OPERATING INSTRUCTIONS

EN

Translation of the Original

IMR 420 | IMR 430

Bayard-Alpert and extractor gauges with bakeable measurement cables

PFEIFFER VACUUM

Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new gauge is designed to support you in your individual applications with maximum performance and without malfunctions. The name Pfeiffer Vacuum represents 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 "Ionization measurement instrument" IMG 400	BG 5520
Declaration of conformity	Part of these instructions

Tbl. 1: Applicable documents

You can find this document in the Pfeiffer Vacuum Download Center.

1.1.2 Variants

This document applies to products with the following article numbers:

Article number	Designation
PT T07 359 900	IMR 420, Bayard-Alpert gauge
PT T08 359 900	IMR 430, extractor gauge

Tbl. 2: Gauges

The part number is found on the rating plate of the product.

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

Information that relates to only one of the products is indicated accordingly.

Unlabeled illustrations correspond to the IMR 420 gauge and also apply likewise to the IMR 430 gauge.

The figures in this document are not to scale.

Dimensions are in mm unless stated otherwise.

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

The pictographs used in the document indicate useful information.

Note

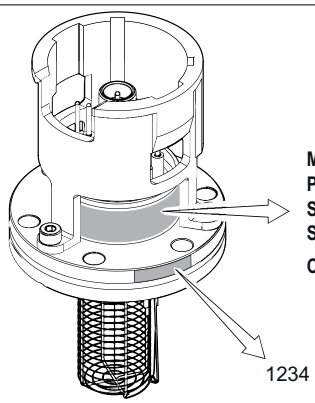
Tip

Wear laboratory gloves

Perform a visual inspection

1.3.3 Labeling on the product

This section describes all existing labeling on the product along with its meaning.



Rating plate

The rating plate is engraved on the side of the built-in measurement system.

System number

The system number is engraved on the side of the flange. The system number uniquely identifies the gauge.

1.3.4 Abbreviations

Abbreviation	Explanation
AC	Alternating current (AC)
CF	Flange: Metal-sealed connector in accordance with ISO 3669
DC	Direct current
EMC	Electromagnetic compatibility
HV	High vacuum

Abbreviation	Explanation
MSL	Mean sea level
p	Pressure
PE	Protective earth (earthed conductor)
PEEK	High temperature resistant plastic (polyetheretherketone)
PTFE	Polymer of fluorine and carbon (polytetrafluorethylene)
PE	Earthed conductor
U	Measuring signal [V] (output voltage)

Tbl. 3: Abbreviations used

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 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

Once the emission is switched on, the active voltages at the two sockets of the IMG 400 are dangerous to touch, even if only one measurement system is connected. In case of error during operation with the IMR 420 and IMR 430 gauges, a dangerous voltage is active at the measurement cable connection.

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 carry out work on the gauge or measurement cable when the IMG 400 is switched off.
► Wait at least 15 minutes after switching off the IMG 400 converter before you start the work.
► Attach the touch protection to the measurement cable connection of the IMG 400.

⚠ DANGER

Danger to life due to electric shock

An improperly grounded product is potentially fatal in the event of a fault.

- ► Connect the product galvanically with the grounded vacuum chambers.
- ► Ensure that the connection complies with the requirements of a protective connection according to EN 61010. (CF connectors comply with this requirement.)

⚠ WARNING

Risk of poisoning from toxic process gases escaping

High mechanical, chemical, or thermal stress causes leaks in the sensor. In processes involving toxic process media, there is a risk of injury and danger to life from poisoning by escaping gas in the event of overpressure in the vacuum system.

- ► Prevent high mechanical, chemical, or thermal stress from occurring.
- ► Prevent overpressure from occurring in the vacuum system.
- ► Take appropriate measures to prevent hazards or damage caused by the release of process media, such as gas supply interruption, extraction, or leak testing.

Risks during operation

⚠ DANGER

Danger to life due to dangerous contact voltage

Once the emission is switched on, the active voltages at the two sockets of the IMG 400 are dangerous to touch, even if only one measurement system is connected. In case of error during operation with the IMR 420 and IMR 430 gauges, a dangerous voltage is active at the measurement cable connection.

