

## *Diaphragm Vacuum Pump*



***MVP 020-3 DC***

***MVP 020-3 AC***

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## Please note:

Current operating instructions are also available via [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net).

## 1. Safety Precautions

Obey all relevant safety requirements (regulations and guidelines) and adopt suitable safety measures.

☞ Read and follow all the instructions in this manual.

☞ Inform yourself regarding:

- Hazards which can be caused by the pump;
- Hazards which can arise in your system;
- Hazards which can be caused by the medium being pumped.

Use the equipment for the intended use only (for generation of vacuum).

☞ Avoid exposing any part of the body to vacuum.

☞ Obey notes on correct vacuum and electrical connections, see section "Use and operation".

☞ Make sure that the individual components are only connected, combined and operated according to their design and as indicated in the instructions for use.

☞ Observe all safety and accident prevention regulations.

☞ Check regularly that all safety requirements are being complied with.

☞ Do not carry out any unauthorised conversions or modifications on the pump.

☞ Check that mains voltage and current conform with the equipment (see rating plate).

☞ Adopt suitable measures to prevent any danger arising from the formation of hot surfaces or electric sparks.

☞ When returning the pump to us please note the shipping instructions in Section 7.

Adopt suitable measures to prevent dangers arising from dangerous or explosive gases and ensure that the materials of the wetted parts are compatible, see section "Technical data".

☞ Adopt suitable measures to prevent the release of dangerous, explosive, corrosive or polluting fluids.

☞ Take adequate precautions to protect people from the effects of dangerous substances, wear appropriate safety-clothing.

☞ Obey applicable regulations when disposing of chemicals. Take into consideration that chemicals may be polluted.

Adopt suitable measures to prevent dangers arising from the formation of explosive fluids or explosive or flammable mixtures.

☞ Use inert gas for gas ballast if necessary.

☞ The user must take suitable precautions to prevent any formation of explosive mixtures in the expansion chamber. In case of a diaphragm crack, mechanically generated sparks, hot surfaces or static electricity may ignite these mixtures.

Modifications reserved

Due to the residual leak rate of the equipment, there may be an exchange of gas, albeit extremely slight, between the environment and the vacuum system.

- ☞ Adopt suitable measures to prevent contamination of the pumped substances or the environment.

Electronic equipment is never 100% fail-safe. This may lead to an indefinite status of the equipment. Provide protective measures against malfunction and failure.

- ☞ Stand still of the pump or operating a valve must not lead to a critical dangerous situation under any circumstances.

Ensure that in case of failure the pump and the vacuum system always will turn into a safe status.

- ☞ In case of diaphragm cracks or leaks in the manifold pumped substances might be re-released into the environment or into the pump housing.
- ☞ Obey especially notes on operation and use and maintenance.

Use only genuine spare parts and accessories.

- ☞ Otherwise safety and performance of the equipment as well as the electromagnetic compatibility of the equipment might be reduced.

Ensure that maintenance is done only by suitable trained and supervised technicians.

Ensure that the maintenance technician is familiar with the safety procedures which relate to the product processed by the vacuum system and that the equipment, if necessary, is appropriately decontaminated before starting maintenance.

Obey local and national safety regulations.

Before starting maintenance vent the system, isolate the pump and other components from the vacuum system and the electrical supply and allow sufficient cooling of the pump.

In order to comply with law (occupational, health and safety regulations, safety at work law and regulations for environmental protection) vacuum pumps, components and measuring instruments returned to the manufacturer can be repaired only when certain procedures (see section "Notes on return to the factory") are followed.

## 1.1. For Your Orientation


### Instructions in the text

- ➔ Operating instructions: Here you have to do something!

### Symbols used

The following symbols are used throughout in the illustrations:

 Vacuum flange

 Exhaust flange

 Power supply connection

### Position numbers

Identical components and accessories parts have the same position numbers in all illustrations.

### Pictogram Definitions



Danger of personal injury.



Danger of damage to the pump or system.



Danger of burns from touching hot parts.



Danger of an electric shock.



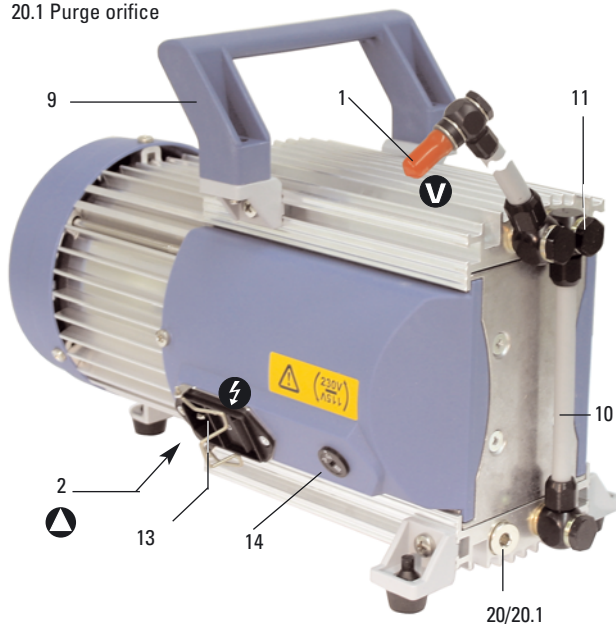
Important note.

## 2. Understanding The Pump

### 2.1. Main Features

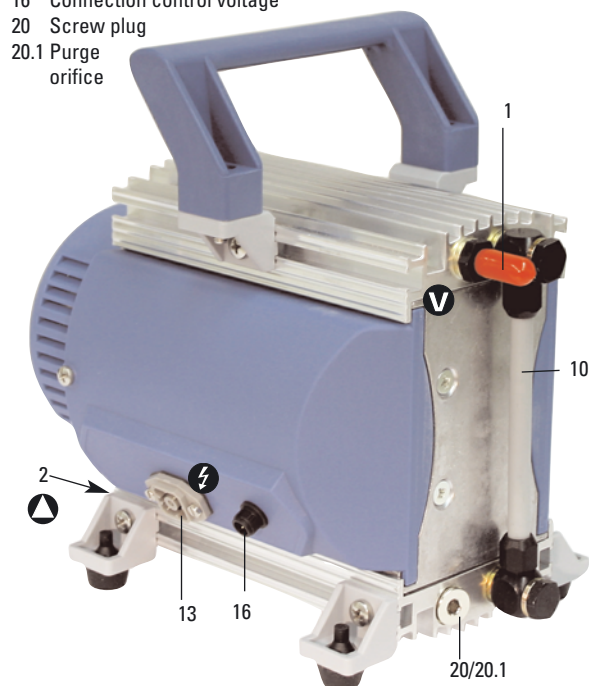
#### MVP 020-3 AC

- 1 Intake connection, with swivelling screw fitting G1/4"
- 2 Exhaust silencer
- 9 Handle
- 10 Interhead connection
- 11 Hollow screw
- 13 Mains connection with securing ring and main switch
- 14 Voltage selection switch
- 20 Screw plug
- 20.1 Purge orifice



#### MVP 020-3 DC

- 1 Intake connection with hose connection
- 2 Exhaust silencer
- 10 Interhead connection
- 11 Hollow screw
- 13 Power supply connection
- 16 Connection control voltage
- 20 Screw plug
- 20.1 Purge orifice



#### Proper use

- The Diaphragm Pump may only be used for the purpose of generating vacuum.
- Do not pump corrosive or explosive gases.
- Do not pump liquids.
- Do not operate the pump in locations where there is an explosion hazard.
- Accessories other than those named in this manual may not be used without the agreement of Pfeiffer Vacuum.
- Do not use the connecting line 10 between the heads of the pump as a handle.
- Equipment must be connected only to a suitable fused and protected electrical supply and a suitable earth point.
- Ensure that installation is in compliance with limitations from the degree of protection, see section "Technical Data".

