VACUUM DEGASSER

1-CHANNEL, 2-CHANNEL, 3-CHANNEL, 4-CHANNEL

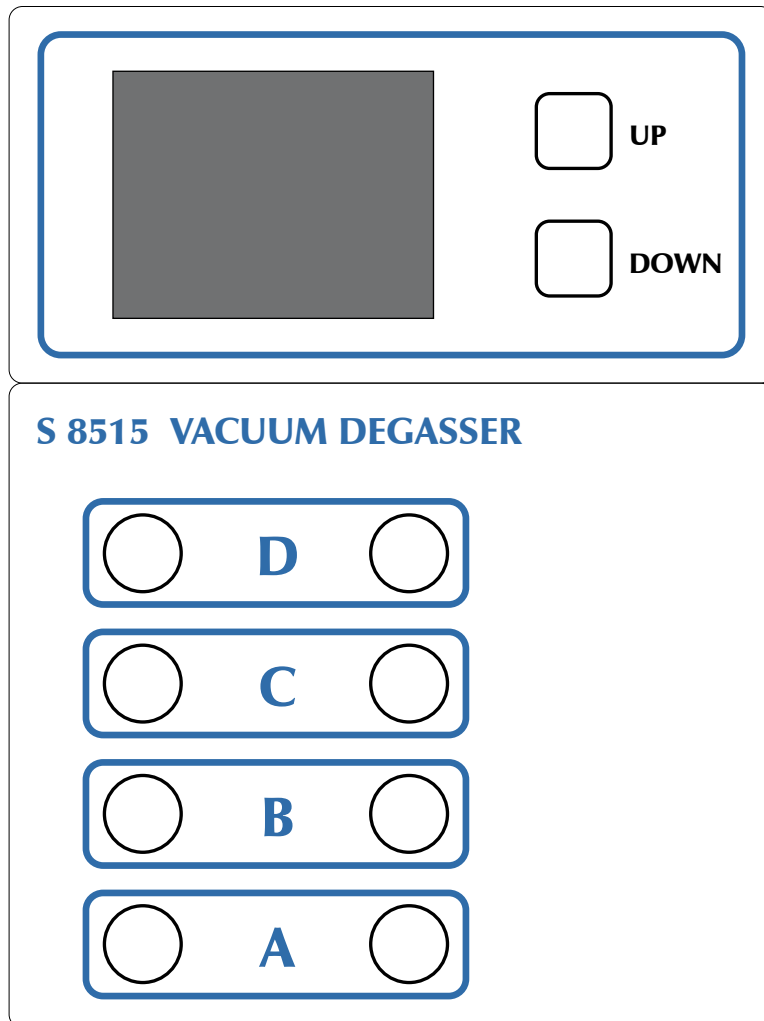# USER MANUAL

S 8515 VACUUM DEGASSER

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1.INTRODUCTION

1.1 How to Use this Manual

This manual is designed as a reference to the installation, operation and maintenance of the **Vacuum Degasser**.

It is strongly recommended to review this manual before operating the instrument.

The content of this manual is subject to change without notice. This document is believed to be complete and accurate at the time of publication.

The Manufacturer is not liable for any damage resulted from the use of this manual.

1.1.1 Symbols

Throughout this manual important text sections are marked with the following symbols:

This section includes important information which may result in instrument or personal damage if not carefully followed.	**STOP !**
This section includes important information for the proper operation of the instrument. Failure to follow this information may result in faulty behaviour of the instrument and/or wrong analysis results.	**WARNING**
This section emphasis some detailed information intended to optimize the performance of the instrument or to give a better understanding of some technical details.	**NOTE**

1.2 Safety Information

This instrument is compliant with all related standards as stated in Appendix B.

1.2.1 General Safety Information

The operation of any analytical instrumentation requires the operator to be familiar with the potential hazards of using chemical solvents.

To avoid personal injury and/or damage to the instrument the operator is responsible to follow all safety information herein.

