GX-271 Liquid Handler

User's Guide

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Safety

Read this section before installing and operating the liquid handler.

The liquid handler 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 liquid handler.

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 liquid handler. 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. Refer to the rear panel label on the instrument or the Declaration of Conformity document for the current standards to which the instrument has been found compliant.

Safety

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

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. Refer to the Technical Specifications for the weight. Always lift the instrument from the base and follow any unpacking instructions provided with the instrument.

Voltage

Access to the rear panel is necessary because the liquid handler must be detached from all voltage sources before service, repair, or exchange of parts.

For normal operation, the liquid handler is to be grounded through the AC line cord provided. Failure to do so can result in a potential shock hazard that could result in serious personal injury.

Use only fuses with the rated current and of the specified type as listed on the rear panel of the instrument.

The instrument must only be operated with the voltage specified on the rear panel label of the instrument using a grounded AC line cord.

Probes

While operating the liquid handler, keep hands clear of probe to avoid risk of personal injury by piercing.

Because the probe installed on the Z-arm may contain a dangerous substance, do not interfere in the work area of the instrument until the liquid handler has completed its procedures.

Solvents

Observe safe laboratory practices when handling solvents. If dangerous liquids are used, adequate protection such as proper ventilation, safety glasses, etc., should be used.

Refer to the Material Safety Data Sheets for the solvents before use.

Replacement Parts

Be sure to use only replacement parts mentioned in this user's guide. If it is necessary to change parts not listed, please contact your local Gilson.

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.

Le détecteur 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.

Sécurité

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

Symbole	*Explication*
~	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

Les notes de sécurité suivantes peuvent apparaitre dans ce document:

⚠WARNING	WARNING indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entrainer des blessures graves
⚠CAUTION	CAUTION indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entrainer des blessures mineures à modérées
NOTICE	NOTICE indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entrainer des dégâts matériels

Levage

Cet instrument dépasse le poids maximum pouvant être manipulé en toute sécurité par une seule personne. Deux personnes au moins sont nécessaires pour soulever l'appareil en toute sécurité. Soulevez-le toujours en le saisissant par sa base et veillez à respecter les consignes de déballage fournies avec l'instrument.

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 1

This chapter provides information on the following topics:

Description

The **GX-271 Liquid Handler** is an X/Y/Z instrument that can automate liquid handling procedures. The GX-271 Liquid Handler can be configured with a GX Solvent System or 402 Syringe Pump, a GX Direct Injection Module, a fraction collection valve, rinse stations, a GX Rinse Pump and racks.

The optional **GX Solvent System** is a bi-directional pump that can switch from aspirate to dispense mode. The GX Solvent System can handle flow rates up to 50 mL/min. The solvent selection valve on the GX Solvent System can accommodate up to five different reservoir solvents.

The optional **402 Syringe Pump** is a liquid transfer station, that can be used to deliver up to 25 mL in one stroke and down to 10 µL (typical value) with high accuracy.

The optional **GX Direct Injection Module** is mounted on the locator plate of the GX-271 Liquid Handler. The GX Direct Injection Module has an option of four different valves (for 1/8" OD sample loops or 1/16" OD sample loops). The valves available for the GX Direct Injection Module feature a vertical direct connection for the injection port. One GX Direct Injection Module can be placed on the locator plate of the GX-271 Liquid Handler.

The optional **Fraction Collection Valve** is a three-way valve mounted low on the Z-arm. This design allows for reduced dead volume and collection of larger volumes.

Figure 1-1: GX-271 Liquid Handler with GX Solvent System

Figure 1-2: GX-271 Liquid Handler without Pump

Unpacking

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

To unpack the instrument:

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

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

3 Lift the unit out of the box and 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).

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

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

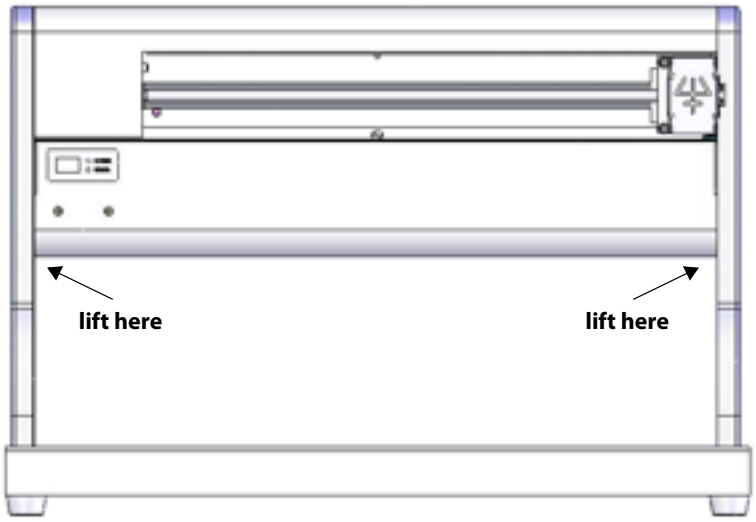


Figure 1-3: Unpacking the Liquid Handler

Standard Equipment

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

- GX-271 Liquid Handler
- locator pan
- Z-arm
- isolator probe holder
- accessory kit:
  - Z height adjustment tools (125 and 175 mm)
  - Ethernet cable, RS-232 cable, or GSIOC cable
  - power cords
  - fuses and fuse drawer
  - terminal block connectors (6-pin and 8-pin)
  - spiral wrap
  - ten tubing retaining clips
  - LLD cable assembly
  - three Allen wrenches (2.5, 3, and 4 mm)
  - Phillips screwdriver
  - Gilson Ethernet Utility (included with Ethernet instruments)
  - GX-27X Liquid Handler Offset Utility Kit

Documentation

The following documentation is provided:

- GX-271/GX-274 Liquid Handlers Documentation CD
- IQ Procedure GX-271 Liquid Handler
- Unpacking the GX-271/GX-274 Liquid Handler and GX-271/GX-274 ASPEC™
- Gilson Ethernet Utility Instructions on the Gilson Ethernet Utility CD
- GX-27X Series Offset Utility Kit Instructions
- Quality Control Checklists
- Declaration of Conformity

Accessories

The following accessories (ordered separately) are available for the liquid handler. Refer to Appendix A, Replacement Parts and Accessories for part numbers.

- tray insert
- guide foot assembly
- rinse stations
- probes
- racks
- GX Solvent System (included with the GX-271 Preparative Liquid Handler)
- 402 Syringe Pump (Single or Dual)
- GX Rinse Pump
- GX Direct Injection Module (for 1/16" of 1/8" OD sample loops)
- Fraction Collection Valve
- syringes (for the 402 Syringe Pump)
- GX-27X Shield Kit

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 5-6.

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-271 Liquid Handler on page 1-7
- GX Solvent System on page 1-9
- 402 Syringe Pump on page 1-10
- GX Direct Injection Module on page 1-11
- GX Rinse Pump on page 1-12
- Fraction Collection Valve on page 1-12

GX-271 Liquid Handler

Technical Specification	*Definition*
Arm Speed	350 mm/sec in X dimension 350 mm/sec in Y dimension 125 mm/sec in Z dimension
Contact Control	Two inputs (contact closure, TTL), two relay outputs, two switched +24V DC 1A outputs, and one safety input **NOTICE** For your safety, do not switch voltages higher than 30V even though the output contacts are rated for high voltage.
Dimensions (W x D x H)	59.7 x 54.1 x 57.1 cm (23.5 x 21.3 x 22.5 in)
Environmental Conditions	Indoor use Altitude: up to 2000 m Temperature range: 5°–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
Fuse	5 x 20 mm “T” type 3.15A
Horizontal Motion Strength	X: 2.0 kg (4.5 lbs.) Y: 2.0 kg (4.5 lbs.)
Liquid Level Detection (LLD)	Capacitive liquid level detection is supported when using tubes in aluminum racks

GX-271 Liquid Handler (Continued)

Technical Specification	*Definition*	
Locator Plate Capacity	**Code 20-series tray insert (part number 26041033)**	
	Code 20-series	Up to five racks
	Code 33X/34X-series	
	Code 12X-series	One Code 12X rack or one solvent bottle rack can be placed at the back of the Code 20-series tray insert
	Solvent bottle racks	
	Code 200-series tray insert (part number 26041035)	
	Code 200-series	Up to three racks **Note:** If a GX Direct Injection Module is installed on the locator plate of the liquid handler, only two Code 200-series or Code 300-series racks can be installed. The rack position in front of the GX Direct Injection Module must remain empty
	Code 300-series	
Power Requirements	Frequency: 50 to 60 Hz Voltage: 100–240V (Universal Input) Current rating: 2.0A for 100–120V or 1.0A for 220–240V Power consumption: 250W maximum	
Probe Positioning Performance	Accuracy: +/- 0.75 mm in X/Y/Z dimensions Repeatability: +/- 0.20 mm in X/Y/Z dimensions	
Probe Rinse	Probe rinsing and flowing probe rinsing occurs through a dedicated rinse station	
Safety and Compliance	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 or 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	Computer control via Ethernet and TRILUTION software; or via RS-232 or GSIOC	
Vertical Punch Strength	4.5 kg (10.0 lbs.)	
Weight	22 kg (48 lbs.)	

GX Solvent System

Technical Specification	*Definition*
Back Pressure	50 psi
Dimensions (W x D x H)	10.8 x 14.8 x 18.2 cm (4.25 x 5.83 x 7.15 in)
Flow Rate	1 µL/min up to 50 mL/min
Liquid Contact Materials	Valcon H, Nitronic 60 (N60), PTFE
Power Requirements	Voltage: 24V DC Current rating: 1.5A
Pump Internal Volume	625 µL ± 12 µL
Selection Valve Switching Speed	180 msec
Volumetric Accuracy	Volume Range: 100 µL–25 mL (water) Accuracy at 500 µL: ± 10 nL Accuracy at 10 mL: ± 200 µL
Weight	2.2 kg (4.9 lbs.)

402 Syringe Pump

Technical Specification	*Definition*	
Dimensions (W x D x H)	17 x 20 x 24 cm (6.7 x 7.9 x 9.4 in)	
Flow Rate	1 µL/min up to 240 mL/min	
Liquid Contact Materials	FEP, PTFE, PEEK, Ekonol, glass, and ceramics	
Maximum Syringe Flow Rate for Water	*Syringe Size*	*Recommended Maximum Flow Rate*
	100 µL	4 mL/min
	250 µL	10 mL/min
	500 µL	20 mL/min
	1 mL	40 mL/min
	5 mL	100 mL/min
	10 mL	100 mL/min
	25 mL	100 mL/min
Power Requirement	Frequency: 50–60 Hz Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ± 10% of the nominal voltage	
Syringe Capacity	100 µL, 250 µL, or 500 µL; 1 mL, 5 mL, 10 mL, or 25 mL	
Volumetric Accuracy	Volume range: 100 µL to 25 mL (water) Accuracy at 10 µL: ± 0.2 µL	
Weight	5 kg (11 lbs.) for 402 Single Syringe Pump 7 kg (15.4 lbs.) for 402 Dual Syringe Pump	

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	**Analytical (1/16")** < 0.005% (Stainless steel valve; Cheminert and stainless steel port; 20 µL loop; total loop overfill)
Injection Reproducibility	**Analytical (1/16")** CV < 0.7% (Stainless steel and PEEK valves; Cheminert port; 20 µL loop; total loop overfill) **Preparative (1/16")** CV <0.9% (Stainless steel valve; Cheminert port; 1 mL loop; partial loop)
Liquid Contact Materials	Valcon H, Nitronic 60 (N60), PTFE, PAEK
Power Requirements	Voltage: 24V DC Current rating: 1.0A
Valve Switching Speed	**Analytical** 200 msec for GX Direct Injection Module (1/16") **Preparative** 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 output
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
Rinse Speed	High speed: 200 rpm Low speed: 120 rpm
Weight	1.0 kg (2.28 lbs.)

Fraction Collection Valve

Technical Specification	*Definition*
3-Way Valve	Three-port, PTFE, 114 µL internal volume, 10 µL dead volume, up to 200 mL/min

Installation 2

The liquid handler 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 Rear Panel Connections

4 Rack Installation

5 Plumbing Connections

6 Z-Arm Cable Support Rod and Spiral Wrap Installation

7 Shield Installation (Optional)

8 Final Z-Arm Height Adjustment

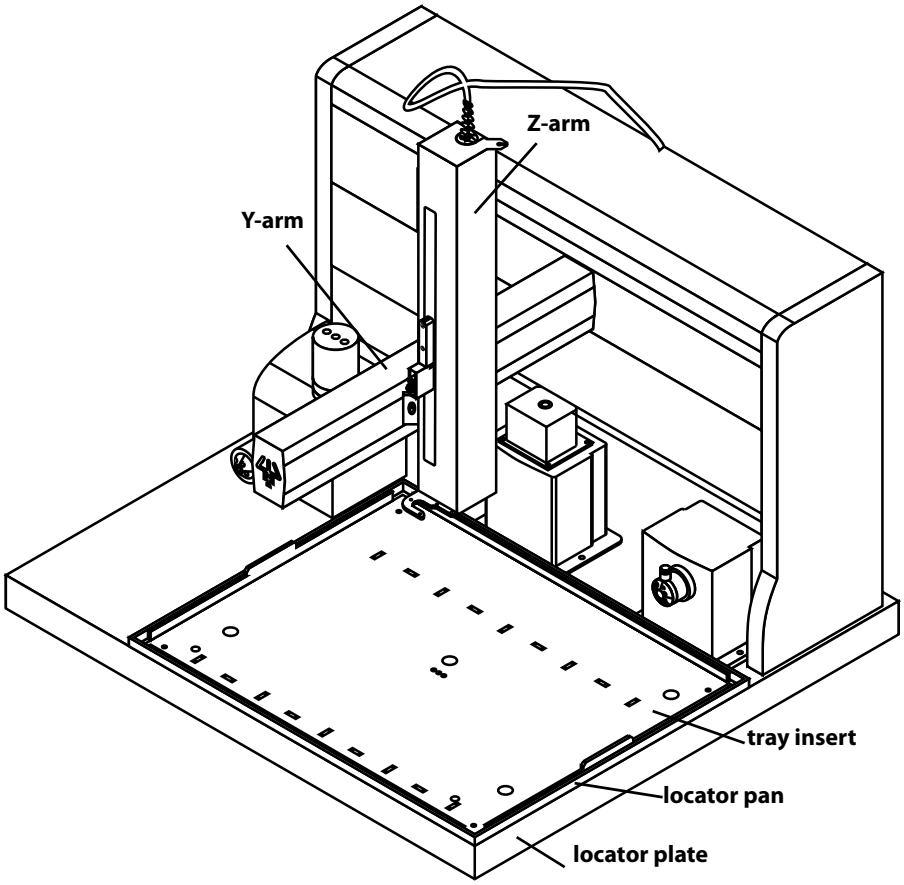


Figure 2-1: GX-271 Liquid Handler
with GX Solvent System, GX Rinse Pump, and GX Direct Injection Module

Locator Plate Setup

The locator plate and accessories should be set up and installed in the order shown below.

1 GX Direct Injection Module Installation (Optional)

2 Locator Pan Installation

3 Rinse Station Installation

4 Tray Insert Installation

5 GX Solvent System Installation (Optional)

6 GX Rinse Pump Installation (Optional)

The following diagrams show the location of the tray insert and accessories on the locator plate of the liquid handler.

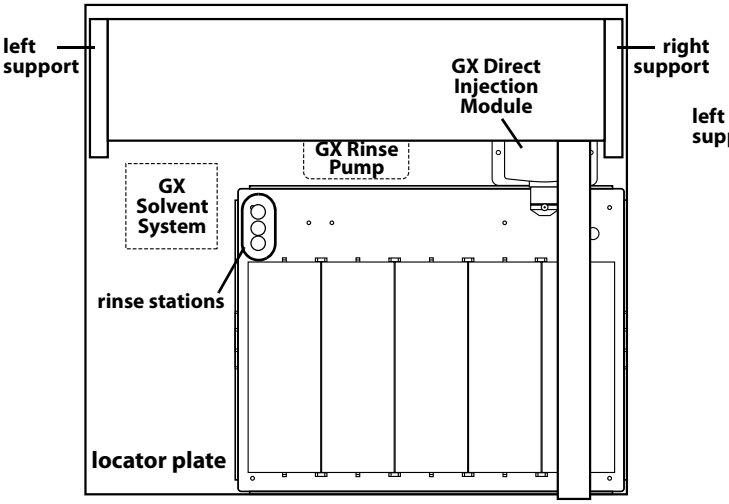


Figure 2-2: Locator Plate of the GX-271 with Code 20-Series Tray Insert Installed

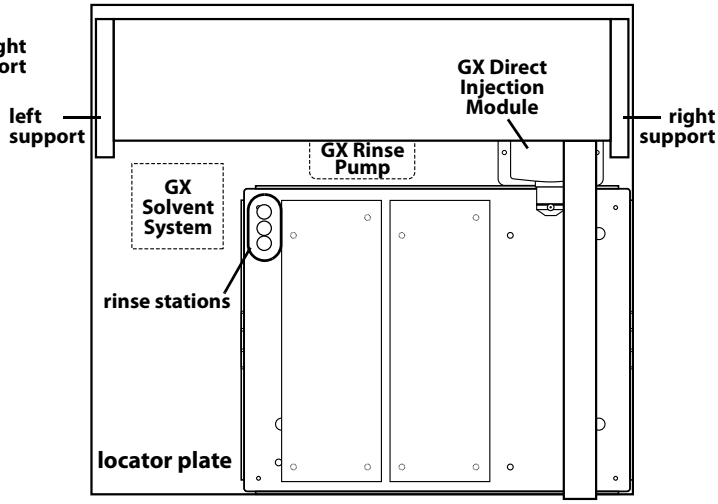


Figure 2-3: Locator Plate of the GX-271 with Code 200-Series Tray Insert Installed

GX Direct Injection Module Installation (Optional)

Install the GX Direct Injection Module on the right side of the locator plate, next to the liquid handler's right support.

Injection Module

To install the GX Direct Injection Module on the locator plate of the liquid handler:

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

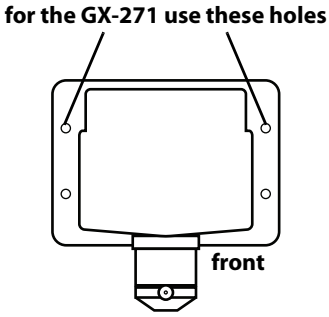


Figure 2-5: GX Direct Injection Module (Top View)

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

Note: There are two locator pins included with the GX Direct Injection Module; these pins will not be used with the GX-271 Liquid Handler.

Figure 2-4: GX Direct Injection Module on the Locator Plate of the GX-271 Liquid Handler

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

3 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.

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

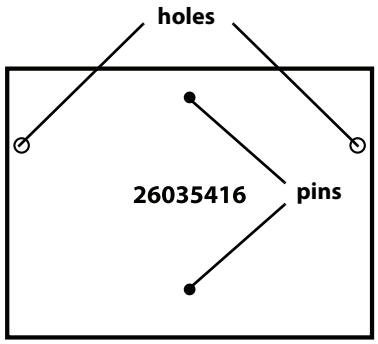


Figure 2-6: GX-271 Riser Block (Top View)

Locator Pan Installation

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

To install the locator pan:

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

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

3 Locate the two screws included with the locator pan and place them in the holes at the front of the instrument. Using a Phillips screwdriver, tighten the screws.

