OSNA
PUMPENTECHNOLOGIE

Original Operating Manual

LG Piston Pump

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CE

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Contents

List of Tables

List of Images

1 General

1.1 About this operating manual

This operating manual contains important instructions that must be observed during installation, operation and maintenance. For this reason, ensure that it is read by specialist personnel and the responsible operator/owner prior to assembly and commissioning. The manual must be available at all times at the location where the system is used.

Please observe the safety instructions described in this operating manual, along with the relevant national accident prevention regulations and any internal work, operational and safety specifications of the operator. We assume no liability for damages and operational interruptions resulting from non-observance of this operating manual.

⚠ **WARNING**

Pay particular attention to section 2 "Safety instructions" during commissioning and all maintenance work.

Section 2 also provides an explanation of the symbols used in this manual. Knowledge of this operating manual is essential to preventing errors and ensuring safe and uninterrupted operation.

The operating specification does not take local safety regulations into account. The owner bears full responsibility for compliance with these, including on the part of the assembly personnel used.

This operating manual:

- is part of the pump
- is valid for all type series mentioned
- describes safe and proper use in all phases of operation

1.2 Target groups

Target group	Task
System owner	► Ensure that this manual is available at the location where the system is used, including for later reference. ► Ensure that personnel read and observe this operating manual and the other valid documents, in particular the safety and warning information. ► Observe additional system-related regulations and specifications.
Specialist personnel, assembly staff	► Read, observe and follow this operating manual and the other valid documents, in particular the safety and warning information.

Table 1: Target groups and their tasks

1.3 Other valid documents

Document	Purpose
Installation diagram	Installation dimensions, connection dimensions, etc.
Spare parts list	Ordering spare parts
Clearance certificate	Returning the pump
Declaration of conformity	Conformity with standards, content of the declaration of conformity

Table 2: Other valid documents and their purposes

1.4 Warning notices and symbols

Warning notice	Hazard level	Consequences of non-observance
⚠ **DANGER**	Immediate hazard	Death, severe physical injury
⚠ **WARNING**	Potential hazard	Death, severe physical injury
⚠ **CAUTION**	Potentially dangerous situation	Minor physical injury
NOTICE	Potentially dangerous situation	Material damage

Table 3: Warning notices and consequences of non-observance

Symbol	Meaning
⚠	Safety sign ► Follow all instructions identified with safety signs in order to avoid death or injuries.
►	Instruction
1. , 2. , …	Instruction with multiple steps
✓	Condition
→	Reference
ⓘ	Information, note

Table 4: Symbols and their meanings

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2 Safety

The manufacturer shall not bear any liability for damages caused as a result of non-observance of this documentation.

2.1 Correct and proper use

- Only use this pump for the purposes of conveying the agreed pumping media.
- Comply with operating limits.
- The water may not contain any abrasive or long-fibered components that may damage the pump materials. Consult the manufacturer if using other media.
- Ensure that the pump is only commissioned with pumping medium and is not operated without it.
- Open the suction-side fitting, and do not use it to control the flow rate.
- Never operate the pump when the armature on the delivery side is closed.
- To avoid damaging the motor, observe the permitted number of times per hour that the motor can be switched on (→ Manufacturer information).
- Any other use must be agreed with the manufacturer.
- The temperature of the pumping medium must not exceed 40 °C.

Avoiding obvious misuse (examples)

- Observe the operating limits of the pump for temperature, pressure, flow rate and speed.

The main areas of use are:

- Water supply to single-family and multiple-family homes
- Water supply to businesses and agriculture
- Sprinkling and irrigation of gardens and other usable areas

The pump is self-priming after being filled once with water.

Do not operate the pump without water. Dry running can lead to damage to the pump.

Ensure that the foot valve is in the water at all times.

⚠ WARNING

Any use that goes beyond the purposes described above shall be considered improper use. OSNA shall bear no liability for any resulting damages. The owner bears full risk for improper use.

2.2 General safety instructions

Please observe the following specifications before performing any activities.

2.2.1 Product safety

This pump is constructed according to the latest state of the art and accepted safety rules. Nevertheless, risks to life and limb for the user or third parties are still possible when using the pump, as are impairments to the pump and other material assets.

- Only use the pump in a technically perfect state and for the intended purpose. Ensure compliance with this operating manual and be aware of the hazards and safety issues during operation.
- Keep this operating manual and all other valid documents in a complete and legible state, and store in a location that is accessible at all times to personnel.
- Do not permit any activity that endangers personnel or uninvolved third parties.
- In the event of a safety-relevant fault, stop the pump immediately and have the fault rectified by responsible personnel.
- In addition to this documentation, ensure compliance with the statutory or other regulations for safety and accident prevention, as well as the relevant standards and specifications of the respective country.
- Do not remove any technical stickers.

Personnel qualification

2.2.2 Duties of the system owner

Safety-conscious work

Observe the safety specifications detailed in this operating manual, along with the occupational safety regulations and all additional internal safety regulations.

- Only use the pump in a technically perfect state and for the intended purpose. Ensure compliance with this operating manual and be aware of the hazards and safety issues during operation.
- Ensure compliance and monitoring:
  - correct and proper use
  - statutory or other safety and accident prevention regulations
  - safety specifications for handling hazardous substances
- Provide personal protective equipment.
- Do not remove contact protection during operation.
- Prevent any dangers from electrical energy (for details, please refer to the specifications of the VDE and the local energy supplier).
- Switch off the motor during all assembly and maintenance works, and secure against reactivation.
- Only work on the system when the pump is at a standstill.

The owner of the system must ensure that the personnel tasked with working on the pump have read and understood this operating

manual and all other valid documents before beginning work, in particular information on safety, maintenance and repair.

Work of any kind on the machine may only be performed when it has been completely decommissioned. Reinstall and reactivate all safety mechanisms after work.

Before restarting the machine, ensure that all necessary commissioning steps have been completed (→ 7.2 Commissioning, pg 25).

- Determine responsibilities, tasks and monitoring for personnel.

- Only allow work of any kind to be performed by specialist technical personnel:
  - assembly, maintenance and repair work
  - work on the electrical systems

- Only allow personnel undergoing training to perform work on the pump under the supervision of specialist technical personnel.

Safety mechanisms

- Provide the following safety mechanisms and ensure that they function correctly:
  - for moving components: contact protection for the pump, installed by the customer
  - for potential electrostatic charges: provide appropriate earthing

- Please consult the manufacturer before carrying out any conversions, repairs or changes during the guarantee period.

- Only use original parts or parts approved by the manufacturer.

2.2.3 Duties of personnel

- Observe the information on the pump and ensure it is legible (e.g. direction of rotation arrow, fluid connection indicators).

- Do not remove the contact protection for moving parts during operation.

- Use personal protective equipment if necessary.

- Only work on the system when the pump is at a standstill.

- Switch off the motor during all assembly and maintenance works, and secure against reactivation.

- Reinstall the safety mechanisms after working on the pump according to specifications.

Guarantee

2.3 Dangers of non-observance of the safety instructions

- Non-observance of the safety instructions can lead to hazards to personnel, the machine and the environment.

- Non-observance of the safety instructions can also lead to the loss of any damage claims.

- In particular, non-observance can lead to the following dangers:
  - failure of important system functions
  - electrical and mechanical hazards to personnel

2.4 Unauthorized conversion and production of spare parts

Conversions or changes to the machine are only permitted following consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer help ensure safety. The manufacturer bears no liability for the consequences of the use of other parts.

2.5 Unauthorized modes of operation

The operational safety of the machine is only guaranteed when it is used for the intended purpose according to the operating manual (→ 2.1 Correct and proper use, pg 7). Never exceed the limit values indicated in the technical data

.

2.6 Special hazards

2.6.1 Explosion area

- Do not use the pump in areas where there is a risk of explosion.

2.6.2 Hazardous pumping media

- Observe the safety regulations for handling hazardous substances (e.g. toxic, hazardous to health).

- Use personal protective equipment when performing work on the pump.

2.6.3 Noise emissions

The maximum continuous sound pressure level for a correctly installed and commissioned LG piston pump is 70 dB(A).

3 Layout and function

3.1 Labeling

This operating manual applies to pumps of the LG 100 to LG 750 series.

Model code:

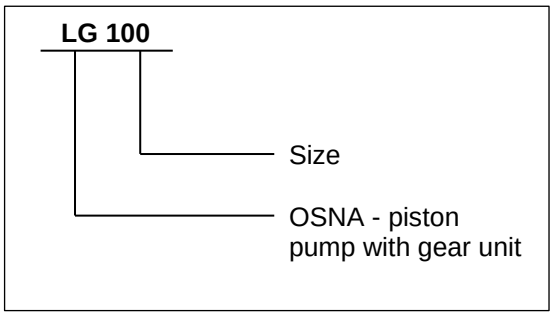

Figure 1: Model code

3.2 Scope of delivery, type LG piston pump

The customer can order the pump:

- in a preassembled state, i.e. delivery without motor, accessories enclosed unassembled. The motor is installed by the customer.

- in a fully assembled state, i.e the pump is fitted with motor ex-works.

The scope of delivery corresponds to the scope indicated in the order. Please check that the delivery is complete upon receipt. Notify the delivery company of any transport damage immediately. Please also refer to our conditions of sale and delivery. If using other motor brands, please ensure that the motors have the following drive torques as a multiple of the nominal torque.

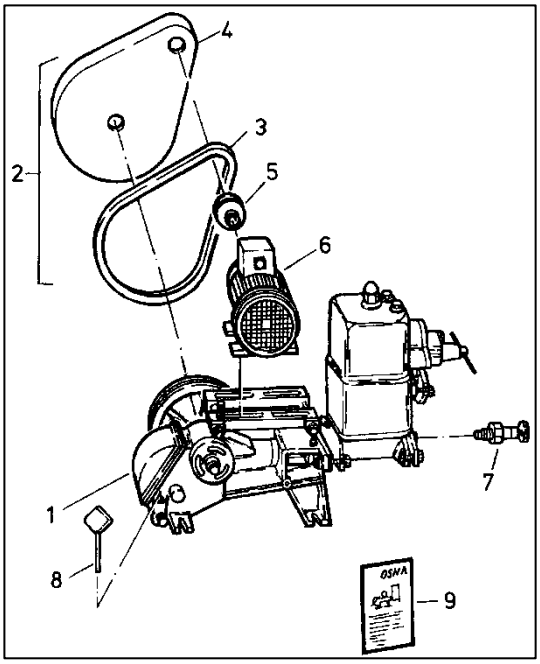

Figure 2: Scope of delivery for type LG

Key:

1 Pump

2 Accessories (includes items 3 to 9, fully assembled in complete version)

3 V-belt

4 Belt guard with holder and clamping set

5 V-role pulley key for motor shaft with lock screw

6 Motor with motor fastening set

7 Snifter valve

8 Oil dipstick

9 Assembly and operating manual

Motor power	Starting torque ratio	
[kW]	Ms/Mn	Mn [Nm]
0.37	1.9	2.5
0.55	1.7	3.7
0.75	1.6	5.0
1.1	2.0	7.3
1.5	2.3	9.9
2.2	2.6	14.6
3.0	2.8	20.0

Table 5: Starting torques

M_s = Starting torque

M_n = Nominal torque

kW = Kilowatt

Nm = Newton meter

List applies only to three-phase motors.

