Operating manual

Original Operating Manual

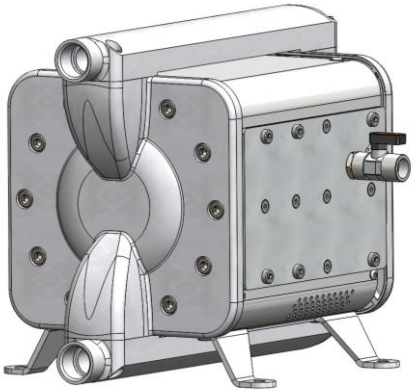
Article no.: 99999101E

Rev. 03/ 10.2019

Doppelmembranpumpe

PTI-MHD1110

Year of construction: 2019



II 2 G Ex h IIB T6-T4 Gb X

II 2 D Ex h IIIC 85°C-150°C Db X

We reserve the right to make technical changes relative to the presentations and information in this manual, that are necessary for improvement of the product characteristics.

Contents

1 EU Declaration of Conformity

DESIGN: DOUBLE DIAPHRAGM PUMP

Type: PTI-MHD1110

ATEX marking: CE Ex II2 G Ex h IIB T6-T4 Gb X

II2 D Ex h IIIC 85°C-150°C Db X

The double diaphragm pump has been designed and manufactured in accordance with EC directives:

Directive 2006/42/EC EU Gazette L157/24 of 17 May 2006

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

under the sole responsibility of (manufacturer):

Timmer GmbH

Dieselstrasse 37

D-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

City, date

Managing Director (Klaus Gehrmann)

2 About this manual

2.1 Use and safekeeping:

- The pump can only be appropriately and safely placed in service, operated and maintained with the aid of this operating manual.
- This operating manual refers only to the product that is specified on the cover sheet.
- This operating manual is a component of the scope of delivery.
- Consequently, always keep this operating manual in legible condition, on hand for the operator in the vicinity of the pump. Leave this document with the pump if the pump is resold or loaned out.
- This operating manual is intended only for instructed and authorised specialists.
- The section on safety provides an overview of all important safety aspects for optimal protection of personnel, and for safe and trouble-free operation of the pump.
- The manufacturer is not liable for damage resulting from failure to comply with the instructions in this operating manual.
- Reprints, translations and duplications in any from, including excerpts, requires the written consent of the publisher.
- The copyright remains with the manufacturer.

2.2 Manufacturer information

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2.3 Areas of applicability

This product complies with the directives of the European Union.

In this regard, please note:

- This EU Declaration of Conformity
- The intended use
- The improper use

2.4 Warranty

For all Timmer pumps, we grant the initial purchaser a one year warranty on workmanship and material starting from the date of purchase; provided that the pump is used as intended. Normal wear is excluded from the warranty. The warranty is invalidated automatically if the parts that are not original Timmer spare parts are installed in the Timmer pump.

In compliance with applicable law, Timmer GmbH excludes all liability for consequential damage. In all cases the liability of Timmer GmbH shall be restricted to and in no case shall exceed the equivalent value of the purchase price. Prior to purchasing and shipment of the Timmer pump, the customer should review the national and local laws and regulations to ensure that the product, the installation and the application are in compliance with the applicable regulations.

- Notify the manufacturer immediately of warranty claims after defects or faults are detected.
- In all cases the warranty shall be invalidated where liability claims cannot be legally asserted.
- Claims for modification of systems and components that have already been delivered cannot be asserted from the information, illustrations and descriptions in this operating manual.
- No liability is accepted for damage or malfunctions that occur as described below:
    - Disregard of the operating manual
    - Unauthorised modifications of the system
    - Operator error
    - Failure to perform maintenance tasks

3 Safety

3.1 Basic information concerning safety

The Safety chapter provides an overview of all important safety aspects for optimal protection of personnel, as well as for safe and trouble-free use of the pump, from transport to operation and extending to disposal.

Failure to comply with the instructions and safety notices cited in this operating manual can result in considerable hazards for personnel and material damage of pump.

The pump is operationally reliable.

However more extensive residual hazards can be associated with operation of the pump under the following circumstances, if

- The pump is not used as intended.
- The pump is used improperly or operated by untrained or uninstructed personnel.
- The pump is not properly maintained or serviced.
- The safety instructions, notices and warnings specified in this operating manual are not complied with.
- The pump is improperly modified or converted.
- The prescribed maintenance is not performed in a timely manner.
- In the event of a diaphragm rupture, the medium to be pumped can escape from the silencer. This can cause the medium to escape from the pump during prolonged operation of the defective pump. The operator must take organisational and design measures to ensure that any dangerous liquids which escape do not pose a risk.

3.2 Compliance with the instructions in the operating manual

Every person who is assigned to perform tasks on and with the pump must have read and under this operating manual, particularly the "Safety" chapter.

Knowledge of and compliance with the content of this manual is the prerequisite for protecting personnel from danger and avoiding error.

Consequently, all safety instructions must always be complied with, compliance is in the interest of your safety.

The operating manual is a component of the pump and must always be available in the vicinity of the product. The instructions in the operating manual must be complied with. If content of this operating manual is not clear or not understandable, contact the manufacturer without delay, see the paragraph "Manufacturer information".

In addition to the safety instructions in this operating manual the following rules and regulations must also be complied with:

- Intended use
- The national and company-internal accident prevention regulations (UVV)
- Occupational health regulations
- Generally accepted rules for safety
- Country-specific regulations
- Manufacturer information (safety data sheets) for operating materials and auxiliary materials, chemical substances

Moreover, these directives and regulations can be supplemented with work instructions that take into account plant-internal regulations or operational particularities.

In supplementation to this operating manual, company-internal instruction of the appropriate persons must be provided with due consideration of the technical qualifications.

3.3 Operational prerequisites

Dependence on other systems and equipment must be tested by the owner separately.

Moreover, since they are not in our area of responsibility, the following prerequisites must be in place for regular operation of the pump:

- Properly concluded installation.
- Successful trial run with all required adjustment tasks.
- Instruction of operating personnel concerning operation of the pump and the applicable safety regulations.
- If hot or cold machine parts result in additional danger, then the customer must safeguard these parts from being touched.
- The possibility of hazards due to electrical energy must be excluded (for details in this regard see VDE guidelines or guidelines issued by the electrical utility, for example).
- The pump must be easily accessible.
- Designation of a person who is 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 Non-intended 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 Kap. 3.4
- 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
- The pump is used exclusively for pumping liquid media.
- The medium to be pumped must be compatible with the materials of the pump. The operator of the pump is responsible for selecting the medium to be pumped.
- Operating the pump outdoors.
- Pumping the media with temperatures above 65°C.
- Pumping liquids with low conductivity (< 10000 pS/m), as long as no additional safety measures have been taken.

3.6 Foreseeable misuse

The following points describe foreseeable misuse of the pump:

- Installation on unsuitable grounds or flooring
- Attachment of transport aids on the housing
- Failure to comply with the operating data
- Failure to comply with the maintenance intervals
- Operation with unsuitable media
- Operation in the wrong Ex zone

3.7 Labelling on the pump

The data on the rating plate affixed on the pump must always be complied with. The rating plate must not be removed, and it must be kept in completely legible condition.

3.7.1 Rating plate

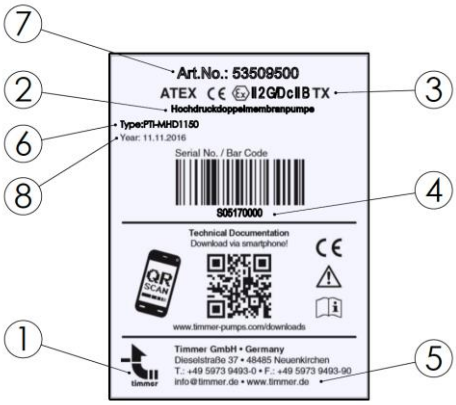

Fig. 1: Rating plate

1	Logo	5	Manufacturer address
2	Product designation	6	Type key
3	ATEX marking according to RL2014/34/EU	7	Article number
4	Serial number	8	Date

3.8 Personnel qualifications

Tasks on the pump must only be performed in accordance with existing rules and statutory regulations, by personnel who have been instructed and are qualified in this regard, in compliance with due diligence obligations.

The following requirements must be fulfilled:

- Personnel must have special skills and experience in the respective technical area. This particularly applies for maintenance and repair tasks on mechanical and pneumatic fixtures of the pump.
- Personnel must be familiar with applicable standards, directives, accident prevention regulations and operating conditions.
- Personnel must have been authorised by the person responsible for safety to perform each of the required activities.
- Personnel must be capable of recognising and avoiding possible dangers.

The required personnel qualifications are subject to different statutory regulations depending on the implementation site. The owner must ensure compliance with the applicable laws.

3.9 Personal protective equipment

Failure to wear the personal protective equipment can result in severe injury or death.

