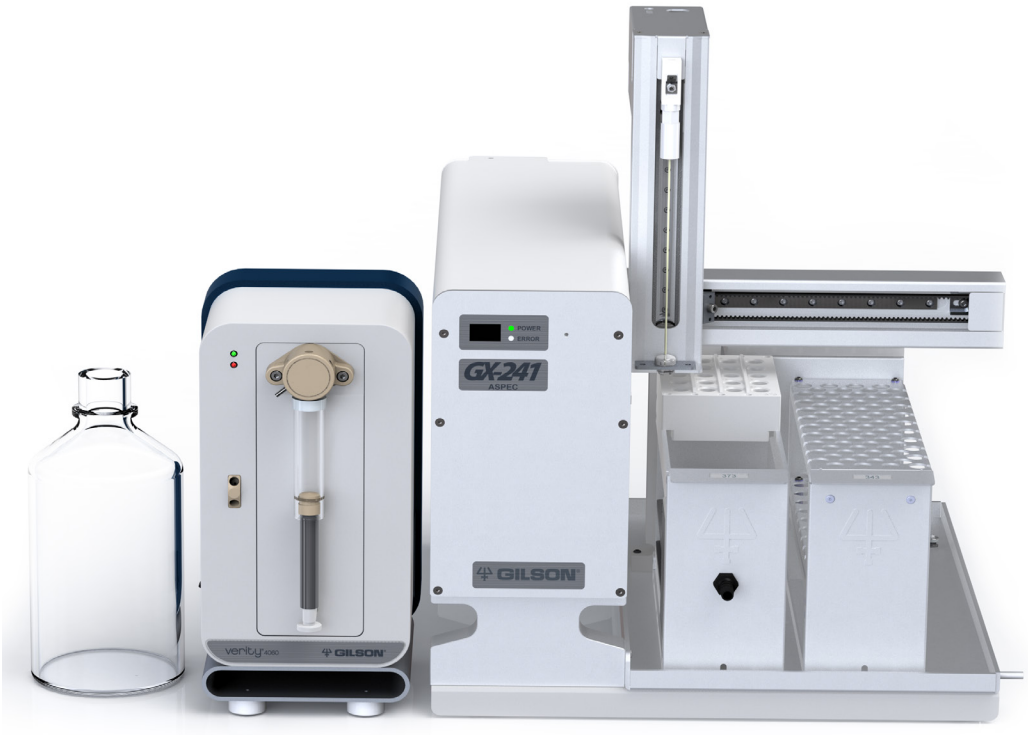
GX-241 ASPEC™

User's Guide



GILSON®

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LT319668-01

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Safety

Read this chapter before installing and operating the instrument.

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

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

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

Electronic and Hazard Symbols

The following electronic and hazard symbols may appear on the instrument:

Symbol	*Explanation*
⎓	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
	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

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

Veuillez lire ce paragraphe avant d'installer et de faire fonctionner le manipulateur de liquides.

Le manipulateur de liquides est prévu pour être utilisé dans l'environnement d'un laboratoire par du personnel technique formé.

Pour une utilisation correcte et en toute sécurité de cet instrument, il est recommandé que les opérateurs ainsi que le personnel de service suivent les instructions contenues dans le guide lors de l'installation, du nettoyage et de l'entretien du manipulateur de liquides.

Les précautions de sécurité suivantes doivent être observées pendant toutes les phases de fonctionnement, d'entretien, et de réparation de l'instrument. Si les précautions suivantes ou les avertissements spécifiques mentionnés dans ce guide utilisateur ne sont pas respectés, les normes de sécurité prévues lors de la conception, de la fabrication et l'utilisation du manipulateur de liquide seront transgressées. Gilson n'assume aucune responsabilité si un client ne respecte pas ces exigences.

Symboles Électroniques et de Dangers

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

Symbole	*Signification*
⎓	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
	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.

Tension

Un accès au panneau arrière est nécessaire car le manipulateur de liquides doit pouvoir être débranché de toutes sources électriques avant l'entretien, la réparation, ou le changement de pièces.

Utiliser l'instrument avec l'alimentation secteur fourni et uniquement à la tension indiquée sur l'étiquette située à l'arrière de l'instrument.

Sondes

Lors de l'utilisation du manipulateur de liquides, garder les mains éloignées de la sonde afin d'éviter tous risques de blessures par perforation.

La sonde étant installée sur le bras-Z qui peut contenir des substances dangereuses, ne pas s'immiscer dans le zone de travail de l'instrument jusqu'à ce que le manipulateur de liquides ait complétement terminé sa procédure.

Solvants

Observer les bonnes pratiques de laboratoire lors de la manipulation des solvants. Si des liquides dangereux sont utilisés, une protection adéquate tel qu'une ventilation correcte, des lunettes de sécurité, etc., doivent être utilisés.

Se reporter aux fiches signalétiques des 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-241 ASPEC™ when paired with a VERITY® 4060 Single Syringe Pump, can automate liquid handling procedures and solid phase extraction (SPE) using positive pressure elution in cartridge-based applications. The GX-241 ASPEC can be configured with a solvent reservoir rack, disposable extraction cartridge (DEC) rack, sample rack, rinse station, and a GX Rinse Pump.

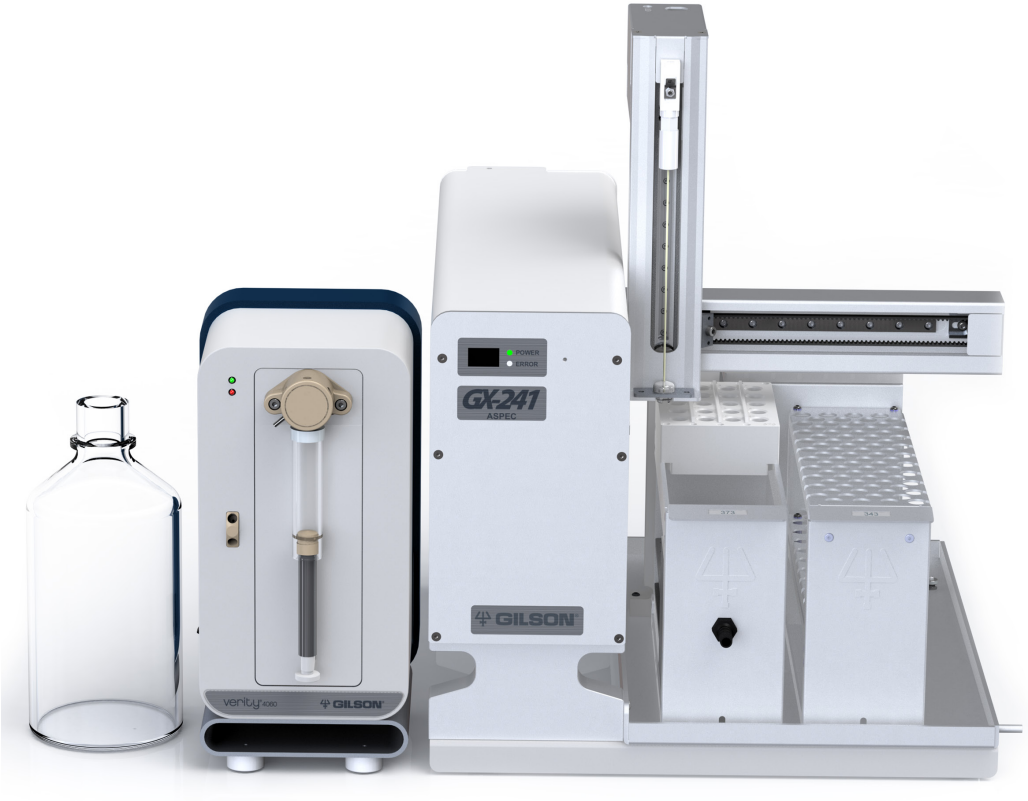


Figure 1: GX-241 ASPEC™ with VERITY® 4060 Single Syringe Pump

Unpacking

The GX-241 ASPEC is delivered with most major components already assembled. Keep the original container and packing assembly in case the GX-241 ASPEC must be returned to the factory.

To unpack the instrument:

1. Open the box.
2. Remove the boxed power supply.
3. Remove the bag of accessories.
4. Remove the packing material.

   NOTE The foam material on the locator plate contains the Z-arm.

5. Lift the unit out of the box and place it on a lab bench or cart.

   NOTICE Do not attempt to lift the instrument from the X-arm (horizontal arm). Always lift the instrument from its base.

   a. Grip the unit at the large rectangular opening.

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

Standard Equipment

The following items are considered standard equipment and are provided with the GX-241 ASPEC:

- Accessory Kit, which includes:
  - Allen wrenches (2 mm and 3 mm)
  - Cable support rod with clip and mounting screw
  - Drain tubing
  - Ethernet cable
  - Gilson Ethernet Utility
  - GX-241 Offset Utility
  - LLD cable assembly
  - Offset tool
  - Power cords
  - Spiral wrap and tubing clips
  - Terminal block connectors (8-pin, qty 2)
  - Z-height adjustment tool
- External power supply
- Z-arm

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
- Declaration of Conformity
- Gilson Ethernet Utility Instructions on the Gilson Ethernet Utility CD
- GX-241 Offset Utility Instructions on the GX-241 Offset Utility CD
- Hazardous Materials Declaration (China RoHS)
- Items Included Checklist
- Quality Control Checklist
- System Setup Overview

Accessories

Required

Some accessories are required, but are ordered separately:

- DEC rack
- Probe
- Probe guide assembly
- Rinse station
- Sample rack
- Solvent reservoir rack

For part numbers, refer to the **Parts and Accessories** appendix.

Optional

The following optional accessories are also available:

- ASPEC™ SPE cartridges
- GX Rinse Pump
- Safety shield

For part numbers, refer to the **Parts and Accessories** appendix.

Technical Specifications

Please be aware of the following before operating the instrument.

NOTICE 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-241 ASPEC™ on page 13
- GX Rinse Pump on page 15

GX-241 ASPEC™

Technical Specification	*Definition*
Arm Speed	0–350 mm/sec (300 mm/sec default) in X and Y dimensions 0–150 mm/sec (125 mm/sec default) in Z dimension
Communication	Ethernet
Contact Control	Four inputs (contact closure, TTL), two relay outputs, and two switched +24V DC 1A outputs **NOTICE** Switching voltages higher than 30V or greater than 1A of current may damage the instrument
Dimensions* (W x D x H) *with Z-Arm installed and connected	39 x 50 x 51.5 cm (15.4 x 19.8 x 20.3 in.)
Environmental Conditions	Indoor use Altitude: up to 2000 m Temperature range: 5°C–40°C Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C
Front Panel	Two digit display and indicator lights for Power and Error
Horizontal Motion Strength	0.3 kg (0.7 lbs.)