4 Transport and intermediate storage

4.1 Transport

Weight information (→ Other valid documents)

NOTICE

Transport the pumps carefully and secure them to prevent damage.

► Avoid applying pressure to the pump-side V-role pulley key.

4.1.1 Unpacking and checking the delivery condition

1. Check that the delivery is complete upon receipt.
2. Unpack the pump/unit upon delivery and check for transport damage.
3. Notify the delivery company of any transport damage immediately.
4. Dispose of the packaging material in line with the applicable local regulations.

4.1.2 Lifting

⚠ DANGER

Risk of death or crushed limbs from falling transported goods!

► Choose lifting equipment that is suitable for the total weight to be transported.

► Do not stand under suspended loads.

4.2 Storage

NOTICE

Material damage due to incorrect storage!

► Ensure that the pump is correctly stored.

1. Close all openings with blank flanges, blind plugs or plastic covers.
2. Ensure that the storage area meets the following conditions:
   – dry
   – free of frost
   – free of vibrations
3. Move the piston rod once per month.

NOTICE

Damage to bearings due to high water pressure or splashing water!

► Do not use water jets or steam jet cleaners to clean the bearing areas.

NOTICE

Damage to seals due to incorrect cleaning agent!

► Ensure that the cleaning agent does not corrode the seals.

1. Choose the cleaning agent according to the area of use.
2. Dispose of preservatives in line with the applicable local regulations.
3. When storing for longer than 6 months:
   – Check all elastomers (round seals, shaft seal rings, gaskets and gland packing) for elasticity, and replace if necessary.

4.3 Intermediate storage

Ensure during intermediate storage that the pump is not exposed to any weather conditions for a long period of time. If the pump is decommissioned for a longer period of time (approximately 2 to 3 months), ensure that it is fully drained. (→ 7.3 Decommissioning, pg 29)

4.4 Disposal

Plastic parts may be contaminated by toxic or radioactive pumping media. If this is the case, cleaning is not sufficient.

⚠ WARNING

Risk of poisoning and environmental damage from pumping medium!

► Use personal protective equipment when performing work on the pump.

► Before disposing of the pump:
   – Collect the oil and dispose of it in line with the applicable local regulations.
   – Neutralize any pumping medium residues in the pump.

► Dispose of the pump in line with the applicable local regulations.

5 Layout and mode of operation

5.1 Mode of operation

The OSNA piston pump is a double-acting, self-priming piston pump that has proven itself thanks to its quiet running, long service life and good suction performance.

The OSNA piston pump can be used together with a pressurized container for household water supply.

5.2 Functional and operating elements

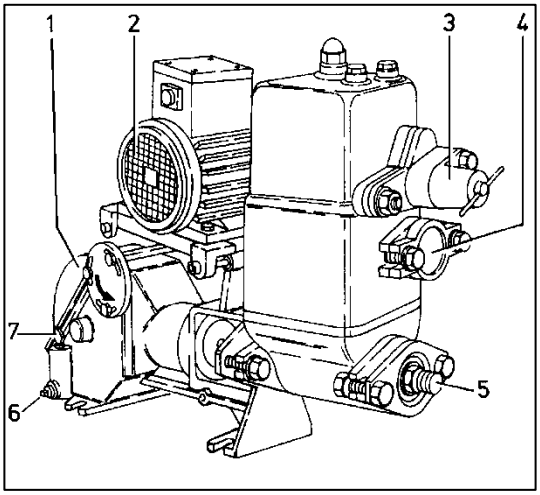

Figure 3: Functional elements 1

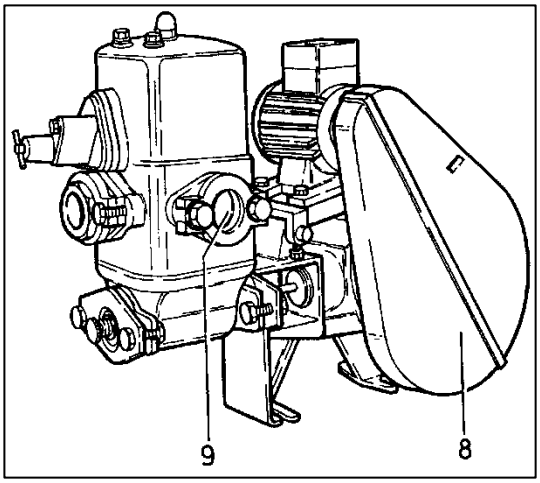

Figure 4: Functional elements 2

Key:

1 Piston pump
2 Motor
3 Safety valve (SIOS valve, checked by TÜV)
4 Discharge nozzle
5 Snifter valve
6 Oil drain plug
7 Oil dipstick
8 Belt guard
9 Suction nozzle

5.3 Layout of the piston pump with pressurized container

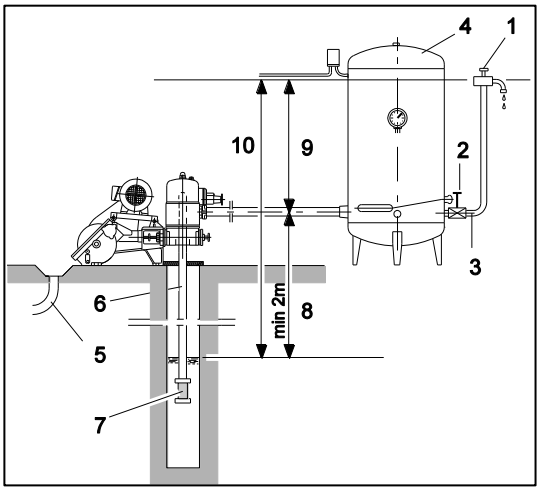

Figure 5: Layout with pressurized container

Key:

1 Consumer
2 Shut-off valve with water outlet
3 Delivery pipe
4 Pressurized container
5 Leakage fluid outlet
6 Suction pipe
7 Foot valve
8 Suction head
(Minimum suction head 2 m or ≈ -0.2 bar)
9 Check valve

The items listed here are not included in delivery with the piston pump.

5.4 Technical data

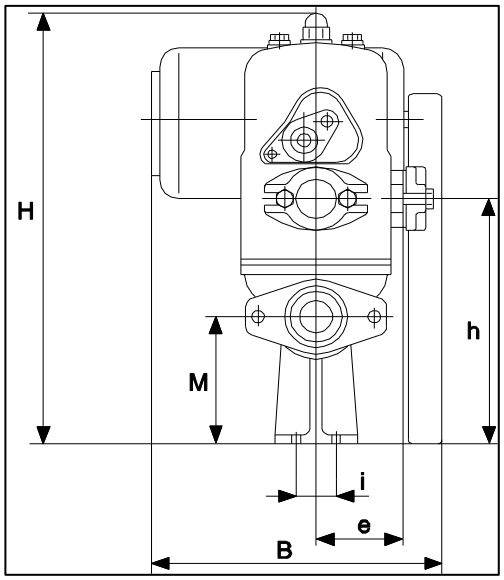

Figure 6: Dimensions in front view

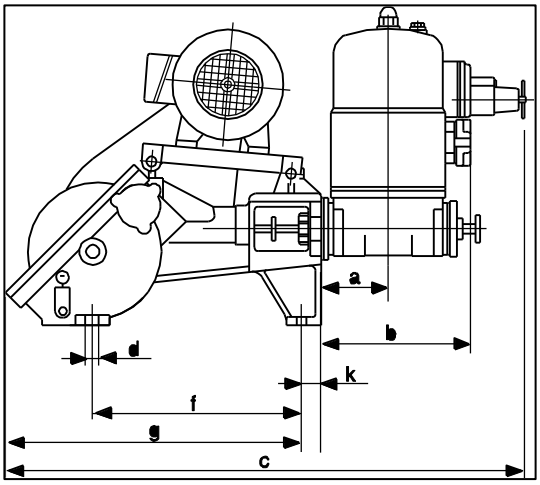

Figure 7: Dimensions in side view

Please check the pump type on the type plate to determine the correct gap.

Pump type		LG 100	LG 200	LG 400	LG 500	LG 750
Flow rate	Liters/hour	1500	2500	4000	5000	7000
Pump pressure	bar	4/6	4/6	4/6	4/6	4/6
Motor power, output *	kW	0.37 (0.55)	0.55 (0.75)	0.75 (1.1)	1.1 (1.5)	1.5 (2.2)
Motor speed	rpm	1450	1450	1450	1450	1450
Pump pipe connections suction + delivery	Inches	1	1 1/4	1 1/2	2	2
Cylinder - ø	mm	55	75	90	100	100
Electrical connection	Volt	230/400	230/400	230/400	230/400	230/400
Dimensions a [min]	mm	85	93	93	114	114
b [min]	mm	170	193	193	232	232
B [min]	mm	≈350	≈350	≈350	≈420	≈420
c [min]	mm	≈735	≈758	≈758	≈870	≈870
d [min]	mm	14	14	14	17	17
e [min]	mm	80	95	95	180	180
f [min]	mm	300	300	300	395	395
g [min]	mm	470	470	470	588	588
H [min]	mm	399	440	450	554	554
h [min]	mm	232	243	253	304	304
i [min]	mm	140	140	140	170	170
k [min]	mm	40	40	40	38	38
M [min]	mm	110	110	110	142	142
Suction head min [1)]	m	2	2	2	2	2
Suction head max [1)]	m	8	8	8	8	8
Total delivery head [2)] (4/6 bar)	m	40/60	40/60	40/60	40/60	40/60

* Motor output for AC motors available upon request
1) Without pipe losses
2) The total delivery head is comprised of the suction head, the geodetic delivery head and friction losses

Table 6: Technical data

6 Assembly and installation

NOTICE

Material damage due to contamination!

► Only remove covers, transport caps and sealing caps immediately before connecting the pump to the pipelines.

