



OPERATING INSTRUCTIONS



Translation of the Original

RPT 010

Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new sensor is designed to support you in your individual application with maximum 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. From this extensive, practical experience we have gained a large volume of information that can contribute to efficient deployment and to your personal safety.

In the knowledge that our product must avoid consuming work output, we trust that our product can offer you a solution that supports you in the effective and trouble-free implementation 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

This document is the intellectual property of Pfeiffer Vacuum and all contents of this document are protected by copyright. They may not be copied, altered, reproduced or published without the prior written permission of Pfeiffer Vacuum.

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

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1 About this manual



IMPORTANT

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

1.1 Validity

This document describes the function of the products listed in the following and provides the most important information for safe use. The description is written in accordance with the valid directives. The information in this document refers to the current development status of the products. The document retains its validity assuming that the customer does not make any changes to the product.

1.1.1 Applicable documents

Designation	Document
TC "electronic drive unit" operating instructions	(depending on the device used)
HiPace "turbopump" operating instructions	(depending on the device used)
HiScroll "scroll pump" operating instructions	(depending on the device used)
TIC 010 "adapter for 2 sensors" assembly instructions	PT 0484 BN
Declaration of conformity	(part of these instructions)

Tbl. 1: Applicable documents

You can find these documents in the [Pfeiffer Vacuum Download Center](#).

1.1.2 Variants

This document applies to products with the following part numbers:

Article number	Designation	Connection
PT R71 035	RPT 010 (G1/8", 0.35 m cable)	Molex
PT R71 050	RPT 010 (G1/8", 0.5 m cable)	Molex
PT R71 100	RPT 010 (G1/8", 1.0 m cable)	Molex
PT R71 150	RPT 010 (G1/8", 1.5 m cable)	Molex
PT R71 550	RPT 010 (G1/8", 0.5 m cable)	Micro USB
PD 100 100 -T ¹⁾	RPT 010 (G1/8", 0.5 m cable)	D-Sub, 15-pin

Tbl. 2: Variants

1.2 Target group

These operating instructions are aimed at all persons performing the following activities on the product:

- Transportation
- Setup (Installation)
- Usage and operation
- Decommissioning
- Maintenance and cleaning
- Storage or disposal

The work described in this document is only permitted to be performed by persons with the appropriate technical qualifications (expert personnel) or who have received the relevant training from Pfeiffer Vacuum.

1) The information on the rating plate is PT R71 050.

1.3 Conventions

1.3.1 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. ...

1.3.2 Pictographs

The pictographs used in the document indicate useful information.



Note



Tip



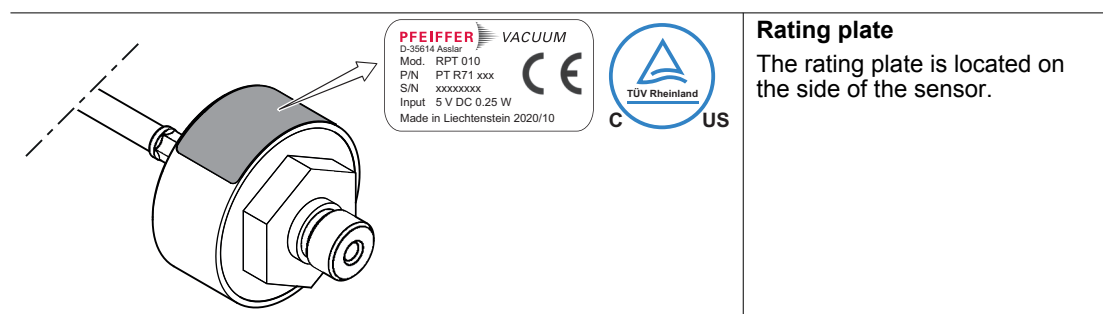
Wear laboratory gloves



Perform a visual inspection

1.3.3 Stickers on the product

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



1.3.4 Abbreviations

Abbreviation	Explanation
ATM	Atmosphere
c	Constant for converting measuring signal and pressure
C	Calibration factor for calculating the pressure for gases other than air
HV	High vacuum
HPU	Handheld Programming Unit
DCU	Display Control Unit
LPS	Limited power source
MSL	Mean sea level

Abbreviation	Explanation
OR	Overrange
[P:000]	Electronic drive unit parameter with number
p	Pressure
PLC	Programmable logical controller
WAF	Width Across Flats
TC	Turbopump electronic drive unit (turbo controller)
U	Measuring signal [V] (output voltage)
UR	Underrange

Tbl. 3: Abbreviations used

1.4 Trademark proof

- HiPace® is a registered trademark of Pfeiffer Vacuum GmbH.
- Molex® is a registered trademark of Molex Incorporated, Lisle, Illinois, USA.

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 instructions



Safety instructions according to product's life stages

All safety instructions in this document are based on the results of a risk assessment. Pfeiffer Vacuum has taken into account all the relevant life stages of the product.

Risks during maintenance

DANGER

Electric shocks due to moisture penetrating into the device

Moisture that has penetrated into the device results in personal injury through electric shocks.

- ▶ Only operate the device in a dry environment.
- ▶ Operate the device away from fluids and humidity sources.
- ▶ Do not switch on the device if fluid has penetrated into it, instead contact Pfeiffer Vacuum Service.
- ▶ Always disconnect the current supply before cleaning the device.

