



OPERATING INSTRUCTIONS

EN

Translation of the Original

PLUG-IN BOARDS

for total pressure measuring and control units TPG 300/TPG 500

Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new total pressure measuring and control unit should support you in your individual application with full performance and without malfunctions. The name Pfeiffer Vacuum stands for high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. From this extensive, practical experience we have gained a large volume of information that can contribute to efficient deployment and to your personal safety.

In the knowledge that our product must avoid consuming work output, we trust that our product can offer you a solution that supports you in the effective and trouble-free implementation of your individual application.

Please read these operating instructions before putting your product into operation for the first time. If you have any questions or suggestions, please feel free to contact info@pfeiffer-vacuum.de.

Further operating instructions from Pfeiffer Vacuum can be found in the [Download Center](#) on our website.

Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

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We reserve the right to make changes to the technical data and information in this document.

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1 About this manual



IMPORTANT

Read carefully before use.

Keep the manual for future consultation.

1.1 Validity

This document describes the function of the products listed in the following and provides the most important information for safe use. The description is written in accordance with the valid directives. The information in this document refers to the current development status of the products. The document retains its validity assuming that the customer does not make any changes to the product.

1.1.1 Applicable documents

Designation	Document
Operating instructions "Total pressure measuring and control unit" TPG 300	BG 5970
Operating instructions "Total pressure measuring and control unit" TPG 500	BG 6008
Communication protocol "Total pressure measuring and control unit" TPG 300	BG 5973
Communication protocol "Total pressure measuring and control unit" TPG 500	BG 6009
"Gauges" operating instructions ModulLine gauges	(depending on the gauge used)

Tbl. 1: Applicable documents

You can find these documents in the [Pfeiffer Vacuum Download Center](#).

1.1.2 Variants

This document applies to the products with the following part numbers:

Part number	Type	Designation
PT 546 920-T	Measurement board (Pirani)	PI 300D
PT 549 214-T		PI 300DN
PT 441 375-T	Measurement board (cold cathode)	PE 300DC9
PT 441 000-T	Measurement board (Pirani/cold cathode)	CP 300C9
PT 441 114-T		CP 300C10
PT 441 080-T		CP 300T11
PT 441 120-T		CP 300T11L
PT 441 130-T	Interface and relay board (RS-232-C)	IF 300A
PT 441 250-T		IF 300B
PT 441 390-T	Interface and relay board (RS-422)	IF 300C
PT 441 395-T	Interface and relay board (Profibus)	IF 300P

Tbl. 2: Variants

You can find the part number on the rating plate of the product.

Pfeiffer Vacuum reserves the right to make technical changes without prior notification.

The figures in this document are not to scale (dimensions in mm).

1.2 Target group

These operating instructions are aimed at all persons performing the following activities on the product:

- Transportation
- Setup (Installation)
- Usage and operation
- Decommissioning
- Maintenance and cleaning
- Storage or disposal

The work described in this document is only permitted to be performed by persons with the appropriate technical qualifications (expert personnel) or who have received the relevant training from Pfeiffer Vacuum.

1.3 Conventions

1.3.1 Instructions in the text

Usage instructions in the document follow a general structure that is complete in itself. The required action is indicated by an individual step or multi-part action steps.

Individual action step

A horizontal, solid triangle indicates the only step in an action.

- This is an individual action step.

Sequence of multi-part action steps

The numerical list indicates an action with multiple necessary steps.

1. Step 1
2. Step 2
3. ...

1.3.2 Pictographs

Pictographs used in the document indicate useful information.



Note



Tip

1.3.3 Abbreviations

Abbreviation	Explanation
ASCII	American Standard Code for Information Interchange
ATM	Atmosphere
CNTR-P	Repeater direction control signal (Profibus)
ESD	Electrostatic Discharge
IF	Interface
GND	Ground
HV	High vacuum
MHV	Miniature High Voltage (coax high voltage connector in miniature design)
NN	Mean sea level
PE	Penning
Profibus DP	Profibus distributed periphery

Abbreviation	Explanation
RS-232	Recommended Standard 232 (Standard for a serial interface often available on computers)
RS-422	Recommended Standard 422 (Interface standard for a wired differential serial data transfer)
RxD	Received eXchange Data (incoming data line)
SHV	Safe High Voltage (connector for coax cable)
TPG	Total Pressure Gauge (total pressure measuring and control unit)
TxD	Transmitted eXchange Data (outgoing data line)

Tbl. 3: Abbreviations used

1.4 Trademark proof

- Profibus® is a registered trading name of Profibus Nutzerorganisation e.V.

2 Safety

2.1 General safety information

The following 4 risk levels and 1 information level are taken into account in this document.

DANGER

Immediately pending danger

Indicates an immediately pending danger that will result in death or serious injury if not observed.

- Instructions to avoid the danger situation

WARNING

Potential pending danger

Indicates a pending danger that could result in death or serious injury if not observed.

- Instructions to avoid the danger situation

CAUTION

Potential pending danger

Indicates a pending danger that could result in minor injuries if not observed.

- Instructions to avoid the danger situation

NOTICE

Danger of damage to property

Is used to highlight actions that are not associated with personal injury.

- Instructions to avoid damage to property



Notes, tips or examples indicate important information about the product or about this document.

2.2 Safety instructions



Safety instructions according to product's life stages

All safety instructions in this document are based on the results of a risk assessment. Pfeiffer Vacuum has taken into account all the relevant life stages of the product.

Risks during installation

DANGER

Danger to life due to dangerous contact voltage

Voltages above 30 V (AC) or 60 V (DC) are considered dangerous in accordance with EN 61010. If you come into contact with dangerous contact voltage, this can result in injury through electric shocks or even death.

- Only connect the gauge to professionally grounded devices.
- Take additional safety measures on the system-side if processes in the vacuum system (e.g. flashovers) can result in dangerous voltages at the gauge connections.
- Secure the line to the gauge.

Risks during disposal

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

2.3 Safety precautions

The product is designed according to the latest technology and recognized safety engineering rules. Nevertheless, improper use can result in danger to operator all third party life and limb, and product damage and additional property damage.



Duty to provide information on potential dangers

The product holder or user is obliged to make all operating personnel aware of dangers posed by this product.

Every person who is involved in the installation, operation or maintenance of the product must read, understand and adhere to the safety-related parts of this document.



Infringement of conformity due to modifications to the product

The Declaration of Conformity from the manufacturer is no longer valid if the operator changes the original product or installs additional equipment.

- Following the installation into a system, the operator is required to check and re-evaluate the conformity of the overall system in the context of the relevant European Directives, before commissioning that system.

General safety precautions when handling the product

- ▶ When handling the gases and contaminated parts used, observe the applicable guidelines.
- ▶ Observe the protective measures.
- ▶ Observe the safety guidelines specified in this document.
 - All work is only permissible when observing the relevant guidelines and adhering to the protective measures.
- ▶ Inform yourself about any contamination before starting work.
- ▶ Pass on safety instructions to all other users.

2.4 Proper use

The plug-in boards are analog measuring, interface and relay boards for the ModulLine total pressure measuring and control units TPG 300 and TPG 500.

- ▶ Install, operate and maintain the product only in accordance with these operating instructions.
- ▶ Comply with the application limits.
- ▶ Observe the technical data.

2.5 Foreseeable improper use

Improper use of the product invalidates all warranty and liability claims. Any use that is counter to the purpose of the product, whether intentional or unintentional, is regarded as misuse, in particular:

- Use outside the mechanical and electrical application limits in accordance with the technical data
- Use with corrosive or explosive media, if this is not explicitly permitted
- Use outdoors
- Use after technical changes (on the inside or the outside of the product)
- Use with replacement or accessory parts that are unsuitable or are not approved

2.6 Responsibilities and warranty

Pfeiffer Vacuum shall assume no responsibilities and warranty if the operating company or a third party:

- disregards this document.
- does not use the product for its intended purpose.
- carries out any modifications to the product (conversions, changes, maintenance work, etc.) that are not listed in the corresponding operating instructions.
- operates the product with accessories that are not listed in the corresponding operating instructions.

The operator is responsible for the process media used.

2.7 Owner requirements

Safety-conscious working

1. Only operate the product in a technically flawless state.
2. Operate the product in line with its intended purpose, safety and hazard-conscious and only in compliance with these operating instructions.
3. Fulfill the following instructions and monitor the observation of the following instructions:
 - Proper use
 - Generally applicable safety instructions and accident prevention regulations
 - International, national and locally applicable standards and guidelines
 - Additional product-related guidelines and regulations
4. Only use original parts or parts approved by Pfeiffer Vacuum.
5. Keep the operating instructions available at the place of installation.
6. Ensure personnel qualification.

2.8 Personnel qualification

The work described in this document may only be carried out by persons who have appropriate professional qualifications and the necessary experience or who have completed the necessary training as provided by Pfeiffer Vacuum.

Training people

1. Train the technical personnel on the product.
2. Only let personnel to be trained work with and on the product when under the supervision of trained personnel.
3. Only allow trained technical personnel to work with the product.
4. Before starting work, make sure that the commissioned personnel have read and understood these operating instructions and all applicable documents, in particular the safety, maintenance and repair information.

2.8.1 Ensuring personnel qualification

Specialist for mechanical work

Only a trained specialist may carry out mechanical work. Within the meaning of this document, specialists are people responsible for construction, mechanical installation, troubleshooting and maintenance of the product, and who have the following qualifications:

- Qualification in the mechanical field in accordance with nationally applicable regulations
- Knowledge of this documentation

Specialist for electrotechnical work

Only a trained electrician may carry out electrical engineering work. Within the meaning of this document, electricians are people responsible for electrical installation, commissioning, troubleshooting, and maintenance of the product, and who have the following qualifications:

- Qualification in the electrical engineering field in accordance with nationally applicable regulations
- Knowledge of this documentation

In addition, these individuals must be familiar with applicable safety regulations and laws, as well as the other standards, guidelines, and laws referred to in this documentation. The above individuals must have an explicitly granted operational authorization to commission, program, configure, mark, and earth devices, systems, and circuits in accordance with safety technology standards.

Trained individuals

Only adequately trained individuals may carry out all works in other transport, storage, operation and disposal fields. Such training must ensure that individuals are capable of carrying out the required activities and work steps safely and properly.