GX-241 ASPEC Technical Specifications (continued on page 14)

GX-241 ASPEC™

Technical Specification	*Definition*	
Liquid Contact Materials* *For more information, refer the Materials appendix.	***Description***	***Material***
	Probe Guide	PET
	Probe	316L Stainless Steel
	Rinse Station	PET
	Tubing (Drain)	Tygon®
	Tubing (Transfer)	FEP
Liquid Level Detection (LLD)	Capacitive liquid level detection	
Locator Plate Capacity	Two racks, one rinse station, and one solvent reservoir rack	
Number of Racks	One solvent reservoir rack and two Code 33X-series, Code 34X-series, Code 37X-series, Code 386, or a combination	
Power Requirements	**GX-241 ASPEC** Voltage: 24V DC Current Rating (Maximum): 6.25A, 150W	
	External Power Supply Voltage Input Frequency: 50 to 60 Hz Voltage: 100–240V AC Voltage Output Voltage: 24V DC Current rating: 6.25A, 150W	
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.	

GX-241 ASPEC Technical Specifications (continued on page 15)

GX-241 ASPEC™

Technical Specification	*Definition*
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	Small footprint X/Y/Z with stationary rack design
Software Control	PC control via Ethernet and TRILUTION® LH
Vertical Punch Strength	1.8 kg (4 lbs.)
Weight* *with Z-Arm installed	8.7 kg (19.2 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: 1A
Pump Type	Peristaltic
Rinse Speed	High speed Low speed
Weight	1.0 kg (2.28 lbs.)

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.

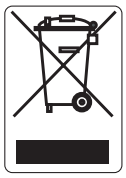
Return Procedure

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. Specific contact information can be found at **www.gilson.com**. To help us serve you quickly and efficiently, please refer to **Before Calling Us** on page 16.

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- Teflon® is a registered trademark of E.I. du Pont de Nemours & Co, Inc.
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All other trademarks within are trademarks or registered trademarks of Gilson, Inc.

Installation

Chapter Two

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

1. Locator Plate Setup
2. Z-Arm Setup
3. Plumbing Connections
4. Rear Panel Connections
5. Solvent Reservoir Rack Installation
6. Rack Installation
7. Safety Shield (Optional) Installation

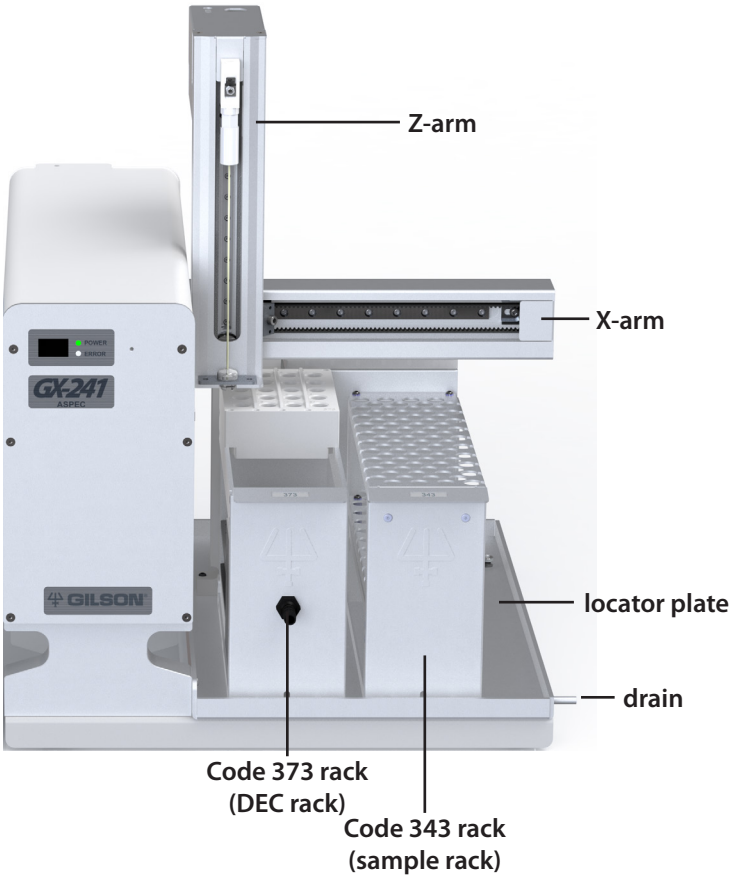


Figure 2: GX-241 ASPEC™ (Front View)

Locator Plate Setup

The locator plate, on which the rinse station and racks are placed, is factory-installed.

The GX Rinse Pump (optional) is positioned next to the GX-241 ASPEC™
Refer to the **GX Rinse Pump (Optional) Installation** instructions on page 25.

Refer to the installation instructions for:

- **Rinse Station Installation** on page 21
- **Solvent Reservoir Rack Installation** on page 34
- **Rack Installation** on page 35

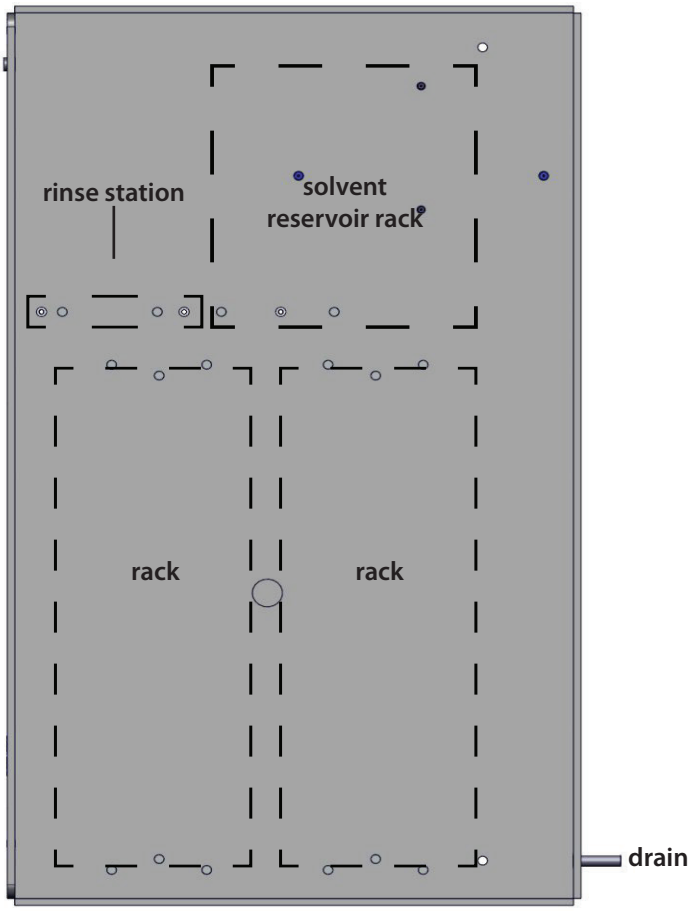


Figure 1: Locator Plate with Rinse Station, Solvent Reservoir Rack, and Two Racks

Rinse Station Installation

To install the rinse station on the locator plate:

1. Align the holes in the base of the rinse station with the pins on the locator plate. The fittings on the rinse station should point toward the rear of the instrument.

2. Locate the two hex screws included with the rinse station and place them through the holes in the base of the rinse station. Tighten the hex screws using the supplied 2 mm Allen wrench.

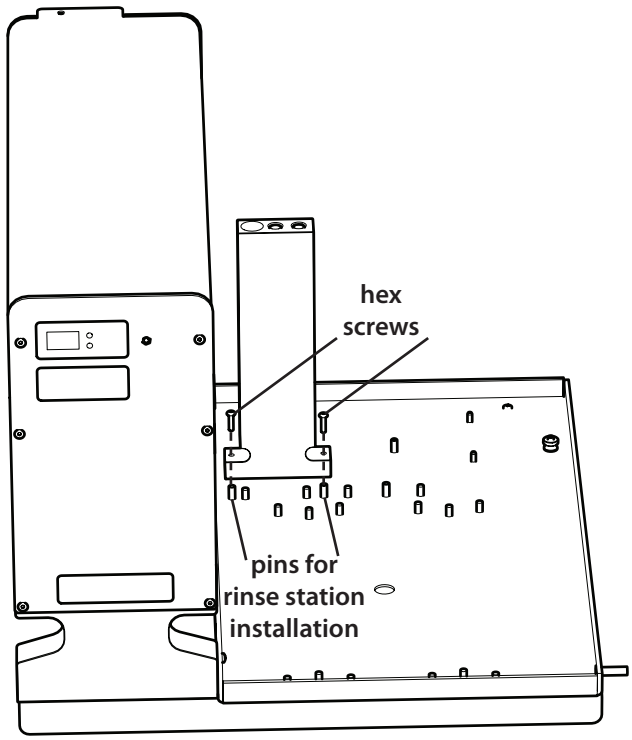


Figure 2: Rinse Station Location on Locator Plate

Z-Arm Setup

It is recommended to perform the Z-arm setup in the following order:

1. Lower Probe Holder Installation
2. Z-Arm Installation
3. Probe Guide Insert Installation
4. Probe Installation
5. Liquid Level Detection (LLD) Cable Installation
6. Z-Arm Cable Support Rod Installation

Lower Probe Holder Installation

The lower probe holder is supplied in the probe guide assembly (part number 26056015), which also includes the probe guide insert, retainer bracket, and four M3 x 5 mm hex screws.

Install the lower probe holder on the threaded probe holder sleeve. Refer to the diagram, if necessary.

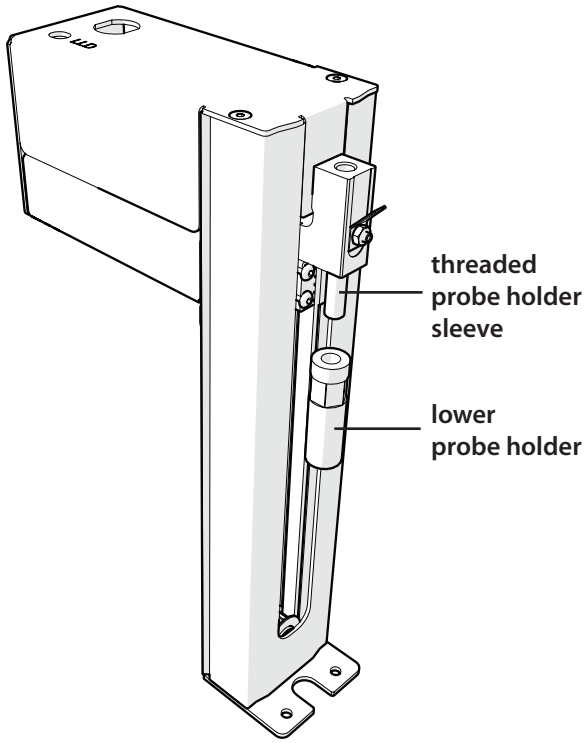


Figure 3: Lower Probe Holder Installation

Z-Arm Installation

To install the Z-arm:

1. Locate the Z-height adjustment tool (part number 26056021) in the accessory kit.
2. Using the 3 mm Allen wrench included in the accessory kit, turn the mounting screw on the Z-arm mounting bracket counterclockwise.
3. Partially pull out the bracket. Do not remove completely.
4. Place the Z-arm into the mounting bracket. Insert one side of the Z-arm into place at a time (right to left).
5. Place the Z-height adjustment tool under the Z-arm.
6. While holding the adjustment tool in place, use the other hand to lower the Z-arm until it lightly rests on the adjustment tool.

