

Progressive cavity pump

Operating and service instructions

Series AEB1F, AEB2E

with disassembly and assembly instructions

Design type MF

Retain original operating instructions for future use!

Operating data, dimensions, and other supplemental information is provided in the order-specific portion of the documentation.

Order No.:

ID No. of the pump

Machine No.:

Pump type:



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CE

Subject to technical changes!

Important notice!

These operating instructions are supplemented by order-specific information.





These operating and service instructions contain notices from the pump manufacturer. It may be necessary to augment them with the operating company's instructions to its staff.

Specific notices for operation and service of the larger process, into which the pump is integrated, are not considered here. These can be provided only by those who are responsible for constructing and planning the system (system manufacturer).

These specific notices for operation and service of the larger process, into which the pump is integrated, take precedence over the notices from the pump manufacturer. The system manufacturer must observe all operational limits!

Refer to the operating instructions of the system manufacturer!

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1 About these instructions

These instructions:

- are an integral part of the pump itself;
- are valid for all specified series and design types;
- describe safe and proper use in all phases of operation.

1.1 Target groups

Target group	Responsibilities			
Operating company	Retain these instructions and keep them accessible at the system's place of use.			
	Require employees to read and observe these instructions and the associated documents, especially the safety and warning notices.			
	Observe additional system- specific stipulations and regulations.			
Technical personnel, installers	Read, observe, and follow these instructions and associated documents, especially the safety and warning notices.			

Table 1 Target groups

1.2 Associated documents

Documents	Purpose			
Order data sheet	Specifications, operating conditions, operational limits			
Unit drawing	Installation dimensions, connection dimensions, etc.			
Technical description	Specifications			
Sectional drawing	Sectional drawing, parts numbers, designation of components			
Vendor document- tation	Technical documentation for vendor parts			
Spare parts list	Ordering spare parts			
Declaration of conformity	Standards conformity			
ATEX supplemental instructions	Instructions for operation in potentially explosive atmospheres			

Table 2 Associated documents

1.3 Warning notices and symbols

A few names and symbols are used in the operating instructions to identify hazards and safety regulations.

The safety symbols, together with the text of the safety notice, are meant to draw attention to unavoidable residual risks when using the machine. These residual risks are based on:

- persons
- the machine
- other things and objects
- the environment

Warning notice	Hazard level and consequences of non-observance			
	Danger! Indicates an immediately			
	to death or serious injury.			
	Warning!			
	Indicates a potentially hazardous situation that can			
	lead to death or serious injury.			
	Caution!			
	Indicates a potentially hazardous situation that can lead to minor injuries or property damage.			
	Attention!			
4	Draws attention to the danger of electric shock.			
Table 3 Hazard overview				

Warning notice	Hazard level and consequences of non-observance			
	Safety symbol Follow all measures identified by the safety symbol in order to avoid injury or death.			
•	Instructions for action			
1. , 2. ,	Multi-step instructions for action			
\checkmark	Requirement			
→	Cross reference			
i	Notice! Indicates information that contributes to better understanding of the machine procedures.			

Table 4 Symbols and their meaning

1.4 Technical terms

Pump: The term "pump" refers to the pump without the drive and other components. Pump unit: The term "pump unit" refers to the pump with the drive and all other components.

About these instructions



1.5 Safety notices

Please read the operating instructions carefully before starting work on the system.

Knowledge of basic safety notices and safety regulations is a fundamental requirement for correct and safe handling and disturbance-free operation of this machine.

All persons who are involved with the installation, commissioning, operation, service, or repair of the system must be properly qualified or trained and follow these operating instructions exactly.

In addition, the rules and regulations for accident prevention at the place of use must be observed.

Independently performed conversions and changes to the system are not permitted for safety reasons.

Notices provided on the machine directly, e.g.

- direction of rotation
- fluid connection markers
- safety notices

must be observed at all times and kept in a completely readable condition.

1.6 Keep information accessible

These operating instructions must be retained at the machine. Ensure that all persons who must perform tasks on the machine can view the operating instructions at all times. In addition to the operating instructions, operating notices pursuant to worker protection laws (*ArbSchG* and *AMBV* in Germany) must be provided.

All safety notice signs and operating notice signs on the machine must be kept in an easily readable condition at all times. Any damaged or unreadable signs must be replaced immediately.

1.7 Inspection

Before leaving our factory, all pumps are subjected to a leak and performance inspection. Only flawlessly operating pumps that reach our assured performance leave our factory. Therefore, when the following operating instructions are observed, the conditions for disturbance-free running are met.



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1.8 Warranty

Our liability for defects in the delivery is defined in our Delivery Terms. No liability is assumed for damages caused by failure to observe the operating instructions or the operating conditions.

If, at a later time, operating conditions (e.g. the pumped liquid, speed, viscosity, temperature, or pressure conditions) change, we will have to investigate on a case-by-case basis and potentially confirm whether the pump is suitable for this. Unless special agreements have been reached, pumps that we deliver may be opened or modified during the warranty period only by us or our authorized customer-service workshops. Original parts or parts approved by the manufacturer must be used exclusively. Otherwise our liability for any defects and the validity of the EC declaration of conformity for the machine will lapse. **ALLWEILER®**

2 Safety

These operating instructions contain basic notices that must be observed during installation, operation, and servicing. Therefore, it is essential that the installers and the responsible technical personnel/operators read these operating instructions before installation and commissioning and the instructions remain accessible at the place of operation. Not only must the general safety notices described under this main point Safety be observed, but also the special safety notices, e.g. for private use, that are inserted under the other main points.

2.1 Hazards during nonobservance of the safety notices

Failure to observe the safety notices may result in a hazard for people, the environment, and the machine. Failure to observe the safety notices will result in loss of all damage compensation claims.

Specifically, non-observance may cause e.g. the following hazards:

- failure of important functions of the machine/system
- failure of prescribed service and repair methods
- endangerment of persons from electrical, mechanical, or chemical effects
- endangerment of the environment through escape of hazardous materials.

2.2 Proper use

The pump and its parts and modules are intended exclusively for the purpose for which they were built.

Any other or more extensive use or application is an improper use. ALLWEILER will not be liable for the resulting damages.

Proper use includes also the observance of all notices contained in the operating instructions and performance of inspection and service tasks.

Use only original spare, wearing, and accessory parts; these parts are designed specially for the system. If non-original parts are used, there can be no assurance that they were designed and manufactured according to load and safety specifications.

Parts and special equipment that were not delivered by us are not approved by us for use on the system.

2.3 Avoidance of obvious misuse (examples)

- Observe the pump's operating limits for temperature, pressure, flow rate, viscosity, and speed (→Order data sheet).
- When pumping liquids containing solids, observe the limit values for solids content and grain size (→ Order data sheet, technical description).
- When using auxiliary operating systems, ensure a continuous supply of the corresponding operating medium.

2.4 General safety notices

2.4.1 Product safety

The pump is constructed according to the current state of technology and recognized technical safety rules. Nevertheless, hazards to the life and limb of the user or third parties or damage to the pump and other assets is possible during use of the pump.

- Operate the pump only in a technically flawless condition, for its intended use, cognizant of safety and hazards, and in observance of these instructions.
- Keep these instructions and all associated documents in a complete and legible conditions and keep them accessible to the personnel at all times.
- Prohibit all methods of operation that endanger the personnel or uninvolved third parties.
- If a safety-relevant disturbance occurs, immediately stop the pump and ask the responsible person to remove the disturbance.
- In addition to the overall documentation, observe the legal and other safety- and accident-prevention regulations and applicable standards and directives of the country of operation.

2.4.2 Obligations of the operating company

Work in a safety-conscious manner

- Operate the pump only in a technically flawless condition, for its intended use, cognizant of safety and hazards, and in observance of these instructions.
- Ensure compliance and monitoring of:
 - proper use
 - legal or other safety- and accidentprevention regulations

Safety precautions

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- safety regulations in handling of hazardous materials
- applicable standards and directives of the operating country.
- Provide access to personal protective equipment

2.4.3 Obligations of personnel

- Observe notices on the pump and keep them in a legible condition, e.g. direction of rotation arrow, labeling of liquid connections.
- Do not remove safety guarding for hot, cold, and moving parts during operation.
- When necessary, use personal protective equipment.
- Perform work on the pump only when stopped.
- Shut off the motor's power supply and lock it in the off position before all assembly and maintenance tasks.
- After completing any work on the pump, properly re-install the safety equipment.
- Do not step onto the pump and accessory parts or use as a climbing aid.

