Economy-Pumpstand
Turbo-Drag-Pumpstand

Economy Pumping Station
Turbo-Drag Pumping Station

TSH 071 E
TSU 071 E
Index

1. Safety Instructions .................. 15
   1.1. For Your Orientation .................. 15
   1.2. Pictogram Definitions .................. 15

2. Understanding .................. 16
   The Pumping Station
   2.1. Main Features .................. 16
   2.2. Pumping Station Control .................. 16
   2.3. Pumping Station Components .................. 16

3. Installation .................. 17
   3.1. Preparations For Installation .................. 17
   3.2. Laying The Exhaust Line .................. 17
   3.3. Venting Units .................. 17
   3.4. Electrical Connections .................. 17
   3.5. Connecting The Vacuum System .................. 18
   3.6. Cooling .................. 18
   3.7. Connecting The Casing Heating .................. 18
   3.8. Connections Diagram .................. 19

4. Operations .................. 20
   4.1. Lubricant Filling .................. 20
   4.2. Before Starting .................. 20
   4.3. Starting .................. 20
   4.4. Switching OFF .................. 21

5. What To Do .................. 21
   In Case Of Breakdowns?

6. Maintenance .................. 21
   6.1. The Lubricant .................. 21

7. Service .................. 22

8. Technical Data .................. 22
   8.1. Dimensions .................. 23

9. Accessories .................. 24

10. Spare Parts .................. 24

Declaration of Contamination .......... 25
Declaration Of Conformity .... (last page)

Please note: Current operating instructions are available via www.pfeiffer-vacuum.net
1. Safety Instructions

- Read and follow all instructions in this manual.
- Inform yourself regarding:
  - Hazards which can be caused by the pumping station;
  - Hazards which can be caused by your system;
  - Hazards which can be caused by the medium being pumped.
- Avoid exposing any part of the body to vacuum.
- Observe the safety and accident prevention regulations.
- Regularly check that all accident prevention measures are being complied with.
- Do not operate the turbo pumping station with open high vacuum flange.
- Use at least 4 bracket screws to connect the high vacuum flange (ISO flange).
- Do not disconnect the plug between the TC 600 and accessory components during operations.
- During operations temperatures of up to 65 °C can arise in the lower part of the turbopump. Take care to avoid burns!
- The unit has been accredited protection class IP 30. When the unit is operated in environments which require other protection classes, the necessary measures must be taken.
- Do not carry out any unauthorised conversions or alterations to the turbo pumping station.
- When returning individual components please observe the shipping instructions (refer to the operating instructions for the pumping station components).

1.1. For Your Orientation

In the text
- Working instruction: here, you have to do something.

Symbols used
The following symbols are used throughout in illustrations.

- High vacuum flange
- Fore-vacuum flange
- Air cooling
- Sealing gas connection
- Venting connection
- Electric connection / Electronic drive unit

Abbreviations used
DCU = Display and Operating unit
TC = Electronic drive unit, turbopump
TPS = Power unit

1.2. Pictogram Definitions

![Warning](image1)

Danger of personal injury.

![Caution](image2)

Danger of damage to the pumping station or to the system.

![Warning](image3)

Danger of injury from rotating parts.

![Warning](image4)

Danger of burns from touching hot parts.

![Please Note](image5)

Attention to particularly important information on the product, handling the product or to a particular part of the documentation.

Modifications reserved.
2. Understanding The Pumping Station

2.1. Main Features

<table>
<thead>
<tr>
<th>Turbomolecular Drag Pumping Station TSH 071 E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Turbomolecular Drag Pump TMH 071 P</td>
</tr>
<tr>
<td>2  Diaphragm Pump MVP 015-2</td>
</tr>
<tr>
<td>2a ON/OFF mains switch diaphragm pump</td>
</tr>
<tr>
<td>3  Display And Operating Unit DCU 001</td>
</tr>
<tr>
<td>6  Electronic Drive Unit TC 000</td>
</tr>
<tr>
<td>29 ON/OFF Pumping Station (located internally)</td>
</tr>
<tr>
<td>36  Air Cooling</td>
</tr>
</tbody>
</table>

The pumping stations are of plug and play type and are fully automatic operating pumping units.

