Pirani Gauge Display

PGD500

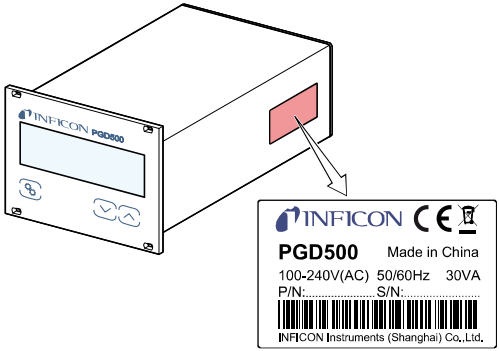
CE

Operating Manual

Incl. EU Declaration of Conformity

Product Identification

In all communications with INFICON, please specify the information on the product nameplate. For convenient reference copy that information into the space provided below:



Validity

This document applies to products with part number 398-802.

The part number (P/N) can be taken from the product nameplate.

This document is based on firmware number F-1.00.

If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 🗎 25).

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

Intended Use

The PGD500 is used together with INFICON gauges for total pressure measurement. All products must be operated in accordance with their respective Operating Manuals.

Scope of Delivery

1× Pirani Gauge Display
1× Power cord
1× Operating Manual

Contents

For cross-references within this document, the symbol (→ 🗎 XY) is used, for cross-references to further documents, listed under "Further Information", the symbol (→ 🕮 [Z]).

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.

Further symbols

The lamp/display is lit.

The lamp/display is dark.

Press the key (example: 'set' key).

Do not press any key.

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

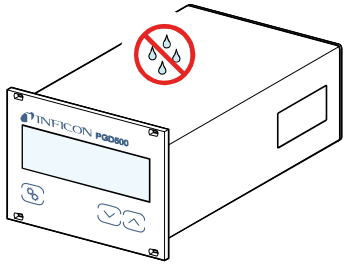
Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.

DANGER

Mains voltage

Contact with live parts is extremely hazardous when any liquids penetrate into the unit.

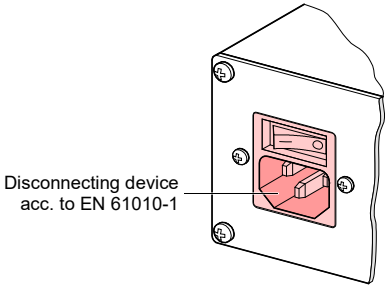
Make sure no liquids penetrate into the equipment.



Disconnecting device

The disconnecting device must be readily identifiable and easily reached by the user.

To disconnect the controller from mains, you must unplug the mains cable.



Communicate the safety instructions to all other users.

1.4 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.

2 Technical Data

Mains specifications

Voltage	100 … 240 V (ac)
Frequency	50 … 60 Hz
Power consumption	≤30 VA
Overvoltage category	II
Protection class	1
Connection	European appliance connector IEC 320 C14

Ambiance

Temperature	
Storage	–20 … +60 °C
Operation	+ 5 … +50 °C
Relative humidity	≤80% up to +31 °C, decreasing to 50% at +40 °C
Use	indoors only max. altitude 2000 m
Pollution degree	II
Degree of protection	IP20 (EN 60529)

Compatible gauges

Number	1	
Compatible types		
Pirani	PSG	(PSG500, PSG500-S, PSG502-S, PSG510-S, PSG512-S), (PSG550, PSG552, PSG554)
Pirani/Capacative	PCG	(PCG550, PCG552, PCG554)
Cold cathode/Pirani	MPG	(MPG400, MPG401, MPG500, MPG504)

Gauge connection

SENSOR connector	RJ45 (FCC68), female (pin assignment → 🗎 22)

