



OPERATING INSTRUCTIONS

EN

Translation of the original instructions

OMNISTAR™ THERMOSTAR™

GSD 320 Gas Analysis System

PFEIFFER  **VACUUM**

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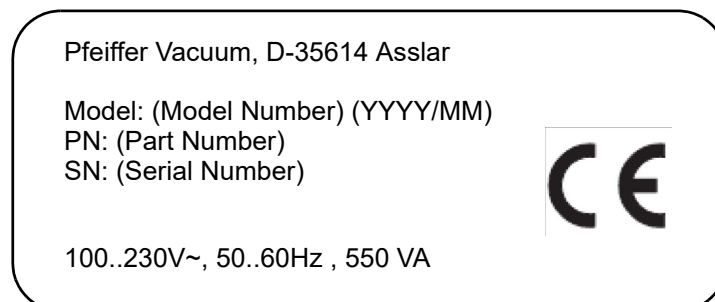
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1 Introduction

1.1 Product identification

In all communications with Pfeiffer Vacuum, please specify the information on the product name plate. For convenient reference, copy that information into the parentheses provided below.

Figure 1-1 Product Nameplate



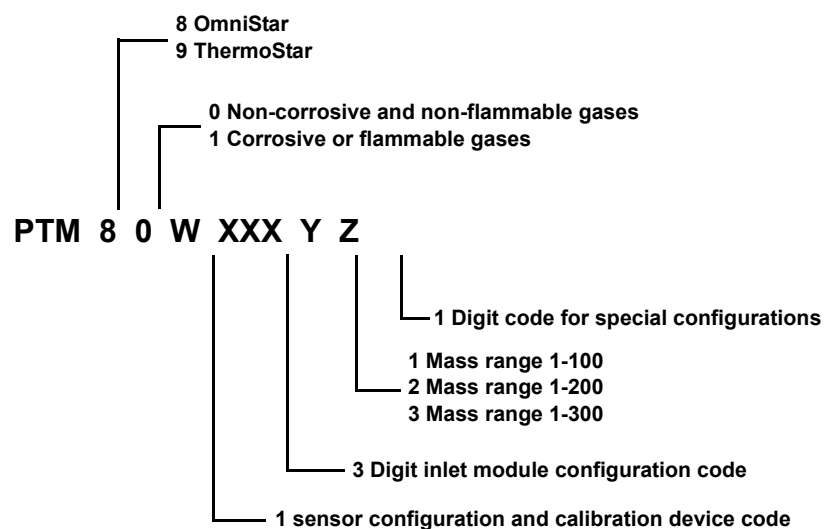
1.2 Validity

This document applies to products with part numbers corresponding to the following key. See [Figure 1-2](#).

The part number (PN) is located on the name plate.

We reserve the right to make technical changes without prior notice.

Figure 1-2 Manual Validity Key



1.3 Intended use

GSD 320

The standard version of the Pfeiffer Vacuum OmniStar™/ThermoStar™ GSD 320 is designed for manually controlled as well as automatic analysis of non-corrosive non-flammable gases. The standard version is not suitable for corrosive or flammable gases.

GSD 320 C

The corrosive-gas version of the Pfeiffer Vacuum OmniStar/ThermoStar, i.e. GSD 320 C, may be suitable for some corrosive or flammable gas applications. However, the system is not intended for use in an environment where explosive gas mixtures can occur. Furthermore, the system is not explosion-proof according to ATEX. Contact your local Pfeiffer Vacuum representative for consultation regarding corrosive or flammable gases.

NOTE

If you have any questions, please do not hesitate to contact your local Pfeiffer Vacuum representative.

2 Safety

2.1 Safety Instructions

The safety instructions in Pfeiffer Vacuum operating manuals are the result of risk evaluations and hazard analyses and are oriented on international certification standards as specified by UL, CSA, ANSI Z-535, SEMI S1, ISO3864 and DIN4844. In this document, the following hazard levels and information are considered:

DANGER

Immediate danger

Death or very severe injuries can occur.

WARNING

Possible danger

Injuries or severe property damages can occur.

CAUTION

Possible danger

Injuries or property damages can occur.

NOTE

Command or note

Command to perform an action or information about properties, the disregarding of which may result in damage to the product.

2.2 Pictograph definitions



Caution against actions which may bring about a malfunction or the loss of data.






Warning of the presence of potentially lethal voltages.



2.3 Personnel qualifications



All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the owner of the product.



2.4 General safety instructions

 The product is not for use in a manner not specified by the manufacturer. If the product is used in a manner not specified by the manufacturer the protection provided by the equipment may be impaired.

  Potentially lethal voltages are present when the line cord is connected.

  Only trained personnel may perform service actions on the product.

  Refer all maintenance to qualified personnel.

  Do not position the product where the disconnecting device is not easily accessible.

State of the art

The GSD 320 is built according to the most advanced engineering principles and is safe to operate.

Extension of the scope of application

Any use of this equipment for purposes other than originally intended (including sampling of corrosive or flammable gases or sampling of liquids) requires the prior written approval by the Pfeiffer Vacuum parent company.

Any use of the GSD 320 not corresponding to the (extended) scope of application is considered to be non-conforming and the manufacturer declines all liability resulting from such use.

Access by unauthorized persons

The owner shall ensure that only trained persons work on the GSD 320.

Inappropriate working procedures

The equipment must not be operated in any way that impairs the safety of the users and the GSD 320.

Obligation to report changes of the system

The user shall immediately notify the owner of any changes that have occurred and may impair the safety of the GSD 320.

Obligation to perform maintenance

The owner shall keep the GSD 320 in proper working condition at all times.

Shut-down and disconnection from the power

The GSD 320 must be switched off and disconnected from the power source before any maintenance work is performed. The shut-down procedures in these Operating Instructions must be strictly followed.

Removal of protective devices

Protective devices may only be removed after the GSD 320 has been completely shut down and disconnected from the power source.

Inspection after maintenance or repair work

After maintenance or repair work, make sure that all protective devices have been installed and that they function correctly. Only when this is the case, the GSD 320 may again be put into service.

Industry-specific accident prevention regulations

In all cases, the industry specific and local accident prevention regulations are applicable to the GSD 320.

Disposal of the operating media

The operating media must be treated and disposed of in accordance with local regulations.

Instructions

Based on these Operating Instructions, the owner shall prepare a set of instructions that describe the activities and specifications required for safe operation.

These instructions shall be posted at a suitable place at the workplace and shall be observed by all persons working with the equipment.

2.5 Gases

Adhere to the applicable regulations and take the necessary precautions for the process media used.

Consider possible reactions between the materials and the process media.

If toxic or combustible gases are sampled with the GSD 320, the exhaust gases shall be treated and disposed of in conformity with the applicable regulations.

2.6 Liability and warranty

Pfeiffer Vacuum assumes no liability and the warranty becomes null and void if the owner or third parties:

- ◆ Disregard the information in this document
- ◆ Use the product in a non-conforming manner
- ◆ Make any kind of interventions (modifications, alterations etc.) on the product
- ◆ Use the product with accessories not listed in the corresponding product documentation

The owner assumes the responsibility in conjunction with the process media used.

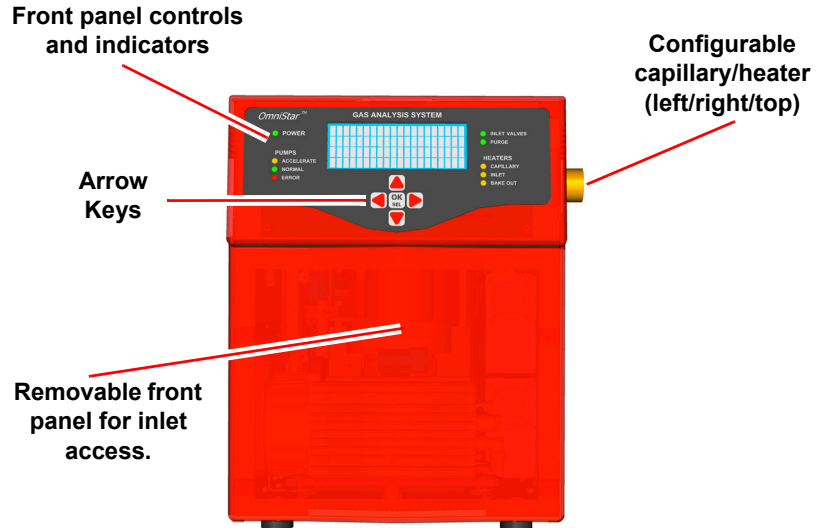
2.7 Training

Pfeiffer Vacuum offers application, operating and maintenance courses for the best use of this product. Please contact your local Pfeiffer Vacuum representative.

3 Instrument overview

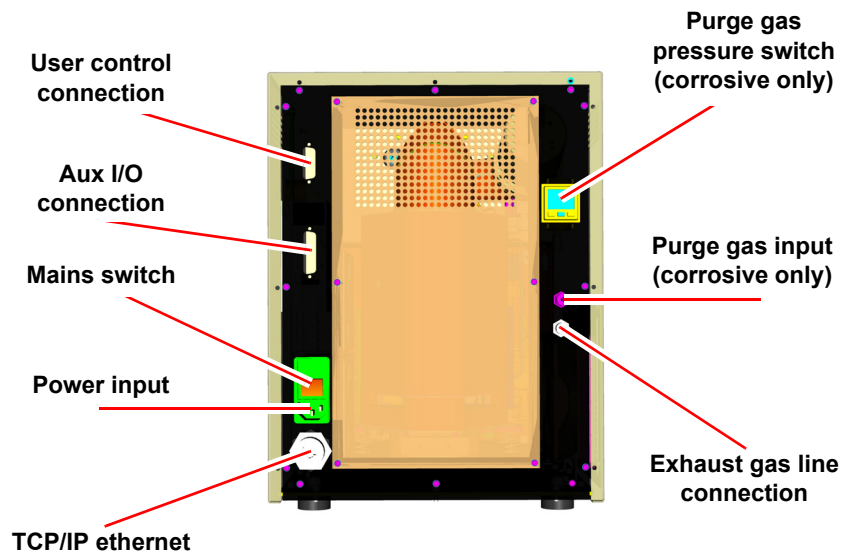
3.1 Front view

Figure 3-1 Front View of GSD 320



3.2 Connections

Figure 3-2 Connection to the GSD 320

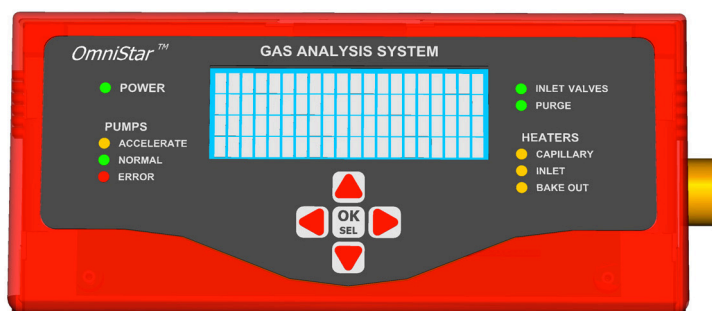


WARNING

For reasons of electromagnetic compatibility (EMI) (external interface) a screened cable must be used. The screen has to be connected to the connector case. The opposite end must be left open or grounded in order to suppress ground loop currents. It is strongly recommended to use twisted pairs for the (+) and (-) wiring of the analog inputs.

3.3 Front panel controls and indicators

Figure 3-3 OmniStar front panel controls and indicators



Arrow Keys

Push buttons on the front panel can be used to operate the GSD 320 locally. The **arrow keys** can be used to highlight a specific option on the LCD Screen. When the desired option is highlighted, push **OK SEL** to confirm.

Power LED

Power: Mains power and status okay.

Pumps LEDs

Accelerate: Amber LED illuminated when the turbo pump is on, but not at normal state.

Normal: System is normal and a good vacuum has been attained. Turbo pump has reached the rotational speed setpoint (90% of the nominal speed).

Error: Pumping system fault.

Inlet Valves: LED (OmniStar)

Inlet Valves: Any gas inlet valve open
(Sampling inlet valve or calibration device)

Cal LED (ThermoStar)

Calibration valves: Valve of the calibration device open

Purge LED

Purge: Purge gas inlet pressure within acceptable range

Heaters LEDs

Capillary: Capillary heater on

Inlet: Inlet heater on

Bake Out: Vacuum chamber is being heated

Heaters

Table 3-1 Heater Information

Heater Type	Max Temp	Default Temp	Additional Information
200°C Capillary Heater	200°C	200°C	
350°C Capillary Heater	350°C	350°C	
Inlet Heater	150°C	120°C	A warning appears above 120°C due to possible degradation of solenoid lifetime.
Bakeout (Manifold) Heater	170°C at 45°C ambient	150°C at 25°C ambient	
Vari Inlet Heater	120°C	70°C	A warning appears above 70°C due to possible degradation of solenoid lifetime.

NOTE
<p>Important temperature control information found below:</p> <ul style="list-style-type: none"> ♦ If capillary or inlet temperature exceeds 5°C past the configured setpoint temperature the indicator LED will flash and an out of regulation warning will be issued. The heaters will not automatically turn off. ♦ If capillary or inlet temperature exceeds 15°C past the maximum temperature the heaters are turned off and an error will be issued. ♦ If during bakeout the internal temperature of the GSD 320 exceeds 70°C the GSD 320 deactivates the bakeout (manifold) heater. When the internal temperature of the GSD 320 falls below 70°C the bakeout (manifold) heater will not automatically turn back on, instead the user is required to turn the heater back on.

4 Technical data

4.1 Detector type

C-SEM/Faraday

4.2 Ion source

Gas tight, 2 filaments

4.3 Mass range

Mass range specifications are only applicable for non-interfering gases/species. See [Table 4-1](#).

Table 4-1 Sensor performance by mass range

	1 - 100 amu	1 - 200 amu	1 - 300 amu
Contribution to neighboring mass: (40/41)	< 10 ppm	< 20 ppm	< 50 ppm
Detection limit minimum: C-SEM	< 1 ppm	< 1 ppm	< 1 ppm
Detection limit minimum: Faraday	< 20 ppm	< 40 ppm	< 100 ppm

4.4 Calibration compound (Option)

Perfluorotributylamine (PFTBA)

4.5 Scan Speed

MID: 2 ms/amu - 60 s/amu

Bargraph stair scan: 2 ms/amu - 60 s/amu

Analog scan: 20 ms/amu - 60 s/amu

Bargraph scan: 20 ms/amu - 60 s/amu

4.6 Capillary gas connection

Material: stainless steel (OmniStar) or Quartz (ThermoStar)

Sample pressure: 1000 mbar (Standard version)

Gas flow rate: 1-2 sccm

Length: 1 m (2 m available)

Inlet valve control: Front Panel and/or Software (QUADERA®)

Capillary Operating temperature: 200°C (350°C available)

4.7 Process gas (measuring gas)

Pressure: 500 ... 1500 mbar

Gas flow rate: 1 ... 2 sccm

OmniStar Capillary: outside \varnothing 1/16", inside \varnothing 0.125 mm

ThermoStar Capillary: outside \varnothing 0.22 mm, inside \varnothing 0.15 mm

Impurities: particle size \leq 1 μ m

4.8 Corrosive Service (Option)

Purge gas: Inert gas preferably nitrogen or argon

Pressure: 5 ... 7 bar

Gas Flow Rate: \approx 500 sccm

Impurities: \leq 100 ppm oxygen

Connection: Swagelok Fitting, 1/8"

4.9 Exhaust gas

Admissible pressure: \leq ambient pressure

Gas flow rate: \approx 500 sccm (applicable only for purged/corrosive operation)

Connection: PTFE tube, outside \varnothing 6 mm, inside \varnothing 4 mm

4.10 Materials on the vacuum side

Gas inlet: stainless steel, FPM

Orifice: platinum

Vacuum chamber: stainless steel

Analyzer: stainless steel, copper, silver, gold, quartz glass, ceramics

Turbo pump: aluminum, stainless steel, epoxy, lubricant

Tubing: PTFE, stainless steel, FPM

Diaphragm pump: aluminum, anodized aluminum, FPM, PTFE-coated NBR, PA

4.11 Pumping characteristics

Ready for operation: after 10 minutes

Time interval between switch off and restarting: > 10 seconds

Shut-down time: 15 minutes

4.12 Ambient conditions

Storage/transport: 5 ... 45°C

Operation: 12 ... 35°C

Relative humidity: maximum 80% up to 31°C, linearly decreasing to 50% at 40°C

Application: indoors only

Altitude: up to 2000 m

Protection category: IP30

Pollution degree: 2

4.13 Noise level

<50 dB in full operation

4.14 Power connection

Voltage: 100, 120, 230 VAC

Frequency: 50 ... 60 Hz

Power consumption: 550 VA

Line filter fuses: 4 A slow blow

4.15 User interfaces

Software: QUADERA® (version 4.00 or later)

Communication: TCP/IP ethernet

4.16 User control

5 Analog inputs: 5x ± 10 V / 12 Bit

4 Analog outputs: 4 x 0...10 V / 12 Bit

4 Digital inputs: 4 x external protection

7 Digital outputs: 7 x Sink, optical isolated, 24 V

Pump status: Digital Output channel 1, 1 relay, switching contact, NC, NO, COM

Connectors: 15-pin Dsub (User I/O) and 25-pin Dsub (Aux I/O)

For additional information on user controls see [Aux I/O connection on page 27](#) and [User I/O and Aux I/O Details on page 28](#).

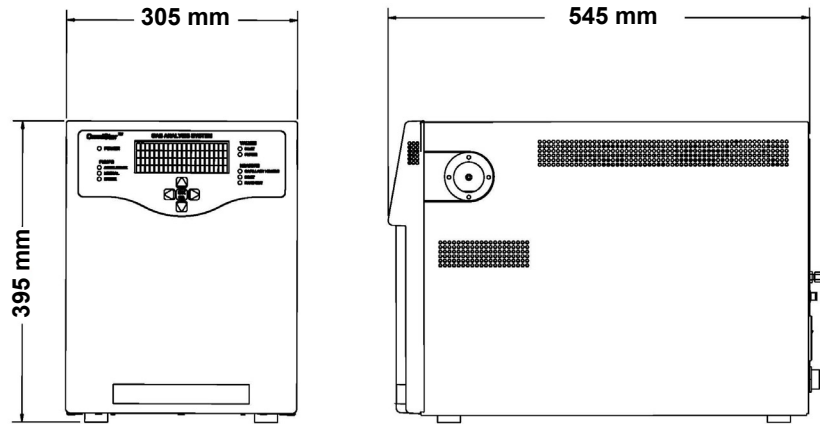
4.17 Weight

35 kg

4.18 Dimensions

L x W x H: 545 x 305 x 395 mm

Figure 4-1 Dimensions (mm)



5 Installation

5.1 Carrying and transporting the unit

Product weight > 25 kg. Always transport the GSD 320 with two persons by placing hands under the front and rear portion of the chassis.

WARNING

Physical injury can result if the product is lifted and carried by only one person. Adhere to the local regulations and take the necessary precautions when lifting and transporting the product.

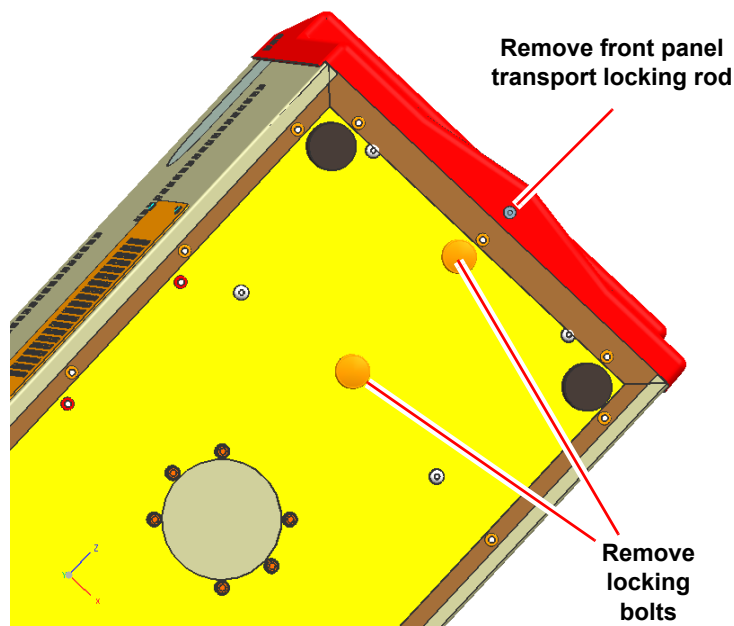
CAUTION

Always move the instrument with the front panel transport locking rod installed.

