

Perndorfer Hapro Technik ServoJet 4000 – SJ55

Probably the most efficient high-pressure pump in the world

Technical Product Description



1. General

The cutting speed depends on the size of the water jet in use and the amount of the injected abrasive material.

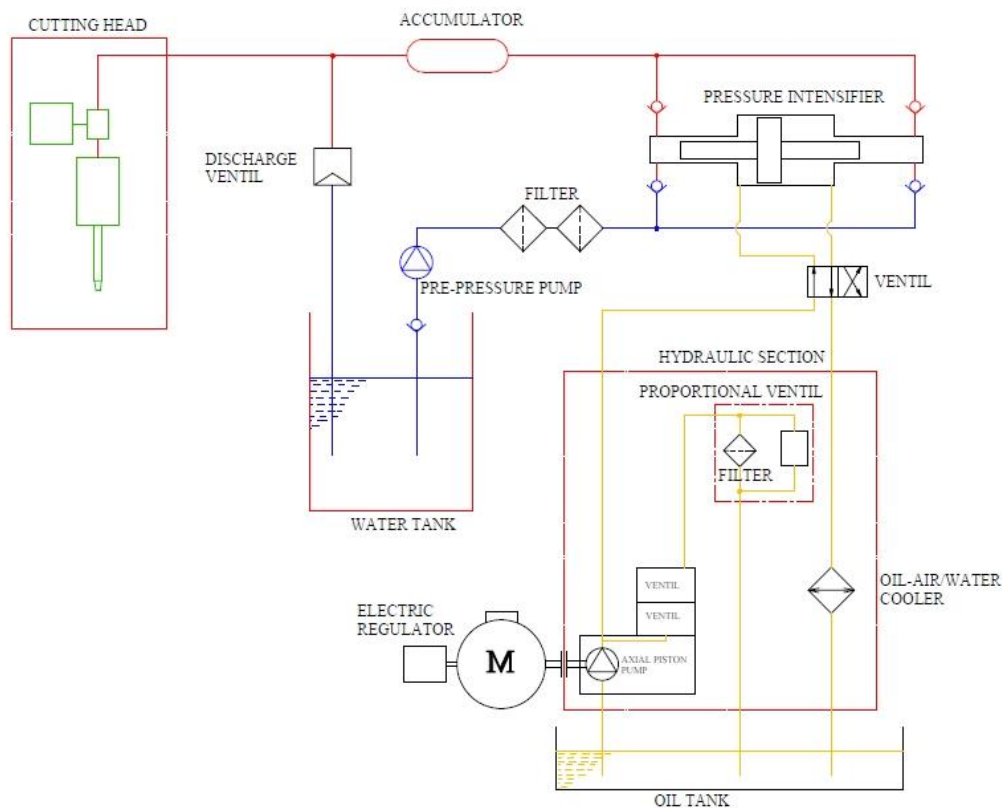
In principle applies: the larger the diameter of the waterjet, the higher the speed!
On the other hand, the waterjet diameter depends on the flow rate and consequently, on the drive performance of the high-pressure pump.

The goal in the industry is higher cutting speed, which requires more efficient high-pressure pumps. So far, with the available technology, this has always resulted in an increase of energy consumption as well.

The ServoJet 4000 high-pressure pump by Hapro Technik, however, makes it possible to keep the energy consumption sustainably at a low level even in case of a high flow rate.