⚠ WARNING**Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

⚠ WARNING**Health hazards due to cleaning agent**

The cleaning agent being used causes health hazards which could include, for example, poisoning, allergies, skin irritations, chemical burns or damage to the airways.

- ▶ When handling cleaning agents, observe the applicable regulations.
- ▶ Adhere to safety measures regarding handling and disposal of cleaning agents.
- ▶ Be aware of potential reactions with product materials.

Risks when shipping**⚠ WARNING****Risk of poisoning from contaminated products**

Where products that contain harmful substances are shipped for maintenance or repair purposes, the health and safety of service personnel is at risk.

- ▶ Comply with the instructions for safe distribution.

Risks during disposal**⚠ WARNING****Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

2.3 Safety precautions

The product is designed according to the latest technology and recognized safety engineering rules. Nevertheless, improper use can result in danger to operator all third party life and limb, and product damage and additional property damage.

**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.
- ▶ Pass on safety instructions to all other users.
- ▶ Do not expose body parts to the vacuum.
- ▶ Always ensure a secure connection to the earthed conductor (PE).
- ▶ Never disconnect plug connections during operation.
- ▶ Observe the above shutdown procedures.
- ▶ Keep lines and cables away from hot surfaces ($> 70\text{ °C}$).
- ▶ Do not carry out your own conversions or modifications on the device.
- ▶ Observe the unit protection degree prior to installation or operation in other environments.
- ▶ Provide suitable touch protection, if the surface temperature exceeds 70 °C .
- ▶ Inform yourself about any contamination before starting work.

2.4 Proper use

The sensor is used for the integrated pressure measurement at the Pfeiffer Vacuum HiPace or HiScroll within the permissible total pressure range.

Use the product according to its intended purpose

1. Install, operate and maintain the sensor only as prescribed in these operating instructions.
2. Use the sensor only for the pressure measurement of air, inert gases and gas mixtures outside their explosion limits.
3. Comply with the application limits.
4. Observe the technical data.

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 misuse, in particular:

- Use outside the mechanical and electrical application limits in accordance with the technical data
- Use with corrosive or explosive media, if this is not explicitly permitted
- Use outdoors
- Use after technical changes (on the inside or the outside of the product)
- Use with replacement or accessory parts that are unsuitable or are not approved

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 Function

The sensor has two measurement systems:

- Pirani measurement system
- Piezo-resistive measurement system

The sensor responds to measured value requests, type requests and adjustment commands. Signals are evaluated via the interfaces of the electronic drive unit using a Pfeiffer Vacuum display and control unit or external units (e.g. PLC or PC).

3.2 Status display

Information on the operating status of the sensor is provided via the display and control unit.

You can obtain further details in the display and control unit operating instructions.

3.3 Identifying the product

You will need all the data from the rating plate to safely identify the product when communicating with Pfeiffer Vacuum.

1. Read the data on the product rating plate.
2. Record this data.
3. Always have all rating plate specifications to hand.

3.4 Scope of delivery

The scope of delivery includes the following parts:

- Sensor with cable and power supply plug
- Operating instructions

Unpacking the product and checking completeness of the shipment

1. Unpack the product.
2. Remove the transport fasteners, transport protection etc.
3. Store the transport fasteners, transport protection etc. in a safe place.
4. Check that the shipment is complete.
5. Ensure that no parts are damaged.

4 Transport and storage

4.1 Transporting the product

NOTICE

Damage caused by incorrect transportation

Transportation in unsuitable packaging, or failure to install all transport locks, can damage the product.

- ▶ Comply with the instructions for safe transportation.



Packing

We recommend keeping the transport packaging and original protective cover.

General information regarding safe transport

- ▶ Observe the weight specified on the transport packaging.
- ▶ Where possible, always transport or ship the product in the original transport packaging.
- ▶ Always use dense and impact-proof transport packaging for the product.
- ▶ Remove the existing protective cover and transport protections only immediately prior to installation.
- ▶ Reattach transport locks and transport protections prior to each transport.

4.2 Storing the product

NOTICE

Damage caused by improper storage

Improper storage will lead to damage to the product.

Static charging, moisture, etc. lead to defects on the electronic components.

- ▶ Comply with the instructions for safe storage.



Packing

We recommend storing the product in its original packaging.

General information for safe storage

- ▶ Store the product in a cool, dry, dust-free place, where it is protected against impacts and mechanical vibration.
- ▶ Always use dense and impact-proof packaging for the product.
- ▶ Where possible, store the product in its original packaging.
- ▶ Store electronic components in antistatic packaging.
- ▶ Maintain the permissible storage temperature.
- ▶ Avoid extreme fluctuations of the ambient temperature.
- ▶ Avoid high air humidity.
- ▶ Seal connections with the original protective caps.
- ▶ Protect the product with the original transport protection (where available).

5 Installation

5.1 Establishing the vacuum connection

NOTICE

Impairment from contamination and damage

Touching the devices or components with bare hands increases the desorption rate and leads to incorrect measurements. Dirt (e.g. dust, fingerprints, etc.) and damage impair the function.

