



# OPERATING INSTRUCTIONS

EN

Translation of the Original

## HISCROLL

automated gas ballast valve

**PFEIFFER**  **VACUUM**

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## Dear customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new Pfeiffer Vacuum accessory should support you in your individual application with full performance and without malfunctions. The name Pfeiffer Vacuum stands for high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. With this expertise, we have acquired a multitude of skills contributing to an efficient and secure implementation of our product.

Knowing that our product must not interfere with your actual work, we are convinced that our product offers you the solution that supports you in the effective and trouble-free execution of your individual application.

Please read these operating instructions before putting your product into operation for the first time. If you have any questions or suggestions, please feel free to contact [info@pfeiffer-vacuum.de](mailto:info@pfeiffer-vacuum.de).

Further operating instructions from Pfeiffer Vacuum can be found in the [Download Center](#) on our website.

## Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

## Copyright

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We reserve the right to make changes to the technical data and information in this document.

# Table of contents

<b>1</b>	<b>About this manual</b>	<b>6</b>
1.1	Validity	6
1.2	Applicable documents	6
1.3	Target group	6
1.4	Conventions	6
	1.4.1 Instructions in the text	6
	1.4.2 Pictographs	6
	1.4.3 Stickers on the product	7
	1.4.4 Abbreviations	7
1.5	Trademark proof	7
<b>2</b>	<b>Safety</b>	<b>8</b>
2.1	General safety information	8
2.2	Safety instructions	8
2.3	Safety precautions	8
2.4	Limits of use of the product	9
2.5	Proper use	9
2.6	Foreseeable misuse	9
2.7	Personnel qualification	9
<b>3</b>	<b>Product description</b>	<b>10</b>
3.1	Function	10
3.2	Identifying the product	10
3.3	Scope of delivery	10
<b>4</b>	<b>Installation</b>	<b>11</b>
4.1	Installing solenoid valve	11
4.2	Establishing electric connection	13
4.3	Configuring accessories	14
<b>5</b>	<b>Operation</b>	<b>16</b>
5.1	Controlling gas ballast valve with a pressure sensor	16
5.2	Controlling gas ballast valve without a pressure sensor	17
<b>6</b>	<b>Accessories</b>	<b>18</b>
<b>7</b>	<b>Technical data and dimensions</b>	<b>19</b>
7.1	Technical data	19
7.2	Dimensions	19
	<b>Declaration of Conformity</b>	<b>20</b>

## List of tables

Tbl. 1:	Applicable documents	6
Tbl. 2:	Stickers on the product	7
Tbl. 3:	Abbreviations used in this document	7
Tbl. 4:	Permissible ambient and operating conditions	9
Tbl. 5:	HiScroll gas ballast valve switch settings	12
Tbl. 6:	Parameter settings at the electronic drive unit of the scroll pump	16
Tbl. 7:	Accessories for inert gas supply	18
Tbl. 8:	Technical data for solenoid valve	19

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## List of figures

Fig. 1:	Position of the stickers on the product	7
Fig. 2:	Design of the solenoid valve for gas ballast valve	10
Fig. 3:	Preparing gas ballast valve	12
Fig. 4:	Installing and aligning solenoid valve	13
Fig. 5:	Electric connection of solenoid valve	14
Fig. 6:	Accessory connector assignment	15
Fig. 7:	Pressure-dependent gas ballast valve control in automatic mode	17
Fig. 8:	Gas ballast valve control in automatic mode	17
Fig. 9:	Solenoid valve dimensions	19

# 1 About this manual



**IMPORTANT**

Read carefully before use.  
Keep the manual for future consultation.

## 1.1 Validity

This operating instructions is a customer document of Pfeiffer Vacuum. The operating instructions describe the functions of the named product and provide the most important information for the safe use of the device. The description is written in accordance with the valid directives. The information in this operating instructions refers to the product's current development status. The document shall remain valid provided that the customer does not make any changes to the product.

## 1.2 Applicable documents

Designation	Document
Declaration of conformity	A component of these instructions

Tbl. 1: **Applicable documents**

You can find this document in the [Pfeiffer Vacuum Download Center](#).

## 1.3 Target group

This operating instructions is intended for persons who

- install,
- operate.

The work described in this document may be carried out only by people who have completed suitable technical training (experts), or who have received equivalent training from Pfeiffer Vacuum.

## 1.4 Conventions

### 1.4.1 Instructions in the text

Usage instructions in the document follow a general structure that is complete in itself. The required action is indicated by an individual step or multi-part action steps.

**Individual action step**

A horizontal, solid triangle indicates the only step in an action.

