



JM410V Label Printer Operations & Maintenance Manual



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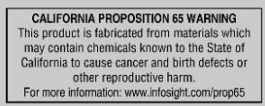
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Optical/Laser Safety

| | |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO <u>DIRECT OR SCATTERED RADIATION</u> CLASS 1 LASER PRODUCT, USING</p> <p>A CLASS 4 EMBEDDED LASER (10 W, 10.57 – 10.63 μm)</p> <p><i>The laser beam Exits the Final lens 10 inches above the tag</i></p> |
|  | <p><i>Never attempt to operate the Laser Tag Marker without the protective covers in place.</i> <i>Never attempt to override any of the safety interlocks on the tag printer.</i> <i>Never attempt to dismantle or repair the tag printer. In case of malfunction contact an Infosight service representative.</i> <i>Any of the actions mentioned above may result in permanent eye or skin damage. Refer to Appendix A for more information on laser safety.</i></p> |

Symbol Definitions

| | |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Caution, Laser Radiation - Consult Accompanying Documents</p> |
|  | <p>Warning label located on top of the main cover: CLASS 4 INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION</p> |
|  | <p>Caution, Consult Accompanying Documents</p> |
|  | <p>Warning label located above the rating plate on the back of the Laser Marker CLASS 1 LASER PRODUCT</p> |
|  | <p>Warning label located above the rating plate on the back of the Laser Marker: CLASS 1 LASER PRODUCT</p> |
| <p>Environmental Conditions</p> | <p>The Labelase® Printer is intended for Indoor use only. Altitude up to 6500 feet, operating temperature 40 to 100 degrees F, 80% maximum relative humidity, rated 100-240Vac 50/60 HZ, 2.4 Amps, pollution degree 2</p> |
| <p>CAUTION</p> | <p>If this printer is not used in the manner specified by this manual, the safety features provided may be insufficient.</p> |
|  | <p>Warning Label located on the back panel of the printer, regarding California Proposition 65.</p> |

PREFACE

The JM410V is based on the JM410 which includes with advanced design features for the printing of single or multiple die-cut tags. The JM410V is designed to print and “cut” various size and shape labels from polyacrylic film material. The JM410V utilizes the same PC-based Producer™ interface as all LabelLase® printers.

This OPERATIONS manual is intended as a companion to the ONLINE REFERENCE MANUALS supplied with the Producer & Designer software package and also available on the Infosight webpage:
<http://www.infosight.com/labelaseproducer2/> .

MINIMUM SYSTEM REQUIREMENTS

- IBM PC 100% compatible computer.
- Windows 7 (32/64bit) / Windows 8/8.1 (32/64 bit) / Windows 10 (32/64 bit)
- 1 Serial Com port, USB port, or Ethernet port (for connection to the printer).
- Color monitor (1024X768 resolution or higher recommended).

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PRINTER SETUP

The JM410V Label Printer requires 100-240 VAC, 50/60 Hz, 2.4 A. Fused at 5 Amps.

The JM410V Label Printer should be positioned so that the power supply cord exits from the back of the machine. Always leave access to the E-STOP (Emergency Stop Push Button) and power switch that are located on the rear of the machine.

The JM410V Label Printer should be placed in a temperature controlled environment. This printer, though designed for industrial use, should be treated as any typical computer system and printer. Dirty environments will necessitate a more frequent cleaning schedule for internal optics.

A 12-foot (3.6 meter) RS-232 serial communications cable is provided for communicating with your Windows-based PC.

A 15-foot (4.6 meter) USB cable is supplied for USB/Ethernet connectivity.

SOFTWARE INSTALLATION

Before connecting the printer to your PC, LabeLase® Producer™ Software and communications should first be installed on your PC.

The easiest way to install the software is to use the Installer Thumb Drive that came with your new printer. In addition to installing the correct version of Producer™ and Designer for your specific printer model, it will also allow you to configure the appropriate communications interface.

If your original Installer Thumb Drive is not available, OR for the latest release of Producer™ and Designer software, downloaded the installer package directly from <http://www.infosight.com/support/software/37-labelase-producer-metal-tag-production-software>. This is a self-contained, single self-installing file. However, it will not automatically guide you through the configuration process for communications, and you must therefore follow the steps outlined in the LabeLase® Producer™ Software Installation Manual.

The LabeLase® Producer™ Software Installation Manual is available and shipped with your equipment. The Installation Manual covers printer connection, communication connections, and installation of the software. Refer to this manual for any issues during software installation on your PC.

NOTE: LabeLase® Producer™ and Designer Software are separate executable programs, however they are bundled together and downloaded/installed together.

SYSTEM CONNECTIONS & POWER-UP:



USB & Ethernet ports exist under the RS 232 port (1, above). Refer to the Communications Section of this manual for instructions on installing the required drivers.

1. Attach the included RS-232 cable, USB, or Ethernet cable from the JM410V Label Printer to your Windows-based PC running LabeLase® Producer™ software.
2. Insert the AC power cord into a nearby power receptacle. **Note: Both sides of the incoming line voltage are fused. See the Maintenance section of instructions on replacing fuses.**
3. Place the security key into rear of machine, near the power cord exit point. The key functions as an ON-OFF switch.
4. Turn the key to the horizontal (I) (ON) position. NOTE: The security key can only be removed when in the vertical (O) (OFF) position.
5. Press the power switch to the ON (I) position. The power switch is located directly above the power cord.
6. Disengage the E-Stop by twisting the red button one-quarter turn clockwise.

PRINTER COMMUNICATIONS

The JM410V requires a communication link to a PC running Producer™ software. In addition to the serial RS232 link, an integrated USB/Ethernet module is provided. The LabeLase® Producer™ Software Installation Manual addresses Printer Communications in Sections “Connection Type”, “RS232 Serial COM Port”, “USB Port”, and “Ethernet Network Connection”.

STARTUP SEQUENCE:

1. Confirm that the rear power switch is on (I) and the rear key switch is in the horizontal (I) ON position.
2. Disengage E-STOP by twisting the red button one-quarter turn clockwise.
3. Start LabelLase® Producer™ software on your PC.
4. Load a pre-existing label layout, or design a new label layout. NOTE: designing or changing a label layout requires SUPERVISOR login.
5. Adjust printer setup parameters if necessary (e.g., laser speed). NOTE: other than setting laser speed (LIGHTER/DARKER slider bar), this feature requires SUPERVISOR login.



NOTE: The printer should generally be turned on before starting Producer™. This will allow Producer™ to poll the printer for its configuration parameters and load them into Producer's™ working memory.

