GILSON PRODUCT GUIDE

Automation • Detectors • Fraction Collectors • HPLC Systems
Liquid Handling/Injection • Pumps • Software • Solid Phase Extraction

GILSON®
SOLUTIONS AT WORK FOR YOU

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NEBULA™ Series Systems

UniPoint™ System Software offers several advantages:

- Graphical sample tracking
- True multi-tasking
- Collection of peaks of interest necessary to ensure accurate and repeatable assays
- Data acquisition and system control
- Allows for custom hardware configuration
- Re-inject collected fractions onto HPLC or LC/MS

The NEBULA™ Series Liquid Handlers and Injectors provide a flexible solution for your laboratory's needs. From the small footprint and high capacity of the 235 Autoinjector to the high-throughput injection of the Multiple Probe 215 Injector, and with the fully automated solid phase extraction SPE 215 System, Gilson has solutions at work for you.

Collect fractions using the FC 203B, FC 204 or, for large-bed fraction collection, the 215 Fraction Collector. UniPoint™ System Software offers graphical sample tracking and facilitates re-injection of collected fractions to check for purity and percent recovery.

Note: Multipe-probe systems can not be used for fraction collection.

Multiple Probe 215 System

- Inject up to eight samples in parallel for complete screening of a 96-well microplate in less than 12 minutes
- Flexibility to aquire data from one to four HPLC systems in parallel with single software control. Add additional HPLC systems as the demands on your laboratory increase
- Accurate, reliable, and robust liquid handler provides an excellent base for your HPLC and LC/MS systems
- The Multiple Probe 215 Analysis System helps your laboratory produce faster product development cycles, with increased throughput up to 700%

Gilson's Systems provide a wide range of detection solutions for excellent sensitivity and reproducibility including Mass Spectrometry and UV/VIS Detection.

215 Analysis System

Gilson's 321 and 322 Pumps provide an excellent and accurate pumping source. Combining a multisolvent, high-pressure, variable mixer with interchangeable heads, the Pumps are the perfect solution for your solvent delivery needs.

215 Direct-Inject System

- Ideal for microbore to semi-prep applications
- Rheodyne's rocket valve allows for fast, low-dead volume direct-injection—system is designed to load samples directly into the valve
- Low dead volume with direct injection decreases carryover and increases injection reproducibility
- Designed to handle sample injection onto HPLC, NMR, and MS systems
- Ideal for small-volume injections (as low as 500 nlL) as well as micro pipetting into microplates and vials for reagent and internal standards addition
- Large bed can accommodate up to 17 microplates

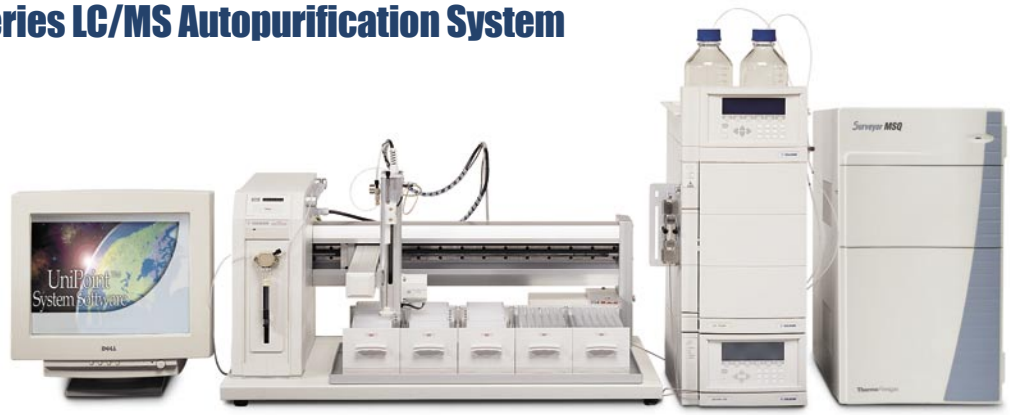
NEBULA™ Series Preparative HPLC System

- Wide flow rate range of the 333 and 334 pumps allows the user to perform both semi-preparative and preparative separations with the same system
- Low dwell volume allows fast, reproductive gradients
- Off-bed collection racks allow for true large-scale fraction collection without sacrificing valuable bed space
- Injection of up to 15 g per run depending on column dimensions
- 30X pump series, configured as injection pumps, can inject volumes up to several liters to maximize sample loading on the preparative HPLC column
- High pumping power accommodates a wide range of preparative column sizes

Combinatorial Chromatography System

- Ideal for analyses covering a wide range of drug discovery applications: high-throughput screening, pharmacokinetics, drug metabolism, FIA/MS, high-throughput purification, and mass spectrometry
- Single-instrument solution for injection, fraction collection, and re-injection of samples from the same bed
- Optional VALVEMATE® Valve Actuator maximizes throughput by allowing automatic column switching between analytical and preparative columns without manual intervention
- Exclusive graphical sample tracking through UniPoint™ System Software saves time and eliminates errors

NEBULA™ Series LC/MS Autopurification System



- Easy-to-use, UV- or mass-based purification system
- Injection and fraction collection on the same bed
- Real-time traces both from MS and UV for on-screen comparison
- Chromatographic trace is generated from the summed extracted ion chromatogram of up to seven masses
- MS interface is ideal for non-volatile buffers, enabling continuous operation for weeks
- Ability to add samples on the fly for increased flexibility
- Collection by slope, level, time, and drop. Collection can be set for peaks and non-peaks
- Advanced reporting allows the mass labeling of each peak with optional background-subtracted base peak
- VALVEMATE® Valve Actuator provides automatic column switching capability to maximize throughput
- Full-scan MS data collection leads to greater confidence in identification of collected fractions
- Performs both negative and positive ionization

NEBULA™ Series Semi-Preparative HPLC System

- Small-to-medium injection and fraction capacity
- A single instrument for sample injection, fraction collection, and re-injection—no need to transfer tubes or racks
- Simultaneously displays a chromatogram, a list of sample descriptions and images of the sample, and collected fraction tubes
- Easily automated linear scale up from analytical to preparative HPLC methods
- Graphical sample tracking allows for easy matching of samples, chromatograms, and fractions
- Easily customized reports include required calculations using all mathematical functions

MALDILC™ System

Gilson's new MALDILC™ System is designed to perform nano to microbore HPLC with fraction collection and simultaneous matrix addition onto MALDI plates. The plated fractions can then be analyzed repeatedly by MALDI-TOF MS. The Gilson MALDILC System is an ideal preparation technique for easily automating a historically manual procedure.

- Nano, capillary, and micro HPLC with fraction collection directly to MALDI targets
- On-line matrix addition with mixing
- HPLC-coupled fraction collection simplifies complex tryptic digests, providing more readable MS spectra
- Compatible with most MALDI target formats
- 350 Micro Pumps deliver accurate and reliable flow rates (300 nL/min. to 50 µL/min.) without splitting flow

235 Analysis System

- High capacity in a small footprint. The 235 Autoinjector can inject from four 384- or 96-well microplates, or 192 2-mL or 384 0.7-mL vials
- Integrate the 235 Analysis System with your HPLC or LC/MS system for sample injection
- Heat or cool your samples with the 235P Autoinjector—allowing for a complete range of operation
- Handles an amazing 1536 samples—ideal for unattended operation

nLC™ System

Gilson's versatile nLC™ System accommodates columns from 75 µm to 1 mm in diameter, providing you with a single solution for nano, capillary, or micro LC. This new system provides an important tool for protein analysis—only the new nLC System can deliver gradient elution down to 300 nL/min. without a flow splitter. This allows the system to maintain constant flow rates independent of column backpressure.

The system's air gap detectors ensure precise positioning of nanoliter sample volumes in the loop while minimizing sample waste. The system also provides column-switching capability, which allows sample cleanup and preconcentration on the same system. The system saves on costly samples and reagents due to reduced sample injection size and solvent consumption. With Gilson's nLC System, users can develop multi-dimensional protocols that include sample preparation and injections from 96-, 384-, or 1536-well plates.

- Ideal for LC/MS/MS and proteomic applications
- Splitless flow gradient delivery for nano to micro flows
- Flexible column switching capability for applications including multi-dimensional chromatography, sample enrichment, and more

cLC™ System

Gilson's cLC™ System is a complete chromatography system capable of automating the purification of compounds using both reverse-phase and normal-phase columns. The cLC System also has the ability to accommodate various modes of detection including UV/VIS, MS, ELSD, or RI. Additional analytical components are also integrated into the cLC System, enabling automated on-line evaluation of the collected fractions.

- Automated solvent selection and equilibration of up to 12 different solvents
- Fraction collection pathway is separate from the injection pathway
- Automated injection and fraction collection with graphical sample tracking
- Capable of performing >20 different chromatography applications on one system:
  - Analytical, Semi-Prep, Preparative
  - Reverse and Normal Phase, Chromatofocusing, Affinity, Size Exclusion, Ion Exchange, Flash, etc …
- Purifies >15 g/column at flow rates up to 200 mL/min.
- Accommodates up to 5 columns (analytical, semi-prep, and preparative) in a variety of sizes

940 Workstation

925 Workstation

925 and 940 Workstations

Gilson's Workstations are available in two sizes to suit virtually any liquid handling and sampling protocol.

In addition to pipetting, plate gripping, and moving capabilities, the workstations can interface with other laboratory equipment such as balances, mixers, incubators, vortexers, plate sealers, washers, vacuum blocks, and plate readers. This gives you the ability to automate a full range of liquid handling and sample preparation steps.

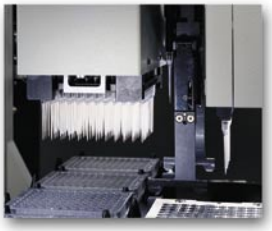
- Flexible, customizable deck design accommodates virtually any liquid handling or sampling protocol
- Multiple-function cartesian robot holds up to five tools (1-, 8-, 96-, 384-channel pipettors and gripper) to allow immediate access to multiple tools on the same head; no need to drop off or pick up tools, saving time and increasing efficiency
- Single-channel pipettor for accessing individual wells—ideal for cherry-picking operations
- Ability to process vials and microplates on the same deck allows for flexibility in the choice of methods and applications
- Disposable pipette tips and fixed probes allow user-determined, on-the-fly switchover between fixed probes or disposable tips
- Ability to integrate third party accessories and devices provides application flexibility with the use of accessories such as the Bio-Tek® Plate Washer and Molecular Devices Plate Reader

For technical specifications, see page 30.

Product Nos.: 16101925 (925 Workstation), **16101940** (940 Workstation)

96-channel pipettor accessing a 384-well microplate

Microplate gripper transporting a 384-well microplate



X/Y carriage configured with four independently moving tools

All Gilson instruments come with a one-year warranty, including our sophisticated liquid handlers. We do this with confidence because our instruments are designed and built to our stringent specifications. Extended warranties are also available. Call **800-445-7661** for more information on Gilson's warranty program.

925 PC
Protein Crystallography Workstation

Automates the preparation of 96 hanging drop and sitting drop experiments in minutes. Meets the demand for high-throughput reagent screening, yet can provide large, high-quality crystals suitable for X-ray diffraction.

- Ideal for high-throughput rapid screening protocols
- Significantly reduces the time and expense needed to determine strategies for optimization experiments
- Processes up to four sitting drop plates per batch
- Rapid and efficient screening of large numbers of different proteins
- Flexibility of using time-tested hanging or sitting drop vapor diffusion techniques—no need to validate new methods
- Multiple-tool head allows for plate gripper, and 96-channel and eight-channel pipettors for fast transfer of screening and protein solutions
- 96-well plate and Teflon® cover seals all wells completely, eliminating evaporation and increasing productivity
- Eliminates carryover and cross-contamination by using disposable pipette tips for accurate, repeatable, and dependable results
- Deck layout holds plates, tips, screening solutions, and protein reservoirs on the same bed, allowing for complete and quick automation
- Dispenses protein in volumes as low as 1 µL, which saves precious protein sample and costly reagents
- Reduces protein consumption up to 50% and reagent use up to 90% compared to classical crystallography experiments using 24-well plates

For technical specifications, see page 30.

Product No.: 16101925PC

Plate flipper tool

8-channel pipettor accessing a 96-well microplate

HANDS ON

Did You Know?

Gilson offers customer training, featuring technical courses for Gilson instrument and software users. Courses are held at the Gilson Technical Center in Middleton, Wisconsin. Call **800-445-7661** to learn about our 3-day, hands-on Constellation® 1200 course or to request your FREE Gilson Customer Training brochure.

Constellation® 1200 Liquid Handler

Precise, nanoliter-volume liquid handling capability allows you to accurately dispense volumes from 5 nL to 400 mL without an air gap. Precision robotics and flexible software ensure accurate, repeatable X/Y motion so you'll hit your target every time. Capable of dispensing with or without an air gap, providing increased flexibility for your specific application.

- Large bed holds up to 12 microplates
- Aspirates from 96- and 384-well microplates; dispenses into 96-, 384-, and 1536-well microplates , MALDI-TOF plates, or non-standard formats
- 12-tip Z-arm configuration provides high throughput for genomic and proteomic applications
- Noncontact dispensing eliminates damage to tips during "touch-off"
- Complete control using 735 Sampler Software (version 5.1 or higher)
- Optional microplate chiller cools plates to reduce sample evaporation and preserve sample integrity

For technical specifications, see page 31.

Product No.: 281010

215 Liquid Handler/Injector

Single-probe, high-throughput liquid handler delivers a robust performance for fast and accurate direct injection onto HPLC or LC/MS systems. Suitable for a wide variety of applications with the capability of piercing thick septa.

- Versatile liquid handler accommodates a wide variety of sample vessels such sas microplates, microcentrifuge vials, test tubes, scintillation vials, and bottles
- Large capacity: holds up to 17 standard or deep-well microplates, or 480 autoinjector vials
- Icon-based software with a graphical tray editor makes automated method setup fast and easy
- Numerous custom software and rack configurations to meet the demands of your applications
- New spring-loaded probe is ideal for low- and sub-microliter liquid handling

For technical specifications, see pages 31–32.

Product No.: 2510121 (215 with syringe pump)

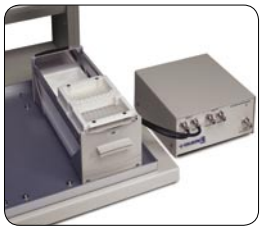
ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
215 Liquid Handler w/o syringe pump	2510191

Quad-Z 215 Liquid Handler/Injector

Features four independent probes with variable horizontal spacing from 9 to 18 mm for access to a wide range of sample vessels. Large bed capacity holds up to 17 microplates. Accommodates virtually all existing Gilson racks for maximum flexibility for sample transfer between tubes, vials, and plates.

- The 444 QuadDilutor has four independently controlled syringe pumps for use with the four independently controlled probes on the Quad-Z 215 for maximum flexibility across all four channels
- The 444 accepts syringe sizes ranging from 100 µL to 25 mL
- Optional 849 Multiple Injection Module enables automated on-line injection onto parallel HPLC systems

For technical specifications, see page 32.



Optional Vacuum Rack and Controller provide a high-throughput solution for vacuum SPE applications using 96-well SPE plates.

Product Nos.: 25101411 (Quad-Z 215 with 444 QuadDilutor)
2515352 (Vacuum Rack with Controller)

215 SW Liquid Handler/Injector

Smaller footprint saves on bench space and allows the 215 SW to fit inside a fume hood for safer use while working with volatile chemicals. The increased clearance between the Z-arm and the bed enables you to use larger tubes and bottles.

- The 215 SW Controller provides complete remote-access control of the instrument from outside the fume hood
- External 402 Dual-Syringe Pump increases liquid handling and solvent delivery flexibility; large delivery volume range of 1 µL to 25 mL
- Accommodates virtually all of Gilson's numerous standard and custom racks, providing increased application flexibility
- Optional High Force Z-Arm provides more than twice the vertical punch strength than the standard Z-arm for piercing thick septa
- Optional 819 Injection Modules enable automated on-line injection onto HPLC systems

For technical specifications, see pages 32–33.

Product No.: 261010

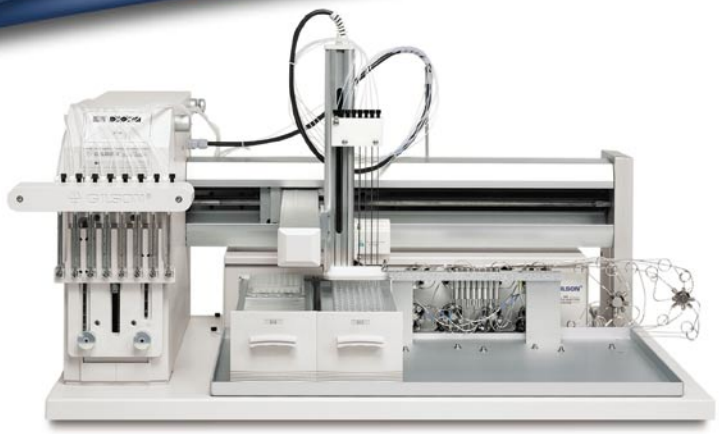
Quad-Z 215 with Disposable Tips

The addition of disposable tips to Gilson's Quad-Z 215 Liquid Handler offers an important tool for molecular biology applications including DNA probes, PCR preparation, automated sample prep, and electrophoresis. The disposable tips option increases throughput, efficiency, and reproducibility and lowers costs by automating manual pipetting procedures. Disposable tips also eliminate the problem of contamination from carryover and increase speed by eliminating wash steps.

- A four-probe liquid handler with the capability of employing disposable tips eliminates the concern of contamination from carryover
- Independent probes with variable horizontal spacing from 9 to 18 mm allows access to a wide range of tubes, vials, and microplates
- Accepts both 10 µL and 200 µL Gilson Diamond® Tips for a dispensing volume range of 1 to 200 µL
- Independent syringe control allows independent volume transfer across all four tips at the same time
- On-bed tip storage allows quick and easy access and pick up by the probes

For technical specifications, see page 33.

Product Nos.: 25101411 (Quad-Z 215 with 444 QuadDilutor)
250616 (Quad-Z 215 Adapter Kit for Disposable Tips)



Multiple Probe 215 Liquid Handler/Injector

Flexible liquid handler and injector is designed to improve throughput for drug discovery and drug metabolism laboratories. High-throughput capacity is ideal for parallel injection onto HPLC or LC/MS systems.

- Large-capacity, multiple-probe liquid handler processes four or eight samples simultaneously
- High-throughput automation of basic liquid handling tasks such as: sample transfer, dilutions, mixing, reagent addition, and plate reformatting
- Perfect for high-throughput injection onto FIA/MS systems using the optional 889 Multiple Injection Module
- Patented Dual Rail™ syringe drive technology allows for accurate use of one to eight syringes and probes

For technical specifications, see pages 33–34.

Product No.: 25101311 (Multiple Probe 215 Liquid Handler with 125 mm arm)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
Multiple Probe 215 Liquid Handler with 175 mm arm	25101312
Multiple Probe 215 Injector with 125 mm arm	25101315
Multiple Probe 215 Injector with 175 mm arm	25101316

Micro 215 Liquid Handler/Injector

Designed to handle the demands of smaller injection volumes—delivers microliter volumes with precision and accuracy. Injects 1µL (or less) from 96-well microplates, vials, or tubes.

- Ideal for injecting 1µL (or less) directly into the 841 Micro Injection Module to minimize carryover and maximize precision; can also accommodate large-volume injections
- Optional Peltier Racks for cooling and heating of samples in standard microplates
- Accommodates up to 17 standard or deep-well microplates
- Increases throughput with valve switching speeds five times faster than the standard 215 Liquid Handler/Injector

For technical specifications, see page 34.

