GX-271 ASPEC™

User's Guide

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Safety

Read this section before installing and operating the instrument.

The instrument is intended to be used in a laboratory environment by trained technical personnel.

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

The following safety precautions must be observed during all phases of operation, service, and repair of the instrument. Failure to comply with these precautions or with specific warnings elsewhere in this user's guide violates safety standards of design, manufacture, and intended use of the instrument. Gilson assumes no liability for the customer's failure to comply with these requirements.

The instrument has been certified to safety standards required in Canada, Europe, and the United States. See 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:

Symbol	*Explanation*
~	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 éloignees 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 Etats-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 apparaitre sur l'instrument:

Symbole	*Signification*
~	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 éloignees de l'aiguille Halten Sie Hände fein von der Nadel

Notes de Sécurité

Les notes de sécurité suivantes peuvent apparaitre 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

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

VERITY® 4060 Single Syringe Pump
OR
VERITY® 4260 Dual Syringe Pump

For installation instructions, refer to the *VERITY® 4060 Single and VERITY® 4260 Dual Syringe Pump User's Guide* included on the *ASPEC™ Systems Documentation*

GX Rinse Pump

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

For installation instructions, refer to page 36.

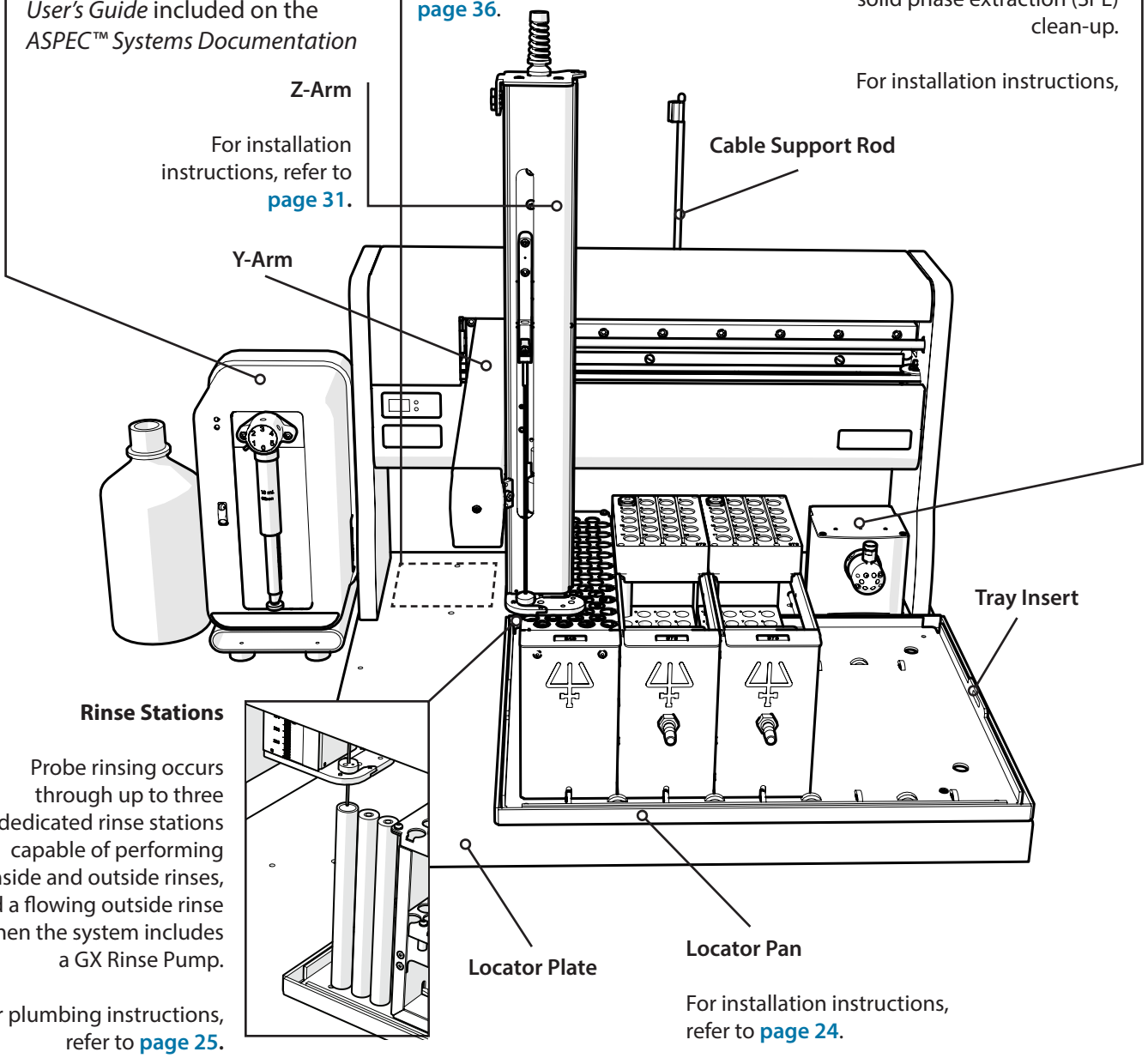
GX Direct Injection Module

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

For installation instructions,

Z-Arm

For installation instructions, refer to page 31.



Rinse Stations

Probe rinsing occurs through up to three dedicated rinse stations capable of performing inside and outside rinses, and a flowing outside rinse when the system includes a GX Rinse Pump.

For plumbing instructions, refer to page 25.

Locator Plate

Locator Pan

For installation instructions, refer to page 24.

Figure 1: GX-271 ASPEC System Overview

Unpacking

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

To unpack the instrument:

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

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

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

4. Remove the plastic wrap covering the GX-271 ASPEC™.

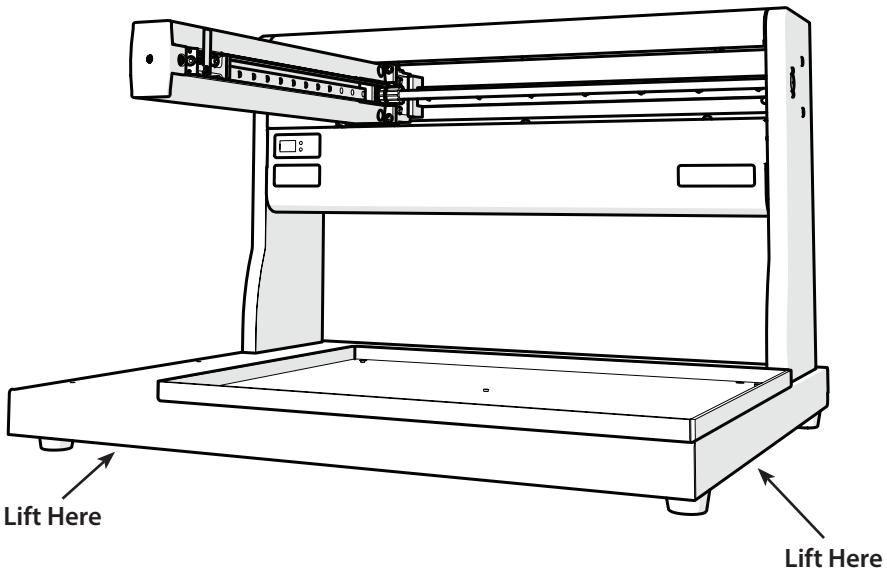


Figure 2: Lifting the GX-271 ASPEC

Standard Equipment

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

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

Documentation

The following documentation is provided:

- ASPEC™ Systems Documentation CD, which includes this user's guide (and other ASPEC system user's guides), plumbing diagrams, and IQ procedure documents.
- Gilson Ethernet Utility Instructions on the Gilson Ethernet Utility CD
- GX-27X Series Offset Utility Kit Instructions
- Declaration of Conformity
- Hazardous Materials Declaration Document (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:

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

Refer to the **Parts and Accessories** appendix for part numbers.

Optional

- ASPEC™ SPE Cartridges
- GX Direct Injection Module
- GX Rinse Pump
- Riser Block
- Safety Shield
- Sample Loops
- 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.

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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-271 ASPEC™
- GX Direct Injection Module
- GX Rinse Pump

GX-271 ASPEC™

Technical Specification	*Definition*	
Arm Speed (Maximum)	350 mm/sec in X dimension	
	350 mm/sec in Y dimension	
	125 mm/sec in Z dimension (factory set to 80 mm/sec)	
Communication	Ethernet	
Contact Control	Two inputs, transistor-transistor logic (TTL) contact closures	
	Two relay outputs	
	Two switched +24V DC 1A outputs	
	One safety input	
	NOTICE	Switching voltages higher than 30V or greater than 1A of current may damage the instrument.

GX-271 ASPEC™ Technical Specifications (continued on page 18)

GX-271 ASPEC™

Technical Specification	*Definition*	
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 VERITY® 4060 Single Syringe Pump or 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: 5C°–40° C	
	Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C	
Front Panel	Two blue, digital displays and two indicator lights for power and error.	
Fuse	Two 5 x 20 mm, "T" type, 3.15A fuses	
Horizontal Motion Strength	4.5 lbs.	
Liquid Contact Materials* *Refer to the **Materials** appendix for more details.	***Description***	***Material***
	Probe Guide	PET
	Probe	316L Stainless Steel
	Rinse Station	PET
	Transfer Port	PEEK PET PTFE 316L Stainless Steel
	Tubing (Drain)	TYGON®

GX-271 ASPEC™ Technical Specifications (continued on page 19)

GX-271 ASPEC™

Technical Specification	*Definition*	
Locator Plate Capacity	Code 20-series	Up to five of these racks can be placed on the Code 20-series tray insert (part number 26041033).
	Code 33X/34X-series	
	Code 37X DEC racks	
	Code 386	
	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 rinse station capable of performing inside and outside rinses, and a flowing outside rinse when the system includes a GX Rinse Pump.	
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	4.5 kg (10.0 lbs.)	
Weight* ***With Z-arm**	22 kg (48 lbs.)	

