

ICS-15XM Laser Safety Interlock

Failsafe laser safety interlock control system for advanced installation

The ICS-15XM is the most adaptable, expandable, all-encompassing laser safety interlock system yet developed by Lasermet.

Its extended capability includes full dual channel architecture including dual safety and emergency stop circuits with separate dual channel control for each circuit.

It can display up to 10 interlocks plus two emergency stop circuits.

It has 9 output contacts for operating interlocks, beam shutters and door locks.

It can be remotely monitored over a network and the internet with the plug-in expansion module.

The interlock output functions include:

- Interlocked mains power supply
- Interlocked low voltage supply for directly powering laser shutters, door locks, low voltage warning signs and other accessories
- Laser interlock connector operators
- Keyswitch operation to prevent unauthorised use
- Arm and disarm Laser button
- Time limited fail-safe override option
- Automatic switching of illuminated signs
- Emergency stop circuit



Expansion sockets link to:

- Active Laser Guarding Systems
- Safety Logic Plus
- Node based intelligent interlocks
- RF interlocks
- Remote Monitoring using Network and Internet Connectivity

Other beneficial features include:

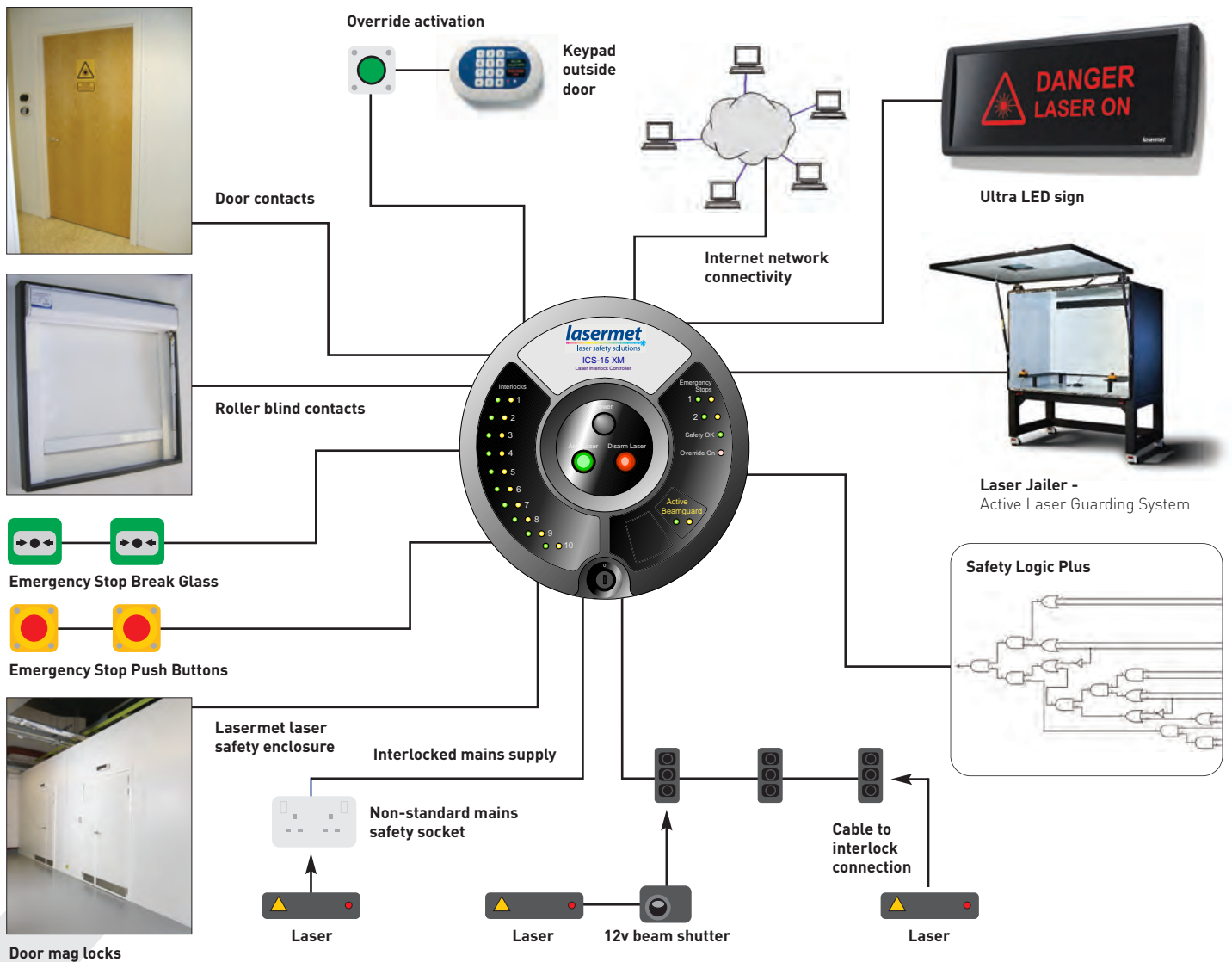
- Configurable as locking/non-locking interlock
- Automatic fault detection system
- Complies with all of the relevant international standards (see specification sheet)