The Manufacturer assumes no liability for any damage resulted from not following any of these safety procedures.

1.2.2 Intended Purpose

This instrument is designed and certified as a general purpose laboratory instrument for research and routine analysis work only. It is not certified for in-vitro or other medical applications.

Any use outside this intended purpose does not fall with the manufacturer's liability.

1.2.3 Environmental Safety

Only operate the instrument in well-ventilated areas. If volatile or flammable solvents are used with this instrument, arrange for proper disposal of any waste and/or fumes.

Always properly dispose any waste solvents.

Avoid open flames and sparks when working with flammable and volatile solvents.

In case of instrument leakage, turn off the instrument and remedy the leakage problem immediately.

1.2.4 Electrical Safety

Always use the provided power cords.

Replace faulty power cords and other cables before operating the instrument.

Always replace blown fuses with original spare fuses.

When the instrument's housing is open, electrical connections will be ex-

The housing should only be opened by certified service personnel! Damage of the instrument of injury may result from improper handling.

2. INSTRUMENT OVERVIEW

2.1 Instrument Description

The *Vacuum Degasser* is an online degasser system with high efficiency. Dissolved gasses are removed from the solvents by applying vaccum to a semi-permeable membrane.

The *Vacuum Degasser* is available as 1-Channel, 2-Channel, 3-Channel, or 4-Channel version. Each solvent channel can used for a different solvent or several channels can be used in series to increase the efficiency even more.

The vacuum pump is operated at a constant speed. The *Vacuum Degasser* vacuum level is not regulated in any way. The maximum vacuum level reached is the physical maximum possible with the system setup, consisting of vacuum chamber(s) and vacuum pump.

2.1.1 Working Principle

The solvent flows through a short length of Teflon AF® capillary inside a sealed chamber. This chamber (vacuum chamber) is completely sealed to the environment and vacuum is applied with a pump.

