verity® 1810

Conductivity and pH Monitor

User's Guide

GILSON®

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SAFETY

Read this chapter before installing and operating the instrument.

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

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

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

Symbols and Signs

The following table explains symbols and labels that are used on the instrument or in the user's guide:

Symbol	Meaning
⚠️	Caution Attention Vorsicht

Safety Notices

The following safety notices may appear in this document:

⚠️WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, may result in serious injury
⚠️CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury
NOTICE	NOTICE indicates a potentially hazardous situation which, if not avoided, may result in equipment damage

Solvents

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

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

Replacement Parts

Be sure to use only replacement parts mentioned in this user's guide.

SÉCURITÉ

Merci de lire attentivement cette section avant toute installation ou utilisation de l'instrument.

Cet instrument est exclusivement destiné à être utilisé dans un environnement de laboratoire, par un personnel qualifié, à des fins de manipulations de liquides non-médicales. Pour une utilisation correcte et en toute sécurité de l'instrument, il est nécessaire que le personnel qui utilise et réalise la maintenance de l'instrument, suive les instructions contenues dans ce guide lors de l'installation, du nettoyage et de la maintenance de l'instrument. Toutes les consignes de sécurité doivent être respectées durant toutes les phases de fonctionnement, d'entretien ou de réparation de l'instrument.

Le non-respect de ces précautions ou des avertissements spécifiques mentionnés dans ce guide compromet les normes de sécurité de conception, de fabrication et d'utilisation prévue de l'instrument. Gilson décline toute responsabilité en cas d'incapacité du client à se conformer à ces exigences.

L'instrument a été certifié conformément aux normes de sécurité en vigueur au Canada, en Europe et aux Etats-Unis. Merci de vous reporter aux indications mentionnées sur le panneau arrière de l'instrument ainsi qu'au document de Déclaration de Conformité aux normes pour lesquelles l'instrument a été déclaré conforme.

Symboles et Signes

Le tableau suivant détaille les symboles et signes utilisés sur l'instrument ou dans le guide de l'utilisateur:

Symbole	Signification
⚠	Caution Attention Vorsicht

Notes de Sécurité

Les notes de sécurité suivantes peuvent apparaitre dans ce document:

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

Solvants

Respectez les Bonnes Pratiques de Laboratoire lors de la manipulation de solvants. Si des liquides dangereux sont utilisés, assurez-vous que la ventilation est adéquate et portez en permanence un équipement de protection individuelle (EPI), tel que: lunettes, gants et vêtements de protection.

Reportez-vous aux Fiches de Données de Sécurité pour les solvants avant toute utilisation.

Pièces détachées

Assurez-vous de n'utiliser exclusivement que les pièces détachées mentionnées dans ce guide.

INTRODUCTION

Chapter One

This chapter provides information on the following topics:

- **Description** on page 12
- **Unpacking** on page 12
- **Technical Specifications** on page 14
- **Customer Service** on page 16

Description

The VERITY® 1810 Conductivity and pH Monitor is a state-of-the-art detection instrument for biological purifications with a large dynamic range and fast response time for real-time gradient monitoring. It is a compact, integral component for systems performing oligonucleotide, monoclonal antibody (mAb), and other biological separations.

The VERITY® 1810 Conductivity and pH Monitor is a USB powered instrument with an integrated conductivity sensor, an external connection for an optional pH sensor, and analog output connections for conductivity and pH. Real-time conductivity and pH data can be viewed on an LCD display or monitored either through the USB connection or analog outputs.

Figure 1
VERITY® 1810 Conductivity and pH Monitor with Optional pH Flow Cell

Unpacking

The instrument is delivered with most of the major components already assembled. Retain all packing material so the instrument may be shipped safely in the future.

To unpack the instrument:

1. Open the box.

2. Remove the foam insert on the top of the instrument.

3. Grip the instrument and lift it out of the packaging.

4. Remove the instrument from the bag.

5. Remove the bag of accessories from the box.

Standard Equipment

- VERITY® 1810 Conductivity and pH Monitor with Installed Conductivity Flow Cell

- USB Cable

- Two Analog Cables

- Inlet and Outlet Fittings

- Gilson Ethernet Utility

Documentation

The following documentation is provided:

- VERITY® 1810 Conductivity and pH Monitor Documentation CD, which includes:

  ○ VERITY® 1810 Conductivity and pH Monitor User's Guide

  ○ VERITY® 1810 Conductivity and pH Monitor Installation Qualification (IQ) Procedures

- Declaration of Conformity

- Hazardous Materials Declaration (China RoHS)

- Conductivity Flow Cell Calibration Certificate

- Items Included Checklist

- Quality Control (QC) Checklist

Accessories

Required

Some accessories are required, but are ordered separately:

- Inlet and Outlet Tubing

- TRILUTION® LC Software v3.0 with Service Pack 6 (or higher)

Optional

- pH Flow Cell, which includes:

  ○ pH Sensor

  ○ pH Flow Cell Base

  ○ pH Calibration Utility CD

  For more information, refer to the **pH Flow Cell** appendix in this user's guide.

Technical Specifications

Please be aware of the following before operating the instrument.

NOTICE	Changes or modifications to the instrument not expressly approved by Gilson could void the factory-authorized warranty.

The instrument complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This instrument may not cause harmful interference, and (2) this instrument must accept any interference received, including interference that may cause undesired operation.

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

VERITY® 1810 Conductivity and pH Monitor

Technical Specification	Definition			
Analog Outputs	Two 0–1V dedicated analog outputs: one for streaming conductivity data and the other for streaming pH data			
Communication	USB			
Conductivity Flow Cell	*Accuracy*	± 4% or ± 20 µS/cm,whichever is greater,within 1 µS/cm–300 mS/cm at 25°C		
	Part Number	11000002		
	Pressure	*psi*	*bar*	*MPa*
		200	13.79	1.38
	Readable Range	1 µS/cm–999.99 mS/cm		
	Specification Range	1 µS/cm–300 mS/cm		
	Wetted Materials	PEEK, Titanium		
	Volume	54.1 µL		
Data Acquisition	2, 5, or 10 points/sec with TRILUTION® LC Software			
Dimensions (W x D x H)	13.4 x 10.3 x 7.1 cm (5.3 x 4.1 x 2.8 in.)			
Environmental Conditions	Indoor use Altitude: up to 2000 m Temperature range: 4°C–40°C Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C			
Front Panel	Three line display			

VERITY® 1810 Conductivity and pH Monitor

Technical Specification	Definition		
Monitor Channels	Three: Conductivity, pH, and Temperature		
pH Flow Cell	*Accuracy*	±0.1 units at 25°C	
	Maximum Drift	0.1/10 hours at constant conditions	
	Part Number	11100001	
	Pressure	*psi*	*bar*	*MPa*
		100	6.89	0.69
	Readable Range	0–14 pH	
	Specification Range	2–12 pH	
	Wetted Materials	Acrylic, PVDF, pH Glass, epoxy, BUNA-N	
	Volume	110 µL	
Power Requirements	USB powered instrument Instrument Power Requirement: 5V DC (1W)		
Recommended Flow Rate Range	0.5–150 mL/min		
Safety and Compliance	The instrument has been certified to safety standards specified for Canada, Europe, and the United States. Refer to the instrument rear panel label and the Declaration of Conformity document for the current standards to which the instrument has been found compliant.		
Software Control	PC control via USB and TRILUTION® LC Software		
Weight	0.34 kg (0.75 lbs.)		