2.5 Safety precautions

2.5.1 Authorized operating personnel

Only authorized and trained personnel may work on the progressive cavity pump. The minimum age for operators is 18 years. Apprenticing personnel may work on the system only under the supervision of an experienced person.

The operator is responsible for third parties within the working area.

Responsibilities for various tasks on the system must be clearly defined and observed. A lack of clarity about responsibilities is a safety risk.

All persons who perform work on the machine must read the operating instructions and confirm with their signature that they have understood the operating instructions.

2.5.2 Safety measures during normal operation

The progressive cavity pump may be operated only if all safety equipment is fully functional.

No safety equipment may be removed or made non-functional before or during operation of the system.

Before switching on the system you must ensure that no person can be endangered by the starting system.

The system must be inspected at regular intervals for visually detectable damage and for proper functionality of the safety equipment.

2.5.3 Safety at the place of installation

Safe access to the system must be ensured at all times.

Do not block the escape paths!

The operator must provide slip-resistant, even floors and sufficient illumination at the workplace.

Provide for cleanliness in the immediate surroundings of the system.

Children and the public may not have access to the system.

Safety equipment (emergency stop switch) must be easily accessible and accessible at all times.

2.6 Servicing and maintenance, fault removal

The operator must ensure that all service, inspection, and assembly tasks are performed by authorized and qualified technical personnel who have attained adequate knowledge through thorough reading of the operating instructions.

Work may be performed on the machine only when stopped. The procedure described in the operating instructions for stopping the machine (Decommissioning \rightarrow p 16) must be observed at all times.

Pumps or units that pump harmful liquids must be decontaminated.

The points detailed in the Initial startup section (\rightarrow p 15) must be observed before bringing the pump or units back into service.

Mandatory adjustment, service, and inspection tasks must be performed according to schedule.



Safety

Independent conversions and spare parts production

The operating personnel must be informed before the start of service and maintenance tasks.

All upstream and downstream system parts and operating media such as compressed air and hydraulics must be secured against unintended restarting.

Before starting any service, inspection, and repair tasks, switch off the power supply, lock it in the off position, and secure the main switch against unintended restarting.

- When possible, lock the main switch and remove the key
- or attach a sign that warns against restarting.

All safety and protective equipment must be reinstalled, made functional, and inspected immediately after conclusion of the work.

2.7 Independent conversions and spare parts production

Conversions or changes to the machine are permitted only if agreed with the manufacturer. Original spare parts and manufacturerauthorized accessories promote safety. The use of other parts will annul liability for resulting consequences.

2.8 Unauthorized methods of operation

Operational safety of the delivered machine is ensured only when used properly in accordance with Section 1 of the operating instructions. The limit values specified in the data sheet may never be exceeded.

2.9 Protective equipment



Protective gloves Wear protective gloves at all times.



Footwear Wear sturdy, insulated safety shoes with steel tips. They will protect the feet from falling parts.



Safety glasses

Wear protective glasses when working near the shaft sealing chamber.



Clothing

Wear suitable clothing. No synthetic pieces of clothing! They are a fire hazard.

2.10 Residual risks

There is unimpeded access to the shaft seal for functionality checks and/or adjustments.



Danger! Risk of drawing in and entrapment. Perform work on the pump only when stopped.



Danger points 3

3.1 Hazards when working with the system

The progressive cavity pump is constructed according to the current state of technology and recognized technical safety rules. Nevertheless, there may be hazards to the life and limb of the user or third parties or damage to the system and other assets may occur. Hazardous parts of the system are:

- moving parts •
- electrical components (mains connection).

Hazardous materials are:

- toxic materials •
- harmful materials
- corrosive materials
- irritants
- potentially explosive materials
- materials supporting combustion and highly, easily and combustible materials
- carcinogenic materials •
- teratogenic materials •
- mutagenic materials •
- materials that are otherwise hazardous for humans.

3.2 Dangers of leaks

Leaks (e.g. at the shaft seal) of hazardous pumps materials (e.g. explosive, toxic, hot) must be diverted in such a way that there is no risk for persons and the environment. Legal stipulations must be observed.

Dangers of electrical energy 3.3

There are electrical hazards when working on the pump:

- from direct contact with voltage-carrying parts or parts that carry voltage due to faults
- from electrostatic processes
- from high voltage
- from short circuits and overloads.

Only electrical experts may perform work on the electrical power supply.

The machine's electrical equipment must be inspected at regular intervals. Loose connections and scorched cables must be removed immediately.

If there is the possibility of electrostatic charging, appropriate grounding must be provided.

If work on voltage-carrying parts is necessary, a second person must assist who can actuate the main switch if necessary.

Danger from dust 3.4

When operating pump units in dust-laden environments (e.g. mills, chipboard production, bakeries) the surfaces of the pumps and motors must be routinely cleaned, with the cleaning frequency dependent on the local dust concentration, in order to maintain the cooling effect and eliminate the possibility of spontaneous combustion. (→ See also the explosion protection directives (BGR 104)).

3.5 Dangers from moving parts

The safety guarding for moving parts may not be removed while the machine is in operation.

3.6 Dangers from hot or cold machine parts

If there are hazards from hot or cold machine parts, these parts must be secured against contact at the site of installation.

3.7 **Operation in potentially**explosive atmospheres

If the pump or pump unit is operated in a potentially-explosive atmosphere, the ATEX supplemental instructions must be observed.

3.8 Dangers from pumped liquids

Danger of injury and poisoning from ejected pumped liquids. Appropriate protective equipment must be used during all work on the pump.

4 Structural design and function

4.1 Use and area of application

Progressive cavity pumps are self-priming, rotating displacement pumps for pumping and metering thin to highly viscous liquids, neutral or aggressive liquids, pure or abrasive liquids, gaseous liquids, or liquids prone to foaming, including liquids containing fibers and solids.

4.2 Designation

4.2.1 Nameplate



Fig. 1 Nameplate (example)

- 1 pump number
- 2 pump type
- 3 direction of rotation or flow
- 4 direction of rotation or flow
- 5 CE mark, year of construction

4.2.2 ATEX nameplate



Fig. 2 ATEX nameplate

1 pump number

- 2 pump type
- 3 direction of rotation or flow
- 4 direction of rotation or flow
- 5 CE mark, year of construction
- 6 explosive-protection designation



Danger!

If the pump or pump unit is operated in a potentially-explosive atmosphere, the ATEX supplemental instructions must be observed.

4.2.3 Pump type designation

The short designation of progressive cavity pumps is constructed according to the following pattern:



This brief designation is stamped or printed on the nameplate.

4.3 Performance data

Refer to the order data sheet for precise performance data that apply to the pump.

4.4 Design

4.4.1 Structural design

Self-priming, one- or two-stage progressive cavity pump. Pumping elements are the rotor and stator. Drive torque is transferred over the stub shaft to the universal joint shaft and the rotor.

Discharge casing, disassembly piece, stator, and suction casing are held together by means of external casing connection bolts (clamp bolts).

The mechanical seal casing is part of the lantern base. The lantern base is screwed to the suction casing.

4.4.2 Bearing and lubrication

Universal joint shaft with liquid-sealed pin joints at both ends. Lubricated with joint oil. The drive shaft/stub shaft uses the drive's reinforced bearing.

4.4.3 Shaft seal

Uncooled, maintenance-free, unbalanced, single-acting mechanical seal.



4.4.4 Dimensions/ branch position/flanges

Refer to the unit drawings for dimensions of the pump and pump unit, the flange position, and the flange dimensions.

4.4.5 Noise pressure

Measurement conditions for noise pressure: 1 meter away from the pump.

If the pump speed and/or the differential pressure fall below the values indicated in the table below, the noise pressure level will be lower.

