

Operating and Installation Instructions

A-Series A 08 - A 50



Pneumatic Diaphragm Pumps made of Plastic

ought to be studied before installing the pump

Original Instruction



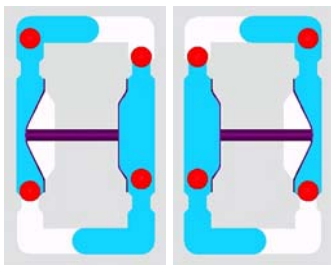
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Introduction

ALMATEC air-operated diaphragm pumps are constructed according to the state of the art and they are reliable. Imminent danger by operating error or misuse can lead to damages of properties and/or persons. The pumps are to be applied for the intended use and in a safety-related proper condition only.

Each person working on the ALMATEC air-operated diaphragm pumps concerning installation, start-up, handling or maintenance has to read this manual completely and in an attentive way and has to follow all mentioned procedures and safety notes.

General description of the machine, appropriate use and residual dangers



The ALMATEC A-Series pumps are oscillating positive displacement pumps and are based on the functional principle of double diaphragm pumps. The basic configuration consists of two external side housings with a center housing between them. Each of the side housings contains a product chamber which is sealed against the center housing by a diaphragm. The two diaphragms are interconnected by a piston rod. Directed by an air control system, the diaphragms are alternately loaded with compressed air so that they move back and forth. In the first figure, the compressed air has forced the left-hand diaphragm towards the product chamber and displaced the liquid from that chamber through the open valve at the top to the discharge port. Liquid is simultaneously drawn in by the right-hand diaphragm, thus refilling the second product chamber. When the end of the stroke is reached, it reverses automatically and the cycle is repeated in the opposite direction. In the second figure, liquid is drawn in by the left-hand diaphragm and displaced by the right-hand diaphragm.

The appropriate use of an Almatec air-operated diaphragm pump of the A-Series refers to the liquid transport taking into account the operation parameter mentioned in this manual and in compliance of the given terms for commissioning, operation, assembly, disassembly and maintenance.

Even if all necessary safety measures described in this manual have been met, a residual danger exists by leakages or mechanical damages. At sealing areas or connections liquid can be released uncontrollably then.

Storage

In general the ALMATEC pump is delivered operational and packaged. If the unit is not installed right away, proper storage conditions are important for a trouble free operation later. The pump has to be protected from wetness, coldness, dirtying, UV-radiation and mechanical influences. The following storage conditions are recommended:

- Steady ventilated, dust and vibration free storage room
- Ambient temperature between 15°C and 25°C with a relative humidity below 65%
- Prevention of direct thermal influences (sun, heating)

Codesystem

The ALMATEC Maschinenbau GmbH is certified as a modern, quality-orientated enterprise according to DIN EN ISO 9001:2008 and 14001:2005. Before release for dispatch, any pump of the A-Series has to undergo an extended final control. The performance data registered during this are archived in our records and can be read back at any time.

As a general rule in the countries of the EU only such machines are allowed to take into operation, which are determined to meet the regulations of the EU machinery directive, the harmonized standards, European standards and the respective national standards. Hence the operator has to verify whether the ALMATEC pump manufactured and delivered properly according to the customers order meets the mentioned requirements.

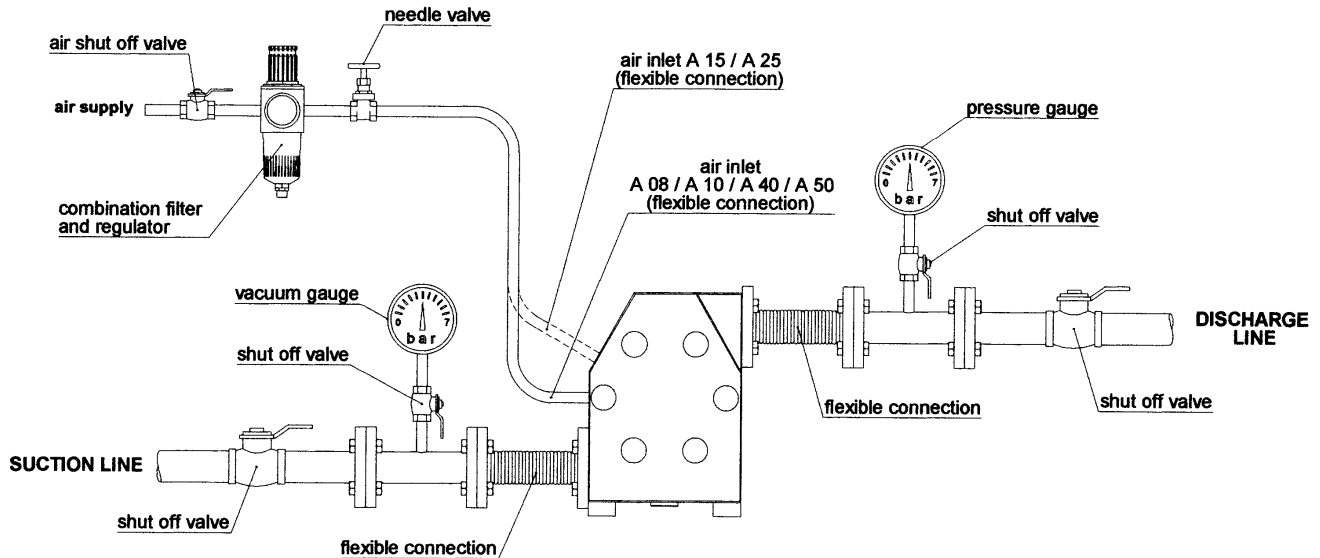
Therefore make sure, before putting the pump into operation, that the pump and the used materials of construction are suitable for the provided application and the installation site. To check this, the exact pump code is required. This code, the serial number and the year of construction are noted on the identification plates on the pump itself.

Technical data	A 08	A 10	A 15	A 25	A 40	A 50
Dimensions (mm): length width height	90 113 129	110 127 169	166 176 240	220 231 320	280 326 432	360 396 552
Nominal port size (NPT) Air connection	1/4" R 1/8	3/8" R 1/8	1/2" R 1/4	1" R 1/4	1 1/2" R 1/2	2" R 1/2
Weight (kg): PE PTFE	- 2	2 4	5 10	13 25	29 60	58 120
Max. particle size of solids (mm) for pumps with ball valves	2	3	4	6	9	11
Suction lift, dry (mWC): cylinder valves ball valves	1 0.5	2 1.5	3 2	4 3	5 4	5 4
Suction lift, wet (mWC)	9	9	9.5	9.5	9.5	9.5
Max. driving and operating pressure (bar)	7	7	7	7	7	7
Max. operating temperature (°C): PE PTFE*	- 100	70 100	70 120	70 120	70 120	70 120
Theoretical displacement volume per single stroke (l)	0.0075	0.0215	0.1	0.34	0.98	2.6
Sound pressure level acc. to DIN 45635, part 24, depending on the operating data [dB (A)]: driving pressure 3 bar driving pressure 5 bar driving pressure 7 bar	68-70 71-74 71-76	68-70 71-73 72-75	68-71 73-75 74-78	69-71 71-75 73-76	63-65 64-68 69-74	65-70 69-74 73-78

* PTFE pumps with NBR equipment 80°C

These technical data are for ALMATEC A-Series pumps without optional equipment.

