


Operation Manual
Original Operation Manual

Rev. 02 / 04.2019

Double Diaphragm Pump
PTI-MEM1150ALU
Year of manufacture: 2020



CE  II 2 G Ex h IIB T6-T4 Gb X

II 2 D Ex h IIIC 85°C-150°C Db X

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1 EU Declaration of Conformity

CATEGORY: DOUBLE DIAPHRAGM PUMP
Model: PTI-MEM1150
ATEX marking: **CE**  II2 G Ex h IIB T6-T4 Gb X
II2 D Ex h IIIC 85°C-150°C Db X

This double diaphragm pump has been designed and manufactured in accordance with the following EC/EU directives:

Directive 2006/42/EC OJEU L157/24 of 17 May 2006

Directive 2014/34/EU, OJEU L 96/309 of 26 February 2014

under the sole responsibility of (manufacturer):

Timmer GmbH

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48485 Neuenkirchen, Germany

www.timmer.de

The following harmonised standards have been applied:

EN ISO 12100:2010 Safety of machinery –

General principles of design – Risk assessment and risk reduction

EN 809:1998+A1:2009 Pumps and pump units for liquids – Common safety requirements

EN ISO 4414:2010 Pneumatic fluid power - General rules and safety requirements for systems and their components

DIN EN ISO80079-36:2016: Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres– Basic method and requirements (ISO 80079-36:2016)

DIN EN ISO80079-37:2016: Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k" (ISO 80079-37:2016)

Person responsible for compiling the documentation: Timmer GmbH

Address: see manufacturer

Neuenkirchen, 10.2019

Place, date



Managing Director (Klaus Gehrmann)

2 About these instructions

2.1 Use and safekeeping

Please observe the following:

- The pump can only be properly and safely commissioned, operated and maintained with the assistance of this Operation Manual
- This Operation Manual refers exclusively to the product stated on its cover sheet.
- This Operation Manual is part of the scope of delivery.
- Therefore, always keep this Operation Manual in a legible condition in the vicinity of the pump where it is within easy reach of the operator. In the event of the pump being sold or hired out, please leave the document with the pump.
- This Operation Manual is only intended for instructed and authorised technical staff.
- The chapter on Safety provides an overview of all important safety aspects for optimum protection of the personnel and for the safe and trouble-free operation of the pump.
- The manufacturer shall not assume liability for damage resulting from the non-observance of this Operation Manual.
- Reprints, translations and duplications in any form whatsoever, even in excerpts, require the written consent of the publisher.
- The copyright shall remain with the manufacturer.

2.2 Manufacturer information

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2.3 Areas of application

This product complies with the directives of the European Union.

Please observe:

- the enclosed EU Declaration of Conformity
- the intended use
- the inappropriate use

2.4 Warranty

On all Timmer pumps, we provide the first-time buyer with a one year warranty from the date of purchase covering workmanship and materials, subject to use for the intended purpose. Normal wear and tear is excluded from the warranty. The warranty lapses automatically if parts other than genuine Timmer spare parts are installed in the Timmer pump.

In compliance with the applicable law, Timmer GmbH shall not be liable for any consequential damage. The liability of Timmer GmbH is limited in all cases and never exceeds the equivalent value of the purchase price. Before purchasing and shipping the Timmer pump, the customer must check the national and local laws and regulations to ensure that the product, the installation and application comply with the applicable rules.

- File warranty claims to the manufacturer immediately after detection of the defect or fault.
- Warranty shall become null and void in all cases in which no liability claims can also be filed.
- No claims for the modification of already delivered systems and components can be filed on the grounds of the details, illustrations and descriptions contained in this Operation Manual.
- No liability shall be assumed for damage and operational malfunctions arising as described below:
 - Non-observance of the Operation Manual
 - Unauthorised modifications to the system
 - Operating errors
 - Non-performance of maintenance work

3 Safety

3.1 General safety information

• The chapter on Safety provides an overview of all important safety aspects for optimum protection of the personnel and for the safe and trouble-free operation of the pump from transport over operation through to disposal. Non-observance of the instructions and safety information listed in this Operation Manual can lead to considerable danger to persons and material damage to the pump.

The pump is safe for operation.

Residual risks may arise from the pump under the following circumstances, if

- the pump is not used for its intended purpose.
- the pump is operated improperly by untrained or unauthorised personnel.
- the pump is not properly maintained or serviced.
- the safety instructions and warnings contained in this Operation Manual are disregarded.
- the pump is improperly modified or converted.
- the specified maintenance work is not performed in due time.

3.2 Observance of the Operation Manual

Any person commissioned with performing work on and with the pump must have read and understood this Operation Manual and in particular the "Safety" chapter.

The knowledge and observance of the contents is the prerequisite for protecting people from danger and for avoiding faults.

Therefore, adherence to the safety instructions is essential and serves for your protection.

The Operation Manual is a constituent part of the pump and must be available within easy reach of the product at all times. The Operation Manual must be observed. If questions should arise pertaining to the contents of this Operation Manual, or if there are any points requiring clarification, please immediately contact the manufacturer, see section "Manufacturer information".

Apart from the safety instructions in this Operation Manual, attention must be paid that the following regulations and provisions are adhered to:

- Intended use
- The relevant accident prevention regulations (in Germany: UVV)
- Occupational health regulations
- Generally acknowledged safety-related rules
- Country-specific provisions
- The manufacturer's information (safety data sheets) for operating materials and auxiliaries, chemical substances

Furthermore, these regulations and provisions can be supplemented by operating instructions pertaining to the observance of in-house provisions or specific operational features.

In addition to this Operation Manual, in-house instruction must be provided taking into consideration the technical qualification of the respective person.

3.3 Operational prerequisites

Dependence on other equipment and facilities is not known and must be separately checked by the operating company.

Furthermore, the following prerequisites must be fulfilled for the regular operation of the pump, unless they lie within our scope of responsibility:

- Properly completed assembly.
- Successful trial run with all necessary setting work.
- Instruction of the operating personnel in the operation of the pump and the relevant safety instructions.
- If hot or cold machine components involve additional hazards, these parts must be protected against contact by the customer.
- Exclusion of hazards caused by electrical energy (details see e.g. regulations of the VDE (German electrotechnology association) or power supply company).
- The pump must be easily accessible.
- Appointment of a person mainly responsible for proper operation.

3.4 Intended use

- The pump and the operating manual are intended exclusively for commercial use.
- The pump must only be used for pumping fluid media (see section "Technical data").
- The pump must only be operated within the limits specified for intended use (see section "Technical data").
- The pumped medium must be compatible with the materials of the pump (see section "Technical data").
- The owner of the pump is responsible for selection of the medium to be pumped.
- The pump must only be operated in environments that do not adversely affect the properties of the materials used.
It is the responsibility of the owner to verify the suitability of the material.

