



Bulldog[®]

Bulldog[®] Antiblast



40x.037xx

40x.060x

40x.080xxxxx

40x.101xx

600.080

600.100x

Operating instructions
English
July 26 | Version 1.4



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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 and new design ideas. 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.

enz® technik ag

Tel. +41 41 676 77 66

info@enz.com

**Feedback form**www.enz.com/en/header/feedback

Person responsible for the documentation:

Luca Gottenkiény (Tech. Support / QM Manager)

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

These operating instructions serve to use our product in a comprehensive sense according to its intended use, correctly, effectively and safely. The users are informed about the risks, reasonably foreseeable misuse and residual risks.

**Important!**

Before using the product for the first time, read these original operating instructions, handle accordingly and keep them in a safe place for future reference.

Carefully read through the operating instructions before working with the cleaning tool. Make sure that it has been understood by all persons working with the product.

The operating instructions should be made available to the operating personnel at all times. It must be stored at an easily accessible location.

If the operating instructions are lost or have been destroyed, a copy can be requested from your local dealer or direct from the manufacturer.

1 Safety

1.1 Consequences when disregarding the safety instructions

Disregarding the safety instructions may lead to accidents with serious personal injury, property or environmental damage.

The manufacturer is not liable for damage that results from disregarding the safety instructions.

1.2 Target group

These operating instructions are intended for all persons that are involved in assembly, commissioning and operation of the pipe cleaning tool.

1.3 Requirements on the user

All persons that are involved in the assembly, commissioning and operation of the tool must ...

- be familiar with the cleaning work environment and have professional knowledge;
- be trained and instructed accordingly for the use of the product;
- have read and understood the operating instructions, in particular the chapter “ **Safety**”.

If the personnel do not have the necessary knowledge, this must be trained and instructed. If necessary, this can be carried out by the manufacturer of the pipe cleaning tool.

Only the maintenance and repair activities described in these operating instructions may be carried out by users who fulfil the requirements specified. All other maintenance and repair work may only be carried out by qualified personnel of the manufacturer.



Observe the instructions in the chapter “**Maintenance**”!

1.4 ⚠ Meaning of the general safety instructions

The general safety instructions in this chapter inform you about potential residual risks which, despite correct use of the product, may be permanently present or occur unexpectedly.

To avoid personal injury, property or environmental damage, it is essential that all persons working with the product observe the safety instructions. For these persons, it is therefore mandatory that this chapter is read and understood.

1.5 ⚠ Types of instructions in these operating instructions



DANGER!

Designates dangers which, if disregarded, will result in **death** or severe injuries!



WARNING!

Designates dangers which, if disregarded, may result in **death**, severe injuries and / or invalidity!



CAUTION!

Designates dangers which, if disregarded, may result in injuries and significant property, financial or environmental damage!



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

1.6 Intended use

Due to the high pressures and temperatures, there is a risk of property damage as well as a risk of injury for the user and other persons. For the correct and intended use of the product, the following points must be observed:

-  The pipe cleaning tool may be used exclusively in pipes or pipe-like channels. In doing so, the profile to be cleaned must be closed and surrounded by material.
-  Suitable for use in concrete, steel, ceramic, clay, cast, stoneware pipes and inliners.
-  The product may only be operated with correct hose connections free of faults.
-  During operation including setup and clearing work, the cleaning area (shaft, feed, etc.) must be sufficiently secured.
-  During operation, **no** persons may remain in the pipes or at the ends of the pipes.
-  The max. pressure specified on the nozzle may **not** be exceeded.
-  The dirty water may **not** be directed into streams or rivers.
-  Before putting into operation each time, the correct state of the product must be checked.
-  Defects must be rectified before putting into operation.
-  Use only a correct tool. (For nuts, use only matching spanners)
-  Secure hose lines in such a way that they cannot be damaged during operation.
-  Only accessory parts provided and approved by **enz® technik ag** may be used.

