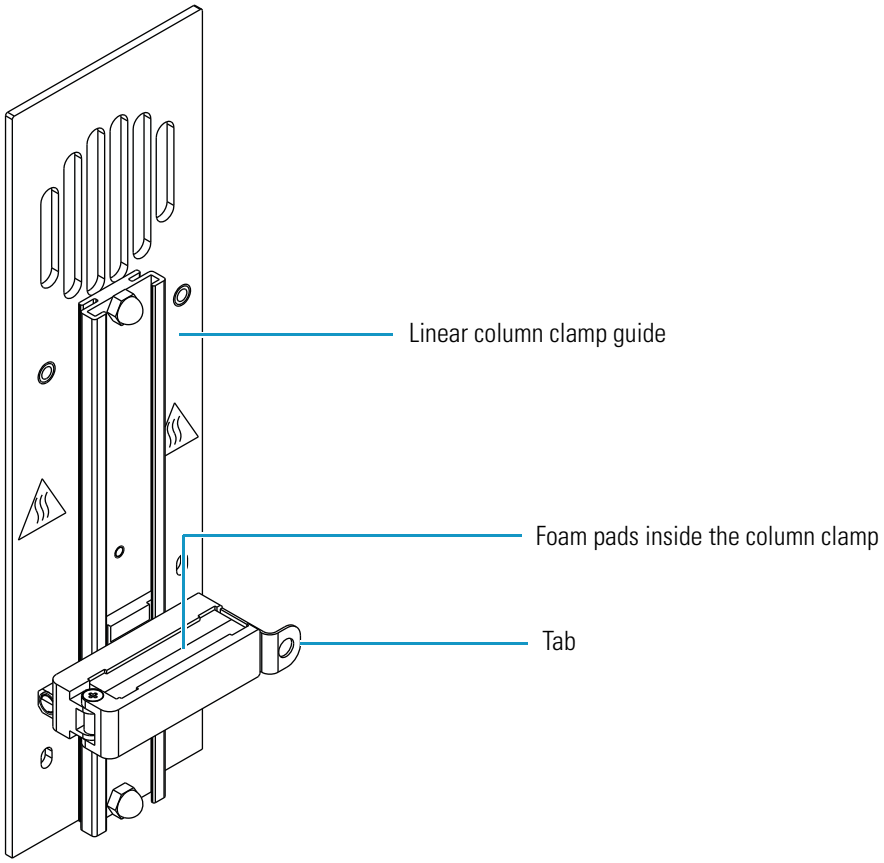
If your Accela LC system includes an Accela Autosampler, mount the LC column using the column clamp inside the column oven compartment.

CAUTION To prevent personal injury, before you touch the metal surfaces inside the column oven compartment, ensure that the column oven compartment is at room temperature. The column oven compartment can reach temperatures as high as 95 °C (203 °F). Figure 44 shows the Hot Surface caution symbols on the column oven surface.

❖ To mount the LC column

1. Make sure that the column oven compartment is at room temperature.
2. Adjust the height of the clamp by sliding the clamp up or down the clamp track.
3. To open the clamp, press the tab (see Figure 49) on the right side of the clamp (current version).

