

## INSTRUCTION SHEET

EN

Translation of the original instructions

### IMR 265

Compact Process Ion Gauge

BG 5132 BEN / B (2017-02)

PFEIFFER VACUUM

### Validity

This document applies to products with part numbers (No):

PT R26 500	(DN 25 ISO-KF flange)
PT R26 501	(DN 40 ISO-KF flange)
PT R26 502	(DN 16 CF-F flange)
PT R26 503	(DN 40 CF-F flange)
PT R26 504	(DN 16 ISO-KF flange)
PT R26 505	(with 3/4" tube)

The part number (No) can be taken from the product name-plate.

We reserve the right to make technical changes without prior notice.

### About this document

This document contains information on the installation and operation of the above products.

For further information please refer to the Operating instructions, which is separately available [1].

### Intended Use

The IMR 265 Compact Process Ion Gauge has been designed for vacuum measurement of gases in a pressure range of  $2 \times 10^{-6}$  ... 1 hPa. The control range of the gauge allows a trend display from < 1 hPa to 1000 hPa.

It must not be used for measuring flammable or combustible gases in mixtures containing oxidants (e.g. atmospheric oxygen) within the explosion range.

The gauge is a part of the Pfeiffer Vacuum Compact Gauges family and can be operated in connection with the MaxiGauge™ vacuum measurement and control unit TPG 256 A or with another evaluation unit.

### Functional Principle

Over the whole measurement range, the measuring signal is output as logarithm of the pressure.

The IMR 265 functions with a process hot cathode ionization manometer, which is controlled by the built-in Pirani manometer (control range). The hot cathode is switched on only below the switching threshold of  $5 \times 10^{-2}$  hPa (to prevent filament burn-out). For pressures above this threshold, the Pirani signal is output.

### Trademark

MaxiGauge™ INFICON GmbH

## Safety

### Symbols Used

**DANGER**

Information on preventing any kind of physical injury.

**WARNING**

Information on preventing extensive equipment and environmental damage.

**Caution**

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.

### Personnel Qualifications

**Skilled personnel**

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

### General Safety Instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used. Consider possible reactions between the materials and the process media. Consider possible reactions of the process media (e.g. explosion) due to the heat generated by the product.
- Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
- Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Communicate the safety instructions to all other users.

### Liability and Warranty

Pfeiffer Vacuum assumes no liability and the warranty becomes null and void if the end-user or third parties

- disregard the information in this document
- use the product in a non-conforming manner
- make any kind of interventions (modifications, alterations etc.) on the product
- use the product with accessories not listed in the corresponding product documentation.

The end-user assumes the responsibility in conjunction with the process media used.

Gauge failures due to contamination or wear and tear, as well as expendable parts (filament), are not covered by the warranty.

## Technical Data

Measurement range (air, N <sub>2</sub> )	2 × 10 <sup>-6</sup> ... 1 hPa
Hot cathode	1 × 10 <sup>-2</sup> ... 1000 hPa
Pirani (control range)	(after 5 min. stabilization)
Repeatability	2 % measurement
10 <sup>-5</sup> ... 10 <sup>-1</sup> hPa	= 30 % measurement

Emission of hot cathode	1 hPa
Switching threshold (can be selected from 5 defined setpoints)	5 × 10 <sup>-1</sup> hPa
	2 × 10 <sup>-1</sup> hPa
	1 × 10 <sup>-1</sup> hPa
	5 × 10 <sup>-2</sup> hPa (default)

Emission current continually rising	4 μA
from 1 hPa	130 μA
to 2 × 10 <sup>-9</sup> hPa	180 V
Anode voltage	

Output signal (measuring signal)

Voltage range	0 ... 10.2 V
Measurement range	
Hot cathode	1.5 V ... 7.5 V
Pirani	8.5 V ... 9.75 V
Overrange hot cathode	7.5 V < U < 8 V
Underrange hot cathode	0.5 V < U < 1.5 V
Overrange Pirani	9.75 V < U < 10.2 V
Underrange Pirani	8 V < U < 8.5 V
Voltage vs. pressure	logarithmic,
Hot cathode	1.00 V / decade
Pirani	0.25 V / decade
Error signals	→ [1]
0.3 V	error hot cathode system
0.5 V	error Pirani system, electronics incorrectly mounted to sensor

Minimum load 10 kΩ, short circuit proof

Gauge identification (Pin 1, U<sub>max</sub> = 4.25 V) Resistor 15.2 kΩ referenced to supply common