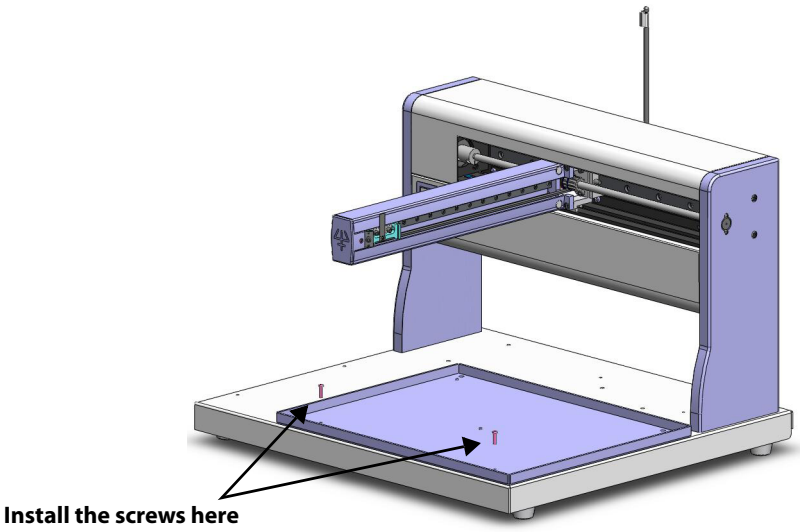


Figure 2-7: Locator Pan Installation

Rinse Station Installation

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

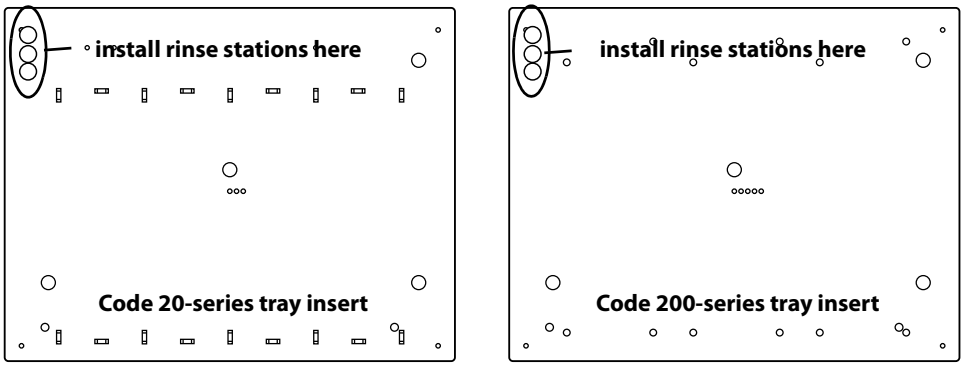


Figure 2-8: Rinse Station Locations on Code 20-Series and Code 200-Series Tray Inserts

Up to three rinse stations can be installed on the locator plate of the liquid handler. There are two types of rinse stations available. Each of these is available in two different heights. Refer to the table for part numbers.

Part number	*Description*
26034552	Rinse station, GX 125 mm (Rinse station for outside rinse of probe)
26034551	Rinse station, GX 175 mm (Rinse station for outside rinse of probe)
26034554	Rinse station, GX 125 mm FC (Drain/rinse station for inside rinse of probe)
26034555	Rinse station, GX 175 mm FC (Drain/rinse station for inside rinse of probe)

Choose the Type of Rinse

Determine what type of rinse you will be performing.

- With the Rinse Station for Outside Rinse of Probe you can perform a static rinse or a flowing rinse using the GX Rinse Pump.
  - For a static rinse place the plug in the bottom hole and the drain in the top hole.
  - For a flowing rinse place the plug in the top hole and the drain at the bottom
- Use the Drain/Rinse Station to perform an inside rinse.

Install the outside rinse stations in the front or center positions on the tray insert. Install the drain/rinse station in the rear position on the tray insert.

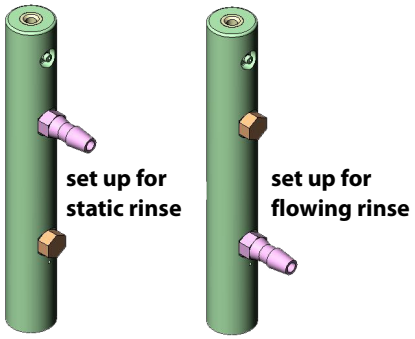


Figure 2-9: Rinse Station for Outside Rinse of Probe

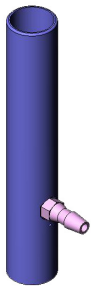


Figure 2-10: Drain/Rinse Station for Inside Rinse of Probe

Install the Tubing

To make the plumbing connections to the rinse station:

1 Connect the drain tubing (part number 470331206, included with the rinse station) to the barbed union on the rinse station.

2 If you are using the GX Rinse Pump, connect the 1/16" OD tubing (part number 4715187060, included with the rinse pump) to the top barbed fitting on the rinse station. Refer to GX Rinse Pump Plumbing (Optional) on page 2-34 for more information.

Install the Rinse Station

To install the rinse station on the tray insert:

1 Locate the following items included with the rinse station:

- rinse station support
- flat-head screw
- hex nut

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

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

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

4 After installation, check that the rinse station is perpendicular to the tray insert.

If the rinse station is not flush to the tray insert and not perpendicular to the ruler, remove it and reinstall.

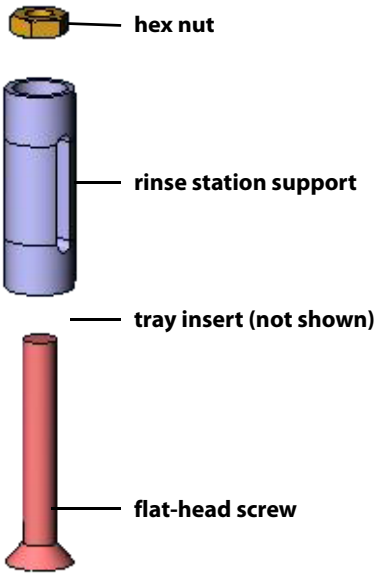


Figure 2-11: Rinse Station

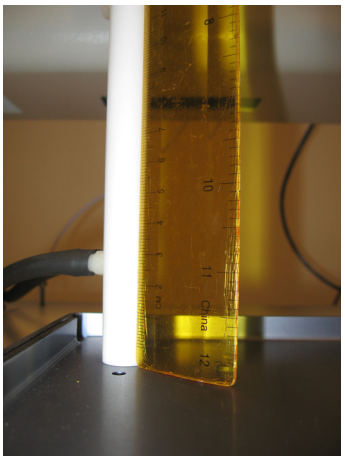


Figure 2-12: Rinse Station Perpendicular to Tray Insert

Tray Insert Installation

A tray insert is used to position the racks and the rinse stations on the instrument. There are two inserts available (ordered separately) depending on the type of racks that will be used.

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

  The Code 20-series tray insert is used for Code 20-series and Code 33X/34X-series racks.

- Insert for three Code 200-series racks (part number 26041035)

  The Code 200-series tray insert is used for Code 200-series and Code 300-series racks.

Tray Insert Identification

In the center of each tray insert there are holes used to identify the insert. The number of holes depends on the part number of the insert. Refer to the table below for more information.

Part Number	*Description*	*Holes in Insert*
26041033	Insert for Code 20-series racks	3
26041035	Insert for Code 200-series racks	5

To install the tray insert on the locator pan of the liquid handler:

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

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

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

GX Solvent System Installation (Optional)

The solvent system is installed next to the left support on the liquid handler.

There are two locator pins included with the solvent system; these pins will not be used with the GX-271 Liquid Handler.

Figure 2-13: GX Solvent System on the Locator Plate of the Liquid Handler

GX Rinse Pump Installation (Optional)

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

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

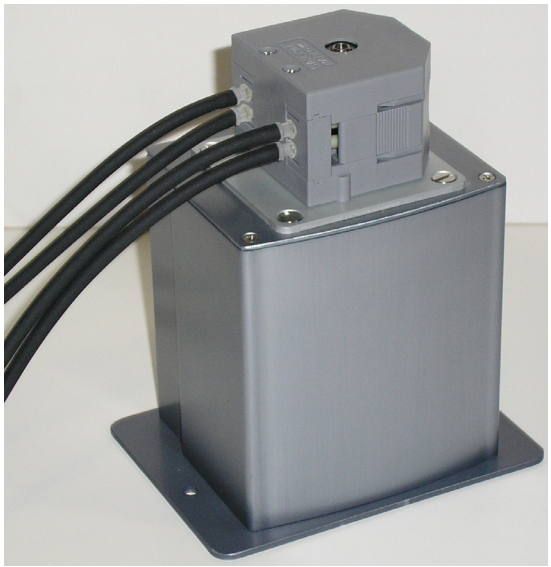


Figure 2-14: GX Rinse Pump

Z-Arm Setup

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

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

1 Isolator Probe Holder Installation

2 Guide Foot Installation

3 Fraction Collection Valve Installation

   a) Tube and Wire Routing Strip Installation

4 Z-Arm Installation

5 Adjusting the Z Travel Height

6 Probe Installation

7 Liquid Level Detection (LLD) Cable Installation

8 Final Z-Arm Height Adjustment

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 Using the 3 mm Allen wrench included in the accessory package, remove the screw from the bottom of the isolator mounting block.

2 Slide the isolator mounting block down as far as it will go to the bottom of the Z-arm.

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

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

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 and tighten using the 3 mm Allen wrench.

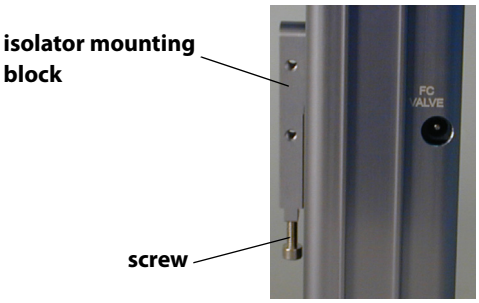


Figure 2-15: Right Side of Z-Arm

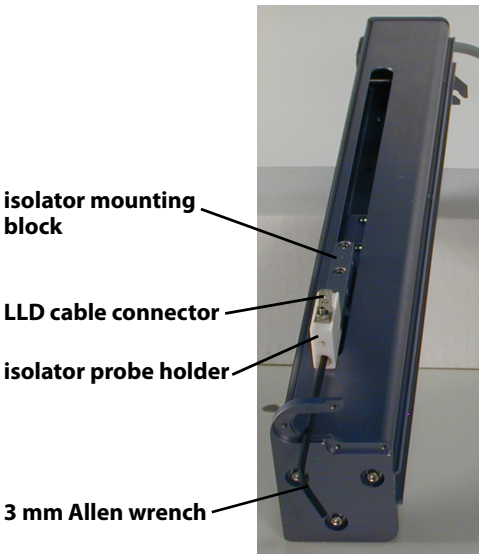


Figure 2-16: Isolator Probe Holder Installation

Guide Foot Installation

The guide foot assembly (ordered separately) includes the 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.)

There are different guide foot assemblies available depending on the outer diameter of the probe being used. Refer to the table for part numbers.

Part Number	*Description*
2604610	GUIDEFOOT, GX-271, 1.3MM
2604611	GUIDEFOOT, GX-271, 1.5MM
2604612	GUIDEFOOT, GX-271, 1.8MM
2604613	GUIDEFOOT, GX-271, 2.3MM
2604614	GUIDEFOOT, GX-271, 2.7MM

The guide foot is installed on the Z-foot of the Z-arm.

To install the guide foot:

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

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

Each insert is marked with a number of indentations for identification. Refer to the table.

Probe Guide Insert	*Number of Indentations*
1.3 mm	0
1.5 mm	1
1.8 mm	2
2.3 mm	3
2.7 mm	4

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.

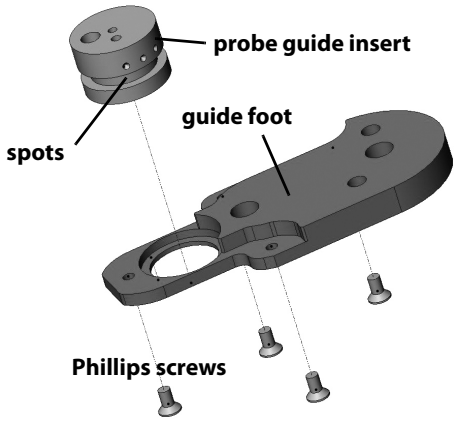


Figure 2-17: Guide Foot Assembly

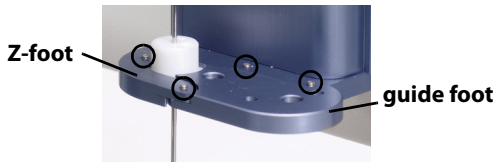


Figure 2-18: Guide Foot Installed

Fraction Collection Valve Installation

The fraction collection valve is installed on the guide foot.

To install the fraction collection valve:

1 Place the valve on top of the guide foot as shown in the photo. Align the two holes on the bottom of the valve with the holes on the guide foot. Attach the valve to the guide foot using the two Phillips screws.

2 Connect the black cable from the top of the valve to the FC VALVE port on the side of the Z-arm.

Figure 2-19: FC Valve Installed

Tube and Wire Routing Strip Installation

The tube and wire routing strip (part number 26036123) is included with the fraction collection valve.

To install the tube and wire routing strip:

1 Using the 3 mm Allen wrench included in the accessory package, loosen the stop pin so that it is flush with the right side of the Z-arm.

Note: The stop pin is installed on the left side of the Z-arm in the hole labeled S2.

2 Orient the tube and wire routing strip so that the side with two smaller notches is on the left.

3 Slide the tube and wire routing strip over the two raised rails on the right side of the Z-arm. The notch should line up with the hole in the Z-arm for the stop pin.

4 Fully tighten the stop pin. The tip of the stop pin should be visible on the right side of the Z-arm.

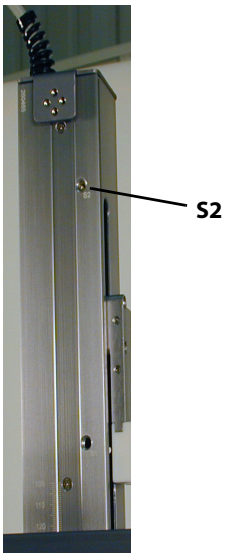


Figure 2-20: Left Side of Z-Arm

Note: Plumbing connections are described on page 2-36.

Figure 2-21: Tube and Wire Routing Strip Installed

Z-Arm Installation

Follow these steps to install the Z-arm:

1 Using the 3 mm Allen wrench included in the accessory package, loosen the mounting screw on the Z-arm mounting bracket located on the Y-arm. Turn counterclockwise to loosen.

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

3 Place the Z-arm into the mounting bracket. 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. This adjustment is described on page 2-40.

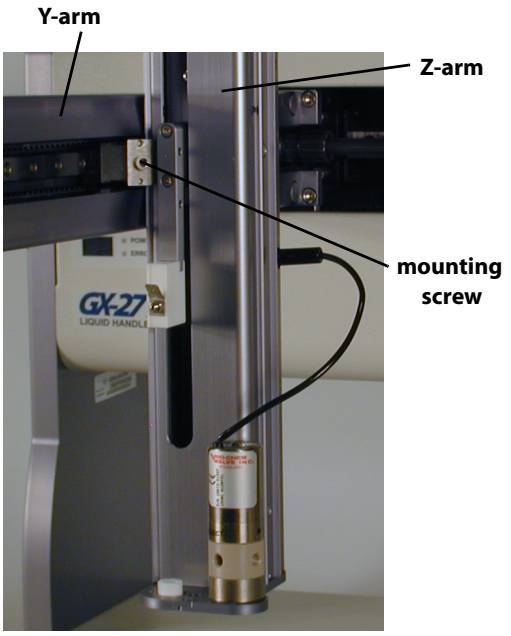


Figure 2-22: Z-Arm Installed

Adjusting the Z Travel Height

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

Follow these steps to adjust the Z travel height:

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

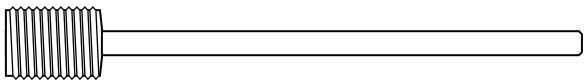


Figure 2-23: Stop Pin

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

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.

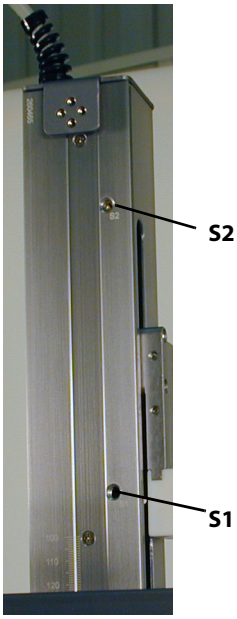


Figure 2-24: Left Side of Z-Arm

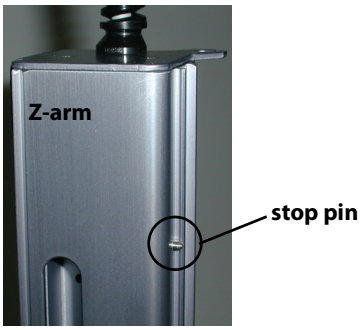


Figure 2-25: Stop Pin on Right Side of Z-Arm

Probe Installation

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

To install the probe on the Z-arm, insert the probe into the top of the isolator probe holder and pull it through until the tip of the probe is in the center hole of the probe guide insert.

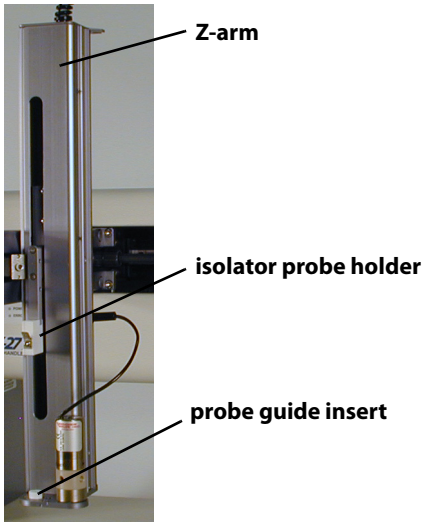


Figure 2-26: Probe Installation

Liquid Level Detection (LLD) Cable Installation

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

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

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

3 Place the strain relief in the bracket at the top of the Z-arm.

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

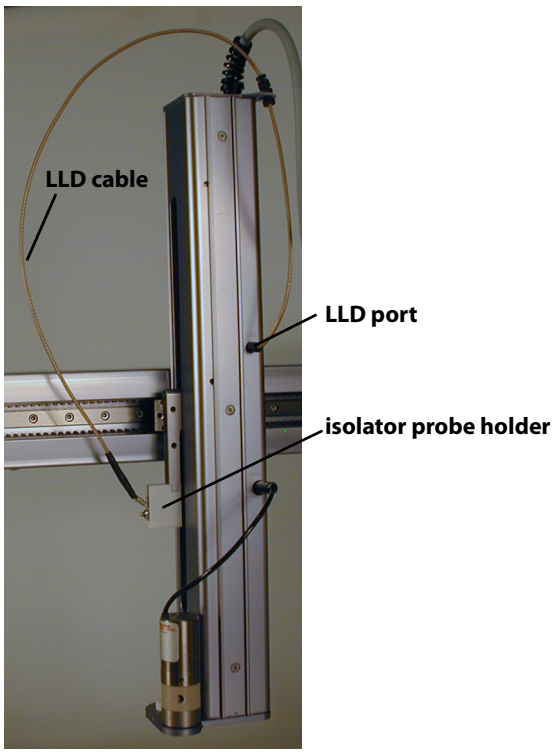


Figure 2-27: LLD Cable Installation

Note: Polypropylene racks, Teflon-coated probes, and microplates are not compatible with liquid level detection.

Syringe Installation—402 Syringe Pump

⚠CAUTION To prevent injury, when operating the syringe pump, keep hands clear of syringe to avoid risk of personal injury by pinching.

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

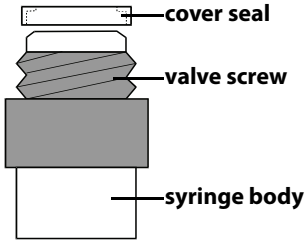


Figure 2-28: Cover Seal on Syringe

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

The piston operating rod will be shipped in the down position. If the rod is not in the down position, refer to the instructions for replacing a syringe on page 4-9. Those instructions include how to lower the rod.