2.8.2 Personnel qualification for maintenance and repair**Advanced training courses**

Pfeiffer Vacuum offers advanced training courses to maintenance levels 2 and 3.

Adequately trained individuals are:

- **Maintenance level 1**
 - Customer (trained specialist)
- **Maintenance level 2**
 - Customer with technical education
 - Pfeiffer Vacuum service technician
- **Maintenance level 3**
 - Customer with Pfeiffer Vacuum service training
 - Pfeiffer Vacuum service technician

2.8.3 Advanced training with Pfeiffer Vacuum

For optimal and trouble-free use of this product, Pfeiffer Vacuum offers a comprehensive range of courses and technical trainings.

For more information, please contact [Pfeiffer Vacuum technical training](#).

2.9 Operator requirements**Observing relevant documents and data**

1. Read, observe and follow this operating instruction and the work instructions prepared by the operating company, in particular the safety and warning instructions.
2. Install, operate and maintain the product only in accordance with these operating instructions.
3. Carry out all work only on the basis of the complete operating instructions and applicable documents.
4. Comply with the application limits.
5. Observe the technical data.
6. Please contact the Pfeiffer Vacuum Service Center if your questions on operation or maintenance of the product are not answered by these operating instructions.
 - You can find information in the [Pfeiffer Vacuum service area](#).

3 Product description

3.1 Function

3.1.1 Pirani measuring system

Within certain limits, the heat conductivity of gases depends on the pressure. This physical occurrence is utilized in the Pirani thermal conductivity vacuum gauge to measure the pressure. A thin wolfram wire with high temperature coefficients is used as the measuring element. With a suitable control circuit, the resistance of the wire and thus its temperature are kept constant. The electrical power that is fed to the wire is a measure for the heat power dissipated in the gas through heat conduction and therefore a measure of the pressure.

3.1.2 Cold cathode measuring system

The current that flows into a self-sustaining gas discharge with cold cathode (similar to Penning) depends on the applied voltage, the composition of the gas and the pressure. A magnetic field penetrates into the measuring room that causes the electrons on the spiral trajectories to move from the cathode towards the anode, and as a result perform a sufficient number of ionizing impacts to maintain the discharge, even with low gas density. If the anode voltage and magnetic field are now kept constant (with known gas type), the discharge current is a measure for the pressure.

3.2 Identifying the product

You will need all the data from the rating plate to safely identify the product when communicating with Pfeiffer Vacuum.

1. Read the data on the product rating plate.
2. Record this data.
3. Always have all rating plate specifications to hand.

3.3 Structure of the plug-in boards

Pirani measurement boards

When the total pressure measuring and control unit is switched on, the Pirani measuring circuits are always in operation. The analog signals are always available, irrespective of the pressure display.

Pirani measurement boards have:

- 2 independent fine vacuum measuring circuits, each with
 - 1 gauge power supply plug
 - 2 calibration potentiometers
 - 1 analog signal output

Cold cathode measurement boards

When the gauge is switched on, the analog signals are always available, irrespective of the pressure display. This measurement board has special electronics that limit the measurement current to 100 μ A. This results in a considerably longer service life for the gauges.

Cold cathode measurement boards for high vacuum have:

- 2 measuring circuits, each with
 - 1 gauge power supply plug
 - 1 analog signal output

Pirani/cold cathode measurement boards

The properties of these measurement boards correspond with the Pirani and cold cathode measurement boards. The measurement boards for the range 10^{-10} hPa (CP 300C10) and 10^{-11} hPa (CP 300T11 and CP 300T11L) have special electronics that limit the measurement current to 100 μ A. This results in a considerably longer service life for the gauges.

Pirani/cold cathode measurement boards have:

- 1 Pirani measuring circuit
- 1 cold cathode measuring circuit

Interfaces and relay boards

There are 4 types of interface and relay boards:

- 2 with RS-232-C interfaces
- 1 with RS-422 interface
- 1 with Profibus-DP interface

All 4 types each have 5 relays with potential-free switching contacts. The types each have a different switching voltage for the relays and different interface connections.

3.4 Interfaces

3.4.1 "OUTPUT" connection on PI 300 and CP 300

Each measuring circuit has an analog signal output. Suitable plugs are included with each measurement board.

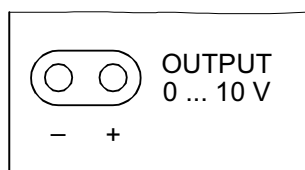


Fig. 1: "OUTPUT" connection with 2 sockets

3.4.2 "CONTROL" connection on PE 300DC9

Each measuring circuit has a control input as well as an analog signal output. A suitable plug is included with each measurement board.

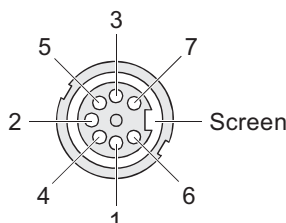


Fig. 2: "CONTROL" connection on PE 300DC9

1	Analog GND IKR 1	5	IKR ON 2
2	Digital GND	6	Analog Output
3	Analog GND	7	Analog Output
4	IKR ON 1	Gehäuse	Screen

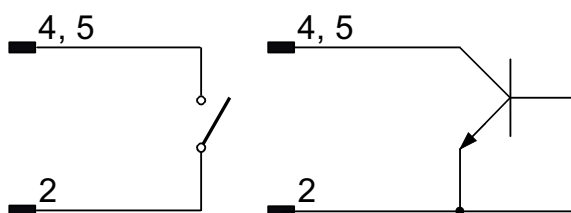


Fig. 3: Switch and logic on the "CONTROL" connection

Switching the measuring circuit on or off externally (PE 300DC9)

1. First switch the gauge on manually or automatically if you want to control the gauge via the external input.
2. Switch the measuring circuit on or off using one of the three options.
 - manual
 - automatic
 - external, via a contact on the "CONTROL" connection

3.4.3 "RELAY" connection on IF 300A/C/P

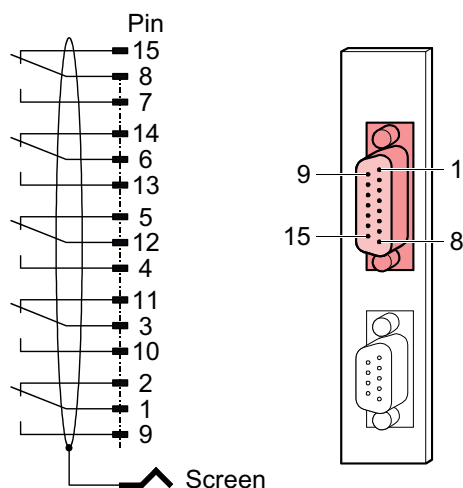


Fig. 4: "RELAY" connection on IF 300A/C/P

The figure shows the contacts in rest position.

Pins			Designation	Switching function
15	8	7	Relay 1	1
14	6	13	Relay 2	2
5	12	4	Relay 3	3
11	3	10	Relay 4	4
2	1	9	Relay 5	Error status

Tbl. 4: Switch functions on IF 300A/C/P

3.4.4 "RELAY" connection on IF 300B

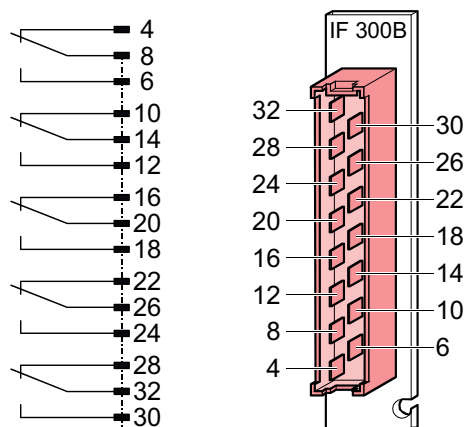


Fig. 5: "RELAY" connection on IF 300B

The figure shows the contacts in rest position.

Pins			Designation	Switching function
4	8	6	Relay 1	1
10	14	12	Relay 2	2
16	20	18	Relay 3	3

Pins			Designation	Switching function
22	26	24	Relay 4	4
28	32	30	Relay 5	Error status

Tbl. 5: Switching functions on IF 300B

3.4.5 "RS-232" connection on IF 300A

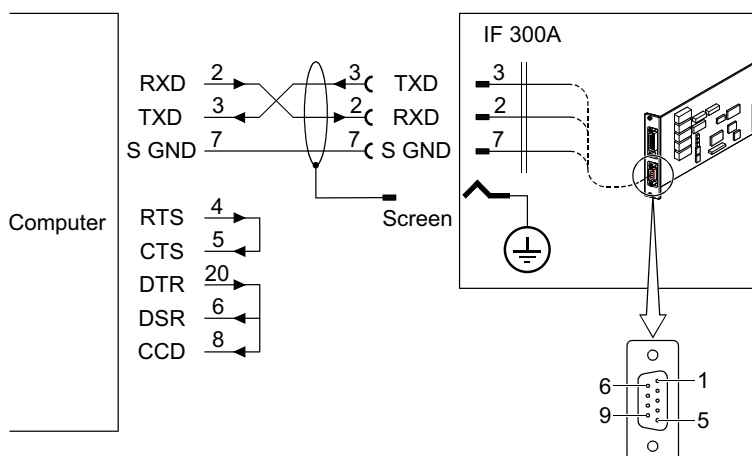


Fig. 6: "RS-232" connection on IF 300A

- 2 Receive data (RxD)
(relating to the measuring device)
- 3 Transmit data (TxD)
(relating to the measuring device)
- 7 Signal ground (S GND)

3.4.6 "RS-232" connection on IF 300B

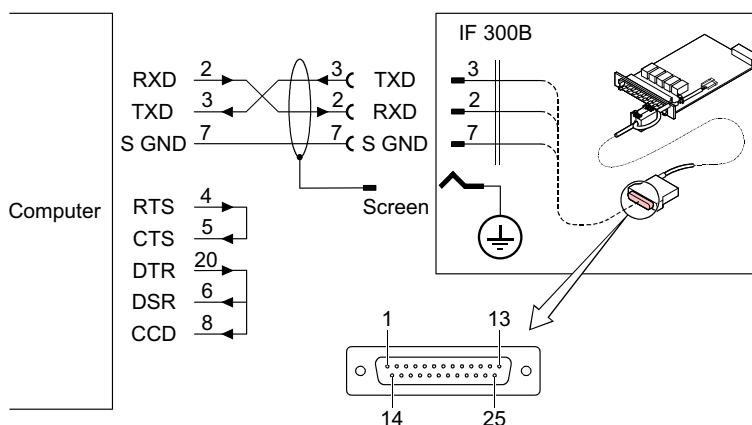


Fig. 7: "RS-232" connection on IF 300B

- 2 Receive data (RxD)
(relating to the measuring device)
- 3 Transmit data (TxD)
(relating to the measuring device)
- 7 Signal ground (S GND)