- ▶ This is an individual action step.

**Sequence of multi-part action steps**

The numerical list indicates an action with multiple necessary steps.

1. Step 1
2. Step 2
3. ...

### 1.4.2 Pictographs

Pictographs used in the document indicate useful information.



Note



Tip

### 1.4.3 Stickers on the product

This section describes all the stickers on the product along with their meanings.

	<p><b>Rating plate (example)</b> The rating plate is located on the valve coil</p>
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Tbl. 2: Stickers on the product

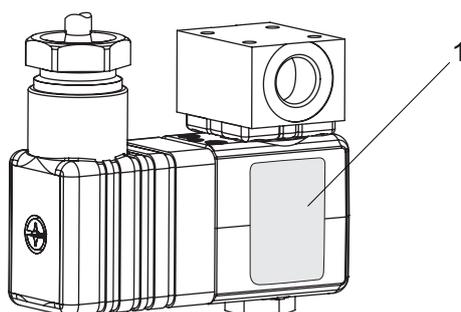


Fig. 1: Position of the stickers on the product

### 1.4.4 Abbreviations

Abbreviation	Meaning in this document
DC	Direct current
GB	Gas ballast
[P:xxx]	Electronic drive unit control parameters. Printed in bold as a three-digit number in square brackets. Frequently displayed in conjunction with a short description. Example: <b>[P:312]</b> software version
WAF	Width Across Flats
USB	Universal Serial Bus

Tbl. 3: Abbreviations used in this document

## 1.5 Trademark proof

- Hirschmann® is a registered trademark of Hirschmann Electronics GmbH.
- Loctite® is a trademark of HENKEL IP & HOLDING GMBH.

## 2 Safety

### 2.1 General safety information

The following 4 risk levels and 1 information level are taken into account in this document.

<b>⚠ DANGER</b>
<p><b>Immediately pending danger</b>                  Indicates an immediately pending danger that will result in death or serious injury if not observed.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid the danger situation</li> </ul>

<b>⚠ WARNING</b>
<p><b>Potential pending danger</b>                  Indicates a pending danger that could result in death or serious injury if not observed.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid the danger situation</li> </ul>

<b>⚠ CAUTION</b>
<p><b>Potential pending danger</b>                  Indicates a pending danger that could result in minor injuries if not observed.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid the danger situation</li> </ul>

<b>NOTICE</b>
<p><b>Danger of damage to property</b>                  Is used to highlight actions that are not associated with personal injury.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid damage to property</li> </ul>

<b>i</b>	<p>Notes, tips or examples indicate important information about the product or about this document.</p>
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### 2.2 Safety instructions

All safety instructions in this document are based on the results of the risk assessment carried out in accordance with Low Voltage Directive 2014/35/EU. Where applicable, all life cycle phases of the product were taken into account.

#### Risks during operation

<b>⚠ CAUTION</b>
<p><b>Danger of injuries from contact with vacuum at gas ballast connection</b>                  There is a danger of minor injuries during operation due to limbs being sucked in (hematoma) at the open gas ballast connection.</p> <ul style="list-style-type: none"> <li>▶ Keep a sufficient distance away from automatic gas inlet or ventilation systems.</li> <li>▶ Always mount the sinter filter or a secure hose supply line at the gas ballast connection.</li> </ul>

### 2.3 Safety precautions

<b>i</b>	<p><b>Duty to provide information on potential dangers</b>                  The product holder or user is obliged to make all operating personnel aware of dangers posed by this product.                  Every person who is involved in the installation, operation or maintenance of the product must read, understand and adhere to the safety-related parts of this document.</p>
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#### Infringement of conformity due to modifications to the product

The Declaration of Conformity from the manufacturer is no longer valid if the operator changes the original product or installs additional equipment.

- Following the installation into a system, the operator is required to check and re-evaluate the conformity of the overall system in the context of the relevant European Directives, before commissioning that system.

#### General safety precautions when handling the product

- ▶ Observe all applicable safety and accident prevention regulations.
- ▶ Check that all safety measures are observed at regular intervals.
- ▶ Never disconnect plug connections during operation.
- ▶ Keep lines and cables away from hot surfaces (> 70 °C).
- ▶ Observe the unit protection degree prior to installation or operation in other environments.
- ▶ Do not carry out your own conversions or modifications on the unit.

## 2.4 Limits of use of the product

Parameter	Air cooling
Permissible ambient temperature	5 – 40 °C
Permitted pressure range	0 – 1500 hPa (absolute)
Protection degree	IP54
Relative humidity of air	≤ 85 % not condensing

Tbl. 4: Permissible ambient and operating conditions

## 2.5 Proper use

- ▶ Use the solenoid valve as accessory for the automatic inert gas supply at the manual gas ballast valve of a Pfeiffer Vacuum HiScroll.