Operation

Front panel	via 3 keys

Measurement values

Display range PGD500	
PSG	5×10^{-4} … 1000 mbar
PCG	2.44×10^{-4} … 1500 mbar
MPG	5×10^{-9} … 1000 mbar
Measurement error	
Gain error	≤0.02% FSr
Offset error	≤0.05% FSr
Measurement rate	30 / s
Display rate	50 / s
Filter time constant	150 ms (f_g = 1 Hz)
Pressure units	mbar, Pa, Torr

Gauge supply

Voltage	+24 V (dc) ±5%
Current	750 mA
Power consumption	18 W
Fuse protection	900 mA with PTC element, self-resetting after turning the PGD500 off or disconnecting the gauge

Switching function

Number	1
Reaction delay	≤10 ms if switching threshold close to measurement value (for larger differences consider filter time constant).
Adjustment range	
PSG	1×10^{-3} … 500 mbar
PCG	1×10^{-4} … 500 mbar
MPG	1×10^{-8} … 500 mbar
Hysteresis	≥10% of measurement value

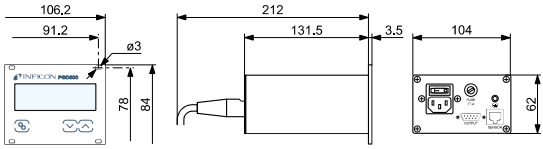
Switching function relay

Contact type	floating changeover contact
Load max.	60 V (dc), 1 A (ohmic) 50 V (ac), 5 A (ohmic)
Service life	
Mechanic	10^8 cycles
Electric	10^5 cycles (at maximum load)
Contact positions	→ 🗎 23
OUTPUT connector	9-pin D-sub, male (pin assignment → 🗎 23)

Analog output

Number	1
Voltage range	0 … +10.3 V
Internal resistance	660 Ω
Measurement signal vs. pressure	depending on gauge (→ 🕮 [1] … [5])
OUTPUT connector	9-pin D-sub, male (pin assignment → 🗎 23)

Dimensions [mm]



Use	For incorporation into a rack or control panel or as desk-top unit
Weight	0.85 kg

3 Installation

DANGER

Damaged product

Putting a product which is visibly damaged into operation can be extremely hazardous.

If a product is visibly damaged do not put it into operation and make sure it is not inadvertently put into operation.

3.1 Rack Installation

The PGD500 is designed for installation into a 19" rack chassis adapter according to DIN 41 494. For this purpose, four collar screws and plastic sleeves are needed.

DANGER

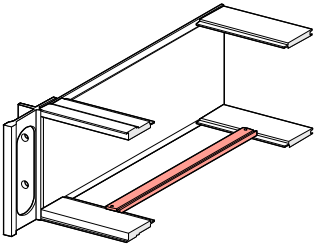
Protection class of the rack

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. the EN 60204-1 regulations for switching cabinets.

Take appropriate measures for the rack to meet the specifications of the protection class.

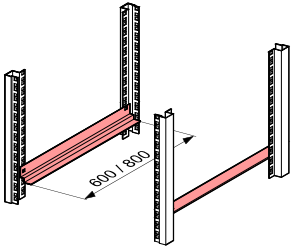
Guide rail

In order to reduce the mechanical strain on the front panel of the PGD500, preferably equip the rack chassis adapter with a guide rail.

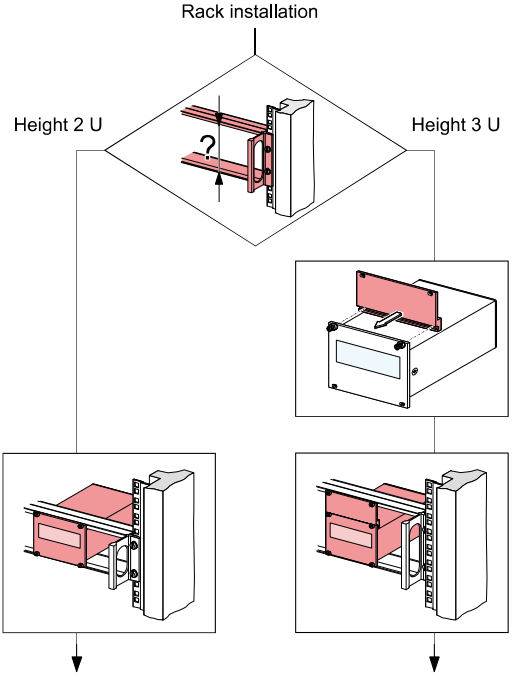


Slide rails

For safe and easy installation of heavy rack chassis adapters, preferably equip the rack frame with slide rails.