If Producer™ is already running when the printer is turned on, Producer™ will force-download whatever parameters were last used when Producer™ was controlling a printer. This can cause unexpected results if the previous printer was a different model, or if its setup was modified for a special application.

Remember – PRINTER ON FIRST!!

USB & Ethernet ports exist under the RS 232 port. Refer to the Communications Section of this manual for instructions on installing the required drivers.

NOTE: The Producer™ software is password protected for all features beyond loading an existing tag layout, entering tag variable data, adjusting laser speed and initiating printing.

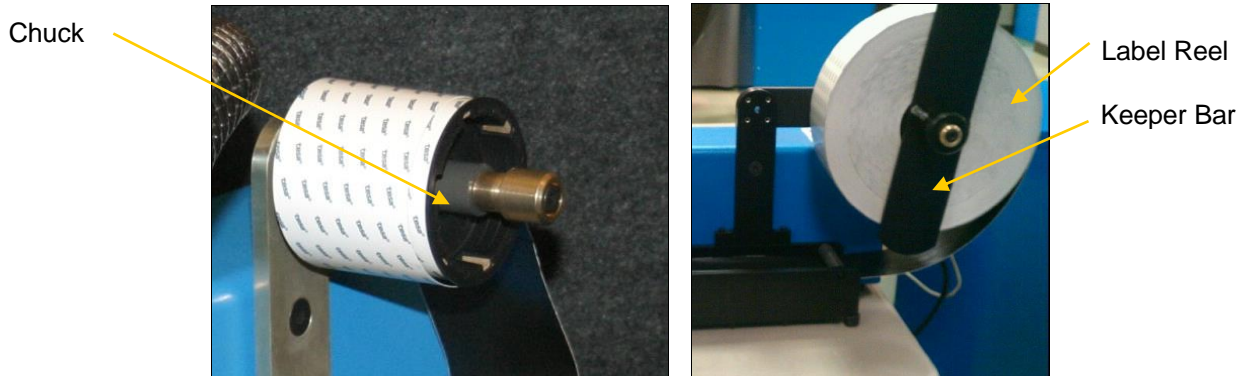
The default password for new installations is blank (no data, no spaces). A new password should be created before printer is commissioned for regular operator use.

Reminder - The marker is not ready for use and will not feed tags until the E-STOP button is returned to the OUT position by twisting the red button one-quarter turn CLOCKWISE.

NOTE: For Flexible Film Tag Material the vacuum extractor must also be set up to start running before tags are printed.

LOADING FLEXIBLE FILM TAG MATERIAL

Loading a new roll of flexible film tag material requires the use of a chuck provided by the film manufacturer. The chuck is placed inside the spool. The spool can now be mounted on the payoff reel so that it unwinds from the bottom. Hand-feed the leading edge of the tag material into the rear feed slot. The marking side of the tag material should be facing UP. Gently push it into the slot until it stops against the internal (rear drive) roller. The printer will then automatically draw the tag material into the printer. Do not use a wrench to tighten the keeper bar.



Reminder - The marker is not ready for use and will not feed tags until the E-STOP button is returned to the OUT position by twisting the red button one-quarter turn CLOCKWISE.

PREPARING TO PRINT TAGS – USING VACUUM FUME EXTRACTOR

Caution:

The JM410 Vector Tag Printer is capable of printing Flexible Film Tags when no Vacuum Fume Extractor is running. It is the operator's responsibility to ensure the Vacuum Fume Extractor is running prior to printing on Flexible Film Tag Material.

The Auto Reverse Feed should be disabled when printing on flexible film tag material because its use could cause the material to jam the printer.

Instructions to properly set up the printer for each tag material are below:

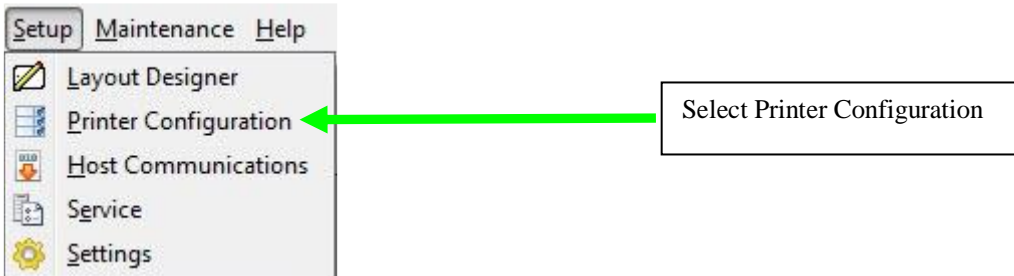
Printer Configuration for Flexible Film Material

1. In the Labelase Producer Software Screen, select Setup/Printer Configuration:
2. Select the Printer Configuration Tab.
3. Uncheck the box next to Disable Filter Delay (thus enabling the Filter Delay).
4. The Auto Reverse Feed should be disabled.
5. Print tags according to directions below: **PRINTING A FLEXIBLE FILM TAG.**

