

819 Injection Module User's Guide

Table of Contents

Declaration of Conformity

1 Introduction

Unpacking.....	1-2
Customer Service	1-3
Technical Specifications	1-4

2 Installation

Installing the Injection Module on the 215	2-2
215 Liquid Handler	2-2
215 SW Liquid Handler	2-3
Making Electrical Connections	2-4
Rear Panel.....	2-4
GSIOC Port.....	2-5
Input/Output Port.....	2-6
Unit ID Selection	2-8
Fuse Installation	2-9
Power Cord Connection	2-10
Plumbing Connections.....	2-11
Drain and Waste Tubing	2-11
Column and Pump Tubing	2-11
Adjusting the Z-Arm Height	2-12
Adjusting Z-Arm Height	2-12
Indicating Z-Height in Setup Program	2-14
Verification for Injection Port Use	2-16

3 Operation

Front Panel	3-2
Start Up	3-3

4 Maintenance

Helpful Hints	4-2
Replacing Parts	4-3
Replacing Tubing	4-3
Replacing the Injection Port Seal	4-5
Replacing Injection Valve Components.....	4-6
Replacing a Fuse.....	4-7
Transporting the Injection Module	4-8

5 Troubleshooting

Electrical	5-2
Input Functions Not Operating	5-2
Output Functions Not Operating	5-2
Unit Not Operational	5-3
Unit Blows Fuses	5-3
LEDs Flashing On Front Panel	5-3
Mechanical	5-4
Bubbling Liquid From Injection Port	5-4
Bubbling Liquid From Waste Port or Injection Port	5-4
Repair and Return Policies	5-5
Before Calling Us	5-5
Warranty Repair	5-5
Non-Warranty Repair	5-5
Rebuilt Exchange	5-5
Return Procedure	5-6

Appendix A Replacement Parts and Accessories

Appendix B GSIOC Commands

GSIOC Commands	B-2
GSIOC Command List	B-2

Appendix C Baud Rate

Appendix D Specifications Methods

Injection Carryover Method	D-2
System	D-2
Mobile Phase/Rinse Solvent	D-3
Flow Rate	D-3
Injection	D-3
Rinse Volume	D-3
Injections	D-3
Calibration Curve Parameters	D-3
Injection Protocol	D-4
Injection Reproducibility Method	D-5
System	D-5
Mobile Phase	D-5
Flow Rate	D-5
Injection	D-5
Rinse Volume	D-6
Injection Volume	D-6

Appendix E Using an Additional 819 Module for Fraction Collection

Required Accessories	E-2
Electrical Connections	E-3
Making Contact Connections	E-3
Plumbing Connections	E-4
At Initialization	E-6
Example UniPoint Method	E-7

Declaration of Conformity

Application of Council Directives:

89/336/EEC, 73/23/EEC

Standards to which Conformity is Declared:

EN61326, EN61000-3-3, EN61000-3-2, EN61010-1

Manufacturer's Name Gilson, Inc.

Manufacturer's Address 3000 W. Beltline Highway
Middleton, WI 53562

EC Office Address Gilson S.A.S.
19, avenue des Entrepreneurs, BP 145,
F-95400 VILLIERS LE BEL France

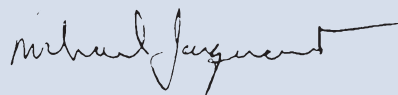
Type of Equipment Laboratory Equipment

Model. **819 Injection Module**

Beginning with Serial Number: **259M4A001**

Month and Year of Manufacture: **December 1994**

I, the undersigned, hereby declare that the equipment
specified above conforms to the above Directives and Standards.



Place: Middleton, WI (USA)
Issue Date: August 1995

Michael Jacquart
Senior Vice President
Corporate Technology Development

Introduction

1

The Gilson 819 Injection Module enables you to inject samples onto an HPLC system. It is used with a Gilson 215 Liquid Handler.



Gilson 819 Injection Module

Unpacking

The injection module is delivered with all major components already assembled. Keep the original container and packing material in case it must be returned to the factory.

The injection module and accessories are shipped in one container. Unpack the container and inspect for damage. Promptly report any damage to the carrier. Some carriers must receive concealed damage claims within seven days of delivery.

After unpacking the injection module and its accessories, ensure you have the following:

- 819 Injection Module with installed Rheodyne valve, injection loop, stainless steel waste tubing, injection port, and calibrated tubing
- power cords
- fuse drawers and fuses
- Z-height adjustment tool
- GSIOC cable
- 5/16"-1/4" wrench
- two 10 mm wrenches
- terminal block connector
- replacement fuse
- two knurled screws
- Tygon drain tubing

Customer Service

Gilson, Inc. and its worldwide network of authorized representatives provide customers with the following assistance: sales, technical, applications, and instrument repair.

If you need assistance, please contact your Gilson representative or if you are in the United States call the Gilson Customer Service Department at 800-445-7661 or 608-836-1551. You can also contact the Customer Service Department via its e-mail address: service@gilson.com. Specific contact information can be found on the Gilson web site at www.gilson.com. To help us serve you quickly and efficiently, please refer to the **Before Calling Us** section on [page 5-5](#).

Technical Specifications

Please be aware of the following before operating the 819 Injection Module.

Warning: Changes or modifications to this unit not expressly approved by Gilson could void your factory-authorized warranty.

This unit has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC commercial environment. This unit generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this unit in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.

<i>Technical Specification</i>	<i>Definition</i>
Available sample loops	5 µL, 10 µL, 20 µL, 50 µL, 100 µL, 200 µL, 1 mL, 2 mL, 5 mL, and 10 mL
Available valves	Rheodyne 7010
Contact control	One contact closure output and one contact closure input
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	LOAD and INJECT LED lights
Injection carryover	0.01% using equipment and method described in Appendix D .
Injection reproducibility	See Appendix D for details about the configuration and test procedure that Gilson used to determine the limits below. Total loop fill: CV<0.9%
Liquid contact materials	316L stainless steel, 304 stainless steel, FEP, PEEK, and Vespel or Tefzel
Manufacturing standards	Meets applicable Safety and EMC certification standards; UL and CE certified
Power requirements	Frequency: 47 to 63 Hz Voltage: 100–240V (Universal Input) Current rating: 1.0A for 100–120V or 0.5A for 220–240V

Software control	Gilson Serial Input/Output Channel (GSIOC) port for computer control of the injection module
Valve switching speed (mS)	Less than 500 milliseconds
Weight	3.6 kg (8 lbs.) with installed valve

This section takes you through the steps for setting up your 819 Injection Module.

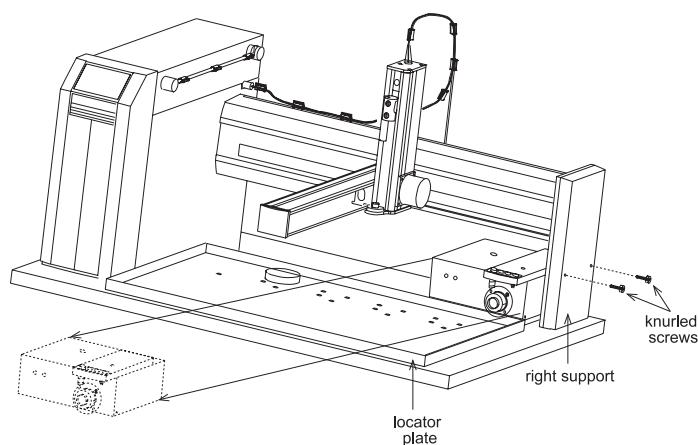
Installing the Injection Module on the 215

To prepare the injection module and install it onto the 215, follow the appropriate instructions that follow.

