



VistaShield™
Stir/Purge™
Operator's Manual



If You Have Problems

Please visit our service and support page at www.gamry.com/service-support/. This page contains information on installation, software updates, and training. It also contains links to the latest available documentation. If you are unable to locate the information you need from our website, you can contact us via email using the link provided on our website. Alternatively, you can contact us one of the following ways:

| | |
|-----------|--|
| Internet | www.gamry.com/service-support/ |
| Telephone | (215) 682-9330 9:00 AM–5:00 PM US Eastern Standard Time (877) 367-4267 Toll Free US & Canada Only |

We will be happy to provide a reasonable level of free support for registered users. Reasonable support includes telephone assistance covering the normal installation and use of the VistaShield Faraday Cage with Stir/Purge option.

A service contract that extends both the hardware warranty and software-update period is available at an additional charge. Software updates **do not** include software enhancements offered to our customers at additional cost.

Enhancements to the Stir/Purge and Gamry's standard applications software that require significant engineering time on our part may be performed on a contract basis. Contact us with your requirements.

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Gamry Instruments, Inc. warrants to the original user of this product that it shall be free of defects resulting from faulty manufacture of the product or its components for a period of two years from the original shipment date of your purchase.

Gamry Instruments, Inc. makes no warranties regarding either the satisfactory performance of the VistaShield with Stir/Purge including the software provided with this product or the fitness of the product for any particular purpose. The remedy for breach of this Limited Warranty shall be limited solely to repair or replacement, as determined by Gamry Instruments, Inc., and shall not include other damages.

Gamry Instruments, Inc. reserves the right to make revisions to the system at any time without incurring any obligation to install same on systems previously purchased. All system specifications are subject to change without notice.

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The information in this manual has been carefully checked and is believed to be accurate as of the time of printing. However, Gamry Instruments, Inc. assumes no responsibility for errors that might appear.

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Chapter 1: Safety Considerations

Your VistaShield Stir/Purge has been supplied in a safe condition. This chapter of the Operator's Manual contains some information and warnings that you must follow to insure continued safe operation.

Inspection

When you receive your VistaShield Faraday Cage Stir/Purge, inspect it for evidence of shipping damage. If any damage is noted, please notify Gamry Instruments Inc. and the shipping carrier immediately. Save the shipping container for possible inspection by the carrier. The VistaShield itself has a conductive coating on the glass pane in the door. If the glass is cracked, the conductivity could be broken, compromising the VistaShield's ability to function as a Faraday cage.



Warning! The door of the VistaShield contains a large pane of glass with a conductive coating on the outside surface. Chips on the corners, while not affecting performance, can have extremely sharp edges that represent a significant safety hazard.

Product safety

The Stir/Purge option for the VistaShield Faraday Cage has been designed, tested and certified to meet the requirements of IEC 1010, *Safety requirements for **electrical equipment** for measurement, control, and laboratory use*. As defined in this standard, it is a Category III apparatus, designed for connection to low voltage circuits.

The "AC Adapter" supplied with the Stir/Purge option is certified under EN 60950. The AC Adapter converts the AC mains voltage to 12 V DC, which is used to power the Stir/Purge.

Always use the AC adapter supplied with your VistaShield Stir/Purge to supply DC power to the instrument.



Caution: Use of a DC power source other than the AC-adapter model provided with your Stir-Purge may void the performance and/or safety characteristics of the device.

AC mains connection to the power supply

The VistaShield Stir/Purge does not connect directly to an AC mains supply. Instead, the mains is connected to the desktop AC-adapter, which outputs 12 V DC, which in turn powers the Stir/Purge.



The Stir-Purge's AC Adapter is rated for operation from 100 to 240 volts AC, 47 to 63 Hz. It should therefore be useful throughout the world.

The VistaShield Stir/Purge is normally provided with an AC line cord suitable for your location. This AC line cord connects the AC mains to the AC power adapter. If your VistaShield has been provided without an AC line cord, or a cord that is not compatible with your local AC mains socket, obtain a line cord certified for use in your country. Contact your local Gamry Representative or e-mail to techsupport@gamry.com if you are uncertain what AC line cord to use.

Grounding in the VistaShield and Stir/Purge

The circuitry and the metal case of the Stir/Purge are **not** connected to an earth ground. The Stir/Purge chassis is normally in electronic contact with the VistaShield Faraday Cage above. Grounding is best accomplished by connecting the ground lead of the potentiostat to the internal ground lug of the VistaShield Faraday Cage. Proper grounding is required for the Faraday cage to function.

Most electrochemical cells are isolated from earth ground, in which cases isolation of the VistaShield from earth is not required. Connection of the VistaShield to an earth ground (when allowed) may lower the noise seen in an electrochemical test.



Sources of earth ground include:

- Most metal water pipes,
- The chassis of most electronic apparatus (which are generally earth grounded), and
- The protective ground terminal of an AC mains power plug.

We recommend that you discuss grounding with an electrical or electronics professional prior to making this earth ground connection.

This connection of the VistaShield to an earth ground is not a “Protective Earth Ground” as defined in IEC 1010. The VistaShield Stir/Purge is safe in the absence of this connection, since it does not contain any hazardous voltages.



Warning! Do not connect the VistaShield Faraday Cage’s ground binding post to any voltage other than a potentiostat’s floating or earth ground. An improper connection can create a safety hazard, which could result in personal injury or death.

The Stir/Purge can also be used without a VistaShield in a stand-alone configuration. Stand-alone operation is also safe with regard to electrical shock hazards. In the unlikely event that you need to ground a stand-alone Stir/Purge, you can connect a ground wire to one of the top cover mounting screws or to one of the metal nuts holding a rear panel gas fitting in place.

Temperature and ventilation

Your VistaShield Stir/Purge was designed for indoor use at ambient temperatures between 0°C and 45°C. You may need to ventilate or even cool the Stir/Purge with forced air if the temperature rises excessively.

Environmental limits

There are environmental-limit conditions on the storage, shipping and operation of this equipment. The VistaShield Stir/Purge has **not** been designed for outdoor use.

