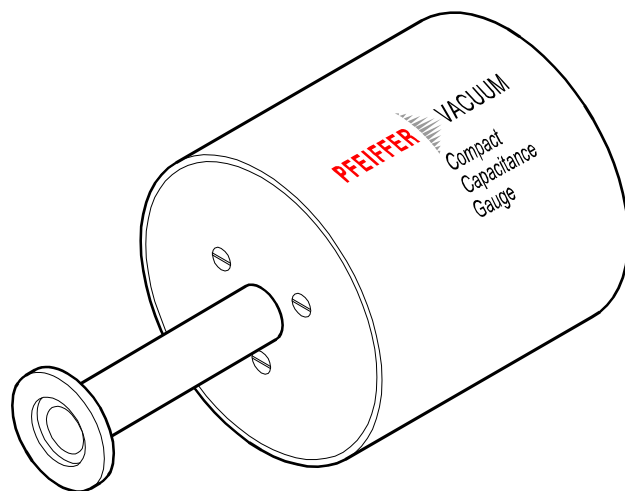
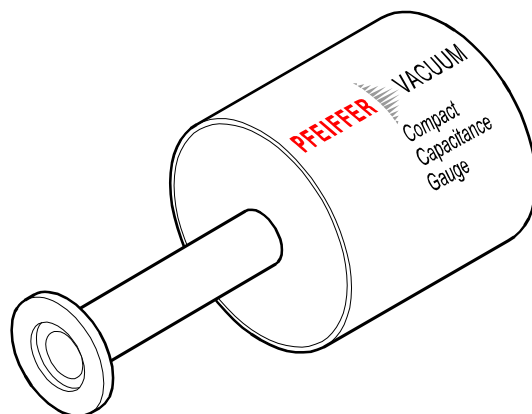


Compact Capacitance Gauge



CMR 261
CMR 262
CMR 263
CMR 264
CMR 271
CMR 272
CMR 273
CMR 274
CMR 275



CE

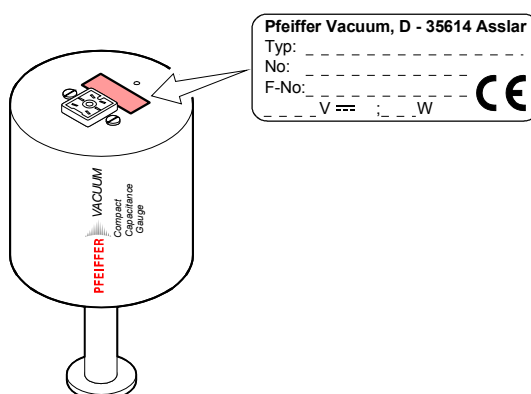
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For cross-references within this document, the symbol (→  XY) is used, for cross-references to other documents, the symbol (→  [Z]).

Product Identification

In all communications with Pfeiffer Vacuum, please specify the information given on the product nameplate. For convenient reference transfer this information into the diagram below.



Validity

This document applies to products with part number

PT R24 500	CMR 261 (with ½" tube)
PT R24 501	CMR 261 (DN 16 ISO-KF flange)
PT R24 502	CMR 261 (DN 16 CF-R flange)
PT R24 503	CMR 261 (8 VCR flange)
PT R24 510	CMR 262 (with ½" tube)
PT R24 511	CMR 262 (DN 16 ISO-KF flange)
PT R24 512	CMR 262 (DN 16 CF-R flange)
PT R24 513	CMR 262 (8 VCR flange)
PT R24 520	CMR 263 (with ½" tube)
PT R24 521	CMR 263 (DN 16 ISO-KF flange)
PT R24 522	CMR 263 (DN 16 CF-R flange)
PT R24 523	CMR 263 (8 VCR flange)
PT R24 530	CMR 264 (with ½" tube)
PT R24 531	CMR 264 (DN 16 ISO-KF flange)
PT R24 532	CMR 264 (DN 16 CF-R flange)
PT R24 533	CMR 264 (8 VCR flange)
PT R25 000	CMR 271 (with ½" tube)
PT R25 001	CMR 271 (DN 16 ISO-KF flange)
PT R25 002	CMR 271 (DN 16 CF-R flange)
PT R25 003	CMR 271 (8 VCR flange)
PT R25 010	CMR 272 (with ½" tube)
PT R25 011	CMR 272 (DN 16 ISO-KF flange)
PT R25 012	CMR 272 (DN 16 CF-R flange)
PT R25 013	CMR 272 (8 VCR flange)
PT R25 020	CMR 273 (with ½" tube)
PT R25 021	CMR 273 (DN 16 ISO-KF flange)
PT R25 022	CMR 273 (DN 16 CF-R flange)
PT R25 023	CMR 273 (8 VCR flange)
PT R25 030	CMR 274 (with ½" tube)
PT R25 031	CMR 274 (DN 16 ISO-KF flange)
PT R25 032	CMR 274 (DN 16 CF-R flange)
PT R25 033	CMR 274 (8 VCR flange)
PT R25 040	CMR 275 (with ½" tube)
PT R25 041	CMR 275 (DN 16 ISO-KF flange)
PT R25 042	CMR 275 (DN 16 CF-R flange)
PT R25 043	CMR 275 (8 VCR flange)

The part number can be taken from the product nameplate.