1.7 Safety instructions for modifications

It is forbidden to carry out any conversions or modifications to the pipe cleaning tool. Only parts authorised by the manufacturer may be used. The manufacturer is not liable for damage that results in conjunction with conversions to the product made at your own authority.

1.8 Protective equipment when working in shafts, pits and channels

The employer provides suitable protective equipment. They must ensure that their employees wear these during work.

The protective equipment prescribed by the SUVA (Switzerland) are described in the following.

See the leaflet for this purpose:

Safe access and working in shafts, pits and channels

Order number: 44062.d

Suva

Schweizerische Unfallversicherungsanstalt
Arbeitsicherheit
Postfach, 6002 Luzern, Switzerland
Information:
Tel. 041 419 51 11
Orders:
www.suva.ch/waswo
Fax 041 419 59 17
Tel. 041 419 58 51

	Isolation devices Isolation device (breathing apparatus) for remaining in dangerous atmospheres and for rescue operations.
	Isolation devices Isolation devices for self-rescue (self-contained open-circuit compressed air breathing apparatus and regenerative devices) for remaining in channels and for first supply of persons injured
	Rescue harness Rescue harness or safety clothing with sewn-in neck eyelet. During the rescue operation, the rescue rope is attached to the neck eyelet. Lifting the injured person is carried out, e.g. By means of a rescue lifting device with automatic load backstop.
	Suitable work clothing Closed work clothing protects against contamination of skin and possible infections. Visually noticeable work clothing should make the employees more visible for road users.
	Suitable shoes The safety shoes should, in particular, offer good support as well as be anti-slip and leak proof (e.g. Rubber boots).
	Gloves Suitable gloves protect against hand injuries and contact against substances hazardous to health and contaminated water.
	Hard hat The hat protects the persons head against falling objects as well as against knocking against fixed components and objects.

	Ear protection
	Eye protection
	Network-independent lighting

For noise which can damage hearing, e.g. ear protector capsules with integrated headset can be worn.

If there is a danger from splitters, splashing of hazardous substances, etc. eyes must be protected.

For example, a splash-proof torch or a lamp fixed to a hard hat must be carried.

1.9 ⚠ General safety instructions



Danger! | High-pressure water jets

Defective or incorrect operation of the product may generate dangers from splash water under pressure. Before operation, ensure the trouble-free state of the product. Powerful water jets may cause severe injuries or even sever limbs. Non-observance of the safety instructions may result in **death** or very serious injuries!



Danger! | Poisonous vapours

Channels may contain poisonous vapours. Wear the prescribed protective equipment such as gas masks, gas alarms and rescue harnesses. Inhaling poisonous vapours or air contaminated with particles may result in **death** or very serious injuries from the particles penetrating into the lungs!



Warning! | Parts falling down

In the area of open shafts, objects may fall into the shaft on top of persons working there. When inserting the product, never remain directly under the shaft opening. Secure the shaft access against parts that may fall down. Do not throw any tools or objects into the shaft. Never access shafts that are in danger of collapsing. Persons could be buried. Non-observance of safety instructions may result in **death** or very serious injuries!



Warning! | Chemical burns

Channels may contain unknown, corrosive or other harmful substances. Wear the respective protective clothing.. Use the prescribed protective equipment. Chemical burns to skin and eyes as well as infections with pathogens may be the consequence.



Warning! | Risk of falling

In the area where work is carried out using the product, open shafts are to be expected. Open shafts must be indicated. Take care where you step. Persons falling may result in **death** or very serious injuries!



Warning! | Hand injuries

With a modification of the product, there is a risk of hand injuries from entrapment or abrasion. Wear gloves when working. Observe where you hold the product. Carry heavy devices with the assistance of a second person. This may result in crushing, abrasion up to the severing of limbs.

**Caution! | Tipped objects**

With a modification of the product, there is a risk of hand injuries from sharp edges. Wear gloves when working. Observe where you hold the product. This may result in cut injuries to hands and other body parts.

**Caution! | Risk of falling**

In the area where work is carried out with the product, lines and objects are to be expected on the ground. Take care where you step. Keep the operating area clean and tidy. Falling caused by tripping may result in injury.

