

# User's Guide

## Gilson CPC Systems



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# TABLE OF CONTENTS

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## **1 | SAFETY**

- 2 | Symbols and Notices
- 3 | Chemical Hazards
- 4 | Electrical Hazards
- 4 | Flammable Solvents
- 4 | Lifting
- 4 | Replacement Parts
- 4 | Signs of Damage
- 4 | Site Requirements
- 4 | Spacing
- 4 | Storage and Movement

## **5 | INTRODUCTION**

- 6 | Description
- 8 | Unpacking
- 10 | Technical Specifications
- 14 | Customer Service

## **15 | INSTALLATION**

- 16 | Drain Pan and Drain Tube Installation
- 17 | Plumbing Connections
- 20 | Electrical Connections

## **21 | OPERATION**

- 22 | Front Panel
- 25 | Start Up
- 26 | Control the System
- 29 | Loop Injection with Manual Valve
- 30 | Change the Elution Mode (ASC/DSC)
- 31 | Power Down

## **33 | MAINTENANCE**

- 34 | Helpful Hints
- 34 | Cleaning and Decontamination
- 36 | Maintenance Schedule
- 37 | Replace a Seal in a Column Rotary Seal

## **43 | TROUBLESHOOTING**

- 44 | Troubleshooting Table
- 46 | Error Messages
- 47 | Repair and Return Policies

## **49 | WARRANTY**

- 49 | General
- 50 | Limited Warranty

## **51 | REPLACEMENT PARTS AND ACCESSORIES**

## **55 | MATERIALS**

- 55 | Liquid Contact Materials



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# SAFETY

## IN THIS CHAPTER

- Symbols and Notices | 2
- Chemical Hazards | 3
- Electrical Hazards | 4
- Flammable Solvents | 4
- Lifting | 4
- Replacement Parts | 4
- Signs of Damage | 4
- Site Requirements | 4
- Spacing | 4
- Storage and Movement | 4

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.

Read all documentation and safety information for accessories, peripherals, and other instruments that may be used with this instrument before operating the system.

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



## Symbols and Notices

The following symbols and notices may appear on the instrument or in this document.

### Electrical and Hazard Symbols

SYMBOL	EXPLANATION
	Direct Current
	Alternating Current
	Protective Conductor Terminal
	Electrical Power ON
○	Electrical power OFF
	Caution
	Caution, Risk of Electric Shock
	Caution, Ultraviolet Light, Risk of UV Radiation
	Caution, Two Person Lift Required
	Warning, Corrosive Chemical
	Caution, Hot Surface

## Label Symbols

The following label symbols may appear on the instrument:

SYMBOL	EXPLANATION
	Reference of the product
	Serial Number
	Year of Manufacture
	Refer to the User's Guide

## Safety Notices



Indicates a potentially hazardous situation which, if not avoided, may result in personal injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates a potentially hazardous situation which, if not avoided, may result in equipment damage.

## Chemical Hazards

Any chemicals used for analysis should be handled according to good laboratory practice (GLP). They should also be stored, used, and disposed of in accordance with the manufacturer's specifications, as well as local and national regulations. Potentially hazardous chemicals can be used with the instrument. Use care when handling chemicals and wear appropriate personal protective equipment (PPE), such as safety glasses, gloves, etc.

The responsible individual must ensure that personnel are not exposed to hazardous levels of toxic substances as outlined in the Material Safety Data Sheets (MSDSs), or any documentation provided by local governing bodies such as The Health Protection Agency (United Kingdom) or The Occupational Safety and Health Administration (United States).





## Electrical Hazards

Unless specifically instructed, do not remove any protective covers. Detach all sources of voltage from the instrument before the service, repair, or exchange of parts.

Use only the grounded AC cord provided. Ungrounded power cords can result in electrical shock and serious personal injury. Faulty or frayed power cords must be immediately replaced with one of the same type and rating. When it is necessary to use a non-original power cord, make sure the replacement cord adheres to following specifications and local building safety codes: 1) European Union Model; Connector A: Male, Type E or F (Schuko), 16A; Connector B: Female, IEC320/C13, 10A; 250 V~, H05VV-F 3G1.0 mm<sup>2</sup> and 2) United States and Canadian Model; Connector A: Male Type, NEMA 15-5, 15A; Connector B: Female, IEC320/C13, 10A; 125 V~, SVT 3x18 AWG.

### NOTICE

Use only approved fuses with the specified current rating. The instrument must be operated within the voltage specified on the right panel of the instrument.

## Flammable Solvents

Secure all flammable solvents. The temperature of liquids inside the system must be 25°C (77°F) below the lowest flame temperature of any solvents used.

## Lifting

The instrument exceeds the weight one person can lift safely. Two or more people are required to lift the instrument safely. Always lift the instrument from the base and follow any unpacking instructions provided with the instrument.

## Replacement Parts

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

## Signs of Damage

Do not attempt to use the instrument if there are visible signs of damage.

## Site Requirements

Do not operate the instrument if site conditions are not within specifications.

## Spacing

Allow sufficient spacing around the system for proper cooling and for the connection of power cords, plumbing, injection pump, liquid handler, external detectors, or any other peripherals.

## Storage and Movement

Run a clean solvent through the fluid path before storing the instrument. Do not leave buffer in the system, as it may cause blockages and damage the seals. Rinse the fluid path and prevent the liquids from flowing out by inlets and outlets before moving the instrument. Store the instrument indoors (temperature > 5°C) on a flat surface and in an area with low moisture and low risk of impact or movement.

# INTRODUCTION

## IN THIS CHAPTER

- Description | 6
- Unpacking | 8
- Technical Specifications | 10
- Customer Service | 14



## Description

The Gilson CPC Systems are designed for centrifugal partition chromatography (CPC), also known as counter-current chromatography (CCC), a silica-free, liquid-liquid chromatographic (LLC) technique for preparative and industrial-scale purifications. Two non-miscible liquid phases are used: one as the mobile phase eluent and the other as the stationary phase maintained in the chromatography column by a centrifugal force. The centrifugal force is created by the rotation of the column, also called the “rotor,” which is composed of horizontally-stacked discs.

Gilson CPC Systems can be equipped with several models of columns, which vary in volume from 100 mL to 1L.

When used as a standalone unit, an optional kit with manual valves mounted on the right side of the instrument allows Gilson CPC Systems to change elution mode—ascending (ASC) to descending (DSC)—and inject sample—load to injection. For more information, refer to [Loop Injection with Manual Valve](#) on page 29 and [Change the Elution Mode \(ASC/DSC\)](#) on page 30.

Injection ranges, typical flow rates, maximum pressures, and rotation speeds vary according to the column model. Refer to [Technical Specifications](#) on page 10.

Gilson CPC Systems are standalone and can be controlled with the built-in touchscreen and buttons.

The combination of a Gilson CPC System and PLC Purification System, fully controllable with Gilson Glider CPC (GGC) Software, creates a complete purification system for various applications. In this configuration, a detector measures the absorbance and sends the chromatogram to the onboard control software, after which fractions are collected via the integrated fraction collector. For more information about PLC Purification Systems, refer to the *PLC 2050/2250/2500 Purification System User's Guide*.



**Figure 1**  
Gilson CPC System with PLC Purification System

## Rotor Module



The user must not access this part of the system due to dangers caused by rotative parts and hot surfaces.

The rotor module includes the rotor and the fluidic parts as well as the mechanical parts and the motor that drive the rotor. The brushless servomotor drives the rotor through a system of pulleys and belt. A tensioner bearing ensures the suitable tension of the belt. The belt has an antistatic coating. The rotor module is fixed on four absorbers allowing an antivibration isolation.

The liquid-liquid interface between the rotating parts and the non-rotating parts is made with two rotary seals assemblies, one on each side of the rotor module. They are composed of a hollow ceramic axis rotating in polymeric double lips seals. The inlet and outlet tubing are connected to the rotary seal heads. The rotary seals assemblies incorporate a secondary fluid path called cleaning discs that is used to collect the outflow of possible leakages of the rotary seals.

## Rotor Housing



The user must not access this part of the system due to dangers caused by rotative parts and hot surfaces.

The rotor housing integrates the rotor module and its fluidic connections. A drain pan at the bottom collects leakages, if necessary. A cover screwed to other panels avoids the access to the rotative parts.

## Electrical Cabinet

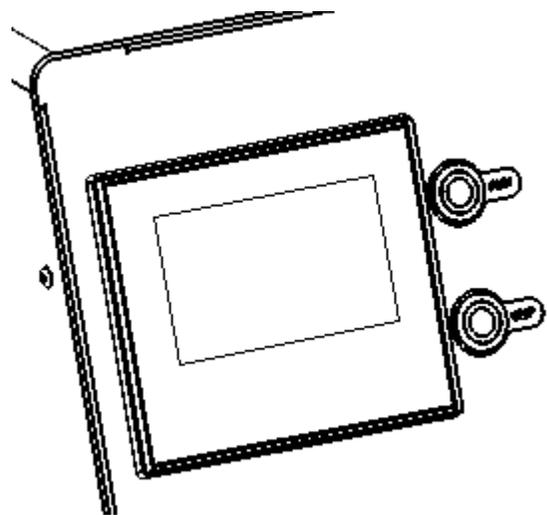


The user must not access this part of the system due to dangers caused by rotative parts and hot surfaces.

The electrical cabinet located at the back of the unit integrates all the electronic and electrical components such as the transformer, power supply, programmable logic controller, motor servo-drive, and fan.

## Touchscreen

Fixed on the front panel, the touchscreen allows to visualize in real time the working parameters of the instrument, rotor speed and acceleration.



**Figure 2**  
Touchscreen



## Unpacking

Upon receipt of the instrument, inspect the exterior of the shipping box. It should arrive unopened and undamaged. If examination reveals that damage has occurred in shipment, notify the carrier and Gilson immediately. Refer to [Customer Service](#) on page 14.

**WARNING**

Do not plug in the instrument if any damage is detected. Powering the instrument in a damaged state may result in serious injury and may damage internal components of the instrument.

The Gilson CPC Systems are delivered with most major components already assembled. Keep the original container and packing assembly so the unit may be shipped safely, if necessary.

Carefully unpack the Gilson CPC System and its accessories. Verify that all parts are included and undamaged. Do this now, even if the Gilson CPC System will not be used immediately. Many carriers must receive concealed damage claims within seven days of delivery.

**CAUTION**

The CPC 100, CPC 250, and CPC 250 PRO can each weigh up to approximately 70 kg (154 lbs.) and an additional 10 kg (22 lbs.) with packaging. These systems are too heavy to be lifted or moved by one person safely. To avoid personal injury and for general safety, if moving or lifting the Gilson CPC System, always get another person to assist you.

The CPC 1000 and CPC 1000 PRO can weigh up to approximately 120 kg (264 lbs.) and an additional 10 kg (22 lbs.) with packaging. These systems are too heavy to be lifted or moved by one or two persons safely. To avoid personal injury and for general safety, if moving or lifting the Gilson CPC System, always get two additional persons (four in all) to assist you.

Do not attempt to lift the instrument from a valve. Always grip it from its base.

Gilson CPC Systems are shipped with rotor and fluid path filled with methanol and water. Observe all laboratory safety precautions when handling solvents.

To unpack the instrument:

1. Open the box.
2. Remove the accessories packed inside the box.
3. Remove the packing material on top. The unit is not attached to the box, it is put on a dedicated foam.
4. Lift the unit out of the box and place it at suitable location, such as a lab bench or cart, and always on a plane surface.

**NOTICE**

It is recommended to operate the Gilson CPC Systems inside a fume hood to ensure proper ventilation.

Allow sufficient spacing around the system for proper cooling and for making connections.

Allow at least 20 cm free space around the instrument at all times to allow for proper tubing and cable connections and to provide adequate ventilation during operation.

Do not place item(s) on the Gilson CPC System.

## Unpacking List

The following items are considered standard equipment and are provided with the Gilson CPC Systems.