Storage

| | |
|---------------------|----------------------------|
| Ambient Temperature | -40°C to 75°C |
| Relative Humidity | Maximum 90% non-condensing |

Shipping

| | |
|----------------------|--------------|
| Same as storage plus | |
| Acceleration | Maximum 30 G |

Operation

| | |
|---------------------|----------------------------|
| Ambient Temperature | 0°C to 45°C |
| Relative Humidity | Maximum 90% non-condensing |



Caution: The VistaShield Stir-Purge is not designed for operation in conditions where liquid water may enter the chassis, or water vapor may condense within the chassis.

Use with dangerous materials

Do not use the Stir/Purge with hazardous gases or other poisonous or noxious materials.



Warning: Do not connect the Stir-Purge unit to poisonous, noxious, or explosive materials. Failure to observe this warning could cause injury or property damage. The VistaShield is not gas or liquid tight. Use the same precautions as if using an open electrochemical cell on a bench. Operate in a hood (fume cupboard) if dangerous gases are used.

Cleaning

When cleaning the Stir/Purge, disconnect it from all power sources prior to cleaning.

Use a cloth **lightly** dampened with either clean water or water containing a mild detergent to clean the outside of the Stir/Purge enclosure. Alternatively, you can use isopropyl alcohol. Do not use a wet rag or allow fluid to enter the Stir/Purge enclosure. Do not immerse the Stir/Purge in any type of cleaning fluid (including water). Do not use any abrasive cleaners.



Caution: Read and understand the Material Safety Data Sheet (MSDS) for any solvent, such as isopropyl alcohol, before use. Always take appropriate precautions when using these materials.

When lightly cleaning the Faraday cage portion of the VistaShield Stir/Purge, the above notes are adequate. For more thorough cleaning (e.g., of dried-on chemicals) we highly recommend that you remove the Faraday cage from the Stir/Purge.

Leakage into the Stir/Purge

The VistaShield and Stir/Purge are not sealed to be liquid tight. Liquid spilled inside the VistaShield can leak into the Stir/Purge chassis. Liquids inside the Stir/Purge can cause Stir/Purge malfunction and damage.

Avoid spills and promptly clean up any spills that do occur.

Service

Your VistaShield Stir/Purge has no user serviceable parts inside. Refer all service to a qualified service technician.

RFI Warning

Your VistaShield Stir/Purge generates, uses, and can radiate radio-frequency energy. The radiated levels are low enough that the Stir/Purge should not create an interference problem in most laboratory environments.

The VistaShield Stir/Purge has been tested for both radiated and conducted RF interference and has been found to be in compliance with FCC Part 18 and EN 61326:1998—*Electrical equipment for measurement, control, and laboratory use—EMC Requirements*.

Electrical Transient Sensitivity

Your VistaShield Stir/Purge was designed to offer reasonable immunity from electrical transients, including transients on the incoming AC mains supply and Electrostatic Discharge. It has been tested for compliance with EN 61326:1998—*Electrical equipment for measurement, control, and laboratory use—EMC Requirements* describing acceptable limits for Electrical Transient susceptibility in Laboratory Test equipment. The Stir/Purge is not rated for continuous use when subject to ESD events. It should suffer no permanent damage when subject to the standard ESD events defined in EN61326, but may cease normal operation until it is turned off and restarted.

In severe cases, the Stir/Purge could malfunction as a result of electrical transients such as a static discharge. If you are having problems in this regard, try the following steps:

If the problem is static electricity (sparks are apparent when you touch the VistaShield):

- Place your VistaShield on a static-control work surface. Static-control work surfaces are now generally available from computer-supply houses and electronics tool suppliers. An antistatic floor mat may also help, particularly if a carpet generates the static electricity.
- Air-ionizers or even simple air-humidifiers can reduce the voltage available in static discharges.

If the problem is AC power-line transients (often from large electrical motors nearby):

- Try plugging your Stir/Purge into a different AC power branch circuit.
- Plug your Stir/Purge into a power-line surge suppressor. Inexpensive surge suppressors are now generally available because of their use with computer equipment.

Contact Gamry Instruments, Inc. if these measures do not solve the problem.

CE Compliance

The European Community has instituted standards limiting radio-frequency interference emitted by electronic devices, setting limits for susceptibility of apparatus to RF energy and transient events, and mandating safety requirements. Gamry Instruments, Inc. has designed and tested the Stir/Purge to comply with these standards.

The relevant CE regulations include EN 61010 and EN 61326.

RoHS Compliance

The VistaShield and Stir/Purge have been built using lead-free components and lead-free solder. These instruments are in compliance with the European RoHS initiative.

Chapter 2: Introduction

About this manual

This manual covers the installation, safety, and use of the Gamry Instruments VistaShield Stir/Purge. This manual describes use of a Stir/Purge Option and VistaShield with Revision 5.6 of the Gamry Framework software.

This manual does not discuss software installation or software operation in any detail. Software support for the Stir/Purge is described in the Gamry's On-line Help system.

Why purge?

Purge or sparging is a process of replacing an electroactive gas (for example, O₂) from the electrolyte by flooding the system with an inert gas (typically N₂ or Ar). The Stir/Purge also can be used to saturate an electrochemical cell with a reactive gas.



Warning: Do not connect the Stir-Purge unit to poisonous, noxious, or explosive materials. Failure to observe this warning could cause injury or property damage. VistaShield is not gas tight. Use the same precautions as if using an open electrochemical cell on a bench. Operate in a hood (fume cupboard) if dangerous gases are used.

The Stir/Purge has two gas outlets, one intended for gas bubbling through the electrolyte, one used for gas blanketing the volume above the electrolyte. If blanketing is not required, the blanket port can be plugged.

Purge gas can be pre-saturated by passing the gas through an electrolyte bubbler. Check the compatibility of your saturated gas with materials used to make the Stir/Purge:

- Solenoids: stainless-steel for wetted parts, Viton[®] seals
- Needle valve: nickel-plated brass and Viton[®]
- Connectors: Brass or Ni-plated Brass/Viton[®]
- Tubing: High-density polyethylene (HDPE)
- Mechanical: Aluminum
- Gas fittings: Polypropylene

This Stir/Purge unit uses HDPE tubing which can absorb O₂ and will outgas. Between the Stir/Purge and the electrochemical cell, Tygon[®] tubing is often used. Oxygen will also slowly diffuse out of Tygon[®]. If this is a problem, alternate materials, such as low-permittivity plastics or metal may be used for the tubing.

