

## THIS IS HOW WATER-JET CUTTING WORKS.



### 2021

Further development of the SJ family with the Servo-Jet master-slave control and the SJ 18

## 2020

Despite the pandemic adversity this year, Hapro Technik has created a real innovation with the preparing system HT PR-Evo: as HT PR-Evo2 it is now completely chemical-free and guarantees optimal water quality for high-pressure pumps. In the Perndorfer Cutting World, the HT team shows its customers how waterjet cutting works!

### 2018

Hapro Technik expands its product and service portfolio and establishes itself with increasing success as a full-service provider of high-pressure technology for waterjet cutting. The debut of the new high-pressure pump Servo-Jet4000 PURE is the world's first directly-driven plunger pump designed especially for pure water cutting.

### 2017

Intensification of the partnership with Perndorfer Maschinenbau KG, exclusive service partner for Perndorfer waterjet cutting systems, commissioning of the first Hapro Technik Plus systems

### 2015

Adaption of the product portfolio, increased focus on high-pressure technology, bundling know-how as a full-service provider for waterjet cutting

### 2004

Representation in Austria for the company HSB-Automation, linear technology, drive technology, handling technology

### 2000

Representation in Austria for the company Teseo, aluminium systems in modular design for the transport of compressed air, nitrogen, synthetic oils, mineral oils, and water up to 15 bar pressure

### 1997

Representation in Austria for the company Tecnoingranaggi, expansion of water jet cutting technology for the areas equipment and friction materials, high-pressure pumps, and abrasive technology

### 1995

Representation in Austria for the company Püschel, automation systems and handling technology

### 1993

Company founding, project planning, and sale of compr. air components

#### HT Team Real Full Service – Your Profit 4 **HT** Technology HT Plus 6 HT Power 8 **HT High-Pressure Technology** 10 **High-Pressure Pumps** 13 HT Servo-Jet4000 14 HT Servo-Jet4000 PURE HT Cutting Heads 16 HT Expert Injector System 17 **HT Plus Water Purifying and Recycling** 18 Recycling System HT RS 18 Preparing System HT PR-Evo 20 **HT Premium Wear Parts** 24 **HT Machine Elements** 25 Abrasive Metering 26 Abrasive Feed 27 **HT Equipment** 28 HT Service and Maintenance 30

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Tel: +43 7733 8026 office@haprotechnik.com, www.haprotechnik.com

## WE ARE BEHIND THE HT TEAM.

HT Hapro Technik grew out of the family-run company Perndorfer Maschinenbau KG and creates the best conditions for you to produce efficiently and, at the same time, to work sustainably.

We assist your workflow with our processes and products, which we guarantee to deliver promptly and in the highest quality. We apply our experience and know-how in a targeted manner to enhance your waterjet system.

Together, we are the HT TEAM.



Family-run company Perndorfer: Founder Franz with Ewald, Doris and Andreas Perndorfer.

## **REAL FULL SERVICE – YOUR PROFIT.**

The HT Team has established itself as a reliable partner for all WJC users. Consisting of specialists in the fields of service, advice, technology and support, it knows your needs exactly and guarantees full service: the experience and know-how of the HT Team support your workflow and help you to optimize your waterjet cutting system.



Together, we are the HT Team!



#### **HT Support**

The HT Team responds promptly and reliably within 24 hours, offers support and guarantees the fastest possible delivery of high-quality spare parts and wear parts.

#### **HT High-Pressure Technology**

High pressure technology for standard and special applications from high pressure pumps and premium technology to spare parts.



Fastest possible delivery of high-quality parts



The HT Power technology optimizes every water jet cutting system efficient: cutting speeds increase significantly, while operating costs reduce effectively.

### **HT Plus**

plus

The HT Plus products improve the efficiency and sustainability of a waterjet cutting system. They help to increase service life, save energy and protect resources.

### **HT Service**

Our experienced HT Service technicians work accurately and reliably. Our service vehicles are equipped with a wide range of spare parts and wear parts.