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

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

2 Lubricate the piston with solvent to reduce piston seal friction during syringe installation.

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

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

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

6 Fully tighten the valve screws to secure the valve.

7 Fully tighten the syringe to the valve.

Remember or note the size of the syringe you are installing for later software configuration.

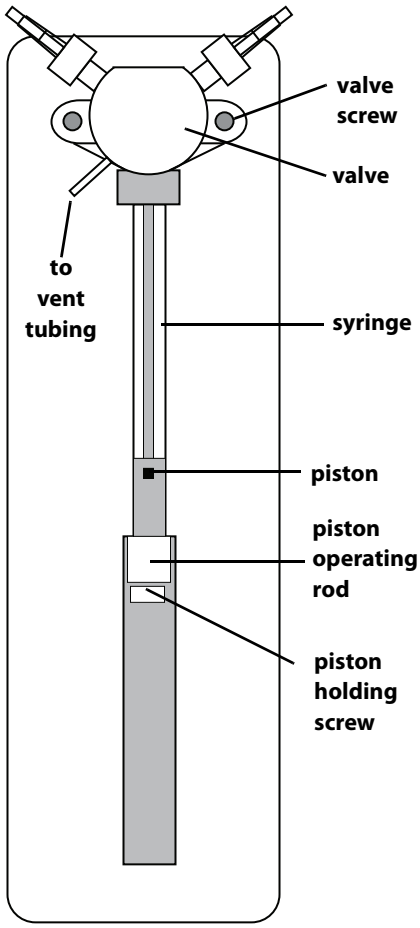


Figure 2-29: Syringe Installation

Rear Panel Connections

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

- For the GX-271 Liquid Handler, refer to page 2-15
- For the GX Solvent System (optional) refer to page 2-8
- For the 402 Syringe Pump (optional) refer to page 2-22
- For the GX Rinse Pump (optional) refer to page 2-24
- For the GX Direct Injection Module (optional) refer to page 2-25

GX-271 Liquid Handler Rear Panel

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

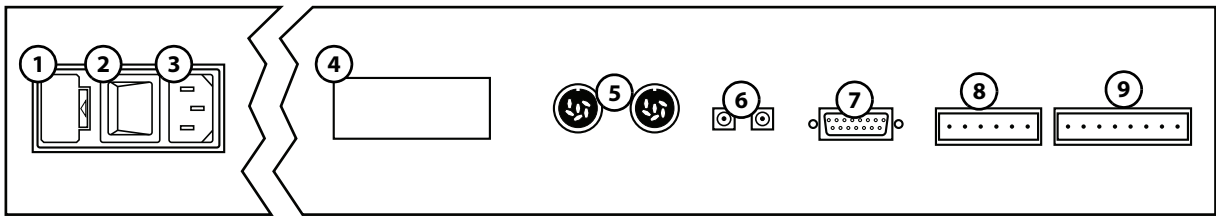


Figure 2-30: GX-27X Liquid Handler Rear Panel—Partial

1 Fuse drawer

2 Power switch

3 Power receptacle

4 Communication
   a) Ethernet
   b) RS-232
   c) GSIOC

5 GSIOC accessories

6 Solenoid valve (not used)

7 Z-arm

8 Input ports and safety

9 Output ports

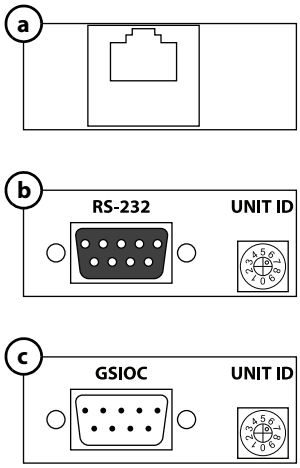


Figure 2-31:
Communication Options

Communication

The liquid handler is shipped with one of the following types of communication, Ethernet, RS-232, or GSIOC. Refer to the following sections for information specific to the liquid handler ordered.

- For Ethernet communication refer to page 2-16
- For RS-232 communication refer to page 2-17
- For GSIOC communication refer to page 2-18

Ethernet Communication

The liquid handler is shipped with one of the following types of communication, Ethernet, RS-232, or GSIOC. The following instructions apply to Ethernet communication. For information on RS-232 communication, refer to page 2-17. For information on GSIOC communication, refer to page 2-18.

To make an Ethernet connection to the instrument, a router and Ethernet cables are needed.

Note: The router is not available from Gilson, Inc.

1 Connect power to the router

Connect the power supply to the router and then connect the power supply to a power source.

2 Connect the instrument to the router

Before connecting, ensure that the instrument is powered OFF.

Locate the Ethernet cable that was included in the GX-27X accessory kit. Plug one end of the cable into the ETHERNET port on the liquid handler and the other end to an Ethernet port on the router.

3 Connect the computer to the router

Connect one end of another Ethernet cable to an Ethernet port on the router and the other end to an Ethernet port on the network adapter in the computer.

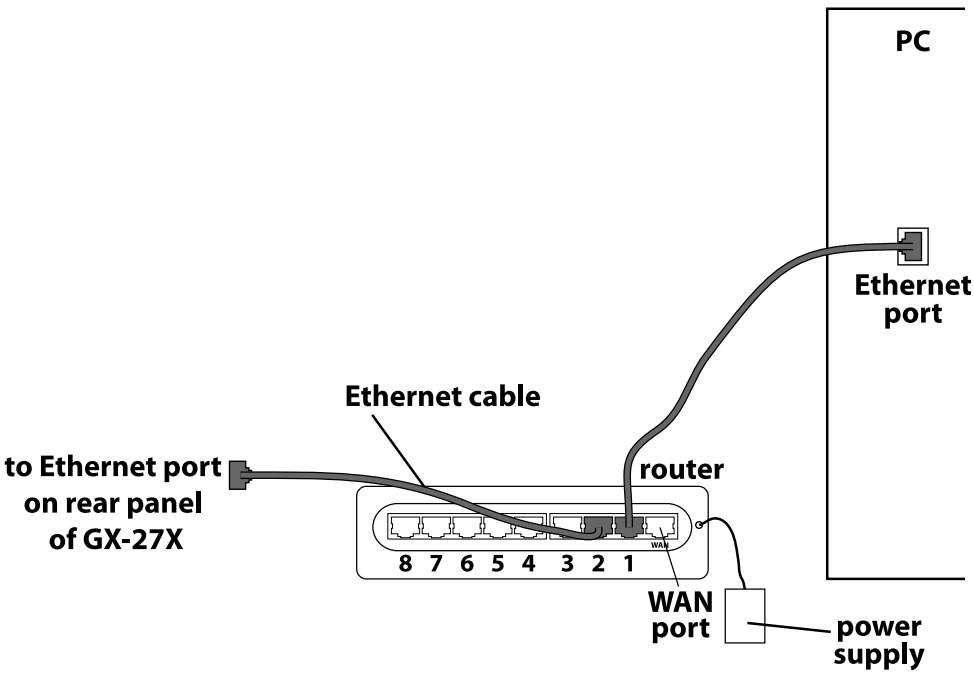


Figure 2-32: Ethernet Connections

RS-232 Communication

The liquid handler is shipped with one of the following types of communication, Ethernet, RS-232, or GSIOC. The following instructions apply to RS-232 communication. For information on Ethernet communication, refer to page 2-16. For information on GSIOC communication, refer to page 2-18.

The RS-232 port is used to transfer information between the liquid handler and a computer. To connect the liquid handler to the computer, you will need the RS-232 cable (part number 36083129, included in the accessory package).

To connect the RS-232 cable:

1 Attach the male end of the RS-232 cable to the RS-232 port located on the rear panel of the liquid handler. Tighten the retaining screws.

2 Attach the female end of the RS-232 cable to the computer's RS-232 serial communications port. Tighten the retaining screws.

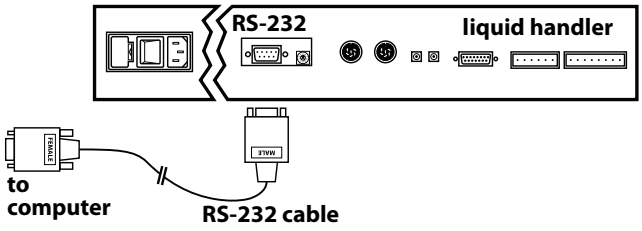


Figure 2-33: RS-232 Cable to Computer

Connecting GSIOC Modules

The GSIOC accessories ports are used to transfer information between the liquid handler and a GSIOC module. To connect the liquid handler to a GSIOC module, you will need a 6-pin to 9-pin GSIOC cable (ordered separately, part number 260354551).

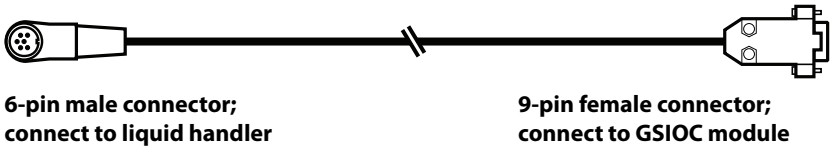


Figure 2-34: 6-Pin to 9-Pin GSIOC Cable

To connect the 6-pin to 9-pin GSIOC cable:

1 Attach the male connector of the 6-pin to 9-pin GSIOC cable to one of the GSIOC ACCESSORIES ports located on the rear panel of the liquid handler.

2 Attach the female connector of the 6-pin to 9-pin GSIOC cable to the GSIOC module. Tighten the retaining screws using a flat-blade screwdriver.

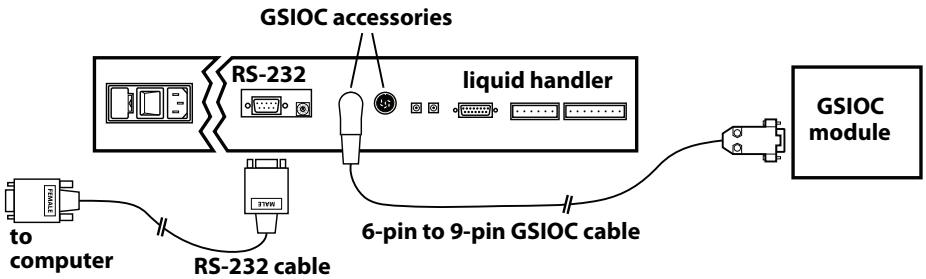


Figure 2-35: 6-Pin to 9-Pin GSIOC Cable Connection

Note: When you are using more than one GSIOC module, you will need both a 6-pin to 9-pin GSIOC cable and a standard GSIOC cable (ordered separately, part number 36078143).

To connect multiple GSIOC modules:

1 Attach the male connector of the 6-pin to 9-pin GSIOC cable to one of the GSIOC ACCESSORIES ports located on the rear panel of the liquid handler.

2 Attach the male connector of the standard GSIOC cable to the female connector of the 6-pin to 9-pin GSIOC cable. Tighten the retaining screws using a flat-blade screwdriver.

3 Attach one female connector to each GSIOC module. Tighten the retaining screws.

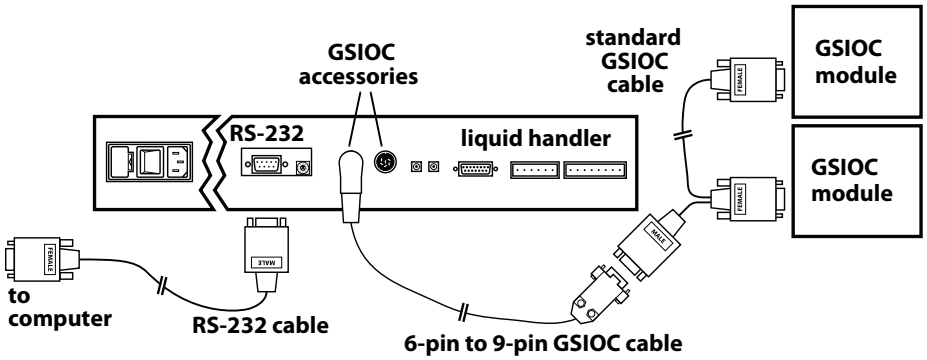


Figure 2-36: Connecting Multiple GSIOC Modules

Unit ID

The unit ID identifies the liquid handler to software packages that can issue GSIOC commands to the liquid handler.

The unit ID is set to 20. There is no need to change this number unless it has been assigned to another Gilson instrument that is also connected along the GSIOC.

To change the unit ID:

1 Gently insert a small flat-blade screwdriver into the unit ID selector on the rear panel and turn it. See rear panel on page 2-15.

2 Align the white dot with one of the indicated numbers. The unit ID is 20 plus the selected number.

GSIOC Communication

The liquid handler is shipped with one of the following types of communication, Ethernet, RS-232, or GSIOC. The following instructions apply to GSIOC communication. For information on Ethernet communication, refer to page 2-16. For information on RS-232 communication, refer to page 2-17.

A 508 Interface Module or a 506C System Interface Module is required for communication between the liquid handler and the computer. Use the GSIOC cable (part number 36078143, included in the accessory package) to connect the liquid handler to the interface module.

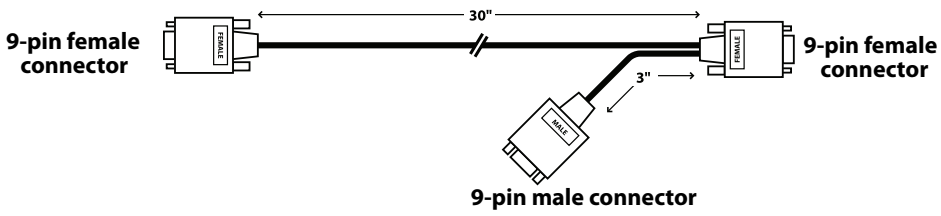


Figure 2-37: GSIOC Cable

To connect the liquid handler to the interface module:

1 Attach the female connector of the GSIOC cable (located individually at one end of the cable) to the GSIOC port on the interface module. Tighten the retaining screws.

2 Attach the female connector of the GSIOC cable (located on the same end as the male connector) to the GSIOC port located on the rear panel of the liquid handler. Tighten the retaining screws.

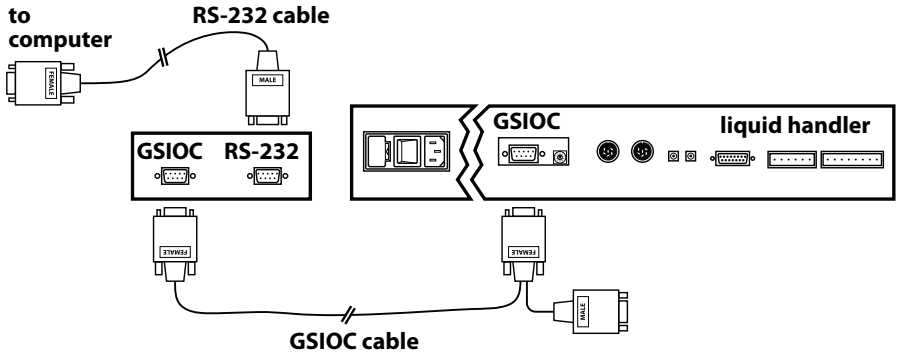


Figure 2-38: GSIOC Cable Connection

Note: The male connector of the GSIOC cable is used to connect modules to the liquid handler. See Connecting GSIOC Modules on page 2-20.

To connect the interface module to the computer:

1 Locate the RS-232 cable provided with the interface module. Attach the male end of the RS-232 cable to the RS-232 port located on the rear panel of the interface module. Tighten the retaining screws.

2 Attach the female end of the RS-232 cable to the computer's RS-232 serial communications port. Tighten the retaining screws.

Connecting GSIOC Modules

If you are connecting more than one GSIOC module, you will need an additional GSIOC cable (part number 36078143) for each additional module.

1 Attach the female connector of the GSIOC cable (located individually at one end of the cable) to the male connector of the GSIOC cable that is attached to the liquid handler. Tighten the retaining screws.

2 Attach the female connector (located on the same end as the male connector) to the GSIOC module. Tighten the retaining screws.

Note: The remaining male connector of the GSIOC cable (currently attached to the GSIOC module) is used to connect additional GSIOC modules.

3 Attach the female connector of the GSIOC cable (located on the same end as the male connector) to the male connector of the GSIOC cable currently attached to the GSIOC module. Tighten the retaining screws. Repeat step 3 for each additional module.

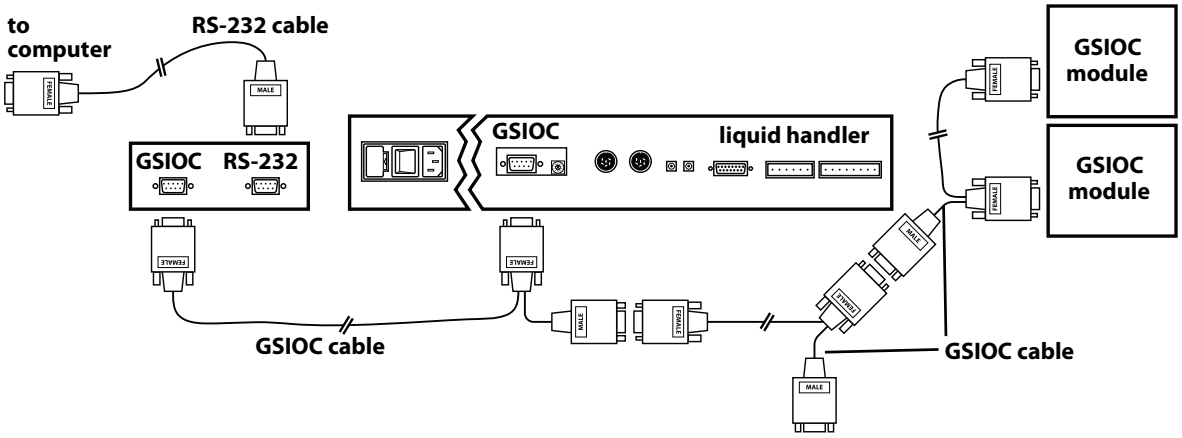


Figure 2-39: Connecting Multiple GSIOC Modules

Unit ID

The unit ID identifies the liquid handler to software packages that can issue GSIOC commands to the liquid handler.

The unit ID is set to 20. There is no need to change this number unless it has been assigned to another Gilson instrument that is also connected along the GSIOC.

To change the unit ID:

1 Gently insert a small flat-blade screwdriver into the unit ID selector on the rear panel and turn it. See rear panel on page 2-15.

2 Align the white dot with one of the indicated numbers. The unit ID is 20 plus the selected number.

Rear Panel Connections—GX Solvent System (Optional)

To make connections between the solvent system and the liquid handler refer to the diagram and instructions below.

1 Ensure that the power is turned off to the liquid handler.

Note: Any time the solvent system will be disconnected from the liquid handler ensure that the power is turned off to the liquid handler.

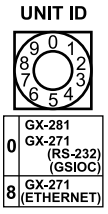
2 Connect the right-angled end of the power cable (part number 26035455) to the FROM GSIOC ACCY port on the solvent system.

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

Unit ID

At the factory, the unit ID on the solvent system is set to 0.

Refer to the table below for the correct setting, which is dependent on the type of communication to be used.