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

Intended Use

The Compact Capacitance Gauges CMR 261 CMR 262 CMR 263 CMR 264 CMR 271 CMR 272 CMR 273 CMR 274 CMR 275 have been designed for absolute pressure measurement of gases in the following ranges:

CMR 261, CMR 271	10^{-1} - 1100 mbar	(1000 mbar F.S.)
CMR 262, CMR 272	10^{-2} - 110 mbar	(100 mbar F.S.)
CMR 263, CMR 273	10^{-3} - 11 mbar	(10 mbar F.S.)
CMR 264, CMR 274	10^{-4} - 1.1 mbar	(1 mbar F.S.)
CMR 275	10^{-5} - 1.1 mbar	(0.1 mbar F.S.)

The vacuum gauges can be operated in connection with a Pfeiffer Vacuum measurement and control unit for Compact Gauges or another evaluation unit.

Functional Principle

CMR gauges consist of a capacitive diaphragm made of aluminum oxide ceramic and electronics which converts the capacitive signal into a DC output signal.

The output signal is linear with the pressure to be measured and independent of the gas type (→ "Technical Data").

1 Safety

1.1 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.

<....> labeling

← 6.1 → all measures in mm



do not dispose of

1.2 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.

1.3 General Safety Instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used.
Consider possible reactions between the materials (→ 8) and the process media.
Consider possible reactions of the process media 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 you begin 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 other users.

1.4 Liability and Warranty

Pfeiffer Vacuum assumes no liability and the warranty becomes null and void if the custodian or third parties

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

The custodian assumes the responsibility in conjunction with the process media used.

2 Technical Data

Measurement


Measuring range	
CMR 261, CMR 271	10^{-1} - 1100 mbar (1000 mbar F.S.)
CMR 262, CMR 272	10^{-2} - 110 mbar (100 mbar F.S.)
CMR 263, CMR 273	10^{-3} - 11 mbar (10 mbar F.S.)
CMR 264, CMR 274	10^{-4} - 1.1 mbar (1 mbar F.S.)
CMR 275	10^{-5} - 0.11 mbar (0.1 mbar F.S.)
Resolution	
CMR 261 ... CMR 263	0.0015 % F.S.
CMR 271 ... CMR 273	0.0015 % F.S.
CMR 264	0.0025 % F.S.
CMR 274, CMR 275	0.0025 % F.S.
Accuracy	
CMR 261 ... CMR 264	0.20 % of measured value
CMR 271 ... CMR 275	0.15 % of measured value
Temperature effect on zero	
CMR 261 ... CMR 263	0.0050 % F.S. /°C
CMR 264	0.0190 % F.S. /°C
CMR 271 ... CMR 274	0.0025 % F.S. /°C
CMR 275	0.0065 % F.S. /°C
Temperature effect on span	
CMR 261 ... CMR 264	0.01 % of measured value /°C
CMR 271 ... CMR 275	0.01 % of measured value /°C
Gas type dependence	none ¹⁾


Output signal

Measuring signal	
Voltage range	1.0 V ... 9.8 V
Relationship voltage-pressure	linear ¹⁾ (→ 25)
Error signal	< 0.4 V (no supply, sensor error)
	0.4 V ... 0.6 V underrange
	> 9.8 V overrange
Output impedance	< 10 Ω
Minimum load	10 k Ω , short-circuit proof
Response time	
CMR 261 ... CMR 264	30 ms
CMR 271 ... CMR 273	30 ms
CMR 274, CMR 275	100 ms
Gauge identification	13.2 k Ω resistor referenced to supply common

¹⁾ At $p < 1$ mbar and $T_{\text{Gauge}} \neq T_{\text{Vacuum}}$ the linearity is influenced by thermal transpiration (gas type dependent) at most in the order of magnitude of the zero stability.
See K. F. Poulter, et al., Vacuum 33, 331 (1983); W. Jitschin and P. Röhl, J. Vac. Sci. Technol. A, Vol. 5, No. 3, 1987.

