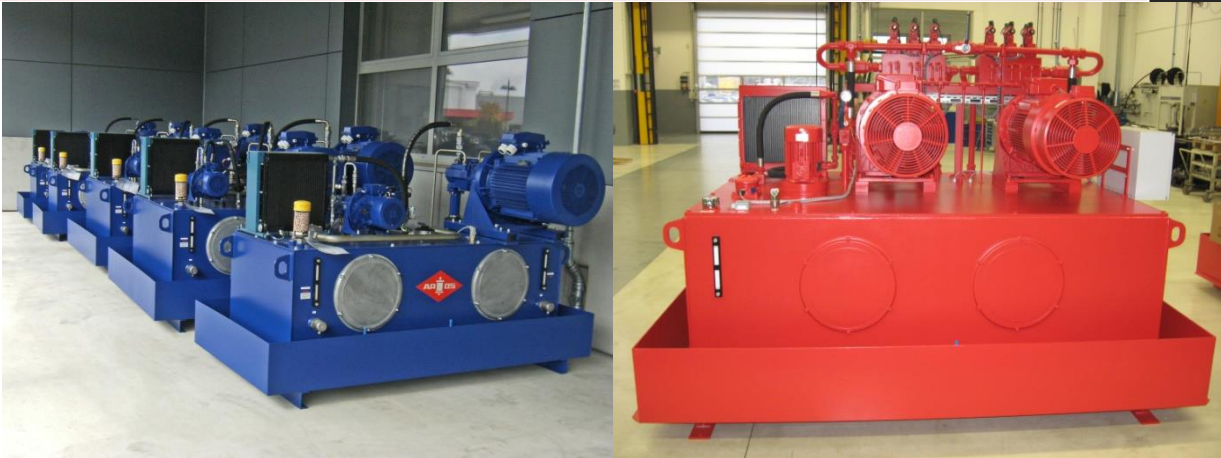




AROS Hydraulik GmbH

General Operating and Assembly Instructions for Hydraulic Units



Allgemeine Betriebs- und
Montageanleitung für
Hydraulikaggregate



General Operating and
Assembly Instruction for
Hydraulic Units

... we get things moving!

General Operating and Assembly Instructions for Hydraulic Units

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General Operating and Assembly Instructions for Hydraulic Units

1 General

Please refer to the information given in this document before using hydraulic units.

We assume that you have read and understood this document completely before working with hydraulic units.

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 applies to all hydraulic units. Further information can be found in the relevant product data sheet or the 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 adhere to the relevant technical regulations.

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1.2 Symbols

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

	General information to 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 handling 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 hydraulic unit.

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



Danger

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

Further potential hazards may occur due to the interaction between the hydraulic unit and the complete machine during installation of the hydraulic unit in the machine. In particular, this applies to the influence of hydraulic and electric control systems on hydraulic drives that produce mechanical movements. The manufacturer of the complete machine must have carried out an independent risk assessment. In addition, he must have created operating instructions for the complete machine on this basis.



These operating and maintenance instructions do not constitute a substitute for the operating instructions of the complete machine.

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Further information:

- Use the hydraulic unit only if it is in perfect working order.
- Only suitable 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 hydraulic unit is used.
- Observe the valid accident prevention regulations and environmental protection legislation.
- Keep the manufacturer's oil recommendation available and observe the safety information given.
- The guarantee provided by AROS Hydraulik GmbH only applies to the version delivered. All cases of incorrect assembly, incorrect use and/or improper handling shall render the guarantee null and void.

2.1 Correct use

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

The following should be observed:

- They should only be installed by a specialist.
- The operating pressure must be limited by a pressure relief valve.
- 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 risks arising from incorrect use are the sole responsibility of the operating company; **AROS Hydraulik GmbH** shall assume no liability.

Incorrect use is defined as:

Non-observance of

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

2.3 Risk prevention and safety measures

Before installation, the hydraulic unit is to be inspected for possible transport damage such as cracks and loose or missing screws or covers.

Operate the hydraulic unit only in the power range specified in the technical data.

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3 Scope of delivery

The scope of delivery covers the hydraulic unit ordered by you and confirmed by us.

Furthermore, all ports are closed using sealing plugs or, alternatively, covers. These serve exclusively to prevent contamination of the hydraulic unit during transport.

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4 Product

4.1 Purpose

The purpose of all hydraulic units irrespective of the version and variant is to produce a drive movement.

