Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

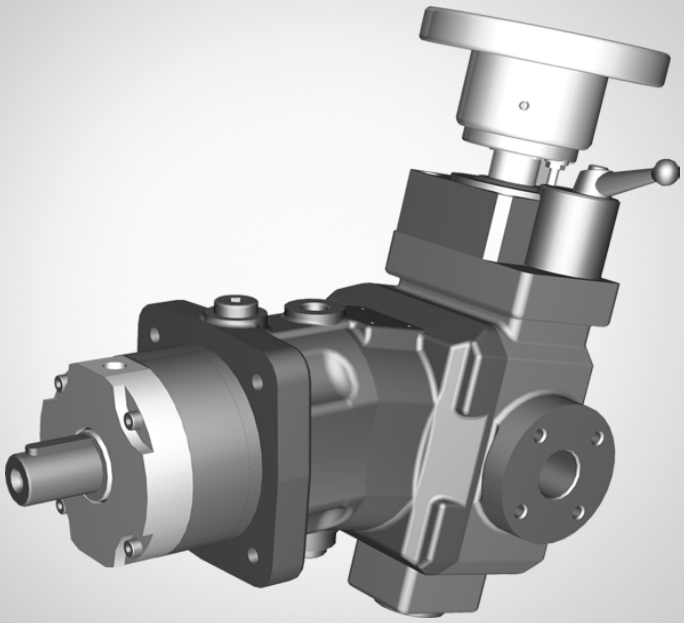
Rexroth
Bosch Group

Axial Piston Variable Pump
A7VK

Series 10

RE 94010-01-B/09.10
Replaces: 11.08
English

Instruction manual



The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

The cover shows an example application. The product delivered may differ from the image on the cover.

The original operating instructions were created in the German language.

Contents

1 About this document

This manual contains important information on the safe and appropriate installation, transport, commissioning, maintenance, removal and simple troubleshooting of the A7VK series 10 axial piston variable pump.

- Read this manual completely, especially chapter "2 General safety instructions" on page 6, before working with the A7VK axial piston variable pump.

1.1 Related documents

The A7VK axial piston variable pump is a system component. Also observe the manuals for the other system components.

Further information on the A7VK axial piston variable pump, its installation and operation can be found in the Rexroth documents listed in the following table.

Table 1: Related documents

Related documents	Contents
Order confirmation	Contains the preset technical data of your A7VK axial piston variable pump.
Installation drawing	Contains the outer dimensions, all connections and the hydraulic circuit diagram for your A7VK axial piston variable pump. The installation drawing can be requested from your responsible contact person at Rexroth.
Data sheet RE 94010	Contains the permissible technical data for the A7VK series 10 axial piston variable pump.

Also observe the generally applicable, legal or otherwise binding regulations of the European and national legislation and the rules for accident prevention and for environmental protection applicable in your country.

1.2 Abbreviations used

As an umbrella term for "A7VK axial piston variable pump", the designation "axial piston unit" will be used in the following.

As an umbrella term for "polyurethane components", which are intended for pumping through the A7VK axial piston variable pump, the designation "hydraulic fluid" will be used in the following.

Table 2: Abbreviations

Abbreviation	Meaning
A7VK	Axial piston variable pump for pumping polyurethane components
DIN	Deutsche Industrie Norm (German Institute for Standardization)
EC	European Community
EU	European Union
ISO	International Organization for Standardization
MA	Control, manual with handwheel
RE	Rexroth document in the English language
VDI 2230	Directive for the systematic calculation of high duty bolted joints and joints with one cylindrical bolt from the VDI (Verein Deutscher Ingenieure - Association of German Engineers)

2 General safety instructions

The axial piston unit has been manufactured according to the generally accepted rules of current technology. There is, however, still a danger of personal injury or damage to equipment if the following general safety instructions and the warnings before the steps contained in this manual are not complied with.

- Read this manual completely and thoroughly before starting work with the axial piston unit.
- Keep this manual in a location where it is accessible to all users at all times.
- Always include the instruction manual when you pass the axial piston unit on to third parties.

2.1 Intended use

Axial piston units are hydraulic components, meaning that in their application they are classified neither as complete nor as incomplete machines in the sense of the EU machine directive 2006/42/EC. A component is exclusively intended to form an incomplete or a complete machine together with other components. The component may only be commissioned after it has been installed in the machine/system for which it is intended.

The product is intended for the following use:

The axial piston unit is only approved for pumping polyurethane components (polyol and isocynate).

- Observe the technical data, application operating conditions and performance limits as specified in data sheet RE 94010 and in the order confirmation. Information about approved hydraulic fluids can be found in data sheet RE 94010.
- For other hydraulic fluids, consult with Rexroth Service (see chapter "9.5 Spare parts" for address).

The axial piston unit is only intended for professional use and not for private use.

Intended use includes having read and understood this documentation, especially chapter "2 General safety instructions".

2.2 Improper use

Any use other than that described as intended use shall be considered as improper and is therefore impermissible.

If unsuitable products are installed or used in applications that are of relevance to safety, unexpected operating conditions may occur in the application which could result in injury to persons or property damage. For this reason, products should only be used in safety-relevant applications if this usage is expressly specified and approved in the documents related to the product. For example, in ex-protection areas or in safety-related parts of a control system (functional safety).

Bosch Rexroth AG shall accept no liability whatsoever for damages resulting from improper use. The user shall bear all risks arising from improper use.

Similarly, the following predictable faulty usages are also considered to be not as intended:

- Using the axial piston unit in an explosive environment
- Pumping non-approved fluids as per the data sheet RE 94010, e.g. water.
- Modification of factory settings by non-authorized persons
- Using axial piston unit fittings (e.g. mountable filter, control unit, valves) for other applications
- Using the axial piston unit under water
- Using the axial piston unit in aircraft or space craft
- Using with a sustained pressure differential between exterior and interior pressure of more than 6 bar with the exterior pressure greater than the interior pressure (case pressure).
- Using the axial piston unit in an aggressive atmosphere
- Using outside the operating parameters approved in the data sheet (unless special approval has been granted)

2.3 Personnel qualifications

Installation, commissioning and operation, removal, care and maintenance require basic mechanical, hydraulic and electrical knowledge, as well as knowledge of the appropriate technical terms. For transporting and handling the product, additional knowledge is necessary with regard to working with a lifting device and the corresponding attachment equipment. In order to ensure operating safety, these activities may therefore only be performed by qualified personnel or an instructed person under the direction and supervision of qualified personnel.

Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant regulations pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area.

2.4 Safety instructions in this manual

In this manual, there are safety instructions before the steps whenever there is a danger of personal injury or damage to equipment. The measures described for danger prevention must be observed.

Safety instructions are structured as follows:

SIGNAL WORD! 	**Type of danger!** Consequences ▶ Precautions

- **Safety signs:** (warning triangle): draw attention to danger
- **Signal word:** identifies the degree of the danger
- **Type of danger:** identifies the type or source of the danger
- **Consequences:** describes what could occur if the safety instructions are not complied with
- **Precautions:** states how the danger can be avoided.

The signal words have the following meaning:

Signal word	Application
DANGER! 	Indicates a large, impending danger which, if not avoided, will certainly result in death or serious injury.
WARNING! 	Indicates a potential danger which, if not avoided, could result in death or serious injury.
CAUTION! 	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to equipment.
	If this information is disregarded, the operating procedure may be impaired.

2.5 Adhere to the following instructions

General instructions

- Observe the regulations for accident prevention and environmental protection for the country where the product is used and at the workplace.
- Only use Rexroth axial piston units in good technical order and condition.
  - Inspect the product for obvious defects.

- Do not modify or convert the axial piston unit.
- Use the product only within the performance range provided in the technical data.
- Persons who install, commission, operate, remove or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to respond.
- The warranty applies only to the delivered configuration.
- The warranty is rendered void if the product is incorrectly installed, commissioned or operated, as well as if not used as intended and/or handled improperly.
- Do not expose the product to any mechanical loads under any circumstances. Never use the product as a handle or step. Do not place/lay any objects on it.
- The noise emission of axial piston units depends on speed, operating pressure and installation conditions. The sound pressure level may rise above 70 dBA during normal application conditions. This can cause hearing damage.
  - Always wear hearing protection while working in the vicinity of the operating axial piston unit.

- The axial piston unit may heat up so much during operation that you can burn yourself on it.
  - Allow the axial piston unit to cool down sufficiently before touching it.
  - Wear heat-resistant protective clothing, e.g. gloves.

- There is fire hazard when using highly inflammable hydraulic fluids.
  - Keep open flames and ignition sources away from the axial piston unit.
  - Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

- Contact with hydraulic fluids may cause health damage.
  - When working with hydraulic fluids, strictly observe the safety instructions provided by the hydraulic fluid manufacturer.

