

OPERATING AND MAINTENANCE MANUAL

TURBO NOZZLE

TD 1000

TD 2000

TD 3000



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1. GENERAL

1.1 PREFACE

WOMA products are high-quality machines which will give you excellent service provided that they are correctly operated and maintained.

Our units and accessories are manufactured in accordance with the European standard for general safety requirements

“Pumps and Pump Units for Liquids” as per EN 809

and in accordance with the German

“Regulations for Liquid Sprayers (spraying devices)” ZH 1/406 and

“Working with Liquid Sprayers” BGR 500 part 2 chapter 2.36

issued by the Liability Insurance Association.

Their design and construction are state of the art and they are operationally reliable. However, high-pressure water jet machinery and its connected accessories may cause danger if they are not properly operated by trained and authorized persons or if they are improperly used.

- **Danger to the bodies and lives of the operators or third persons!**
- **Damage to the machine or other property!**

Any person concerned with the erection, commissioning, operation, maintenance and repair of the machine and/or its accessories must have read and fully understood the operating instructions.

Read the operating instructions completely and carefully!

Only a good knowledge of the operating instructions can avoid mistakes and will guarantee troublefree operation.

So the operating instructions do not belong in the office but must always be available to the operating personnel and must be visibly fixed to the high-pressure water jet unit.

The technical information and data contained in this publication are the latest at the time of printing.

Changes in design will be made from time to time to serve the further development and improvement of our products.

No claims shall be made on account of the data, illustrations and descriptions in these operating instructions.

Any reprint or photomechanical reproduction - also in extracts - is subject to our explicit approval.

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Subject to alterations.

1.2 GUARANTEE

These operating instructions contain all necessary information. They must be carefully read before commissioning the machine.

WOMA shall not be liable for any damage and failure resulting from non-observance of these operating instructions.

Wear parts are not covered by our guarantee. Claims under guarantee shall be made immediately after finding a defect. Mention the order number in your claim.

The guarantee does not apply

- in case of improper handling of the machine
- in case of improper use of the machine
- in case of use of impermissible operating material
- in case of incorrect erection
- in case of wrong or faulty laying of the pipes, cables and hoses
- in case of tampering with or removing or breaking the lead seals
- in case of use of spare parts other than original WOMA spare parts

ATTENTION



WOMA original spare parts and WOMA accessories are specially designed for WOMA high-pressure water jet machines and are tested in a most extensive series of tests.



We expressly point out that any spare parts and accessories not supplied by us are not tested, approved and released by us.



The installation and use of non-original products may negatively change the design-based properties of the high-pressure water jet machine and may thus cause danger to man, machine or other property.



The manufacturer shall not be liable for damage due to the use of non-original spare parts or accessories or damage resulting from unauthorized changes or conversion of the high-pressure water jet machine or its connected accessories.

1.3 SERVICE

Our world-wide SERVICE AGENCIES will be at your disposal for all technical information about WOMA products and their use in technical systems.

Should there be any trouble with our products, please contact our service stations or the authorized agencies or the manufacturer's works. They will all be glad to assist you.

Quick help and correct processing of order will only be possible if the order number and the serial number are known to us.

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2. SAFETY INSTRUCTIONS

2.1 EXPLANATION OF SYMBOLS AND NOTES



ATTENTION-ADVICE

Working safety symbol

You will find this symbol with all notes in these operating instructions concerning the working safety and where there may be danger to the body and life of a person.

Observe these notes carefully and act especially cautiously in all these cases. Make the safety instructions available to other operating personnel. Apart from these safety instructions the General Instructions for Safety and the Prevention of Accidents must be strictly observed.

2.2 WORKERS' PROTECTION RULES



In order to protect life and limb the safety regulations must be strictly observed!

WOMA high-pressure water jet machines and water tools are state of the art and operationally safe. The machines may, however, be dangerous if they are improperly operated or unduly used by unqualified persons.

