

**UV/one-Series Laser Marking System General Arrangement**

### SYSTEM OVERVIEW

The Telesis® UV/one™ is an all-in-one (AIO) advanced, Diode-Pumped Solid State (DPSS) laser marking system. The AIO design places all critical optics and electronics in a IP50 sealed area. The fan/cooling area which has no other components besides a fan is IP20. The laser beam and Q-switched pulse characteristics are optimized for applications that require high beam quality and stability. The UV/one™ does an exceptional job of high-speed marking on delicate and sensitive electronics components, glass and medical instruments. These characteristics make it an ideal choice for general purpose laser marking, scribing, trimming, and other material processing applications.

The UV/one™ design features a frequency tripled, Q-switched Nd:YAG laser with an internal diode pump source.

The robust mechanical and optical design allows the all in one Telesis UV/one™ marking head to operate in an industrial environment where shock and vibration are a concern.

The laser marking system offers the following advantages:

- Reliable, long, maintenance-free performance
- Compact size and modular construction
- Exceptional beam quality and stable output power
- Air cooling
- Active AO Q-switching
- Standard 115/230 VAC operation
- Laser Off button, safety key shutoff, interlocked safety shutter, safety interlock and emission indicators by the Pendant control
- DoD-compliant Unique Identification (UID) marking

### SYSTEM CONFIGURATION

The UV/one™ system computer, required for running the Merlin® II LS software, is an external device connected to the laser head internal controller through the TCIP ethernet port. The system can be configured to mark stationary and moving objects.

The all-in-one design allows for less overall space to be used with less external cabling required. The basic laser system consists of the following components:

- **Laser Marking Head**—sealed resonator, beam expander, galvanometer assembly
- **Laser Controller**—built internally into the laser head.
- **Cable Assemblies**—power, control, and Ethernet data cables
- **Software**—Merlin II LS version 12.0 or higher laser marking software
- **System Computer**—an external device connected to the laser head via an ethernet cable; supplied by Telesis or by the customer
- **Monitor, Keyboard, and Mouse**—components supplied by Telesis or by the customer for external computers.

# UV/one™-Series Laser Marking System

---

## SYSTEM SPECIFICATIONS

Compliance.....	CDRH, CE
Rating .....	(IP 50) Optics/Electronics Section (IP 20) Fan/cooling Section
Laser Type.....	Diode-pumped, Q-switched, Nd:YAG
Wavelength .....	355 nanometers (nm)
Mode .....	M <sup>2</sup> <1.3, TEM <sub>00</sub>
Long Term Output	
Power Drift .....	< 2%
Power Requirements ...	90 to 264 VAC, single-phase, 6A, 50/60 Hz
Supply Voltage	
Fluctuation.....	< ±10% with clean ground line
Maximum Supply	
Voltage .....	264 VAC
Operational	
Temperature.....	18° to 34°C (65° to 93.2°F)
Recommended	
Temperature.....	20° to 25°C (68° to 77°F)
Ambient Relative	
Humidity .....	10% to 80%

## SYSTEM OPTIONS

- External computer (desktop or notebook) to run the Merlin II LS laser marking software
- Remote pushbutton station (start/abort)
- Manually operated tool post for vertical (Z-axis) adjustment
- Programmable tool post for vertical (Z-axis) adjustment (requires two-axis controller)
- Rotary drive fixture for rotational (Theta-axis) adjustment (requires two-axis controller)
- Workstation/work area enclosure
- Fume extraction systems
- Ethernet IP or Profinet
- iZONIT™ Camera System

