Lake Shore CRYOTRONICS
a DwyerOmega brand

INFINITE HELIUM

2025 R&D 100 WINNER

Effortless Intelligent Cooling

environment by JANIS

INFINITE HELIUM

Introducing Infinite Helium—an automated solution that makes your LHe cryostat cryogen-free. Infinite Helium innovatively circulates helium in a closed loop, enabling your continuous flow cryostat to operate without constant helium replenishment. Infinite Helium seamlessly integrates with your existing or new continuous flow cryostats to enable cryogen-free operation. While it's commonly paired with our ST-500 cryostat for microscopy, ST-400 cryostat for UHV/beamline applications, and ST-FTIR or ST-NMR cryostats, its compatibility extends across our entire range of continuous flow cryostats. Automation features further reduce user error, simplifying the cooldown process and valve adjustments, ensuring consistent and optimal performance.

AUTOMATION

Reduce user error with **automated valve adjustments** and **safety checks** to recover from faults.

LOW BASE TEMPERATURE

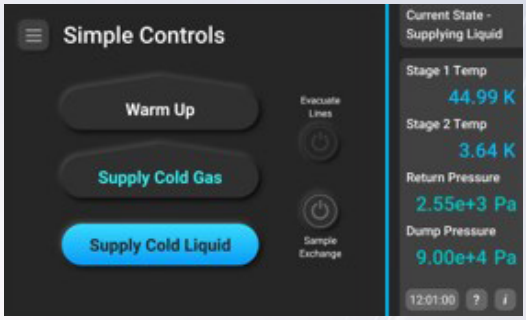
Push measurement boundaries down to **<2 K base temperature** (cryostat-dependent).

LOW-VIBRATION OPTION

A highly stable platform with **<2 nm RMS vibration levels** for sensitive microscopy applications.

Simplicity at its best – single-button cooldown

EFFORTLESS



A single button controls system cooldown and adjusts valves automatically, allowing you to be up and running fast.

No more adjusting valves and constantly having to keep an eye on cooldown and runtime operations. Hands-on operation is reduced from hours to seconds. Infinite Helium offers very easy operation and eliminates the learning curve associated with complex recirculating cooling systems.

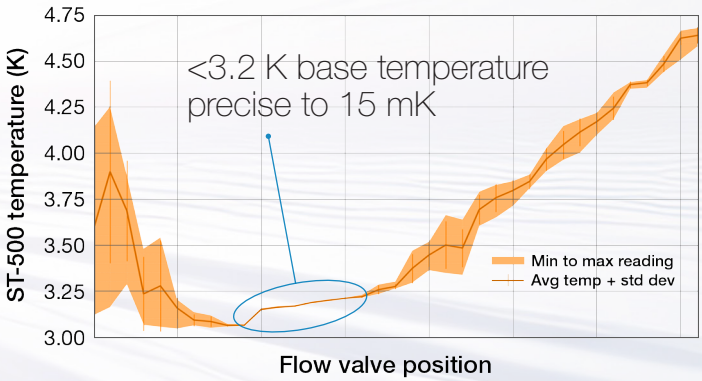
An automated system, Infinite Helium is simplicity at its best. Samples can be exchanged easily without warming up the system, allowing for fast turnaround times. Plus, you experience smooth, worry-free operation with the system. It can operate for extended periods—up to 6 months or longer—without requiring servicing (other solutions may need to be serviced as often as every couple of weeks). No service costs or frequent interruptions to your experiments or lab operations.

INTELLIGENT

Infinite Helium automates the entire recirculation process. The valve automation process takes away all of the guesswork. Plus, it comes with Lake Shore MeasureLINK™ software for full system control as well as easy integration with other Lake Shore lab cooling and measurement instrumentation. MeasureLINK enables you to construct an experiment by selecting a sequence of pre-written functional steps to control temperature and collect data—and no programming required.

Optimal tuning with MeasureLINK*

Automatically determines optimum settings for best cooling power and base temperature with MeasureLINK



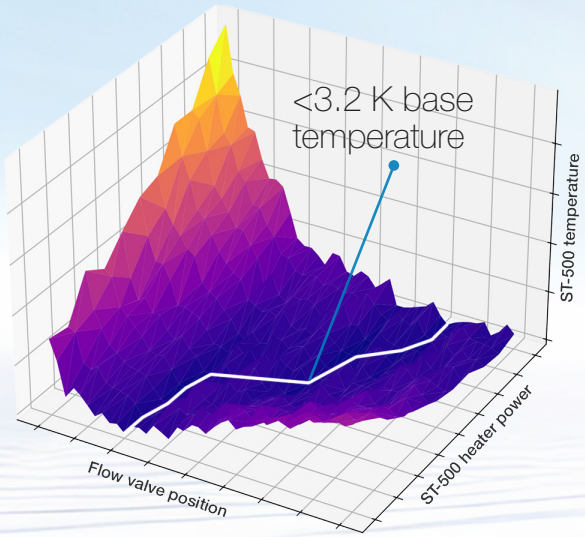
VERSATILE

Easily move Infinite Helium between multiple continuous flow cryostats.