3.5 Improper use

A use other than the use described in the section, "Intended use" and in this operating manual, and any use that extends beyond the specified intended use, is considered non-intended use. The manufacturer shall not be liable for damage resulting from non-intended use. This risk is borne solely by the user / owner.

- Pumping of media that does not meet the product specification
- Do not modify the pump in any manner whatsoever.
- Use of the pump for purposes other than those cited in section
- Operating a damaged pump
- Operation, maintenance and repair of the system by unauthorised and/or untrained personnel
- Pump operation without earthing
- Pump operation outside of the specified parameters and/or operating data
- Operating the pump at a location where there are ignition hazards due to sources of ignition in the vicinity of the pump
- Use or commissioning of the pump by private users
- Modifying or converting the pump
- Set up on unsuitable substrates
- Attaching transport aids on the housing
- Failure to comply with the specified maintenance intervals

- Operating the pump in Zone 0 explosive gas/dust atmospheres
- Immersing the pump in the pumped medium
- Operation in explosive atmospheres without prior implementation of the requirements stipulated in Directive 1999/92/EC and national regulations for explosion protection, on the part of the owner
- Initial commissioning without prior inspection of the area and the pump by a person qualified to perform the inspection
- Pumping of media that is chemically incompatible with the materials used to construct the pump – The owner of the pump must check the chemical compatibility of the pumped media
- Pumping of media with parameters (e.g. ignition temperatures) that are not compatible with the information specified on the pump
- Operating the pump with bypassed safety devices is prohibited

3.6 Foreseeable misuse

The following points describe a foreseeable misuse of the pump:

- Installation on unsuitable surfaces
- Attachment of transport aids to the housing
- Non-adherence to operating data
- Non-adherence to maintenance intervals
- Operation with unsuitable media
- Operation in the wrong Ex zone

3.7 Labelling on the pump

The rating plate attached to the pump must be absolutely observed. It may not be removed and must be kept in a legible condition at all times.

3.7.1 Rating plate

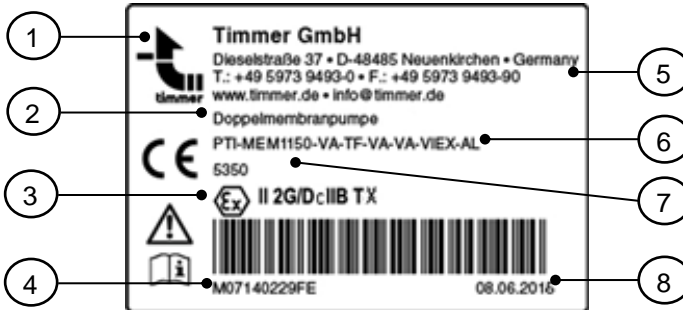


Fig.1: Rating plate

- | | | | |
|---|---|---|------------------------|
| 1 | Logo | 5 | manufacturer's address |
| 2 | Product designation | 6 | Ordering code |
| 3 | ATEX marking acc. to Directive 2014/34/EU | 7 | Item number |
| 4 | Serial number | 8 | Date |

3.8 Qualifications of personnel

Any work on the pump may only be performed in accordance with the existing rules and statutory provisions by suitably qualified and trained personnel with the customary due diligence.

The following points must be fulfilled:

- The personnel must have special knowledge and experience in the respective specialist field. This particularly applies to maintenance and repair work on mechanical and pneumatic systems of the pump.
- The personnel must have knowledge of the relevant standards, provisions, accident prevention regulations and operating conditions.
- The personnel must have been authorised to perform the necessary work by a person responsible for safety.
- The personnel must be able to recognise and avoid potential hazards.

The necessary personnel qualifications are subject to the various statutory provisions at the respective place of operation. The operating company must ensure adherence to the applicable laws.

3.9 Personal protective equipment

Not wearing the personal protective equipment can lead to severe injury or even death.

- Wear the protective equipment specified by the company e.g. hearing protection, eye protection, safety footwear, safety helmet, protective clothing and safety gloves when performing any work on the pump.



- Do not wear untied long hair, loosely fitting clothing or jewellery. There is a risk of injury from being caught, drawn in or carried along on moving parts.
- Ensure that there are no unauthorised persons within the danger zone.

3.10 Safety instructions in the Operation Manual

WARNING

The signal word **WARNING** marks a potential hazard.
Non-observance can lead to most severe injuries or even death.

CAUTION

The signal word **CAUTION** marks a potential hazard.
Non-observance can lead to slight or moderate injury.

! Attention

The signal word **Attention** marks potential material damage.
Non-observance can lead to damage to the machine.

Environmental protection information

The signal words **Environmental protection information** mark information on the protection of the environment.

Note

The signal word **Note** marks additional information on the machine or its application.

3.11 Safety information **CAUTION****Hazard to persons due to a defective pump!**

- Check the pump regularly for damage or leaks.
- Immediately switch off a damaged or leaky pump.

 **CAUTION****Risk to health through coming into contact with harmful media!**

- Cleaning, repairs, troubleshooting activities and fault elimination during which contact with the medium is possible, may only be carried out when the relevant personal protective equipment PPE (at least protective clothing, protective gloves, safety glasses) is worn.
- The manufacturer's safety data sheets and the national laws and provisions must be observed.

Attention**Damage to the pump due to the operating conditions and the properties of the conveyed media!**

- The properties of the conveyed media (e.g. abrasiveness, viscosity, etc.) and the conditions of use can have a negative effect on the service life and function of the pump.
- Solids in the medium may damage the pump, in particular the diaphragm, and lead to immediate failure.

Attention**Damage to the pump due to chemically incompatible media!**

- The pump operator must check the chemical compatibility between the conveyed media and the materials used to construct the pump.
A list of pump materials can be found in the chapter "Technical Data".

Attention

Damage to the pump by too high mechanical forces!

- Do not expose the pump to large mechanical forces.

Attention

Destruction of the pump from too high air pressure!

Too high an air pressure can lead to the diaphragm being destroyed and the pump bursting.

- Operate the pump with a maximum air pressure of 8 bar.
- Make sure that the outlet point of the medium to be conveyed is not clogged or closed.

WARNING

Danger of explosion due to improper installation tasks!

- During installation and dismantling, maintenance, transport to/from the place of use, and maintenance there is danger of generating sparks through friction, impact and rubbing processes or through electrostatic charging. Consequently, ensure that these hazards are safely eliminated or that an explosive atmosphere is not present during these work stages.

 **WARNING****When handling dangerous substances:**

The following instructions must be complied with if the hazard analysis conducted by the owner reveals that a possible leak of the medium poses an increased risk:

- The installation of media shut-off valves at the medium inlets and outlets to shut off the medium flow in case of a leakage on the pump.
- The installation of the pump with shut-off valve, 3-way valve and check valve in the compressed air supply line. These 3 components prevent the pumped medium from entering the compressed air system if a diaphragm tears.
- If diaphragms are completely defective, the fluid can enter the compressed air circuit, damage the compressed air circuit and exit via the silencer. Depending on the pumped medium, the silencer must be replaced by a suitable pipe or hose connection to avoid danger. The discharge must be taken to safe place.
- If diaphragms are completely defective, the medium to be pumped can react with materials in the compressed air circuit. Prior to commissioning the owner must assess the risk and take suitable measures.