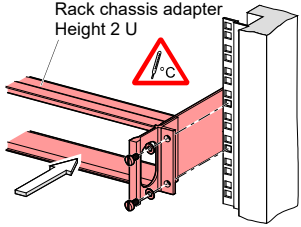
Mounting height



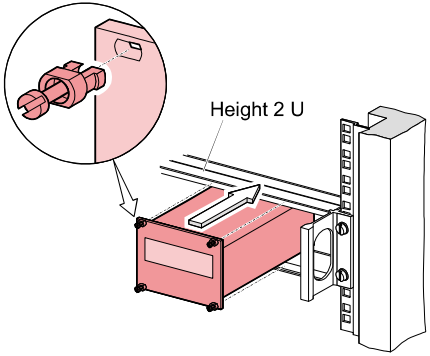
Height 2 U rack chassis adapter

❶ Secure the rack chassis adapter in the rack frame.

The admissible maximum ambient temperature (→ 🗎 9) must not be exceeded neither the air circulation obstructed.



❷ Slide the PGD500 into the adapter …



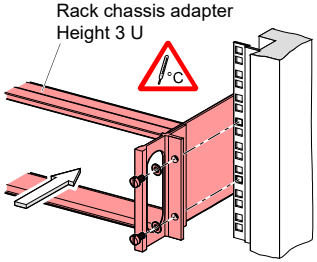
… and fasten the PGD500 to the rack chassis adapter using collar screws and plastic sleeves.

Height 3 U rack chassis adapter

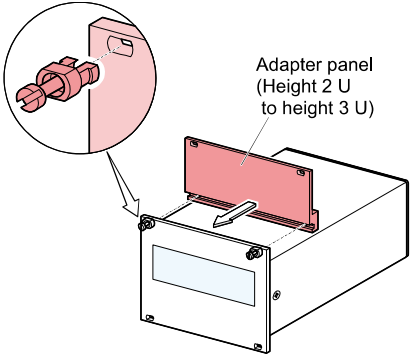
For incorporation into a 19" rack chassis adapter, height 3, an adapter panel (incl. two collar screws and plastic sleeves) is available (→ 🗎 35).

❶ Secure the rack adapter in the rack frame.

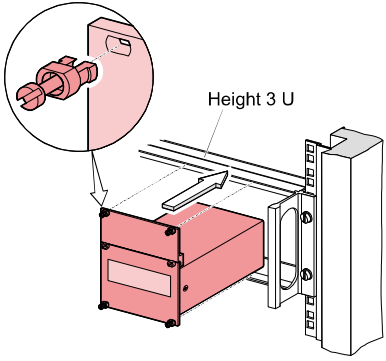
The admissible maximum ambient temperature (→ 🗎 9) must not be exceeded neither the air circulation obstructed.



❷ Mount the adapter panel as upper extension to the front panel of the PGD500 using collar screws and plastic sleeves.



❸ Slide the PGD500 into the rack chassis adapter …



…and fasten the adapter panel to the rack chassis adapter using collar screws and plastic sleeves.

3.2 Installation in a Control Panel

The PGD500 is suited for incorporation into a control panel.

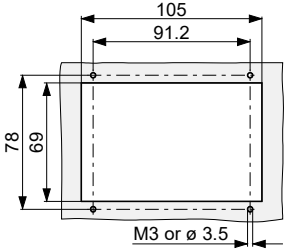
DANGER

Protection class of the control panel

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. according to the EN 60204-1 regulations for switching cabinets.