GX Direct Injection Module

Technical Specification	*Definition*
Available Valves	**Analytical** ● Stainless steel direct injection valve ○ (2-position, 6-port) 0.016" (ID) ports, 1/16" (OD) ● PEEK direct injection valve ○ (2-position, 6-port) 0.016" (ID) ports, 1/16" (OD)
	Preparative ● Stainless steel direct injection valve ○ (2-position, 6-port) 0.060" ID ports, 1/8" OD ● Stainless steel direct injection valve ○ (2-position, 6-port) 0.030" ID ports, 1/16" OD
Available Sample Loops	**Analytical** ● For GX Direct Injection Module (1/16"): 2 µL, 5 µL, 10 µL, 20 µL, 50 µL, 100 µL, 250 µL, 500 µL, 1 mL, and 2 mL
	Preparative ● For GX Direct Injection Module (1/8"): 5 mL, 10 mL, 20 mL, and 25 mL ● For GX Direct Injection Module (1/16"): 250 µL, 500 µL, 1 mL, 2 mL, and 5 mL
Dimensions (W x D x H)	12.1 x 8.9 x 10.1 cm (4.75 x 3.50 x 3.98 in.)
Front Panel	LED indicator for LOAD and INJECT positions
Injection Carryover* *Contact Gilson, Inc. (techsupport@gilson.com) to learn what methods and conditions were used to obtain the values.	**Analytical (1/16")** ● < 0.005% ○ Stainless steel valve and port ○ 20 µL loop ○ Total loop overfill

GX Direct Injection Module Technical Specifications (continued on page 21)

GX Direct Injection Module

Technical Specification	*Definition*	
Injection Reproducibility* *Contact Gilson, Inc. to learn what methods and conditions were used to obtain the values.	**Analytical (1/16")** ● CV < 0.7% ○ Stainless steel and PEEK valves and ports ○ 20 µL loop ○ Total loop overfill	
	Preparative (1/16") ● CV <0.9% ○ Stainless steel valve and port ○ 1 mL loop ○ Partial loop	
Liquid Contact Materials* *Refer to the Materials appendix for more details.	*Description*	*Material*
	Injection Valve	Valcon H Nitronic 60 (N60) PTFE PAEK
	Injection Port	PPS SS
Power Requirements	Voltage: 24V DC Current rating: 1.0A	
Valve Switching Speed	200 msec for GX Direct Injection Module (1/16")	
	300 msec for GX Direct Injection Module (1/8")	
Weight	1.2 kg (2.63 lbs.)	

GX Rinse Pump

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

Installation

Chapter Two

The GX-271 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
- Z-Arm Setup
- Z-Arm Installation
- GX Rinse Pump (Optional) Installation
- GX Direct Injection Module (Optional) Installation
- Plumbing Connections
- Electrical Connections
- Rack Installation
- Final Z-Arm Adjustments
- Safety Shield (Optional) 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-271 ASPEC™, tray inserts, and rinse stations.

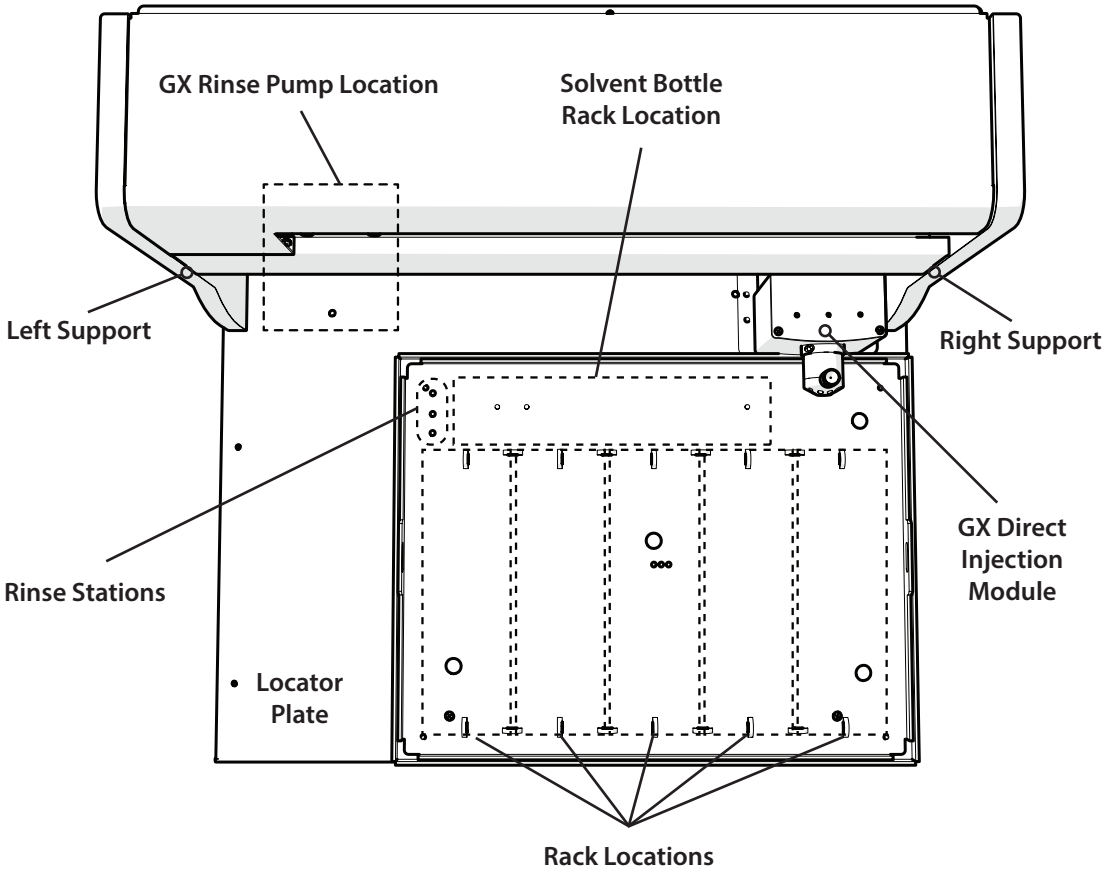


Figure 3: GX-271 ASPEC Overview

Locator Pan Installation

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

1. Orient the two posts on the bottom of the locator pan toward the back of the instrument.
2. Place the locator pan on the locator plate. The front and right side of the locator pan should be flush with the front and right side of the locator plate. The two posts should be inserted in the locator plate.
3. Locate the two screws included with the locator pan, and place them in the holes at the front of the instrument. Tighten the screws using a Phillips screwdriver.

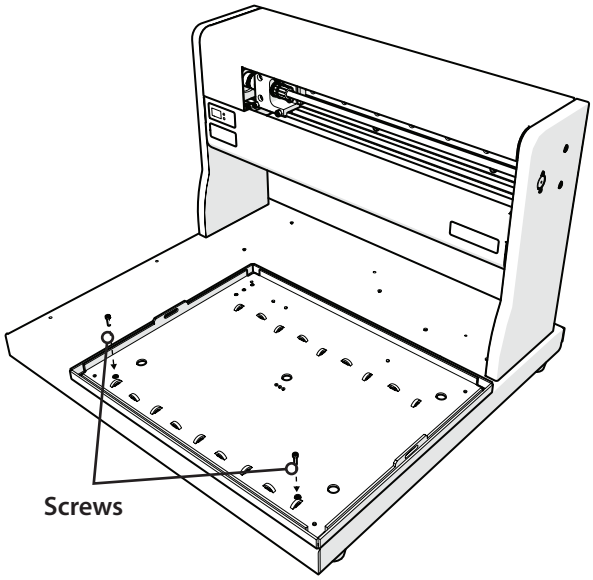


Figure 4: Installing the Locator Pan

Rinse Station Installation

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

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

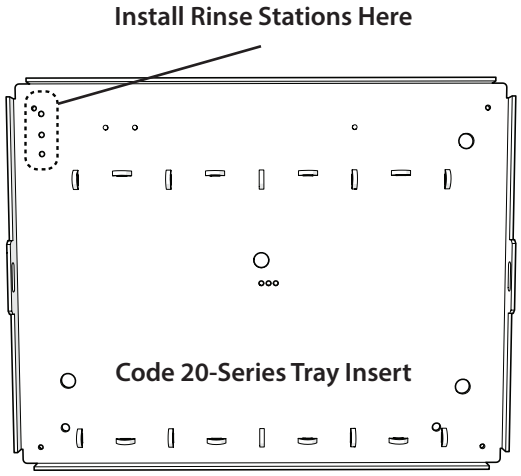


Figure 5: Installing the Rinse Station on the Tray Insert

Inside Probe Rinse

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

Outside Probe Rinse

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

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

Inside Probe Rinse	*Outside Probe Rinse*	
	Static Rinse	*Flowing Rinse*

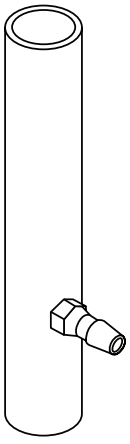
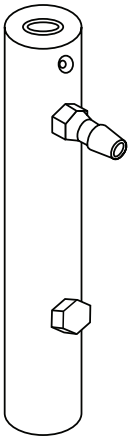
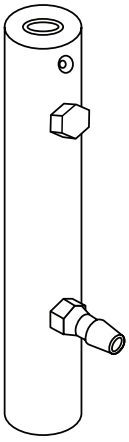

		

Figure 6: Inside Rinse/Drain Station	**Figure 7:** Outside Static Rinse Station	**Figure 8:** Outside Flowing Rinse Station

Installing the Rinse Station on the Tray Insert

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

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

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

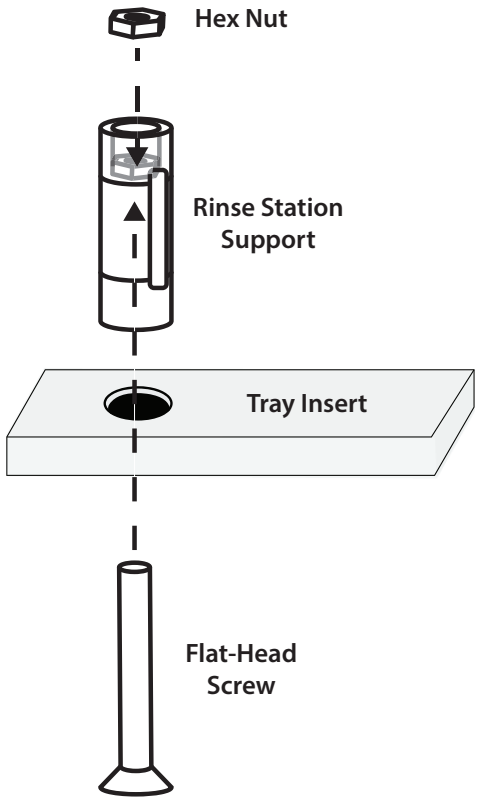


Figure 9: Installing the Rinse Station on the Tray Insert

Tray Insert Installation

The Code 20-series tray insert (part number 26041033), is used to position the racks and the rinse stations on the instrument. In the center of the tray insert there are three holes used to identify the insert.

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

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

   NOTE The rinse stations should be installed before installing the tray insert on the locator pan. Refer to **Rinse Station Installation** on page 25 for more information on installing the rinse stations.

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

Solvent Bottle Rack Installation

Solvent bottle racks (part number 260440005) or (part number 26044036), ordered separately, can be installed on the Code 20-series tray insert.

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

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

NOTE The solvent bottle rack must be placed adjacent to the rinse station location, as shown in **Figure 10**, even if the rinse stations are not installed.

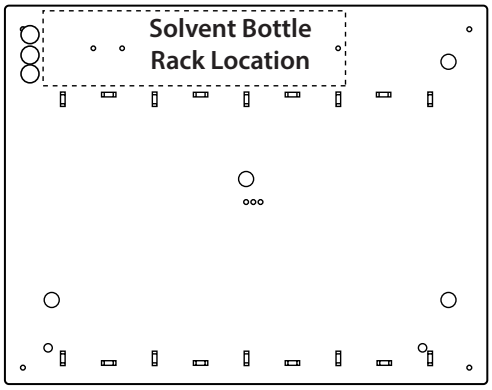


Figure 10: Code 20-Series Tray Insert with Solvent Bottle Rack and Rinse Station

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.

