KNUTH
MACHINE TOOLS

ACE Laser

LASER CUTTING MACHINES

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Laser Cutting Machines

ACE Laser

State of the art cutting technology sets the standard in price and performance



ROBUST DESIGN WITH HIGH QUALITY COMPONENTS

COMPLETE CUTTING PACKAGE

48 HOURS SERVICE FOR SOURCE AND CUTTING HEAD**

MAXIMUM EFFICIENCY AT AN AFFORDABLE PRICE

***Valid only in Germany*

ACE Laser Cutting Systems
series 3015 • 4020 • 6020

» The ACE laser is more than a machine, it's a cutting system that sets new standards in price and performance. It is fully customer oriented, designed for high performance and excellent part quality.

» It also fulfills your needs for productivity, safety and reliability. Extensive standard equipment gives users total operational control and versatility.

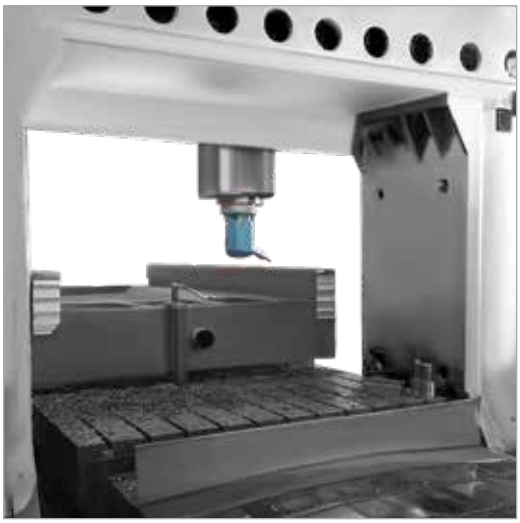
» These features make the ACE Laser the optimal choice for industrial laser cutting applications, from metal fabrication jobs for small shops to large series production for electronics, aerospace or automotive.

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Main Features

Cutting table



° Machine design adopts latest technology standards. Lower body consists of a thoroughly welded frame from high quality steel, which is machined with modern industrial equipment to reach very high tolerance requirements.



° The side walls are reinforced to increase the structural rigidity. The customer can rely on a long-term and reproducible cutting-edge accuracy.



° A thermal treatment is applied to the welded machine frame and all structural parts. This eliminates all production-related material stresses – ensuring long-lasting, precise alignment of all components.



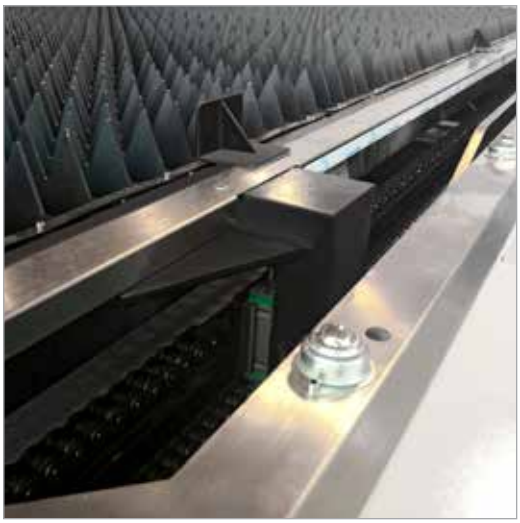
° All guideways and racks are fully covered with high quality bellows, which protects against premature wear, while keeping away dust, slag and small cut parts.

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Main Features

Cutting table

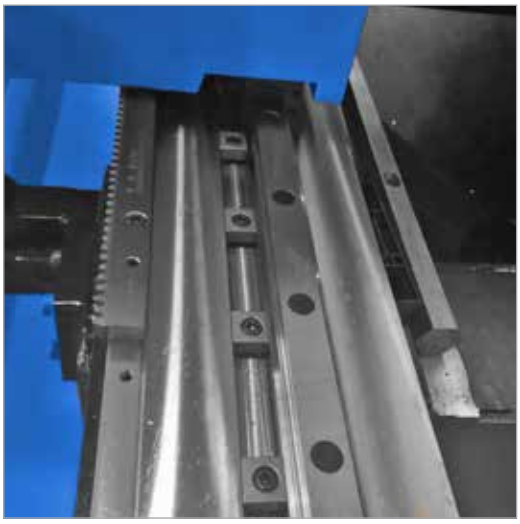


° Workpiece weight is supported by brackets. After usage, they can be replaced via KNUTH, or can be machined by the customer. The DXF file for the brackets as well for the strips are already saved in the CNC control.

