



**Operating and Installation  
 Instructions  
 Pulsation Damper  
 P Series  
 for Pumps of the  
 BIOCOR Series**

**ought to be studied before installing the  
 pulsation damper**



**Original Instruction**

**Introduction**

ALMATEC pulsation damper 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 pulsation damper 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**

Pulsation dampers of the P series are used for damping of a pulsating flow. They are self-regulating and have their own air connection.

The appropriate use of an ALMATEC pulsation damper is the installation on the discharge side of a pump transporting liquids 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 pulsation damper 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)

**Code system**

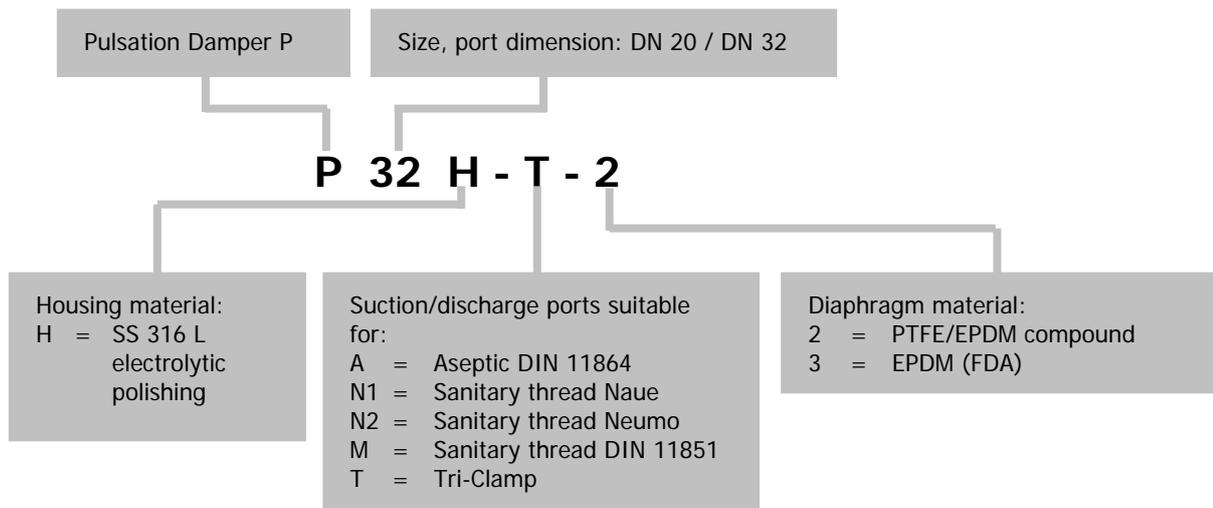
The ALMATEC Maschinenbau GmbH is certified as a modern, quality-orientated enterprise according to DIN EN ISO 9001:2000 and 14001:2005. Before release for dispatch, any P series pulsation damper has to

undergo an extended final control. When applying a damper behind a pump, the capacity of the whole system decreases depending on the point of operation.

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 pulsation damper manufactured and delivered properly according to the customers order meets the mentioned requirements.

Therefore make sure, before putting the damper into operation, that the materials of construction are resistant to the chemical contacted. To check this, the exact damper code is required. This code, as well as the serial number and the year of construction, can be found on the identification plates on the pulsation damper itself.

Here is an example to clarify the system of the damper code:



### Operation in explosion-proof areas and for inflammable liquids (Reg.-No. PTB: 03 ATEX D004)

For inflammable liquids as well as for applications in explosion-proof areas, the dampers have to be grounded separately to a housing bolt. They are suitable to be used in explosion areas of the category 2 and 3, atmosphere G/D, which are liable to the 94/9/EG. Conductive diaphragms (liquid side) are applicable without restrictions for transferring liquids of any explosion-group.

When using non-conductive diaphragm materials, the following exemplary protection measures have to be respected:

- The pump is always used for the transfer of exclusively fluids which are conductive or soluble in water or
- Dry-running is avoided by action steps within the facility and/or its control or
- The system is inertised in case of dry running by nitrogen, water, carbon dioxide etc. when the fluid transfer ends.

Piping systems and product connections have to be grounded separately. To avoid ignition hazards the formation of dust deposits on the pumps must be prevented. In explosion proof areas repair working only after careful inspection of the practicability and only with appropriate tools. For the ATEX marking according to 94/9/EG please see the attached conformity declaration and the according damper label.

