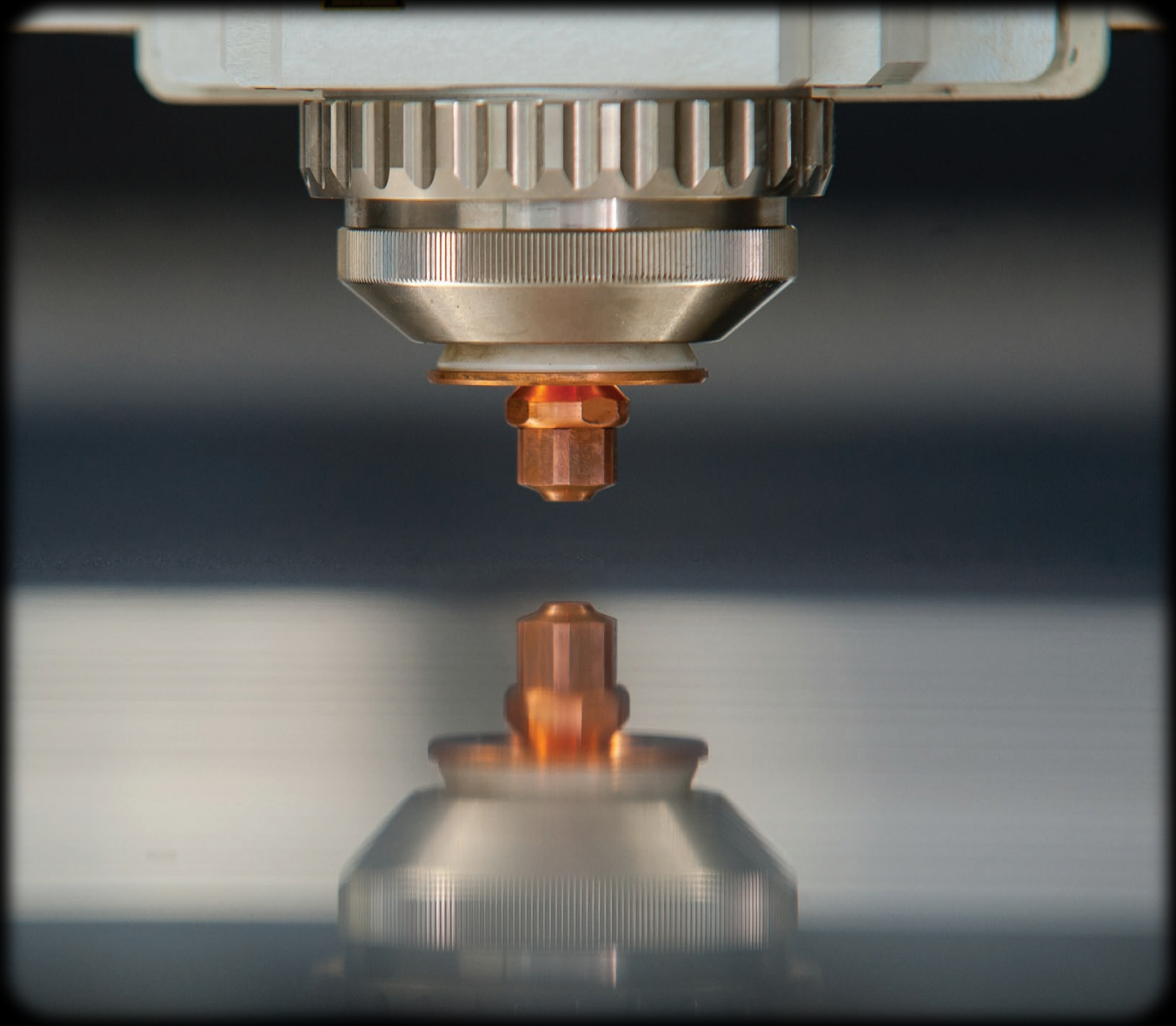


WHITNEY



6 g Laser Cutting Systems

WHITNEY 6 g LASER

WHITNEY 6 g laser cutting machines are high-performance, state-of-the-art, extremely precise and dynamic machines dedicated to the demanding production of complex shapes.