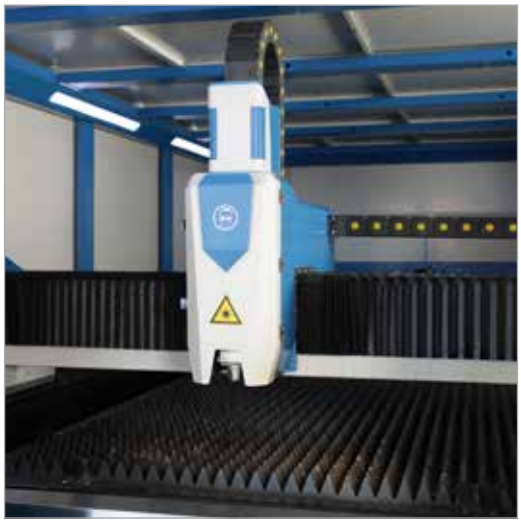


° Machine is equipped standard with lateral scrap drawers which allow the removal of small sized parts and waste material without interrupting the cutting process.

Bridge



° This laser cutting system features a gantry type construction with drives on both sides and a large working area that can accommodate most common plate sizes.



° The Y axis bridge is made from high quality aerospace aluminum die-cast construction with low weight and high rigidity for excellent dynamics.
° An automatic centralized lubrication system is installed on the gantry, which increases machine reliability and minimizes service requirements.

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Main Features

Machine housing

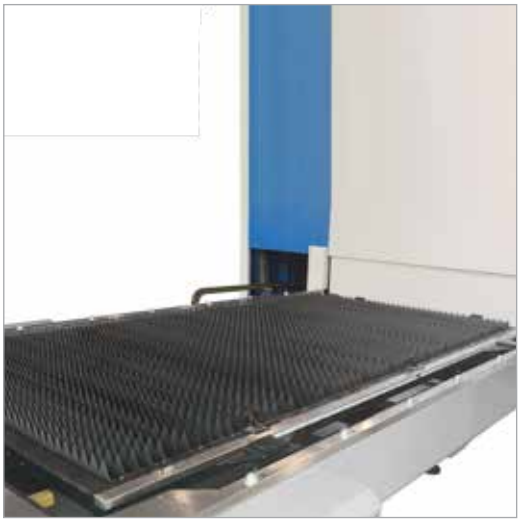


° For the safety of people and the environment, the cutting system is equipped with a fully enclosed housing and filter extraction system.
° Front doors are equipped with windows with special protective glass, allowing the cutting area to be viewed without the laser beam escaping the enclosure.



° The design of the housing is very ergonomic for loading and unloading sheet metal plates. It features two front doors and, based on the size, some models can have large sliding doors on the right side as well.
° The design shown is for model including tube cutting system. Models without this option might have a slightly different housing design.

Automatic Exchange Table



° The automatic exchange table system minimizes production downtimes, since the table can be loaded and unloaded during the cutting process.



° Using European technology, the pallet exchanging is done very fast and smoothly, via chain transmission.
- exchange time under 15 sec. for 3015 series.
- exchange time under 18 sec. for 4020 series.
- exchange time under 20 sec. for 6020 series.

° Secondary command panel at the backside of the machine with basic commands for controlling the exchange table.

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Main Features

Kinematics



° High-performance Schneider Electric servo motors and drives on all axes enable fast and accurate positioning and support high-speed movement. Offering more than just improved performance, these servos are designed to drive the industries of tomorrow due to their long life, maintenance free and energy-efficient design.



° The transmission on X and Y axes is done using high quality helical rack and pinion from the Taiwanese supplier - KAI HE. This low-wear and low maintenance drive system easily handles heavy load capacities and duty cycles due to a higher contact ratio (number of effective teeth engaged).



° Low-backlash gearboxes offer high output in a compact design. As a result, they have high stiffness and overload capacity. They also have lifetime lubrication making them maintenance free and reliable.



° Special linear guide ways from HIWIN on all axes, designed for large load capacity with high rigidity. They feature equal load ratings in the radial, reverse radial and lateral directions, and are self-aligning to absorb installation-error. They are designed for long life and smooth linear motion even at high speeds.

ACE Laser

State of the art cutting technology sets the standard in price and performance

Main Features

Precitec Cutting Head





° Whether for flatbed or bevel cutting systems: The cutting head LightCutter 2.0 is the perfect solution for efficient and cost-effective laser cutting. The new generation of our Light Cutter family is designed for cutting applications in the medium power range up to 4 kW and is characterized by a high cutting quality for all metals - especially mild steel, stainless steel and aluminum.

° Due to an automated motor-driven adjustment of the axial focus position, the cutting head works precise and stable at all times, even at accelerations of up to 3 g. The display of the set focus position on the front of the cutting head makes commissioning much easier. The LightCutter 2.0 Motorized covers a large Focus position range of 23 mm.