6.1 Preparing for installation

6.1.1 Checking the surrounding conditions

1. Ensure that the required surrounding conditions are met (→ 6.2 Installation, pg 18).

2. Please consult the manufacturer when installing at altitudes over 1000 m above mean sea level.

6.1.2 Preparing the installation location

► Ensure that the installation location meets the following conditions:

- pump is freely accessible from all sides
- sufficient space for installing/removing piping, as well as for maintenance and repair work, in particular for installing/removing the pump and motor
- no effects from external vibrations on the pump (bearing damage)
- protection against frost

6.1.3 Preparing the base surface and foundations

► Ensure that the base surface and foundations meet the following conditions:

- level
- clean (no oils, dust or other contaminations)
- foundations can support the weight of the pump unit and all operating forces
- stability of the pump unit ensured

6.2 Installation

6.2.1 Installing the pump

Prior to installation, remove the packaging (if present) and check the pump for any transport damage. Ensure that the installation area is dry and free of frost.

⚠ CAUTION

Do not operate the pump in areas where there is a risk of explosion. Ensure that the pump is installed and connected in line with the local regulations.

We recommend installing the pump on a noise-insulating base, in order to prevent transmission noises to parts of the building.

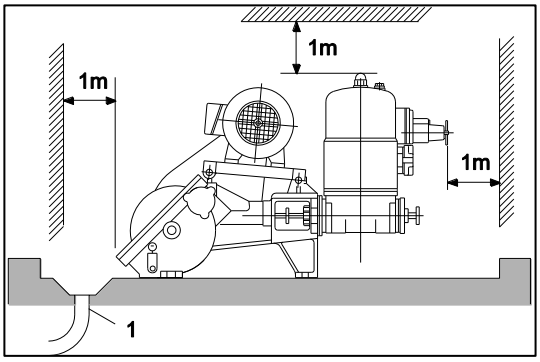

Figure 8: Installation area side view

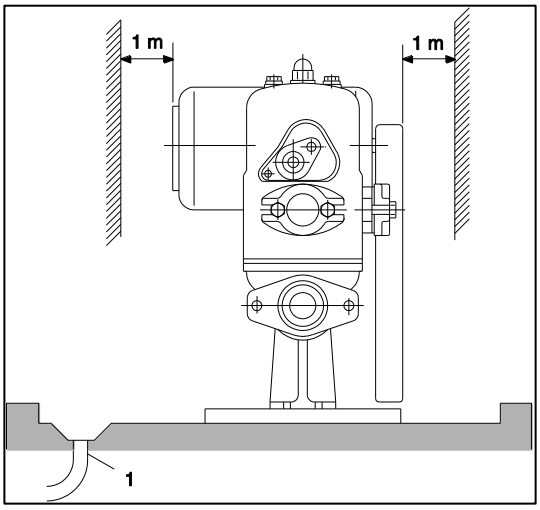

Figure 9: Installation area front view

Ensure a minimum clearance to aid maintenance work (→ Figure 8).

Provide an outlet (1) for leakage fluid during maintenance work.

⚠ CAUTION

Install the pump in such a way that prevents flooding of building sections as the result of a leak or when performing maintenance work.

6.2.2 Electrical connection

⚠ CAUTION

Electrical connection must be carried out by a specialist electrician, in line with the specifications of the local energy supplier or the VDE.

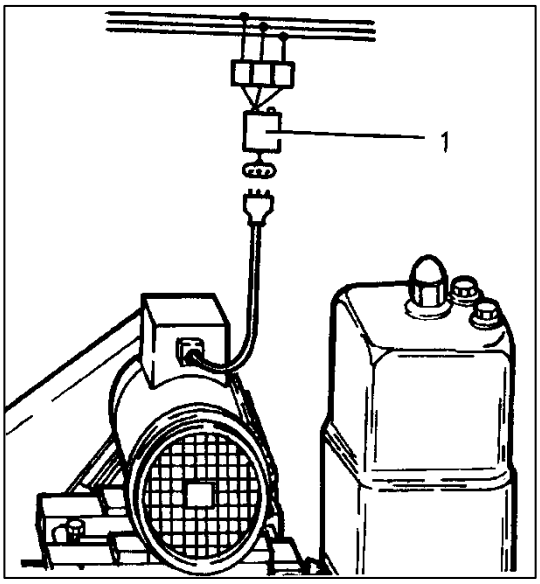

Figure 10: Motor protection switch

Install a motor protection switch (1) to protect the motor (→ Figure 10).

6.2.3 Water connection

Connect the suction pipe (1) to the suction nozzle (2). Install a check valve in the suction pipe.

Connect the discharge pipe (5) to the discharge nozzle (4).

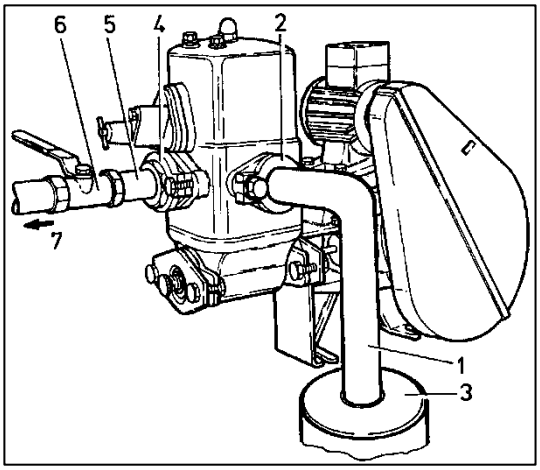

Figure 11: Water connection

Key

1 Suction pipe
2 Suction nozzle
3 Water container
4 Discharge nozzle
5 Delivery pipe
6 Non-return valve
7 To consumer

We recommend installing shut-off valves (6) on the system side to make it easier to drain the pump.

6.2.4 Assembling the piston pump with additional pressurized container

The pump can be operated with an additional pressurized container (2).

(Available upon request)

⚠ CAUTION

Ensure compliance with all safety specifications during installation and operation.

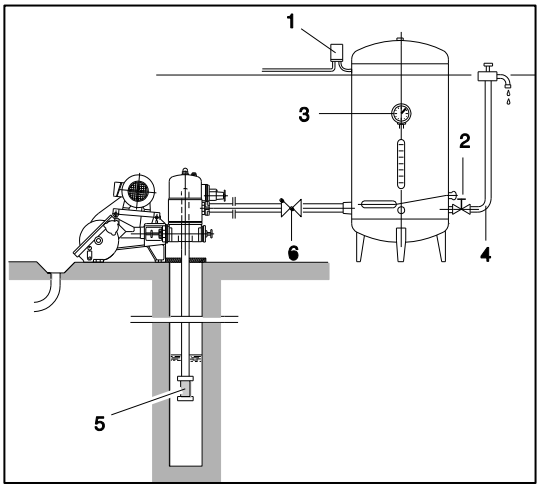

Figure 12: Assembly with pressurized container

Key

1 Push switch
2 Pressurized container
3 Manometer
4 Delivery pipe
5 Foot valve
6 Non-return valve
7 Water level indicator

6.3 Installation

- Screw the pump horizontally to the foundation.

Provide a noise-insulating base

6.3.1 Installing the V-belt

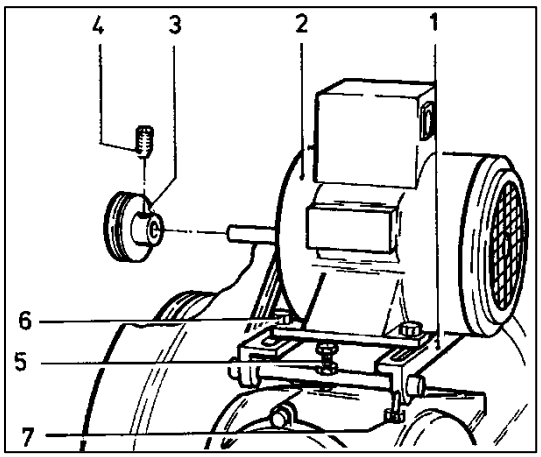

Figure 13: Assembly with pressurized container

Key

1 Rocker arm
2 Motor
3 V-role pulley key
4 Lock screw
5 Tensioning screw
6 Motor fastening screw
7 Screw

- Push the small V-role pulley key (3) onto the motor shaft as shown. The hub must be facing the motor.
  Drill a hole in the motor shaft to accommodate the lock screw.

Insert the lock screw (4).

- Place the motor (2) on the rocker arms (1) and tighten slightly.

- Position the V-belt and align the motor on the rocker arm until the pulleys are aligned.

⚠ CAUTION

The pulleys must be aligned precisely in order to ensure that the drive runs perfectly.

(Readjustment may be necessary)

- Tension the V-belt using the tensioning screw (5).

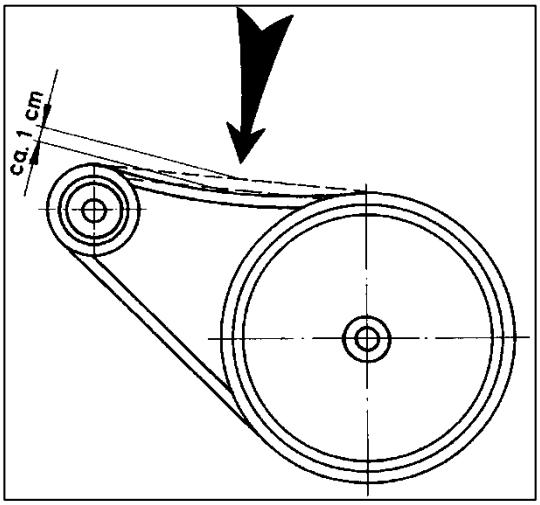

Figure 14: Tensioning the V-belt

After tensioning, it must still be possible to push the V-belt by around 1 cm.

- Tighten the motor fastening screws (6) on the motor base.
- Tighten the screws (7) on the rocker arms (1).
- Insert the oil dipstick.

6.3.2 Belt guard

⚠ CAUTION

Never operate the pump without the belt guard.

Always reattach the belt guard after maintenance work.

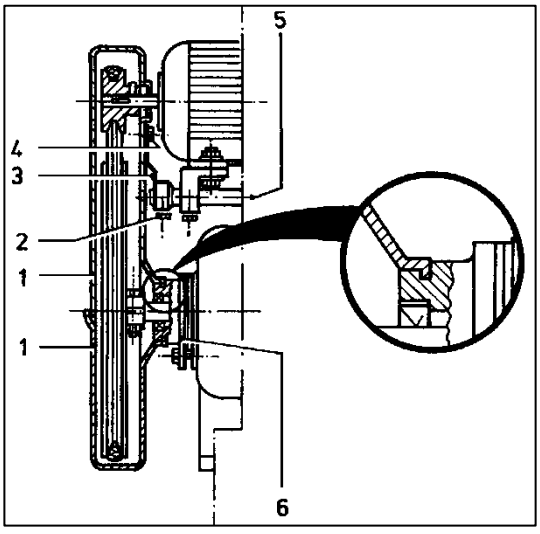

Figure 15: Belt guard for LG 100 - 400

Key

1 Shell halves
2 Screw
3 Clamp
4 Screw
5 Rocker shaft
6 Crankcase

Assembling the belt guard for LG 100 - 400

- Push the clamp (3) onto the rocker shaft (5).
- Insert the shell halves of the guard (1) into the groove on the crankcase (6) and push together (snap connections).
- Loosely screw on the guard and the clamp.
- Align the guard and tighten both screws (2 and 4) on the clamp.

