OPERATING INSTRUCTIONS

EN

Translation of the Original

HIPACE

Heating sleeve

PFEIFFER VACUUM

Dear customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new Pfeiffer Vacuum accessory 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. With this expertise, we have acquired a multitude of skills contributing to an efficient and secure implementation of our product.

Knowing that our product must not interfere with your actual work, we are convinced that our product offers you the solution that supports you in the effective and trouble-free execution 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.

Copyright

Table of contents

1 About this manual

IMPORTANT
Read carefully before use.
Keep the manual for future consultation.

1.1 Validity

This operating instructions is a customer document of Pfeiffer Vacuum. The operating instructions describe the functions of the named product and provide the most important information for the safe use of the device. The description is written in accordance with the valid directives. The information in this operating instructions refers to the product's current development status. The document shall remain valid provided that the customer does not make any changes to the product.

1.1.1 Applicable documents

You can find these documents in the Pfeiffer Vacuum Download Center.

1.1.2 Variants

Heating sleeve for:

- HiPace 60 P
- HiPace 80
- HiPace 300
- HiPace 300 M
- HiPace 350
- HiPace 400
- HiPace 450
- HiPace 700
- HiPace 700 M
- HiPace 800
- HiPace 800 M
- HiPace 1200
- HiPace 1500
- HiPace 2300

1.2 Target group

This operating instructions is intended for persons who

- install,
- operate,

The work described in this document may be carried out only by people who have completed suitable technical training (experts), or who have received equivalent 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 Stickers on the product

This section describes all the stickers on the product along with their meaning.

PFEIFFER VACUUM D-35641 Asslar Mod.-Nr.: PM 071 272 -T Input: 230 V 50/60 Hz Output: 200 W Made in Germany 12/2019 CE	**Rating plate** (example) The rating plate is located on the relay box
	**Warning hot surface** This sticker warns of injuries caused by high temperatures in case of touching without protection during operation. Two stickers included in the scope of delivery.

Tbl. 1: Stickers on the product

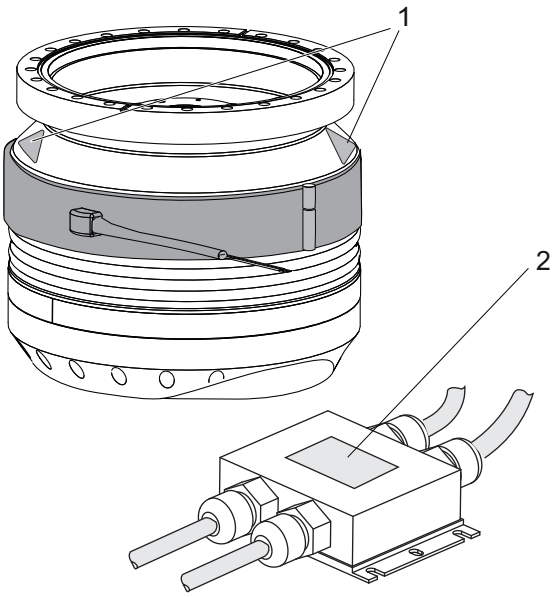


Fig. 1: Position of the stickers on the product

1 Hot surface warning sign 2 Rating plate

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

All safety instructions in this document are based on the results of the risk assessment. Where applicable, all life cycle phases of the product were taken into account.

Risks during operation

⚠ CAUTION

Danger of burns on hot surfaces

When baking out the turbopump or vacuum chamber, there is a danger of burns caused by touching, even after the housing heater has been switched off.

► Implement thermal insulation measures on the heating sleeve, pump housing, and vacuum chamber.
► Wear personal protective equipment if necessary.
► Allow the turbopump to cool down.

2.3 Safety precautions

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.
- ► Recommendation: Establish a secure connection to the earthed conductor (PE); protection class I.
- ► Never disconnect plug connections during operation.
- ► Keep lines and cables away from hot surfaces (> 70 °C).
- ► Do not carry out your own conversions or modifications on the unit.
- ► Observe the unit protection category prior to installation or operation in other environments.

