

CTS™ Ovation™ Mixer Module

USER GUIDE

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The information in this guide is subject to change without notice.

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Contents

■	CHAPTER 1	Product information	5
		Product description	5
		Features	5
		Contents	5
		Module description	6
		Mixer components	6
		Working space	7
		Module weight	7
		Instrument properties	8
		Properties of CTS™ Ovation™ Mixer Module	8
		Push button control	9
		Speed control	9
		CTS™ Compleo™ Single-Use Kit	9
■	CHAPTER 2	Installation and setup	11
		Packaging contents	11
		Install on Compleo™ instrument	12
		Mixing Bag height adjustment	15
		Power "On" Ovation™ Mixer Module	15
		Ovation™ Mixer Module Connection–Compleo™	16
■	CHAPTER 3	Basic Operation	18
		Automatic	18
		Manual	18
		Safety	19
■	CHAPTER 4	Maintenance	20
		User maintenance schedule	20
		Instrument cleaning	20
		Inspect casing	21
		Power and Fuses	21

- **CHAPTER 5** Troubleshooting 22
 - Troubleshooting 22
- **CHAPTER 6** Compliance 23
 - Compliance standards for Ovation™ Mixer Module 23
- **Safety instructions** 24
 - Safety labels 24
 - Emergency shut-down 25
 - Restart after shut-down 26
 - Warnings and precautions using Ovation™ Mixer Module 27
- **APPENDIX A** Safety 28
 - Symbols on this instrument 28
 - Standard safety symbols 28
 - Additional safety symbols 29
 - Control and connection symbols 31
 - Conformity symbols 31
 - Safety information for instruments not manufactured by Thermo Fisher Scientific 32
 - Instrument safety 32
 - General 32
 - Physical injury 33
 - Electrical safety 34
 - Cleaning and decontamination 35
 - Instrument component and accessory disposal 35
 - Safety and electromagnetic compatibility (EMC) standards 35
 - Safety standards 36
 - EMC standards 36
 - Environmental design standards 37
 - Chemical safety 38
 - Biological hazard safety 39
- **APPENDIX B** Documentation and support 40
 - Customer and technical support 40
 - Limited product warranty 40



Product information

IMPORTANT! Before using this product, read and understand the information in the “Safety” appendix in this document.

Product description

This document is intended to provide instructions for using the CTS™ Ovation™ Mixer Module. The CTS™ Ovation™ Mixer Module provides automated mixing functionality, compatible for use with the Compleo™ system.

Features

The CTS™ Ovation™ Mixer Module provides easy integration of mixing alongside CTS™ Compleo™ unit operations and can be used from research through commercial manufacturing.

- **Compact Module:** Easily integrates with Compleo™ via CAN-bus protocol.
- **Automated Mixing:** Gentle fluid displacement with user-selectable mixing speed and duration.
- **Safe Paddle Design:** Enables quick loading and unloading of the Mixing Bag.
- **Adjustable Components:** Includes an adjustable Mixer Hanger Arm and Mixer Bag Pins to accommodate different Mixing Bag sizes.

Contents

Table 1 CTS™ Ovation™ Mixer Module (Cat. No. [A58163](#))

Material	Amount
CTS™ Ovation™ Mixer Module	1 EA
Power Supply	Included
Standalone Mixing Bag	Not included
CTS™ Compleo™ Single-Use Kit with pre-attached 1 L Mixing Bag	Available separately

Module description

Mixer components

The below image shows the components of the CTS™ Ovation™ Mixer Module.

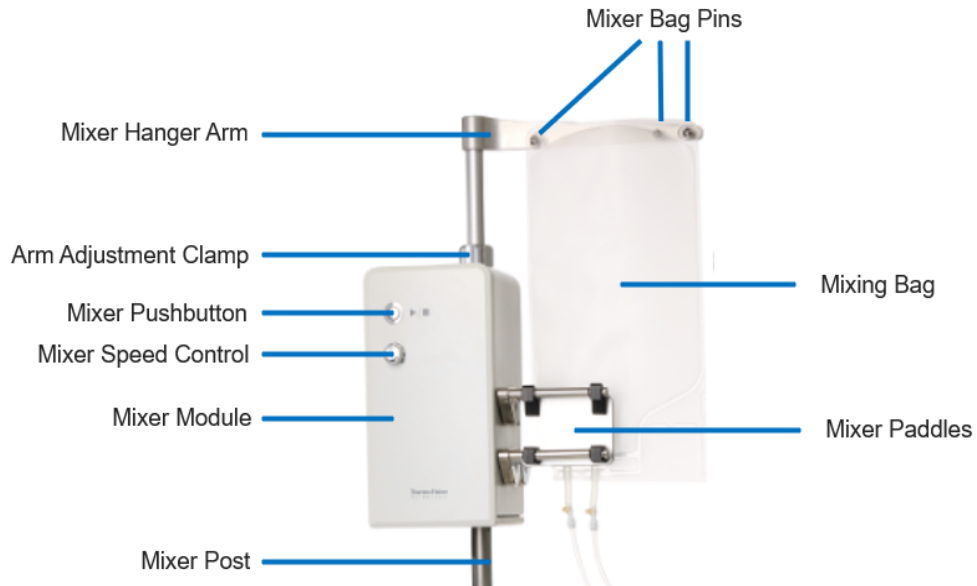


Figure 1 CTS™ Ovation™ Mixer Module

Working space

The Ovation™ Mixer Module is mounted to the Compleo™ instrument using the Post Clamps located on the backside of the instruments.



Figure 2 Compleo™ instrument with Ovation™ Mixer Module

Module weight

Table 2

Type	Weight
Mixer Module including Mixer Hanger Arm	10.8 lb (4.9 kg)

Instrument properties

Properties of CTS™ Ovation™ Mixer Module

Note: The properties in Table 3 are applicable to the mixer as part of the CTS™ Compleo™ system. The CTS™ Compleo™ Single-Use Kit includes a pre-attached 1 L Mixer Bag, from which recommended Mixing Bag working volumes were defined.

Table 3

Category	Property	Value
Electrical	Supply voltage	24 VDC
	Maximum rated input current	5 A
	Fuses	2 × 5 A
Sound level	Maximum sound level	70 dBA (measured 1 m from instrument)
	Typical sound level	65 dBA (measured 1 m from instrument)
Environmental ranges	Ambient temperature	15°C to 30°C
	Transport temperature	0°C to 45°C
	Storage temperature	15°C to 30°C
	Maximum relative humidity	80% (non-condensing)
	Altitude (max.)	2000 m
	Indoor use only	–
	Not intended for use in a wet location	–
	Intended for use in pollution degree 2 environment	–
Operating limits	Mixing Bag - recommended working volume	7 mL to 750 mL (pre-attached FP-FLEX 1000 A bag on Compleo™ kit)
	Maximum bag weight	2.2 lb (1 kg)
	Mixing parameters	Mix and recirculation: 5 to 200 cycles at 1 to 80 cycles/minutes. Dilute mixing: 0 to 80 cycles/minutes. Dispense mixing: 0 to 80 cycles/minutes until all outputs have been dispensed.
	Media temperature	4°C to 38°C
	Media density	1.0 g/mL to 1.1 g/mL (DMSO)

Table 3 (continued)

Category	Property	Value
Operating limits	Media viscosity	1.0 kg/ms $\times 10^{-3}$ to 2.0 kg/ms $\times 10^{-3}$ (DMSO)
CAN-bus connections	Purpose	Connection and control by Compleo™ instrument
	Connector	TE connectivity T4111402051-000 M12 Plug
	Connections	Pin 1: VCC CAN - +5 V out Pin 2: CAN-H – Dominant High Pin 3: CAN-L – Dominant Low Pin 4: GND – Ground Pin 5: GND – Shield (optional)

Push button control

The Ovation™ Mixer Module is controlled by the Compleo™ instrument via CAN-bus and activates automatically as required during a protocol. A mechanical push button at the front of the Mixer Module also enables the user to power the mixer module on and off.