#### Improper Use

The following are regarded as improper:

- The pumping of corrosive gases (except with corrosive gas processes version).
- The pumping of explosive gases.
- Operating the pump in locations where there is an explosion hazard.
- The pumping of gases which are contaminated with particles, dust and condensate.
- The Pump may not be used for the purpose of generating pressure.
- The pumping of liquids.
- Connection to pumps and units which is not permitted according to their operating instructions.
- Connection to units which contain touchable and voltage carrying parts.

**Improper use will cause any rights regarding liability and guarantees to be forfeited.**

### 2.2. Differences Between The Pump Types

Merkmal	MVP 020-3 DC	MVP 020-3 AC
Power supply	24V/DC $\pm$ 10%	180 ... 254V; 50/60Hz 90 ... 126V; 50/60Hz
Voltage connection	power supply cable	via mains connection socket with securing ring and switch <sup>1)</sup>
Variable speed function	via control voltage <sup>2)</sup>	no
Vacuum side	Hose connection DN6 with G 1/8" thread	Swivelling screw fitting G1/8" with hose (DN 6 x 1000 mm) and swivelling screw fitting G 1/4"
Exhaust side	Silencer	Silencer

<sup>1)</sup> Mains power cable is not included in the delivery consignment, for individual ordering please see Section 10. Accessories.

<sup>2)</sup> intermittent operation via 24 V= control voltage input (PWM signal) at turbo pump electronics TC 600/100 or customized variable speed operation (please see Section 3.4.2)

## 3. Installation

### 3.1. Setting Up The Pump And Location

Obey national safety regulations and safety requirements concerning the use of vacuum and electrical equipment.

- ➔ Remove all packing material, remove the product from its packing-box, remove the protective covers from the inlet and outlet ports and keep, inspect the equipment.
- ➔ If the equipment is damaged, notify the supplier and the carrier in writing within three days; state the item number of the product together with the order number and the supplier's invoice number. Retain all packing material for inspection.
- ➔ Do not use the equipment if it is damaged.
- ➔ If the equipment is not used immediately, replace the protective covers. Store the equipment in suitable conditions.
- ➔ Read and obey this manual before installing or operating the equipment.
- ➔ Transport the pump at the provided handles.
- ➔ If the equipment is brought from cold environment into a room for operation, allow the equipment to warm up (pay attention to water condensation on cold surfaces).
- ➔ Make sure ventilation is adequate if pump is installed in a housing or if ambient temperature is elevated.
- ➔ Provide a firm level platform for the equipment and check that the system to be evacuated is mechanically stable and that all fittings are secure.  
Attention: Flexible elements tend to shrink when evacuated.

To the best of our knowledge the equipment is in compliance with the requirements of the applicable EC-directives and harmonized standards (see "Declaration of conformity") with regard to design, type and model, especially directive IEC 1010. This directive gives in detail conditions, under which the equipment can be operated safely (see also IP degree of protection).

- ➔ Adopt suitable measures in case of differences, e. g. using the equipment outdoors, installation in altitudes of more than 1000 m above mean sea level, conductive pollution or dewiness.
- ➔ Anchor the pump if it is to be erected in a stationary position.
- ➔ Anchoring is not necessary if the pump is not erected in a stationary position.
- ➔ Ambient temperature range + 12 ... +40 °C.
- ➔ Where rack installation is involved, ensure adequate ventilation.

### 3.2. Connecting The Vacuum Side

- ➔ Remove locking cap on intake connection.
- ➔ Make connection between the vacuum system and pump as short as possible.
  - Ensure no mechanical forces act on the pump by a rigid piping system; use elastic connections or bellows.
- ➔ Connect pump with intake connection to the apparatus.
- ➔ Obey maximum permitted pressures and pressure differences, see section "Technical data". Do not operate the pump with overpressure at the inlet.
- ➔ If liquid - which would generate vapours - is present in the system to be evacuated, a condensate trap must be fitted upstream of the pump.

### 3.3. Connecting The Exhaust Side



Pressure can rise to dangerous levels in exhaust lines. Therefore, lay exhaust side lines without shut-off units. Do not connect the exhaust side with a closed system on account of the danger of bursting.

In certain applications, exhaust gases and vapours can be very hot and represent a health and/or environment hazard.

- ➔ Lay lines from the pump sloping downwards so that condensate cannot run back into the pump, otherwise fit a separator.
- ➔ Due to the high compression ratio of the pumps, pressure at the outlet port might be generated being higher than the max. permitted pressure compatible with the mechanical stability of the system.
- ➔ Do not permit any uncontrolled pressurizing (e. g. make sure that the exhaust pipeline cannot become blocked). If you have an exhaust-isolation valve, make sure that you cannot operate the equipment with the valve closed. Risk of bursting!
- ➔ Ensure that the system design does not allow the exhaust pipeline to become blocked.
- ➔ Avoid overpressure of more than 0.2 bar in case inert gas is connected.
- ➔ The diameter of the inlet and outlet pipeline should be at the least as large as the diameter of the pump connection pipelines.



### 3.4. Connecting To Mains Power

#### MVP 020-3 AC

The pump is driven by wide voltage AC motors with the following possible variants:

„230 V - range“: 180...254 V, 50/60 Hz

„115 V - range“: 90.. 126 V, 50/60 Hz



Power connections must comply with local regulations. Voltage and frequency information given on the voltage selector switch correspond to the mains voltage and frequency values. The pump may only be connected to mains current with earthed conductor.

#### 3.4.1 Voltage Selector Switch Change-Over

The respective single phase mains voltage must be checked before each installation or re-location of the diaphragm pump.

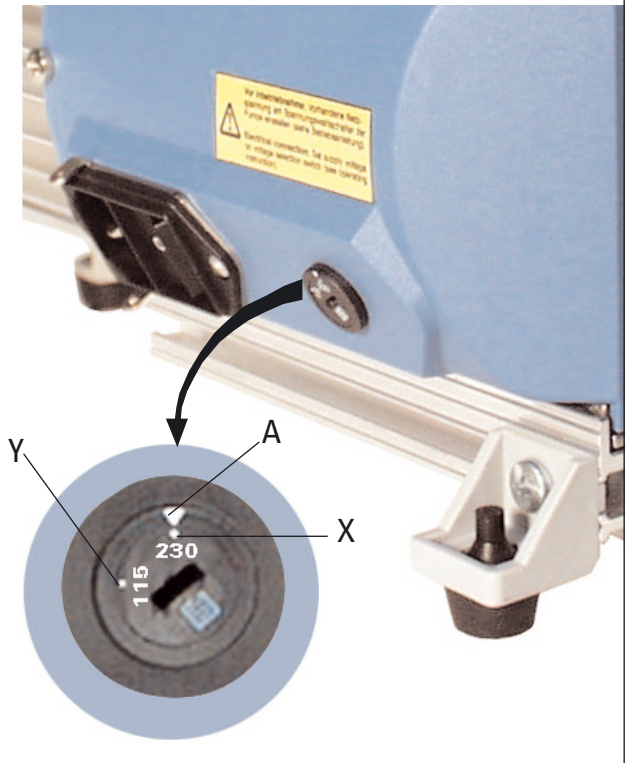
Use an appropriate screwdriver on the diaphragm pump voltage selector switch to select the range which corresponds with the mains voltage provided.