Features

° Excellent value
° Very high cutting speed and optimal edge quality
° Motorized focus adjustment
° Different fiber plugs (QBH, D)
° Display of the focus position on the front side of the cutting head
° Focal position up to 23 mm

Technical data

Laser cutting head		**LightCutter 2.0 Motorized**
Max. laser	W	4.000
Focal length collimation (FC)	mm	100
Focal lengths (FF)	mm	125, 150, 200
NAmax		0,12 at FC100
Vertical adjustment range	mm	23 including +11/ -8 mm

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Laser Sources

IPG - Laser Sources



° IPG Photonics' YLR-MM Series represents a new generation of diode-pumped CW fiber lasers in world leading small form factor, with a unique combination of high power, ideal beam quality, fiber delivery and high wallplug efficiency. The YLR-MM is offered as a cost effective, adaptable solution for a clean room system or for integration into a production line. The high brightness YLR-MM lasers feature standard 50 µm core feeding fiber high with beam parameter product <2.

° Featuring a touch panel display or rear control via Analog, RS-232 or Ethernet interfaced, the rack mount configuration is ideal for a multitude of applications from cutting, welding and drilling to medical device manufacturing. Output powers are available up to 3 kW. Beam delivery options include coupler, beam switch (time or energy share) and delivery optics such as cutting and welding heads.

° YLR-MM Multi-mode lasers are equipped with a standard 50 µm feeding fiber to HLC-8 connector. Additional options include 100 or 200 µm diameters to the HLC-8 connector or 50, 100 or 200 µm to an affixed collimator. Focal lengths at 20, 38 or 53 mm are available.

° IPG manufactures a complete suite of optical beam delivery components including delivery fiber and optics, collimators, beam couplers, switches and sharers, and processing heads and scanners, as well as process control and tooling solutions. Interchangeable collimators and processing heads connect easily to the HLC-8.

Features

° Wavelength 1.07 µm*
° Small Focus Over Large Working Distance
° Output Power up to 3 kW
° Record Wall-plug Efficiency
° Excellent Beam Parameter Product
° Modulation up to 50 kHz
° Constant BPP Over Entire Power Range
° Record Reliability
° Maintenance-free Operation
° Compact, Rugged and Easy to Install
° Wide Range of Beam Delivery Option

Technical data

Laser source		**YLR-700**	**YLR-1000**	**YLR-1500**	**YLR-2000**	**YLR-3000**
Wavelength	nm			1070 ± 10		
Output power	kW	500	1.000	1.500	2.000	3.000
Operation mode				CW / modulated		
Modulation frequency	Hz			0-50k		
Power Turnability				10 - 100%		
Beam parameter product	mm×mrad			<2, <5, <15		
Cabinet dimensions (W×D×H)	mm	448×580×133	448×680×177	448×680×177	448×798×177	448×798×177
Weight	kg	< 50	< 70	< 70	< 80	< 80
Cooling		Air	Water	Water	Water	Water

We reserve the right to change specifications without prior notice

Laser Sources

Cutting Parameters

Material	Thickness	IPG 700 (100×125)	IPG 1000 (100×125)	IPG 1500 (100×125)	IPG 2000 (100×125)	IPG 3000 (100×150)	IPG 3000 (100×200)
Carbon Steel (using Oxygen)	mm	m/min	m/min	m/min	m/min	m/min	m/min
	1	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16	10 - 16
	2	3,0 - 4,5	5,0 - 6,0	5,0 - 8,0	5,0 - 8,0	5,0 - 8,0	5,0 - 8,0
	3	2,0 - 3,0	2,5 - 4,0	4,0 - 5,0	3,5 - 4,0	3,5 - 5,0	3,5 - 5,0
	5	1,0 - 1,5	1,5 - 1,8	1,5 - 2,0	2,5 - 3,0	2,5 - 3,6	2,5 - 3,6
	6	0,5 - 1,0	1,2 - 1,6	1,5 - 1,8	1,8 - 2,5	2,4 - 3,0	2,4 - 3,0
	8	0,5 - 0,8	0,8 - 1	1,0 - 1,5	1,6 - 2,0	1,8 - 2,4	1,8 - 2,4
	10		0,5 - 0,7	1,0 - 1,3	1,2 - 1,5	1,2 - 1,8	1,2 - 1,8
	12		0,4 - 0,6	0,8 - 1,0	1,0 - 1,5	1,0 - 1,5	1,0 - 1,5
	14			0,6 - 0,8	0,6 - 1,0	0,6 - 1,0	0,6 - 1,0
	16			0,5 - 0,7	0,6 - 0,8	0,7 - 0,85	0,7 - 0,85
	18				0,4 - 0,7	0,6 - 0,75	0,6 - 0,75
	20					0,5 - 0,65	0,5 - 0,65
	22					0,3 - 0,5	0,3 - 0,5
	25						