## 2.6 Foreseeable misuse

Improper use of the product invalidates all warranty and liability claims. Any use that is counter to the purpose of the product, whether intentional or unintentional, is regarded as improper use, in particular:

- Connection to vacuum pumps or equipment which are not suitable for this purpose according to their operating instructions
- Connection to equipment with exposed live parts

## 2.7 Personnel qualification

The work described in this document may only be carried out by persons who have appropriate professional qualifications and the necessary experience or who have completed the necessary training as provided by Pfeiffer Vacuum.

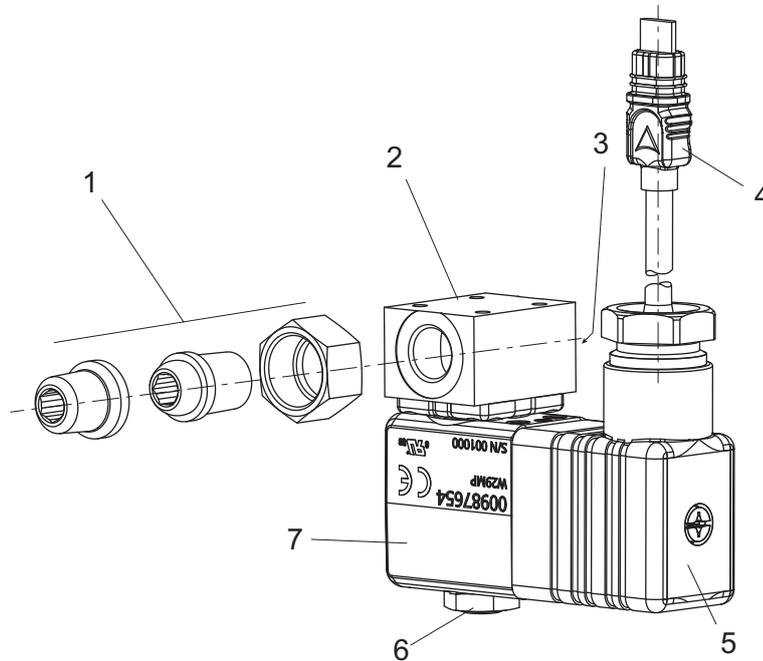
#### Training people

1. Train the technical personnel on the product.
2. Only let personnel to be trained work with and on the product when under the supervision of trained personnel.
3. Only allow trained technical personnel to work with the product.
4. Before starting work, make sure that the commissioned personnel have read and understood these operating instructions and all applicable documents, in particular the safety, maintenance and repair information.

## 3 Product description

### 3.1 Function

The solenoid valve is used for the automation of the gas ballast valve of scroll pumps. The solenoid valve opens or closes the inert gas supply by means of vacuum pump monitoring.



**Fig. 2: Design of the solenoid valve for gas ballast valve**

- |                          |                 |
|--------------------------|-----------------|
| 1 Double nipple, G 1/8"  | 5 Cable socket  |
| 2 Valve body             | 6 Fastening nut |
| 3 Gas inlet, 1/8" thread | 7 Valve coil    |
| 4 Power supply plug      |                 |

### 3.2 Identifying the product

- ▶ To ensure clear identification of the product when communicating with Pfeiffer Vacuum, always keep all of the information on the rating plate to hand.
- ▶ Learn about certifications through test seals on the product or at [www.certipedia.com](http://www.certipedia.com) with company ID no. [000021320](http://www.certipedia.com).

### 3.3 Scope of delivery

The scope of delivery includes the following parts:

- Solenoid valve
- Connecting cable with Hirschmann cable socket
- Cable clip, 2x
- Double nipple
- Operating instructions

## 4 Installation

### 4.1 Installing solenoid valve

#### NOTICE

##### Property damage from impermissibly high inlet pressure

Increased inlet pressure compromises the operational reliability of the vacuum pump and causes an increase in power consumption and operating temperature.

- ▶ Observe the max. permissible inlet pressure of **1,500 hPa (absolute)**.
- ▶ Dose the flushing gas quantity with the dosing screw in the gas ballast valve or on site.

#### NOTICE

##### Property damage caused by unfiltered media supply

Using unfiltered media for the gas inlet of a vacuum pump may result in particle contamination. There is a risk of damage to, and even destruction of, vacuum components.

- ▶ Install suitable filters from the Pfeiffer Vacuum accessories range upstream of the gas inlet, before you use ambient air or other unclean media.