- ▶ When working on high or ultra high vacuum systems, always wear clean, lint-free and powder-free laboratory gloves.
- ▶ Only use clean tools.
- ▶ Make sure that the connection flanges are free of grease.
- ▶ Remove protective caps and protective covers from flanges and connections only when necessary.
- ▶ Carry out all work in a well lit area.

NOTICE

Damage to housing or cable connection

Any improper use of force will damage the sensor.

- ▶ Do not apply any force with a tool to the housing or cable connection.



Vacuum pump operating instructions

Observe the information on the connection in the operating instructions for the vacuum pump.

5.1.1 Connecting the sensor to HiPace

Required tools

- Open-end wrench, **WAF 19, ≤ 4 mm flat**
- Calibrated torque wrench (tightening factor ≤ 2.5)

Prerequisites

- Vacuum pump switched off and vented
- Sealing gas connection or fore-vacuum connection with intermediate piece for the sensor selected
- Appropriate ambient conditions
- Sufficient space for electrical connection (e.g. permissible bending radii of cables)

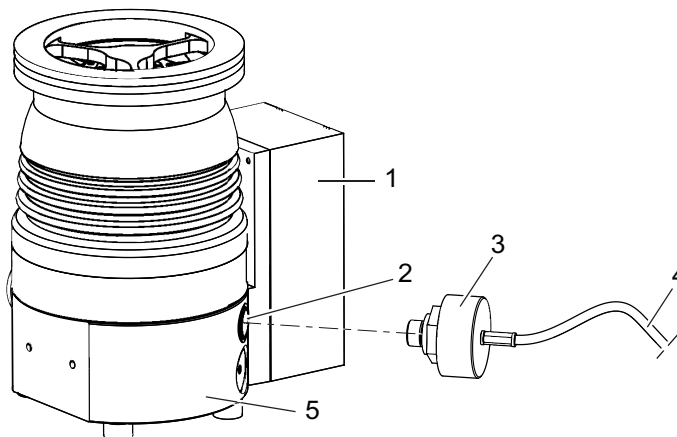


Fig. 2: Example: Connect the sensor to HiPace

- | | |
|---|--------------------|
| 1 Electronic drive unit | 4 Sensor cable |
| 2 1/8" connector (here: sealing gas connection) | 5 Pump bottom part |
| 3 Sensor | |

Procedure

1. Remove the protective cap from the sensor and store it in a safe place.
2. Remove the locking screw from the desired connector of the turbopump.
3. Mount the sensor on the vacuum side on the desired G 1/8" connector of the turbopump.
 - Tightening torque: **max. 3 Nm**

5.1.2 Connecting the sensor to HiScroll

Required tools

- Open-end wrench, **WAF 19, ≤ 4 mm flat**
- Allen key, **WAF 3**
- Allen key, **WAF 4**
- Calibrated torque wrench (tightening factor ≤ 2.5)

Prerequisites

- Vacuum pump switched off and vented
- Appropriate ambient conditions
- Sufficient space for electrical connection (e.g. permissible bending radii of cables)
- Fan cover of HiScroll removed according to operating instructions

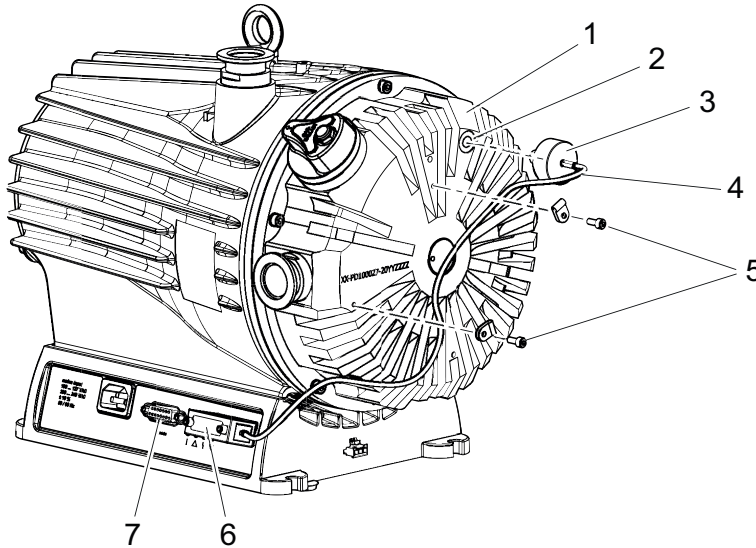


Fig. 3: Example: Connecting the sensor to HiScroll

- | | |
|------------------------------|---|
| 1 Spiral housing | 5 Plastic clamps and interior hexagon socket screws |
| 2 Pressure sensor connection | 6 D-Sub adapter of the sensor |
| 3 Sensor | 7 Remote connection |
| 4 Sensor cable | |

Procedure

1. Remove the protective cap from the sensor and store it in a safe place.
2. Remove the locking screw from the pressure sensor connector of the HiScroll.
3. Mount the sensor on the vacuum side on the pressure sensor connector of the HiScroll.
4. Tighten the sensor at the hexagon socket (WAF 19) on the HiScroll.
 - Tightening torque: **max. 2.5 Nm**
5. Route the sensor cable on the spiral housing.
6. Fasten the sensor cable to the spiral housing with two plastic clamps and interior hexagon socket screws.
 - Tightening torque: **max. 1.25 Nm**

5.2 Establishing the 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.

5.2.1 Connecting the sensor with TIC 010 to HiPace



Electronic drive unit operating instructions

Observe the information on the connection in the operating instructions for the electronic drive unit.



