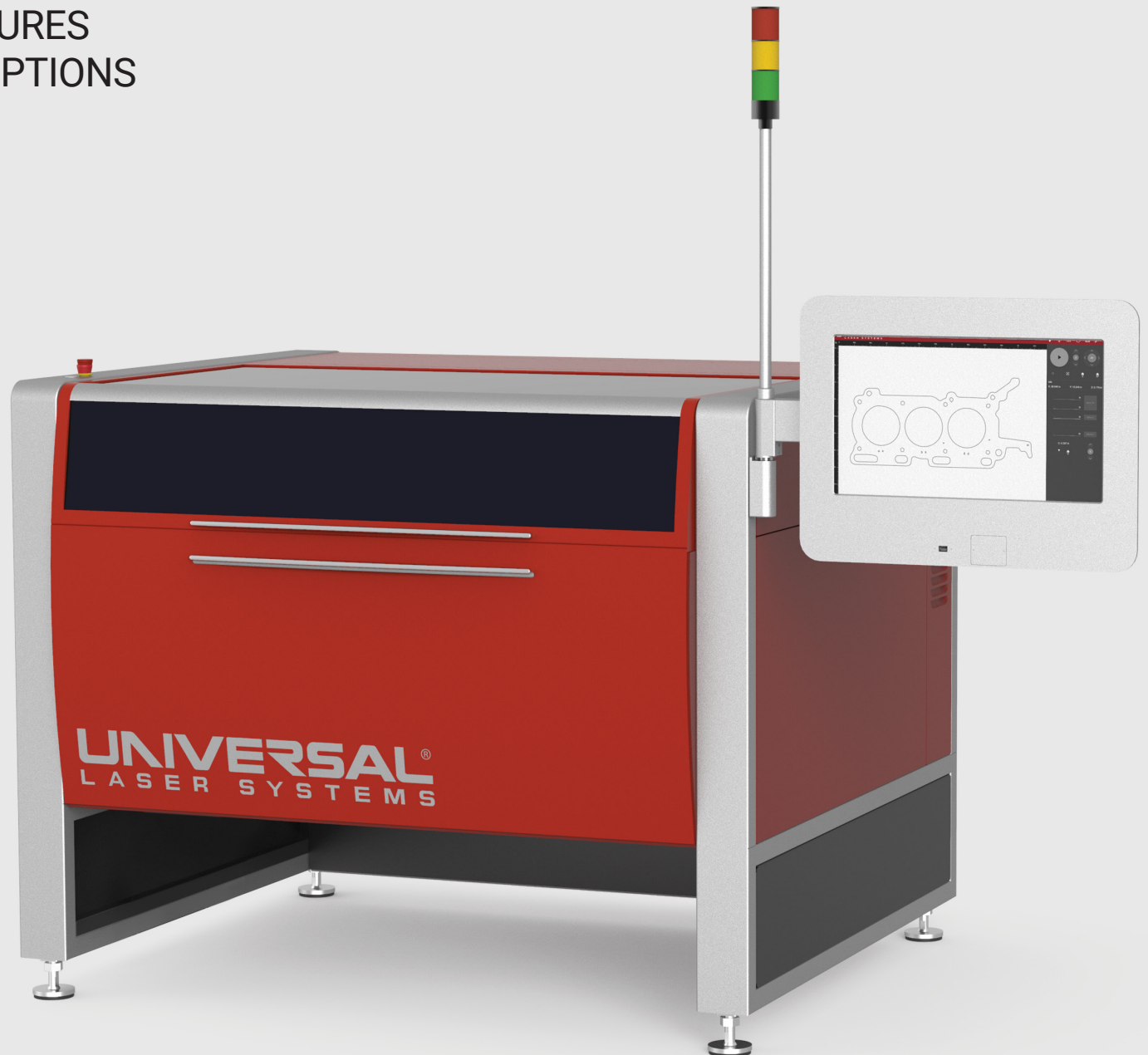# ULTRA X6000

## Precision Laser Material Processing System

SPECIFICATIONS
FEATURES
and OPTIONS



UNIVERSAL®
LASER SYSTEMS

# TECHNOLOGIES

**Camera Registration**
INCLUDED

A feature that aligns a control file to registration marks or features on the surface of a material. Compensates for scale, skew, and perspective.

**Precision Material Independent Autofocus**
INCLUDED

A motorized Z axis and high-resolution touch sensor with repeatability of +/- .001in (25 μm).