Take appropriate measures for the control panel to meet the specifications of the protection class.

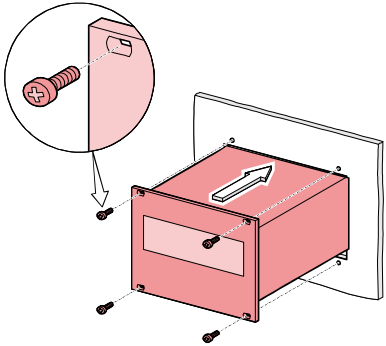
For mounting the PGD500 into a control panel, the following cut-out is required:



The admissible maximum ambient temperature (→ 9) must not be exceeded neither the air circulation obstructed.

For reducing the mechanical strain on the front panel, preferably support the unit.

Slide the PGD500 into the cut-out of the control panel …



… and secure it with four M3 or equivalent screws.

3.3 Use as Desk-Top Unit

The PGD500 is also suited for use as desk-top unit.

Select a location where the admissible maximum ambient temperature (→ 9) is not exceeded (e.g. due to sun irradiation).

3.4 Mains Power Connector

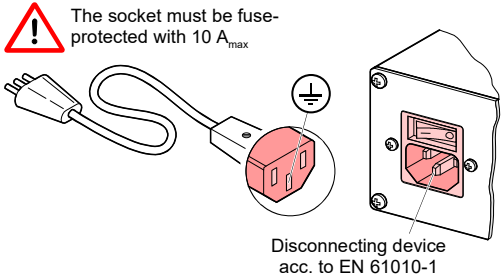
DANGER

Line voltage

Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 3-conductor power cable (3×1.5 mm^2) with protective ground. The power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

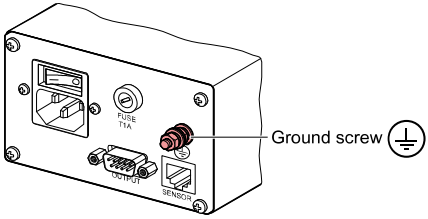
The unit is supplied with a 2 m power cord. If the mains cable is not compatible with your system, use your own, suitable cable with protective ground.



If the unit is installed in a switch cabinet, the mains voltage should be supplied and turned on via a central power distributor.

Grounding

On the rear of the unit, there is a screw which can be used to connect the unit to ground, e.g. using the grounding of the pumping station.



3.5 SENSOR Connector

Connect the gauge to the SENSOR connector on the rear of the unit. Use a screened 1:1 cable (electromagnetic compatibility).

Make sure the gauge is compatible (→ 9).

DANGER

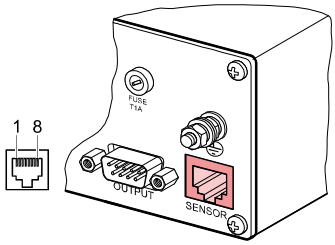
Protective low voltage

According to EN 61010, voltages exceeding 30 V (ac) or 60 V (dc) are hazardous.

Only connect a protective low voltage (PELV).

Pin assignment SENSOR

Pin assignment of the 8-pin RJ45 appliance connector:



Pin	Signal	
1	Supply	+24 V (dc)
2	Supply common	GND
3	Signal input	(Measurement signal+)
4	not connected	
5	Signal common	(Measurement signal–)
6	not connected	
7	not connected	
8	not connected	

3.6 OUTPUT Connector

This connector allows to read the measurement signal and to evaluate state of the floating switching function.

Connect the peripheral components to the OUTPUT connector on the rear of the unit. Use a screened cable (electromagnetic compatibility).

