Operating Instructions

Original Operating Instructions

Celsius[®] FFT Freezer

For Freezing and Thawing of Palletized Celsius® FFT Containers



ZUNT: 1000144950



SVISCIEVAS

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1 About these Instructions

1.1 Validity

These instructions are part of the device; they must be read in full and stored. These instructions apply to the following versions of the device:

Device	Type as Indicated on Type Plate
Celsius® FFT Freezer, consisting of	CELSIUS FFT FREEZER
Chamber	
Refrigeration Unit — Standard Version OR	

- Low Global Warming Potential Version

1.2 Related Documents

- In addition to these instructions, please observe the following documents:
 - $\,$ Instructions for the Celsius $^{\rm e}$ FFT Lift
 - Instructions for AliquoT[®] | Pallet
 - Instructions for Celsius[®] FFT 75 L
 - Documentation on customer-specific modifications (if applicable)
 - Safety Data Sheet (SDS) for the respective refrigerant
 - BioPAT[®] MFCS Operating Instructions
 - BioPAT[®] MFCS Recipe Control Module | Biobrain[®] Recipe Editor Operating Instructions
 - Biobrain[®] Operating Instructions
 - System Electrical Schematics
 - System Functional Specifications
 - Pre-Installation Checklist | Utility List

1.3 Target Groups

These instructions are addressed to the following target groups. The target groups must possess the knowledge specified below.

Target group	Knowledge and Qualifications
Operator	The operator is familiar with the device and the associated work processes. The operator understands the hazards which may arise when working with the device, and knows how to prevent them.*
Operating en- gineer labora- tory manager	The operating engineer laboratory manager makes decisions about the use and configuration of the device.*

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Target group	Knowledge and Qualifications
Administrator	The administrator is responsible for integrating the device into the production process. The administrator ensures the reliable functioning of the system and device software.*
Electrician	A qualified electrician who has the specialized training, knowledge, and experience, as well as familiarity with applicable standards and regulations, to evaluate the work assigned to them and identify possible hazards.

* If a person in the target group operates the software interface of the device, they are also the "user".

1.4 Software User Groups

For software user groups, see chapter "14.9 Access Rights", page 66.

1.5 Symbols Used

1.5.1 Warnings in Operation Descriptions

A DANGER

Denotes an immediate hazard that will result in death or serious injury if it is **not** avoided.

🔺 WARNING

Denotes a hazard that may result in death or severe injury if it is **not** avoided.

▲ CAUTION

Denotes a hazard that may result in moderate or minor injury if it is **not** avoided.

NOTICE

Denotes a hazard that may result in property damage if it is **not** avoided.

1.5.2 Other Symbols Used

- Required action: Describes activities that must be carried out. The activities in the sequence must be carried out in succession.
- ▷ Result: Describes the result of the activities carried out.
- [] Refers to operating and display elements. Indicates status, warning, and error messages.

Figures in These Instructions

Depending on the device configuration, the figures depicting the device and operating display may differ slightly from the supplied device. The variants shown in these instructions are examples.

2 Safety Information

2.1 Intended Use

The device is intended for freezing or thawing palletized Celsius[®] FFT single-use Containers in the following sizes:

- 1–4 x Celsius[®] FFT 75 L
- 1 10 x Celsius[®] FFT 12 L
- 1 10 x Celsius[®] FFT 6 L

The single-use Containers must be (stacked) on their respective Pallet.

Use with any other types of containers or pallets, or deviation from the defined quantities, is considered misuse.

Do not use the device to carry out any processes using biological materials in Safety Classes 3 or 4 (pursuant to EU 2000/54/EC) or Biosafety Level 3 or 4 (as per the United States Centers for Disease Control and Prevention).

The device is intended exclusively for use in accordance with these instructions. Any further use beyond this is considered improper.

If the device is used improperly: The device's protective systems may be impaired. This can lead to unforeseeable personal injury or property damage.

Foreseeable Misuse

The following applications are not permitted:

- Assembly of the device by non-Sartorius Service personnel
- The use of unapproved refrigeration piping connections for circulating refrigerant or heat transfer fluid
- The introduction of flammable liquids and gases into the chamber workspace
- The keeping or storing of flammable explosive substances in the vicinity of the chamber
- The use of any operating and process media other than those specified in these operating instructions
- The bending of flexible hoses below the minimum bend radius (see chapter "14.1.6 Flexible Hoses", page 56)
- Exceeding or falling below the specific limits (temperature, pressure, agitation conditions, etc.) of the system
- Performing unauthorized conversions or making other technical changes to the device
- Using the device as steps

Operating Conditions for the Device

Do not use the device in potentially explosive environments. Only use the chamber indoors.

The device may only be used with the equipment and under the operating conditions described in the Technical Data section of these instructions.

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2.1.1 Modifications to the Device

If the device is modified, persons may be put at risk. Device-specific documents and product approvals may lose their validity.

For queries regarding modifications to the device, contact Sartorius.

2.1.2 Repairs and Maintenance on the Device

Device repairs and maintenance may only be carried out by persons with specialized knowledge of the device. If the device is not repaired or serviced by a specialist: Persons may be put at risk. Device-specific documents and product approvals may lose their validity.

Sartorius recommends that any repair work, even that carried out after the end of the warranty period, is carried out by Sartorius Service or after consulting with Sartorius Service.

Only the maintenance tasks described in these instructions may be carried out. For maintenance tasks that need to be carried out by Sartorius Service, contact Sartorius Service.

Add a lockout-tagout before performing troubleshooting or maintenance.

2.2 Qualifications of Personnel

Persons who do not possess adequate knowledge about how to use the device safely may injure themselves and other persons.

If a particular qualification is required for an activity: The target group will be specified. If no qualification is specified: The activity may be carried out by the "operator" target group.

2.3 Functionality of the Device Parts

Non-functioning device parts, e.g., as a result of damage or wear, can cause malfunctions. There is a risk of injury to persons.

- If device parts are not functional, do not use the device.
- Comply with the maintenance intervals (for intervals and maintenance tasks, see chapter "9.3 Maintenance Schedule", page 42).

2.4 Safety Equipment

The safety equipment on the device protects persons who work with the device against the hazards associated with it, e.g., electrical current. If the device's safety equipment is dismantled or modified: People may be seriously injured.

- Do not dismantle, modify, or disable the safety equipment (for safety equipment, see chapter "3.4 Safety Equipment", page 23).
- Check the safety equipment regularly.
- Check the functionality of the safety equipment before restarting.

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2.5 Safety Information on the Device

Symbols, e.g., warnings and safety stickers, are safety information for handling the device. Missing or illegible safety information may result in this information not being observed. There is a risk of injury to persons.

- Do not conceal, remove, or modify the symbols.
- Replace the symbols if they become illegible.

2.6 Electrical Equipment

2.6.1 Damage to the Device's Electrical Equipment

Damage to the device's electrical equipment, e.g., damaged insulation, can be life-threatening. Contact with parts under voltage represents a danger to life.

- If the electrical equipment of the device is defective, cut off the power supply and contact Sartorius Service.
- Carry out regular visual inspections of the electrical equipment.
- ▶ Keep live parts away from moisture. Moisture can cause short circuits.
- Do not bypass or disable any fuses or circuit breakers. When replacing them, maintain the correct amperage specification.
- Do not step on, run over, or otherwise crush electrical cables.

2.7 Conduct in an Emergency

If an emergency occurs, e.g., due to malfunctions of the device or dangerous situations: Persons may be injured. The device must be immediately taken out of operation:

- Press the emergency stop button to shut down the power supply of the drives.
- ▷ The current recipe step will be paused. A horn will sound and the signal light will blink red. The control voltage remains operational, as well as the batteries and compressed air lines onboard the device.
- Secure the device to prevent it from restarting by cutting off the electricity supply and compressed air to the device.
- If the device catches fire: Only attempt to extinguish the fire with CO₂ extinguishers. Do not use other fire extinguishers.

2.8 Accessories, Consumables, and Spare Parts

The use of unsuitable accessories, consumables and spare parts can affect the functionality and safety of the device and have the following consequences:

- Risk of injury to persons
- Damage, malfunctions, or failure of the device
- Only use accessories, consumables, and spare parts that have been approved by Sartorius and are reliable for use.
- Only use operating media inside the Containers that have been approved by Sartorius and are reliable for use (see Validation Guide of the Containers used).

2.9 Personal Protective Equipment

Personal protective equipment protects against risks arising from the device. If the personal protective equipment is missing or is unsuitable for the work processes on the device, persons may be injured.

The following personal protective equipment must be worn:

- Cryogenic safety gloves (when in contact with cold surfaces)
- Safety gloves
- Safety boots | non-slip safety footwear
- Safety glasses

2.10 Cold Surfaces

During use, parts of the device and its surfaces can cool down to temperatures below -80 °C. There is a danger of low temperature burns to parts of the body that come into contact with these surfaces.

- Avoid unprotected contact with cold surfaces.
- ▶ Wear personal protective equipment.
- Always use the Celsius[®] FFT Lift for handling the Celsius[®] palletized Containers.

2.11 Hot Surfaces

During use, parts of the device and its surfaces can heat up to temperatures up to 100 °C. There is a danger of hot temperature burns to parts of the body that come into contact with these surfaces.

- Avoid unprotected contact with hot surfaces.
- ▶ Wear personal protective equipment.
- Always use the Celsius[®] FFT Lift for handling the Celsius[®] palletized Containers.

2.12 Shifting of the Agitation System

After a complete agitation cycle, whenever an agitation run is paused, and any time the door is opened, the agitation system must return to a level position. If the agitation system is not maintained regularly and the system fails to return to a level position: Persons may be injured.