Assembly instructions for the TIC 010

Observe the information on assembly in the assembly instructions for the TIC 010.

The plug-in contacts of the adapter TIC 010 are numbered on its circuit board and correspond to parameters and output values in the further course. You can select the plug-in position of the sensor as desired.

Prerequisites

Electronic drive unit	Firmware version (or higher)
TC 110	012500
TC 120	010300
TC 400	012400
TC 1200	012400
TM 700	010600

Tbl. 4: Electronic drive units and required firmware versions

Accessories required

- TIC 010, adapter for two sensors

Procedure

1. Make sure that the cable has zero potential.
2. Check the firmware version of the electronic drive unit.
3. Connect the cable to the TIC 010 at the "PV.can" connector of the electronic drive unit.
4. Make the settings and perform the control via the interfaces of the electronic drive unit.

5.2.2 Connecting the sensor with a D-Sub adapter to HiScroll

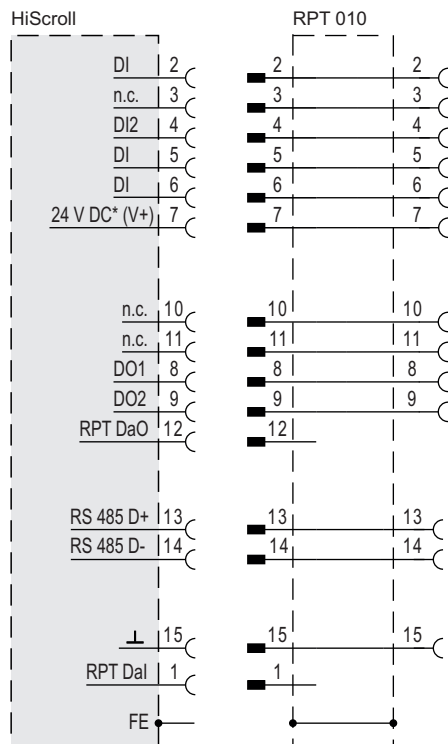


Fig. 4: D-Sub adapter connection diagram

The D-Sub adapter of the sensor guides contacts 2 to 11 and 13 to 15 of the remote interface to the D-Sub socket on the back. Contacts 1 and 12 are used to control the sensor.

Connecting the sensor to remote

1. Make sure that the cable has zero potential.
2. Connect the cable to the connector of the electronic drive unit.
3. Make the settings and perform the control via the interfaces of the electronic drive unit.

5.2.3 Connecting the sensor with micro USB to HiPace neo



Vacuum pump operating instructions

Observe the information on the connection in the operating instructions for the vacuum pump.

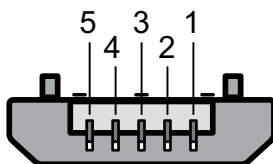


Fig. 5: Micro USB connection (type B)

- | | |
|-------------------------------------|-----------------------|
| 1 + 5 V (blue) | 4 Not connected (red) |
| 2 Sensor Rx/D / master Tx/D (white) | 5 GND (black) |
| 3 Sensor Tx/D / master Rx/D (green) | |

Procedure

1. Make sure that the cable has zero potential.
2. Connect the cable to a free micro USB connector of the vacuum pump.
3. Make the settings and perform the control via the interfaces of the electronic drive unit.

6 Operation

The connected sensor unit is ready for operation as soon as the supply voltage is supplied to the electronic drive unit.

The pressure measured in the Pirani range depends on the gas type.

Recommendations

- ▶ Observe a minimum stabilization period of 5 to 10 minutes.
- ▶ Note the relationship between measuring signal and pressure.

6.1 Evaluating the measurement signal



Signal evaluation via output interfaces

The output interfaces of the electronic drive unit with the applicable Pfeiffer Vacuum protocol and the Pfeiffer Vacuum parameter set are used to operate the connected accessory devices on a Pfeiffer Vacuum vacuum pump.

See the valid operating instructions for the electronic drive unit used.

Prerequisites

Control unit	RS-485 parameter	Firmware version (or higher)
DCU	Data type "u_expo_new"	020300
HPU 001		010300 ²⁾

Tbl. 5: Required firmware versions

Checking the firmware versions

- ▶ Request the firmware version of the electronic drive unit via parameter **[P:312]** of the electronic drive unit (TC)
- ▶ Request the firmware version of the display and control unit via parameter **[P:351]** of the display and control unit (DCU or HPU)

6.2 Determining the effective pressure with calibration factors



Gas and vapor mixtures

Process gases are mostly mixtures of gas and vapor. Precise measuring of gas and vapor mixtures is only possible using partial pressure measurement instruments, for example a quadrupole mass spectrometer.

The measurement signal of the pressure sensor depends on the type of gas in the Pirani area. The pre-set correction factor = 1 applies for nitrogen (N₂), oxygen (O₂), dry air, and carbon monoxide (CO).

Gas type	Calibration factor (C)
Air, oxygen (O ₂), carbon monoxide (CO), nitrogen (N ₂)	1.0
Hydrogen (H ₂)	0.5
Carbon dioxide (CO ₂)	0.9
Water vapor	0.5
Helium (He)	0.8
Neon (Ne)	1.4
Argon (Ar)	1.7
Krypton (Kr)	2.4
The calibration factors provided are mean values.	

