USER'S MANUAL **990-850**

REVISION 22: **NOV 2017**

AMADA MIYACHI AMERICA

INSTALLATION MANUAL
FOR THE
DELTA LASER WORKSTATION
(VERTICAL DOOR OPTION)

(Front Panel Controlled Delta Laser Workstation Shown. Colors May Vary)

General

Printed in the United States of America.

Revision Record

Revision	EO	Date	Basis of Revision
1	N/A	10/07	Engineering Release
2	N/A	01/08	Add Options
3	N/A	06/08	Add Options
4	N/A	11/08	Add Base Options
5	N/A	11/08	Changes per QA
6	N/A	02/10	Update Schematic/ Add Part Number Callouts
7	N/A	09/10	Add Appendix
8	N/A	01/11	Update Schematic
9	N/A	02/12	Add Options
10	N/A	02/13	Add Sinusoidal Amplifiers
11	N/A	05/13	Update Electrical Bay Layout
12	N/A	06/13	Utilize Safety Circuit
13	N/A	06/13	Add side feed thru option
14	N/A	09/13	Add Side Panel Options
15	N/A	12/14	New standard Electrical Drawer
16	N/A	01/15	New logo updates
17	N/A	01/15	Update document format
18	N/A	3/15	Updated height options
19	N/A	6/15	Changes per QA
20	N/A	9/15	Changes per QA
21	N/A	6/16	Add Part Number Callouts
22	N/A	6/16	Modifed text for PAUSE button

FOREWORD

Thank you for purchasing the Delta Laser Workstation. If you have any questions about the contents of this manual, or find any errors or omissions, please notify Amada Miyachi America at:

Amada Miyachi America
Laser and System Service Department
1820 S Myrtle Ave
Monrovia, CA 91017-7135
Phone: (626) 303-5676
Fax: (626) 358-8048
E-mail: **info@amadamiyachi.com**

WARNING

This instruction manual describes how to perform procedures on lasers. These procedures MUST be performed as detailed by QUALIFIED and TRAINED personnel.

Procedures not performed as prescribed in this manual may expose personnel to laser radiation hazards.

Be sure to wear protective goggles having an optical density of at least 6 at a wavelength of 1064 nanometers.

CDRH Compliance Statement

The Amada Miyachi America laser workstation is certified to be fully compliant with all applicable standards and regulations as set forth by the United States of America's Health and Human Services (HHS), Food and Drug Administration (FDA), Center for Devices and Radiological Health (CDRH), standard 21 CFR 1040.10 for Class I laser devices.

Workstation Laser Safety

The Delta Laser Workstation is designed to meet Class I CDRH standards at the YAG 1064 nanometer wavelength, which requires no eye protection, by users. The Optical Density of the viewing window material is greater than 5. Transmission of laser radiation at the wavelength of 1064 nanometer is less than 1 part in 100,000 or 1.0E–5

The laser radiation must be at a suitable level that it will not damage your eyes after passing through the window. A laser welding system has three parts: the laser welding power supply, the optical fiber, and the focusing head. The laser radiation is divergent when it exits the fiber. The focusing head collimates the radiation with the first lens (or set of lenses), then the second lens (or set of lenses) focuses the laser radiation on the work piece. Laser radiation reflecting from the work piece is again divergent and the energy density of the laser beam is reduced. The following illustration shows a typical configuration.

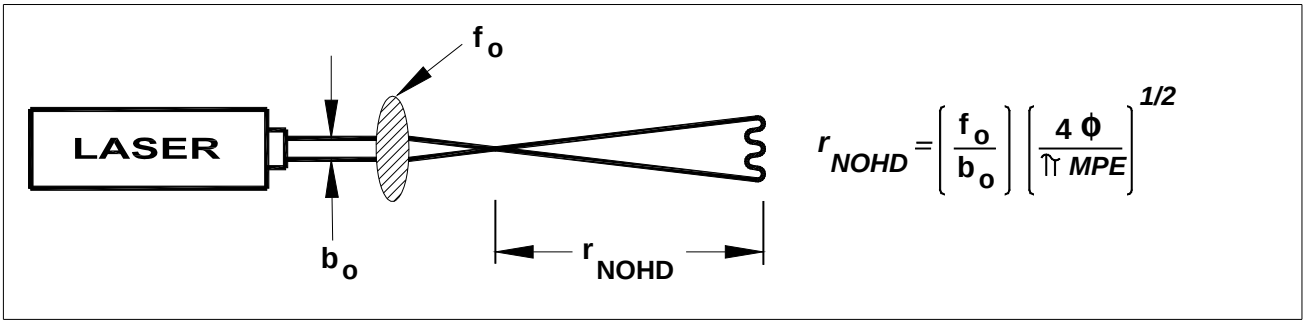


Figure 1. Laser Radiation Divergence

The following tables were calculated assuming worst-case conditions:

- The laser is operated at maximum power
- The laser is operated at maximum repetition rate
- Laser radiation strikes the viewing window in the shortest path after reflecting from the work piece
- Reflectivity from the work piece is 100%

Table Instructions:

- Determine the diameter (mm) of the focusing unit lens output
- Determine the focal length (mm) of the focusing unit output
- Determine the laser power supply model number or maximum output power rating
- Multiply the required distance times the focal length

Compare the resultant value with the actual path distance from the work piece to the window

AMYA Pulsed YAG (1064 nm wavelength) Laser welding Power Supplies

LW5A with 50mm Lens	0.20
LW10 with 50mm Lens	0.24
LW15 with 50mm Lens	0.30
LW15A with 50mm Lens	0.34
LW25A with 50mm Lens	0.44
LW51 with 50mm Lens	0.67
LW52 with 50mm Lens	0.67
LW50A/50AC with 50mm Lens	0.79
LW70A/70AC with 50mm Lens	0.95
LW100 with 50mm Lens	0.95
LW150A with 50mm Lens	1.40
LW250 with 50mm Lens	1.78
LW300 with 50mm Lens	1.95
LW300A with 50mm Lens	2.20
LW400/400A with 50mm Lens	2.53
LW500/500A with 50mm Lens	2.84
LW600A with 50mm Lens	3.12