We reserve the right to change specifications without prior notice

Material	Thickness	IPG 700 (100×125)	IPG 1000 (100×125)	IPG 1500 (100×125)	IPG 2000 (100×125)	IPG 3000 (100×150)	IPG 3000 (100×200)
Stainless Steel (using Nitrogen)	mm	m/min	m/min	m/min	m/min	m/min	m/min
	1	16 - 22	25 - 28	40 - 45	25 - 35	35 - 50	12 - 20
	2	3,5 - 5,0	7,0 - 8,0	16 - 18	10 - 14	14 - 18	9 - 12
	3	1,5 - 2,0	2,0 - 3,0	3,0 - 4,5	5,0 - 6,5	7 - 10	7 - 10
	4	0,8 - 1,2	1,0 - 1,5	2,0 - 2,8	3,0 - 4,0	4,0 - 6,0	4,0 - 6,0
	5		0,5 - 0,8	1,3 - 1,8	1,5 - 2,5	2,5 - 4,0	2,5 - 4,0
	6			0,6 - 0,8	1,2 - 1,5	1,8 - 2,5	1,8 - 2,5
	8				0,6 - 0,8	1,2 - 1,8	1,2 - 1,8
	10					0,7 - 0,9	0,7 - 0,9
	12						
	14						

We reserve the right to change specifications without prior notice

Bigger cutting speeds can be achieved when using Nitrogen

For simple shapes and small production

Maximum cutting thickness, only for sampling, not for production

Laser Sources

Cutting Parameters

Material	Thickness	IPG 700 (100×125)	IPG 1000 (100×125)	IPG 1500 (100×125)	IPG 2000 (100×125)	IPG 3000 (100×150)	IPG 3000 (100×200)
Aluminum (using Nitrogen)	mm	m/min	m/min	m/min	m/min	m/min	m/min
	1	8 - 12	10 - 14	14 - 18	18 - 24	30 - 38	12 - 20
	2	1,0 - 2,0	2,0 - 4,0	5,0 - 6,0	7,0 - 12	12 - 16	8,0 - 10
	3		0,5 - 1,0	2,5 - 3,5	3,0 - 5,0	6,5 - 8,0	6,5 - 8,0
	4			1,4 - 2,0	2,0 - 3,0	3,5 - 5,0	3,5 - 5,0
	5			0,5 - 1,0	1,0 - 2,0	2,5 - 3,5	2,5 -3,5
	6				0,6 - 0,8	1,5 - 2,5	1,5 - 2,5
	8					0,5 - 1,0	0,5 - 1,0
	10						

We reserve the right to change specifications without prior notice

Material	Thickness	IPG 700 (100×125)	IPG 1000 (100×125)	IPG 1500 (100×125)	IPG 2000 (100×125)	IPG 3000 (100×150)	IPG 3000 (100×200)
Brass (using Nitrogen)	mm	m/min	m/min	m/min	m/min	m/min	m/min
	1	8,0 - 10	10 - 14	14 - 18	18 - 24	30 - 38	12 - 20
	2	1,0 - 2,0	2,0 - 4,0	5,0 - 6,0	7,0 - 12	12 - 16	8,0 - 10
	3		0,5 - 1,0	2,5 - 3,5	3,0 - 5,0	6,5 - 8,0	6,5 - 8,0
	4			1,4 - 2,0	2,0 - 3,0	3,5 - 5,0	3,5 - 5,0
	5			0,5 - 1,0	1,0 - 2,0	2,5 - 3,5	2,5 - 3,5
	6				0,6 - 0,8	1,5 - 2,5	1,5 - 2,5
	8					0,5 - 1,0	0,5 - 1,0
	10						

We reserve the right to change specifications without prior notice

For simple shapes and small production

Maximum cutting thickness, only for sampling, not for production

Laser Sources

Auxiliary Gases For Fiber Laser Cutting



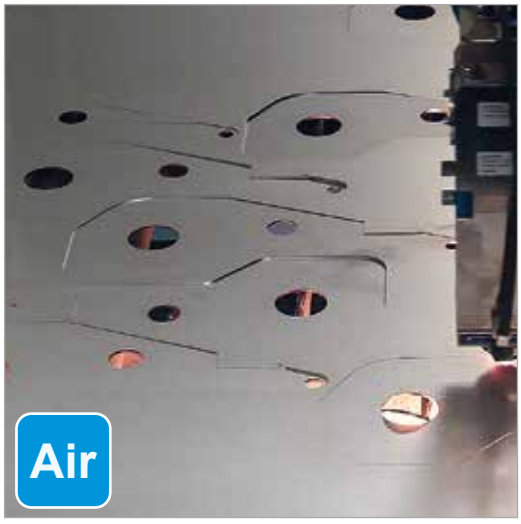
- The laser cutting process relies on an assist gas, either active or inert. The gases used currently in the industry are oxygen, nitrogen and air.
- Machine is equipped standard with automatic gas console for using oxygen. The solenoid and proportional valves regulate the gas pressures (set in the control) during the cutting process without the interference of the operator.



- **OXYGEN -** this is the most commonly used gas, especially when working with carbon steel. Being an active gas, during the cutting process the reaction between oxygen and metal generates additional energy, giving more heat to the process, allowing you to cut thicker plates.
- At the same time it is very important to have an optimized control - too much pressure will decrease cutting quality.



