Turbopuls



410.060x
410.080x
410.080x-G
410.120x-W
410.120x
410.120x-G
410.1209 Twin-Kit

Operating Instructions
English
November 26| Version 1.5

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Foreword

Dear Customer

Thank you for choosing our product and placing your trust in us.
We welcome suggestions for improvement and constructive feedback. Your input helps us optimize our product and its documentation.

Please contact our customer service team directly with any questions or suggestions:

enz® technik ag
Tel. +41 41 676 77 66
info@enz.com

Feedbackformular
www.enz.com/de/header/feedback

Person responsible for documentation:
Bryan Bieri (Technical Support / Head of Quality Management)

Subject to technical changes, further developments, and printing errors.

Purpose of this document

These operating instructions explain how to use our product as intended, correctly, effectively, and safely. They describe risks, reasonably foreseeable misuse, and residual risks.



Important!
Read carefully before use.
Keep for future reference.

Read these operating instructions carefully before working with the cleaning tool. Ensure that everyone working with the product understands them.

The operating instructions must always be available to operating personnel and kept in an easily accessible location.
If these operating instructions are lost or destroyed, a replacement copy can be requested from your nearest dealer or directly from the manufacturer.

1 Safety

1.1 Consequences of ignoring safety instructions

Failure to follow the safety instructions may cause accidents resulting in serious personal injury, property damage, or environmental harm.

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The manufacturer is not liable for damage resulting from failure to observe the safety instructions.

1.2 Target audience

These operating instructions are intended for anyone involved in assembling, commissioning, or operating the pipe cleaning tool.

1.3 Operator requirements

Anyone assembling, commissioning, or operating the tool must:

- be familiar with sewer maintenance work and have the necessary technical expertise.
- have received appropriate training and instruction in the use of the product.
- have read and understood these operating instructions, especially the “Safety” chapter.

Personnel lacking the necessary knowledge must receive training and instruction. If necessary, this can be provided by the manufacturer of the pipe cleaning tool.

Only users who meet these requirements may perform the maintenance and repair work described in these operating instructions. All other maintenance and repairs must be carried out by qualified specialists employed by the manufacturer.



Follow the instructions in the “Maintenance” chapter!

1.4 Meaning of the general safety instructions

The general safety instructions in this chapter describe potential residual hazards that may exist continuously or arise unexpectedly even when the product is used as intended.
To prevent personal injury, property damage, and environmental harm, everyone working with the product must follow these safety instructions. Reading and understanding this chapter is therefore mandatory.

1.5 Types of notices in these operating instructions



DANGER!

Indicates hazards that will result in death or very serious injury if ignored!



WARNING!

Indicates hazards that may result in serious injury or permanent disability if ignored!



CAUTION!

Indicates hazards that may result in injury or considerable property, financial, or environmental damage if ignored!



Information for technically correct and efficient use of the product.

1.6 Intended use

The product is intended for internal pipe cleaning (sewer cleaning). To ensure proper use, observe the following points:

- ⚠ The cleaning tool may only be used inside pipes or similar enclosed channels. The pipe section being cleaned must be enclosed and surrounded by material.
- ⚠ The following pipe materials can be cleaned:
  - Plastic pipes
  - Steel pipes
  - Concrete pipes
- ⚠ Consult the manufacturer before use in pipes made from other materials.
- ⚠ Only operate the product with correct, undamaged threaded connections.
- ⚠ Secure cleaning areas (manholes, inlets, etc.) adequately during operation, setup, and cleanup.
- ⚠ No one may remain inside the pipes or at pipe openings during operation.
- ⚠ Never exceed the maximum pressure specified on the nozzle.e
- ⚠ Never discharge wastewater into streams or rivers.
- ⚠ Check that the product is in proper condition before every startup.
- ⚠ Correct any defects before startup.
- ⚠ Use only suitable tools in proper condition (for example, correctly sized wrenches for nuts).