 **Environmental protection notice****Environmental pollution due to pumped media and cleaning agents.**

- Regularly check all lines, hoses and connections for leaks and apparent damage. Immediately repair any damage!
- Take up or wipe up leaked and spilled media and cleaning agents and dispose of them in an eco-friendly manner.
- Prevent escaped or spilled media and cleaning agents from getting into the groundwater.
- For safe and eco-friendly disposal of media, cleaning agents and replacement parts.
- Comply with the safety regulations applicable to the media and cleaning agents.

4 Additional ATEX information

4.1 ATEX marking in accordance with Directive 2014/34/EU and DIN EN ISO 80079-36 for the pump

CE  **2G Ex h IIB T6-T4 Gb X / 2D Ex h IIIC 180 °C Db X**

Symbol	Meaning
CE	CE mark.
	Marking relevant for explosion prevention in accordance with ATEX.
II	Atex device of Equipment Category II intended for use in explosive atmospheres, except for mines.
h	Non-electrical device for the explosive area.
2 G/D	ATEX device of Equipment Category 2 (avoidance of effective ignition sources). The device can be used as intended in areas where Zone 1 and Zone 2 explosive gas or dust atmospheres can occur. Use of the device is prohibited in Zone 0.
IIB	The intended use is permitted in gas explosive areas with gases and vapours of explosion groups IIA and IIB. The intended use is not permitted in gas explosive areas with gases and vapours of explosion group IIC.
IIIC	Use as intended in potentially explosive dust atmospheres with dusts of dust groups IIIA, IIIB and IIIC
T6-T4	Temperature class for the gas explosion hazardous area. The actual maximum surface temperature does not depend on the device; but rather it depends on the operating conditions (medium temperature and compressed air temperature).
T85°C- T150 °C	Surface temperature for the area with a dust explosion hazardous area. The actual maximum surface temperature does not depend on the device; but rather it depends on the operating conditions (medium temperature and compressed air temperature).
Gb/Db	Device protection class for gas or dust. In normal operation and for the faults that can usually be expected (defects on the device), the device ensures the required degree of safety and avoidance of ignition sources.
X	The following special conditions must be met to ensure safe operation of the pump in explosive atmospheres. Pay attention to the limited ambient temperature.

	Mechanisms/processes that generate stronger charges than are generated through manual rubbing, must be prevented on the labels, the silencer and possibly the diaphragm.
--	--

WARNING

Danger due to highly effective charge-generating processes!

- Highly efficient charge-generating processes can cause electrostatically dangerous charging of diaphragms that have a non-dissipative layer (e.g. PTFE) on the media side. Highly-effective processes that generate static charges, include flange purging of multiphase fluids and liquids with low conductivity ($< 100 \text{ pS/m}$) and the purging of the pump with compressed air.
The owner must take additional protective measures to safely prevent these processes. Possible measures include:
 - Filling the pipes and pump chambers with inert gas during dry-run
 - Slow filling and emptying of the pump
 - Reliable avoidance of dry-run (slurp operation)
- Highly-effective charge-generating processes can cause electrostatic charging of labels/stickers, silencers and ball valve handles. Highly efficient processes that generate charges include cleaning the pump with a high-pressure cleaner.
The owner must take additional protective measures to safely prevent these processes. Possible measures include:
 - Large-area, permanent covering of the labels/stickers with transparent conductive foil, or the removal of such labels/stickers (rating plates must not be removed).
 - Replacement of the silencer with a conductive/dissipative silencer.

WARNING

Danger of explosion due to hot surfaces!

The maximum surface temperature is equal to the max. temperature of the pumped medium and/or the compressed air temperature.

- In accordance with national regulations, the medium temperature/compressed air temperature must with certainty and with a sufficient differential, be below the ignition temperature of the explosive atmosphere.

4.1.1 Ignition sources in the device

Mechanically generated sparks, chemical reaction and static electricity are potential ignition sources in the pump. The effectiveness of these ignition sources is reliably prevented, even in event of the usual errors, through integration into the equipotential bonding system and by limiting the operating parameter settings and ambient conditions.

5 Transport

If possible, only transport the pump in its original packaging to avoid transport damage.

5.1 Check the scope of delivery

1. Remove the transport packaging of the pump.
2. Dispose of the transport packaging in a proper manner.
3. Examine the pump for any transport damage.
 - Transport damage must be immediately communicated to the transport company and the manufacturer in writing.
 - Protect the pump from further damage.
4. Check the delivery against the dispatch documents for completeness.

6 Storage

- Storage conditions have a detrimental effect on the service life of the diaphragm.
- The pump may only be put away for storage after it has been thoroughly cleaned.
- Extreme storage conditions accelerate the ageing process.
- We recommend a storage temperature between +10°C and +25°C.
- The diaphragms must not be exposed to sources of heat or direct sunlight.
- Exclude the effect of ozone or ionising radiation.
- Store the diaphragm such that it is not under tension.
- We recommend the replacement of the diaphragm at the latest after one year of storage under the storage conditions stated above.

7 Product description

The double diaphragm pump is a self-priming, pneumatically driven liquid pump. Liquid is conveyed by the opposing movement of two diaphragms. A changeover valve ensures that the two diaphragms are alternately pressurized with compressed air. Each diaphragm comprises a liquid inlet and a liquid outlet valve.

When the diaphragm movement enlarges the pump chamber, the outlet valve closes and the inlet valve opens, sucking the liquid into the pump chamber. When the diaphragm moves in the opposite direction, the pump chamber is reduced in size, the inlet valve closes, the outlet valve opens and the liquid is pumped out.

When one of the diaphragms reaches its end position during the suction process, a proximity sensor actuates the changeover valve, pressurizing the other diaphragm with air.

The changeover valve is designed so that it cannot remain in a central position.

8 Installation

8.1 Safety information

WARNING

Risk of explosion due to electrostatic charging!

- Connect the pump to a protective earthing system (equipotential bonding) before commissioning.

WARNING

Personnel are in danger due to improper installation!

- Connections must be used that are made of material that is compatible with the pumped medium and with the material of the pump.
- The pump does not have its own pneumatic shut-off valve. If the pump cannot be switched off by simply, safely disconnecting or switching off the compressed air supply, an additional, easily accessible shut-off valve must be installed upstream of the compressed air connection.
- The pump must be integrated in the compressed air system in such a manner that it can be taken out of service by switching off the compressed air.
- Select the installation location for the pump in such a manner that the possibility of impacts that can cause ignition is excluded.
- The compressed air supply (hoses, etc.) must be installed in such a manner that they do not pose any hazard.
- Use a pressure relief valve in the compressed air supply if there is a risk of exceeding the operating parameters.