Removing the belt guard for LG 100 - 400

- Loosen and remove the screw (4).
- Pull off the belt guard.

⚠ CAUTION

During assembly, ensure that the seam of the belt guard is properly inserted in the groove on the crankcase/gear casing.

Assembling the belt guard for LG 500 and 750

- Remove the V-role pulley key (3) on the pump.
- Loosely screw on the clamp (4) to the rear section of the belt guard (1).

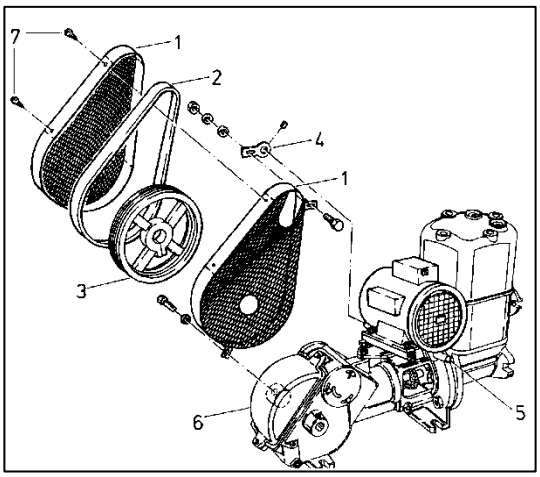

Figure 16: Assembling the belt guard for LG 500 and 750

Key

1 Belt guard
2 V-belt
3 V-role pulley key
4 Clamp
5 Rocker shaft
6 Casing
7 Tapping screw

- Align the rear section of the belt guard (1) and screw to the front rocker shaft (5) and the casing (6).
- Reattach the V-role pulley key (3).
- Position and tension the V-belt (2).
- Push on the front section of the belt guard (1) and align.
- Drill holes in the front section of the belt guard for the tapping screws (7).
- Secure the front section with tapping screws (7).

Removing the belt guard for LG 500 and 750

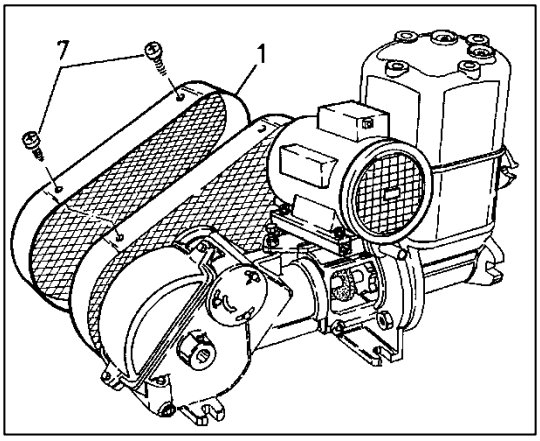

Figure 17: Removing the belt guard for LG 500 and 750

- Loosen the tapping screws (7).
- Remove the front section of the belt guard (1).

No further disassembly of the belt guard (1) is required, as the V-belt is freely accessible once the front section has been removed.

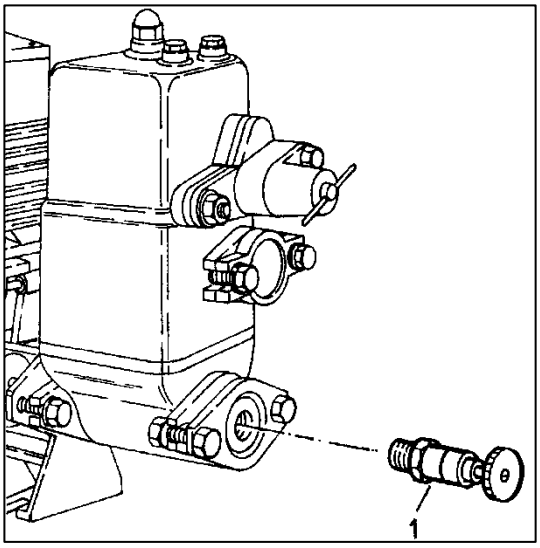

Figure 18: Snifter valve

Key

1 Snifter valve

Seal the snifter valve (1) on the thread and screw into the pump cylinder cover.

6.3.3 Installing the snifter valve

7 Commissioning/ decommissioning

7.1 Preparing for commissioning

7.1.1 Determining the pump configuration

► Determine the pump configuration

Pump configurations include, for example, the type of drive transmission or the limiting pressure.

7.1.2 Filling the drive casing with oil

We recommend only using OSNA gear oil in our piston pumps. OSNA gear oil is available from specialist retailers.

OSNA gear oil has the viscosity class SAE 10W, making it relatively thin by gear oil standards. It is equivalent to common motor oils in its flow behavior. Thicker gear oils do not distribute adequately throughout the gear unit. **For this reason, do not use standard gear oils!**

- Remove the screws (1) and take off the casing cover (2).
- Fill the required quantity of oil.
- Check the oil level on the dipstick marking (3).

Oil quantity:

Series LG 100 - LG 400	min.	0.4 l
Series LG 500 - LG 750	min.	0.8 l

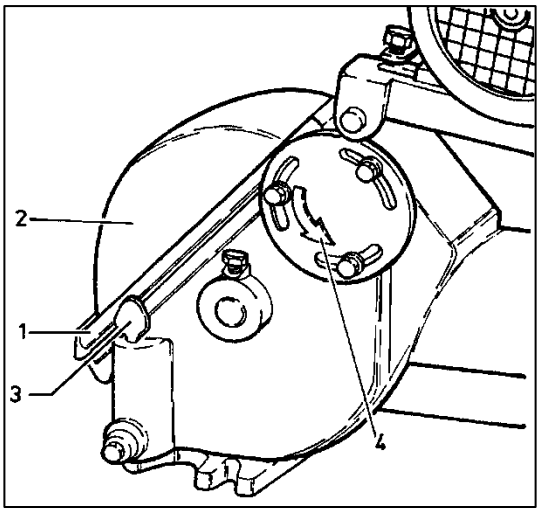

Figure 19: Drive casing

Key

1 Screw
2 Casing cover
3 Dipstick
4 Arrow (direction of rotation)

Ensure that used oil is disposed of at the waste oil collection point.

Incorrect handling and disposal of waste oil can damage the environment.

It is forbidden to add third-party oils such as solvents, brake fluid and coolant.

Waste oil can be returned to us free of charge up to the purchased quantity.

7.2 Commissioning

7.2.1 Filling the pump

If using long suction pipes, fill the entire pipe before initial commissioning.

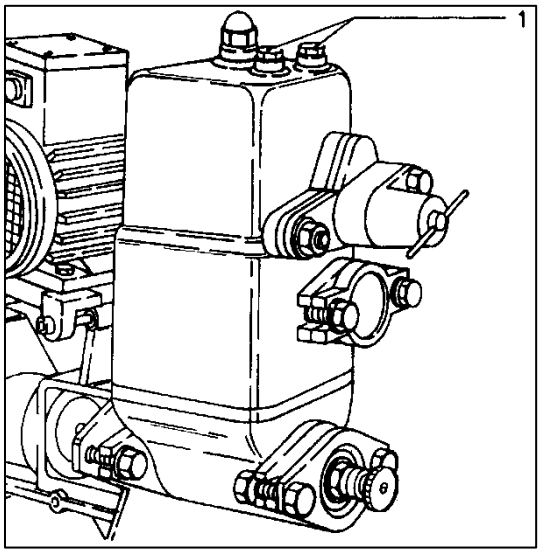

Figure 20: Water side

Key

1 Screwed plug

⚠ CAUTION

Check that there is enough water in the well or feed tank.

Do not operate the pump without water. Dry running can lead to damage to the pump.

7.2.2 Checking direction of rotation

⚠ WARNING

Risk of poisoning or injury due to hazardous pumping media!

► Collect any escaping pumping medium safely and dispose of in an environmentally friendly way.

NOTICE

Material damage due to dry running!

► Ensure that the pump is properly filled.

- Unscrew the screwed plugs (1).
- Fill approx. 3/4 l of pumping medium into both filler openings of the air vessel.
- Reinsert and tighten the screwed plugs.

⚠ CAUTION

Incorrect direction of rotation

=

Insufficient lubrication

The cast arrow (→ Figure 19: Drive casing, pg 25) on the casing (opposite the pump disc) indicates the required direction of rotation.

7.2.3 Starting the piston pump

- ✓ Pump correctly installed and connected
- ✓ Motor correctly installed and connected
- ✓ Motor and belt precisely aligned
- ✓ All connections established, sealed and free of tension
- ✓ All safety mechanisms installed and function tested
- ✓ Pump correctly prepared, filled and vented

⚠ **DANGER**

NOTICE

Risk of injury due to running pump!

- ► Do not touch the running pump.
- ► Do not perform any work on the running pump.

⚠ **DANGER**

Risk of poisoning or injury due to spurting pumping medium!

- ► Use personal protective equipment when performing work on the pump.

NOTICE

Material damage due to dry running!

- ► Ensure that the pump is properly filled.

Open the suction-side fitting, and do not use it to control the flow rate. Do not close the pressure-side fitting!

NOTICE

Never operate the pump when the fitting on the delivery side is closed.

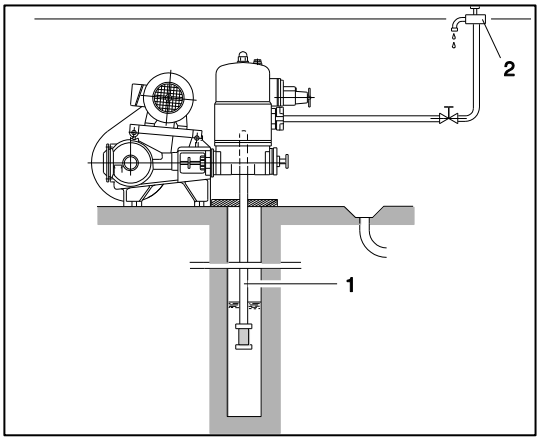

Figure 21: Starting the piston pump

Key

1 Suction pipe (suction head at least 2 m or -0.2 bar)

2 System-side consumer

0.1 MPa = 1 bar ≈ 10 m

- Check before commissioning that all pipe connections are fitted and pressure tight. Ensure that the snifter valve on the pump is closed.
- Open any system-side consumers (2) if present.