## SYSTEM SETUP

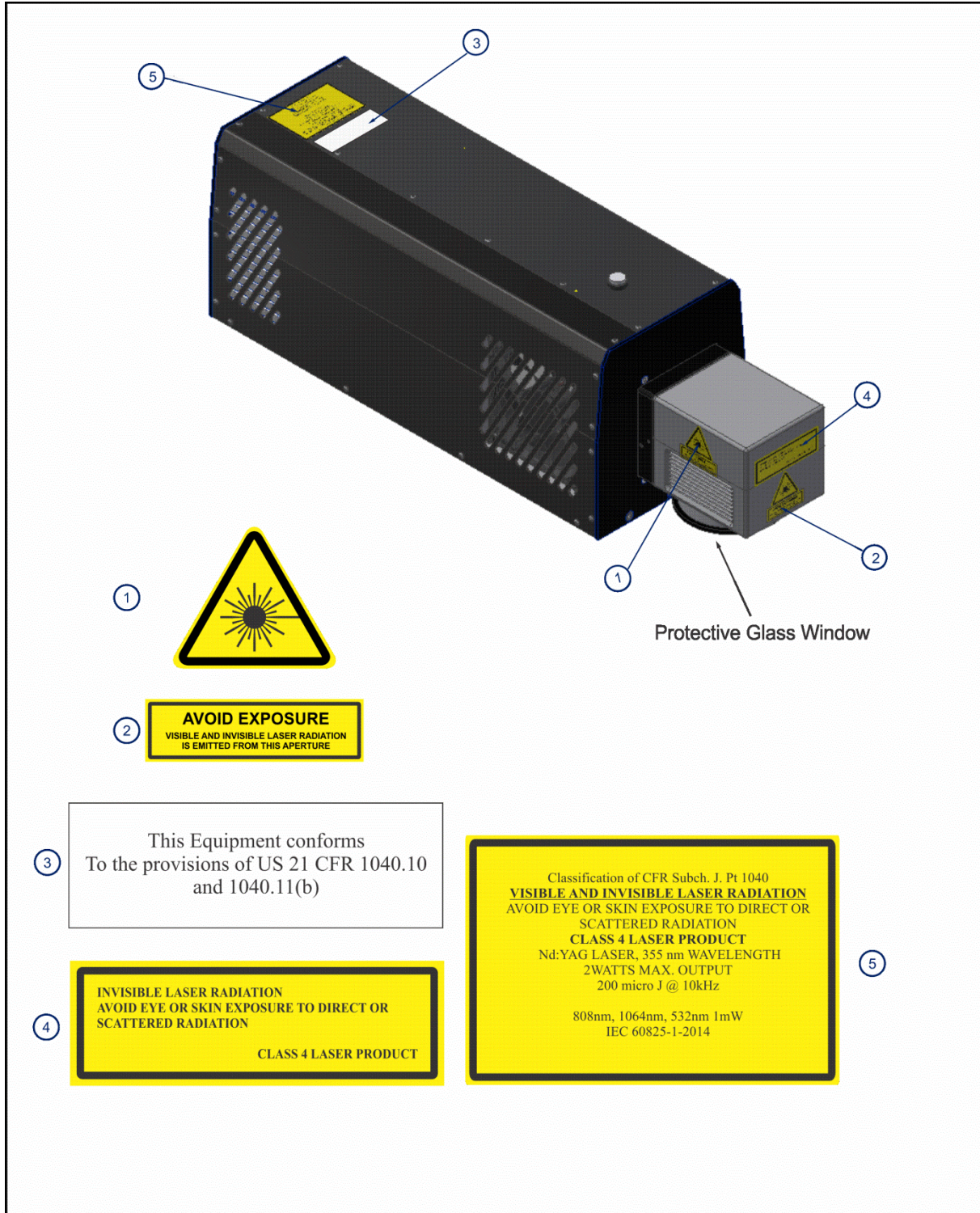
The following procedures are listed for reference only to provide a general overview of the installation process. Refer to the *UV/one™ Installation & Maintenance Manual* for complete installation details.