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 carry out work on the gauge or measurement cable when the IMG 400 is switched off.
- ► Wait at least 15 minutes after switching off the IMG 400 converter before you start the work.
- ► Attach the touch protection to the measurement cable connection of the IMG 400.

Risks during maintenance

⚠ DANGER

Danger to life due to dangerous contact voltage

Once the emission is switched on, the active voltages at the two sockets of the IMG 400 are dangerous to touch, even if only one measurement system is connected. In case of error during operation with the IMR 420 and IMR 430 gauges, a dangerous voltage is active at the measurement cable connection.

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 carry out work on the gauge or measurement cable when the IMG 400 is switched off.
- ► Wait at least 15 minutes after switching off the IMG 400 converter before you start the work.
- ► Attach the touch protection to the measurement cable connection of the IMG 400.

⚠ DANGER

Danger to life from electric shock caused by moisture ingress

Water that has entered the unit will result in personal injury through electric shocks.

- ► Only operate the unit in a dry environment.
- ► Operate the unit away from fluids and sources of moisture.
- ► Do not switch on the unit if fluid has entered it. Instead contact Pfeiffer Vacuum Service.
- ► Always disconnect the power supply before cleaning the unit.

⚠ 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.

Risks when shipping

⚠ WARNING

Risk of poisoning from contaminated products

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

- ► Comply with the instructions for safe distribution.

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

- ► Observe all applicable safety and accident prevention regulations.
- ► Check that all safety measures are observed at regular intervals.
- ► Pass on safety instructions to all other users.
- ► Do not expose body parts to the vacuum.
- ► Always ensure a secure connection to the earthed conductor (PE).
- ► Never disconnect plug connections during operation.

- ► Observe the above shutdown procedures.
- ► Keep lines and cables away from hot surfaces (> 70 °C).
- ► Do not carry out your own conversions or modifications on the device.
- ► Observe the unit protection degree prior to installation or operation in other environments.
- ► Provide suitable touch protection, if the surface temperature exceeds 70 °C.
- ► Inform yourself about any contamination before starting work.

2.4 Limits of use of product

Parameter		Value
Relative humidity of air	Annual average	≤ 65 % (non-condensing)
	at 60 days	≤ 85 % (non-condensing)
Mounting orientation		Arbitrary
Usage		Only in indoor areas
Installation altitude max.		2000 m MSL
Degree of pollution		2

Tbl. 4: Permissible ambient conditions

2.5 Proper use

The gauges are used for vacuum measurement of gases in vacuum systems with a Pfeiffer Vacuum ionization measurement instrument IMG 400.

Use the product according to its intended purpose

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

2.6 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 improper use; in particular:

- Use outside the mechanical and electrical limits of use
- Use with corrosive or explosive media, if this is not explicitly permitted
- Use for the measurement of highly flammable or combustible gases mixed with an oxidizing agent (e.g. atmospheric oxygen) within the explosion limits
- Use outdoors
- Use after technical changes (inside or outside on the product)
- Use with replacement or accessory parts that are not suitable or not approved

2.7 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.

2.7.1 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.

2.7.2 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

2.7.3 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.

3 Product description

3.1 Function

The IMR 420 gauge is a Bayard-Alpert measurement system for connecting to an IMG 400 ionization measurement instrument. The IMR 430 gauge is an extractor measurement system for connecting to an IMG 400 ionization measurement instrument. The functional principle of this passive gauge relies on the hot cathode ionization effect.

3.2 Status display

The ionization measurement instrument IMG 400 delivers information on the operating status of the gauges.

You will find details in the ionization measurement instrument IMG 400 operating instructions.

3.3 Identifying the product

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

► To ensure clear identification of the product when communicating with Pfeiffer Vacuum, always keep all of the information on the rating plate to hand.

3.4 Scope of delivery

Gauges

- Gauges
- Operating instructions

Measurement cable

- Measurement cable with plug fitted on the device side, and touch protection
- Housing with cover (included separately)
- Ion collector line
- Connecting screws (included separately)
- 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 transport

Transport in unsuitable packaging or failure to install all transport locks can result in damage to the product.

► Comply with the instructions for safe transport.

Packing

We recommend keeping the transport packaging and original protective cover.

Transport product safely

- ► 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. will lead to defects on the electronic components.

► Comply with the instructions for safe storage.

Packing

We recommend storing the product in its original packaging.

