

ULS Safety Guide

Safety

Description of Appropriate Use

This device is designed for laser cutting and engraving in an office, laboratory, workshop or light duty manufacturing environment. Materials to be processed must fit completely inside the system for proper operation.

CAUTION: This device is 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.

General Safety

Use of the equipment in a manner other than described in this manual or failure to follow the operational requirements and safety guidelines listed in this manual can result in injury to yourself and others and may cause damage to the equipment and your facility.

EXPOSURE TO THE LASER BEAM MAY CAUSE PHYSICAL BURNS AND CAN CAUSE SEVERE EYE DAMAGE. Proper use and care of this system are essential to safe operation. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



NEVER OPERATE THE LASER SYSTEM WITHOUT CONSTANT SUPERVISION OF THE CUTTING AND ENGRAVING PROCESS. Exposure to the laser beam may cause ignition of combustible materials which can lead to a fire. A properly maintained fire extinguisher should be kept on hand at all times.

NEVER LEAVE MATERIALS IN THE LASER SYSTEM AFTER LASER PROCESSING HAS FINISHED.

Always remove all material including scrap material from the machine after use. Scrap material left in the laser system including materials that collect in the optional cutting table can be a fire hazard. It is also recommended you allow scrap materials to cool prior to leaving the work area. A properly maintained fire extinguisher should be kept on hand at all times.



A PROPERLY CONFIGURED, INSTALLED, MAINTAINED AND OPERATIONAL PARTICULATE AND FUME EXHAUST SYSTEM IS MANDATORY WHEN OPERATING THE LASER SYSTEM. Fumes and smoke from the engraving process must be extracted from the laser system and exhausted outside.



SOME MATERIALS, WHEN ENGRAVED OR CUT WITH A LASER, CAN PRODUCE TOXIC AND CORROSIVE FUMES. We recommend that you obtain the Material Safety Data Sheet (MSDS) from the manufacturer of the particular material. The MSDS discloses all of the hazards when handling or processing a particular material. **DISCONTINUE** processing any material that causes chemical deterioration of the laser system such as rust, metal etching or pitting, peeling paint, etc. Damage to the laser system from corrosive fumes is **NOT** covered under warranty.

DO NOT ATTEMPT TO MOVE OR LIFT THIS SYSTEM ALONE. Obtain assistance from three or four additional people when lifting or carrying (secure motion system and doors before lifting). Bodily injury may occur if improper lifting techniques are used or the system is dropped.



DANGEROUS VOLTAGES ARE PRESENT WITHIN THE ELECTRONICS ENCLOSURES OF THIS SYSTEM. Access to these areas is not necessary during normal operation. If it becomes necessary to open one of these enclosures for service reasons, please remember to disconnect the power cord from your electrical supply.



NEVER REMOVE THE GROUND LEAD TO THE ELECTRICAL CORD AND PLUG THE SYSTEM INTO A NON-GROUNDED OUTLET. A laser system that is not properly grounded is hazardous and has the potential to cause severe or fatal electrical shock. Without proper grounding, the laser system may exhibit sporadic or unpredictable behavior. Always plug the system into a properly grounded (earthed) outlet.

THE POWER SUPPLY CORD IS THE MAINS DISCONNECT DEVICE; THE EQUIPMENT SHOULD BE LOCATED CLOSE TO AN EASILY ACCESSIBLE POWER OUTLET. To disconnect the equipment from the supply mains, the power cord should be unplugged from the power outlet or main power inlet (appliance coupler) of the unit.

THE LASER SYSTEM IS DESIGNED AS A CLASS I, GROUP A, PLUGGABLE DEVICE. It is also designed for connection to IT power systems which provide the most flexibility to the user.

THIS DEVICE IS SPECIFICALLY DESIGNED TO COMPLY WITH CDRH PERFORMANCE REQUIREMENTS UNDER 21 CFR 1040.10 AND 1040.11 AND TO COMPLY WITH EUROPEAN LASER SAFETY REGULATIONS UNDER EN60825-1. CDRH is the Center for the Devices of Radiological Health division of the Food and Drug Administration (FDA) in the USA. No guarantees of suitability or safety are provided for any use other than those specified by Universal Laser Systems, Inc.

Laser Safety

The device contains a sealed carbon dioxide (CO₂) laser that produces intense invisible laser radiation at a wavelength of 10.6 microns in the infrared spectrum. For your protection, the laser is contained within a Class 1* enclosure designed to completely contain the CO₂ laser beam. **CAUTION:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- The intense light that appears during the engraving or cutting process is the product of material combustion or vaporization. **DO NOT STARE AT THIS INTENSE LIGHT OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS SUCH AS BINOCULARS OR MICROSCOPES.**
- This device may contain a visible Red Diode Pointer (Class 3R) to aid in positioning material to be cut or engraved. **DO NOT LOOK DIRECTLY INTO THE RED LASER BEAM OR USE A REFLECTIVE SURFACE TO REDIRECT OR VIEW THE RED LASER BEAM. NEVER ATTEMPT TO VIEW THE RED LASER BEAM USING OPTICAL INSTRUMENTS SUCH AS BINOCULARS OR MICROSCOPES.**
- The user door(s) are safety interlocked which will prevent the CO₂ laser beam from firing when the user door(s) are opened. The Red Diode Pointer is **NOT** safety interlocked and can be automatically activated with the door(s) either open or closed.
- **DO NOT OPERATE THE LASER SYSTEM IF ANY SAFETY FEATURES HAVE BEEN MODIFIED, DISABLED OR REMOVED.** This may lead to accidental exposure to invisible CO₂ laser radiation which may cause severe eye damage and/or severe burns to your skin.
- Always use caution when operating a laser system.

*An enclosure which does not permit human access to laser radiation in excess of the accessible emission limits of Class 1 for the applicable wavelength and emission duration.

Tamper Proof Labels

All laser cartridges are equipped with tamper proof labels. There are **NO** field serviceable parts inside a Universal Laser System, Inc. (ULS) laser cartridge. If your laser cartridge needs service, please contact the Customer Service Team at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com.

Laser Safety When Using the Optional Class 4 Module (ILS Only)

The Industrial Laser Series (ILS) laser system is equipped with interlocked access doors on either side of the unit. An optional device is available to allow the user to operate the laser system with the side doors open. This device bypasses the safety interlocks on the side doors of the ILS laser system. With this optional device in place, the protective system housing will not fully contain the infrared laser radiation produced by the carbon dioxide laser, creating the potential for exposure. Use of this optional device redefines the safety classification of the ILS laser system from Class 1, which is considered safe for use under all conditions of normal use, to Class 4, which is considered potentially hazardous. Additionally, the system housing will not contain flames or by-products from potential ignition of materials within the system housing. It should also be noted that damage or ignition of flammable materials in the immediate or remote vicinity can be caused by infrared laser radiation escaping the housing of a system equipped with the Class 4 Laser Option.

There are many mandatory safety measures set by national standards and laws and European standards which must be complied with when operating a Class 4 laser system. Certain safety measures are provided by the manufacturer through incorporation into the optional Class 4 laser device, including the following:

1. **Remote Interlock Connection** – A means of remotely connecting to the interlock circuit of the laser system allowing connection of remote switches to the laser system for deactivating the laser. This feature must be used to connect an interlock switch to the doors of the designated room in which the laser system will be operated so that the laser is automatically deactivated when the doors are open.
2. **Key Control** – A removable key that prevents unauthorized operation of the laser.
3. **Laser Radiation Emission Warning Device** – A visible warning light that indicates when the laser is capable of emitting laser radiation.
4. **Attenuator** – A mechanical device to block emission of laser radiation. This device takes the form of a shutter which is manually operated.
5. **Class 4 Warning Label** – A Class 4 warning label to indicate the laser system is classified as Class 4.