5.2 Removal of transport locking parts

While one person tips the GSD 320, a second person removes the front panel transport locking rod and the two locking bolts.

Figure 5-1 Removal of transport locking parts



CAUTION

Remove both locking bolts (transport fixing parts) on the bottom of the GSD 320 before starting operation.

CAUTION

Remove the front panel transport locking rod on the bottom of the GSD 320 before starting operation.

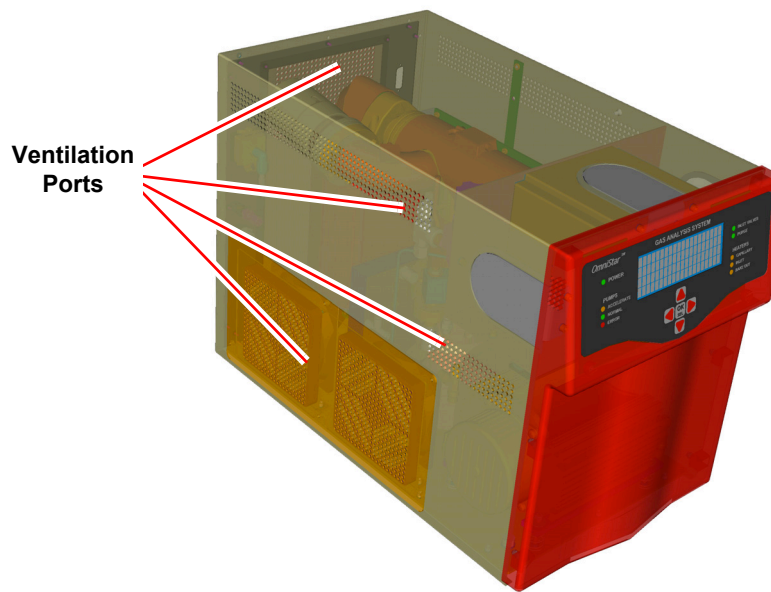
NOTE

Store locking bolts and front panel transport locking rod and remount them if the GSD 320 is to be transported again.

5.3 Ventilation requirements

For adequate ventilation, maintain *at least 25 mm* clearance around the GSD 320. If the GSD 320 is inside an enclosure, the enclosure must be large or ventilated to provide adequate cooling by fan on the GSD 320.

Figure 5-2 Cooling air circulation



CAUTION

Covering the cooling air inlet and outlets may result in unit overheating and may cause damage to the GSD 320.

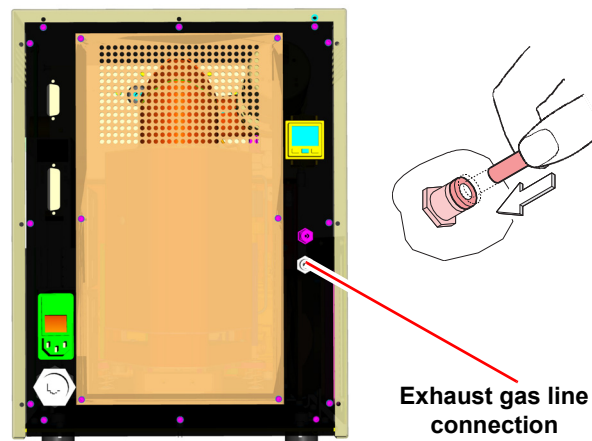
5.4 Connecting the exhaust gas line

Extend the exhaust tube with a suitable coupling piece and tube and connect it to the exhaust duct.

NOTE

For corrosive or flammable applications, exhausting the GSD 320 C is required. For non-corrosive non-flammable applications, exhausting can be done in accordance to the facilities requirements.

Figure 5-3 Connecting the exhaust gas line



CAUTION

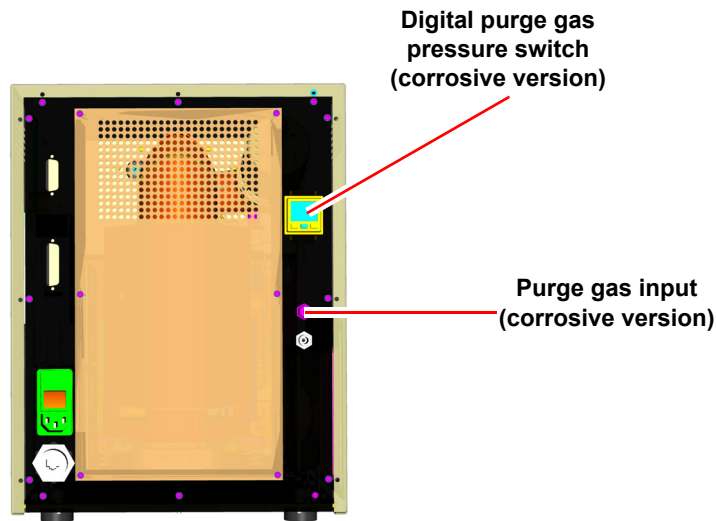
If you sample corrosive or flammable gases with the GSD 320 C, the exhaust gases must be treated and disposed of in accordance with the applicable regulations.

WARNING

If the proper exhaust connections are not installed, sampling corrosive or flammable or any hazardous gases could result in lethal amounts of gas being exhausted from the system.

5.5 Connecting the purge gas

Figure 5-4 Connecting the purge gas



On corrosive pumping systems, the purge gas provides a continuous flow of dry gas to the bearings of the turbo molecular pump. The GSD 320 C has an internal regulator that is preset in the factory using a flow meter to produce the proper flow of nitrogen purge.

Purpose of digital pressure switch:

- ◆ Provides a visual display of the nitrogen purge input pressure.
- ◆ Provides a signal that initiates the shutdown procedure when the purge gas is not with the specified range of 5 ... 7 bar.

CAUTION

The GSD 320 C is not equipped with a purge gas shut-off valve. If the purge gas pressure is likely to exceed the specifications, install a suitable pressure reduction system.

CAUTION

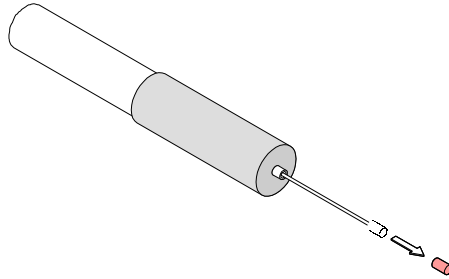
Inside the GSD 320 C, there is an override jumper for operation without purge gas. This operating mode is reserved for service and test purposes and may only be used by trained service personnel.

5.6 Connecting the capillary

OmniStar

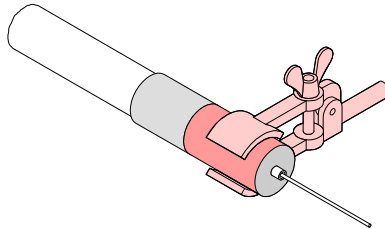
- 1 Remove the cap. See [Figure 5-5](#).

Figure 5-5 Removing the cap



- 2 Connect the capillary to the measurement point. See [Figure 5-6](#).

Figure 5-6 Connecting the capillary to the measurement point



CAUTION

Firmly connect the front tip of the capillary heater tube to the measurement equipment. Clamp only the end of the tube as show in [Figure 5-6](#).

CAUTION

Handling the capillary in a manner inconsistent with the following parameters may damage the sampling system of the GSD 320:

Minimum bending radius 150 mm.

Do not additionally insulate or cover the capillary heater.

Do not expose the capillary to any additional heat (for example, heated flange).

ThermoStar

DANGER

DANGER: Hazardous gases.
Process gases can cause health and environmental damage.
Before admitting the process gas, make sure the gas connection is leak-tight.

DANGER

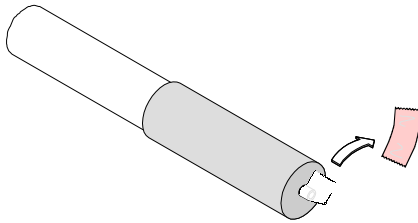
DANGER: Flammable gases.
If incorrectly handled, flammable gases can cause health, environmental and material damage.
Adhere to the relevant regulations and take the necessary precautions when handling flammable gases.

NOTE

For reliable connection of the capillary heater, an adapter is available as an accessory.

- 1 Remove the adhesive tape. See [Figure 5-7](#).

Figure 5-7 Remove adhesive tape



- 2 Verify that the GSD 320 is shutdown in the proper manner.
- 3 Remove mains power from the GSD 320.

CAUTION

Verify that the front panel transport locking rod has been removed. Refer to [section 5.2 on page 17](#).

- 4 Remove the front cover of the GSD 320 from the frame as described in [Removing the front cover on page 23](#). Next, remove the heater box cover from the inlet oven, as described in [Removing the inlet heater box on page 24](#).

Removing the front cover

- 1 Grab the front cover at the top corners and gently pull the cover away from the frame until the top and middle spring pins release from the frame. See [Figure 5-8](#).

Figure 5-8 Removing the cover



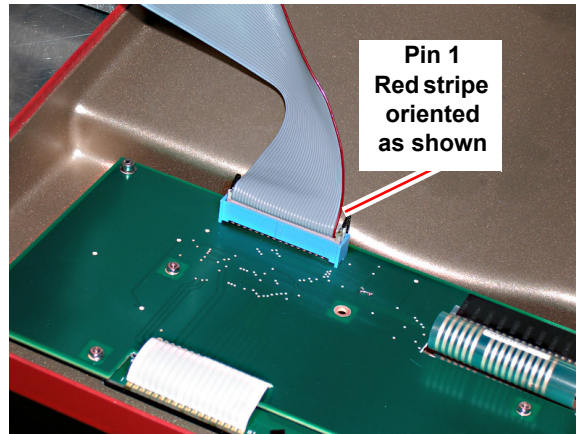
- 2 Next grab the cover between the middle and bottom spring pins and pull the cover until the spring pins release from the frame. See [Figure 5-9](#).

Figure 5-9 Pulling the front cover



- 3 Disconnect the ribbon cable from the front panel circuit board. See [Figure 5-10](#).

Figure 5-10 Disconnect ribbon cable

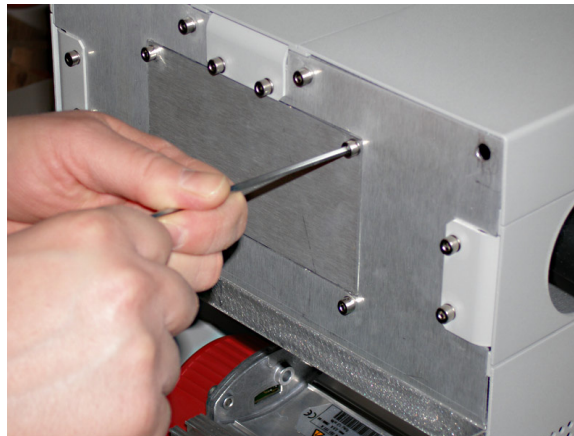


- 4 Use a 3 mm hex key (included in the ship kit) to remove the socket head cap screws (2) from the inlet oven.

Removing the inlet heater box

Remove the inlet heater box cover from the inlet oven. See [Figure 5-11](#).

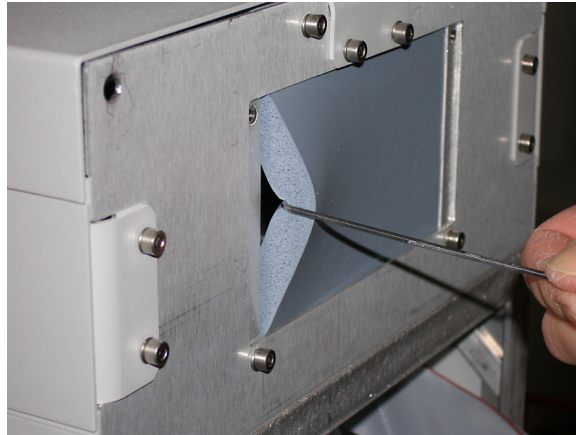
Figure 5-11 Remove the inlet heater box cover



Removing the insulation and adjusting the capillary

- 1 Remove the foam insulation from the inlet oven. If necessary, insert the short leg of the hex key through the insulation and gently pull the foam back. It's recommended to start at the top and work towards the bottom when pulling the foam insulation from the oven. See [Figure 5-12](#).

Figure 5-12 Remove foam insulation

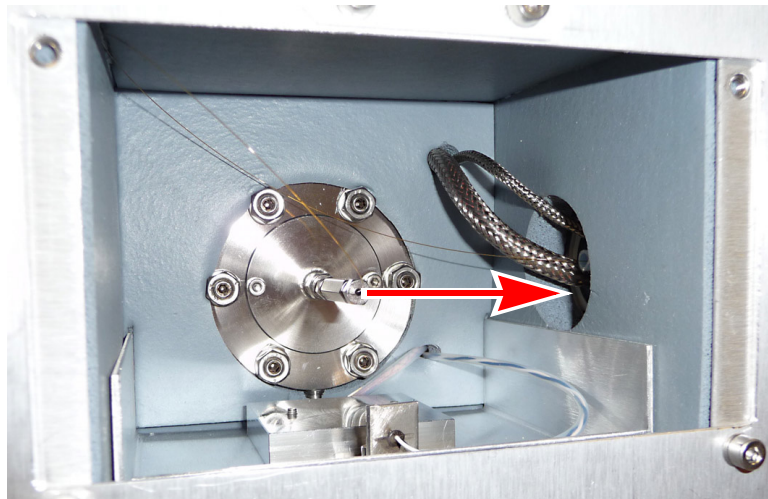


- 2 Push the capillary forward to reach the measurement point. See [Figure 5-13](#).

NOTE

Use only metal ferrules to avoid damaging the capillary.

Figure 5-13 Push capillary towards measurement point



- 3 Connect to measurement point according to system configuration.

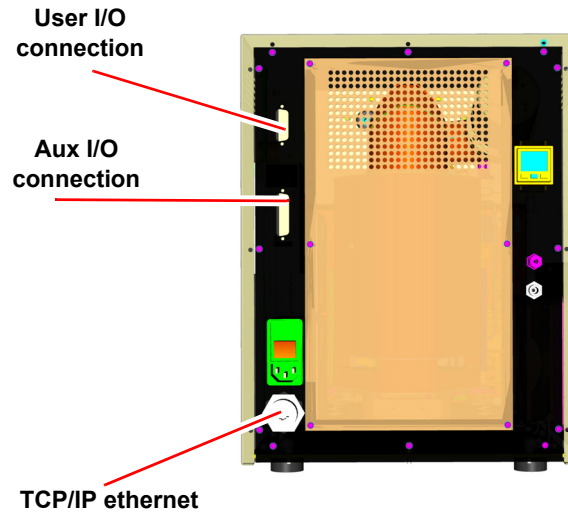
NOTE

The capillary should be attached to the sample point in such a way as to avoid pressurization of the mass spectrometer. A simple "T" arrangement that allows excess sample gas to vent to atmospheric pressure is usually sufficient.

5.7 Connecting the interfaces

The GSD 320 has a TCP/IP ethernet interface for communication and two input/output (I/O) connectors, User I/O and Aux I/O, that allow GSD 320 interaction with customer supplied peripheral devices.

Figure 5-14 User control and ethernet interface



User I/O connection

The User I/O connector provides an interface for electronic inputs to, and outputs from, the GSD 320.

Pin Number	Description
1	GND (0 V) for digital inputs
2	Digital input, Channel 1
3	Relay NO (Digital output, Channel 1 active = Contact to pin 4 closed)
4	Relay COM
5	Analog Input, Channel 2 (-)
6	Analog Input, Channel 2 (+)
7	Analog Input, Channel 1 (-)
8	Analog Input, Channel 1 (+)
9	Reference GND of the analog output
10	Reference GND of the analog output
11	Analog Output, Channel 2 (+)
12	Analog Output, Channel 1 (+)
13	Pumping System "Normal" Relay COM
14	Pumping System "Normal" Relay NO
15	Pumping System "Normal" Relay NC

Aux I/O connection

The Aux I/O connector provides an interface for electronic inputs to, and outputs from, the GSD 320, in addition to those of the User I/O connector.

Pin Number	Description
1	Analog Output, Channel 3 (+)
2	Reference GND of the analog outputs
3	Analog Input, Channel 3 (-)
4	Analog Input, Channel 4 (-)
5	Analog Input, Channel 5 (-)
6	Reference GND of the analog outputs
7	Digital input, Channel 2
8	Digital input, Channel 4
9	+24V, 10mA for digital inputs
10	Digital output, Channel 3
11	Digital output, Channel 5
12	Digital output, Channel 7
13	GND (0 V) for digital inputs
14	Analog Output, Channel 4 (+)
15	GND (0 V) for digital inputs
16	Analog Input, Channel 3 (+)
17	Analog Input, Channel 4 (+)
18	Analog Input, Channel 5 (+)
19	GND (0 V) for digital inputs
20	Digital input, Channel 3
21	GND (0 V) for digital inputs
22	Digital output, Channel 2
23	Digital output, Channel 4
24	Digital output, Channel 6
25	Reserved

User I/O and Aux I/O Details

Digital Inputs

Digital Inputs are ACTIVE LOW. These inputs are pulled high internal to the GSD 320 Controller Module, allowing a simple contact closure or TTL input to activate them. A contact closure is preferred to maintain ground isolation.

Total Number of channels: 4

User I/O connector: Channel 1

Aux I/O connector: Channels 2-4

Input Impedance: 10k Ohm

Digital Outputs

Digital Outputs are OPEN COLLECTOR and can each sink and source approximately 150 mA and are capable of driving LEDs and other small loads directly.

Digital Output Channel 1 is internally connected to a relay (24VAC/DC, 1A) with its Normally Open (NO) and Common (COM) contacts connected to pin 3 and pin 4 respectively of the USER I/O.

Total Number of channels: 7

USER I/O connector: Channel 1 (pin 3 Relay NO, pin 4 Relay COM)

AUX I/O connector: Channels 2-7

Analog Inputs

The Analog Inputs are differential and can handle inputs between -10 to +10 volts and common mode voltages of 100 volts.

Total Number of channels: 5

USER I/O connector: Channels 1 and 2

AUX I/O connector: Channels 3-5

Input Impedance: 2k Ohm

Resolution: 12 bit

Analog Outputs

The Analog Output provides external connections that can carry voltages that vary in proportion to the abundance of the specified ions. The software provides a means for the user to assign a mass to each of the four channels along with a scaling factor and offset. The Analog Outputs ranges from 0 to 10v.

Total Number of channels: 4

USER I/O connector: Channels 1 and 2

AUX I/O connector: Channels 3 and 4

Pumping System Status Relay

The USER I/O interface provides a relay (24VAC/DC, 1A) that indicate status of the Turbo pump speed. If the Turbo pump speed is >90% (>1350 Hz) of its set rotational speed (1500 Hz), then the NO contact is closed.

USER I/O connector:

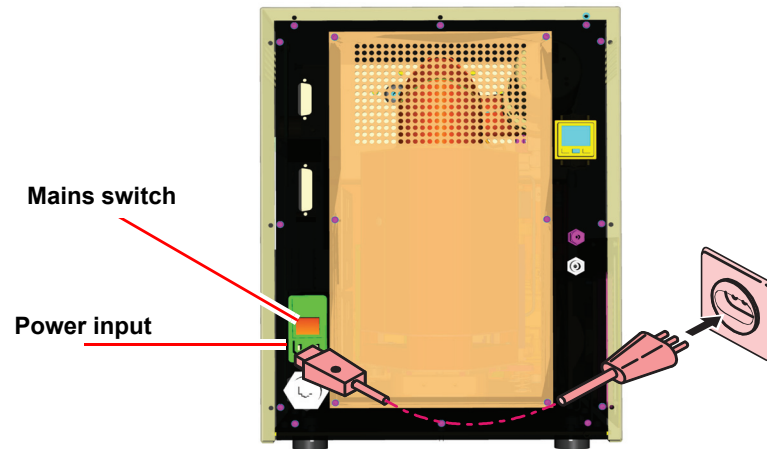
Relay COM (pin 13)

Relay NO (pin 14)

Relay NC (pin 15)

5.8 Power Connection

Figure 5-15 Connecting the input power



Voltage: 100, 120, 230 VAC

Frequency: 50 ... 60 Hz

Power consumption: 550 VA

- 1 Turn off the mains switch.
- 2 Connect the power cord to source power. Refer to [Figure 5-15](#).

