



# P360

*(07.2500A/B)*

Operating Manual

English USA

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## Preface

### **Dear valued customer,**

Thank you for the confidence and trust you've placed in us by purchasing one of our products.

We always appreciate suggestions for improvement and constructive comments. Your feedback will help us improve the design of our product and the associated documentation.

If you have any questions or suggestions, please contact our Customer Service Department.

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We reserve the right to modify and further enhance our products without prior notice as a result of technological advances. Misprints reserved.

## Purpose of the document

The purpose of this manual is to instruct you on how to use our product correctly, effectively, safely, and for its intended purpose. The user will be informed about risks, reasonably foreseeable misuse, and residual risks.



### **Important!**

Read carefully before use.  
Keep for later reference.

---

Please read this operating manual thoroughly before using the cleaning tool. Make sure that all employees who work with the product know how to use it correctly.

The operating manual must be available to all operating personnel at all times. It must be kept in an easily accessible place.

If the manual is misplaced or destroyed, a new copy can be requested from your nearest dealer or from the manufacturer directly.



# 1 Safety

## 1.1 Noncompliance with the safety information and its consequences.

Disregarding these safety instructions may lead to accidents and severe personal injuries, material damage as well as damage to the environment.

The manufacturer cannot be held responsible for any damage resulting from noncompliance with these instructions.

## 1.2 Target group

This manual is intended for all persons who will be involved in the assembly, start-up, and operation of the pipe cleaning tool.

## 1.3 User requirements

All persons involved with assembly, start-up, and operation of the tool must

- Be familiar with the field of channel maintenance work and possess the appropriate technical knowledge.
- Be trained and instructed appropriately in the use of the product.
- Have read and understood the operating manual, in particular the section on **"Safety."**

If your personnel do not possess the necessary knowledge, they must be trained and instructed on it. If necessary, the pipe cleaning tool manufacturer can provide this instruction and training.

Only the maintenance and service activities described in this manual may be performed by users who have met the above-listed requirements. Any additional maintenance and service work may be performed only by qualified specialist personnel from the manufacturer.



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Please refer to the section on "MAINTENANCE."

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## 1.4 Explanation of general safety instructions

The general safety instructions in this section provide information about potential residual risks, which are inherent to the product and may occur unexpectedly, despite the proper usage of the product.

In order to prevent personal injuries, damage to property and the environment, all personnel working with this product must comply with these safety instructions. It is mandatory for said personnel to read and understand the information provided in this section.



## 1.5 Information provided in these operating instructions



### DANGER

Noncompliance may lead to serious injury or **loss of life**.



### WARNING

Noncompliance may lead to serious injury or **loss of life** and/or long-term disability.



### CAUTION

Noncompliance may lead to injury and considerable material damage, financial loss, or damage to the environment.



Information on the technically correct and efficient use of the product.

## 1.6 Explanation of specific safety instructions

Safety information pertaining to particular situations is highlighted in the appropriate section of the operating manual.

## 1.7 Intended use

The product is designed to clean the insides of pipes (channel pipes). The following points must be followed to ensure proper use of the product.



The cleaning tool may be used only in pipes or pipe-like channels. The profile to be cleaned must be free of leaks and surrounded by material.



The tool may be used on the following types of pipes:

- PE pipes
- Steel pipes
- Concrete pipes



For use in pipes made of other material, please consult the manufacturer.











The product may be operated only in pipes with correctly installed and defect-free connections.



Cleaning areas (manholes, pipe branches, etc.) need to be sufficiently secured during the operation, including during construction and cleaning work.



-  During the cleaning operation, **no** personnel are allowed inside the pipes or at either end of the pipes.
-  The maximum pressure indicated on the nozzle may **not** be exceeded.
-  Wastewater may **not** be drained into watercourses (creeks, rivers etc.).
-  The product must be inspected to ensure it is in proper working order before every start-up.
-  Defects must be rectified before start-up.
-  Use the tool only as intended. (Use only the correct wrench for nuts).
-  Secure the hose lines in such a way that they cannot become damaged during operation.
-  Only the accessories provided and approved by **enz® technik ag** may be used.

## 1.8 Safety warnings for modifications

No other changes or modifications to the pipe cleaning tool may be performed. Only parts authorized by the manufacturer may be used. The manufacturer is not liable for damage resulting from unauthorized changes to the product.

## 1.9 Protective equipment for working in manholes, excavations, and channels

The employer must provide suitable personal protective equipment and ensure that it is worn by the employees during work.

In the following section, the protective equipment prescribed by Schweizerische Unfallversicherung SUVA (the Swiss Accident Insurance Organization) will be described.

### See also:

Suva  
 Schweizerische Unfallversicherungsanstalt  
 Arbeitssicherheit  
 Postfach, 6002 Lucerne, Switzerland  
 For information:  
 Phone +41 41 419 51 11  
 For orders:  
[www.suva.ch/waswo](http://www.suva.ch/waswo)  
 Fax +41 41 419 59 17  
 Phone +41 41 419 58 51  
**Safe entry and working in shafts, excavations, and channels (in German, French & Italian)**  
**Order number: 44062.d**





## Respirators



Self-contained respiratory equipment for spending time in dangerous atmospheres and for use during rescue operations.

## Suitable working clothing



Leak-proof working clothing protects the skin from becoming soiled and from possible infections. Visually conspicuous work clothing makes the employee more visible to traffic.

## Respirators



Self-rescue respiratory equipment (devices with compressed air tanks or regeneration devices) for working in channels and for first aid for injured persons.

## Appropriate footwear



Safety footwear should, in particular, have good grip and be slip-resistant and leak-proof (e.g. rubber boots).

## Rescue harness



Rescue harness or protective clothing with a loop sewn into the neck. During rescue, the rescue rope will be attached to the neck loop. Injured persons will be lifted out using a rescue lifting device with a self-actuating load brake.

## Gloves



Appropriate gloves will protect you from hand injuries and contact with materials that could impair your health and from untreated water.



### Hardhat



The hardhat will protect your head from falling objects and from bumping into fixed components and objects.