Store product safely

- ► 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 Establishing vacuum connection

⚠ DANGER

Danger to life due to electric shock

An improperly grounded product is potentially fatal in the event of a fault.

- ► Connect the product galvanically with the grounded vacuum chambers.
- ► Ensure that the connection complies with the requirements of a protective connection according to EN 61010. (CF connectors comply with this requirement.)

⚠ WARNING

Risk of poisoning from toxic process gases escaping

High mechanical, chemical, or thermal stress causes leaks in the sensor. In processes involving toxic process media, there is a risk of injury and danger to life from poisoning by escaping gas in the event of overpressure in the vacuum system.

- ► Prevent high mechanical, chemical, or thermal stress from occurring.
- ► Prevent overpressure from occurring in the vacuum system.
- ► Take appropriate measures to prevent hazards or damage caused by the release of process media, such as gas supply interruption, extraction, or leak testing.

NOTICE

Impairment from contamination and damage

Touching the devices or components with bare hands increases the desorption rate and leads to incorrect measurements. Dirt (e.g. dust, fingerprints, etc.) and damage impair the function.

- ► When working on high or ultra high vacuum systems, always wear clean, lint-free and powder-free laboratory gloves.
- ► Only use clean tools.
- ► Make sure that the connection flanges are free of grease.
- ► Remove protective caps and protective covers from flanges and connections only when necessary.
- ► Carry out all work in a well lit area.

NOTICE

Damage due to sudden gas flow

A sudden flow of gas will cause permanent mechanical damage to the cathode.

- ► Do not install the gas inlet systems (e.g., venting valves) in the immediate vicinity of the measurement system.

Prerequisites

- Appropriate ambient conditions
- Operating temperature within permissible range
- Adequate room available for electrical connection (e.g. permissible bending radii for cables)

Recommendations

- ► If possible, make sure that the gauge is not exposed to any oscillations, impacts or vibrations during operation, as this will lead to deviations in the measured values.
- ► Ensure visual separation if multiple measurement systems are installed on one component (T-piece or cross piece). Measurement systems can influence each other and deliver faulty results.

Procedure

1. Remove the protective cap and store in a safe place.
2. Install the gauge on the vacuum system with vacuum components from the Pfeiffer Vacuum Components Shop.

5.2 Establishing electric connection

⚠ DANGER

Danger to life due to dangerous contact voltage

Once the emission is switched on, the active voltages at the two sockets of the IMG 400 are dangerous to touch, even if only one measurement system is connected. In case of error during operation with the IMR 420 and IMR 430 gauges, a dangerous voltage is active at the measurement cable connection.

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 carry out work on the gauge or measurement cable when the IMG 400 is switched off.
- ► Wait at least 15 minutes after switching off the IMG 400 converter before you start the work.
- ► Attach the touch protection to the measurement cable connection of the IMG 400.

⚠ DANGER

Danger to life due to electric shock

An improperly grounded product is potentially fatal in the event of a fault.

- ► Connect the product galvanically with the grounded vacuum chambers.
- ► Ensure that the connection complies with the requirements of a protective connection according to EN 61010. (CF connectors comply with this requirement.)