- Wear the plant prescribed protective equipment, e.g. hearing protection, eye protection, safety footwear, hard hat, protective clothing, and protective gloves for all tasks on the pump.

- Long hair must be tied back and covered; do not wear loose clothing or jewellery. Danger of injury through entrapment, being pulled in or entanglement due to moving parts.
- Ensure that there are no unauthorised persons in the danger zone.

3.10 Safety notices in the operating manual

⚠ WARNING

The signal word **WARNING** indicates a possible danger.

Failure to comply with the instruction can result in severe or fatal injury.

⚠ CAUTION

The signal word **CAUTION** indicates a possible danger.

Failure to comply with the instruction can result in minor to moderate injury.

! Attention

The signal word **Attention** indicates possible material damage.

Failure to comply with the instruction can result in machine damage.

Environmental protection notice

The signal word **Environmental protection notice** indicates information on environmental protection.

▶ Note

The signal word **Note** indicates additional information for the machine its use.

3.11 Safety notices

⚠ CAUTION

Hazard for personnel due to a defective pump!

- Check the pump regularly for damage and leaks.
- Switch off a damaged or leaking pump immediately.

⚠ CAUTION

Health impairment due to contact with harmful media!

- If the possibility of contact with the medium cannot be excluded, do not perform cleaning, repair, troubleshooting and fault rectification, until after you have put on the appropriate personal protective equipment PPE (at least protective clothing, protective gloves, protective goggles).
- Comply with the safety data sheets provided by the manufacturers and the national laws and regulations.

Caution

Pump damage due to the operating conditions and properties of the pumped media!

- The characteristics of the pumped media (such as abrasiveness, viscosity, etc.) and the operating conditions can have a negative effect on the service life and the function of the pump.
- Solids in the media can damage the pump, particularly the diaphragms, and cause immediate failure.

Caution

Pump damage due to media that is chemically incompatible!

- The owner of the pump must check whether the pumped media is chemically compatible with the materials that were used to construct the pump.

  A list of the materials used in the pump is provided in the "Technical data" section.

Caution

Pump damage due to high mechanical forces!

- Do not subject the pump to strong mechanical forces.

Attention

Destruction of the pump due to excessive air pressure!

Excessive air pressure can destroy the diaphragm and cause the pump to burst.

- Operate the pump with compressed air pressure of maximum 7 bar.
- Ensure that the exit point of the pumped medium is not clogged or sealed.

⚠ 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

 2G Ex h IIB T6-T4 Gb X / 2D Ex h IIIC 85°C-150°C Db X

Symbol	Meaning
	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 flan puof multiphase fluids and liquids with low conductivity (< 100 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 generaten 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 kremoved).
  - 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, underrange 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

Transport the pump only in its original packaging as far as possible to prevent transport damage.

5.1 Check scope of delivery

1. Remove the transport packaging of the pump.
2. Dispose of the packaging material correctly.
3. Examine the pump for transport damage.
   - Immediately notify the transport company and the manufacturer of transport damage in writing.
   - Protect the pump from further damage.
4. Use the packing slip to verify the completeness of the delivery.

6 Storage

- The storage conditions influence the service life of the diaphragm.
- The pump must only be stored for safekeeping if it has been thoroughly cleaned beforehand.
- Extreme storage conditions accelerate the ageing process.
- We recommend a storage temperature between +10 °C and +25 °C.
- The high-pressure diaphragm must not be exposed to heat sources or direct sunlight.
- Exclude the possibility of influence of ozone or ionising radiation.
- Store the diaphragm in unstressed condition.
- We recommend to replace the diaphragm at the latest after one year storage under the above-mentioned storage conditions.

7 Product description

The double diaphragm pump is a self-priming, pneumatically-powered fluid pump. The liquid is pumped through the opposite movement of two diaphragms. A reversing valve ensures that the two diaphragms are alternately charged with compressed air. Each diaphragm comprises a liquid inlet valve and liquid outlet valve.

When the diaphragm is enlarged due to the movement of the pump chamber, the outlet valve closes and the inlet valve opens so that the liquid is sucked into the pump chamber. When the diagram is moving in another direction, the pump chamber becomes smaller, the inlet valve closes, the outlet valve opens and the liquid is sucked out.

When one of the diaphragms reaches its end position during the suction process, the end switch operates the reversing valve so that the other diaphragm is charged with air.

The reversing valve is designed in such a way that it cannot stay in the central position.

8 Installation

8.1 Safety instructions

⚠ 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.

⚠ WARNING

Danger of explosion due to electrostatic charging!

- Before commissioning, connect the pump to the protective earth system (equipopotential bonding).

⚠ WARNING

Personnel are in danger due to improper installation!

- Installation tasks must only be executed by trained personnel.
- Wear personal protective equipment (PSA).

⚠ CAUTION

Personnel are in danger due to inadequate lighting!

- Only perform installation tasks on the pump in an adequately illuminated and air-conditioned environment.

Attention

Multifunction or damage due to residual substances in the pump!

- Prior to commissioning purge the pump with suitable media to remove from the pump interior any substances introduced during the customer process (goods receipt, handling, storage, installation, etc.) that may impair paint wetting, substances that are incompatible with the pumped medium.
- For this, section 12 Cleaning must be complied with!

8.2 Preparations

- Do not use the pump as support for the pipeline system.
- Ensure that the system components are properly supported to prevent stress on the pump parts.
- Make sure that the provisions regarding the protective earth system (potential equalisation) are met.
- During assembly and dismantling, transport to/from the location of use and initial start-up, there is a risk of sparks, electrostatic charge, etc. It has to be ensured that these dangers are reliably prevented or that there is no potentially explosive atmosphere.

▶ Note

- An electrical connection is not required.
- The pump is self-priming.

8.3 Connection

1. Install the pump on a horizontal, level surface with the pump base down.
2. Make sure the pump is in a stable position by fixing using suitable fixing screws.

   Do not immerse the pump into the pumped medium.
3. Install a compressed air hose from the compressed air source to the pump.
   There is a G1/2" (1) connection thread on the pump.

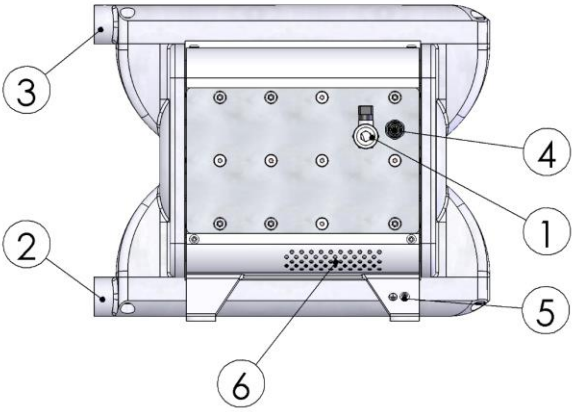

Fig. 2: Pump connections

4. Use flexible connections (for example hose connections) for intake and delivery.

   Flexible connections prevent the transmission of vibrations to the pipeline system.
5. Ensure that the connectors are compatible with the medium to be conveyed and are able to withstand high pressures.
6. Dimension the piping cross-sections sufficiently large.

   The sizes depend on the medium viscosity and the situation of the equipment.
7. Use suitable hose clamps to connect the intake and delivery hose.
8. Connect the intake hose with the entry point (2).
9. Connect the delivery hose with the exit point (3).
10. Connect to the pump will the protective earth system.

    The connection for the potential equalisation is correspondingly marked at the pump base (5).
11. Check all connections for tightness and proper seating.
13. Make sure that the air outlet (6) is not covered.

14. Connect the compressed air hose to the compressed air supply of the pump.

9 Commissioning

9.1 Safety instructions

⚠ WARNING

Danger of explosion due to dust on the pump housing!

- Regularly clean the surface of the pump housing and remove the dust layers.

⚠ WARNING

Danger to life by pumping explosive media in explosive areas!

The pumped medium can attack the components of the part or damage them and escape. This can result in an explosive mixture.

- Conveying explosive media or gases and the use in explosive areas is only allowed if the following marking is used on the nameplate of the pump according to the Directive 2014/34/EU as intended:

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

  II 2 D Ex h IIIC 85°C-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.

Attention

Destruction of the pump due to excessive air pressure!

Excessive air pressure can destroy the diaphragm and cause the pump to burst.

- Operate the pump with compressed air pressure of maximum 7 bar.
- Ensure that the exit point of the pumped medium is not clogged or sealed.

1. If the pump has not been mounted on a horizontal flat surface with the pump base mounted downwards, the function of the fluid check valves is not provided.
2. Set the air pressure between 1 and 7 bar.

   The pump is ready for operation.
3. Open the ball valve for the compressed air supply.

   The pump starts pumping.
4. Operate the pump with compressed air pressure of maximum 7 bar.

10 Operation

10.1 Regulating the delivery rate

▶ Note

If the delivery rate of the pump must be regulated, the owner has to install a throttle valve into the compressed air supply or into the delivery line.

Reducing the delivery rate

- Reduce the compressed air supply or the medium outlet.

