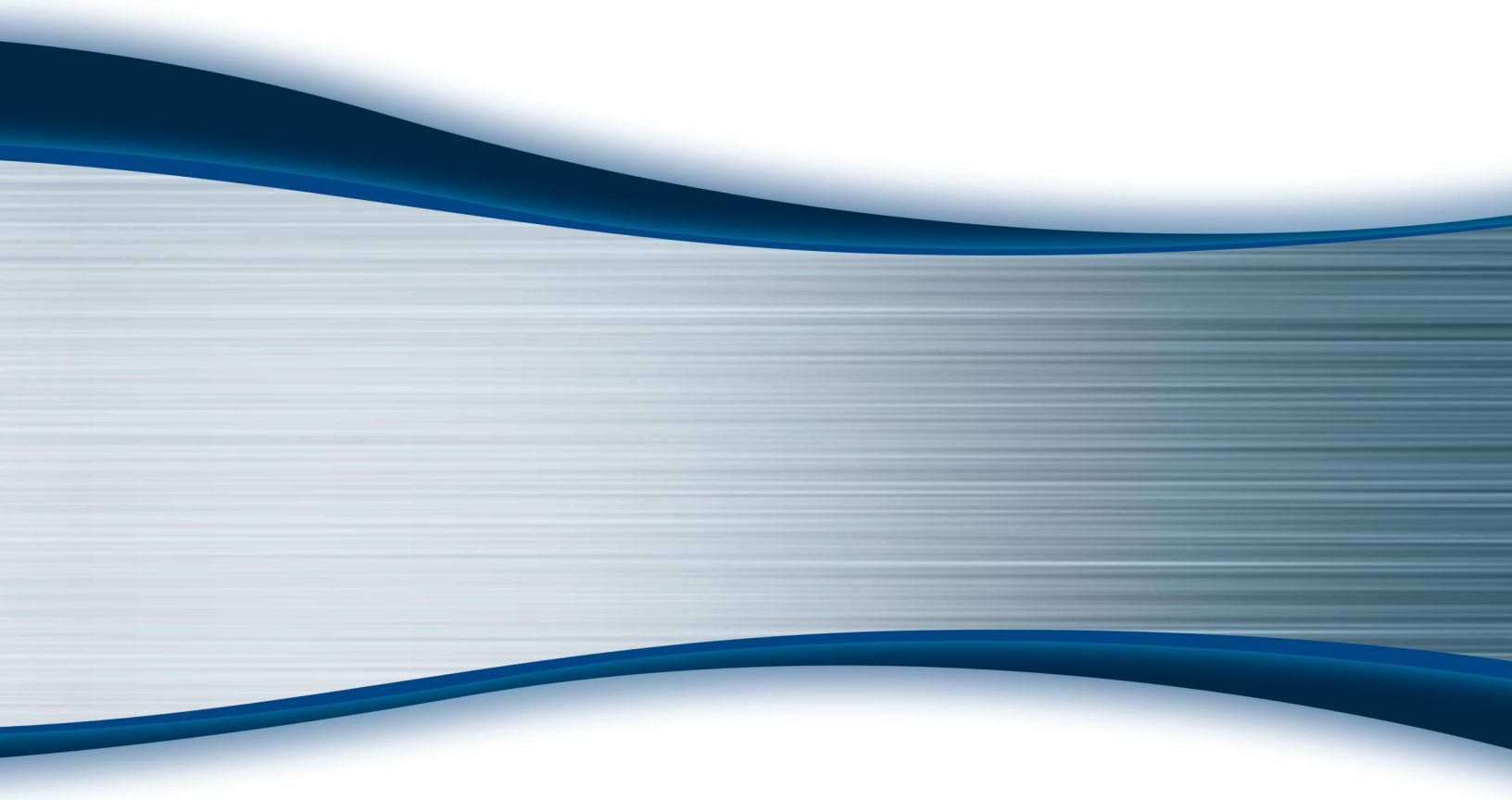
GX-271 ASPEC™



GILSON

GX-271 ASPEC™

World Headquarters
Gilson, Inc.
3000 Parmenter Street
P.O. Box 620027
Middleton, WI 53562-0027 USA
Telephone: 608-836-1551 Fax: 608-831-4451

Gilson S.A.S.
19, avenue des Entrepreneurs
F-95400 VILLIERS LE BEL
France

www.gilson.com
sales@gilson.com, service@gilson.com, training@gilson.com

LT350014-01

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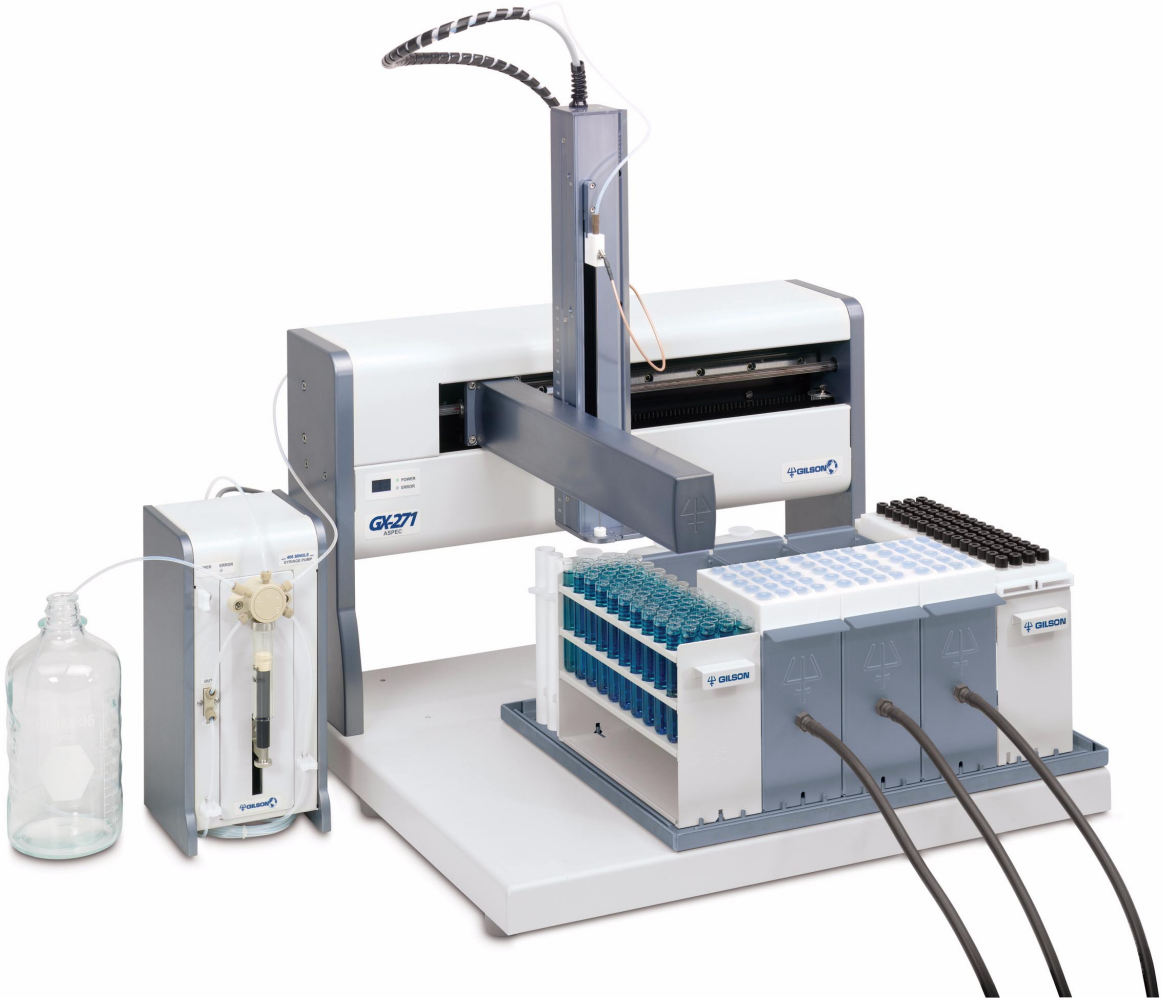


GX-271 ASPEC™ with 406 Single Syringe Pump

Safety Precautions

For safe and correct use of this instrument, it is recommended that both operating and service personnel follow the instructions contained in this guide when installing, cleaning, and maintaining this instrument.

Because the probe installed on the Z-arm may contain a dangerous substance, do not interfere in the work area of the instrument until it has completed its procedures. If dangerous liquids are used, adequate protection such as proper ventilation, safety glasses, etc., should be used.

Always switch the power to off when making adjustments to the instrument. The potential exists for bodily harm if you interfere with the work area of the instrument while it is running.

Description

The GX-271 ASPEC™ is an X/Y/Z instrument that can automate solid phase extraction (SPE) and liquid handling procedures. The locator plate can be configured with several different accessories and racks. The GX-271 ASPEC can be configured with a 406 Syringe Pump, an injection module, and a rinse pump.

The GX Direct Injection Module, an optional component available for the GX-271 ASPEC, is mounted on the locator plate of the GX-271 ASPEC. The GX Direct Injection Module has an option of four different valves (for 1/8" OD sample loops or 1/16" OD sample loops). All of the valves for the GX Direct Injection Module feature a vertical direct connection for the injection port and two of the valves feature a continuous flow path design. One GX Direct Injection Module can be placed on the locator plate of the GX-271 ASPEC.

Unpacking

The instrument is delivered with most major components already assembled. Keep the original container and packing assembly in case the instrument must be returned to the factory.

To unpack the instrument:

1 Open the box and remove the foam inserts from the top of the box.

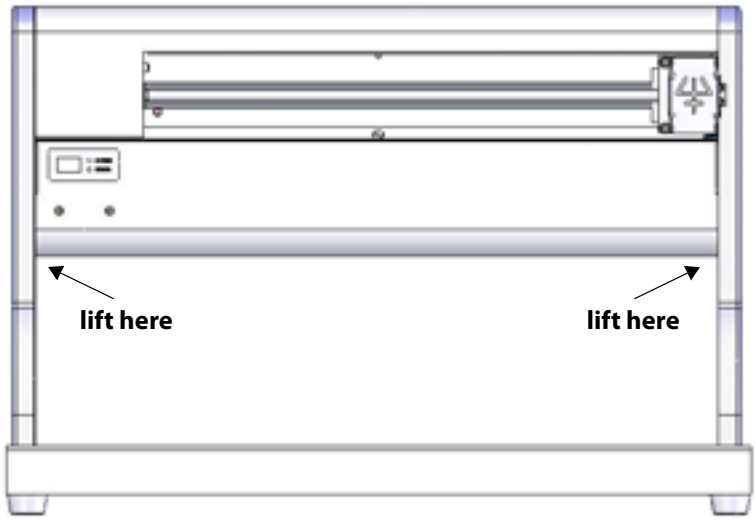
2 Remove the accessory box from the locator plate of the instrument.

3 Lift the unit out of the box. It is recommended that two people lift the unit out of the box. To lift the unit:

   a) Grip the unit below the large rectangular opening in the front of the unit.

   b) Lift the unit up and out of the foam packing material.

Do not attempt to lift the instrument from the Y-arm (the horizontal arm).



Standard Equipment

Once the instrument and the accessories have been unpacked, you should have the following:

- GX-271 ASPEC™
- locator pan
- Z-arm
- isolator probe holder
- 406 Syringe Pump
- Accessory package which includes Z height adjustment tool (185 mm), Cat 5e ethernet cable, power cords, fuses and fuse drawers, terminal block connectors (6-pin and 8-pin), spiral wrap, LLD cable assembly, three Allen wrenches (2.5, 3, and 4 mm), a Phillips screwdriver, and the GX-27X ASPEC Offset Utility Kit

Documentation

The following documents are included with the GX-271 ASPEC:

- ***GX-271/GX-274 ASPEC Documentation CD***
- IQ Procedure GX-271 ASPEC
- Unpacking the GX-271/GX-274 Liquid Handler and GX-271/GX-274 ASPEC™
- Declaration of Conformity

Accessories

Based upon your configuration, you'll also receive additional accessories, such as the probe, transfer tubing, racks, etc. If necessary, refer to ***Appendix A, Replacement Parts and Accessories*** for part numbers.

Optional Accessories

GX Direct Injection Module

Each GX Direct Injection Module includes a power cable to connect to the GX-271 ASPEC, two dowel pins, two socket head cap screws, and a 9/64" ball driver wrench. Refer to the table below for part numbers for the specific GX Direct Injection Module and the plumbing package (ordered separately).

Part number	*Description*
261356	GX Direct Injection Module for 1/16" OD Sample Loop. Includes a stainless steel direct injection valve (2-position, 6-port) 0.016" ID ports, 1/16" OD.
261357	GX Direct Injection Module for 1/16" OD Sample Loop. Includes a PEEK direct injection valve (2-position, 6-port) 0.016" ID ports, 1/16" OD.
261354	GX Direct Injection Module for 1/16" OD Sample Loop. Includes a stainless steel direct injection valve (2-position, 6-port) 0.030" ID ports, 1/16" OD.
261355	GX Direct Injection Module for 1/8" OD Sample Loop. Includes a stainless steel direct injection valve (2-position, 6-port) 0.060" ID ports, 1/8" OD.
26035470	Plumbing Package, Direct Inject 1/16 and 1/8

GX Rinse Pump

Part number	*Description*
261452	GX Rinse Pump which includes: • GX Rinse Pump, 2-channel • Rinse pump cable connector • Knurled knob screws (2) • 2.0 mm ID pharmed tubing • 1/16" ID x 3/16" OD Neoprene tubing

Customer Service

Gilson, Inc. and its worldwide network of authorized representatives provide customers with the following types of assistance: sales, technical support, applications, and instrument repair.

If you need assistance, please contact your Gilson-authorized representative. Specific contact information can be found on the Gilson website at www.gilson.com. To help us serve you quickly and efficiently, please refer to **Before Calling Us** on page 5-5.

Technical Specifications

Please be aware of the following before operating the instrument.

Warning! Changes or modifications to the instrument not expressly approved by Gilson could void the factory-authorized warranty.

The instrument has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC commercial environment. The instrument generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of the instrument in a residential area is likely to cause harmful interference; in which case, the user will be required to correct the interference at the user's own expense.

Shielded cables must be used with the instrument to ensure compliance with the Class A FCC limits.

GX-271 ASPEC™ System

GX-271 ASPEC	
Technical Specification	*Definition*
Arm speed	350 mm/sec in X dimension 350 mm/sec in Y dimension 125 mm/sec in Z dimension
Contact control	Two inputs (contact closure, TTL), two relay outputs, two switched +24V DC 1A outputs, and one safety input **Note:** For your safety, do not switch voltages higher than 30V even though the output contacts are rated for high voltage.
Environmental conditions	Indoor use Altitude: up to 2000 m Temperature range: 5°–40°C Air pressure: 75–105 kPa Pollution degree: 1 or 2, in accordance with IEC 66 Humidity: Maximum relative humidity 80% for temperatures up to 31° C, decreasing linearly to 50% relative humidity at 40°C
Front panel	Two seven-segment blue LED displays and LED indicator lights for power and error
Fuse	5 x 20 mm “T” type 2.50A One for 100–120V; two for 220–240V
Horizontal motion strength	X: 2.0 kg (4.5 lb) Y: 2.0 kg (4.5 lb)

GX-271 ASPEC (Continued)	
Technical Specification	*Definition*
Locator plate capacity	Up to five Code 20-series racks, Code 37X DEC racks, or Code 34X racks
Manufacturing standards	Meets applicable Safety and EMC certification standards; UL and CE certified
Physical space requirement (W x D x H)	59.7 x 54.1 x 57.1 cm (23.5 x 21.3 x 22.5 in) **Note:** This does not include the 406 Single Syringe Pump
Power requirements	Frequency: 50 to 60 Hz Voltage: 100-240V (Universal Input) Current rating: 2.0A for 100-120V or 1.0A for 220-240V Power consumption: 250W maximum
Probe positioning performance	**Accuracy:** +/- 0.75 mm in X/Y/Z dimensions **Repeatability:** +/- 0.20 mm in X/Y/Z dimensions
Probe rinse	Probe rinsing and flowing probe rinsing occurs through a dedicated rinse station
Sampler type	X/Y/Z with stationary rack design
Software control	Computer control via Ethernet and TRILUTION software
Vertical punch strength	3.2 kg (7 lb)
Weight	22 kg (48 lb)

406 Syringe Pump		
Technical Specification	*Definition*	
Environmental conditions	Indoor use Altitude: up to 2000 m Temperature range: 5°–40°C Air pressure: 75–105 kPa Pollution degree: 1 or 2, in accordance with IEC 66 Humidity: Maximum relative humidity 80% for temperatures up to 31° C, decreasing linearly to 50% relative humidity at 40°C	
Front panel	LED indicator lights for power and error Pressure sensor	
Liquid contact materials	FEP, PTFE, PEEK, Ekonol, glass, and ceramics	
Manufacturing standards	Meets applicable Safety and EMC certification standards; UL and CE certified	
Maximum syringe flow rate for water	Syringe Size	Maximum Flow Rate
	100 µL	4 mL/min
	250 µL	10 mL/min
	500 µL	20 mL/min
	1 mL	40 mL/min
	5 mL	100 mL/min
	10 mL	100 mL/min
	25 mL	100 mL/min
Physical space requirement (W x D x H)	13.5 x 13.2 x 27.7 cm (5.3 x 5.2 x 10.9 in)	

406 Syringe Pump (Continued)	
Technical Specification	*Definition*
Power requirements	+24V DC at 2.0A supplied via a 2.1 mm ID power plug; center contact is positive
Syringe capacity	100 µL, 250 µL, 500 µL, 1 mL, 5 mL, 10 mL, 25 mL
Volumetric accuracy	Accuracy: ±2% for (100 µL to 25 mL) water
Weight	4.3 kg (9.4 lb)