During transport
- Make certain that the lifting device has adequate lifting capacity. The weight can be found in chapter "5 Transport and storage".

During installation
- Before installation, make sure that all fluids have been removed from the axial piston unit to prevent mixing with the hydraulic fluid used in the system.
- Always switch the relevant part of the system so that it is non-pressurized before you install the product. Protect the system against being energized.
- Lay lines so that they cannot be damaged and no one can trip over them.
- Before commissioning, make sure that all hydraulic connections are leakproof and undamaged to prevent fluids and contaminants from penetrating the product
- When installing, provide for utmost cleanliness in order to prevent contaminants, such as welding beads or metal cuttings, from getting into the hydraulic lines and causing product wear or malfunctions.

During commissioning
- Make sure that all hydraulic connections and ports are occupied or plugged. Only commission a completely installed product.
- Before commencing series production, check that the hydraulic fluid, including any additives used, is fully compatible with the axial piston unit.

During cleaning
- Plug all openings with the appropriate protective equipment in order to prevent detergents from penetrating the system.
- When using solvents or detergents, compatibility is to be tested in advance or clarified with the service personnel.
- Do not point the power washer at sensitive components, e.g. the shaft seal.

During maintenance and repair
- Perform the prescribed maintenance work at the intervals specified in the instruction manual (see chapter "9.3 Maintenance").
- Make certain that no lines, connections or components are disconnected as long as the system is under pressure. Protect the system against being energized.

During disposal
- Dispose of the product and the hydraulic fluid in accordance with the currently applicable national regulations in your country.

2.6 Operator's obligations

The operator of the Rexroth axial piston unit must provide personnel training on a regular basis regarding the following subjects:

- Observation and use of the instruction manual and the legal regulations
- Intended use and operation of the axial piston unit
- Observation of the instructions from the factory security offices and of the work instructions from the operator

3 Delivery contents

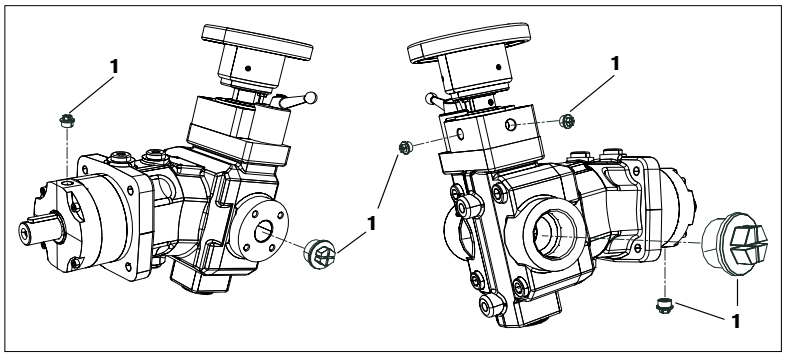


Fig. 1: Axial piston unit A7VK open-design, clockwise rotation

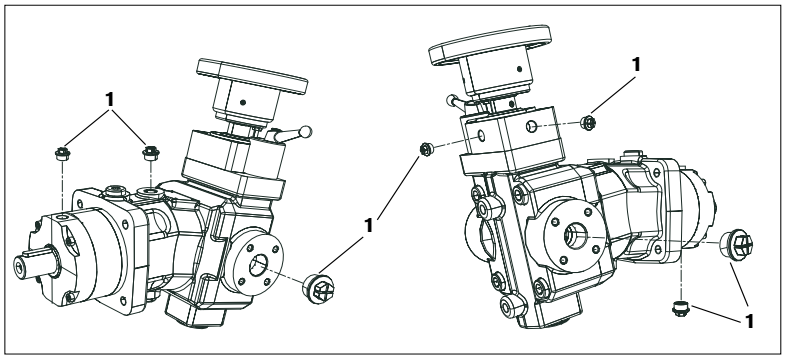


Fig. 2: Axial piston unit A7VK closed design

Included in the delivery contents are:

- 1 axial piston unit

The following parts are also installed on delivery:

- Seal screws (**1**)

4 Product description

CAUTION!

Risk of damage!

The use of additives in the hydraulic fluid may affect the service life of the axial piston unit.

- Before commencing series production with the axial piston unit, the customer should check that the hydraulic fluid, including any additives used, is fully compatible with the axial piston unit.

4.1 Performance description

The axial piston unit generates and meters a hydraulic fluid flow. It is approved for pumping polyurethane components (polyol and isocynate, referred to in the following as hydraulic fluid).

Refer to the data sheet and order confirmation for the technical data, operating conditions and operating limits of the axial piston unit RE 94010.

4.2 Device description

The A7VK is an axial piston variable pump of bent-axis design. There is an open design and a closed design. Flow is proportional to drive speed and displacement. The displacement can be steplessly varied by adjusting the tilted-axle drive.

Open design With the open design, the hydraulic fluid, which is under no or only low admission pressure, flows from the reservoir to the hydraulic pump and is pumped from there to the consumer, e.g. mixing head. Optional pressure safeguarding is via a high-pressure relief valve mounted at the pressure outlet. Depending on the direction of rotation (counter-clockwise or clockwise), there is a high-pressure and a low-pressure side.

Closed design With the closed design, the hydraulic fluid, which is under an increased admission pressure, flows to the hydraulic pump and is pumped from there to the consumer, e.g. mixing head. Optional pressure safeguarding is via a high-pressure relief valve mounted at the pressure outlet. Depending on the direction of rotation (counter-clockwise or clockwise), there is a high-pressure and a low-pressure side (inlet from the reservoir).

4.2.1 Assembly of the axial piston unit

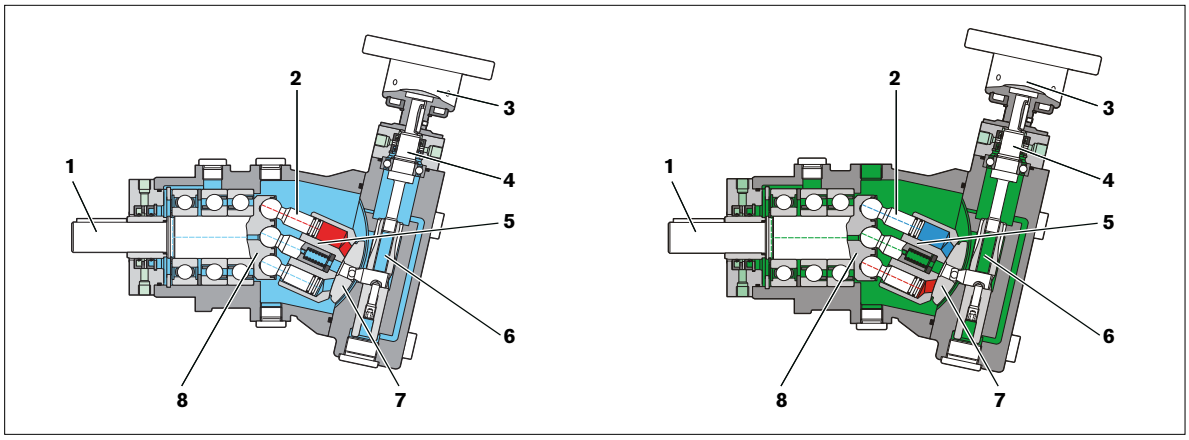


Fig. 3: Assembly of the A7VK series 10, left-hand illustration – open design, right-hand illustration – closed design

1 Drive shaft
2 Tapered pistons
3 Handwheel with position indicator
4 Adjustment spindle
5 Cylinder
6 Stroke piston
7 Lens plate
8 Drive flange

For axial piston units of bent-axis design, the tapered pistons (**2**) are arranged at an angle to the drive shaft (**1**). When the drive shaft is turned, the cylinder (**5**) is picked up and set into motion cardan-free by the tapered pistons, which are flexibly connected to the drive flange (**8**). The tapered pistons execute a stroke within the cylinder, whose amplitude depends on the swivel angle (angle of tilt) of the bent axis.

4.2.2 Functional description

Pump

By turning the drive shaft (**1**), the cylinder (**5**) is set into motion by the tapered pistons (**2**) arranged in a ring on the drive flange (**8**). The cylinder then glides over the spherical lens plate (**7**), in which two kidney-shaped control slots have been incorporated. As they turn, each of the tapered pistons moves from top to bottom dead center and back, executing a stroke that depends on the swivel angle. On the low-pressure side, fluid flows into the enlarging piston chamber. At the same time, on the pressure side the fluid is pushed out of the cylinder chamber into the system by the pistons. The tapered pistons are braced against the drive shaft by the load of the hydraulic pressure. The variable pump pumps polyurethane components (polyol or isocynate) to the consumer, e.g. mixing head.

High-pressure safety device (optional)

A safety mechanism to prevent the maximum permissible pressure from being exceeded should generally be provided in the system (high-pressure safety device).
Optionally, the axial piston unit can be supplied with a high-pressure relief valve mounted on the pressure outlet.