Be sure to disconnect the pump from mains power before changing the voltage range.

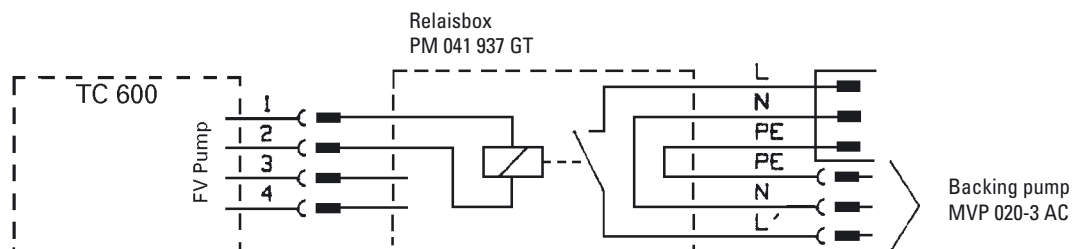
#### Voltage Change-Over Switch 14 On The Terminal Box Cover

- A Setting range marking
- X Position "230", voltage range (180 ... 254V; 50/60Hz)
- Y Position "115", voltage range ( 90 ....126V; 50/60Hz)



Prior to switching on the pump always check the voltage range which has been set in the pump terminal box.

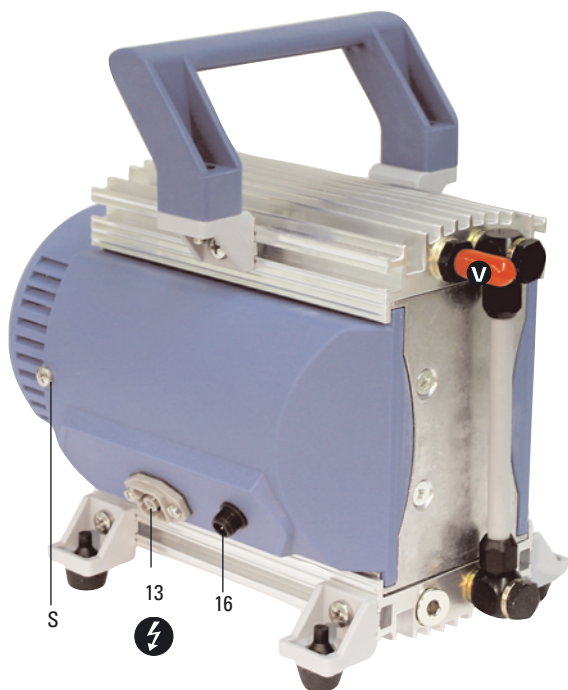
#### Connection of MVP 020-3 AC with Relaisbox at TC 600 for intermittend operation



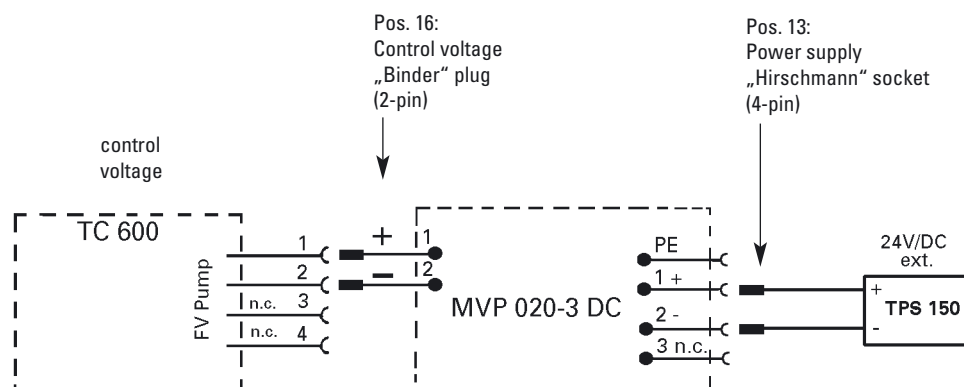
### 3.4.2 Supply Connections of the MVP 020-3 DC

#### MVP 020-3 DC

- 13 Power supply connection
- 16 Connection control voltage
- S Cover retaining screw



#### Connection of MVP 020-3 DC at TC 600 for intermittend operation



## 4. Operations

### 4.1. Important Information



Do not start pump if pressure difference between inlet and outlet port exceeds max. 1 bar.

Attempts to start pump at higher difference may cause blockade and damage of the motor. Check compatibility with max. pressure difference between inlet and outlet ports. Interchanging the connections causes dangerous excess pressure levels.



When the pump is running, surfaces and motor casing become hot.



If the pump is subjected to condensates it should be allowed to run for a few minutes under atmospheric pressure before switching off.

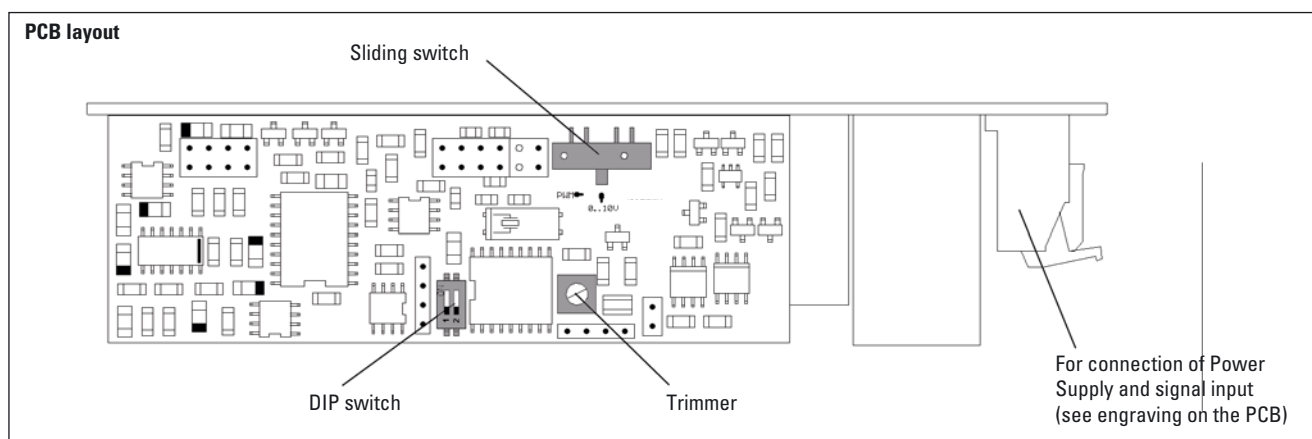


Prevent internal condensation, transfer of liquids or dust. The diaphragm and valves will be damaged, if liquids are pumped in significant amount!



The pump can be switched on and off at all times.

### 4.2. Setup of Control Signal Input

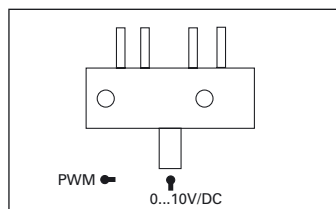


In addition to the voltage input, the pump is equipped with a control signal input 16. In order to select the control signal input the DIP switch, sliding switch and trimmer on the control board under the side pump cover must be set.

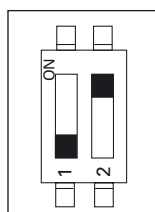
For this, unscrew cover retaining screw S and carefully pull out the cable but only as far as is necessary.