In addition to the fiber laser source and linear motors in all axes, they are equipped with a modern polymer concrete machine base, and a bridge manufactured from carbon fiber. Their work efficiency is enhanced by the industry's fastest pallet changer. The cutting head simplifies set-up by providing automatic beam focus position adjustment and automatic beam focus diameter adjustment to quickly process any type or thickness of material.

The **WHITNEY 6 g** laser cutting machine is easy to learn and operate due to the intuitive user interface. **WHITNEY 6 g** cutting machines achieve cutting speeds of up to 9,843 inches/min (250 meters/min) and acceleration of 6g. All of these features guarantee the best quality, highest precision, and fastest cycle times using fiber laser power from 2 kW to 6 kW.

CUSTOMER BENEFITS

- Highest speeds, accuracy, and long term reliability using linear motor technology.
- Industry's best precision and contouring using a strong, lightweight carbon fiber bridge.
- Reliable processing of highly reflective materials such as aluminum, copper, brass and stainless steels.
- Short operator learning curve due to the innovative, easy-to-learn operator interface.
- Fiber laser systems are more efficient and consume only 1/3 the power of CO₂ lasers.
- More "beam-on" time utilizing the world's fastest pallet changer.
- Industry's fastest installation.
- 30% reduction in required floor space due to the **WHITNEY 6 g's** integrated design.

FLEXIBLE SOLUTIONS

All customers have different needs based on their internal processes. We strive to meet our customers' expectations and needs by giving them a choice of **Cutting Speed, Laser Power and Table Size**. This flexible configuration allows each customer to invest in a system tailored to meet specific requirements.

The laser source, chiller, control cabinet and pneumatic system are all integrated into a single enclosure making it possible to install the **WHITNEY 6 g** in even the smallest locations.

For customers who want to automate their production, we provide material handling systems tailored to meet specific automation needs.



Specifications

Machine Model 1530 2040 2060

Machine Dimensions and Weight ¹

Length	m	10	11.2	14
	ft	32.8	36.7	45.9
Width	m	3.08	4.1	4.1
	ft	10.1	13.5	13.5
Height	m	3.06	3.06	3.06
	ft	10.0	10.0	10.0
Weight	kg	18,100	21,600	23,300
	lbs	39,904	47,620	51,368

Process Area

X axis	m	3.0	4.0	6.0
	in	120	160	240
Y axis	m	1.5	2.0	2.0
	in	60	80	80
Z axis	mm	100	100	100
	in	3.94	3.94	3.94
Max. Sheet Weight	kg	900	1400	2100
	lbs	1,984	3,086	4,630

1) Approximate values. The exact parameters are specified in the installation plan.

Speeds and Axis Parameters

Acceleration	m/s ²	60
	ft/s ²	192
Repeatability	mm	0.03
	in	0.001
Precision	mm	0.1
	in	0.004
Velocity—X, Y & Z axis	m/min	250
	in/min	9,843
Simultaneous	m/min	350
	in/min	13,780
Min. Programmable Distance	mm	0.001
	in	0.00004

System Electrical Service Requirements (480/3/60)

	Average Power (kw)	Electrical Service (kva)
2 kW Laser Source	17	34
3 kW Laser Source	21	42
4 kW Laser Source	25	50
5 kW Laser Source	29	58
6 kW Laser Source	33	66

NOTE: Electrical Service must be TN-S System (L1, L2, L3, N, G)



LASER CUTTING

Increased demands for the efficiency and quality of production processes require the use of modern technological solutions. To meet market needs, the next step in laser metalworking technology is fiber laser.

The fiber laser adds faster cutting speeds, the ability to cut a wide-variety of material types and reduced operational costs which add to a company's profit margin.

STRONG AND LIGHTWEIGHT CARBON FIBER BRIDGE

The major advantages of carbon fiber include low density and high strength. The use of carbon fiber is ideal in cases requiring high durability combined with low weight. Well-known examples are aircraft components and race car bodies.

Precise movements and an acceleration of 6 times gravity (6g) are achieved when using the lighter weight, and nearly perfect rigidity of carbon fiber on the moving bridge. It is an ideal solution, especially for users whose production requires cutting of large quantities of components with many small features.

STABLE POLYMER CONCRETE MACHINE BASE

The machine base of the **WHITNEY 6 g** is manufactured from a high-tech composite material: polymer concrete. This material has unique mechanical properties: **a hundred times higher damping coefficient than steel and high temperature stability.** The ground surface to which the linear motor and guide ways mount maintains very tight tolerances regardless of the operating environment and cutting speed.