Figure 49. Column clamp and clamp track

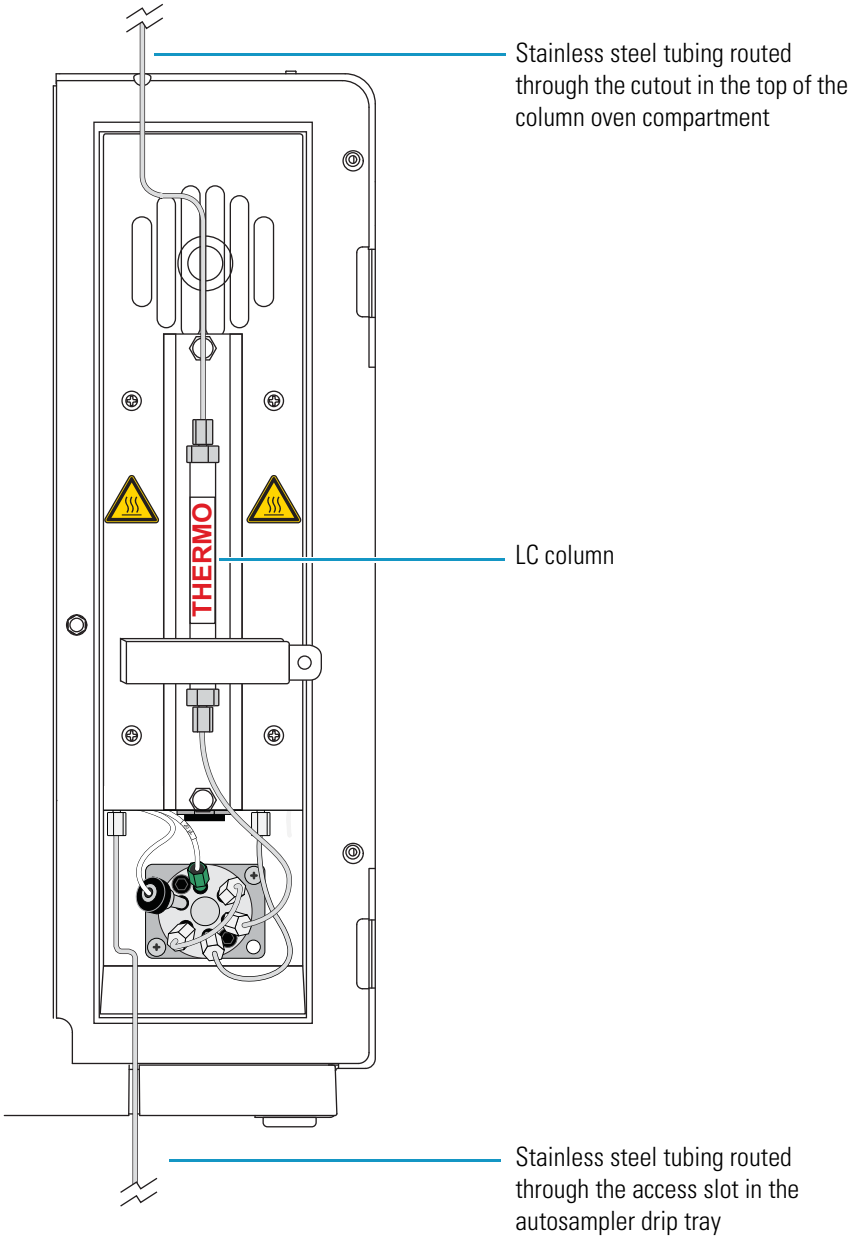


4. Mount the LC column and close the clamp.

   The compressible foam pads inside the column clamp adjust to the column thickness.
5. Route the outlet tubing through the access slot in the top of the column oven compartment.
6. Ensure that the inlet tubing is appropriately routed through the access slot at the bottom of the column oven compartment (see Figure 50).

IMPORTANT When operating the pump at pressures above 276 bar (4000 psi), you must use stainless steel tubing to connect the autosampler outlet to the LC column inlet.

Figure 50. Column oven compartment with an installed LC column



7. Close the column oven compartment door.

Connecting the RI Detector Outlet to Waste

Use the tubing supplied with the RI detector to connect the OUT port to a waste container. This tubing has an inner diameter of 0.06 inches.

CAUTION Because the flow cell in the Accela RI Detector cannot withstand a backpressure greater than 517 kPa (75 psi), the detector must be the last component in the solvent path of the LC system. To avoid damaging the flow cell, do not connect another detector, backpressure regulator, or narrow-bore tubing to the OUT port of the Accela RI Detector.

❖ To connect the OUT port of the RI detector to the waste container

1. Using the 0.060 in. ID × 1/16 in. OD Teflon tubing supplied in the accessory kit, connect the OUT port of the RI detector to a waste bottle with secondary containment.
2. Route the tubing through the access slot in the detector's drip tray.