Unit ID	*Communication*	
8	Ethernet	
0	RS-232	
0	GSIOC	

To change the unit ID:

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

2 Align the arrow with one of the indicated numbers.

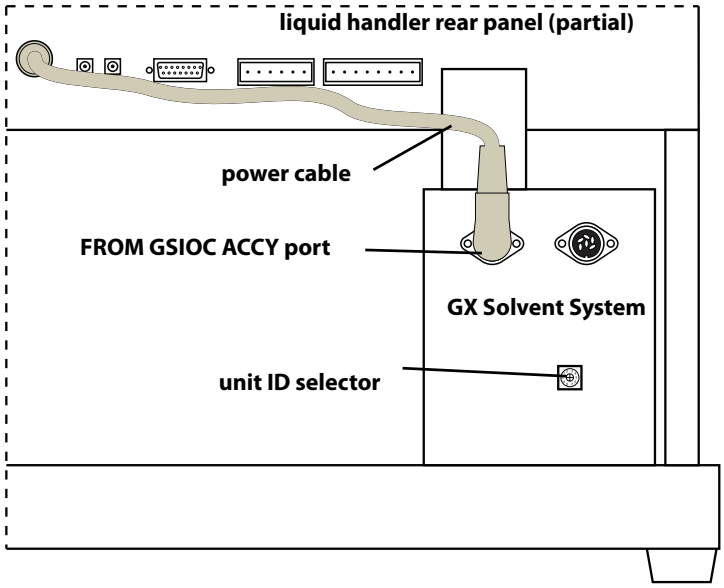


Figure 2-40: GX Solvent System Connected to the Liquid Handler

Rear Panel Connections—402 Syringe Pump (Optional)

Rear Panel

To make connections between the 402 Syringe Pump and the liquid handler refer to the diagram and instructions below.

1 GSIOC

2 ID number

3 Power switch

4 Fuse drawer

5 Power receptacle

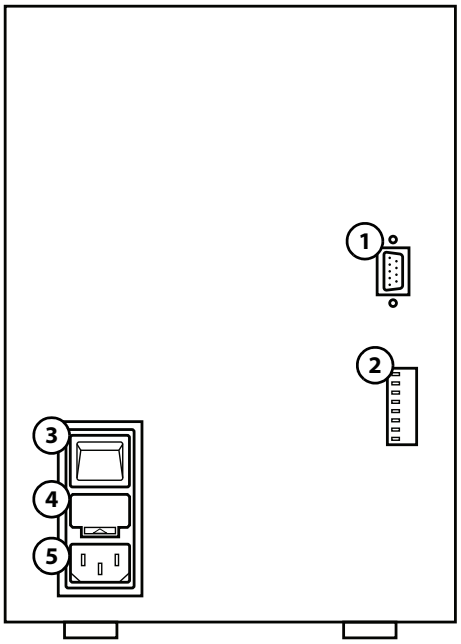


Figure 2-41: 402 Syringe Pump Rear Panel

Communication

Use the GSIOC port on the rear panel of the 402 Syringe Pump to connect to your liquid handler. The cable used to connect the syringe pump to the liquid handler will depend on whether the liquid handler has an RS-232 Communication port or GSIOC Communication port.

RS-232 Communication

Refer to the following diagram and instructions to make the connections from the liquid handler (with RS-232 communication port) to the 402 Syringe Pump.

To connect the liquid handler to the 402 Syringe Pump you will need a 6-pin to 9-pin GSIOC cable (ordered separately, part number 260354551).

To connect the 402 Syringe Pump to the liquid handler

1 Attach the male connector of the 6-pin to 9-pin GSIOC cable to one of the GSIOC ACCESSORIES ports on the rear panel of the liquid handler.

2 Attach the female connector of the 6-pin to 9-pin GSIOC cable to the GSIOC port on the rear panel of the 402 Syringe Pump. Tighten the retaining screws.

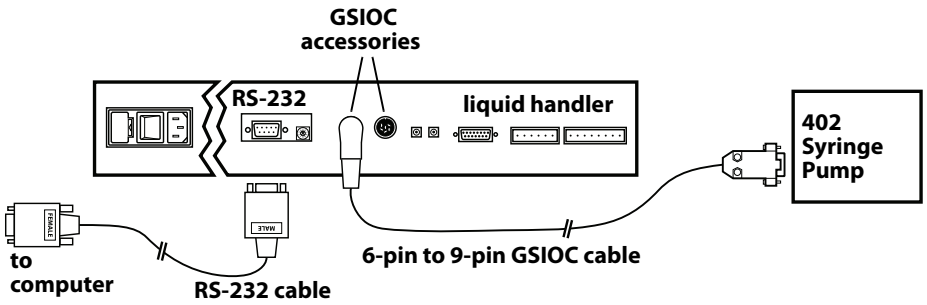


Figure 2-42: 402 Syringe Pump connected to Liquid Handler (RS-232 Communication)

GSIOC Communication

Refer to the following diagram and instructions to make the connections from the liquid handler (with GSIOC communication port) to the 402 Syringe Pump.

To connect the liquid handler to the syringe pump you will need an additional GSIOC cable (ordered separately, part number36078143).

To connect the 402 Syringe Pump to the liquid handler

1 Attach the female connector (located individually at one end of the cable) to the male connector of the GSIOC cable that is attached to the liquid handler. Tighten the retaining screws.

2 Attach the female connector (located on the same end as the male connector) to the GSIOC port on the syringe pump. Tighten the retaining screws.

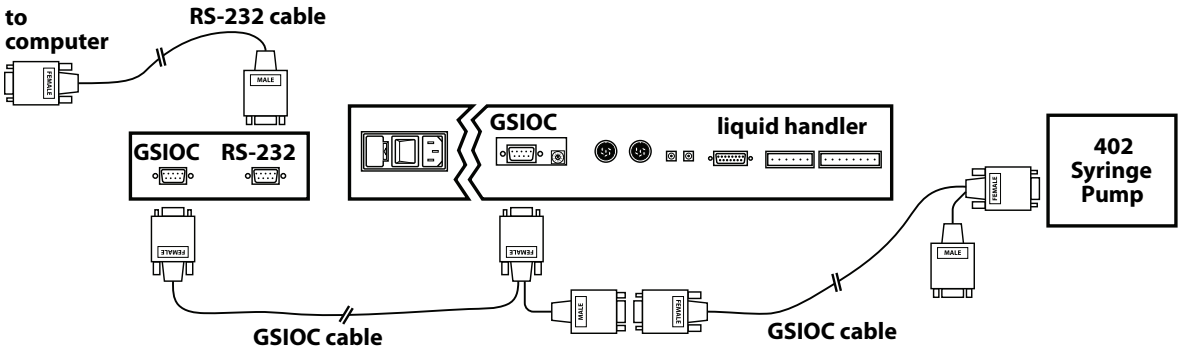


Figure 2-43: 402 Syringe Pump connected to Liquid Handler (GSIOC Communication)

ID Number

The eight microswitches on the rear panel of the syringe pump are used to set the instrument identification (ID Number), baud rate, and clock source. The microswitches are numbered from one to eight starting from the bottom.

GSIOC Identification Number

The factory sets the identification number to 0. Refer to the 402 Syringe Pump User's Guide for more information on setting the microswitches.

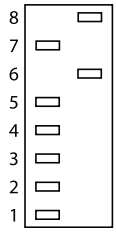


Figure 2-44: GSIOC Identification Number

Power Cord Connection

1 Set the power switch to OFF.

2 Connect the power cord to the power receptacle on the rear panel of the syringe pump, and then connect to power source.

Rear Panel Connections—GX Rinse Pump (Optional)

To make connections between the GX Rinse Pump and the liquid handler refer to the diagram and instructions below.

1 Ensure that the power is turned off to the liquid handler.

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

Another assembly, GX Rinse Pump 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 liquid handler.

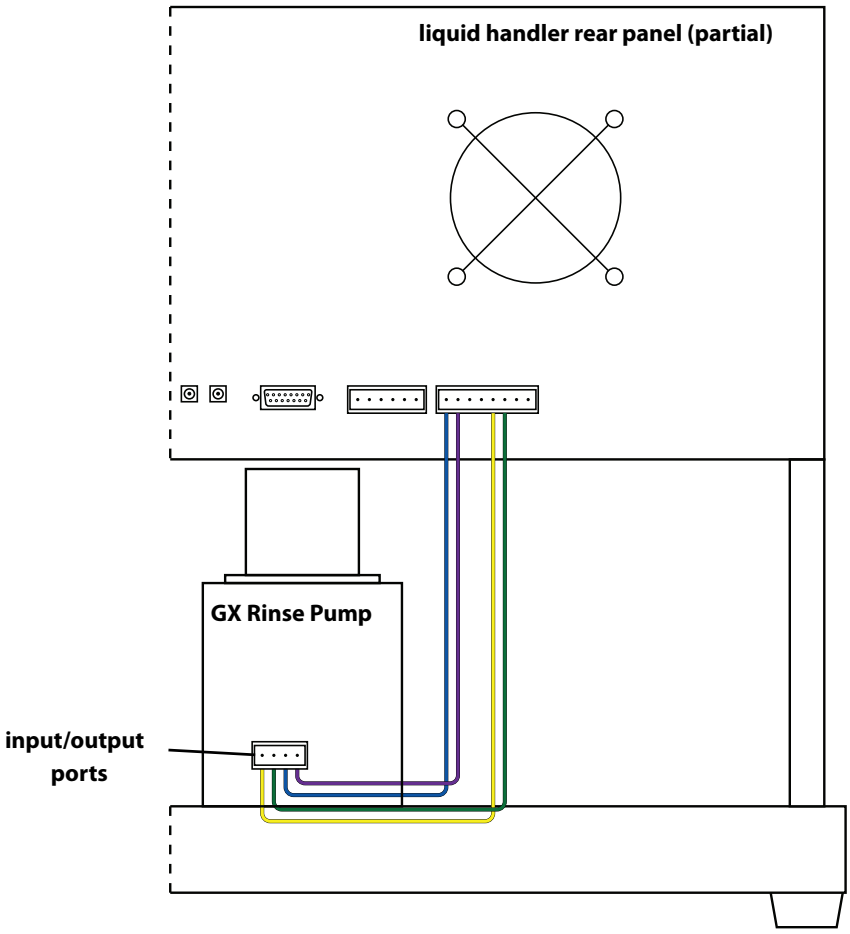


Figure 2-45: GX Rinse Pump Connected to the Liquid Handler

Rear Panel Connections—GX Direct Injection Module (Optional)

To make connections between the GX Direct Injection Module and the liquid handler refer to the diagram and instructions below.

1 Ensure that the power is turned off to the liquid handler.

Note: Any time the injection module will be disconnected from the liquid handler ensure that the power is turned off to the liquid handler.

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 liquid handler.

Unit ID

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

Refer to the table below for the correct setting, which is dependent on the type of communication to be used.

Unit ID	*Communication*	
9	Ethernet	UNIT ID 
3	RS-232	
3	GSIOC	

INSTRUMENT	UNIT ID
GX-281	3 (LEFT)
	4 (RIGHT)
GX-271 (RS-232)	3
GX-271 (GSIOC)	3
GX-271 (ETHERNET)	9

To change the unit ID:

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

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

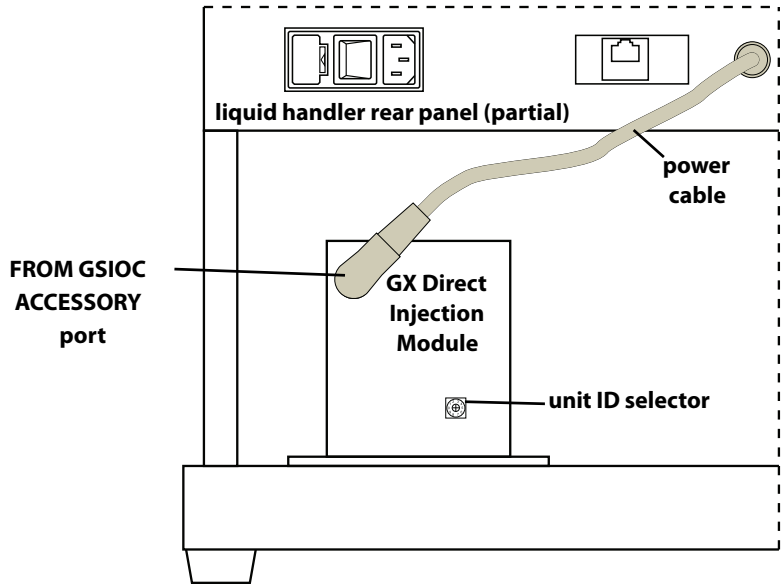


Figure 2-46: GX Direct Injection Module Connected to the Liquid Handler

Input/Output Ports

You can use the input and output contacts found on the rear panel of the liquid handler to control peripheral devices. Refer to the diagram on page 2-15 for the location of the input/output ports.

Contact Inputs

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

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

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

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

Contact Outputs and DC Power Outputs

The output terminal block has eight contacts.

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

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

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

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

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 liquid handler. Insert each wire into the appropriate terminal on the terminal block connector.

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

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

4 Reconnect the terminal block connector to the liquid handler. Push the connector in as far as it will go. It is designed to fit snugly into its receptacle.

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

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

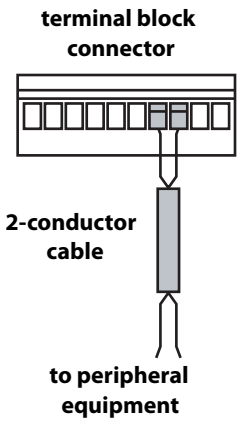


Figure 2-47: Input/Output Connections

Z-Arm Connection

Connect the cable from the Z-arm to the Z-ARM port on the rear panel of the liquid handler. Refer to the diagram on page 2-15 for the location of this port.

Fuse Installation

1 Locate the fuse drawer and two of the supplied fuses.

2 Install the fuses in the fuse drawer.

3 Insert the fuse drawer into its receptacle in the liquid handler. See rear panel diagram on page 2-15.

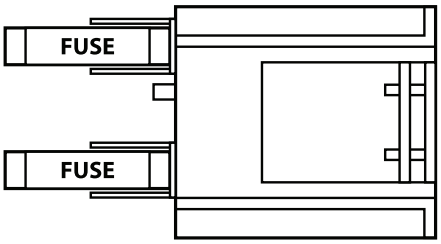


Figure 2-48: Fuse Installation

Power Cord Connection

Locate the appropriate power cord for your line voltage.

Use the power cord to connect the liquid handler to a power source.

Connection Diagram

Refer to the diagram below when making the rear panel connections.

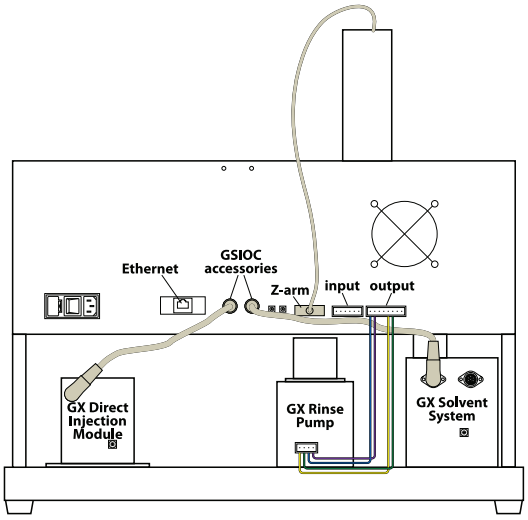


Figure 2-49: Rear Panel Connections—GX-271 Liquid Handler with Ethernet Communication

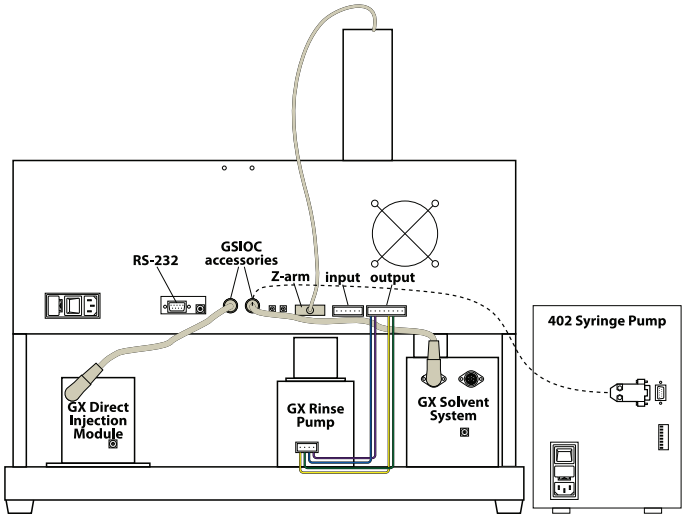


Figure 2-50: Rear Panel Connections—GX-271 Liquid Handler with RS-232 Communication

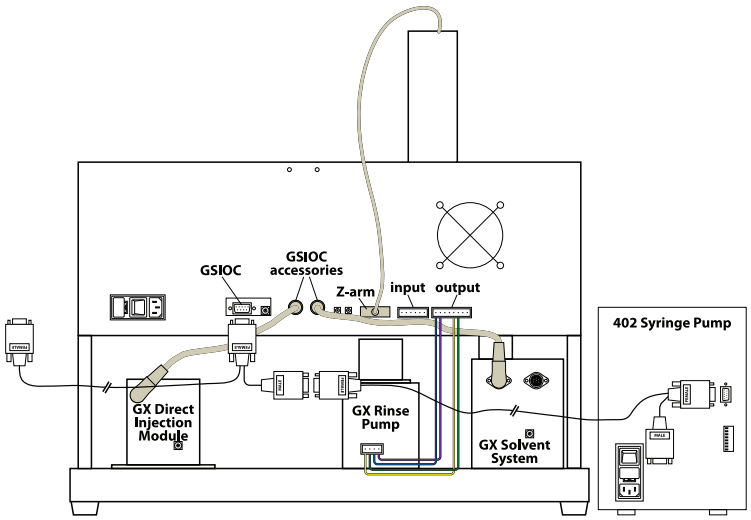


Figure 2-51: Rear Panel Connections—GX-271 Liquid Handler with GSIOC Communication

Rack Installation

The GX-271 Liquid Handler is equipped to locate up to five Code 20-series, five Code 33X/34X-series, three Code 200-series, or three Code 300-series racks.

The tray insert that was installed on page 2-7 determines which racks can be used.

- If a Code 20-series insert is installed on the locator plate, refer to Code 20-Series or Code 33X/34X-Series Rack Installation.

  In addition to the standard racks, a Code 12X rack or a solvent bottle rack can be installed at the back of the Code 20-Series tray insert.
- If a Code 200-series insert is installed on the locator plate, refer to Code 200-Series or Code 300-Series Rack Installation.

Code 20-Series 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.

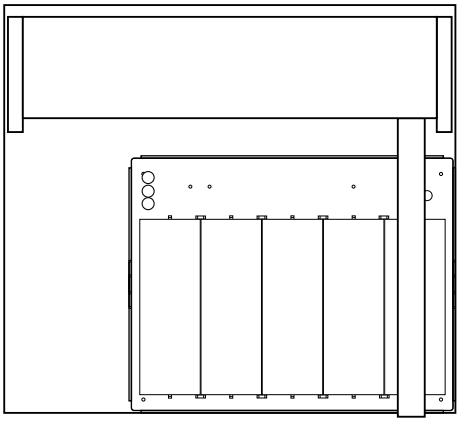


Figure 2-52: Code 20-Series Insert on Locator Plate with Racks Installed

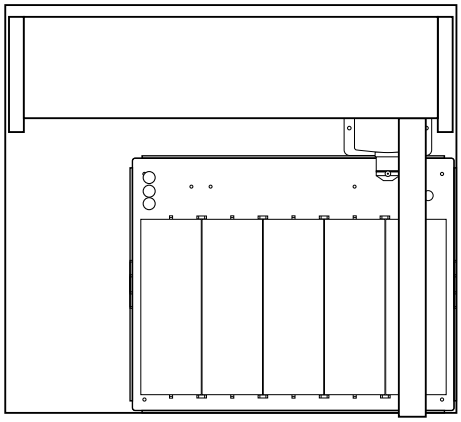


Figure 2-53: Code 20-series Insert on Locator Plate with Racks and Direct Injection Module Installed

Code 12X Rack Installation

To install a Code 12X rack on 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.