**Do not connect any power cable to a power source until all system connections are made.**

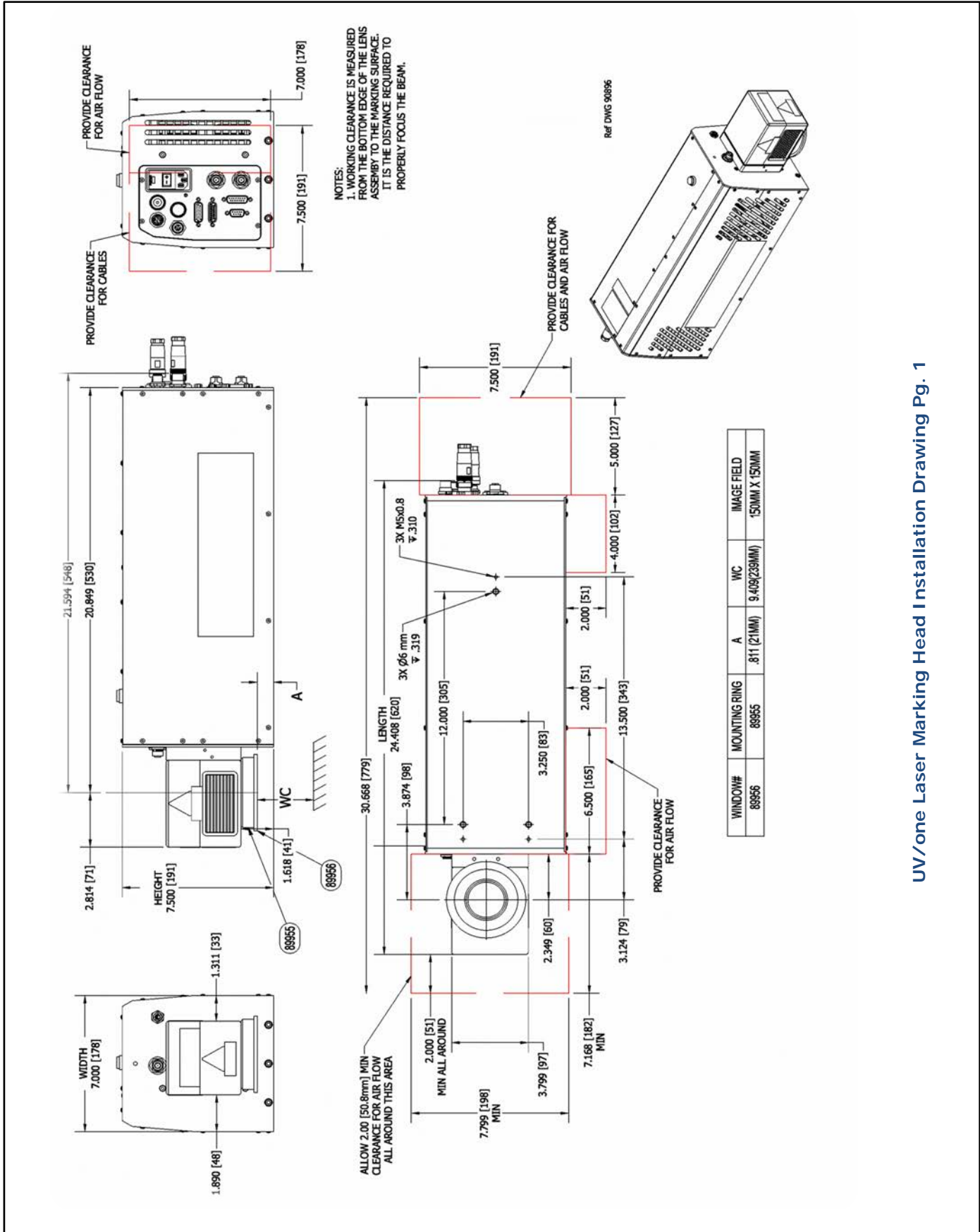
1. All equipment must remain powered down and in the OFF position until mounting and connections are complete.
2. Place the laser head, monitor, keyboard, mouse, and the external system computer in the desired locations.
3. Ensure sufficient clearance exists on all sides of the laser head to allow for proper air circulation and to permit proper installation of applicable cables. Refer to the *Laser head Dimensions* drawings for details.
4. If using, assemble the pendant adjustable arm to the laser head and pendant.
5. Place sufficient fume extraction near the area to be marked. Debris and contamination caused by lasing can damage the laser output window and create chemical hazards.
6. Connect all cables as applicable (Ethernet cable, computer monitor, keyboard, mouse, and power cables).
7. Connect any optional or customer-supplied devices or interface circuits as applicable.
8. Refer to the *UV/one™ Operation Supplement* for proper startup procedure. Refer to the *Merlin II LS Operating Instructions* for complete information on using the system software.

