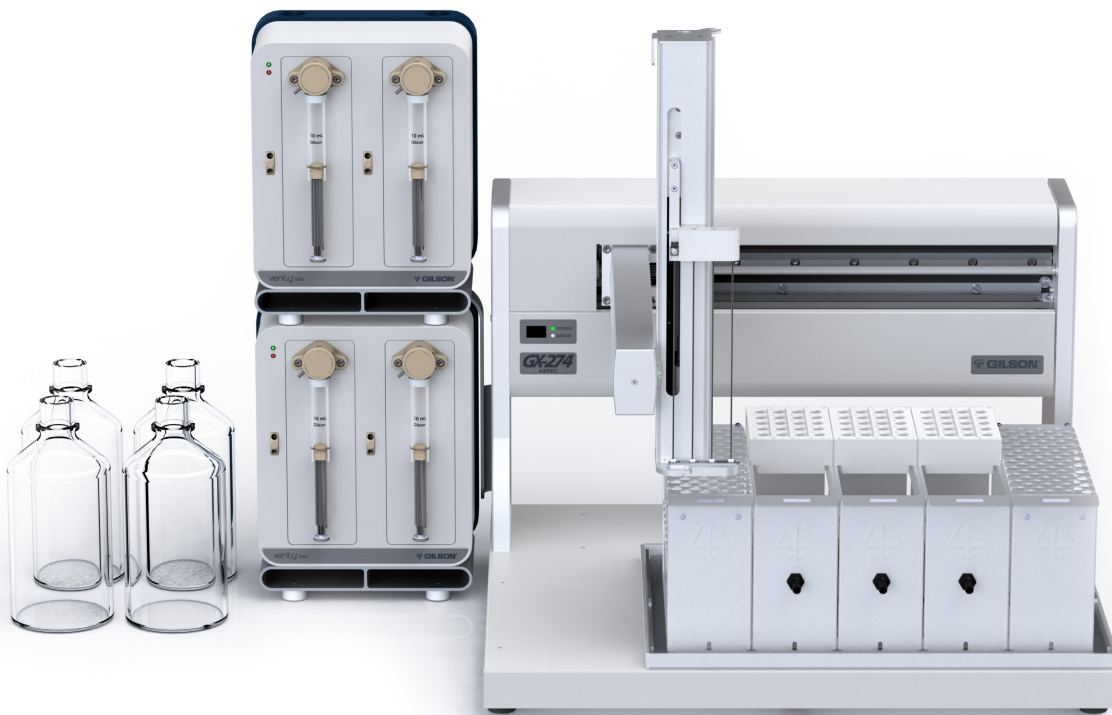




GX-274 ASPEC™

User's Guide



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Safety

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.

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 electronic and hazard symbols may appear on the instrument:

<i>Symbol</i>	<i>Explanation</i>
~	Alternating current Courant alternatif Wechselstrom
— — —	Direct current Courant continu Gleichstrom
	Protective conductor terminal Borne de terre de protection Schutzleiteranschluss
	Electrical power ON Sous tension Netzschalter ein
o	Electrical power OFF Hors tension Netzschalter aus
	Caution Attention Vorsicht
	Caution, risk of electric shock Attention, risque de choc électrique Vorsicht, Elektroschockgefahr
	Caution, hot surface Attention, surface chaude Vorsicht, heiße Oberfläche
	Fuse Fusible Sicherung
 KEEP HANDS CLEAR OF PROBE!	Keep hands clear of probe Garder les mains éloignées de l'aiguille Halten Sie Hände fein von der Nadel

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. Probes may contain hazardous substances.

Solvents

Observe safe laboratory practices when handling solvents. Adequate safety precautions, such as proper ventilation, safety glasses, etc., must be used when handling dangerous liquids. Refer to the Material Safety Data Sheet (MSDS) for each solvent before use.

Replacement Parts

Only use the replacement parts mentioned in this user's guide.

Sécurité

Merci de lire attentivement cette section avant toute installation ou utilisation de l'instrument.







Cet instrument est exclusivement destiné à être utilisé dans un environnement de laboratoire, par un personnel qualifié, à des fins de manipulations de liquides non-médicales. Pour une utilisation correcte et en toute sécurité de l'instrument, il est nécessaire que le personnel qui utilise et réalise la maintenance de l'instrument, suive les instructions contenues dans ce guide lors de l'installation, du nettoyage et de la maintenance de l'instrument. Toutes les consignes de sécurité doivent être respectées durant toutes les phases de fonctionnement, d'entretien ou de réparation de l'instrument.

Le non-respect de ces précautions ou des avertissements spécifiques mentionnés dans ce guide compromet les normes de sécurité de conception, de fabrication et d'utilisation prévue de l'instrument. Gilson décline toute responsabilité en cas d'incapacité du client à se conformer à ces exigences.

L'instrument a été certifié conformément aux normes de sécurité en vigueur au Canada, en Europe et aux États-Unis. Merci de vous reporter aux indications mentionnées sur le panneau arrière de l'instrument ainsi qu'au document de Déclaration de Conformité aux normes pour lesquelles l'instrument a été déclaré conforme.



Symboles Électroniques et de Dangers

Les symboles électroniques et de dangers suivants peuvent apparaître sur l'instrument:

<i>Symbole</i>	<i>Signification</i>
~	Alternating current Courant alternatif Wechselstrom
≡	Direct current Courant continu Gleichstrom
	Protective conductor terminal Borne de terre de protection Schutzleiteranschluss
	Electrical power ON Sous tension Netzschalter ein
o	Electrical power OFF Hors tension Netzschalter aus
	Caution Attention Vorsicht
	Caution, risk of electric shock Attention, risque de choc électrique Vorsicht, Elektroschockgefahr
	Caution, hot surface Attention, surface chaude Vorsicht, heiße Oberfläche
	Fuse Fusible Sicherung
	Keep hands clear of probe Garder les mains éloignées de l'aiguille Halten Sie Hände fein von der Nadel

Notes de Sécurité

Les notes de sécurité suivantes peuvent apparaître dans ce document:

 WARNING	WARNING (AVERTISSEMENT) indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures graves.
 CAUTION	CAUTION (ATTENTION) indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures mineures ou légères.
NOTICE	NOTICE (AVIS) indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des dommages matériels.

Déplacement

Le poids de l'instrument implique que deux personnes ou plus sont requises pour le déplacer en toute sécurité. Toujours soulever l'instrument par sa base et suivre les instructions de déballage fournies avec l'appareil.

Tension

S'assurer que l'accès au panneau arrière est libre. Déconnecter la source d'alimentation avant toute opération d'entretien, de réparation ou de remplacement de pièces. Utiliser exclusivement le bloc et le cordon d'alimentation avec raccordement à la terre fournis. Un cordon d'alimentation sans terre peut provoquer choc électrique et graves blessures. Utiliser exclusivement des fusibles de l'intensité et du type spécifié. Pour le fonctionnement, respecter la tension indiquée sur le panneau arrière de l'instrument.

Aiguilles

Afin d'éviter tout risque de blessure, rester à distance des aiguilles lorsque le bras X/Y/Z est en mouvement. Les aiguilles peuvent contenir des substances dangereuses.

Solvants

Respecter les Bonnes Pratiques de Laboratoire lors de la manipulation de solvants. Si des liquides dangereux sont utilisés, s'assurer que la ventilation est adéquate et porter en permanence un équipement de protection individuelle (EPI), tel que : lunettes, gants et vêtements de protection. Se reporter aux Fiches de Données de Sécurité relatives aux solvants avant toute utilisation.

Pièces Détachées

S'assurer d'utiliser seulement les pièces détachées mentionnées dans le guide utilisateur. S'il est nécessaire de changer des pièces non listées, merci de contacter votre représentant Gilson local.

Introduction

Chapter One

This chapter provides information on the following topics:

- **Description** on page 10
- **Unpacking** on page 12
- **Repair and Return Policies** on page 15
- **Customer Service** on page 16
- **Trademarks** on page 16
- **Technical Specifications** on page 17

Description

The GX-274 ASPEC™ is a four-probe X/Y/Z liquid handler that when paired with two VERITY® 4260 Dual Syringe Pumps can automate liquid handling procedures and solid phase extraction (SPE) procedures that use positive pressure elution for cartridge-based applications. This four-probe, four-syringe configuration allows for processing four samples simultaneously.

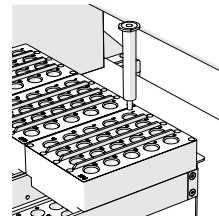
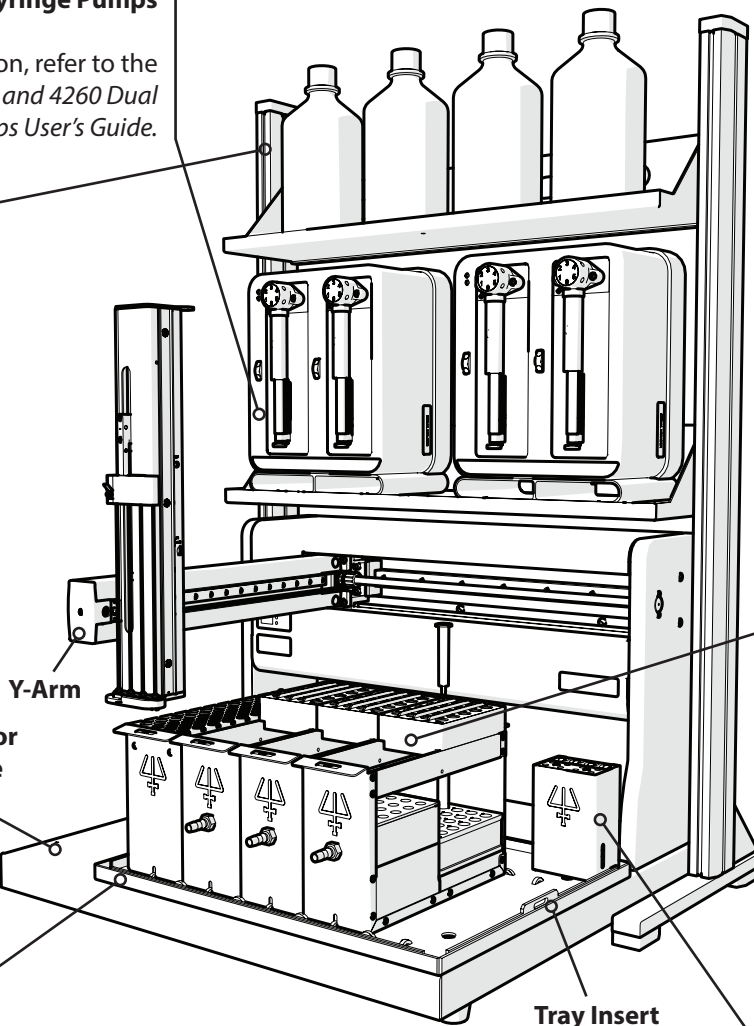
VERITY® 4260 Dual Syringe Pumps

For more information, refer to the *VERITY® 4060 Single and 4260 Dual Syringe Pumps User's Guide*.

System Organizer

An optional accessory to conserve bench space. Arrange system components vertically, instead of horizontally.

For more information, refer to the *GX-27X System Organizer Installation Instructions*.



The automation of the solid phase extraction (SPE) process is based on the design of the **DEC Rack Assembly** that holds the SPE cartridges (or DEC's).

For installation instructions, refer to [page 46](#).

The **Rinse Station/Reservoir** (ordered separately) is an optional 4-probe rinse station with transfer ports and can be used to provide access to two off-bed solvents.

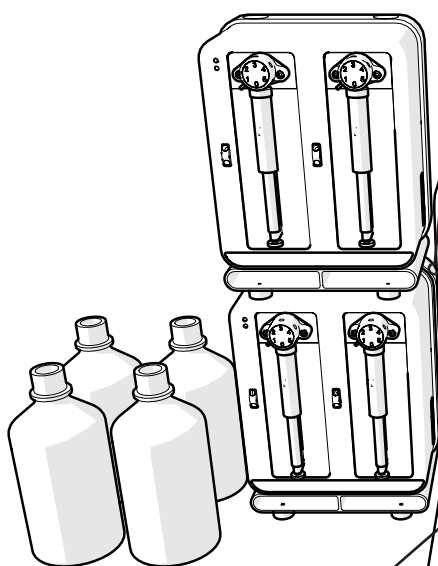
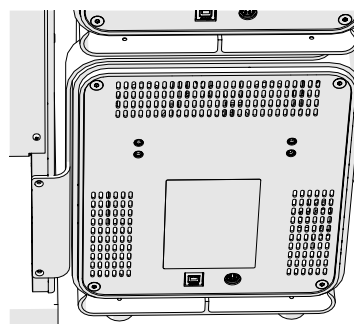
For installation instructions, refer to [page 26](#).

Figure 1: GX-274 ASPEC™ with System Organizer

Stacking Bracket (Rear View)

Provides stability when stacking the VERITY® 4260 Dual Syringe Pumps.

For installation instructions, refer to [page 52](#).



GX Rinse Pump

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

For installation instructions, refer to [page 37](#).

Z-Arm

For installation instructions, refer to [page 29](#).

The 4-Probe Rinse Station is capable of performing inside and outside rinses, and a flowing outside rinse when the system includes a GX Rinse Pump.

For installation instructions, refer to [page 26](#).

