

OPERATING INSTRUCTIONS

EN

Translation of the original instructions

IMR 420, IMR 430

Bayard-Alpert and Extractor Gauges, Temperature Resistant Gauge Head Cable

Sticker

Meaning of the sticker → "Calibration", (Fig. 12).



Product Identification

In all communications with Pfeiffer Vacuum, please specify the information on the product nameplate.

Pfeiffer Vacuum, D-35614 Asslar
 Typ: IMR 420 (2015/07)
 No: PTT08359900
 F-No: 1

Specimen nameplate

Validity

This document applies to products with part numbers

PT T07 359 900	(IMR 420, Bayard-Alpert Gauge)
PT T08 359 900	(IMR 430, Extractor Gauge)
PT 548 332 -T	(Gauge head cable, 3 m)
PT 548 333 -T	(Gauge head cable, 5 m)
PT 548 334 -T	(Gauge head cable, 10 m)
PT 548 338 -T	(Gauge head cable, 50 m)
PT 548 342 -T	(Gauge head cable, temperature resistant 200 °C, 3 m)
PT 548 343 -T	(Gauge head cable, temperature resistant 200 °C, 5 m)
PT 548 344 -T	(Gauge head cable, temperature resistant 200 °C, 10 m)
PT 548 348 -T	(Gauge head cable, temperature resistant 200 °C, 50 m)

The part number (No.) can be taken from the product nameplate.

If not indicated otherwise in the legends, the illustrations in this document correspond to the IMR 420 Bayard-Alpert gauge. They apply to the IMR 430, extractor gauge by analogy.

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

All dimensions in mm.

The references to diagrams, e.g. (2/3), consist of the fig. no. and the item no. in that order.

Description

The IMR 420 is a Bayard-Alpert measurement system and the IMR 430 is an extractor measurement system for connection to an IMG 400 operating unit. Operation of these passive sensors is based on the hot cathode ionisation effect.

The temperature resistant gauge head cable must not be exposed to a temperature exceeding 200 °C max. (250 °C at the flange of the sensor).

Intended Use

The IMR 420 and IMR 430 gauges may only be used for the measurement of total pressures in vacuum systems and this only in connection with the IMG 400 operating unit.

Scope of Delivery

Gauges



Gauge
Operating Instructions

Temperature resistant
gauge head cable

Gauge head cable with plug fitted on the equipment side and with touch protection
Housing with cover (supplied separately)
Ion collector cable
Mounting bolts (supplied separately)
Operating Instructions

Contents

Sticker	2
Product Identification	2
Validity	2
Description	2
Intended Use	2
Scope of Delivery	3
1 Safety	5
1.1 Symbols Used	5
1.2 Personnel Qualifications	5
1.3 General Safety Instructions	5
1.4 Liability and Warranty	5
2 Technical Data	6
3 Installation	8
3.1 Montage	8
3.2 Connecting the Temperature Resistant Gauge Head Cable	8
4 Operation	12
5 Maintenance	13
5.1 Exchanging the Cathode	13
6 Spare Parts, Accessories	14
7 Storage	15
8 Returning the Product	15
9 Disposal	16
Appendix	17
A: Conversion Table	17
B: Literature	17
EU Declaration of Conformity	18

For cross-references within this document, the symbol (→  XY) is used; for cross-references to further documents listed under 'Literature', use is made of the symbol (→  [Z]).

1 Safety

1.1 Symbols Used

Symbols for residual risks



DANGER

Information on preventing any kind of physical injury.



WARNING

Information on preventing extensive equipment and environmental damage.



Caution

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.



Notice

1.2 Personnel Qualifications



Skilled personnel

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed

1.3 General Safety Instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used.
Consider possible reactions with the product materials (→ 6).
- Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
- Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Communicate the safety instructions to all other users.

1.4 Liability and Warranty

Pfeiffer Vacuum assumes no liability and the warranty is rendered null and void if the end-user or third parties