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⚠ Secure hose lines so they cannot be damaged during operation.

⚠ Use only accessories supplied and approved by enz® technik ag.

1.7 Safety instructions for modifications

Unauthorized modifications or alterations to the pipe cleaning tool are prohibited. Only manufacturer-approved parts may be used. The manufacturer is not liable for damage caused by unauthorized modifications.

1.8 Protective equipment for work in manholes, pits, and sewers

The employer must provide suitable protective equipment and ensure that employees wear it while working.

The protective equipment required by SUVA is described below.

For more information, see the brochure:

Safe entry and work in manholes, pits, and sewers
Order number: 44062.d

Suva
Swiss National Accident Insurance Fund
Occupational safety
P.O. Box, 6002 Lucerne, Switzerland
For information:
Tel. 041 419 51 11
For orders:
www.suva.ch/waswo
Tel. 041 419 58 51



Self-contained breathing apparatus

Independent breathing apparatus for use in hazardous atmospheres and rescue operations.



Self-rescue breathing apparatus

Self-rescue breathing apparatus (compressed-air or oxygen-regenerating units) for work in sewers and initial assistance to injured persons.



Rescue harness

Rescue harness or safety clothing with an integrated neck attachment point. Attach the rescue rope to this point and recover the injured person using a rescue hoist with an automatic load brake.



Suitable work clothing

Closed work clothing protects the skin from contamination and possible infections. High-visibility clothing makes workers more visible to road users.



Suitable footwear

Safety footwear should provide a secure grip, be slip resistant, and be waterproof (e.g., rubber boots).

Gloves

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Suitable gloves protect against hand injuries and contact with hazardous substances and contaminated water.



Safety helmet

The helmet protects against falling objects and impacts with fixed components and other objects.



Hearing protection

Where noise levels may damage hearing, earmuffs with an integrated communication headset may be used.



Eye protection

Protect the eyes against flying fragments, splashes, hazardous substances, etc.



Battery-powered lighting

Carry a splash-resistant flashlight or a light attached to the helmet.

1.9 General safety instructions



Danger!

Ein defektes Produkt oder ein unsachgemässer Betrieb kanA defective product or improper operation can create hazards from water spraying under pressure. Never remain inside a sewer during operation. Check that the product is in perfect condition before use. High-pressure water jets can cause extremely serious injuries, including the loss of limbs.



Danger!

Toxic vapors can form in sewers. Wear the prescribed protective equipment, including respirators, gas detectors, and rescue harnesses. Inhalation of toxic vapors or particle-contaminated air can result in death or severe lung injury!n

	**Warning!** Objects can fall into open manholes and strike people below. Never stand directly below a manhole opening when inserting the product. Secure access against falling objects. Never throw tools or objects into the manhole. Do not enter manholes at risk of collapse; people could be buried.
	**Warning!** Sewers may contain unknown, corrosive, or otherwise harmful substances. Wear suitable protective clothing and the prescribed PPE. Chemical burns to skin or eyes and infections may result.
	**Warning!** Open manholes may be present in the work area. Mark and secure them. Watch your footing.s
	**Warning!** Handling the product can cause pinching or abrasions. Wear gloves and take care where you grip the tool. Carry heavy equipment with two people. Crushing, abrasion, or even amputation may result.SS
	**Caution!** Sharp edges can cause injuries when handling the product. Wear gloves and take care where you grip the tool. Cuts to hands or other parts of the body may result.S
	**Caution!** Hoses and other objects may be on the ground. Watch your footing and keep the work area tidy. Trips can cause injuries.

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2 Legal provisions

2.1 Copyright

Without prior written permission from enz® technik ag, this manual may not be copied, photocopied, reproduced, translated, or converted into electronic or machine-readable form, in whole or in part.

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2.2 Disclaimer

The manufacturer is not liable for damage:

- caused by unauthorized modifications to the product.
- caused by failure to follow safety instructions.