The mains cable is not included with the delivery consignment and must therefore be ordered separately (see 'Accessories').

The pumping station can be supplied with or without the Display And Operating Unit DCU 001. The Display And Operating Unit DCU 001 serves to control and monitor the pumping station. The DCU can be detached from the pumping station and operated with the 3 m long connecting cable as a remote control and which is included with the delivery.

Cooling
Standard:  Air cooling (range from 5 to 35 °C ambient temperature)
Alternative:  Water cooling (Accessory)

Proper Use
- The turbomolecular pumping stations may only be used for the purpose of generating vacuum.
- The turbomolecular pumping stations may only be operated in the configuration shown.

Improper Use
The following, inter alia, is regarded as improper:
- The pumping of corrosive or explosive gases,
- Operating the pumping stations in areas where there is a danger of explosion,
- Operating in surroundings which require a protection type superior to IP 30,
- The use of accessory parts not named in these operating instructions or which have not been agreed with the manufacturer.

Improper use will cause all guarantees and liability claims to be null and void.

2.2. Pumping Station Control

<table>
<thead>
<tr>
<th>Pumping station</th>
<th>High vacuum flange, Pumping station control</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM S03 520</td>
<td>DN 63 ISO-K, TC 600, TPS 100</td>
</tr>
<tr>
<td>PM S03 521</td>
<td>DN 63 CF-F, TC 600, TPS 100</td>
</tr>
<tr>
<td>PM S03 522</td>
<td>DN 40 ISO-KF, TC 600, TPS 100</td>
</tr>
<tr>
<td>PM S03 525</td>
<td>DN 63 ISO-K, TC 600, TPS 100, DCU 001</td>
</tr>
<tr>
<td>PM S03 526</td>
<td>DN 63 CF-F, TC 600, TPS 100, DCU 001</td>
</tr>
<tr>
<td>PM S03 527</td>
<td>DN 40 ISO-KF, TC 600, TPS 100, DCU 001</td>
</tr>
</tbody>
</table>

* Alteration to the operating parameters with the DCU 001 possible.

Accessory connection to TC 600:
- Air cooling
- Venting Valve TVF 005
- Turbo pump heating

DCU 001:
- Pressure gauges (see Accessories)

2.3. Pumping Station Components

<table>
<thead>
<tr>
<th>Pumping stations</th>
<th>TSH / TSU 071 E</th>
<th>Operating Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumping station components</td>
<td>Turbomolecular Drag Pump with Electronic Drive Unit TC 600</td>
<td></td>
</tr>
<tr>
<td>TMH / TMU 071 P</td>
<td>PM S03 520</td>
<td>PM 0504 BN</td>
</tr>
<tr>
<td>MVP 015-2</td>
<td>PU 0012 BN</td>
<td></td>
</tr>
<tr>
<td>Power Unit</td>
<td>TPS 100</td>
<td>PM 0521 BN</td>
</tr>
<tr>
<td>Air cooling</td>
<td></td>
<td>PM 0543 BN</td>
</tr>
<tr>
<td>Display And Operating Unit</td>
<td>DCU 001</td>
<td>PM 0477 BN, PM 0547 BN</td>
</tr>
</tbody>
</table>
3. Installation

3.1. Preparations For Installation

Do not carry out any unauthorized modifications or alterations to the turbo pumping station.

- The lubricant reservoir on turbopumps is fitted and filled ready for operation.
- Only remove the blank flange on the high vacuum side immediately before connecting.
- Pay attention to the permissible magnetic field ≤ 3 mT.
- Set up the pumping station on a horizontal surface.
- Remove transportation package from the diaphragm pump.
- In order to avoid the build-up of heat when operating the pumping station, the minimum distances to walls and adjacent units should be observed (as shown in the following illustration).

3.2. Fitting The Exhaust Line

When fitting the exhaust line take account of the instructions in the operating instructions for the backing pump.

The exhausted process gases and vapours can represent a health hazard and can also be environmentally damaging. Comply with all the gas manufacturer’s safety instructions.

3.3. Venting Units

Turbomolecular Drag Pumps TMH/TMU 071 P can be vented manually with the venting screw (condition on delivery).

For information to possible venting modes refer to the operating instructions of the turbopump.