Pump size	Number of stages	Pump speed [min ⁻¹]	Differential pressure ∆ p [bar]	Noise pressure L _p (A) [dB(A)]	
403	1	420	6	71.4 dB(A)	
553	1	500	6	73.8 dB(A)	
703	1	350	6	73.7 dB(A)	
1003	1	400	6	75.5 dB(A)	
1603	1	270	6	74.5 dB(A)	
200	2	600	10	71.8 dB(A)	
380	2	500	10	76.9 dB(A)	
750	2	400	10	79.3 dB(A)	

Table 5 Noise pressure

4.4.6 Non-ionizing radiation

The progressive cavity pump emits no nonionizing radiation, e.g. through a magnetic field.

4.4.7 Mode of operation

Self-priming, rotating displacement pump. The pumping elements are the rotor and the fixed stator. On the AEB1F and AEB2E series, the rotor and stator are in contact at two points that, viewed along the length of the pumping elements, form two sealing lines. The content of the sealed chambers (formed during movement of the rotor) is moved fully continuously in the axial direction from the suction to the discharge ends of the pump. Despite rotation of the rotor, no turbulence results. The uniform chamber volume eliminates squeezing forces and ensures extremely gentle, low-pulsation pumping action.

4.5 Pump/motor assembly

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4.5.1 Drive

Driven by non-explosion-protected or explosion-protected electric motors, gear motors, or variable gear motors.

4.5.2 Base plate

Pumps in horizontal configuration are normally installed with the drive on a shared base plate. The base plate is made of steel unless otherwise requested by the operating company.

5 Transport, storage, and disposal

5.1 Packaging

Always observe the pictograms shown on the packaging.

The suction and discharge ends and auxiliary connections of the pump must be sealed with plugs during transport and storages.

 Remove the plugs when setting up the pump unit.

5.2 Transport

If necessary, use lifting apparatus to safely transport the pump or pump unit to the place of installation.



Danger!

There is a risk of the pump or unit falling or becoming unstable. The regulations for lifting loads according to VBG 9a must be observed. Crane equipment and lifting gear must be properly dimensioned!

Lifting gear may not be fastened to the motor's suspension eyelets unless for the purpose of providing additional security against upsetting due to topheaviness.

Refer to the order-specific documentation for weight data.

When transporting the pumps with a crane, place the sling securely around the suction casing. If lifting a complete pump unit, place an additional sling on the drive motor.

The slings must be placed around the pump and pump unit in such a way that the pump or pump unit is perfectly balanced when lifted.

Make sure that the pump unit is transported to and at the place of installation in a stable position. Eliminate the possibility of upsetting due to top-heaviness.



Notice!

Check for transport damages as soon as the pump is received. Immediately report any damages that are found!

5.3 Preserving progressive cavity pumps and placing them into storage

5.3.1 Preservation



Notice! Not necessary for stainless materials!



Caution!

Improper preservation will result in property damage!

- Properly preserve the pump internally and externally.
- Select the preservation agent according to the type and duration of storage (→ Preservation agents, p. 10).
- Use the preservation agent(s) specified by the manufacturer.
- Preserve all inner and outer uncoated metal parts.



Caution!

Use of improper preservation agent will result in damage to the seals, joint collars, and stator.

 Make sure that the seals, stator elastomer, joint collars, and rotor screw are preserved with silicone oil only.

5.3.2 Storage



Caution!

Improper storage will result in property damage!

- Properly preserve and store the pump.
- Seal all openings with blank flanges, blank plugs, or plastic covers.
- Make sure that the storage area fulfills the following conditions:

Transport, storage, and disposal

Preserving progressive cavity pumps and placing them into storage

- dry
 - frost-free
- vibration-free
- Fully rotate shaft once per month.
- When doing so, make sure that the shaft, rotor, and bearing change their rotational position.
- 1

Notice!

The elastomer stator in the progressive cavity pump is particularly sensitive to elemental influences (ozone, light, temperature). Depending on the pump size, length of storage, and type of storage the pump may need to be disassembled, wrapped in dark film, and stored within a temperature range of -10 to +25 °C.

 \checkmark Discuss with factory.

5.3.3 Removing preservation

i

Notice!

Only necessary for preserved pumps.



Warning!

Danger of poisoning from preservation and cleaning agents near food or drinking water!

- ► Use only cleaning agents that are compatible with the pumped liquid (→ Cleaning agent, p. 11).
- Completely remove preservation agent.



Caution!

High water pressure or spray water will damage the bearing!

Do not clean near the bearings with a water or steam jet.



Caution!

Improper cleaning agent will damage the joint collars, stator, and seals!

- Make sure that the cleaning agent will not chemically attack the joint collars, stator, and seals.
- Internal preservation can be removed by flushing the pump with the pumped liquid. If the preservation agent is not permitted to contaminate the pumped liquid, the pump must be disassembled and the metal parts must be cleaned with an approved cleaning agent.
- Choose cleaning agent(s) that are suitable for the field of use (→ Cleaning agent p. 11).
- Dispose of the preservation agent in accordance with local regulations.
- If storage time will exceed 12 months:
 - Check all elastomers (stator, round sealing rings, shaft seals) for shape elasticity and replace if necessary.
 - Replace elastomers made of EP rubber (EPDM).

5.3.4 Preservation agent



Notice!

Use preservation agent from Valvoline or comparable (recommended).

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Type of storage	Storage time (months)	Preservation internal 1)	Replenish (months) internal	Preservation external	керіепізп (months) external
In a closed, dry, and	6-12	Tectyl 502-C-EH	-	Tectyl 846-K-19	-
dust-free space	>12	Tectyl 502-C-EH	24	Tectyl 846-K-19	36
Outdoors, in central	6-12	Tectyl 502-C-EH	3	Tectyl 846-K-19	-
European climate	>12	Tectyl 502-C-EH	3	Tectyl 846-K-19	12
Outdoors, tropical	6-12	Tectyl 502-C-EH	3	Tectyl 846-K-19	-
aggressive industrial air, or near the sea	>12	Tectyl 502-C-EH	3	Tectyl 846-K-19	12

Table 6 Preservation agent from Valvoline

1) Reference to point "Internal preservation" from Table 6, p. 11.



Caution!

Use of improper preservation agent will result in damage to the seals, joint collars, and stator elastomer.

Make sure that the seals, joint collars, stator elastomers, and rotor screw are preserved with silicone oil only.

5.3.5 Cleaning agent

Area of application	Cleaning agent
Near food and drinking water	e.g. ethyl alcohol, Ritzol 155, superalkaline soapsuds, steam jet (for individual parts only)
Other	gasoline for cleaning, wax solvent, diesel, petroleum, alkaline cleaner

Table 7 Cleaning agents

5.4 Disposal

Plastic parts and elastomers may be so contaminated by toxic or radioactive pumped liquids that cleaning will not be sufficient.



Warning!

Danger of poisoning and environmental damage from pumped liquid or oil!

- Personal protective equipment must be used during all work on the pump.
- Before disposing of the pump: Capture any escaping pumped liquid and oil and dispose in accordance with local regulations.
- Neutralize residual liquid in the pump.
- ► Remove preservation (→ 5.3 Preserving progressive cavity pumps and placing them into storage, p. 9).
- Disassemble plastic parts and elastomers and dispose in accordance with local regulations.

Dispose of the pump in accordance with local regulations.

Ambient conditions



6 Setup and connection

6.1 Ambient conditions



Notice!

Consult with the manufacturer before using under other ambient conditions.

Temperature [°C]	Relative hu	Altitude above sea	
	long-term	short-term	level [m]
0 to +40	≤85	≤100	≤1000

Table 8 Ambient conditions

6.2 Setup

The pumps can be set up horizontally only.



Caution!

Incorrect installation position may lead to damage to the shaft seal and the drive.



Warning!

Danger of burns and scalding! When the pumped liquid temperature exceeds 60 °C, safeguards according to EN 809 must be provided in order to avoid personal injury by burning!

6.3 Foundation

The characteristics of the foundation depend on the size of the pump and pump unit and local conditions.