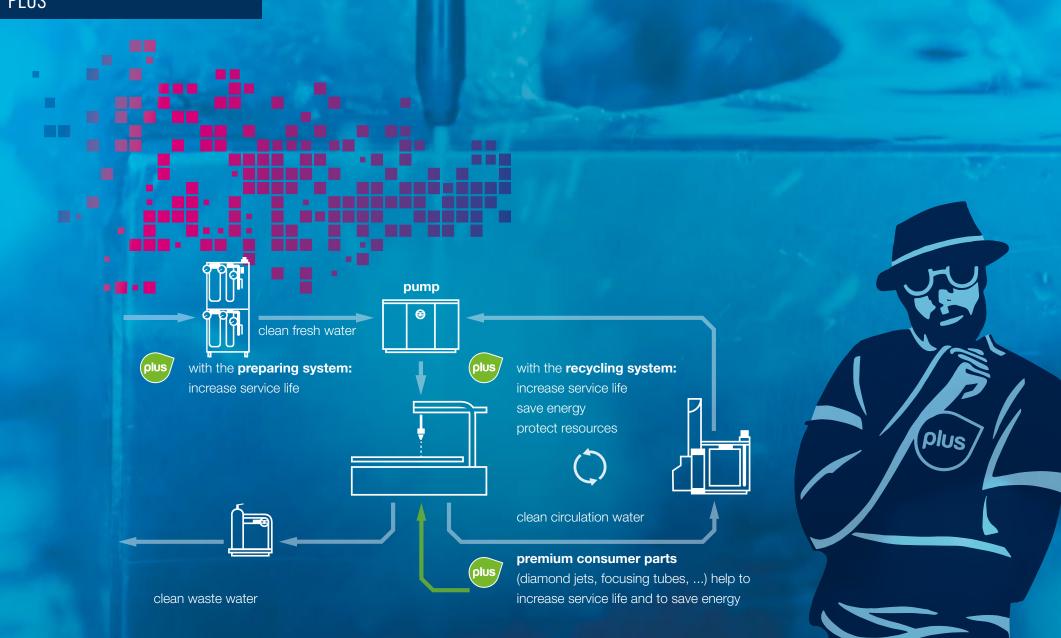


Knowledgeable service -technicians in-house and "on the road"



ULL SERVICA

### HT PLUS



For water supply and waste water treatment or for a closed water cycle.

## **EFFICIENCY AND SUSTAINABILITY WITH HT PLUS.**

**Increase Service Life, Save Energy, Protect Recources.** 

- Considerable increase in the effectiveness of waterjet cutting systems
- Development of the HT Plus products according to strict criteria
- HT Plus products help to increase the service life of the system, save energy and protect resources.
- Hapro Technik is a leader in technology efficiency and sustainability with a focus on the environment is a top priority.

The preparing system improves the quality of the water.

With the recycling system, the used cutting water can be cleaned and reused in the cycle. Regulatory requirements are easily met.

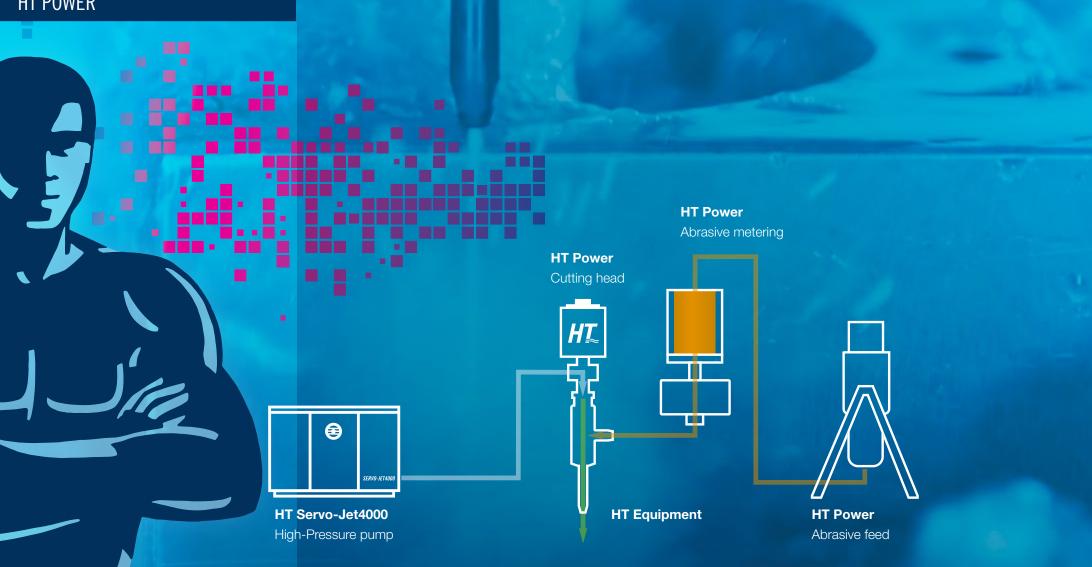
With their high quality, premium consumer parts contribute to a trouble-free operation of the system.

The unique Servo direct-drive technology in the high-pressure pump HT Servo-Jet4000 reduces energy consumption considerably and has a longer service life than, for example, pressure intensifier pumps.