Supply




 **DANGER**

The gauge may only be connected to supply or measurement 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	18.0 ... 30.0 VDC (ripple max. 1 V _{pp})
Power consumption	(supply voltage dependent)
CMR 261 ... CMR 264	1 ... 1.8 W
CMR 271 ... CMR 275	7.5 W _{max.}
Internal fuse	1 AT, automatic reset (Polifuse)

The gauge is protected against polarity change of the supply voltage.

Electrical connection	Hirschmann compact connector type GO 6, 6 poles, male
Sensor cable	5 poles plus screen
Cable length	
CMR 261 ... CMR 264	≤ 120 m (0.25 mm ² conductor cross-section)
CMR 271 ... CMR 275	≤ 65 m (0.25 mm ² conductor cross-section)

For longer cables, bigger conductor cross-sections are required or the minimum voltage of the power supply must be increased proportionally to the cable length (→  13).

Grounding concept	
Vacuum flange-measuring common	→ Figure 1
Supply common-signal common	conducted separately, differential measurement recommended

Vacuum

Materials exposed to vacuum	
Flange and tube	stainless steel (AISI 316L)
Measuring chamber and diaphragm	ceramic (Al ₂ O ₃ >99.5%), partially crystallized glass solder
Ceramic - metal connection	Vacon 70 (28% Ni, 23% Co, 49% Fe), AgCuTi
Internal volume	
CMR 261 ... CMR 264	
1/2" tube	5.75 cm ³
DN 16 ISO-KF / DN 16 CF-R	6 cm ³
8 VCR	8 cm ³
CMR 271 ... CMR 275	
1/2" Rohr	7 cm ³
DN 16 ISO-KF / DN 16 CF-R	7.25 cm ³
8 VCR	9.25 cm ³
Pressure max.	
CMR 261, CMR 271	4.0 bar (absolute)
CMR 262 ... CMR 264	2.6 bar (absolute)
CMR 272 ... CMR 275	1.3 bar (absolute)

¹⁾ Pfeiffer Vacuum measurement and control units for Compact Gauges fulfill these requirements.

Environment

Admissible temperatures

Storage		-40 °C ... +65 °C
Operation	CMR 261 ... CMR 264	+ 5 °C ... +50 °C
	CMR 271 ... CMR 275	+15 °C ... +40 °C
Bakeout	CMR 261 ... CMR 264	+110 °C max. at the flange
	CMR 271 ... CMR 275	+90 °C

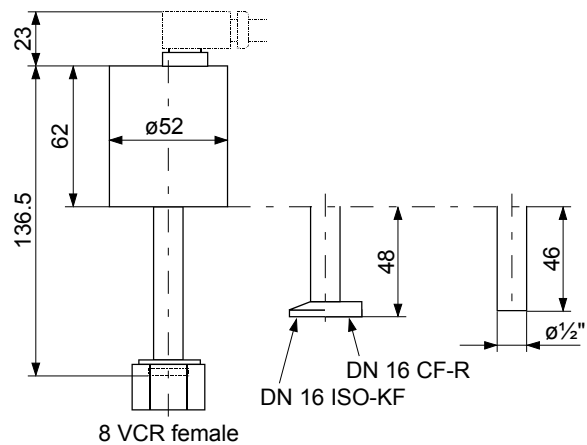
Relative humidity max. 80% at temperatures ≤ +31°C
decreasing to 50 % at +40°C

Use indoors only
altitude up to 2000 m (6600 ft.)

Type of protection IP 30

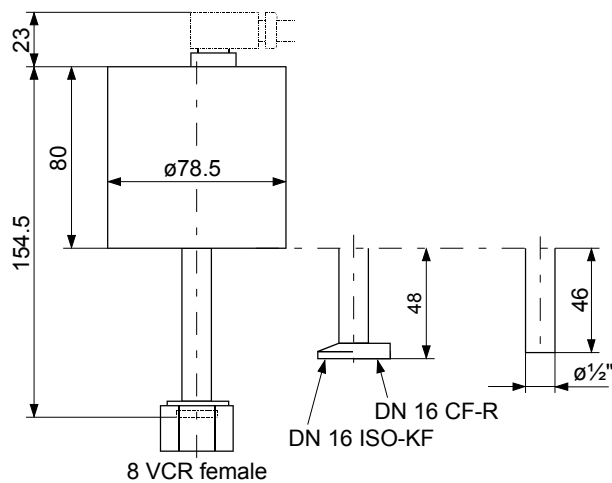
Dimensions,
Weight

CMR 261 ... CMR 264
Dimensions



Weight 260 - 290 g (depending on flange)

CMR 271 ... CMR 275
Dimensions



Weight 485 - 515 g (depending on flange)

3 Installation

3.1 Vacuum Connection

Shut-off valve



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



If the gauges are vented to atmosphere for a prolonged period of time they take a "recovery time" (pressure within their measuring range) of up to several hours before they output accurate and repeatable measured values (→ 15)
We recommend keeping the gauges in an evacuated state by means of a shut-off valve when the system is vented for a prolonged period of time.