Refer to our dimension sheets and unit drawings for precise pump and unit dimensions.

The foundation may be a concrete foundation or a weight-bearing frame, e.g. in steel. All foundation designs must be capable of supporting the weight of the pump unit on the entire surface.

6.3.1 Characteristics of a steel frame

A steel frame must be designed so that the base plate is supported across the entire

surface and can be secured with bolts or welds.



Caution!

If the base plate is supported only at distinct points, this will lead to the sagging or tension of the pump unit. This will influence the alignment of the pump unit and may lead to high noise emissions and damage.

6.3.2 Characteristics of a concrete foundation

The foundation must be level, even, and clean and fully absorb the loads placed on it.

A concrete foundation must be designed so that the base plate contacts the foundation across its entire surface and can be secured with suitable bolts (see pump unit drawings for connection dimensions).



Caution!

If the base plate is supported only at distinct points, this will lead to the sagging or tension of the pump unit. This will influence the alignment of the pump unit and may lead to high noise emissions and damage.

6.3.3 Fastening the pump unit to the concrete foundation

 After aligning the pump unit on the foundation, tighten the bolts alternately and progressively for uniform tightening torque.

6.3.4 Characteristics of a concrete foundation for poured base plates

When constructing the concrete formwork, consider that there must be an open space between the top edge of the finished foundation block and the bottom edge of the base plate for alignment of the pump unit and filling with mortar compound.

- After aligning the pump unit on the foundation, tighten the bolts alternately and progressively for uniform tightening torque.
- The set concrete foundation must be level, even, and clean.



- Any oil contamination on the foundation must be removed.
- Clean the recessed anchor holes for the foundation bolts and blow them out with air.
- Before setting up the pump unit, roughen and clean the surface of the concrete foundation in order to ensure good adhesion between the foundation block and the mortar compound.

6.3.5 Pouring the base plate

- After alignment on the concrete foundation, pour the base plate using a non-shrinking mortar compound along the entire length and fill the anchor holes with the inserted anchor bolts.
- Once the mortar compound is set on the base plate and in the anchor holes, tighten the foundation bolts alternately and progressively for uniform tightening torque.



Notice!

When pouring and filling with mortar compound, make sure that the base plate has contact along its entire surface. Tap to ensure that there are no voids!

6.4 Base plate

The base plate must be fastened onto the foundation without tension.

Check the pump unit for tension:

- Loosen the fastening bolts on the foot of the discharge casing (504) (→ see sectional drawing on p. 36). After the bolts are loosened, the foot of the discharge casing may neither be sloping nor wobble nor be under pressure.
- If any of these things occur to an unacceptable degree, loosen the fastening of the base plate and refill with mortar to resolve the issue.

6.4.1 Space requirement for service and repair



Caution!

The pump must be accessible from all sides so the necessary visual inspections can be performed.

The pump is designed to be very easy to service. The rotor, stator, joint, stub shaft, and

mechanical seal may be replaced without removing the pump from the pipework. Sufficient space must be provided for these tasks.

6.5 Laying the pipework

6.5.1 Standard diameters

The standard diameters of the suction and discharge lines shall be the same as the nominal diameters of the pump flanges. Any large deviations, especially on the suction side, must be discussed with the factory.

Blocking devices must be present in the suction and discharge lines.

6.5.2 Supports and flange connections

The pipes must be connected to the pump without tension at the flange connections. They must be supported close to the pump and it must be possible to screw them in using light force in order to avoid tension. After the bolts are loosened, the flanges may neither be sloping nor wobble nor contact each other under tension. Any heat tension in the pipework must be kept away from the pump with suitable measures such as the installation of compensators.

6.5.3 Cleaning the pipework before fitting

Before installing the pump, it is essential that the suction-side pipes, gate valve, and valves be flushed and cleaned.

Use the cleaning agent, disinfectant, and flushing agent and associated method recommended by the operating company.



Notice!

Residuals from installation such as bolts, nuts, welding beads, and pieces of steel will destroy the inner parts of the pump.

All warranty claims will be void as soon as such residuals cause this type of damage. Flange seals may not protrude into the inner spaces. Blank flanges, plugs, protective films and/or protective coatings on the flanges and sealing strips must be completely removed.



6.6 Safety and control devices

6.6.1 Pressure gage and vacuum meter

A pressure gage or a vacuum meter shall be installed on the discharge and suction line.

6.6.2 Safety organ in the discharge line



Warning!

Hazard from driving the pump by means of a discharge-side liquid column (reverse running). A return flow block between the discharge flange and the stop valve must ensure that the pumped liquid will not flow back when the pump is shut down.

A safety device, e.g. a bypass line with integrated overpressure valve, space membrane, or protective motor switch, must be installed whenever a blocking organ is placed in the discharge line or if there is the possibility that the discharge line will become clogged.



Warning!

High pressure

Progressive cavity pumps are displacement pumps and are capable of producing tremendously high pressure.

If the discharge line becomes closed, e.g. due to clogging or closing of a valve for any reason, the pump-generated pressure may climb to several times the permissible pressure. This may lead to bursting of the lines, a situation that must be avoided under all circumstances, but especially when pumping hazardous products. For this reason, it is essential that appropriate safety devices, such as pressure switches, be installed in the system.

6.6.3 Electrical connections



Attention!

An electrical expert must connect the coupled drive motor's power supply cable according to the motor manufacturer's connection diagram. Valid engineering regulations (VDE in Germany) and regulations of the local power and utilities company must be observed. All electrical energy hazards must be eliminated. An emergency stop switch must be installed!



7 Operation

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7.1 Preparing for initial startup

7.1.1 Filling the pump with liquid



Caution!

The pump may not run dry!

The pump must be filled with liquid before initial startup or after extended periods of downtime.

Even just a few revolutions without liquid can damage the stator. Therefore, the suction casing must be filled with water or pumped liquid before starting in order to lubricate the stator and rotor. The filling procedure must be repeated after an extended period of downtime, i.e. if there is reason to believe that the residual liquid in the pump has evaporated, or after a repair.

Once filled, the pump will be self-priming. Venting is not necessary, since a liquid/gas mixture can be pumped without problem.

7.1.2 Freeing the pump

When initially starting or after a long period of downtime, make sure that the drive machine is able to rotate the pump. If adhesion between the rotor and stator of a new pump prevents this, you can apply a suitable tool to the stub shaft behind the shaft seal in order to help get it started.



Caution!

Avoid damaging the stub shaft.

7.1.3 Check direction of rotation

When viewed from the drive over the stub shaft, the normal direction of rotation is counterclockwise. The suction connection is thereby on the shaft seal side, relieving the shaft seal. In special situations, e.g. when drawing from a vacuum or when pumping liquids that do not tolerate gas inclusions, the pump will turn clockwise. In these cases, the suction and pressure sides will be reversed.



Caution!

The pump's direction of rotation must match the directional arrow "n" on the pump's nameplate. Turning the wrong direction may damage the pump!

 To check the direction of rotation, switch on the motor and then immediately switch it back off.

7.2 Bringing the pump into operation

7.2.1 Starting



Caution!

Open all blocking organs on the suction and pressure sides before starting.

7.2.2 Drive

Switch on the motor.



Caution!

Observe any peculiarities of the drive you are using. **Refer to the manufacturer's operating instructions.**

7.2.3 Verifying performance specifications

Once the drive has reached its operating speed, use a vacuum gage and pressure gage to verify inlet pressure and final pressure.

Do not overload the motor. Power consumption may be checked with an ampere meter. Temperature and viscosity of the pumped liquid must be checked in this context. Compare the obtained values to the order data sheet and acceptance log. Taking the pump out of operation

7.2.4 Dry-Running Protection

If there is no pumped liquid on the suction side, the heat energy created by dry friction and deformation in the pumping elements of the progressive cavity pump will no longer be adequately dissipated and the stator elastomer will be thermally destroyed after just a short time. Stators on design type MF are ready for dry-running protection as standard with a sensor sleeve for receiving a sensor integrated into every stator at the factory. This makes it easy to attach or retrofit a dry running protection device.