## UV/ONE LASER MARKING HEAD SAFETY LABELS

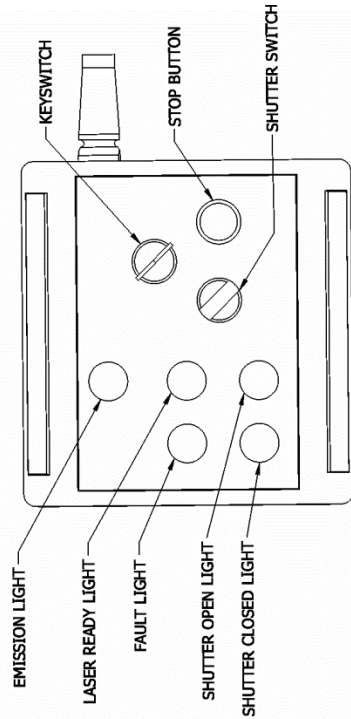
The following illustration shows the labels and their locations on the UV/one Laser Marking Head. Familiarize yourself with the laser labels and their locations prior to operating the laser marking system.



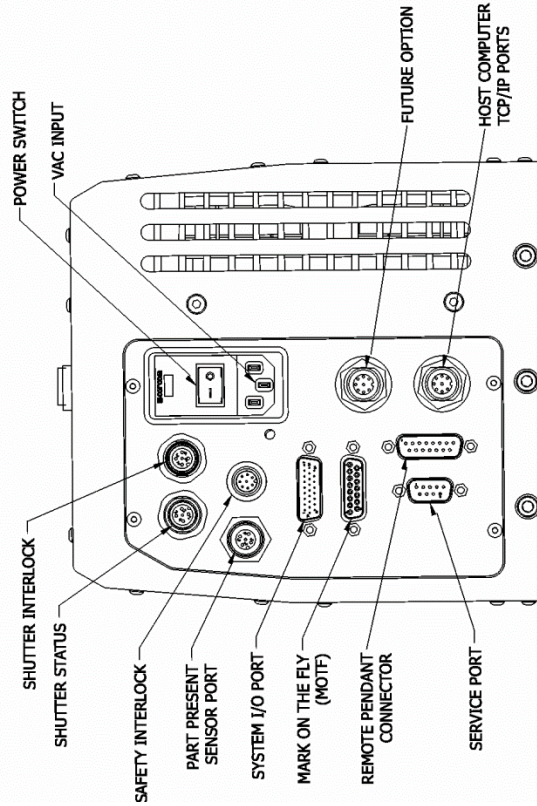
# UV/one™ –Series Laser Marking System



UV/one Laser Marking Head Installation Drawing Pg. 1

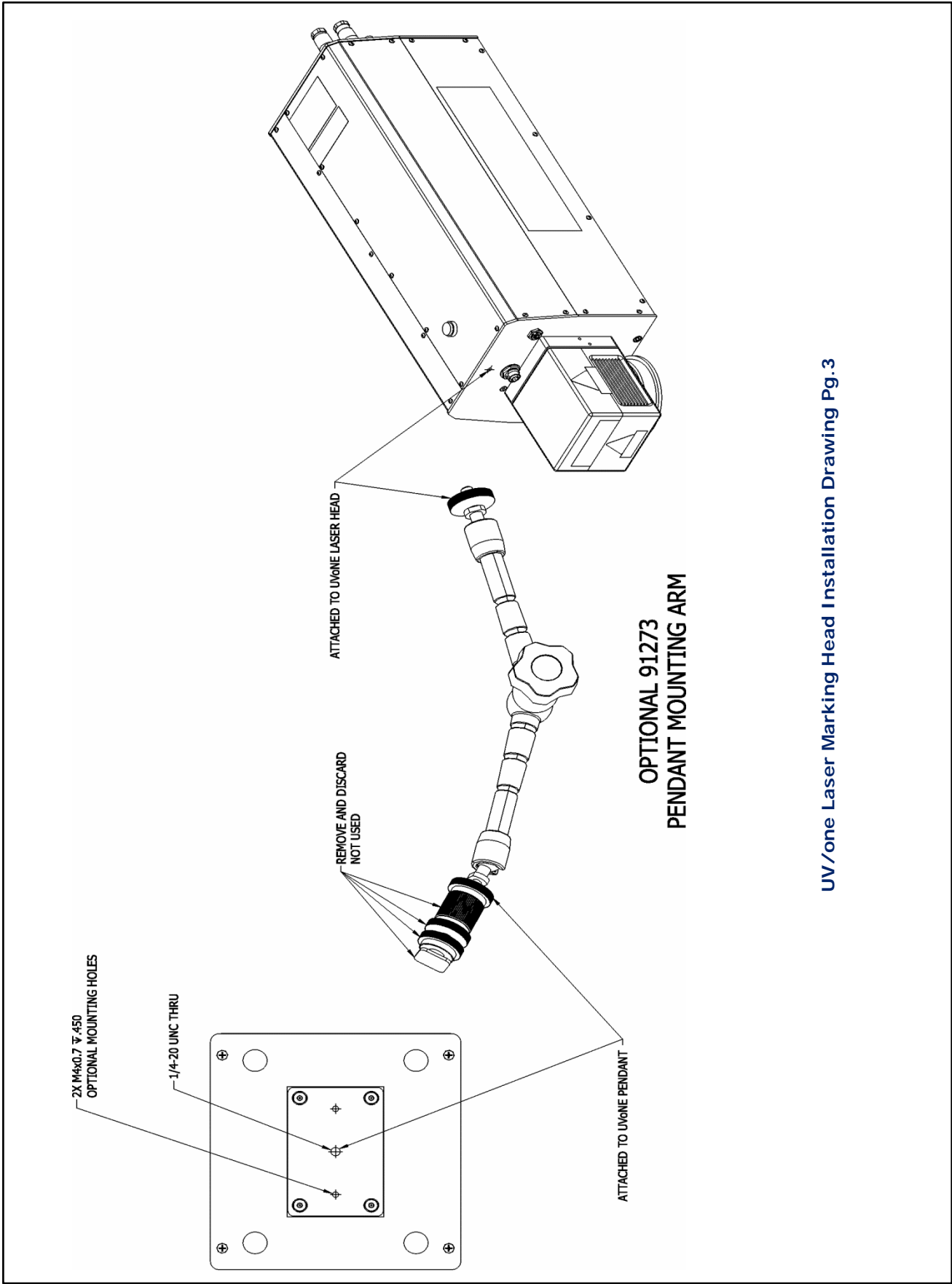


REMOTE PENDANT, FRONT PANEL



UV/one, BACK PANEL

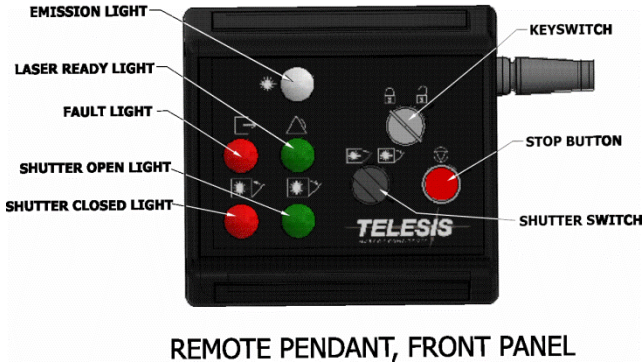
UV/one Laser Marking Head Installation Drawing Pg.2