215 Liquid Handler

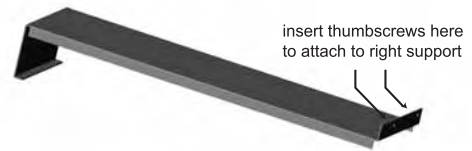
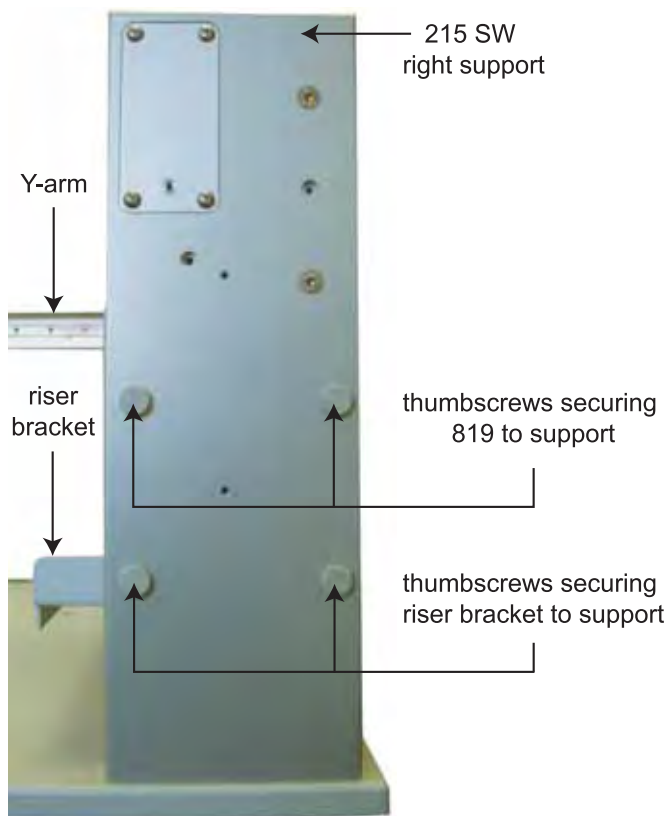
Note: If the injection module is being installed on the liquid handler along with two Gilson 818 AutoMix modules, refer to *Appendix C* in the *818 AutoMix User's Guide* for placement information.

- 1 Using a Phillips screwdriver, remove the two labeled shipping screws from the injection port plate on the top of the injection module. Store the screws in case the module must be returned to the factory.
- 2 Place the module behind the last rack position on the locator plate, next to right support of the liquid handler.
- 3 Secure the module into place using the two knurled screws, supplied in the accessory package.
- 4 Remove the tape securing the stainless steel waste tubing.



215 SW Liquid Handler

- 1 Using a Phillips screwdriver, remove the two labeled shipping screws from the injection port plate on the top of the injection module. Store the screws in case the module must be returned to the factory.
- 2 Obtain and secure a riser bracket (part number 26014054) to the 215 SW's right support using the thumbscrews provided. Refer to the picture below and at right.

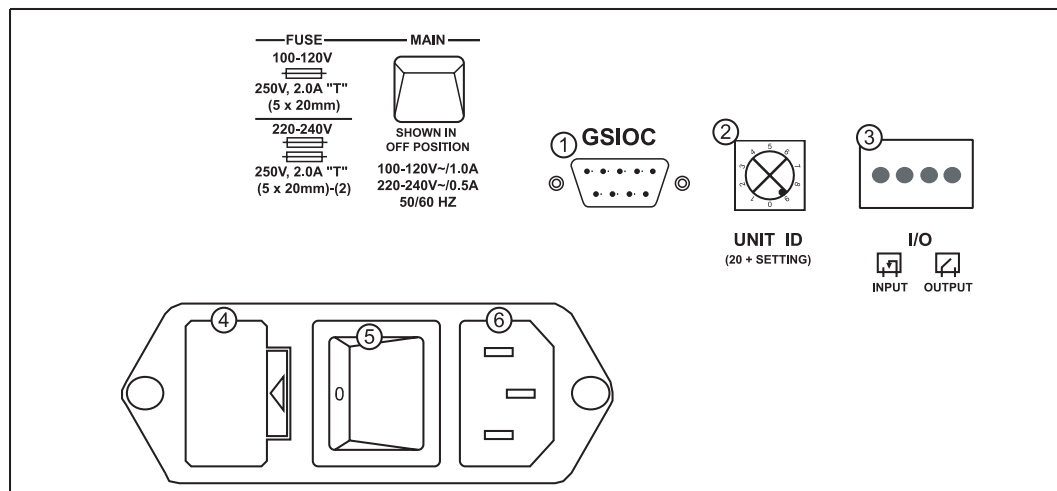


- 3 Place the module on the riser bracket and next to right support of the liquid handler.
- 4 Secure the module into place using the two knurled screws, supplied in the accessory package.
- 5 Remove the tape securing the stainless steel waste tubing.

Making Electrical Connections

Rear Panel

- 1 Gilson Serial Input/Output Channel (GSIOC) port
- 2 Unit ID selector
- 3 Input/Output (I/O) port
- 4 Fuse drawer
- 5 Power switch
- 6 Power receptacle

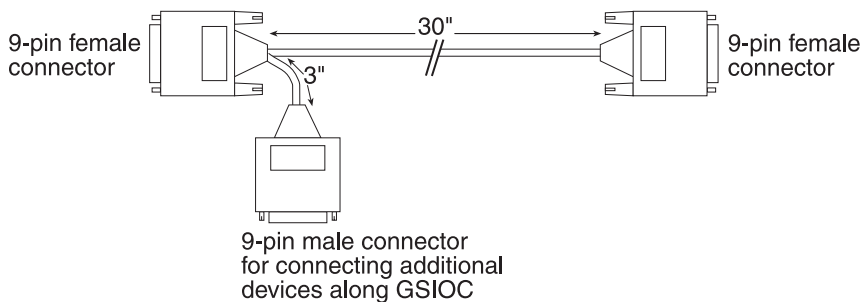


GSIOC Port

Use the GSIOC port to connect the injection module to the 215 Liquid Handler. This enables the module to be controlled via a program running on the keypad or computer connected to the liquid handler.

- 1 Locate the GSIOC cable in the accessory package.
- 2 Connect one of the female connectors to the GSIOC port of the injection module. Tighten the retaining screws.
- 3 Connect the other female connector to the GSIOC port of the 215 Liquid Handler.

Note: If the liquid handler and the injection module are part of a Gilson HPLC system, use the male connector to connect additional devices along the GSIOC.



Input/Output Port

You can use the input and output contacts found on the rear panel of the 819 Injection Module to receive signals from and send signals to other devices. Refer to the diagram on [page 2-4](#) for the location of the input/output port.

The 819 Injection Module has one contact input.

<i>Input</i>	<i>Action</i>
open to close	valve to Inject position
close to open	valve to Load position

The module has one contact output. The contact is closed when the valve reaches the Inject position. The contact is opened when the valve reaches the Load position. While the valve is moving, the contact remains in the previous state. When using contact input control, if input equals output, motion is finished.

<i>Contact In</i>	<i>Contact Out</i>	<i>State</i>
open	open	Load position
open	closed	Moving to Load position
close	open	Moving to Inject position
close	closed	Inject position

Making connections

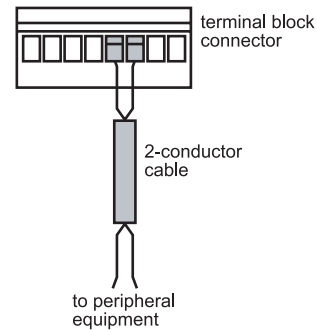
To make connections, you need the following:

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

You can purchase a 6-foot piece of suitable cable (part number 709910206) from Gilson.

To prepare and make connections with the 2-conductor cable:

- 1 Cut the cable into pieces of appropriate length.
- 2 Strip about 0.25 cm of insulation from each end of the cable.
- 3 Locate the terminal block connector in the accessory package.
- 4 Insert each wire into the appropriate slot on the connector. Push the wire all the way in; then tighten its corresponding pin screw.
- 5 Connect the terminal block connector to the injection module. Push the terminal connector in as far as it will go. It is designed to fit snugly into its receptacle.
- 6 Connect the opposite ends of the wires to the other device. Be sure to match ground connections.
- 7 Label each cable to identify the purpose of the connection.

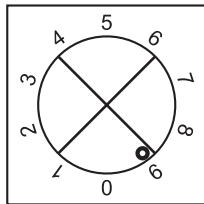


Unit ID Selection

At the factory, Gilson set the unit ID to 29. The unit ID identifies the 819 Injection Module to Gilson software packages that can issue GSIOC commands to Gilson devices. There is no need to change the unit ID unless it is the same as that assigned to another Gilson device connected along the GSIOC.

To change the unit ID:

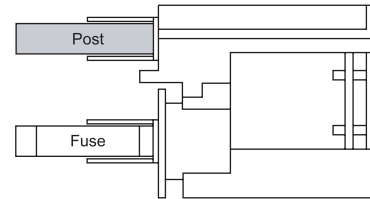
- 1 Gently insert a small flat blade screwdriver into the Unit ID selector on the rear panel and turn it.
- 2 Align the white dot with one of the indicated numbers. The unit ID is 20 plus the selected number.