Vibrations



Caution



Vibrations cause deviations of the measured values.
Install the gauge the gauge in such a way that it is isolated from vibrations through the flange or sensor cable. The CMR 264, CMR 274 and CMR 275 are especially sensitive to vibrations.

Condensation



Caution



If the temperature of the venting gas is the same as or higher than the gauge temperature, condensation water may be formed on the internal surfaces of the vacuum system. Humidity in the gauge causes deviations of the measurement values and prolongs the pumpdown process.
We recommend keeping the gauges in an evacuated state by means of a shut-off valve while venting the system.

Pressure surges



Caution



Make sure the process involves no pressure surges exceeding the specified maximum pressure (→ 8).

Mounting orientation



Caution



The gauge may be mounted in any orientation.
However, it should be mounted so that no particles and condensates can penetrate into the measuring chamber.

If the gauge is operated with a Pfeiffer Vacuum measurement and control unit for Compact Gauges, the zero can be adjusted on the measurement unit. Otherwise make sure the <zero adj.> potentiometer remains accessible for a screwdriver.

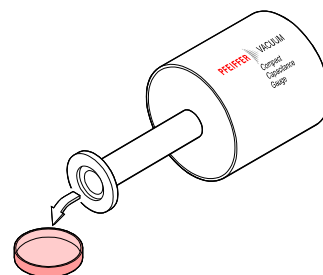
For space requirements see the dimension drawings (→ 10).

Connecting the gauge to the vacuum system

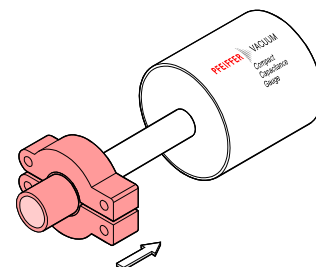
- 1 Remove the protective cap.



The protective cap will be needed for maintenance.



- 2 Make the flange connection.



STOP DANGER



Caution: overpressure in the vacuum system > 1 bar

If clamps are opened incorrectly, injury can be caused by catapulted parts and your health can be damaged by leaking process gases.

Use the type of clamps which can only be opened and closed by means of a tool (e.g. hose clip clamping ring).

3.2 Electrical Connection

STOP DANGER



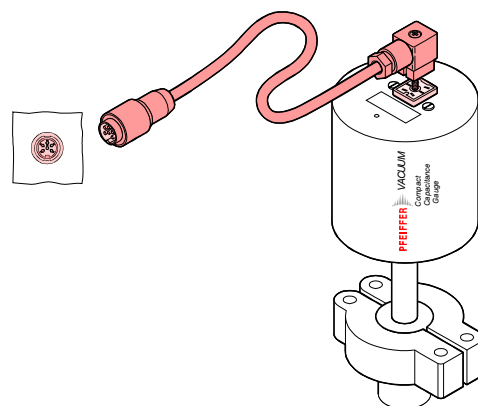
The gauge must be electrically connected to the grounded vacuum chamber. The connection must conform to the requirements of a protective connection according to EN 61010:

- CF and 8 VCR flanges fulfill this requirement.
- For gauges with KF flanges use a conductive metallic clamping ring.
- If using gauges with 1/2" tubes, take appropriate measures to fulfill the above requirement.

3.2.1 Use With a Pfeiffer Vacuum Measurement Unit

If the gauge is used with a Pfeiffer Vacuum measurement unit for Compact Gauges, a corresponding sensor cable is required (→ 23).

- Secure the cable on the gauge with the screw.



3.2.2 Use With Another Evaluation Unit

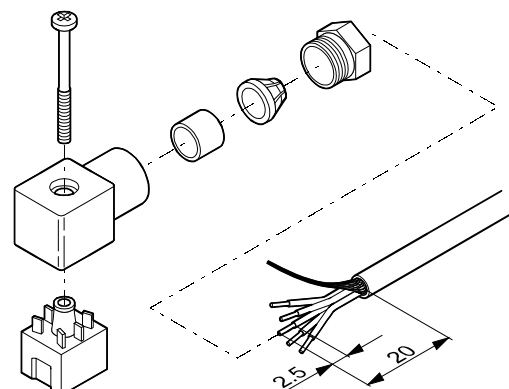
The gauge can also be operated with other evaluation units. In this case, an individual sensor cable must be made.

