

ICS-6 ELISe

Expandable Laser Interlock system 'e'

The ICS-6 Expandable Laser Interlock System designed to achieve performance level 'e' (EN ISO 13849-1 PLe), is derived from the ICS-5 which is the most popular Laser Interlock Control System designed and manufactured by Lasermet.

This compact, versatile unit can control laser interlocks, door locks, illuminated warning signs and other equipment. It can operate beam shutters and the laser power with feedback monitoring and fault detection. It can be interfaced to Access Control and Fire Detection Systems and may be fitted with an Override to allow controlled access through interlocked doors while also accepting emergency stop inputs.

The ICS-6 provides even higher levels of safety and functionality than its predecessor and has full start-to-end dual channel architecture and fault detection to meet the latest standards. The ICS-6 complies with the relevant European Machinery Directive Standards and can be connected to achieve EN ISO 13849-1 PLe (Performance Level 'e' - Safety related control systems).

It has a simple, easy-to-use control panel which can be wired directly to 4 interlocks or groups of interlocks.

The ICS-6 functions include the following:

- Full start-to-end dual channel architecture
- Full start-to-end fault detection
- Interlocked mains supply



- Interlocked low voltage supply for beam shutters
- Laser interlock connector operators
- Key switch operation to prevent unauthorised use
- Arm laser button
- Time limited fail-safe override option
- Automatic switching of illuminated signs
- Emergency stop circuit

ICS-6 can be configured as a locking or non-locking interlock system featuring:

- Automatic fault detection and shutdown
- Dual-redundant fail-safe circuitry
- Dual Channel Override control
- Feedback based Sign Control – to maintain warning sign at Danger if the shutter/power control fails to go to the safe condition
- LED indication for the Status of the following:
 - Interlock Switches
 - Expansion cards

- Emergency Stop
- Safety Circuits OK
- System Overridden
- Safety Circuit Fault (Mismatch Fault)
- Laser Armed

Expandable

Several Expansion Cards (which are automatically tested) may be fitted to enable the following options:

- Remote Communications (Ethernet/USB Connectivity)
- Integrated Active Laser Guarding
- Safety Logic Plus integration
- The provision of an uncommitted relay board for future options

The expandable capability of the ICS-6 means that new options can be integrated on additional boards as they are developed.

lasermet
laser safety solutions*

ICS-6 ELISe

Expandable Laser Interlock System to Performance Level e... *continued from page 1*

The standard ICS-6 can be expanded to have 9 interlock outputs by adding the IB9 interlock board. By using the deep back box, contactors can also be added to give interlocked 32A single phase and 3 phase mains supplies.

Further ICS-6 functions:

- ICS-6 can be connected to other Lasernetmet interlock controllers to operate as a master or slave unit.
- Optional safety status and ready status outputs can be provided to communicate with other Lasernetmet interlock controllers or a remote indicator panel
- Surface-mounted, the ICS-6 has a "deep box option" for expansion cards or safety contactors to switch high power or multiple lasers.
- External facility to allow the system to be disabled by an external source e.g. supervisor's key-switch
- Integrated automatic switching of single or dual mode signs
- Connect to virtually unlimited number of door contacts and Emergency Stop Buttons

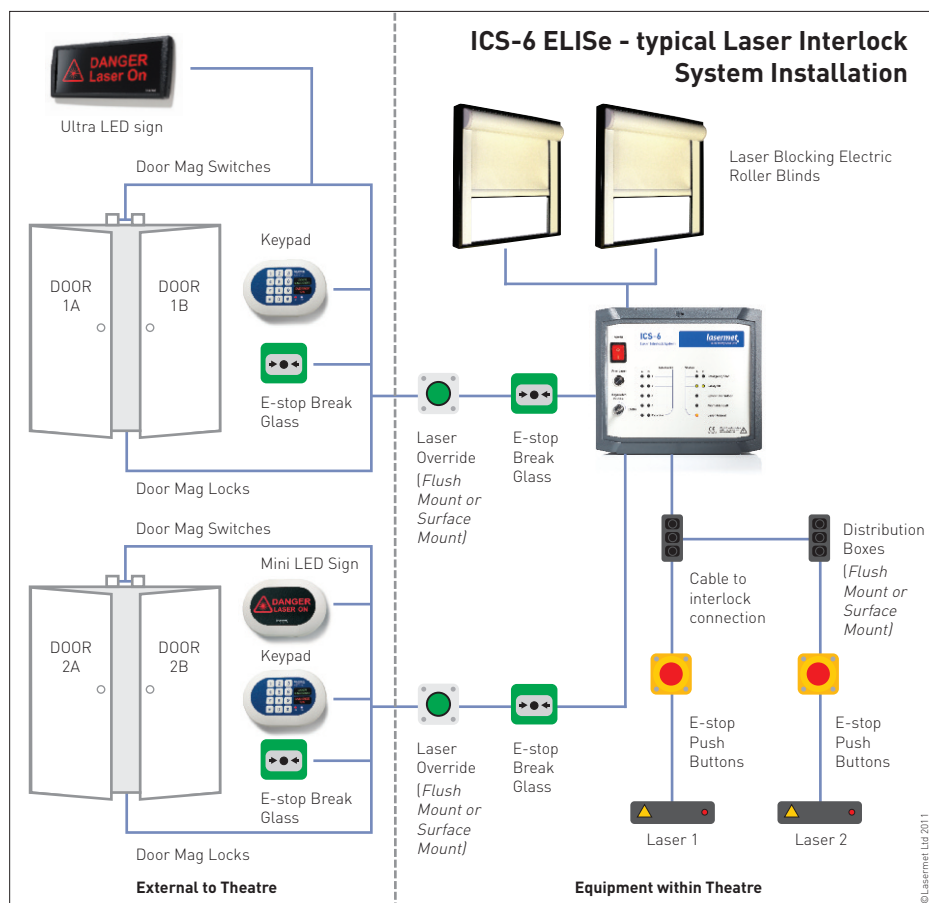
EN ISO 13849-1 Performance Level e (PLe)