Venting Valve TVF 005 (Accessory)

The Venting Valve TVF 005 can be used in conjunction with the TC 600 to vent the TMH/TMU 071 P. Control is via the setting which has been pre-selected on the Electronic Drive Unit TC 600.

The venting mode on the TVF 005 is selectable via the DCU 001.

For information to the installation of the venting valve refer to the operating instructions of the turbopump.

3.4. Electrical Connection

The electrical connection should be carried out in accordance with local regulations. Alternating current is required to operate the pumping station.

Change-over the voltage selection switch

The diaphragm pump has a change-over single phase wide range motor.

- Before the installation of the pumping station the local mains voltage must be ascertained.
- Using a suitable screwdriver set the voltage change-over (on the diaphragm pump terminal box cover) to the range of mains voltage available (see the adjacent illustration).

Works setting: X = 230 (voltage range 190 - 260 V)

Voltage change-over switch on the diaphragm pump

A Setting marking
X Setting "230" voltage range 190-260V; 50/60 Hz
Y Setting "115" voltage range 90-127V; 50/60 Hz
3.5. Connecting The Vacuum System

The weight of a vacuum chamber freely flanged onto the vacuum flange must not exceed 200 N (corresponds to 20 kg). No unilateral loading on the high vacuum flange.

- Only remove the blank cover on the high vacuum flange when the apparatus is ready for connection so that no moisture can precipitate in the pump; this would prolong the pumping time needed for attainment of final vacuum.
- Insert splinter shield for protection against the ingress of foreign particles in the high vacuum flange (see “Accessories” for the turbopump).
- Remark the instructions for the installation of the turbopump. Refer to the relevant operating instructions.

3.6. Cooling

The pumping stations are equipped with air cooling as standard; this can be used up to an ambient temperature of 35 °C. If required, a change to water cooling is possible.

Where operations involve casing heating and/or gas loads, water cooling is necessary (see “Accessories”).

3.7. Connecting The Casing Heating

Only valid for the turbopump TMU 071 P with stainless-steel housing and CF-F flange.

In order to accelerate the attainment of final pressure, turbopumps and vacuum chambers can be heated. The heating duration is dependent on the degree of contamination and the required final pressure. The heating duration should be at least 4 hours.

Where casing heating is involved, the turbopump must be water cooled.

High temperatures are generated when heating turbopumps. There is a danger of burns when coming into contact with hot parts even after the casing heating is switched off. As far as possible, thermally insulate the heating sleeve and pump casing during installation. When heating, do not touch the pump casing and heating sleeve.

The relay box of the casing heater can be secured to the pumping station casing with 4 screws M4 (see also Section 8.1. Dimensions). For details of the casing heating and its installation please refer to the relevant operating instructions (see “Accessories”).
3.8. Connections Diagram

TC 600

1. n.c.
2. +24 VDC* / max. 200 mA (supply voltage, DCU)
3. n.c.
4. +24 VDC*/max. 50 mA
5. Venting release
6. Motor TMP
7. Pumping station
8. Heating / Reset
9. Standby
10. PWM on (touch relation 25 - 75 %)
11. Switching output 1 (24 VDC / max. 50 mA)
12. Switching output 2 (24 VDC / max. 50 mA)
13. GND*
14. Contact output 1: Switch point attained
15. Contact output 2: Collective malfunction

RS 485

1. n.c.
2. +24 VDC*/max. 50 mA
3. Venting release
4. Motor TMP
5. Pumping station
6. Heating / Reset
7. Standby
8. PWM on (touch relation 25 - 75 %)
9. Switching output 1 (24 VDC / max. 50 mA)
10. Switching output 2 (24 VDC / max. 50 mA)
11. GND*
12. Contact output 1: Switch point attained
13. Contact output 2: Collective malfunction
14. Analog output 0-10 VDC = 0-100 % *fend/R · 10 kΩ

REMOTE

1. n.c.
2. +24 VDC*/max. 50 mA
3. Venting release
4. Motor TMP
5. Pumping station
6. Heating / Reset
7. Standby
8. PWM on (touch relation 25 - 75 %)
9. Switching output 1 (24 VDC / max. 50 mA)
10. Switching output 2 (24 VDC / max. 50 mA)
11. GND*
12. Contact output 1: Switch point attained
13. Contact output 2: Collective malfunction
14. Analog output 0-10 VDC = 0-100 % *fend/R · 10 kΩ

