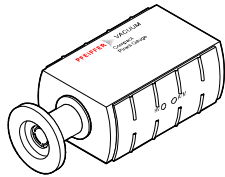


Instruction Sheet
Incl. Declaration of Conformity

Compact Pirani Gauge TPR 265



BG 805 104 BE / A (0010)

Original: German BG 805 104 BD / A

Validity

This document applies to products with the following part numbers:

- PT R26 750 (DN 16 ISO-KF short)
- PT R26 751 (DN 16 CF-R short)
- PT R26 752 (1/4" NPT short)
- PT R26 753 (1/2" Cajon 8 VCR female)
- PT R26 760 (DN 16 ISO-KF long)
- PT R26 761 (DN 16 CF-R long)

The part number can be taken from the product nameplate.

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 [1].

Intended Use

The Compact Pirani Gauge TPR 265 has been designed for vacuum measurement of gases in the pressure range of 5×10^{-4} ... 1000 mbar.

It can be operated in connection with a Pfeiffer Vacuum controller for Compact Gauges or with another evaluation unit.

Functional Principle

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

Safety

- Adhere to the applicable regulations and take the necessary precautions for the process media used.
- Consider possible reactions between the product materials and (→ Technical Data) and the process media.

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

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.

Installation

Vacuum Connection



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.

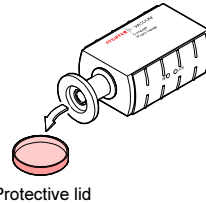
The gauge may be mounted in any orientation. To keep condensates and particles from getting into the measuring chamber preferably choose a horizontal to upright position and possibly use a seal with a centering ring and filter.



1 Remove the protective lid.



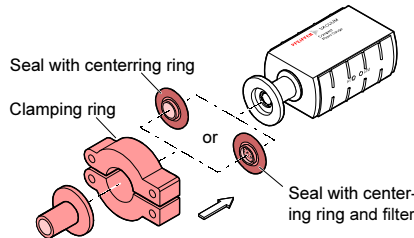
The protective lid will be required for maintenance work.



Protective lid



2 Make the flange connection.



DANGER

Caution: overpressure in the vacuum system > 1 bar

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

Caution: overpressure in the vacuum system > 4 bar

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

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, NPT, and Cajon 8 flanges fulfill this requirement
- For gauges with a KF flange, use a conductive metallic clamping ring

If adjustment should be possible after the gauge has been installed, be sure to install it so that trimming potentiometers <HV> and <ATM> can be accessed with a screwdriver.

The space requirements are indicated in the dimensional drawing (→ Technical Data).

Electrical Connection

Make sure that the flange connection is properly made (see above).

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

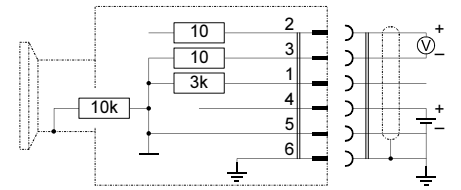
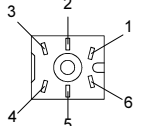


Figure 1 Electrical connection

- Pin 1 identification
- Pin 2 signal output (measuring signal)
- Pin 3 signal common
- Pin 4 supply (14 ... 30 V=)
- Pin 5 supply common
- Pin 6 screening



Connector soldering side

Connect the gauge to the evaluation unit.

Operation

When the supply voltage is applied, the measuring signal is available between pins 2 and 3 (relationship between measuring signal and pressure → Technical Data).

Allow for a stabilization period of approx. 2 minutes. It is advisable to operate the gauge continuously, irrespective of the pressure.

Gas type dependence

The measuring signal depends on the type of gas being measured. The relationship between measuring signal and pressure is accurate for N₂, O₂, dry air, and CO. It can be mathematically converted for other gases (→ Technical Data).

If the gauge is operated with a Pfeiffer Vacuum controller for Compact Gauges, a calibration factor for correction of the actual reading can be applied (→ [1] of the corresponding controller).

