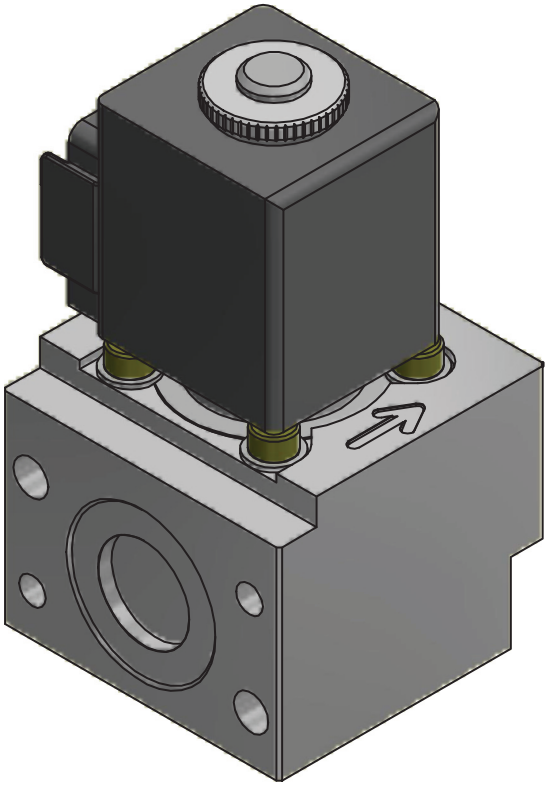


OPERATING INSTRUCTIONS

EN

Translation of the Original

IV 16 M

Vacuum safety valve

PFEIFFER VACUUM

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.

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

Table of contents

List of tables

List of figures

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 Variants

Article number	Connection	Characteristic	Pressure differential
PD Z10 050	Reducing piece DN 25 / DN 16	without voltage reduction	safe switching from $\Delta p < 50$ mbar
PM Z01 382	DN 16 ISO-KF / 3/8 "	with voltage reduction	safe switching from $\Delta p < 50$ mbar
PM Z01 383	DN 16 ISO-KF / 3/8 "	with voltage reduction	safe switching against atmosphere

Tbl. 2: Variants

1.4 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.

1.5 Conventions

1.5.1 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.

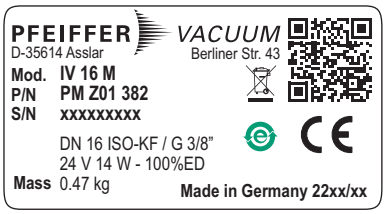
Sequence of multi-part action steps

The numerical list indicates an action with multiple necessary steps.

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

1.5.2 Stickers on product

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

	**Valve coil rating plate** (example) The rating plate is located on the valve coil **Valve body rating plate** The rating plate for the valve body is located on the side

Tbl. 3: Stickers on product

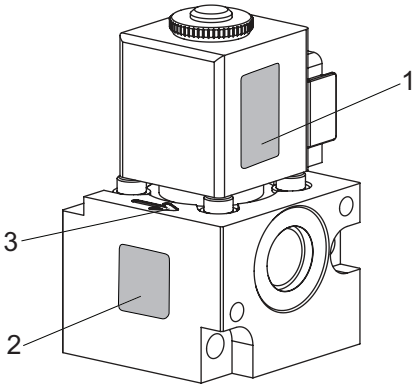


Fig. 1: Position of the sticker on the product

1 Valve coil rating plate
2 Valve body rating plate
3 Marking arrow for direction of flow, laser engraved

1.5.3 Abbreviations

Abbreviation	Meaning in this document
DC	Direct current
DuC	Duty cycle
IV	Isolation valve
[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: **[P:312]** software version
WAF	Width Across Flats
USB	Universal Serial Bus

Tbl. 4: Abbreviations used in this document

1.6 Trademark proof

- Hirschmann® is a trademark of Hirschmann Electronics GmbH.

2 Safety

2.1 General safety information

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

⚠ DANGER

Immediately pending danger

Indicates an immediately pending danger that will result in death or serious injury if not observed.

► Instructions to avoid the danger situation

⚠ WARNING

Potential pending danger

Indicates a pending danger that could result in death or serious injury if not observed.

► Instructions to avoid the danger situation

⚠ CAUTION

Potential pending danger

Indicates a pending danger that could result in minor injuries if not observed.

► Instructions to avoid the danger situation

NOTICE

Danger of damage to property

Is used to highlight actions that are not associated with personal injury.