#### Adjustments at DIP switch

#### Adjustments at sliding switch



Setting	
PWM:	External digital setting of the motor rotation speed via the PWM signal (works setting).
0 ... 10V/DC:	External analog setting of the motor rotation speed via Voltage pre-selection



1	2	
on	on	Setting the motor rotation speed via the trimmer (programming mode).
on	off	Interlocking the trimmer pre-selection as previously selected (operating mode).
off	on	External digital setting of the motor rotation speed via the PWM signal (works setting).
off	off	External analog setting of the motor rotation speed via voltage pre-selection (0 ... 10V/DC)



#### 4.2.1 Intermittent Operations with PWM-Signal

To prolong the life of diaphragm pumps, intermittent operations can be selected with lesser gas throughputs of  $< 0.18 \text{ mbar l/s}$ . This means that, dependent on the TMP power take-up, the backing pump will be switched on and off. TMP power take-up is dependent on the fore-vacuum pressure and gas throughput.

- By comparing the power take-up with an upper and a lower limit value, the relative switch-on duration with lesser gas throughputs can be reduced to approx. 1 to 60%
- To avoid too frequent switching on, the buffer volume in the fore-vacuum line should amount to  $\geq 0.5$  liter from approx.  $0.018 \text{ mbar l/s}$ .

#### Intermittent operation with turbo electronics TC 600 / 100

- ➔ Carry out adjustments at sliding switch and Dip switch for operation with PWM signal.
- ➔ Connect galvanic isolated PWM-signal to signal input 16.  
0 V ==> Pump „off“  
24 V ==> Pump „on“ (max. rotation speed)



For this operation mode there is no variable speed control possible.

#### Variable speed control

- ➔ Carry out adjustments at sliding switch and Dip switch for operation with PWM signal.
- ➔ Connect galvanic isolated PWM signal to signal input 16 for variable customized speed control.
  - (5V ... 24V); **absolutely necessary!**
  - Frequency range:  $>100 \text{ Hz}$ ,  $< 1,5 \text{ kHz}$ .

#### Variable speed range:

PWM-signal	$<25\%$	25%	25% ... 75%	$>75\%$
Number of revolutions	0 RPM	350 RPM	Linear increasing	1600 UPM



Also see operating instructions „Adapter box „ PM 800 563 BN.

#### 4.3. Operation With Purge Orifice (Accessorie)

The pumping of air or process gases can cause moisture/vapour to condense in the pump. This has an effect on the attainable final pressure and the volume flow rate levels.

The rate of expulsion of condensate can be increased by admitting a purge media (air) and the pump will attain the specified final pressure within a shorter time. This is achieved by replacing the screw plug 20 with a purge orifice 20.1.



Make sure that air/gas inlet through the purge orifice never lead to hazardous, explosive or otherwise dangerous mixtures. If in doubt, use inert gas.



For intake pressures  $> 500 \text{ mbar}$  process gas can discharge at the purge orifice; if applicable use a suction line.

## 5. What To Do In The Case Of Breakdowns ? ---

Problem	Possible cause	Remedy
Pump fails to start or stops immediately.	<ul style="list-style-type: none"> <li>➔ Supply failure?</li> <li>➔ Pressure in outlet pipeline too high?</li> <li>➔ Motor overloaded?</li> <li>➔ Dirty valves/diaphragms</li> <li>➔ Wrong adjustment of the Voltage selection switch</li> <li>➔ Ambient temperature &lt; 12 °C</li> <li>➔ DC version: Control voltage faulty</li> <li>➔ Pump seized or con-rod rough-running</li> </ul>	<ul style="list-style-type: none"> <li>☞ Check voltage supply.</li> <li>☞ Remove blockade in line, open valve.</li> <li>☞ Allow motor to cool, identify cause of failure.</li> <li>☞ See maintenance in section 6.</li> <li>☞ Check adjustment.</li> <li>☞ Warm pump</li> <li>☞ Check control voltage (see section 3.4. and 4.2.).</li> <li>☞ Return the equipment to Pfeiffer Vacuum service</li> </ul>
Pump does not achieve ultimate total pressure or normal pumping speed	<ul style="list-style-type: none"> <li>➔ Long narrow line?</li> <li>➔ Pump has been exposed to condensate?</li> <li>➔ Deposits have been formed inside the pump?</li> <li>➔ Hose connectors between pump are leaky</li> <li>➔ Leak in system</li> <li>➔ New diaphragms or valves</li> <li>➔ Valves or diaphragm damaged?</li> <li>➔ Outgasing substances or vapour generated in the process?</li> <li>➔ Pump becomes too hot</li> </ul>	<ul style="list-style-type: none"> <li>☞ Use line with larger diameter, length as short as possible.</li> <li>☞ Run pump at atmospheric pressure for a few minutes.</li> <li>☞ Clean and inspect pump heads.</li> <li>☞ Check hose connectors between pump heads for leaks.</li> <li>☞ Repair leak</li> <li>☞ A run-in period of several hours is required before the pump achieves its ultimate vacuum.</li> <li>☞ Replace valves and/or diaphragms.</li> <li>☞ Check process parameters.</li> <li>☞ Reduce pump rotation speed, ensure enough cooling or reduce input pressure.</li> </ul>
Pump too noisy.	<ul style="list-style-type: none"> <li>➔ Valves or diaphragm damaged?</li> <li>➔ Atmospheric or high pressure at inlet port?</li> <li>➔ Diaphragm clamping disc loose?</li> <li>➔ Motor fan faulty</li> <li>➔ Exhaust silencer is loose or missing</li> <li>➔ None of above mentioned causes?</li> </ul>	<ul style="list-style-type: none"> <li>☞ Replace valves and/or diaphragms.</li> <li>☞ Connect hose to pump outlet.</li> <li>☞ Perform maintenance.</li> <li>☞ Exchange motor fan</li> <li>☞ Check silencer; exchange if necessary</li> <li>☞ Return the equipment to Pfeiffer Vacuum service.</li> </ul>

## 6. Maintenance

### 6.1. Precautionary Measures During Maintenance Work



Whenever working on the pump ensure the motor cannot get switched on. If necessary, remove pump from the system for inspection. Before dismantling allow the pump to cool down.

- ➔ Only dismantle the pump as far is necessary to effect repairs.
- ➔ Use only alcohol or similar cleaning agents for cleaning. Do not use solvents.

All bearings are encapsulated and are filled with long-life lubricant. Under normal operating conditions, the pump is maintenance free. The valves and the diaphragms are wear parts. If the rated ultimate vacuum is no longer achieved, the pump interior, the diaphragms and the valves must be cleaned and the diaphragms and valves must be checked for cracks or other damage.

Depending on individual cases it may be efficient to check and clean the pump heads on a regular basis. In case of normal wear the lifetime of the diaphragms and valves is > 10000 operating hours.

### 6.2. Cleaning And Replacing Valves And Diaphragms

- ➔ Allow the pump to cool down before dismantling.
- ➔ Use open-ended wrench SW 14 to remove fitting 11 (hollow screw) at the pump head and remove together with connecting hose.



To not remove housing bearing flange 8.

- ➔ Remove two screws at the handle 9 and remove together with handle.
- ➔ Use hex key to remove six socket head screws 1.3 from pump head and remove upper housing (housing cover 1.1 and head cover 3.1).