### STANDARD EQUIPMENT

After the Gilson CPC System and the accessories have been unpacked, you should have the following:

#### CPC 100, CPC 250, CPC 250 PRO, and CPC 1000

- Tubing and fittings for column inlet and outlet
  - PEEK Tubing, 1/16" (OD), 0.75 mm (ID), 3 m
  - PEEK Fingertight Fittings for 1/16" tubing (qty. 4)

#### CPC 1000 PRO

- Tubing and fittings for column inlet and outlet
  - PEEK Tubing, 1/8" (OD), 2.0 mm (ID), 3 m
  - SS Fittings for 1/8" tubing (qty. 4)

#### All Gilson CPC Systems

- RS-232 cable
- Power cord, based on destination country
- Waste tubing
- Drain pan

### DOCUMENTATION

- *Gilson CPC Systems User's Guide*

### OPTIONAL ACCESSORIES

- Valves kit, manual (factory installed)
  - 6-way, 2-position injection manual valve
  - 6-way, 2-position ASC/DSC manual valve
  - Bracket, union, tubing and fittings
  - Injection valve accessory kit, which includes:
    - Large-bore syringe needle
    - Needle port cleaner
    - 9/64" and 5/64" Allen keys (qty. 2)
    - 1/4"-5/16" wrench
    - Operating instructions
- ASC/DSC valve, manual (factory-installed)
  - 6-way, 2-position ASC/DSC manual valve
  - Bracket, union, tubing and fittings



# Technical Specifications

Please be aware of the following before operating the Gilson CPC System.

**NOTICE**

Changes or modifications to the Gilson CPC System not expressly approved by Gilson could void the warranty.

## Gilson CPC Systems

SPECIFICATION	DESCRIPTION	
Airborne Noise Emission	System	Emission
	CPC 100 CPC 250 CPC 250 PRO	LAS = 72 dB ±1.5 dB
	CPC 1000 CPC 1000 PRO	LAS = 78 dB ±1.5 dB
	A frequency weighting, Slow time constant 1 m distance between system (front) and sound level meter System on a 0.8 m high bench, measuring device at 1.6 m height	
Communication	Standalone or RS-232	
Compliance	Directive/Standard	Description
	European Directive 2006/42/EC	Directive of the European parliament and of the council of 17 May 2006 on machinery, and amending Directive 95/16/EC
	European Directive 2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility
	European Directive 2014/35/EU	Directive of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
	European Directive 2011/65/EU	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment
Control	Onboard via touchscreen interface (4", resolution 320 x 240 pix) and buttons. PC via RS-232 and GGC Software	
Dimensions (W x D x H)* <small>*without manual valves</small>	57 x 52 x 46 cm (22.4 x 20.5 x 18.1 in.)	
Electrical Protection	System	General Fuse
	110-120 V~	6.25A, 250 V~, 6.3 x 32 mm, T-type
	220-240 V~	3A, 250 V~, 6.3 x 32 mm, T-type

TECHNICAL SPECIFICATIONS CONTINUED ON PAGE 11

## Gilson CPC Systems



SPECIFICATION	DESCRIPTION	
Environmental Conditions	Specification	Definition
	Environment	Indoor use only
	Altitude	Up to 2000 m
	Temperature range	5°C to 40°C (41°F to 104°F)
	Humidity	Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C
External ports	Serial port, RS-232	
Flow Rate	System	Flow Rate (Elution, Typical)
	CPC 100	Up to 15 mL/min
	CPC 250	Up to 15 mL/min
	CPC 250 PRO	Up to 80 mL/min
	CPC 1000	Up to 50 mL/min
	CPC 1000 PRO	Up to 350 mL/min
Injection Range	System	Range
	CPC 100	Up to 1 g
	CPC 250	Up to 6 g
	CPC 250 PRO	Up to 30 g
	CPC 1000	Up to 30 g
	CPC 1000 PRO	Up to 100 g

TECHNICAL SPECIFICATIONS CONTINUED ON PAGE 12



## Gilson CPC Systems

SPECIFICATION	DESCRIPTION	
Liquid Contact Materials*	Description	Material
	Column discs and parts	316L SS
	Column discs gaskets	Novaflon® 100* *Modified PTFE with hollow glass micro-spheres
	Manual valves	316 SS PEEK Vespel®
	Rotation axis	PTFE Zirconium Oxide
	Rotation axis seals	GFP Hastelloy C
	Tubing, fittings, sample loops, and unions	316 SS PEEK / ETFE / PTFE
	*Refer to <b>MATERIALS</b> on page 55 for more information.	
Maximum Pressure	System	Pressure
	CPC 100, CPC 250, CPC 250 PRO	100 bar (1450 psi)
	CPC 1000, CPC 1000 PRO	80 bar (1160 psi)
Power Requirements	Specification	Description
	Line voltage	110-120 V- or 220-240 V-
	Line frequency	50/60 Hz
	Wattage	400 W maximum
	Distribution	TT or TN power system only Transient overvoltages Category II Class 1 equipment

TECHNICAL SPECIFICATIONS CONTINUED ON PAGE 13

## Gilson CPC Systems



# TECHNICAL SPECIFICATIONS

SPECIFICATION	DESCRIPTION			
Speed and Acceleration	System	Loading Speed (Setpoint)	Elution Speed (Setpoint)	Speed Range
		Loading Acceleration	Elution Acceleration	Acceleration Range
	CPC 100	500 rpm 20 <i>g</i>	1600 rpm 207 <i>g</i>	100 to 3000 rpm 1 to 728 <i>g</i>
	CPC 250	500 rpm 19 <i>g</i>	1600 rpm 195 <i>g</i>	100 to 3000 rpm 1 to 685 <i>g</i>
	CPC 1000	500 rpm 28 <i>g</i>	1200 rpm 163 <i>g</i>	100 to 1500 rpm 1 to 254 <i>g</i>
	CPC 250 PRO	500 rpm 20 <i>g</i>	1600 rpm 207 <i>g</i>	100 to 3000 rpm 1 to 729 <i>g</i>
CPC 1000 PRO	500 rpm 28 <i>g</i>	1200 rpm 163 <i>g</i>	100 to 2000 rpm 1 to 452 <i>g</i>	
Weight	System	Weight		
	CPC 100	60 kg (132 lbs.)		
	CPC 250	70 kg (154 lbs.)		
	CPC 250 PRO	65 kg (143 lbs.)		
	CPC 1000	120 kg (264 lbs.)		
	CPC 1000 PRO	115 kg (253 lbs.)		



## Customer Service

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

If you need assistance, please contact your local Gilson representative. Specific contact information can be found at [www.gilson.com](http://www.gilson.com). To help us serve you quickly and efficiently, please refer to [Repair and Return Policies](#) on page 47.

# INSTALLATION

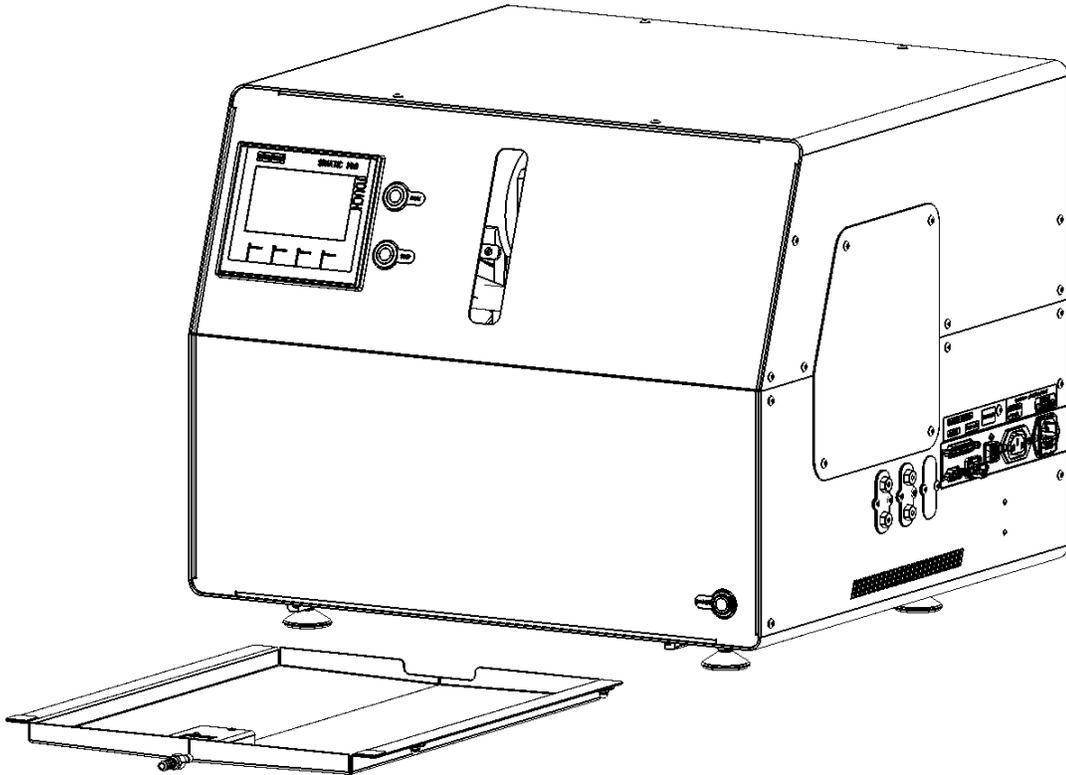
## IN THIS CHAPTER

- Drain Pan and Drain Tube Installation | 16
- Plumbing Connections | 17
- Electrical Connections | 20



## Drain Pan and Drain Tube Installation

Slide the drain pan by the front into the two guides placed under the system. Four magnets fixed on the bottom panel of the unit and four magnets fixed on the drain pan allow it to stay in place. It is designed to collect leakages.



**Figure 4**  
Drain Pan

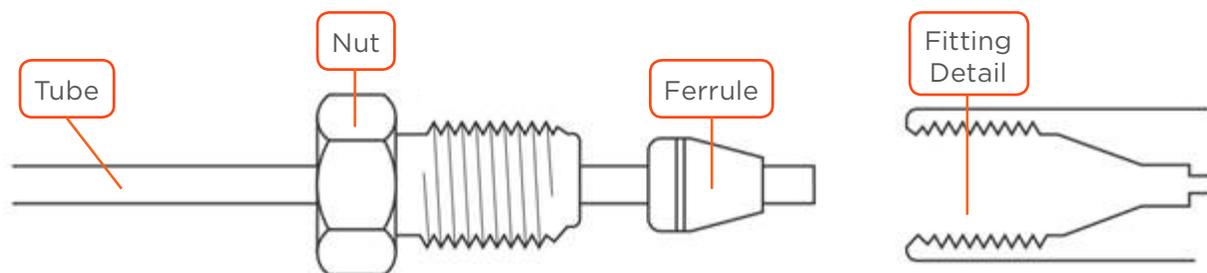
The drain tube connects the drain pan at the bottom of the rotor housing to a waste reservoir. Use a suitable length of polymeric tubing (not supplied). Tube fitting external diameter is 1/4". Connect the tubing to the adapter in front of the drain pan by inserting the tube end onto the SS barbed adapter with a gentle twist motion. Push the tubing as far as required. Put the other end into suitable translucent waste tank to visually control the possible leakages.

## Plumbing Connections

The instrument is shipped with plugs in the inlet and the outlet. Remove the plugs before connecting any tubing.

### Stainless Steel (SS) Fittings Assembly (CPC 1000 PRO Only)

1. Slide the nut and ferrule onto the tubing in the order shown on the figure.
2. Insert this assembly into the fitting detail, screwing the nut in two or three turns by hand.
3. Push the tubing all the way forward into the detail so that it seats firmly. This is essential for a proper Zero Dead Volume connection.
4. Manually turn the nut into the detail until it is finger tight.
5. Using the appropriate open end wrench, turn the nut  $1/4$  turn ( $90^\circ$ ) past the point where the ferrule first starts to grab the tubing. The amount of force required can vary considerably due to the friction between the nut and the threads and the composition and wall thickness of the tubing used. Because of these variables a torque specification is unreliable.
6. Finish plumbing connections by following the instructions for your configuration: [Gilson CPC System \(Standalone\)](#) on page 18 or [Gilson CPC System with PLC Purification System](#) on page 19.



