environment by JANIS

Lake Shore CRYOTRONICS
a DwyerOmega brand

ST-500

SuperTran Cryostats

ST-500 Series low-vibration optical microscopy cryostats 3.5 K to 475 K

ST-500 Series cryostats offer a precise and versatile solution for low-vibration applications, including micro-Raman and micro-PL. Nanometer-level vibrations and variable temperature sample cooling make these cryostats ideal for microscopy.

The ST-500 Series includes several models to suit a variety of sample sizes and experimental configurations. The standard ST-500 features a short working distance, as small as 1 mm from microscope objective lens to sample. To accommodate restricted spaces such as in a superconducting magnet bore or electromagnet pole gap, the ST-500 can be fitted with an optional vacuum shroud extension. The ST-500-C has a very low profile at 29.5 mm (1.16 in) for fitting in the smallest vertical spaces, while the ST-500-LGV enables mounting very large samples such as semiconductor wafers or multiple samples simultaneously, expanding the cryostat's versatility even further.

Samples can be easily accessed and exchanged from the top of the cryostat without the need to disassemble or remove them from the microscope, saving time and effort. The ST-500 offers transmission geometry and can be equipped with a variety of window materials, providing the flexibility to match your experimental needs.

ST-500 Series cryostats can be combined with Infinite Helium for fully cryogen-free operation throughout the entire temperature range. This enables unattended cryostat operation, ideal for extended duration measurements.

Key features

- <12 nm vibration
- Fast cooldown — 30 min to 5 K
- Sample in vacuum
- Easy top sample access
- Short lens to sample working distance — as short as 1 mm

Featured components

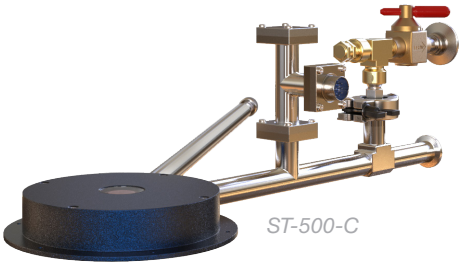
- 152 mm (6 in) vacuum shroud
- Selection of top and bottom window materials available
- Integrated supply and return bayonets
- High-efficiency, flexible LHe/LN_2 transfer line

ST-500 Series variants

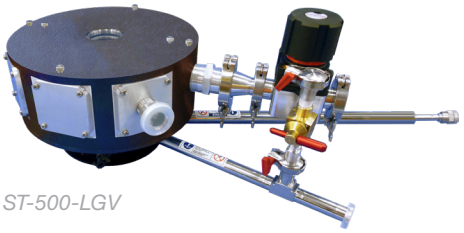
- **ST-500** microscopy
- **ST-500-C** ultra-compact microscopy
- **ST-500-LGV** low-vibration, large sample space

Specifications

	ST-500	ST-500-C	ST-500-LGV
Initial cooldown time (LHe to 5 K)	~30 min		~30 min to 10 K
Temperature range	3.5 K to 475 K	<6 K to 475 K	3.5 K to 475 K
Typical temperature stability[1]	±50 mK		
Orientation	Any		
Cryogen consumption (LHe room to base temp)	~1 L		
Cryogen consumption (LHe at 5 K)	1.1 L/h	2.5 L/h (at 6 K)	1.1 L/h
Cryogen consumption (LHe at 10 K)	0.5 L/h	0.8 L/h	0.5 L/h
Cryogen consumption (LHe at 20 K)	0.2 L/h	0.4 L/h	0.2 L/h
Cryogen consumption (LN_2 at 80 K)	0.1 L/h	0.1 L/h	0.1 L/h
Initial vacuum level requirement[2]	~10^{-4} Torr		
Typical base pressure during operation	~10^{-5} Torr		
Nominal vibration amplitude[3]	<12 nm		
Typical positional drift at 4 K (averaged over 2 h)	2 nm/min		
Size			
Height	67 mm (2.62 in)	29.5 mm (1.16 in)	Varies
Inner diameter (at sample region)	73 mm (2.9 in)	59 mm (2.3 in)	Varies
Sample mount diameter	19.05 mm (0.75 in)		64 to 178 mm (2.5 to 7 in)
Weight (excluding transfer line)	3.2 kg (7 lb)	2.3 kg (5 lb)	Varies
Shipping weight (cryostat only)	8.6 kg (19 lb)		Varies
Shipping weight (transfer line)	9.1 kg (20 lb)		Varies
Shipping dimensions (cryostat only)	762 × 508 × 508 mm (30 × 20 × 20 in)		Varies
Shipping dimensions (transfer line)	2057.4 × 660.4 × 127 mm (81 × 26 × 5 in)		Varies