3.4.7 "RS-422" connection on IF 300C

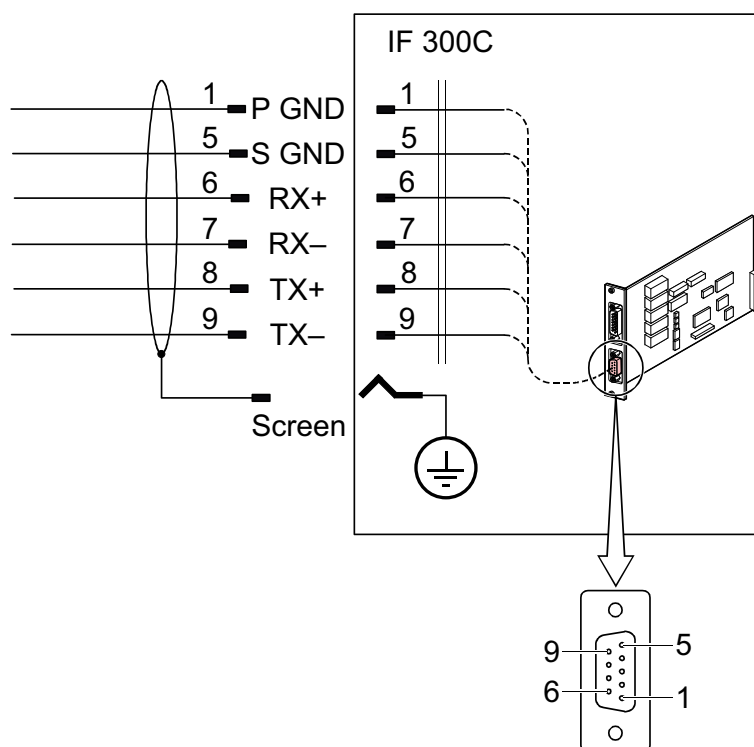


Fig. 8: "RS-422" connection on IF 300C

1	Protective ground (P GND)	7	Reception data (Rx-) (relating to the measuring device)
2, 3, 4	unassigned	8	Transmission data (Tx+) (relating to the measuring device)
5	Signal ground (S GND)	9	Transmission data (Tx-) (relating to the measuring device)
6	Reception data (Rx+) (relating to the measuring device)	Screen	Screen

3.4.8 "Profibus" connection on IF 300P



Details on the Profibus-DP interface

You can find details on the Profibus-DP interface in the corresponding communication protocol.

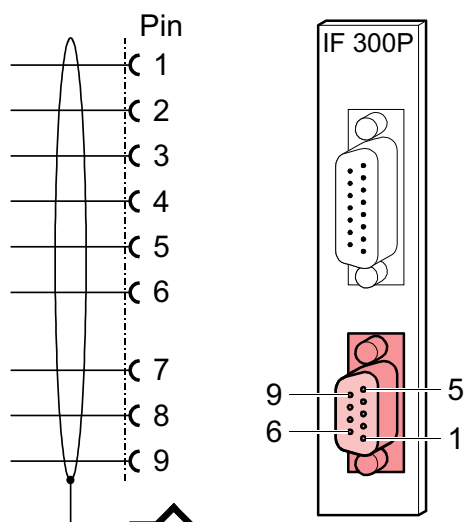


Fig. 9: "Profibus" connection on IF 300P

- | | |
|----------------------|---|
| 1 Screen | 6 VP (only required with bus end devices) |
| 2 Do not connect | 7 Do not connect |
| 3 RxD/TxD-P (Line B) | 8 RxD/TxD-N (Line A) |
| 4 CNTR-P (optional) | 9 Do not connect |
| 5 DGND | |

3.5 Scope of delivery

The shipment includes the following parts:

- Plug-in board
- Plugs for analog signals
- Folding ferrite (for IF 300B)
- Operating instructions

Unpacking the product and checking completeness of the shipment

1. Unpack the product.
2. Remove the transport fasteners, transport protection etc.
3. Store the transport fasteners, transport protection etc. in a safe place.
4. Check that the shipment is complete.
5. Ensure that no parts are damaged.

4 Transport and storage

4.1 Transporting the product

NOTICE

Damage caused by incorrect transportation

Transportation in unsuitable packaging, or failure to install all transport locks, can damage the product.

- ▶ Comply with the instructions for safe transportation.



Packing

We recommend keeping the transport packaging and original protective cover.

General information regarding safe transport

- ▶ Observe the weight specified on the transport packaging.
- ▶ Where possible, always transport or ship the product in the original transport packaging.
- ▶ Always use dense and impact-proof transport packaging for the product.
- ▶ Remove the existing protective cover and transport protections only immediately prior to installation.
- ▶ Reattach transport locks and transport protections prior to each transport.

4.2 Storing the product

NOTICE

Damage caused by improper storage

Improper storage will lead to damage to the product.

Static charging, moisture, etc. lead to defects on the electronic components.

- ▶ Comply with the instructions for safe storage.



Packing

We recommend storing the product in its original packaging.

General information for safe storage

- ▶ Store the product in a cool, dry, dust-free place, where it is protected against impacts and mechanical vibration.
- ▶ Always use dense and impact-proof packaging for the product.
- ▶ Where possible, store the product in its original packaging.
- ▶ Store electronic components in antistatic packaging.
- ▶ Maintain the permissible storage temperature.
- ▶ Avoid extreme fluctuations of the ambient temperature.
- ▶ Avoid high air humidity.
- ▶ Seal connections with the original protective caps.
- ▶ Protect the product with the original transport protection (where available).

5 Installation

5.1 Installing/removing plug-in boards

NOTICE

Damage to unit from electrostatic discharge

Electrostatic discharge damages electronic components. Defects resulting from failure to comply with this warning result in loss of any warranty claim entitlement.

- ▶ Carry out all work on ESD-protected workstations only, in compliance with the appropriate working methods.
- ▶ When the unit is open, take suitable precautions against electrostatic charges.
- ▶ Always store electronic units and components in anti-static packaging (see Storage).
- ▶ Observe EN 61340, Parts 5-1 and 5-2 – Protection of electronic devices from electrostatic phenomena.



Dummy plates for free slots

Always cover the free slots on the total pressure measuring and control unit with dummy plates for safety reasons.

Suitable dummy plates are available as accessories.

Required tools

- Flat-tip screwdriver

Accessories required

- Dummy plates, if free slots are available on the TPG.

Procedure

1. Switch the TPG off.
2. Wait at least 1 minute.
3. Disconnect all cable connections, except the mains cable of the TPG.
4. Afterwards, connect the mains cable of the TPG.
5. Unscrew the dummy plate/plug-in board.
6. Remove the dummy plate/plug-in board from the TPG.
7. Carefully insert the plug-in board into the TPG.
8. Carefully tighten the plug-in board.
 - If plug-in board screws are loose, trouble-free operation cannot be guaranteed.
9. Connect the mains cable back onto the TPG.
10. Re-establish all other cable connections to the TPG.
11. Switch the TPG back on again.

5.2 Connecting gauges

5.2.1 Connecting Pirani gauges

⚠ DANGER

Danger to life due to dangerous contact voltage

Voltages above 30 V (AC) or 60 V (DC) are considered dangerous in accordance with EN 61010. If you come into contact with dangerous contact voltage, this can result in injury through electric shocks or even death.

- ▶ Only connect the gauge to professionally grounded devices.
- ▶ Take additional safety measures on the system-side if processes in the vacuum system (e.g. flashovers) can result in dangerous voltages at the gauge connections.
- ▶ Secure the line to the gauge.

Procedure

1. Make sure that the TPG is switched off.
2. Despite being partially screened, do not lay the gauge cable parallel with cables with too much interference.
3. Connect the gauge with the measuring cable to the "IKR" connection on the measurement board.
4. Lock the plug to prevent unintentional disconnection.

5.2.2 Connecting the cold cathode gauge

⚠ DANGER

Danger to life due to dangerous contact voltage

Voltages above 30 V (AC) or 60 V (DC) are considered dangerous in accordance with EN 61010. If you come into contact with dangerous contact voltage, this can result in injury through electric shocks or even death.

- ▶ Only connect the gauge to professionally grounded devices.
- ▶ Take additional safety measures on the system-side if processes in the vacuum system (e.g. flashovers) can result in dangerous voltages at the gauge connections.
- ▶ Secure the line to the gauge.



Maximum length of coax cables

The maximum length of 100 m for coax cables applies for compliance with EN 61010. Longer lengths are not permitted without additional safety measures.