**Figure 5**  
Tubing Assembly with SS Fittings (Vici)



## Gilson CPC System (Standalone)

### INLET

Inlet tubing connects the column inlet to an external pumping system. Use the PEEK 1/16" or 1/8" tubing supplied and cut the suitable length for this connection.

Put a PEEK fingertight or an SS fitting at one end and screw it into the inlet bulkhead union above the ASC/DSC manual valve. Put another PEEK fingertight fitting at the other end and connect it to the outlet of the external pumping system.

### OUTLET

The outlet tubing connects the column outlet to an external device for detection or collection. Use the PEEK 1/16" or 1/8" tubing supplied and cut the suitable length for this connection. If needed, you can use a low-pressure 1/16" tubing made of ETFE or PTFE material (not supplied).

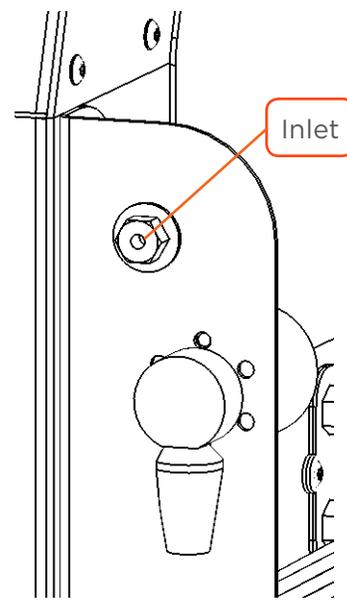
Put a PEEK fingertight or an SS fitting at one end and screw it into the port 5 of the ASC/DSC manual valve. Put another PEEK fingertight fitting at the other end and connect it to the inlet of the external device for detection or collection.

### WASTE

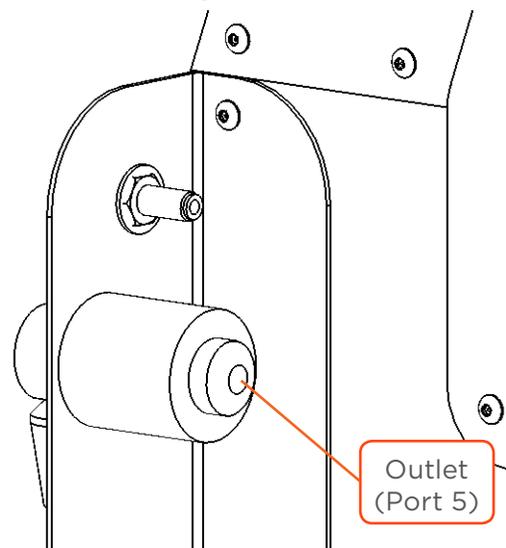
The injection valve is equipped with waste outlets (ports 5 and 6) for liquid outflow that may occur during manual sample loading or manual switching.

The column rotary seals are equipped with waste outlets for liquid outflow that may occur if the seals are damaged.

All of these waste tubings are already connected to the system. Place them in a suitable waste receptacle.



**Figure 6**  
Inlet Tubing Connection



**Figure 7**  
Outlet Tubing Connection

## Gilson CPC System with PLC Purification System

When the backflush ASC/DSC valve is not mounted on the Gilson CPC System, the automatic backflush valve on the PLC Purification System is used. Inlet and outlet tubing connects the column to the automatic backflush (ASC/DSC) valve. The Gilson CPC System is shipped with plugs in the inlet and the outlet. Remove the plugs before connecting any tubing.

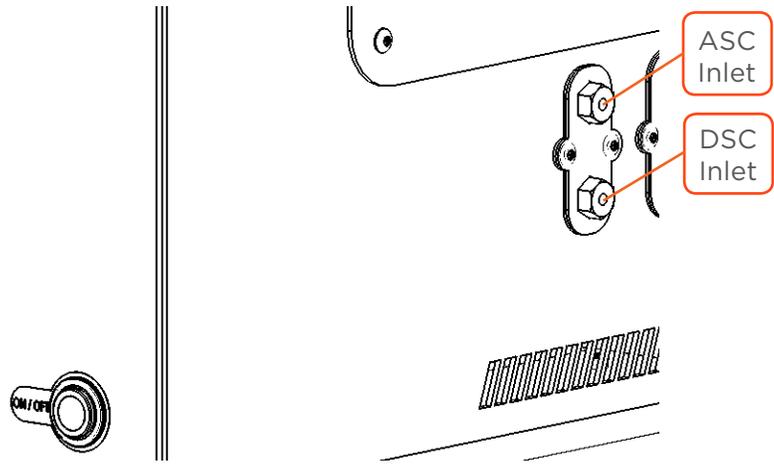
### INLETS

The ASC inlet tubing is used to connect the ASC inlet of the column to the ASC outlet (Port 3) of the backflush valve on the PLC Purification System. The DSC inlet tubing is used to connect the DSC inlet of the column to the DSC outlet (Port 1) of the backflush valve on the PLC Purification System. Cut a suitable length of the supplied PEEK 1/16" or 1/8" (OD) tubing to make these connections.

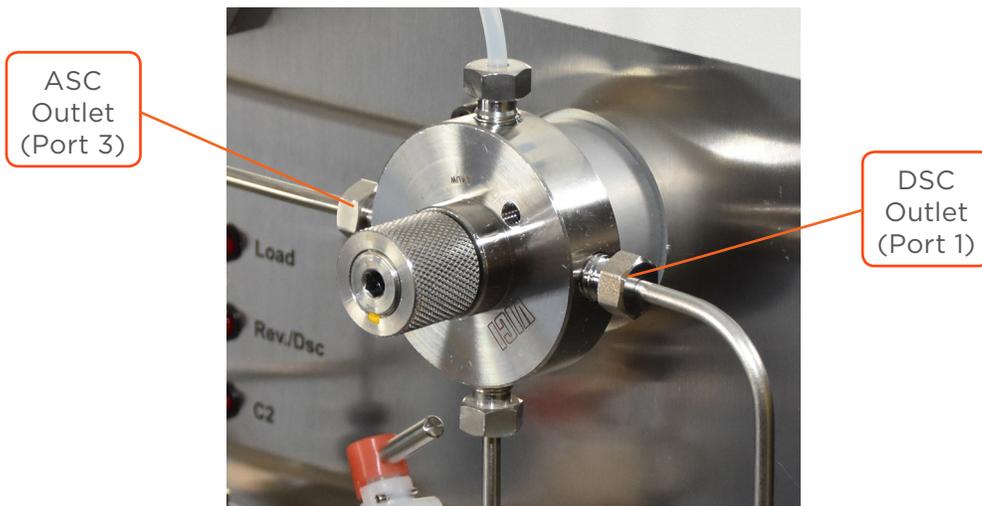
Put a PEEK fingertight or an SS fitting at each end of the ASC inlet tubing. Screw one fitting into the ASC inlet bulkhead union and the other to port 3 of the PLC backflush valve.

Put a PEEK fingertight or an SS fitting at each end of the DSC inlet tubing. Screw one fitting into the DSC inlet bulkhead union and the other to port 1 of the PLC backflush valve.

The ASC and DSC inlets of a Gilson CPC System supplied with a PLC Purification System are located on the right side of the instrument to facilitate the tubing installation.



**Figure 8**  
Inlet Tubing Connections - Gilson CPC System



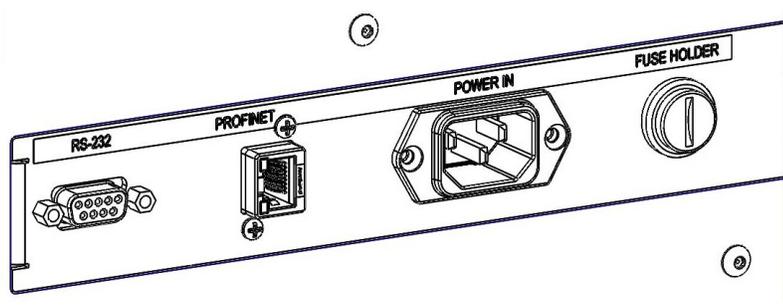
**Figure 9**  
Outlet Tubing Connections (Automatic Backflush Valve on PLC Purification System)



## Electrical Connections

### Right Side Panel Diagram

The Gilson CPC System right side panel includes the connection for RS-232.



**Figure 10**  
Right Side Panel Diagram

### RS-232

When controlled by GGC Software, the Gilson CPC System communicates with a PLC Purification System or with a standard PC via RS-232.

To make the RS-232 connection between the PC and the rotor, use the RS-232 cable supplied.

1. Attach the male end of the RS-232 cable to the RS-232 port located on the right side panel of the Gilson CPC System. Tighten the retaining screws.
2. Attach the female end of the RS-232 cable to the RS-232 serial communication port located on the right side panel of the PLC Purification System, or to the RS-232 serial communication port on the PC. Tighten the retaining screws.

### Profinet

Intended for original equipment manufacturer (OEM) usage (program loading and upgrade).

### Power Connection

The Gilson CPC System is supplied with the appropriate fuses and is ready to operate at the line voltage of the destination country.

To make the power connection, plug the AC power cord into the system power receptacle (POWER IN) and then make the connection between the system and the AC power source.

#### NOTICE

When installing or operating the Gilson CPC System, you must ensure that there is sufficient space to the right side of the instrument to unplug the power cord.

Never use any cabling not supplied or recommended by Gilson. Use of unspecified cabling may lead to improper operation or failure to comply with safety or EMC regulations.



When operating the Gilson CPC System, it must be possible to disconnect it from mains supply at any time. In the event of an emergency, the power connector of the Gilson CPC System must be easily accessible and removable.

The Gilson CPC System must never be operated from a power outlet that has no ground connection. The absence of a ground connection can lead to electric shock or short circuit.

The Gilson CPC System is designed for use with liquids; however, liquid contact with external equipment may lead to the risk of electric shock or short circuit. Ensure that fluidic connections are not close to ancillary equipment and are checked for leaks prior to use. In the event of a leak, any ancillary equipment not designed for use with liquids must be turned off until the liquid is removed.

# OPERATION

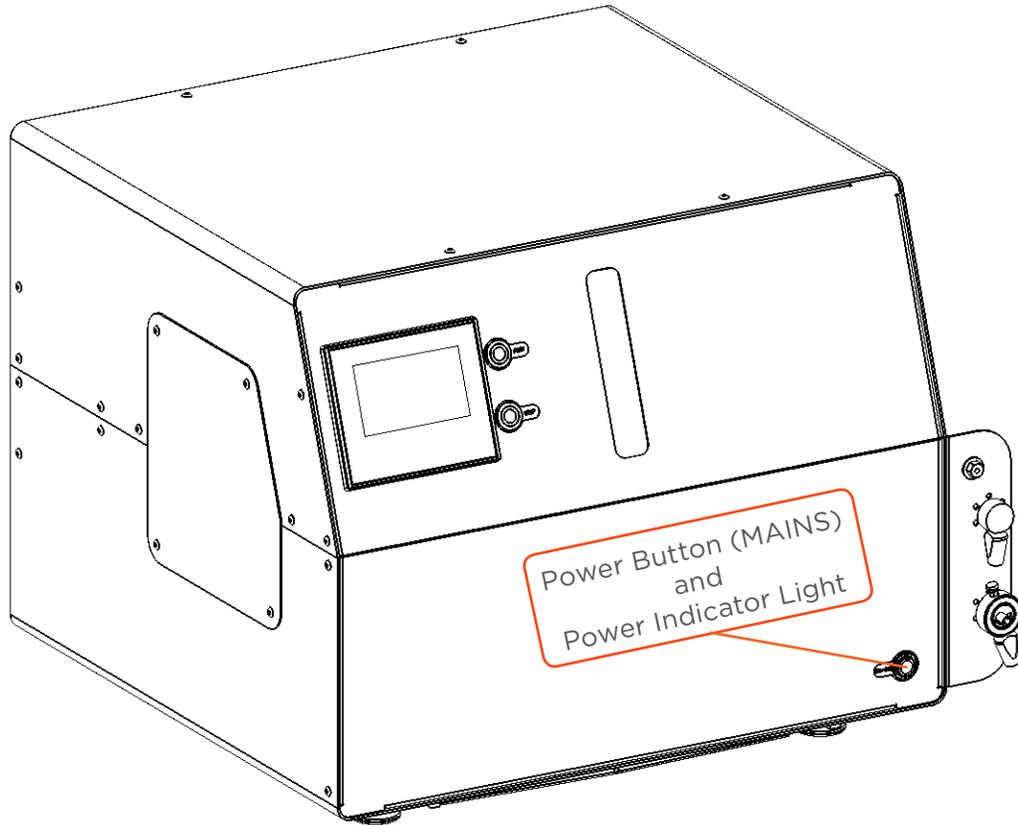
### IN THIS CHAPTER

- Front Panel | 22
- Start Up | 25
- Control the System | 26
- Loop Injection with Manual Valve | 29
- Change the Elution Mode (ASC/DSC) | 30
- Power Down | 31



## Front Panel

The front panel includes the power button with indicator light (lower, right corner), touchscreen (top, left side), four function keys for the touchscreen, and two momentarily illuminated push buttons for **RUN** and **STOP**.