- Make sure the agitation system is checked according to the maintenance schedule.
- Visually verify that the agitation system has returned to the correct position before handling the palletized Containers with the Celsius[®] FFT Lift.

2.13 Health Damage Due to Refrigerant

In the event of a leak from the device, refrigerant in high concentrations can cause a loss of consciousness when inhaled and can result in asphyxiation. Skin or eye contact with the refrigerant can cause severe frostbite, irritation of mucous membranes and permanent eye damage.

- Only qualified refrigeration technicians may handle refrigerant.
- Comply with the instructions on the refrigerant manufacturer's safety data sheet (SDS).
- ▶ Keep a self-contained breathing apparatus at hand for emergencies.
- Do not inhale refrigerant. When working with refrigerant always ensure that there is a supply of fresh air. In case of accidental inhalation, bring the exposed person to fresh air, put them in the recovery position, and keep them warm.
- Avoid skin contact with refrigerant. In case of inadvertent skin contact, wash off the affected part of the skin with plenty of clean water for at least 20 minutes. Then cover the affected area of the skin with a sterile dressing. Seek immediate medical attention.
- Avoid eye contact with refrigerant. In case of inadvertent eye contact, immediately rinse the eye, also under the eyelid, for at least 15 minutes with clean water. Aim a gentle jet of water directly into the eye and do not rub. Then cover the eye with a sterile dressing. Seek immediate medical attention.

2.14 Flammable Refrigerant (Low Global Warming Potential Version Only)

If flammable refrigerant is released from the device, an explosive concentration can be present in the air surrounding the device. If there is an ignition source nearby, a release of flammable refrigerant can result in a fire or explosion.

- Only qualified refrigeration technicians may handle refrigerant.
- Do not disconnect power, unplug the device, or begin servicing the device before checking the area for the presence of flammable refrigerants or other flammable substances with a combustible gas monitor designed for use with flammable refrigerants.
- After the absence of flammable refrigerants has been confirmed, the device should be de-energized before any further servicing is conducted.

2.15 Components Under Pressure

Pneumatic and refrigeration lines are under high pressure during operation and in standby mode. The compressed air can injure eyes and cause uncontrolled movements of the lines as well as serious injury. Defective pressurized components can also cause uncontrolled movements which may result in serious injury.

- Always have the device depressurized by Sartorius Service or maintenance personnel before mounting or dismantling hoses, lines, threaded joints, quick couplings, or valves.
- Have faulty components immediately replaced by qualified personnel. In the event of misuse, compressed air can escape from compressed air lines and their fittings and couplings.
- Optional: Equip the device with gas leak sensors. Ensure that the sensors are connected and calibrated before use.

2.16 Workspace

Danger due to the use of unsuitable test material or storage of flammable or explosive materials in the vicinity of the test chamber.

▶ Do not store hazardous materials near the chamber.

2.17 Door

Fingers and other body parts can get crushed between the door and the device | walls | other devices.

- ▶ Use the door handle when opening and closing the door.
- Be careful when opening and closing the door, so that no body parts get crushed.

2.18 Leaking Liquids

Leaks or condensation can cause liquids to accumulate on the ground. Slipping in these liquids can lead to a fall and to serious injury. Leaks that have been caused by escaping product can also contain hazardous biological substances.

- Immediately determine the location of the leak and eliminate the leak if it is safe to do so.
- Immediately wipe up any liquids with suitable materials if it is safe to do so.
- Affix warnings and mandatory signs in or close to the area on the floor where accumulation of liquid can occur.
- Observe the list of approved materials (see Validation Guide of the Containers used).

3 Device Description

3.1 Device Overview



Fig.1: Celsius $^{\circ}$ FFT Freezer, chamber loaded with palletized Celsius $^{\circ}$ FFT 75 L

Pos.	Name	Description
1	Chamber	Location for palletized Containers for the freezing and thawing of enclosed drug substance.
2	Refrigeration unit	Regulates the chamber temperature (2 versions available).

3.2 Chamber



Fig. 2: Chamber, front view (left opening door configuration)

Pos.	Name	Description	
1	Door	Door that fully opens to the left or right with perimeter door gasket.	
2	Airflow distribution grille	Stainless steel grille ensuring even airflow distribution for consistent freez- ing and thawing.	
3	Fans	For circulation of air inside the chamber at a regulated temperature.	
4	Door latch	Pneumatic door locks	
5	17" touch screen	Human Machine Interface (HMI)	
6	Electrical cabinet		
7	Access port validation port	Pluggable 3" hole to the chamber (allowing e.g. sensor insertion, cable pas- sage etc.)	
8	Agitation system	Platform for positioning the Pallet during loading and holding in place during freeze thaw cycles. Platform can be agitated during thawing cycles.	
9	Guide bar for the Celsius® FFT Lift	Allows alignment of the Celsius® FFT Lift so that the Pallet can be loaded unloaded correctly.	
	Chamber drain (under- neath the chamber)	$\gamma_2^{\prime\prime}$ NPT (female), to drain liquid from condensation cleaning out of the chamber.	

3.2.1 Door Area



Fig. 3: Door, front view

Pos.	Name	Description
1	Door handle	
2	[Close] button	
3	[Open] button	Electrically interlocked when the de- vice is in operation.

3.2.2 Sensor Connection



Fig. 5: Sensor connections

Pos.	Name	Description
1	Sensor connection panel	For connecting the Celsius® FFT Freezer Thermal Sensor Cable.

3.2.3 Chamber Interconnections



Fig. 6: Chamber interconnections, top view

Pos.	Name	Description
1	Refrigeration inter- connection	For connecting the device to the refriger- ation unit.
2	Dry air supply	$\frac{\gamma_2''}{2}$ NPT (female) inlet, for connecting the supplied dry air.
3	UPS	Optional: For connecting an additional uninterruptible power supply.
4	Electrical intercon- nection	For electrical connection of the device to the refrigeration unit (high voltage).
5	Signals and com- munication inter- connection	For electrical connection of the device to the refrigeration unit (low voltage).
6	Main power in	
7	Air equalization control system	Contains a pressure relief vent that ex- hausts excess humid air.
-		

3.2.4 Stack Light



Fig. 7: Stack light

Stack Light	Description
Red	At least one alarm is triggered and is acknowledged in the device.
Red, flashing	At least one alarm is triggered and is not acknowledged by the operator.
Blue, flashing	At least one user information message is active. Action on the device is required.
Green	The device is performing a function, e.g. freezing.
White	The device is switched on and idle.
Acoustic alarm	An alarm is triggered and has not yet been acknowledged by the operator.

3.3 Refrigeration Unit

3.3.1 Standard Version: Back View



Fig. 8: Refrigeration unit, back view

Pos.	Name	Description
1	Water outlet	1.25″ NPT (female), for the cooling water outlet connection at the installation site.
2	Waterinlet	1.25″ NPT (female), for the cooling water inlet connection.
3	Refrigeration inter- connection	For connecting the device to the cham- ber.
4	Refrigeration sys- tem access panels	
5	Airvent	Sound deadening
6	Drain outlet	½″ NPT (female), for draining the device.
-		

3.3.2 Standard Version: Side View



Fig. 9: Refrigeration unit, side view

Pos.	Name	Description
1	Electrical intercon- nection	For electrical connection of the device to the chamber.
2	Emergency stop	
3	Power disconnect switch	
4	Electrical cabinet	
5	Airvent	Sound deadening



3.3.3 Low Global Warming Potential Version: Front View

Fig. 10: Refrigeration unit, front view

Pos.	Name	Description
1	Touch screen	
2	LED indicator	Shows temperature, status and the cur- rent flow diagram.
3	Power disconnect switch	
4	Emergency stop	



3.3.4 Low Global Warming Potential Version: Side View

Fig. 11: Refrigeration unit, side view

Pos.	Name	Description
1	Outlet	For the circulation flow.
2	Inlet	For the circulation return.
3	Cable entry	For the gas warning sensor.
4	Cooling water con- nections	Contain inlet, outlet and drain.
5	Exhaust air	4″ duct. Can be used to vent the refriger- ant gases in case of leakage. Can be con- nected to an exhaust fan.
6	Power supply con- nection	
7	Controller interface	Ethernet, USB, and service interfaces.

3.4 Safety Equipment



Fig. 12: Safety equipment

Pos.	Name	Description			
1	Safety switch	For the chamber door interlock. Ensures that the device can be operated only if the door is closed. Heating cooling system, agitation system, pallet restraint cylinders, and other powered systems will remain de-energized if the door is not closed.			
2	[Reset] button	Resets the safety relay switch after turning on the system, releasing the emer- gency stop, or rebooting the system after a power failure.			
3	Emergency stop	Linked to the refrigeration unit emergency stop. Shuts down the power supply of the drives. The control voltage remains operational.			
4	Main switch	Serves as master system power disconnect switch. Mains power disconnect switches are interlocked with the electrical cabinet doors to prevent a high-volt- age current flowing when the electrical cabinet doors are opened.			
5	Emergency chamber door release button	To unlock the door if an operator is accidentally locked in.			
6	Anchoring feet	To fix the device to the ground.			
	Air pressure safety valve	Protects the device and keeps operators safe in the event of overpressure or equipment failure (inside the rear panel).			
	Air pressure de-ener- gization switch	If the device unexpectedly activates or if the unexpected release of compressed air could cause injury, the compressed air will be isolated (rear of the device).			

