



AROS Hydraulik GmbH

General Operating and Assembly Instructions for Hydraulic Cylinders



Allgemeine Betriebs- und
Montageanleitung für
Hydraulikzylinder



General Operating and
Assembly Instructions for
Hydraulic Cylinders

... we get things moving!

General Operating and Assembly Instructions for Hydraulic Cylinders

Contents

1.1	Validity and target group	3
1.1.1	Staff qualifications	3
1.2	Symbols.....	4
2	Safety Information	4
2.1	Correct use	5
2.2	Incorrect use.....	5
3	General information regarding material damage and damage to the product	5
4	Scope of delivery	6
5	Product	7
5.1	Performance description	7
5.2	Product description.....	7
5.3	Product identification	7
6	Transport and storage	8
6.1	Transporting AROS cylinders.....	8
6.2	Storing AROS cylinders.....	8
6.3	Non-observance of correct storage	9
7	Assembly	9
7.1	Unpacking	9
7.2	Installation conditions	9
7.3	Assembling AROS cylinders	10
8	Commissioning.....	11
8.1	Filling and bleeding the AROS cylinder.....	11
8.2	End-position cushioning	13
8.3	Displacement transducers, proximity switches	13
8.4	Recommissioning	13
9	Operation.....	13
10	Maintenance and repairs.....	13
10.1	Maintenance	13
10.1.1	Piston-rod maintenance	14
10.2	Inspection	14
10.2.1	Finding and rectifying faults	15
10.3	Repairs	16
11	Decommissioning and disassembling AROS cylinders	16
11.1	Decommissioning	16
11.2	Preparation for disassembly.....	16
11.3	Disassembly	17
12	Replacing components.....	17
12.1	Removing the seal.....	18
12.2	Fitting the piston seals.....	19
12.3	Fitting the guide seals	22
13	Disposal.....	26
14	Modifications and deviations from the specification	26
15	Technical Specifications.....	26
16	Contact	26

General Operating and Assembly Instructions for Hydraulic Cylinders

1 General

Please refer to the information contained in this document before using AROS cylinders.

We assume that you have read and understood this document completely before working with AROS cylinders.

DIN EN ISO 4413 "Hydraulic fluid power - General rules and safety requirements for systems and their components" and our hazard warnings are to be observed.

1.1 Validity and target group

This document is valid for all AROS cylinders. Further information can be found in the relevant product data sheet and dimension sheet.

This document contains important information regarding the correct and safe transport, storage, assembly, commissioning, operation, maintenance, disassembly and disposal of the product.

The target group for this document includes assembly workers, operators, plant manufacturers, plant operators and service technicians.

1.1.1 Staff qualifications

The activities described in this document require basic knowledge of mechanical, electrical and hydraulic systems as well as a sound understanding of the relevant technical terms.

Only trained specialists and persons with relevant instruction supervised by a qualified member of staff are authorised to perform the activities described in this document.

A specialist is a person who on account of their professional training, know-how and experience is able to recognise hazards and implement appropriate safety measures. Furthermore, a specialist is obliged to observe the relevant technical regulations.

General Operating and Assembly Instructions for Hydraulic Cylinders

1.2 Symbols

Standardised symbols are used throughout to ensure that you can use the product quickly and safely using this document.

	General information which must be observed to ensure the optimum use of the product.
 Danger	This symbol indicates a dangerous situation which must be avoided. Non-observance can result in material damage, severe physical injury and even death.
<ol style="list-style-type: none">1.2.3.	Numbered instructions which specify the sequence of the corresponding activities.

2 Safety Information

The General Operating and Assembly Instructions are for information purposes. Observing the safety information also reduces the risks when storing, transporting and installing the product in the machine.

Strict compliance allows accidents and material damage to be avoided and guarantees trouble-free operation of the AROS cylinder.

Keep the General Operating and Assembly Instructions accessible for all persons to guarantee that the latest version is available at all times. Include the documentation when transferring the AROS cylinder to a third party.



Danger

At the first sign of incorrect operation, the AROS cylinder is to be taken out of service and secured against unauthorised use.

Further information:

- Please note the information on the AROS cylinder.
- Use the AROS cylinder only if it is in perfect working order.
- Only appropriate original spare parts from **AROS HYDRAULIK GMBH** are to be used in order to rule out the risk of injury to personnel.
- Observe the national safety regulations and standards in the country in which the AROS cylinder is used.
- Observe the valid accident-prevention regulations and environmental-protection legislation.