Increasing the delivery rate

- Increase the compressed air supply or the medium outlet.

11 Fault rectification

Fault	Cause of the error	Error rectification
Pump not running or is running too slow	Insufficient compressed air pressure	Set pressure between 4 and 7 bar
	Cross section of the hose is too small	Use a hose with a larger cross section
	Control valve leaking	Renew control valve and seals
	Blockage of the sound absorbers, pump running heavily, seal is welled or piston material damaged	Check material strength, avoid dry running
Pump is running but does not pump the medium or stops when the pressure side is shut off	Valves clogged	Clean the pump with detergent
	Delivery hose clogged	Clean delivery hose
	Suction and pressure valves clogged	Allow the pump running at maximum speed for a short time
	Connections leaking, possibly intake of tramp air, vacuum collapses	Check connections for leak and re-seal
	Valves clogged	Clean or renew the valves
	No suction effect	Put your hand over the openings to feel the suction effect and, if necessary, replace the seals
	Excessive medium viscosity	High-viscous media cannot be delivered (see chapter "Technical data" for the limit values)
	Delivery hose has cracks or has holes the size of pin holes	Replace conveyor hose

Fault	Cause of the error	Error rectification
	Counter pressure at the injection point is too high	Reduce the counter pressure at the injection point
	Threaded fittings, ball valve or non-return valve have no passage or reduced passage	Re-establish flow-through: clean or replace affected fittings
	Air in the pump chamber	Vent the pump
Fluid container runs empty autonomously	Exit point of the fluid is lower than the fluid level in the container	Place the fluid container lower or the exit point higher

12 Cleaning

12.1 Safety instructions

Attention

Pump damage due to hardening, crystallising media!

- When pumping fluids that contain solids that harden, crystallise, or that can corrode pump materials due to chemical or physical properties, the pump must be cleaned before longer standstill periods!
- A longer standstill period is defined depending on the previously pumped medium and the change of its aggregate state from fluid to solid.
- The definition is the responsibility of the owner and must be complied with in any case to avoid pump damage.

1. Only clean the pump with a cleaning agent that is suitable for the pump material and the conveyed material.

   Water or solvents may be suitable.

   Liquid and solid detergents must not exceed a temperature of 65 °C.
2. Connect the suction pipe connection with the detergent.
3. Connect the media outlet to a suitable container.
4. Pump the cleaning agent until all residues are detached from the pump.
5. Completely empty the pump.

6. To do this, pull the suction hose out of the cleaning agent far enough that air is suctioned in.
7. One cleaning agent no longer comes out of the outlet, disconnect the media outlets of the pump completely.
8. Svivel the pump 180° to completely drain it so that the pump base is facing up.
9. Operate the pump with compressed air pressure of approx. 2 bar.
10. During that move the pump slightly back and forth until the remnant as all run out.
11. Clean the outer parts of the pump.

Cleaning before decommissioning

1. Clean and empty the pump as described in the preceding paragraph.
2. Replace the pump the latest one year after storage at the latest because it is subject to normal ageing and to ensure a safe and reliable operation of the pump.

   Extreme storage conditions can accelerate the ageing process.

▶ Note

In the case of shutdown and placing in storage a complete emptying of the pump is necessary because the cleaning liquid may accelerate the ageing of the pump diaphragm.

13 Maintenance

13.1 Safety instructions

⚠ WARNING

Personnel are in danger due enclosed compressed air and pressurised medium!

- Do not service or clean the pump, hoses and the outlet valve for the compressed air while the system is pressurised.
- Before performing tasks on the pump de-pressurise the pneumatic section and the fluid section.
- Secure against unintentional restart.
- Shut off the compressed air supply and wait until the residual pressure is dissipated via the outlet valve for the compressed air.
- Empty the pump before replacing components.

⚠ WARNING

Personnel are in danger due to improper installation!

- Installation tasks must only be executed by trained personnel.
- Wear personal protective equipment (PSA).

⚠ WARNING

Hazard for personnel due to spraying fluids (media)!

- Ensure that the material hoses and other components can withstand the fluid pressure generated by this pump.
- Check the pump for damage or wear on a regular basis.
- Ensure that the pneumatic valve, the outlet area for the compressed air and the suction side and pressure side are clean and functioning effectively for the medium.
- Depressurise the pump before dismounting. Under some circumstances, a slight residual pressure may still be present in the pressure chamber causing the medium to eject.
- For dismounting tasks on the pump comply with the information in the safety data sheets of the previously pumped medium.

⚠ CAUTION

Personnel are in danger due to inadequate lighting!

- Only perform installation tasks on the pump in an adequately illuminated and air-conditioned environment.

The double diaphragm pump is resistant to wear except for high-pressure diaphragm. The quality of the compressed air supply, the characteristics of the pumped media (such as abrasiveness, viscosity, etc.) and the operating conditions can negatively influence the service life of the pump.

Consequently we recommend regular inspection of the pump and the pump valve.

Nevertheless, should a fault occur, or if the delivery capacity decreases, you can perform the following tasks:

- Replace the high-pressure diaphragm
- Clean or replace the media check valves
- Replace the seals
- Clean and grease the pneumatic valve

13.2 Maintenance schedule

Prepare maintenance plan on the basis of the service life of the pump.

Such a maintenance plan with maintenance intervals is particularly important to reach a small operation of the pump.

The following table contains recommendations. If the pump is subjected to high load through the medium or the ambient conditions, shorter maintenance and replacement intervals must be used.

Machine part	Task	Interval
Diaphragm pump overall	Check proper condition and cleanliness of the machine	Every shift start
Check the bearing and shock absorption of the piston	Check bearing clearance and piston stop. The piston must run smoothly and must not strike against metal.	Each time when changing diaphragm
Diaphragm	Exchange diaphragm and support disc	Recommended: every 10 million double strokes
Media valves:	Cleaning and replacement	Recommended: after 10 million double strokes
Pneumatics:	Cleaning and replacing seals	Recommended: every 20 million double strokes

13.3 Timmer Service

We recommend having Timmer Service perform all recurring maintenance tasks, particularly for the entire pneumatic unit.

Timmer offers a comprehensive service concept in this regard.

14 Decommissioning

14.1 Safety instructions

⚠ WARNING

Personnel are in danger due to improper installation!

- Installation tasks must only be executed by trained personnel.
- Wear personal protective equipment (PSA).

⚠ CAUTION

Health impairment due to contact with harmful media!

- Only perform cleaning, repairs, troubleshooting and fault rectification in which the possibility of contact with the medium cannot be excluded, if beforehand you have put on the appropriate personal protective equipment PSA (at least protective clothing, protective gloves, protective goggles).
- Comply with the safety data sheets of the manufacturers and the national laws and directives.

Shut off the compressed air supply to the pump if the system will not be used for a longer period.

15 Replacing components

15.1 Safety instructions

⚠ WARNING

Personnel are in danger due to improper installation!

- Installation tasks must only be executed by trained personnel.
- Wear personal protective equipment (PSA).

⚠ WARNING

Hazard for personnel due to spraying fluids (media)!

- Ensure that the material hoses and other components can withstand the fluid pressure generated by this pump.
- Check the pump for damage or wear on a regular basis.
- Ensure that the pneumatic valve, the outlet area for the compressed air and the suction side and pressure side are clean and functioning effectively for the medium.
- Depressurise the pump before dismounting. Under some circumstances, a slight residual pressure may still be present in the pressure chamber causing the medium to eject.
- For dismounting tasks on the pump comply with the information in the safety data sheets of the previously pumped medium.

⚠ WARNING

Personnel are in danger due enclosed compressed air and pressurised medium!

- Do not service or clean the pump, hoses and the outlet valve for the compressed air while the system is pressurised.
- Before performing tasks on the pump de-pressurise the pneumatic section and the fluid section.
- Shut off the compressed air supply and wait until the residual pressure is dissipated via the outlet valve for the compressed air.
- Empty the pump before replacing components.

⚠ CAUTION

Personnel are in danger due to inadequate lighting!

- Only perform installation tasks on the pump in an adequately illuminated and air-conditioned environment.

Health impairment due to contact with harmful media!

- Only perform cleaning, repairs, troubleshooting and fault rectification in which the possibility of contact with the medium cannot be excluded, if beforehand you have put on the appropriate personal protective equipment PSA (at least protective clothing, protective gloves, protective goggles).
- Comply with the safety data sheets of the manufacturers and the national laws and directives.

Attention

Pump damage due to incorrect tightening torque of the housing screws!

- The prescribed tightening torque for the cylinder screws of the housing cover is 35Nm.
- To prevent damage and leaks of the pump, the value must be complied with.
- Use a calibrated torque wrench.