Customer Service

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

If you need assistance, please contact your local Gilson representative. Specific contact information can be found at **www.gilson.com**. To help us serve you quickly and efficiently, please refer to **Before Calling Us** on page 35.

INSTALLATION

Chapter Two

This chapter explains the steps for setting up the instrument, which includes:

- **Plumbing Connections** on page 18

- **Rear Panel Connections** on page 19

Plumbing Connections

Inlet and outlet tubing are ordered separately so as to be appropriate for the application flow rate. Refer to the **Replacement Parts and Accessories** appendix for part numbers. Fittings are supplied.

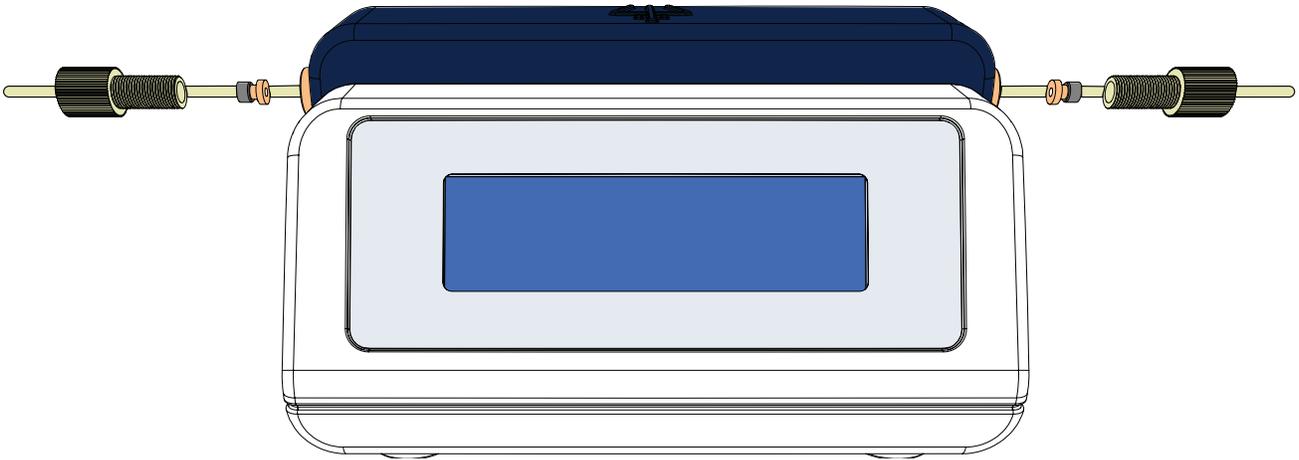To make the plumbing connections:

1. On each end of the tubing, slide the nut, then the steel compression ring, and then the ferrule. The flattened end of the ring should face towards the nut with the narrow end of the ferrule towards the ring.

2. Insert the nut at each end into its port. (Ports are not labeled as the direction of the liquid flow is not specific.) Hold the tubing to the bottom of the fitting while tightening the nut to fingertight.

The flattened end of the ring should face towards the nut

The narrow end of the ferrule is to touch the ring
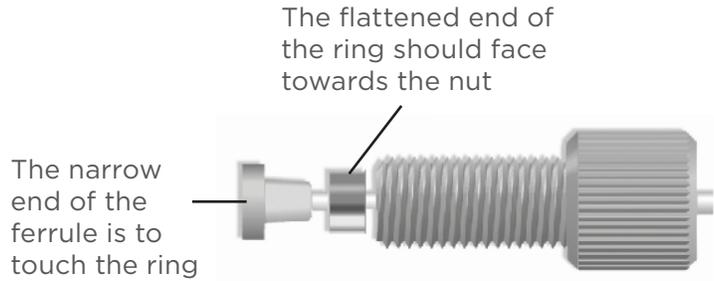
Figure 2
Plumbing Connections

| NOTE | If the system includes a pH flow cell, one connection goes to the pH flow cell inlet. Refer to the **pH Flow Cell** appendix for instructions and more information. |

Figure 3
Plumbing Connections (Exploded View)

Rear Panel Connections

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

(1) pH Sensor input

(2) Analog pH output

(3) Analog Conductivity output

(4) USB Device port
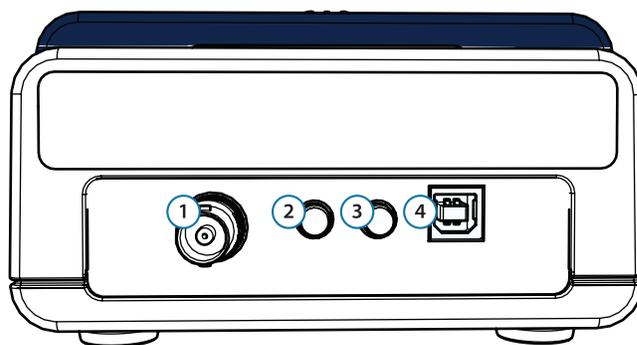
Figure 4
Rear Panel Diagram

pH Sensor

The pH sensor cable has a BNC connector.

After assembling the optional pH flow cell, connect the pH sensor cable to the pH Sensor input, and then twist clockwise 1/4 turn to lock. For pH flow cell assembly instructions, refer to the **pH Flow Cell** appendix.

Figure 5
BNC Connector on pH Sensor Cable

Output Channels

NOTE	If the VERITY® 1810 Conductivity and pH Monitor is part of a Gilson system, it is not necessary to make analog output connections. In a Gilson system, make the USB connection between the VERITY® 1810 Conductivity and pH Monitor and the PC.

The monitor has two output channels: Analog pH and Analog Conductivity. Optionally, direct output from the monitor to an external device.

To connect an output channel, use one of the supplied cables (part number 11000023). Connect the cable to the corresponding output port and then twist the nut to secure the connection.

To set the analog output range, refer to **Conductivity Analog Endpoint** on page 27.

USB Device

The monitor communicates with a standard PC and is powered via USB.

To make the USB connection between the VERITY® 1810 Conductivity and pH Monitor and the controlling device (PC) or power source (USB hub), use the USB cable (part number 32000012) supplied in the accessory kit. Use the end with the "A-type" (flat) connector to connect to the controlling device or power source and use the end with the "B-type" (square) connector to connect to the monitor.
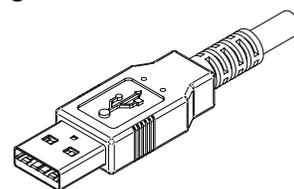
Figure 6
USB Cable with "A-Type" Connector
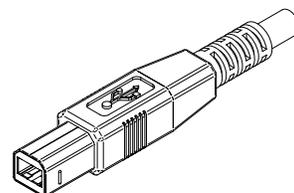
Figure 7
USB Cable with "B-Type" Connector

OPERATION

Chapter Three

Install TRILUTION® LC Software according to the installation instructions provided with the software. This software provides control of the VERITY® 1810 Conductivity and pH Monitor. For more information about TRILUTION® LC Software, refer to its user's guide, on-line help, and documentation supplied with the software.

For use in any HPLC system, use the analog outputs. Refer to **Output Channels** on page 19.

