

# User's Guide

## ASPEC<sup>®</sup> 271



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# SAFETY

## IN THIS CHAPTER:

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- Lifting | 8
- Voltage | 9
- Probes | 9
- Chemical Hazards | 9
- Replacement Parts | 9

Read this chapter before installing and operating the instrument.

Only trained technical personnel in a laboratory environment may use the instrument for non-medical, liquid handling purposes. For safe and correct use of the instrument, operating and service personnel must follow all instructions contained in this guide when installing, cleaning, and maintaining the instrument. All safety precautions must be observed during all phases of operation, service, and repair of the instrument.

Failure to comply with these precautions or with warnings described in the user's guide violates safety standards of design, manufacture, and intended use of the instrument. Gilson assumes no liability for customers failing to comply with these requirements.

This instrument complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this instrument may not cause harmful interference, and (2) this instrument must accept any interference received, including interference that may cause undesired operation.

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

The instrument has been certified to safety standards required in Canada, Europe, and the United States. Refer to the rear panel label on the instrument and the Declaration of Conformity document for the current standards to which the instrument has been found compliant.



## Electronic and Hazard Symbols

The following electrical and hazard symbols may appear on the instrument or in this document:

SYMBOL	EXPLANATION
	Direct Current
	Alternating Current
	Protective Conductor Terminal
	Electrical Power ON
o	Electrical power OFF
	Caution
	Caution, Risk of Electric Shock
	Fuse

## Safety Notices

The following safety notices may appear in this document:

**WARNING**

WARNING indicates a potentially hazardous situation which, if not avoided, may result in serious injury

**CAUTION**

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

**NOTICE**

NOTICE indicates a potentially hazardous situation which, if not avoided, may result in equipment damage

## Lifting

The instrument exceeds the weight one person can lift safely. Two or more people are required to lift the instrument safely. Always lift the instrument from the base and follow any unpacking instructions provided with the instrument.



## Voltage

Ensure that the rear panel is easily accessible. Detach all sources of voltage from the instrument before the service, repair, or exchange of parts. Use only the grounded AC cord provided. Ungrounded power cords can result in electrical shock and serious personal injury. Use only approved fuses with the specified current rating. The instrument must be operated within the voltage specified on the rear panel of the instrument.

## Probes

Keep clear of the probe while the X/Y/Z arm is in motion to avoid personal injury by piercing and to avoid contact with potentially hazardous substances on the probe.

## Chemical Hazards

Any chemicals used for analysis should be handled according to good laboratory practices. Chemicals should be stored, used, and disposed of in accordance with the manufacturer's specifications, as well as local and national regulations. Potentially hazardous chemicals and dangerous liquids can be used with the instrument. Use care when handling chemicals and solvents. Ensure proper ventilation and wear appropriate personal protective equipment (PPE), such as safety glasses, gloves, etc.

Be sure to follow guidance about exposure to hazardous levels of toxic substances as outlined in any applicable Safety Data Sheet (SDS), or any documentation provided by local governing bodies such as The Health Protection Agency (United Kingdom) or The Occupational Safety and Health Administration (United States).

## Replacement Parts

Be sure to use only replacement parts mentioned in this user's guide. Do not repair or change parts which are not listed in this user's guide. If it is necessary to change parts not listed, please contact your Gilson-authorized representative.



# INTRODUCTION

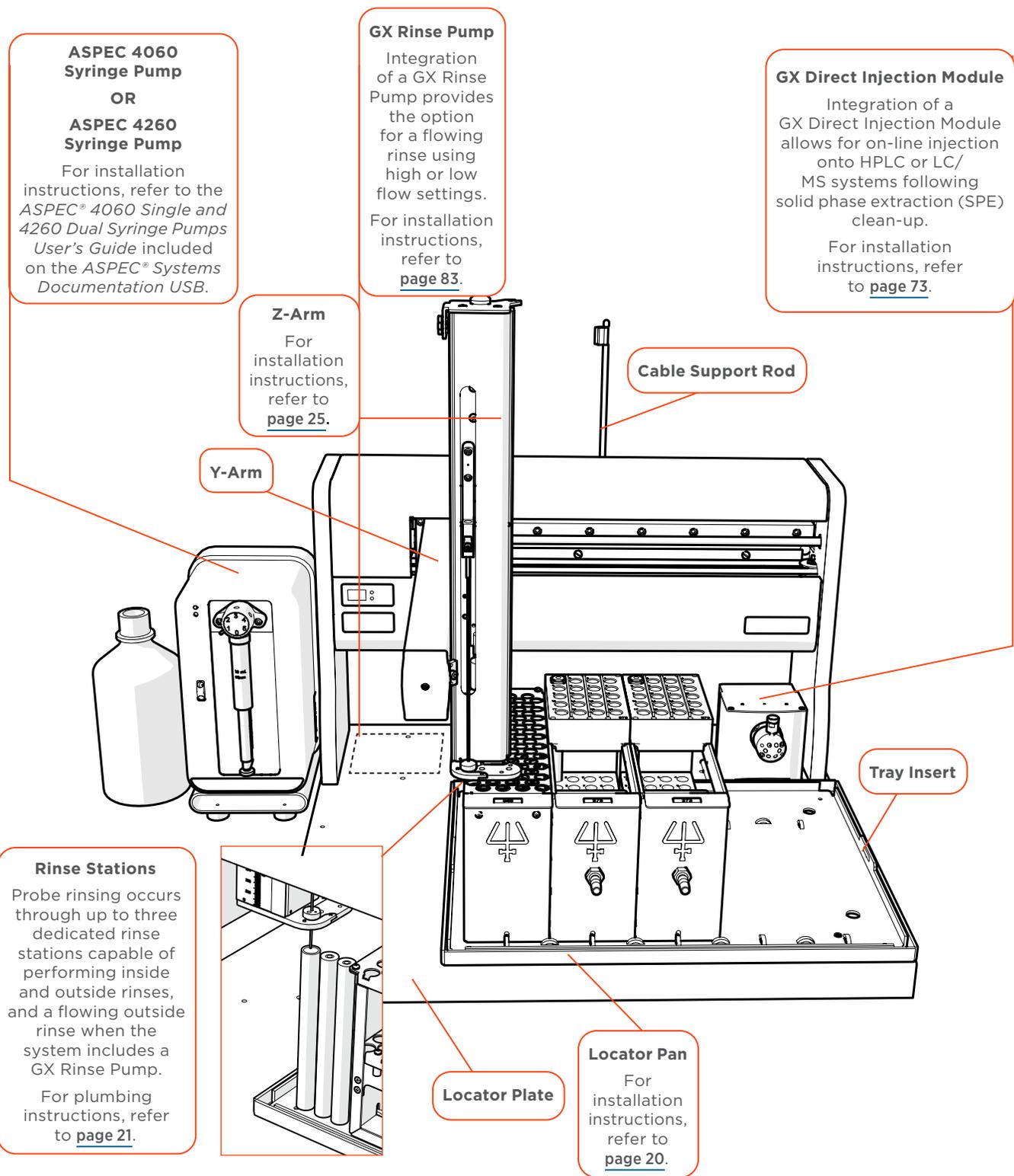
### IN THIS CHAPTER:

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- Unpacking | 13
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- Repair and Return Policies | 16
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## Description

The ASPEC® 271 is a single-probe X/Y/Z liquid handler that when paired with a ASPEC® 4060 Single Syringe Pump or ASPEC® 4260 Dual Syringe Pump is an ASPEC® 271 System that can automate liquid handling procedures and solid phase extraction (SPE) procedures that use positive pressure elution for cartridge-based applications.



**Figure 1**  
ASPEC® 271 System Overview

## 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.
2. Remove the accessory box from the locator plate of the instrument and set aside.
3. Grip the instrument at the base and lift it out of the box. Place it on a lab bench or cart.

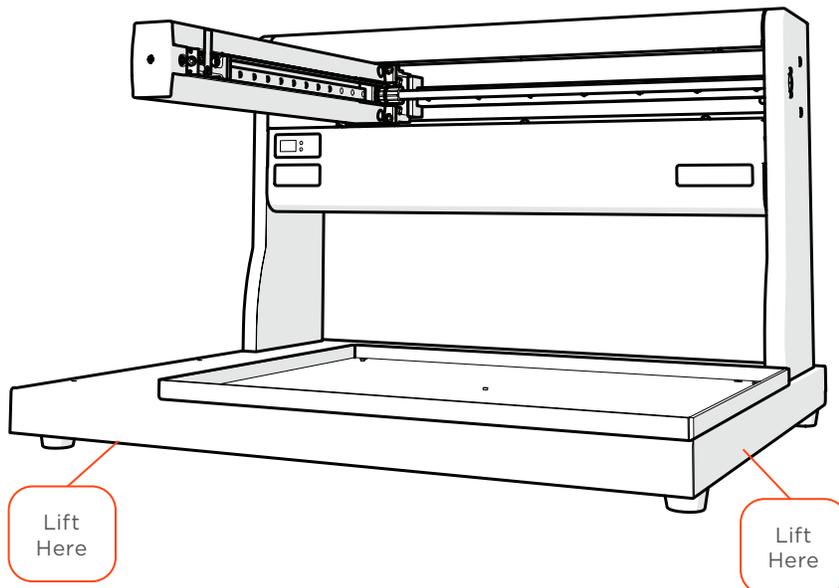
### **CAUTION**

It is recommended that two people lift the unit out of the box.

### **NOTICE**

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

4. Remove the plastic wrap covering the ASPEC 271.



**Figure 2**  
Lifting the ASPEC® 271





## Standard Equipment

The following items are considered standard equipment and are provided with the ASPEC 271:

- Locator pan
- Z-arm
  - Isolator probe holder
- Accessory package
  - Allen wrenches (2.5 mm, 3 mm, and 4 mm)
  - Cable support rod
  - Ethernet cable
  - Fuses
  - GX-27X Series Offset Utility kit\*
  - Liquid level detection (LLD) cable assembly
  - Phillips screwdriver
  - Power cord
  - Spiral wrap
  - Terminal block connectors (6- and 8-pin)
  - Tubing retaining clips
  - Z height adjustment tool (185 mm)

\*Includes the Gilson Software USB which contains the GX-Series Offset Utility and Gilson Ethernet Utility

## DOCUMENTATION

The following documentation is provided:

- ASPEC® Systems Documentation USB, which includes this user's guide (and other ASPEC system user's guides), plumbing diagrams, declaration of conformity documents, and IQ procedure documents.
- Hazardous Materials Declaration Document (China RoHS)
- Quality Control (QC) Checklist
- System Setup Overview
- Unpacking Instructions

## Accessories

### REQUIRED

Some accessories are required, but are ordered separately:

- Tray Insert (part number 26041033)
- Probe
- Guide Foot Assembly
  - The inert guide foot assembly, part number 26046228, is recommended.
- Racks
  - Disposable Extraction Cartridge (DEC)
  - Sample
- Rinse station(s)

Refer to the [Parts and Accessories](#) appendix for part numbers.

### OPTIONAL

- ASPEC® SPE Cartridges
- GX Direct Injection Module  
For more information, refer to [Appendix D | GX Direct Injection Module on page 73.](#)
- GX Rinse Pump  
For more information, refer to [Appendix E | GX Rinse Pump on page 83.](#)
- Riser Block for GX Direct Injection Module
- Safety Shield  
For more information, refer to [Appendix F | Safety Shield on page 89.](#)
- Sample Loops for GX Direct Injection Module
- Solvent Bottle Rack
- System Organizer

Refer to the [Parts and Accessories](#) appendix for part numbers.

## Customer Service

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

If you need assistance, please visit [www.gilson.com/contact.html](http://www.gilson.com/contact.html) for contact options. To help us serve you quickly and efficiently, please refer to [Repair and Return Policies on page 16.](#)





## Repair and Return Policies

Refer to the following information and then contact your local Gilson representative. Specific contact information can be found at [www.gilson.com](http://www.gilson.com).

**NOTE**

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

### Before Calling Us

Your local Gilson representative will be able to serve you more efficiently if you have the following information:

- Serial number and model number of the instruments involved.
  - The serial number is located under the Y-arm near the rear of the instrument.
- Installation procedure you used.
- List of concise symptoms.
- List of operating procedures and conditions you were using when the problem arose.
- List of all instruments in the configuration and the connections to those instruments.
- List of other electrical connections in the room.

### Warranty Repair

For information about warranty repair or replacement, refer to our website (<https://www.gilson.com/default/terms-and-conditions-service-contract-usa.html>).



### Non-Warranty Repair

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

### Return Procedure

Contact your local Gilson representative 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 local Gilson representative regarding proper method of shipment. No responsibility is assumed by Gilson or your local Gilson representative 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

For more information about where you can drop off your waste equipment for recycling, contact your local dealer from whom you originally purchased the product or contact your local council. By doing so, you will help conserve natural resources and ensure that your waste equipment is recycled in a manner that protects human health and the environment.



# Technical Specifications

- [ASPEC® 271](#)
- [GX Rinse Pump](#)
- [GX Direct Injection Module](#)

## ASPEC® 271

TECHNICAL SPECIFICATION	DEFINITION
Arm Speed (Maximum)	350 mm/sec in X dimension
	350 mm/sec in Y dimension
	125 mm/sec in Z dimension (factory set to 80 mm/sec)
Communication	Ethernet
Contact Control	Two inputs, transistor-transistor logic (TTL) contact closures
	Two relay outputs
	Two switched +24V DC 1A outputs
	One safety input
	<b>NOTICE</b> Switching voltages higher than 30V or greater than 1A of current may damage the instrument.
Dimensions (W x D x H)	59.7 x 54.1 x 57.1 cm (23.5 x 21.3 x 22.5 in.)
	<b>NOTE</b> Dimensions do not include the ASPEC 4060 Syringe Pump or ASPEC 4260 Syringe Pumps. The height dimension does not include the Z-arm, which will vary depending on where the Z-arm is clamped.
Environmental Conditions	Indoor use Altitude: up to 2000 m Temperature range: 5°C–40°C Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C
Front Panel	Two blue digital displays and two indicator lights for power and error.
Fuse	Two 5 x 20 mm, “T” type, 3.15A fuses
Horizontal Motion Strength	2.0 kg (4.5 lbs.)

ASPEC® 271 TECHNICAL SPECIFICATIONS (CONTINUED ON PAGE 18)





## ASPEC® 271

TECHNICAL SPECIFICATION	DEFINITION	
Liquid Contact Materials* <small>*Refer to the <a href="#">Materials</a> appendix for more details.</small>	<b>Description</b>	
	<b>Material</b>	
	Probe Guide	PET
	Probe	316L Stainless Steel
	Rinse Station	PET
	Transfer Port	PEEK PET PTFE 316L Stainless Steel
	Tubing (Drain)	TYGON®
Locator Plate Capacity	Code 20-series	
	Code 33X/34X-series	
	Code 37X DEC racks	
	Code 386	
	Solvent bottle rack	
	Up to five of these racks can be placed on the Code 20-series tray insert (part number 26041033).	
	One solvent bottle rack can be placed at the back of the Code 20-series tray insert.	
Power Requirements	Frequency: 50 to 60 Hz	
	Voltage: 100–240V (Universal Input)	
	Current rating	2.0A for 100–120V 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 occurs through a dedicated rinse station capable of performing inside and outside rinses, and a flowing outside rinse when the system includes a GX Rinse Pump.	
Sampler Type	X/Y/Z with stationary rack design	
Software Control	PC control via Ethernet communication and TRILUTION® LH Software	
Vertical Punch Strength	4.5 kg (10.0 lbs.)	
Weight* <small>*With Z-arm</small>	22 kg (48 lbs.)	