This vacuum pump decreases the pressure inside the chamber to near-vacuum. Due to this vacuum any dissolved gases in the solvent running through the inner capillary are removed through its semi-permeable membrane wall. The high efficiency of the Teflon AF® material allows the usage of a very short length of capillary inside the vacuum chamber. This low dead volume offers a quick solvent exchange and very short equilibration time.
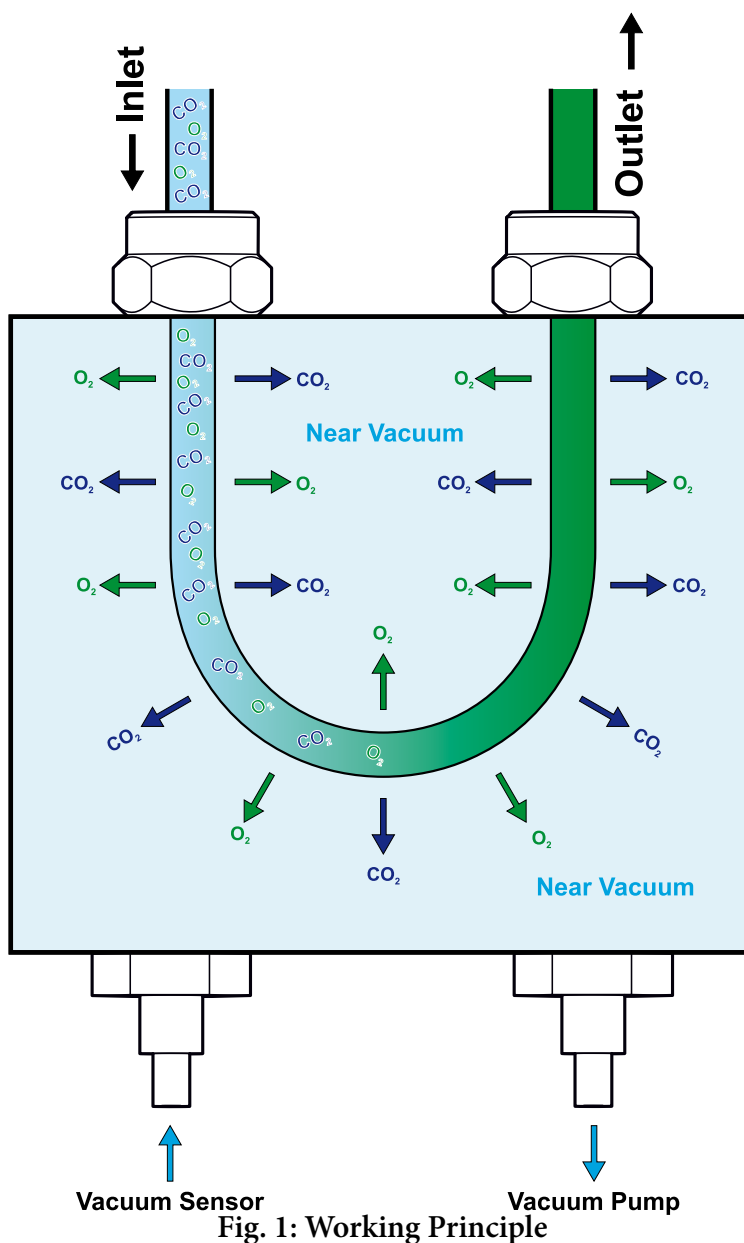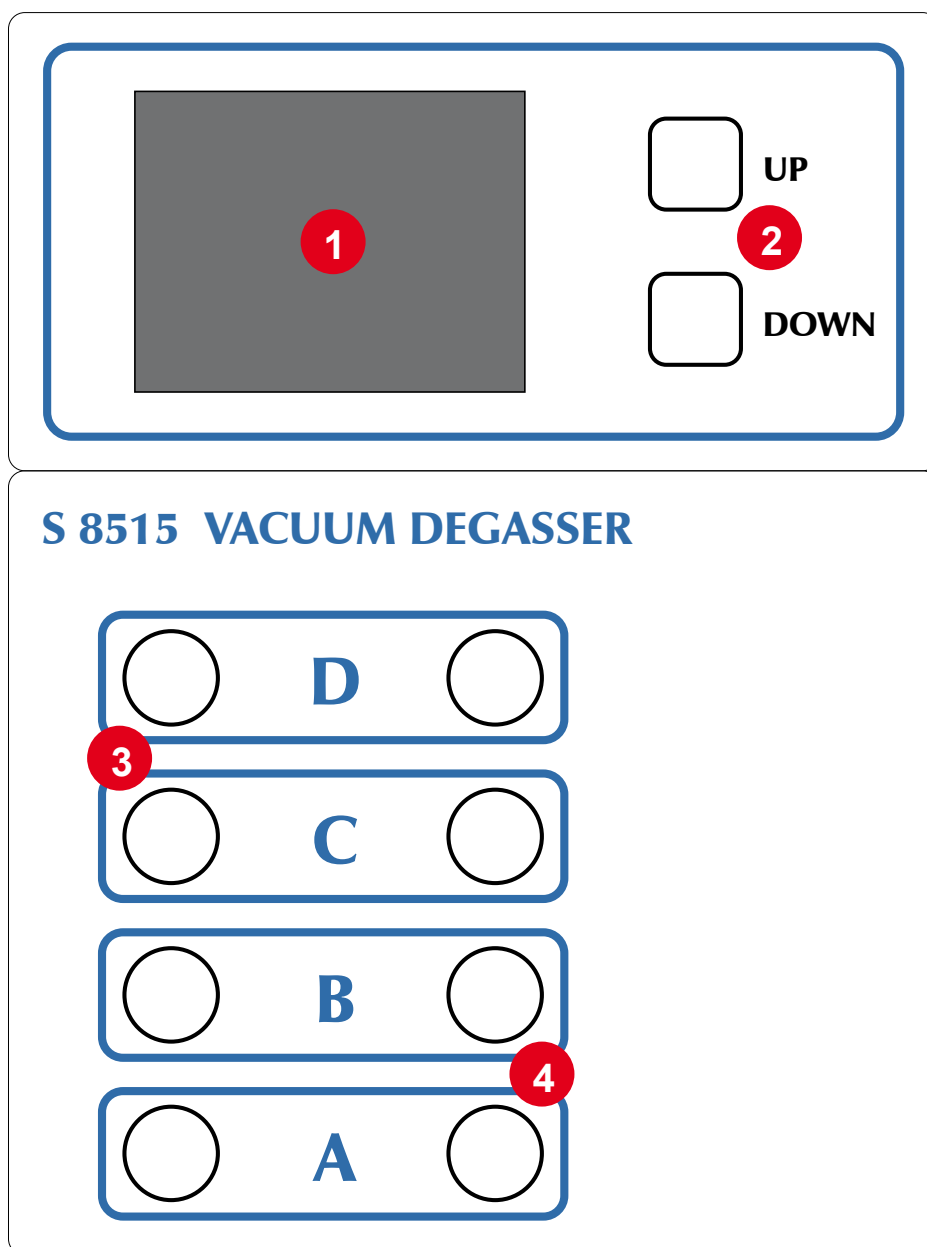