**SuperSpeed™ Technology**
OPTIONAL

A patented feature that produces two focal spots (one for each laser beam) to enable the system to deliver two independently controlled raster lines at a time. SuperSpeed requires a laser system equipped with two $CO_2$ lasers of the same wavelength and power.

**Multi-Wave Hybrid™ Technology**
OPTIONAL

A patented technology that enables a combination of laser wavelengths (up to two wavelengths for ULTRA R5000 and three wavelengths for ULTRA X6000) to be focused to the same focal point within the same focal plane and used either sequentially or simultaneously.

**Rapid Reconfiguration™**
INCLUDED

A patented technology that enables users to install and reinstall any supported ULS $CO_2$ laser source onto any ULS laser system without tools and optical alignment to optimize laser processing for the widest variety of materials.

**Intelligent Materials Database**
INCLUDED

A powerful and unique database that generates laser processing parameters for a wide variety of materials and laser system configurations. If the system configuration changes, the database automatically recalculates the parameter values.

**21" Touch Screen Control Panel**
INCLUDED

A fully integrated 21" (533 mm) touch panel command and control console used to control laser system operation. Eliminates the need for a separate control computer.

**Automation Interface**
INCLUDED

An addressable device that can receive input signals and provide output signals. Enables the laser system to control external devices and allows external devices to initiate laser system functions.

**Laser System Manager (LSM)**
INCLUDED

An advanced user interface with a high degree of functionality and control that allows users to efficiently manage design files and laser material processing parameters.

**Industry Standard Interchange Format Support**
INCLUDED

A software feature that supports industry standard graphic interchange formats including DXF, PDF, and G-Code.

| | |
|---|---|
| **Design File Relocation and Duplication Controls**<br>INCLUDED | A set of user controls to reposition or duplicate design files anywhere within the material processing field. |
| **Kerf Compensation**<br>INCLUDED | A user adjustable control that compensates for material width removed during laser cutting in order to achieve desired dimensions without changing the design file. It maintains true arc and circle geometry if present in the design. |
| **Vector Acceleration Control**<br>INCLUDED | A user adjustable control to define acceleration of vector motion for each control file. |
| **User Access Administration**<br>INCLUDED | A software administration feature for managing multiple user accounts and permissions. |
| **Dynamic Energy Stabilization**<br>INCLUDED | A feature that maintains even laser energy delivery regardless of the speed of the motion system. |
| **True Position Laser Pulsing**<br>INCLUDED | A feature that provides optimal laser pulse placement driven by positional feedback from synchronized multi-axis linear encoders. |
| **Intelligent Path Planner**<br>INCLUDED | A comprehensive path planning algorithm that minimizes laser processing completion time. |
| **True Width Raster Processing**<br>INCLUDED | A feature that eliminates the need for motion system over-travel beyond the edges of the raster image. |
| **Design File Geometry Preservation**<br>INCLUDED | A feature that maintains curves in a design file, i.e., circles, ellipses, b-splines, Beziers, and NURBS, and ensures curves are kept throughout the path planning process rather than using linear interpolation. |
| **Line Segment Reduction**<br>INCLUDED | A user control to reduce excessive line segmentation contained in some design files. |
| **Path Deviation Control**<br>INCLUDED | A user control to adjust the allowable deviation from the intended path to increase throughput. |

## OPTICS

| | |
|---|---|
| **Controllable Laser Power Density**<br>**4x**<br>INCLUDED<br><br>**1x / 13x**<br>OPTIONAL | A patent pending feature that provides the unique ability to control laser power densities while maintaining a high degree of alignment accuracy of the focal plane with the material surface as well as a Gaussian beam distribution. Power Densities: 1X (optional), 4X (included) or 13X (optional) for 10.6 µm and 9.3 µm wavelengths; 52X for 1.06 µm fiber wavelength (included). Normalized power density (watts/cm$^2$) = power density coefficient x 103 x average laser power (watts). Normalized power density is the power of the material processing laser(s) divided by the area of the focal spot measured at 1/e2. |

# GAS ASSIST

**Programmable Gas Assist**
INCLUDED

A feature that allows the user to program gas type and flow rate on a process-by-process basis within a control file.

**Optics Protection**
INCLUDED

A barrier of clean air that protects optical components during processing.

**Coaxial Gas Assist Attachment**
INCLUDED

A gas assist attachment that directs air (or gas) perpendicular to the material's surface.

**Lateral Gas Assist Attachment**
OPTIONAL

An adjustable gas assist attachment that directs air (or gas) laterally or at an angle to the material's surface.

**Air Compressor**
OPTIONAL

A compressed air source that delivers optimally conditioned, clean, dry, and oil-free air for Optics Protection and gas-assisted laser processing.

