

## Cryogen-free

# Sample in vacuum cryostats <4 K to 800 K

These Lake Shore closed-cycle refrigerator cryostats cool the sample in vacuum and are bottom-loading. With a wide range of electrical feedthrough and window options, they are a versatile choice for making cryogenic measurements without using liquid helium.

### Key features

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<4 K to 800 K

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Cryogen-free

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Sample in vacuum

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### Featured components

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Choice of cryocooler to match performance and cooling requirements

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Integrated control heater and calibrated control sensor

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### Cryostat models

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**CCS-100** optical, vacuum

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**CCS-300S** subcompact, optical, vacuum

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**CCS-300ST** subcompact, non-optical, vacuum

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**CCS-400** optical, high-temperature (500 K), vacuum

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**CCS-400H** optical, high-temperature (800 K), vacuum

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**CCS-XG** low-vibration, vacuum

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# Specifications

	CCS-100	CCS-300S	CCS-300ST	CCS-XG	CCS-400	CCS-400H
Minimum temp options	202	<11 K			<12 K	—
	204	<9 K			<10 K	<12 K
	204N	<7 K			<8 K	<10 K
	101				<5 K	—
	408					
	412	<4 K			<4 K	<5 K
	415					
	418					
Maximum temperature	325 K				500 K	800 K
Typical temperature stability <sup>1</sup>	±50 mK					
Cold head location	Any			Top	Any	
Cooldown time	1 h to 2 h	1.5 h to 2.5 h		2 h to 3 h	1.5 h to 3 h	2 h to 2.5 h
Optical		✓		✗	✓	
Size	—	Compact			—	
Vibration		—		<40 nm		—
Height (approximate)	56 to 84 cm (22 to 33 in)	71 to 99 cm (28 to 39 in)	71 to 99 cm (28 to 39 in)	66 to 94 cm (26 to 37 in)	61 to 89 cm (24 to 35 in)	66 to 94 cm (26 to 37 in)
Weight (approximate)	16 to 29 kg (36 to 64 lb)	17 to 30 kg (37 to 66 lb)	17 to 30 kg (37 to 66 lb)	17 to 30 kg (37 to 66 lb)	16 to 30 kg (36 to 65 lb)	16 to 30 kg (36 to 65 lb)
Window block size	83 mm to 85 mm (3.25 in to 3.75 in) square	38 mm (1.5 in) square	—		83 mm to 85 mm (3.25 in to 3.75 in) square	
Recommended maintenance	13,000 h					

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

## Facility requirements

CCS-	Cold head	Recommended		Water-cooled				Air-cooled				
		Compressor maintenance interval	Cold head maintenance interval	60 Hz power requirements	50 Hz power requirements	Cooling water requirements	Compressor size	60 Hz power requirements	50 Hz power requirements	Cooling air requirements	Compressor size	
100 300S 300ST 400 400H XG	-202 -204 -204N	13,000 h	13,000 h	208 to 230 VAC, 1-phase, 2.6 kW	200, 220 to 240 VAC, 1-phase, 2.25 to 2.4 kW	1.9 to 3.8 L/min at 4 to 27 °C	444 mm × 453 mm × 617 mm high; 73 kg	208 to 230 VAC, 1-phase, 2.6 kW	200, 220 to 240 VAC, 1-phase, 2.25 to 2.4 kW	17.6 m <sup>3</sup> /min (60 Hz) or 14.7 m <sup>3</sup> /min (50 Hz)	444 mm × 453 mm × 876 mm high; 103 kg	
100 300S 300ST 400 XG	-101			10,000 h	208 to 230 VAC, 1-phase, 2.6 kW	200, 220 to 240 VAC, 1-phase, 2.25 to 2.4 kW	1.9 to 3.8 L/min at 4 to 27 °C	444 mm × 453 mm × 617 mm high; 73 kg	208 to 230 VAC, 1-phase, 2.6 kW	200, 220 to 240 VAC, 1-phase, 2.25 to 2.4 kW	17.6 m <sup>3</sup> /min (60 Hz) or 14.7 m <sup>3</sup> /min (50 Hz)	444 mm × 453 mm × 876 mm high; 103 kg
100 300S 300ST 400 400H XG	-408 -412 -415 -418				200 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	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 <sup>3</sup> /min	450 mm × 485 mm × 925 mm high; 155 kg