7.3 Taking the pump out of operation

7.3.1 Shut down

Switch off the motor.

7.3.2 Measures when pump is out of service for an extended period

If you anticipate the pump staying out of operation for a longer period of time and there is a risk of freezing, you must empty the pump.

► To do this, screw the plug (502) from the suction casing (505). The pump must then be preserved (→Section 5.3 p.9).

7.4 Operating in special fields of application

If the pump or pump unit is operated in a potentially-explosive atmosphere, the ATEX supplemental instructions must be observed.



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8 Service cycles and intervals

Service may be necessary for the following parts:

Rotor + Stator: Wear of the rotor and/or stator will manifest itself as reduced capacity and lower pressure. When this happens, you can plan for maintenance, i.e. it is not necessary to immediately replace the rotor and/oder stator.

Refer to Section 9, pg. 18 and Section 10, pg. 20

9 Service

9.1 Service

- When performing maintenance and repair, always observe the safety requirements described in Section 2.
- Regular monitoring and service of the pump will extend the service life.



Caution!

Use protective equipment whenever necessary!

9.1.1 General monitoring

- The pump may not run dry.
- Do not overload the drive motor.
- Check suction and discharge lines for leaks.
- An integrated mechanical seal may not exhibit excessive leaks.
- Observe pressure and temperature monitoring devices and compare the obtained values to the order data sheet and acceptance log.

9.1.2 The shaft's universal joint

The universal joints are lubricated with ALLWEILER special joint oil type B or Plantogear 460-S oil from Fuchs Lubrication.



Caution!

We have not tested and therefore cannot recommend any other lubricants!

The joints are lifetime lubricated. However, if the pump must be opened for other reasons, we recommend checking the cover sleeve for leaks and to replace the joint oil after 8000 operating hours. The table in Section 9.1.5 p. 19 shows the amount of oil (in cubic centimeters) required for each pump size. See Section 10.1 p. 20 for information on changing the joint oil.

9.1.3 Shaft seal

The shaft is sealed with a mechanical seal.



Danger!

There is unimpeded access to the shaft seal for functionality checks and/or adjustments. Risk of drawing in and entrapment! Perform work on the pump only when stopped.

9.1.3.1 Mechanical seal

Unbalanced mechanical seals are used. The mechanical seal is maintenance-free.

If wear causes heavy leaks, replace the mechanical seal (\rightarrow Section 10.1 p. 20).



Caution!

Since dry-running of the mechanical seal must be avoided, the pump may be started only when filled!

9.1.4 Drive motors and (variable) gear motors

Refer to the manufacturer's operating and service instructions.

9.1.5 Lubricant quantities for joints (→Section 9.1.2)

Pump size	AEB1F	403	553 703	1003 1603
	AEB2E	200	380	750
Oil volume in c per joint	m ³	37	52	87

Table 9 Joint lubricant volume



10 Repairs

10.1 Disassembly and assembly instructions

Trained customer-service installers are available upon request for installation and repair work.



Caution!

When customer personnel or our technical installers perform repairs, it is essential that the pump is completely drained and cleaned. This applies particularly to pumps that are sent to our factory or an authorized workshop for repair!

In the interest of our workers' safety and for environmental reasons, we must refuse to accept any pumps that are sent to us filled with liquid.

If filled pumps are sent to us, we must invoice the customer/operating company for the cost of environmentally-sound disposal.

When pumps that were operated with hazardous materials and/or environmentally hazardous liquids require repair, the customer/operating company must pro-actively provide information about this to its own our on-site installers or, if the pump is sent back, to our factory or authorized workshop. In these situations, when a customer-service installer is requested, an attestation of pumped material, e.g. a DIN safety data sheet, must be presented.

Your own or our installation personnel must be made aware of all hazards that may arise in conjunction with on-site repairs.

The most important removal and installation tasks are described in these instructions. The installation steps described in the individual sections must be consistently observed.

Special tools for installation and removal of the pumps can be purchased from us separately.

 \checkmark Contact factory for more information.

It is not necessary to remove the pump from the piping in order to perform maintenance and service tasks. Possible service and repair tasks are described on the following pages.

10.1.1 Removal of the progressive cavity pump

The following tasks must be performed before starting the removal process:

- 1. Disconnect the power supply cable for the motor. It may not be possible for the motor to switch on.
- 2. All blocking organs in the feed and discharge lines must be closed.

 \checkmark You must be certain that the pump is depressurized.

 Drain the pumped liquid from the suction casing. To do this, remove the screw plug (502) (→ see sectional drawing on page 36)

Notice!

Use a collection container.



10.1.2 Removing the stator

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

- 1. Remove hexagon bolt (529).
- 2. Remove disassembly piece (527): First remove the ring on the discharge-casing side (a); then remove the ring on the stator side (b).



Fig. 4 Removing disassembly piece



Notice!

The two parts of the disassembly piece are specially contoured. Part (a) may be removed only in one direction.



Fig. 5 Removing disassembly piece



Notice!

If the disassembly piece cannot be removed, loosen the bolts on the foot of the discharge casing.

- 3. Remove the hexagon nuts (609) and washers (610) from the clamp bolts (611).
- 4. Pull off the stator flange (526).
- 5. Remove clamp bolts (611).



Caution!

Stator is a pinching hazard. Support the stator with suitable tools.

6. Pull the stator (402) forward and off of the rotor (401).



Fig. 6 Pulling the stator from the rotor.



Caution!

Rotor is a pinching hazard. Support the rotor with suitable means.

10.1.3 Removing the rotor and rotorside joint

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

Remove the rotor and rotor-side joint after removing the stator (402) \rightarrow Section 10.1.2 page 21.

- 1. Remove hexagon bolts (508) and washers (525).
- 2. Remove suction casing cover (506) and O-ring (507) from the suction casing (505).



Notice!

In most cases, but depending on the branch position or how the pump is installed, removal of only one cover will be sufficient.

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- 3. Remove protective caps (327) from the cylinder head bolts (326).
- 4. Remove cylinder head bolts (326) from the universal joint shaft (307).
- 5. Pull off the rotor (401), including the installed rotor-side joint.



Fig. 7 Pull off rotor

10.1.4 Removing rotor and stator together

→ the sectional drawing on page 35 for the positions of the parts mentioned below. Alternatively, the rotor can be removed together with the stator:

- 1. Remove hexagon bolt (529).
- 2. Remove disassembly piece (527): First remove the ring on the dischargecasing side (a); then remove the ring on the stator side (b).



Fig. 8 Removing disassembly piece



Notice!

The two parts of the disassembly piece are specially contoured. Part (a) may be removed only in one direction.



Fig. 9 Removing disassembly piece

Notice!



If the disassembly piece cannot be removed, loosen the bolts on the foot of the discharge casing.

- 3. Remove the hexagon nuts (609) and washers (610) from the clamp bolts (611).
- 4. Pull off the stator flange (526).
- 5. Remove clamp bolts (611).



Caution!

Stator is a pinching hazard. Support the stator with suitable means.

- 6. Remove hexagon bolts (508) and washers (525).
- 7. Remove suction casing cover (506) and O-ring (507) from the suction casing (505).



In most cases, it is sufficient to remove one cover for disassembly of the pump. This will depend on the branch position or how the pump was installed.

- 8. Remove protective caps (327) from the cylinder head bolts (326).
- Remove cylinder head bolts (326) from 9. the universal joint shaft (307).
- 10. Pull out the stator (402) together with the rotor (401) and the rotor-side joint.



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Disassembly and assembly instructions



Fig. 10 Pull out stator



Caution!

Rotor and stator are a pinching hazard. Support the stator with suitable tools.

10.1.5 Removing the universal joint shaft, stub shaft, and mechanical seal

→ the sectional drawing on page 35 for the positions of the parts mentioned below. Remove the universal joint shaft and stub shaft after removing the stator (402) and rotor (401).

- 1. Remove hexagon bolt (245).
- 2. Loosen the cover (215) from the centering.
- 3. Pull thrower (123) from the clamping set (123).
- 4. Loose the clamp bolts of the clamping set (123) uniformly and in series.
- 5. To do this, rotate the stub shaft (125) if necessary. If the outer ring of the clamping set does not separate from the inside ring on its own, you can remove a few of the clamp bolts and screw them into the neighboring forcing threads. Unclamping will then be no problem.