#### NOTICE

##### Loss of leak tightness due to improper installation of gas connections

Inadequate cleanliness when handling the pipe connections will result in leakages and potential process damage.

- ▶ Always wear suitable gloves before touching or installing components.
- ▶ Install all seals dry and free of grease.
- ▶ Look out for damaged surfaces and sealing surfaces.
- ▶ Replace any damaged components.

#### Prerequisites

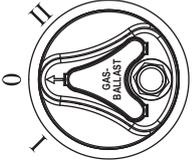
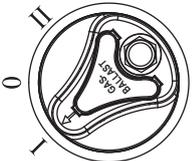
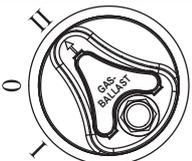
- External inert gas supply dismantled, if present

#### Required tools

- Open-end wrench, **15 mm**
- Allen key, **WAF 5**
- Calibrated torque wrench (tightening factor  $\leq 2.5$ )

#### Required aids

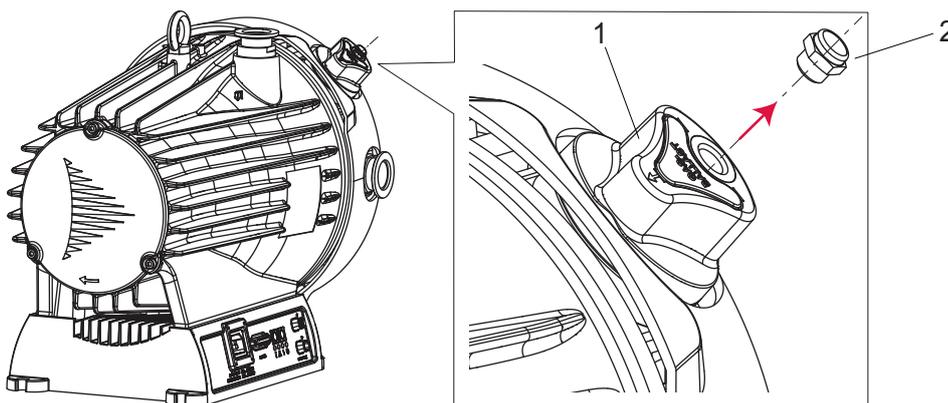
- Loctite 577 thread sealant

	<p><b>Position "0":</b></p> <ul style="list-style-type: none"> <li>• Switch setting for media without condensation</li> <li>• The gas ballast valve is closed</li> <li>• No gas flow into the suction chamber</li> </ul>
	<p><b>Position "1":</b></p> <ul style="list-style-type: none"> <li>• Switch setting for slight to medium condensation</li> <li>• The gas ballast valve is open</li> <li>• The gas flow depends on the type</li> </ul>
	<p><b>Position "2":</b></p> <ul style="list-style-type: none"> <li>• Switch setting for medium to severe condensation</li> <li>• The gas ballast valve is open</li> <li>• The gas flow depends on the type</li> </ul>

**Tbl. 5: HiScroll gas ballast valve switch settings**

**Presetting manual gas ballast valve**

- ▶ Turn the selector switch for the gas ballast valve to "1" or "2", depending on the accumulation of condensate.
  - Allow the selector switch to completely engage in position.