**Figure 11**  
Front Panel Diagram - Power Button and Power Indicator Light



**Figure 12**  
Front Panel Diagram - Display/Touchscreen

## Power Button and Power Indicator Light

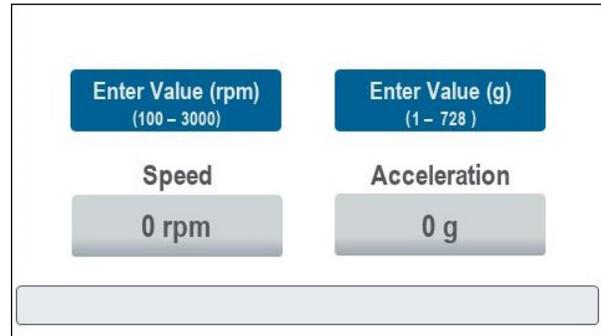
When the power is turned on, the green indicator light inside the power button illuminates.

## Display/Touchscreen

When the Gilson CPC System is used as a standalone unit, the touchscreen enables direct control of the rotors and modification of the working parameters. When the system is controlled with the remote software, the touchscreen is not used and displays the welcome screen.



**Figure 13**  
Touchscreen - Welcome Screen



**Figure 14**  
Touchscreen - Control Interface

### NOTICE

Do not use sharp tools to touch the display. Use your fingers.

## Loading Speed

When pressed, the speed setpoint (or the acceleration setpoint) automatically adjusts to the standard value for rotor loading:

- 500 rpm (or 20 g) for CPC 100 and CPC 250 PRO
- 500 rpm (or 19 g) for CPC 250
- 500 rpm (or 28 g) for CPC 1000 and CPC 1000 PRO

## Elution Speed

When pressed, the speed setpoint (or the acceleration setpoint) automatically adjusts to the standard value for elution:

- 1600 rpm (or 207 g) for CPC 100 and CPC 250 PRO
- 1600 rpm (or 195 g) for CPC 250
- 1200 rpm (or 163 g) for CPC 1000 and CPC 1000 PRO

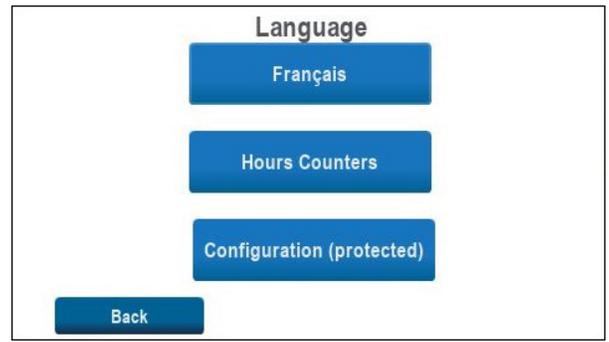


## Menu

Press the **Menu** button below the touchscreen to access the **Menu** screen. The **Menu** screen provides options to change settings for the touchscreen interface, view time counters, or perform troubleshooting actions. Select **Back** to close the **Menu** screen.

## Setup

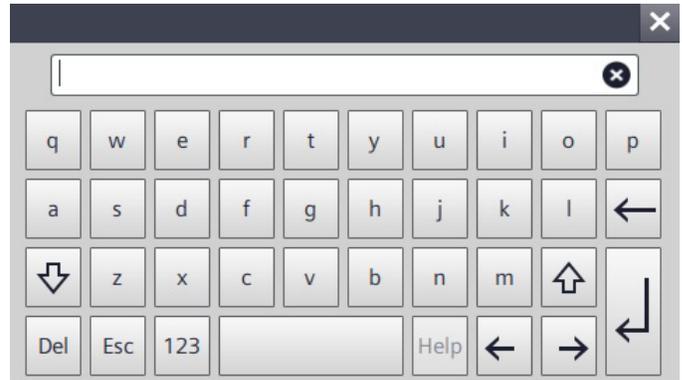
Press the **Setup** button below the touchscreen to access the **Setup Screen**: a **Login Dialog Box** will appear.



**Figure 15**  
Menu Screen



**Figure 16**  
Login Screen



**Figure 17**  
On-screen Keyboard

### NOTICE

Only qualified service personnel or certified Gilson partners may access the Setup Screen. Changing the advanced settings in this menu without Gilson authorization may damage the Gilson CPC System and void the warranty.

## RUN

Press the **RUN** button to the right side of the touchscreen to start the rotor. The button flashes blue while the rotor accelerates, and is fully illuminated when the setpoint is reached.

## STOP

Press the **STOP** button to the right side of the touchscreen to stop the rotor. The button flashes red while the rotor decelerates, and is fully illuminated when the rotor is stopped.

When a hardware error occurs, the stop button flashes rapidly. Refer to [Error Messages](#) on page 46.

## Start Up

Follow the instructions in [Chapter 2 | INSTALLATION](#) to make all right side panel and plumbing connections.



**Do not plug in or switch on the instrument when the protective panels are removed. Starting the rotor without protection may result in serious injury.**

To start/turn on the Gilson CPC System, press the **Power** button on the lower right side of the front panel.

- The green indicator light inside the power button will illuminate.
- The red indicator light inside the stop button will illuminate.
- The touchscreen turns on and displays the Siemens logo. The Programmable Logic Controller initializes. After 30 seconds, the **Welcome** screen appears with the message, **Touch the Screen to Start...**



**Figure 18**  
Touchscreen - Welcome Screen

## Local Control

Touch the screen. The **Control Interface** screen opens.

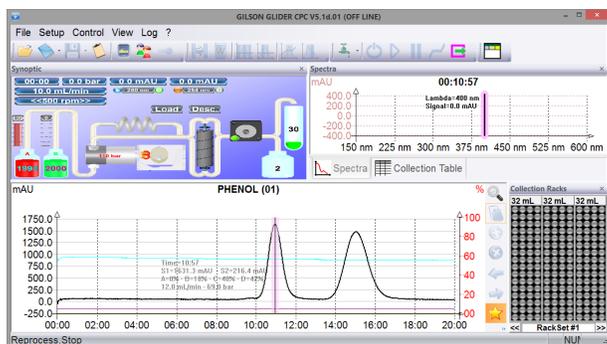
## Remote Control

Do not touch the screen. Turn on the PLC Purification System with embedded GGC Software, and wait for the GGC Software to load.

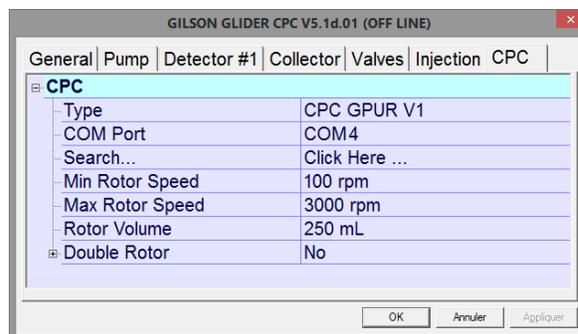
- The message “Under Remote Control” appears on the CPC screen.
- The GGC Software user interface opens on the PLC Purification System screen and communication is established with the Gilson CPC System and other devices, if present. Once the software is loaded, several graphics will appear, displaying in real time the status of the instrument and related components.



**Figure 19**  
Gilson CPC System Under Remote Control



**Figure 20**  
Gilson Glider CPC (GGC) Software Control Screen



**Figure 21**  
Gilson Glider CPC (GGC) Software System Configuration Screen



## Control the System

This section explains how to control a Gilson CPC System used as standalone unit. After the instrument is powered on and the control interface opened, use the built-in touchscreen and buttons to control the rotor.

### Operating Conditions

Load the columns with stationary phase at a rotation speed of 500 rpm and perform extrusion (i.e., stationary phase pumping step) at the same rotation speed used for elution (i.e., mobile phase pumping step). Maximum rotation speeds are described in the table below.

SYSTEM	MAXIMUM RECOMMENDED OPERATING SPEED	MAXIMUM POSSIBLE SPEED (EXCEPTIONAL OCCURRENCES ONLY)*
CPC 100 CPC 250 CPC 250 PRO	2000 rpm	3000 rpm
CPC 1000	1200 rpm	1500 rpm
CPC 1000 PRO	1500 rpm	2000 rpm

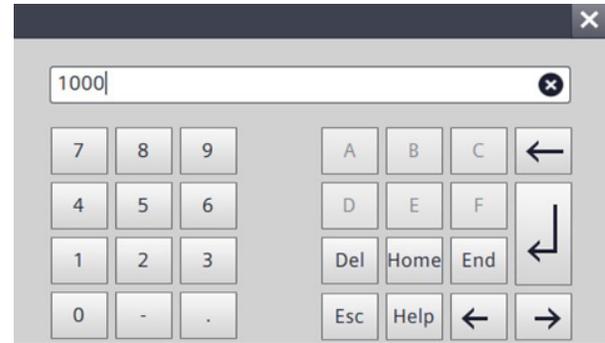
\*These speeds are strongly not recommended for intensive use

## Start the Rotor

- Enter the speed setpoint or acceleration setpoint to a value for your application using one of the following options:
  - Select the **Setpoint** field to open the on-screen keypad, and then enter the desired value. Touch ↵ to accept the value and close the on-screen keypad.
  - Press the **Loading Speed** button below the touchscreen. When entering the setpoint, refer to [Speeds and Accelerations](#) on page 28.



**Figure 23**  
Loading Speed Setpoint



**Figure 22**  
On-Screen Keypad



**Figure 24**  
Rotor Status

- Press the **Elution Speed** button below the touchscreen.
- Press the **RUN** button next to the touchscreen:
    - The rotor starts, and then the **RUN** button flashes blue.
    - The **Speed** indicator provides the current speed of the rotor and the **Acceleration** indicator provides the current acceleration of the rotor.
    - A progress bar at the bottom of the screen shows the current status of the rotor. When the setpoint is reached, the progress bar is full and the **RUN** button illuminates blue.

The setpoint can be modified at any time while the rotor is spinning by modifying the **Setpoint** field or by pressing the **Loading Speed** or **Elution Speed** button. The modification takes effect immediately and the **RUN** button flashes. The progress bar adjusts to the new setpoint. If the setpoint is lower than the current speed, a right arrow appears at the end of the progress bar.

### NOTE

Drops may appear on the window during rotation. This originates from greasing during the manufacturing process and does not affect CPC operations.



