ImageXpress HCS.ai

High-Content Screening System

Safety Guide

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MOLECULAR DEVICES

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Contents

Safety Information

This guide describes the safe use of the ImageXpress® HCS.ai High-Content Screening System. Safety includes an understanding of the information in this guide, the safety labels on the system, and the precautions that you must follow before and during operation of the system.

For complete details on using the ImageXpress HCS.ai system, review the documentation on the Molecular Devices Knowledge Base at support.moleculardevices.com.

When using the ImageXpress HCS.ai system, always observe Good Laboratory Practices (GLP).

It is important to confirm that everyone involved with the operation of the ImageXpress HCS.ai system has:

- Received instruction in general safety practices for laboratories.
- Received instruction in specific safety practices for the system.
- Read and understood all Safety Data Sheets (SDS) for all materials being used.
- Read and understood all system documentation, including all danger, warning, and caution statements.

Always remember that the key to safety is operating the system with care. The safety of personnel and equipment can only be ensured if you strictly observe all safety instructions and safety-related warnings.

DANGER! If the ImageXpress HCS.ai system is used in any manner not specified by Molecular Devices, the protection provided by the system may be impaired.

Intended Use

The ImageXpress HCS.ai High-Content Screening System—when used with the MetaXpress® Acquire Image Acquisition Software—is an integrated cellular imaging system designed for rapid, automated screening of fluorescently labeled biological samples in microplates as well as label-free imaging using transmitted light.

DANGER! If the ImageXpress HCS.ai system is used in any manner not specified by Molecular Devices, the protection provided by the system may be impaired.

Note: The ImageXpress HCS.ai system is for research use only. It is not for use in diagnostic procedures.

Safety Symbols in This Guide

All safety symbols in this guide are framed by a triangle. An exclamation mark is used for most safety symbols. Other symbols can warn of specific hazards, such as biohazard, electrical, or laser safety warnings.

When danger, warning, or caution statements appear in this guide, ensure you follow the related safety information.

The following safety symbols may appear in this guide:

DANGER! A danger statement indicates a situation or operation that could cause serious personal injury or death if precautions are not followed. The danger symbol can vary depending on the hazard. The definition of the symbol is included in the text of the statement.

WARNING! A warning statement indicates a situation or operation that could cause personal injury if precautions are not followed. The warning symbol can vary depending on the hazard. The definition of the symbol is included in the text of the statement.

CAUTION! A caution statement indicates a situation or operation that could cause damage to the system or loss of data if correct procedures are not followed.

In addition, the following informational symbols appear in this guide:

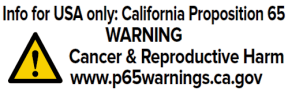
Note: A note calls attention to significant information.

Tip: A tip provides useful information or a shortcut, but is not essential to the completion of a procedure.

Safety Labels on the System

Each safety label found on the ImageXpress HCS.ai system contains an alert symbol to indicate the potential safety hazard. The following table lists the alert symbols that can be found on the instrument and the water immersion controller.

Symbol	Indication
	Indicates that the product documentation must be consulted.
	Indicates a potential heat hazard.
	Indicates a potential lifting hazard. To prevent injury, use a minimum of two people to lift the instrument. See the *ImageXpress HCS.ai User Guide* for details on the weight of the instrument.
	Indicates CSA certification.

Symbol	Indication
	Indicates European technology conformity.
	Indicates United Kingdom technology conformity.
	Indicates Korean technology conformity.
	Indicates compliance with the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. You must not discard this electrical or electronic product or its components in domestic household waste or in the municipal waste collection system. For products under the requirement of the WEEE directive, contact your dealer or local Molecular Devices office for the procedures to facilitate the proper collection, treatment, recovery, recycling, and safe disposal of the device.
	Indicates the environmental friendly use period for China RoHS. The symbol may indicate the number of years in the use period.
	Indicates that there is an authorized representative in the European community.
	Indicates the instrument manufacturer.
	Indicates the instrument manufacture date.
	Indicates compliance with California Proposition 65, which requires businesses to warn Californians about significant exposures to chemicals that cause cancer, birth defects, or other reproductive harm.

Note: See the documentation for the external light source for details on the safety labels on the light source.

Protective Housing and Safety Interlocks

The ImageXpress HCS.ai system features a protective outer housing and interlocks, which are designed to protect you from exposure to light, hot surfaces, moving parts, and high voltage.

The top door of the instrument is interlocked. Do not operate the instrument with the top door open. Do not disable an interlock. When the top door is open, the laser light source is disabled to prevent hazards associated with laser emission.

DANGER! Do not override any interlocks, open the protective housing, or attempt to gain access to the interior of the instrument. These actions can damage the instrument components and result in hazardous exposure to laser light, hot surfaces, moving parts, or high voltage.