The Performance Level of ICS-6 ELISe is based on the ability of the safety-related parts to perform a safety function, which is expressed through the determination of the performance level (PL).

The integrity of the correctly specified and installed ICS-6 to EN ISO 13849-1 to 'Performance Level e' means that it

is almost not possible for a failure to occur that results in a dangerous situation over the lifetime of the installation, assuming the system has been correctly installed, commissioned and maintained in accordance with the appropriate instructions.

These measures are vital to ensure the safety of personnel and surrounding infrastructure.



ICS-6 and Laser Jailer

Active Laser Guarding System

Active Laser Guard integration option

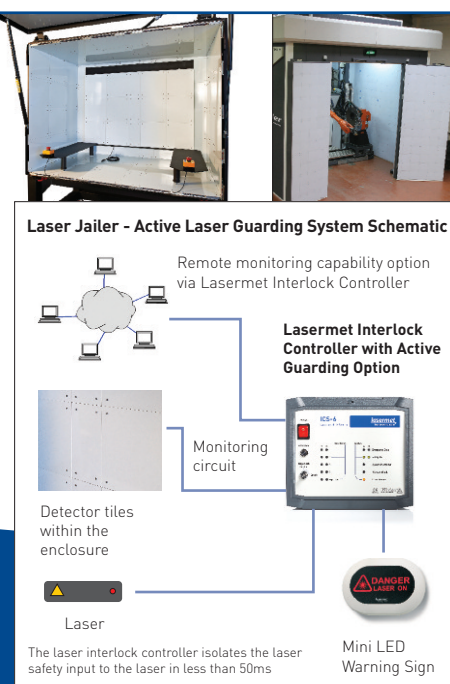
The ICS-6 can be integrated with the Active Laser Guarding System - Laser Jailer.

Laser Jailer is a modular active guarding system which is built into the internal structure of a laser safety enclosure. It is designed to provide protection from multi-kw lasers. If the laser beam inadvertently strikes the internal wall of the enclosure, which comprises of an array of detector tiles, the interlock controller detects this signal as part of

its monitoring function and isolates the laser safety input in less than 50ms.

The ICS-6 ELISe is specifically designed to accommodate an expansion card dedicated to controlling the active guarding function, which can be used with any type of laser covering any wavelength and power.

The ICS-6 failsafe interlock control system automatically tests the operation of the detector panel array whenever the system is armed. It then continues to monitor the system. Patents applied for.



ICS-6 & Safety Logic Plus

Logic Integration System

Safety Logic Plus integration option

Lasermet's Safety Logic Plus is a simple but cost effective and safe concept whereby the logic configuration required for a safety interlock system is hard wired in a single logic enclosure.

The system uses modules that receive inputs from all of the interlock switches individually from the laser facility. The enclosure contains all of the logic functions for the safety interlock. It is set to arm the laser via the Lasermet Interlock Controller when all of the safe conditions have been met. This includes self-checking.

Customers can...