ST-500-C



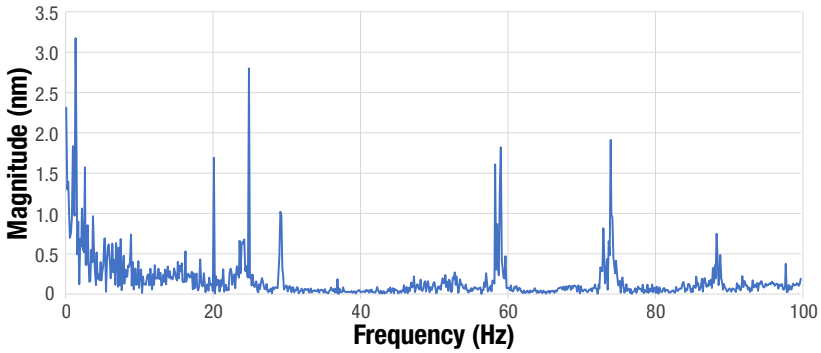
ST-500-LGV

[1] *Measured with temperature controller*

[2] *Pressure measured at room temperature prior to adding cryogen*

[3] *Measured with cryostat on a vibration isolation table*

Typical vibration of an ST-500 sample mount at 4.2 K



Complete your setup

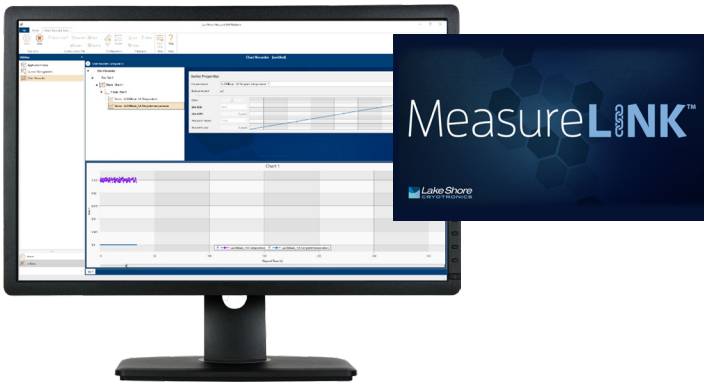
Temperature control

Included

Every cryostat includes a Lake Shore temperature controller and calibrated sensor.

MeasureLINK control software

Optional add-on



MeasureLINK software enables a wide range of capabilities including charting and logging, system monitoring with a cryostat-specific process view, and controlling Lake Shore equipment as well as third-party instrumentation. No programming required—drag-and-drop to create temperature sweeps, access measurements, and see real-time internal cryostat temperatures in process view.

Source + measure + lock-in

Optional add-on

The Lake Shore M81-SSM provides highly synchronized DC, 100 kHz AC, and mixed DC + AC sourcing and measuring—including both voltage and current lock-in measurement capabilities—for low-temperature material research performed in your cryostat. It supports up to three remote-mountable source and three measure modules per a single M81-SSM-6 instrument and, owing to its modularity, allows signal and source amplifiers to be located as close as possible to the sample being characterized. This minimizes the signal wiring to the sample, reduces noise, and increases measurement sensitivity.

Cryogen-free operation

Optional add-on

Cryostats can be combined with Infinite Helium for fully cryogen-free operation throughout the entire temperature range. This enables unattended cryostat operation, ideal for extended duration measurements.