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

2 Technical Data

General gauge head data

	IMR 420	IMR 430
Materials exposed to vacuum		
Lead-in pins		NiFe
Insulator		Al ₂ O ₃ ceramic, glazed
Pin sealing plate		NiFe
Flange		stainless steel
Cathode		iridium with yttrium oxide coating
Anode	Pt/Ir 90/10 and Mo/Pt wrapped wire	Mo and CoNiCr
Collector		tungsten
Reflector		NiFe
Flange connection		DN 40 CF
Electrode system configuration	Bayard-Alpert	Extractor system
Ambient temperature during operation		+20 ... +80 °C
Max. flange temperature with temperature resistant gauge head cable		250 °C
Max. bake-out temperature without plug		400 °C
Storage temperature		+20 ... +50 °C
Relative humidity		
Annual average		≤65% (non-condensing)
On 60 days		≤85% (non-condensing)
Use		within indoor rooms only, altitude up to 2000 meters above sea level
X-ray limit	<1×10 ⁻¹¹ hPa	<1×10 ⁻¹² hPa
Upper limit of measuring range	1×10 ⁻² hPa	1×10 ⁻⁴ hPa
Lower limit of measuring range	2×10 ⁻¹¹ hPa	2×10 ⁻¹² hPa

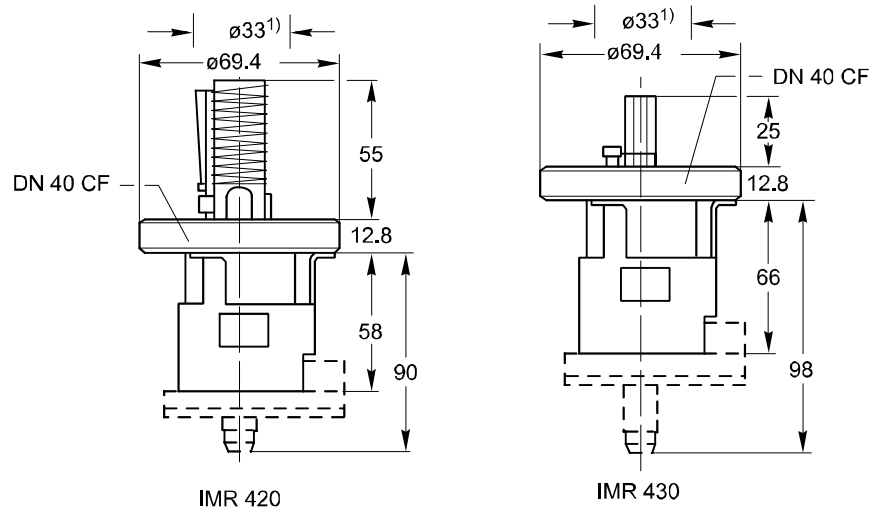
Heat resistant gauge head cable

Max. bake-out temperature	200 °C (250 °C at the gauge head flange)
Insulation materials used	PTFE, PEEK
Length	3 m, 5 m, 10 m, 50 m

Operating characteristics when used with control unit IMG 400

	IMR 420	IMR 430
Collector potential		0 V
Cathode potential	+80 V	+100 V
Anode potential	+220 V	+220 V
Reflector potential	–	+205 V
Emission current range	0.1 ... 10 mA	1.6 mA
Cathode heater current		1.5 A (typ.)
Cathode heater voltage	3 V (typ.)	3.7 V (typ.)
Sensitivity for nitrogen	17 hPa (typ.)	6.25 hPa (typ.)
Max. power when baking out	90 mA / 480 V	45 mA / 480 V

Dimensions [mm]



1) Diameter electrical feedthrough vacuum side.

Fig. 1 Dimensions in mm

3 Installation

3.1 Montage



Caution



As a rule, all ionisation measurement systems must only be operated in connection with a properly earthed pump system.

Installation and mounting may only be carried out with the operating unit switched off.



Caution



When connecting the vacuum gauges to the vacuum system it must be strictly observed that during operation the gauges are not subjected to mechanical oscillations, impact or vibrations.

The mounting position of the gauge heads has no influence on proper operation. It is not permissible to install a venting valve in the immediate vicinity. The then suddenly occurring air flow may result in mechanical damage to the sensitive cathode.

When installing several gauge heads at one common component (T-piece or cross for example) an optical separation is required. The gauge heads may not directly "see" each other. Interactions may cause incorrect measurements.

Humidity at the insulators (2/14) caused by condensing water for example, can give rise to incorrect measurements due to leakage currents.

Connecting the gauge head cable and the extension cable



Caution



Do not use force to connect the plug. When plugging in make sure first that all pins are lined up in parallel and are straight. Otherwise the current feedthrough can suffer damage.



DANGER



DANGER: Live Voltages

If during operation the IMG 400 suffers a malfunction then a live voltage may be present at the gauge head cable connection (CH 1, CH 2).

Affix the touch protection component at the IMG 400 (BNC plug). The touch protection component is supplied together with the gauge head cable.