### Eye protection



Your eyes should be protected against grit, sprayed dangerous substances, etc.

### Hearing protection



If there is noise that could damage your hearing, you can wear, e.g. earmuffs with built-in headphones and microphone.

### Lighting independent of the power grid



For example, a waterproof flashlight or a flashlight attached to your hardhat.



## 1.10 General safety instructions

### Danger! | High-pressure water jets



Defects in or unintended use of the product could cause hazards due to pressurized water spray. Never remain in the channel during operation. Ensure that the product is in perfect condition before operation. Highly concentrated water jets can cause serious injury and could even sever limbs. Noncompliance with these safety instructions could be **fatal** or lead to serious injury.

### Warning! | Falling objects



Around open manholes, objects can fall into the manhole and onto the people below. Never remain directly beneath the manhole opening when guiding the products in. Secure the manhole entrance against parts that could fall. Do not throw any tools or objects down into the manhole. Do not enter any manhole where there is a danger of falling. Personnel could become trapped. Noncompliance with these safety instructions can be **fatal** or could lead to serious injury.

### Danger! | Toxic vapors



There can be toxic vapors in channels. Wear the prescribed protective equipment such as gas masks, gas warning devices and rescue harnesses. Inhaling toxic vapors or air that is contaminated with particles could be **fatal** or lead to serious injuries if the particles enter the lungs.

### Warning! | Chemical burns



There may be unidentified, corrosive, or otherwise harmful substances in channels. Put on appropriate protective clothing. Use the protective equipment prescribed. Otherwise, you could suffer from chemical burns to your skin and eyes or become infected with pathogens.

**Warning! | Falls from height**

Open manholes are to be expected in the area where you will be working with the product. You must warn people about open manholes. Pay attention to where you are walking. Falling from height can be **fatal** or could lead to serious injury.

**Warning! | Hand injuries**

If the product is tampered with, there is a risk of hand injury due to trapping or abrasion. Wear gloves during work. Pay attention to where you grip the product. Always have two people carry heavy equipment. Consequences can include crushing injuries, abrasions or even the loss of a limb.

**Caution! | Sharp objects**

If the product is tampered with, there is a risk of hand injuries due to sharp edges. Wear gloves during work. Pay attention to where you grip the product. Consequences can include cut injuries to your hands or other parts of your body.

**Caution! | Trip hazards**

Lines and other objects are to be expected on the ground in the area around where the product is being used. Pay attention to where you are walking. Keep the area of use tidy. Tripping and falling could cause serious injuries.

## 2 Legal

### 2.1 Copyright

Without the prior written permission of enz® technik ag, this manual shall not be duplicated partially or in its entirety. It shall not be photocopied, reproduced, translated, or converted into an electronic or machine-readable format.

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### 2.2 Exclusion of liability

The manufacturer is not liable for damage that:

- Is caused as a result of unauthorized changes to the product.
- Is caused by not following the safety instructions.

### 2.3 Warranty conditions

In accordance with our sales and delivery conditions, we offer a warranty. However, the warranty is voided if:

- The product is used under conditions that are not permitted by us.
- Replacement and accessory parts that are not original replacement and accessory parts from **enz® technik ag** are used.
- If there is damage due to:
  - Improper use
  - Not following the operating manual
  - Unsuitable operating equipment
  - Incorrect or improper routing of the hose or pipelines
  - Unauthorized changes, modifications or changes to the product.

### 3 Propeller nozzle P360 (07.2500A/B)

#### 3.1 Application area (07.2500A/B)

With the propeller nozzle P360, full-circle cleaning is performed in large channels of Ø23 – 118 inch. The application diameter can be easily adjusted. It can be used for round, flat, or egg-shaped profiles. The P360 was designed to be operated with recycled water, but it can also be operated with fresh water.



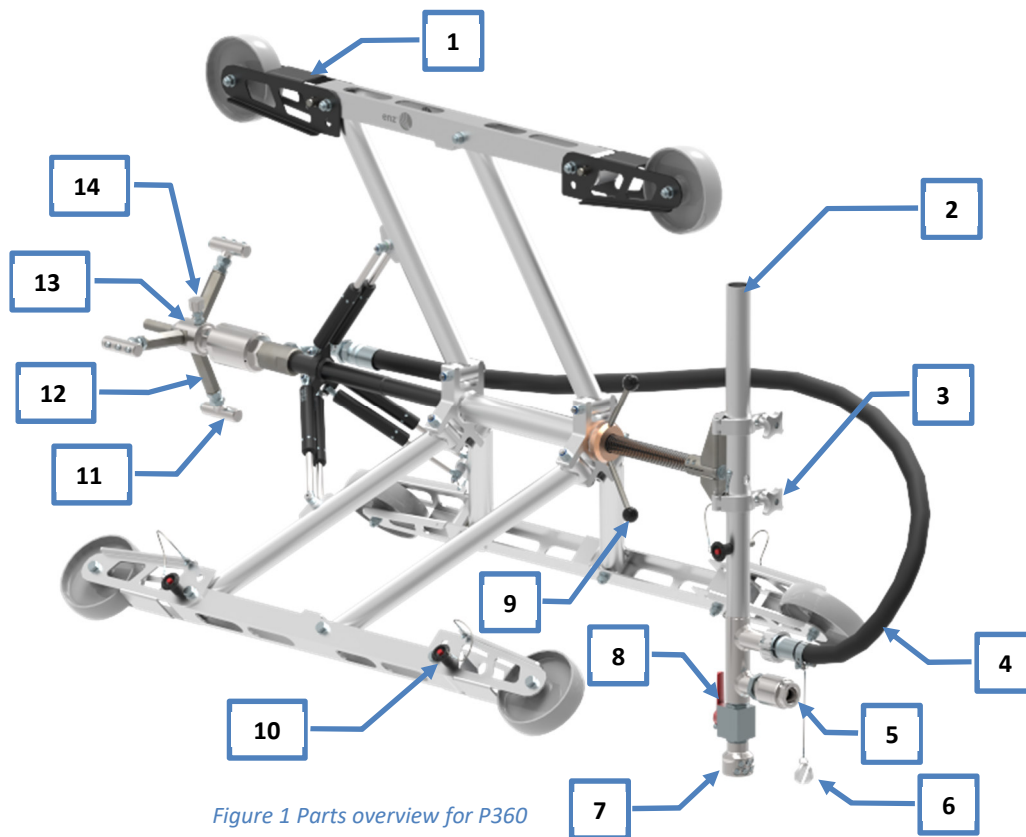
#### WARNING

The maximum pressure on the P360 may not exceed 200 bar (2,900 psi)! The components are designed for this maximum pressure and can fail if it is exceeded. Exceeding the maximum pressure can result in serious injuries and material damage.