Product No.: 25101233 (Micro 215 Liquid Handler with 125 mm arm)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
Micro 215 Liquid Handler with 175 mm arm	25101234
Micro 215 Injector with 125 mm arm	25101231
Micro 215 Injector with 175 mm arm	25101232

250 Nano Injector

The 250 Nano Injector is designed to handle very small amounts of sample while maintaining good injection performance. This is accomplished by the injector's innovative mechanical design—a mobile sample tray and stationary probes. An optical sensor is used to detect the air gap in front the sample. This detection capability enables the injector to consume a minimum of sample and to position it precisely in the injection loop.

- Precise sample injection from 50 nL to 100 µL—ideal for limited sample applications, minimizes solvent usage
- Optical sample placement sensor provides accurate, reproducible sample injection volumes
- Integrated column switching valves increase efficiency of 2-D separations and sample pre-concentration procedures
- Stationary sampling probe design minimizes fluid path length, reduces sample band broadening, and enhances separations
- High-precision sample tray robotics utilizes 96-, 384-, or 1536-well microplates and 2- or 20-mL vials

For technical specifications, see pages 34–35.

Product No.: 271010 (250 Nano Injector, standard configuration)

235/235P Autoinjectors

High-throughout, small-footprint injectors accurately deliver microliter samples onto your HPLC, LC/MS, or FIA/MS system with precise reproducibility. Peltier (P) heating/cooling and septum-piercing (SP) models are also available.

- Large-capacity bed capable of handling up to 1536 samples—perfect for overnight operation
- Offer the flexibility to interface with a variety of detectors including UV/VIS and MS
- Accommodate a variety of sample vessels
- Accommodate a variety of sample vessels
- Peltier cooling capability reduces evaporation, enabling smaller sample sizes and improved sample integrity

For technical specifications, see pages 35–36.

Product Nos.: **241021** (235 Autoinjector)
241022 (235P Autoinjector with Peltier Controller)
241023 (SP 235 Autoinjector with septum-piercing capability)
241024 (SP 235P Autoinjector with Peltier Controller and septum-piercing capability)

Features/Benefits of Septum-Piercing Models (SP 235 & SP 235P)

- Septum-piercing probe has a grooved surface that vents sealed vials to ensure injection precision
- Angled tip allows septa to be pierced with 20–30% less force than the conical-tip probe
- Spring-loaded, septum-piercing probe design allows samples to be kept sealed to prevent evaporation or potential contamination
- The smaller 0.7-mm tip width helps reduce carryover, while easily piercing most common septa, including "sheet" and Cap Mat "bubble" microplate covers and Teflon® sheet-style, 2-mL vial septa

234 Autoinjector

Low-cost automatic injector combines excellent reproducibility, versatility, and performance for routine applications at an economical price.

- Five built-in injection methods make it quick and easy to set up and run your samples
- User-selectable method parameters give you the flexibility you need to automate a wide range of routine sample handling procedures
- Three loop-filling options—total, partial, and centered
- Stores up to 20 protocols for future retrieval
- Menu-driven software ensures fast, easy setup and operation
- Automatic, two-position needle rinsing station rinses both inside and outside the needle, eliminating a manual step and minimizing cross-contamination from carryover

For technical specifications, see pages 36–37.

Product No.: 2710451

223 Sample Changer

Programmable sampler for automated sample preparation and transfer. The 223 Sample Changer is the perfect solution for protocols such as serial dilutions, addition of samples, sampling into vials, timed reactions, and tube-to-tube transfers.

- Ideal for automated transfer of samples in analytical techniques like FIA and spectroscopy (UV/VIS, AA, ICP)
- Level-sensing and user-selectable rinsing parameters help eliminate sample contamination due to carryover
- Operates as a stand-alone or slave instrument
- Control via 735 Sampler Software allows for easy, customer-developed methods
- Choose from a wide variety of probe designs and standard and custom racks
- Optional flow-through rinse station available
- New spring-loaded probe is ideal for low- and sub-microliter liquid handling

For technical specifications, see page 37.

Product No.: 191015

221 XL/222 XL Liquid Handlers

Large-capacity, robotic liquid handlers automate your sample preparation and transfer protocols. The 221 XL and 222 XL are ideal for automating liquid transfer for many applications, including ICP, AA, UV/VIS, spectrophotometry, FIA, and colorimetery.

- Operate with Minipuls 3 Pump or 402 Syringe Pump
- Built for easy, unattended operation
- Multiple control options such as RS-232 and contact closure I/Os help ensure integration with your instrument
- Large, flexible bed. The 221 XL has a 120-tube capacity; the 222 XL offers 540-tube capacity, and accepts up to five different racks in a single tray
- Rack options accommodate tubes of virtually any size and volume

For technical specifications, see pages 37–38.

Product Nos.: 271021 (221 XL)
271052 (222 XL)

231 XL/232 XL/233 XL Sample Injectors

Built for unattended operation, the 231 XL and 232 XL automate virtually any sample preparation and injection procedure. The 231 XL holds a single rack with up to 120 vials; the 232 XL and 233 XL accept up to five different racks with a capacity of up to 540 vials.

- Task-oriented software makes it fast and easy to build injection protocols
- 402 Syringe Pump delivers volumes from 1 mL to 99 mL with excellent precision
- Allow selection of flow rates to compensate for different sample viscosities

For technical specifications, see page 38.

Product Nos.: 271041* (231 XL)
271081* (232 XL)
271091* (233 XL with 720 Sampler Software)

**Requires additional accessories for operation. For information, please call 800-445-7661, or contact your local sales representative.*

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
233 XL Sampling Injector with 735 Sampler Software	2710915

ASPEC™ XLi SPE System

Utilizes laboratory terminology for all SPE steps (condition, load and collect, wash, elute, column drying). Offers automated sample pretreatment.

- Collects eluting fractions into different rows utilizing the multi-collect feature
- Flexible control via 735 Sampler Software
- Improved speed and extreme precision of both large and small sample and solvent volumes with Gilson's 402 Syringe Pump
- Offers a combination of operating modes, including sequential and batch modes
- Accommodates 1-, 3-, and 6-mL standard SPE cartridges

For technical specifications, see pages 38–39.

Product No.: 2910715 (ASPEC XLi with 735 Sampler Software)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
ASPEC XLi with Keypad 721 Sampler Software	291071

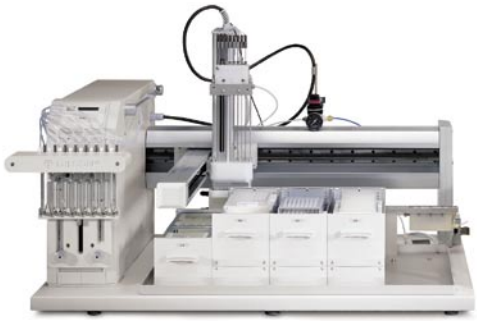
ASPEC™ XL4 SPE System

Processes four samples in parallel, with the capability of processing up to 50 samples per hour. Large capacity; access up to 108 samples in a single batch.

- Flexible control via Gilson's 735 Sampler Software
- Accepts 1-, 3-, and 6-mL standard SPE cartridges and 3M 96-well microplates
- Transfers extract into open or sealed autoinjector vials
- Provides mixed-mode (sequential, batch, or combination) SPE and multicollection capabilities
- Collects eluting fractions into different rows utilizing the multi-collect feature
- Uses positive-pressure elution technology, assuring better reproducibility and higher precision
- Accesses up to nine solvents from any size bottle with Gilson's 404 Syringe Pump

For technical specifications, see page 39.

Product No.: 2910915 (ASPEC XL4 with 735 Sampler Software)



SPE 215 System

The optimal solution for high-throughput solid phase extraction and sample purification. Offers versatile application support through 96-well extraction plates, and 1-mL and 3-mL SPE cartridges. Positive-pressure elution—accomplished through Gilson's "Integrated Sealing Foot Design"—provides more accurate and precise liquid transfers.

- Processes up to 96 samples in an hour; ideal for high-throughput drug discovery LC/MS applications
- An automated solution for sample preparation, dry down, sample reconstitution, and injection onto HPLC or LC/MS systems
- Enables parallel cleanup, filtration, and purification of combinatorial libraries and biological fluids
- Select large volumes of one to nine solvents or reagents depending upon your application
- Performs injection of up to eight samples in parallel with the addition of the optional 889 Multiple Injection Module

For technical specifications, see pages 39–40.

Product No.: 25101321

151/152 UV/VIS Detectors

Deliver versatile, rugged HPLC detection for drug discovery and drug metabolism applications.

- Gilson's optical design lets you optimize detection of your sample at any wavelength from 190 to 700 nm
- The detectors have a sensitivity range of 0.001 to 2.0 AUFS (Absorbance Units, Full Scale)
- Controlled via Gilson's UniPoint™ System Software or choose stand-alone, keypad control with the 151 model
- Choose from the following modes to specify detection conditions and basic operating parameters:
  - single wavelength
  - file
  - status
  - setup

For technical specifications, see pages 40–41.

Product No.: 10105311 (151 with flow cell/accessory kit)
10105411 (152 with flow cell/accessory kit)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
151 UV/VIS Detector w/o flow cell accessory kit	1010531
152 UV/VIS Detector w/o flow cell accessory kit	1010541

155/156 UV/VIS Detectors

Offer integrated detection for your HPLC. Gilson's optical design lets you optimize detection of your sample at any wavelength from 190 to 700 nm.

- The detectors have a sensitivity range of 0.001 to 2.0 AUFS (Absorbance Units, Full Scale)
- Controlled via Gilson's UniPoint™ System Software or choose stand-alone, keypad control with the 155 model
- Choose from the following modes to specify detection conditions and basic operating parameters:
  - single wavelength
  - dual wavelength
  - scan wavelength
  - file
  - status
  - setup

For technical specifications, see page 41.

Product No.: 10105511 (155 with flow cell/accessory kit)
10105611 (156 with flow cell/accessory kit)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
155 UV/VIS Detector w/o flow cell accessory kit	1010551
156 UV/VIS Detector w/o flow cell accessory kit	1010561

Turn to pages 30–49 to find the **Technical Specifications** for the instruments in this Product Guide. The technical specifications include information such as software control, environmental conditions, dimensions, power requirements, and more.

112 UV Detector

Rugged, economical, fixed-wavelength detector for analytical or preparative HPLC and LC. A front panel knob allows selection of wavelength to monitor the absorbency of almost any sample.

- Provides detection at the following wavelengths::
  - 214
  - 229
  - 254
  - 280
- Easy-to-change lamp/filter assemblies for selecting wavelengths
- Fixed-wavelength design provides increased sensitivity
- With a 10-mm pathlength analytical flow cell, the detector offers excellent sensitivity—ranging from 0.001–1 AUFS (Absorbance Units, Full Scale)
- Dual-beam optics ensure equal illumination of both the sample cell and the reference aperture to maintain baseline stability at high sensitivity
- Easy, one-step baseline function helps reduce operating and set up time
- Event-marking function allows convenient marking of the point of injection or advance of a fraction collector on the recorder or data system

For technical specifications, see pages 41–42.

Product No.: 0310511 (112 with lamp and 11µL flow cell/accessory kit)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
112 UV Detector w/lamp & 40 µL flow cell/accessory kit	0310521
112 UV Detector w/o lamp or flow cell/accessory kit	0310501

FC 206 Fraction Collector

Gilson's FC 206 is a high-flow fraction collector, ideal for large-scale preparative work. Enables collection of up to 40 fractions at flow rates from 200 mL/min. to 800 mL/min. with the addition of high-flow accessories.

- Fits easily into a fume hood; separate keypad for operator safety
- Allows collection into both tubes and large bottles (up to several liters)
- Capable of time, peak, and combined modes
- Funnel collection capabilities for off-bed collection

For technical specifications, see page 42.

Product No.: 131021

215 Fraction Collector

Allows for injection and collection on the same bed when used in Gilson Combinatorial Chromatography Systems. Makes the ideal large-bed fraction collector. Configurations available for preparative fraction collection.

- Flexible collection methods: collect fractions by time, volume, peak collection by level, peak collection by slope, or subfractions by time
- Off-bed funnel collection for unlimited volume capability
- Movable Z-arm provides for more accurate sample collection into any collection vessel, especially microplates, without residual splashing and contamination in neighboring wells
- UniPoint™ System Software features graphical sample tracking, matching each sample position with its corresponding fraction(s) and chromatogram
- Re-inject collected fractions to verify peak purity

For technical specifications, see pages 42–43.

Product No.: 2510121* (215 Fraction Collector with syringe pump)
**Requires additional accessories for operation. For information, please call 800-445-7661, or contact your local sales representative.*

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
215 Fraction Collector w/o syringe pump	2510191*

FC 203B

FC 203B/FC 204 Fraction Collectors

Collect fractions by time, drop, or peak to suit all your LC applications. Choose the compact FC 203B for small-capacity collection or the FC 204 for large volumes and capacities. Both units accept a wide variety of collection vessels, including microplates, microvials, and tubes.

- In peak mode, collectors monitor a detector signal and identify peaks using either an adaptive-slope algorithm or a specified millivolt cutoff
- Up to ten programmable time windows can be added for collecting only what you want while discarding the column's void volume, peaks of no interest, and equilibration volumes
- Operate as stand-alone instruments with an easy-to-use keypad, or can be controlled through your PC via UniPoint™ System Software
- 3-way diverter valve prevents contamination of collected fractions (standard on FC 204, optional on FC 203B)
- Contact closure inputs are available to remotely start/advance or stop
- Compact size fits in most fume hoods

For technical specifications, see page 43.

Product Nos.: 171011 (FC 203B)
171041 (FC 204)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
FC 203B Fraction Collector with 3-way valve	171011DV

202C Fraction Collector

Multi-cycle operations make the 202C ideal for fraction collection with automated, repetitive-injection HPLC systems. With 15 operating modes, it's suitable for virtually any HPLC application—including large-scale preparative applications.

- Large-bed, high-capacity, cold room-compatible fraction collection with a wide variety of standard and non-standard racks
- Choose from six basic collection modes: time, drop, peak, time program, signal program, and manual
- Select from nine combined modes for maximum peak purity and sub-fractionation of selected peaks
- Free vessel programming and storage of up to nine fractionation files
- With up to 20 collection time windows and 20 drain steps, the 202C is a powerful fraction collection solution
- Expand your fraction collection capabilities by selecting up to five racks for non-stop collection into 540 tubes

For technical specifications, see pages 43–44.

Product No.: 151011

Looking for probes? Gilson offers a wide selection of standard probes to meet many liquid handling applications. **Turn to page 25 for a helpful probe selection chart.** Need a specialized probe? Give us a call! Gilson's unparalleled customization capability can provide solutions for all your liquid handling needs.

321/322 HPLC Pumps

Multisolvent pumps designed for use in Gilson's NEBULA™ Series Analysis Systems for analytical and semipreparative chromatography. Pump heads are easy to access and simple to maintain. Stackable to conserve bench space.

- 321 functions as a master pump with control panel; 322 is remotely controlled via 321 master or UniPoint™ System Software
- H1 pump heads are ideal for 2–12 mm ID columns with flows up to 15 mL/min. and pressures up to 8000 psi
- H2 pump heads are ideal for 3–20 mm ID columns with flows up to 30 mL/min. and pressures up to 4300 psi
- High-pressure Adjustable Volume Dynamic Mixer (AVDM™) enables fast gradient response times and homogeneous mixtures
- Software benefits: safety files (pressure limits, emergency signal and power failure); anomaly processing procedures with related outcomes; GLP functions: solvent consumption, diagnostic helps, maintenance logs, leak test, piston-seal installation, mixing test, and audit trail
- Control within a complete preparative workstation: Gilson UniPoint™ System Software—includes data processing and report of results

For technical specifications, see page 44.

Product Nos.: **38103211** (321-H1 Pump with 0.15–15 mL/min. flow)
381032211 (322-H1 Pump with 0.15–15 mL/min. flow)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
321-H2 Pump with 0.30–30 mL/min. flow	38103212
322-H2 Pump with 0.30–30 mL/min. flow	381032221

331/332 HPLC Pumps

Dual-piston pumps for semipreparative and preparative chromatography. Feature a variable-volume, dynamic mixer for optimized gradient performance.

- Milligram-level sample mass-throughput per injection: 150 mg with a 20-mm bore column
- Easy linear transposition from analytical to preparative HPLC methods on 4 to 20 mm ID columns packed with high-efficiency stationary phases
- Solvent selection on each pump: additional four-solvent valve (up to 12 solvents)
- Control from 331 Master Pump: flow-rate gradient, four-solvent selection and step gradient (additional valve), composition gradient (one or two additional pumps), sample-injection pump, UV/VIS detector, and electrical input/output contacts with any other associated equipment
- Software benefits: safety files (pressure limits, emergency signal and power failure); anomaly processing procedures with related outcomes; GLP functions: solvent consumption, diagnostic helps, maintenance logs, leak test, piston-seal installation, mixing test, and audit trail
- Control within a complete preparative workstation: Gilson UniPoint™ System Software—includes data processing and report of results

For technical specifications, see page 44.

Product Nos.: **38103312** (331-H2 Primary Solvent, Dual-Piston, Reciprocating Master Pump)
38103322 (332-H3 Secondary Solvent, Dual-Piston, Reciprocating Remote-Controlled Pump)

333/334 Prep-Scale HPLC Pumps

Your delivery solution for preparative chromatography. Capable of fast separations with high-efficiency columns in normal-phase and reverse-phase modes. Choose the 333 Master Pump for isocratic applications.

- Milligram- to gram-level mass throughput per injection; up to 15 g depending on column size and loading capacity
- Same max loading with two different column sizes
- Composition gradient with high-pressure mixing: 333-334 Binary System (third pump for ternary). Solvent selection on each pump: additional four-solvent valve (up to 12 solvents)
- Ability to operate additional pumps in parallel to double the flow rate
- Control from 333 Master Pump: flow-rate gradient, four-solvent selection and step gradient (additional valve), composition gradient (one or two additional pumps), sample-injection pump, UV/VIS detector, and electrical input/output contacts with any other associated equipment
- Control 33X Pumps and entire preparative workstation

For technical specifications, see page 45.

Product Nos.: **38103331** (333-H3 Primary Solvent, Dual-Piston, Reciprocating Master Pump)
38103341 (334-H3 Secondary Solvent, Dual-Piston, Reciprocating Remote-Controlled Pump)

Application Note

Fully Automated Preparative HPLC Using Recycling Technology

Application: Separation of Enantiomers
Single enantiomeric drugs represent 50% of the top 500 drugs worldwide. Therefore, preparative scale separation of pure enantiomeric products from racemic drugs is a significant problem to solve in pharmaceutical process research.

Purpose
Isomer purification in the chemical and pharmaceutical industries can be achieved by the use of recycling technology.

Advantages of Recycling Technologies
• High purity and recovery yield in the separation of two closely eluted compounds, such as enantiomeric isomers

• Reliable technique—with limited changes to the outlet tubing, the 333 Pump, with its dual-piston technology, is ideal for preparative recycling applications, and the system can easily revert to simple chromatography

• High increase of column efficiency—this system allows the use of a shorter column without losing resolution, which is of interest when using expensive chiral phases

• Low eluent consumption and reduced working pressure

This application highlights the advanced features of Gilson's preparative pumps.

Want to know more? Go to **www.gilson.com/pdf/lt800417e.pdf** *for a complete copy of this application note.*

Application Note

Minimizing Injection Carryover by Optimizing Rinse and Injection Parameters

Sample solubility, sample concentration, sample volume, sample matrix, and rinse solvent all affect injection carryover. These parameters must be closely scrutinized to minimize carryover. Being aware of and controlling parameters that affect carryover can help you reduce injection carryover to a manageable level.

When working with very concentrated samples or minimally soluble samples, extensive rinses of the probe, transfer tubing, injection port, and injection valve may be necessary to reduce injection carryover. This requires custom injection protocols with custom rinse commands. Optimizing your system injection and rinse procedures, as described in this note, will help reduce the injection carryover in your system.

Check out the rest of this application note at **www.gilson.com/pdf/lt40001.pdf**

350 Micro Pump

Gilson's 350 Micro Pump provides precise solvent delivery for nano to micro LC that delivers accurate and reproducible gradients from 300 nL/min. to 50 µL/min. The 350 is capable of delivering true micro flow rates without requiring a flow splitter.