About the VistaShield and Stir/Purge

The VistaShield is a Faraday cage, designed to be as flexible as possible and convenient for a wide range of electrochemical experimentation. The Stir/Purge option is a unit that allows remote or local control of a magnetic-stirring apparatus and the control of a feed gas, typically used to either purge or blanket a working solution.

VistaShield with Stir/Purge features include:

- Conductive-glass window to allow visual inspection without breaking shielding,
- Pass-throughs for cables, feed gas, thermostatic control [water],
- Fifteen stirring-speed positions
- Switchable gas supply from single-feed source
- Electrical isolation from earth ground,
- TTL remote control option,
- Compatibility with Gamry software complete with customization.

Notational conventions

In order to make this manual more readable we have adopted some notational conventions. These are used throughout this manual and all other Gamry Instruments manuals:

- Numbered lists. A numbered list is reserved for step-by-step procedures, with the steps always performed sequentially.
- Bulleted list. The items in a bulleted list, such as this one, are grouped together because they represent similar items. The order of items in the list is not critical.

Chapter 3: Unpacking and Installation – Complete Unit

This chapter of the Gamry Instruments Inc. VistaShield Stir/Purge Operator's Manual covers normal installation of the Stir/Purge when purchased with a VistaShield. When this is the case, the Stir/Purge has already been mounted under the VistaShield. Installation includes:

- Inspection of the System
- Software Installation (if required)
- Connecting Power
- Connecting Digital Control
- Installing gas-flow fittings

The next chapter gives step-by-step instructions for mounting a Stir/Purge option underneath a separately purchased VistaShield and discusses use of a Stir/Purge in a stand-alone system without a VistaShield. The reader should return to this chapter after finishing any work called for in the next chapter.

Front view of a VistaShield with Stir/Purge underneath



Unpacking

When you receive your Vista Shield and Stir/Purge, please verify that you have received the following items:

- Stir/Purge unit attached to VistaShield (see photo above)**
- Stir/Purge Operator's manual**
- Gamry Software installation CD-ROM**
- AC Line cord**
- 12 V output desktop power supply**
- Quick-disconnect 1/8" NPT**
- Quick-disconnect with shut-off**
- Qty 2 of 1/8" NPT to barbed-end fitting**
- 15-pin cable (part # 985-118)**

Initial visual inspection

After you remove your VistaShield with Stir/Purge from its shipping carton, check it for any signs of shipping damage. If any damage is noted, please notify Gamry Instruments, Inc. and the shipping carrier immediately. Save the shipping container for possible inspection by the carrier.



Caution: If the Stir/Purge is taken from a cold location (for example: outdoors in winter conditions) to a warm, humid location, water vapor could condense on the cold surfaces inside the Stir/Purge. Before connecting power to a "cold" Stir/Purge, allow at least one hour for the Stir/Purge to warm to room temperature.

Physical location

You normally locate your VistaShield with Stir/Purge on a flat workbench surface. You need access to the rear and right side of the VistaShield and Stir/Purge for cable and gas-tubing connections.

If you place your Stir/Purge within an enclosed space, make sure that the internal temperature within that space does not exceed the 45°C ambient temperature limit of the Stir/Purge. Be particularly careful if a computer or other heat-dissipating equipment is mounted in the same enclosure.

The VistaShield Stir/Purge has not been designed for outdoor use.

VistaShield Stir/Purge setup options

The Stir/Purge can operate in a stand-alone configuration (manual control), or through a potentiostat via the Digital I/O (Remote) CONTROL. Specifics of control are discussed in Chapter 4. Briefly, Manual versus Remote control is toggled independently for the STIR and PURGE options on the front panel (See Figure 4-1). Manual control is possible, even when the Digital CONTROL I/O is connected in the back.

Software Installation

The Stir/Purge was designed for convenient remote control of the Stir and Purge functions using Gamry's Framework scripts. The control is implemented through digital control lines on a cable connecting the Stir/Purge to any Gamry Potentiostat. An appropriate cable was provided with the Stir/Purge.

If you will be using remote control of the Stir/Purge, Gamry recommends that you upgrade your Gamry software to the latest revision of the Gamry Framework. A Software installation CD was provided for this purpose.



The Gamry Framework software is written for use on computers running a recent version of Microsoft Windows. Make sure that your computer meets these simple requirements.

A computer based on one of the Pentium™ family of Intel microprocessors or a 100% compatible processor from another vendor.

One of the following operating systems:

Windows® 2000, Windows® XP, Windows® Vista, or Windows® 7

(contact Gamry's Internet site www.gamry.com if you have a newer Windows edition).

Insert the CD into the computer that you will use with the Stir/Purge. If Autoplay is enabled, a Setup Program will run. If Autoplay is not enabled on your computer, you will have to navigate to the CD's main folder and run Autoplay. Follow the instructions that appear on the screen as Autoplay runs a Setup program.

USB Port

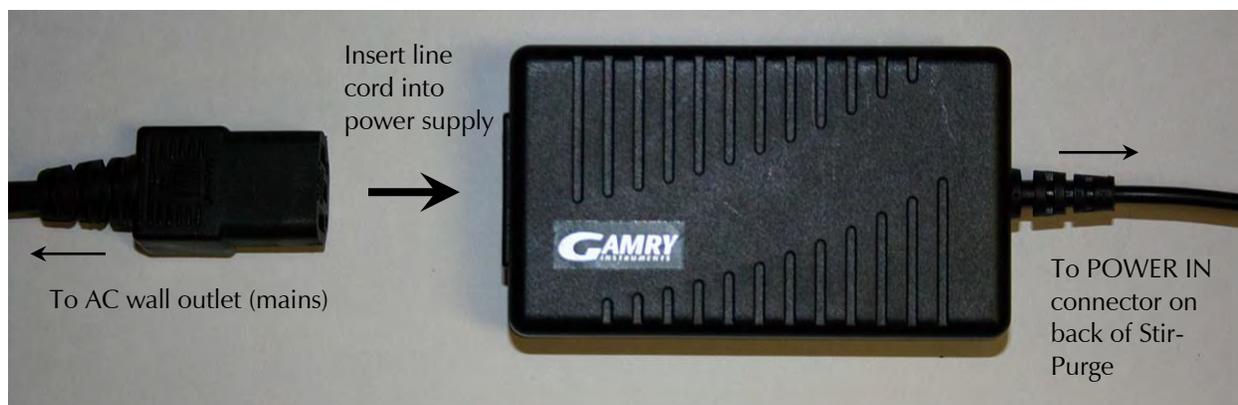
The USB port on the back of the Stir/Purge is currently used for firmware updates only. Do not make any connections to this port during normal installation of the system.