Fig. 1: Working Principle

2.1.2 Front Panel Description

The front panel of the *Vacuum Degasser* houses the solvent inlets and outlets and the operational controls.

#	Element
1	TFT Display
2	Keyboard
3	Solvent Inlets
4	Solvent Outlets

Fig. 2: Front Panel

2.1.3 Back Panel Description

The back panel of the **Vacuum Degasser** houses the communication interface and power supply connector.

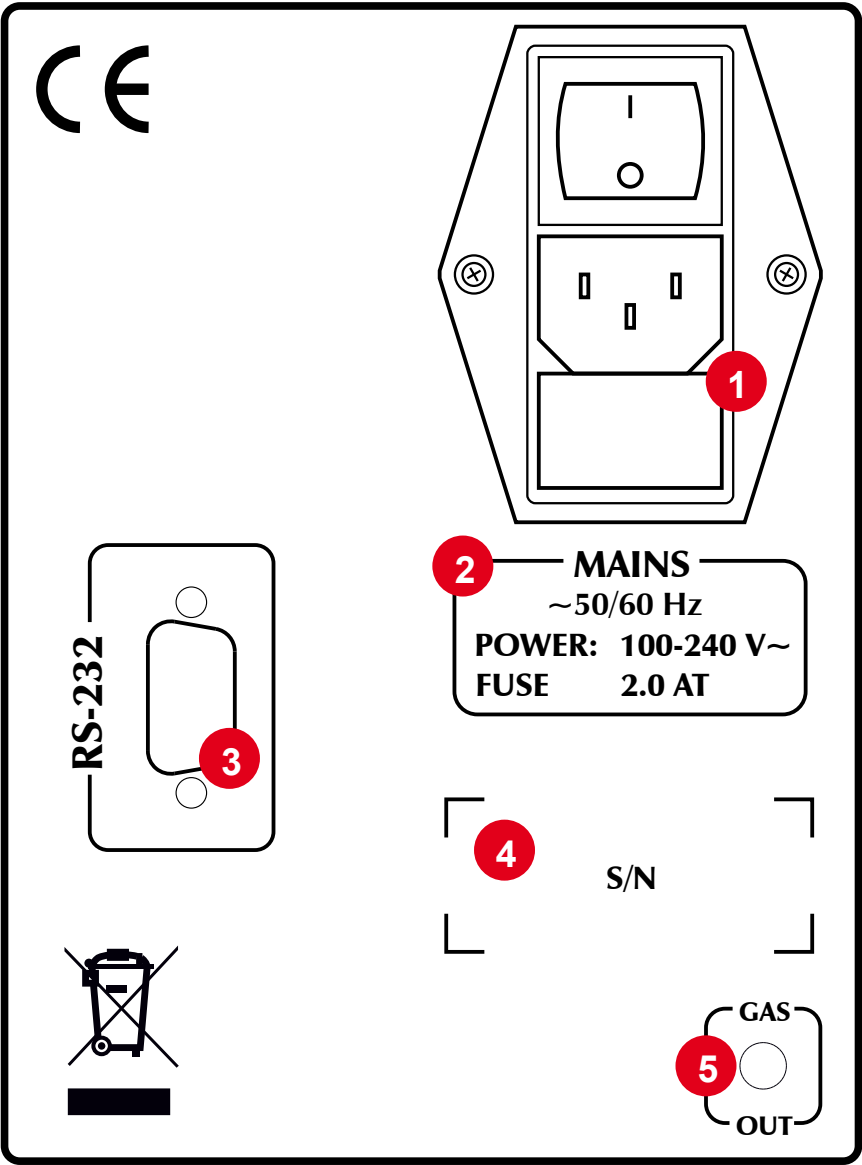| #	Element
1	Power Supply Connector
2	Power Supply Data
3	RS-232 Connector
4	Type Plate
5	Gas Out Connector