Warning!

Never completely remove the clamp bolts. Hazard from ejected parts.

Pull out the universal joint shaft (307) with the stub shaft (125) and the rotating part of the mechanical seal (219) from the suction casing (505).



Fig. 11 Pull out mechanical seal

7. Clamping set (123) and cover (215) remain on the gear motor's drive shaft.



Fig. 12 Clamping set and cover

 Push the counter ring of the mechanical seal (219) out of the cover (215), if necessary.

10.1.6 Disassembling the joint

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.



Notice!

This step is optional. Spare parts with a pre-assembled joint can be obtained from us. See Chapter 11.2.

 Use a metal saw to saw open the lock on the joint clamp (306); then use a screwdriver to press it outward to both sides. Remove the joint clamp (306) from the cover sleeve (308) (see Fig. 13).

Repairs Assembling the progressive cavity pump



Fig. 13 Removing the joint clamp

2. Use a screwdriver to lift the cover sleeve (308) on the drive-side joint and pull it off in the axial direction towards the universal joint shaft (307), or in the direction of the joint head (317) on the rotor-side joint, respectively.



Notice!

Use a collection container.

 Drive the retaining sleeve (304) over the collar of the joint universal joint shaft (307) or joint head (317), respectively. In doing so, do not deflect the universal joint shaft (307) or the joint head (317), respectively (see figure below).



Fig. 14 Removing the retaining sleeve

- 4. Drive out the joint pin (301).
- Use a brass pin punch to drive both bushes for the joint pin (303) halfway out. To do this, cant the universal joint shaft (307) or the joint head (317), respectively (see figure below).



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Fig. 15 Removing the bushes for the joint pin

- 6. Pull the rotor (401) from the joint head (317) or the stub shaft (125) from the universal joint shaft (307), respectively.
- 7. Push the joint bush (302) from the universal joint shaft (307) or from the joint head (317), respectively.
- 8. Use a brass punch to drive the bush for the joint pin (303) from the rotor or from the stub shaft (125), respectively.

10.2 Assembling the progressive cavity pump

After thorough cleaning, assemble the individual pump components in reverse order.

10.2.1 Installing the joint

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.



Notice!

This step is optional. Spare parts with a pre-assembled joint can be obtained from us. See Chapter 11.2.

- 1. Use a brass punch to drive the bushes for the joint pins (303) halfway into the rotor (401) or the stub shaft (125), respectively.
- 2. Press the joint bush (302) into the universal joint shaft (307) or the joint head (317), respectively, as follows:

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Caution!

The longitudinal axis of the oval hole (identified by two grooves) must correspond with the longitudinal axis of the joint shaft or with the joint head, respectively, and the joint bush must protrude evenly on both sides of the joint shaft or the joint head, respectively (\rightarrow see figure below).



Fig. $16\ \text{Pressing}$ in the joint bush

- 3. Insert the joint head (317) into the head of the rotor (401) or insert the joint shaft (307) into the head of the stub shaft (125), respectively.
- 4. Drive the joint pin (301) fully into the joint bush (302) and bushes for joint pins (303).
- 5. If necessary, lap smooth the outer diameter of the retaining sleeve (304) and pull it onto the head of the rotor (401) or the stub shaft (125), respectively.
- After pulling on the retaining sleeve (304), secure it against axial shifting on the head of the rotor (401) or on the head of the stub shaft (125), respectively.



Caution!

To do this, use a prick punch to drive the face side of the retaining sleeve (304) into the groove on the head of the rotor (401) or on the head of the stub shaft (125), respectively (see figure below)!



Fig. 17 Securing the retaining sleeve

- Use a screwdriver to pull open the cover sleeve (308). Use the screwdriver to lift cover sleeve, guide oil bottle's injection tube under the collar and fill the joint space with ALLWEILER special joint oil type B or Plantogear 460-S oil from Fuchs Lubrication. Filling amount (→ see table in Section 9.1.5 page 19).
- Check whether joint clamp's strap (306) is contacting the joint clamp lock. If not, use a common flat nose pliers to press it on (see figure below).



Fig. 18 Press joint clamp strap onto joint clamp lock

9. Place joint clamps (306) into the circumferential grooves of the cover sleeve (308) and tighten.



Notice!

To do this, use the banding tool indicated below:

- For pump sizes smaller/equal to AEB1F 703 or AEB2E 380 banding tool PoK-It II.
 - For pump sizes equal to or larger than AEB1F 1003 or AEB2E 750,

banding tool Band-It together with J050 adapter.

These tools can be obtained through us.

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Assembling the progressive cavity pump

Tightening of the joint clamps is descried in the next section.

10.2.1.1 Tightening with banding tool Band-It and Adapter J050

- 1. Guide the end of the joint clamp (306) into the tightening tool with adapter up to the joint clamp lock.
- Hold the sleeve end with the cam lever of the banding tool and turn the crank to tighten the joint clamp (306) (→ figure below).



Spannwerkzeug Band-It mit Adapter J050

Fig. 19 Banding tool Band-It and adapter J050



Notice!

Correct tension of the joint clamps (306) is shown in the figure below.



snug.



CorrectIncorrectJoint clampJoint clamp(306) has(306) is toosomewhatloose and candrawn in theslip off.outer shape ofthe collar and is



308

Joint clamp (306) is too tight. Collar will be damaged (sheared off).

306

Fig. 20 Tightening the joint clamps

- 3. Make sure that the joint clamp (306) contacts the cover sleeve (308) in the collar groove along the entire circumference.
- Slowly rotate the banding tool by approx. 60° upward until the shearing hook grasps behind the joint clamp lock (→ see image below).

5. Manually tighten the pressure screws until the joint clamp is securely clamped.

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Fig. 21 Shearing the joint clamp

6. Turn the pressure screw in the clockwise direction with a wrench or ratchet until the joint clamp is sheared off.



Caution!

If the joint clamp is raised slightly raised on the sheared side, carefully bend it back so it is straight. Hammering or striking the joint clamp lock is not advisable because this may result in damage to the collar!

10.2.1.2 Banding with the PoK-It II banding tool

If using the PoK-It II banding tool, after banding rotate the banding tool in order to bend the joint clamp (306) at the joint clamp lock so that the sleeve cannot slip back through the lock. After bending at the joint clamp lock, shear off the joint clamp with metal shears and then deburr the cut edges (\rightarrow see figure below).



Fig. 22 Bending and shearing off the joint clamp

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Caution!

Make sure that the joint clamp is bent in a way that it cannot slip back through the joint clamp lock (\rightarrow figure above). If this is not the case, the joint clamp must be removed and replaced with a new one!

10.2.2 Installing the universal joint shaft, stub shaft, and mechanical seal

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

Install drive-side joint, as described under 10.2.1.



Fig. 23 Drive-side joint

10.2.2.1 Installing the mechanical seal, general

Mechanical seals are high-precision parts. Careful handling and extreme cleanliness during installation are essential to ensure flawless functionality. Surfaces that slide over O-rings may be lubricated with a slip agent such as silicon oil, poly diol, or lubricating soap to aid in installation.



Caution!

Do not use mineral oil or synthetic oil as a lubricant!



Notice!

Parts that slide against each other must always be replaced in pairs.

10.2.2.2 Installing the mechanical seal

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

1. Press the mechanical seal's counter ring (219) with angled collar into the cleaned cover (215).





Fig. 24 Mechanical seal



Notice! Make sure pressure is distributed evenly.

2. Slide the rotating part of the mechanical seal (219) onto the stub shaft (125).

10.2.3 Installing the stub shaft with shaft seal and installed universal joint shaft

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

- 1. The clamping sets (123) are delivered ready for installation. Therefore, do not take them apart before initial clamping.
- 2. Dismantled clamping sets (123) must not be taken apart and re-lubricated before re-clamping.
- 3. The clamping set (123) must be cleaned and re-lubricated only if it is dirty.
- 4. Use a solid lubricant with a friction value of $\mu = 0.04$.