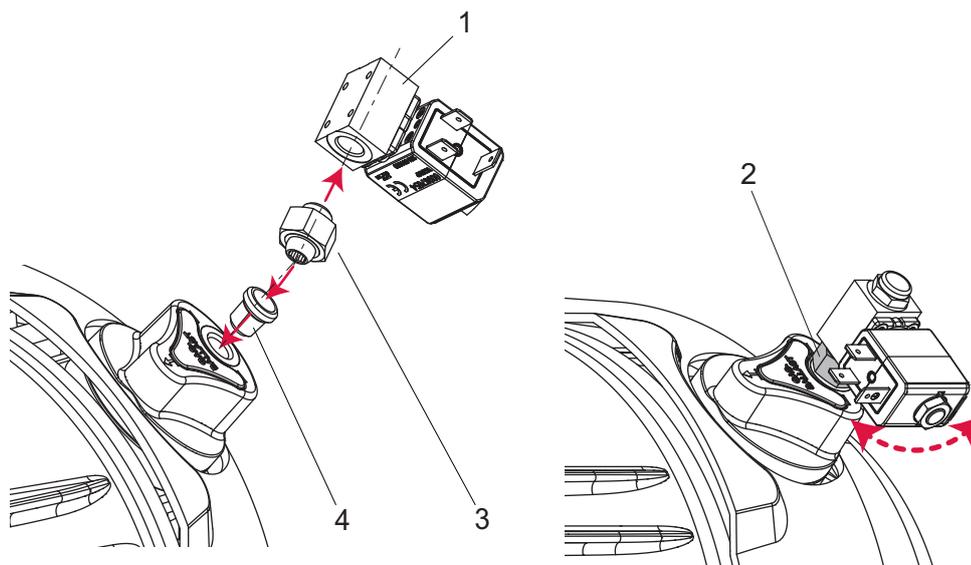


**Fig. 3: Preparing gas ballast valve**

- 1 Gas ballast valve, selector switch
- 2 Sinter filter

**Preparing gas ballast valve**

- ▶ Unscrew the sinter filter from the selector switch for the gas ballast valve.



**Fig. 4: Installing and aligning solenoid valve**

- |                              |                                    |
|------------------------------|------------------------------------|
| 1 Solenoid valve, valve body | 3 Threaded nipple II with lock nut |
| 2 Lock nut, WAF 15           | 4 Threaded nipple I                |

#### Installing and aligning solenoid valve

1. Apply the Loctite thread sealant economically onto the turns of the threads of both threaded nipples.
2. Screw threaded nipple I into the G 1/8" filter bore in the selector switch of the gas ballast valve.
  - Tightening torque: **2.5 Nm**
3. Screw threaded nipple II with the lock nut into the G 1/8" bore in the valve body of the solenoid valve.
  - Tightening torque: **2.5 Nm**
4. Wait for the drying time of the threaded sealant to pass.
5. By hand, screw the solenoid valve with the lock nut onto threaded nipple I.
6. Turn the solenoid valve into the desired position and screw the lock nut tight.
7. Install the external inert gas supply on the inlet side of the solenoid valve, if present.

## 4.2 Establishing electric connection

### NOTICE

#### Property damage to the electronics or the sensor

Disconnecting the plug-and-socket connection with the voltage supply switched on may lead to the destruction of electronic components.

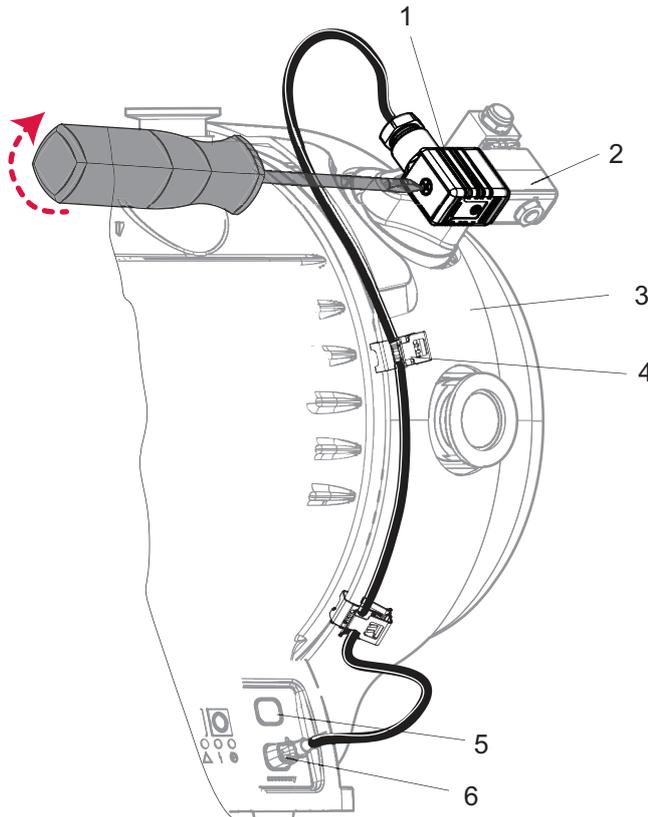
- ▶ Always interrupt the voltage supply before you plug in or unplug the sensor connection cable.

#### Required tools

- Crosshead screwdriver

#### Required materials

- Preconfigured connecting cable with Hirschmann cable socket
- Cable clip, 2x



**Fig. 5: Electric connection of solenoid valve**

- |                |   |
|----------------|---|
| 1 Cable socket | 4 Cable clip, 2×                                |
| 2 Valve coil   | 5 Accessory connector "C" for pressure sensor   |
| 3 Fan cover    | 6 Accessory connector "D" for gas ballast valve |

**Establishing the cable connection**

1. Check the pressure sensor connection (option).
  - Use accessory connector "C" always for the pressure sensor, if present.
2. Screw the cable socket of the connecting cable onto the valve coil.
  - Tightening torque:  $\leq 0.2 \text{ Nm}$
3. Stick 2 cable clips onto the edge of the fan cover.
4. Lay the cable and secure it with the cable clips.
5. Plug the connecting cable into a free accessory connector "C" or "D" at the electronic drive unit of the vacuum pump.