#### 3.2 Technical data

Item no.			07.2500A/B
Ø x length		[inch]	23 x 79
Ø access shaft	<b>Min.</b>	[inch]	23.5
Thrust jet inserts			7x
Cleaning inserts			9x
Rotational drive inserts			1x
Weight		[lbs]	132
Connecting thread		[inch]	1" / 1¼"
Application range Ø		[inch]	23 - 118
Volumetric flow at 1500 psi with thrust	<b>Min.</b>	[gal/min]	79
Volumetric flow at 1500 psi without thrust	<b>Min.</b>	[gal/min]	39
Working pressure	<b>Max.</b>	[psi]	2,900
Recycled water			Yes

### 3.3 Propeller nozzle P360



## 3.4 Part names

### Key:

1. Wheel carrier
2. Thrust part, including: (4; 5; 6; 7; 8)
3. Star knob
4. Connecting hose
5. Swivel joint
6. Hose cap
7. Thrust part
8. Thrust valve
9. Rotary lever
10. Locking pin
11. Cleaning nozzle
12. Propeller arm
13. Propeller, including: (11; 12; 14)
14. Rotational drive



## 4 Commissioning

### 4.1 Fitting options based on enz® JetCalc

The P360's propeller has various options for fitting. Three propeller arms each with three nozzle inserts plus the separate rotational drive have to be adjusted to one another.

JetCalc has three different fitting options in order to achieve the desired flow.

- Fitting B1 → 1 nozzle insert per nozzle head
- Fitting B2 → 2 nozzle inserts per nozzle head
- Fitting B3 → 3 nozzle inserts per nozzle head

If a sufficiently large water flow rate is available, then the cleaning result will be best with the B3 fitting. The nozzle inserts should not be smaller than  $\varnothing 1.5$  mm, because otherwise the nozzle's ability to use recycled water will be impaired.



If easily damaged pipes need to be cleaned, then the nozzle inserts can be replaced with flat jet nozzles.

The rotational speed is changed by selecting a smaller or larger insert on the rotational drive.



#### CAUTION

Never change the direction of rotation!  
The direction of rotation prevents the nozzle from coming off. Parts of the P360 could come off if you change the direction of rotation. This can adversely affect property, plant, and equipment.

During use, the nozzle rotates in a counter-clockwise direction; the connecting thread, in contrast, rotates in a clockwise direction. This prevents the nozzle from detaching itself from the connecting thread during operation.

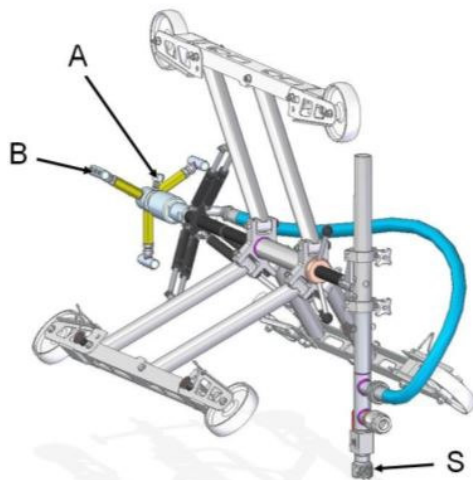
## 4.2 Example fitting options (100 US-gpm | 1500 psi net)

### Calculated values

Flow rate	99.4 (B1) / 99.7 (B2) / 98.9 (B3) US-G/min
Final pressure	1'500.0 PSI
Pressure loss	0.0 PSI
Traction approx.	65 lbs
Excess	0.6 (B1) / 0.3 (B2) / 1.1 (B3) US-G/min
Leakage	0.0 US-G/min

### Assembly

A = 2.0 mm
B1 = 3 x 3.6 mm
B2 = 3 x 2.5, 3 x 2.6 mm
B3 = 6 x 2.0, 3 x 2.2 mm
S = 7 x 1.7 mm



### Example B3

B3 in this case would be 6 x 2.0 mm and 3 x 2.2 mm. This means 2 x 2.0 mm and 1 x 2.1 mm per propeller arm.

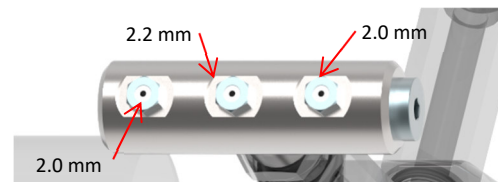


Figure 2 Example B3

### Example B2

With B2, a nozzle insert is replaced with a blind plug.

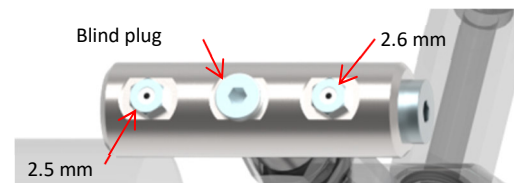


Figure 3 Example B2

### Example B1

With B1, two nozzle inserts are replaced by blind plugs.

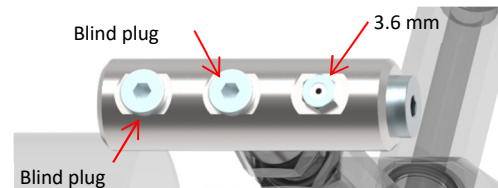


Figure 4 Example B1

### 4.3 Working without thrust

The high-pressure water tap on the thrust part, called the thrust valve, provides an additional option for controlling the available water flow rate.

