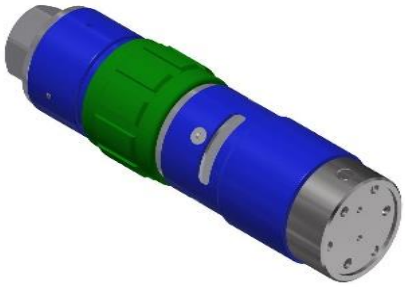
# Rotation Nozzle PRD 3500 LV

Operation and Maintenance Instructions



## Contents

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www.kamat.de

# 1 General

The rotation nozzle PRD 3500 LV is a product of the highest technical quality. As manufacturer of the rotation nozzle, KAMAT guarantees that all parts are in good condition and the functionality of the product. If this documentation is complied with, we provide a warranty in accordance with our general conditions of sale.

Our worldwide sales and support service is available to provide technical information and training. In case of damage, please contact one of our sales and service points or KAMAT directly, using the completed defects/failure report.

Find out more about our sales partners under http://www.Kamat.de/Welt-weit/0_313.html

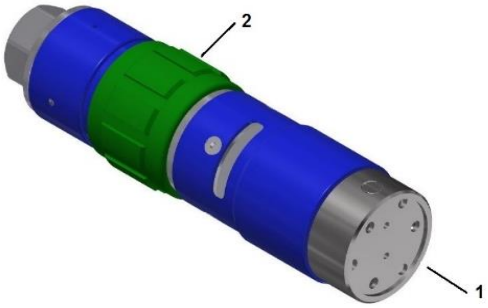
# 2 Field of application

The rotation nozzle is designed to be used in conjunction with a high pressure spray gun for spraying water under high pressure. The rotation nozzle is suitable for working on different surfaces and materials.

Any other type of operation is not intended.

# 3 Function

The rotation nozzle is screwed onto the spray pipe of a high pressure gun or lance.




The rotation nozzle is self-propelled. The recoil force of the high pressure jet puts the nozzle carrier (1) in rotation around its own axis. The rotational speed can be adjusted with the sliding sleeve (2). Depending on the field of application different nozzle carriers are available equipped with bores for three or six nozzles.

For details about the nozzle carrier and the threaded nozzles please refer to the Technical Data (see Chap. 10 Appendix).

# 4 Safety

The rules of technology and valid standards and guidelines have been applied in the development and construction of the rotation nozzle. The rotation nozzle is designed such that hazards are largely excluded if it is used properly. Nevertheless, there is a risk of property damage and personal injury due to the high pressures from the escaping water jet.

For this reason, connection, operation, maintenance and repair of the rotation nozzle may only be performed by technically trained staff. Only adults may work with the rotation nozzle. All persons entrusted with working on or with the rotation nozzle must have

previously read and understood these instructions. The instructions must be available on site and be observed precisely.

The rotation nozzle may only be used in a technically flawless and structurally unaltered state.

Hazards are identified in these instructions, as follows:

**WARNING**

Indicates a hazard that could result in serious injury or death.

CAUTION

Indicates a hazard that could cause minor injury.

ATTENTION

Indicates a hazard that may result in damage to property.

## 4.1 Emergency Measures

High pressure jets represent a significant hazard. In the case of accidents caused by high pressure jets, an emergency examination at a hospital is required. The doctor treating the patient must be informed of the type of accident that has occurred. In addition to the pressure medium and air, any admixtures / impurities may have entered the bloodstream.

## 4.2 Instructions for the operator

Organizational arrangements and careful planning are required for safe operation of the rotation nozzle.

- Specify the instructions required for safe operation.
- Designate areas of responsibility and competencies for all work.
- Ensure that the operating personnel are correctly trained.
- Ensure that the personnel wear protective equipment.
- Ensure that unauthorized persons do not enter the work area.

## 4.3 Instructions for operation

### WARNING

**Risk of injury from spraying media**

- Before starting work, inspect the entire high pressure system for leaks and damage.
- Stop operation immediately in case of leaks or malfunction.
- Do not direct the PRD 3000 towards yourself or at any other living creatures.
- Do not direct the high pressure jet at persons in order to clean clothes or shoes.
- Do not grasp into the emerging high pressure jet.

### CAUTION

**Risk of burns and scalding from hot media**

- Do not touch non-insulated areas when using working materials and auxiliary substances whose temperature exceeds 40 °C.
- Wear protective gloves.

### CAUTION

**Risk of damage to hearing**

When operating the rotation nozzle noise is produced - which is a health hazard.

- Wear ear protection.