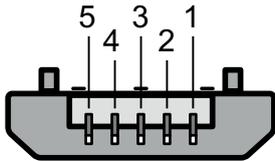
### 4.3 Configuring accessories

<b>NOTICE</b>
<p><b>Property damage to third-party electronic devices</b></p> <p>The accessory connections on the vacuum pump do not meet any USB standard. The connection assignment does not comply with any standard. Depending on their configuration, the 24 V DC supply voltage may damage or destroy third-party electronic devices, e.g. tablet computer.</p> <ul style="list-style-type: none"> <li>▶ Do not connect any third-party electronic devices to the accessory connections.</li> <li>▶ Only use the connecting sockets for pump-specific accessories.</li> </ul>

Accessory connectors "C" and "D" are each used to connect an accessory. The software of the electronic drive unit automatically detects accessories connected to interfaces.

**Approved accessories**

- Pressure sensor
- Solenoid valve for gas ballast
- Vacuum safety valve



**Fig. 6: Accessory connector assignment**

- |                                   |  |
|-----------------------------------|--|
| 1 + 5 V (blue)                    | 4 + 24 V (depending on software configuration) |
| 2 Sensor RxD / master TxD (white) | 5 GND (black)                                  |
| 3 Sensor TxD / master RxD (green) |  |

#### Configuring accessories

- ▶ Configure connected accessories with parameters **[P:068]** and **[P:069]**, if necessary.
  - The manual configuration overwrites the automatically detected value.

## 5 Operation

**⚠ CAUTION**

**Danger of injuries from contact with vacuum at gas ballast connection**

There is a danger of minor injuries during operation due to limbs being sucked in (hematoma) at the open gas ballast connection.

- ▶ Keep a sufficient distance away from automatic gas inlet or ventilation systems.
- ▶ Always mount the sinter filter or a secure hose supply line at the gas ballast connection.

Important settings and function-related variables are programmed ex factory as parameters in the vacuum pump electronic drive unit. Each parameter has a three-digit number and a description. Parameter-driven operation and control is supported via Pfeiffer Vacuum displays and control units, or externally via RS-485 using Pfeiffer Vacuum protocol.

Parameter	Display	Designation	Setting/display	default
[P:030]	VentMode	Valve mode	0 = auto 1 = closed 2 = open	0
[P:052]	BalGasValv	Gas ballast valve control	0 = off 1 = on	0
[P:068]	CfgAccC1	Accessory connection C1 <sup>1)</sup>	15 = gas ballast valve, closed without current 16 = vacuum safety valve IV 16 M 17 = pressure sensor <sup>2)</sup> 18 = vacuum safety valve ISV 25	
[P:069]	CfgAccD1	Accessory connection D1 <sup>3)</sup>	15 = gas ballast valve, closed without current 16 = vacuum safety valve IV 16 M 17 = pressure sensor 18 = vacuum safety valve ISV 25	
[P:721]	SlgVlvTime	Opening interval of gas ballast valve	5 min.	
[P:740]	Pressure	Current pressure value	hPa	

Tbl. 6: Parameter settings at the electronic drive unit of the scroll pump

### Gas ballast valve operated automatically

1. Select valve mode with [P:030].
2. Switch on monitoring of the gas ballast valve with [P:052] = 1.

If the gas ballast valve control is open, [P:030] defines the valve mode. There are 2 flow scenarios for the automated gas ballast valve, depending on the pressure sensor (option).

### 5.1 Controlling gas ballast valve with a pressure sensor



#### Automatic valve control

The solenoid valve opens automatically depending on the parametrization and the respective operating status.

- Observe the preset parameters before commissioning.