In addition to a properly installed exterior exhaust connected to the laser system equipped with the Class 4 Laser Option, the laser system must be operated only in a continuously well-ventilated area. Certain operational safety measures are the responsibility of owners of the ILS laser system with the optional Class 4 laser device installed. **These safety measures are mandatory for operation of Class 4 laser devices under Federal and State law in the United States as well as under the laws of most foreign countries.** Many of these safety measures are outlined in ANSI Standard Z136.1 “American National Standard for the Safe Use of Lasers” or in equivalent standards available in most foreign countries, such as the European Standard EN 60825-1. Other safety measures may be required by state and/or local authorities, for example, the Regulation BGV B2 on laser beams of the German Employer’s Liability Insurance Association, and will be the responsibility of the Owner to understand and adhere to these laws.. A brief synopsis of the most common safety requirements addressed to Owners of a Class 4 laser is outlined below:

- A. In any facility in which a Class 4 laser system is to be operated, an individual must be designated as a Laser Safety Officer (“LSO”) who will assume the authority and responsibility to monitor and enforce the control of laser hazards. The individual designated as the LSO should be trained in laser safety and aware of all safety measures set by law. There are many avenues available to acquire this training. Recognized sources of this training are the Laser Institute of America (www.laserinstitute.org), the Employer’s Insurance Liability Associations in the European countries or, laser safety associations within Owner’s country or territory.
- B. The Owner of the Class 4 laser system will be responsible for creation of a controlled area in which a Class 4 laser system will be operated. A controlled area is an area designed to fully contain the laser radiation potentially escaping from a Class 4 laser system. and with measures in place to prevent unauthorized personnel from entering the area including lighted warning signs outside the designated and controlled area and interlocks on entryways.
- C. The LSO will be responsible for designating and training all personnel authorized to operate, maintain or service a Class 4 laser system. It will also be the responsibility of the LSO to take measures to inform and restrict all unauthorized personnel from access to a Class 4 laser system.
- D. The Owner of the Class 4 laser system will be responsible for identifying and providing to all authorized personnel

any protective equipment such as specially designed eyewear, protective equipment and clothing needed when operating, maintaining or servicing a Class 4 laser system. Further, the Owner will ensure that no juveniles operate the laser, and that mirrors, lenses and other reflecting materials are fixed and are only moved in a controlled manner if the last is in use.

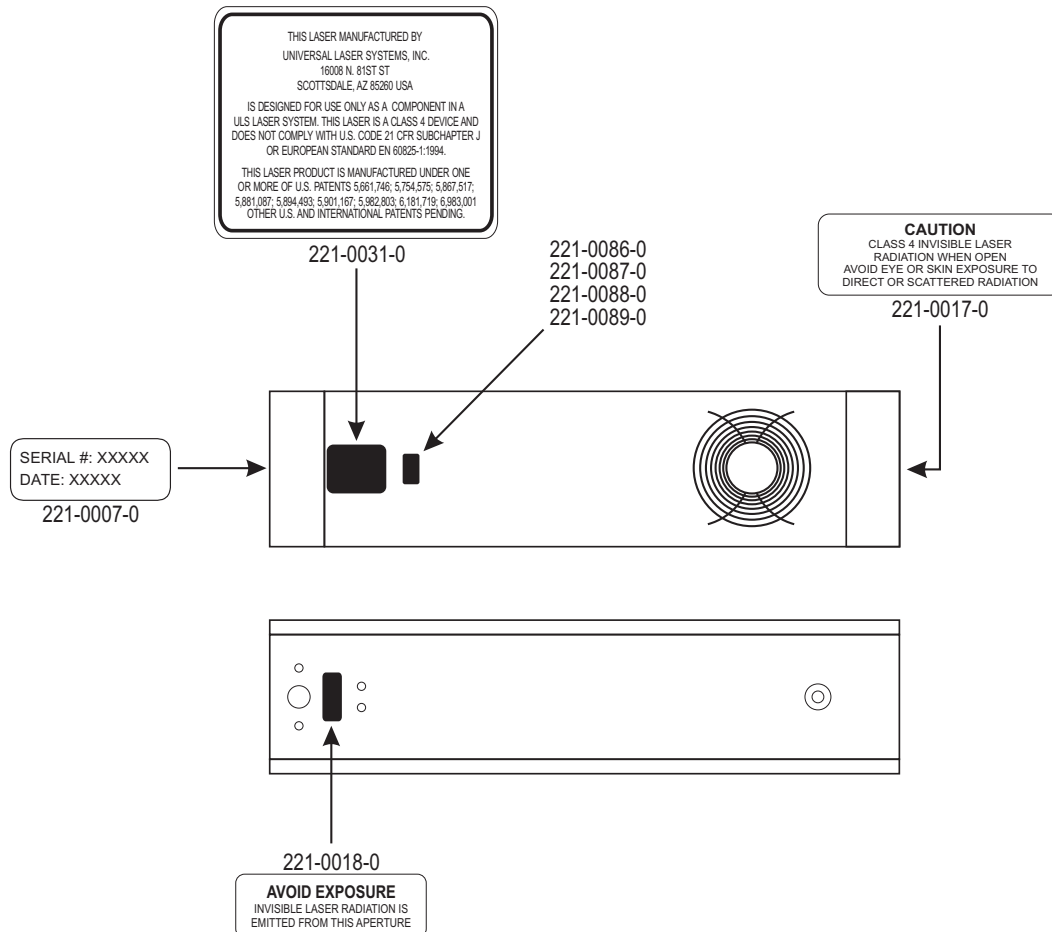
- E.** The LSO will be responsible for auditing all safety measures on a regular basis. This includes regular retraining of authorized personnel, serialization and regular inspection (and replacement when necessary) of all special eyewear and clothing and regular inspection of all safety measures surrounding the controlled area in which a Class 4 laser system is operated. The LSO may be required to maintain records as necessary to prove compliance.
- F.** The LSO will be responsible for regular medical surveillance of all authorized personnel operating a Class 4 laser system. This can include but is not restricted to mandatory annual eye exams, for example.
- G.** Class 4 lasers must not be used at tradeshow or exhibitions.

The above list is not to be considered all inclusive. Other mandatory safety measures may be applicable and will vary from state to state and country to country. **It is the responsibility of the owners of a Class 4 laser system and the owners of the facility in which it will be operated to identify and comply with all regulations pertinent to their locale.** In some states, for example, anyone wishing to operate a Class 4 laser device must register with the state radiation regulatory agency, pay annual fees and submit to annual inspections. There may be penalties involved for non-compliance. The United States Occupational Safety and Health Administration ("OSHA") has also adopted rules for safe use of lasers in the workplace. The LSO must comply with all Rules and Regulations set by law.

To reiterate, the safety measures relating to operation of a Class 4 laser system are mandatory under Federal and State law in the United States as well as in most foreign countries. This optional Class 4 laser device must not be used if you are unable or unwilling to comply with all safety measures required for safe operation of a Class 4 laser system.

Safety Labels

CDRH and CE regulations require that all laser manufacturers affix warning labels in specific locations throughout the equipment. The following warning labels are placed on the laser system for your safety. **Do not** remove these labels for any reason. If the labels become damaged or have been removed for any reason, **do not operate** the laser system and immediately contact Universal Laser Systems, Inc. at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com for a free replacement.