► Instructions to avoid damage to property

Notes, tips or examples indicate important information about the product or about this document.

2.2 Safety precautions

Duty to provide information on potential dangers

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.

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.

2.3 Limits of use of product

Parameter	
Supply voltage	24 V/DC ±10 %
Permissible ambient temperature at 11 W switching power	max. +35 °C
Permissible ambient temperature at 14 W switching power	max. +40 °C
Permissible ambient temperature at 44 W switching power	max. +33 °C
Permitted pressure range	0 – 1000 hPa (absolute)
Protection degree	IP54
Relative air humidity	≤ 85 % not condensing

Tbl. 5: Permissible ambient and operating conditions

Remarks about ambient conditions

The specified permissible ambient temperatures depend on the switching power in each case. In the event of higher ambient temperatures, the vacuum safety valve (PM Z01 383) heats up to > 60 °C in the area of the knurled nut.

- In this case, install touch protection.

2.4 Proper use

- ► Use the vacuum safety valve at the fore-vacuum connection to protect against inadvertent venting of a turbopump after the backing pump has been switched off.
- ► Use the vacuum safety valve to protect against inadvertent venting after the vacuum pump has been switched off.

2.5 Foreseeable improper use

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:

- Use for media that attack or decompose materials making contact with the media
- Connecting to vacuum pumps and units that are not designed for this purpose according to their operating instructions
- Use of accessories or spare parts not listed in these instructions
- Use of supply voltage other than that specified in the technical data
- Connecting to units with exposed live parts

2.6 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 Functional description

The vacuum safety valve is a direct-acting 2/2-way solenoid valve. The valve is closed without current.

- For vacuum pumps that evacuate directly against atmosphere, the vacuum safety valve blocks the supply line to the vacuum chamber and protects against inadvertent pressure rises.
- For turbopumps, the vacuum safety valve in the fore-vacuum line protects the process vacuum and the turbopump against inadvertent venting and backflow after switching off the backing pump or in case of a power failure.

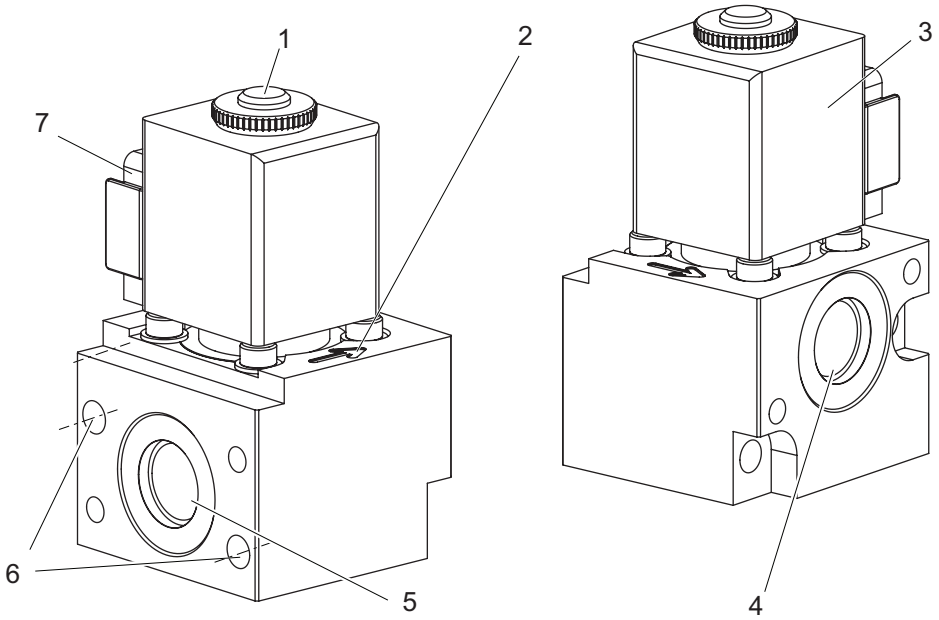


Fig. 2: Structure of vacuum safety valve

1 Knurled screw
2 Marking arrow for direction of flow
3 Valve coil
4 Outlet side, G 3/8"/DN 16
5 Inlet side, G 3/8"/DN 16
6 Fixing hole, M6
7 Electrical connection

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 with company ID no. 000021320.