HEAT/TMS

Relay box

Mains input, heating 115/208/230 VAC

HEATING

VENT

Venting valve TVF 005

FV PUMP

Relay box pumping station

FAN

Fan

MVP 015-2

TPS 100

X4

Protection conductor (PE)

X1

Supply voltage TC

X2

GND

DCU 001
4. Operations

4.1. Lubricant Filling
- The bearing on the turbomolecular Drag Pump has been filled with the required amount of lubricant. Changing the lubricant reservoir should be carried out in accordance with the instructions in the respective operating instructions.
- The diaphragm vacuum pump is lubricated for the duration of its working life.

4.2. Before Starting

The rotor on the turbopump rotates at great speed. When the high vacuum flange is open there is a danger of injury and of damage to the pump resulting from objects falling in. Therefore never start the turbo pumping station with the high vacuum flange open.

- With water cooling: Open the cooling water supply and check flow.
- Plug in mains plug.

The main switch 2a on the diaphragm pump must be set to the Position "ON".

WARNING
Take care when pumping dangerous gases. Take account of all the safety recommendations of the gas manufacturer.

4.3. Starting

Operations without DCU 001
- Switch on the pumping station with the ON/OFF switch 29 (see Section 2.).
- After a successfully completed (duration approximately 10 seconds) the pumping station will start.
- If, after switching on, the vacuum pump does not start, please refer to "What To Do In The Case Of Breakdowns?" in the respective operating instructions.
- The turbomolecular drag pump runs up automatically. The running up phase up to the attainment of the rotation speed switch point is dependent on the size of the vacuum chamber. For the run-up time for the pump please refer to "Technical Data" in the respective operating instructions.

Before starting the pumping station it is recommended, particularly where the incidence of water vapour is to be anticipated, to open the gas ballast valve on the backing pump by hand. If it is ascertained that the intake pressure increases or is abnormally high, the valve can be opened when the pumping station is running. Once the final pressure has stabilized, the valve can be closed again.

Operations with DCU 001
The DCU 001 serves to control and monitor the pumping station.
- Switch on the ON/OFF switch 29 (see Section 2.).
- Remove bridges 1-4 on the remote plug on the TC 600.
- Select [P:794] «Param. Set» and set to «1».
- Check relevant set value data and setting commands (see operating instructions "Pumping Operations With The DCU").
- Select [P:023] «Motor TMP» and set to «ON».
- Switch on the pumping station with the key on the DCU.

Turbopump Run-Up
If the self-test has been successfully completed, the turbopump begins to run and the backing pump starts. During the pre-set run-up time [P:700] the rotation speed switchpoint [P:701] must be attained. Both parameters can be matched to the process. If a malfunction code is displayed please refer to the malfunction code table, Section Kap. 4, in the operating instructions "Pumping Operations With The DCU”. When the malfunction has been acknowledged, the run-up starting time will be renewed.

Further details can be found in the following operating instructions:
- PM 0477 BN; Display And Operating Unit DCU
- PM 0547 BN; Pumping Operations With DCU.

Display And Operating Unit DCU 001

<table>
<thead>
<tr>
<th>No.</th>
<th>Function</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCD Display</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Status display</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Key &quot;malfunction acknowledgment&quot;</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Key &quot;Left&quot;</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Key &quot;Right&quot;</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Key &quot;Pumping Station ON/OFF&quot;</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Red illuminating diode for malfunction status</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Green illuminating diode for operations status</td>
<td></td>
</tr>
</tbody>
</table>
4.4. Switching OFF

Operations without DCU 001

- The complete pumping station is switched off with the ON/OFF switch 29 (see Section 2.).
- The pump and the vacuum chamber can be vented directly after switching off (see Section 3.3.).
- Where Venting Valve TVF 005 is in use, the preassigned venting mode on the TC 600 runs for the turbopump. The venting mode can be altered via a DCU 001 or the serial interface.
- Refer to the chapter “operations with the remote control unit” in the operating instructions for the turbopump PM 0504 BN.

The pumping station is only free of voltage when the mains plug is disconnected.

Operations With DCU 001

- Switch off the pumping station with key D on the DCU 001.