15.2 Exploded-view drawing

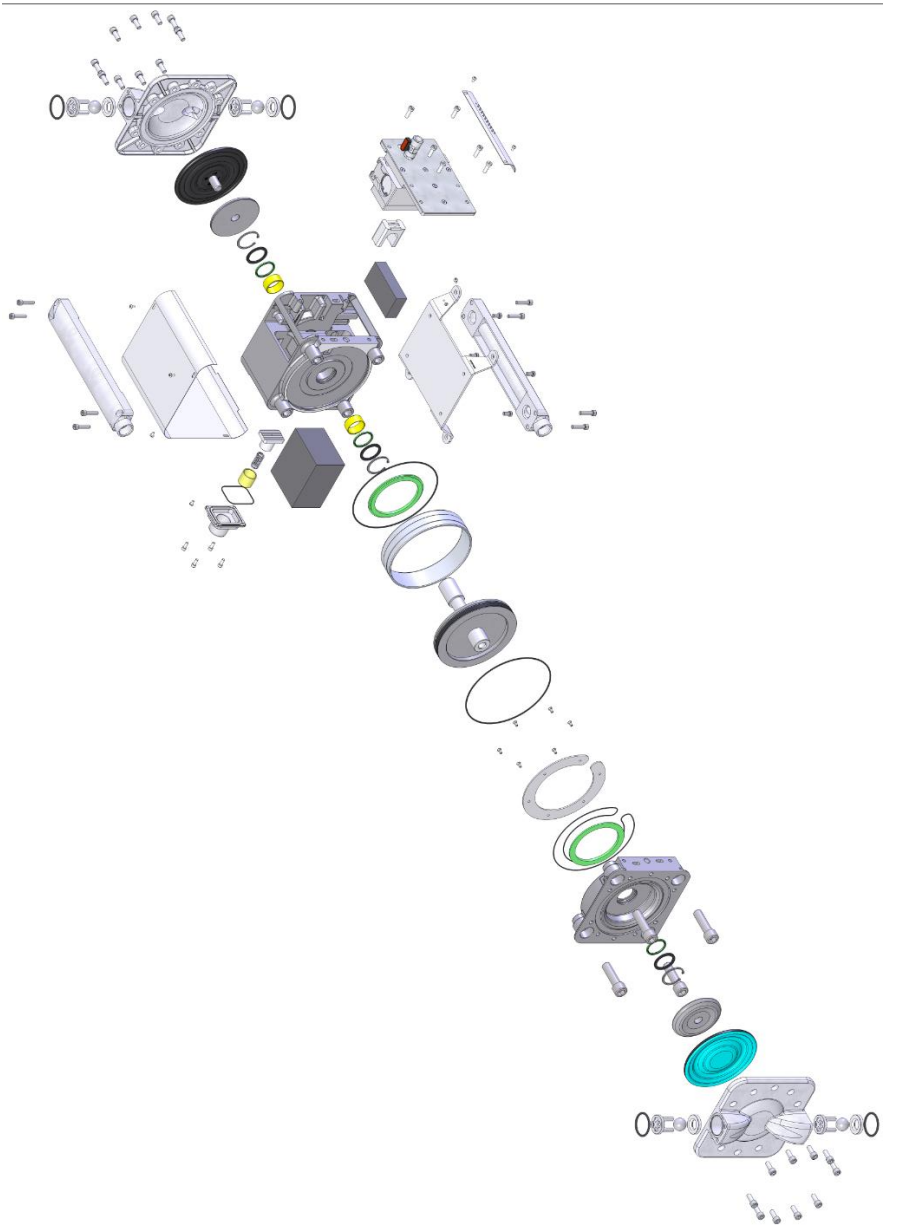

Fig. 3: Exploded-view drawing

15.3 Replacing the diaphragm

Note

- When changing the diaphragm, a change of support discs is imperative because due to the high load the support disc has only a limited lifetime.
- Timmer GmbH disclaims all warranties if the diaphragm is changed without changing the support disc.

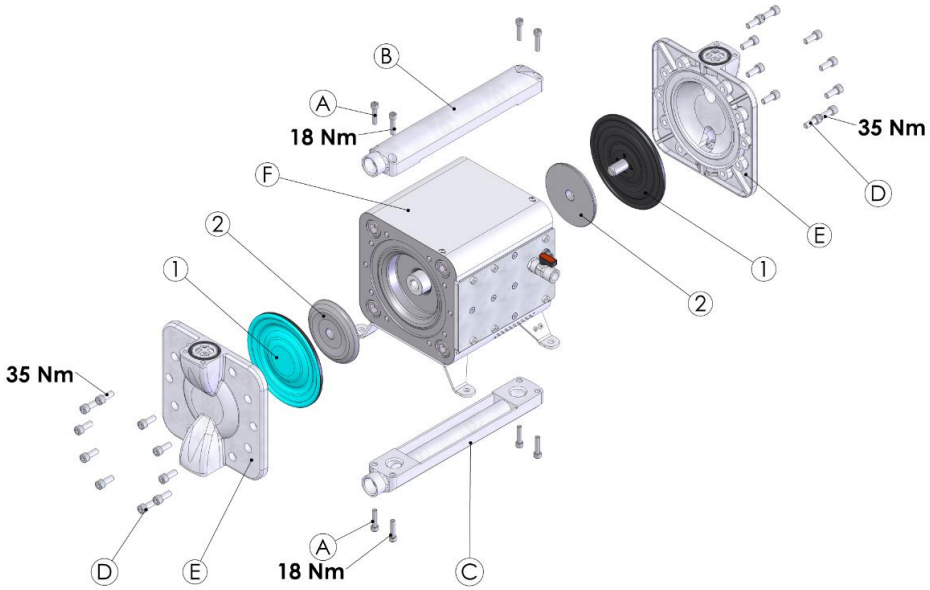

Fig. 4: Replacing the diaphragm

1. Loosen the fillister head screws (A) on both media tubes (B, C) and remove the media tubes (B, C).
2. Loosen the hexagon screws (D) of the housing cover (E) and remove the housing cover (E).
3. Remove the diaphragm (1) and the support disc (2) from the piston rod by turning counterclockwise.

4. Place the new diaphragm (1) onto the new support disc (2) and firmly screw both parts in a clockwise direction on the piston rod. Observe the installation direction of the support disc (see figure 5).

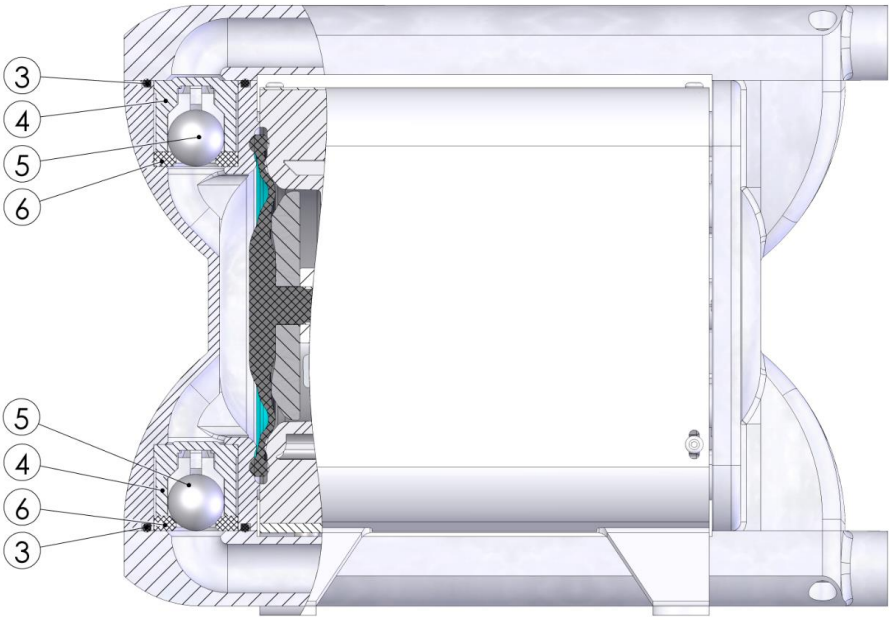

Fig. 5: Installation of the support disc

5. Assemble the housing cover (E) with fillister head screws (D).
6. Tighten the fillister head screws crosswise with the tightening torque of **35 Nm**. Make multiple passes when fastening to gradually tighten the elastomer of the diaphragm.
7. Fasten the media pipes (B, C) with the cap screws (A). The specified torque is **18 Nm**.

15.4 Maintenance of the pneumatics

► Note

- When changing the pneumatic valve, the media part must be removed. It makes sense to carry out a maintenance in combination of membrane change, media valve change and pneumatic valve change.

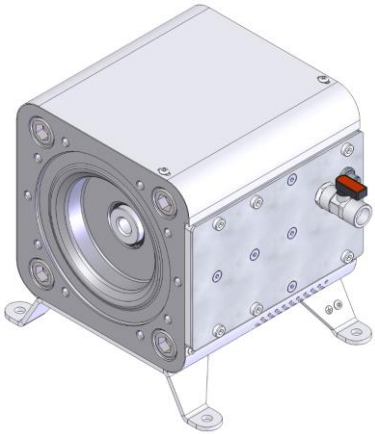

Fig. 6: Prepared middle section for maintenance of the pneumatic system

1. Disassemble the media pipes, side parts, diaphragms and support discs as described in "Replacing the diaphragms".
2. Now the pneumatic part is ready for professional maintenance.