2.3 Warranty conditions

We provide a warranty in accordance with our terms and conditions of sale and delivery. The warranty is void:

- if the product is operated outside the conditions specified by us.
- if spare parts or accessories other than original enz® technik ag parts are used.
- in the event of damage caused by:
  - improper handling
  - failure to follow the operating instructionstrieb
  - unsuitable operating equipment
  - incorrect or improper routing of hoses or pipes
  - unauthorized changes, modifications, or alterations to the product.

3 Introduction

The Turbopuls nozzle uses an eccentrically mounted rotor that generates very strong vibrations. Thanks to its turbine wheel drive, all Turbopuls nozzles can operate with recycled water. The vibrations loosen deposits or break them away in fragments.

In many cases, Turbopuls nozzles eliminate the need for a milling tool.

3.1 Applications

Turbopuls nozzles are designed to remove hard deposits from plastic, steel, and concrete pipes.



CAUTION!

Turbopuls nozzles must not be used in clay or ceramic pipes. The pipes may break!



CAUTION!

Strong mechanical impacts and vibrations can damage pipes. Do not remain in one spot. Keep the nozzle moving at all times.

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4 Installation

4.1 Assembling the tools

The tools are delivered ready for operation. After unpacking, check that the delivery is complete.

4.2 Preparation

It is helpful to clarify certain aspects before use. The following information can assist with preparation:

1. Pipe route
2. Inside diameter of the pipe to be cleaned
3. Material of the pipe to be cleaned
4. Type of deposits inside the pipe
5. Intended flushing direction — working against the direction of flow is recommended.→
6. Any slope in the pipe to be cleaned
7. Access to the pipe

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4.3 Setting up the work area

Take the following precautions before working with a Turbopuls nozzle:

- ⚠ Install barriers and protective equipment (folding warning signs, barrier ropes, etc.).
- ⚠ Secure the work area to prevent falls and hazards from road traffic.
- ⚠ Obtain information about wastewater entering the manhole (chemicals, gases, vapors, etc.).
- ⚠ Ensure that the required measuring equipment, such as explosion meters, oxygen meters, and gas detectors, is ready for use.
- ⚠ Make sure suitable pipe cleaning nozzles are available. The nozzle application range is shown in the technical data section.**25**
- ⚠ The pipe route (manhole plan) must be known before work begins to prevent the nozzle from emerging at the end of the pipe run. Have support personnel monitor possible exit points.
- ⚠ Have the customer sign a liability waiver to protect against potential damage.



Figure 1 ***Abgesperrter & signalisierter Arbeitsbereich***

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5 Operation

5.1 Operating the Turbopuls

Screw the Turbopuls nozzle onto the vehicle's high-pressure hose. The thread size depends on the Turbopuls model and is listed under "Technical data."**25**

During normal operation, the nozzle rotates counterclockwise while the connection thread rotates clockwise. This prevents the nozzle from unscrewing from the hose during operation.

1. Preclean the pipe with a Grenade Bomb nozzle or a pointed nozzle to remove all loose material.
2. Insert the entire tool into the pipe to be cleaned.
3. Slowly increase the pressure at the nozzle to 100 bar (1,450 psi). This operating pressure is usually sufficient for efficient pipe cleaning.
4. If visibility is limited or distances are too great, have another person monitor the exit manhole.
5. Pull the nozzle back at regular intervals and flush out loosened deposits to prevent material from accumulating behind it.



DANGER!

Never exceed the maximum operating pressure specified in the technical data. There is a risk of death! If a nozzle bursts, pipe walls may be penetrated and fragments may be ejected at high speed.**25**



DANGER!

The tool may turn around inside larger pipes and recoil. Use a suitable safety tube. Extremely serious injuries may result!



CAUTION!

Pull the tool back at regular intervals and flush out the removed material. Cleaning too long a section at once can trap the nozzle behind loosened deposits.



CAUTION!