Drainage Tubing Connections

The Accela Autosampler, Accela 600 Pump, and Accela 1250 Pump ship with preinstalled drainage lines between the drip trays. You must install the drain lines from the bottom of the pump and the drainage manifold on the Accela Autosampler to the solvent waste container.

For the Accela Open Autosampler, you must connect the waste line to a waste container.

Contents

- Accela Autosampler and Accela Pump Drainage Connections
- Accela Open Autosampler Drainage Connections

Accela Autosampler and Accela Pump Drainage Connections

Table 3 lists the part numbers and application of the two sections of drainage tubing for the Accela Autosampler and an Accela pump.

Table 3. Drainage tubing

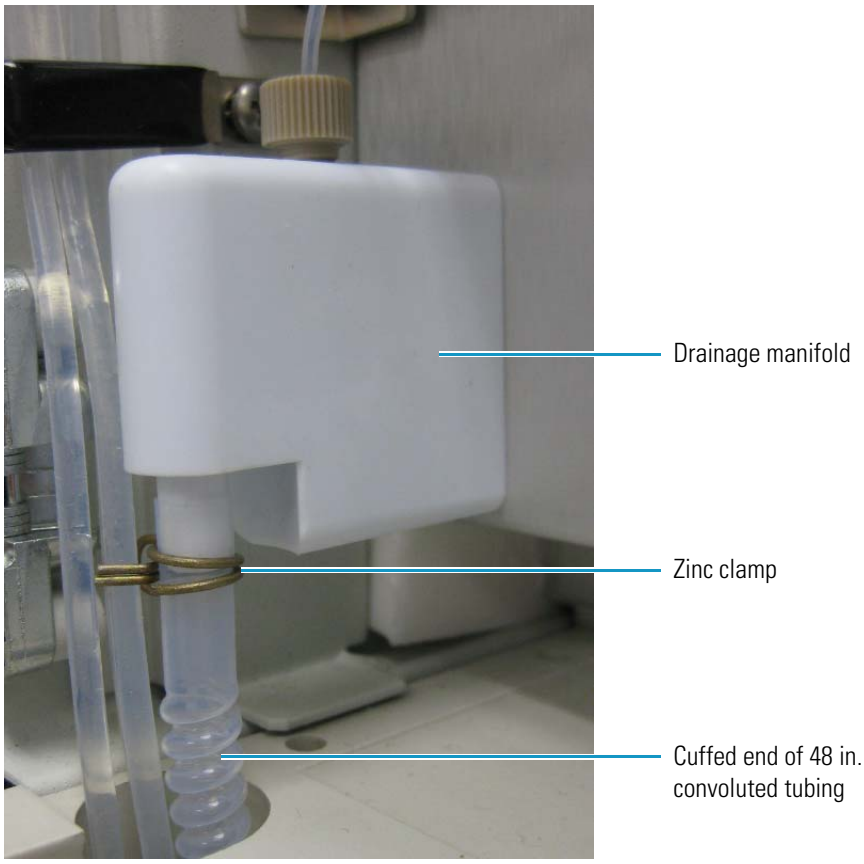
Length	Application	Part number
0.9 m (36 in.)	Drains fluid from the bottom of the pump to the waste bottle (cuff 1 end).	F5034-040
1.2 m (48 in.)	Drains fluid from the drainage manifold of the autosampler to the waste bottle (cuff 1 end).	F5034-050

❖ **To attach the two precut pieces of drainage tubing**

1. Ensure that the drainage port on the bottom of the detector is aligned directly over the drainage funnel on the top of the autosampler.
2. Attach the 1.2 m (48 in.) piece of convoluted tubing to the drain manifold (see Figure 51), located in front of the tray compartment:
   a. Using pliers, open the zinc spring clamp that is attached to the cuffed end of the 1.2 m (48 in.) length of convoluted tubing.
   b. Slip the cuffed end of the tubing onto the drain manifold. To secure the tubing to the drain manifold, adjust the clamp over the cuff, ensuring that the straight ends of the clamp face in toward the tray compartment.

c. Place the uncuffed end of the tubing into an appropriate waste container.

