



## 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 the RGC recirculating gas cooler for fully cryogen-free operation throughout the entire temperature range. This enables unattended cryostat operation, ideal for extended duration measurements.

### Key features

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<12 nm vibration

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Fast cooldown — 30 min to 5 K

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Sample in vacuum

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Easy top sample access

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Short lens to sample working distance — as short as 1 mm

### Featured components

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152 mm (6 in) vacuum shroud

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Selection of top and bottom window materials available

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Integrated supply and return bayonets

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High-efficiency, flexible LHe/LN<sub>2</sub> transfer line

### ST-500 Series variants

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**ST-500** microscopy

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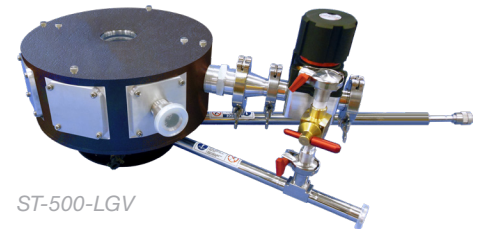
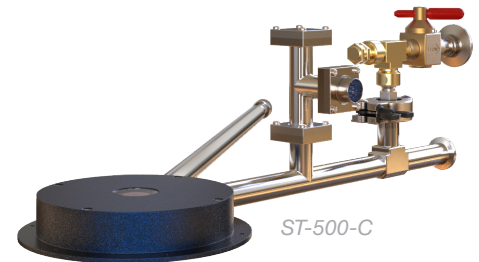
**ST-500-C** ultra-compact microscopy

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**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 <sup>1</sup>	±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 <sub>2</sub> at 80 K)	0.1 L/h	0.1 L/h	0.1 L/h
Initial vacuum level requirement <sup>2</sup>	~10 <sup>-4</sup> Torr		
Typical base pressure during operation	~10 <sup>-5</sup> Torr		
Nominal vibration amplitude <sup>3</sup>	<12 nm		
Typical positional drift at 4 K (averaged over 2 h)	2 nm/min		



<sup>1</sup> Measured with temperature controller

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<sup>2</sup> Pressure measured at room temperature prior to adding cryogen

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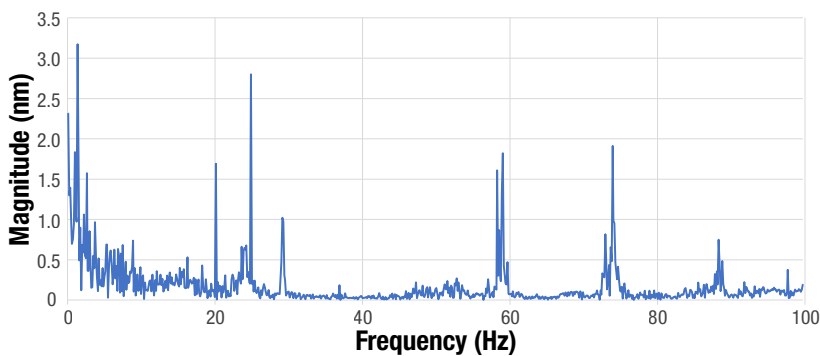
<sup>3</sup> Measured with cryostat on a vibration isolation table

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## Size

	ST-500	ST-500-C	ST-500-LGV
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

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



# Complete your system

## Temperature control

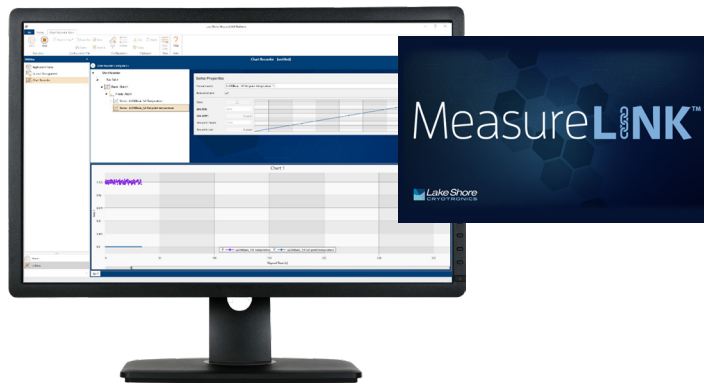
Included



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 the RGC recirculating gas cooler 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

<b>ST-500</b>	Optical, 3.5 K to 475 K, calibrated temperature sensor
<b>ST-500-C</b>	Compact optical, <6 K to 475 K, calibrated temperature sensor
<b>ST-500-LGV</b>	Optical, 3.5 K to 475 K, calibrated temperature sensor with large vacuum shroud for expanded sample space
<b>CUSTOM</b>	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.

<b>CONSULT</b>	Resistivity
<b>CONSULT</b>	Custom

### Windows

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

#### Top windows

<b>WT-ST-500-062-FS</b>	Top UV-grade fused silica window—1.57 mm thick
<b>WT-ST-500-020-FS</b>	Top UV-grade fused silica window—0.5 mm thick
<b>WT-ST-500-062-ZNSE</b>	Top ZnSe window—1.57 mm thick
<b>WT-ST-500-020-SAPH</b>	Top sapphire window—0.5 mm thick
<b>WT-ST-500-080-CAF2</b>	Top CaF <sub>2</sub> window—2 mm thick

#### Bottom windows

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

### Snout extension

<b>ST-500-EXT-PM</b>	ST-500 sample mount extension with extended vacuum shroud and radiation shield for permanent magnet
<b>ST-500-MAGNET-SET</b>	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
<b>ST-500-EXT-SCON</b>	ST-500 sample mount extension with extended vacuum shroud and radiation shield to fit SCON

### Cooled radiation shield window (ST-500 only)

<b>WT-ST-500-SHIELD</b>	Cooled radiation shield; includes 0.875 in diameter clear view fused silica window and retainer
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## 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.

<b>10RVP</b>	General-purpose mechanical pumping station
<b>10DDP</b>	General-purpose mechanical pumping station with LN <sub>2</sub> cold trap and isolation valve
<b>TS-85-D</b>	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 system configurations

### Cryogen-free operation

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

<b>RGC4-10</b>	Recirculating cooler with base temperature <4.2 K
<b>RGC4-12</b>	Recirculating cooler with base temperature <4.0 K
<b>RGC4-15</b>	Recirculating cooler with base temperature <3.8 K
<b>RGC4-20</b>	Recirculating cooler with base temperature <3.5 K

### Measurement instrumentation

Cryostats come standard with one temperature controller.

<b>336</b>	Model 336 temperature controller
<b>335</b>	Model 335 temperature controller
<b>335-3060</b>	Model 335 temperature controller with installed 3060 thermocouple option card
<b>325</b>	Model 325 temperature controller

### M81-SSM electronic synchronous source measure system

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

<b>M81-SSM-X</b>	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
<b>VM-10</b>	AC/DC voltage measure module + lock-in
<b>BCS-10</b>	AC/DC balanced current source module
<b>CM-10</b>	AC/DC current measure module + lock-in
<b>VS-10</b>	AC/DC voltage source module

## 6. Select optional control software

<b>ML-MCS</b>	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
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## 7. Select additional accessories

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

<b>CX-1050-CU-HT-1.4M</b>	Cernox® magnetic field independent, calibrated
<b>CF-100</b>	LHe storage Dewar
<b>LN-50</b>	LN <sub>2</sub> storage Dewar configured for use with SuperTran cryostats

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