15.4.1 Dismantling pneumatic middle section

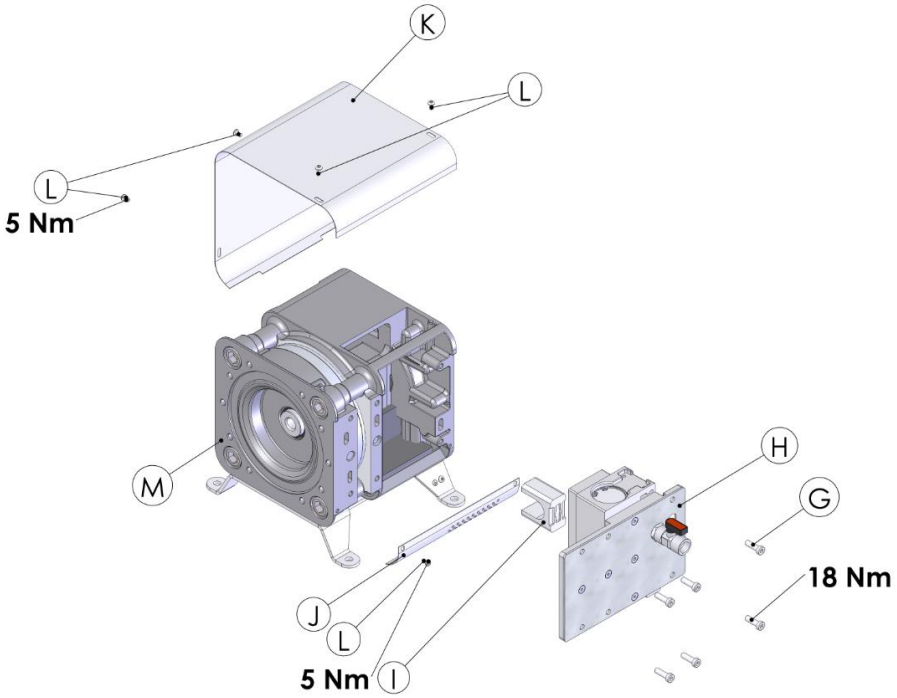

Fig. 7: Dismantling valve unit

1. Dismantle the cover plates (J and K) by loosening and unscrewing the screws (L).
2. Loosen the screws (G) and remove them.
3. Remove the valve unit (H) and the control valve (I) from the housing.

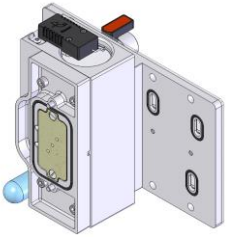

Fig. 8: Valve unit

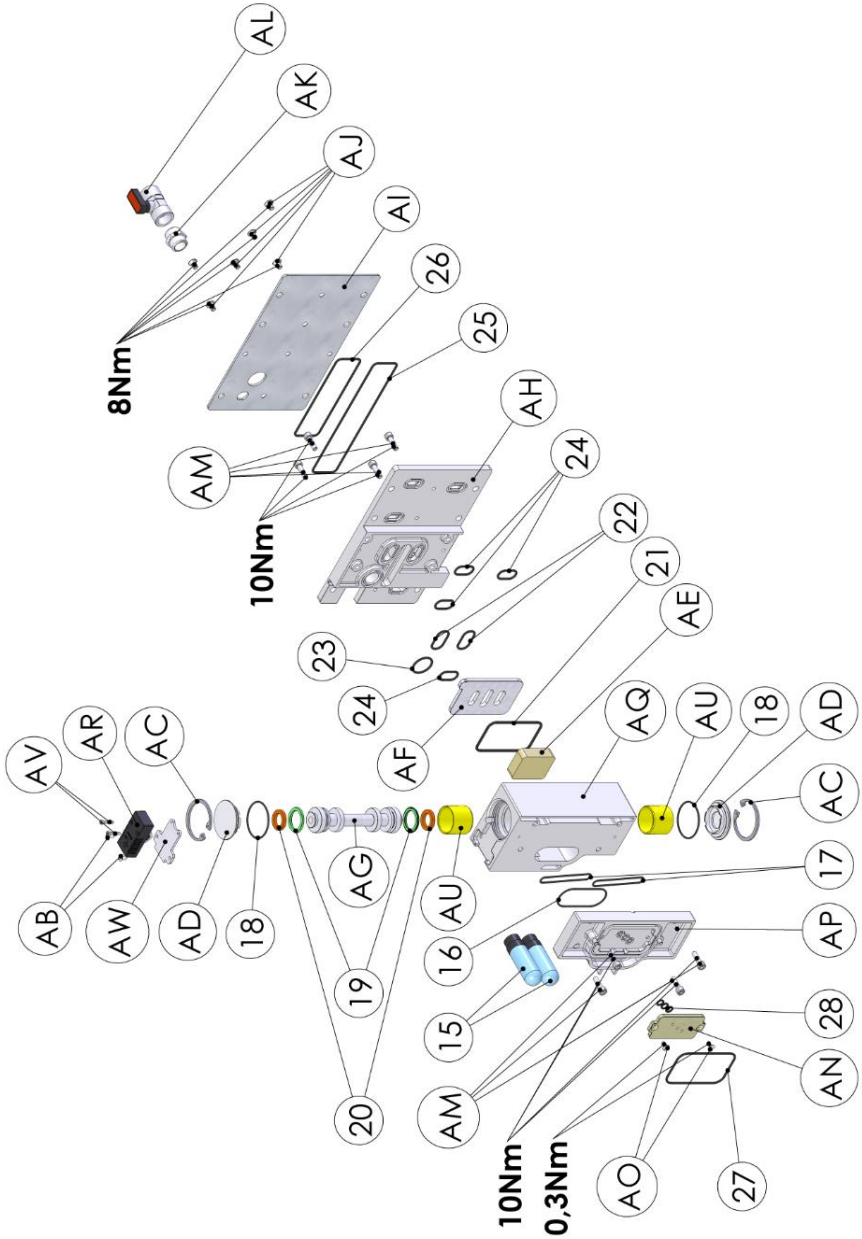

Fig. 9: Explosion valve unit

1. Remove the ball valve (AL) and the double nipple (AK) from the valve unit.
2. Optional: Disassemble the frequency sensor (AR) by removing the screws (AB) and loosening the bushing in the valve cover plate (AL).
3. Remove the valve cover plate by loosening and unscrewing the 6 screws (AJ)
4. Take the O-rings (25 and 26) out of the grooves of the valve unit.
5. Loosen the screws (AM) and turn them out. Now remove the air distributor (AH) from the valve unit.
6. Remove the O-rings (22, 23, 24) out of the grooves of the air distributor (AH).
7. Remove the main valve ceramic (AF), O-ring (21), and main valve obturator (AE) from the valve unit.
8. Remove the O-ring (27) and the silencer (15)
9. Remove the screws (AO) and remove the control valve ceramics (AN) and the seal (28).
10. Loosen and remove the screws (AM) and remove the valve plate (AP).
11. Remove the O-rings (16 and 17) from the grooves of the valve plate (AP)
12. Remove the bore rings (AC) from the grooves of the valve housing.
13. Remove the stop discs (AD) and O-rings (18) from the valve housing.
14. Slide the control valve piston (AG) with the damping discs (20) and seals (19) laterally out of the valve housing.
15. Remove the seals (19) and the damping discs (20) from the control valve piston (AG).