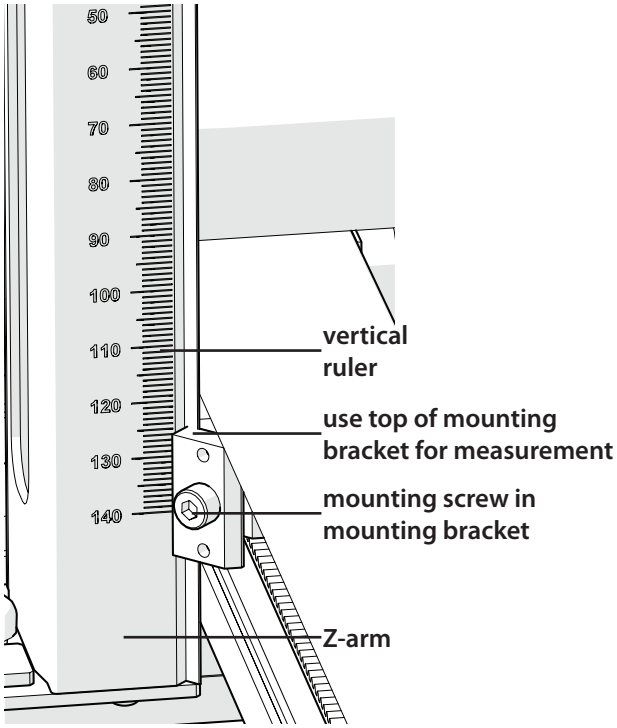


Figure 4: Z-Arm Installation

7. Tighten the mounting screw on the Z-arm mounting bracket so the Z-arm is secure.
8. 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.
9. Confirm and note the installed height of the Z-arm using the vertical ruler located on one side of the Z-arm. This clamp height is required for software control.

Probe Guide Insert Installation

To install the probe guide insert:

1. Locate the probe guide insert and slide it into the opening in the Z-foot. The probe guide insert should be oriented with the domed part on top. The probe guide insert will fit tightly in the opening.

2. Slide the retainer bracket onto the Z-foot so that the opening in the retainer bracket surrounds and secures the probe guide insert.

3. Align the holes in the retainer bracket with the holes in the Z-foot. Place two of the M3 x 5 mm hex screws (part number 4013534051) through the retainer bracket into the Z-foot and then tighten using the supplied 2 mm Allen wrench.

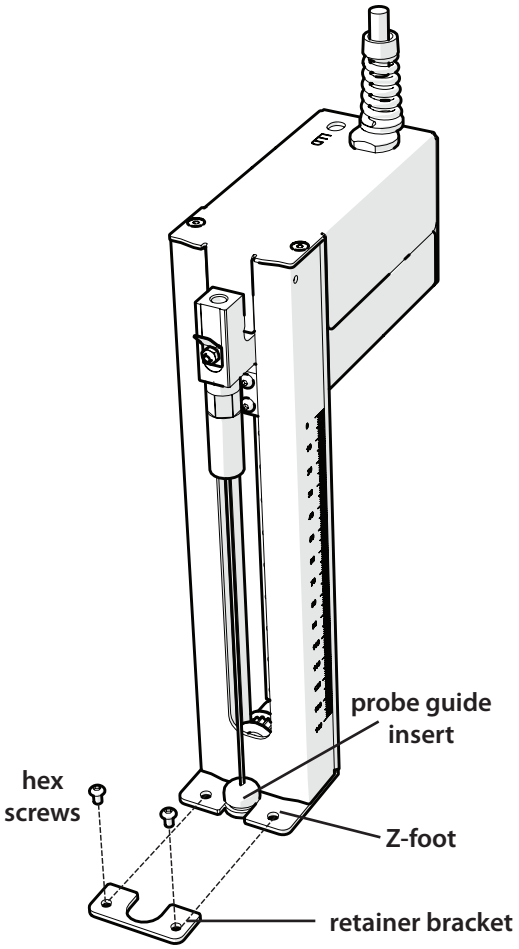


Figure 5: Probe Guide Insert Installation

Probe Installation

There are different probes available for use on the GX-241 ASPEC™. Depending upon the application, purchase the appropriate probe.

To install the probe, insert the probe into the top of the probe holder and then pull it through until the tip of the probe is in the center hole of the probe guide insert.

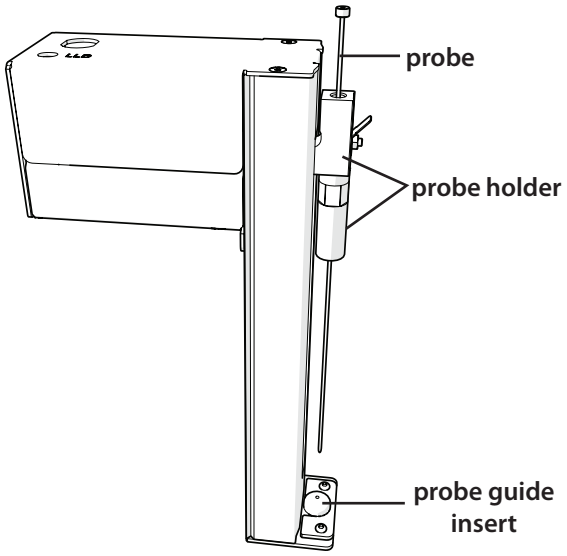


Figure 6: Probe installation

Liquid Level Detection (LLD) Cable Installation

To install the liquid level detection cable assembly (part number 26056014):

1. Plug the cable into the LLD port on the top of the Z-arm. Turn the metal ring until tight.
2. Place the metal slot end of the cable over the metal tab on the probe holder.

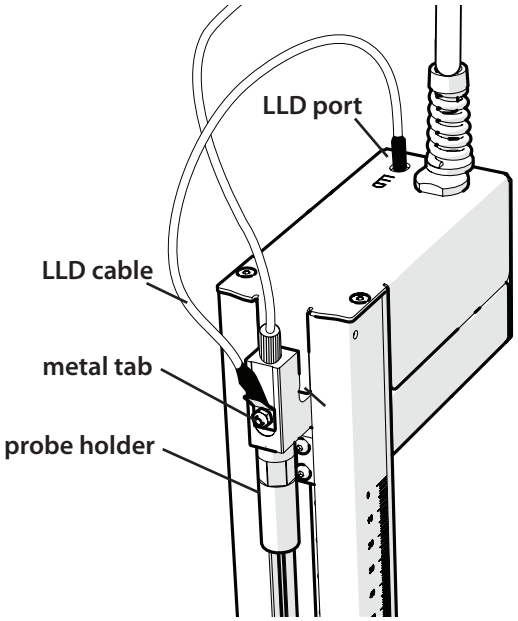


Figure 7: LLD Cable Installation

Z-Arm Cable Support Rod Installation

1. Using the Phillips screw included with the Z-arm cable support rod, install the cable support rod on the rear of the instrument.
2. Attach the retaining clip to the Z-arm cable support rod, if necessary.
3. Snap the Z-arm control cable into the retaining clip on the Z-arm cable support rod.
4. 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 around the bed.

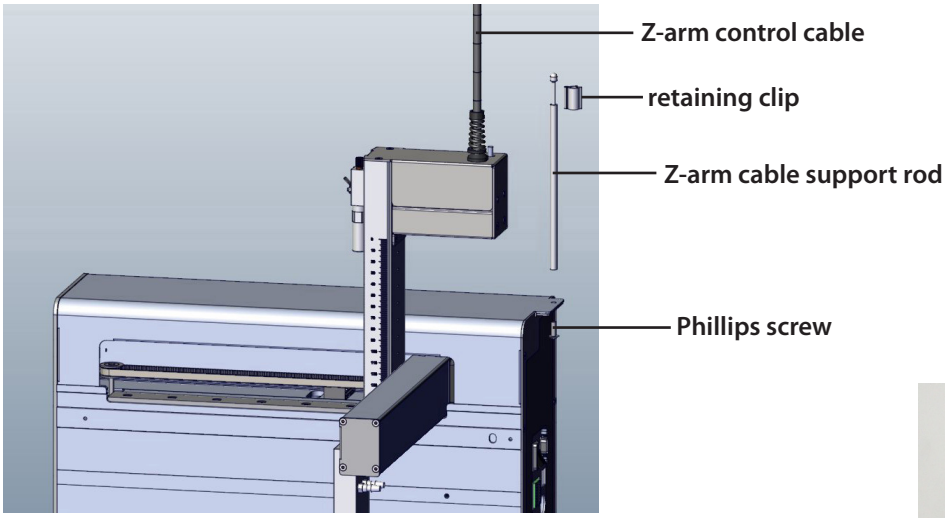


Figure 8: Z-Arm Cable Support Rod Installation

GX Rinse Pump (Optional) Installation

The GX Rinse Pump should be placed near the rinse station.

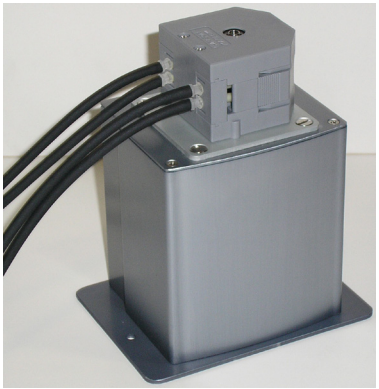


Figure 9: GX Rinse Pump

Plumbing Connections

Refer to the following sections for detailed information on making plumbing connections.

- For **Rinse Station Plumbing**, refer to page 26.
- For **GX Rinse Pump (Optional) Plumbing**, refer to page 27.
- For the **Transfer Tubing Connection,** refer to page 28.
- For the **Drain Waste Tubing Connection**, refer to page 28.

Rinse Station Plumbing

The rinse station design accommodates three types of rinses:

- Inside Rinse/Drain
- Outside Static Rinse
  - Place the plug in the bottom hole and the drain in the top hole.
- Outside Flowing Rinse
  - Place the plug in the top hole and the drain at the bottom. Pump a second source of liquid to the rinse station.

To make the plumbing connections:

1. Connect the drain waste tubing(s), supplied with the rinse station, to the barbed drain fitting(s) installed on the rinse station.
2. For a flowing rinse, 1/16" ID tubing is needed to connect to the stainless steel barbed fitting from the external liquid source. This tubing is supplied with the GX Rinse Pump.