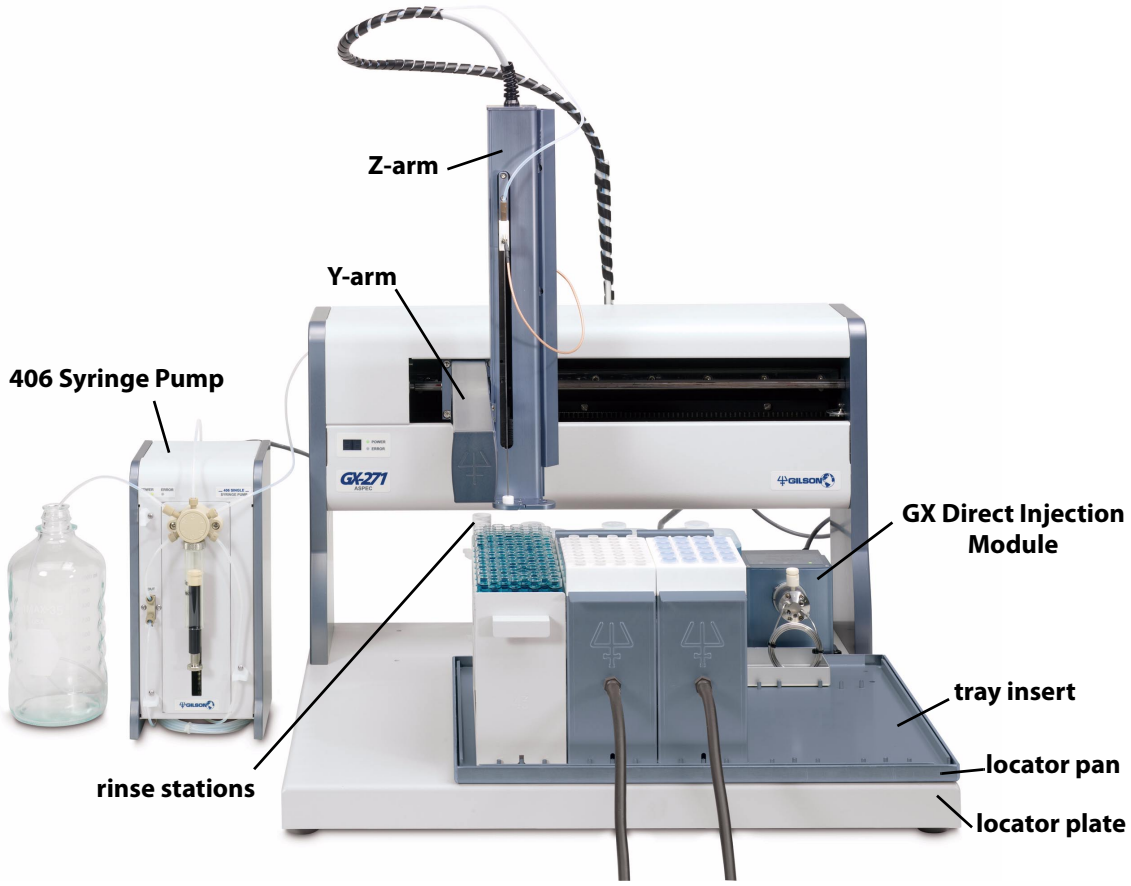
GX Direct Injection Module	
Technical Specification	*Definition*
Available valves	**Analytical** GX Direct Injection Module for 1/16" OD Sample Loop (Stainless Steel). Includes a stainless steel direct injection valve (2-position, 6-port) 0.016" ID ports, 1/16" OD. GX Direct Injection Module for 1/16" OD Sample Loop (PEEK). Includes a PEEK direct injection valve (2-position, 6-port) 0.016" ID ports, 1/16" OD. **Preparative** GX Direct Injection Module for 1/8" OD Sample Loop. Includes a stainless steel direct injection valve (2-position, 6-port) 0.060" ID ports, 1/8" OD. GX Direct Injection Module for 1/16" OD Sample Loop. Includes a stainless steel direct injection valve (2-position, 6-port) 0.030" ID ports, 1/16" OD.
Available sample loops	**Analytical** For GX Direct Injection Module (1/16"): 2 µL, 5 µL, 10 µL, 20 µL, 50 µL, 100 µL, 250 µL, 500 µL, 1 mL, and 2 mL **Preparative** For GX Direct Injection Module (1/8"): 5 mL, 10 mL, 20 mL, and 25 mL For GX Direct Injection Module (1/16"): 250 µL, 500 µL, 1 mL, 2 mL, and 5 mL
Front panel	LED indicator for LOAD and INJECT positions
Liquid contact materials	Valcon H, Nitronic 60 (N60), PTFE, PAEK
Physical space requirement	12.1 x 8.9 x 10.1 cm (4.75 x 3.50 x 3.98 in)

GX Direct Injection Module (Continued)	
Technical Specification	*Definition*
Power requirements	Voltage: 24V DC Current rating: 1.0A
Valve switching speed	For GX Direct Injection Module (1/16"): 200 msec For GX Direct Injection Module (1/8"): 300 msec
Weight	1.2 kg (2.63 lb)

GX Rinse Pump	
Technical Specification	*Definition*
Contact control	One input (contact closure) and one switched +24V DC 1A output
Physical space requirement	12.1 x 8.9 x 18.3 cm (4.76 x 3.5 x 7.2 in)
Power requirements	Voltage: 24V DC Current rating: 1.0A
Rinse speed	High speed: 200 rpm Low speed: 120 rpm
Weight	1.0 kg (2.28 lb)

Installation 2

This section takes you through the steps for setting up your GX-271 ASPEC™.



Shipping Screw Removal

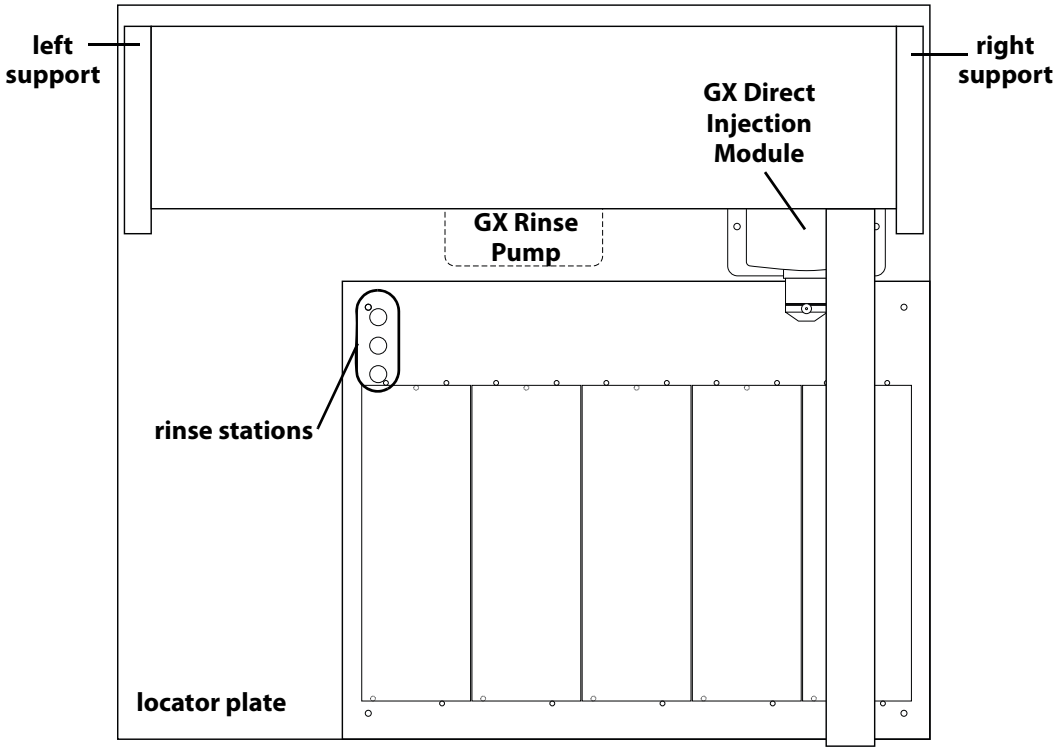
There is a shipping screw on the right support of the instrument that secures the Y-arm during shipment. The shipping screw must be removed before installing the Z-arm and operating the instrument. If the shipping screw is not removed, the instrument cannot move in the X direction. This results in an error state during operation.

If you need to move the instrument, always reinstall the shipping screw. This safeguards against mechanical damage.

Remove the shipping screw using the 4 mm Allen wrench included in the accessory package. Store the shipping screw for future use.

Locator Pan Installation and Setup

This section takes you through the steps for installing the locator pan on the locator plate of the instrument, installing the tray inserts, and installing the rinse stations.



Locator plate of the GX-271 ASPEC™ with Code-20 series tray insert installed

Locator Pan Installation

The locator pan is installed on the locator plate of the instrument. The locator pan holds the tray inserts.

To install the locator pan:

1 Orient the two posts on the bottom of the locator pan toward the back of the instrument.

2 Place the locator pan on the locator plate. The front and right side of the locator pan should be flush with the front and right side of the locator plate and the two posts should be inserted in the locator plate.

Rinse Station Installation

The rinse stations are installed on the tray insert before it is placed in the locator pan.

Up to three rinse stations can be installed on the locator plate of the instrument. There are two types of rinse stations available.

Available rinse stations:

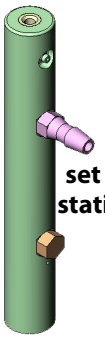
Part number	*Description*
26034551	Rinse station, GX tall 175 mm
26034555	Rinse station, GX tall drain 175 mm

Before installing the rinse station determine what type of rinse you will be performing.

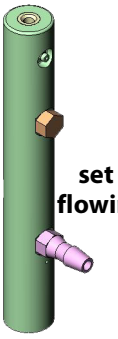
With the Rinse Station for Outside Rinse of Probe you can perform a static rinse or a flowing rinse using the GX Rinse Pump.

- For a static rinse place the plug in the bottom hole and the drain in the top hole.
- For a flowing rinse place the plug in the top hole and the drain at the bottom

Use the Drain/Rinse Station to perform an inside rinse.



set up for static rinse



set up for flowing rinse

rinse station for outside rinse of probe

Install the outside rinse stations in the first two positions on the tray insert.

rain/rinse station for side rinse of probe

stall the drain/rinse ation in the back position the tray insert.

To install the rinse station on the locator plate:

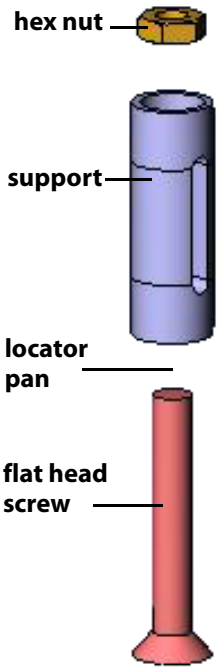
1 Locate the following items included with the rinse station:

- rinse station support
- flat head screw
- hex nut

Note: The rinse station also includes a socket head cap screw that will not be used for this installation.

2 Place the hex nut in the recessed end of the rinse station support. Using a large Phillips screwdriver, push the hex nut all the way into the recessed opening on the rinse station support.

3 Place the flat head screw up through the bottom of the locator pan and place the rinse station support/hex nut assembly over the screw. Using a Phillips screwdriver, tighten the screw to the rinse support/hex nut assembly.



Tray Insert Installation

A tray insert is used to position the racks and the rinse stations on the instrument. The following insert (ordered separately) is available for use with the GX-271 ASPEC.

- Insert for five Code 20-series racks (part number 26041033)

  The Code 20-series tray insert is used for Code 20-series, Code 34X-series, and Code 37X-series racks.

  In the center of this tray insert there are three holes used to identify the insert.

To install the tray insert on the locator pan of the instrument:

1 Make sure that the rinse stations (or the holes for the rinse stations) are located at the left rear of the tray insert.

  Note: The rinse stations should be installed before installing the tray insert on the locator pan. Refer to page 2-5 for more information on installing the rinse stations.

2 Place the tray insert in the locator pan on the locator plate of the instrument. The holes on the pan insert should line up with the posts on the locator pan.

Solvent Bottle Rack Installation

A solvent bottle rack (ordered separately) can be installed on the Code 20-series tray insert.

To install a solvent bottle rack on the Code 20-series tray insert,

1 Align the holes on the bottom of the solvent bottle rack with the holes on the tray insert.

   If a rinse station is installed, the solvent bottle rack will only fit in one location on the tray insert. If a rinse station is not installed, the solvent bottle rack can be installed further to the right.

2 Place the solvent bottles in the rack.

Z-Arm Setup

Probe Guide/Guide Foot Installation

There are different size probe guide inserts available depending on the outer diameter of the probe being used. Each insert is marked with a number of spots on the insert. Refer to the table below for more information.

Insert	*Part Number*	*Number of Spots*
1.3 mm	26046214	0
1.5 mm	26046215	1
1.8 mm	26046216	2
2.3 mm	26046217	3
2.7 mm	26046218	4

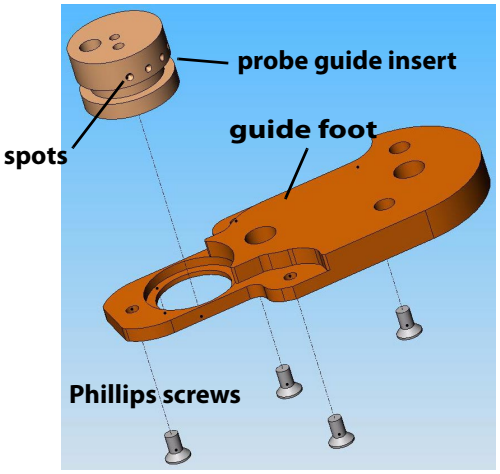
The guide foot, ordered separately, is installed on the Z foot of the instrument.

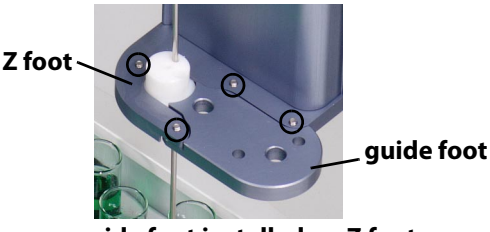
1 Lay the Z-arm on its back on a flat surface.

2 Locate the probe guide insert (included with the guide foot) and place it on the top of the guide foot. The probe guide insert should be oriented so the wider part is at the bottom and the three holes are at the top.

3 Place the guide foot below the Z foot and align the holes on the guide foot with the holes on the Z foot.

4 Place the four Phillips screws through the bottom of the guide foot into the Z foot and tighten.





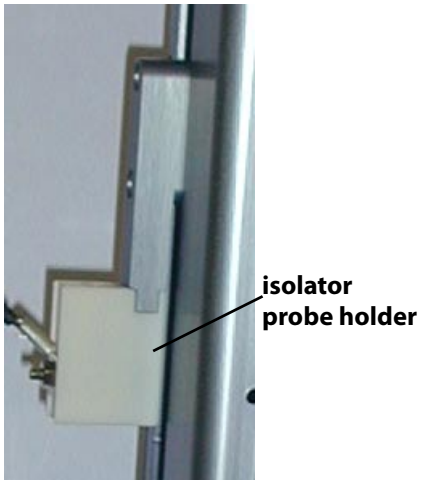
guide foot installed on Z foot

Isolator Probe Holder Installation

1 Using the 3 mm Allen wrench included in the accessory package, remove the screw from the bottom of the isolator probe holder.

2 The D notch in the isolator probe holder should be at the top and the connector for the LLD cable facing out. Place the D notch in the isolator probe holder over the lower part of the isolator probe holder bar.

3 Place the screw up through the bottom of the isolator probe holder and into the isolator probe holder bar and tighten using the 3 mm Allen wrench.



Z-Arm Installation

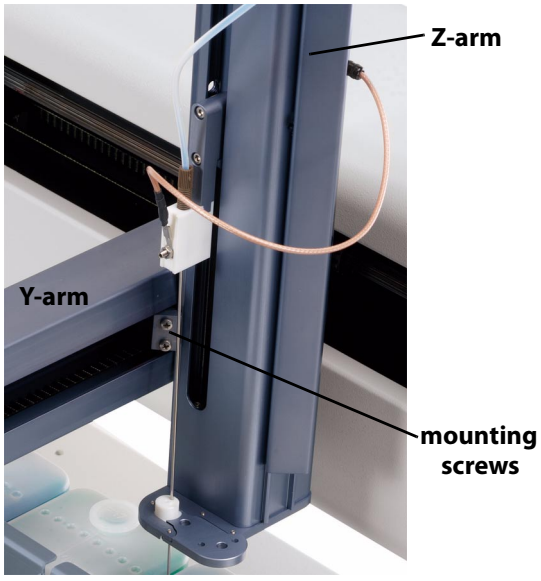
Follow these steps to install the Z-arm:

1 Using the 2.5 mm Allen wrench included in the accessory package, loosen the mounting screws on the Z-arm mounting bracket located on the Y-arm. Turn counterclockwise to loosen.

2 Partially pull out the bracket. Do not remove completely.

3 Place the Z-arm into the mounting bracket. You will need to insert one side of the Z-arm into place at a time (back to front).

4 Tighten the screws on the mounting bracket until the Z-arm is secure.

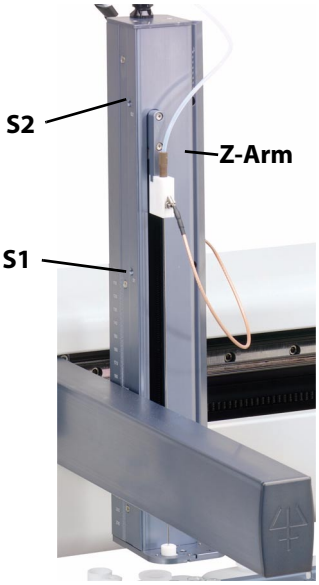


The Z-arm will be set to its proper height as the final step of the installation. This adjustment is described on page 2-47.

Adjusting the Z Travel Height

The Z travel height is set by default to the S2 position (125 mm).

Follow these steps to adjust the Z travel height:



1 Using the 3 mm Allen wrench included in the accessory package, remove the stop pin (part number 260463) from the Z-arm. The stop pin is installed on the left side of the Z-arm in the hole labeled S2.

stop pin

Note: If you will be setting the Z travel height to 175 mm you will not use the stop pin. If the stop pin is not being used it should be stored for future use.

2 Insert the stop pin in the proper hole on the Z-arm.

- S1 for 56 mm probe
- S2 for 125 mm probe
- No pin installed for 175 mm probe

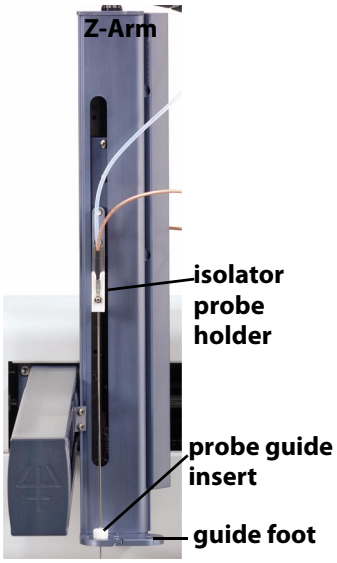
3 Using the 3 mm Allen wrench, tighten the head of the stop pin until it reaches a hard stop.