- Modular, binary pumping system with independent micro mixer optimizes separation with nano, capillary, and micro columns for 1-D, 2-D, and LC/MS/MS applications
- Splitless flow delivery eliminates the inaccuracy of flow splitters, while dramatically reducing solvent consumption
- Dual-piston pump with patented magnetic coupling ensures precise, accurate flow rates from 300 nL/min. to 50 µL/min.
- Quick pressurization protocol allows for fast system startup and column stabilization
- Pump head seal wash permits the use of buffered solvents with increased confidence and decreased maintenance

For technical specifications, see page 45.

Product No.: 38103931 (350 Micro Pump w/o degasser)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
350 Micro Pump with degasser	38103932

Minipuls 3 Peristaltic Pump

Multichannel peristaltic pump provides smooth, pulse-free flow. Easy to integrate into your existing system—control through a digital keypad or remotely through another device.

- Accommodates a wide range of flow rates. Choose from four interchangeable standard pump heads with one, two, four, or eight channels for flow rates between 0.05 mL/min. and 45 mL/min.; or from two high-flow pump heads with two or four channels for flow rates between 5 mL/min. and 250 mL/min.
- Driven by ten stainless steel rollers, it produces smoother, pulse-free flows at higher pressures
- Offers enhanced reliability and ease of operation. The pump's speed stability is maintained independent of normal temperature variations from 0–40˚C
- Ideal for all biological perfusion applications from 0–40˚C

For technical specifications, see pages 45–46.

Product No.: F155004 (Minipuls 3 Pump, single-channel)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
Minipuls 3 Pump, 2-channel	F155005
Minipuls 3 Pump, 2-channel (high flow)	F155008
Minipuls 3 Pump, 4-channel	F155006
Minipuls 3 Pump, 4-channel (high flow)	F155009
Minipuls 3 Pump, 8-channel	F155007

VALVEMATE® Valve Actuator

Automates HPLC and LC techniques to save time, extend column life, and reduce consumable consumption. Controls high- and low-pressure valves to facilitate a wide range of column switching and LC applications.

- Controls one multiport, multiposition valve or operates in concert with additional VALVEMATE actuators when two or more valves are required
- Controls Rheodyne six- and ten-port high-pressure valves with up to six positions
- Controls Hamilton and Rheodyne low-pressure valves ranging from four to eight ports and up to eight positions
- Easy to integrate into any system with RS-232 control; contact closure inputs and Gilson Serial Input/Output Channel (GSIOC) interface available
- Fast valve movement times (see specifications)

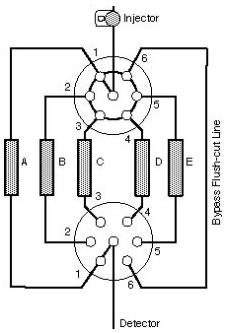
For technical specifications, see page 46.

Product No.: 331051

High-Pressure Applications

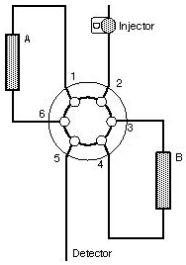
Five-column switching

In multiuser labs, two VALVEMATEs operating in tandem allow easy selection from up to five columns.



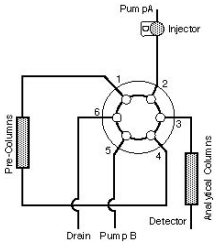
Two-column switching

Samples can be injected onto two different column stationary phases to check sample purity.



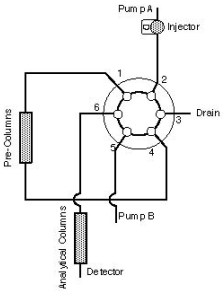
Sample cleanup

With a two-pump system, undesired compounds are removed from the sample with a precolumn. The second pump flushes the precolumn.



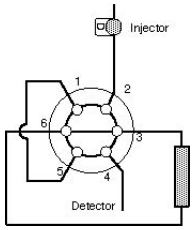
Sample enrichment

Sample is loaded and concentrated on a precolumn. The VALVEMATE then switches the mobile phase to elute the concentrated sample.



Column backflushing

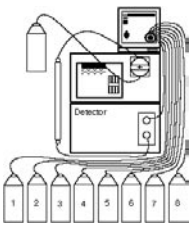
The VALVEMATE reverses the mobile phase flow, backflushing the analytical column to elute unwanted sample components as a single peak.



Low-Pressure Applications

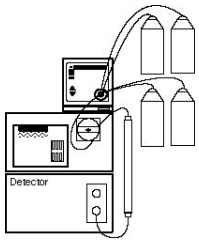
Fraction collection

The VALVEMATE can function as a preparative fraction collector with detector eluent directed to a low-pressure valve.



Mobile phase selection

With a low-pressure valve connected to the pump inlet, the VALVEMATE can switch solvents to create a step gradient. This can also provide a way to automatically flush salts from the pump.



402 Syringe Pump

Assures accuracy in sample transfer, dilution, reagent addition, mixing, and more. Offers speed and reliability for repetitive liquid handling tasks at the touch of a button.

- Delivers volumes from 1.0 µL to 25 mL with excellent precision
- Allows selection of liquid handling flow rates to compensate for different sample viscosities
- Single-and dual-syringe with tee junction, and dual-syringe with valve modules available

For technical specifications, see pages 46–47.

Product No.: F410511 (402, single-module with tee junction)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
402 Dilutor-Dispenser, dual-module with tee junction	F410512
402 Dilutor-Dispenser, dual-module with two valves	F410513

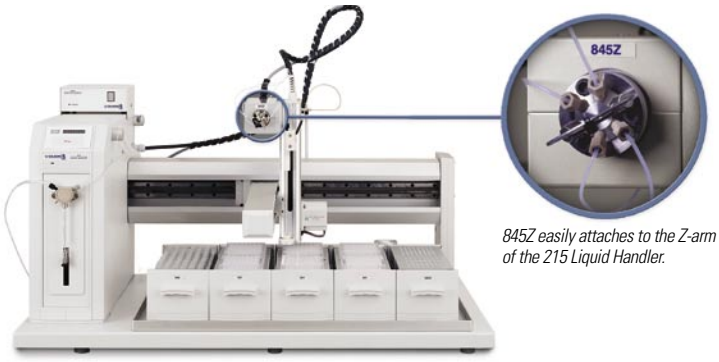
818 AutoMix

Provides fully automated, software-driven mixing and sampling. Designed for NEBULA™ Series 215 Liquid Handlers/Injectors.

- Typical applications include the mixing of whole blood samples and two immiscible liquids
- Mix an entire rack of samples at once with oscillating mixing
- Operates at two settings: low (10 rpm) and high (20 rpm)

For technical specifications, see page 47.

Product No.: 251520



845Z easily attaches to the Z-arm of the 215 Liquid Handler.

845Z Injection Module

Gives you the best of both worlds—high-throughput capacity with minimal carryover. Attaches directly to the Z-arm of the 215 Liquid Handler for aspirating sample directly into the loop.

- Shorter injection cycle times translate to significant time savings in your lab
- No injection port means minimal carryover—less than 0.02% for analytical methods
- Low sample dispersion
- Available in analytical and preparative configurations

For technical specifications, see page 47.

Product No.: 251551s

Multiple Probe 215 configured with 849 Multiple Injection Module

849/889 Multiple Injection Modules

Designed for parallel injection onto an HPLC or LC/MS system. Deliver high-throughput capacity with outstanding speed and performance. Modules are the ideal choice for high-throughput injection onto FIA/MS.

- Configure with Rheodyne's RV700-100 valves or RV700-112 valves depending upon your laboratory's needs
- Accommodate injection loop sizes as small as 5 µL up to 5 mL

For technical specifications, see pages 47–48.

Product Nos.: 2515154 (849 with RV700-100 injection valves)
251515 (889)

ALTERNATE CONFIGURATIONS	
Configuration	**Product No.**
849 Multiple Injection Module with RV700-112 valves	2515155

Gilson offers more than 100 standard rack configurations. **See pages 50–51 for a handy Compatibility Chart** to assist you with choosing the proper rack for your Gilson liquid handler

852/853/854 Peltier Racks

Flexible, accurate, and programmable racks for heating and cooling. Three versatile rack options: 852 for shallow-well plates, 853 for 2-mL vials, and 854 for deep-well plates.

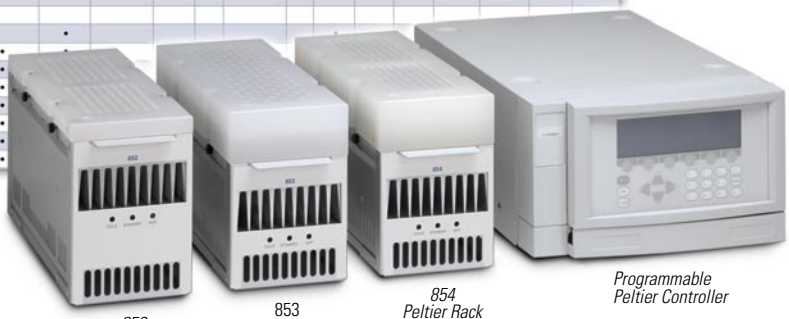
- Control via the Programmable Peltier Controller as an integral part of any system or as a stand-alone unit
- Flexible—can be configured with NEBULA™ Series 215 Liquid Handlers/Injectors
- Open OCX controls make integration into your system quick and easy
- Precise temperature control from 4–40°C
- Control up to five racks from a single Programmable Peltier Controller

For technical specifications, see page 48.

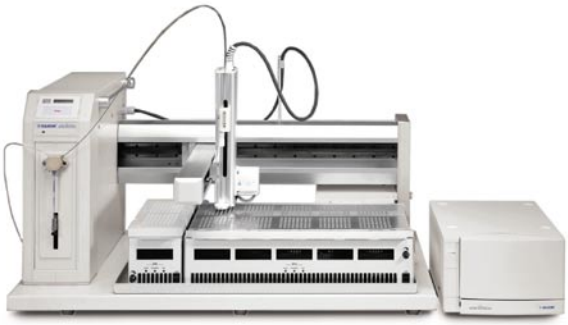
Product Nos.: **2514852** (852 Peltier Rack)
2514853 (853 Peltier Rack)
2514854 (854 Peltier Rack)

GILSON RACK/LIQUID HANDLER COMPATIBILITY CHART

Rack Code	Product No.	215/215 SW/ 215 FC	Quad-Z 215	Multiple-Probe 215	Micro 215	234	235/SP235/ 235P/ SP235P	223	221 XL	222 XL	231 XL	232 XL/ 233 XL	SPE 215	ASPEC XLi	ASPEC XL4
0	270430	•			•			•	•	•	•	•			
0	12040302								•	•	•	•			
1	12040101														
2	130402														
4	130412														
7	2707401							•	•	•	•	•			
8	270438	•			•			•	•	•	•	•			
9	270439	•			•			•	•	•	•	•			
10	130411														
11	170413														
14	170414														
15	170415														
16	170416														
16D	170416D														
17	170418														
20	150425		•												
21	150422	•													
22	150424	•													
22U	150498	•													
23	150426	•													
23W	270433	•													
24	150427	•													
28	150420	•													



852 Peltier Rack
853 Peltier Rack
854 Peltier Rack
Programmable Peltier Controller



Micro 215 Injector with one 242 Peltier Rack and one 542 Peltier Rack and a 215 Peltier Controller

242/542 Peltier Racks

Provide cooling and heating for the entire NEBULA™ Series 215 Liquid Handlers/Injectors. Individually controlled to allow cooling and heating on the same bed.

- Peltier Racks provide cooling of samples for reduction of evaporation, enabling smaller sample sizes and improved sample integrity
- Control both the 542 and 242 Peltier Racks from a single power source
- Each 242 Peltier Rack handles up to two standard 96-well microplates
- A single 215 Peltier Controller powers one 542 Peltier Rack and an optional 242 Peltier Rack or up to five 242 Peltier Racks
- The 542 Peltier Rack enables cooling and heating control of up to 1152 samples when combined with an optional 242 Peltier Rack

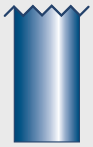
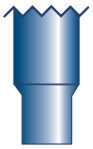
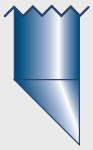
For technical specifications, see pages 48–49.

Product Nos.: **25146331** (242 Peltier Rack)
2514542 (542 Peltier Rack)

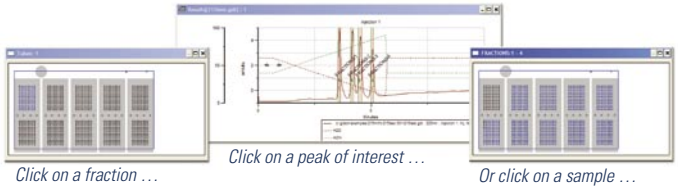
Probes

Gilson offers many different types of probes and probe tips to allow you to select the design that best fits your application. Gilson's broad array of probes and tips provides solutions for all your liquid handling needs.

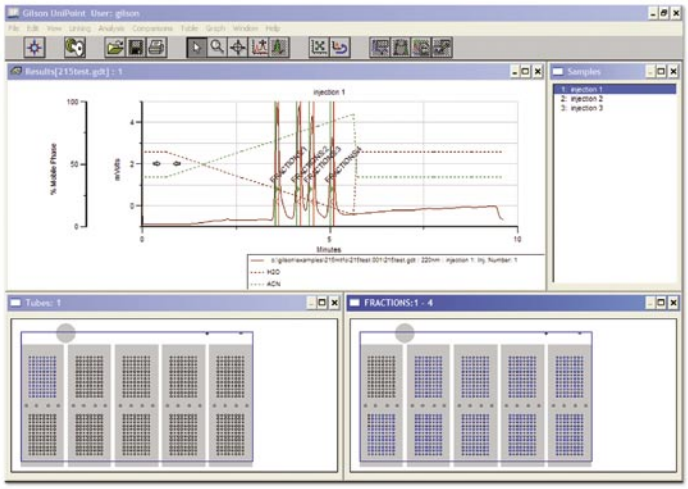
To order a Gilson probe, simply call **800-445-7661**.

Tip Design		Description	Comments
	**Flat**	The tip is cut perpendicular to the length of the probe.	■ Aspirates the last drop of liquid ■ Non-piercing ■ No injection
	**Constricted Tip**	The bottom part of the probe has a smaller inner diameter than the rest. Constricted-tip probes may have different tip designs. For example, a probe may be constricted and beveled.	■ Compatible with injection ports
	**Beveled**	The tip is cut at an angle, leaving a bevel.	■ Sharp tip enables septum-piercing ■ Compatible with injection ports
	**Vented**	Two styles: 1. A shallow groove cut in the probe shaft, above the tip (shown at left). 2. Two probes are assembled concentrically, creating two separate channels: the inner channel for liquid, and the outer channel for gas. Vented probes may have different tip designs.	■ Septum-piercing ■ Vent allows pressures inside and outside a sealed vessel to equilibrate as liquid is dispensed or aspirated
	**Side-entry**	The liquid flowpath opens on the side of the probe, not at the tip.	■ Recommended for thick septa ■ Prevents coring of septa ■ Compatible with injection ports
	**Deflected**	Based on the beveled tip design. The probe tip is curved and very sharp.	■ Septum-piercing ■ Tip pushes septa out of the way as it pierces to prevent coring ■ Compatible with injection ports
	**Conical**	Designed for PEEK injection ports.	■ Capable of piercing thin septa ■ Used only on the Micro 215 Injector and 235 Autoinjector ■ Aspirates the last drop of liquid

UniPoint™ System Software



Click on a fraction … *Click on a peak of interest …* *Or click on a sample …*



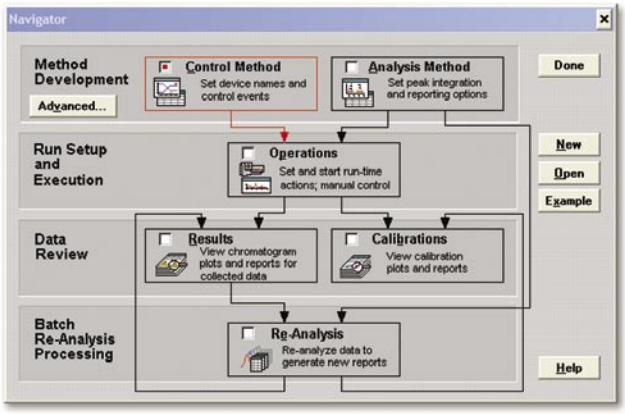
In just seconds, all of the corresponding information is conveniently displayed on a single screen.

UniPoint's graphical tracking offers several time-saving features:

- UniPoint's graphical tracking offers several time-saving features:
  - Powerful sample tracking
  - View a single peak of the plot
  - Overlay traces by simply pointing and clicking
  - Sample description files are easily imported from and exported to external spreadsheets for fast, accurate file exchange

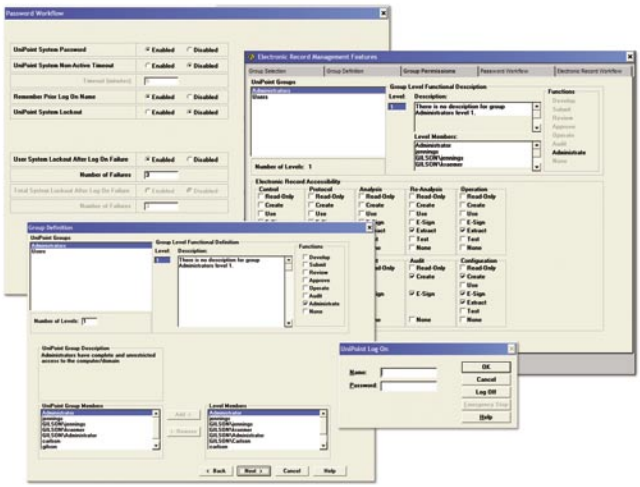
True multi-tasking capabilities:

- Control multiple systems simultaneously from a single computer
- Edit UniPoint software methods or re-analyze your data during a chromatography run
- Utilize other software while controlling your HPLC system
- Liquid handling capabilities for reformatting, diluting, etc.
- Versatile and flexible injection techniques
- Automated re-injection of collected fractions directly from the fraction sites with no manual intervention
- The interactive screen allows you to click on a fraction tube/well, peak, or sample location; the screen automatically updates corresponding windows
- Control of peripheral devices via RS-232 control



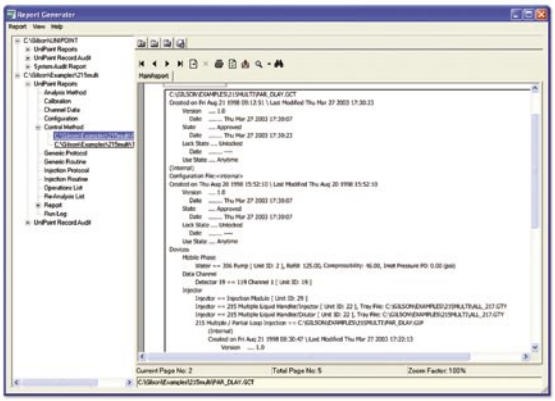
UniPoint offers single point control of all components and multi-tasking capabilities.