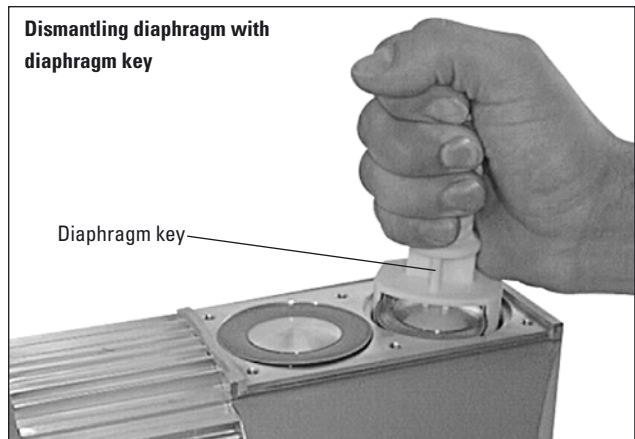
Never remove parts by using a spiky or sharp-edged tool (e. g. screw driver), we recommend to use a rubber mallet or compressed air (to be blown carefully into port).

- ➔ Remove head cover 3.1 from housing cover I (1.1) and check valves 3. Note position of valves and remove. Replace valves if necessary.
  - Use petroleum ether or industrial solvent to remove deposits. Do not inhale.
  - Check diaphragm for damage and replace if necessary.

#### Replacing the diaphragm:

- ➔ Lift diaphragm 5 carefully.
  - Apply pressure to the clamping disc 4 beside the diaphragm to bring connecting rod 7 into upper turning point position if necessary.
  - Never use a spiky or sharp-edged tool to lift the diaphragm.

Dismantling diaphragm with diaphragm key



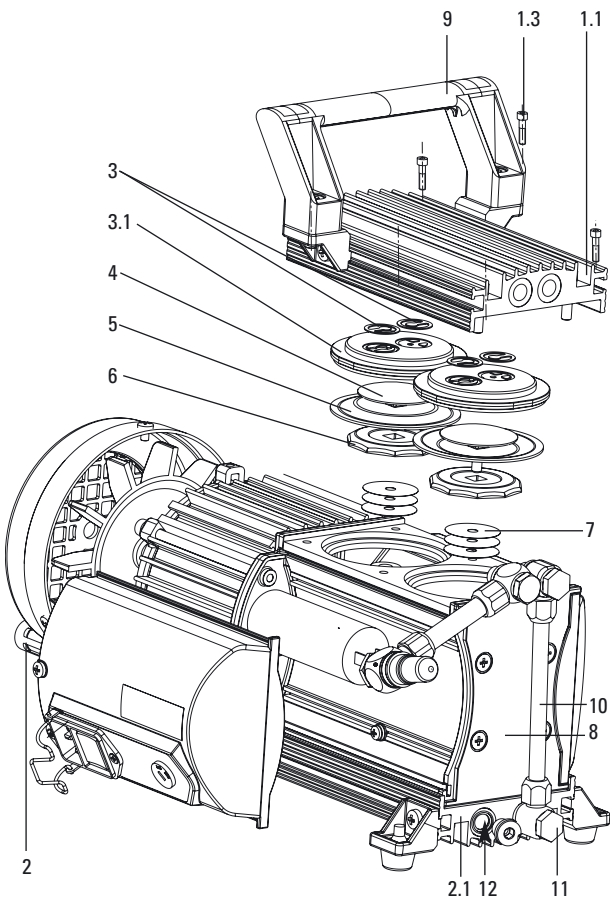
- ➔ Use diaphragm key to grip under the diaphragm to the diaphragm support disc 6.
- ➔ Apply pressure to the diaphragm clamping disc to bring the diaphragm into lower turning point position. Press diaphragm key against diaphragm clamping disc and remove diaphragm support disc with diaphragm.
  - If the old diaphragm is difficult to separate from the support disc, immerse assembly in naphtha or petroleum ether. Do not inhale!
  - Check for washers under clamping disc. Do not mix the washers from the different heads. Make sure that the original number is reassembled at the individual pump head.
- ➔ Position new diaphragm between diaphragm clamping disc with square head screw and diaphragm support disc.



Position diaphragm with white PTFE side to diaphragm clamping disc (to pump chamber).

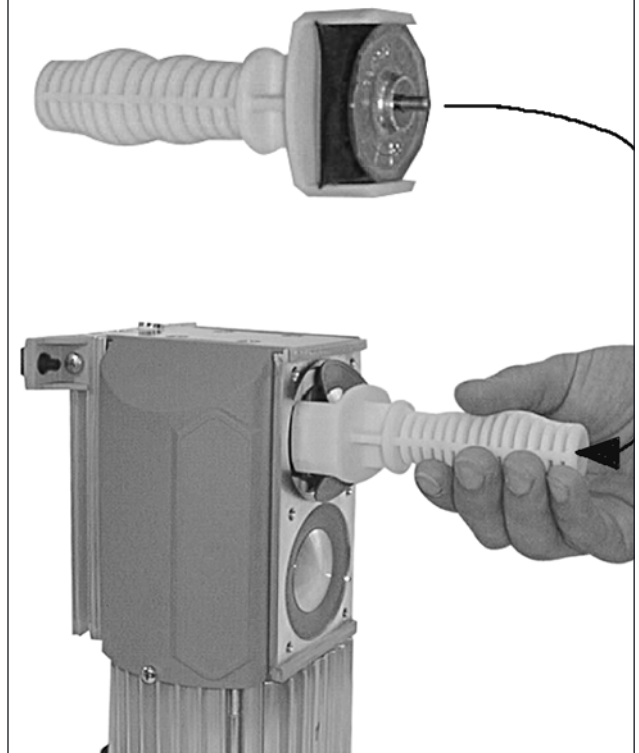
### Dismantling / Assembling pump heads

- 1.1 Housing cover I
- 1.3 Socket head screws
- 2.1 Housing cover II
- 3 Valves
- 3.1 Head cover
- 4 Clamping disc with square head screw
- 5 Diaphragm
- 6 Diaphragm support disc
- 7 Disc
- 8 Housing bearing flange
- 9 Handle
- 10 Interhead connection
- 11 Fitting (Hollow screw)
- 12 USIT-Ring



- ➔ Lift diaphragm at the side and position carefully together with diaphragm clamping disc and diaphragm support disc in the diaphragm key.
  - Avoid damage of the diaphragm: Do not crack diaphragm in a way that light lines at the diaphragm upper side occur.
- ➔ Check for washers under clamping disc. Do not mix the washers from the different heads. Make sure that the original number is reassembled at the individual pump head.
  - Smaller number of washers: The pump will not attain final vacuum. More washers: Clamping disc will hit head cover; noise or even blockage of the pump.
- ➔ After assembling all parts rotate pump 180° and dismantle lower housing cover II (2.1) in the same manner.

### Assembling diaphragm clamping disc, diaphragm and diaphragm support disc to connecting rod.



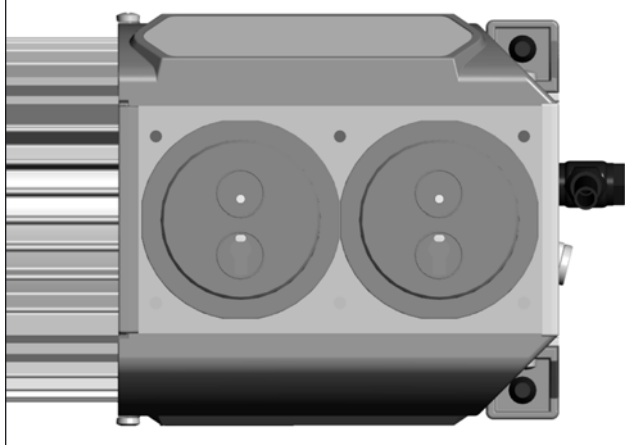
### Assembling pump heads:

- ➔ Make sure that the square head screw of the diaphragm clamping 4 disc is correctly seated in the guide hole of the diaphragm support disc 6.
- ➔ Assemble diaphragm clamping disc, diaphragm and diaphragm support disc to connecting rod.
  - Position washers if available between diaphragm support disc and rod 7.
- ➔ Bring diaphragm into a position in which diaphragm is in contact with housing and centred with respect to bore.
- ➔ Assemble head cover 3.1 and valves 3.
  - Check for correct position (see fig. below).