6 MONTHS+ CONTINUOUS RUN TIME

All components are selected for performance longevity. Don't interrupt your research because of servicing.

Unlimited possibilities of data collection with automation and MeasureLINK



COOLING

Cooling power goes beyond one number. We offer a comprehensive view of cooling power against heat load, so you can ascertain the baseline temperature possible with your sample. For example, with Infinite Helium Plus and an ST-500, you can cool to as low as 3.2 K. Or, with an ST-400, you can attain temperatures as low as 2 K. Infinite Helium Plus can generate up to 1 L LHe/h.

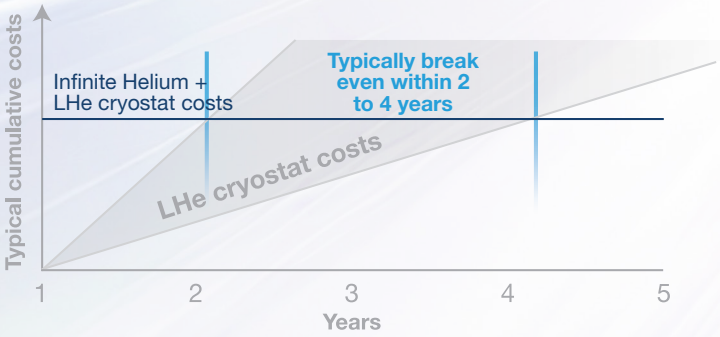
COMPREHENSIVE SAMPLE MAPPING

Fully characterize your cryostat environment with automated data collection. Control both your experiment cryostat and Infinite Helium with MeasureLINK.

TYPICALLY BREAK EVEN WITHIN 2 TO 4 YEARS

Users typically break even within 2 to 4 years (depending on helium consumption). Save money long-term with Infinite Helium and eliminate helium sourcing struggles.

Speak to our sales team about possible trade-in options for your existing Lake Shore RGC.



STABLE TEMPERATURE

Sensitive samples require a stable environment. Guard against thermal-induced changes with low thermal drift. Precise to 15 mK at base temperature.

AUTOMATED SAFETY ALERTS

- Water shut off
- Loss of power
- Contaminated helium
- Small leak
- Major leak
- Equipment not responding
- Helium pressure out of range
- Maintenance due

FACILITY REQUIREMENTS

Recommended compressor maintenance interval 30,000 h

Recommended cold head maintenance interval 10,000 h

Single-phase 100/120/220/240 VAC, 50/60 Hz

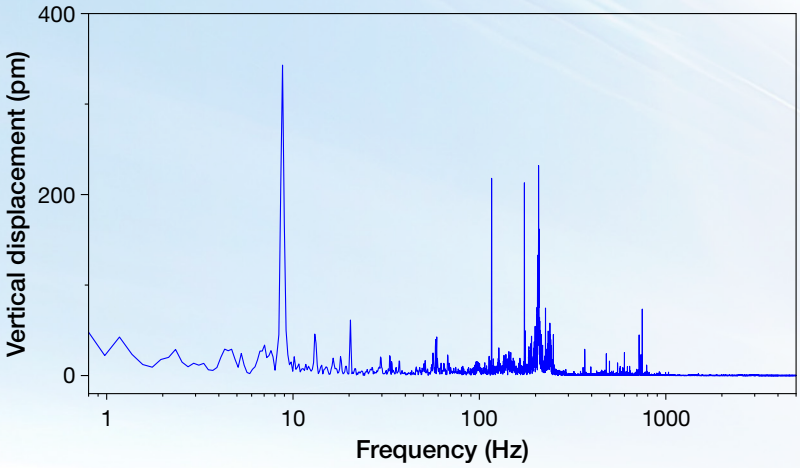
Compressed air line 70 psig

Water-cooled			
60 Hz power requirements	**50 Hz power requirements**	**Cooling water requirements**	**Compressor size**
200 VAC, 3-phase, 7.5 to 7.8 kW or 480 VAC, 3-phase, 7.5 to 7.8 kW	200 VAC, 3-phase, 6.6 to 6.9 kW or 380 to 415 VAC, 3-phase, 6.6 to 6.9 kW	6 to 9 L/min at 5 to 25 °C	443 mm × 493 mm × 532 mm high; 100 kg

Air-cooled			
60 Hz power requirements	**50 Hz power requirements**	**Cooling air requirements**	**Compressor size**
200 VAC, 3-phase, 7.5 to 8.3 kW steady state or 460/480 VAC, 3-phase, 7.5 to 8.3 kW	200 VAC, 3-phase, 6.5 to 7.2 kW steady state or 380/400/415 VAC, 3-phase, 6.5 to 7.2 kW	23 m^3/min	450 mm × 485 mm × 925 mm high; 155 kg

LOW VIBRATION

For vibration-sensitive microscopy applications in which the ST-500 cryostat is used, the low-vibration option offers best-in-class vibration levels. With less than 2 nm RMS vibration measured in X and Y, and less than 1 nm RMS vibration in the Z direction, the full package provides an ultra-stable platform for sensitive measurements. Centered on the transfer line between the ST-500 and Infinite Helium, the option's components mitigate mechanical vibrations to aid in focal stability and measurement accuracy.