2 Rights

2.1 Copyright

This manual may not be partially or completely copied, photocopied, reproduced, translated or converted in an electronically of machine-readable form without the prior written consent of **enz® technik ag**.

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2.2 Disclaimer

The manufacturer is not liable for damage that:

- has resulted in conjunction with modifications to the product carried out at your own authority.
- have resulted from disregarding the safety instructions.

2.3 Guarantee conditions

In line with our terms of sales and delivery, we issue a guarantee. However, the guarantee is omitted:

- When used under conditions stipulated otherwise by us.
- When using replacement or accessory parts that are not original from **enz® technik ag**.
- In event of damage caused by:
 - Incorrect handling
 - Non-observance of the operating instructions
 - Unsuitable operating material
 - Routing of the hose or pipelines incorrectly or inappropriately
 - Changes, modifications or conversions to the product at your own authority.

3 Environment

3.1 Disposal

Old devices have valuable recyclable materials that should be recycled. Thus, please dispose of the old device via appropriate collecting points.

3.2 Environmental protection

Please observe that surfaces can only be cleaned where the composition is known. Chemicals or other poisonous substances must never be released to the environment. Take care to avoid excessive use of water. In this way, you help to protect natural resources.

4 Technical data

4.1 Introduction

4.1.1 Bulldog®

The enz® Bulldog® rotating nozzle has been designed for operation using recycled and fresh water. The sealed bearing system allows the use of every kind of recycled water. The nozzle insert determines the permissible dirt particle size to a maximum Ø 1 mm. An integrated magnetic brake system allows low-wear operation at controlled speeds. This allows a most efficient and economic pipe cleaning to be achieved.

4.1.2 Bulldog® Antiblast

Cleaning sewer lines when near home installations brings the risk of pressure equalisation through toilets or odour traps. This comes from negative pressure arising ahead of the nozzle or excess pressure following the nozzle if the installation is not correct or venting is not working properly. The Bulldog® Antiblast prevents this unpleasant side effect.

The Bulldog® is low-maintenance and is characterised by its simple handling.

4.2 Area of application

Bulldog® nozzles are designed for the removal of fat, roots and harder incrustations. They are also well suited for cleaning in all directions before TV recordings.

4.3 Legend for technical data

	Connecting thread [“]		Rotating nozzles / bore
	Front jet:		Thrust jet
	Weight [kg]		Area of application
	Mass		min. flow rate at 100 bar
	Maximum pressure		

4.4 Bulldog® 408.037xx



Figure 1: Bulldog® 408.037xx

Description:

The Bulldog 408.037xx is characterised by its low water consumption. Moreover, the water is only distributed onto two inserts which results in a powerful water jet. Depending on the water consumption, it can be equipped in three different variants.

Area of application:

- Low water capacity
- Cleaning pipes for TV recordings
- Cleaning in all directions from Ø 40-150 mm

Order no.		408.037	408.037B	408.037BN
		BSPP 1/2"	BSPP 3/8"	3/8" NPT
		2xM6 to the rear		
		1xM6		
		-		
		0.40		
	mm	40-150	40-100	
	inch	1.6-5.9	1.6-3.9	
ØxL	mm	38x85	38x89	
	inch	1.5x3.4	1.5x3.5	
	l/min	24		
	US gpm	6		
	bar	350		
	psi	5'000		

Table 1: Technical data Bulldog® 408.037xx

4.5 Bulldog® 400.037x



Figure 2: Bulldog® 400.037x

Description:

The Bulldog® 400.037x is equipped with three drive jets and three neutral jets. All six jets are directed to the rear. A high tractive power is achieved with the three thrust jest.