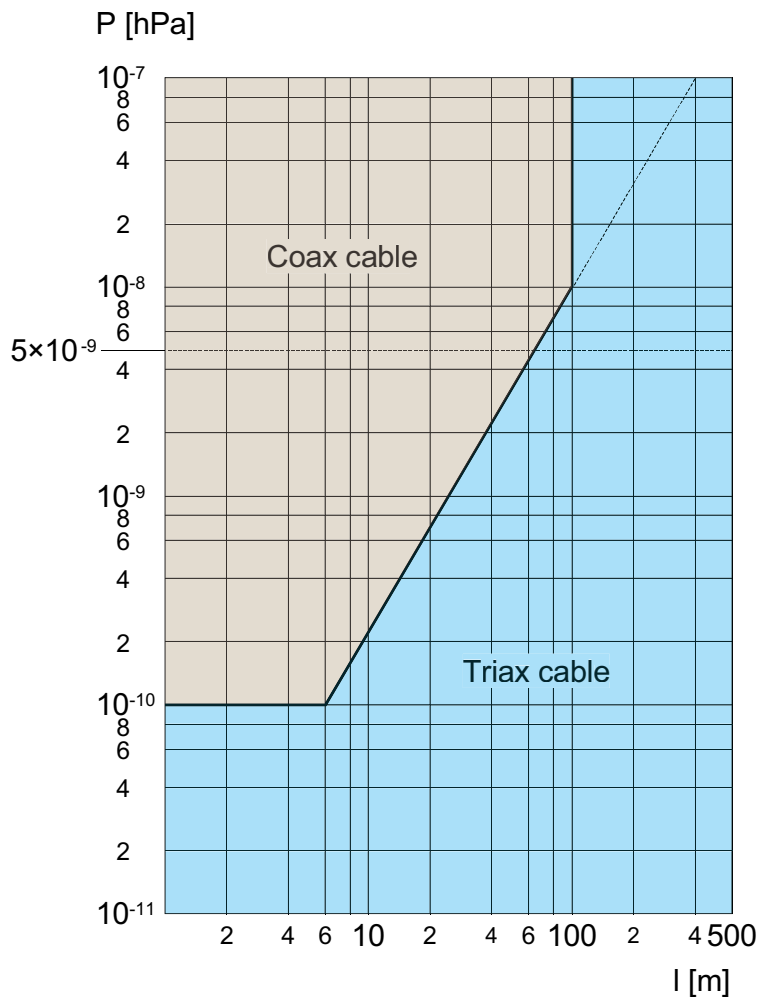
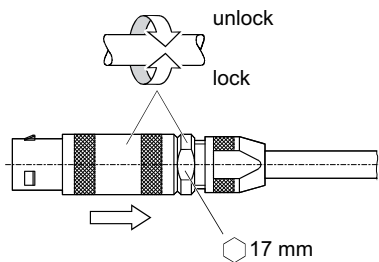


Fig. 10: Coax cable and triax cable

Required tool

- With triax cable: Open-end wrench (17 mm WAF)

**Fig. 11: Locking the triax plug****Procedure**

1. Make sure that the TPG is switched off.
2. Despite being partially screened, do not lay the gauge cable parallel with cables with too much interference.
3. Choose the suitable measuring cable type in accordance with Figure "Coax cable and triax cable".
4. Connect the gauge with the measuring cable to the "IKR" connection on the measurement board.
5. With triax cable: Lock the triax plug to prevent unintentional disconnection, loosening and touching of the inner conductor.
6. Additionally, ground the gauge if the gauge is not grounded via the recipients.

5.3 Connecting interfaces and connections

5.3.1 Connecting the analog signal to the measurement boards

Procedure

1. Only use screened cable.
2. Connect the screen to the plug sleeve.
3. If you ground both ends of the screen you prevent the occurrence of compensating currents (e.g. when connecting all devices involved to the same mains distributor).
4. Make sure that components to be connected externally contain the technical data of the plug-in board.
5. Connect the analog signal to the plugs included with the plug-in board.

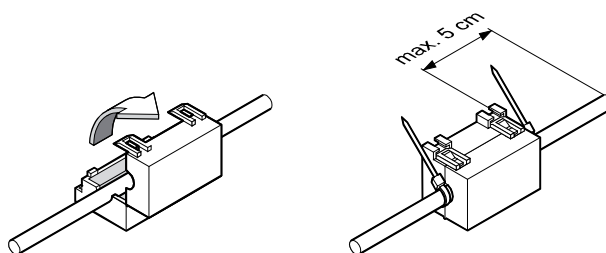
5.3.2 Connecting relays to the interface boards

Connecting relays (IF 300A/C/P)

1. Only carry out work on the plug when it is de-energized.
2. Make sure that components to be connected externally contain the technical data of the plug-in board.
3. Connect the relay with the relay plug.

**Insulated flat pin terminals for IF 300B**

With voltages < 50 V, you may use 4.8 × 0.8 mm insulated flat pin terminals. However, Pfeiffer Vacuum recommends using the relay plug, as the relay plug enables fast disconnection of the connection as well as strain relief.

**Fig. 12: Folding ferrite for IF 300B**

Connecting relays (IF 300B)

Screened cable is not required for the connection.

1. Only carry out work on the plug when it is de-energized.
2. In general, use the relay plug for voltages ≥ 50 V for safety reasons.
3. Make sure that components to be connected externally contain the technical data of the plug-in board.
4. Mount the folding ferrite in order to prevent electromagnetic interference.
 - The folding ferrite is included in the scope of delivery.
5. Maintain a distance of max. 5 cm between the folding ferrite and the relay plug.
6. Connect the relay to the relay plug or insulated flat pin terminals.

5.3.3 Connecting the "RS-232-C" interface of the IF 300A

Procedure

1. Only use screened cable.
2. Connect the screen to the plug sleeve.
3. If you ground both ends of the screen you prevent the occurrence of compensating currents (e.g. when connecting all devices involved to the same mains distributor).
4. Make sure that components to be connected externally contain the technical data of the plug-in board.
5. Use a suitable interface cable to connect the interface.

5.3.4 Connecting the "RS-232-C" interface of the IF 300B

Accessories required

- Interface cable, for IF 300 B, RS-232-C, 0.4 m

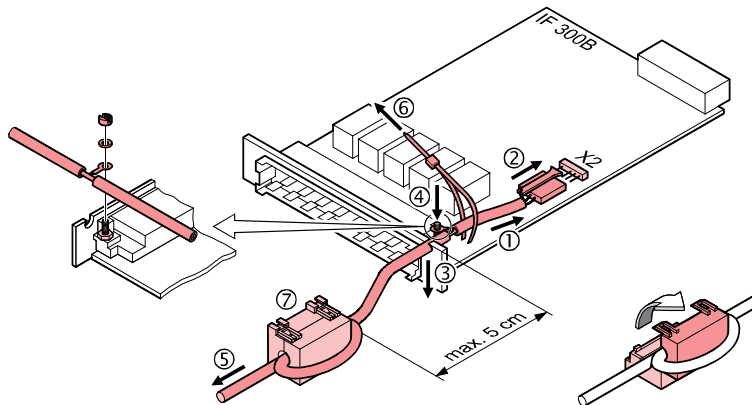


Fig. 13: Connecting the interface cable to IF 300B

Procedure

1. Guide the interface cable to connection "X2" on the interface board.
2. Fasten the plug of the interface cable to connection "X2" on the circuit board.
3. Connect the interface cable in the front plate of the interface board.
4. Tighten the interface cable using the fastening parts.
5. Pull the interface cable through the folding ferrite.
 - The folding ferrite is included in the scope of delivery.
6. Secure the interface cable to the circuit board using the cable tie.
7. Mount the folding ferrite in order to prevent electromagnetic interference.
8. Maintain a distance of max. 5 cm between the folding ferrite and the front plate.

5.3.5 Connecting the "RS-422" interface of the IF 300C

Procedure

1. Only use screened cable.
2. Connect the screen to the plug sleeve.
3. If you ground both ends of the screen you prevent the occurrence of compensating currents (e.g. when connecting all devices involved to the same mains distributor).

4. Make sure that components to be connected externally contain the technical data of the plug-in board.
5. Use a suitable interface cable to connect the interface.

5.3.6 Connecting the "Profibus-DP" interface on the IF 300P

**Details on the Profibus-DP interface**

You can find details on the Profibus-DP interface in the corresponding communication protocol.

Procedure

1. Only use the special cable provided.
2. Make sure that components to be connected externally contain the technical data of the plug-in board.
3. Connect the interface using the special cable.

6 Calibrating the Pirani measuring circuit



Maintenance in the Pfeiffer Vacuum Service Center

Pfeiffer Vacuum offers a complete maintenance service for all products.

Pfeiffer Vacuum recommends: Contact your Pfeiffer Vacuum Service Center to arrange the maintenance of defective products and components.

Utilization in other climatic conditions, long-term operation, extreme temperatures, a different mounting orientation and aging or contamination can lead to a zero point shift in the Pirani measuring circuit. This will in turn necessitate recalibration or cleaning.

Pfeiffer Vacuum has calibrated the gauge to standard values at the factory. However, as a result of individual scattering, gauge tolerances, gauge contamination or different cable lengths, you must accept deviations. You can compensate these factors with 2 trimming potentiometers in certain limits. You do not need to calibrate cold cathode measuring circuits.

Required tool

- Flat-tip screwdriver

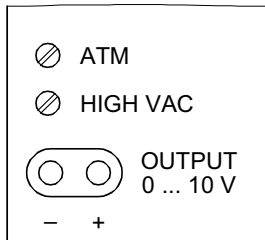


Fig. 14: ATM and HIGH VAC trimming potentiometers

Preparing for calibration

1. Perform a calibration at regular intervals.
2. Perform the calibration under the same, constant ambient conditions and with the same mounting orientation as normally used for the gauge.
3. Start up the measuring tube.

You may now perform a calibration.

Performing an HV calibration

1. Operate the gauge (for at least 10 minutes) until the gauge has reached the operating temperature.
2. Evacuate the vacuum system to pressure $< 10^{-4}$ hPa.
3. Select the measuring circuit you wish to calibrate on the TPG.
 - You can find further information on the "Sensor" mode in the TPG operating instructions.
4. Rotate the "HIGH VAC" trimming potentiometer until the pressure 8.0×10^{-4} hPa appears on the TPG display.
5. Rotate the "HIGH VAC" trimming potentiometer around a $1/4$ of a turn in an anticlockwise direction.
 - An underrange "ur 10^{-4} " appears on the TPG display.

Performing an ATM calibration

1. Operate the gauges for at least 10 minutes at atmospheric pressure.
2. Select the measuring circuit you wish to calibrate on the TPG.
 - You can find further information on the "Sensor" mode in the TPG operating instructions.
3. Rotate the "ATM" trimming potentiometer until the pressure 1.0×10^3 hPa appears on the TPG display.
4. Evacuate the vacuum system to pressure $< 10^{-4}$ hPa.
5. Check the high vacuum value.
6. Adjust the high vacuum value if necessary.

7 Malfunctions



Warranty

Malfunctioning of the equipment as a direct result of contamination or wear, as well as wear parts, is not covered by the warranty.