5.2.1 Removing gauge

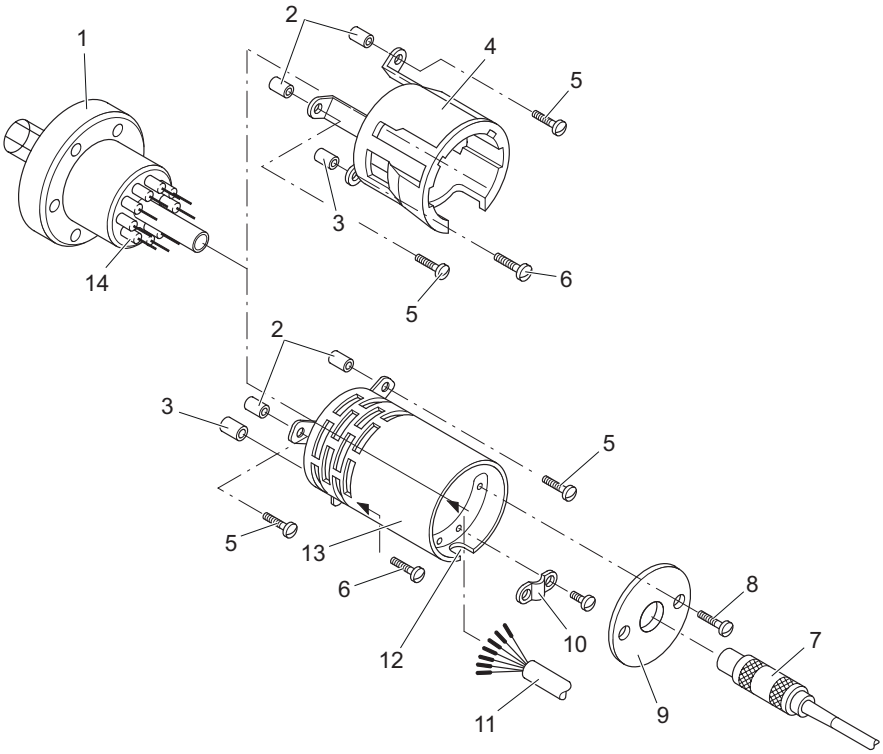


Fig. 1: Individual parts of the gauge

1	Built-in measuring system	8	Countersunk screws (M3× 15)
2	Spacer for cylinder screw M3	9	Cover
3	Spacer for cylinder screw M4	10	Strain relief incl. fixing screw
4	Connector guide	11	Bakeable measurement cable
5	Cylinder screw M3	12	Cable guide
6	Cylinder screw M4	13	Housing
7	Ion collector line (coax)	14	Insulators (10×)

The gauge must be disassembled to connect the bakeable measurement cable.

Spacers

The distance between the flange of the built-in measurement system and the connector guide is greater in the case of the built-in measurement system for the IMR 420 gauges. This is why 3 spacers are inserted between the flange of the built-in measurement and the connector guide.

Procedure

1. Unscrew the countersunk screws (M3×15) from the cover.
2. Remove the cover.
3. Unscrew the M3 and M4 cylinder screws from the built-in measurement system.
4. Remove the connector guide.
   – The positioning of the connector guide is defined on the built-in measurement system due to the different screw diameters.

5.2.2 Connecting bakeable measurement cable to gauge flange

Prerequisite

- Gauge removed

Required measurement cable

- Measurement cable for the Pfeiffer Vacuum ionization measurement instrument IMG 400

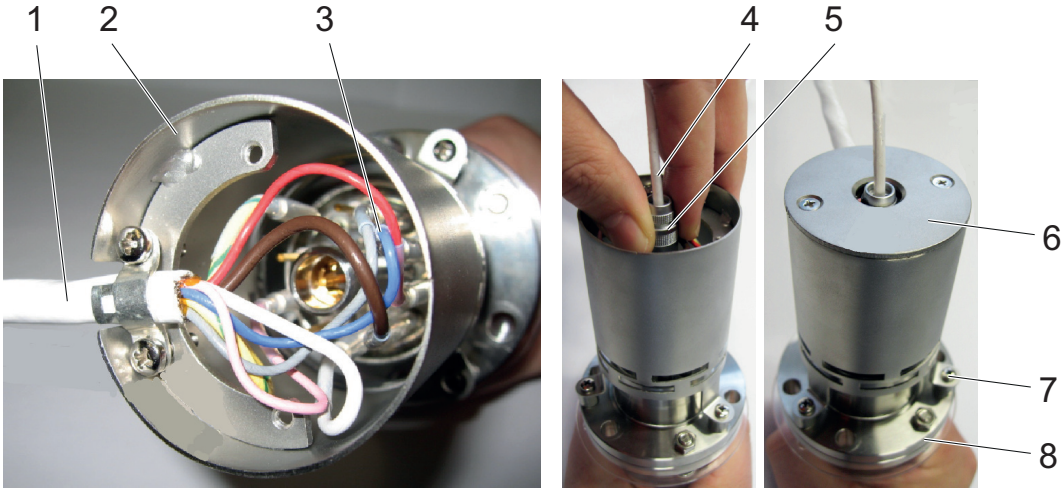


Fig. 2: Connecting bakeable measurement cable to gauge flange

1 Bakeable measurement cable
2 Housing
3 Power supply plug
4 High-temperature cable/ion collector line
5 Plug
6 Cover
7 Cylinder screws M3 and M4, and spacers
8 Flange of built-in measurement system