If you are working without thrust and the nozzle is pulled through the channel, then all the water can be used for the cleaning. For this, in the first selection window of the P360, JetCalc provides a fitting option where no thrust jet inserts are taken into account ( $S = 7 \times 0.0 \text{ mm}$ ).

The thrust valve must then be completely closed.

Figure 5 JetCalc selection screen for thrust

### 4.4 Drive variants

Basically, there are three variants for how the P360 can be driven in the channel. All these variants need to be pulled back from the end manhole to the entry manhole using the truck's connection hose. The difference is in the options for how the P360 advances in the channel from the entry manhole.

1. The P360 works through the channel from the entry manhole using the thrust part.
  - Proximity protection on the propeller (standard)
  - Thrust valve switched on
2. The P360 is pulled from manhole to manhole. Using a pre-cleaning tool, the hose is taken to the end manhole. There, the hose is attached to the P360. The pre-cleaning tool is returned above-ground. to the truck
  - Proximity protection on the propeller (standard)
  - Thrust valve can optionally be switched on or off
3. The P360 is pulled with a rope from the entry manhole to the end manhole. For this variant, the pulling equipment supplied with the P360, called the pulling eye, is mounted on the propeller.
  - Pulling eye on the propeller (862222.0300)
  - Thrust valve switched off

## 5 Installation

### 5.1 Setting up the work area

Prior to working with the propeller nozzle, the following actions must be taken:

- ⚠ Set up barriers and safety equipment (warning triangle, block off the area, etc.)
- ⚠ The work area must be blocked off and secured so that there is no risk of falling or traffic-related dangers.
- ⚠ The necessary information on the wastewater flowing through the manhole must be obtained (chemicals, gas, vapors, etc.)
- ⚠ Measuring instruments such as explosive gas meters, oxygen meters, gas warning devices, etc. must be readily available.
- ⚠ You must ensure that the appropriate nozzle sizes for cleaning the pipes are available. The application range of each nozzle is listed in the "Technical data" section on page 13.

- ⚠ The layout of the pipes (manhole drawings) must be known before starting the work so that the nozzle can be prevented from emerging at a pipe end. Support personnel must be on hand to monitor possible emerging points.
- ⚠ Have the liability waiver signed by the customer to protect against any possible claims for damages.



*Figure 6 Blocked off & signed work area*

## 5.2 Putting the P360 into the channel

### Pre-cleaning the channel

The channel invert must first be cleaned. The scraper, for example, is well-suited for this.



#### CAUTION

Ensure that the channel is clear. Check the pipe inlets, ladders, lines, etc. to ensure that the nozzle can work unimpeded. If it gets stuck, it could cause material damage.

### Putting the propeller nozzle into the channel

1. Separate the thrust part from the rest of the nozzle. To do this, use the star knobs at the thrust fastener. The connecting hose stays on the nozzle.



#### Tip:

Do not turn the star knobs too far. There is a danger that you could lose the knobs.

2. Fold up the nozzle by turning the rotary levers as far as they will go.

3. The nozzle and the thrust part can now be lowered into the channel one after the other. To do this, secure the harness around the main pipe, located in the center.



#### WARNING

Use a winch to prevent back injuries.



*Figure 7 P360 on the winch*

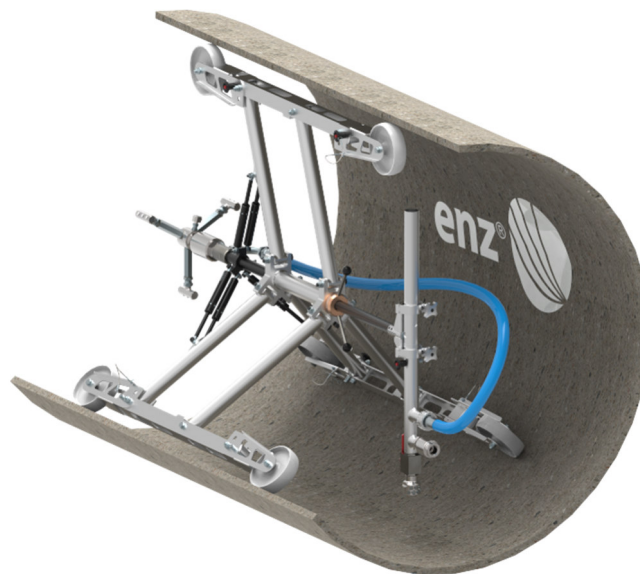
### 5.3 Installation in the channel

The steps for how you should install the P360 in the channel are described individually on the next few pages. The order can vary depending on the space available in the channel. In most cases, it is best to follow the following sequence:

1. Turn the P360 into the correct position in the profile.  
(Page 21 & 22)
2. Fold out the wheel carriers.  
(Page 22)
3. Wind out the skids.  
(Page 22)
4. If needed, extend the propeller arms.  
(Page 23)
5. Mount the thrust part and the connecting hose.  
(Page 24)
6. Secure the connecting hose.  
(Page 24)
7. Attach the channel rinsing hose.  
(Page 25)

### 5.4 Installation in circular, arch, and rectangular profiles

In these profiles, the P360 is set up with the skid with the black wheel carriers pointing upwards. This means that the remaining two skids are at the bottom, and aligned at a 90° angle to one another.



*Figure 8 P360 in a circular profile*

### 5.5 Installation in an ovoid profile

In an ovoid profile, the P360 is set up with the two skids that are at an angle of 90° to one another pointing upwards. The skid with the black wheel carriers is at the bottom. The thrust part is mounted at 180° to its orientation in the circular profiles.



Figure 9 P360 in the ovoid profile

### 5.6 Folding the wheel carriers outward

Press the red button on the locking pin and pull it out at the same time. Swivel the wheel carrier and put the pin in the new position.

Folding out is not necessary in circular profiles up to 60 inch. For working in ovoid profiles, only the black wheel carriers need to be folded outward. In all other profiles, the wheel carriers can be folded outward or not, depending on the situation.