2.4 Limits of use of the product

Parameter	Heating sleeve
Required design of flange	CF-F
Permissible flange temperature with heating	max. +120 °C[1)]
Ambient temperature	+12 °C to +40 °C
Protection category	IP54
Cooling	Water cooling is essential for the turbopump
Relative air humidity	≤ 85 % not condensing

Tbl. 2: Permissible ambient and operating conditions

2.5 Proper use

- ► Use the heating sleeve exclusively for the baking out of Pfeiffer Vacuum turbopumps with a stainless steel high vacuum flange.
- ► Adhere to the installation, commissioning, operating, and maintenance instructions.
- ► Do not use any accessory parts other than those recommended by Pfeiffer Vacuum.

2.6 Foreseeable misuse

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:

- Connection to pumps or equipment which are not suitable for this purpose according to their operating instructions
- Connection to equipment with exposed live parts

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.

1) Depending on the turbopump being used

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.

3 Product description

3.1 Function

The use of heating sleeves on turbopumps increases the desorption rates and reduces the pump-down times due to the final pressure being reached more quickly. A stainless steel high vacuum flange is essential for the use of heating sleeves.

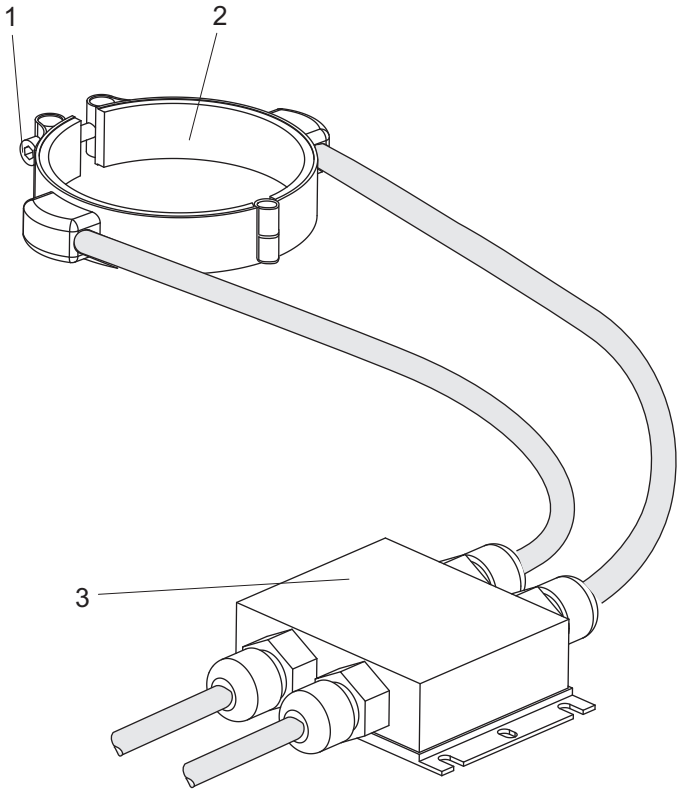


Fig. 2: Structure of heating sleeve

1 Interior hexagon socket screw
2 Heating sleeve
3 Relay box

3.2 Identifying the product

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

3.3 Scope of delivery

The scope of delivery includes the following parts:

- Heating sleeve with relay box and connecting cable
- Base plate for securing the relay box to the wall
- 2x "Hot surface" sticker
- Set of screws
- Operating instructions

4 Installation

Operational conditions for a housing heater

Heating sleeves may only be used on turbopumps with a stainless steel high vacuum flange. Use of a housing heater is only permissible in conjunction with water cooling.

- Observe the maximum permissible flange temperature at the high vacuum connection to the vacuum system supplied by the customer.
- Observe the maximum permissible rotor temperature applicable for the respective type.
- Do not exceed the maximum permissible irradiated thermal output.
- If necessary, install screening sheets (information available upon request).