General Operating and Assembly Instructions for Hydraulic Cylinders

2.1 Correct use

AROS cylinders are classified as "partly completed machinery". The AROS cylinder is only intended for incorporation in a machine or system taking into consideration the data and specifications contained in the valid data sheets.

AROS cylinders are used to move loads. For this reason, the following should be observed:

- They should only be installed by a specialist.
- The operating pressure must be limited by a pressure relief valve.
- If used incorrectly, there is a risk of crushing.
- DIN EN ISO 4413 "Hydraulic fluid power - General rules and safety requirements for systems and their components" is to be observed.

2.2 Incorrect use

Only the use described in this document is permitted. The user is responsible for risks caused by incorrect use.

AROS Hydraulik GmbH assumes no liability for damage caused by incorrect use.

Incorrect use is defined as:

Non-observance of:

- the operating pressure specified in the assembly drawing,
- hydraulic-fluid specifications,
- operating and environmental conditions other than those specified.

3 General information regarding material damage and damage to the product

Hazards due to incorrect operation – Material damage

The product may only be used as specified in section 2.1 "Correct use".

Surfaces relevant to correct operation (e.g. mounting surfaces, piston-rod surface) and attachments (e.g. limit switches and screw couplings) should not be damaged.

Mixing hydraulic fluids – Material damage

Mixing hydraulic fluids of any kind is expressly forbidden (different manufacturers and/or different types of fluid).

Incorrect cleaning – Material damage

Close all openings with suitable threaded blanking plugs to prevent cleaning agents entering.

Use only suitable cleaning fluids when cleaning AROS cylinders. Do not use aggressive cleaning agents.

General Operating and Assembly Instructions for Hydraulic Cylinders

Avoid cleaning seals and connections with high pressure.

Do not use compressed air to clean functional interfaces (spherical plain bearings, trunnion bearings, piston rods and seals).

Contamination by fluids and foreign bodies – Material damage

During assembly pay attention to cleanliness to prevent foreign bodies entering the hydraulic lines.

Hydraulic lines, connections and add-on components must be clean and free of swarf.

We explicitly recommend the use of residue-free industrial wiping cloths for the removal of lubricants and other soiling.

The AROS cylinder should only be brought into service after ensuring that all hydraulic and mechanical connections are properly connected.

Leakage or spillage of hydraulic fluids – Environmental damage

Use oil-binding agents to bind leaked hydraulic oil.

Always place an oil drain pan under the cylinder when filling and draining the AROS cylinder.

Please note the information contained in the safety data sheet for the hydraulic fluid used.

4 Scope of delivery

The delivery comprises the AROS cylinder ordered by you and confirmed by us.

Furthermore, the connections are plugged, or, alternatively, closed with cover plates. These are only used to protect the AROS cylinder from dirt during transport.

General Operating and Assembly Instructions for Hydraulic Cylinders

5 Product

5.1 Performance description

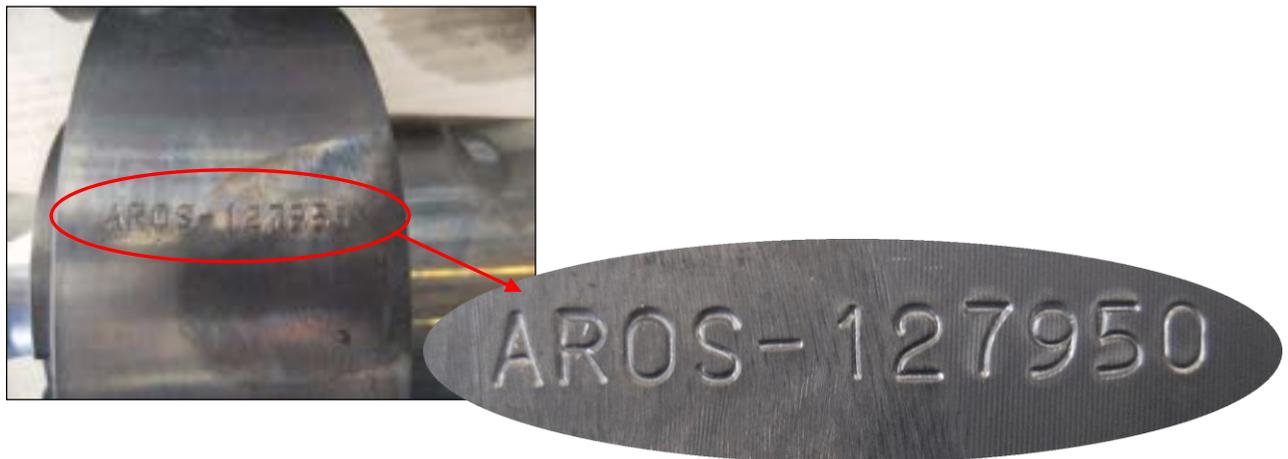
All AROS cylinders in all their different versions and variants are intended to produce a linear movement. The hydraulic pressure acting on the piston and ring surfaces in the cylinder barrel produces the motive force.