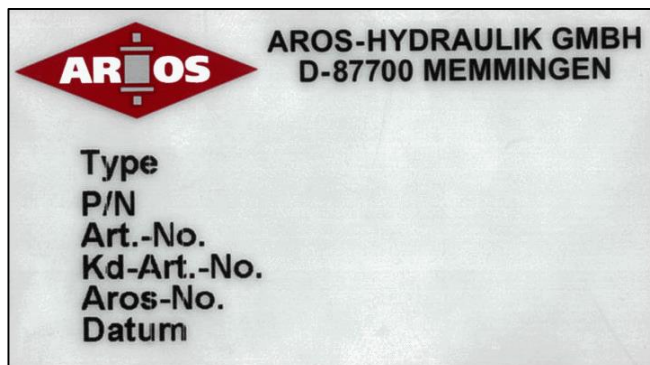
4.2 Product description and identification

For detailed information on the main and functional components of the hydraulic unit refer to the documentation (circuit diagram and spare-parts list).

Every hydraulic unit has its own consecutive commission number stamped in the cover at the front left as standard. Using this commission number, it is possible to process all subsequent transactions concerning the hydraulic unit in question.



The following data plate is only attached at the express wish of the customer. Several versions are available, the version shown below being the standard version.



General Operating and Assembly Instructions for Hydraulic Units

5 Transport and storage

5.1 Transporting the hydraulic unit

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

Please note the following:

- Always transport the hydraulic unit in the original packaging and in an upright position.
- Use soft lifting slings to avoid damaging the paintwork or protective coating, and use only those positions or attachment points provided for this purpose.
- Ensure that auxiliary equipment (manifold blocks, valves, hoses, etc.) is not subject to external forces when transporting the hydraulic unit on wooden blocks.
- We recommend raising the hydraulic unit be only lifted to a height sufficient for transport.
- When transporting with industrial trucks, the centre of gravity of the hydraulic unit must be positioned to ensure maximum stability. The hydraulic unit should also be secured to counter the forces that can occur during acceleration.
- Secure the hydraulic unit so that it cannot shift during transportation.
- Always use lifting straps with sufficient load-bearing capacity.
- As far as possible, the hydraulic unit should not be removed from its packaging until immediately before assembly.



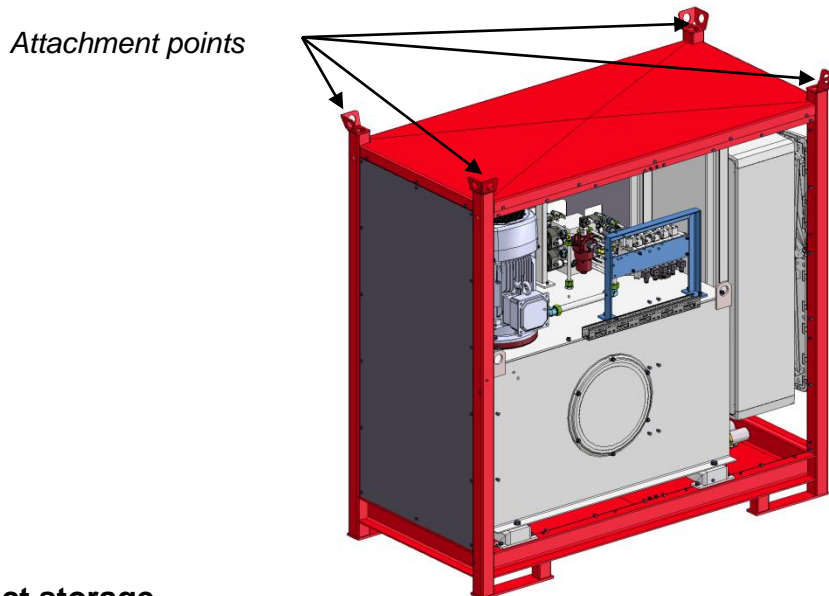
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5.2 Using attachment points

Standard hydraulic units do not have attachment points; these are only installed according to customer specification. As these are often no longer strong enough after being used for a longer period of time or may no longer be recognisable as attachment points, they should always be replaced before transporting the unit.

- The attachment points provided are specified on the relevant installation drawing; only these attachment points are to be used.
- After disassembly, check the stability of the attachment points before transporting the hydraulic unit.
- Defective or missing attachment points are to be replaced correctly.
- Lift and lower the hydraulic unit slowly and carefully.
- Lift the hydraulic unit above the ground only as far as absolutely necessary.