# INSTALLATION

### IN THIS CHAPTER:

- Locator Pan Installation and Setup | 20
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- Electrical Connections | 30
- Rack Installation | 33
- Final Z-Arm Adjustments | 37

The ASPEC® 271 should be set up and installed in the order listed above. Complete instructions for each step are included in this chapter.

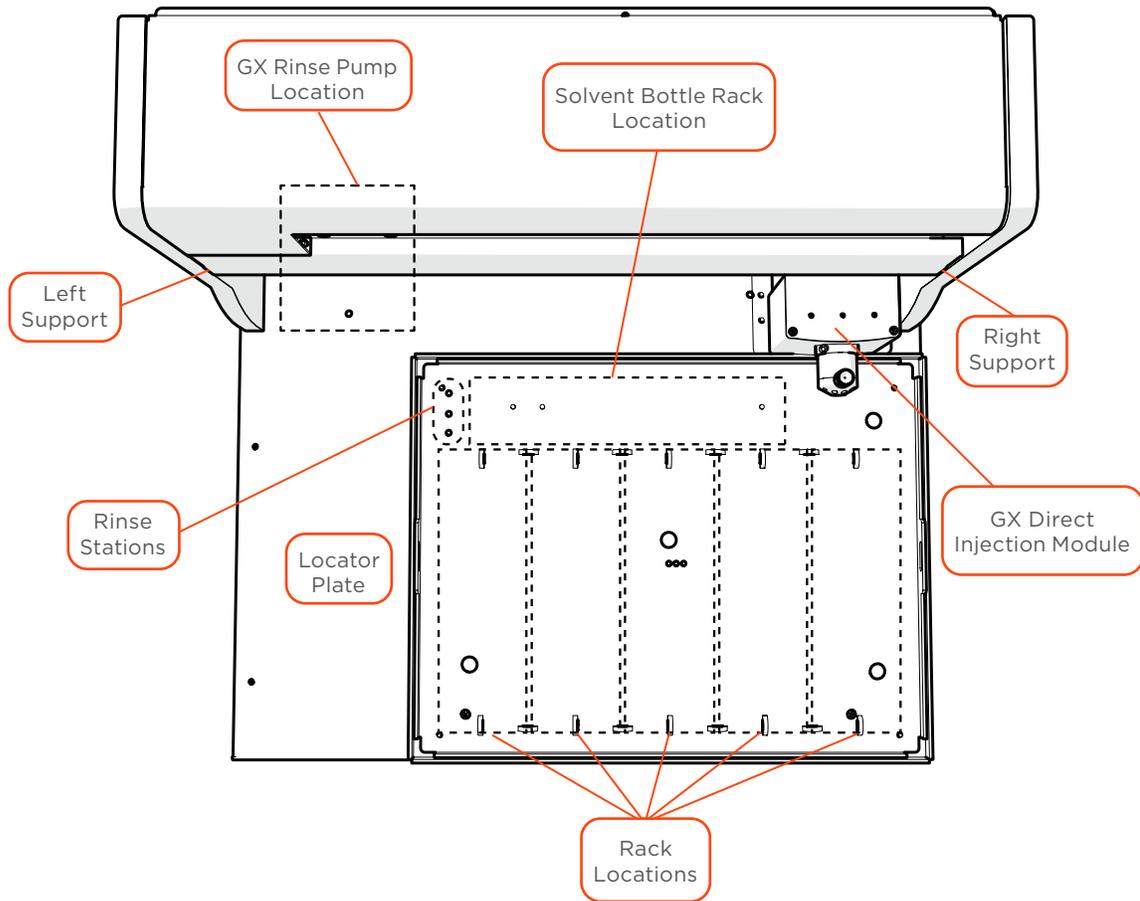
Installation instructions for optional accessories are provided in the appendices:

- GX Direct Injection Module - [Appendix D | GX Direct Injection Module on page 73.](#)
- GX Rinse Pump - [Appendix E | GX Rinse Pump on page 83.](#)
- Safety Shield - [Appendix F | Safety Shield on page 89.](#)



## Locator Pan Installation and Setup

This section takes you through the steps for installing the locator pan on the locator plate of the ASPEC 271, tray inserts, and rinse stations.



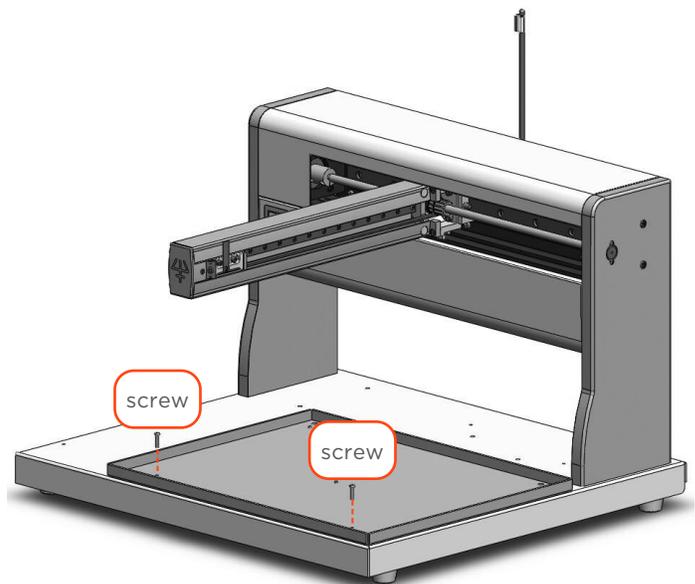
**Figure 3**  
ASPEC® 271 Overview

### Locator Pan Installation

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

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. The two posts should be inserted in the locator plate.
3. Locate the two screws included with the locator pan, and place them in the holes at the front of the instrument. Tighten the screws using a Phillips screwdriver.



**Figure 4**  
Install the Locator Pan

## Rinse Station Installation

The rinse stations are installed on the tray insert before it is placed in the locator pan. Refer to [Figure 5](#) for the location of the rinse stations.

Up to three rinse stations can be installed on the locator plate of the instrument. There are two types of rinse stations available, one for the outside rinse of the probe (part number 26034551) and one for the inside rinse of the probe (part number 26034555), which can also function as a drain.

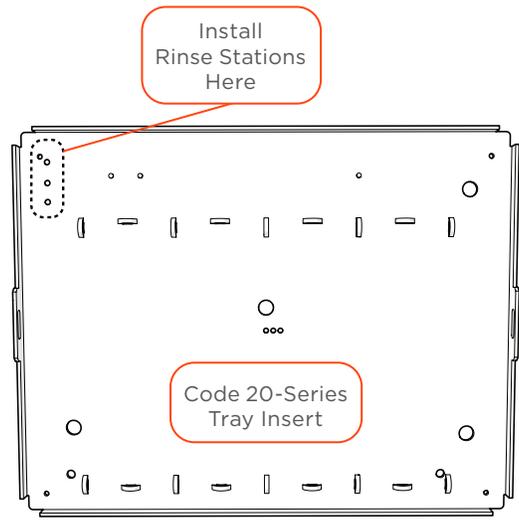
### Inside Probe Rinse

Install the inside rinse station in the rear position on the tray insert. The inside rinse station can also be used as a drain.

### Outside Probe Rinse

Install the outside rinse stations in the front or center positions on the tray insert. Outside rinse stations can be configured for a static or flowing rinse.

- 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 in the bottom hole.



**Figure 5**  
Installing the Rinse Station on the Tray Insert

Inside Probe Rinse	Outside Probe Rinse	
	Static Rinse	Flowing Rinse
<p>Inside Rinse/Drain Station</p>	<p>Outside Static Rinse Station</p>	<p>Outside Flowing Rinse Station</p>



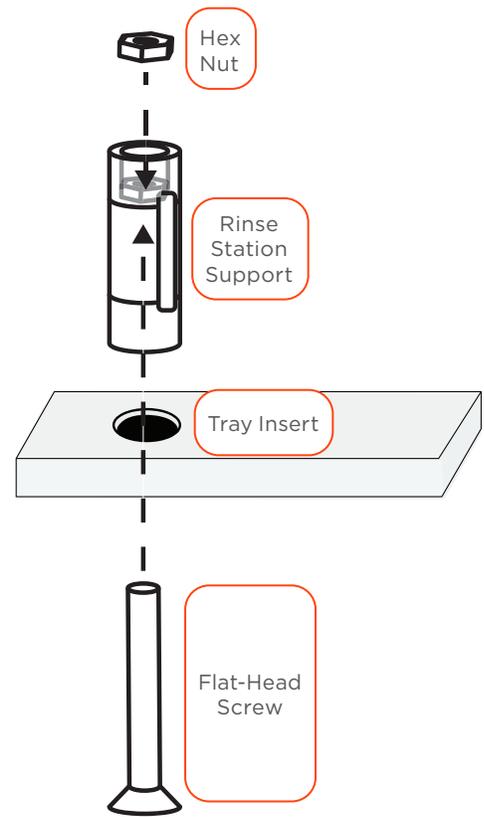
## Installing the Rinse Station on the Tray Insert

1. Locate the following items included with the rinse station:
  - Hex nut
  - Flat-head screw
  - Rinse station support

**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. Push the hex nut all the way into the recessed opening on the rinse station support using a Phillips screwdriver.
3. Place the flat-head screw up through the bottom of the tray insert and place the rinse station support and hex nut assembly over the screw. Tighten the screw to the rinse support and hex nut assembly using a Phillips screwdriver.
4. Repeat steps 1 through 3 for all other rinse stations.



**Figure 6**

Installing the Rinse Station on the Tray Insert

## Tray Insert Installation

The Code 20-series tray insert (part number 26041033), is used to position the racks and the rinse stations on the instrument. In the center of the 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 [Rinse Station Installation on page 21](#) for more information on installing the rinse stations.

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

## Z-Arm Setup

### NOTE

All of the components on the Z-arm must be installed before the Z-arm is attached to the instrument. Do not install the Z-arm until instructed to do so.

The Z-arm and its components should be assembled and installed in the following order:

1. Isolator Probe Holder Installation
2. Guide Foot Installation
3. Z-Arm Installation
4. Z Travel Height Adjustment
5. Probe Installation
6. Transfer Tubing Installation
7. Liquid Level Detection (LLD) Cable Installation

### Isolator Probe Holder Installation

Follow the instructions below to install the isolator probe holder (part number 2604615) on the isolator mounting block on the Z-arm.

### NOTE

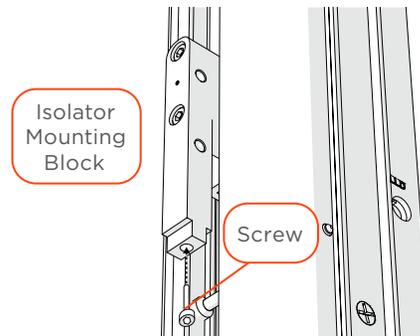
The isolator mounting block is installed at the factory. Do not remove it from the Z-arm.

1. Remove the screw from the bottom of the isolator mounting block using the 3 mm Allen wrench.
2. Slide the isolator mounting block down as far as it will go to the bottom of the Z-arm.

### NOTE

There may be some resistance when sliding the isolator mounting block.

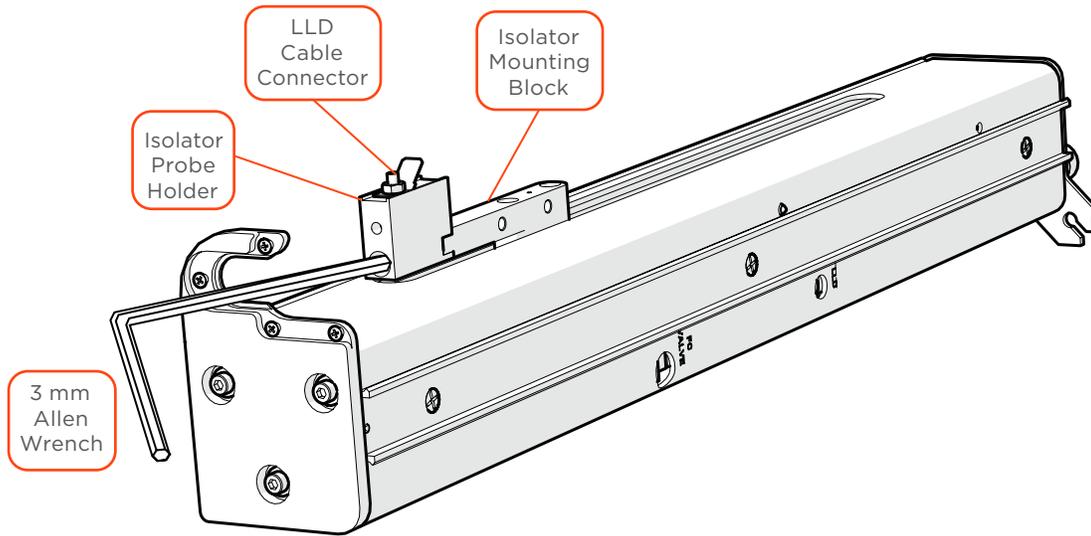
3. Lay the Z-arm on its back on a flat surface.



**Figure 7**  
Close-Up of Right Side of Z-Arm



4. Orient the isolator probe holder so that the D notch is at the top and the connector for the LLD cable is facing out. Place the D notch in the isolator probe holder over the lower part of the isolator mounting block.
5. Place the screw removed in Step 1 up through the bottom of the isolator probe holder and into the isolator mounting block. Tighten using the 3 mm Allen wrench.



**Figure 8**  
Z-Arm Components

## Guide Foot Installation

The inert guide foot is used with the ASPEC 271. This guide foot assembly includes a probe guide insert and six screws. (Four of the screws are used to secure the guide foot on the Z-foot and the other two screws are extras.)

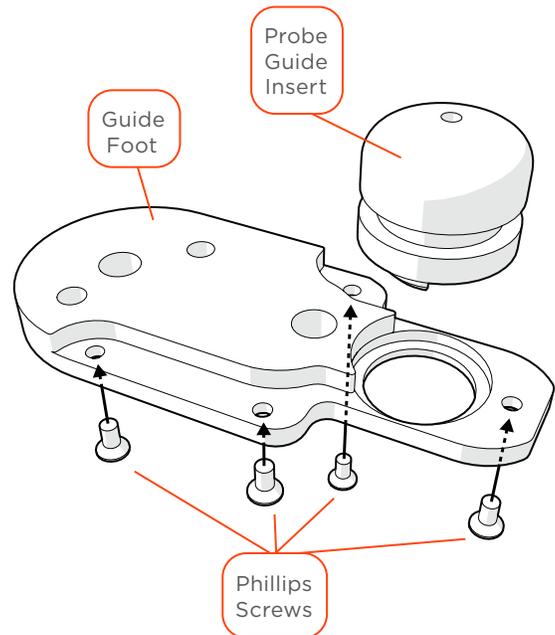
To install the guide foot on the Z-foot of the Z-arm:

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

**NOTE**

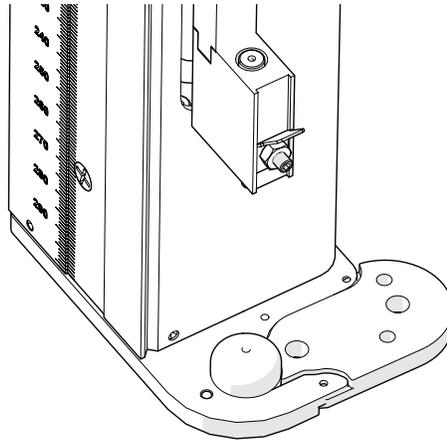
If a guide foot was already installed on the Z-foot, use a Phillips screwdriver to remove the four screws that attach the guide foot. (Save the original guide foot and probe guide insert for future use.)