3.3 Scope of delivery

The scope of delivery includes the following parts:

PM Z01 382:

- Valve body
- Valve coil
- Operating instructions

PM Z01 383:

- Valve body
- Valve coil
- Operating instructions

PD Z10 050:

- Valve body with valve coil
- Fastening pack with components for installation
- 1× preconfigured cable with AccessLink and cable socket
- Operating instructions

4 Installation

4.1 Installing vacuum safety valve in fore-vacuum line

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

- Turbopump switched off and vented

Required tools

- Allen key, **WAF 5**
- Calibrated torque wrench (tightening factor ≤ 1.6)

Required aids

- Centering ring with O-ring
- 2 cylinder screws

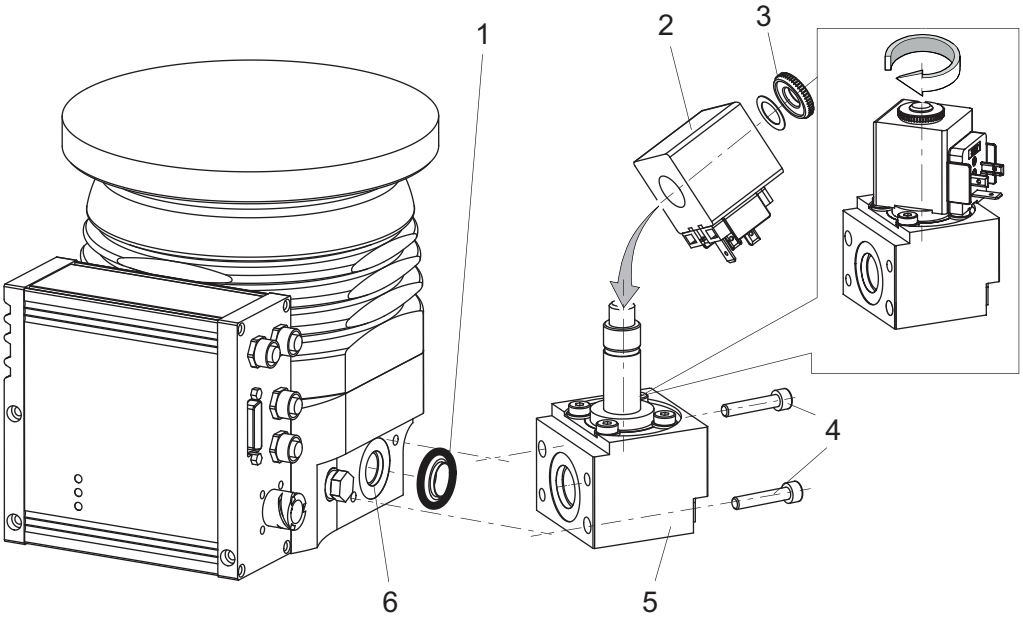


Fig. 3: Example: Installing vacuum safety valve with fixing screws

1 Centering ring with O-ring
2 Valve coil
3 Knurled screw with washer
4 Cylinder screws
5 Valve body
6 Turbopump fore-vacuum connection

Mounting valve body

1. Pay attention to the direction of flow when choosing the mounting orientation.
2. Loosen the knurled screw on the valve coil and rotate the valve coil into the desired connecting position.
3. Re-tighten the knurled screw.
4. Mount the valve body with centering ring and hexagon socket screws at the fore-vacuum connection.
5. Tighten both hexagon socket screws evenly.
   – Tightening torque: **2.0 Nm**