UV/one Laser Marking Head Installation Drawing Pg.3

## Operator Pendant Control Panel

The Pendant control module includes the System Key switch, laser off push button, manual safety shutter control, function indicators, and laser stop. The Pendant will mount to the front of the Laser head with an adjustable arm or can be mounted on a wall for ease of use.



## UV/ONE LASER MARKING HEAD

UV/one™ lasers are designed as an all-in-one unit. A heat exhaust fan is located on the side of the unit.

The laser marking head encloses the sealed laser resonator, the beam expander and the galvanometer assembly.

## UV/one Laser Marking Head Specifications

Dimensions (L x W x H)

UV/one™ Head..... 620 x 178 x 191 mm  
(24.408 x 7.0 x 7.5 in)

Surrounding Envelope. See *UV/one Laser Marking Head Installation* drawing

Mounting Weight (approximate)

UV/one™ ..... 16.1 kg (35.5 lb)

Mounting..... Three M5-0.80 mounting bolts or three 0.2362P6 locating pins

Field Resolution..... 16 bit (65535 data points)

Galvanometer

Repeatability ..... < 22 micro radian

Marking Field Size ..... 150mm X 150mm

Cooling ..... Air cooled

# UV/one™ –Series Laser Marking System

## Dual-Sensor Shutter Circuit

The laser marking head employs a dual sensor to detect the closed state of the laser shutter mechanism. The sensor signals can be monitored at the Outputs connector on the back panel of the laser head.

## Sealed Laser Resonator

The laser resonator is assembled and sealed in a clean room environment to prevent contamination. The laser marking head contains an electro-mechanical safety shutter as well as a safety interlock that controls the laser source power. Under power, the safety shutter allows the laser beam to pass through the galvanometer steering mirrors. It also provides shutter status to external safety logic. If the shutter is closed during normal operation (or power is removed from the system via a power off/stop condition), it will block the 355 nm laser beam.

## Marking Field Size

There are no F-theta/ flat- field lenses used for the UV/one to affect the marking field size.

## Marking Depth

Simple laser parameters can be operator-programmed to create depths ranging from simple surface discoloration, shallow laser etching, or deeper laser engraving. Marking depth depends on several factors, including material, and laser marking parameters. Please contact Telesis for the proper setting for your specific application.

## SYSTEM COMPUTER

The laser system requires a Windows® 7 or higher based PC for running the Merlin II LS laser marking software version 12.0 or higher. The system computer is connected to the laser head through an Ethernet connection. Telesis recommends the PC be purchased with the system, but can be supplied by the customer.

### NOTICE

**Merlin II LS software and associated applications are pre-installed on computers purchased from Telesis Technologies**

All system computers supplied by Telesis have the Merlin II LS software installed prior to shipment so the entire assembly is tested as a laser marking system. Warranties for the computer, keyboard, monitor, and peripherals default to the original equipment manufacturer.

If the external system computer is supplied by anyone other than Telesis, it must meet the following criteria to use the Merlin software. You must also use the *UV/one Merlin II LS software Installation manual* to setup:

Operating System	Windows® 7, 8, 10 (32b or 64b)
Operator Interface	Telesis Merlin II LS laser marking software
Processor	Intel Core with RAM as recommended per operating system
Hard Drive .....	32 GB Hard Disk Drive
Comm Ports .....	two available USB ports two available Ethernet ports
Optional Ports.....	one available <u>full-height</u> PCIe x4 slots one available RS-232 serial port
Peripherals.....	Color Monitor, Mouse, Keyboard