## Setpoints and Limits

The minimum and maximum setpoints for speed and acceleration are indicated on the **Control Interface** screen. Refer to the table below for these limits and the pre-registered values for the **Loading Speed** and **Elution Speed** buttons:

### Speeds and Accelerations

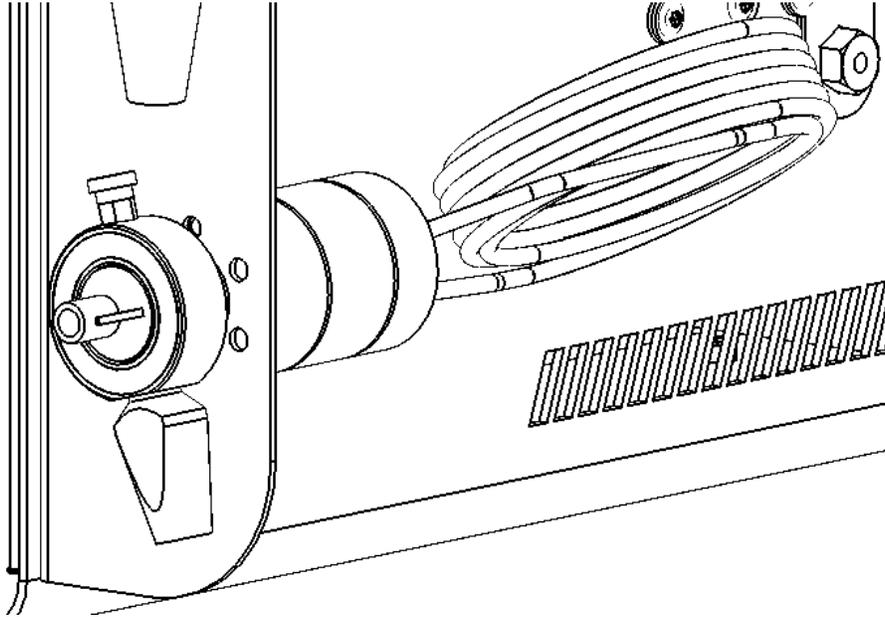
SYSTEM	LOADING SPEED (SETPOINT)	ELUTION SPEED (SETPOINT)	SPEED RANGE
	LOADING ACCELERATION	ELUTION ACCELERATION	ACCELERATION RANGE
CPC 100	500 rpm 20 g	1600 rpm 207 g	100 to 3000 rpm 1 to 728 g
CPC 250	500 rpm 19 g	1600 rpm 195 g	100 to 3000 rpm 1 to 685 g
CPC 1000	500 rpm 28 g	1200 rpm 163 g	100 to 1500 rpm 1 to 254 g
CPC 250 PRO	500 rpm 20 g	1600 rpm 207 g	100 to 3000 rpm 1 to 729 g
CPC 1000 PRO	500 rpm 28 g	1200 rpm 163 g	100 to 2000 rpm 1 to 452 g

## Stop the Rotor

To stop the spinning rotor at any time, press the **STOP** button, which will flash red as the rotor slows. The indicators on the screen and the progress bar show the deceleration of the rotor. When the rotor is completely stopped, the **STOP** button illuminates red.

## Loop Injection with Manual Valve

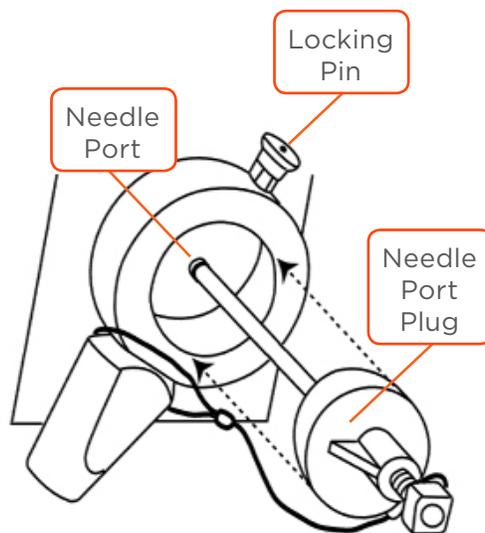
When mounted on the Gilson CPC System, use the six-way manual loop injection valve to load the sample into the sample loop and inject it onto the column. This action can be done at any time while the pumps are pumping and the rotor is spinning.



**Figure 25**  
Manual Loop Injection Valve with 10 mL Loop

**CAUTION**

Mobile phase spray from the needle port may occur when the valve is turned from the INJECT to LOAD position. Use the needle port plug, attached to the handle assembly, to shield yourself from this potential spray.



**Figure 26**  
Manual Injection Valve - Needle Port

**NOTICE**

Pass the sample solution (i.e., sample + solvent) through a filter with a rating of 10 micron or less. This prevents particle accumulation, which can negatively impact system performance (e.g., clogging of fluidic paths, premature wear of consumables).

Rinse the valve with water after using buffer solutions to prevent crystals from forming, which can cause scratches on the rotor seal of the valve.

To inject the sample into the column:

1. Rotate the manual injection valve handle to the LOAD position.
2. Fit the large-bore syringe needle (supplied) on a syringe and fill it with the desired volume of sample.
3. Pull the locking pin to unlock and remove the needle port plug.
4. Insert the syringe with the needle into the needle port and load the sample into the sample loop. Any surplus will flow through the waste tubing (Port 6).
5. Switch the valve from the LOAD to INJECT position with a 60° rotation of the handle.
  - The sample is pumped into the fluid path and pushed into the chromatographic column via the mobile phase used.

**NOTE**

Refer to the “Operating Instructions” for more explanations of the manual sample injector.

When the Gilson CPC System is coupled with a PLC Purification System, there is no injection valve on the Gilson CPC System. The injection process is performed on the PLC Purification System, manually or automatically depending on the injection valve model, and managed by the GGC Software.

## Change the Elution Mode (ASC/DSC)

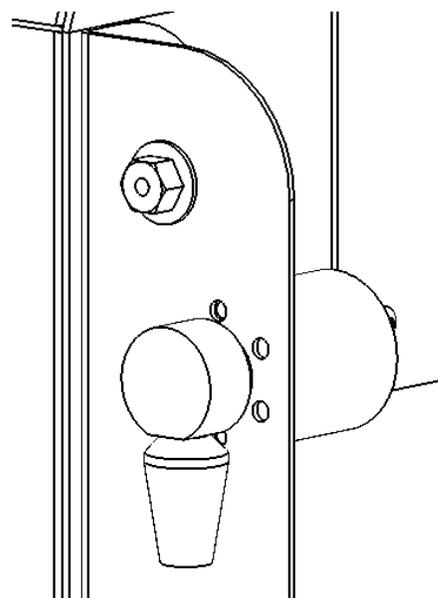
When the manual backflush valve is mounted on the Gilson CPC System, use this valve to manually change the elution mode ascending (ASC) mode or descending (DSC) mode.

**NOTICE**

Do not switch the manual backflush valve while the pump is running as internal damage may occur due to a sudden overpressure.

To change the elution mode, switch the valve from ASC to DSC position or inversely (60° rotation of the handle).

When the Gilson CPC System is coupled with a PLC Purification System, there is no backflush valve on the Gilson CPC System. The elution mode changing is automatically performed on the PLC Purification System with the automatic backflush (ASC/DSC) valve, and managed by GGC Software.



**Figure 27**  
Backflush ASC/DSC Valve



## Power Down

1. Stop the rotor and the running method.
2. Wait for the rotor to stop.
3. Close the GGC Software (if using remote control).
4. Press the **Power** button on the lower right side of the front panel to turn off the instrument.
  - The green indicator light inside the **Power** button will switch off.
  - The red indicator light inside the **STOP** button will switch off.
  - The touchscreen turns off.



# MAINTENANCE

### IN THIS CHAPTER

- Helpful Hints | 34
- Cleaning and Decontamination | 34
- Maintenance Schedule | 36
- Replace a Seal in a Column Rotary Seal | 37

This chapter describes actions that should be performed on a routine basis to ensure the long-term, safe, and trouble-free operation of the Gilson CPC System. The frequency of the maintenance activities is dependent on the nature of the application, such as the solvents used, the volume of the mobile phases delivered by the pump, the level of cleanliness of the facility, etc. The system has been designed for reliability and needs very little routine maintenance when operated correctly.

When performing the maintenance described in this chapter, use good laboratory practice (GLP), 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.



## Helpful Hints

To keep the system at optimal performance, Gilson recommends the following:

- Follow the preventative [Maintenance Schedule](#) on page 36.
- Do not start the rotor without fluid in the system as this may prematurely wear the seals.
- Do not leave buffer in the system. Doing this may cause blockages and wear of the seals.
- Run a clean and appropriate solvent through all fluid paths before storing the system.
- Clean the valves if the system has not been used for a while.
- Wipe up all spills immediately.
- Allow liquids to equilibrate to room temperature before running them through the system; cold liquids may cause leakage.

## Cleaning and Decontamination

### Exterior

The Gilson CPC System should be cleaned occasionally using a dry, clean cloth. If necessary, use a cloth dipped in soapy water. If liquid is accidentally spilled on the Gilson CPC System, wipe it up immediately. If a contamination is suspected, the external surfaces of the instrument should be wiped down with laboratory detergent (alkaline), rinsed with water, and then wiped down with a 10% ethanolic (or IPA) aqueous solution (v/v) to remove any residue.

### Drain Pan

In case of leakage through the drain tube, follow the instructions below:

1. Stop the rotor and the pumping system.
2. Determine the source of the leakage and eliminate it.
3. Disconnect the drain tube and then flush it.
4. Remove the drain pan and then empty, clean, and decontaminate it.
5. Reinstall the drain pan and the drain tube.

## Column and Fluid Path

Depending on your use of the Gilson CPC System, it may be necessary to flush the entire fluid path. It is important to clean the column and the fluid path if you won't be using the system for a while or if you're using a solution with a high salt concentration for a wash or as a diluent. Refer to the instructions below:

- Prime the fluid path with distilled or deionized water, or with a solution adapted to your use of the Gilson CPC System (solvent system, injected sample, etc.).
- Flush the column and fluid path with an alcohol/water mixture, ratio between 30/70 up to 100/0 (v/v) for 1.5 x column volume. Flush the column with the rinsing mixture at 500 rpm in ASC mode. The flow rate depends on the CPC column size. Refer to the table below to know the column rinsing parameters. After rinsing, the solvent eluted from the column is expected to be colorless (i.e., the same color the solvent was when loaded on to the column); if the eluate is tinted, or visibly contains residual sample, the rinsing procedure must be repeated. The fluid path has now been cleaned appropriately for weekend storage (or longer).

### Typical Parameters for Column Rinsing

SYSTEM	MINIMUM VOLUME (1.5 X COLUMN VOLUME)	FLOW RATE	ROTATION SPEED
CPC 100	150 mL	50 mL/min	500 rpm
CPC 250	375 mL	50 mL/min	500 rpm
CPC 250 PRO	375 mL	100 mL/min	500 rpm
CPC 1000	1500 mL	100 mL/min	500 rpm
CPC 1000 PRO	1500 mL	500 mL/min	500 rpm

#### NOTICE

Before running an application, prime and flush the fluid path with distilled or deionized water and with the solvents for the application.

#### WARNING



Potentially hazardous chemicals can be used with the system. Use care when handling chemicals and wear appropriate PPE. Handling toxic, flammable, and hazardous chemicals can lead to health and safety risks.



## Maintenance Schedule

Gilson recommends performing periodic inspection and maintenance of components of Gilson CPC System to ensure operational performance. The recommended inspection and maintenance periods are listed below, but are only general guidelines. The frequency of the maintenance will vary depending on the system usage and type of sample injected.

**NOTICE**

Follow all guidelines listed in this table to avoid damaging the Gilson CPC System.

### Maintenance Schedule

OPERATION	FREQUENCY
Verify the cleanliness of all liquid containers.	Daily
Clean all parts in contact with solvents or samples with suitable solutions. Rinse thoroughly using a mix of water and alcohol. > Perform maintenance any time an aqueous solution with strong buffer is used.	As needed
Check the suitable tightening of fittings and the proper state of tubing (not kinked, damaged, etc.). > Perform maintenance any time solvent leaks or air bubbles are observed.	Weekly
Check that the fans are operational.	Monthly
Replace the tubing and associated fittings (except the preformed, stainless steel tubing). Replace damaged tubing and fittings any time damage is observed.	Yearly
Replace the column rotary seals. Refer to <a href="#">Replace a Seal in a Column Rotary Seal</a> on page 37. > Perform maintenance if solvent leakage is detected or observed through a waste outlet.	As needed

## Replace a Seal in a Column Rotary Seal

### NOTICE

The life of the seals is dependent on the flow rate, pressure, type of liquids used and temperature used in the instrument, but mostly on the cleanliness of the mobile phase and sample. The presence of micro-particles will cause accelerated wear and tear of the seals. Similarly, any dried buffer particles on the piston will damage the seal.