Figure 10 Wheel carriers folded outward

## 5.7 Winding out the skids

Turn the rotary lever in order to move the P360's skids out. Ensure that there is an approx. 50 mm gap between the skids and the pipe wall. This prevents the P360 from becoming wedged in the channel.

Due to geometry, the force required to rotate the lever is maximum at the smallest setting. This means the lever becomes easier to rotate as it moves further away from the thrust part.



Figure 12 Central pipe with rotary lever

## 5.8 Extending the propeller

The quality of the water jet at the pipe wall is vital for a good cleaning result. The force of the water jet decreases as the distance to the wall increases.

The extensions shorten the distance to the channel wall and increase the force of the water jet when it meets it.

The short propeller arms are adequate for circular profiles up to  $\varnothing 70''$ . Beyond this, the use of the extension pipes is recommended.

Install the extension pipes as shown in Figure 11.

The following articles supplied as accessories are needed:

Item	No.	Description	Item no.
1	3x	VDS seal 1/2"	VDS-08
2	3x	Adapter flange G1/2" -G1/2"	A-08BM-08BM
3	3x	Water pipe	007.281400

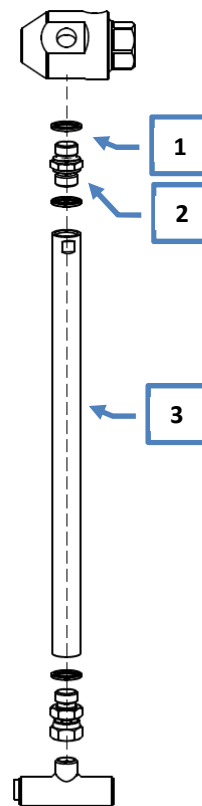
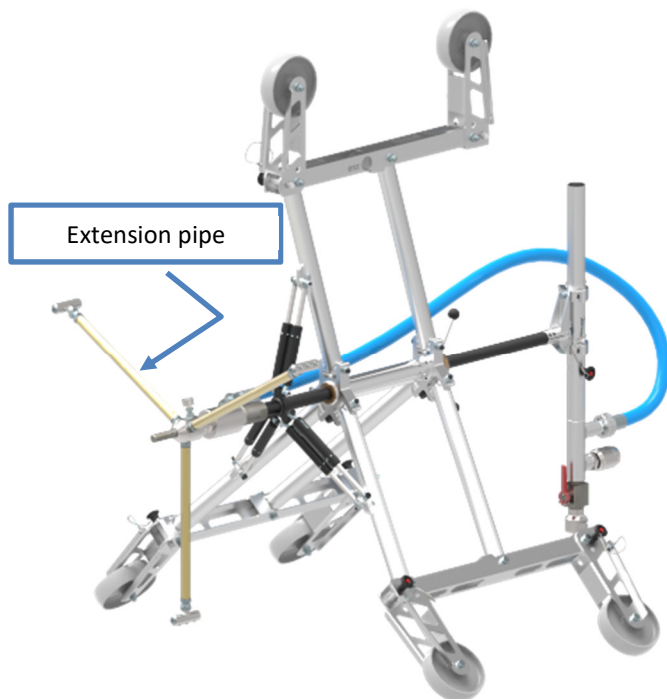


Figure 11  
Exploded diagram of the extension pipe



**Tip:**

The propeller arms can be prepared outside of the channel and then simply need to be mounted.



*Figure 13 P360 with extension pipes*

## 5.9 Mounting the thrust part and the connecting hose

1. Mount the thrust part with the star knobs. There should be a distance of approx. 2 inch – 4 inch to the pipe invert.
2. Place the thrust rod extension in the thrust part. It is optional and can be left out for small diameters.
3. Now, screw the connecting hose onto the upper connector on the thrust part. A hand-tight connection using the hand grip on the hose is sufficient.
4. Switch the thrust valve on or off based on the selected drive variant.

### CAUTION



Ensure that all wedge lock washers are positioned on the outside of the pipe clamp and directly bearing on the star knob. Otherwise, the thrust part is not secured and could come loose during operation! This could result in material damage or even injuries.

## 5.10 Securing the hose

For small diameters, it is necessary to secure the high-pressure hose with the pre-mounted belts.

1. Check the connecting hose and replace it if the hose fabric has any damage.
2. Ensure that the connecting hose cannot under any circumstances touch the channel wall.
3. Ensure that the hose is not bent any tighter than a radius of 4 inch.

## 5.11 Connecting the channel rinsing hose

Connect the vehicle's hose to the to the lower connector using the swivel joint.

The thread dimension is listed in the "Technical data" section on page 13.

### CAUTION



If the connecting hose touches the pipe wall during operation, the hose will become damaged. Do **not** operate the P360 with a defective connecting hose. This can cause injuries and adversely affect property, plant, and equipment.

## 6 Operation

### 6.1 Increasing pressure

1. Slowly increase the pressure until the working pressure is 1500 psi at the nozzle.  
(For easily damaged pipes, the working pressure is 100 psi).
2. Pay attention to the speed of the rotation; you should be able to hear it easily. The settings are explained on page 16.
3. Clean 80 inch with the P360 and check the cleaning performance.
4. When the P360 reaches the end of the channel to be cleaned, reduce the pressure to the ambient pressure.

In general, with heavily soiled pipes, the propeller should rotate slowly, and with pipes with little soiling, it should rotate quickly.



#### CAUTION

**Never** let the tool skip (e.g. by pulling the hose back and suddenly letting go)! This may damage the tool and the pipe.



#### WARNING

The maximum pressure on the P360 may not exceed 200 bar (2,900 psi)! The components are designed for this maximum pressure and can fail if it is exceeded. Exceeding the maximum pressure can result in serious injuries and material damage.

### 6.2 Cleaning pipes with minor damage

Slightly damaged pipes usually exhibit cracks in the pipe wall. You can see an example of this in Figure 14. If detected, always contact the customer or the appropriate authority.

When working inside a slightly damaged pipe, extreme caution must be used.