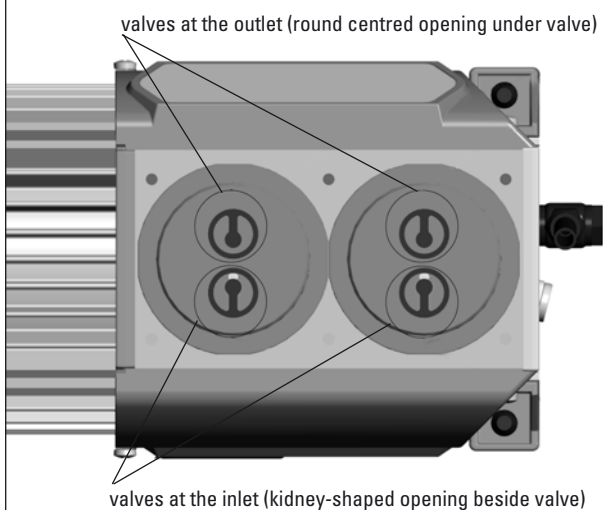


Obey position and orientation of the head covers and the valves definitely.

**Scheme pump head with head covers**



**Scheme pump head with head covers and valves**



#### **Assembling fittings:**

- ➔ Use open ended wrench to reconnect fittings with connection hose to pump heads.
- Fix the ring nut when tighten the hollow bolt.



If the pump does not achieve the ultimate pressure:

In case the diaphragms and valves have been replaced, a run-in period of several hours is required before the pump achieves its ultimate vacuum.

If all pump heads achieve a vacuum below 90 mbar but pump does not achieve the ultimate total pressure:

- ➔ Check hose connectors between pump heads and manifolds for leaks. If necessary recheck pump chamber.

- ➔ Position housing cover I (1.1).
  - Move housing cover slightly to make sure that the head covers are correctly positioned.
  - Screw in six socket head screws 1.3 fixing housing cover crosswise first slightly, then tighten.



Do not tighten until housing cover is in contact with housing, max. torque 6 Nm.

- ➔ Assemble handle 9 with screws and tighten.
  - Check for correct position of the handle over the centre of gravity of the pump. The handle is in correct position if the end of the handle is positioned over the end of the housing cover.

## 7. Service

### Do Make Use Of Our Service Facilities

In the event that repairs are necessary to your pumping station, a number of options are available to you to ensure any system down time is kept to a minimum:

- Have the pump repaired on the spot by our Pfeiffer Vacuum Service Engineers;
- Return the individual components to the manufacturer for repairs;
- Replace individual components with a new value exchange units.

Local Pfeiffer Vacuum representatives can provide full details.

### Before Returning:

- ➔ When returning the pump please use original factory packing.
- ➔ Dismantle all accessories.
- ➔ If the pump free of harmful substances, please attach a clearly visible notice: "Free of contamination" (to the unit being returned, the delivery note and accompanying paperwork).

Harmful substances" are substances and preparations as defined in current legislation. Pfeiffer Vacuum will carry out the decontamination and invoice this work to you if you have not attached this note. This also applies where the operator does not have the facilities to carry out the decontamination work. Units which are contaminated microbiologically, explosively or radioactively cannot be accepted as a matter of principle.

### Fill Out The Contamination Declaration

- ➔ In every case the "Contamination Declaration" must be completed diligently and truthfully.
- ➔ A copy of the completed declaration must accompany the unit; any additional copies must be sent to your local Pfeiffer Vacuum Service Center.

Please get in touch with your local Pfeiffer Vacuum representatives if there are any questions regarding contamination.



Decontaminate units before returning or possible disposal. Do not return any units which are microbiologically, explosively or radioactively contaminated.

### Returning Contaminated Units

If contaminated units have to be returned for maintenance/repair, the following instructions concerning shipping must be followed without fail:

- ➔ Neutralise the pump by flushing with nitrogen or dry air.
- ➔ Seal all openings to the air.
- ➔ Seal pump or unit in suitable protective foil.
- ➔ Ship units only in appropriate transport containers.



Repair orders are carried out according to our general conditions of sale and supply.

- ➔ If repairs are necessary, please send the unit together with a short damage description to your nearest Pfeiffer Vacuum Service Center.



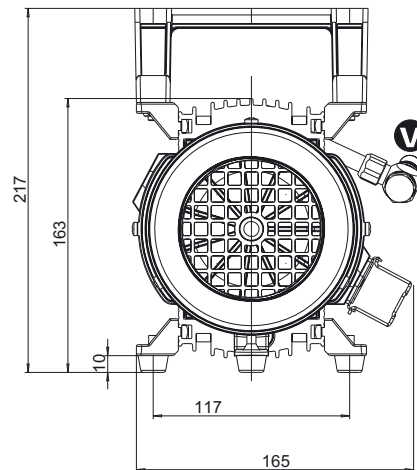
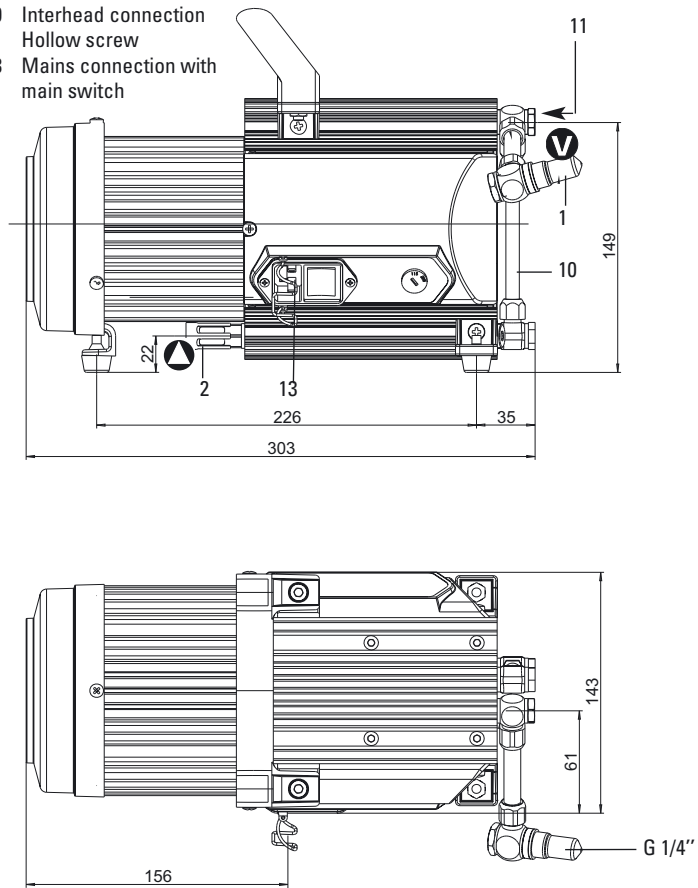
## 8. Technical Data