Disturbance	Possible cause	Remedy
Gauge cable will not connect to IKR gauge.	Old IKR gauge with MHV plug	Use a correct cable.
		Change the plug.
Gauge cable will not connect with measurement board.	Gauge cable has old plug	Use a correct cable.
		1. Disconnect the plug. 2. Replace the plug.

Tbl. 6: Disturbances during installation

Disturbance	Possible cause	Remedy
Pirani display too high	Pirani gauge contaminated	Calibrate the Pirani measuring circuit (see chapter "Calibrating the Pirani measuring circuit", page 26).
		Clean the gauge.
		Replace the gauge.
Cold cathode display too high	Plug insulation is contaminated or damp	<ul style="list-style-type: none"> Clean the insulation. Replace the plug.
	Air humidity (leakage current)	Keep the air humidity level low.
		Keep the gauge in continuous operation.
Cold cathode display too low	Cold cathode gauge contaminated	Clean the gauge.
Pirani will not calibrate.	Incorrect combination: Measurement board - gauge - cable	Choose the correct combination (see chapter "Connecting Pirani gauges", page 21).
	Gauge too contaminated	Clean the gauge.
		Replace the gauge.

Tbl. 7: Interference during operation and calibration

Disturbance	Possible cause	Remedy
Cold cathode permanently displays OR (overrange), although the pressure is within the measurement range.	Short circuit cold cathode cable/gauge	Repair the cable/gauge.
		Replace the cable/gauge.
	Cold cathode measurement board defective	Replace the cold cathode measurement board.
Cold cathode permanently displays U (underrange), although the pressure is within the measurement range.	No IKR gauge connected	Connect a gauge.
	Interruption cold cathode cable	Repair the cable.
		Replace the cable.
	Cold cathode gauge failed	Replace the gauge.
	Cold cathode measurement board defective	Replace the cold cathode measurement board.

Tbl. 8: Disturbances as a result of defects

Disturbance	Possible cause	Remedy
No communication	Pins 2 and 3 of interface cable not crossed	Use a correct cable. (see chapter "RS-232" connection on IF 300A", page 17) (see chapter "RS-232" connection on IF 300B", page 17)
	Incorrect Baud rate	Adjust the Baud rate.
	Incorrect data format	Maintain the data format in accordance with the data in the TPG basic unit.

TbI. 9: Disturbances with the RS-232-C interface

Disturbance	Possible cause	Remedy
No communication	Incorrect Baud rate	Adjust the Baud rate.
	Incorrect data format	Maintain the data format in accordance with the data in the TPG basic unit.

TbI. 10: Disturbances with the RS-422 interface

Disturbance	Possible cause	Remedy
No communication	Incorrect Baud rate set ¹⁾	Set the correct Baud rate (19200 Baud).
	Incorrect data format	Observe the Profibus-DP communication instructions.
Cycle time > 100 ms	Incorrect firmware	Check the firmware: TPG 300 firmware: 302-654 Profibus firmware: V1.5
	Incorrect Baud rate set ²⁾	Set the correct Baud rate (19200 Baud).

TbI. 11: Disturbances with the Profibus-DP interface

1) On TPG 300 basic unit, from firmware 302-654.

2) On TPG 300 basic unit, from firmware 302-654.

8 Shipping

WARNING

Risk of poisoning from contaminated products

Where products that contain harmful substances are shipped for maintenance or repair purposes, the safety of service personnel is at risk.

- ▶ Comply with the instructions for safe shipping.



Decontamination subject to charge

Pfeiffer Vacuum decontaminates products not clearly declared "Free of contamination" at your expense.

Instructions for safe shipping

- ▶ Do not ship microbiological, explosive or radioactively contaminated products.
- ▶ Observe the shipping guidelines for the participating countries and transport companies.
- ▶ Highlight any potential dangers on the outside of the packaging.
- ▶ Download the explanation for contamination at [Pfeiffer Vacuum Service](#).
- ▶ Always enclose a completed declaration of contamination.

9 Recycling and disposal

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.



Environmental protection

You **must** dispose of the product and its components in accordance with all applicable regulations for protecting people, the environment and nature.

- Help to reduce the wastage of natural resources.
- Prevent contamination.



Environmental protection

The product and its components **must be disposed of in accordance with the applicable regulations relating to environmental protection and human health**, with a view to reducing natural resource wastage and preventing pollution.

9.1 General disposal information

Pfeiffer Vacuum products contain materials that you must recycle.

- ▶ Dispose of our products according to the following:
 - Iron
 - Aluminium
 - Copper
 - Synthetic
 - Electronic components
 - Oil and fat, solvent-free
- ▶ Observe the special precautionary measures when disposing of:
 - Fluoroelastomers (FKM)
 - Potentially contaminated components that come into contact with media

9.2 Disposing of plug-in boards

Pfeiffer Vacuum plug-in boards contain materials that you must recycle.

1. Separate the components into recyclable materials.
2. Recycle the components.
3. Dispose of the product or components in a safe manner according to locally applicable regulations.

10 Service solutions by Pfeiffer Vacuum

We offer first-class service

High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

We are always focused on perfecting our core competence – servicing of vacuum components. Once you have purchased a product from Pfeiffer Vacuum, our service is far from over. This is often exactly where service begins. Obviously, in proven Pfeiffer Vacuum quality.

Our professional sales and service employees are available to provide you with reliable assistance, worldwide. Pfeiffer Vacuum offers an entire range of services, from original replacement parts to service contracts.

Make use of Pfeiffer Vacuum service

Whether preventive, on-site service carried out by our field service, fast replacement with mint condition replacement products, or repair carried out in a Service Center near you – you have various options for maintaining your equipment availability. You can find more detailed information and addresses on our homepage, in the Pfeiffer Vacuum Service section.

You can obtain advice on the optimal solution for you, from your Pfeiffer Vacuum representative.

For fast and smooth service process handling, we recommend the following:



1. Download the up-to-date form templates.
 - Explanations of service requests
 - Service requests
 - Contamination declaration



- a) Remove and store all accessories (all external parts, such as valves, protective screens, etc.).
- b) If necessary, drain operating fluid/lubricant.
- c) If necessary, drain coolant.
2. Complete the service request and contamination declaration.



3. Send the forms by email, fax, or post to your local Service Center.

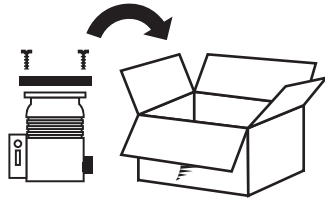


4. You will receive an acknowledgment from Pfeiffer Vacuum.

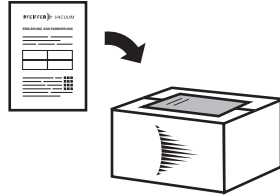
PFEIFFER VACUUM

Submission of contaminated products

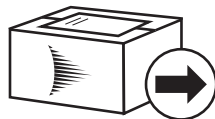
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination costs** may be incurred.



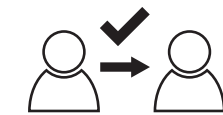
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
 - a) Neutralize the product with nitrogen or dry air.
 - b) Seal all openings with blind flanges, so that they are airtight.
 - c) Shrink-wrap the product in suitable protective foil.
 - d) Package the product in suitable, stable transport containers only.
 - e) Maintain applicable transport conditions.



6. Attach the contamination declaration to the **outside** of the packaging.



7. Now send your product to your local Service Center.



8. You will receive an acknowledgment/quotation, from Pfeiffer Vacuum.

PFEIFFER VACUUM

Our sales and delivery conditions and repair and maintenance conditions for vacuum devices and components apply to all service orders.

11 Accessories



View the [range of accessories for ModuLine](#) on our website.

11.1 Accessory information

Measuring boards

For the connection of Pirani gauges (TPR) and cold cathode gauges (IKR) for measuring atmospheric pressure (TPR) up to UHV (IKR)

Interface boards

Serial and fieldbus interfaces with switchpoints with contacts of varying loading capacity

Measurement cable and extension measurement cable

Measurement cable in standard and high temperature versions in different lengths, for connecting to a Pfeiffer Vacuum total pressure measuring and control unit or an ionization measuring device

Dummy plates

Cover plate for free slots on Pfeiffer Vacuum total pressure measuring and control units that are not fully configured

11.2 Ordering accessories

Description	Order number	suitable for measurement boards
Pirani gauge head TPR 010, DN 10 ISO-KF	PT R02 270	PI 300D, CP 300C9, CP 300C10
Pirani gauge head TPR 017, corrosion resistant, DN 16 ISO-KF	PT R13 270	PI 300DN
Pirani gauge head TPR 017, corrosion resistant, DN 16 CF-F	PT R13 271	PI 300DN
Pirani gauge head TPR 018, DN 16 ISO-KF	PT R15 010	PI 300D, CP 300C9, CP 300C10
Pirani gauge head TPR 018, DN 16 CF-F	PT R15 011	PI 300D, CP 300C9, CP 300C10
Pirani gauge head TPR 018, DN 40 CF-F	PT R15 014	PI 300D, CP 300C9, CP 300C10

Tbl. 12: Pirani gauges

Description	Order number	suitable for measurement boards
Cold cathode gauge head IKR 050, coaxial, FPM seal DN 25 ISO-KF	PT R18 500	PE 300DC9, CP 300C9, CP 300C10
Cold cathode gauge head IKR 050, coaxial, FPM seal, DN 40 ISO-KF	PT R18 501	PE 300DC9, CP 300C9, CP 300C10
Cold cathode gauge head IKR 050, coaxial, FPM-Seal, DN 40 CF-F	PT R18 502	PE 300DC9, CP 300C9, CP 300C10
Cold cathode gauge head IKR 060, coaxial, metal seal, DN 40 ISO-KF	PT R18 753	PE 300DC9, CP 300C9, CP 300C10
Cold cathode gauge head IKR 060, coaxial, metal seal, DN 40 CF-F	PT R18 751	PE 300DC9, CP 300C9, CP 300C10

Description	Order number	suitable for measurement boards
Cold cathode gauge head IKR 070, triaxial, metal seal, DN 40 ISO-KF	PT R20 501	CP 300T11, CP 300T11L
Cold cathode gauge head IKR 070, triaxial, metal seal, DN 40 CF-F	PT R20 502	CP 300T11, CP 300T11L

Tb1. 13: Cold cathode gauges

**Measuring and extension cable**

The cable is available in a standard version for temperatures up to max. 80 °C and as a high temperature table for temperatures up to 250 °C.