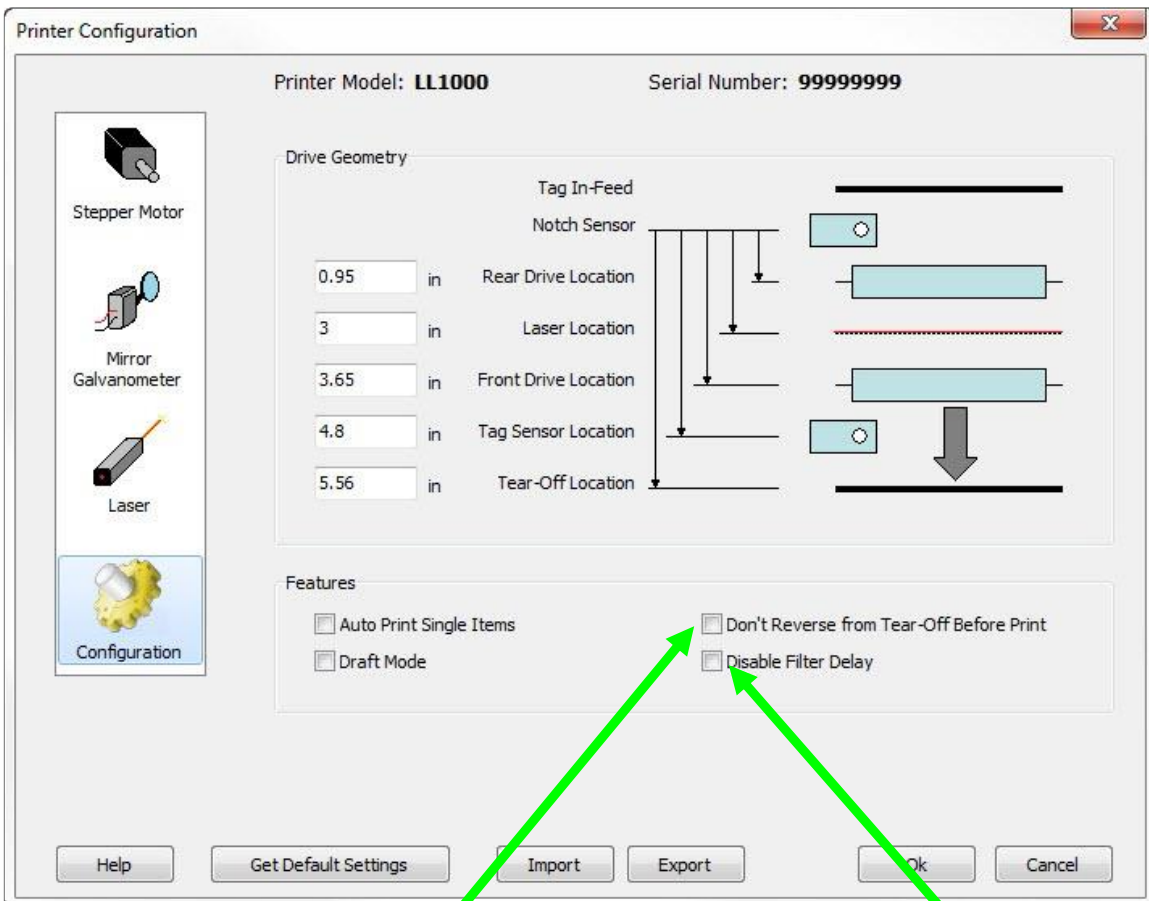
LabelLase Producer Screens for Printer Configuration:

Please note these screens may change with different versions of LabelLase Producer Software.

1. Setup/Printer Configuration:



2. Select Configuration Tab and check or uncheck desired boxes:



Don't Reverse from Tear-Off Before Print (Or Disable Auto Reverse Feed):
Check Box when printing Flexible Film Tags

Disable Filter Delay:
Check box when printing Metal Tags

PRINTING A FLEXIBLE FILM TAG

Caution:

The JM410 Vector Tag Printer is capable of printing Flexible Film Tags when no Vacuum Fume Extractor is running. It is the operator's responsibility to ensure the Vacuum Fume Extractor is running prior to printing on Flexible Film Tag Material.

Note - The following assumes the JM410 Vector Tag Printer has already been setup with a tag layout.

1. Flexible Film tag material is loaded in the machine from the rear payoff reel and properly aligned at the break off exit point.
2. In the LabeLase Producer Software screen, select Set Up/Printer Configuration from the Menu Bar.
3. Start the print cycle by:
 - a. Pressing the **F12 key** on your PC *or*
 - b. Placing the mouse pointer over the **Begin Print** button on your PC and left clicking *or*
 - c. A **print command** may be sent from your host computer to your PC via Extended Protocol.

STORING THE JM410

1. Engage the E-Stop by pressing in the red button to prevent the JM410V Label Printer from operating unexpectedly.
2. The status line on the bottom of the Producer™ screen will display E-STOP and IDLE.
3. When you are ready to print more tags, disengage the E-Stop by twisting the red button one-quarter turn clockwise to return the JM410 to normal service.

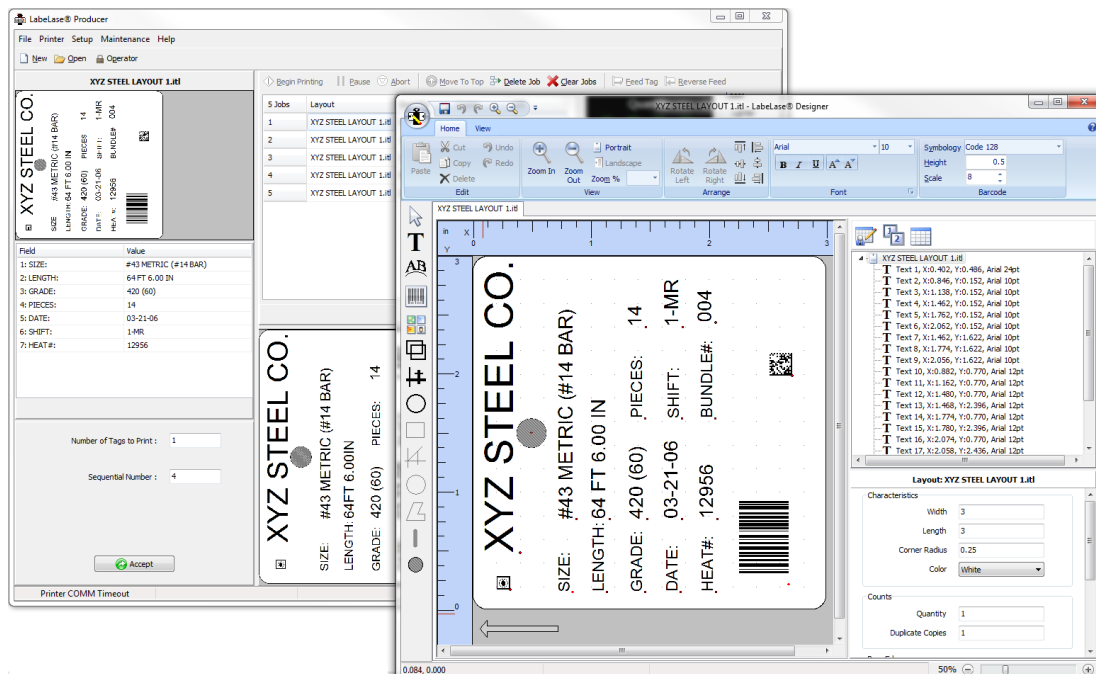
LABELASE® PRODUCER™ SOFTWARE

Labelase® Producer™ is an integrated, Windows-based application for complete control of tag design and printing. For complete details, please refer to the ONLINE REFERENCE MANUAL supplied with the software, or on the web at www.infosight.com/labelaseproducer2/.