## CAUTION

**Risk of injury and property damage due to loosened particles**

Particles are loosened from the effect of the high pressure jet on the surface to be worked. Due to the energy of the high pressure jet, these particles are strongly accelerated and can lead to property damage or injury.

- Use protective clothing: safety helmet with visor, safety gloves, safety shoes, protective safety overalls. Normal work clothes are not able to withstand the high pressure water jet. Work clothing which protects against high pressures can be obtained from KAMAT.
- Do not use the spraying device when people without protective clothing are in the area.
- Secure the work area spacious with barriers or barrier tape.

## CAUTION

**Risk of injury and damage to property due to high pressure**

- Do not spray any objects which conduct electricity or are fragile (e.g. glass).
- Take precautions to ensure that no hazardous substances (e.g. asbestos) are released into the environment.

## CAUTION

**Risk of injury and damage to property by the rotation nozzle carrier**

Touching the nozzle carrier which rotates at high speed with the surface to be cleaned can lead to injury and damage to property.

- Do not touch the rotation nozzle.
- Maintain a sufficient distance between rotation nozzle and the surface to be cleaned.

# 5 Assembly

## WARNUNG

**Risk of injury due to high pressure**

Manually intervening when the pump is in operation can lead to serious injuries.

- Turn off the pump
- Ensure that the pump is not accidentally switched on.
- Turn off the water supply.
- Make sure that sections which can be opened are not under pressure.

Only use approved components from KAMAT. All components must be approved for the pressure and temperature range.

Only use the rotation nozzle with spray guns where the pressure can be activated by a pressure on/off switch. This will ensure that the pressure required at the start of rotation is actually available. If the pressure required at the beginning of the rotation is only achieved gradually, the rotation of the nozzle may possibly start after a delay. Under certain circumstances, the rotation nozzle may not rotate at all.

Equip the rotation nozzle with threaded nozzles before the rotation nozzle is screwed on a pressure gun or lance.

- Use spray guns with a recoil force of 150 N or more only with a shoulder support.
- Do not use spray guns freehandedly starting from a recoil force of 250 N.

## 5.1 Assemble threaded nozzles

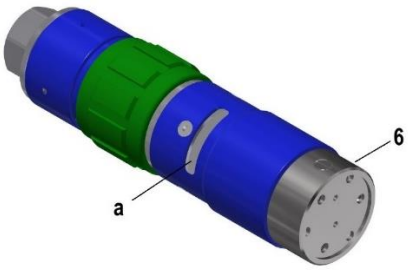
Select the threaded nozzles according to the nozzle selection table (see Chap. 10 Appendix).

The nozzle selection table shows the pressure / liter power corresponding to the nozzle head and the nozzle assembly.

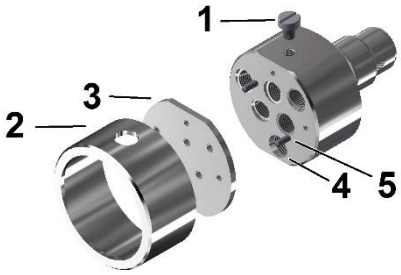
Only use threaded nozzles of the same type for the rotation nozzle.

**Note**

The number of threaded nozzles must not match with the number of bores in the nozzle carrier. A nozzle carrier with six bores can also be operated with three nozzles that are mounted on the outer circle while the three bores in the inner circle are sealed with plugs.




1. Put an open-end wrench size. 13 on the slot (a)..
   The shaft is locked for the dismantling of the nozzle carrier.
2. Unscrew the nozzle head (6).
   **Note**: Left-handed thread!




3. Remove the screw (1).
4. Remove the outer sleeve (2) of the nozzle carrier (4).
5. Remove the cover plate (3).

If the nozzle carrier (4) has three holes for screw-in nozzles:
- Equip each hole with a screw-in nozzle of the same diameter.
If the nozzle carrier (4) has six holes:
- Equip each hole with a screw-in nozzle of the same diameter.
or
-Equip the outer circle with three screw-in nozzles of the same diameter and the inner circle with three screw-in nozzles of the same diameter.
or
- Equip the hole in the outer ring with three screw-in nozzles of the same size and close the holes in the inner ring with three plugs.

6. Push the cover plate (3) onto the positioning pins (5).
7. Place the outer sleeve (2) on the nozzle carrier (4).
8. Fasten the outer sleeve (2) with the screw (1).
9. Unscrew the nozzle head (6).

## 5.2 Assemble rotation nozzle

The discharge connection of the rotation nozzle is equipped with an inner thread.

- Screw the rotation nozzle onto the gun or lance tube.

# 6 Operation

**WARNING**

**Risk of injury from high pressure!**

- Follow the instructions in the chapter Safety.