LW5AM with 30mm Lens	0.12
LW5A with 30mm Lens	0.32
LW10 with 30mm Lens	0.40
LW15 with 30mm Lens	0.48
LW15A with 30mm Lens	0.55
LW25A with 30mm Lens	0.72
LW51 with 30mm Lens	1.08
LW52 with 30mm Lens	1.08
LW50A/50AC with 30mm Lens	1.28
LW70A/70AC with 30mm Lens	1.51
LW100 with 30mm Lens	1.52
LW150A with 30mm Lens	1.96
LW250 with 30mm Lens	2.85
LW300 with 30mm Lens	3.12
LW300A with 30mm Lens	3.51
LW400/400A with 30mm Lens	4.06
LW500/500A with 30mm Lens	4.53
LW600A with 30mm Lens	4.98

Workstation Specifications

Item		DELTA LASER WORKSTATION
Width***	3426	33.78 in. (85.80 cm) w/ Optional Side Panel 41.78 in
	4026	39.78 in. (101.04 cm) w/ Optional Side Panel 47.78 in
Height*	w/BASE	74.70 in. (189.74 cm)
Depth	3426	25.5 in. (64.77 cm)
	4026	27.0 in. (68.58 cm)
Weight**	w/BASE	425 lbs. (192.78 Kg)
	wo/BASE	335 lbs. (151.95 Kg)
Viewing window		Optical density greater than 5 at 1064 nm wavelength
Exhaust port		3 in. (7.62 cm) port (when applicable). Two on back panel (Optional)

*Height measured with standard base support.

See Appendix C for optional base support.

See Appendix D for additional height options.

** Approximate weight (excluding Laser). The weight will depend on actual components mounted in workstation.

*** See Appendix E for optional side feed thru tooling tray.

Laser Safety Labels (See Figures Included and Appendix)

The following safety labels are mounted on the workstation as shown:

2 **DANGER** VISIBLE AND/OR INVISIBLE LASER RADIATION WHEN OPEN. AVOID EYE AND SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.

3 **DANGER** VISIBLE and/or INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK FAILED OR DEFEATED. AVOID EYE AND SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION

4, 5, 6 Standard laser safety symbols. Label 4 is the smallest; label 6 is the largest.

7 **CAUTION** TO PREVENT SHOCK HAZARD, DISCONNECT POWER SUPPLY CORD AND WAIT FIVE MINUTES BEFORE REMOVING COVER.

NOTE: The same laser safety labels shown mounted on the right-hand side of the workstation are also mounted on the left-hand side.

User Maintenance

WARNING: The Delta Laser Workstation has been manufactured and tested to meet standard CDRH, 21 CFR 1040.10, Class I accessible emission limits. If you suspect a light leak, DO NOT use the workstation until you have consulted with Amada Miyachi America. If necessary, we will have you return your unit to us, or send one of our technicians to your site.

CONTENTS

Section I. General Description

Description

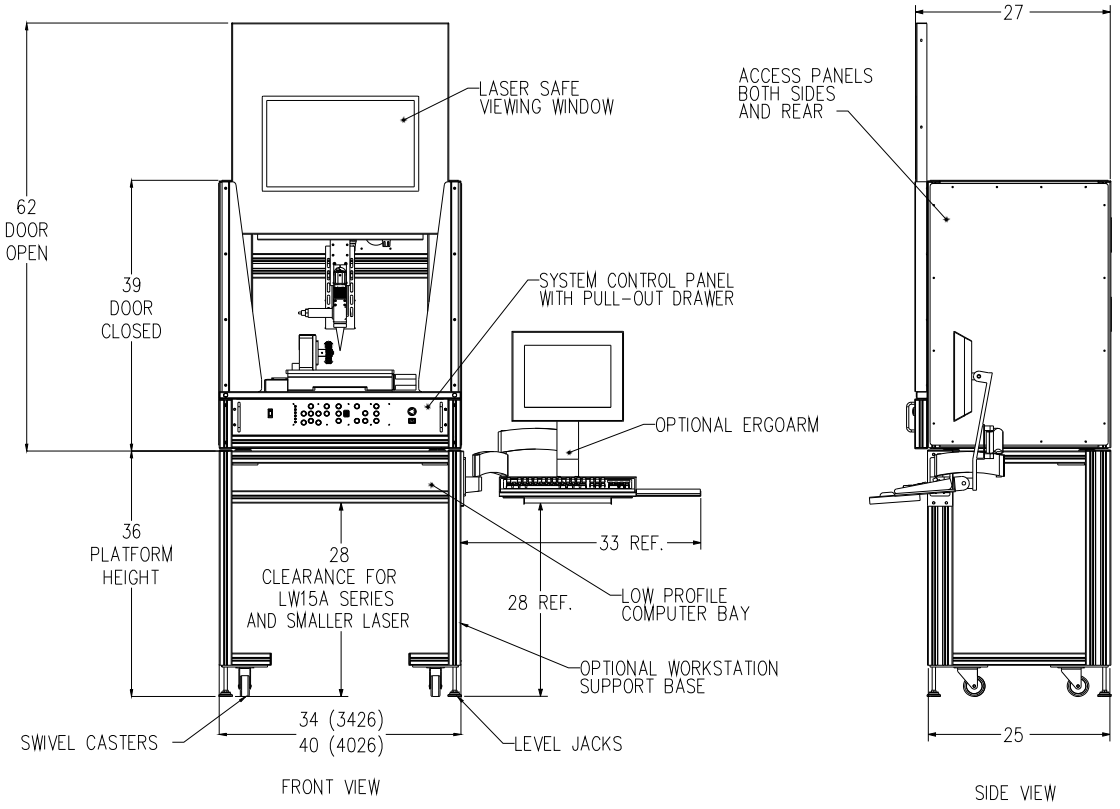
The Delta Laser Workstation is a heavy duty steel CDRH Class I laser-safe enclosure with pneumatic front access door, a large Nd: YAG safety view port, safety interlocks, interior lighting, fume extraction port, and recessed electronic bay. The electronic bay includes the control wiring distribution, PLC, control system, and rear connection panel. The workstation can be front panel controlled, pendant controlled, or both.