DANGER

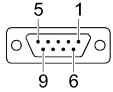
Protective low voltage

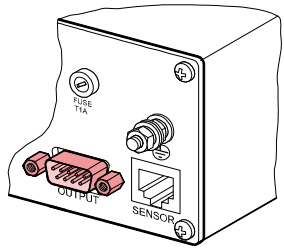
According to EN 61010, voltages exceeding 30 V (ac) or 60 V (dc) are hazardous.

Only connect a protective low voltage (PELV).

Pin assignment, Contact positions OUTPUT

Pin assignment of the female 9-pin D-sub appliance connector:

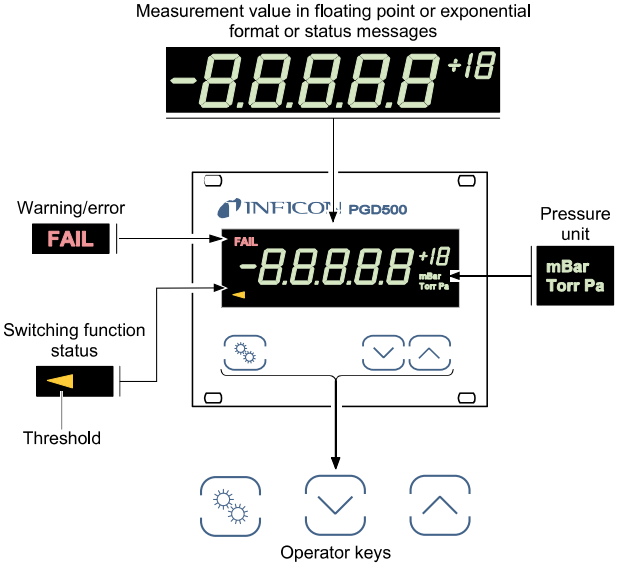




Pin	Signal	
1	Analog output	0 … +10 V (dc)
2	Chassis = GND	
3	 Pressure below threshold	 Pressure above threshold or power supply turned off
4		
5		
9	not connected	
8	not connected	
6	not connected	
7	not connected	

4 Operation

4.1 Front Panel



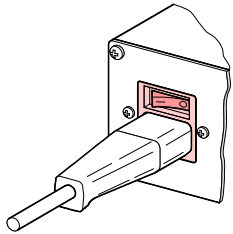
4.2 Turning the PGD500 On and Off

Make sure the PGD500 is correctly installed and the specifications in the Technical Data are met.

Turning the PGD500 on

The power switch is on the rear of the unit.

Turn the PGD500 on with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).



After power on, the PGD500 …

- automatically performs a self-test
- displays the firmware version F-1.00 for 3 s
- identifies if a gauge is connected
- displays the gauge which was connected before the last power off
- activates the parameters that were in effect before the last power off
- switches to the measurement mode

Turning the PGD500 off

Turn the PGD500 off with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).

Wait at least 10 s before turning the PGD500 on again in order for it to correctly initialize itself.

4.3 Operating Modes

The PGD500 works in the following operating modes:

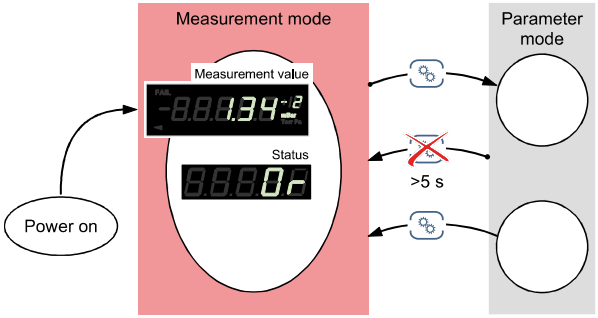
- Measurement mode
  for displaying measurement values or status messages
  (→ 27)
- Parameter mode
  for entering or displaying parameters (→ 28)