The massive polymer concrete base greatly dampens vibrations and provides precise cutting on a level comparable to precision measuring devices. It is a stable base for extremely fast and efficient linear motors and dampens the vibrations resulting from dynamic direction changes of the cutting head. **This is the perfect solution for producing high accuracy components in all material thicknesses.**





RELIABLE FIBER LASER TECHNOLOGY

Reliability and energy savings of the fiber laser source result from its simple design. The small number of solid-state components reduces the risk of failure to an absolute minimum. **The result is low operating costs and minimized maintenance requirements when compared to CO₂ designs.**

The laser source is designed for at least 100,000 working hours and tested for 2,000 hours prior to final assembly. During this period, neither maintenance nor replacement of laser operating elements should be necessary. Minimal laser source cooling is required and the source and cooler are both integrated into the machine's design.

SIMPLIFIED BEAM GUIDANCE

The laser beam is guided by a fiber optic cable which delivers energy from the laser source to the cutting head without any interference and power loss. The fiber optic cable eliminates mirrors that are required for beam guidance with CO₂ laser technology. **This system has no maintenance items such as mirrors, gases and bellows, resulting in reduced operating costs.**

AVAILABLE LASER SOURCES AND MAXIMUM SHEET THICKNESS

Laser Power		2kW	3kW	4kW	5kW	6kW
Maximum Material Thickness	Carbon Steel	mm	16	18	20	25
		in	0.625	0.688	0.750	1.000
	Stainless Steel	mm	10	15	20	25
		in	0.375	0.625	0.750	1.000
	Aluminum	mm	6	12	15	20
		in	0.250	0.500	0.625	0.750
	Brass	mm	4	6	8	12
		in	0.157	0.250	0.312	0.500
	Copper	mm	4	6	6	10
		in	0.157	0.250	0.250	0.375

SUPERIOR BEAM CONTROL

The fiber laser source produces a beam wavelength of 1.07 μm which is more highly absorbed by the processed material than beams with longer wavelengths (such as CO_2 lasers). With fiber laser, the beam can be focused to 1/10 the diameter than one created by a CO_2 source. The brightness and smaller focus diameter provide higher energy density and longer focal length which makes the cutting process more stable. The energy density supplied to the work piece is up to 100 times higher than CO_2 .

As a result, fiber laser beams can process a wider range of material types, including highly reflective sheets such as aluminum, copper, brass, and specialty steels. Cutting with nitrogen provides a smooth edge without oxidation at all laser power levels.