2. Locate the probe guide insert and place it on top of the guide foot. Press down on the insert until it seats into place. (The probe guide insert should be oriented with the domed part on top.)



**Figure 9**  
Inert Guide Foot (Exploded View)

3. Place the guide foot below the Z-foot and align the holes in the guide foot with the holes in the Z-foot.
4. Place four of the Phillips screws through the bottom of the guide foot into the Z-foot and tighten.



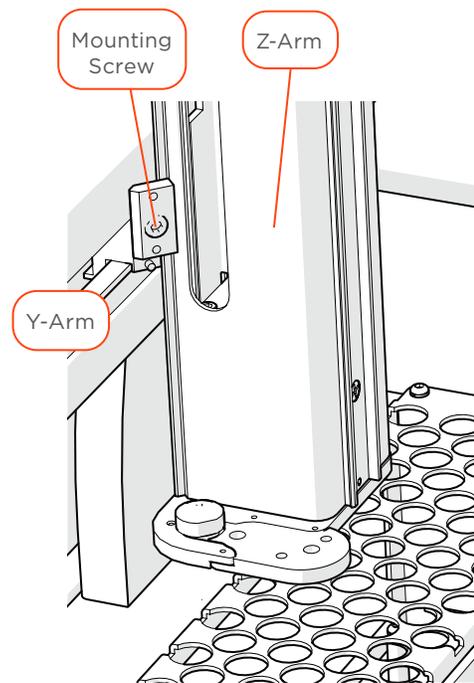
**Figure 10**  
Inert Guide Foot (Installed)

## Z-Arm Installation

Follow these steps to install the Z-arm:

1. Loosen the mounting screw on the Z-arm mounting bracket located on the Y-arm using the 3 mm Allen wrench. 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 screw 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. Refer to [Z-Arm Height Adjustment on page 27](#).



**Figure 11**  
Z Arm Installation

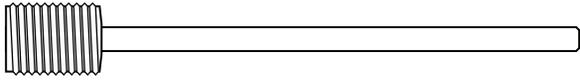


## Z Travel Height Adjustment

The Z travel height is set by default to the S2 position.

Follow these steps to adjust the Z travel height:

1. Remove the stop pin (part number 260463) from the Z-arm using the 3 mm Allen wrench. The stop pin is installed on the left side of the Z-arm in the hole labeled S2.



**Figure 13**  
Stop Pin

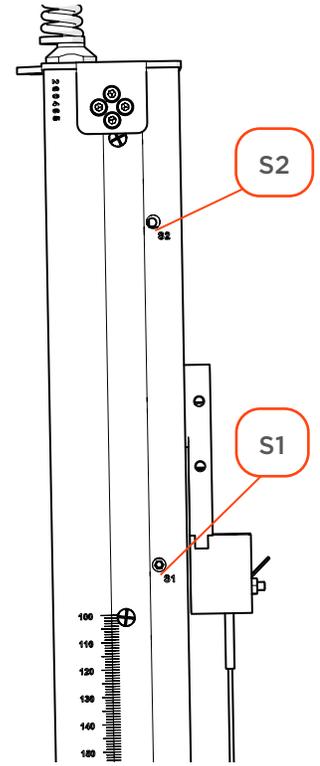
**NOTE**

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 probes
  - S2 for 125 mm probes
  - No pin installed for 175 mm probes
3. Tighten the head of the stop pin until it reaches a hard stop using the 3 mm Allen wrench.

**NOTE**

The stop pin is inserted in a hole on the left side of the Z-arm and as it is tightened should enter the adjacent hole on the right side of the Z-arm. The tip of the stop pin is visible on the right side of the Z-arm.

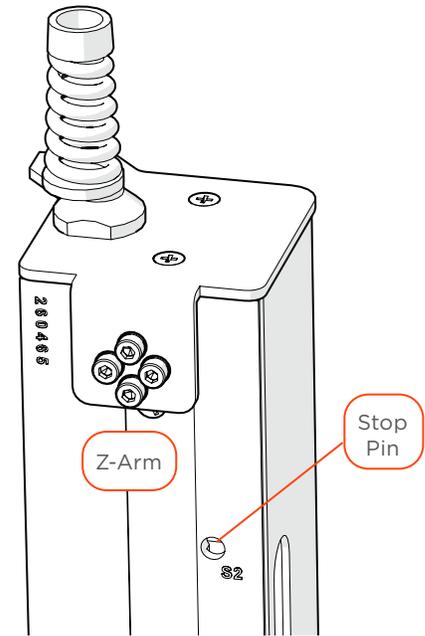


**Figure 12**  
S1 and S2 Positions

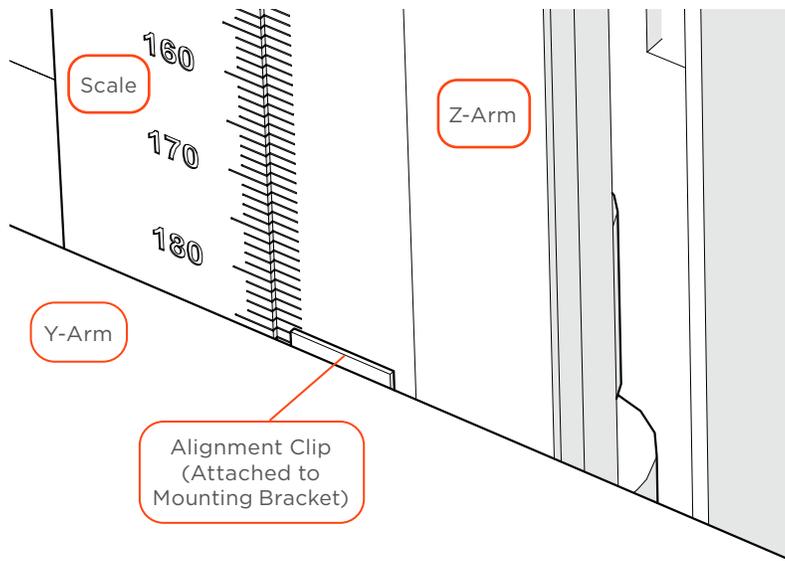
## Z-Arm Height Adjustment

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

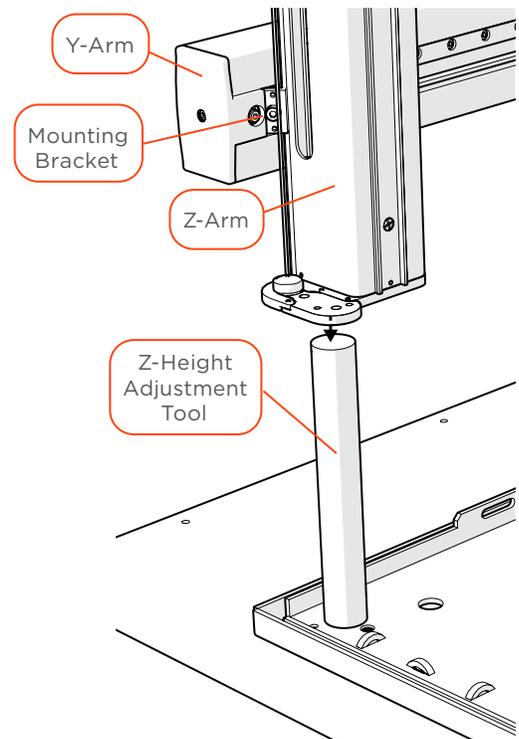
1. Locate the 185 mm Z-height adjustment tool (part number 95260185) that was shipped in the accessory package.
2. Loosen the mounting screw on the Z-arm mounting bracket using a 3 mm Allen wrench and slightly raise the Z-arm.
3. Place the Z-height adjustment tool under the Z-arm.
4. While holding the adjustment tool in place, use the other hand to lower the Z-arm until it lightly rests on the adjustment tool.
5. Remove the adjustment tool and then nudge the Z-arm up to 187 mm. Use the scale on the Z-arm to confirm your adjustment. The top of the alignment clip, attached to the mounting bracket, should be flush with the correct line on the scale. Refer to **Figure 16**.
6. Tighten the mounting screw on the Z-arm mounting bracket to secure the Z-arm.



**Figure 14**  
Close-Up of Z-Arm and Stop Pin



**Figure 16**  
Close-Up of Z-Arm Scale



**Figure 15**  
Z-Arm Height Adjustment



## Probe Installation

There are different probes available for use on the instrument.

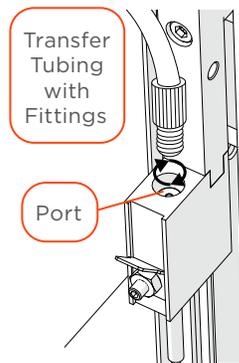
To install the probe on the Z-arm:

1. Insert the probe into the top of the isolator probe holder.
2. Pull the probe through the isolator probe holder.
3. Thread the tip of the probe into the probe guide insert.

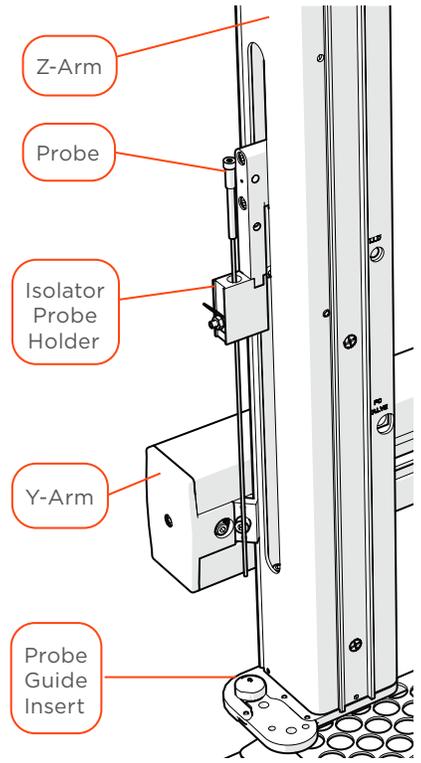
## Transfer Tubing Installation

To install the transfer tubing:

1. Connect one end of the transfer tubing with fittings to the appropriate port on the syringe pump and then finger tighten. For more information, refer to the *ASPEC® 4060 Single and 4260 Dual Syringe Pumps User's Guide*.
2. Connect one end of the transfer tubing with fittings to the top of the isolator probe holder. Firmly tighten this fitting, since it holds the probe in place.



**Figure 18**  
Connecting Transfer Tubing to ASPEC® 271

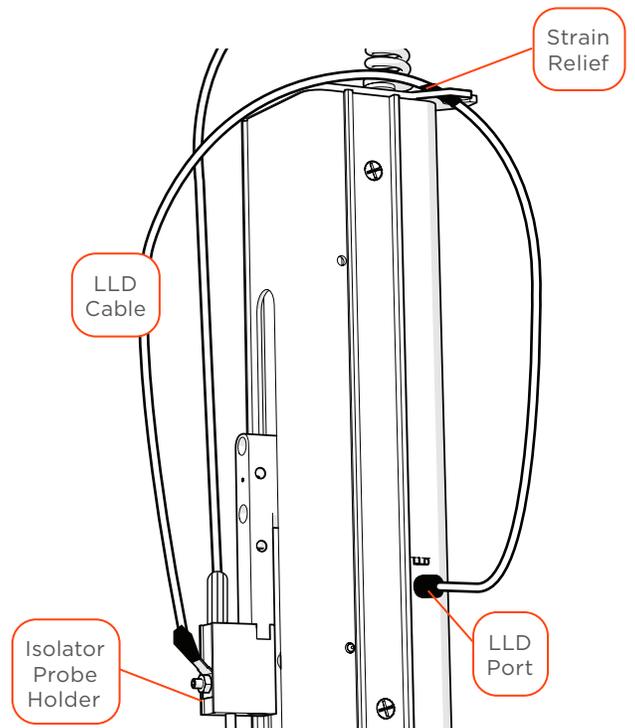


**Figure 17**  
Installing Probe on the Z-Arm

## Liquid Level Detection (LLD) Cable Installation

To install the LLD 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 strain relief 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.



**Figure 19**  
Installing the Liquid Level Detection Cable on the Z-Arm

## Plumbing Connections

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

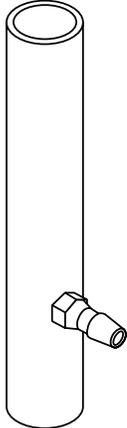
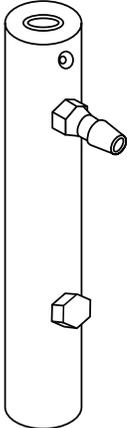
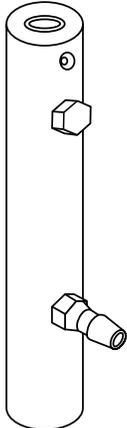
### Transfer Tubing

Refer to [Transfer Tubing Installation on page 28](#) for instructions on connecting the tubing fittings to the probe and probe ports on the syringe pump valves.