- Injection and fraction collection on one hardware platform
- Re-inject collected fractions into analytical system for purity check and estimate concentration
- Use multiple variables to customize operations and methods
- Easily add switching valves for multiple columns and multiple mobile phases
- 2-D chromatography capability
- Preparative injection and collection to 200 mL/min. with an unlimited collection volume
- Multiple detector signals with a single run



- Fully validated
- Electronic Records Management features help ensure GMP, GLP, and 21 CFR Part 11 compliance
- Electronic workflow capabilities
- Electronic signatures
- Security integrated with Microsoft® Windows®-based security
- Automatic versioning of records

Report Generator



Report Generator

The Gilson Report Generator is a powerful, stand-alone utility that is used to generate reports and electronic records from native Gilson software data files. With Report Generator, you can view and print reports directly or export them to rich text format (*.rtf), Adobe® PDF (*.pdf), Microsoft® Word (*.doc), or Microsoft® Excel (*.xls) file types for further study and formatting. Report Generator allows you to:

- Export reports to PDF, MS Word, MS Excel, and RTF file types
- Remotely generate reports across the network
- Customize reports with your company logo and header/footer information
- Provide several options for report layouts
- Create reports from a single sample or batch many reports together
- Work with several projects at once from one location

Remote Data Browser

Browsing to a Remote UniPoint™ System Software Installation

- With Report Generator, you can now access UniPoint System Software data that is located on a remote system—down the hall or across the world!
- By clicking on the Browse button on the Report Generator Toolbar, the UniPoint Installation Browser is displayed.
- The Log On button becomes active when a UniPoint permissions file is located
- After a successful log on, any available UniPoint records are accessible from the Report Selection Window.

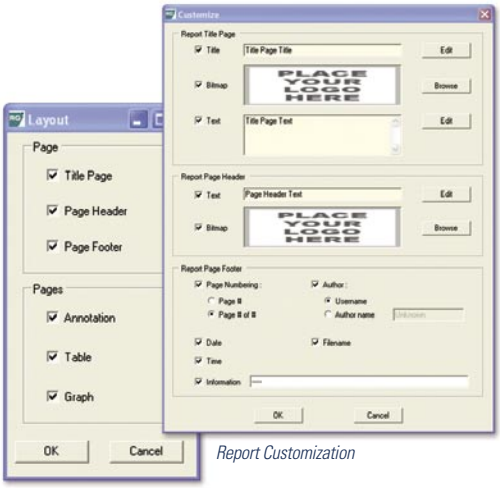
Formatting a Report

Customize

- Easily create a title page, header, and footer that include text or graphics (for example, page numbers, date, and file name, or the User name, Author name, and company logo; a header can be printed in the top margin and a footer in the bottom margin)

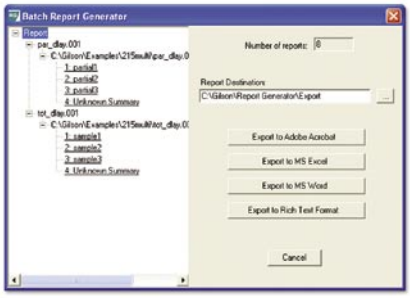
Layout

- Choose elements for the page layout (for example, header, footer, annotation, table, or graph) to enhance reports



Report Customization

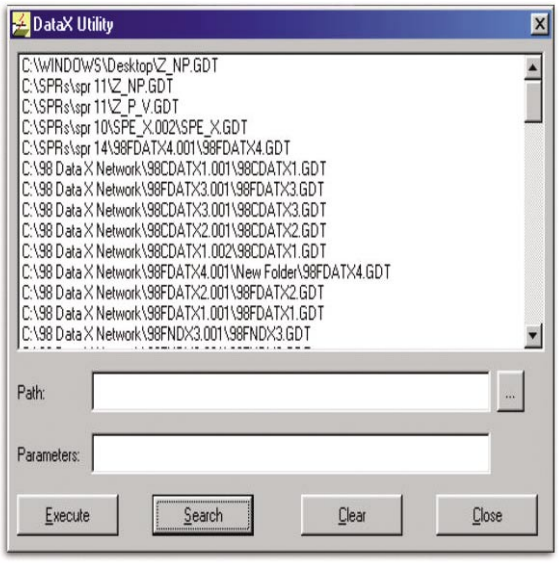
Report Layout



Batch Report Generator

Batch Reporting

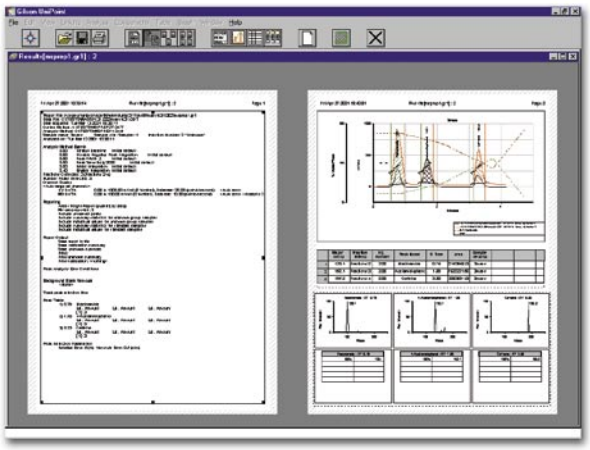
- Select multiple samples or files to export simultaneously to save time



DataX Software

DataX Software provides users with a simple way to export data from UniPoint™ System Software into an open database connectivity (ODBC) format. DataX is an executable program that reads a UniPoint generated data file (.GDT) and creates and populates a Microsoft® Jet database (.MDB file). The Jet database is ODBC compliant, which makes the converted UniPoint data available to other ODBC-compliant data systems. DataX exports all the data within the .GDT file to an .MDB file: sample location, fraction site, wavelength, etc.

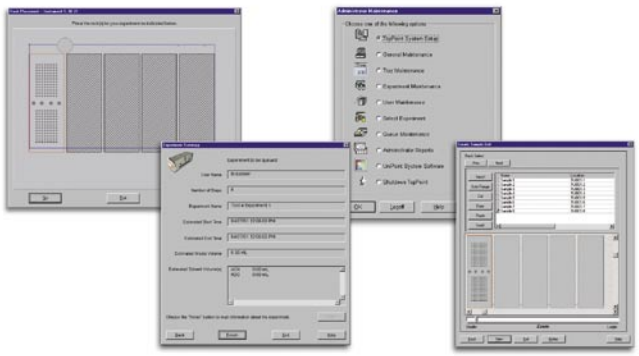
- Enables manual data conversions of previously collected UniPoint data
- Performs automatic data conversion performed during a UniPoint run
- Creates a subfolder within the directory that contains the .GDT and .MDB files; the .MDB file can then be viewed in Microsoft® Access or any ODBC-compliant database program
- Includes a DataX utility, allowing you to queue up several .GDT files for conversion and walk away, letting the computer do all the work
- Compatible with UniPoint System Software versions 3.0, 3.1, 3.3, and 4.0 on Microsoft® Windows® NT4 and Windows® 2000



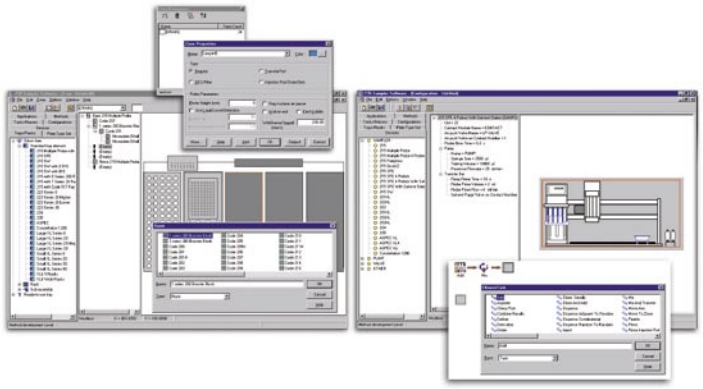
TopPoint offers three report screens: System, Users, and Results. Choose from a variety of pre-set options to customize the reports to your specific needs.

TopPoint Software

Provides multiple-user interface for total instrument control through UniPoint™ System Software. Allows multiuser and multilevel administrator access and control for data management in a completely open-access environment.



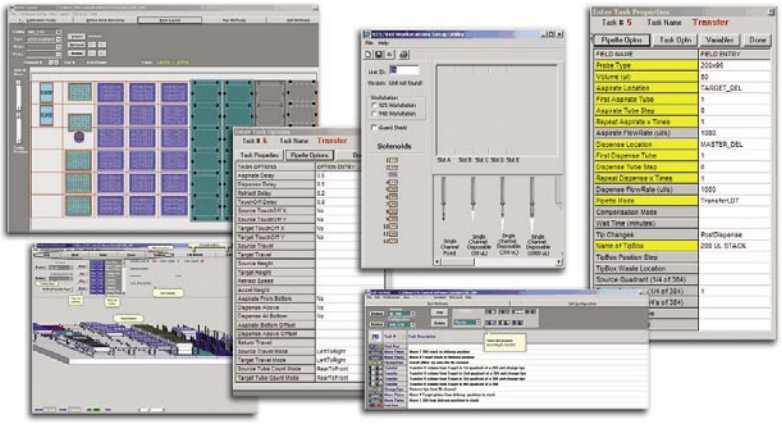
- Users simply log in with a password, select their experiment, create their sample list, and click FINISH to start their run
- Administrators have all the control needed to create powerful applications via UniPoint System Software
- Graphical sample tracking made easy with the click of a button
- Data acquisition and system control in a single software running on one computer or on a network
- Accurate, selective, and reproducible collection of multiple sample peaks
- Powerful tool to produce customized reports to fit your specific needs
- Compatible with UniPoint System Software versions 3.0, 3.1, and 3.3 on Microsoft® Windows® NT4



735 Sampler Software

Gilson's 735 Sampler Software is an intuitive and powerful, fully validated software package that offers you complete control of most Gilson NEBULA™, SPE, and XL Series instruments for liquid handling and injection protocols. The program offers fast, easy creation of both simple and complex methods. Its multi-tasking functionality allows you to maximize throughput, and the transfer of methods and applications from user to user is quick and easy.

- Reduced learning curve due to the easy-to-use, drag-and-drop graphical user interface
- Customize and optimize methods to meet the needs of virtually any application
- Run Simulation feature allows pre-calculation of volumes and checking for errors—saving time and ensuring accurate runs
- Easy method optimization using variables within the task properties
- Choose from more than 90 tasks utilizing common liquid handling protocols—from simple dilution to combinatorial dispensing
- Electronic Records Management features include:
  - Fully searchable audit trail
  - Integrated electronic signature capability
  - Integrated archive utility
  - User-level access control
  - Easy-to-create audit trail reports
  - Facilitates compliance with 21 CFR Part 11 and GMP and GLP requirements



745 Control Software

745 Control Software controls every aspect of the Gilson 925/940 Workstations. It is versatile to the point that it can accommodate almost any physical layout of the workstation deck, while also being able to incorporate a multitude of integrated devices and peripheral accessories. The software allows for almost any type of consumable product to be integrated and used in a method. 745 Control Software also allows users to create methods with much flexibility and without generating software code.

- User-friendly, graphical control system
- Create custom routines in minutes using the drag-and-drop programming environment
- Enables you to control the Gilson Workstations and create procedures using a graphical interface
- User Access Control lets you set a password that will allow access only to the "Run Procedures" screen

Customer Training Note

Gilson offers customer training, featuring technical courses for Gilson instrument and software users. Courses are held at the Gilson Technical Center in Middleton, Wisconsin.

Introduction to 735 Sampler Software
This 2-day course provides users of Gilson 735 Sampler Software with the basic information they need to create liquid handling and automatic sample injection applications for control of their liquid handler or sampling injector. Customers that have a Gilson liquid handler or sampling injector requiring automation will find this course a necessary introduction to the 735 Sampler software. A 2-day **Advanced 735 Sampler Software** course is also offered.

Call **800-445-7661** for course dates and pricing or check online at **www.gilson.com**.

AUTOMATION

925 and 940 Workstations

Liquid Handling
- Reproducibility: 3.5% CV at 5 µL
- Accuracy: 102% at 5 µL

For 5 µL with 96-channel pipettor/200-µL internal syringe/50-µL disposable tips using 745 Control Software Transfer Task

Sampler Type
- Stationary deck cartesian robot

Deck Capacity
- 925 Workstation: 200+ microplates
- 940 Workstation: 400+ microplates

Pipette Tip Capacity
- Single-channel pipettor : 10, 20, 50, 200, and 1000 µL
- 8-channel Pipettor:: 20, 50, and 200 µL
- 96-channel Pipettor: 20, 50, and 200 µL

Syringe Pump
- Optional, external, integral, high-precision, single- or dual-piston 402 Syringe Pump

Probe Rinse
- Single rinse station available

Arm Speed
- X/Y: 114 cm/sec. (45 in./sec.)
- Z: 10 cm/sec. (4 in./sec.)

Horizontal Motion Strength
- X: 18 kg (40 lbs.)
- Y: 18 kg (40 lbs.)

Software
- Gilson 745 Control Software

Communication Interface
- RS-232; Five relay outputs, four switched +24V DC 2A ouputs, four inputs (contact closure or TTL), and a safety switch

Display Panel
- Two lines of 24 alphanumeric characters

Front Panel
- Red button (Servo Power OFF), Yellow button (programmable), and Green button (Servo Power ON)

Compressed Air Requirement
- Maximum 6.9 bar @ 3.4 m^3/h (100 psi @ 2 cfm)

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120V or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 6.0A for 100–120V or 3.0A for 220–240V

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Instrument Dimensions (w x d x h)*
- 925 Workstation: 119 x 112 x 89 cm (47 x 44 x 35 in.)
- 940 Workstation: 175 x 112 x 89 cm (69 x 44 x 35 in.)

*Excludes optional syringe pump and accessories

Working Dimensions (w x d x h)
- 925 Workstation: 79 x 66 cm (31 x 26 in.)
- 940 Workstation: 145 x 66 cm (57 x 26 in.)

Instrument Weight
- 925 Workstation: 200 kg (440 lbs.)
- 940 Workstation: 227 kg (500 lbs)

Shipping Weight
- 925 Workstation: 417 kg (920 lbs.)
- 940 Workstation: 445 kg (980 lbs.)

925 PC Protein Crystallography Workstation

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed (max.)
- X/Y: 52.4 cm/sec. (60 in./sec.)
- Z: 25.4 cm/sec. (10 in./sec.)

Compressed Air Requirements
- 80 psi (5.3 bar) @ 2 cfm

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Maximum Syringe Flow Rates for Water
- 1000 µL/sec.; adjustable from 75 to 1000 µL/sec.

Pipette Tip Capacity
- 96-channel: 200 µL
- 8-channel: 50 µL
- Single-channel: 200 µL

Precision
- CV <2.4%

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 10A for 115V AC (20A with chiller) or 7A for 230V AC (15A with chiller)

Probe Positioning Performance
- Accuracy: ±0.2 mm (0.008 in.) in X/Y/Z dimensions
- Repeatability: ±0.1 mm (0.004 in.) in X/Y/Z dimensions

Sampler Type
- Gantry style X/Y/Z with stationary rack design

Software
- Gilson 745 Control Software

Syringe Pump
- Internal, high-precision, piston

Environmental Operating Temperature
- 5–40°C*

**Actual temperature is a function of the ambient temperature and the style of microplates used.*

Typical Number of Experimental Drops per Hour
- 1110+

Typical Volume of Protein Required
- 100 µL (about 10 µL per 8 sample vials)

Typical Volume of Screening Solution Required
- 50 µL per 96 wells

Vacuum Requirements
- 25" Hg @ 2 cfm

Vertical Punch Strength
- 96-Well: 4.5 kg (10 lbs.)
- Gripper: 8.2 kg (18 lbs.)

Dimensions* (w x d x h)
- 122 x 96 x 88 cm (48 x 37.8 x 34.6 in.)

**Include air gap and connectors*

Instrument Weight
- 132 kg (291 lbs.)

LIQUID HANDLING/INJECTION

Constellation® 1200 Liquid Handler

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Bed Capacity
- Twelve 96-well, 384-well, or 1536-well shallow microplates

Communication Interface
- RS-232 or GSIOC; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and two switched +24V DC 1A outputs

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 24-character, 2-line LED display and emergency stop activated by opening or pressing the front door panel

Gas Requirement
- Helium that is 99.99999% pure; 100–300 ft.^{3} at 3.4 bar (20 psi) using a gas pressure regulator

Maximum Flow Rates (for degassed, HPLC-grade water through the probe)

Syringe Size (µL)	Aspirate Rate (mL/min.)	Dispense Rate (mL/min.)
100	2	3
500 (default)	2	3
1000	2	3
2500	2	3
5000	2	3

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 3.5A for 100–120V or 1.75A for 220–240V

Probe Positioning Performance
- Accuracy: ±0.030 mm in X/Y dimensions over 600 mm
- Repeatability: ±0.002 mm in X/Y dimensions; ±0.001 mm in Z dimension

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probes; selectable rinse time and optional flowing rinse

Sampler Type
- X/Y/Z robot with a 12-probe configuration

Software
- Gilson 735 Sampler Software

Syringe Capacity
- 100 or 500 µL; 1, 2.5, or 5 mL

Syringe Pump
- Dual, internal, integral, high-precision

Dimensions (w x d x h)
- Overall: 114.6 x 68.7 x 76.4 cm (45.1 x 27.1 x 30.1 in.)
- Base Only (for use inside a fume hood): 93.9 x 67.3 x 45.7 cm (37 x 26.5 x 18 in.)

Instrument Weight*
- 121 kg (266 lbs.)

Shipping Weight*
- 168 kg (370 lbs.)

*Base and tower.

215 Liquid Handler/Injector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- >45.7 cm/sec. (>18 in./sec.) in X dimension
- >40.6 cm/sec. (>16 in./sec.) in Y dimension

Communication Interface
- RS-232 or GSIOC; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and one switched +24V DC 1A output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 8-character display, START and emergency STOP soft keys

Horizontal Motion Strength
- X: 5 kg (11.1 lbs.)
- Y: 7 kg (15.6 lbs.)

Injection Carryover†
- <1 ppb

Locator Plate Capacity
- Up to five Code 200-Series racks, up to seven Code 20- or 30-Series racks (or a combination of up to five racks of both types), or one Code 500-Series and one Code 200-Series rack

Maximum Syringe Flow Rates for Water

Syringe Size (µL)	Max. Flow Rate (mL/min.)
100	3.37
250	8.43
500	16.87
1000	33.75
5000	100
10,000	100
25,000	100

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.0A for 100–120V or 1.0A for 220–240V

Probe Positioning Performance
- Accuracy: ±0.5 mm in X/Y dimensions ±1 mm in Z dimension
- Repeatability: ±0.25 mm in X/Y/Z dimensions

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe; selectable rinse volume and flow rate. Optional inserts for level-sensing, nonleveling-sensing, and flow rinse

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson UniPoint™ System Software or 735 Sampler Software
- Local control via Gilson XL keypad

Syringe Capacity
- 100, 250, or 500 µL; 1, 5, 10, or 25 mL

Syringe Pump
- Internal, integral, high-precision, single-piston

Vertical Punch Strength
- 4.9 kg (11 lbs.)

Volumetric Accuracy and Precision† (max.)
- Open-tube-to-open-tube transfer:
  50 µL A = 0.25%, CV = 0.38%
  500 µL A = 0.19%, CV = 0.13%
- Sealed tube-to-open-tube transfer:
  50 µL A = 2.0%, CV = 0.63%
  500 µL A = 1.38%, CV = 0.25%

Dimensions (w x d x h)
- 91.4 x 61 x 55.8* cm (36 x 24 x 22* in.)
  **Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 150 mm (dependent on installed Z-arm).*

Instrument Weight
- 40 kg (89 lbs.)

Shipping Weight
- 73 kg (160 lbs.)

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Quad-Z 215 Liquid Handler/Injector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X: >45.7 cm/sec. (>18 in./sec.)
- Y: >40.6 cm/sec. (>16 in./sec.)

Communication Interface
- GSIOC or RS-232; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and one switched +24V DC 1A output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 8-character display, START and emergency STOP soft keys

Horizontal Motion Strength
- X: 5 kg (11.1 lbs.)
- Y: 7 kg (15.6 lbs.)