Area of application:

- Removal of roots and fat
- Cleaning pipes for TV recordings
- Cleaning in all directions from Ø 40-200 mm

Order no.		400.037	400.037S
		BSPP 1/2"	
		6xM6 to the rear	
		1xM6	
		-	3xM4
		0.40	0.41
	mm	40-200	
	inch	1.6-8.0	
	mm	38x85	
	inch	1.5x3.4	
	l/min	50	90
	US gpm	13	24
	bar	200	
	psi	2,900	

Table 2: Technical data Bulldog® 400.037x

4.6 Bulldog® 401.037xx



Figure 3: Bulldog® 401.037xx

Description:

The Bulldog® 401.037xx is equipped with three radial jets which directly clean the walls of the pipe and rinse out the lateral pipes. The three thrust jets are suitable for the advance which allows the loosened material to be flushed away, and the nozzle has an optimum tractive power.

Area of application:

- Cleaning of drain pipes
- Cleaning of lateral pipes
- Removal of solid deposits

Order no.		401.037	401.037C	401.037S	401.037CS
		BSPP 1/2"	BSPP 3/4"	BSPP 1/2"	BSPP 3/4"
		3xM6 radial			
		-			
		-		3xM4	
		0.74			
	mm	62-200			
	inch	2.4-8.0			
ØxL	mm	59x125			
	inch	2.3x4.9			
	l/min	30		60	
	US gpm	8		16	
	bar	350			
	psi	5'000			

Table 3: Technical data Bulldog® 401.037xx

4.7 Bulldog® 404.037xx



Figure 4: Bulldog® 404.037xx

Description:

The Bulldog® 404.037xx is equipped with three radial jets and three jets to the rear. As a result, it is also well suited for the removal of fat and soap. The three thrust jets are suitable for the advance which allows the loosened material to be flushed away, and the nozzle has an optimum tractive power.

Area of application:

- Cleaning of drain pipes
- Cleaning of lateral pipes
- Removal of fat and soap

Order no.		404.037	404.037C	404.037S	404.037CS
		BSPP 1/2"	BSPP 3/4"	BSPP 1/2"	BSPP 3/4"
		3xM6 to the rear 3xM6 radial			
		-			
		-	3xM4		
		0.74			
	mm	62-200			
	inch	2.4-8.0			
ØxL	mm	59x125			
	inch	2.3x4.9			
	l/min	50		80	
	US gpm	13		21	
 max	bar	350			
	psi	5'000			

Table 4: Technical data Bulldog® 404.037xx

4.8 Bulldog® 406.037xx



Figure 5: Bulldog® 406.037xx

Description:

The Bulldog® 406.037xx is equipped with two front jets and six jets to the rear. Due to the rotation of the two front jets, the effect of a powerful jet is created for the best cutting performance with clogged pipes.

Area of application:

- Penetration of clogged pipes
- Flushing out steel pipes after hydraulic thrust boring
- Opening of interlaced roots

Order no.		406.037	406.037C	406.037S	406.037CS
		BSPP 1/2"	BSPP 3/4"	BSPP 1/2"	BSPP 3/4"
		6xM6 to the rear			
		2xM4			
		-		3xM4	
		0.74			
	mm	62-200			
	inch	2.4-8.0			
ØxL	mm	59x125			
	inch	2.3x4.9			
	l/min	65		85	
	US gpm	17		22	
	bar	350			
	psi	5'000			

Table 5: Technical data Bulldog® 406.037x

4.9 Bulldog® 400.060x



Figure 6: Bulldog® 400.060x

Description:

The Bulldog® 400.060x is suitable for cleaning pipes from all materials. Due to the rotating head with three drive jets and three radial jets, an optimum cleaning in all directions is achieved up to a diameter of 300 mm. The six thrust jets ensure for high tractive power.

Area of application:

- Cleaning of drain pipes
- Cleaning of lateral pipes
- Removal of fat and soap

Order no.		400.060A	400.060B
		BSPP 3/4"	BSPP 1"
		3xM8 to the rear 3xM8 radial	
		1xM8	
		6xM8	
		2.10	
	mm	100-300	
	inch	4.0-12.0	
ØxL	mm	60x154	
	inch	2.4x6.0	
	l/min	100	
	US gpm	26	
	bar	200	
	psi	2,900	

Table 6: Technical data Bulldog® 400.060x

4.10 Bulldog® 406.060x



Table 7: Bulldog® 406.060x

Description:

The Bulldog® 406.060x is designed for cleaning pipes made of all types of materials. Its rotating head, equipped with four forward-facing water jets and an optional front jet, ensures thorough 360° cleaning in pipes with diameters of up to 300 mm. In addition, six rear thrust jets provide high pulling force and excellent cleaning performance.