5.2 Product description

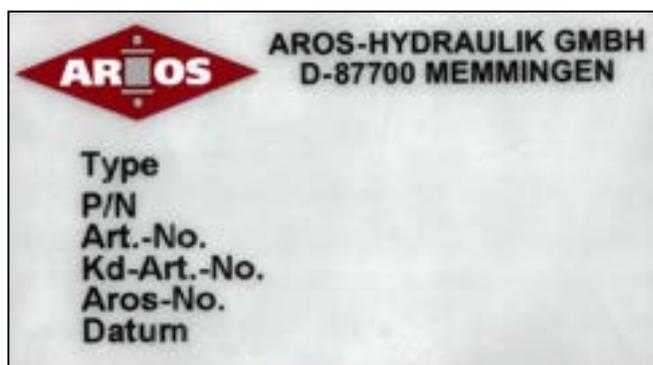
For detailed information on the main and functional components of the AROS cylinder, please refer to the relevant documentation (spare-parts drawing and list).

5.3 Product identification

Every AROS cylinder has a unique consecutive commission number, which is stamped into the cylinder as standard (near the cylinder base). Using this commission number, it is possible to deal with all matters arising at a later date with regard to a specific AROS cylinder.



The following data plate will only be attached at the express wish of the customer. The standard version is shown below, although other versions are available.



General Operating and Assembly Instructions for Hydraulic Cylinders

6 Transport and storage

6.1 Transporting AROS cylinders

Depending on the size of the cylinder and the conditions on-site, AROS cylinders can be transported using a forklift truck, a crane, or other types of lifting gear.

Please note the following:

- Always transport AROS cylinders horizontally in the original packaging.
- Use soft lifting slings to avoid damaging the paintwork or protective coating.
- When transporting AROS cylinder on wooden blocks, ensure that no external forces act on the add-on components (proximity switches, connecting plates, etc.).
- We recommend that the AROS cylinder be only lifted to a height sufficient for transport.
- Secure the AROS cylinder so that it cannot shift during transportation.
- When using lifting slings, take into account their rated load-bearing capacity.

6.2 Storing AROS cylinders

AROS cylinders are only to be stored in dry, dust-free rooms. The primer coating suffices as external corrosion protection for short-term storage in this type of room.

On request, AROS hydraulic cylinders are delivered with a 50-70- μm beige coating as standard.

The following surfaces are neither primed nor painted and are protected with anti-corrosion oil (Safe Coat 612 as standard):

- Fits
- Sealing surface
- Connecting surface
- Minimes coupling
- Stroke-measuring system
- Spherical plain and swivel bearings
- Grease nipple
- Inductive proximity switch

AROS cylinders are tested with HLP32 oil. The residual oil film after testing provides for short-term corrosion protection inside the cylinder. Sealing plugs are used to close off the hydraulic ports.

Do not store AROS cylinders that are prefilled with oil in places where they are subject to direct sunlight or other heat sources. The hydraulic pressure in the AROS cylinder can increase if the ambient temperature rises.

If stored for more than six months, the surface of the AROS cylinder must be painted, or treated with anti-corrosion oil. Furthermore, we recommend that AROS cylinders be rotated through 90° every five weeks if stored horizontally.

General Operating and Assembly Instructions for Hydraulic Cylinders

In addition, the following points should be noted in order to keep AROS cylinders in perfect condition:

- Examine the AROS cylinders thoroughly every six months.
- Extend and retract AROS cylinders every six months.