#### DANGER

When cracks are washed out, pipe fragments can break off and the material surrounding the pipe may be flushed out. If in doubt, you should not use the product. Using it in these circumstances can result in collapsed channels and accompanying injuries or **death**.



*Figure 14 Damaged pipe wall*

## 6.3 Troubleshooting

### Streaks in the pipe



*Figure 15 Streak formation in the pipe*

- Pull the P360 more slowly.
- Check the inserts for clogging.

- Allow the propeller to rotate more quickly by using a larger nozzle insert in the rotation drive.

### Weak cleaning performance

- Check the inserts for clogging.
- Check whether the pumps used meet the minimum requirements for pressure and volumetric flow.
- If you are working in a channel with a diameter of 75 inch or larger, extend the propeller arms with the extension pipes.

### Rotor does not turn

- Check whether the pumps used meet the minimum requirements for pressure and volumetric flow.
- Check the rotational drive for clogging.
- Ensure that the propeller can move freely.

If the problem is still not fixed, please contact the manufacturer.

## 7 After operation

### 7.1 Removing the nozzle from the channel

After use, the P360 needs to be brought to the surface through the manhole. To do this, follow these steps:

1. Ensure that the P360 is no longer under pressure.
2. Remove the connecting hose.
3. Pre-clean by rinsing the P360 with fresh water.
4. Remove the connecting hose from the thrust part and then remove the thrust part.

**Tip:**

The P360 can be folded together more easily if it has been pre-cleaned in the channel.

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5. Immediately take the thrust part out of the manhole and up to the surface. This ensures that the nozzle inserts clog the least.

6. For the same reason, close the connecting hose with the screw cap.
7. Fold up all wheel carriers.
8. If necessary, remove all propeller arm extensions.
9. Wind the skids up completely.
10. Pull the nozzle out of the manhole.
11. Clean the nozzle thoroughly.

### 7.2 Completing the work process

If possible, use a special channel pipe video camera to inspect the cleaned pipes. Look out for any damage and ensure that no liquids can escape into the environment.

After completing the channel cleaning process, close all manholes.

### 7.3 Transport

The P360 should be completely folded together for transport. The connecting hose can be secured to the P360 with the belts. The thrust part is usually transported separately.

## 8 Maintenance

The maintenance and service activities described in this manual may only be performed by users who have the required knowledge.

### 8.1 Maintenance after each use

1. Check the inserts for clogging.
2. Then check the tool for traces of wear and replace defective parts if needed.
3. Clean the spindle and grease it afterward with Germes lubricant (item no. 14.99008).
4. For corrosion protection and care, spray OIL SPRAY BIO (item no. C191) on the tool.

### 8.2 Nozzle inserts

The nozzle inserts must be inspected regularly. Nozzle wear depends on the degree of contamination in the water used. If recycled water is being used, the nozzle inserts must be inspected **daily**.



#### CAUTION

Damaged nozzle inserts may be replaced only with identical nozzle inserts of the same diameter. If the tool is not correctly assembled, the tool or the pipe may become damaged.

This could result in injuries or material damage.

If you do not know the nozzle diameter, you must use JetCalc to determine it.

1. Remove the defective nozzle inserts.
2. Clean the threaded holes and the new inserts. All threads should be grease-free.
3. Coat the nozzle insert threads with Loctite No. 243 adhesive.
4. Immediately screw the nozzle inserts into the tool body as far as they will go, then use a socket wrench to slightly tighten each insert.

## 8.3 Lubricating the spindle

1. Remove any grease residues from the spindle with a cloth.
2. Grease the spindle with Germes lubricant (item no. 14.99008).
3. Turn the rotary lever to open and close the skids at least once.

## 8.4 Replacing the connecting hose

1. Loosen and remove the defective connecting hose with the open-end wrench (wrench size 41 mm). To do so, you may need to hold it against the angle piece.
2. First, attach the replacement hose to the angle piece and tighten it with the open-end wrench.
3. If you are only replacing the hose:  
Change the hand grip and the hose cap over to the replacement hose.

## 8.5 Additional work

Furthermore, a qualified user is allowed to replace the parts that are installed during installation and the following parts:

- Hose belt (007.250075)
- Hose cap (007.250071)
- Locking pin (007.250058)
- Wheel carrier (007.250050)

- Polyamide wheel (007.250052)
- Pneumatic spring (C365)
- Complete thrust part (007.25001)
- Thrust rod (007.250014)
- Star knob (007.250023)

Any additional maintenance and service work may be performed only by qualified specialist personnel from the manufacturer.

## 8.6 Care

If the tool is due to remain unused for an extended period, spray the nozzle holes and the connecting threads with OIL SPRAY BIO (item no. C191).



## 8.7 Disposal, environmental protection

The tools do not require any special disposal procedure. Simply dispose of them with other scrap metal.

Please note that pipes are cleaned only if the composition of the wastewater is known (in particular industrial wastewater). Under no circumstances may chemicals or other toxic substances flow through defective pipes and enter the environment.

Defective pipes or leaking substances must be reported to the supervisory authority.

Do not use excessive amounts of water. This will help conserve our natural resources.

## 9 Accessories and spare parts

### 9.1 Accessories



OIL SPRAY BIO

Item no. C191

Germes  
LubricantItem no.  
14.99008Threadlocking adhesive  
"medium strength"  
Loctite® 243, 50 ml