Lower the operating costs of your waterjet system with products from HT Plus.



### **HT POWER**



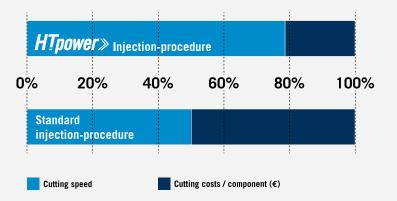
Individually customized: The combination of high quality components is tailored to the actual requirements of your cutting system, regardless of the manufacturer.



## MORE PERFORMANCE AND SUCCESS WITH HT POWER.

Our trailblazing technology is an optimized system of proven HT components for your waterjet cutting system. It enables up to **twice the cutting speed** \* for injection and waterjet cutting **without costly 6,000 bar technology!** 

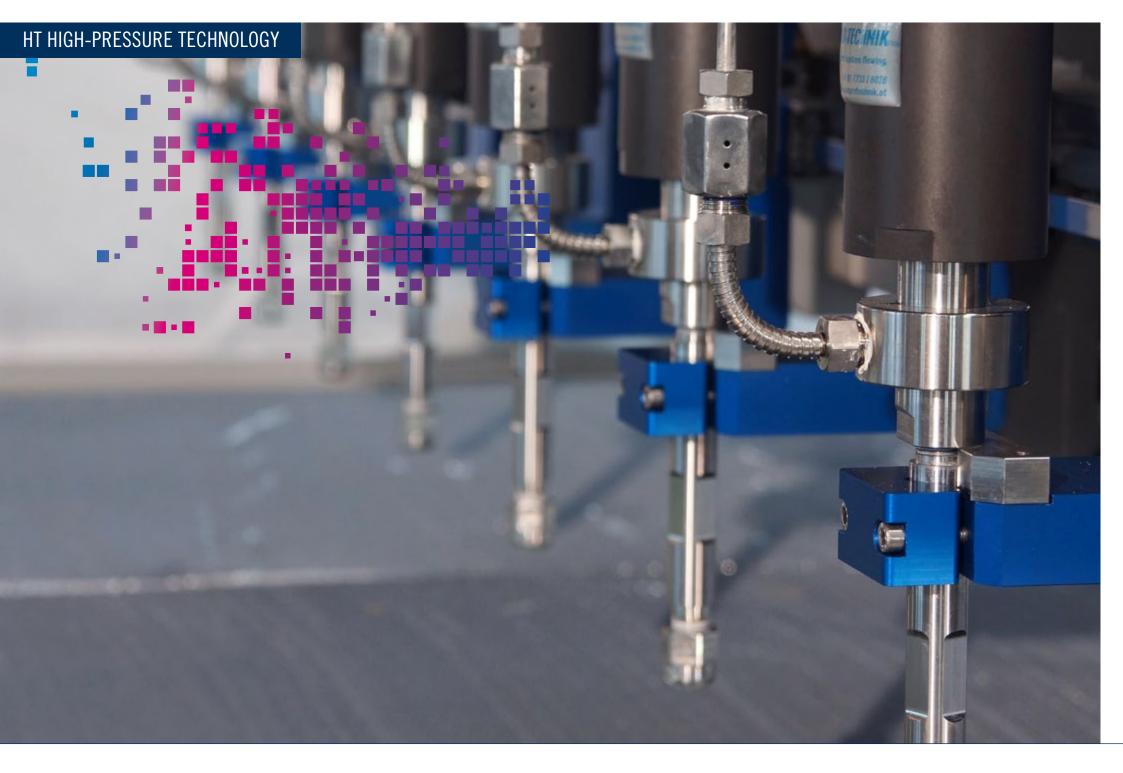
By using the HT Power components, your waterjet cutting system will be optimized effectively. The result: a significant increase in the cutting speed as well as an increase in machine availability and, at the same time, an effective reduction in operating costs.



JEE /

Universally applicable for all brands of waterjet cutting systems.

\* compared to conventional cutting speeds for standard materials



## **HT HIGH-PRESSURE TECHNOLOGY**

As specialists for waterjet cutting products we know the requirements of your system exactly. Regardless of whether you are using high pressure technology for a standard or a special application: We provide **solutions tailored to your requirements with a fair price-performance ratio,** and ensure **high availability with short delivery times.** 

Cutting head

- Cutting heads
- Focusing tubes
- Diamond jets
- Piping components
- Seals
- Tools
- etc.