Configure your cryostat

1. Select cryostat variant

ST-500	Optical, 3.5 K to 475 K, calibrated temperature sensor
ST-500-C	Compact optical, <6 K to 475 K, calibrated temperature sensor
ST-500-LGV	Optical, 3.5 K to 475 K, calibrated temperature sensor with large vacuum shroud for expanded sample space
CUSTOM	Custom configurations are available to fit your experiment needs—contact Sales for details

2. Select cryostat configurations

Sample holders

Specify the distance from the sample mounting surface to the inside of the top window at time of order.

CONSULT	Resistivity
CONSULT	Custom

Windows

See our cryostat window selection guide for additional information. Contact us for custom window options.

Top windows

WT-ST-500-062-FS	Top UV-grade fused silica window—1.57 mm thick
WT-ST-500-020-FS	Top UV-grade fused silica window—0.5 mm thick
WT-ST-500-062-ZNSE	Top ZnSe window—1.57 mm thick
WT-ST-500-020-SAPH	Top sapphire window—0.5 mm thick
WT-ST-500-080-CAF2	Top CaF_2 window—2 mm thick

Bottom windows

WB-ST-500-062-FS	Bottom UV-grade fused silica window—1.57 mm thick
WB-ST-500-062-ZNSE	Bottom ZnSe window—1.57 mm thick
WB-ST-500-020-SAPH	Bottom sapphire window—0.5 mm thick
WB-ST-500-080-CAF2	Bottom CaF_2 window—2 mm thick
WB-ST-500-BLNK	Blank bottom plate

Sample mount extension

ST-500-EXT-PM	ST-500 sample mount extension with extended vacuum shroud and radiation shield for permanent magnet
ST-500-MAGNET-SET	Set of 5 permanent ring magnets (0.1 T, 0.2 T, 0.3 T, 0.4 T and 0.5 T) for use with ST-500-EXT-PM
ST-500-EXT-SCON	ST-500 sample mount extension with extended vacuum shroud and radiation shield to fit SCON

Cooled radiation shield window (ST-500 only)

WT-ST-500-SHIELD	Cooled radiation shield; includes 0.875 in diameter clear view fused silica window and retainer

3. Select pump (optional)

Each cryostat requires a pump to operate. If you do not have an existing pump to use, select one of the pumps below.

10RVP	General-purpose mechanical pumping station
10DDP	General-purpose mechanical pumping station with LN_2 cold trap and isolation valve
TS-85-D	Turbopumping station

4. Select cryostat wiring

We offer a variety of both unwired and wired feedthroughs to complete your measurement setup. Please refer to the cryostat feedthroughs and wiring guide for more information.

5. Select optional setup configurations

Cryogen-free operation

Base temperatures listed are for the ST-500; ST-500-C temperatures will vary.

INFHE-20	Infinite Helium recirculating cooler with base temperature down to <3.5 K
INFHE-15	Infinite Helium recirculating cooler with base temperature down to <3.8 K
RGC4-10	RGC Series recirculating cooler with base temperature down to <4.2 K

Measurement instrumentation

Cryostats come standard with one temperature controller.

M81-SSM electronic synchronous source measure system

Contact us for cables and adapters for M81-SSM/cryostat integration.

M81-SSM-X	M81-SSM instrument with X = 2, 4, or 6 channels; half the channels are dedicated to sourcing and the other to measurement; see modules below
VM-10	AC/DC voltage measure module + lock-in
BCS-10	AC/DC balanced current source module
CM-10	AC/DC current measure module + lock-in
VS-10	AC/DC voltage source module

6. Select optional control software

ML-MCS	MeasureLINK-MCS software with scripting development license; includes lifetime activation for version purchased and full MeasureLINK capability on up to 5 computers with Lake Shore instrument drivers, chart recorder functionality, and drag-and-drop measurement sequences; some application packs sold separately

7. Select additional accessories

Cryostats come standard with one installed temperature sensor. Other sensors are available—contact us.

CX-1050-CU-HT-1.4M	Cernox® magnetic field independent, calibrated
CF-100	LHe storage Dewar
LN-50	LN_2 storage Dewar configured for use with SuperTran cryostats

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