Adjusting the Gauge

The gauge is factory calibrated. Through use in different climatic conditions, extreme temperatures, contamination or aging, a shifting of the characteristic curve can occur and readjustment may become necessary.



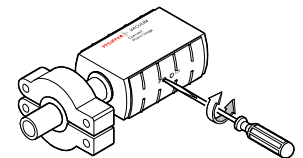
1 If you are using a seal with centering ring and filter, check that they are clean or replace them if necessary.



2 Activate the gauge.



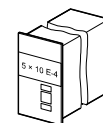
3 Evacuate it to $p \ll 10^{-4}$ mbar and wait for ≥ 2 min.



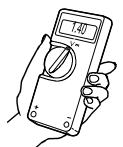
Adjust the <HV> potentiometer ...

... to 5×10^{-4} mbar

or ... or 1.40 V ...

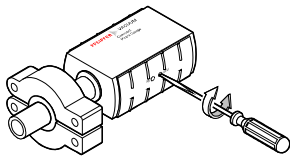


... and then turn it counterclockwise 1/4 turn.



5 Vent the gauge with air to atmospheric pressure, and wait ≥ 2 min.

6



Adjust the <ATM> potentiometer ...

... to 1000 mbar

or

... to 8.5 V.



Materials exposed to vacuum

- flange stainless steel
 - filament tungsten
 - feedthrough glass
 - baffle (only gauge with DN 16 ISO-KF) stainless steel
 - other materials nickel, copper, NiFe
- Internal volume
- short type $\approx 2 \text{ cm}^3$
 - long type $\approx 10 \text{ cm}^3$
- Pressure max. $\leq 10 \text{ bar}$ (absolute) limited to inert gases

Admissible temperatures

- storage $-20 \text{ }^\circ\text{C} \dots +65 \text{ }^\circ\text{C}$
- operation $+5 \text{ }^\circ\text{C} \dots +60 \text{ }^\circ\text{C}$
- flange temperature
- short type $<80 \text{ }^\circ\text{C}$
- long type $<250 \text{ }^\circ\text{C}$

Relative humidity

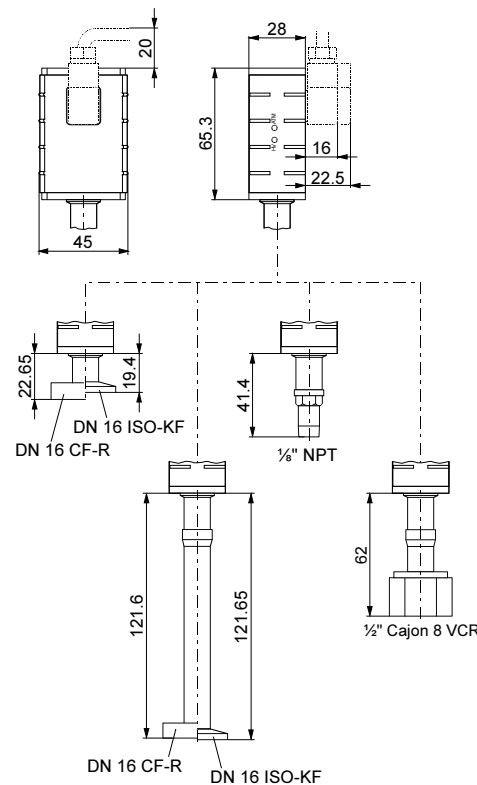
- $\leq 80\%$ at temperatures up to $31 \text{ }^\circ\text{C}$, decreasing to 50% at $+40 \text{ }^\circ\text{C}$