This chapter provides the following information:

- A description of the monitor **Front Panel** on page 22

- **Flow Path Diagram** on page 22

- **Start Up** on page 22

- Instructions for **Control from TRILUTION® LC** on page 23

- Instructions for viewing **Results** on page 25

Front Panel

The front panel of the monitor contains a:

(1) Three Line Display

- ○ The first line displays the conductivity channel reading.

- ○ The second line displays the pH channel reading.

- ○ The third line displays the temperature reading.

Figure 8
VERITY® 1810 Conductivity and pH Monitor
Front Panel Display

Flow Path Diagram

The flow to the VERITY® 1810 Conductivity and pH Monitor should be post column and post UV detector in an HPLC system.
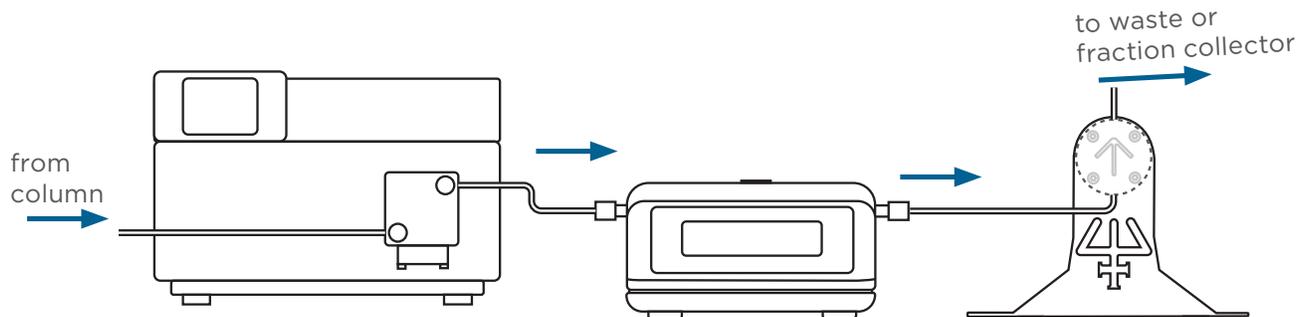
Figure 9
Flow Path Diagram -
VERITY® 1810 Conductivity and pH Monitor with Conductivity Flow Cell, Optional pH Flow Cell, and
159 UV-VIS Detector

Start Up

Follow the instructions in the **Installation** chapter to make all rear panel and plumbing connections and then start TRILUTION® LC software.

Control from TRILUTION® LC

The following pages describe how to set conditions for control via TRILUTION LC. For additional information about method setup and the chromatography run in TRILUTION LC, refer to the software on-line help or user's guide.
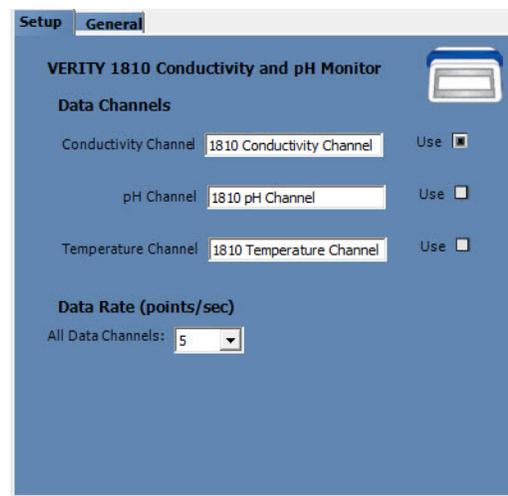
Configuration

The VERITY 1810 Conductivity and pH Monitor is added to TRILUTION® LC v3.0 after installation of Service Pack 6.

The VERITY® 1810 Conductivity and pH Monitor will be detected in a scan, which is the recommended way to add an instrument to the configuration.

When adding the monitor to the configuration:

1. Optionally, type a unique description for each data channel. This description and the data channel's signal will be displayed in the status box while data is being collected during an Application Run if the Use check box is selected for that data channel. The Use check box for 1810 Conductivity Channel defaults selected. There are three data channels available: Conductivity, pH, and Temperature.

2. Right-click on a data channel marked for use and then select **Primary Channel**. One channel per configuration must be specified as the primary channel. Fraction collection and sample re-injection are based on the primary channel.

3. Select the data rate, which is the number of data points collected per second for all channels. One rate is selected for all channels.

4. On the General tab, optionally enter a different name that will be used to identify the monitor. (The default name is Detector.)

5. Scanning for the monitor automatically populates the serial number field and is recommended, but typing the serial number is also an option. The serial number is located on the underside of the instrument.

Figure 10
Configuration Property Page (CPP) Setup Tab
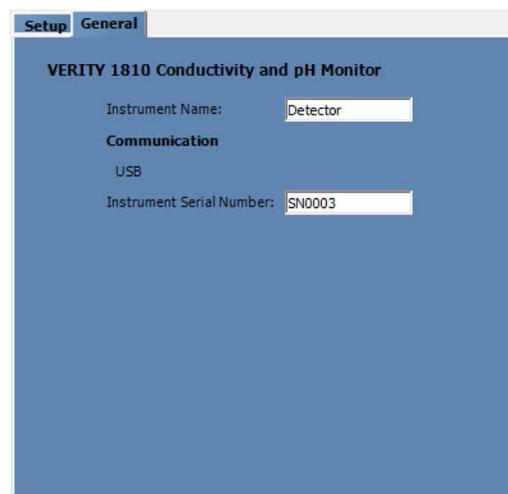
Figure 11
Configuration Property Page (CPP) General Tab

Control

The Control tab window in the Method Builder is a graphical interface used to organize the tasks used in a method.

Tasks

The table below lists the tasks for the VERITY 1810 Conductivity and pH Monitor.

VERITY 1810 Conductivity and pH Monitor Tasks

Task Icon	Task Name and Description
	Start Data Collection This task tells TRILUTION LC to begin collecting data. This task has no properties to set.
	Stop Data Collection This task tells TRILUTION LC to stop collecting data. This task has no properties to set.

Error Handling

Optionally, use error handling to check the status of the instrument. Run a stop method to shut down the system if an error is encountered.

Error	Description
Instrument Error	This error results when any scheduled command fails to execute or if the software loses communication with an instrument.

Analysis

Using the options in the Method Builder - Analysis window, indicate how collected data is analyzed and reported. TRILUTION LC uses the information in the analysis to report on peaks detected in samples.

To create an analysis, right-click on a data channel in the Configured Instruments Panel and then select **New Analysis**.

Application Run

In the Application Run window, specify the list of steps, called a sample list, to execute during a run. A step in the sample list identifies the method to run. Access the Application Run window by:

● right-clicking an application in the Project Library and then selecting **Run** or

● selecting an application in the Project Library and then clicking **Run** or

● opening a saved method in the Method Builder and then clicking **Run**.

After setting up the sample list, click **Run** in the Application Run window to begin executing the steps in the run.

Results

From a run, the software produces results containing the channel data collected and stored for all injected samples. Results contain time and signal information for each sample.

Results are accessed in the Project Library. Click on an application and double-click the results icon (). The Results window is displayed, listing all runs for the selected application.

Double-click on a Run Name to display the Run Results window.