Required tools

- Allen key, size 4 or 5
- Calibrated torque wrench (tightening factor ≤ 1.6)

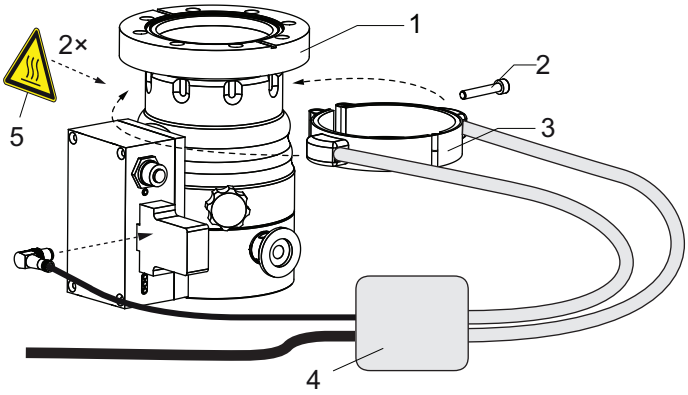


Fig. 3: Example: Assembling a heating sleeve on the HiPace 80

1 Pump housing
2 Interior hexagon socket screw
3 Heating sleeve
4 Heating relay box
5 "Hot surface" warning sticker

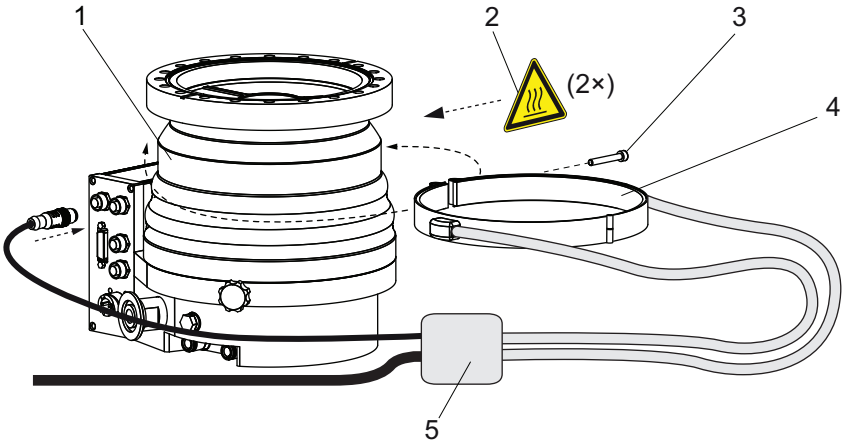


Fig. 4: Example: Assembling a heating sleeve on the HiPace 700

1 Pump housing
2 "Hot surface" warning sticker
3 Interior hexagon socket screw
4 Heating sleeve
5 Heating relay box

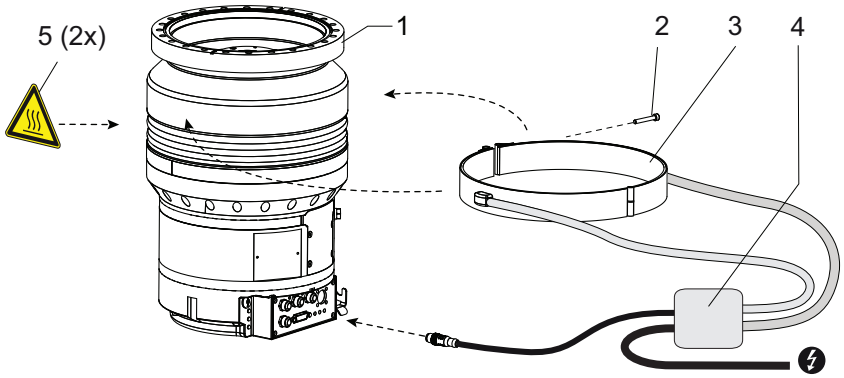


Fig. 5: Example: Assembling a heating sleeve on the HiPace 1200

1 Pump housing
2 Interior hexagon socket screw
3 Heating sleeve
4 Heating relay box
5 "Hot surface" warning sticker

Assembling a heating sleeve

1. Carefully bend out the heating sleeve at the outer clamping strap.
2. Push the sleeve onto the cylindrical section of the pump housing, either from above or from the side, depending on the respective installation situation.
3. Make sure that the heater bands are not deformed and that the sleeve is sitting flush against the housing.
4. Secure the heating sleeve onto the housing with the interior hexagon socket screw.
5. Attach the "Hot surface" sticker to the pump housing.
6. Install suitable screening sheets as protection in case the irradiated heat input exceeds the permissible maximum values.