Use

- indoors only
- altitude up to 2000 m NN
- IP 40

Type of protection

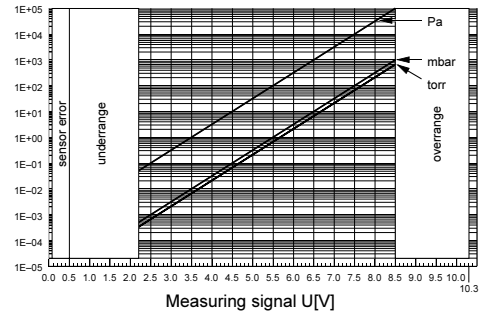
Dimensions [mm]



- Weights
- $\approx 100 \text{ g}$ (DN 16 ISO-KF short)
 - $\approx 120 \text{ g}$ (DN 16 CF-R short)
 - $\approx 120 \text{ g}$ ($1/8"$ NPT short)
 - $\approx 140 \text{ g}$ (DN 16 ISO-KF long)
 - $\approx 145 \text{ g}$ ($1/2"$ Cajon 8 VCR)
 - $\approx 160 \text{ g}$ (DN 16 CF-R long)

Relationship Measuring Signal – Pressure

Pressure p



$p = 10^{(U-c)}$ ↔ $U = c + \log_{10} p$

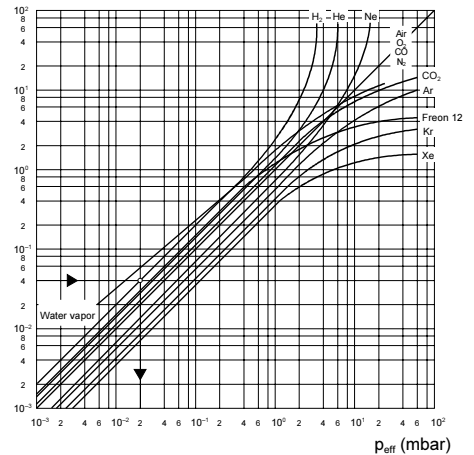
U	p	c	U	p	c
[V]	[mbar]	5.5	[V]	[micron]	2.625
[V]	[µbar]	2.5	[V]	[Pa]	3.5
[V]	[Torr]	5.625	[V]	[kPa]	6.5
[V]	[mTorr]	2.625			

where

- p pressure $5 \times 10^{-4} \text{ mbar} < p < 1000 \text{ mbar}$
- U measuring signal $3.75 \times 10^{-4} \text{ Torr} < p < 750 \text{ Torr}$
- c constant (pressure unit dependent) $5 \times 10^{-2} \text{ Pa} < p < 1 \times 10^5 \text{ Pa}$

Gas Type Dependence

Pressure reading (gauge adjusted for air)
p (mbar)



Calibration factors for the pressure range below 1 mbar

Gas type	Calibration factor C	Gas type	Calibration factor C
He	0.8	H ₂	0.5
Ne	1.4	N ₂ , O ₂ , CO, air	1.0
Ar	1.7	CO ₂	0.9
Kr	2.4	water vapor	0.5
Xe	3.0	Freon 12	0.7

$p_{\text{eff}} = C \times \text{pressure reading}$

Technical Data

Measurement principle	Thermal conductance according to Pirani
Measurement range (air, N ₂ , O ₂)	$5 \times 10^{-4} \dots 1000 \text{ mbar}$
Accuracy	$\approx 10\%$ of the measured value in the range $1 \times 10^{-3} \dots 100 \text{ mbar}$ (outside this range up to factor 2)
Repeatability	$\approx 2\%$ of the measured value in the range $1 \times 10^{-3} \dots 100 \text{ mbar}$
Output signal (measurement signal)	$\approx 0 \dots \approx +10.3 \text{ V}$
Measurement range	$2.2 \text{ V} \dots 8.5 \text{ V}$
Pressure - voltage relationship	logarithmic, 1.0 V / decade
Error signal	$<0.5 \text{ V}$ (filament rupture)
Output impedance	$2 \times 10 \text{ } \Omega$
Minimum load	$10 \text{ k}\Omega$, short-circuit proof
Response time	$\approx 10 \text{ ms}$
Gauge identification	Resistance $3.0 \text{ k}\Omega$ referenced to supply common
Adjustment	
Trimming potentiometer <HV>	adjustment at $5 \times 10^{-4} \text{ mbar}$
Trimming potentiometer <ATM>	adjustment at atmospheric pressure