3.5 Symbols on the Device

Symbol	Meaning
Possibly hazardous optical radiation emitted from this product. Risk Group 2.	LED lights are used to light the interior of the chamber. Take care to avoid injury to eyes and skin when in the vicinity of optical radiation.
K CAUTION Hot or cold surface, Do not touch. To swod serious burns or frostble, follow Counsented accessing inside of chamber.	Hot cold surfaces: Take care to avoid coming into contact with a hot cold surface.
Arc flash and shock hazards. Tim off and lock out, power before servicing.	High energy electrical discharge between two electrically conductive materials: Take care to avoid opening the electrical cabinet unless electri- cal components are de-energized or specialized personal protective equipment is worn.
	Access to cabinets: Ensure that cabinets or facilities containing harmful substances or equipment are kept locked.
▲ CAUTION Not a step.	Surface unsuitable for stepping onto: Do not step onto the device!
	Shear point: Keep guard in place.
Mixing parts can crush and cut. Do NOT operate with guard removed. Lockour / tagout before	Risk of crushing: Take care when closing and latching the door.
A DANGER Shear hazard. Moving parts will cause severe injury. Keep hands clear.	
COMPRESSED AIR. LOCK OUT source and BLEED OFF pressure before servicing equipment.	Before performing maintenance, the source of the compressed air should be locked or isolated to prevent accidental activation. Any re- maining air pressure in the device must be released to ensure it is com- pletely safe to work on.

Symbol Meaning Image: Constrained out of the system power before servicing. Electrical voltage: Risk of injury due to live parts. Only electricians may have access to and work on these parts. Image: Constrained out out system power before servicing. Electrical voltage: Risk of injury due to live parts. Only electricians may have access to and work on these parts. Image: Constrained out system power before servicing. Image: Constrained o



Lifting devices such as forklifts, hoists, or other lifting equipment should be used to move or position the device.

3.6 Process and Functional Description

The Celsius® FFT Freezer consists of a chamber and a refrigeration unit. The refrigeration unit houses critical refrigeration components and is connected to the chamber by means of refrigerant | heat transfer fluid piping and an electrical interconnection.

The refrigerant | heat transfer fluid piping is connected to heat exchanger coils within the chamber. The standard version also contains heating elements. The air distribution system constantly recirculates air past heat exchanger coils and heating elements to maintain a temperature-controlled airstream. This airstream also flows past Celsius[®] FFT Containers situated in the chamber, freezing or thawing the Celsius[®] FFT Containers in the process.

The grill is specifically designed to regulate the airflow distribution over the Container and ensure consistent freezing | thawing time between the different Containers.

3.7 Operating Principle

Freezing

To freeze, the airstream temperature is set to a value significantly below the solid-liquid phase change temperature of the process media. Circulation of refrigerant or very cold heat transfer fluid in the heat exchanger keeps these at a very cold temperature. The heat exchangers cool the recirculated airstream, which in turn constantly cools the Celsius® FFT Containers until a thermal equilibrium is reached or the process is stopped.

Thawing

To thaw, the airstream temperature is set to a value slightly above the solid-liquid phase change temperature of the process media. The heating elements or warm heat transfer fluid circulated in the heat exchangers constantly warm the recirculated airstream, which in turn warms the Celsius® FFT Containers until a thermal equilibrium is reached or the process is stopped.

In order to evenly thaw the product ingredients and speed up thawing, an agitation system (consisting of motor and drivetrain) gently moves the Containers during the thawing processes. The agitator phase (including the pallet lock) has an interlock to prevent it starting unless the supply air temperature is 5 °C or higher.

Dynamic thawing is fully compatible with palletized Celsius[®] FFT 75 L. For the smaller volumes, contact Sartorius before using a dynamic thawing process.

4 Operating Design

A detailed description of the software and its functionality can be found in the Biobrain[®] Operating Instructions. The process view is explained here as an example.



4.1 Process View: Standard Version

Fig. 13: Process view: standard version

Pos.	Name	Description			
1	Menu bar	For navigating between menus, e.g., the "Process" or "Phases" menus.			
2	[Batch execution] button	 Opens the [Batch] dialog for the execution of batches. Displays the name of the loaded configuration. 			
3	Refrigeration unit picto- gram	Displays the process parameters and processes for the refrigeration unit.			
4	Large dry air purge valve description	Displays the status of the large dry air purge valve (open or closed).			
5	Small dry air purge valve description	Displays the status of the small dry air purge valve (open or closed).			
6	Process view	Displays a graphical representation of the equipment and allows settings to be changed and equipment to be controlled.			

Pos.	Name	Description				
7	Door lock description	Displays the status of the chamber door (open or closed).				
8	Pallet lock description	Displays the status of the pallet lock (locked or unlocked).				
9	Agitator pictogram description	Displays the process parameters and processes for the agitator driver.				
10	Circulating fans picto- gram description	Displays the process parameters and processes for the circulating fans.				
11	Header	 For selecting higher-level functions, e.g., log in or log out user. Displays process information, e.g., alarms that have occurred or outstand- ing user actions. Indicates remote operation, e.g., an existing OPC UA connection. 				

4.2 Process View: Low Global Warming Potential Version



Fig. 14: Process view: Low Global Warming Potential Version

Pos.	Name	Description
1	Menu bar	For navigating between menus, e.g., the "Process" or "Phases" menus.
2	[Batch execution] button	 Opens the [Batch] dialog for the execution of batches. Displays the name of the loaded configuration.

Pos.	Name	Description
3	Refrigeration unit picto- gram	Displays the process parameters and processes for the refrigeration unit.
4	Large dry air purge valve description	Displays the status of the large dry air purge valve (open or closed).
5	Small dry air purge valve description	Displays the status of the small dry air purge valve (open or closed).
6	Process view	Displays a graphical representation of the equipment and allows settings to be changed and equipment to be controlled.
7	Door lock description	Displays the status of the chamber door (open or closed).
8	Pallet lock description	Displays the status of the pallet lock (locked or unlocked).
9	Agitator pictogram description	Displays the process parameters and processes for the agitator driver.
10	Circulating fans picto- gram description	Displays the process parameters and processes for the circulating fans.
11	Header	 For selecting higher-level functions, e.g., log in or log out user. Displays process information, e.g., alarms that have occurred or outstand- ing user actions. Indicates remote operation, e.g., an existing OPC UA connection.

5 Installation

5.1 Scope of Delivery

Packaging	Item	Quantity
Crate 1	Chamber	1
Crate 2	Refrigeration unit	1
Crate 3	Door	1
Crate 4	Box 1 – 3, agitation motor assembly	1
Box 1	Circulation fan motors	3
Box 2	17″ touch display and mounting arm	1
Box 3	Pressure relief vent	1
	LED light assemblies	2
	Anchoring feet	8
	Stack light	2
	Miscellaneous air tubing	
	Barcode QR scanner, USB cable	1
	Document tray	1
	Panel access key	3

5.2 Selecting an Installation Site

Procedure

- Make sure that the setup conditions have been met (see chapter "14 Technical Data", page 55).
- ▶ Refer to the pre-installation checklist provided.
- Restrictive dimensions within the facility such as doorways and hallways in the route to the chamber or refrigeration unit's intended location need to be greater than device's dimensions according to chapter "14 Technical Data", page 55.
- Consider extra space needed for maneuvering equipment and when turns are required to move the device to the intended location.
- For installations in seismically active areas, a seismic anchoring calculation report must be prepared.
- ▶ Refer to the seismic anchoring calculation report for floor requirements.
- The chamber and refrigeration unit can either be hoisted from the top or lifted from below by a forklift that can handle the size and weight according to the specifications (see chapter "14 Technical Data", page 55).

5.3 Acclimatization

When a cold device is brought into a warm environment: The temperature difference can lead to condensation from humidity in the device (moisture formation). Moisture in the device can lead to malfunctions.

Procedure

Allow the device to acclimatize for approx. 24 hours at the installation site. The device must be disconnected from the power supply during that time.

5.4 Installing the Device

External parties hired by the customer will be needed to perform other installation tasks with the guidance and supervision of Sartorius Service during a planned installation. Please refer to the Celsius® FFT Freezer Pre-Installation Checklist for site readiness and customer responsibilities before the scheduled installation. Contact Sartorius Service for support before installation. Tasks include but are not limited to:

Rigger:

- Unloading crates from the delivery vehicle prior to the arrival of Sartorius Service.
- Moving the chamber, door, refrigeration unit, and agitation motor assembly.
- Attaching the door (see chapter "5.4.6 Attaching the Door", page 33).
- Installing anchors and securing 8 anchoring feet to the floor at the installation site. Anchor types and bolts may vary depending on the seismic anchoring calculations specific to the customer's site (see chapter "5.4.3 Mounting the Brackets | Adjusting the Leveling Feet", page 32).

Plumber:

- Installing the shut-off valve, flow gage, temperature gage, and pressure gage at the chilled water inlet and outlet.
- Providing and connecting tubing from the chamber and | or refrigeration unit to the utility drain.
- Providing and connecting tubing from the device to the utility compressed air.
- Providing and connecting tubing from the utility cooling water to the refrigeration unit.

Ventilation Technician:

Providing the duct and connecting the duct flange on the air equalization control system of the device to the exhaust ventilation at the installation site.

5.4.1 Inspecting and Unpacking the Crates | Boxes

Sartorius Service is not responsible for moving the crates from the delivery truck to the storage location.

A forklift that can handle the crates, specifically the crate's dimensions and weight, is the preferred method of unloading from the delivery vehicle (see chapter "14.1.1 Dimensions, Weights", page 55). A forklift, forklift operator, and pallet jack will be needed for planned installation tasks when Sartorius Service is on site.

Procedure

- **WARNING** Risk of serious injury due to improper unpacking.
 - The device must only be unpacked together with Sartorius Service.
 Hire external parties for support.
- Contact Sartorius Service if the crates are damaged.
- \triangleright A wireless power drill is preferred to remove panels.

5.4.2 Mounting the Device

Procedure

- **WARNING** Risk of serious injury due to improper assembly.
 - ▶ The device must only be installed together with Sartorius Service.
 - ▶ Contact Sartorius Service for installation assistance.
 - ► Hire external parties for support.