Lubricant	Commercial form/ manufacturer
Molykote 321 R	Spray/
(lubricant coating)	Dow Corning
Molykote spray	Spray/
(powder spray)	Dow Corning

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Molykote G Rapid	Spray or paste/ Dow Corning
Aemasol MO 19 R	Spray or paste/ A.C. Matthes
Molykombin UMFT 1	Spray/ Kluber lubric.
Unimoly P 5	Powder/ Kluber lubric

Table 10 Lubricants

- 5. If the tapered surfaces become damaged, the clapping set must be replaced.
- Lubricate the clamp bolt threads and connecting surface with Molykote and manually screw in the clamp bolts until the heads of the clamp bolts contact the inside ring of the clamping set.



Caution!

Do not tighten the clamp bolts before the stub shaft (125) is pushed onto the shaft of the drive. Risk of damage to the clamping set.



Caution!

Clean and **degrease** the shaft of the drive and the hole of the stub shaft (125).

 Guide the stub shaft (125) with the installed universal joint shaft (307) and the rotating part of the mechanical seal (219) through the suction casing (505).



Fig. 25 Inserting stub shaft



Notice!

Clamping set (123), thrower (123), and cover (215) are arranged on the driveshaft of the gear box.

- 8. Slide cover (215) onto the stub shaft.
- 9. Slide thrower (123) onto the stub shaft (125).
- 10. Lightly grease the seat of the clamping set (123) on the stub shaft (125) and



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slide clamping set (123) onto the stub shaft (125) until it stops.

- 11. Slide the stub shaft (125) onto the shaft of the drive until it stops.
- 12. Tighten the clamp bolts of the clamping set (123) progressively for uniform torque. To do this, rotate the stub shaft if necessary.



Caution!

Tighten all clamp bolts until the front surfaces of the outer and inside rings are flush and the screw tightening torque increases greatly (\rightarrow see Functional state in). The permissible bolt tightening towards [Nm] are engraved in the clamping set (123).





Fig. 26 Clamping sets in inner collar

- Check for the proper position of the clamping set (123) on the stub shaft (125) according to , Detail X must be checked.
- 14. Pull thrower (123) onto the clamping set (123).
- 15. Screw cover (215) onto the lantern base (123) using hexagon head bolts (245).



Caution!

When sliding the cover (215) into the centering of the lantern base (123), make sure that the counter ring of the mechanical seal (219) is not canted in order to avoid damage.

10.2.4 Installing the rotor and rotorside joint

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

- Install the rotor-side joint onto the rotor (401) as described under Section 10.2.1.
- 2. Driving centering pins (320) into the joint head (317).
- 3. Guide the rotor (401) with the installed joint head (317) and drived-in centering pins (320) into the installed universal joint shaft (307).



Fig. 27 Inserting rotor

- 4. Screw joint head (317) onto the universal joint shaft (307) using cylinder bolts (326).
- 5. Mount protective caps (327) onto cylinder bolts (326).
- Install suction casing cover (506) with O-ring (507) onto the suction casing (505). To do this, screw on suction casing cover (506) with hexagon head bolts (508) and washers (525).

10.2.5 Installing the stator

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

1. Before pulling on the stator (402) and rotor (401), coat them with a lubricant (silicon oil, poly diol, lubricating soap, or similar).



Caution!

Do not use mineral oil or synthetic oil as a lubricant!



Notice!

If difficulty is encountered, simultaneously rotate the stator (402) with a chain wrench. Hold the stub shaft (125) stationary.

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2. Pull on the stator (402) and rotor (401).



Caution! Stator is a the stator

Stator is a pinching hazard. Support the stator with suitable tools.

- 3. Screw clamping bolts (611) into suction casing (505).
- 4. Slide stator flange (526) onto clamp bolts (611) and stator (402).
- 5. Screw together the stator flange (526), stator (402), and suction casing (505) with the clamp bolts (611) and hexagon nuts (609). Tighten the hexagon nuts uniformly.



Notice!

Notice the position of the grooved dowel pins (528) in the stator flange (526)!



Fig. 28 Positions of the grooved dowel pins

Install the disassembly piece (529) with the associated O-rings and align them with the grooves. To do this, first insert the stator-side disassembly piece (b) and support it on the grooved dowel pin (528). The groove is positioned at the top. Then insert the discharge casing-side disassembly piece (a). Groove at the top.



Fig. 29 Installing disassembly piece





Notice!

The surfaces of the disassembly pieces are specially contoured. This makes them self-centering and installation is possible in only one particular position.

7. Screw together the discharge casing (504) and stator flange (526) with hexagon head bolts (529). Tighten the hexagon bolts uniformly.

10.2.6 Installing the rotor and stator together

 \rightarrow the sectional drawing on page 35 for the positions of the parts mentioned below.

- 1. Install stub shaft, universal joint shaft, and mechanical seal as described under 10.2.3.
- 2. Install rotor (402) with joint head (317) as described under 10.2.1.
- 3. Before pulling on the stator (402) and rotor (401), coat them with a lubricant (silicon oil, poly diol, lubricating soap, or similar).



Caution!

Do not use mineral oil or synthetic oil as a lubricant!

4. Insert rotor (401) in stator (402).



Notice!

When inserting the rotor into the stator, observe the following adjustment dimension L.



Fig. 30 Observe adjustment dimension

Pump size	Adjustment dimension L
2E200, 1F403	~ 92 mm
2E380, 1F553, 1F703	~ 117 mm
2E750, 1F1003, 1F1603	~ 140 mm

Install stator (402) together with the rotor (401) onto the suction casing (505) and universal joint shaft (307). To do this, guide the centering pins (320) of the joint head (317) into the universal joint shaft (307).



Fig. 31 Installing stator

- 6. Screw joint head (317) onto the universal joint shaft (307) using cylinder bolts (326).
- 7. Place protective caps (327) onto cylinder bolts.
- Install suction casing cover (506) with O-ring (507) onto the suction casing (505). To do this, screw on suction casing cover (506) with hexagon head bolts (508) and washers (525).
- 9. Screw clamping bolts (611) into suction casing (505).

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- 10. Slide stator flange (526) onto clamp bolts (611) and stator (402).
- 11. Screw together the stator flange (526), stator (402), and suction casing (505) with the clamp bolts (611) and hexagon nuts (609). Tighten the hexagon nuts uniformly.



Notice!

Notice the position of the grooved dowel pins (528) in the stator flange (526)!



Fig. 32 Positions of the grooved dowel pins

12. Install the disassembly piece (529) with the associated O-rings and align them with the grooves. To do this, first insert the stator-side disassembly piece (b) and support it on the grooved dowel pin (528). The groove is positioned at the top. Then insert the discharge casing-side disassembly piece (a). Groove at the top.



Fig. 33 Installing disassembly piece



Notice!

The surfaces of the disassembly pieces are specially contoured. This makes them self-centering and installation is possible in only one particular position. 13. Screw together the discharge casing (504) and stator flange (526) with hexagon head bolts (529). Tighten the hexagon bolts uniformly.

11 Spare parts

The sectional drawing below with directory of parts depicts all mentioned pumps. The parts identified in the directory of parts can be held as spare/reserve parts.



Caution!

For safety reasons, stock and install only original spare parts delivered by us. In this context we refer to the specifications provided under Section 2.7 (\rightarrow page 5)!

When ordering reserve or spare parts, provide the following information:

- pump number
- pump type
- part number
- designation and part quantity
- or ID no. and quantity



Notice!

The pump number and the pump type are stamped onto the nameplate. The ID no. and quantity can be found on the separate included spare parts list.