Supply

STOP DANGER

The gauge may only be connected to supply and evaluation units that conform to the requirements of a grounded protective extra-low voltage (SELV-E according to EN 61010). The connection to the gauge has to be fused.¹⁾

Voltage at the gauge	$14 \dots 30 \text{ V} =$ (ripple max. 1 V_{pp})
Power consumption	$\leq 1.5 \text{ W}$
Fuse required ¹⁾	$\leq 1 \text{ AT}$ (slow)

Electrical connection	Hirschmann compact connector, type GO 6, 6-pole, male
-----------------------	---

Cable	5-pole plus screening
Line length max.	150 m (0.25 mm^2 conductor) 200 m (0.34 mm^2 conductor)

Grounding concept	→ Figure 1
Vacuum flange – measuring common	connected via $10 \text{ k}\Omega$ (max. voltage difference $\pm 50 \text{ V}$)
supply common – signal common	conducted separately; differential measurement recommended for lines $\geq 10 \text{ m}$

¹⁾ Pfeiffer Vacuum controllers fulfill this requirement.



Maintenance, Troubleshooting

→ [1]

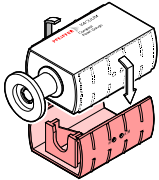
Gauge failures due to contamination are not covered by the warranty.

Replacing the Sensor

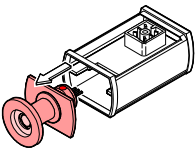
In case of severe contamination or a malfunction, the sensor can be replaced.

1 Deinstall the gauge (→ [1]).

2 Remove the housing.

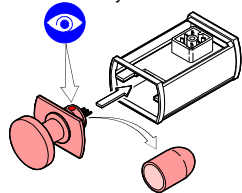


3 Remove the defective sensor and dispose of it (→ Disposal).

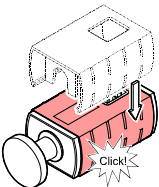


4 Plug in the new sensor.

Position the sensor correctly.



5 Mount the housing.



6 Adjust the gauge (→ Operation).

Deinstallation

STOP DANGER



Caution: 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

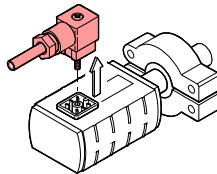


Caution: vacuum component
Dirt and damages impair the function of the vacuum component.
When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

1 Vent the vacuum system.

2 Turn the gauge off.

3 Unplug the sensor cable.



4 Remove the gauge from the vacuum system.

5 Place the protective lid.

Spare Parts

When ordering spare parts, always indicate:

- all information on the product nameplate
- description and ordering number according to the spare parts list

		Ordering number
Spare sensor		
DN 16 ISO-KF	short type	PT 120 131-T

Returning the Product

! WARNING



Caution: forwarding contaminated products
Contaminated products (e.g. radioactive, toxic, caustic or microbiological) 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.

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

When returning a product to our service center, put it in a tight and impact resistant package.

Disposal

! WARNING



Caution: 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.

STOP DANGER



Caution: 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.

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.

Further Information

[1] www.pfeiffer-vacuum.de
Operating Instructions TPR 265
BG 805 174 BE

Declaration of Contamination

The service, repair, and/or disposal of vacuum equipment and components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.
This declaration may only be completed (in block letters) and signed by authorized and qualified staff.