CAUTION

Hazard to persons due to insufficient lighting!

- Only carry out installation work on the pump in a sufficiently illuminated and air-conditioned environment.

! Attention

Malfunction or damage due to residual substances in the pump

- The pump must be thoroughly flushed with suitable media prior to commissioning in order to remove any substances harmful to the wetting properties of lacquers or substances incompatible with the medium to be conveyed that may have been introduced during the customer's handling process (incoming goods, handling, storage, assembly, etc.) from inside the pump.
- For this purpose, please make sure to observe section 11 Cleaning

8.2 Preparations

- Do not use the pump as a support for the pipework system.
- Ensure that the system components are correctly supported to prevent an overload on the pump parts.
- Ensure that regulations relating to the protective earthing system (equipotential bonding) are observed.

Note

- No electrical connection is required.
- The pump is self-priming.

8.3 Connection

1. Fix the pump using suitable fastening screws to ensure its stability.
Do not immerse the pump in the medium to be conveyed.

Pump with springs in the media valves

A different pump position is possible, however the pump chambers must be vented during commissioning.

Start pump in the preferred horizontal position at maximum frequency.

2. Provide a compressed air hose from the compressed air source to the pump.

The connection thread on the pump is 1/2"

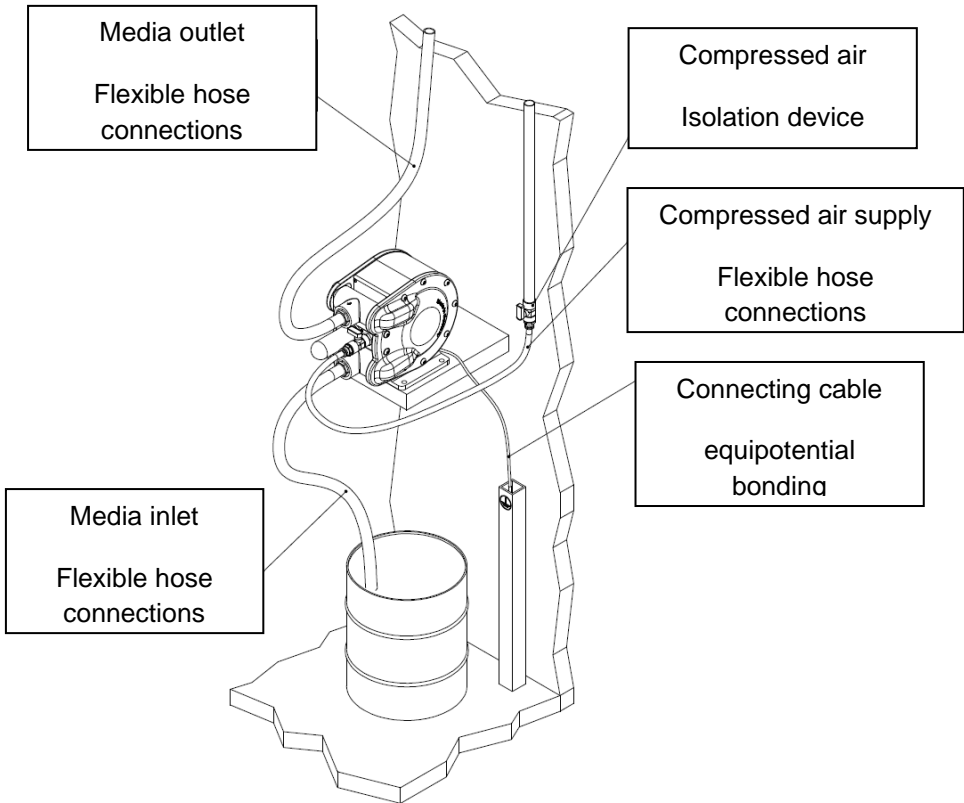


Fig. 2: Connections on the pump

3. Provide flexible suction and outlet connections (e.g. hose connections). The flexible connections prevent vibrations being transferred to the pipework system.
4. Pay attention that the connections are compatible with the conveyed medium and are able to withstand high pressures.
5. Ensure that the line cross-sections are sufficiently dimensioned. This depends on the viscosity of the medium and the circumstances of the system.

Installation

6. Make absolutely sure to connect the suction and conveying hose with suitable hose clamps.
The flow direction is marked with arrows on the pump housing. Make sure to observe these arrows, do not remove them and keep them in a clearly recognisable condition.
7. Connect the suction hose to the inlet point).
8. Connect the conveying hose to the outlet point.
9. Connect the pump to a protective earthing system.

The connection for the equipotential bonding is marked accordingly on the pump foot (1).

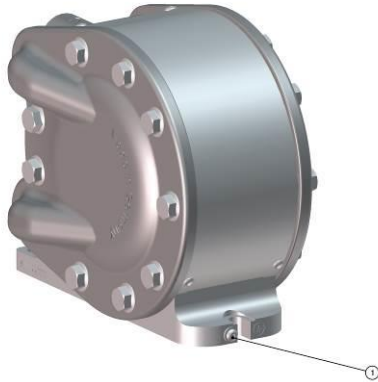


Fig. 3: Connection for the equipotential bonding

10. Check that all connections are tight and do not leak.
11. Attach the compressed air hose to the compressed air connection on the pump.

9 Commissioning

9.1 Safety information

WARNING

Risk of explosion due to dust on the pump housing!


- Clean the surface of the pump housing regularly and remove the layers of dust.

WARNING

Danger to life due to conveying explosion-prone media in potentially explosive environments!

The medium to be conveyed can corrode or destroy the pump or cause it to leak. This may lead to the formation of an explosive mixture.

- The conveying of explosive media and the employment in an explosion-hazardous area is only permitted according to regulations by Directive 2014/34/EU marked on the rating plate of the pump:

CE  II 2 G Ex h IIB T6-T4 Gb X

II 2 D Ex h IIIC 85-150 °C Db X

 **WARNING****Life-threatening danger when operating the pump in hazardous areas!**

- The pump may be used in explosive areas (for example paint shops), only if this is appropriately indicated on the pump rating plate.
- Moreover the owner of the pump is obligated to comply with the requirements stipulated in Directive 1999/92/EC.
- The pump may only be used in explosive atmospheres (e.g. paint shops) if the ATEX markings on the rating plate of the pump and its sub-devices meet the requirements of the zone classification.
- During operation, ensure that the pump is always completely filled with fluid. The continuous pumping of ignitable gas/fluid mixtures that cause a Zone 0 to occur inside the pump, is prohibited.
- The pumped medium can react exothermally with the material of the pump. Before pumping the medium, check the suitability of the pump materials for the medium to be pumped.
- Operation of the pump above the permissible flow rate and longer dry-run operation can cause overheating of the pump.
- When pumping media in ring systems, the delivery capacity of the pump is converted into heat. For short lines, this can cause dangerous heating of the medium.
- Operation of the pump can adiabatically compress explosive gas mixtures in the pump and/or the piping system. This can result in increases in temperature that pose an ignition hazard. The owner must take appropriate measures. The media outlet must not be closed during pump operation.
- The special operating conditions of the pump must be noted and complied with.
- Impacts on the outer aluminium housing parts can lead to ignition-effective sparks.