Control

Turning the handwheel (**3**), which controls the swivel angle, steplessly adjusts the angle of the tilted-axle drive and thus the displacement in the range from $V_{g\,0}$ to $V_{g\,max}$. Turning the handwheel clockwise results in a reduction in displacement. Turning it counter-clockwise results in an increase in displacement.

A manual locking device, which is fitted as standard equipment, prevents unintentional adjustment.

Position indicator

The position indicator is integrated in the handwheel.

Further information on the control and position indicator can be found in data sheet RE 94010.

4.3 Product identification

The axial piston unit can be identified from the name plate. The following example shows an A7VK name plate:

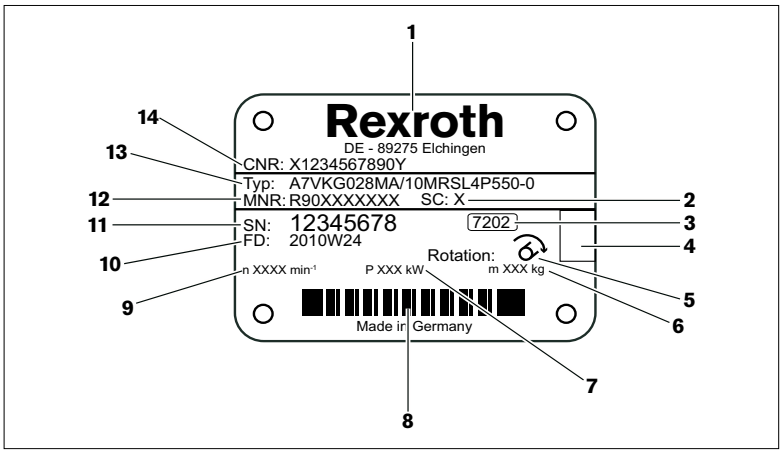


Fig. 4: Name plate A7VK

1 Manufacturer
2 Sample category (optional)
3 Internal plant designation
4 Specified area for test stamp
5 Direction of rotation (viewed from drive shaft) – here: clockwise
6 Weight (optional)
7 Power
8 Barcode
9 Rotational speed
10 Production date
11 Serial number
12 Material number of the axial piston unit
13 Ordering code
14 Customer material number

5 Transport and storage

5.1 Transporting the axial piston unit

CAUTION!

Risk of damage!

Striking or impulsive forces could damage the axial piston unit.

- Do not strike the coupling or drive shaft of the axial piston unit.
- Do not set/place the axial piston unit on the drive shaft.
- Do not strike sensitive fittings (e.g. sensors or valves).
- Do not strike sealing surfaces (e.g. service line ports).

Axial piston units can be transported with a forklift truck or with a lifting device.

- Make certain that the forklift truck or lifting device has adequate lifting capacity.

Dimensions and weights

Table 3: Dimensions and weights

Size		12	28
Weight	kg	11.7	22.1
Width	mm	The dimensions vary with the unit type. The values applicable for your axial piston unit can be found in the installation drawing (request if necessary).	
Height	mm		
Depth	mm		

The weight specifications may vary depending on the unit type.

Carrying the axial piston unit

The size 12 axial piston unit weighs approximately 11.7 kg and can be transported by hand if necessary.

- Never carry the axial piston unit holding it by the handwheel or the clamping bracket.

Axial piston units heavier than 15 kg (size 28) must be transported using a lifting device.

CAUTION!

Risk of personal injury and property damage!

Carrying the axial piston unit by the handwheel or clamping bracket can cause property damage. When the axial piston unit is being carried, it could slip out of your hands, causing injury and damage to equipment.

- Never carry the axial piston unit holding it by the handwheel or the clamping bracket.
- Axial piston units heavier than 15 kg (size 28) must be transported using a lifting device.

5.1.1 Transporting with lifting device

For transporting, the axial piston unit can be connected to a lifting device via a ring screw or a lifting strap.

Transport with ring screw

The drive shaft can be used to transport the axial piston unit as long as only outward (pulling) axial forces occur. Thus, you can suspend the axial piston unit from the drive shaft.

- To do this, screw a ring screw completely into the thread on the drive shaft. The thread sizes is stated in the installation drawing.
- Make sure that each ring screw can bear the total weight of the axial piston unit plus approx. 20%.

You can hoist the axial piston unit as shown in Fig. 5 with the ring screw screwed into the drive shaft.

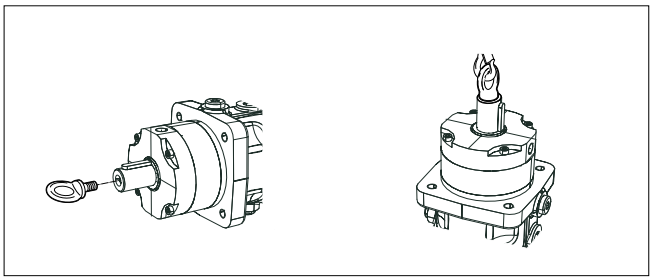


Fig. 5: Fixing the ring screw

Transport with lifting strap

- Place the lifting strap around the axial piston unit in such a way that it passes over neither the attachment parts (e.g. valves) nor such that the axial piston unit is hung from attachment parts (handwheel or clamping bracket) (see Fig. 6).

WARNING!

Risk of injury!

During transport with lifting device, the axial piston unit could fall, causing injury, when parts (handwheel, clamping bracket) are being attached or the unit is being tipped from the lifting strap.

- Use the widest possible lifting strap.
- Make sure that the axial piston unit is securely fixated with the lifting strap.
- Never fix the lifting strap to the handwheel or the clamping bracket.
- Only guide the axial piston unit by hand for fine positioning and to avoid oscillations.
- Never stand under or put you hands under suspended loads.

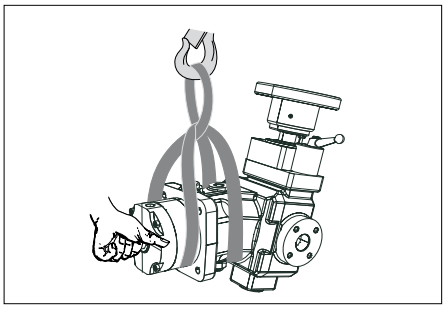


Fig. 6: Transport with lifting strap

5.2 Storing the axial piston unit

Requirement

- The storage areas must be free from corrosive materials and gasses.
- The storage areas must be dry.
- Ideal storage temperature: +5 °C to +20 °C
- Minimum storage temperature: -50 °C.
- Maximum storage temperature: +60 °C.
- Avoid intense lights.
- Do not stack axial piston units and store them shock-proof.
- Do not store the axial piston unit on sensitive attachment parts.
- For other storage conditions, see Table 4.

► Check the axial piston unit monthly to ensure proper storage.

After delivery

The axial piston units are provided ex-works with corrosion protection packaging (corrosion protection film).

Listed in the following table are the maximum permissible storage times for an originally packed axial piston unit.

Table 4: Storage time with factory corrosion protection

Storage conditions	Standard corrosion protection	Long-term corrosion protection
Closed, dry room, uniform temperature between +5 °C and +20 °C. Undamaged and closed corrosion protection film.	Maximum 12 months	Maximum 24 months

The warranty is rendered void if the requirements and storage conditions are not adhered to or after expiry of the maximum storage time (see Table 4).

Procedure after expiration of the maximum storage time:

1. Check the entire axial piston unit for damage and corrosion prior to installation.
2. Check the axial piston unit for proper function and leaks during a test run.
3. If the storage time exceeds 24 months, the shaft seal must be replaced.

After expiry of the maximum storage time, we recommend that you have the axial piston unit inspected by your responsible Rexroth Service partner.

In the event of questions regarding repair and spare parts, contact your responsible Rexroth Service partner or the service department of the manufacture's plant for the axial piston unit, see chapter "9.5 Spare parts" for further information.

After removal

If a dismounted axial piston unit is to be stored, it must be preserved against corrosion for the duration of the storage.

If a removed axial piston unit has to be put into storage, it must be properly cleaned prior to a new preservation (depending on the hydraulic fluid used). If necessary, consult with Rexroth Service (see chapter "9.5 Spare parts" for address).

Rexroth recommends the following procedure for preserving (following professional cleaning).

4. For storage time up to 12 months: Moisten the inside of the axial piston unit with mineral oil and fill with approx. 100 ml mineral oil.
   For storage time up to 24 months: Fill the axial piston unit with corrosion protection medium VCI 329 (20 ml).
   Fill via case drain port "**T_1**" or "**T_2**“,
   see chapter "6.4 Installing the axial piston unit", Fig. 11 to 13.
5. Seal all ports airproof.
6. Moisten the corrosion-prone surfaces of the axial piston unit with mineral oil or a suitable, easily removed corrosion protection agent, e.g. acid-free grease.
7. Package the axial piston unit airproof together with desiccant in corrosion protection film.
8. Store the axial piston unit so that it is protected against jolts. Further conditions for storage can be found at the start of this section.