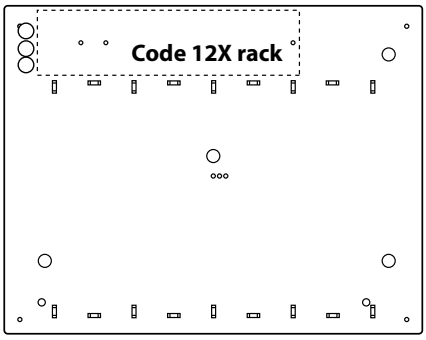


Figure 2-54: Code 12X Rack on Code 20-Series Insert

Solvent Bottle Rack Installation

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

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

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

2 Place the solvent bottles in the rack.

Code 200-Series or Code 300-Series Rack Installation

To install a Code 200-series or Code 300-series rack:

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

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

Note: If a GX Direct Injection Module is installed on the locator plate of the liquid handler, only two Code 200-series or Code 300-series racks can be installed. The rack position in front of the GX Direct Injection Module must remain empty.

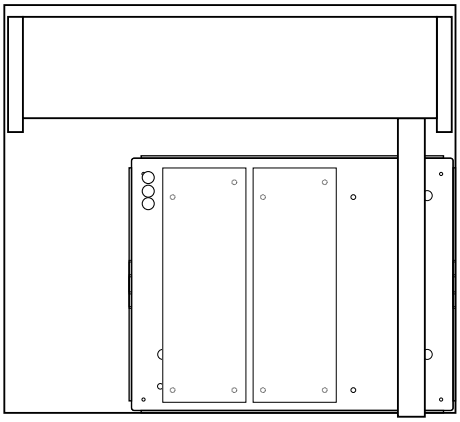


Figure 2-55: Code 200-Series Insert on Locator Plate with Racks Installed

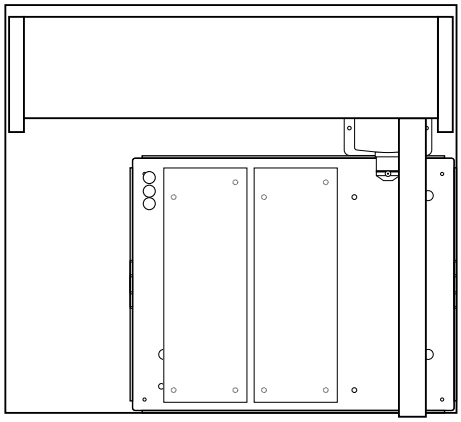


Figure 2-56: Code 200-series Insert on Locator Plate with Racks and Direct Injection Module Installed

Plumbing Connections

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

- For the GX Solvent System refer to page 2-32
- For the 402 Syringe Pump refer to page 2-33
- For the GX Rinse Pump refer to page 2-34
- For the GX Direct Injection Module refer to page 2-35
- For the fraction collection valve refer to page 2-36

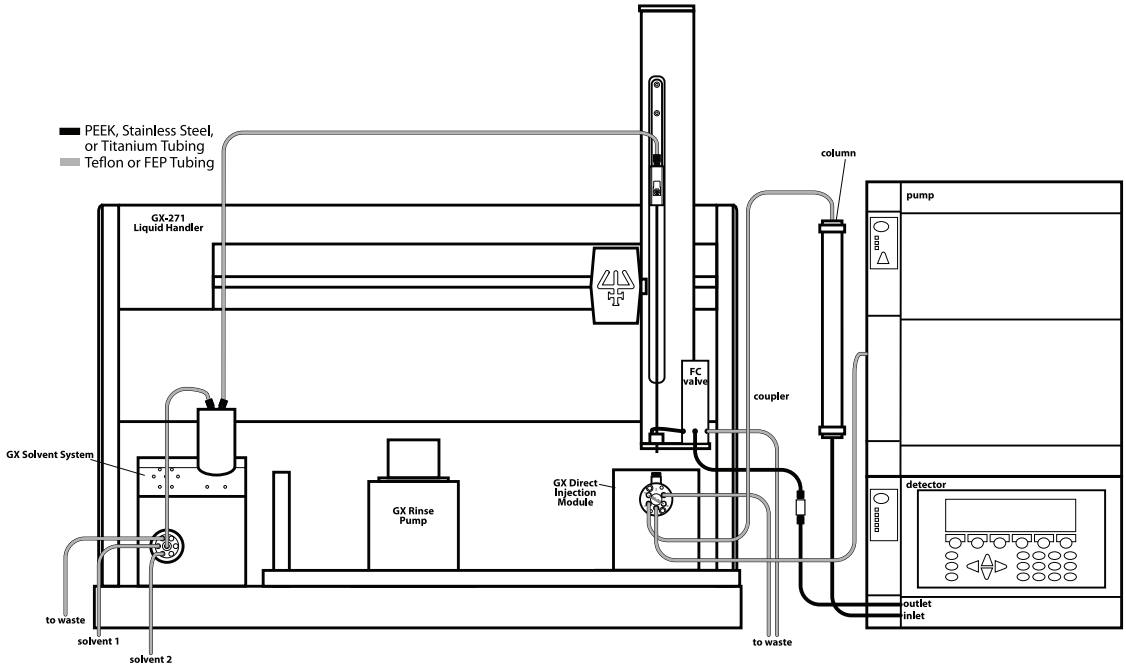


Figure 2-57: GX-271 Liquid Handler Plumbing Connections with GX Solvent System

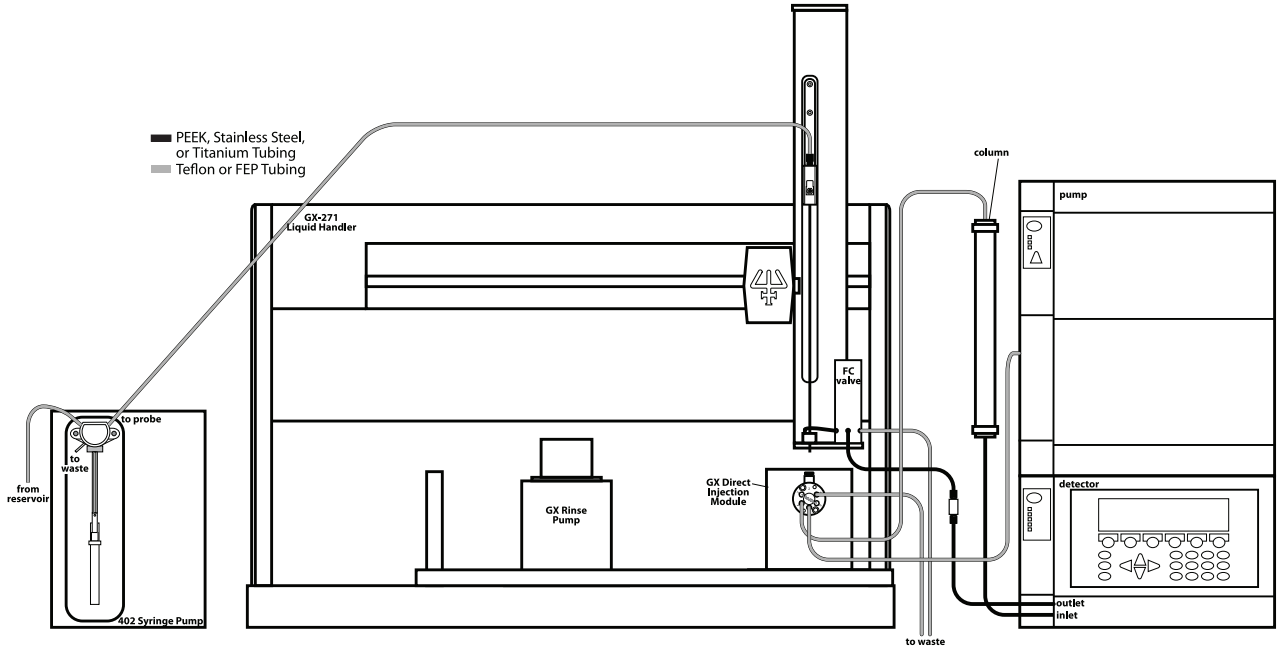


Figure 2-58: GX-271 Liquid Handler Plumbing Connections with 402 Syringe Pump

GX Solvent System Plumbing (Optional)

This section will take you through the steps for plumbing the GX Solvent System.

Before making the plumbing connections, locate the items listed below.

Part number	*Description*
Included with the GX Solvent System:	
499484021	Solvent inlet tubing, prep
49948122	Solvent valve to pump tubing, prep
490032	Waste tubing, 0.063 ID x 0.125 OD, PTFE (15 ft)
490410332	P-331 nut, 1/8", 1/4-28 PEEK
49041027	P-359 ferrule, 1/8"
and one of the following, ordered separately:	
499424013	Transfer tubing 1.1 mL
499471112	Transfer tubing 5.5 mL
499474103	Transfer tubing 10.5 mL
499483602	Transfer tubing 30 mL
499486002	Transfer tubing 50 mL

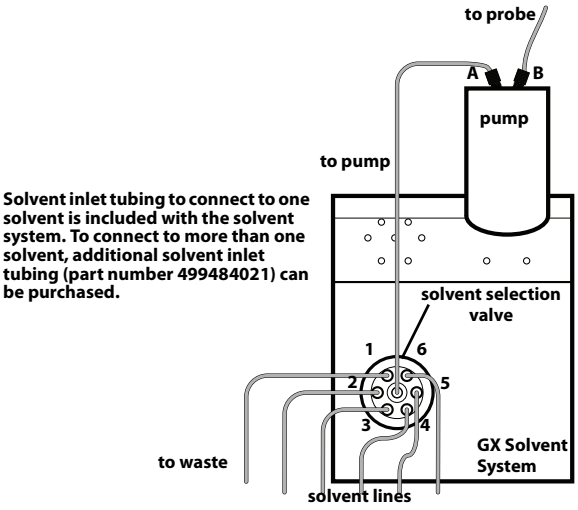


Figure 2-59: GX Solvent System Plumbing Connections

The table and diagram provide detailed information about making the plumbing connections for the solvent system.

GX Solvent System	Tubing	Connections
Port 1 to waste	15 feet of Teflon tubing (0.063" ID x 0.125" OD)	Upchurch P-331 PEEK nut and P-359 ferrule.
Ports 2–6 to reservoir	**Solvent inlet tubing (part number 499484021)**	
	40 inches of Teflon tubing (0.085" ID x 1/8" OD)	Connect the end of the tubing with the fitting attached to ports 2–6 on the selection valve.
Center port to port A	**Solvent valve to pump tubing (part number 49948122)**	
	14 inches of Teflon tubing (0.085" ID x 1/8" OD)	Connect one end to the center port on the valve and the other end to port A on the pump.
Port B to probe	**1.1 mL transfer tubing (part number 499424013)**	
	87 inches of Teflon tubing (0.030" ID x 1/16" OD)	Connect one end to the probe and the other end to port B on the pump.
	5.5 mL transfer tubing (part number 499471112)	
	102 inches of Teflon tubing (0.062" ID x 1/8" OD)	Connect the end with the headless nut to the probe and the other end to port B on the pump.
	10.5 mL transfer tubing (part number 499474103)	
	204 inches of Teflon tubing (0.062" ID x 1/8" OD)	Connect one end to the probe and the other end to port B on the pump.
	30 mL transfer tubing (part number 499483602)	
	360 inches of Teflon tubing (0.085" ID x 1/8" OD)	Connect one end to the probe and the other end to port B on the pump.
	50 mL transfer tubing (part number 499486002)	
	600 inches of Teflon tubing (0.085" ID x 1/8" OD)	Connect one end to the probe and the other end to port B on the pump.

402 Syringe Pump Plumbing (Optional)

This section takes you through the steps for plumbing the 402 Syringe Pump.

Inlet and Vent Tubing Installation

1 Install the 1/4–28 fitting of the 2 mm ID tubing (part number 3645357) to the inlet side of the 402 Syringe Pump. Refer to the diagram.

2 Place the filtered end of the assembly into the bottle containing your diluent or probe rinse solution.

3 Slip the vent tubing onto its port on the valve.

Transfer Tubing Installation

The transfer tubing is ordered separately.

To install the transfer tubing:

1 Connect one end of the transfer tubing to the transfer tubing side of the syringe pump and then finger tighten.

2 Connect the other end to the top of the isolator probe holder. Firmly tighten this fitting since it holds the probe in place.

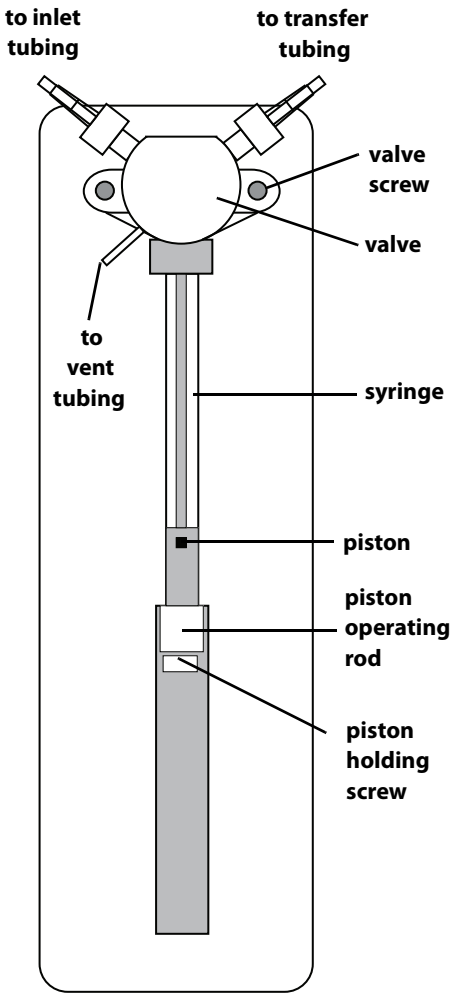


Figure 2-60: 402 Syringe Pump Plumbing Connections

GX Rinse Pump Plumbing (Optional)

Locate the following tubing included with the rinse pump:

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

To install the tubing:

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

2 Remove the two pieces from the side of the pump head. Store the pieces for future use.

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 to the rinse station.

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

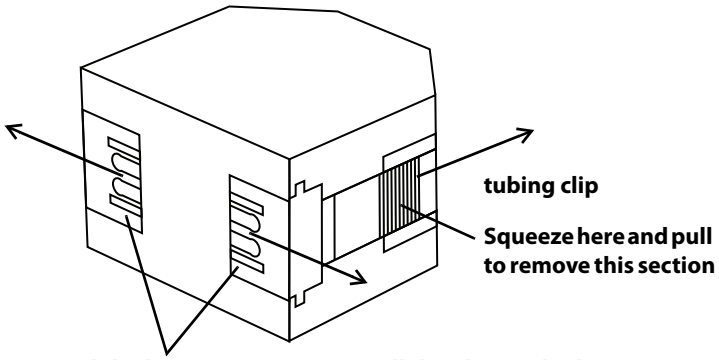


Figure 2-61: GX Rinse Pump Tubing Installation Preparation

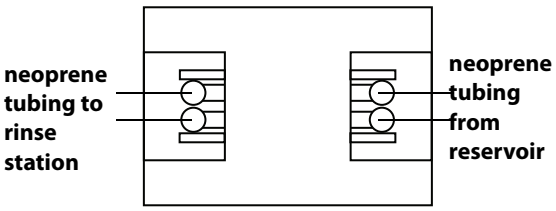


Figure 2-62: GX Rinse Pump Tubing Installation

GX Direct Injection Module Plumbing (Optional)

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*
4903180411	MZN1PK nut (5)
4903180511	ZF1PK ferrule (5)
495033	Teflon tubing, 0.020" ID x 1/16" OD, 10 ft/pk

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

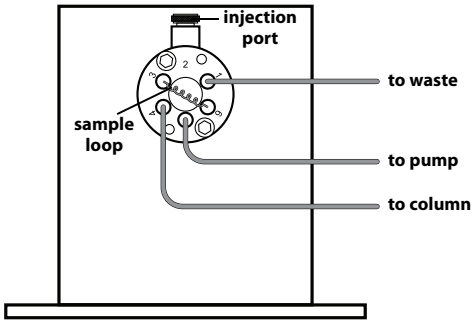


Figure 2-63: GX Direct Injection Module for 1/16" OD Sample Loop Plumbing Connections

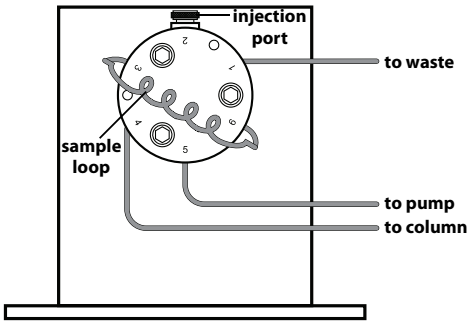


Figure 2-64: GX Direct Injection Module for 1/8" OD Sample Loop Plumbing Connections

GX Direct Injection Module	Tubing	Connections
Port 1 to waste	Teflon tubing, 0.020" ID x 1/16" OD (part number 495033)	Use an MZN1PK 1/16" nut (part number 4903180411) and a ZF1PK 1/16" ferrule (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 1.3 mm OD probe (part number 26035410) Injection port for 1.3 mm OD probe, SS (part number 26035412) Injection port for 1.5 mm OD probe (part number 26035411) Injection port for 1.5 mm OD probe, SS (part number 26035413)
Port 3 to port 6	sample loop (ordered separately)	
Port 4 to column		Use an MZN1PK 1/16" nut (part number 4903180411) and a ZF1PK 1/16" ferrule (part number 4903180511) to connect the tubing to port 4 on the valve.
Port 5 to pump		Use an MZN1PK 1/16" nut (part number 4903180411) and a ZF1PK 1/16" ferrule (part number 4903180511) to connect the tubing to port 5 on the valve.

Fraction Collection Valve Plumbing (Optional)

This section will take you through the steps for plumbing the fraction collection valve.

Before making the plumbing connections, locate the plumbing package for the Low Mount FC Valve (part number 26037270) which contains the following:

Part number	*Description*
49953029	Tubing, 0.030" x 20 ft, PEEK
25077422	Collection tube, 1/8" TFE (refer to Assembling the Collection Probes on page 2-36 for assembly instructions).
25077423	Collection tube, 1/16" TFE (refer to Assembling the Collection Probes on page 2-36 for assembly instructions).
49041012	Nut, 1/16", black, (P-201) (5)
49041011	Ferrule, 1/16", red, (P-200R) (5)
F1410050	Couplings, 200–16, 5/ea
49041015	Ferrule, flangeless, 1/8", TEFZEL (P-300)
49041016	Nut, 1/4–28 x 1/8" Delrin (P-304)
490032	Tubing, 1.5 mm ID x 3.0 mm OD, TFE clear, (15 ft)
26036123	Tube & wire routing strip, Z drive

Assembling the Collection Probes

Refer to the following procedures to assemble the collection probes. The probe packages come with all of the necessary materials.

- For the 1/8" OD Teflon probe (part number 25077422):
  1. Cut a piece of the supplied 1/8" OD tubing to approximately 75 mm.
  2. Insert the supplied nut and ferrule onto the tubing.
- For the 1/16" OD Teflon probe (part number 25077423):
  1. Cut a piece of the supplied 1/16" OD tubing to approximately 70 mm.
  2. Insert the supplied nut and ferrule onto the tubing.

Installing the Collection Probes

1. Insert the end of the collection probe with the fitting attached into the COLLECT port of the valve.
2. For the 1/8" tubing, press the tubing against the back of the port and finger tighten the screw.

   Note: For the 1/16" tubing make sure that the tubing does not extend past the ferrule.
3. While holding the valve and collection probe, insert the collection probe into the guide hole until 3 mm of tubing is exposed below the guide foot.

   The 1/8" tubing uses the larger guide hole and the 1/16" tubing uses the smaller guide hole.

The following table and diagram provide detailed information on making plumbing connections for the fraction collection valve.