3.2 Connecting the Temperature Resistant Gauge Head Cable



Caution



Switch the gauge off first before working at the gauge cable. After switching off, wait for at least 15 seconds.

Disassembling the gauge head for connecting the temperature resistant gauge head cable

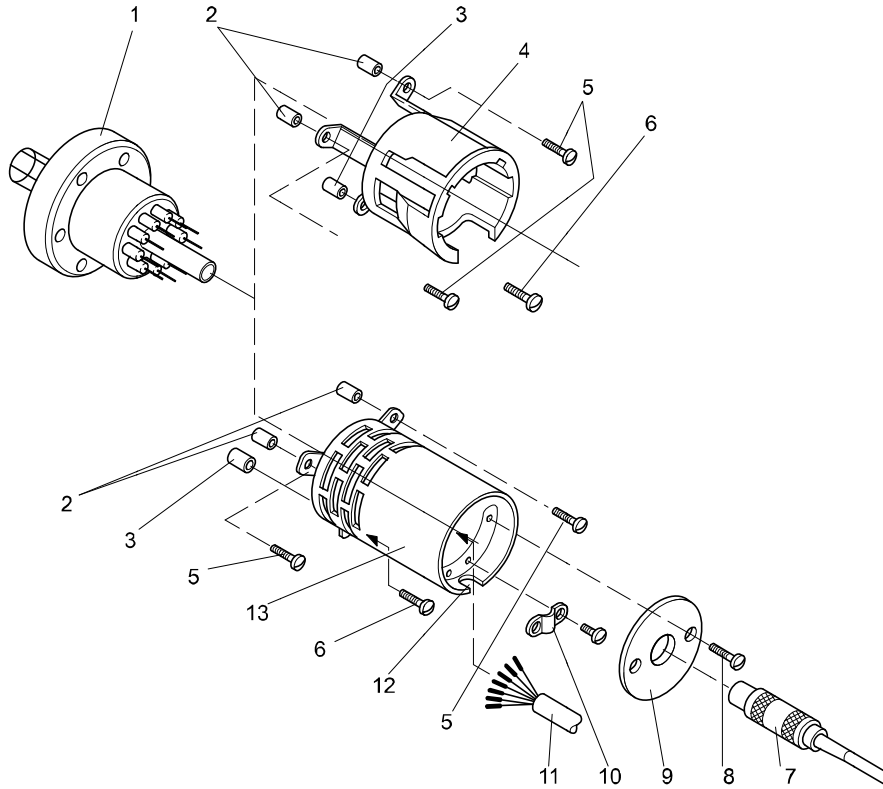
Remove the plug guide (2/4) by unscrewing the cylinder head screws (2/5 and 2/6) from the gauge head (2/1).

The gauge head IMR 420 has been designed in accordance with the VDE regulations with a greater distance between gauge head flange (2/1) and plug guide (2/4).

For this reason three spacers have been fitted between gauge head flange (2/1) and the plug guide (2/4). Positioning of the plug guide is defined through the different bolt diameters on the gauge head (2/1).



The temperature resistant gauge head cable may also be connected after the gauge head has already been installed.



- 1 Gauge head
- 2 Spacer for M3 screw
- 3 Spacer for M4 screw
- 4 Plug guide
- 5 Cylinder head screw M3
- 6 Cylinder head screw M4
- 7 Ion collector cable (coax.)
- 8 Countersunk screws (M3 × 15)
- 9 Lid
- 10 Strain relief
- 11 Temperature resistant gauge head cable
- 12 Cable groove
- 13 Housing
- 14 Insulators (10 pcs.)

Fig. 2 Connection of the gauge head

Connecting the temperature resistant gauge head cable to the flange on the gauge head

- 1** Via the high-temperature cable pull the housing (2/13) over the connection plugs so that these may thereafter be screwed back onto the gauge head flange (2/1).
- 2** Connect the temperature resistant gauge head cable to the gauge head as depicted in fig. 3. The individual wires of the gauge head cable are color-coded
- 3** Bolt the housing (2/13) onto the gauge head flange (2/1) again with the bolts (2/5 and 2/6) and the 3 spacers. Secure the entire cable with the strain relief (2/10).



- 4 Now the ion collector cable (2/7) can be inserted at the centre of the gauge head.



- 5 Secure the cover (2/9) with the countersunk screws (2/8).



Fitting the gauge head including the temperature resistant gauge head cable

The gauge head including the temperature resistant gauge head cable can be now inserted into the vacuum chamber and bolted on.