Locator Plate Capacity
- Up to five Code 200-Series racks in the standard locator plate, up to five combined Code 200-series and Code 20/30-Series racks in the standard locator plate, up to seven Code 20- or 30-Series racks in the Code 20- or 30-Series locator plate, or one Code 505 or 505H rack plus one Code 200-Series rack

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.5A for 100–120V or 1.4A for 220–240V

Probe Positioning Performance
- Accuracy:
  ±0.5 mm in X/Y dimensions
  ±1 mm in Z dimension
- Repeatability:
  ±0.25 mm in X/Y/Z dimensions

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson 735 Sampler Software or 706 Device Driver Software

Syringe Capacity
- 100, 250, or 500 µL; 1, 5, 10, or 25 mL

Syringe Pump
- External, integral, high-precision, four-piston (444 QuadDilutor)

Vertical Punch Strength
- 3.06 kg/probe (6.74 lbs./probe)

Dimensions (w x d x h)
- 91.4 x 61 x 60.8* cm (36 x 24 x 24* in.)
  **Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 150 mm (dependent on installed Z-arm).*

Instrument Weight
- Quad-Z 215: 40 kg (89 lbs.)
- 444 QuadDilutor: 14 kg (31 lbs.)

Shipping Weight
- Quad-Z 215: 75 kg (165 lbs.)
- 444 QuadDilutor: 18 kg (40 lbs.)

215 SW Liquid Handler/Injector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X: >45.7 cm/sec. (>18 in./sec.)
- Y: >40.6 cm/sec. (>16 in./sec.)

Communication Interface (215 SW Controller)
- RS-232 or GSIOC; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and one switched +24V DC 1A output

Cross Contamination†
- 0.001% into first methanol blank

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Horizontal Motion Strength
- X: 4 kg (9 lbs.)
- Y: 3 kg (7 lbs.)

Injection Carryover†
- 0.01%

Injection Reproducibility†
- Total loop fill: CV=0.5%
- Partial loop fill: CV=0.5%

Locator Plate Capacity
- Up to four Code 200-Series racks, four Code 20- or 30-Series racks (or a combination of up to four racks of both types), or one Code 500-Series rack

Power Requirements (215 SW Controller)
- Frequency: 50–60 Hz
- Voltage: 100–120 and 200–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 3.0A for 100–120V or 1.5A for 220–240V

Probe Positioning Performance
- Accuracy: ±0.5 mm in X/Y dimensions, ±1 mm in Z dimension
- Repeatability: ±0.25 mm in X/Y/Z dimensions

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson UniPoint™ System Software or 735 Sampler Software

Syringe Capacity
- 100, 250, or 500 µL; 1, 5, 10, or 25 mL

Vertical Punch Strength
- 5 kg (12 lbs.)
- High-Force Z-Arm: 11 kg (25 lbs.)

Volumetric Accuracy†
- Open-tube-to-open tube transfer: 50 µL transfer is 94.0% accurate, 400 µL transfer is 100.0% accurate
- Closed-tube-to-open tube transfer: 50 µL transfer is 91.0% accurate, 400 µL transfer is 98.8% accurate

Dimensions (w x d x h)
- 78.7 x 61 x 74.9* cm (31 x 24 x 29.5* in.)
  **Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 180 mm (dependent on installed Z-arm).*
- 215 SW Controller: 26.2 x 40.6 x 15.2 cm (10.3 x 16 x 6 in.)

Instrument Weight
- 29 kg (65 lbs.)
- 215 SW Controller: 6 kg (13 lbs.)

Shipping Weight
- 70 kg (155 lbs.)

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Quad-Z 215 Liquid Handler/Injector with Disposable Tips

Liquid Handling
- Reproducibility: 1.8% CV at 5 µL
- Accuracy: 98% at 5 µL
  For 5 µL with 10-µL disposable tip and 250-µL syringe using 735 Sampler Software

Sampler Type
- Stationary bed cartesian robot

Maximum Sample Capacity
- 3,072

Syringe Pump
- 444 QuadDilutor

Recommended Syringe Capacity
- 100–250 µL

Probe Positioning Performance
- ±0.5 mm in X/Y dimensions*; ±1 mm in Z dimension*
- Repeatability: ±0.25 mm in X/Y/Z dimensions

Arm Speed
- X: >46 cm/sec. (>18 in./sec.)
- Y: >41 cm/sec. (>16 in./sec.)

Horizontal Motion Strength
- X: 5 kg (11 lbs.)
- Y: 7 kg (15 lbs.)

Vertical Punch Strength
- 3 kg (7 lbs.)*

Disposable Tips
- Gilson Diamond® Tips: DL10 (10 µL) and D200 (200 µL)

Software
- Gilson 735 Sampler Software

Communication Interface
- RS-232 or GSIOC; Four relay outputs, one switched +24V DC 1A output, and four inputs (contact closure, TTL, or open collector)

Display Panel
- Eight-character LCD

Front Panel
- START and emergency STOP soft key

Liquid Contact Materials
- 316L stainless steel, polypropylene, FEP, PTFCE (Kel F)

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120V or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.5A for 100–120V or 1.4A for 220–240V

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Instrument Dimensions (w x d x h*)
- 91 x 61 x 61 cm (36 x 24 x 24 in.)
  **Vertical arm height is adjustable to accommodate vessel heights between 1 and 150 mm.*

Working Dimensions (w x d x h)
- 59 x 33 x 18 cm (23 x 13 x 7 in.)

Instrument Weight
- Quad-Z 215: 40 kg (89 lbs.)
- 444 QuadDilutor: 14 kg (31 lbs.)

Shipping Weight
- Quad-Z 215: 75 kg (165 lbs.)
- 444 Quad Dilutor: 18 kg (40 lbs.)

Multiple Probe 215 Liquid Handler/Injector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X: >45.7 cm/sec. (>18 in./sec.)
- Y: >40.6 cm/sec. (>16 in./sec.)

Communication Interface
- GSIOC or RS-232; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and one switched +24V DC 1A output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 8-character display, START and emergency STOP soft keys

Horizontal Motion Strength
- X: 5 kg (11.1 lbs.)
- Y: 7 kg (15.6 lbs.)

Injection Carryover†
- <1 ppb using a septum-piercing probe with capacitive-level sensing
  †Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Locator Plate Capacity
- Up to five Code 200-Series racks or one Code 505 or 505H rack plus one Code 200-Series rack

Maximum Syringe Flow Rates for Water (with eight syringes installed)

Syringe Size (µL)	Max. Flow Rate (mL/min.)
100	0.42
250	0.80
500	2.11
1000	4.22
2500	8.40
5000	12.50

Maximum Syringe Flow Rates for Water (with four syringes installed)

Syringe Size (µL)	Max. Flow Rate (mL/min.)
100	0.75
250	1.50
500	4.25
1000	8.50
2500	16.75
5000	25.00

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 and 200–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.0A for 100–120V or 1.0A for 220–240V

Probe Positioning Performance
- Accuracy: ±0.5 mm in X/Y dimensions, ±1 mm in Z dimension
- Repeatability: ±0.25 mm in X/Y/Z dimensions

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probes

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson UniPoint™ System Software or 735 Sampler Software
- Local control via Gilson XL keypad

Syringe Capacity
- 100, 250, or 500 µL; 1, 2.5, or 5 mL

Syringe Pump
- Integral high-precision, eight-piston syringe pump

Vertical Punch Strength
- 0.6 kg/probe (1.4 lbs./probe)

Dimensions (w x d x h)
- 97.8 x 61 x 55.8* cm (38.5 x 24 x 22* in.)

**Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 150 mm (dependent on installed Z-arm).*

Instrument Weight
- 40 kg (89 lbs.)

Shipping Weight
- 73 kg (160 lbs.)

Micro 215 Liquid Handler/Injector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X: >45.7 cm/sec. (>18 in./sec.)
- Y: >40.6 cm/sec. (>16 in./sec.)

Communication Interface
- GSIOCor RS-232; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and one switched +24V DC 1A output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 8-character display, START and emergency STOP soft keys

Horizontal Motion Strength
- X: 5 kg (11.1 lbs.)
- Y: 7 kg (15.6 lbs.)

Injection Carryover†
- <0.002% with recommended rinsing volumes

Injection Repeatability @ 1µL†
- Total-loop filling method: 1.5%
- Partial-loop filling method: 1.8%
- Centered-loop filling method: 2.5%

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Injection Valve Switching Speed
- <100 ms

Injection Volume
- 0.5 µL–5000 µL

Locator Plate Capacity
- Up to five Code 200-Series racks, up to seven Code 20- or 30-Series racks (or a combination of up to five racks of both types), or one Code 500-Series and one Code 200-Series rack

Maximum Syringe Flow Rates for Water

Syringe Size (µL)	Max. Flow Rate (mL/min.)
100	3.37
250	8.43
500	16.87
1000	33.75
5000	100.00
10,000	100.00
25,000	100.00

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 and 200–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.0A for 100–120V or 1.0A for 220–240V

Probe Positioning Performance
- Accuracy: ±0.5 mm in X/Y dimensions, ±1 mm in Z dimension
- Repeatability: ±0.25 mm in X/Y/Z dimensions

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe; selectable rinse volume and flow rate. Optional inserts for level-sensing, nonleveling-sensing, and flow rinse

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson UniPoint™ System Software or 735 Sampler Software
- Local control via Gilson XL keypad

Syringe Pump
- Integral, high-precision, single-piston

Syringe Capacity
- 100, 250, or 500 µL; 1, or 5 mL

System Resolution
- 0.1 µL

Vertical Punch Strength
- 4.1 kg (11.0 lbs.)

Dimensions
- 91.4 x 61 x 55.8 cm* (36 x 24 x 22* in.)

**Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 150 mm (dependent on installed Z-arm).*

Instrument Weight
- 40 kg (89 lbs.)

Shipping Weight
- 73 kg (160 lbs.)

250 Nano Injector

Injection
- Mode: total loop or centered loop (except for 50-nL injection loop
- Carryover (with 100-nL internal loop): <0.055%, using rinsing parameters
- Reproducibility (with 100-nL internal loop):
  - total loop RSD: <2%
  - centered loop RSD: <10%
- Accuracy: ±5%

- Valve switching speed: <0.2 seconds
- Volume: 50 nL–100 nL with the standard injection valve (100-nL internal loop), 50 nL–500 nL with loop exchange (4-port valve), 2 µL–100 µL with loop exchange (6-port valve)
- Available sample loops:
  - internal: 50, 100, 200, or 500 nL
  - external: 2, 5, 10, 20, 50, or 100 µL
- Transfer flow rate: 2 µL/min. (recommended); adjustable from 100 nL/min.–100 µL/min.

Sampler Type
- Mobile sample platform cartesian robot

Number of Sample Vessels/Bed
- For samples: 2 microplates (96- and 384-well, deep or shallow, or 1536-well) or 112 x 2-mL vials
- For reagents: 4 x 20-mL or 4 x 2-mL vials

Probes (L x OD x ID)
- Probe options:
  - sample prep (stationary): beveled-tip, stainless steel, grooved septum-piercing, constricted (103 x 1.5 x 0.4 mm)
  - sample injection (stationary): beveled-tip, stainless steel, grooved septum-piercing, constricted (103 x 1.5 x 0.4 mm; tip OD: 0.7 mm) with fused silica tubing (263 x 0.36 x 0.1 mm)
  - sample injection (stationary): flat tip for 1536-well plates, stainless steel (103 x 2 x 0.4 mm; tip: 6 x 0.36 x 0.1 mm) with fused silica tubing (263 x 0.36 x 0.1 mm)

Probe Rinse
- Inside probe rinse via dedicated syringe pump; outside probe rinse via peristaltic pump

Tray Positioning Performance
- Accuracy: ± 0.05 mm (0.002 in.) in X/Y/Z dimensions

Tray Speed Performance
- 75 mm/sec. (3 in./sec.) in X/Y dimensions; 50 mm/sec. (2 in./sec.) in Z dimension

Tray Cooling
- Sample cooling via external chiller

Syringe Pump
- Three syringe pumps for: high-precision injection, injection probe rinsing, and sample preparation

Recommended Syringe Capacities
- Injection syringe: 10, 50, 100, or 500 µL
- Rinsing syringe: 100, 500, 1000, or 2500 µL
- Sample prep. syringe: 100, 500, 1000, or 2500 µL

Available Valves
- Standard: one 4-port valve; optional: two additional 6-port valves

Software
- Gilson 735 Sampler Software

Communication Interface
- RS-232 or GSIOC; Three relay outputs, one 12V DC, 0.5A output, three contact inputs, and one analog signal input

Front Panel
- Power, Detector Calibration, and Air Gap LED indicators; Detector, Dilutors, HP Valves, and Arm ERROR LED indicators; emergency STOP soft key

Liquid Contact Materials
- PEEK, Teflon®, 316 stainless steel, fused silica

Power Requirements
- Current rating: 3.15A
- Frequency: 50–60 Hz
- Voltage: 100–120V or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage

Environmental Operating Temperature
- 5–40°C

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Instrument Dimensions (w x d x h)
- Sample platform: 74 x 54 x 39 cm (29 x 21 x 15 in.)
- Hydraulic module: 41 x 25 x 23 cm (16 x 10 x 9 in.)

Instrument Weight
- Sample platform: 47 kg (104 lbs.)
- Hydraulic module: 10 kg (22 lbs.)

Shipping Weight
- 75 kg (165 lbs.)

235/235P Autoinjectors

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Arm Speed (max.)
- X: 10.16 cm/sec. (4.0 in./sec.)
- Y: 8.76 cm/sec. (3.5 in./sec.)

Available Sample Loops
- 1 (internal), 5, 10, 20 (standard), 50, 100, 200, or 500 µL; 1, 2, or 5 mL

Available Valve
- Rheodyne RV700-120 analytical injection valve

Communication Interface
- RS-232 or GSIOC; Four inputs (contact closure), four relay outputs, and one switched +12V DC, 0.5A output

Dead Volume
- 1.5 µL from PEEK injection port to sample loop

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- STOP/HOME soft key and LED indicator lights for POWER, READY, INJECT, LOAD, and ERROR

Injection Carryover†
- Lower than 0.0035% with the following rinse volumes: Injection port rinse: 500 µL; Outside probe rinse: 500 µL

Injection Reproducibility†
- CV <0.5%* with 20 µL loop, 100 µL syringe, and total loop filling method

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Liquid Contact Materials
- 304 and 316L stainless steel, ceramic, PEEK

Locator Plate Capacity
- Up to 4 96- or 384-well microplates, 192 2-mL vials, or 384 0.7-mL vials*

**Racks for the 235P only accept microplates.*

Power Requirements
- Frequency: 47–63 Hz
- Voltage: 85–245V

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe; selectable rinse volume and flow rate. Rinse station may also be used for a flow through rinse

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson 235 Autoinjector Software, UniPoint™ System Software, or 735 Sampler Software (version 4.0)

Syringe Capacity
- 100, 250, or 500 µL; 1, 5 or 10 mL

Syringe Pump
- Integral, high-precision, single-piston

Environmental Operating Temperature*
- 8°–40°C

**Actual temperature is a function of the ambient temperature and the style of microplates used.*

Valve Switching Speed
- <200 ms

Vertical Punch Strength
- 1.8 kg (4.0 lbs.)

Dimensions (w x d x h)
- 25.9 x 61.2 x 35.1 cm (10.2 x 24.1 x 13.8 in.)

Instrument Weight
- 235: 19 kg (42 lbs.)
- 235P: 19 kg (42 lbs.)

Shipping Weight
- 235: 23 kg (51 lbs.)
- 235P: 23 kg (51 lbs.)

SP 235/SP 235P Autoinjectors

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Arm Speed (max.)
- X: 10.16 cm/sec. (4.0 in./sec.)
- Y: 8.76 cm/sec. (3.5 in./sec.)

Available Sample Loops
- 1 (internal), 5, 10, 20 (standard), 50, 100, 200, or 500 µL; 1, 2, or 5 mL

Available Valve
- Rheodyne RV700-100 analytical injection valve

Communication Interface
- RS-232 or GSIOC; Four inputs (contact closure), four relay outputs, and one switched +12V DC, 0.5A output

Dead Volume
- 7 µL from PEEK injection port to sample loop

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- STOP/HOME soft key and LED indicator lights for POWER, READY, INJECT, LOAD, and ERROR

Injection Carryover†
- Lower than 0.0070% with the following rinse volumes: Injection port rinse: 500 µL; Outside probe rinse: 500 µL

Injection Reproducibility†
- CV <0.5%* with 20 µL loop, 100 µL syringe and total loop filling method

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Liquid Contact Materials
- 304 and 316L stainless steel, ceramic, PEEK

Locator Plate Capacity
- Up to 4 96- or 384-well microplates, 192 2-mL vials, or 384 0.7-mL vials*

**Racks for the SP 235P only accept microplates.*

Power Requirements
- Frequency: 47–63 Hz
- Voltage: 85–245V

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe; selectable rinse volume and flow rate. Rinse station may also be used for a flow through rinse

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson 235 Autoinjector Software, UniPoint™ System Software, or 735 Sampler Software (version 4.0)

Syringe Capacity
- 100, 250, or 500 µL; 1, 5 or 10 mL

Syringe Pump
- Integral high-precision, single-piston

Environmental Operating Temperature*
- 8–40°C

**Actual temperature is a function of the ambient temperature and the style of microplates used.*

Valve Switching Speed
- <200 ms

Vertical Punch Strength
- 1.8 kg (4.0 lbs.)

Dimensions (w x d x h)
- 25.9 x 61.2 x 35.1 cm (10.2 x 24.1 x 13.8 in.)

Instrument Weight
- SP 235: 19 kg (42 lbs.)
- SP 235P: 19 kg (42 lbs.)

Shipping Weight
- SP 235: 23 kg (51 lbs.)
- SP 235: 23 kg (51 lbs.)

Peltier Controller

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC; Two input contact closures (one for each 235P/SP 235P controlled)

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- LED indicator lights for POWER, HEAT, or COOL (unit 1) and HEAT or COOL (unit 2)
- Two 3-position switches and two temperature control knobs (one for each 235P/SP 235P controlled)

Power Requirements
- Frequency: 47–63 Hz
- Voltage: 100–120 and 200–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 5.0A for 100–120V or 2.5A for 220–240V

Dimensions (w x d x h)
- 26.5 x 43.5 x 15.6 cm (10.4 x 17.1 x 6.2 in.)

Instrument Weight
- 8 kg (18 lbs.)

Shipping Weight
- 10 kg (23 lbs.)

234 Autoinjector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Available Sample Loop
- 20 µL

Available Valve
- Rheodyne 7010

Communication Interface
- RS-232 or GSIOC; Three inputs and two relay outputs

Cross Contamination†
- <0.005% with recommended needle rinsing parameters

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 2-line, 80-character LCD, 5 soft keys for protocol setup; 2 LED injection valve position indicators

Injection Reproducibility†
- Standard Configuration:
  - Total loop fill: CV=<0.5%
  - Partial loop fill: CV=<0.8%
- Alternative Configuration:
  - Total loop fill: CV = 0.2%
  - Partial loop fill: CV = 0.7%

Liquid Contact Materials
- 316L stainless steel, FEP, PEEK, PP, PI

Locator Plate Capacity
- Up to 120 7-mL vials

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 and 200–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe; selectable rinse volume and flow rate

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson UniPoint™ System Software or 735 Sampler Software

Syringe Capacity
- 100 or 500 µL (standard)

Syringe Pump
- Integral, high-precision

Dimensions (w x d x h)
- 38 x 38 x 38.5 cm (15 x 15 x 15.1 in.)

Instrument Weight
- 20 kg (43 lbs.)

Shipping Weight
- 28 kg (62 lbs.)

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

223 Sample Changer

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X/Y: 25 cm/sec. (9.9 in./sec.)
- Z: 2.0, 3.0, 6.2, 12.7, 24.7 cm/sec. (0.79, 1.18, 2.44, 5.00, 9.72 in./sec.)

Communication Interface
- RS-232 or GSIOC; Four inputs (contact closure, TTL, or open-collector), four relay outputs, and one switched +24V DC (500 mA max.) output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- One yellow LED indicator light

Horizontal Motion Strength
- X: 2 kg (5 lbs.)
- Y: 1.5 kg (3 lbs.)