Further details can be found in the following operating instructions:
- PM 800 477 BN; Display And Operating Unit DCU
- PM 800 547 BN; Pumping Operations With The DCU.

- If the pumping station is switched off for longer periods, the ON/OFF switch 29 (see Section 2.) should also be switched off.

The pumping station is only free of voltage when the mains plug is disconnected.

5. What To Do In The Case Of Breakdowns?

The elimination of malfunctions is described in the operating instructions for the individual components (operating instructions see Section 2.3.).

6. Maintenance

Maintenance of the individual components of the pumping station should be carried out in accordance with the relevant operating instructions (see Section 2.3.).

6.1. Lubricant

- The bearing on the diaphragm vacuum pump is lubricated for the duration of its working life.
- The lubricant reservoir on the turbopump should be replaced at least every three years. Where extreme operating conditions or unclean processes are involved, the replacement interval should be checked with your Pfeiffer Vacuum Service Center.

<table>
<thead>
<tr>
<th>Lubricant Reservoir, turbopump</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMH 071 P</td>
<td>PM 103 993 AT</td>
</tr>
<tr>
<td>TMU 071 P</td>
<td></td>
</tr>
</tbody>
</table>
7. Service

Do make use of our service facilities
In the event that repairs are necessary on 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 individual components to the manufacturer for repairs.
- Replace individual components.

Local Pfeiffer Vacuum representatives can provide full details.

Before returning:
- Please attach a clearly visible notice "Free of harmful substances" (both on the unit and also on the delivery note and any accompanying letters).

"Harmful substances" are substances and preparations as defined in the current, local, dangerous substances regulations; in the U.S.A. as "materials in accordance with the Code of Federal Regulations (CFR) 49 Part 173.240 Definition and Preparation". We 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 declaration of contamination
- In every case the "Declaration of Contamination" 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.

8. Technical Data

<table>
<thead>
<tr>
<th>Pumping Station</th>
<th>Unit</th>
<th>TSH 071 E</th>
<th>TSH 071 E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection, nominal diameter</td>
<td>DN 40 ISO-KF</td>
<td>DN 83 ISO-K</td>
<td></td>
</tr>
<tr>
<td>Volume flow rate for</td>
<td>l/s</td>
<td>l/s</td>
<td>l/s</td>
</tr>
<tr>
<td>Nitrogen N₂</td>
<td>33</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Helium He</td>
<td>39</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Hydrogen H₂</td>
<td>32</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Compression rate</td>
<td>&gt;10⁻¹¹</td>
<td>6·10⁻⁶</td>
<td>&gt;10⁻⁵</td>
</tr>
<tr>
<td>Final pressure</td>
<td>mbar</td>
<td>mbar</td>
<td>mbar</td>
</tr>
<tr>
<td>Start-up time</td>
<td>min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working range from to</td>
<td>mbar</td>
<td>mbar</td>
<td>mbar</td>
</tr>
<tr>
<td>Backing pump volume flow rate at 50 Hz</td>
<td>l/min</td>
<td>3.8</td>
<td>&lt;1·10⁻⁷</td>
</tr>
<tr>
<td>60 Hz</td>
<td>l/min</td>
<td>4.4</td>
<td></td>
</tr>
<tr>
<td>Duration/max. power</td>
<td>W</td>
<td>100/110</td>
<td></td>
</tr>
<tr>
<td>Mains connection</td>
<td>VAC</td>
<td>90-132/185-265</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>15</td>
<td>15/18</td>
</tr>
</tbody>
</table>

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 have to be returned for maintenance/repair, the following instructions concerning shipping must be followed:
- 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 pump to your nearest Pfeiffer Vacuum Service Center.

Please refer to the relevant operating instructions for technical data on the individual components (see Section 2.3.).