Technical data		P 20	P 32
Dimensions (mm):	length	205	260
	width	150	200
	height	139	170
Air connection (BSP)		R ¼"	R ¼"
Nominal port size		DN 20	DN 32
Max. operating temperature		80°C (176°F)	80°C (176°F)
Max. driving and operating pressure (bar)		7	7

## Installation and operation

In general, any pulsation damper has to be connected load free. Neglecting this causes leakage and maybe even damages. Before connecting the pump, take the yellow blind plugs out of the liquid and air connections. The operator is responsible for an adequately stability and an appropriate fixation of the piping according to the state of the art.

The ALMATEC pulsation dampers are regulating and adjusting themselves automatically. They can only be attached to the discharge side of a pump at a distance as small as possible; a direct connection to the discharge of the pump is ideal. The installation position can be chosen variably, however, it has to be ensured, that no air locks can occur in the liquid chamber of the damper. For a draining until the last drop the damper has to be installed in a vertical position.

For optimal function, the pulsation damper absolutely requires an air supply of its own, connected to the air supply line of the pump the damper is working on. No closing or regulating fitting whatsoever may be positioned between the pump and damper supply as pump and damper always have to be driven with the same air pressure.

It is not possible to operate one pulsation damper with several pumps; every single pump needs a separate damper, which it forms a closed regulating circuit with. ALMATEC pulsation dampers have to be supplied with oil-free, clean and dry compressed air. A minimum counter pressure of approximately 1 bar is required for faultless function. An empty damper has to be driven slowly along with the pump. It adapts itself to changing operating conditions automatically. A general aspect to be considered is, that a pulsation damper decreases the total capacity of the system depending on the point of operation.

## Safety hints



- Installation, operation, and maintenance by qualified staff only.
- Before putting the pulsation damper into operation as well as after some hours of pumping, the housing bolts [10] have to be fixed, as the elements of construction "settle". In case a gap is visible between the damper housing [1] and the damper head [16], the housing bolts [10] have to be fixed carefully until the housing [1] contacts the damper head [16]. Fixing the bolts is necessary as well after longer periods of stoppage, at extreme temperature variations, after transport and dismantling the pump.
- Before any maintenance and service procedures arising on the pulsation damper, 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/damper. Additional a danger sign against restart should be attached.
- Pressure tests of the plant may only be carried out with the pump and damper 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/damper.
- Pump/damper must not be operated with a positive suction pressure.
- 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.



- If the product tends to settle, the pump/damper has to be flushed regularly. For larger solids a filter has to be installed in the suction line of the pump.
- The relevant effective security advises have to be respected.
- Pools of liquid which appear in the near outer area of the pulsation damper 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 pulsation damper (mixture of different substances) and the freezing of the liquid have to be avoided.
- Before starting to disassemble the pulsation damper, take care that the pump/damper has been emptied and rinsed. Both ports piping are to be closed and drained if applicable. Further the pump/damper has to be cut off from any energy on the air and product side. If the pulsation 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 pulsation damper 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. Hence, appropriate safety equipment according to the safety data sheet of the liquid is indispensable.
- Before putting the pump/damper back into operation, the tightness of the has to be checked.
- Pulsation damper 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 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/damper, damages of properties and/or persons cannot be excluded.
- 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 damper return: According to the requirements of our 14001-certification, every unit which is send 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.
- For further warning instructions, please refer to the pump manual.

### **CIP and SIP cleaning**

Basic condition for the delivery of hygienic perfect and high-quality liquids is a clean pump. The construction of the P series damper permits the CIP as well as the SIP cleaning. Despite the general restriction of temperature of 80°C (176°F) a brief operating (max. 30 minutes) to 130°C (266°F) for purification processes is permitted, in these cases the pump/damper must run slowly (e.g. sterilization with steam). If a cleaning liquid is used, this should be sucked by the pump itself without external pressure in the system. For explosion proof areas please see the explanations on page 2.

## Disassembly

When dismantling a pulsation damper the previous mentioned procedures and safety notes have to be considered generally. The general design of the ALMATEC P series pulsation dampers is simple. No special tools are required for disassembly and re-assembly. Part numbers can be found in the spare part list.

Loosen the housing bolts [2] using a socket spanner and remove the housing [1] (do not damage the sealing surfaces for the diaphragms!). Screw the diaphragm [4] off the actuator shaft [3] counter-clockwise and take out the actuator shaft [3]. Remove both parts of the shaft piston rings [6] from their grooves carefully (do not damage the edges in the damper head; a re-assembly of the same piston rings is impossible; they have to be replaced). To tear the old O-rings out of the grooves, a needle may be helpful.

## Assembly

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

To assemble new piston rings [6], carefully shape them like kidneys with locking ring pliers and insert the rings into the grooves (Attention: rings have to be fit into the first, third and fifth groove) in the damper head [5]; completely press the rings into the grooves smoothly using some round tool.

