3-Part Construction Standards
LASER INTERLOCK AND ACCESS CONTROL EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Module Construction.

B System Wiring.

C. Key Control and Safety Relays.

D. Warning Modules.

E. Crash Modules.

F. Access Control Methods and Timing.

G. System Power Supply

1.2 REFERENCES

A. ANSI Z136.1-2014 – American National Standard for Safe Use of Lasers

B. 21CFR1040.10 - Federal Laser Product Performance Standards

C. Underwriters Laboratories, Inc. (UL): UL 94 Flammability Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

D. NFPA 70E (National Fire Protection Association - safety-related work practices for use of lasers

1.3 SUBMITTALS

A. Submit under provisions of Section.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Submit drawings as necessary to depict the proper configuration, assembly and installation and termination of each product specified in this section.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of five (5) years experience.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing electrical control systems.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

C. Store products indoors in temperature controlled facility.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.7 WARRANTY

A. At project closeout, provide to Owner or Owners Representative a copy of the manufacturer's standard warranty. Example: 3 year standard warranty shown on page 14 of Laser Safety Systems user manual.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Laser Safety Systems, LLC. 3017 Roast Duck Lane, Johns Island SC 29455 https://www.lasersafetysystems.com

email sales@lasersafetysystems.com

B. Substitutions: Not permitted.

2.2 APPLICATIONS/SCOPE

A. Interlock Systems: Configuration based on guidance given in ANSI-Z136.1 Section 4.3 for the Indoor Laser Controlled Area.

B. Interlock Configuration types.

Single door- Non-Defeatable monitored Door
Single door- Defeatable Entryway Controls
Multiple door- Multiple Defeatable Entryways
Multiple door- Combination of Defeatable and Non-Defeatable systems
Curtain -Non-Defeatable or Defeatable Entryway Controls

2.3 MODULE CONSTRUCTION

A. Interlock control system circuit boards shall comply with UL 94V-0 flammability ratings.

B. Interlock control modules shall be designed to meet the failsafe requirements of article 330 of NFPA 70E (National Fire Protection Association - safety-related work practices for use of lasers

C. Interlock control modules shall have a common yellow color scheme for rapid visual identification as a laser safety related control component.

D. All interlock controls shall be clearly marked with the words “LASER AREA” and shall provide additional wording to indentify the module function.

E. All controls shall utilize solid state light emitting diodes for control illumination. This lighting shall have a typical operational lifetime of > 100,000 hours.

F. All modules shall provide screw clamp cage type terminals that accept a stripped wire termination without the need for terminating crimped connections.

2.4 SYSTEM WIRING

A. Module to Module system cabling shall be Plenum rated.

B. All interlock functions shall fall under the Class 1 power-limited circuit classification of the National Electric Code.

C. The control system shall accomodate future system expansion using manufactures drop-in modules.

2.5 KEY CONTROL and SAFETY RELAYS

System shall be capable of lockout using key control. Manufacturer shall offer over 20 different key combinations so client facilities with multiple labs spaces will each have a unique system key for each lab space.

A. The final interlock connection to client laser system shall provide two (2) Form C dry contacts that can only be activated when the interlock system is armed.

Example: Model LSS-2382 Main Control Module by Laser Safety Systems

B. The interlock control system shall allow the insertion of additional “laser interlock” relays if the needs of the client require system expansion.

Example: Model LSS-2384 Laser/Shutter Interface Module by Laser Safety

2.6 WARNING MODULES

A. All modules designed for area laser warning shall permit end user selection of strobe or solid modes of operation.

B. All modules designed for area laser warning shall clearly state the laser conditions of “ARMED” and “SAFE”

C. All modules shall provide user feedback of system “crashed safe” status.

D. All modules shall automatically activate based on the state of the room interlock.

Example: Model LSS-2380 Laser Warning Module by Laser Safety Systems.

2.7 CRASH MODULES

A. All system CRASH (E-Stop) buttons shall conform to EN IEC 60947-5-5. This specification requires a “foolproof” action with a locking crashed function. The button mechanism must be twisted clockwise to reset the crashed condition.

B. All CRASH buttons shall have red LED backlighting present when the interlock system is armed. The backlighting shall extinguish when the system is not armed.

Example: Model LSS-2383 Emergency Crash Module by Laser Safety Systems.

2.8 ACCESS CONTROL METHODS AND TIMING

A. The interlock control system shall permit the selection of access control methods comprised of:

1. Non-Defeatable monitoring of a door or curtain. System drops to safe mode if the monitored entry is comprimized. Example: LSS-2387 Non-Defeatable Access monitor by Laser Safety Systems.

2. A system of Defeatable Access Control shall permit any of the following:

   a. Keypad override of the door interlock for authorized laser workers.

   b. Option for access granted via an external building controlled card reader activation. (LSS-2388EZ curtain module excluded from this requirement)

   c. Option to drive either 24V Magnetic Locks or electric strikes.

Example: LSS-2388 Defeatable Access Control Kit by Laser Safety Systems

B. A Defeatable Access Controller shall utilize “intelligent” access timing. This feature automatically cancels the override condition within two (2) seconds of door closure after an access. The feature also cancels the access override condition if the door has not been opened within 5 seconds of the initiation of the access request.

Example: LSS-2388 Defeatable Access Control Kit and LSS-2388EZ Curtain Defeatable Access Control Kit by Laser Safety Systems.

2.9 SYSTEM POWER SUPPLY

A. The system shall operate on low voltage 24 volts direct current.

B. The system power supply shall be UL LISTED and be clearly marked with the UL designation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Store system in original protective wrapping until ready for installation.

B. Read installation manual prior to beginning installation.

3.2 PREPARATION

A. Pull major interlock cable runs in advance of module installation.

B. In cases where multiple cables enter a single mounting box, label the cables with a marking that will permit destination identification.

3.3 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Strip and connect wires in accordance with manufacturers wiring schematic.

C. Test system operation in accordance with manufacturers written procedures.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 TRAINING

Manufacturer shall provide an online training video describing typical installation wiring, modes of operation, and system response during each mode of operation.

END OF SECTION