### WARNING

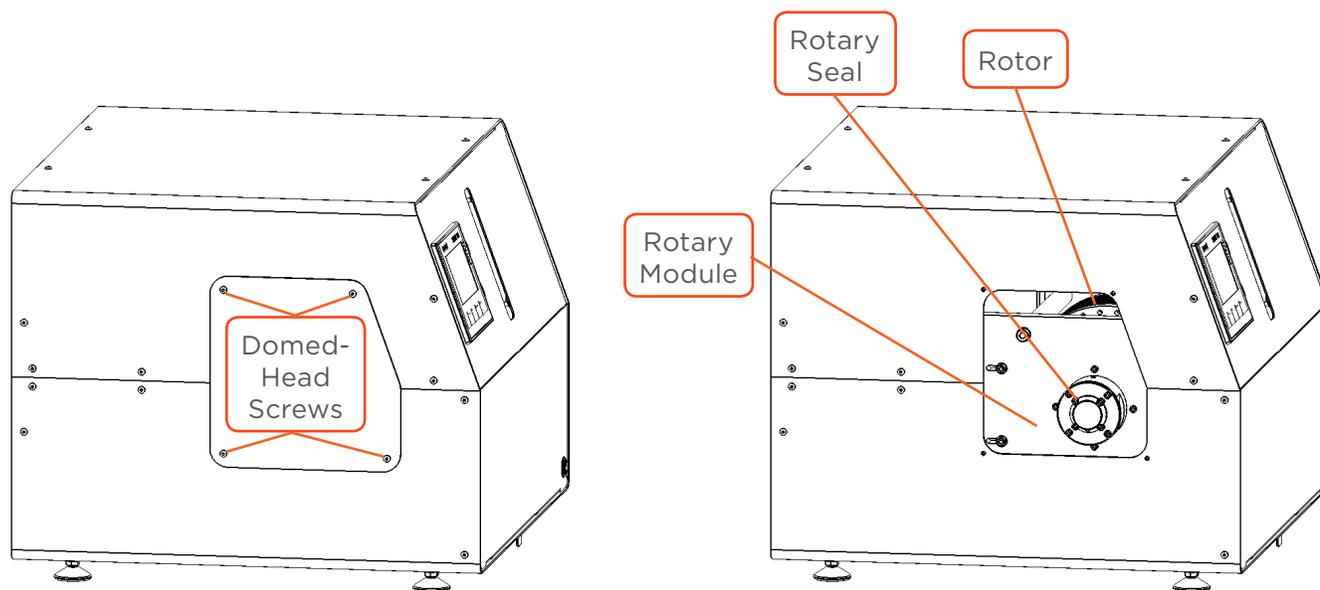
Do not plug in or switch on the instrument when the protective panels are removed. Starting the rotor without protection may result in serious injury.

When disassembling or reassembling a column rotary seal, make sure that each component is clean and take care that the system is assembled in a clean environment.

There are four seals: one on each head, and one on each cleaning disc.

To access and replace a rotary seal, follow the instructions below:

1. Purge the system with a suitable solvent.
2. Press the **STOP** button to stop the rotor and then wait for the rotor to stop rotating (at least two minutes for a normal stop or at least four minutes in case of power outage). Ensure that the rotor is stopped by viewing it through the front window.
3. Remove the side panel of the system by removing the four domed-head screws with a 2.5 mm Allen wrench. Do not remove other external panels.



**Figure 28**

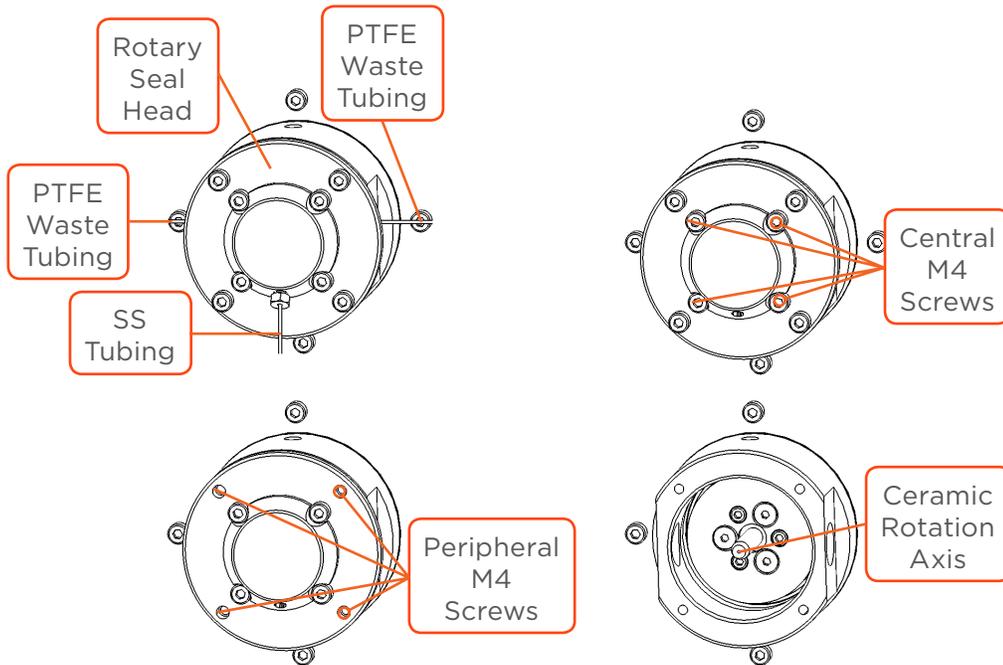
Column Rotary Seal Access

4. Disconnect the SS tubing from the head of the rotary seal with a 1/4" or 3/8" spanner (SS nut).
5. Disconnect the PTFE waste tubing from the sides of the cleaning disc with a 1/4" spanner (SS nuts).
6. Loosen without pulling out the four central M4 screws of the rotary seal in an alternating criss-cross pattern with a 3 mm Allen wrench (only one turn counter-clockwise).



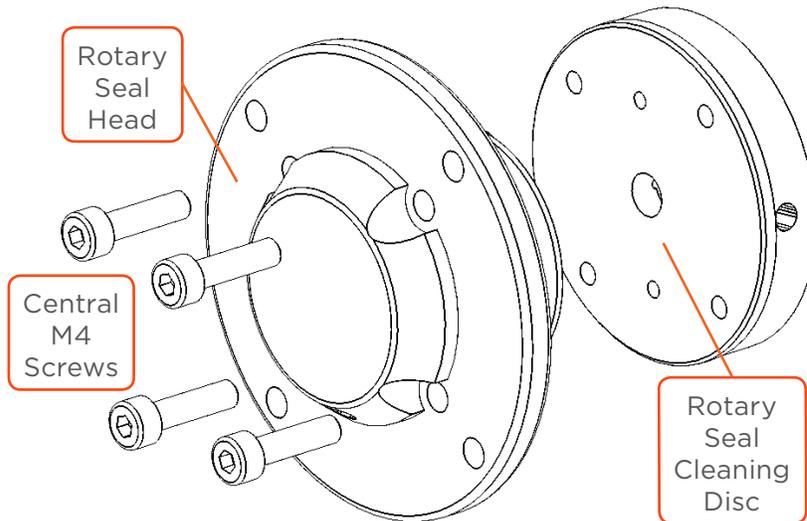


7. Loosen the four peripheral M4 screws of the rotary seal in an alternating criss-cross pattern with a 3 mm Allen wrench and consecutively pull out the four screws.
8. Carefully remove the head together with the cleaning disc. The ceramic rotation axis will be visible.



**Figure 29**  
Rotary Seal Assembly Removal

9. Once the rotary seal head and cleaning disc are removed, loosen the four central M4 screws with a 3 mm Allen wrench to disassemble the head and the cleaning disc.



**Figure 30**  
Rotary Seal Assembly

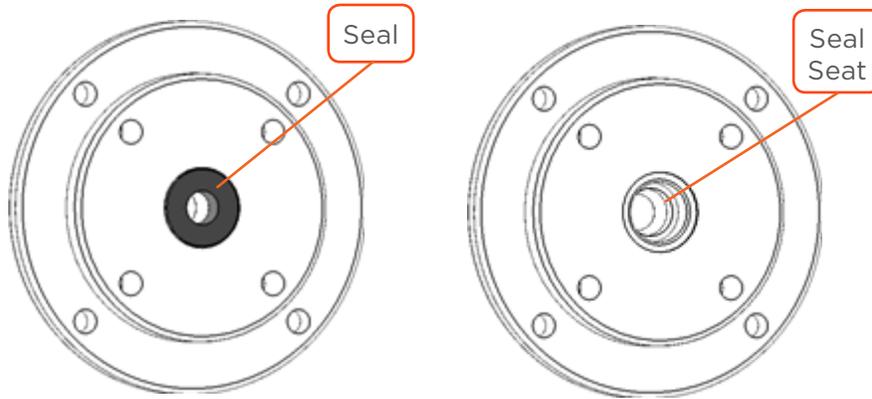
**NOTE**

Note the positioning of the holes for tubing connection on the head and cleaning disc before disassembling.

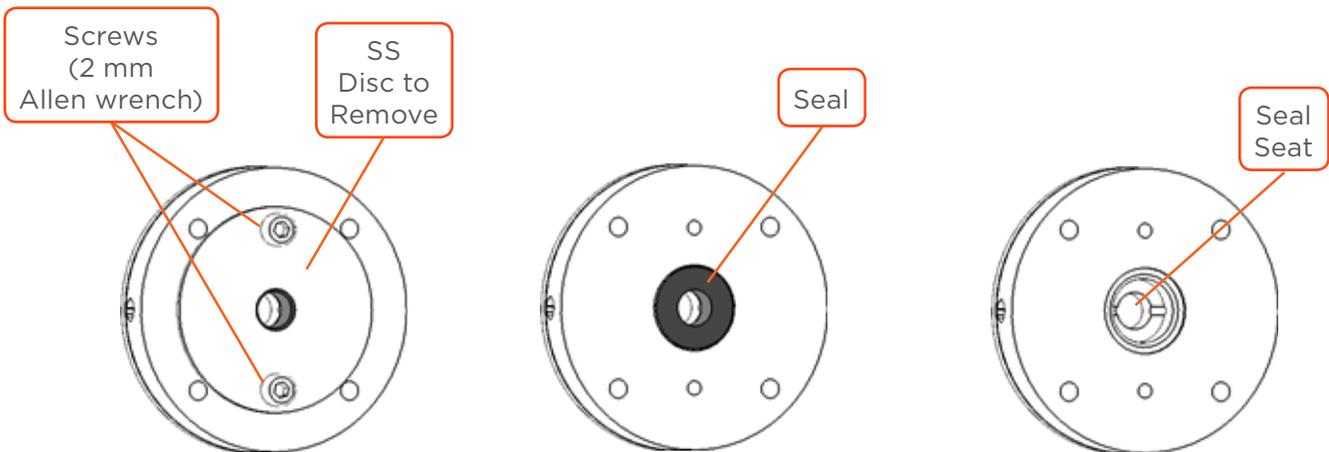
10. Carefully remove the old seal from the head and/or the cleaning disc. To access to the cleaning disc seal, the SS disc must be removed (two M3 screws with a 2 mm Allen wrench).

**NOTICE**

Do not score the seat of the seal. If the seat is scored, it is necessary to replace the rotary seal head or the cleaning disc (not under warranty).