Insert the actuator shaft [3] and attach the diaphragm completely. The spanning area of the diaphragm and the diaphragm sealing surface of both damper housing [1] and head [5] have to be absolutely clean and undamaged; mere small scratches can cause leaking (if necessary, smoothen the housing surfaces carefully with fine sandpaper). Align the bore holes of the diaphragm to those in the damper head [5]. Lay on the damper housing [1] and shove the housing bolts [2] carefully through the head (slightly turning the bolts helps them to find their way). Fix the housing bolts [2] crosswise evenly until the damper housing [1] contacts the damper head [5]. 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 damper has to be checked.

## Notes

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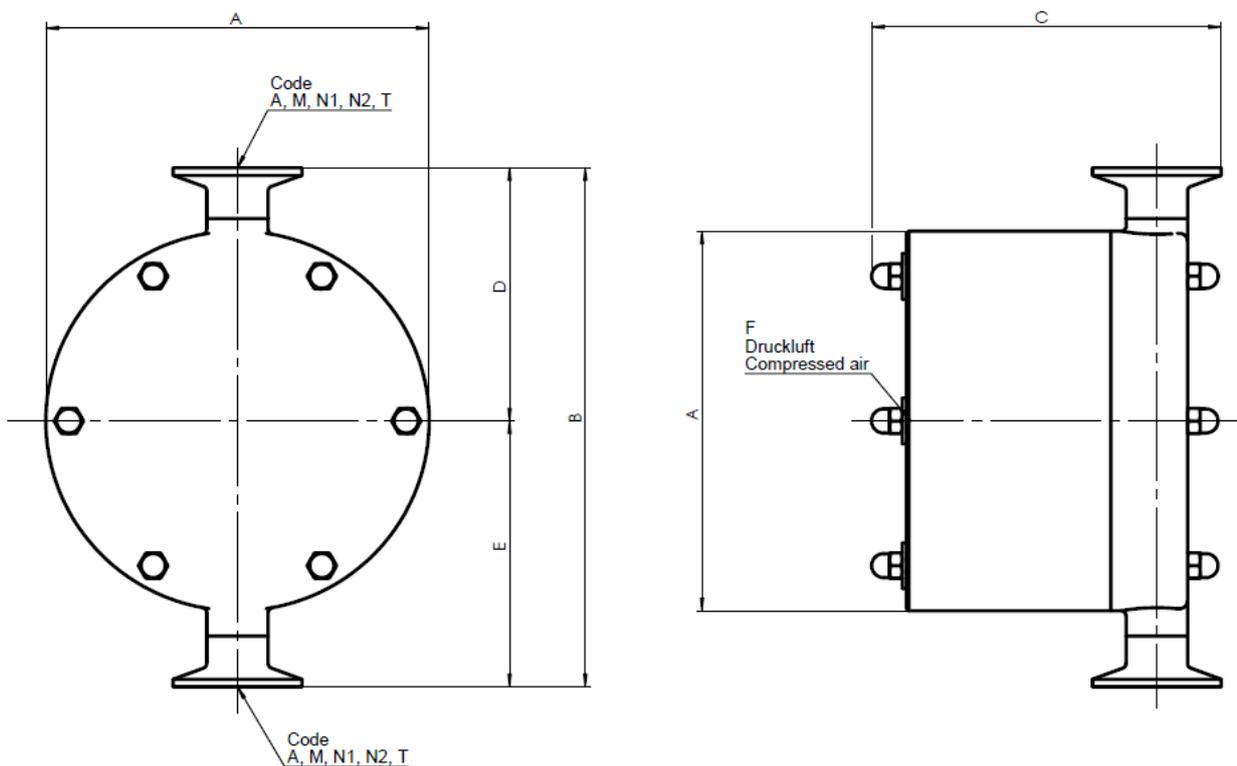
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**Spare part list**

Damper size				P 20	P 32
Item	Pc.	Description	Material	Part number	Part number
1	1	Damper housing, Code A (DIN 11864)	SS 316 L	5 20 470 23	5 32 470 23
	1	Damper housing, Code N1 (Naue)	SS 316 L	5 20 070 23	5 32 070 23
	1	Damper housing, Code N2 (Neumo)	SS 316 L	5 20 170 23	5 32 170 23
	1	Damper housing, Code M (DIN 11851)	SS 316 L	5 20 270 23	5 32 270 23
	1	Damper housing, Code T (Tri-Clamp)	SS 316 L	5 20 370 23	5 32 370 23
2	6	Housing bolt, cpl.	1.4301	5 20 073 22	5 32 073 22
3	1	Actuator shaft	1.4301	1 15 482 22	1 25 482 22
4	1	Diaphragm	EPDM (FDA)	1 15 031 73	1 25 031 73
		Diaphragm	PTFE	1 15 031 67	1 25 031 67
5	1	Damper head	PE conductive	2 25 081 55	2 40 081 55
6	3	Shaft piston ring, cpl.	PTFE	1 15 041 64	1 25 041 64
7	1	Muffler	PE	1 15 644 51	1 25 644 51