- Full dual channel cross checking
- Autodimming of LEDs
- Two dedicated sign control outputs
- Can operate and monitor safety contactors for high power switching of lasers

The system has been designed to comply with Machinery Directive standards for safety control systems and to EN 61508. It is suitable for use as a control system to SIL3 or as a component in a SIL4 system.

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Laser Safety Interlock Control System ICS-15XM



System description

The ICS-15XM laser safety interlock controller is designed for use with multiple inputs to create a sophisticated interlock system to prevent users being inadvertently exposed to laser beams.

The system comprises of the main unit usually mounted on the wall of the laser enclosure room together with interconnections to multiple inputs and outputs - all dependent on the particular installation.

Purpose and capability

The ICS-15XM will control an interlock system to provide laser safety protection. It can monitor many switches and doors and disable the laser if any of these switches are open.

Designed for long-term service, the ICS-15XM is not processor controlled and therefore does not have the obsolescence issues associated with operating systems, microprocessors and programming languages.

It is ideal for larger complex interlocks and is adaptable and flexible in its ability to integrate with safety related equipment such as Lasermet's Active Laser Guarding System and Safety Logic Plus, (the integrated connectivity logic system for laser facility buildings).

Internet network connectivity

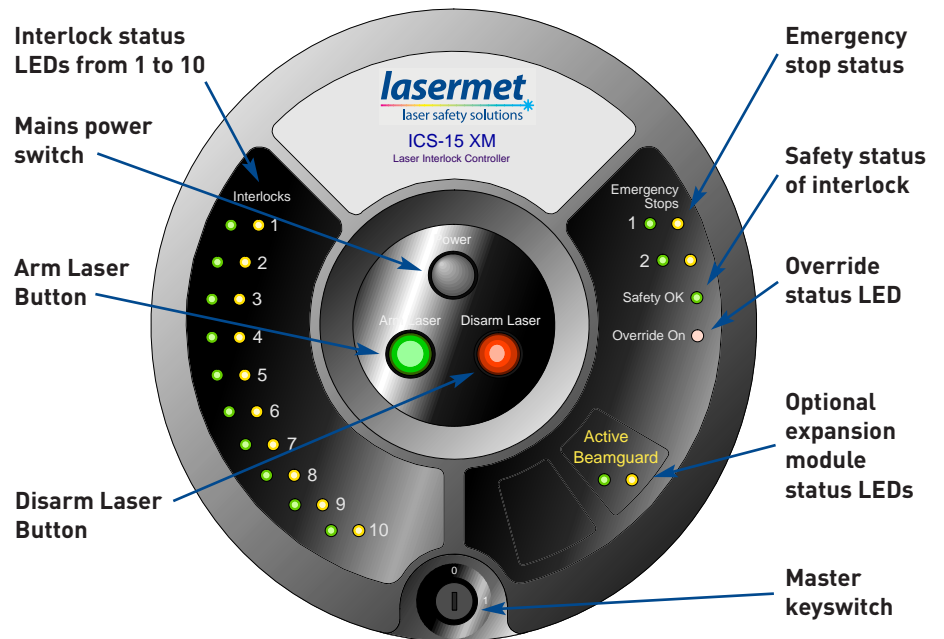
The Communications Module enables the ICS-15XM to be networked so that it can be monitored remotely. It provides in-depth access and diagnostics of the system to quickly identify any area of concern.