Attention

Destruction of the pump from too high air pressure!

Too high an air pressure can lead to the diaphragm being destroyed and the pump bursting.

- Operate the pump with a maximum air pressure of 8 bar.
- Make sure that the outlet point of the medium to be conveyed is not clogged or closed.
- Ensure that the exit point of the pumped medium is not clogged or sealed.

1. If the pump is not mounted on a horizontal, even surface with the pump foot at the bottom, vent the pump chambers.
2. Adjust the air pressure to 1 ... 8 bar.
The pump is ready for operation.
3. The pump will start to run as soon as it is charged with compressed air.
4. Operate the pump with a maximum air pressure of 8 bar.

10 Operation**10.1 Regulating the delivery rate****▶ Note**

If the pump delivery rate is to be regulated, the operating company must install a throttle valve in the compressed air supply or in the conveying line.

To reduce the delivery rate

- Reduce the compressed air supply or the medium outflow.

To increase the delivery rate

- Increase the compressed air supply or the medium outflow.

11 Rectification of malfunctions

Malfunction	Cause	Rectification
Pump not running or running too slowly	Compressed air pressure too low	Set the pressure from 4 to 8 bar
	Hose cross-section too small	Use hose with a larger cross-section
	Control valve leaks	Replace spool valve and seals
	Blockage on the sound absorber, pump running laboured, seal swollen or piston material damaged	Check material resistance, prevent running dry
Pump runs but does not convey medium or does not stop when the pressure side is isolated	Valves contaminated	Flush pump with a cleaning agent
	Conveying hose blocked	Clean conveying hose
	Suction and pressure valves contaminated	Allow the pump to run at maximum speed for approx. 10 to 20 minutes
	Leaking connections, possibly sucking in extraneous air, vacuum breaks.	Check connections for leaks, re-seal
	Valves contaminated	Clean or replace valves
	No suction effect on the suction and discharge side	Close the openings by hand and check the suction effect, replace seals as required
	Viscosity of the conveyed medium too high	High-viscosity media are not conveyable (for limit value see chapter "Technical data")
	Conveying hose split or exhibits pin-sized holes	Replace conveying hose
Back pressure at the injection point too high	Reduce back pressure at the injection point	

Rectification of malfunctions

Malfunction	Cause	Rectification
	Screwed joints, ball valve or non-return valve have no or restricted clearance	Restore clearance: clean or replace
	Air in the pump chamber	Vent pump
Fluid reservoir automatically runs to empty	Liquid outlet is below the fluid level in the reservoir	Position the fluid reservoir lower or the liquid outlet higher

12 Cleaning

12.1 Safety information

Attention

Damage to the pump due to hardening, crystallising media!

- The pump must be cleaned prior to long downtimes if liquids are conveyed that harden or crystallise, or contain solids, or that may corrode the pump material due to their chemical or physical properties!
- The definition of a long downtime depends on the previously conveyed medium and its change of state from liquid to solid.
- The definition is the responsibility of the operating company and should be adhered to in any case in order to prevent damage to the pump.

1. Clean the pump only with a suitable cleaning agent, depending on the pump material and the conveyed medium.
Solvents may be suitable.
Liquid and solid cleaning agents must not be used at temperatures exceeding 65 °C.
2. Connect the suction line connection to the cleaning agent.
3. Connect the medium outlet to a suitable container.
4. Pump the cleaning agent until all residues from the pump have been released.
5. Completely empty the pump.
6. For this, pull the suction hose far enough out of the cleaning agent to enable air to be taken in.
7. Completely disconnect the medium outlets of the pump when no more cleaning agent is leaking at the outlet.
8. To empty completely, swivel the pump by 90°, so that the media connections face downwards.

Note

It is necessary to completely empty the pump prior to decommissioning and putting into storage, as the cleaning fluid may possibly accelerate the ageing of the pump diaphragm.

9. Operate the pump at an air pressure of approx. 1 bar.
10. In doing so, move the pump slightly to and fro until the residual quantity in the pump has fully drained out.
11. Clean the external parts of the pump.

Cleaning prior to decommissioning

1. Clean and empty the pump as described in the previous section.
2. Renew the pump diaphragm at the latest after one year to ensure safe and reliable function of the pump, as it is subject to normal ageing.
Extreme storage conditions may accelerate the ageing process.

13 Maintenance

13.1 Safety information

WARNING

Hazard to persons due to trapped compressed air and pressurized medium!

- Do not maintain or clean the pump, hoses or outlet valve while the system is pressurized.
- Depressurize the pneumatic part and the liquid part prior to working on the pump.
- Isolate the compressed air supply and wait until the residual pressure has dissipated via the compressed air outlet valve.
- Empty the pump before replacing components.

WARNING

Hazard to persons due to fluids (media) squirting out!

- Ensure that the material hoses and other components are able to withstand the hydraulic pressure generated by this pump.
- Check the pump regularly for damage or wear.
- Ensure that the pneumatic valve, the outlet area for the compressed air and the suction and pressure side for the medium are clean and functioning correctly.
- Depressurize the pump before dismantling. Under certain circumstances, a small amount of residual pressure can remain in the pressure chamber causing medium to squirt out.
- Please observe the safety data sheets of the previously conveyed chemicals when performing disassembly work on the pump

WARNING

Hazard to persons due to improper installation!

- Installation work may only be performed by trained personnel.
- Wear personal protective equipment (PPE).

CAUTION

Hazard to persons due to insufficient lighting!

- Only carry out installation work on the pump in a sufficiently illuminated and air-conditioned environment.
-

The double diaphragm pump is very resistant to wear, apart from the diaphragm. The quality of the compressed air supply, the properties of the conveyed media (such as e.g. abrasiveness, viscosity, etc.), and the conditions of use can have a negative effect on the service life of the pump. We therefore recommend regular inspection of the pump and the pneumatic valve.

Should a malfunction nonetheless occur or the conveying output decrease, you can simply carry out the following work:

- replace the diaphragm
- clean the liquid valves
- replace the seals
- clean and grease the pneumatic valve

13.2 Maintenance schedule

Draw up a maintenance schedule on the basis of the service life of the pump. Such a maintenance schedule with maintenance intervals is particularly important for maintaining the perfect function of the pump.

13.3 Timmer Service

We recommend that you have any maintenance work, in particular on the entire pneumatic unit, performed by Timmer Service.