Applications:

- Flushing steel pipes after pipe jacking operations
- Cleaning and flushing service lines from buildings to the main sewer line
- Removing ice from manholes and pipelines

Order no.		406.060	406.060A(S)	406.060B(S)
		BSPP 1/2"	BSPP 3/4"	BSPP 1"
		4xM8 forwards		
		1xM8		
		(6xM8)		
		2.36	2.31	2.25
	mm	100-300		
	inch	3.9 - 11.8		
ØxL	mm	60 x 161	60 x 161	60 x 153
	inch	2.4 x 6.3	2.4 x 6.3	2.4 x 6.0
	l/min	60	60 (with thrust 150)	
	US gpm	15.9	15.9 (with thrust 39.6)	
	bar	200		
	psi	2'900		

Table 7: Technical data Bulldog® 406.060x

4.11 Bulldog® 40x.080xxxxx



Figure 8: Bulldog® 402.080xxxxx

Description 402.080LS:

The 402.080LS operates without thrust jets. The six semi-radial water jets provide the 402.080LS with sufficient propulsion.

Description 404.080HS

Due to the three drive jets, three neutral jets and six thrust jets, the nozzle achieves an optimum cleaning performance.

Area of application:

- Removal of solid fat deposits
- Removal of light to middle-hard mineral deposits

Area of application:

- Cleaning the pipes for TV recordings
- Cleaning in all directions from Ø 125-400 mm

Order no.		402.080 LS100	402.080 LS150	404.080 HS100	404.080 HS150
		BSP 1"			
		6xM10 to the rear		3xM10 to the rear 3xM10 radial	
		1xM10			
		-		6xM8	
		3.70	5.77	3.70	5.77
	mm	125-400	170-400	125-400	170-400
	inch	5-16	7-16	5-16	7-16
ØxL	mm	100x220	150x260	100x220	150x260
	inch	4.0x8.7	6.0x10.2	4.0x8.7	6.0x10.2
	l/min	200			
	US gpm	53			
 max	bar	200			
	psi	2,900			

Table 8: Technical data Bulldog® 40x.080xxxxx

4.12 Bulldog® 40x.101xx



Figure 9: Bulldog® 401.101xx

Description:

Bulldog® 40x.101xx is available with two different heads. The RGS head can be equipped in two different ways (401.101xx and 404.101xx), and the KBR head (400.101x).

Area of application

400.101x:

- Cleaning of lateral pipes
- Removal of fat and soap

Area of application

401.101xx:

- Cleaning vertical pipes in all directions
- Cleaning of deep shafts

Area of application

404.101xx:

- Removal of roots and solid deposits

Order no.	400.101 A	400.101 B	401.101 AS	401.101 BS	404.101 AS	404.101 BS
	BSPP 1"	BSPP 1 1/4"	BSPP 1"	BSPP 1 1/4"	BSPP 1"	BSPP 1 1/4"
	3xM10 to the rear 2xM10 radial		6xM10 radial		3xM10 to the rear 3xM10 radial	
	1xM10					
	6xM10					
	7.20					
	mm	250-600				
	inch	10-24				
ØxL	mm	130x260				
	inch	5.1x10.2				
	l/min	200				
	US gpm	53				
	bar	200				
	psi	2,900				

Table 9: Technical data Bulldog® 40x.101xx

4.13 Bulldog® Antiblast



Figure 10: Bulldog® Antiblast

Description:

Bulldog® Antiblast is equipped with the same features as the conventional Bulldog®. Due to the additionally adapted steel geometry, the excess and negative pressure is reduced and prevents the odour traps from overflowing or being extracted.