2) Read-only access up to firmware version 010300

Gas type	Calibration factor (C)
Xenon (Xe)	3.0
Freon 12	0.7

The calibration factors provided are mean values.

Tbl. 6: Calibration factors for the pressure range < 1 hPa

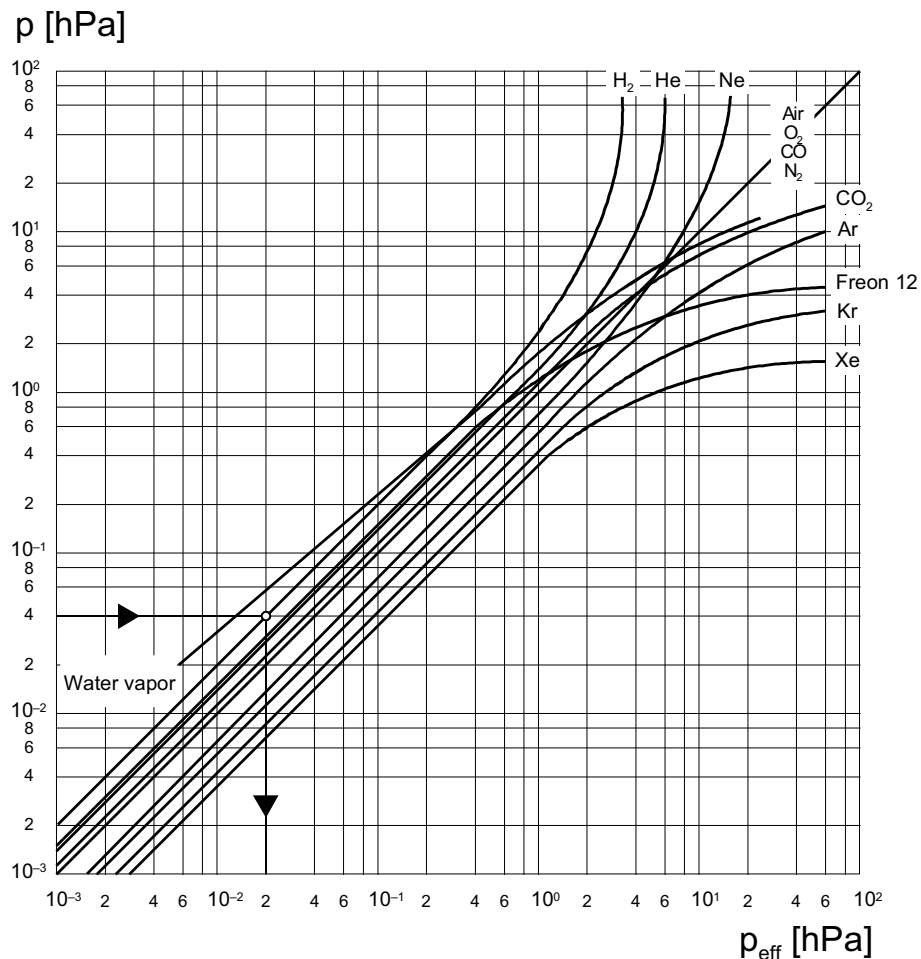


Fig. 6: Displayed pressure

Within the pressure range < 1 hPa, the display is linear.

Set calibration factor at electronic drive unit

- Use [P:742] to enter calibration factor and correct displayed measured value.

Alternatively: Calculate pressure for gases other than air

1. Set the calibration factor in the electronic drive unit to 1.
2. Calculate the effective pressure using the following formula:

$$P_{\text{eff}} = C \times p$$

- P_{eff} = Effective pressure
- C = Calibration factor of the gas to be measured
- p = Displayed pressure (gauge calibrated for air)

7 Maintenance

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.



Maintenance in the Pfeiffer Vacuum Service Center

Pfeiffer Vacuum offers a complete maintenance service for all products.

Pfeiffer Vacuum recommends: Contact your Pfeiffer Vacuum Service Center to arrange the maintenance of defective products and components.



Cleaning in the Pfeiffer Vacuum Service Center

Pfeiffer Vacuum recommends: Contact your nearest Pfeiffer Vacuum Service Center to arrange the cleaning of heavily-soiled products and components.



Warranty claim

Opening the device during the warranty period or damaging/removing the warranty seal will void the warranty.

Contact the Pfeiffer Vacuum Service Center in the event of process-related shorter maintenance intervals.



First read through the sections completely

Read the section with the work instructions through completely first before you commence with work.

Utilization in other climatic conditions, long-term operation, extreme temperatures, a different mounting orientation and aging or contamination can lead to a zero point shift in the Pirani measuring circuit. A zero point shift will necessitate recalibration or cleaning.

7.1 Removing components

NOTICE

Impairment from contamination and damage

Touching the devices or components with bare hands increases the desorption rate and leads to incorrect measurements. Dirt (e.g. dust, fingerprints, etc.) and damage impair the function.

- ▶ When working on high or ultra high vacuum systems, always wear clean, lint-free and powder-free laboratory gloves.
- ▶ Only use clean tools.
- ▶ Make sure that the connection flanges are free of grease.
- ▶ Remove protective caps and protective covers from flanges and connections only when necessary.
- ▶ Carry out all work in a well lit area.