The USB connection is not used in normal operation. The Stir/Purge works without a computer connection.

Power cord and power connection

The VistaShield Stir/Purge does not plug directly in the AC mains supply. Instead, the mains is connected to an external power supply, which supplies a regulated 12-volt DC output. This regulated DC is then connected to the POWER IN jack on the rear of the Stir/Purge.



The external power supply provided with the Stir/Purge is rated for operation from 100 to 240 V AC, at frequencies from 47 to 63 Hz. It should therefore be useable worldwide.

The Stir/Purge external supply is supplied with a line cord suitable for use in the United States. In other countries, you may have to replace the line cord with one suitable for your electrical outlet type. You must always use a line cord with a CEE 22 Standard V female connector on the apparatus end of the cable. This is the same connector used on the US standard line cord supplied with your Stir/Purge. See Chapter 1 for specific safety information regarding line cord selection.

The DC output cord from the external power supply plugs into the POWER IN jack on the rear panel of the Stir/Purge (see below):

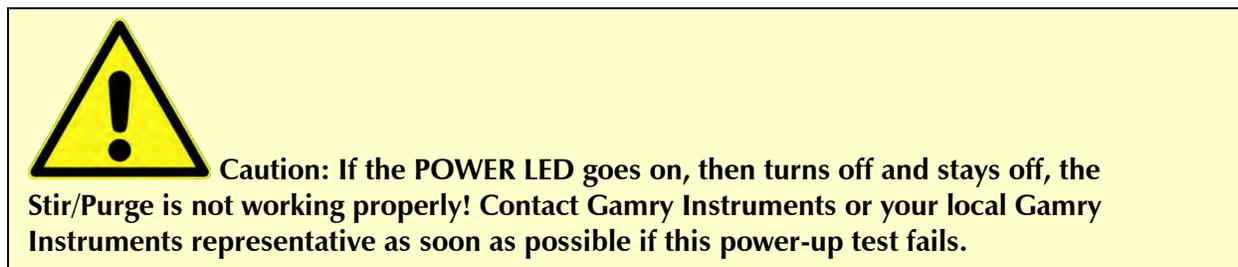


Power-up test

Before you make any other connections to your Stir/Purge, power up the Stir/Purge and watch the blue POWER LED indicator on the front panel of the Stir/Purge:

After connecting DC power to the Stir/Purge, turn on the POWER switch on the front panel of the Stir/Purge (see Figure 5 - 1).

Watch the POWER LED as the Stir/Purge starts up. This LED should remain illuminated. The status of the other LED indicators is not important at this time.



Gas fitting installation

Three purge gas ports exit the Stir/Purge from the rear of the unit. One is used as the gas inlet and two are used as gas outlets. All three ports are designed to accept 1/8" NPT male fittings.

The hose barbs normally used in these ports protrude significantly from the case, which can make them susceptible to damage during shipping and unpacking. For this reason, the hose barbs were removed prior to shipping and the ports were protected using temporary caps. The hose-barb fittings were shipped with the unit.



The manufacturer of the needle valve used to control gas flow rate does not recommend use of PTFE tape on any threaded fittings used in the inlet gas plumbing. Small pieces of the tape may escape into the gas flow and block the needle valve orifice. You can use PTFE thread-seal tape on the outlet ports if you desire.

The photograph of the rear panel (above) shows the normal installation of the fittings. A quick-disconnect fitting is used on the inlet port so the VistaShield and Stir/Purge can be moved easily. Simple hose-barbs are normally installed in the other two ports.

→ DON'T FORGET!

The Stir/Purge allows for blanket gas over the surface of a cell. This blanket is used to prevent re-adsorption of oxygen into the cell electrolyte once the purge process is finished. If you will not need blanket gas flow, you can block the blanket gas port.

The hose barb fittings are installed as follows:

1. Remove the plug on the Gas Inlet port. Replace it with the threaded piece of the quick-disconnect fitting.
2. Install the hose barb piece of the quick-disconnect fitting as shown in the photograph.
3. Remove the plug on the Purge (A) port. Replace it with a hose barb as shown in the photograph.
4. Remove the plug on the Blanket (B) port. Replace it with a hose barb as shown in the photograph.

Chapter 4: Adding a Stir/Purge to a VistaShield and Stand-Alone Operation

This chapter contains detailed instructions for adding a Stir/Purge Option to a separately purchased VistaShield. It also discusses configuration of the Stir/Purge as a stand-alone device.

Unpacking

When you receive your Stir/Purge option, please verify that you have received the following items:

- Stir/Purge unit**
- Stir/Purge Operators manual**
- Gamry Software installation CD-ROM**
- AC Line cord**
- 12 V output desktop power supply**
- Quick-disconnect 1/8" NPT**
- Quick-disconnect with shut-off**
- Qty 2 of 1/8" NPT to barbed-end fitting**
- 15-pin cable (part # 985-00118)**
- Stir/Purge Configuration Kit (contains 8 screws)**

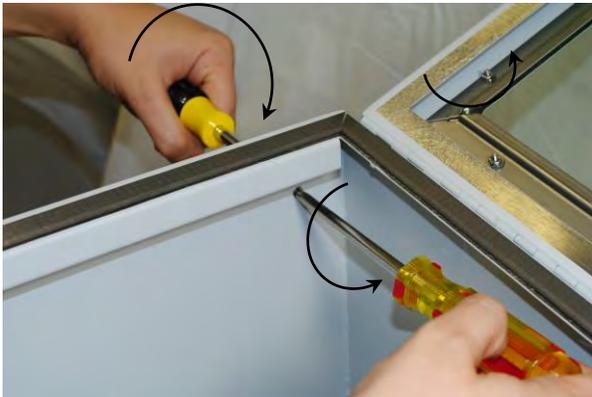
Mounting the Stir/Purge to the VistaShield

Follow this step-by-step procedure to install the Stir/Purge option to the VistaShield.