Fig. 3: Back Panel

2.2 Instrument Operational Controls

The *Vacuum Degasser* features a full color TFT display and keyboard for adjusting the instrument settings.

2.2.1 Status Screen

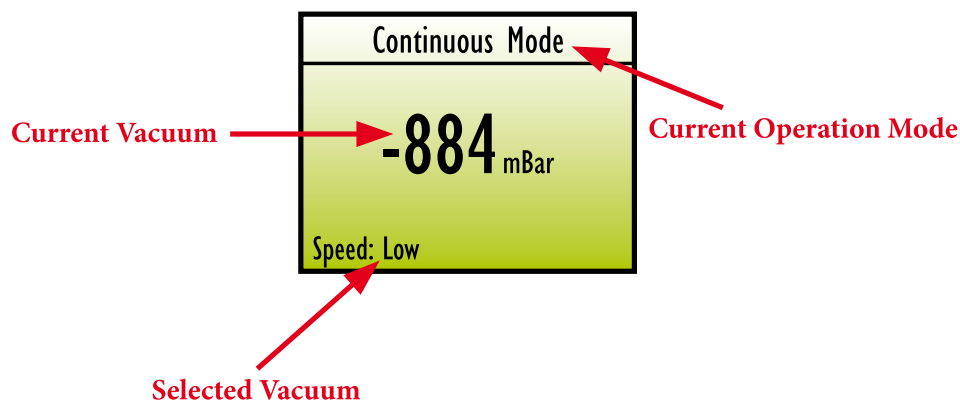After turning on the instrument, the Status Screen is shown on the display.

Fig. 4: Status Screen

Operation Mode

At the top of the screen, the currently selected Operation Mode is displayed. The 2 possible operation modes are: *Continuous Mode* and *Hysteresis Mode*.

Vacuum

In the center of the screen the current Vacuum Level is displayed in
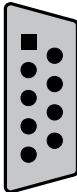
(950 [mBar] – pressure in Vacuum Chamber [mBar])

Vacuum Pump Speed

In the lower left corner of the screen the selected Vacuum Pump speed is displayed. The pump can be run in 3 different speed settings: *Low*, *Medium* and *High*.

2.3 Instrument Communication Interface

The *Vacuum Degasser* features a standard RS-232 serial communication interface.

RS-232	Pin	Function
	1	DSR (DCD)
	2	TxD
	3	RxD
	4	DSR (DSR)
	5	GND
	6	DSR (DTR)
	7	CTS
	8	RTS
	9	DSR (RI)

3. INSTRUMENT SETUP

3.1 Unpacking

Remove the *Vacuum Degasser* from its package and put it on the working desk. Check the instrument thoroughly for any damage that may have occurred during shipping. Contact your supplier in case of any damages.