Figure 51. Convoluted tubing secured to the drain manifold with a clamp

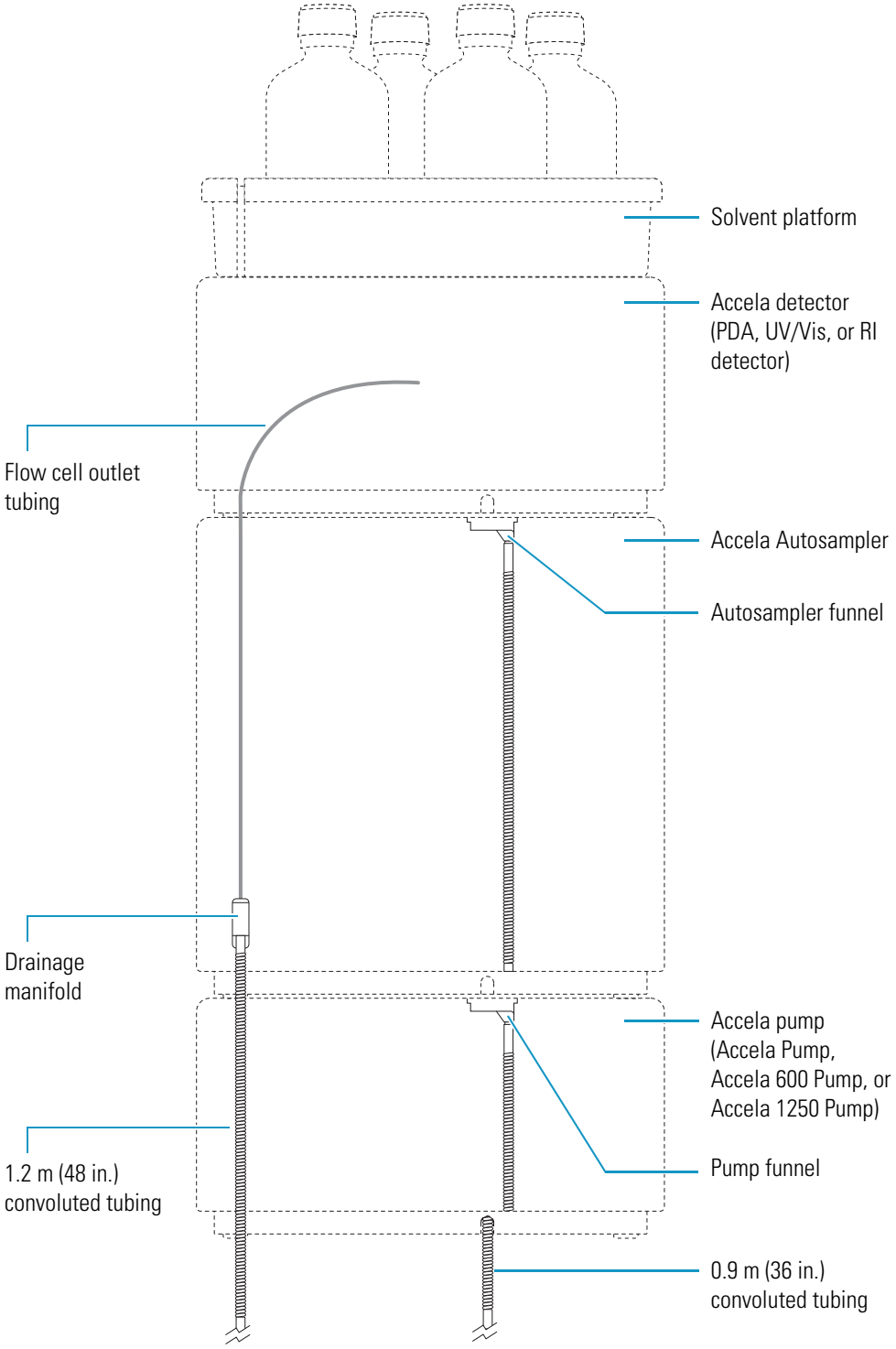


3. Attach the cuffed end of a 0.9 m (36 in.) length of convoluted tubing to the drain port on the bottom of the pump and place the other end of the tubing into an appropriate waste container.