Size	Unit	MVP 020-3 AC	MVP 020-3 DC
Connections Intake side <sup>1)</sup>		G 1/8" swivelling screw fitting (at the pump) and hose (DN 6x1000mm) and swivelling screw fitting G 1/4"	G 1/8" (at the pump) and hose connection DN 6 with G 1/8" thread
Pressure side		G 1/8" with silencer	G 1/8" with silencer
Nominal volume flow rate at 1000 mbar 50 Hz	m <sup>3</sup> /h	1	
60 Hz	m <sup>3</sup> /h	1,2	
Nominal volume flow rate at 1500 min <sup>-1</sup>	m <sup>3</sup> /h		1
Rotation speed at 50/60 Hz	min <sup>-1</sup>	1500 / 1800	
Max. rotation speed	min <sup>-1</sup>	—	1500
Final pressure without / with purge orifice	mbar	≤ 2 / ≤ 3	≤ 2 / ≤ 3
Permissible exhaust pressure without final pressure change	mbar	1100	1100
Leak rate	mbar l/s	≤ 1·10 <sup>-1</sup>	≤ 1·10 <sup>-1</sup>
Max. operating altitude (a. s. l)	m	approx. 2000	approx. 2000
Max. permissible operating temperature	°C	+12 ... +40	+12 ... +40
Noise level	dB(A)	ca. 48	ca. 48
Motor power supply	V	Dual voltage 90 ... 126 V/AC	Variable speed drive 24 V/DC (+/- 10%)
	V	180 ... 254 V/AC	
Motor power, max.	W	80	64
Motor current draw	A	1,7 (for 100 ... 120 V)	3,5 (at 1000 mbar)
	A	0,85 (for 200 ... 240 V)	0,9 (at final pressure)
Motor protection		IP 54	IP 20
Weight, approx.	kg	6,5	4,1

## 8.1. Dimensions

### MVP 020-3 AC

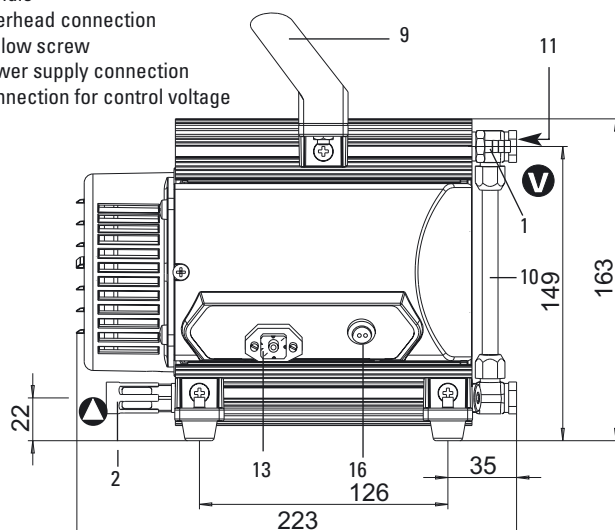
- 1 Inlet with hose connection
- 2 Silencer
- 10 Interhead connection
- 11 Hollow screw
- 13 Mains connection with main switch



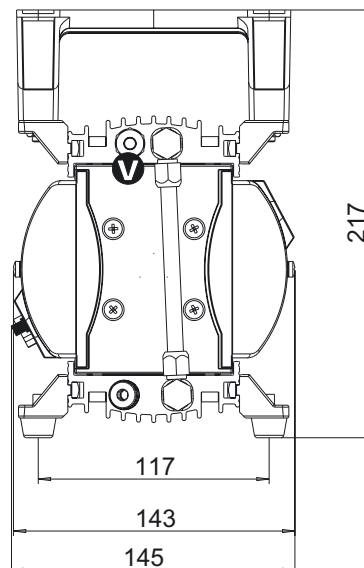
PK217mAC

### MVP 020-3 DC

- 1 Inlet with hose connection
- 2 Outlet with Silencer
- 9 Handle
- 10 Interhead connection
- 11 Hollow screw
- 13 Power supply connection
- 16 Connection for control voltage



PK217mDC



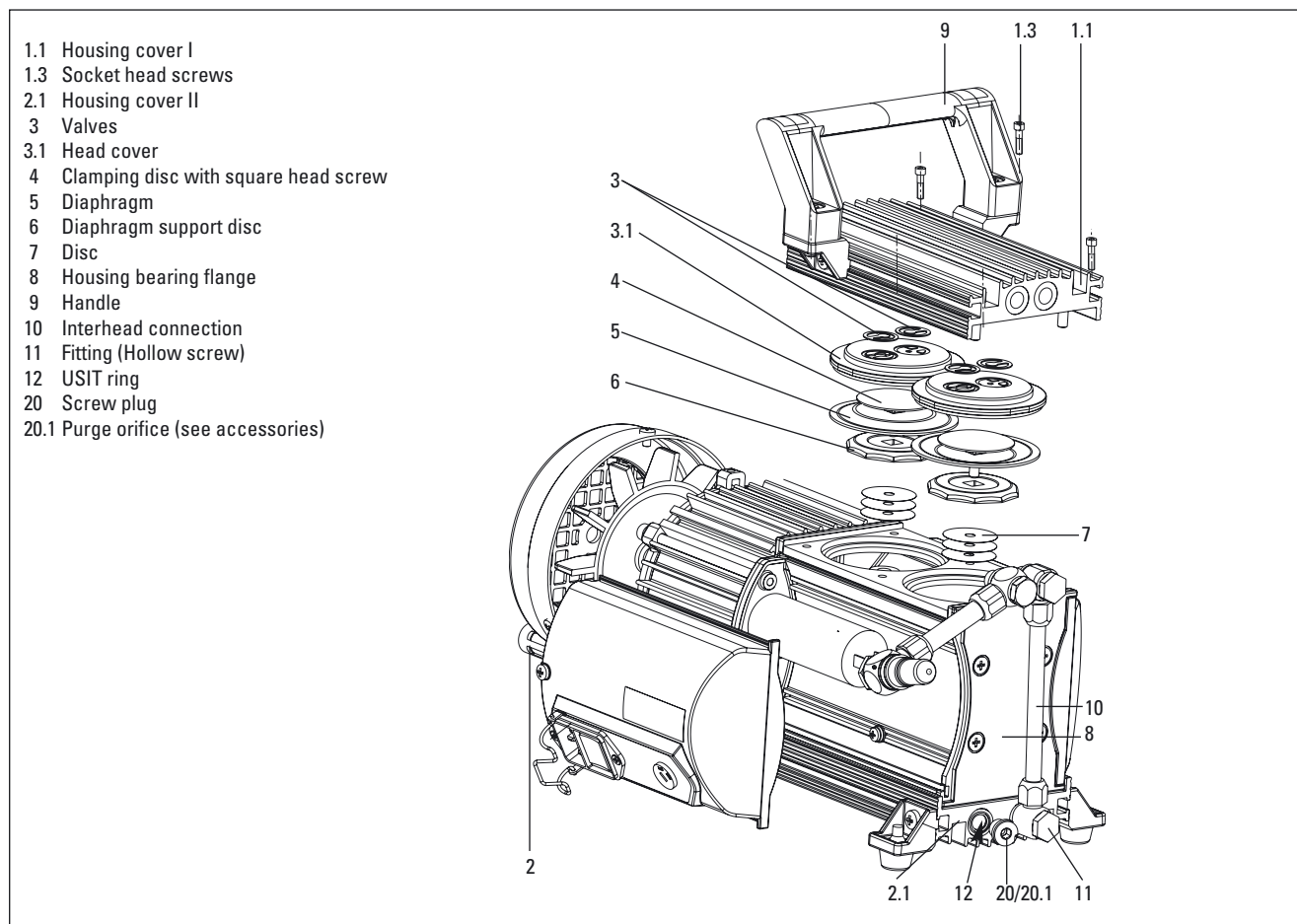
## 8.2. Substances Which Come Into Contact With The Medium