Speed control

The speed of the Ovation™ Mixer Module ranges from 0 to 80 cycles/minutes. When connected via CAN-bus, the speed (cycles/minute) is controlled by the instrument and defined within the protocol being performed. In manual mode, the speed can be adjusted by the Mixer Speed Control at the front of the Module.

CTS™ Compleo™ Single-Use Kit

The Compleo™ Single-Use Kits include a FP-FLEX dual port Mixing Bag designed to maximize mixing efficiency.

- The tube diameter and port geometry have been selected to provide a clear breakpoint between fluid and air within the tube. This ensures optimal fluid management as it enters the Compleo™ system.
- The length of tube connecting the Mixing Bag to the Compleo™ Single-Use Kit has been specified to optimize priming and ensure complete purging of fluid in the return line to the Mixing Bag.

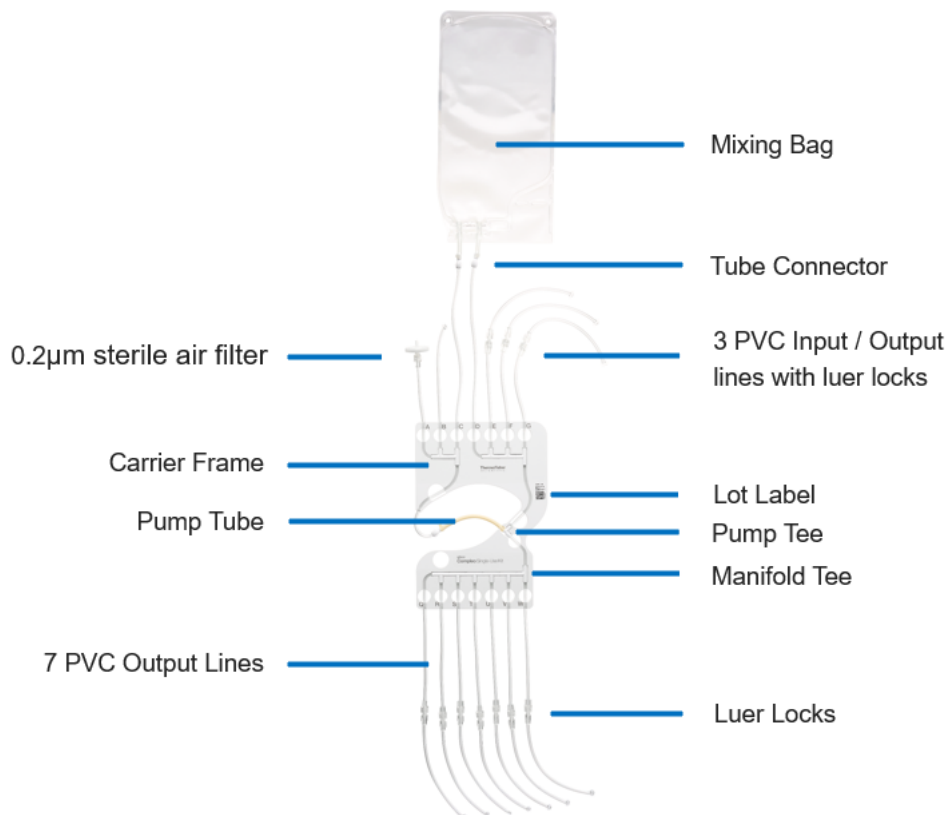


Figure 3 Compleo™ Single-Use Kit Assembly

IMPORTANT! If using the mixer with a mixing bag not supplied by Thermo Fisher Scientific, please consider the following when choosing the mixing bag:

- The FP-FLEX 1000 A 1 L Mixing Bag attached to the Compleo™ consumable has a tapered design at the bottom of the bag. An advantage of the tapered design is that it minimizes the wetted surface area in the bag, hence reducing residual volume. The design and placement of the ports at the bottom of the bag also minimize residual volume.
- The maximum recommended working volume in the Compleo™ pre-attached Mixing Bag is 750 mL, despite the bag having a capacity of 1 L. To maximize mixing efficiency, it is recommended to leave headspace in the bag, enabling fluid displacement. If the bag is too full, fluid cannot be displaced and mixing efficiency is reduced.
- Ensure the Mixing Bag materials of construction are appropriate for the application. For example, if the bag will contain DMSO, it is recommended to use a cryobag. Also ensure that the bag selected has sufficiently low levels of particle contribution.
- It is the customer's responsibility to validate the use and performance of alternative Mixing Bags with the CTS™ Ovation™ Mixer Module.

2

Installation and setup



CAUTION! Before performing the following procedures, read and understand the information in the “Safety” appendix in this document.

Packaging contents

- Ovation™ Mixer Module with pre-assembled Mixer Paddles, Mixer Hanger Arm and connection cables.
- Power Supply (if not connected to instrument power).

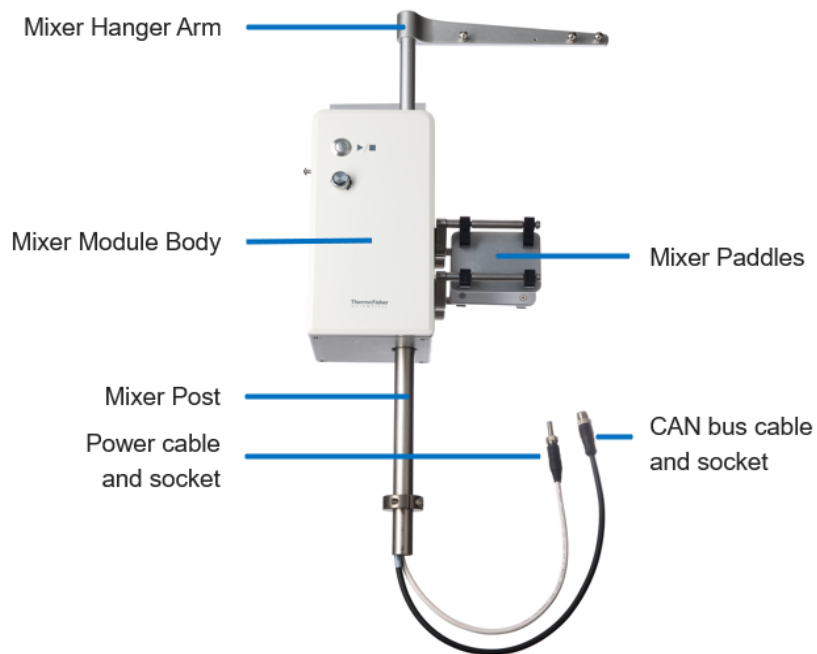


Figure 4 Ovation™ Mixer Module Installation setup

IMPORTANT! Before the installation of the Ovation™ Mixer Module to the Compleo™ instrument, ensure the instrument is installed on a stable bench with at least 4 inches (100 mm) between the rubber feet and the edges of the bench. If a mobile set up is used, it is the user’s responsibility to address all safety hazards and functional risks. This includes adequately supporting the weight of the instrument and ensuring a sufficient wheel span for the stability of both the trolley and the instrument.