Before connecting, we recommend to pump down the system and if possible run a vacuum test or a direct leak search.

For removing or replacing the gauge head proceed in the reverse order. The plug must be unlocked in the gauge head housing, and for this reason unscrew the cover (2/9) first.



Caution



Especially note the pin assignment. Provide the connection with great care. Do not subject the pin contacts to any bending forces! (Damaging of the current feedthrough/leak)



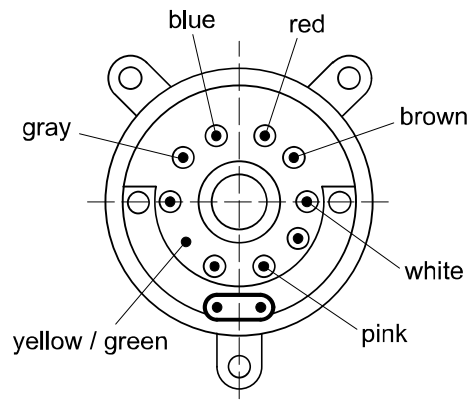
DANGER



DANGER: Live Voltages

If during operation the IMG 400 suffers a malfunction then a live voltage may be present at the gauge head cable connection (CH 1, CH 2).

Affix the touch protection component at the IMG 400 (BNC plug). The touch protection component is supplied together with the gauge head cable.



Color	IMR 430	IMR 420
ye / green	LP ²⁾	LP ²⁾
grey	jumper	- ¹⁾
blue	reflector	- ¹⁾
red	anode	anode
brown	cathode	cathode
white	cathode	cathode
pink	jumper	- ¹⁾

- 1) Function not available for IMR 400 but must be connected.
- 2) LP (longest pin) = protective earth conductor (for facilitating installation)

Fig. 3 View onto the gauge head

4 Operation

Calibration

Each IMR 420 / IMR 430 gauge head has been individually calibrated in the course of final factory testing. This ensures a high accuracy of the pressure readout.

In order to calibrate making use of the calibration factor given on the sticker in the Operating Instructions (→ "Sticker", 2), it is required to set the IMG 400 operating unit to "Cal_Full". Calibration process → Operating Instructions BG 5520 BEN for the IMG 400.

Operation



In the presence of halogen gases like fluorine, chlorine, bromine and iodine and their compounds, the yttrium oxide coating will suffer rapid wear. As a result of this, the cathodes will burn out.



Caution



Humidity at the insulators (2/14) caused by condensing water for example, can give rise to incorrect measurements due to leakage currents.

5 Maintenance



DANGER

DANGER: contaminated parts

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



Caution



Caution: vacuum component

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



Caution



Caution: dirt sensitive area

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

5.1 Exchanging the Cathode



The cathode is supplied on a plate under a cover. The cathode must only be exchanged in a room which is free of dust. Wearing of clean gloves is mandatory.

Preparation

- ❶ Switch off the operating unit.
- ❷ Detach the gauge head cable from the gauge head.
- ❸ Remove the gauge head from the vacuum system.
- ❹ After loosening the hex screws at both terminals remove the faulty cathode.
- ❺ Open the transport packaging, remove the replacement cathode in the same way and install it in the place of the old cathode.

The required 0.89 mm screwdriver is included with the replacement cathode.

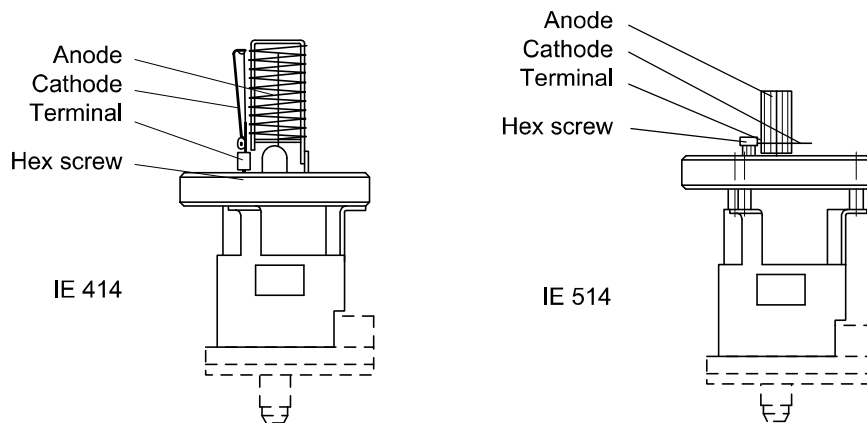


Fig. 4 View onto the gauge head

The cathode should be positioned as parallel as possible with respect to the anode. The initially applicable calibration values do not apply any longer after exchanging the cathode. Deviations up to 15 % may occur.