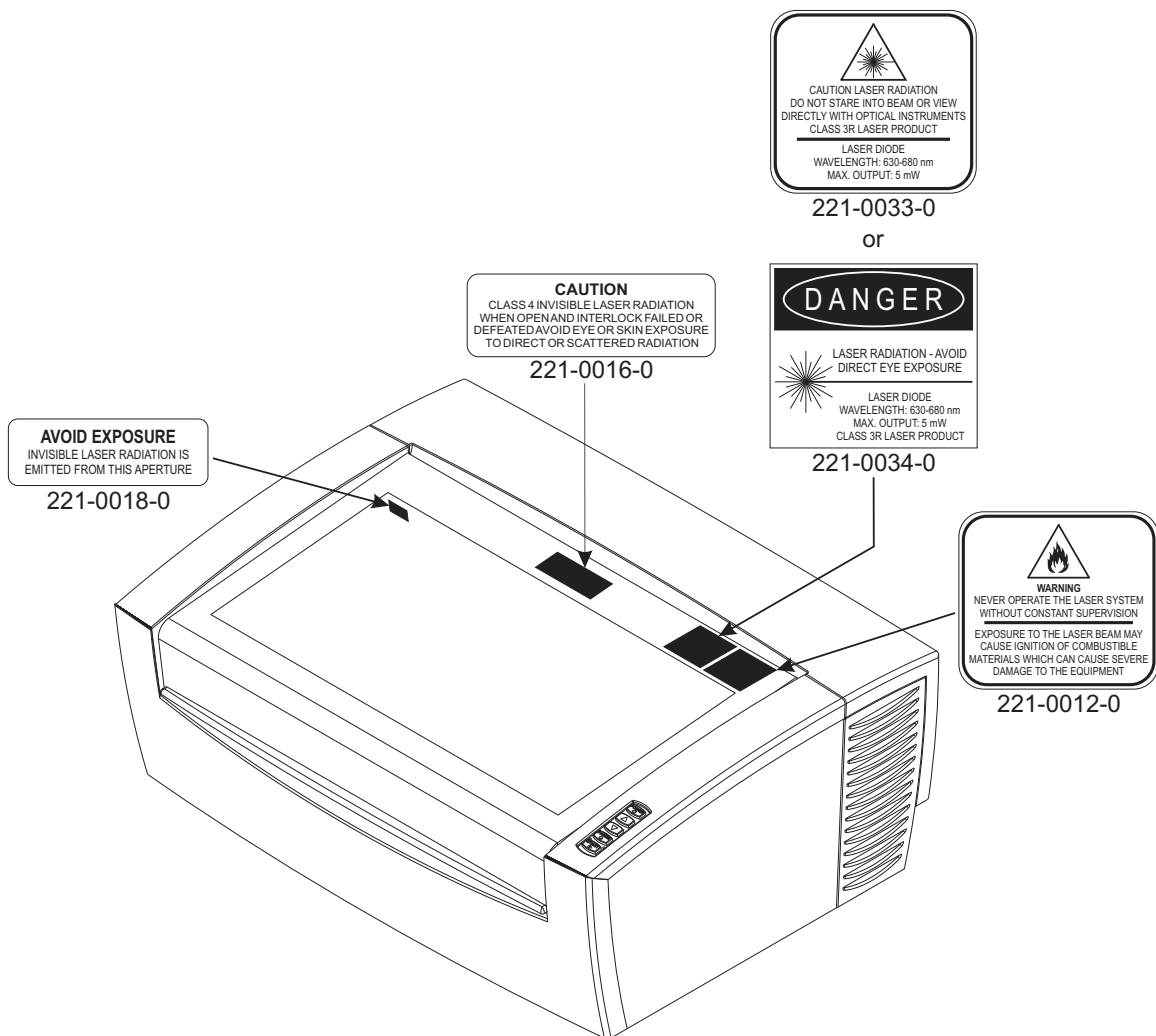


ULS Laser Cartridge Labels

Laser cartridge and labels are not to scale

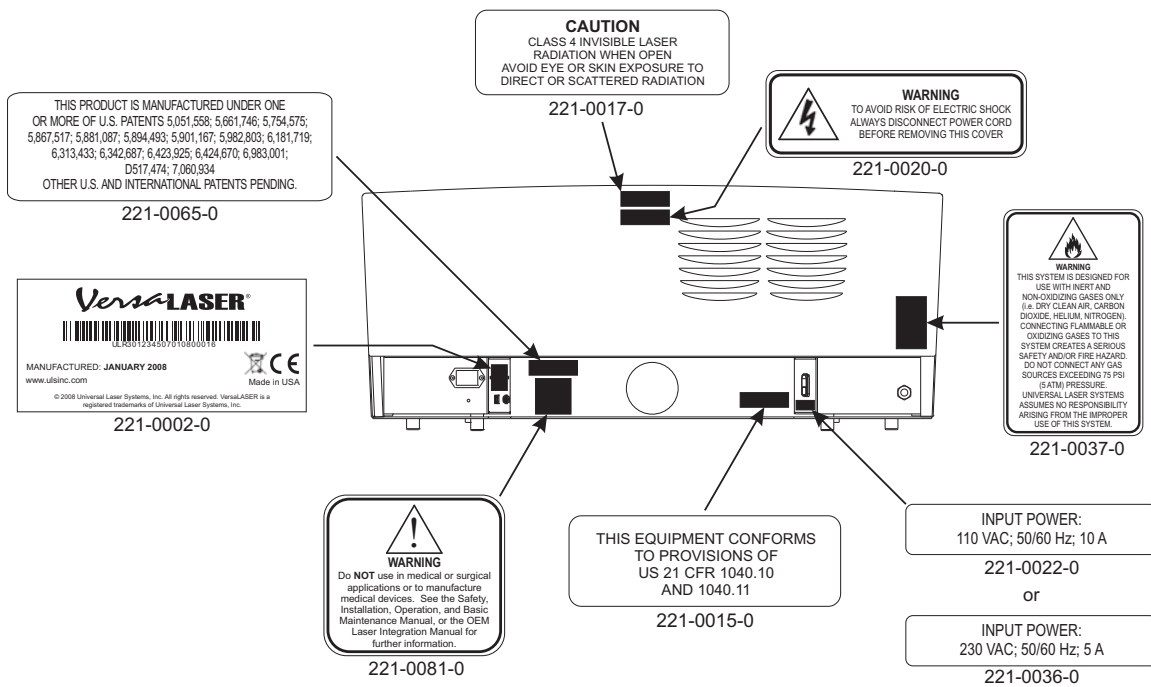
VersaLASER®

VLS2.30 and VLS3.50

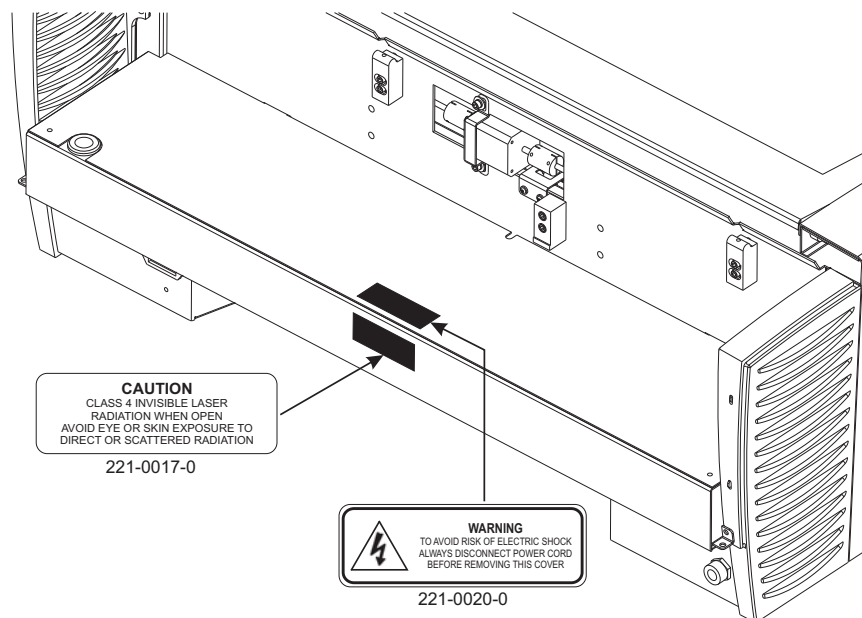


VersaLASER VLS2.30 and VLS3.50 Front View

Laser system and labels are not to scale



