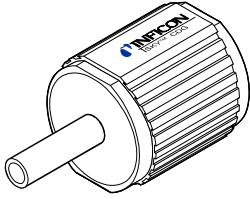


SKY™ AllCeramic™ Capacitance Diaphragm Gauge CDG025-C



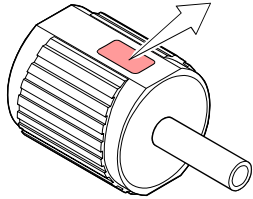
Operating Manual
Incl. Declaration of Conformity

tinz11e1 (0108)

Product Identification

In all communications with Inficon, please specify the information given on the product nameplate. For convenient reference copy that information into the diagram below.

INFICON AG, LI-9496 Balzers	
Model:	-----
PN:	-----
SN:	-----
----- V ----- W	



Validity

This document applies to the product with part numbers

371-250	(1.33×10 ¹ ... 133322 Pa (F.S.))
371-251	(1.33×10 ⁰ ... 13332.2 Pa (F.S.))
371-252	(1.33×10 ⁻¹ ... 1333.22 Pa (F.S.))
371-253	(1.33×10 ⁻² ... 133.322 Pa (F.S.))

The part number (PN) can be taken from the product nameplate.

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

All dimensions in mm.

Intended Use

The SKY™ AllCeramic™ Capacitance Diaphragm Gauge of the CDG025-C series are intended for absolute pressure measurement of gases in the pressure ranges specified in section "Validity".

The gauges can be operated in connection with an Inficon controller or another appropriate measuring unit.

Functional Principle

The temperature compensated CDG025-C consists of a capacitive sensor element made of aluminum oxide ceramic and electronics which convert the capacitance change into a DC voltage output signal.

The output signal is linear to the measured pressure and independent of the gas type.

Trademarks

SKY™ Inficon
AllCeramic™ Inficon

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 with the product materials.
- 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

Inficon 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 product documentation.

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

Technical Data

Measurement ranges	→ "Validity"
Accuracy	0.2% of reading
Resolution	
371-250 ... 371-252	0.0015% F.S.
371-253	0.0025% F.S.
Temperature effect on zero	
371-250 ... 371-252	0.005% F.S./ °C
371-253	0.015% F.S./ °C
Temperature effect on span	0.01% of reading / °C
Gas type dependence	none

Output signal (measurement signal)	
measurement range	0 ... +10.0 V
voltage range	-11.0 ... +11.0 V
voltage vs. pressure	linear
Output impedance	200 Ω (short-circuit proof)
Minimum loaded impedance	10 kΩ
Response time	
371-250 ... 371-252	30 ms
371-253	100 ms

Gauge identification	Resistance 13.2 kΩ referenced to supply common
----------------------	--

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⁾.

Supply voltage at the gauge	
at pin 7	+15 VDC ±5% (ripple <0.3 V _{pp})
or at pin 11	+18.0 ... +26.4 VDC (ripple <1.0 V _{pp})
Current	63 mA
Power consumption (depending on supply voltage)	1 ... 1.6 W
Internal fuse	1 AT, slow reaction, automatic reset (Polifuse)
The gauge is protected against polarity change of the supply voltage.	

Electrical connection	15-pole D-Sub, male screw lock NC 4-40
Sensor cable	5 poles plus shielding
Cable length	≤120 m (5×0.25 mm ²)
For longer cables, bigger conductor cross-sections are required (R _{conductor} ≤1.0 Ω).	

Grounding concept	
vacuum connection	isolated
supply common	connected to protective ground at the supply unit → "Electrical Connection"
signal common	conducted separately; for differential measurement
cable shield	connected to connector case at both ends and connected to protective ground at the supply unit

Materials exposed to vacuum	
tube (vacuum connection), plasma shield, sensor housing, diaphragm	ceramic (Al ₂ O ₃ ≥99.5%)
connection sensor housing – diaphragm	glass ceramic solder

Internal volume	4.3 cm ³
Admissible pressure	
371-250	≤399966 Pa (absolute)
371-251 ... 371-253	≤266644 Pa (absolute)

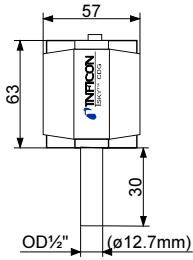
¹⁾ Inficon controllers fulfill these requirements.