5.9 QUADERA installation

Directions to install the software package can be found in [section 7.2 on page 44](#) of this operating manual.

6 Initial start up

6.1 Precondition

Installation completed as described in Chapter 5, [Installation](#).

6.2 Procedure

- 1 Turn the mains switch on.
- 2 Start the pumping system (as described in [section 7.1 on page 31](#) for front panel operation or [section 7.2 on page 44](#) for QUADERA).

LED	MAINS ON	PUMPDOWN IN PROGRESS	NOMINAL PUMPING SPEED ACHIEVED	PUMPING SYSTEM ERROR
POWER	GREEN	GREEN	GREEN	GREEN
ACCELERATE		AMBER		
NORMAL			GREEN	
ERROR				RED

CAUTION

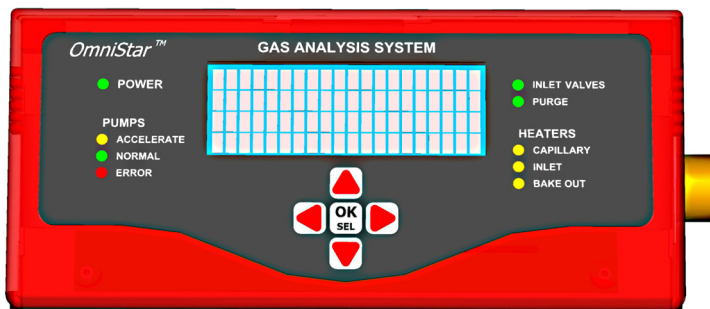
Excessive shock and vibration during operation and after switching off can damage the turbo pump. Avoid shocks and vibrations (e.g. moving over cables, door sills) during operation and up to 5 minutes after switching the GSD 320 off.

7 Operation

7.1 Front panel operation

The following section briefly describes the operation of the GSD 320 using the Front Panel interface.

Figure 7-1 GSD 320 LEDs, keypad, and LCD



- ◆ **LEDs** indicate the state of the sub-systems.
- ◆ A **keypad** is used for navigating the menu (UP, DOWN, LEFT, or RIGHT) as well as selecting tasks and modifying data parameters.

Figure 7-2 Keypad



- ◆ An **LCD** displays the menu structure for viewing and configuring the instrument. The root menu can be reached at any time by pressing and holding the **OK / SEL** key until an audible beep is heard.

NOTE

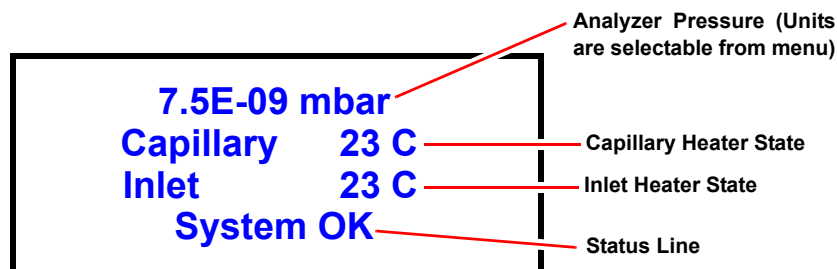
This operation can be thought of as an **ESC**ape key. Cursoring LEFT (<) will **ESC**ape from a menu tree in the same way.

Normal Operation Screen

The **NORMAL** operation screen when pumped down is shown in [Figure 7-3](#).

It should be noted that the front panel screen may display an analyzer pressure that varies from that shown within the QUADERA software. The QUADERA software will display the most accurate table.

Figure 7-3 Normal Operation Screen

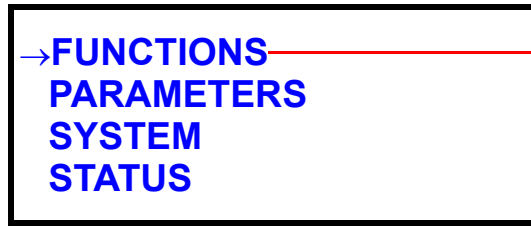


From the Normal operation screen, press any key to display the **Setup** screen.

FUNCTIONS menu

Select **Setup** → **FUNCTIONS**.

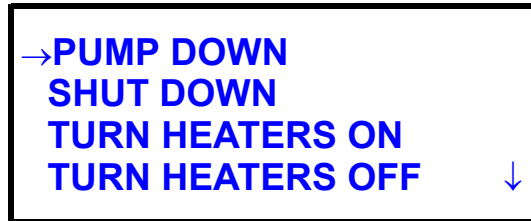
Figure 7-4 Setup → FUNCTIONS



Arrow pointing right is the current selection

The menu choices shown in Figure 7-5 and Figure 7-6 are available.

Figure 7-5 FUNCTIONS menu choices



Down arrow indicates continuation of menu below.

Figure 7-6 FUNCTIONS menu choices 2



Up arrow indicates continuation of menu above.

Figure 7-7 FUNCTIONS menu choices 3



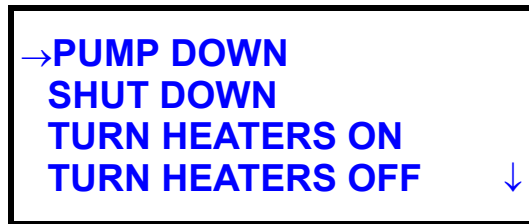
NOTE

All **FUNCTIONS** menu choices execute immediately except **Shut Down**.

PUMP DOWN

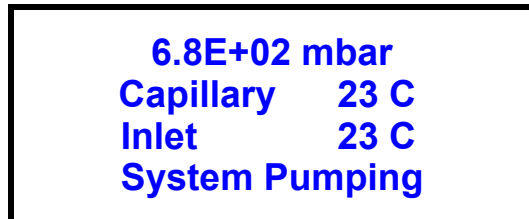
Select **FUNCTIONS** → **PUMP DOWN** to pump the system down.

Figure 7-8 **FUNCTIONS** → **PUMP DOWN**



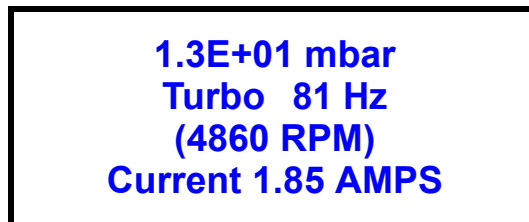
The status line shows the System Pumping until the turbo pump is turned on.

Figure 7-9 **System Pumping**



Turbo speed in Hz and RPM is shown along with Drive Current.

Figure 7-10 **Turbo speed and rpm**



SHUT DOWN

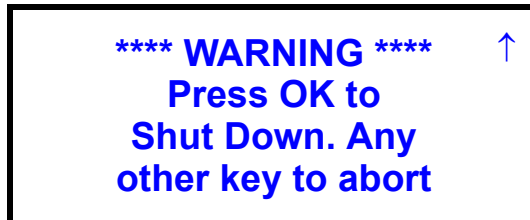
Select **FUNCTIONS** → **SHUT DOWN** to shut the system down.

Figure 7-11 FUNCTIONS → Shut Down



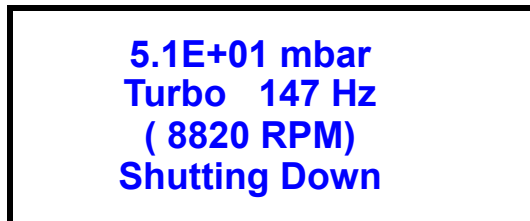
The following Warning screen is displayed.

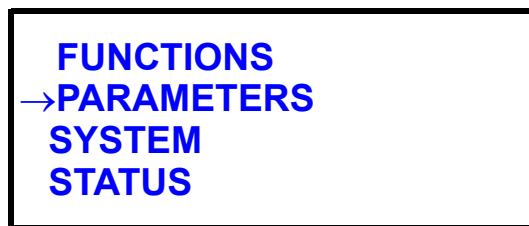
Figure 7-12 Shut down warning screens



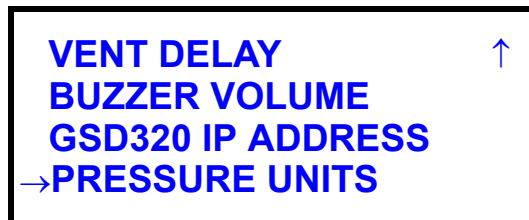
Once the OK/SEL key is selected, the Turbo Pump will shut down.

Figure 7-13 TURBO pump shut down screen



PARAMETERS menu choices**Figure 7-14 Setup Screen → PARAMETERS**

The **PARAMETERS** menu screens are displayed. See Figure 7-15 and Figure 7-16.

Figure 7-15 PARAMETERS menu screen 1**Figure 7-16 PARAMETERS menu screen 2**

Example: changing the inlet heater set point

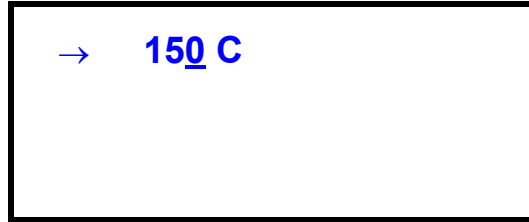
- 1 Select **PARAMETERS** → **INLET HTR SETPT**.

Figure 7-17 PARAMETERS → INLET HTR SETPT



- 2 Press **OK SEL.** . The **INLET HTR SETPT** is displayed.

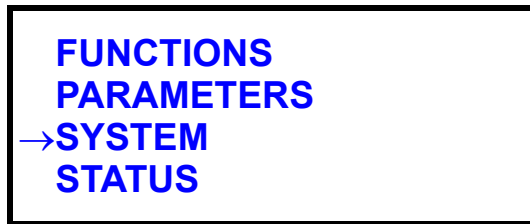
Figure 7-18 INLET HTR SETPT display



- 3 Change the **INLET HTR SETPT** by:
 - ♦ Move the cursor with the left and right arrow keys.
 - ♦ Change data with the up and down arrow keys.
 - ♦ Accept the change with the **OK SEL** key.

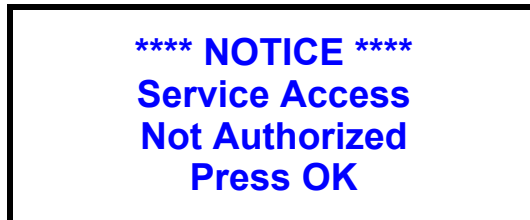
SYSTEM menu choices

Figure 7-19 Setup → SYSTEM



Selecting **Setup** → **SYSTEM** will display the following message regarding access to advanced functionality.

Figure 7-20 SYSTEM menu screen

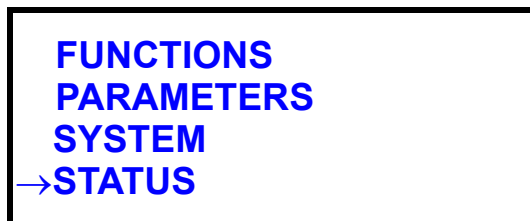


NOTE

For assistance with advanced system functionality, please contact your local Pfeiffer Vacuum representative.

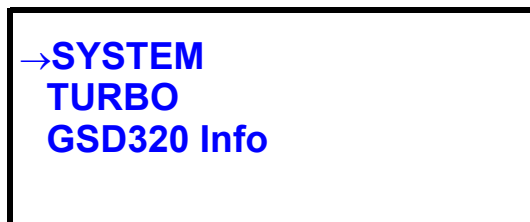
STATUS menu choices.

Figure 7-21 Setup → STATUS



Selecting **STATUS** from the **Setup** screen will provide the menu choices shown below.

Figure 7-22 STATUS menu choices



STATUS-SYSTEM menu choices

Figure 7-23 STATUS → SYSTEM

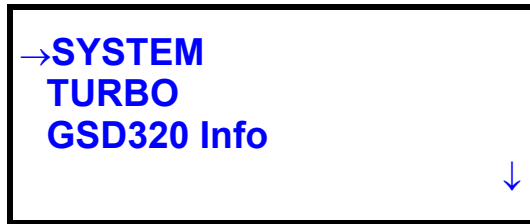


Figure 7-24 STATUS-SYSTEM menu screen 1

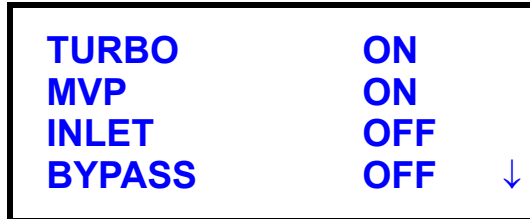
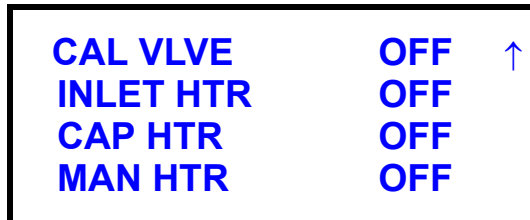


Figure 7-25 STATUS-SYSTEM menu screen 2



TURBO menu choices

Figure 7-26 STATUS → TURBO

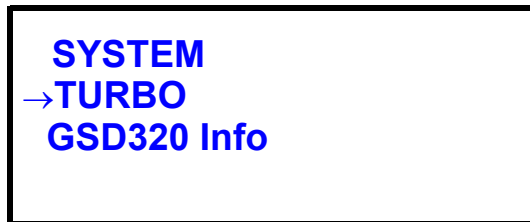


Figure 7-27 TURBO menu screen 1

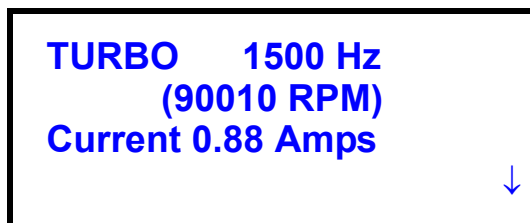


Figure 7-28 TURBO menu screen 2

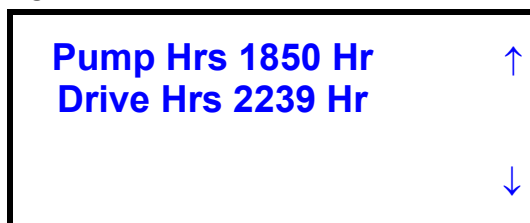


Figure 7-29 menu screen 3

BottomPlate	34 C	↑
Bearing	34 C	
Controller	45 C	
Motor	42 C	↓

Figure 7-30 menu screen 4

Turbo Errors ↑
Errors NONE
 Press any key to
 exit

GSD 320 info menu choices

Figure 7-31 STATUS → GSD320 Info

SYSTEM
TURBO
 → **GSD320 Info**

Figure 7-32 GSD 320 Info menu screen 1

Version 0.9B	—	Firmware version
Compile 02-12-2009	—	Compile date
Warning Code 0x00	—	See System Warning Codes
Error Code 0x00	—	See System Error Codes

Figure 7-33 GSD 320 Info menu screen 2

QMG220 IP 010.211.070.104 GSD320 IP 010.211.070.109	↑	IP addresses for PrismaPlus (QMG220) and GSD 320
--	---	---

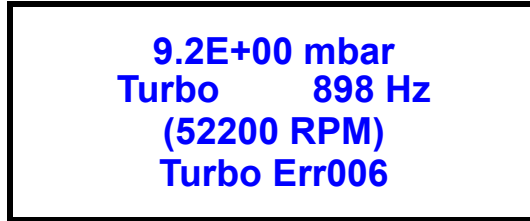
NOTE

The GSD 320 is shipped with default addresses in the 192.168.x.x range. Do not change these addresses until instructed in [System setup on page 45](#).

Error Turbopump

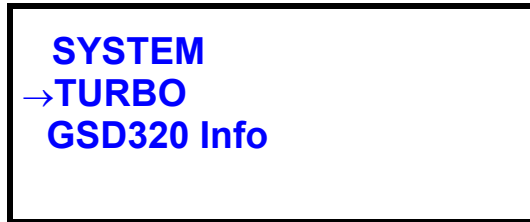
If a Turbo Pump error occurs, an error message will display. The error number can be referenced in the Turbo Pump User's Manual.

Figure 7-34 TURBO pump error screen



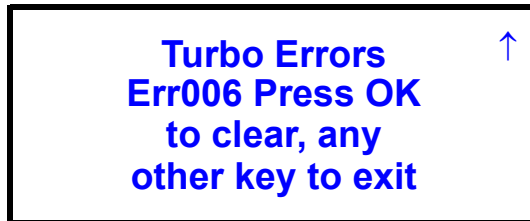
Select STATUS → TURBO.

Figure 7-35 STATUS → TURBO



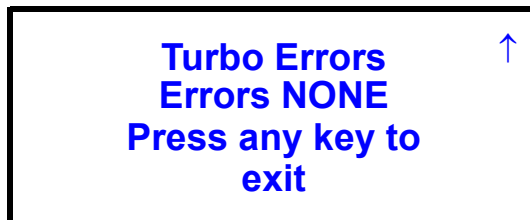
The TURBO ERROR page is displayed.

Figure 7-36 TURBO pump error screen



Press OK SEL.  to clear the error.

Figure 7-37 TURBO pump error cleared screen

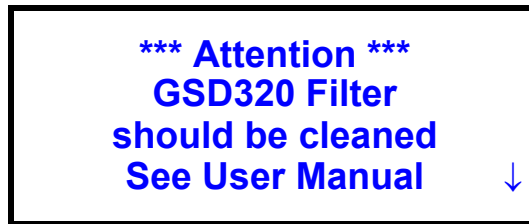


Press any key to return to the status menu.

Reminder to clean the GSD 320 filters

The filters on the side of the GSD 320 must be cleaned or replaced every three months. After three months has elapsed, the following reminder to clean or replace the filters is displayed.

Figure 7-38 Filter reminder screen



The next screen will be displayed and will persist until **OK SEL** is pressed.

Figure 7-39 Filter reminder screen 2



If the filter is not cleaned, the attention message will reappear and require acknowledgement from a user before the GSD 320 menu is usable again.

After cleaning or replacing the filters, a new Filter time interval must be updated by finding the Reset Filter Time menu in **FUNCTIONS** → **RESET FILTER TIME**. Press **OK SEL** to update the Filter time interval.

Figure 7-40 FUNCTIONS menu screen 2



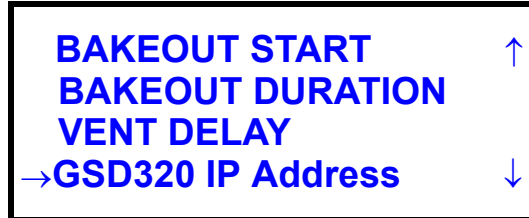
Changing the IP address

NOTE

The GSD 320 is shipped with default addresses in the 192.168.x.x range. Do not change these addresses until instructed so in [System setup on page 45](#).

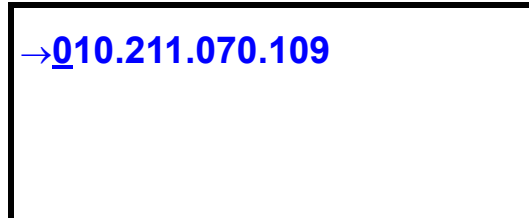
- 1 Select **PARAMETERS** → **GSD320 IP Address**, press **OK SEL**.

Figure 7-41 **PARAMETERS** → **GSD320 IP Address**



- 2 Use the cursor to adjust IP Address. The arrow UP/DOWN keys increment / decrement the number. The arrow LEFT / RIGHT keys move the cursor. **OK SEL** starts the modification of the IP address.

Figure 7-42 **IP Address adjustment screen**



- 3 After **OK SEL** is selected, the following screen indicates that the IP address modification is in progress.

Figure 7-43 **IP Address modification is in progress**



- 4 If the IP configuration is successful, a Success screen is displayed.

Figure 7-44 **IP Address configuration success**



- 5 If the IP configuration fails, a Failure screen is displayed. The IP address is reset to its previous setting.

Figure 7-45 IP Address configuration failure



Can not bakeout if system is not under vacuum

If the System is not under vacuum, the Manifold Heater cannot be turned ON. If the Bake Out selection is made, an Attention message is displayed, and Bake Out is not permitted.