### Rinse Station Plumbing

To attach tubing to the drain:

1. Locate the 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 [GX Rinse Pump on page 83](#).

	Outside Probe Rinse	
Inside Probe Rinse	Static Rinse	Flowing Rinse
		
Inside Rinse Station	Outside Static Rinse Station	Outside Flowing Rinse Station

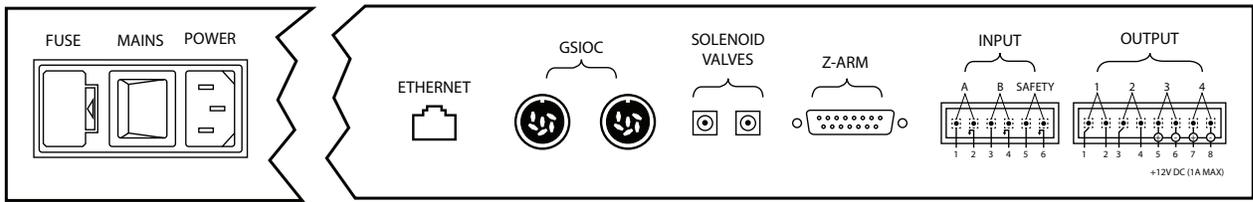
**Figure 20**  
Rinse Station Configurations



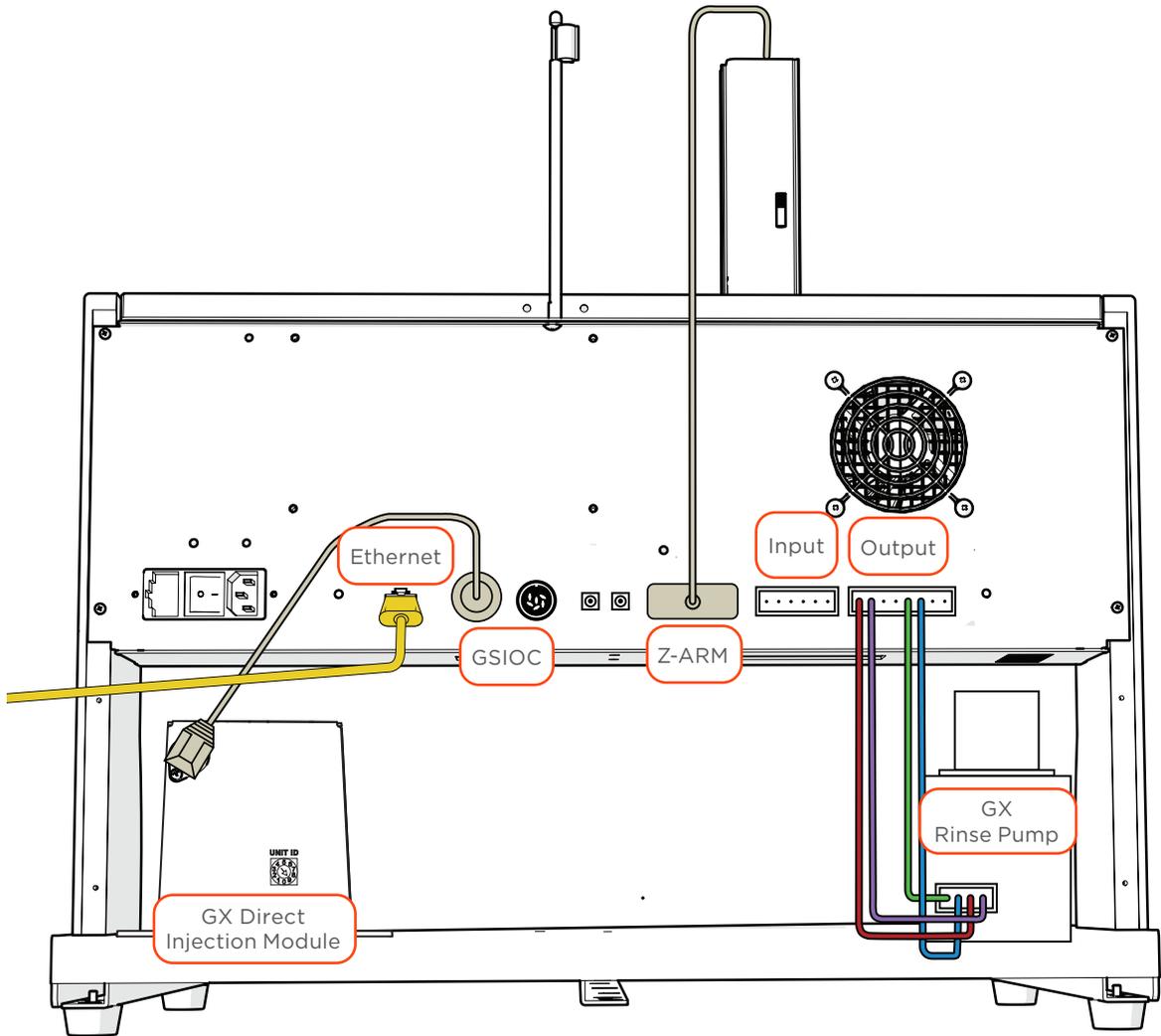
# Electrical Connections

## Rear Panel Diagram

Refer to the diagrams below when making the connections described in this section.



**Figure 21**  
Rear Panel Diagram



**Figure 22**  
Electrical Connections Diagram for the ASPEC® 271 with Accessories

## ETHERNET

To make the Ethernet connection to the instrument, a router (ordered separately) and Ethernet cables are required.

Follow the steps below to make the Ethernet connection:

1. Locate the Ethernet cable provided with the router.
2. Plug one end of the Ethernet cable into an available Ethernet port on the router and the other to the PC.
3. Turn on the PC.
4. Connect the AC power cord to the router, then plug the power cord into a grounded outlet. If necessary, switch the router ON.
5. Ensure that the ASPEC 271 is powered OFF.
6. Locate the Ethernet cable provided with the accessory kit.
7. Plug one end of the Ethernet cable into the ETHERNET port on the ASPEC 271 and the other to an available Ethernet port on the router.

**NOTE** Do not turn on the ASPEC 271 until directed to in the [Operation](#) chapter.

## Z-ARM CONNECTION

Connect the cable from the Z-arm to the Z-ARM port on the rear panel of the ASPEC 271. Refer to the [Rear Panel Diagram on page 30](#) for the location of this port.

## INPUT/OUTPUT PORTS

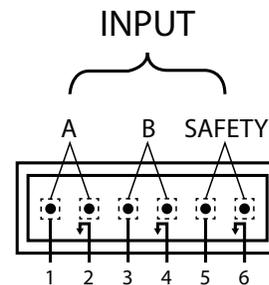
You can use the input and output contacts found on the rear panel of the instrument to control peripheral devices. Refer to the [Rear Panel Diagram on page 30](#) for the location of the input/output ports.

### 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.



**Figure 23**  
Input Contacts

**NOTICE**

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.

### MAKING CONNECTIONS

To make connections, you'll need the following:

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

A 6-foot piece of suitable cable (part number 709910206) is available for purchase from Gilson.

To 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 (if installed). Insert each wire into the appropriate terminal on the terminal block connector.

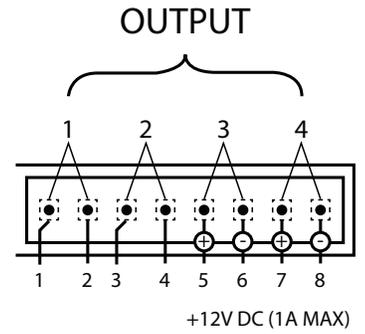
**NOTE**

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

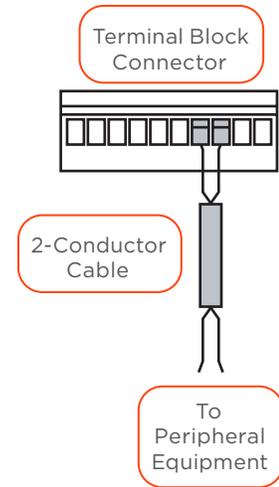
4. Push the wire all the way in, then tighten its corresponding pin screw.
5. Install the terminal block connector in the rear panel and push it in as far as it will go. It is designed to fit snugly into its receptacle.
6. Connect the opposite ends of the wires to the other device(s). Be sure to match ground connections.
7. Label each cable to identify the purpose of the connection.

### POWER

Connect the power cord to the power receptacle on the ASPEC 271 and then to an outlet. Ensure that the power cord is plugged into a grounded power outlet.



**Figure 24**  
Output Contacts



**Figure 25**  
Terminal Block Connections

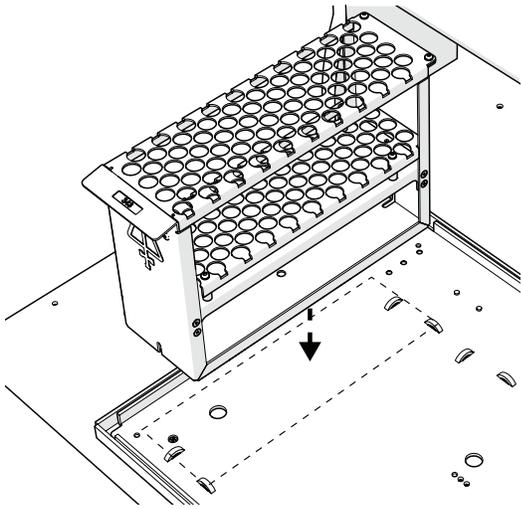
## Rack Installation

The ASPEC 271 is equipped to locate up to five Code 20-series, Code 33X/34X-series, or Code 37X DEC racks. Refer to the [Racks and Accessories](#) appendix for a list of racks available for the instrument.

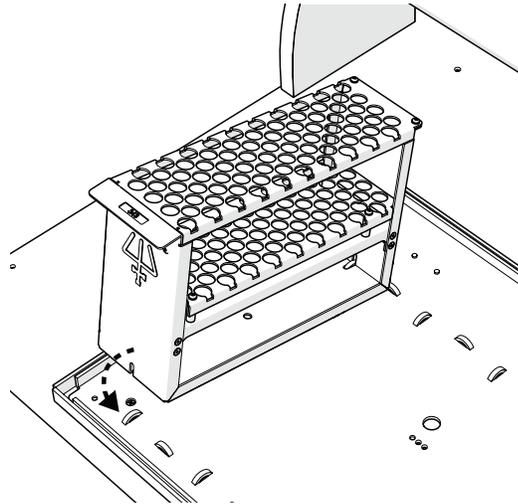
### Code 20- or Code 33X/34X-Series Rack Installation

To install a Code 20-series or a Code 33X/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.



**Figure 26**  
Orient the Rack (Step 1)



**Figure 27**  
Seat the Rack into Tabs (Steps 2 and 3)



## Solvent Bottle Rack Installation

A solvent bottle rack (ordered separately) can be installed on the Code 20-series tray insert. Two solvent bottle racks are available, one for 500 mL or 700 mL solvent bottles (part number 260440005) and one for 650 mL solvent bottles (part number 26044036) made of high density polyethylene (HDPE) and Teflon®.

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.

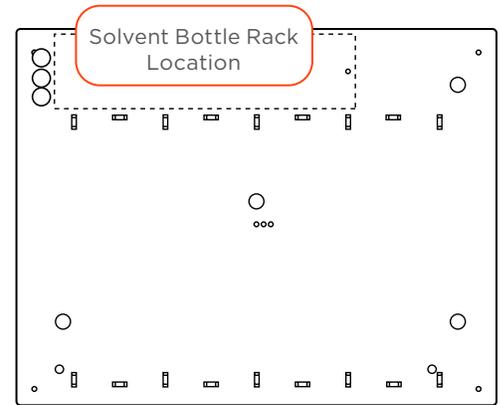
**NOTE**

The solvent bottle rack must be placed adjacent to the rinse station location as shown in the figure at right even if the rinse stations are not installed.

2. Place the solvent bottles in the rack.

**NOTE**

Refer to the [Racks and Accessories](#) appendix for a complete list of solvent bottle racks and available solvent bottles.

**Figure 28**

Code 20-Series Tray Insert with Solvent Bottle Rack and Rinse Station

## Disposable Extraction Cartridge (DEC) Racks and Accessory Kits

### INTRODUCTION

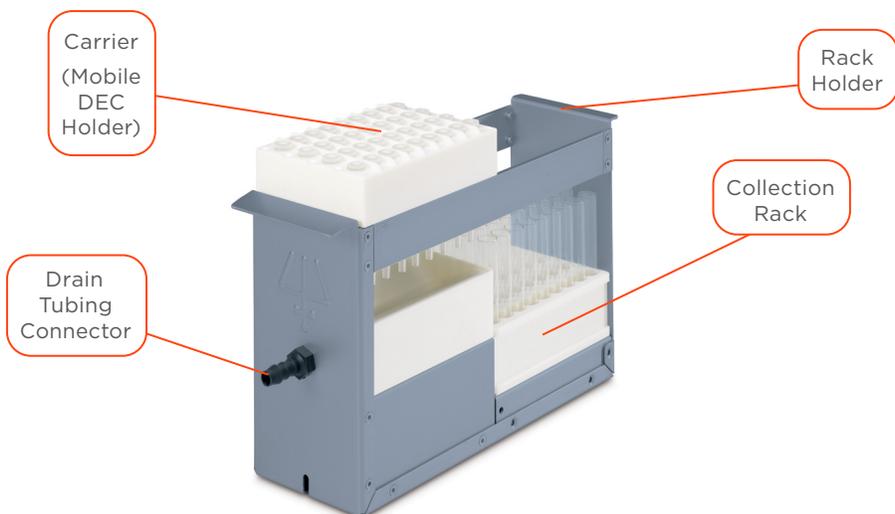
The automation of the solid phase extraction (SPE) process is based on the design of the DEC rack assembly that holds the SPE cartridges. The upper part of the rack assembly consists of a mobile DEC holder that holds the SPE cartridges and slides backwards and forwards. The DEC holder is moved by the 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 cartridges are over the drain. The SPE cartridges can be conditioned, loaded, and washed here using the relevant software commands. When the DEC holder is in the rear position, the SPE cartridges 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 cartridges
- Code 373 for 3 mL SPE cartridges
- Code 376 for 6 mL SPE cartridges
- Code 386 for 6 mL SPE cartridges

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



**Figure 29**  
DEC Rack Diagram

**NOTE**

The Code 376 and Code 386 racks do not use a collection rack riser.

## DEC ACCESSORY KITS

All DEC accessory kits include the following:

- Solvent Bottle Rack (x 1)
- Solvent bottles (500 mL), 4/pkg (x 1)
- Solvent bottles (700 mL), 4/pkg (x 1)
- Tube, Viton® 0.313" ID x .438" OD 20 ft (x 1)

### 1 mL DEC Accessory Kit

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

- Code 371 Rack (x 3)
- Caps, natural polyethylene (PE), for 1 mL cartridge, 1000/pkg (x 1)
- Tubes, 12 x 75 mm, 5mL, glass, 250/pkg (x 2)
- Tubes, polypropylene (PP), 12 x 75 mm, 5 mL, 250/ctn (x 2)

### 3 mL DEC Accessory Kit

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

- Code 373 Rack (x 3)
- Caps, natural polyethylene (PE), for 3 mL cartridge, 1000/pkg (x 1)
- Tubes, 12 x 75 mm, 5mL, glass, 250/pkg (x 2)
- Tubes, polypropylene (PP), 12 x 75 mm, 5 mL, 250/ctn (x 2)





## 6 mL DEC Accessory Kits

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

- Code 376 Rack (x 3)
- Tubes, 15 x 85 mm, 10 mL, glass, 250/ctn (x 2)
- Caps, 6 mL DEC, polyethylene (PE), 1000/pkg (x 1)
- Tubes, polypropylene, 10 mL, 500/pkg (x 1)

6 mL DEC accessory kit (part number 2604704) includes the following:

- Code 386 Rack (x 3)
- Tubes, 15 x 85 mm, 10 mL, glass, 250/ctn (x 2)
- Caps, 6 mL DEC, polyethylene (PE), 1000/pkg (x 1)

### DEC RACK SETUP

Refer to [DEC Racks on page 34](#) for the components of a DEC rack.

**NOTICE**

The tips of the SPE cartridges 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 4701438630) 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 cartridges into the mobile DEC holder and check that all cartridges are installed correctly.

This is accomplished by standing the DEC holder on a flat surface and inserting the cartridges into the holes into the DEC holder one-by-one. When correctly installed, the supporting flange at the top of each cartridge must be flat against the upper surface of the DEC holder and the tip of each cartridge 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 DEC's. (Use only Gilson SPE caps with the ASPEC 271, even when using non-Gilson brand SPE cartridges.)