1. From underneath the chassis base, remove the four screws holding the four rubber feet on the VistaShield. You will need a tool to prevent rotation of the nuts within the feet.

A 1/4 inch nut driver can be used to hold the nuts. If you do not have this specific nut driver, use small pliers to prevent rotation of the nuts.

Save the feet, screws, and nuts in a safe place. This hardware will be used if the Stir/Purge needs to be removed and the feet reinstalled on the VistaShield.



2. Place the VistaShield on top of the Stir/Purge, aligning the four screws with the four holes in the top of the Stir/Purge chassis.

Chapter 4: Adding a Stir/Purge to a VistaShield and Stand-Alone Operation--Installation of the Stir/Purge as a stand-alone system

3. Fix the VistaShield to the Stir/Purge, using four flat-head screws supplied in Stir/Purge Configuration Kit packet, as shown:



4. The installation of the Stir/Purge option onto the VistaShield is now complete. Continue the system installation using the information in Chapter 3.

Installation of the Stir/Purge as a stand-alone system

The Stir/Purge can be used without the VistaShield as a stand-alone system. In this configuration four screws are used to block the holes in the top of the Stir/Purge. This provides a minimum of protection against liquid leakage into the Stir/Purge chassis.

The screws are pan-head screws with a built-in O-ring. They can be found in the Stir/Purge Configuration Kit. Add one screw to each hole in the top of the Stir/Purge. Do not over-tighten the screws – excessive torque can damage the o-rings.

Once the screws are in place, continue the system installation using the information in Chapter 3.

Disassembly of the Stir/Purge from the VistaShield

Circumstances may require removal of a Stir/Purge option from a VistaShield. If the Stir/Purge is in need of service, it should be returned to Gamry separately.

Follow these step-by-step instructions to disassemble the system.

1. Inside the VistaShield chamber, remove the four screws holding the VistaShield to the Stir/Purge:



2. Remove the VistaShield from the Stir/Purge unit.
3. With the screws and nuts saved from the installation, re-attach the four rubber feet onto the underside of the VistaShield. Once again, a ¼ inch nut driver or pliers will be needed to prevent rotation of the nut within each foot.



--Disassembly of the Stir/Purge from the VistaShield

Chapter 5: Panel Indicators and Controls

Front panel

The Stir/Purge front panel includes one valve knob, one 16-position control knob, two 3-position toggle switches, one 2-position toggle switch, and four LED indicators. Each of these is discussed in this chapter.

The POWER Switch and LED



The POWER Switch and LED are located on the right of the Stir/Purge front panel. When the toggle switch is in the “ON” (up) position, the LED normally glows a steady blue.

When the POWER LED is off one or more of the following conditions may apply:

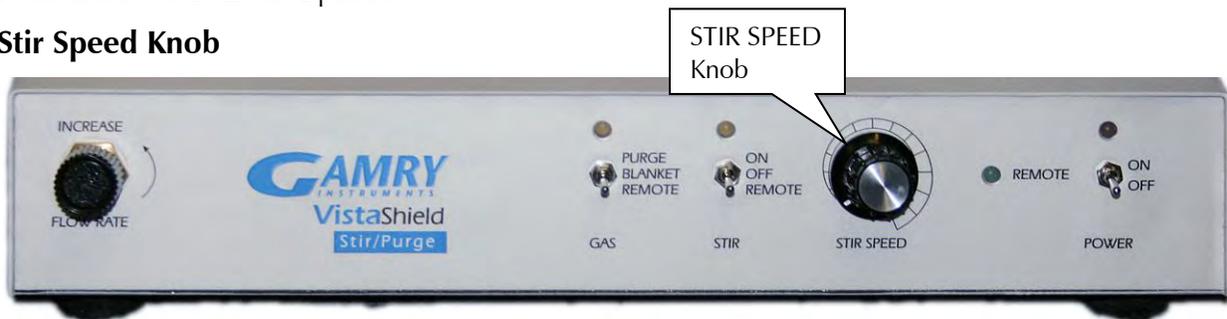
- The front panel power switch is off.
- There is no DC +12 V supply connected to the rear-panel DC POWER IN connector.
- The external DC power supply has no input power or is malfunctioning.
- The internal power switch is faulty.

REMOTE LED



An LED is located to the left of the POWER toggle/LED. This LED is lit when one or both of the STIR or GAS switches are in the REMOTE position.

Stir Speed Knob



To the left of the REMOTE LED is the STIR SPEED Knob. This is a 16-position control knob. The bottom position is “Off” and the stir speed increases from the lower left, clockwise, through the remaining 15 positions

to its maximum rotation rate at the lower right. Stirring speed increases in exponential fashion with approximate speeds indicated in the table below. Stirring speed ramps up over a few seconds, starting slowly, then speeding up. This is designed to avoid abrupt transitions that can cause the stirring bar to decouple from the stir motor. The mechanism for spinning is a step-motor driver, so low stirring rates cause a magnetic stir bar to “tick” through 8 distinct positions when making a rotation. Stirring speeds are controlled by an internal clock and are repeatable.

| Knob Position | Stir Speed (RPM) | Knob Position | Stir Speed (RPM) | Knob Position | Stir Speed (RPM) |
|---------------|------------------|---------------|------------------|---------------|------------------|
| 0 | 0 | 6 | 176 | 11 | 1163 |
| 1 | 25 | 7 | 258 | 12 | 1740 |
| 2 | 38 | 8 | 380 | 13 | 2406 |
| 3 | 55 | 9 | 556 | 14 | 2468 |
| 4 | 82 | 10 | 816 | 15 | 4806 |
| 5 | 120 | | | | |

The choice of stir-bar depends on the cell design. STIR SPEED is not controlled by the REMOTE connector. The REMOTE can only control whether stirring is on or off.