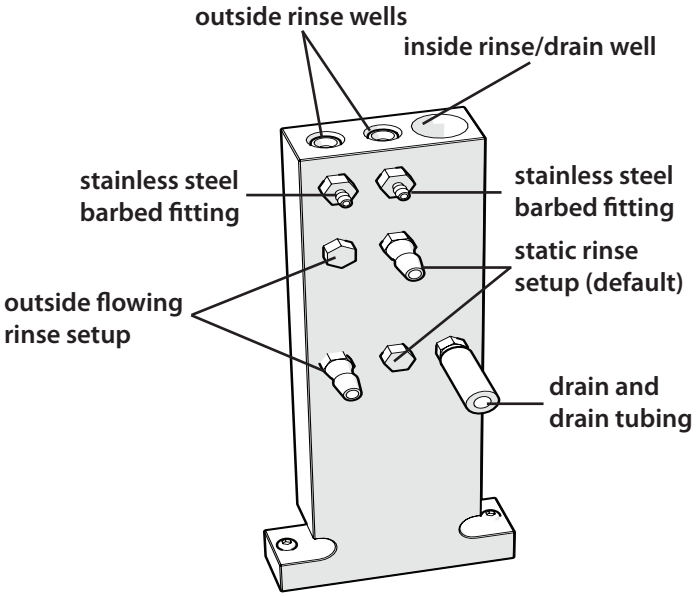


Figure 10: Rinse Station (Rear View)

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)

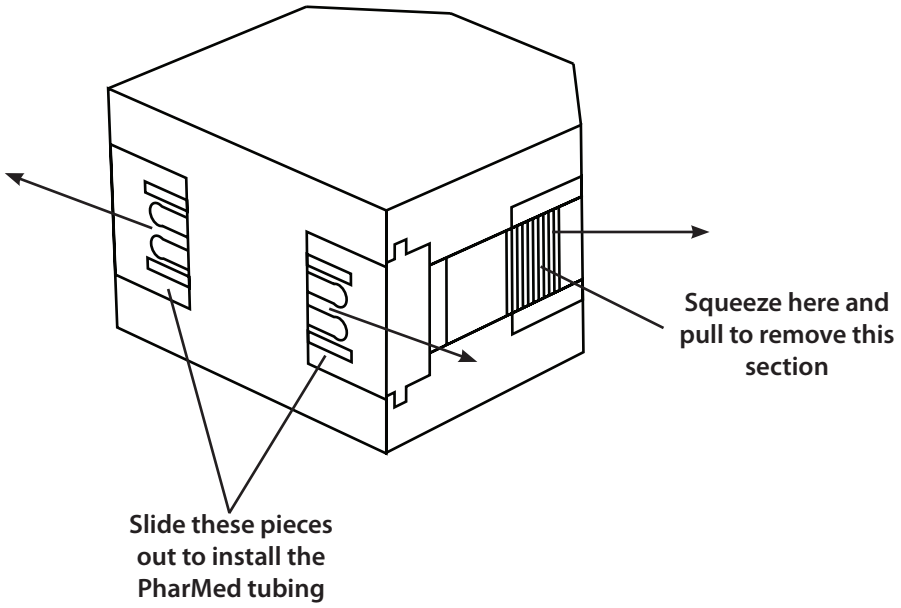


Figure 11: GX Rinse Pump Tubing Installation

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.
3. Place one end of the PharMed tubing assembly in the left side of the pump head and snap into place.
4. Place the other end of the PharMed tubing assembly in the right side of the pump head and snap into place.
5. Replace the tubing clip.
6. Connect a length of neoprene tubing to the top barbed fitting on the right side and place the other end in a reservoir.
7. Connect a length of neoprene tubing to the top barbed fitting on the left side and connect to the rinse station.

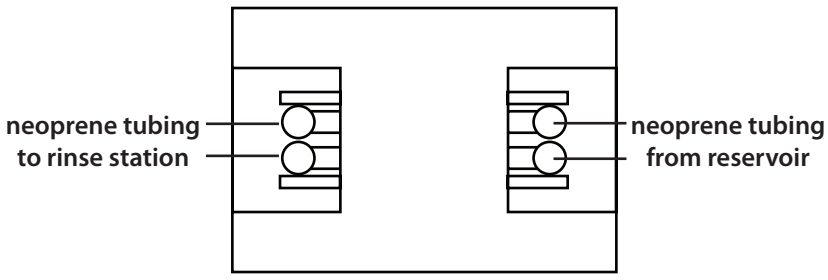


Figure 12: GX Rinse Pump Tubing Installation

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

Transfer Tubing Connection

The transfer tubing is routed from the syringe pump to the probe.

To install the transfer tubing:

1. Install the fitting on the end of the transfer tubing.
2. Connect the fitting to the top of the probe holder.
3. Firmly tighten the fitting since it holds the probe in place.

Spiral Wrap Installation

Use the spiral wrap included in the accessory kit to contain the tubing, but do not include the LLD cable in the spiral wrap.

If necessary, attach the two adhesive-back tubing clips to the side panel and route the transfer tubing through them.

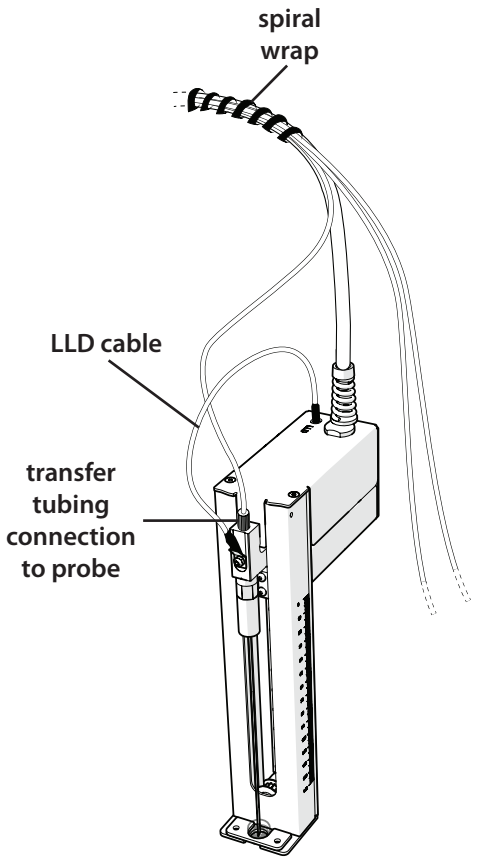


Figure 13: Transfer Tubing Connection and Tubing Containment Using Spiral Wrap

Drain Waste Tubing Connection

The locator plate includes a drain for liquid spills, such as those caused by overflowing vessels.

To connect waste tubing to the drain:

1. Push the waste tubing (part number 470331206, located in the accessory kit) onto the drain until secure.
2. Place the other end of the waste tubing in a waste container. Make sure the waste container is placed in a location that is lower than the instrument bed.

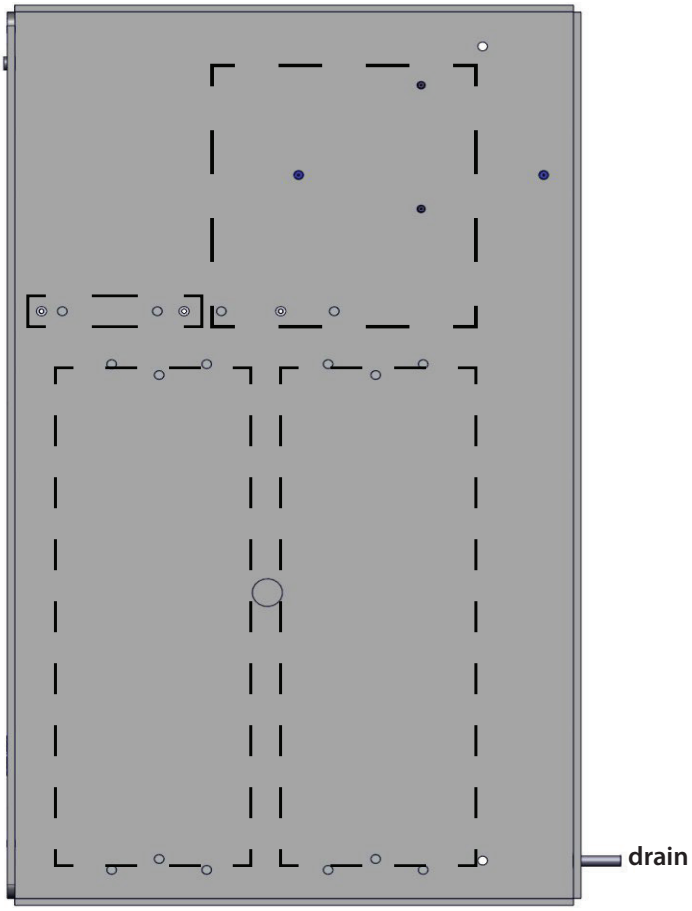


Figure 14: Drain Location on Locator Plate

Rear Panel Connections

The following sections provide detailed information on making rear panel connections.

- For the **GX-241 ASPEC™**, refer to page 30.
- For the **GX Rinse Pump (Optional)**, refer to page 33.

GX-241 ASPEC™

Rear Panel Diagram

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

1. Power switch (MAINS)
2. Input/Output ports
3. Power receptacle
4. Z-arm
5. Ethernet
6. Solenoids
7. GSIOC

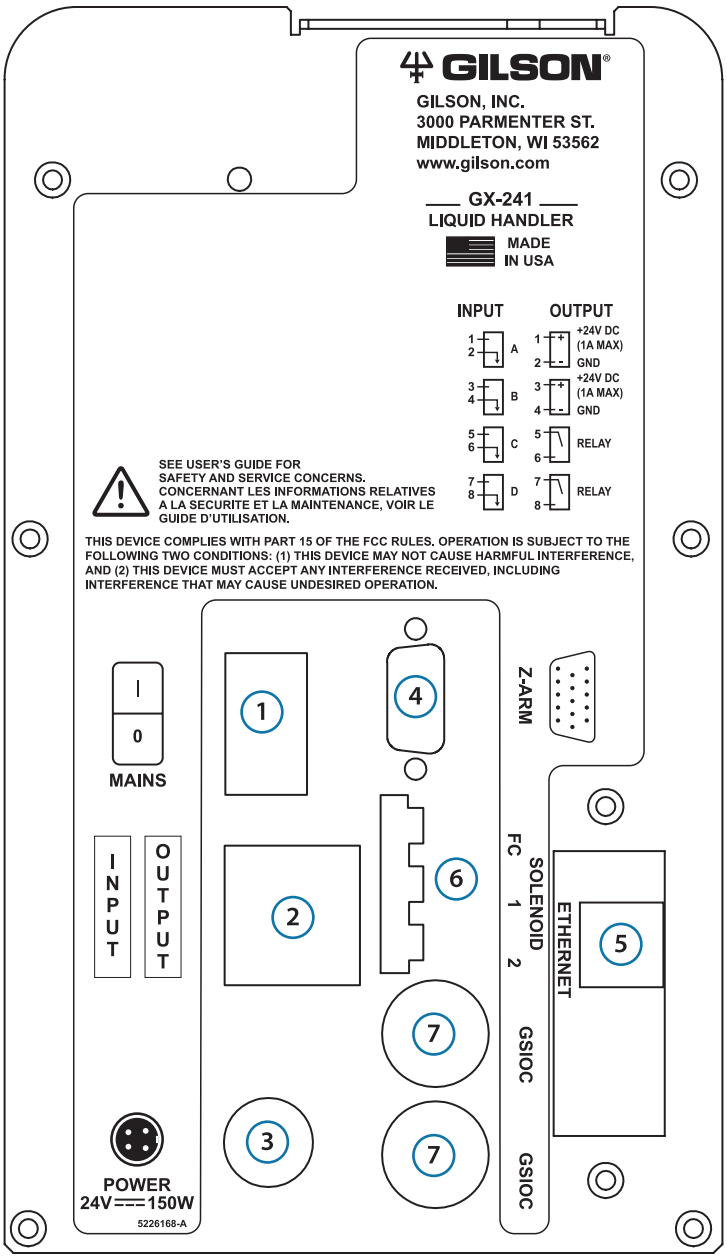


Figure 15: Rear Panel Diagram - GX-241 ASPEC

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-241 ASPEC is powered OFF.
6. Locate the Ethernet cable provided in the accessory kit.
7. Plug one end of the Ethernet cable into the ETHERNET port on the GX-241 ASPEC and the other to an available Ethernet port on the router.