NOTICE

Do not activate the piston pump when the armatures are closed.

- Switch on the electric motor and check whether there is suction from the pump. If suction is insufficient, switch off the pump and repeat the filling process (→ 7.2.1 Filling the pump, pg 26).

NOTICE

Do not exceed the maximum authorized pressure of 4 bar (6 bar).

1. Open the suction-side armature.
2. Open the delivery-side armature.
3. Switch on the motor and ensure that it runs quietly.
4. After the first pressure loads, check whether the pump is tight.

5. Set a slight leakage on the gland packing.

For optimal system operation, ensure a minimum suction head of 2 m or -0.2 bar.

For other modes of operation, we recommend contacting OSNA customer service.

7.3 Decommissioning

⚠ DANGER

Risk of injury from hazardous pumping media!

► Collect any escaping pumping medium safely and dispose of in an environmentally friendly way.

► Take the following measures in the event of operating interruptions:

Pump to be	Measure
Shut down for longer period	► Take measures according to the pumping medium
Drained	► Close suction and delivery-side fittings.
Disassembled	► Deactivate motor and secure against unauthorized reactivation.
Put into storage	► Observe storage measures (→ 4.2 Storage, pg 13).

Table 7: Measures in the event of operational interruption

Flow medium behavior	Duration of operating interruption (depending on process)	
	short	long
Solid components settle	► Flush pump.	► Flush pump.
Solidified/frozen, non-corrosive	► Heat or drain pump and containers.	► Drain pump and containers.
Solidified/frozen, corrosive	► Heat or drain pump and containers.	► Drain pump and containers. ► Apply preservative to pump and containers.
Remains fluid, non-corrosive	–	–
Remains fluid, corrosive	–	► Drain pump and containers. ► Apply preservative to pump and containers

Table 8: Measures depending on the behavior of the pumping medium

Drain the pump completely if shutting down for a longer period (approx. 2 - 3 months), or if there is a danger of frost.

⚠ CAUTION

Disconnect the pump from the electricity supply if shutting down for a longer period.

Draining the pump and protecting against frost

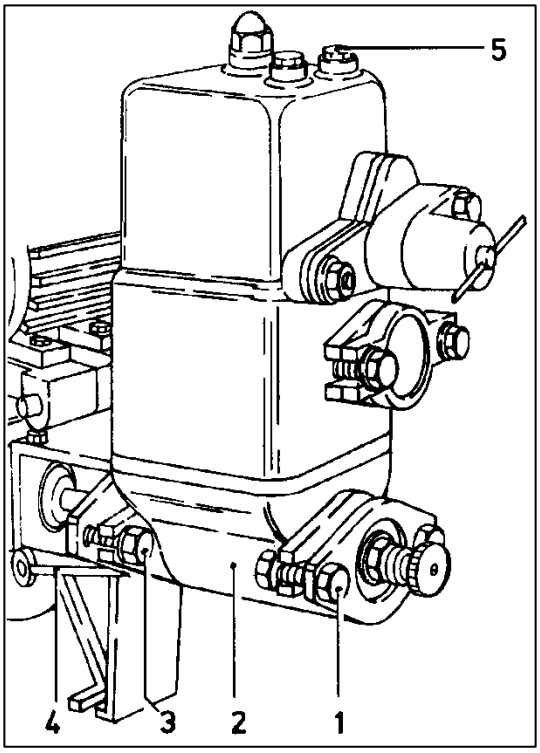

Figure 22: Draining the pump

Key

1 Cylinder cover screw
2 Cylinder
3 Tie bolt
4 Drive side
5 Screwed plug

- Turn off the pump, then unscrew the upper screwed plug on the suction side (5).
- Disconnect the suction and delivery pipes.
- Loosen the cylinder cover screws (1) and tie bolts (3) between the drive side (4) and the cylinder (2) until the remaining water in the pump drains out on both sides.
- Re-tighten the loosened screws and re-attach the suction and discharge pipes.
- Reinsert the suction-side screwed plug (5) and check for tightness.

7.4 Recommissioning

⚠ CAUTION

The pump must move easily for recommissioning.

- Check the oil level before recommissioning. Top up with oil if necessary (→ 8.1.1 Oil level, pg 32).
- Check that the seal parts of the stuffing box are in good condition (→ 8.1.4 Stuffing box, pg 34).
- Perform all further work steps in line with 7.2 Commissioning (pg 25).

For operating interruptions > 1 year:

Shut down time	Measure
> 1 year	► Check visually for leaks
> 2 years	► Replace elastomer seals (gaskets, round seals, shaft seal rings and gland packings). ► Replace anti-friction bearings.

Table 9: Measures following longer shut down time

8 Maintenance and repair

We can provide trained customer service technicians for assembly and repair work. Please present proof of the conveyed goods upon request.

(DIN safety data sheet or clearance certificate)

DANGER

Risk of injury due to running pump!

- ► Do not touch the running pump.
- ► Do not perform any work on the running pump.

WARNING

Risk of poisoning or injury due to hazardous pumping media!

- ► Use personal protective equipment when performing work on the pump.

DANGER

Risk of death from electric shock!

- ► Only allow work on the electrical systems to be carried out by a qualified electrician.
- ► Ensure that the supply of electricity is switched off and secured against reactivation when performing all maintenance work.

8.1 Maintenance

OSNA piston pumps are virtually maintenance free as far as their main components are concerned. To ensure higher operational safety, however, perform the following checks at intervals of 2-3 months.

8.1.1 Oil level

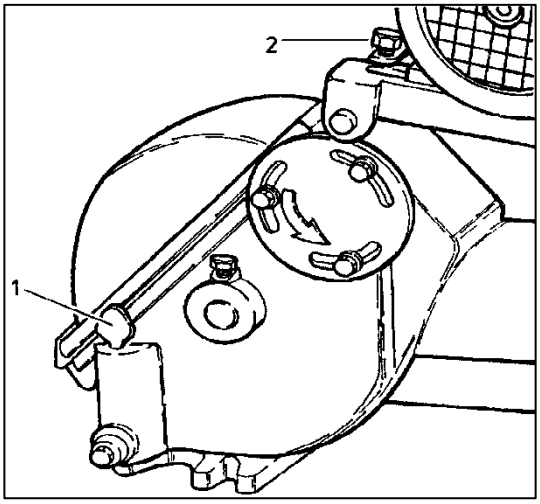

Figure 23: Oil level

Key

1 Dipstick

2 Tensioning screw

- Check the oil level using the dipstick (1). Perform the first oil change after one month of operation.

- Change the oil every 3 years thereafter.

8.1.2 V-belt

⚠ DANGER

Only perform the inspection when the system is switched off and secured.

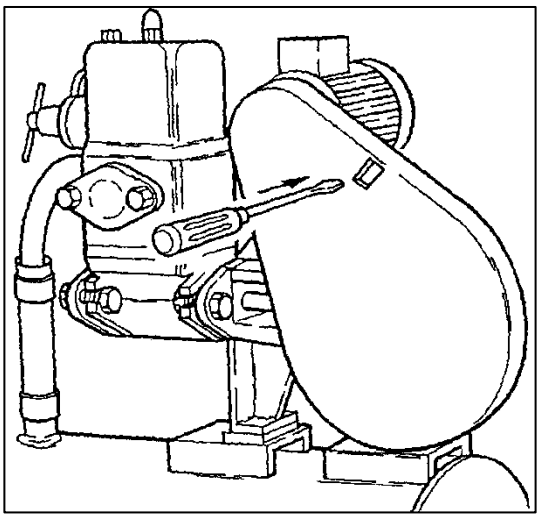

Figure 24: V-belt guard

Re-tension new V-belts after around 4-5 weeks of running time using the tensioning screw (2) (→ Figure 23)).

The V-belt and pulley must remain free of oil and grease, as the belt could otherwise slip and be destroyed.

Check the V-belt tension during all maintenance intervals. This check can be performed without disassembling the belt guard. Use a thin object (such as a screwdriver) to push the V-belt through the slot in the belt guard. It should be possible to push the belt by around 1 cm.

8.1.3 Adding air

Once the system's shut-down pressure is reached, the normal air/water ratio is 1/3 air to 2/3 water. You can add more air by opening the snifter valve (→ Figure 25).

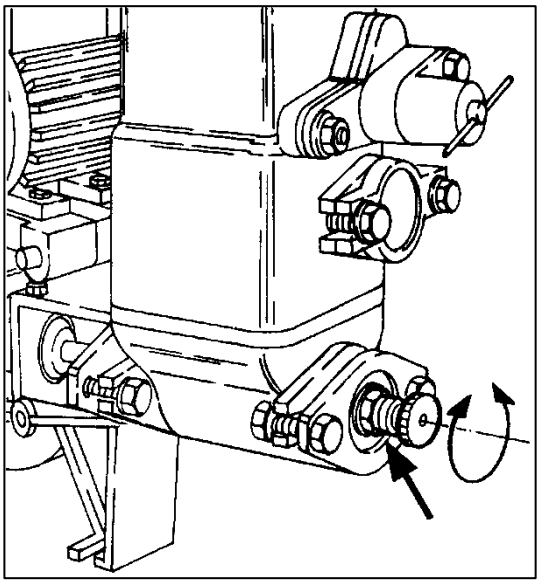

Figure 25: Adding air

A sufficient air cushion is required in the pressurized container to maintain the switching cycles. Air must be added if the pump switching intervals are short.

⚠ WARNING

Ensure the snifter valve is closed after adding air.

8.1.4 Stuffing box

The stuffing box has a grooved ring packing. The packing seals automatically, requiring just a slight tightening of the domed nut (3) by hand.

⚠ WARNING

Excessive tightening places too much tension on the grooved rings. This leads to loss of tightness in the stuffing box.

Replace the gland packing if the stuffing box leaks. Check at the same that the piston rods are in a good condition. Any worn or scored piston rods can lead to premature destruction of the packing.