Check the accessories shipped with the instrument if everything is complete and in good condition.

3.2 Eluent Connections

Connect the 1/8" PVDF tubings to the eluent inlets and outlets as shown in the following figure. Use the fittings and ferrules shipped with the instrument to connect the capillaries.

WARNING

Make sure that the eluent bottles are on a higher level than the Vacuum Degasser, so that the eluent can freely flow downwards!
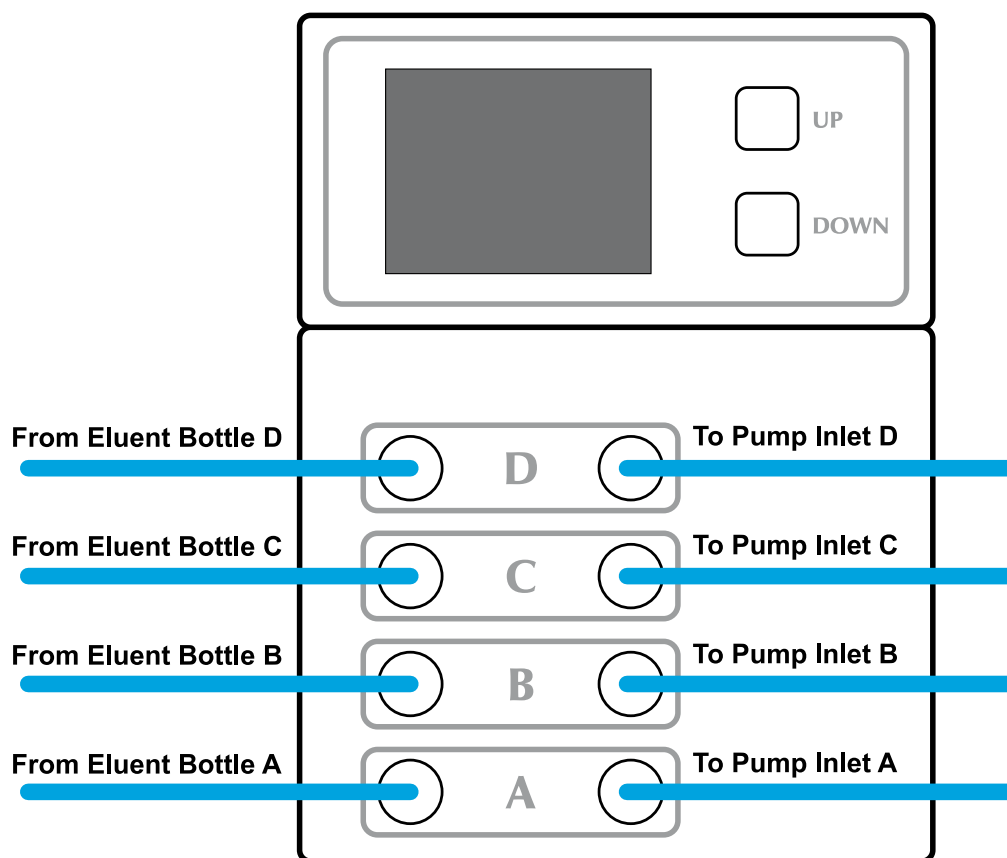

Fig. 4: Eluent Connections

3.3 Gas Connections

Connect the supplied gas tubing (*blue colored*) to the GAS OUT connector on the backside of the instrument.