(Front Panel Controlled Delta Laser Workstation Shown. Colors May Vary)

(Front Panel Controlled Delta Laser Workstation Shown)

Delta Laser Workstation Dimensions (Figure 1A)

(Front Panel Controlled Workstation Shown. Height and width may vary)
Optional extensions not shown.



Workstation Facility Requirements (Figures 1A)

Electrical: The workstation requires 115 VAC, 12 Amps or 230 VAC 6 Amps. A power cable is supplied to connect the system to facility power.

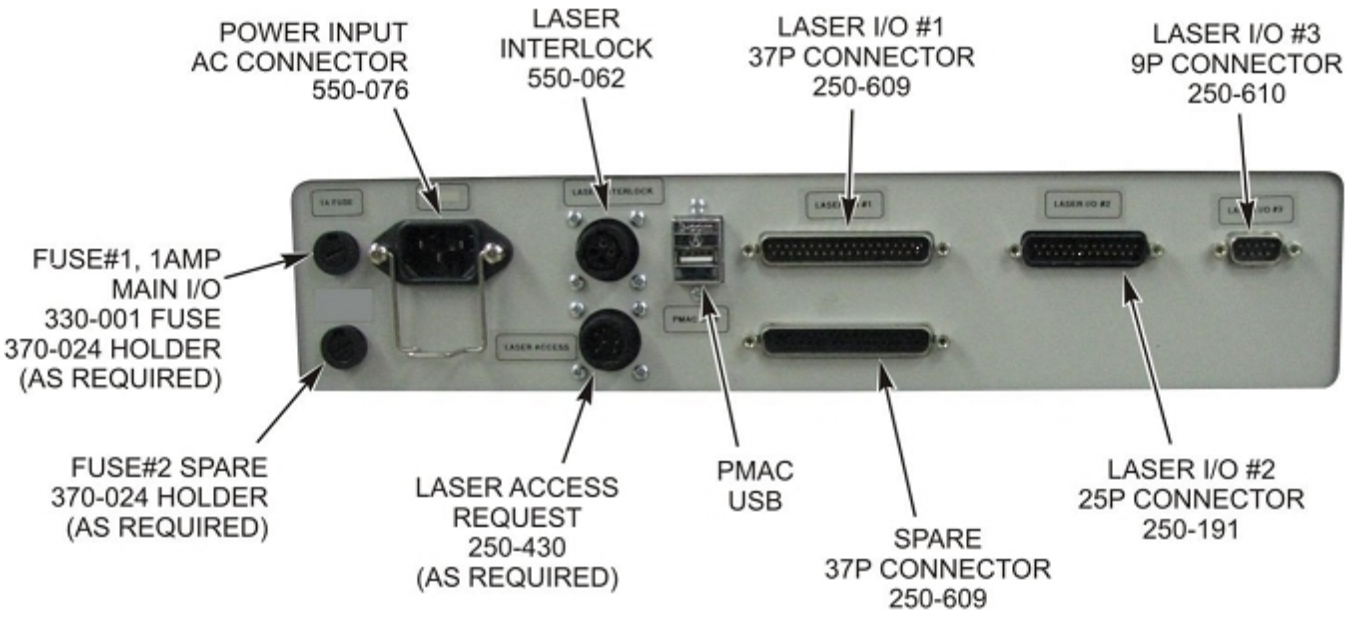
Air: 80-100 PSI filtered air supply line supplied by customer (¼" dia quick-connect hose connection)

Cover Gas: Supplied by customer (¼" dia quick-connect hose connection supplied by AMYA). Industrial grade Argon at 60-100 PSI. (Supplied by customer)

Section II. Components and Figures

Workstation Rear Connector Panel (Figure 1B)

(Basic Connector Panel. Connectors and Locations May Vary)



Workstation Components

Viewing Windows: Window is provided for safely viewing the weld operation while the laser beam is turned on.
WARNING: The window is specially treated (See Specifications). Do not replace the windows with ones having a lower optical density specification. Excessive viewing of the laser weld area is not recommended even when viewing through the protective glass. Never stare directly into Laser Beam.
Note: *For special requirements additional viewing windows may be provided.*

Interlock Switches: On standard workstation two shutter interlock switches are wired in series, and one door interlock cable is provided. The laser will automatically be disabled if the interlock switches fail to close and laser operation is activated.
CE Only: A single door interlock switch is wired to a Safety Relay module.
WARNING: Do not attempt to override these switches. Exposure to laser beam radiation can cause severe injury.

Pneumatic Door: The door provides access to the interior of the enclosure. When the door is open and the safety interlock system is connected to the laser, the laser cannot be operated.

Height Adjustment: Leveler feet with swivel pads.

Lights: One fluorescent light provides illumination of the interior work area.

Power Strip: An external 115 VAC (or 220 VAC) power strip is supplied with the enclosure. It is provided for auxiliary workstation components.