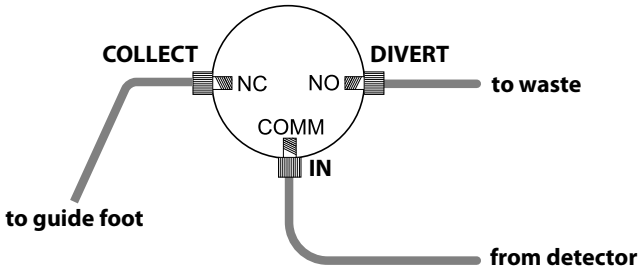


Figure 2-65: Fraction Collection Valve Connections (Top View)

Figure 2-66: Tubing Routed Through the Tube and Wire Routing Strip and Connected to Valve

3-way valve	Tubing	Connections
INLET COMM port (common port) to coupler	PEEK tubing 0.030" x 1/16" x 5 feet (part number 49953059)	On both ends of the tubing, use an Upchurch P-201 nut (1/16", 1/4–28) and P-200 ferrule (1/16"). Route one end of the tubing down through the tube and wire routing strip and connect it to the IN port of the valve. Connect the other end to a coupler (part number F1410050).
DIVERT position NO (normally open) port to waste	Teflon tubing 1.5 mm ID x 3.0 mm OD x 15 feet (part number 490032)	Use an Upchurch P-304 nut (1/8", 1/4–28) and P-300 ferrule (1/8") on one end of the tubing. Route that end of the tubing down through the tube and wire routing strip and then connect it to the DIVERT port of the valve.
COLLECT position NC (normally closed) port to probe	1/16" TFE probe (part number 25077423) or 1/8" TFE probe (part number25077422)	Information on making these connections can be found in Installing the Collection Probes on page 2-36.

Z-Arm Cable Support Rod and Spiral Wrap Installation

Z-Arm Cable Support Rod

To install the Z-arm cable support rod:

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

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

3 Use the extra tubing retaining clips (included in the accessory package) to contain the tubing.

Spiral Wrap

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

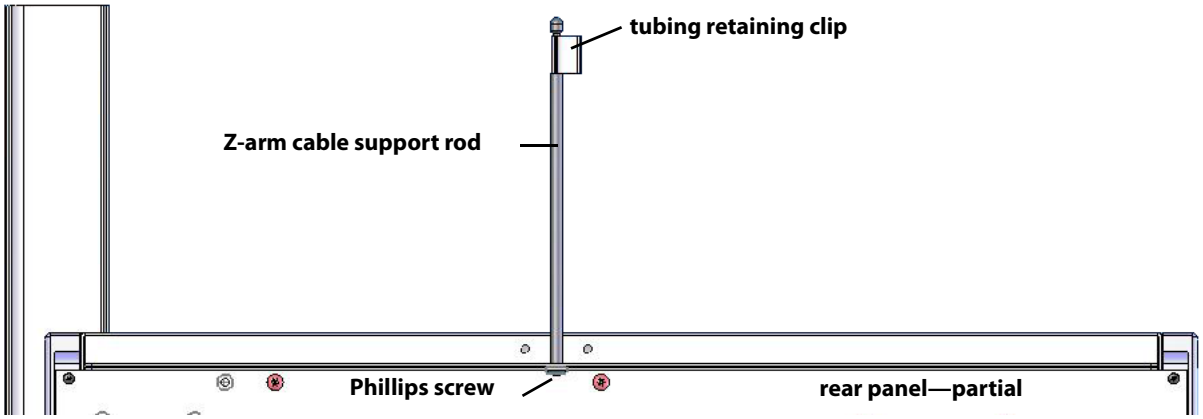


Figure 2-67: Z-Arm Cable Support Rod

Shield Installation (Optional)

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

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

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

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

4 Remove the top screw on the right support of the liquid handler 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 liquid handler. 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 liquid handler.

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

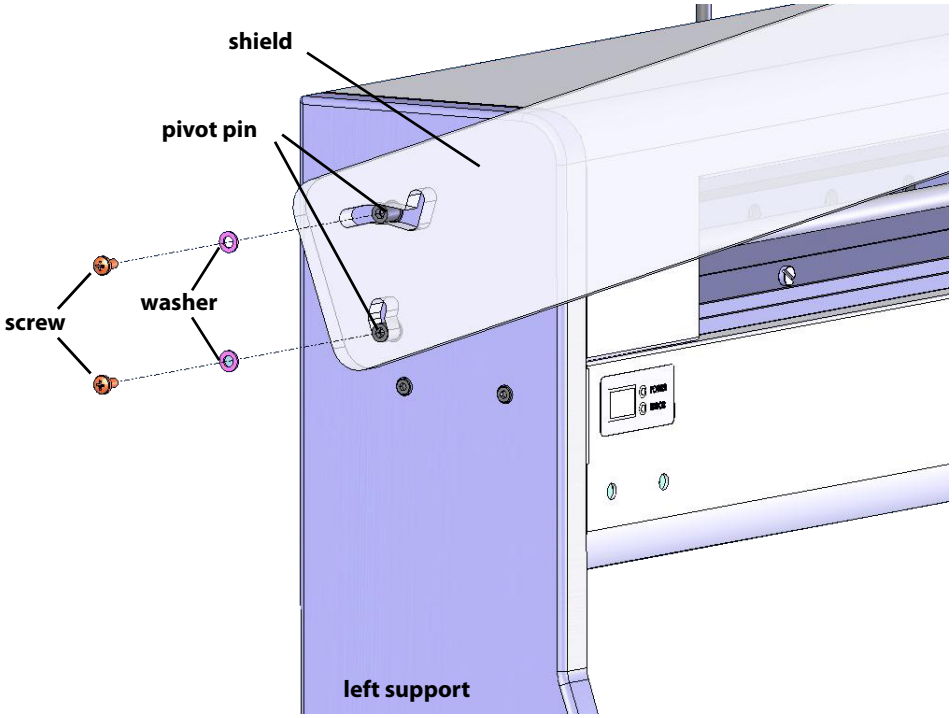


Figure 2-68: GX-27X Shield Installation

Final Z-Arm Height Adjustment

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

1 Locate one of the Z-height adjustment tools that was shipped with the liquid handler. Refer to the table below for replacement part numbers.

Part number	*Description*
25051094	125 mm Z-height adjustment tool
25051095	175 mm Z-height adjustment tool

2 Using the 3 mm Allen wrench included in the accessory package, loosen the mounting screw on the Z-arm mounting bracket and slightly raise the Z-arm.

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

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

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

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

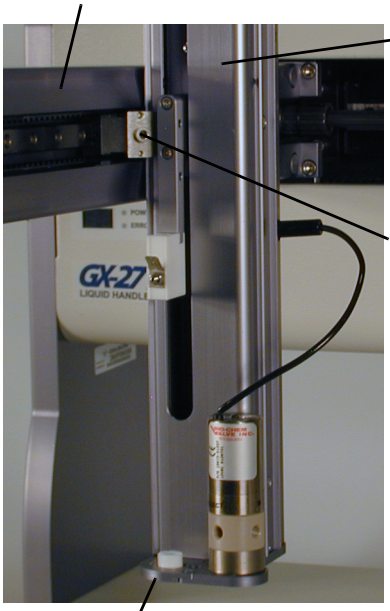


Figure 2-69: Final Z-Arm Height Adjustment

Operation 3

This section provides information on the following topics:

- A description of the Front Panel of the liquid handler
- How to Start Up the liquid handler
- GX-27X Series Offset Utility for the liquid handler
- Aspirate and Dispense Sequences for the GX Solvent System

Front Panel

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

Figure 3-1: Front Panel (Partial)

POWER Indicator Light

The green indicator becomes lit when you turn on power to the liquid handler using the power switch located on the rear panel. Refer to the rear panel diagram on page 2-15 if necessary.

ERROR Indicator Light

The yellow indicator becomes lit when an error has been encountered. Refer to Error Messages on page 5-2 for a list of error messages.

Start Up

Follow the instructions in Chapter 2, Installation, to make all rear panel and plumbing connections.

Ensure that the power supply is connected to the router and that the power supply is connected to a power source.

To start the liquid handler:

1 Make sure the liquid handler is connected to a power source.

2 Turn on the liquid handler using the power switch located on the rear panel. Refer to rear panel diagram on page 2-15 if necessary. The POWER indicator light on the front panel illuminates.

GX-27X Series Offset Utility

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

The GX-27X Series Offset Utility software (part number 21067529) is supplied on a CD located in the offset utility kit (part number 2604710 for the GX-27X ASPEC Offset Utility Kit or part number 2604711 for the GX-27X Liquid Handler Offset Utility Kit).

The following components are included in the kits:

- GX-27X Series Offset Utility CD for use with Windows® XP and Windows® 7
- 125 mm Offset Tool
- 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\GX-27X Series\Offset Utility.

   The installation path on a Windows® 7 (64-bit) system is C:\Program Files (x86)\Gilson\Utilities\GX-27X Series\Offset Utility.

Before You Begin

1 Ensure that plumbing and electrical connections have been made as described in Chapter 2, Installation.

2 Turn on the instruments.

3 Remove all racks from the tray insert.

Start the GX-27X Series Offset Utility

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

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

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

Use the GX-27X Series Offset Utility

Specify and Set Configuration

1 Allow instruments to scan into list.

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

GSIOC/RS-232-controlled instruments will display the unit ID (ID=).

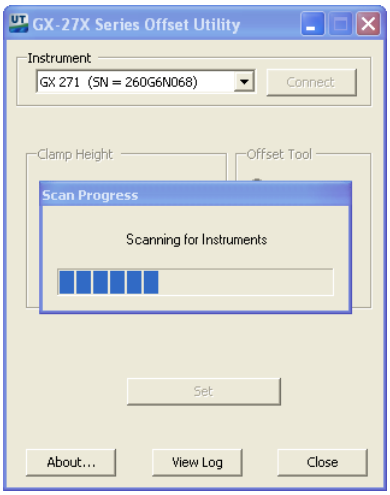


Figure 3-2: Scanning for Instruments

2 Select the instrument and then click **Connect**.

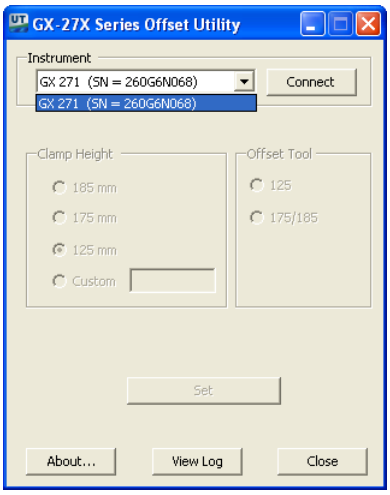


Figure 3-3: Connect to the Instrument

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

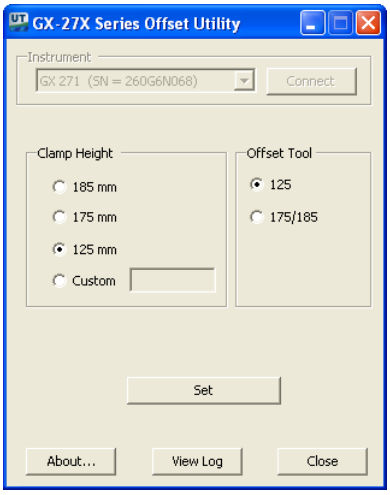


Figure 3-4: Select the Clamp Height

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.

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.

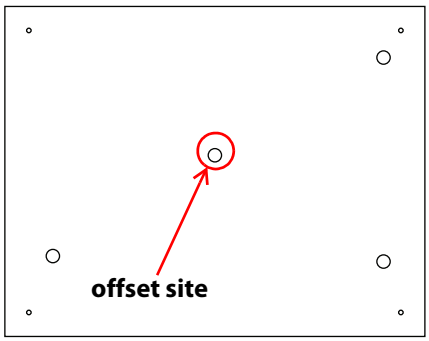


Figure 3-5: Offset Site

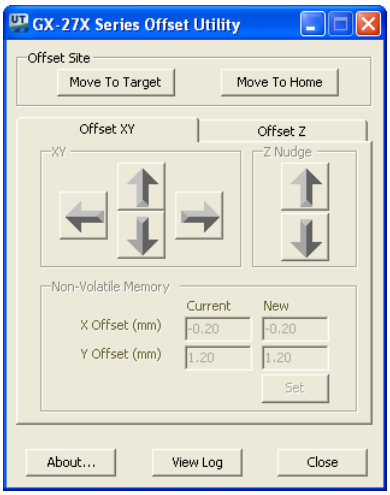


Figure 3-6: XY Offset

Determine and Set Z Offset

1 Select the Offset Z tab.

2 To move to the Z offset site, click **Move To Target**.

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

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

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

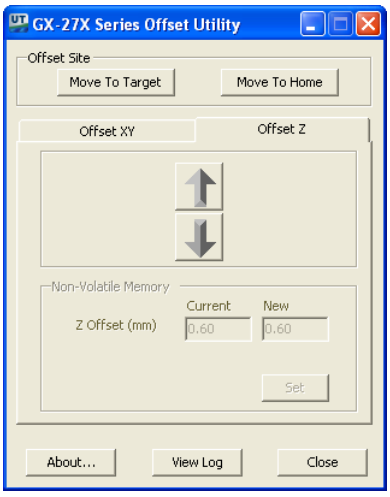


Figure 3-7: Z Offset

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.

Aspirate and Dispense Sequences

Aspirating Fluid from a Well

Aspirate sequence:

1 The selection valve on the solvent system switches to waste (position 1)

2 The solvent system starts moving, aspirating fluid from the well. The fluid in the transfer tubing is dispensed to waste.

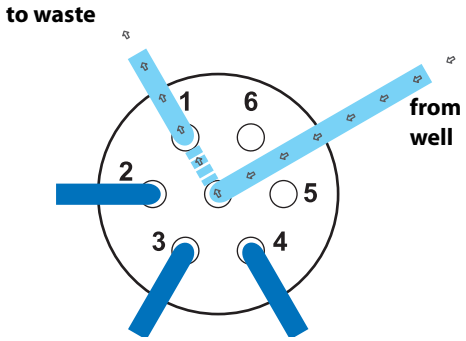


Figure 3-8: Aspirate Sequence

Dispensing Fluid to a Well

Dispense sequence:

1 The selection valve switches to reservoir (positions 2–6).

2 The solvent system starts moving, dispensing fluid to the well. The fluid is aspirated from reservoir.

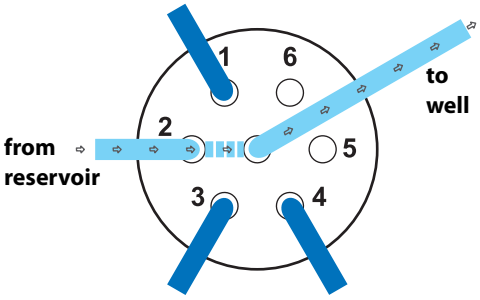


Figure 3-9: Dispense Sequence

Maintenance 4

To obtain optimum performance and maximum life from the liquid handler, it is important to keep the instrument well-maintained.

This section contains the following information to help you maintain your liquid handler.

Helpful Hints

In order to keep your liquid handler at peak performance, it is recommended that you do the following:

- Change or clean the tubing regularly to maintain maximum performance.
- Flush the probe and rinse stations 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

Cleaning the Liquid Handler

The liquid handler 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 liquid handler, wipe the instrument using a dry, clean cloth.

Cleaning the Syringe

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

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

To clean a syringe, follow the procedures below and use the diagram as a reference.

Remove the Syringe

The following procedures use TRILUTION® LH Software.

To remove the syringe:

1 Open a TRILUTION LH Software method with 402 Syringe Pump in the configuration.

2 Click **Run** to open the Application Builder.

3 Add a method to the sample list.

4 Select the **Manual Control** tab.

5 Select a method from the drop-down list of methods.

6 Click **Go**. The instruments will initialize.

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

8 Click **Lower Syringe**.

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

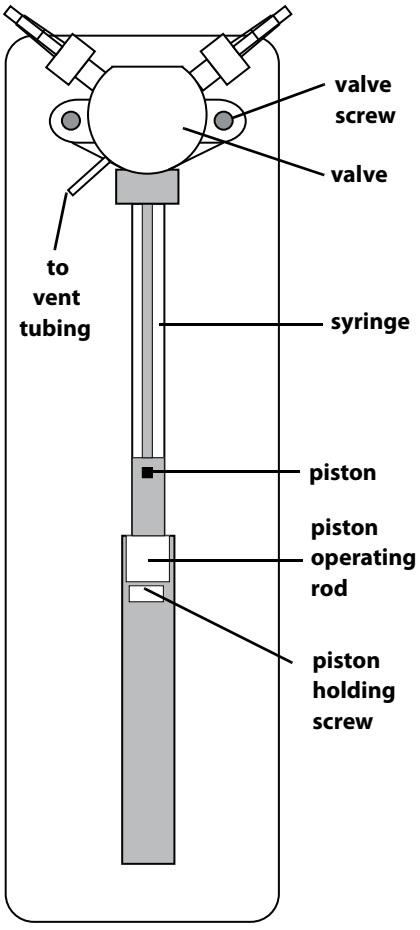


Figure 4-1: 402 Syringe

Clean the Syringe

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

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

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

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

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

Reinstall the Syringe

When the syringe is clean, reinstall it:

1 Fully tighten the syringe into the valve.

2 Click **Raise Syringe**.

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

Cleaning the Fluid Path

Depending upon your use of the liquid handler, 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 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

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

1 Prime the fluid path with distilled or deionized water.

2 Flush the fluid path using a weak detergent solution.

3 Pause the priming sequence.

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

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

Acidic Compounds, Basic Compounds, or Salt Solutions

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

1 Prime the fluid path with distilled or deionized water.

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

3 Pause the priming sequence.

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

5 Pause the priming sequence.

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

7 Pause the priming sequence.

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

Biological Fluids

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

1 Prime the fluid path with distilled or deionized water.

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

3 Flush the fluid path using the bleach solution.

4 Pause the priming sequence.

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

Cleaning the Valve—402 Syringe Pump

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

- Corrosive or hazardous liquids have been pumped
- Possible back flow of liquids into the waste tubing
- Leakage
- System has not been used for a while

Remove the Valve

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

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

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

Disassemble the Valve

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

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

3 Separate the ceramic stator from the ceramic rotor.

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

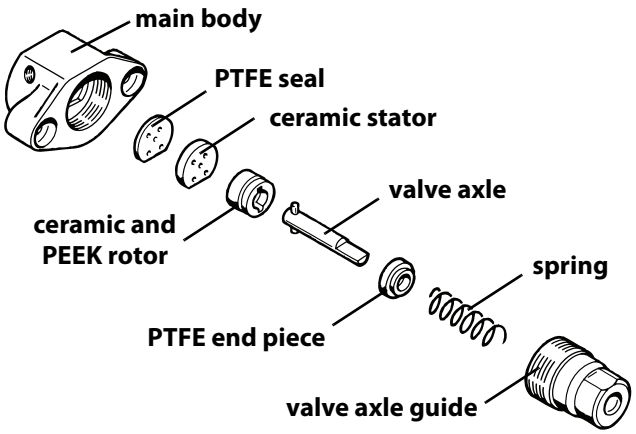


Figure 4-2: 402 Valve

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

Clean and Reinstall the Valve

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

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

2 Reassemble the valve parts by reversing the above procedure.

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

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

Replacing Parts

Replacing Tubing

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

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

Replacing the Probe

Remove the Z-Arm from the Liquid Handler

1 Using a 3 mm Allen wrench, loosen the mounting screw on the Z-arm mounting bracket.

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

3 Remove the Z-arm from the mounting bracket.

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

Replacing a Probe with the Same Outer Diameter

To install a replacement probe with the same outer diameter as the probe that is currently installed:

1 Remove the transfer tubing 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 center hole of the probe guide insert.

