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1. Introduction

Piston accumulators in the PAC and PAS series are CE-marked and approved for use within the EU and have been checked in accordance with the procedures in modules B (prod. type) and D, according to the EU-directive 2014/68/EU on pressure equipment.

Read the instruction book carefully prior to use. Take particular note of warning texts before using the piston accumulator. Incorrect use can involve the risk of injury and accidents, possibly fatal.



N.B.

The user is wholly responsible for ensuring that applicable regulations are adhered to, and only personnel with the necessary training are allowed to work, install and maintain the piston accumulator.

The regulations for the commissioning and use of the piston accumulator that are applicable at the installation site must be observed.

The manual can be downloaded from www.hennlich-hct.de.
Store the manual for easy access when required.

2. Delivery



Warning!
Piston accumulators that have been damaged during transport must not be used.

All transport of gas-filled piston accumulators must be performed with the greatest possible care, and all applicable transport regulations for gas-filled products must be complied with.

Only approved lifting equipment may be used for transport and handling.

The piston accumulator is delivered either:

- Pre-charged with nitrogen gas (N₂) at a pressure of max 2 bar in order to prevent corrosion and to prevent the piston from moving during transport. This is not counted as pre-charged and is not specified on the piston accumulator's label.
- Pre-charged with nitrogen (N₂) at a pressure specified by the customer. This pressure is declared on the label on the piston accumulator.



2.1 Marking

Marking is information that is stamped onto the piston accumulator, and labels.

The user is responsible for controlling that all marking on the piston accumulator is intact and completely legible. It is strictly prohibited to alter or remove marking, and damaged marking must always be replaced. Contact the supplier.

The sticker on the piston accumulator usually specifies the pre-charged pressure but it is not always filled in as it may have been pre-charged after delivery by the manufacturer.

2.2 Reception control

- Always check that a delivery corresponds with the order.
- Check any damage to the packaging if there is a risk that the piston accumulator has been damaged.
- Check any damage to the surface.
- Check any other damage to the piston accumulator and accessories.
- Check that the declaration of conformity corresponds with the marking on the piston accumulator.

2.3 Handling



Warning!
Always use suitable protective equipment when handling heavy piston accumulators.

Be careful not to damage the piston accumulator (surface, accessories etc) in any way.

To erect large piston accumulators, use suitable lifting equipment and lifting straps. Ensure that the piston accumulator is balanced.

End caps on large piston accumulators have threaded holes for lifting eyes for use when erecting.

2.4 Storage

The piston accumulator is in preserved form on delivery (greased, plugged and filled with nitrogen). It can be stored for up to two years in a dry, cool place out of direct sunlight.

If the piston accumulator is stored for more than two years, all seals must be changed before being taken into operation.



If the piston accumulator is stored for more than three months and is pre-charged to >5 bar, the pressure must be reduced to a maximum of 5 bar.

Pre-charged piston accumulators must be stored in a safe place, protected from collision and fire, which can cause explosions.

3. Installation



Warning!
No welding, riveting or soldering work or mechanical work may be performed on the piston accumulator, to avoid the risk of explosion.



Warning!
Be extra careful when installing equipment on the gas side of the piston accumulator. The piston accumulator may be pre-charged.

Different regulations can apply to the use and installation of the piston accumulator in different countries. Before installation and use, find out which national regulations are applicable in the country in which the piston accumulator is to be used.

The piston accumulator can be installed in any position. To reduce the risk of wear and tear, installation in a vertical position is recommended, with the fluid port downwards.

The following are strictly prohibited:

- To weld, rivet or solder components onto the piston accumulator.
- To perform any measure that can affect the accumulator's mechanical properties.
- To alter the accumulator without the consent of **HENNLICH - HCT**.

Ensure that the fluid is suitable for the equipment.

Ensure that the highest permissible pressure of the piston accumulator is the same or higher than that of the hydraulic circuit.

Check the environmental conditions and protect the equipment as required.

Ensure that there is a space of approx. 200 mm above the gas valve to allow the pre-charging and control equipment to be mounted.

All markings must remain visible.



When piston position indicator is used, it must always be properly secured and mounted vertically with the fluid port downwards.

HENNLICH - HCT has an accessory range of clamps and brackets for securing the piston accumulator during installation. (See separate data sheet.)

In the case of small piston accumulators up to approx. 10 kg, securing with two clamps is recommended. In the case of heavier units, the number of clamps depends on the size and type of piston accumulator, and use of a supporting bracket is recommended, to relieve the weight.

Use suitable connections that are intended for hydraulic systems and ensure that the correct tightening torque is used.

3.1 Safety equipment

We recommend installation of safety equipment on the fluid side and the gas side, to limit the pressure in the piston accumulator.

We recommend a burst disc or spring-loaded relief valve on the gas side. Both of these open at a pre-set pressure irrespective of the reason for the high pressure.

We recommend use of a safety block with a safety/pressure-reducing valve on the fluid side.