Area of application:

- Cleaning pipes near home installations
- Cleaning pipes for TV recordings
- Cleaning in all directions from Ø 100-600 mm

Order no.		600.080	600.100A	600.100B
		BSPP 1"	BSPP 1 1/4"	
		3xM10 to the rear		1xM10 radial
		1xM10		
		6xM8	6xM10	
		4.26	7.60	
	mm	200-400	250-600	
	inch	8-16	10-24	
ØxL	mm	100x206	130x260	
	inch	4.0x8.1	5.1x10.2	
	l/min	180	200	
	US gpm	48	53	
	bar	80		
	psi	1,150		

Table 10: Technical data Bulldog® Antiblast

4.14 Bulldog® Heads

Figure	Specifications		
	Head 37 HRH without inserts 3x2 for 408.037xx Front jet: 1xM6 Rotational jet: 6xM6 to the rear		
	Head 37 HRH without inserts for 400.037x Front jet: 1xM6 Rotational jet: 6xM6 to the rear		
	Head 37 universal without inserts for 401.037xx, 404.037xx, 406.037xx Front jet: 2xM4 Rotational jet: 6xM6 to the rear 3xM6 radial		
	Head KBR Bulldog® 60 for 400.060x Front jet: 1xM8 Rotational jet: 3xM8 to the rear 3xM8 radial		
	Head HRV Bulldog® 60 for 406.060x Front jet: 1xM8 Rotational jet: 4xM8 nach vorne		
	Head HRH for Bulldog® 80 for 402.080xxxxx Front jet: 1xM10 Rotational jet: 6xM10 to the rear		
	Head KBR for Bulldog® 80 for 404.080xxxxx Front jet: 1xM10 Rotational jet: 3xM10 to the rear 3xM10 radial		
	Head KBR for Bulldog® 101 for 400.101x Front jet: 1xM10 Rotational jet: 3xM10 to the rear 2xM10 radial		
	Head RGS for Bulldog® 101 for 401.101xx, 404.101xx Front jet: 1xM10 Rotational jet: 3xM10 to the rear 6xM10 radial		
	Head for Bulldog Antiblast 80 for 600.080 Front jet: 1xM10 Rotational jet: 3xM10 to the rear 3xM10 radial		
	Head for Bulldog Antiblast 100 for 600.100x Front jet: 1xM10 Rotational jet: 3xM10 to the rear 3xM10 radial		

Table 11: Bulldog® Heads

5 Installation

5.1 Placement

To match the Bulldog® optimally to the flushing vehicle, enz® technik ag needs the following parameters for each order:

- | | | |
|---------------------|---------|--------|
| • Pumping capacity: | l/min | US gpm |
| • Pumping pressure: | bar | psi |
| • Hose diameter: | mm | inch |
| • Hose length: | m | feet |
| • Hose material: | Plastic | Rubber |



If changes are made to the parameter, you should re-coordinate the Bulldog.

5.2 Assembly of the tools

The Bulldog® is delivered ready for use. After unpacking, check that the delivery is complete. Then the Bulldog® is screwed onto the pressure hose. The tools have different thread dimensions which are apparent in the sub-chapter “Technical data” from page 14.

As standard, the tool rotates counter-clockwise. This means that it cannot be disconnected from pressure hose during operation.



When screwing on the pressure hose, make sure that no contamination can enter in the tool. Particles may clog the inserts.