# MATERIAL HANDLING

**Multifunction Material Support Structure**
INCLUDED

A built-in aluminum honeycomb work surface designed to keep materials stationary and in focus during laser processing. Reduces back reflection and enables exhaust of laser processing byproducts from underneath materials. Includes a full-field masking material dispenser. Configurable using Machined Aluminum Tiles, Material Support Pins and Vacuum Booster.

**Machined Aluminum Tiles**
OPTIONAL

An accessory that provides a rigid and smooth work surface for laser material processing. When used with cutting processes, the compatible Material Support Pins are recommended.

**Material Support Pins**
OPTIONAL

A set of custom machined pins for laser cutting that can be inserted into either the Multifunction Material Support Structure or the Machined Aluminum Tiles. Pins add sufficient space between the target material and the work surface to eliminate back reflection.

**Vacuum Booster**
OPTIONAL

An external accessory that dramatically increases the pressure differential between the material support surface of the Multifunction Material Support Structure and ambient/atmospheric pressure to keep materials stationary.

**Class 4 Conversion Module for Pass-Through**
OPTIONAL

A patented technology that enables the laser system to facilitate material pass-through in compliance with CDRH and international safety regulations for operating Class 4 laser systems. This optional, add-on module converts a fully enclosed Class 1 system into an open Class 4 system.

**Cylindrical Material Indexer**
OPTIONAL

An accessory that enables 360° rotation laser processing of cylinders, spherically-shaped, and tapered objects. The addressable resolution is 13 arc seconds.

# AIR FILTRATION and HANDLING

**Intelligent Air Filtration UAC 2000/4000**
OPTIONAL

An external accessory that uses a patented dual carbon filter and sensor suite (for CO and VOCs) that filters out laser processing byproducts, monitors filtration performance at every stage, and alerts the operator when predefined contaminant thresholds have been reached. Connects directly to the laser system to turn filtration on and off with laser processing and communicates the status of all aspects of the UAC 2000/4000.

**Traveling Exhaust**
OPTIONAL

An attachment that collects laser processing byproducts at the location of laser processing. Required with Class 4 Pass-Through.

# SAFETY and FACILITY

**Overtemperature Detection**
INCLUDED

A safety feature designed to disable all laser sources, home the motion system, and trigger an audible alarm in the event it detects an unusually high temperature in the laser processing area.

**Safety Interlocks**
INCLUDED

A safety feature that disables the laser source when access doors are open as required by all major international safety standards.

**Laser Blocking Laminated Safety Glass**
INCLUDED

A shatterproof multi-layer laminated safety glass with appropriate wavelength filter media. Meets laser safety requirements OD 5+ for 10.6 µm , 9.3 µm and 1.06 µm wavelength laser radiation.

**Metal Enclosure with Labyrinth Seals**
INCLUDED

A design feature consisting of overlapping flanges that all enclosure doors or access panels must have to prevent direct line of sight into the enclosure, as required by international safety regulations.

**E-Stop**
INCLUDED

A highly visible standards-compliant pushbutton. Once depressed, DC power to all laser sources, the motion system, and other control mechanisms are immediately shut off, while aborting all system operations.

**Fire Suppression**
OPTIONAL

A patented accessory that deploys fire suppressant into the laser material processing area if self-sustained combustion is detected.

**Collision Detection**
INCLUDED

A feature that immediately stops and disables servo motors In the event an obstruction interferes with the motion system from any direction or axis.

**Light Tower**
INCLUDED

A set of color-coded lights mounted atop a pole used to indicate the laser system status to personnel in visual proximity of the laser system.