**NOTE**

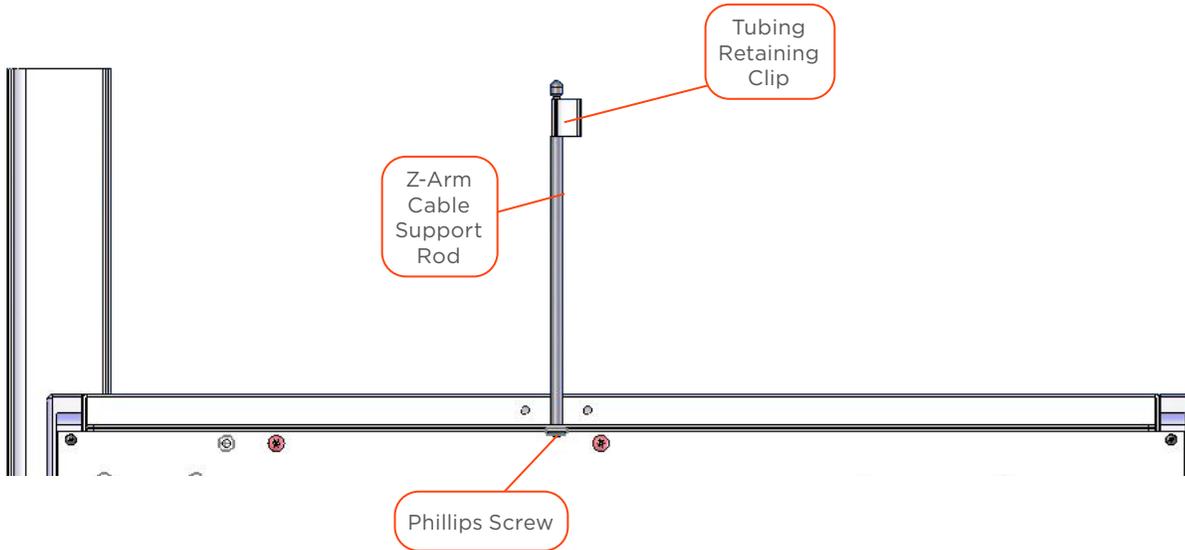
Gilson ASPEC® SPE Cartridges are pre-capped and ready to use on Gilson ASPEC systems.

5. Replace the carrier on top of the frame and check that it moves freely along the frame. Install collection tubes that are suitable for the size of the SPE cartridges in use.
6. Install the rack on the locator plate. Refer to the instructions for [Rack Installation on page 33](#).

## Final Z-Arm Adjustments

### Z-Arm Cable Support Rod Installation

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 cable support rod.



**Figure 30**  
Installing Z-Arm Cable Support Rod (Partial Rear Panel View)

3. Gather the tubing before installing the spiral wrap. Ensure that there is enough slack in the Z-arm cable and tubing.

#### NOTE

The cable support rod can also be used to secure an SPE pressure regulator. For more details, refer to the *ASPEC® 4060 Single and 4260 Dual Syringe Pumps User's Guide*.

### Spiral Wrap Installation

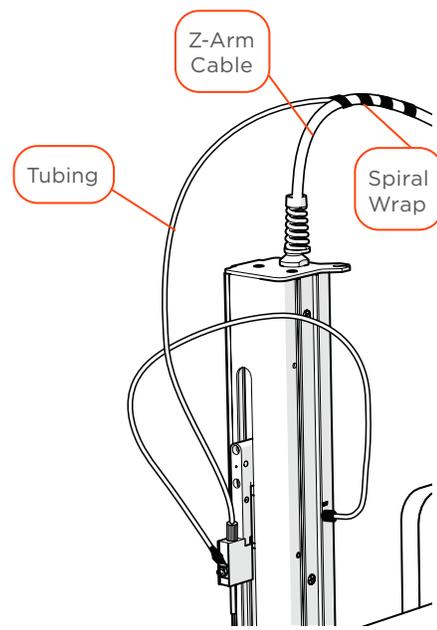
Use the spiral wrap included in the accessory package to contain the tubing.

### Z-Arm Movement Verification

Manually move the arm to ensure that it can travel freely around the bed. If not, adjust the cable in the clip until it can move freely.

#### CAUTION

Ensure that the ASPEC 271 is unplugged before manually moving the Z-arm.



**Figure 31**  
Containing Tubing and Cables with Spiral Wrap



# OPERATION

### IN THIS CHAPTER:

- Front Panel | 40
- Start Up | 40
- GX-27X Series Offset Utility | 40

TRILUTION® LH Software provides programmed control of the ASPEC® 271 System. For more information about TRILUTION LH, refer to its user's guide and the documentation supplied with the software.



## 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 [Rear Panel Diagram on page 30](#).

### Error Indicator Light

The orange indicator becomes lit when an error has been encountered. Refer to [Error Messages on page 46](#) for a list of error messages.

## Start Up

To start the instrument:

1. Make sure the instrument is connected to a power source.
2. Make sure that any optional accessories are connected to the ASPEC 271.

**NOTE**

Any time the GX Direct Injection Module will be connected or disconnected from the ASPEC 271, ensure that the power is turned off to the ASPEC 271.

3. Turn on the instrument using the power switch located on the rear panel. Refer to [Rear Panel Diagram on page 30](#). The power indicator light on the front panel illuminates.

## GX-27X Series Offset Utility

It is recommended to use this utility at the 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, and if the tray insert is changed.

The GX-27X Series Offset Utility and instructions (LT319625) are provided on the Gilson Software USB located in the GX-27X Offset Utility Kit (part number 2604710).



**Figure 32**  
Front Panel (Partial)

# MAINTENANCE

### IN THIS CHAPTER:

- Cleaning | 42
- Helpful Hints | 43
- Part Replacement | 44
- Transporting the Instrument | 44

When performing the maintenance described in this chapter, use good laboratory practice, including, but not limited to, wearing protective clothing and preparing the maintenance space for service. After completing the maintenance operation, verify the safe and good working order of the part and instrument.

This chapter contains some general guidelines for maintaining the system.



## Cleaning

### 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.

### 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.

### 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

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

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

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.

## Helpful Hints

To keep the system at peak performance, Gilson recommends doing the following:

- Check periodically to ensure that all fittings are tight.
- Wipe up all spills immediately.
- Warm fluids to room temperature before running them through the system, as cold fluids may cause leakage.



## Part Replacement

### 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.

### Probe

Follow the steps below to install a replacement probe with the same outer diameter (OD):

1. Remove the fitting for the transfer tubing that is 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.

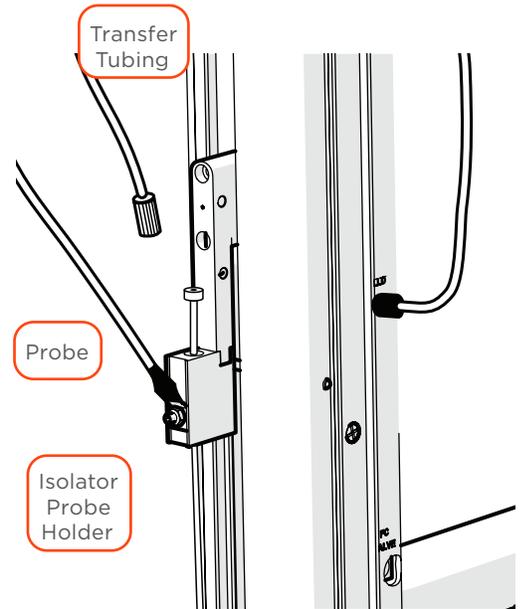
### Fuse

1. Power off the instrument and disconnect the power cord.
2. Locate or order replacement fuses. (Extras were provided with the instrument.)
3. Place a small screwdriver or a fingernail under the tab on the fuse drawer to detach it.
4. Remove the fuse drawer from its receptacle on the rear panel.
5. Replace both fuses. Use only fuses with the rated current and specified type as listed on the rear panel of the instrument.
6. Insert the fuse drawer into its receptacle on the rear panel.

Refer to the [Parts and Accessories](#) appendix for part numbers.

## 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.



**Figure 33**  
Probe Installation

# TROUBLESHOOTING

**IN THIS CHAPTER:**

- Error Messages | 46
- Mechanical | 48
- Electrical | 48
- Communication | 49



## Error Messages

When an instrument error occurs, the error number appears on the front panel display. Refer to the table below for the error text.

ERROR	ERROR TEXT	SOLUTION
0	No error	N/A
10	Unknown command	An unknown command was sent. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
11	Invalid NV-RAM address	Attempt to write to an NV-RAM address that doesn't exist. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
12	Safety contact closed	The safety contact was closed. Release contact. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Restart controlling program.
13	Invalid command parameter	A numerical parameter was out of range. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
14	S buffer overflow	The S command buffer is full (up to 21 commands can be in the buffer). Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
15	S command while unhomed	A buffered S command was sent when the instrument was not homed. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
19	X encoder error	Motion was not detected while homing the X axis. Check cabling. Replace motor/encoder and/or replace main PCB board.
20	Y encoder error	Motion was not detected while homing the Y-axis. Check cabling. Replace motor/encoder and/or replace main PCB board.
21	X homing error	Home failed on the X-axis. Check for obstructions. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error.
22	Y homing error	Home failed on the Y-axis. Check for obstructions. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error.
23	XY target out of range	A command was sent to set the XY position outside of the valid range. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
24	XY speed invalid	The specified XY speed is outside of the valid range. Send a <b>Home</b> command using the Gilson Ethernet Utility. Correct the error in the program controlling the instrument.

ASPEC 271 ERROR MESSAGES CONTINUED ON PAGE 47



ERROR	ERROR TEXT	SOLUTION
25	X stall or jam	X motion measured by encoders does not match requested motion. Check for obstructions. Send a Home command using the Gilson Ethernet Utility to clear the error.
26	Y stall or jam	Y motion measured by encoders does not match requested motion. Check for obstructions. Send a Home command using the Gilson Ethernet Utility to clear the error.
27	XY move while unhomed	Attempt to move to an XY location before completing the homing sequence. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
28	XY move while busy	Attempt to move to an XY location while XY is still in motion. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
29	Park location invalid	Attempt to move to a configured park location that is out of the allowed XY ranges. Check NV RAM locations 3 and 4.
31	Z homing error	Home failed on the Z-axis. Check for obstructions. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error.
32	Z target out of range	A command was sent to set the Z position outside of the valid range. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Check the clamp height setting with the GX-27X Series Offset Utility and/or correct the error in the program controlling the instrument.
33	Z speed invalid	The specified Z speed is outside of the valid range. Send a <b>Home</b> command using the Gilson Ethernet Utility. Correct the error in the program controlling the instrument.
34	Z stall or jam	Z motion measured by encoders does not match requested motion. Check for obstructions. Send a Home command using the Gilson Ethernet Utility to clear the error.
35	Z move while unhomed	Attempt to move to a Z location before completing the homing sequence. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
36	Z move while busy	Attempt to move to a Z location while Z is still in motion. Send a <b>Home</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.



## Mechanical

### Probe No Longer Finding Tube Center

- Probe may be bent. Straighten or replace the probe.
- The instrument may need X/Y/Z adjustment. Run the GX-27X Series Offset Utility.

## 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 and that the unit is plugged in.
- Check AC power cord connections.
- Try different AC outlet.
- Check fuse(s); replace if necessary.

### Unit Blows Fuses

Contact your local Gilson representative.

## Communication

If a communication problem between the instrument and the software is suspected:

1. Close TRILUTION LH.
2. Power off the ASPEC 271.
3. Cycle power to router by turning the router off, waiting 15 seconds, then powering the router back on.
4. Power on the ASPEC 271.
5. Start TRILUTION LH.





# RACKS AND ACCESSORIES

### IN THIS CHAPTER:

- Racks | 52
- ASPEC® SPE Cartridges | 58
- DEC Accessory Kits | 64

The ASPEC® 271 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 ASPEC 271. Refer to [Rack Installation on page 33](#) for rack installation procedures.



## Racks

PART NUMBER	IMAGE	RACK CODE	MATERIAL	VESSELS
<b>150425</b> RACK, CODE 20, 108 10 X 100MM, 4.5ML		20	Polypropylene	108 Tubes 10 x 100 mm (4.5 mL)
<b>150422</b> RACK, CODE 21, 60 13 X 100MM, 9ML		21	Polypropylene	60 Tubes 13 x 100 mm (9 mL)
<b>150424</b> RACK, CODE 22, 44 18 X 150MM, 25ML		22	Polypropylene	44 Tubes 18 x 100 mm (25 mL) 18 x 150 mm (32 mL)
<b>150498</b> RACK, CODE 22U, UNIV 10-18mm DIA x 100-175mm		22U	Polypropylene	44 Tubes 10-18 mm x 100-180 mm
<b>150426</b> RACK, CODE 23, 44 17 X 55 SCINT VIALS		23	Polypropylene	44 Scintillation Vials 17 x 55 mm (6.8 mL) 17 x 65 mm (8 mL)

RACKS CONTINUED ON PAGE 53



PART NUMBER	IMAGE	RACK CODE	MATERIAL	VESSELS
<b>270433</b> RACK, CODE 23W 44 15 X 45MM WISP VIAL 4ML		23W	Polypropylene	44 Waters WISP Vials 15 x 45 mm (4 mL)
<b>150427</b> RACK, CODE 24, 14 28 X 57 SCINT VIALS		24	Polypropylene	14 Scintillation Vials 28 x 57 mm (20 mL) 28 x 60 mm (20 mL)
<b>150420</b> RACK, CODE 28, 108 10 X 75MM, 3.5ML		28	Polypropylene	108 Tubes 10 x 65 mm (3 mL) 10 x 75 mm (3.5 mL)
<b>150429</b> RACK, CODE 29, 60 12 X 75MM OR 13 X 75MM		29	Polypropylene	60 Tubes 12 x 75 mm (3.5 mL) 13 x 75 mm (5 mL)
<b>2704342</b> RACK, CODE 29LE 60 1.5ML EPPENDORF VIALS		29LE	Polypropylene	60 Eppendorf Vials 11 x 40 mm (1.5 mL)
<b>2704341</b> RACK, CODE 29SE 60 0.5ML EPPENDORF VIALS		29SE	Polypropylene	60 Eppendorf Vials 7 x 30 mm (0.5 mL)

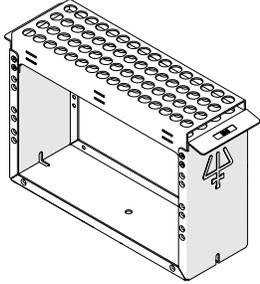
RACKS CONTINUED ON PAGE 54



PART NUMBER	IMAGE	RACK CODE	MATERIAL	VESSELS
<b>260440031</b> RACK, CODE 330 60 12x32MM VIALS 2mL		330	Aluminum	60 Vials 12 x 32 mm (2 mL)
<b>260440079</b> RACK, CODE 332 44 18x150MM TUBES		332	Aluminum	44 Tubes 18 x 150 mm (25 mL)
<b>260440081</b> RACK, CODE 334 14 40mL SCINT VIALS		334	Aluminum	14 Scintillation Vials 40 mL
<b>260440083</b> RACK, CODE 335 48 15x45MM WISP VIALS		335	Aluminum	48 WISP Vials 15 x 45 mm (4 mL)
<b>260440094</b> RACK, CODE 336 2 MICRO-T DBL WIDE		336	Aluminum	Two Microplates 96-well microplates (shallow or deep)

RACKS CONTINUED ON PAGE 55



PART NUMBER	IMAGE	RACK CODE	MATERIAL	VESSELS
<b>260440095</b> RACK, CODE 337 4 MICRO-T TPL WIDE		337	Aluminum	Four Microplates 96-well microplates (shallow or deep)
<b>260440106</b> RACK, CODE 338 64 12x32MM VIALS 2mL		338	Aluminum	64 Vials 12 x 32 mm (2 mL)
<b>260440039</b> RACK, CODE 341 108 10x75mm TUBES		341	Aluminum	108 Tubes 10 x 75 mm
<b>260440025</b> RACK, CODE 343 80 13x100MM TUBES		343	Aluminum	80 Tubes 13 x 100 mm
<b>260440041</b> RACK, CODE 345 44 16x150mm TUBES		345	Aluminum	44 Tubes 16 x 150 mm