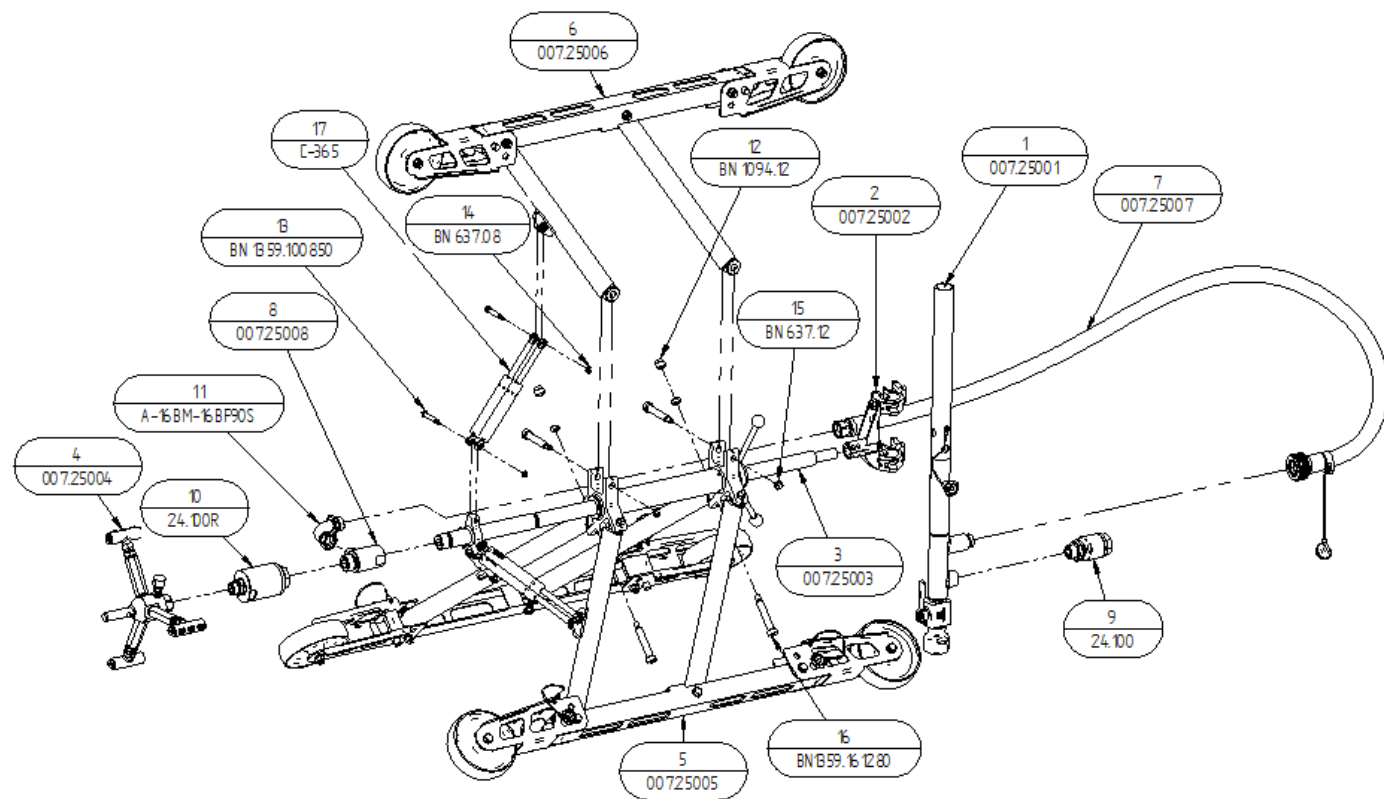
Item no. C192

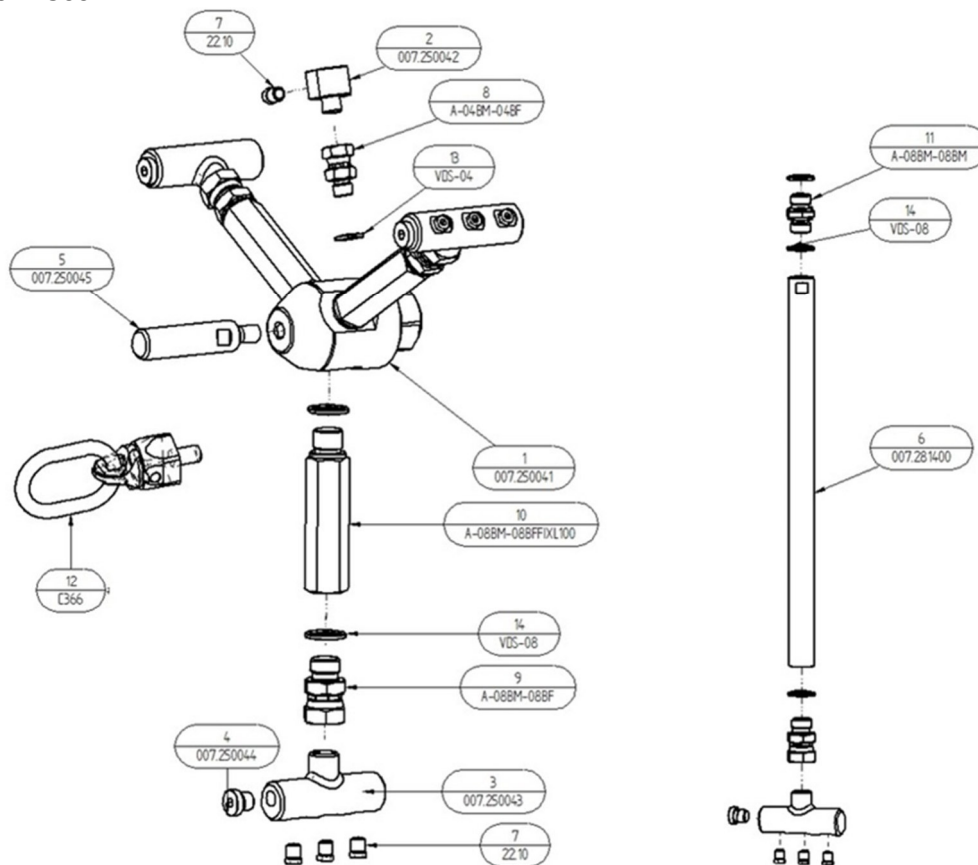
Extension pipes:  
Ø1,400Item no.  
3 x 007.281400(optional)