Install on Compleo™ instrument

1. Prepare bench space so you can easily access the “On/Off” switch and MAINS IEC Connector at the rear of the Compleo™ instrument.
2. Open the carton and remove the top layer of foam.
3. Grasp the Ovation™ Mixer Module by the main body and Lower Post and lift it out of the bottom layer of foam.
4. Remove the outer packaging.
5. Feed the CAN-bus cable through the Mixer Post Clamp, followed by the Mixer Power Cable.

Note: The CAN-bus socket will not fit through the Mixer Post Clamp if the Mixer Power Cable has already been inserted.

6. Insert the Lower Post of the Mixer Module into the Mixer Post clamp until it rests on the collar; this sets the height of the Ovation™ Mixer Module.
7. Rotate the Ovation™ Mixer Module so the Mixer Paddles face inwards, then tighten the knob.
8. Adjust the Mixing Bag height by loosening the Arm Adjustment Clamp, raising or lowering the Mixer Hanger Arm, then retighten the Arm Adjustment Clamp.
9. Slowly rotate the CAN-bus connector to align the pins. Insert it into one of the CAN-bus sockets, and secure it using the threaded socket.

10. Insert the Mixer Power Cable into the separate Power Supply or into the Bag Mixer Power Connector on the backside of the instrument, and secure it using the threaded socket.

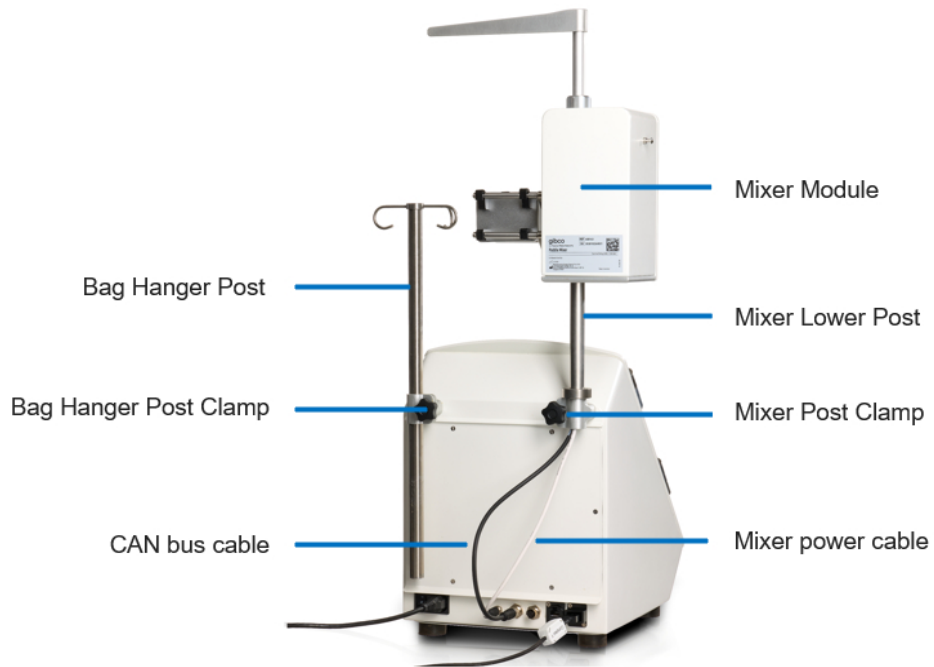


Figure 5 Ovation™ Mixer Module Installation setup

IMPORTANT! The Ovation™ Mixer Module weighs 10.8 lb (4.9 kg). If required, exercise proper caution and seek assistance when installing the Mixer Module or lifting and moving the instrument.

Do not lift the Ovation™ Mixer Module using the Mixer Hanger Arm as it is not fully secured by the Arm Adjustment Clamp and may slide out.

Do not lift the instrument using the Bag Hanger Posts, Mixer Module, cables, or connectors.

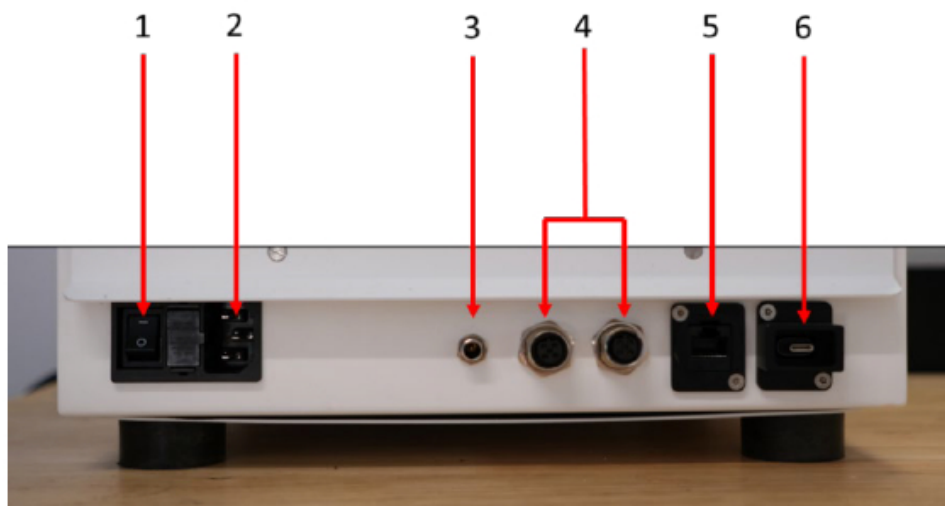


Figure 6 Back View of the Compleo™ instrument

- ① Mains switch
- ② Mains IEC connector
- ③ Bag Mixer Power Connector
- ④ CAN bus sockets
- ⑤ Ethernet port
- ⑥ USB-C port



Figure 7 Assembled Compleo™ System

Mixing Bag height adjustment

1. Check that the Mixer Bag pins align with the Mixer Bag's prepunched holes. Use a 6 mm spanner to remove and reposition pins if necessary.
2. Hang the Mixing Bag on the Mixer Bag Pins and position the bag between the two Mixing Paddles.
3. Rotate the Arm Adjustment Clamp counterclockwise to loosen it.
4. Adjust the height of the Mixer Hanger Arm so the bottom edge of the Mixer Paddles sits just above the top of the Mixing Bag tube ports.
5. Rotate the Arm Adjustment Clamp clockwise to lock the Mixer Hanger Arm in place.