5.3 Preparation work

Before use, we recommend clarifying several points. Knowledge of the following points are useful for the preparation and setting of the tool:

- Pipe run
- Internal diameter of the channel to be processed
- Material quality of the channel to be processed
- Type of contamination in the pipe
- Intended flushing direction → We recommend working against the direction of flow
- Any possible inclines of the channel to be processed
- Access possibilities to the channel

5.4 Setting up the workplace

Before working with a Bulldog®, the following measures must be taken:

-  Install any barriers and protective equipment (Triopan warning sign, fencing ropes, etc.).
-  Obtain the necessary information about the waste water introduced to the shaft (chemical substances, gases, vapours, etc.).
-  The necessary measuring devices such as explosimeter, oxygen meter, gas alarm, etc. must be ready for use.
-  The working area must be cordoned off such that there is no risk of falling and no danger from road traffic.
-  Make sure that the suitable nozzles are present for the pipe cleaning. The area of application of each nozzle is apparent in chapter “Technical data”, from page 14.
-  The pipe run (plans) must be known before starting work in order to prevent the nozzle from exiting at the end of the line. Possible exit location must be monitored by support staff.
-  Have the exclusion of liability signed in order to protect against any possible damage.

6 Operation

6.1 Operating the Bulldog®

1. Measure the length of the pipe to be cleaned (marking on the shaft) and check this during cleaning.
2. Insert the tool into the pipe to be cleaned.
3. Slowly increase the pressure on the nozzle to 100 bar.
4. Run the tool carefully to the end of the location to be cleaned.
5. Slowly pull the tool back to clean the pipe and flush loosened contamination to the shaft.
6. After completing the cleaning work, close all shaft covers again.



DANGER!

The maximum work pressure must never be exceeded; there is potential mortal danger! (See "Technical data" from page 15)!

If the nozzle ruptures, walls of the pipe may be pierced through and parts thrown away at high speed.



DANGER!

In larger pipes, the tool may turn. Use a safety pipe for this purpose, this can result in **death** or very serious injuries.



Always monitor the cleaning work using a camera.



With strongly contaminated pipes, we recommend that the tool is pulled back at regular distances. This prevents clogging from fragments and detached material.

6.2 Cleaning slightly damaged pipes

Slightly damaged pipes generally have cracks in the pipe wall. Please always report such observations to the customer or respective authority.

Take great care when working in slightly damaged pipes. The application always takes place at your own responsibility. enz® technik ag accepts no liability whatsoever.

**CAUTION!**

By washing out the cracks, pipe fragments may break away and the area around the pipe flushed out. In case of doubt, do not use the tool. The consequence could be channels collapsing and accompanying injuries!

**CAUTION!**

If the pressure is too high the cleaning jet may damage or break through the pipe wall. This may result in work interruptions and property damage.

6.3 After use

After finishing the cleaning work, the following points must be observed:

1. Check the nozzle inserts for blockage. The best way to do this is when you still have the tool on the hose, and check if water runs out on each nozzle insert.
2. Disassemble the tool from the hose
3. Flush the tool with fresh water
4. Dry the tool and preserve it with Oil Spray Bio (Art. no. C191)

7 Maintenance

The maintenance and repair activities described in these operating instructions may only be carried out by users who have the necessary knowledge.

7.1 Changing the nozzle inserts

Nozzle inserts must be checked at regular intervals in order to ensure an optimum cleaning performance. The wear depends on the degree of contamination of the water used.



CAUTION!

Worn nozzle inserts impair the cleaning performance and there is an increased risk when working with higher pressures. This can result in damage to the tool.

Another reason to change nozzle inserts is a repositioning. In this case, the JetCalc must be used for determination of the nozzle inserts.

Follow the next steps in order to replace the nozzle inserts:

1. Clear the nozzle insert from dirt and heat it for approx. 10 seconds using a gas torch (Art. No. C158).

- ! Heat only locally in order not to damage the seals.

2. Disassemble the nozzle insert using a socket spanner.



Socket spanner:

Bulldog® 37	WAF 3.5 (Art. no. C104)	WAF 5 (Art. no. C101)
Bulldog® 60	WAF 7 (Art. no. C160)	
Bulldog® 80	WAF 7 (Art. no. C160)	WAF 10 (Art. no. C131)
Bulldog® 100	WAF 10 (Art. no. C131)	

3. Clean the threaded hole and the new nozzle insert fat free. E.g. using acetone.
4. Coat the thread of the nozzle insert with Loctite 243 (Art. no. C192)
5. Using the socket spanner, immediately screw the nozzle insert into the tool body to the stop.
6. Leave the adhesive to harden for at least 24 hours at room temperature (approx. 22°C).