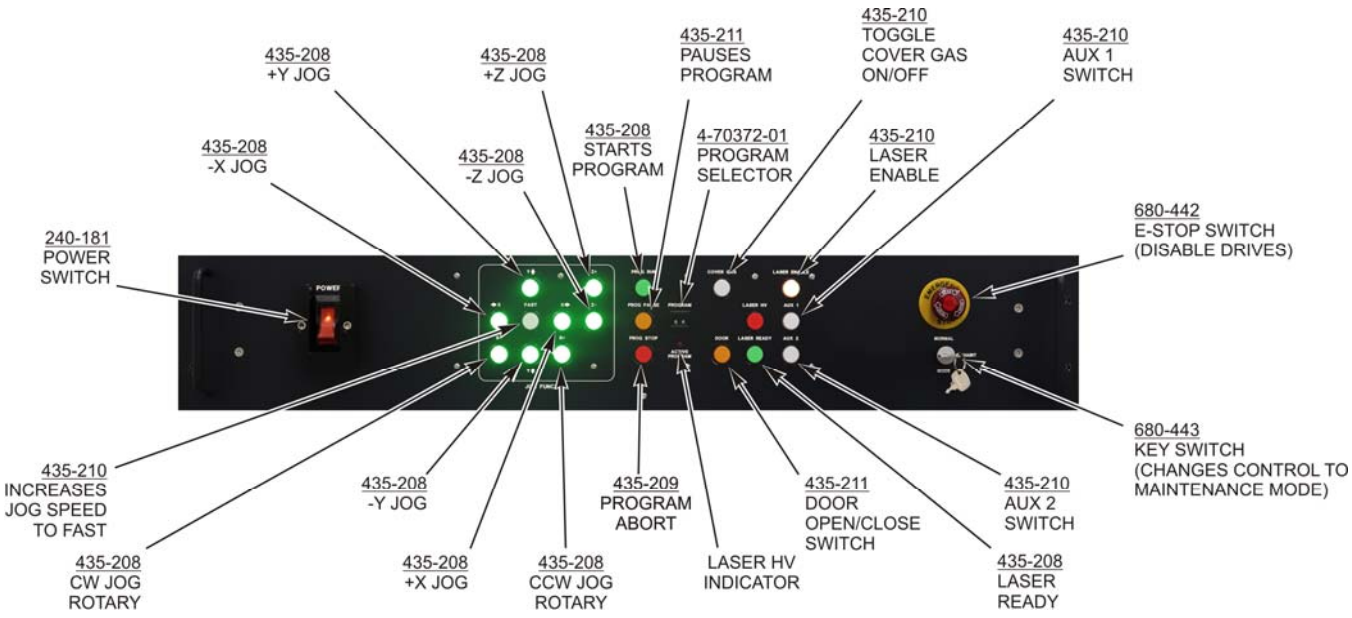
Workstation Front View (Figure 2)

(Front Panel Controlled Delta Laser Workstation Shown. Colors May Vary)

(Front Panel Controlled Delta Laser Workstation Shown)

Workstation Front Panel - Panel Controlled (Figure 3A)

(Color, Buttons, and Locations May Vary)