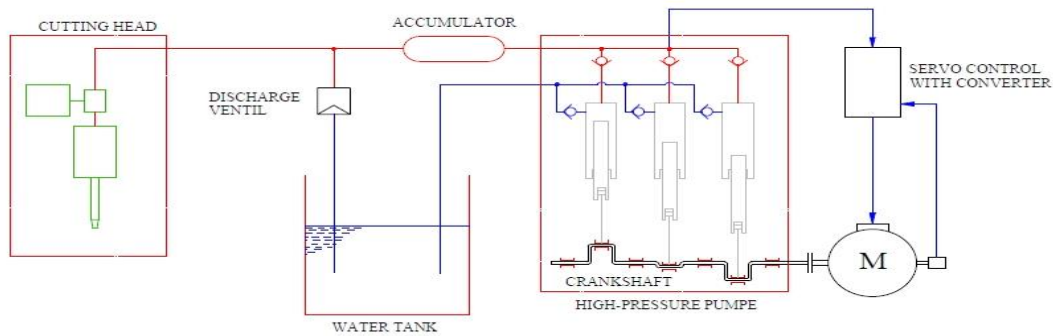
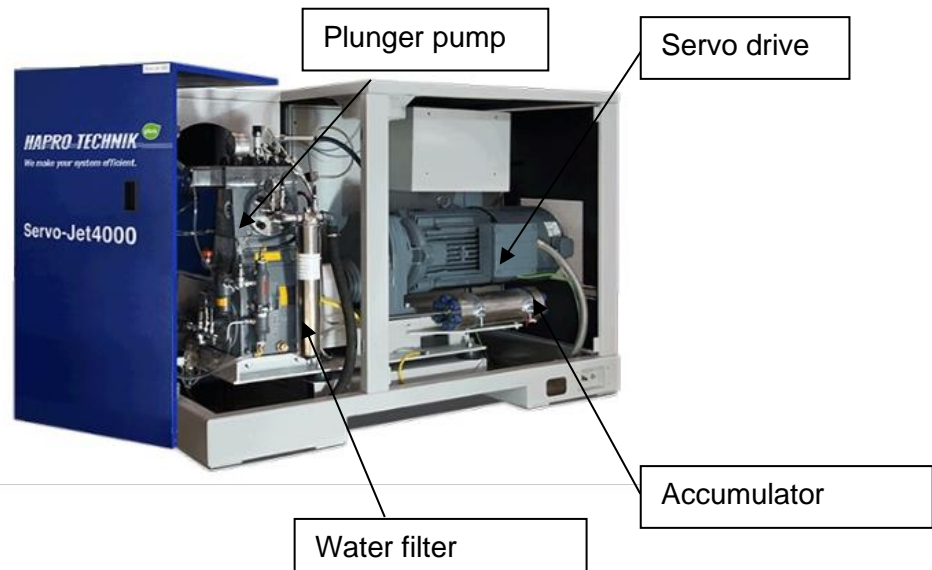
2. Conventional high-pressure pumps

At the moment the pumps in use are based on the pressure intensifier principle. A stronger electric engine/motor operates/drives a hydraulic pump, which in turn drives/operates a large-surface hydraulic cylinder. This cylinder is linked/attached to a small-surface water-cylinder. As a result, the pressure is transmitted from hydraulic to water and is increased to the same extent. With the help of this technology a total efficiency of up to 60% can be achieved. It should be noted that the pump uses the total drive power as soon as it is switched on and the three-phase motor in use works continuously as well.



3. ServoJet 4000 – the new industrial standard

By applying the direct drive technology, which is included in ServoJet 4000, an **energy saving of up to 40%** can be achieved. This technology, patented by Hapro Technik, renounces the low-efficiency hydraulic and uses the economical and high-efficiency servo-drive technology instead. The pressure intensifier is replaced by a three-piston plunger pump, which is operated by a servo-drive.



4. **Advantages of ServoJet 4000**

- **Efficiency of up to 98%** by attaching/linking a plunger pump to the drive technology patented by Hapro Technik.
- **High liter performance** of up to 8,4 l/min with a maximum required performance of 55kW
- **Replaces the 6000-bar technology** – highest possible cutting speed by applying water jets of up to 2 x 0,4mm with low running costs
- Pump adjusts itself automatically to the required flowrate - no parameterization is needed
- **no hydraulic system** installed
- no warm-up or start-up phase – **ready to use instantly**
- the shortest possible adjustment time
- pump works only if cutting valve is in use – longer maintenance intervals, no energy consumption when cutting valve is closed
- no rise time – pressure is maintained between punctuations
- **permanent pressure control** – no pressure fluctuation, resulting in up to 10% higher cutting speed than with pressure intensifier in comparable settings
- **Accumulator installed** – more precise pressure – less wear and tear of circuits and water jets, perfect jet-formation
- **Constant cutting quality** – wear and tear is compensated by adjusting the cutting pressure
- Low and flexible energy intake – energy intake is calculated on and adjusted to the flowrate
- Maximum electric fuse of 100A – suitable also to companies with low power supply
- **No reactive current** due to servo drive
- Extremely low **noise level of 75dB**
- Direct drive – no maintenance and long service life
- Constant supervision of the pump status with the help of sensors to detect the need of maintenance preventively and make it possible to plan ahead
- operating status visible and modifiable with the help of a touch panel