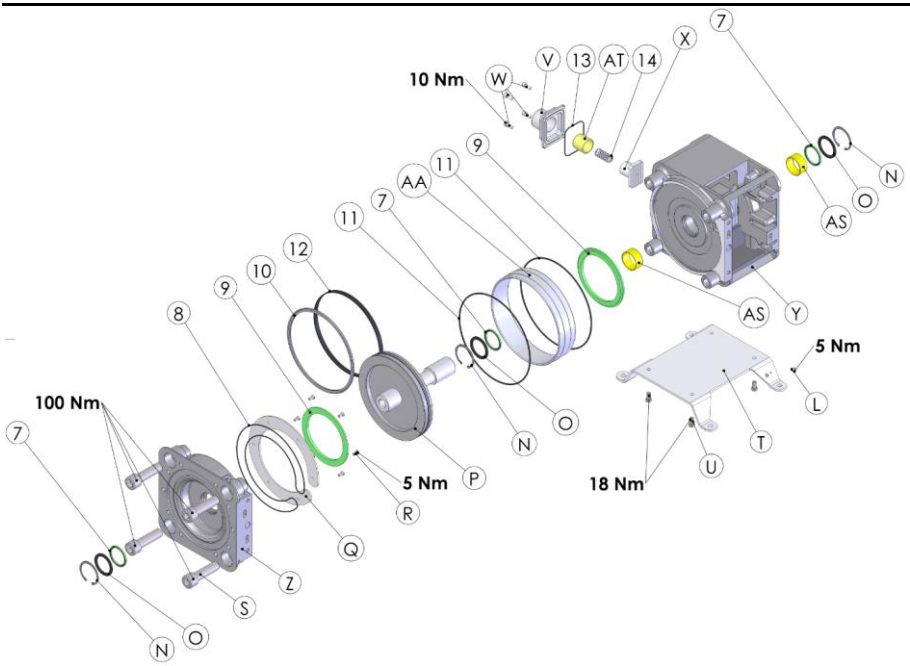

Fig. 10: Explosion pneumatic middle part

16. Remove the pump base (T) by loosening the screws (U)
17. Release the housing of the over-center element (V) from the middle of the housing by loosening the screws (W)
18. Remove the O-ring (13), the spring (14) and the over-center element (X) from the housing of the over-center valve (V).
19. Loosen the screws (S) and remove the intermediate housing part (Z).
20. Loosen the screws (R) and remove the cover (Q), O-ring (8), stop disc (9) and O-ring (11).
21. Remove the retaining ring (N), the sealing washer (O) and the rod seal (7) from the intermediate housing part (Z).
22. Slide the piston (P) out of the middle housing section.
23. Remove the seal (10) and guide band (12) from the piston (P).
24. Remove the cylinder liner (AA), O-ring (11) and stop dics (9) from the middle housing section (Y).
25. Remove the retaining rings (N), the sealing washers (O) and the rod seals (7) from the middle housing section (Y).

Assembly of the pneumatic system

Note

- Apply the lifetime lubrication, which is important for pneumatics, when performing the following assembly steps. All seals and running surfaces on which a permanent movement is carried out shall be provided with a lifetime lubrication of pneumatic grease. The universal oil is intended for the assembly the valve obturators on the ceramic plates. The ball valve at the air inlet of the pump must be sealed with liquid seal.

  - Use pneumatic grease: Timmer item no.70010083
  - Use universal oil: Timmer item no. 15073311
  - Use liquid seal: Timmer item no. 15071259

15.4.2 Installation of the pneumatic valve

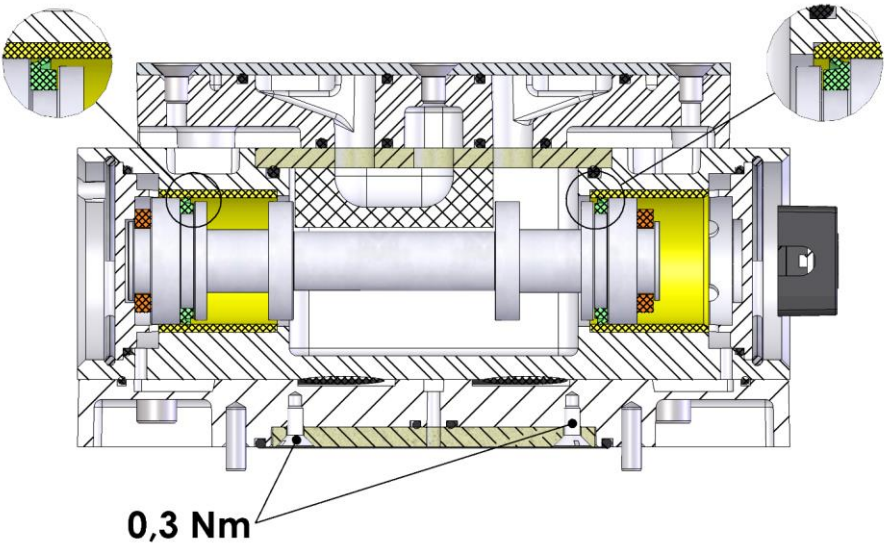

Fig. 11: Sectional view of pneumatic valve

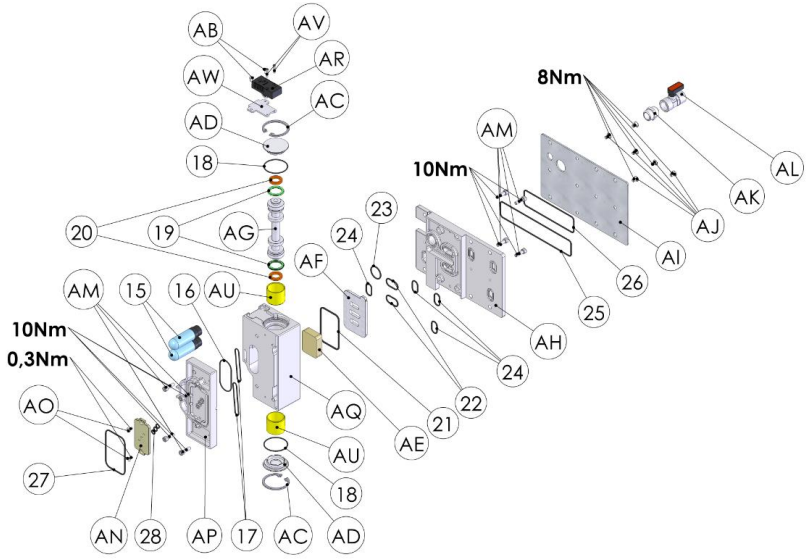

Fig. 12: Explosion valve unit

1. Mount the seals (19) and the damping discs (20) on both sides of the control valve obturator (AG), note the installation direction of the seals (see picture)!
2. Mount the O-ring (18), stop disc (AD) on one side of the valve housing (AQ) and fix it with the bore ring (AC).
3. Insert the control valve obturator with the seals into the valve housing (AQ).
4. Mount the O-ring (18), stop disc (AD) on the second side of the valve housing and fix it with the bore ring (AC).
5. Insert the main valve obturator (AE), seal (21) and main valve ceramic (AF) into the valve housing (AQ).
6. Install the air distributor (AH) with the inserted O-rings (22, 23, 24) and the screws (AM) to the valve block (AQ). Torque of screws (AM) 18Nm.
7. Insert the O-rings (26,27) into the grooves of the air distributor (AH).
8. Mount the valve cover plate (AI) with the screws (AJ), installation torque: 8Nm.
9. Insert the seal (28), the control valve ceramic plate (AN) and the O-ring (27) into the valve plate (AP).
10. Fasten the control valve ceramic plate (AN) with the screws (AO). Mounting torque: 0.3Nm
11. Install the double nipple (AK) and ball valve (AL) using the specified sealant.
12. Optional: Mount the stroke counting sensor (AR) with the screws (AB). Insert the cable through the provided groove and secure the connector in the valve cover plate (AI).

15.4.3 Assembly of the pneumatic middle section

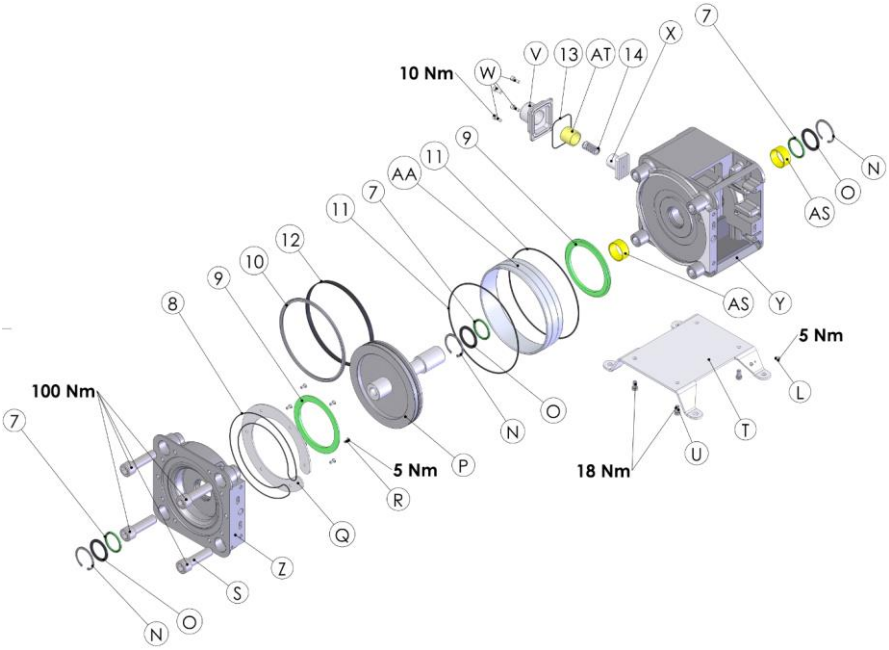

Fig. 13: Explosion pneumatic middle part

1. Mount the rod seals (7), the sealing washers (O) and the retaining rings (N) in the middle housing section (Y).
2. Insert the damping disc (9) and the O-ring (11) into the middle housing section (Y).
3. Install the cylinder liner (AA) into the middle housing section (Y).
4. Install the piston seal (10) and the guide band (12) on the piston (P).
5. Push the piston (P) with the mounted guide and seal into the middle housing section (Y).
6. Insert the seal (8) into the intermediate housing part (Z), and install the intermediate housing part (Q) with the screws (R). Mounting torque: 5Nm
7. Install the sealing ring (7), the sealing washer (O), the retaining ring (N), the O-ring (11) and the damping disc (9) into the intermediate housing part (Z).
8. Place the intermediate housing part (Z) on the middle housing section (Y) and secure it with the screws (S).