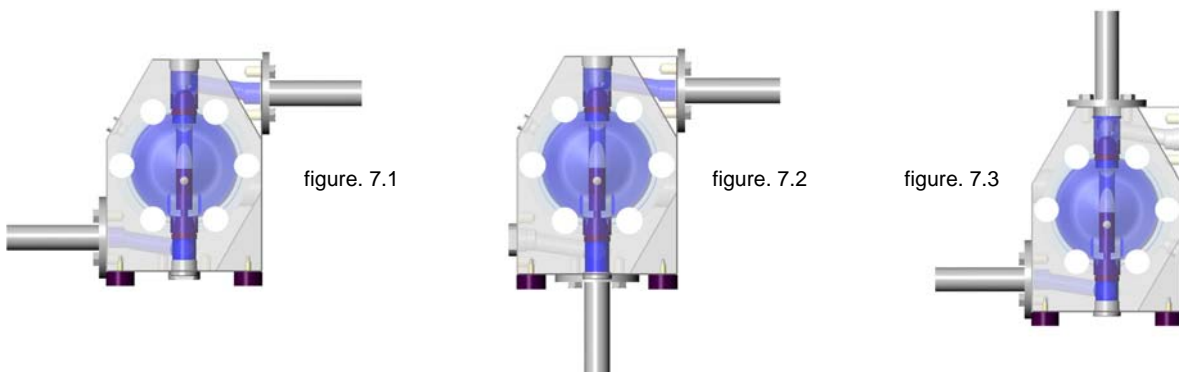
Recommended installation



Product ports

The product ports are integrated into the center housing [2]. Different port configurations can be obtained (without using of a screwed pulsation damper only). The standard configuration of the A-Series at delivery is with the suction inlet horizontally at the bottom and the discharge outlet horizontally at the top (figure 7.1). Further possible configurations:

- Suction inlet vertically at the bottom, the discharge outlet horizontally at the top (figure 7.2)
To obtain this configuration, the plug of the center housing [8] has to be removed and set in the standard inlet.
- Suction inlet horizontally at the bottom, the discharge outlet vertically at the top (figure 7.3)
Unscrew the housing bolts [15], take off the side housings [1] and turn the center housing [2]. Remount the pump and adjust the plug [8] accordingly.



Installation, operation and maintenance

UV-radiation can damage the housing parts of pumps made of PE (material code E). In general, the pump has to be connected load free. Neglecting this causes leakage and maybe even damages. To avoid vibrations, pulsation dampers and compensators are recommended. Before connecting the pump, take the yellow blind plugs out of the suction and discharge connections as well as the air inlet [19] in the center housing [2]. The connections of ALMATEC pneumatic diaphragm pumps in polymer materials have slightly tapered threads. Use threadseal only sparingly, otherwise the connections could be damaged.

The operator is responsible for an adequately stability and an appropriate fixation of the piping according to the state of the art. To facilitate the installation and maintenance shut off valves should be installed right before and after the pump. The nominal width of the connection pipes has to be chosen in accordance to the connections of the pump. A smaller piping can cause cavitation (suction line) as well as a loss of performance (suction and discharge line). In case the pipe is too big, the dry suction capacity of the pump can decrease. Connect the suction line to the lower connection in the center housing [2]. Seal the suction line diligently; hosepipes should be suitably armoured. A suction line continuously rising will prevent the formation of air locks

in the line which would affect the suction lift.

The air inlet [19] is located in the middle of the center housing [2]. Before installation make sure that the air supply pipe is free of solids. To supply the pump with driving air sufficiently, the pipe diameter should match the size of the air inlet. Take care that no dirt or particles can intrude into the pump during the connection, as these can accumulate inside the pump and can cause malfunctions. An air filter [20] directly behind the air inlet [19] (not included in A 08 and A 10) prevents the entry of bulk particles.

The integrated air control system *PERSWING P*[®] is a precision-control that requires oil-free, dry and clean compressed air for optimal function. If humidity is expected, a water separator or air dryer has to be fitted to protect the pump from blocking by ice. The ideal condition is the dewpoint of air at -20°C. In humid surroundings, icing from the outside may occur despite the driving air is dried. If so, a prolonged waste-air-exhaust (ca. 500 mm by pipe or hose) can be helpful. When installing the pump into boards or cabinets, it has to be ensured that cold air does not get caught behind the muffler. In applications with a tendency to freezing at the waste air exhaust, good experiences in practise have been achieved by pre-heating the driving air to increase the distance to the dew point of the air. Doing so, it has to be considered that the driving air temperature generally may not exceed 50°C to avoid expansion and sticking effects on the air side. This max. air temperature is a well valid when using a compressor producing warm air which is e.g. often true for truck compressors.

The pressure of the driving air should be limited to the amount required to meet the performance needed. Excessive pressure increases both the air consumption and the wear of the pump. The pump is regulated by tuning the flow rate of the air. For a proper operation at the lower performance range the regulation via a needle valve is recommended. An empty pump has to be driven slowly (e.g. via a needle-valve). The pump starts automatically. Pumps of the A-Series are self-priming when dry, thus it is not necessary to fill the suction line of the pump. The suction lift capacity of a liquid-filled pump, however, is much higher. The pump is appropriate for running dry during slow operation. Dry running at high stroke frequency causes premature wear. The pumps can briefly (up to max. one hour) be operated against a closed discharge line. Throttling on the suction side may damage the pump. When the pump operation has been stopped by a closed discharge, the pressure equilibrium of the diaphragms must be ensured. This can be achieved by keeping the pump connected to the air supply pressure; for longer stoppage, the pump must be released from the pressure within the system on both fluid side and air supply side.

Torque values



Immediately before putting the pump into operation as well as after some hours of pumping, the housing bolts [15] have to be fixed according to the torque data of the following schedule, as the elements of construction "settle". The valve stops discharge valve [6] and the plugs [7/8] have to be fixed too. Fixing all these parts is necessary as well after periods of stoppage, at temperature variations, after transport and dismantling the pump. In case of temperature varying between extremes or high temperature difference between the liquid and the surrounding, the housing bolts should be controlled more frequently (interval proposals are available on request).