The maximum cable length should be dimensioned for a maximum voltage drop of 1 V. See Technical data (→ 8) for the corresponding specifications.

Procedure



- 1 Prepare the connection socket (ordering number → 23).



- 2 Solder the sensor cable according to the diagram.

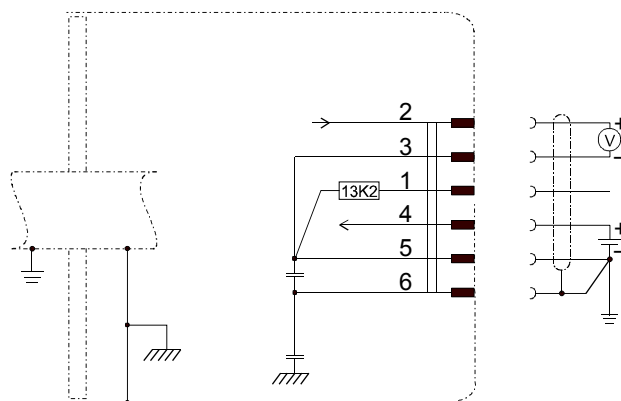
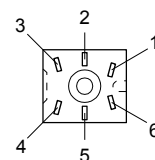


Figure 1: Electrical connection

- | | |
|-------|----------------------------------|
| Pin 1 | identification |
| Pin 2 | signal output (measuring signal) |
| Pin 3 | signal common |
| Pin 4 | supply |
| Pin 5 | supply common |
| Pin 6 | screen |



Connection socket soldering side

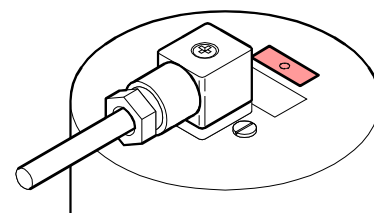


WARNING

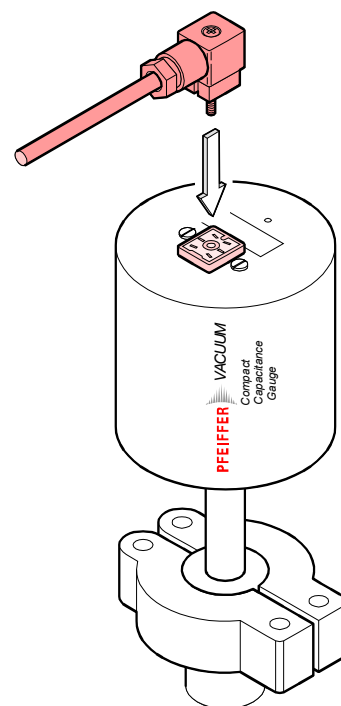


The supply common (pin 5) and screen (pin 6) must be connected to the supply unit with protective ground.

- 3 Assemble the connection socket in such a way that the connection socket and the cable do not cover the opening <zero adj.>.



- 4 Plug in the connection socket.
Secure the connection socket on the gauge with the screw.



4 Operation

As soon as the required voltage is applied, the measuring signal is available between pins 2 and 3 (see Appendix A for the relationship between the measuring signal and the pressure).

Zero



Caution



When operating the gauge for the first time and after maintenance, check the zero and readjust it if necessary at the normal operating temperature in order for correct measurement values to be output (→ 18). Long time operation and big temperature differences can cause zero drifts.

Warm up time



Caution



Only at the normal operating temperature, the gauge outputs correct, repeatable measurement values.

Warm up time:

approx. 30 min.	CMR 261 ... CMR 264
approx. 1 hour	CMR 271 ... CMR 275

Warm up time for high precision measurement:

up to 2 hours	CMR 263, CMR 264, CMR 273, CMR 274, CMR 275
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Recovery time



Caution



If the CMR 263, CMR 264, CMR 273, CMR 274 and CMR 275 gauges are exposed to atmospheric pressure their measuring range is exceeded by far and therefore they are subject to an extreme mechanical stress.

After a short exposure to atmosphere, the accuracy of the gauges and thus the repeatability of the measured values is hardly affected. However, after prolonged mechanical stress by atmospheric pressures, the gauges may take a "recovery time" of several hours (pressure within measuring range of the gauge) before they output accurate, repeatable measurement values.

We recommend keeping the gauges in an evacuated state by means of a shut-off valve when the system is vented for a prolonged period of time.

Accuracy



Caution



The overall accuracy (→ 7) of a capacitance manometer is influenced by a number of parameters.

There are three major factors contributing to the total deviation of the effective pressure:

1. the component summarized under the term "accuracy", comprising the non-linearity, hysteresis and non-repeatability
2. the resolution
3. the temperature effects on zero and span

In the middle measurement range, the "accuracy" (temperature independent) becomes increasingly important and influences the total deviation in the upper decade.