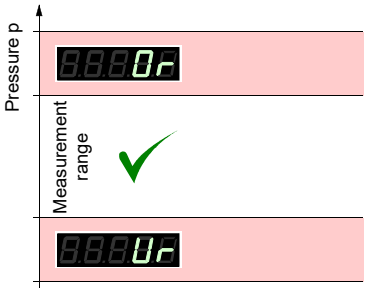
4.4 Gauge Identification

Pirani gauge (PSG500, PSG500-S, PSG502-S, PSG510-S, PSG512-S), (PSG550, PSG552, PSG554)	
Pirani/Capacative gauge (PCG550, PCG552, PCG554)	
Cold cathode/Pirani gauge (MPG400, MPG401, MPG500, MPG504)	

4.5 Measurement Mode

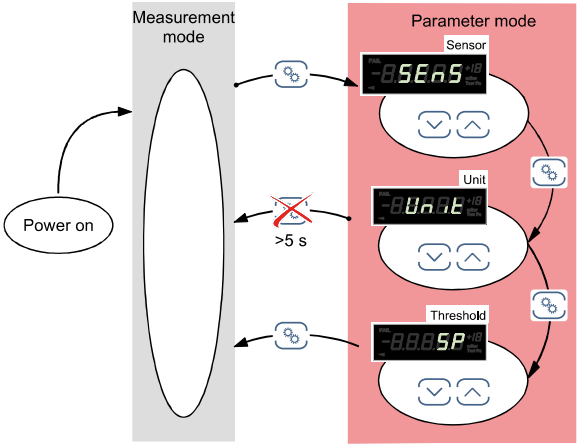
The Measurement mode is the standard operating mode of the PGD500. Measurement values as well as status messages (→ 🗎 33) are displayed in this mode.





4.6 Parameter Mode

The Parameter mode is used for displaying, editing and entering parameter values.



Selecting a parameter

⇨ The name of the parameter

e.g.: 
Sensor

is displayed as long as the key is pressed or at least for 1 s.

Afterwards, the currently valid parameter value is displayed.

Editing the parameter value

⇨ Press key <1 s:
The value is increased / decreased by 1 increment.

Press key >1 s:
The value is increased / decreased continuously.

⇨ Save the modificated parameter value.

Modifications of parameters come into effect immediately and are stored automatically.

4.6.1 Parameters

Gauge

Type of the connected gauge.

	Value
	
	⇨ Pirani gauge (default) (PSG500, PSG500-S, PSG502-S, PSG510-S, PSG512-S), (PSG550, PSG552, PSG554)
	⇨ Pirani/Capacative gauge (PCG550, PCG552, PCG554)
	⇨ Cold cathode/Pirani gauge (MPG400, MPG401, MPG500, MPG504)

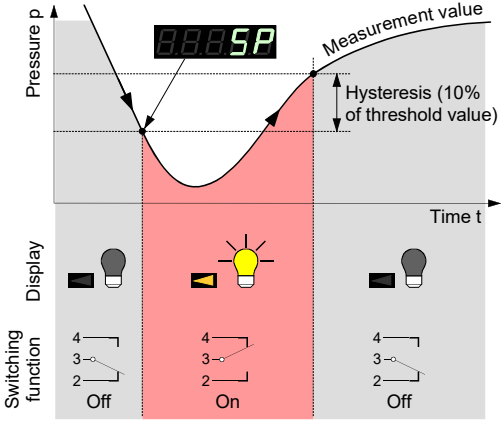
Pressure unit

Unit of measured values, thresholds etc.

	Value	
		
	⇨ mbar (default)	
	⇨ Torr	
	⇨ Pascal	

Switching threshold

The PGD500 has a switching function with one adjustable threshold. The status of the switching function is displayed on the front panel (→ 24) and can be evaluated via the floating contact at the CONTROL connector (→ 22).



	Value
	The switching threshold defines the pressure at which the switching function is activated when the pressure is dropping.
e.g.: 	default PSG gauges
e.g.: 	default PCG gauges
e.g.: 	default MPG gauges

5 Maintenance, Repair

The product requires no maintenance.