Size	A 08	A 10	A 15	A 25	A 40	A 50
Torque values for housing bolts (Nm):						
PE-pumps	-	6	8	13	17	22
PTFE-pumps	2	4,5	6	10	14	18

Safety hints



- Installation, operation, and maintenance by qualified staff only.
- Before start-up of the pump anyone should acquaint oneself with the explanations of the chapter troubleshooting (see pages 16/17). Only by this the defect quickly can be realized and eliminated in case of trouble. Problems which cannot be solved or with an unknown reason should be passed on to the manufacturer.
- Before any maintenance and service procedures arising on the pump or on the optional equipments, the complete installation has to be turned off and protected against accidental turn on. This is possible by a lockable emergency stop for the air supply of the pump. Additional a danger sign against restart should be attached.
- Pressure tests of the plant a pump is included in may only be carried out with the pump disconnected from the pressure on both ports or by using the pressure the pump develops while operating. The load of a pressure in the plant may damage the pump.
- Pump must not be operated with a positive suction pressure.
- Depending on the conditions of operation, the liquid conveyed might escape from the pump through the muffler in case of a diaphragm rupture (in this case muffler has to be replaced). For further safety requirements the optional equipment diaphragm monitoring and barrier chamber system are recommended.
- In case of a diaphragm rupture, it might be possible for the fluid pumped to intrude into the air side of the pump. In very adverse conditions - e.g. pressure within the fluid system during stopped air supply - the fluid might as well find its way into the air supply lines. To protect other devices like pulsation dampers or even pneumatic valves, it is recommended to protect the air supply line accordingly, e.g. via a non-return valve. This would as well avoid polluting the air supply line.
- The state of the muffler has to be inspected regularly, as a blocked muffler can be forced out of the pump. If this happens, damages of properties and/or persons cannot be excluded.
- If the product tends to settle, the pump has to be flushed regularly. For larger solids a filter has to be installed in the suction line.
- In case of delivery of hot liquids the wetted pump must not standstill for a longer time, because it could lead to temporary leaks in the valve area and to a blockade of the air control system.
- The relevant effective security advises have to be respected.
- Pools of liquid which appear in the near outer area of the pump have to be inspected on danger potential, if necessary safety measures are to be taken.
- Chemical and biological reactions in the product chamber of the pump (mixture of different substances) and the freezing of the liquid have to be avoided.
- Before starting to disassemble the pump, take care that the pump has been emptied and rinsed. Both ports piping are to be closed and drained if applicable. Further the pump has to be cut off from any energy on the air and product side. If the pump is being deported from the plant, a reference about the delivered liquid has to be attached.
- Please respect the relevant additional security advices, if the pump has been used for aggressive, dangerous or toxic liquids (e.g. suitable protective equipment according to the safety data sheet of the liquid). In case of a diaphragm rupture, it is possible that residues of the liquid remain behind the diaphragms, in the area of the air control system and at the muffler, despite of several flushing processes. Hence, appropriate safety equipment according to the safety data sheet of the liquid is indispensable.
- Before putting the pump back into operation, the tightness of the pump has to be checked.
- Air-operated diaphragm pumps can lead to bruises when lifting, sinking or assembling them. Appropriate accessories and safety equipments are to be used. Big and heavy modules have to be fixed and secured to lifting gears when transporting/replacing them.
- Especially when deliver critical liquids, wear parts, like diaphragms, should be replaced within a preventive maintenance.
- The use of non-original ALMATEC spare parts and structural changes lead to the lapse of the warranty immediately. When operating such a pump, damages of properties and/or persons cannot be excluded.
- The operation of the pump with nitrogen as driving gas is possible. In closed rooms sufficient ventilation must be provided.
- Possible electrical connections (e.g. when using optional equipment with controllers) may be executed by a qualified person only. The regulations of the respective manufacturers are to be followed.
- At any work arising it has to be made sure that no explosive atmosphere can appear. Appropriate safety equipment is recommended.
- Procedure for pump return: According to the requirements of our 14001-certification, every

unit which is sent to ALMATEC for diagnosis or maintenance reasons has to be accompanied by a filled out decontamination-sheet. Otherwise a processing is not possible. The decontamination-sheet is enclosed to this manual. Please pay attention to the further safety regulations.

Using as submersible pump

Consider the following advises when using an A-Series pump as a submersible pump: When immersing an air-operated diaphragm pump, it must generally be ensured that the waste air is deducted above the fluid level with a pipe or similar. The pump must be located vertically upright to guarantee proper function. Minute leakage on the air inlet or outlet can block the air valve. The pump must be disconnected from the pressure within the system during standstill. When choosing the pump type, it must be taken into consideration that all external parts - even those non-wetted during standard operation - like covers, shock absorbers, connections etc. must be resistant to the fluid pumped. Please consider as well that depending on the material, the pump must be weight down resp. fixed.

Additional temperature hints

The temperature and pressure limitations listed on page 5 are solely based on mechanical temperature limits of the housing material used. Depending on the fluid pumped, the maximum safe operating temperature of the housing material can be reduced significantly.

A general aspect of lower temperatures is, that below 0°C cold-brittling of the elastomers used within the pumps can results in accelerated wear. Regarding the housing materials, please note that PE - other than PP - keeps its mechanical strengths at low temperatures and PTFE keeps mechanically stable as well for an extended temperature range. ALMATEC pumps of the A-Series can therefore be operated safely as well within low-temperature installations: However, with liquids below 0°C accelerated wear of internal parts has to be accepted. Moreover, freezing, bogging or crystallisation of the fluid pumped must be avoided, especially within the pump. Emptying the pump via the drainage system (optional equipment code R) may be a useful tool to assist this.

Please consider, that viscosity and specific gravity of most fluids change with temperature (most often increasing at lower temperature). Depending on the application, this fact may not only result in result in a reduced flow rate, the pump may even be unable to prime the thicker and/or "heavier" fluid any more.

In case of varying application temperatures, the housing bolt tension has to be controlled very thoroughly, as variations like these can change the effective tension of the housing bolts via the different thermal expansion characteristics of single.

Providing spare parts

We recommend having spare part kits S on stock. These include the relevant spare parts for your pump.

Disassembly

When dismantling a pump the mentioned procedures and safety notes on the pages 9-11 have to be considered generally. Among the different sizes of the A-Series - A 15 to A 50 - only the number of housing bolts [15] varies. Besides, for the sizes A 08 and A 10 the shaft [16] additionally functions as the pilot piston for the air-valve. In these pumps A 08 and A 10, there are no shaft piston rings [18] and no set screws [17] nor an air filter [20]. Please keep these differences in construction in mind when reading the following dismantling instructions.

The general design of the ALMATEC A-Series is simple. Two tools are delivered along with every pump. The plastic one of these is designed for the mounting of the air-valve [22], the other one for the mounting of valve seat [10]. Further special tools are not required.