6.3 Non-observance of correct storage

Incorrect storage can cause the seals to become brittle and the anti-corrosion oil to resinify.

7 Assembly



Danger

Incorrect assembly, commissioning and maintenance can lead to serious accidents! These activities should only be carried out by trained specialist personnel.

7.1 Unpacking

Unpack AROS cylinders correctly and dispose of the packaging material according to the regulations that apply to you.

7.2 Installation conditions

- The AROS cylinder should not be installed under tension caused by mounting surfaces. Thus, the mounting surfaces should be designed to avoid torsion of the AROS cylinder and to allow for thermal expansion.
 - Ensure that the AROS cylinder, and especially the piston rod, is not damaged during installation.
 - The AROS cylinder is to be mounted such that the load acts axially on the centre line of the hydraulic cylinder.
- The following must be kept as low as possible when mounting AROS cylinders:
 - Excessive deformation of the AROS hydraulic cylinder due to tensile or compressive loading.
 - Lateral loading or bending moments.
 - Swivel speeds when trunnion-mounted requiring constant external lubrication.
- Ensure that seals and other wear relevant to maintenance are easily accessible.
- Bleed connections must be freely accessible. If possible, the AROS cylinder should be installed with the bleed connections facing upwards.
- Compare the type designation of the AROS cylinder with the order data before installing the AROS cylinder.
- Fill the AROS cylinder with hydraulic fluid before and bleed it after installation to prevent unexpected, sudden movement of the parts due to residual compressed air in the cylinder.

General Operating and Assembly Instructions for Hydraulic Cylinders

- Use only soft straps and transport equipment when using lifting gear. Structures extending beyond the basic cylinder (components, piping, etc.) are not to be used for lifting.
- Make sure the AROS cylinder and the surrounding area are clean at all times during assembly work.
- Before installation, clean pipes, fittings etc. to remove dirt, swarf, scale and other contamination. Use only lint-free fabrics.
- Hot-bent or welded pipes must be pickled, rinsed and oiled.
- Only state-of-the-art sealants are to be used.
- Where possible, avoid the use of hydraulic fittings (e.g. using bent pipes rather than elbow fittings).
- Ensure the cylinder is installed free of tension and deformation.
- Neither the cylinder mounting nor the loading should result in lateral forces that could cause malfunctions and premature wear.
- The mounting position can be freely chosen within the constraints due to the risk of buckling.
- Always use the tightening torques specified for screws, locknuts and other accessories.

7.3 Assembling AROS cylinders



Danger

Before installing the AROS cylinder, depressurise all relevant systems and ensure that the maximum permissible lateral forces on the piston rod are not exceeded during installation. These would inevitably cause damage to the piston rod and the interior of the cylinder tube.

- When installing rod ends or other connecting elements supplied by the customer, always tighten them down to the stops.
- Do not remove protective elements, e.g. screw plugs, until the corresponding connection is to be made.

The cylinder is to be connected according to the hydraulic diagram. If applicable, electrical components such as displacement transducers or limit switches are to be connected by a specialist according to the electrical circuit diagram.

General Operating and Assembly Instructions for Hydraulic Cylinders

8 Commissioning

Before commissioning the AROS cylinder, check that the operating pressure and the pressure peaks specified in the installation drawing will not be exceeded. Moreover, the special information on our installation drawing and the order confirmation are to be observed.

Before commissioning the AROS cylinder, all screw plugs and flange covers used to protect the inside of the cylinder from corrosion are to be removed.

All valves installed ex-works are preset and should only be adjusted by a specialist.



**The cylinder is designed for use with mineral oils according to DIN 51524 (HL, HLP).
The sealing elements are suitable for operating temperatures from -20 °C to +80 °C.**

Please contact us for approval if other fluids (e.g. water-in-oil emulsions, low-flammability oils, etc.) are to be used or other operating temperatures are expected.

The purity of the fluid used has a significant influence on the service life of the AROS cylinder. The purity classification according to ISO 4406 must be suitable for the most sensitive component!

We recommend that the system be thoroughly flushed before commissioning and that the fluid used be well filtered.



The cylinder should not be connected to the hydraulic system during flushing.

Danger

8.1 Filling and bleeding the AROS cylinder

The AROS cylinder must be bled before every commissioning. Bleed screws must be at the highest points of the AROS cylinder to ensure that it is bled completely. The cylinder must be under low pressure (approx. 2–50 bar) during bleeding.