5.4.3 Mounting the Brackets | Adjusting the Leveling Feet

A rigger hired by the customer is responsible for securing the anchoring feet to the floor.

Procedure

- ▶ Use the brackets (2) to fasten the device to the floor.
- Adjust the leveling feet (1) by unscrewing all 4 feet with the wrench until the device is level.
- ▷ A bull's eye level can be placed on a horizontal surface of the agitation system within the chamber to confirm that the chamber is level.
- If installing in a seismically active zone, refer to the seismic calculation report for anchor specifications. The seismic calculation report is prepared by personnel hired by the customer.



5.4.4 Connecting the Utilties

The customer is responsible for supplying the required materials and connecting all utilities to the device after positioning. The necessary utilities are described in the Utility List provided by Sartorius.

Procedure

- Connect the cooling water and process air as specified in the technical data (see chapter "14 Technical Data", page 55) and the Utility List.
- Install shut-off valves, a flow gage, a temperature gage, and a pressure gage.

5.4.5 Connecting the Power Supply

Required qualification: Certified electrician

Procedure

WARNING Severe injuries due to the use of defective power supply cables! Check the power supply cable for damage, e.g., cracks in the insulation.

▶ If required: Contact Sartorius Service.

- NOTICE Damage to the device due to excessive input voltage! Check whether the voltage specifications match those of the power supply at the installation site.
 - If the input voltage is too high: Do not connect the device to the power supply.
 - Contact Sartorius Service.
- Connect the power supply to the device based on the corresponding version. Choose the appropriate cable size and rating according to the distance between the power source and the system, ensuring it meets local power supply requirements.

5.4.6 Attaching the Door

A rigger hired by the customer must hoist the door in a vertical position by the 2 hooks located at the top of the door. Please pay attention to the dimensions and weight of the door (see chapter "14 Technical Data", page 55). Sartorius Service will fasten the hinges on the door to the chamber while the rigger is hoisting the door.

5.4.7 Interconnecting the Chamber and Refrigeration Unit

Procedure

- MARNING Serious risk of injury due to improper assembly.
 - Interconnection of the chamber and refrigeration unit must be performed with the help of Sartorius Service.
 - Contact Sartorius Service for installation assistance.
 - ► Hire external parties for support.

6 Getting Started

6.1 Commissioning the Device

Procedure

- **WARNING** Risk of serious injury due to improper commissioning.
 - ► The device must only be commissioned and connected to the installation site together with Sartorius Service.
 - ► Contact Sartorius Service for assistance.

6.2 Switching the Device On

Procedure

- Check that the emergency stop button (2) is in its unlocked ("out") position.
- ▶ Turn the main switch (3) to its "ON" position.
- \triangleright The device initializes the boot process.
- Push the [Reset] button (1).

6.3 Logging In | Out

Procedure

- Click the [Log in | Log out] button.
- Enter the user ID and password.
- ▷ Both successful and failed login attempts are logged in the event log.
- ▶ To log out, click the [Log in | Log out] icon in the [Home] screen.

6.4 Loading Recipes

The device will be delivered with 3 preloaded recipes. For a detailed description of how to load and approve recipes for execution, please refer to the Biobrain[®] Operating Instructions.



7 Process Preparation

7.1 Starting a Batch and Linking a Recipe

For a detailed description of how to start a batch and link recipes, please refer to the Biobrain[®] Operating Instructions.

The recipe contains guided steps to guide the user through the process preparation requirements.

7.2 Scanning the Container Codes

The HMI will guide the user through the required actions. The first step of the recipe will include scanning the Container code.

Requirements

The 75 L Containers are stacked on the Celsius[®] FFT 75 L | Pallet Base (see Instructions for Use of the Celsius[®] FFT 75 L).

Procedure

▶ Open the message and click the [OPEN SCAN DIALOG] button (1):

≡∣	UWP	Service 👻						Ô	
	Equipment phases				« » E	S120 - SCANCONTAINER			
		Phase 🔺	Phase state	Subtype	Owner	Duration		Phase: Step: Date, time:	Code scanner S120 SCANCONTAINER
≔							Code scanner Equipment phase	S120 - SCANCONTAINE	R
~		Code scanner	Running	System	Operator	0 00:03:54		Please open the scan dialo over all containers on the p	g and scan the Sartorius coo allet.
•								OPEN SC	AN DIALOG
4								1	

- Follow the instructions on the HMI to scan the Container barcodes, and record the information.
- Select the Container position on the pictogram (1).
- Scan the barcode.
- ▶ After scanning all Containers, click [FINISH SCANNING] (2).



7.3 Chamber Preparation Phase

The recipe will include a chamber preparation phase to guide the user through the process preparation.

7.3.1 Opening | Closing the Door

The door lock is part of the safety equipment. The device does not start a process if the door is unlocked and it can only be unlocked if the device is at a standstill.

Requirements

No freezing | thawing process is running.

Procedure

Open the message and the "Equipment phases" dialog box:

	LWP	Service 👻										Ō		
	Equipment phases										×	S100 - OP_MSG1		
		Phase	•	Phase state	Subtype	Owner	Duration					Dhoney	Chember preparation	
												Step:	S100 OP_MSG1	
				_	_	-	_	Char	mber i	nrenaration		Date, time:		
18 - E		Chamber preparation		Running		Operator		Equip	oment	phase				
												S100 - OP_MSG1		
~	<u> </u>											Open the door and press O	< to confirm.	
-														
ч														
-														

- ▶ To open the door, push the [Open] button (2).
- Open the door using the door handle (1).
- Click the [OK] button to confirm.
- CAUTION Danger of crushed body parts when closing the door!
 Use the door handle (1) when closing the door.
 - Be careful when opening and closing the door, so that no body parts get crushed.
- Make sure that no person is in the chamber, in the door area or behind the door.
- When the door is in the closed position, lock the door by pushing the [Close] (3) button.

7.3.2 Preparing the Containers

Equipment:	– Celsius [®] FFT 75 L Thermal Sensor (optional)							
	- Celsius [®] FFT Freezer Thermal Sensor Cable (optional)							
	– Top plate							

Personnel: 2 people

Requirements

For monitoring the fluid temperature: The Thermal Sensor is attached to the top of the Container (see Instructions for Use of the Celsius® FFT 75 L).


Procedure

- ▶ Follow the instructions on the HMI and confirm the actions.
- Optional: Connect the Celsius[®] FFT Freezer | Thermal Sensor Cable with the Thermal Sensor(s) on the Container(s).
- ▶ Have 2 people lift the top plate (2) onto the stacked 75 L Containers.
- ▷ The top plate is required for all Container quantities, ranging from 1 to 4 containers.
- Secure the top plate with 4 clamps (1).

7.3.3 Checking the Device

Procedure

 Check the device according to the maintenance schedule (see chapter "9.3 Maintenance Schedule", page 42).

7.3.4 Loading the Chamber

Equipment:

Celsius[®] FFT Lift

- ▶ Follow the instructions on the HMI and confirm the actions.
- Open the door (see chapter 7.3, page 36).
- Visually verify that the agitation system has returned to the correct position.
- Align the Celsius[®] FFT Lift with the guide bar (1) underneath the chamber.
- ▶ Using the Celsius[®] FFT Lift, place the Pallet with the Containers in the chamber.





Optional: Connect the Celsius® FFT Freezer | Thermal Sensor Cable to the sensor connection panel (1) inside the chamber.

Close the door (see chapter 7.3, page 36).

8 Operation

8.1 Starting the Temperature Control Process

After the chamber preparation is completed, the HMI will ask for confirmation to start the temperature control process.

Requirements

- A recipe has been selected (see chapter 7.2, page 35).
- The chamber has been loaded (see chapter 7.3.4, page 37).

Procedure

Click the [OK] button (1) to start the tempering:

	LWP	Service -							Ô	
	Equ	ipment phases							Operator Message	
_		Phase 🔺	Phase state	Subtype	Owner	Duration	Step no	Step	Phase:	Work flow
									Step: Date, time:	S100 MESSAGE
∷≡										
									Operator Message	
∽									Press OK to start tempering	1
		Temperature control	Running	Control	Operator	0 00:03:47	S142	Temperat		
		Work flow	Running	Guidance	Operator	0 00:00:21	S100	Show ope		
»									CLOSE	ок

- Based on the temperature setpoint, the device will start cooling | heating.
- ▷ It is possible to check the status on the process view screen.
- Optional: Monitor the selected variables with the embedded trending tool (see Biobrain[®] Operating Instructions):



8.2 Chamber Release and Finishing Process

After the temperature control phase is completed, the HMI will start the chamber release phase to guide the user through the process.

Procedure

- ▷ If the recipe includes cooling with a setpoint less than 2 °C, a notice is displayed which instructs the user not to run a back-to-back freezing cycle.
- Click the [OK] button to confirm.

=	LWP	Service •							Ô	
	Equ	ipment phases						« » 🛛	S110 - OP_MSG1	
		Phase	•	Phase state	Subtype	Owner	Duration			
								P	Step:	S110 OP MSG1
									Date, time:	
								Chamber release		
:=								Equipment phase	S110 OD MSC1	
1 .		Chamber release		Running	Process	Operator			Running back-to-back freez	ing cycles may impair the
Ľ									performance of Celsius® Fl recipe if needed. Press OK t	FT Freezer. Run the defrost o acknowledge.

8.2.1 Unloading the Chamber

ACAUTION

Danger of frostbite when handling frozen material!

- Wear personal protective equipment such as cryogenic safety gloves.
- ▶ Follow the instructions on the HMI and confirm the actions.
- Open the door (see chapter 7.3.1, page 36).
- Optional: Disconnect the Celsius® FFT Freezer | Thermal Sensor Cable from the sensor connection panel (1) inside the chamber.