Adjustment

Pirani	automatic adjustment by hot cathode system at p = 1 ... 3 × 10 <sup>-3</sup> hPa
HV	adjustment via ATM button (keep button depressed for at least 5 seconds) at atmospheric pressure
ATM (<ATM> button)	calibration setting with 16-position switch according to the label
Hot cathode	

Supply

<b>DANGER</b>	The gauge may only be connected to supply and evaluation units that conform to the requirements of a grounded protective extra-low voltage (PELV). The connection to the gauge has to be fused <sup>1)</sup> .
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Voltage at gauge 20 ... 30 VDC <sup>2)</sup> (max. ripple: 1 V<sub>pp</sub>)

Power consumption	
Standard	≤ 0.5 A
Start of emission (200 ms)	≤ 1.4 A
Power consumption	≤ 16 W
Fuse to be connected <sup>1)</sup>	≤ 1.25 AT
Voltage at the supply unit with maximum cable length	21 ... 30 VDC (max. ripple: 1 V <sub>pp</sub> )

Electrical connection	Compact connector Hirschmann GO 6, 6 contacts, male
Tightening torque	≤ 0.2 Nm
Cable	5 poles plus shielding
Cable length max.	35 m (0.25 mm <sup>2</sup> conductor) 50 m (0.34 mm <sup>2</sup> conductor) 100 m (1.0 mm <sup>2</sup> conductor)

Grounding concept → "Electrical Connection"

Materials on the vacuum side

Housing, supports, screens	stainless steel
Pins	NiFe nickel plated
Isolator	glass
Cathode	iridium, yttrium oxide
Cathode holder	molybdenum, platinum
Pirani element	tungsten, copper
Internal volume	≈ 20 cm <sup>3</sup>
Pressure max.	500 kPa (absolute), (only for inert gases and temperatures < 100 °C)

Admissible temperatures

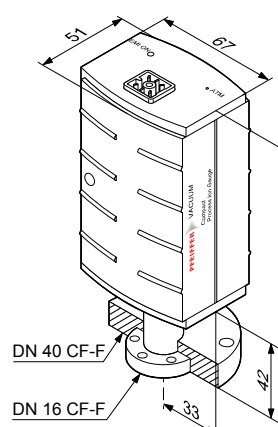
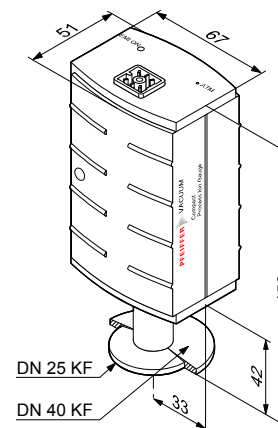
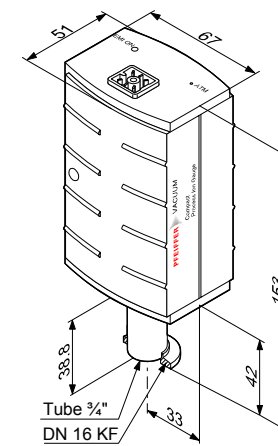
Storage	-20 °C ... +70 °C
Operation	0 °C ... +50 °C
Bakeout	150 °C in bakeout area (electronics removed)

Relative humidity

Year's mean	≤ 65% (no condensation)
During 60 days	≤ 85% (no condensation)
Use	indoors only altitude up to 2000 m NN

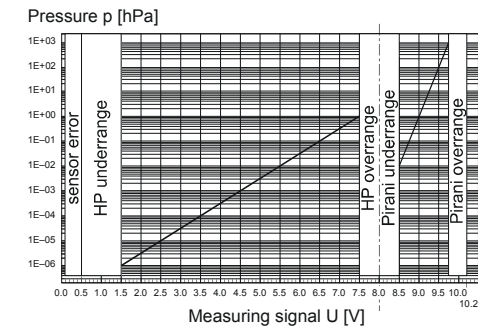
Degree of protection IP 30

Dimensions [mm]



Weight	≈280 g (DN 16 ISO-KF flange)
	≈285 g (DN 25 ISO-KF flange)
	≈315 g (DN 40 ISO-KF flange)
	≈310 g (DN 16 CF-F flange)
	≈550 g (DN 40 CF-F flange)
	≈270 g (with 3/4" tube)