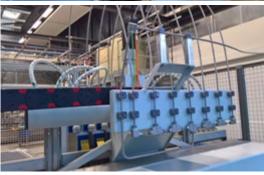


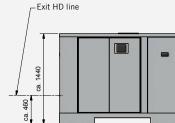
## **COSTUMISED HIGH-PRESSURE SOLUTIONS**

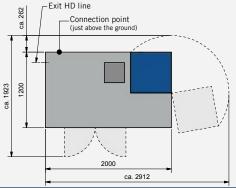
High pressure demands high standards for quality and technical design of a waterjet cutting system, and for its periphery. Also, the efficiency depends fundamentally on the quality of the system components.

We develop and produce robust, sophisticated high-pressure technology. Thanks to our large product range, we deliver fastest possible the correct original spare or wear part for every customised requirement.









#### Consultation

In person or on call/ e-mail/service-request

#### Service

Professional maintenance and repairs, knowledgeable technicians

#### Spare parts

High-quality parts, available immediately ex-stock



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# HŢ

## **HIGH-PRESSURE PUMPS**

### They Are the Heart of Every Waterjet Cutting System.

### The more efficient the pump, the more efficent the entire system!

In addition to our own high-pressure pump series HT Servo-Jet we also carry high-pressure pumps from our permanent cooperation-partners. Our many years of experience help us help you choose the right pump for your system. For the longevity of your new high-pressure pump, no matter which manufacturer, the HT Team offers its know-how, and is happy to share it with you in ongoing trainings. Take advantage of our excellently trained service technicians and a prompt supply of spare parts.





High-pressure pump series HT Servo-Jet4000

Our product range comprises pumps in the 4,000 bar and 6,000 bar classes. A high standard of equipment and a top price-performance ratio are always a matter of course.



## **ADVANTAGES OF THE HT SERVO-JET**

### A Well-Thought-Out Principle that is Very Effective.

- Up to 40 % energy savings compared to conventional systems, investment is eligible for grants
- + High energy efficiency: Servo direct-drive, no reactive current, low and flexible current consumption
- + Low connected load required: No power consumption when the system is at a standstill, suitable for operations with low energy supply
- Plunger pump with three pistons: High power density and high level of efficiency of up to 98 %, replaces 6,000 bar technology, long maintenance intervals, simple structure, no hydraulic system, no warm-up and startup phase – ready to go right away
- Permanent pressure control and integrated pulsation damping: Continual readjustment of the cutting pressure on the set point – lowest pressure fluctuations, higher cutting speed than with the pressure intensifier in a comparable combination

Up to

45 %

funding

possible!

- + Lowest noise level of 75 dB: High-quality, complete unit with sound hood
- + Can be used in all waterjet cutting machines and brands

### Advantages of the HT Servo-Jet4000 PURE

- + Developed for pure water cutting
- + Switch cycles of under one second
- + High-precision pressure control
- + Allows for unparalleled cutting speeds
- + Easy connection to all WJC systems
- + Quick shoots possible

#### Pure Performance – Pure Speed - Pure Precision.

The world's first direct-drive plunger pump – ideal for pure water cutting. Our innovative technology allows for record-breaking switch cycles of under one second. The high-precision pressure control – combined with an accumulator – guarantees a constant waterjet and allows for unparalleled cutting speeds. The use of quality components promises a long service life and the same for the high-pressure pump. That is water jet cutting at its finest!



## **HIGH-PRESSURE PUMP HT SERVO-JET**

# The Probably Most Energy-saving High-Pressure Pump in the World.

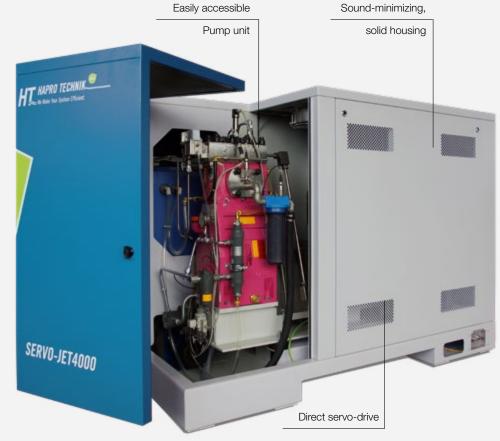
The HT Servo-Jet4000 clearly demonstrates the highest level of efficiency with its exceptional energy efficiency and simultaneous high cutting speed.

Compared to a conventional high-pressure pump, the HT Servo-Jet4000 foregoes ineffective hydraulic systems. A plunger pump with three pistons coupled with a highly efficient Servo direct-drive boosts the overall efficiency to almost 98 %.

At low power consumption (max. 55 kW) there is a large output (max. 8.4 l/min). This makes it possible to supply several cutting jets at the same time and means the leap into a new, future-oriented efficiency class.