RACKS CONTINUED ON PAGE 56



PART NUMBER	IMAGE	RACK CODE	MATERIAL	VESSELS
<b>260440049</b> RACK, CODE 346 44 16x100MM TUBES		346	Aluminum	44 Tubes 16 x 100 mm (15 mL)
<b>260440044</b> RACK, CODE 371 ASPEC 274 1 mL 36-12x75		371	Aluminum	36 (1 mL) SPE Cartridges and 36 Tubes 1 mL SPE Cartridges Collection Block Holds: 12 x 75 mm (5 mL) Tubes
<b>260440045</b> RACK, CODE 373 ASPEC 274 3 mL 20-12x75		373	Aluminum	20 (3 mL) SPE Cartridges and 20 Tubes 3 mL SPE Cartridges Collection Block Holds: 12 x 75 mm (5 mL) Tubes
<b>260440046</b> RACK, CODE 376 ASPEC 271 6 mL 15-15x85		376	Aluminum	15 (6 mL) SPE Cartridges and 15 Tubes 6 mL SPE Cartridges Collection Block Holds: 15 x 85 mm (10 mL) Tubes
<b>260440109</b> RACK, CODE 386 ASPEC 274 6 mL 16-15x85		386	Aluminum	16 (6 mL) SPE Cartridges and 15 Tubes 6 mL SPE cartridges Collection Block Holds: 15 x 85 mm (10 mL) Tubes

RACKS CONTINUED ON PAGE 57



PART NUMBER	IMAGE	RACK CODE	MATERIAL	VESSELS
<b>260440005</b> RACK,SOLVENT BOTTLE,4 PROBE		N/A	Aluminum	Four 500 or 700 mL Solvent Bottles
<b>26044036</b> RACK,CODE 123 4 650mL GLASS BOTTLES		123	Teflon® (Top) High Density Polyethelene (HDPE) for Bottom	Four 650 mL Solvent Bottles

### Tray Insert

Part Number	Description
26041033	LOCATOR,271 FIVE 20 SERIES RACKS Tray Insert

### Test Tubes

Part Number	Description
2954726	TUBE,12 X 75MM,5ML,GLASS (250/PK) 5 mL, glass, 12 x 75 mm, 250/package
2954729	TUBE,15 X 85MM,10ML,GLASS (250/PK) 10 mL, glass, 15 x 85 mm, 250/carton

### Solvent Bottles

Part Number	Description
54370601	BOTTLE,SOLVENT,650ML 4/PK 600 mL, 4/package, glass
543701700	BOTTLE,SOLVENT,700ML,4/PK 700 mL, 4/package



## ASPEC® SPE Cartridges

### Silica

Part Number	Description
54350501	ASPEC, SILICA, 50 MG, 1 ML CAPS, 100/PK 50 mg, 1 mL
54350502	ASPEC SILICA, 100 MG, 1 ML CAPS, 100/PK 100 mg, 1 mL
54350503	ASPEC SILICA, 200 MG, 3 ML CAPS, 50/PK 200 mg, 3 mL
54350504	ASPEC SILICA, 500 MG, 3 ML CAPS, 50/PK 500 mg, 3 mL
54350505	ASPEC SILICA, 500 MG, 6 ML CAPS, 50/PK 500 mg, 6 mL
54350506	ASPEC SILICA, 1 G, 6 ML CAPS, 50/PK 1 g, 6 mL

### C4

Part Number	Description
54350507	ASPEC C4, 50 MG, 1ML CAPS, 100/PK 50 mg, 1 mL
54350508	ASPEC C4, 100 MG, 1ML CAPS, 100/PK 100 mg, 1 mL
54350509	ASPEC C4, 200 MG, 3ML CAPS, 50/PK 200 mg, 3 mL
54350510	ASPEC C4, 500 MG, 3ML CAPS, 50/PK 500 mg, 3 mL
54350511	ASPEC C4, 500 MG, 6ML CAPS, 50/PK 500 mg, 6 mL
54350512	ASPEC C4, 1 G, 6ML CAPS, 50/PK 1 g, 6 mL

## C8

Part Number	Description
54350513	ASPEC C8, 50 MG, 1ML CAPS, 100/PK 50 mg, 1 mL
54350514	ASPEC C8, 100 MG, 1ML CAPS, 100/PK 100 mg, 1 mL
54350515	ASPEC C8, 200 MG, 3ML CAPS, 50/PK 200 mg, 3 mL
54350516	ASPEC C8, 500 MG, 3ML CAPS, 50/PK 500 mg, 3 mL
54350517	ASPEC C8, 500 MG, 6ML CAPS, 50/PK 500 mg, 6 mL
54350518	ASPEC C8, 1 G, 6ML CAPS, 50/PK 1 g, 6 mL

## C18

Part Number	Description
54350519	ASPEC C18,50MG,1ML CAPS (100/PK) 50 mg, 1 mL
54350520	ASPEC C18,100MG,1ML CAPS (100/PK) 100 mg, 1 mL
54350521	ASPEC C18,200MG,3ML CAPS (50/PK) 200 mg, 3 mL
54350522	ASPEC C18,500MG,3ML CAPS (50/PK) 500 mg, 3 mL
54350523	ASPEC C18,500MG,6ML CAPS (50/PK) 500 mg, 6 mL
54350524	ASPEC C18,1G,6ML CAPS (50/PK) 1 g, 6 mL





## SAX, ASPEC A Chloride nec

Part Number	Description
54350525	ASPEC SAX NEC, 50 MG, 1ML CAPS, 100/PK 50 mg, 1 mL
54350526	ASPEC SAX NEC, 100 MG, 1ML CAPS, 100/PK 100 mg, 1 mL
54350527	ASPEC SAX NEC, 200 MG, 3ML CAPS, 50/PK 200 mg, 3 mL
54350528	ASPEC SAX NEC, 500 MG, 3ML CAPS, 50/PK 500 mg, 3 mL
54350529	ASPEC SAX NEC, 500 MG, 6ML CAPS, 50/PK 500 mg, 6 mL
54350530	ASPEC SAX NEC, 1 G, 6ML CAPS, 50/PK 1 g, 6 mL

## SAX-2, ASPECMA Acetate nec

Part Number	Description
54350531	ASPEC SAX-2 NEC, 50 MG, 1ML CAPS, 100/PK 50 mg, 1 mL
54350532	ASPEC SAX-2 NEC, 100 MG, 1ML CAPS, 100/PK 100 mg, 1 mL
54350533	ASPEC SAX-2 NEC, 200 MG, 3ML CAPS, 50/PK 200 mg, 3 mL
54350534	ASPEC SAX-2 NEC, 500 MG, 3ML CAPS, 50/PK 500 mg, 3 mL
54350535	ASPEC SAX-2 NEC, 500 MG, 6ML CAPS, 50/PK 500 mg, 6 mL
54350536	ASPEC SAX-2 NEC, 1 G, 6ML CAPS, 50/PK 1 g, 6 mL

## SCX, ASPECToxic Acid

Part Number	Description
54350537	ASPEC SCX ,50MG,1ML CAPS, 100/PK 50 mg, 1 mL
54350538	ASPEC SCX ,100MG,1ML CAP, 100/PK 100 mg, 1 mL
54350539	ASPEC SCX ,200MG,3ML CAPS, 50/PK 200 mg, 3 mL
54350541	ASPEC SCX ,500MG,6ML CAPS, 50/PK 500 mg, 6 mL
54350542	ASPEC SCX , 1G, 6ML CAPS, 50/PK 1 g, 6 mL

## SCX-2, ASPEC Propylsulfonic Acid

Part Number	Description
54350543	ASPEC SCX-2, 50MG,1ML CAPS, 100/PK 50 mg, 1 mL
54350544	ASPEC SCX-2, 100 MG,1ML CAPS, 100/PK 100 mg, 1 mL
54350545	ASPEC SCX-2, 200 MG,3ML CAPS, 50/PK 200 mg, 3 mL
54350546	ASPEC SCX-2, 500 MG,3ML CAPS, 50/PK 500 mg, 3 mL
54350547	ASPEC SCX-2, 500 MG,6ML CAPS, 50/PK 500 mg, 6 mL
54350548	ASPEC SCX-2, 1G, 6ML CAPS, 50/PK 1 g, 6 mL





## WAX, ASPEC Amine

Part Number	Description
54350549	ASPEC WAX ,50MG, 1ML CAPS, 100/PK 50 mg, 1 mL
54350550	ASPEC WAX ,100MG, 1ML CAP, 100/PK 100 mg, 1 mL
54350551	ASPEC WAX ,200MG,3ML CAPS, 50/PK 200 mg, 3 mL
54350552	ASPEC WAX ,500MG,3ML CAPS, 50/PK 500 mg, 3 mL
54350553	ASPEC WAX ,500MG,6ML CAPS, 50/PK 500 mg, 6 mL
54350554	ASPEC WAX , 1 G, 6ML CAPS, 50/PK 1 g, 6 mL

## WCX, Carboxylic Acid

Part Number	Description
54350555	ASPEC WCX, 50 MG, 1ML CAPS, 100/PK 50 mg, 1 mL
54350556	ASPEC WCX, 100 MG, 1ML CAPS, 100/PK 100 mg, 1 mL
54350557	ASPEC WCX, 200 MG, 3ML CAPS, 50/PK 200 mg, 3 mL
54350558	ASPEC WCX, 500 MG, 3ML CAPS, 50/PK 500 mg, 3 mL
54350559	ASPEC WCX, 500 MG, 6ML CAPS, 50/PK 500 mg, 6 mL
54350560	ASPEC WCX,1 G, 6ML CAPS, 50/PK 1 g, 6 mL

## HLB

Part Number	Description
54350561	ASPEC HLB,30MG,1ML CAPS (100/PK) 50 mg, 1 mL
54350562	ASPEC HLB,60MG,3ML CAPS (50/PK) 100 mg, 1 mL
54350563	ASPEC HLB,100MG,6ML CAPS (30/PK) 200 mg, 3 mL
54350564	ASPEC HLB,200MG,6ML CAPS (30/PK) 500 mg, 3 mL
54350565	ASPEC HLB,500MG,6ML CAPS (30/PK) 500 mg, 6 mL





## DEC Accessory Kits

### ASPEC 1 mL

Part Number	Description
2604701	DEC ACCY SET,1 mL ASPEC DEC accessory set, 1 mL ASPEC
2954698	CAP,1ML COLUMN,NATURAL PE (1000/PK) Caps, natural PE, for 1 mL cartridge, 1000/pkg
2954726	TUBE,12 X 75MM,5ML,GLASS (250/PK) Tubes, 12 x 75 mm, 5 mL, glass, 250/pkg
4701438630	TUBING,VITON,0.313 X 0.438,20FT Tubing, Viton 0.313 ID x 0.438 OD, 20 ft
543506002	TUBES,12 X 75MM,5ML,POLYPROP (250/pk) Tubes, polypropylene, 12 x 75 mm, 5 mL, 250/ctn
543701500	BOTTLE,SOLVENT,500ML,4/PK Bottle, solvent, 500 mL, 4/pkg
543701700	BOTTLE,SOLVENT,700ML,4/PK Bottle, solvent, 700 mL, 4/pkg

### ASPEC 3 mL

Part Number	Description
2604702	DEC ACCY SET,3 mL ASPEC DEC accessory set, 3 mL ASPEC
2954699	CAP,3ML COLUMN NATURAL PE (1000/PK) Caps, natural PE, 3 mL cartridge, 1000/pkg
2954726	TUBE,12 X 75MM,5ML,GLASS (250/PK) Tubes, 12 x 75 mm, 5 mL, glass, 250/pkg
4701438630	TUBING,VITON,0.313 X 0.438,20FT Tubing, Viton 0.313 ID x 0.438 OD, 20 ft
543506002	TUBES,12 X 75MM,5ML,POLYPROP (250/pk) Tubes, polypropylene, 12 x 75 mm, 5 mL, 250/ctn
543701500	BOTTLE,SOLVENT,500ML,4/PK Bottle, solvent, 500 mL, 4/pkg
543701700	BOTTLE,SOLVENT,700ML,4/PK Bottle, solvent, 700 mL, 4/pkg

## ASPEC 6 mL

Part Number	Description
2604703	DEC ACCY SET,6 mL ASPEC DEC accessory set, 6 mL ASPEC
2954729	TUBE,15 X 85MM,10ML,GLASS (250/PK) Tubes, 15 x 85 mm, 10mL, glass, 250/ctn
2954730	CAP,6ML COLUMN,NATURAL PE (1000/PK) Sealing caps, 6 mL DEC, polyethylene, 1000/pkg
4701438630	TUBING,VITON,0.313 X 0.438,20FT Tubing, Viton 0.313 ID x 0.438 OD, 20 ft
543506003	TUBES,10ML,POLYPROPYLENE (500/PK) Tubes, polypropylene, 10 mL, 500/pkg
543701500	BOTTLE,SOLVENT,500ML,4/PK Bottle, solvent, 500 mL, 4/pkg
543701700	BOTTLE,SOLVENT,700ML,4/PK Bottle, solvent, 700 mL, 4/pkg

## DEC Caps

Part Number	Description
2954698	CAP,1ML COLUMN,NATURAL PE (1000/PK) Natural polyethylene (PE) for 1 mL cartridge, 1000/package
2954699	CAP,3ML COLUMN NATURAL PE (1000/PK) Natural polyethylene (PE) for 3 mL cartridge, 1000/package
2954730	CAP,6ML COLUMN,NATURAL PE (1000/PK) Natural polyethylene (PE) for 6 mL cartridge, 1000/package





# PARTS AND ACCESSORIES

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- GX Rinse Pump | 67
- Safety Shield | 67
- GX Direct Injection Module | 67
- Probes | 68
- Z-Arm and Components | 69
- Rinse Stations | 69
- Miscellaneous | 69
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### ASPEC® 271 Systems

Part Number	Description
2614007	ASPEC® 271 with ASPEC® 4060 Single Syringe Pump
2614008	ASPEC® 271 with ASPEC® 4260 Dual Syringe Pump

### GX Rinse Pump

For part numbers, refer to [Appendix E | GX Rinse Pump on page 83](#).

### Safety Shield

For the part number, refer to [Appendix F | Safety Shield on page 89](#).

### GX Direct Injection Module

For part numbers, refer to [Appendix D | GX Direct Injection Module on page 73](#).



## Probes

The following are commonly used probes. Contact your local Gilson representative for information about probe choices for other applications.