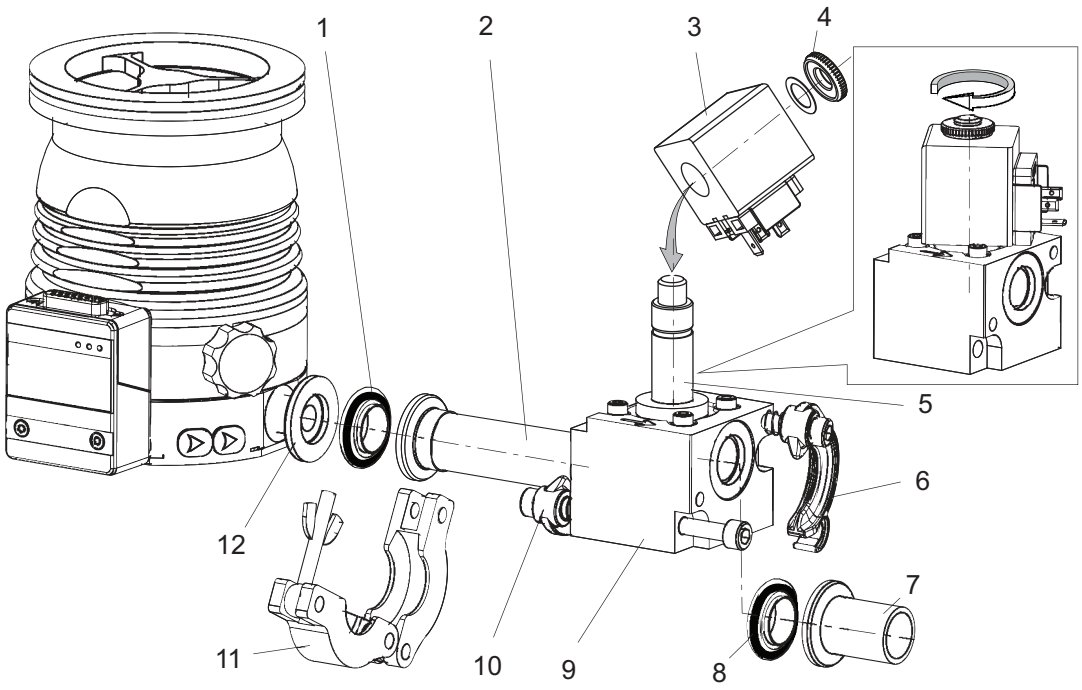


Fig. 4: Example: Installing vacuum safety valve with clamping ring

1	Centering ring with O-ring	7	DN 16 small flange component
2	ISO-KF small flange component	8	Centering ring
3	Valve coil	9	Valve body
4	Knurled screw	10	C-clamp
5	Valve piston	11	Clamping ring
6	C-clamp	12	Turbopump fore-vacuum connection

Mounting valve body

1. Pay attention to the direction of flow when choosing the mounting orientation.
2. Mount the valve body with centering ring, small flange components and clamping ring at the fore-vacuum connection of the turbopump.
3. Place the valve coil on the valve piston and rotate the valve coil into the desired connecting position.
4. Re-tighten the knurled screw.
5. Mount the corresponding small flange components, depending on the installation situation, on the connection side of the backing pump.

4.2 Installing valve as vacuum safety valve

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

- Vacuum pump switched off and vented

Required tools

- Allen key, **WAF 5**
- Calibrated torque wrench (tightening factor ≤ 1.6)

Required aids

- Clamping ring

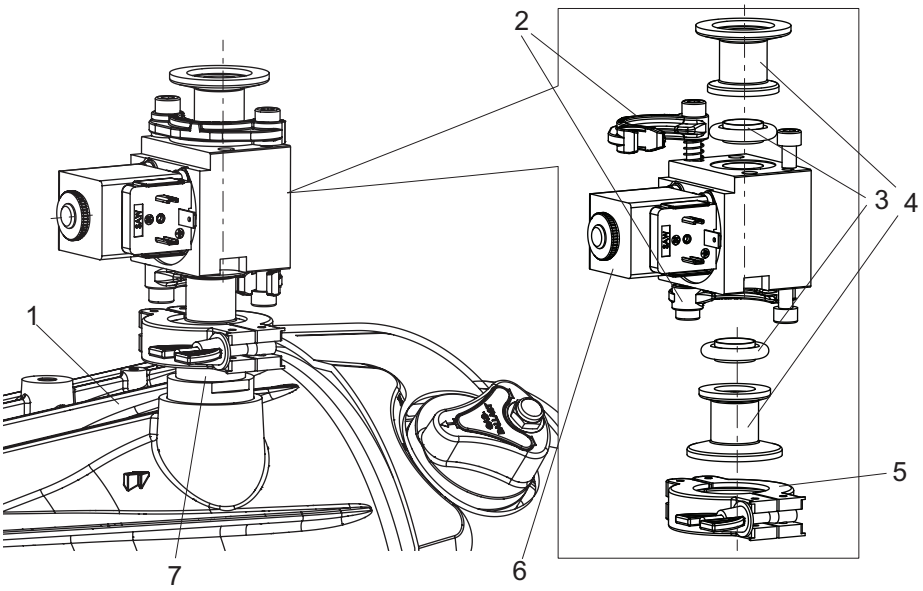


Fig. 5: Installing valve as vacuum safety valve on vacuum pump

1 Vacuum pump, e.g. HiScroll
2 C-clamp
3 Centering ring
4 DN 25/16 reducing piece
5 Clamping ring
6 Valve coil
7 Backing pump vacuum connection

Procedure

1. Make sure that the installation orientation of the valve is correct.
2. Mount the reducing piece with centering ring and C-clamp on the valve body on both sides.
3. Mount the valve body with reducing piece and clamping ring at the backing pump vacuum connection.
   – Pay attention to the centering ring.