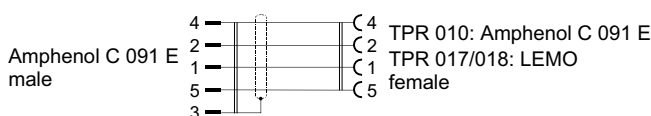


Fig. 15: Pirani measuring cable connection diagram

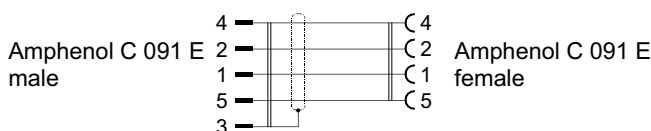


Fig. 16: Pirani extension cable connection diagram

Description	Order number
Measurement Cable, TPR 010, 2.0 m, 80 °C	PT 548 401-T
Measurement Cable, TPR 010, 3.0 m, 80 °C	PT 548 402-T
Measurement Cable, TPR 010, 6.0 m, 80 °C	PT 548 403-T
Measurement Cable, TPR 010, 10 m, 80 °C	PT 548 450-T
Measurement Cable, TPR 010, 15 m, 80 °C	PT 548 451-T
Measurement Cable, TPR 010, 20 m, 80 °C	PT 548 452-T
Measurement Cable, TPR 010, 25 m, 80 °C	PT 548 453-T
Measurement Cable, TPR 010, 30 m, 80 °C	PT 548 415-T
Measurement Cable, TPR 010, 35 m, 80 °C	PT 548 454-T
Measurement Cable, TPR 010, 40 m, 80 °C	PT 548 416-T
Measurement Cable, TPR 010, 45 m, 80 °C	PT 548 455-T
Measurement Cable, TPR 010, 50 m, 80 °C	PT 548 417-T

Tb1. 14: Measuring cable for TPR 010

Description	Order number
Measurement Cable, TPR 017/018, 3.0 m, 80 °C	PT 548 308-T
High-Temperature Measurement Cable, TPR 017/018, 3.0 m, 250 °C	PT 548 414-T
Measurement Cable, TPR 017/018, 6.0 m, 80 °C	PT 548 309-T
High-Temperature Measurement Cable, TPR 017/018, 6.0 m, 250 °C	PT 548 465-T
Measurement Cable, TPR 017/018, 10 m, 80 °C	PT 548 456-T
High-Temperature Measurement Cable, TPR 017/018, 10 m, 250 °C	PT 448 047-T
Measurement Cable, TPR 017/018, 15 m, 80 °C	PT 548 457-T
High-Temperature Measurement Cable, TPR 017/018, 15 m, 250 °C	PT 448 043-T
Measurement Cable, TPR 017/018, 20 m, 80 °C	PT 548 458-T
High-Temperature Measurement Cable, TPR 017/018, 20 m, 250 °C	PT 448 044-T
Measurement Cable, TPR 017/018, 25 m, 80 °C	PT 548 459-T

Description	Order number
Measurement Cable, TPR 017/018, 30 m, 80 °C	PT 548 460-T
Measurement Cable, TPR 017/018, 35 m, 80 °C	PT 548 461-T
Measurement Cable, TPR 017/018, 40 m, 80 °C	PT 548 462-T
Measurement Cable, TPR 017/018, 45 m, 80 °C	PT 548 463-T
Measurement Cable, TPR 017/018, 50 m, 80 °C	PT 548 464-T

Tbl. 15: Measuring cable for TPR 017 and TPR 018

Description	Order number
Extension for measurement cable, TPR 010/017/018, 10 m, 80 °C	PT 548 466-T
Extension for measurement cable, TPR 010/017/018, 20 m, 80 °C	PT 548 468-T
Extension for measurement cable, TPR 010/017/018, 30 m, 80 °C	PT 548 470-T
Extension for measurement cable, TPR 010/017/018, 40 m, 80 °C	PT 548 472-T
Extension for measurement cable, TPR 010/017/018, 50 m, 80 °C	PT 548 474-T

Tbl. 16: Extension cable for TPR 010, TPR 017 and TPR 018

Description	Order number
Measurement Cable, IKR 050/060, 3.0 m, 80 °C	PT 548 406-T
High-Temperature Measurement Cable, IKR 050/060, 3.0 m, 250 °C	PT 548 542-T
Measurement Cable, IKR 050/060, 6.0 m, 80 °C	PT 548 407-T
High-Temperature Measurement Cable, IKR 050/060, 6.0 m, 250 °C	PT 548 543-T
Measurement Cable, IKR 050/060, 10 m, 80 °C	PT 548 419-T
High-Temperature Measurement Cable, IKR 050/060, 10 m, 250 °C	PT 448 045-T
Measurement Cable, IKR 050/060, 15 m, 80 °C	PT 548 483-T
High-Temperature Measurement Cable, IKR 050/060, 15 m, 250 °C	PT 548 989-T
Measurement Cable, IKR 050/060, 20 m, 80 °C	PT 548 484-T
High-Temperature Measurement Cable, IKR 050/060, 20 m, 250 °C	PT 448 046-T
Measurement Cable, IKR 050/060, 25 m, 80 °C	PT 548 485-T
Measurement Cable, IKR 050/060, 30 m, 80 °C	PT 548 422-T
Measurement Cable, IKR 050/060, 35 m, 80 °C	PT 548 486-T
Measurement Cable, IKR 050/060, 40 m, 80 °C	PT 548 487-T
Measurement Cable, IKR 050/060, 45 m, 80 °C	PT 548 488-T
Measurement Cable, IKR 050/060, 50 m, 80 °C	PT 548 489-T
Coax cable with SHV plugs, test voltage: 6 kV DC	

Tbl. 17: Measuring cable for IKR 050 and IKR 060

Description	Order number
Measurement Cable, IKR 070, 3.0 m, 80 °C	PT 548 306-T
Measurement Cable, IKR 070, 6.0 m, 80 °C	PT 548 317-T
Measurement Cable, IKR 070, 10 m, 80 °C	PT 548 490-T
Measurement Cable, IKR 070, 15 m, 80 °C	PT 548 491-T
Measurement Cable, IKR 070, 20 m, 80 °C	PT 548 492-T
Measurement Cable, IKR 070, 30 m, 80 °C	PT 548 493-T
Measurement Cable, IKR 070, 40 m, 80 °C	PT 548 494-T
Triax cable with triax plugs, test voltage: 6 kV DC	

Description	Order number
Measurement Cable, IKR 070, 45 m, 80 °C	PT 548 495-T
Measurement Cable, IKR 070, 50 m, 80 °C	BP 229 748-T
Triax cable with triax plugs, test voltage: 6 kV DC	

Tbl. 18: Measuring cable for IKR 070

Description	Order number
D-sub plug, female, 15-pin, for IF 300 A/C, relay output	PT 441 129-T
D-sub plug, female, for IF 300 A, RS-232-C	PT 441 128-T
Relay connector, complete, for IF 300 B	PT 546 999-T
Interface cable, for IF 300 B, RS-232-C, 0.4 m	PT 548 932-T

Tbl. 19: Plugs and interface cable

Description	Order number
Blanking Panel, for IF 300	PT 441 017
Blanking Panel, for Measurement Board	PT 441 259

Tbl. 20: Dummy plates

12 Technical data and dimensions

12.1 Technical data

Parameter		Value/designation
Measuring board	PI 300D	for Pirani gauges with wolfram filament
	PI 300DN	for Pirani gauges with nickel filament
Number of measuring circuits		2
Measuring range (N ₂ equivalent)		1000 hPa to 8×10^{-4} hPa
Measuring cable length, max.		100 m
Signal output	Measurement value, analog	0 to +10 V
	Error message (error)	> 11.5 V
	Current, max.	2 mA
	Output resistance	400 Ω
Response time (10 to 90 %) with rapid pressure change	< 10^{-3} to 10^3 hPa	< 50 ms
	10^3 to < 10^{-3} hPa	< 600 ms
Connection, device side	TPR gauge	6-pin Amphenol C 091 B socket
	Signal output	\varnothing 2 mm sockets
Weight		approx. 0.14 kg

Tbl. 21: Technical data PI 300D / PI 300DN

Parameter		Value/designation
Number of measuring circuits		2
Measuring range (N ₂ equivalent)		5×10^{-3} hPa to 1×10^{-9} hPa
Measuring cable length, max.		60 ³⁾ up to 100 m
Power supply for IKR gauges	Operating voltage	3.3 kV
	Measurement current, max.	100 μ A
Signal output	Measurement value, analog	0 to +10 V
	Error message (error)	> 11.5 V
	Current, max.	2 mA
	Output resistance	400 Ω
Response time (10 to 90 %) with rapid pressure change	< 10^{-9} to 10^3 hPa	< 20 ms
	10^3 to < 10^{-9} hPa	< 20 ms
Connection, device side	IKR gauge	SHV, coax, socket
	Signal output	7-pin Amphenol C 091 B socket
Weight		approx. 0.26 kg

Tbl. 22: Technical data PE 300DC9

3) with use of the lower measurement range limit

Parameter		Value/designation
Number of measuring circuits		1 each of
Measuring range (N ₂ equivalent)	Pirani	1000 hPa to 8×10^{-4} hPa
	Cold cathode	<u>CP 300C9</u> 5×10^{-3} hPa to 5×10^{-9} hPa <u>CP 300C10</u> 5×10^{-3} hPa to 1×10^{-10} hPa <u>CP 300T11/T11L</u> 5×10^{-3} hPa to 1×10^{-11} hPa
Measuring cable length, max.	Pirani	<u>CP 300C9/C10/T11</u> 100 m <u>CP 300T11L</u> 500 m
	Cold cathode	<u>CP 300C9/C10</u> 60 ⁴⁾ up to 100 m <u>CP 300T11/T11L</u> 500 m
Power supply for IKR gauge	Operating voltage	3.3 kV
	Measurement current, max.	<u>CP 300C9</u> 600 µA <u>CP 300C10/T11/T11L</u> 100 µA
Signal output	Measurement value, analog	0 to +10 V
	Error message (error)	> 11.5 V
	Current, max.	2 mA
	Output resistance	400 Ω
Response time (10 to 90 %) with rapid pressure change	<u>Pirani</u>	
	< 10^{-3} to 10^3 hPa	< 50 ms
	10^3 to < 10^{-3} hPa	< 600 ms
	<u>Cold cathode</u>	
	< 10^{-9} to 10^3 hPa	<u>CP 300C9</u> < 10 ms <u>CP 300C10/T11/T11L</u> < 50 ms
	10^3 to < 10^{-9} hPa	<u>CP 300C9</u> < 10 ms <u>CP 300C10/T11/T11L</u> < 50 ms