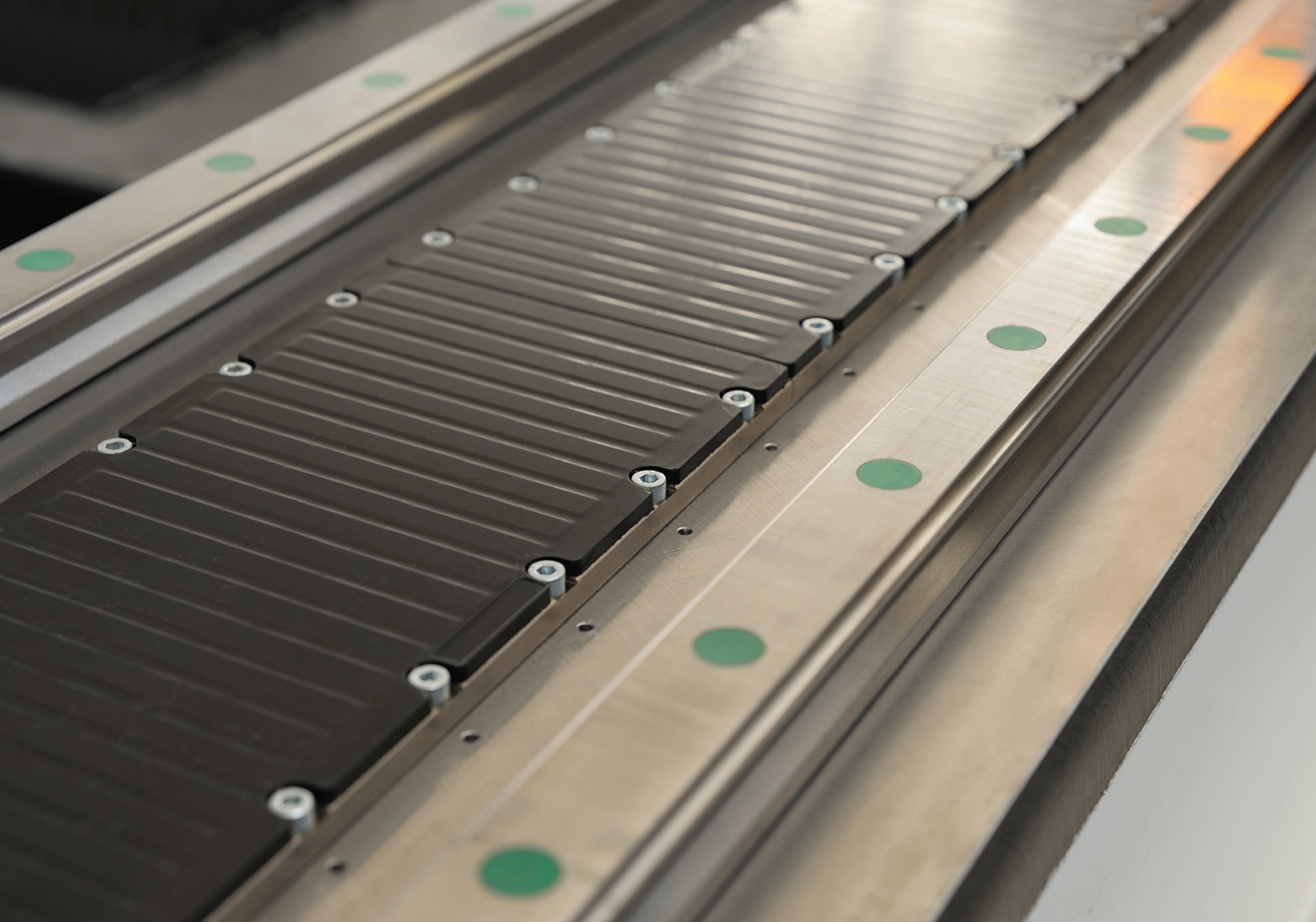
ADVANCED CUTTING HEAD

The laser system utilizes a single cutting head which has been designed specifically for fiber laser technology. **The cutting head features automatic focus positioning and automatic focus diameter adjustment.** A protective glass, mounted under the lens, prevents lens contamination and lowers operating costs. The collimator lens also includes a protective glass which extends its service life.

Automatic Focus Position—This function automatically sets the focus location based on the material thickness and its type.

Automatic Focus Diameter—This function automatically sets the beam focus diameter on the material by using the machine's control system. Material up to 1" (25 mm) thick may be cut at high speed and high quality without the need to use a different focusing lens.

Rapid-Pierce—The **WHITNEY 6 g** offers the world's fastest controlled pierce in all material thicknesses. Faster pierce times result in reduced heat input into the work piece.



HIGH PERFORMANCE LINEAR MOTORS

Linear motor technology has the following advantages when compared to rack & pinion or ball screw motion drive systems: lower friction, elimination of mechanical clearances (for better accuracy), improved energy efficiency, and better reliability.

The most important advantage of linear motors is the ability to generate higher torque loads, which in turn improves acceleration and deceleration. **WHITNEY 6 g** machines are available with an industry leading acceleration of six times the acceleration of gravity (6g) in all axes including the cutting head. This improved dynamic control creates more accurate contours (such as small holes), and faster changes of direction. **Parts with a high concentration of small features will be made significantly faster, and with higher quality, than machines with less acceleration.**

Since there is no wear associated with linear motors, high speed operating parameters can be maintained throughout the life of the machine without a loss of part quality.



INDUSTRY'S FASTEST PALLET CHANGE

Pallet changes are non-productive time, and when cutting cycles are short, the time spent on pallet changes can be a significant percentage of the total operational cycle time. The **WHITNEY 6 g's** simplified pallet changer exchanges pallets in **less than 10 seconds** so that more time is spent cutting parts and less time is spent moving pallets.

The simplified design eliminates the need for hydraulics and greatly improves the reliability of the pallet changer system.