- **NITROGEN** – this non-reactive gas is mostly used for stainless steel and it is usually referred to clean cutting gas. Being an inert gas, it doesn't react with the metal, material removal being done only by the laser power. Therefore the cutting capacities are lower.
- At the same time, increasing gas pressure will result in higher cutting speeds. But the process is limited by the cooling effect of the high pressure gas.



- **AIR -** although not a new concept, it recently has become very popular mainly because of it's low cost. Compared with N2, air assisted cuts are around 20% less in quality, but the cost reductions can reach up to 50%.
- The choice of the assist gas is determined by the type of applications. Clearly air is not the best gas for all instances, there are cutting jobs for which nitrogen or oxygen offer a better solution.

Dust collector and filtration unit

TEKA ECOTUBE Series



- The TEKA EcoCube series are systems that can be used in almost all tasks in the field of filtration of smoking and dusts.
- Via a piping system (not included in delivery), the polluted air is sucked in by means of the fan and fed into the filter section. Here, the particulate pollutants deposit on the surface of the filter cartridges.
- The filter cartridges are automatically cleaned by compressed air at the required intervals. The adhering to the cartridges particles dissolve by the compressed air blast and get into a dust collector. The cleaned air is returned to the working room without loss of heat. The EcoCube can be used as a central extraction system for multiple manual welding stations, as a suction system for welding robots / cabins and as a suction system for suction hoods.
- You will receive a fully operational system including the control unit required to control the fan. Only the supply line has yet to be laid. The main components of the EcoCube are fan unit with pneumatics as well as integrated controls, filter section including cartridges and dust collection section. The housing is made of a sturdy sheet steel construction and provided with a powder coating both inside and outside. The individual sections are equipped with maintenance doors for optimal and quick maintenance.
- The control unit is delivered completely pre-set. This control unit has been specially developed for the monitoring and control of the filter system. The EcoCube is equipped with filter cartridges of dust class M according to DIN EN 60335-2-69: 2008.

Technical data

		ECOTUBE Central filter unit		
Motor power	kW	5,5	7,5	11,0
Max. flow	m^3/h	4.500	7.000	10.000
Max. pressure	Pa		3.000	
Separation efficiency			≥ 99 %	
Nozzle	mm	250	400	400
Noise level	dB(A)		ca. 75	
Dimensions (W×D×H)	mm	1.790×850×3.140	1.930×850×3.150	1.930×850×3.200
Weight	kg	ca. 470	ca. 475	ca. 480

Tube Cutting System (OPTIONAL)

Machine integration





- Option can only be ordered at the same time with the machine due to the changes required in machine design. There is no retrofitting possibility.
- The bridge is extended so the cutting head can travel up to the tube cutting area.
- Machine housing's width is extended to include the cutting system as well.
- Software update with tube cutting module - CypTube.

- This option allows you to extend your production range to cutting tubes as well
- The max. tube size is Ø150 mm with 3.000 mm length

Headstock



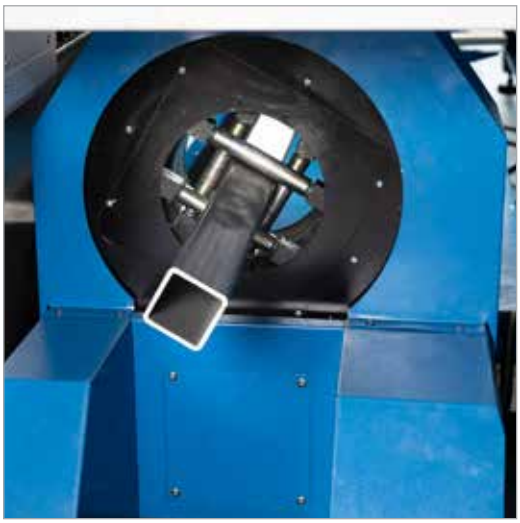


- Robust design of traveling headstock for precise tube positioning and feed.
- It travels smoothly on linear guides which, like the entire travel path are fully covered to prevent possible damage from sparks.

- It features a pneumatic 4-jaw self-centering chuck for fast tube clamping.
- The air pressure from the pneumatic system can be adjusted manually according to profile thickness and material.

Tube Cutting System (OPTIONAL)

Front chuck and additional supports



- The special design of the front chuck allows cutting of both round and rectangular profiles. Machine automatically detects the position
- Jaw adjustment is done manually



- To achieve maximum precision and avoid vibrations of the workpiece, this machine features additional pipe supports
- They are situated on the travel path of the tube and, to avoid collision with the headstock, they are automatically lowered/raised via a pneumatic system

Technical data

Tube cutting system		**3000**
Tube length	mm	3.000
Round tube diameter	mm	ø30 - 150
Max. cutting length	mm	1.200
Square tube size	mm	30×30 - 105×105
Minimum tailing size	mm	300
Front chuck		
Chuck type		manual clamping
Rear chuck		
Chuck type		pneumatic
Drive mode		belt drive
Max. rotation speed	rpm	100