4) with use of the lower measurement range limit

Parameter		Value/designation
Connection, device side	TPR gauge	6-pin Amphenol C 091 B socket
	IKR gauge	CP 300C9/C10 SHV, coax, socket CP 300T11/T11L triax, socket
	Signal output	Ø 2 mm sockets
Weight		CP 300C9 approx. 0.21 kg CP 300C10 approx. 0.23 kg CP 300T11/T11L approx. 0.25 kg

Tbl. 23: Technical data CP 300C9/C10/T11/T11L

Parameter		Value/designation
Relay	Quantity, number	5
	Contacts	1 x switching contact, potential-free, max. 50 V AC against other contacts and against ground
AC characteristics	Switching voltage, max.	50 V AC
	Switching current, max.	1.5 A
	Switching output, max.	75 VA
DC characteristics	Switching current, max.	Switching voltages > 50 V DC are not permitted for safety reasons. 0.6 A with 50 V DC 0.8 A with 40 V DC 1.5 A with 30 V DC
	Switching output, max.	-
Connection, device side		D-Sub plug, 15-pin, pins
Electrical resistance with plug		125 mΩ
Interface	Type	RS-232-C, asynchronous
	Baud rates	300, 1200, 2400, 4800, 9600
	Data format	ASCII, 1 start bit, 8 data bits, 1 stop bit, no parity bit
	Connection, device side	D-Sub plug, 9-pin, pins
	Cable length, max.	30 m
Weight		approx. 0.14 kg

Tbl. 24: Technical data IF 300A

Parameter		Value/designation
Relay	Quantity, number	5
	Contacts	1 x switching contact, potential-free, max. 250 V AC against other contacts and against ground
AC characteristics	Switching voltage, max.	250 V AC
	Switching current, max.	4 A
	Switching output, max.	1000 VA

Parameter		Value/designation
DC characteristics	Switching current, max.	0.25 A with 200 V DC 0.3 A with 140 V DC 0.4 A with 100 V DC 0.5 A with 60 V DC 0.6 A with 50 V DC 0.8 A with 40 V DC 4.0 A with 30 V DC
	Switching output, max.	120 W
Connection, device side		GdsA-H, DIN 41612, 15-pin, pins
Electrical resistance with plug		70 mΩ
Interface	Type	RS-232-C, asynchronous
	Baud rates	300, 1200, 2400, 4800, 9600
	Data format	ASCII, 1 start bit, 8 data bits, 1 stop bit, no parity bit
	Connection, device side	0.4 m cable with D-Sub plug 25-pin, pins
	Cable length, max.	30 m
Weight		approx. 0.15 kg

Tbl. 25: Technical data IF 300B

Parameter		Value/designation
Relay	Quantity, number	5
	Contacts	1 x switching contact, potential-free, max. 50 V AC against other contacts and against ground
AC characteristics	Switching voltage, max.	50 V AC
	Switching current, max.	1.5 A
	Switching output, max.	75 VA
DC characteristics	Switching current, max.	Switching voltages > 50 V DC are not permitted for safety reasons. 0.6 A with 50 V DC 0.8 A with 40 V DC 1.5 A with 30 V DC
	Switching output, max.	-
Connection, device side		D-Sub plug, 15-pin, pins
Electrical resistance with plug		125 mΩ
Interface	Type	RS-422, asynchronous
	Baud rates	300, 1200, 2400, 4800, 9600
	Data format	ASCII, 1 start bit, 8 data bits, 1 stop bit, no parity bit
	Connection, device side	D-Sub plug 9-pin, sockets
	Cable length, max.	1200 m
Weight		approx. 0.14 kg

Tbl. 26: Technical data IF 300C

Details on the Profibus-DP interface

You can find details on the Profibus-DP interface in the corresponding communication protocol.

Parameter		Value/designation
Relay	Quantity, number	5
	Contacts	1 x switching contact, potential-free, max. 50 V AC against other contacts and against ground

Parameter		Value/designation
AC characteristics	Switching voltage, max.	50 V AC
	Switching current, max.	1.5 A
	Switching output, max.	75 VA
DC characteristics	Switching current, max.	Switching voltages > 50 V DC are not permitted for safety reasons. 0.6 A with 50 V DC 0.8 A with 40 V DC 1.5 A with 30 V DC
	Switching output, max.	-
Connection, device side		D-Sub plug, 15-pin, pins
Electrical resistance with plug		125 mΩ
Interface	Type	Profibus DP
	Baud rates	≤ 12 MBaud
	Data format	(see communication protocol)
	Connection, device side	D-Sub plug 9-pin, sockets
	Cable length, max.	(see communication protocol)
Weight		approx. 0.16 kg

Tbl. 27: Technical data IF 300P

12.2 Dimensions

Dimensions in mm.

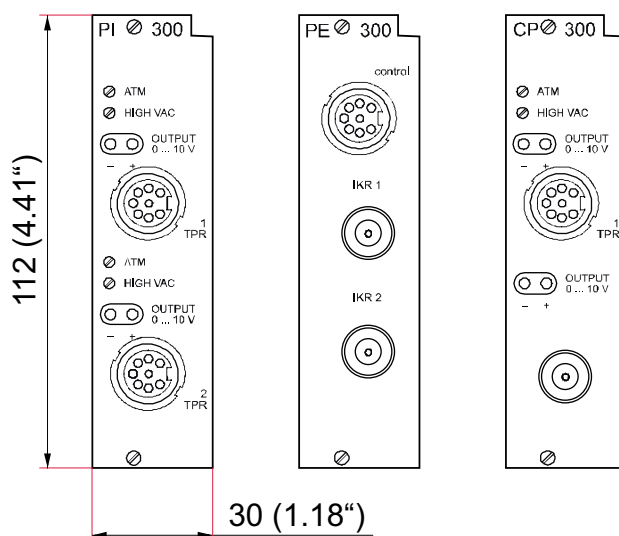


Fig. 17: Dimensions of measurement boards

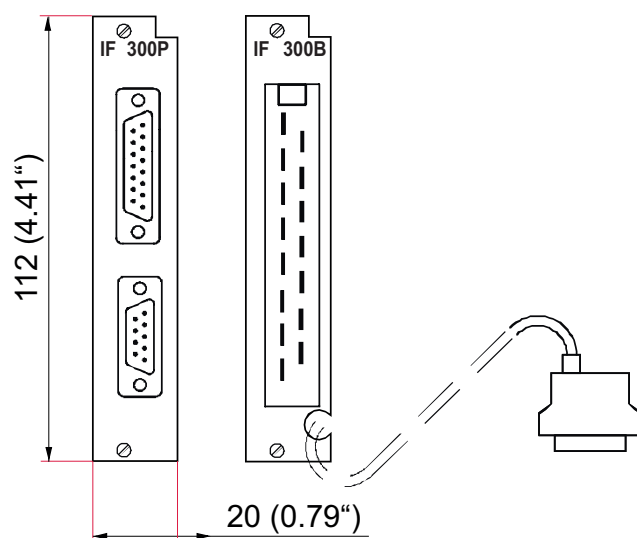


Fig. 18: Dimensions of interface and relay boards

13 Appendix

13.1 Relation: measuring signal and pressure

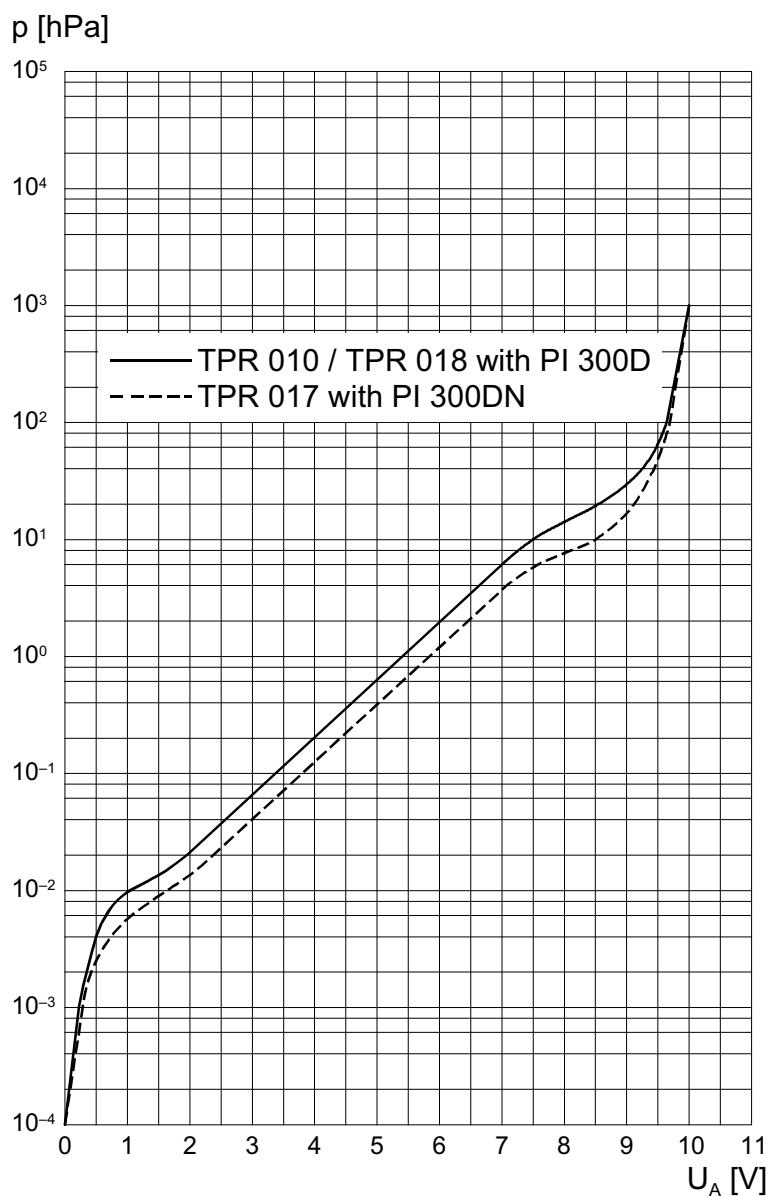


Fig. 19: Relation: Measuring signal and pressure with TPR gauges

p Pressure

U_A Measuring signal [V] (output voltage)