Prerequisites

- Vacuum system vented to atmospheric pressure
- Supply voltage switched off

Removing the sensor

1. Disconnect the sensor cable from the connected electronic drive unit.
2. Remove the sensor from the vacuum pump.
3. Fit the protective cap on the connection flange.

7.2 Cleaning of components

⚠ DANGER**Electric shocks due to moisture penetrating into the device**

Moisture that has penetrated into the device results in personal injury through electric shocks.

- ▶ Only operate the device in a dry environment.
- ▶ Operate the device away from fluids and humidity sources.
- ▶ Do not switch on the device if fluid has penetrated into it, instead contact Pfeiffer Vacuum Service.
- ▶ Always disconnect the current supply before cleaning the device.

⚠ WARNING**Health hazards due to cleaning agent**

The cleaning agent being used causes health hazards which could include, for example, poisoning, allergies, skin irritations, chemical burns or damage to the airways.

- ▶ When handling cleaning agents, observe the applicable regulations.
- ▶ Adhere to safety measures regarding handling and disposal of cleaning agents.
- ▶ Be aware of potential reactions with product materials.

NOTICE**Damage caused by penetrating moisture**

Penetrating moisture, e.g. through condensation or dripping water, damages the device.

- ▶ Protect the device against moisture penetrating.
- ▶ Only operate the device in a clean and dry environment.
- ▶ Operate the device away from fluids and humidity sources.
- ▶ Take special precautions if there is a risk of dripping water.
- ▶ Do not switch on the device if fluid has penetrated into it, instead contact the Pfeiffer Vacuum Service Center.

NOTICE**Damage caused by unsuitable cleaning agents**

Unsuitable cleaning agents damage the product.

- ▶ Do not use solvents as they attack the surface.
- ▶ Do not use any aggressive or abrasive cleaning agents.

Required consumables

- Industrial alcohol
- Cloth (soft, lint-free)

External cleaning of the device

1. Always use a cloth soaked in industrial alcohol for external cleaning.
2. Allow the surfaces to dry thoroughly after cleaning.

7.3 Calibrating the pressure sensor

Pfeiffer Vacuum calibrated the pressure sensor at the factory.

Required aids

- Vacuum gauge for reference measurement on the vacuum system
- Pfeiffer Vacuum display and control unit or PC

Perform HV calibration

1. Operate vacuum system at final pressure.
2. Wait for stabilization period of at least 10 minutes.
3. Read off actual pressure value of reference measurement.
4. Use **[P:740]** to set actual pressure value to reference value.
5. Enter "000000" for $p \leq 1 \times 10^{-4}$ hPa.

Perform ATM calibration

1. Vent vacuum system to atmospheric pressure.
2. Wait for stabilization period of at least 10 minutes.
3. Use **[P:740]** to precisely set actual pressure value to daily pressure.

8 Shipping

WARNING

Risk of poisoning from contaminated products

Where products that contain harmful substances are shipped for maintenance or repair purposes, the health and safety of service personnel is at risk.

- ▶ Comply with the instructions for safe distribution.



Decontamination subject to charge

Pfeiffer Vacuum decontaminates products not clearly declared "Free of contamination" at your expense.

Instructions for safe shipping

- ▶ Do not ship microbiological, explosive or radioactively contaminated products.
- ▶ Observe the shipping guidelines for the participating countries and transport companies.
- ▶ Highlight any potential dangers on the outside of the packaging.
- ▶ Download the explanation for contamination at [Pfeiffer Vacuum Service](#).
- ▶ Always enclose a completed declaration of contamination.

9 Recycling and disposal

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.



Environmental protection

You **must** dispose of the product and its components in accordance with all applicable regulations for protecting people, the environment and nature.

- Help to reduce the wastage of natural resources.
- Prevent contamination.



Environmental protection

The product and its components **must be disposed of in accordance with the applicable regulations relating to environmental protection and human health**, with a view to reducing natural resource wastage and preventing pollution.

9.1 General disposal information

Pfeiffer Vacuum products contain materials that you must recycle.

- ▶ Dispose of our products according to the following:
 - Iron
 - Aluminium
 - Copper
 - Synthetic
 - Electronic components
 - Oil and fat, solvent-free
- ▶ Observe the special precautionary measures when disposing of:
 - Fluoroelastomers (FKM)
 - Potentially contaminated components that come into contact with media

9.2 Disposal of sensors

Pfeiffer Vacuum sensors contain materials that you must recycle.

1. Decontaminate the components that come into contact with process gases.
2. Separate the components into recyclable materials.
3. Recycle the non-contaminated components.
4. Dispose of the product or components safely according to locally applicable regulations.

10 Service solutions by Pfeiffer Vacuum

We offer first-class service

High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

We are always focused on perfecting our core competence – servicing of vacuum components. Once you have purchased a product from Pfeiffer Vacuum, our service is far from over. This is often exactly where service begins. Obviously, in proven Pfeiffer Vacuum quality.

Our professional sales and service employees are available to provide you with reliable assistance, worldwide. Pfeiffer Vacuum offers an entire range of services, from [original replacement parts](#) to [service contracts](#).