Fixing screw thread	Tightening torque in cold condition	Tightening torque for bakeout	One-time retightening after cooling
M5	6 Nm	7 Nm	7 Nm
M6	11 Nm	12 Nm	12 Nm

Tbl. 3: Tightening torques for heating sleeve fixing screws

Connecting the control line

1. Connect the accessory control line to the electronic drive unit using the corresponding accessory connection, and screw the plug tight.
2. Check the specification in the configuration of the respective turbopump *"accessory A1"*.

Connecting to the mains power supply

- ► Make sure that the supply voltage is correct.
- ► Connect the plug on the mains cable to a suitable socket.
- ► Always ensure a secure connection to the earthed conductor (PE), protection class I.

5 Operation

⚠ CAUTION

Danger of burns on hot surfaces

When baking out the turbopump or vacuum chamber, there is a danger of burns caused by touching, even after the housing heater has been switched off.

- ► Implement thermal insulation measures on the heating sleeve, pump housing, and vacuum chamber.
- ► Wear personal protective equipment if necessary.
- ► Allow the turbopump to cool down.

NOTICE

Damage to the turbopump due to excess temperature

High process temperatures will cause damage to the pump.

- ► Always use water cooling when using the vacuum pump with a housing heating or during operation with heated vacuum chambers.
- ► Avoid additional energy input in the vacuum pump when using a housing heater.
- ► Observe the limit values specified in the ambient conditions.

Important settings and function-related variables programmed ex factory as parameters in the vacuum pump electronic drive unit. Each parameter has a three-digit number and a description. Parameter-driven operation and control is supported via Pfeiffer Vacuum displays and control units, or externally via RS-485 using Pfeiffer Vacuum protocol.

Parameter	Name	Designation	Setting
[P:001]	Heating	Heating	1 = On
[P:035]	CfgAccA1	Accessory connection A1	2 = heating

Tbl. 4: Parameter settings in the electronic drive unit of the turbopump

Information regarding commissioning of the turbopump with heating sleeve

1. Observe the cooling water flow and flow rate.

Information regarding operation

The heating duration depends on the degree of contamination in the process, as well as the final pressure to be reached.

- ► Determine the optimum bake-out time by running a pump-out to reach the prescribed final pressure.

6 Service solutions by Pfeiffer Vacuum

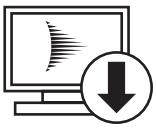
We offer first-class service
High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

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.

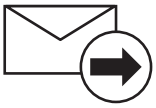
You can obtain advice on the optimal solution for you, from your Pfeiffer Vacuum representative.
For fast and smooth service process handling, we recommend the following:



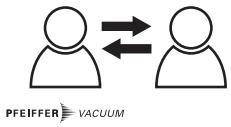
1. Download the up-to-date form templates.
   - Explanations of service requests
   - Service requests
   - Contamination declaration

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.

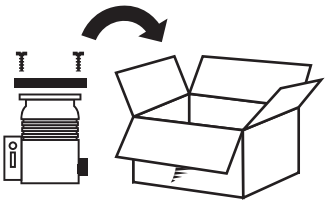


3. Send the forms by email, fax, or post to your local Service Center.

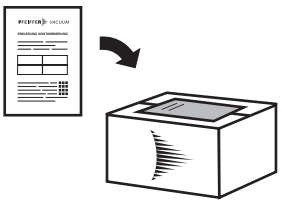


4. You will receive an acknowledgment from Pfeiffer Vacuum.

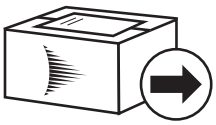
Submission of contaminated products
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree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



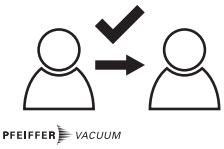
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
a) Neutralize the product with nitrogen or dry air.
b) Seal all openings with blind flanges, so that they are airtight.
c) Shrink-wrap the product in suitable protective foil.
d) Package the product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