Probe Installation

There are different probes available for use on the instrument. Depending upon your application, you have purchased the appropriate probe and guide foot. When installing the probe, refer to the following procedure and diagram that show where they are installed on the Z-arm.

To install the probe on the Z-arm:

Insert the probe into the top of the isolator probe holder and pull it through until the tip of the probe is in the probe guide insert.



Liquid Level Detection Cable Installation

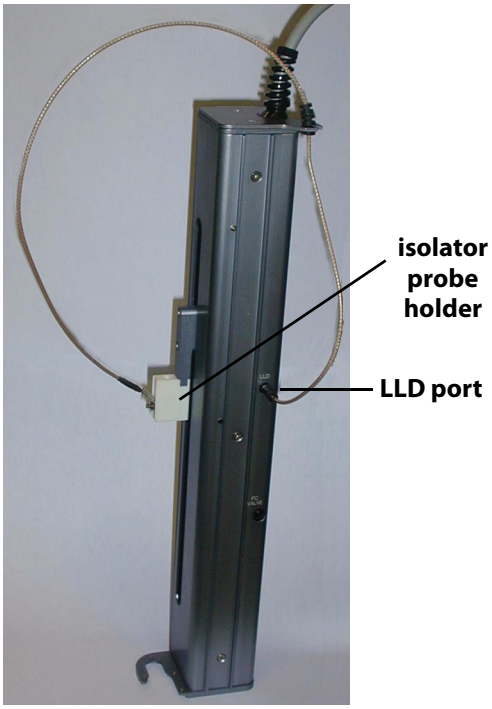
To install the liquid level detection cable assembly (part number 260461126):

1 Tighten the hex nut on the front of the isolator probe holder.

2 Place the metal slot end of the cable over the metal tab on the isolator probe holder.

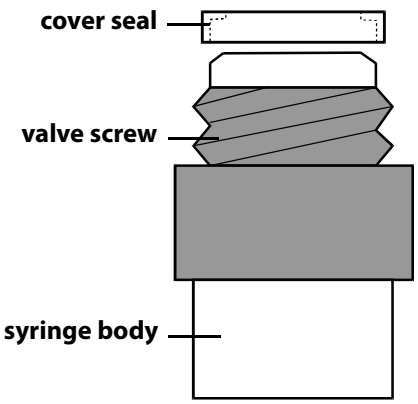
3 Place the black cone piece in the bracket at the top of the Z-arm.

4 Plug the other end of the cable into the LLD port on the right side of the Z-arm.



Syringe Installation—406 Syringe Pump

The 100 µL, 250 µL, and 500 µL syringes are supplied with a cover seal to ensure an airtight fit between the syringe and the valve.



Before mounting one of the smaller syringes (100 µL, 250 µL, 500 µL and 1 mL), manually prime it. Place its open end in the pump reservoir and use the piston to aspirate the liquid. This manual prime is not necessary for the 5 mL, 10 mL and 25 mL syringes.

The piston operating rod will be shipped in the down position. If the rod is not in the down position, refer to the instructions on changing a syringe. Those instructions detail how to lower the rod.

The following procedure is important for correct syringe piston alignment. Improper alignment may cause premature piston failure.

1 Remove the valve from the front panel by removing the two securing screws.

2 Lubricate the piston with diluent in order to reduce piston seal friction during syringe installation.

3 Loosely screw the syringe into the valve. Do not fully tighten.

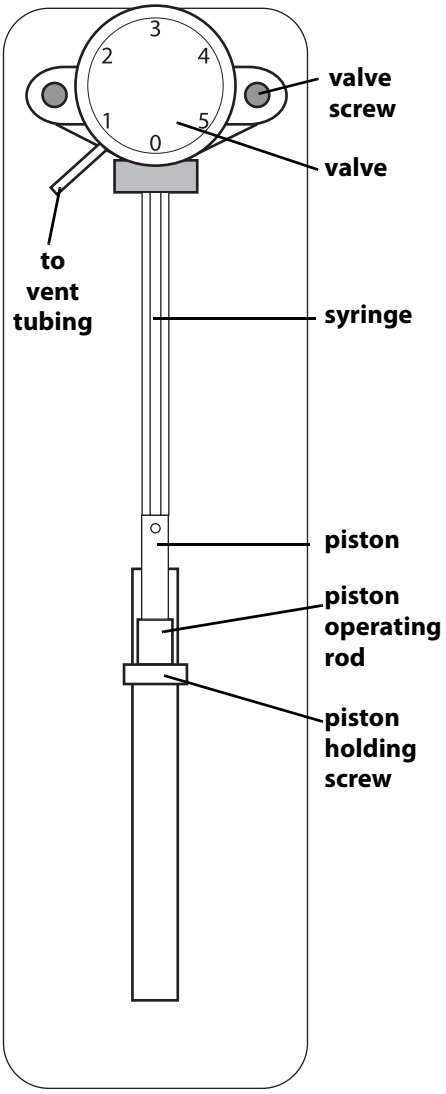
4 Loosely attach the valve to the syringe pump with the supplied screws.

5 Pull down the piston so it comes into contact with the piston operating rod and firmly tighten the piston holding screw.

6 Fully tighten the valve screws to secure the valve.

7 Fully tighten the syringe to the valve.

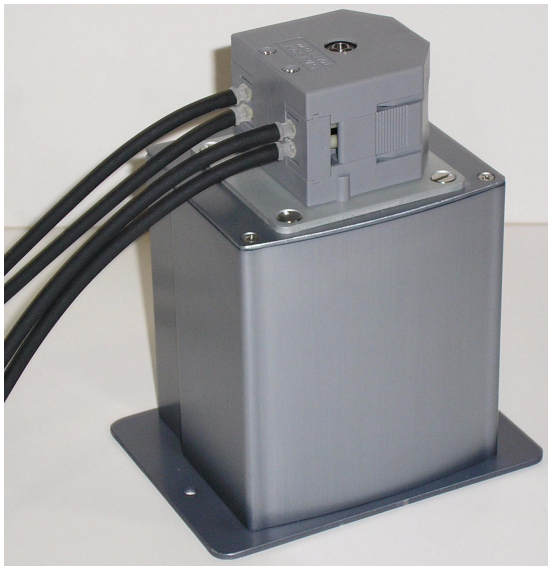
Note: Remember the size of the syringe you are installing for later software configuration. (You can write the size in the margin here for reference.)



GX Rinse Pump Installation (Optional)

The GX Rinse Pump sits on the locator plate of the instrument. It should be placed behind the locator pan near the rinse stations.

There are two thumbscrews included with the rinse pump, these screws will not be used.



GX Rinse Pump

GX Direct Injection Module Installation (Optional)

The GX Direct Injection Module is installed on the right side of the locator plate of the GX-271 ASPEC™ next to the right support.

GX Direct Injection Module on the locator plate of the GX-271 ASPEC

To install the GX Direct Injection Module on the locator plate of the GX-271 ASPEC:

1 Align the holes on the GX Direct Injection Module base with the holes in the locator plate.

2 Place one of the provided screws on each side of the GX Direct Injection Module and tighten using the supplied ball driver wrench.

Note: There are two locator pins included with the GX Direct Injection Module, these pins will not be used.

GX Direct Inject Riser Block Installation

The riser block should be used when collecting fractions to tubes 150 mm and taller or when using the Code 34X-series racks.

To install the riser block with the GX Direct Injection Module on the locator plate:

1 Locate the pins shipped with the riser block and place them in the holes on the top of the riser block.

2 Align the pins with the holes on the GX Direct Injection Module and then push the injection module into place.

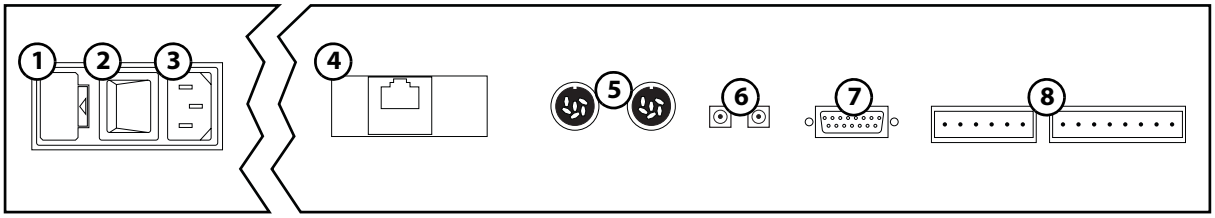
3 Place the two screws (included with the riser) through the second set of holes on the GX Direct Injection Module.

4 With the valve facing toward the front of the instrument, slide the injection module/riser assembly from the back of the instrument toward the front until it is lined up with the holes on the locator plate.

5 Using the supplied ball driver wrench, tighten the screws connecting the injection module/riser assembly to the locator plate.

Electrical Connections

Rear Panel—GX-271 ASPEC™



GX-271 ASPEC rear panel—partial

1 Fuse drawer

2 Power switch

3 Power receptacle

4 Ethernet

5 GSIOC accessory

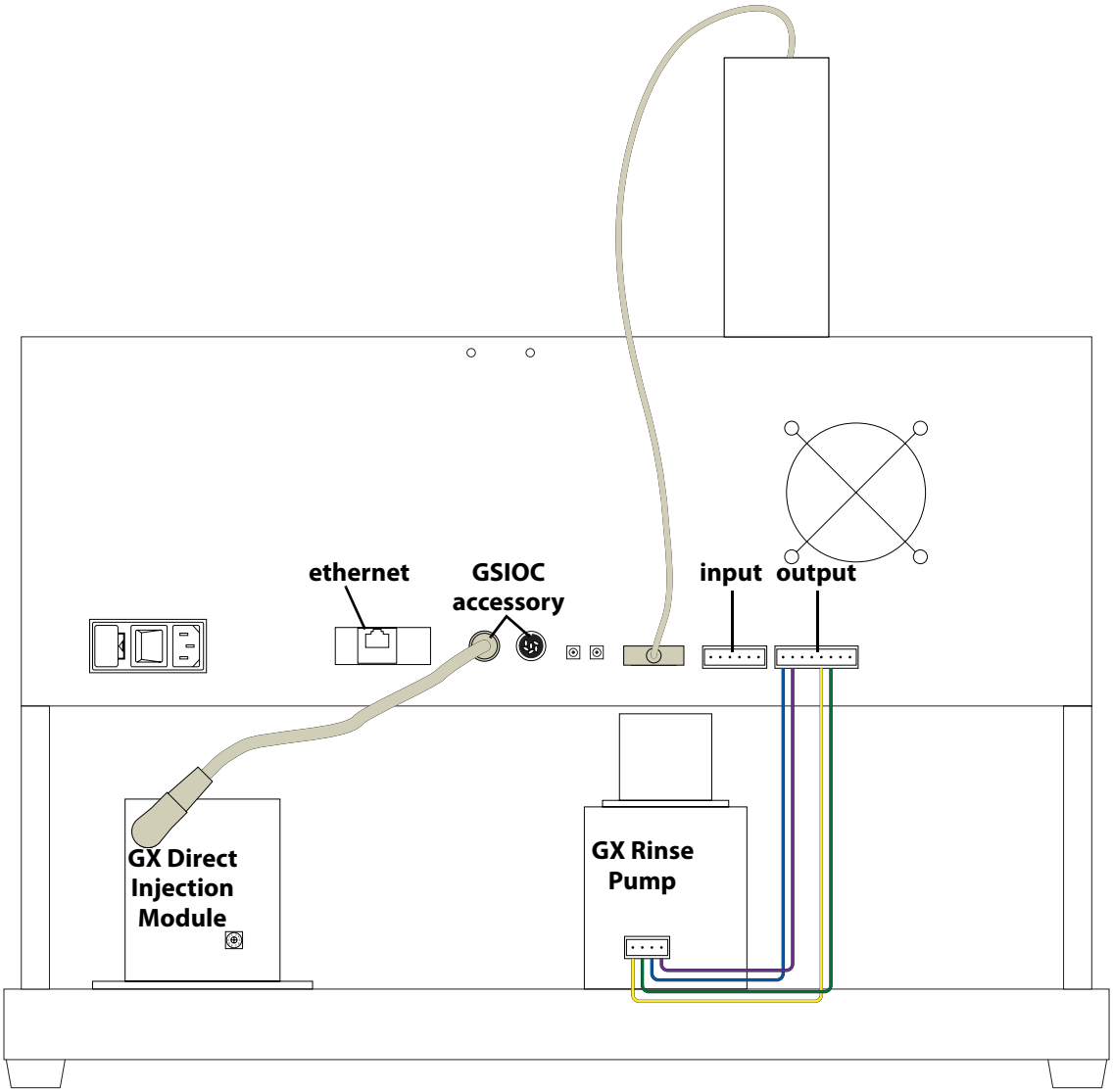
6 Solenoid valve (not used)

7 Z-arm

8 Input/Output ports and safety

Connection Diagram

Refer to the diagram below when making the electrical connections.



GX-271 ASPEC Rear Panel

GX Rinse Pump (Optional)

Rear Panel—GX Rinse Pump

1 Input/Output (I/O) ports

Input/Output Ports

Before making the connections, ensure that the power is turned off to the GX-271 ASPEC.

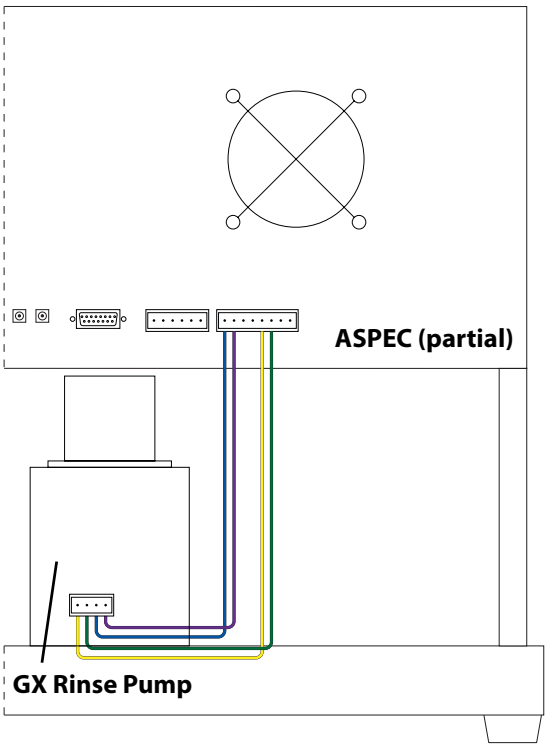
To make connections between the GX Rinse Pump and the GX-271 ASPEC refer to the diagram and instructions below.

GX Rinse Pump rear panel

1 Locate the GX Rinse Pump cable connector (part number 26035256). This assembly contains two pre-wired terminal block connectors.

2 Connect the four pin terminal block connector to the back panel of the GX Rinse Pump.

3 Connect the eight pin terminal block connector to the output ports on the back panel of the GX-271 ASPEC.

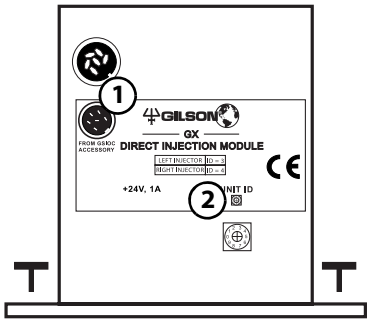


GX Direct Injection Module (Optional)

Rear Panel—GX Direct Injection Module

1 GSIOC accessory

2 Unit ID



GX Direct Injection Module rear panel

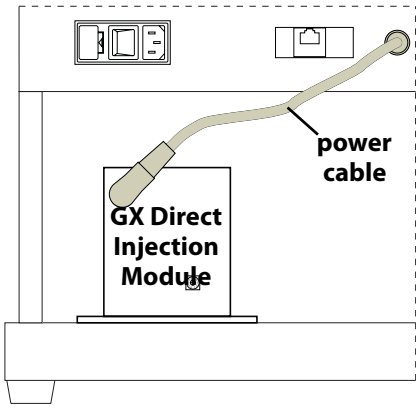
GSIOC Accessory

Refer to the diagram and instructions below to make the connections from the GX-271 ASPEC to the GX Direct Injection Module. Before making the connections, ensure that the power is turned off to the GX-271 ASPEC.

1 Connect the right-angled end of the power cable (part number 26035455) to the FROM GSIOC ACCY port on the GX Direct Injection Module.

2 Connect the other end of the power cable to one of the GSIOC ACCESSORIES ports on the rear panel of the GX-271 ASPEC.

GX-271 ASPEC (partial)



Unit ID

At the factory, Gilson set the unit ID on the GX Direct Injection Module to 3.

For use with the GX-271 ASPEC, the unit ID on the injection module should be set to 9.

To change the unit ID:

1 Gently insert a small flat-blade screwdriver into the selector on the rear panel and turn it.

2 Align the arrow with one of the indicated numbers.

Ethernet

To make the Ethernet connection to the instrument, you will need a router (ordered separately).

Note: The router is not available for purchase from Gilson, Inc. it must be purchased from somewhere else.

The router is packaged in a separate box. For this installation you will need the following from the box:

- router
- Cat 5e ethernet cable
- 5V DC power adapter

Connect the router to your company's network

Note: If you will be connecting to your company's network you will need another Cat 5e ethernet cable (not included).

Connect one end of the Cat 5e ethernet cable to the company network and the other end of the cable to the WAN port on the back of the router.

Connect the router to a power source

Use the DC power supply (included with the router) to make the connection between the router's +5V DC power receptacle and a power source.

Connect the computer to the router

Connect one end of the Cat 5e ethernet cable (included with the router) to one of the ports numbered 1–8 on the back of the router and the other end to an available Ethernet port on the network adapter in the computer.

Connect the instrument to the router

Warning! Before connecting the instrument ensure that it is powered OFF.

Locate the Cat 5e ethernet cable that was included in the GX-27X accessory kit. Plug one end of the cable into the Ethernet port on the ASPEC and the other end to one of the ports numbered 1–8 on the back of the router.

Input/Output Ports

You can use the input and output contacts found on the rear panel of the instrument to control peripheral devices. Refer to the diagram on page 2-17 for the location of the input/output ports.

Contact Inputs

The input terminal block of the instrument has six contacts. All of the inputs are paired, and each pair includes a GROUND reference ( ).

The contact input pairs are labeled A and B; there is also a safety contact input.

A contact is connected if it has a short across the input or is held low by a TTL output or other device.

Never connect voltages higher than 5V DC to an input. When using TTL signals, be sure to match GROUND connections.

