

# **Laser Sentry™**

## Entryway Control System

**Model AE-40**



**distributed by:**

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# **Laser Sentry Entryway Control System**

## **Device Overview**

The Laser Sentry Entryway Control System is used to control entry and egress to areas in which there is accessible and/or exposed laser energy. The Laser Sentry can be configured to meet the access control requirements as specified by ANSI Z136.1 - 2014 (American National Standard for the Safe User of Lasers). The Laser Sentry is used to control access to areas such as University and Government Laser Laboratories, Hospital Operating Rooms, Laser Manufacture and Test Areas, Laser Machine shops, etc.

The Laser Sentry panel (part # AE-40) is the main control module and is used in conjunction with other customer supplied components such as magnetic door reed switches, magnetic door latches, entry keypads, remote pushbuttons, Lighted Safety Signs, and other devices.

## **Notes to the Architect / Installation Contractor**

### **Before Design or Installation Consult the Facility Laser Safety Officer (LSO)**

This device can be configured to suit the needs of many different installation requirements. Before beginning design or installation consult the facility LSO to determine the specific requirements. Provide this document to the LSO at time of consultation.

## **Notes to the facility Laser Safety Officer (LSO)**

This device to be configured, installed and operated under the direct supervision of the facility Laser Safety Officer (LSO). The LSO is entirely responsible for ensuring that this product is suitable and appropriate for the task for which it is being installed and used. The LSO shall instruct the design or installation team on its required function. The LSO shall also test and certify that the device was installed properly and functions properly prior to its first use. By certifying that the unit is ready for use, the LSO shall agree that the unit is configured and operates appropriately as required by ANSI or alternately, as required by the facility's Laser Safety Program Guidelines.

**INSTALLATION AND USE OF THE LASER SENTRY AND ASSOCIATED DEVICES IS SOLEY AT THE DISCRETION AND RISK OF THE LSO AND/OR FACILITY.**

## **AE-40 Laser Sentry Installation Data**

The AE-40 Laser Sentry is a very flexible access control module with the following features:

- Front Panel mounted system controls and status indicators and E-Stop button
- Local or remote system engage (start up)
- Audible warning during engage timer and exit period
- Built in 5 second CDRH emission delay
- control of magnetic door latches
- Automatic control of Tri-Lume and Bi-Lume lighted laser warning signs
- Local or remote “exit request” control
- Adjustable exit delay period
- Front panel mounted E-Stop button
- Auxiliary input allows easy interlocking through other systems such as facility fire alarm.
- 4 isolated laser interlock circuits
- 3 isolated Auxiliary Interlock circuits
- “Exit Delay Active” contact closure
- Voltage output indicates system status for easy monitoring by other systems.
- System status indicators

### **SAFETY REQUIREMENTS AND INFORMATION:**

**THIS IS NOT A LIFE SAFETY DEVICE!**

The Laser Sentry system must in all cases be installed by the customer or customer’s contractor in a method which is fail safe. This means that if the unit is implemented in such a way as to latch a door or access way with a magnetic latch or similar locking device **THE SYSTEM MUST BE DESIGNED SUCH THAT INSTANT EGRESS (EXIT) IS POSSIBLE UNDER ALL CONDITIONS.** This includes panic, misuse, improper operation, or failure of any device or component.

It is the customer’s responsibility to design and install the complete system in such manner as to ensure the quick and simple egress under all foreseeable and unforeseeable situations.

One example of proper installation under some codes may utilize a door mounted failsafe “crash bar” switch which interrupts the final current loop circuit for the magnetic latch. In this manner, the door will be unlocked regardless of the state of the other system

components when an occupant pushes on the door's crash bar. This is of critical importance for emergency egress situations such as fire or panic.

This example is for illustration only. It is the customer's responsibility to comply with the appropriate codes and requirements. Electrical, Fire and Life Safety codes may vary from location to location, check codes with local officials to ensure that your proposed design meets all local, facility, state and federal requirements.

**THIS IS NOT A LIFE SAFETY DEVICE AND MUST NEVER BE INSTALLED OR OPERATED AS TO PRECLUDE THE RAPID EGRESS UNDER ANY CIRCUMSTANCE.**

## **System Description**

### **Front Panel Controls**

- Engage  
The Engage button activates the system and allows laser operation after the appropriate time delay.
- Exit  
The Exit (Exit Request) button starts the exit delay sequence allowing egress from the controlled laser area without shutting down the laser interlocks.
- E-Stop  
The E-Stop button functions a normally closed contact. When activated the switch terminals power to the entire unit in the event of an emergency.

### **Front Panel Indicators**

- Power  
Indicates DC power is present and system is ready to function
- Doors Closed  
Indicates that the control area doors are closed. The system cannot be engaged when doors are open.
- Interlock On  
Indicates that the interlock sequence has been initiated and is active
- Exit Now.  
Indicates that the exit sequence is active and controlled egress is possible



## **DIRECTIONS FOR USE**

Ensure that the E-Stop button on the front panel, or any other auxiliary e-stop buttons, are not in the off (depressed) position. To reset E-Stop, rotate in the direction of the arrows.