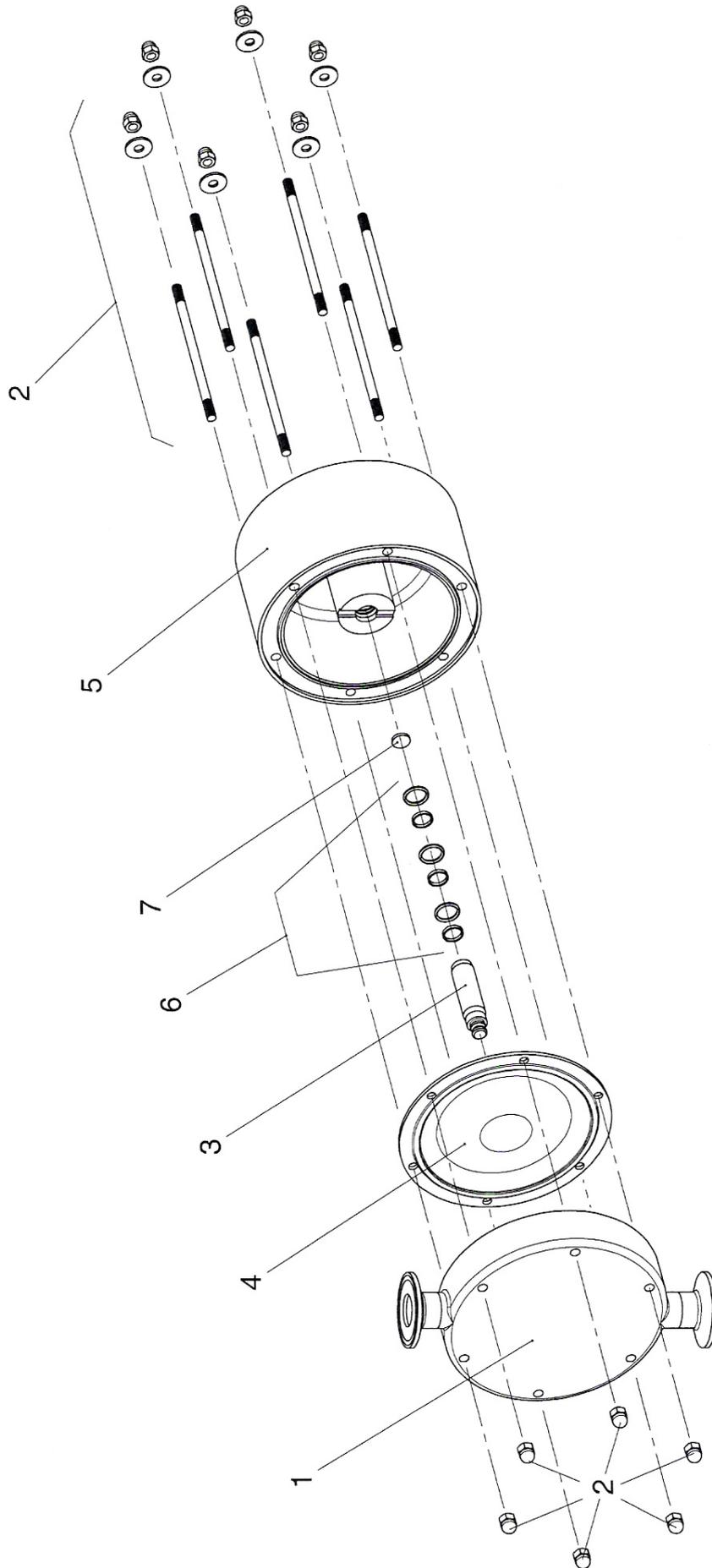
When ordering please state the serial number of the damper!

**Maße** (in mm)



	A	B	C	D	E	F	Code A (DIN 11864)	Code M	Code N1	Code N2	Code T
<b>P 20</b>	150	205	139	100	105	R 1/8"	Rd 44 x 1/6" (DN 20)	Rd 44 x 1/6" (DN 20)	M 36 x 2 (DN 20)	M 36 x 2 (DN 20)	1 " Tri-Clamp
<b>P 32</b>	200	260	170	125	135	R 1/4"	Rd 58 x 1/6" (DN 32)	Rd 58 x 1/6" (DN 32)	M 52 x 2 (DN 32)	M52 x 2 (DN 32)	1 1/2" Tri-Clamp

Exploded view





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