Safety Interlock Failure

If the external light source or the focusing LED stays on when the top door of the instrument is open, it is unsafe to continue using the instrument due to a safety interlock failure. Contact Molecular Devices Technical Support immediately. See Obtaining Support on page 15 for details.

Non-Interlocked Panels

The instrument has several panels that are intended for use by field service personnel only and are not interlocked. All service panels are secured to the protective housing with screws and require a special tool to remove.

WARNING! If you are instructed to remove non-interlocked panels, make sure that the instrument is powered OFF and the power cable is unplugged. Never operate this instrument with any covers or panels removed. Do not attempt to access the service-only areas inside the instrument when the power cable is connected.

Light Source Safety

The ImageXpress HCS.ai system is equipped with an external light source, which is connected to the instrument with a light guide. Depending on the model, the light source is one of the following:

- The Advanced Gen1 model uses a Lumencor laser light source.
- The Advanced Gen2 model uses a Pavilion Integration Corporation (PIC) laser light source.
- The Confocal and Widefield models use an LED light source.

Laser Safety

WARNING! LASER LIGHT. This symbol indicates that a potential hazard to personal safety exists from a laser source. When this symbol appears in this guide, follow the specific safety information related to the symbol.

The ImageXpress HCS.ai Advanced system is rated a Class 1 laser product.

The external light source for the ImageXpress HCS.ai Advanced system is a Class 4 (with Gen1) or Class 3B (with Gen2) high-power laser product.

Note: The ImageXpress HCS.ai Widefield system and ImageXpress HCS.ai Confocal system both use an LED light source and do not contain any laser products. See LED Safety on page 9 for details.

Never attempt to open the instrument or access the high-power laser product. Installation and service is to be performed by a Molecular Devices Field Service Engineer only.

The Class 4 (with Gen1) or Class 3B (with Gen2) laser product is designed and tested in accordance with IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1, EN 61010-1, and IEC/EN 60825-1

Note:

- For Gen1, see lumencor.com/products/celesta-light-engines for complete details on the external laser light source.
- For Gen2, see pavilionintegration.com/products-solutions/lapis-integrated-engines/lapis-integrated-high-power-multi-laser-engine for complete details on the external laser light source.

Item	Description
Emitted Wavelength	405 nm - 748 nm
Maximum Output Power	Approx, 800 mW
Laser Class (Gen1)	Class 4
Laser Class (Gen2)	Class 3B

The ImageXpress HCS.ai Advanced system instrument is equipped with a redundant laser safety system. When samples are being loaded or unloaded, hardware interlocks prevent the laser modules from powering on until the instrument top door is closed.

DANGER! VISIBLE AND/OR INVISIBLE LASER RADIATION. Do not operate the external light source when housing is open and interlocks are defeated. Avoid eye or skin exposure to direct or scattered radiation.

DANGER!

- A Class 4 or Class 3B laser beam can cause materials to smolder or burn, especially at close range. Dark materials, which absorb heat, and materials such as plastic, paper, and fabric can easily be burned by visible laser beams.
- Fumes produced when laser radiation vaporizes or burns a target material—whether metallic, organic, or biologic—may be hazardous.
- To prevent damaging materials at close range in a widefield acquisition, avoid setting an exposure time of more than 10 seconds. In addition, avoid exposing any single site for longer than 10 seconds. (For example, if you are acquiring a Z Series with 10 planes, avoid setting an exposure time of over 1 second.)
- To avoid unintentional operation of the Class 4 or Class 3B laser beam, always power off the external light source when not in use.

WARNING! LASER LIGHT.

- Do not attempt to repair or adjust the Class 4 or Class 3B high-power laser product. Removing the top panel, safety interlocks, external light source, and microscope objective and then looking into the Class 4 or Class 3B laser beam can cause severe eye injury and blindness.
- Operate the instrument only when all the doors and panels of the instrument are in place and closed.

LED Safety

The ImageXpress HCS.ai Confocal system and Widefield system uses a solid-state LED light source. There are no user-replaceable parts in the LED light source. The light source uses an electronic shutter to control the exposure of the sample to excitation light, which helps to minimize sample degradation and photobleaching.

Electrical Safety

To prevent electrical-related injuries and property damage, inspect all electrical equipment before use and immediately report all electrical deficiencies. Contact Molecular Devices Technical Support to service equipment that requires the removal of covers or panels. See Obtaining Support on page 15 for details.

To ensure sufficient ventilation and allow access to the power, light source, and gas supply connections, the instrument requires at least 25.4 cm (10 in.) of clearance on the left side.

We recommend that you power off the instrument when it will not be used for an extended period of time.

WARNING!