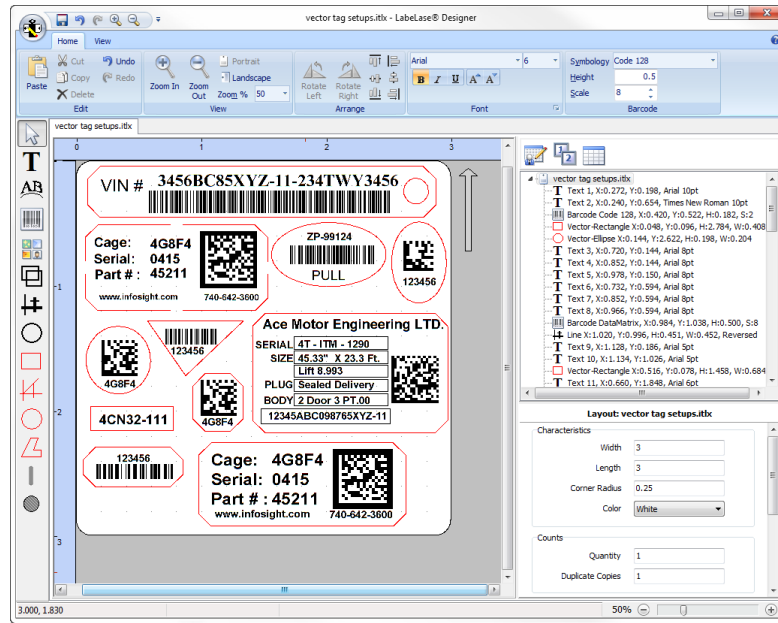
Features:

The software has many features designed to provide maximum flexibility to serve the customer's specific marking needs. Some of these features include:

- ❑ Built-in and online (web access) HELP.
- ❑ Total freedom to change tag layout whenever needed.
- ❑ WYSIWYG (“What You See Is What You Get”) user interface for simple and intuitive tag design.
- ❑ New features emulating popular presentation software packages to speed layout and organization of complex designs containing multiple text and graphics fields.
- ❑ An unlimited number of data, text, barcode and graphics fields.
- ❑ Move fields easily with drag-and-drop.
- ❑ Rotate fields in 90-degree increments.
- ❑ Unlimited UNDO-REDO to easily correct mistakes.
- ❑ Optional placement grid with snap-to placement aid.
- ❑ Optional field anchor display shows field alignment.
- ❑ Zoom in/out for detailed display.
- ❑ Tag geometry features such as holes, slots, bare edges and bend lines can be shown.
- ❑ Prints all PC-installed fonts, including Unicode characters for all languages.
- ❑ User-selectable download of message data from a host computer via RS-232, network TCP/IP, or network file transfer. A wide selection of communications protocols includes InfoSight Extended, emulation of Zebra and Intermec standard printers, and simple comma or tab-separated, flat-file formats. Details can be found in the communications chapter of the online reference manual.
- ❑ Operator entry of message data, for example if the host computer is unavailable.
- ❑ Easy control over printer setup parameters such as laser speed (i.e., formerly known as the “heat” setting for different types of laser tag material) and high/low pixel density (i.e., “draft” and “normal” printing modes)
- ❑ UID Wizard
- ❑ GS1 Wizard
- ❑ Option to lock fields, such as background features, so they cannot be selected, moved, or edited.
- ❑ Windows Service version of Producer™ for operating in the background without the Graphical User Interface.



VECTOR TAG SETUPS:



The LabelLase® Designer Manual address the Vector Tools available and how to use them on pages 50-60.

PRINTER CONFIGURATION & LASER SETTINGS

The JM410V Label Printer and LabeLase® Producer™ software are designed with a high degree of flexibility and user-control, to enable the system to be used in a wide range of applications and on an ever-increasing array of laser-markable materials.

Calibration and configuration settings are accessed in LabeLase® Producer™ under SETUP-PRINTER CONFIGURATION. On-line help instructions will guide you through each of the available settings. The most common parameters for fine-tuning the performance of the printer beyond the easy-to-use LIGHTER/DARKER SLIDER BAR are LASER SPEED, LASER OFF TICKLE, and LASER ON DUTY CYCLE, all of which are found under the LASER tab. Each of these parameters separately and together can be adjusted to create the right balance of black/white contrast, fineness of detail and cycle time.

As laser speed is increased printing cycle time will be faster. In general, as laser speed increases, duty cycle must also be increased to achieve the same relative blackness. Some materials with especially sensitive surfaces, such as PermaLabel®, will print more consistently at lower duty cycles, and therefore correspondingly lower laser speeds. Tickle controls the readiness of the laser to fire and helps maintain consistency of marking across the tag surface. Some tag materials are more sensitive to power variation than others, but **in most cases this parameter can be left at its factory setting.**

Typical Range of Settings (DRAFT mode OFF):

- Laser Speed: 50-65 ips
- Laser Off Tickle: 7-15 μ s
- Laser On Duty Cycle: 85-95%

Each printer is calibrated in our factory before shipping, and the results are recorded. Save this tag in the event you ever want to return the printer to its original factory configuration.

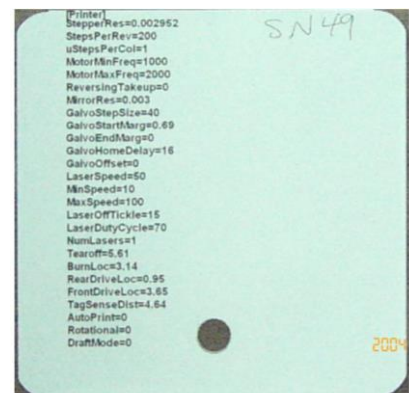
Experience has shown the following settings to be a good starting point for the most common types of tag material. Each individual application may then be fine tuned to achieve the right balance of cycle time, fineness of detail, and black/white contrast.

Typical Laser Settings (DRAFT mode OFF)

| | Flexible Film Label Material |
|-------------|------------------------------|
| Laser Speed | 40 |
| Tickle | 15 |
| Duty Cycle | 70% |



Calibration Tag

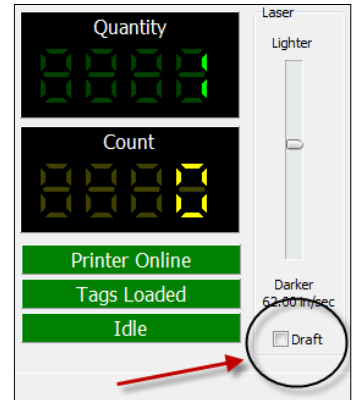


Factory Settings

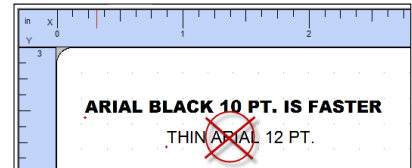
CYCLE TIME CONSIDERATIONS

Tag layout and printer configuration can have a significant influence on cycle time. Here are a few techniques that in many cases can significantly speed printing.