Fuse Installation

To install the fuses in the 819 Injection Module:

- 1 Locate the accessory package containing the fuse drawer appropriate for your line voltage. Discard the other fuse drawer.
- 2 Locate the accessory package containing the fuses.
- 3 Install the fuse(s) into the fuse drawer. The fuse drawer for 100/120V accepts one fuse. The fuse drawer for 220/240V accepts two fuses.
- 4 Insert the fuse drawer into its receptacle in the module.



Fuse installation for 100/120 voltage



Fuse installation for 220/240 voltage

Power Cord Connection

If necessary, locate the appropriate power cord for your line voltage. Discard the other power cord.

Use the power cord to connect the injection module to an AC power source.

Plumbing Connections

Drain and Waste Tubing

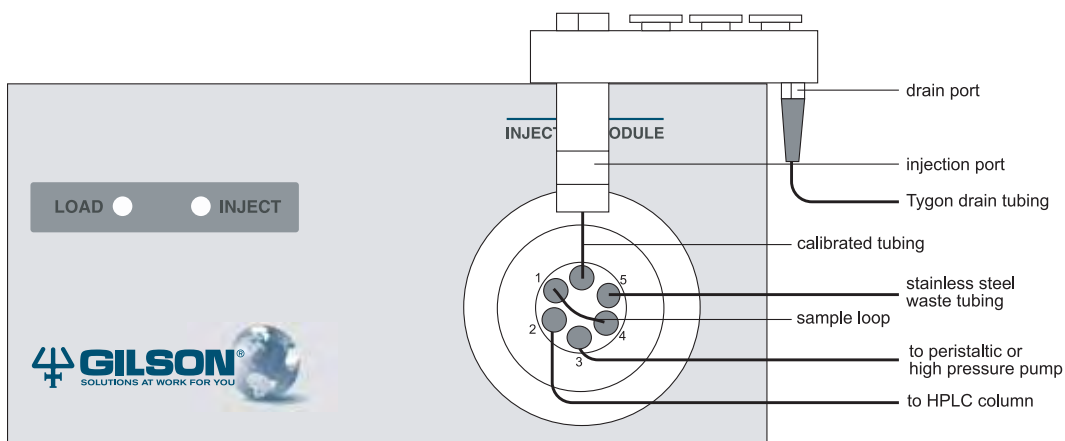
Connect one end of the Tygon drain tubing, supplied in the accessory package, to the drain connector of the injection port plate. Place the other end into a waste receptacle.

Place the free end of the stainless steel waste tubing into a waste receptacle. Make sure that the outlet is lower than the waste port of the valve.

Column and Pump Tubing

Connect the tubing from your HPLC column to port 2 of the injection valve.

Connect the tubing from your peristaltic or high pressure pump to port 3 of the injection valve.



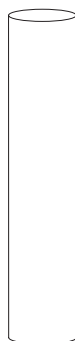
Adjusting the Z-Arm Height

The following pages describe how to adjust the height of the liquid handler's Z-arm for use with the 819 Injection Module.

Adjusting Z-Arm Height

To adjust the Z-arm's height so the probe is properly lowered into the injection port, follow the procedures below:

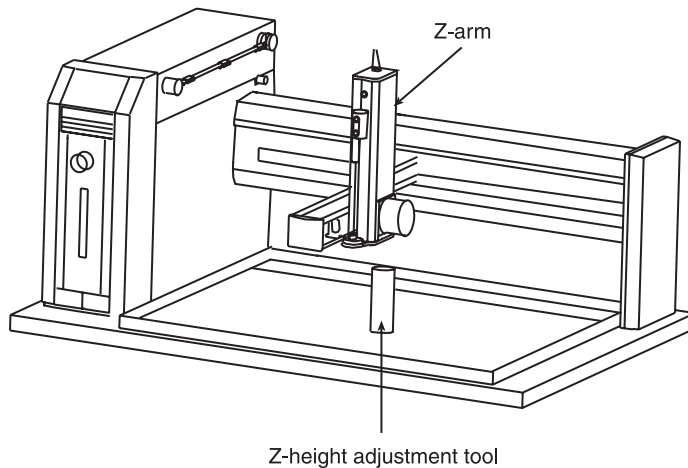
- 1 Turn off power to the 215.
- 2 Locate the Z-height adjustment tool that was shipped with the Z-arm for the 215. Refer to the table below for replacement part numbers.



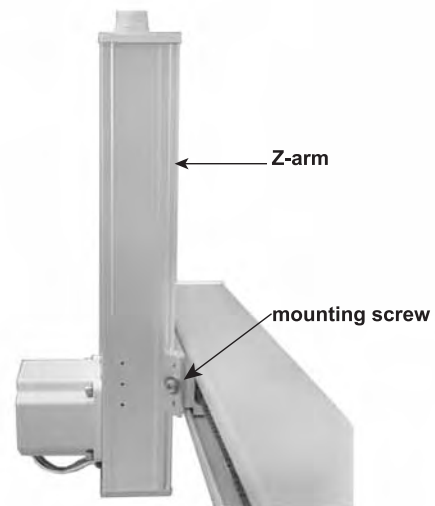
Z-height adjustment tool

<i>Part number</i>	<i>Description</i>
25051094	125 mm Z-height adjustment tool. Use this tool to adjust a 125 mm Z-arm on a 215 Liquid Handler for use with the 819 Injection Module; no Gilson 818 AutoMix is installed on the 215 Liquid Handler.
25051095	175 mm Z-height adjustment tool. Use this tool to adjust a 175 mm Z-arm on a 215 Liquid Handler for use with the 819 Injection Module. Or, use this tool to adjust a 125 mm Z-arm when a Gilson 818 AutoMix is installed along with the injection module on the 215 Liquid Handler.
95260004	270 mm Z-height adjustment tool. Use this tool to adjust the Z-arm on a 215 SW Liquid Handler for use with the 819 Injection Module.

- 3 Place the Z-height adjustment tool on one of its ends near the center of the locator plate (if necessary, remove any racks or accessories before doing this).



- 4 Loosen the mounting screw on the Z-arm mounting bracket and slightly raise the Z-arm.
- 5 Manually move the arm so the Z-arm is centered over the Z-height adjustment tool.
- 6 While holding Z-height adjustment tool flat against the locator plate, use the other hand to lower the Z-arm until it lightly rests on the adjustment tool.
- 7 Tighten the mounting screw on the Z-arm mounting bracket so the Z-arm is secure.
- 8 While holding the adjustment tool in place, slide the Z-arm off the tool. Ensure that the bottom of the Z-arm lightly rubs against the adjustment tool as it moves. Repeat steps 4 through 7 until this is true.
- 9 Store the Z-height adjustment tool.



Indicating Z-Height in Setup Program

To ensure that the Z-arm is adjusted for use with the injection port, run SET_215.EXE or the 215 Setup Utility.

If you are using a Keypad Controller

SET_215.EXE is supplied on the 215 Keypad disk for use in a Gilson Keypad Controller.

- 1 Start the SET_215.EXE program, and choose item 6, Z height.
- 2 If you used the 125 mm Z-height adjustment tool to adjust the Z-arm, set the option to 125 mm. If you used the 175 mm Z-height adjustment tool, set the option to 175 mm.
- 3 Exit the program by choosing item 0 twice.

If you are using a 215 Liquid Handler

The 215 Setup Utility is supplied on the 215 Utility Programs CD-ROM supplied with your 215 Liquid Handler.

- 1 Start the 215 Setup Utility.
- 2 Click on the Z Heights tab.
- 3 If you used the 125 mm Z-height adjustment tool to adjust the Z-arm, set the clamp height to 125 mm. If you used the 175 mm Z-height adjustment tool, set the clamp height to 175 mm.
- 4 Click on OK to store the Z height in the liquid handler's memory.

If you are using a 215 SW Liquid Handler

The 215 SW Setup Utility is supplied on the 215 SW Utility Programs CD-ROM supplied with your 215 SW Liquid Handler.

- 1 Start the 215 SW Setup Utility.
- 2 Click on the Z Arm tab.
- 3 Set the Clamp Height to 270 mm.
- 4 Click *Ok* to store the clamp height in the liquid handler's memory.
- 5 Click on the About tab then Exit to close the 215 SW Setup Utility.