Assembly sequence:

Tallow ring

Grooved ring

Grooved ring

Tallow ring

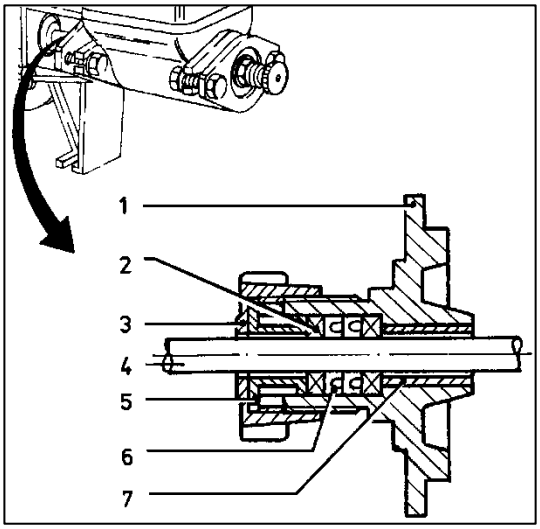

Figure 26: Stuffing box

Key

1 Stuffing box body
2 Gland packing (tallow ring)
3 Gland nut
4 Piston rod
5 Stuffing box
6 Grooved ring
7 Neck bush

8.2 Maintenance service

NOTICE

Have the pump inspected every 3 years by a specialist service provider or the OSNA customer service.

8.2.1 Oil change

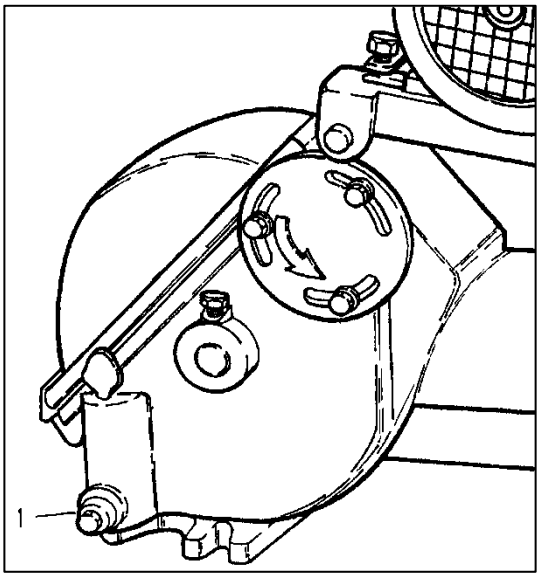

Figure 27: Oil change

- Unscrew the oil drain plug (1) and drain the oil.

Collect the oil in a container in an environmentally friendly way, and dispose of it according to specifications.

- Re-tighten the oil drain plug.

Re-seal the oil drain plug!

- Fill with oil as described in section 8.1.1 Oil level (pg 32).

8.2.2 Sending the pump to the manufacturer

✓ Pump depressurized

✓ Pump completely drained

✓ Electrical connections disconnected and motor secured against reactivation

✓ Manometer removed together with supply lines and holders

1. Only send pumps or individual components to the manufacturer together with a verifiable and completely filled out clearance certificate. Request a clearance certificate from the manufacturer if required.

2. Using the following table, take the action required for returning the pump according to the necessary repair.

Repair	Action for return
At customer	► Return defective component to manufacturer.
At manufacturer	► Flush pump. ► Send complete pump (not disassembled) to manufacturer.
At manufacturer, with guarantee claim	► Only if using hazardous pumping medium: flush pump. ► Send complete pump (not disassembled) to manufacturer.

Table 10: Measures for return

8.3 Safety valve

OSNA piston pumps are fitted with a TÜV-approved OSNA - SIOS safety valve (→ Figure 28: Safety valve), located in the pump's air vessel. This component is type tested and therefore compliant with safety specifications.

OSNA-SIOS valve 4 bar:

White cap

Nominal pressure:	4.0 bar
Max. shut-off pressure:	3.5 bar
Pumping medium:	Water
Temperature range:	0-40°C

OSNA-SIOS valve 6 bar:

Red cap

Nominal pressure:	6.0 bar
Max. shut-off pressure:	5.5 bar
Pumping medium:	Water
Temperature range:	0-40°C

WARNING

Do not operate the piston pump without a safety valve.

All warranty claims are void if the seal is removed.

Pump type	SIOS 4 bar	SIOS 6 bar	Comments
LG 100	X	X	
LG 200	X	X	
LG 400	X	X	
LG 500	-	-	System-side protection required for 4 and 6 bar
LG 750	-	-	

Table 11: Selection of SIOS valves

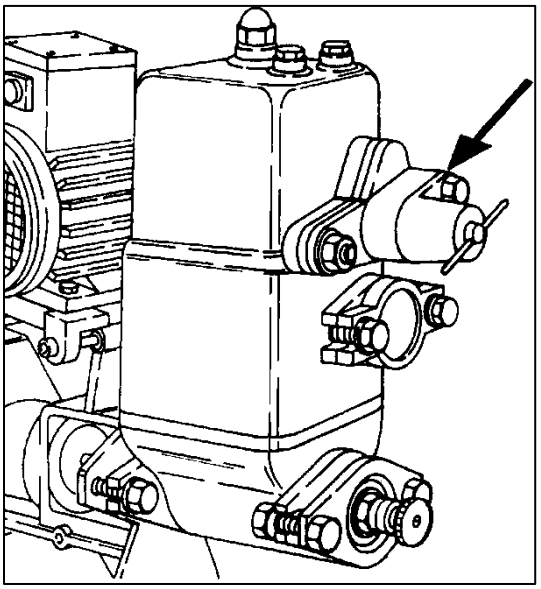

Figure 28: Safety valve

If using a piston pump without OSNA-SIOS safety valve, the system should be protected against vacuums by means of a TÜV-appropriate safety valve.

To ensure the installed OSNA-SIOS safety valve remains fully functional over the long term, it is necessary to manually operate the valve approximately every 6 months (pull the valve toggle horizontally).

The SIOS valve responds when there is 4 or 6 bar of pressure in the piston pump's air vessel. Do not judge by the manometer display on the vessel. This is because the manometer does not measure the resistances through the discharge pipe, the inertia of the push switch, and pressure peaks. This response can also occur prematurely if the air cushion in the air vessel is too low.

Always fit the suction pipe rising to the pump.

The SIOS valve opens if there is inlet pressure.

9 Faults and troubleshooting

Please consult the manufacturer should you experience any faults that are not described in the following table, or cannot be traced back to the described causes.

Fault	Cause	Remedy
No pump suction, pump conveys little to no water.	Pump is insufficiently filled.	Decommission pump and repeat filling process, multiple times if necessary.
	Suction pipe not vacuum tight.	Re-seal suction pipe.
	Valves jammed or leaky.	Remove air vessel and clean valves, replace rubber valve discs if necessary, consult specialist.  During assembly, ensure that the valve plate, valve stop and seals are fitted in the correct position. (Valve stop with borehole → discharge side)
	Suction head too high.	Check with mano-vacuummeter, consult specialist.
	Stuffing box leaks.	Tighten or replace stuffing box if necessary, check piston rod.
	Piston and cylinder worn.	Consult specialist, possibility of sand being conveyed by pump, improve conditions in water supply.
Pump knocks	No air cushion in air vessel.	Check air vessel tightness, replace screwed plug seal if necessary. Increase suction head or consult specialist. Check non-return valve in discharge pipe. Rubber lip of snifter valve jammed, replace.
	Suction pipe too long. Suction head too high.	Have suction pipe fitted with next-largest pipe dimension, if possible.
	No air cushion in pressurized container.	Check for leaks with soap and remedy. Top up air cushion.
OSNA-SIOS safety valve responds.	Insufficient air cushion in air vessel, snifter valve not functioning properly.	Reduce switching pressure, add air by opening the snifter valve.
	Discharge-side resistances too high.	Check system for suction. Consult specialist.

Fault	Cause	Remedy

Oil leak on pump or bearing.	Oil leak on pump or bearing.	Consult specialist.
Drive knocks.	Drive components defective.	Have drive components replaced by specialist.
	Damage can be caused by: – insufficient lubrication – oil saponified by spray water	Change oil and improve ventilation of installation area.
	Incorrect direction of rotation.	Have inspected by specialist.
Water leak on snifter valve.	Rubber lip of snifter valve defective.	Replace rubber lip.
Pump switches on after slightest water extraction. (When operating with additional pressurized container)	No air cushion in pressurized container.	Check for leaks with soap and remedy. Top up air cushion.
Air leak on tap.	Air volume in pressurized container too high. (When operating with additional pressurized container)	Vent air from pressurized container.
	Air intake on suction side.	Consult specialist.
	Extraction may be greater than pump output.	Consult specialist.
	Snifter valve may be open.	Close valve.

Table 12: Fault causes

10 Appendix

10.1 Service, spare parts, accessories

Please note in particular that spare parts and accessories not delivered by the manufacturer are also not checked and approved by the manufacturer. The installation and/or use of such products can therefore, under certain circumstances, have a negative effect on the properties of the piston pump specified in the design. This can in turn jeopardize safety. Any liability and guarantee on the part of OSNA for damages resulting from the use of non-original spare parts and accessories is excluded.

Any faults that cannot be rectified by the owner may only be rectified by OSNA customer service or specialist service providers. Please provide a precise description of the fault, so that our service technician can prepare and bring the required spare parts. You can reach our customer service via the address on the last page.

Spare parts can be ordered via specialist retailers. Please refer to the type plate for the type designation.

In the event of any guarantee claims, please provide the machine number on the housing.

The following spare parts diagrams are intended solely to ease the process of finding and procuring the spare parts.

⚠ WARNING

Do not use the spare parts diagrams as assembly instructions.