Procedure

1. Pull the housing over the high-temperature cable over the power supply plugs so that the power supply plugs can then be screwed back onto the flange of the built-in measurement system.
2. Connect the bakeable measurement cable to the gauge.
   – The wires of the bakeable measurement cable are color coded.
3. Lock the plug.
4. Screw the housing onto the flange of the built-in measurement system using the M3 and M4 cylinder screws and the spacers.
5. Fixate the entire cable bundle with the strain relief.
6. Push the ion collector line into the center of the gauge.
7. Fasten the cover with the countersunk screws (M3× 15).

5.2.3 Connecting gauge with bakeable measurement cable to IMG 400

NOTICE

Damage due to bending contacts

If you apply bending force to the pin contacts during assembly, you will skew or bend the contacts and, by doing so, cause damage to or a leakage of the system.

► Make sure that all pins are aligned parallel and straight to avoid damaging the current feed-through.

Prerequisite

- Bakeable measurement cable connected to gauge flange

Carrying out hard vacuum or leak detection

Pfeiffer Vacuum recommends: Before connecting, evacuate the vacuum chamber and carry out a leak test.

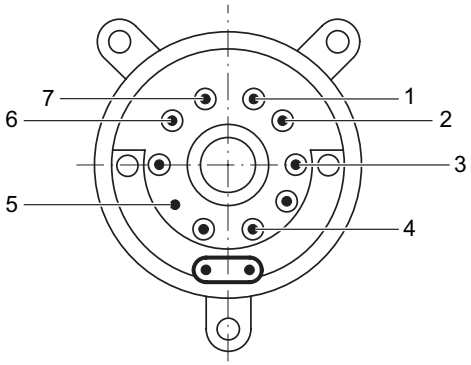


Fig. 3: Contact assignments in view of built-in measurement system

1	red	5	yellow/green
2	brown	6	gray
3	white	7	blue
4	pink		

Color	IMR 420	IMR 430
yellow/green	PE [1]	PE [2]
gray	- [3]	Bridge
blue		Reflector
red	Anode	Anode
brown	Cathode	Cathode
white		
pink	- [4]	Bridge

Tbl. 5: Contact colors

Procedure

1. Connect the gauge to the Pfeiffer Vacuum ionization measurement instrument IMG 400.
2. Pay attention to correct assignment of the contacts.

1) Longest pin = earthed conductor. For orientation purposes during installation.
2) Longest pin = earthed conductor. For orientation purposes during installation.
3) This function is not available with the IMR 420, however, the contact is required.
4) This function is not available with the IMR 420, however, the contact is required

6 Operation

Halogen gases in the process

If halogen gases such as fluorine, chlorine, bromine, and iodine or their compounds occur, the yttrium oxide layer of the iridium cathode will be removed within a very short time. As a result, the cathodes will burn out.

Incorrect measurements due to stray currents

Moisture on the insulators, e.g., condensate, can lead to incorrect measurements due to stray currents.

Baking out components

► Bake out the components taking the permissible temperatures into account.

7 Maintenance

⚠ 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.

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.

Cleaning in the Pfeiffer Vacuum Service Center

Pfeiffer Vacuum recommends: Contact your nearest Pfeiffer Vacuum Service Center to arrange the cleaning of heavily-soiled products and components.

Warranty claim

Opening the device during the warranty period or damaging/removing the warranty seal will void the warranty.

Contact the Pfeiffer Vacuum Service Center in the event of process-related shorter maintenance intervals.

Warranty

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

First read through the sections completely

Read the section with the work instructions through completely first before you commence with work.

7.1 Calibrating the gauge

Pfeiffer Vacuum has calibrated the gauge at the factory. You will find the gauge calibration factor on the rating plate.

Adjusting sensitivity

- ► Set the sensitivity of the IMG 400 with the gauge parameter "CAL_FULL".
  - – You will find this information in the operating instructions for the IMG 400.

7.2 Replacing cathode

Pfeiffer Vacuum supplies the replacement cathode mounted on a plate under a cover hood and with the required 0.89 mm screwdriver.

Calibration values

The calibration values stated for the built-in measuring system can no longer be guaranteed after replacing the cathode. The deviations can be up to 15%.