6 Installation

Prior to installation, the following documents must be available:

- Installation drawing for axial piston unit (can be obtained from your responsible contact person at Rexroth)
- Hydraulic circuit diagram for the axial piston unit (in the installation drawing)
- Hydraulic circuit diagram for the system (available from the system manufacturer)
- Order confirmation (contains the preset data of the axial piston unit)
- Data sheet for the axial piston unit (contains the technical data)

6.1 Unpacking

The axial piston unit is delivered in a corrosion protection film made of polyethylene material (PE).

- ▶ Dispose of the packaging according to the national regulations of your country.

CAUTION!

Risk of parts falling out

If the packaging is not opened correctly, parts may fall out and damage the parts or even result in injury.

- ▶ Place the packaging on a flat and solid underground.
- ▶ Only open the packaging from the top.

6.2 Installation conditions

- The installation location and position of the axial piston unit essentially determine the procedures during installation and commissioning (such as when filling and air bleeding the axial piston unit).
- Correct filling and air bleeding is necessary to prevent damage to the axial piston unit and to maintain correct function.

- ▶ Observe all limits specified in the data sheet, e.g. temperature, viscosity, filter grade of the hydraulic fluid and direction of rotation.
- ▶ Make sure that the axial piston unit is air bled and filled with hydraulic fluid during commissioning and operation, and that the barrier fluid chambers are filled with suitable barrier fluid. This is also to be observed following relatively long standstill periods as the axial piston unit may empty via the hydraulic lines.

For monitoring the shaft seals for zero leakage, we recommend connecting a barrier fluid monitor at ports **U_1** to **U_4**. See also data sheet RE 94010.

Installation

- For the closed design, the case drain fluid in the case interior must be drained to the reservoir via the highest case drain port. Use the line size which is appropriate for the port. For the open design, a case drain line is not necessary.
- For the closed design, avoid the use of a check valve in the case drain line.
- To achieve favorable noise values, decouple all connecting lines from all vibration-capable components (e.g. reservoir) using elastic elements.
- For the closed design, make certain that the case drain lines flow into the reservoir below the minimum fluid level in all operating conditions.
- Make sure that a minimum pressure of 1.0 bar absolute is present at the service line port during operation and on cold starts in all installation positions and installation locations for the axial piston pump. See data sheet for additional values.

To prevent cavitation, we recommend monitoring the pressure in the feed line with a pressure gauge. The filling pressure is to be calculated for the system in question. The permissible values are available in data sheet RE 94010.

- Utmost cleanliness is required. The axial piston unit must be installed in a clean condition. Contamination of the hydraulic fluid can have a considerable impact on the function and service life of the axial piston unit.
- Do not use any cotton waste or linty cloths for cleaning.
- Use suitable liquid detergents to remove lubricants and other difficult-to-remove contamination. Detergents must not penetrate the hydraulic system.

CAUTION!

Risk of damage due to lack of lubrication!

Sufficient lubrication must be guaranteed to prevent damage to the axial piston unit.

- During installation, make certain that the axial piston unit is adequately supplied with hydraulic fluid in all installation positions and installation locations while in operation and on cold starts (e.g. no air intrusions).
- Completely bleed air from the axial piston unit prior to commissioning.
- During commissioning and during operation, the feed line must be filled with hydraulic fluid.

CAUTION!

Risk of damage by hydraulic fluid loss!

With unfavorable installation situations, the case interior may drain via the case drain line after longer standstill periods (air enters via the shaft seal) or via the service line (gap leakage). The bearings are thus insufficiently lubricated when the pump is restarted.

- Check the hydraulic fluid level in the case interior regularly; if necessary, recommission.

6.3 Installation position

The following installation positions are permissible.

Other installation positions are possible after consulting with your responsible Rexroth Service contact.

Preferred installation position: drive shaft horizontal.

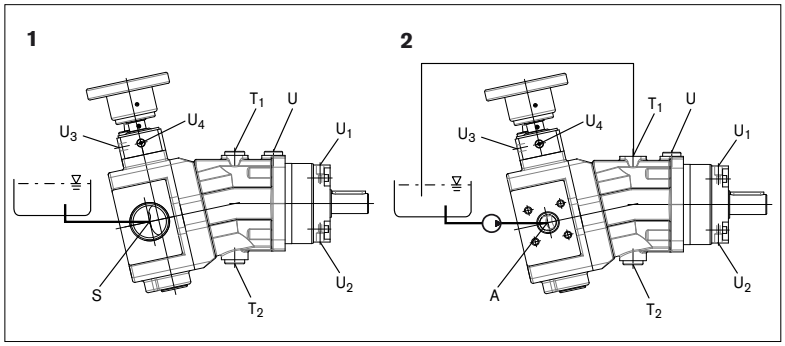


Fig. 7: Installation position 1: open design, installation position 2: closed design

T_1/T_2	Filling /air bleeding case drain port	**U**	Bearing flushing
S	Suction / fill port	**U_1 to U_4**	Barrier fluid port
A	Service line port		

Table 5: Filling and air bleeding

Installation position	Air bleeding	Filling
1 (open design)	**T_1**	**S**
2 (closed design)	**T_1**	**T_1**

6.4 Installing the axial piston unit

DANGER!

Systems which are in operation pose a risk of injury!

Working on operating systems poses a danger to life and limb. The work steps described in this chapter must only be performed on systems which are at a standstill. Before beginning work:

- Ensure that the engine cannot be switched on.
- Ensure that all power-transmitting components and connections (electric, pneumatic, hydraulic) are switched off according to the manufacturer's instructions and are secured against being switched on again. If possible, remove the main fuse for the system.
- Ensure that the system is completely hydraulically relieved and depressurized. Please follow the system manufacturer's instructions.
- Only qualified personnel (see chapter "2.3 Personnel qualifications") are authorized to install the axial piston unit.

6.4.1 Preparation

1. Check the delivery contents for completeness and transport damages.
2. Compare the material number and designation (ordering code) with the details in the order confirmation.

If the material number for the axial piston unit does not correspond to the one in the order confirmation, contact Rexroth Service for clarification, see chapter "9.5 Spare parts" for address.

3. Before installing, drain the axial piston unit to prevent mixing with the hydraulic fluid used in the system (see chapter "7.1.4 Performing flushing cycle").
4. Check the direction of rotation of the axial piston unit (on the name plate) and make sure that this corresponds to the direction of rotation of the engine.

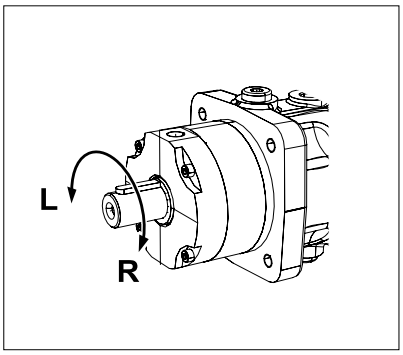


Fig. 8: Direction of rotation

L Counter-clockwise

R Clockwise

The direction of rotation as specified on the name plate determines the direction of rotation of the axial piston unit as viewed on the drive shaft. For information on the direction of rotation of the engine, please refer to the engine manufacturer's instruction manual.

6.4.2 Dimensions

The installation drawing contains the dimensions for all connections and ports on the axial piston unit. Also observe the manuals provided by the manufacturers of the other components when selecting the required tools.

6.4.3 General instructions

During installation and removal of the axial piston unit, observe the following general instructions and handling instructions:

- ▶ Fix the axial piston unit so that the expected forces and torques can be transferred without any danger.

WARNING!

Risk of damage!

Striking or impulsive forces could damage the axial piston unit.

- ▶ Do not strike the coupling or drive shaft of the axial piston unit.
- ▶ Do not set/place the axial piston unit on the drive shaft.
- ▶ Do not strike sensitive fittings (e.g. sensors or valves).
- ▶ Do not strike sealing surfaces (e.g. service line ports).

How to install the axial piston unit depends on the connecting elements to the drive side. The following descriptions explain the installation of the axial piston unit:

- with a coupling
- on an engine

6.4.4 Installation with coupling

How to install the axial piston unit with a coupling is described in the following:

1. Install the specified coupling half onto the drive shaft of the axial piston unit according to the instructions of the coupling manufacturer.

The drive shaft of the axial piston unit is equipped with a threaded bore. Use this threaded bore to pull the coupling element onto the drive shaft. Refer to the installation drawing for the dimensions of the threaded bore.