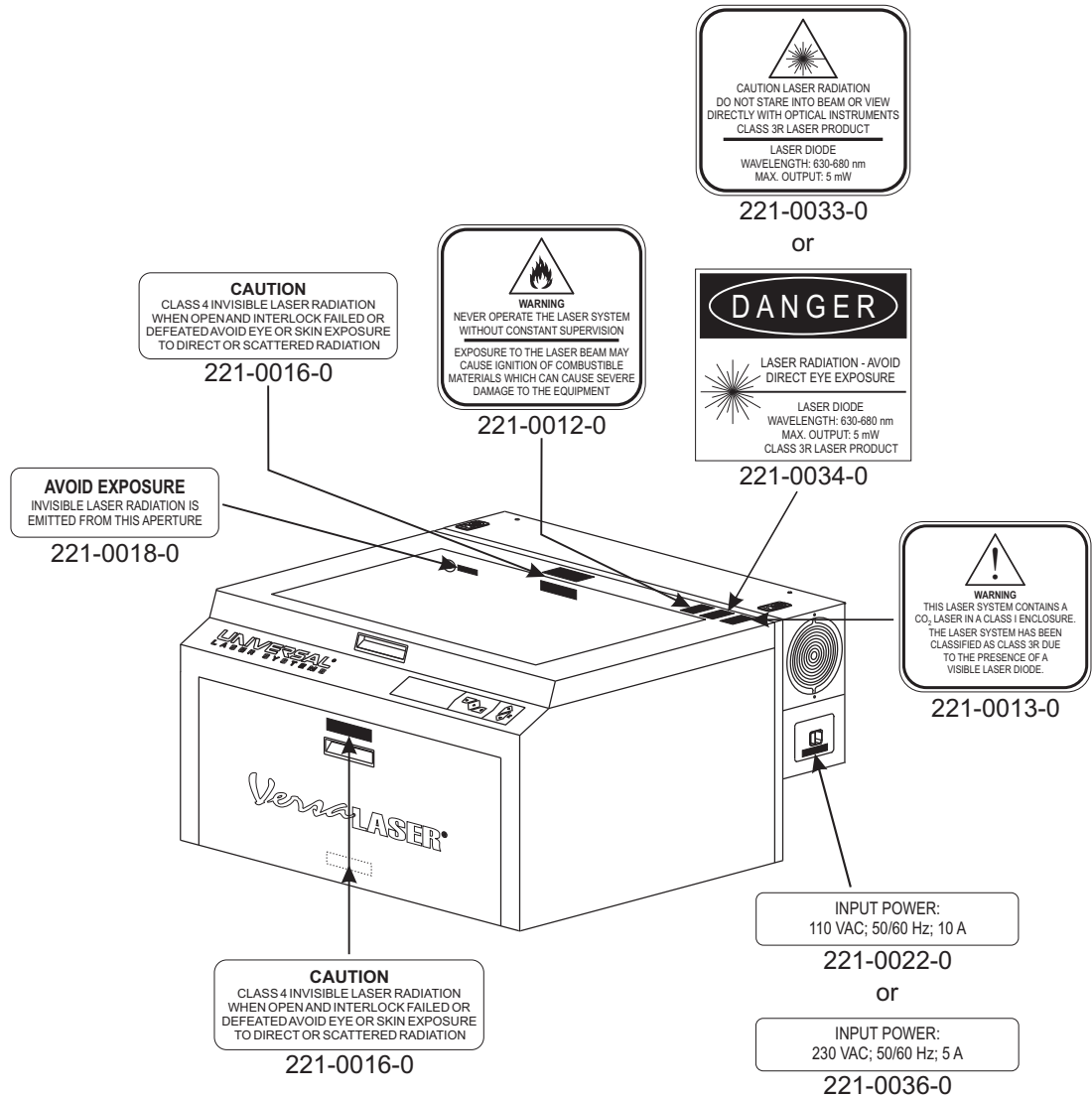
VersaLASER VLS2.30 and VLS3.50 Back View



VersaLASER VLS2.30 and VLS3.50 Back View with Rear Cover Removed

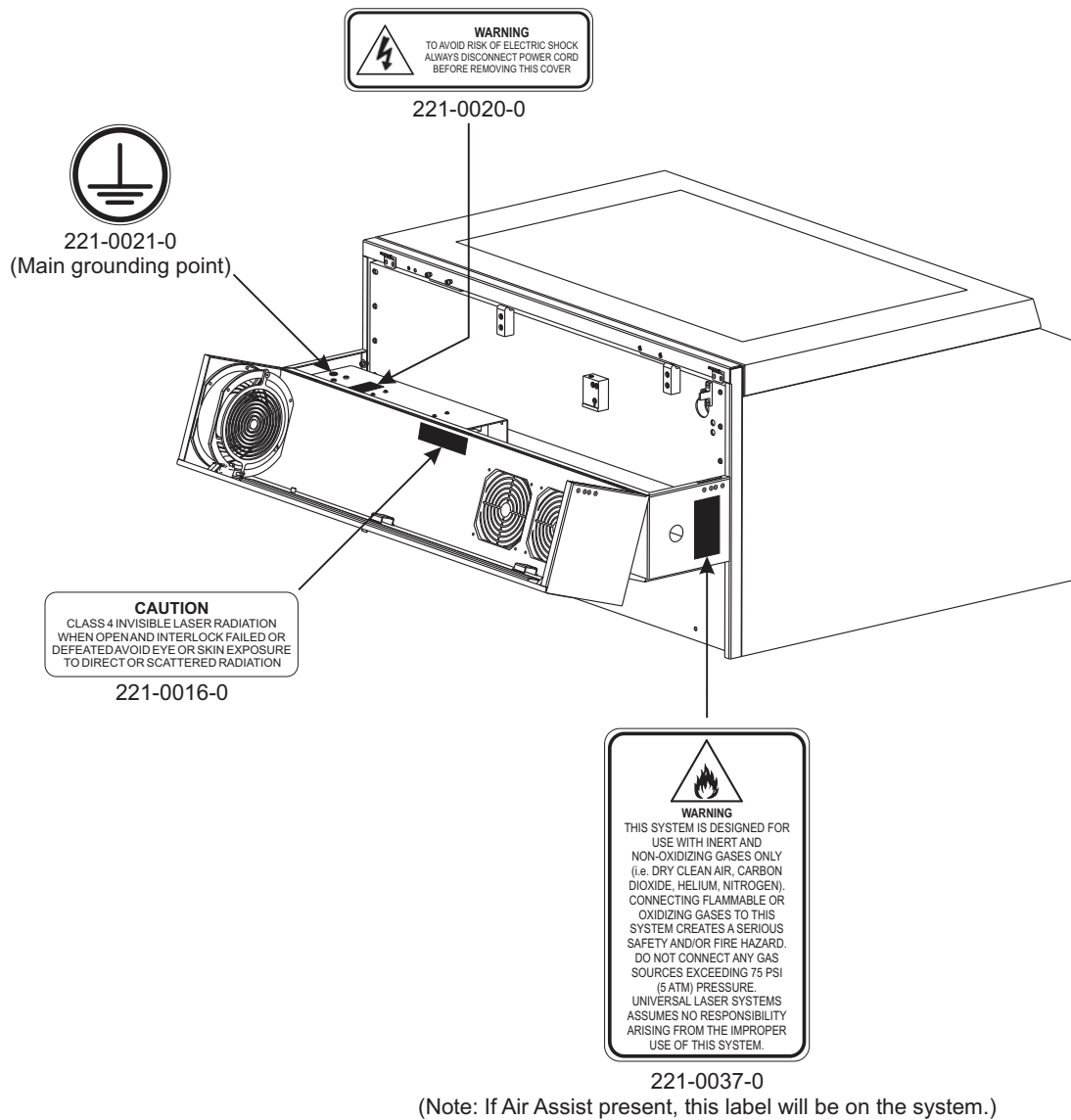
VersaLASER®

VLS3.60, VLS4.60 and VLS6.60



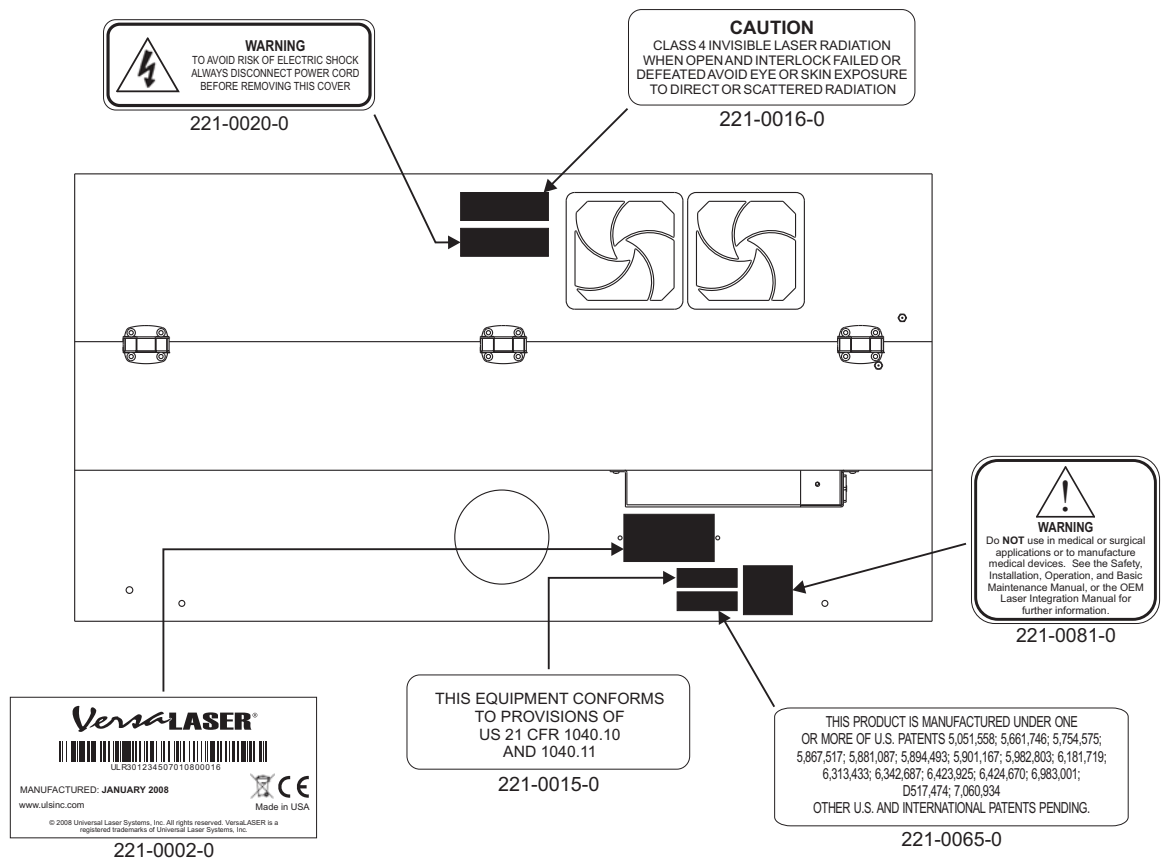
VersaLASER VLS3.60, VLS4.60 and VLS6.60 Front View