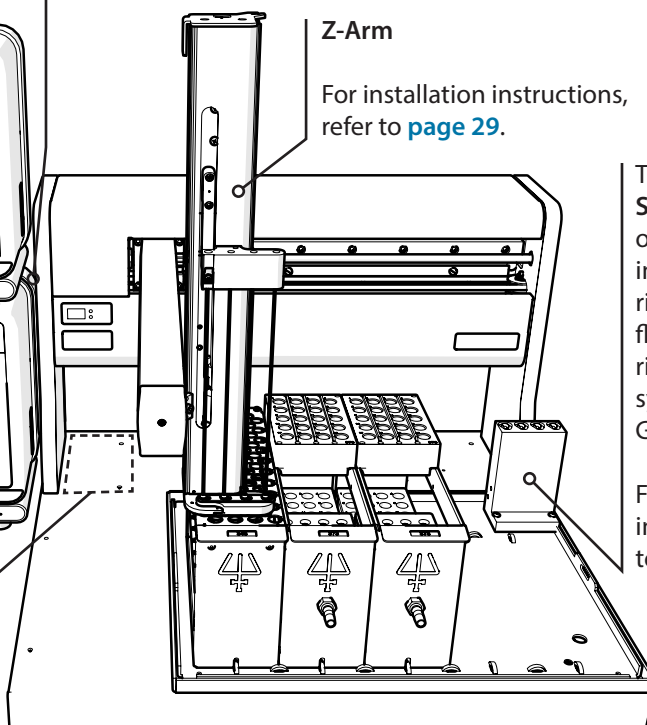


Figure 3: GX-274 ASPEC™ with Stacking Bracket

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 GX-274 ASPEC™.

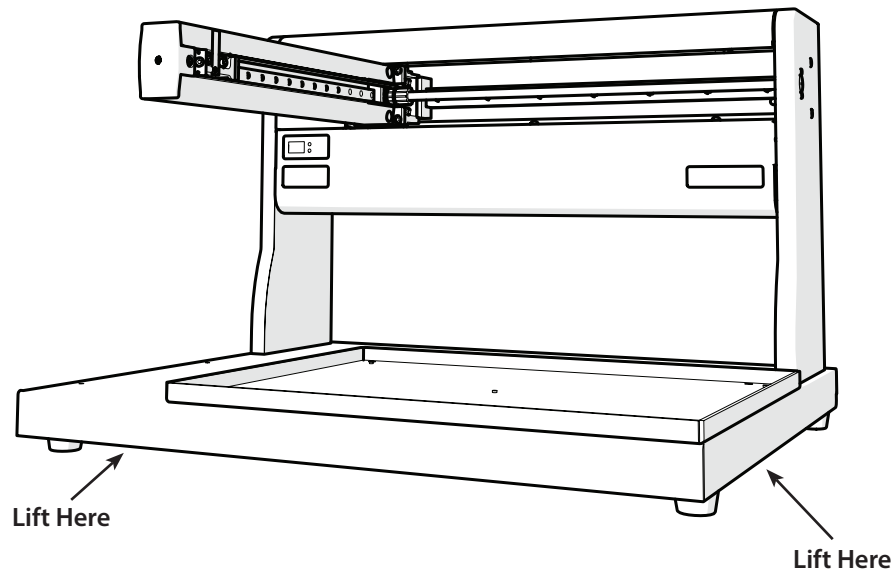


Figure 2: Lifting the GX-274 ASPEC™

Standard Equipment

The following items are considered standard equipment and are provided with the GX-274 ASPEC™:

- Locator pan
- Z-arm
 - Isolator probe holder
- Accessory Package
 - Allen wrenches (2.5, 3, and 4 mm)
 - Ethernet cable
 - Fuses and fuse drawer
 - Gilson Ethernet Utility
 - GX-27X Offset Utility Kit
 - Liquid level detection (LLD) cable assembly
 - Phillips screwdriver
 - Power cords
 - Spiral wrap
 - Stacking bracket
 - Terminal block connectors (6- and 8-pin)
 - Tubing retaining clips
 - Z Height adjustment tool (185 mm)

Documentation

The following documents are included with the GX-274 ASPEC™:

- ASPEC™ Systems Documentation CD, which includes this user's guides (and other ASPEC system user's guides), plumbing diagrams, and IQ procedure documents.
- Declaration of Conformity
- GX-27X Offset Utility Kit CD, which includes an instruction document
- Gilson Ethernet Utility CD, which includes an instruction document
- Hazardous Materials Declaration (China RoHS)
- Installation Qualification (IQ) Procedure
- Quality Control (QC) Checklist
- System Setup Overview
- Unpacking Instructions

Accessories

Required

Some accessories are required, but are ordered separately:

- Probes
- Racks
 - Disposable Extraction Cartridge (DEC)
 - Sample
- Rinse station

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

Optional

- GX Rinse Pump
- Riser block for 4-probe rinse station
- Safety shield
- Solvent bottle rack
- System organizer

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

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.

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

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

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

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).



Customer Service

Gilson, Inc. 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 contact your local Gilson representative. Detailed contact information can be found at www.gilson.com. To help us serve you quickly and efficiently, refer to **Before Calling Us** on page 15.

Trademarks

The following trademarks may appear in this document.

- PharMed® is a registered trademark of Saint Gobain Performance Plastics.
- Tygon® is a registered trademark of E.I. du Pont de Nemours & Co., Inc.
- Viton® is a registered trademark of DuPont Performance Elastomers, L.L.C.
- Windows® is a registered trademark of Microsoft Corporation in the United States and/or other countries.

All other trademarks within are trademarks or registered trademarks of Gilson, Inc.

Technical Specifications

Please be aware of the following before operating the instrument.

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

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.

Technical specifications for the following components are provided:

- GX-274 ASPEC™
- GX Rinse Pump

GX-274 ASPEC™

Technical Specification	Definition
Arm Speed	350 mm/sec in X dimension
	350 mm/sec in Y dimension
	125 mm/sec in Z dimension (factory set at 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
	NOTICE Switching voltages higher than 30V or greater than 1A of current may damage the instrument.
<i>GX-274 ASPEC™ Technical Specifications (continued on page 18)</i>	

GX-274 ASPEC™

<i>Technical Specification</i>	<i>Definition</i>	
Dimensions (W x D x H)	59.7 x 54.1 x 57.1 cm (23.5 x 21.3 x 22.5 in.)	
	NOTE	Dimensions do not include the two VERITY® 4260 Dual Syringe Pumps.
	NOTE	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 seven-segment blue LED displays and LED indicator lights for power and error messages	
Fuse	Two 5 x 20 mm, “T” type, 3.15A fuses	
Horizontal Motion Strength	X: 2.0 kg (4.5 lbs.) Y: 2.0 kg (4.5 lbs.)	
Liquid Contact Materials* <small>*Refer to the Materials appendix for more details.</small>	<i>Description</i>	<i>Material</i>
	Probe Guide	PET
	Probe	316L Stainless Steel
	Rinse Station	PET
	Transfer Port	PEEK PET PTFE 316L Stainless Steel
	Tubing (Drain)	Tygon®
<i>GX-274 ASPEC™ Technical Specifications (continued on page 19)</i>		

GX-274 ASPEC™

Technical Specification	Definition	
Locator Plate Capacity	Code 37X DEC racks	Up to five of these racks can be placed on the Code 20-series tray insert (part number 26041032).
	Code 33X/34X racks	
	Code 386 rack	
	Solvent bottle rack	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 4-probe rinse station capable of performing inside and outside rinses, and a flowing outside rinse when the system includes a GX Rinse Pump. An optional 4-probe rinse station with transfer ports can be used to provide access to two off-bed solvents.	
Safety and Compliance	The instrument has been certified to safety standards specified for Canada, Europe, and the United States. Refer to the instrument rear panel label and the Declaration of Conformity document for the current standards to which the instrument has been found compliant.	
Sampler Type	X/Y/Z with stationary rack design	
Software Control	PC control via Ethernet communication and TRILUTION® LH software	
Vertical Punch Strength	1.4 kg (3.0 lbs.) per probe	
Weight* <small>*with Z-arm</small>	22 kg (48 lbs.)	

GX Rinse Pump

<i>Technical Specification</i>	<i>Definition</i>
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

Chapter Two

The GX-274 ASPEC™ and its components should be set up and installed in the order shown below. Complete instructions for each step are included in this chapter.

- **Locator Pan Installation and Setup**
- **Solvent Bottle Rack Installation**
- **Rinse Station Installation**
- **Z-Arm Setup**
- **Z-Arm Installation**
- **GX Rinse Pump Installation (Optional)**
- **Plumbing Connections**
- **Electrical Connections**
- **Rack Installation**
- **Final Z-Arm Adjustments**
- **Safety Shield (Optional) Installation**
- **Stacking Bracket Installation**

Locator Pan Installation and Setup

This section takes you through the steps for installing the locator pan on the locator plate of the GX-274 ASPEC™ along with the tray insert and rinse station.

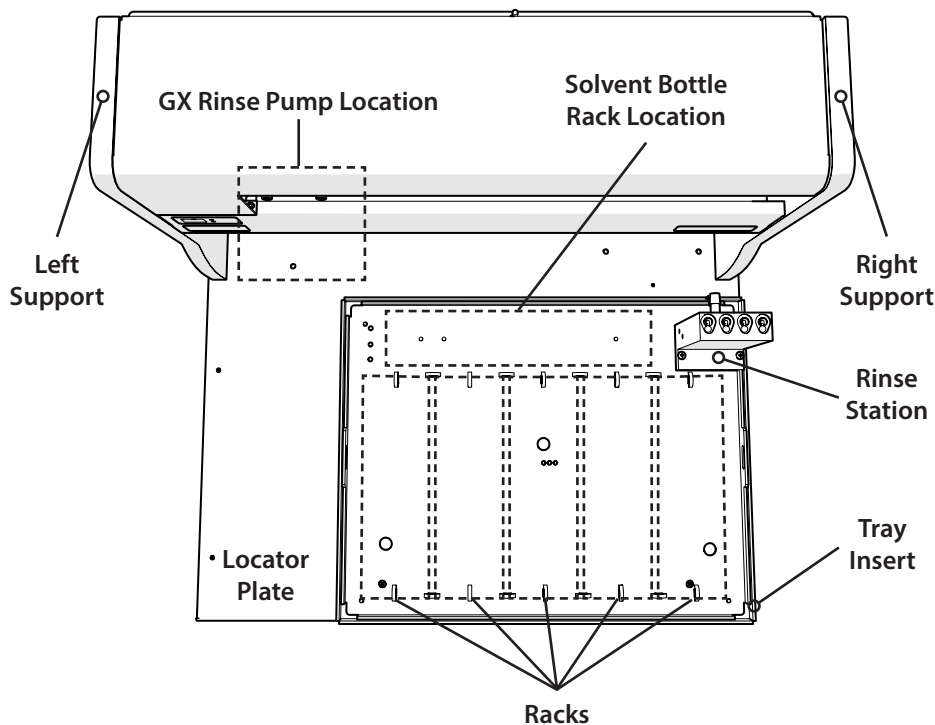


Figure 4: Locator Plate of the GX-274 ASPEC™ with Code-20 Series Tray Insert Installed

Locator Pan Installation

The locator pan is installed on the tray insert 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 tray insert. The front and right side of the locator pan should be flush with the front and right side of the tray insert. The two posts should be inserted in the tray insert.
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.

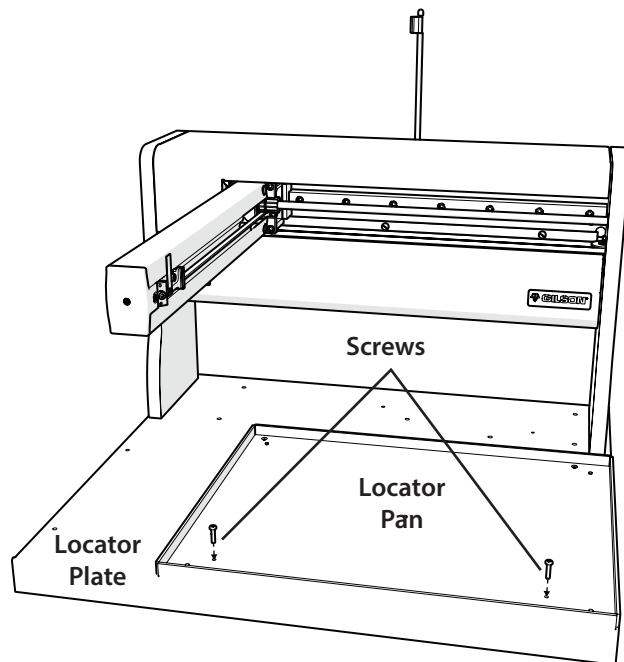


Figure 5: Installing the Locator Pan

Tray Insert Installation

The Code 20-series tray insert (part number 26041032) for the GX-274 ASPEC™ is used to position the racks and the rinse station on the instrument. In the center of the tray insert there are two holes used to identify the insert.

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

1. Make sure that the holes for the rinse/reservoir are located at the right rear of the tray insert.
2. Place the tray insert in the locator pan. The holes on the tray insert should line up with the posts on the locator pan.

Tray Clamp Installation

The tray insert clamp is used to secure the tray insert to the locator pan.