The term attachment point refers to devices in the form of eyelets that are welded to the hydraulic unit. These allow the hydraulic unit to be secured or lifted during transport.



5.3 Incorrect storage

Incorrect storage can result in embrittlement of the seals (e.g. in the return filter) and/or hoses as well as resinification of the anti-corrosion oil.

5.4 Storing the hydraulic unit

Our hydraulic units are tested with HLP 32 oil. The oil film that remains after testing provides short-term corrosion protection in the interior of the unit. Sealing plugs are used to protect the hydraulic ports.

If necessary, replace the individual components (e.g. hoses, accumulators, filters) for which a maximum period of storage applies (see 9.4 Maintenance).

General Operating and Assembly Instructions for Hydraulic Units

5.5 Storage periods

Storage conditions	Packaging	Protective agent	Storage periods in months	
			Inspection with the protective agent	Filling with the protective agent
In a dry room at uniform temperature	Seaworthy	1	12	24
		2	12	24
	Not seaworthy	1	9	24
		2	12	24
Outdoors: the product should be protected against damage and water ingress	Seaworthy	1	6	12
		2	9	24
	Not seaworthy	1	0	12
		2	6	24

1 = mineral oil

2 = anti-corrosion oil

6 Assembly and installation

This section covers setting up and connecting the hydraulic unit on-site. For the information required to install the unit in the complete machine, in particular with regard to its overall function and logical operating principle, please refer to the documentation and instructions for the complete machine.



Danger

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

6.1 Unpacking

Remove the packaging material correctly and dispose of it in accordance with the regulations that apply for you.

6.2 Set-up

- Ensure that the hydraulic unit is stable.
 - Support structures should only be removed when the stability is guaranteed by other means.
 - Observe the information regarding total weight and set the hydraulic unit down on a suitable surface.

- Observe the following procedure when setting up the hydraulic unit:
 - Position the hydraulic unit in accordance with the assembly drawing of the complete machine.
 - Check that the contact with the ground is uniform and, if necessary, prevent the unit rocking using suitable means (e.g. by inserting a supporting element between the unit and the ground).
 - Adjust the hydraulic unit so that it is level in both the longitudinal and the transverse axes.

General Operating and Assembly Instructions for Hydraulic Units

6.3 Installing the hydraulic unit



Danger

Before installing or mounting the hydraulic unit, ensure that all relevant system components are depressurised.

- Always keep the working area clean during installation.
- The hydraulic unit must be installed free of dirt. Ensure that hydraulic lines, connections and auxiliary equipment are clean.
- Cleaning agents must not enter the hydraulic system.
- Only use lint-free cloths or cotton waste when cleaning the hydraulic unit.

Hydraulic connections are to be made according to the hydraulic diagram. The electrical connections are to be made by a qualified electrician according to the electrical circuit diagram.

Installation procedure:

1. Remove all sealing plugs and covers and replace them with pressure-resistant fittings.
2. Before installing the connecting lines, these must be free of dirt, chips, scale, etc.
3. When installing the hose assemblies ensure that
 - they are not kinked, twisted and/or under tension.
 - The outer layer must not be abraded due to collision or rubbing.



Danger

The use of a hose safety catch is recommended if a hazard could occur due to whipping if the hose connection were to come loose under pressure. This is not necessary if the hose assembly has anti-pull-off hose fittings.

4. If you have an oil/water cooler, the hoses must be routed to the corresponding water connections and connected according to the circuit diagram.

6.4 Installing the electrical system

Switch off the power supply before installing the electrical system. The electrical system must be installed by a qualified electrician according to good electrical-engineering practice.

Every hydraulic unit must be earthed before use. In accordance with VDE regulations, the earthing cables and the cables for the equipotential bonding must have the minimum cross-section specified and a yellow-green outer sheave.

Before connecting the cables, the equipment in question must be earthed. Establish equipotential bonding via a common potential equalisation rail.

The control and monitoring equipment (switching, open-loop or closed-loop control devices) can be connected in accordance with the relevant documentation taking into consideration appropriate safety measures.

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7 Commissioning

Before commissioning the hydraulic unit, check that the operating pressure specified on the installation drawing is not exceeded, even by pressure spikes. Furthermore, observe the special guidelines on our installation drawing and the order confirmation.