- ▶ Use the Celsius[®] FFT Lift to remove the Pallet from the chamber.
- ▶ Remove the top plate.
- Close the door (see chapter 7.3.1, page 36).
- Stop the batch (see Biobrain[®] Operating Instructions).
- Optional: Generate a batch report (see Biobrain[®] Operating Instructions).
- Check the device according to the maintenance schedule (see chapter "9.3 Maintenance Schedule", page 42).



9 Cleaning and Maintenance

🛆 WARNING

Risk of injury due to electrical hazard!

There is the risk of severe injury or death due to accidental energization of the device.

- Ensure all power sources are de-energized.
- Add a lockout-tagout before performing troubleshooting or maintenance.

9.1 Cleaning

Requirements

- The process has been completed.
- The Pallet with the 75 L Containers has been removed.

Procedure

- CAUTION Danger of frostbite when cleaning the device after a freezing process! Let the device warm up for a few hours before performing any cleaning and maintenance tasks.
- ▶ Turn off the device by putting the main switch to the "OFF" position.
- Disconnect the main power from the utility supply.
- NOTICE Corrosion or damage to the device due to unsuitable cleaning agents! Only use suitable cleaning agents and cleaning procedures and observe the product information for the cleaning agent used (see 14.7, 64).
- Spray or wipe the housing with 70% IPA solution.
- Only use HVAC cleaning agents to clean the heat exchanger components.

9.2 Carrying Out Maintenance

Requirements

The device is switched off (except for calibration tasks or functional tests).

- WARNING Danger of contamination due to tasks performed on a contaminated device! Tasks performed on the device that have not been decontaminated can result in severe poisoning, infection, or allergic reactions.
 - Before carrying out any maintenance work, ensure that the device has been properly cleaned and decontaminated.
 - Only perform maintenance tasks once a declaration of decontamination has been issued, filled out, and signed by an authorized person.

9.3 Maintenance Schedule

Interval	Activity	Target Group		
To be specified by the op- erator but not to exceed Sartorius or sensor manu- facturer recommendations	Calibrate the process-relevant measurement points of the device (see 9.3.3, 45).	Sartorius Service personnel, or operator, or sensor manu- facturer		
Before each operation	Perform all required inspections before operation (see 9.3.1, 45).	Operator		
After each operation	Perform daily inspections after operation (see 9.3.2, 45).	Operator		
Monthly	Visually check the refrigeration unit for damage and stability.	Maintenance specialist of the operating entity		
	Inspect the door gaskets for tears and damage.	Operator		
Every 6 months	Check that the measurement instruments are secured tightly.			
	Check the fan for unusual running noises.			
	Visually check the door interlock switch is properly inserted when the door is closed.			
	 Perform a function check of the door [Open] [Close] buttons. While the door is open, visually confirm the ceil- ing lights within the chamber are on. 			
	 Visually check all air pressure regulators on the chamber are set to the values indicated on the pneumatic schematics supplied with the device. Confirm the flow rate of the dry air purge valves complies with the required values. 	Maintenance specialist of the operating entity		
	 Perform a function check of the emergency stop on the chamber and the refrigeration unit. Press the emergency stop button. Confirm functions are stopped after pressing. Release the emergency stop button. Press the [Reset] button. 			
	 Perform a function check of the [Reset] button. After pressing and releasing the emergency stop button, the [Reset] button should not be illumi- nated. Press the [Reset] button so that it lights up and functions can be performed. 			

Interval	Activity	Target Group	
Every 6 months	 Perform a function check of the main disconnect on the chamber. Turn the switch to the "Off" position. Wait about 5 minutes. Turn the switch to the "On" position. Wait for the "Login" screen to appear. Press the [Reset] button. Visually check the the utility process air meets the pressure reading requirements. The custom- er is responsible for checking that the air quality, dew point and air flow requirements are met 	Maintenance specialist of the operating entity	
	 Visually check the cooling water flow gage, temperature gage, and pressure gage readings are within the required values. 	_	
	 Take a voltage reading of the chamber's main power. Confirm the voltage reading is within the re- quirements. It is recommended that this check be performed by an electrician hired by the cus- tomer. 	Electrician	
	 Perform a function check of the internal agitation unit. Turn on the agitation phase and confirm the device is running smoothly. 	Maintenance specialist of the operating entity	
	 Perform a function check of the pallet locks. Turn the pallet lock phase on. Confirm the pallet locks rotate down when locked and rotate up when unlocked. 		
	Check the cooling water quality and, if necessary, descale the cooling water circuit.		
	Check drains inside the chamber for blockage.	Maintenance specialist of the operating entity	
Every 12 months	Perform a functional test of the over-temperature protection of the device.	Sartorius Service personnel	
	Check the compressed air is not leaking from the pneumatic cylinders on the refrigeration unit.	Maintenance specialist of the operating entity or Sartorius Service personnel	
	Check that all visible threaded connections are secure and tight.		
	Inspect the eccentric front and rear agitator shafts for damage.	- Sartarius Sarvice personnal	
	Inspect the through-wall connector shafts for damage.	- סמינטוועג ספי אוכפ אפרגטוווופו	
	Inspect the rotary shafts of the pallet clamping system for damage.	_	

Interval	Activity	Target Group
Every 12 months	Inspect the flange mount bearing for damage.	
	Inspect the pillow block bearing for damage.	Sartorius Service personnel
	Lubricate the grease ports of the door hinges.	
	Check the condition of the cryo piping insulation.	Maintenance specialist of the operating entity or Sartorius Service personnel
	Check all bellows shaft couplers for damage.	
	Check all bellows shaft couplers and shaft couplings are firmly secured. Refasten if necessary.	_
	Inspect the door gasket compression.	_Sartorius Service personnel
	Have the heat exchanger coils checked for leaking heat transfer fluid (only for Low Global Warming Potential version).	
	Clean the heat exchanger coils by the circulation fans.	Maintenance specialist of the operating entity or Sartorius Service personnel
	 Perform a function check of the cooling water shut-off valves. Close the cooling water shut-off valves. Confirm the system recognizes the loss of water. Open the cooling water shut-off valves. Visually check the internal agitation unit rests in 	_
	 Visually check the internal agrication unit rests in or near the home position when fully stopped. The home position is defined as bottom dead center. 	_
	 Perform a function check of the emergency door release valve. While the door is closed, pull the emergency door release valve. Confirm the pneumatic door latches enter the open position. Press the valve reset button to reset the valve controller. 	Sartorius Service personnel
	 Press the emergency release valve to return it to the original position and the door latches should remain in the open position. 	_
	 Perform a function check of the low and high pressure interlocks. Adjust the main process air pressure regulator to below or above the interlock value. Confirm process air functions are not active when above or below the interlock value. Restore the utility process air pressure to the original value. 	
	Check that the door gasket is properly attached to the door and has no other tears or damage.	

Interval	Activity	Target Group
Every 24 months	Replace the heat transfer fluid (only for Low Global Warming Potential version).	Sartorius Service personnel
Every 36 months	Replace the industrial PC BIOS CMOS battery.	Sartorius Service personnel
Manufacturer recommendation	Perform preventative maintenance of the refrigeration unit and interconnection piping.	Sartorius Service personnel

9.3.1 Pre-Operating Inspections

Requirements

The operation has not yet been started.

Procedure

- ► Check HMI for any error messages.
- Check utilities are operating correctly.
- Check area around the device for leaking fluids.
- Check the refrigeration unit for any leaking fluids.
- ▶ Low Global Warming Potential version only: Check the heat transfer fluid level.
- Low Global Warming Potential version only: Check the heat transfer fluid ports for leaks (see chapter 9.3.4, page 45).

9.3.2 Post-Operating Inspections

Requirements

The operation has been completed.

Procedure

- Check the device is dry and free of condensate after a freeze | thaw cycle.
- Check HMI for any error messages.
- Check area around the device for leaking fluids.
- Check the refrigeration unit for any leaking fluids.

9.3.3 Calibrating the Device

Please contact Sartorius Service to schedule calibration of the device. The air sensor monitoring dew point will require calibration by the specific sensor's manufacturer.

9.3.4 Using UV Light to Detect HTF Leak (Low Global Warming Potential Version Only)

Once insulation is placed over the heat transfer fluid piping, a UV lamp can only generally be used over exposed piping such as the heat transfer coils.

- ▶ Inspect the HTF piping | connections and heat exchangers with a UV lamp.
- ▷ Inspection under UV blacklight of the piping | connections will reveal leaks as a bright fluorescent yellow | green glow.
- ▶ In the event of a leak, contact Sartorius Service.

10 Faults

10.1 Restarting After an Emergency Stop

There are 2 emergency stops: One on the chamber and one on the refrigeration unit. If one of them is pressed, it will stop both the chamber and the refrigeration unit. After releasing the emergency stop, the [Reset] button is located on the chamber only.

The emergency stop button shuts off the electrical power to the compressors, agitation drive, circulation fan drive, door heater circuit, the dry air purge valves, and the dry air purge solenoid valves.

After a power outage, the device will automatically reboot and enter a "HOLD" position. The device will remain in this state until it has been verified and confirmed that it is safe to resume operation.

- ▷ Once the emergency stop button has been pressed,, the current recipe step will be paused. A horn will sound and the signal light will blink red.
- $\,\triangleright\,\,$ The control voltage remains operational.
- ▶ ▲ WARNING Risk of severe injury or even death due to malfunctioning or overridden safety devices!
 - Before restarting, make sure that the reason for the emergency stop has been eliminated and all safety devices are correctly installed and functional.
 - Only unlock the emergency stop button when there is no longer any danger.
- ▶ Turn the emergency stop button (2) to its unlocked ("out") position.
- ▶ Press the [Reset] button (1) on the chamber electrical cabinet.