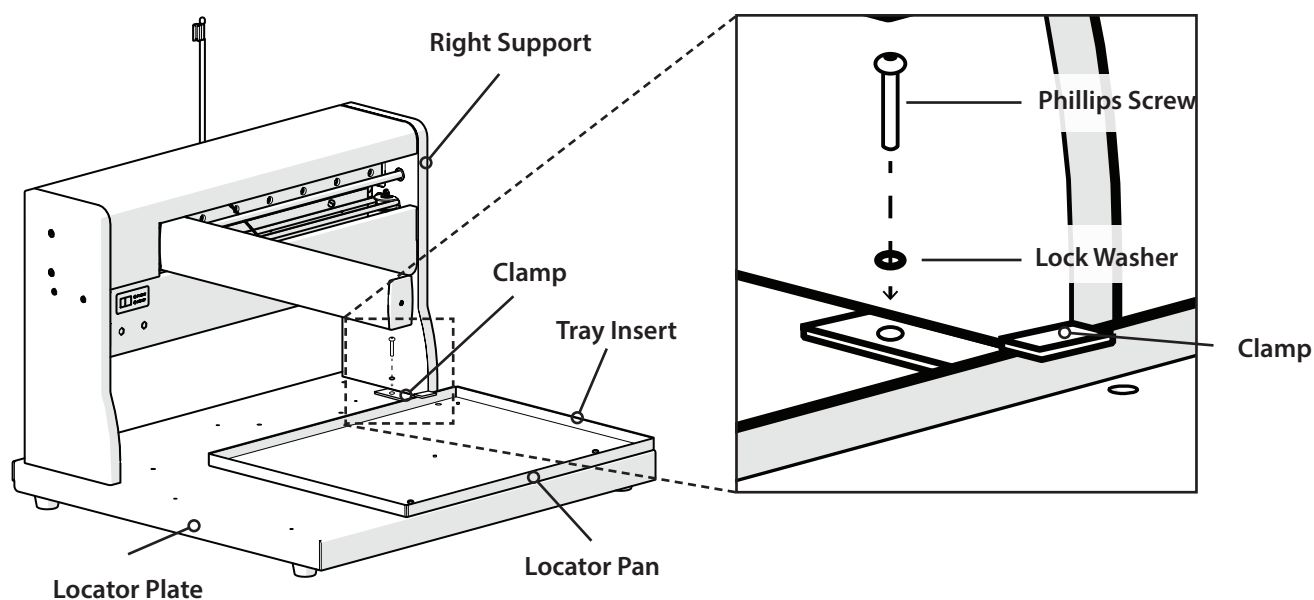


Figure 6: Locator Tray Clamp Installation Diagram

To install the clamp:

1. Ensure that the locator pan and tray insert are installed on the tray insert of the instrument.
2. Place the clamp on the tray insert as shown in the drawing above, and align the hole in the clamp with the hole in the tray insert next to the right support.
3. Position the lock washer over the hole, and then insert and tighten the Phillips screw.

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- or 700 mL solvent bottles (part number 26044005) 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 [Figure 7](#), 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.

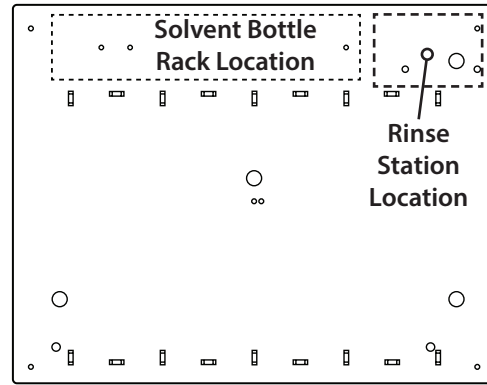


Figure 7: Solvent Bottle Rack Location on the Code 20-Series Tray Insert for the GX-274 ASPEC

Rinse Station Installation

There are two rinse stations and a riser available:

- 4-probe rinse station (part number 260440001).
- 4-probe rinse station/reservoir with transfer ports (part number 260440002) allowing access to two large-volume solvent reservoirs
- Rinse station riser (part number 26045103) for use with the 4-probe rinse stations

NOTE The rinse station riser is recommended for use with the GX-274 ASPEC™.

The rinse station is installed in the back right corner of the Code 20-series tray insert. Refer to [Rinse Station Installation](#) on page 26.

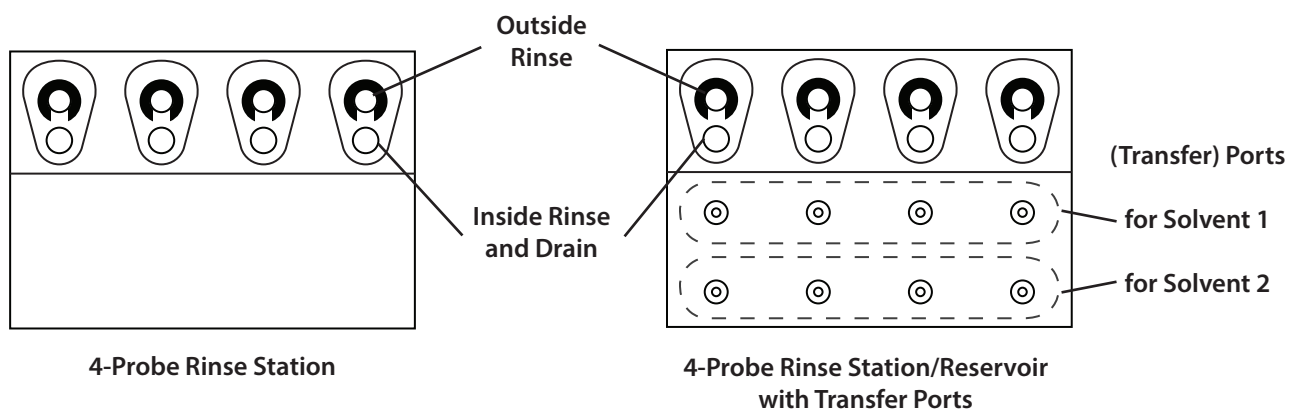


Figure 8: 4-Probe Rinse Station Diagrams

Rinse Station Installation and Setup

To install the rinse station on the tray insert:

1. Align the holes in the rinse station with the locator pins affixed to the tray insert.
2. Locate the two Phillips screws included with the rinse station and place them through the holes on the base of the rinse station. Tighten the screws using a Phillips screwdriver.

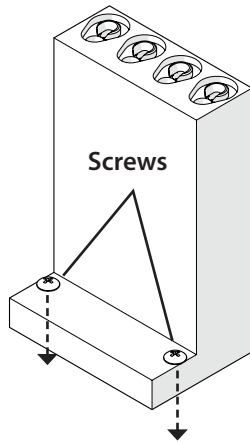


Figure 10: 4-Probe Rinse Station without Transfer Ports

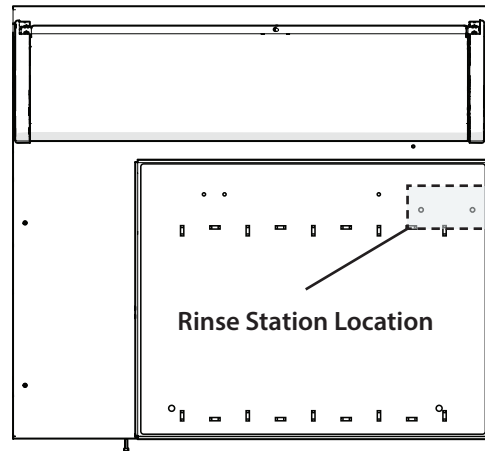


Figure 9: Rinse Station Location

Rinse Station/Reservoir Installation

To install the rinse station/reservoir on the tray insert:

1. Remove the two Phillips screws from the back of the rinse station.
2. Raise the cover on the rinse station (refer to [Figure 11](#)) and align the holes in the rinse station with the locator pins affixed to the tray insert.
3. Locate the two Phillips screws included with the rinse station and place them through the holes on the base of the rinse station. Tighten the screws using a Phillips screwdriver.
4. Lower the cover on the rinse station.

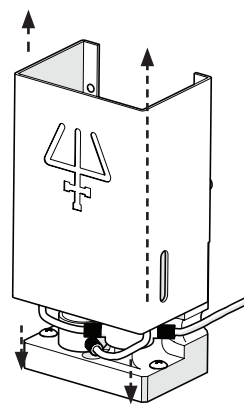


Figure 11: Opening the Cover on the 4-Probe Rinse Station with Transfer Ports

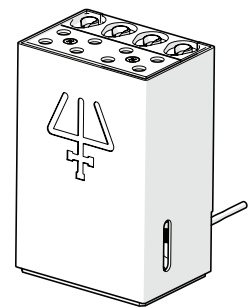


Figure 12: 4-Probe Rinse Station with Transfer Ports Secured to Tray

Rinse Station with Riser Installation

To install the rinse station and riser assembly on the tray insert:

1. Align the holes in the riser with the locator pins affixed to the locator tray.
2. Locate the two screws included with the riser and place them through the holes on the base of the rinse station. Tighten the screws using a Phillips screwdriver to secure the riser to the locator tray.
3. Align the holes at the top of the riser with the holes at the bottom of the rinse station.
4. Locate the two Phillips screws and standoffs included with the rinse station.
5. Push one of the standoffs up through the hole, and hold the standoff in place.
6. Thread the Phillips screw down through the top of the hole. Tighten the screw with a screwdriver.
7. Repeat steps 4 through 7 for the other standoff.

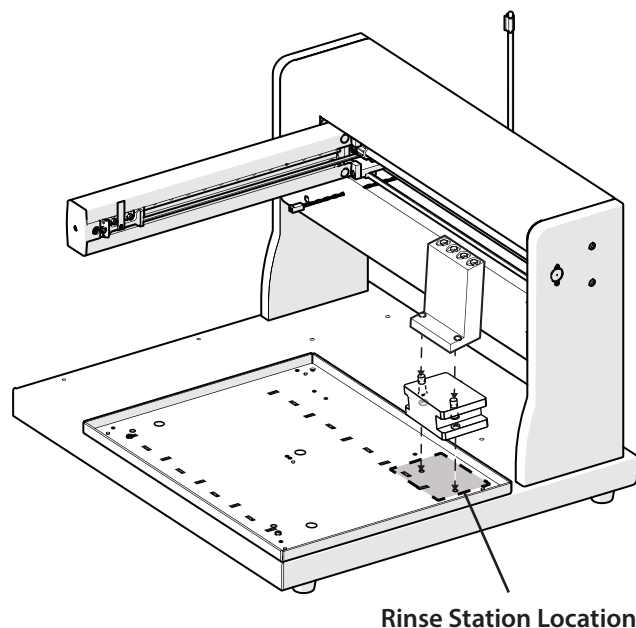


Figure 13: Rinse Station Location on the Locator Plate with Riser

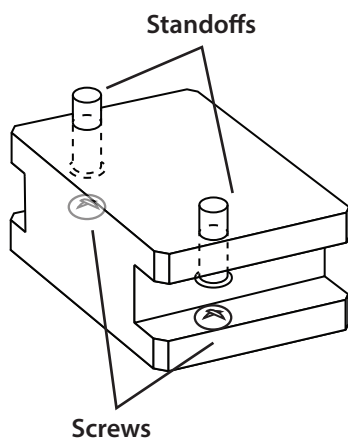


Figure 14: Riser Installation

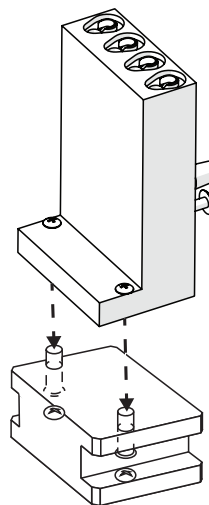


Figure 15: Placing the Rinse Station on the Riser

Rinse Station/Reservoir with Riser Installation

To install the rinse station/reservoir and riser assembly on the tray insert:

1. Align the holes in the riser with the locator pins affixed to the locator tray.
2. Locate the two screws included with the riser and place them through the holes on the base of the rinse station. Tighten the screws using a Phillips screwdriver to secure the riser to the locator tray.
3. Lift up the cover on the rinse station/reservoir.
4. Align the holes at the top of the riser with the holes at the bottom of the rinse station/reservoir.
5. Locate the two Phillips screws and standoffs included with the rinse station.
6. Push one of the standoffs up through the hole, and hold the standoff in place.
7. Thread the Phillips screw down through the top of the hole. Tighten the screw with a screwdriver.
8. Repeat steps 4 through 7 for the other standoff.

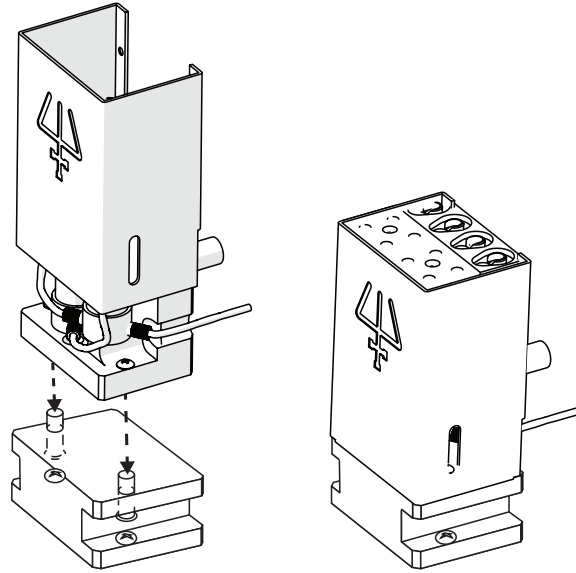


Figure 16: Securing the 4-Probe Rinse Station with Transfer Ports on the Locator Tray

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 2604645) on the isolator mounting block on the Z-arm. The isolator probe holder includes the isolator support and three mounting screws.

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.