Before commissioning the hydraulic unit, remove all sealing plugs and covers used to protect the interior of the unit.



Built-in valves are set ex-works and the settings should only be changed by a specialist.

The hydraulic units are designed for use with mineral oils to DIN 51524. If other fluids (e.g. water-in-oil emulsions, fire-resistant oils, etc.) are to be used or other operating temperatures are expected, please consult us beforehand.

The purity of the fluid has a significant influence on the service life of the hydraulic unit. The purity class of the hydraulic fluid according to ISO 4406 must be suitable for the most sensitive component in the system!

The hydraulic unit must not be operated without or with too little oil. For this reason, ensure that sufficient oil is available before commissioning. When operating the hydraulic unit, always ensure that the oil tank, the suction lines and the components are filled with oil in accordance with the manufacturers' specification.



Insufficient oil in the hydraulic unit can result in damage, and smooth operation will no longer be possible!

Danger

Before switching on the power supply and bleeding the machine's overall hydraulic system, please refer to the instructions provided by the manufacturer of the machine.

7.1 Initial commissioning

Before commissioning, the hydraulic unit and the hydraulic lines must always be checked to ensure that they are in a safe working condition. All valves on the suction and coolant lines (if applicable) should be opened beforehand. The pressure gauge bleeding device should also be opened to avoid measurement errors. If applicable, you can now adjust the temperature sensor to suit the application.

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Danger

Always depressurise the hydraulic unit before removing fittings, hoses and couplings!

Procedure:

- Check the direction of rotation of the electric motor and start in inching mode.
- Flush the hydraulic system (see 7.1.4 Flushing).
- Actuate the valves and extend and retract the consumers several times.
- Repeat the bleeding process at low pressure until the oil flowing into the container is free of air bubbles and the consumer extends and retracts smoothly. Slowly increase the load.
- Observe the oil level and top up if necessary.
- If the machine is then run for several hours, the temperature should also be monitored. The hydraulic connections should also be checked for tightness. Rectify any leaks.

The following points are to be observed in this section.

7.1.1 Setting the valves

Never change factory settings. This applies, above all, to sealed valves and valves that are preset on delivery in accordance with the technical specification in the hydraulic diagram or bill of material.

Procedure:

- Pressure and flow control valves are to be adjusted to the lowest setting.
- Directional control valves are to be in the neutral position.
- Proportional valves must not be energized with the setpoint value.

7.1.2 Using pressure measuring points

To allow the pressure control valves to be adjusted, the respective pressure must be displayed. This can be done using the built-in pressure gauge, external measuring instruments or a digital pressure indicator. For this purpose, the hydraulic unit is equipped with measuring couplings.



Danger

Because these measuring positions can be used under pressure, extra caution is called for. Please also keep in mind that the measuring hoses do not have a locking function.

Ensure that the other end of the measuring hose is correctly secured to the corresponding measuring instrument before connecting it to the measuring coupling.

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7.1.3 Filling the hydraulic unit

To ensure the correct purity class, we recommend filling the hydraulic unit using a suitable filtration unit or a filtration station with a fine filter.

Filling procedure:

- Ensure that the working area is clean when filling the hydraulic unit.
- If contamination has occurred during transport or storage, clean the filling ports of the tank before opening. If the hydraulic unit has been transported or stored for a longer period of time, check whether water has collected in the tank. This can be removed via the drain valve.
- Do not remove filter elements when filling the tank.
- The pumps can be filled with oil via the leakage port.
- Always pay attention to the maximum/minimum fluid level.

7.1.4 Flushing the hydraulic unit

The purpose of flushing is to achieve the defined degree of cleanliness in order to prevent malfunctions and to extend the service life of the components. There is a defined purity class for the components that must be guaranteed after installation in the hydraulic system. Please refer to the manufacturers' data sheets.

The medium that is to be used during subsequent operation can also be used as the flushing fluid. If a different oil is used, this must be compatible with the materials used in the system, especially the seals, and the oil tank must be thoroughly emptied.

The oil should be brought up to operating temperature and the pressure setting must be reduced. If pressure switches are installed, these should be deactivated before flushing.

Flushing is complete when the required purity level has been achieved. Ideally, the oil sample should be taken upstream of the return filter.

The hydraulic unit's operational settings should then be restored. The flushing connections must then be removed and all ports completely sealed.