Maximum Number of Vials
- 432 (7 x 40 mm or 10 x 75 mm)

Number of Racks
- Up to four Code 20- or 30-Series racks

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: one 2.0A fuse for 90–120V or two 2.0A fuses for 220–240V

Probe Positioning Performance
- Accuracy: ±1 mm in X/Y/Z dimensions
- **Repeatability:** ±0.25 mm in X/Y/Z dimensions

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probe

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson 735 Sampler Software
- Local control via Gilson Keypad Controller

Vertical Punch Strength
- 1 kg (2 lbs.)

Dimensions (w x d x h*)
- 53.5 x 43.7 x 60* cm (21.1 x 17.2 x 24* in.)

**Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 150 mm (dependent on installed Z-arm).*

Instrument Weight
- 18 kg (39 lbs.)

Shipping Weight
- 23 kg (51 lbs.)

221 XL/222 XL Liquid Handlers

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X/Y: 25 cm/sec. (9.8 in./sec.)
- Z upward: 12.5 cm/sec. (4.9 in./sec.)
- Z downward: 9 cm/sec. (3.5 in./sec.)

Communication Interface
- RS-232 or GSIOC; Four inputs, four outputs, three relay outputs, and two 12V power supplies

Cross Contamination†
- <0.0001% with liquid level detection and recommended needle rinsing parameters; <0.005% without liquid level detection

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Liquid Contact Materials
- 316L stainless steel or titanium, FEP, PTFE, PEEK, PP

Maximum Number of Sample Vessels
- 221 XL: 120 (6 x 32 mm or 7 x 40 mm) tubes
- 222 XL: 540 (7 x 40 mm or 10 x 75 mm) tubes

Power Requirements
- Frequency: 50–60 Hz

- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage

Probe Positioning Performance
- Accuracy: ±0.75 mm in X/Y/Z dimensions
- Repeatability: ±0.2 mm in X/Y/Z dimensions

Software
- Gilson 735 Sampler Software

Syringe Capacity (402 Syringe Pump)
- 100, 250, or 500 µL; 1, 5, 10, or 25 mL

Dimensions (w x d x h)
- 221 XL: 33 x 46.5 x 23 cm (13 x 19.3 x 9 in.)
- 222 XL: 51.5 x 62 x 23 cm (20.3 x 24.4 x 9 in.)

Instrument Weight
- 221 XL: 15 kg (34 lbs.)
- 222 XL: 20 kg (43 lbs.)

Shipping Weight
- 221 XL: 22 kg (49 lbs.)
- 222 XL: 29 kg (63 lbs.)

231 XL/232 XL/233 XL Sample Injectors

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Analog Input
- One analog signal (10 or 100 mV); convertible as fifth contact input

Arm Speed
- X/Y: 25 cm/sec. (9.8 in./sec.)
- Z upward: 12.5 cm/sec. (4.9 in./sec.)
- Z downward: 9 cm/sec. (3.5 in./sec.)

Available Sample Loop
- 20 µL

Available Valves
- Rheodyne 7010
- Rheodyne 7413

Communication Interface
- RS-232 or GSIOC; Four inputs, four outputs, three relay outputs and two 12V power supplies

Cross Contamination†
- <0.0001% with liquid level detection and recommended needle rinsing parameters; <0.005% without liquid level detection

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Injection Volume
- From 2 µL to 5 mL with partial loop filling of 7010 valve; from 0.5 to 2 µL with 7413 valve

Liquid Contact Materials
- 316L stainless steel or titanium, FEP, PTFE, PEEK, PP, PI

Maximum Number of Sample Vessels
- 231 XL: 120 (6 x 32 mm or 7 x 40 mm) tubes or 2 plates
- 232 XL/233 XL: 540 (7 x 40 mm or 10 x 75 mm) tubes or 9 plates

Minimum Sample Volume
- 10 µL, for four 1 µL injections, with peak area variations of less than 0.8%

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage

Precision†
- Total loop fill: RSD=0.5%
- Partial loop fill: RSD=0.8%

Replicate Injections
- Up to 100 from one vial

Sample Loading Method
- Direct introduction into a loop filler port allowing partial and total loop filling at selected flow rate

Software
- Gilson UniPoint™ System Software or 735 Sampler Software
- Local control via Gilson XL keypad with 720 software

Syringe Capacity (402 Syringe Pump)
- 100, 250, or 500 µL; 1, 5, 10, or 25 mL

Transfer Flow Rate
- Selectable from 3 to 1600 µL/sec. (0.2–96 mL/min.)

Dimensions (w x d x h)
- 231 XL: 33 x 46.5 x 23 cm (13 x 18.3 x 14.5 in.)
- 232 XL/233 XL: 51.5 x 62 x 23 cm (20.3 x 24.4 x 14.5 in.)

Instrument Weight
- 231 XL: 15 kg (34 lbs.)
- 232 XL/233 XL: 22 kg (48 lbs.)

Shipping Weight
- 231 XL: 22 kg (49 lbs.)
- 232 XL/233 XL: 34 kg (75 lbs.)

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

SOLID PHASE EXTRACTION

ASPEC™ XLi SPE System

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Available Valves
- Rheodyne 7010
- Rheodyne 7413

Communication Interface
- RS-232 or GSIOC; Four inputs + one analog signal (10 or 100 mV), four outputs, three relay outputs, and two 12V power supplies

Cross Contamination†
- <0.0001% with liquid level detection and recommended needle rinsing parameters; <0.005% without liquid level detection

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Rate
- 0.01 mL to 120 mL/min.

Injection Volume
- 0.5 µL to 5 mL

Liquid Contact Materials
- 316L stainless steel or titanium, FEP, PTFE, PEEK, PP, PE

Number of Solvents
- Up to 15 solvent bottles with no volume limit, plus up to 12 solvent bottles (250 mL) on the tray

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage

Precision†
- Total loop fill: RSD=0.5%
- Partial loop fill: RSD=0.7%

Sample Preparation Capability
- All SPE steps (condition, load, wash, elute) including SPE cartridge drying (gas valve fitted as standard). Multicollect and multicartridge methods. Reagent and internal standard addition, derivatization, dilution, mixing. With advanced programming options (link method, sub method).

Sample/Reagent Vessels
- 3.5-mL (10 x 75 mm), 9-mL (13 x 100 mm), and 20-mL (16 x 150 mm) tubes and 2-mL (12 x 32 mm) autoinjector vials

Software
- Gilson 735 Sampler Software
- Local control via Gilson XL keypad with 720 software

Syringe Capacity
- 100, 250, or 500 µL; 1, 5, 10 (standard), or 25 mL

Temperature Control
- Optional Peltier Controller (4° to 40°C)

Transfer of the Extract
- The extract can be automatically transferred into open or sealed autoinjector vials for further analysis

1-mL SPE Cartridge (10 to 200 mg, or 4-mm disk)
- Sample/cartridge capacity: 108
- Max. collection volume: 5 mL
- Multiple collection: Up to 9 fractions per cartridge

3-mL SPE Cartridge (200–500 mg, or 7-mm disk)
- Sample/cartridge capacity: 80
- Max. collection volume: 5 mL
- Multiple collection: Up to 5 fractions per cartridge

6-mL SPE Cartridge (500–1000 mg, or 12-mm disk)
- Sample/cartridge capacity: 28
- Max. collection volume: 15 mL
- Multiple collection: Up to 5 fractions per cartridge

Dimensions (w x d x h)
- 51.5 x 62 x 23 cm (20.3 x 24.4 x 24.4 in.)

Instrument Weight
- 17 kg (37.5 lbs.)

†Contact Gilson Customer Service to learn what methods and conditions were used to obtain the values.

ASPEC™ XL4 SPE System

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC; Eight inputs + one analog signal (10 or 100 mV); four outputs, three relay outputs, and 2 x 12 V power supplies

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Rate
- 1 µL/min. to 20 mL/min.

Injection Volume
- 50 µL to 25 mL

Number of Solvents
- Eight solvent bottles with no volume limit, and 11 rows of four 20 mL tubes on the tray

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V, mains voltage fluctuations not to exceed ±10% of the nominal voltage

Sample Preparation Capability
- All SPE steps (condition, load, wash, elute) including SPE cartridge drying (gas valve fitted as standard). Multicollect and multiuse methods. Reagent and internal standard addition, derivatization, dilution, mixing. With advanced programming options (link method, sub method).

Sample/Reagent Vessels
- 3.5-mL (10 x 75 mm), 9-mL (13 x 100 mm), and 20-mL (16 x 150 mm) tubes and 2-mL (12 x 32 mm) autoinjector vials

Software
- Gilson 735 Sampler Software
- Local control via Gilson XL keypad with 724 Software

Syringe Capacity
- 500 µL; 1, 5, 10 (standard), or 25 mL

Temperature Control
- Optional Peltier Controller (4° to 40°C)

Transfer of the Extract
- The extract can be automatically transferred into open or sealed autoinjector vials for further analysis

1-mL SPE Cartridge (100 mg, or 4-mm disk)
- Sample/cartridge capacity: 108
- Max. collection volume: 5 mL
- Multiple collection: Up to 9 fractions per cartridge

3-mL SPE Cartridge (200–500 mg, or 7-mm disk)
- Sample/cartridge capacity: 80
- Max. collection volume: 15 mL
- Multiple collection: Up to 5 fractions per cartridge

6-mL SPE Cartridge (500–1000 mg, or 12-mm disk)
- Sample/cartridge capacity: 28
- Max. collection volume: 15 mL
- Multiple collection: Up to 5 fractions per cartridge

Dimensions (w x d x h)
- 52 x 66 x 29 cm (21 x 26 x 33 in.)

Instrument Weight
- 29 kg (65 lbs.)

Shipping Weight
- 37 kg (82 lbs.)

SPE 215 System

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Arm Speed
- X: >45.7 cm/sec. (>18 in/sec.)
- Y: >40.6 cm/sec. (>16 in/sec.)

Communication Interface
- RS-232 or GSIOC; Four inputs (contact closure, TTL, or open-collector), 4 relay outputs, and one switched +24V DC, 1A output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 8-character display, START and emergency STOP soft keys

Horizontal Motion Strength
- X: 5 kg (11.1 lbs.)
- Y: 7 kg (15.6 lbs.)

Locator Plate Capacity
- Up to five combined Code 200-Series Racks and Code 800-Series SPE Racks

Maximum Syringe Flow Rates for Water (with eight syringes installed)

Syringe Size (µL)	Max. Flow Rate (mL/min.)
500	2.11
1000	4.22
2500	8.40
5000	12.50

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.5A for 100–120V, or 1.4A for 220–240V

Probe Positioning Performance
- Accuracy: ±0.5 mm in X/Y dimensions, ±1 mm in Z dimension
- Repeatability: ±0.25 mm in X/Y/Z dimensions

Probe Rinse
- Through a dedicated rinse station for rinsing the inside and outside of the probes

Sampler Type
- X/Y/Z with stationary rack design

Software
- Gilson 735 Sampler Software

Syringe Capacity
- 500 µL; 1, 2.5, or 5 mL

Syringe Pump
- External, integral, high-precision, eight-piston

Vertical Punch Strength
- 1.4 kg (3.1 lbs.) per probe at the default speed of 16.85 cm/sec.

Dimensions (w x d x h)
- 97.8 x 61 x 64 cm (38.5 x 24 x 25.2 in.)

Instrument Weight
- 51 kg (112 lbs.)

Shipping Weight
- 78 kg (171 lbs.)

DETECTORS

151/152 UV/VIS Detectors

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Autozero Range
- Suppresses up to 1.0 AU with 5 mm flow cell installed

Communication Interface
- RS-232 or GSIOC; Event and autozero inputs; remote contact closure can be activated by other instruments or the computer. Three channels output data to a recorder.

Drift
- After 1 hour at constant temperature: 3.0×10^{-4} AU/hr.

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Cell Assemblies
- The following quartz flow cells are available:

Flow Cell	Path (mm)	Volume (µL)	psi
Analytical	5	12	500
Microbore	2	1.6	500
Preparative	0.2	0.7	500
Preparative	0.05	0.16	500

Flow Sensitivity
- 4.0×10^{-4} AU for flow step of 2.0 mL/min. to 0.5 mL/min. with methanol

Front Panel
- Four-line display shows modes, parameters, commands, and data. Six soft keys and HELP, ESC, CLEAR, ENTER, numeric, and arrow hard keys (151 only). LED indicator lights for POWER, UV,VIS, REMOTE, and ERROR. LAMP ON/OFF hard key (151 and 152).

Lamps
- UV lamp: Deuterium, warranted for 750 hours or 180 days
- Visible lamp: Tungsten/halogen, warranted for 500 hours

Lamp Warmup Time
- One hour maximum

Linearity
- 1%, when value is within sensitivity range of 0.001 to 2.0 AU

Monochromator
- Dual beam, stepper motor-driven
  - Range: 190–700 nm
  - Spectral bandwidth: 9 nm
  - Setting accuracy: ±1 nm
  - Setting precision: ±0.2 nm

Noise with Air Block Installed
- 220 nm, short term, peak to peak, 2.0×10^{-5} AU/cm; 254 nm, short term, peak to peak, 2.0×10^{-5} AU/cm; 350 nm, short term, peak to peak, 10.0×10^{-5} AU/cm; 415 nm, short term, peak to peak, 8.0×10^{-5} AU/cm; 520 nm, short term, peak to peak, 6.0×10^{-5} AU/cm; 650 nm, short term, peak to peak, 4.0×10^{-5} AU/cm

Operating Modes
- Single wavelength, status, file, and setup

Peak Width
- 0 and 4 to 99 seconds

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 1.0A for 90–120V, or 0.5A for 220–240V
- Online switching regulation of line input from 80 to 260V AC

Sensitivity Range
- 0.001 to 2.0 AU. Sensitivity is adjustable in increments of 0.001 AU

Software
- Gilson UniPoint™ System Software. You can issue commands to do the following:
  - Select all detection parameters
  - Program parameter changes during run to optimize detection
  - Send digital detector output

Static RI Sensitivity
- Methanol versus cyclohexane at 270 nm: 5.0×10^{-3} AU

Temperature Sensitivity
- 3.0×10^{-4}/°C for temperature change from 21° to 24°C

Dimensions (w x d x h)
- 26.5 x 43.5 x 15.6 cm (10.4 x 17.1 x 6.2 in.)

Instrument Weight
- 10 kg (21 lbs.)

Shipping Weight
- 15 kg (34 lbs.)

155/156 UV/VIS Detectors

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Autozero Range
- Suppresses up to 1.0 AU with 5 mm flow cell installed

Communication Interface
- RS-232 or GSIOC; Event and autozero inputs; remote contact closure can be activated by other instruments or the computer. Three channels output data to a recorder.

Drift
- After 1 hour at constant temperature: 3.0×10^{-4} AU/hr.

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Cell Assemblies
- The following quartz flow cells are available:

Flow Cell	Path (mm)	Volume (µL)	psi
Analytical	5	12	500
Microbore	2	1.6	500
Preparative	0.2	0.7	500
Preparative	0.05	0.16	500

Flow Sensitivity
- 4.0×10^{-4} AU for flow step of 2.0 mL/min. to 0.5 mL/min. with methanol

Front Panel
- Four-line display shows modes, parameters, commands, and data. Six soft keys and HELP, ESC, CLEAR, ENTER, numeric, and arrow hard keys (155 only). LED indicator lights for POWER, UV,VIS, REMOTE, and ERROR. LAMP ON/OFF hard key (155 and 156).

Lamps
- UV lamp: Deuterium, life of 750 hours
- Visible lamp: Tungsten/halogen lamp, life of 500 hours

Lamp Warm-up Time
- One hour maximum

Linearity
- 1%, when value is within sensitivity range of 0.001 to 2.0 AU

Monochromator
- Dual beam, stepper motor-driven
  - Range: 190–700 nm
  - Spectral bandwidth: 9 nm
  - Setting accuracy: ±1 nm
  - Setting precision: ±0.2 nm

Noise with Air Block Installed
- 220 nm, short term, peak to peak, 2.0×10^{-5} AU/cm; 254 nm, short term, peak to peak, 2.5×10^{-5} AU/cm; 350 nm, short term, peak to peak, 10.0×10^{-5} AU/cm; 415 nm, short term, peak to peak, 8.0×10^{-5} AU/cm; 520 nm, short term, peak to peak, 6.0×10^{-5} AU/cm; 650 nm, short term, peak to peak, 4.0×10^{-5} AU/cm

Operating Modes
- Single, dual, and scan wavelength, status, file, and setup

Peak Width
- 0 and 4 to 99 seconds for single- or scan-wavelength mode; 4 to 99 seconds for dual-wavelength mode

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 1.0A for 90–120V, or 0.5A for 220–240V
- Online switching regulation of line input from 80 to 260V AC

Sensitivity Range
- 0.001 to 2.0 AU. Sensitivity is adjustable in increments of 0.001 AU

Software
- Gilson UniPoint™ System Software. You can issue commands to do the following:
  - Select all detection parameters
  - Program parameter changes during run to optimize detection
  - Send digital detector output

Static RI Sensitivity
- Methanol versus cyclohexane at 270 nm: 5.0×10^{-3} AU

Temperature Sensitivity
- 3.0×10^{-4}/°C for temperature change from 21° to 24°C

Dimensions (w x d x h)
- 26.5 x 43.5 x 15.6 cm (10.4 x 17.1 x 6.2 in.)

Instrument Weight
- 10 kg (21 lbs.)

Shipping Weight
- 15 kg (34 lbs.)

112 UV Detector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Autozero Range
- –0.5 to + 1 AU, to within 5×10^{-5} AU; front panel or remote activation

Communication Interface
- RS-232 or GSIOC; Event and autozero inputs; three channels output data to a recorder

Detector Type
- UV silicon photodiode

Drift
- 3×10^{-4} AU/hr.

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Event Marker
- Negative deflection on trace; front panel or remote activation

Flow Cells
- The following fused quartz flow cells are available:

Flow Cell	Path (mm)	Volume (µL)	psi
HPLC	10.0	11.0	1000
LC	10.0	40.0	1000
Microbore	5.0	1.3	1000
Preparative	2.0	10.0	1000
Preparative	0.5	2.5	1000
Preparative	0.1	0.3	1000

Flow Cell Sensitivity
- $<4 \times 10^{-4}$ AU for flow step of 0.5–2 mL/min. with methanol

Front Panel
- LCD indicator shows percent of full-scale output

Lamps
- Standard: Mercury (254 nm), life of 2000 hours; Phosphor-coated Mercury (280 nm), life of 500 hours

- Optional: Zinc (214 nm), life of 500 hours; Cadmium (229 nm), life of 500 hours

Lamp Warm-up Time
- One hour maximum

Monochromator
- Dual beam with interference filter, to monitor at a single wavelength
  - Range: 254 and 280 nm standard (selectable on front panel); 214 and 229
  - Spectral bandwidth: 0.2 nm at 214, 229, and 254 nm; 12 nm at 280 nm

Noise with Air Block Installed
- 254 nm, short term, peak-to-peak, 4 x 10^{-5} AU/cm; long term, peak-to-peak, 6 x 10^{-5} AU
- 280 nm, short term, peak-to-peak, 6 x 10^{-5} AU/cm; long term, peak-to-peak, 6 x 10^{-5} AU

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 1.0A for 100–120V, or 0.5A for 220–240V

Reference Chamber
- Air

Sensitivity Range
- 0.0001 to 1.0 AU with standard flow cell installed. Up to 100 AU when 0.1 mm flow cell is used. Selectable on front panel.

Temperature Sensitivity
- 3.0 x 10^{-4}/°C for temperature change from 21° to 24°C

Time Constant
- 0.1, 0.2, 0.5, 1, 2, or 5 seconds; selectable on front panel

Dimensions (w x d x h)
- 32 x 32 x 13 cm (12.6 x 12.6 x 5.2 in.)

Instrument Weight
- 7 kg (16 lbs.)

Shipping Weight
- 10 kg (23 lbs.)

FRACTION COLLECTORS

FC 206 Fraction Collector

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

3-way Valves
- 3-port, PTFE, 50 µL dead volume, up to 100 mL/min.