1) With maximum gas throughput.
8.1. Dimensions

Gewindelöcher (4xM4) zur Befestigung der Heizungsrelaisbox
Threaded holes (4xM4) for securing the heating relay box
9. Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
<th>Number</th>
<th>Comments/Relevant operating instructions</th>
<th>Ordering Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains cable 230 V</td>
<td>CEE7/CEE22</td>
<td>P 4564 309 ZA</td>
<td>length 3 m</td>
<td></td>
</tr>
<tr>
<td>230 V</td>
<td>NEMAG6-15P/CEE22</td>
<td>P 4564 309 ZF</td>
<td>length 3 m</td>
<td></td>
</tr>
<tr>
<td>115 V</td>
<td>NEMAG5-15P/CEE22</td>
<td>P 4564 309 ZE</td>
<td>length 3 m</td>
<td></td>
</tr>
<tr>
<td>Display And Operating Unit DCU 001 with connecting cable TC 800-DCU 001 (3 m)</td>
<td></td>
<td>PM 041 816 AT</td>
<td>PM 0417 BN / PM 0547 BN</td>
<td></td>
</tr>
<tr>
<td>Venting Valve TVF 005, without current closed</td>
<td>24 VDC</td>
<td>PM 201 135</td>
<td>PM 0507 BN</td>
<td></td>
</tr>
<tr>
<td>Venting flange</td>
<td>DN 16 ISO-KF</td>
<td>PM 033 737-T</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td>Hose clip clamping for venting flange</td>
<td>DN 16 - 16 ISO-KF</td>
<td>PM 033 016-T</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td>Casing heating</td>
<td>230 V; Schuko plug</td>
<td>PM 041 900-T</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>208 V; UL-plug</td>
<td>PM 041 901-T</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>115 V; UL-plug</td>
<td>PM 041 902-T</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td>Water cooling</td>
<td></td>
<td>PM 016 000-T</td>
<td>PM 0546 BN</td>
<td></td>
</tr>
<tr>
<td>Sealing gas valve</td>
<td></td>
<td>PM 201 142</td>
<td>PM 0229 BN</td>
<td></td>
</tr>
<tr>
<td>Splinter shield for turbopumps</td>
<td>DN 40 ISO-KF</td>
<td>PM 038 375-X</td>
<td>PM 0231</td>
<td></td>
</tr>
<tr>
<td>Splinter shield for turbopumps</td>
<td>DN 33 CF-F</td>
<td>PM 016 312</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td>Protection screen for turbopumps</td>
<td>DN 33 CF-F</td>
<td>PM 016 333</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td>Centering ring with splinter shield</td>
<td>DN 33 ISO-K</td>
<td>PM 016 207-U</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td>Centering ring with protective screen</td>
<td>DN 33 ISO-K</td>
<td>PM 016 208-U</td>
<td>PM 0542 BN</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure Gauges</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compact Capacitance CMR 261</td>
<td></td>
<td>PT R24 501</td>
<td>Connecting Flange DN 16 ISO-KF</td>
<td></td>
</tr>
<tr>
<td>Compact FullRange PKR 251</td>
<td></td>
<td>PT R26 000</td>
<td>Connecting Flange DN 25 ISO-KF</td>
<td></td>
</tr>
<tr>
<td>Pirani TPR 280</td>
<td></td>
<td>PT R26 950</td>
<td>Connecting cable not included</td>
<td></td>
</tr>
<tr>
<td>Sensor cable Al</td>
<td>length 3m</td>
<td>PT 448 250-T</td>
<td>PM 0544 BN</td>
<td></td>
</tr>
</tbody>
</table>

Further accessories for the individual components are listed in their operating instructions. When ordering accessories, it is essential to state the full part number. Use the list as an order form (copy).

10. Spare Parts

The spare parts for the individual components can be found in the respective operating instructions (see Section 2.3.).
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:
   ____________________________
   ____________________________
   ____________________________

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 ☐ no ☐

4. Process related contamination of equipment
   - toxic yes ☐ no ☐
   - corrosive yes ☐ no ☐
   - microbiological hazard*) yes ☐ no ☐
   - explosive*) yes ☐ no ☐
   - radioactive*) yes ☐ no ☐
   - other harmful substances yes ☐ no ☐

*) 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:

<table>
<thead>
<tr>
<th>Tradename</th>
<th>Chemical name (or Symbol)</th>
<th>Danger class</th>
<th>Precautions associated with substance</th>
<th>Action if spillage or human contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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: ____________________________
Tel.: ____________________________
Fax: ____________________________ Telex: ____________________________
Name: ____________________________
Job title: ____________________________
Date: ____________________________ Company stamp: ____________________________
Legally binding signature: ____________________________