Laser system and labels are not to scale



VersaLASER VLS3.60, VLS4.60 and VLS6.60 Back View with Rear Door Open

Laser system and labels are not to scale

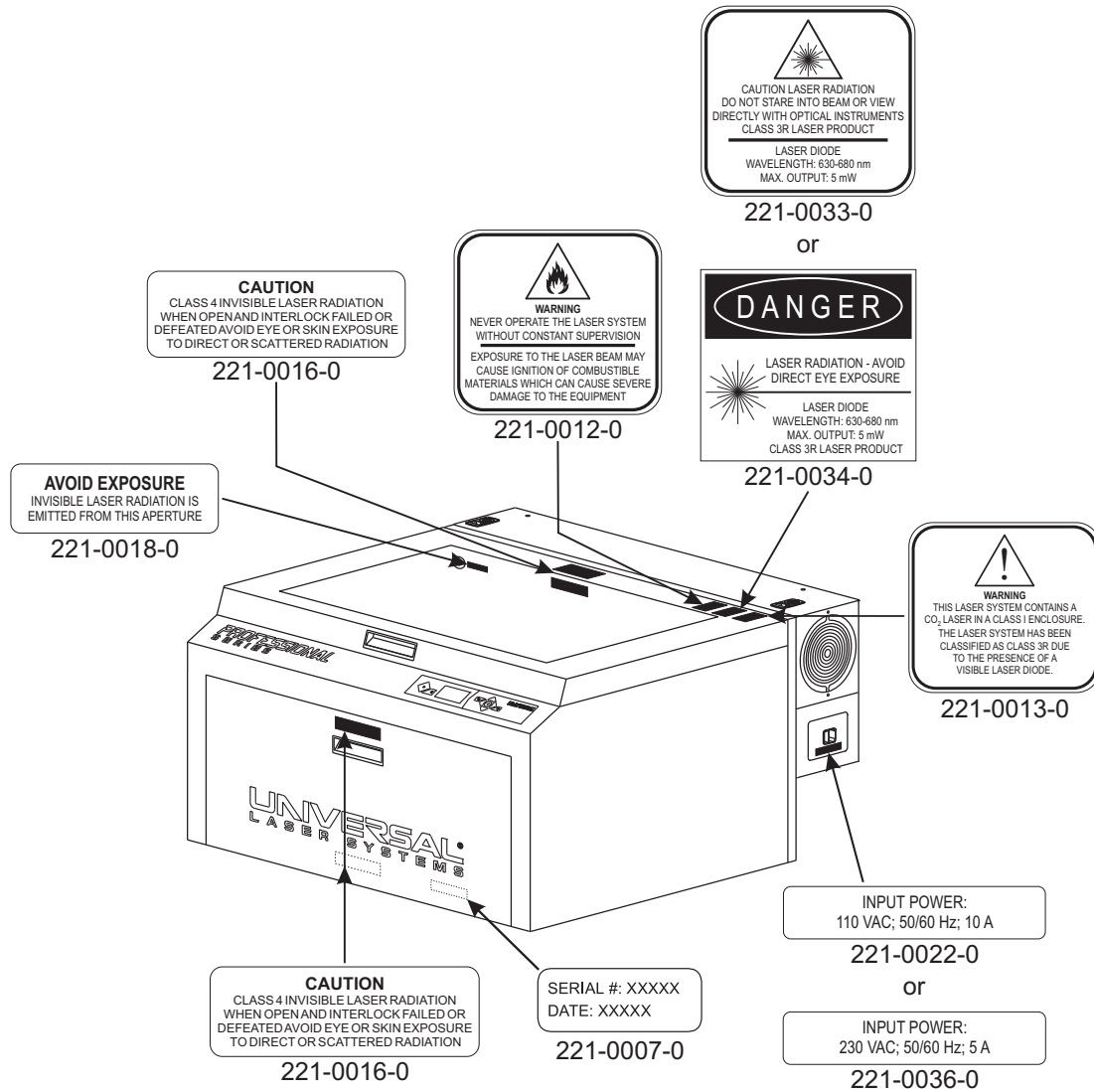


VersaLASER VLS3.60, VLS4.60 and VLS6.60 Back View

Laser system and labels are not to scale