Communication Interface
- RS-232 or GSIOC; Two electrical inputs for start/stop and pause/resume; three electrical outputs for event marker, safety, and programmable

Detector Input
- ±10 mV, 100 mV, 1V, or 10V full scale

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Keypad
- Two-line, 24-character display. Five soft keys; STOP, HELP, ESCAPE, CLEAR and 0–9 numeric hard keys

Maximum Flow Rate
- 200 mL/min. (standard configuration); 800 mL/min. with high-flow accessories

Maximum Number of Sample Vessels
- 108 tubes (3-mL)
- 40 large bottles (several liters)

Method Storage
- Up to 9 files; lock/unlock, delete/copy

Multiple-Cycle Operation
- Up to 999 cycles; for repetitive injection of same sample or automatic injection of different samples. Possible to overlap multiple injections

Number of Racks
- Holds one rack

Operating Modes
- Manual, Peak, Peak + Time, Time, Time Prog., and Time + Prog.

Peak Detection
- Up to 99 selected peaks, positive or negative, with automatic tracking of baseline drift. Peak parameters: threshold level and maximum width at peak base. Time constant: 8 values from 0.2 to 30 seconds

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage

Programmable Time Units
- From 0.01 to 999.99 minutes

Software
- Gilson UniPoint™ System Software

Time-Based Programming
- Up to 20 collection windows and 20 drain steps

Dimensions (w x d x h)
- 33 x 15.5 x 24.5 cm (13 x 6.1 x 9.6 in.)

Instrument Weight
- 10 kg (22 lbs.)

Shipping Weight
- 13 kg (28 lbs.)

215 Fraction Collector

(For 215 Liquid Handler/Injector specifications, see pages 31–32.)

Detector Input
- ±10 or 100 mV full scale

Event Marker
- UniPoint™ System Software labels the start/stop of the fraction

Maximum Number of Sample Vessels
- 17 96-well microplates
- 480 vials
- 480 tubes
- 36 funnel collection racks (Numerous configurations available using Gilson's large variety of racks.)

Method Storage
- Method and protocol storage in UniPoint

Multiple-Cycle Operation
- UniPoint control offers specific site collection and continuous collection options with graphical sample tracking capabilities

Peak Collection
- Adaptive slope algorithm accommodates drifting baselines, negative and asymmetrical peaks, applying user-set peak parameters. Absolute threshold level collects all peaks above a user-specified mV level.

Software
- Gilson UniPoint™ System Software or 735 Sampler Software

Time-Based Programming
- Numerous flexible programming options available through UniPoint

Dimensions (w x d x h)
- 91.4 x 61 x 55.8* cm (36 x 24 x 22* in.)

**Maximum height. Z-arm height is adjustable to accommodate vessel heights between 1 and 150 mm (dependent on installed Z-arm).*

Instrument Weight
- 40 kg (89 lbs.)

Shipping Weight
- 73 kg (160 lbs.)

FC 203B/FC 204 Fraction Collectors

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

3-way Valves
- FC 203B/204: 3-port, PTFE, 67 µL internal volume, 3.5 µL dead volume from common port to the normally closed port, up to 20 mL/min. with standard or large bore needle
- FC 204: 3-port, PTFE, 114 µL internal volume, 6 µL dead volume from common port to the normally closed port, up to 20 mL/min. with standard or large bore needle

Communication Interface
- RS-232 or GSIOC; Inputs for start/advance and end/home; event mark output; one programmable output for control of peripheral devices

Data Acquisition
- An input channel for analog-to-digital conversion; digital data is transmitted on the GSIOC

Detector Input
- ±100 mV full scale

Drop Counting
- Up to 9999 drops per fraction; maximum rate: 20 drops /sec.

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Event Marker
- 100 ms pulse (contact closure)

Front Panel
- Two-line, 24-character display on backlit LCD. Five command, HELP, YES, NO, and 0–9 numeric hard keys; four soft keys

Maximum Collection Volume/Tube
- FC 203B: 20 mL (28 x 60 mm scintillation vials with optional Code 24 rack)
- FC 204: 32 mL (18 x 180 mm tubes or 25 mL (18 x 150 mm)

Maximum Fractions
- FC 203B: 128 (12 x 75 mm tubes with optional Code 14 rack)
- FC 204: Up to 768 when configured with eight 96-well, 2-mL Whatman/Polyfiltronics microplates on a Code 17 rack)

Multiple-Column Collection
- Simultaneous collection from up to 8 (FC 203B) or up to 18 (FC 204) columns with installation of optional multiple column adaptor(s)

Multiple-Cycle Operation
- Repetitive collection of each sample into same set of tubes or collection of each sample into different set of tubes
- 3-port, PTFE, 114 mL internal volume, 6 µL dead volume from the common port to the normally closed port, up to 200 mL/min. with large bore needle

Number of Racks
- FC 203B: Holds one rack
- FC 204: Holds one Code 16 or Code 16D rack, one Code 17 rack, or up to four Code 20-Series racks (all racks must be the same code)

Operating Modes
- Drop, Manual, Peak + Drop, Peak + Time, Time

Peak Detection
- Adaptive-slope algorithm that applies user-specified parameters to accommodate drifting baselines, negative and asymmetrical peaks, or absolute threshold level that collects all peaks above specified mV value
- Peak parameters: peak height or level, in mV and peak width at half-height, in minutes
- Minimum peak height for fractionation: 0.1 mV full scale
- Detector-collector delay: 0.01 minute increments

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 0.5A for 100–120V, or 0.25A for 220–240V

Programmable Time Units
- From 0.01 to 99.99 minutes per tube with a 0.01 minute limit of resolution

Software
- Gilson UniPoint™ System Software

Time-Based Programming
- Up to 10 collection windows and 10 drain steps in any mode

Tube Change Time
- 100–250 ms (FC 203B) or 100–720 ms (FC 204), center to center, depending on rack type

Zero Power Memory
- Maintains memory for a minimum of five years from date of shipment

Dimensions (w x d x h)
- FC 203B: 32.4 x 29.2 x 26.7 cm (12.8 x 11.5 x 10.5 in.)
- FC 204: 47.9 x 46.4 x 33 cm (18.9 x 18.3 x 13 in.)

Instrument Weight
- FC 203B: 5 kg (11 lbs.)
- FC 204: 10 kg (22 lbs.)

Shipping Weight
- FC 203B: 10 kg (23 lbs.)
- FC 204: 19 kg (42 lbs.)

202C Fraction Collector

Time-Based Programming
- Up to 20 collection windows & 20 drain steps

Multi-Cycle Operation
- Up to 99 cycles for repetitive collection of same sample or automatic collection of different samples

Display Panel
- 16 alphanumeric characters plus decimal point

Communication Interface
- RS-232 or GSIOC; Nine inputs, seven outputs (including two programmable via 25-pin connector) for injector, elution pump, recorder, three-way valve, and system shut-off

Collection Vessels & Capacity
- 220 18-mm test tubes
- 300 13-mm test tubes
- 540 10-mm test tubes
- 40 user-defined vessels

Keypad Location
- Separate

Method Storage
- Up to 10 fractionation files

Peak Collection
- Adaptive slope algorithm accommodates drifting baselines, negative and asymmetrical peaks, applying user-set peak parameters. Thirty peaks out of 99 can be selected

Software
- Gilson UniPoint™ System Software

Environmental Operating Temperature
- 0–40°C

Event Marker
- 210 ms pulse by contact closure

Detector Input
- ±10 or 100 mV full scale

Dimensions (w x d x h)
- 51 x 44 x 23 cm (20.1 x 17.3 x 9 in.)

Keypad Controller Dimensions (w x d x h)
- 21.5 x 11 x 3.3 cm (8.5 x 4.3 x 1.3 in.)

Instrument Weight
- 8 kg (18 lbs.)

Shipping Weight
- 16 kg (35 lbs.)

PUMPS

321/322 HPLC Pumps

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Composition and Mixing
- **Increment:** 0.1%
- **Dwell Volume:** 260–2260 µL, pressure-independent (60 µL excluding mixer volume)
- **Effective Mixing Volume:** 220 µL for 1 mL/min. and 0.2 mL mixer volume adjustment
- **Gradient Linearity Range:** 1–98%B for 1 mL/min. and higher, mixer volume adjustment set at 0.2 mL

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Rate
- Selectable units: µL/min. and mL/min. (default: mL/min.)
- Adjustment increment: 1 µL/min.
- Accuracy: ≤±2% or 4 µL/min. for H1 and 8 µL/min. for H2
- Repeatability: <0.7% or 2 µL/min. for H1 and 4 µL/min. for H2
- Minimum adjustable volume: 2 µL/min. for H1, 5 µL/min. for H2

Front Panel (321 Pump)
- 40-character, eight-line display, adjustable contrast turning off after 0–999 min. (default: 10 min.); 25 functional keys including six soft keys

Liquid-Contact Materials
- 316L stainless steel, titanium, FEP, PTFE, PCTFE, ETFE, PEEK, UHMWPE, sapphire, ruby, and ceramics

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–120 or 220–260V; mains voltage fluctuations not to exceed ±10% of the nominal voltage

Pressure
- Nominal range from 0.5 MPa (5 bar, 70 psi) up to 60 MPa (600 bar, 8700 psi) for H1, up to 30 MPa for H2

Pump Options
- 321-H1*: master pump (w/control panel), 15 mL/min, 60 MPa (8700 psi)
- 322-H1: remote control pump (w/o control panel), 15 mL/min., 60 MPa (8700 psi)
- 321-H2*: master pump (w/control panel), 30 mL/min., 30 MPa (4350 psi)
- 322-H2: remote control pump (w/o control panel), 30 mL/min., 30 MPa (4350 psi)

**H1 and H2 are interchangeable pump heads.*

Software
- Gilson UniPoint™ System Software

Dimensions (w x d x h)
- 321: 26 x 41 x 51 cm (10.2 x 16.2 x 20.1 in.)
- 322: 26 x 41 x 38.7 cm (10.2 x 16.2 x 15.3 in.)

Instrument Weight
- 30 kg (66 lbs.)

Shipping Weight
- 40 kg (88 lbs.)

331/332 HPLC Pumps

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Composition and Mixing
- Increment: 0.1%
- Dwell Volume: 372–2372 µL, pressure independent
- Gradient Linearity Range: 1–98% B for 10 mL/min. and higher

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel (331 Pump)
- 40-character, eight-line display, adjustable contrast and screen saver; 25 functional keys, including six soft keys

Flow Rate
- Selectable units: µL/min. and mL/min. (default: mL/min.)
- Adjustment increment: 1 µL/min.
- Accuracy: bias <±1% or 1.3 µL/min. (331), bias <±2% or 13 µL/min. (331/332)
- Repeatability: RSD <0.5% or 1 µL/min. (331), RSD < 0.7% or 7 µL/min. (331/332)

Liquid-Contact Materials
- 316L stainless steel, titanium, FEP, PTFE, PCTFE, ETFE, PEEK, UHMWPE, ruby, sapphire, and ceramics

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–120 or 220–260V; mains voltage fluctuations not to exceed ±10% of the nominal voltage

Pressure
- Nominal range: from 0.5 MPa (5 bar, 70 psi) up to 60 MPa (600 bar, 8700 psi)

Pump Options
- 331: single-solvent master pump (w/control panel), 0.05–50 mL/min., 60 MPa (8700 psi)
- 331/332: two-solvent pumping system, 0.5–50 mL/min., 60 MPa (8700 psi)
- 332: third-solvent, remote controlled pump (w/o control panel), 0.5–50 mL/min., 60 MPa (8700 psi)

Software
- Gilson UniPoint ™ System Software

Dimensions (w x d x h)
- 331: 26 x 41 x 50.7 cm (10.2 x 16.1 x 20 in.)
- 332: 26 x 41 x 38.7 cm (10.2 x 16.1 x 15.2 in.)

Instrument Weight
- 35 kg (77 lbs.)

Shipping Weight
- 44 kg (97 lbs.)

333/334 Prep-Scale HPLC Pumps

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Composition and Mixing
- Increment: 0.1%
- Dwell volume: 3.7 mL, pressure independent
- Gradient linearity range: 1–98% B for 10 mL/min. and higher

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Rate
- Selectable units: L/hr. and mL/min.
- Adjustment increment: 0.01 mL/min.
- Minimum adjustable value: 20 µL/min.
- Accuracy: bias <±1% or 5.3 µL/min. (333), bias <±2% or 53 µL/min. (333/334)
- Repeatability: RSD <0.5% or 2.7 µL/min. (333), RSD <0.7% or 27 µL/min. (333/334)

Front Panel (333 Pump)
- 40-character, eight-line display, adjustable contrast and screen saver; 25 functional keys, including six soft keys

Liquid-Contact Materials
- 316L stainless steel, titanium, FEP, PTFE, PCTFE, ETFE, PEEK, UHMWP, ruby, and ceramics

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–120 or 220–260V; mains voltage fluctuations not to exceed ±10% of the nominal voltage

Pressure
- Nominal range: from 0.5 MPa (5 bar, 70 psi) up to 21 MPa (210 bar, 3040 psi)

Pump Options
- 333: single-solvent master pump (w/ control panel), 0.2–200 mL/min., 21 MPa (3040 psi)
- 333/334: two-solvent pumping system, 2–200 mL/min. 21 MPa (3040 psi)
- 334: third-solvent, remote controlled pump (w/o control panel), 2–200 mL/min., 21 MPa (3040 psi)

Software
- Gilson UniPoint™ System Software and 506C interface

Dimensions (w x d x h)
- 333: 26 x 41 x 51 cm (10.2 x 16.2 x 20.1 in.)
- 334: 26 x 41 x 39 cm (10.2 x 16.2 x 15.3 in.)

Instrument Weight
- 34 kg (75 lbs.)

Shipping Weight
- 43 kg (95 lbs.)

350 Micro Pump

Pump Options
- Isocratic pump (350D): electrically-actuated valves, 300 nL/min. to 50 µL/min., 30 MPa (300 bars, 4350 psi), micro degasser
- Gradient pumping system (350D + 350 + gradient pumping kit): electrically-actuated valves, 300 nL/min. to 50 µL/min., 30 MPa (300 bars, 4350 psi)

Pump Heads
- Micro E head

Number of Solvents/Pump
- One

Flow Rate
- Selectable units: nL/min. or µL/min.
- Adjustment increment: 0.01 µL/min.
- Accuracy: <±1% (5–50 µL/min.
- Repeatability: <0.5% for 5–50 µL/min.; <1% for 0.5–5 µL/min.

Composition and Mixing
- Adjustment increment: 0.1% B for 1–50 µL/min.; 1% B below 1 µL/min.
- Dwell volume/Effective mixing volume: 60 nL (up to 5 µL/min.); 3 µL (above 5 µL/min.)
- Accuracy: ±1%
- Repeatability: ±1%

Pressure
- Operating range: 0 MPa–30 MPa (300 bar, 4350 psi)
- Accuracy: <±1% or 0.1 MPa (1 bar, 15 psi)
- Repeatability: <1% or 0.1 MPa (1 bar, 15 psi)

Pump Volume
- 37.8 µL (from inlet of inlet valve to outlet of outlet valve)

Piston Stroke Volume
- 39.4 µL

Software
- Gilson Unipoint™ System Software via 506C interface

Communication Interface
- Nine-pin GSIOC socket, three input and four output contact closures

Front Panel
- Green POWER, yellow ON, and yellow REMOTE LED indicators; ON/OFF soft key

Liquid Contact Materials
- 316L stainless steel, titanium, hastelloy, zirconium, FEP, PTFE, PCTFE, ETFE, PEEK, and UHMWPE

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage

Environmental Operating Temperature
- 4–40°C

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Dimensions (w x d x h)
- 26 x 34 x 30 cm (10 x 13 x 12 in.)

Instrument Weight
- 350:13.5 kg (30 lbs.)
- 350D:15 kg (33 lbs.)

Shipping Weight
- 350:18.5 kg (41 lbs.)
- 350D:20 kg (44 lbs.)

Minipuls 3 Peristaltic Pump

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC; Two TTL-compatible inputs for control of start/stop and direction of flow and one 0.5V analog input for variable control of motor speed

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m

- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Rate
- Standard model: 0.05 mL/min. to 40 mL/min. (72 psi/5 bar max.)
- High-Flow model: 5 mL/min. to 250 mL/min. (42 psi/3 bar max.)

Head Speed
- Continuous adjustment from 0 to 48 rpm by 0.01 rpm increments up to 9.99 rpm and by 0.1 rpm increments above 10 rpm

Motor Speed Stability
- 0.5% for any variation of line voltage, torque, or temperature

Peristaltic Tubing Diameter
- Standard model: 0.25–4 mm (ID)
- High-Flow model: 2–8 mm (ID)

Power Requirements
- Frequency: 47–63 Hz
- Voltage: 90–132 or 180–264V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Consumption: Full load 45W at 220V; no load 35W at 220V

Pump Heads
- Standard model: 1-, 2-, 4-, or 8-channel heads with 10 stainless steel rollers per head
- High-Flow model: 2- or 4-channel heads with five stainless steel rollers per head

Software
- Gilson UniPoint ™ System Software

Dimensions (w x d x h)
- 15 x 17.5 x 18 cm (6 x 7 x 7 in.)

Instrument Weight
- 4 kg (9 lbs.)

Shipping Weight
- 6 kg (14 lbs.)

ACCESSORIES

VALVEMATE® Valve Actuator

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Available Valves
- **High Pressure:** Rheodyne 7000, 7010, 7030, 7040, 7060, 7610, 7710, 9010, 9030, 9060, 9710
- **Low-Pressure:** Rheodyne 5011, 5012, 5031, 5032, 5041, 5042; Hamilton 86905, 86913, 86915, 86918

Communication Interface
- RS-232 or GSIOC; Two contact closure inputs for moving the installed valve

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 16-character, two-line, backlit LCD; MODE, up arrow, and down arrow keys and LED indicator lights for Remote and Power

Modes
- Position mode identifies the installed valve, its current position, and the number of positions available
- Unit ID mode identifies the indentification number assigned to the VALVEMATE; the default is 35
- Baud rate mode identifies the communication rate (9600, 19200, or external) between the VALVEMATE and a controlling instrument
- Valve mode identifies the installed valve
- Service mode identifies the number of times the valve has been rotated and the number of hours that the VALVEMATE has been in use

Power Requirements
- Frequency: 47–63 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 1.0A for 100–120V, or 0.5A for 220–240V
- Consumption: 100W maximum

Software
- Gilson UniPoint ™ System Software

Valve Switching Speed
- <100 mS from position to position
- For a six-position valve, switching from position 1 to position 2 will take up to 100 mS and switching from position 2 to position 3 will take up to 100 mS. Therefore, the total switching time between position 1 and position 3 would be no more than 200 mS.

Dimensions (w x d x h)
- 12.7 x 39 x 15 cm (5 x 15.4 x 6 in.)

Instrument Weight
- 7 kg (16 lbs.)

Shipping Weight
- 10 kg (21 lbs.)

402 Syringe Pump

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC

Driving Mechanism
- Two stepper motors with independently-operated, three-port, rotary valve

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Flow Rate
- 1 µL/min. to 240 mL/min.

Injection Volume
- 1.0 µL–25 mL

Liquid-Contact Materials
- FEP, PTFE, PEEK, Ekonol, glass, and ceramics

Maximum Dilution Ratio
- Up to 500:1 using Gilson Samplers

Maximum Pressure
- 0.8 MPa (8 bar, 110 psi) for 0.1- to 10-mL syringes
- 0.3 MPa (3 bar, 40 psi) for 25-mL syringe

Minimum Piston Travel Time
- From 1.0 second to 10 hours for one complete stroke

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage

Software
- Gilson UniPoint ™ System Software

Syringe Capacity
- 100, 250, or 500 µL; 1, 5, 10, or 25 mL

Dimensions (w x d x h)
- 17 x 20 x 24 cm (6.7 x 8 x 9.4 in.)