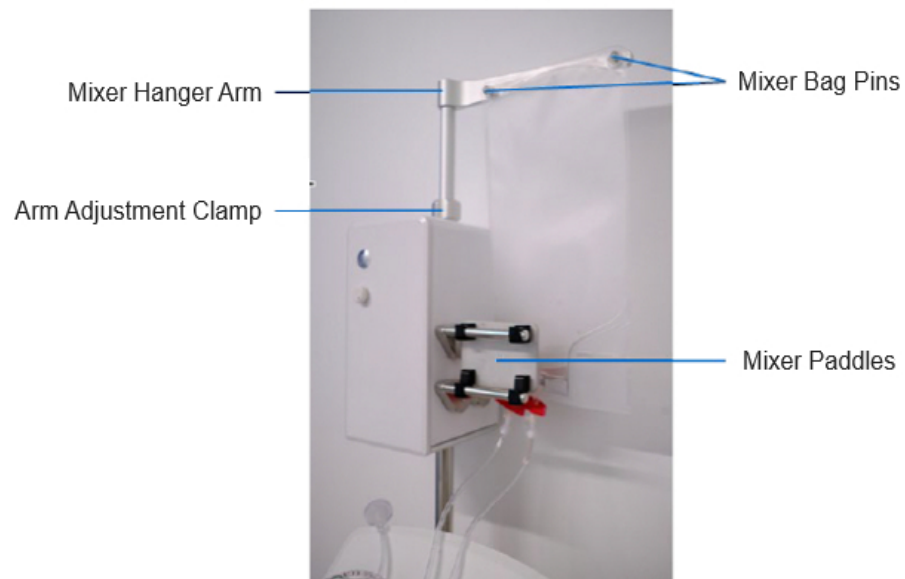


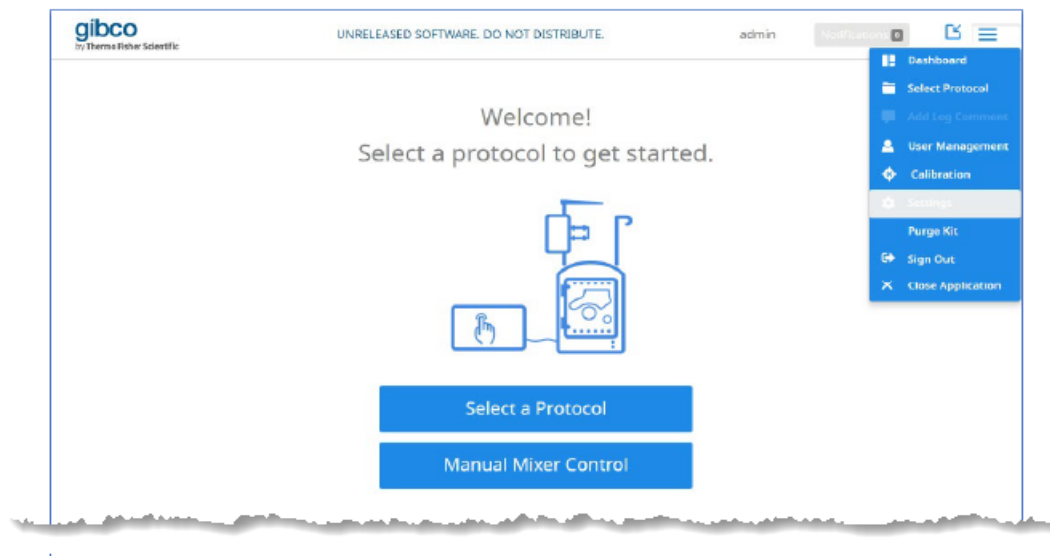
Figure 8 Mixing Bag

Power "On" Ovation™ Mixer Module

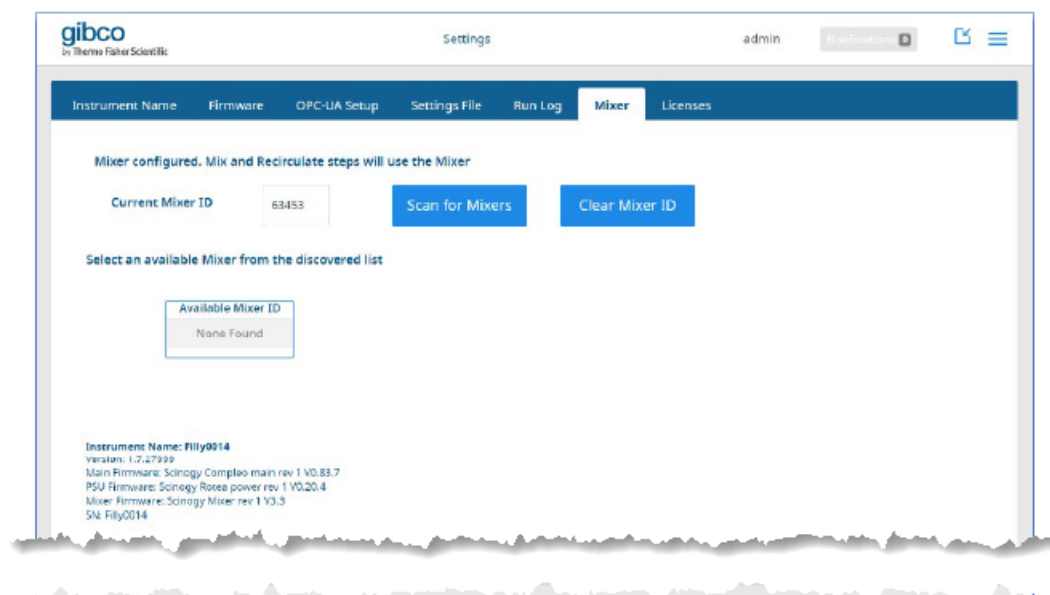
- To Power "On" the Ovation™ Mixer Module, connect it to the Bag Mixer Power Connector on the backside of the instrument, then switch on the instrument's MAINS IEC Switch.
- When using the separate Power Supply, ensure it is connected to the power outlet, then press the power button on the Ovation™ Mixer Module.

Ovation™ Mixer Module Connection–Compleo™

1. The Mixer tab in the Compleo™ application allows the user to connect/scan for its attached Mixer.
2. Select **Settings** from the main menu.

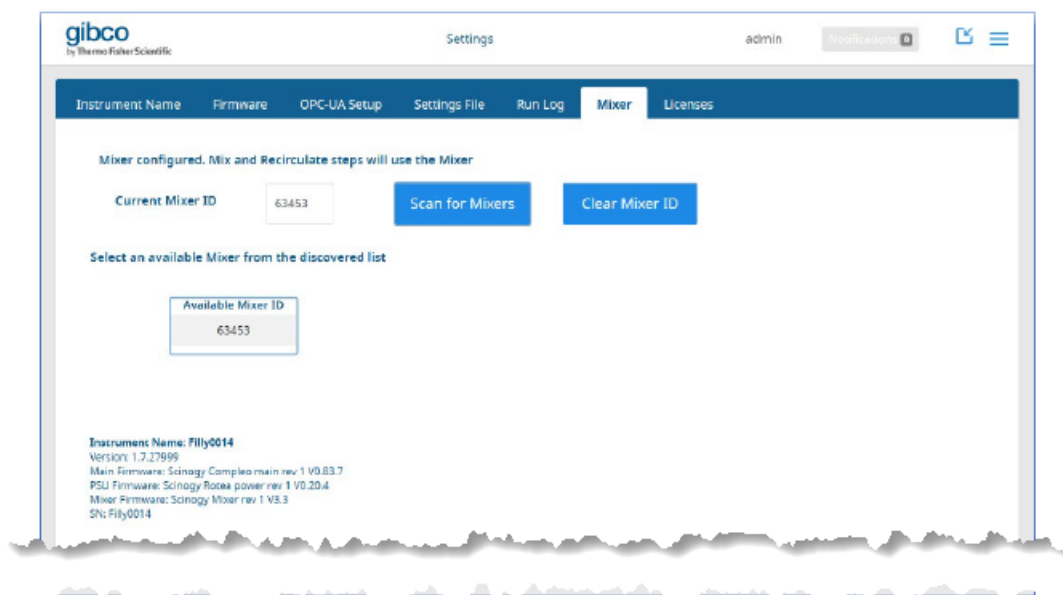


3. Click on the **Mixer** tab.



4. Check that the glass door of the instrument is closed and the instrument is powered on.

5. Select **Scan for Mixers**. The system will automatically scan for available devices and display them in the **Available Mixer ID** box. Select **Available Mixer ID** to set it as the **Current Mixer ID**.