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. Inert Guide Foot Installation
3. Z-Arm Installation
4. Adjusting the Z Travel Height
5. Probe Installation
6. Liquid Level Detection (LLD) Cable Installation

Isolator Probe Holder Installation

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

NOTE The isolator mounting block is factory-installed. 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.

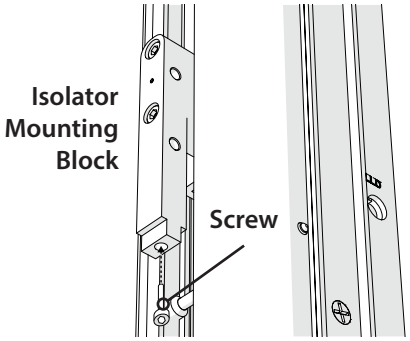


Figure 11: Close-Up of Right Side of Z-Arm

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

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

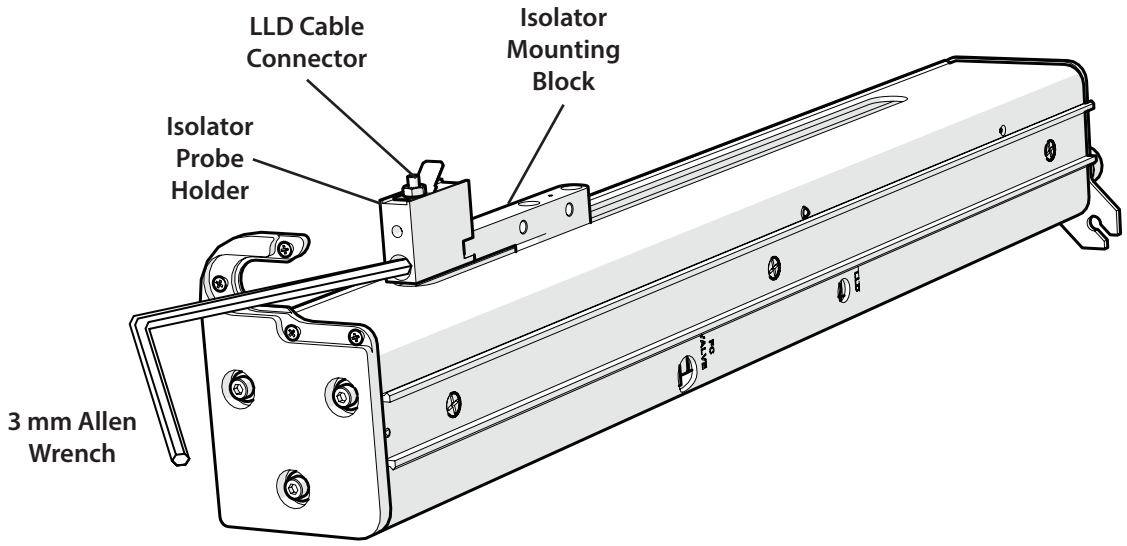


Figure 12: Z-Arm Components

Inert Guide Foot Installation

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

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

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

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

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

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

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

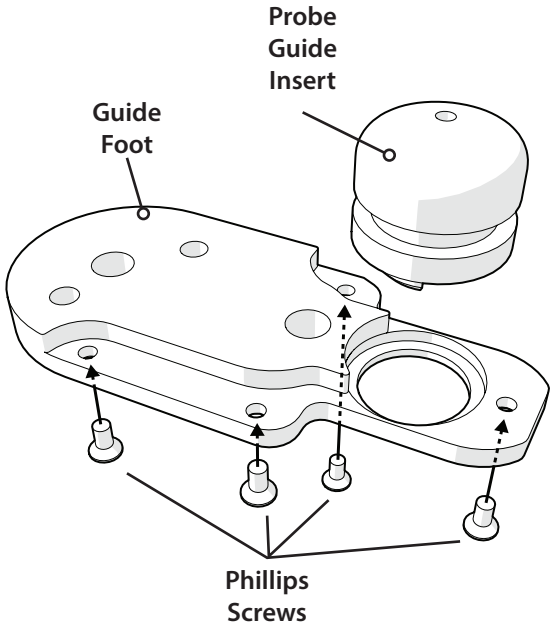


Figure 13: Inert Guide Foot (Exploded View)

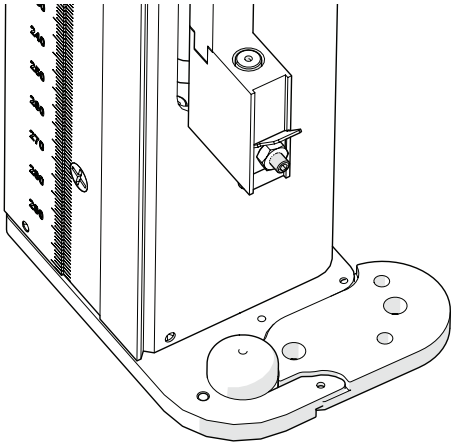


Figure 14: Inert Guide Foot (Installed)

Z-Arm Installation

Follow these steps to install the Z-arm:

1. Loosen the mounting screw on the Z-arm mounting bracket located on the Y-arm using the 3 mm Allen wrench. Turn counterclockwise to loosen.
2. Partially pull out the bracket. Do not remove completely.
3. Place the Z-arm into the mounting bracket. You will need to insert one side of the Z-arm into place at a time (back to front).
4. Tighten the screw on the mounting bracket until the Z-arm is secure.

The Z-arm will be set to its proper height as the final step of the installation. Refer to **Z-Arm Height Adjustment** on page 33.

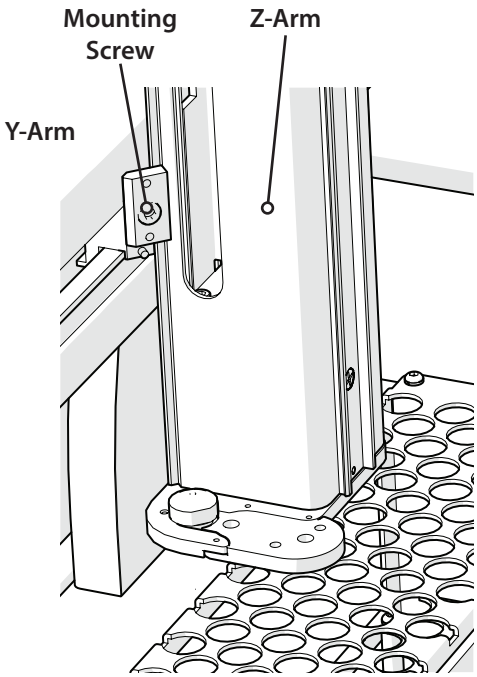


Figure 15: Z Arm Installation

Adjusting the Z Travel Height

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

Follow these steps to adjust the Z travel height:

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

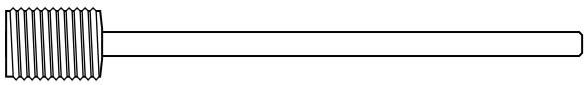


Figure 17: Stop Pin

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

2. Insert the stop pin in the proper hole on the Z-arm.
   - S1 for 56 mm probes
   - S2 for 125 mm probes
   - No pin installed for 175 mm probes
3. Tighten the head of the stop pin until it reaches a hard stop using the 3 mm Allen wrench.

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

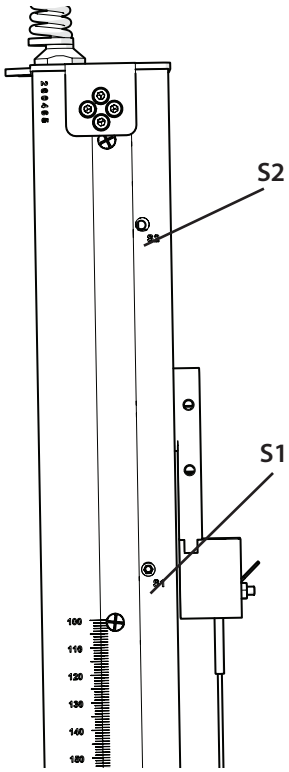


Figure 16: S1 and S2 Positions

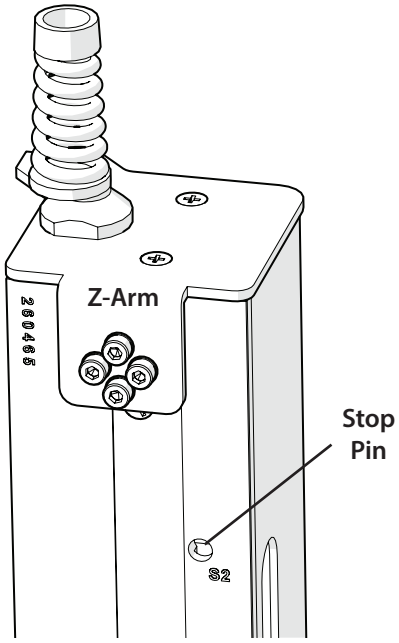


Figure 18: Close-Up of Z-Arm and Stop Pin

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. Nudge the Z-arm up to 187 mm. Use the scale on the Z-arm to confirm your adjustment. The top of the alignment clip, attached to the mounting bracket, should be flush with the correct line on the scale. Refer to **Figure 16**.
6. Tighten the mounting screw on the Z-arm mounting bracket to secure the Z-arm.
7. While holding the adjustment tool in place, slide the Z-arm off the tool. Ensure that the bottom of the Z-arm lightly rubs against the adjustment tool. If necessary, loosen and readjust the Z-arm until it does.