Part Number	Description
2507255	PROBE,269X1.5X0.4MM BEV Beveled tip, 269 x 1.5 x 0.4 mm
27067374	PROBE,221x1.5x1.1MM CON BEV .45ID TIP Non-septum piercing, beveled taper tip, 221 x 1.5 x 1.1 mm
27067373	PROBE,221x1.5x1.1MM CON FL .45ID TIP Non-septum piercing, tapered tip, 221 x 1.5 x 1.1 mm
27067382	PROBE,221x2.0x0.8MM BEV 1.5 TIP GROOV SP Septum piercing, beveled tip, 221 x 2.0 x 0.8 mm

## Probe Guide Assembly

Part Number	Description
26046228	GUIDE,1.5MM ASPEC 271 PROBE ASPEC 271 inert guide foot assembly

## PROBE GUIDE INSERT

Part Number	Description
26046226	GUIDE,1.5MM, ASPEC 241/271 PROBE Probe guide insert for ASPEC 271 inert guide foot assembly

## PROBE GUIDE FOOT

Part Number	Description
26046227	RETAINER, ASPEC 271 GUIDE FOOT Probe guide foot for ASPEC 271 inert guide foot assembly

## ISOLATOR PROBE HOLDER

Part Number	Description
2604615	ISOLATOR,271 SINGLE PROBE Isolator probe holder for ASPEC 271 inert guide foot assembly

## Z-Arm and Components

### Z-Arm

PART NUMBER	DESCRIPTION
260465	GX-27X Z-arm

### Components

PART NUMBER	DESCRIPTION
260463	Stop pin

### Rinse Stations

Part Number	Description
26034551	RINSE STATION,GX OUTSIDE,175MM Rinse station for outside rinse of probe, 175 mm
26034555	RINSE STATION,GX INSIDE,175MM FC Drain/rinse station for inside rinse of probe, 175 mm

### Miscellaneous

Part Number	Description
95260185	TUBE,Z HEIGHT ADJUSTMENT TOOL,185MM Z-height adjustment tool, 185 mm
21050000	GX-27X SYSTEM ORGANIZER System organizer, GX-27X
26041033	LOCATOR,271 FIVE 20 SERIES RACKS Code 20-series tray insert





## Cables and I/O Accessories

Part Number	Description
260461126	CABLE, 271 LLD Liquid level detection (LLD) cable assembly
36078142	CABLE,CAT5E,MODULAR RJ45,MOLDED BOOT,7' Ethernet cable
638306512	CONNECTOR,6 TERMINAL BLOCK MATING Terminal block connector, 6-pin
638308512	CONNECTOR,8 TERMINAL BLOCK MATING Terminal block connector, 8-pin
709910206	WIRE,2-CONDUCTOR INTERCONNECT,6FT 2-conductor interconnect wire, 6', for making contact connections
6730314007	FUSE,3.15A,250V,T-3.15,SLO-BLO Fuse, 3.15A, "T" type, SLO-BLO
6770100411	FUSE DRAWER,250V/10A,5X20MM,4303.2401 Fuse drawer
7080318114	POWER CORD-C13,US & JAPAN,90-DEG Power cord, right angle, 110V
7080318115	POWER CORD-C13,EURO,90-DEG Power cord, right angle, 220V

# Appendix C

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## MATERIALS

Information provided by Valco Instruments Company Inc.

The information provided in the following table is accurate to the best of our knowledge and belief, but is intended for general information only.

MATERIAL	DESCRIPTION
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.
PAEK	<p>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.</p> <p>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%).</p>
PEEK	<p>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.</p> <p>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.</p>
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.
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.



# GX DIRECT INJECTION MODULE

### IN THIS CHAPTER:

- Technical Specifications | 74
- Plumbing | 76
- Electrical Connections | 78
- Startup/Operation | 78
- Error Messages | 79
- Part Numbers | 79

Integration of a GX Direct Injection Module allows for on-line injection onto HPLC or LC/MS systems following solid phase extraction (SPE) clean-up.



# Technical Specifications

## GX Direct Injection Module

GX DIRECT INJECTION MODULE

TECHNICAL SPECIFICATION	DEFINITION
Available Valves	<b>Analytical</b> <b>Stainless Steel Direct Injection Valve</b> (2-position, 6-port) 0.016" (ID) ports, 1/16" (OD) <b>PEEK Direct Injection Valve</b> (2-position, 6-port) 0.016" (ID) ports, 1/16" (OD)
	<b>Preparative</b> <b>Stainless Steel Direct Injection Valve</b> (2-position, 6-port) 0.060" ID ports, 1/8" OD <b>Stainless Steel Direct Injection Valve</b> (2-position, 6-port) 0.030" ID ports, 1/16" OD
Available Sample Loops	<b>Analytical</b> 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
	<b>Preparative</b> 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
Dimensions (W x D x H)	12.1 x 8.9 x 10.1 cm (4.75 x 3.50 x 3.98 in.)
Front Panel	LED indicator for LOAD and INJECT positions
Injection Carryover* <small>*Contact Gilson, Inc. (techsupport@gilson.com) to learn what methods and conditions were used to obtain the values.</small>	Analytical (1/16") < 0.005% Stainless Steel Valve and Port 20 µL Loop Total Loop Overfill
Injection Reproducibility* <small>*Contact Gilson, Inc. to learn what methods and conditions were used to obtain the values.</small>	<b>Analytical (1/16")</b> CV < 0.7% Stainless steel and PEEK valves and ports 20 µL loop Total loop overfill
	<b>Preparative (1/16")</b> CV < 0.9% Stainless steel valve and port 1 mL loop Partial loop

GX DIRECT INJECTION MODULE TECHNICAL SPECIFICATIONS (CONTINUED ON PAGE 75)

## GX Direct Injection Module



TECHNICAL SPECIFICATION	DEFINITION	
	Description	Materials
Liquid Contact Materials* <small>*Refer to the <a href="#">Materials</a> appendix for more details.</small>	Injection Valve	Valcon H, Nitronic 60 (N60), PTFE, PAEK
	Injection Port	PPS, SS
Power Requirements	Voltage: 24V DC Current rating: 1.0A	
Valve Switching Speed	200 msec for GX Direct Injection Module (1/16")	
	300 msec for GX Direct Injection Module (1/8")	
Weight	1.2 kg (2.63 lbs.)	

### Installation

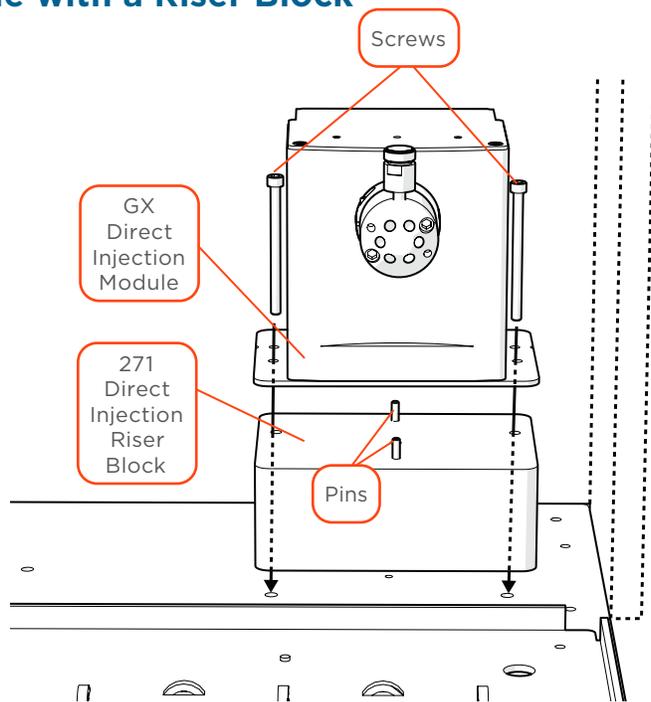
Install the GX Direct Injection Module on the right side of the locator plate, next to the right support of the ASPEC 271.

### Installing the GX Direct Injection Module with a Riser Block

Use the 271 Direct Inject Riser Block (part number 26035458, ordered separately) when collecting fractions to tubes 150 mm and taller or when using the Code 33X/34X-series racks.

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

1. Align the pins on the top of the riser block with the holes on the bottom of the GX Direct Injection Module and then push the injection module into place.
2. 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.
3. Place the two screws (included with the riser) through the rear set of holes on the GX Direct Injection Module.
4. Using the supplied ball driver wrench, tighten the screws connecting the injection module/riser assembly to the locator plate.



**Figure 34**  
Installing the GX Direct Injection Module on the Riser



## Installing the GX Direct Injection Module on the Locator Plate

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 in the rear holes of the GX Direct Injection Module. Tighten the screws 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 with the ASPEC 271.



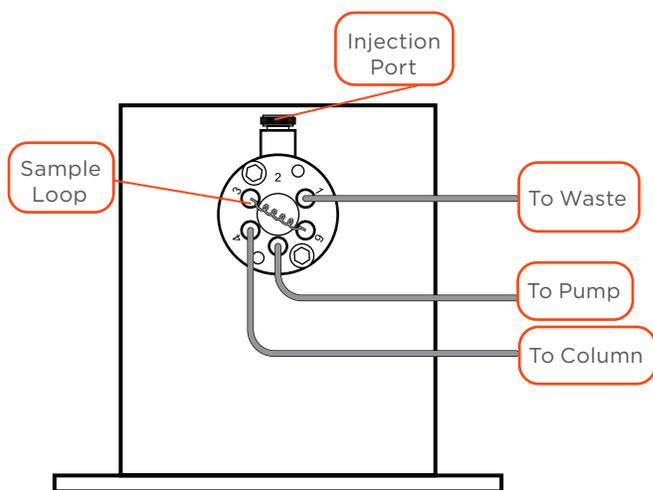
**Figure 35**  
GX Direct Injection Module on the Locator Plate

## Plumbing

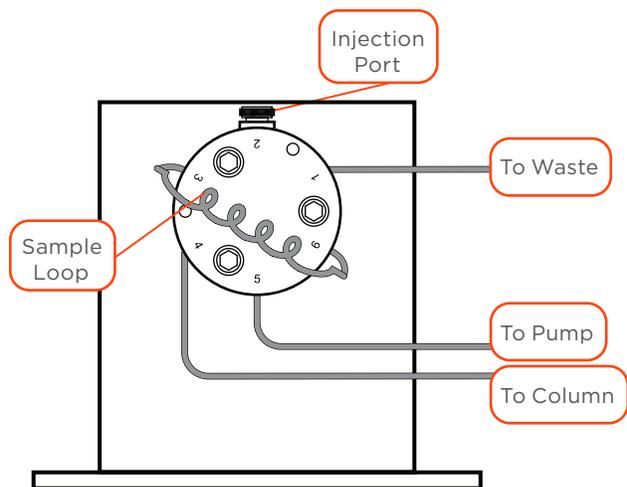
This section will take you through the steps for plumbing the GX Direct Injection Module. Before making the tubing connections, locate the Plumbing Package for the GX Direct Injection Module (part number 26035470) which contains the following:

Part Number	Description	Quantity
4903180411	1/16" Nut, PEEK, (MZN1PK)	5
4903180511	1/16" Ferrule, PEEK, (ZF1PK)	5
495033	Teflon tubing, 0.020" ID x 1/16" OD, 10 ft/pk	1

Refer to the diagrams and table that follows when making plumbing connections for the GX Direct Injection Module.



**Figure 36**  
GX Direct Injection Module for 1/16" (OD) Sample Loop



**Figure 37**  
GX Direct Injection Module for 1/8" (OD) Sample Loop

GX Direct Injection Module	Tubing	Connections
Port 1 to waste	Teflon® tubing, 0.020" ID x 1/16" OD, 10 ft. (part number 495033)	Use a 1/16" Nut, PEEK, (MZN1PK) (part number 4903180411) and a 1/16" Ferrule, PEEK, (ZF1PK) (part number 4903180511) to connect the tubing to port 1 on the valve.
Port 2 (Injection port)	N/A	One of the following: Injection port for 1.5 mm OD probe, PPS, (part number 26035411) Injection port for 1.5 mm OD probe, SS (part number 26035413)
Port 3 to port 6	Sample loop (ordered separately) For part numbers for available sample loops, refer to <a href="#">page 81</a> .	
Port 4 to column	Not supplied. Application specific.	Use a 1/16" Nut, PEEK, (MZN1PK) (part number 4903180411) and a 1/16" Ferrule, PEEK, (ZF1PK) (part number 4903180511) to connect the tubing to port 4 on the valve.
Port 5 to pump	Not supplied. Application specific.	Use a 1/16" Nut, PEEK, (MZN1PK) (part number 4903180411) and a ZF1PK 1/16" ferrule (part number 4903180511) to connect the tubing to port 5 on the valve.



## Electrical Connections

To make connections between the GX Direct Injection Module and the ASPEC 271 refer to the instructions below.

1. Ensure that the power is turned off to the ASPEC 271.

**NOTE**

Any time the injection module will be connected or disconnected, ensure that the power is turned off to the ASPEC 271.

2. Connect the right-angled end of the power cable (part number 26035455) to the FROM GSIOC ACCESSORY port on the GX Direct Injection Module.
3. Connect the other end of the power cable to one of the GSIOC ACCESSORIES ports on the rear panel of the ASPEC 271.

### Unit ID

The unit ID on the GX Direct Injection Module is set to 3.

**NOTE**

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

INSTRUMENT	UNIT ID
GX-281	3 (LEFT)
	4 (RIGHT)
RS-232	3
GSIOC	3
ETHERNET	9

**UNIT ID**



**Figure 38**  
Unit ID Label

To change the unit ID:

1. Gently insert a small flat-blade screwdriver into the selector on the rear panel of the injection module and turn it.
2. Align the arrow with one of the indicated numbers.

## Startup/Operation

To start the injection module:

1. Make sure that the injection module is connected to the ASPEC 271. If not, ensure that the power is turned off to the ASPEC 271 before making the connection.

**NOTE**

Any time the injection module will be connected or disconnected from the ASPEC 271, ensure that the power is turned off to the ASPEC 271.

2. Turn on power to the ASPEC 271. Power is supplied to the GX Direct Injection Module by the ASPEC 271:
  - The indicator lights on the injection module illuminate briefly.
  - The injection module initializes. It stops with the valve set to the Inject position.

## Error Messages

To obtain the error code and message:

1. Install the Gilson Ethernet Utility. Refer to its documentation, if necessary.
2. Start the Gilson Ethernet Utility. Select the **Start** button and then select **Gilson Applications > Gilson Ethernet Utility**.
3. Select **GX D Inject** from the list and then select **Connect**.
4. Select **Get Error** from the command drop-down and then select **Go**. The Results will display the current error.

Refer to the table below for a list of the error codes and messages.

ERROR	ERROR TEXT	SOLUTION
0	No Error	No solution needed.
1	Unknown Command	Send a <b>Clear Error</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
2	Invalid NV-RAM Address Specified	Send a <b>Clear Error</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
3	Previous Move Not Complete	Send a <b>Clear Error</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
4	Invalid Position Requested	Send a <b>Clear Error</b> command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.