Our patented drive technology replaces the costly 6,000 bar technology in the HT Servo-Jet4000 –the highest cutting speed in the cutting system is achieved using large water jets (up to 0.5 mm) – at low operating costs and low energy consumption.

Universally applicable for all brands of waterjet cutting systems.



### Technical information:

Width (mm)	1,200
Depth (mm)	2,000
Height (mm)	1,500
Empty weight (kg)	1,500
Noise level (db), max.	75





## **HT CUTTING HEADS**

### **Products with Maximum Added Value:**

- Precise adjustment possibilities for your individual requirements
- + High throughput for the operation of large water jets
- + Simple maintenance
- + Long service life of the seals and components
- + Short set-up times

All of the cutting heads are developed and produced in accordance with high performance and quality criteria. We put great emphasis on continually improving our product. We combine the latest research findings in high-pressure technology, material and manufacturing technology with our extensive experience.

### Application areas:

- Pure water cutting
- Abrasive cutting
- Two-dimensional applications
- Three-dimensional applications
- Customised productions: Hapro Technik develops uniquely adapted cutting heads for your individual requirements.



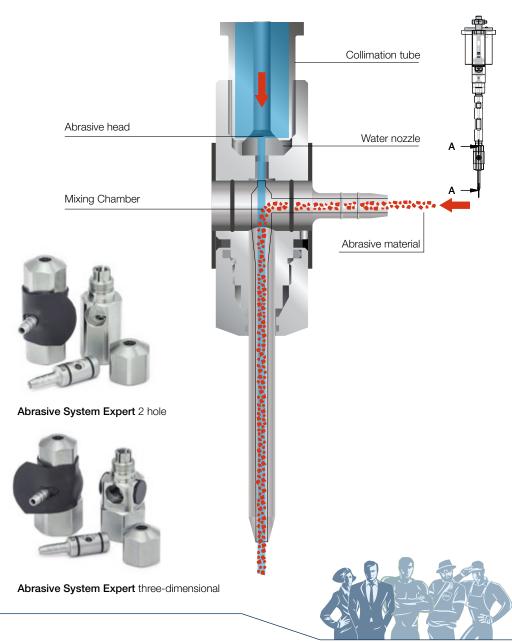
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## **HT EXPERT INJECTOR SYSTEM** The Professional Solution from One Provider.

To cut hard materials every water jet cutting system requires the addition of abrasive material. This is added directly in the cutting head via an injector. HT's (abrasive) injector system provides your cutting system with many great advantages:

- + High cutting capacity: High flow of water and abrasive
- + Durable: Sturdy workmanship
- + Short set-up times: Water jet and mixing chamber can be changed separately
- + Quiet: Low noise level
- + Adaptive: Adjustable to changing requirements possible
- + Independent of manufacturer: Use of standard sizes for jets and focusing tubes
- + Flexible: Usable for cutting heads of all makes
- + Efficient: mixing chamber with inlet pipe

For an even higher level of optimisation, premium models from the HT Plus product range are available.



### Impressively Easy to Work.

The surplus water from the water jet cutting plant flows into the settling basin. Once the floating particles have settled here, the wastewater is coarsely filtered before it goes into the Recycling System.

The water is purified using an innovative filtration technology at 2 bar pressure, then pumped into the buffer tank before moving into the high-pressure pump. Finally, it is reused in the water jet cutting system.

The automatic cleaning cycle of the filters eliminates the need to change the filter!

The independent operation of the HT RS (Hapro Technik Recycling System) allows for an uncomplicated integration into existing waterjet cutting plants since no intervention in its control mechanism is required. Usage in sewage treatment plants, grinding machines, industrial water treatment plants, and so on is also possible.

HT RS reduces the amount of fresh water needed as well as sewer costs and makes it easier to obtain an operating permit and operate water jet cutting machines even where little water is available.

The circulation process of the low maintenance Recycling System allows for efficient use of the entire water jet cutting plant with an efficiency level of 95%.

### Advantages of the HT RS

- + Independent of manufacturers and self-sufficient
- + Easily integrated into existing systems
- + Extremely low maintenance
- + No wastewater in the sewer
- + Independent of regulatory requirements
- + Can be used everywhere (sewage treatment plants, industrial wastewater treatment, etc.)
- + Without chemical additives and flocculants





Contaminated cutting water

Water after being cleaned in the recycling plant.





## **RECYCLING SYSTEM HT RS**

### **Resource-Efficient Cutting Water Processing without Chemicals.**

Save fresh water, wastewater costs and any regulatory inspections, by reusing your cutting water in the cycle. In addition, the HT RS system optimizes the cutting water and thus extends the service life of your system.