- **The ImageXpress HCS.ai system is an Equipment Class 1 product that relies on protective earth grounding for safe operation. Any interruption of the protective earth ground conductor—inside or outside the—or disconnection of the protective earth ground terminal can result in personal injury.**
- **Do not block the power switches on the left side of the instrument or on the external light source.**

WARNING! HIGH VOLTAGE. Do not operate the external light source with the external light source housing open. With the ImageXpress HCS.ai Advanced system, never attempt to open or tamper with the laser light source housing due to the extreme hazard of the Class 4 or Class 3B high-power laser product.

Moving Parts Safety

The ImageXpress HCS.ai system contains moving parts that can cause injury. Under normal conditions, the system is designed to protect you from these moving parts.

To prevent injury:

- Never try to exchange labware, reagents, or tools while the instrument is operating.
- Never try to physically restrict the moving components of the instrument.
- Avoid contact with the top door of the instrument when it is opening or closing.
- Some user-controlled moving parts exist inside the instrument. When performing maintenance operations, avoid contact with parts that are in motion.

WARNING! Do not attempt to access the interior of the system unless specifically instructed to do so by Molecular Devices Technical Support. In addition, do not operate the system with any covers or panels removed. These actions can damage system components and cause injury.

Note: Observe all safety statements for any attached external device during the operation of the system. For details on the operating and safety procedures of an external device, see the documentation for that device.

Lifting Hazard

WARNING! LIFTING HAZARD. The ImageXpress HCS.ai instrument weighs approximately 109 kg (240 lb). Use great care when lifting or moving the instrument. To prevent injury, do not attempt to lift or move the instrument without assistance.

CAUTION!

- Do not slide or push the instrument. Sliding or pushing can damage the feet on the bottom of the instrument.
- Moving the instrument can damage sensitive parts and disrupt optical alignments. When transporting the instrument, use the original packaging and shipping box to properly secure the instrument. Your warranty does not cover problems caused during or as a result of shipment or relocation.

Chemical and Biological Safety

WARNING! BIOHAZARD. Normal operation of the system can involve the use of materials that are toxic, flammable, or otherwise biologically harmful.

WARNING! Never use the system in an environment where potentially damaging liquids or gases are present.

When using materials with the ImageXpress HCS.ai system that are toxic, flammable, or otherwise biologically harmful, observe the following precautions:

- Handle infectious samples based on good laboratory procedures and methods to prevent the spread of disease.
- Observe all cautionary information printed on the original containers of solutions before their use.
- Dispose of all waste in accordance with your lab's waste disposal procedures.
- Operate the system in accordance with the instructions outlined in the *ImageXpress HCS.ai User Guide*, and take all the required precautions when using pathological, toxic, or radioactive materials.
- Splashing of liquids can occur. When working with potentially hazardous liquids, take applicable safety precautions, such as wearing safety glasses and protective clothing.
- Use compressed gas supplies in a well-ventilated area. The instrument is not airtight. Gas can escape into the atmosphere surrounding the instrument. When you use potentially toxic gas, observe the cautionary procedures defined by your safety officer to maintain a safe work environment, such as the use of an automatic warning system.
- Observe the applicable cautionary procedures defined by your safety officer when using toxic, pathological, or radioactive materials.
- Observe the applicable cautionary procedures defined by your safety officer when using flammable solvents in or near that is powered on.

WARNING! BIOHAZARD. You are responsible for decontaminating all system components before returning parts to Molecular Devices for repair. Molecular Devices does not accept items that have not been decontaminated where it is applicable to do so. If parts are returned, they must be enclosed in a sealed plastic bag stating that the contents are safe to handle and are not contaminated.

Before returning parts, contact Molecular Devices Technical Support if you have questions about decontamination. See Obtaining Support on page 15 for details.

Environmental Control System Safety

Take note of the following when using the optional environmental control system:

WARNING!

- **Do not operate the environmental control system with substances or under conditions that can cause a risk of explosion, implosion, or the release of gases.**
- **Use compressed gas supplies in a well-ventilated area. The instrument is not airtight. Gas can escape into the atmosphere surrounding the instrument. When you use potentially toxic gas, observe the cautionary procedures defined by your safety officer to maintain a safe work environment, such as the use of an automatic warning system.**
- **Use only the gases described in the *ImageXpress HCS.ai User Guide*, which are CO_2, N_2, and compressed air. NEVER attempt to connect a pure O_2 tank or any other unsupported gas supply to the instrument.**

WARNING! BIOHAZARD. You are responsible for decontaminating all system components before returning parts to Molecular Devices for repair. Molecular Devices does not accept items that have not been decontaminated where it is applicable to do so. If parts are returned, they must be enclosed in a sealed plastic bag stating that the contents are safe to handle and are not contaminated.

Before returning parts, contact Molecular Devices Technical Support if you have questions about decontamination. See Obtaining Support on page 15 for details.

CAUTION!