For this purpose, Timmer offers an extensive service concept.

14 Decommissioning

14.1 Safety information

WARNING

Hazard to persons due to improper installation!

- Installation work may only be performed by trained personnel.
- Wear personal protective equipment (PPE).

CAUTION

Risk to health through coming into contact with harmful media!

- Cleaning, repairs, troubleshooting activities and fault elimination during which contact with the medium is possible, may only be carried out when the relevant personal protective equipment PPE (at least protective clothing, protective gloves, safety glasses) is worn.
- The manufacturer's safety data sheets and the national laws and provisions must be observed.

Isolate the compressed air supply line to the pump if the system is not operated for prolonged periods.

15 Replacing components

15.1 Safety information

WARNING

Hazard to persons due to improper installation!

- Installation work may only be performed by trained personnel.
 - Wear personal protective equipment (PPE).
-

WARNING

Hazard to persons due to fluids (media) squirting out!

- Ensure that the material hoses and other components are able to withstand the hydraulic pressure generated by this pump.
 - Check the pump regularly for damage or wear.
 - Ensure that the pneumatic valve, the outlet area for the compressed air and the suction and pressure side for the medium are clean and functioning correctly.
 - Depressurize the pump before dismantling. Under certain circumstances, a small amount of residual pressure can remain in the pressure chamber causing medium to squirt out.
 - Please observe the safety data sheets of the previously conveyed chemicals when performing disassembly work on the pump
-

WARNING

Hazard to persons due to trapped compressed air and pressurized medium!

- Do not maintain or clean the pump, hoses or outlet valve while the system is pressurized.
 - Depressurize the pneumatic part and the liquid part prior to working on the pump.
 - Isolate the compressed air supply and wait until the residual pressure has dissipated via the compressed air outlet valve.
 - Empty the pump before replacing components.
-

 **CAUTION****Hazard to persons due to insufficient lighting!**

- Only carry out installation work on the pump in a sufficiently illuminated and air-conditioned environment.

Attention**Damage to the pump caused by incorrect torque of housing screws!**

- The specified torque for the hexagonal head set screws of the housing cover is 20 Nm.
- The value must be observed to prevent damage to and leakage from the pump.
- Use a calibrated torque wrench.

15.2 Exploded drawing

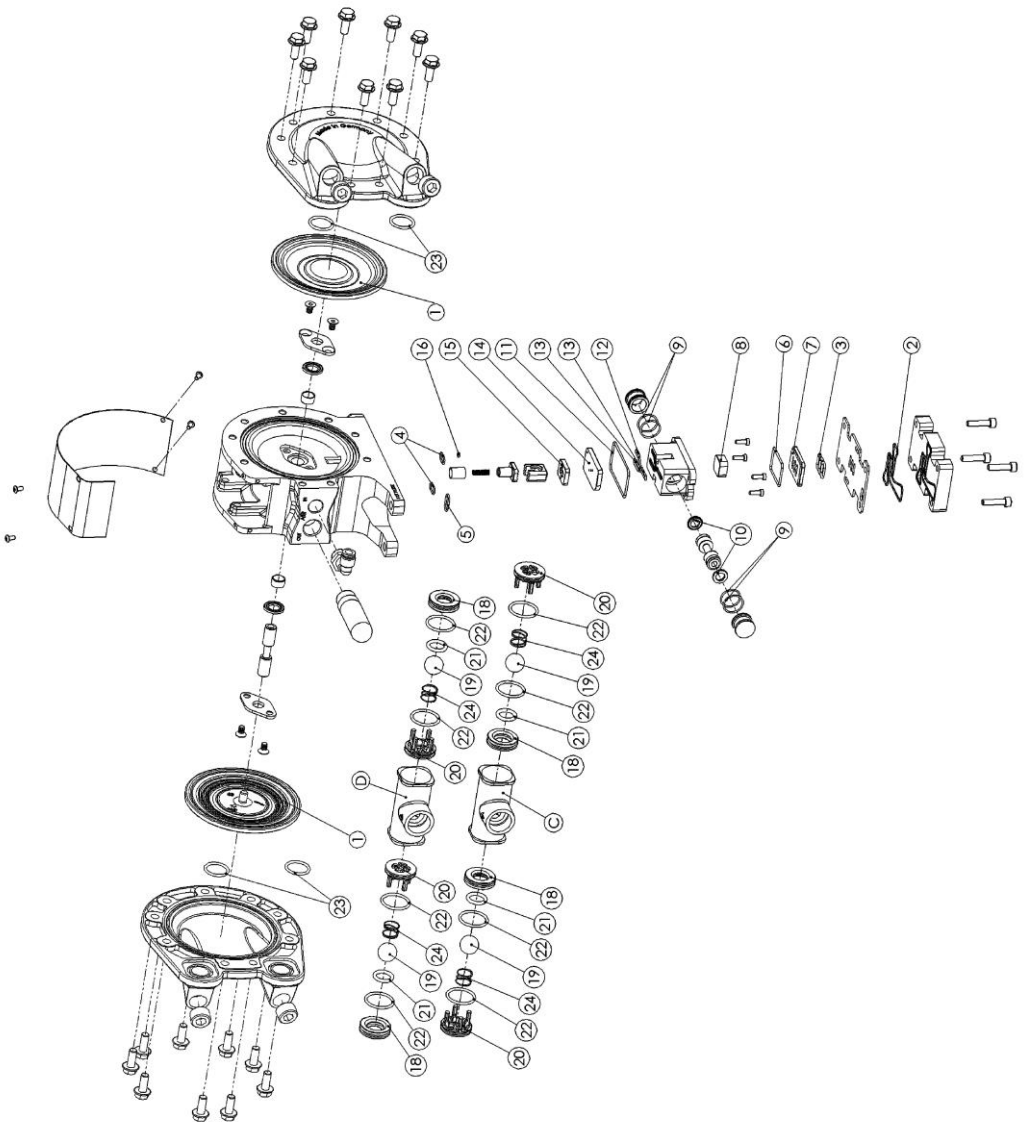
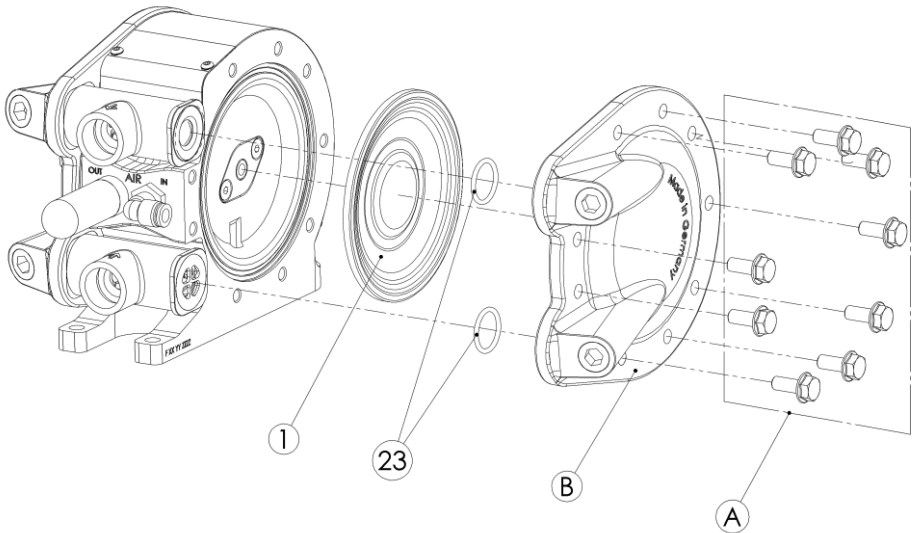