Figure 7-46 System not under vacuum

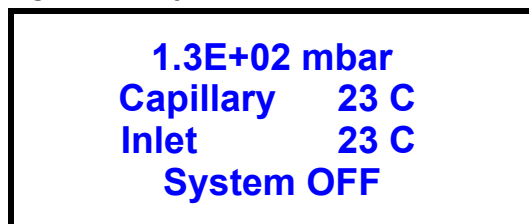


Figure 7-47 PARAMETERS →TURN BAKEOUT ON

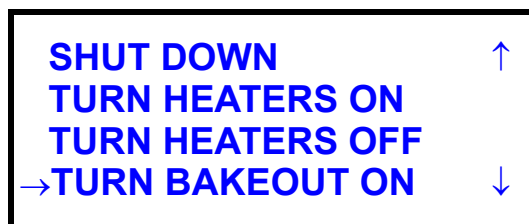
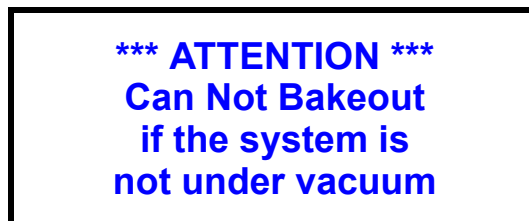


Figure 7-48 Can not bakeout message



7.2 Operation from QUADERA

This chapter provides instructions for setting up the GSD 320 system and the QMG 220, which is internal to the system, and running the GSD 320 using the QUADERA Add-in.

These instructions assume that QUADERA 4.00 or higher is installed, that QUADERA is licensed to use the GSD 320 Add-in, and that the computer and GSD 320 are connected via a network or Ethernet crossover cable.

General Information

IP Addresses

- ◆ The GSD 320 system uses two IP addresses — one for the GSD 320 controller and one for the QMG 220, which is internal to the system. Both IP addresses must be set to the same network, using the same Network ID and partial Host ID. For example, when setting the IP address of the GSD 320 and QMG 220, each is set in the factory to a 192.168.x.x number.
- ◆ If the GSD 320 is connected to a network, then the IP addresses of the GSD 320 and QMG 220 must be set to a network-based address that is available on the network. The computer most likely acquires its IP address automatically so it is not necessary to set an address on the computer. However, you will need to temporarily set the computer's IP address in steps 2 through 12 of [System setup on page 45](#).
- ◆ If the GSD 320 is directly connected to the computer, then the IP addresses of the GSD 320 and QMG 220 must be set in the same range as the computer IP address. The computer should be set to a fixed IP address when using the direct connection.

DHCP

For the GSD 320 system, it is strongly recommended to set DHCP **'off'** on the QMG 220. If DHCP is left on, then each new assignment of an IP address (from the network) will require the user to repeat steps 16-28 in [System setup on page 45](#).

Refer to the QUADERA 'Readme' file for helpful information on "IP-Addresses" and "Point-to-point connections".

Software installation

To install QUADERA, insert the QUADERA installation CD into the CD-ROM drive. The installation procedure should start automatically after a few seconds.

If the installation procedure does not start within 30 seconds, the autostart function of the drive may be disabled. In this case, use Windows Explorer® to access the CD-ROM drive and execute the **index.html** file. Alternatively it is possible to execute the Setup.exe file from the software folder on the QUADERA CD, in which case you must also read the Readme.html file from the same software folder.

Refer to the QUADERA manual (QUADERA.pdf), located on the CD in the \Manuals folder, for further information on installing QUADERA.

System setup

To use the GSD 320 with QUADERA, the QMG 220 and GSD 320 Controller must be configured. Both devices are Ethernet based, so they each require a unique IP Address on the same network. The factory default IP Addresses are:

QMG 220 192.168.1.101
GSD 320..... 192.168.1.102

Use the following steps to set up the system for connection to a network.

NOTE

These instructions assume that the GSD 320 IP Address has not been changed via the Front Panel.

- 1 Connect the supplied crossover cable between the GSD 320 and the PC.
- 2 Set a fixed IP Address on the PC of 192.168.1.103 (with a required subnet mask of 255.255.0.0).

NOTE

Refer to Windows® Help on 'Configure TCP/IP Settings' for assistance on setting an IP Address.

- 3 Run QUADERA.

NOTE

Do not run the GSD 320 Add-in.

- 4 Use the menu selection **Device >> Device Setup** to open the Device Setup dialog. Press the **Search** button to open the Device Search dialog and search for the QMG 220. If no Device is shown, press the **Search** button multiple times until the Device is shown.
- 5 Select the QMG 220 found and use the **Add** button to add it to the system. The Device Search dialog will close.
- 6 Highlight the QMG 220 in the Device Setup list and press **Configure**.

NOTE

Do not press OK.

- 7 Enter an IP Address for the QMG 220 that is appropriate and available for your network and press the **Change** button to apply the changes.

NOTE

For direct connect systems: If the GSD 320 will not be used on a network, and will only be used with a direct connection to the PC, then changing this IP Address is not necessary. In this case, the GSD 320, QMG 220 and PC can all use addresses in the 192.168.x.x range and steps 9 through 13 can be skipped. Go directly to step 14.

NOTE

If the IP Address is changed using the step above then you must wait at least 6 minutes before continuing.

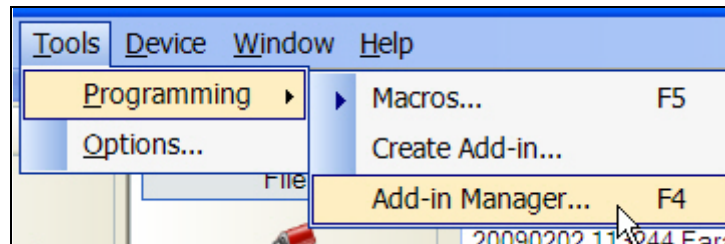
- 8 Close the Configure dialog.
- 9 Press **OK** in the Device Setup dialog. Ignore any error message that is displayed and press OK. The IP Address has been changed.
- 10 Exit QUADERA.
- 11 Change the GSD 320 IP Address from the front panel to an appropriate and available address for the network. Refer to [Changing the IP address on page 42](#) for detailed instructions on changing the IP Address from the front panel.
- 12 Change the IP Address on the PC to an appropriate and available address for the network or set it to 'Obtain an IP address automatically'.

NOTE

Refer to Windows® Help on 'Configure TCP/IP Settings' for assistance on setting an IP Address.

- 13 Start QUADERA.
- 14 Run the GSD 320 Add-in. Load the GSD 320 Add-in from the **Tools >> Programming >> Add-in Manager** menu selection (see [Figure 7-49](#)).

Figure 7-49 Add-in Manager Menu Selection



- 15 Select the GSD 320 check box and press the **OK** button to load the Add-in (see Figure 7-50). The main form of the GSD 320 Add-in will load. See Figure 7-51.

Figure 7-50 Selecting the GSD 320 Add-in to Start

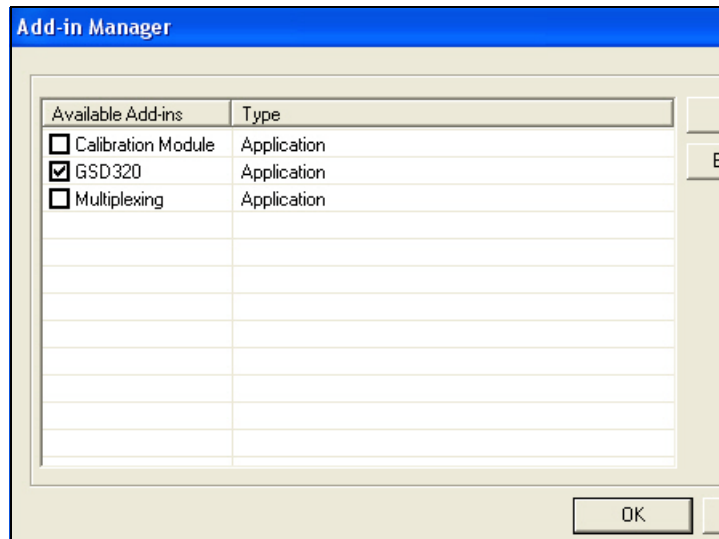
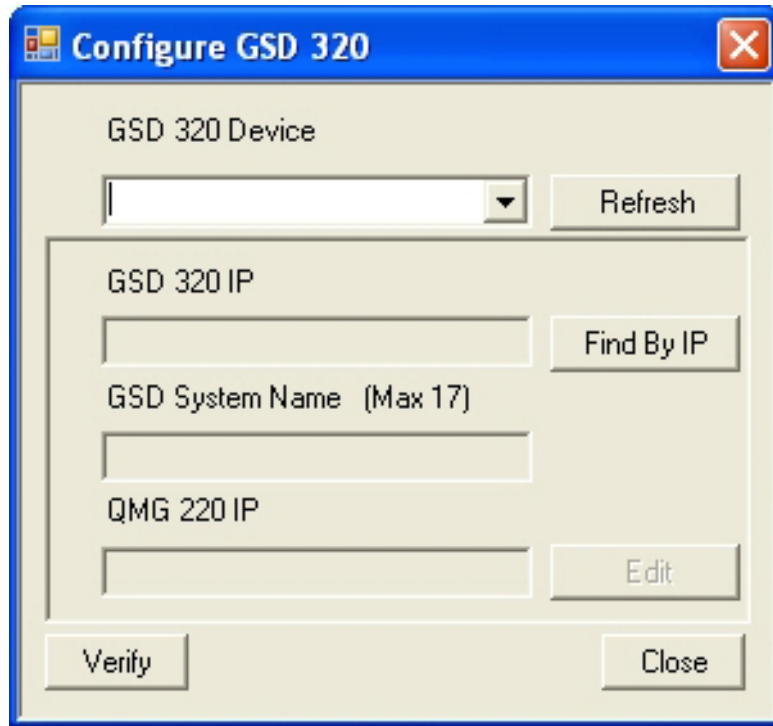


Figure 7-51 GSD 320 Add-in Main Form



- 16 Pick the GSD 320 Device from the Device drop down shown in [Figure 7-51](#). If no Device is shown, press the Refresh button multiple times until the Device is shown in the drop down list. If the GSD 320 appears in the Device list, then continue with [step 22 on page 50](#). If the GSD 320 does not appear in the device list, then continue to step 17.
- 17 Press the **Config** button as shown in [Figure 7-51](#) to open the Configure dialog shown below in [Figure 7-52](#).

Figure 7-52 GSD 320 Configure Dialog

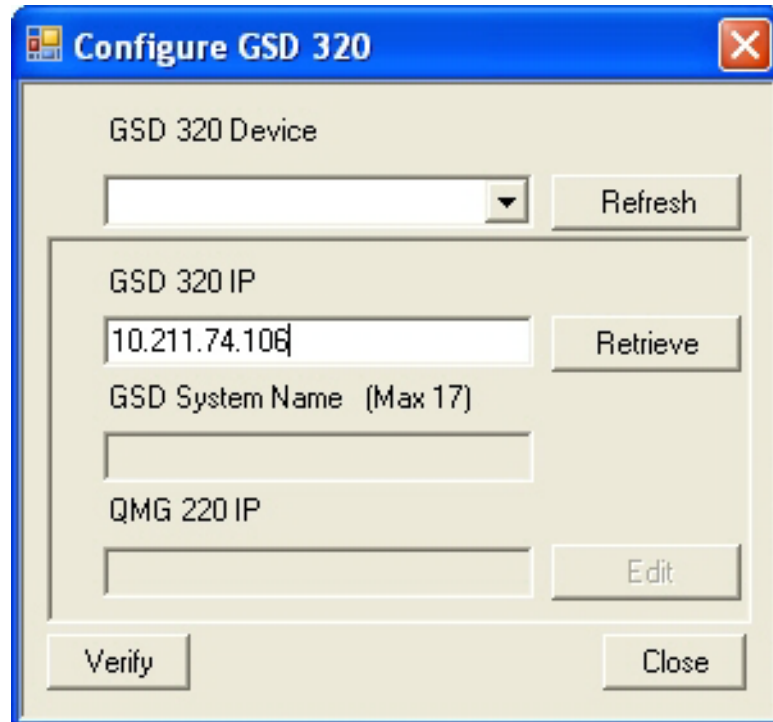


NOTE

The Configure dialog allows for configuration of the GSD 320 IP Address, Name, and its knowledge of the QMG 220 within the GSD 320. Since QUADERA primarily communicates with the QMG 220, this information is important. If the system has been preconfigured, the IP Addresses for the GSD 320 and QMG 220 will be set to the same network (e.g. 192.168.x.x).

- 18 Press the Find by IP button shown in [Figure 7-52](#).
- 19 Manually enter the GSD 320 IP address that is appropriate for your computer or network application.
- 20 Click on the Retrieve button as shown in [Figure 7-53](#).

Figure 7-53 Configuration Dialog Showing the Retrieve Button



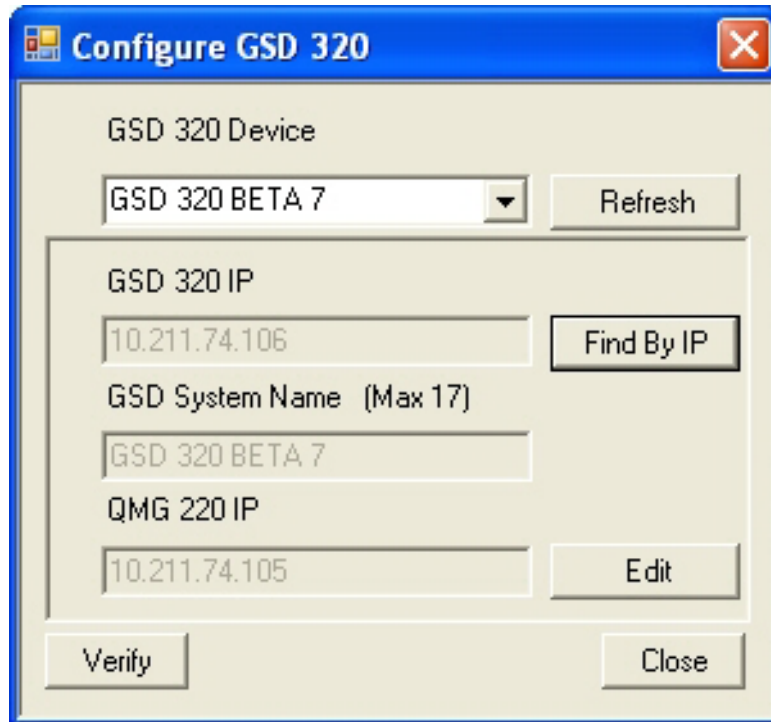
- 21 After clicking on the Retrieve button [Figure 7-54](#) should appear with the values appropriate for your system.

NOTE

If you were required to complete steps 17 through 21, then skip step 22 and continue on to step 23.

- 22 Press the **Config** button as shown in Figure 7-51 to open the Configure dialog shown below in Figure 7-52.
- 23 Press the **Edit** button shown in Figure 7-54.

Figure 7-54 Configuration Dialog showing the Edit Button



- 24 Change the QMG 220 IP Address to the same IP Address set in step 7 on page 45. This step is not actually changing the QMG 220 IP Address; it is changing the information used by the GSD 320 to understand which QMG 220 is within the system. **It is very important to enter this correctly.** If this IP Address already matches that used in step 7 then no change is required.
- 25 Press the **Update** button if a change was made in step 24.
- 26 In order to activate any new QMG220 address, close and re-open the GSD 320 Add-In Main Form.

NOTE

To re-open the Add-In Main Form select **Tools >> Programming >> Macros** to open the Macro Window. Next click on **Show_GSD320_Dialog** and select **Run**. The Add-In Main Form will then open.

You may instead select **Tools >> Programming >> Add-In Manager**, to open the Add-In Manager window. Next un-check the GSD 320 box and select **OK**. Re-open the Add-In Manager window, check the GSD 320 box and press **OK**. The Add-In Main Form will then open.

- 27 Next Press the **Config** button.

28 Press the **Verify** button. QUADERA will connect to the Device and verify the GSD 320 and QMG 220.

NOTE

This step is critical because it establishes the system relationship between the GSD 320 and QMG 220.

29 Close the Configure dialog.
The system is now ready to operate.

GSD 320 functionality from the add-in

The following list of functions is available from the GSD 320 Add-in (see [Figure 7-51](#)).

- Device This drop-down list allows selection of a GSD 320 that is connected to the system.
- Refresh. This button will search for GSD 320 devices and renew the Device list.
- Config. Provides access to the Configure dialog (refer to [Figure 7-52](#)).
- Service A dialog of information regarding the turbo pump and controller within the GSD 320.
- Recipe Allows browsing and selection of a recipe.

NOTE

A Scan Analog recipe can be run on the GSD 320 but the data will not be plotted in the bar chart panels. Scan Analog recipes do not contain individual measurement tasks (i.e. masses) and therefore cannot be plotted as individual mass bars. Use the main QUADERA working area (i.e. data graph) to see data output from a Scan Analog recipe.

- Save Measurement Project File. This check-box can be found by clicking on the Data File Setup button. The option must be chosen to save data.
- Mass. The masses of the Recipe are listed and can be selected to be displayed in the bar chart panels on the right of the Add-in.
- Min Range Sets the minimum value of the Y-axis in the bar chart panels on the right of the Add-in.
- Max Range. Sets the maximum value of the Y-axis in the bar chart panels on the right of the Add-in.

- Connect Connects QUADERA to the GSD 320 for communications and control. When connected, this button will display and function as 'Disconnect'.
- Pump Down Starts the pumping sequence to pump down the GSD 320 for operation.
- Run. Starts the measurement.
- Setup Input Trigger When enabled QUADERA will run according to the status of the digital inputs. Any user specifications will be saved until the user chooses to vary them, or disables the triggered runs mode.

NOTE

When the **Close Measure Project on Stop** check box is selected QUADERA will generate a different data filename for each trigger cycle.

If the **Start Immediately** check box is selected QUADERA will run automatically when the start trigger is activated.

- Stop Stops the measurement.
- Shut Down Starts the sequence to shut down the pumping system of the GSD 320.
- Bake Out Starts the Bake Out process, which uses the parameters of the Config dialog.
- Configure Bake Out Provides access to the Bake Out Configuration dialog (see [Figure 7-55](#)).
- Total Pressure Displays total analyzer pressure.
- Open Inlet. Opens the inlet.
- Errors and Warnings Displays warnings that correspond to errors occurring in the system.
- Status Displays the state of the system.



..... Filament Off



..... Filament On

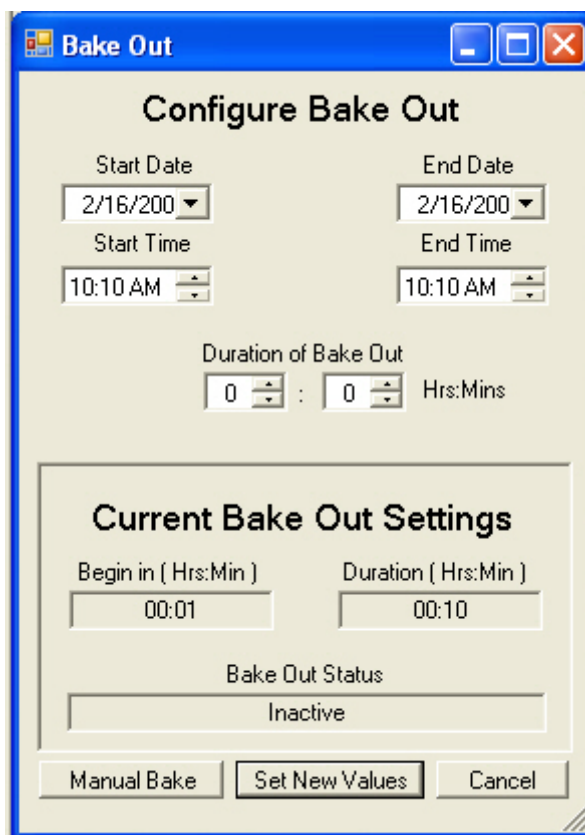


..... Electron Multiplier Off



..... Electron Multiplier On

Figure 7-55 Bake Out Configuration



The following settings are for configuring the Bake Out. These settings are interdependent, i.e. changing one may affect others:

- Start Date The next scheduled date on which Bake Out will start.
- Start Time The next scheduled time at which Bake Out will start.
- End Date The next scheduled date on which Bake Out will end.
- End Time The next scheduled time at which Bake Out will end.
- Duration of Bake Out The duration of hours and minutes Bake Out will run.

NOTE

Setting Start Date and Start Time does not actually start the timer to run the next Bake Out. Once these settings have been programmed, the Bake Out button on the GSD 320 Main Form must be pressed to start the timer.

The following settings are displayed to show the current Bake Out configuration. The current Bake Out configuration is contained within the GSD 320 and remains in effect until it is changed with the Set New Values button:

Begin in A count down in hours and minutes until the Bake Out will start.