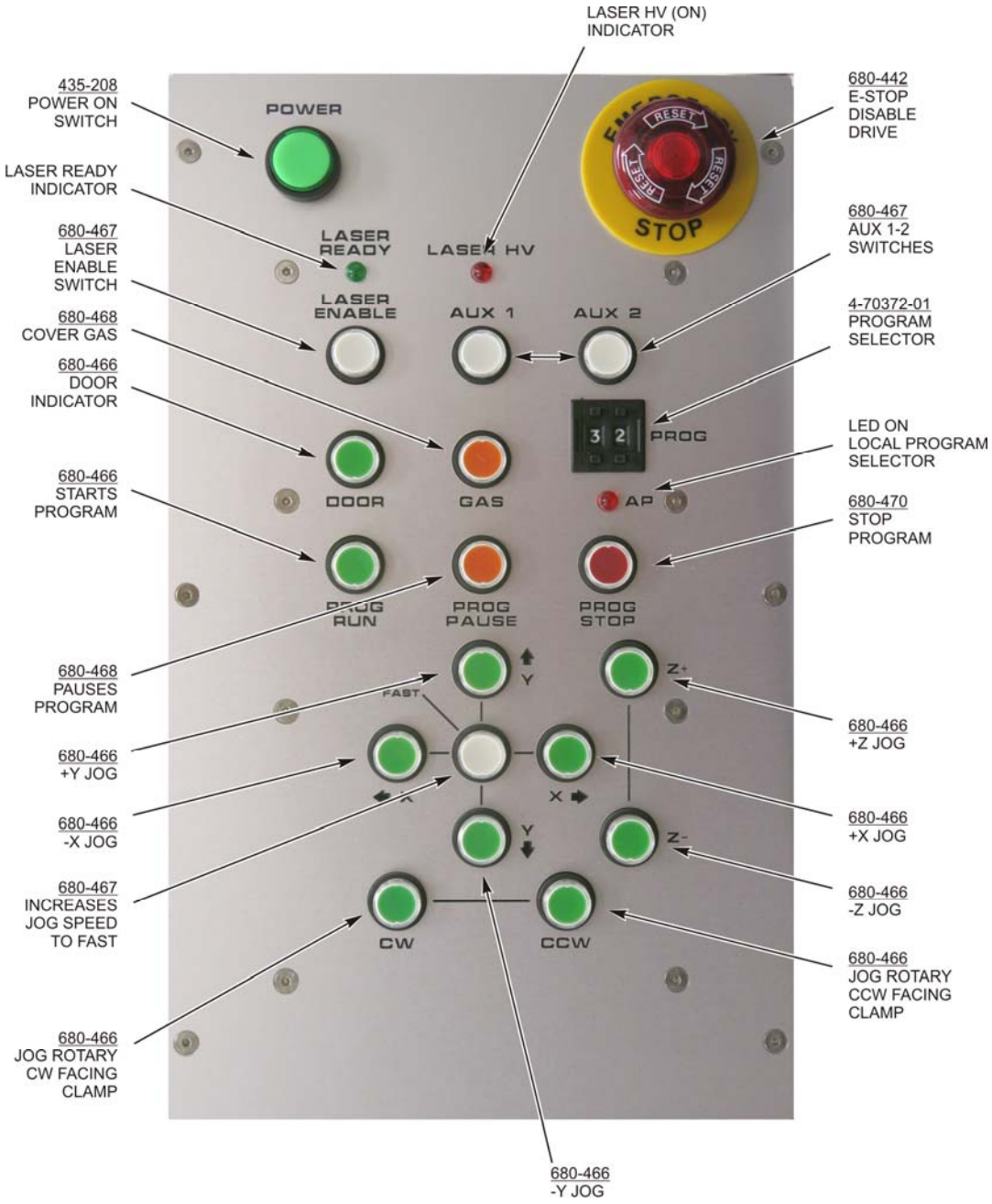


Workstation Front Panel - Pendant Controlled (Figure 3B)

(Color, Buttons, and Locations May Vary)

Workstation Control Panel (Figure 4)

(Pendant Control Panel Shown. Buttons and Locations May Vary)



Power: Distributes power On/Off workstation only. It includes all internal components as motion, pneumatics and lighting. (See Schematic for any further power distribution.)

Note: Switch may be replaced with Circuit Breaker 240-206 (240V-60V, 5amp).

E-stop: Pressing this button will disable the laser system and terminate motion. The laser will not operate again until the system is reset.

Key Switch: Changes Control from Maintenance Mode to Normal. Removing key in Normal Mode this will **not** allow the operator to disable the laser.

Program Run: Start program or continue if the program was paused.

Program Pause: (In most systems for Spot Welds) This button pauses drives. This will not disable laser, so action while a weld is in process is not recommended. Button is typically disabled on systems setup for seam welding.
Note: Program Pause is set-up to help Home Program. See Operation Manual for Procedure.

Program Stop: Stops Drives. Note that this is **not** Emergency Stop. It is also set-up for reset. This will **not** disable laser.
(May be Red or Blue depending on special requirements)
Note: Program Stop is set-up to help Home Program. See Operation Manual for Procedure.

Cover Gas: May toggle cover gas On /Off when applicable.

Door: Opens and Closes Door for optional pneumatic vertical door.
Note: Door is set up with Safety Interlock Switches. DO NOT OVERRIDE switches. May cause severe injury and damage of system.

Laser HV: Indicates voltage is supplied to the laser and it is ready to fire.

Laser Ready: Indicates system is ready to start program.

Laser Enable: When illuminated the laser will fire only operational when key switch is in 'Maint' mode.

Aux 1 & 2: May be set up for special requirements.

Jog Functions: Jogs motion if required. Fast will increase jog speed. More Jog switches may be required and set up on panel for special request.
Note: Fast switch is only lit during its operation.

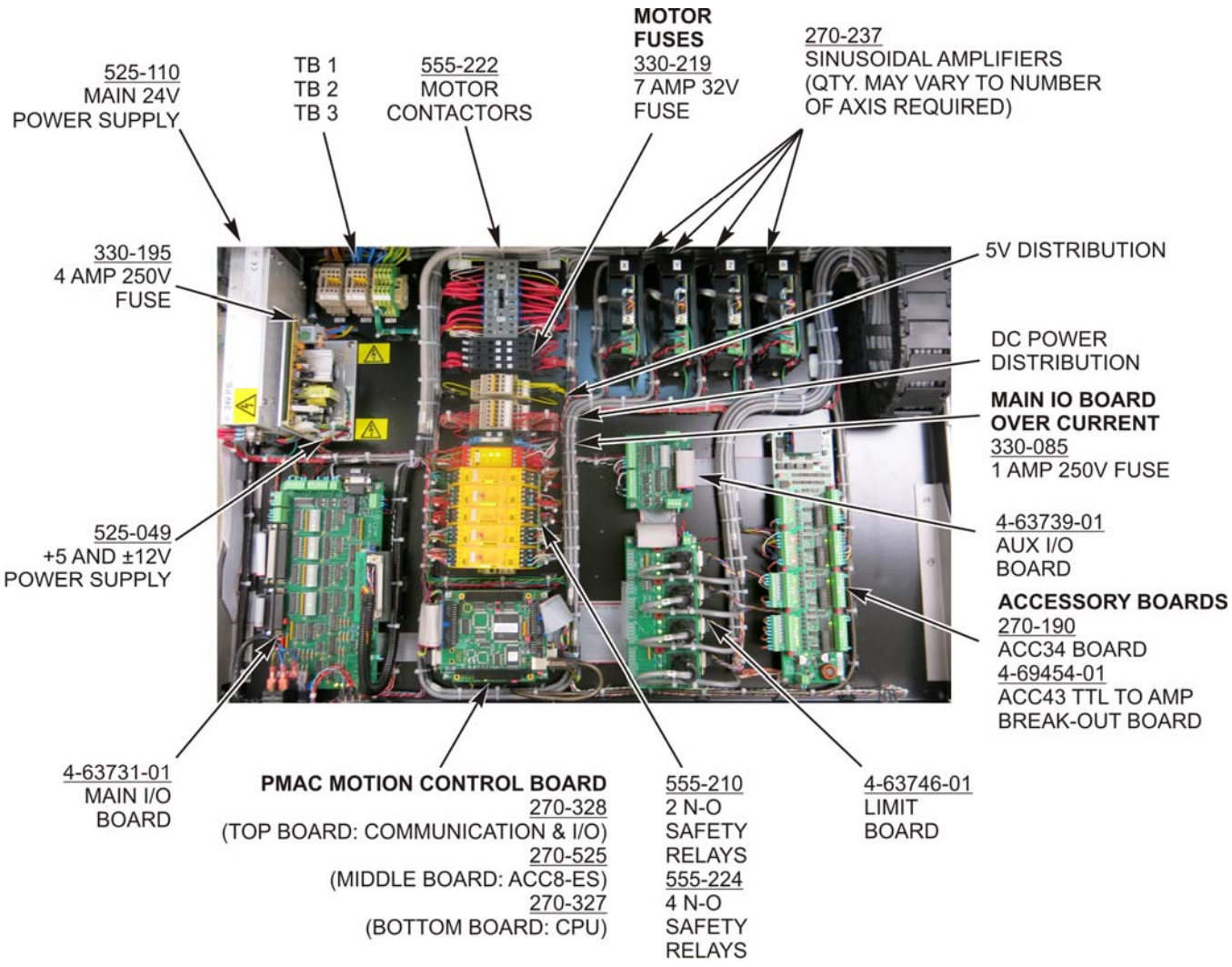
Laser Access: Only applies when a single laser is shared by multiple workstations. See additional Multi-Workstation Manual when required.