### Measuring Signal vs. Pressure



Measurement range hot cathode system:

$$p = 10^{U-c_1} \Leftrightarrow U = c_1 + \log_{10} p$$

Measurement range Pirani system:

$$p = 10^{U-c_2} \Leftrightarrow U = c_2 + 0.25 \log_{10} p$$

U	p	c1	c2
[V]	[hPa]	7.5	9
[V]	[μbar]	4.5	8.25
[V]	[Torr]	7.625	9.031
[V]	[mTorr]	4.625	8.281
[V]	[micron]	4.625	8.281
[V]	[Pa]	5.5	8.5
[V]	[kPa]	8.5	9.25

where

p pressure  
U measuring signal  
c1, c2 constant (pressure unit dependent)

valid in the range

Hot cathode: 1.50 V ≤ U ≤ 7.50 V  
Pirani: 8.50 V ≤ U ≤ 9.75 V

### Gas Type Dependence

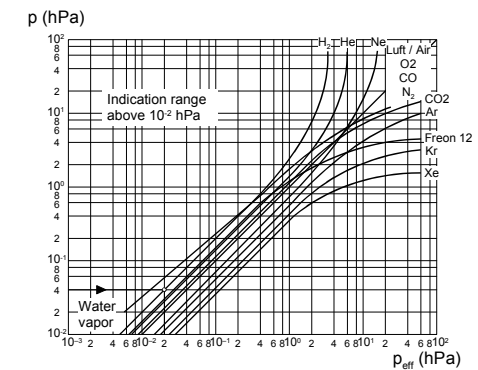
Hot cathode measurement range

For gases other than air, the pressure in the indication range  $p < 10^{-1}$  hPa can be determined by a simple conversion:

$$p_{\text{eff}} = K \times \text{pressure indicated}$$

where	Gas type	K (mean)
	Air (N <sub>2</sub> , O <sub>2</sub> , CO)	1.0
	Xe	0.4
	Kr	0.5
	Ar	0.8
	H <sub>2</sub>	2.4
	Ne	4.1
	He	5.9

Pirani measurement range



## Installation

### Vacuum Connection

**DANGER**

DANGER: overpressure in the vacuum system >100 kPa

Injury caused by released parts and harm caused by escaping process gases can result if clamps are opened while the vacuum system is pressurized.

Do not open any clamps while the vacuum system is pressurized. Use the type clamps which are suited to overpressure.

**DANGER**

DANGER: overpressure in the vacuum system >250 kPa

KF flange connections with elastomer seals (e.g. O-rings) cannot withstand such pressures. Process media can thus leak and possibly damage your health.

Use O-rings provided with an outer centering ring.

**DANGER**

DANGER: protective ground  
Incorrectly grounded products can be extremely hazardous in the event of a fault.

The gauge must be electrically connected to the grounded vacuum chamber. This connection must conform to the requirements of a protective connection according to EN 61010:

- CF connections fulfill this requirement
- For gauges with a KF flange, use a conductive metallic clamping ring.
- For the 3/4" tube take the appropriate measures to fulfill this requirement.

**Caution**

Caution: vacuum component  
Dirt and damages impair the function of the vacuum component.  
When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**Caution**

Caution: dirt sensitive area  
Touching the product or parts thereof with bare hands increases the desorption rate.  
Always wear clean, lint-free gloves and use clean tools when working in this area.

The gauge may be mounted in any orientation. To keep condensates and particles from getting into the measuring chamber, preferably choose a horizontal to upright position.

Remove the protective lid and install the product to the vacuum system. Keep the protective lid.



Original: German BG 5132 BDE / B (2017-02)

<sup>1)</sup> The MaxiGauge™ fulfills these requirements.

<sup>2)</sup> The minimum voltage of the power supply must be increased proportionally to the length of the measuring cable.

## Electrical Connection

Make sure the vacuum connection is properly made (→ "Vacuum Connection").

- If no sensor cable is available, make one according to the following diagram.

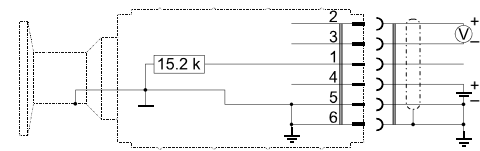


Figure 1 Electrical connection  
 Pin 1 Identification ( $U \leq 4.25$  V)  
 Pin 2 Signal output (measuring signal)  
 Pin 3 Signal common GND  
 Pin 4 Supply  
 Pin 5 Supply common GND  
 Pin 6 Screening  
 Connector, soldering side

- Connect the gauge to the measurement unit.
- Secure the connector on the gauge with the lock screw (tightening torque  $\leq 0.2$  Nm).

## Operation

When the voltage is supplied, the measuring signal is available between pins 2 and 3. Over the whole measurement range, the measuring signal is output as logarithm of the pressure (Relationship between measuring signal and pressure → Technical Data).

Allow for a stabilizing time of approx. 10 minutes. Once the gauge has been switched on, permanently leave it on irrespective of the pressure.

## Gas type Dependence

The measurement value is gas dependent. The display applies to dry air,  $N_2$ ,  $O_2$  and CO. For other gases, it has to be converted (→ Technical Data).