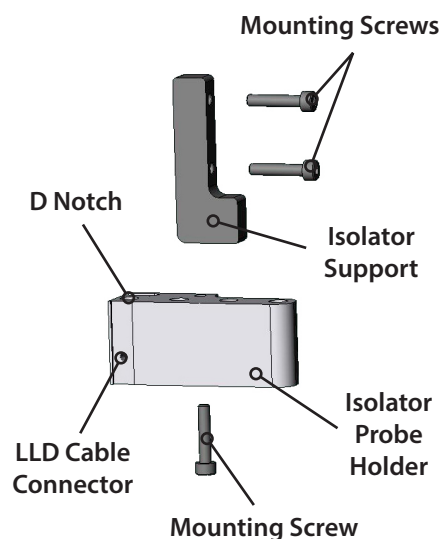


Figure 17: Isolator Mounting Block Diagram

3. Lay the Z-arm on its back on a flat surface.
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 slightly using the 3 mm Allen wrench. Refer to the steps illustrated in [Figure 18](#).
6. Position the isolator support next to the isolator mounting block on the Z-arm.
7. Place one of the supplied screws up through the isolator probe holder and into the isolator support. Tighten slightly using the 3 mm Allen wrench.
8. Place one screw into each hole on the right side of the isolator support. Tighten slightly using the 3 mm Allen wrench.
9. Using the 3 mm Allen wrench, first tighten the two screws on the bottom of the isolator probe holder, and then tighten the two screws on the side of the isolator support.

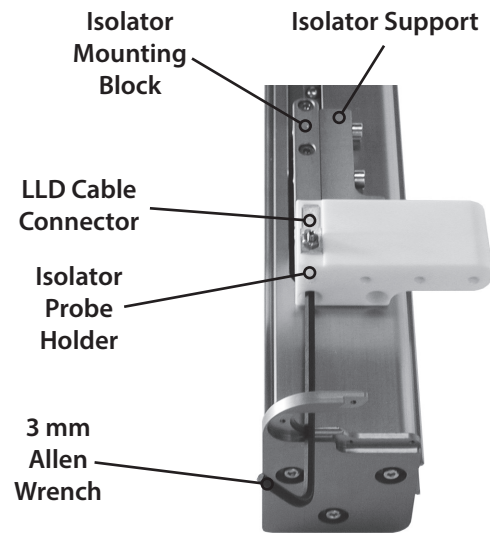


Figure 18: Installing the Isolator Mounting Block on the Z-Arm

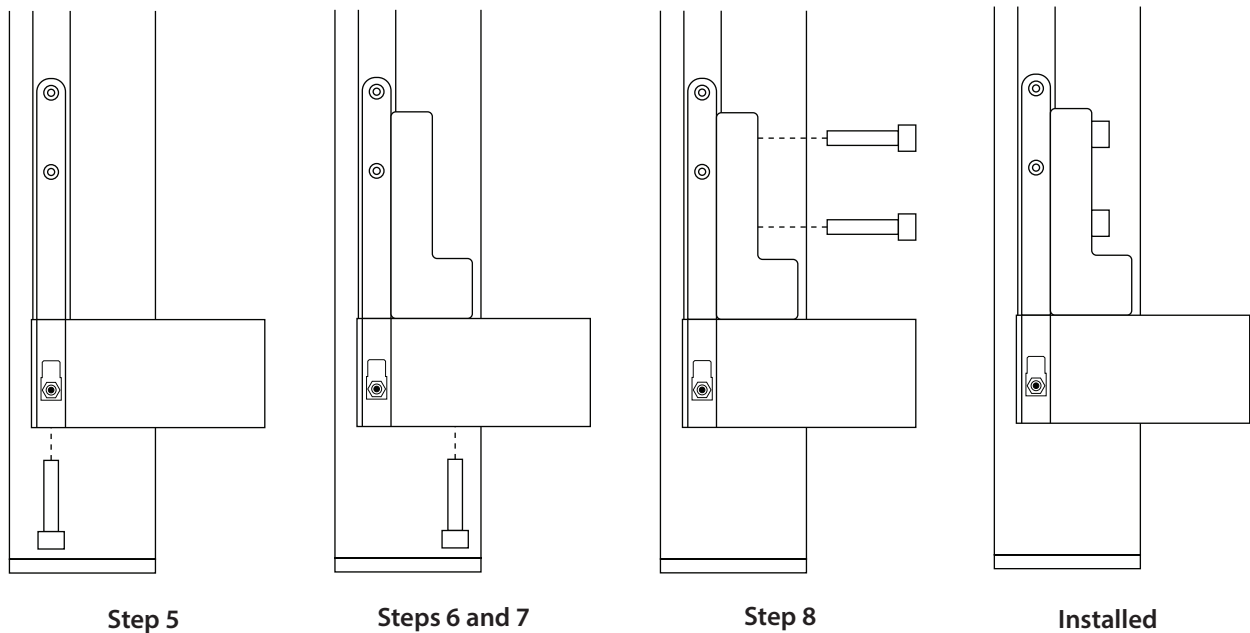


Figure 19: Steps to Install the Screws on the Isolator Probe Holder

Guide Foot Installation and Setup

The inert guide foot is used with the GX-274 ASPEC™. This guide foot assembly includes the guide retainer lock, four probe guide inserts, and seven screws (two are extra).

Guide Foot Assembly

To assemble the guide foot:

1. Locate the guide foot and the probe guide inserts. Place the probe guide inserts up through the holes on the guide foot. The probe guide inserts should be oriented with the domed part on top.
2. Place the guide retainer lock over the probe guide inserts. Orient the retainer lock so the larger diameter part of the holes is over the inserts.
3. Slide the guide retainer lock to lock the inserts in place.
4. Place one of the Phillips screws in the notch on the side of the guide retainer lock and tighten using a Phillips screwdriver.

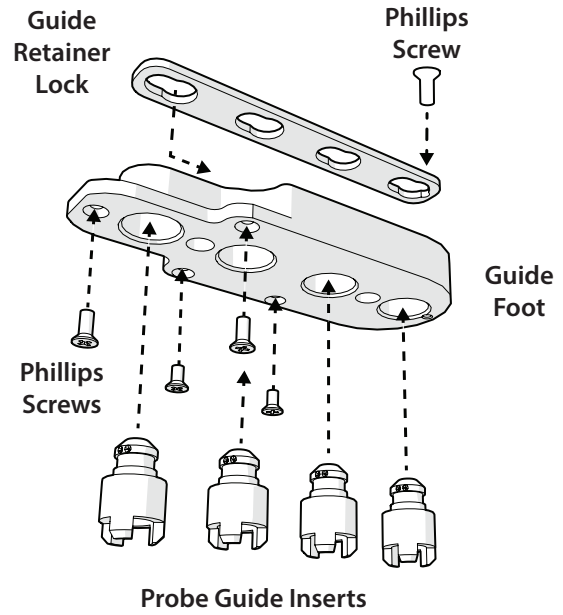


Figure 20: Inert Probe Guide Assembly (Exploded View)

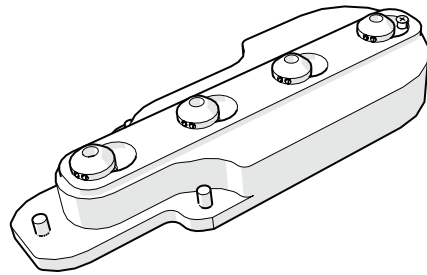


Figure 21: Inert Probe Guide Fully Assembled

Guide Foot Installation

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

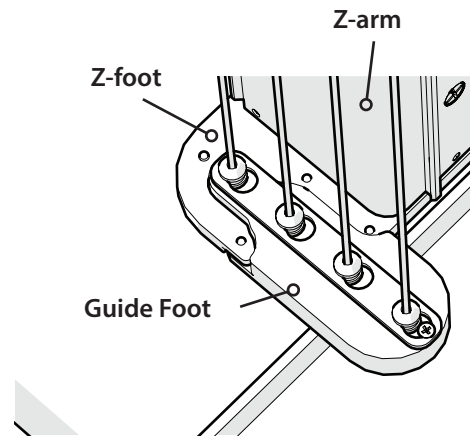


Figure 22: Guide Foot Installed on Z-Foot

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 34.

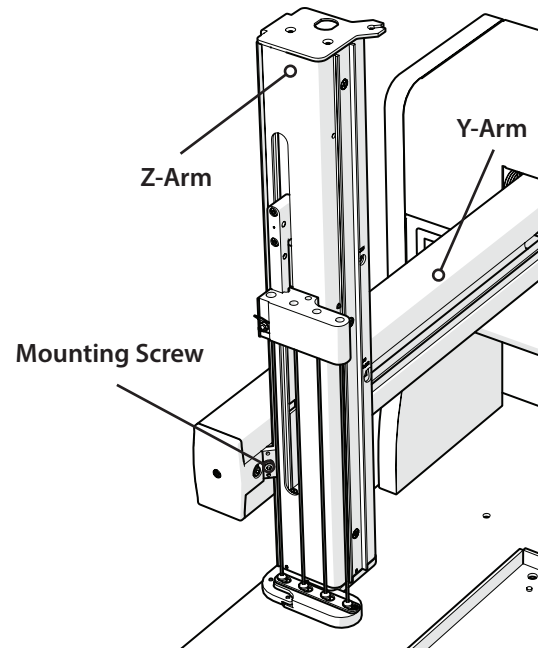


Figure 23: Z-Arm Mounted on GX-274 ASPEC

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. 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.

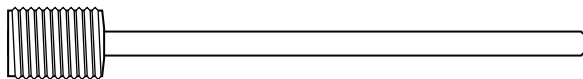


Figure 25: Stop Pin

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.

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

2. 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.

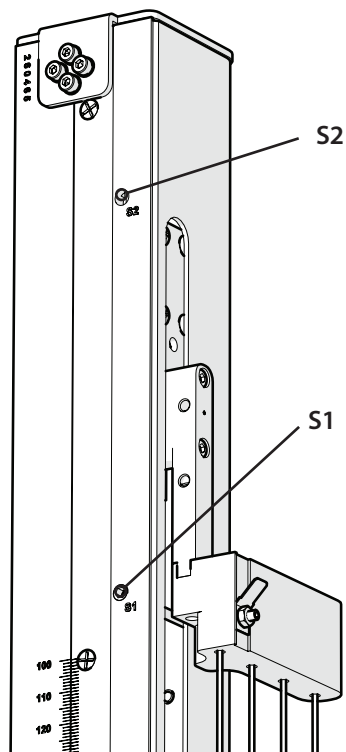


Figure 24: S1 and S2 Positions

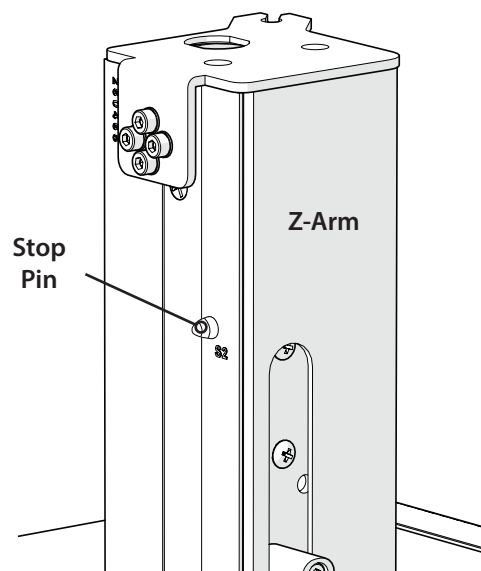


Figure 26: Close-Up of Z-Arm and Stop Pin

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 28](#).
6. Tighten the mounting screw on the Z-arm mounting bracket to secure the Z-arm.

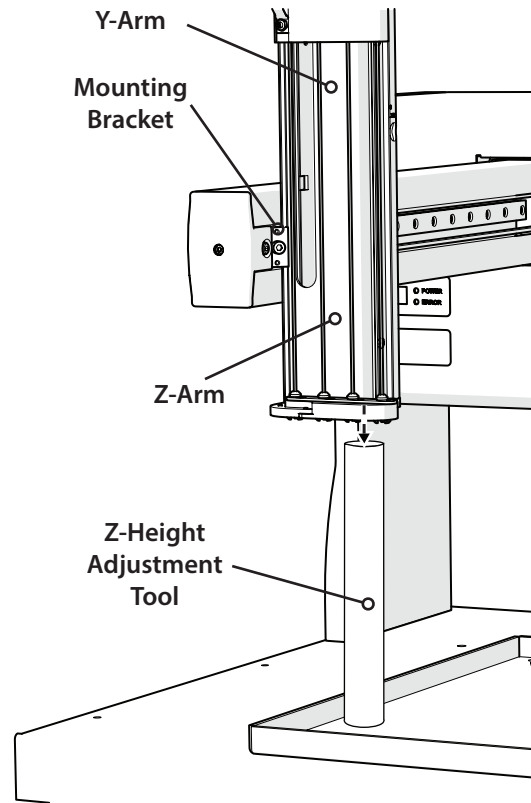


Figure 27: Z-Arm Height Adjustment

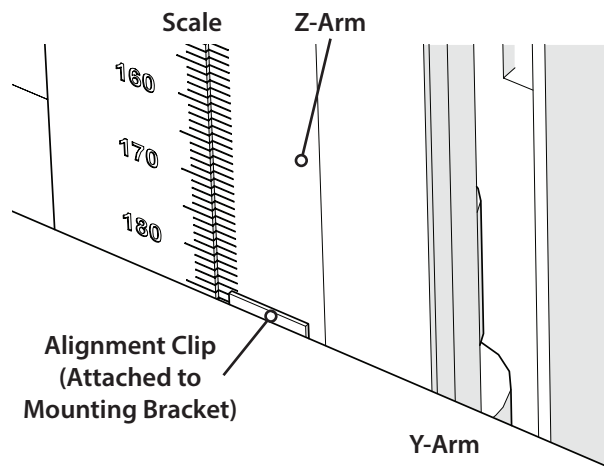


Figure 28: Close-Up of Z-Arm Scale

Probe Installation

There are different probes available for use on the instrument. Follow the instructions below to install a probes:

1. Insert a 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.
4. Repeat steps 1 through 3 for additional probes, if necessary.