2. Make certain that the installation location is clean and free from dirt and contaminants.
3. Clamp the coupling hub onto the drive shaft or ensure permanent lubrication of the drive shaft. This prevents the formation of frictional corrosion and the associated wear.
4. Transport the axial piston unit to the installation location.
5. Install the coupling onto the input according to the instructions of the coupling manufacturer.

The axial piston unit must not be tightened down until the coupling has been correctly installed.

6. Fix the axial piston unit at the installation location.
7. If necessary, details on the required tools and tightening torques for the fixing screws are available from the machine or system manufacturer.
   - For bell housing installation, check the coupling axial play through the bell window according to the manufacturer's instructions.
   - For flange installation, align the support for the axial piston unit with the input.
8. When using flexible couplings, check that the input is free of resonance after completing the installation.

6.4.5 Installation on an engine

How to install the axial piston unit on an engine is described in detail in the following:

After installing on an engine, the axial piston unit is covered and is difficult to access:

- Therefore, before installing, make sure that the centering spigot centers the axial piston unit (observe tolerances) and that no axial or radial forces act on the drive shaft of the axial piston unit (installation length).
- Protect the spline of the drive shaft from frictional corrosion by providing permanent lubrication.

6.4.6 Completing installation

1. Remove any mounted transport screws.
2. Remove the transport protection.
   The axial piston unit is delivered with protective covers and seal screws. These must be removed before connecting. Use appropriate tools.
3. Make certain that the sealing and functional surfaces are not damaged.

Ports that are intended for connecting lines are provided with protective covers and seal screws, which serve as transport protection. If no connection is made, these ports must be plugged with a suitable metal locking screw, since the seal screw is not pressure-proof.

CAUTION!

Risk of personal injury and property damage!

Operating the axial piston unit with seal screws can result in injuries or damage to the axial piston unit.

- Before commissioning, remove all seal screws and replace them with suitable, pressure-proof, metal locking screws.

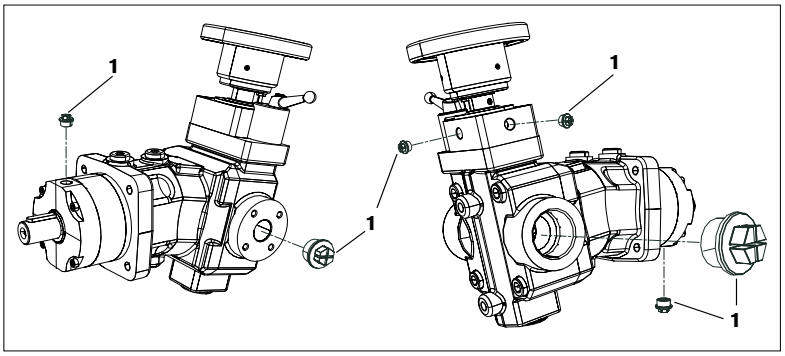


Fig. 9: Remove the transport protection, A7VK open design, clockwise rotation

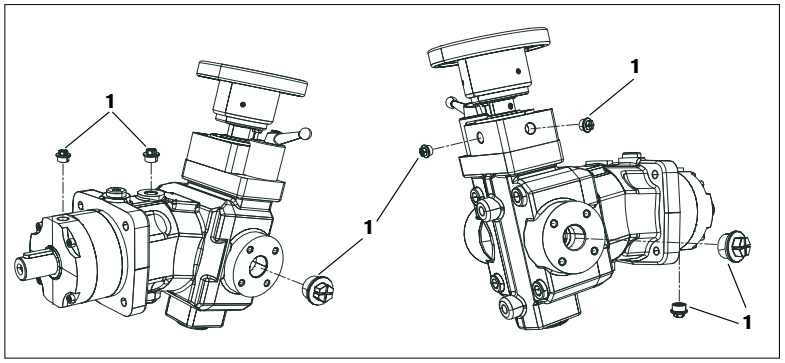


Fig. 10: Remove transport protection, A7VK closed design

1 Seal screws

6.4.7 Hydraulically connecting the axial piston unit

The machine or system manufacturer is responsible for dimensioning the lines. The axial piston unit must be connected to the rest of the hydraulic system in accordance with the hydraulic circuit diagram of the machine or system manufacturer.

CAUTION!

Risk of damage!

Hydraulic lines and hoses that are installed under stress create additional mechanical forces during operation which reduce the service life of the axial piston unit and the entire machine or system.

- Install hydraulic lines and hoses without mechanical stress.

CAUTION!

Risk of damage!

For axial piston pumps, a minimum permissible filling pressure at the service line port (closed design) or port **S** (open design) is generally specified for all installation positions. If the minimum filling pressure at the service line port or port **S** drops below the specified values, damage may occur which may lead to destruction of the axial piston pump.

- Make certain that the necessary filling pressure is not undercut. This is influenced by:
  - a suitable fill pump
  - the piping (e.g. suction cross-section, pipe diameter, length of feed line)
  - the position of the reservoir or reservoir charging
  - the viscosity of the hydraulic fluid
  - if fitted, a filter cartridge or check valve in the feed line (regularly check the level of soiling of the filter cartridge)

Only connect suitable hydraulic lines to the service and function ports.

CAUTION!

Wear and malfunctions!

The cleanliness of the hydraulic fluid has a considerable impact on the cleanliness and service life of the hydraulic system. Any contamination of the hydraulic fluid leads to wear and malfunctions. In particular, contaminants, such as welding beads or metal cuttings in the hydraulic lines, may damage the axial piston unit.

- Utmost cleanlinessis required.
- The axial piston unit must be installed in a clean condition.
- Make certain that all ports, hydraulic lines and add-on units (e.g. measuring equipment) are clean.
- Make certain that no contaminants enter when sealing the ports.
- Make certain that no detergents enter the hydraulic system.
- Do not use any cotton waste or linty cloths for cleaning.
- Do not use hemp as a sealant under any circumstances.

Notes on routing the lines

Observe the following notes when routing the inlet, pressure and case drain lines.

- Make certain that the feed line (pipe or hose) is as short and straight as possible.
- The line cross section of the feed line is to be dimensioned so that the minimum permissible pressure at the service line port or port **S** is not undercut and the maximum permissible pressure is not exceeded.
- Be certain that the design of all junctions is air tight and that the pressure capability of all hoses meet specifications, also with respect to the external air pressure.
- With the pressure lines, make certain that the pipes, hoses and connecting elements are approved for the operating pressure range.
- For the closed design, always route the case drain lines so that the case is constantly filled with hydraulic fluid and air bled and to prevent air from entering at the shaft seal even during extended standstill periods. The case internal pressure must not exceed the maximum values listed for the axial piston unit in the data sheet under any operating conditions. The case drain line in the reservoir must end up below the minimum fluid level under all conditions (see chapter "6.3 Installation position").

The ports and fixing threads are designed for the maximum pressure specified in the data sheet. The machine or system manufacturer must ensure that the connecting elements and lines correspond to the specified application conditions (pressure, flow, hydraulic fluid, temperature) with the necessary safety factors.

Procedure

To connect the axial piston unit to the hydraulic system:

1. Remove the locking screws at the ports at which the connections are to be made according to the hydraulic circuit diagram.
2. Only use clean hydraulic lines or rinse out the hydraulic system with a flushing unit before commissioning. Follow the instructions of the flushing unit manufacturer.
3. Connect the lines according to the hydraulic circuit diagram.
   Either pipes or hoses must be connected to all ports according to the installation drawing and machine or system circuit diagram or the ports plugged using suitable locking screws.

The installation drawing contains the dimensions for all connections and ports on the axial piston unit. Also observe the manuals provided by the manufacturers of the other hydraulic components when selecting the required tools.

4. Make certain that the union nuts on the fittings and flanges are tightened correctly (observe the manufacturer's tightening torques!). Mark all checked fittings using e.g. a permanent marker pen.
5. Make certain that the pipes and hose lines and every combination of connecting piece, coupling or connecting point with hoses or pipes have been inspected by a technically qualified person for safe working condition.