Generally speaking, water jetcutting is an environmentally friendly technology. However, given that a single cutting head uses on average 400,000 litres per year, large amounts of drinking water are needed. Once used, the water drains into the sewer which leads to considerable expenses. In many cases, these expenses involve disposal costs to remove traces of problematic materials left in the water after cutting.

For the HT Team it is important to keep the ecological footprint as small as possible. In the HT RS system (Hapro Technik Recycling System), the cutting water is processed without any chemical additives and fed via an intermediate container back to the high-pressure pump. This saves water, makes it easier to obtain an operating permit, protects the environment, and is less costly. The maintenance costs and energy consumption are low.





### The 7 Step Technology

Activated carb	on
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Preliminary filtration, absorbs free chlorine and organic turbidity

#### 2 AOP oxidation filter

Removes heavy metals, iron, manganese and corrosion products with a filter sharpness of up to 3  $\mu m$ 

#### 3 Water softening

The water hardness in calcite compounds is determined by means of a catalyst that do not leave any hard deposits

### Degassing

Carbonic acid is removed mechanically

5 SICO filter

Removes silicate, carbonic acid and iron completely

#### 6 Antibacterial nanofiber filter

Absorbs suspended matter and disinfects the cutting water with nano zinc

7 Police filter – monitors the water treatment and blocks the water flow when the filter cartridges are used up and thus ensures clean water and protection for the pump.

### Advantages of the HT PR-EV02

- + Significant extension of the service life of the high-pressure components
- + Greatest effiziency without dangerous chemicals
- + Crystal clear, soft water
- + Smooth operation, no electronic controls
- + 99% maintenance-free
- + An easy-to-manage cartridge system
- + "Plug-and-play"-installation
- + Individual adjustment to the existing water quality
- + Can be used for all waterjet cutting systems
- + Latest generation of green technology
- No danger to humans and the environment





## **PREPARING SYSTEM HT PR-EV02** Increase in Service Life without Chemicals.

#### Ideal water quality for high-pressure pumps.

Whether or not a high-pressure pump performs well depends to a large degree on the water quality after water treatment. Instead of costly technology, our Preparing System HT PR-EVO2 optimizes all factors which reduce downtimes relating to water quality with intelligent and effective materials - without chemical additives. With the Preparing System HT PR-EVO2, the maintenance intervals can be extended, which results in considerable cost savings.

At the same time, operational safety is increased by reducing damage to the high-pressure pump due to water-side malfunctions. This results in quick amortisation with moderate consumption costs.

#### Equipment (optional):

#### Backwashable pre-filter

recommended for own fountain supply for the filtration of sands and sediment as well as in waters with extra high conductivity over 900 µS / cm.

Width (mm)

Depth (mm)

Height (mm)

Power

pH-value

(TDS)

The backwashing is done manually and is optionally also available automatically.



### Factors to Reduce Downtimes in High-Pressure Pumps.

In addition to the corrosion dirt that forms a coating on pumps and water hardness, a number of other factors are responsible for a more frequent maintenance plan on high-pressure pumps. The gas content or the content of free carbonic acid in water also has a major influence on the intervals between pump maintenance. And there are other substances which have a corrosive effect in the high-pressure area of the pump or which even form solid material.

#### The Preparing Sytem HTPR-EVO2 eliminates:

all kinds of solids measuring up to 1 µm in size,

all corrosion products, e.g. iron oxides, manganese oxide, and hydrogen sulphide all heavy metals, e.g. lead, copper, chrome, zinc, mercury, and arsenic, carbonate and sulphate hardness, chlorine, free carbonic acid and oxygen organic compounds, e.g. phenols, pesticides, solvents, deluents, oils, and alcohols, microorganisms incl. bacteria, algae, and fungi and silicate.



Filter and oxidise

Bind and protect





## WATER TREATMENT

### In Harmony with Nature.

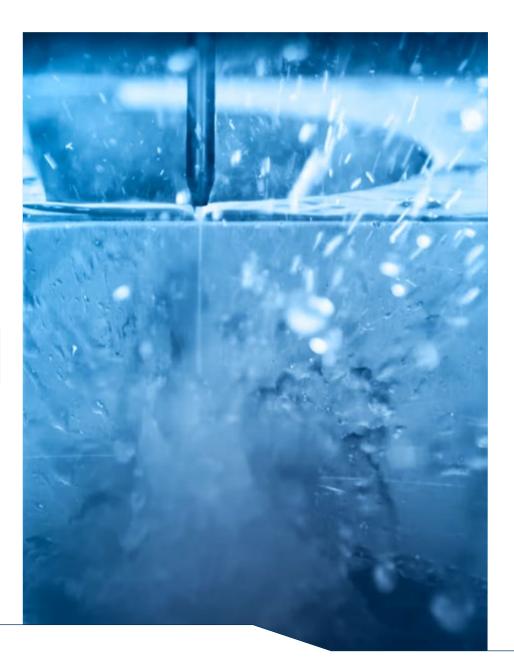
The effectiveness of waterjet cutting machines can be increased considerably with Hapro Technik Plus products. They prepare high qualitiy cutting water thereby reducing water disturbances considerably. At the same time, it protects the environment and valuable resources.