4 Replace and tighten the fitting.

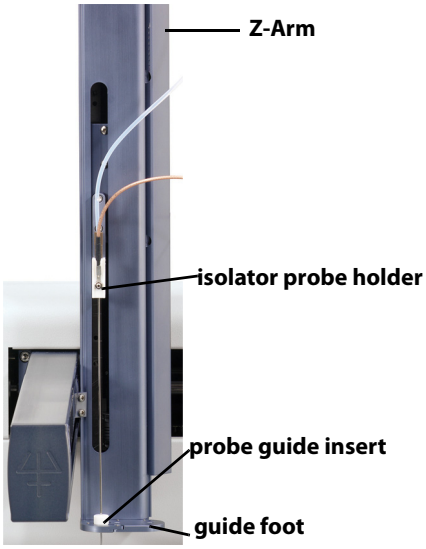


Figure 4-3: Probe Replacement

Replacing a Probe with a Different Outer Diameter

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

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

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

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

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

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

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

7 Replace and tighten the fitting.

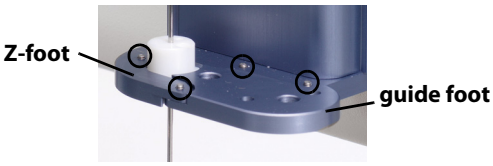


Figure 4-4: Guide Foot Removal

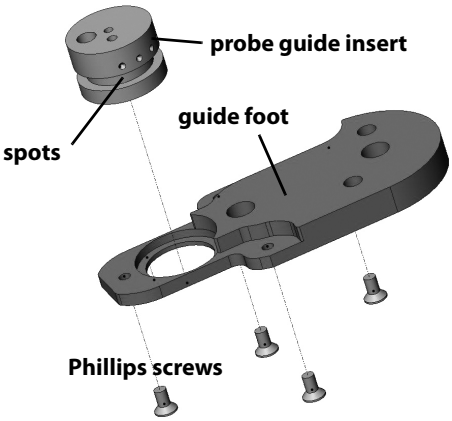


Figure 4-5: Guide Foot Assembly

Re-Install the Z-Arm on the Liquid Handler

1 Place the Z-arm in the mounting bracket. Insert on side of the Z-arm into place at a time (back to front).

2 Tighten the screw on the mounting bracket until the Z-arm is secure.

Run the GX-27X Offset Utility

It is recommended to run the GX-27X Offset Utility 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. Refer to GX-27X Series Offset Utility on page 3-4 for more information.

Replacing the Syringe

If necessary, refer to the diagram on while performing the procedures below. The following procedures use TRILUTION® LH Software.

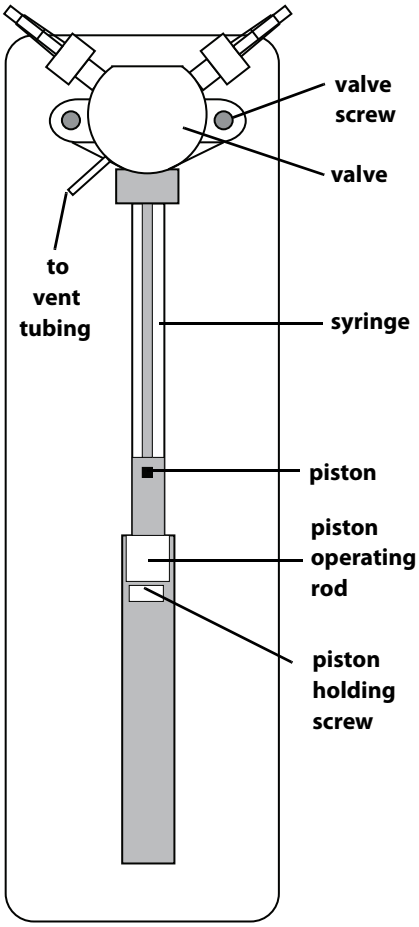


Figure 4-6: 402 Syringe

Removing the Syringe

To remove the syringe:

1 Open a TRILUTION LH Software method with a 402 Syringe Pump in the configuration.

2 Click **Run** to open the Application Builder.

3 Add a method to the sample list.

4 Select the **Manual Control** tab.

5 Select a method from the drop-down list of methods.

6 Click **Go**. The instruments will initialize.

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

8 Click **Lower Syringe**.

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

Install the New Syringe

To install the new syringe:

1 Fully tighten the syringe into the valve.

2 Click **Raise Syringe**.

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

Replacing the Piston Seal

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

Piston Seal for 100 and 250 µL Syringes

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

2 Slide the piston out of the syringe barrel.

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

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

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

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

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

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

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

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

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

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

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

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

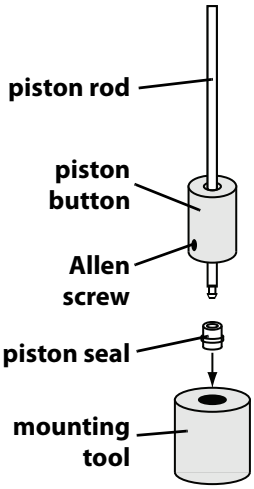


Figure 4-7: 250 µL Syringe

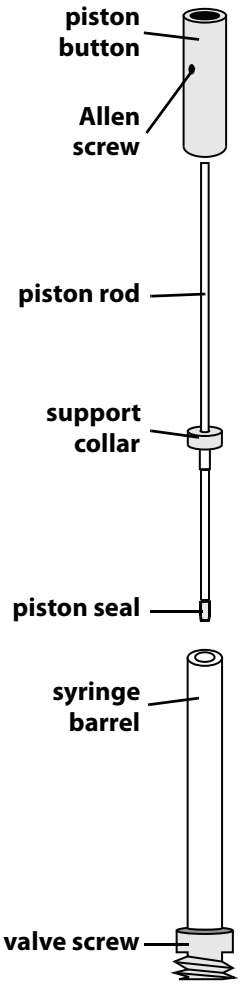


Figure 4-8: 100 µL Syringe

Piston Seal for 500 µL Syringe

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

2 Slide the piston out of the syringe barrel.

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

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

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

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

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

8 Remove the tools away from the piston assembly.

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

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

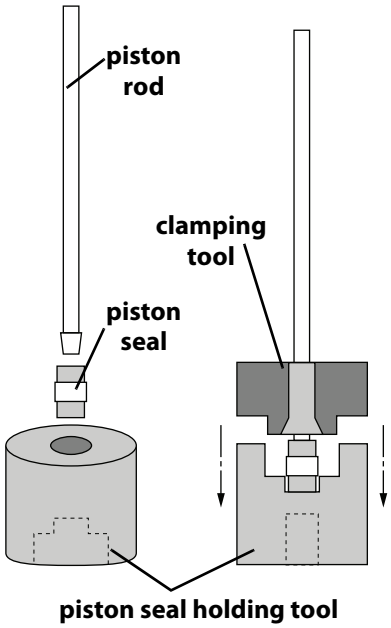


Figure 4-9: 500 µL Syringe

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

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

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

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

Piston Seal for 1 mL Syringes

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

2 Slide the piston out of the syringe barrel.

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

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

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

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

7 Remove the piston assembly from the holding tool.

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

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

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

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

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

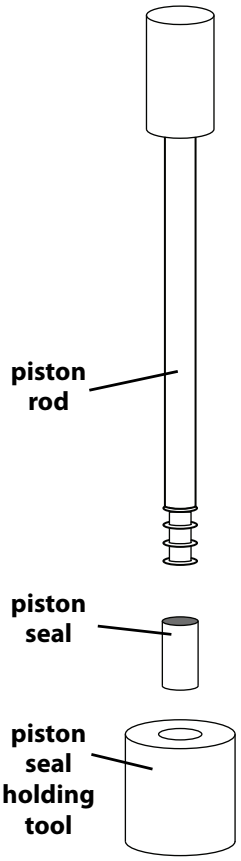


Figure 4-10: 1 mL Syringe

Piston Seal for 5 mL and 10 mL Syringes

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

2 Slide the piston out of the syringe barrel.

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

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

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

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

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

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

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

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

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

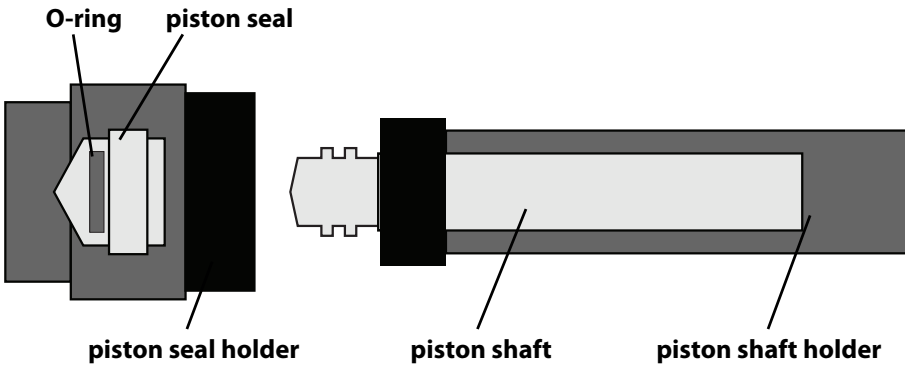


Figure 4-11: 5 mL and 10 mL Syringes

Piston Seal for 25 mL Syringe

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

2 Slide the piston out of the syringe barrel.

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

4 Screw a new piston seal on the shaft.

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

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

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

Replacing the Valve

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

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

2 Disconnect the syringe from the syringe pump. Refer to the procedure for replacing the syringe on page 4-9.

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

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

5 Re-install the syringe. Refer to the procedure for mounting new syringe on page 4-9.

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

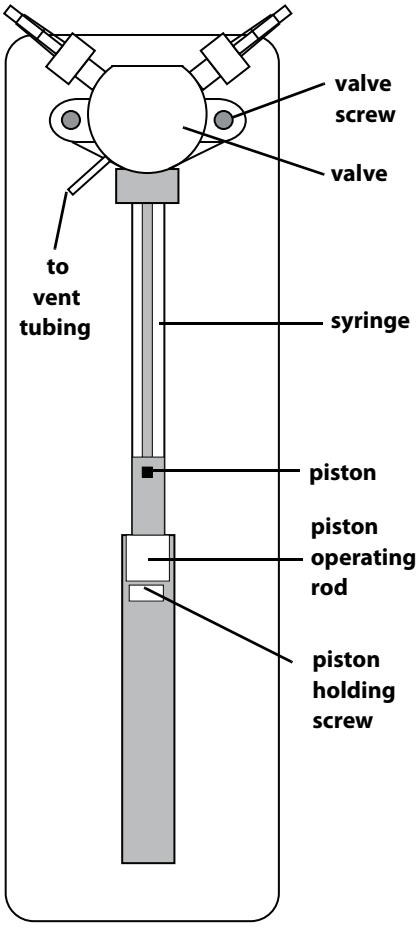


Figure 4-12: 402 Syringe

Replacing a Fuse

A blown fuse may indicate the existence of another problem in the instrument. If the replacement fuses blow, don't try others. Contact your local Gilson representative. See Before Calling Us on page 5-6.

To change a fuse, follow these steps.

1 Power of the instrument and then disconnect the power cord from the power outlet and from the rear panel receptacle.

2 Locate the fuse drawer on the rear panel. See page 2-15 if necessary.

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

4 Using the screwdriver, lift up to remove the fuse drawer. The fuse drawer contains two 3.15A fuses.

5 Remove the old fuses and install the new fuses.

6 Insert the fuse drawer into its receptacle in the liquid handler.

Transporting the Liquid Handler

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

Troubleshooting 5

This section provides information on the following topics:

- Error Messages
- Mechanical Troubleshooting and Electrical Troubleshooting Troubleshooting
- Ethernet Connections
- Repair and Return Policies

Error Messages

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.

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

Mechanical Troubleshooting

Probe no longer finding tube center

- Probe may be bent. Straighten or replace the probe.
- Liquid handler may need X/Y/Z adjustment. Follow the procedure in GX-27X Series Offset Utility on page 3-4.

Electrical Troubleshooting

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 liquid handler 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 liquid handler should be compatible with device to which it is interfaced. Outputs are contact closures.

Unit not operational

- Make sure power is turned on.
- Check AC power cord connections.
- Try different AC outlet.
- Check fuses; replace if necessary.
- Check all liquid handler connections and make sure that the unit is plugged in.

Unit blows fuses

- Contact your local Gilson representative.

Ethernet Connections

For communication to occur, the instrument must be connected via an Ethernet connection to a router. If there are communication problems between the instrument and the computer, verify that the procedure below has been followed.

1 Connect the router to a power source and then wait 30 seconds for the router to initialize.

2 With the instrument powered OFF, connect one end of an Ethernet cable to a port on the router and the other end to the ETHERNET port on the rear panel of the instrument.

3 Power the instrument ON and then wait 1 minute for it to initialize. The instrument will be assigned an IP address via DHCP from the router at this time.

4 Using an Ethernet cable, connect one end of the cable to the connector on the computer and the other end to a port on the router.

Ethernet Communication

After the connections have been verified, use the procedure below to confirm Ethernet communication.

1 Close software programs controlling Gilson system.

2 Turn off power to the router and the Gilson system.

3 Wait five minutes.

4 Turn power on to the router.

5 Turn power on to the Gilson system.

6 Start the control software.

Repair and Return Policies

Before Calling Us

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

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

Item	Serial Number Location
GX-271 Liquid Handler	Inside the left support, near the top
Z-arm	Back side, at the top
GX Solvent System	Right side
402 Syringe Pump	Rear panel, near the bottom
GX Direct Injection Module	Right side
GX Rinse Pump	Right side

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

Warranty Repair

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

Non-Warranty Repair

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

Rebuilt Exchange

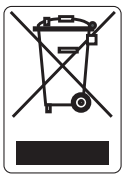
For some units, rebuilt exchange components are available. Contact your local distributor for details.

Return Procedure

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

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

Unit End-of-Life



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

Replacement Parts and Accessories A

GX-271 Liquid Handler

Part Number	*Description*
2614107	GX-271 Preparative Liquid Handler
2614101	GX-271 Liquid Handler

Commonly Used Probes (125 mm)

Part Number	*Description*
27067382	Bevel tip probe, stainless steel, grooved septum piercing; 221 x 2.0 x 0.8 mm ID (tip dimensions: 2.1 x 1.5 x 0.8 mm ID, 100 µL volume).
270673821	Bevel tip probe, coated stainless steel, grooved septum piercing; 221 x 2.0 x 0.8 mm ID (tip dimensions: 2.1 x 1.5 x 0.8 mm ID, 100 µL volume).
27067383	Probe, septum-piercing, 221 x 1.5 x 0.4 mm, bevel tip, grooved, 28.73 µL volume
270673831	Probe, septum-piercing, coated, 221 x 1.5 x 0.4 mm, bevel tip, grooved, 28.73 µL volume

Commonly Used Probes (175 mm)

Part Number	*Description*
2507214	Non septum-piercing probe; constricted tip, capacitive level-sensing, stainless steel. Dimensions: 269 x 1.8 x 1.4 mm ID (tip dimensions: 1.5 x 1.2 x 0.8 mm ID).
2507255	Non septum-piercing probe, bevel tip, capacitive level sensing, stainless steel. Dimensions: 269 x 1.5 x 0.4 mm ID.

Other Probes (125 mm)

Part Number	*Description*
2507234	Septum-piercing probe; side-entry, capacitive level-sensing, stainless steel, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions: 12 x 1.3 mm OD, entry hole center is 3.5 mm from tip).
2507235	Septum-piercing probe; side-entry, vented, capacitive level-sensing, stainless steel, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions: 12 x 1.3 mm OD, entry hole center is 3.5 mm from tip).

Part Number	*Description*
2507236	Septum-piercing, short pencil-point probe; vented at 14 mm, side-entry, vented at 72 mm, capacitive level sensing, stainless steel. Dimensions: 272 x 1.8 x 0.8 mm ID.
2507237	Septum-piercing, pencil-point probe; vented at 72 mm, side-entry, capacitive level sensing, stainless steel. Dimensions: 273 x 1.8 x 0.8 mm ID.
2507244	Septum-piercing probe; deflected tip, capacitive level-sensing, stainless steel, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions: 12 x 1.3 mm OD, bevel cut entry hole).
2507245	Septum-piercing probe; deflected tip, vented, capacitive level-sensing, stainless steel, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions: 12 x 1.3 mm OD, bevel cut entry hole).
2507242	Septum-piercing probe; deflected tip, capacitive level-sensing, stainless steel with Teflon-coated liquid path, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions: 12 x 1.3 mm OD, bevel cut entry hole).
2507243	Septum-piercing probe; deflected tip, vented, capacitive level-sensing, stainless steel with Teflon-coated liquid path, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions 12 x 1.3 mm OD, bevel cut entry hole).
27067361	Non septum-piercing probe; bevel tip, capacitive level-sensing, stainless steel. Dimensions: 220.5 x 1.5 x 1.1 mm ID.
2507414	Non septum-piercing probe; constricted tip, capacitive level-sensing, stainless steel. Dimensions: 220 x 1.3 x 0.8 mm ID (tip dimensions: 1.5 x 0.9 x 0.45 mm ID).
27067373	Non septum-piercing probe; constricted tip, capacitive level-sensing, stainless steel. Dimensions: 221 x 1.5 x 1.1 mm ID (tip dimensions: 2 x 1.1 x 0.4 mm ID).
27067374	Non septum-piercing probe; constricted bevel tip, capacitive level-sensing, stainless steel. Dimensions: 221 x 1.5 x 1.1 mm ID (tip dimensions: 2 x 1.1 x 0.4 mm ID).
2507252	Micro septum-piercing probe; constricted 45° bevel tip, capacitive level-sensing, stainless steel. Dimensions: 220 x 1.5 x 1.1 mm ID (tip dimensions: 10 x 0.7 x 0.4 mm ID).
2507256	Beveled-tip probe, stainless steel, grooved septum-piercing; 221 x 1.5 x 0.4 mm ID.
27067375	Non-septum-piercing probe: beveled-tip, Teflon-coated stainless steel. Dimensions: 221 x 1.5 x 1.1 mm ID.

Other Probes (175 mm)

Part Number	*Description*
2507215	Non septum-piercing probe; constricted tip, capacitive level-sensing, stainless steel. Dimensions: 269 x 1.3 x 0.8 mm ID (tip dimensions: 1.5 x 0.9 x 0.45 mm ID).
2507216	Non septum-piercing probe, bevel tip, capacitive level sensing, stainless steel. Dimensions: 269 x 1.5 x 1.1 mm ID (tip dimensions: 1.6 x1.2 x 0.8).
2507253	Micro septum-piercing probe; constricted 45° bevel tip, capacitive level sensing, stainless steel. Dimensions: 269 x 1.5 x 1.1 mm ID (tip dimensions: 10 x 0.7 x 0.4 mm ID).
2507254	Non septum-piercing probe; flat tip, capacitive level-sensing, stainless steel. Dimensions: 269 x 1.8 x 1.4 mm ID.
2507555	Inert non septum-piercing probe; Teflon-covered stainless steel. Dimensions: 269 x 2.7 x 0.8 mm ID (tip dimensions: 5 x 1.5 mm OD).
25075551	Non septum-piercing probe; straight tip. Dimensions: 256.6 x 2.7 x 0.8 mm ID.
25073645	Non septum-piercing probe; beveled tip, capacitive level-sensing, stainless steel. Dimensions: 269 x 1.3 x 0.8 mm ID.
251646	Inert gas probe assembly (for maintaining an inert atmosphere inside sealed vessel), beveled tip, stainless steel, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID. Includes probe holder/guide kit.
26017050	Septum-piercing probe; beveled tip, stainless steel. Dimensions: 269 x 2.0 x 0.8 mm ID (tip dimensions: 1.5 mm OD x 0.8 mm ID).