6 Spare Parts, Accessories

Gauge head cables

	Ordering number
Gauge head cable, 3 m with touch protection	PT 548 332 -T
Gauge head cable, 5 m with touch protection	PT 548 333 -T
Gauge head cable, 10 m with touch protection	PT 548 334 -T
Gauge head cable, 50 m with touch protection	PT 548 338 -T
Gauge head cable, temperature resistant 200 °C, 3 m with touch protection	PT 548 342 -T
Gauge head cable, temperature resistant 200 °C, 5 m with touch protection	PT 548 343 -T
Gauge head cable, temperature resistant 200 °C, 10 m with touch protection	PT 548 344 -T
Gauge head cable, temperature resistant 200 °C, 50 m with touch protection	PT 548 348 -T

Spare parts list

When ordering spare parts, always indicate:

- all information on the product nameplate
- description and ordering number according to the spare parts list

	Ordering number
Replacement cathode for IMR 420	PT 120 020 -T
Replacement cathode for IMR 430	PT 120 021 -T

7 Storage



Caution



Caution: vacuum component

Inappropriate storage leads to an increase of the desorption rate and/or may result in mechanical damage of the product.

Cover the vacuum ports of the product with protective lids or grease free aluminum foil. Do not exceed the admissible storage temperature range (→ 6).

8 Returning the Product



WARNING



WARNING: forwarding contaminated products

Products returned to Pfeiffer Vacuum for service or repair should, if possible, be free of harmful substances (e.g. radioactive, toxic, caustic or microbiological). Otherwise, the type of contamination must be declared.

Adhere to the forwarding regulations of all involved countries and forwarding companies and enclose a completed contamination declaration (Form under www.pfeiffer-vacuum.com).

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

Products not accompanied by a duly completed declaration of contamination are returned to the sender at his own expense.

9 Disposal



DANGER



DANGER: contaminated parts

Contaminated parts can be detrimental to health and environment.

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



WARNING



WARNING: substances detrimental to the environment

Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment.

Dispose of such substances in accordance with the relevant local regulations.

Separating the components

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

Contaminated components

Contaminated components (radioactive, toxic, caustic or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.

Other components

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

Appendix


A: Conversion Table

Pressure units
(vacuum technology)

	mbar	Bar	Pa	hPa	kPa	Torr mm HG
mbar	1	1×10^{-3}	100	1	0.1	0.75
Bar	1×10^3	1	1×10^5	1×10^3	100	750
Pa	0.01	1×10^{-5}	1	0.01	1×10^{-3}	7.5×10^{-3}
hPa	1	1×10^{-3}	100	1	0.1	0.75
kPa	10	0.01	1×10^3	10	1	7.5
Torr mm HG	1.332	1.332×10^{-3}	133.32	1.3332	0.1332	1

$$1 \text{ Pa} = 1 \text{ N/m}^2$$

B: Literature

-  [1] www.pfeiffer-vacuum.com
 Operating Instructions
 Ionization Gauge Controller IMG 400
 BG 5520 BEN
 Pfeiffer Vacuum GmbH, D-35614 Asslar, Deutschland

EU Declaration of Conformity



We, Pfeiffer Vacuum, hereby declare that the equipment mentioned below complies with the provisions of the Directive relating to electrical equipment designed for use within certain voltage limits 2014/35/EU, the Directive relating to electromagnetic compatibility 2014/30/EU and the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU.

Products

Bayard-Alpert and Extractor gauges
IMR 420, IMR 430
(operation with IMG 400)

Part numbers

PT T07 359 900
PT T08 359 900

Standards

- Harmonized and international/national standards and specifications:
- EN 61000-6-2:2005
(EMC: generic immunity standard for industrial environments)
- EN 61000-6-4:2007 + A1:2011
(EMC: generic emission standard for industrial environments)
- EN 61010-1:2010
(Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1:2013
(EMC requirements for electrical equipment for measurement, control and laboratory use)

Manufacturer / Signatures

Pfeiffer Vacuum GmbH, Berliner Str. 43, D-35614 Asslar
21. April 2016

Dr. Ulrich von Hülsen
Geschäftsführer

Notes

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 can support you with your plant layout and provide first-class on-site-service worldwide.

Are you looking for a
perfect vacuum solution?
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