Verification for Injection Port Use

To ensure that the Z-arm is adjusted for use with the injection port, run INJECT_Z.EXE, the 215 Injection Z-Height Utility, or the 215 SW Setup Utility.

If you are using a Keypad Controller

INJECT_Z.EXE is supplied on the 215 Keypad disk for use in a Gilson Keypad Controller.

INJECT_Z.EXE prompts you:

- to press a key so it can proceed with homing the liquid handler's probe.
- to specify the location of the 819 Injection Module: next to the liquid handler's right support or near the center of the liquid handler's locator plate.
- to adjust the height of the liquid handler's probe so it is flush with the top of the injection port. To verify that the probe is on the same plane as the injection port, slide a small piece of paper (approximately 1" by 1") between the probe tip and injection port. The probe is aligned if the top of the paper catches the tip of the probe when it is slid between the probe and injection port.
- to approve the adjustment made to the Z-arm height.

If you are using a 215 Liquid Handler

The 215 Injection Z-Height Utility is supplied on the 215 Utility Programs CD-ROM supplied with your 215 Liquid Handler.

- 1 Start the 215 Injection Z-Height Utility.
- 2 Select the location of the injection module in the Location of Injection Module field.
- 3 To position the probe over the injection port, click *Move to Injection Port*. If the probe does not stop above the injection port, select a different option button in the Location of Injection Port Plate area and click *Move to Injection Port* again.
- 4 To see if the probe's Z height is aligned correctly, slide a small piece of paper between the probe's tip and the injection port. The probe is aligned if the top of the paper catches the tip of the probe when you position the paper between the probe and the injection port.
- 5 If the probe is not aligned, click on  or  to move the probe.
- 6 When the probe is aligned, click *Update* to store the new alignment into the liquid handler's memory.
- 6 Click *Done* to close the 215 Injection Z-Height Utility.

Note: If the probe requires adjustment along the X- or Y-axis, use the 215 Setup Utility (Adjust XY tab).

If you are using a 215 SW Liquid Handler

The 215 SW Setup Utility is supplied on the 215 SW Utility Programs CD-ROM supplied with your 215 SW Liquid Handler.

- 1 Start the 215 SW Setup Utility.
- 2 To position the probe over the injection port, click *Move to Port*.
- 3 To see if the probe's Z height is aligned correctly, slide a small piece of paper between the probe's tip and the injection port. The probe is aligned if the top of the paper catches the tip of the probe when you position the paper between the probe and the injection port.
- 4 If the probe is not aligned, click on  or  to move the probe.
- 5 When the probe is aligned, click *Ok* to store the new alignment in the liquid handler's memory.
- 5 Click on the About tab then Exit to close the 215 SW Setup Utility.

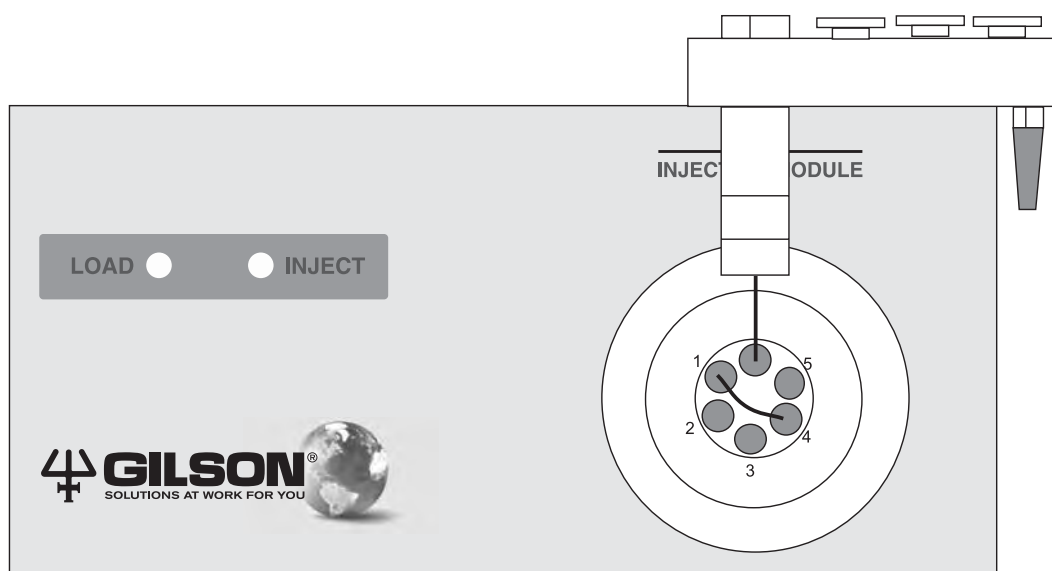
Note: If the probe requires adjustment along the X- or Y-axis, use the Adjust XY tab.

You control the 819 Injection Module via an executable program being run on a computer or on the 215 Liquid Handler's Keypad Controller. The program is generated by Gilson control software (ordered separately).

Front Panel

The front panel of the injection module contains a Load LED and an Inject LED. These LEDs identify the position of the injection valve:

<i>Load LED</i>	<i>Inject LED</i>	<i>Condition</i>
On	Off	Valve at Load position
Off	On	Valve at Inject position
Off	Off	Valve is turning
Blinking	Blinking	Valve error



Start Up

To get the injection module ready for injections, turn on power to the module using the power switch located on the rear panel. Refer to the rear panel diagram on [page 2-4](#) if necessary.

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

This section contains guidelines to help you maintain your injection module.

Helpful Hints

In order to keep your injection module at peak performance, Gilson recommends that you do the following:

- Flush the injection port, valve, and tubing daily with distilled or deionized water.
- Check periodically to ensure that all fittings are tight.
- Wipe up all spills immediately.

Replacing Parts

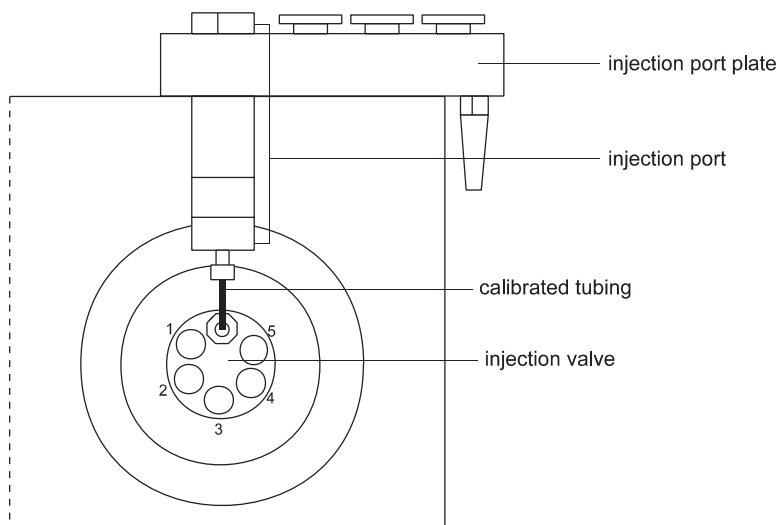
Replacing Tubing

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

Replace tubing as needed. See [Appendix A](#) for part numbers for replacement tubing.

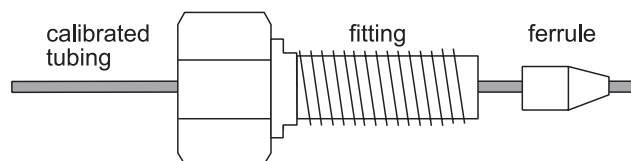
To replace the calibrated tubing:

- 1 Disconnect the calibrated tubing from the injection port. To fully remove the fitting, do the following:
 - a) Loosen the two knurled screws that secure the injection module to the liquid handler. See diagram on [page 2-2](#) if necessary.
 - b) Lift and tilt the injection port plate from the top of the injection module with one hand while loosening the fitting with the other hand.



- 2 Disconnect the calibrated tubing from the injection valve.

- 3 Install the fittings and ferrules on the replacement tubing as shown below.



- 4 Connect one end of the replacement tubing to the injection valve and finger tighten. When secure, turn the fitting 1/4 turn with a 1/4" wrench, supplied with the injection module.
- 5 Connect the other end to the bottom of the injection port. You may need to lift and tilt the injection plate for better access to the injection port. Finger tighten the fitting. When secure, turn the fitting 1/4 turn with the 1/4" wrench.
- 6 If necessary, reinstall the injection port plate onto the injection module, making sure the plate is seated on the pins on the top of the module.
- 7 Secure the module into place using the two knurled screws.