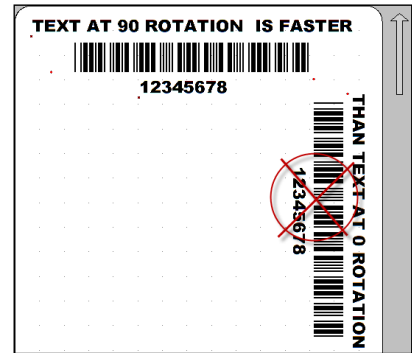
1. Select DRAFT mode. When DRAFT mode is on, stepper and mirror resolution, laser speed, font sizes, and barcode and graphic scales are automatically adjusted.
2. Increase laser speed (move slider bar to LIGHTER). It may be necessary to increase Laser Duty Cycle to maintain black/white contrast.



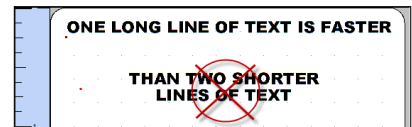
3. Use ARIAL BLACK font for text, to create darker easier-to-read characters. Also try using the BOLD font setting instead of a larger font size.



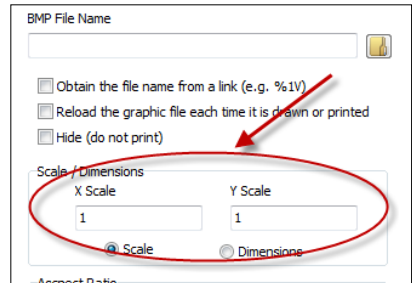
4. Design printing to run ACROSS the tag at 90° rotation (right angles to tag feed) rather than down the tag at 0° rotation (printing parallel to tag feed is slower).



6. Combine text strings into fewer lines. A single long line of text is more efficient than several short lines of text (at 90° rotation, parallel to tag feed).



7. Keep graphics/logo X-scale and Y-scale factors equal to 1. If the graphic or logo must be re-sized to fit on the tag, use an external application such as MS PAINT to change the dimensions of the image and re-save the BMP file before importing into Producer™.



USING AN EXHAUST EXTRACTOR

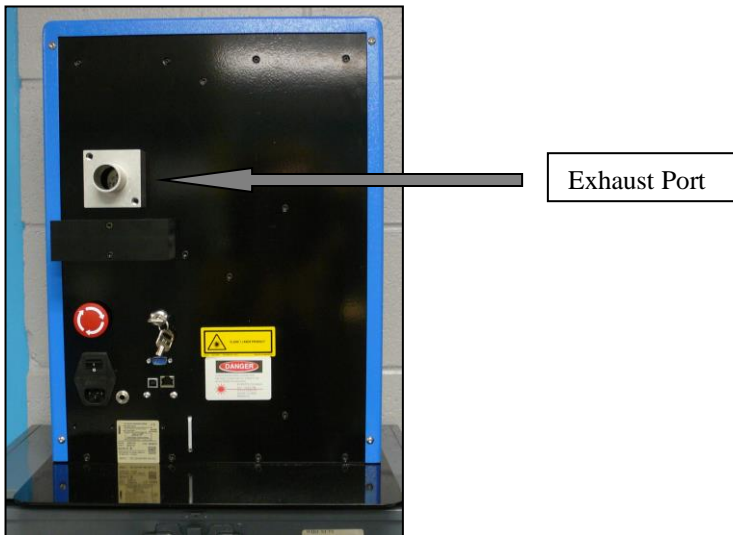
The JM410V Label Printer includes an optional coupling port for an exhaust extractor, located on the back of the printer.

Certain printing situations call for removing any exhaust fumes from the printing area. These situations include:

- **printing on materials that create objectionable fumes**
- **printing on materials that create hazardous fumes**
- printing large quantities of metal tags in enclosed environments

The JM410V Label Printer should always have an exhaust extractor running while it is printing. The flexible film material meets the first two criteria above.

An elbow out of the exhaust port is necessary because of the location of the label material spool.



Note:

When printing large quantities of metal tags in an enclosed area or printing materials that cause objectionable or hazardous fumes, an exhaust extractor should be used to remove these fumes from the printing area.

BASIC TROUBLE SHOOTING

Service during normal business hours (Monday-Friday, 8am-5pm):

1.888.642.3600 (outside the USA call +1.740.642.3600)

Emergency after-hours service:

1.800.401.0716 (outside the USA call +1.740.642.4666)

Problem: Marker does not respond to a print command.

- Check power cord.
- Check key switch.
- Check E-STOP.
- Check Comms cable to PC.
- Producer™ software must be running on the connected PC.
- Main Producer™ screen indicates printer status – “ONLINE”, “ESTOP” or “UNKNOWN MODE”. If UNKNOWN MODE, check communications cable and settings.
- From within Producer™, click on HELP-ABOUT. If the FIRMWARE VERSION is blank or reads “?.??”, your PC does not see the printer. Check communications cable and settings (SETUP-PREFERENCES-TAG PRINTER COMMUNICATIONS).

Problem: Tag print appears very light, fine lines appear to drop out.

- Reduce laser speed (DARKER)
- Increase Laser Off Tickle (SETUP-PRINTER CONFIGURATION).
- Lens or mirror may require cleaning (see Maintenance section below).

Problem: Tag print shows “shadows”

- Decrease Laser Off Tickle (SETUP-PRINTER CONFIGURATION).

Problem: Barcode too long for tag size.

- Reduce number of characters in barcode data, especially unnecessary punctuation marks.
- Use more efficient barcode symbology, such as code 128 for all numerics (instead of code 39, for example).
- Reduce barcode scale.

Problem: Flexible Film Tag Material Does not peel off from backing

- Increase Vector Duty Cycle

Problem: Flexible Film is cut entirely through the backing

- Decrease Vector Duty Cycle

NORMAL MAINTENANCE & SERVICING

The only regular maintenance required is periodic cleaning of both surfaces of the final lens and Galvanometer mirror. Please refer to the JM410 Service Manual for lens cleaning instructions.