The AROS cylinder can be bled either via a bleed screw or a Minimes coupling according to customer requirements.



Do not remove fittings, hoses and couplings before the cylinder is completely depressurised!

Danger

If the AROS cylinder does not have a bleed screw, it must be bled via the hydraulic port. In this case the operator is responsible for the actions necessary to bleed the cylinder.

General Operating and Assembly Instructions for Hydraulic Cylinders

Bleeding via a bleed screw:

1. The bleed screw should only be partially screwed out, not completely removed. Screw out the bleed screw by approx. 2 turns until the oil flowing across the gap is free of bubbles.



Danger

High risk of injury due to oil spraying out of the opening at high pressure. Always wear appropriate protective clothing and cover the source of danger with a cloth!

2. After a period of time foaming oil rather than air will appear. At this point the AROS cylinder has been correctly bled.
3. Close the bleed screw.



Bleeding via a Minimes coupling

1. The screw cap can be removed from the Minimes coupling without risk.
2. Before the Minimes hose is connected to the coupling on the AROS cylinder, a suitable receptacle must be attached to the other end (alternatively, a simple container can be used to catch the oil).



Danger

On attaching the hose to the coupling on the AROS cylinder, oil will flow immediately!



3. After a period of time foaming oil rather than air will appear. At this point the AROS cylinder has been correctly bled.
4. Remove the hose from the Minimes coupling and replace the cap.



This procedure must be repeated several times for all bleeding methods until there is no more air in the AROS cylinder. Only then has the cylinder been correctly bled.

Subsequently, extend and retract the hydraulic cylinder 3-5 times without load at low pressure and dispose of the oil-air mixture in accordance with the regulations that apply to you.

General Operating and Assembly Instructions for Hydraulic Cylinders

8.2 End-position cushioning

The AROS cylinder is available with or without adjustable end-position cushioning depending on the type of cylinder. The end-position cushioning can be adjusted after loosening the locknut on the throttle check valve. The throttle screw should not be screwed out beyond the red marking.



Please note that the end-position cushioning is only effective if full use is made of the stroke.

8.3 Displacement transducers, proximity switches

Refer to the relevant data sheet for information on the electric connections.



For safety reasons, the proximity switch should not be screwed in too far. Thus, the adjustment is to be carried out only at the end positions.

Danger

8.4 Recommissioning

Carry out recommissioning as described for initial commissioning.

9 Operation

The AROS cylinder being only a component part, operational information can only be given in the context of the machine or system in which it is installed. Please refer to the operating instructions issued by the manufacturer of the machine or system in which the cylinder is installed.

10 Maintenance and repairs

In order to ensure that your AROS cylinder operates flawlessly and has a longest possible service life, please note the following:

10.1 Maintenance

Generally, an AROS cylinder requires little maintenance after commissioning. We do, however, recommend that the perfect operation of the AROS cylinder be checked at regular intervals. Pay particular attention to the following points:

- Leakage at the oil connections and the cylinder cap
- Mechanical damage
- Damage to the coating
- Visible wear marks
- Leakage around the piston rod and cylinder cap
- The purity of the hydraulic fluid

Wear parts such as seals and guide strips should to be replaced at regular intervals. The change intervals depend on the individual application and the ambient conditions on-site. Thus, there is no compulsory change interval for wear parts.

General Operating and Assembly Instructions for Hydraulic Cylinders

Leakage around the piston rod and the cylinder cap is a sign that wear parts may need to be replaced.

Refer to the system manufacturer's maintenance schedule for information on the lubrication intervals for spherical rod eyes, trunnions, etc.



Extreme temperatures and contamination reduce the service life of the AROS cylinder. It is thus important that you observe the information on operating and ambient temperatures.

10.1.1 Piston-rod maintenance

Make sure the piston rod always has a protective oil film. If the piston rod is subject to high relative humidity, constantly fluctuating temperatures or inclement weather (for outdoor applications), we recommend that the piston rod be inspected once a week to ensure it remains in perfect condition.

