Epiroc

Operation Instructions for the Accumulator

1. Technical data of the accumulator

Accumulators are pressure vessels according to the European directive 2014/68/EU and used to charge and supply hydraulic energy in applications such as pressure fluid storage, pulsation dampening and shock absorption. Its diaphragm acts as a separator between the pressure fluid of a hydraulic system and the pressure-energy-storing nitrogen gas volume of the accumulator. Accumulators are designed in accordance with generally accepted technical regulations and standards.
Accumulator ≤ 1 liter: according to directive 2014/68/EU it is not allowed to put CE sign on Accumulators with an nominal volume up to one liter and max. permissible working pressure up to 1000 bar.
Accumulator >1 liter: according to directive 2014/68/EU accumulators with a nominal volume more than one liter have to be marked with an CE–identification and has passed successfully a conformity assessment procedure.

Type	D0.9-230 D1.5-230
Volume	V 0.9 L V 1.5 L
Permissible working pressure	PS 230 bar
Permissible pressure range	40 bar
Permissible working temperature:	-10 .-. +80 °C Other temperatures please request
Year of manufacture	*See stamp on accumulator*
Working fluid	Mineral oil (other liquids please request)
Security valve	Is not included in the delivery capacity

2. Safety

2.1. Safety instructions

Accumulators are pressure containers in the context of the European pressure equipment directive 2014/68/EU.

The regulations concerning hydrostatic accumulators and applicable at the place of installation must be observed before commissioning and during operation.

The legal regulations applicable at the place of installation are mandatory for commissioning and continuous intended use of the accumulators.
The operator bears sole responsibility for compliance with all existing regulations.

WARNING: *The permissible operating conditions (in particular max. working pressure, min./max. working temperature) specified in the technical documentation and on the name plate must be observed.*

Never install the accumulator in a machine or system under hydraulic system pressure. Prior to repair and maintenance work on the diaphragm accumulator, the gas pre-charge pressure must be completely relieved. The accumulator shall cool down sufficiently before starting work.

CAUTION: *Risk of Burns! Accumulators may generate high surface temperatures during operation.*

WARNING: *Work on improperly pressure-relieved accumulator or its machine/system may result in death, serious injuries or property damage!*

CAUTION: *Commissioning as well as repair and maintenance shall only be carried out by trained and qualified persons.*

Do not make any unauthorized modifications to the accumulator. This will result in an immediate expiry of the operating permit! This includes the use of non-approved or third party spare parts.

DANGER: *There is a risk of bursting during mechanical processing!*

DANGER: *There is a risk of explosion during welding and soldering work!*

Accumulators may only be charged with nitrogen of Class 4.0 (N2-vol.%>99.9). Oxygen and air are not permitted as filling gas, as they can cause a fire or an explosion.

DANGER: *When filling with oxygen or compressed air, there is a risk of explosion!*

The accumulator may only be operated with fluids of fluid group 2. Flammable, oxidizing, explosive, toxic or corrosive fluids of fluid group 1 must not be used.

WARNING: *Danger to health when handling hydraulic fluids! Pressure fluids can cause skin damage, eye injuries or poisoning when inhaled.*

2.2. Safety Equipment

Provision, installation and operation of accumulators are set out in the national regulations.

In the Federal Republic of Germany, these are governed e.g. by the operating safety ordinance (BetrSichV), technical regulation pressure containers / EN 14359.

These require the following safety equipment:

- Equipment preventing pressure excess (prototype tested)
- Release equipment
- Pressure measuring equipment
- Testing gauge connection
- Shut-off equipment

The following may also be added

- Electro-magnetically operated release equipment
- Safety equipment to prevent temperature excess

The safety devices mentioned above are not included in the scope of delivery. However, suitable devices are available from Construction Tools GmbH.

3. Transport and Storage

Transport must be completed with extreme caution and in observance of all applicable transport and safety directives.

Accumulators must be kept dry and cool (5 °C – 20 °C) and protected against direct sunlight. Care must be taken that no dirt can permeate into the containers. The gas valve is to be covered with its plug and the oil valve with its protective cap.

If the accumulator is to be stored for long time, it is recommended that the gas pre-stress be reduced in order to prevent warping of the membrane / sealing element.

WARNING: *Do not use accumulators that have been damaged in transit or in storage.*

Note:

Inspection intervals in accordance with legal regulations applicable at the installation site are often related to the date of manufacture and are therefore not extended by the storage period before commissioning.

The warranty period also remains unaffected by storage prior to commissioning. It starts at the date of delivery.