Duration The duration of hours and minutes for which Bake Out will run.

Bake Out Status The current status of Bake Out.

The following functions are available in the Bake Out Config dialog:

Manual Bake Starts the Bake Out immediately, regardless of the Date and Time associated settings.

Set New Values Translates the 'Configure Bake Out' settings and programs them into the GSD 320, resulting in new 'Current Bake Out Settings'.

Cancel Cancels changes made to the dialog.

NOTE	
The GSD 320 must be pumped down in order to run Bake Out. Bake Out is not permitted if the system is not pumped down.	

8 Vari OmniStar

8.1 Safety

The Vari OmniStar safety instructions are in accordance with the information found in [Chapter 2, Safety](#).

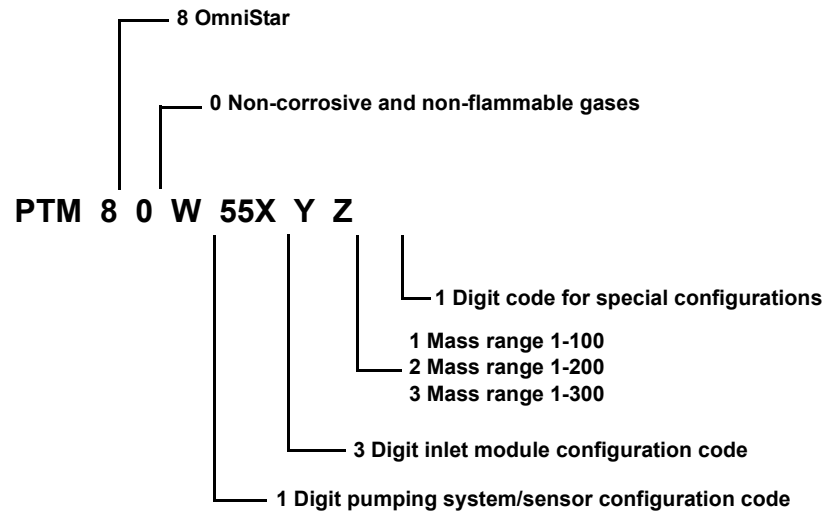
8.2 Intended Use

The GSD 320 Vari OmniStar with control valve EVR 116 and RVC 300 valve controller is designed for manual control as well as automatic analysis of non-corrosive and non-flammable gases (subject to the material compatibility, TLVs as well as Ex-limits).

Validity

This manual applies to the product:

Figure 8-1 Manual Validity Key



- ◆ RVC 300 Gas Dosing System Control Unit, PFI00792
- ◆ EVR 116 Regulating Valve, PFI39933

8.3 Design

The major components of the Vari OmniStar can be seen in Figure 8-2.

Figure 8-2 Vari OmniStar major components

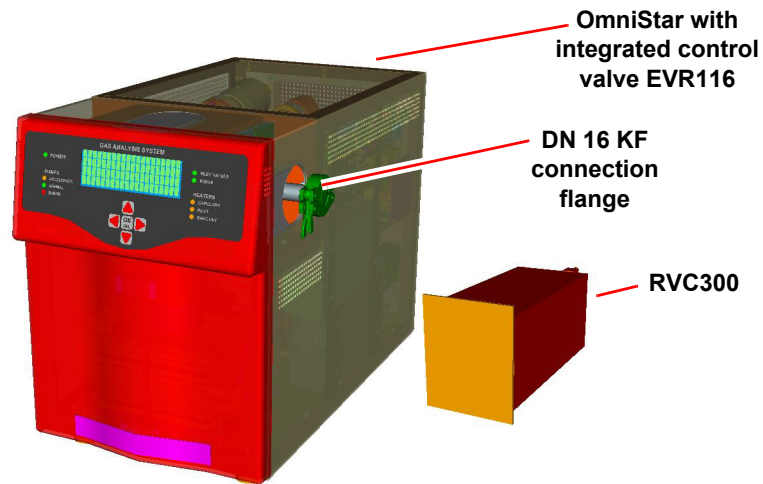
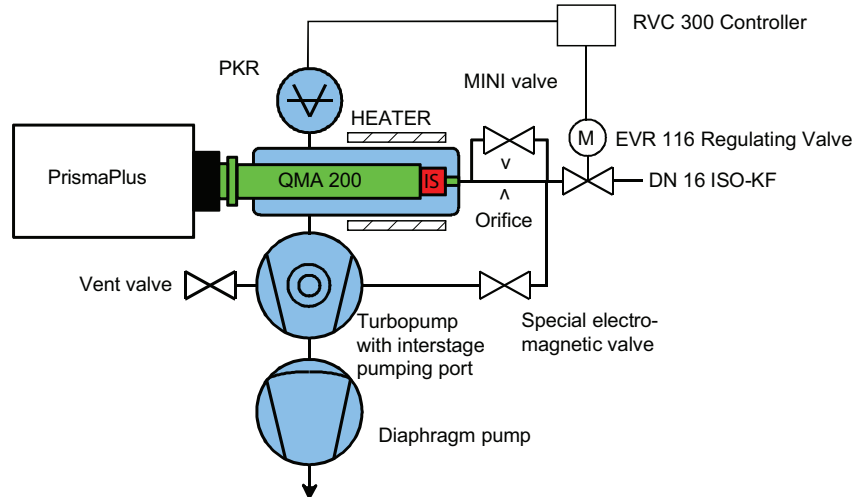


Figure 8-3 Vari OmniStar functional block diagram



The Vari OmniStar with control valve EVR 116 and valve controller RVC 300 allows for regulated sampling of gases in the pressure range between 5E-3 mbar and 1000 mbar. The system is connected to the process chamber to be sampled by a DN 16 KF flange. The gas flow rate from the process chamber into the analysis chamber of the Vari OmniStar is controlled by an EVR 116 control valve with RVC controller and two electromagnetically operated shut-off valves. The analyzer pressure to be regulated is measured by a full range PKR 251 total pressure gauge mounted to the analysis chamber. If the process pressure is less than 5E-3 mbar then the system will not achieve regulation yet will continue to sample with the vari valve open, the high-conductance valve open, and the bypass valve closed. If the analyzer pressure is measured as being above 1E-4 mbar then the valves will automatically close.

The status of the EVR 116 control valve as well as those of the two electromagnetically operated shut-off valves are indicated by the GSD 320 front panel. Depending on the process pressure, the control valve as well as the shut-off valves are set to allow for optimum pressure reduction with minimum gas fractionation into the analysis chamber. The Vari OmniStar is designed to track gradual changes in pressure and may not be able to handle extreme pressure changes or bursts.

At high process pressure, first the pressure is reduced by the EVR 116 control valve pumped by the inter-stage port of the HiPace 80 turbomolecular pump through the special electromagnetic valve which is also called the bypass valve. A second pressure reduction into the ion source of the mass spectrometer is performed by a platinum orifice.

At low process pressure, the pressure drop from the process pressure to the pressure in the mass spectrometer is performed by the control valve only. In this case the special electromagnetic valve to the turbopump is closed and the EVI 005 MI mini valve (also called the high-conductance valve) is opened.

8.4 Installation

Connecting the Vari OmniStar to the measurement point

The Vari OmniStar is connected to the measurement point with the DN 16 KF flange on the tube. The connecting line should be as short as possible to minimize additional dead volume and to obtain minimum response time.

Connecting the Vari OmniStar to controller RVC 300

There are four cables to be connected between the Vari OmniStar and RVC 300 controller.

One cable directly connects the RVC 300 controller to the EVR 116 control valve. This cable is installed on the Vari OmniStar already. Plug the connector to the corresponding **X9 VALVE** plug on the rear side of the RVC 300.

A second cable connects the PKR 251 total pressure gauge, located at the analysis chamber of the Vari OmniStar, to the RVC 300 controller. The cable is installed on the Vari OmniStar already. Plug the connector to the corresponding **X2 sensor** plug on the rear side of the RVC 300.

The third and fourth cables act as interface cables between the Vari OmniStar and the RVC 300 and transfers digital and analog signals in both directions. These cables are installed on the OmniStar already. Plug the connector to the corresponding plugs **X6 analog in/out** and **X7 digital in/out** on the rear side of the RVC 300 controller.

Power connection

Connect the Vari OmniStar to the power source according to [section 5.8 on page 29](#) of this operating manual. Refer to the RVC 300 Pressure Controller Operating Manual to connect the RVC 300 controller to the power source.

CAUTION

The same ground potential must be used for the Vari OmniStar and the RVC 300 controller.

8.5 Initial start up

Start up the Vari OmniStar according to [section 6.1 on page 30](#), and [section 6.2 on page 30](#) of this operating manual. Refer to the RVC 300 Pressure Controller Operating Manual to start up the RVC 300 controller.

Checking parameters on the RVC 300

The RVC 300 controller has been configured to operate correctly in combination with the Vari OmniStar. The settings must be checked before the first operation.

All settings are given in [Appendix A](#).

If any setting differs from the values shown in [Appendix A](#), change the parameter to the value shown in [Appendix A](#).

For changing parameter settings, refer to the RVC 300 Controller Operating Manual.

Temperature control

The inlet of the Vari OmniStar may be heated to a temperature of up to 70°C to prevent condensation of gases. Turn the inlet heater on using the front panel of the Vari OmniStar.

CAUTION
The heater should be switched on only if the heater insulation and the oven panels are in place. Otherwise, the preset temperature may not be reached.

Activation of the inlet system

The inlet system is set to a standby mode after the pump down of the Vari OmniStar. The automatic settings of the two electromagnetically operated valves and the control valve are started by activating the Vari OmniStar front panel as described in this section.

The front panel will display graphics which correspond to the state of the Vari OmniStar. Those states include Closed, In Regulation, Out of Regulation, and Maximum Pressure. The In Regulation and Out of Regulation states indicate that the valve is between the fully open and closed positions, and that the pressure is either in regulation or out of regulation. The percent that the valve is open is also displayed on the front panel and will be discussed in [Pressure Regulation Screen on page 59](#).

The analyzer pressure displayed on the front panel is the PKR 251 analysis chamber total pressure.

Normal Operation Screen

The **NORMAL** operation screen after pump down is shown in [Figure 8-4](#).

Figure 8-4 Normal Operation Screen, Closed

7.5E-09 mbar	Analyzer Pressure (Units are selectable from menu)
Vari Valve Closed	Vari Valve State
Inlet 70 C	Inlet Heater State
'→' to Start VariV	Status Line

From the Normal operation screen, press '→' to start RVC 300 pressure regulation or any other key to display the **Setup** screen.

Pressure Regulation Screen

The **REGULATION** operation screen when pumped down is shown in [Figure 8-5](#).

The symbols >+25+< are shown on the front panel to demonstrate how open or closed the valve is, and whether or not the analyzer pressure is in or out of regulation. The plus signs and inward arrows indicate the pressure as being in regulation. The number twenty five signifies the valve is 25 percent open. The front panel shown in [Figure 8-5](#) describes a system with a pressure within regulation and a valve open 25 percent. The front panel shown in [Figure 8-6](#) describes a system with a pressure out of regulation and the valve opened to 25 percent.

Figure 8-5 In-Regulation Operation Screen (RVC setpoint = 2.00E-06 mbar)

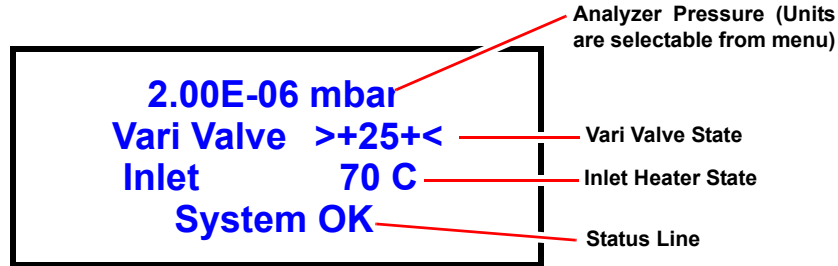
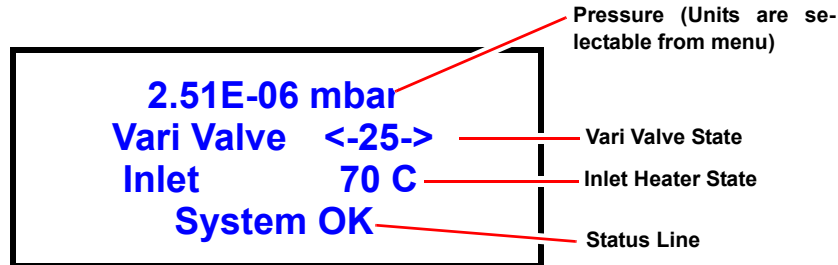


Figure 8-6 Out-of-Regulation Operation Screen (RVC setpoint = 2.00E-06 mbar)



Vari valve and high-conductance cycle

In order for the system to reach a pressure within the regulation range it may require the high conductance valve to open (turn on). The system will begin a cycle in effort to reach the acceptable pressure range by opening the vari valve. At this point the front panel will no longer display closed, but instead something similar to [Figure 8-6](#). As the vari valve gradually opens, the percent the valve is open will increase on the front panel display. If at some point during the vari valve opening an in-regulation pressure is achieved, then the minus symbols surrounding the percent open value will switch to plus symbols and the valve will remain at that position.

In some cases the system will not reach an in-regulation pressure despite the valve opening all the way. In this case the vari valve will shut and the high conductance valve will open. The vari valve will then begin the gradual process of opening until the system reaches a pressure within regulation.

Deactivating the Vari OmniStar Inlet

The **PRESSURE CONTROL** operation screen shown in Figure 8-7 is utilized to turn off the vari valve or to display the state of valves.

Figure 8-7 Setup → Pressure Control

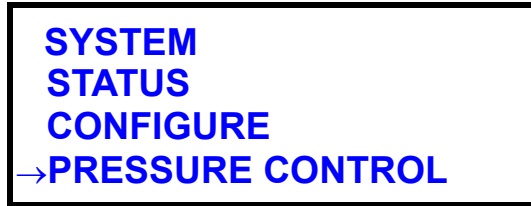
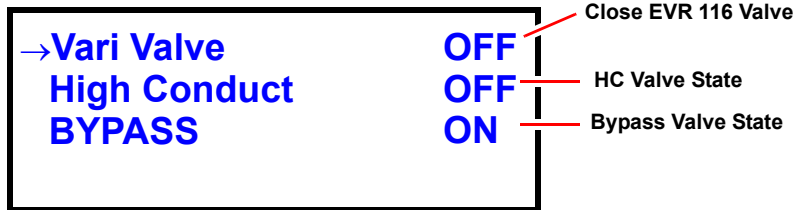


Figure 8-8 Deactivating Pressure Control Operation Screen



Protection of the Vari OmniStar against a fast pressure increase at the measurement point

The EVR 116 control valve in combination with the RVC 300 controller maintains the pressure within the analysis chamber of the Vari OmniStar to a constant value. Nevertheless, precautions must be taken if the pressure at the measurement point of the Vari OmniStar increases too fast.

CAUTION

The control valve has a finite reaction time to compensate for pressure changes at the measurement point of the Vari OmniStar. If the pressure increases too fast, then the control valve may not be quick enough to reduce the conductance. This may result in an overpressure condition in the analysis chamber of the Vari OmniStar. For example, if the process pressure will increase from 5E-3 mbar to 1000 mbar in less than 60 seconds, then the control valve must first be closed manually by deactivating the Vari inlet before the pressure increase starts. Refer to [Deactivating the Vari OmniStar Inlet on page 60](#) for deactivating the Vari inlet.

8.6 Vari OmniStar maintenance

Please contact your local Pfeiffer Vacuum service center if:

- ◆ the EVR 116 does not control correctly
- ◆ the orifice is blocked
- ◆ one of the valves does not open or close correctly

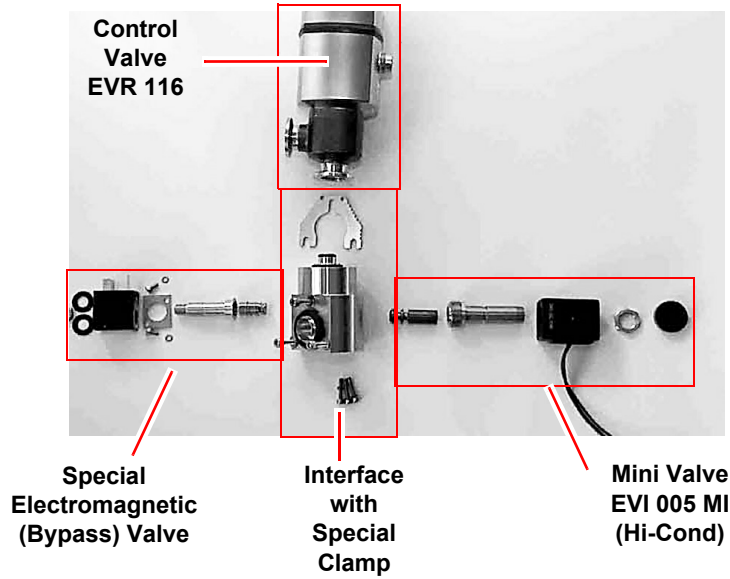
WARNING

Touching live parts is hazardous. Always disconnect the product from the mains prior to maintenance.

8.7 Overview of all parts in the inlet system

Figure 8-9 shows a completely disassembled inlet system.

Figure 8-9 Main components of the inlet system



8.8 EVR 116 Replacement

EVR 116 Replacement Procedure

WARNING

Service should only be completed by trained personnel.

WARNING

Observe all safety warnings per the manual.

WARNING

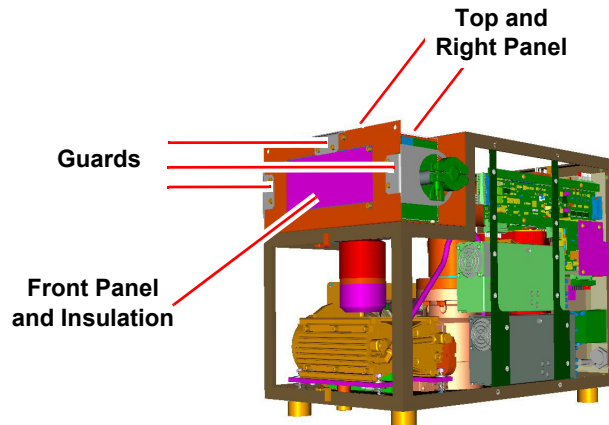
Disconnect power before attempting to service.

WARNING

Ensure unit has cooled before attempting to service heater components.

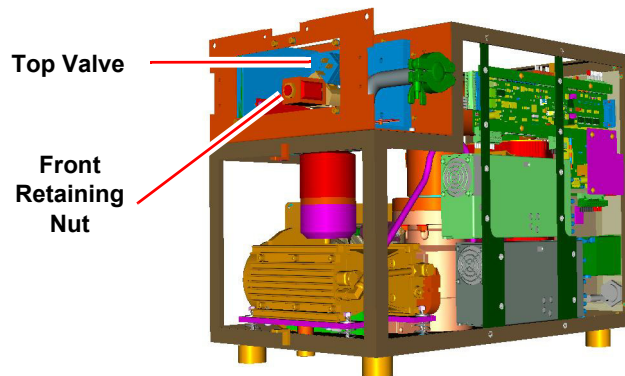
- 1 Remove the front and main covers from the GSD 320. See [Figure 8-10](#).

Figure 8-10 Removing the covers



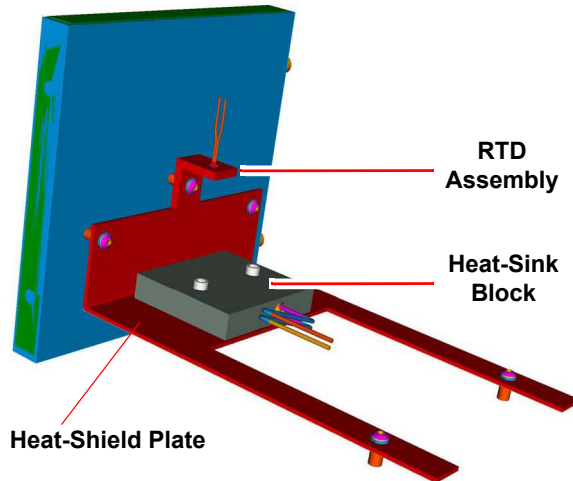
- 2 Remove left, right, and top access guards.
- 3 Remove the front panel.
- 4 Remove the insulation from inside the front wall.
- 5 Remove top panel and right panel from the oven box.
- 6 Disconnect wires from the top solenoid valve (bypass valve). See [Figure 8-11](#).