Run Results Window

The Run Results window enables viewing chromatogram plots and analysis information for collected data. To view chromatogram results, preview the report.
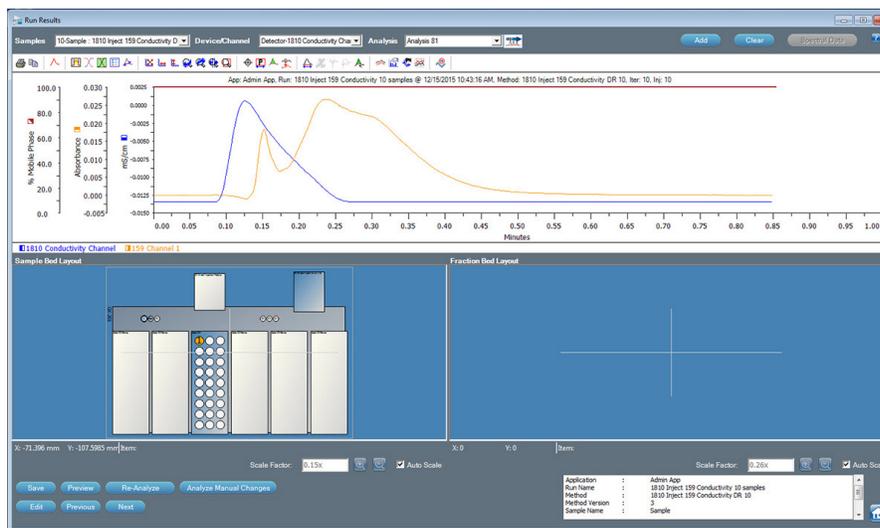
Figure 12
Run Results Window

Temperature Compensation Coefficient

For increased conductivity accuracy, the VERITY® 1810 Conductivity and pH Monitor includes the ability to set a conductivity temperature compensation coefficient. Use the Set Temperature Compensation command in Gilson Ethernet Utility. The temperature compensation coefficient varies by solution and by temperature. By default, a 2% temperature compensation coefficient (Temperature Compensation = 0.02) is used by the VERITY® 1810 Conductivity and pH Monitor.

To set a temperature compensation coefficient, use of the Gilson Ethernet Utility and the GEARS Application is required. The Gilson VERITY 1810 Conductivity and pH Monitor GEARS Plugins must be installed.

To set a temperature compensation coefficient:

1. Install the Gilson Ethernet Utility. Refer to its documentation, if necessary.

2. Start the Gilson Ethernet Utility.

   a. To start the Gilson Ethernet Utility, click the **Start** button and then select **All Programs > Gilson Applications > Utilities > Gilson Ethernet Utility**.

   b. When starting the Gilson Ethernet Utility, the Windows Firewall may block some features of the program. Click **Allow access** to use the Gilson Ethernet Utility.

3. Check that the Gilson VERITY 1810 Conductivity and pH Monitor GEARS Plugins is installed (**Control Panel > Programs > Programs and Features**). It is installed with TRILUTION® LC v3.0 with Service Pack 6 (or higher) and is required to communicate with the monitor.

4. Start the GEARS Application. The GEARS Application allows the Gilson Ethernet Utility to communicate with some Gilson USB instruments, and must be running to communicate with the VERITY® 1810 Conductivity and pH Monitor. When running, the GEARS Application appears as an icon (⬚) in the Windows system tray. To start the GEARS Application, do either of the following:

   - Start TRILUTION software.

   - Click the Start button, and then select **All Programs > Gilson Applications > Utilities > GEARS > GEARS Application**.

   Wait briefly for GEARS to detect the instrument.

5. In the Gilson Ethernet Utility, select **VERITY 1810 Conductivity and pH Monitor** from the list, and then click **Connect**.

6. Select the **Set Temperature Compensation** command.

7. Enter a coefficient value for the **Temperature Compensation** property.

8. Click **Go**.

Conductivity Analog Endpoint

When using the analog output to monitor conductivity, the VERITY® 1810 Conductivity and pH Monitor includes the ability to set the analog output range, which allows adjustment of the output sensitivity.

Use the Set Analog EP command in Gilson Ethernet Utility. By default, the output range is 0–1000 mS/cm (the full conductivity range of the monitor). The range can be reduced (0–100 mS/cm, for example) to enable increased sensitivity for lower conductivity samples. The analog output is 0–1000 mV; therefore, by setting the output range to 0–100 mS/cm, 1000 mV output equals 100 mS/cm, which provides the increase in sensitivity.

To set the analog output range, use of the Gilson Ethernet Utility and the GEARS Application is required. The Gilson VERITY 1810 Conductivity and pH Monitor GEARS Plugins must be installed.

To set the analog output range:

1. Install the Gilson Ethernet Utility. Refer to its documentation, if necessary.

2. Start the Gilson Ethernet Utility.

    a. To start the Gilson Ethernet Utility, click the **Start** button and then select
       All Programs > Gilson Applications > Utilities > Gilson Ethernet Utility.

    b. When starting the Gilson Ethernet Utility, the Windows Firewall may block some features of the program. Click **Allow access** to use the Gilson Ethernet Utility.

3. Check that the Gilson VERITY 1810 Conductivity and pH Monitor GEARS Plugins is installed (**Control Panel > Programs > Programs and Features**). It is installed with TRILUTION® LC v3.0 with Service Pack 6 (or higher) and is required to communicate with the monitor.

4. Start the GEARS Application. The GEARS Application allows the Gilson Ethernet Utility to communicate with some Gilson USB instruments, and must be running to communicate with the VERITY® 1810 Conductivity and pH Monitor. When running, the GEARS Application appears as an icon ( ) in the Windows system tray. To start the GEARS Application, do either of the following:

    ● Start TRILUTION software.

    ● Click the Start button, and then select **All Programs > Gilson Applications > Utilities > GEARS > GEARS Application**.

    Wait briefly for GEARS to detect the instrument.

5. In the Gilson Ethernet Utility, select **VERITY 1810 Conductivity and pH Monitor** from the list, and then click **Connect**.

6. Select the **Set Analog EP** command.

7. Enter a value for the **Lower** and **Upper** properties to set the range.

8. Click **Go**.

MAINTENANCE

Chapter Four

When performing the maintenance described in this chapter, use good laboratory practice, including, but not limited to, wearing protective clothing and preparing the maintenance space for service. After completing the maintenance operation, verify the safe and good working order of the part and instrument.

This chapter contains the following information to help maintain the instrument:

● **Cleaning** on page 30

● **Conductivity Flow Cell** on page 31

You are only permitted to perform the maintenance tasks described in this user's guide. If additional maintenance is required, contact your local Gilson representative.

All smooth surfaces of the instrument can be cleaned with a mild, commercially available cleaning solution, or with isopropanol on a moistened cloth.

Cleaning

Exterior

Clean the external surfaces by applying one of the following solvents to a clean cloth and wiping.

NOTICE	Do not maintain contact between the solvent and the surface for more than 15 seconds.

The external surfaces of the housing may be cleaned with the following cleaning agents:

- Isopropanol
- Methanol
- Ethanol
- Sodium Hypochlorite (15% Bleach)

Conductivity Flow Cell

Follow these instructions if you need to clean the flow cell, unclog the flow cell, replace the inlet or outlet tubing, or replace the flow cell.

NOTICE	Be extremely careful when working with the flow cell and its fittings. Flow cells are considered expendable and are not covered by warranty if damaged or broken during any maintenance procedure.

CLEAN THE INSIDE OF THE CONDUCTIVITY FLOW CELL

Increased noise and reduced sensitivity can be a result of a dirty flow cell.