4. Installation

4.1. Preparation for on-site installation

After removing the transport packaging, the following checks must be carried out in advance to the on-site installation:

- Inspection of the nameplate information and alignment with the operating conditions of the machine or application system for which the accumulator is intended.
- Comparison of the name plate data with the details of the declaration of conformity.
- Visual inspection to exclude transport damage of the vessel, gas and oil port connections as well as any indication of corrosion or other surface damage.
- Await sufficient temperature compensation of the accumulator with the ambient conditions at the installation site.
- Check the gas and oil connection fastening by torque-controlled tightening of the oil-side groove and the gas-side retaining nut according to the specifications.

WARNING: *Before assembly, ensure that the hydraulic system is pressure free. Incorrect assembly may result in serious accidents.*

4.2. Installation Location

The installation location can be where desired.

An installation space of 200 mm should be maintained above the gas valve for a testing and filling device.

4.3. Fixing

The accumulator must be fixed such that it is securely held in place in the event of vibrations caused by operation or any break in the connection line and such that the accumulator will not be affected by any tensions.

Construction Tools GmbH supplies suitable retaining clamps.

5. Commissioning

5.1. Fill Pressure

Accumulators are generally supplied ready for operation. The fill pressure (p_0) is specified on the accumulators housing.

Should the specified fill pressure not comply with the requirements of the operator, the accumulator must be filled to the prescribed fill pressure before operation.

5.2. Fill Gas

Accumulators must be filled only with nitrogen class 4.0, ultra-clean, N2 99.9 vol. %.

5.3. Max. Operating Temperature

Construction Tools GmbH accumulators are suitable for operating temperatures according to the details of technical data page 2. Please enquire for other temperatures.

5.4. Testing Prior to Operation

Both testing prior to operation and recurring tests are to be carried out in accordance with national regulations.

All lines and connections are to be particularly checked for functionality and replaced in the case of a fault.

5.5. Filling of Refillable Accumulators

A fill testing device must be used for filling the accumulator. Observe the filling equipment operating instructions are for this.

NOTE: *The pre-fill pressure changes with the gas temperature. After filling or releasing nitrogen, it is necessary to wait until the temperature has levelled before checking the gas pressure.*

CAUTION: *Maintenance and repair of the accumulator may only be carried out by trained specialist.*

6. Maintenance

After filling with gas, Construction Tools GmbH accumulators are largely maintenance free. For fault free operation and long durability, the following maintenance work must be carried out:

- Check gas fill pressure and top up if required
- Visual inspection for outer corrosion
- Check line connection and fittings for possible leaks
- Check safety equipment for condition and proper function

The system/accumulator must be depressurised each time before the gas connection is opened. Other work on the accumulators is to be carried out by authorised persons only.

6.1. Gas Fill Pressure Testing Intervals

After installation of the container, the fill pressure must be checked at least once during the first week. If no loss of gas is found, the second check is to be carried out after three months. If no change in pressure is found at that stage, then testing can be switched to annual.

Note

Further checks, e.g. prior to installation and recurring checks, are to be carried out in accordance with national regulations.

6.2. Measuring on the Gas Side

Construction Tools GmbH supplies nitrogen filling and testing equipment in various designs. These enable safe testing and, if necessary, adjustment of the gas fill pressure. The procedure is explained in the respective operating instructions

6.3. Measuring on the Fluid Side

Connect the pressure gauge to the accumulator via the line. Alternatively, the pressure gauge can be connected directly to the ventilation connection.

Procedure:

1. Pour the pressure fluid into the accumulator.
2. Close the shut off device
3. Allow the pressure fluid to run off slowly (temperature levelling), by opening the release valve
4. Watch the pressure gauge during the emptying procedure. As soon as the fill pressure in the accumulator is reached, the indicator drops sharply to zero.

If deviations are being measured, the following should also be checked:

- Can these be traced back to varying ambient or gas temperatures?
- Are pipelines and fittings sealed?

Further checking of the accumulator is only necessary once these fault causes are eliminated.

7. Service life

The service life limit of accumulators, in particular the limit of the accumulator vessel, depend on the number of load cycles and the related operating pressure range.

Accumulators, i.e. their pressure containing parts are fatigue-resistant if maintenance instructions are observed and if they are operated within the permissible limit values.

8. Disposal

Accumulators as sealed hollow bodies are not allowed to be included unopened in scrap for smelting, as per German regulation BGV D23. It is therefore necessary to depressurize accumulators on the gas side by carefully unscrewing gas filling screws or gas filling valves and opening the accumulator. Filling devices are also well suited to this task.

WARNING:
On special designs with a permanently sealed gas filling opening (disposable accumulators) only careful drilling (Ø ≥ 6 mm) of the gas chamber in a suitable retaining jig can be used. As the gas flowing out can draw metal splinters or particles with it, safety glasses must be worn.

Carefully drill the accumulator open, as the escaping gas might cause damage to hearing. Therefore be advised to wear hearing protection.

Furthermore, please note the accumulator contains nitrogen which suppresses oxygen. Please make sure work places are ventilated sufficiently.