Replacing the Injection Port Seal

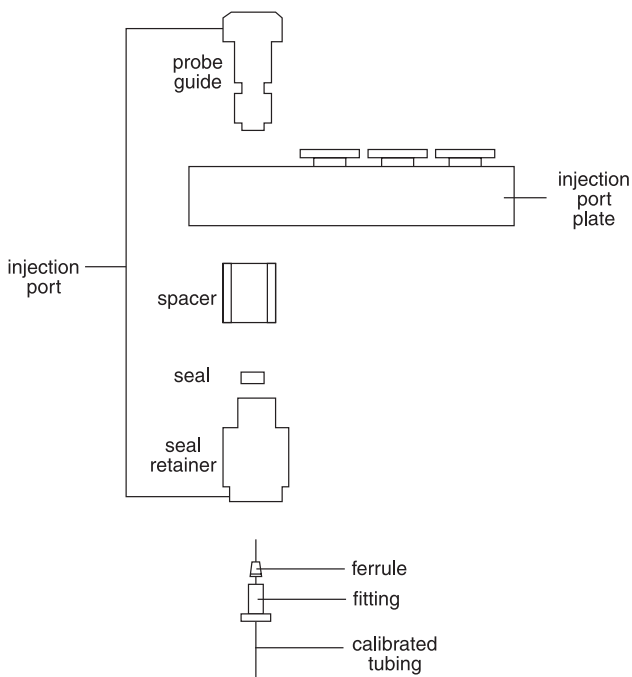
To replace the injection port's seal:

- 1 Disconnect the calibrated tubing from the injection port. To fully remove the fitting, do the following:

- a) Loosen the two knurled screws that secure the injection module to the liquid handler. See diagram on [page 2-2](#) if necessary.
- b) Lift and tilt the injection port plate from the top of the injection module with one hand while loosening the fitting with the other hand.

- 2 Using the 10 mm wrenches, remove the seal retainer piece from the injection port. Refer to the diagram. It shows the components of a disassembled injection port: probe guide, spacer, seal, and seal retainer. It also shows the injection port plate, calibrated tubing, its fitting, and ferrule.

- 3 To remove the seal from the top of the seal retainer, insert a #6 wood screw into the seal then pull. Discard the old seal.
- 4 Using your fingers, push the replacement seal into place in the seal retainer.
- 5 Before reconnecting the seal retainer, ensure that the probe guide and spacer are secure in the injection port plate. Use the 10 mm wrenches if necessary.
- 6 Finger tighten the seal retainer to the spacer. When secure, use a 10 mm wrench and turn the spacer 1/4 turn.



- 7 Connect the calibrated tubing to the bottom of the injection port. You may need to lift and tilt the injection port plate for better access to the injection port. Finger tighten the fitting. When secure, turn the fitting 1/4 turn with the 1/4" wrench.
- 8 If necessary, reinstall the injection port plate onto the injection module, making sure the plate is seated on the pins on the top of the module.
- 9 Secure the injection module into place using the two knurled screws.

Replacing Injection Valve Components

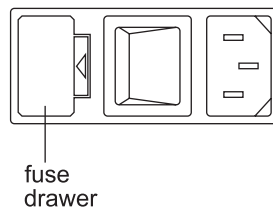
For part numbers for replacement valve parts, see [Appendix A](#). Procedures for performing valve maintenance are supplied with replacement part(s).

Replacing a Fuse

A blown fuse may indicate the existence of another problem in the instrument. If the replacement fuses blow, do not try others. Contact your local representative or Gilson. See [Before Calling Us](#) in *Section 5*.

To change a fuse, follow these steps.

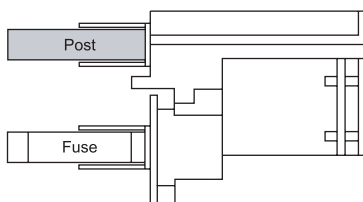
- 1 Disconnect the power cord from the power outlet and from the rear panel receptacle.
- 2 Locate the fuse drawer on the rear panel.
- 3 Insert a small screwdriver into the notch located to the right of the fuse drawer.



- 4 Twist the screwdriver to open and remove the fuse drawer. The fuse drawer contains one fuse for a 100/120 voltage selection. It contains two fuses for a 220/240 voltage selection.
- 5 Remove the old fuse(s) and insert the new fuse(s).

The type of fuse used for both 100/120 and 220/240 voltage selections is a 2A "T" Slo-Blo fuse (5 x 20 mm size), part number 6730204007.

- 6 Insert the fuse drawer into its receptacle in the module.



**Fuse drawer for 100/120
voltage selection**



**Fuse drawer for 220/240
voltage selection**

Transporting the Injection Module

When moving the liquid handler to another location or when sending it back to the factory, reinstall the shipping screws into the injection valve plate on top of the module.

Electrical

Input Functions Not Operating

- Make sure connections into terminal block connector are secure.
- Make sure terminal block connector is secure in input/output port.
- Check connections for proper pin assignments.
- Be sure pins from external devices are assigned correctly.
- Check polarity of input. Inputs should be a contact closure. If not, it must be TTL level (logic 0 activates).
- Confirm that source supplying input to injection module is working.

Output Functions Not Operating

- Make sure connections into terminal block connector are secure.
- Make sure terminal block connector is secure in the input/output port.
- Check connections for proper pin assignments.
- Output from injection module should be compatible with device to which it is interfaced. Outputs are contact closures.

Unit Not Operational

- Make sure power is turned on.
- Check AC power cord connections.
- Try different AC outlet.
- Check fuse(s); replace if necessary.
- Check all module connections and make sure that the unit is plugged in.

Unit Blows Fuses

- Contact the Gilson Customer Service Department.

LEDs Flashing On Front Panel

- Check that a valve is installed.
- Contact the Gilson Customer Service Department.

Mechanical

Bubbling Liquid From Injection Port

- Check to see if calibrated tubing is plugged.
- Check Z-arm/probe height. See pages [2-12](#) through [2-18](#).
- Replace injection port seal. See [page 4-5](#).

Bubbling Liquid From Waste Port or Injection Port

- Replace injection valve's rotor seal. See instructions supplied with the replacement seal.

Repair and Return Policies

Before Calling Us

Gilson Customer Service personnel will be able to serve you more efficiently if you have the following information:

- the serial number located on the bottom of your injection module
- the installation procedure you used
- list of symptoms
- list of operating procedures and conditions you were using when the problem arose
- list of other devices connected to the module and a description of those connections
- list of other electrical connections in the room

Warranty Repair

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

Non-Warranty Repair

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

Rebuilt Exchange

For some units, rebuilt exchange components are available. Contact Gilson for details.

Return Procedure

In the United States, contact the Gilson Customer Service Department to obtain authorization before returning any Gilson instrument. To return the instrument:

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

Gilson, Inc.
Attention: Customer Service
(indicate the authorization here)
3000 W. Beltline Highway
Middleton, WI 53562

Outside the United States, contact your Gilson representative for return procedures.

Replacement Parts and Accessories

A

<i>Part Number</i>	<i>Description</i>
2954640	Injection port with stainless steel calibrated tubing for 1.5 mm OD probes; includes 1.5 mm injection port seal (part number 2954674).
25051040	Rheodyne 7010 stainless steel injection valve with gear assembly (for 819 Injection Module). Order sample loop separately.
25051043	7010 injection valve with make-before-break stator assembly and gear assembly (for 819 Injection Module).
25051015	Injection port with PEEK calibrated tubing for 1.3 mm OD probes; includes 1.3 mm injection port seal (part number 250510153).
2954674	Injection port seal for 1.5 mm outer diameter probe tip injector port, for 849.
250510153	Injection port seal for 1.3 mm OD probe tip injection port (part number 25051214)
499410522	Calibrated tubing, PEEK, 52 x 1.6 x 0.25 mm ID, fitted with hexagonal nuts and ferrules.
2707288	Calibrated tubing, PEEK, 85 x 1.6 x 0.25 mm ID
49571876	10.0 mL sample loop. When used on an 819 injection valve, the rack position in front of the 819 cannot be used.
496020	5 µL sample loop, stainless steel
496021	10 µL sample loop, stainless steel

Replacement Parts and Accessories

496022	20 µL sample loop, stainless steel
496023	50 µL sample loop, stainless steel
496024	100 µL sample loop, stainless steel
496025	200 µL sample loop, stainless steel
496026	500 µL sample loop, stainless steel
496027	1.0 mL sample loop, stainless steel
496028	2.0 mL sample loop, stainless steel
496029	5.0 mL sample loop, stainless steel
4961047	Rheodyne fittings for 7010 valve; includes 2 long bushings, 2 short bushings, 4 ferrules
470321803	Tygon drain tubing for injection port plate; per foot
49051501	Drain tubing fitting for injection port plate
638304512	Terminal block connector, 4-pin
709910206	2-conductor interconnect wire, 6', for making contact connections
6730204007	Replacement fuse; 2 amp (250V) T-type fuse, 5 mm x 20 mm
25051094	125 mm Z-height adjustment tool. Use this tool to adjust a 125 mm Z-arm for use with the 819 Injection Module; no Gilson 818 AutoMix is installed on the liquid handler.
2507722	215 low pressure valve assembly-replacement valve
251772	215 Low Pressure Valve Package. Includes low pressure valve, valve mounting assembly and plumbing package required to plumb a 215 Liquid Handler/819 Injection Module as a fraction collector when controlled by UniPoint System Software.