Installation

Port overview

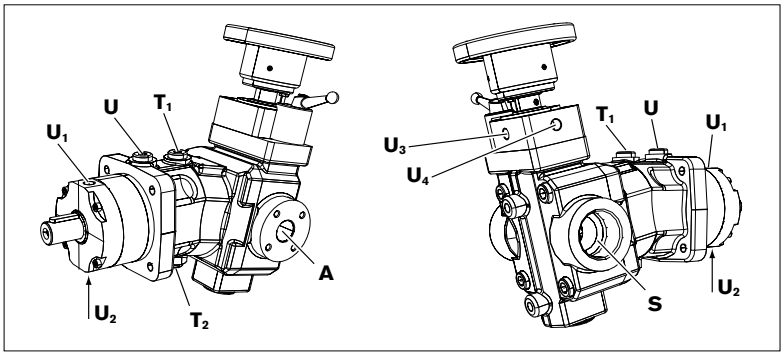


Fig. 11: A7VK port overview, open design, clockwise rotation

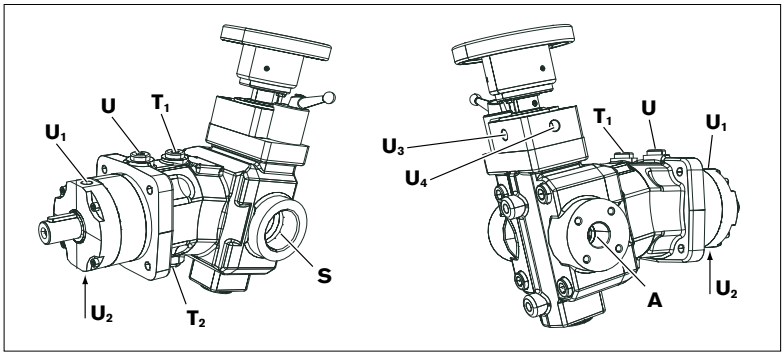


Fig. 12: A7VK port overview, open design, counter-clockwise rotation

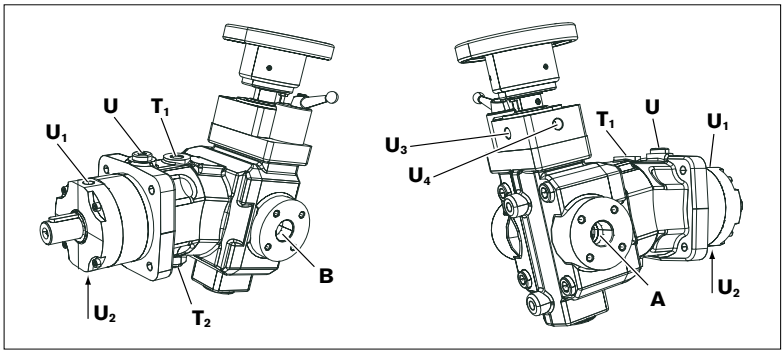


Fig. 13: A7VK port overview, closed design

Table 6: Ports, A7VK series 10

Designation	Port for	Standard	Maximum pressure [bar][1]	State
A[3]	Service line	DIN 3852[2]	Clockwise: 30 Counter-clockwise: 315	O
B[3]	Service line	DIN 3852[2]	Clockwise: 315 Counter-clockwise: 30	O
A[4]	Service line	DIN 3852[2]	315	O
S[4]	Suction / fill line	DIN ISO 228[2]	6	O
T_1	Case drain fluid	DIN 3852[2]	6	O[5]
T_2	Case drain fluid	DIN 3852[2]	6	X[5]
U	Bearing flushing	DIN 3852[2]	6	X
U_1, U_2	Barrier fluid	DIN 3852[2]	3[6]	O
U_3, U_4	Barrier fluid	DIN 3852[2]	3[6]	O

[1] Short-term pressure spikes may occur depending on the application. Keep this in mind when selecting measuring equipment and fittings.

[2] The countersink may be deeper that specified in the standard.

[3] Closed design only.

[4] Open design only.

[5] Depending on installation position, "T_1" or "T_2" must be connected for the closed design (see chapter "6.3 Installation position"). With the open design, a case drain line is not necessary, "T_1" and "T_2" are plugged.

[6] The minimum case pressure must be equal to or greater than the barrier fluid pressure. In addition, the barrier fluid pressure must be equal to or greater than the external pressure on the outer shaft seal.

O = Must be connected (plugged on delivery)

X = Plugged (in normal operation)

Tightening torques

The following tightening torques apply:

- Threaded hole of the axial piston unit:
  The maximum permissible tightening torques $\mathbf{M}_{G\,max}$ are maximum values of the threaded holes and must not be exceeded. For values, see the following table.
- Fittings:
  Observe the manufacturer's instruction regarding the tightening torques of the used fittings.
- Fixing screws:
  For fixing screws according to DIN 13/ISO 68, we recommend checking the tightening torque in individual cases as per VDI 2230.
- Locking screws:
  For the metallic locking screws supplied with the axial piston unit, the required tightening torques of locking screws $\mathbf{M}_V$ apply. For values, see the following table.

Fig. 14: Table 7: Tightening torques of the internal threaded holes and locking screws

Ports		Maximum permissible tightening torque of the threaded holes $M_{G\,max}$	Required tightening torque of the locking screws M_V	Size of hexagon socket for the locking screw
Standard	Thread size			
DIN 3852	M10 x 1	30 Nm	12 Nm	5 mm
	M12 x 1.5	50 Nm	25 Nm	6 mm
	M16 x 1.5	100 Nm	50 Nm	8 mm
	M18 x 1.5	140 Nm	60 Nm	8 mm
	M22 x 1.5	210 Nm	80 Nm	10 mm
	M27 x 2	330 Nm	135 Nm	12 mm
DIN ISO 228	G1 1/4	720 Nm	–	–
	G1 1/2	960 Nm	–	–

Installation

Risk of mix-ups with threaded connections

The axial piston units are used in application areas with metric as well as with Imperial systems of units.

Both the system of units and the size of threaded hole and threaded plug (e.g. locking screw) must match.

Due to the limited options for visually detecting differences, there is a risk of mix-ups.

WARNING!

Risk of personal injury and property damage!

If a threaded plug which is of a different measurement system and size with respect to the threaded hole is pressurized, the threaded plug may loosen itself or even be ejected from the hole in a projectile-like manner.
This can result in serious injury and damage to equipment. Hydraulic fluid can be discharged from this leakage point.

- Use the drawings (installation drawing/data sheet) to determine the required threaded plug for each fitting.
- Make certain that there are no mix-ups when installing fittings, fixing screws and locking screws.
- For all threaded holes, use a threaded plug from the same system of units and of the correct size.

7 Commissioning

WARNING!

Danger while working in the danger zone of a machine or system!

It is not permissible to work in the danger zone of a machine or system.

- The machine or system must only be operated if safe working is ensured.
- Pay attention to and rectify potential danger sources before operating the machine or system.
- Nobody may stand in the danger zone of the machine or system.
- The emergency stop button for the machine or system must be within the operator's reach.
- Always follow the instructions of the machine or system manufacturer during commissioning.

CAUTION!

Risk of personal injury and property damage!

Commissioning of the axial piston unit requires basic mechanical and hydraulic knowledge.

- Only qualified personnel (see chapter "2.3 Personnel qualifications") are authorized to commission the axial piston unit.

WARNING!

Risk of toxication and injury!

Contact with hydraulic fluids may cause health damage (e.g. eye injuries, skin damage, toxication upon inhalation).

- Always check the lines for wear and damage before each commissioning.
- While performing these checks, wear safety gloves, safety glasses and suitable working clothes.
- If hydraulic fluid should, nevertheless, come into contact with your eyes or penetrate your skin, consult a doctor immediately.
- When working with hydraulic fluids, strictly observe the safety instructions provided by the hydraulic fluid manufacturer.

WARNING!

Fire hazard!

There is fire hazard when using highly inflammable hydraulic fluids.

- Keep open flames and ignition sources away from the axial piston unit.
- Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

7.1 First commissioning

CAUTION!

Risk of damage to the product!

Any contamination of the hydraulic fluid leads to wear and malfunctions. In particular, contaminants, such as welding beads or metal cuttings in the hydraulic lines, may damage the axial piston unit.

- Ensure utmost cleanliness during commissioning.
- Make certain that no contaminants penetrate when plugging the gauge ports.

CAUTION!

Risk of damage to the product!

If you commission the axial piston unit without or with insufficient hydraulic fluid, the axial piston unit will be damaged immediately, possibly beyond repair.

- When commissioning or recommissioning a machine or system, make sure that the case interior and the feed and service lines of the axial piston unit are filled with hydraulic fluid and remain filled during operation

When commissioning the axial piston unit, observe the general safety instructions and notes about the intended use provided in chapter "2 General safety instructions".

- Connect the pressure gauge to the measurement points provided for operating pressure, case pressure and filling pressure to allow the technical data to be checked during initial operation.

7.1.1 Filling the axial piston unit

You will require a tested hydraulic fluid: The axial piston pump is approved for pumping polyurethane components (polyol and isocynate). For permissible temperatures, see the data sheet RE 94010.

CAUTION!

Risk of damage due to lack of lubrication!

Sufficient lubrication must be guaranteed to prevent damage to the axial piston unit.

- Check the hydraulic fluid level in the case interior regularly; if necessary, recommission. With unfavorable installation situations, the case interior may drain via the case drain line after longer standstill periods (air enters via the shaft seal) or via the service line (gap leakage). The bearings are thus insufficiently lubricated when the pump is recommissioned.
- Make certain that the feed line is always filled with hydraulic fluid during commissioning and operation.