# Complete your system

## Temperature control

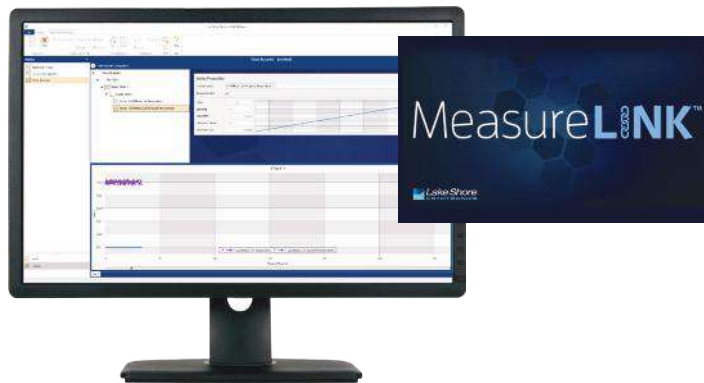
Included



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.



# Configure your cryostat

## 1. Select cryostat

<b>CCS-100</b>	Optical, vacuum
<b>CCS-300S</b>	Subcompact, optical, vacuum
<b>CCS-300ST</b>	Subcompact, non-optical, vacuum
<b>CCS-400</b>	Optical, high-temperature (500 K), vacuum
<b>CCS-400H</b>	Optical, high-temperature (800 K), vacuum
<b>CCS-XG</b>	Low-vibration, vacuum
<b>CUSTOM</b>	Custom configurations are available to fit your experiment needs—contact Sales for details

## 2. Select cryostat configurations

### Sample holders

<b>SH-BLANK-1.5-STD</b>	Blank
<b>SH-BLANK-1.5-800</b>	Blank, high-temperature
<b>SH-OPTICAL-1.5-STD</b>	Optical
<b>SH-OPTICAL-1.5-800</b>	Optical, high-temperature
<b>SH-RESISTIVITY-1.5-STD</b>	Resistivity
<b>CONSULT</b>	Custom sample holders

### Cold head

Some cold heads have a similar base temperature with no load, but have different cooling powers and are therefore able to handle different heat loads. Consult us for more information.

<b>202</b>	2 W at 20 K bare head cooling power
<b>204</b>	7 W at 20 K bare head cooling power
<b>204N</b>	3 W at 10 K bare head cooling power
<b>101</b>	0.2 W at 4.2 K bare head cooling power
<b>408</b>	1 W at 4.2 K bare head cooling power
<b>412</b>	1.25 W at 4.2 K bare head cooling power
<b>415</b>	1.5 W at 4.2 K bare head cooling power
<b>418</b>	2 W at 4.2 K bare head cooling power

### Windows (optical variants only)

Windows are available in multiple thicknesses and materials. See our cryostat window selection guide and contact sales for additional information.

### Compressor type

<b>CONSULT</b>	Substitute air-cooled compressor in place of standard water-cooled
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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

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## 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 support

<b>XG-STAND</b>	Low-vibration support stand with pulley to suspend cold head within helium exchange gas chamber (CCS-XG only)
<b>CONSULT</b>	Elastomeric cold head supports—eliminates need for cold head support stand, but with higher vibration level (CCS-XG only)
<b>CONSULT</b>	Cryostat mounting stand for optical table (included with some models)

## 6. Select optional system configurations

### 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>336-3060</b>	Model 336 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

## 7. 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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## 8. 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>CONSULT</b>	Thermocouple (CCS-400/H only)