7 Technical data

Classification	Heating sleeve for HiPace® 80, 230 V AC	Heating sleeve for HiPace® 80, 208 V AC	Heating sleeve for HiPace® 80, 115 V AC
Order number	PM 061 360 -T	PM 061 361 -T	PM 061 362 -T
Pump	HiPace 80 with TC 110	HiPace 80 with TC 110	HiPace 80 with TC 110
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	40 W	40 W	40 W
Plug	M8	M8	M8
Nominal diameter	82 mm	82 mm	82 mm

Tbl. 5: Technical data heating sleeve for HiPace 80 with TC 110

Classification	Heating sleeve, screened, for HiPace 80, 230 V AC	Heating sleeve, screened, for HiPace 80, 208 V AC	Heating sleeve, screened, for HiPace 80, 115 V AC
Order number	PM 071 260 -T	PM 071 261 -T	PM 071 262 -T
Pump	HiPace 80 with TC 110 PB	HiPace 80 with TC 110 PB	HiPace 80 with TC 110 PB
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	40 W	40 W	40 W
Plug	M8	M8	M8
Nominal diameter	82 mm	82 mm	82 mm

Tbl. 6: Technical data heating sleeve for HiPace 80 with TC 110 PB, screened

Classification	Heating sleeve for HiPace® 300, 230 V AC	Heating sleeve for HiPace® 300, 208 V AC	Heating sleeve for HiPace® 300, 115 V AC
Order number	PM 061 363 -T	PM 061 364 -T	PM 061 365 -T
Pump	HiPace 300 with TC 110	HiPace 300 with TC 110	HiPace 300 with TC 110
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	120 W	120 W	120 W
Plug	M8	M8	M8
Nominal diameter	130 mm	130 mm	130 mm

Tbl. 7: Technical data heating sleeve for HiPace 300 with TC 110

Classification	Heating sleeve, screened, for HiPace 300, 230 V AC	Heating sleeve, screened, for HiPace 300, 208 V AC	Heating sleeve, screened, for HiPace 300, 115 V AC
Order number	PM 071 263 -T	PM 071 264 -T	PM 071 265 -T
Pump	HiPace 300 with TC 110 PB	HiPace 300 with TC 110 PB	HiPace 300 with TC 110 PB
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC

Classification	Heating sleeve, screened, for HiPace 300, 230 V AC	Heating sleeve, screened, for HiPace 300, 208 V AC	Heating sleeve, screened, for HiPace 300, 115 V AC
Power consumption of heating sleeve, max.	120 W	120 W	120 W
Plug	M8	M8	M8
Nominal diameter	130 mm	130 mm	130 mm

Tbl. 8: Technical data heating sleeve for HiPace 300 with TC 110 PB, screened

Classification	Heating sleeve for HiPace® 300, 230 V AC	Heating sleeve for HiPace® 300, 208 V AC	Heating sleeve for HiPace® 300, 115 V AC
Order number	PM 061 366 -T	PM 061 367 -T	PM 061 368 -T
Pump	HiPace 300 with TC 400	HiPace 300 with TC 400	HiPace 300 with TC 400
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	120 W	120 W	120 W
Plug	M12	M12	M12
Nominal diameter	130 mm	130 mm	130 mm

Tbl. 9: Technical data heating sleeve for HiPace 300 with TC 400

Classification	Heating sleeve for HiPace® 400/700/800, 230 V AC	Heating sleeve for HiPace® 400/700/800, 208 V AC	Heating sleeve for HiPace® 400/700/800, 115 V AC
Order number	PM 061 369 -T	PM 061 370 -T	PM 061 371 -T
Pump	HiPace 400/700/800	HiPace 400/700/800	HiPace 400/700/800
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	120 W	120 W	120 W
Plug	M12	M12	M12
Nominal diameter	184 mm	184 mm	184 mm