4. For a stand-alone LC system (without a mass spectrometer), route the outlet tubing from the detector through the drain manifold of the autosampler into the 1.2 m (48 in.) length of convoluted tubing that drains to the waste bottle.

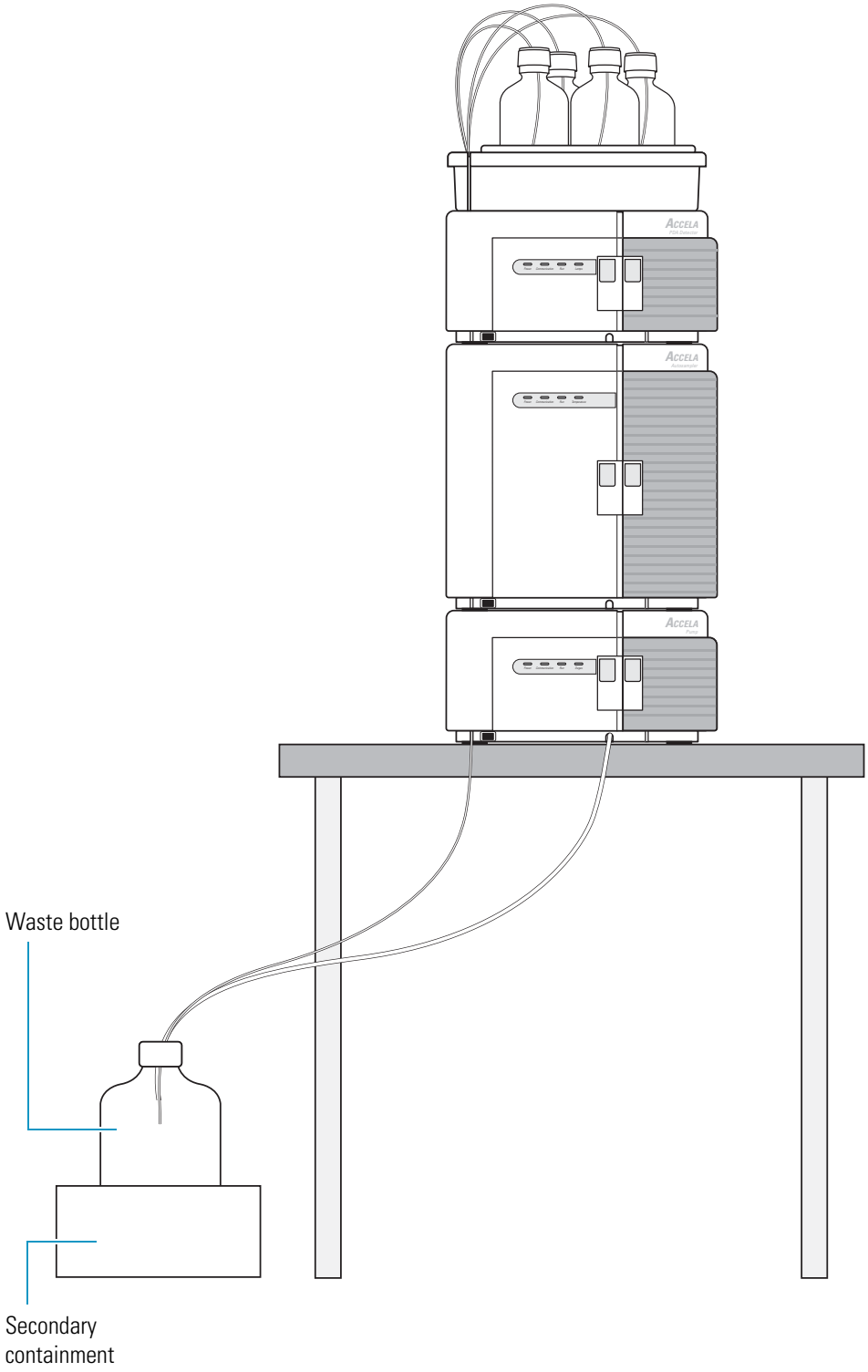
   Figure 52 shows all the drainage tubing connected.