- Clear and acknowledge all the alarms.
- Low Global Warming Potential version only: Turn on the device by moving the main switch from the tripped position to "OFF", then "ON".
- Restart the phases manually.

10.2 Restarting After a Power Failure

In the event of a power failure, all the high-voltage components will shut down immediately. The UPS inside the cabinet will supply the device, shut down the software, and power off the cabinet. When the power supply comes back, the device reboots automatically.

Procedure

Press the [Reset] button (1) on the chamber electrical cabinet.



- Move the main switch from te tripped position to "OFF", then "ON".
- Clear and acknowledge all the alarms.
- Restart the phases manually.

10.3 Door Emergency Release

The chamber door cylinders and lock are supplied with an emergency release valve that provides the ability to open the door, from inside or outside the chamber, in the event of a loss of power and | or process air.

Procedure

In the event of losing power and | or process air, open the cabinet under the HMI.



1



- Release the door from outside the chamber by pulling the emergency release valve (2).
- In rare situations, if someone has been trapped inside the chamber, the door can be released from inside by pushing on the emergency valve HV-3192 from inside.
- If the door is released using the emergency release valve, reset the valve. To do so:
 - ▶ While the door is open, press the reset valve (1) for at least 2 seconds. If there are any issues with resetting the door valve, e.g., if there is low air pressure while trying to reset the valve, the pressure switch will activate the alarm "Door reset ok".
 - Return the emergency release valve (2) to the original position by pushing it from outside the chamber.
 - ▶ Close and open the door normally a few times.

10.4 Overpressure | Low Pressure

The device is equipped with a high-pressure switch to detect overpressure. In the event of pressures of 80 psi and higher, a hardware circuit is interrupted, and the pressure relief valve will start to bleed the extra pressure from the line.

The device is equipped with a low-pressure switch to detect low pressure. In the event of pressures of 60 psi and lower, a hardware circuit is interrupted. The device is equipped with an air reservoir tank that allows opening | closing of the door, at least once, in the event that pressure is low or the process air is lost completely.

- Before restarting, make sure that the cause of the overpressure | low pressure has been eliminated and that all safety devices are correctly installed and functional.
- Clear and acknowledge the alarms.
- Manually restart the affected phases that were running before the overpressure | low pressure occurred.

10.5 Gas Leakage (Low Global Warming Potential Version Only)

The Low Global Warming Potential version uses a flammable natural refrigerant. To mitigate the risk of flammable gas leakage, the chiller can be equipped with 2 gas sensors designed to detect leaks both during operation and when the unit is turned off. These gas sensors need to be powered and monitored by an external evaluation unit (to be ordered separately from external suppliers).

As the chiller is powered by the chamber, the chamber needs to be connected to the evaluation unit, allowing it to receive a digital input signal if any gas leakage is detected while the chamber is running. Therefore, it will cut the power to the refrigeration unit in the event of any leakage.

If there is a gas leak or the gas sensor device alarm is active:

- The signal from the evaluation unit is "No gas leak (DI) = False."
- The temperature control unit is OFF, and the main switch is in the tripped position.
- Door stays in the last position.
- The temperature control unit running phase is in "Held" mode.

- After checking the refrigeration unit for gas leaks (see chapter "9.3.4 Using UV Light to Detect HTF Leak (Low Global Warming Potential Version Only)", page 45), the signal from the evaluation unit should be: "No gas leak (DI) = TRUE".
- Clear and acknowledge the alarms.
- Turn on the temperature control unit by moving the main switch from the tripped position to "OFF" then "ON".
- Restart the phases manually.

10.6 Hardware Faults

Fault	Cause	Solution
Agitation system stops in unexpected position.	The agitator proximity sensor is not aligned with the home position flag.	Contact Sartorius Service.
The cooling water is not being fed into the cooling system.	The cooling water supply line is blo- cked, or the valves of the water supply are defective.	Check the valves.
	The cooling water feed valve does not work because of particulate contami- nants in the cooling water or scale de- posits.	 Check the water hardness. Feed clean cooling water into the cooling system. If required, install a pre-filter.
The cooling water is not	The flow rate is too low.	 Set the minimum operating tempera- ture and sufficient flow rate
Sumelent.	The cooling water temperature is too high.	 If required, install a separate upstream cooling device.
	The pressure difference between coo- ling water supply and return is not suf- ficient.	
Heating or cooling perfor- mance is reduced.	There is a refrigerant or heat transfer fluid leak. The pump or compressor performance is reduced throughout as a result of air in the temperature control circuit.	 Low Global Warming Potential version: Make sure that the circulation pump setpoint is set at 3500 rpm or higher. Use the UV light to check for heat transfer fluid leakage (see 9.3.4, 45). Check the HTF level at room tempera- ture. Make sure it is the same while the pump is running and stopped.
		Standard version: A refrigerant technician should check the refrigerant interconnec- tion to make sure there is no leakage.
Device has power but there is an "AC power fail" alarm.	The device is equipped with a phase monitor to protect the device from over voltage, under voltage, phase im- balance, or phase reversal. Any of these conditions will trigger the alarm.	Check the main AC power quality and make sure that it meets the technical spe- cification requirements. The status of the phase monitor LED inside the cabinet pro- vides a troubleshooting guide to determi- ne the main cause.
Door cannot be opened closed.	 The process air supply pressure is insufficient. The [Open] [Close] buttons are malfunctioning. The door lock solenoid valves are malfunctioning. 	 Check the process air supply pressure and make sure it meets the require- ments. Check the door [Open] [Close] but- tons and solenoid valves. If required, call Sartorius Service to ch- ange the door lock solenoid valves.

Fault	Cause	Solution
The Pallet lock unlock function is not working.	 The process air supply pressure is insufficient. One of the pallet lock or unlock proximity sensors is not in place to detect the cylinder's location. 	 Check the process air supply pressure and make sure it meets the require- ments. Check the 4 pallet lock unlock proxi- mity sensors and make sure that they are in place. 2 of the pallet lock unlock proximity sensors read the unlock position and the other 2 read the lock position. If needed, call Sartorius Service to adjust or change the defective proximity sen- sors.

11 Decommissioning | Transport

\Lambda DANGER

Danger to life caused by hazardous electrical voltage!

Residual energy may be released when disconnecting from the power supply and energy transmission.

- Only to be carried out by trained personnel.
- Ensure controlled dissipation of residual energy in components.

Requirements

The process has been completed.

- Switch off the device at the main switch.
- ▶ Wait 3 minutes.
- Disconnect all utilities: power supply, air supply, and cooling water.
- Clean the device (see chapter 9.1, page 41).
- **WARNING** Serious risk of injury due to improper decommissioning.
 - The device must only be decommissioned and disconnected from the installation site together with Sartorius Service.
 - ► Contact Sartorius Service for assistance.

12 Shipping

12.1 Decontaminating the Device

The cultures and media (e.g., Container liquids) used during the process are potentially hazardous substances that might cause biological or chemical hazards.

Contaminated liquids used during the process that could cause biological or chemical hazards if they leak are potentially hazardous substances.

If the device has come into contact with hazardous substances, steps must be taken to ensure proper decontamination and declaration.

Procedure

Decontaminate the device. The operator of the device is responsible for adhering to local government regulations on the proper decontamination and declaration for transport and disposal.

12.2 Returning the Device and Parts

Defective devices or parts can be sent back to Sartorius. Returned devices must be clean, decontaminated, and packed properly | in their original packaging.

The sender shall be billed for any transport damage as well as measures for subsequent cleaning and disinfection of the device or parts by Sartorius.

Devices contaminated with hazardous materials, e.g., harmful biological or chemical substances, will not be accepted for repair or disposal. The devices must be decontaminated before shipping (for decontamination, see chapter "12.1 Decontaminating the Device", page 53).

- Decommission the device.
- Contact Sartorius Service for instructions on how to return devices or parts (please refer to www.sartorius.com).
- Pack the device and its parts properly | in their original packaging for return.

13 Disposal

The device and the device accessories must be disposed of properly at disposal facilities.

A UPS battery is installed inside the device. The battery must be disposed of properly at disposal facilities.

The device contains refrigerants (see chapter "14 Technical Data", page 55). The refrigerants must be removed and disposed of by qualified personnel in accordance with the relevant national regulations for proper disposal.

Requirements

The device has been decontaminated.

- ► For more information on the refrigerant, see the safety data sheet (SDS) of the refrigerant and the heat transfer fluid.
- CAUTION Danger to persons and the environment due to improper disposal!
 - Do not discharge the refrigerant | heat transfer fluid into the atmosphere. Do not discharge into sewers, cellars, working pits and similar places where the accumulation of gases could be dangerous.
 - Separate parts of the device and electrotechnical components as well as operating materials according to type and dispose of them properly in accordance with local regulations and directives.
 - Have the refrigerant | heat transfer fluid disposed of by qualified personnel. If necessary: Check with local authorities or specialized disposal companies.
 - ▶ If you have any questions about disposal: Contact the manufacturer.
- Dispose of the device in accordance with local government regulations. Inform the disposal facility that there is a UPS battery installed inside the device.
- Dispose of the packaging in accordance with local government regulations.