Program: Selects the program file to be run. Only operational when **Active Program** light is illuminated.

Power Indicators: Indicates that power and status or OK.
Note: When using Sinusoidal Amplifiers there is no power supply indicators.

Workstation Electrical Bay (Figure 5)

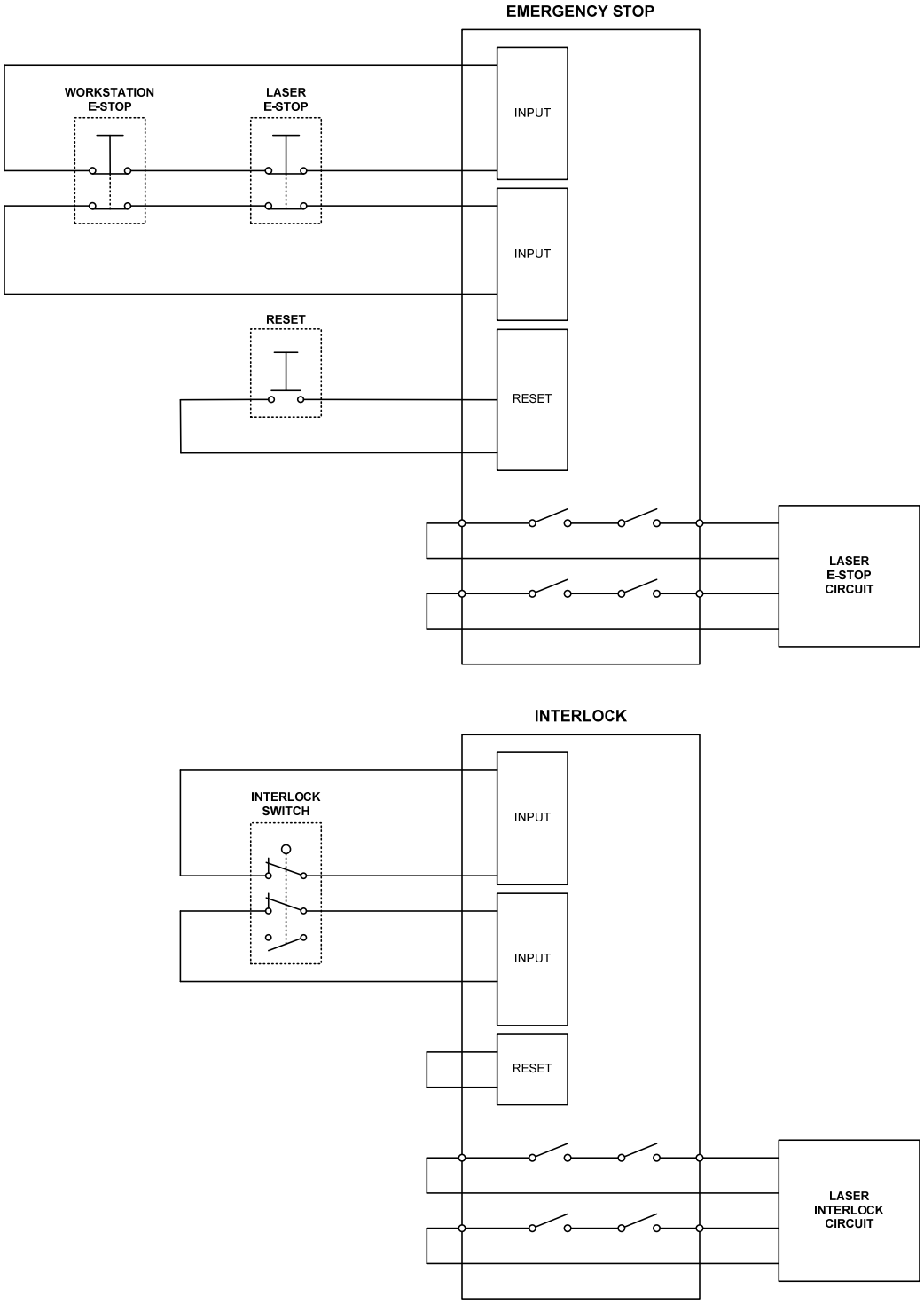
(Delta Laser Workstation Layout Shown. Components and Locations May Vary)



Safety Circuit Utilizing Laser Emergency Stop and Door Safety Interlock (Figure 6)