Installation

Vacuum Connection

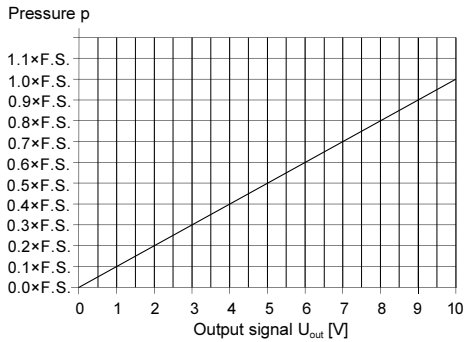
Admissible temperatures	
operation	+5 ... +50 °C
bakeout temperature at vacuum connection (not operational)	≤100 °C
storage	-40 ... +65 °C
Relative humidity	≤80% at temperatures ≤+31 °C, decreasing to 50% at +40 °C
Mounting orientation	any, → "Installation"
Use	indoors only altitude up to 2000 m NN
Protection category	IP 30

Dimensions [mm]



Weight 250 g

Output Signal vs. Pressure



$$p = (U_{out} / 10 \text{ V}) \times p(\text{F.S.})$$

Example: Gauge with 13332.2 Pa F.S.
Output signal $U_{out} = 6 \text{ V}$

$$p = (6 \text{ V} / 10 \text{ V}) \times 13332.2 \text{ Pa} = 0.6 \times 13332.2 \text{ Pa} = 7999.32 \text{ Pa}$$

Conversion Pa ↔ Torr

Pa	Torr
1.00	$760 / 101325 = 7.50062 \times 10^{-3}$

Conversion Torr ↔ Pa

Torr	Pa
1.00	$101325 / 760 = 1.33322 \times 10^2$

STOP DANGER

Caution: fragile material

The vacuum connection is made of ceramic. This material is strong but brittle and could burst when radial force is applied.

Take appropriate measures to protect the vacuum connection, e.g. by installing a protective grid.

STOP DANGER

Caution: overpressure in the vacuum system >100000 Pa

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.

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 one's bare hands increases the desorption rate.

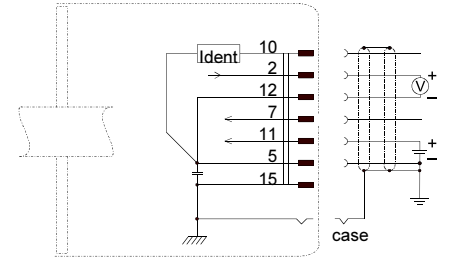
Always wear clean, lint-free gloves and use clean tools when working in this area.

The gauge can be mounted in any orientation, preferably vertically. However, it should be mounted so that no vibrations occur and that no particles and condensates can penetrate into the measuring chamber. If it should be possible to adjust the gauge while it is mounted, make sure the potentiometer <zero> is accessible with a screw driver.

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.



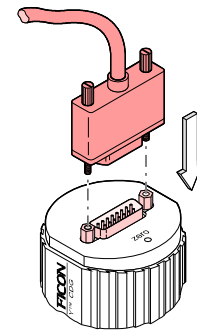
Electrical connection

Pin 2	Signal output (measuring signal)	9	1
Pin 5	Supply common	15	8
Pin 7	Supply (+15 V)		
Pin 10	Identification		
Pin 11	Supply (+18 ... +26.4 V)		
Pin 12	Signal common		
Pin 15	Housing		
case	Connector housing		

D-Sub, 15-pole female soldering side

- Connect **only one** supply voltage (+15 V or +18 ... +26.4 V).
- Pins 1, 3, 4, 6, 8, 9, 13 and 14 are not assigned in the gauge.
- The cable must be shielded and grounded as indicated in the above illustration and the "Technical Data" (Grounding concept).

Connect the cable to the gauge.



Secure the cable socket to the gauge connector with the lock screws.

Connect the sensor cable to the controller.



1.1.2.161

(0108)

Operation

Turn the gauge on and allow a warm up time of at least 30 minutes, i.e. wait until the signal has become stable. Zero the gauge as described below.

Gas Type Dependence

The measured value is independent of the gas type.

Zeroing the Gauge <zero>

When the gauge is put into operation for the first time, its zero should be adjusted.

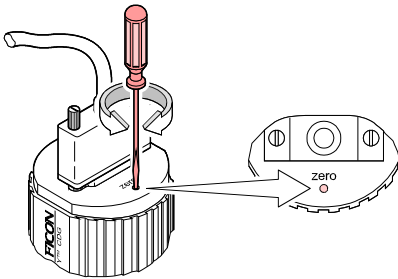
Due to long time operation or contamination, a zero drift could occur. Periodically check the zero and adjust it if necessary.