It is often sufficient to clean the flow cell to restore optimal performance.

⚠CAUTION	To prevent injury, observe good laboratory practices when handling solvents. Know the physical and chemical properties. Refer to the Material Safety Data Sheets for the solvents used.

To clean the inside of the flow cell:

1. Pump deionized water through the flow cell at 2–5 mL/min for 10 minutes.

2. Check monitor performance by running a sample through the system.

3. If the cleaning does not have the desired effect, repeat cleaning procedure, but substitute methanol for deionized water.

Conductivity Flow Cell

Calibration

It is recommended to calibrate the conductivity flow cell annually. Contact your local Gilson representative for more information and assistance.
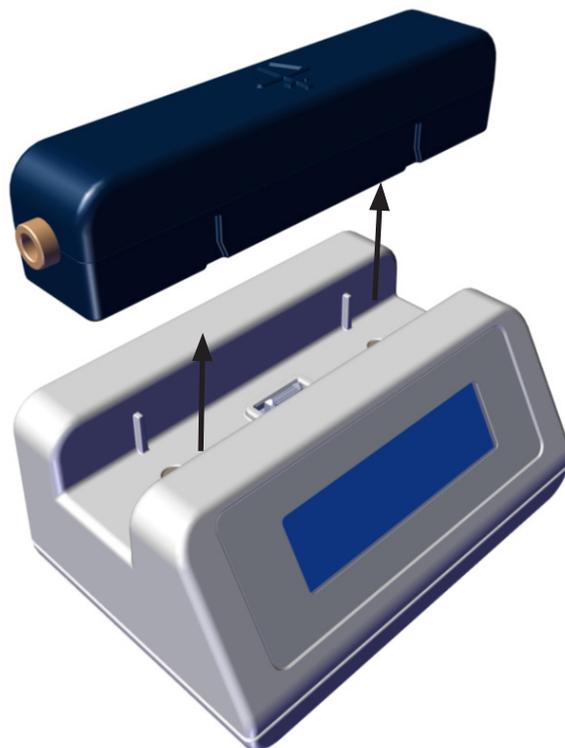
Replacement

Refer to the instructions in this section when replacing the conductivity flow cell.

REMOVE INSTALLED FLOW CELL

1. Disconnect the USB cable from the back of the instrument.

2. Disconnect the inlet and outlet tubing from the flow cell.

3. Hold the installed flow cell securely with your hand, and then lift the flow cell up and out. The flow cell is secured with magnetic force.

INSTALL NEW FLOW CELL

1. Insert the new flow cell into its holder on top of the monitor. It will only fit one way.

2. Connect the inlet and outlet tubing to the new flow cell.

Figure 13
Conductivity Flow Cell Removed

Inlet and/or Outlet Tubing Replacement

When replacing the inlet or outlet tubing, refer to the table below for part numbers for replacement tubing and fittings. When replacing the tubing, always replace the fittings too.

Tubing and Fittings

Flow Rate (mL/min)	Part Number	Description
0.5–5	49951059	TUBING,PEEK .010IDx.063OD 5FT
5–20	49952059	TUBING,.020"X 1/16 PEEK 5 FT. LONG,ORA
20–50	49953059	TUBING,.030" X 5FT, PEEK
>50	49954059	TUBING,.040" X 5FT, PEEK
All Flow Rates	49041034	FERRULE, 1/16" ANTI-TWIST, PEEK (P-250)
All Flow Rates	490410255	NUT, 1/16" ANTI TWIST PEEK (P-255)

To replace the tubing:

1. Disconnect the tubing and fittings.

1. On each end of the tubing, slide the nut, then the steel compression ring, and then the ferrule. The flattened end of the ring should face towards the nut with the narrow end of the ferrule towards the ring.

2. Insert the nut at each end into its port. (Ports are not labeled as the direction of the liquid flow is not specific.) Hold the tubing to the bottom of the fitting while tightening the nut to finger tight.

The flattened end of the ring should face towards the nut

The narrow end of the ferrule is to touch the ring
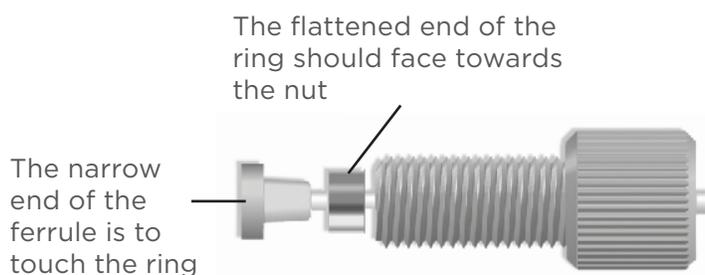
Figure 14
Plumbing Connections
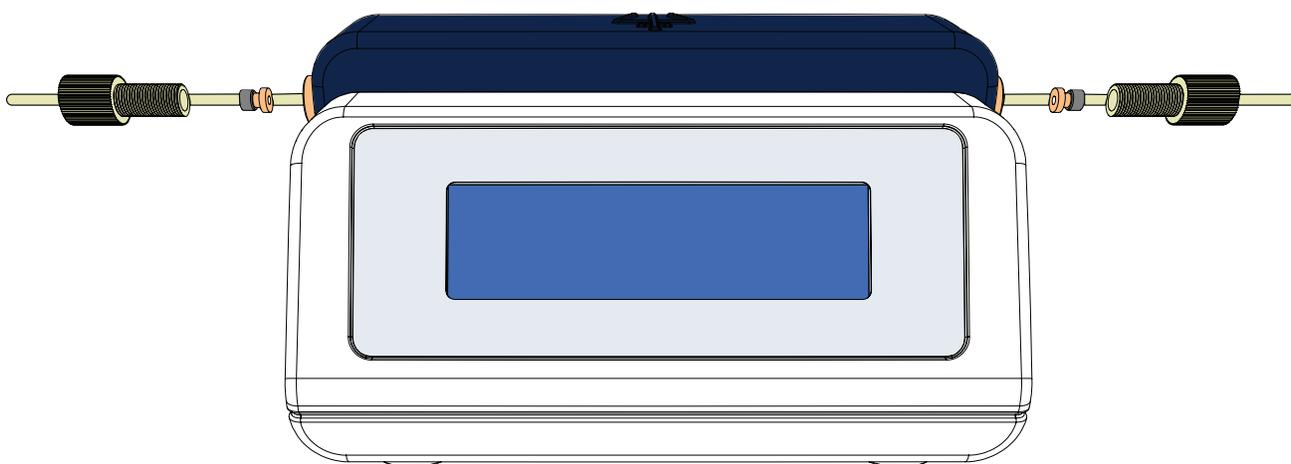
Figure 15
Plumbing Connections (Exploded View)

TROUBLESHOOTING

Chapter Five

This chapter provides information on the following topics:

Troubleshooting

When troubleshooting a problem, first do the following:

1. Check all cabling.

2. Check all fittings.

3. Check for air in the tubing.

4. Check for leaks.

Solvent and Buffer Compatibility

Chemical Resilience

All surfaces of the VERITY® 1810 Conductivity and pH Monitor housing resist limited exposure (less than 30 minutes) to the following solvents and buffers, in addition to any vapors that the chemicals may emit:

- Acetonitrile
- Methanol
- Isopropyl Alcohol
- Ethanol
- Hexane
- Ethyl Acetate
- Dichloromethane
- Water
- 1M Sodium Hydroxide
- 1M Sodium Chloride
- 1M Phosphate Buffer Saline
- 1M Citrate Buffer
- 1M HEPES Buffer
- 1M Tris Buffer
- 0.1% Formic Acid
- 0.1% Trifluoroacetic Acid

Repair and Return Policies

Before Calling Us

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

- Serial number and model number of the instruments involved

  ○ The serial number is located on the underside of the instrument.