Figure 8-11 Top (bypass) valve and front retaining nut



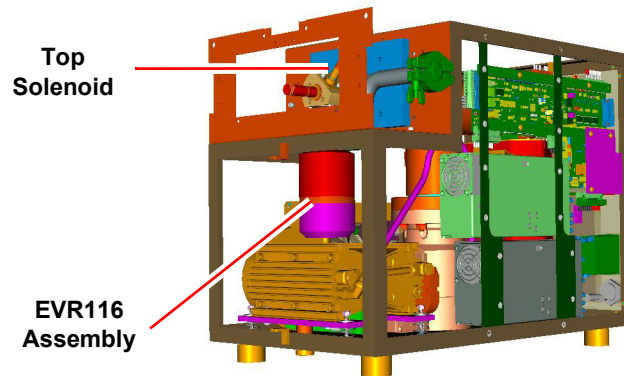
- 7 Remove Front Solenoid (high-conductance mini-valve) by removing the front solenoid retaining nut. See [Figure 8-11](#).
- 8 Remove the RTD assembly. See [Figure 8-12](#).
- 9 Remove heat-sink block. See [Figure 8-12](#).
- 10 Remove left side panel with the heat-shield plate. Carefully drape the RTD and heat-sink assembly leads over the frame.

Figure 8-12 Left side panel



11 Remove the top solenoid by removing the nut and two washers. See [Figure 8-13](#).

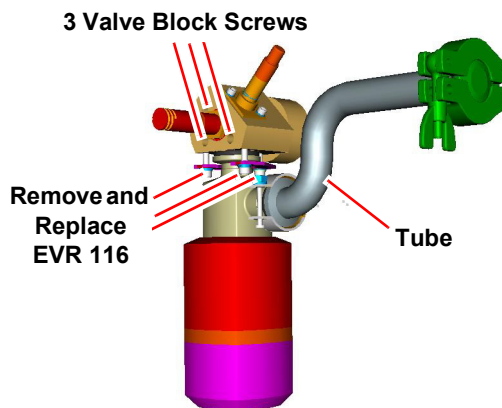
Figure 8-13 Removing top solenoid.



12 Remove the internal and external foam insulation from the bottom of the oven box. The external foam slides from the box brackets.

13 Unfasten the valve block from the inlet flange by removing three valve block screws. Then remove the entire pressure-regulating valve assembly from the system. See [Figure 8-14](#).

Figure 8-14 Removing the valve assembly and the valve



- 14** Remove and replace the EVR 116 by following the steps below. Be sure to keep the removed parts for the EVR116 replacement.
- 15** Uninstall the tube from the EVR 116 pressure-regulated valve.
- 16** Uninstall the pressure-regulating valve from the gas inlet block by removing three screws.
- 17** Install a new EVR116 valve assembly.
- 18** Reassemble the GSD 320.

9 Care of the GSD 320

9.1 Maintenance courses

Pfeiffer Vacuum offers maintenance courses for this product. Thorough examples and more detailed documentation from these courses enable the user to keep the equipment in proper working condition. For additional information, please contact your local Pfeiffer Vacuum service center.

9.2 Cleaning the unit

WARNING

Touching live parts is hazardous. Always disconnect the product from the mains prior to maintenance.

A slightly damp cloth normally suffices for cleaning the outside of the unit. Do not use any aggressive or scouring cleaning agents.

CAUTION

Make sure that no liquid can penetrate the product. Allow the product to dry thoroughly before putting it back into operation.

10 Maintenance

10.1 Shortening the Capillary (Omnistar)

Preconditions

- ◆ System switched off
- ◆ Capillary detached from measurement point
- ◆ Length of capillary still adequate after shortening

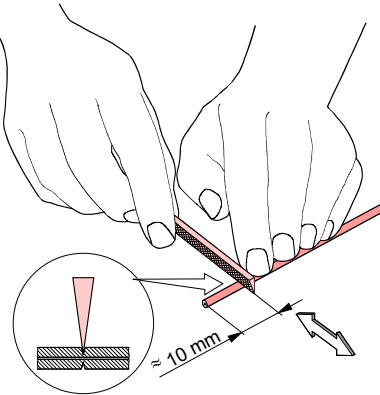
Required tools

- ◆ Tube cutter, capillary cutting tool or knife file.

Procedure

- 1 Make two opposing small indentations. See [Figure 10-1](#).

Figure 10-1 Making the indentations

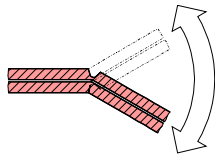


CAUTION

Maximum depth of indentations must not exceed 0.5 mm.

- 2 Bend the capillary until it breaks. See [Figure 10-2](#).

Figure 10-2 Bending the capillary



- 3 Turn on the system. Wait for 10 minutes (turbo pump acceleration time).

- 4 Check the pressure in the analysis chamber.
 - 4a The total pressure of the analysis chamber is displayed on the front panel of the GSD 320, or you can determine the total pressure by using the software program.
 - ♦ The displayed pressure should be $\geq 1 \times 10^{-6}$ mbar
 - ♦ The displayed pressure must not be $< 1 \times 10^{-6}$ mbar
Several possible causes are listed below:
 - Capillary clogged at the end
Solution: Shorten the capillary by additional 10 mm
 - Orifice clogged
Solution: Replace the orifice
 - Capillary clogged across the entire length
Solution: Replace the capillary
- 5 Connect the capillary to the measurement point.

10.2 Shortening the Capillary (Thermostar)

Preconditions

- ♦ System switched off
- ♦ Capillary detached from measurement point
- ♦ Length of capillary still adequate after shortening

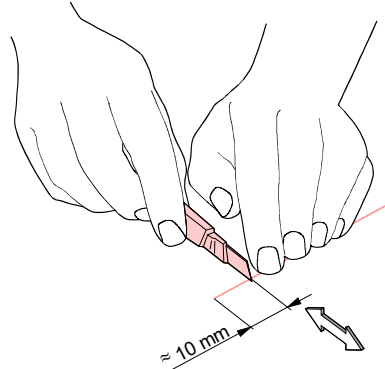
Required tools

- ♦ Diamond scribe (scribe for fused silica)

Procedure

- 1 Carefully notch the capillary. See [Figure 10-3](#).

Figure 10-3 Notching the capillary

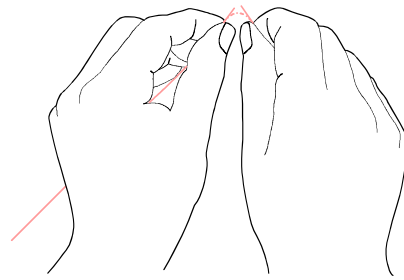


CAUTION

Do not exert pressure!
Wear safety glasses as quartz capillaries may splinter.

- 2 Break the capillary at the point notched previously. See [Figure 10-4](#).

Figure 10-4 Breaking the capillary



- 3 Turn on the system. Wait for 10 minutes (turbo pump acceleration time).
- 4 Check the pressure in the analysis chamber.
 - 4a The total pressure of the analysis chamber is displayed on the front panel of the GSD 320, or you can determine the total pressure by using the software program.
 - ◆ The displayed pressure should be $\geq 1 \times 10^{-6}$ mbar
 - ◆ If displayed pressure is $< 1 \times 10^{-6}$ mbar
Several possible causes are listed below:
 - Capillary clogged at the end
Solution: Shorten the capillary by additional 10 mm
 - Orifice clogged
Solution: Replace the orifice
 - Capillary clogged across the entire length
Solution: Replace the capillary
- 5 Connect the capillary to the measurement point.

10.3 Capillary replacement instructions

During normal operation, the capillary may become dirty and clogged due to process conditions. Perform the following procedure to replace the capillary.

CAUTION

Failure to follow this procedure can result in damage to the instrument.

- 1 Verify that the GSD 320 is shutdown in the proper manner.
- 2 Detach the capillary from the measurement point.
- 3 Remove mains power from the GSD 320.

CAUTION

Verify that the front panel transport locking rod has been removed. Refer to [section 5.2 on page 17](#).

- 4 Remove the front cover of the GSD 320 as described in [Removing the front cover on page 23](#). Next remove the heater box cover from the inlet oven, as described in [Removing the inlet heater box on page 24](#).
- 5 Remove the insulation as described in [Removing the insulation and adjusting the capillary on page 25](#). Now you are ready to change the capillary.
- 6 For changing a **quartz capillary** (ThermoStar) only:
 - 6a Use the capillary wrench (960-9001-P01) and nut driver (930-065-P1) provided in the ship kit to remove the quartz capillary. Position the capillary wrench on the body of the hex union as far back as possible to avoid twisting the capillary tube in the assembly. Place the nut driver on the hex nut and loosen the nut. See [Figure 10-5](#) and [Figure 10-6](#).

Figure 10-5 Capillary wrench on hex union

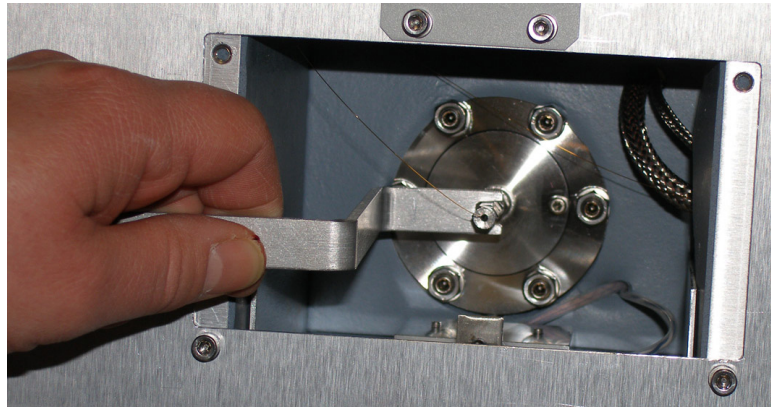
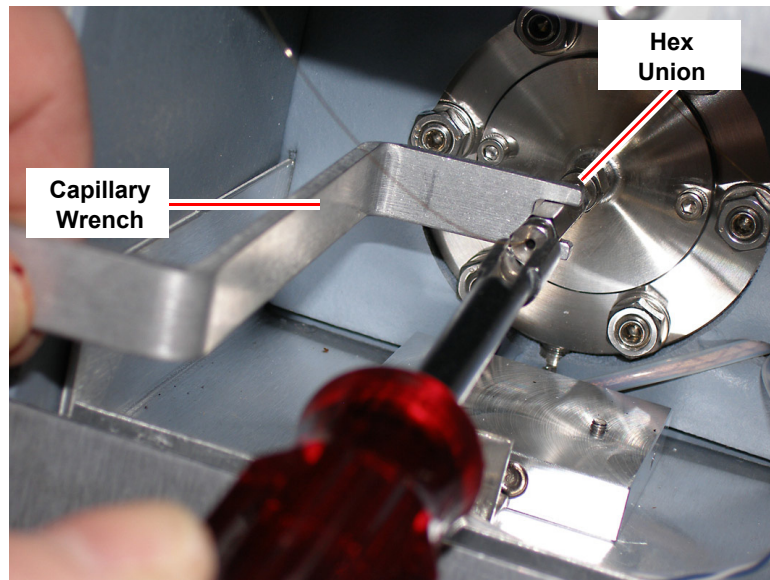


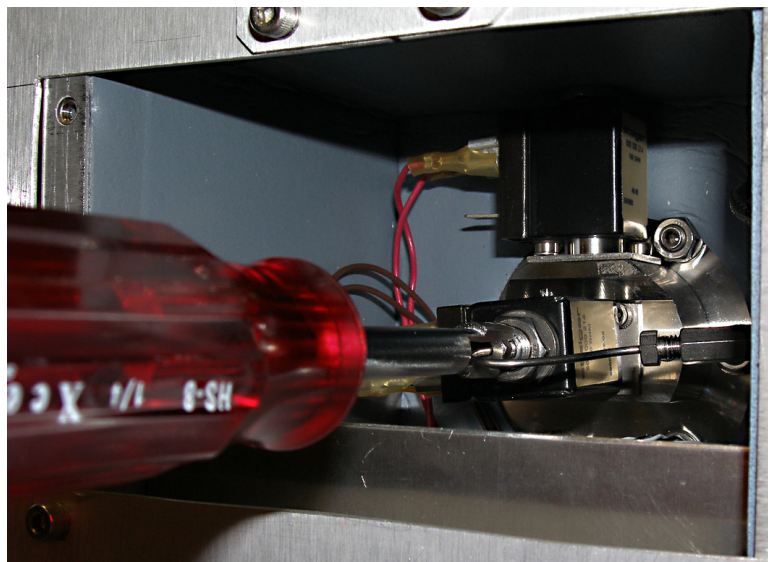
Figure 10-6 Nut driver on quartz capillary hex nut



- 6b Remove the hex nut, ferrule, and capillary from the unit.
- 6c Slide the hex nut and a new ferrule (B4119610DH) onto end A of the new capillary. Allow the capillary to extend 30 to 40 mm past the end of the ferrule.

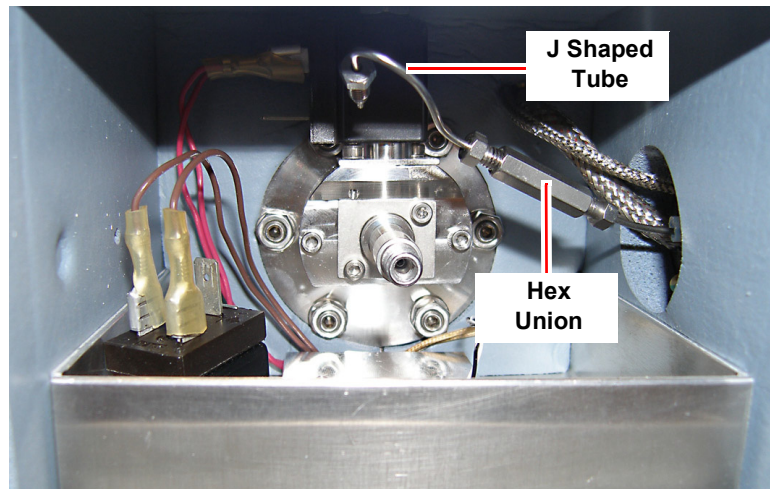
- 6d Carefully insert the capillary into the hex union and push the capillary until it stops. Engage the hex nut in the union. Pull the capillary back slightly (approximately 1 to 2 mm) so that it's not seated against the face of internal tube. Tighten the hex nut in the union so that the nut is finger tight.
 - 6e Place the capillary wrench on the body of the hex union and tighten the hex nut 3/4 of a turn (past finger tight) using the nut driver. Verify that the capillary is tight by gently tugging on the capillary.
 - 6f Carefully feed the capillary through the oven opening and capillary heater so that 50 mm of the quartz capillary extends beyond the end of the heater.
 - 6g Coil the excess capillary in the oven.
- 7 Changing a **stainless steel capillary** (OmniStar) only:
- 7a If necessary, cut off the fitting used to attach the capillary to the measurement point.
 - 7b Use the nut driver (930-065-P1) provided in the ship kit to remove the hex nut that attaches the J shaped tube to the inlet. See [Figure 10-7](#).

Figure 10-7 Remove stainless steel hex nut with nut driver



- 7c With the J shaped tube and hex union still attached to the capillary, pull the capillary out of the heater through the front oven. See [Figure 10-8](#).

Figure 10-8 Remove stainless steel capillary assembly



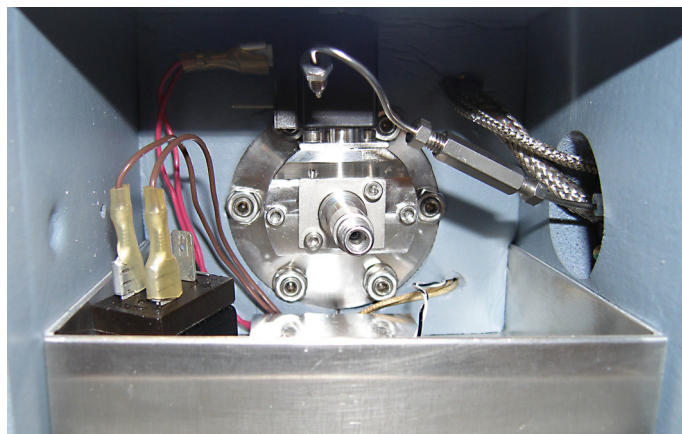
- 7d Disconnect the hex union from the old capillary.

NOTE

Ensure that the shape of J shaped capillary is not modified.

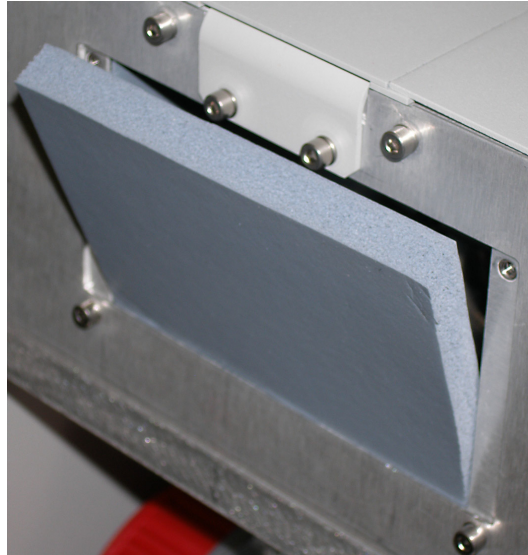
- 7e Install a nut and ferrule (B0141949) on one end of the new capillary and place them in the open end of hex union.
- 7f Tighten the hex nut using 1/4" wrenches.
- 7g Insert the free end of the capillary through the oven opening and into the opening of the capillary heater. Push the entire length of capillary through the heater. See [Figure 10-9](#).
- 7h Connect the J shaped tube to the inlet and tighten the nut using the nut driver.

Figure 10-9 Attach stainless steel capillary assembly



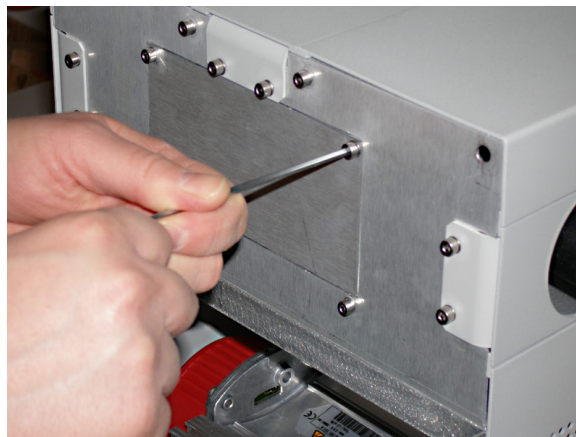
- 8 Install the foam insulation in the oven. Insert the bottom edge of the foam first so that the foam is held in place between the oven wall and plate. Next, insert the top half of the foam into the oven. Ensure that the quartz capillary is not pinched or kinked while installing the insulation. See [Figure 10-10](#).

Figure 10-10 Re-install foam insulation



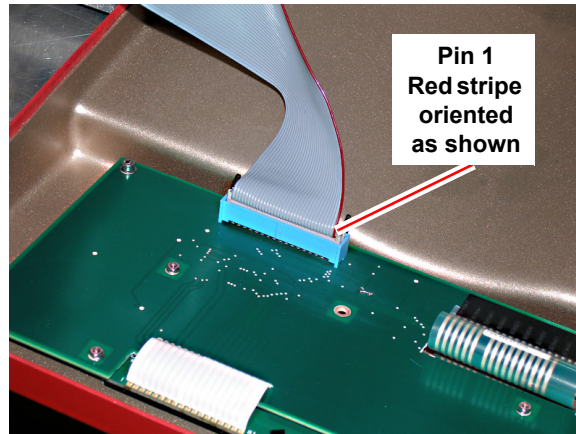
- 9 Install the inlet heater box cover and fasten in place with socket head cap screws. See [Figure 10-11](#).

Figure 10-11 Re-install inlet heater box cover



10 Connect the ribbon cable to the front panel. See [Figure 10-12](#).

Figure 10-12 Re-install front panel ribbon cable



11 Re-install the front panel in the following manner:

- 11a Insert the top spring pins into the frame so they engage slightly in their mating holes.
- 11b Engage the middle and bottom spring pins.
- 11c Gently tap around the edge of the panel to seat the spring pins in the frame.