# SPECIFICATIONS

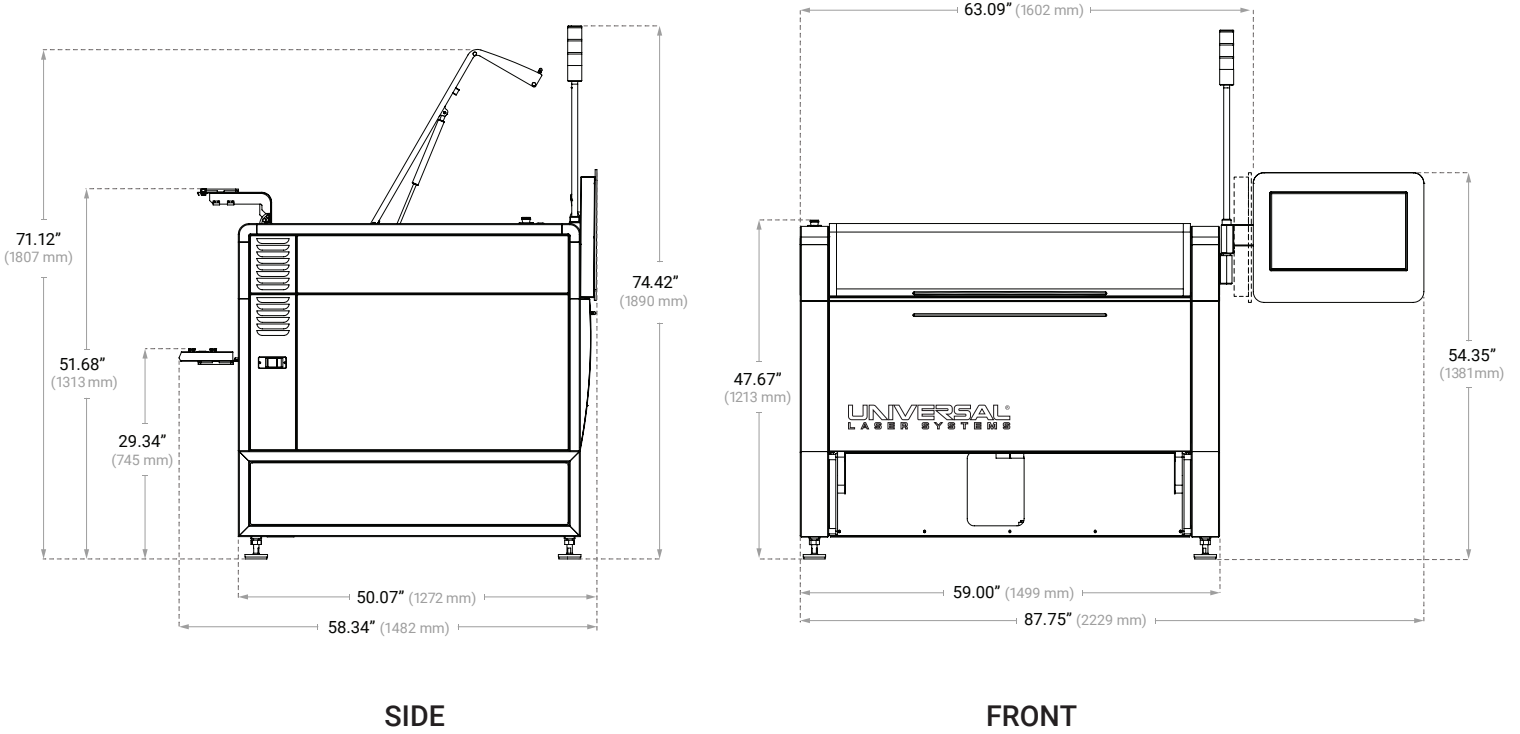| | |
|---|---|
| **Material Processing Envelope (X,Y,Z)** | 36 x 24 x 12 in. *(914 x 610 x 305 mm)* |
| **Minimum Addressable Beam Positioning** | 2 µm (.00008 in.) beam position addressability |
| **Maximum Effective Raster Material Processing Speed** | >300 in./sec* *(7620 mm/sec)* |
| **Multiple Laser Support** | UP TO 3 LASER SOURCES CAN BE USED INDIVIDUALLY OR IN COMBINATION<br><br>LASER SOURCES AVAILABLE:<br><br>$CO_2$  10.6  µm  10, 30, 50, 60, 75 and 125** watt laser sources<br>$CO_2$  9.3  µm  30, 50 and 75 watt laser sources<br>Fiber  1.06  µm  20 and 50 watt laser sources<br><br>LASER SOURCE COMBINATIONS:<br><br>Up to (2) $CO_2$ laser sources and<br>(1) permanently mounted fiber laser source.<br><br>SUPPORTS RAPID RECONFIGURATION™ OF $CO_2$ LASERS. |
| **Maximum Laser Power** | $CO_2$ :  250W<br>Fiber :  50W |
| **System External Dimensions** | Width:  63.09 in.  *(1602 mm) with Control Panel Folded*<br>87.75 in.  *(2229 mm) with Control Panel Extended*<br>Depth:  50.07 in.  *(1272 mm)*<br>Height:  47.67 in.  *(1211 mm) to top of enclosure.*<br>74.42 in.  *(1890mm) to top of light tower.* |
| **Weight** | 550 lbs *(250 Kg)* |
| **Power Requirements** | 220V-240V/20A |
| **Exhaust Requirements** | Intelligent Air Filtration (UAC 2000/4000) or<br>External Exhaust Blower Capable of >700 CFM at 6 in.<br>WG Static Pressure (1190 m3/hr. at 1.5 kPa) |
| **Computer Requirements** | Not required; includes integrated 21" Touch Screen Control Panel |
| **Laser Safety Classification** | Class 1 for material processing lasers<br>Class 2 overall due to red laser pointer<br>Can convert to Class 4 with optional Class 4 module |

\* Requires SuperSpeed™ operation

\*\* 125 watt $CO_2$ laser available fourth quarter of 2020

Weight is approximate and varies with laser source selection.