Contact Outputs and DC Power Outputs

The output terminal block has eight contacts.

Pins 1 through 4 are paired, isolated-relay contact closures and are labeled 1 and 2.

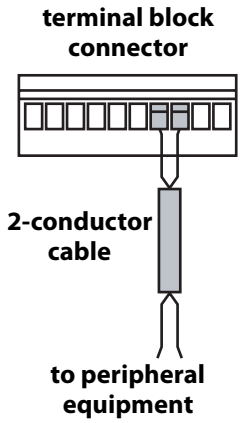
Pins 5 through 8 are DC power outputs and can be turned on (supplying +24V DC) or off (+24V DC output will float) via software control.

Items you'll need

To make connections, you'll need the following:

- 2-conductor cable (22–30 gauge for each wire)
- wire insulation stripper
- small-blade screwdriver

You can purchase a 6-foot piece of suitable cable (part number 709910206) or a package of five cables with identification markers (part number 36078155) from Gilson.



Making connections

To prepare and make connections with the 2-conductor cable:

1 Cut the cable into pieces of appropriate length.

2 Strip about 3 mm of insulation from each end of the cable.

3 Remove the terminal block connector from the instrument. Insert each wire into the appropriate slot on the terminal block connector.

Note: When making connections, be sure to maintain the correct orientation of the connector relative to the port.

Push the wire all the way in; then tighten its corresponding pin screw.

4 Reconnect the terminal block connector to the instrument. The wires will be facing left and the pin screws will be facing you as you look at the rear of the instrument. Push the connector in as far as it will go. It is designed to fit snugly into its receptacle.

5 Connect the opposite ends of the wires to the other device(s). Be sure to match ground connections.

6 Label each cable to identify the purpose of the connection.

Z-Arm Connection

Connect the cable from the Z-arm to the Z-ARM port on the back of the GX-271 ASPEC. Refer to the diagram on page 2-17 for the location of this port.

Fuses

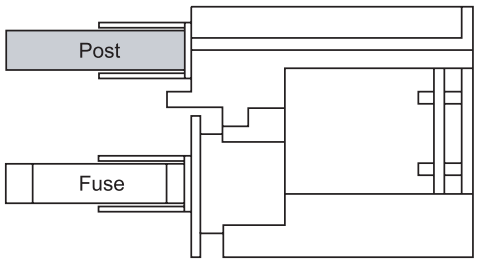
You received the instrument without any fuses installed. To install the fuses:

1 Locate the accessory package containing the fuse drawer appropriate for your line voltage. Discard the other fuse drawer.

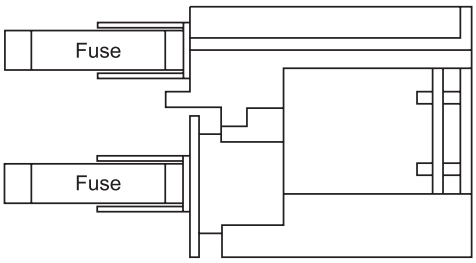
2 Locate the accessory package containing the 2.5A "T" Slo-Blo fuse (5 x 20 mm size) fuses.

3 Install the fuse(s) into the fuse drawer. The fuse drawer for 100–120V accepts one fuse. The fuse drawer for 220–240V accepts two fuses.

4 Insert the fuse drawer into its receptacle in the instrument. See rear panel diagram on page 2-17.



fuse installation for 100–120 voltage



fuse installation for 220–240 voltage

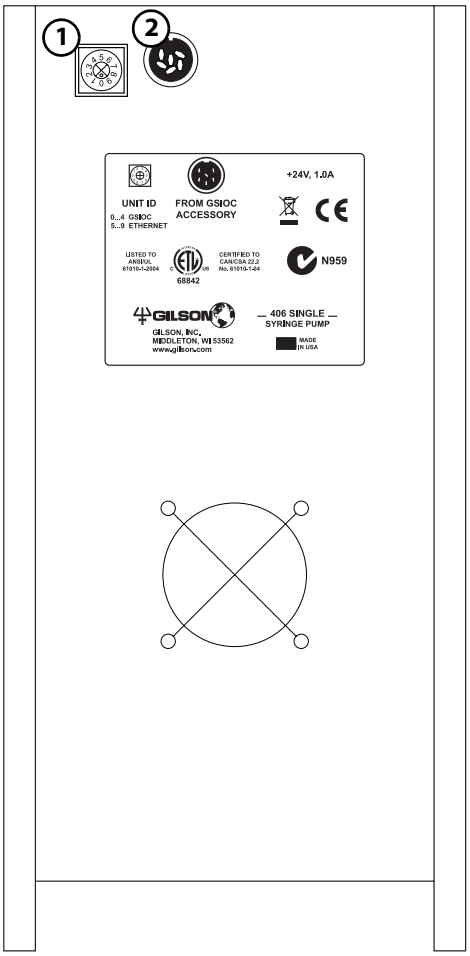
Power Cord Connection

Locate the appropriate power cord for your line voltage. Discard the other power cord.

Use the power cord to connect the instrument to an AC power source.

Electrical Connections—406 Syringe Pump

Rear Panel—406 Single Syringe Pump



Please read this entire section and refer to the rear panel diagram below before making any electrical connections. Do not turn on power to the syringe pump until all connections have been made.

1 Unit ID selector

2 From GSIOC Accessory

Unit ID

At the factory, Gilson set the unit ID on the syringe pump to 7.

To change the unit ID:

1 Gently insert a small Phillips screwdriver into the selector on the rear panel and turn it.

2 Align the white dot with one of the indicated numbers.

GSIOC accessory

Refer to the information below to make the connections from the GX-271 ASPEC™ to the 406 Single Syringe Pump. Before making the connections, ensure that the power is turned off to the GX-271 ASPEC.

1 Connect the right-angled end of the power cable (part number 26035455) to the FROM GSIOC ACCY port on the syringe pump.

2 Connect the other end of the power cable to one of the GSIOC ACCESSORIES ports on the rear panel of the GX-271 ASPEC.

Rack Installation

The GX-271 ASPEC™ is equipped to locate up to five Code 20-series, Code 34X-series, or Code 37X DEC racks. See ***Appendix B, Racks*** for a list of racks available for the instrument.

- For Code 20-series or Code 34X-series racks, refer to **Code 20-Series and Code 34X-Series Rack Installation**
- For DEC racks, refer to **DEC Racks and Accessory Kits**

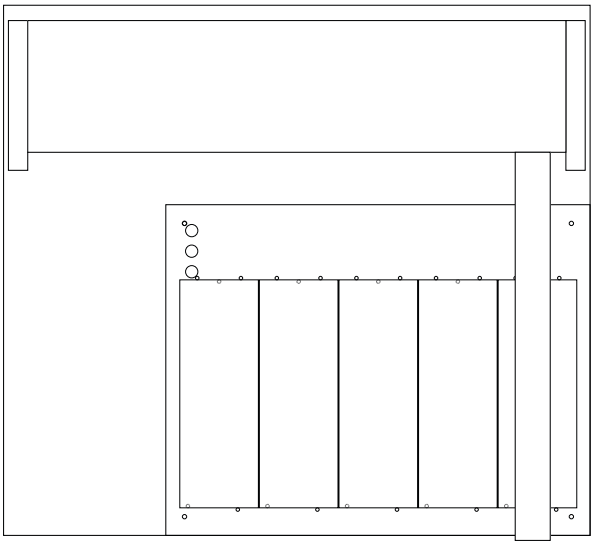
Code 20-Series and Code 34X-Series Rack Installation

To install a Code 20-series or Code 34X-series rack:

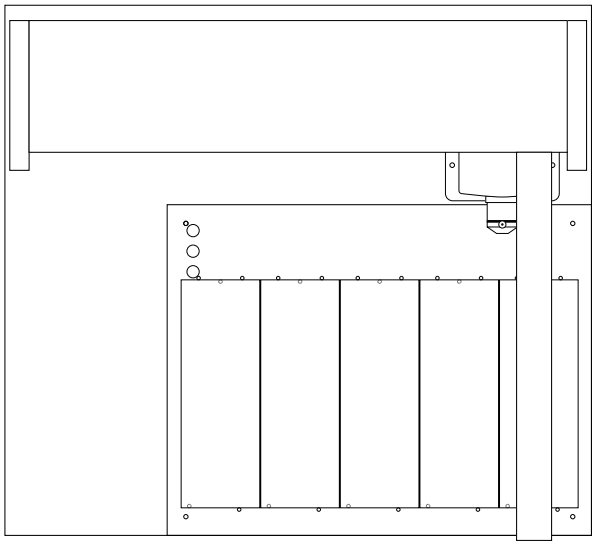
1 Orient the rack so that the code number is facing forward.

2 Locate the middle slot on the back of the rack. Slide this over the raised tab on the tray insert.

3 Fit the middle slot on the front of the rack over the raised tab in the front of the tray insert.



Code 20-series insert on locator plate with racks installed



Code 20-series insert on locator plate with racks and Direct Injection Module installed

DEC Racks and Accessory Kits

Introduction

The automation of the Solid Phase Extraction (SPE) process is based on the design of the DEC rack assembly that holds the SPE columns (or DECs).

The upper part of the rack assembly consists of a mobile DEC holder that holds the SPE columns and slides backwards and forwards. The DEC holder is moved by the probe.

The lower part of the rack assembly contains two positions. The front position contains the drain and the rear position contains the collect vials.

When the DEC holder is in the front position, the SPE columns are over the drain. The SPE columns can be conditioned, loaded, and washed here using the relevant software commands.

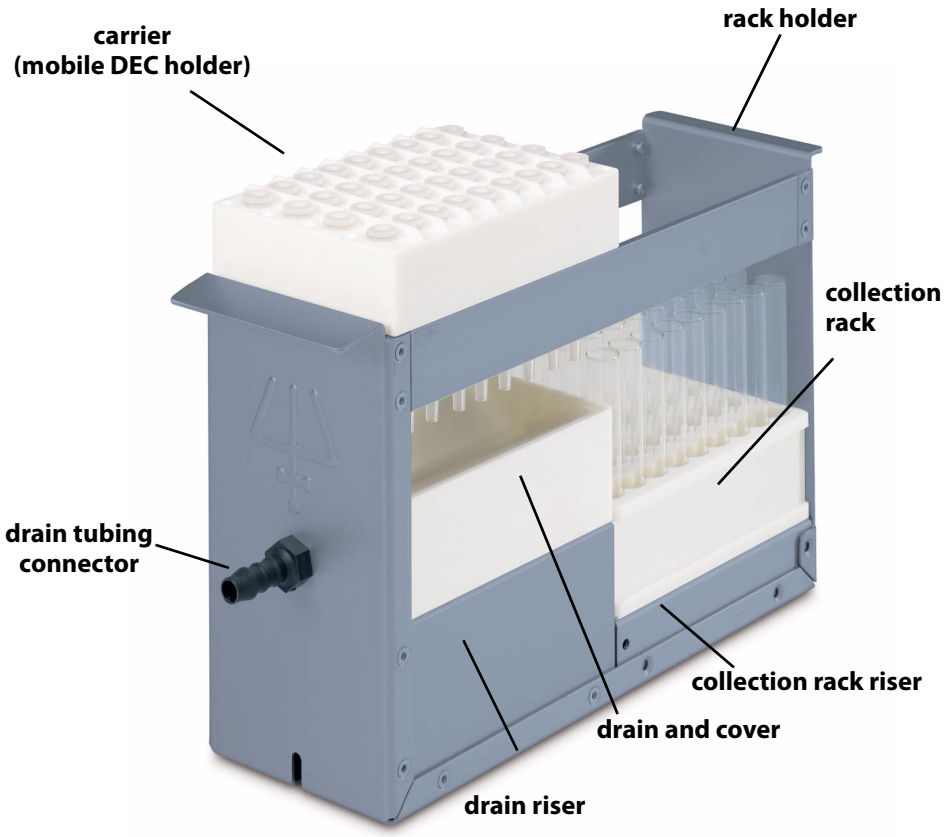
When the DEC holder is in the rear position, the SPE columns are over the collect tubes. Liquids are collected or eluted into the collect tubes.

DEC Racks

Three types of DEC racks are available:

- Code 371 for 1 mL SPE columns (included in the 1 mL DEC accessory kit, part number 2604701, ordered separately)
- Code 373 for 3 mL SPE columns (included in the 3 mL DEC accessory kit, part number 2604702, ordered separately)
- Code 376 for 6 mL SPE columns (included in the 6mL DEC accessory kit, part number 2604703, ordered separately)

Refer to the diagram below for the components of a DEC rack



Note: The Code 376 rack does not use a collection rack riser.

DEC Accessory Kits

1 mL DEC accessory kit (part number 2604701) includes the following:

- Code 371 rack (qty 3)
- Caps, natural PE, for 1 mL column, 1000/pkg (qty 1)
- Tubes, 12 x 75 mm, 5mL, glass, 250/pkg (qty 2)
- Rack solvent bottles 4 probe (qty 1)
- Tubes, polypropylene 12 x 75 mm 5 mL 125/pkg. (qty 4)
- Bottle, solvent, 500 mL, 4/pkg. (qty 1)
- Bottle, solvent, 700 mL, 4/pkg. (qty 1)
- Tube, Viton .313 ID x .438 OD 20 ft. (qty 1)

3 mL DEC accessory kit (part number 2604702) includes the following:

- Code 373 rack (qty 3)
- Caps, natural PE, for 3 mL column, 1000/pkg (qty 1)
- Tubes, 12 x 75 mm, 5mL, glass, 250/pkg (qty 2)
- Rack solvent bottles 4 probe (qty 1)
- Tubes, polypropylene 12 x 75 mm 5 mL 125/pkg. (qty 4)
- Bottle, solvent, 500 mL, 4/pkg. (qty 1)
- Bottle, solvent, 700 mL, 4/pkg. (qty 1)
- Tube, Viton .313 ID x .438 OD 20 ft. (qty 1)

6 mL DEC accessory kit (part number 2604703) includes the following:

- Code 376 rack (qty 3)
- Tubes, 15 x 85 mm, 10 mL, glass, 1000/pkg. (qty 2)
- Sealing caps, 6 mL DEC, polyeth, 1000/pkg. (qty 1)
- Rack solvent bottles 4 probe (qty 1)
- Tubes, polypropylene 10 mL 500/pkg. (qty 1)
- Bottle, solvent, 500 mL, 4/pkg. (qty 1)
- Bottle, solvent, 700 mL, 4/pkg. (qty 1)
- Tube, Viton .313 ID x .438 OD 20 ft. (qty 1)

DEC Rack Setup

Refer to the diagram on page 2-29 for the components of a DEC rack.

Warning! The tips of the SPE columns must not touch the tops of the collection tubes

To assemble the DEC racks:

1 Fit one end of a length of Viton drain tubing (part number 4701483630) to the drain tubing connector, and put the other end in a suitable receptacle.

2 Place the collection tubes in the collection rack.

3 Put the SPE columns into the mobile DEC holder, checking that all columns are installed correctly.

   This is done by standing the DEC holder on the bench and inserting the columns into the holes into the DEC holder one-by-one. When correctly installed, the supporting flange at the top of each column must be flat against the upper surface of the DEC holder and the tip of each column must almost touch (within 0.5 mm or less) the surface of the bench. If this is not the case, check that the feet fitted to the DEC holder are of the correct length.

4 Fit caps of the appropriate size to the DECs.

5 Replace the carrier on top of the frame and check that it moves freely along the frame. You must install collection tubes that are suitable for the size of SPE column in use.

DEC Rack Installation

DEC Racks require a Code 20-series tray insert.

To install a DEC rack on the tray insert:

1 Orient the rack so that the code number is facing forward.

2 Locate the middle slot on the back of the rack. Slide this over the raised tab on the tray insert.

3 Fit the middle slot on the front of the rack over the raised tab in the front of the tray insert.

Solvent Bottle Rack Installation

A solvent bottle rack is included in each DEC accessory kit.

To install a solvent bottle rack refer to **Solvent Bottle Rack Installation** on page 2-7

Plumbing Connections

The tables and diagrams in the following sections provide detailed information on making plumbing connections.

- For the GX-271 ASPEC™ and 406 Syringe Pump refer to **Inlet and Transfer Tubing Installation—GX-271 ASPEC** on page 2-33
- For the rinse station (optional) refer to **Rinse Station Plumbing** on page 2-38
- For the GX Direct Injection Module (optional) refer to **GX Direct Injection Module Plumbing (Optional)** on page 2-39
- For the GX Rinse Pump (optional) refer to **GX Rinse Pump Plumbing (Optional)** on page 2-42

Inlet and Transfer Tubing Installation—GX-271 ASPEC

Before making the connections, locate one of the following plumbing packages (ordered separately):

- TheGX-271 ASPEC plumbing package, 5 mL (part number 2644700). This package includes the items listed below.

Part number	*Qty.*	*Description*
499484021	1	Solvent inlet tubing
499671142	1	Transfer tubing, 5 mL
4996752	1	Pressure sensor to valve tubing assembly
49967722	1	Pump to probe tubing assembly

- The GX-271 ASPEC plumbing package, 10 mL (part number 2644701). This package includes the items listed below.

Part number	*Qty.*	*Description*
499484021	1	Solvent inlet tubing
499672282	1	Transfer tubing, 10 mL
4996752	1	Pressure sensor to valve tubing assembly
49967722	1	Pump to probe tubing assembly

- The GX-271 ASPEC plumbing package, 25 mL (part number 2644702). This package includes the items listed below.

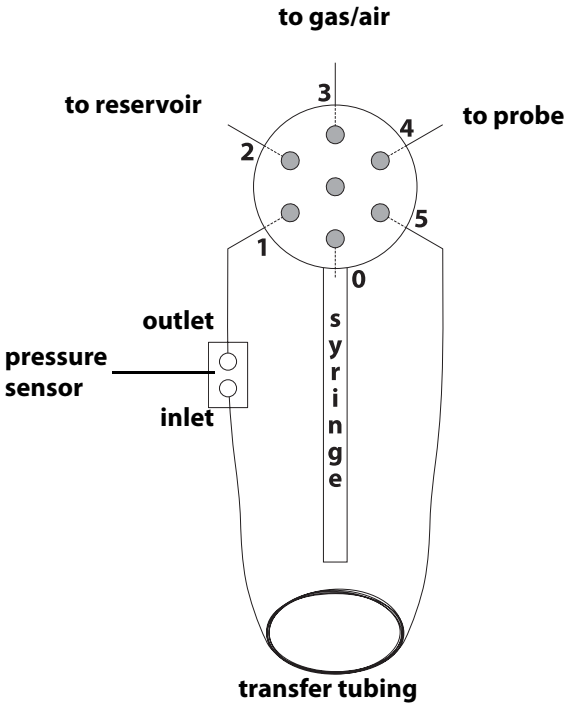
Part number	*Qty.*	*Description*
499484021	1	Solvent inlet tubing
4996757021	1	Transfer tubing, 25 mL
4996752	1	Pressure sensor to valve tubing assembly
49967722	1	Pump to probe tubing assembly

To make air or gas connections the following plumbing package must also be ordered.