Take the caps out of the side housings [1] to get access to the housing bolts [15]. Unscrew the housing bolts [15] on one side using a socket wrench and remove the side housing [1]. Work carefully to ensure that the sealing surfaces in contact to the diaphragms are not damaged. Carefully draw the housing bolts [15] out of the pump. The center housing [2] and both side housings [1] are removeable now. Remove the sleeve [3] out from the side housing [1]. Take the O-rings sleeve [11] out of the center housing [2] and both side housings [1] for a possible renewal.

For further dismantling of the side housings [1], screw out the valve stop, discharge valve [6] with an appropriate wrench (figure 12.1). Alternatively, you can stick two housing bolts [15] into the holes in the valve stop [6] and loosen the valve stop with a third housing bolt [15] fixed in between the others. Take out the ball valve [9] resp. cylinder valve [9] and the O-ring, valve stop, discharge valve [12]. Use the metallic mounting tool to unscrew the valve seat [10] (figure 12.2/12.3).

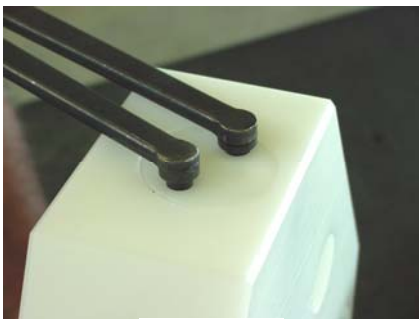


figure 12.1

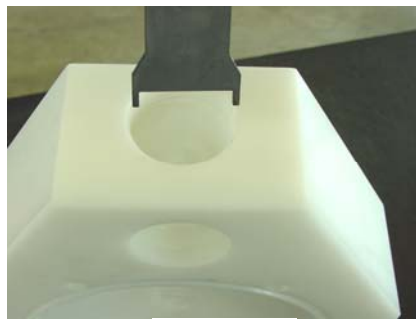


figure 12.2

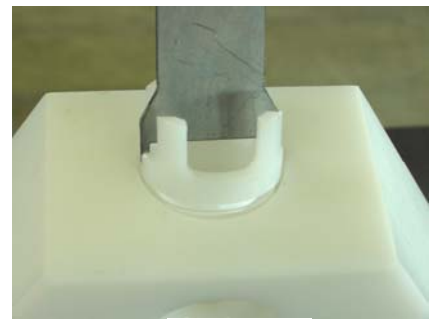


figure 12.3

The plug, side housing [7] can be unscrewed the same way as described for the valve stop [6]. Loosen the bolt, valve stop [5] with a screw-driver (figure 12.4). Push the valve stop, suction valve [4] towards the discharge, so that the ball/cylinder valve [9] can be removed. Turn the mounting tool and screw the valve seat [10] into the side housing [1] (figure 12.5). The valve seat [10] and the valve stop, discharge valve [4] can now be removed from inside the side housing.



figure 12.4

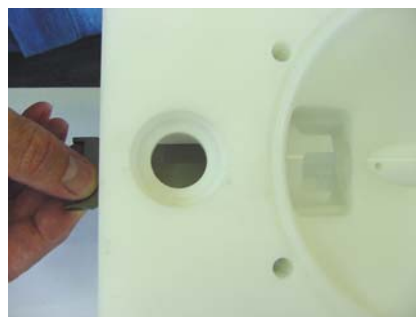


figure 12.5



figure 12.6

Screw one diaphragm [14] left-turning off the shaft [16] and pull the other diaphragm [14] out of the center housing [2] using the shaft[16]. Take set screws shaft [17] out of the diaphragms [14] (figure 12.6).

Remove both parts of the shaft piston rings [18] from their grooves carefully (figure 13.1); do not damage the edges in the center housing, a re-assembly of the same piston rings is impossible, they have to be replaced. Unscrew the muffler [21], the air inlet [19] and the air filter [20] out of the center housing [2]. To remove the *PERSWING P*® air control system, screw off both end caps using the plastic mounting tool delivered with the pump (figure 13.2). Take out main and pilot piston. Push out the air valve housing with the mounting tool turned around (figure 13.3).



figure 13.1



figure 13.2



figure 13.3

Assembly

The re-assembly of the components is principally carried out vice-versa to the dismantling. Here are some additional references.

For the installation of the *PERSWING P*[®] air control system, first screw in one end cap flushly into the center housing [2]. Insert one of the six O-rings air-valve housing [24] into the end cap from the inside. Moisture the four O-rings [24] of the air-valve housing with a bit of water and push the housing into the center housing [2] using the mounting tool. Take care that it slips in softly. Do never insert the housing violently with a hammer. In case the housing cocks or hardly gets in, take it out again completely and start again. Insert the main piston and the pilot piston. Lay the sixth O-ring [24] on the edge of the air valve housing and screw in the second end cap.



figure 14.1

To assemble new piston rings [18], carefully shape them like kidneys with locking ring pliers and insert the rings into the grooves in the center housing [2] (figure 14.1); completely press the rings into the grooves smoothly using some round tool.

Screw the set screws [17] into the diaphragms and tighten them. Fix the diaphragms [14] completely into the shaft [16] with the set screws [17]. Adjust the bores in the center housing [2] to the diaphragm on both sides (turn slightly backwards if necessary). The sealing surfaces of the diaphragms and the side housings [1] have to be absolutely clean and undamaged; mere small scratches can cause leaking (if necessary, smoothen the housing surfaces carefully with fine sandpaper).

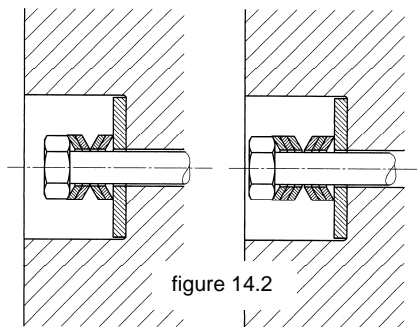


figure 14.2

When assembly the housing bolts pay attention to the correct arrangement of the spring washers. The pump sizes A08/A10 have 2 spring washers on both housing bolt sides. Figure 14.2 shows the arrangement of the A15/A25 (4 pieces on both sides) and of the A40/A50 (6 pieces on both sides). The arrangement represented in the drawings makes an improvement of power and way possible. Already used spring washers may not be installed again.