5. Cost advantages:

	Standard Pump	ServoJet 4000, SJ 55
Water Pressure	380 MPa	380 MPa
Water	7,6 l/min	8,4 l/min
Energy	75 kW	55 Kw
Work hours / year	2.000 hours	
Jet size	0,35 mm	
Number of jets	2	
Water delivered / minute	7 l	
Electricity cost	2 €/kWh	
Maintenance / hour	5,5 €/h	2,5 €/h
Total electricity cost / year	30.000 €	20.800 €
Total maintenance cost / year	11.000 €	5.000 €
Total cost / year	41.000 €	25.800 €
Savings per year		15.200 €

6. Technical data:

Data	SJ 55
Power, max [kW]	55
Flow rate, max [l/min]	8,4
Pressure, max [MPa]	380
Accumulator Vol [l]	0,88
Ambient Temperature [°C]	10 - 35
Shortest cycles time [s]*	5
Connections	SJ 55
Water	½"
Water pressure [bar]	3 – 8
Connected water temperature, max [°C]	15
High pressure air connection	M20 x 1,5
Air pressure, min/max [bar]	6,0 – 10
Air connection (Schlauch A.D.) [mm]	8
Voltage [V]	400
Frequency [Hz]	50
Current, max [A]	102
Electrical cabinet protection class	IP55
Diverse	SJ 55
Width [mm]	1200
Depth [mm]	2000
Hight [mm]	1500
Weight [kg]	1700
Noise level, max.	75
Color	grey - blue

* Minimum time between opening and closing of cutting valve including punctuation time

7. Maintenance

Hapro Technik recommends a preventive maintenance of ServoJet 4000 after about every 1250 hours of high-pressure operation. This figure is a general guideline and does not provide the right to any warranty services.

8. Water quality for ServoJet4000:

Parameter	Value
Filter	1µm
Water hardness	3 – 7°dH
pH	7,0-8,5
Conductivity	300 bis 450µS/cm
Dry extract content max.	20 mg/l
CaCo3 max.	50 – 175 mg/l
NH4 max.	0,5 mg/l
Fe max	<0,1 mg/l
CL max.	<100 ppm
SO4 max.	<100 ppm
PO3 max.	50 ppm
SiO2/SiO4 max.	<5 mg/l
CO2 max	<20 ppm
Free chlorine max.	1 mg/l

The use of a water treatment system is recommended. Hapro Technik is ready to offer support with the analysis of the service water and the selection of the suitable system.

9. Guarantee and warranty

According to our general terms and conditions we provide a guarantee of 24 months or 2000 hours of operation, excluding the usual wear parts.

The guarantee expires in case of:

- Using other conditions than agreed on
- Installing and using a bigger motor than specified on the data sheet of the motor
- Damaging the seals on the safety devices
- Using other than original Hapro Technik spare or accessory parts

In case of damage due to:

- Improper use
- Non-compliance to the instruction manual
- Use for other than the intended mode and function
- Use of inappropriate equipment or material
- Inadequate installation
- Faulty or non-professional installation of pipe- and hose-lines
- Unauthorized changes or reconstructions
- Cavitation (formation of air- or gas-bubbles)

In case of a potential warranty claim contact Hapro Technik

10. Construction and installation

The ServoJet 4000 is constructed to be self-sufficient. It can be used with any kind of waterjet-cutting equipment. The installation takes place by connecting it to the high-pressure system and the control unit. The process of the waterjet-cutting itself will not be changed by the installation.

11. Overall benefit

ServoJet 4000 convinces by enabling a higher cutting speed while keeping the running costs low.