If possible, fill the axial piston unit with a filling device. The axial piston unit must not be operated while it is being filled.

CAUTION!

Danger of environmental contamination!

The discharge or spillage of hydraulic fluid while filling the axial piston unit can lead to environmental pollution and contamination of the groundwater.

- When filling and changing the hydraulic fluid, always place a drip tray under the axial piston unit.
- Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

1. Fill and air bleed the axial piston unit via the appropriate ports, see chapter "6.3 Installation position". The hydraulic lines of the system must also be filled.
2. Test the direction of rotation of the engine. To do this, rotate the engine briefly at the lowest rotational speed (inching). Make sure that direction of rotation of the axial piston unit matches the details on the name plate, see also chapter "4.3 Product identification", Fig. 4: Name plate.
3. Operate the axial piston pump at the lowest speed (starter speed for combustion engines or inching operation for electric motors) until the pump system is completely filled and air bled. To inspect, drain the hydraulic fluid at the case drain port for the closed design and wait until it drains without bubbles.
4. Make certain that all ports are either piped up or plugged according to the general circuit diagram.

7.1.2 Testing the hydraulic fluid supply

The axial piston unit must always have a sufficient supply of hydraulic fluid. For this reason, the supply of hydraulic fluid must be ensured at the start of the commissioning process.

When you test the hydraulic fluid supply, constantly monitor the noise development and check the hydraulic fluid level in the reservoir. If the axial piston unit becomes louder (cavitation) or the case drain fluid is discharged with bubbles with the closed design, this is an indication that the axial piston unit is not being sufficiently supplied with hydraulic fluid.

Notes on troubleshooting can be found in chapter "14 Troubleshooting".

To test the hydraulic fluid supply:

1. Allow the engine to run at the lowest speed. The axial piston unit must be operated without load. Pay attention to leakage and noise.
2. For the closed design, check the case drain line of the axial piston unit here. The case drain fluid should not contain any bubbles.
3. Increase the load and check whether the operating pressure rises as expected.
4. Check the filling pressure at the service line port or port S of the axial piston pump. Refer to data sheet RE 94010 for the permissible value.
5. For the closed design, check the case drain pressure at connected port "**T_1**" or "**T_2**". Refer to data sheet RE 94010 for the permissible value.

7.1.3 Performing functional test

WARNING!

Risk of injury in case of incorrectly connected machine or system!

Interchanging the ports will cause malfunctions resulting in danger for persons and equipment.

- When connecting hydraulic components, observe the specified piping according to the hydraulic circuit diagram of the machine or system manufacturer.

Once you have tested the hydraulic fluid supply, you must perform a functional test on the machine or system. The functional test should be performed according to the instructions of the machine or system manufacturer.

- In particular, check whether the axial piston unit builds up pressure after the engine is started and that the case pressure does not rise to an impermissible level.
- If necessary, remove the pressure gauge and plug the ports so that they are airproof.

The axial piston unit is checked for functional capability before delivery according to the technical data. During commissioning, it must be ensured that the axial piston unit was installed in accordance with the design of the machine or system.

7.1.4 Performing flushing cycle

In order to remove foreign bodies from the system, Rexroth recommends a flushing cycle for the entire system.

During the flushing cycle, the axial piston unit must be operated without load. The flushing cycle can be performed, e.g. by using an additional flushing unit. Follow the instructions of the flushing unit's manufacturer for the exact procedure during the flushing cycle.

7.2 Recommissioning after standstill

Depending on the installation conditions and ambient conditions, changes may occur in the system which make recommissioning necessary.

Among others, the following criteria may make recommissioning necessary:

- Air in the hydraulic system
- Water in the hydraulic system
- Old hydraulic fluid
- Other contamination

- Before recommissioning, proceed as described in chapter "7.1 First commissioning".

7.3 Running-in phase

The bearings and sliding surfaces are subject to a running-in phase. The increased friction at the start of the running-in phase results in increased heat development which decreases with increasing operating hours. The volumetric and mechanical-hydraulic efficiency increases as well through the conclusion of the running-in phase of approx. 10 operating hours.

CAUTION!

Risk of damage by insufficient viscosity!

The increased temperature of the hydraulic fluid during the running-in phase can cause the viscosity to drop to an impermissible level.

- Monitor the operating temperature during the running-in phase.
- Reduce the loading (pressure, rpm) of the axial piston unit if impermissible operating temperatures and/or viscosities occur.

8 Operation

Use the product only within the performance range provided in the technical data. The machine or system manufacturer is responsible for the proper project planning of the hydraulic system and its control.

8.3.1 Adjusting the displacement

Turning the handwheel steplessly adjusts the displacement in the range from $V_{g\,0}$ to $V_{g\,max}$. Turning the handwheel clockwise in a reduction in displacement. Turning it counter-clockwise results in an increase in displacement.

A manual locking device, which is fitted as standard equipment, prevents unintentional adjustment. A position indicator is integrated in the handwheel. Additional information about this topic can be found in chapter "4 Product description".

No other adjustments or modifications are necessary.

9 Maintenance and repair

9.1 Cleaning and care

CAUTION!

Damage to the surface caused by solvents and aggressive detergents!

Aggressive detergents may damage the seals on the axial piston unit and cause them to age faster.

- Avoid the use of solvents or aggressive detergents.
- When using solvents or detergents, compatibility is to be tested in advance or clarified with the service personnel.

CAUTION!

Damage to the hydraulic system and the seals!

The water pressure of a power washer could damage the seals of the axial piston unit.

- Do not point the power washer at sensitive components, e.g. the shaft seal.

For cleaning and care of the axial piston unit, observe the following:

- Plug all openings with suitable protective caps/devices.
- Check that the ports are free of leaks to ensure that no moisture can penetrate the axial piston unit during cleaning.
- Only clean the axial piston unit with tested detergent.
- Remove any coarse dirt on the outside and keep sensitive components clean.

9.2 Inspection

In order to enable long and reliable operation of the axial piston unit, Rexroth recommends testing the hydraulic system and axial piston unit on a regular basis and documenting the following operating conditions:

Table 7: Inspection schedule

Tasks to be performed		Interval
Hydraulic system	Check level of hydraulic fluid in the reservoir.	continuous
	Check operating temperature (comparable load condition).	weekly
	Perform a hydraulic fluid analysis: viscosity, aging, contamination	as per specifications of hydraulic fluid manufacturer
Axial piston unit	Check barrier fluid level	continuous
	Check axial piston unit for external leakage. Early detection of hydraulic fluid loss can help to find faults on the machine or system and to rectify them. For this reason, Rexroth recommends that the axial piston unit and system always be kept in a clean condition.	daily
	Check axial piston unit for noise development.	daily
	Check fasteners for tight seating. All fasteners have to be checked when the system is switched off, non-pressurized and cooled down.	monthly

9.3 Maintenance

The axial piston unit is low maintenance when used as intended.

Changes in the case drain flow indicate wear in the axial piston unit. For this reason, for the closed design we recommend that the case drain quantity be measured and documented at regular intervals. This will enable unscheduled wear in the axial piston unit to be detected at an early stage and thus enable the cause to be rectified quickly.

9.4 Repair

Rexroth offers a comprehensive range of services for the repair of Rexroth axial piston units.

Repairs to the axial piston unit may only be performed by authorized, skilled and instructed personnel.

- Only use genuine spare parts from Rexroth for repairing the Rexroth axial piston units.
- Only send completely empty and cleaned axial piston unit back to Rexroth Service.

Tested and pre-installed original Rexroth assembly groups allow for successful repair requiring only little time.

9.5 Spare parts

CAUTION!

Danger of personal injury and damage to equipment due to faulty spare parts!

Spare parts that do not meet the technical requirements specified by Rexroth may cause personal injury or property damage.

- Use only original spare parts from Rexroth.

The spare parts lists for axial piston units are order specific. When ordering spare parts, quote the material and serial number of the axial piston unit as well as the material numbers of the spare parts.

Address all questions regarding spare parts to your responsible Rexroth Service partner or the service department of the manufacture's plant for the axial piston unit.

Rexroth is obliged to supply spare parts to the system or equipment manufacturer.

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Fax +49-7308-72-74
service.elchingen@boschrexroth.de

For the addresses of foreign subsidiaries, please refer to
`www.boschrexroth.com/addresses`

10 Decommissioning

The axial piston unit is a component that does not require decommissioning. For this reason, this chapter of the manual does not contain any information.

For details about how to remove or replace your axial piston unit, please refer to chapter "11 Removal and replacement".

11 Removal and replacement

11.1 Required tools

Removal can be performed using standard tools. No special tools are necessary.

11.2 Preparing for removal

WARNING!

Risk of injury if removing under pressure!

If you do not switch off pressure before removing the product, you may get injured or the device or system components may be damaged.

- ▶ Make sure that the relevant system components are non-pressurized.