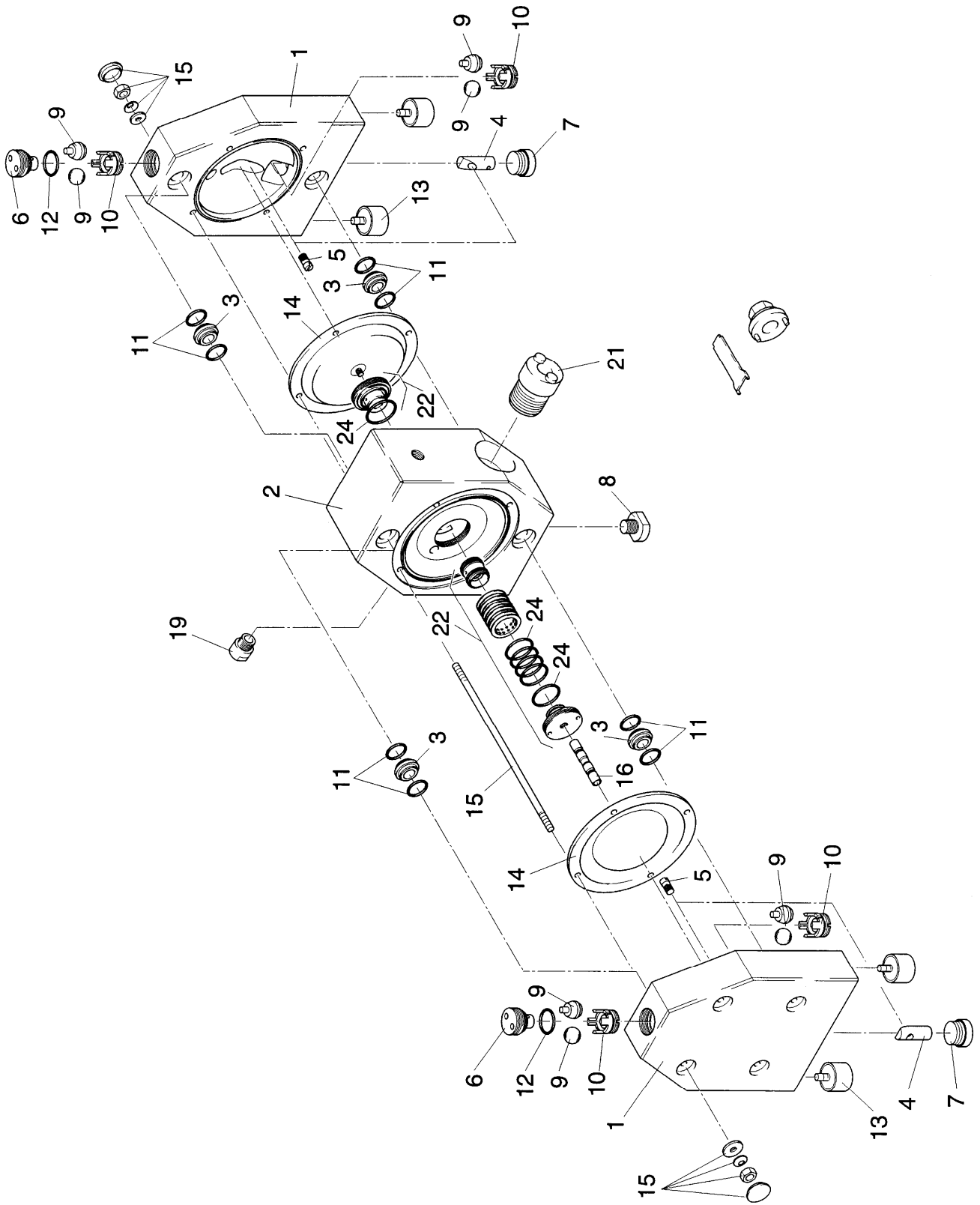
Cautiously push the O-rings, sleeve [11] into the side housings [1] and the center housing [2] (avoid bending the rings by all means! If necessary, moisture and softly twist the rings). When building in cylinder valves, take care that these valves [9] are set into the valve stops [4,6] with the pin on their top (figure 14.3).