251773	Prep FC package (high mount). Includes valve, valve mounting assembly and plumbing package required to plumb a 215 Liquid Handler/819 Injection Module as a fraction collector when controlled by UniPoint System Software. For flow rates greater than 20 mL/min use a probe with an internal diameter of 0.8 mm or larger.
251774	Prep FC Package (Low Mount), for flows up to 200 mL/min. Includes valve, valve mounting assembly, valve bracket assembly, probe guide foot, and plumbing package required to plumb a 215 Liquid Handler/819 Injection Module as a fraction collector when controlled by UniPoint System Software. For use with collection tubes 16 mm ID or larger.
95260004	175 mm Z-height adjustment tool. Use this tool to adjust a 175 mm Z-arm for use with the 819 Injection Module. Or, use this tool to adjust a 125 mm Z-drive when a Gilson 818 AutoMix is installed along with the injection module on the liquid handler.
95260004	270 mm Z-height adjustment tool. Use this tool to adjust the Z-arm on a 215 SW Liquid Handler for use with the 819 Injection Module.
36078143	Shielded GSIOC cable, 30".
49601040	Stator for 7010 Rheodyne Valve.
49601039	Rotor seal for 7010 Rheodyne Valve.
49601071	Rotor Seal / 7010TI Valve Tefzel.
49601015	Isolation seal for 7010 Rheodyne Valve.
49601038	Shaft assembly for 7010 Rheodyne Valve.
27073013	Gear set for 7010 Rheodyne Valve and valve motor.
496010	Stainless steel 7010 Rheodyne Valve without valve gear assembly or mounting collar.
496010TI	Titanium 7010 Rheodyne Valve without valve gear assembly or mounting collar.

Replacement Parts and Accessories

250455191	819 locator plate. Required to install 819 Injection Module when two 818 Automix modules are installed on 215 Liquid Handler, or to install two 819 Injection Modules.
25051016	Calibrated tubing, stainless steel, 70 x 0.8 mm ID; with fittings .
250510751	Injection port plate. Includes plate with mounting screws, drain tubing, fitting and Z-height adjustment tool.
25051094	Z-height adjustment tool (to adjust 215 vertical arm height for 125 mm vertical arm)
2954698	Caps, natural PE, for tabless 1 ml column, 1000/pkg
2954709	Transfer port accessory set for 1 port. Includes one polyamide molded transfer port, PTFE inlet tubing (1000 x 3 x 2 mm ID) with filter, PE disposable sealing caps and instruction leaflet.
2954714	Replacement transfer port; does not include inlet tubing, extra sealing caps or instruction leaflet.
36078143	Shielded GSIOC cable, 30".
490410654	Upchurch P-654 extra long PEEK adapter; 1/4"-28 to 10-32.
49600016	Vespeal large bore rotor seal 7000L.
49601017	Make-before-break stator for Rheodyne 7010 valve.
49601039	Rotor seal for 7010 injection valve.
49601069	Large bore stator for Rheodyne 7000/7010/7030/7040 valves.
4960108	7010 valve with make-before-break stator
49931062	Calibrated tubing, stainless steel, 70 x 1.6 x 0.25 mm ID with hexagonal nuts and ferrules; 4.2 mL.

49942107	0.8 mm ID Teflon tubing for injection port to other instrument. 10 feet plus 2 end fittings.
49944107	0.3 mm ID Teflon tubing for injection port to other instrument. 10 feet plus 2 end fittings.
26014054	215 SW riser bracket assembly for installing 819 Injection Module on the 215 SW Liquid Handler
26014055	215 SW riser bracket assembly for installing two 819 Injection Modules on the 215 SW Liquid Handler or for installing the 819 Injection Module if it cannot be positioned next to the 215 SW Liquid Handler's right support

GSIOC Commands

B

The Gilson Serial Input Output Channel (GSIOC) is an asynchronous serial communications interface that enhances the power of your Gilson equipment.

The GSIOC incorporates an EIA RS-485 interface and allows up to 32 slave devices to be controlled from a single master in a multi-drop configuration.

Each slave device is identified by a unique number which must be known to the controller. The default ID code of the 819 is 29.

To control the 819 Injection Module via the GSIOC interface, you need the following:

- a computer with any Gilson control software or 706 Device Driver Software installed
- 506C System Interface or 215

From the controller, you:

- specify the 819 as the instrument you want to control
- issue commands that set operating parameters, control operation, or request information from that device

GSIOC Commands

There are two kinds of commands that you can send over the GSIOC:

- **Buffered commands** (B) send instructions to the injection module. These commands are executed one at a time.
- **Immediate commands** (I) request status information from the injection module. These commands are executed immediately, temporarily interrupting other commands in progress.

GSIOC Command List

In the command list on the following page, the GSIOC command must be entered in the proper upper or lower case format. If a buffered command requires additional information, you see italicized text next to the command. The description of the command identifies what you need to enter in place of the italicized parameter.

<i>Command</i>	<i>Type</i>	<i>Description</i>
\$	I	Resets the 819. Equivalent to cycling power.
%	I	Reads the current software version. Returns: "819vx.xx" where x.xx is the currently installed version.
V	I	Returns the valve status: L - Load position I - Inject position M- Moving E - Error
E	I	Returns error code. 00 - No error 10 - No valve installed 12 - Load position detection error 13 - Inject position detection error
M	I	Returns the total number of valve turns.
Mn..n	B	Sets the total number of valve turns to n..n. The command M0 resets the number of valve turns.
T	I	Returns valve switching time in milliseconds; uses format 'xxx mS'. The time is updated after moving valve.
VI	B	Rotates valve to Inject position.
VL	B	Rotates valve to Load position.

As a default, the baud rate is set to external, indicating that the injection module is a slave device in a Gilson system and the baud rate is being clocked externally.

Other baud rate selections are available if the injection module is being controlled by non-Gilson applications.

- 0 - External (default)
- 1 - 19,200
- 2 - 9600
- 3 - 4800
- 4 - 2400
- 5 - 1200
- 6 - 600
- 7 - Reserved
- 8 - Reserved
- 9 - Reserved

To change the baud rate:

- 1 Disconnect the calibrated tubing from the injection port. To fully remove the fitting, do the following:
 - a) Loosen the two knurled screws that secure the injection module to the liquid handler. See diagram on [page 2-2](#) if necessary.
 - b) Lift and tilt the injection port plate from the top of the injection module with one hand while loosening the fitting with the other hand.
- 2 Remove the four screws that secure the cover and then remove the cover.
- 3 Locate the SW1 selector, on the left, near the back panel. This is the baud rate selector.
- 4 Gently insert a small flat blade screwdriver into the numbered side of the SW1 selector and turn it.
- 5 Align the white dot with one of the indicated numbers.
- 6 Replace the cover and the four screws that secure it.
- 7 Reconnect the calibrated tubing to the bottom of the injection port. You may need to lift and tilt the injection plate for better access to the injection port. Finger tighten the fitting. When secure, turn the fitting 1/4 turn with the 1/4" wrench.
- 8 If necessary, re-install the injection port plate onto the injection module, making sure the plate is seated on the pins on the top of the module.
- 9 Secure the injection module into place using the two knurled screws.

This appendix contains information on the methods used to obtain the injection carryover and the injection reproducibility data listed on [page 1-5](#).