Inputs

The ICS-15XM system can be connected to any number of door switches and can indicate the status of up to 10 switches or groups of switches. Further inputs can be added by external connections or by using Lasermet's Safety logic Plus. The ICS-15XM can be connected to any number of Emergency Stop switches and can indicate the status of up to two switches or groups.

Interlock Inputs and Outputs

These are all Volt free cross checked safety interlock outputs.



Interlock outputs

Qty	Voltage or type	Type	Description
1	240V AC / 8A	Output	Laser power supply (Higher current capacity available)
1	24V DC / 3A	Output	Supplies up to 15 LS-20-12 shutters
1	12V DC / 3A	Output	Supplies up to 24 LS-20-12 shutters
6	50V DC / 8A	Output	Volt free laser interlock operators – contact rating 50V DC 8A

This interlock output configuration shown above is a typical example only. There are a total of 9 interlock outputs which can be configured as desired.

Other outputs

Qty	Voltage or type	Type	Description
2	240V AC or 24V DC	Output	Dedicated to warning signs - mains or low voltage
1	240V AC	Output	Active when system switched on

Inputs

Qty	Type	Description
10+	Interlock Inputs	Inputs – virtually unlimited number of door switches. Up to 10 of these switches or groups of switches can be monitored
2+	Emergency stop input	Emergency Stop switches. ICS-15XM can indicate the status of up to two switches or groups.
1	Master Enable	Dual channel Master controls numerous Interlock controllers
1	Override	Contact Input
1	Override keypad	Direct connection to Lasermet ICS-KP12 Keypad
2	Output monitor	To prove safe condition of output devices – shutters, contactors etc. – prior to arming. The ICS15-XM is compatible with SIL3 rated shutters (LS-20-SIL3) to provide a Safety Integrity Level 3 to EN 61508.

Optional expansion modules

Qty	Voltage or type	Type	Description
2	240V AC or 24V DC	Output	Dedicated to warning signs - mains or low voltage
2	240V AC or 24V DC	Output	Dedicated to warning signs - mains or low voltage
1	240V AC	Output	Active when system switched on

Master or Slave

The ICS-15XM can be used as either a master or slave controller when used with other Lasermet interlocks systems. A remote master switch or master interlock system can be connected to control one or more ICS-15XM's from one central point preventing the interlocks and associated lasers from being armed. The Master Enable input is dual-channel and any mismatch between the channels is detectable.

Easy to Use

The ICS-15XM has an Arm Laser button which is pressed to arm the laser when all the safety requirements are met, and a Stop button which may be pressed to disable the laser. A key lock prevents unauthorised use of the system.

Safety mismatch detection can be implemented for maximum safety if all of the interlocks have dual channels applied. If all the door interlock and emergency stop switches have two contacts, one in each safety loop, then both safety circuits should open more or less simultaneously. If this does not happen then the ICS-15XM will indicate this and prevent the laser from arming.

Override facility and options

The ICS-15XM can be configured so that some, or all, of the interlock inputs can be overridden to allow suitably qualified personnel to access the laser enclosure. This includes the option of using the Lasermet KP12 keypad that provides a fail-safe timed override controlled by a key code. Alternatively, Lasermet produce a fail-safe timer module that fits inside the ICS-15XM that can be activated by a pushbutton or keyswitch.

The override can also be operated directly without a timer. In normal configuration the Emergency Stop and Master Control signals cannot be overridden.

Internal Diagnostics

With more complex interlocks and dual safety circuits it can be time-consuming to locate faults which are preventing the system from working. The ICS-15XM has various test modes and has a number of internal indicator LED's which allow the state of the system to be quickly determined. Indicators are provided for both safety circuits of every input, the expansion module socket and every internal relay. In this way it is possible to locate faults more easily than having to trace the circuits through with test equipment. With the optional communications module these indications can be accessed remotely.

Conformance

- Machinery Directive
- Low Voltage Directive
- Electromagnetic Compatibility Directive
- And meets the following European Standards:



- EN ISO 13849-1:2008 Safety of Machinery: Safety-related parts of control systems
- EN ISO 12100:2010 Safety of Machinery: General principles for design
- EN 61010-1:2010 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory use
- EN 60947-1:2007 Low Voltage Switchgear and Control Gear
- EN 61508-1:2010 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems
- EN 60950-1:2006 Information Technology Equipment- Safety.