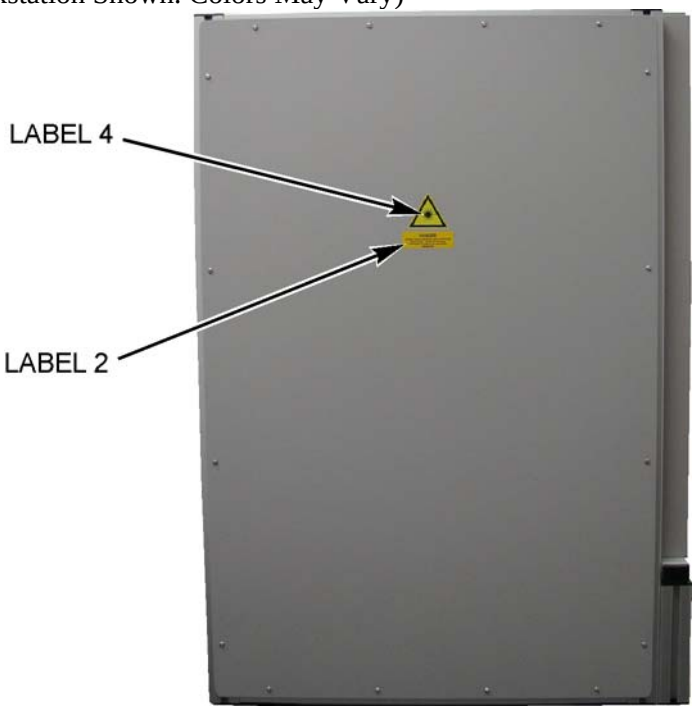
(Standard CE Safety Circuit Shown)

See attached schematic for further details and options.



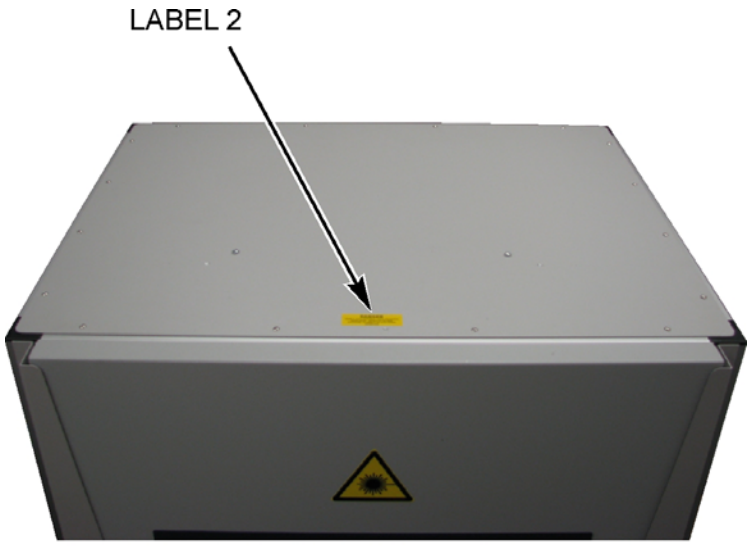
Workstation Side View (Figure 7)

(Standard Delta Laser Workstation Shown. Colors May Vary)



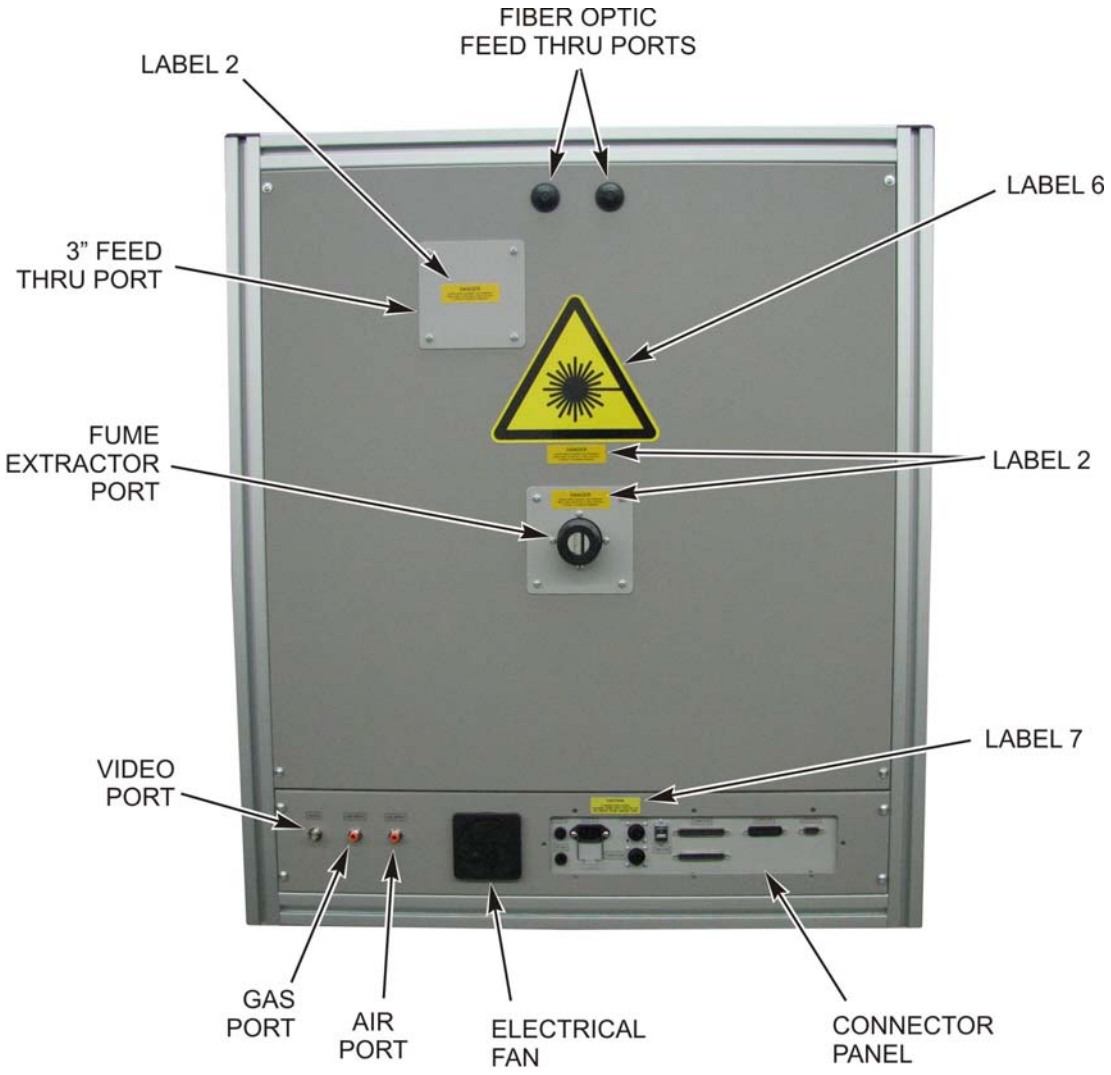
Workstation Top View (Figure 8)