4.3 Establishing electric connection to turbopump

NOTICE

Property damage to third-party electronic devices

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.

► Do not connect any third-party electronic devices to the accessory connections.
► Only use the connecting sockets for pump-specific accessories.

Required tools

- Crosshead screwdriver
- Torque wrench (≤ 0.2 Nm)

Required materials

- Preconfigured cable with AccessLink

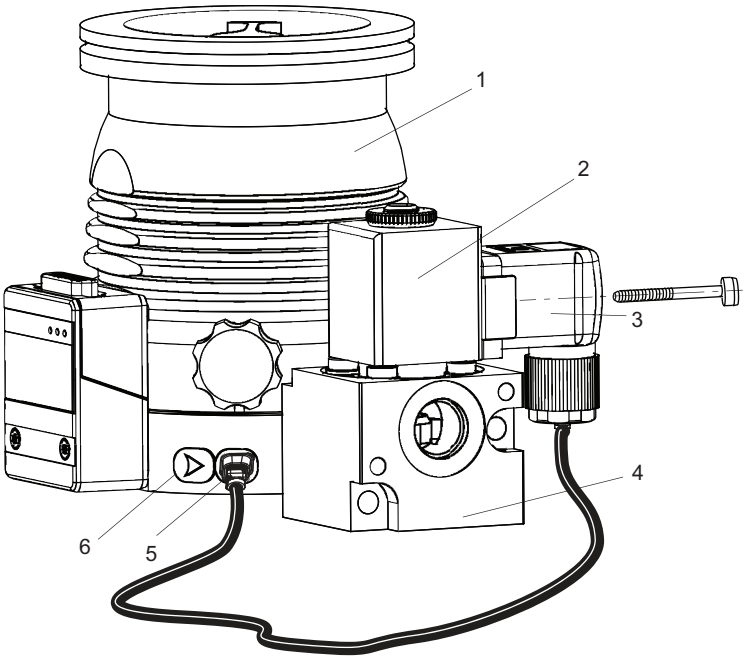


Fig. 6: Establishing electric connection to HiPace 80 Neo

1	Turbopump	4	Valve body
2	Valve coil	5	Accessory connector "C1"
3	Cable socket	6	Accessory connector "D1"

Establishing cable connection

1. Pay attention to the profile seal.
2. Place the cable socket on the valve connector.
3. Screw the cable socket of the connecting cable onto the valve coil.
   – Tightening torque: **≤ 0.2 Nm**
4. Lay the cable and secure it with cable clips if necessary.
5. Plug the connecting cable into a free accessory connector "C" or "D" at the electronic drive unit.
   – The electronic drive unit software automatically detects the accessories connected.

4.4 Establishing electric connection to HiScroll

Required tools

- Crosshead screwdriver
- Torque wrench (≤ 0.2 Nm)