Figure 52. Drainage line connections



5. Provide secondary containment for the waste container (see Figure 53).

Figure 53. Drainage tubing connected to a waste bottle with secondary containment



Accela Open Autosampler Drainage Connections

For an LC system with an Accela Open Autosampler, the pump and detector reside under the autosampler table. If the system contains two pumps, the pumps reside under the autosampler table and the detector resides next to the autosampler table.

The dynamic load and wash (DLW) option is a standard component of the Accela Open Autosampler. This option includes two micro pumps, a wash station, solenoid valve, and syringe set.

❖ To connect the drainage system for an LC system with an Accela Open Autosampler

1. Make sure that the waste line is connected between port 2 of the autosampler injection valve and the upper waste port on the front of the DLW wash station.
2. Do one of the following:
   - If your autosampler has only one injection valve, make sure that the lower waste port on the front of the wash station is closed with a dummy plug.
   - If your autosampler has two injection valves, make sure that the second injection valve is connected to the lower waste port on the front of the wash station.
3. Place the free end of the drainage tubing that is connected to the bottom of the wash station into a waste container that is located below the height of the injection valve. Verify that the waste liquid flows into the waste container without restriction.
4. Place the free end of the tubing connected to the detector flow cell outlet into the waste container.
5. Place the free end of the drainage tubing connected to the module on the bottom of the stack into the waste container.

System Connection Parts and Kits

This appendix provides information about the parts that you use to make the system contact closure and plumbing connections.

Contents

- Accela System Kit
- Solvent Interconnect Kit
- Accela Open Autosampler Accessories

Accela System Kit

Table 4 lists the parts supplied in the Accela System Kit (November 2010 or later). With the exception of the Accela Open Autosampler interconnect and adapter cables, this kit contains the cables, tubing, and fittings for connecting the Accela LC system modules.

Note Accela Accessory Kits shipped before November 2010 do not contain the 0.188 in. length ferrules.

Table 4. Accela System Kit (P/N 60057-60060) (Sheet 1 of 2)

Description	Part number	Quantity
5-port Ethernet switch, 5 port, 10/100 Base-T, 100 - 240 V	00825-01-00024	1
Ethernet cable with two ferrites	97355-98006	1
System interconnect cable (7-connector cable for an Accela UHPLC system with an Accela Autosampler)	60053-63034	1
UHP filter cartridge, 0.5 µm particle size, Teflon	00109-99-00020	1
Solvent bottle holder (solvent platform for Accela system that contains the Accela Autosampler)	60057-60014	1
Solvent bottle, 1 liter	1413-0430	4
Solvent bottle caps (outer portion)	A0343-010	4
Solvent bottle cap adapter (inner portion)	A3191-010	4
Solvent bottle label set	A4158-020	1

Table 4. Accela System Kit (P/N 60057-60060) (Sheet 2 of 2)