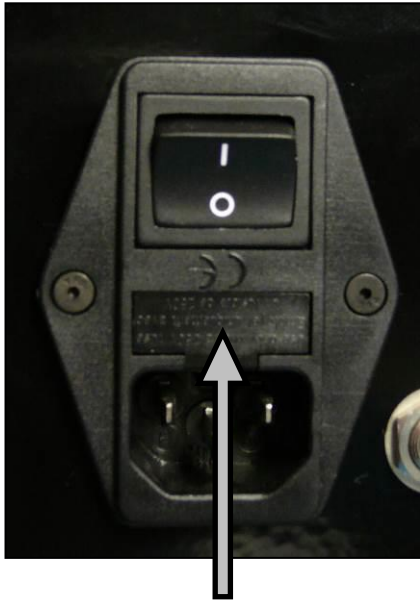
The incoming AC line is fused on both legs. Changing fuses is not a preventive item; it only needs to be done if they are blown.

FUSE REPLACEMENT

The incoming AC line is fused on both legs. Before replacing the fuses, first determine and fix the cause of the blown fuses.

CAUTION: BE SURE TO REMOVE THE AC POWER CORD BEFORE REMOVING THE FUSE HOLDER OR PERFORMING ANY OTHER TROUBLESHOOTING OR MAINTENANCE!

To replace the fuses, remove the fuse holder on the back of the printer between the power cord input and the on-off rocker switch. The fuse holder only goes back in one-way. If it does not fit easily, turn it upside down and then insert it gently so that it snaps in place.



FUSE HOLDER



FUSE HOLDER REMOVED



FUSES ARE RATED FOR
250V / 5A AC Fast acting

CUSTOMER SERVICE

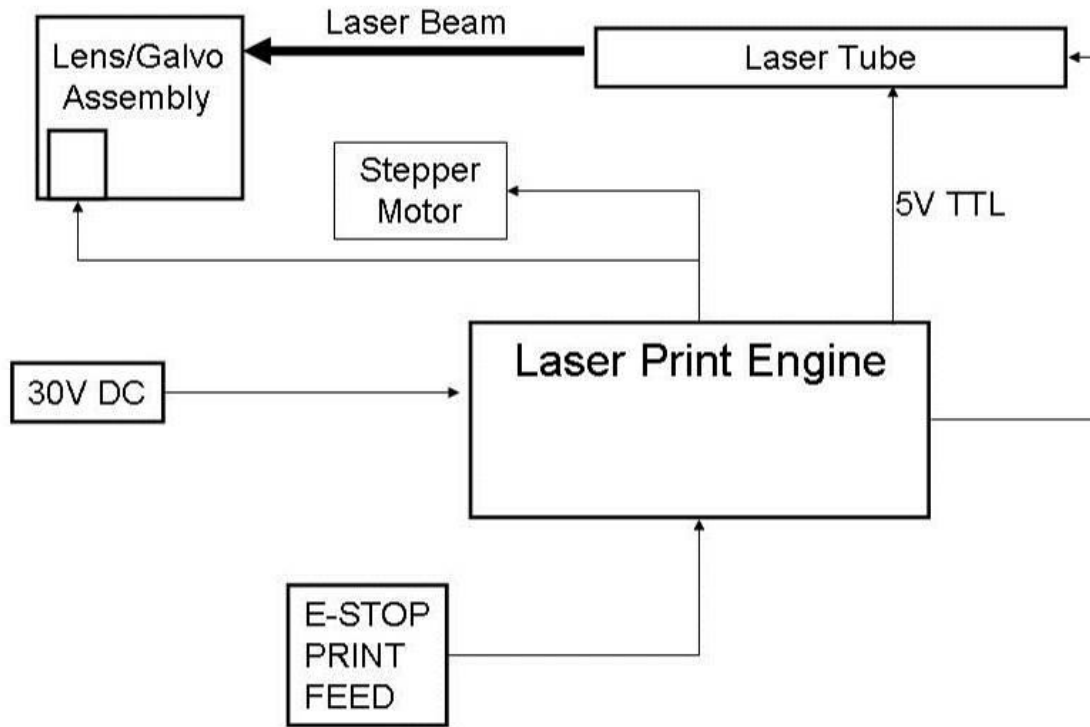
How to reach customer service:

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phone Support | InfoSight Corporation Customer Service offers free phone support to answer questions during normal non-holiday working hours, Monday through Friday 8am to 5pm Eastern time (New York, USA). Call +1.1.888.642.3600, or outside the USA call +1.740.642.3600. |
| Emergency Service | After regular business hours, call: +1.800.401.0716 (USA or Canada) or +1.740.642.4666 (International). |
| On-Site Service | InfoSight Corporation can dispatch a Field Service Engineer to your facility to perform equipment start-up, repair, maintenance, and training. |
| Service Contracts | Periodic scheduled on-site maintenance, technical service and extended warranties can be arranged by contacting Customer Service at the number below. |
| Factory Service | Call Customer Service for a Return Authorization Number before returning equipment to our factory for repair and/or major maintenance. |

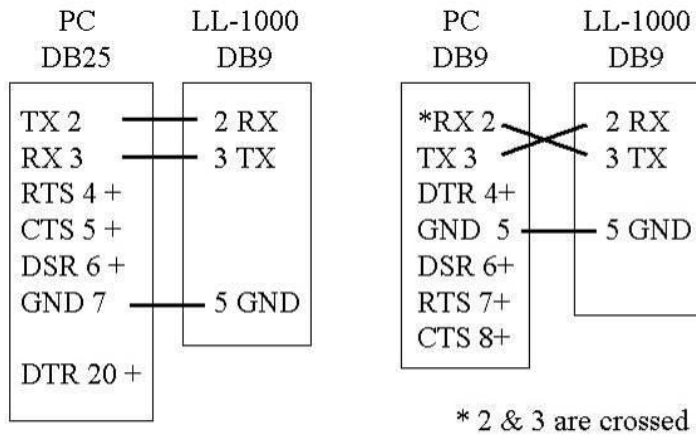
For more information regarding any of these services, call +1.888.642.3600 (outside the USA call +1.740.642.3600) and ask for Customer Service.

Or, visit us on the worldwide web at www.infosight.com

FUNCTIONAL BLOCK DIAGRAM



JM410 Serial port connection to an IBM-PC or equivalent.



Note: Handshake protocol is XON / XOFF. Communications adapters such as USB to RS232 must support XON / XOFF.