  ○ The serial number for the conductivity flow cell is located on the rear of the flow cell.

- Installation procedure you used

- List of concise symptoms

- List of operating procedures and conditions you were using when the problem arose

- List of other devices connected to the instrument and a description of those connections

- List of other electrical connections in the room

Warranty Repair

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

Non-Warranty Repair

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

Return Procedure

Contact your local Gilson representative to obtain authorization before returning any Gilson equipment. To return a piece of equipment:

- Carefully pack the unit to prevent damage in transit. Check with your local Gilson representative regarding proper method of shipment. No responsibility is assumed by Gilson or your local Gilson representative for damage caused by improperly packaged instruments. Indicate the authorization on the carton and on the packing slip.

- Always insure for the replacement value of the unit.

- Include a description of symptoms, your name, address, phone number, and purchase order to cover repair costs, return and shipping charges, if your institution requires it.

Unit End-of-Life

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

REPLACEMENT PARTS AND ACCESSORIES

Appendix A

VERITY® 1810 Conductivity and pH Monitor

Part Number	Description
11100000	VERITY® 1810 Conductivity and pH Monitor with Installed Conductivity Flow Cell

Flow Cells

Part Number	Description
11100001	pH Flow Cell Assembly
11000002	Conductivity Flow Cell Assembly

Tubing and Fittings

Flow Rate (mL/min)	Part Number	Description
0.5–5	49951059	TUBING,PEEK .010IDx.063OD 5FT
5–20	49952059	TUBING,.020"X 1/16 PEEK 5 FT. LONG,ORA
20–50	49953059	TUBING,.030" X 5FT, PEEK
>50	49954059	TUBING,.040" X 5FT, PEEK
All Flow Rates	49041034	FERRULE, 1/16" ANTI-TWIST, PEEK (P-250)
All Flow Rates	490410255	NUT, 1/16" ANTI TWIST PEEK (P-255)

pH Sensor

Part Number	Description
11000025	pH Sensor (Replacement)
5464549103	O-Ring

Cables

Part Number	Description
32000012	USB Cable
11000023	Analog Output Cable

PH FLOW CELL

Appendix B

Figure 16
VERITY® 1810 Conductivity and pH Monitor with
Optional pH Flow Cell

Technical Specifications

pH Flow Cell

Technical Specification	Definition			
pH Flow Cell	*Accuracy*	±0.1 units at 25°C		
	Maximum Drift	0.1/10 hours at constant conditions		
	Part Number	11100001		
	Pressure	*psi*	*bar*	*MPa*
		100	6.89	0.69
	Readable Range	0–14 pH		
	Specification Range	2–12 pH		
	Wetted Materials	Acrylic, PVDF, pH Glass, epoxy, BUNA-N		
	Volume	110 µL		

Setup

The pH Flow Cell requires some assembly.

There are four parts: the base, the O-ring, the pH sensor, and the securing nut.

When unpacking and storing the pH sensor, refer to the manufacturer's instructions provided with the pH sensor.

> **NOTE** The O-ring provided in the soaker bottle with the pH sensor is not required for this setup and should remain in the soaker bottle cap for future storage of the pH sensor.

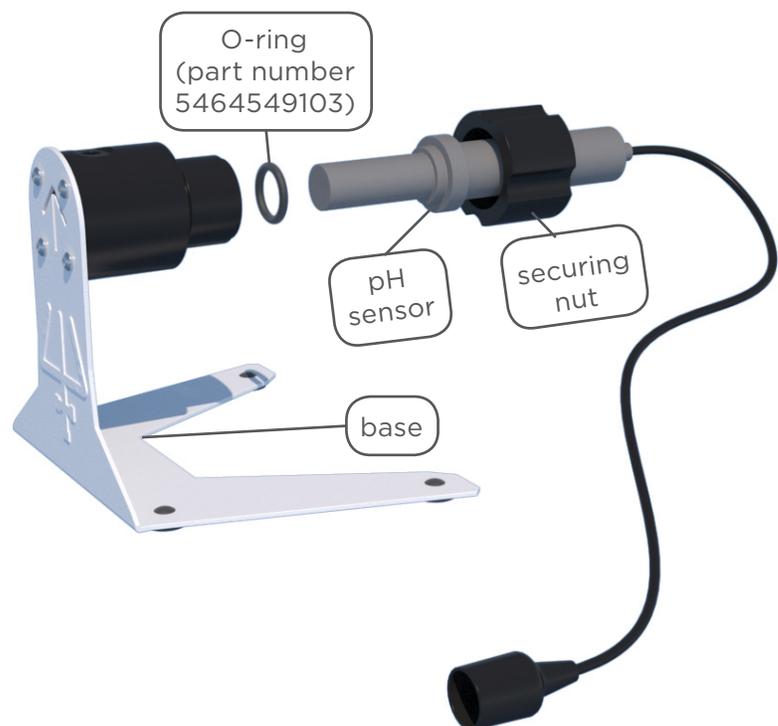After unpacking the items, do the following:

1. Place the O-ring on the black (thinner) end of the pH sensor.

2. Insert the black end of the pH sensor with O-ring into the base.

3. Pass the end of the pH sensor cable through the securing nut.

4. Hand-tighten the securing nut to the base.

> **NOTICE** Do not use tools.
> Do not overtighten.
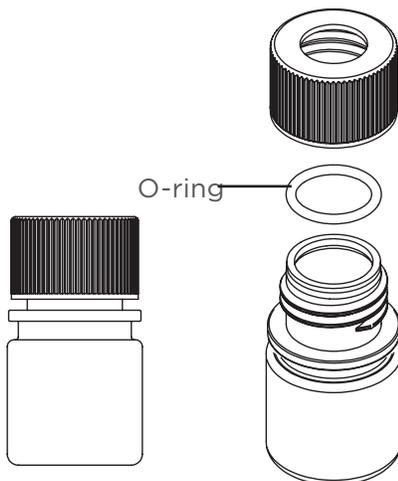
Figure 18
Soaker Bottle

Figure 17
pH Flow Cell (Exploded View)

Plumbing Connections

Tubing and fittings for inlet and outlet tubing connections are ordered separately so as to be appropriate for the application flow rate. The arrows on the base indicate the flow path.

Tubing and Fittings

Flow Rate (mL/min)	Part Number	Description
0.5–5	49951059	TUBING,PEEK .010IDx.063OD 5FT
5–20	49952059	TUBING,.020"X 1/16 PEEK 5 FT. LONG,ORA
20–50	49953059	TUBING,.030" X 5FT, PEEK
>50	49954059	TUBING,.040" X 5FT, PEEK
All Flow Rates	49041034	FERRULE, 1/16" ANTI-TWIST, PEEK (P-250)
All Flow Rates	490410255	NUT, 1/16" ANTI TWIST PEEK (P-255)

To make the plumbing connections:

1. On each end of the tubing, slide the nut, then the steel compression ring, and then the ferrule. The flattened end of the ring should face towards the nut with the narrow end of the ferrule towards the ring.

