Sample in vacuum cryostats <4 K to 800 K

CCS-100

Cryogen-free

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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

- <4 K to 800 K
- Cryogen-free
- Sample in vacuum

Featured components

- Choice of cryocooler to match performance and cooling requirements
- Integrated control heater and calibrated control sensor

Cryostat models

- **CCS-100** optical, vacuum
- **CCS-300S** subcompact, optical, vacuum
- **CCS-300ST** subcompact, non-optical, vacuum
- **CCS-400** optical, high-temperature (500 K), vacuum
- **CCS-400H** optical, high-temperature (800 K), vacuum
- **CCS-XG** low-vibration, vacuum

Quantum Design

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Lake Shore CRYOTRONICS

Sample in vacuum cryostats
<4 K to 800 K

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	<4 K			<5 K		—
	408				<4 K		<5 K
	412						
	415						
	418						
Maximum temperature		325 K				500 K	800 K
Typical temperature stability[1]		±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					

[1] *Measured with temperature controller*

Facility requirements

		Recommended		Water-cooled				Air-cooled			
CCS-	Cold head	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	30,000 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 m³/min (60 Hz) or 14.7 m³/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 m³/min (60 Hz) or 14.7 m³/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 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	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 m³/min	450 mm × 485 mm × 925 mm high; 155 kg

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Complete your system

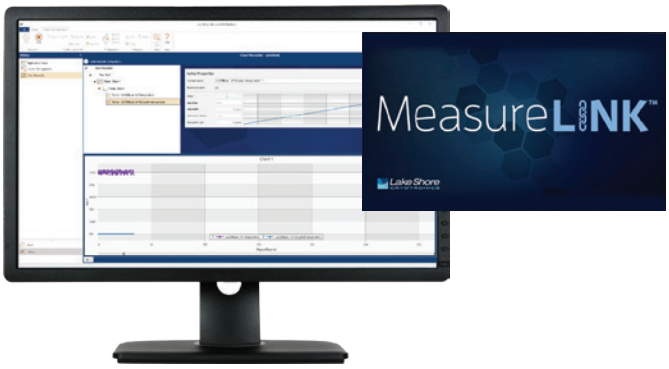
Temperature control

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.

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Configure your cryostat

1. Select cryostat

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

2. Select cryostat configurations

Sample holders

SH-BLANK-1.5-STD	Blank
SH-BLANK-1.5-800	Blank, high-temperature
SH-OPTICAL-1.5-STD	Optical
SH-OPTICAL-1.5-800	Optical, high-temperature
SH-RESISTIVITY-1.5-STD	Resistivity
CONSULT	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.

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

CONSULT	Substitute air-cooled compressor in place of standard water-cooled

3. Select pump (optional)

Each cryostat required 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 support

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

6. Select optional system configurations

Measurement instrumentation

Cryostats come standard with one temperature controller.

336	Model 336 temperature controller
335	Model 335 temperature controller
335-3060	Model 335 temperature controller with installed 3060 thermocouple option card
336-3060	Model 336 temperature controller with installed 3060 thermocouple option card
325	Model 325 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

7. 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

8. 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
CONSULT	Thermocouple (CCS-400/H only)

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