



OPERATING INSTRUCTIONS

RPT 010

Piezo/Pirani sensor for the integrated pressure measurement

PFEIFFER  *VACUUM*

EN

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1 About this manual

1.1 Validity

This operating manual is for customers of Pfeiffer Vacuum. It describes the functioning of the designated product and provides the most important information for safe use of the unit. The description follows applicable EU guidelines. All information provided in this operating manual refers to the current state of the product's development. The documentation remains valid as long as the customer does not make any changes to the product.

Up-to-date operating instructions can also be downloaded from www.pfeiffer-vacuum.com.

2 Safety

2.1 Safety precautions



Duty to inform

Each person involved in the installation or operation of the unit must read and observe the safety-related parts of these operating instructions.

→ The operator is obligated to make operating personnel aware of dangers originating from the unit or the entire system.

- Observe the safety and accident prevention regulations.
- Check regularly that all safety precautions are being complied with.
- The unit has been accredited with protection class IP 54. Take necessary measures when installing into ambient conditions, which afford other protection classes.
- Consider possible reactions between the materials and the process media.
- Consider possible reactions of the process media due to the heat generated by the product.
- Do not modify or alter the unit yourself.
- Inform yourself about a possible contamination before starting work.
- Adhere to the relevant regulations and take the necessary precautions, when handling contaminated parts.
- Communicate the safety instructions to other users.

2.2 Proper use

- The piezo/Pirani sensor RPT 010 serves for the integrated pressure measurement within the permissible total pressure range.
- The RPT 010 sensor is only suitable for pressure measurement of air, inert gases and gas mixtures outside of their explosion limits.
- Use the RPT 010 in conjunction with the *PV.can* TIC 010 converter on a Pfeiffer Vacuum HiPace® turbo pump.

3 Product description

The RPT 010 sensor is a two-part pressure gauge consisting of a Pirani and a piezo-resistant component.

To correctly identify the product when communicating with Pfeiffer Vacuum, always have the information from the rating plate available.

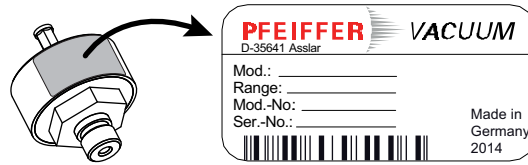


Fig. 1: Product identification on the rating plate

The sensor responds to measurement value queries, type queries and setting commands.

Signals are evaluated by the interfaces of the drive electronics using a Pfeiffer Vacuum display and control device or external devices (e.g., PLC or a PC).

The unit RPT 010 must be installed and operated in the following ambient conditions:

Installation location	weather protected (indoor)
Protection class	IP 54
Installation altitude	max. 2000 m
Ambient temperature	+5°C to +60°C
Relative humidity	5 ... 85 %, non-condensing
Atmospheric pressure	860 hPa - 1060 hPa

4 Installation

4.1 Vacuum connection



NOTICE

Vacuum component

Dirt and damage impair the function of the vacuum component.

- When handling vacuum components, ensure that they are kept clean and are protected against damage.
- Ensure that the connection flange is clean, dry and free of grease.

→ Remove and keep safe the protective covers.

→ Screw the RPT 010 sensor into a suitable G 1/8" connection on the vacuum side of the turbopump. The following options are available as standard equipment:

- Sealing gas connection
- Fore-vacuum connection with intermediate piece

→ Tightening torque at the hexagon head (width across flats 19): **2-3 Nm**.

- Do not exert any forces through tools on the housing or cable connection!

4.2 Electrical connection



NOTICE

Damage to the product

Only connect cables when de-energized.

- Never establish a connection using a live cable.



Specify the sensor number

The plug contacts of the converter are numbered on the PCB and correspond in the further course with parameters and output values.

- The plug contact can be freely selected.

→ Connect the sensor RPT 010 to the interface "**PV.can**" of the electronic drive unit using the converter TIC 010.

The RPT 010 sensor with converter TIC 010 can be connected to and operated with all electronic drive units with the following software version or higher:

Electronic drive unit	Software version
TC 110	012500
TC 120	010300
TC 400	012400
TC 1200	012400
TM 700	010600



Access to data types with DCU and HPU

- DCU display and control units up to firmware version 020300 do not support RS-485 parameters of the data type "u_expo_new".
- The HPU 001 display and control device up to firmware version 010300 only supports read access to RS-485 parameters of the data type "u_expo_new."

→ The software version can be queried via parameter **[P:312]** of the respective electronic drive unit or via **[P:351]** of the display and control unit.

5 Operation

After applying the operating voltage to the electronic drive unit, the connected sensor is ready for operation. Measured values are meaningful after a stabilization period of 5-10 min.

The pressure measured in the Pirani range depends on the gas type. To adjust for different gases, a corresponding gas type correction factor can be set; this generates correct measurements in the pressure range below 1 hPa. The gas type correction factor is factory-set for air and N₂ to 1.00 (see p. 6, chap. 7).