2. Insert the nut at each end into its port. Hold the tubing to the bottom of the fitting while tightening the nut to finger tight.

The flattened end of the ring should face towards the nut

The narrow end of the ferrule is to touch the ring
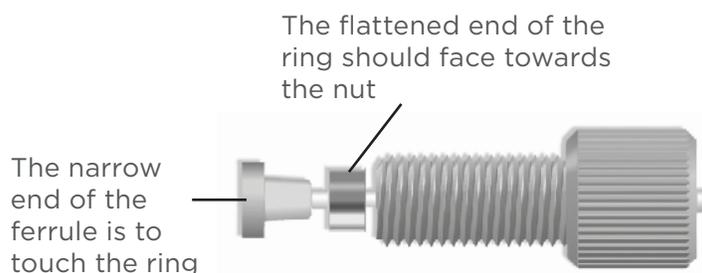
Figure 19
Plumbing Connections

outlet

inlet
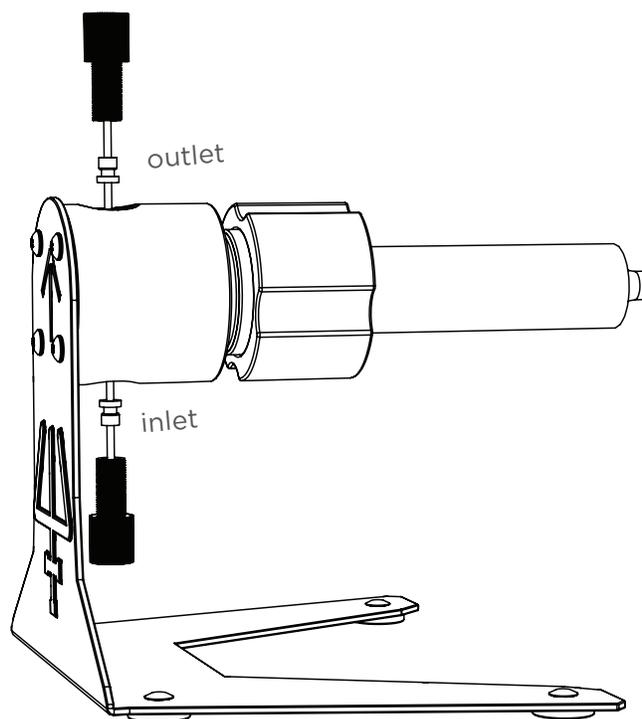
Figure 20
Plumbing Connections

Connection to the
VERITY® 1810 Conductivity and pH Monitor

Refer to the diagram when making the pH sensor cable connection.
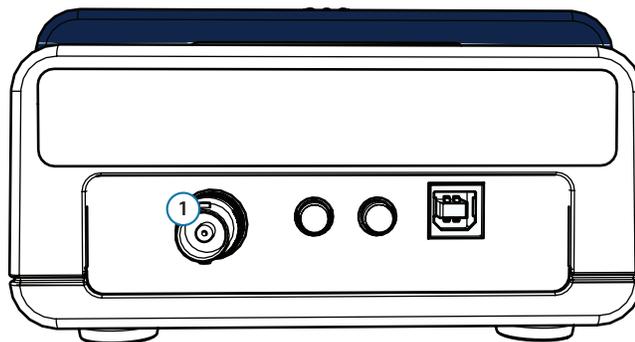
(1) pH Sensor input

pH Sensor

The pH sensor cable has a BNC connector.

Connect the pH sensor cable to the pH Sensor input, and then twist clockwise 1/4 turn to lock.

Figure 21
Connection to VERITY® 1810 Conductivity and pH Monitor
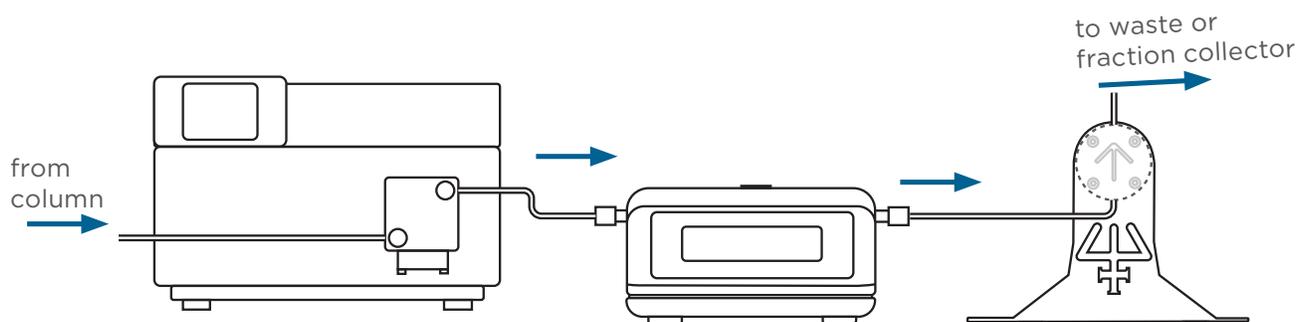
Figure 22
BNC Connector on pH Sensor Cable

Flow Path Diagram

The flow to the VERITY® 1810 Conductivity and pH Monitor should be post column and post UV detector in an HPLC system.

to waste or fraction collector

from column

Figure 23
Flow Path Diagram -
VERITY® 1810 Conductivity and pH Monitor with Conductivity Flow Cell, Optional pH Flow Cell, and 159 UV-VIS Detector

VERITY® 1810 Monitor pH Calibration Utility

Before running samples for the first time, calibrate the pH sensor/flow cell using the VERITY® 1810 Monitor pH Calibration Utility.

The VERITY® 1810 Monitor pH Calibration Utility is supplied on the Gilson Software USB, which is provided with the pH flow cell.

Install the VERITY® 1810 Monitor pH Calibration Utility

PRE-INSTALLATION CHECKLIST

Before beginning the installation:

❑ Log on as a Windows® Administrator

❑ Close all running applications

❑ Temporarily disable antivirus software

❑ Temporarily disable firewall

INSTALLATION

The installation of the VERITY® 1810 Monitor pH Calibration Utility proceeds as follows:

1. Insert the USB into the drive and then run SETUP.EXE.

2. Install the VERITY® 1810 Monitor pH Calibration Utility. Follow the on-screen instructions.

   - If a User Account Control window appears, click **Yes**.

   - If prompted with a warning about installing driver software, select to "Install this driver software anyway".

The installation path on a Windows® 7 (32-bit) system is:
C:\Program Files\Gilson\Utilities\VERITY 1810 Conductivity and pH Monitor\pH Calibration Utility.

The installation path on a Windows® 10 or Windows® 7 (64-bit) system is:
C:\Program Files (x86)\Gilson\Utilities\VERITY 1810 Conductivity and pH Monitor\pH Calibration Utility.

Prepare to Run the VERITY® 1810 Monitor pH Calibration Utility

1. Ensure that plumbing and electrical connections have been made as described in the **Installation** chapter.

   For communication to occur, the instrument must be connected via a USB connection to the PC.