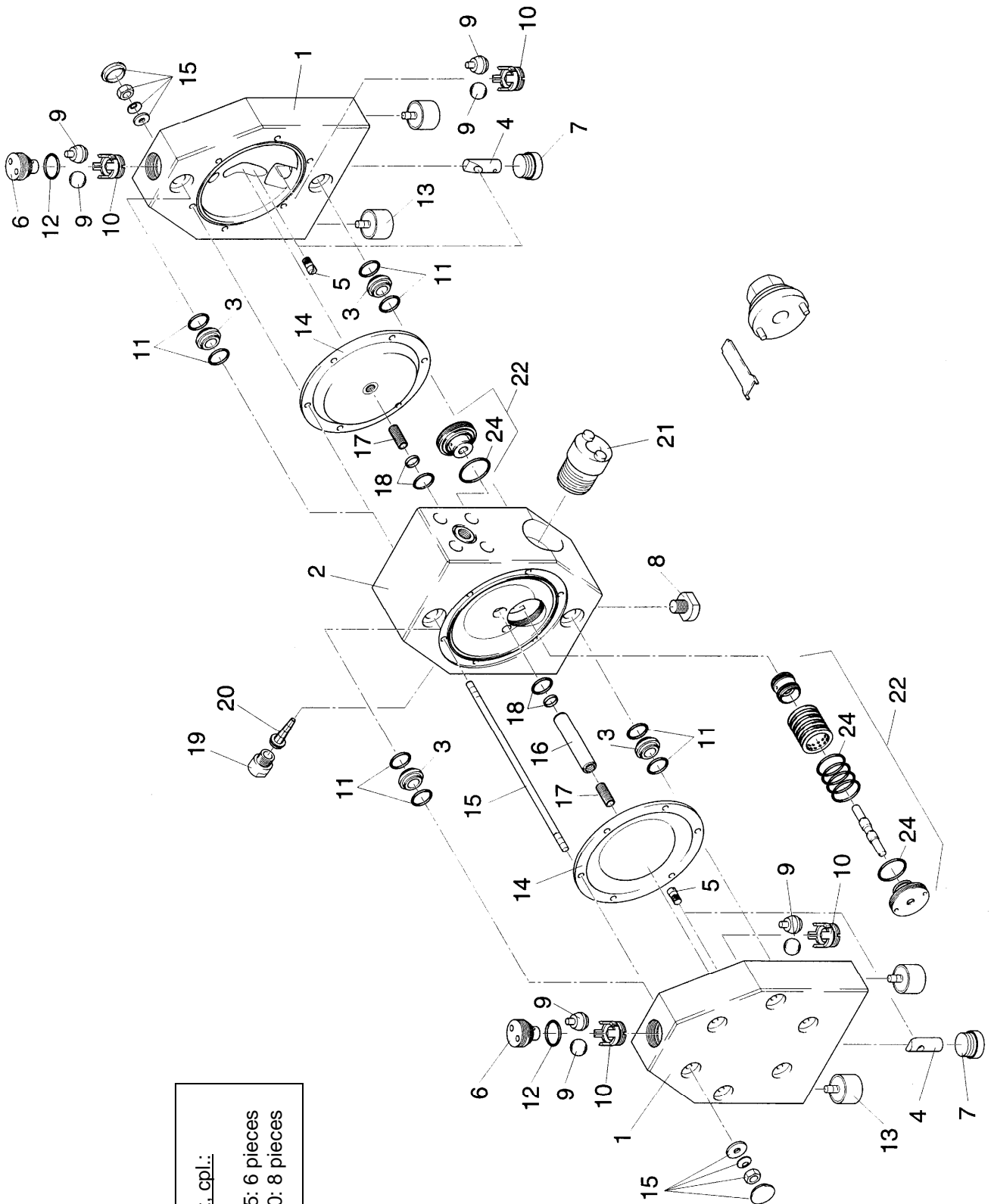
figure 14.3

Shove one diaphragm [14] into the center housing [2], lay the side housing [1] onto the diaphragm and fix its position with housing bolts [15]. After that, shove the other diaphragm [14] into the center housing [2] and carefully push the housing bolts [15] completely through the center housing [2] [slightly turning the bolts helps them to find their way]. Take care, that the diaphragms [14] are not damaged. Adjust the second side housing [1]. Fix the housing bolts [15] crosswise evenly according to the given torque values until the side housings [1] are situated on the center housing [2]. Any further tightening of the bolts does not improve sealing but can deform the housing! Before putting the pump back into operation, the tightness of the pump has to be checked.

Exploded view pump sizes A 08 / A 10



Exploded view pump sizes A 15 / A 25 / A 40 / A 50



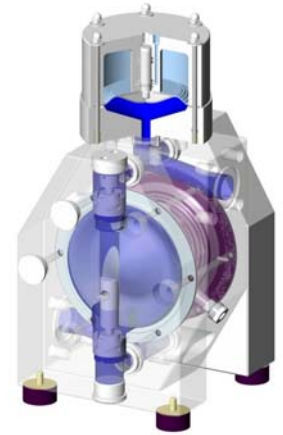
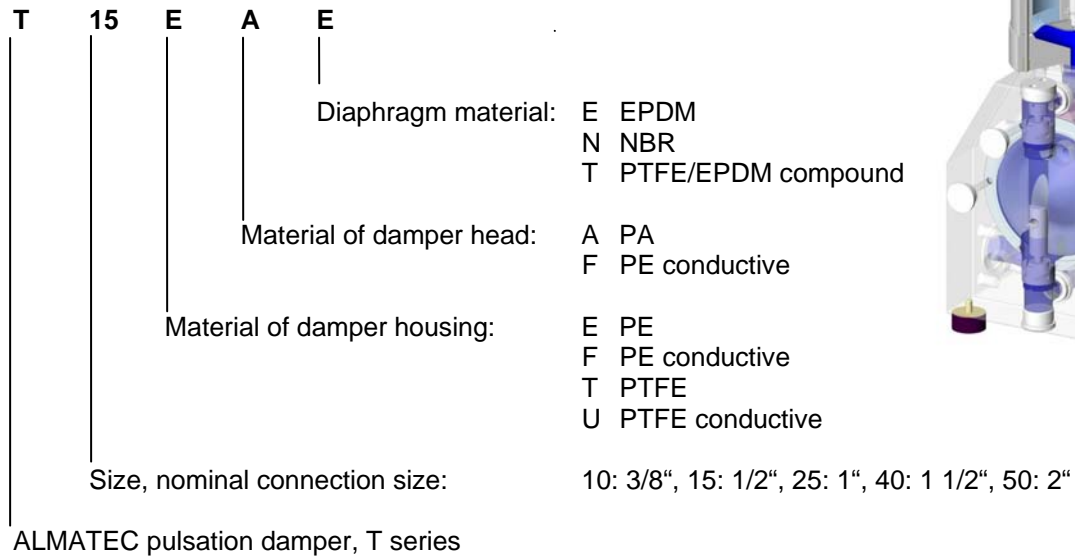
Item 15 housing bolt, cpl.:
 pump sizes A 15 / 25: 6 pieces
 pump sizes A 40 / 50: 8 pieces

ALMATEC Pulsation Dampers, T Series for the A-Series Pumps

The ALMATEC pulsation dampers series T represents the latest generation of active pulsation dampers. They are specially designed to be used along with ALMATEC pneumatic double diaphragm pumps of the A-Series. A general aspect to be considered is, that a pulsation damper decreases the total capacity of the system depending on the point of operation.

Before putting an ALMATEC pulsation damper into operation, make sure, that the materials of construction are resistant to the chemical to be pumped. To check this, the exact damper code is required. This code, the serial number and the year of construction are noted on the identification plates on the damper itself.

Example of the damper type code:



Air supply connection: T 10 - T 25: R 1/8", T 40 / T 50: R 1/4"

Max. operating pressure: 7 bar

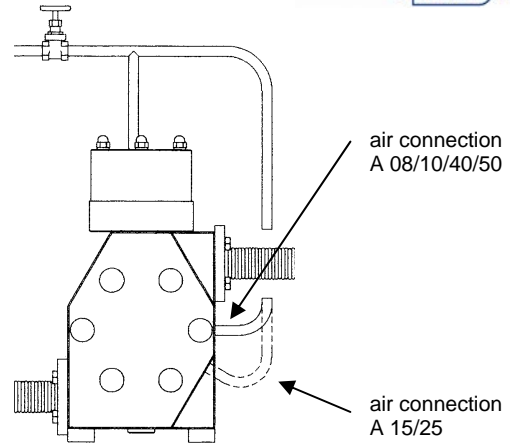
Max. operating temperature: for damper housing in PE 70°C
for damper housing in PTFE size T 10 100°C, for the other sizes 120°C (with damper head in PE conductive 80°C)

For inflammable liquids as well as for applications in explosion protected areas, only dampers made of conductive polymer materials (code F resp. U) may be used. It is not necessary to ground the damper separately, as the damper is connected conductively to the A-Series pump, which is conductive and has to be grounded itself.

In general, pump and damper are dispatched completely mounted. Still, they can be packed in separate boxes, especially for the bigger sizes. If so, the damper has to be screwed into the thread at the top of the center housing [1] carefully, but only until the damper is in contact with the pump. Exceeded tightening may damage the thread. Besides, a correct positioning of the O-ring [30] within the groove has to be ensured.

An ALMATEC T-damper can easily be attached to an A-Series pump at any time without changes of the piping, provided that the pump is configurated with product ports both horizontally. Make sure that the plug, center housing (Pos. 8 in the exploded view of the pump) is in the right position. For pumps delivered without dampers, this plug can be found at the bottom side of the pump generally. Therefore, the center housing has to be turned 180°, to get the plug to the top of the pump. Take the plug out, insert the flange-O-ring [30] and screw the damper onto the pump. When dismounting a pump which is already being in use, take care of the warning advices on pages 8/9 of this manual. The use of a pulsation damper of the series T reduces the capacity of the complete system in dependence of the point of operation.