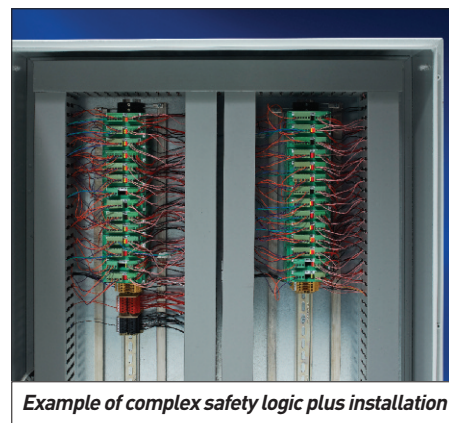
- Design and build complex safety interlock systems

- Virtually eliminate obsolescence (30+ years life expectancy) as there is no software, no Programmable Logic Control, no operating system and no specialist training
- Simplify on-site installation and reduce installation time and costs
- Simplify testing and fault finding

Simple design - Easy to maintain and understand

- All safety switches are wired back to the enclosure
- All logic functions are performed in the enclosure
- Modules are used for all logic functions

Safety: It is a fail-safe system: It uses dual channels: It has full cross checking of all circuits. The laser will not arm until all circuits are checked



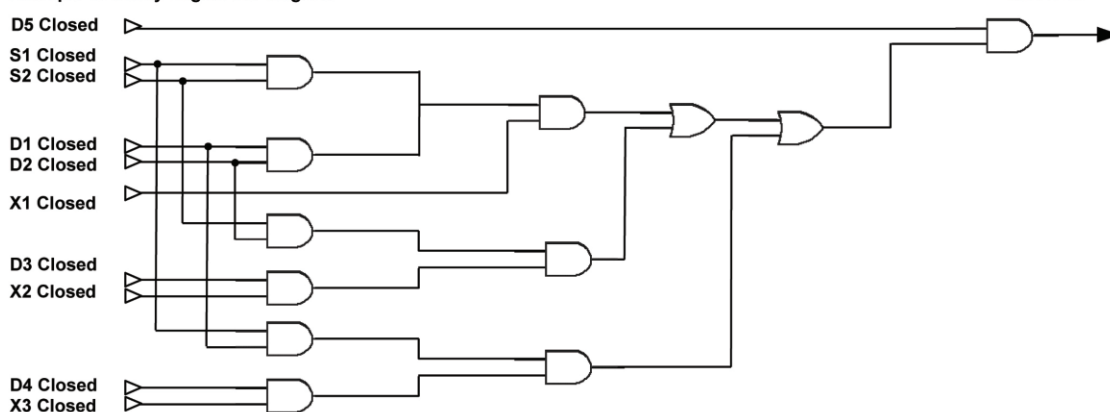
Example of complex safety logic plus installation

on both channels and all conditions are satisfied - including self-checking.

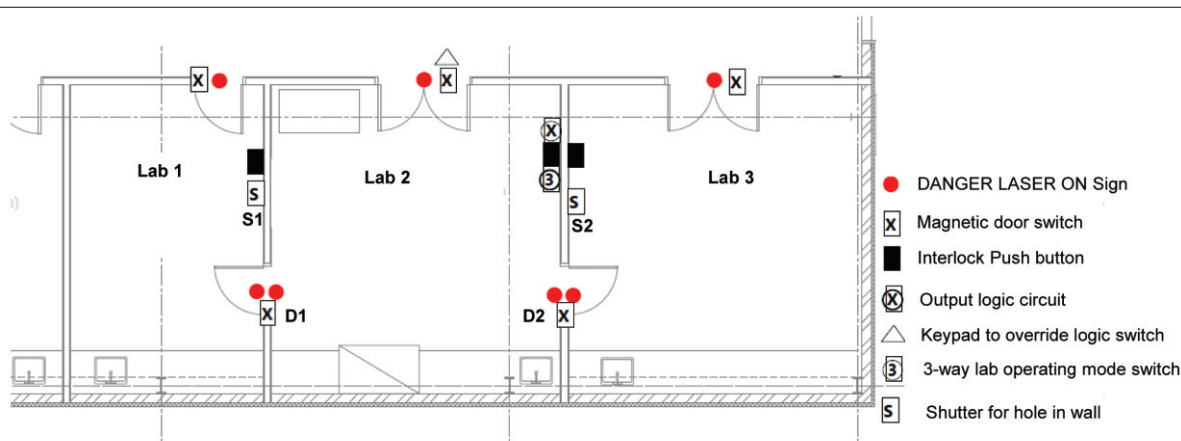
Costs are reduced because installation, maintenance and testing is straightforward; no specialist PLC training is required; the design enables easy and fast fault finding; and logic changes are done within the enclosure.

Safety Logic Plus is a dual channel, cross-checked system that uses simple proven components, follows basic engineering logical principles and is cost effective.