CAUTION! Before performing the following procedures, read and understand the information in the “Safety” appendix in this document.

The CTS™ Ovation™ Mixer Module includes two operating modes: Automatic mode and Manual mode.

Automatic

- Automatic mode requires the Ovation™ Mixer Module to be connected to the Compleo™ instrument via CAN-bus, with appropriate firmware, software and protocol installed.
- The Compleo™ instrument will signal the Ovation™ Mixer Module to start and stop at the specified speed as required by the protocol.
- If communication between the Mixer Module and instrument is lost during a protocol, the Mixer will continue to operate at the current speed setting until communications are re-established, and the next Mixer settings are received.
- If Power to the instrument is lost, it will need to be restored, and the Mixer Module restarted.
- All events related to the Mixer will be captured in the instrument run log.

Note: The Mixer Speed Control knob and Mixer Pushbutton can be used to operate the Ovation™ Mixer Module in manual mode prior to a protocol commencing. Once a protocol commences, they are disabled, and automatic control is transferred to the instrument.

Manual

- When used in manual mode, the Mixer Pushbutton and Mixer Speed Control knob on the front panel of the Ovation™ Mixer Module are active.
- The Ovation™ Mixer Module can be started and stopped by pressing the Mixer Pushbutton.
- The speed of the Mixing Paddles can also be adjusted from 0–80 cycles per minute by turning the Mixer Speed Control knob.

IMPORTANT! The Mixing Speed and start/stop events will not be captured in the instrument run log when operating in manual mode. If Power to the Mixer Module is lost, it will need to be restored, and the Mixer Module restarted.

Safety

- The Ovation™ Mixer Module has been designed to provide an inherently safe operating environment.
- The Mixer Paddles are spring-loaded to ensure that the maximum force applied by the paddles is within required safety limits.
- If the Mixer Paddles are unable to reach their normal closed position due to an obstruction, the Paddles will automatically retract.

4

Maintenance



CAUTION! Before performing the following procedures, read and understand the information in the “Safety” appendix in this document.

Note: All maintenance procedures described in this guide can be safely performed by QUALIFIED SERVICE PERSONNEL. Maintenance not covered in this guide must be performed only by Thermo Fisher Scientific service personnel.

User maintenance schedule

The user is responsible for defining and implementing a suitable maintenance schedule based on their specific usage of the Ovation™ Mixer Module.



WARNING! Regular maintenance should be scheduled with Thermo Fisher Scientific to ensure correct operation. Any modifications, revisions, maintenance, or repair to the Ovation™ Mixer Module shall be performed by Thermo Fisher Scientific approved technicians. Only spare parts and accessories that are approved or supplied by Thermo Fisher Scientific can be used for maintaining or servicing the product.

Instrument cleaning

All biological contaminants are contained within the Compleo™ Single-Use Kits. However, if required, a sanitization procedure can be performed to reduce the microbiological levels on the Ovation™ Mixer Module between product batches or following accidental microbiological contamination.

With the Single-Use Kit removed, the Mixer Module face and features can be decontaminated with:

- Light spraying with 70% isopropanol or ethanol.
- 10% bleach solutions followed by a rinse of water or ethanol.
- Wipe with a lint-free disposable cloth.



CAUTION! The Ovation™ Mixer Module has been sealed against moisture ingress but has not been designed for aggressive wash down or vapor sterilization regimes.

Inspect casing

IMPORTANT! On a monthly basis, check the Mixer Module enclosure, for any damage, corrosion, effects of chemicals or wear. If any such defects are found discontinue use and contact Thermo Fisher Scientific for repair.

Power and Fuses

- **Power Supply:** The instrument Power Supply is rated to operate with international standard single-phase power. Specification: 90–264 VAC, Frequency 47–63 Hz, 240 Watts.
- **Fuses:** For continued protection against the risk of fire, replace fuses only with fuses of the type and rating specified for the instrument.



Troubleshooting

IMPORTANT! Before performing the following procedures, read and understand all prior sections of the user guide.

Note: If you have any doubts regarding the use or maintenance of this instrument, kindly contact an approved Thermo Fisher Scientific representative.

Troubleshooting

Observation	Recommended action
Mixer not communicating	<ul style="list-style-type: none">• Confirm correct mixer ID is selected (Under settings -> Mixer in the Compleo™ GUI).• Confirm the integrity of the CAN bus connection• If the Mixer fails to connect during a protocol, the user can select “Continue” to enable the protocol to be completed. <p>Note: The user will be required to manually mix the bag and to initiate progression to the next step.</p>
Paddles retract before reaching the closed position	<ul style="list-style-type: none">• Remove obstructions between the Paddles.• Adjust position of Mixing Bag so that the Paddles are closing slightly above the top of the inlet/outlet ports of the FP-FLEX Mixing Bag.• Check that there is sufficient spare volume in the Mixing Bag to accommodate displaced fluid.
Mixer Pushbutton not responding	<ul style="list-style-type: none">• Manual: Ensure the Power Cable is connected, and Power Supply is switched on.• Automatic: Ensure the Power Cable is connected, and Instrument Power is switched on.• Ensure the glass door is locked, the GUI is running, and USB-C cable connected.



Compliance standards for Ovation™ Mixer Module

The Ovation™ Mixer Module is designed to comply with the following standards:

1. UL 61010-1:2012
2. UL 61010-2-081:2019
3. CAN/CSA C22.2 No. 61010-1-12
4. CAN/CSA C22.2 No. 61010-1-081:2015
5. IEC 61010-1:2010
6. IEC 61010-2-081:2019
7. EN 61010-1:2020
8. EN 61010-2-081:2020
9. European Low Voltage Directive 2014/35/EU
10. EMC Directive 2014/30/EU
11. EN 61326-1:2017 (Class A)
12. IEC 61326-1:2020
13. FCC 47 CFR Part 15 Subpart B
14. ICES-001: Issue 4
15. AS/NZS CISPR 11:2011
16. RoHS, Directive 2011/65/EU
17. China GB/T 26572-2011, markings comply with SJ/T 11364-2014
18. REACH Regulation (EC) 1907/2006
19. WEEE Directive 2012/19/EU



Safety instructions



CAUTION! Before performing the following procedures, read and understand the information in the “Safety” appendix in this document.

Note: All maintenance procedures described in this guide can be safely performed by QUALIFIED SERVICE PERSONNEL. Maintenance not covered in this guide must be performed only by Thermo Fisher Scientific service personnel.