- The high-pressure water jet is a tool and thus a source of danger. Its careless or improper use may cause danger to life and limb.
- The responsible supervising personnel shall again and again remind the operating personnel that with a high-pressure pump the power generated by the drive motor - reduced by the pump and flow loss - is fully effective at its pressure outlet (e. g. nozzle).
- Any person concerned with the assembly, disassembly, commissioning, operation and maintenance of the high-pressure water jet machine and its water tools must have read and fully understood the complete operating instructions.
- We advise that the operator/owner ask the operating personnel to confirm this in writing.

2.3 SAFETY INSTRUCTIONS FOR THE WORKING AREA



The working areas (spraying areas) and the areas surrounding the high-pressure water jet machine must be clearly protected against unauthorized entering during operation.

Set up danger signs and barriers!

- The work place of the persons who operate the spraying device must be safe. This is particularly important with a view to mutual endangering while several spraying devices are simultaneously operated.
During spraying operation no person, except the operator, must be within a distance of 10 metres.
- **Special care must be taken while spraying on working platforms!** Due to recoil the operator is in danger of falling. Suitable protection against falling must be provided.
- **Loose planks are no safe workplace!**
- During operation in winter there is the danger of skidding.
- Suitable instructions and checks shall guarantee that the workplace is always easy to survey and kept clean.
Remove loop formation of hoses as well as tools which are not used.
- The stand of the operator must be free of grease etc. in order to prevent the operator from skidding due to the reaction forces of the water.
- During operation in closed rooms (tanks, autoclaves etc.) the operator must be secured by a rope and sufficient fresh air must be provided. A second person must permanently watch the operator on the spraying unit.

2.4 SAFETY INSTRUCTIONS FOR PROTECTIVE CLOTHING

Protective Clothing is Prescribed!

Corresponding to EC – directions for personal protective equipment



Alternatively:

Protective helmet	- EN 397 -
	PN 320.0789
Safety glasses	- EN 175 -
	PN 320.2072
Face shield	- EN 175 -
Face shield	PN 320.0791
Holder for face shield	PN 320.0790
Hearing protectors: Ear muffs	- EN 352 -
Standard size	PN 320.0793
Protective gloves	- EN 374 -
Size 10	PN 320.0802
Protective boots	- EN 345 / EN 344 -
Size 40 (6)	PN 320.2677
Size 41 (7)	PN 320.2678
Size 42 (8)	PN 320.0803
Size 43 (9)	PN 320.2679
Size 44 (10)	PN 320.0804
Size 45 (11)	PN 320.2680
Size 46 (12)	PN 320.0805
Size 47 (13)	PN 320.2681
Size 48 (14)	PN 320.0806
Combination with hood	- DIN 61539 -
Size XL	PN 320.3108
Size XXL	PN 320.3109
Protective jacket	- DIN 61539 -
Size 46 / 48 (0)	PN 320.0946
Size 50 / 52 (1)	PN 320.0794
Size 54 / 56 (2)	PN 320.0796
Protective trousers	- DIN 61539 -
Size 46 / 48 (0)	PN 320.0947
Size 50 / 52 (1)	PN 320.0798
Size 54 / 56 (2)	PN 320.0800



The **protective clothing** will only give protection against **spraying water** and **particles coming off**. In case of direct contact with the high-pressure water jet the **protective effect will no longer exist sufficiently**.

TurtleSkin WaterArmor®

Description:

TurtleSkin is made from the tightest weave ever achieved in Kevlar. It is a fiber two times stronger and five times lighter than steel. TurtleSkin WaterArmor can protect water jet operators from pressures as high as 2800 bar and gives ambitious protection without restricting freedom of movement.

Frontal coverage allows excellent air circulation, and joints permit the knees and waist to bend freely. Suit is thin and lightweight with built-in kneepads and adjustable leg length.

Special Advantages:

One size which fits everyone.

Whole day comfort



NEVER intentionally hit anyone with a stream of high pressure water. This garment will not protect against a stationary blast. It was designed to lessen injury caused by a quickly moved water jet.