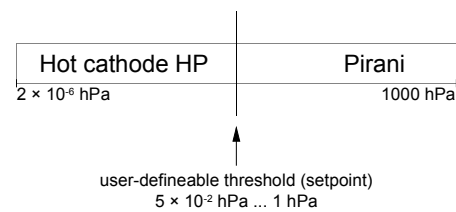
Is the gauge being operated in connection with a MaxiGauge™ vacuum measurement and control unit, a calibration factor can be applied for correction of the reading (→ [2]).

## Measurement Range

The IMR 265 covers the measurement range of  $2 \times 10^{-6}$  hPa ... 1000 hPa.

- The Pirani system continuously monitors the pressure.
- The hot cathode system (controlled by the Pirani) is only switched on when the pressure drops below the set threshold. The hot cathode will be ready for operation after a few seconds' heating time, when the <EMI ON> lamp is lit.
- When the pressure rises above the setpoint the hot cathode is switched off and the <EMI ON> lamp turns off.

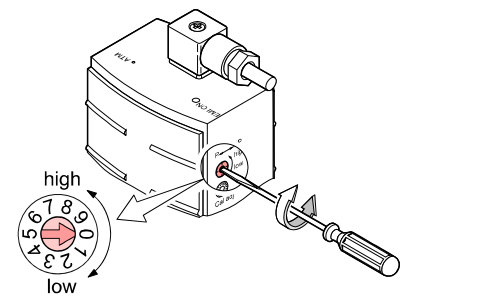
In the upper pressure range, the Pirani reading and in the lower pressure range, the hot cathode reading is output.



## Selecting the Setpoint

The IMR 265 has five definable switching thresholds. It is thus possible to prevent the switching range from being situated within the process pressure range. The factory setting of the threshold is  $5 \times 10^{-2}$  hPa. Another setpoint can be selected via the <P ↔ HP> switch. Since the contamination of the hot cathode system is reduced at low pressures, the lowest possible setpoint should be selected.

- Since the switch position is only polled upon activation of the gauge, the changeover threshold should be selected before the gauge is turned on.



Switch position (<P ↔ HP>)	Corresponding setpoint
0 or 1	1 hPa
2 or 3	$5 \times 10^{-1}$ hPa
4 or 5	$2 \times 10^{-1}$ hPa
6 or 7	$1 \times 10^{-1}$ hPa
8 or 9	$5 \times 10^{-2}$ hPa (default)

## Adjusting the Gauge

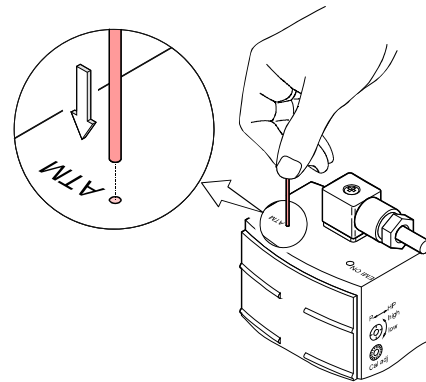
The gauge is factory calibrated. If used under different climatic conditions or in a different position, through aging or contamination, and after exchanging the sensor, the characteristic curve can be offset and readjustment can become necessary. Only the Pirani system can be readjusted.

### Adjustment of the Pirani system under high vacuum conditions:

The Pirani system is automatically adjusted by the hot cathode system when the gauge is activated (i.e. as soon as the pressure range  $1 \dots 3 \times 10^{-3}$  hPa is reached).

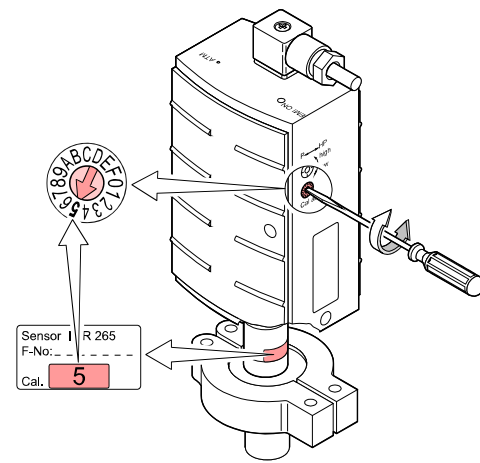
### Adjustment of the Pirani system at atmospheric pressure:

- Operate the gauge for 10 minutes at atmospheric pressure. If the gauge was operated within the hot cathode range, a cooling-down time of approx. 30 minutes is to be expected (gauge temperature = ambient temperature).
- Insert a pin through the opening marked <ATM> and push the button inside for at least 5 s.