1) Detection via interface  
2) Preferred plug-in position  
3) Detection via interface

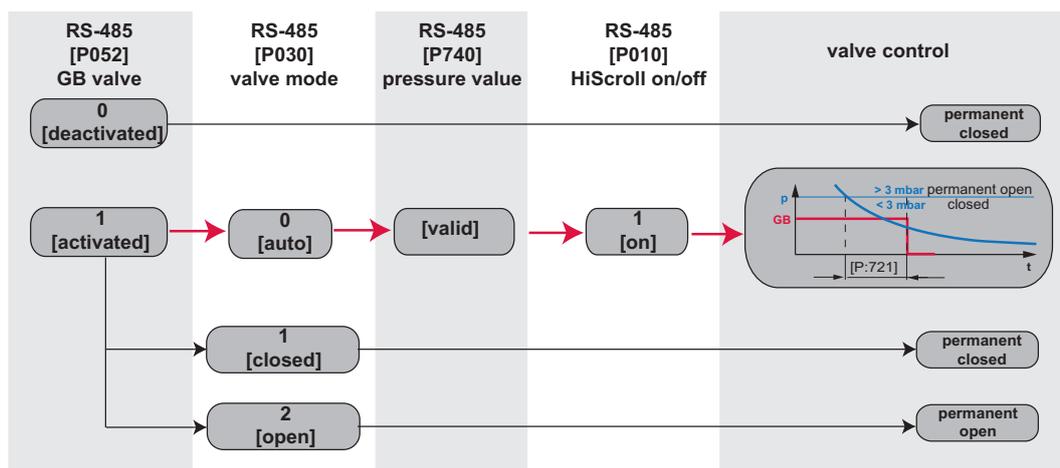


Fig. 7: Pressure-dependent gas ballast valve control in automatic mode

**Procedure**

- ▶ Set the desired opening interval for the gas ballast valve with [P:721].

**Sequence in automatic mode for version with pressure sensor**

- The gas ballast valve opens each time the pump is started. If the pressure value falls to  $\leq 3$  mbar, the solenoid valve closes after the time set in [P:721].
- The gas ballast valve is permanently open if the pressure value remains  $> 3$  mbar.

## 5.2 Controlling gas ballast valve without a pressure sensor



**Automatic valve control**

The solenoid valve opens automatically depending on the parametrization and the respective operating status.

- Observe the preset parameters before commissioning.

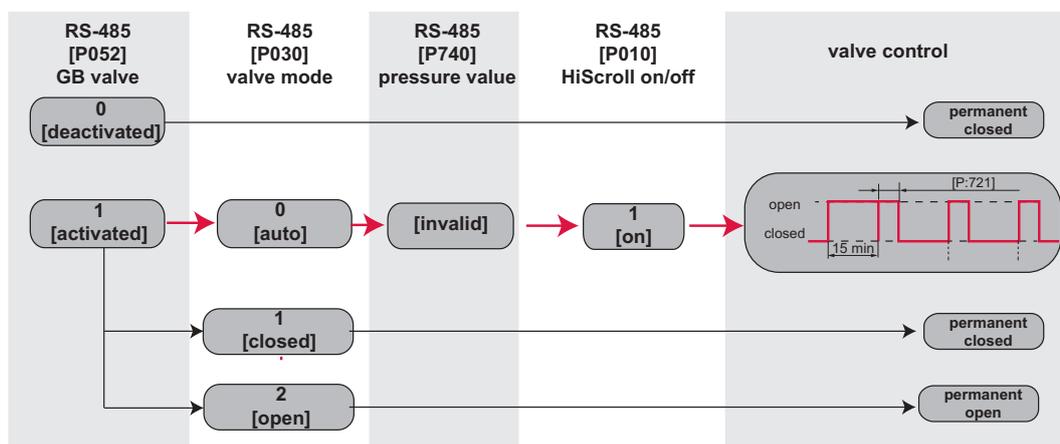


Fig. 8: Gas ballast valve control in automatic mode

**Procedure**

- ▶ Set the desired opening interval for the gas ballast valve with [P:721].

**Sequence in automatic mode for version without pressure sensor**

- The gas ballast valve opens automatically for a time of 15 min. plus the time set in [P:721] each time the pump starts.
- The gas ballast valve then opens every 15 min. for the time set in [P:721].

## 6 Accessories

Description	Order number
Flange with pipe thread, DN 16 ISO-KF, G 1/8"	PM 016 780 -T
Push-in fitting for 6 mm tube, G 1/8"	PM 016 781 -T
Push-in fitting for 8 mm tube, G 1/8"	PM 016 782 -T
Hose nozzle for 9 mm hose, G 1/8"	PM 016 783 -T

**Tbl. 7: Accessories for inert gas supply**

## 7 Technical data and dimensions

### 7.1 Technical data

Selection field	Automated gas ballast valve, 24 V DC, G 1/8"
Part number	PD Z10 100
Connection flange (in)	G 1/8"
Connection flange (out)	G 1/8"
Inlet pressure max.	1500 hPa (absolute)
Integral leakage rate	$1 \cdot 10^{-7}$ Pa m <sup>3</sup> /s
Gas flow at atmospheric pressure min.	0 sccm (20 °C)
Gas flow at atmospheric pressure max.	24 sccm (20 °C)
Supply: Voltage V DC	24 V DC
Voltage: Range	± 10 %
Power consumption	5 W
Electrical connection	C industry (micro)
Version	Valve is closed without current
Protection degree	IP54
Ambient temperature	5 – 40 °C
Weight	200 g