Notes on ordering spare parts:

In order to prevent incorrect deliveries, please ensure that the information you provide when ordering is as precise as possible:

- Type designation
- Designation
- Required quantity
- Required shipping method (e.g. post, freight, express freight, courier delivery)
- Precise delivery address

10.2 Individual parts of the LG piston pump

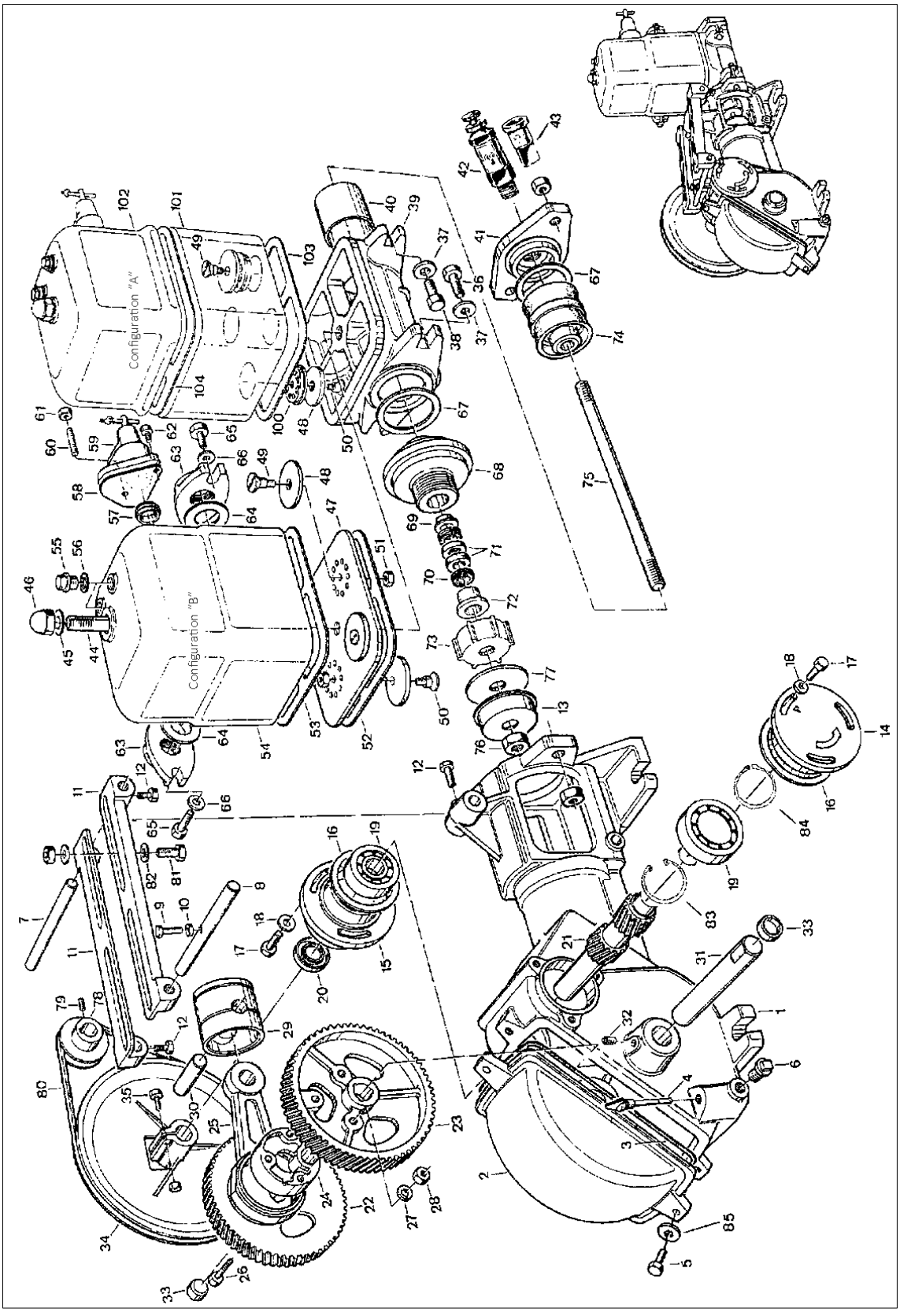

Figure 29: Explosion diagram of the LG 100-400 piston pump

Item	Designation	Item	Designation
1	Casing	47	Valve seat
2	Casing cover	48	Valve plate
3	O-Ring	49	Valve stop delivery side
4	Oil level dipstick	50	Valve stop suction side
5	Hexagon head bolt	51	Retaining nut
6	Plug	52	Gasket
7	Rocker axis without hole	53	Gasket
8	Rocker axis with hole	54	Air vessel
9	Hexagon head bolt	55	Screwed plug
10	Hexagon nut	56	Joint ring
11	Rocker arm	57	Valve seat
12	Hexagon head bolt	58	Membrane
13	Cover with oil preventer cover	59	Valve body with functional parts
14	Bearing cover	60	Stud
15	Bearing cover	61	Hexagon nut
16	Gasket	62	Hexagon head bolt
17	Hexagon head bolt	63	Flange
18	Disc	64	Gasket
19	Radial grooved ball bearing	65	Hexagon head bolt
20	Radial shaft seal	66	Disc
21	Pinion shaft bearing	67	Gasket
22	Gear wheel "L"	68	Stuffing box body
23	Gear wheel "R"	69	Neck bush
24	Eccentric cam	70	Grooved ring
25	Connecting rod	71	Gland packing
26	Hexagon head bolt	72	Stuffing box
27	Spring washer	73	Gland nut
28	Hexagon nut	74	Piston
29	Crosshead	75	Piston rod
30	Crosshead small end	76	Hexagon nut
31	Stub shaft	77	Thrower
32	Square-head bolt	78	V-role pulley key, motor side
33	Push-on sealing cap	79	Grub screw
34	V-role pulley key pump side	80	V-belt
35	Hexagon head bolt with nut	81	Hexagon head bolt with nut
36	Hexagon head bolt with nut	82	Disc
37	Disc	83	Circlip
38	Hexagon head bolt with nut	84	Circlip
39	Pump cylinder	85	Disc
40	Liner		
41	Pump cylinder cover	**Configuration A**	
42	Snifter valve (incl. 43 rubber lip)	100	Valve plate
43	Rubber lip	101	Valve body
44	Stud	102	Air vessel with SIOS valve
45	Joint ring	103	Gasket
46	Domed nut	104	Gasket

Table 13: Parts list for the LG 100-400 piston pump

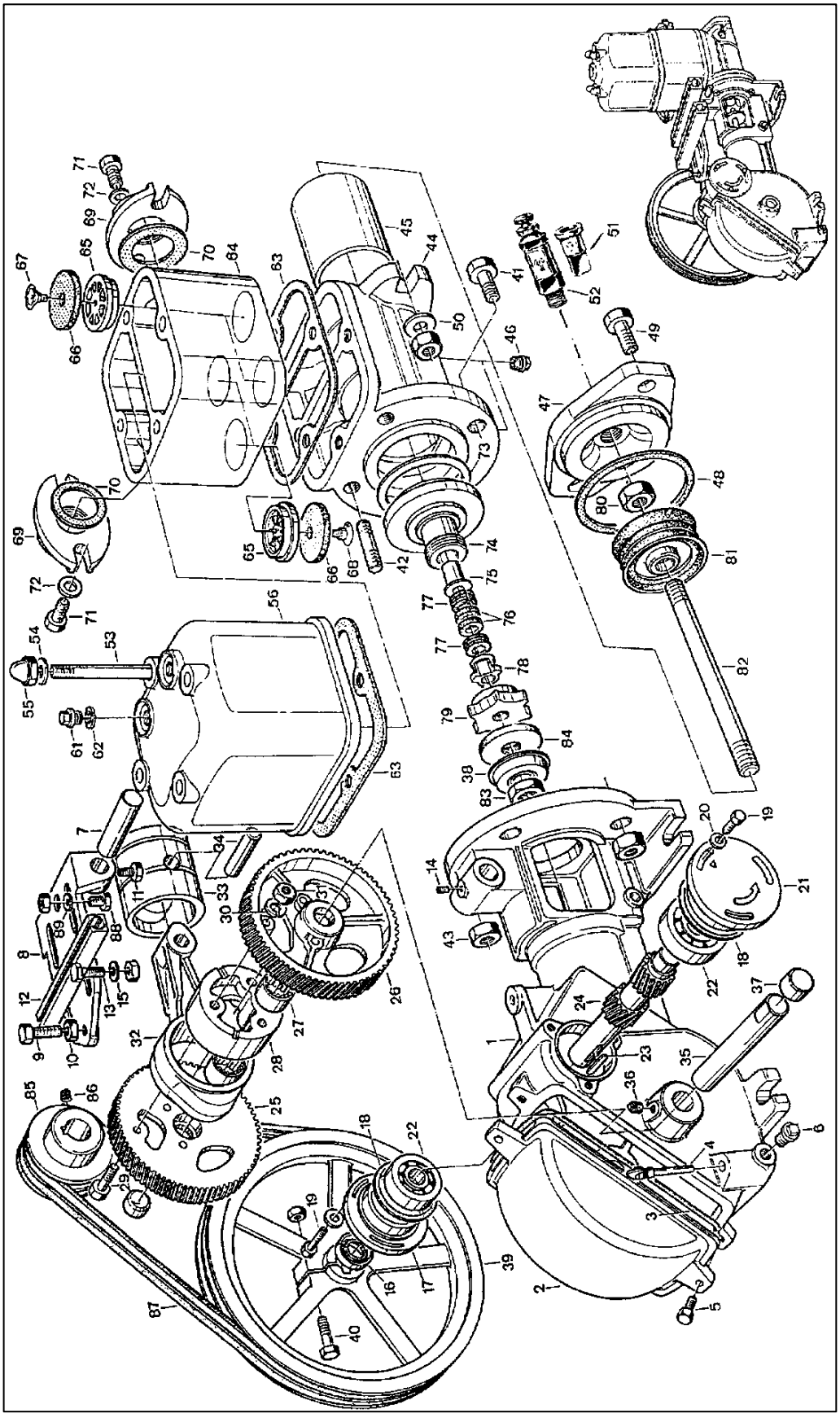

Figure 30: Explosion diagram of the LG 500-750 piston pump

Item	Designation	Item	Designation
1	Casing	45	Liner
2	Casing cover	46	Plug with rim
3	O-Ring	47	Pump cylinder cover
4	Oil level dipstick	48	Gasket
5	Hexagon head bolt	49	Hexagon head bolt with nut
6	Plug with rim	50	Disc
7	Rocker axis without hole	51	Rubber lip (separate)
8	Motor rocker	52	Snifter valve (incl. 51 rubber lip)
9	Hexagon head bolt	53	Stud
10	Hexagon nut	54	Disc
11	Hexagon head bolt	55	Domed nut
12	Tensioning rail	56	Air vessel
13	Hexagon head bolt with nut	61	Screwed plug
14	Grub screw	62	Joint ring
15	Disc	63	Gasket
16	Radial shaft seal ring	64	Valve body
17	Bearing cover	65	Valve plate
18	Gasket	66	Valve plate
19	Hexagon head bolt	67	Valve stop delivery side
20	Disc	68	Valve stop suction side
21	Bearing cover	69	Flange
22	Radial grooved ball bearing	70	Gasket
23	Key	71	Hexagon head bolt
24	Pinion shaft bearing	72	Disc
25	Gear wheel "L"	73	Gasket
26	Gear wheel "R"	74	Stuffing box body
27	Needle bearing	75	Neck bush
28	Eccentric cam	76	Grooved ring
29	Hexagon head bolt	77	Gland packing
30	Spring washer	78	Stuffing box
31	Hexagon nut	79	Gland nut
32	Connecting rod	80	Hexagon nut
33	Crosshead	81	Piston
34	Crosshead small end	82	Piston rod
35	Stub shaft	83	Hexagon nut
36	Square-head bolt	84	Thrower
37	Push-on sealing cap	85	V-role pulley key motor side
38	Cover with oil preventer cover	86	Grub screw
39	V-role pulley key pump side	87	V-belt
40	Hexagon head bolt with nut	88	Hexagon head bolt with nut
41	Hexagon head bolt with nut	89	Disc
42	Stud		
43	Hexagon nut		
44	Pump cylinder		