- GX-271 ASPEC air-gas plumbing package (part number 2644703)

Air or gas configuration

Refer to the following diagram and table for instructions on making the plumbing connections for an air or gas configuration.

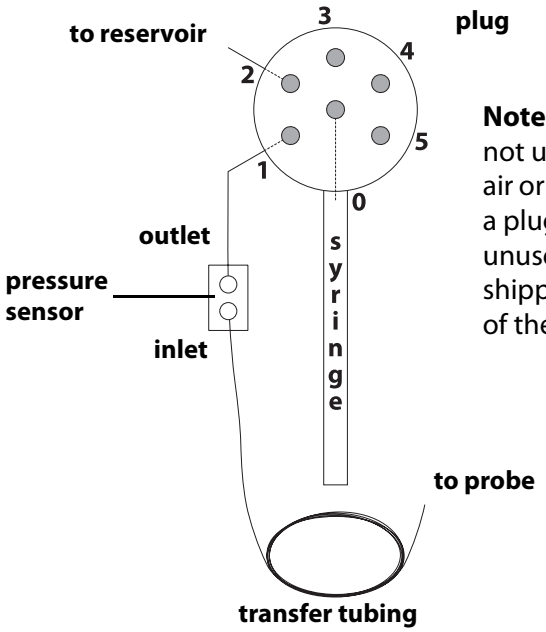


Air/Gas Configuration		
406 Syringe Pump	**Tubing**	**Connections**
Port 0 (syringe)		
Port 1 to pressure sensor outlet	**Pressure sensor to valve tubing (part number 4996752)**	
	4.5 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to port 1 on the 406 Syringe Pump and the other end to the pressure sensor outlet.
Port 2 to reservoir	**Solvent inlet tubing (part number 499484021)**	
	40 inches of Teflon tubing (0.085" ID x 1/8" OD)	Connect the end of the tubing with the fitting attached to port 2 on the 406 Syringe Pump.

Air/Gas Configuration		
406 Syringe Pump	**Tubing**	**Connections**
Port 3 to gas	**GX-271 Air-Gas plumbing package (part number 2644703)**	
	Polyurethane tubing (5/64" ID x 1/8" OD)	Refer to page 2-43 for details on making these connections.
Port 4 to probe	**Pump to probe tubing (part number 49967722)**	
	72 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect the end with the nut and ferrule to port 4 and connect the end with the headless nut to the probe.
Port 5 to pressure sensor inlet	**Note:** It is recommended to store the excess transfer tubing under the syringe pump.	
	5 mL transfer tubing (part number 499671142)	
	101 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to port 5 on the 406 Syringe Pump and the other end to the pressure sensor inlet.
	10 mL transfer tubing (part number 499672282)	
	202 inches (19 feet) of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to port 5 on the 406 Syringe Pump and the other end to the pressure sensor inlet.
	25 mL transfer tubing (part number 4996757021)	
	505 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to port 5 on the 406 Syringe Pump and the other end to the pressure sensor inlet.

No air or gas connection

Refer to the following diagram and table for instructions on making the plumbing connections for a standard configuration (no gas or air connections).



Note: Ports 3, 4, and 5 are not used when there is no air or gas connected. Place a plug in each of the unused ports. The 406 is shipped with plugs in each of the ports.

No Air or Gas Connection		
406 Syringe Pump	**Tubing**	**Connections**
Port 0 (syringe)		
Port 1 to pressure sensor outlet	**Pressure sensor to valve tubing (part number 4996752)**	
	4.5 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to port 1 on the 406 Syringe Pump and the other end to the pressure sensor outlet.
Pressure sensor inlet to probe	**Note:** The transfer tubing is coiled. In order to connect one end of the tubing to the probe, the clips that hold the tubing will need to be cut. After the connection to the probe has been made, it is recommended to re-coil the transfer tubing and place the excess tubing under the syringe pump.	
	5 mL transfer tubing (part number 499671142)	
	101 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to the pressure sensor inlet and the other end to the probe.
	10 mL transfer tubing (part number 499672282)	
	202 inches (19 feet) of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to the pressure sensor inlet and the other end to the probe.
	25 mL transfer tubing (part number 4996757021)	
	505 inches of Teflon FEP tubing (0.062" ID x 1/8" OD)	Connect one end to the pressure sensor inlet and the other end to the probe.
Port 2 to reservoir	**Solvent inlet tubing (part number 499484021)**	
	40 inches of Teflon tubing (0.085" ID x 1/8" OD)	Connect the end of the tubing with the fitting attached to port 2 on the 406 Syringe Pump.

Rinse Station Plumbing

To attach tubing to the drain:

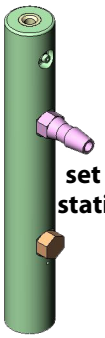
1 Locate the Tygon drain tubing (part number 470331206) included with the rinse station.

2 Connect the drain tubing to the barbed union on the rinse station.

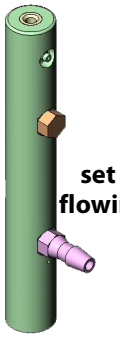
3 If you are using a GX Rinse Pump, refer to the instructions on page 2-42.

drain/rinse station for inside rinse of probe

Install the drain/rinse station in the back position on the tray insert.



set up for static rinse



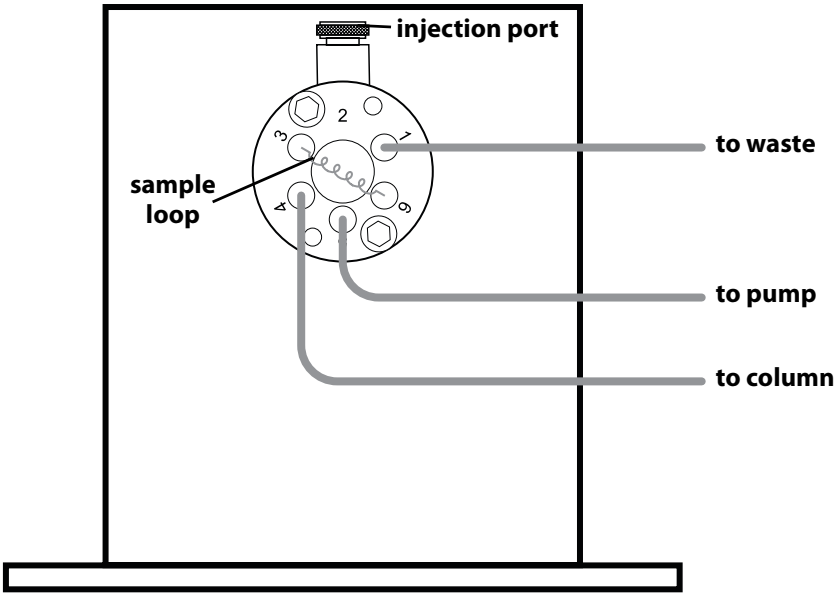
set up for flowing rinse

rinse station for outside rinse of probe

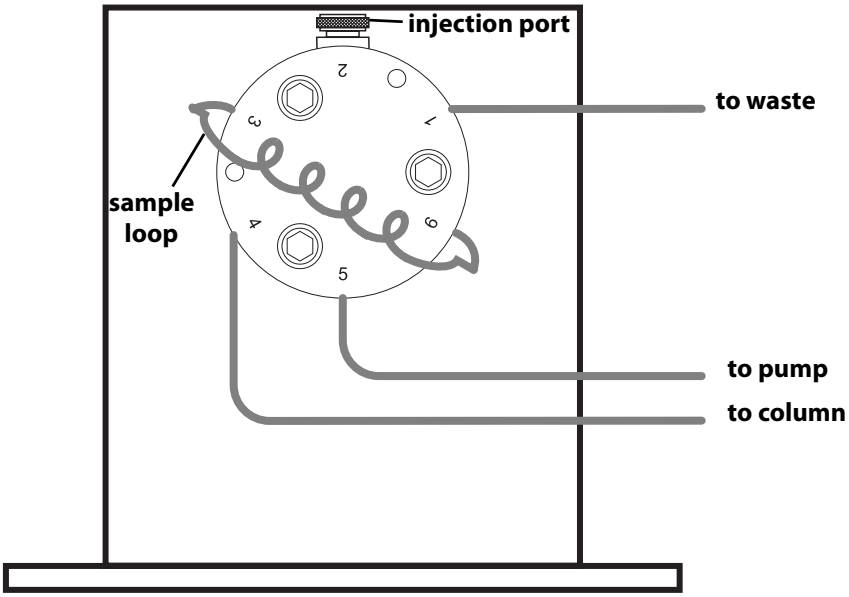
Install the outside rinse stations in the first two positions on the tray insert.

GX Direct Injection Module Plumbing (Optional)

This section will take you through the steps for plumbing the GX Direct Injection Module.



GX Direct Injection Module for 1/16" OD Sample Loop



GX Direct Injection Module for 1/8" OD Sample Loop

Before making the tubing connections, locate the Plumbing Package for the GX Direct Injection Module (part number 26035470) which contains the following:

Part number	*Qty*	*Description*
490318041		MZN1PK nut
490318051		ZF1PK ferrule
495033		Teflon tubing, 0.020" ID x 1/16" OD

The following table contains detailed information on making plumbing connections for the GX Direct Injection Module.

GX Direct Injection Module	Tubing	Connections
Port 1 to waste	Teflon tubing, 0.020" ID x 1/16" OD (part number 495033)	Use an MZN1PK 1/16" nut (part number 490318041) and a ZF1PK 1/16" ferrule (part number 490318051) to connect the tubing to port 1 on the valve.
Port 2=injection port	N/A	Injection port for 1.3 mm OD probe (part number 26035410) **or** Injection port for 1.5 mm OD probe (part number 26035411)
Port 3 to port 6	sample loop	
Port 4 to column		Use an MZN1PK 1/16" nut (part number 490318041) and a ZF1PK 1/16" ferrule (part number 490318051) to connect the tubing to port 4 on the valve.

GX Direct Injection Module	Tubing	Connections
Port 5 to pump		Use an MZN1PK 1/16" nut (part number 490318041) and a ZF1PK 1/16" ferrule (part number 490318051) to connect the tubing to port 5 on the valve.
Port 6 to port 3	sample loop	

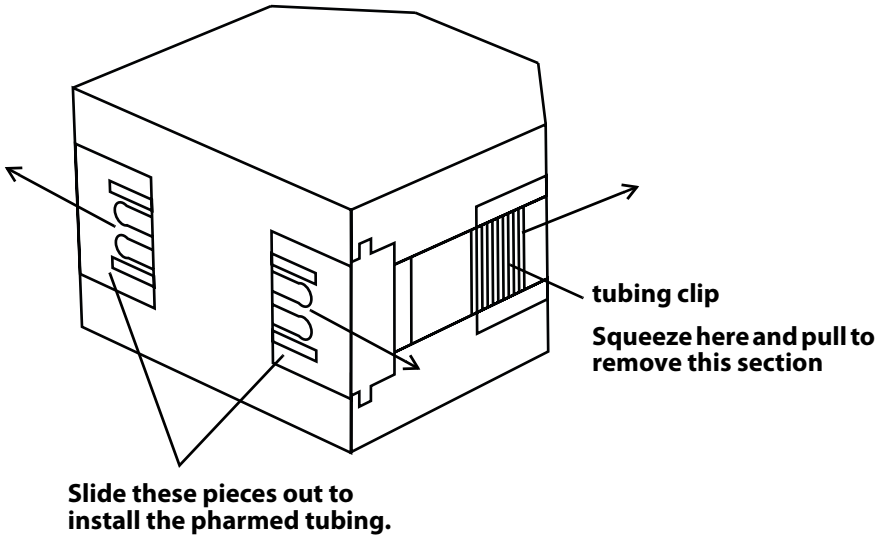
GX Rinse Pump Plumbing (Optional)

Locate the following tubing included with the rinse pump:

- 2.0 mm ID pharmed tubing assembly (part number 26035221)
- 1/16" ID x 3/16" OD neoprene tubing (part number 4715187060)

To install the tubing:

1 Remove the tubing clip from the top of the rinse pump by squeezing the sides and then pulling it out.

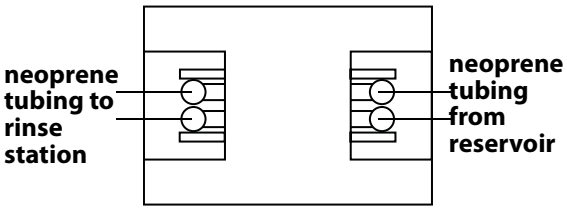


2 Remove the two pieces from the side of the pump head. Store the pieces for future use. Place one end of the pharmed tubing assembly in the left side of the pump head and snap into place.

3 Place the other end of the pharmed tubing assembly in the right side of the pump head and snap into place.

4 Replace the tubing clip.

5 Connect a length of neoprene tubing to the top barbed fitting on the right side and place the other end in a reservoir.



6 Connect a length of neoprene tubing to the top barbed fitting on the left side to the rinse station.

7 Repeat steps 6 and 7 for the bottom set of fittings.

Gas/Air Supply Connections—GX-271 ASPEC™

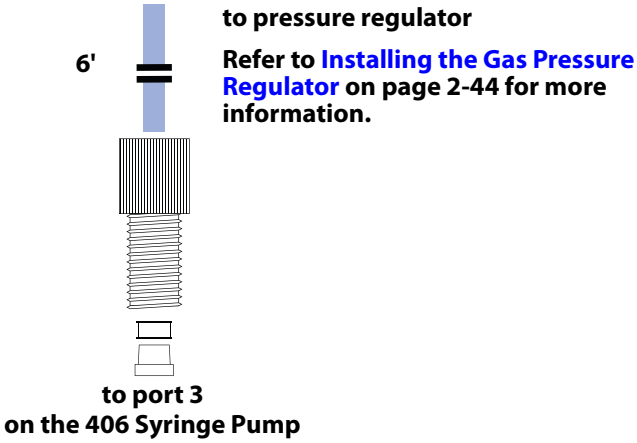
Tubing Connections

The GX-271 ASPEC air-gas plumbing package (part number 2644703, ordered separately) includes the following:

Part number	*Qty.*	*Description*
4713125026	6 ft	Blue polyurethane tubing (5/64" ID x 1/8" OD)
49041027	1	Upchurch P-359 Super Flangeless™ Ferrule, 1/8", TEFZEL® (ETFE) with ring, yellow
490410332	1	Upchurch P-331 Super Flangeless™ Nut, 1/8", 1/4-28, PEEK™, natural

1 Install the nut and ferrule on one end of the tubing.

2 Connect the other end to the pressure regulator. Refer to the diagram below for more information.



Installing the Gas Pressure Regulator

The SPE pressure regulator (part number 25051376, ordered separately) includes the following:

- pressure regulator with attached bracket
- truss head screw
- hex nut
- lock washer
- double cable clamp

To install the pressure regulator:

1 Attach the double cable clamp to the bracket using the screw, hex nut, and washer.

2 Attach the double cable clamp to the cable support rod.

3 Use the appropriate tubing and fittings to connect the gas pressure regulator to your gas supply.

Installing the Z-Arm Cable Support Rod and Spiral Wrap

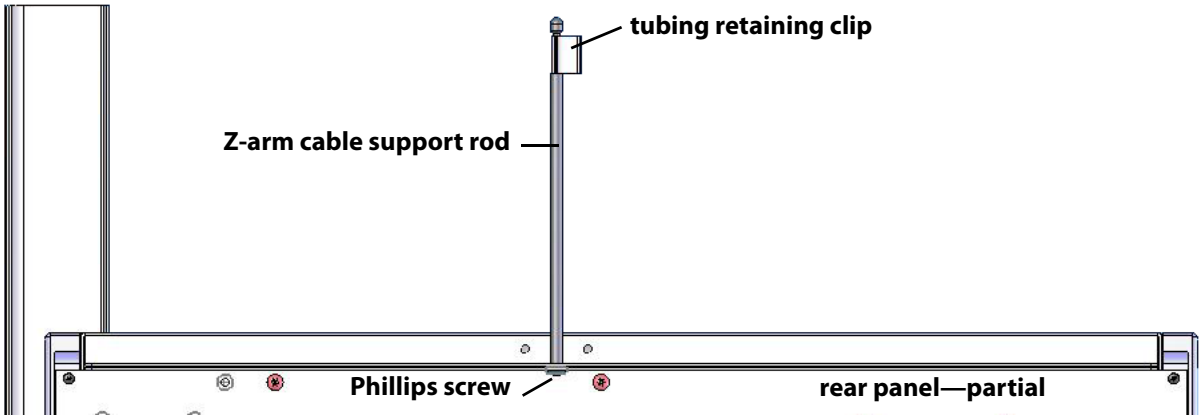
1 Using the Phillips screw included with the Z-arm cable support rod, attach the cable support rod to the rear panel of the instrument. The hole for the screw is located on the rear panel near the top center of the instrument.

2 Snap the Z-arm control cable into the retaining clip on the Z-arm control cable.

3 Use the extra tubing retaining clips to contain the tubing.

Installing spiral wrap

Use the spiral wrap included in the accessory package to contain the tubing.



Shield Installation (Optional)

Refer to the instructions and diagram that follow to install the shield.

1 Locate the GX-27X Shield Kit (ordered separately, part number 2604706).

2 Using a 4 mm Allen wrench, remove the top screw on the left support of the instrument and replace with one of the pivot pins included with the shield.