When working with aggressive and/or toxic solvents, make sure that any fumes from the GAS OUT connector is properly disposed of and not evaporated into the working area!
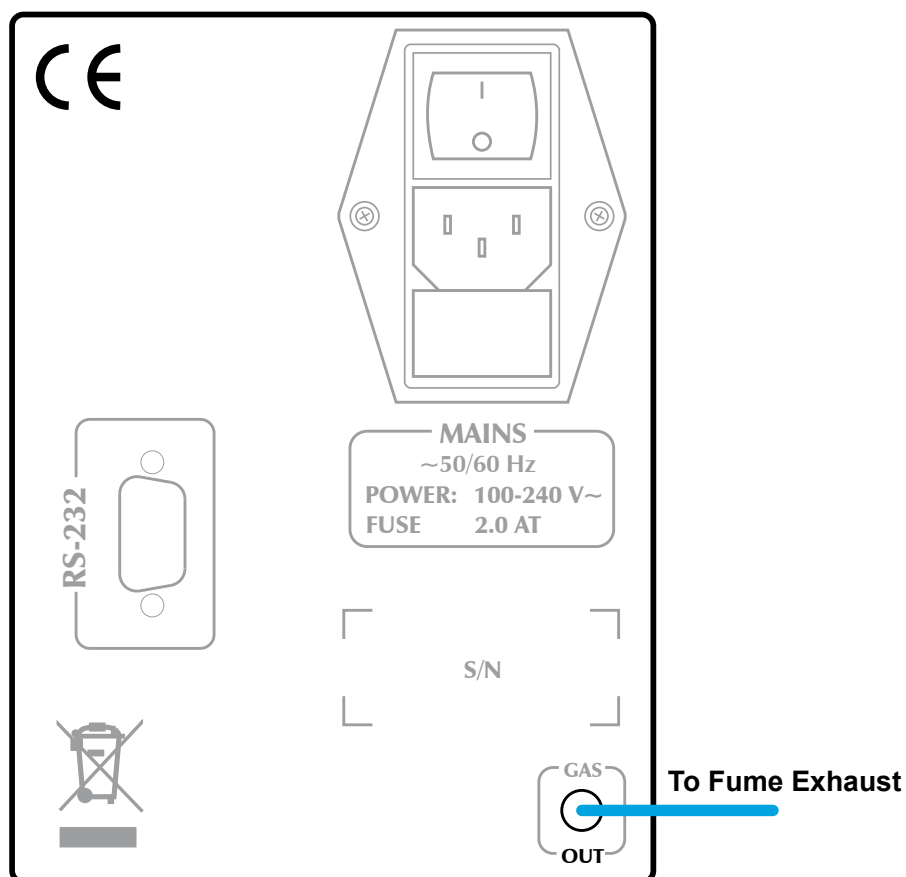
⚠ **STOP !**

Fig. 5: Gas Connections

4.INSTRUMENT OPERATION

4.1 Setting Operation Mode

The **Vacuum Degasser** can be run in 2 Operation Modes: *Hysteresis Mode* and *Continuous Mode*.

The Operation Mode can be set when the instrument is switched on. After the logo with the firmware version is shown on the display, hold the [UP] key.
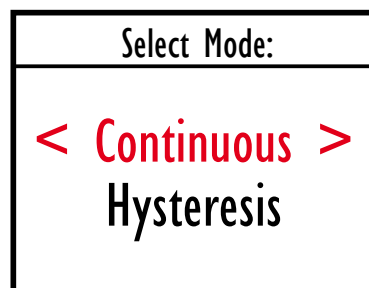

Fig. 5: Operation Mode Selection

Use the [UP] and [DOWN] keys to select the Operation Mode you wish to use. Confirm the selection by pressing [UP] and [DOWN] together.
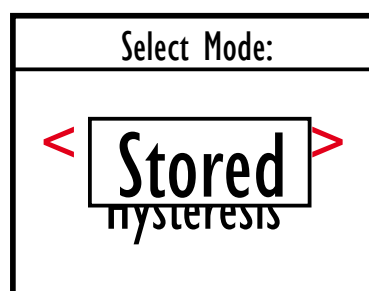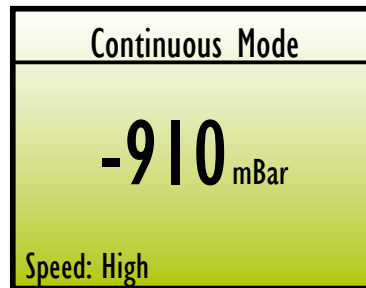

Fig. 6: Operation Mode Selection Confirmation

4.2 *Continuous* Operation Mode

In *Continuous* Operation Mode, the vacuum pump can be set to 3 different speeds: *Low*, *Medium*, or *High*.