14 Technical Data

14.1 Chamber

14.1.1 Dimensions, Weights

	Unit	Value
Dimensions, door closed L x W x H without piping	mm in	2997 x 2565 x 2286 118 x 101 x 90
Dimensions, door open L x W x H without piping	mm in	3327 x 4826 x 2286 131 x 190 x 90
Approx. crated shipping dimensions $(L \times W \times H)$	mm in	2007 x 3150 x 2210 79 x 124 x 87
Weight	kg Ib	2132 4700
Maximum weight load on the agitation system	kg Ib	500 1102

14.1.2 Electrical Data

	Unit	Stand	ard		Low (Global Warming Potential	
Voltage, ± 10%	V	480	415 400 380	380	480	415 400 380	380
No. of phases					3		
Frequency	Hz	60	50	60	60	50	60
Full load amps (FLA)	А	68	69	74	92	92	116
Recommended minimum service	A	80	80	90	110	110	150
Max. Fuse Size	А	100	100	110	125	125	175
Short-circuit current rat- ing	kA			!	5		
Protection class	IP			5	54		
Air supply and return monite	oring: 2>	« PT100	RTD				
Control system PLC type: Siemens WinCC OA Soft PLC							

14.1.3 Operating Ranges

	Unit	Value
Operating temperature range	°C	-70 - +35
Agitation range		
Speed	rpm	0 - 70
Displacement: 1″ peak to peak		
Home position: bottom dead center		
Maximum load capacity		
– 1 to 4 Celsius® FFT 75 L Containers (300 L max) on Celsius	s® FFT 75 L Pallet	
 – 1 to 10 Celsius[®] FFT 12 L Containers (120 L max) on Celsius 	[®] FFT 6 12 L Pallet	t
– 1 to 10 Celsius® FFT 6 L Containers (60 L max) on Celsius®	FFT 6 12 L Pallet	

14.1.4 Materials

Exterior: 340 SS	
Interior: 316 SS	

14.1.5 Ambient Conditions | Compatibility

	Unit	Value
Ambient temperature, min.	°C	5
Ambient temperature, max.	°C	40
Humidity	%	50
Clean room compatibility		ISO 7 Grade C
Altitude above sea level, max.	m	< 2000
Pollution degree rating, pollution degree		2

14.1.6 Flexible Hoses

	Unit	Value
Static bending radius, min.	mm	150
Dynamic bending radius, min.	mm	350

14.1.7 Acoustic Emissions

	Unit	Value
Acoustic emissions, at 1 meter	dB(A)	< 80

14.2 Compressed Air Supply

	Unit	Value	
Max. pressure	barg	6.9	
Min. pressure	barg	6.2	
Max. required flow	LPM	425	
Dew point	°C	-73	
Type of connection: ½" NPTF			
Filtered to ISO 8573-1:2010 [4:1:3]			

14.3 Refrigeration Unit: Standard Version

14.3.1 Dimensions, Weights

	Unit	Value
Dimensions (L x W x H)	mm	1143 x 1981 x 2273
	in	45 x 78 x 90
Dimensions with minimum service access without piping $(L \times W \times H)$	mm	2896 x 3639 x 2273
	in	114 x 144 x 90
Approx. crated shipping dimensions (W x D x H)	mm	1524 x 2388 x 2184
	in	60 x 94 x 86
Approx. shipping weight, net.	kg	1727
	lb	3800

14.3.2 Electrical Data

	Unit	Value
Power supply: powered by chamber		
Protection class	IP	54
Control system PLC type: Siemens		

14.3.3 Ambient Conditions

	Unit	Value
Min. max. ambient temperature	°C	5 - 40

14.3.4 Acoustic Emissions

	Unit	Value
Acoustic emissions, at 1 meter	dB(A)	~ 70

14.3.5 Materials

Housing material: 340 SS 2B finish

14.3.6 Refrigeration System

	Unit	Value	
Direct expansion refrigeration scheme			
Refrigerant types and mass			
— Primary: R-449A – 6.6 kg			
— Secondary: R-508B – 6.8 kg R-600A – 0.14 kg			
Coolant: 100% water, or mixture of water and propylene glycol			
Cooling water inlet			
Min. max. pressure	barg	2.1 - 5.5	
Min. differential pressure	barg	2.1	
Min. max. temperature	°C	2 - 30	
Required flow rate: @7.2 18.3 29.4 °C (100 % water): 42.6 56.	.8 121.7 L/min		
Type of connection: 1.25" NPTF			
Cooling water return			
Min. max. pressure	barg	0 – 5	
Min. differential pressure	barg	2.1	
Min. max. temperature	°C	37 - 55	
Type of connection: 1.25" NPTF			
Cooling capacity			
at 480 V	kW	11.5	
at 380 V	kW	9.5	
Heating capacity			
at 480 V	kW	6	
at 380 V	kW	3.8	

14.4 Refrigeration Unit: Low Global Warming Potential Version

14.4.1 Dimensions, Weights

	Unit	Value
Dimensions (L x W x H)	mm in	950 x 1547 x 1705 38 x 61 x 67
Dimensions with minimum service access without piping (L x W x H)	mm in	2450 x 3097 x 1705 98 x 123 x 67
Approx. shipping weight, net	kg Ib	1106 2438

14.4.2 Electrical Data

	Unit	Value
Power supply: powered by chamber		
Protection class	IP	20
Control system PLC type: Siemens		

14.4.3 Ambient Conditions

	Unit	Value
Min. max. ambient temperature	°C	5 - 40

14.4.4 Acoustic Emissions

	Unit	Value
Acoustic emissions, at 1 meter	dB(A)	~ 70

14.4.5 Materials

Housing material: 304 SS	
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14.4.6 Refrigeration System

	Unit	Value
Heating power	kW	32
Mechanical cascade refrigeration system		
Heat transfer fluid: FRAGOLTHERM® X-T12 F		
Refrigerant types and mass		
– Primary: R1270 – 2.25 kg		
– Secondary: R170 – 1.25 kg		
Coolant: 100% water, or mixture of water and propylene glycol		
Cooling water inlet		
Min. max. pressure	barg	1-6
Min. differential pressure	barg	>1
Min. max. temperature	°C	4 - 20
Flow rate	L/min	22
Type of connection: G ¼″ male thread		
Cooling water return		
Min. max. pressure	barg	0 - 5
Min. differential pressure	barg	>1
Min. max. temperature	°C	33 - 50
Flowrate	L/min	22
Type of connection: G $\frac{3}{4}$ male thread		
Cooling capacity		
at 0 °C	kW	20
at -20 °C	kW	20
at -40 °C	kW	20
at -60 °C	kW	15
at -80 °C	kW	5
Heating capacity	kW	32

14.5 Requirements for the Installation Site

The installation site meets the requirements concerning the ambient conditions:

solid concrete floor

air-conditioned facility

indoors (chamber)

Floor level within ± 0.125" per 10 feet (± 3.175 mm per 3.05 m) required for proper chamber installation

Chamber location utilities provided at installation site: floor drain, compressed air, electricity, exhaust ventilation, RJ45 wall port

Refrigeration unit location utilities provided at installation site: floor drain, chilled water

Compressed air: ≥15 cfm, ≥90 psi, ≤-73°C dew point, filtered to ISO 8573-1, ½" NPT connection

Floor drain: 1/2" NPT connection, -trap or low-pressure check valve

Pressure relief vent: 4" duct connection to building exhaust (optional)

Other utilities provided at installation site such as shut-off valve, flow gage, temperature gage, pressure at chilled water inlet and outlet



Fig. 15: Space requirements for the chamber



Fig. 16: Space requirements for the refrigeration unit, Standard Version



Fig. 17: Space requirements for the refrigeration unit, Low Global Warming Potential Version

14.6 Interconnection Requirements Between Chamber and Refrigeration Unit

The refrigeration unit can be installed in a separate room.

14.6.1 Standard Version

	Unit	Value
Maximum interconnection piping distance	m	22.86
	ft	75

14.6.2 Low Global Warming Potential Version

	Unit	Value
Maximum interconnection piping distance	m	10
	ft	32.8

14.7 Cleaning Agents and Cleaning Processes for the Housing

Cleaning agent
Isopropyl alcohol, 70%
NaOH, 2%
Citric, Acid 3%
Ultrapure water (WFI), 30%
No corrosive or scouring components
No chlorine or chloride-containing components
No solvents
Cleaning procedure
No high-pressure cleaners or steam jet cleaners
No spraying processes for cleaning or disinfection

14.8 Process Values List

14.8.1 Standard Version

Parameter	Unit	Lower Process Limit	Upper Process Limit
Temperature supply air	°C	-70	35
Temperature return air	°C	-70	35
Agitator speed	rpm	0	70

Parameter	Unit	Lower Process Limit	Upper Process Limit
4x product temperature	°C	-70	35
Dew Point	°C	Dependent on the air temperature	Dependent on the air temperature
Air differential pressure across the left coils	mbar	0.1	2.5
Air differential pressure across the right coils	mbar	0.1	2.5
Pressure (process air low)	psi	60	N/A
Pressure (process air high)	psi	N/A	80
Fans speed	Hz	60	60

14.8.2 Low Global Warming Potential Version

Parameter	Unit	Lower Process Limit	Upper Process Limit
Temperature supply air	°C	-70	35
Temperature return air	°C	-70	35
Agitator speed	rpm	0	70
4x product temperature	°C	-70	35
dew Point	°C	Dependent on the air temperature	Dependent on the air temperature
Air differential pressure across the left coils	mbar	0.1	2.5
Air differential pressure across the right coils	mbar	0.1	2.5
Temperature HTF supply	°C	-75	45
2x temperature HTF return	°C	-75	45
Pressure HTF supply	bar	0	2.5
2x pressure HTF return	bar	0	2.5
Pressure (process air low)	psi	60	N/A
Pressure (process air high)	psi	N/A	80
Fans speed	Hz	60	60