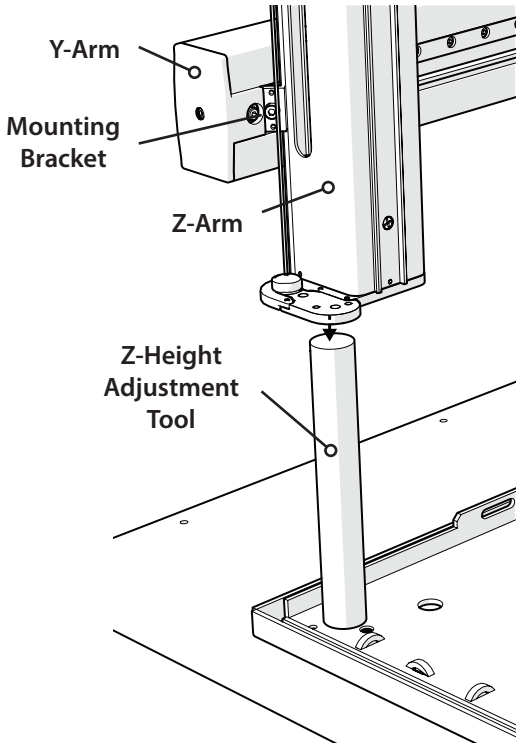


Figure 20: Z-Arm Height Adjustment

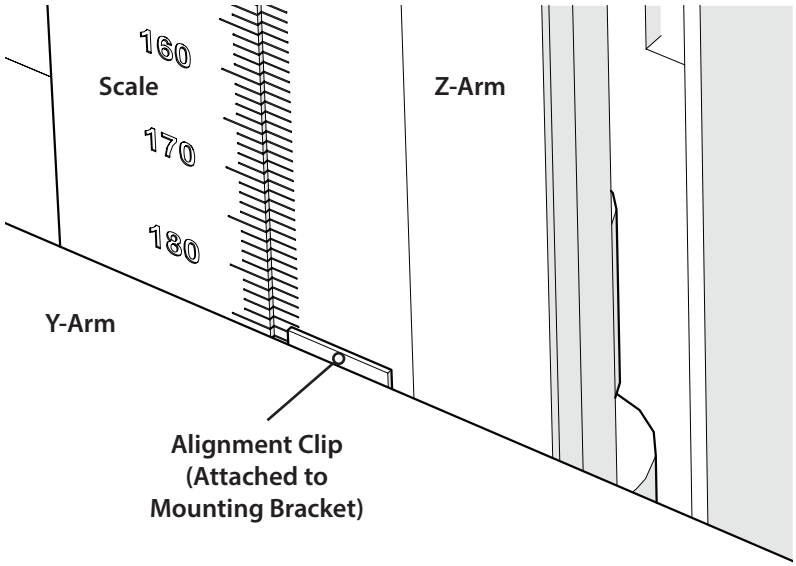


Figure 19: Close-Up of Z-Arm Scale

Probe Installation

There are different probes available for use on the instrument. When installing the probe, refer to the following procedure and diagram that show where it is installed on the Z-arm.

To install the probe on the Z-arm:

1. Insert the probe into the top of the isolator probe holder.
2. Pull the probe through the isolator probe holder until the tip of the probe is in the probe guide insert.

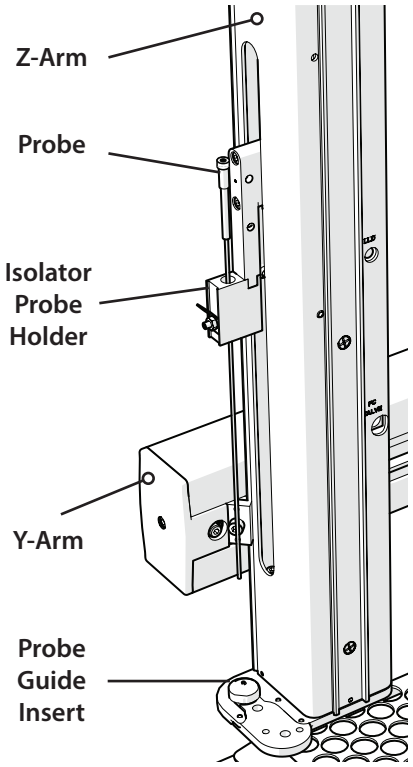


Figure 21: Installing Probes on the Z-Arm

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.

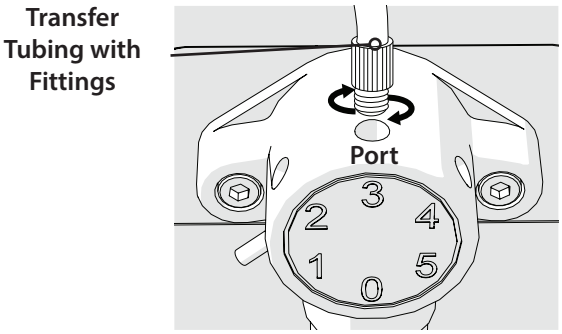


Figure 22: Connecting Transfer Tubing to Syringe Pump

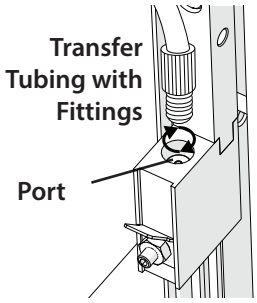


Figure 23: Connecting Transfer Tubing to GX-271 ASPEC

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

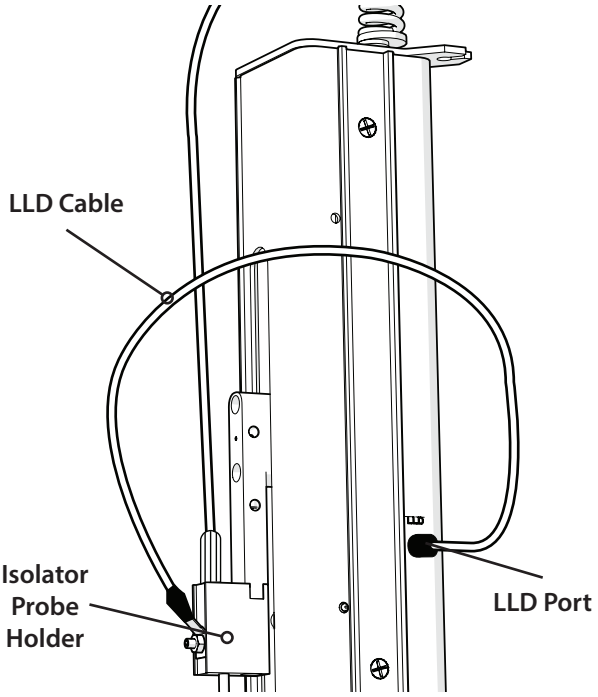


Figure 24: Installing the LLD Cable

GX Rinse Pump (Optional) Installation

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

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

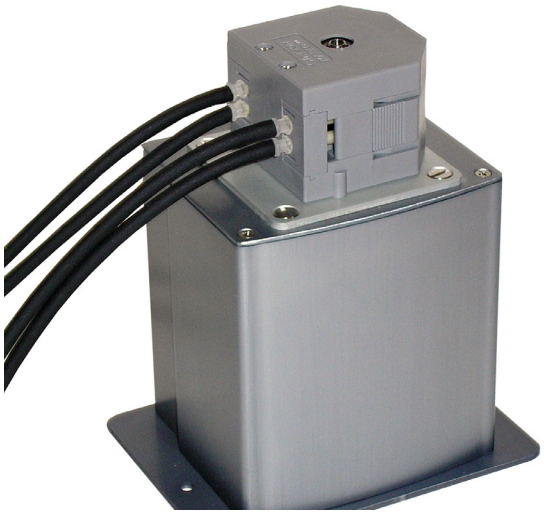


Figure 25: GX Rinse Pump

GX Direct Injection Module (Optional) Installation

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

Installing the Injection Module with a Riser Block

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

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

1. Align the pins on the top of the riser block with the holes on the bottom of the GX Direct Injection Module and then push the injection module into place.
2. With the valve facing toward the front of the instrument, slide the injection module/riser assembly from the back of the instrument toward the front until it is lined up with the holes on the locator plate.
3. Place the two screws (included with the riser) through the rear set of holes on the GX Direct Injection Module.
4. Using the supplied ball driver wrench, tighten the screws connecting the injection module/riser assembly to the locator plate.

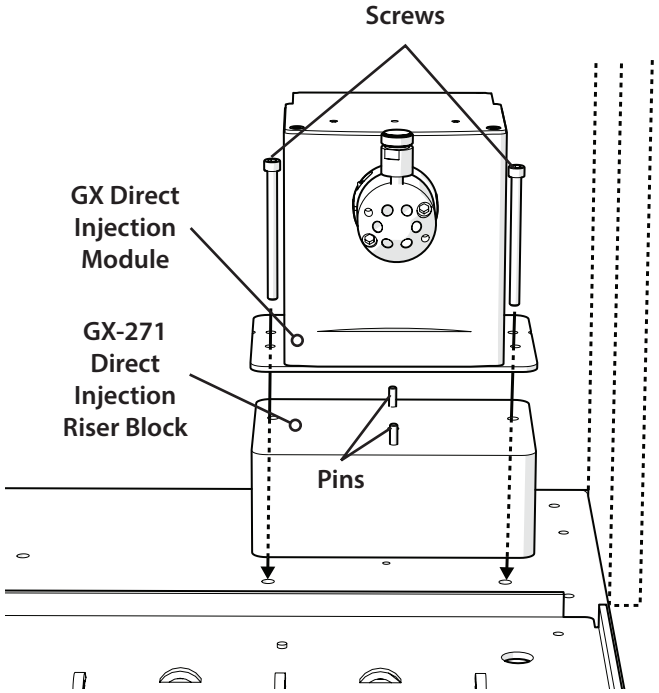


Figure 26: Installing the GX Direct Injection Module on the Riser

Installing the Injection Module on the Locator Plate

1. Align the holes on the GX Direct Injection Module base with the holes in the locator plate.
2. Place one of the provided screws on each side in the rear holes of the GX Direct Injection Module. Tighten the screws using the supplied ball driver wrench.

NOTE There are two locator pins included with the GX Direct Injection Module; these pins will not be used with the GX-271 ASPEC.

Figure 27: GX Direct Injection Module on the Locator Plate

Plumbing Connections

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

Transfer Tubing

Refer to **Transfer Tubing Installation** on page 34 for instructions on connecting the tubing fittings to the probes and probe ports on the syringe pump valves.

Rinse Station Plumbing

To attach tubing to the drain:

1. Locate the drain tubing (part number 470331206) included with the rinse station.
2. Connect the drain tubing to the barbed union on the rinse station.
3. If you are using a GX Rinse Pump, refer to **GX Rinse Pump (Optional)** on page 45.