Always keep the Turbopuls moving during operation. Remaining in one spot can damage the pipe due to strong vibrations!



Check cleaning progress with a camera.

5.2 Cleaning sensitive pipes

A softer impact head is available as an accessory for the Turbopuls 410.120A/B. It is recommended to prevent damage to sensitive pipes.
See Section 7.4 for details.**7.430**

5.3 Final steps

Inspect the cleaned pipes using a camera. Pay particular attention to damage and any liquids leaking into the environment. If necessary, remove any remaining deposit edges using a cable or chain flail.-

5.4 After use

To ensure a long service life, maintain the nozzles after every use. Follow Section 6.**619**

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5.5 Troubleshooting

5.5.1 Insufficient vibration with Turbopuls 410.060A/B, 410.080A/B, and 410.100

A hose that is too heavy can significantly dampen the vibrations. We recommend using the reducing hose (part no. 95.F100M075150).
See Section 7.1.**7.127**

5.5.2 The Turbopuls floats above the deposits

Excess water flow through the rear thrust jets may cause the Turbopuls to lift off the surface. An additional pulling unit (part no. 30.100Z) at the end of the reducing hose (part no. 95.F100M075150) prevents this. See Section 7.1.**7.127**

5.5.3 No vibration

If the Turbopuls suddenly stops vibrating properly, several causes are possible:re

- The turbine wheel is blocked — use a screwdriver to turn the turbine wheel manually and clear the blockage.→
- The drive nozzle insert is clogged — see the maintenance section.→**20**
- The turbine wheel is worn — see the maintenance section.→**22**

5.5.4 No forward movement

The Turbopuls cannot climb over a deposit. If this happens, fit a center tip as described in Section 7.3.gKapitel 7.3 auf **29**

5.5.5 Deposits are removed from only one side of the pipe

Due to its internal direction of rotation, the Turbopuls may clean only one side of larger pipes. To remove all deposits, we recommend cleaning from both ends.
If this is not possible, the eccentric weight rotation direction can be reversed on Turbopuls 410.080 and 410.120 nozzles. See Section 7.6.**33**

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6 Maintenance

The maintenance and repair procedures described in these instructions may be performed by operators with the necessary expertise.

6.1 Maintenance after every use

1. Check the nozzle inserts for blockages.
2. Inspect the material for signs of wear and replace any defective parts.
3. Treat the tool with OIL SPRAY BIO (part no. C191) for preservation and care.



Figure 2 ***Oil Spray Bio, 500 ml***

6.2 Nozzle inserts

Inspect the nozzle inserts regularly. Wear depends on how contaminated the water is. When recycled water is used, check the inserts daily and clean them if necessary.

CAUTION!

Worn nozzle inserts reduce cleaning performance and increase the risk when operating at higher pressure. When using recycled water, check nozzle inserts daily.

If the nozzle insert diameters are unknown, use JetCalc to determine them.

6.2.1 Replacing nozzle inserts

1. Remove the defective nozzle inserts.
2. Clean the threaded bores and the new inserts. All threads must be free of grease.
3. Apply Loctite 243 adhesive (part no. C192) to the nozzle insert threads.
4. Immediately screw the nozzle inserts fully into the tool body and lightly tighten them with the appropriate socket wrench.
5. Allow the adhesive to cure for at least 24 hours.

CAUTION!

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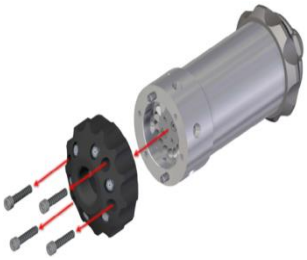
Replace damaged nozzle inserts only with identical inserts of the same diameter. Incorrect nozzle configuration may damage the tool or pipe!

Before extended storage, spray the nozzle openings and connection threads with OIL SPRAY BIO (part no. C191).