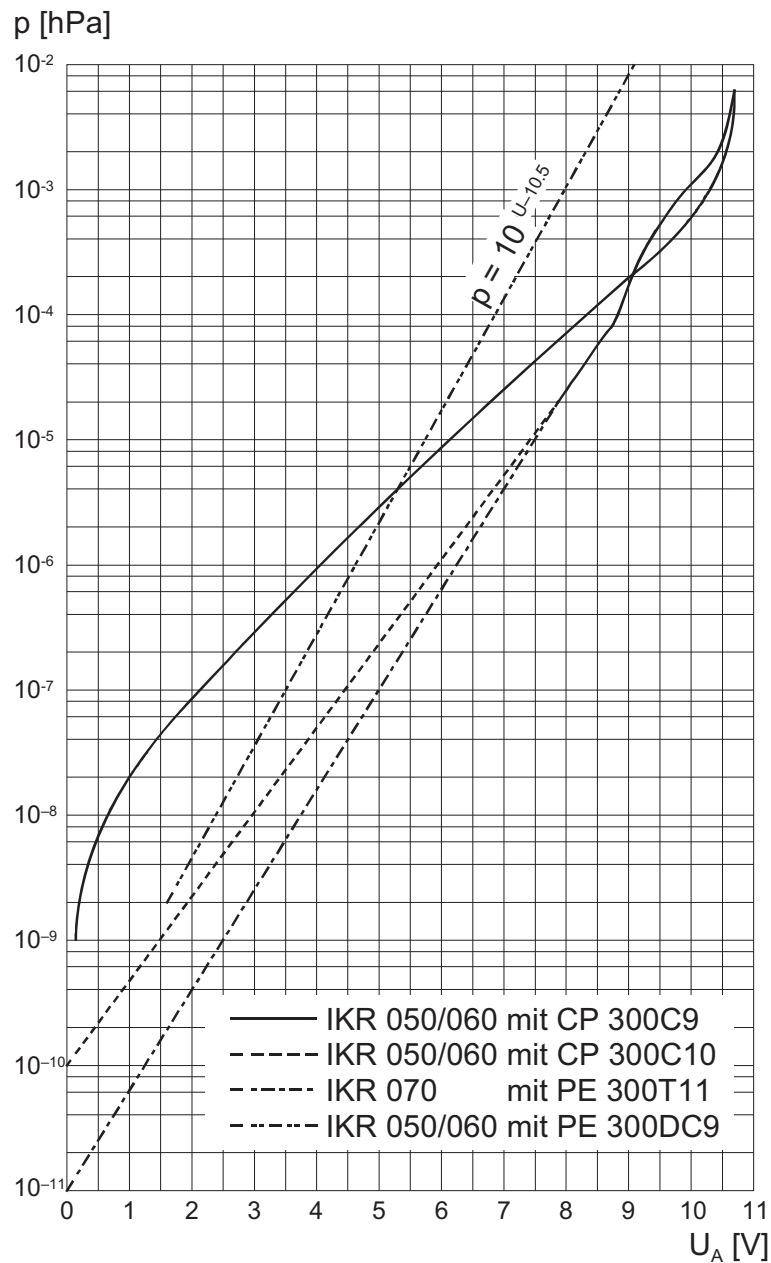


Fig. 20: Relation: Measuring signal and pressure with IKR gauges

p Pressure

U_A Measuring signal [V] (output voltage)

13.2 Gas type dependence

The measuring signal is gas type-dependent. The characteristics apply for nitrogen (N_2), oxygen (O_2), dry air and carbon monoxide (CO).

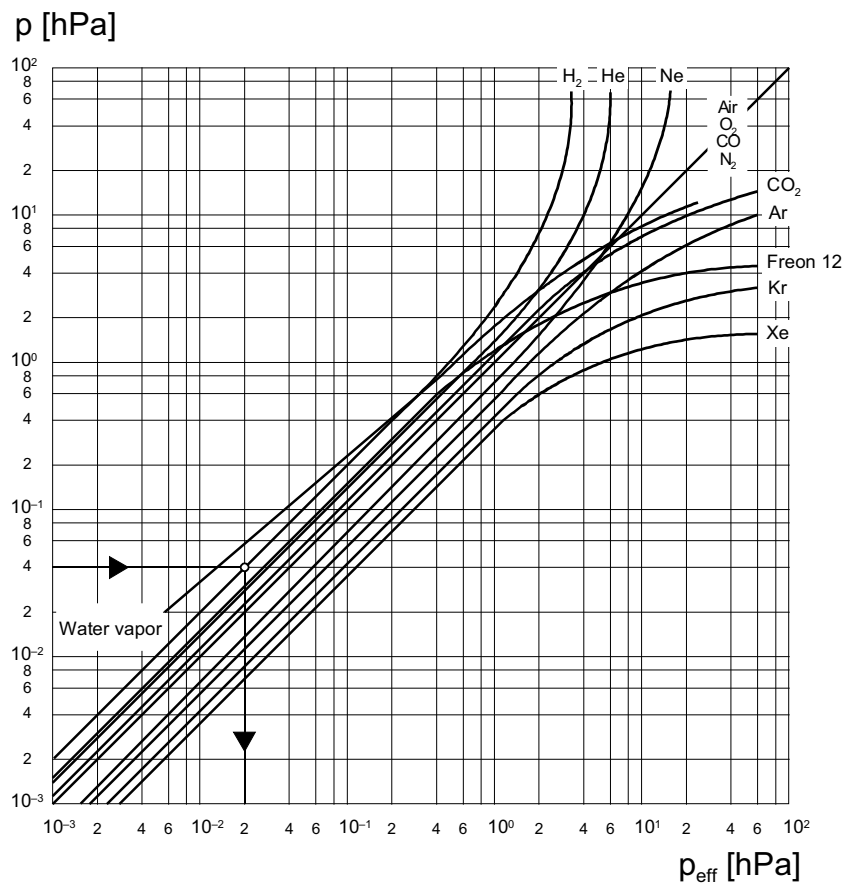


Fig. 21: Displayed pressure for TPR gauges

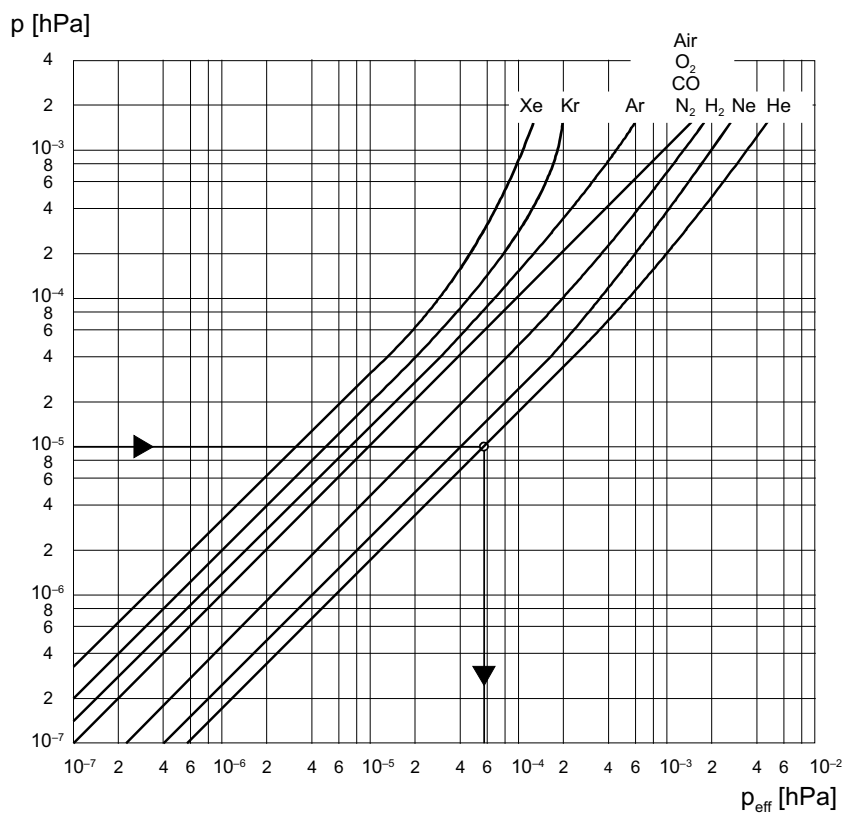


Fig. 22: Displayed pressure for IKR gauges

13.3 Units of pressure

Unit	mbar	bar	Pa	hPa	kPa	Torr / mm Hg
mbar	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
bar	1000	1	$1 \cdot 10^5$	1000	100	750
Pa	0.01	$1 \cdot 10^{-5}$	1	0.01	$1 \cdot 10^{-3}$	$7.5 \cdot 10^{-3}$
hPa	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
kPa	10	0.01	1000	10	1	7.5
Torr / mm Hg	1.33	$1.33 \cdot 10^{-3}$	133.32	1.33	0.133	1
1 Pa = 1 N/m ²						

Tbl. 28: Units of pressure and their conversion

13.4 Gas throughputs

Unit	mbar l/s	Pa m ³ /s	sccm	Torr l/s	atm cm ³ /s
mbar l/s	1	0.1	59.2	0.75	0.987
Pa m ³ /s	10	1	592	7.5	9.87
sccm	$1.69 \cdot 10^{-2}$	$1.69 \cdot 10^{-3}$	1	$1.27 \cdot 10^{-2}$	$1.67 \cdot 10^{-2}$
Torr l/s	1.33	0.133	78.9	1	1.32
atm cm ³ /s	1.01	0.101	59.8	0.76	1

Tbl. 29: Gas throughputs and their conversion

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