The resolution contributes to the total measurement error especially in the lower measurement range.

The temperature effect on the zero causes the dominant error in the two lowest decades of the measurement range.

The best results are obtained by keeping the operating temperature stable and adjusting the zero at this temperature (→ 18).

The following table shows the factors influencing the total measurement error.

Total measurement error CMR 261 (for $\Delta t = 1^\circ\text{C}$ and F.S. = 1000 mbar)

		Pressure [mbar]				
		1000	100	10	1	0.1
Accuracy	(0.2 % of reading)	2	0.2	0.02	0.002	0.0002
Resolution	(0.0015 % F.S.)	0.015	0.015	0.015	0.015	0.015
Temperature effects						
zero	(0.005 % F.S./ $^\circ\text{C}$)	0.05	0.05	0.05	0.05	0.05
span	(0.01 % of reading/ $^\circ\text{C}$)	0.1	0.01	0.001	0.0001	0.00001
Total error						
absolute		2.165	0.275	0.086	0.067	0.0652
% of reading		0.21	0.27	0.86	6.7	65.2

Minimum pressure for measurement

The following table shows the limit values for reliable and practicable pressure measurement in different measurement ranges. Accurate measurement of lower pressures is only possible with stable temperatures and gas flows.


Measurement range F.S. [mbar]	Minimum pressure for measurement [mbar]
0.1	5×10^{-5}
1	5×10^{-4}
10	5×10^{-3}
100	5×10^{-2}
1000	5×10^{-1}

Minimum pressure for process control


The gauge can be integrated in a process control system. The control range should preferably be between 20% and 80% of the measurement range of the gauge. If pressure control in the lower measurement range of the gauge is required, a minimum difference from the zero is recommended. The following table shows the lowest pressures for control in the corresponding measurement range for a voltage difference of 40 mV (output signal = 1.040 V).

Measurement range [mbar]	Minimum pressure for process control [mbar]
0.1	5×10^{-4}
1	5×10^{-3}
10	5×10^{-2}
100	5×10^{-1}
1000	5

Contamination



Caution



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

Gauge contamination is influenced by the process media used as well as any existing or new contaminants and their respective pressures.

Contamination can to a certain extent be reduced by:

- geometric protections (e.g. screenings, elbows) against particles that spread rectilinearly
- shut-off valve (for keeping the gauge evacuated while the system is being vented)
- mounting the flange of the gauge at a place where the partial pressure of the contaminants is particularly low.

The gauge is protected by a plasma shield. Heating the gauges of the CMR 271 ... CMR 275 series reduces condensation in the measuring chamber.

Aggressive gases

The gauge is largely stable to most aggressive gases since it is made of extremely corrosion resistant materials such as Al_2O_3 .

5 Maintenance

5.1 Zero Adjustment

When operating the gauge for the first time check the zero and adjust it if necessary. Long time operation and contamination can cause zero drifts and zero readjustment may thus be required.

Adjust the zero in the ambient temperature in which the gauge is normally operated. For zero adjustment, the gauge must be in the same mounting orientation as for operation.

Procedure

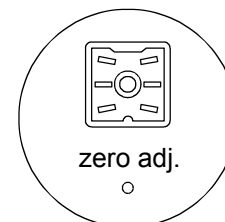
- 1 Evacuate the gauge until the pressure indicated in the table below is reached:

Full Scale (F.S.) [mbar]	Recommended maximum pressure for zero adjustment [mbar]
0.1	$<5 \times 10^{-6}$
1	$<5 \times 10^{-5}$
10	$<5 \times 10^{-4}$
100	$<5 \times 10^{-3}$
1000	$<5 \times 10^{-2}$

- 2 Operate the gauge for at least one hour. For high precision measurement, a warm up time of at least 2 hours is recommended.
- 3 Adjust the gauge using a reliable, accurate, and correctly calibrated instrument.

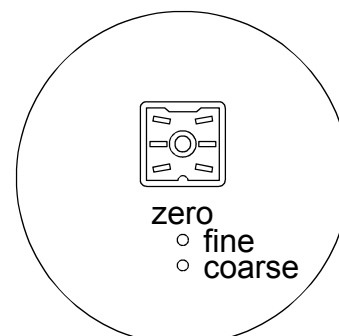
CMR 261 ... CMR 264

Using a screw driver (1.5 mm), adjust the zero < zero adj.> so that the output signal is 1.000 VDC.



CMR 271 ... CMR 275:

Using a screw driver (1.5 mm), adjust <zero fine> to the center position. After that, adjust <zero coarse> so that the output signal is 1.000 VDC \pm 0.200 VDC. Then adjust the output signal to 1.000 VDC with <zero fine>.