3.2 Pre-charging



Warning!
The piston accumulator must only be filled with nitrogen gas (N₂). Risk of explosion if oxygen or air is used.

Check that the pre-charging pressure of the gas is correct for the unit.

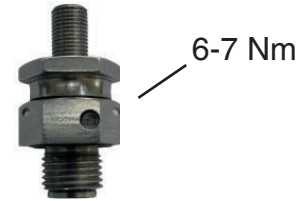
The quality of the nitrogen gas is important for the unit's performance and length of life. Industrial quality is sufficient. Use nitrogen gas with a minimum purity value of 99.95% (class 4.0 or better).

3.3 Gas valve

Opens and closes when the pre-charging equipment's connection thread is being assembled or dismantled. The hollow pin in the nozzle of the pre-charging equipment opens the valve. The valve is otherwise shut.



N.B.
**If the gas valve has a hex operating nut,
use torque 6-7 Nm to close it.**



Use the pre-charging equipment to drain or fill the nitrogen gas.

4. Start-up

If air needs to be vented from the piston accumulator prior to use, this must be done at the oil-side connection.

Before the accumulator is used, it must be correctly pressurized, with the pressure being calculated in accordance with the device's operational data.

The permitted working pressure and working temperature depend on the materials used in the accumulator and are specified in the marking on the product.

The accumulator must be assembled in such a way that safety can be guaranteed in the event of vibrations or possible breaks in connecting pipes etc.

Before pressurizing, check:

- that the piston accumulator has been correctly installed;
- that equipment such as gas valves, bursting discs and pipe connections have been properly tightened and that all components have been correctly threaded;
- that there is no leakage after pressurizing. If leaking has occurred, tighten the connection in question. If the product still leaks, contact **HENNLIICH - HCT**.
- that attachments do not put strain on the accumulator.

5. Maintenance

5.1 General maintenance

To ensure long, problem-free usage, the following maintenance measures should be performed regularly.

Check:

- the pre-charging pressure of the nitrogen gas regularly during the first weeks of usage, and thereafter at appropriate intervals (see item 5.2). When filling with nitrogen gas, ensure it is sufficiently clean;
- that connections have been tightened and are free of leakage;



- the performance of the safety and stop blocks;
- the mounting brackets;
- the accumulator ocularly at regular intervals to look for any damage due to corrosion, or any other deformation. External corrosion must be dealt with immediately and is not permissible. Minor external corrosion is repaired by painting;
- that the marking on the accumulator is legible. If the accumulator is worn, contact the supplier.

5.2 Frequency of checks

We recommend the following intervals between testing of the pre-charged pressure:

- directly after installation
- one week after installation
- six weeks after installation

Thereafter, in the case of normal operations, once every six months and, in the case of high working temperatures, once a month.

5.3 Leakage

Leakage can occur if the fluid leaks over to the gas side or the gas leaks over to the fluid side. Gas pressure that is too low can be an indication of an external or an internal gas leakage.

5.4 Internal leakage

Gas pressure that is too high can be an indication that fluid is leaking to the gas side. Gas pressure that is too low can be an indication that gas is leaking over to the fluid side.

Internal leakage can be caused by:

- the piston seal being worn or damaged
- the cylinder's inner surface being damaged

Worn and damaged seals should be replaced with original seals and damaged **HENNLIICH - HCT** must be inspected by skilled, authorized personnel in order to judge whether the damage can be repaired or whether the cylinder must be replaced (see item 7. Service).

5.5 External leakage

Gas pressure that is too low can be an indication of external leakage. Fluid can leak out from the fluid side or gas from the gas side.



External leakage can be caused by:

- the end-cap seal being worn or damaged.
- the seal surface in the thread of the seal being damaged.
- the cylinder being damaged at the seal.
- the valve not being sufficiently tightened or being damaged.

Worn and damaged seals should be replaced with original seals and damaged end-cap or accumulator pipe must be inspected by skilled, authorized personnel in order to judge whether the damage can be repaired or whether replacements are needed. If the valve is damaged, replace the gas valve. For safe dismantling, see item 7. Service.

6. Length of life

The life of the piston accumulator is limited. The length of life depends on pressure amplitude and number of pressure cycles.

The permitted number of load switches is specified in the conformity documentation. These data are required in order to decide the length of life of the accumulator. The lifetime is dependent on the working conditions in the hydraulic system.

7. Service



Warning!

The user is wholly responsible for ensuring that applicable regulations are adhered to, and only personnel with the necessary training are allowed to perform service work on the piston accumulator.



Warning!

Be extra careful when dismantling and assembling equipment on the gas side of the piston accumulator. The piston accumulator must be depressurized!



Warning!

The oil can retain heat for a while after switching off.

Never drain the gas side by opening the gas valve or other connections. The gas valve or other parts can shoot out.

Rapid release of gas can involve a suffocation risk. Ensure that there is good ventilation.



If information regarding dismantling and repairs is required, contact **HENNLICH - HCT**. Use only **HENNLICH - HCT** original components.
Service, checks and repairs can be performed at **HENNLICH - HCT**.