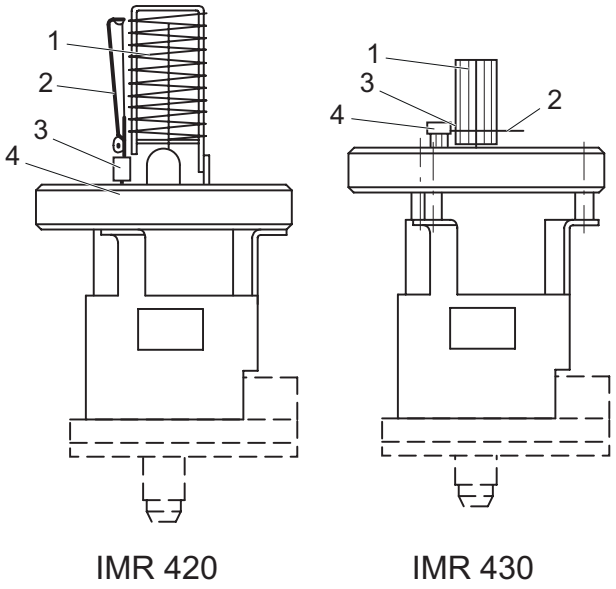


Fig. 4: Replacing cathode

1	Anode	3	Terminal
2	Cathode	4	Hexagon socket screw

Procedure

1. Replace the cathode in a dust-free room.
2. Switch the IMG 400 off.
3. Disconnect the measurement cable from the built-in measuring system of the gauge.
4. Remove the built-in measuring system of the gauge from the system.
5. Undo the hexagon socket screws of the cathode.
6. Remove the defective cathode from both clamps.
7. Take the replacement cathode out of the packing.
8. Remove the replacement cathode from the pins in the same way.
9. Install the replacement cathode as parallel as possible to the anode at the position of the old cathode.

8 Shipping

⚠ WARNING

Risk of poisoning from contaminated products

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

► Comply with the instructions for safe distribution.

Decontamination subject to charge

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

Ship product safely

► 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.

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 Dispose of gauges

Pfeiffer Vacuum gauges contain materials that you must recycle.

1. Decontaminate the components that come into contact with process gases.
2. Separate the components into recyclable materials.
3. Recycle the non-contaminated components.
4. Dispose of the product or components in a safe manner according to locally applicable regulations.

10 Service solutions by Pfeiffer Vacuum

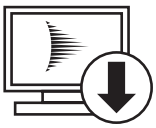
We offer first-class service
High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

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 section.

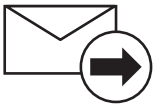
You can obtain advice on the optimal solution for you, from your Pfeiffer Vacuum representative.
For fast and smooth service process handling, we recommend the following:



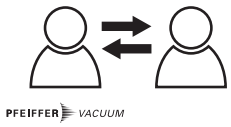
1. Download the up-to-date form templates.
   - Explanations of service requests
   - Service requests
   - Contamination declaration

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.

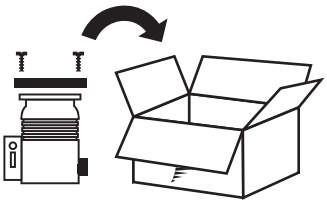


3. Send the forms by email, fax, or post to your local Service Center.

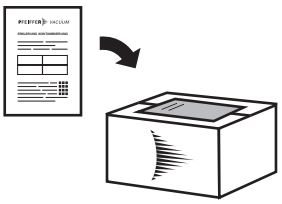


4. You will receive an acknowledgment from Pfeiffer Vacuum.

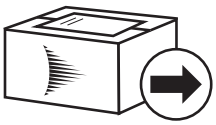
Submission of contaminated products
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree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



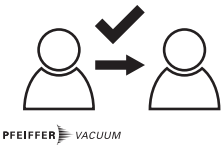
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
a) Neutralize the product with nitrogen or dry air.
b) Seal all openings with blind flanges, so that they are airtight.
c) Shrink-wrap the product in suitable protective foil.
d) Package the product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

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

11 Spare parts

Ordering spare parts

- ► Have the part number to hand, along with other details from the rating plate as required.
- ► Install original spare parts only.