XON is DC1 CTL-Q or 11h or 17 decimal
 XOFF is DC3 CTL-S or 13h or 19 decimal

LASER SAFETY

04/23/03

Section I: Introduction to Laser Safety

Lasers, like arc welders, are sources of intense light that require certain precautions to insure a safe, comfortable and compliant working environment. This is especially true since the laser included in this marking equipment operates in the infrared (invisible) portion of the light spectrum. The enclosure surrounding the marking area is designed to prevent human exposure to the light emitted by the laser. The following information covers the procedures taken to design a safe, efficient environment for laser marking equipment.

Laser products are categorized into one of four classes based upon the power of the laser light that is accessible to any person during normal operation. These classes range from Class 1, the lowest class requiring no additional safeguards other than those provided by the manufacturer, to Class 4, the highest class that requires additional operator and working environment safeguards for safe operation.

Class 1 laser marking systems include enclosures integral to the workstation that are constructed to prevent human access to the laser beam. Class 1 systems are safe in all working environments; they are installed and operated as any other industrial machine tool. Class 1 laser systems do not require the use of any special laser safety equipment by operators or bystanders during their normal operation.

Class 4 laser marking systems do not incorporate protective enclosures. Extra precautions are required. Avoid eye or skin exposure to direct or scattered radiation.

The JM410V Label Printer complies with Class 1 during normal use because of the numerous interlocks provided as detailed in section II.

During service and/or alignment the JM410V Label Printer becomes a Class 4 device. Servicing should be performed only by a **Qualified Laser Service/Safety Technician!** Because of the Class 4 classification, InfoSight will provide such a person to be available to the end user of this marker.

The nominal power output of the laser used is 10 watts, with a maximum peak power output of 30 watts. It is a CO₂ infrared (invisible) laser with a wavelength of 10.57 to 10.63 microns. The Radiant energy and the wavelength are less than Class 1 requirements during normal operation.

Section II: Types of safety interlocks.

There are several types of safety features provided on the InfoSight JM410V Label Printer:

Type 1 includes **Mechanical Switches**. These switches are located atop the printer and on the rear of the printer. These switches remove power supplied to the laser printer, as shown in electrical drawings.

- Switch A -- Large Red, easily accessible, E-STOP operator Emergency Stop Push Button.
- Switch B -- Key switch
- Switch C -- On/Off rocker switch

Type 2 includes **Optical Sensors**. Sensors monitor whether tag material is in place and the printer is able to move the tag material. These two sensors are monitored by the marking microprocessor.

Type 3 includes **Mechanical Design**. Here, narrow slots are provided to minimize the release of laser radiation. The beam path from laser tube to final pass through lens is entirely enclosed in a metal shield, with suitable material that will absorb the heat produced by the beam emitting from the CO₂ laser.

Type 4 includes **Password Security Access**. The Software requires a **Supervisor Password** to change layout of tags or to alter the operating parameters of the printer itself.

The features and precautions described above are designed with the safety of the user in mind. Should you have any questions or suggestions please contact InfoSight directly.

DECLARATION OF CONFORMITY

InfoSight Corporation

20700 US Highway 23 Chillicothe, Ohio 45601
(740) 642-3600 TEL (740) 642-5001 FAX

InfoSight hereby declares the equipment specified conforms to the Classification(s), Directive(s) and Standard(s) set forth in this document.

InfoSight produces laser systems within one of two classes as identified and classified by the CDRH. These are Class I and Class IV. (See CDRH 21 CFR (J) 1040.1 - 1040.5). End user of the equipment should be familiar with ANSI, CDRH and OSHA standards for radiation emitting devices as they apply to them also.

ANSI Z136.1 - 1993

During servicing we will provide adequate data to the LSO (Laser Safety Officer) enabling LSO to designate NHZ (nominal hazard zone) as required pursuant to Class IV 3.4.1

CDRH 21 CFR (J) 1040.1 1040.5

OSHA Publication 8-1.7 Section II Chapter 6

Certifications: EMC

IEC 61000-6-2:2005, IEC 61000-6-4:2006, IEC 61000-3-2:2005 w/ A1:2008 and A2:2009,
IEC 61000-3-3:2008 & CFR47 FCC Part 15, Subpart B:2009

Name and Publication Date of Standard Used to Evaluate Laser safety:

IEC EN 61010-1:2001
IEC 60825-1: 2007 (2nd Edition)

Note: InfoSight design guidelines are drawn from ANSI and CDRH



1.1.1 JM410 Declaration of Conformity

Declaration of conformity

Konformitätserklärung

Déclaration de conformité

Declaración de Confomidad

Verklaring de overeenstemming

Dichiarazione di conformità

We/Wir/ Nous/WIJ/Noi: **InfoSight Corporation**

20700 US Highway 23

Chillicothe, Ohio 45601 USA

declare under our sole responsibility that the product,
erklären, in alleniniger Verantwortung, daß dieses Produkt,
déclarons sous notre seule responsabilité que le produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilità, che il prodotto,

JM410

to which this declaration relates is in conformity with the following standard(s) or other normative documents.
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
a cui si riferisce questa dichiarazione è conforme alla/e seguente/i norma/o documento/i normativo/i.

EMC

**IEC 61000-6-2:2005, IEC 61000-6-4:2006, IEC 61000-3-2:2005 w/ A1:2008 and A2:2009,
IEC 61000-3-3:2008 & CFR47 FCC Part 15, Subpart B:2009**

Safety

IEC EN 61010-1:2001

IEC 60825-1 : 2007 (2nd Edition)

Edward S. O'Neal

8/2009

Chillicothe, Ohio

APPENDIX A | LASER SAFETY

Laser Hazard Classifications

The intent of laser hazard classification is to provide clear distinction of the lasers' properties and hazards to users so appropriate protective measures can be taken. Classification is based on the maximum output available for the intended use. Specific labeling requirements indicate that the class of the laser as well as the emission wavelength(s) and any other applicable precautionary instructions must be included on any signage. Laser classification is also used for determining requirements for medical surveillance for those individuals working with and around lasers.

The Federal United States laser safety standard [21 CFR 1040.10], the ANSI standard [ANSI Z136.1], as well as the international standard [EN 60825], divide lasers into five distinct hazard categories. These classes are based upon the combination of wavelength range, power, and emission duration, which are used to determine the level of risk and the potential to cause biological damage to the eye or skin. The definitions compiled from ANSI Z136.1 are as follows:

Class 1: Any laser, or laser system containing a laser, with wavelength ranges from Ultraviolet through Far Infrared (180 nm – 100,000 nm +), that cannot emit laser radiation levels exceeding Class 1 Accessible Emission Limits (AEL) as defined by ANSI Z136.1. For example this would compute to exposure (for an eight-hour period) for a 488 nm laser of no greater than 0.2 mW. Basically, the laser radiation level emitted by a device classified as Class 1 produces no hazard whatsoever to the user during normal operation. Presently, Class 1 lasers and laser systems are exempt from all control measures. The Class 1 designation does not apply during times of maintenance or service where the safety controls of the device are defeated or otherwise removed. The Class 1 environment resumes once the device is returned to its original state with all safety devices properly reconnected.