If you are using a Pfeiffer Vacuum measurement unit for Compact Gauges, you can adjust the zero on that measurement instrument.

Zero offset

Adjusting the zero at a pressure higher than the minimum resolution results in a constant zero offset. This means that over the whole range, the measured values will be linear and accurate relative to the offset value.



Caution



If the pressure cannot be reduced as required (e.g. because of a big process chamber), it is recommendable to install a three-way valve. By means of such a valve you can isolate the gauge from the process chamber without having to remove and connect it to a mobile pumping station. The zero can thus be adjusted irrespective of the process and in the normal operating orientation of the gauge.

5.2 Readjustment

The work is factory-calibrated and supplied with a calibration certificate (factory calibration according to DIN 28418, traceable to DKD (Deutscher Kalibrierdienst)).

Long time operation usually has virtually no effect. However, if readjustment is necessary, we offer the above factory calibration or alternatively direct comparison according to standard 1 with DKD certificate.



Please do not hesitate to contact your nearest Pfeiffer Vacuum representative for further information.

5.3 Cleaning the Gauge



DANGER



Caution: contaminated parts

Contaminated parts can be detrimental to your health.

Before you begin to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.



DANGER



Caution: cleaning agents

Cleaning agents can be detrimental to health and environment.

Adhere to the relevant regulations and take the necessary precautions when handling and disposing of cleaning agents.



Caution




Caution: Do not clean the measuring chamber.

Cleaning agents can damage the measuring chamber.


Pfeiffer Vacuum declines any warranty if the custodian cleans the measuring chamber.

Procedure

- a) Clean the housing with a dry, clean cloth.
- b) Carefully clean the sealing surfaces with a lint-free, clean cloth.



Caution



The sealing surfaces must be worked only concentrically.

5.4 What to Do in Case of Problems

Problem	Possible cause	Correction
Measuring signal continually < 0.4 V	No supply voltage Gauge defective	Turn on the power supply Exchange the gauge
Measuring signal 0.4 ... 0.6 V (underrange)	Zero out of adjustment	Zero adjustment → 18
Measuring signal continually > 9.8 V (Constant overrange)	Insufficient pressure in the measuring chamber	Test measuring chamber for coarse leak
	Sensor cable between gauge and measurement unit defective	Repair or replace the sensor cable
	The gauge has a short-circuit	Exchange the gauge
	Measurement unit defective	Repair or exchange the measurement unit
Unstable zero error	Ambient temperature too high or very unstable	Check that the ambient temperature is still within the admissible range → 9

6 Deinstallation



DANGER



Caution: contaminated parts

Contaminated parts can be detrimental to your health.

Before you begin to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.



Caution



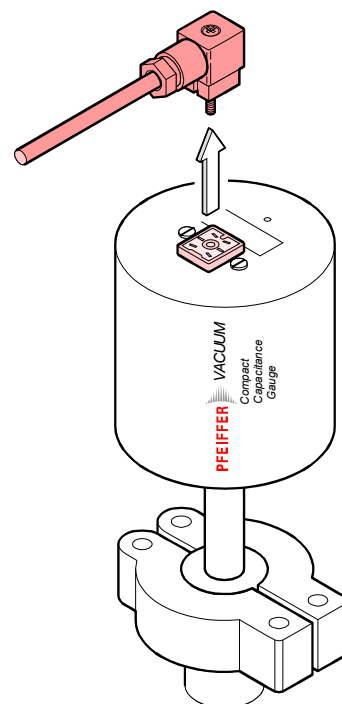
Caution: vacuum component

Dirt and damages impair the function of the vacuum component.

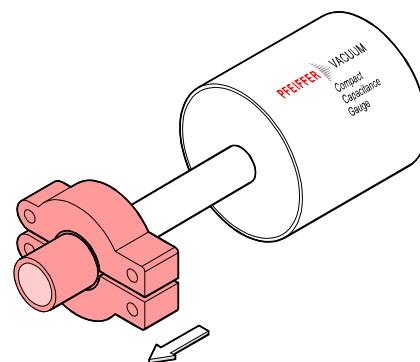
When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

Procedure

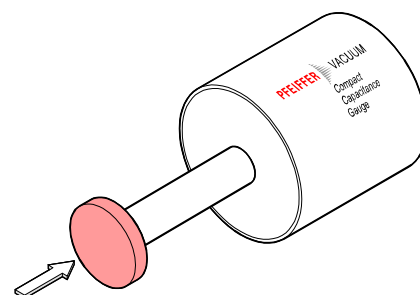
- 1 Deactivate the gauge.
- 2 Vent the vacuum system.
- 3 Unplug the connection socket.