3 Remove the screw below the one that was just removed and replace it with a pivot pin.

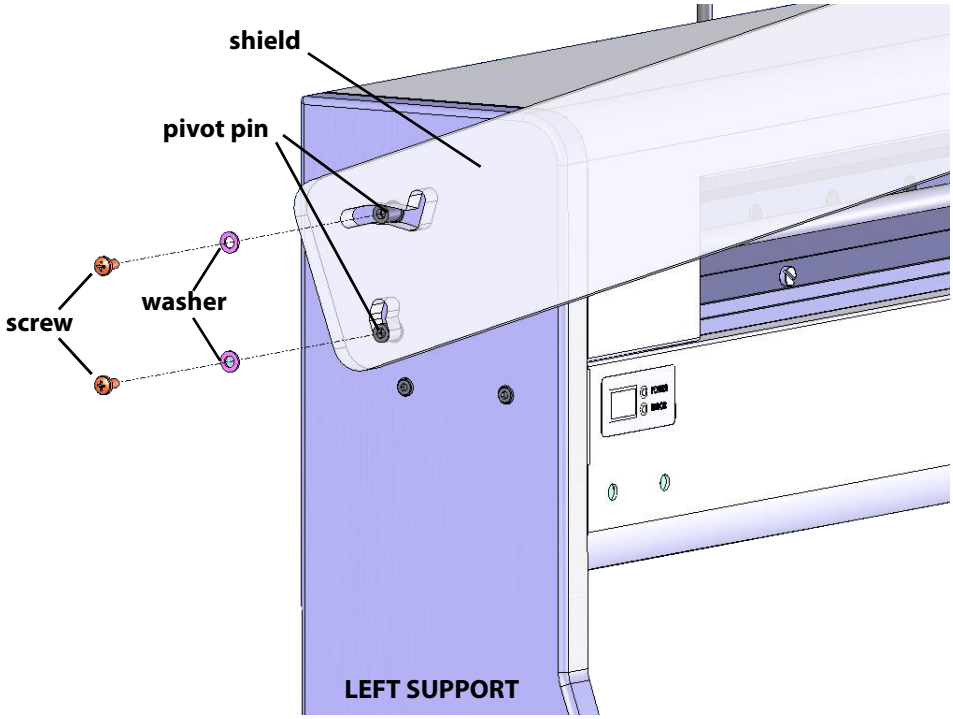
4 Remove the top screw on the right support of the instrument and replace with one of the pivot pins included with the shield.

5 Remove the screw below the one that was just removed and replace it with a pivot pin.

Warning! Remove only one screw at a time from the support of the instrument. Replace each screw with a pivot pin before removing the next screw.

6 Place the shield over the pivot pins on both sides of the instrument.

7 Place a washer and then a screw over each of the pivot pins and then tighten each screw using a Phillips screwdriver.



Final Z-Arm Adjustment

Follow these steps to adjust the Z-arm to the proper height.

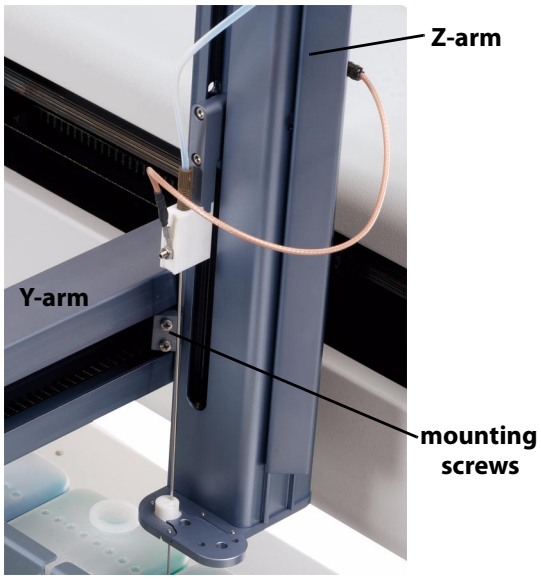
1 Locate the 185 mm Z-height adjustment tool (part number 95260185) that was shipped in the accessory package.

2 Using the 2.5 mm Allen wrench included in the accessory package, loosen the mounting screws on the Z-arm mounting bracket and slightly raise the Z-arm.

3 Place the Z-height adjustment tool under the Z-arm.

4 While holding the adjustment tool in place, use the other hand to lower the Z-arm until it lightly rests on the adjustment tool.

5 Tighten the mounting screws on the Z-arm mounting bracket so the Z-arm is secure.



6 While holding the adjustment tool in place, slide the Z-arm off the tool. Ensure that the bottom of the Z-arm lightly rubs against the adjustment tool as it moves. Repeat steps 2 through 5 until this is true.

Operation 3

Front Panel

The front panel of the instrument contains an LED display, a power indicator light, and an error indicator light.

Power Indicator Light

The green indicator becomes lit when you turn on power to the instrument using the power switch located on the rear panel. Refer to the rear panel diagram on page 2-17 if necessary.

Error Indicator Light

The yellow indicator becomes lit when an error has been encountered. Refer to **Before Calling Us** on page 5-5 for a list of error messages.

Start Up

To start the instrument:

1 Make sure the instrument is connected to a power source.

2 Turn on the instrument using the power switch located on the rear panel. Refer to rear panel diagram on page 2-17 if necessary. The power indicator light on the front panel illuminates.

Running Programs

The instrument is controlled by programs run from a computer.

The following utility program is provided on the GX-27X Series Offset Utility CD (part number 21067529).

- GX-27X Series Offset Utility

Control of the instrument is provided by TRILUTION™ Software.

GX-27X Series Offset Utility

It is recommended to run this utility at time of installation and any time a change is made to the Z-arm such as installing a different probe, changing the clamp height, or installing a different size probe guide insert.

Note: Before beginning this procedure, ensure that plumbing and electrical connections have been made as described in the instrument's user's guide.

The GX-27X Series Offset Utility is supplied on the GX-27X Series Offset Utility CD-ROM located in the offset utility kit (part number 2604710 for the GX-27X ASPEC Offset Utility Kit or part number 2604711 for the GX-27X Liquid Handler Offset Utility Kit). Inspect your GX-27X Series Offset Utility Kit and verify that you have the following:

- GX-27X Series Offset Utility CD-ROM
- 125 mm Offset Tool
- 175/185 mm Offset Tool

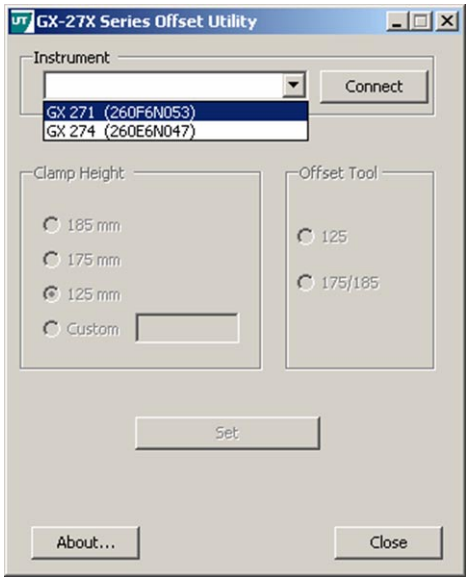
  Note: The GX-27X ASPEC Offset Utility Kit does not include the 125 mm offset tool.

1 Install the GX-27X Series Offset Utility program to your computer.

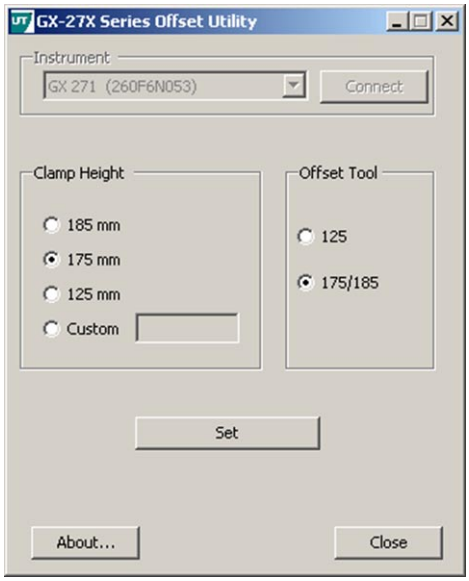
2 Launch the GX-27X Series Offset Utility (located at Start→Programs→Gilson Applications→GX-27X Series→GX-27X Series Offset Utility).

3 The GX-27X Series Offset Utility window will appear.

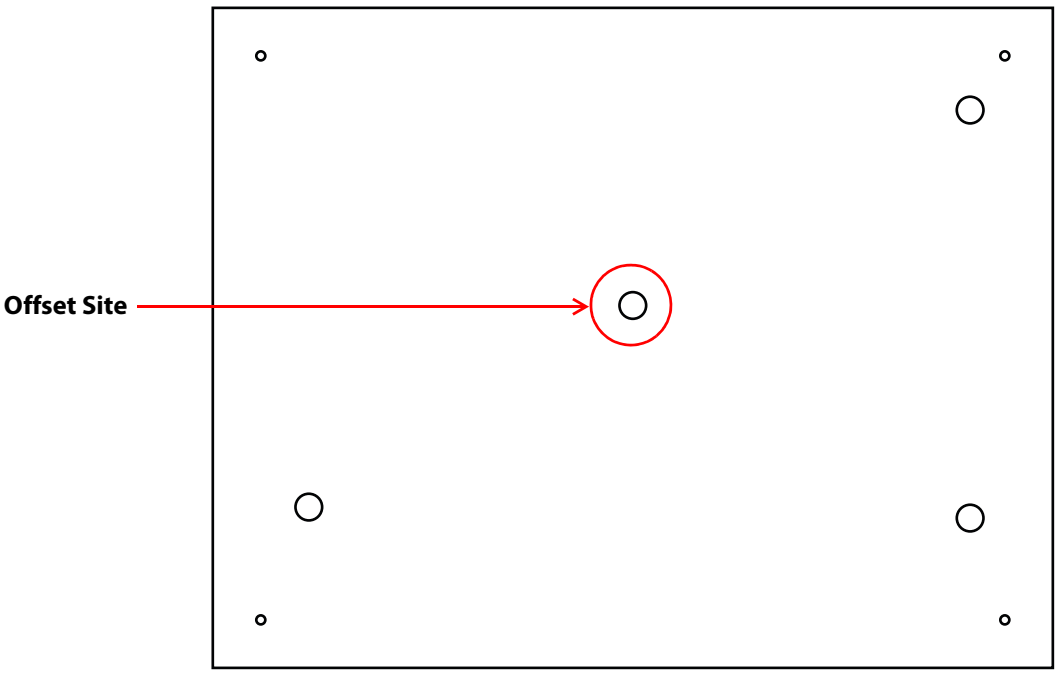
4 Select the instrument and press **Connect**.



5 Select the Clamp Height and the Offset Tool and press **Set**.



6 Place the selected offset tool on the center hole in the tray insert.



7 To move to the XY offset site, press **Move To**.

8 The arm will move to the offset site, and then move the probe 5 mm above the offset tool.

9 Use the Z Nudge arrows to move the probe down.

10 Offset the probe to the center of the offset tool using the XY arrow keys.

11 When the probe is centered, press **Set** to save the X and Y Offsets.

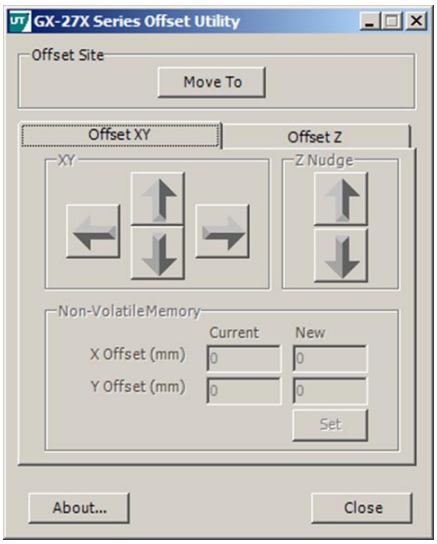
12 Select the Offset Z tab.

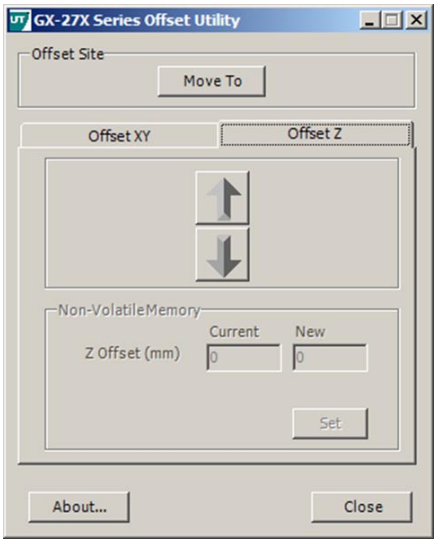
13 To move to the Z offset site, press **Move To**.

14 Use the arrows to align the top of the probe with the top of the offset tool.

15 Press **Set** when this is done to save the Z offset.

16 Close the utility and remove the offset tool.





Maintenance 4

To obtain optimum performance and maximum life from the GX-271 ASPEC™ and 406 Syringe Pump, it is important to keep the system well-maintained.

This section contains some general guidelines that will help you to maintain your system.

Helpful Hints

In order to keep your system at peak performance, Gilson recommends that you do the following:

- Change or clean the piston seals and tubing regularly to maintain maximum syringe pump performance.
- Do not cycle the syringe pump without fluid. Doing this causes excessive piston seal wear.
- Flush the syringe pump, probe housing, and rinse stations daily with distilled or deionized water. On a weekly basis, flush these instruments with a 10% solution of bleach or weak detergent.
- If bubbles remain in the syringe(s) after priming, clean the syringe(s) with alcohol.
- Check periodically to ensure that all fittings are tight.
- Check that each syringe is tight in the syringe pump valve fitting.
- Wipe up all spills immediately.
- Warm fluids to room temperature before running them through the system; cold fluids may cause leakage.

Cleaning

Cleaning the Instruments

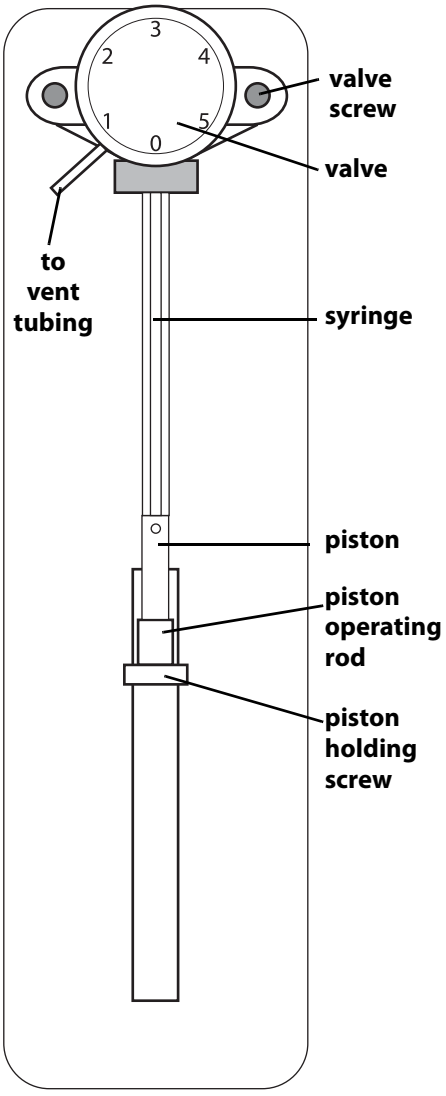
The instruments should be cleaned occasionally using a dry, clean cloth. Or, if necessary, use a cloth dipped in soapy water. If liquid is accidentally spilled on an instrument, wipe it using a dry, clean cloth.

Cleaning the Syringe

Clean a syringe when some or all of the following occurs:

- Corrosive or hazardous liquids have been pumped
- Possible back flow of liquids into the waste tubing
- Leakage
- Aspiration of samples or reagents into the syringe

To clean a syringe, follow the procedures on the next page and use the diagram as a reference.



Removing the syringe

The following procedures use TRILUTION LH Software.

To remove the syringe:

1 Open TRILUTION LH method with 406 Syringe Pump in configuration.

2 Click **Run** to bring up application screen.

3 Select method from drop-down menu.

4 Click **Manual Control** tab. Select Method and click **Go**.

5 After instruments initialize, deselect the syringe not being removed.

6 Disconnect the syringe piston from the piston operating rod by unscrewing the piston holding screw on the underside of the rod.

7 Click **Lower Syringe**.

8 After the syringe has been lowered, unscrew and remove the syringe from the valve.

Cleaning the syringe

Once the syringe has been removed, it can be cleaned:

1 Place the syringe in a beaker containing methanol. Then aspirate and dispense several volumes of methanol through the syringe.

2 Place the syringe in a beaker containing distilled or deionized water. Then aspirate and dispense several volumes of water through the syringe.

3 Hold the syringe housing in one hand. Clean the syringe using a non-abrasive cloth dampened with alcohol. Remove the piston and clean the piston with a non-abrasive cloth dampened with alcohol.

4 Dry the syringe and piston using a clean, lint-free cloth.

Reinstalling the syringe

When the syringe is clean, reinstall it:

1 Fully tighten the syringe into the valve.

2 Click **Raise Syringe**.

3 Firmly tighten the piston holding screw to secure the syringe piston.

Cleaning the Fluid Path

Depending upon your use of the system, it may be necessary to flush the entire fluid path. When flushing the fluid path it is recommended to use a volume that is equal to ten times the syringe volume plus the transfer tubing volume.

flush volume = (10 * syringe volume) + transfer tubing volume

It's important to clean the fluid path if you won't be using the system for a while or if you're using a solution with a high salt concentration for a probe wash or as a diluent. Refer to the instructions below.

1 Prime the fluid path with distilled or deionized water.

2 Flush the fluid path with 30% ethanol. The fluid path has now been cleaned appropriately for weekend storage (or longer).

3 Prime and flush the fluid path with distilled or deionized water before running applications.

Cleaning methods

Depending on the samples or reagents that come into contact with the fluid path, you may need to vary your cleaning methods accordingly. Use the following cleaning protocols as references and make any changes to them as required for the samples and reagents being pumped for your application.

Proteins and peptides

Follow this procedure if the fluid path is in contact with proteins and peptides:

1 Prime the fluid path with distilled or deionized water.

2 Flush the fluid path using a weak detergent solution.

3 Pause the priming sequence.

4 After 30 minutes, resume flushing and priming the fluid path using distilled or deionized water to pump the remaining detergent from the tubing into a waste container.

5 When you're satisfied that the entire fluid path has been flushed with water, end the priming sequence.

Acidic compounds, basic compounds, or salt solutions

Follow this procedure if the fluid path is in contact with acidic compounds, basic compounds, or salt solutions:

1 Prime the fluid path with distilled or deionized water.

2 Flush the fluid path using a 0.1N NaOH solution.

3 Pause the priming sequence.

4 After 10 minutes, resume priming the fluid path using distilled or deionized water. Prime until the fluid path has been flushed with water.