(Standard Delta Laser Workstation Shown. Colors May Vary)



Workstation Rear View (Figure 9)

(Standard Delta Laser Workstation Shown. Colors May Vary)



Exhaust Connections:

3" dia. exhaust connection is available to port exhaust gases from the enclosure interior (at rear of enclosure).

Fiber Optic Cable Entry Port:

These ports provide entry for fiber optic cable. **WARNING:** Once a strain relief grommet has been loosened for fiber removal or replacement completely retighten prior to operation of laser.

Appendix A
Labels and Warnings

AMADA

AMADA MIYACHI AMERICA, INC.
1820 SOUTH MYRTLE AVENUE, MONROVIA, CA. 91017 U.S.A.
MADE IN U.S.A.

CAT. NO.
MOD. NO.
SER. NO.
MFG: MONTH, YEAR

COMPLIES WITH 21 CFR 1040.10.
CLASS 1 LASER PRODUCT

1

DANGER

VISIBLE AND/OR INVISIBLE LASER RADIATION
WHEN OPEN. AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION

2

DANGER

VISIBLE and/or INVISIBLE LASER RADIATION
WHEN OPEN AND INTERLOCK DEFEATED.
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

3

4-SMALL 5-MEDIUM 6 LARGE
INTERNATIONAL LASER WARNING LABEL

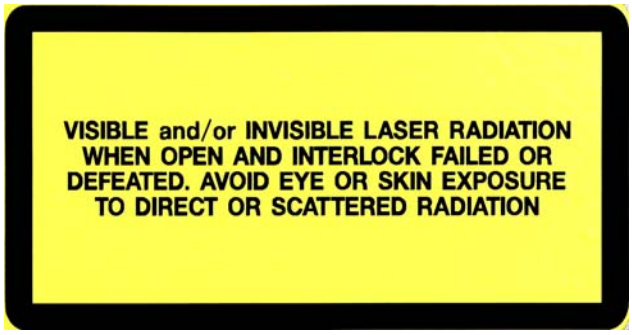
CAUTION

TO PREVENT SHOCK HAZARD,
DISCONNECT POWER SUPPLY CORD AND WAIT
FIVE MINUTES BEFORE REMOVING COVER

7


VISIBLE AND/OR INVISIBLE LASER RADIATION
WHEN OPEN. AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION

8


VISIBLE and/or INVISIBLE LASER RADIATION
WHEN OPEN AND INTERLOCK FAILED OR
DEFEATED. AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION

9

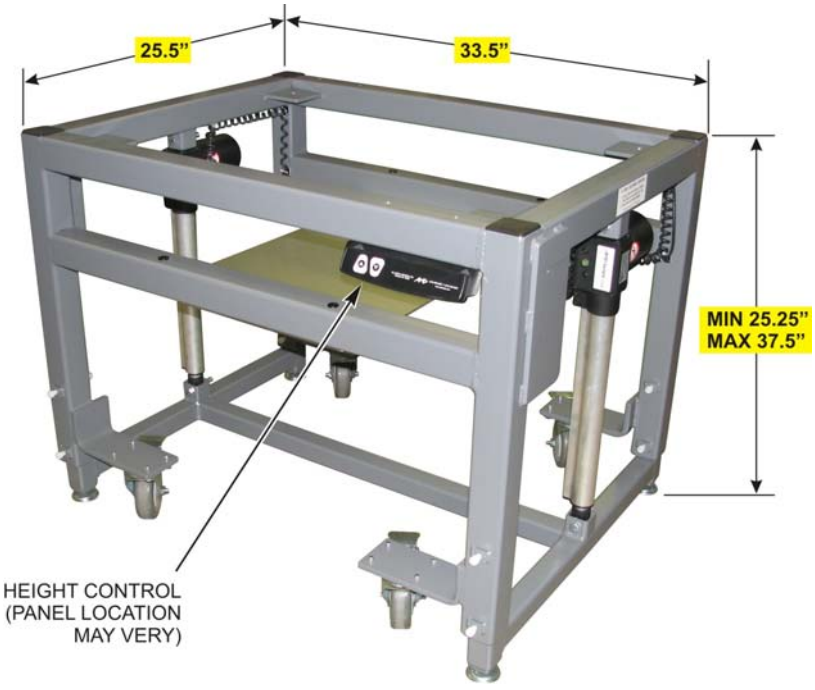
Appendix B

Base Options

(Note: for 3426 and 4026 only)

Standard Base

Adjustable Base



Appendix C

Additional Height Options