Adjust the zero at the ambient temperature at which the gauge is normally operated. The gauge should be adjusted in the position in which it will be operated.

- 1 Evacuate the gauge to a pressure in accordance with the table below:

	Recommended final pressure for zero adjustment
371-250	$<6.65 \times 10^0 \text{ Pa}$
371-251	$<6.65 \times 10^{-1} \text{ Pa}$
371-252	$<6.65 \times 10^{-2} \text{ Pa}$
371-253	$<6.65 \times 10^{-3} \text{ Pa}$

- 2 Operate the gauge for at least 30 minutes (till the signal is stable).
- 3 Adjust the gauge using a (at least) 4-digit, correctly calibrated instrument at the signal output (measuring signal).
- 4 The influence of the mounting orientation on the output signal is compensated by adjusting the output signal. Using a screwdriver (1.5 mm), adjust the <zero> potentiometer so that the output signal is 0.000 VDC.



If you are using the Inficon controller, you can adjust the zero on the controller (→ [1, 2]).

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



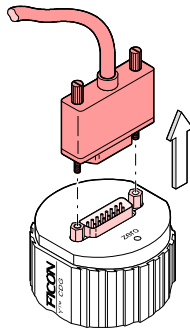
Caution: vacuum component
Dirt and damages impair the function of the vacuum component.
When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

Caution



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

- 1 Vent the vacuum system.
- 2 Turn the gauge off.
- 3 Loose the lock screws and unplug the sensor cable.



- 4 Remove the gauge from the vacuum system.

Maintenance, Repair

Under clean operating conditions, the product requires no maintenance.



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

Inficon assumes no liability and the warranty becomes null and void if any repair work is carried out by the end-user or third parties.

Returning the Product

WARNING



Caution: forwarding contaminated products
Contaminated products (e.g. radioactive, toxic, caustic or microbiological hazard) can be detrimental to health and environment.
Products returned to Inficon 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. Products not accompanied by a duly completed declaration of contamination are returned to the sender at his own expense.

Disposal

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.

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.

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 disposed of.
- Other components
Such components must be separated according to their materials and recycled.

Further Information

[1] www.inficon.com
Operating Manual
Vacuum Gauge Controller VGC401
tinb01e1
Inficon AG, LI-9496 Balzers, Liechtenstein

[2] www.inficon.com
Operating Manual
Vacuum Gauge Controller VGC032
tinb02e1
Inficon AG, LI-9496 Balzers, Liechtenstein

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 _____
Part number _____
Serial number _____

2 Reason for return

3 Operating fluid(s) used (Must be drained before shipping.)

4 Process related contamination of product:

toxic	no <input type="checkbox"/> 1)	yes <input type="checkbox"/>
caustic	no <input type="checkbox"/> 1)	yes <input type="checkbox"/>
biological hazard	no <input type="checkbox"/>	yes <input type="checkbox"/> 2)
explosive	no <input type="checkbox"/>	yes <input type="checkbox"/> 2)
radioactive	no <input type="checkbox"/>	yes <input type="checkbox"/> 2)
other harmful substances	no <input type="checkbox"/> 1)	yes <input type="checkbox"/>

1) or not containing any amount of hazardous residues that exceed the permissible exposure limits

2) Products thus contaminated will not be accepted without written evidence of decontamination!

The product is free of any substances which are damaging to health
yes

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:

Trade/product name	Chemical name (or symbol)	Precautions associated with substance	Action if human contact

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 dispatched in accordance with the applicable regulations.

Organization/company _____
Address _____ Post code, place _____
Phone _____ Fax _____
Email _____
Name _____

Date and legally binding signature _____ Company stamp _____

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



We, Inficon, hereby 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.

**SKY™ AllCeramic™
Capacitance Diaphragm
Gauge
CDG025-C**

Part numbers

371-250
371-251
371-252
371-253

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)

Signatures

INFICON AG, Balzers

7 August 2001

Hannes Fischer
Product Manager

7 August 2001

Dr. Georg Sele
Technical Support Manager
Quality Representative



LI-9496 Balzers
Liechtenstein
Tel +423 / 388 3111
Fax +423 / 388 3700
reach.liechtenstein@inficon.com
www.inficon.com