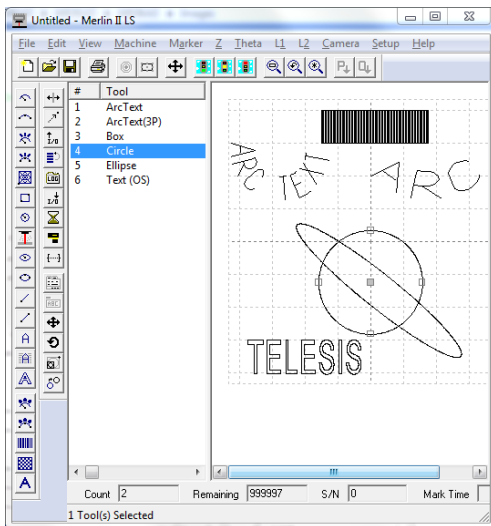
*One additional PCIe slot required if system is configured for Profinet or Ethernet IP operation. If the system computer is a notebook, expansion must be used to provide the PCIe slot*



## SYSTEM SOFTWARE

The powerful Telesis Merlin II LS laser marking software is a Windows® based software package that comes standard with the laser marking system. For the UV/one, the Merlin II LS software used must be **version 12.0 or higher**. It is a graphical user interface that makes marking pattern design quick and easy. The WYSIWYG (what-you-see-is-what-you-get) interface provides a to-scale image of the pattern as it is created. Just “click and drag” for immediate adjustment to field size, location, or orientation.

The Merlin II LS software includes tools to create and edit text at any angle, arc text, rectangles, circles, ellipses, and lines. Multiple fields can be grouped and saved as a block to form a logo. Existing DXF files can also be imported for marking. Non-printable fields can be created to clearly display a graphical representation of the part being marked.



**Merlin II LS User Interface**

## Merlin II LS Laser Marking Software Specifications

Font Generation .....	True Type Fonts
Barcodes and Matrix	2D Data Matrix, PDF417, BC 39, Interleaved 2 of 5, UPCA/UPCE BC 128, Maxi Code, Code 93, QR Code, and others
Graphic Formats.....	Raster and Vector: BMP, GIF, JPG, WMF, EMF, DXF, CUR, ICO
Serialization.....	Automatic and Manual Input Host Interface Capable
Linear Marking .....	Scalable w/ Letter Spacing Control
Arc Text Marking .....	Scalable and Adjustable
Drawing Tools.....	Line, Rectangle, Circle, Ellipse

## Remote Communications

The communication capability of the laser marking software allows you to control the laser from a remote source. Remote communications can be performed by connecting to a host computer or an optional two-axis auxiliary controller.

**Host Communications.** Remote communications can be executed from a host computer using RS-232, Ethernet (TCP/IP), or optional Profinet / Ethernet IP connections to the system computer running the Telesis laser marking software. The software provides parameters to define the data transmitted to and from the host. For more information on using and configuring these parameters, refer to the *Merlin II LS Operating Instructions*.

**Two-Axis Controller.** Telesis offers an optional two-axis controller for all laser systems that use the Merlin II LS laser marking software. The auxiliary controller provides an interface for connecting a Z-Axis tool post and/or a Theta-Axis rotary drive unit. An optional board allows connection of two additional linear axes. For installation details, refer to the *Auxiliary Controller Installation & Maintenance Manual* supplied with the two-axis controller.

## Communications Protocols

Two types of host interface (RS-232 or TCP/IP) are supported and two communication protocols (Programmable and Extended) are provided through the Merlin II LS laser marking software.

**Programmable Protocol.** Programmable protocol provides one-way (receive only) communication with no error checking or acknowledgment of the transmitted data. You can use Programmable Protocol to extract a continuous portion of a message string to print. This can be used with a host computer or a bar code scanner. Note that XON/XOFF Protocol applies even when Programmable Protocol is selected.