11.1 Individual part directory and recommended spare/reserve parts

Legend of recommended spare parts:

R = large repair set

r = small repair set

Part No.	Designation	Repair set	Quantity	Remarks:
122	Lantern base		1	
123	Clamping set		1	
125	Stub shaft	R	1	
212	Screw plug		1	
213	Sealing strip		1	
215	Mechanical seal cover		1	
218	O-ring	R	1	
219	Mechanical seal	R	1	
245	Hex-head bolt		3	
301	Joint pin	R, r	2	
302	Joint bush	R, r	2	
303	Bush for joint pin	R, r	4	
304	Joint sheath	R, r	2	
305	Joint oil	R, r		
306	Joint clamp	R, r	4	
307	Universal joint shaft,	R, r	1	
308	Cover sleeve	R, r	2	
317	Joint head	R, r	1	
320	Grooved dowel pin	R, r	2	
326	Cylinder head bolt	R, r	2	
327	Protective cap	R, r	2	
401	Rotor	R, r	1	
402	Stator	R, r	1	
501	Seal for suction casing	R, r	1	
502	Screw plug		1	
503	Seal ring	R	1	
504	Discharge casing		1	
505	Suction casing		1	
506	Suction casing cover		2	
507	Gasket	R	2	
508	Hex-head bolt		8	1
525	Washer		8	0
526	Stator flange		1	
527	Disassembly piece, complete	R	1	
528	Grooved dowel pin		2	
529	Hex-head bolt		4	



Spare parts

Part No.	Designation	Repair set	Quantity	Remarks:
601	Nameplate		1	
602	Round head grooved pin		4	
603	Information plate "Startup"		1	
604	Information plate "Suction"		1	
605	Information plate "Discharge"		1	
606	Hex-head bolt		4	
607	Hex nut		4	
608	Serrated washer		4	
609	Hex nut		4	
610	Washer		4	
611	Clamp bolt		4	

Pre-assembled spare parts kits

Table 11 Individual part labeling

① 12 pieces at AEB 1F1603, AEB 2E 0750

11.2 Pre-assembled spare parts kits

Alternatively, pre-assembled spare parts kits can be ordered from us.

Rotor with installed joint head and rotor-side joint:



Fig. 34 Rotor with installed joint head

Stub shaft with installed universal joint shaft and drive-side joint:



Fig. 35 Stub shaft with installed universal joint shaft



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11.3 Sectional drawing





12 Operational disturbances, causes, and their removal

Discuss with the manufacturer any disturbances that are not named in the table or not traceable to the stated causes.

The possible disturbances get a letter in the following table. This letter will take you to the corresponding cause and corrective measures in the table of disturbances.

 \rightarrow To reduce noise and vibrations, refer to letter f in the table below.

Letter	Disturbance
a:	Pump does not start.
b:	Pump does not generate suction.
C:	Capacity is not achieved.
d:	Delivery head is not achieved.
e:	Irregular pumping.
f:	Pump runs loudly or vibrates.
g:	Pump is stuck or doesn't pump anymore.
h:	Motor gets too warm.
i:	Stator wears prematurely.
j:	Shaft seal leaks.

Table 12 Overview of potential disturbances

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No	Op	bera	tiona	al di	stur	ban	ces				Causes and their removal
•	а	b	с	d	е	f	g	h	i	j	
1	•							•			High adhesion between rotor and stator in new condition or after a long period of downtime. Use tool to manually rotate the pump.
2		•									Check direction of rotation according to arrow on the pump; if necessary, reverse the poles of the motor.
3			\bullet		ullet	ullet	ullet				Check suction line and shaft seal for leaks.
4		•	•		•	•					Check suction head – enlarge suction line cross section if necessary. Install a larger filter. Fully open suction valve.
5		•			•						Check viscosity of pumped liquid.
6	•		•					•			Check pump rotational speed. Check speed and power consumption of drive motor. Check voltage and frequency.
7					•						Avoid air inclusions in pumped liquid.
8	•		•				•	•	•		Check discharge head. Fully open gate valve in discharge line, remove clog in discharge line.
9		•	•		•		•		•		Pump running partially or fully dry. Make sure enough pumped liquid is present at the suction side.
10		•	•								Increase speed if pumping thin liquid and at a high suction volume.
11		•				ullet					Reduce speed if pumping viscous liquid – danger of cavitation.
12						•					Check longitudinal joint pins, joint bush may be incorrectly installed.
13	•	•	•				•		•		Check for foreign objects in the pump, dismantle pump, remove foreign objects, replace defective parts.
14		•	•	•		•	•				Stator and rotor are worn: Dismantle pump, replace defective parts.
15		•	•			•	•				Joint parts (f, g) and/or stub shaft (b, c) are worn: Dismantle pump, replace defective parts.
16		•					•		•		Suction line partially or fully clogged.
17	•	•					•	•	•		Check temperature of pumped liquid. Stator expansion too great – stator stuck on rotor – stator may be burnt or swollen.
18	•	•					•		•		Solids content and/or grain size too great – reduce speed: Install sieve with permissible mesh width in front of pump.
19	•	•							•	•	Solids settle and harden when pump stops: Flush pump, disassemble and clean if necessary.
20	•	•					•		•	•	Liquid solidifies when temperature falls below a certain level – heat the pump.

Table 13 Table of remedies for disturbances

13 Certificate of non-objection

Die von uns, dem / Reparaturauftrag ge	der Unterzeichner / -in, egebene Pumpe und de	zusammen mit dies ren Zubehör,	er Unbedenklichkeits	bescheinigung in Ins	pektions- /			
Тур:			Lieferdatum:					
Artikel-Nr.:			- Auftrags-Nr.:					
Grund des Inspektio	ons- / Reparaturauftrage	s:	-					
		-						
	wurde nicht in gesund	heits- / umweltgefäh	rdenden Medien eing	jesetzt.				
	hatte als Einsatzgebie	t: -						
	und kam mit kennzeic	hnungspf ichtigen bz	w. schadstoffbehafte	ten Medien in Kontal	ĸt.			
	Letztes Fördermedium	n: _						
	Die Pumpe ist vor Vers	sand / Bereitstellung	sorgfältig entleert, so	owie außen und inne	n gereinigt worden.			
	Besondere Sicherheitsvorkehrungen sind bei der weiteren Handhabung nicht erforderlich.							
	Folgende Sicherheitsvorkehrungen hinsichtlich Spülmedien, Restfüssigkeit und Entsorgung sind erforderlich:							
	Wurde die Pumpe mit Sendung beilegen.	kritischen Medien b	etrieben bitte unbedir	ngt ein Sicherheitsd	atenblatt der			
Wir versichern, das Bestimmungen erfo	s die vorstehenden Ang lgt.	aben korrekt und vo	llständig sind, und de	r Versand gemäß de	n gesetzlichen			
Firma / Anschrift:				Telefon:				
				Telefax:				
Kunden-Nr.:			_					
Name Aussteller: (Druckbuchstaben)	_			Position:				
Datum:	F	Firmenstempel / Ur	terschrift:					

Fig. 36 Certificate of non-objection

14 Declaration according to EC Machinery Directive

Declaration of conformity according to EC Machinery Directive



Notice!

The following declaration contains no serial number and no signatures. The original declaration with identification of the document manager and the signatures is delivered with the associated pump.



CIRCOR	ALLWEILER®								
	EG-Konform EC Declaration Déclaration d gemäß / ac Maschinenrichtlinie Machinery Directive Directive 2006/	nitätserklärung on of Conformity e conformité CE c. to / d'après 2006/42/EG Anhang II A 2006/42/EC Annex II A 42/CE Annexe II A							
Hiermit erklären wi	r, / We hereby declare / Par la présente, no	us déclarons							
Allweiler GmbH, Pos	tfach 200123, 46223 Bottrop, Tel.	+49 (0)2045-966-60, Fax. +49 (0)2045 966-679							
dass die Maschine	/ that the machine / que le machin	e							
Ident Nr. / Ident no / Benennung / Desig Equipment Nr. / Eq Auftrag Nr. / Order	Ident Nr. / Ident no / N° d'ident:Benennung / Designation / Désignation:Equipment Nr. / Equipment no. / N° d'équipment:Auftrag Nr. / Order no. / N° de commande:								
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Maschinenrichtlinie (2006/42/EG) / Machinery Directive 200	6/42/EC / Directive 2006/42/CE relative aux machines							
Dokumentationsve technique	Dokumentationsverantwortlicher , person authorised to compile the technical file, la personne autorisée à constituer le dossier technique								
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Subject to technical changes!





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