Tbl. 8: Technical data for solenoid valve

### 7.2 Dimensions

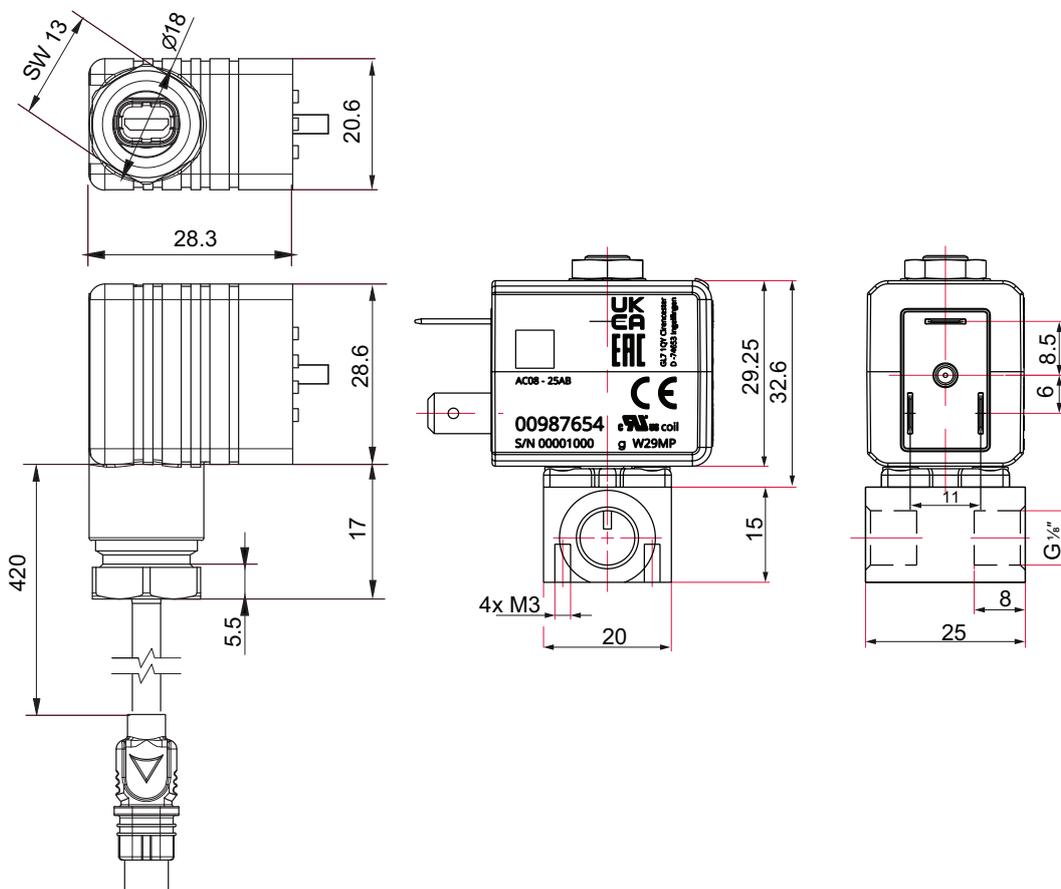


Fig. 9: Solenoid valve dimensions

# Declaration of Conformity

Declaration for product(s) of the type:

**Solenoid valve**

for HiScroll gas ballast valve

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

- **Electromagnetic compatibility 2014/30/EU**
- **Restriction of the use of certain hazardous substances 2011/65/EU**
- **Restriction of the use of certain hazardous substances, delegated directive 2015/863/EU**

**Harmonized standards and applied national standards and specifications:**

DIN EN 61000-3-2 : 2019

DIN EN 61000-3-3 : 2020

DIN EN 61326-1 : 2018

DIN VDE 0580 : 2011

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Signature:



(Daniel Sälzer)  
Managing Director

Pfeiffer Vacuum GmbH  
Berliner Straße 43  
35614 Asslar  
Germany

---

Asslar, 2022-07-14





## VACUUM SOLUTIONS FROM A SINGLE SOURCE

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

## COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:

We are the only supplier of vacuum technology that provides a complete product portfolio.

## COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!

We support you with your plant layout and provide first-class on-site service worldwide.

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Are you looking for a  
perfect vacuum solution?  
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