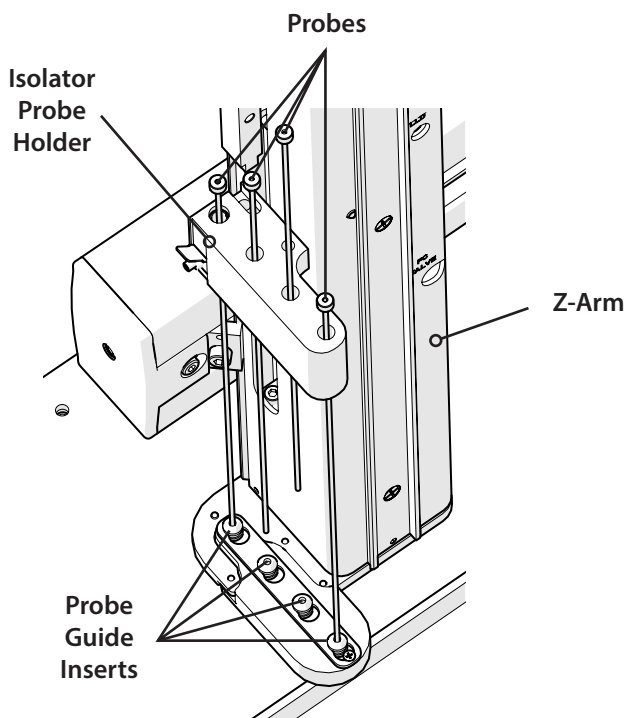


Figure 29: Probe Installation

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.
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.

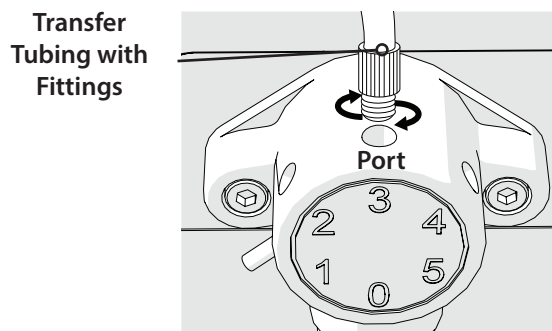


Figure 30: Connecting Transfer Tubing to Syringe Pump

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.

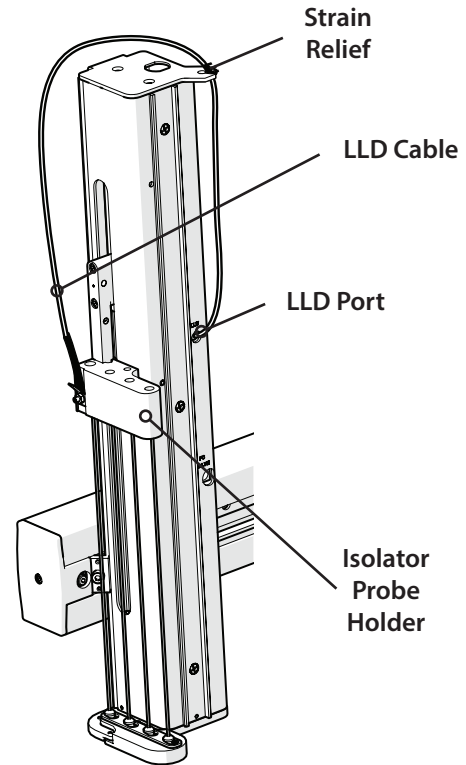


Figure 31: LLD Installation on the GX-274 ASPEC™

GX Rinse Pump Installation (Optional)

The GX Rinse Pump sits on the tray insert of the instrument. It should be placed behind the locator pan near the rinse station.

NOTE

There are two thumbscrews included with the rinse pump. These screws will not be used with the GX-274 ASPEC™.

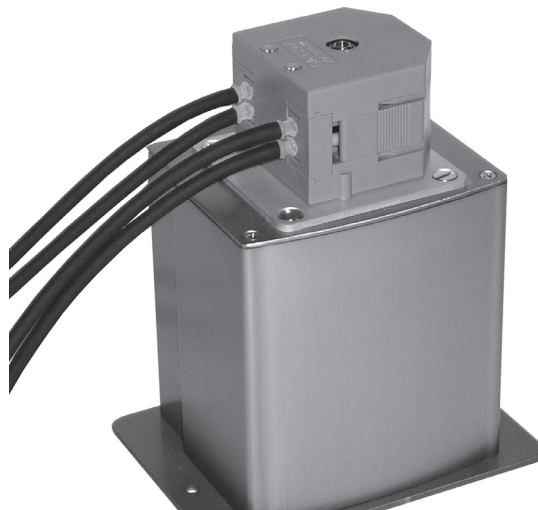


Figure 32: GX Rinse Pump

Plumbing Connections

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

Rinse Station Plumbing

The rinse station includes the following items:

- Barbed adapter
 - Stainless steel barbed fitting
 - Stainless steel Phillips screw
 - Tygon® drain tubing
1. Place the barbed adapter in the upper hole in the back of the rinse station, and turn clockwise until finger tight. Do not over tighten the barbed adapter.
 - For a flowing rinse using the rinse pump, place the stainless steel barbed fitting in the lower hole. Tighten the fitting.
 - For a static rinse, place the Phillips screw in the lower hole and tighten using a Phillips screwdriver.
 2. Connect one end of the Tygon drain tubing to the barbed adapter. Place the other end in a waste container.
 3. If you are connecting the rinse station to a GX Rinse Pump, refer to [GX Rinse Pump Plumbing \(Optional\)](#) on page 40.

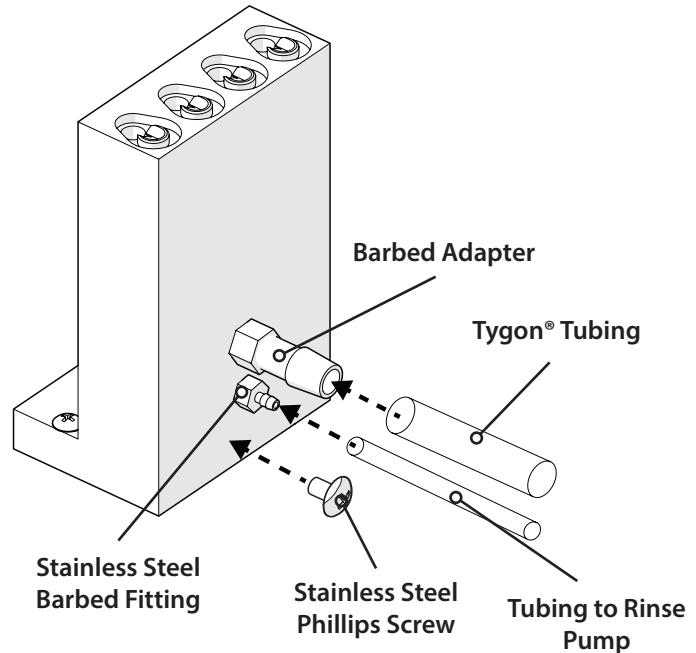


Figure 33: 4-Probe Rinse Station Plumbing

Rinse Station/Reservoir Plumbing

The 4-probe rinse station/reservoir assembly includes the following items:

- Barbed adapter
 - Solvent lines (pre-installed)
 - Stainless steel barbed fitting
 - Stainless steel Phillips screw
 - Tygon® drain tubing
1. Route the tubing from the left side of the rinse station/reservoir (viewed from the rear) to a solvent bottle (Solvent 1).
 2. Route the tubing from the right side of the rinse station/reservoir (viewed from the rear) to a solvent bottle (Solvent 2).
 3. Route the waste tubing to a waste bottle.
 4. Route the Tygon® tubing to a solvent bottle dedicated to probe rinse.
 5. The cables on the back left side of the rinse station will be connected to the rear panel of the GX-274 ASPEC™. Refer to [Solenoid Valves](#) on page 42 for connection instructions.

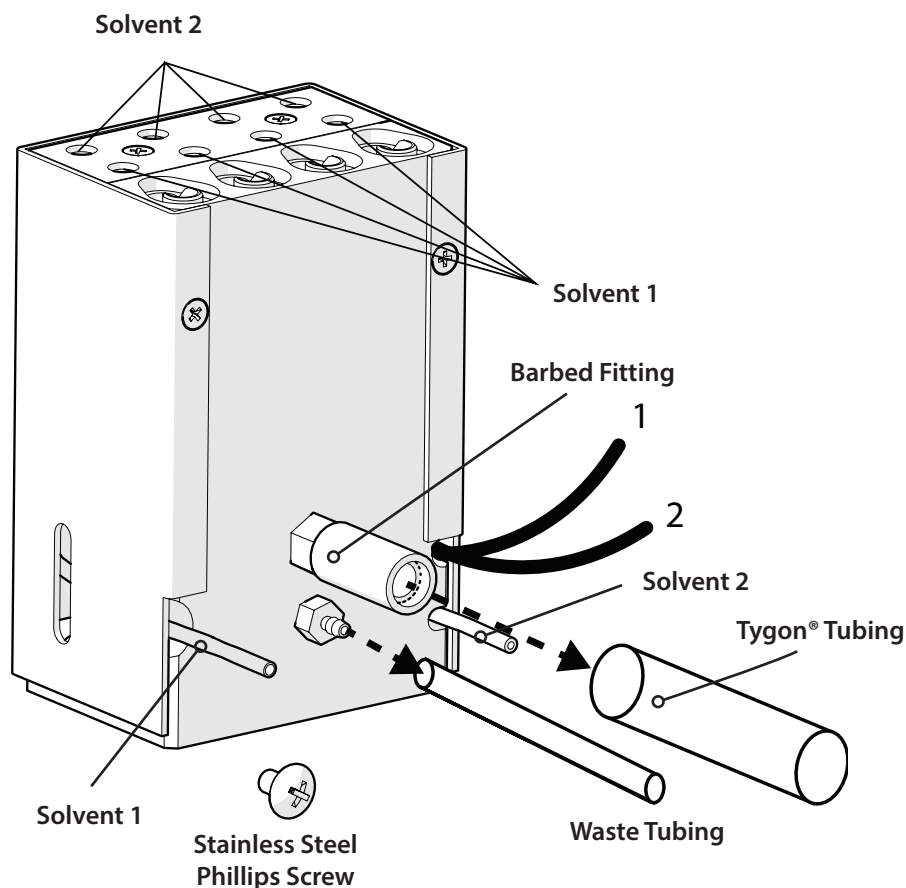


Figure 34: 4-Probe Rinse Station/Reservoir Plumbing (Rear View)

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 5 and 6 for the bottom set of fittings.

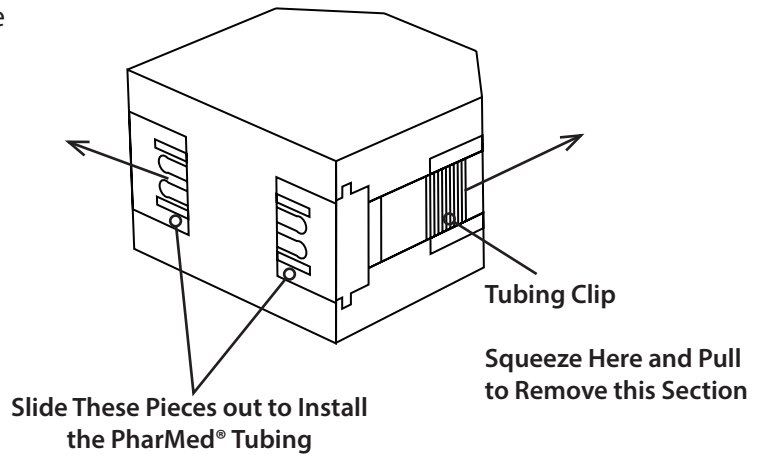


Figure 35: Installing Tubing in the GX Rinse Pump

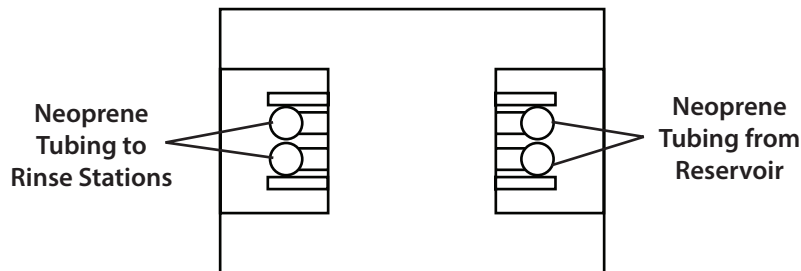


Figure 36: Making the Neoprene Tubing Connections

Electrical Connections

Rear Panel Diagram

Refer to the diagrams below when making the connections to the GX-274 ASPEC™.

