

SHI-950T-LT



## Cryogen-free

# Sample in exchange gas cryostats 1.5 K to 800 K

These Lake Shore closed-cycle refrigerator cryostats cool the sample in exchange gas. Helium circulates through an independent cooling loop to cool samples to temperatures as low as 1.5 K, allowing nearly unlimited operation. The sample space is separate from the cooling loop, minimizing the risk of blockages. 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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<1.5 K (continuous operation) to 800 K

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Cryogen-free

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Sample in exchange gas

### Featured components

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Optional helium-3 insert for operation down to 300 mK

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Gas handling system with scroll pump

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Integrated control heater and calibrated control sensor

### Cryostat models

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**SHI-950-LT** low-temperature 1.5 K, optical

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**SHI-950T-LT** low-temperature 1.5 K, non-optical

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# Specifications

|  |                           | SHI-950-LT                        | SHI-950T-LT               |
|--|---------------------------|-----------------------------------|---------------------------|
| Minimum temperature options                | Standard                  | 1.5 K                             |                           |
|  | With optional He-3 insert | 300 mK                            |                           |
| Maximum temperature                        |                           | 800 K                             |                           |
| Typical temperature stability <sup>1</sup> |                           | ±50 mK                            |                           |
| Cold head location                         |                           | Top                               |                           |
| Cooldown                                   |                           | 9 h                               | 8 h to 9 h                |
| Sample cooling time <sup>2</sup>           |                           | ~80 min                           |                           |
| Optical                                    |                           | ✓                                 | ✗                         |
| Height (approximate)                       |                           | 142 cm to 168 cm (56 in to 66 in) |                           |
| Weight (approximate)                       |                           | 113.4 kg (250 lb)                 |                           |
| Sample tube size                           |                           | 51 mm (2 in)                      | 51 mm (2 in) <sup>3</sup> |
| Window block size                          |                           | 108 mm (4.25 in) square           | —                         |
| Recommended maintenance                    |                           | 13,000 h                          |                           |

SHI-950-LT



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

<sup>2</sup>Time to cool sample from room temperature in an already cold cryostat

<sup>3</sup>Narrow tails available for room temperature bore magnet integration

## 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                       |
| SHI-950-LT<br>SHI-950T-LT | -408      | 30,000 h                        | 10,000 h                       | 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 <sup>3</sup> /min   | 450 mm × 485 mm × 925 mm high; 155 kg |

# Complete your setup

## Temperature control

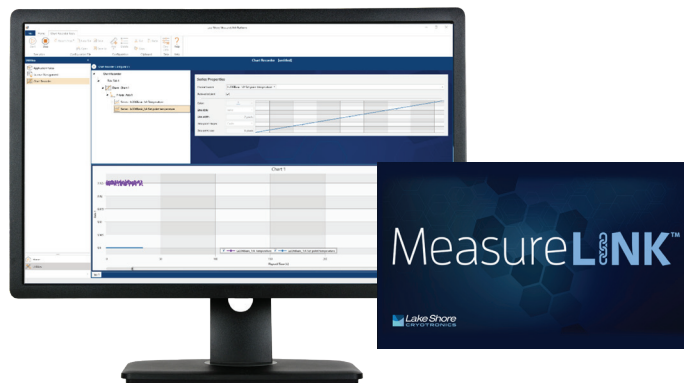
Included



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

|                    |  |
|--------------------|--|
| <b>SHI-950-LT</b>  | Optical, continuous low-temp   |
| <b>SHI-950T-LT</b> | Non-optical, continuous low-temp   |
| <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     |

### Sample positioners/inserts

Cryostats come with one sample positioner.

|                |   |
|----------------|---|
| <b>CONSULT</b> | Helium-3 insert for 300 mK base temperature   |
| <b>CONSULT</b> | Standard sample positioner with calibrated temperature sensor for operation to 500 K (sample tube evacuated above room temperature) |
| <b>CONSULT</b> | High-temperature sample positioner with type E thermocouple for operation to 800 K (sample tube evacuated above room temperature)   |

### 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 |
|----------------|--|

## 3. Select pump (optional)

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

|                 |   |
|-----------------|---|
| <b>TSJ-85-D</b> | Turbopumping station with scroll backing pump |
|-----------------|---|

## 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

### Measurement instrumentation

Cryostats come standard with one temperature controller.

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

### 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 two installed temperature sensors. Other sensors are available—contact us.

|                           |  |
|---------------------------|--|
| <b>CX-1050-CU-HT-1.4M</b> | Cernox® magnetic field independent, calibrated |
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