NOTE Do not turn on the GX-241 ASPEC until directed to in the **Operation** chapter.

Input/Output Ports

Use the input and output contacts found on the rear panel to control peripheral devices. Refer to the rear panel label or the **Rear Panel Diagram** on page 30 for orientation and identification of the ports.

Inputs

The terminal block has eight contact pins; four input pins labeled A through D paired with their associated ground reference. The inputs are biased high in the default state, so to activate them they need to be pulled low to their associated ground reference. Do not apply more than 5V DC to the input pins.

Outputs

The terminal block has eight contact pins; two pins and two associated grounds for switching 24V DC to the outputs connection. The remaining four pins are two pairs of relay switched outputs for controlling external devices. These connections must be limited to switching voltages less than 30V DC and currents less than 1A.

Making Connections

The following are needed to make connections:

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

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

To make the cable connection:

1. Cut the cable into pieces of appropriate length.
2. Strip about 8 mm of insulation from each end of the cable.
3. Remove the terminal block connector from the instrument.
4. Press in the spring-loaded retainer for the appropriate terminal on the terminal block connector. Insert each wire into the appropriate terminal on the terminal block connector and then release the spring-loaded retainer.
5. Reconnect the terminal block connector to the instrument. Push the connector in as far as it will go. It is designed to fit snugly into its receptacle.
6. Connect the opposite ends of the wires to the other device(s). Be sure to match ground connections.
7. Label each cable to identify the purpose of the connection.

Z-Arm Connection

Connect the cable from the Z-arm to the Z-ARM port on the rear panel and then use a small, flat blade screwdriver to tighten the screws to secure it.

Power Connection

Use the power cord on the external power supply (part number 549512024) to make the connection between the power receptacle on the GX-241 ASPEC and the external power supply.

The connection from the external power supply to the GX-241 ASPEC uses a connector with a locking collar. Check the alignment of the pins and then push in until it clicks and locks in place. To disconnect, pull back on the locking collar and then disconnect the cable from the rear panel of the GX-241 ASPEC.

Locate the appropriate power cord for the line voltage and then make the connection between the external power supply and the AC power source.

GX Rinse Pump (Optional)

Rear Panel

(1) Inputs

Connections

To make connections between the GX Rinse Pump and the GX-241 ASPEC™, refer to the diagram and instructions below.

1. Ensure that the power is turned off to the instrument.
2. Locate the GX Rinse Pump cable connector (part number 26035257). This assembly contains two pre-wired terminal block connectors.

   Another assembly, GX Rinse Pump cable connector (part number 26035256), is included, but will not be used.
3. Connect the 4-pin terminal block connector to the input ports on the rear panel of the GX Rinse Pump.

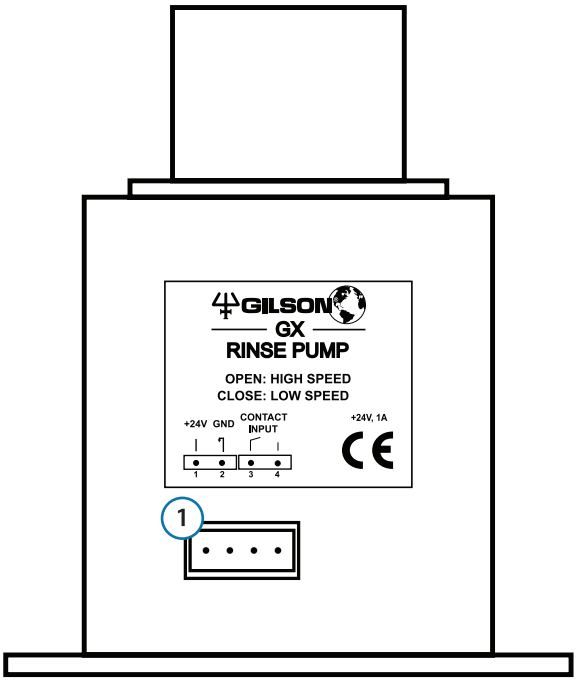


Figure 16: Rear Panel Diagram - GX Rinse Pump

4. Connect the 8-pin terminal block connector to the output ports on the rear panel of the GX-241 ASPEC.

Solvent Reservoir Rack Installation

For the location of the solvent reservoir rack on the locator plate, refer to the diagram at right and the **Locator Plate Setup** diagram on page 20.

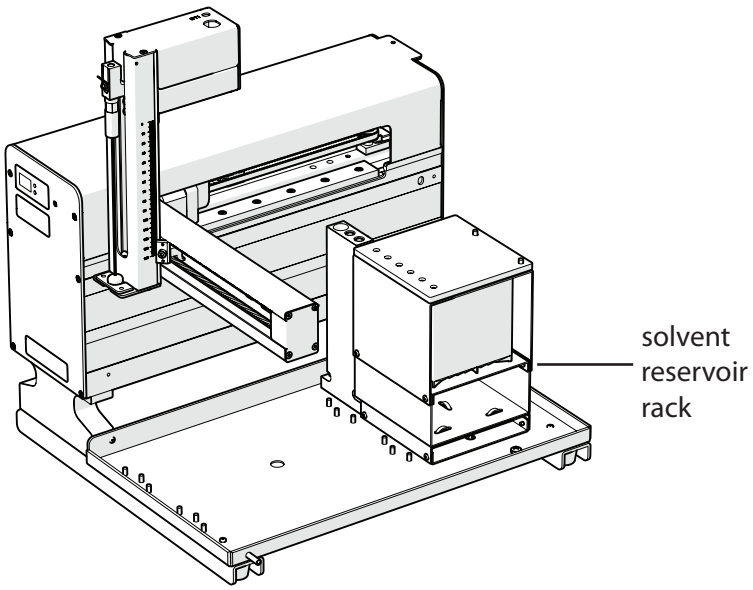


Figure 17: Solvent Reservoir Rack Location on Locator Plate

To install the solvent reservoir rack:

1. Remove the knurled thumbnuts from the threaded studs on the locator plate. These will not be used.
2. Install the rack base so that the alignment pins are on the right. Ensure that the base is fully seated on the locator plate. It will only fit one way.
3. Install the rack on the base by aligning the slots on the bottom of the rack with the alignment pins on the base. The rack should be flush on the right, but will hang over slightly on the left.
4. Remove the rack cover, remove the cap from each of the six 100 mL reservoirs, and then place them back in the rack.
5. Re-install the cover on the rack. It only fits one way.

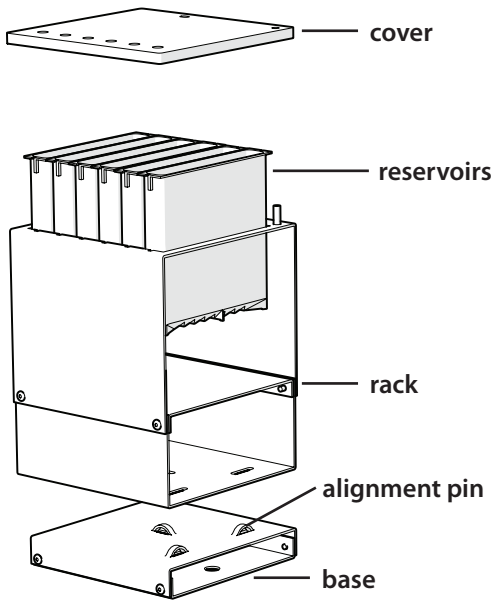


Figure 18: Solvent Reservoir Rack (Disassembled)

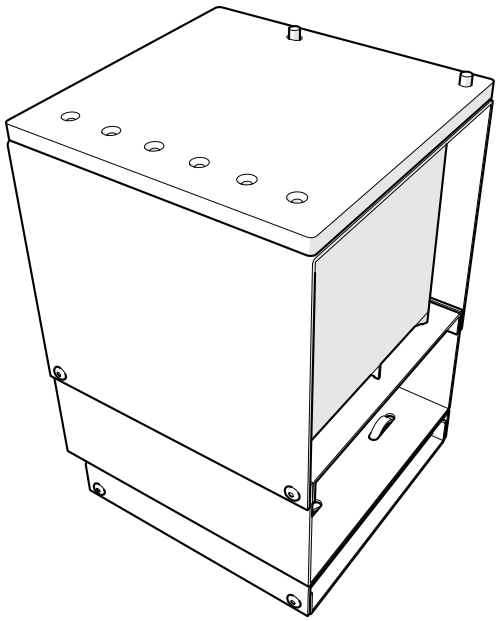


Figure 19: Solvent Reservoir Rack (Assembled)

Rack Installation

GX-241 ASPEC™ is equipped to accommodate one solvent reservoir rack and two racks (Code 33X-series, Code 34X-series, Code 37X-series, Code 386, or a combination).

To install a sample or DEC 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 pins on the locator plate.
3. Fit the middle slot on the front of the rack over the pins in the front of the locator plate.