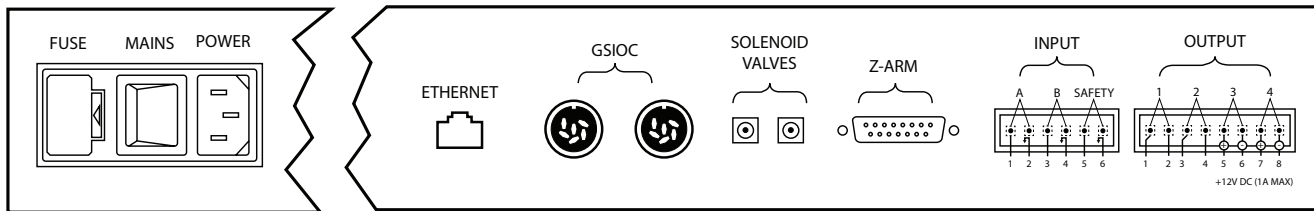


Figure 37: Rear Panel Diagram

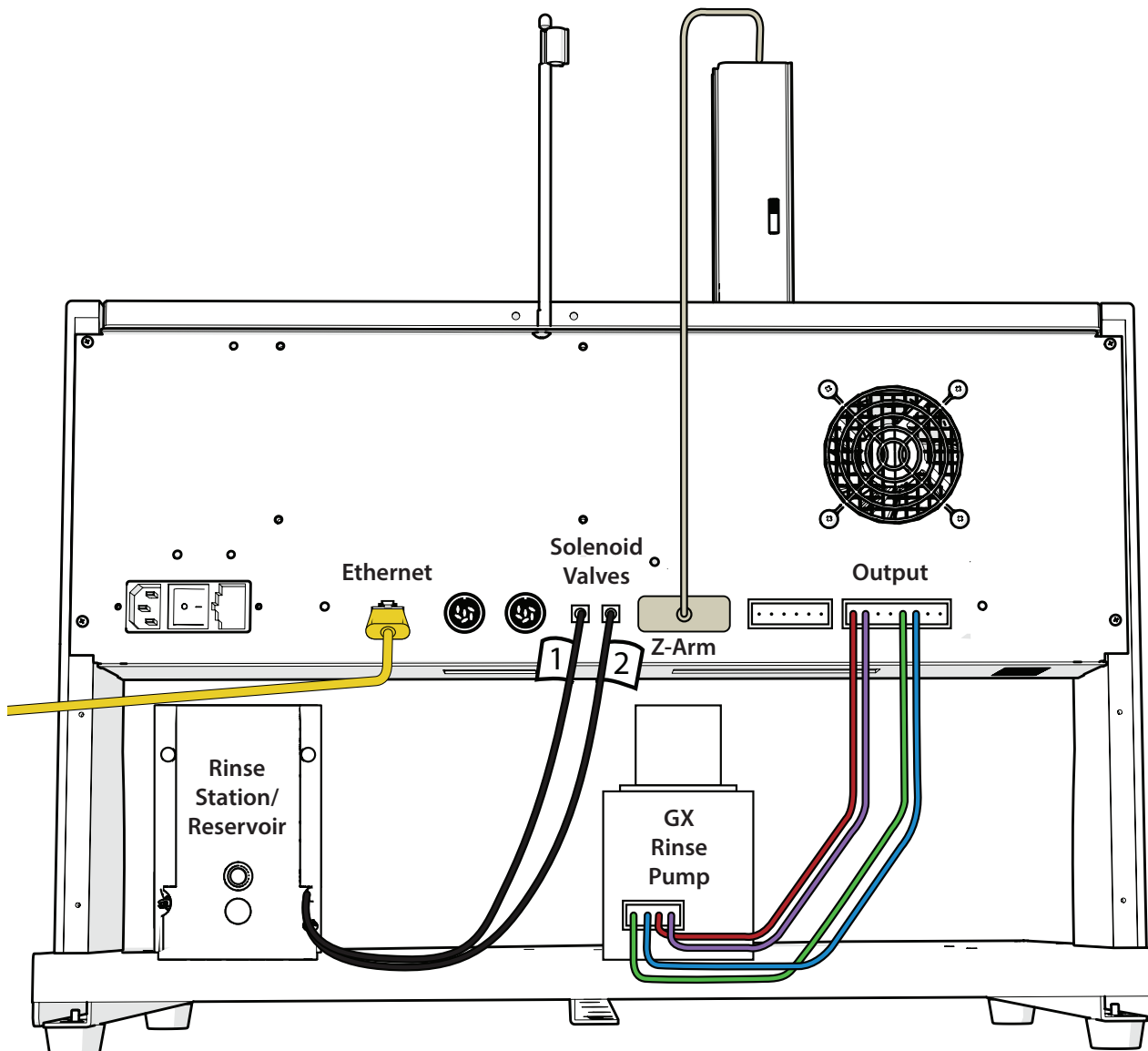


Figure 38: Electrical Connections Diagram for the GX-274 ASPEC with Accessories

GX-274 ASPEC™

Fuse Drawer

To install the fuses:

1. Locate the fuse drawer and two of the supplied fuses. Refer to the [Rear Panel Diagram](#) on page 41 for the location of this port.
2. Place a small screwdriver or a fingernail under the tab on the fuse drawer to detach it.
3. Remove the fuse drawer from its receptacle on the rear panel.
4. Insert the fuses in the fuse drawer.
5. Insert the fuse drawer into its receptacle on the rear panel.

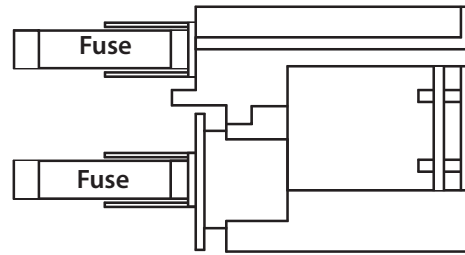


Figure 39: Fuse Diagram

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 GX-274 ASPEC 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 GX-274 ASPEC and the other to an available Ethernet port on the router.

NOTE Do not turn on the GX-274 ASPEC until directed to in the [Operation](#) chapter.

Solenoid Valves

To connect the optional rinse station/reservoir:

1. Locate the two black cables on the back left side of the rinse station/reservoir, labeled 1 and 2.
2. Connect cable 1 to the port labeled SOLENOID VALVE 1 on the rear panel of the GX-274 ASPEC™ and connect cable 2 to the port labeled SOLENOID VALVE 2. Refer to the [Rear Panel Diagram](#) on page 41 for the location of the solenoid ports.

Z-Arm Connection

Connect the cable from the Z-arm to the Z-ARM port on the rear panel of the GX-274 ASPEC. Refer to [Rear Panel Diagram](#) on page 41 for the location of this port.

Input and Output Ports

You can use the transistor-transistor logic (TTL) input and output contacts found on the rear panel of the instrument to control peripheral devices. Refer to the [Rear Panel Diagram](#) on page 41 above for the location of the input and 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 ($\overline{\text{V}}$).

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.

NOTICE

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

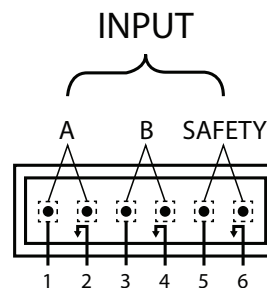


Figure 40: Input Contacts

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.

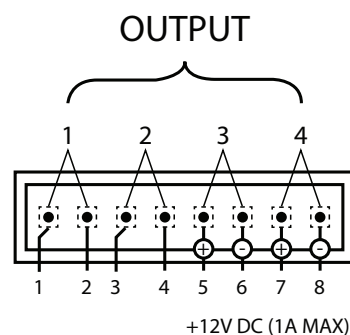


Figure 41: Output Contacts

Making Connections

To make connections, use the following items:

- 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. 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. 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.
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 GX-274 ASPEC™ and then to an outlet. Ensure that the power cord is plugged into a grounded power outlet.

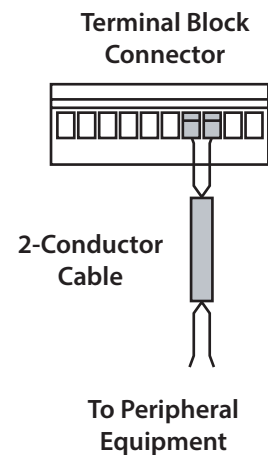


Figure 42: Terminal Block Connections

GX Rinse Pump (Optional)

To make connections between the GX Rinse Pump and the GX-274 ASPEC™ refer to the [Rear Panel Diagram](#) on page 41 and instructions below.

1. Ensure that the power is turned off to the GX-274 ASPEC.
2. Locate the GX Rinse Pump power cable (part number 26035256). This assembly contains two per-wired 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 GX-274 ASPEC™.

Rack Installation

The GX-274 ASPEC™ 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.

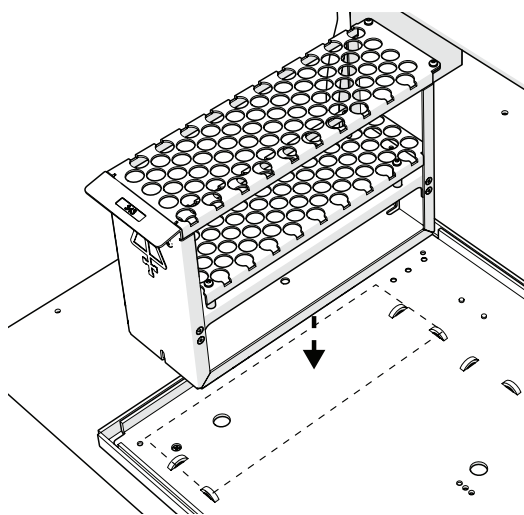


Figure 43: Orient the Rack (Step 1)

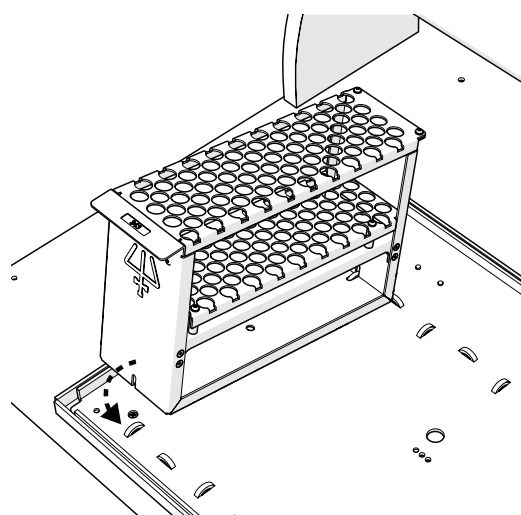


Figure 44: Seat the Rack into Tabs (Steps 2 and 3)

Solvent Bottle Rack Installation

One solvent bottle rack can be installed at the back of the Code 20-series insert.

1. Orient the rack so that the lip is on the right side.

Fit the rack on the tray insert so the slots and holes on the underside of the rack align with the pins on the tray insert.

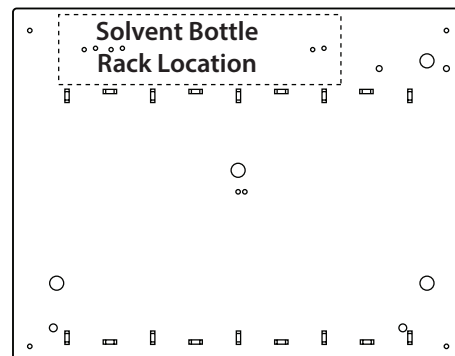


Figure 45: Solvent Bottle Rack Location

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 (or DEC)s. 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 386 for 6 mL SPE cartridges

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

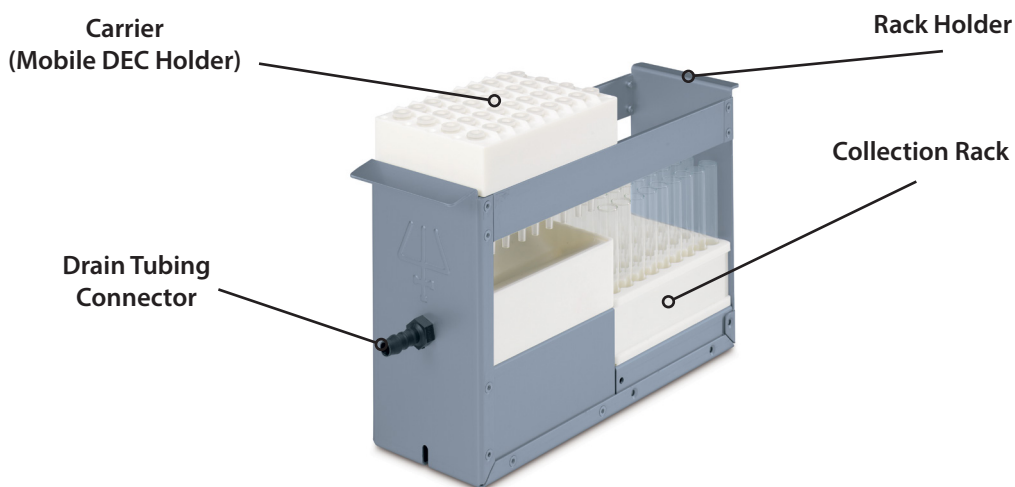


Figure 46: DEC Rack Diagram

DEC Accessory Kits

All DEC accessory kits include the following:

- Rack solvent bottles 4 probe (x 1)
- Tubes, polypropylene (PP), 12 x 75 mm 5 mL 250/ctn. (x 2)
- Bottle, solvent, 500 mL, 4/pkg. (x 1)
- Bottle, solvent, 700 mL, 4/pkg. (x 1)
- Tube, Viton® 0.313" ID x .438" OD 20 ft. (x 1)

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

- 1 mL SPE cartridges (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)

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

- 3 mL SPE cartridges (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)

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

- 6 mL SPE cartridges (x 3)
- Tubes, 15 x 85 mm, 10 mL, glass, 250/ctn. (x 2)
- Sealing caps, 6 mL DEC, polyethylene (PE), 1000/pkg. (x 1)
- Tubes, polypropylene (PP), 10 mL 500/pkg. (x 1)

DEC Rack Setup

Refer to [Disposable Extraction Cartridge \(DEC\) Racks and Accessory Kits](#) on page 47 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 done 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 GX-271 ASPEC, even when using non-Gilson brand SPE cartridges.)

NOTE Gilson ASPEC™ cartridges come 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. You must install collection tubes that are suitable for the size of SPE cartridge in use.
6. Install the rack on the locator plate. Refer to the instructions for [Rack Installation](#) on page 46.

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. Refer to the [Rear Panel Diagram](#) on page 41 for the location of the Z-ARM port. 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.

NOTE The cable support rod can also be used to secure an SPE gas pressure regulator.

3. Route the Z-arm cable through the retaining clip and collect tubing together before installing the spiral wrap. Ensure that there is enough slack in the Z-arm cable and tubing.