Cleaning the PGD500

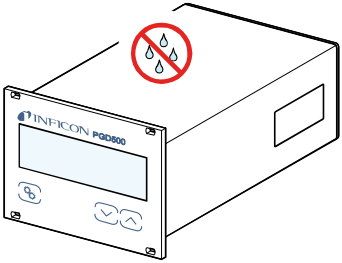
For cleaning the outside of the PGD500, a slightly moist cloth will usually do. Do not use any aggressive or scouring cleaning agents.

DANGER

Mains voltage

Contact with live parts is extremely hazardous when any liquids penetrate into the unit.

Make sure no liquids penetrate into the equipment.



6 Troubleshooting

Signalization of errors

Error messages

	Possible cause and remedy / acknowledgement
S-Err	Interruption or instability in sensor line or connector (Sensor error).
F.-Bro	Pirani error (sensor defective). ⇨ Replace the sensor

Status messages

	Possible cause and remedy / acknowledgement
Ur	The output signal of the gauge is outside the measurement range (depending on gauge, → 🕮 [1] … [5]). ⇨ Adjust the gauge (→ 🕮 [1] … [5]).
Or	The output signal of the gauge is outside the measurement range (depending on gauge, → 🕮 [1] … [5]). ⇨ Adjust the gauge (→ 🕮 [1] … [5]).

Technical support

If the problem persists after the message has been acknowledged for several times and/or the gauge has been exchanged, please contact your local INFICON service center.

7 Repair

Please contact your local INFICON service center.

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

8 Accessories

	Ordering number
Adapter panel for installation into a 19" rack chassis adapter, height 3 U	398-499

9 Storage

Caution

Electronic component

Inappropriate storage (static electricity, humidity etc.) can damage electronic components.

Store the product in a bag or container. Observe the corresponding specifications in the technical data (→ 9).

10 Disposal

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

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.

Appendix

A: Default Parameters

	Default	User	
SEnS	PSG		
SP	1.0^{-3} mbar *)		
Unit	mbar		

*) PCG: 1.0^{-4} mbar
MPG: 1.0^{-8} mbar

B: Literature

[1] Operating Manual
Pirani Standard Gauge
PSG500, PSG500-S, PSG502-S,
PSG510-S, PSG512-S
tina44e1 (English)
INFICON AG, LI–9496 Balzers, Liechtenstein

[2] Operating Manual
Pirani Standard Gauge
PSG550, PSG552, PSG554
tina60e1 (English)
INFICON AG, LI–9496 Balzers, Liechtenstein

[3] Operating Manual
Pirani Capacitance Diaphragm Gauge
PCG550, PCG552, PCG554
tina56e1 (English)
INFICON AG, LI–9496 Balzers, Liechtenstein

[4] Operating Manual
Inverted Magnetron Pirani Gauge
MPG400, MPG401
tina48e1 (English)
INFICON AG, LI–9496 Balzers, Liechtenstein

[5] Operating Manual
Cold Cathode Pirani Gauge
MPG500, MPG504
tina83e1 (English)
INFICON AG, LI–9496 Balzers, Liechtenstein

EU Declaration of Conformity

CE

We, INFICON, hereby declare that the equipment mentioned below complies with the provisions of the following Directives:

- 2014/35/EU, OJ L 96/357, 29.3.2014
  (Low Voltage Directive; Directive relating to electrical equipment designed for use within certain voltage limits)
- 2014/30/EU, OJ L 96/79, 29.3.2014
  (EMC directive; Directive relating to electromagnetic compatibility)
- 2011/65/EU, OJ L 174/88, 1.7.2011
  (RoHS directive; Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment)

Pirani Gauge Display

PGD500

Standards

Harmonized and international/national standards and specifications:

- EN 61010-1:2010 (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1:2013; Group 1, Class B (EMC - Electrical equipment for measurement, control and laboratory use; general EMC requirements)

Signatures

INFICON AG, Balzers

29 July 2020

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29 July 2020

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