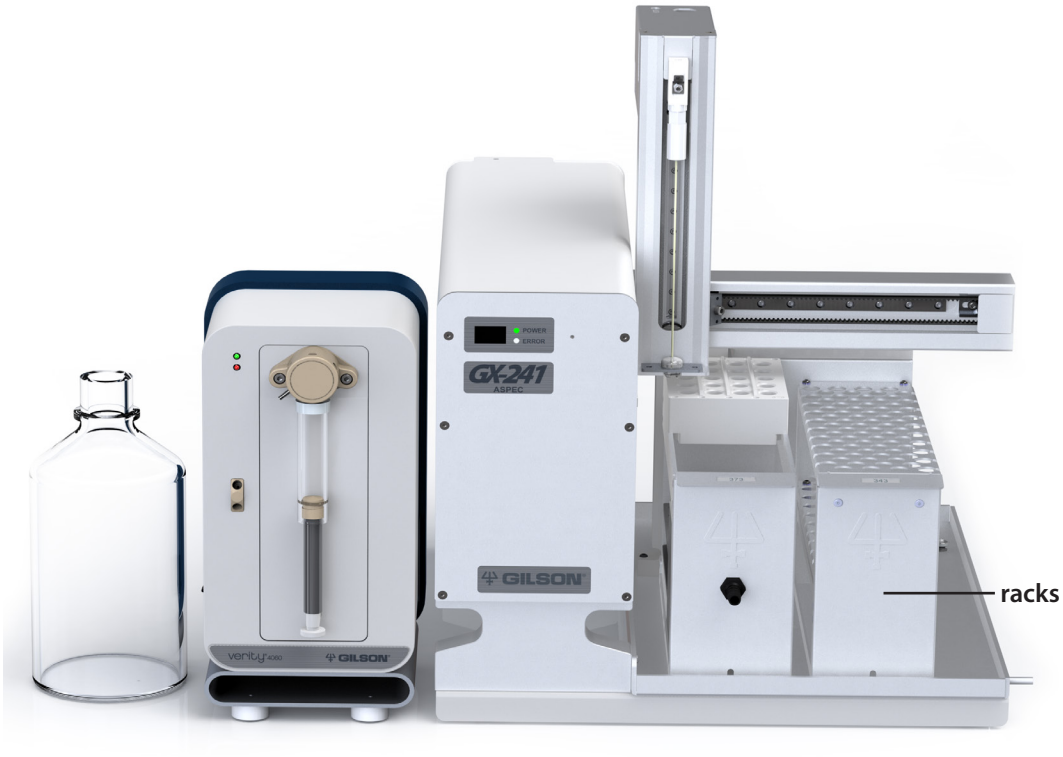


Figure 20: Rack installation Location on Locator Plate

Disposable Extraction Cartridge (DEC) Racks

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

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

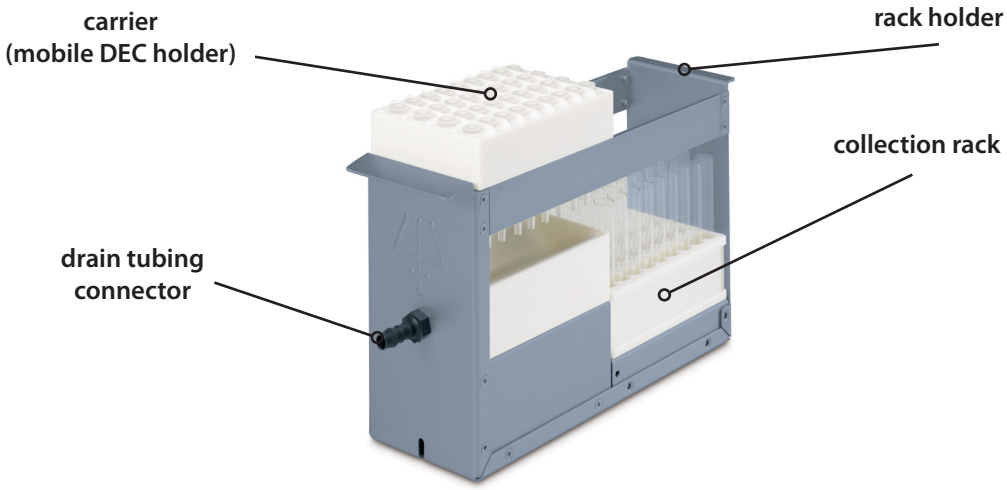


Figure 21: DEC Rack Diagram

NOTE The Code 376 rack does not use a collection rack riser.

DEC Rack Setup

Refer to **DEC Racks** on page 36 for the components of a DEC rack.

NOTE The tips of the SPE cartridges must not touch the tops of the collection tubes.

To assemble the DEC rack:

1. Fit one end of a length of Viton® drain tubing (part number 4701438630) to the drain tubing connector, and put the other end in a suitable receptacle.
2. Place the collection tubes in the collection rack.
3. Put the SPE cartridges into the mobile DEC holder and check that all cartridges are installed correctly.

   This is done by standing the DEC holder on a flat surface and inserting the cartridges into the holes in the DEC holder one-by-one. When correctly installed, the supporting flange at the top of each cartridges 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 Gilson DEC caps of the appropriate size to the 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 35.

Safety Shield (Optional) Installation

Refer to the instructions and diagram that follow to install the safety shield (part number 26057009).

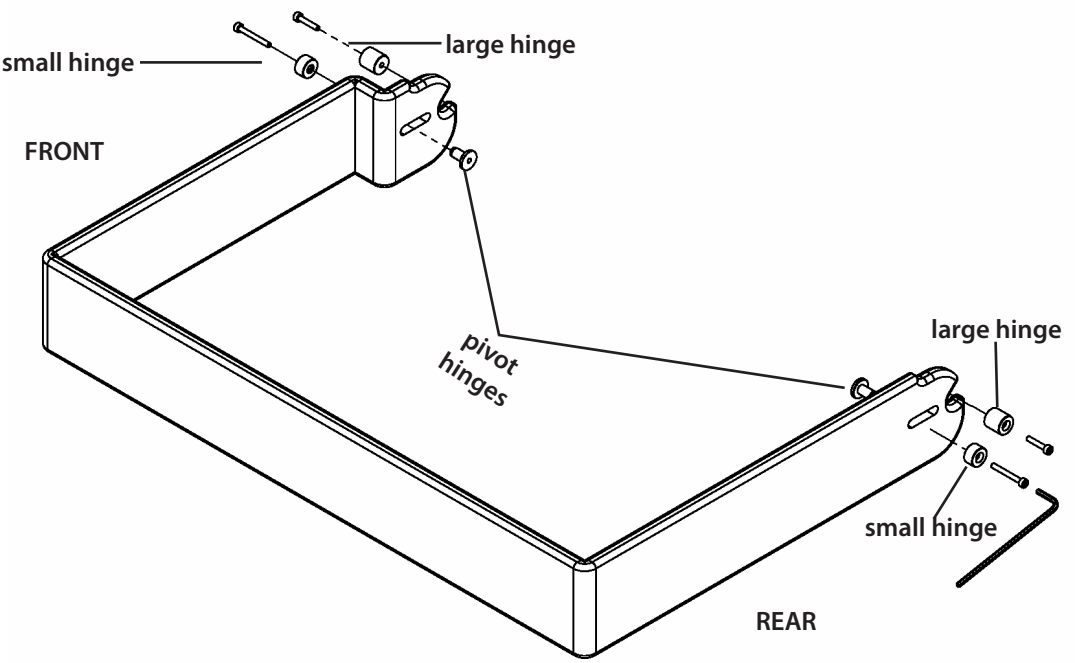


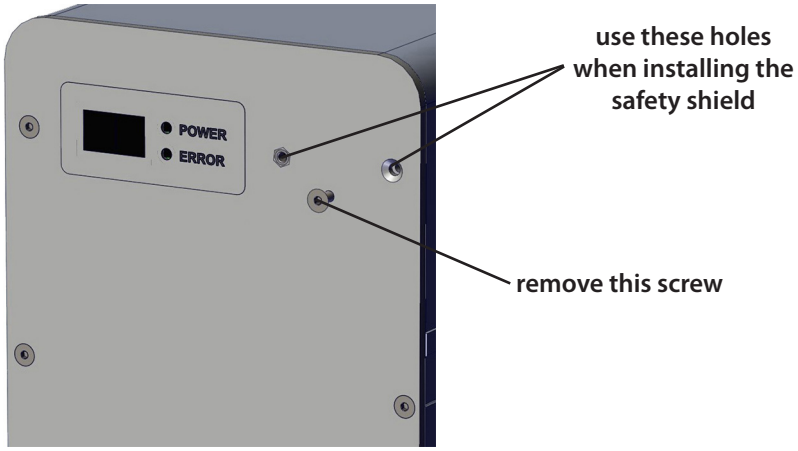
Figure 22: Safety Shield Installation

1. Using the supplied 2.5 mm Allen wrench, install one screw through the large hinge and then through the opening in the safety shield into the hole on the front of the instrument.

2. Using the 2 mm Allen wrench supplied in the accessory kit, remove the top screw on the right from the front of the instrument.

3. Install the other screw through the smaller hinge, pivot hinge, and finally through the hole from which the screw was just removed.

4. Repeat all steps to attach the other side of the safety shield to the rear of the instrument.



Operation

Chapter Three

TRILUTION® LH software provides control of the GX-241 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:

- A description of the **Front Panel** of the GX-241 ASPEC
- How to **Start Up** the GX-241 ASPEC
- How to use the **GX-241 Offset Utility**

Front Panel

The front panel includes a two-digit display for displaying error codes, a POWER indicator light, and an ERROR indicator light.

POWER Indicator Light

The green indicator becomes lit when the power is turned on using the MAINS power switch located on the rear panel. It flashes when preventative maintenance (PM) service is needed.

ERROR Indicator Light

The red indicator light flashes when an error has been encountered and the error code is displayed.

Figure 23: Front Panel

Start Up

Follow the instructions in the **Installation** chapter to make all rear panel and plumbing connections.

To start the GX-241 ASPEC™

1. Make sure the GX-241 ASPEC is connected to the power supply and to a power source.
2. Turn power on at the external power supply.
3. Turn the power on using the MAINS power switch located on the rear panel. The POWER indicator light on the front panel illuminates.

GX-241 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 or changing the clamp height.

The GX-241 Offset Utility is supplied on the GX-241 Offset Utility CD (part number 21067549), which is located in the accessory kit. The offset tool used with the utility is also supplied in the accessory kit.

When using the GX-241 Offset Utility with the GX-241 ASPEC™, use a custom tool height as described in the following instructions.

Install the GX-241 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-241 Offset Utility proceeds as follows:

1. Insert the CD into the drive. If the setup program does not start automatically, browse for SETUP.EXE.
2. Install the Gilson Server (if not previously installed).
   - Gilson Server v1.0 for Windows® XP
   - Gilson Server v2.0 for Windows® 7
3. Install Microsoft® .NET Framework (if necessary).
4. Install the GX-241 Liquid Handler 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\GX-241 Liquid Handler\Offset Utility.
   - The installation path on a Windows® 7 (64-bit) system is: C:\Program Files (x86)\Gilson\Utilities\GX-241 Liquid Handler\Offset Utility.

Install Custom XY Position

To enable the ability to set a custom offset position, select **All Programs > Gilson Applications > GX-241 Liquid Handler > Custom XY Position > Install Custom XY Position**. This copies a file required for using a custom offset position to the offset utility folder.

If a message like that shown below appears, click **Yes**.

A command prompt will flash briefly as the file required for using a custom offset position is copied to the offset utility folder.

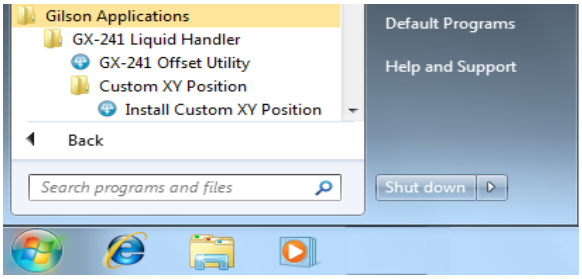


Figure 24: Install Custom XY Position

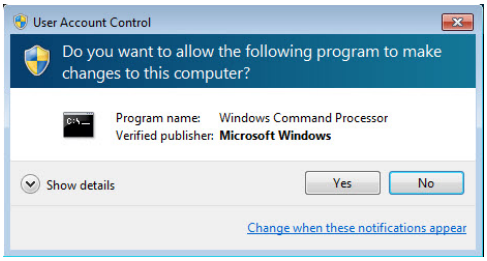


Figure 25: User Account Control Message

GX-241 Offset Utility Setup

1. Ensure that plumbing and electrical connections have been made.

   For communication to occur, instruments must be connected via an Ethernet connection to the PC using a router.

2. Turn on the instrument.

3. Remove all racks from the locator plate.

Start the GX-241 Offset Utility

To start the GX-241 Offset Utility, click the Start button and then select **All Programs > Gilson Applications > GX-241 Liquid Handler > GX-241 Offset Utility**.

If any Windows Security Alerts appear with Gilson, Inc. as the Publisher, click **Allow access**.

The GX-241 Offset Utility window will appear.