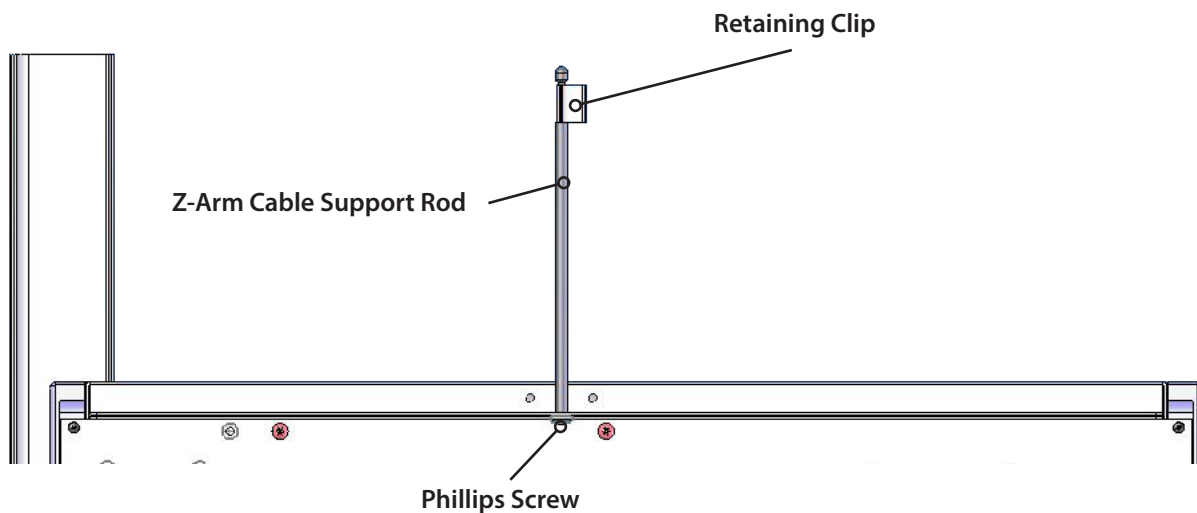


Figure 47: Z-Arm Cable Support Rod Installation (Partial Rear Panel View)

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 GX-274 ASPEC™ is unplugged before manually moving the Z-arm.

Safety Shield (Optional) 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.

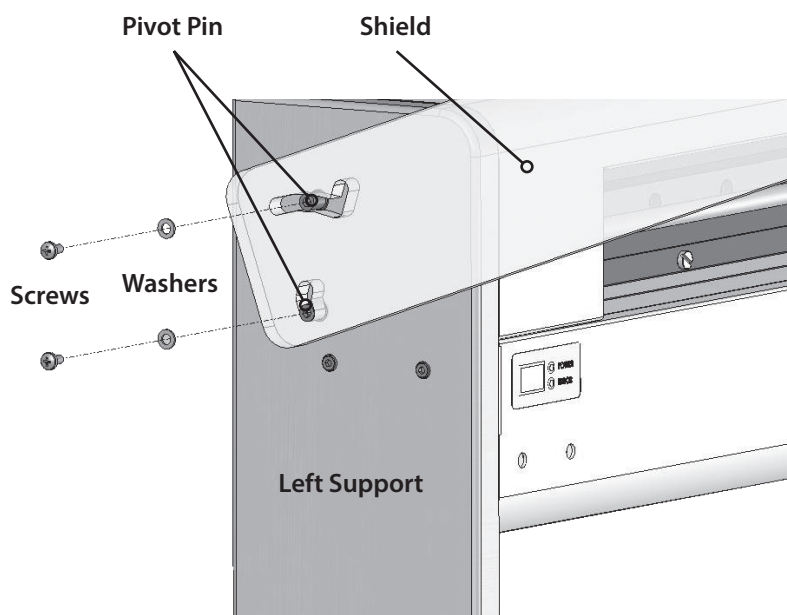


Figure 48: Shield Installation Diagram

Stacking Bracket Installation

The supplied stacking bracket kit (part number 31030017) must be used to prevent tipping when stacking two VERITY® 4260 Dual Syringe Pumps. Do not stack more than one pump on top of another pump. The stacking bracket stabilizes the pump stack by anchoring it to the GX-274 ASPEC™.

The following items will be included with the stacking bracket kit:

- L-bracket
- Two Phillips screws
- Four rubber spacers (pre-installed)
- One metal spacer

To install the stacking bracket:

1. Thread a Phillips screw through the top hole in the L-bracket and through the 0.175" metal spacer.
2. Insert the screw and threaded components into the top hole of the left support on the GX-274 ASPEC. Loosely tighten the top screw.
3. Insert the other screw through the L-bracket into the bottom hole of the left support on the GX-274 ASPEC. Fully tighten the screw.
4. Fully tighten the top screw.
5. Slide one of the VERITY® 4060 Dual Syringe Pump under the installed bracket.
6. Set the second VERITY® 4060 Dual Syringe Pump on top of the first, threading the back support feet through the holes on the L-bracket.

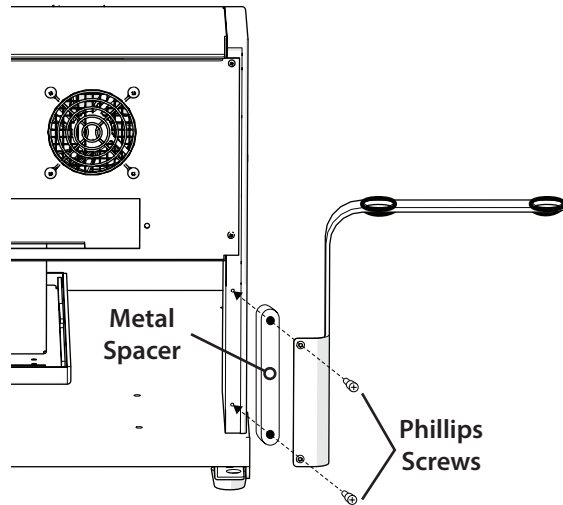
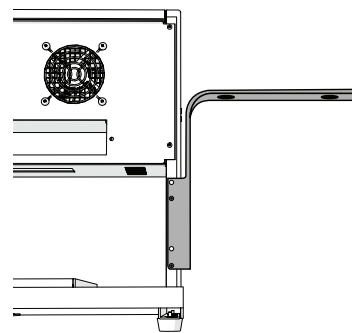
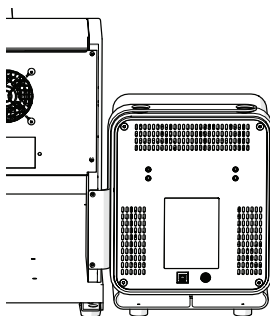


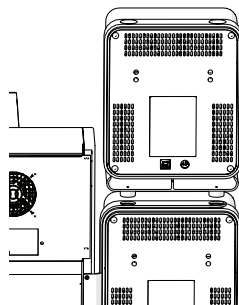
Figure 49: Stacking Bracket and Components (Rear View)



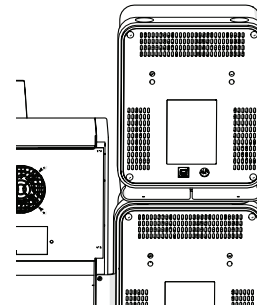
Steps 1 to 4



Step 5



Step 6



Step 7

Operation

Chapter Three

TRILUTION® LH provides programmed control of the GX-274 ASPEC™ system. Refer to the *TRILUTION® LH User's Guide* for complete instructions. This chapter provides information on the following topics:

- **Front Panel** on page 54
- **Start Up** on page 54
- **GX-27X Series Offset Utility** on page 55

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 41.

Error Indicator Light

The orange indicator becomes lit when an error has been encountered. Refer to [Error Messages](#) on page 68 for a list of error messages.

Start Up

GX-274 ASPEC™

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 41. The power indicator light on the front panel illuminates.



Figure 50: Front Panel (Partial)

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.

The GX-27X Series Offset Utility software (part number 21067529) is supplied on a CD located in the offset utility kit (part number 2604710).

The following are included:

- GX-27X Series Offset Utility CD for use with Windows® XP and Windows® 7
- 175/185 mm Offset Tool
- GX-27X Series Offset Utility Kit Instructions

Install the GX-27X Series Offset Utility

Pre-Installation Checklist

Before beginning the installation:

- Log on as a Windows® Administrator
- Close all running applications
- Temporarily disable antivirus software
- Temporarily disable firewall

Installation

The installation of the GX-27X Series Offset Utility proceeds as follows:

1. Uninstall the previous version of the GX-27X Series Offset Utility (if necessary).
2. Insert the CD into the drive. If the setup program does not start automatically, browse for SETUP.EXE.
3. Install the Gilson Server (if not previously installed).
 - Gilson Server v1.0 for Windows® XP
 - Gilson Server v2.0 for Windows® 7
4. Install Microsoft® .NET Framework (if necessary).
5. Install the GX-27X Series Offset Utility. Follow the on-screen instructions.
 - If a User Account Control window appears, click **Yes**.
 - The installation path on a Windows® XP and Windows® 7 (32-bit) system is C:\Program Files\Gilson\Utilities.
 - The installation path on a Windows® 7 (64-bit) system is C:\Program Files (x86)\Gilson\Utilities.

Setup the GX-27X Series Offset Utility

1. Ensure that plumbing and electrical connections have been made as described in [Plumbing Connections](#) on page 38 and [Electrical Connections](#) on page 41.
2. Turn on the instruments.
3. Remove all racks from the tray insert.

Start the GX-27X Series Offset Utility

To start the GX-27X Series Offset Utility, click **Start > All Programs > Gilson Applications > GX-27X Series > GX-27X Series Offset Utility**.

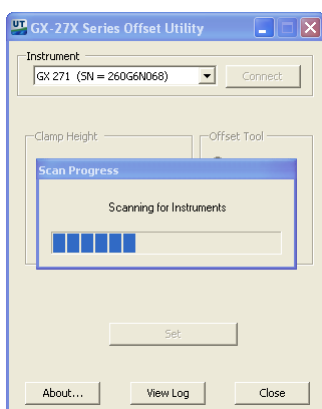
If any Windows® Security Alerts appear with Gilson, Inc. as the Publisher, click **Unblock** (Windows® XP) or **Allow access** (Windows® 7).

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

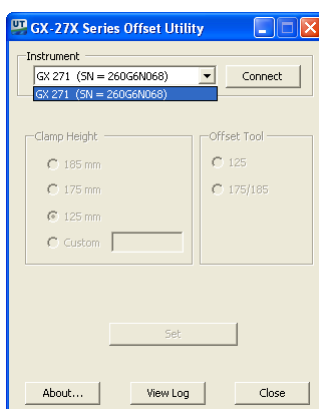
Use the GX-27X Series Offset Utility

Specify and Set Configuration

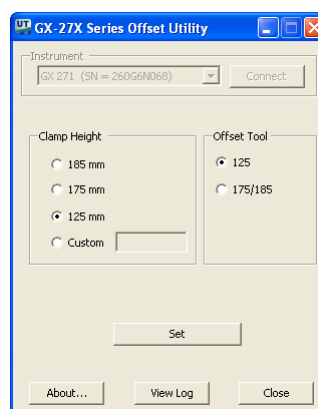
1. Allow instruments to scan into list.
Ethernet-controlled instruments will display the serial number (SN=).
2. Select the instrument and then click **Connect**.
3. Select the Clamp Height and the Offset Tool and then click **Set**.



Step 1: Scan



Step 2: Connect



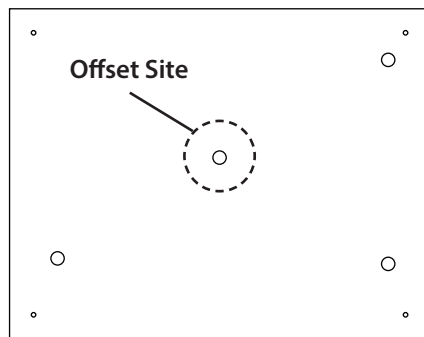
Step 3: Set

Determine and Set XY Offset

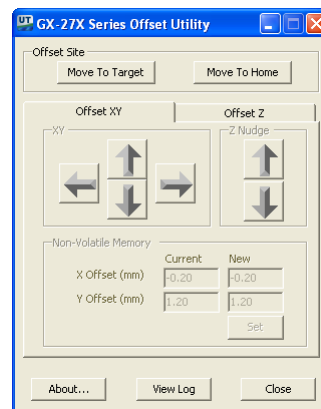
1. Place the selected offset tool on the center hole in the tray insert.
2. To move to the XY offset site, click **Move To Target**.
3. The arm will move to the offset site and then will move the probe 5 mm above the offset tool.
4. Use the Z Nudge arrows to move the probe down.
5. Offset Probe 1 to the center of the offset tool using the XY arrow keys.

NOTE If a message appears indicating that the minimum or maximum offset value has been reached, contact your local Gilson representative for assistance.

7. When the probe is centered, click **Set** to save the X and Y Offsets.



Step 1: Place the Offset Tool



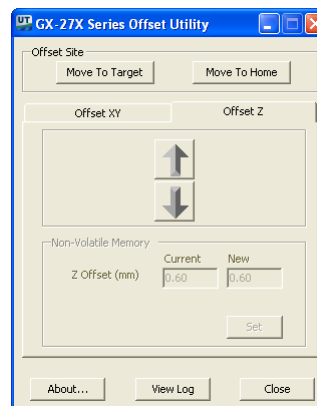
Step 2: Set the Offsets

Determine and Set Z Offset

1. Select the Offset Z tab.
2. To move to the Z offset site, click **Move To Target**.
3. Use the arrows to align the tip of the probe with the top of the offset tool.

NOTE If a message appears indicating that the minimum or maximum offset value has been reached, contact your local Gilson representative for assistance.