→ Set the correction factors using **[P:742]** and **[P:752]**.



Signal evaluation via the interfaces of the electronic drive unit

The electronic drive unit output interfaces serve to the operation of accessories connected to a Pfeiffer Vacuum turbopump using the Pfeiffer Vacuum protocol and the Pfeiffer Vacuum parameter set.

→ Observe valid operating instructions of the used electronic drive unit.

5.1 Adjusting the sensor

The sensor is factory-adjusted. Re-adjusting is necessary in the case of, e.g.:

- Contamination
- modifying the mounting orientation
- extreme temperature fluctuations
- aging

→ Evacuate the vacuum chamber to the pressure $p \leq 1 \cdot 10^{-5}$ hPa.

→ Observe the stabilization period.

→ Enter pressure value **[P:740]**, resp. **[P:750]** using the value "000000" for low pressure (corresponds to $p < 1 \cdot 10^{-5}$ hPa).
– "ur" (under range)

→ Vent the vacuum system to atmospheric pressure.

→ Observe the stabilization period.

→ Set the actual pressure value **[P:740]** resp. **[P:750]** exactly to the present pressure,
– e.g. enter 980 hPa using the value "980022".

6 Spare parts

Designation	RPT 010
Seal ring	P 3529 133 -P

7 Technical data and dimensions

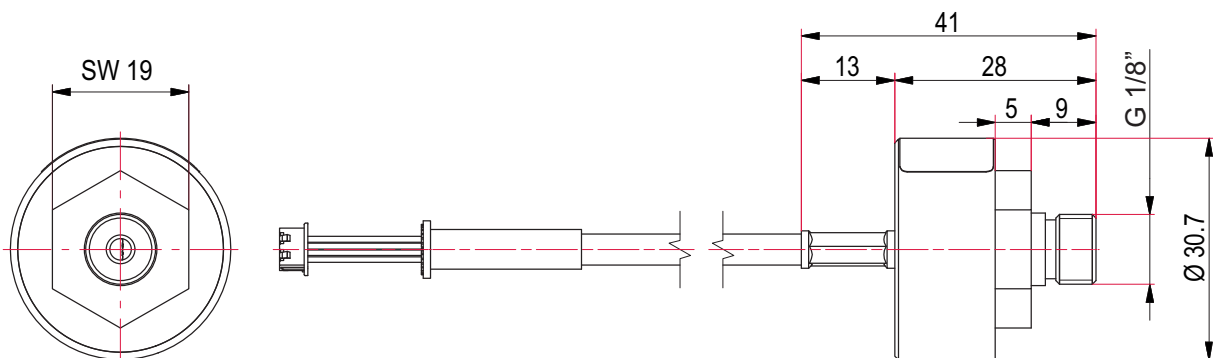
Parameter	RPT 010
Flange (in)	G 1/8"
Method of measurement	Piezo/Pirani
Accuracy of measurement	$5 \cdot 10^{-4} - 1 \cdot 10^{-3} \pm 50 \%$; $1 \cdot 10^{-3} - 100 \text{ hPa} \pm 15 \%$; $100 - 1200 \text{ hPa} \pm 15 \text{ hPa}$
Repeatability of measurement	$1 \cdot 10^{-3} - 100 \text{ hPa} \pm 3 \%$; $100 - 1200 \text{ hPa} \pm 3 \text{ hPa}$
Materials in contact with media	Ceramic, nickel, stainless steel, tungsten, silicon oxide, glass, araldite, solder
Pressure max.	2000 hPa
Measurement range max.	1200 hPa
Measurement range min.	$5 \cdot 10^{-4} \text{ hPa}$
Sensor cable length max.	1.5 m
Measuring cycle	100 ms
Interface: Connection	Cable with connector for TIC 010
Temperature: Operating	+5 – +60 °C
Temperature: Storage	-20 – +70 °C
Supply: Voltage	5 V DC
Supply: power consumption	0.25 W
Volume	0.4 cm^3
Protection category	IP 54
Weight	92 (with cable 1m) g

Parameter	TIC 010
Protection category	IP 40
Output voltage	5 V DC
Input voltage	24 V DC
Weight	24 g

Pirani correction factor (for pressures $< 1 \cdot 10^{-1} \text{ hPa}$)

N ₂	1.00
Air	1.00
H ₂	0.58
He	1.02
Ar	1.59
CO ₂	0.89

7.1 Dimensions





Declaration of conformity

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

- **Electromagnetic Compatibility 2014/30/EU**
- **Low Voltage 2014/35/EU**

Piezo/Pirani
RPT 010

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

EN 61326-1: 2013 Group 1 / Class B
EN 50581: 2012

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Dr. Ulrich von Hülsen)
Managing Director

Asslar, 2019-02-11

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Pfeiffer Vacuum GmbH
Headquarters • Germany
T +49 6441 802-0
info@pfeiffer-vacuum.de

www.pfeiffer-vacuum.com

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