By pressing the [UP] or [DOWN] keys the motor speed can be selected.

Under normal operation, it is recommended to keep the motor speed at *Low*. The motor speed does not effect the maximum vacuum level, just the time in which the vacuum level is reached.

```
┌─────────────────────────┐
│    Continuous  Mode     │
├─────────────────────────┤
│                         │
│     -910 mBar           │
│                         │
│ Speed: High             │
└─────────────────────────┘
```

4.3 *Hysteresis* Operation Mode

In Hysteresis Operation Mode the vacuum degasser switches off the vacuum pump as soon as the vacuum level of -800 mBar is reached, and switches on again, if the vacuum level falls below the hysteresis level of -780 mBar.

```
┌─────────────────────────┐
│    Hysteresis  Mode     │
├─────────────────────────┤
│                         │
│     -910 mBar           │
│                         │
│                         │
└─────────────────────────┘
```
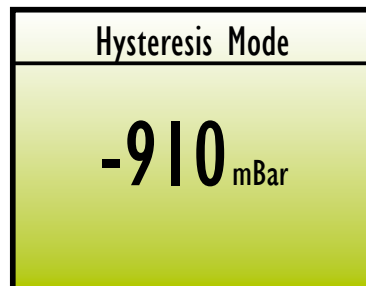
APPENDIX A: SPECIFICATIONS

A.1 Technical Specifications

A.1.1 Vacuum Chamber

# of Channels:	1, 2, 3, or 4
Degassing Technique:	Applied vacuum through semipermeable membrane
Wetted Materials:	Teflon AF®, Stainless Steel
Volume per Channel:	< 500 µl
Inner Diameter (Capillary):	1.1 mm
Degassing Efficiency:	< 20% dissolved gases remaining in water at 1.0 ml/min*

A.1.2 Vacuum Pump

Mechanism:	Stepper Motor driven membrane pump
Wetted Material (Fumes only):	Teflon, Aluminium, EPDM

A.1.3 Instrument

Dimensions:	125 x 167 x 270 mm (W x H x D)
Weight:	3.2 kg
Power Supply:	100 – 250 ~V, 47 – 63 Hz, 20 W

*   *Determined by internal testing method: O^2-enriched water is degassed by the Vacuum Degasser and the O^2 content is measured by an oxygenemeter to determine the remaining O^2 content.*

A.2 Environmental Conditions

A.2.1 Operational Conditions

Ambient Temperature:	+10 °C to +35 °C
Ambient Relative Humidity:	20 to 80 % RH (non-condensing)

A.2.2 Storage Conditions

Ambient Temperature:	-20 °C to +60 °C
Ambient Relative Humidity:	20 to 80 % RH (non-condensing)

APPENDIX B: ACCESSORIES

B.1 Standard Accessories

The *Vacuum Degasser* is delivered with the following standard accessories:

- 1x   Power Cord (EU Type)

- 2x   1/8" Capillary, FEP (1 m) (*per Channel*)

- 2x   1/8" Fitting & Ferrule, PVDF (*per Channel*)

- 1x   Operation Manual (this)

- 2x   Fuse, 2 A

APPENDIX C: VERSION CONTROL

D.1 Version History

The **Vacuum Degasser** *Operation Manual* is subject to version control. The version history is continued and noted on every document. The access to the original document is restricted to the creating party. The document is subject to periodical checks and can never reach an unchangeable state.

Version	Release Date	Description
1.0	2012-03-08	First Release