## Adjusting the Calibration Setting of the Hot Cathode System

The sensor is factory calibrated. The calibration setting of the hot cathode range 0 ... F is printed on the label. Correct this value with the <Cal adj> switch to adjust the electronics to the sensor. Before operating the gauge for the first time or after replacing the sensor, check the calibration value setting and adjust it if necessary.



## Deinstallation

**DANGER**

**DANGER:** contaminated parts  
 Contaminated parts can be detrimental to health and environment.  
 Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**Caution**

**Caution:** vacuum component  
 Dirt and damages impair the function of the vacuum component.  
 When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**Caution**

**Caution:** dirt sensitive area  
 Touching the product or parts thereof with bare hands increases the desorption rate.  
 Always wear clean, lint-free gloves and use clean tools when working in this area.

- Vent the vacuum system and take the gauge out of operation.
- Unfasten the lock screw and unplug the sensor cable.
- Remove the gauge from the vacuum system and install the protective lid.

## Maintenance, Repair

In case of severe contamination or a malfunction, the sensor can be replaced (→ [1]).

- Gauge failures due to contamination or wear and tear, as well as expendable parts (filament), are not covered by the warranty.

## Returning the Product

**WARNING**

**WARNING:** forwarding contaminated products  
 Contaminated products (e.g. radioactive, toxic, caustic or microbiological hazard) can be detrimental to health and environment.  
 Products returned to Pfeiffer Vacuum should preferably be free of harmful substances. Adhere to the forwarding regulations of all involved countries and forwarding companies and enclose a duly completed declaration of contamination <sup>1)</sup>.

<sup>1)</sup> Form under [www.pfeiffer-vacuum.de](http://www.pfeiffer-vacuum.de)

Products that are not clearly declared as "free of harmful substances" are decontaminated at the expense of the customer.

Products not accompanied by a duly completed declaration of contamination are returned to the sender at his own expense.

## Disposal

**DANGER**

**DANGER:** contaminated parts  
 Contaminated parts can be detrimental to health and environment.  
 Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**WARNING**

**WARNING:** substances detrimental to the environment  
 Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment.  
 Dispose of such substances in accordance with the relevant local regulations.

### Separating the components

After disassembling the product, separate its components according to the following criteria:

- Contaminated components  
 Contaminated components (radioactive, toxic, caustic, or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and recycled.
- Other components  
 Such components must be separated according to their materials and recycled.

## Conversion Table

	mbar	bar	Pa	hPa	kPa	Torr mm HG
mbar	1	$1 \times 10^{-3}$	100	1	0.1	0.75
bar	$1 \times 10^3$	1	$1 \times 10^5$	$1 \times 10^3$	100	750
Pa	0.01	$1 \times 10^{-5}$	1	0.01	$1 \times 10^{-3}$	$7.5 \times 10^{-3}$
hPa	1	$1 \times 10^{-3}$	100	1	0.1	0.75
kPa	10	0.01	$1 \times 10^3$	10	1	7.5
Torr mm HG	1.332	$1.332 \times 10^{-3}$	133.32	1.3332	0.1332	1

1 Pa = 1 N/m<sup>2</sup>

## Further Information

- [1] [www.pfeiffer-vacuum.com](http://www.pfeiffer-vacuum.com)  
 Operating Instructions IMR 265  
 BG 5172 BDE (German)  
 BG 5172 BEN (English)  
 BG 5172 BFR (French)  
 Pfeiffer Vacuum GmbH, D-35614 Asslar, Germany
- [2] [www.pfeiffer-vacuum.com](http://www.pfeiffer-vacuum.com)  
 Operating Instructions TPG 256 A  
 MaxiGauge™  
 BG 5186 BDE (German)  
 BG 5186 BEN (English)  
 BG 5186 BFR (French)  
 Pfeiffer Vacuum GmbH, D-35614 Asslar, Germany

## EU Declaration of Conformity

**CE** We, Pfeiffer Vacuum, hereby declare that the equipment mentioned below complies with the provisions of the Directive relating to electromagnetic compatibility 2014/30/EU and the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU.

**Product**  
 IMR 265

### Standards

Harmonized and international/national standards and specifications:

- EN 61000-6-2:2005 (EMC: generic immunity standard)
- EN 61000-6-3:2007 + A1:2011 (EMC: generic emission standard)
- EN 61010-1:2010 (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1:2013 (EMC requirements for electrical equipment for measurement, control and laboratory use)

### Manufacturer / Signatures

Pfeiffer Vacuum GmbH, Berliner Straße 43, D-35614 Asslar  
 7 March 2016

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