- 4** Remove the gauge from the vacuum system.



- 5** Place the protective cap.



7 Returning the Product



WARNING



Caution: forwarding contaminated products

Products returned to Pfeiffer Vacuum for service or repair should preferably be free of harmful substances (e.g. radioactive, toxic, caustic or microbiological).

Adhere to the forwarding regulations of all involved countries and forwarding companies and enclose a completed contamination declaration.


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


When returning a product for service, put it in a tight and impact resistant package.

8 Accessories

	Ordering number
Sensor cable for Pfeiffer Vacuum measurement unit for Compact Gauges	
3 m	BG 448 250 -T
6 m	BG 448 251 -T
10 m	BG 448 252 -T
Hirschmann connection socket	
GO 6 WF, 6 poles, angled, female	B 4707 283 MA

9 Disposal



DANGER




Caution: contaminated parts

Contaminated parts can be detrimental to your health.

Before you begin to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.


WARNING



Caution: substances detrimental to the environment

Products, operating materials etc. may require disposal in accordance with special regulations.

For information on environmentally compatible disposal, please contact your nearest Pfeiffer Vacuum Service Center.

Separating the components

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

Components with exposure to process gases

Components which have been exposed to radioactive, toxic, caustic, or microbiological process gases must be disposed of in accordance with the relevant national regulations.

Components which have been exposed to other process gases must be separated according to their materials and recycled.

Components without exposure to process gases

Such components must be separated according to their materials and recycled.

Appendix

A: Relationship Measuring Signal vs. Pressure

The measuring signal between 1 ... 9.8 V is linear to the pressure to be measured between 0 ... 1.1×F.S. The F.S. measurement values are:

CMR 261, CMR 271	1000 mbar
CMR 262, CMR 272	100 mbar
CMR 263, CMR 273	10 mbar
CMR 263, CMR 274	1 mbar
CMR 275	0.1 mbar

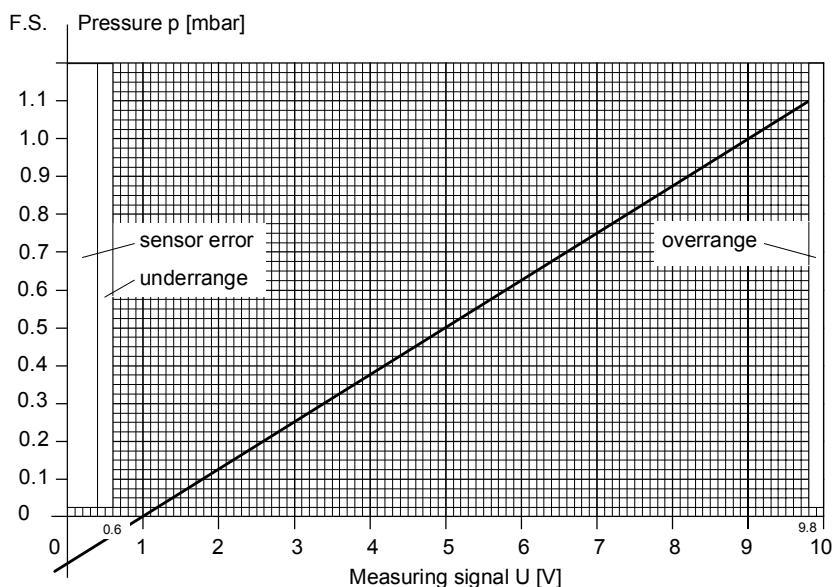
Conversion formula

$$p = [U - 1] c \text{ (F.S.)} \quad \Leftrightarrow \quad U = 1 + p / [c \text{ (F.S.)}]$$

p	U	c
[mbar]	[V]	0.125
[Torr]	[V]	0.094
[mTorr]	[V]	93.75
[micron]	[V]	93.75
[Pa]	[V]	12.5

where p pressure
U measuring signal
c constant (pressure unit dependent)

Conversion curve



Conversion table

Measuring signal U [V]	Pressure p [mbar]
0...0.4	Sensor error (no supply voltage)
0.4 ... 0.6	Underrange
0.600	-0.0500 × F.S.
1.000	0.0000 × F.S.
1.800	0.1000 × F.S.
2.600	0.2000 × F.S.
3.400	0.3000 × F.S.
4.200	0.4000 × F.S.
5.000	0.5000 × F.S.
5.800	0.6000 × F.S.
6.600	0.7000 × F.S.
7.400	0.8000 × F.S.
8.200	0.9000 × F.S.
9.000	1.0000 × F.S.
9.800	1.1000 × F.S.
>9.8	Overrange

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