The speed of the rotation nozzle is regulated by the position of a magnet inside the rotation nozzle. Turning the sliding sleeve shifts the magnet inside the rotation nozzle back and forth.

The fixed mark on the housing of the rotation nozzle is used to adjust the strength of the rotation. The longer the bar on the sliding sleeve at the point of the marker, the stronger is the rotation.

Note

In the housing of the rotation nozzle are several bores from which emerges leak water. A .slight dripping at this point is due to design.

## 6.1 Start

1. Turn the sliding sleeve of the rotation nozzle to maximum rotation.
2. Switch on the pump.
   If the operating pressure of the pump is reached:
3. Open the high pressure gun.
   If the speed of the rotation nozzle is too high:
4. Close the high pressure gun.
5. Adjust the rotation nozzle by turning the sliding sleeve at a lower rotation.
6. Open the high pressure gun.
7. Repeat the steps 4-6 until the rotation is satisfactory.

## 6.2 Stopping operation

1. Close the high pressure gun.
2. Switch the pump to pressure-less operation.
3. Switch off the pump.
4. Open the high pressure gun briefly in order to depressurize the system.
5. Close the high pressure gun.

## 6.3 Operating after longer work break

If the rotation nozzle has not been used for several days, the friction of the sealing rings is higher than in the run-in state. Rotation therefore starts at somewhat higher pressures. Serviced or stored nozzles must therefore be run-in for a short period. In doing so, the maximum rotational speed should not exceed 4000 rpm.

1. Set the rotation nozzle to maximum rotation.
2. Turn on the pump.
   If the operating pressure of the pump is reached:
3. Open the high pressure gun.
4. Operate the rotation nozzle until the rotation is uniform.
5. Close the high pressure gun.
6. Reduce the nozzle rotation by turning the sliding sleeve at a lower rotation.
7. Open the high pressure gun.
8. Repeat the steps 5-7 until the rotation is satisfactory.

# 7 Service and cleaning

The rotation nozzle is maintenance-free. Clean the rotary nozzle after each use with a soft cloth.

If any leaks, irregularities in the rotation, detergency or unusual noises occur, take the rotary nozzle out of service and inform the maintenance staff.

# 8 Maintenance

The durability of threaded nozzles, seals and bearings is highly dependent on the operating conditions of the rotation nozzle.

**Wearing parts**

Wearing parts are:

- Shaft seals, back rings and seal rings
- Ball bearings
- Threaded nozzles

It is recommended to change the wearing parts regularly.

Replace all sealing elements after max. 200 h.

Replace the bearings after max. 500 h.

If outside the servicing intervals greater leakages occur it is recommended to replace the seals.

If the rotation nozzle starts slowly or runs with irregular speed it is recommended to check the bearings.

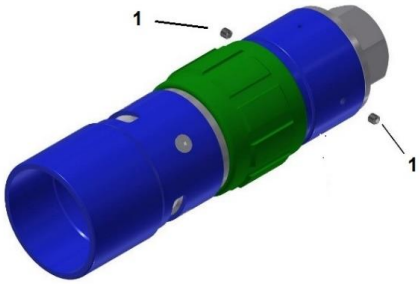
If the flow rate, recoil force, rotation speed and operating pressure is reduced replace the threaded nozzle.

**Note**

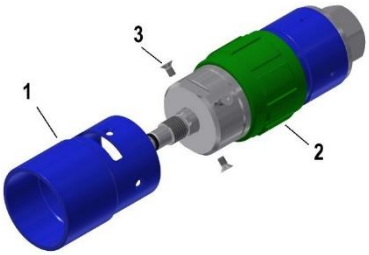
After maintenance works the rotation nozzles must be run-in. This is equivalent to an operation after a longer work break, also see Chap. 6.3 Operating after longer work break.