Tbl. 10: Technical data heating sleeve for HiPace 400 – HiPace 800 with TC 400

Classification	Heating sleeve, screened, for HiPace® 300, 230 V AC	Heating sleeve, screened, for HiPace® 300, 208 V AC	Heating sleeve, screened, for HiPace® 300, 115 V AC
Order number	PM 071 266 -T	PM 071 267 -T	PM 071 268 -T
Pump	HiPace 300 with TC 400 PB | HiPace 300 M with TM 700	HiPace 300 with TC 400 PB | HiPace 300 M with TM 700	HiPace 300 with TC 400 PB | HiPace 300 M with TM 700
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	120 W	120 W	120 W
Plug	M12	M12	M12
Nominal diameter	130 mm	130 mm	130 mm

Tbl. 11: Technical data heating sleeve for HiPace 300 with TC 400 PB, screened

Classification	Heating sleeve for HiPace 350/450, 230 V AC	Heating sleeve screened, for HiPace 350/450, 115 V AC
Order number	PM 071 700 -T	PM 071 705 -T
Pump	HiPace 350/450 with TC 110/120	HiPace 350/450 with TC 400
Mains cable Type	FR, DE	US
Voltage	230 V AC	115 V AC
Power consumption of heating sleeve, max.	120 W	120 W
Plug	M8	M12
Nominal diameter	145 mm	145 mm

Tbl. 12: Technical data heating sleeve for HiPace 350 and HiPace 450

Classification	Heating sleeve, screened, for HiPace® 400/700/800, 230 V AC	Heating sleeve, screened, for HiPace® 400/700/800, 208 V AC	Heating sleeve, screened, for HiPace® 400/700/800, 115 V AC
Order number	PM 071 269 -T	PM 071 270 -T	PM 071 271 -T
Pump	HiPace 400/700/800 with TC 400 PB | HiPace 700/800 M with TM 700	HiPace 400/700/800 with TC 400 PB | HiPace 700/800 M with TM 700	HiPace 400/700/800 with TC 400 PB | HiPace 700/800 M with TM 700
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	120 W	120 W	120 W
Plug	M12	M12	M12
Nominal diameter	184 mm	184 mm	184 mm

Tbl. 13: Technical data heating sleeve for HiPace 400 – HiPace 800, screened

Classification	Heating sleeve, screened, for HiPace® 1200/1500, 230 V AC	Heating sleeve, screened, for HiPace® 1200/1500, 208 V AC	Heating sleeve, screened, for HiPace® 1200/1500, 115 V AC
Order number	PM 071 272 -T	PM 071 273 -T	PM 071 274 -T
Pump	HiPace 1200/1500	HiPace 1200/1500	HiPace 1200/1500
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC
Power consumption of heating sleeve, max.	200 W	200 W	200 W
Plug	M12	M12	M12
Nominal diameter	264 mm	264 mm	264 mm

Tbl. 14: Technical data heating sleeve for HiPace 1200 \| HiPace 1500, screened

Classification	Heating sleeve, screened, for HiPace® 2300/230 V AC	Heating sleeve, screened, for HiPace® 2300/208 V AC	Heating sleeve, screened, for HiPace® 2300, 115 V AC
Order number	PM 071 275 -T	PM 071 276 -T	PM 071 277 -T
Pump	HiPace 2300	HiPace 2300	HiPace 2300
Mains cable Type	FR, DE	US	US
Voltage	230 V AC	208 V AC	115 V AC

Classification	Heating sleeve, screened, for Hi-Pace® 2300/230 V AC	Heating sleeve, screened, for Hi-Pace® 2300/208 V AC	Heating sleeve, screened, for Hi-Pace® 2300, 115 V AC
Power consumption of heating sleeve, max.	450 W	450 W	450 W
Plug	M12	M12	M12
Nominal diameter	311 mm	311 mm	311 mm

Tbl. 15: Technical data heating sleeve for HiPace 2300, screened

Declaration of conformity

Declaration for product(s) of the type:

Heating sleeve
HiPace 80 – 2300 turbopumps

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

Electromagnetic compatibility 2014/30/EU

Low voltage 2014/35/EC

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 61000-3-2: 2014
DIN EN 61000-3-3: 2013
DIN EN 61010-1: 2010
DIN EN 61326-1: 2013
DIN EN 62061: 2005

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Daniel Sälzer)
Managing Director

Aßlar, 2020-01-15

CE

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:
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