1 Description of product Type _____ Article Number _____ Serial Number _____	2 Reason for return _____ _____ _____																														
↓																															
3 Operating fluid(s) used _____ _____																															
↓																															
4 Process related contamination of product: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">toxic</td> <td style="width: 10%;">no <input type="checkbox"/></td> <td style="width: 10%;">yes <input type="checkbox"/></td> <td style="width: 50%;"></td> </tr> <tr> <td>corrosive</td> <td>no <input type="checkbox"/></td> <td>yes <input type="checkbox"/></td> <td></td> </tr> <tr> <td>biological hazard</td> <td>no <input type="checkbox"/></td> <td>yes <input type="checkbox"/> *)</td> <td></td> </tr> <tr> <td>explosive</td> <td>no <input type="checkbox"/></td> <td>yes <input type="checkbox"/> *)</td> <td></td> </tr> <tr> <td>radioactive</td> <td>no <input type="checkbox"/></td> <td>yes <input type="checkbox"/> *)</td> <td></td> </tr> <tr> <td>other harmful substances</td> <td>no <input type="checkbox"/></td> <td>yes <input type="checkbox"/></td> <td></td> </tr> </table> <div style="text-align: right; margin-top: 10px;"> *) Products thus contaminated will not be accepted without written evidence of decontamination! </div>		toxic	no <input type="checkbox"/>	yes <input type="checkbox"/>		corrosive	no <input type="checkbox"/>	yes <input type="checkbox"/>		biological hazard	no <input type="checkbox"/>	yes <input type="checkbox"/> *)		explosive	no <input type="checkbox"/>	yes <input type="checkbox"/> *)		radioactive	no <input type="checkbox"/>	yes <input type="checkbox"/> *)		other harmful substances	no <input type="checkbox"/>	yes <input type="checkbox"/>							
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5 Harmful substances, gases and/or by-products Please list all substances, gases, and by-products which the product may have come into contact with: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 20%;">Trade/product name manufacturer</th> <th style="width: 20%;">Chemical name (or symbol)</th> <th style="width: 15%;">Dangerous material class</th> <th style="width: 15%;">Measures in case of spillage</th> <th style="width: 30%;">First aid in case of contact</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		Trade/product name manufacturer	Chemical name (or symbol)	Dangerous material class	Measures in case of spillage	First aid in case of contact																									
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6 Legally binding declaration: I/we hereby declare that the information on this form is complete and accurate and that I/we will assume any further costs that may arise. The contaminated product will be in accordance with the applicable regulations.																															
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Organization/company _____</td> <td style="width: 40%;">Post code, place _____</td> </tr> <tr> <td>Address _____</td> <td>Fax _____</td> </tr> <tr> <td>Phone _____</td> <td>_____</td> </tr> <tr> <td>Email _____</td> <td>_____</td> </tr> <tr> <td>Name _____</td> <td>_____</td> </tr> </table>		Organization/company _____	Post code, place _____	Address _____	Fax _____	Phone _____	_____	Email _____	_____	Name _____	_____																				
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This form can be downloaded from our website.

Copies:
Original for addressee - 1 copy for accompanying documents - 1 copy for file of sender

Declaration of Conformity

as defined by the Directive relating to machinery 98/37/EC, Appendix IIb



We, Pfeiffer Vacuum, hereby declare that putting the incomplete equipment mentioned below into operation is not permitted until evidence is given that the system into which that incomplete equipment shall be installed is in accordance with the provisions of the EC Directive relating to machinery.

We also declare that the equipment mentioned below complies with the provisions of the Directive relating to electrical equipment designed for use within certain voltage limits 73/23/EEC and the Directive relating to electromagnetic compatibility 89/336/EEC.

Compact Pirani Gauge
TPR 265

Part numbers

PT R26 750
PT R26 751
PT R26 752
PT R26 753
PT R26 760
PT R26 761

Standards

Harmonized and international/national standards and specifications:

- EN 61010 (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 50081-1 (Electromagnetic compatibility generic emission standard)
- EN 50082-2 (Electromagnetic compatibility generic immunity standard)

Pfeiffer Vacuum GmbH, Asslar

23 October 2000

Wolfgang Dondorf
Geschäftsführer

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