Safety labels

Safety label is located on the back of the Ovation™ Mixer Module

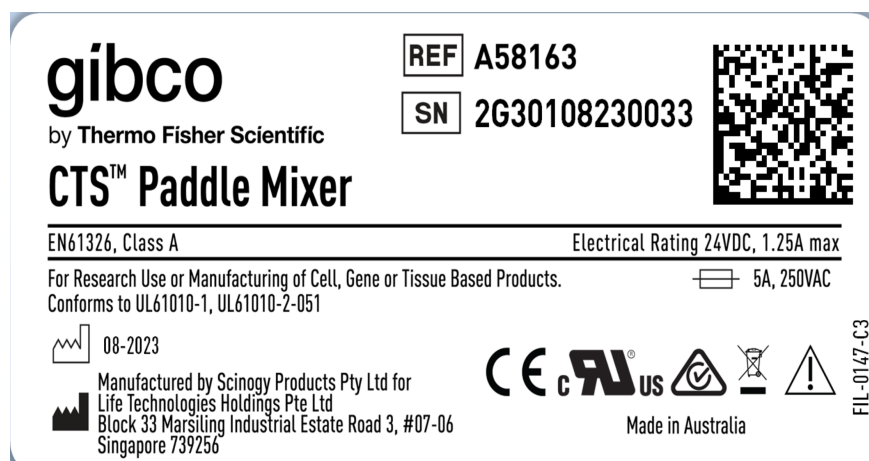


Figure 9 Safety label



Emergency shut-down

The Ovation™ Mixer Module can be shut down by the user in the following ways:

1. Power "Off" the Ovation™ Mixer Module using the Power Switch or by disconnecting Mains Power to the instrument or the separate Power Supply.

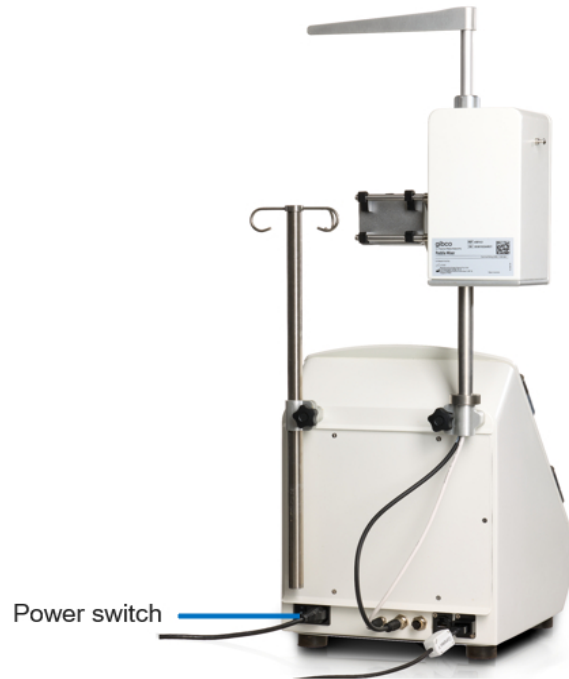


Figure 10 Ovation™ Mixer Module Mains

2. Press the pause/stop (red) button on the instrument or the Compleo™ GUI to stop all instrument functions immediately.

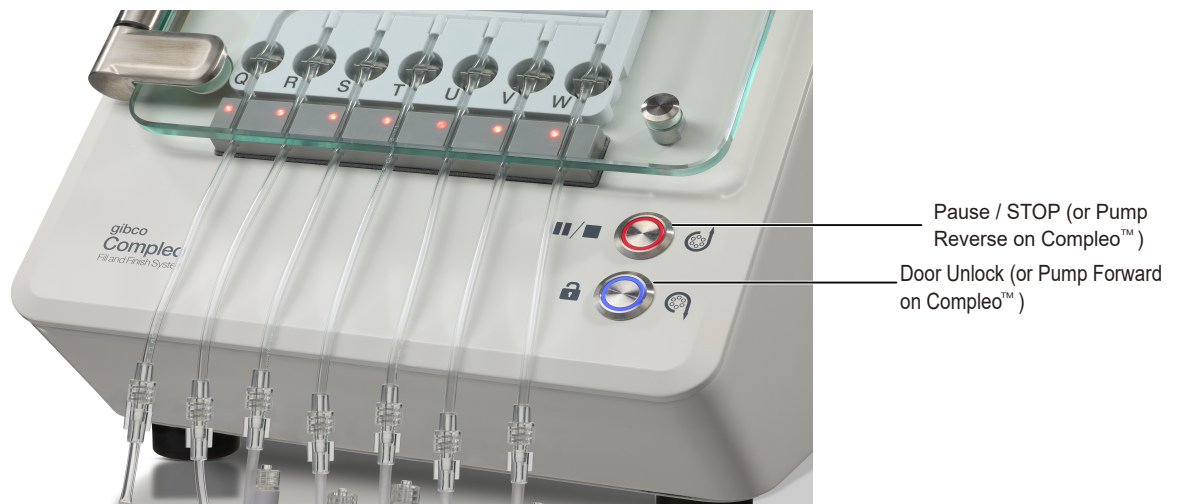


Figure 11 Ovation™ Mixer Module functions



Restart after shut-down

Before restarting the Ovation™ Mixer Module, ensure that the issue causing the shut-down has been resolved. Once confirmed, the instrument can now be restarted.



Warnings and precautions using Ovation™ Mixer Module



WARNING!

- The Ovation™ Mixer Module should only be operated by trained personnel. The user is responsible for ensuring that they have read and understood the user guide.
- If the Ovation™ Mixer Module is used in a manner not specified by Thermo Fisher Scientific, the protection provided by the equipment may be impaired.
- The user must check that the instruments and kits are in a safe operating condition prior to use.
- Thermo Fisher Scientific shall not be liable for any injury or damage resulting from use of the Ovation™ Mixer Module that does not comply with the user guide.
- Always use appropriate Personal Protective Equipment (PPE) when operating the instrument or performing maintenance activities.
- Ovation™ Mixer Module is not approved for use with flammable or explosive materials, materials which could react chemically with sufficient vigour to cause a hazard, or glass apparatus where mechanical energy could lead to breakage.
- Ovation™ Mixer Module is not approved for use in a potentially explosive atmosphere.
- Never exceed the operating limits stated in this user guide and on the system label. Operation outside these limits could damage equipment and cause personal injury or death.
- The kits are intended to be part of the bio-containment system however they are not to be relied on as the only means of safeguarding users and the environment when handling pathogenic micro-organisms.
- Do not use the Ovation™ Mixer Module if it is not working properly or has suffered any damage.
- Handle fluids with care when assembling and loading kits, attaching input vessels, collecting in-process samples, unloading kits, disconnecting and handling output material and disposing of used kits and components. Always use appropriate Personal Protective Equipment when operating or interacting with the Ovation™ Mixer Module.
- Before maintenance or service is performed by Thermo Fisher Scientific or an approved representative, including return of the instrument, the system owner must first clean and decontaminate the system and provide documentary confirmation.
- Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with Thermo Fisher Scientific that the proposed method will not damage the equipment.



CAUTION!