Use the GX-241 Offset Utility

Specify and Set Configuration

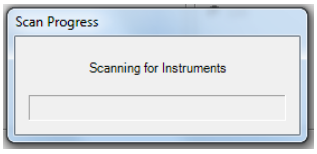


Figure 26: Scanning for Instruments

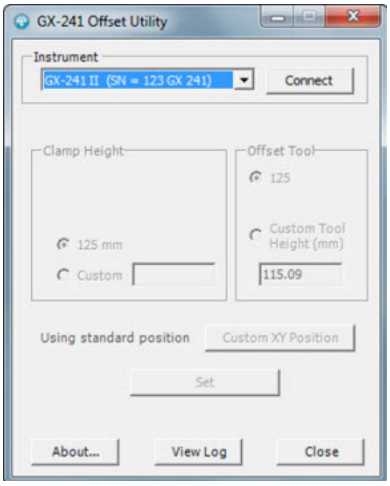


Figure 27: Connect to the Instrument

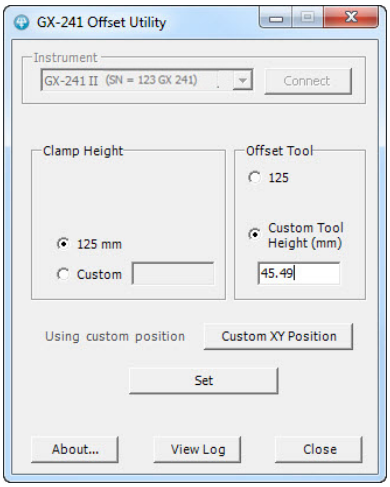


Figure 28: Enter Custom Tool Height

1. Allow the instruments to scan into the list.
2. Click **Connect**.
3. Select or enter the Clamp Height.
4. Enter a Custom Tool Height (mm). For the GX-241 ASPEC™, enter **45.49**.

   If the standard offset position was last used, the on-screen text displays "Using standard position". If a custom offset position was last used, the on-screen text displays "Using custom position".

Specify Custom Offset Position (Optional)

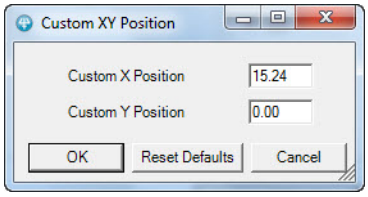


Figure 29: Custom XY Position

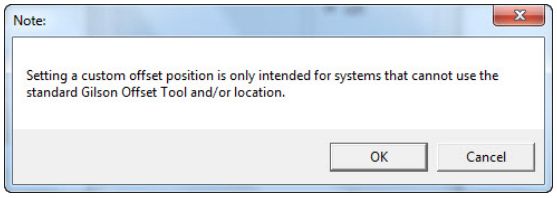


Figure 30: Notification Before Setting Custom Offset Position

1. To use a custom offset position or review the current offset position setting, click **Custom XY Position**. The message shown at right will appear. Click **OK**.
2. Review and/or enter a Custom X Position and Custom Y Position.

   To reset the positions to the factory defaults, click **Reset Defaults**.
3. Click **OK** to close the Custom XY Position dialog

Set Configuration and Custom Offset Position

Click **Set** to set the configuration and custom offset position and instruct the utility software to remember the values.

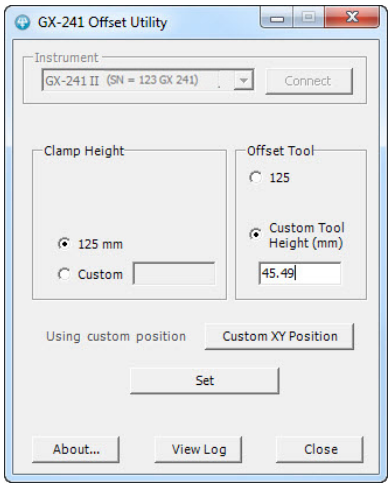


Figure 31: Set Configuration and Custom Offset Position

Determine and Set XY Offset

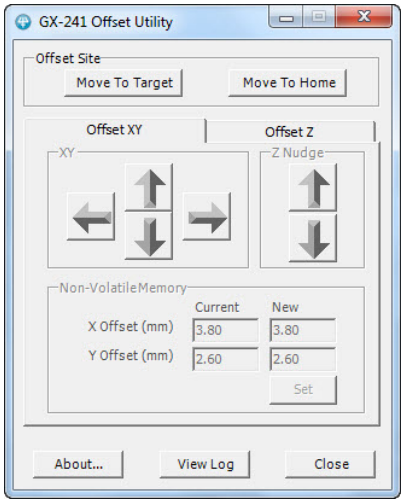


Figure 32: Determine and Set XY Offset

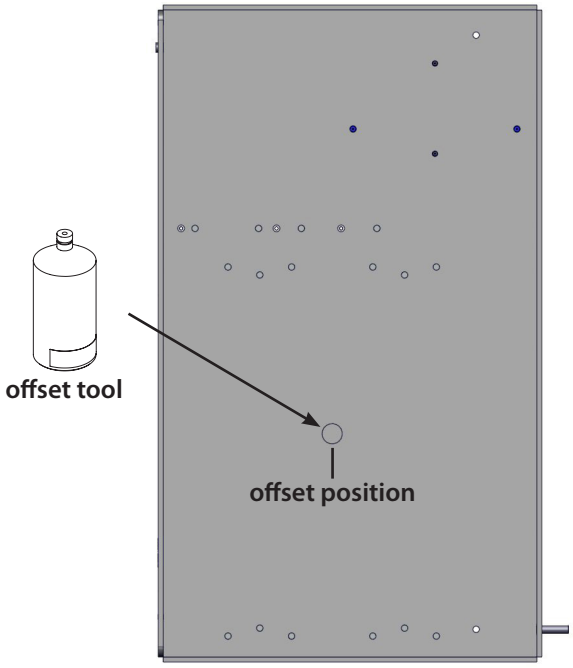


Figure 33: Default Offset Position on Locator Plate

1. If using the standard (default) offset position, place the offset tool on the locator plate at the offset position. Refer to the diagram.
2. To move to the XY offset position, click **Move To Target**. The arm will move the probe to a position approximately 3 mm above the offset tool (or target if using a custom offset position).
3. Use the Z Nudge arrows to move the probe down.
4. Offset the probe to the center of the offset tool (or target) using the XY arrow keys.

   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 centered, click **Set** to save the X and Y Offsets.

Determine and Set Z Offset

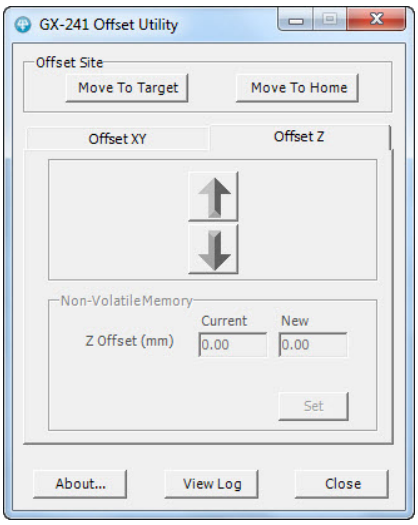


Figure 34: Determine and Set Z Offset

1. Select the Offset Z tab.
2. Click **Move To Target**. The arm will move to the offset position.
3. Use the arrows to align the tip of the probe with the top of the offset tool. Slide a small piece of paper between the tip of the probe and the offset tool. If the top of the paper touches the tip of the probe, the Z offset is correct.

   The offset values increase when the down arrow is clicked and the probe moves down. The offset values decrease when the up arrow is clicked and the probe moves up.

   If a message appears indicating that the minimum offset value (0 mm) has been reached, modify the Z clamp height, and then rerun the offset utility.
4. Click **Set** to save the Z offset.

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 information about the following to help maintain the instrument:

Helpful Hints

The GX-241 ASPEC™ will notify when preventative maintenance (PM) service is needed. The POWER indicator light on the front panel will flash. Schedule PM service by contacting your local Gilson representative or sending an email to **service@gilson.com**.

To keep the instrument at peak performance:

- Change or clean the tubing regularly to maintain maximum performance.
- Flush the probe and rinse station daily with appropriate solvents.
- Check periodically to ensure that all fittings are tight.
- Wipe up all spills immediately.
- Allow fluids to equilibrate to room temperature before running them through the system; cold fluids may cause leakage.

Cleaning

The instrument 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 the instrument, wipe it using a dry, clean cloth.

Fluid Path

Depending upon your use of the instrument, it may be necessary to flush the entire fluid path.

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

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

Cleaning Methods

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

Proteins and Peptides

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 are 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.

Part Replacement

Refer to the instructions in this section to replace the probe, probe holder, and/or probe guide insert.

Probe

To install a replacement probe:

1. Remove the transfer tubing fitting connected to the top of the probe holder.
2. Grasp the current probe and push it up through the top of the probe holder.
3. Insert the new probe into the top of the probe holder and then pull it through until the tip of the probe is in the probe guide insert.
4. Replace and tighten the fitting.

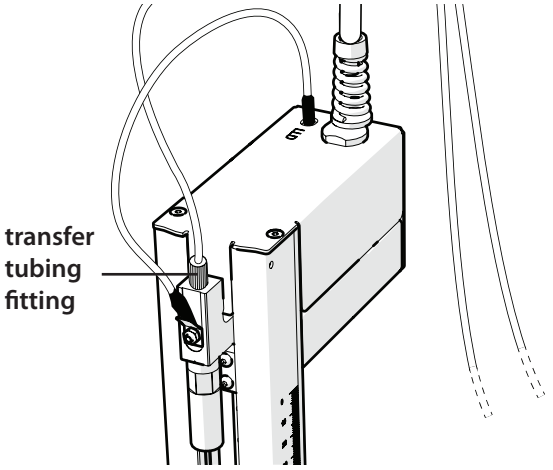


Figure 35: Transfer Tubing Fitting Location

Probe Holder/Probe Guide Insert

Remove Probe

1. Remove the transfer tubing fitting connected to the top of the probe holder.
2. Grasp the current probe and push it up through the top of the probe holder.

Remove Lower Probe Holder and Probe Guide Insert

1. Unscrew the lower probe holder from the threaded probe holder sleeve.
2. Use a 2 mm Allen wrench to remove the two hex screws that attach the retainer bracket to the Z-foot, and then remove retainer bracket and the probe guide insert.