Order number	Selection field
PT 120 020 -T	Replacement cathode for IMR 420 (incl. 0.89 mm screwdriver)
PT 120 021 -T	Replacement cathode for IMR 430 (incl. 0.89 mm screwdriver)

Tbl. 6: Replacement cathodes

12 Accessories

View the range of accessories for ModulLine on our website.

12.1 Accessory information

Measurement cable
Measurement cables of different lengths, for connecting to a Pfeiffer Vacuum IMG 400 ionization measurement instrument

12.2 Ordering accessories

Part number	Selection field
PT 548 332 -T	Measurement cable IMG 400 for IMR 420 and IMR 430, 3 m
PT 548 333 -T	Measurement cable IMG 400 for IMR 420 and IMR 430, 5 m
PT 548 334 -T	Measurement cable IMG 400 for IMR 420 and IMR 430, 10 m
PT 548 338 -T	Measurement cable IMG 400 for IMR 420 and IMR 430, 50 m
PT 548 342 -T	High-temperature measurement cable IMG 400 for IMR 420 and IMR 430, 3 m
PT 548 343 -T	High-temperature measurement cable IMG 400 for IMR 420 and IMR 430, 5 m
PT 548 344 -T	High-temperature measurement cable IMG 400 for IMR 420 and IMR 430, 10 m
PT 548 348 -T	High-temperature measurement cable IMG 400 for IMR 420 and IMR 430, 50 m

Tbl. 7: Measurement cable

13 Technical data and dimensions

13.1 General

	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. 8: Conversion table: Pressure units

	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. 9: Conversion table: Units for gas throughput

13.2 Technical data

Parameter	IMR 420	IMR 430
Measuring range	$1 \times 10^{-2} – 2 \times 10^{-11}$ hPa	$1 \times 10^{-4} – 2 \times 10^{-12}$ hPa
Measuring principle	Bayard-Alpert	Extractor system
Flange connection	DN 40 CF	DN 40 CF
X-ray limit	$<1 \times 10^{-11}$ hPa	$<1 \times 10^{-12}$ hPa

Tbl. 10: Measured and pressure values

Parameter	IMR 420	IMR 430
Ion collector potential	0 V	0 V
Cathode potential	+ 80 V	+ 100 V
Anode potential	+ 220 V	+ 220 V
Reflector potential	-	+ 205 V
Emission current	0.1 – 10 mA	1.6 mA
Cathode heating current	1.5 A (typical)	1.5 A (typical)
Cathode heating voltage	3 V (typical)	3.7 V (typical)
Sensitivity for nitrogen	17 hPa^{-1} (typical)	6.25 hPa^{-1} (typical)
Bakeout power	90 mA / 480 V	45 mA / 480 V

Tbl. 11: Setting data for operation with the IMG 400

Parameter		Value
Relative humidity of air	Annual average	≤ 65 % (non-condensing)
	at 60 days	≤ 85 % (non-condensing)

Parameter	Value
Mounting orientation	Arbitrary
Usage	Only in indoor areas
Installation altitude max.	2000 m MSL
Degree of pollution	2

Tbl. 12: Ambient conditions

Parameter	Value
Operation	+20 – +80 °C
Max. flange temperature with bakeable measurement cable	250 °C
Max. ambient temperature without electric connection	400 °C
Storage	+20 – +50 °C

Tbl. 13: Temperatures

Component	IMR 420	IMR 430
Feedthrough pins	Nickel-iron (NiFe) alloy	Nickel-iron (NiFe) alloy
Insulator	Ceramic (Al_2O_3)	Ceramic (Al_2O_3)
Feedthrough plate	Nickel-iron (NiFe) alloy	Nickel-iron (NiFe) alloy
Flange	Stainless steel, rust-proof	Stainless steel, rust-proof
Cathode	Iridium (Ir), yttrium oxide (Y_2O_3)	Iridium (Ir), yttrium oxide (Y_2O_3)
Anode	Molybdenum	Stainless steel 1.4404
Ion collector	Tungsten	Tungsten
Reflector	Nickel-iron (NiFe) alloy	Nickel-iron (NiFe) alloy

Tbl. 14: Substances in contact with media

Parameter	Value
Max. bakeout temperature	200 °C (250 °C at gauge flange)
Insulation materials used	PTFE, PEEK
Length	3 m, 5 m, 10 m, 50 m