Class 2: This classification applies only to continuous wave (CW) and repetitive-pulse lasers and laser systems of the visible part of the electromagnetic spectrum (400 – 700 nm) that exceed Class 1 levels, but do not exceed an average radiant power of 1 mW.

Class 3a: Lasers and laser systems that have an accessible output between one and five times the Class 1 AEL for wavelengths shorter than 400 nm or longer than 700 nm, or less than five times the Class 2 AEL for wavelengths between 400 and 700 nm. Lasers of this class have intermediate power ranges of 1 - 5 mW.

Class 3b: Lasers and laser systems having the power range between 5 - 500 mW. This applies to lasers with wavelength ranges from Ultraviolet through Far Infrared (180 nm – 100,000 nm +). These lasers or laser systems can produce a hazard if viewed directly, and may produce an eye hazard when viewing diffuse reflections off of a shiny surface at angles of less than 5 degrees from the source, however Class 3b lasers should not produce a hazardous diffuse reflection from a matte (not shiny) surface.

Class 4: Lasers and laser systems having power greater than 500 mW. This applies to lasers with wavelength ranges from Ultraviolet through Far Infrared (180 nm – 100,000 nm +). This class of laser poses the greatest hazard, and any and all precautions should be taken to protect oneself from exposure to direct or diffuse laser radiation. Direct exposure to the eye from this class of laser can cause permanent damage. Stray beams are potential fire hazards and combustible material should be kept out of beam paths at all times.

1.2 CONTROL MEASURES FOR LASER CLASSIFICATIONS

| Control Measure | Class 1 | Class 2 | Class 3a | Class 3b | Class 4 |
|------------------------------------------------------|------------------------|------------------------|------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| <i>Activation Warning Systems</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>Should have.</i> | <i>Shall have.</i> |
| <i>Indoor Laser XE Optics Lasers Controlled Area</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>Shall have. Nominal Hazard Zone analysis required.</i> | <i>Shall have. Nominal Hazard Zone analysis required.</i> |
| <i>Labels</i> | <i>Shall have</i> | <i>Shall have</i> | <i>Shall have.</i> | <i>Shall have.</i> | <i>Shall have.</i> |
| <i>Area Posting</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>Should have</i> | <i>Shall have. Nominal Hazard Zone analysis required.</i> | <i>Shall have. Nominal Hazard Zone analysis required.</i> |
| <i>Standard Operating Procedures</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>Should have.</i> | <i>Shall have.</i> |
| <i>Education and Training</i> | <i>No requirement.</i> | <i>Should have.</i> | <i>Should have.</i> | <i>Shall have.</i> | <i>Shall have.</i> |
| <i>Authorized Personnel</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>No requirement.</i> | <i>Shall have.</i> | <i>Shall have.</i> |
| <i>Warning Signs and Labels</i> | <i>No requirement</i> | <i>Should have.</i> | <i>Should have.</i> | <i>Shall have. Nominal Hazard Zone analysis required.</i> | <i>Shall have. Nominal Hazard Zone analysis required.</i> |

ANSI Z136.1 requires specific control measures for each laser classification and the environment in which they are used. The chart above lists some of the requirements that may need to be implemented in a laboratory setting. The company Laser Safety Officer, or designee, should reference the applicable safety regulations for appropriate control measures to implement in the area the marker will be used.

1.3 BIOLOGICAL EFFECTS OF LASER IRRADIATION

1.3.1 Eye Injury

Because of the high degree of beam collimation, a laser serves as an almost ideal point source of intense light. A laser beam of sufficient power can theoretically produce retinal intensities at magnitudes that are greater than conventional light sources, and even larger than those produced when directly viewing the sun. Eye exposure to a direct beam can cause permanent eye damage including blindness. Protective eyewear should always be worn when potential exposure to direct laser beams exist.

- Due to the lens-like focusing effect of the human eye, it is 100,000 times more vulnerable to injury than the skin.
- Laser safety eyewear should always be available for the wavelengths of lasers in use.
- Eye protective equipment, however, should be considered the last line of defense against laser beam exposure – engineering and administrative controls should be used first.
- Remove all jewelry when working with an open beam to prevent reflection of the beam in unsafe directions.
- When possible, use all protective housings, interlocks and shields.
- Laser Safety Eyewear should always be worn during laser repair, alignment, or installation, or at any time when any laser safety control is not in place.

1.3.2 Thermal Injury

The most common cause of laser-induced tissue damage is thermal in nature, where the tissue proteins are denatured due to the temperature rise following absorption of laser energy.

The thermal damage process (resulting in burns) is generally associated with lasers operating at exposure times greater than 10 microseconds and in the wavelength region from the near ultraviolet to the far infrared. Tissue damage may also be caused by thermally induced acoustic waves following exposures to sub-microsecond laser exposures.

1.3.3 Skin Injury

To the skin, UVA (315-400 nm) can cause hyperpigmentation and erythema (aka: sunburn). Exposure in the UVB (280-315 nm) range is most injurious to skin. In addition to thermal injury caused by ultraviolet energy, there is also possibility of radiation carcinogenesis from UVB. The shorter wavelengths are absorbed in the outer dead layers of the epidermis (stratum corneum) and the longer wavelengths have an initial pigment-darkening effect followed by erythema if there is exposure to excessive levels.

The hazards associated with skin exposure are of less importance than eye hazards; however, with the expanding use of higher-power laser systems, particularly ultraviolet lasers, the unprotected skin of personnel may be exposed to extremely hazardous levels of the beam power if used in an unenclosed system design.

Skin burns caused by lasers can happen quite fast and with great intensity. Protective clothing should be worn when potential exposure to direct laser beams exist.

- UVC: 200-280 nm exposure may cause erythema (sunburn), skin cancer, and burns.
- UVB: 280-315 nm exposure may cause accelerated skin aging, increased skin pigmentation and burns.
- UVA: 315-400 nm exposure may cause pigment darkening and skin burns.
- Visible: 400-700 nm exposure may cause photosensitive reactions and skin burns.
- Infrared 700-100,000 nm exposure may cause skin burns.