6.2.2 Clogged drive nozzle

If the Turbopuls no longer produces the desired vibration, the drive nozzle may be clogged. Remove the drive assembly to clean it.v

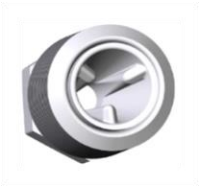
1. Loosen the four socket-head screws and remove the drive assembly.



2. Unscrew the drive nozzle insert (heat gently if necessary).



3. Clear and clean the nozzle insert.



4. Apply Loctite 243 to the drive nozzle threads and screw the insert back in.



4. Install the drive assembly. Secure the four socket-head screws with Loctite 243 and tighten to 38 Nm. Allow the Loctite to cure for at least 24 hours.

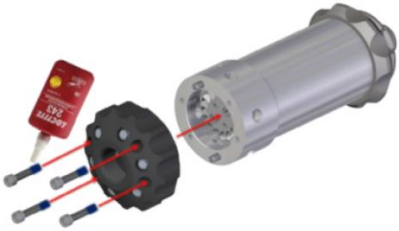


Figure 3: Servicing the drive nozzle3



Worn nozzle inserts reduce cleaning performance.



When using recycled water, inspect the nozzle inserts more frequently.

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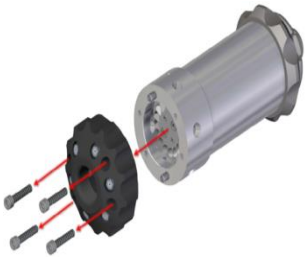
6.3 Turbine wheel wear

If the Turbopuls no longer vibrates properly, inspect the turbine wheel in addition to the nozzle inserts. The illustration at right shows a new turbine wheel. Replace the wheel if the rib (marked green) is damaged or missing.



Figure 4 ***Neues Turbinenrad***

1. Loosen the four socket-head screws and remove the drive assembly.



2. Loosen and remove the two socket-head screws securing the turbine wheel. Caution: Do not heat the screws!



3. Lever the turbine wheel out using two screwdrivers.



4. Install the new turbine wheel and tighten the screws to 10 Nm.



5. Install the drive assembly. Secure the four socket-head screws with Loctite 243 and tighten to 38 Nm.
   Allow the Loctite to cure for at least 24 hours.

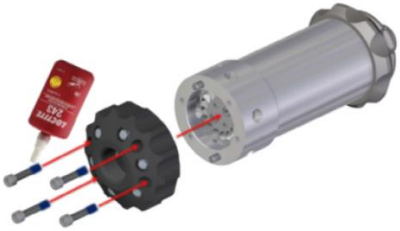


Figure 5: Checking the turbine wheel5

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6.4 Disposal and environmental protection

The tools require no special disposal and can be recycled as scrap metal.

Clean only pipes for which the wastewater composition is known, particularly industrial wastewater. Chemicals and other toxic substances must never escape into the environment through damaged pipes.
Always report damaged pipes or leaked substances to a supervisor or the appropriate authority.

Avoid excessive water consumption to help conserve natural resources.