12 If desired, re-install the front panel transport locking rod.

10.4 Inlet heater orientation instructions

To optimize orientation for the gas inlet for a given application, the capillary can be oriented to the top, left, or right. Proceed as follows to re-orient the gas inlet.

CAUTION

Failure to follow this procedure can result in damage to the instrument.

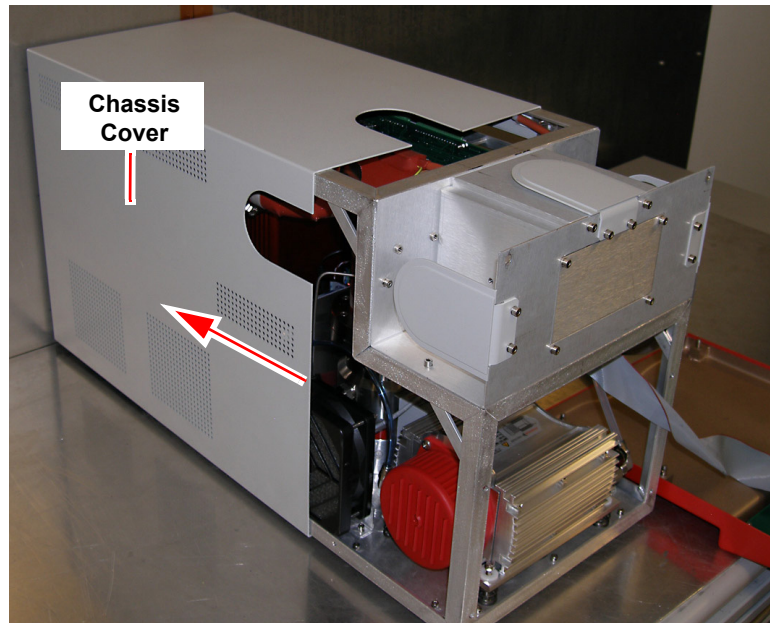
- 1 Verify that the GSD 320 is shutdown in the proper manner.
- 2 Detach the capillary from the measurement point.
- 3 Remove mains power from the GSD 320.

CAUTION

Verify that the front panel transport locking rod has been removed. Refer to [Removal of transport locking parts on page 17](#).

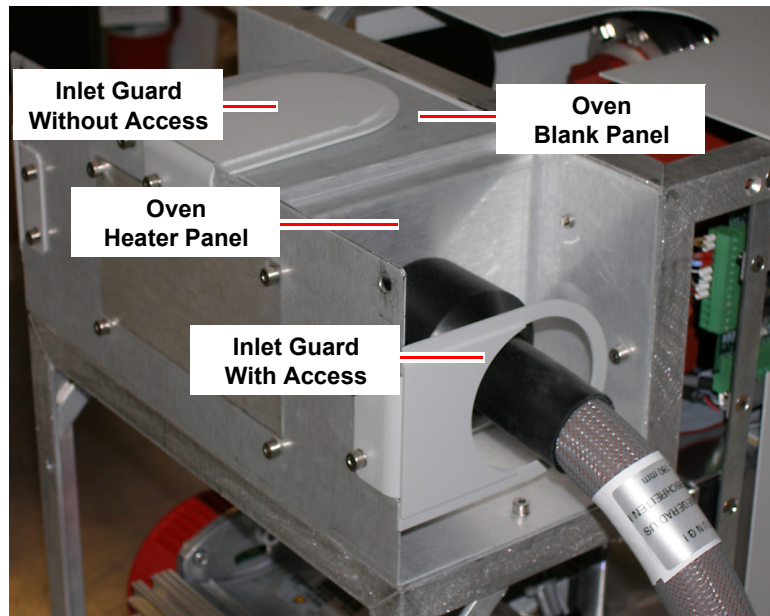
- 4 Remove the front cover of the GSD 320 from the frame in the manner described in [Removing the front cover on page 23](#).
- 5 Slide the chassis cover off of the GSD 320. See [Figure 10-13](#).

Figure 10-13 Slide chassis cover off



- 6 Remove the front panel and disconnect the capillary as described in [step 6 on page 69](#) for ThermoStar or [step 7 on page 70](#) for OmniStar.
- 7 Proceed as follows to change the heater inlet orientation from **side to top**. See [Figure 10-14](#) and [Figure 10-15](#).

Figure 10-14 Inlet side configuration



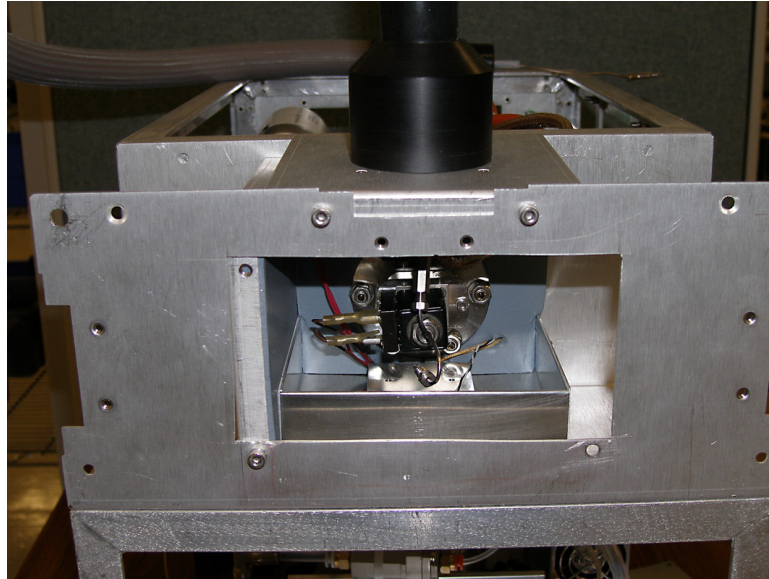
- 7a Remove the inlet guard with access from the heater line and remove the inlet guard without access from the top of the GSD 320. Use a 3 mm hex key to remove the socket head cap screws.
- 7b Remove (4) socket head cap screws in the oven panel that the heater line is attached.

- 7c Remove the oven blank panel from the top of the oven by removing (4) socket head cap screws.
- 7d Move the oven panel with the heater to the top of the GSD 320 and fasten in place with (4) socket head cap screws.

NOTE

There is slack in the length of the heater power cords for moving the panel, but it might be necessary pull additional length from inside the GSD 320.

Figure 10-15 Capillary inlet top configuration



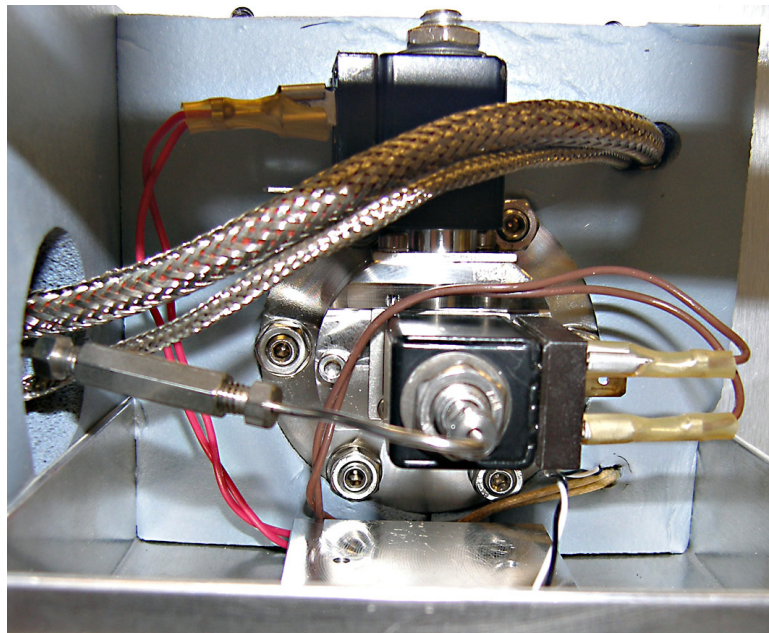
- 7e Install the oven blank panel in the side of the oven and fasten in place with (4) socket head cap screws.
- 7f Install the inlet guard with access on the heater line and inlet guard without access on the blank panel. Use (4) socket head cap screws to fasten guards in place.
- 7g Re-install the capillary line, foam insulation, and oven cover as described in [section 10.3 on page 68](#).
- 7h Place the chassis cover back on the GSD 320 and fasten it to the frame using (9) screws.
- 7i Install the front panel as described in [section 10.3 on page 68](#).
- 8 For changing the heater inlet orientation from **side to side**:
 - 8a Remove the inlet guard with access from the heater line and remove the inlet guards without access from the blank panels of the GSD 320. Use a 3 mm hex key to remove the socket head cap screws.
 - 8b Remove (4) socket head cap screws in the panel that the heater line is attached to.
 - 8c Remove the blank panels from the top and side of the oven by removing (4) socket head cap screws from each panel.
 - 8d For OmniStar units, the inlet solenoid valve must be rotated 180 degrees so that the electrical terminals are opposite of the heater line. Use a 13 mm wrench to remove the hex nut on the solenoid valve. See [Figure 10-16](#).

- 8e Move the panel with the heater to the side of the GSD 320 and fasten in place with four socket head cap screws.

NOTE

There is slack in the length of the heater power cords for moving the panel, but it might be necessary pull additional length from inside the GSD 320.

Figure 10-16 Capillary inlet opposite side configuration



- 8f Install the blank panels in the top and side of the oven and fasten each panel in place with (4) socket head cap screws.
- 8g Install the inlet guard with access on the heater line and inlet guards without access on the bland panels. Use (4) socket head cap screws to fasten guards in place.
- 8h Re-install the capillary line, foam insulation, and oven cover as described in [section 10.3 on page 68](#).
- 8i Place the chassis cover back on the GSD 320 and fasten it to the frame using (9) screws.
- 8j Install the front panel as described in [section 10.3 on page 68](#).

10.5 Removing the PrismaPlus from the GSD 320

The PrismaPlus must be removed from the GSD 320 to replace the filament.

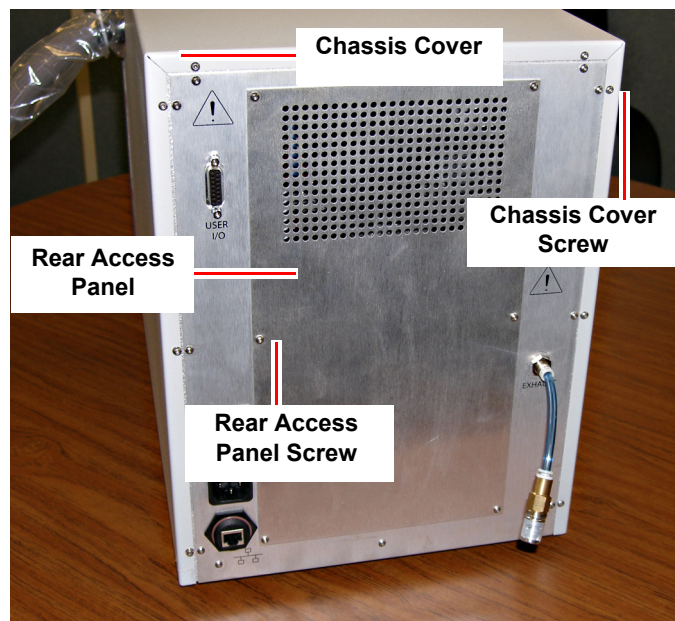
Tools Required

- ◆ M2 Hex Key
- ◆ M4 Hex Key
- ◆ M5 Hex Key

Procedure

- 1 Execute the GSD <Shutdown> function.
- 2 Remove mains power connection from GSD 320.
- 3 Using the M2 hex key remove the (6) screws that secure the rear access panel. The rear access panel is shown in [Figure 10-17](#).

Figure 10-17 Removing the rear panel and chassis screws



- 4 Using the M4 hex key remove the (9) screws that secure the chassis cover. The chassis cover is shown in [Figure 10-17](#).

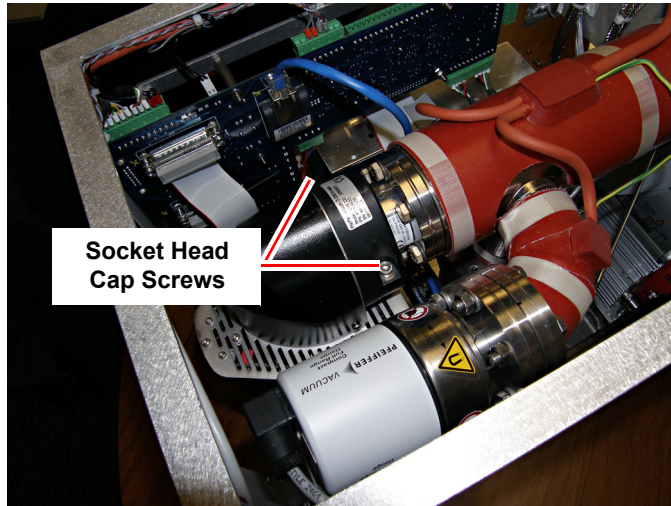
- 5 Slide the cover back and off the GSD 320. As shown in [Figure 10-18](#).

Figure 10-18 Sliding the cover back and off of the GSD 320



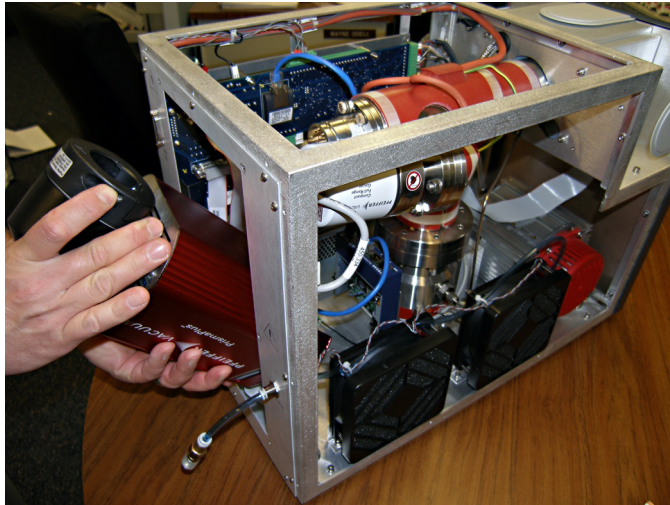
- 6 Loosen the (2) socket head cap screws with the M5 hex key. The screws are shown in [Figure 10-19](#).

Figure 10-19 The socket head cap screws



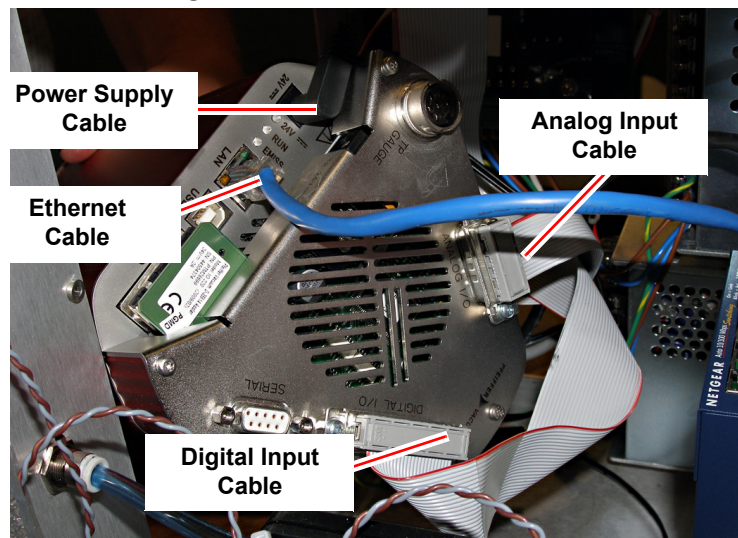
- 7 Slide the sensor away from the GSD 320 as seen in [Figure 10-20](#).

Figure 10-20 Removing the PrismaPlus Sensor



- 8 Disconnect the ethernet, analog input, digital input, and power supply cables shown in [Figure 10-21](#).

Figure 10-21 Removing the Cables



10.6 Filament replacement

NOTE

Instructions for replacing the filament for a Closed HS Ion Source can be found in the PrismaPlus Operating Manual BG 5214.

10.7 Filter Mat

Cleaning the filter mat

The filter mat at the air entrance has to be cleaned if a substantial layer of dust has accumulated. Use a vacuum cleaner to clean the filter mat. In case of severe Filter mat clogging, it is recommended to replace the filter mat.

Replacing the filter mat

Tools required

- ◆ Screwdriver Torx T10

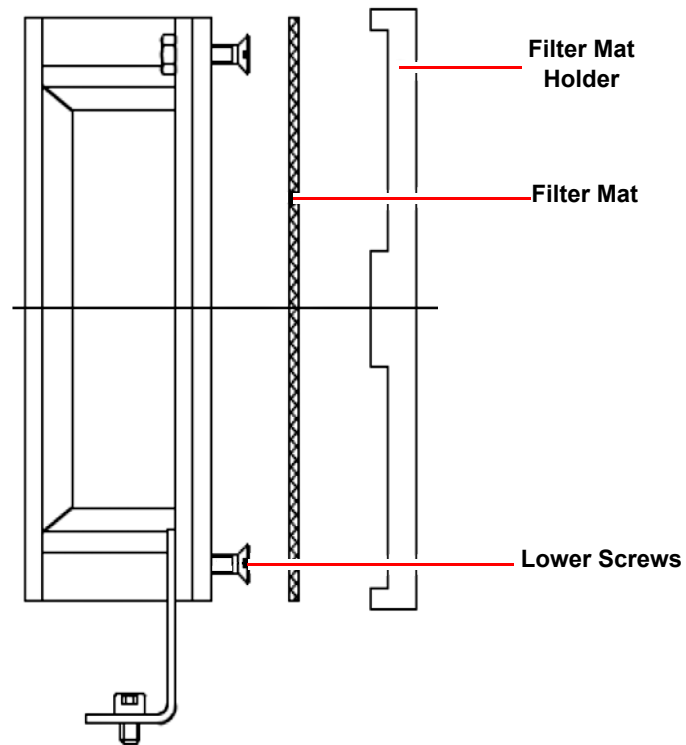
Procedure

- 1 Turn off the emission and C-SEM of the GSD 320 using the QUADERA software, or the front panel.
- 2 Wait 10 minutes (ion source cooling time).
- 3 Turn off the pumps via <Shutdown> command.
- 4 Wait for the system to be vented (approx. 10 minutes).
- 5 Turn off the power switch and unplug the power connector.
- 6 Remove the cover ([Refer to Removing the front cover on page 23](#)).
- 7 Pull the filter mat together with the holder off the ventilator with your hand. See [Figure 10-22](#).
- 8 Clean/replace the filter mat and place it together with the holder on the ventilator.
- 9 Reinstall the cover.
- 10 Reinsert the mains power connector.

11 Put the GSD 320 back into service.

12 Dispose of the used filter mat in accordance with the local regulations.

Figure 10-22 Cleaning and replacing the filter mats.



10.8 Replacing the orifice of the OmniStar

WARNING

When working in a vacuum area, always use clean tools, and wear lint free gloves.

Tools required

NOTE

The OmniStar gas inlet kit is required for orifice replacement on the GSD 320 OmniStar. Ordering Number: PT 162 001

- ◆ Special tool for GSD 320
- ◆ Open ended wrenches size 13 and 1/4 inch
- ◆ Hexagon socket wrenches sizes 2.5 and 3

WARNING

When working with a corrosive system parts that come in contact with process gas may possibly be contaminated.