STATE-OF-THE-ART CONTROL SYSTEM

All **WHITNEY 6 g** machines are equipped with a reliable Beckhoff control system and EtherCAT technology which provides the fastest possible communication and machine control. This “real-time” control system provides high-speed (microseconds) communication among the CNC program, the control’s work parameters and actual machine position. **Beckhoff system components are available worldwide.**

INTUITIVE OPERATOR INTERFACE

Operators become efficient quickly due to the state-of-the-art, user-friendly machine interface.

FAST AND RESPONSIVE TECHNICAL SUPPORT

WHITNEY 6 g machines are designed with the installer, operator and service technician in mind. The integrated design, which combines the fiber laser generator and chiller with the machine frame, allows for shipment after factory testing without the need to disconnect these key components from the machine. **Installation and start-up time is reduced from weeks to days compared to conventional laser cutting machine designs.**

Personnel training includes machine operation, maintenance and application support to ensure maximum beam-on time and productivity. Due to the simple design and construction, **WHITNEY 6 g** systems require minimal maintenance which can typically be performed by the operator.

On-line problem diagnosis by Whitney’s Service Team is available along with on-site service if required.

WHITNEY 6 g systems utilize many common components available on a worldwide basis. However, we maintain a well-stocked parts warehouse at our Rockford, IL facility. We guarantee quick shipping and competitive prices.



FIBER LASER CUTTING OF HEAVY PLATE

In the 1990s, Whitney pioneered the development of heavy plate cutting with CO₂ lasers. Whitney now leads the way in developing fiber laser cutting of heavy plate. We have developed production cutting parameters for cutting thick carbon steel with cutting speeds and edge quality that rival CO₂ laser cutting.

Our advanced, heavy plate cutting capability and our unique **Rapid-Pierce technology** make Whitney laser cutting machines superior to all others for cutting plate steel.

WHITNEY'S RAPID-PIERCE TECHNOLOGY

Whitney has adapted its unique Rapid-Pierce technology to our fiber laser cutting systems. This unique combination of optics and parameter control during the piercing cycle generates extremely fast pierce times in heavy material with small pierce holes and low heat input to the work piece.

The benefits to the end customer are:

Fast Cycle Times—Many laser cutting machine manufacturers still use slow pulse pierce technology. Whitney's Rapid-Pierce technology pierces 1" (25mm) thick mild steel in less than one second, while pulse piercing may take 15 seconds or more. **This translates to savings of minutes (not seconds) per part** when parts have multiple internal holes and cutouts.

Better Cut Quality—By keeping heat input low, small holes can be successively pierced and cut cleanly. Other piercing technologies such as blast piercing or pulse piercing transmit more heat into the work piece, creating dross and stuck slugs. **With Rapid-Pierce, operators no longer need to hammer out small cutouts in thick steel.**

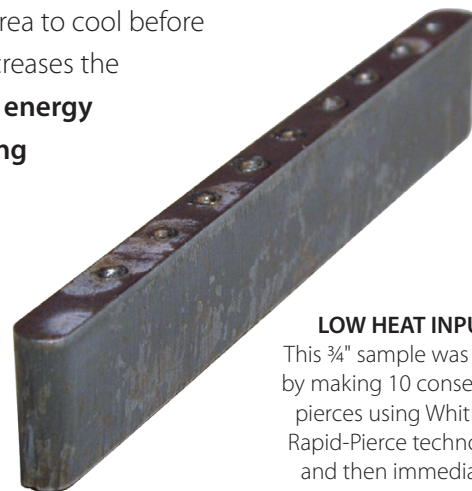
Easier Programming—When using other piercing technologies (blast or pulse piercing), end customers often resort to programming all of the pierces in a nest of parts first before cutting the features. This allows each localized pierce area to cool before returning to that same area to cut the feature. This process increases the nest cycle time. **The Rapid-Pierce process imparts minimal energy to the work piece so it can be cut immediately after piercing without cut quality degradation.**



Pulse Pierce
15 sec.

Whitney Rapid Pierce
< 1 sec.

Blast Pierce
3 sec.



LOW HEAT INPUT

This ¾" sample was made by making 10 consecutive pierces using Whitney's Rapid-Pierce technology, and then immediately cutting the perimeter.



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