Technical Data:

1.	Protective vest	Part-No. 320.4246
2.	Leg protection	Part-No. 320.3938
3.	protective gaiters	Part-No. 320.3582
1. + 2.	Protective vest and leg protection	Part-No. 320.3838
1. + 2. + 3.	Protective clothing, complete	Part-No. 010.9662

3. DESCRIPTION

The turbo nozzles are water tools with a self-driving, rotating nozzle carrier head.

The components, i.e. high-pressure gun combined with the turbo nozzle, make up a high-pressure water jet tool, which, because of the rotation of the nozzle carrier head, guarantees an extremely efficient surface treatment resp. surface cleaning.

When the nozzle diameters and pressures prescribed in the product leaflet are observed revolutions/min of about 1000 - 2000 are reached being dependent on work tolerances.

The edge life of these nozzles is essentially influenced by the following points:

- Quality of water

Requirements on the water used – see WOMA specification under point 8 -

- Nature of contamination resp. coating to be removed – very abrasive or soft and flexible
- Observance of the prescribed maintenance periods
- Observance of the prescribed performance specifications according to product leaflet

Bigger nozzle diameters and pressures can lead to malfunction or can destroy the turbo nozzle because of overstressing.

4. START-UP

- Nozzle choice /Technical data – see product leaflet
- Threads must not be damaged or worn.
- Screwed connections of stainless steel must be protected against seizure before each mounting by a suitable anti-seize agent – WOMA PN 530.0451.

ATTENTION

- Only use regular tools for the tightening of screwings. The use of wrong tools can lead to injuries and to damages.
- Each inspection of the screwed connection may only be done when the pressure generator and the pressure line are relieved!
- Only eliminate leakages when the pressure generator is switched off and the pressure line is relieved.
- Only use nozzles of the same inner diameter and of the same form.

5. SHUTDOWN

- Switch off pressure generator.
- Relieve pressure line. When working with the gun actuate the trigger several times.

6. MAINTENANCE

Maintenance after 150 - 300 operating hours.

For this maintenance work the turbo nozzle has to be disassembled.

1. Control bearings and regrease with Molykote Longtherm W2, PN 400.0260. If necessary, replace bearings.
2. Check and clean, if necessary, shaft and housing for pollutants resp. sediments.
3. Check and possibly replace all seals as well as radial shaft seal.

6.1 SAFETY DIRECTIONS FOR MAINTENANCE AND REPAIR

On principle, high-pressure water jet machines and spraying devices must not be maintained, repaired and tested by unauthorized persons.

If necessary, please contact our next service station.

7. TECHNICAL DATA

See WOMA product leaflets

Z-147-1000	Turbo nozzle TD 1000
Z-148-2000	Turbo nozzle TD 2000
Z-149-3000	Turbo nozzle TD 3000

8. REQUIREMENTS ON THE WATER USED FOR HIGH PRESSURE PUMPS

(V-012-0893-EN)

1. Temperature max. + 60 °C
2. PH-value

This value depends on the carbonate hardness contained in the water. A neutral point has to be aspired. The PH-value of this neutral point depends on the calcium/carbonic acid balance. It is admissible to exceed the variable neutral point by three PH-value points. This means the PH-value may vary between 6,5 and max. 12.
3. Total hardness 3 - 30° D.H.
4. Iron content max. 0,2 mg/l Fe
5. Manganous content max. 0,05 mg/l Mn
6. Chloride content max. 100 mg/l CL
7. Organic substances max. 12 mg/l KMnO₄ consumption
8. Sulphate content max. 100 mg/l So₄
9. Chlorine content max. 0,5 mg/l CL₂
10. Dissolved oxygen min. 5 mg/l
11. All further values have to be in accordance with the regulations DIN 50930. Criticism of the corrosive/chemical behaviour of cold waters against galvanized or not galvanized ferrous products.
12. The water must be free from abrasive harmful substances (max. 5 mg/l).
13. Free from undissolved gases.
14. Conductivity under 1000 µ S/cm.

In case of differing values as well as in case of adding chemicals to the water please contact the pump manufacturer.