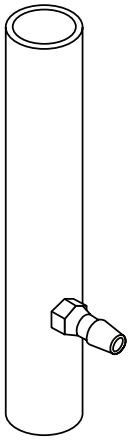
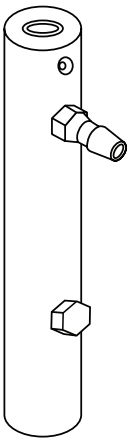
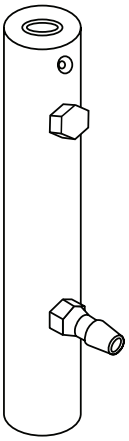
Inside Probe Rinse	*Outside Probe Rinse*	
	Static Rinse	*Flowing Rinse*
		
Inside Rinse Station	**Outside Static Rinse Station**	**Outside Flowing Rinse Station**

Figure 28: Rinse Station Configurations

GX Direct Injection Module (Optional) Plumbing

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

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

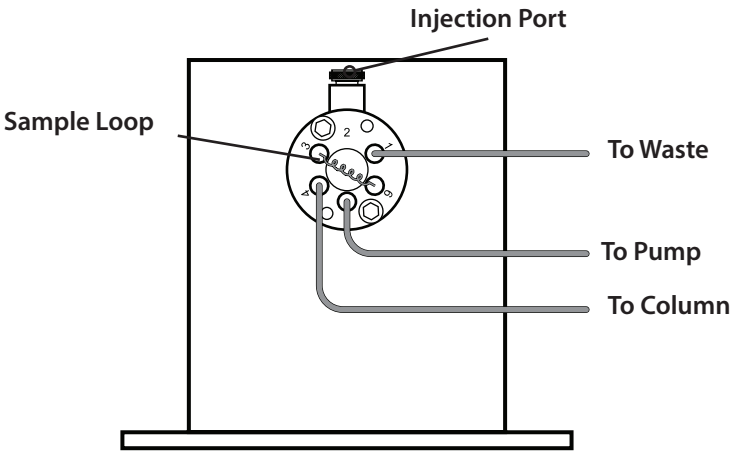


Figure 29: GX Direct Injection Module for 1/16" (OD) Sample Loop

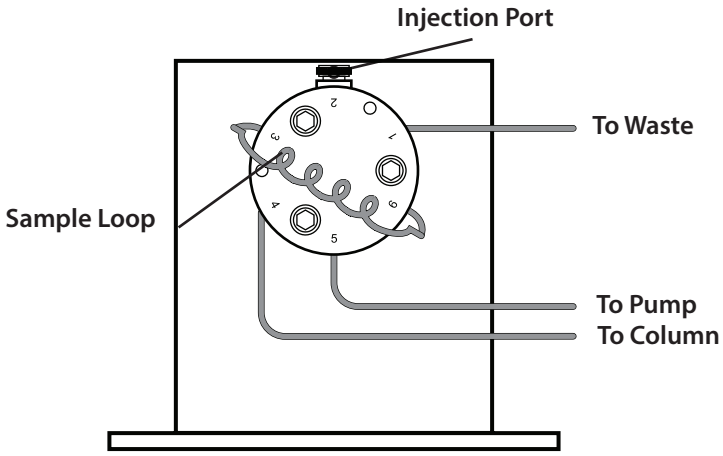


Figure 30: GX Direct Injection Module for 1/8" (OD) Sample Loop

Making Plumbing Connections for the GX Direct Injection Module.

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

GX Rinse Pump (Optional) Plumbing

Locate the following tubing included with the rinse pump:

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

To install the tubing:

1. Remove the tubing clip from the top of the rinse pump by squeezing the sides and then pulling it out.
2. Remove the two pieces from the side of the pump head. Store the pieces for future use. Place one end of the PharMed® tubing assembly in the left side of the pump head and snap into place.
3. Place the other end of the PharMed® tubing assembly in the right side of the pump head and snap into place.
4. Replace the tubing clip.
5. Connect a length of neoprene tubing to the top barbed fitting on the right side and place the other end in a reservoir.
6. Connect a length of neoprene tubing to the top barbed fitting on the left side to the rinse station.
7. Repeat steps 5 and 6 for the bottom set of fittings.

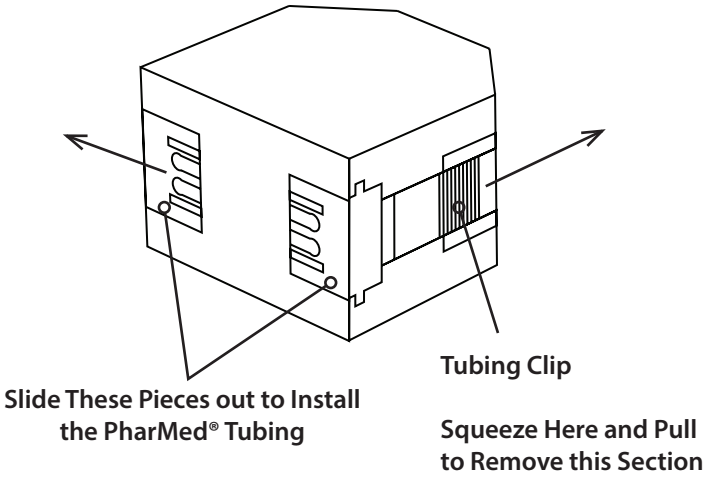


Figure 31: Installing Tubing in the GX Rinse Pump

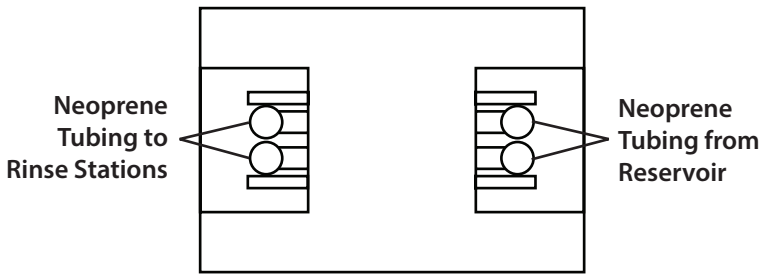


Figure 32: Making the Neoprene Tubing Connections

Electrical Connections

Rear Panel Diagram

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

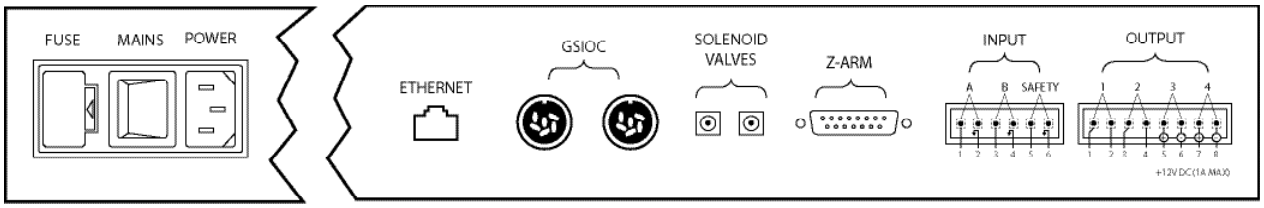


Figure 33: Rear Panel Diagram

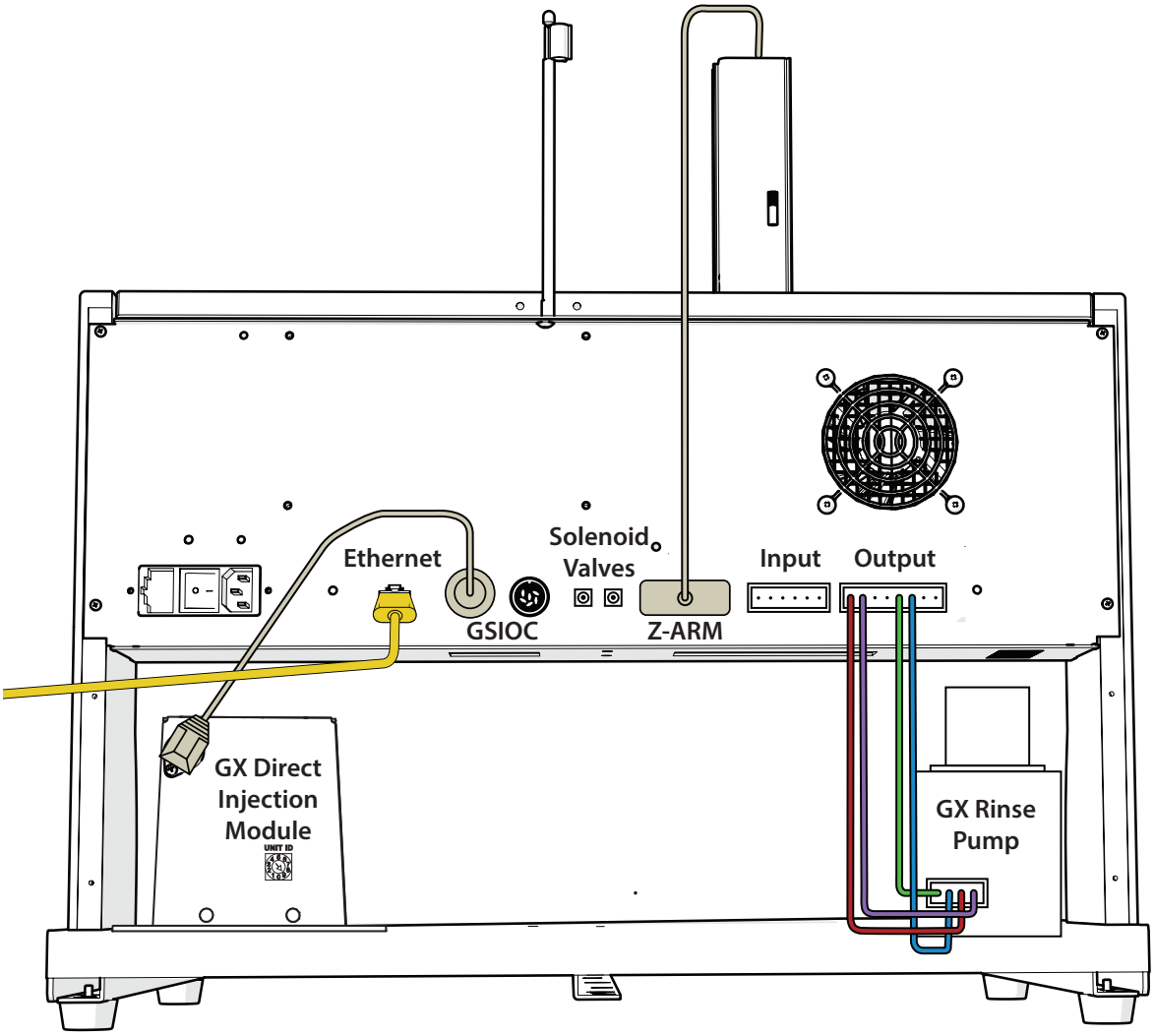


Figure 34: Electrical Connections Diagram for the GX-271 ASPEC™ with Accessories

GX-271 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 42 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.

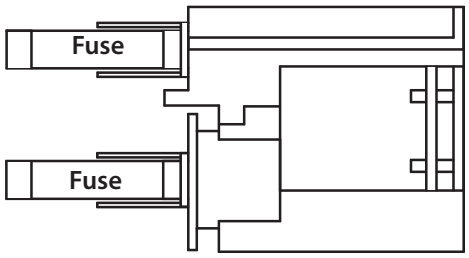


Figure 35: Fuse Installation

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-271 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-271 ASPEC until directed to in the **Operation** chapter.

Z-Arm Connection

Connect the cable from the Z-arm to the Z-ARM port on the rear panel of the GX-271 ASPEC. Refer to the **Rear Panel Diagram** on page 42 for the location of this port.

Input/Output Ports

You can use the input and output contacts found on the rear panel of the instrument to control peripheral devices. Refer to **Rear Panel Diagram** on page 42 for the location of the input/output ports.

Contact Inputs

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

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

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

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

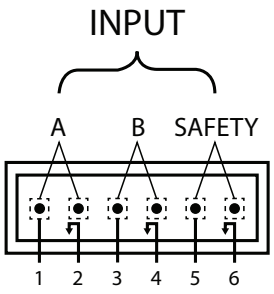


Figure 36: Input Contacts

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.