Example of Safety Logic Plus diagram



Typical example of safety logic plus diagram derived from example lab set up



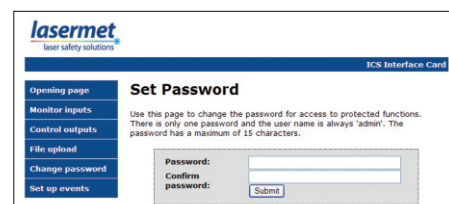
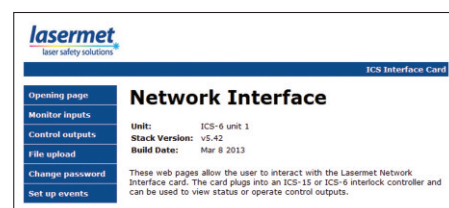
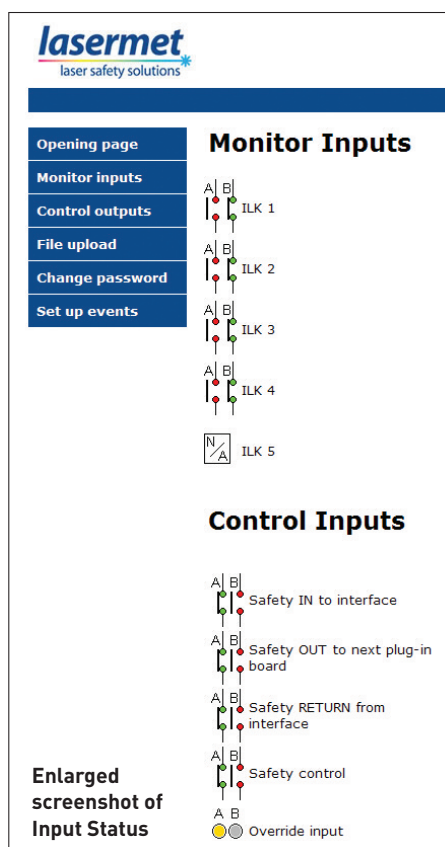
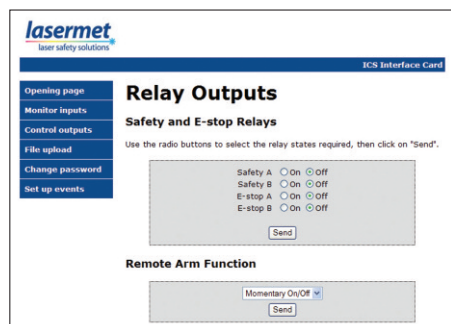
Remote Communications and Control

Network Communications Interface

The Network Board allows the ICS-6 to be plugged into an ethernet network such that it may be monitored and optionally armed remotely.

The Interface provides monitoring of the ICS-6 inputs so that the status of the ICS-6 and connected interlock signals may be monitored.

Examples of the browser based interface screenshots show the status of the ICS-6 inputs and outputs.



ICS-6 ELISe front panel

ICS-6 Specifications

	ICS-6	ICS-6 + IB9 Enhancement	ICS-6 + IB9 + Contactor Enhancement
Interlocked outputs	3 x outputs (rated at 6 A at 110/250 VAC / 50 VDC) Configure as desired e.g. 1 off Interlocked mains output (6 A) 1 off Interlocked shutter output (for up to 4 shutters) 1 off Interlock connector operator	8 A at 110/250 VAC / 50 VDC Configure as desired e.g. 1 off Interlocked mains output (8 A) 1 off Interlocked shutter output (for up to 6 shutters) 7 off Interlock connector operators	8 x outputs (rated at 8 A at 110/250 VAC / 50 VDC) 4 x mains outputs (rated at 32 A, 415 VAC) Configure as desired e.g. 1 off Interlocked mains output (32 A) 1 off Interlocked 3-phase output (32 A) 1 off Interlocked shutter output (for up to 30 shutters) 7 off Interlock connector operators
Door interlock switches	Unlimited numbers can be connected. Monitoring available for 4 switches or groups of switches		
Warning light output	110/230 V or 24 VDC, 1 A. Automatic switching of single or dual message signs		
Emergency Stops	Unlimited numbers of emergency stops can be connected. Can be connected into Fire Alarm or Access Control system		
Supply	110/230 V, 1 A + connected load		
Size	265w x 230h x 86deep (mm)	265w x 230h x 145deep (mm)	265w x 230h x 145deep (mm)
Weight	2 kg	2.2 kg	3 kg
Directives	Conforms to Machinery Directive, Low Voltage Directive, EMC Directive		
Standards	Meets EN954-1 & EN ISO 13849-1 PLe (Cat 3 safety system, performance level 'e'), EN61508 (SIL 4), EN61010, EN60947-1		