5 Pause the priming sequence.

6 Prime the fluid path using a 0.1N HCl solution.

7 Pause the priming sequence.

8 After 10 minutes, resume priming the fluid path using distilled or deionized water.

Biological fluids

Follow this procedure if the fluid path is in contact with biological fluids such as blood products:

1 Prime the fluid path with distilled or deionized water.

2 Make a solution of 10% bleach by adding one part of commercial bleach to nine parts of water.

3 Flush the fluid path using the bleach solution.

4 Pause the priming sequence.

5 After 30 minutes, resume priming the fluid path using distilled or deionized water to pump the remaining bleach solution from the tubing into a waste container.

Cleaning the Valve—406 Syringe Pump

Clean the syringe pump's valve with a nonabrasive cloth after any of the following situations have occurred:

- Corrosive or hazardous liquids have been pumped
- Possible back flow of liquids into the waste tubing
- Leakage

Removing the valve

To clean the valve, first remove it from the syringe pump:

1 Disconnect the inlet, transfer and vent tubing from the valve.

2 Disconnect the syringe from the valve and remove the valve from the syringe pump as described on page 4-3.

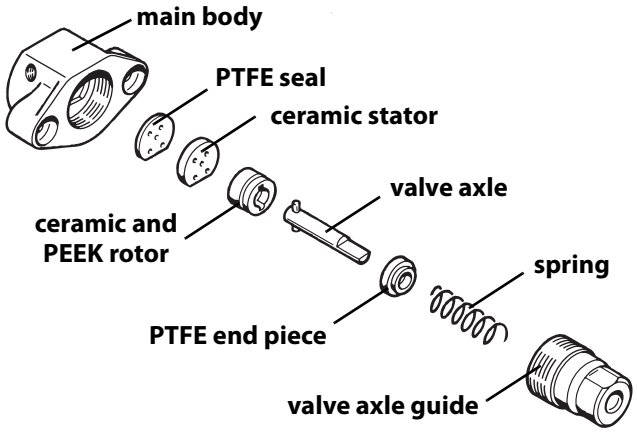
Disassembling the valve

1 Hold the valve body firmly in one hand. Using a 17 mm open-ended wrench, turn the valve axle guide counterclockwise and separate the two halves.

2 Pull the valve axle away from the valve main body.

3 Separate the ceramic stator from the ceramic rotor.

4 Tap the valve axle guide against a solid level surface to remove the spring and PTFE end piece.



Note: Do not remove the ceramic stator from the valve main body.

Cleaning and reinstalling the valve

The disassembled parts of the valve can be cleaned using a non-abrasive cloth dampened with alcohol or by autoclaving.

1 Dry the components using a clean, lint-free cloth.

2 Reassemble the valve parts by reversing the above procedure.

3 Reinstall the syringe and valve by following the instructions on page 4-4.

Replacing Parts

Replacing Tubing

It is important to keep all tubing clean and free of crimps. Tubing that has become dirty, blocked, or crimped can result in poor accuracy and precision, loss of air gap or the syringe stalling.

Replace both the transfer tubing and inlet tubing as needed. See ***Appendix A, Replacement Parts and Accessories*** for part numbers for replacement tubing. For tubing installation procedures, see ***Chapter 2, Installation***.

Replacing the Piston Seal

To change the syringe pump's piston seal, refer to the instructions on the following pages. For part numbers for replacement seals, contact your Gilson-authorized representative.

100 and 250 µL syringes

1 Remove the syringe from the pump as described on page 4-3.

2 Slide the piston out of the syringe barrel.

3 Remove the piston seal from the piston rod by carefully pinching the piston seal with a pair of pliers and gently pulling the piston seal off the piston rod. Take care not to damage the end of the piston rod when removing the seal. (It is possible to remove the seal by pinching it between the thumb and forefinger nails and pulling.)

4 Remove any remaining debris of the original piston seal from the end of the rod.

5 The 100 µL and 250 µL pistons have a narrow rod that may be damaged if handled incorrectly. In order to fit a new piston seal without unduly bending the piston rod, undo the Allen screw that secures the piston button to the piston rod. Slide the button down the piston rod to within 10 mm of the end of the rod where the new piston seal is to be mounted and re-tighten it in position.

6 Put the new piston seal in its recess in the piston seal mounting tool. The 100 µL and 250 µL piston seals use the same tool. One face of the tool has a recess for the 100 µL piston seal, the other face has a recess for the 250 µL piston seal.

7 Hold the piston button and gently push the end of the piston rod into the new piston seal.

8 Remove the piston assembly from the piston seal holder. Slacken the piston button and slide it away from the piston rod.

9 Dip the piston seal in distilled water and slide the piston assembly into the syringe.

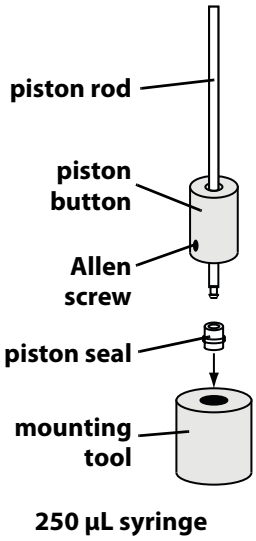
10 Hold the syringe upright with the threaded end of the syringe resting on a flat, clean surface. Slide the piston into the syringe until the piston stops (the seal is level with the end of the syringe).

11 **For the 100 µL piston only**, insert the support collar as shown on the right. The support collar should be replaced after 60 000 strokes.

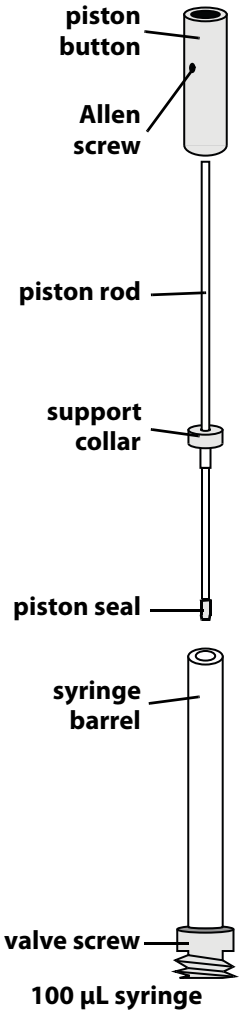
12 Slide the piston button against the body of the syringe and tighten the Allen screw that secures the piston button onto the piston rod.

13 Slide the piston up and down in the syringe five or six times to ensure a smooth operation between the piston and syringe.

14 Remount the syringe on the pump as described on page 4-4.



250 µL syringe



100 µL syringe

500 µL syringes

1 Remove the syringe from the pump as described on page 4-3.

2 Slide the piston out of the syringe barrel.

3 Remove the piston seal from the piston rod by carefully pinching the piston seal with a pair of pliers and gently pulling the piston seal off the piston rod. Take care not to damage the end of the piston rod when removing the piston seal.

4 Remove any remaining debris of the original seal from the end of the piston rod.

5 Put the new piston seal in its recess in the piston seal holding tool.

6 Turn the tool upside down and place the piston assembly as shown in the figure on the left.

7 Slacken the piston button and remove it from the piston rod. Slide the clamping tool down the piston rod and press the two tools firmly against each other. A slight rotation of the clamping tool ensures a correct fitting.

8 Remove the tools away from the piston assembly.

9 Dip the piston seal in distilled water and slide the piston into the syringe.

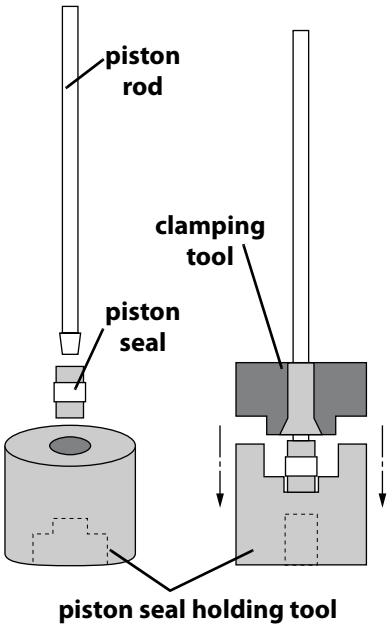
10 Hold the syringe upright with the threaded end of the syringe resting on a flat, clean surface. Slide the piston into the syringe until the piston stops (the seal is level with the end of the syringe).

11 Slide the piston button against the body of the syringe and tighten the Allen screw that secures the piston button onto the piston rod.

12 Slide the piston up and down in the syringe five or six times to ensure a smooth operation between the piston and syringe.

13 Make sure of the presence of the plastic cover when re-mounting the syringe on the pump.

14 Remount the syringe on the pump as described on page 4-4.



1 mL syringes

1 Remove the syringe from the pump as described on page 4-3.

2 Slide the piston out of the syringe barrel.

3 Remove the piston seal from the piston rod by carefully pinching the piston seal with a pair of pliers and gently pulling the piston seal off the piston rod. Take care not to damage the end of the piston rod when removing the piston seal.

4 Remove any remaining debris of the original seal from the end of the piston rod.

5 Put the new piston seal in its recess in the piston seal holding tool.

6 Holding the piston rod firmly, gently push the end of the piston rod into the new piston seal until the rod is clamped in the piston seal.

7 Remove the piston assembly from the holding tool.

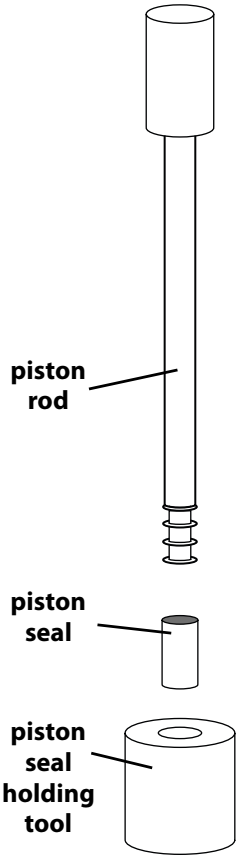
8 Dip the piston seal in distilled water and slide the piston into the syringe.

9 Hold the syringe upright with the threaded end of the syringe resting on a flat, clean surface. Slide the piston into the syringe until the piston stops (the seal is level with the end of the syringe).

10 Slide the piston button against the body of the syringe and tighten the Allen screw that secures the piston button onto the piston rod.

11 Slide the piston up and down in the syringe five or six times to ensure a smooth operation between the piston and syringe.

12 Remount the syringe on the pump as described on page 4-4.



5 mL and 10 mL syringes

1 Remove the syringe from the pump as described on page 4-3.

2 Slide the piston out of the syringe barrel.

3 Remove the piston seal from the shaft by carefully pinching the piston seal with a pair of pliers and gently pulling the piston seal off the shaft. Take care not to damage the end of the shaft when removing the piston seal.

4 Remove any remaining debris of the original piston seal from the end of the shaft.

5 Insert the new piston seal in the recess of the piston seal holder. Make sure that the aperture is facing outward and the O-ring is inside the seal.

6 Place the piston shaft in the piston shaft holder, see diagram below.

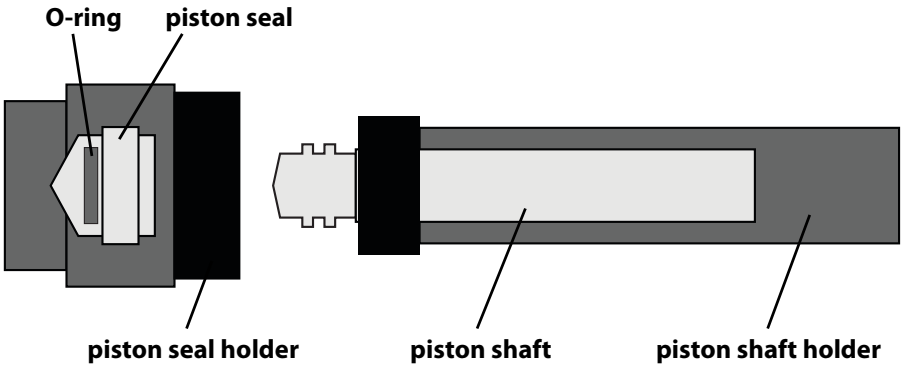
7 Screw the two parts of the tool together until tight.

8 Unscrew the tool, the piston seal should be correctly seated on the shaft.

9 Dip the piston seal in distilled water and slide the piston into the syringe.

10 Slide the piston up and down in the syringe five or six times to ensure a smooth operation between the piston and syringe.

11 Remount the syringe on the pump as described on page 4-4.



25 mL syringes

1 Remove the syringe from the pump as described on page 4-3.

2 Slide the piston out of the syringe barrel.

3 Hold the piston seal firmly in one hand and unscrew the seal from the piston shaft.

4 Screw a new piston seal on the shaft.

5 Slide the piston into the syringe barrel and complete the piston seal fitting by screwing the shaft until the piston seal turns with the piston shaft.

6 Dip the piston seal in distilled water and slide the piston up and down in the syringe barrel five or six times to ensure a smooth movement between the piston and syringe.

7 Remount the syringe on the pump as described on page 4-4.

Replacing the Syringe

If necessary, refer to the diagram on page 4-3 while performing the procedures below. The following procedures use TRILUTION LH Software.

Removing the syringe

To remove the syringe:

1 Open TRILUTION LH method with 406 Syringe Pump in configuration.

2 Click **Run** to bring up application screen.

3 Select method from drop-down menu.

4 Click **Manual Control** tab. Select Method and click **Go**.

5 After instruments initialize, deselect the syringe not being removed.

6 Disconnect the syringe piston from the piston operating rod by unscrewing the piston holding screw on the underside of the rod.

7 Click **Lower Syringe**.

8 After the syringe has been lowered, unscrew and remove the syringe from the valve.

Mounting new syringe

1 Fully tighten the syringe into the valve.

2 Click **Raise Syringe**.

3 Firmly tighten the piston holding screw to secure the syringe piston.

Replacing the Valve

To replace a valve on the syringe pump, follow the instructions below. If necessary, refer to the syringe pump diagram on page 4-3.

1 Disconnect the inlet, transfer and vent tubing from the valve.

2 Disconnect the syringe from the syringe pump. Refer to the procedure for replacing the syringe on page 4-14.

3 Remove the two screws securing the valve to the syringe pump and then remove the valve.

4 Fully tighten the valve screws to secure the replacement valve.

5 Re-install the syringe. Refer to the procedure for mounting new syringe on page 4-14.

6 Reconnect the inlet, transfer and vent tubing to the newly installed valve.

Replacing the Probe

Refer to the appropriate instructions below depending on whether you're replacing the probe with one of the same type or one of a different type.

Installing same type of probe

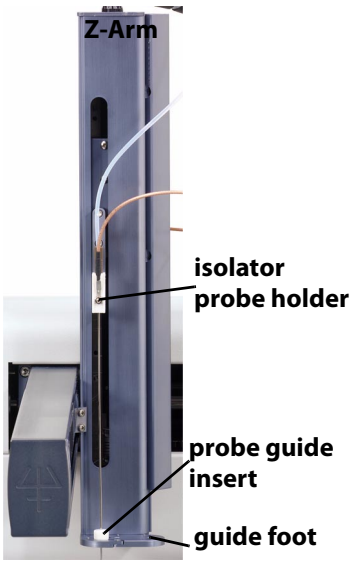
To install a replacement probe of the same type that's currently installed:

1 Remove the transfer tubing's fitting connected to the top of the isolator probe holder.

2 Grasp the current probe and push it up through the top of the isolator probe holder.

3 Install the new probe by pushing it through the top of the isolator probe holder. Make sure the tip of the probe sits inside the probe guide.

4 Replace and tighten the fitting.



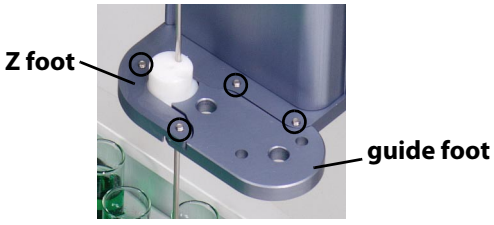
Installing different type of probe

To install a replacement probe with a different outer diameter than is currently installed, you'll need a probe guide insert appropriate for the new probe.

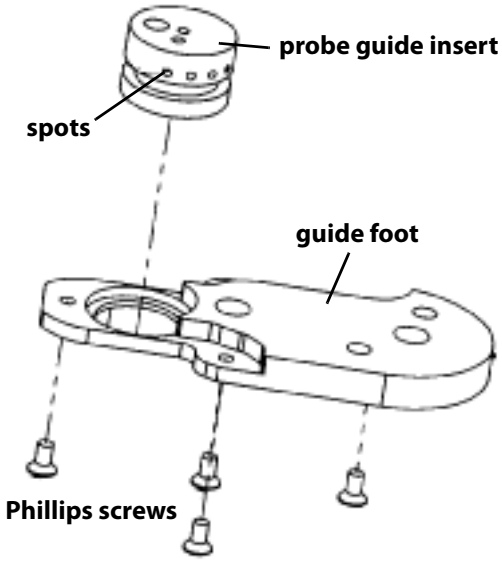
1 Remove the transfer tubing's fitting connected to the top of the isolator probe holder.

2 Grasp the current probe and push it up through the top of the isolator probe holder.

3 Using a Phillips screwdriver, remove the four screws from the bottom of the guide foot. Remove the guide foot.



4 Remove the current probe guide insert and replace it with the new probe guide insert.



5 Place the guide foot below the Z foot and secure it using the screws.

6 Install the new probe by pushing it through the top of the isolator probe holder. Make sure the tip of the probe sits inside the probe guide insert.

7 Replace and tighten the fitting.

Installing the Probe

Insert the probe into the top of the isolator probe holder and pull it through the holder until the tip of the probe is in the probe guide insert.

Replacing a Fuse

A blown fuse may indicate the existence of another problem in the instrument. If the replacement fuses blow, don't try others. Contact your Gilson-authorized representative. See **Before Calling Us** on page 5-5.

To change a fuse, follow these steps.

1 Disconnect the power cord from the power outlet and from the rear panel receptacle.

2 Locate the fuse drawer on the rear panel. See page 2-17 if necessary.

3 Insert a small screwdriver into the notch under the fuse drawer.

4 Using the screwdriver, lift up to remove the fuse drawer. The fuse drawer contains one 2.5A "T" Slo-Blo fuse (5 x 20 mm size) for a 100–120 voltage selection. It contains two 2.5A fuses for a 220–240 voltage selection.

5 Remove the old fuse(s) and insert the new fuse(s).

6 Insert the fuse drawer into its receptacle in the instrument.

Transporting the Instrument

When moving the instrument to another location or when sending it back to the factory, do not use the Y-arm as a handle. Always lift the instrument from the base.