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7 Technical data

Part number	Description	Connection thread	Rotating jets	Thrust jetsdüsen	Suitable for recycled water	Weight	Application range	Dimensions	Minimum flow at 100 bar (1,450 psi)	Maximum operating pressure (bar / psi)
410.060A	Turbopuls 60	1/2"	1xM6	3xM8	✓	2.4 kg 5.3 lb	100–200 mm 4-8 inch	64x180 mm 2.5x7.1 inch	60 l/min (16 US GPM)	200 bar 2900 psi
410.060B		3/4"								
410.080A	Turbopuls 80	1/2"	1xM6	3xM8	✓	4.3 kg 9.5 lb	150-300 mm 6-12 inch	78x210 mm 3.1x8.3 inch	80 l/min (21 US GPM)	200 bar 2900psi
410.080B		3/4"								
410.080A-G	Turbopuls 100	1/2"	1xM6	3xM8	✓	5.2 kg 11.5 lb	150-300 mm 6-12 inch	100x210 mm 3.9x8.3 inch	80 l/min (21 US GPM)	200 bar 2900 psi
410.080B-G		3/4"								
410.120A-W	Turbopuls 120	1"	1xM8	6xM10	✓	14.6 kg 32.2 lb	200-1000 mm 8-39 inch	120x320 mm 4.7x12.6 inch	150 l/min (40 US GPM)	200 bar 2900 psi
410.120B-W		1 1/4"								
410.120A		1"	1xM8	6xM10	✓	14.5 kg 32 lb	200-1000 mm 8-39 inch	120x320 mm 4.7x12.6 inch	150 l/min (40 US GPM)	200 bar 2900 psi
410.120B		1 1/4"								
410.120A-G	Turbopuls 150	1"	1xM8	6xM10	✓	15 kg 33 lb	200-1000 mm 8-39 inch	150x330 mm 5.9x13.0 inch	150 l/min (40 US GPM)	200 bar 2900 psi
410.120B-G		1 1/4"								
410.1209	Twin Kit	1"			✓	9.0 kg 19.8 lb	500-2000 mm	360 x 700 mm	2x 150 l/min 2x (40 US GPM)	200 bar 2900 psi
		1 1/4"								

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Figure 6 ***410.060A/B Turbopuls 60***



Figure 7 ***410.080A/B Turbopuls 80***



Figure 8 ***410.080A/B-G Turbopuls 100***



Figure 9 ***410.120A/B-W Turbopuls 120***



Figure 10 ***410.120A/B Turbopuls 120***



Figure 11 ***410.120A/B-G Turbopuls 150***

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7.1 Reducing hose

The extra-lightweight 5/8-inch plastic reducing hose maintains strong vibrations when the smaller Turbopuls nozzles are used with a heavy 1-inch or 1 1/4-inch hose. The reducing hose (part no. 95.F100M075150) is installed between the vibrating nozzle and the vehicle's flushing hose. It has a 1-inch female thread on the flushing-hose end and a 3/4-inch male thread on the nozzle end.



Figure 12 ***Turbopuls 80 mit Reduktionsschlauch***

7.2 Using the pulling unit

Flushing hoses larger than 3/4 inch normally supply too much water to Turbopuls 60/80 nozzles. The high thrust causes the vibrating nozzles to lift off the pipe surface, substantially reducing cleaning performance. A pulling unit (part no. 30.100Z) splits the available flow between the Turbopuls and the pulling unit. This keeps the nozzle on the pipe bottom while maintaining strong pulling force. The pulling unit is installed between the vehicle flushing hose and reducing hose (part no. 95.F100M075150).s

7.2.1 Recommended use of the reducing hose and pulling unit



Figure 13 ***Zugteil mit Reduktionsschlauch***

Turbopuls 60 / 80
At flow rates of 150 l/min (40 US gpm) and above, a pulling unit and reducing hose are recommended!

When operating the Turbopuls with a pulling unit, the two components must be correctly matched. Use the nozzle calculation program at https://my.enz.com/ or consult your dealer.

CAUTION!

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	Water from the pulling unit initially sprays upward out of the manhole.
	Keep a safe distance from the manhole to avoid being struck by the water jet.
	When using the pulling unit (part no. 30.100Z), the rear thrust nozzle insert diameters on the Turbopuls must be adjusted. Use JetCalc to calculate the sizes.

7.2.2 Nozzle calculations with a pulling unit

We recommend using a pulling unit with Turbopuls 60/80 at flows of 150 l/min (40 US gpm) or higher. Flow exceeding 150 l/min is used by the pulling unit to provide additional thrust. Calculate as follows:

1. Calculate the pressure loss in the flushing hose using the customer parameters. Record the calculated pressure at the nozzle.
2. Calculate the Turbopuls 60/80 nozzle configuration (net calculation) with 150 l/min and the nozzle pressure calculated in Step 1.
3. Calculate the pulling unit (net calculation) using the remaining flow and the nozzle pressure from Step 1.