1. Insert key in front panel switch and rotate clockwise
2. Ensure DC power is present to AE-40 control unit. When power is present the “Power” indicator will light.
3. Ensure doors (and other external interlock loops) are closed. When the doors and other interlock features are in the proper condition (closed circuit) the “Doors Closed” indicator will light.
4. Ensure that the environmental conditions are safe for start up of laser interlocks, personnel are clear and wearing eyewear, etc. The exact parameters of start up are to be determined by your Laser Safety Officer.
5. Depress the “Engage” button on the front panel (or at other locations optionally).
6. Audible warning will sound for 5 seconds prior to the interlock circuits closing. The magnetic latch relay circuits will close at the beginning of this sequence.
7. The interlock circuits are now closed allowing laser operation.
8. To exit the controlled area depress the “exit” button on the front panel. (or at other locations optionally).
9. The audible warning will sound during the exit period. The door latch relay opens during the exit period allowing egress. The duration of the exit period can be adjusted with knob “R1, EXIT DURATION” mounted on the PCB inside the AE-40 housing. The duration limits are approximately 3 –30 seconds.
10. If the door has not been closed at the end of the exit duration the interlock will fault shutting down the interlock system and any lasers, shutters, etc which are attached. Also, if the door is forced open while the interlock is active the interlock will shutdown.
11. During the exit period the Tri-Lume sign control shifts from yellow “caution” to red “Danger”.
12. External Entrance. Enter code on keypad mounted on the outside of the access doors to gain access. Requesting entrance will initiate the “Exit” sequence and all operational parameters are the same as an exit operation. Note: The entrance request device such as keypad or keycard control is supplied by the customer and will vary from installation to installation.
13. To deactivate system turn off front panel mounted key switch. Remove key when not in use to prevent unauthorized use. Alternately, if the recommended “emergency stop” button(s) are installed these buttons can be used to deactivate the system at any time. Even if the emergency stop buttons are used to deactivate the system, the key should be removed from the front panel when work is complete. Some versions of ANSI Z136.1 “For Safe Use Of Lasers” may refer to the emergency stop as “Panic Button”.

Note:

The on some models the audible alarm can be optionally selected to mute under all conditions.

## **Installation Data**

It is the responsibility of the customer's Laser Safety Officer (LSO) to determine the appropriate parameters for the installation. The customer will supply all accessory items such as any magnetic door latch, magnetic reed switches for door sensing, access keypad, etc.

## **TYPICAL INSTALLATION**

A typical installation for a laser lab with one door may include the following items:

- Qty 1, AE-40 Laser Sentry Interlock Controller, (AC power supply included)
- Qty 1, Externally mounted emergency access latching switch
- Qty 1, Magnetic Reed type door switch (SPST)
- Qty 1, Door mounted failsafe crash-bar electrical switch
- Qty 1, Magnetic door latch (wired through crash-bar switch)
- Qty 1, External mounted access keypad (SPST, normally open contacts)
- Qty 1, Wall mounted "Exit" request button (SPST, Normally open contacts)
- Qty 1 or 2, Wall mounted "Emergency Stop" red mushroom head pushbuttons (SPST Normally Closed contacts)
- Qty 1, Externally mounted Tri-Lume or Bi-Lume illuminated Laser Warning sign

## **TYPICAL INSTALLATION PARAMETERS**

### **General Parameters**

The Laser Sentry control unit should be used to control only low voltage DC circuits. The maximum rating for each internal contact closure is 30VDC at 1 amp. Do not hook higher voltage AC or DC circuits to the AE-40 PCB.

### **Power Supply**

The AC to DC power supply is included with the AE-40 control unit. The power supply consists of a wall mounted transformer and a power supply PCB mounted in the Laser Sentry cabinet. This transformer has an input voltage of 120VAC and an output voltage of 16VAC. The AC output terminals of the transformer must be hooked to the terminals labeled "AC" on the power supply PCB. The input voltage to power supply PCB should not exceed approximately 16VAC. **Note: Do not short circuit transformer leads.**

**Transformer is internally fused.**

## **Electrical Installation and hook up**

Each i/o connector on the PCB is labeled as to its function and will be further discussed below.

J1 and J2 are internal connections and are not used by the customer

### **DC Power in**

J3 (12VDC IN) is the input connector for the 12 to 15VDC power supply for the AE-40 unit. This is factory wired to the internal power supply.

### **Emergency Stop**

J4 is the Emergency Stop (Emer. Stop) connection point. All systems should be installed with an externally mounted latching emergency shutdown switch. This switch allows persons external to the controlled space (which may be electronically locked) to gain access to the space from the outside in the event of emergency. For the system to operate the terminals of this connector must be shorted (closed circuit). Therefore the externally mounted emergency shutdown switch must function as normally closed contacts.