- The CTS™ Compleo™ System with Ovation™ Mixer Module shall be used exclusively with the FP-FLEX Mixing Bag pre-attached to the Compleo™ consumable. The kits are for single use only and should be used within their stated expiration date. The user is responsible for appropriate storage, handling and disposal of consumable kits, including the pre-attached mixing bag. Thermo Fisher Scientific shall not be held responsible for any consequences resulting from the use of consumables or bags other than as specified in the user guide.
- Ensure that you contact an approved Thermo Fisher Scientific representative if there is any doubt as to the use of the Ovation™ Mixer Module.



Safety



WARNING! GENERAL SAFETY. Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, visit thermofisher.com/support.

Symbols on this instrument



Symbols may be found on the instrument to warn against potential hazards or convey important safety information. In this document, the hazard symbol is used along with one of the following user attention words.






- **CAUTION!**—Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
- **WARNING!**—Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
- **DANGER!**—Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

Standard safety symbols






Symbol and description	
	CAUTION! Risk of danger. Consult the manual for further safety information.
	CAUTION! Risk of electrical shock.
	CAUTION! Hot surface.

(continued)




Symbol and description	
	CAUTION! Potential biohazard.
	CAUTION! Ultraviolet light.












Symbole et description	
	MISE EN GARDE ! Risque de danger. Consulter le manuel pour d'autres renseignements de sécurité.
	MISE EN GARDE ! Risque de choc électrique.
	MISE EN GARDE ! Surface chaude.
	MISE EN GARDE ! Danger biologique potentiel.
	MISE EN GARDE ! Rayonnement ultraviolet.

Additional safety symbols








Symbol and description	
	CAUTION! Moving parts.
	CAUTION! Moving parts.
	CAUTION! Moving parts.
	CAUTION! Moving parts.
	CAUTION! Moving parts.

(continued)






Symbol and description	
	CAUTION! Piercing hazard.
	CAUTION! Sharp edges.
	CAUTION! Potential slipping hazard.

Symbole et description	
	MISE EN GARDE ! Parties mobiles.
	MISE EN GARDE ! Parties mobiles.
	MISE EN GARDE ! Parties mobiles.
	MISE EN GARDE ! Parties mobiles.
	MISE EN GARDE ! Parties mobiles.
	MISE EN GARDE ! Danger de perforation.
	MISE EN GARDE ! Bords coupants.
	MISE EN GARDE ! Danger de glisser potentiel.
	MISE EN GARDE ! Danger en surplomb potentiel.
	MISE EN GARDE !
	electrostatic

Control and connection symbols

Symbols and descriptions	
	On (Power)
	Off (Power)
	Earth (ground) terminal
	Protective conductor terminal (main ground)
	Direct current
	Alternating current
	Both direct and alternating current

Conformity symbols

Conformity mark	Description
	INDICATES CONFORMITY WITH SAFETY REQUIREMENTS FOR CANADA AND U.S.A.
	INDICATES CONFORMITY WITH CHINA RoHS REQUIREMENTS.
	INDICATES CONFORMITY WITH AUSTRALIAN STANDARDS FOR ELECTRICAL SAFETY AND ELECTROMAGNETIC COMPATIBILITY.
	INDICATES CONFORMITY WITH THE WEEE DIRECTIVE 2012/19/EU.  CAUTION! To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.



Safety information for instruments not manufactured by Thermo Fisher Scientific

Some of the accessories provided as part of the instrument system are not designed or built by Thermo Fisher Scientific. Consult the manufacturer's documentation for the information needed for the safe use of these products.

Instrument safety

General



CAUTION! Do not remove instrument protective covers. If you remove the protective instrument panels or disable interlock devices, you may be exposed to serious hazards including, but not limited to, severe electrical shock, laser exposure, crushing, or chemical exposure.

If covers are removed, do not use the instrument. Contact Technical Support.



CAUTION! Solvents and Pressurized fluids. Wear eye protection when working with any pressurized fluids. Use caution when working with any polymeric tubing that is under pressure:

- Extinguish any nearby flames if you use flammable solvents.
- Do not use polymeric tubing that has been severely stressed or kinked.
- Do not use polymeric tubing with tetrahydrofuran or nitric and sulfuric acids.
- Be aware that methylene chloride and dimethyl sulfoxide cause polymeric tubing to swell and greatly reduce the rupture pressure of the tubing.
- Be aware that high solvent flow rates (~40mL/min) may cause a static charge to build up on the surface of the tubing and electrical sparks may result.

Physical injury



CAUTION! Moving and Lifting Injury. If the instrument needs to be repositioned, proper technique should be used. Improper lifting can cause painful and permanent back injury.

Things to consider before lifting or moving the instrument or accessories:

- Depending on the weight, moving or lifting may require two or more persons.
- If you decide to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques.
- Ensure you have a secure, comfortable grip on the instrument or accessory.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time. Keep your spine in a good neutral position while lifting with your legs.
- Participants should coordinate lift and move intentions with each other before lifting and carrying.
- For smaller packages, rather than lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone else slides the contents out of the box.



CAUTION! Moving Parts. Moving parts can crush, pinch and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing.

Electrical safety



WARNING! Fuse Installation. Before installing the instrument, verify that the fuses are properly installed and the fuse voltage matches the supply voltage. Replace fuses only with the type and rating specified for the unit. Improper fuses can damage the instrument wiring system and cause a fire.



WARNING! Voltage Selector Switch. Before installing the instrument, verify that the voltage selector switch is set for the supply voltage. This will prevent damage to the instrument, reduce risk of fire, and enable proper operation.



WARNING! Ensure appropriate electrical supply. For safe operation of the instrument:

- Plug the system into a properly grounded receptacle with adequate current capacity.
- Ensure the electrical supply is of suitable voltage.
- Never operate the instrument with the ground disconnected. Grounding continuity is required for safe operation of the instrument.



AVERTISSEMENT ! Veiller à utiliser une alimentation électrique appropriée. Pour garantir le fonctionnement de l'instrument en toute sécurité :

- Brancher le système sur une prise électrique correctement mise à la terre et de puissance adéquate.
- S'assurer que la tension électrique est convenable.
- Ne jamais utiliser l'instrument alors que le dispositif de mise à la terre est déconnecté. La continuité de la mise à la terre est impérative pour le fonctionnement de l'instrument en toute sécurité.



WARNING! Power Supply Line Cords. Use properly configured and approved line cords for the power supply in your facility. If the line cord is damaged, contact Technical Support.



AVERTISSEMENT ! Cordons d'alimentation électrique. Utiliser des cordons d'alimentation adaptés et approuvés pour raccorder l'instrument au circuit électrique du site.



WARNING! Disconnecting Power. To fully disconnect power either detach or unplug the power cord, positioning the instrument such that the power cord is accessible.



AVERTISSEMENT ! Déconnecter l'alimentation. Pour déconnecter entièrement l'alimentation, détacher ou débrancher le cordon d'alimentation. Placer l'instrument de manière à ce que le cordon d'alimentation soit accessible.

Cleaning and decontamination



CAUTION! Cleaning and Decontamination. Use only the cleaning and decontamination methods that are specified in the manufacturer user documentation. It is the responsibility of the operator (or other responsible person) to ensure that the following requirements are met:

- No decontamination or cleaning agents are used that can react with parts of the equipment or with material that is contained in the equipment. Use of such agents could cause a HAZARD condition.
- The instrument is properly decontaminated a) if hazardous material is spilled onto or into the equipment, and/or b) before the instrument is serviced at your facility or is sent for repair, maintenance, trade-in, disposal, or termination of a loan. Request decontamination forms from customer service.
- Before using any cleaning or decontamination methods (except methods that are recommended by the manufacturer), confirm with the manufacturer that the proposed method will not damage the equipment.