Example:
Flow: 250 l/min
Pressure: 200 bar
Hose: 150 meters — 1 inch — rubber

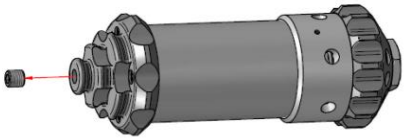
1. Pressure loss in a 150-meter, 1-inch rubber hose at 250 l/min and 200 bar = 31.6 bar. Nozzle pressure: 200 – 31.6 = 168.4 bar.→
2. Turbopuls (net calculation): 150 l/min and 168.4 bar.
3. Pulling unit (net calculation): 100 l/min and 168.4 bar.

7.3 Center tip

The center tip extends the stepped profile of the impact head, helping it climb over deposits. It is available for every Turbopuls size.

7.3.1 Installing the center tip

1. Remove the set screw.



2. Apply Loctite 243 to the center tip thread and screw it in. Allow the Loctite to cure for at least 24 hours.

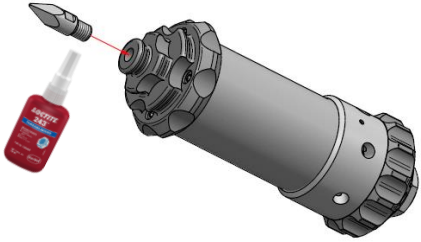


Figure 14: Installing the center tip14



CAUTION!

The installed center tip can damage pipes. In large pipes or bends, the center tip can bore into the pipe wall.



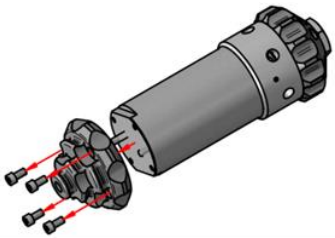
For heavy lime deposits, the center tip acts like a chisel, breaking off brittle layers through thrust and vibration.s

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7.4 Replacing the impact head

The impact heads can be interchanged to increase the removal performance of the 410.080 or to avoid damaging sensitive pipes with the 410.120.

1. Loosen the four socket-head screws on the impact head and remove the head.



2. Install the replacement impact head, apply Loctite 243 to the screws, and tighten to 38 Nm. Allow the Loctite to cure for at least 24 hours.

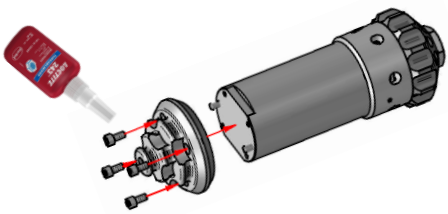


Figure 15: Replacing the impact head15



Changing the impact head changes the removal performance. Always work carefully and keep the Turbopuls moving.

7.5 Twin Kit for Turbopuls 410.120A/B

The Twin Kit can be used in pipes with diameters of 400 mm (15.7 inches) or larger. Two Turbopuls nozzles operate side by side, doubling the removal performance.
To keep the Twin Kit centered in the pipe, the rotation direction of one Turbopuls is reversed at the factory. One eccentric weight therefore rotates counterclockwise while the other rotates clockwise.