Before connecting the pump, take the yellow blind plugs out of air inlet which is located on the top of the damper head [16]. For correct operation, the damper absolutely needs an air-supply of its own, which has to be taken from the air-supply of the pump. Pump and pulsation damper have to be connected to the same air pressure. No stop or regulating valve may be placed between pump and damper. The driving air has to be oil-free, dry and clean. The damper requires a minimum counter pressure of at least 1 bar for optimal function. Together with the pump an empty damper has to be driven slowly. The dampers are self-regulating for all changing operating conditions.



- Do not use any threadseal for the connection of pump and damper, otherwise the threads could be damaged.
- Before putting the pulsation damper into operation as well as after some hours of operating, the housing bolts [10] have to be tightened according to the torque data of the following schedule, as the elements of construction tend to "settle". Fixing the bolts is necessary as well after longer periods of stoppage, at extreme temperature variations, transport and after dismantling.
- Pressure tests of the plant a pump and a damper are included in may only be carried out with the aggregate (pump and damper) disconnected from the pressure on both ports or by using the pressure the aggregate develops while operating. The load of a pressure in the plant may damage the pump and the pulsation damper.
- Before starting to disassemble the pump, take care that pump and damper have been emptied and rinsed. Further both have to be cut off from any energy on the air and product side. If pump and damper is being deported from the plant, a reference about the delivered liquid has to be attached.
- Please respect the relevant additional security advices, if the pump and the damper have been used for aggressive, dangerous or toxic liquids.
- Before putting the pump and the damper back into operation, the tightness of both has to be checked.
- For further warning instructions, please refer to page 8/9.

Damper size	T 10	T 15	T 25	T 40	T 50
Torque values for housing bolts (Nm):					
PE damper	-	3	6	10	11
PTFE damper	2	3	6	10	11

Disassembly instructions

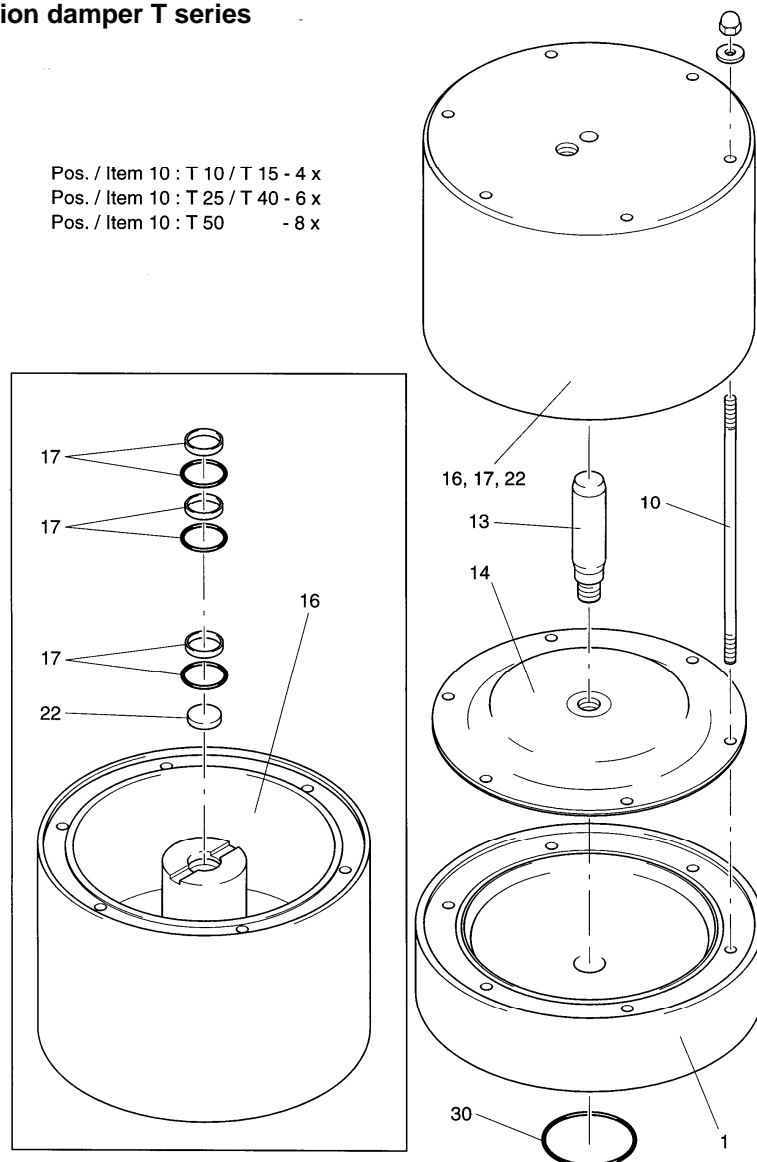
Unscrew housing bolts [10] carefully. After that, all parts can be removed. Screw the diaphragm [14] off the actuator shaft [13]. A re-assembly of used piston rings [17] is impossible; they have to be replaced including the O-rings underneath. To assemble new piston rings [17] carefully shape them like kidneys with locking ring pliers and insert the rings into the grooves; completely press the rings into the grooves smoothly using some round tool.

Spare part list, pulsation damper T series

Damper size				T 10	T 15	T 25	T 40	T 50
Item	Pc.	Description	Material	Part-No.	Part-No.	Part-No.	Part-No.	Part-No.
1	1	Damper housing, code E..	PE	-	2 15 080 52	2 25 080 52	2 40 080 52	2 50 080 52
		Damper housing, code F..	PE conductive	-	2 15 080 56	2 25 080 56	2 40 080 56	2 50 080 56
		Damper housing, code T..	PTFE	2 10 080 69	2 15 080 69	2 25 080 69	2 40 080 60	2 50 080 60
		Damper housing, code U..	PTFE conduct.	2 10 080 68	2 15 080 68	2 25 080 68	2 40 080 65	2 50 080 65
10	*	Housing bolt, cpl.	1.4301	2 10 083 22	2 15 083 22	2 25 083 22	2 40 083 22	2 50 083 22
13	1	Actuator shaft	1.4301	1 10 482 22	1 10 482 22	1 15 482 22	1 25 482 22	1 40 482 22
14	1	Diaphragm, code ..E	EPDM	-	1 10 031 72	1 15 031 72	1 25 031 72	1 40 031 72
		Diaphragm, code ..N	NBR	-	1 10 031 70	1 15 031 70	1 25 031 70	-
		Diaphragm, code ..T	PTFE	1 08 031 67	1 10 031 67	1 15 031 67	1 25 031 67	1 40 031 67
16	1	Damper head, code .A.	PA	2 10 081 53	2 15 081 53	2 25 081 53	2 40 081 53	2 50 081 53
		Damper head, code .F.	PE conductive	2 10 081 55	2 15 081 55	2 25 081 55	2 40 081 55	2 50 081 55
17	3	Shaft piston ring, cpl.	PTFE	1 08 041 64	1 08 041 64	1 15 041 64	1 25 041 64	1 40 041 64
22	1	Muffler	PE	1 08 644 51	1 08 644 51	1 15 644 51	1 25 644 51	1 40 644 51
30	1	Flange-O-ring, center housing, code ..E	EPDM	-	9 33 632 72	9 50 633 72	9 62 634 72	9 73 635 72
		Flange-O-ring, center housing, code ..N	NBR	-	9 33 632 71	9 50 633 71	9 62 634 71	-
		Flange-O-ring, center housing, code ..T	FEP/FKM	9 20 631 59	9 33 632 59	9 50 633 59	9 62 634 59	9 73 635 59