1. Decommission the entire system as described in the overall manual for the machine or system.
2. Relieve the hydraulic system according to the instructions of the machine or system manufacturer.

11.3 Removing the axial piston unit

Proceed as follows to remove the axial piston unit:

1. Make sure that the hydraulic system is non-pressurized.
2. Check whether the axial piston unit has cooled down far enough so that it can be removed without danger.
3. Place a drip tray under the axial piston unit to collect any hydraulic fluid that may escape.

WARNING!

Risk of toxication and injury!

Contact with hydraulic fluids may cause health damage (e.g. eye injuries, skin damage, toxication upon inhalation).

- ▶ While performing these checks, wear safety gloves, safety glasses and suitable working clothes.
- ▶ If hydraulic fluid should, nevertheless, come into contact with your eyes or penetrate your skin, consult a doctor immediately.
- ▶ When working with hydraulic fluids, strictly observe the safety instructions provided by the hydraulic fluid manufacturer.

CAUTION!

Danger of environmental contamination!

The discharge or spillage of hydraulic fluid while removing the axial piston unit can lead to environmental pollution and contamination of the groundwater.

- ► When draining the hydraulic fluid, always place a drip tray under the axial piston unit.
- ► Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

4. Loosen the lines and collect the escaping hydraulic fluid in the vessel.
5. Remove the axial piston unit. Use an appropriate lifting device.
6. Completely empty the axial piston unit.
7. Plug all openings.

11.4 Preparing the components for storage or further use

- ► Proceed as described in section "5.2 Storing the axial piston unit".

12 Disposal

Observe the following points when disposing of the axial piston unit:

1. Completely empty the axial piston unit.
2. Dispose of hydraulic fluid in compliance with the national regulations of your country and in accordance with the safety data sheet for the hydraulic fluid.
3. Remove the axial piston unit into its individual parts and properly recycle these parts.
4. Separate parts by:
   - Cast parts
   - Steel
   - Non-ferrous metal
   - Electronic waste
   - Plastic
   - Seals

12.1 Environmental protection

Careless disposal of the axial piston unit, the hydraulic fluid and the packaging material could lead to pollution of the environment.

- ▶ Therefore, dispose of the axial piston unit, the hydraulic fluid and the packaging material in accordance with the currently applicable regulations in your country.
- ▶ Dispose of hydraulic fluid residues according to the applicable safety data sheets for these hydraulic fluids.

13 Extension and conversion

Do not convert the axial piston unit.

The warranty from Rexroth only applies to the delivered configuration. In case of extensions or conversions, the warranty will become void.

14 Troubleshooting

The following tables may assist you in troubleshooting. The tables make no claim for completeness.

In practical use, problems which are not listed here may also occur.

14.1 How to proceed for troubleshooting

- Always act systematically and targeted, even under pressure of time. Random and imprudent removal and changing of settings could result in the inability to ascertain the original error cause.
- First obtain a general overview of how your product works in conjunction with the entire system.
- Try to determine whether the product worked properly in conjunction with the entire system before the error occurred.
- Try to determine any changes of the entire system in which the product is integrated.
  - Were there any changes to the product's application conditions or operating range?
  - Were there any changes or repair works on the complete system (machine / system, electric works, control) or on the product? If yes, which?
  - Was the hydraulic fluid changed?
  - Were the product and machine used as intended?
  - How did the malfunction appear?
- Try to get a clear idea of the error cause. Directly ask the (machine) operator.
- If you cannot rectify the error, contact one of the contact addresses which can be found under:
  `www.boschrexroth.com/addresses`.

14.2 Malfunction table

Table 8: Malfunction table - A7VK variable pump

Malfunction	Possible cause	Remedy
Unusual noises	Drive speed too high.	Machine or system manufacturer.
	Wrong direction of rotation.	Ensure correct direction of rotation.
	Inadequate feed conditions, e.g. air in the feed line, insufficient diameter of the feed line, viscosity of the hydraulic fluid too high, filling pressure too low, contaminants in the feed line.	Machine or system manufacturer (e.g. optimize inlet conditions, use suitable hydraulic fluid).
		Completely air bleed axial piston unit, fill feed line with hydraulic fluid.
		Remove contaminants from the feed line.
	Improper fixing of the axial piston unit.	Check fixing of the axial piston unit according to the specifications of the machine or system manufacturer. Observe tightening torques.
	Improper fixing of the attachment parts, e.g. coupling and hydraulic lines.	Fix attachment parts according to the information provided by the coupling or fitting manufacturer.
	Malfunction of the pressure relief valves of the axial piston unit (boost pressure, high pressure).	Air bleeding the axial piston unit Check viscosity of the hydraulic fluid Contact Rexroth Service.
	Mechanical damage to the axial piston unit (e.g. bearing damage).	Exchange axial piston unit, contact Rexroth Service.
No or insufficient flow	Faulty mechanical input (e.g. defective coupling).	Machine or system manufacturer.
	Drive speed too low.	Machine or system manufacturer.
	Inadequate feed conditions, e.g. air in the feed line, insufficient diameter of the feed line, viscosity of the hydraulic fluid too high, filling pressure too low, contaminants in the feed line.	Machine or system manufacturer (e.g. optimize inlet conditions, use suitable hydraulic fluid).
		Completely air bleed axial piston unit, fill feed line with hydraulic fluid.
		Remove contaminants from the feed line.
	Hydraulic fluid not in optimum viscosity range.	Use suitable hydraulic fluid (machine or system manufacturer).
	Manual control device incorrectly set.	Check the adjustment of the handwheel and the position indicator. Pull locking lever tight.
	The value in the position indicator is not correct.	Check value of the indicator; while turning counter-clockwise, the stop must turn back to "0".
	Malfunction in axial piston unit control device.	Contact Rexroth Service.
	Wear of axial piston unit.	Exchange axial piston unit, contact Rexroth Service.
	Mechanical damage to the axial piston unit.	Exchange axial piston unit, contact Rexroth Service.

Table 8: Malfunction table - A7VK variable pump

Malfunction	Possible cause	Remedy
No or insufficient pressure	Faulty mechanical input (e.g. defective coupling).	Machine or system manufacturer.
	Drive power too low.	Machine or system manufacturer.
	Inadequate feed conditions, e.g. air in the feed line, insufficient diameter of the feed line, viscosity of the hydraulic fluid too high, filling pressure too low, contaminants in the feed line.	Machine or system manufacturer (e.g. optimize inlet conditions, use suitable hydraulic fluid).
		Completely air bleed axial piston unit, fill feed line with hydraulic fluid.
		Remove contaminants from the feed line.
	Hydraulic fluid not in optimum viscosity range.	Use suitable hydraulic fluid (machine or system manufacturer).
	Manual control device incorrectly set.	Check the adjustment of the handwheel and the position indicator. Pull locking lever tight.
	The value in the position indicator is not correct.	Check value of the indicator; while turning counter-clockwise, the stop must turn back to "0".
	Malfunction in axial piston unit control device.	Contact Rexroth Service.
	Wear of axial piston unit.	Exchange axial piston unit, contact Rexroth Service.
	Mechanical damage to the axial piston unit (e.g. bearing damage).	Exchange axial piston unit, contact Rexroth Service.
	Output unit defective (e.g. hydraulic motor or cylinder).	Machine or system manufacturer.
Pressure/flow fluctuations	Axial piston unit not or insufficiently air bled.	Completely air bleed axial piston unit.
	Inadequate feed conditions, e.g. air in the feed line, insufficient diameter of the feed line, viscosity of the hydraulic fluid too high, filling pressure too low, contaminants in the feed line.	Machine or system manufacturer (e.g. optimize inlet conditions, use suitable hydraulic fluid).
		Completely air bleed axial piston unit, fill feed line with hydraulic fluid.
		Remove contaminants from the feed line.
Hydraulic fluid temperature too high	Excessive inlet temperature at the axial piston unit.	Machine or system manufacturer: inspect system, e.g malfunction of the cooler, insufficient hydraulic fluid in the reservoir.
	Malfunction in pressure control valve (e.g. high-pressure relief valve).	Contact Rexroth Service.
	Wear of axial piston unit.	Exchange axial piston unit, contact Rexroth Service.
Instability/vibrations	Setpoint value not stable.	Machine or system manufacturer.
	Resonance in the case drain line.	Machine or system manufacturer.
	Malfunction of the control device.	Contact Rexroth Service.

15 Technical data

The technical data of your axial piston unit can be found in data sheet RE 94010.

The data sheet can be found on the internet at

www.boschrexroth.com/industrial-hydraulics-catalog

The preset technical data of your axial piston unit can be found in the order confirmation.

16 Appendix

16.1 Address directory

For the addresses of foreign subsidiaries, please refer to www.boschrexroth.com/addresses

17 Alphabetical index