The Programmable Protocol Message Type identifies the type of message sent from the host and determines how the marker uses the data it extracts from the host message string when Programmable Protocol is used.

- 65 Message type 65** (ASCII A) updates the Offset Angle parameter with the data extracted from the host message. Syntax for the transmitted string is  $\pm n$ , where  $\pm$  is a positive or negative sign and  $n$  is an integer that represents the offset angle for the marking window.
- 72 Message type 72** (ASCII H) updates the Offset X/Y parameters with the data extracted from the host message. Syntax for the transmitted string is  $\pm X.X, \pm Y.Y$ ; where  $\pm$  is a positive or negative sign,  $X.X$  represents the X-axis offset distance, and  $Y.Y$  represents the Y-axis offset distance.
- 80 Message type 80** (ASCII P) indicates the data extracted from the host message is the name of the pattern to be loaded.
- 81 Message type 81** (ASCII Q) updates the text in the first query text buffer (buffer 0) with the data extracted from the host message.
- 86 Message type 86** (ASCII uppercase V) updates the text in the first variable text field in the pattern with the data extracted from the host message.
- 118 Message type 118** (ASCII lowercase v) updates the first text field encountered in the pattern that contains a variable text flag that matches the specified string length.

- 0 Message type 0** (zero) indicates the host will provide message type, field number (if applicable), and data. This delegates message type selection to the host on a message-by-message basis. The host message must use the format:

**Tnn<string>**

where:

T = the message type (1, A, H, P, Q, V, or v)

nn = the two-digit field number or query text buffer where data will be placed.

**Note:** Not used with Message Types A, H, P.

<string> = the pattern name to load (Message Type P) or the data to be inserted into the field or the query text buffer, as applicable (Message Types 1, Q, V, or v).

# UVC-Series/U15 Laser Marking System

---

**Extended Protocol.** Extended Protocol provides two-way communication with error checking and transmission acknowledgment. It is designed to provide secure communications with an intelligent host device using pre-defined message formats and response formats where serial communication is a vital part of the marking operation.

All communications are carried out in a parent-child relationship, with the host being the parent. Only the host has the ability to initiate communications. The Extended Protocol message is transmitted using the following format:

## SOH TYPE [##] STX [DATA] ETX BCC CR

**TYPE** The message type is defined by a single, printable ASCII character. The Extended Protocol message types are:

- A Message Type A** provides data to the system Offset Angle parameter for the marking window or polls the system for data. See [DATA] for details.
- E Message Type E** allows the host to take the machine offline. It also provides the option of displaying an error message box with the provided data string. See [DATA] for details.
- G Message Type G** initiates a print cycle.
- H Message Type H** provides data to the system X/Y Offset parameters or polls the system for data. See [DATA] for details.
- I Message Type I** polls the system for the I/O status.
- M Message Type M** sets the current Omni Serial Number to the integer value in the message data.
- O Message Type O** places the marker online. This allows a host computer to reset. For example, this can be used to recover from a power outage when the marker is unattended.
- P Message Type P** loads a pattern or polls the system for the current pattern name. See [DATA] for details.
- R Message Type R** allows a rotation angle to be specified via the host to rotate all pattern objects about the window origin.
- Q Message Type Q** provides data to the system query text buffer or polls the system for data. See [DATA] for details.
- S Message Type S** polls the system for the machine status. The machine status is returned to the host in an eight-character hexadecimal mask.
- V Message Type V** provides data to a variable text string in the pattern or polls the pattern for data. See [DATA] for details.
- X Message Type X** sets the current Pattern Serial Number to the integer value in the message data.

## TRADEMARKS

**Telesis** and **Merlin** are registered trademarks of Telesis Technologies, Inc. in the United States and/or other countries.

**Pentium** is a registered trademark of Intel Corporation in the United States and other countries.

**Windows** and **Vista** are registered trademarks of Microsoft Corporation in the United States and other countries.