Required materials

- Preconfigured cable with AccessLink and Hirschmann cable socket

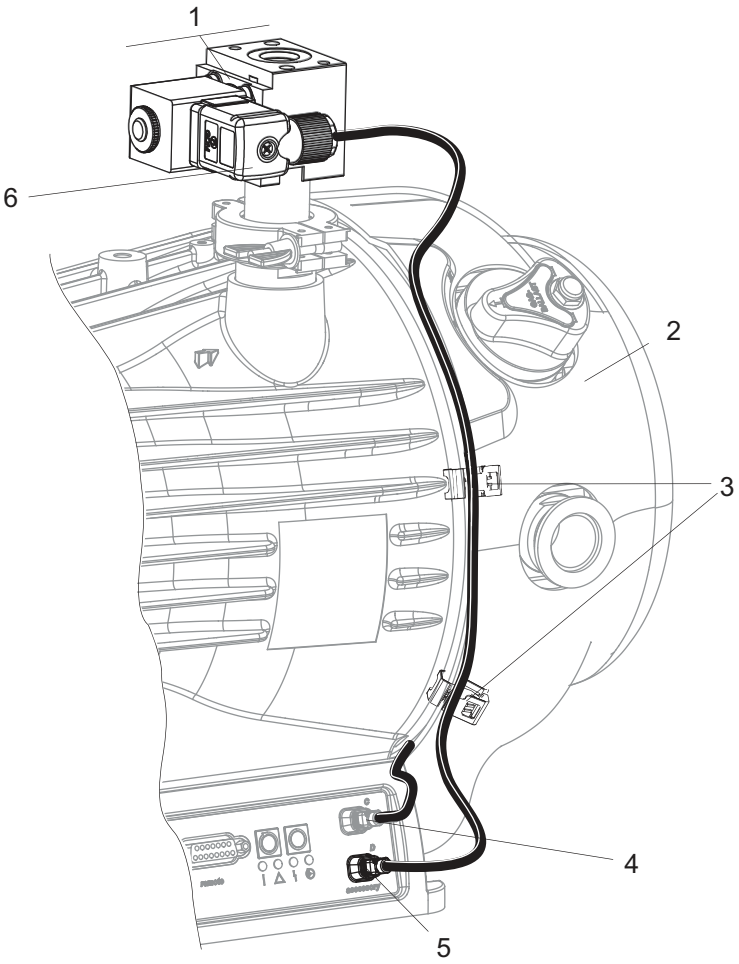


Fig. 7: Establishing electric connection to HiScroll

1	Solenoid valve	4	Accessory connector "C" for pressure sensor (option)
2	Fan cover	5	Accessory connector "D" for vacuum safety valve
3	Cable clip	6	Cable socket

Establishing cable connection

1. Check the pressure sensor connection (option).
   – Always use accessory connector "C" for the pressure sensor if available.
2. Screw the cable socket of the connecting cable onto the valve coil.
   – Tightening torque: **≤ 0.2 Nm**
3. Affix 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.
   – The electronic drive unit software automatically detects the accessories connected to the accessory connectors.

4.5 Establishing electric connection at valve connector

Required tools

- Crosshead screwdriver

Required materials

- Preconfigured cable with AccessLink
- Cable socket

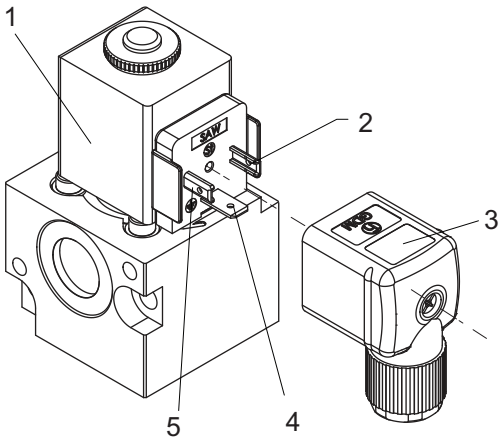


Fig. 8: Connecting cable socket

1	Valve coil	4	GND (shielding)
2	Voltage supply 0 V DC	5	Voltage supply +24 V DC
3	Cable socket		

Establishing cable connections

1. Connect the wires of the connecting cable to the terminals on the valve coil.
2. Alternatively, use an appropriate cable socket for inserting.
3. Use screened cable.

5 Operation

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 control units, or externally via RS-485 using Pfeiffer Vacuum protocol.

Parameter	Name	Designation	Setting
[P:068]	CfgAccC1	Accessory connection C1	6 = valve closed 7 = valve open 18 = fore-vacuum pressure-controlled valve switching in connection with gauge ● - open at < 10 mbar ● - opens automatically after 10 seconds (without gauge)
[P:069]	CfgAccD1	Accessory connection D1	as per [P:068]

Tbl. 6: Parameter settings in the electronic drive unit of the turbopump

Parameter	Name	Designation	Setting
[P:068]	CfgAccC1	Accessory connection C1	16 = vacuum safety valve, type IV 16 M
[P:069]	CfgAccD1	Accessory connection D1	as per [P:068]

Tbl. 7: Parameter settings in the electronic drive unit of the scroll pump

5.1 Operating vacuum safety valve on turbopump

NOTICE

Turbopump damage due to impermissible high pressure rise

Impermissible pressure rise rates place heavy loads on the rotor and the turbopump magnetic bearing. When opening the fore-vacuum valve, there is a risk of mechanical damage that can result in failure of the turbopump.

► Only vent by means of the fore-vacuum connection.
► Use a venting valve from the Pfeiffer Vacuum line of accessories if necessary.

Switch-on behavior for version with voltage reduction

To reduce the valve's energy consumption, the control reduces the voltage after switching on. If a high pressure differential develops, the valve remains closed to prevent an ingress of air.

- Check the pressure differential.
- Repeat the switching operation with a reduced pressure differential.