The piston rod should always be retracted during system downtimes, and the following preventative maintenance activities should be performed during longer downtimes:

1. Ensure the working environment is dry. Remove salt, sand, operational residues and other contamination from the piston rod using fresh water.
2. Preventative maintenance should only be carried out when the piston rod is dry. For this reason allow the piston rod to dry completely.
3. Soak a residue-free industrial cloth in preservative oil with the lowest viscosity possible. Take particular care to ensure that the complete piston-rod surface is covered with preservative oil.

If the piston rod has come into contact with chemicals, remove these completely and carry out the preventative maintenance as described above.

10.2 Inspection

We recommend that the results of the inspection be documented. At the same time check the function and energy efficiency of the cylinder. Comparing the results with previously documented values allows faults to be recognised immediately and remedial action to be taken.

General Operating and Assembly Instructions for Hydraulic Cylinders

10.2.1 Finding and rectifying faults

In general, faults are rectified by replacing the defective components. Replace only those parts listed in the spare-parts list with comparable approved components of OEM quality.

If an AROS cylinder is to be repaired, please contact **AROS Hydraulik GmbH** directly.

Fault	Possible cause of failure	Remedy
Leakage at the piston rod	Worn piston-rod seals	Replace the piston-rod seals
	Surface irregularities caused by piston-rod wear.	Replace the piston rod
Leakage at the hydraulic connections	Loose fittings	Torque the fittings to the correct setting
	Damaged seal	Replace the seal of the fitting
Stick-slip phenomenon	The piston rod and the AROS cylinder as a whole are subject to lateral forces.	Adhere to the regulations described in section 7.2 "Installation conditions"
	Wear of seal components	Replace the seals
	Air in the AROS cylinder	Bleed the cylinder again, following the instructions in section 8.1. "Filling and bleeding the AROS cylinder".
	Valve malfunction	Check the valves
Cushioning effect insufficient or non-existent	The end-position cushioning is not adjusted according to your requirements.	Check the adjustment of the end-position cushioning and adjust accordingly as described in section 8.2 "End-position cushioning".

General Operating and Assembly Instructions for Hydraulic Cylinders

10.3 Repairs

The repair measures serve to return the AROS cylinder to full working order. Please do not hesitate to contact our sales personnel with regard to repairs.

11 Decommissioning and disassembling AROS cylinders

11.1 Decommissioning



Due to the high operating pressure in the AROS cylinder, moving parts or escaping oil can cause injuries and material damage.

Gefahr

Observe the following points to avoid the risk of danger:

1. Switch off all components and connections in accordance with the manufacturer's instructions, and ensure that they cannot be restarted unintentionally. If possible, remove the system's main fuse.
2. Depressurise the AROS cylinder completely and relieve it from all external forces.
3. Drain the oil into a container with a capacity sufficient to take the complete volume of oil. Ensure the hydraulic lines are completely emptied.

11.2 Preparation for disassembly

Before disassembling the AROS cylinder, a clearly legible assembly drawing / spare-parts list is required (these can be found in our technical documentation) as well as a stable working surface on which to place the AROS cylinder and the disassembled components.

Furthermore, clean professional tools and a clean, tidy workplace is required. When removing the cylinder, no dirt should enter the hydraulic system. Thus, we recommend that all ports are completely covered with cover plates or that plastic blanking plugs are fitted.

Pay attention that the AROS cylinder, and particularly the piston rod, is not damaged during removal. Observe the transport instructions in section 6.1 when lifting and moving the AROS cylinder during removal.

General Operating and Assembly Instructions for Hydraulic Cylinders

11.3 Disassembly

Note the following steps during disassembling!

1. So far as reasonably practicable, drain the hydraulic fluid out of the AROS cylinder before removal. The remaining oil can be drained after removal.
2. Remove the guide and then drain the remaining hydraulic fluid.
3. Pull the piston rod out of the AROS cylinder. If necessary, we recommend the use of lifting slings.
4. Place the piston rod on a stable working surface prepared for this purpose. Ensure the piston rod cannot roll.
5. Remove the seals.
6. Clean the piston rod, its thread, the guide, the mounting eyes and the protective sleeve.
7. Pay attention that no dirt particles remain which could damage the seals during reassembly.

12 Replacing components

When replacing components, proceed as described in section 11.3. The removal and installation of the seals is described in detail below. Seal kits and other spare parts that are to be replaced can be ordered using the article number of the AROS cylinder. If the article number is no longer known, the AROS cylinder can be clearly identified using the AROS number stamped in the cylinder as described in section 5.3.