14.9 Access Rights

Description	Example Scope	Adminis- trator	Super- visor	Operator	Service
Basic rights	Used for, e.g., guests — taking screenshots, etc.	Access	Access	Access	Access
Process over- view	General: – see mimics – see EPH and RPH list – see all faceplates – see the live alarm list grouped alarms within the live alarm list	Access	Access	Access	Access
Administra- tion	 all setting functions restart machine change audit trail mode change communication settings (e.g., IP address, etc.) user management (change users, add, delete, block, reset, change group assignment) horn and visual indicator settings recipe administration (import, delete) 	Access	No access	No access	Access
Service	Note: This privilege is used by the equipment module faceplate. Example: Mode selection (Maintenance) in EM	No access	No access	No access	Access
Trending	See trends, create, edit, and delete trend tem- plates	Access	Access	Access	Access
Alarming (basic)	 General: silence alarms access the live alarm list from the unit tile access the alarm flyout to acknowledge alarms or access the alarm list acknowledge alarm in live alarm list Note: Alarming (basic) right can only choose 1 line from the live alarm table to acknowledge alarm. If the user selects multiple lines, the ac- knowledge button will be disabled. 	Access	Access	Access	Access
Alarming (ad- vanced)	After selecting multiple lines from alarm table, acknowledging all selected alarms at the same time	Access	Access	No access	Access

Description	Example Scope	Adminis- trator	Super- visor	Operator	Service
Module pa- rameters (basic)	 Note: This privilege is used by the control module faceplate. General: n/a Actuator change setpoint change operating mode (operator user can change only if module is in manual mode) Sensor enable disable warning limit monitoring for process value change simulation value Controller change operating mode change operating mode change operating mode change setpoint change control value change simulation value 	Access	Access	Access	Access

Description	Example Scope	Adminis- trator	Super- visor	Operator	Service
Module pa- rameters (ad- vanced)	Note: This privilege is used by the control module faceplate. General - enable disable manual bypass - enable disable basic interlock bypass Actuator - change operating mode (operator user can also change if module is in manual mode) - change setpoint range - change aramp time - change direction (e.g., pump) (operator user can also change if module is in manu- al mode) - execute initialization - enable disable simulation - change module mode (auto manual) - change monitoring time Sensor - enable disable alarm limit monitoring for process value - change alarm thresholds - change alarm delay - enable disable simulation - change module mode Controller - change setpoint range - change control value range - change control value range - change control value default - change control value fault - change tuning parameters (Gain, TI, TD) - change tuning parameters (Gaiband, an- ti-wind-up) - enable disable simulation - change module mode Driver - change simulation value - change module mode Driver - change simulation value - change simulation value - change module mode Driver - change simulation value - change simulation value - change simulation value - change select from flow driver calibration - parameters Function	trator Access	visor Access	No access	Access
	 able totalizer) change parameter values execute commands (e.g., tare, reset, etc.) 				

Description	Example Scope	Adminis- trator	Super- visor	Operator	Service
Module pa- rameters (ad- ministration)	Note: This privilege is used by the control module faceplate. General - n/a Actuator - n/a Sensor - change working range (min max) - change measurement range (min max) Controller - n/a Driver - change measurement ranges (min max) - enable disable simulation - change protocol settings (scanrate, time- out, baudrate, etc.) Function - n/a	Access	No access	no access	Access
Module pa- rameters (service)	Note: This privilege is used by the equipment module faceplates. Examples: - operating scheme requested - all parameters in EM - mode selection in EM (auto manual)	Access	Access	No access	Access
Phase param- eters (basic)	Note: This privilege is used by the EPH face- plate. Example: All parameters defined as process memory that are visible on the phase faceplate.	Access	Access	Access	Access
Phase param- eters (ad- vanced)	Note: This privilege is used by the EPH face- plate. Examples: All parameters defined as config that are visible on the phase configuration faceplate.	Access	Access	No access	Access
Phase control (basic)	Note: This privilege is used by the EPH VM faceplate Examples: Phase control bar (start stop pause hold)	Access	Access	Access	Access
Phase control (advanced)	 Note: This privilege is used by the EPH face-plate. Examples: Transition mode (auto manual semi-auto AND semi-auto OR) Step number (only visible if manual transition mode is selected.) Operator confirm (only visible if semi-auto AND OR transition mode is selected.) Abort reset button 	Access	Access	No access	Access

Description	Example Scope	Adminis- trator	Super- visor	Operator	Service
Operator messages	Confirm, yes no, enter value	Access	Access	Access	Access
Configura- tion (basic)	 Refers to actions in operating area: switch load specific application recipe (only approved recipes) create and start a batch from the batch drawer 	Access	Access	Access	Access
Configura- tion (ad- vanced)	Load configurations that are not yet ap- proved.	Access	Access	No access	Access
Configura- tion (adminis- tration)	Administration of configurations - create new - copy - delete - load approved configurations Administration of batches - add - delete - lock unlock - release back to planned - modify - link recipe (may require additional administration rights)	Access	Access	No access	Access
Batch	 open (start) close (end) abort 	Access	Access	Access	Access
Batch (ad- vanced)	Users with this privilege can do the following: — approve a historical batch — reject a historical batch	Access	Access	No access	Access
Reports	Basic rights for reports: — create a report — view the list of stored reports	Access	Access	Access	Access
Review	Users with this privilege can review a historical batch.	Access	Access	No access	Access
Power set- tings	Note: This privilege is used by the control module (CM_System) faceplate. Examples: - shutdown state simulation - shutdown state simulation value - disable shutdown in simulation - emergency state simulation - emergency state simulation value	Access	No access	No access	Access
Remote op- eration	Login via OPC UA clients to server allowed	Access	Access	No access	No ac- cess

15 Ordering Information

15.1 With Standard Refrigeration Unit Version

Countries	Electrical Requirement	t Door Opening		Order Number	
		Left	Right		
USA Canada Mexico	3p - 480 V - 60 Hz			FTH-BF01111-0001	
			•	FTH-BF01112-0002	
Russia China Hong Kong Argentina	3p - 380 V - 50 Hz			FTH-BF01121-0003	
				FTH-BF01122-0004	
EU Europe India Israel Turkey UK Sin-	3p - 400 V - 50 Hz			FTH-BF01131-0005	
gapore Thailand Australia Malaysia			•	FTH-BF01132-0006	
Malaysia	3p - 415 V - 50 Hz			FTH-BF01141-0007	
				FTH-BF01142-0008	
South Korea Brazil	3p - 380 V - 60 Hz			FTH-BF01151-0009	
				FTH-BF01151-0010	

15.2 With Low Global Warming Potential Version

Countries	Electrical Requirement	Door Opening		Order Number	
		Left	Right		
USA Canada Mexico	3p - 480 V - 60 Hz			FTH-BF02111-0021	
				FTH-BF02112-0022	
Russia China Hong Kong Argentina	3p - 380 V - 50 Hz			FTH-BF02121-0023	
				FTH-BF02122-0024	
EU Europe India Israel Turkey UK Sin-	3p - 400 V - 50 Hz			FTH-BF02131-0025	
gapore Thailand Australia Malaysia				FTH-BF02132-0026	
Malaysia	3p - 415 V - 50 Hz			FTH-BF02141-0027	
				FTH-BF02142-0028	
South Korea Brazil	3p - 380 V - 60 Hz			FTH-BF02151-0029	
				FTH-BF02152-0030	

16 Spare Parts

Please refer to the recommended spare parts list provided by Sartorius.

17 Peripherals and Accessories

Item	Description	Order number
Celsius® FFT 75 L	Celsius® FFT 75 L single-use Container with a min. max. filling volume of 18.75 75 L. Ready to use sterile Container to be stacked (4 max) on Celsius® FFT 75 L Pallet.	Configuration dependent
Celsius® FFT 75 L Pallet	The Celsius® FFT 75 L Pallet Base allows stacking of up to 4 Celsius® FFT 75 L to enable the freezing or thawing of up to 300 L.	Celsius® FFT 75 L Pallet Base: FTH-SM00101-0087
	It can be covered for Container protection during storage and shipping with the Celsius® FFT 75 L Pallet Cover.	Celsius® FFT 75 L Pallet Cover: FTH-SM00101-0088
Celsius® FFT 6/12 L Pallet	Celsius® FFT 6/12 L Pallet Base allows stacking of up to 10 Celsius® FFT 12 or 6 L and to freeze or thaw up to 120 L. It can be covered for Container protection during storage and shipping with	Celsius® FFT 6/12 L Pallet Base: FTH-SM00101-0091 Celsius® FFT 6/12 L Pallet
Celsius® FFT Lift	Celsius [®] FFT 6/12 L Pallet Cover. Electrically-powered forklift with automated functionalities for safe and ergonomic handling of palletized Celsius [®] FFT Containers and secured loading and unloading of Celsius [®] FFT equipment.	Cover: FTH-SM00101-0092 FTH-FL00001-0001
AliquoT [®] Pallet	Automatic filling and draining system for Celsius® FFT palletized on Celsius® FFT 75 L Pallet or Celsius® FFT 6/12 L Pallet	Configuration dependent
Celsius® FFT Mixer	Allows for swift homogenization of Celsius® FFT palletized Containers content before freezing or after thawing.	Configuration dependent

18 Sartorius Service

Sartorius Service is available to answer any queries regarding the product. Please visit the Sartorius website (www.sartorius.com) for information about the service addresses, services provided, or to contact a local representative.

When contacting Sartorius Service with questions about the product or in the event of malfunctions, be sure to have the product information, e.g., serial number, close at hand. This information can be found on the manufacturer's ID label.
Sartorius Stedim North America, Inc. 150 Locke Dr 01752 Marlborough, MA USA

Phone: +1.508.970.0089 www.sartorius.com

The information and figures contained in these instructions correspond to the version date specified below.

Sartorius reserves the right to make changes to the technology, features, specifications and design of the equipment without notice. Masculine or feminine forms are used to facilitate legibility in these instructions and always simultaneously denote all genders.

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