5.2 Operating vacuum safety valve on HiScroll

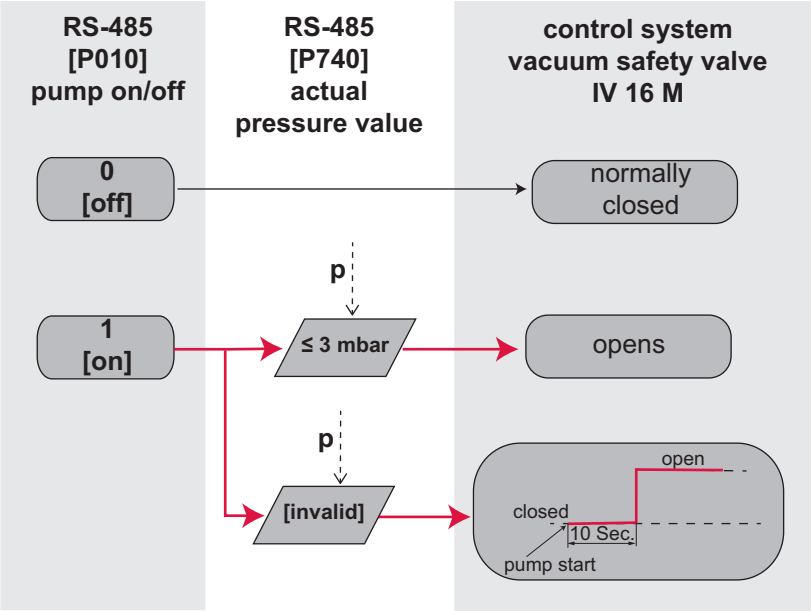


Fig. 9: Diagram illustrating valve control

Depending on the pressure sensor (option), there are two sequence scenarios for the vacuum safety valve when using the scroll pump:

Sequence for version with pressure sensor

- The valve opens as soon as the pressure reaches **≤ 3 mbar**.
- If the vacuum pump switches off or in the event of a power failure, the valve closes immediately.

Sequence for version without pressure sensor

- The valve opens automatically 10 seconds after the pump starts.
- If the vacuum pump switches off or in the event of a power failure, the valve closes immediately.

6 Accessories

Description	Order number
Reducing piece, straight, stainless steel 1.4301/304, DN 25-16 ISO-KF	120RRG025-016-40
C-clamp DN 16 ISO-KF, complete	PM 203 500 -T
ISO-KF clamping ring for elastomer seal	110BSR016
Centering ring, aluminum EN AW-6061, DN 16 ISO-KF	111ZRG016
HiScroll connecting cable, AccessLink cable socket	PE 100 271 -X
HiPace Neo connecting cable, AccessLink cable socket	PE 100 347 -X
Cable socket with diode, without cable	P 0105 681

Tbl. 8: Optional accessories

7 Technical data and dimensions

7.1 General

	mbar l/s	Pa m³/s	sccm	Torr l/s	atm cm³/s
mbar l/s	1	0.1	59.2	0.75	0.987
Pa m³/s	10	1	592	7.5	9.87
sccm	$1.69 \cdot 10^{-2}$	$1.69 \cdot 10^{-3}$	1	$1.27 \cdot 10^{-2}$	$1.67 \cdot 10^{-2}$
Torr l/s	1.33	0.133	78.9	1	1.32
atm cm³/s	1.01	0.101	59.8	0.76	1

Tbl. 9: Conversion table: Units for gas throughput

7.2 Technical data

Type designation	IV 16 M	IV 16 M	IV 16 M
Part number	PD Z10 050	PM Z01 382	PM Z01 383
Version	Valve is normally closed	Valve is normally closed	Valve is normally closed
Connection flange (in)	DN 25 ISO-KF	G 3/8", DN 16 ISO-KF	G 3/8", DN 16 ISO-KF
Connection flange (out)	DN 25 ISO-KF	G 3/8", DN 16 ISO-KF	G 3/8", DN 16 ISO-KF
Control voltage	24 V DC	24 V DC	24 V DC
Voltage: Range	±10 %	±10 %	±10 %
Power consumption	11 W	14 W (90 ms) 1,2 W	44 W (90 ms), 3.8 W
Integral leakage rate	$1 \cdot 10^{-7}$ Pa m³/s	$1 \cdot 10^{-8}$ Pa m³/s	$1 \cdot 10^{-8}$ Pa m³/s
Electrical connection	B industry (micro)	Valve connector DIN 43650 A	Valve connector DIN 43650 A
Ambient temperature	5 – 40 °C	5 – 40 °C	5 – 33 °C
Weight	470 g	470 g	470 g