Pump components	Substances in contact with the media
Housing cover	Aluminium
Head cover	Aluminium
Diaphragm clamping disc	Aluminium
In- outlet valves	FPM
Diaphragm	PTFE coated NBR
Intake connection (Hose nipple)	Aluminium, anodised
Exhaust silencer	Aluminium / Silicone
Hose	Polyethylene, crossed-linked
Fittings	Aluminium, anodised

## 9. Spare Parts

Pos.	Description	Pieces MVP 020-3 AC	Pieces MVP 020-3 DC	Size	Number (for 1 piece)	Comments
	<b>MVP 020-3 AC and MVP 020-3 DC</b> Set of wearing parts	1	1		PK 050 119-T	including 4 diaphragm, 8 valves, diaphragm key and sealing ring of the silencer
	Diaphragm key	1	1		P 0995 941	
2	Silencer	1	1		P 0995 942	
11	Fitting (Hollow screw)	1 of 2	1 of 2	G 1/8"	P 0995 943	
12	USIT ring	1 of 8	1 of 7	G1/8"	P 0920 632 E	

When ordering accessories and spare parts please be sure to state the full part number. When ordering spare parts please state additionally the unit type and unit number (see rating plate). Please use this list as an order form (by taking a copy).



## 10. Accessories

### MVP 020-3 AC

Pos.	Description	Pieces	Size	Number	Comments / Operating instructions	Order Quantity
	Mains cable for individual wiring	1	3,0 m	PK 050 111	with EURO box CEE 22; without mains plug	
	Mains cable 230 V with schuko plug, EURO Counter plug CEE 22	1	2,0 m	PK 050 109		
	Mains cable 115 V, UL EURO Counter plug CEE 22	1	2,0 m	PK 050 110		
	Small flange with seal ring for intake or outlet side	1	DN 16 ISO-KF	PK 050 108-T	(for input or output optional)	
	Relay box for connection to TC 600	1		PM 041 937 GT		
20.1	Purge orifice in place of screw plug		G 1/8"/Ø 0,2	PK 050 122	to reduce condensate	

### MVP 020-3 DC

Pos.	Description	Pieces	Size	Number	Comments / Operating instructions	Order Quantity
	Small flange	1	DN 16 ISO-KF	PK 050 108 -T	for intake and outlet side	
	TPS 150, 24 V/DC power unit	1	150 VA	PM 051 461 -T	PM 800 521 BN	
	Power supply cable TPS 150 / MVP 020-3 DC, pos. 13	1	3 m	PM 051 103 -T	with plug; 4-pole	
	Power supply cable TPS 150 / MVP 020-3 DC, pos. 13	1	5 m	PM 051 104 -T	with plug; 4-pole	
	Mains cable, 230V AC, safety plug CEE 7, EURO counter plug C 13		3 m	P4564 309 ZA		
	Mains cable, 115V AC, UL plug, NEMA 5-15P, EURO counter plug C 13		3 m	P4564 309 ZE		
	Connecting cable TC 100/600 - MVP 020-3 DC, pos. 16	1	0,5 m	PM 041 959 -X	for intermittend operation	
	Mating plug for power supply	1		P 0920 635 E	counter part to pos. 13, 4-pole	
	Cable connector for rotation speed control	1		P 0992 287	counter part to pos. 16 2-pole	
20.1	Purge orifice in place of screw plug		G 1/8"/Ø 0,2	PK 050 122	to reduce condensate	

### ***Declaration of Contamination of Vacuum Equipment and Components***

The repair and/or service of vacuum components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.

The manufacturer could refuse to accept any equipment without a declaration.

**This declaration can only be completed and signed by authorised and qualified staff:**

**1. Description of component:**

- Equipment type/model: \_\_\_\_\_
- Code No.: \_\_\_\_\_
- Serial No.: \_\_\_\_\_
- Invoice No.: \_\_\_\_\_
- Delivery Date: \_\_\_\_\_

**2. Reason for return:**

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### 3. Equipment condition

- Has the equipment been used?  
yes ☐ no ☐
- What type of pump oil was used?  
\_\_\_\_\_
- Is the equipment free from potentially harmful substances?  
yes ☐ (go to section 5)  
no ☐ (go to section 4)

#### 4. Process related contamination of equipment

- toxic	yes <input type="checkbox"/>	no <input type="checkbox"/>
- corrosive	yes <input type="checkbox"/>	no <input type="checkbox"/>
- microbiological hazard*)	yes <input type="checkbox"/>	no <input type="checkbox"/>
- explosive*)	yes <input type="checkbox"/>	no <input type="checkbox"/>
- radioactive*)	yes <input type="checkbox"/>	no <input type="checkbox"/>
- other harmful substances	yes <input type="checkbox"/>	no <input type="checkbox"/>

\*<sup>1</sup>) We will not accept delivery of any equipment that has been radioactively or microbiologically contaminated without written evidence of decontamination!

Please list all substances, gases and by-products which may have come into contact with the equipment:

Tradename Product name Manufacturer	Chemical name (or Symbol)	Danger class	Precautions associated with substance	Action if spillage or human contact
1.				
2.				
3.				
4.				
5.				

## 5. Legally Binding Declaration

I hereby declare that the information supplied on this form is complete and accurate. The despatch of equipment will be in accordance with the appropriate regulations covering Packaging, Transportation and Labelling of Dangerous Substances.

Name of Organisation: \_\_\_\_\_

Address: \_\_\_\_\_ Post code: \_\_\_\_\_

Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

Name: \_\_\_\_\_

Job title:

Date: \_\_\_\_\_ Company stamp: \_\_\_\_\_

Legally binding signature: \_\_\_\_\_



## **Konformitätserklärung** ***Declaration of Conformity***



im Sinne folgender EU-Richtlinien:  
*pursuant to the following EU directives:*

- **Maschinen/Machinery 98/37/EG (Anhang/Annex IIA)**
- **Elektromagnetische Verträglichkeit/Electromagnetic Compatibility 89/336/EWG**
- **Niederspannung/Low Voltage 73/23/EWG**

Hiermit erklären wir, daß das unten aufgeführte Produkt den Bestimmungen der EU-Maschinenrichtlinie 98/37/EG, der EU-Richtlinie über Elektromagnetische Verträglichkeit 89/336/EWG und der EU-Niederspannungsrichtlinie 73/23/EWG entspricht.

*We hereby certify, that the product specified below is in accordance with the provision of EU Machinery Directive 98/37/EEC, EU Electromagnetic Compatibility Directive 89/336/EEC and EU Low Voltage Directive 73/23/EEC.*

**Produkt/Product:**

***MVP 020-3 AC***  
***MVP 020-3 DC***

Angewendete Richtlinien, harmonisierte Normen und angewendete nationale Normen:

*Guidelines, harmonised standards, national standards which have been applied:*

**DIN EN ISO 12100-1; -2**  
**EN 60 204-1    EN 60 335-1**  
**EN 55 014      EN 50 081-1**  
**EN 50 082-1    EN 60 555-2,**  
**EN 60 555-3    EN 1012-2**

Unterschrift/Signature:



Pfeiffer Vacuum GmbH  
Berliner Str. 43  
35614 Asslar  
Germany

(W. Dondorf)  
Geschäftsführer  
*Managing Director*

Konf.I./2003





**Vacuum is nothing, but everything to us!**



**Turbo Pumps**



**Rotary Vane Vacuum Pumps**



**Roots Pumps**



**Dry Vacuum Pumps**



**Leak Test Units**



**Valves**



**Flanges, Feedthroughs**



**Vacuum Measurement**



**Gas Analysis**



**System Technology**



**Service**



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