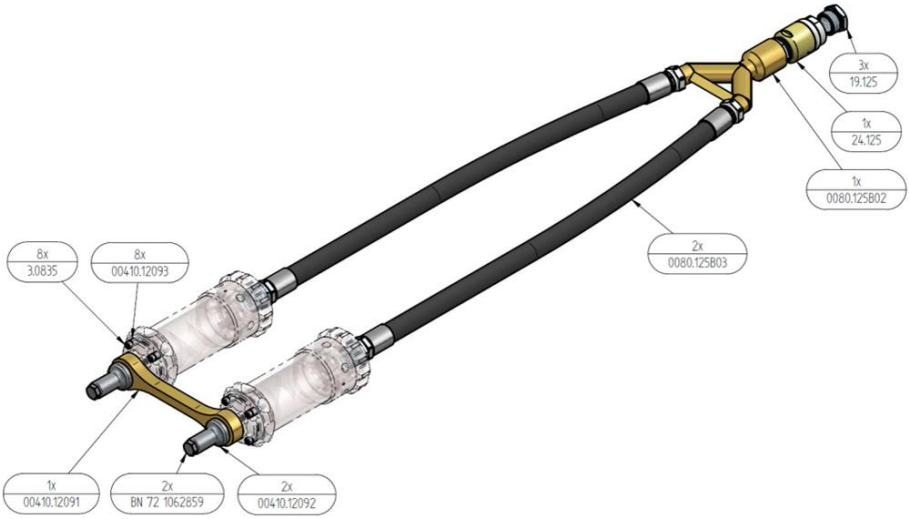


Figure 16 ***Twin-Kit***

7.5.1 Assembling the Twin Kit

1. Loosen and remove the four socket-head screws from both impact heads.



2. Coat the socket-head screws supplied with the Twin Kit with Loctite 638 (part no. C109), install them together with the sleeves, and tighten to 16 Nm.



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3. Remove the sealing plugs from both impact heads.

4. Apply Loctite 648 to both hex-head screws. Fit the twin connector onto both impact heads together with the clamping sleeves and tighten the hex-head screws to 200 Nm.

5. Install the hoses, Y-piece, and swivel joint. Make sure the entire assembly is leak-tight.

6. Allow the Loctite to cure for at least 24 hours!



Figure 17: Assembling the Twin Kit17

CAUTION!

When assembling the Twin Kit, reverse the direction of rotation of one Turbopuls! See the conversion instructions in Section 7.6.**33**

7.6 Changing the rotation direction on 410.080 / 410.120

The standard direction of rotation is indicated by a dot (red arrow) on the thrust cover. In this position, the insert is installed in its standard location, and the other three openings are sealed with plugs.

1. Loosen the four socket-head screws on the drive assembly and remove the thrust section.



2. The standard direction of rotation is marked by a dot.



3. Unscrew the drive nozzle and the sealing plug on the opposite side. Clean the threads, apply Loctite 243, and screw each component into the opposite opening.



4. Apply Loctite 243 to the four socket-head screws, install the thrust cover, and tighten to 38 Nm. Allow the Loctite to cure for at least 24 hours.



Figure 18: Changing the rotation direction18

CAUTION!

Tighten the Turbopuls onto the high-pressure hose using a wrench! Reversing the direction of rotation may cause the Turbopuls to unscrew from the hose!

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8 Spare parts and accessories

8.1 Turbopuls 410.060 / 410.080

Illustration	Description	Part number
	Eye bolt	258.10
	Center tip	00410.08010
	Pulling unit	30.100Z
	Reducing hose	95.F100M075150

8.2 Turbopuls 410.080

Illustration	Description	Part number
	Standard impact head (with screws)	410.0805
	Impact head Ø 100 mm (with screws)	410.08052

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8.3 Turbopuls 410.120

Illustration	Description	Part number
	Eye bolt	258.16
	Center tip	00410.12010
	Twin Kit (without Turbopuls)	410.1209
	Standard impact head (with screws)	410.1205
	Soft impact head (with screws)	410.12051
	Impact head Ø 150 mm (with screws)	410.12052

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8.4 Maintenance / service

Illustration	Description	Part number
	Loctite 638	C109
	Loctite 243	C192
	Oil Spray Bio	C191
	Gas torch	C158
	Nozzle gauge Ø 0.45–1.5 mm	C200
	Nozzle gauge Ø 1.5–3.0 mm	C201
	enz nozzle cleaning tool kit	C202
	Nozzle maintenance tool kit	C205

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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