Tbl. 10: Technical data for vacuum safety valve

7.3 Substances in contact with media

Pump parts	Substances in contact with media
Compression spring	1.4310
Tube	1.4301
Anchor, core	1.4105
Flat head screw, supporting ring, flange	1.4305
Valve body Seal holder	EN AW-6026, alternative AlSi1MgMn
Foil	PTFE
Bushing	POM

Tbl. 11: Materials that make contact with process media

7.4 Dimensions

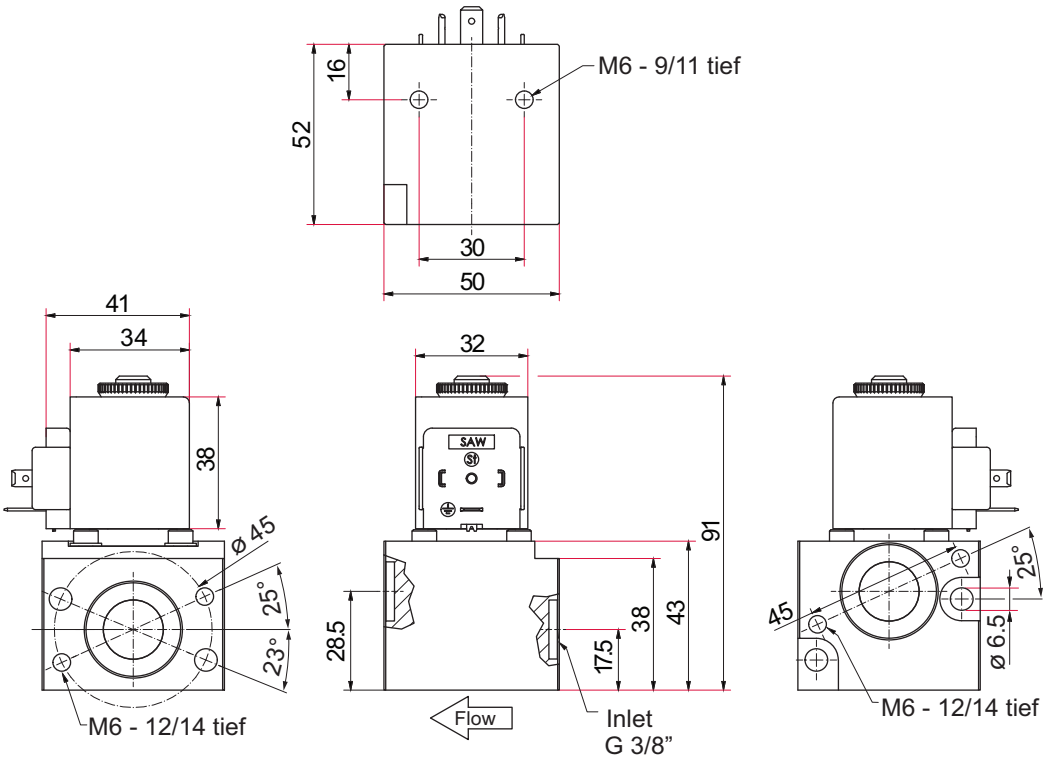


Fig. 10: Dimensions IV 16 M
Dimensions in mm

EC Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Vacuum safety valve

IV 16 M

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: 2022

DIN VDE 0580: 2011

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Daniel Sälzer)
Managing Director

Asslar, 2023-04-14

CE

PFEIFFER VACUUM

UK Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Vacuum safety valve

IV 16 M

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

Electromagnetic Compatibility Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Applied standards and specifications:

EN IEC 61000-3-2: 2019

EN IEC 61000-3-3: 2013

EN IEC 61326-1: 2021

The manufacturer's authorized representative in the United Kingdom and the authorized agent for compiling the technical documentation is Pfeiffer Vacuum Ltd, 16 Plover Close, Interchange Park, MK169PS Newport Pagnell.

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Daniel Sälzer)
Managing Director

Asslar, 2023-04-14

UK CA

PFEIFFER VACUUM

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.

A - Date 2304 - P/N:PT0741BEN

Are you looking for a perfect vacuum solution? Please contact us

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info@pfeiffer-vacuum.de

www.pfeiffer-vacuum.com

PFEIFFER VACUUM