   Mounting torque: 100Nm

Note

- Align the surfaces of the intermediate housing part (Z) and the middle housing section (Y) on the side of the air ducts parallel to one another before fastening the screws (S)! If the alignment is insufficient, there is the risk of mounting problems or leaks in the valve unit.

9. Insert the O-ring (13), the spring (14) and the locking element (X) into the housing of the over-center element (V) and secure it with the screws (W) in the middle housing section (Y).
   Mounting torque: 10 Nm
10. Attach the pump base (T) with the screws (U).
    Mounting torque: 18Nm

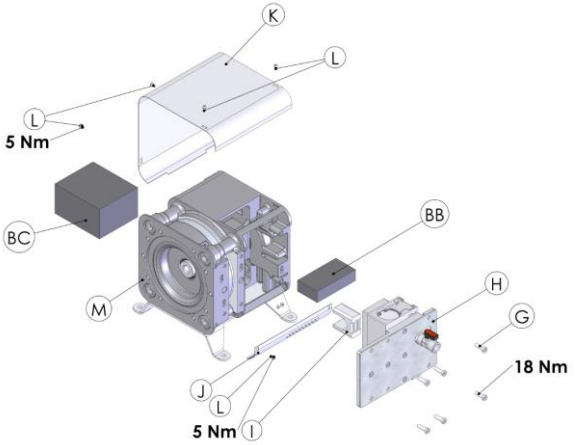

Fig. 14: Assembly of valve unit, middle housing section

11. Insert the control valve obturator (I) and the valve unit (H) into the middle housing section (M) and fasten the valve unit (H) with the screws (G). Mounting torque: 18Nm
12. Attach the cover plates (J and K) to the middle housing section with the screws (L). Mounting torque: 5Nm
13. The final assembly of the pump is carried out as described in "Replacing the diaphragms".

15.5 Replacing the media valves

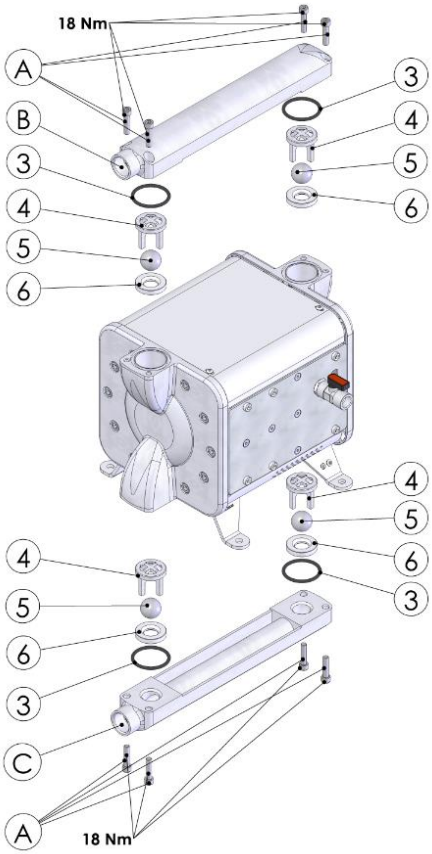

Fig. 15: Replacing the media valves

1. Loosen the fillister head screws (A) on both media pipes (B, C) and remove the media pipes (B, C).
2. Remove the O-rings (3) at all 4 points, the media valve cages (4) and the balls (5) at the media exit side.
3. Use an internal extractor tool Ø20mm to remove all 4 cage bottoms (6) from the side covers of the pump.
4. Disassemble the cages of the media valves (4) and the balls (5) at the media input side.

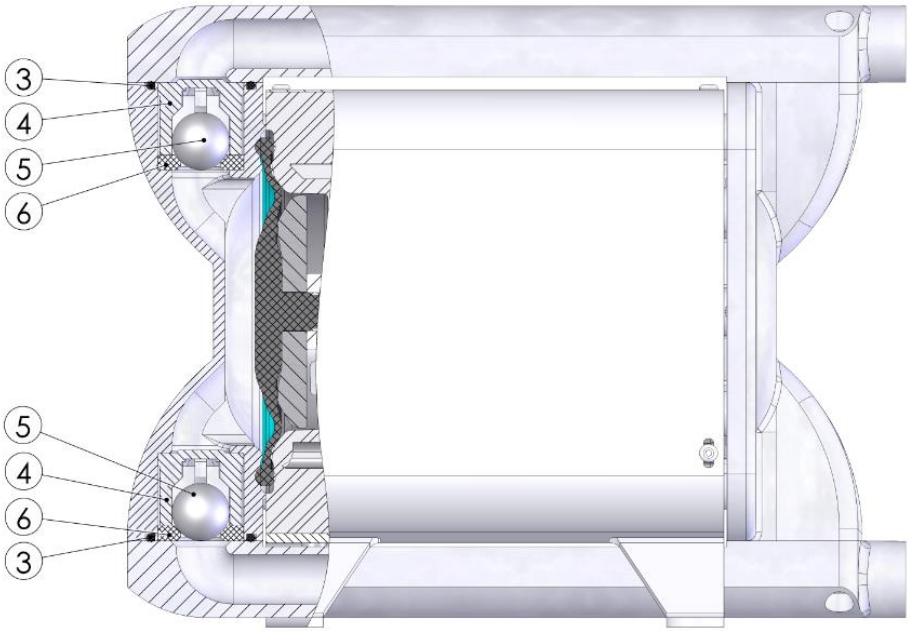

Fig. 16: Replacing the media valves

5. Clean the components and install the new components in reverse order. Make sure that the cage bottoms (6) are in the correct position. The larger chamfer must point to the ball.
6. The specified torque of the fillister head screws (A) is **18 Nm**.

16 Disposal

16.1 Return shipment

Please send the pump to the following address:

Timmer GmbH
Dieselstrasse 37
D-48485 Neuenkirchen, Germany
Germany

▶ Note

- Please send the pump in the original packaging, to avoid transport damage.
- The pump must be rinsed out and the surface must be clean.
- If rinsing out is not possible, then the media connections must always be tightly sealed to prevent the medium from running out.
- Always include a safety data sheet of the last pumped medium or cleaning agent with the returned pump.

17 Technical data

General data	
Operating conditions	+5 ... +40°C at maximum 80% relative humidity
Maximum flow rate	Approx.110 l/min
Conveyed volume per double stroke	approx.450cm³
recommended max. frequency	1 Hz
Drive	Pneumatic
Compression ratio	approx. 4 : 1
Fluid connections	1“ BSP thread (special versions available)
Operating pressure	Maximum 7 bar compressed air, filtered according to DIN ISO 8573
Max. operating pressure (medium pressure)	25 bar
Compressed air connection	Thread G1/2“
Suction height, dry	4 m
Weight	approx.50 kg
Maximum medium viscosity	approx. 15.000 mPa•s
Conveyed medium temperature	+5 ... +65 °C
Sound pressure level	max. 88dB (A)
Sound power level	max. 100dB (A)

Material of the parts that come into contact with medium	
Housing	Stainless steel
Pressure pipe	Stainless steel
Diaphragm	Composite membrane PTFE/NBR
Valve ball	Stainless steel
Fluid seal	FEPM
Valve seat	PTFE

18 Wear parts for standard version

▶ Note

Wear parts are only available in the wear parts packages. The packets vary depending on the selected variant. In this case the spare parts numbers are provided separately.

Use only original Timmer spare parts.