Procedure

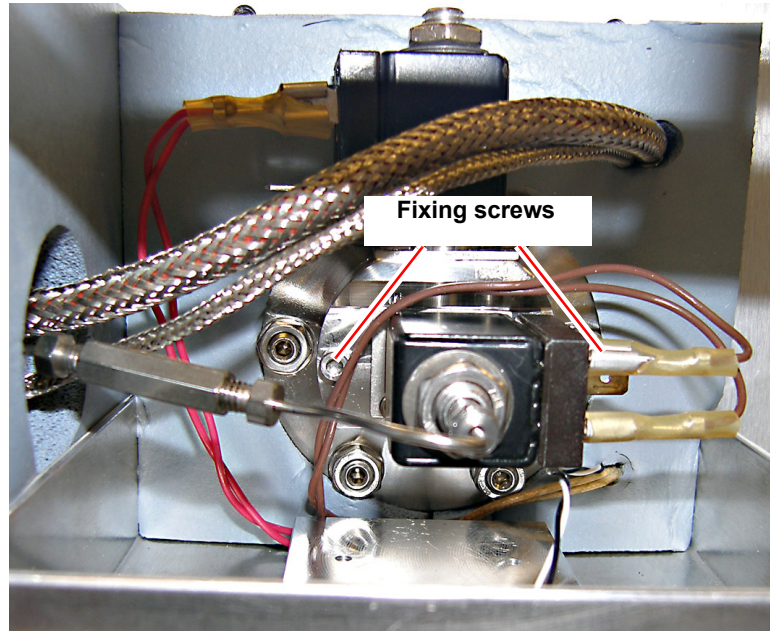
- 1 Turn off the emission and C-SEM of the GSD 320 using the QUADERA software or front panel.
- 2 Wait ten minutes (ion source cooling time).
- 3 Turn off the pumps by the <Shutdown> command.
- 4 Wait for the system to be vented (approx. 10 minutes)
- 5 Remove the mains power connector from the GSD 320.
- 6 Remove the front cover of the GSD, the inlet heater box, and the insulation according to [Removing the front cover on page 23](#), [Removing the inlet heater box on page 24](#), and [Removing the insulation and adjusting the capillary on page 25](#) of this manual.

CAUTION

If the capillary is still hot, allow it to cool down.

- 7 Detach the capillary from the gas inlet valve using a 1/4 in open-end wrench.
- 8 Use the M2.5 hex key to remove the (2) fixing screws from the gas inlet flange. The two fixing screws are shown in [Figure 10-23](#).
- 9 Lift the gas inlet out of the GSD 320.

Figure 10-23 Removing the two fixing screws



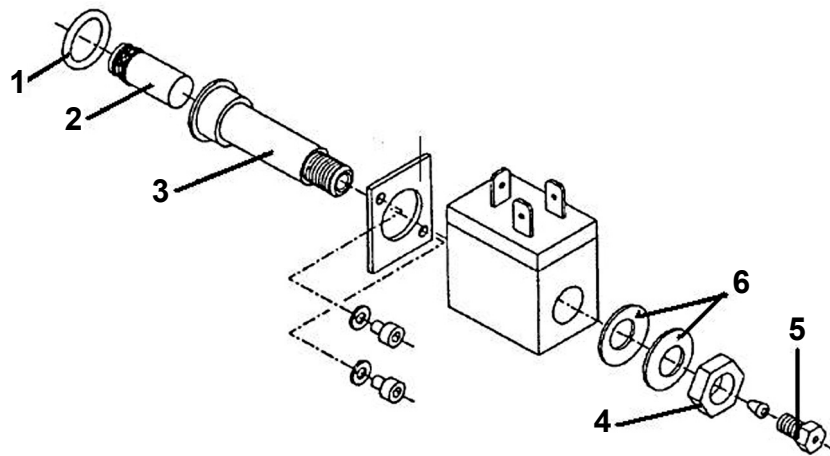
NOTE

Step 15 through Step 23 apply to both valves.

- 10 With open-end wrench size 13 unfasten the nut and remove the spring washers.
- 11 Pull the magnet off the guiding tube.
- 12 Using a hexagon socket wrench size 2.5 remove the (2) screws from the retaining plate 2.

13 Replace the plunger with spring, seal, and O-ring 12.42 X 1.78 (Refer to Figure 10-24). Check the sealing surfaces and clean them if necessary.

Figure 10-24 Removing the plunger



- 1 O-Ring
- 2 Plunger
- 3 Guiding tube
- 4 Nut
- 5 VICI Pressing Screw
- 6 Spring Washers

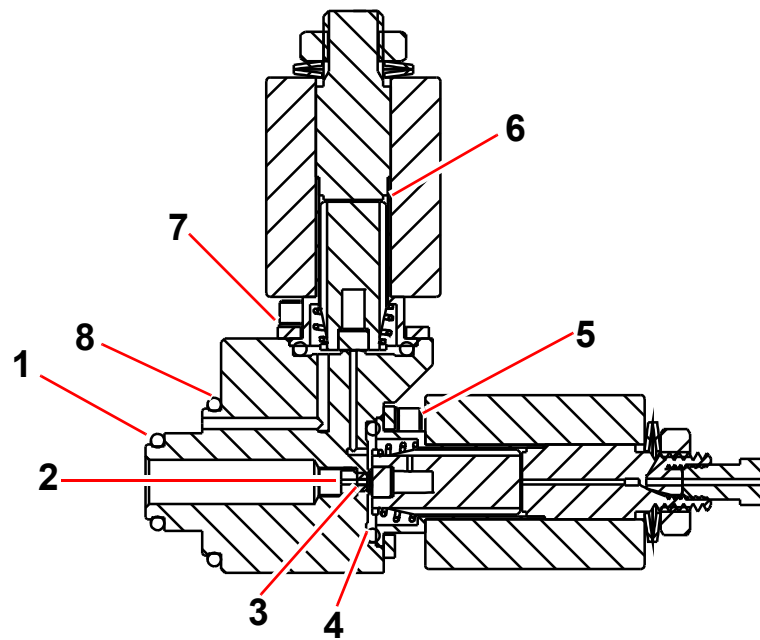
14 Check the sealing surfaces of the gas inlet and gas inlet flange and clean them if necessary.

15 Replace the O-rings 9.25 x 1.78 and 18.77 x 1.78. (See Figure 10-25.)

16 Replace the pressing screw and orifice of the gas inlet flange if necessary. (See Figure 10-25.)

17 Proceed in reverse order to reassemble the valve.

Figure 10-25 Valve Assembly



- 1 O-ring 9.25 x 1.78
- 2 Retaining Screw
- 3 Orifice
- 4 O-ring 12.42 X 1.78
- 5 Screw M3 X 6
- 6 Plunger with Spring and Seals
- 7 Plate
- 8 O-ring 18.77 X 1.78

18 Reinstall the gas inlet in the GSD 320 and connect the capillary.

19 Plug in the electrical connections of both valves.

CAUTION

Be careful not to mix up the valve cables.

20 Place insulation back inside the heater box, replace heater box cover, and front cover to the GSD 320.

21 Plug in the mains power connector.

22 Put the GSD 320 into operation using the QUADERA software or the front panel.

23 Dispose of the replaced parts in accordance with local regulations.

10.9 Replacing the orifice of the ThermoStar

WARNING

When working in a vacuum area, always wear lint free gloves and use clean tools.

Tools required

NOTE

A ThermoStar gas inlet kit is required for orifice replacement on the GSD 320 ThermoStar. Ordering Number: PT 162 002

- ◆ Special tool for GSD 320
- ◆ Open ended wrenches size 13 and 1/4 inch
- ◆ Hexagon socket wrench size 2.5

WARNING

When working with a corrosive system parts that come in contact with process gas may possibly be contaminated.

Procedure

- 1 Turn off the emission and C-SEM of the GSD 320 using the QUADERA software or front panel.
- 2 Wait ten minutes (ion source cooling time).
- 3 Turn off the pumps by the <shutdown> command.
- 4 Wait for the system to be vented (approx. 10 minutes).
- 5 Remove the mains power connector for the GSD 320.
- 6 Remove the front cover of the GSD 320, the inlet heater box, and the insulation according to [Removing the front cover](#), [Removing the inlet heater box](#), and [Removing the insulation and adjusting the capillary sections](#) of this manual.

CAUTION

If the capillary is still hot, allow it to cool down.

- 7 Using an open ended wrench size 1/4 inch detach the quartz capillary from the gas inlet flange.

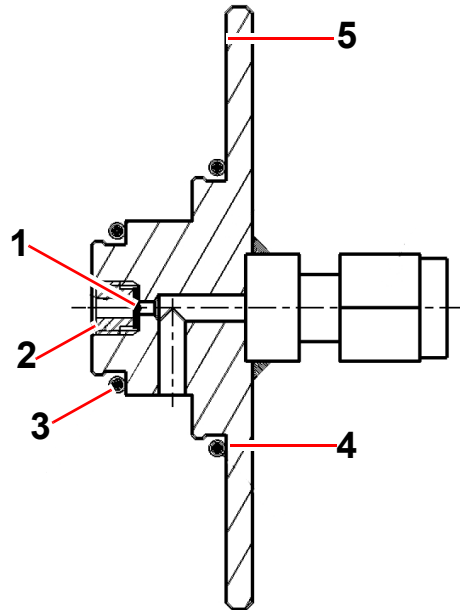
DANGER

Quartz capillaries break easily. Wear protective goggles.

- 8 Unfasten the M3 x 6 screws. (See [Figure 10-26](#).)
- 9 Lift the complete gas inlet out of the GSD 320.
- 10 Replace the pressing screw and orifice. (See [Figure 10-26](#).)

- 11 Replace the O-rings 9.25 x 1.78 and 18.77 x 1.78 (See Figure 10-26). Check the sealing surfaces of the gas inlet flange and clean them if necessary.

Figure 10-26 Gas inlet ThermoStar



- 1 Orifice
 2 Pressing Screw
 3 O-ring 9.25 x 1.78
 4 O-ring 18.77 x 1.78
 5 Screw M3 x 6

- 12 Proceed in reverse order to mount the gas inlet into the GSD 320.
 13 Reconnect the quartz capillary to the gas inlet flange.
 14 Place insulation back inside the heater box, replace heater box cover, and front cover to the GSD 320.
 15 Plug in the mains power connector.
 16 Put the GSD 320 back into operation.
 17 Dispose of the replaced parts in accordance with local regulations.

10.10 Diaphragm pump maintenance

NOTE

For questions regarding the diaphragm pump please reference the diaphragm pump operating manual: PK 0217 BN.

- ◆ All bearings are encapsulated and filled with long life lubricant.
- ◆ Under normal conditions the diaphragm pump is maintenance free.
- ◆ The valves and diaphragms are wear parts.
- ◆ It is necessary to perform the proper procedures if the rated ultimate vacuum is not achievable:
 - ◆ Clean the pump interior, diaphragms and valves.
 - ◆ Diaphragms and valves must be checked for cracks and damaged.
- ◆ To replace the diaphragm please pay attention to the corresponding operating instructions.
- ◆ Regular checking and cleaning of the pump heads is more efficient in some cases.
- ◆ In cases of normal wear, the diaphragm and valves have a lifetime of >10000 operating hours.

10.11 Turbo pump maintenance

NOTE

For questions regarding the turbo pump please reference the turbo pump operating manual: PT 0208 BN.

- ◆ Clean the turbo pump externally with a lint free cloth and a small amount of industrial alcohol.
- ◆ Change the operating fluid reservoir at least every four years. Please pay attention to the corresponding operating instructions.
- ◆ Change the turbo pump bearing at least every four years. Contact your Pfeiffer Vacuum service location.
- ◆ Clarify shorter change intervals for extreme loads or impure processes with your local Pfeiffer Vacuum Service.
- ◆ For all other cleaning, maintenance or repair work, please contact your Pfeiffer Vacuum service location.

10.12 Maintenance and service schedule

Assembly Part number	Quantity per unit	Function	Operating time in hours/weeks				Operating Manual	Rep. level	Place	Test facilities Comments	Material Designation	Part No.
			160	8600	17200	<25800						
GSD 320 Basic unit, housing												
Ventilator 51-0004	1	Clean filter mat	X(3)					I	os	Depending on severity of contamination		
		Replace filter mat		X				I	os	Concurrent with overhaul	Set of filter mats (10 pcs)(V)	BN 846 136 - T
GSD 320 Basic unit, vacuum system												
MVP 020/3	1	Replace diaphragm	X(1)			PK 0217 BN		II	os	Usual lifetime of >10000 operating hours	Wearing parts kit	PU E22 003-T
		Replace pump						II	os	In case of malfunction	Exchange MVP 020	PK T01 151 #A
HiFace 80	1	Change operating fluid			X(3)	PT 0208 BN		II	os	Special tool, at least every 4 years	Lubricant reservoir	PM 143 740-TT
		Replace bearing			X(3)			II	ws	At least every 4 years or after 3 years of idle time	Exchange pump	PM P02 812C#A
		Exchange pump						II	os	In case of malfunction	Exchange HiFace 80	PM P02 812 C#A
PKR 251 PT R26 002	1	Cleaning, alignment		X		BG 805 119 BN		II	os	Concurrent with overhaul	Maintenance kit	BN 846 239 - T
Analyzer	1	Replace Filament				BG 5214		II	os	In case of malfunction	Tungsten filament Yttriated Iridium filament	BN 846 281-T BN 846 395-T
GSD 320 Gas inlet												
Of ThermoStar	1	Replace orifice and capillary	X(3)					I	os	or in case of malfunction	Spare parts kit	PT 162 002
		Replace gas inlet						II	os	In case of malfunction	Replacement gas inlet	PT 162 003
Of OmniStar	1	Replace plunger and seals Replace orifice	X(3)					II	os	Or in case of malfunction	Spare parts kit	PT 162 001
		Replace capillary	X(3)					I	os	Or in case of malfunction	Spare parts kit	PT 162 001
		Replace gas inlet						II	os	In case of malfunction	Replacement gas inlet	PT 162 004
GSD 320 Accessories												
Calibration Device	1	Replenish Replace glass tube Replace plunger and seals						II	os	When necessary	5 ml PFTBA	B 2705 421
								II	os	In case of malfunction	From spare parts kit	BN 841 310 - T
					X(3)			II	os	In case of malfunction	Seals Kit	BN 841 310 - T

Legend:

Repair Level I	Customer
Repair Level II	Customer with Technical Support Training or Pfeiffer Vacuum Service Engineer
Repair Level III	Customer with Pfeiffer Vacuum service Training or Pfeiffer Vacuum Service Engineer

* Functional check, cleaning if required, replenish lubricant, repair, adjust, tighten, test for leaks

X Carry out maintenance work

1 Process dependent

2 Dependent upon media facility

3 Dependent upon environment and/or application

(4) Included in one year maintenance kit

(5) Included in two year maintenance kit

(V) Consumable material

OS: on-site/on customer's system

WS: work shop

Replacement: Module is replaced by a new one

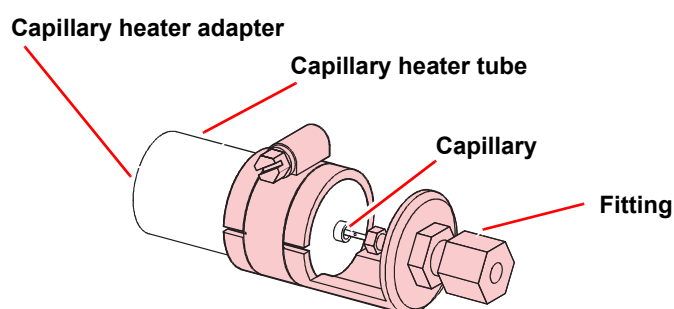
Exchange (#A): Module can be replaced by an overhauled module, if available

= Maintenance Work

11 Accessories

Description	Ordering number	Available from
Tube cutter TT-6	082780	SGE International Pty Ltd,
Capillary cutting tool CTT (or compatible products of other manufacturers)	0625010	Scientific Glass Engineering 7 Argent Place, Ringwood Vic 3134, Australia or any of their national distributors
Capillary heater adapter	BG 442 778 -T	Pfeiffer Vacuum

Figure 11-1 Capillary heater adapter



12 Spare parts

12.1 Introduction

When ordering spare parts, always indicate:

- ♦ all information on the product nameplate
- ♦ description and ordering number

12.2 Parts for both systems

Description	Ordering Number
Tungsten Filament (standard)	BN 846 281 -T
Iridium yttriated	BN 846 395 -T

12.3 OmniStar

Description		Ordering Number
Gas inlet consumables set, consisting of:		PT 162 001
Stainless steel capillary	0.12 mm 5 m	
Ferrule	4	
O-ring	12.42 mm × 1.78 mm	3
O-ring	18.77 mm × 1.78 mm	2
O-ring	9.25 mm × 1.78 mm	2
Orifice	0.025 mm	2
Press screw	1	
Plunger FPM	3	
Nut	1	

12.4 ThermoStar

Description		Ordering Number
Gas inlet consumables set, consisting of:		PT 162 002
Quartz capillary	0.23 mm / 0.15 mm 5 m	
Ferrule	0.3 mm 10	
Coupling	1	
O-ring FPM ^{1/4} +3	18.77 mm × 1.78 mm	1
O-ring FPM	9.25 mm × 1.78 mm	1
Orifice	0.025 mm	1
Press screw	1	

13 Service

Pfeiffer Vacuum offers first-class service!

- ◆ Operating fluid and bearing change on the spot by Pfeiffer Vacuum Field Service
- ◆ Maintenance / repair in the nearby Service Center or Serviceability
- ◆ Fast replacement with exchange products in mint condition
- ◆ Advice on the most cost-efficient and quickest solution

Detailed information, addresses and forms at: www.pfeiffer-vacuum.com (Service).

Maintenance and repair in the Pfeiffer Vacuum Service Center

The following steps are necessary to ensure a fast, smooth servicing process:

- ➔ Download the forms "Service Request" and "Declaration of Contamination".¹⁾
- ➔ Fill in the "Service Request" form and send it by fax or e-mail to your service address.
- ➔ Include the confirmation on the service request from Pfeiffer Vacuum with your shipment.
- ➔ Fill in the declaration of contamination and include it in the shipment (required!).
- ➔ Detach all accessories.
- ➔ Leave drive electronics on the pump.
- ➔ If possible, ship unit in the original packaging.

Sending of contaminated pumps or devices

No units will be accepted if they are contaminated with micro-biological, explosive or radioactive substances. "Hazardous substances" are substances and compounds in accordance with the hazardous goods directive (current version). If units are contaminated or the declaration of contamination is missing, Pfeiffer Vacuum performs decontamination at the shipper's expense.

- ➔ Neutralize the unit by flushing it with nitrogen or dry air.
- ➔ Close all openings airtight.
- ➔ Seal the unit in suitable protective film.

Exchange unit

The factory operating parameters are always preset with exchange units. If you use changed parameters for your application, you have to set these again.

Service orders

All service orders are carried out exclusively according to our repair conditions for vacuum units and components.

1) Forms under www.pfeiffer-vacuum.com

14 Disposal

DANGER

Danger: Contaminated parts.
Contaminated parts can be detrimental to health and environment.
Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

WARNING

Warning: Substances detrimental to the environment.
Electric components can be detrimental to the environment and are subject to specific disposal regulations.
Dispose of such components in accordance with the relevant local regulations.

WARNING

Warning: Substances detrimental to the environment.
Products, operating fluids etc. can be detrimental to the environment and might be subject to specific disposal regulations.
Dispose of such substances in accordance with the relevant local regulations.

14.1 Separating the components

After disassembling the product, separate its components according to the following criteria.

- Contaminated components** Contaminated components (radioactive, toxic, caustic, or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.
- Other components** Such components must be separated according to their materials and recycled.

AO

AO1 Signal sensor
AO2 Valve signal
AO 3 Valve position
AO 4 +10V REF

A.3 Serial Interface

Interface
Type -----
Param.

A.4 General

LCD- Contrast 30
Measure mbar
Language English
Autoboot ON
Autoreset ON

A.5 Parameters

Para

Parameter Pressure
Act. X.XE-X mbar
Nom. 2.0E-6 mbar
Min. 5.0E-9 mbar
Max. 2.0E-6 mbar

Source

Source Nominal Pressure
Source Internal

Control

Controller type
Type Auto 50
Kp -----
Tn -----
Tv -----



Declaration of Conformity

We hereby declare that the product cited below satisfies all relevant provisions according to the following **EC directives**:

- **Low Voltage Directive 2014/35/EU**
- **Electromagnetic Compatibility 2014/30/EU**
- **Restriction of the use of certain Hazardous Substances 2011/65/EU**
- **Machinery 2006/42/EC (Annex II, no. 1 A)**

OmniStar™ GSD 320
ThermoStar™ GSD 320

Gas Analysis System

Harmonised standards and national standards and specifications which have been applied:

Safety:	EN 61010-1:2010 EN ISO 12100:2011-03 Safety of Machinery
Emissions:	EN 61326-1:2013 EN 55011:2009 + A1:2010 / CISPR 11:2009 + A1:2010 Radiated and Conducted Electromagnetic Emissions FCC 47 CFR Part 18 Class A emission requirements (USA) ICES-001 Issue 4 ISM emission requirements (Canada)
Immunity:	EN 61326-1:2013 (General EMC) Class A EMC - Measurement, Control & Laboratory Equipment
RoHS:	Fully Compliant

Signatures:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Dr. Ulrich von Hülsen)
Managing Director

2016-08-17

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