Fig. 4: Exploded drawing

15.3 REPLACING THE DIAPHRAGM

Fig. 5: REPLACING THE DIAPHRAGM

1. Undo the hexagonal head set screws (A) on one of the housing covers (B) and remove the housing cover (B).
2. Remove the diaphragm (1) from the piston rod by turning anticlockwise.
3. Tightly screw the new diaphragm (1) in clockwise direction on to the piston rod.
4. Mount the housing cover (B) using the hexagonal head set screws (A). Make sure the O-rings sit in the groove of the cover.
5. Tighten the hexagonal screws crosswise with a torque of 10 Nm. Then retighten all hexagon head screws crosswise with a torque of 20 Nm.
6. Repeat the procedure on the other diaphragm side.

15.4 Replacement of the pneumatic valve

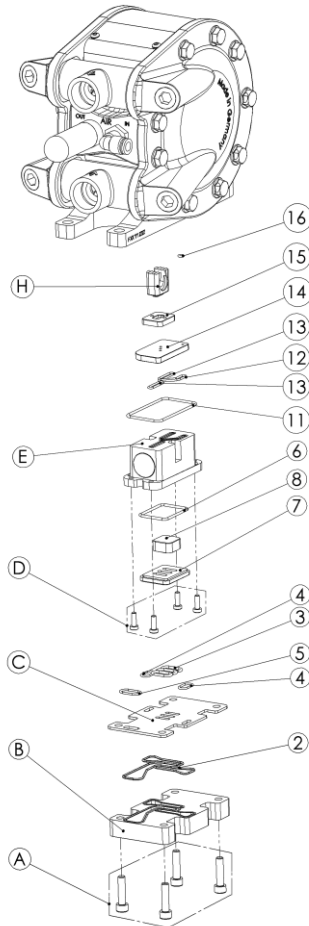


Fig. 6: Replacement of the pneumatic valve

1. Undo the hexagonal head set screws (A) on the base plate (B) and remove the base plate (B).
2. Take out in sequence the seal (2), the intermediate plate (C), the O-rings (4) and (5), the seal (3), the ceramic plate (7), the O-ring (6) and the main valve slide (8).
3. Loosen the hexagonal head set screws (D) and take the pneumatic valve (E) from the pump housing.

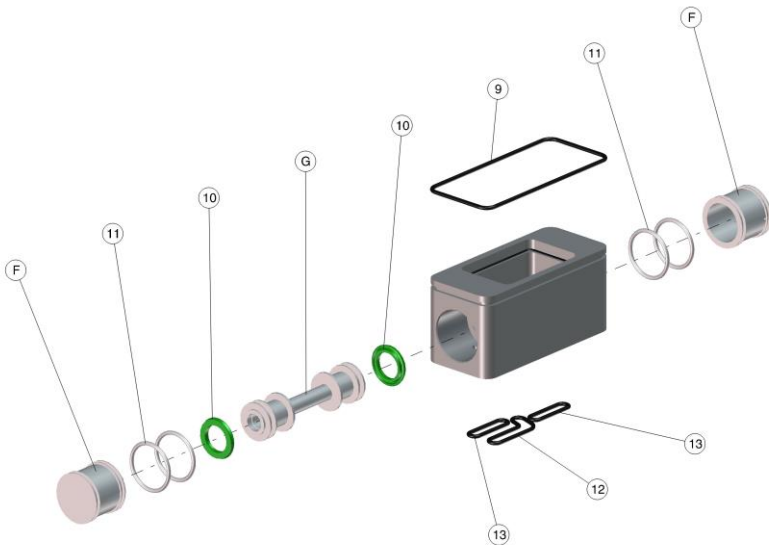
15.4.1 Dismantling of the pneumatic valve


Fig. 7: Dismantling of the pneumatic valve

1. Take out the O-rings (11), (12) and (13) from the grooves in the pneumatic valve block (E).
2. Remove the covers (F) and O-rings (9).
3. Take out the slide (G) with the piston seals (10) from the pneumatic valve block (E).
4. Clean the components using a suitable cleaning agent!
First check the media compatibility!
5. Check the components, especially the O-rings and replace any defective parts.

15.4.2 Mounting the pneumatic valve

1. Place the O-rings (16) in the groove of the centre piece of the pump. The O-ring will better maintain its position if coated in grease.
2. Place the control valve slide (15) with the bevelled side forward into the centrepiece of the double diaphragm pump. The groove of the slide must engage in the groove of the carrier (H).

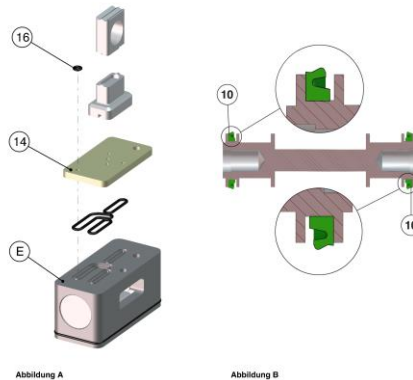


Fig. 8: Position of the ceramic plate

3. Place the ceramic plate (14) in the centrepiece of the pump so that a hole aligns with the O-ring (16) (see Figure A).
4. Assemble the pneumatic valve block (E) in reverse order.
5. Grease the seals and O-rings before assembly (e.g. with Fuchs® Renolit Unitemp 2) and avoid any kind of damage to the seals and O-rings during assembly.
Grease particularly the raceway of the piston seals (10) in the covers (F).
6. Mount the piston seals (10) on the slide (G) as shown in diagram B.
7. Place the slide (G) in the pneumatic valve block (E).
8. Place the O-ring (11) into the outer groove in the pneumatic valve block (E).
9. Insert the O-rings (12) and (13) into the groove of the pneumatic valve block (E).

During assembly, pay attention that the O-rings do not jump out of the grooves and are damaged.