**Figure 31**  
Back Rotary Seal Head

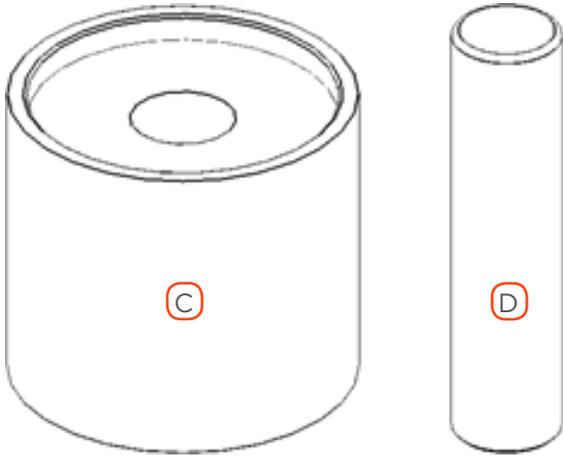


**Figure 32**  
Back Rotary Seal Cleaning Disc

11. Thoroughly clean the seal seat with Isopropyl Alcohol (IPA) or ethanol to remove possible worn seal particles, and then immerse the new seal in IPA for lubrication.
12. Align the new seal over the seal seat of the head or cleaning disc.

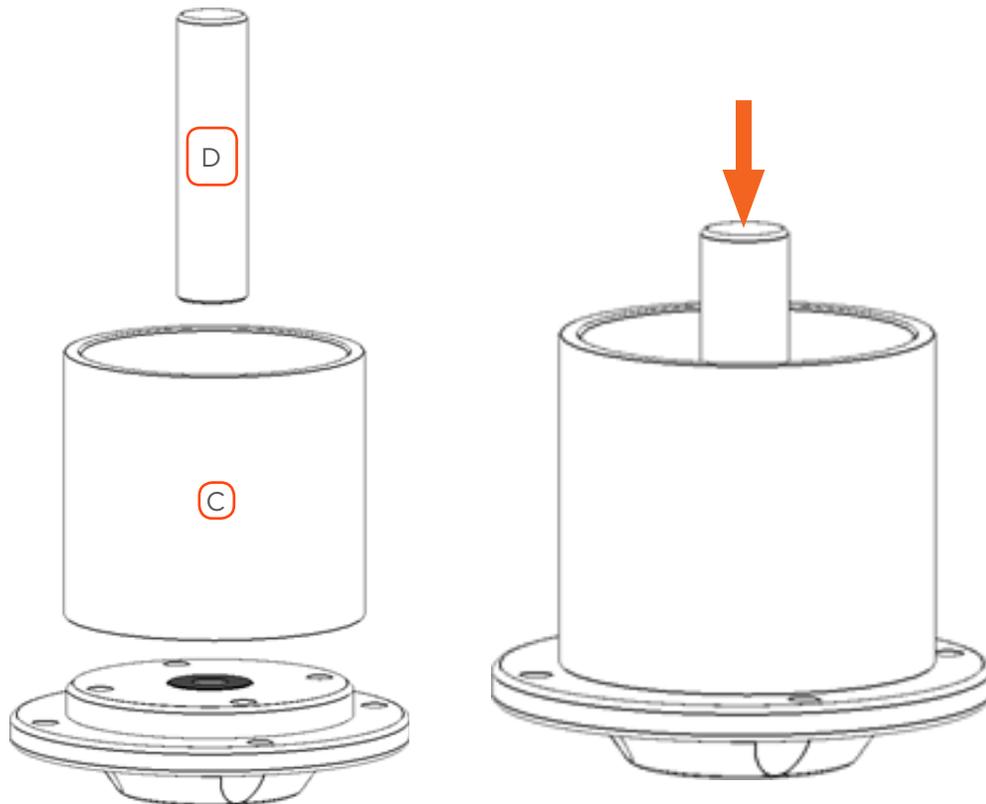


13. Use the CPC seal insertion tool, C and D, pictured below.



**Figure 33**  
Tool for Column Seal Insertion

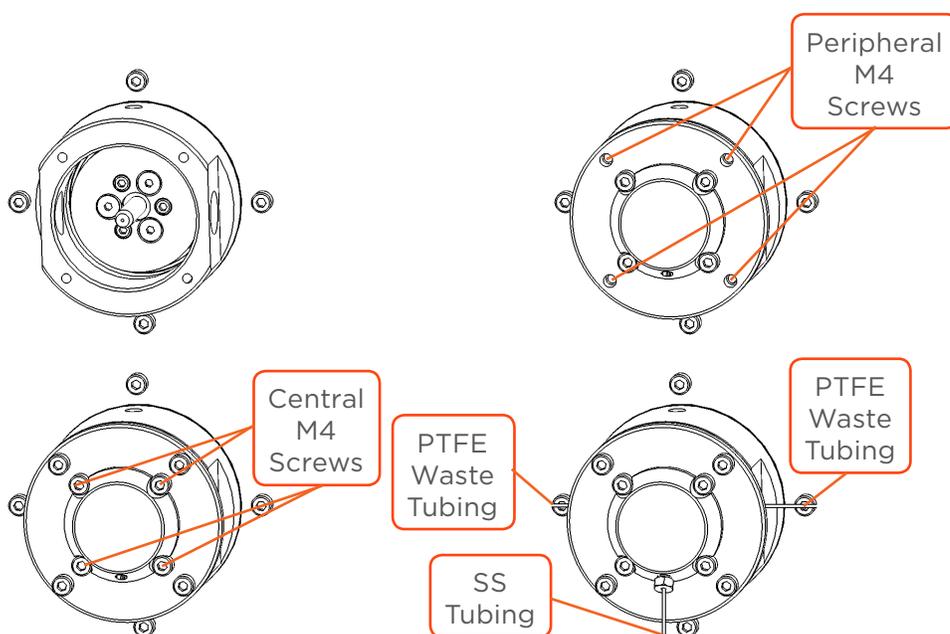
14. Position part C over the back rotary seal head or the back cleaning disc and slip part D into C.
15. Briskly push part D with the palm of your hand, inserting the seal into position.



**Figure 34**  
Column Seal Seating Instructions

16. Remove the tool and examine the seal to ensure it is properly placed.

17. Reassemble the head and cleaning disc together by screwing the four central M4 screws with a 3 mm Allen wrench, but do not tighten completely. Take care that the holes for tubing connection on the head and cleaning disc are properly placed. Tighten screws until contact and unscrew one turn. The cleaning disc should be free of movement. Ensure the SS disc of the cleaning disc is properly fixed (two M3 screws with a 2 mm Allen wrench).
18. Clean the ceramic rotation axis rod with alcohol to remove possible worn seal particles.
19. Replace carefully the rotary seal onto the rotation axis. Appropriate alignment can be verified by checking that the hole for the fitting on the head is at the bottom.
20. Replace the four peripheral screws of the rotary seal. Tighten slowly in an alternating criss-cross pattern with a 3 mm Allen wrench. This allows for proper positioning of the head.
21. Tighten slowly the four central screws in an alternating criss-cross pattern with a 3 mm Allen wrench. This allows for proper positioning of the cleaning disc.
22. Reconnect the tubing and fittings.



**Figure 35**  
Rotary Seal Reassembly

23. Start the pumping system and increase progressively the pressure/flow rate to check the absence of leakage. (Gilson CPC System turned off.)
24. Reattach the cover and side panels of the rotor housing.
25. Turn on the instrument, open the **Menu** screen and then the **Hours Counters** screen. Press **Reset** below the **Seals** field to reset the counter and close the **Menu** screen.

**NOTE**

When the Gilson CPC System is used for the first time, or after replacing a seal of the rotary seal assembly, black particles may appear in the waste and fraction collector vessels. This is expected and will go away with continued use.



# TROUBLESHOOTING

## IN THIS CHAPTER

- Troubleshooting Table | 44
- Error Messages | 46
- Repair and Return Policies | 47



## Troubleshooting Table

The following table details some basic symptoms, possible causes, and potential solutions for issues related to Gilson CPC System. If the problem persists after all remedies have been attempted, contact Gilson customer service. Refer to [Customer Service](#) on page 14.

### Fluidics and Pumping

SYMPTOM(S)	POSSIBLE CAUSES	SOLUTIONS
Leakage or air bubbles	The fittings are not sufficiently tightened	Tighten the fittings
Abnormal overpressure	<ul style="list-style-type: none"><li>• Improper state of tubing or fitting</li><li>• The fluid path is partially or totally blocked</li></ul>	<ul style="list-style-type: none"><li>• Determine the overpressure location by isolating different parts of the fluid path</li><li>• Check the state of tubing</li><li>• Replace the tubing, if damaged</li><li>• Clean the fluid path. Refer to <a href="#">Cleaning and Decontamination</a> on page 34</li></ul>
Leakage near the rotary seals heads or cleaning discs	Worn seals	Replace the seals. Refer to <a href="#">Replace a Seal in a Column Rotary Seal</a> on page 37
Leakage near a high-pressure valve	<ul style="list-style-type: none"><li>• The fittings are not sufficiently tightened</li><li>• Improper state of tubing or fitting</li><li>• The fluid path is partially or totally blocked</li></ul>	<ul style="list-style-type: none"><li>• Tighten the fittings and check the state of the tubing</li><li>• Replace the fittings and/or tubing, if damaged</li><li>• Clean the valve and the fluid path. Refer to <a href="#">Cleaning and Decontamination</a> on page 34</li></ul>

## Mechanical, Communications, and Electrical

SYMPTOMS	REASON	SOLUTIONS
Rotor abnormally noisy or abnormally unbalanced while spinning	An internal part is damaged	<ul style="list-style-type: none"> <li>• Stop the rotor</li> <li>• Open the <b>Menu</b> screen to check the <b>Hours Counters</b> screen</li> <li>• Contact your local Gilson representative</li> </ul>
Gilson CPC System does not switch on	The Gilson CPC System is not supplied with voltage	<ul style="list-style-type: none"> <li>• Check the AC power source</li> <li>• Try a different AC outlet</li> <li>• Check the AC power cord</li> <li>• Check the fuses and replace, if necessary</li> </ul>
Gilson CPC System does not respond to GGC Software	<ul style="list-style-type: none"> <li>• Incorrect configuration</li> <li>• No communication</li> <li>• Loss of communication</li> <li>• Electronic failure</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure the power is turned on</li> <li>• Check cabling connections</li> <li>• Unplug and then reconnect the RS-232 cable</li> <li>• Restart the Gilson CPC System</li> <li>• Restart the PLC Purification System</li> </ul>
Driver Errors “Over Speed (Error 7)” or “Braking Overload (Error 14)” occurs	Incorrect firmware	Contact your local Gilson representative to upgrade the firmware (SD card required)
<ul style="list-style-type: none"> <li>• Rotor does not start</li> <li>• Inopportune rotor stop</li> <li>• <b>STOP</b> button flashes rapidly</li> <li>• “Driver Error” is displayed on the screen</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect initialization of an internal device</li> <li>• No communication with an internal device</li> <li>• Loss of communication</li> <li>• Electronic failure</li> </ul>	<ul style="list-style-type: none"> <li>• If the system was “Under Remote Control”, press the <b>STOP</b> button for 2 seconds to access the control interface, and then open the <b>Menu</b> screen to perform a <b>Driver Reset</b></li> <li>• Restart the instrument</li> </ul>





## Error Messages

When a Driver Error occurs, the red **STOP** button light flashes rapidly on the front panel of the instrument and the error number appears on the front panel display. For assistance with resolving an error, contact your local Gilson representative. Refer to the table below for the error text.

ERROR	ERROR TEXT
1	Over Voltage
2	Lower Voltage
3	Over Intensity
4	Resolver Alarm
5	Motor PTC Alarm
6	Over Converter Temperature
7	Over Speed
14	Braking Overload
22	Over Ambient Temperature

## 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 left side of the Gilson CPC System
- 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 packaging 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](http://www.gilson.com) for directions and information on the end-of-life policy. This is in accordance with the European Union Directive on Waste Electrical and Electronic Equipment (WEEE).





# Appendix A

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## WARRANTY

### General

A Gilson CPC System is under warranty to be free from defects in material or workmanship under normal use within the instrument specifications indicated in this user's guide and under conditions given below.