The following explanation is based on one of the seal versions available. Due to the various seal versions available, these may differ slightly with regard to their removal and installation. If you have questions or doubts, please contact your contact person in our sales department at all times.

When handling seals – unless they are to be removed and disposed of – never use sharp objects, and ensure that the piston, the guide and the seals are free of dirt.



When replacing components, please refer to the product-specific spare-parts list for the corresponding positions of the individual seals.

General Operating and Assembly Instructions for Hydraulic Cylinders

12.1 Removing the seal

Fig. 1

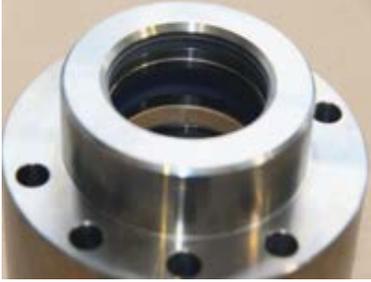


Fig. 2



Fig. 3

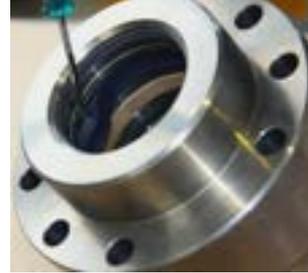


Fig. 4

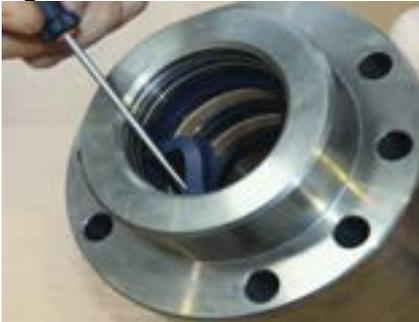


Fig. 5

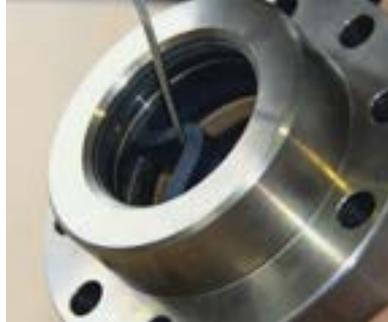


Fig. 6



Insert a seal puller (Fig. 2) behind the rod seal.

Attention: Be careful not to damage the base of the groove.

Using the seal puller, pull the rod seal out of the groove (Figs. 3 to 5).

The rod seal can now be removed with the finger.

Follow this procedure for all other seals during disassembly.

General Operating and Assembly Instructions for Hydraulic Cylinders

12.2 Fitting the piston seals

Fig. 7



Place one side of the seal in the groove.

Fig. 8



Then push the rest of the seal into the groove and check that it is sitting correctly.

Fig. 9



Install the O-ring in the piston-seal groove using a flat-blade screwdriver with rounded blade edges.

Piston seal =
O-Ring and PTFE seal

Fig. 10



The screwdriver can now be removed. Check that the O-ring has been correctly inserted into the groove.

Fig. 11



Twist the preformed guide strip slightly apart and slip it over the piston.

Fig. 12



Insert the guide strip into its groove. Installing the guide strip first ensures that the PTFE seal does not slip into the guide-strip groove.

General Operating and Assembly Instructions for Hydraulic Cylinders

Fig. 13



Please use an assembly bush and an assembly sleeve to install the PTFE seal. Place the PTFE seal over the assembly bush.

Fig. 14



Then use the assembly sleeve to push the PTFE seal to the end of the assembly bush.

Fig. 15



After pushing the PTFE seal to the end of the assembly bush, the assembly sleeve may be removed. We recommend that it not be removed, as it will be required again later.

Fig. 16



Place the assembly bush on the end of the piston. The assembly bush should be flush with the upper edge of the installed guide strip.

Fig. 17



Using the assembly sleeve, push the PTFE seal into the groove on top of the O-ring.

Fig. 18



Remove the assembly bush when the PTFE seal sits completely in the groove.

General Operating and Assembly Instructions for Hydraulic Cylinders

Fig. 19



Check whether the piston seal has been correctly installed and grease it.

Fig. 20



The piston seal deforms slightly during assembly with the assembly bush.
A calibration sleeve is required to return the piston seal to its original shape.
Push this over the piston.