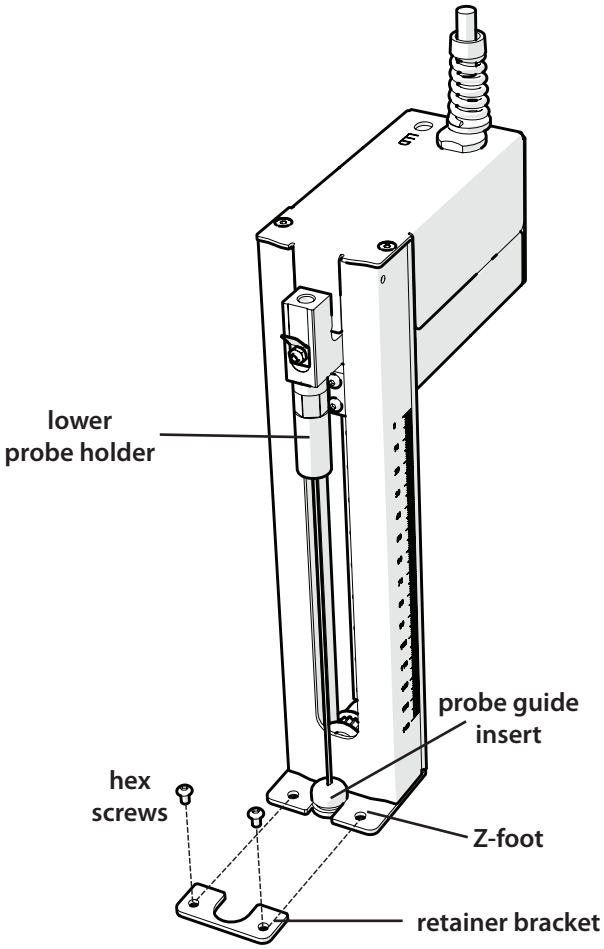


Figure 36: Probe Holder/Probe Guide Insert Replacement

Install Lower Probe Holder and Probe Guide Insert

1. Install the lower probe holder on the threaded probe holder sleeve.
2. Locate the probe guide insert and slide it into the opening in the Z-foot. The probe guide insert should be oriented with the domed part on top. The probe guide insert will fit tightly in the opening.

Parts and Accessories

Appendix A

GX-241 ASPEC™

System

Part Number	*Description*
26150006	GX-241 ASPEC™ with VERITY® 4060 Single Syringe Pump

Probes (125 mm)

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

Part Number	*Description*
2507255	Non septum-piercing probe, bevel tip, capacitive level sensing, stainless steel Dimensions: 269 x 1.5 x 0.4 mm ID
27067373	Non septum-piercing probe; constricted tip, stainless steel Dimensions: 221 x 1.5 x 1.1 mm ID (tip dimensions: 1.5 x 1.1 x 0.45 mm ID)
27067374	Non septum-piercing probe; constricted bevel tip, capacitive level-sensing, stainless steel Dimensions: 221 x 1.5 x 1.1 mm ID (tip dimensions: 2 x 1.1 x 0.4 mm ID)
27067382	Grooved, septum-piercing probe; beveled-tip, stainless steel, 100 µL volume Dimensions: 221 x 2.0 x 0.8 mm ID (tip dimensions: 21 x 1.5 x 0.8 mm ID)

Probe Guide Assembly

Part Number	Description
26056015	Probe guide assembly for 1.5 mm OD probe, GX-241 ASPEC

Probe Guide Insert

Part Number	Description
26046226	Probe guide insert for GX-241/GX-271 ASPEC

Rinse Station

Part Number	Description
26044044	Rinse station assembly with drain tubing for GX-241 ASPEC

Racks and Rack Accessories

Racks

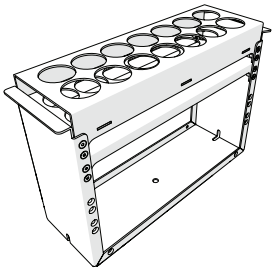
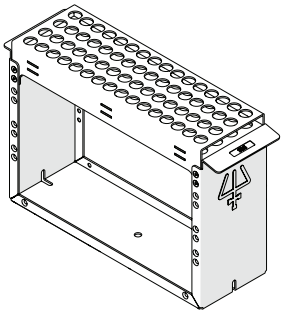
All of the following racks are aluminum.

Racks

Part Number	Image	Rack Code	Vessels	Additional Instructions for Use
260440031		330	60 Vials 12 x 32 mm (2 mL)	

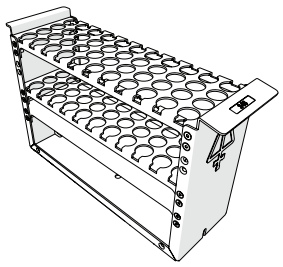
Racks (continued on page 55)

Racks

Part Number	*Image*	*Rack Code*	*Vessels*	*Additional Instructions for Use*
260440036		333	14 Scintillation Vials 20 mL	
260440081		334	14 Scintillation Vials 40 mL	
260440083		335	48 WISP Vials 15 x 45 mm (4 mL)	
260440106		338	64 Vials 12 x 32 mm (2 mL)	

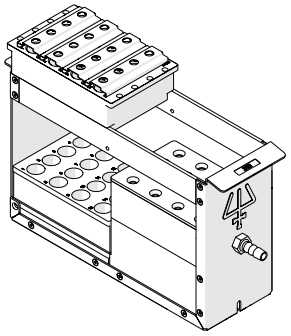
Racks (continued on page 56)

Racks

Part Number	*Image*	*Rack Code*	*Vessels*	*Additional Instructions for Use*
260440039		341	108 Tubes 10 x 75 mm	
260440025		343	80 Tubes 13 x 100 mm	Use a Z Offset greater than 2.6 mm from Tube Bottom.
260440049		346	44 Tubes 16 x 100 mm	Use a Z Offset greater than 5.6 mm from Tube Bottom.

Racks (continued on page 57)

Racks

Part Number	*Image*	*Rack Code*	*Vessels*	*Additional Instructions for Use*
260440044		371	36 (1 mL) SPE Cartridges and 36 Tubes 1 mL SPE Cartridges Collection Block Holds: 12 x 75 mm (5 mL) Tubes	
260440045		373	20 (3 mL) SPE Cartridges and 20 Tubes 3 mL SPE Cartridges Collection Block Holds: 12 x 75 mm (5 mL) Tubes	
260440046		376	15 (6 mL) SPE Cartridges and 15 Tubes 6 mL SPE Cartridges Collection Block Holds: 15 x 85 mm (10 mL) Tubes	
260440109		386	16 (6 mL) SPE Cartridges and 16 Tubes 6 mL SPE cartridges Collection Block Holds: 15 x 85 mm (10 mL) Tubes	

Racks (continued on page 58)

ASPEC™ 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

Caps

NOTE Gilson ASPEC™ SPE Cartridges are pre-capped and ready to use on Gilson ASPEC systems. Caps are required when using SPE cartridges from other manufacturers.

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

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 Reservoir Rack

Part Number	*Description*
26044037	Solvent reservoir rack with six 100 mL reservoirs

Solvent Reservoir

Part Number	*Description*
54350570	Solvent reservoir (100 mL)

Safety Shield

Part Number	*Description*
26057009	Safety shield for GX-241 ASPEC

Miscellaneous

Part Number	*Description*
6383087203	Terminal block connector, 8-pin
709910206	2-conductor interconnect wire, 6', for making contact connections
26056021	Z-height adjustment tool
36078142	Ethernet cable
36083129	Serial cable, D9Pin male to D9Pin female

GX Rinse Pump

Part Number	*Description*
261452	GX Rinse Pump

Error Messages

Appendix B

When an instrument error occurs, a red indicator light flashes on the front panel of the instrument and the error number appears on the 2-digit, front panel display. For assistance with resolving an error, contact your local Gilson representative.

When an instrument error occurs on the GX-241 ASPEC™, the error number appears on the 2-digit, front panel display. Refer to the table below for the error text.

Error	*Error Text*	*Error*	*Error Text*
0	No Error	26	Z Axis Moving
10	Unknown Command	28	X Axis Stall
11	Invalid NV-RAM Address	29	Y Axis Stall
12	Safety Stop Activated	30	Z Axis Stall
13	Bad Parameter Entered	32	X Axis Encoder
14	FIFO Full	33	Y Axis Encoder
15	FIFO Add	34	Z Axis Encoder
16	Character Limit	36	X Axis Speed Range
17	X Axis Park Location	37	Y Axis Speed Range
18	Y Axis Park Location	38	Z Axis Speed Range
20	X Axis Unhomed	40	X Axis Target Range
21	Y Axis Unhomed	41	Y Axis Target Range
22	Z Axis Unhomed	42	Z Axis Target Range
24	X Axis Moving	99	Accessory Error* *This is a software-controlled error. If an accessory errors, the software can send a command to put the instrument into this error state.
25	Y Axis Moving		

Materials

Appendix C

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

Liquid Contact Materials

Material	*Description*
FEP	Fluorinated ethylene propylene is another member of the fluorocarbon family with similar chemical properties. It is generally more rigid than PTFE, with somewhat increased tensile strength. It is typically more transparent than PTFE, slightly less porous, and less permeable to oxygen. FEP is not as subject to compressive creep at room temperature as PTFE, and because of its slightly higher coefficient of friction is easier to retain in a compression fitting.
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%).
	Liquid Contact Materials (Continued on page 66)

Material	*Description*
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.
PET	PET is a polyester plastic with excellent wear resistance, a low coefficient of friction and good chemical resistance. Its dimensional stability, combined with low moisture absorption, allows PET polyester plastics to be machined into precise, high-tolerance components. PET is both FDA and 3A-Dairy compliant, making it ideal for food applications. PET has good mechanical properties, and it works well for high load and wear conditions. PET can be formulated with additional lubricants to increase its wear characteristics without changing the basic attributes of the material.
PPS	Polyphenylene sulphide is the generic name for the material produced as Fortron®, Ryton®, and others. It is very resistant to all solvents, acids, and bases.
PTFE	Polytetrafluoroethylene is the generic name for the class of materials such as Teflon®. It offers superior chemical resistance but is limited in pressure and temperature capabilities. Because it's so easy to handle, it is often used in low pressure situations where stainless steel might cause adsorption. PTFE tubing is relatively porous, and compounds of low molecular weight can diffuse through the tubing wall.

Liquid Contact Materials (Continued on page 67)

Material	*Description*
Stainless Steel, Type 316L	Type 316L is an extra low carbon alloy that offers better corrosion resistance adjacent to brazes. This alloy contains a maximum of only 0.03% carbon. This amount of carbon is small enough to eliminate harmful carbon precipitation adjacent to brazes during the brazing operation. This extra low carbon grade is only recommended for equipment made for service below the lower sensitizing temperature of 800°F, especially when corrosive conditions are severe. It is not recommended for use at high temperature. This grade can be highly polished with no surface blemishes.
Tygon® Vacuum & Laboratory Tubing Formulation R-3603	Crystal-clear and flexible, Tygon® Tubing handles virtually all inorganic chemicals found in the lab. It is non-oxidizing and non-contaminating. Long-lasting and crack-resistant, Tygon® Laboratory Tubing is less permeable than rubber tubing. The glassy-smooth inner bore helps prevent buildup so that cleaning is facilitated. Coils are marked at 1-foot intervals for easy measuring. Autoclavable. Remains flexible at -45°F (43°C). Durometer hardness: Shore A, 55.
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.

FEP, Nitronic 60, PAEK, PEEK, PPS, PTFE, and Valcon H descriptions provided by Valco Instruments Company Inc (www.vici.com).

PET description provided by Midland Plastics, Inc. (www.midlandplastics.com).

Stainless Steel, Type 316L description provided by New England Small Tube Corporation (www.nesmalltube.com).

Tygon® Vacuum & Laboratory Tubing Formulation R-3603 description provided by Saint-Gobain Performance Plastics Corp (www.processsystems.saint-gobain.com).