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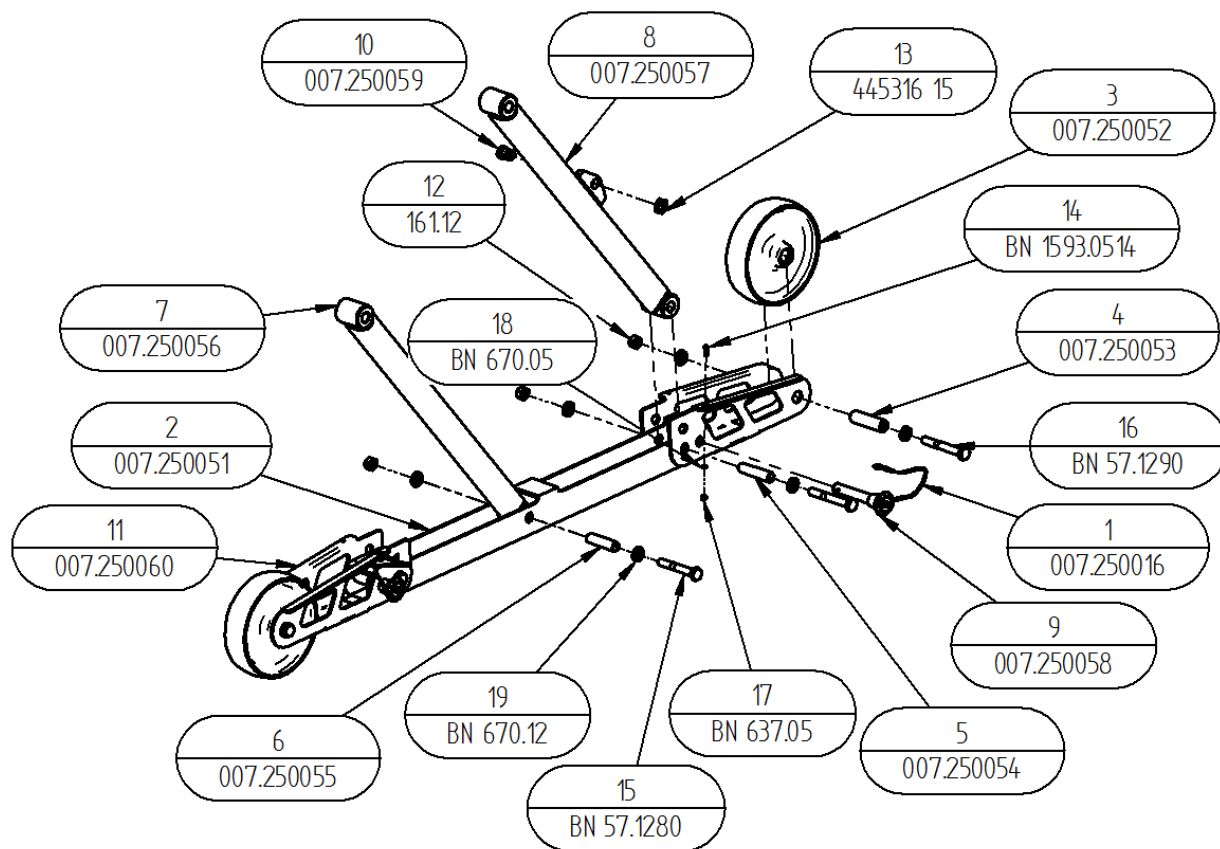


## 9.2 Propeller nozzle P360

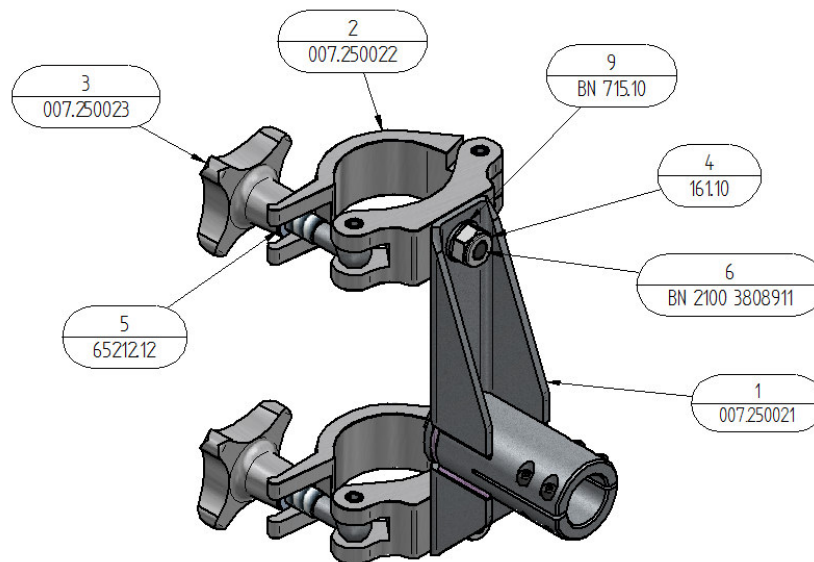
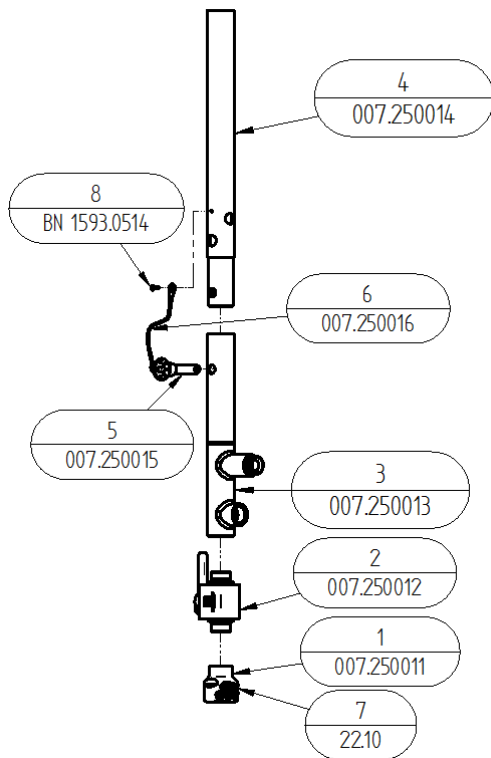




## 9.4 Skid 007.25005



## 9.5 Thrust 007.25001 & thrust fastener 007.25002







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