# ULTRA X6000
## Dimensional Drawing

**SIDE**

71.12" (1807 mm)
74.42" (1890 mm)
51.68" (1313 mm)
29.34" (745 mm)
50.07" (1272 mm)
58.34" (1482 mm)

**FRONT**

63.09" (1602 mm)
47.67" (1213 mm)
54.35" (1381mm)
59.00" (1499 mm)
87.75" (2229 mm)

Universal Laser Systems® reserves the right to change these specifications at any time, and without notification.

Warning: All laser processing requires constant supervision while the laser system is in use; exposure to the laser beam may cause combustible materials to ignite, which may lead to a fire hazard.
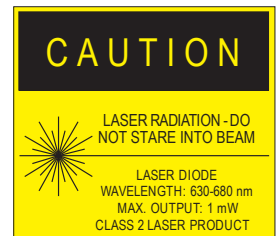
WARNING: UNIVERSAL LASER SYSTEMS PRODUCTS ARE NOT DESIGNED, TESTED, INTENDED OR AUTHORIZED FOR USE IN ANY MEDICAL APPLICATIONS, SURGICAL APPLICATIONS, MEDICAL DEVICE MANUFACTURING, OR ANY SIMILAR PROCEDURE OR PROCESS REQUIRING APPROVAL, TESTING, OR CERTIFICATION BY THE UNITED STATES FOOD AND DRUG ADMINISTRATION OR OTHER SIMILAR GOVERNMENTAL ENTITIES. FOR FURTHER INFORMATION REGARDING THIS WARNING CONTACT UNIVERSAL LASER SYSTEMS OR VISIT WWW.ULSINC.COM.

ULS laser systems are protected under one or more of U.S. Patents:
6,313,433, 6,423,925, 6,424,670, D517474, 9,346,122, 9,737,958, 10,391,345, 6,983,001; 7,060,934; 7,415,051; 7,469,000; 7,715,454; 7,723,638, 7,947,919; 8,101,883; 8,294,062; 8,599,898; 8,603,217; 9,155,988; 9,263,844; 9,263,845; 9,281,649; 9,346,122; 9,354,630, 9,694,448;  9,737,958; 10,456,875; 10,391,345.

Other U.S. and international patents pending.

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CE

**CAUTION**

LASER RADIATION - DO NOT STARE INTO BEAM

LASER DIODE
WAVELENGTH: 630-680 nm
MAX. OUTPUT: 1 mW
CLASS 2 LASER PRODUCT

## ULTRA Series

The ULTRA series is a suite of laser material processing systems that offer the most advanced technology, redefining performance expectations and delivering impeccable quality.

## ULTRA X6000

The X6000 is the flagship of the ULTRA family. It is a precision laser material processing system, designed to meet the most demanding requirements of today's manufacturing, product development and materials research.

It offers processing of a wide range of advanced polymer and composite materials by utilizing patented hybrid laser technology with multi-wavelength and laser power optimization capabilities. It affords the best possible matching of the available laser energy with the absorption characteristics of the materials being processed.

It has a built-in and ever-expanding database of material laser processing parameters which drastically simplifies set up and use of the system. Operations that can be performed by the ULTRA X6000 system include precision high-speed cutting, marking, surface profiling, engraving, surface modification and many others.

The system has a modular design and can be easily configured for laser processing of a specific material or a broad range of diverse applications.

The ULTRA X6000 system from Universal Laser Systems represents cutting edge technology, offering an accelerated return on investment, high productivity and expansion in capabilities well beyond previously available.

## About Universal Laser Systems, Inc.

Universal Laser Systems, Inc. (ULS) is a global manufacturer of laser material processing solutions, committed to advancing applied $CO_2$ and fiber laser technology. Through the development of laser sources, software and beam delivery systems, as well as extensive research in laser material-processing, ULS provides its customers with innovative, cost-effective and flexible laser solutions for present and future needs. For more information, visit www.ulsinc.com.

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