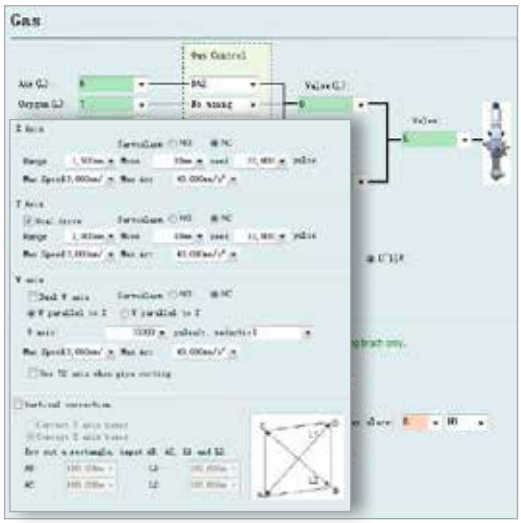
ACE Laser

State of the art cutting technology sets the standard in price and performance

Control Unit



- Machine control and operation are done on the main control panel which is located in front of the machine.
- It is a high performance CNC system with short look-ahead processing time and intelligent speed control to provide the best cutting experience.
- Very intuitive and user friendly user interface with various powerful functions.



- KNUTH engineers ensure optimal controlled laser power and cutting process by predefining advanced settings for laser input, focus control, height control and auxiliary gas connections.
- Machine is delivered with preconfigured mechanical parameters like feed speed, pitch compensation, origins, software limits, axis directions, etc.



- Additionally, for quicker and easier workpiece preparation, the machine is delivered standard with MPG.

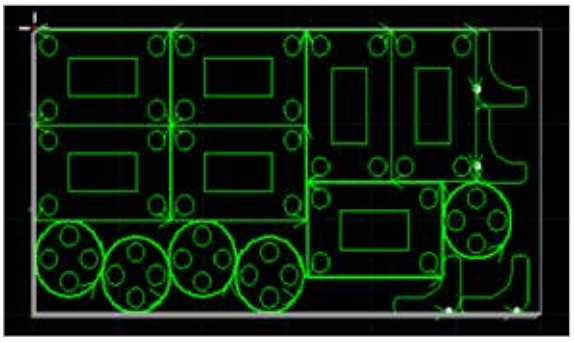


- You can have full visualization of the cutting process through two cameras which provide complete real time monitoring of operations. One is inside the housing, targeted on the cutting process and the second one is in the back, for checking the table exchange system.

Built-in cutting software

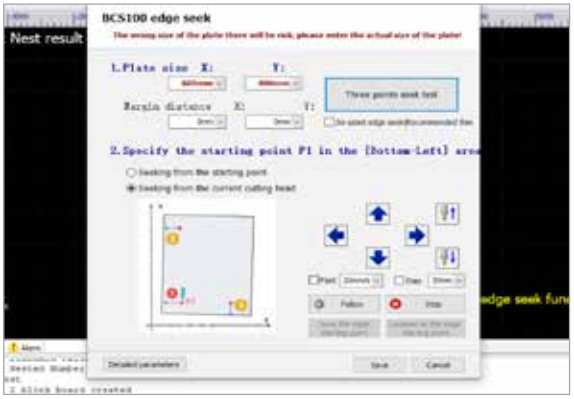
CypCut - Built-in Nesting and Cutting Software

General Overview
- Our machine is delivered standard with Cypcut software. It provides all the necessary features and tools to manipulate the design you add, as well as ways to directly send programs to the cutting machine while showing the status about the operation at all times.
- To give the operator the full control of the part production, the software takes you through all steps of the process, from importing the drawing until part cutting.
- Supports remote control through wireless teach box and Ethernet.

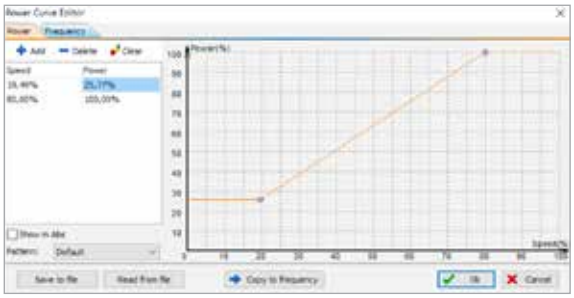


File management
- With powerful material library functions, you can keep all processing parameters so that it can be used again for the same material.
- It supports most common file extensions AI, DXF, PLT, Gerber, LXD and other graphic data formats.
- When importing the graphics, CypCut will automatically remove trivial and duplication, combine near as well as automatically smooth, sort and ungroup.