### **Request our analysis case!**

You can easily test the water quality yourself with the water analysis – or we can do it for you.

The result helps us to advise you comprehensively so that the cutting water can be optimally prepared for your system.



## **WEAR PARTS**

### For Exacting Requirements.

High-quality wear parts and consumables provide peace of mind when it comes to workpiece quality and machine availability.

Increase the productivity of your machine and, at the same time, reduce your running costs with HT Plus Premium Wear Parts.

Abrasive cutting heads

Focusing tube (e.g., ROCTEC 500)

(e.g., Mixing Chamber Premium, 3D Premium)

### Advantages of the HT Plus Premium Wear Parts

- + Increase machine productivity
- + Shorten machine downtimes
- + Reduce set-up times
- + Minimise the use of resources
- + Optimise OEE (key figure to assess the overall effectiveness of the machine availability, performance, and quality factors)

We ensure high availability with short delivery times.

### **Premium Abrasive Material**

The unique hardness and strength of the GMA Garnet guarantees the highest possible cutting capacity and cutting-edge quality. Thanks to the accurate screening, the highest quality is guaranteed. Cutting speed and consumption are streamlined.



Choose from high-quality premium products with a fair priceperformance ratio.



Water jets

(e.g., TetraCORE ™

## MATCHING MACHINE ELEMENTS

### And Equipment Options for Your System.

The use of matching machine elements minimizes risks and downtimes and increases process reliability.

We will be happy to advise you and integrate various equipment options to meet your requirements for the successful implementation of your requirements.

#### **Height sensing**

Sophisticated sensor technology helps prevent the workpieces from colliding. Various designs can be used for the two- and three-dimensional areas as well as for cutting with the angle error adjustment.

Workpiece support grate with a massive basic structure and stainless-steel slats

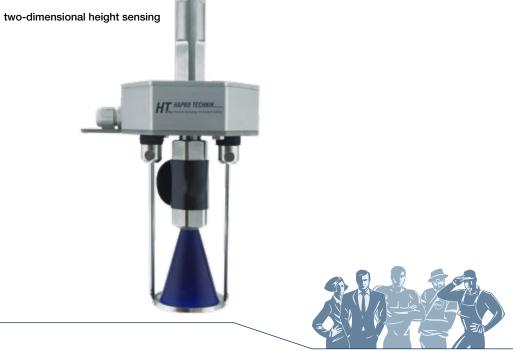
Honeycomb sheets made of aluminium and stainless steel

Workpiece clamping tool to position and mount the workpiece

Laser pointer to visually mark the starting point

**as well as** individually costumised solutions for your system (e.g., splash guard, housing, ...)





## **ABRASIVE METERING**

In water jet cutting with abrasives, abrasives are added to the water jet after the water nozzle. This is garnet sand with a grain size of 80 to 220 mesh. The abrasive cutting technique is used for hard materials such as glass, metal, plastic, composite material, etc.

The abrasive is metered using the one developed by Perndorfer abrasive dosing by means of a conveyor belt. This ensures exact dosing and a continuous cutting process; in addition, the amount of abrasive can be controlled while cutting.

An abrasive tailback or a lack of abrasive is reliably detected and evaluated. The intermediate container above the abrasive dispenser is made of plexiglass and thus enables a quick overview.







#### Autom. Abrasive Conveyor HT AF Gravity 2,000 kg

The automatic HT AF Gravity abrasive conveyor can be filled with at least 2 T of abrasive. The filling levels of the respective containers are constantly monitored by sensors. A warning light shows the level of the abrasive conveyor and signals in good time if more abrasive is needed. The abrasive container can be filled without releasing the pressure in the system. For easier filling, the abrasive tank can also be lifted off the conveyor unit.

# The abrasive conveyors from H conveyance of the abrasive. The



#### Abrasive Container HT AF Standard 200 I

This abrasive container is usually filled with sacks need to fill the pressure container by hand or and used with waterjet cutting machines with one cutting head or as a second container for an alternative abrasive grain. need to fill the pressure container by hand or lift heavy sacks full of abrasive. A warning light shows the level, and the washable dust filter bag makes maintenance easy.