7.1.5 Most common mistakes during commissioning

- Filling with unfiltered oil.
- Bleeding the hydraulic unit incorrectly.
- Not documenting the settings.
- The pump and motor housings were not filled with oil before starting the system.
- Abnormal pump noises were ignored (leaky suction line, too much air in the oil).
- Pressure relief valve setting too close to the operating pressure.
- Pump's pressure regulator was set to the same or a higher pressure as the pressure relief valve.

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7.2 Recommissioning

During recommissioning, the oil level and the tightness of the hydraulic components and lines should be checked. We recommend that the hydraulic unit be bled again and that the information in the operating instructions supplied by the manufacturer of the machine be observed.



Danger

Extreme caution is called for when switching on the machine!

8 Operation

Because the hydraulic unit is just a single component, information on its use can only be provided in connection with the machine or plant in which it is installed. Please refer to the operating instructions supplied by the manufacturer of the machine or plant in question.

9 Maintenance and repairs

Please observe the following points to ensure that your hydraulic unit runs perfectly at all times and to achieve the best possible service life:

9.1 Inspection

We recommend that the results of the inspection be documented. Check the hydraulic unit runs correctly and efficiently. Comparing the results with previously documented values allows faults to be recognised immediately and remedial action to be taken. Carry out a visual inspection for obvious defects (leaks, loose or defective parts, illegible information and warning labels, etc.).

9.2 Repairs

The purpose of the repair measures is to restore the hydraulic unit to full working order. For all enquiries regarding repairs please do not hesitate to contact our sales staff.

9.3 Spare and wear parts

Spare parts are to be ordered in accordance with the product-specific documentation. The use of incorrect parts can result in mechanical hazards or malfunctions.

9.4 Maintenance

The filters (return and pressure filter) in the hydraulic system are to be checked for contamination at regular intervals. Observe the contamination indicators (optical and electric) on the filters. Use only original parts as specified in the spare parts list.

The oil level in the tank must be checked daily to ensure that it does not drop below the minimum level indicated.

The piping system is to be checked regularly for leakage. Leaky fittings must be depressurised before tightening.

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It is sensible to create maintenance reports in order to record the intervals for filter replacement and gas pressure and accumulator checks.

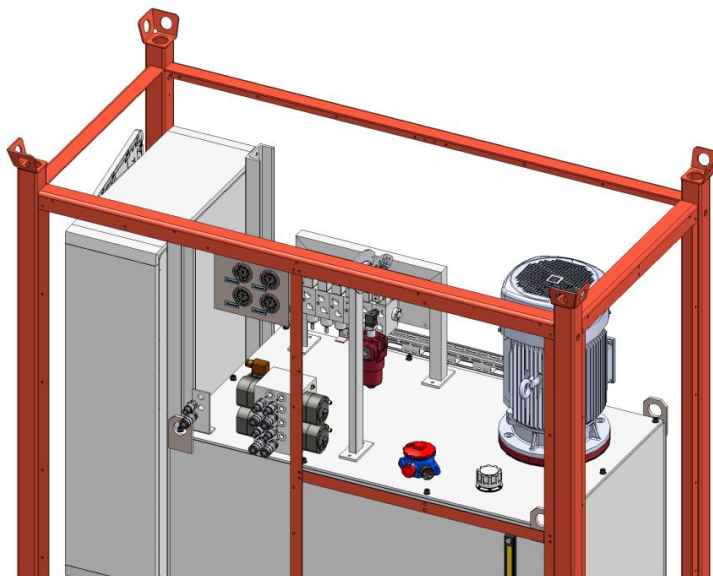
Only trained specialists are permitted to replace components.



Extreme temperatures and contamination shorten the service life of the hydraulic unit. For this reason, always follow the instructions concerning the operating and ambient temperatures.

Overview:

Component	Activity	Interval
Oil	Check and document the condition and temperature of the oil; change the oil	Annually
Filter	Replace filter element	Annually
Settings	Check the settings and function	12 weeks
Accumulator	The testing should to be conducted at statutory provisions → This is the responsibility of the operator!	statutory defined intervals
All	Visual inspection for damage to the hydraulic and electrical systems	Annually
All	Replace damaged elements	Annually
All	Check for noises	Annually



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10 Decommissioning



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

Danger

Observe the following points to avoid hazards:

1. Switch off all components and electrical connections in accordance with the manufacturers' instructions and ensure that they cannot be restarted unintentionally. If possible, remove the system's main fuse.
2. Completely depressurise the hydraulic unit.
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 Disassembling a hydraulic unit

Before disassembling the hydraulic unit, 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 parts that have been removed.