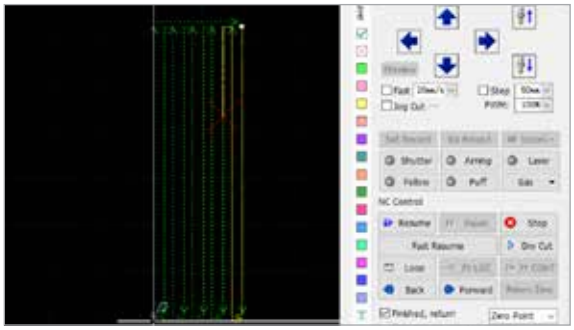
Functions
- Automatically seek edge and precise positioning.
- You can easily set the lead, slotted compensation, lead seal without gap, all basic editing functions, like mirror, rotation, alignment and advanced editing functions like curve splitting, curve connection, curve smoothness, text-to-curve, component integration, and many other functions.



Real time laser power adjustment
- It allows you to edit the power curve and frequency in real-time, and to set parameters of slow starting.

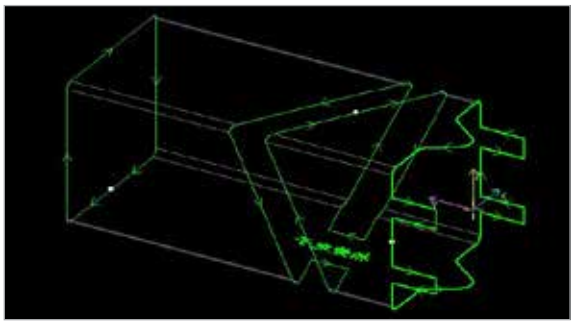


Breakpoint memory
- With processing breakpoint memory, for tracing the breakpoint forwards and backwards, useful function when processing advanced graphics. Allows you to get positioned at any point of the process, to stop or temporarily stop and start processing from any position.



Nesting
- Time saving automatic nesting with various options which can be tailored according to customer's application and guarantee minimum material loss.
- The software includes several predefined nesting patterns which cover most common cutting scenarios.

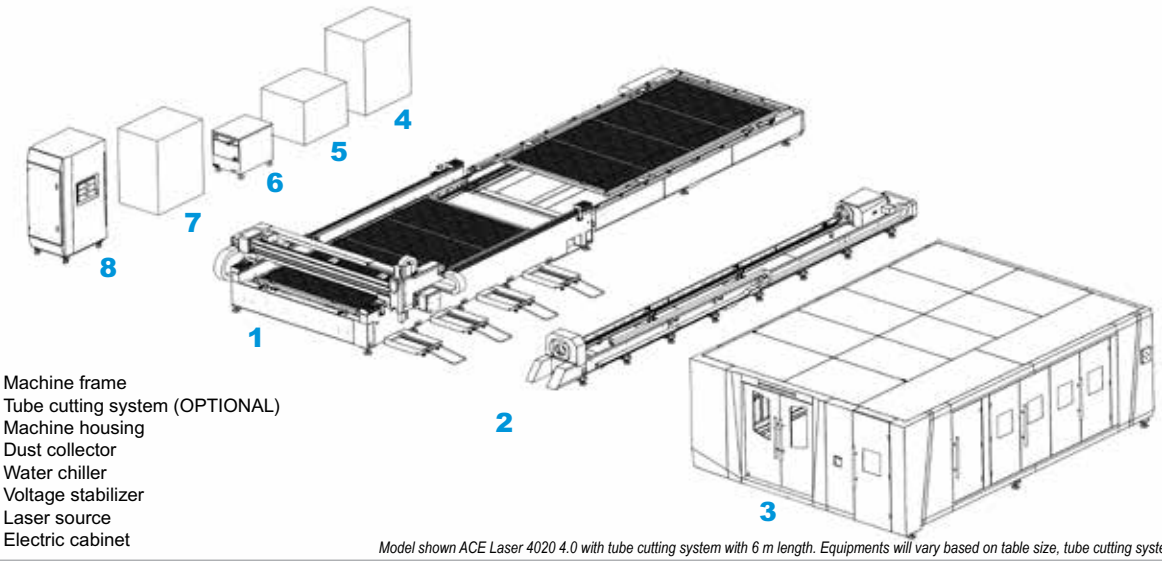
CypTube Module (Optional)
- This powerful module is used when cutting tubes and is delivered together with the pipe cutting system.
- Programming is done same as in CypCut.



ACE Laser

State of the art cutting technology sets the standard in price and performance

Technical Data



1. Machine frame
2. Tube cutting system (OPTIONAL)
3. Machine housing
4. Dust collector
5. Water chiller
6. Voltage stabilizer
7. Laser source
8. Electric cabinet

Model shown ACE Laser 4020 4.0 with tube cutting system with 6 m length. Equipments will vary based on table size, tube cutting system and laser source.