Tbl. 15: Bakeable measurement cable

13.3 Dimensions

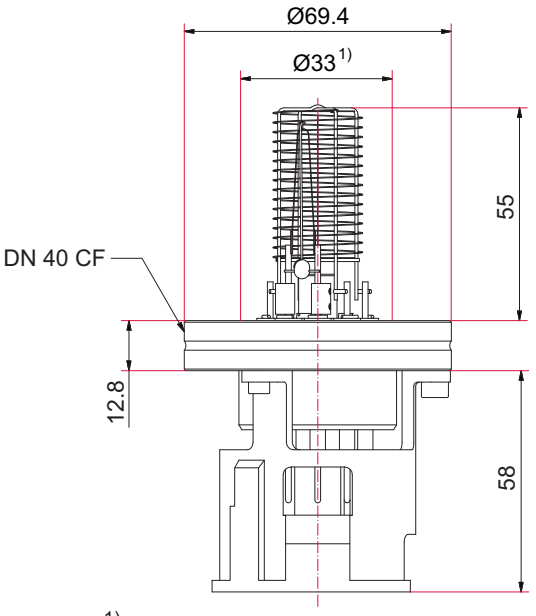


Fig. 5: Dimensions IMR 420
Dimensions in mm

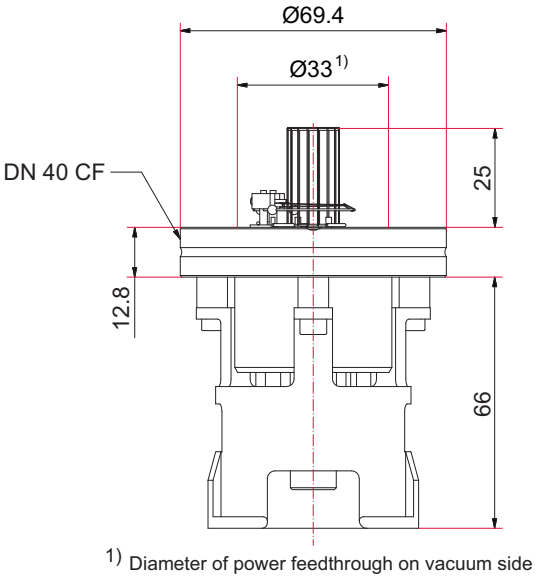


Fig. 6: Dimensions IMR 430
Dimensions in mm

EC Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Gauges

IMR 420 in operation with IMG 400

IMR 430 in operation with IMG 400

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

Low voltage 2014/35/EU

Electromagnetic compatibility 2014/30/EU

Restriction of the use of certain hazardous substances 2011/65/EU

Restriction of the use of certain hazardous substances, delegated directive 2015/863/EU

Harmonized standards and applied national standards and specifications:

DIN EN IEC 61000-6-2:2019

DIN EN IEC 61000-6-4:2020

DIN EN 61010-1:2020

DIN EN IEC 61326-1:2022

DIN EN IEC 63000:2019

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Daniel Sälzer)
Managing Director

Asslar, 2023-11-20

CE

PFEIFFER VACUUM

UK Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Gauges

IMR 420 in operation with IMG 400

IMR 430 in operation with IMG 400

We hereby declare that the listed product satisfies all relevant provisions of the following **British Directives**.

Electrical Equipment (Safety) Regulations 2016

Electromagnetic Compatibility Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Applied standards and specifications:

EN IEC 61000-6-2:2019

EN IEC 61000-6-4:2019

EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

EN IEC 61326-1:2021

EN IEC 63000:2018

The manufacturer's authorized representative in the United Kingdom and the authorized agent for compiling the technical documentation is Pfeiffer Vacuum Ltd, 16 Plover Close, Interchange Park, MK169PS Newport Pagnell.

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Daniel Sälzer)
Managing Director

Asslar, 2023-11-20

UK CA

PFEIFFER VACUUM

VACUUM SOLUTIONS FROM A SINGLE SOURCE

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:
We are the only supplier of vacuum technology that provides a complete product portfolio.

COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!
We support you with your plant layout and provide first-class on-site service worldwide.

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Are you looking for a perfect vacuum solution? Please contact us

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PFEIFFER VACUUM