## 8.1 Replace seals and bearings

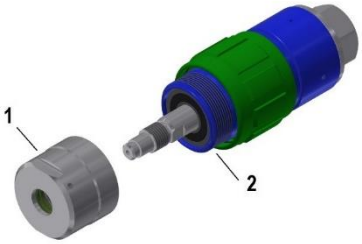
**Dismantling**



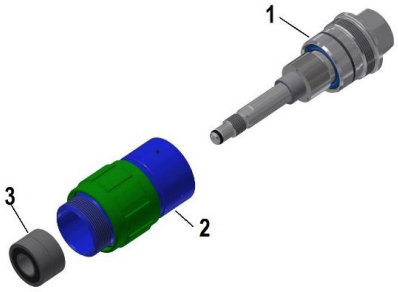

1. Loosen the stud (1).




2. Remove the screws (3).
3. Pull off the guard tube (1).



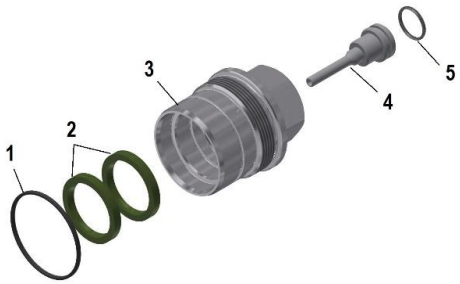

4. Unscrew the cover (1).




5. Remove the connecting fitting (1) from the housing (2).
6. Remove the two ball bearings (3) from the housing (2).

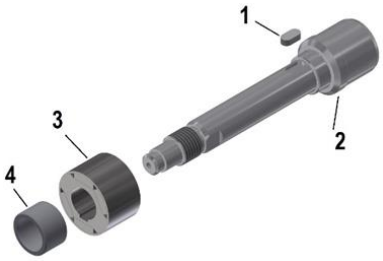

7. Loosen the shaft (1) from the connecting fitting (2).


8. Remove the shaft seals (1) from the cover (2).

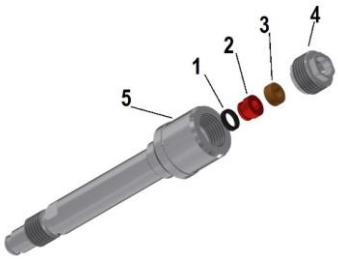


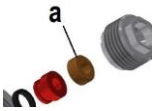

9. Remove the running shaft (4) and the O-ring (5) from the connecting fitting (3).
10. Remove the O-ring (1) and the shaft sealing rings (2) from the connecting fitting (3).


11. Remove the radial bearing (1) from the shaft (2).

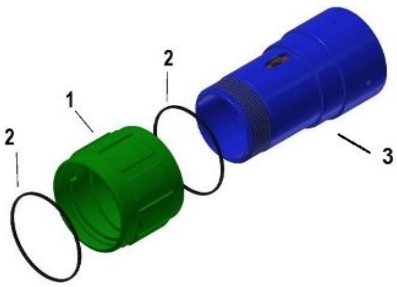



12. Loosen the key (1) on the shaft (2).
13. Remove the spacer ring (4) and the magnet (3).



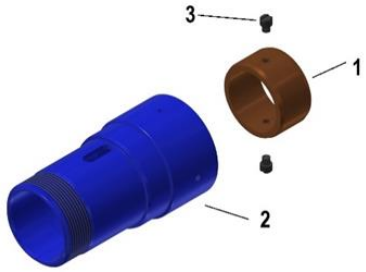




14. Loosen the pressure screw (4) from the shaft (5).
15. Remove the backup ring (3) and the gasket (2).
16. Remove the O-ring (1) from the groove of the seal (2).
    **Note**: Pay attention to the direction of the support ring when assembling. Chamfer (a) must point outwards.




17. Unscrew the adjustable sleeve (1) from the housing (3).
18. Remove the O-rings (2) from the adjustable sleeve (1).

    **Notice**: Grease the inside of the adjustable sleeve (1) and the outer casing of the housing (3) before assembly.




19. Loosen the pins (3).
20. Remove the sleeve (1) from the housing (2).

Assembly takes place in reverse order.

## 8.2 Replaces threaded nozzles

Even minor wear of the threaded nozzles affects the throughput, recoil force, rotation speed and the operating pressure of the rotation nozzle.

If flow rate, recoil force, rotation speed and operating pressure is reduced, replace the threaded nozzles (see Chap. 6.1 Assemble threaded nozzle).

# 9 Storage and transport

For the storage and transport of the rotation nozzle precautions must be taken.

## 9.1 Transport

To transport the rotation nozzle:

- Close the threaded connector with a protective plug.
- Protect the nozzle from the effects of external forces.
- Remove the threaded nozzles.

## 9.2 Storage

If the rotation nozzle is to be stored for a longer period of time:

- Remove any dirt adhering to the outside of the rotation nozzle.
- Remove the threaded nozzles.
- Blow out the rotation nozzle with compressed air (at approx. 5 bar).
- Put a drop of light machine oil into the bores of the threaded nozzles and the connection fitting.
- Rotate the nozzle carrier several times by hand.
- Reassemble the threaded nozzles.

CAUTION

**Danger of injury due to defective seals**

If the storage period exceeds a year the seals may be worn.

- Replace all seals before commissioning.
- Assembly work may only be carried out by special educated personnel.

# 10 Appendix