Injection Carryover Method

System

215 Liquid Handler

- 125 mm Z-arm
- beveled-tip probe, stainless steel, grooved septum-piercing; 221 x 1.5 x 0.4 mm ID (part number 27067383); requires probe holder/guide kit (part number 253641)
- rinse station with deep-pocket insert (part number 25245533)
- 500 μ L syringe (part number 25025347)
- 1.1 mL coiled FEP transfer tubing; 0.8 mm ID (part number 499424012)

819 Injection Module

- 7010 Rheodyne valve with Tefzel rotor seal (part number 49601061)
- 20 μ L stainless steel loop (part number 496022) with 4 mm of tubing extended beyond each ferrule
- injection port (part number 2954640) with stainless steel calibrated tubing for 1.5 mm OD probes and 1.5 mm injection port seal (part number 2954674)

306 Pump

- 10 SC pump head

307 Pump

- 10 SC pump head

811 Dynamic Mixer

- 1.5 mL mixing chamber

Fluorescence Detector

- 3 Gain
- 3 Sensitivity
- 254 nm Excitation
- 400 nm Emission

Column

- Zorbax SB-C18, 4.6 x 150 mm, 5 μ m

Mobile Phase/Rinse Solvent

- isocratic
- 100% methanol

Flow Rate

0.7 mL/min

Injection

- 980 ng/mL anthracene in methanol
- five times overfill total loop injection (100 μ L)

Rinse Volume

- Probe at rinse station: aspirate 300 μ L from reservoir at 15 mL/min then dispense 300 μ L at 16 mL/min
- Injection port and valve: aspirate 450 μ L from reservoir at 16 mL/min then dispense 450 μ L at 4 mL/min

Injections

- 1 two system blank injections of methanol
- 2 two initial blank injections of methanol
- 3 one injection of 980 ng/mL anthracene
- 4 four injections of methanol blanks

Calibration Curve Parameters

- external calibration
- linear curve fit
- five calibration levels
 - 1 0.049 ng/mL
 - 2 0.098 ng/mL
 - 3 0.294 ng/mL
 - 4 0.490 ng/mL
 - 5 0.980 ng/mL

Injection Protocol

- 1 Home
- 2 Air gap 6 μL at 0.3 mL/min
- 3 Sample location TUBE, 1 mm from bottom
- 4 Aspirate five times the loop volume
- 5 Move arm to injection port
- 6 Set injection valve to load
- 7 Dispense five times the loop volume at 0.3 mL/min
- 8 Wait 0.2 min
- 9 Set injection valve to inject
- 10 Synchronize
- 11 Rinse injection port: aspirate 450 μL from reservoir at 16 mL/min then dispense 450 μL at 4 mL/min
- 12 move arm to top
- 13 move arm to rinse station
- 14 rinse probe: aspirate 300 μL from reservoir at 15 mL/min then dispense 300 μL at 16 mL/min

Injection Reproducibility Method

System

215 Liquid Handler

- Septum-piercing probe (part number 2507234); side-entry, capacitive level sensing, stainless steel, strain-relief design. Dimensions: 274 x 1.8 x 0.8 mm ID (tip dimensions: 12 x 1.3 mm OD, entry hole center is 3.5 mm from tip). Requires probe holder/guide kit (part number 253640).
- 1000 μ L syringe

307 Pump

- 10 SC Pump Head

819 Injection Module

- 7010 Rheodyne valve
- 20 μ L stainless steel loop (part number 496022)
- Injection port (part number 25051015) with PEEK™ calibrated tubing for 1.3 mm OD probes; includes 1.3 mm injection port seal (part number 250510153).

Fluorescence Detector

- 0.002 sensitivity
- 254 nm excitation filter
- 400 nm emission filter

Column

- Vydac RP C-18 column: 3 μ m, 4.6 x 50 mm

Mobile Phase

95% methanol: 5% water

Flow Rate

1.5 mL/min

Injection

30 injections of 50 ng/mL anthracene in methanol

Rinse Volume

- Probe at rinse station: 1000 μL
- Injection port and valve: 500 μL

Injection Volume

100 μL , full loop

Using an Additional 819 Module for Fraction Collection

E

The 819 module contains a high-pressure Rheodyne™ two-position, switching valve that can be used for fraction collection. It is an effective way to collect fractions when the flow rate is faster than 20 mL/min. The Rheodyne™ valve can sustain the higher pressures that are related to the faster flow rates unlike the valve used in the low pressure valve assembly (part number 251772).

Required Accessories

For the 215 Liquid Handler you will need:

- Beveled-tip probe, stainless steel, grooved septum-piercing; 221 x 2.0 x 0.8 mm ID (part number 27067382)
- Probe holder/guide kit (part number 253643)

For the 819 Injection Module you will need:

- Make-before-break stator (part number 49601017)
- Injection port (part number 2954640)

For the 819 module being used for fraction collection, you will need:

- Large bore stator (part number 49601069)
- Large bore seal (part number 49600016)

For the system you will need:

- 0.030" ID tubing, 5 feet, stainless steel (part number 499331519)
- Calibrated tubing, stainless steel, 70 x 0.8 mm ID with fittings (part number 25051016)

All the parts mentioned above are available from Gilson.