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## **ABRASIVE FEED**

The abrasive conveyors from Hapro Technik and Perndorfer ensure the continuous conveyance of the abrasive. The abrasive material is only blown on the machine for abrasive dosing and is not sucked in by the abrasive dosing, which is gentler on the hoses.



## **BEST SUPPLY GUARANTEED.**

A major success factor in waterjet cutting is a reliable partner who continually supplies the system with equipment, spare and wear parts, and is on hand for maintenance and other service needs. The HT Team has been satisfying this requirement for many years.











### **Everything From a Single Source:**

All equipment, spare and wear parts are carefully selected and tested by us.

We ensure high availability with short delivery times.

Our range of equipment includes focusing tubes and water nozzles in all standard sizes.

The abrasive material comes from Australia and is, for the most part, available ex-stock in all common grit sizes.

We are a premium partner of GMA-Garnet, the leading supplier of industrial garnet sand. Thus we can guarantee high quality and constant availability for a long time.

#### Consultation

In person or on call/ e-mail/service-request

#### Service

Professional maintenance and repairs, knowledgeable technicians

#### Spare parts

High-quality parts, available immediately ex-stock

Tel: +43 7733 8026

office@haprotechnik.com







### HT SERVICE AND MAINTENANCE

- 21 - 22



SERVICE

www.haprotechnik.com service@haprotechnik.com Service-Hotline: + 43 7733 8026 We respond promptly and reliably upom your request

### Service Hours

Mon. – Thurs. 7:00 a.m. – 6:00 p.m. Fri. 7:00 a.m. – 2:00 p.m.

Professional maintenance / repair, knowledgeable technicians, high-quality parts

#### **Maintenance-Packages**

Support maintenance Machine service

Choose from modular maintenance packages, tailored to your requirements



## SPEED. AVAILABILITY. PERFORMANCE. QUALITY.

These are the most important factors when operating a water jet cutting system. To ensure all of these factors over the long term, perfectly coordinated maintenance is an absolute must. The experienced HT Team is always up-to-date on the latest technical developments of all well-known brands.

You can focus on cutting. We focus on the professional maintenance and servicing of your system \*.

### **HT Service and Maintenance**

## Whether you have an urgent service call or a planned maintenance appointment – We'll take care of it!

The type and scope of the service will be determined together with you. We are endeavoured to perform the work quickly, professionally, and to your complete satisfaction.



#### "Service on the road"

Our service vehicles are equipped with a wide range of spare parts and wear parts. This lets our HT Service technicians respond quickly and reliably.

#### Proc ess reliability

Our maintenance packages are tailored to the system and the requirements. They include set checks and service work on your cutting system. As a result, you receive high cost transparency and increase the availability, performance, and quality for many years. Our experienced and specially trained HT Service technicians test and service the system and all the peripheral equipment.

#### System optimisation

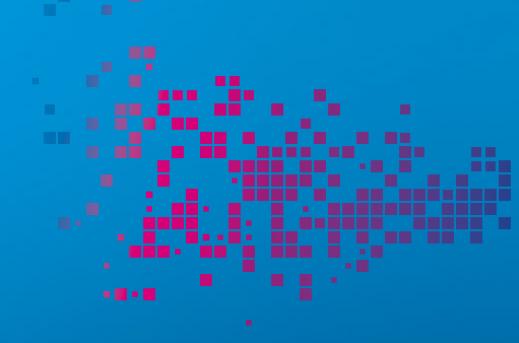
You benefit in many ways. By partnering with HT you have a well-maintained system and benefit from our know-how in water jet cutting. In addition, we provide you with the latest products and information. Your tailored cutting process is continuously enhanced.

#### Quality creates trust. Trust creates partnership.

Place your trust in us and see the quality of our products, just like many of our long-term customers with whom we work in partnership. Together, we are the HT team.



\* Perndorfer – Bystronic – BFT – UHDE – Hammelmann – JetCut – KMT and other brands.



## **REAL FULL SERVICE – YOUR PROFIT.**

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09/2021

Hapro Technik Ges.m.b.H. Parzleithen 8 A-4720 Kallham

Tel. +43 7733 / 8026 Fax +43 7733 / 7193 office@haprotechnik.com www.haprotechnik.com HT Service-Hotline: +43 7733 8026 service@haprotechnik.com

Mon. – Thurs. 7:00 a.m. – 6:00 p.m. Fri. 7:00 a.m. – 2:00 p.m.