Description	Part number	Quantity
Tubing, stainless steel, 0.005 in. ID × 1/16 in. OD, 10 cm length (to connect	00301-01-00008	3
Marker letter A, clip on for 1/8 in. OD tubing	608250001	1
Marker letter B, clip on for 1/8 in. OD tubing	608250002	1
Marker letter C, clip on for 1/8 in. OD tubing	608250003	1
Marker letter D, clip on for 1/8 in. OD tubing	608250004	1
Tubing, stainless steel, 0.005 in. ID × 1/16 in. OD, 20 cm length (to connect the Accela Pump outlet to the inlet of the Accela Autosampler heat exchanger)	00301-01-00009	1
Tubing, stainless steel, 0.005 in. ID × 1/16 in. OD, 26 cm length (to connect the Accela 600 Pump or the Accela 1250 Pump outlet to inlet of the Accela Autosampler heat exchanger)	00028-01-00035	1
Tubing, stainless steel, 0.005 in. ID × 1/16 in. OD, 60 cm length (to connect the Accela pump (all models) outlet to the Accela Open Autosampler injection valve)	00028-01-00039	1
Ferrule, 0.188 in. length, for 1/16 in. OD tubing, stainless steel	00101-18187	12
Ferrule, Valco zero dead volume for 1/16 in. OD tubing, 10 000 psi rating	00101-18122	12
Nut, compression, 0.45 in. length, for 1/16 in. OD tubing, 10-32 thread, stainless steel	2522-1880	12
Vial kit, clear vials with 1.8 mL capacity, black screw-on caps, 100 vials and caps per package	A4954-010	2
Instrument control software, LC Devices (for use with the Xcalibur data system and several other Thermo Scientific mass spectrometry applications)	60257-62005	1
Instrument control software, Thermo pumps add-on for the ChromQuest 5.0 data system	CHROM-93034	1
Instrument control software, Accela detectors add-on for the ChromQuest 5.0 data system	CHROM-98036	1
Instrument control software, Accela Open Autosampler add-on for the ChromQuest 5.0 data system	CHROM-98037	1
Data system independent instrument control software for the Accela Open Autosampler (PAL loader and object manager)	CHROM-98035	1

Solvent Interconnect Kit

Table 5 lists the parts supplied in the Solvent Interconnect Kit (P/N F5050-010). This kit contains the solvent reservoir bottles and low-pressure, 1/8 in. OD solvent lines for the LC system. This kit also contains the Super Flangeless fittings used to connect the solvent lines to the inlet ports of the degassing unit in the Accela Pump and the Teflon solvent filters used to terminate the solvent lines.

Table 5. Solvent Interconnect Kit (P/N F5050-010)

Description	Part number	Quantity
Solvent bottle caps and solvent bottle cap adapters	A0343-010	4
Solvent bottle cap adapters	A3191-010	4
10 µm particle size, Teflon solvent filters	A4258-010	4
FEP tubing (1/8 in. OD × 1/16 in. ID)	3219-2004	6 m (20 ft)
Super Flangeless fittings for 1/8 in. OD tubing (see Figure 35 on page 40)	00101-18225	4
Super Flangeless ferrule for 1/8 in. OD tubing	00101-18017	4
Solvent bottle label set	A4518-020	N/A
Clip-on markers used to label the solvent lines: A, B, C, and D	608250001-608250004	1 each

Accela 600 and Accela 1250 Pump Inlet Tubing Kit

The tubing kit for the Accela 600 and Accela 1250 pumps (P/N 60157-62008) contains four solvent reservoir lines. Each solvent line consists of a 3 m (10 ft) length of 1/8 in. OD × 1/16 in. ID, FEP tubing with a 1/4 in. × 28 PEEK flangeless fitting at one end and a 20 µm particle size, stainless steel filter at the other end.

Accela Open Autosampler Accessories

Table 6 lists the parts that you use to make the connections between the Accela Open Autosampler, the other Accela UHPLC modules, and a Thermo Scientific mass spectrometer.

Table 6. System connection parts for the Accela Open Autosampler

Description	Location	Part number
Interconnect (contact closure) cable that synchronizes the run signals between the autosampler, an Accela 600 or 1250 Pump, and an LTQ Series or MSQ mass spectrometer	Supplied with the Accela Open Autosampler	60157-63024
Detector adapter (trigger) cable for TSQ Series and Exactive mass spectrometers and Accela detectors	Supplied with the Accela Open Autosampler	60157-63026
Accela Pump adapter (contact closure) cable	Available by special order	60157-63022
Tubing, stainless steel, 0.005 in. ID × 1/16 in. OD, 0.60 m (2 ft) length	Supplied with the Accela Open Autosampler	N/A
Ferrule, 0.188 in. length, for 1/16 in. OD tubing, stainless steel		00101-18187
Nut, compression, 0.43 in. length, for 1/16 in. OD tubing, 10-32 thread, stainless steel	Supplied with the Accela Open Autosampler	N/A

Tip To connect the solvent line between the pump outlet and the autosampler injection valve, you can also use the stainless steel, compression nut in the Accela Accessory Kit.

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