ACE Laser Series		ACE Laser 3015	ACE Laser 4020	ACE Laser 6020
Working area				
Table dimensions	mm	3.000×1.500	4.000×2.000	6.000×2.000
Max. workpiece weight	kg	1.000	1.500	2.000
Axis acceleration X / Y axis	m/s²	10	10	8
Axis acceleration Z axis	m/s²	5	5	5
Travels				
Travel X-axis	mm	1.520	2.020	2.020
Travel Y-axis	mm	3.050	4.050	6.050
Travel Z-axis	mm	100	100	120
Rapid feed				
X axis rapid feed	m/min	100	100	80
Y axis rapid feed	m/min	100	100	80
Change time at cutting table	sec	10 - 15	12 - 17	15 - 20
Drive capacity				
Drive capacity X-axis	kW	1,0	1,0	2,0
Drive capacity Y-axis	kW	1,5	1,5	2,0
Drive capacity Z-axis	kW	0,4	0,4	0,4
Supply voltage	V	400	400	400
Measures and weights				
Overall dimensions (L×W×H)	m	9,8x3,7x2,15	10,34x4,28x2.2	16,30x4,74x2,2
Weight	kg	8.000	9.000	17.800
Fiber laser source	W	1.000 - 4.000	1.000 - 4.000	1.000 - 4.000

* Due to the process of constant improvement, products and product's data can change without notice.

ACE Laser

State of the art cutting technology sets the standard in price and performance

Standard Accessories

Ytterbium IPG Fiber laser source



- High-Power fiber laser sources from IPG, with very high electro-optical conversion efficiency.
- Standard with laser power between 1-3 kW, but we have bigger sources available on demand.

CNC controller with integrated CypCut cutting software



- Windows based CNC controller with integrated CypCut cutting software designed as a complete solution for laser cutting industry.
- Includes drawing import and editing, nesting, path generation and real-time process control.

Precitec cutting head



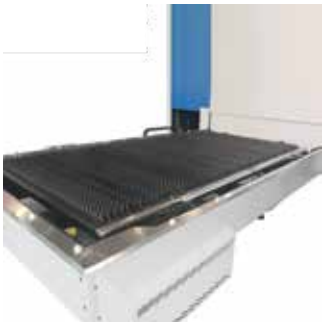
- High quality fiber laser cutting head with automated motor-driven adjustment on axial focus position.
- Focal position up to 23 mm.
- Designed for cutting applications in the power range up to 4 kW.

Modern design housing



- Working area covered by ergonomic housing with protective special glass windows and two front doors with interlock system.
- Models with tube cutting system have one extra front door and large side sliding ones.

Automatic shuttle table



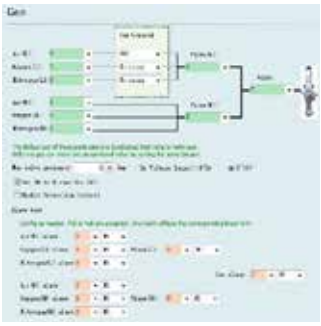
- Automatic shuttle table system which minimizes production downtime using the second table for setting the plates or unloading the cut parts, during the cutting process.

TEKA - filter exhaust system



- Top quality highly certified filtration unit designed to extract and filter the dust, fume and smoke which are generated during cutting operations.
- Unit capacity depends on machine cutting surface and the power of the laser source.

Automatic gas console



- Integrated in the machine, this unit adjusts and maintains gas pressure when cutting with oxygen to ensure the best cutting quality.
- It's controlled by the CNC unit and while cutting it doesn't require any assistance from the operator.

Central lubrication



° Mounted behind the bridge, this unit ensures automatic central lubrication, which minimizes service requirements and greatly increases machine reliability.

Electric cabinet



- Ergonomically designed electric unit with high mobility and three drawers for storage.
- Protected from overheating by an excellent AC air flow.
- All electric components are from worldwide renowned suppliers.

Water chiller



- Energy efficient water chiller with very high cooling performance to deliver a constant laser power for best cutting quality and speed.
- Standard features include automatic temperature adjustment, parameters setting, pressure and level control.

Voltage stabilizer



- Designed to provide real time power compensation and active harmonic voltage in demanding environments,
- Minimizes voltage variations caused by unstable power grids or heavy industrial loads.

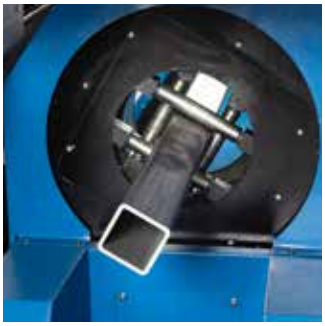
Operator manual



- Contains details about installation, machine components, operation and maintenance.
- Includes technical diagrams and spare parts list.
- Includes software and programming instructions.

Optional Accessories

Pipe cutting system for 3 m pipe length



- Enables tube cutting
- Tube length 3.000 mm
- Cutting length: 1.200 mm
- Software module - CypTube

Laser head starting set for stainless steel / aluminum



- Set of consumables for first start-up and tests.
- Contains protective glass, ceramic part and nozzles.
- Suitable for cutting stainless steel or aluminum.

Laser head starting set for mild steel



- Set of consumables for first start-up and tests.
- Contains protective glass, ceramic part and nozzles.
- Suitable for cutting mild steel.

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