Fig. 21



The calibration sleeve should remain on the piston for approx. 10 seconds to obtain the best result.

Fig. 22



Fit the remaining guide strips as described in Figs. 4 and 5 and repeat the calibration shown in Fig. 20. Make sure, however, that the calibration sleeve encloses all the seals.

General Operating and Assembly Instructions for Hydraulic Cylinders

12.3 Fitting the guide seals

Fig. 23



Insert the seal in its groove using a flat-blade screwdriver with rounded blade edges.

Fig. 24



Check that the seal has been fitted correctly.

Fig. 25



Deform the guide strip to suit the corresponding diameter of the guide and insert it into the correct groove.

Fig. 26



Perform the step shown in Fig. 25 for all guide strips.

Fig. 27



Check that the guide strips have been correctly installed.

Fig. 28



Check the groove for the PTFE seals for damage and contamination.

General Operating and Assembly Instructions for Hydraulic Cylinders

Fig. 29



Insert the O-ring into its groove.

Fig. 30



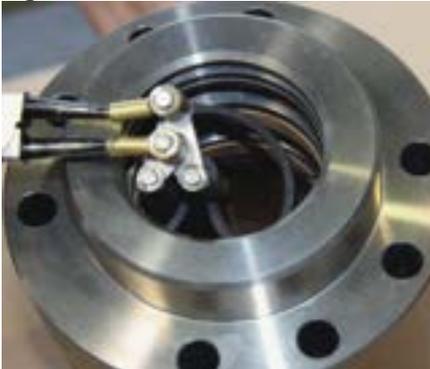
The PTFE seal can either be installed using a special tool or, alternatively, between two fingers.

Fig. 31



To ease fitting in the groove, deform the PTFE seal into a kidney shape.

Fig. 32



Make sure the non-deformed side is inserted into the groove first.

Fig. 33



Then press the rest of the seal into the groove.

Fig. 34



Insert the rod seal.

General Operating and Assembly Instructions for Hydraulic Cylinders

Fig. 35



Check that all the seals have been correctly fitted and grease them.

Fig. 36



Use an assembly drift with a diameter corresponding to the inner diameter of the guide.

Fig. 37



Insert this into the guide in order to restore the PTFE seal to its original shape.

Fig. 38



Place the O-ring in the corresponding groove.

Fig. 39



Deform the wiper into a kidney shape as already described in Figs. 30 and 31.

Fig. 40



Place the wiper in the groove as described in Figs. 32 and 33.

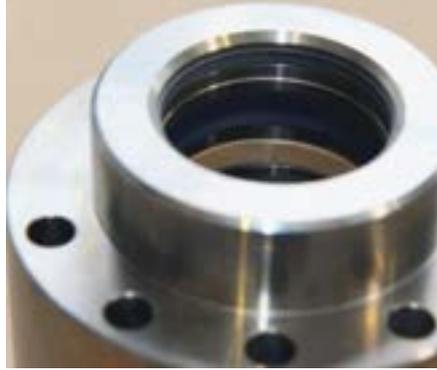
General Operating and Assembly Instructions for Hydraulic Cylinders

Fig. 41



Reinsert the assembly drift into the guide.

Fig. 42



Ensure that all seals have been fitted correctly.

General Operating and Assembly Instructions for Hydraulic Cylinders

13 Disposal

All materials must be disposed of according to national statutory regulations valid in your country or according to internal company rules.

Particular attention must be paid to the disposal of hydraulic fluids and components containing hydraulic-fluid residues. When disposing of hydraulic fluids, note the information contained in the relevant safety data sheets.

14 Modifications and deviations from the specification

AROS Hydraulik GmbH assumes no responsibility for modifications to an AROS cylinder carried out by third parties or deviations from the specification, and disclaims any form of liability.

Modifications to the AROS cylinder or deviations from the specification mean that the product is no longer in its original state. In all such cases, declarations given by **AROS Hydraulik GmbH** with regard to this product lose their validity.

15 Technical Specifications

Exact data for your AROS cylinder can be found in the relevant valid documents.

16 Contact

AROS Hydraulik GmbH
Foehrenweg 3-11
87700 Memmingen
Germany

Tel: +49 8331 8209-0
Fax: +49 8331 8209-90
Email: info@aros-hydraulik.de
Internet: www.aros-hydraulik.de