Make use of Pfeiffer Vacuum service

Whether preventive, on-site service carried out by our field service, fast replacement with mint condition replacement products, or repair carried out in a [Service Center](#) near you – you have various options for maintaining your equipment availability. You can find more detailed information and addresses on our homepage, in the [Pfeiffer Vacuum Service](#) section.

You can obtain advice on the optimal solution for you, from your [Pfeiffer Vacuum representative](#).

For fast and smooth service process handling, we recommend the following:



1. Download the up-to-date form templates.
 - [Explanations of service requests](#)
 - [Service requests](#)
 - [Contamination declaration](#)



- a) Remove and store all accessories (all external parts, such as valves, protective screens, etc.).
- b) If necessary, drain operating fluid/lubricant.
- c) If necessary, drain coolant.
2. Complete the service request and contamination declaration.



3. Send the forms by email, fax, or post to your local [Service Center](#).

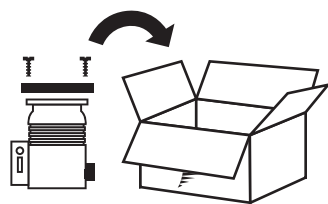


4. You will receive an acknowledgment from Pfeiffer Vacuum.

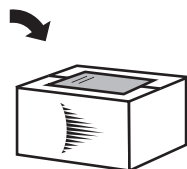
PFEIFFER VACUUM

Submission of contaminated products

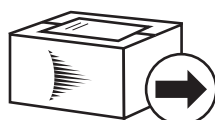
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination costs** may be incurred.



5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
 - a) Neutralize the product with nitrogen or dry air.
 - b) Seal all openings with blind flanges, so that they are airtight.
 - c) Shrink-wrap the product in suitable protective foil.
 - d) Package the product in suitable, stable transport containers only.
 - e) Maintain applicable transport conditions.



6. Attach the contamination declaration to the **outside** of the packaging.



7. Now send your product to your local Service Center.



8. You will receive an acknowledgment/quotation, from Pfeiffer Vacuum.

PFEIFFER VACUUM

Our sales and delivery conditions and repair and maintenance conditions for vacuum devices and components apply to all service orders.

11 Spare parts

Ordering spare parts

- ▶ Have the part number to hand, along with other details from the rating plate as required.
- ▶ Install original spare parts only.

Description	Order number
U sealing ring U 10.4/16 x 2	P 3529 133 -P

Tbl. 7: Spare parts

12 Technical data and dimensions

12.1 General

	mbar	bar	Pa	hPa	kPa	Torr mm Hg
mbar	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
bar	1000	1	$1 \cdot 10^5$	1000	100	750
Pa	0.01	$1 \cdot 10^{-5}$	1	0.01	$1 \cdot 10^{-3}$	$7.5 \cdot 10^{-3}$
hPa	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
kPa	10	0.01	1000	10	1	7.5
Torr mm Hg	1.33	$1.33 \cdot 10^{-3}$	133.32	1.33	0.133	1

$$1 \text{ Pa} = 1 \text{ N/m}^2$$

Tbl. 8: Conversion table: Pressure units

	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

12.2 Technical data

Parameter	Variant		
	Molex	D-Sub	Micro USB
Vacuum connection	1/8" thread		
Measuring principle	Piezo/Pirani		
Precision of the measured value	$\pm 50 \%$ within the range from 5×10^{-4} to 1×10^{-3} hPa $\pm 15 \%$ within the range from 1×10^{-3} to 100 hPa $\pm 15 \%$ hPa within the range from 100 to 1200 hPa		
Repeatability of the measured value	$\pm 3 \%$ within the range from 1×10^{-3} to 100 hPa $\pm 3 \%$ hPa within the range from 100 to 1200 hPa		
Pressure, max.	2000 hPa		
Measuring range, min.	5×10^{-4} hPa		
Measuring range, max.	1200 hPa		
Measurement cable length	max. 1.5 m		
Measuring cycle	100 ms		
Connection (electrical)	Molex PicoBlade, 4-pin, screened (cable with suitable plug for TIC 010)	D-Sub connector, 15-pin (cable with suitable plug for HiScroll)	Micro USB plug (cable with suitable plug for HiPace neo)
Installation location	Only in indoor areas		
Installation altitude	max. 2000 m above sea level		
Mounting orientation	Arbitrary		
Air pressure	860 to 1060 hPa		
Relative humidity	5 to 85 % (non-condensing)		