- The environmental control system includes heated tubing that controls the temperature of the gas flow. Some part of the instrument can reach temperatures of up to 40°C (104°F). Avoid touching the temperature-controlled parts of the system.
- To prevent damage to the instrument, do not allow the gas pressure to exceed 2.1 bar (30 psi).
- With multiple gas supplies, use the same gas pressure for each gas supply.
- Do not use the instrument with hazardous substances.
- If you use any substances or materials that pose a risk of infection, you are responsible for applying best practices when handling these materials.
- If the CO_2 port or the N_2 port is not connected to a gas supply, use a blind plug (included) to close it off.

See the *ImageXpress HCS.ai User Guide* for details on using the environmental control system.

Water Immersion Safety

Before using the optional water immersion system, review the following information to ensure proper operation and to reduce the risk of damage to the instrument.

CAUTION!

- Do not remove or change the water immersion objectives that are installed within the instrument. A Molecular Devices Field Service Engineer must install and remove water immersion objectives.
- Do not touch the leak detection sensor, which is the brass color ring around the top of the water immersion objective below the cap.
- Do not place the water immersion controller on top of the instrument or near electronics. The water immersion controller is not watertight. Water will not be contained within the controller if water spills into the water immersion controller.
- We recommend that the base of the water immersion controller be level with the instrument.
- Do not move the water immersion controller after installation by the Molecular Devices Field Service Engineer. To ensure high-performance acquisition with water immersion, the Field Service Engineer calibrates the water dispense rate. Changing the position of the water immersion controller can negatively affect the calibration.
- Do not attempt to remove the water immersion controller cover. Except for the water bottles, the controller does not contain any user-serviceable parts.
- We recommend that the base of the water immersion controller be level with the instrument.
- Do not move the water immersion controller after installation by the Molecular Devices Field Service Engineer. To ensure high-performance acquisition with water immersion, the Field Service Engineer calibrates the water dispense rate. Changing the position of the water immersion controller can negatively affect the calibration.

Appendix A: Obtaining Support

Molecular Devices is a leading worldwide manufacturer and distributor of analytical instrumentation, software, and reagents. We are committed to the quality of our products and to fully supporting our customers with the highest level of technical service.

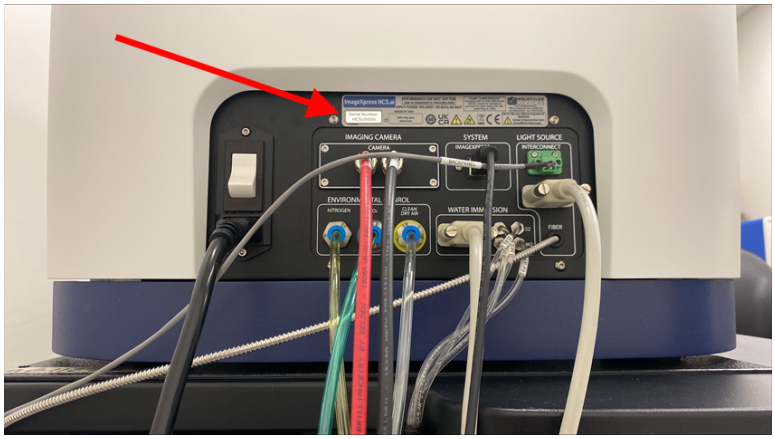
Our Support website—www.moleculardevices.com/service-support—describes the support options offered by Molecular Devices, including service plans and professional services. It also has a link to the Molecular Devices Knowledge Base, which contains documentation, technical notes, software upgrades, safety data sheets, and other resources. If you still need assistance, you can submit a request to Molecular Devices Technical Support.

Technical Support

To contact Molecular Devices Technical Support, submit a support request through the Molecular Devices Knowledge Base at support.moleculardevices.com.

You can also submit a support request by phone. For regional support contact information, go to www.moleculardevices.com/contact.

To expedite support, be prepared to provide the instrument serial number and the software activation code. In the MetaXpress Acquire software, go to the Home page and click **About**. The **About** dialog displays the activation code and the instrument serial number. The serial number can also be seen above the ports on the left side of the instrument.



Documentation

Review the product documentation on the Molecular Devices Knowledge Base at support.moleculardevices.com. In addition, online Help is available within the MetaXpress Acquire software. Press **F1** to access Help for the current page.

Training

Molecular Devices provides training on the general operation of the ImageXpress HCS.ai system at the time of installation. Contact Molecular Devices Technical Support for details on training after installation.

Additional Resources

Web-based microscopy courses:

- www.microscopyu.com
- www.ibiology.org/online-biology-courses/microscopy-series/

The *Molecular Probes Handbook* offers advice on fluorescent probes and can help you determine if there are better stains available for your analysis:

- www.thermofisher.com/us/en/home/references/molecular-probes-the-handbook.html

Filter information:

- www.semrock.com
- www.chroma.com
- www.omegafilters.com

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