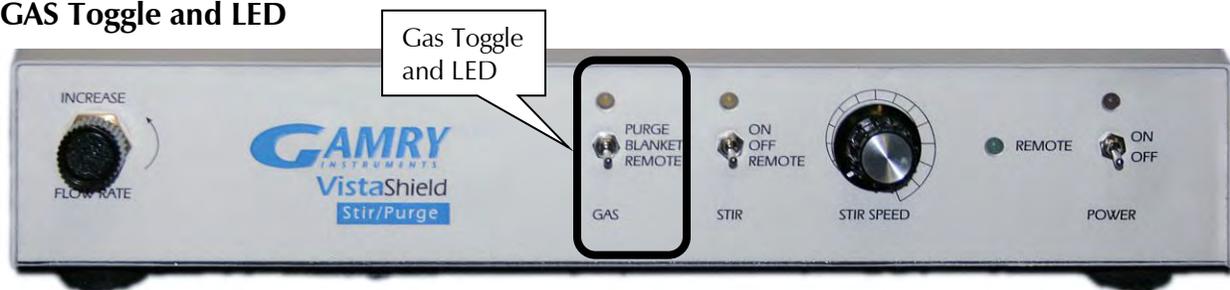
STIR Toggle and LED



The STIR Toggle and LED are located to the left of the STIR SPEED Knob. The STIR function of the Stir/Purge is controlled by the previously mentioned STIR SPEED Knob and the three-position STIR toggle switch. The three positions are (top to bottom) ON, OFF, and REMOTE. When the switch is set to REMOTE, the Digital I/O connector controls the stir operation as described below. The other two positions are for manual control. When set to OFF, the stir function is disabled entirely, and when set to ON, the stir function is enabled at the set-stir speed.

The LED above the toggle switch is on whenever the stir function is on, whether manually set to ON or enabled by the Remote control function while the switch is set to REMOTE.

GAS Toggle and LED



The GAS Toggle and LED are located to the left of the STIR Toggle and LED. The PURGE function of the Stir/Purge is controlled by a three-position GAS toggle switch and by the FLOW RATE knob. The three positions of the GAS toggle are (top to bottom) PURGE, BLANKET, and REMOTE:

- When the switch is set to REMOTE, the Digital I/O connector controls the gas operation as described below.
- When set to BLANKET, the gas flow is directed out of the BLANKET port on the back of the Stir/Purge chassis.
- When set to PURGE, the gas flow is directed out of the PURGE port on the back of the Stir/Purge chassis. The LED above the toggle switch is lit whenever the gas flow is directed to PURGE, whether manually via the toggle or through software when the switch is set to REMOTE. The default behavior with the Gamry Framework software is that blanket gas flows before, during, and after an experiment. The purge gas flows only when performing the stir/purge operation.

FLOW RATE Knob



The FLOW RATE knob is located on the left side of the Stir/Purge front panel. The knob is connected directly to a needle valve. Turning the knob in a counterclockwise direction opens the valve and increases the gas flow directed to either PURGE or BLANKET port depending on the GAS Toggle position. While the individual components are rated to 30 psi gauge, the system as a whole is rated to 10 psi, which is generally low enough that wire tie-downs on hose-connections to barbs are not necessary. Gamry suggests starting with the gas FLOW RATE control off and increase slowly until you get a reasonable bubbling.



The gas FLOW RATE control is reversed compared to many common flow control devices, such as cold water taps. The knob is turned in a clockwise direction to turn off or lessen the gas flow.

There is no indication or recording of whether gas is flowing or how much gas there is. Therefore, the user must determine both that the gas flow is on and that the flow rate is appropriate. Gas-flow rate is not controlled by the REMOTE connector. The REMOTE setting only controls whether gas is directed to the PURGE or BLANKET port.

Always make sure there is an exit path for the gas in your cell. Electrochemical cells can fail dramatically, for example, cell ports can pop open if no relief path is provided. Restricted gas-flow at the exit can also cause reverse flow, sucking solution into the plumbing when the input pressure is removed.



**Caution: The VistaShield is not designed to be gas-tight. It is not a fume hood!
Do not plug holes in the VistaShield.**

Rear Panel

The Stir/Purge rear panel includes one POWER IN jack, one Digital I/O CONTROL connector, one USB jack, and three gas ports (one in, two out). Each of these will be discussed in turn. A picture of the Stir/Purge rear panel is given below.

POWER IN jack



The VistaShield Stir/Purge derives power from +12 volts DC input through the POWER IN jack. The input current is less than 500 mA.



Caution: Use of an incorrect power source can damage the Stir/Purge's power supply, and/or reduce function.

USB port



The USB port on the rear panel of the Stir/Purge is not required for normal operation. The port is only used for updating the Stir/Purge firmware. See Appendix A for instructions on updating the firmware.

CONTROL Digital I/O Connector

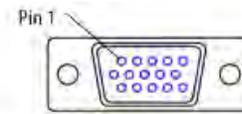


The CONTROL Digital I/O connector controls the stir and purge functions via simple digital signals from any Gamry potentiostat or other device that outputs on the proper pins.

The Digital I/O is a compact 15-pin D female connector that is fully isolated from the Stir/Purge Chassis. A cable for connecting the Digital I/O to a Gamry Potentiostat is included. If you purchase a 3rd party cable, ensure that the cable has all 15 pins connected.

The 15-pin cable (part # 985-00118) included with the system is designed to connect the Stir/Purge to a Gamry Potentiostat, either the Reference Family (Ref 600, Ref 3000), the PC3, or PC4 family (including PCi4 and Series G). When connected to the Potentiostat, Gamry's Framework software controls the Stir/Purge, providing appropriate settings for the GAS and STIR inputs.