2. Obtain pH 7, pH 4, and pH 10 buffer solutions.

Start the VERITY® 1810 Monitor pH Calibration Utility

To start the VERITY® 1810 Monitor pH Calibration Utility, click the **Start** button and then select **All Programs > Gilson Applications > VERITY 1810 Conductivity and pH Monitor > VERITY 1810 Monitor pH Calibration Utility**.

- If prompted to exit the GEARS Application, right-click on the icon ( ) in the Windows system tray, and then select **Exit**.

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

The VERITY® 1810 Monitor pH Calibration Utility window will appear, and if communicating with the instrument, the Serial Number and FW Version will be displayed

Use the VERITY® 1810 Monitor pH Calibration Utility

Remove the pH sensor from the pH flow cell (if installed) or from the storage solution.

To remove the pH sensor from the pH flow cell:

1. Remove the securing nut.

2. Remove the pH sensor.

NOTICE	Be careful with the end of the pH sensor. The time the end of the pH sensor is not submerged should be minimized.

PH 7 CALIBRATION

1. Click **pH 7**.

2. Use a transfer pipet to rinse the outside of the pH sensor with deionized water and then blot the pH sensor dry with a lint-free cloth.

3. Use a transfer pipet to rinse the outside of the pH sensor with pH 7 solution.

4. Submerge the pH sensor in the pH 7 solution.

5. Click **OK**.

6. Wait 2 minutes.

7. To repeat this calibration, click **Retry** or **Reset**.
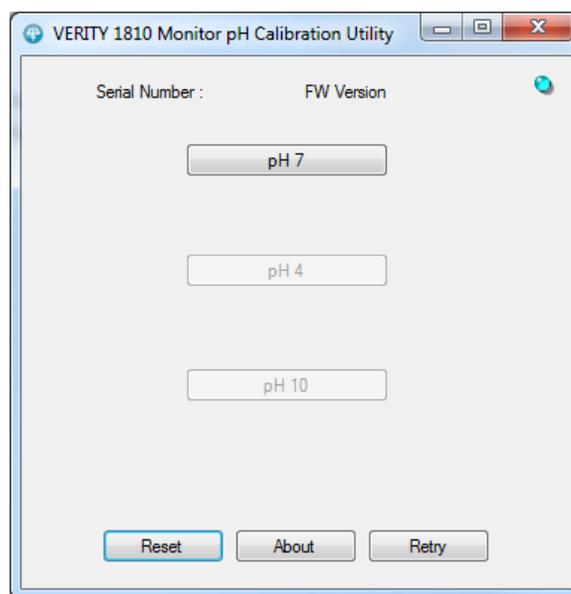
Figure 24
VERITY 1810 Monitor pH Calibration Utility
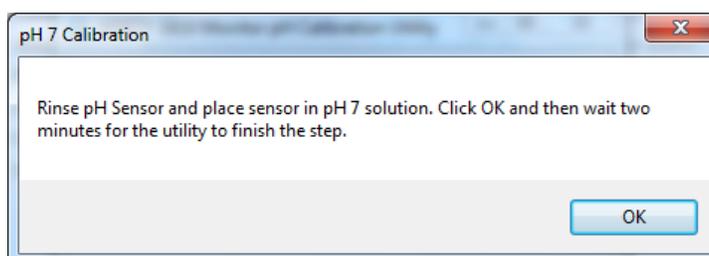
Figure 25
On-screen Instructions for pH 7 Calibration

pH 4 Calibration

1. Click **pH 4**.

2. Wipe the outside of the pH sensor with a lint-free cloth.

3. Use a transfer pipet to rinse the outside of the pH sensor with pH 4 solution.

4. Submerge the pH sensor in the pH 4 solution.

5. Click **OK**.

6. Wait 2 minutes.

7. To repeat this calibration, click **Retry**. To repeat all calibrations, click **Reset**.

PH 10 CALIBRATION

1. Click **pH 10**.

2. Wipe the outside of the pH sensor with a lint-free cloth.

3. Use a transfer pipet to rinse the outside of the pH sensor with pH 10 solution.

4. Submerge the pH sensor in the pH 10 solution.

5. Click **OK**.

6. Wait 2 minutes.

7. To repeat this calibration, click **Retry**. To repeat all calibrations, click **Reset**.

8. Use a transfer pipet to rinse the outside of the pH sensor with deionized water and then blot the pH sensor dry with a lint-free cloth.

9. Return the pH sensor to storage solution or install in the pH flow cell (refer to the diagram on page 46, if necessary).

Close the VERITY® 1810 Monitor pH Calibration Utility
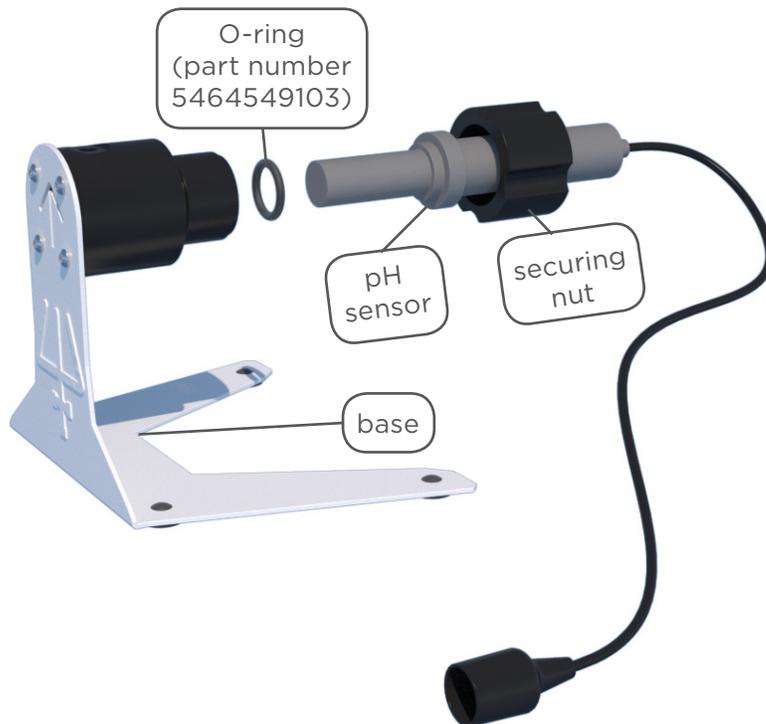
Close the software.

Maintenance

pH Sensor Replacement

If after running the VERITY® 1810 Monitor pH Calibration Utility, it is determined that the pH sensor is out of calibration, the pH sensor (part number 11000025) and optionally, the O-ring (part number 5464549103) should be replaced.

Refer to the instructions below and the instructions supplied with the replacement pH sensor.

To replace the pH sensor:

1. Disconnect the pH sensor cable from the rear panel of the monitor by twisting counterclockwise 1/4 turn and then pulling.

2. Remove the securing nut.

3. Remove the pH sensor.

4. Remove the O-ring from the assembly.

5. Locate the new pH sensor.

6. Place the O-ring on the black (thinner) end of the pH sensor.

Figure 26
pH Flow Cell (Exploded View)

7. Insert the black end of the pH sensor with O-ring into the base.

8. Pass the end of the pH sensor cable through the securing nut.

9. Hand-tighten the securing nut to the base.

10. Connect the pH sensor cable to its port on the monitor rear panel and then twist clockwise 1/4 turn to lock.

> **NOTICE** Do not use tools.
> Do not overtighten.