* T 10 and T 15: 4 pieces; T 25 and T 40: 6 pieces; T 50: 8 pieces

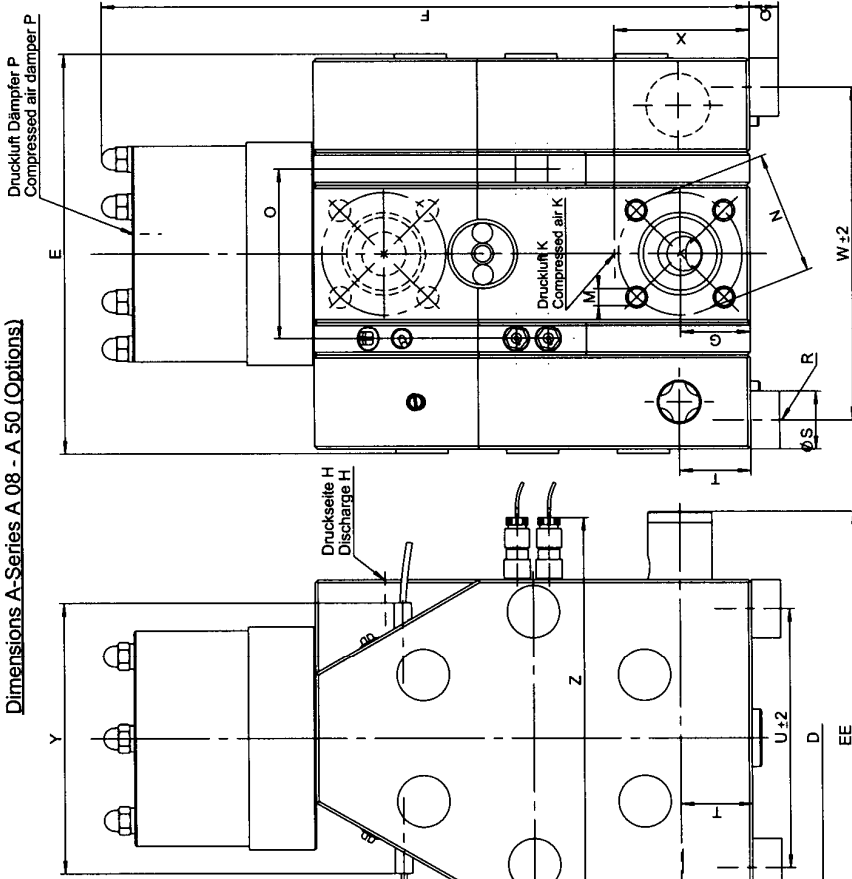
Exploded view, pulsation damper T series



Dimensions

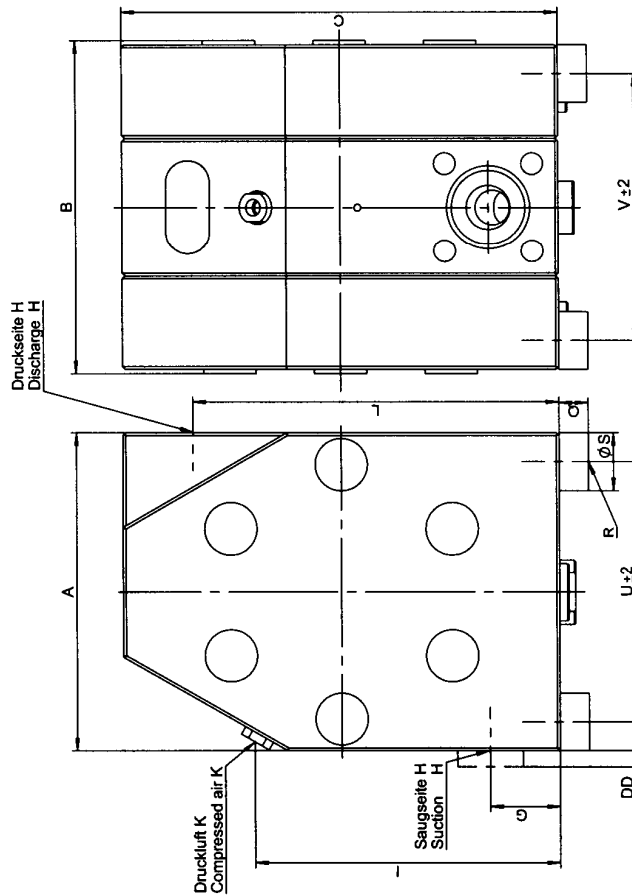
Maßblatt A-Serie A 08 - A 50 (Sonderausstattungen)

Dimensions A-Series A 08 - A 50 (Options)



Maßblatt A-Serie A 08 - A 50 (Standard)

Dimensions A-Series A 08 - A 50 (Standard)



	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
A 08	90	113	116	-	200	15	15	NPT 1/4"	58	R 1/8"	101	-	-	-	R 1/8"	13	M 6	25	-	50	84	-	58	-	-	-	-	-	-	-
A 10	110	127	156	-	240	17	17	NPT 3/8"	78	R 1/8"	139	-	-	75	R 1/8"	13	M 6	25	-	85	97	139	78	160	196	67	89	120	7	-
A 15	166	176	220	201	319	40	40	NPT 1/2"	152	R 1/4"	180	M 12	65	102	R 1/8"	20	M 8	40	37	126	130	174	68	164	252	99	121	178	9	262
A 25	220	231	300	252	447	48	48	NPT 1"	207	R 1/4"	252	M 12	85	118	R 1/8"	20	M 8	40	49	180	185	231	93	188	306	139	161	240	11	316
A 40	280	326	412	316	596	65	65	NPT 1 1/2"	206	R 1/2"	347	M 16	110	154	R 1/4"	20	M 10	50	72	230	270	318	206	224	366	195	217	341	13	374
A 50	360	396	532	392	776	80	80	NPT 2"	266	R 1/2"	452	M 16	125	186	R 1/4"	20	M 10	50	82	310	340	392	266	258	446	255	277	446	15	454