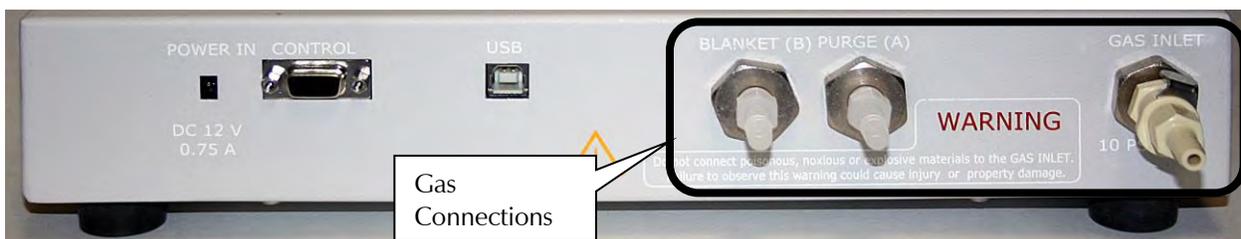
For those not using a Gamry Potentiostat, the diagram to the right shows connector pin-outputs, output- and input-voltage levels, and full signal descriptions. Note that this interface does draw power from an external device. Simple connection of TTL compatible control signals will not work if power is not also provided.



NorComp 180-015-103Lxx1 or equiv
15 Pin High Density Male Connector
5V TTL Level compatible signals

| Pin | Function |
|-------|--|
| 6 | Power Ground |
| 7 | Gas Control: low = blanket, high = purge |
| 8 | Stir Control: low = stop, high = stir |
| 15 | Power (2.7V-5V, 10 mA) |
| Shell | Isolated |

Gas connections



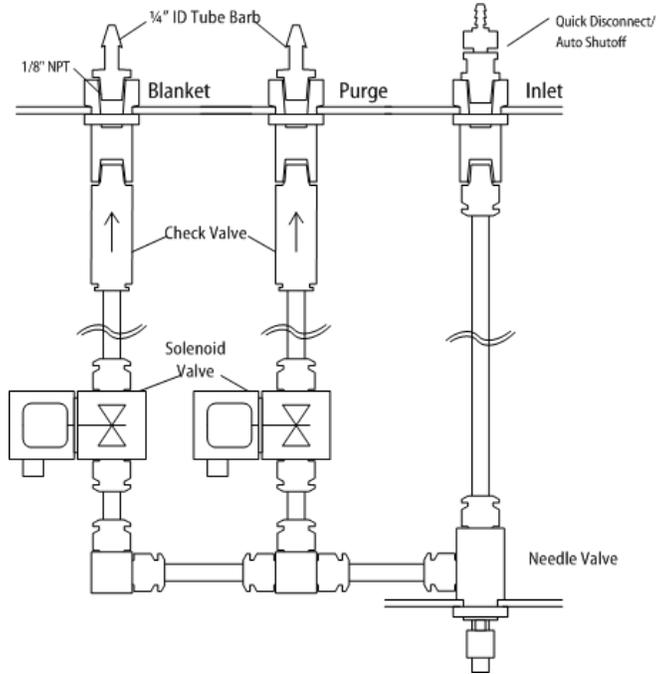
The three connections for gas flow are located on the right side of the back panel. The GAS INLET is a quick release, interchangeable hose barb on the far right, and the two gas outputs [BLANKET (B) and PURGE (A)] are case-mounted hose barbs.

Changing feed gas can be simplified by using multiple quick-connect barbs (one to each gas) and simply swapping out. The feed gas should be regulated to no more than 10 psi gauge, though the equipment is designed to operate up to 30 psig.

The BLANKET port can be blocked off if blanket gas flow is not required. Make sure that the pressure in this condition remains lower than 10 psi (70 kPascal).

 **Warning!** Excess pressure can cause damage to the internal workings of the VistaShield Stir/Purge, and can, in extreme cases, pose an explosive risk to the user. The VistaShield Stir/Purge is not intended for use with explosive, hazardous, or toxic substances which can pose a risk of explosion or poisoning to the user.

Stir/Purge Schematic



Chassis ground

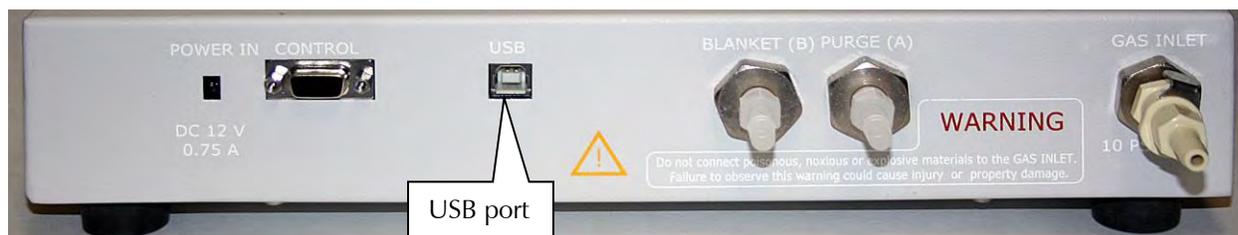
There is no independent grounding (earthing) for the Stir/Purge device. It is in electrical contact with the VistaShield Faraday cage. Grounding of the Faraday cage also grounds the Stir/Purge chassis. The User I/O and USB connectors are both isolated so that the Stir/Purge is not in ground contact when either is connected.

Proper use of the VistaShield Stir/Purge and Faraday Cage has the ground post inside the Faraday cage connected to the ground reference of the potentiostat. If this ground reference is also an earth ground then the system will be earth-grounded. If it is a float ground then the system will be floating. Under either setup the Faraday cage will shield out external electronic noise.

Appendix A: Firmware Updates

The USB port on the Rear panel of the Stir/Purge is only used for updates to the Stir/Purge firmware. This should be required infrequently, if required at all. Gamry Instruments recommends that you update your Stir/Purge firmware only when a Gamry representative tells you that an update is needed.

Computer requirements



If it becomes necessary to connect the Stir/Purge via USB, make sure that your computer meets these simple requirements.

- A computer based on one of the Pentium™ family of Intel microprocessors or a 100% compatible processor from another vendor.
- One of the following operating systems: Windows® 2000, Windows® XP, Windows® Vista, or Windows® 7 (contact Gamry's Internet site www.gamry.com if you have a newer Windows edition).
- A USB port that supports full speed (12 Mbits/second) or high speed (480 Mbits/second) USB transfers. It must be compatible with Revision 1.1 or Revision 2.0 of the USB specification.

The Stir/Purge can be connected to a computer using a standard High Speed USB A/B cable.