The low-vibration option for Infinite Helium provides less than 1 nm RMS vibration in the z direction

Shown is the low-vibration option with the Infinite Helium, optical table, and ST-500 microscopy cryostat

**Vibration testing was conducted on a production ST-500 cryostat cooled by an Infinite Helium. The stage displacement was measured using a laser doppler vibrometer with better than 10 pm of resolution. The vibrometer and cryostat were mounted to a floating optical table located in an environmentally controlled lab with limited foot traffic and low ambient noise while the Infinite Helium compressor was housed in an enclosed ancillary space in proximity to the optical table.*

SPECS

Base temperature

Base temperature is cryostat-dependent

ST-500: 3.4 K with Infinite Helium Plus; 3.9 K with Infinite Helium

ST-400: 2.2 K with Infinite Helium Plus; 2.7 K with Infinite Helium

ST-100/300: 2.7 K with Infinite Helium Plus; 3.2 K with Infinite Helium

STVP-NMR: <7 K with Infinite Helium Plus; <8 K with Infinite Helium

ST-FTIR: 3.1 K with Infinite Helium Plus; 3.6 K with Infinite Helium

TTPX (with 4 probe tips landed): 6.0 K with Infinite Helium Plus; 6.5 K with Infinite Helium

Continuous run time

6 months

Low-vibration option

Vibration levels measured at 1 to 5000 Hz at base temperatures*

X: 1.54 nm RMS
Y: 1.97 nm RMS
Z: 0.62 nm RMS

System dimensions

508 mm (w) × 889 mm (l) × 1575 mm (h)
(20 in × 35 in × 62 in)

Weight (approximate)

182 kg (400 lb); 236 kg (520 lb) with low-vibration option

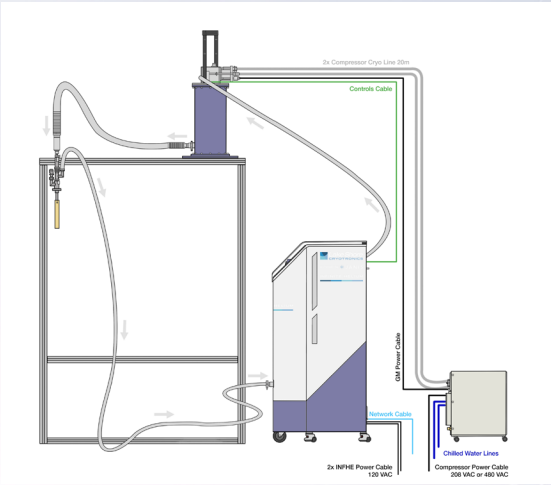
Shipping weight (approximate)

295 kg (650 lb); 349 kg (770 lb) with low-vibration option

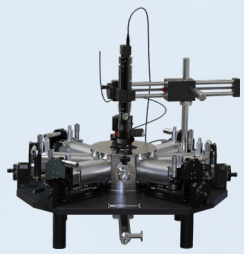
Certifications

CE, NRTL

BEAMLINE



An option for synchrotron or beamline applications, the condensing cryostat of Infinite Helium can be suspended outside of the main enclosure, close to the working cryostat. This accommodates experimental space restrictions without sacrificing the cooling performance of Infinite Helium.



Infinite Helium can also be used with our TTPX tabletop probe station

Popular cryostat pairings

Combine Infinite Helium with one of our cryostats, including these . Also compatible with most continuous flow cryostats from other manufacturers.

ORDERING

All specifications are cryostat-dependent. Please contact us for more information.

1. Select model

Infinite Helium	INFHE-15
Infinite Helium Plus	INFHE-20

2. Select options

Low-vibration for use with the ST-500 microscopy cryostat

Infinite Helium	INFHE-15-LV
Infinite Helium Plus	INFHE-20-LV

Separately located condensing cryostat for synchrotron/beamline applications

Infinite Helium	INFHE-15-S
Infinite Helium Plus	INFHE-20-S

3. Select cryostat (optional)

ST-500	Microscopy applications
ST-400	UHV/beamline applications
ST-FTIR	FTIR applications
STVP-NMR	NMR applications
ST-100/300	General purpose/compact
TTPX	Probe station
Other	Other compatible cryostat

Lake Shore CRYOTRONICS
a DwyerOmega brand

User-intuitive touchscreen interface

Internal temperature monitor

Status indicator shows cooldown progress

Internal roots blower pump extends run time, no Teflon dust

Easy to move around on lockable casters

Westerville manufacturing
575 McCorkle Blvd
Westerville, OH 43082

Westerville corporate offices
480 Olde Worthington Rd
Westerville, OH 43082

sales@lakeshore.com
Tel:+1 614 891 2244

Copyright © Lake Shore Cryotronics, LLC. All rights reserved. Specifications are subject to change. 102126

environment by JANIS