Table 12: Changing the nozzle inserts



CAUTION!

Nozzle inserts may only be replaced by identical nozzle inserts or nozzle inserts calculated in JetCal. If the tool is equipped incorrectly, this may damage the tool and the pipe. This may result in injuries and property damage.

7.2 Care

After using each time, spray the surface of the tool with Oil Spray Bio (Art. no. C191).



If not used for a longer period, also spray the nozzle holes and the connecting thread.

8 Spare parts / Accessories

8.1 Accessories Bulldog® 40x.037xx

Figure	Article number	Designation	Use
	00100.037107	Head 37 HRH without inserts 3x2	408.037xx
	00100.037101	Head HRH without inserts	400.037x
	00100.037104	Head universal without inserts	401.037xx 404.037xx 406.037xx
	00100.03720	Cage 1/2" Bulldog® 37	40x.037xx
	0100.03720B	Cage 3/4" Bulldog® 37	40x.037xx

Table 13: Accessories Bulldog® 40x.037xx

8.2 Accessories Bulldog® 400.060x

Figure	Article number	Designation	Use
	00400.0605	Head KBR for Bulldog 60	400.060x
	00406.0605	Head HRV for Bulldog 60	406.060x
	00100.0807	Cage 100 mm Bulldog 60/80	400.060x 40x.080xxxxx
	00100.0808	Cage 150 mm Bulldog 60/80	400.060x 40x.080xxxxx
	100.060300S	Scissor skid with steel wheels and star handle screw	400.060x
	100.060300P	Scissor skid with polyurethane wheels and star handle screw	400.060x
	100.060300JS	Scissor skid with steel wheels and hand lever	400.060x
	100.060300JP	Scissor skid with polyurethane wheels and hand lever	400.060x
	100.060300J	Scissor skid with hand lever	400.060x
	100.060300S	Scissor skid with star handle screw	400.060x

Table 14: Accessories Bulldog® 400.060x

8.3 40x.080xxxxx und 600.080

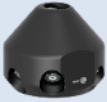
Figure	Article number	Designation	Use
	00402.0805-4	Head HRH for Bulldog 80	402.080LSxxx
	00404.0805-12	Head KBR for Bulldog 80	404.080HSxxx
	00600.0804	Head for Bulldog Antiblast 80	600.080
	00100.0807	Cage 100 mm Bulldog 60/80	400.060x 40x.080xxxxx
	00100.0808	Cage 150 mm Bulldog 60/80	400.060x 40x.080xxxxx
	00100.08073	Thrust stop with O-Ring and screw	402.080xxxxx

Table 15: Accessories Bulldog® 40x.080xxxxx and 600.080

8.4 Accessories Bulldog® 40x.101xx and 600.100x

Figure	Article number	Designation	Use
	00,400.1014	Head KBR for Bulldog 101	400.101x
	00400.1015	Head RGS for Bulldog 101	401.101xx 404.101xx
	00600.1004	Head for Bulldog Antiblast 100	600.100x
	100.1019A	Bulldog cage for 400.101	400.101Ax
	100.1019B	Bulldog cage for 400.101	400.101Bx
	100.1004RA	Cage Ø 400 mm (1 1/4" – 1")	40x.101Ax
	100.100RAW	Cage Ø 400 mm (1 1/4" – 1") without wheels	40x.101Ax
	100.1004RB	Cage Ø 400 mm (1 1/4" – 1 1/4")	40x.101Bx
	100.1004RBW	Cage Ø 400 mm (1 1/4" – 1 1/4") without wheels	40x.101Bx
	100.10073	Thrust stop with O-Ring and screw	401.101xx

Table 16: Accessories Bulldog® 40x.101xx and 600.100x

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enz® technik ag
Schwerzbachstrasse 10
CH-6074 Giswil / Switzerland
Tel. +41 41 676 77 66
info@enz.com
www.enz.com