Table 14: Parts list for the LG 500-750 piston pump

10.3 Motor assembly

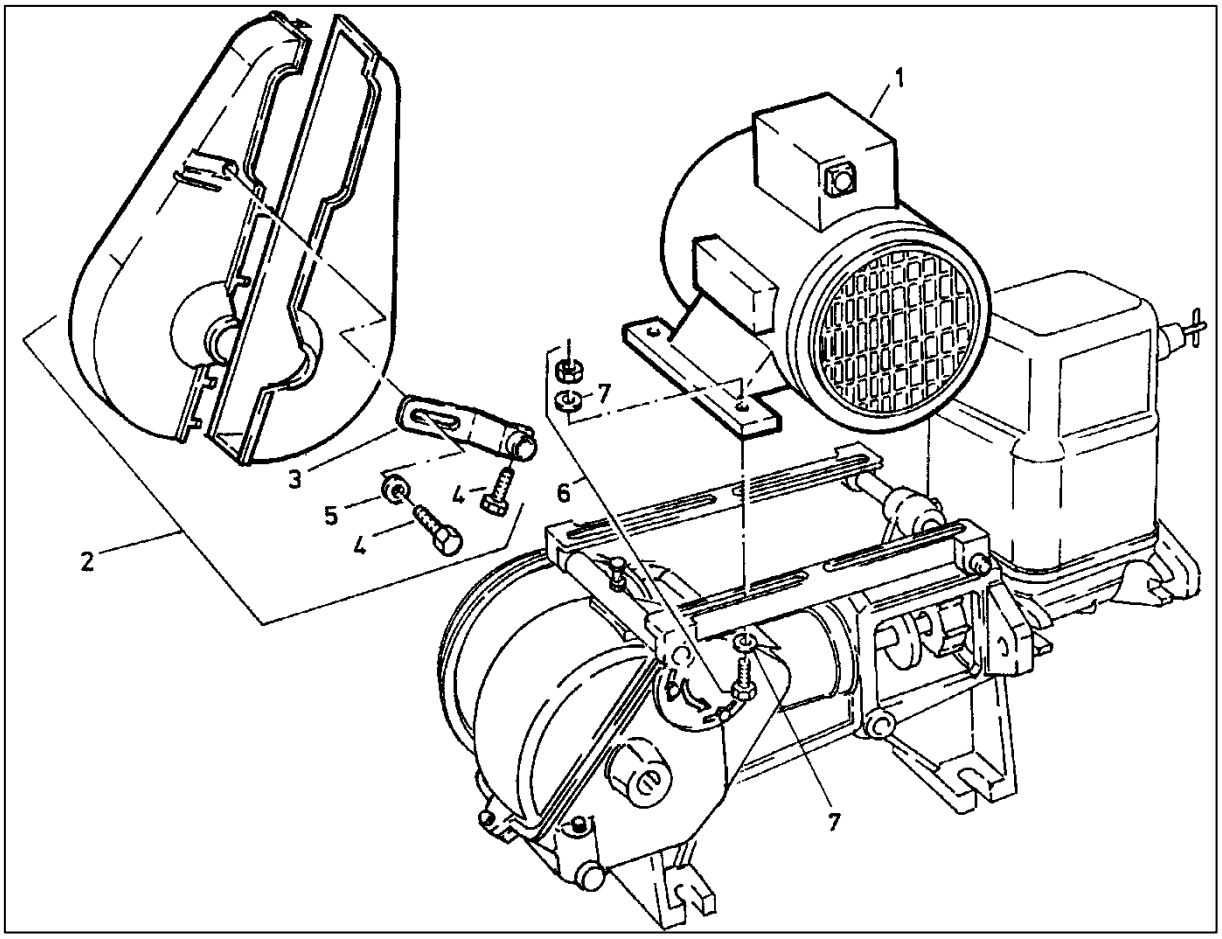

Figure 31: Explosion diagram of the LG 100-400 motor assembly

Item	Designation	Item	Designation
1	Motor (optional)	5	Disc
2	Belt guard	6	Hexagon head bolt with nut
3	Belt guard holder	7	Disc
4	Hexagon head bolt		

Table 15: Motor assembly parts list for LG 100-400

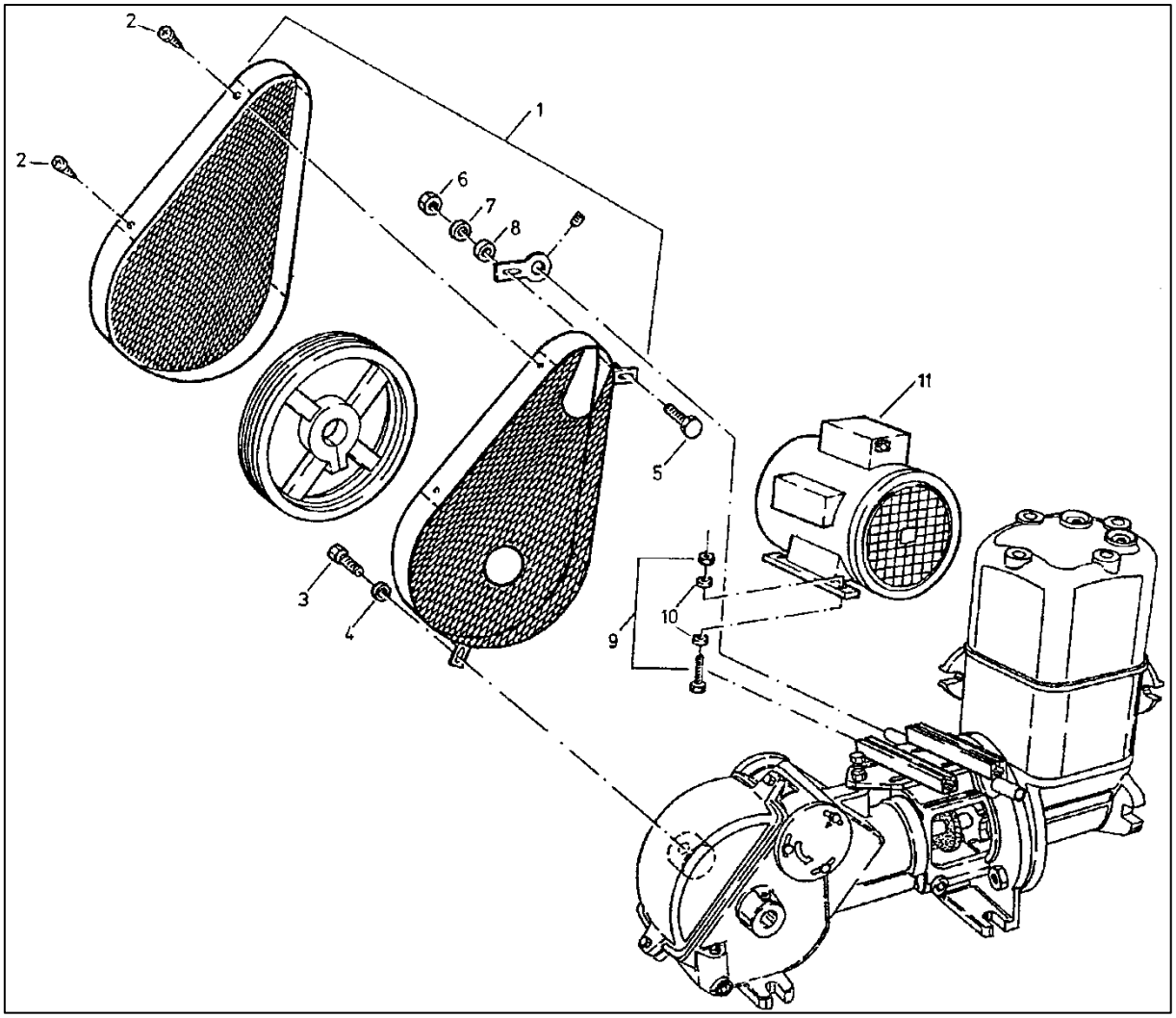

Figure 32: Explosion diagram of the LG 500-750

Item	Designation	Item	Designation
1	Belt guard complete	7	Spring washer
2	Cylinder tapping screw	8	Disc
3	Hexagon head bolt	9	Hexagon head bolt with nut
4	Disc	10	Disc
5	Hexagon head bolt	11	Motor (optional)
6	Hexagon nut		

Table 16: Motor assembly parts list for LG 500-750

10.4 Declaration of Conformity as per EC Directive 2006/42/EC, Annex IIA

We hereby declare under our sole responsibility as manufacturer that the following machine series of the type, as well as the configurations distributed by us, conform to the relevant specifications of the **EC Machinery Directive 2006/42/EC**.

Designation: **Piston pump LG 100, LG 200, LG 400, LG 500, LG 750**

Pump no.: 30703 - 35000

The machine also corresponds with the following directives published in the Official Journal of the European Union:

- Niederspannungsrichtlinie (2014/35/EU)
- EMV-Richtlinie (2014/30/EU)

This declaration shall cease to be valid in the event of any modifications to the machine and/or its protective mechanisms not agreed with us and approved in writing.

Applied harmonized standards and their references in the Official Journal of the European Union:

- DIN EN 809 : 2012
- DIN EN ISO 12100 : 2011
- DIN EN ISO 13849-1 : 2008
- DIN EN ISO 13857-1 : 2008
- DIN EN 60034 : 2007
- DIN EN 60204-1 : 2009
- DIN EN 55024 : 2011

Authorized representative for the composition of technical documentation for OSNA-Pumpen GmbH:

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49090 Osnabrück, Germany

Osnabrück, 27.05.2021 i. A. C. Schmidt

Christopher Schmidt (B.SC.)

10.5 Clearance Certificate

Please copy and send with the pump.

Clearance Certificate

Legal provisions oblige all businesses to protect their employees, other persons and the environment from damaging effects when handling hazardous substances. Products and their components may therefore only be repaired or inspected when the following declaration has been fully and correctly filled out and singed by an authorized and qualified specialist. Please provide the necessary information should safety measures on the part of the system owner still be required despite complete draining and cleaning. This clearance certificate is part of the repair or inspection order.

We hereby assure that the enclosed device

Type: _____

Serial no.: _____

is free of substances that are hazardous to health. No special safety measures are required for further handling. The device was fully drained and thoroughly cleaned inside and outside before dispatch.

Company/institute: _____

Address: _____

Town/city, ZIP code: _____

Phone: _____

Name: _____

Position: _____

Date: _____

Signature ,company stamp: _____

Notes

Notes

PUMPS
SYSTEMS
WATER TREATMENT
ENGINEERING
SERVICES

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