Instrument Weight
- 6 kg (14 lbs.) for single-syringe model
- 8 kg (18 lbs.) for dual-syringe model

Shipping Weight
- 8 kg (17 lbs.) for single-syringe model
- 10 kg (21 lbs.) for dual-syringe model

818 AutoMix

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC; Two contact closure inputs and one contact closure output

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- POWER and NOT READY lights

Liquid-Contact Materials
- Aluminum

Mixing Speeds and Accuracy
- Low speed: 10 rpm, ±0.5 rpm
- High speed: 20 rpm, ±1 rpm

Number of Racks
- One Code 200-Series rack

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 100–120 or 220–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.0A for 100–120V or 1.0A for 220–240V

Software
- Gilson UniPoint™ System Software

Dimensions* (w x d x h)
- 17 x 20 x 24 cm (6.7 x 7.9 x 9.4 in.)

**Fits on the single-probe 215 Liquid Handler; requires two positions on the locator plate.*

Instrument Weight
- 5 kg (12 lbs.)

Shipping Weight
- 8 kg (17 lbs.)

845Z Injection Module

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Available Sample Loops
- 5, 10, 20, 50, and 100 µL

Available Valve
- Rheodyne RV700-100

Communication Interface
- RS-232 or GSIOC; One contact closure input and one contact closure output

Dead Volume*
- ~40 µL from probe tip to valve

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°

Front Panel
- One-character LED display and POWER light

Injection Carryover*
- 0.02%

Injection Reproducibility*
- Total loop fill: CV = 0.5%

Liquid-Contact Materials
- Stainless steel, PEEK, Teflon®

Power Requirements
- +24V DC at 2.0A supplied via a 2.1-mm ID power plug; center contact is positive

Software
- Gilson UniPoint System Software version 3.2 or higher

Valve Switching Speed
- <266 mS

Dimensions (w x d x h)
- Control Box (installed on 215 control cabinet): 15.2 x 13.7 x 7.1 cm (6 x 5.4 x 2.8 in.)
- Valve Box (installed on the 215 Z-arm): 7.9 x 19.3 x 11 cm (3.1 x 7.6 x 4.3 in.)

Instrument Weight (with installed valve)
- 3 kg (6 lbs.)

Shipping Weight
- 3 kg (7 lbs.)

**Contact Gilson service to learn what methods were used to obtain the values.*

849/889 Multiple Injection Modules

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Available Sample Loops
- 5, 10, 20, 50, 100, 200, or 500 µL; 1, 2, or 5 mL

Available Valves
- Rheodyne RV700-100 or Rheodyne RV700-112

Carryover†
- RV700-100 Valve
  - <1 ppb with the following rinse volumes:
    - injection port rinse volume = 250 µL
    - rinse station rinse volume = 500 µL
- RV700-112 Valve
  - <0.05% with the following rinse volumes:
    - injection port rinse volume = 1000 µL
    - rinse station volume = 1000 µL

Communication Interface
- RS-232 or GSIOC

Dead Volume

Injection Port	Dead Volume* (µL)
0.7 mm OD probe tip	11
1.3 mm OD probe tip	15
1.5 mm OD probe tip	14

** From probe to valve (including calibrated tubing)*

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- Power light, 4 or 8 INJECT lights, and 4 or 8 LOAD lights

Liquid-Contact Materials
- 304 and 316L stainless steel, alumina ceramic, FEP, PEEK

Power Requirements
- Frequency: 50–60 Hz
- Voltage: 90–240V; mains voltage fluctuations not to exceed ±10% of the nominal voltage
- Current rating: 2.0A for 90–120V or 1.0A for 220–240V (849); 3.0A for 90–120V or 1.5A or 220–240V (889)

Precision†
- RV700-100 Valve
  - Partial loop fill: CV <2.0% with a 500-µL syringe and 10-µL partial loop fill in a 20-µL injection loop
  - Total loop fill: CV <5.0%
- RV700-112 Valve
  - Partial loop fill: CV <2.0% with a 5-mL syringe and 1-mL partial loop fill in a 2-mL injection loop
  - Total loop fill: CV <5.0%

Software
- Gilson UniPoint™ System Software or 735 Sampler Software

Valve Switching Speed
- RV700-100: <135 mS
- RV700-112: <370 mS

Dimensions (w x d x h)
- 61 x 18 x 13 cm (24 x 7 x 5 in.)

Instrument Weight (with installed valves)
- 8 kg (17 lbs.) with four installed valves
- 11 kg (25 lbs.) with eight installed valves

†Contact Gilson service to learn what method was used to obtain the value.

852/853/854 Peltier Racks

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- HOT, COLD, and STANDBY indicator lights

Liquid-Contact Materials
- Anodized cast aluminum (T6061 and T5052 H32), stainless steel (300 series), polypropylene

Power Requirements
- Voltage: 5 and 24V DC
- Current rating: 0.2A at 5V or 5.0A at 24V

Rack Capacity
- 852: Two Becton Dickinson Falcon™ assay plates; 96-well, shallow, "U-Bottom"
- 853: 96 flat-bottom vials; 12 x 32 mm (2 mL)
- 854: Two Ritter or Beckman microplates; 96-well, deep

Software
- Via Programmable Peltier Controller keypad or Gilson control software

Environmental Operating Temperature
- 4–40°C†

†Contact Gilson service to learn what method was used to obtain the value.

Dimensions* (w x d x h)
- 11.9 x 33.8 x 16.8 cm (4.7 x 13.3 x 6.6 in.)

**Up to five 85x Peltier Racks will fit on the locator plate of a single-probe 215 Liquid Handler.*

Instrument Weight
- 852: 4 kg (8 lbs.)
- 853: 5 kg (11 lbs.)
- 854: 4 kg (8 lbs.)

Programmable Peltier Controller

Manufacturing Standards
- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Air pressure: 75–105 kPa
- Pollution degree: 1 or 2, in accordance with IEC 66
- Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C

Front Panel
- 40-character, four-line backlit LCD; POWER indicator light; 25 soft keys

Modes
- Cooling (C): The current temperature of the rack is more than 2°C warmer than the set temperature
- Heating (H): The current temperature of the rack is more than 2°C cooler than the set temperature
- Initializing (I): The rack is initializing
- Ready (R): The current temperature of the rack is ±2°C of the set temperature
- Stopped (S): The temperature of the rack is no longer being regulated
- Error (E): The rack is in an error state. Contact Gilson for assistance
- Programming (P): The rack is in the programming state. Contact Gilson for assistance

Power Requirements
- Frequency: 50–60 Hz
- Power rating: 60W, 125V
- Maximum switching voltage: 250V AC
- Voltage: 90–240V
- Current rating: 8.0A for 90–120V or 4.0A for 220–240V (max.); 6.0A for 90–120V or 3.0A for 220–240V (typical)
- Internal fuses: Five 5A subminiature PC board fuses to be replaced by service personnel only

Note: For your safety, do not switch voltages higher than 30V even though the output contacts are rated for high voltage.

Software
- From front panel keypad or Gilson control software

Dimensions (w x d x h)
- 26.5 x 43.5 x 15.6 cm (10.4 x 17.1 x 6.2 in.)

Instrument Weight
- 8 kg (18 lbs.)

Shipping Weight
- 10 kg (23 lbs.)

242/542 Peltier Racks

Manufacturing Standards
- Meet applicable Safety and EMC certification standards; UL and CE certified

Communication Interface
- RS-232 or GSIOC; One contact closure input

Environmental Conditions
- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Humidity: Not more than 75%*
- Air pressure: 75–105 kPa

**In a high-humidity environment, condensation may occur.*

Front Panel
- HOT, COLD, and STANDBY indicator lights

Power Requirements

- 242
  - Voltage: 24V DC
  - Current rating: 3.5A at 24V
- 542
  - Voltage: 24V DC
  - Current rating: 17.5A at 24V

Rack Capacity

- 242: Two 96-well, flat-bottom, shallow microplates
- 542: Ten 96-well, flat-bottom, shallow microplates

Environmental Operating Temperature

- 242: 4–40°C when lab temperature is 23.5°C*
- 542: 10–40°C when lab temperature is 23.5°C*

**Actual temperature is a function of the ambient temperature and style of microplates used.*

Dimensions (w x d x h)

- 242: 11.4 x 30.5 x 12.4 cm (4.5 x 12 x 4.9 in.)
- 542: 50.1 x 33.6 x 11.4 cm (20.1 x 13.3 x 4.5 in.)

Instrument Weight

- 242: 3 kg (6 lbs.)
- 542: 11 kg (25 lbs.)

Shipping Weight

- 242: 5 kg (10 lbs.)
- 542: 14 kg (31 lbs.)

215 Peltier Controller

Manufacturing Standards

- Meets applicable Safety and EMC certification standards; UL and CE certified

Communication Interface

- RS-232 or GSIOC

Environmental Conditions

- Indoor use
- Altitude: up to 2000 m
- Temperature range: 5–40°C
- Humidity: Not more than 75%*
- Air pressure: 75–105 kPa

**In a high-humidity environment, condensation may occur.)*

Front Panel

- POWER indicator light

Power Requirements

- Frequency: 50–60 Hz
- Voltage: 115 or 220V AC
- Current rating: 5.0A at 115V or 2.5A at 220V

Dimensions (w x d x h)

- 26.5 x 43.5 x 15.6 cm (10.4 x 17.1 x 6.2 in.)

Instrument Weight

- 8 kg (18 lbs.)

Shipping Weight

- 10 kg (23 lbs.)

GILSON RACK/LIQUID HANDLER COMPATIBILITY CHART

Rack Code	Product No.	215/215 SW/ 215 FC	Quad-Z 215	Multiple-Probe 215	Micro 215	234	235/SP235/ 235P/SP235P	223	221 XL	222 XL	231 XL	232 XL/ 233 XL	SPE 215	ASPEC XLi	ASPEC XL4	203B	204	202C
0	270430	•			•			•	•	•	•	•				•		
0	12040302								•	•	•	•						
1	12040101															•		
2	130402															•		
4	130412															•		
7	2707401							•	•	•	•	•						
8	270438	•			•			•	•	•	•	•						
9	270439	•			•			•	•	•	•	•						
10	130411																	•
11	170413															•		
14	170414															•		
15	170415															•		
16	170416																•	
16D	170416D																•	
17	170418																•	
20	150425		•						•	•	•	•					•	
21	150422	•	•		•			•	•	•	•	•		•		•	•	•
22	150424	•			•			•		•		•		•			•	•
22U	150498	•			•			•	•	•	•	•					•	•
23	150426	•	•		•			•	•	•	•	•		•		•	•	•
23W	270433	•			•			•	•	•	•	•		•		•	•	•
24	150427	•	•		•			•	•	•	•	•		•		•	•	•
28	150420	•	•		•			•	•	•	•	•		•		•	•	•
29	150429	•	•		•			•	•	•	•	•		•		•	•	•
29LE	2704342							•				•				•	•	•
29SE	2704341							•				•				•	•	•
30	2704430	•			•	•		•	•	•	•	•		•		•		•
30P	2704530P					•		•	•	•	•	•		•		•		•
31	2704431	•			•	•		•	•	•	•	•						•
31P	2704531P					•		•	•	•	•	•						•
32	2704432	•			•	•		•	•	•	•	•		•		•		•
33	2704433	•			•	•		•	•	•	•	•		•		•		•
33P	2704533P					•		•	•	•	•	•		•		•		•
34	2704434	•			•	•		•	•	•	•	•		•				•
34P	2704534P					•		•	•	•	•	•		•				•
35P	2704535P					•		•	•	•	•	•						
36P	2704536P					•		•	•	•	•	•						
37	2704437					•		•	•	•	•	•						
38	2704438					•		•	•	•	•	•						
41	2954850														•			
42	2954855														•			
43	2954852														•			
45	2954851														•			
60	2954651								•	•	•	•						
61	2954715									•				•				
62	2954692									•		•						
80	2749662								•	•	•	•						
101	2954848													•	•			
103	2954658													•				

GILSON RACK/LIQUID HANDLER COMPATIBILITY CHART

Rack Code	Product No.	215/215 SW/ 215 FC	Quad-Z 215	Multiple-Probe 215	Micro 215	234	235/SP235/ 235P/SP235P	223	221 XL	222 XL	231 XL	232 XL/ 233 XL	SPE 215	ASPEC XLi	ASPEC XL4	203B	204	202C
106	2954720													•				
143	2954843														•			
200	2504600	•	•		•													
201	2504601	•	•	•	•								•					
201H	2504601H	•	•	•	•								•					
202	2504602	•	•		•													
203	2504603	•	•		•													
204	2504604	•	•		•													
204F	2504604F	•																
205	2504605	•	•	•	•								•					
205H	2504605H	•	•	•	•								•					
206	2504606	•	•		•													
207	2504607	•	•		•													
208	2504608	•	•		•													
209	2504609	•	•		•													
210	2504610	•	•		•													
211	2504611	•	•		•													
211F	2504611F	•																
211H	2504611H	•			•													
212	2504612	•	•		•													
213	2504613	•	•		•													
214	2504614	•	•		•													
216	2504616	•	•		•													
217	2504617		•	•									•					
218	2504618		•	•									•					
220	2504620	•			•													
222	2504622	•	•		•													
222F	2504622F	•																
223	2504623	•			•													
224	2504624	•			•													
225	2504625	•			•													
226	2504626	•			•													
228	2504628	•	•	•									•					
242	25146331	•	•															
353	24014053						•											
356	24014056						•											
502	2504652	•																
505	2504651	•	•	•	•													
505H	2504651H	•	•	•	•													
517	2504653				•													
542	2514542	•	•															
641	2504641	•																
642	2504642	•																
643	2504643	•																
644	2504644	•																
645	2504645	•																
646	2504646	•																
647	2504647	•																

TUBING INTERNAL DIAMETERS AND VOLUMES

Inches	Millimeters	Microns	µl/in	µl/mm
0.001	0.025	25	0.013	0.0005
0.002	0.051	51	0.051	0.0020
0.003	0.076	76	0.116	0.0046
0.004	0.102	102	0.206	0.0081
0.005	0.127	127	0.322	0.0127
0.006	0.152	152	0.463	0.0182
0.007	0.178	178	0.631	0.0248
0.008	0.203	203	0.824	0.0324
0.009	0.229	229	1.042	0.0410
0.010	0.254	254	1.287	0.0507
0.011	0.279	279	1.557	0.0613
0.012	0.305	305	1.853	0.0730
0.013	0.330	330	2.175	0.0856
0.014	0.356	356	2.523	0.0993
0.015	0.381	381	2.896	0.1140
0.016	0.406	406	3.295	0.1297
0.017	0.432	432	3.720	0.1464
0.018	0.457	457	4.170	0.1642
0.019	0.483	483	4.646	0.1829
0.020	0.508	508	5.148	0.2027
0.028	0.711	711	10.090	0.3973
0.030	0.762	762	11.583	0.4560
0.032	0.813	813	13.179	0.5189
0.040	1.016	1016	20.593	0.8107
0.042	1.067	1067	22.703	0.8938
0.055	1.397	1397	38.933	1.5328
0.062	1.575	1575	49.474	1.9478

TEMPERATURE CONVERSION FORMULAS

°C = °F – 32 ÷ 1.8
°C = °K – 273.15
°F = 1.8 x °C + 32
°F = °R – 459.67
°K = °C + 273.15
°R = °F + 459.67

°C = degrees Celsius
°F = degrees Fahrenheit
°K = degrees Kelvin
°R = degrees Rankine

PRESSURE CONVERSION

kPa	psi	bar	MPa
690	100	6.9	0.7
3450	500	34.5	3.4
6890	1000	68.9	6.9
10340	1500	103.4	10.3
13790	2000	137.9	13.8
17240	2500	172.4	17.2
20680	3000	206.8	20.7
24130	3500	241.3	24.1
27580	4000	275.8	27.6
31030	4500	310.3	31.0
34470	5000	344.7	34.5
37920	5500	379.2	37.9
41370	6000	413.7	41.4
44820	6500	448.2	44.8
48260	7000	482.6	48.3
51710	7500	517.1	51.7
55160	8000	551.6	55.2
58610	8500	586.1	58.6
62050	9000	620.5	62.1
65500	9500	655.0	65.5
68950	10000	689.5	68.9

METRIC PREFIXES

Prefix	Symbol	Scientific Notation
yotta	Y	10^{24}
zetta	Z	10^{21}
exa	E	10^{18}
peta	P	10^{15}
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
hecto	h	10^{2}
deka	da	10
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	µ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}
zepto	z	10^{-21}
yocto	y	10^{-24}

TEMPERATURE CONVERSION

Celsius (°C)	Fahrenheit (°F)
–100	–148
–50	–58
–40	–40
–30	–22
–20	–4
–10	14
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113
50	122
55	131
60	140
65	149
70	158
75	167
80	176
85	185
90	194
95	203
100	212
105	221
110	230
115	239
120	248
125	257
130	266
135	275
140	284
145	293
150	302
155	311
160	320
165	329
170	338
175	347
180	356
185	365
190	374
195	383
200	392
205	401
210	410
215	419

FRACTIONAL INCH TO DECIMAL TO MILLIMETER CONVERSION

Fraction	Decimal	Millimeter
1/32	.0313	.7938
1/16	.0625	1.5875
3/32	.0938	2.3813
1/8	.1250	3.1750
5/32	.1563	3.9688
3/16	.1875	4.7625
7/32	.2188	5.5563
1/4	.2500	6.3500
9/32	.2813	7.1438
5/16	.3125	7.9375
11/32	.3438	8.7313
3/8	.3750	9.5250
13/32	.4063	10.3188
7/16	.4375	11.1125
15/32	.4688	11.9063
1/2	.5000	12.7000
17/32	.5313	13.4938
9/16	.5625	14.2875
19/32	.5938	15.0813
5/8	.6250	15.8750
21/32	.6563	16.6688
11/16	.6875	17.4625
23/32	.7188	18.2563
3/4	.7500	19.0500
25/32	.7813	19.8438
13/16	.8125	20.6375
27/32	.8438	21.4313
7/8	.8750	22.2250
29/32	.9063	23.0188
15/16	.9375	23.8125
31/32	.9688	24.6063
1	1.0000	25.4000

INDUSTRY ORGANIZATIONS

American Association for the Advancement of Science
202-326-6400 (phone)
www.aaas.org

American Association for Cancer Research
215-440-9300 (phone)
215-440-9313 (fax)
www.aacr.org

American Association for Clinical Chemistry
800-892-1400 (phone)
202-887-5093 (fax)
www.aacc.org

American Association of Pharmaceutical Scientists
703-243-2800 (phone)
703-243-9650 (fax)
www.aaps.org

American Chemical Society
800-333-9511 (phone)
614-447-3891 (fax)
www.chemistry.org

American Chemistry Council
703-741-5000 (phone)
703-741-6004 (fax)
www.americanchemistry.com

American Crystallographic Association
716-856-9600 ext. 379 (phone)
716-852-4846 (fax)
www.hwi.buffalo.edu/ACA

American Society for Mass Spectrometry
505-989-4517 (phone)
505-989-1073 (fax)
www.asms.org

Biotechnology Industry Organization
202-962-9200 (phone)
202-962-9201 (fax)
www.bio.org

Drug Information Association
215-628-2288 (phone)
215-641-1229 (fax)
www.diahome.org

Food and Drug Administration
888-463-6332 (phone)
www.fda.gov

Institute of Environmental Sciences and Technology
847-255-1561 (phone)
847-255-1699 (fax)
www.iest.org

MSDS Search
615-824-0712 (phone)
615-822-5989 (fax)
www.msdssearch.com

National Institutes of Health
301-496-4000 (phone)
www.nih.gov

National Science Foundation
703-292-5111 (phone)
703-292-9095 (fax)
www.nsf.gov

Parenteral Drug Association
301-986-0293 (phone)
301-986-0296 (fax)
www.pda.org

Society for Biomolecular Screening
203-743-1336 (phone)
203-748-7557 (fax)
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