### **Safety Loop**

The safety loop includes connectors J5 through J8. All of these contacts are wired in series, but utilize them as they are labeled on the PCB so to preserve special function.

J5 and J6 are to be used for the normally closed contacts of the door mounted magnetic reed switches. Multiple reed switches can be hooked in series, but only attach the reed switch loop to J5 or J6. If either J5 or J6 is not used, jumper the connector which is not used to short its contacts. These terminals must be shorted to allow the interlock to be enabled.

J7 (AUX) The auxiliary input can be used to interface to other facility control systems such as fire alarms. By interfacing the interlock system to a building fire alarm the fire alarm system could disable the Laser Sentry interlock system automatically unlocking the doors. The J7 connector must be shorted for the interlock loop to be closed and the interlock system to be enabled. If the J7 Aux connector is used to interface to an additional outside system do so with an isolated Normally Closed relay contact

### **Panic Button**

J8 is the connection point for Panic Buttons also called “Emergency Stops”. These emergency stops differ in intent from the externally mounted “Emergency System Shutdown” switch. The Panic Button is typically located inside the control area for the use of the occupants of the lab. It is suggested that emergency stop buttons are installed at various locations around the laser control area to permit the shutdown of lasers easily

by personnel inside the lab should an emergency arise. All of the emergency stop buttons must have normally closed contacts and be wired in series (current loop).

Any of the Safety loop connectors which are not used should be shorted to themselves to allow the interlock loop to close.

### **System Enable**

J9 is the “System Enable” connector. This connector parallels the function of the front panel push button labeled “enable”. In this manner, the front panel “enable” control can be remoted to a convenient location or even controlled by other systems. To remote this control hook a SPDT normally open pushbutton switch across these terminals. In cases where the system enable button is remoted the front panel button will still function.

If the enable is to be automated or tied to another system, do so with the use of an isolated relay to as to maintain isolation of the Laser Sentry’s circuitry.

### **Exit Request**

J10 is the “Exit Request” connector. This connector parallels the function of the front panel push button labeled “Exit”. In this manner, the front panel “exit” control can be remoted to a convenient location or even controlled by other systems. To remote this control hook a SPDT normally open pushbutton switch across these terminals. In cases where the exit button is remoted the front panel button will still function.

If the exit is to be automated or tied to another system, do so with the use of an isolated relay to as to maintain isolation of the Laser Sentry’s circuitry.

### **BI-LUME, LED Illuminated Safety Sign**

J11 is the interface to the Rockwell Laser Industries BI-LUME illuminated Laser Safety sign. See BI-LUME manual for additional data. These outputs are low voltage, low current signals, do not attempt to drive other signage or devices directly from this interface. The J11 ‘yellow’ and ‘red’ outputs are fuse protected at ‘F2’ and ‘F3’ respectively. DO NOT SHORT CIRCUIT J11 outputs. Fuse protection at 0.2 amps for yellow and red. Green output is limited by the primary system fuse F1 (2 Amp)

### **TRI-LUME, Illuminated Safety Sign**

J11 is the interface to the Rockwell Laser Industries TRI-LUME Illuminated Laser Safety Sign. See TRI-LUME manual for additional data. These outputs are low voltage, low current signals, do not attempt to drive other signage or devices directly from this interface. The J11 ‘yellow’ and ‘red’ outputs are fuse protected at ‘F2’ and ‘F3’ respectively. DO NOT SHORT CIRCUIT J11 outputs. Fuse protection at 0.2 amps for yellow and red. Green output is limited by the primary system fuse F1 (2 Amp)

### **Interlock Closed**

J12 is an impedance protected (1K ohm) 12-15VDC signal which is active when the interlock is enabled.

### **Laser Interlocks**

Connectors J13 through J16 are isolated single pole single throw (SPST) normally open relay contacts. These are the primary laser interlock controls. These contacts are rated for 30VDC at 1 amp. These dry contact closures can be used to control the remote interlock connection points on most lasers. These relays are closed when the system is engaged. These are clearly labeled on the PCB. These relays become active after the engage timeout period.

### **Auxiliary Interlocks**

Connectors J17 through J19 are three additional isolated dry contact closures which are active then the system is engaged. These relays provide normally open and normally closed contacts. These are clearly labeled on the PCB. These relays become active after the engage timeout period.

### **Mag Lock**

J20 is an isolated SPDT relay contact intended to be used to control magnetic door latches or similar. This relay becomes active upon the beginning of the engage timeout period. This relay should be used only to switch the low voltage DC current for the latch, not the AC mains.

### **Exit Delay**

J21 is an isolated SPDT relay dry contact which is active only during the duration of the exit mode.

These documents and specifications are preliminary and subject to change without notice. Contact manufacturer for questions or additional data.

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