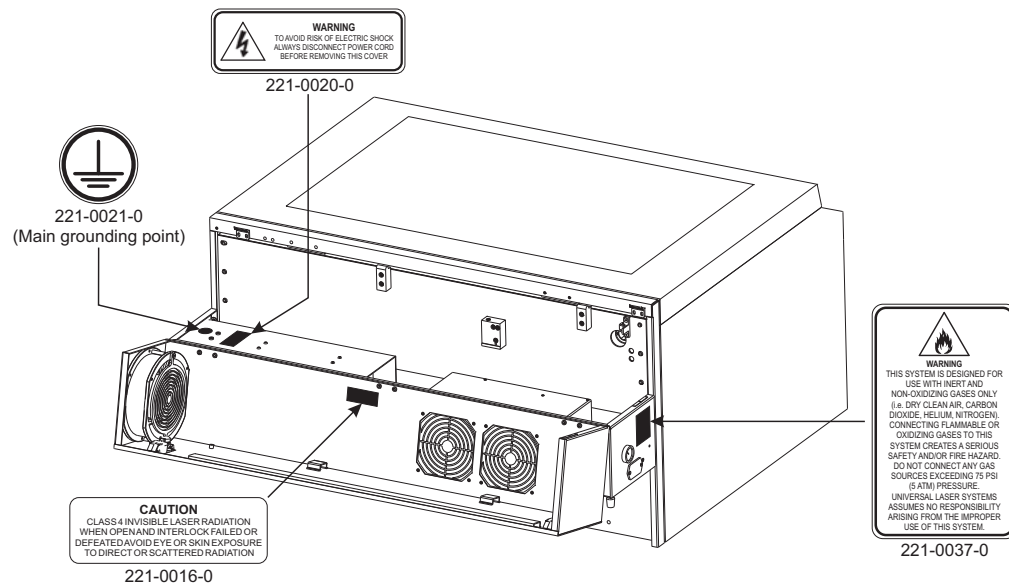
PROFESSIONAL SERIES

PLS3.75, PLS4.75 and PLS6.75

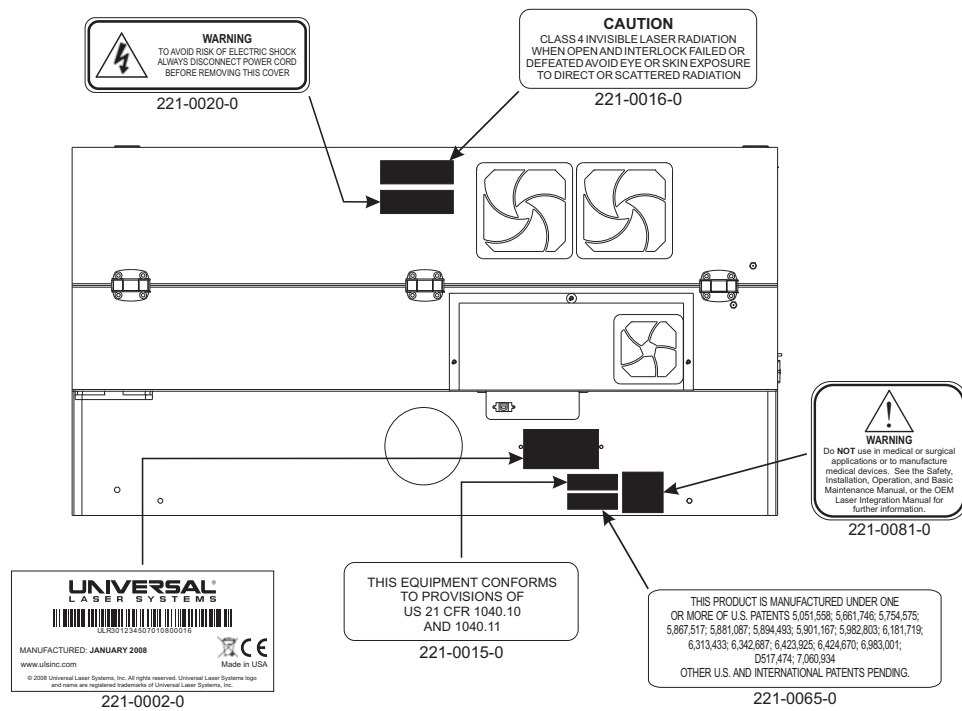


PLS3.75, PLS4.75 and PLS6.75 Front View

Laser system and labels are not to scale



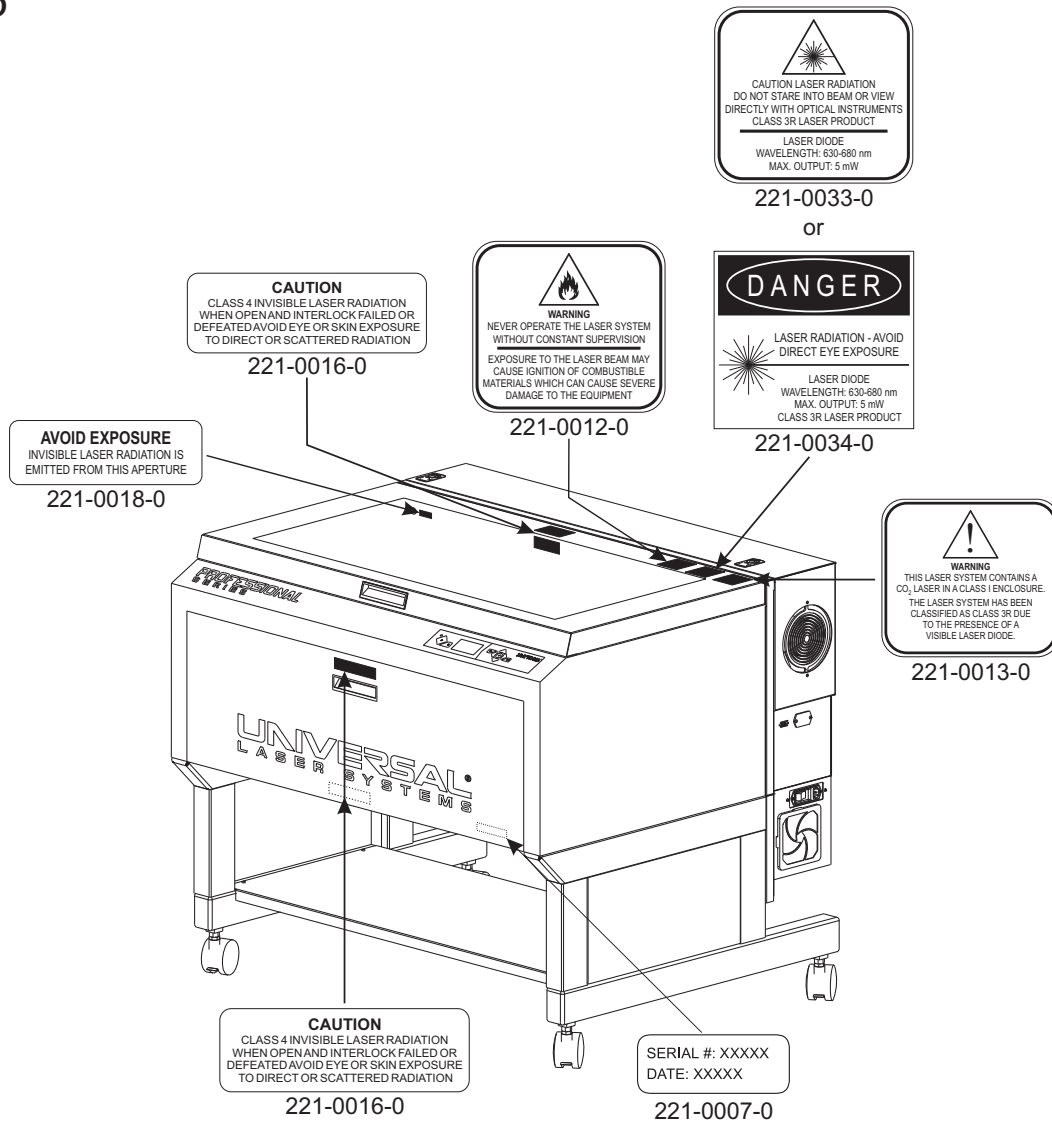
PLS3.75, PLS4.75 and PLS6.75 Back View with Rear Door Open