## Part Numbers

PART NUMBER	DESCRIPTION
261354	GX Direct Injection Module, 1/16" Prep
261355	GX Direct Injection Module, 1/8" Prep
261356	GX Direct Injection Module, 1/16", Analytical, Stainless Steel
261357	GX Direct Injection Module, 1/16", Analytical, PEEK



## Plumbing

PART NUMBER	DESCRIPTION
26035470	KIT,DIRECT INJ,1/16 & 1/8,PEEK,PLUMBING Plumbing package for the GX Direct Injection Module
495033	TUBING,TFE,0.5MM ID X 1.5MM OD (10FT/PK) Teflon tubing, 0.023" ID x 0.062" (1/16") OD (package of 10 ft)
490318041	NUT,VALCO,PEEK,1/16,MZN1PK-10 (10/PK) Valco MZN1PK PEEK nut for 1/16" OD tubing (package of 10)
4903180411	NUT,VALCO,PEEK,1/16 Valco MZN1PK PEEK nut for 1/16" OD tubing, 1 each
490318051	FERRULE,VALCO,PEEK,1/16 (10/PK) Valco ZF1PK PEEK ferrule (1/16"), package of 10
4903180511	FERRULE,VALCO,PEEK,1/16 Valco ZF1PK PEEK ferrule (1/16"), 1 each

## Riser Block

PART NUMBER	DESCRIPTION
26035458	ASY,271 DIRECT INJECT MODULE RISER GX Direct Injection Module riser block assembly

## Injection Ports

PART NUMBER	DESCRIPTION
26035411	INJECTION PORT ASY,1.5MM,GX,PPS GX Direct Injection port for 1.5 mm (OD) probes
26035413	INJECTION PORT ASY,1.5MM,GX,SS GX Direct Injection port for 1.5 mm (OD) probes, SS
2954674	SEAL,PTFE,INJ PORT Injection port seal for 1.5 mm (OD) probes

## Sample Loops, 1/8" (OD), Stainless Steel

PART NUMBER	DESCRIPTION
494400051	SAMPLE LOOP,5.0ML,SS,VALCO,1/8" 5 mL
49440010	SAMPLE LOOP,10ML,SS,VALCO,1/8" 10 mL
49440020	SAMPLE LOOP,20ML,SS,VALCO,1/8" 20 mL
49440025	SAMPLE LOOP,25ML,SS,VALCO,1/8" 25 mL

## Sample Loops, 1/16" (OD), PEEK

PART NUMBER	DESCRIPTION
49440011	SAMPLE LOOP,2.0UL,PEEK,VALCO,1/16" 2 $\mu$ L
49440012	SAMPLE LOOP,5.0UL,PEEK, VALCO, 1/16" 5 $\mu$ L
49440013	SAMPLE LOOP,10UL,PEEK,VALCO,1/16" 10 $\mu$ L
49440014	SAMPLE LOOP,20UL,PEEK,VALCO,1/16" 20 $\mu$ L
49440015	SAMPLE LOOP,50UL,PEEK,VALCO,1/16" 50 $\mu$ L
49440016	SAMPLE LOOP,100UL,PEEK,VALCO,1/16" 100 $\mu$ L
49440017	SAMPLE LOOP,250UL,PEEK,VALCO,1/16" 250 $\mu$ L
49440018	SAMPLE LOOP,500UL,PEEK,VALCO,1/16" 500 $\mu$ L





## Sample Loops, 1/16" (OD), Stainless Steel

PART NUMBER	DESCRIPTION
49440003	SAMPLE LOOP,2.0UL,SS,VALCO,1/16" 2 $\mu$ L
49440004	SAMPLE LOOP,5.0UL,SS,VALCO,1/16" 5 $\mu$ L
49440006	SAMPLE LOOP,10UL,SS,VALCO,1/16" 10 $\mu$ L
49440007	SAMPLE LOOP,20UL,SS,VALCO,1/16" 20 $\mu$ L
49440008	SAMPLE LOOP,50UL,SS,VALCO,1/16" 50 $\mu$ L
49440009	SAMPLE LOOP,100UL,SS,VALCO,1/16" 100 $\mu$ L
494400002	SAMPLE LOOP,250UL,SS,VALCO,1/16" 250 $\mu$ L
494400005	SAMPLE LOOP,500UL,SS,VALCO,1/16" 500 $\mu$ L
49440001	SAMPLE LOOP,1.0ML,SS,VALCO,1/16" 1 mL
49440002	SAMPLE LOOP,2.0ML,SS,VALCO,1/16" 2 mL
49440005	SAMPLE LOOP,5.0ML,SS,VALCO,1/16" 5 mL
49060010	10 ML SAMPLE LOOP (Valco SL10KCUW) 10 mL

# GX RINSE PUMP

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- Plumbing | 85
- Electrical Connections | 86
- Part Numbers | 87

Integration of a GX Rinse Pump provides the option for a flowing rinse using high or low flow settings.



## Technical Specifications

### GX Rinse Pump

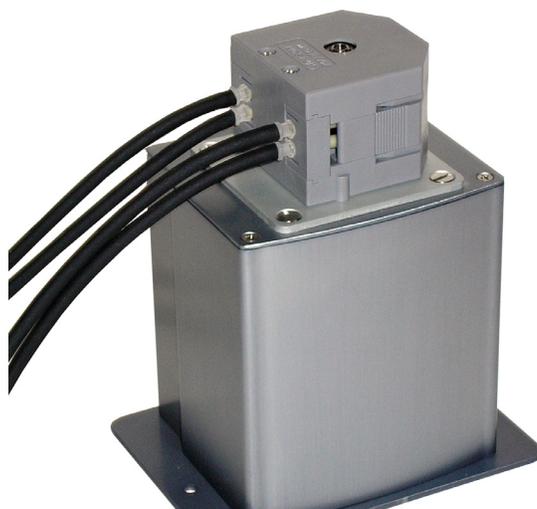
TECHNICAL SPECIFICATION	DEFINITION
Contact Control	One input (contact closure) and one switched +24V DC 1A input
Dimensions (W x D x H)	12.1 x 8.9 x 18.3 cm (4.76 x 3.5 x 7.2 in.)
Power Requirements	Voltage: 24V DC Current rating: 1.0A
Pump Type	Peristaltic
Rinse Speed	High and low
Weight	1.0 kg (2.28 lbs.)

## Installation

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

**NOTE**

There are two thumbscrews included with the rinse pump, which will not be used with the ASPEC 271.



**Figure 39**  
GX Rinse Pump

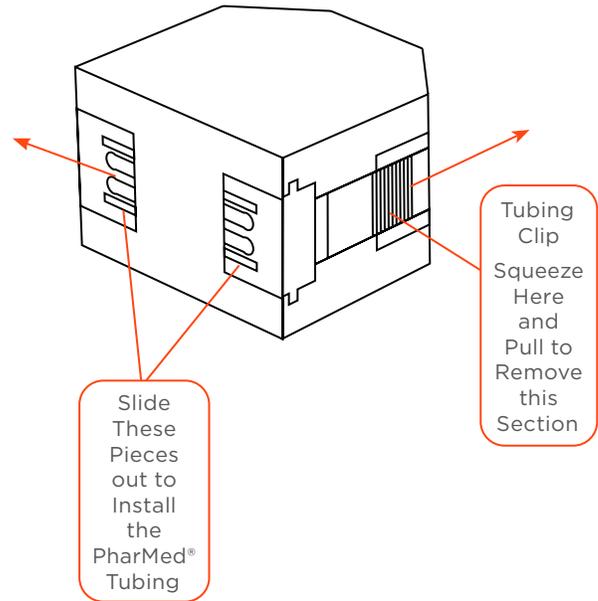
## Plumbing

Locate the following tubing included with the rinse pump:

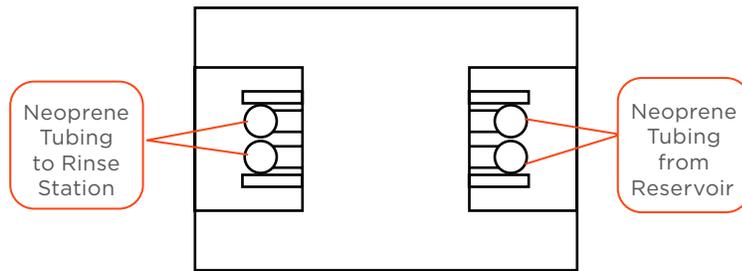
- 2.0 mm ID PharMed® tubing assembly (part number 26035221)
- 1/16" ID x 3/16" OD neoprene tubing (part number 4715187060)

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 5 and 6 for the bottom set of fittings.



**Figure 40**  
Installing Tubing in the GX Rinse Pump



**Figure 41**  
Making the Neoprene Tubing Connections

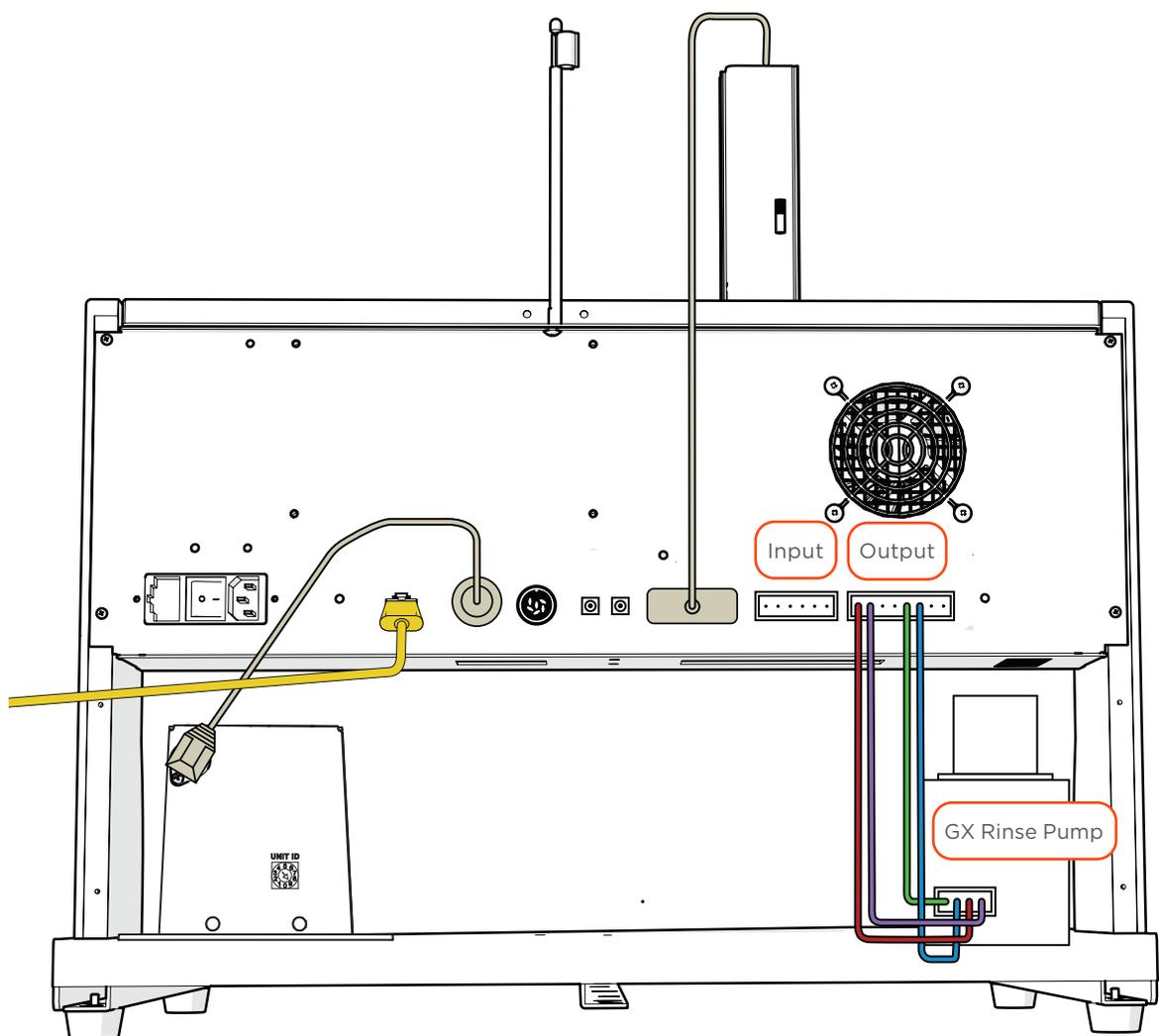




## Electrical Connections

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

1. Ensure that the power is turned off to the ASPEC 271.
2. Locate the GX Rinse Pump cable connector (part number 26035256). This assembly contains two prewired terminal block connectors. Another cable connector (part number 26035257) is included, but will not be used.
3. Connect the 4-pin terminal block connector to the rear panel of the GX Rinse Pump.
4. Connect the 8-pin terminal block connector to the output ports on the rear panel of the ASPEC 271.



**Figure 42**  
Electrical Connections Diagram for the ASPEC® 271 with Accessories

## Part Numbers

Part Number	Description
261452	GX Rinse Pump

## Replacement Parts

Part Number	Description
26035221	KIT,2.0MM PHARMED TUBING TUBE 2.0 mm ID PharMed® tubing assembly
4715187060	TUBING,NEOPRENE,0.063 ID X 0.188OD 1/16" ID x 3/16" OD neoprene tubing
26035256	CABLE,27X RINSE PUMP POWER Power cable for GX Rinse Pump





# SAFETY SHIELD

**IN THIS CHAPTER:**

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## Installation

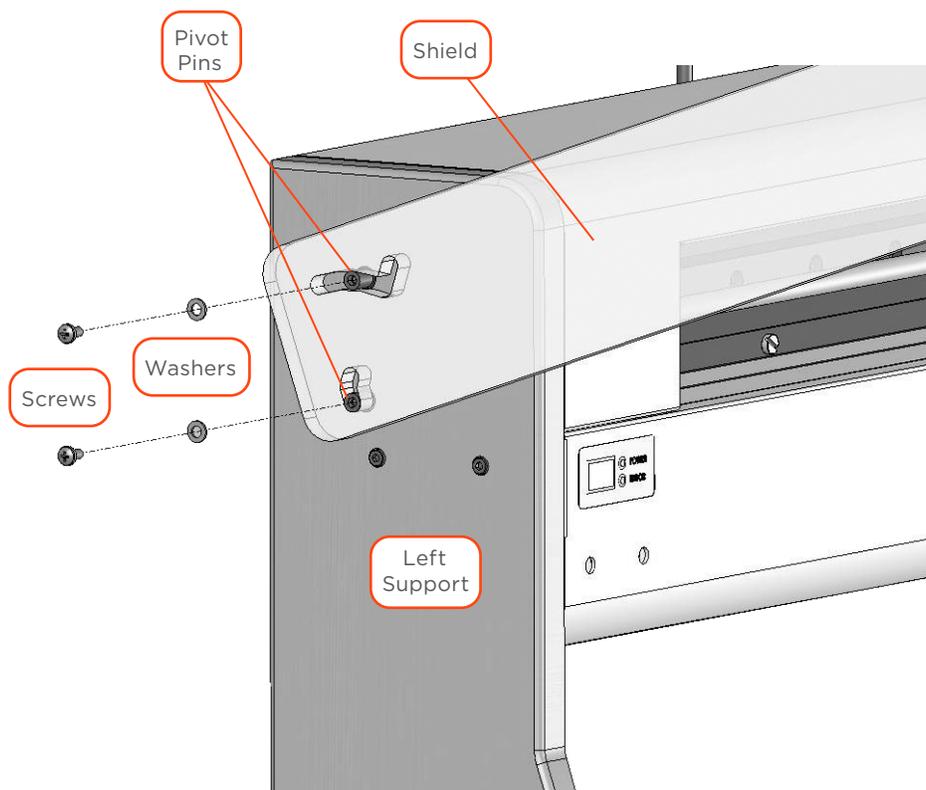
Refer to the instructions and diagram that follow to install the shield.

1. Locate the GX-27X Shield Kit (ordered separately, part number 2604706).
2. Remove the top screw on the left support of the instrument using a 4 mm Allen wrench and replace it 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.

**NOTICE**

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.



**Figure 43**  
Shield Installation Diagram

## Part Number

PART NUMBER	DESCRIPTION
2604706	Shield, GX-27X ASY,GX-27X SHIELD