10. Insert the mounted pneumatic valve block (E) into the centrepiece of the pump. The mounting direction is clearly shown in figure A.
11. Place the main valve slide (8) with the closed side forward into the pneumatic valve block (E). The main valve slide (8) must be inserted so that slide (G) is able to move it.
12. Place the O-ring (6) in the pneumatic valve block (E).
Pay attention to correct assembly (the side without the O-ring groove first).
13. Place the O-rings (3), (4) and (5) into the grooves provided in the centrepiece of the double diaphragm pump.
Ensure that the O-rings are not damaged and do not pop out.
14. Place the ceramic plate (17) into the pneumatic valve block (F).
Pay attention to correct assembly (the side with the large O-ring (9) first).
15. Place the O-rings (5) and (6) into the grooves provided in the centrepiece of the pump.
Ensure that the O-rings are not damaged and do not pop out.
16. Place the intermediate plate (C) in the centrepiece of the pump.
17. Equip the plate (B) with the seal (2) and place the plate (B) in the centrepiece of the pump.
18. Screw the plate (B) tight using the socket head screws (A).
The socket head screws are to be evenly tightened to a torque of 12 Nm.

15.5 Replacing the ball valves and suction pipes

► Note

The design of the media valves of the pump PTI-MEM1150 is shown at the end of the Operation Manual.

The pumps can be clearly identified by the item number on the rating plate!

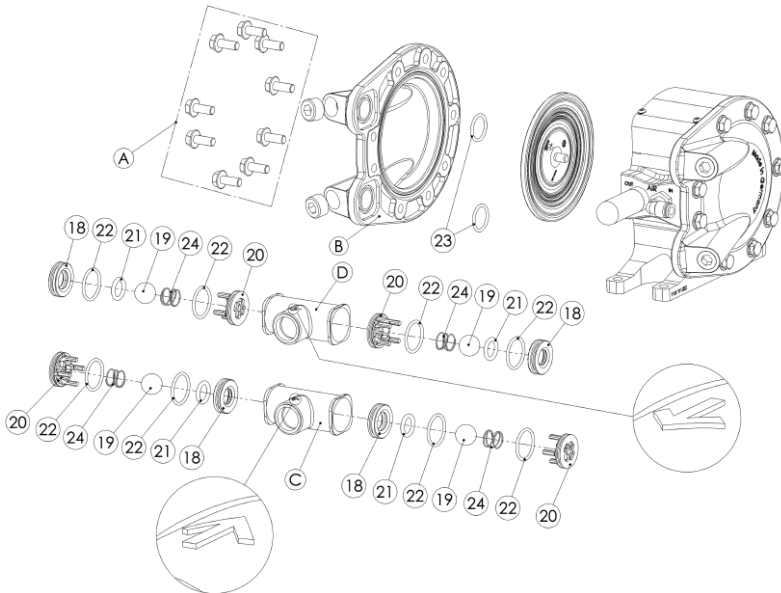


Fig. 9: Replacing the ball valves and suction pipes

1. Undo the hexagonal head set screws (A) on one of the housing covers (B) and remove the housing cover (B).
2. Take out the suction pipe (C) and the discharge pipe (D) with the O-rings (23) from the pump.
3. Remove the suction pipe (C) and discharge pipe (D) as per the drawing.
4. Clean the components using a suitable cleaning agent
First check the media compatibility!
5. Check the components, especially the O-rings, for damage and wear.
Replace defective components.
6. Assemble the valve seats with valve ball and O-ring in the reverse order.

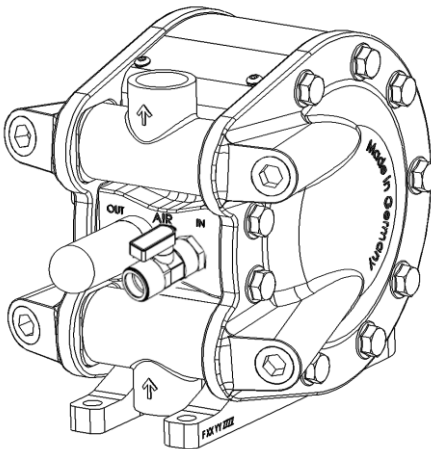
► Note

Do not interchange top and bottom valve!

Observe the mounting direction of the valve seats (17) in accordance with the drawing! The larger inner bevel of the valve seat (17) must be pointing towards the ball!

7. Place the O-rings (23) in the grooves of the pump cover (B).
8. Mount the suction pipe (C) and the outlet pipe (D).
Make sure you observe the flow direction marking.
8. Mount the housing cover (B) using the hexagonal head set screws (A).
The hexagonal head set screws are to be evenly tightened to a torque of 20 Nm.

Alternative suction and discharge pipe positions



The positions of the suction and discharge pipes can be varied by rotating the pipes during assembly. The possible positions are shown on the drawing. Make sure the suction and discharge pipes are correctly positioned. The arrows identify the direction of flow!

16 Disposal

16.1 Return

Please send the pump to the following address:

Timmer GmbH

Dieselstrasse 37

D-48485 Neuenkirchen

Germany

Note

- Please send the pump in the original packaging to prevent transport damage.
- The pump must be flushed and the surface cleaned.
- If flushing is not possible, the media connections must be absolutely tightly closed to prevent medium leakage.
- Always enclose a safety data sheet of the last conveyed medium or flushing agent.

17 Technical data

General data	
Operating conditions	+5 ... +35 °C at a maximum relative humidity of 80 %
Maximum conveying output	approx. 150 l/min (at 6 bar, outlet open)
Drive	Pneumatic
Compression ratio	1 : 1
Liquid connections	1 1/4" BSP thread
Operating pressure	Maximum 8 bar compressed air, filtered acc. to DIN ISO 8573
Compressed air connection	1/2" BSP thread
Air connection	Minimum diameter: 13 mm, inner
Suction height, dry	Maximum 4 m
Weight	< 15 kg
Maximum viscosity of conveyed medium	approx. 15,000 mPa•s
Temperature of conveyed medium	+5 ... +65 °C
Noise level	< 68 dB(A)

Material of medium-carrying parts	
Housing	Aluminium
Pressure pipe	Aluminium
Diaphragm	PTFE
Valve ball / spring	POM / PTFE / PEEK
Liquid seal	FEPM
Valve seat	Stainless steel

18 Spare parts for standard model

18.1 PTI-MEM1150

Item	Item number	Quantity	Description	
001	53503003	2	Diaphragm	Wearing part pack diaphragm Item No. 53507560
017	53507585	4	Bottom part of cage	Wearing part pack medium valves (incl. medium seals Item No.53507598)
018	73010009	4	Spring	
019	70050024	4	Ball Ø30	
020	53507576	2	Cage (ball Ø30)	
021	70010845	4	O-ring Ø26,57x3.53	Wearing part pack medium seals Item No. 53507597
022	70010872	8	O-ring Ø39,34x2.62	
023	70010871	4	O-ring Ø36.17x2.62	

► Note

Spare parts are only available via the wearing parts packs. The packs vary depending on the selected variant. In this case the numbers of the spare parts are enclosed separately.

Only use genuine Timmer spare parts.

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