Lake Shore CRYOTRONICS
a DwyerOmega brand

Cryogen-free

Vibration-isolated and UHV cryostats <4 K to 325 K

CCS-XG-UHV shown with optional vacuum shroud

Lake Shore CCS-XG vibration-isolated closed-cycle cryostats allow measurements down to <4.2 K without LHe and without the vibrations usually associated with cryogen-free cryostats. With the same electrical feedthrough and window options as other Lake Shore cryostats, they are a versatile option for standard vacuum environment measurements.

The CCS-XG is easily extended to the fully bakeable CCS-XG-UHV model for true UHV operation down to 10^{-11} Torr. Add an independent cold head support stand for ultra-low vibration performance or mount the cold head conveniently on the cryostat when vibrations are not a concern. Multiple feedthrough options are available depending on experimental needs, and the cryostats can be configured to fit an existing UHV chamber or supplied with a vacuum shroud.

Key features

- <4 K to 325 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-XG-UHV** low-vibration, ultra-high vacuum
- **CCS-XG** optical, low-vibration, vacuum

Specifications

		Bare cold head cooling power[1]	CCS-XG	CCS-XG-UHV
Minimum temperature options	204	7 W at 20 K	<10 K	<10 K
	204N	3 W at 10 K	<8 K	<8 K
	101	0.2 W at 4.2 K	<5 K	<5 K
	408	1 W at 4.2 K	<4 K	<4 K
	415	1.5 W at 4.2 K	<4 K	<4 K
	418	2 W at 4.2 K	<4 K	<4 K
Baking temperature (with cold head removed)			N/A	200 °C
Maximum operating temperature (with cold head installed)			325 K	
Cold head location			Top	
Cooldown time			2 h to 3 h, depending on radiation shield configuration	
Optical			✓	Optional
Vibration			<40 nm	
Height (approximate)			66 to 94 cm (26 to 37 in)	559 mm to 660 mm (22 in to 26 in) with no vacuum shroud, 813 mm to 914 mm (32 in to 36 in) with vacuum shroud
Weight (approximate)			17 to 30 kg (37 to 66 lb)	Varies, depending on configuration
Window block size			83 mm to 85 mm (3.25 in to 3.75 in) square	N/A

[1]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

[2]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**
XG-UHV XG	-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 m^3/min (60 Hz) or 14.7 m^3/min (50 Hz)	444 mm × 453 mm × 876 mm high; 103 kg
XG-UHV 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^3/min (60 Hz) or 14.7 m^3/min (50 Hz)	444 mm × 453 mm × 876 mm high; 103 kg
XG-UH XGV	-408 -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 m^3/min	450 mm × 485 mm × 925 mm high; 155 kg

Complete your setup

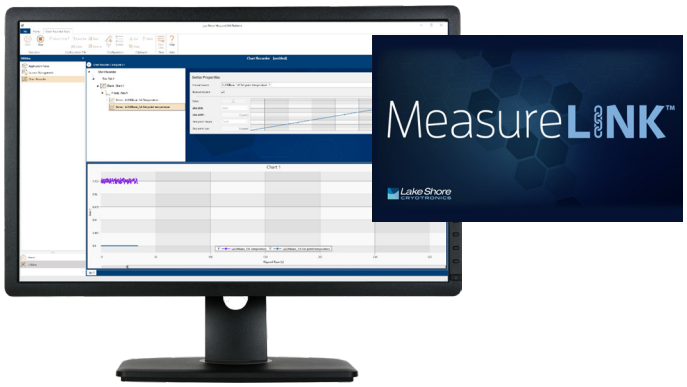
Temperature control

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.

Configure your cryostat

1. Select cryostat

CCS-XG-UHV	Ultra-high vacuum, vacuum shroud not included
CCS-XG	Vacuum, optical
CUSTOM	Custom configurations are available to fit your experiment needs—contact Sales for details

2. Select cryostat configurations

Consult us to discuss configuration options including cryostat ConFlat size, additional ConFlat ports, cooled windows on the radiation shield, and an optical vacuum shroud.

Sample holders (CCS-XG only)

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.

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
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415	1.5 W at 4.2 K bare head cooling power
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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-cooled0

3. Select pump (optional; CCS-XG only)

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 support

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

6. Select optional setup configurations

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

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

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