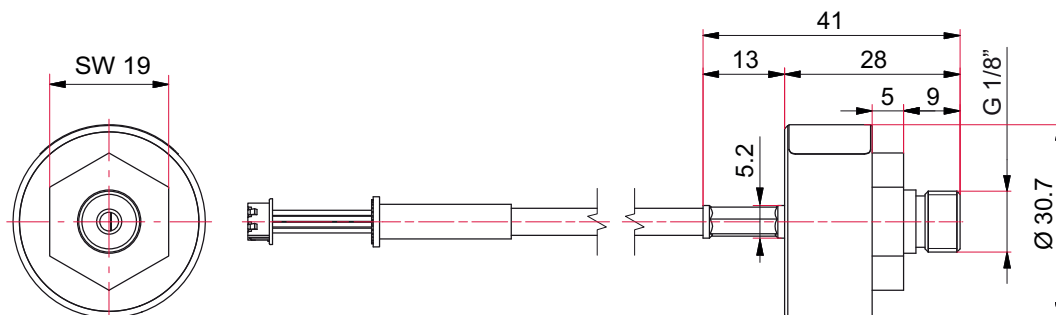
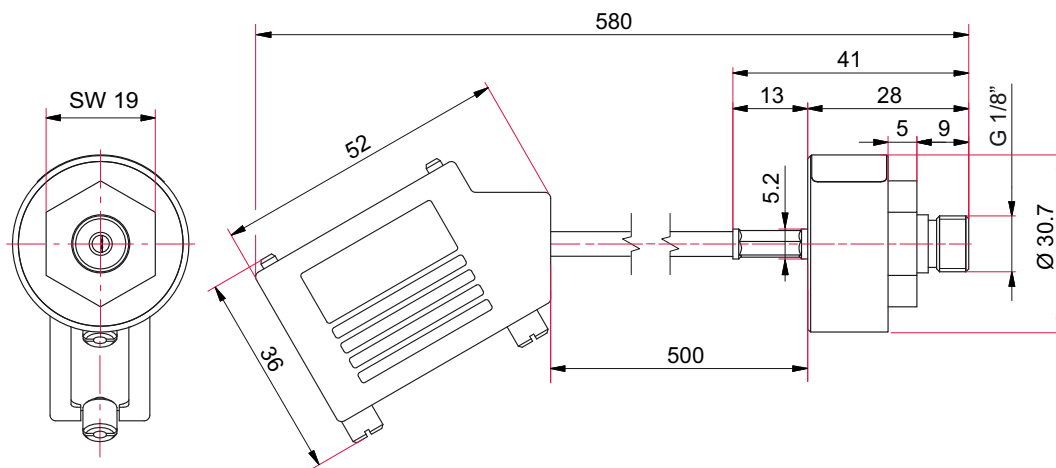
Parameter	Variant		
	Molex	D-Sub	Micro USB
Operating temperature	5 to 60 °C		
Storage temperature	-20 to +70 °C		
Supply voltage	5 V DC		
Power consumption	0.25 W		
Protection degree	IP54	IP20	IP54
Internal volume	0.4 cm ³		
Weight	92 g (with 1 m cable)	130 g (with 0.5 m cable)	75 g (with 0.5 m cable)
Substances in contact with the media	Ceramic, nickel, stainless steel, tungsten, silicon dioxide, glass, araldite, solder		

Tbl. 10: Technical data, RPT 010

Parameter	Value
Protection degree	IP40
Output voltage	5 V DC
Input voltage	24 V DC
Weight	24 g

Tbl. 11: Technical data, TIC 010

12.3 Dimensions


Fig. 7: Dimensions with Molex plug
Dimensions in mm

Fig. 8: Dimensions with D-Sub connector
Dimensions in mm

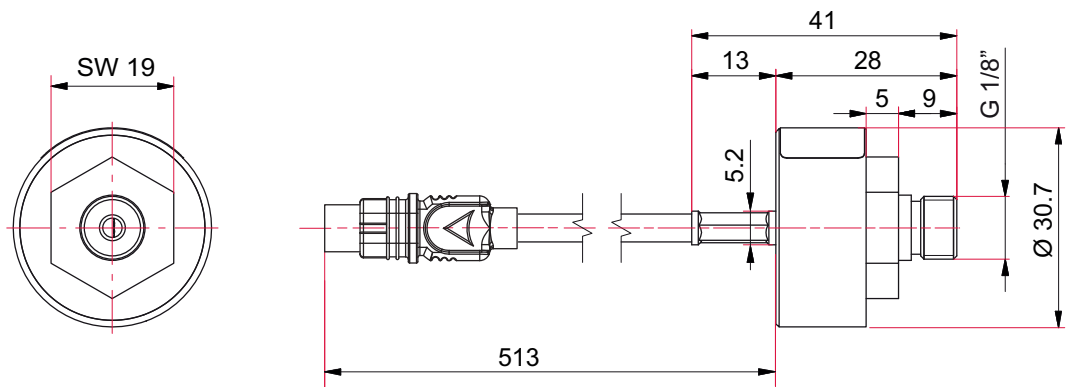
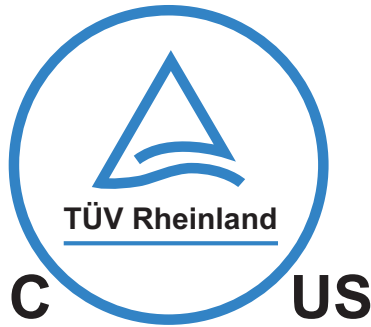


Fig. 9: Dimensions with micro USB plug
Dimensions in mm



The product RPT 010 with Molex connector

- conforms to the UL standard
UL 61010-1:2012.
- is certified to the CAN/CSA standard
CAN/CSA C22.2 No. 61010-1-12.

<https://www.certipedia.com> (Certificate No. 72142403)

Declaration of conformity

Declaration for product(s) of the type:

Piezo/Pirani sensor

RPT 010

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 61326-1:2013, group 1, class B

DIN EN IEC 63000: 2019

Signature:



(Daniel Sälzer)
Managing Director

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

Asslar, 2021-02-02



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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perfect vacuum solution?
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