MISE EN GARDE ! Nettoyage et décontamination. Utiliser uniquement les méthodes de nettoyage et de décontamination indiquées dans la documentation du fabricant destinée aux utilisateurs. L'opérateur (ou toute autre personne responsable) est tenu d'assurer le respect des exigences suivantes:

- Ne pas utiliser d'agents de nettoyage ou de décontamination susceptibles de réagir avec certaines parties de l'appareil ou avec les matières qu'il contient et de constituer, de ce fait, un DANGER.
- L'instrument doit être correctement décontaminé a) si des substances dangereuses sont renversées sur ou à l'intérieur de l'équipement, et/ou b) avant de le faire réviser sur site ou de l'envoyer à des fins de réparation, de maintenance, de revente, d'élimination ou à l'expiration d'une période de prêt (des informations sur les formes de décontamination peuvent être demandées auprès du Service clientèle).
- Avant d'utiliser une méthode de nettoyage ou de décontamination (autre que celles recommandées par le fabricant), les utilisateurs doivent vérifier auprès de celui-ci qu'elle ne risque pas d'endommager l'appareil.

Instrument component and accessory disposal

To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.

Safety and electromagnetic compatibility (EMC) standards

The instrument design and manufacture complies with the following standards and requirements for safety and electromagnetic compatibility.



Safety standards

Reference	Description
EU Directive 2014/35/EU	European Union “Low Voltage Directive”
IEC 61010-1 EN 61010-1 UL 61010-1 CAN/CSA C22.2 No. 61010-1	<i>Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements</i>
IEC 61010-2-051 EN 61010-2-051	<i>Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-051: Particular requirements for laboratory equipment for mixing and stirring</i>
IEC 61010-2-081 EN 61010-2-081	<i>Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes</i>

EMC standards

Reference	Description
EU Directive 2014/30/EU	European Union “EMC Directive”
EN 61326-1 IEC 61326-1	<i>Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements – Part 1: General Requirements</i>
ICES-003, Issue 7	<i>Scientific Information Technology Equipment (including Digital Apparatus)</i>
FCC Part 15 Subpart B (47 CFR)	<p><i>U.S. Standard Radio Frequency Devices</i></p> <p>This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.</p> <p>This equipment has been designed and tested to CISPR 11 Class A. In a domestic environment it may cause radio interference, in which case, you may need to take measures to mitigate the interference.</p> <p>Do not use this device in close proximity to sources of strong electromagnetic radiation (e.g. unshielded intentional RF sources), as these can interfere with the proper operation.</p>

Environmental design standards

Reference	Description
Directive 2012/19/EU	European Union “WEEE Directive” –Waste electrical and electronic equipment
Directive 2011/65/EU & Commission Delegated Directive 2015/863	European Union “RoHS Directive” –Restriction of hazardous substances in electrical and electronic equipment
SJ/T 11364-2014	“China RoHS” Standard –Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products For instrument specific certificates, visit our customer resource page at www.thermofisher.com/us/en/home/technical-resources/rohs-certificates.html .

Chemical safety



WARNING! GENERAL CHEMICAL HANDLING. To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the "Documentation and Support" section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with sufficient ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer cleanup procedures as recommended in the SDS.
- Handle chemical wastes in a fume hood.
- Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if needed) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
- **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.



AVERTISSEMENT ! PRÉCAUTIONS GÉNÉRALES EN CAS DE MANIPULATION DE PRODUITS CHIMIQUES. Pour minimiser les risques, veiller à ce que le personnel du laboratoire lise attentivement et mette en œuvre les consignes de sécurité générales relatives à l'utilisation et au stockage des produits chimiques et à la gestion des déchets qui en découlent, décrites ci-dessous. Consulter également la FDS appropriée pour connaître les précautions et instructions particulières à respecter :

- Lire et comprendre les fiches de données de sécurité (FDS) fournies par le fabricant avant de stocker, de manipuler ou d'utiliser les matériaux dangereux ou les produits chimiques. Pour obtenir les FDS, se reporter à la section « Documentation et support » du présent document.
- Limiter les contacts avec les produits chimiques. Porter des équipements de protection appropriés lors de la manipulation des produits chimiques (par exemple : lunettes de sûreté, gants ou vêtements de protection).
- Limiter l'inhalation des produits chimiques. Ne pas laisser les récipients de produits chimiques ouverts. Ils ne doivent être utilisés qu'avec une ventilation adéquate (par exemple, sorbonne).
- Vérifier régulièrement l'absence de fuite ou d'écoulement des produits chimiques. En cas de fuite ou d'écoulement d'un produit, respecter les directives de nettoyage du fabricant recommandées dans la FDS.
- Manipuler les déchets chimiques dans une sorbonne.

- Veiller à utiliser des récipients à déchets primaire et secondaire. (Le récipient primaire contient les déchets immédiats, le récipient secondaire contient les fuites et les écoulements du récipient primaire. Les deux récipients doivent être compatibles avec les matériaux mis au rebut et conformes aux exigences locales, nationales et communautaires en matière de confinement des récipients.)
- Une fois le récipient à déchets vidé, il doit être refermé hermétiquement avec le couvercle fourni.
- Caractériser (par une analyse si nécessaire) les déchets générés par les applications, les réactifs et les substrats particuliers utilisés dans le laboratoire.
- Vérifier que les déchets sont convenablement stockés, transférés, transportés et éliminés en respectant toutes les réglementations locales, nationales et/ou communautaires en vigueur.
- **IMPORTANT !** Les matériaux représentant un danger biologique ou radioactif exigent parfois une manipulation spéciale, et des limitations peuvent s'appliquer à leur élimination.



WARNING! HAZARDOUS WASTE (from instruments). Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.



WARNING! 4L Reagent and Waste Bottle Safety. Four-liter reagent and waste bottles can crack and leak. Each 4-liter bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position.

Biological hazard safety



WARNING! Potential Biohazard. Depending on the samples used on this instrument, the surface may be considered a biohazard. Use appropriate decontamination methods when working with biohazards.



WARNING! BIOHAZARD. Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Conduct all work in properly equipped facilities with the appropriate safety equipment (for example, physical containment devices). Safety equipment can also include items for personal protection, such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, safety glasses, or goggles. Individuals should be trained according to applicable regulatory and company/ institution requirements before working with potentially biohazardous materials. Follow all applicable local, state/provincial, and/or national regulations. The following references provide general guidelines when handling biological samples in laboratory environment.

- U.S. Department of Health and Human Services, *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, 6th Edition, HHS Publication No. (CDC) 300859, Revised June 2020
[cdc.gov/labs/bmbi](https://www.cdc.gov/labs/bmbi)
- Laboratory biosafety manual, fourth edition. Geneva: World Health Organization; 2020 (Laboratory biosafety manual, fourth edition and associated monographs)
[who.int/publications/i/item/9789240011311](https://www.who.int/publications/i/item/9789240011311)



Documentation and support

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 - Certificates of Analysis
 - Safety Data Sheets (SDSs; also known as MSDSs)

Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and its affiliates warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have questions, contact Life Technologies at www.thermofisher.com/support.