VP diaphragm PTI-MHD1110-SO

Item	Article number	Quantity	Description	
1	53509543	2	High pressure diaphragm PTFE / NBR	Wear parts package diaphragm item no. 53509551
2	53509550	2	PTI-MHD1110-support disc-U-110	

VP diaphragm PTI-MHD1110

Item	Article number	Quantity	Description	
1	53509543	2	High pressure diaphragm PTFE / NBR	Wear parts package diaphragm item no. 53509552
2	53509539	2	PTI-MHD1110-support disc-U	

VP media valves PTI-MHD1110

Item no. 53509553

Item	Article number	Quantity	Description
3	53509533	4	PTI-MHD1110-cage
4	70050014	4	Ball Ø30
5	53509534	4	PTI-MHD1110-ball seat
6	70011271	4	N-OR-48x4,5-FEPM

VP Pneumatic PTI-MHD1110

PTI-MHD1110-VP-Pneumatic → 53509554

*PTI-MHD1110-VP-Pneumatic-SO → 53509555

Item	Article number	Quantity	Description
7	70011268	3	Rod seal
8	70011292	1	O-ring Ø345x2
9	53509520	2	Stop disc pistons
9*	53509549	2	Stop disks piston -SO
10	70011265	1	Piston seal Ø200
11	70020255	2	O-ring Ø201x3
12	70030009	1	Guide band
13	79010508	1	O-ring Ø72x2
14	79011313	1	Spring over-center element
15	15010304	2	Silencer
16	79011319	1	O-ring Ø54x2
17	79010382	2	O-ring Ø48x2
18	70010038	2	O-ring Ø44x2
19	70020254	2	Piston seal Ø32
20	79011380	2	Damping discs main valve piston
21	70019086	1	O-ring Ø75x3
22	70019128	2	O-ring Ø23x2.5
23	70019129	1	O-ring Ø24x2.5
24	70019127	4	O-ring Ø19x2.5
25	70019131	1	O-ring Ø138x2.5
26	70019136	1	O-ring Ø104x2.5
27	70019126	1	O-ring Ø80x2.5
28	53509523	1	Seal ceramic plate, control valve

Parts outside the wearing part packages

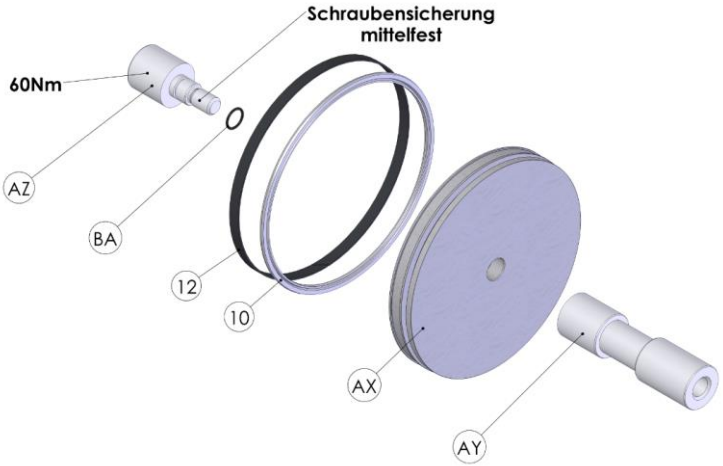

Fig. 17: Assembly, piston

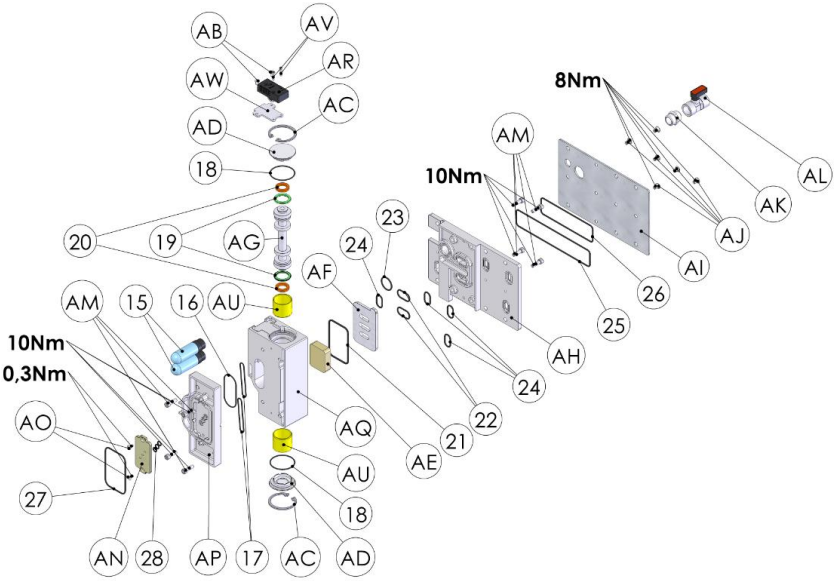

Fig. 18: Assembly, valve

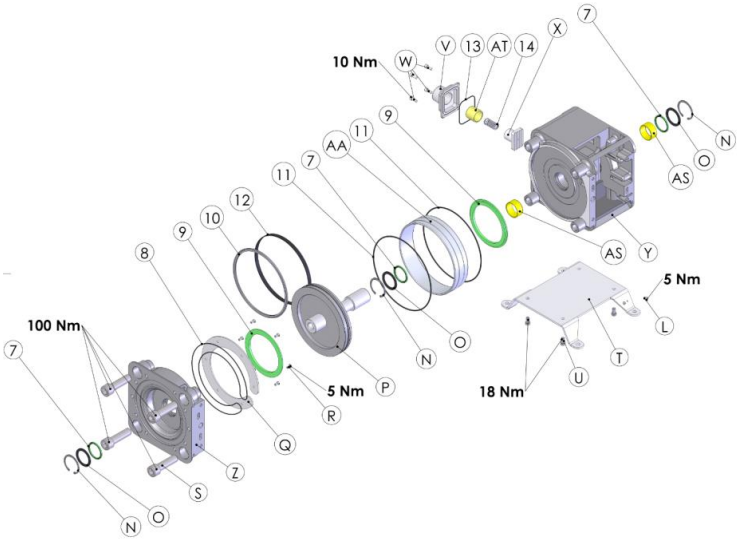

Fig. 19: Assembly, pneumatic middle part

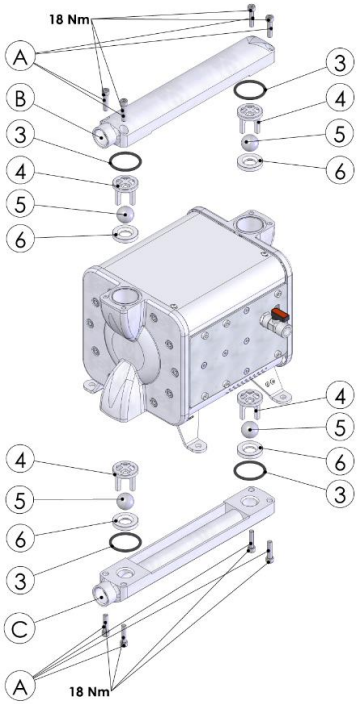

Fig. 20: Assembly, media valves

*Version-SO

Item	Article number	Quantity	Description
A	79011315	4	Fillister head screw DIN912 M8x35
B,C	53509530	2	Media pipe
D	70011270	20	Fillister head screw DIN912 M10x35
E	53509529	2	Housing cover
F	53509501	1	Assembly, middle section cpl.
F*	53509545	1	Assembly, middle section cpl. -SO
G	79010454	6	Fillister head screw DIN6912 M8x25
H	53509502	1	Assembly, valve unit cpl.
I	53509509	1	Control valve obturator
J	53509525	1	Cover plate, small
K	53509526	1	Cover plate, large

L	79010948	7	Raised-head screw
N	70010742	3	Retaining ring
O	53509522	3	Sealing washer
P	53509503	1	Assembly, piston cpl. (incl. 10 and 12)
P*	53509546	1	Assembly, piston cpl. -SO (incl. 10 and 12)
Q	53509538	1	Cover, intermediate housing part
R	79010174	6	Fillister head screw DIN7991 M5x12
S	70011018	4	Fillister head screw DIN912 M20x70
T	53509524	1	Pump base
U	79010795	4	Fillister head screw DIN7984 M8x16
V	53509519	1	Housing over-center element without socket
W	70060042	4	Fillister head screws DIN912 M6x16
X	53509510	1	Over-center element
Y	53509513	1	Middle housing section
Z	53509521	1	Intermediate housing part
AA	53509535	1	Cylinder liner
AB	79010309	2	Raised-head screw ISO7380 M4x8
AC	70010742	3	Retaining ring
AD	53509514	2	Stop disc
AE	53509511	1	Main valve obturator
AF	53509507	1	Main valve ceramic
AG	53509515	1	Control valve piston
AH	53509517	1	Air distributor
AI	53509518	1	Valve cover plate
AJ	70011289	6	Countersunk head screws DIN7991 M6x10
AK	12015009	1	Double nipple
AL	20060414	1	Mini ball valve
AM	79010154	4	Fillister head screw DIN912 M6x20
AN	53509508	1	Ceramic plate, control valve
AO	79011312	2	Countersunk head screw M4x10
AP	53509516	1	Valve plate

AQ	53509512	1	Valve housing
AR	53507437	1	Sensor
AS	70011269	2	Plain bearing bush
AT	70011263	1	Plain bearing bush
AU	70011276	2	Plain bearing bush
AV	79010081	2	Fillister head screw DIN912 M3x16
AW	53509537	1	Sensor plate
AX	53509506	1	Piston
AY	53509505	1	Piston rod part 2
AY*	53509548	1	Piston rod part 2-SO
AZ	53509504	1	Piston rod part 1
AZ*	53509547	1	Piston rod part 1-SO
BA	70020020	1	O-ring Ø16x2
BB	53508034	1	Sound insulation, small
BC	53509556	1	Sound insulation, large

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