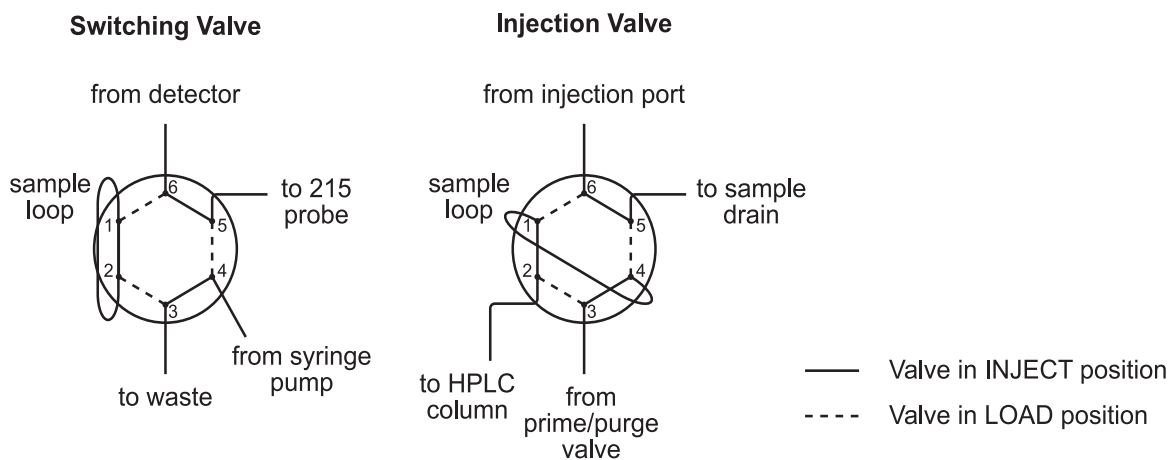
Electrical Connections

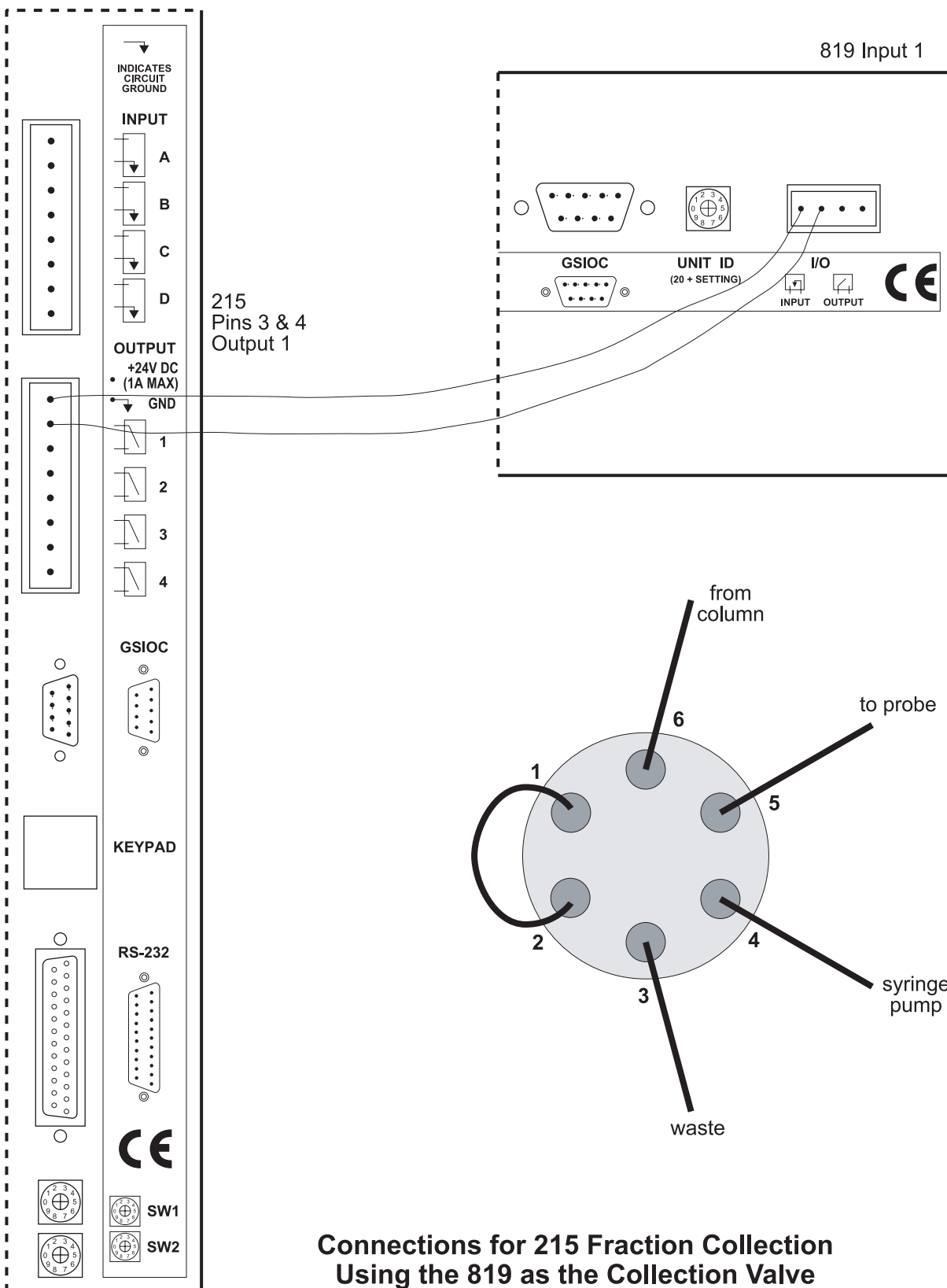
Making Contact Connections

The 819 fraction collection valve requires a contact connection to the output barrier strip of the liquid handler. To make this connection, connect the input contact (pins 1, 2) on the back of the 819 Injection Module to output position 1 on the back of the liquid handler (pins 3, 4). For more information on making contact connections, refer to *Section 2, Installation* of the *819 Injection Module User's Guide* or *215 Liquid Handler User's Guide*.

Plumbing Connections

The following diagrams show the port connection for the switching and injection valves when they are in the INJECT or LOAD position.



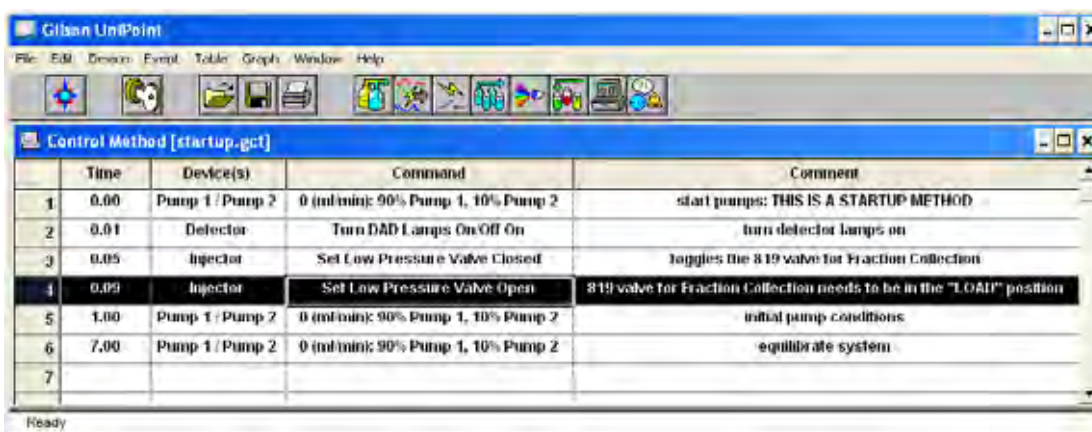


At Initialization

The default position for the second 819 valve is the INJECT (collect) position. Before samples can be injected, the 819 collection valve must be toggled from the INJECT (collect) position to the LOAD (drain) position. To change the valve to the LOAD (drain) position, use the Manual Injector Control dialog in the Operations window. Or, you can add the Set Low Pressure Valve command to the start of the control method or to a startup method to ensure that the valve will be in the correct position at the start of the run. Refer to the examples on the next page.

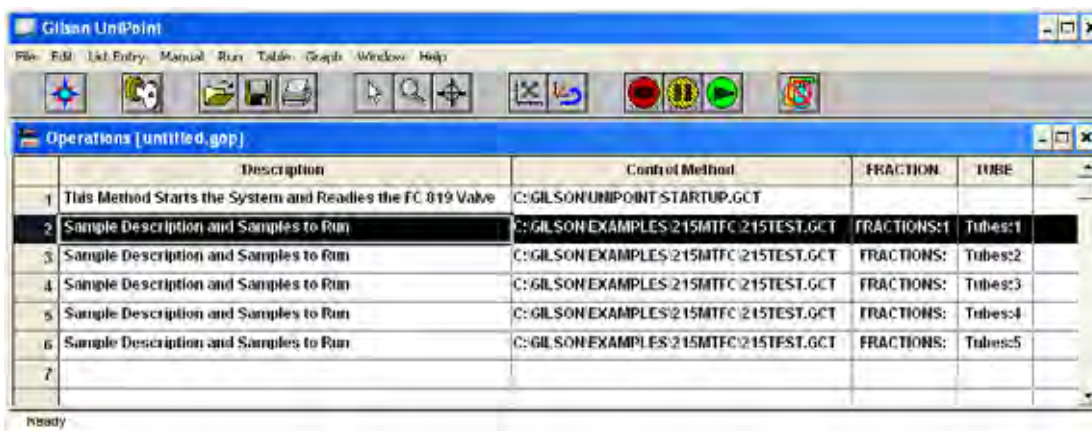
Example UniPoint Method

This is an example of a Control Method (startup.gct) that should be used to switch the valve on the second 819 module for fraction collection to the drain (LOAD) position before injecting the samples through the 819 injection valve. This method should be listed first in an Operations list, then followed by the series of samples with an associated Control Method.



	Time	Device(s)	Command	Comment
1	0.00	Pump 1 / Pump 2	0 (in/min): 90% Pump 1, 10% Pump 2	start pumps: THIS IS A STARTUP METHOD
2	0.01	Detector	Turn DAD Lamps On/Off On	turn detector lamps on
3	0.05	Injector	Set Low Pressure Valve Closed	toggles the 819 valve for Fraction Collection
4	0.09	Injector	Set Low Pressure Valve Open	819 valve for Fraction Collection needs to be in the "LOAD" position
5	1.00	Pump 1 / Pump 2	0 (in/min): 90% Pump 1, 10% Pump 2	initial pump conditions
6	7.00	Pump 1 / Pump 2	0 (in/min): 90% Pump 1, 10% Pump 2	equilibrate system
7				

The following is an example of an Operations List:



	Description	Control Method	FRACTION	TIME
1	This Method Starts the System and Readies the FC 819 Valve	C:\GILSON\UNIPONT\STARTUP.GCT		
2	Sample Description and Samples to Run	C:\GILSON\EXAMPLES\215MTFC\215TEST.GCT	FRACTIONS:1	Tubes:1
3	Sample Description and Samples to Run	C:\GILSON\EXAMPLES\215MTFC\215TEST.GCT	FRACTIONS:1	Tubes:2
4	Sample Description and Samples to Run	C:\GILSON\EXAMPLES\215MTFC\215TEST.GCT	FRACTIONS:1	Tubes:3
5	Sample Description and Samples to Run	C:\GILSON\EXAMPLES\215MTFC\215TEST.GCT	FRACTIONS:1	Tubes:4
6	Sample Description and Samples to Run	C:\GILSON\EXAMPLES\215MTFC\215TEST.GCT	FRACTIONS:1	Tubes:5
7				