Isolator Probe Holder

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

Probe Guide Foot Assemblies

Part Number	*Description*
2604610	Guide foot, GX-271, 1.3 mm; includes the guide foot, probe guide insert, and six screws
2604611	Guide foot, GX-271, 1.5 mm; includes the guide foot, probe guide insert, and six screws
2604612	Guide foot, GX-271, 1.8 mm; includes the guide foot, probe guide insert, and six screws
2604613	Guide foot, GX-271, 2.3 mm; includes the guide foot, probe guide insert, and six screws
2604614	Guide foot, GX-271, 2.7 mm; includes the guide foot, probe guide insert, and six screws

Probe Guide Inserts

Part Number	*Description*
26046214	Probe guide insert, 3-way, for 1.3 mm outer diameter probes
26046215	Probe guide insert, 3-way, for 1.5 mm outer diameter probes

Part Number	*Description*
26046216	Probe guide insert, 3-way, for 1.8 mm outer diameter probes
26046217	Probe guide insert, 3-way, for 2.3 mm outer diameter probes
26046218	Probe guide insert, 3-way, for 2.7 mm outer diameter probes

Rinse Station

Part Number	*Description*
26034552	Rinse station for outside rinse of probe, 125 mm
26034551	Rinse station for outside rinse of probe, 175 mm
26034554	Drain/rinse station for inside rinse of probe, 125 mm
26034555	Drain/rinse station for inside rinse of probe, 175 mm

Rack Accessories

Part Number	*Description*
26041033	Insert for 5 Code 20-series racks (GX-271)
26041035	Insert for 3 Code 200-series racks (GX-271)
260440005	Solvent bottle rack

Miscellaneous

Part Number	*Description*
260461126	LLD cable, GX-271
36078142	Cat 5e ethernet cable
36083129	Serial cable, D9Pin male to D9Pin female
260354551	GSIOC accessory cable, 6PinDIN to 9PIN DSUB
638306512	Terminal block connector, 6-pin
638308512	Terminal block connector, 8-pin
709910206	2-conductor interconnect wire, 6', for making contact connections
6730254007	Fuse, 2.5 A T-2.5 slo-blo
7080318114	Power cord, right angle, 110V
7080318115	Power cord, right angle, 220V
25051094	125 mm Z-height adjustment tool
25051095	175 mm Z-height adjustment tool
260465	GX-27X Z-arm
2604706	Shield, GX-27X

GX Solvent System

Part Number	*Description*
261350	GX Solvent System

Transfer Tubing for GX Prep Solvent System

Part Number	*Description*
499424013	Transfer tubing 1.1 mL volume
499471112	Transfer tubing 5.5 mL volume
499474103	Transfer tubing 10.5 mL volume
499483602	Transfer tubing 30 mL volume
499486002	Transfer tubing 50 mL volume

402 Syringe Pump

Part Number	*Description*
F410511	402 Syringe Pump, Single Module, 110–220V (order syringe separately)

Syringes for 402 Syringe Pump

Part Number	*Description*
25025341	100 µL syringe
25025342	250 µL syringe
25025347	500 µL syringe
25025343	1 mL syringe
25025344	5 mL syringe
25025345	10 mL syringe
25025346	25 mL syringe

Transfer Tubing for 402 Syringe Pump

Part Number	*Description*
499424013	Transfer tubing 1.1 mL volume, 0.8 mm ID
499471112	Transfer tubing 5.5 mL volume, 1.5 mm ID x 9.27 ft, FEP
499474103	Transfer tubing 10.5 mL volume, 1.5 mm ID
499483602	Transfer tubing 30 mL volume
499486002	Transfer tubing 50 mL volume

Inlet Tubing Assembly

Part Number	*Description*
3645357	Tubing assembly, 48" INLET 25SC/215

GX Rinse Pump

Part Number	*Description*
261452	GX Rinse Pump Assembly, 2 channel

Low Mount Fraction Collection Valve

Part Number	*Description*
2604705	GX-271 Low Mount Fraction Collection pkg
26037270	Plumbing package for the FC Valve (GX-271/GX-281)
49953029	Tubing, 0.030" x 20 ft, PEEK
25077422	Collection Tube, 1/8" TFE
25077423	Collection Tube, 1/16" TFE
49041012	Upchurch P-201 nut, flangeless, 1/16", 1/4-28, DELRIN® (ACETAL), black
49041011	Upchurch P-200R ferrule, flangeless, 1/16", TEFZEL® (ETFE), red
F1410050	PVDF coupling for 1/4"-28 fitting, package of 5
49041015	Upchurch P-300 ferrule, flangeless, 1/8", TEFZEL® (ETFE), yellow
49041016	Upchurch P-304 nut, flangeless, 1/8", 1/4-28, DELRIN® (ACETAL), cream
490032	Tubing, 0.063" ID x 0.125" OD, TFE, per ft (1/16" x 1/8")
26036123	Tube & wire routing strip, Z drive

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

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

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

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

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

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

Part Number	*Description*
49440003	2 µL stainless steel sample loop (1/16" OD) for Valco valves
49440004	5 µL stainless steel sample loop (1/16" OD) for Valco valves
49440006	10 µL stainless steel sample loop (1/16" OD) for Valco valves
49440007	20 µL stainless steel sample loop (1/16" OD) for Valco valves
49440008	50 µL stainless steel sample loop (1/16" OD) for Valco valves
49440009	100 µL stainless steel sample loop (1/16" OD) for Valco valves
494400002	250 µL stainless steel sample loop (1/16" OD) for Valco valves
494400005	500 µL stainless steel sample loop (1/16" OD) for Valco valves
49440001	1 mL stainless steel sample loop (1/16" OD) for Valco valves

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

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

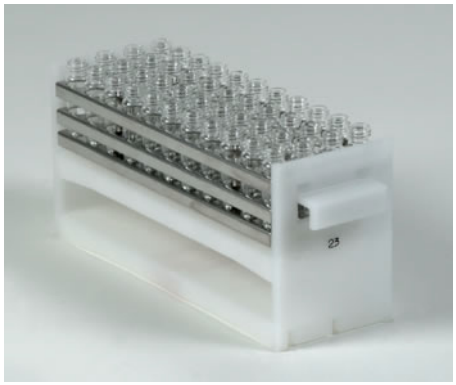
Part Number	*Description*
49440011	2 µL PEEK sample loop (1/16" OD) for Valco valves
49440012	5 µL PEEK sample loop (1/16" OD) for Valco valves
49440013	10 µL PEEK sample loop (1/16" OD) for Valco valves
49440014	20 µL PEEK sample loop (1/16" OD) for Valco valves
49440015	50 µL PEEK sample loop (1/16"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

GX Direct Injection Module Accessories

Part Number	*Description*
26035470	Plumbing package for the GX Direct Injection Module
490318041	Valco MZN1PK PEEK nut (0.062" long) for 1/16" OD tubing, package of 10
4903180411	Valco MZN1PK PEEK nut (0.062" long) for 1/16" OD tubing, 1 each
490318051	Valco ZF1PK PEEK ferrule (1/16"), package of 10
4903180511	Valco ZF1PK PEEK ferrule (1/16"), 1 each
495033	Teflon tubing, 0.023" ID x 0.062" (1/16") OD, package of 10 ft
26035410	Injection port assembly, GX Direct Injection Module, for 1.3 mm OD probes
26035411	Injection port assembly, GX Direct Injection Module, for 1.5 mm OD probes
26035412	Injection port assembly, GX Direct Injection Module, for 1.3 mm OD probes, stainless steel
26035413	Injection port assembly, GX Direct Injection Module, for 1.5 mm OD probes, stainless steel
250510153	Injection port seal for 1.3 mm OD probes
2954674	Injection port seal for 1.5 mm OD probes
26035458	GX-271 Direct Injection Module riser block assembly

Racks

Part Number		*Description*
150425		Code 20 rack For 108 tubes Material: polypropylene Vessels and maximum capacity: 10 x 100 mm (4.5 mL)
150422		Code 21 rack For 60 tubes Material: polypropylene Vessels and maximum capacity: 13 x 100 mm (9 mL)
150424		Code 22 rack For 44 tubes Material: polypropylene Vessels and maximum capacity: 18 x 100 mm (25 mL) 18 x 150 mm (32 mL)
150498		Code 22U rack For 44 tubes Material: polypropylene Vessels and maximum capacity: 10–18 mm x 100–180mm

Part Number		*Description*
150426		Code 23 rack For 44 scintillation vials Material: polypropylene Vessels and maximum capacity: 17 x 55 mm (6.8 mL) 17 x 65 mm (8 mL)
270433		Code 23W rack For 44 Waters WISP vials Material: polypropylene Vessels and maximum capacity: 15 x 45 mm (4 mL)
150427		Code 24 rack For 14 scintillation vials Material: polypropylene Vessels and maximum capacity: 28 x 57 mm (20 mL) 28 x 60 mm (20 mL)
150420		Code 28 rack For 108 tubes Material: polypropylene Vessels and maximum capacity: 10 x 65 mm (3 mL) 10 x 75 mm (3.5 mL)

Part Number		*Description*
150429		Code 29 rack For 60 tubes Material: polypropylene Vessels and maximum capacity: 12 x 75 mm (3.5 mL) 12 x 75 mm (5 mL)
2704342		Code 29LE rack For 60 Eppendorf vials Material: polypropylene Vessels and maximum capacity: 11 x 40 mm (1.5 mL)
2704341		Code 29SE rack For 60 Eppendorf vials Material: polypropylene Vessels and maximum capacity: 7 x 30 mm (0.5 mL)
260440086		Code 121 rack For 60 tubes Material: aluminum Vessels and maximum capacity: 13 x 100 mm (9 mL)

Part Number	*Description*
260440087 	Code 122 rack For 39 tubes Material: aluminum Vessels and maximum capacity: 16 x 100 mm (12 mL)
2504600 	Code 200 rack For 96 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 13 x 100 mm (9 mL)
2504601 	Code 201 rack For two microplates, two Eppendorf vials, and two tubes Material: aluminum Vessels and maximum capacity: 96-well microplates Eppendorf vials (1.5 mL) 13 x 100 mm tubes (9 mL)
2504601H 	Code 201H rack For two microplates with hold-down covers, two Eppendorf vials, and two tubes Material: aluminum Vessels and maximum capacity: 96-well microplates Eppendorf vials (1.5 mL) 13 x 100 mm tubes (9 mL)

Part Number		*Description*
2504602		Code 202 rack For 96 Vacutainer tubes or Eppendorf vials Material: aluminum Vessels and maximum capacity: 10.25 x 47 mm (2.5 mL) Eppendorf vials (1.5 mL)
2504603		Code 203 rack For 96 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 10.25 x 64 mm (3 mL)
2504604		Code 204 rack For 27 scintillation vials Material: aluminum Vessels and maximum capacity: 28 x 57 mm (20 mL)
2504605		Code 205 rack For two deep-well microplates, two Eppendorf vials, and two tubes Material: aluminum Vessels and maximum capacity: 96 deep-well microplates Eppendorf vials (1.5 mL) 13 x 100 mm tubes (9 mL)

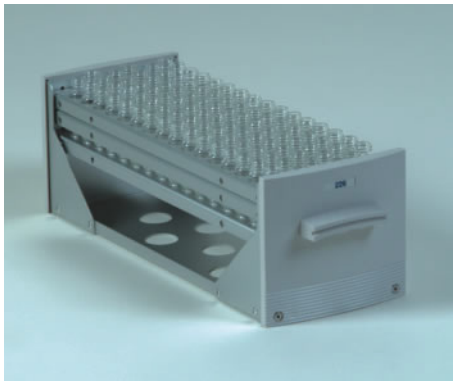
Part Number		*Description*
2504605H		Code 205H rack For two deep-well microplates with hold-down covers, two Eppendorf vials, and two tubes Material: aluminum Vessels and maximum capacity: 96 deep-well microplates Eppendorf vials (1.5 mL) 13 x 100 mm tubes (9 mL)
2504606		Code 206 rack For 96 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 13 x 75 mm (4 mL)
2504607		Code 207 rack For 75 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 16 x 100 mm (12 mL)
2504608		Code 208 rack For 70 vessels Material: aluminum Vessels and maximum capacity: 18 x 150 mm (25 mL)

Part Number		*Description*
2504609		Code 209 rack For 96 vessels Material: aluminum Vessels and maximum capacity: 12 x 32 mm (2 mL)
2504610		Code 210 rack For 75 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 16 x 75 mm (10 mL)
2504611		Code 211 rack For 9 Boston round screw-cap bottles Material: aluminum Vessels and maximum capacity: 48 x 113 mm (125 mL)
2504611H		Code 211H rack For 9 Boston round screw-cap bottles with hold-down cover Material: aluminum Vessels and maximum capacity: 48 x 113 mm (125 mL)

Part Number		*Description*
2504612		Code 212 rack For 96 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 48 13 x 100 mm (9 mL) 48 13 x 75 mm (4 mL) **Note:** Place the shorter tubes into the notched tube locations.
2504613		Code 213 rack For 74 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 37 16 x 100 mm (12 mL) 37 16 x 75 mm (10 mL) **Note:** Place the shorter tubes into the notched tube locations.
2504614		Code 214 rack For 96 Vacutainer tubes Material: aluminum Vessels and maximum capacity: 48 10.25 x 47 mm (2.5 mL) 48 10.25 x 64 mm (3 mL) **Note:** Place the shorter tubes into the notched tube locations.
2504616		Code 216 rack For 60 Waters WISP vials Material: aluminum Vessels and maximum capacity: 15 x 45 mm (4 mL)

Part Number		*Description*
2504617		Code 217 rack For 96 vessels Material: aluminum Vessels and maximum capacity: 10 x 75 mm (4 mL)
2504618		Code 218 rack For two microplates and eight tubes Material: aluminum Vessels and maximum capacity: 96-well microplates (shallow or deep) 10 x 75 mm tubes (4 mL) **Note:** Also holds Beckman modular reservoirs
2504619		Code 219 rack For 27 vessels Material: aluminum Vessels and maximum capacity: 30 x 95 mm (40 mL)
2504620		Code 220 rack For 70 vials Material: aluminum Vessels and maximum capacity: 17 x 62 mm (7 mL)

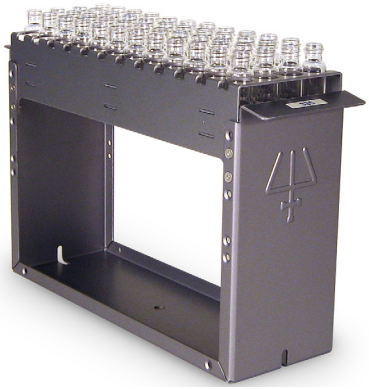
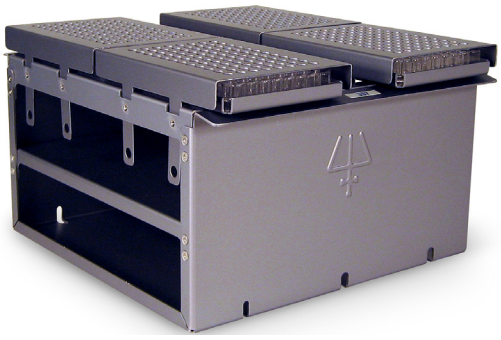
Part Number		*Description*
2504622		Code 222 rack For 27 conical bottom tubes Material: aluminum Vessels and maximum capacity: 30 x 115 mm (50 mL)
2504623		Code 223 rack For 96 tubes with screw caps Material: aluminum Vessels and maximum capacity: 16 x 100 mm (10 mL)
2504624		Code 224 rack For 192 vials Material: aluminum Vessels and maximum capacity: 8.5 x 41 mm
2504625		Code 225 rack For 30 vials Material: aluminum Vessels and maximum capacity: 25 x 150 mm (45 mL)

Part Number		*Description*
2504626		Code 226 rack For 96 Waters WISP vials Material: aluminum Vessels and maximum capacity: 15 x 45 mm (4 mL)
2504628		Code 228 rack For four reagent bottles Material: aluminum Vessels and maximum capacity: 500 or 700 mL
2504637		Code 237 rack For two microplates Material: aluminum Vessels and maximum capacity: 384-well microplates
2504639		Code 239 rack For 40 tubes Material: aluminum Vessels and maximum capacity: 25 x 200 mm

Part Number	*Description*
2504300 	Code 300 rack For 96 (1 mL) tabless SPE cartridges and one deep-well microplate Material: aluminum Vessels and maximum capacity: 1 mL tabless SPE cartridges 96-well (2 mL) microplate (deep) Includes cartridge holder, drain block, collection block and waste bottle with attachments.
2504301 	Code 301 rack For 96 (1 mL) tabless SPE cartridges and one shallow-well microplate Material: aluminum Vessels and maximum capacity: 1 mL tabless SPE cartridges 96-well microplate (shallow) Includes cartridge holder, drain block, collection block and waste bottle with attachments.
2504302 	Code 302 rack For 48 (1 mL) tabless SPE cartridges and 48 tubes Material: aluminum Vessels and maximum capacity: 1 mL tabless SPE cartridges Collection block holds 12 x 32 mm (2 mL) tubes Includes cartridge holder, drain block, collection block and waste bottle with attachments.
2504303 	Code 303 rack For 48 (3 mL) tabless SPE cartridges and 48 tubes Material: aluminum Vessels and maximum capacity: 3 mL tabless SPE cartridges Collection block holds 12 x 32 mm (2 mL) tubes Includes cartridge holder, drain block, collection block and waste bottle with attachments.

Part Number		*Description*
2504304		Code 304 rack For 48 (3 mL) tabless SPE cartridges and 48 tubes Material: aluminum Vessels and maximum capacity: 3 mL tabless SPE cartridges Collection block holds 12 x 75 mm tubes Includes cartridge holder, drain block, collection block and waste bottle with attachments.
2504305		Code 305 rack For 32 (3 mL) tabless SPE cartridges and 32 tubes Material: aluminum Vessels and maximum capacity: 3 mL tabless SPE cartridges Collection block holds 15 x 45 mm (4 mL) tubes Includes cartridge holder, drain block, collection block and waste bottle with attachments.
2504306		Code 306 rack For 20 (6 mL) tabless SPE cartridges and 20 tubes Material: aluminum Vessels and maximum capacity: 6 mL tabless SPE cartridges Collection block holds 12 x 75 mm tubes (5 mL) Includes cartridge holder, drain block, collection block and waste bottle with attachments.

Part Number		Description
2504307		Code 307 rack For 20 (6 mL) tabless SPE cartridges and 20 tubes Material: aluminum Vessels and maximum capacity: 6 mL tabless SPE cartridges Collection block holds 15 x45 mm (4 mL) tubes Includes cartridge holder, drain block, collection block and waste bottle with attachments.
260440031		Code 330 rack For 60 vials Material: aluminum Vessels and maximum capacity: 12 x 32 mm (2 mL)
260440079		Code 332 rack For 44 tubes Material: aluminum Vessels and maximum capacity: 18 x 150 mm (25 mL)
260440036		Code 333 rack For 14 scintillation vials Material: aluminum Vessels and maximum capacity: 20 mL

Part Number	*Description*
260440081 	Code 334 rack For 14 scintillation vials Material: aluminum Vessels and maximum capacity: 40 mL
260440083 	Code 335 rack For 48 WISP vials Material: aluminum Vessels and maximum capacity: 15 x 45 mm (4 mL)
260440094 	Code 336 rack For two microplates Material: aluminum 96-well microplates (shallow or deep)
260440095 	Code 337 rack For four microplates Material: aluminum Vessels and maximum capacity: 96-well microplates (shallow or deep)
260440106	Code 338 rack For 64 vials Material: aluminum Vessels and maximum capacity: 12 x 32 mm (2 mL)

Part Number	*Description*
260440039 	Code 341 rack For 108 tubes Material: aluminum Vessels and maximum capacity: 10 x 75 mm (4 mL)
260440025 	Code 343 rack For 80 tubes Material: aluminum Vessels and maximum capacity: 13 x 100 mm (9 mL)
260440041 	Code 345 rack For 44 tubes Material: aluminum Vessels and maximum capacity: 16 x 150 mm (20 mL)

Materials B

Materials*

Nitronic 60

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

Stainless Steel, Type 316

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

PAEK

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

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

PEEK

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

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

Valcon H

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

* Information provided by Valco Instruments Company Inc.