The warranty period is one year from the date of initial shipment of the manufacturer. Note that it does not apply to the instrument if modified by the user or resold without permission from the manufacturer, nor to consumable parts after limited warranty expiration, nor to any failure of lifetime-expired parts. Refer to [Repair and Return Policies](#) on page 47.

The warranty is void in the following cases:

- Failure due to incorrect installation
- Failure due to using the incorrect AC power supply
- Failure due to mechanical force applied to the unit
- Failure due to improper handling by the user or an individual not authorized to operate the equipment
- Failure due to the use of improper spare parts or hardware
- Damage to the software, data, or hard disk due to a PC virus infection
- Corrosion of cabinet caused by leakage of solvent or samples
- Corrosion of electronic parts caused by highly corrosive atmospheric gas
- Failure due to the disassembly, modification, relocation, or transport after initial installation
- Failure due to the disconnection of main power without taking the specified normal shutdown procedure
- Failure due to the disregard of safety regulations
- Failure due to not following the maintenance schedule
- Failure due to acts of nature

#### NOTICE

Gilson is not responsible for any damage caused by improper use of the system, improper maintenance, unauthorized modifications or failure to comply with the procedures detailed in Gilson documentation



## Limited Warranty

### Fittings and Tubing

#### TERMS OF USE

- Normal tightening of fittings
- Use of clean solvents and containers
- Proper positioning, according to the instructions in this guide

#### DAMAGES NOT COVERED

- Damaged threads caused by improper tightening
- Blocked flow paths caused by improper installation or unsuitable mobile phases
- Bent or cut tubing caused by improper positioning

### Valves

#### TERMS OF USE

- Normal tightening of fittings
- Use of clean solvents and containers
- Following the preventative maintenance schedule

#### DAMAGES NOT COVERED

- Damaged parts or crushed internal parts caused by improper tightening
- Blocked flow paths caused by improper installation or unsuitable mobile phases

# REPLACEMENT PARTS AND ACCESSORIES

**CAUTION**

All items listed must only be supplied by Gilson or an agent thereof. Use of alternate parts may lead to improper operation of the system or failure to comply with safety or EMC regulations.

**NOTICE**

The manufacturer's declaration of conformity becomes invalid if the user modifies the original product or installs additional components.



## Couplers and Adapters

PART NUMBER	DESCRIPTION
49041131	Back pressure regulator, PEEK, 20 psi
49041132	Back pressure regulator, PEEK, 100 psi
49060022	Reducer, 5/16-24 to 10-32, 1 mm bore
21040165	Bulkhead union, SS, 1/16"
21040164	Bulkhead union, SS, 1/8"

## Fittings

PART NUMBER	DESCRIPTION
490410120	Finger-tight fitting, PEEK for 1/16" tubing
21040193	Ferrule, ETFE for 1/8" tubing (qty. 10)
21040198	Ferrule, SS for 1/16" tubing (qty. 10)
21040200	Ferrule, SS for 1/8" tubing (qty. 10)
21040194	Nut, PEEK, short for 1/8" tubing
21040195	Nut, PEEK, long for 1/8" tubing
21040197	Nut, SS for 1/16" tubing (qty. 10)
21040199	Nut, SS for 1/8" tubing (qty. 10)
21041002	Plug, PEEK, 10-32

## Miscellaneous

PART NUMBER	DESCRIPTION
21041003	Fuse, 3.15 A, H 250 V-
21040150	Fuse, 6.3 A, H 250 V-
21040160	Serial RS-232 cable male/female



### Rotor/Column

PART NUMBER	DESCRIPTION
21041004	Ceramic rotation axis 6.35 x 44.50 mm + kit, CPC rotary seal
21041005	Seal, 6.35 mm, CPC rotary seal
21041006	Tool for seal insertion, CPC rotary seal

### Sample Loops

PART NUMBER	DESCRIPTION
21041007	Sample loop, 1 mL CPC System, 1/8"
21041008	Sample loop, 2 mL CPC System, 1/8"
21041009	Sample loop, 5 mL CPC System, 1/8"
21041010	Sample loop, 10 mL CPC System, 1/8"
21041011	Sample loop, 20 mL CPC System, 1/8"
21041012	Sample loop, 30 mL CPC System, 1/8"
21041013	Sample loop, 40 mL CPC System, 1/8"
21041014	Sample loop, 50 mL CPC System, 1/8"

### Tubing

PART NUMBER	DESCRIPTION
21040138	ETFE, 1/8" OD, 1.6 mm ID, 1 meter
21040105	PEEK, 1/16" OD, 0.75 mm ID, 1 meter
21040106	PEEK, 1/8" OD, 2.0 mm ID, 1 meter
21040171	SS, 1/16" OD, 1.0 mm ID, 1 meter
21040140	SS, 1/8" OD, 2.1 mm ID, 1 meter



### Valves

PART NUMBER	DESCRIPTION
21041017	Manual ASC/DSC valve
21041018	Manual Loop Injection Valve
21041019	Needle, 16GA, SS for Manual Loop injection valve
21041020	Rebuild kit for Manual Loop injection valve

# Appendix C

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## MATERIALS

### Liquid Contact Materials

The information provided in the following table is accurate to the best of our knowledge and belief, but it is intended for general information only (classified by alphabetical order).

#### Liquid Contact Materials

MATERIAL	DESCRIPTION
ETFE	Ethylene tetrafluoroethylene is the generic name for the material such as Tefzel®. A fluoropolymer used for sealing surfaces, it is resistant to most chemical attack; however, some chlorinated chemicals will cause a physical swelling of ETFE tubing.
Graphite Fiber-Reinforced Polytetrafluoroethylene (GFP)	GFP is a reinforced graphite fiber PTFE material used in moderate to extreme service conditions. This material has excellent wear resistance in a wide range of speeds, in medium pressures and in high temperatures. GFP performs well in water and other liquid solutions and has limited use in vacuum or inert gas applications. Dynamic surfaces in contact with a seal made from GFP should have a hardness of Rc 40 or higher. GFP is recommended for applications that require good wear in liquids and humid conditions at temperatures from -320°F to +500°F (-196°C to +260°C), such as down-hole logging tools, adhesive, and epoxy dispensing equipment, and chemical and laboratory equipment. GFP has excellent chemical compatibility. This material is compatible with most fluids and gases, except some acids, such as sulfuric, nitric and hydrofluoric acids.
Hastelloy C	<p>This is the material most often recommended for corrosion resistance. This versatile nickel-chromium molybdenum alloy has excellent resistance to most acids, including strong oxidizers such as ferric and cupric chlorides; nitric, formic and acetic acids; wet chlorine; sea water and brine solutions; and mixtures containing nitric acid or oxidizing acids with chloride ions.</p> <hr/> <p>The best choice for most special applications where HPLC grade stainless cannot be used, Hastelloy C has excellent resistance to pitting, stress corrosion cracking, and oxidizing atmospheres up to temperatures well beyond any other standard components of the chromatographic system.</p> <hr/>
Novaflon® 100	This material is a modified PTFE filled with hollow glass micro-spheres. Thanks to its extremely high compressibility, Novaflon® 100 is eminently suitable for use in stress-sensitive flanges, such as glass, ceramic and FRP flanges. Very good anti-stick properties are an outstanding feature of the all-purpose gasket made from modified PTFE. Downtime is minimized as a result, while machine reliability and availability are increased. Novaflon® 100 impressive adaptability enables it to compensate for minor damage or unevenness in the flange surface. Excellent media resistance makes it the ideal solution for use in the chemical industry.

LIQUID CONTACT MATERIALS CONTINUED ON PAGE 56



### Liquid Contact Materials

MATERIAL	DESCRIPTION
PEEK	<p>Considered relatively inert and biocompatible, polyether ether ketone tubing can withstand temperatures up to 100°C. Under the right circumstances, .005” - .020” ID tubing can be used up to 5000 psi for a limited time, and 0.030” to 3000 psi. Larger IDs are typically good to 500 psi. These limits will be substantially reduced at elevated temperatures and in contact with some solvents or acids.</p> <hr/> <p>Its mechanical properties allow PEEK to be used instead of stainless in many situations and in some environments where stainless would be too reactive. However, PEEK can be somewhat absorptive of solvents and analytes, notably methylene chloride, DMSO, THF, and high concentrations of sulfuric and nitric acid. This tubing is highly prone to “kinking”, or sealing off, if held in a sharp bend over time.</p>
PTFE	<p>Polytetrafluoroethylene is the generic name for the class of materials such as Teflon®. It offers superior chemical resistance but is limited in pressure and temperature capabilities. Because it's so easy to handle, it is often used in low pressure situations where stainless steel might cause adsorption. PTFE tubing is relatively porous, and compounds of low molecular weight can diffuse through the tubing wall.</p>
Stainless Steel, Type 316/316L	<p>Stainless Steel 316 is a chromium-nickel based steel that possesses increased levels of resistance against several substances, due to the addition of molybdenum in its composition. The molybdenum allows SS 316 to be more resistance to corrosion overall, with specific resistance against chlorine pitting. SS 316 is also found to be more applicable in areas with high or elevated temperatures compared to other stainless steels. It has more heat resistance than Type 304 but otherwise possesses many of the same general characteristics.</p> <p>316's corrosion resistance is especially effective against chemicals, such as those used in the paper and textile industries. The metal finds other common applications in food processing equipment, chemical processing, nuts and bolts, and medical implants. While the metal is pliable under hot and cold-working techniques, it cannot be work hardened with heat treatment and in general is considered to have lower weldability compared to the 304 type stainless steels. However, it is still preferred over many other stainless steel grades in terms of workability</p> <hr/> <p>Stainless Steel 316L was designed to have a much lower carbon content than its 316 counterpart. As such, 316L is useful in areas where the avoidance of carbon precipitation is desired. The metal is commonly applied in weldments, where its particular carbon content combined with welding guarantees maximum resistance against general corrosion, and also in heavy gauge components.</p> <p>316L is considered to be more resistant to oxidation than type 316, especially in warm marine environments. Once again, its low levels of carbon protect it against carbon precipitation. The metal also shows resistance in extremely low temperatures, even down to cryogenic levels. In regards to heat, 316L shows better resistance to creep, stress to rupture and overall strength than other stainless steel grades.</p> <p>Many of the same work practices effective on type 316 may also be employed on 316L, including weldability and work hardening through cold working. In addition, 316 does not require post-work annealing to maximize its corrosion resistance, however annealing may be utilized in certain situations.</p>

LIQUID CONTACT MATERIALS CONTINUED ON PAGE 57

## Liquid Contact Materials

MATERIAL	DESCRIPTION
Vespel®	This material is made from a variety of materials; polyimides, thermoplastics, composites and chemically-resistant polymers. It offers a combination of physical properties capable of replacing metals and ceramics, as well as other high performance engineering polymers such as PEEK and PAI (polyamide-imide). Vespel® properties help overcome severe sealing, wear, or friction challenges, and endure high temperature.
Zirconium Oxide	<p>The zirconium oxide or zirconia (ZrO<sub>2</sub>) has a tetragonal crystal structure with a grain size not exceeding 0.50 microns, density greater than 6,00 g/cm<sup>3</sup>, and a Vickers hardness value of about 1200.</p> <p>The principal properties of zirconia ZrO<sub>2</sub> include a high mechanical strength, fracture toughness, extreme hardness, compressive strength, low thermal conductivity, excellent resistance to corrosion and wear, excellent tribological properties and good biocompatibility.</p>

### Trademarks

ETFE, Hastelloy C, PEEK, and PTFE descriptions provided by Valco Instruments Co. Inc. ([www.vici.com](http://www.vici.com))

GFP description provided by Bal Seal Engineering, Inc. ([www.balseal.com](http://www.balseal.com))

Vespel® description provided by DuPont ([www.dupont.com](http://www.dupont.com))

Novafon® 100 description provided by Frenzelit-Werke GmbH ([www.frenzelit.com](http://www.frenzelit.com))

Stainless Steel, Type 316 / 316L descriptions provided by Stardust Impex ([www.stardustimpex.com](http://www.stardustimpex.com))

Zirconium Oxide description provided by Ceramaret SA ([www.ceramaret.ch](http://www.ceramaret.ch))