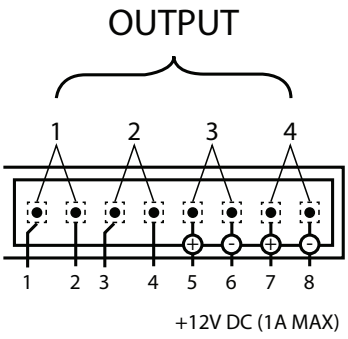


Figure 37: Output Contacts

Making Connections

To make connections, you'll need the following:

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

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

To make connections with the 2-conductor cable:

1. Cut the cable into pieces of appropriate length.
2. Strip about 3 mm of insulation from each end of the cable.
3. Remove the terminal block connector from the instrument. Insert each wire into the appropriate terminal on the terminal block connector.

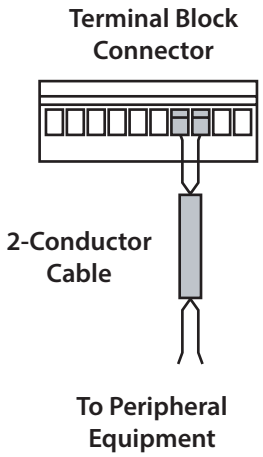


Figure 38: Terminal Block Connections

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. 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-271 ASPEC™ and then to an outlet. Ensure that the power cord is plugged into a grounded power outlet.

GX Rinse Pump (Optional)

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

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

GX Direct Injection Module (Optional)

To make connections between the GX Direct Injection Module and the GX-271 ASPEC™ refer to **Electrical Connections** on page 42 and instructions below.

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

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

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

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

Unit ID

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

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

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

Figure 39: Unit ID Label

To change the unit ID:

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

2. Align the arrow with one of the indicated numbers.

Rack Installation

The GX-271 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.

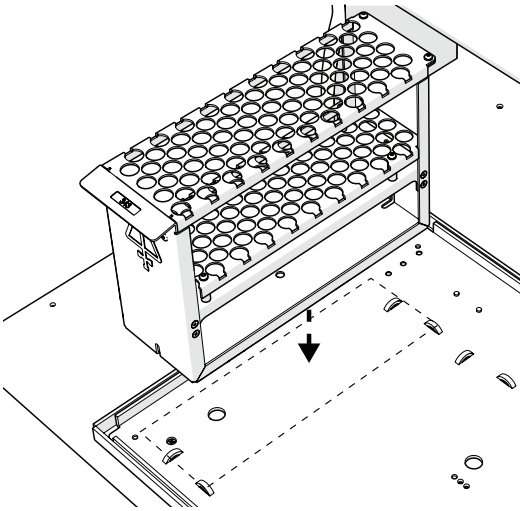


Figure 40: Orient the Rack (Step 1)

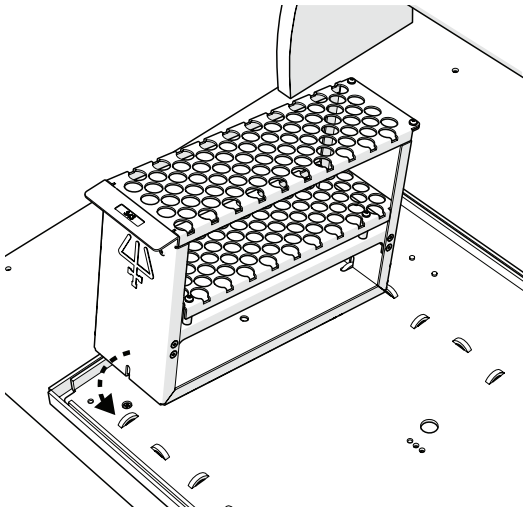


Figure 41: Seat the Rack into Tabs (Steps 2 and 3)

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.
2. 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.

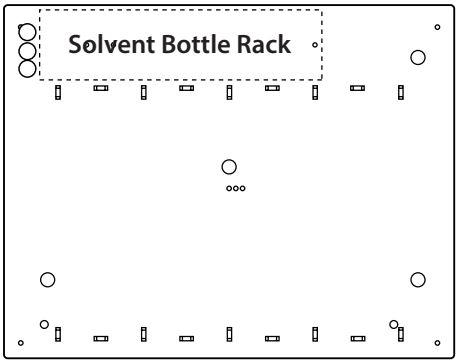


Figure 42: Solvent Bottle Rack Location

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. The upper part of the rack assembly consists of a mobile DEC holder that holds the SPE cartridges and slides backwards and forwards. The DEC holder is moved by the probe. The lower part of the rack assembly contains two positions. The front position contains the drain and the rear position contains the collect vials. When the DEC holder is in the front position, the SPE cartridges are over the drain. The SPE cartridges can be conditioned, loaded, and washed here using the relevant software commands. When the DEC holder is in the rear position, the SPE cartridges are over the collect tubes. Liquids are collected or eluted into the collect tubes

DEC Racks

Three types of DEC racks are available:

- Code 371 for 1 mL SPE cartridges
- Code 373 for 3 mL SPE cartridges
- Code 376 for 6 mL SPE cartridges
- Code 386 for 6 mL SPE cartridges

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

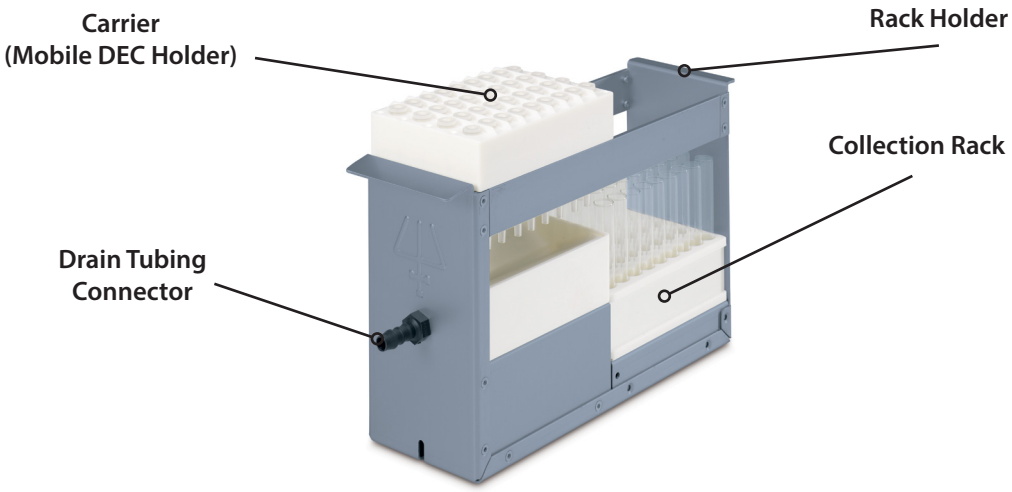


Figure 43: DEC Rack Diagram

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

DEC Accessory Kits

All DEC accessory kits include the following:

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

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

- Code 371 rack (qty 3)
- Caps, natural PE, for 1 mL cartridge, 1000/pkg (qty 1)
- Tubes, 12 x 75 mm, 5mL, glass, 250/pkg (qty 2)

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

- Code 373 rack (qty 3)
- Caps, natural PE, for 3 mL cartridge, 1000/pkg (qty 1)
- Tubes, 12 x 75 mm, 5mL, glass, 250/pkg (qty 2)

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

- Code 376 rack (qty 3)
- Tubes, 15 x 85 mm, 10 mL, glass, 250/ctn. (qty 2)
- Sealing caps, 6 mL DEC, polyethylene, 1000/pkg. (qty 1)
- Tubes, polypropylene 10 mL 500/pkg. (qty 1)

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

- Code 386 rack (qty 3)
- Tubes, 15 x 85 mm, 10 mL, glass, 250/ctn. (qty 2)
- Sealing caps, 6 mL DEC, polyethylene, 1000/pkg. (qty 1)
- Tubes, polypropylene 10 mL 500/pkg. (qty 1)

DEC Rack Setup

Refer to **DEC Racks** on page 48 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 4701483630) to the drain tubing connector, and put the other end in a suitable receptacle.
2. Place the collection tubes in the collection rack.
3. Put the SPE cartridges into the mobile DEC holder and check that all cartridges are installed correctly.

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

4. Fit caps of the appropriate size to the DECs. (Use only Gilson SPE caps with the GX-271 ASPEC, even when using non-Gilson brand SPE cartridges.

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

5. Replace the carrier on top of the frame and check that it moves freely along the frame. Install collection tubes that are suitable for the size of the SPE cartridges in use.
6. Install the rack on the locator plate. Refer to the instructions for **Rack Installation** on page 47.

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 42 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 pressure regulator. For more details, refer to the *VERITY® 4060/4260 Syringe Pumps User's Guide*.

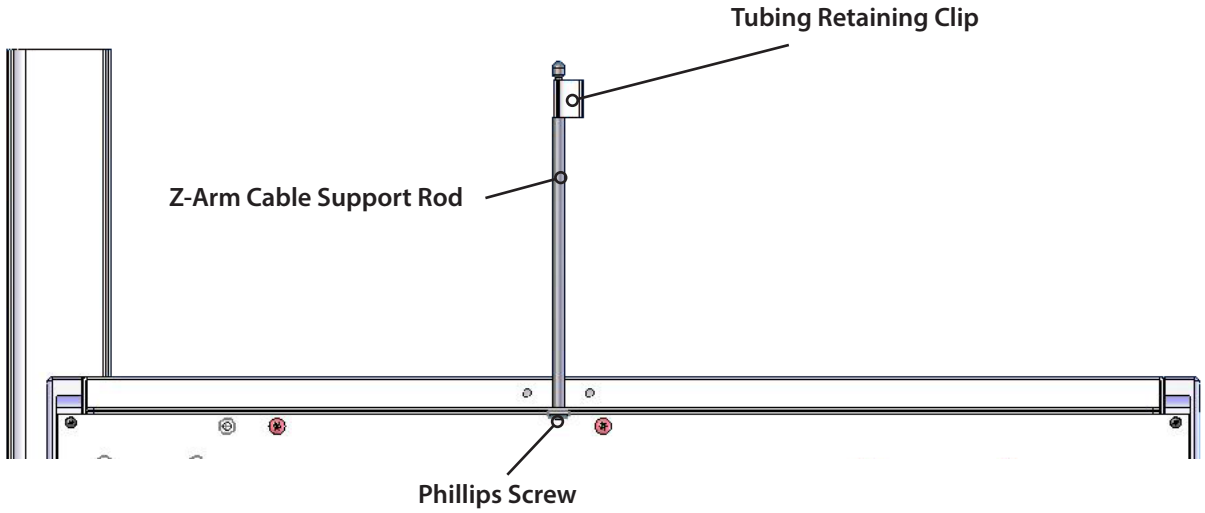


Figure 44: Installing Z-Arm Cable Support Rod (Partial Rear Panel View)

Spiral Wrap Installation

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

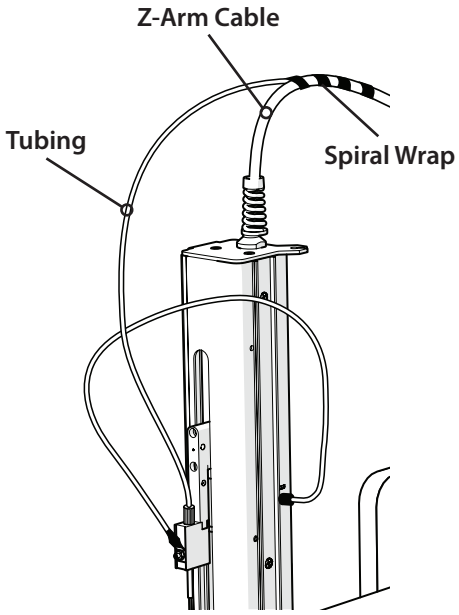


Figure 45: Containing Tubing and Cables with Spiral Wrap

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-271 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.