4. When the probe is aligned, click **Set** to save the Z offset.



Step 2: Move to Target

View Log

Click **View Log** to view the offset history for the connected instruments.

Move to Home

Click **Move To Home** to home the instrument.

Close Utility and Remove Tool

Close the software and then remove and store the offset tool.

Maintenance

Chapter Four

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](#) on page 62
- [Helpful Hints](#) on page 63
- [Part Replacement](#) on page 64
- [Transporting the Instrument](#) on page 65

Cleaning

Instrument

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 on the system use, 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 syringe stalling.

Probe

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

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.

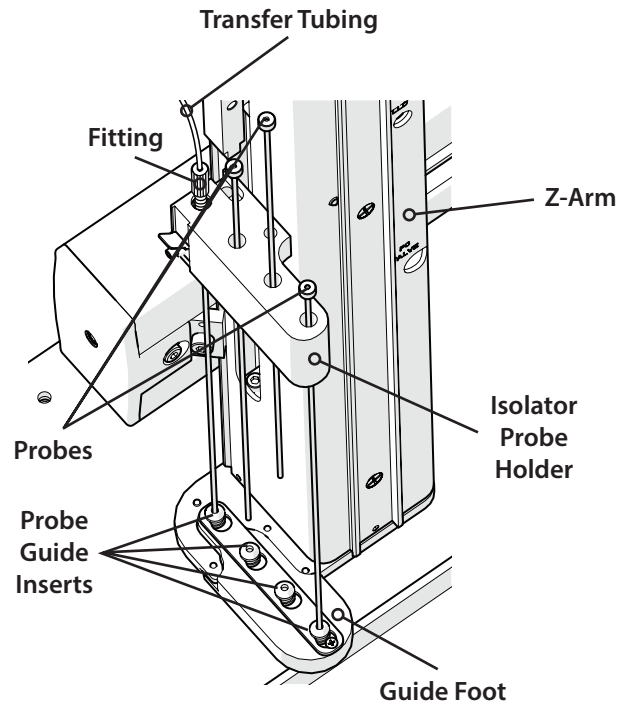


Figure 51: Replacing the Probe/s on the GX-274 ASPEC™

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.

Troubleshooting

Chapter Five

This section provides information on the following topics:

- **Error Messages** on page 68
- **Mechanical** on page 70
- **Electrical** on page 70
- **Communication** on page 71

Error Messages

GX-274 ASPEC™

<i>Error</i>	<i>Error Text</i>	<i>Solution</i>
0	No error	N/A
10	Unknown command	An unknown command was sent. Send a Home 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 Home 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 Home 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 Home 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 Home 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 Home 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 Home 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 Home 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 Home command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.

Error	Error Text	Solution
24	XY speed invalid	The specified XY speed is outside of the valid range. Send a Home command using the Gilson Ethernet Utility. Correct the error in the program controlling the instrument.
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 Home 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 Home 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 Home 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 Home 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 Home 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 Home 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 Home 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 GX-274 ASPEC™.
3. Cycle power to router by turning the router off, waiting 15 seconds, then powering the router back on.
4. Power on the GX-274 ASPEC™.
5. Start TRILUTION® LH.

Racks and Accessories


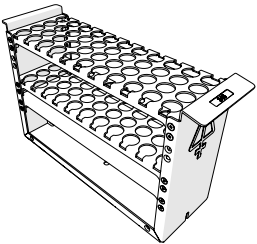


Appendix A

The GX-274 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-274 ASPEC™. Refer to [Rack Installation](#) on page 46 for rack installation procedures.

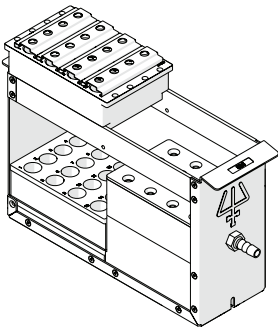
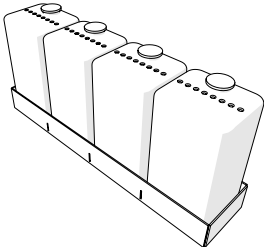
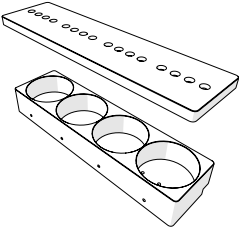
Racks

<i>Part Number</i>	<i>Image</i>	<i>Rack Code</i>	<i>Material</i>	<i>Vessels</i>
260440083		335	Aluminum	48 WISP Vials 15 x 45 mm (4 mL)
260440106		338	Aluminum	64 Vials 12 x 32 mm (2 mL)
260440039		341	Aluminum	108 Tubes 10 x 75 mm
260440025		343	Aluminum	80 Tubes 13 x 100 mm

Racks

<i>Part Number</i>	<i>Image</i>	<i>Rack Code</i>	<i>Material</i>	<i>Vessels</i>
260440041		345	Aluminum	44 Tubes 16 x 150 mm
260440049		346	Aluminum	44 Tubes 16 x 100 mm (15 mL)
260440044		371	Aluminum	36 (1 mL) SPE Cartridges and 36 Tubes 1 mL SPE Cartridges Collection Block Holds: 12 x 75 mm (5 mL) Tubes
260440045		373	Aluminum	20 (3 mL) SPE Cartridges and 20 Tubes 3 mL SPE Cartridges Collection Block Holds: 12 x 75 mm (5 mL) Tubes

Racks

Part Number	Image	Rack Code	Material	Vessels
260440109		386	Aluminum	16 (6 mL) SPE Cartridges and 15 Tubes 6 mL SPE cartridges Collection Block Holds: 15 x 85 mm (10 mL) Tubes
260440005		N/A	Aluminum	4 500 or 700 mL Solvent Bottles
26044036		123	Teflon® (Top) High Density Polyethelene (HDPE) for Bottom	4 650 mL Solvent Bottles

Rack Accessories

Part Number	Description
26041033	Insert for five Code 20-series racks
260440005	Solvent bottle rack, 500 or 700 mL solvent bottles (x4), aluminum
26044036	Solvent bottle rack, 650 mL solvent bottles (x4), Teflon® (Top) and high density polyethylene (HDPE) for the bottom

Solvent Bottles

Part Number	Description
543701700	700 mL, 4/package
54370601	600 mL, 4/package, glass

Test Tubes

<i>Part Number</i>	<i>Description</i>
2954726	5 mL, glass, 12 x 75 mm, 250/package
2954729	10 mL, glass, 15 x 85 mm, 250/carton

ASPEC™ Solid Phase Extraction Cartridges

Silica

<i>Part Number</i>	<i>Description</i>
54350501	50 mg, 1 mL
54350502	100 mg, 1 mL
54350503	200 mg, 3 mL
54350504	500 mg, 3 mL
54350505	500 mg, 6 mL
54350506	1 g, 6 mL

C4

<i>Part Number</i>	<i>Description</i>
54350507	50 mg, 1 mL
54350508	100 mg, 1 mL
54350509	200 mg, 3 mL
54350510	500 mg, 3 mL
54350511	500 mg, 6 mL
54350512	1 g, 6 mL

C8

<i>Part Number</i>	<i>Description</i>
54350513	50 mg, 1 mL
54350514	100 mg, 1 mL
54350515	200 mg, 3 mL
54350516	500 mg, 3 mL
54350517	500 mg, 6 mL
54350518	1 g, 6 mL

C18

<i>Part Number</i>	<i>Description</i>
54350519	50 mg, 1 mL
54350520	100 mg, 1 mL
54350521	200 mg, 3 mL
54350522	500 mg, 3 mL
54350523	500 mg, 6 mL
54350524	1 g, 6 mL

SAX, ASPEC A Chloride nec

<i>Part Number</i>	<i>Description</i>
54350525	50 mg, 1 mL
54350526	100 mg, 1 mL
54350527	200 mg, 3 mL
54350528	500 mg, 3 mL
54350529	500 mg, 6 mL
54350530	1 g, 6 mL

SAX-2, ASPECMA Acetate nec

<i>Part Number</i>	<i>Description</i>
54350531	50 mg, 1 mL
54350532	100 mg, 1 mL
54350533	200 mg, 3 mL
54350534	500 mg, 3 mL
54350535	500 mg, 6 mL
54350536	1 g, 6 mL

SCX, ASPECTosic Acid

<i>Part Number</i>	<i>Description</i>
54350537	50 mg, 1 mL
54350538	100 mg, 1 mL
54350539	200 mg, 3 mL
54350540	500 mg, 3 mL
54350541	500 mg, 6 mL
54350542	1 g, 6 mL

SCX-2, ASPEC Propylsulfonic Acid

<i>Part Number</i>	<i>Description</i>
54350543	50 mg, 1 mL
54350544	100 mg, 1 mL
54350545	200 mg, 3 mL
54350546	500 mg, 3 mL
54350547	500 mg, 6 mL
54350548	1 g, 6 mL

WAX, ASPEC Amine

<i>Part Number</i>	<i>Description</i>
54350549	50 mg, 1 mL
54350550	100 mg, 1 mL
54350551	200 mg, 3 mL
54350552	500 mg, 3 mL
54350553	500 mg, 6 mL
54350554	1 g, 6 mL

WCX, Carboxylic Acid

<i>Part Number</i>	<i>Description</i>
54350555	50 mg, 1 mL
54350556	100 mg, 1 mL
54350557	200 mg, 3 mL
54350558	500 mg, 3 mL
54350559	500 mg, 6 mL
54350560	1 g, 6 mL

HLB

<i>Part Number</i>	<i>Description</i>
54350561	50 mg, 1 mL
54350562	100 mg, 1 mL
54350563	200 mg, 3 mL
54350564	500 mg, 3 mL
54350565	500 mg, 6 mL

DEC Accessory Kits

ASPEC 1 mL

<i>Part Number</i>	<i>Description</i>
2604701	DEC accessory set, 1mL GX ASPEC
2954698	Caps, natural PE, for 1 mL cartridge, 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, 250/ctn
543701500	Bottle, solvent, 500 mL, 4/pkg
543701700	Bottle, solvent, 500 mL, 4/pkg

ASPEC 3 mL

<i>Part Number</i>	<i>Description</i>
2604702	DEC accessory set, 3mL GX ASPEC
2954699	Caps, natural PE, 3 mL cartridge, 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, 250/ctn
543701500	Bottle, solvent, 500 mL, 4/pkg
543701700	Bottle, solvent, 700 mL, 4/pkg

ASPEC 6 mL

<i>Part Number</i>	<i>Description</i>
2604703	DEC accessory set, 6 mL GX ASPEC
2954729	Tubes, 15 x 85 mm, 10mL, glass, 250/ctn
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, 700 mL, 4/pkg

DEC Caps

<i>Part Number</i>	<i>Description</i>
2954698	Natural polyethylene (PE) for 1 mL cartridge, 1000/package
2954699	Natural PE for 3 mL cartridge, 1000/package
2954730	PE for 6 mL, 1000/package

Parts and Accessories

Appendix B

GX-274 ASPEC™

System

<i>Part Number</i>	<i>Description</i>
2614010	GX-274 ASPEC with two VERITY® 4260 Dual Syringe Pumps

Probes

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

<i>Part Number</i>	<i>Description</i>
2507255	Beveled tip, 269 x 1.5 x 0.4 mm
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).
27067382	Septum piercing, beveled tip, 221 x 2.0 x 0.8 mm

Probe Guide Assembly

<i>Part Number</i>	<i>Description</i>
26046233	Inert guide foot assembly, GX-274 ASPEC™

Probe Guide Insert

<i>Part Number</i>	<i>Description</i>
26046237	Inert probe guide insert, GX-274 ASPEC™

Probe Guide Foot

<i>Part Number</i>	<i>Description</i>
26046237	Inert probe guide foot, GX-274 ASPEC™

Probe Guide Retainer Lock

<i>Part Number</i>	<i>Description</i>
26046236	Inert probe guide retainer lock, GX-274 ASPEC™

Z-Arm and Components

Z-Arm

<i>Part Number</i>	<i>Description</i>
260465	GX-27X Z-arm

Components

<i>Part Number</i>	<i>Description</i>
2604645	Isolator probe holder, four probe (GX-274 ASPEC™)
260463	Stop pin

Rinse Stations

<i>Part Number</i>	<i>Description</i>
260440001	Four probe rinse station
260440002	Four probe rinse station/reservoir (GX-274 ASPEC™)
26045103	Rinse station riser

Safety Shield

<i>Part Number</i>	<i>Description</i>
2604706	Shield, GX-27X

Cables and I/O Accessories

<i>Part Number</i>	<i>Description</i>
709910206	2-conductor interconnect wire, 6 ft., for making contact connections
36078142	Ethernet cable
6730314007	Fuse, 3.15 A, T-3.15, SLO-BLO
6770100411	Fuse drawer
260461126	Liquid level detection (LLD) cable assembly
7080318114	Power cord, right angle, 110V
7080318115	Power cord, right angle, 220V
638306512	Terminal block connector, 6-pin
638308512	Terminal block connector, 8-pin

Miscellaneous

<i>Part Number</i>	<i>Description</i>
95260185	185 mm Z-height adjustment tool
26041032	Code 20-series tray Insert
31030017	Stacking bracket
21050000	System organizer, GX-27X
260440002	Tray locator clamp

GX Rinse Pump and Components

GX Rinse Pump

<i>Part Number</i>	<i>Description</i>
261452	GX Rinse Pump

Components

<i>Part Number</i>	<i>Description</i>
26035256	Power cable for GX rinse pump
26035221	PharMed Tubing Assembly 2.0 mm (ID)
4715187060	Tubing, 1/16" x 3/16" (OD), neoprene

Materials

Appendix C

Information provided by Valco Instruments Company, Inc.

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.