PLS3.75, PLS4.75 and PLS6.75 Back View

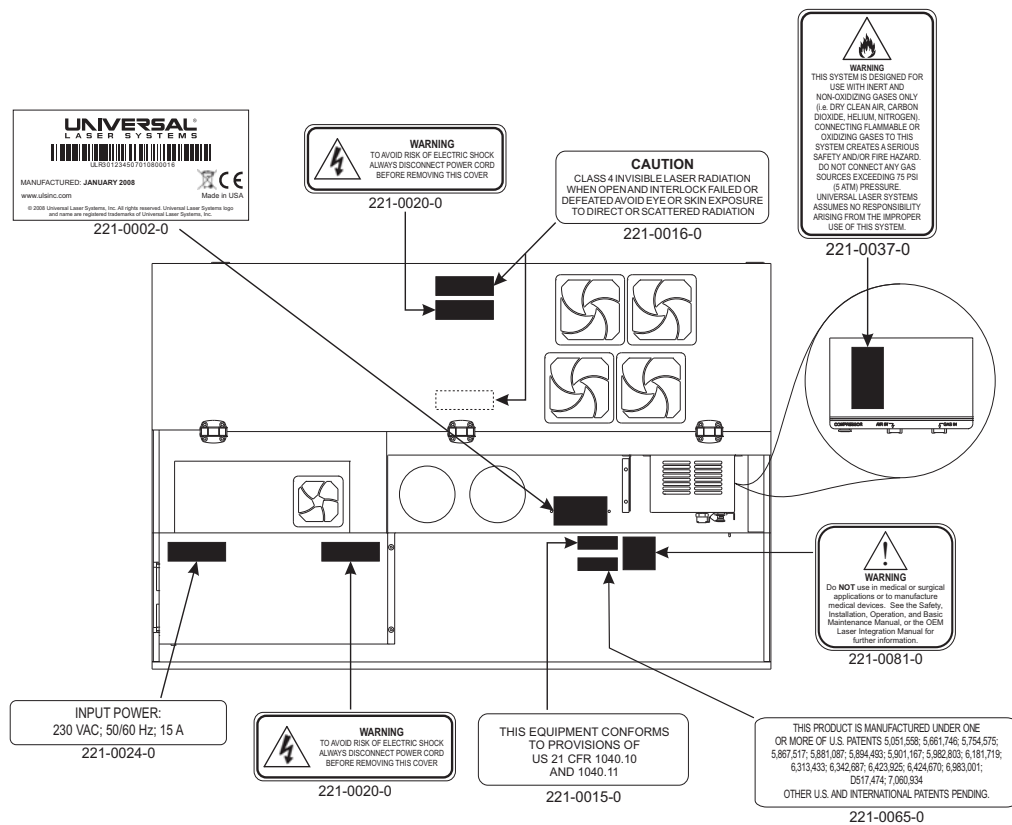
PROFESSIONAL SERIES

PLS6.150D

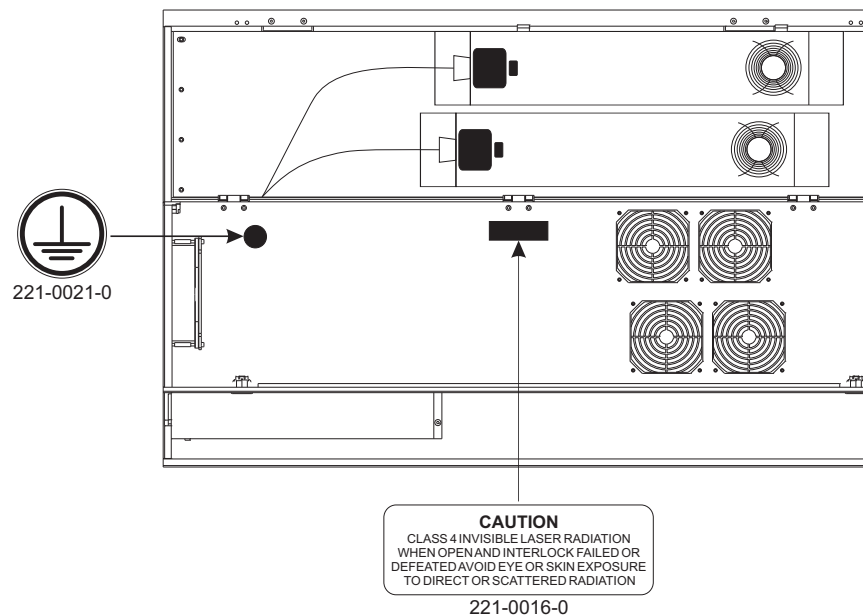


PLS6.150D Front View

Laser system and labels are not to scale



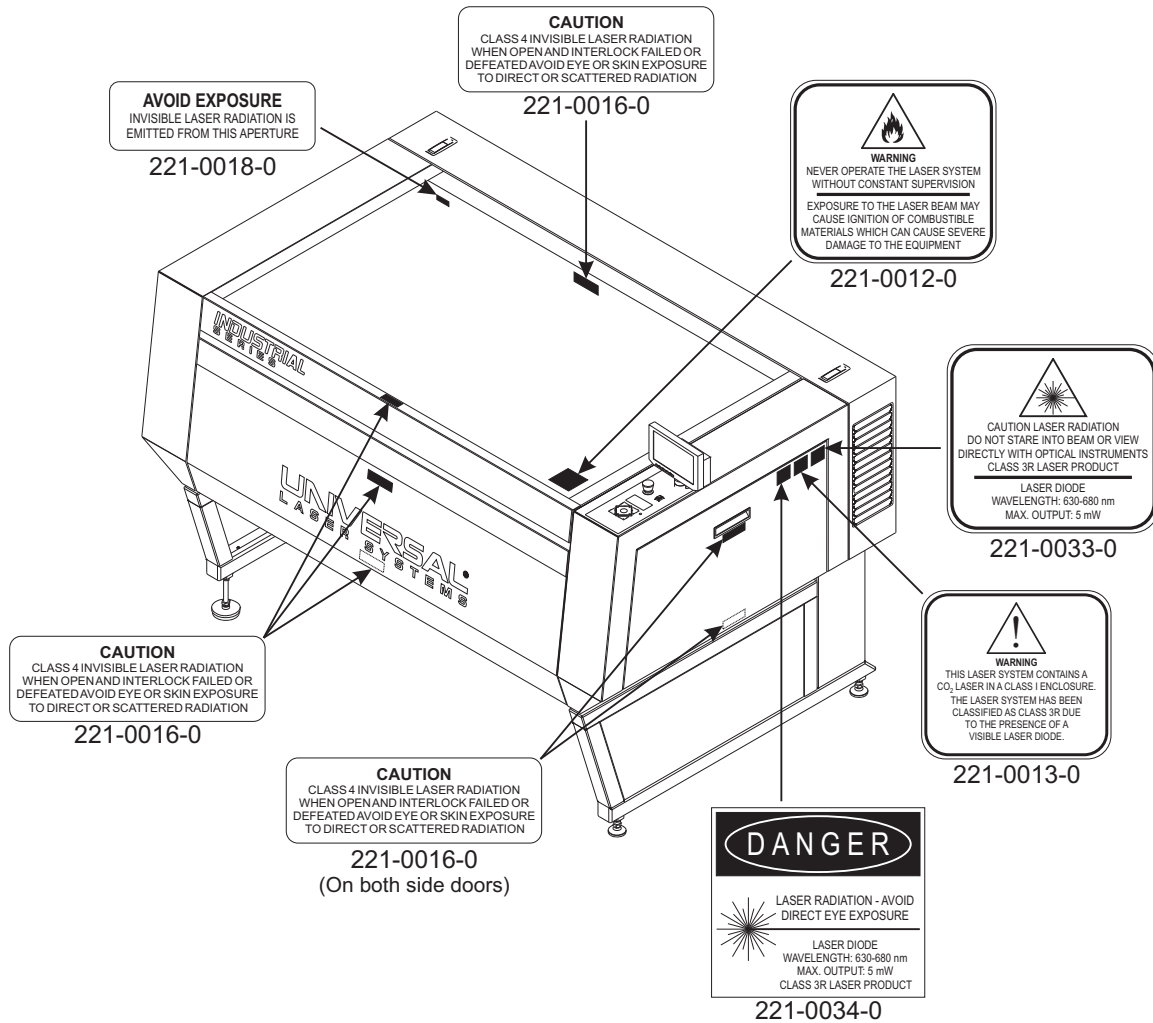
PLS6.150D Back View



PLS6.150D Back View with Rear Cover Open

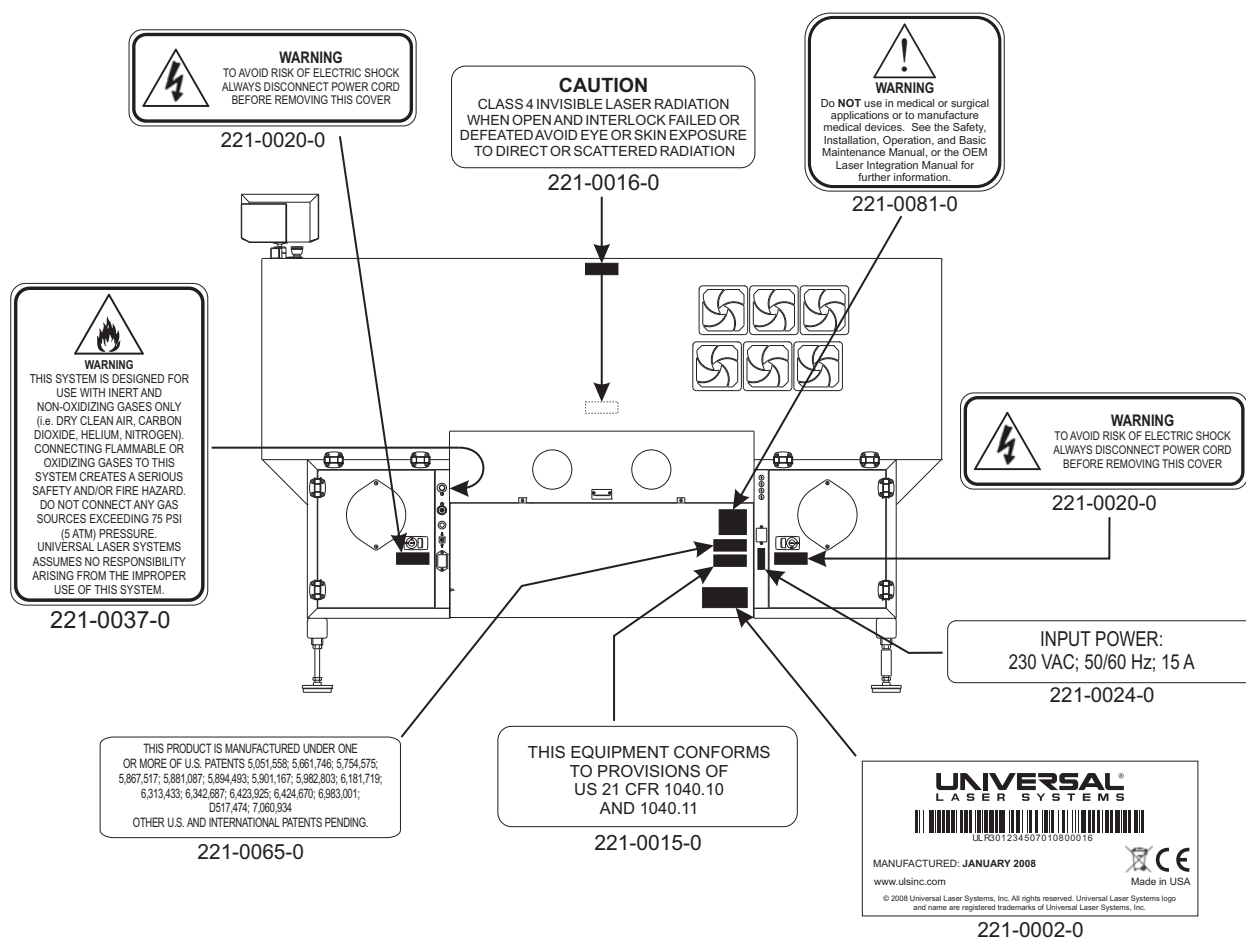
INDUSTRIAL SERIES

ILS9.75, ILS9.150D, ILS12.75 and ILS12.150D



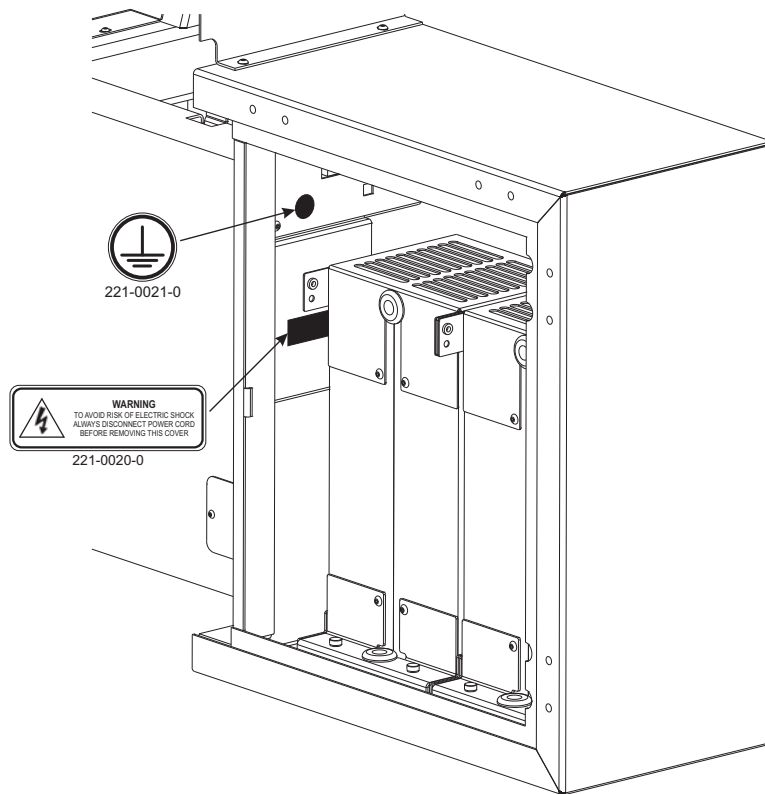
ILS9.75, ILS9.150D, ILS12.75 and ILS12.150D Front View

Laser system and labels are not to scale

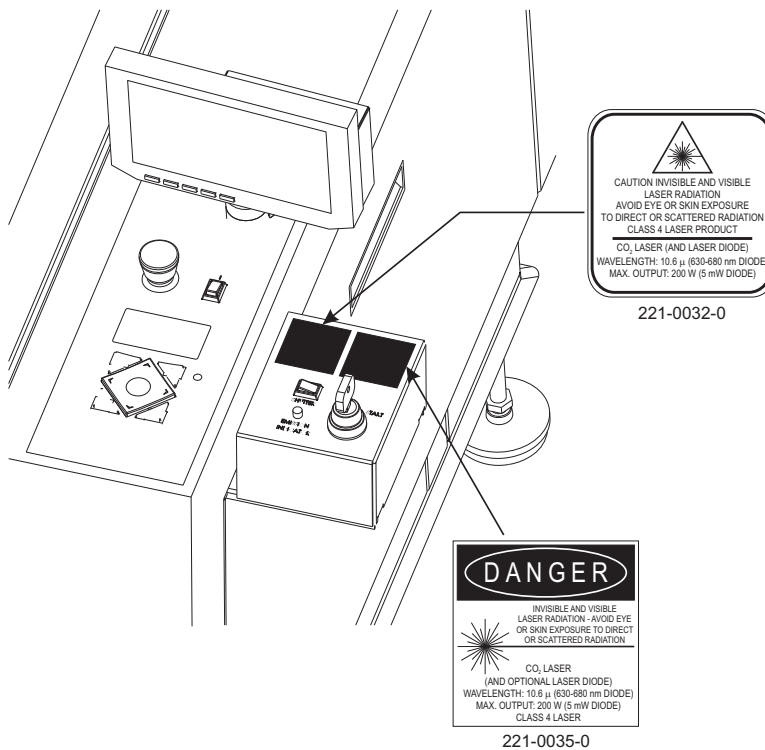


ILS9.75, ILS9.150D, ILS12.75 and ILS12.150D Back View

Laser system and labels are not to scale



ILS9.75, ILS9.150D, ILS12.75 and ILS12.150D Inside Right Electronic Enclosure



ILS9.75, ILS9.150D, ILS12.75 and ILS12.150D Class 4 Module

EU Declaration of Conformity

UNIVERSAL[®] LASER SYSTEMS

Product Identification: VLS2.30, VLS 3.50, VLS3.60, VLS4.60,
VLS6.60, PLS3.75, PLS4.75, PLS6.75,
PLS6.150D, ILS9.75, ILS9.150D, ILS12.75
and ILS12.150D
Laser Engraving and Cutting Systems

Manufacturer:
Universal Laser Systems, Inc.
16008 N. 81st St.
Scottsdale, AZ 85260
USA

European Office:
Universal Laser Systems GmbH
Lerchenfelder Guertel 43
A-1160 Vienna/Austria

The manufacturer hereby declares that the equipment specified below
is in conformity with the following directives:

89/336/EEC	(EMC Directive)
73/23/EEC	(Low Voltage Directive)
98/37/EEC	(Machinery Directive)
2002/95/EEC	(ROHS Directive)
2002/96/ECC	(WEEE Directive)

based on the standards listed.

Standards Used:

Safety:	EN 60950: 2002 EN 60825-1: 2002 (Class 3R)
EMC:	EN 55024 1998 (Class A) EN 55022: 2003 (Class A) EN 61000-3-2: 2001 (class A) EN 61000-3-3: 2002 EN 61000-4-2: 2001 (4kV CD, 8kV AD) EN 61000-4-3: 2003 (3 or 10 V/m) EN 61000-4-4: 2002 (1 or 2 kV power line) EN 61000-4-5: 2001 (class 3) EN 61000-4-6: (3 or 10Vrms) EN 61000-4-8 EN 61000-4-11

Note: This is not a declaration of conformity. The importer of this
equipment supplies the declaration of conformity.

CAUTION: This is a Class A product. In a domestic environment,
this product may cause radio interference, in which case the
user may be required to take adequate measures.

FCC Compliance

This ULS laser system has been tested and found to comply with Federal Communication Commission (FCC) directives regarding Electromagnetic Compatibility (EMC). In accordance with these directives, ULS is required to provide the following information to its customers.

FCC Compliance Statement and Warnings

This device complied with FCC Rules Part 15. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device as set forth in Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Users should be aware that changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment has been type tested and found to comply within the limits for a Computing Device per FCC part 15, using shielded cables. Shielded cables must be used in order to insure compliance with FCC regulations.

Recycling



By placing the above symbol on our products and accessories, Universal Laser Systems is indicating that we are committed to helping reduce the amount of waste electronics ending up in municipal landfills. Therefore, Universal Laser Systems urges consumers to recycle this product and its accessories. Universal Laser Systems is equipped to recycle any of its electronic products and accessories and will assist our customers with their recycling options. To arrange for recycling of your ULS product or accessory, please contact Universal Laser Systems for more information at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com.