FL-HYDRO

HYDROLASER CUTTING COMPLEX

The **FL-HYDRO** hydrolaser cutting complex is a universal 5-axis CNC system for high-precision cutting and drilling of diverse materials across multiple industries. The CNC platform enables simultaneous 5-axis processing. Its machine bed, made of synthetic diabase, provides superior vibration damping compared to cast iron, ensuring maximum rigidity within compact dimensions.

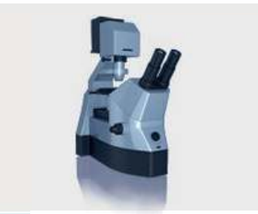
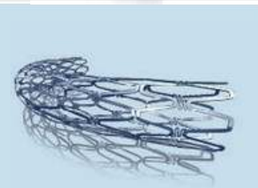
Advantages:

- Burr-free, high-quality cutting surface
- Parallel cutting walls with no heat-affected zone
- No focus adjustment required during processing
- Capability to drill deep micro-holes
- Precise micro-cutting and angled drilling
- Cutting inside cavities and grooves

Processable materials:

- **Semiconductors:** Si, Ge, SiC, GaAs, InP, GaP, CdTe, SiGe, etc.
- **Metals:** Al, Fe, Au, Ag, Cu, CuBe, Mg, W, WC, CuW, Mo, Ni, Ti, Co, Cr
- **Ceramics/hard materials:** AlN, AlO, SiN, AlTiC, ZrO
- **Diamonds**
- **Composites:** carbon fiber reinforced composites
- **Plastics:** black or dark colored

Technology applications

	**Aerospace and Energy Industry**	• Micro-drilling of cooling holes in turbine blades and other jet engine components with thermal barrier coatings • Precision cutting of ceramic matrix composites without thermal impact, micro-cracks, or taper
	**Industry**	Cutting, drilling, and grooving of conductive and non-conductive materials used in cutting tool manufacturing, including tungsten carbides, ceramics, polycrystalline diamond (PCD), and polycrystalline cubic boron nitride (PCBN).
	**Micromachining**	Cutting miniature and complex parts from various materials beyond the capabilities of traditional machining methods.
	**Automotive Industry**	Milling microgrooves (0.04–0.05 mm wide) in molds for automobile tire production.
	**Medicine**	Precision cutting of NiTi stents for medical applications.
	**Electronics Industry**	• Scribing of thin semiconductor wafers • Cutting of thin GaAs wafers • Cutting of precision metal masks

Specifications

Positioning system		
Working area dimensions (H/Ø):		250x160 mm
Maximum travel (X / Y / Z):		500x350x400 mm
Positioning repeatability:		< 5 µm
Circular trajectory deviation:		< 10 µm
A & C axis positioning accuracy:		±25''
Maximum speed (XY):		420 mm/s
Maximum speed (Z):		420 mm/s
Maximum speed (A axis):		200 rpm
Maximum speed (C axis):		500 rpm
CNC control:		HNC 848, 5-axis
Laser		
	QCW	Green laser
Wavelengths:	1070 nm	532 nm
Average power:	450 W	up to 30 W
Pulse duration:	10 µs	up to 100 ns
Water supply system		
Maximum pressure:		500 bar
Consumption:		up to 3 l/h
Nozzle diameter:		40-100 µm
Overall dimensions		
Machine (L × W × H):		1855x1250x1950 mm
Cabinet with communications (L × W × H):		1600x600x1900 mm
Machine weight:		2000 kg
Water treatment cabinet weight:		500 kg

GLOBAL LEADER IN THE LASER INDUSTRY

VPG LaserONE is a Russian company founded by the outstanding Soviet scientist Valentin Pavlovich Gapontsev, founder of the international science and technology corporation.
VPG LaserONE develops and serially produces high-efficiency fibre lasers and amplifiers, optical components, assemblies, modules, instruments, subsystems and systems for:

- Industrial laser cutting, welding, cladding, alloying, heat treatment, marking and cleaning systems.
- Scientific research.
- Fibre-optic, atmospheric and satellite optical communications, cable television.
- Surgery and biomedicine.
- Optical ranging and remote monitoring of industrial facilities and the atmosphere.
- Measurement and control systems, sensors.

In order to introduce innovative laser technologies into production, VPG LaserONE has for many years worked closely with leading domestic machine-building, metallurgical, railway and motor transport enterprises and supplies its customers with more than 600 types of ultra-high-technology laser equipment. Many devices and systems have no equivalents on the world high-tech market. All key components of fibre laser technology are manufactured in-house, which delivers:

- Fast product development.
- Efficient production methods.
- The industry's best product delivery times.
- More advanced and higher-quality solutions.
- The highest wall-plug efficiency, which reduces overall energy consumption and costs.

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1992
Foundation date

1,500+
employees

500+
R&D specialists

>60 000 m²
facilities

100+
patents

90%
component localization