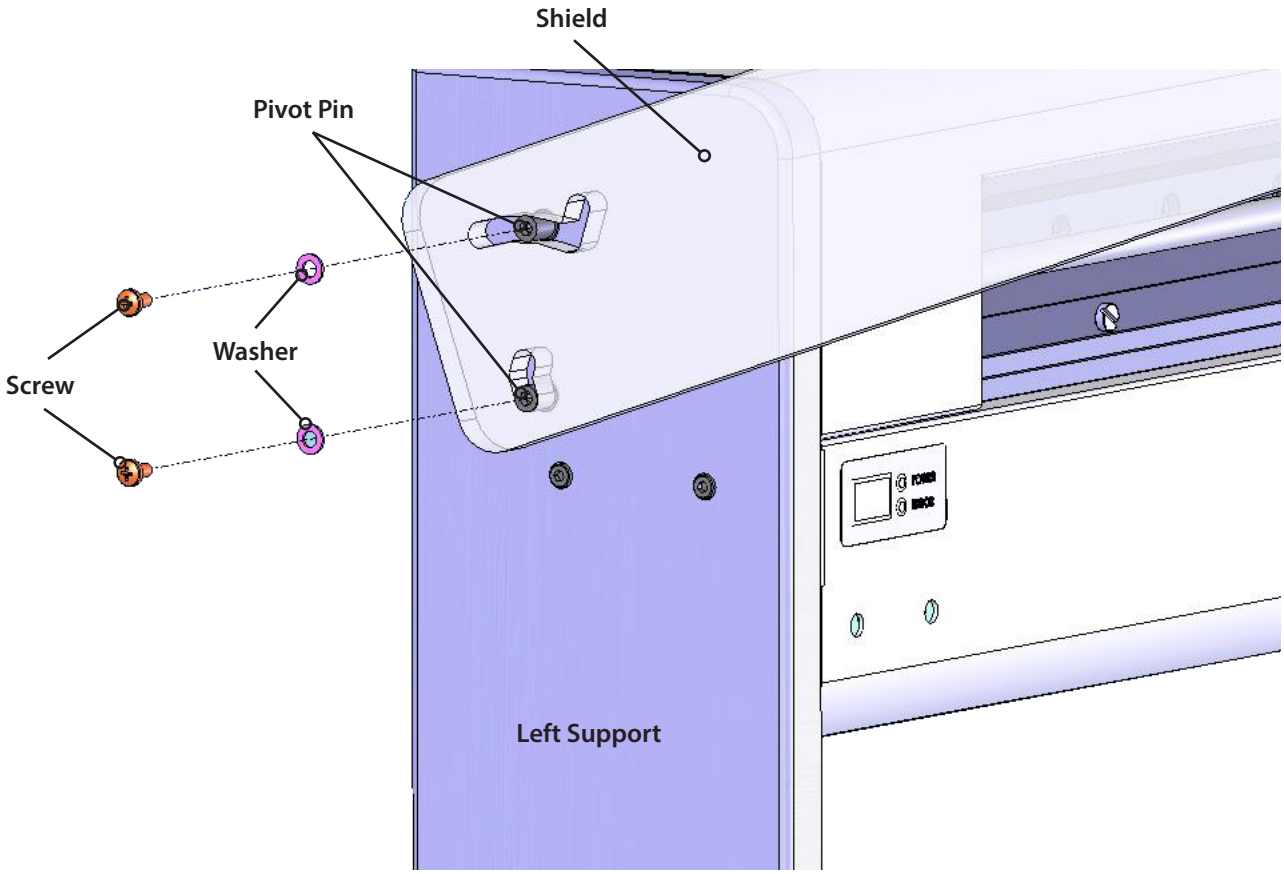


Figure 46: Shield Installation Diagram

Operation

Chapter Three

TRILUTION® LH provides programmed control of the GX-271 ASPEC™ System. For more information about TRILUTION LH software, refer to its user's guide and the documentation supplied with the software. This chapter provides information on the following topics:

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 42.

Error Indicator Light

The orange indicator becomes lit when an error has been encountered. Refer to **GX-271 ASPEC™** on page 66 for a list of error messages.

Figure 47: Front Panel (Partial)

Start Up

GX-271 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 42. The power indicator light on the front panel illuminates.

GX Direct Injection Module (Optional)

To start the injection module:

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

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

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

GX-27X Series Offset Utility

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

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

The following components 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 this user's guide.
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.

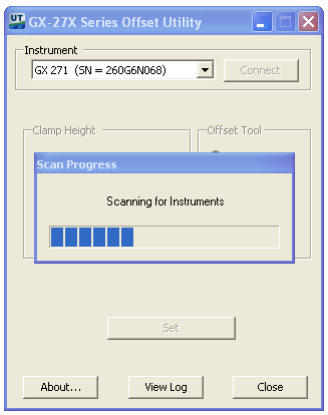
Use the GX-27X Series Offset Utility

Specify and Set Configuration

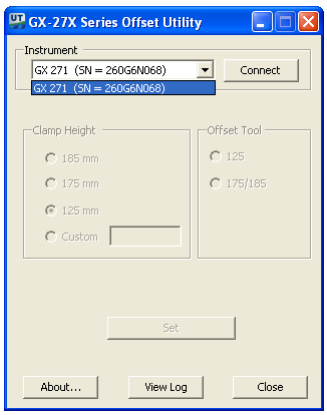
1. Allow instruments to scan into list.

NOTE Ethernet-controlled instruments will display the serial number (SN=).

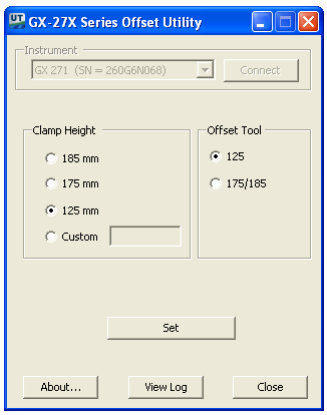
2. Select the instrument and then click **Connect**.
3. Select the Clamp Height and the Offset Tool and then click **Set**.



Step 1: Scan



Step 2: Connect



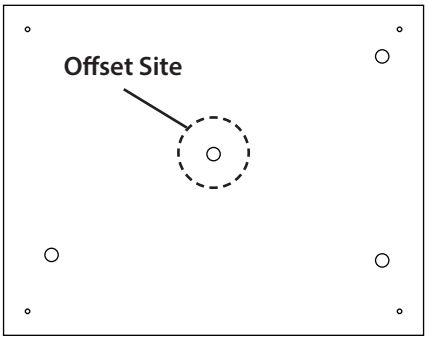
Step 3: Set

Determine and Set XY Offset

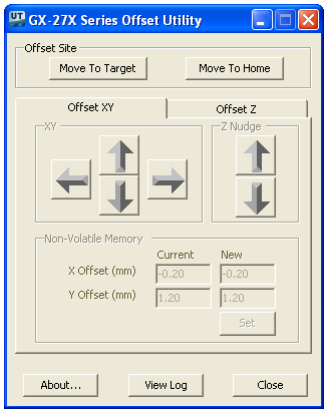
1. Place the selected offset tool on the center hole in the tray insert.
2. To move to the XY offset site, click **Move To Target**.
3. The arm will move to the offset site and then will move the probe 5 mm above the offset tool.
4. Use the Z Nudge arrows to move the probe down.
5. Offset the probe to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

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



Step 1: Place the Offset Tool

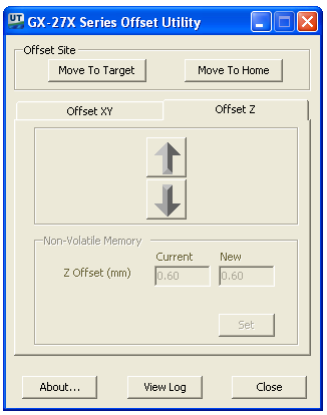


Step 2: Set the Offsets

Determine and Set Z Offset

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

   If a message appears indicating that the minimum or maximum offset value has been reached, contact your local Gilson representative for assistance.
5. 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

Instruments

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

Fluid Path

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

Flush Volume = (10 * Syringe Volume) + Transfer Tubing Volume

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

1. Prime the fluid path with distilled or deionized water.
2. Flush the fluid path with 30% ethanol. The fluid path has now been cleaned appropriately for weekend storage (or longer).
3. Prime and flush the fluid path with distilled or deionized water before running applications.

Methods

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

Proteins and Peptides

1. Prime the fluid path with distilled or deionized water.
2. Flush the fluid path using a weak detergent solution.
3. Pause the priming sequence.
4. After 30 minutes, resume flushing and priming the fluid path using distilled or deionized water to pump the remaining detergent from the tubing into a waste container.
5. When you're satisfied that the entire fluid path has been flushed with water, end the priming sequence.

Acidic Compounds, Basic Compounds, or Salt Solutions

1. Prime the fluid path with distilled or deionized water.
2. Flush the fluid path using a 0.1N NaOH solution.
3. Pause the priming sequence.
4. After 10 minutes, resume priming the fluid path using distilled or deionized water. Prime until the fluid path has been flushed with water.
5. Pause the priming sequence.
6. Prime the fluid path using a 0.1N HCl solution.
7. Pause the priming sequence.
8. After 10 minutes, resume priming the fluid path using distilled or deionized water.

Biological fluids

1. Prime the fluid path with distilled or deionized water.
2. Make a solution of 10% bleach by adding one part of commercial bleach to nine parts of water.
3. Flush the fluid path using the bleach solution.
4. Pause the priming sequence.
5. After 30 minutes, resume priming the fluid path using distilled or deionized water to pump the remaining bleach solution from the tubing into a waste container.