Furthermore, clean professional tools and a clean, tidy workplace are required. Ensure that no dirt enters the hydraulic system during disassembly. Hence, we recommend that all ports are perfectly sealed using cover plates or plastic plugs.

Disassembly can be performed as described in Section 6 "Assembly and installation".

12 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

13 Extension and modification

AROS Hydraulik GmbH assumes no responsibility for modifications and extensions to a hydraulic unit carried out by third parties, and explicitly rejects any liability.

Modifications and extensions to a hydraulic unit mean that the product is no longer in its original state. All declarations issued by **AROS Hydraulik GmbH** with regard to this product are thus rendered null and void.

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14 Troubleshooting

Troubleshooting may only be performed by qualified specialists when the safety devices are active. All technical documents such as circuit diagrams and bills of material are to be available when troubleshooting. Proceed systematically and gain an overview of the functions of the hydraulic unit in connection with the overall system.

15 Rectification of faults

The following is a list of various faults with possible causes. This is only intended as an aid and is not exhaustive.

The faults, possible causes and corrective measures listed only apply to the hydraulic unit.

Contaminated oil

Fault	Possible cause	Corrective measure
Water in oil	Pressure surges on the coolant side	Install magnetic water shut-off valves only in the supply line.
	Corrosion of the oil-water heat exchanger because the water quality does not correspond to the material specification of the heat exchanger	Check the water quality and replace the heat exchanger if required.
Solid-particle contamination	Ingress of dirt due to insufficiently cleaned components during installation	Locate and rectify the cause Flush the hydraulic system
	Ingress of dirt when filling with oil and due to incorrect maintenance and repair work	
	Component abrasion	
	Dirt ingress from the surroundings e.g. via the breather filter	

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Excessive/abnormal noises

Fault	Possible cause	Corrective measure
Oil	Viscosity too high (temperature too low)	Warm up the hydraulic unit before use
	Oil foams (air content too high)	Locate and rectify the cause
Suction conditions	Hydraulic-tank oil level too low	Locate and rectify the cause; top up oil
	Breather filter dirty or too small	Clean or replace the breather filter
	Suction line clogged, leaking or too small	Clean/seal/replace
Pump	Oscillating control system e.g. pressure regulator	Check whether the pump was bled and the set up in accordance with the manufacturer's specification.
	Pump or pump seal defective	Replace component according to the manufacturers' specification.
Pressure control valves	Flow-induced noises and vibrations due to incorrect settings	Check and, if required, correct settings according to the hydraulic diagram
Mechanical drive	Wrong direction of rotation	Swap over the electrical connections of the power supply
	Pump or electric motor defective	Replace components
	Coupling loose, defective or poorly aligned	Tighten, replace or align the coupling
	Pump or electric motor mounting loose	Tighten the attachment according to manufacturer's specification

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Excessive oil temperature

Fault	Possible cause	Corrective measure
Heat radiation	Insufficient heat dissipation due to low oil level in the tank or insufficient thermal radiation caused by encapsulation or lack of ventilation	Check the oil level and install forced ventilation
Pressure control valves	Setting incorrect, too low Pump output flows partially to the tank via the pressure control valve	Check and, if required, correct settings according to the hydraulic diagram

Insufficient force or pressure

Fault	Possible cause	Corrective measure
Directional control valves	Incorrect switching setting	Check and, if required, correct settings according to the hydraulic diagram
Pressure control valves	Operating pressure set too low	Check and, if required, correct settings according to the hydraulic diagram
Pipes and hose assemblies	Pressure drop too large due to incorrect sizing	Replace with components with larger nominal diameters

Switch-on or switch-off frequency of the pump is too high

Fault	Possible cause	Corrective measure
Pump	Pump flow rate too low for machines or accumulators	Check selection of components and use larger ones if necessary
Accumulator (if applicable)	Valve to accumulator not closed Gas preload pressure incorrect Operating pressures and pressure settings do not meet the requirements	Check and, if required, correct settings according to the hydraulic diagram

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16 Technical specifications

Exact data for your hydraulic unit can be found in the relevant valid documents.

17 Contact

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