Troubleshooting 5

Error Messages

Error	*Error Text*
0	no error
10	Unknown command
11	Invalid NV-RAM address
12	Safety contact closed
13	Invalid command parameter
14	S buffer overflow
15	S command while unhomed
19	X encoder error
20	Y encoder error
21	X homing error
22	Y homing error
23	XY target out of range
24	XY speed invalid
25	X stall or jam
26	Y stall or jam
27	XY move while unhomed
28	XY move while busy
29	Park location invalid
31	Z homing error
32	Z target out of range
33	Z speed invalid
34	Z stall or jam
35	Z move while unhomed
36	Z move while busy

Mechanical

Probe no longer finding tube center

- Probe may be bent. Straighten or replace the probe.
- The instrument may need X/Y/Z adjustment. Follow the procedure in **GX-27X Series Offset Utility** on page 3-5.

Electrical

Input functions not operating

- Make sure connections into terminal block connector are secure.
- Make sure terminal block connector is secure in input/output port.
- Check connections for proper pin assignments.
- Be sure pins from external devices are assigned correctly.
- Check polarity of input. Inputs should be a contact closure. If not, it must be TTL level (logic 0 activates).
- Confirm that source supplying input to the instrument is working.

Output functions not operating

- Make sure connections into terminal block connector are secure.
- Make sure terminal block connector is secure in the input/output port.
- Check connections for proper pin assignments.
- Output from the instrument should be compatible with device to which it is interfaced. Outputs are contact closures.

Unit not operational

- Make sure power is turned on.
- Check AC power cord connections.
- Try different AC outlet.
- Check fuse(s); replace if necessary.
- Check all electrical connections and make sure that the unit is plugged in.

Unit blows fuses

- Contact your Gilson-authorized representative.

Repair and Return Policies

Before Calling Us

Gilson-authorized representatives will be able to serve you more efficiently if you have the following information:

- the serial number and model number of the instruments involved. Refer to the table for the location of the serial number.

Item	Serial Number Location
GX-271 ASPEC™	Inside the left support, near the top
Z-arm	Back side, at the top
GX Direct Injection Module	Right side
GX Rinse Pump	Right side
406 Single Syringe Pump	Rear panel, near the bottom

- the installation procedure you used
- list of concise symptoms
- list of operating procedures and conditions you were using when the problem arose
- list of other devices connected to the instrument and a description of those connections
- list of other electrical connections in the room

Warranty Repair

Units covered under warranty will be repaired and returned to you at no charge. If you have any questions about applicability, please contact your local distributor.

Non-Warranty Repair

For out-of-warranty repairs, contact your local distributor. A Customer Service representative will discuss service options with you and can assist in making arrangements to return the equipment, if necessary.

Rebuilt Exchange

For some units, rebuilt exchange components are available. Contact your local distributor for details.

Return Procedure

Contact your local distributor's Customer Service Department to obtain authorization before returning any Gilson equipment. To return a piece of equipment:

- Carefully pack the unit to prevent damage in transit. Check with your distributor regarding proper method of shipment. No responsibility is assumed by Gilson or your distributor for damage caused by improperly packaged instruments. Indicate the authorization on the carton and on the packing slip.
- Always insure for the replacement value of the unit.
- Include a description of symptoms, your name, address, phone number, and purchase order to cover repair costs, return and shipping charges, if your institution requires it.

Unit End-of-Life

When a unit reaches the end of its useful life, refer to www.gilson.com for directions and information on the end-of-life policy. This is in accordance with the European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Replacement Parts and Accessories A

Probes for ASPEC (185 mm Clamp Height)

Part Number	*Description*
2507249	Non septum-piercing probe, conical tip, micro volume, stainless steel. Dimensions: 269 x 1.5 x 0.4 mm ID
27067383	Probe, septum-piercing, 221 x 1.5 x 0.4 mm, bevel tip, grooved, 28.73 µL volume
27067361	Non septum-piercing probe; bevel tip, capacitive level-sensing, stainless steel. Dimensions: 220.5 x 1.5 x 1.1 mm ID.
27067373	Non septum-piercing probe; constricted tip, capacitive level-sensing, stainless steel. Dimensions: 221 x 1.5 x 1.1 mm ID (tip dimensions: 2 x 1.1 x 0.4 mm ID).
27067374	Non septum-piercing probe; constricted bevel tip, capacitive level-sensing, stainless steel. Dimensions: 221 x 1.5 x 1.1 mm ID (tip dimensions: 2 x 1.1 x 0.4 mm ID).

Probe Guide Inserts

Part Number	*Description*
26046215	Probe guide insert, 3-way, for 1.5 mm outer diameter probes
26046217	Probe guide insert, 3-way, for 2.3 mm outer diameter probes

Probe Guide Feet

Part Number	*Description*
2604611	Guide foot, GX-271, 1.5 mm
2604613	Guide foot, GX-271, 2.3 mm

Isolator Probe Holder

Part Number	*Description*
2604615	Isolator probe holder, single probe (GX-271)

Rack Accessories

Part Number	*Description*
26041033	Insert for 5 Code 20-series racks (GX-271)

Syringes and Transfer Tubing (406 Syringe Pump)

Part Number	*Description*
25025341	100 µL syringe
25025342	250 µL syringe
25025347	500 µL syringe
25025343	1 mL syringe
25025344	5 mL syringe
25025345	10 mL syringe
25025346	25 mL syringe
2644700	Plumbing package, GX-271 ASPEC, 5 mL
2644701	Plumbing package, GX-271 ASPEC, 10 mL
2644702	Plumbing package, GX-271 ASPEC, 25 mL
2644703	Plumbing package, GX-271 ASPEC, Air-gas

Rinse Stations/Rinse Pump

Part Number	*Description*
26034551	Rinse station for outside rinse of probe, 175 mm
26034555	Drain/rinse station for inside rinse of probe, 175 mm

Sample Loops for GX Direct Injection Module—Prep (1/8")

Part Number	*Description*
494400051	5 mL stainless steel sample loop (1/8" OD) for Valco valves
49440010	10 mL stainless steel sample loop (1/8" OD) for Valco valves
49440020	20 mL stainless steel sample loop (1/8" OD) for Valco valves
49440025	25 mL stainless steel sample loop (1/8" OD) for Valco valves

Sample Loops for GX Direct Injection Module—Prep (1/16")

Part Number	*Description*
494400002	250 µL stainless steel sample loop (1/16" OD) for Valco valves
494400005	500 µL stainless steel sample loop (1/16" OD) for Valco valves
49440001	1 mL stainless steel sample loop (1/16" OD) for Valco valves
49440002	2 mL stainless steel sample loop (1/16" OD) for Valco valves
49440005	5 mL stainless steel sample loop (1/16" OD) for Valco valves

Sample Loops for GX Direct Injection Module—Analytical (1/16") Stainless Steel

Part Number	*Description*
49440003	2 µL stainless steel sample loop (1/16" OD) for Valco valves
49440004	5 µL stainless steel sample loop (1/16" OD) for Valco valves
49440006	10 µL stainless steel sample loop (1/16" OD) for Valco valves
49440007	20 µL stainless steel sample loop (1/16" OD) for Valco valves
49440008	50 µL stainless steel sample loop (1/16" OD) for Valco valves
49440009	100 µL stainless steel sample loop (1/16" OD) for Valco valves
494400002	250 µL stainless steel sample loop (1/16" OD) for Valco valves

Sample Loops for GX Direct Injection Module—Analytical (1/16") Stainless Steel

Part Number	*Description*
494400005	500 µL stainless steel sample loop (1/16" OD) for Valco valves
49440001	1 mL stainless steel sample loop (1/16" OD) for Valco valves
49440002	2 mL stainless steel sample loop (1/16" OD) for Valco valves
49440005	5 mL stainless steel sample loop (1/16" OD) for Valco valves

Sample Loops for GX Direct Injection Module—Analytical (1/16") PEEK

Part Number	*Description*
49440011	2 µL PEEK loop (1/16" OD) for Valco valves
49440012	5 µL PEEK sample loop (1/16" OD) for Valco valves
49440013	10 µL PEEK sample loop (1/16" OD) for Valco valves
49440014	20 µL PEEK sample loop (1/16" OD) for Valco valves
49440015	50 µL PEEK sample loop (1/16" OD) for Valco valves
49440016	100 µL PEEK sample loop (1/16" OD) for Valco valves
49440017	250 µL PEEK sample loop (1/16" OD) for Valco valves
49440018	500 µL PEEK sample loop (1/16" OD) for Valco valves

GX Direct Injection Module Accessories

Part Number	*Description*
26035470	Plumbing package for the GX Direct Injection Module
490318041	Valco MZN1PK PEEK nut (0.062" long) for 1/16" OD tubing, package of 10
4903180411	Valco MZN1PK PEEK nut (0.062" long) for 1/16" OD tubing, 1 each
490318051	Valco ZF1PK PEEK ferrule (1/16"), package of 10
4903180511	Valco ZF1PK PEEK ferrule (1/16"), 1 each
495033	Teflon tubing, 0.020" ID x 1/16" OD
26035410	GX Direct Injection port for 1.3 mm OD probes

GX Direct Injection Module Accessories (Continued)

Part Number	*Description*
26035411	GX Direct Injection port for 1.5 mm OD probes
250510153	Injection port seal for 1.3 mm OD probes
2954674	Injection port seal for 1.5 mm OD probes
26035457	GX Direct Injection Module riser block assembly

Cables and I/O Accessories

Part Number	*Description*
260461126	LLD cable assy, GX-271
36078142	Cat 5e ethernet cable
638306512	Terminal block connector, 6-pin
638308512	Terminal block connector, 8-pin
709910206	2-conductor interconnect wire, 6', for making contact connections
6730254007	Fuse, 2.5 A T-2.5 slo-blo
7080318107	Power cord, 110V
7080316106	Power cord, 220V

Miscellaneous

Part Number	*Description*
95260185	185 mm Z-height adjustment tool
260461	Z-arm
2604706	Shield, GX-27X

ASPEC 1 mL DEC Accessory Kits

Part Number	*Description*
2604701	DEC accy set, 1mL GX ASPEC
2954698	Caps, natural PE, for 1 mL column, 1000/pkg
2954726	Tubes, 12 x 75 mm, 5 mL, glass, 250/pkg
4701438630	Tubing, Viton 0.313 ID x 0.438 OD, 20 ft
543506002	Tubes, polypropylene, 12 x 75 mm, 5 mL, 125/pkg
543701500	Bottle, solvent, 500 mL, 4/pkg
543701700	Bottle, solvent, 500 mL, 4/pkg

ASPEC 3 mL DEC Accessory Kits

Part Number	*Description*
2604702	DEC accy set, 3mL GX ASPEC
2954698	Caps, natural PE, for 1 mL column, 1000/pkg
2954726	Tubes, 12 x 75 mm, 5 mL, glass, 250/pkg
4701438630	Tubing, Viton 0.313 ID x 0.438 OD, 20 ft
543506002	Tubes, polypropylene, 12 x 75 mm, 5 mL, 125/pkg
543701500	Bottle, solvent, 500 mL, 4/pkg
543701700	Bottle, solvent, 500 mL, 4/pkg

ASPEC 6 mL DEC Accessory Kits

Part Number	*Description*
2604703	DEC accy set, 6 mL GX ASPEC
2954729	Tubes, 15 x 85 mm, 10mL, glass, 1000/pkg
2954730	Sealing caps, 6 mL DEC, polyethylene, 1000/pkg
4701438630	Tubing, Viton 0.313 ID x 0.438 OD, 20 ft
543506003	Tubes, polypropylene, 10 mL, 500/pkg
543701500	Bottle, solvent, 500 mL, 4/pkg
543701700	Bottle, solvent, 500 mL, 4/pkg

Racks B

The GX-271 ASPEC™ can be configured with a variety of rack types and sizes. The following pages describe the racks that can be purchased for use on the GX-271 ASPEC. Refer to page 2-27 for rack installation procedures.

Code 20 rack

For 108 tubes

Material: polypropylene

Vessels and maximum capacity: 10 x 100 mm (4.5 mL)

Part number: 150425

Code 21 rack

For 60 tubes

Material: polypropylene

Vessels and maximum capacity: 13 x 100 mm (9 mL)

Part number: 150422

Code 22 rack

For 44 tubes

Material: polypropylene

Vessels and maximum capacity: 18 x 100 mm (25 mL)
18 x 150 mm (32 mL)

Part number: 150424

Code 22U rack

For 44 tubes

Material: polypropylene

Vessels and maximum capacity: 10-18 mm x 100-180mm

Part number: 150498

Code 23 rack

For 44 scintillation vials

Material: polypropylene

Vessels and maximum capacity: 17 x 55 mm (6.8 mL)
17 x 65 mm (8 mL)

Part number: 150426

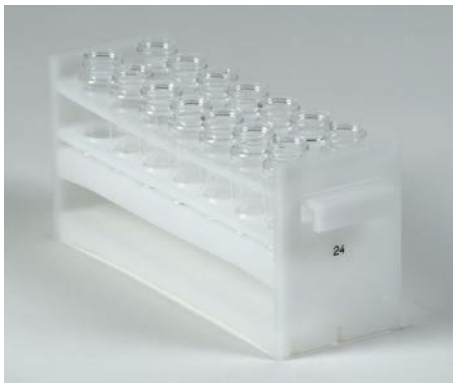
Code 23W rack

For 44 Waters WISP vials

Material: polypropylene

Vessels and maximum capacity: 15 x 45 mm (4 mL)

Part number: 270433



Code 24 rack

For 14 scintillation vials

Material: polypropylene

Vessels and maximum capacity: 28 x 57 mm (20 mL)
28 x 60 mm (20 mL)

Part number: 150427

Code 28 rack

For 108 tubes

Material: polypropylene

Vessels and maximum capacity: 10 x 65 mm (3 mL)
10 x 75 mm (3.5 mL)

Part number: 150420

Code 29 rack

For 60 tubes

Material: polypropylene

Vessels and maximum capacity: 12 x 75 mm (3.5 mL)
12 x 75 mm (5 mL)

Part number: 150429

Code 29LE rack

For 60 Eppendorf vials

Material: polypropylene

Vessels and maximum capacity: Eppendorf vials (1.5 mL)

Part number: 2704342

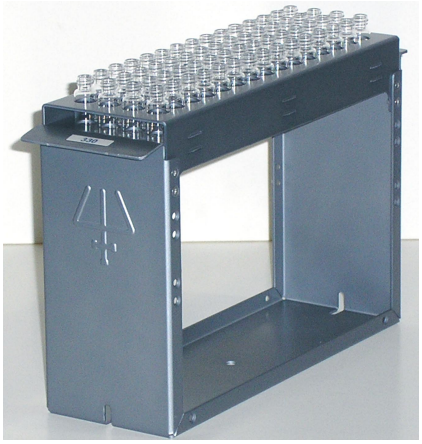
Code 29SE rack

For 60 Eppendorf vials

Material: polypropylene

Vessels and maximum capacity: Eppendorf vials (0.5 mL)

Part number: 2704341



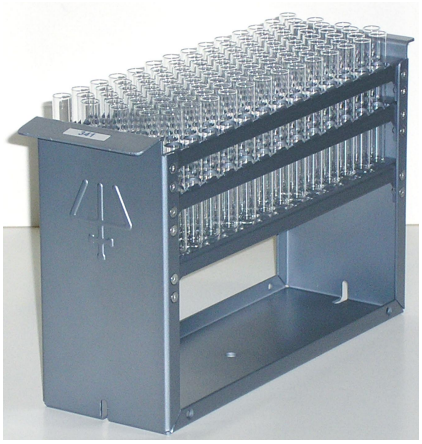
Code 330

For 60 vials

Material: aluminum

Vessels and maximum capacity: 12 x 32 mm

Part number: 260440031



Code 341

For 108 tubes

Material: aluminum

Vessels and maximum capacity: 10 x 75 mm

Part number: 260440039

Code 343

For 80 tubes

Material: aluminum

Vessels and maximum capacity: 13 x 100 mm

Part number: 260440025

Code 345

For 44 tubes

Material: aluminum

Vessels and maximum capacity: 16 x 150 mm

Part number: 260440041

Racks

Code 371

For 36 (1 mL) SPE cartridges and 36 tubes

Material: aluminum

Vessels and maximum capacity: 1 mL SPE cartridges
Collection block holds
12 x 75 mm (5 mL) tubes

Part number: 260440044

Code 373

For 20 (3 mL) SPE cartridges and 20 tubes

Material: aluminum

Vessels and maximum capacity: 3 mL SPE cartridges
Collection block holds
12 x 75 mm (5 mL) tubes

Part number: 260440045

Code 376

For 15 (6 mL) SPE cartridges and 15 tubes

Material: aluminum

Vessels and maximum capacity: 6 mL SPE cartridges
Collection block holds
15 x 85 mm (10 mL) tubes

Part number: 260440046

Materials C

Materials*

Nitronic 60

Chemical resistance is similar to Type 316 stainless, but its resistance to galling and oxidation make it superior to Type 316 or 303 in the majority of applications.

Stainless steel, Type 316

This is the standard tubing material for chromatography, suitable for a wide variety of applications. It is cold drawn seamless, not welded, with close tolerances held on both ID and OD. Type 316 is most commonly used for HPLC because of its superior chloride ion resistance.

PAEK

Polyaryletherketone is the generic name for the family of polyketone compounds. PAEK includes PEK, PEEK, PEKK, and PEKEKK, which differ in physical properties and, to a lesser degree, in inertness.

A range of PAEK-based composites are used for valves and fittings. These composites resist all common HPLC solvents and dilute acids and bases. However, concentrated or prolonged use of halogenated solvents may cause the polymer to swell. Avoid concentrated sulfuric or nitric acids (over 10%).

PEEK

Considered relatively inert and biocompatible, polyetheretherketone tubing can withstand temperatures up to 100°C. Under the right circumstances, 0.005"–.020" ID tubing can be used up to 5000 psi for a limited time, and 0.030" to 3000 psi. Larger IDs are typically good to 500 psi. These limits will be substantially reduced at elevated temperatures and in contact with some solvents or acids.

Its mechanical properties allow PEEK to be used instead of stainless in many situations and in some environments where stainless would be too reactive. However, PEEK can be somewhat absorptive of solvents and analytes, notably methylene chloride, DMSO, THF, and high concentrations of sulfuric and nitric acid. This tubing is highly prone to “kinking,” or sealing off, if held in a sharp bend over time.

Valcon H

This composite, a carbon fiber reinforced, PTFE lubricated inert engineering polymer, has long been the standard for typical HPLC applications in which pressures are around 5000 psi and temperatures are not more than 75°C.

* Information provided by Valco Instruments Company Inc.