Helpful Hints

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

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

Part Replacement

Tubing

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

Probe

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

1. Remove the 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.

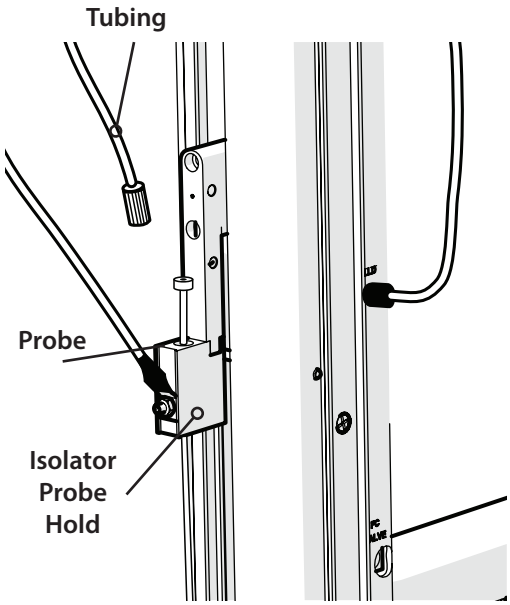


Figure 48: Probe Installation

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 chapter provides information on the following topics:

Error Messages

GX-271 ASPEC™

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

Error	*Error Text*	*Solution*
0	No error	N/A
10	Unknown command	An unknown command was sent. Send a 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.

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.

GX Direct Injection Module

To obtain the error code and message:

1. Install the Gilson Ethernet Utility. Refer to its documentation, if necessary.
2. Start the Gilson Ethernet Utility. Click the **Start** button and then select

   All Programs > Gilson Applications > Utilities > Gilson Ethernet Utility.
3. Select GX D Inject from the list and then click **Connect**.
4. Select **Get Error** from the command drop-down and then click **Go**. The Results will display the current error.

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

Error	*Error Text*	*Solution*
0	No Error	No solution needed.
1	Unknown Command	Send a Clear Error command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
2	Invalid NV-RAM Address Specified	Send a Clear Error command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
3	Previous Move Not Complete	Send a Clear Error command using the Gilson Ethernet Utility to clear the error. Correct the error in the program controlling the instrument.
4	Invalid Position Requested	Send a Clear Error 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-271 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-271 ASPEC™.
5. Start TRILUTION® LH.

Racks and Accessories

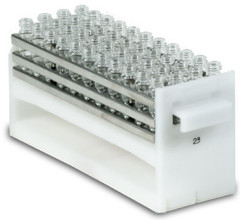
Appendix A

The GX-271 ASPEC™ can be configured with a variety of rack types and sizes. The following pages describe the racks that can be purchased for use on the GX-271 ASPEC™. Refer to **Rack Installation** on page 47 for rack installation procedures.

Racks

Part Number	*Image*	*Rack Code*	*Material*	*Vessels*
150425		20	Polypropylene	108 Tubes 10 x 100 mm (4.5 mL)
150422		21	Polypropylene	60 Tubes 13 x 100 mm (9 mL)
150424		22	Polypropylene	44 Tubes 18 x 100 mm (25 mL) 18 x 150 mm (32 mL)
150498		22U	Polypropylene	44 Tubes 10–18 mm x 100–180 mm
150426		23	Polypropylene	44 Scintillation Vials 17 x 55 mm (6.8 mL) 17 x 65 mm (8 mL)

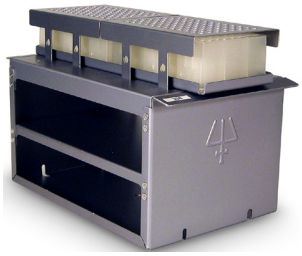
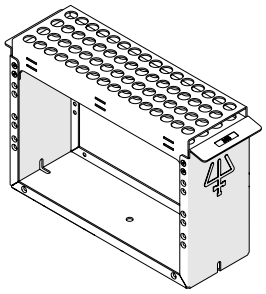
Racks

Part Number	*Image*	*Rack Code*	*Material*	*Vessels*
270433		23W	Polypropylene	44 Waters WISP Vials 15 x 45 mm (4 mL)
150427		24	Polypropylene	14 Scintillation Vials 28 x 57 mm (20 mL) 28 x 60 mm (20 mL)
150420		28	Polypropylene	108 Tubes 10 x 65 mm (3 mL) 10 x 75 mm (3.5 mL)
150429		29	Polypropylene	60 tubes 12 x 75 mm (3.5 mL) 12 x 75 mm (5 mL)
2704342		29LE	Polypropylene	60 Eppendorf Vials 11 x 40 mm (1.5 mL)

Racks

Part Number	*Image*	*Rack Code*	*Material*	*Vessels*
2704341		29SE	Polypropylene	60 Eppendorf Vials 7 x 30 mm (0.5 mL)
260440031		330	Aluminum	60 Vials 12 x 32 mm (2 mL)
260440079		332	Aluminum	44 Tubes 18 x 150 mm (25 mL)
260440081		334	Aluminum	14 Scintillation Vials 40 mL
260440083		335	Aluminum	48 WISP Vials 15 x 45 mm (4 mL)

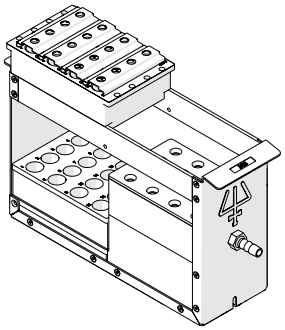
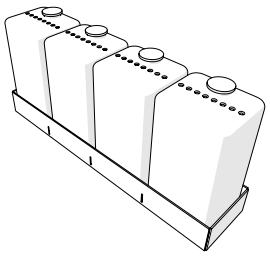
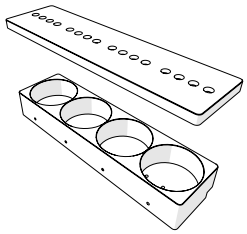
Racks

Part Number	*Image*	*Rack Code*	*Material*	*Vessels*
260440094		336	Aluminum	Two Microplates 96-well microplates (shallow or deep)
260440095		337	Aluminum	Four Microplates 96-well microplates (shallow or deep)
260440106		338	Aluminum	64 Vials 12 x 32 mm (2 mL)
260440039		341	Aluminum	108 Tubes 10 x 75 mm

Racks

Part Number	*Image*	*Rack Code*	*Material*	*Vessels*
260440025		343	Aluminum	80 Tubes 13 x 100 mm
260440041		345	Aluminum	44 Tubes 16 x 150 mm
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*
260440046		376	Aluminum	15 (6 mL) SPE Cartridges and 15 Tubes 6 mL SPE Cartridges Collection Block Holds: 15 x 85 mm (10 mL) Tubes
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 Heighteners

Part Number	*Description*
25045514	RH1 assembly
27595513	RH2
26034050	RH3 assembly
260440061	RH4 200 to 20 series, 49 mm
26014050	1 rack lift
26014051	3 rack lift

Rack Accessories

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

Test Tubes

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

Solvent Bottles

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

ASPEC™ Solid Phase Extraction (SPE) Cartridges

Silica

Part Number	*Description*
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

Part Number	*Description*
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

Part Number	*Description*
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

Part Number	Description
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

Part Number	Description
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

Part Number	Description
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

Part Number	Description
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

Part Number	Description
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

Part Number	Description
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

Part Number	*Description*
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

Part Number	*Description*
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

Part Number	*Description*
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

Part Number	Description
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

Part Number	Description
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

Part Number	Description
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-271 ASPEC™

Systems

Part Number	*Description*
2614007	GX-271 ASPEC™ with VERITY® 4060 Single Syringe Pump
2614008	GX-271 ASPEC™ with VERITY® 4260 Dual Syringe Pump

Probes

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

Part Number	*Description*
2507255	Beveled tip, 269 x 1.5 x 0.4 mm
27067374	Non-septum piercing, beveled taper tip, 221 x 1.5 x 1.1. mm
27067373	Non-septum piercing, tapered tip, 221 x 1.5 x 1.1 mm
27067382	Septum piercing, beveled tip, 221 x 2.0 x 0.8 mm

Probe Guide Assembly

Part Number	Description
26046228	GX-271 ASPEC™ inert guide foot assembly

Probe Guide Insert

Part Number	Description
26046215	Probe guide insert, 3-way, for 1.5 mm (OD) probes

Probe Guide Foot

Part Number	Description
2604611	Guide foot, GX-271 ASPEC™ for 1.5 mm (OD) probes

Isolator Probe Holder

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

Rinse Stations

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

Safety Shield

Part Number	Description
2604706	Shield, GX-27X

Cables and I/O Accessories

Part Number	*Description*
260461126	Liquid level detection (LLD) cable assembly, GX-271
36078142	Ethernet cable
638306512	Terminal block connector, 6-pin
638308512	Terminal block connector, 8-pin
709910206	2-conductor interconnect wire, 6', for making contact connections
6730314007	Fuse, 3.15A, "T" type, SLO-BLO
6770100411	Fuse drawer
7080318114	Power cord, right angle, 110V
7080318115	Power cord, right angle, 220V

Miscellaneous

Part Number	*Description*
95260185	Z-height adjustment tool, 185 mm
260465	Z-arm, GX-27X
21050000	System organizer, GX-27X

GX Rinse Pump

Part Number	*Description*
261452	GX Rinse Pump

GX Direct Injection Module

Part Number	*Description*
261354	GX Direct Injection Module, 1/16" Prep
261355	GX Direct Injection Module, 1/8" Prep
261356	GX Direct Injection Module, 1/16", Analytical, Stainless Steel
261357	GX Direct Injection Module, 1/16", Analytical, PEEK

Injection Ports

Part Number	*Description*
26035411	GX Direct Injection port for 1.5 mm (OD) probes
26035413	GX Direct Injection port for 1.5 mm (OD) probes, SS
2954674	Injection port seal for 1.5 mm (OD) probes

Parts and Accessories

Part Number	*Description*
26035470	Plumbing package for the GX Direct Injection Module
490318041	Valco MZN1PK PEEK nut (0.062" long) for 1/16" (OD) tubing (x10)
4903180411	Valco MZN1PK PEEK nut (0.062" long) for 1/16" (OD) tubing (x1)
490318051	Valco ZF1PK PEEK ferrule, 1/16" (x10)
4903180511	Valco ZF1PK PEEK ferrule, 1/16" (x1)
495033	TFE Tubing, 0.5 mm (ID) x 1.5 mm (OD), 1/16", (10')
26035458	GX-271 Direct Injection Module riser block assembly

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

Part Number	*Description*
494400051	5 mL
49440010	10 mL
49440020	20 mL
49440025	25 mL

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

Part Number	*Description*
49440003	2 µL
49440004	5 µL
49440006	10 µL
49440007	20 µL
49440008	50 µL
49440009	100 µL
494400002	250 µL
494400005	500 µL
49440001	1 mL
49440002	2 mL
49440005	5 mL
49060010	10 mL

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

Part Number	*Description*
49440011	2 µL
49440012	5 µL
49440013	10 µL
49440014	20 µL
49440015	50 µL
49440016	100 µL
49440017	250 µL
49440018	500 µL

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.

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.

Stainless steel, Type 316

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

Valcon H

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