The USB port on the rear panel of the Stir/Purge is a Type B connector as defined in Revision 1.1 and 2.0 of the USB specification. Use a standard, shielded, Type A/B cable to connect this port to a computer's USB port or a USB hub (preferably an externally powered hub). The two ends of a Type A/B cable are different. The more-rectangular end plugs into the computer and the more-square end plugs into the Stir/Purge. If lost, you can replace this cable with a cable from your local computer retailer.

The Stir/Purge is a USB 2.0-compliant, Full Speed (12 MB/s) peripheral. The Stir/Purge USB port is compatible with Revision 1.1 and 2.0 of the USB specification. It supports the Windows® Plug-n-Play mechanism, including dynamic connect/reconnect.

The USB connection can be "hot-plugged". This means that both the computer and the Stir/Purge can be started up before the USB cable is plugged in. Unlike many other instrument-system connections, you need not power down the system before plugging in the USB.

You can also safely remove the USB cable without powering down the Stir/Purge and your computer. Be aware however, that this may have undesirable consequences if the system is currently communicating with the device.

First-time device-installation in Windows®

The Stir/Purge uses the USB port to communicate with a host computer, and automatically connects via the Windows® Plug and Play Manager.

If you have your Gamry Instruments software CD (or DVD), insert it in your computer's CD (or DVD) drive, select **Install the software automatically** radio button, then click the **N**ext button.

The Windows Device Manger will install the required files from the CD.

If you do not have a Gamry Instruments software CD, contact Gamry Instruments, or your local Gamry Sales representative for assistance.

Appendix B: CE Certificate



Declaration of Conformity

According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014

Manufacturer's Name and Location:

Gamry Instruments
734 Louis Drive
Warminster, PA 18974
USA

This declaration is for the Gamry Instruments product models: Vista Shield™ Stir/Purge™

The declaration is based upon compliance with the following directives:

EMC Directive 89/336/EEC as amended by 92/31/EEC and 93/68/EEC

Low Voltage Safety Directive 73/23/EEC as amended by 93/68/EEC

The declaration is based upon product compliance with the following standards as defined in report number R0295-000 from Ergonomics, Inc. for safety analysis and report number RSI-2772L from Radiation Sciences, Inc. for EMC test and analysis.

| EMC Standards | Title | Class/ Criteria |
|-----------------|---|-----------------|
| EN 61000-4-2 | EMC – Electrostatic discharge, Immunity | B |
| EN 61326:2002-2 | EMC – Radiated Emissions | A |

| Low Voltage Directive Safety Standards | Title |
|--|---|
| EN 61010-1:2001 | Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements. |
| EN 61010-2-081: 6/2003 | Safety requirements for electrical equipment for measurement, control and laboratory use, Part 2 Particular requirements for automatic and semiautomatic laboratory equipment for analysis and other purposes |



Signature

October 17, 2011
Date

Dr. Gregory A. Martinchek, PhD
Title: President

Formal signed declaration is on file at Gamry, Inc.

Certificate of Conformance

**CERTIFICATE OF CONFORMANCE
EUROPEAN COMMUNITY
COUNCIL DIRECTIVE 2004/108/EC**

Date of Issue: June, 2011
Issued By: Retlif Testing Laboratories
3131 Detwiler Road
Harleysville, PA 19438
Issued To: Gamry Instruments
734 Louis Drive
Warminster, PA 18974
Reference: Retlif Report Number R-1672P

Retlif Testing Laboratories hereby acknowledges that compliance testing in accordance with the below listed standards was performed on a representative sample of the equipment listed below. Retlif Testing Laboratories further acknowledges that the test sample listed below was found to be in compliance with these standards.
This certificate is hereby issued to the above named grantee and is valid only for the equipment identified below.

Manufacturer: Gamry Instruments
734 Louis Drive
Warminster, PA 18974
Equipment Tested: Magnetic Stirrer
Part Number: 990-00277
Brand Name: Gamry Stir/Purge
Product Type: Measurement, Control Equipment and
Laboratory Use

Note(s):

| | |
|--|--|
| 1) See attached report R-1672P for details and/or conditions pertaining to this certificate. | |
| 2) Conforms to the emissions requirements of EN 61326-1:2006; Clause 7.2: | |
| CISPR 11 Edition 4:2003 | Conducted Emissions, Group 1, Class A |
| CISPR 11 Edition 4:2003 | Radiated Emissions, Group 1, Class A |
| IEC 61000-3-2: 2000 | Harmonics |
| IEC 61000-3-3: 2002 | Flicker |
| 3) Conforms to the immunity requirements of EN 61326-1:2006; Table 1: | |
| IEC 61000-4-2: 2001 | Electrostatic Discharge |
| IEC 61000-4-3: 2002 | Radiated Immunity |
| IEC 61000-4-4: 2004 | EFT/Burst, Power Leads and I/O Cables |
| IEC 61000-4-5: 2001 | Surge Immunity, Power Leads |
| IEC 61000-4-6: 2003 | Conducted Immunity, Power Leads and I/O Cables |
| IEC 61000-4-11: 2004 | Voltage Dips and Interrupts |

Appendix C: Specifications

Specifications apply at 25°C, 115 V_{AC} power, and operation of Gamry Instruments Vista Shield Stir/Purge unless otherwise noted. All specifications are subject to change without notice.

Environmental

| | | |
|-------------|----------|------------------|
| Temperature | 0 to 45 | °C |
| Humidity | 10 to 90 | % non-condensing |

Mechanical

| | | |
|------------|-------------|--------|
| Dimensions | 35 x 35 x 8 | cm |
| | 14 x 14 x 3 | inches |
| Weight | 4.6 | kg |
| | 10 | lbs |

Main Power

| | | |
|---------------|---------|-----------------|
| Input Voltage | 11 - 13 | V _{DC} |
| Input Current | 500 | mA (maximum) |

Digital Interface Power

| | | |
|---------------|---------|-----------------|
| Input Voltage | 2.7 – 5 | V _{DC} |
| Input Current | 20 | mA (maximum) |

Digital Interface Logic

| | | |
|--------------------|-----|-----------|
| Input Voltage High | 2.2 | V minimum |
| Input Voltage Low | 0.6 | V maximum |

Gas

| | | |
|----------|----|-------------------|
| Pressure | 70 | kPascal (maximum) |
| | 10 | psi |

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