

# SuperTran cryostats

## ST-400



### *SuperTran Cryostats*

## **ST-400 Series** ultra-high vacuum cryostats 2 K to 800 K

ST-400 Series cryostats are a customized solution for UHV environments, designed to provide reliable, precise cooling in pressures as low as the  $10E-11$  mbar range. With each unit built to order, ST-400 cryostats are designed to user-specified dimensions and customized configurations to match any experimental chamber requirements. They can be built with vertically-oriented vent and electrical ports, allowing rotation within a limited radius, and different sized ConFlat flanges for seamless integration with the experimental chamber. The sensor and heater are not exposed to the UHV space, allowing them to be accessed without venting the vacuum chamber. A high-efficiency transfer line delivers LHe to the sample chamber for cooling, and temperatures below 4.2 K can be achieved with a vacuum pump. Using the built-in heater and 335 controller, they offer precise variable temperature control within 50 mK.

ST-400 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, making it perfect for extended-duration measurements.

#### Key features

---

Ultra-high vacuum (UHV) sample configuration

---

Fast cooldown — 15 min to 5 K

---

Sample in vacuum

#### Featured components

---

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

---

Heater and sensor wiring not exposed to UHV, eliminating potential vacuum contamination

---

Metal-sealed CF flange for mounting to user-supplied UHV chamber

---

Polished gold-plated copper thermal radiation shield

#### ST-400 Series variants

---

**ST-400** maximum temperature 500 K

---

**ST-400-H** maximum temperature 800 K

# SuperTran cryostats

## ST-400



## Specifications

	ST-400	ST-400-H
Initial cooldown time (LHe to 5 K)	15 min	
Temperature range	2 K to 500 K	2 K to 800 K
Typical temperature stability <sup>1</sup>	±50 mK	
Orientation <sup>2</sup>	Any	
Cryogen consumption (LHe room to base temp)	0.4 L	
Cryogen consumption (LHe at 5 K)	0.6 L/h	
Cryogen consumption (LN <sub>2</sub> at 80 K)	0.1 L/h	
Initial vacuum level requirement <sup>3</sup>	~10 <sup>-3</sup> Torr	
Typical base pressure during operation	~10 <sup>-11</sup> Torr	

### Size

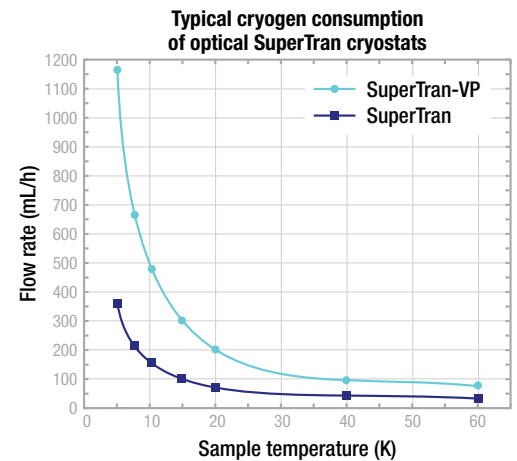
Height	User-specified
Standard radiation shield diameter	33.27 mm (1.32 in) or 38.1 mm (1.5 in)
Sample mount diameter	25 mm (1.0 in)
Weight (excluding transfer line, approximate)	4.6 kg (10 lb)
Shipping weight (cryostat only) <sup>4</sup>	8.6 kg (19 lb)
Shipping weight (transfer line)	9.1 kg (20 lb)
Shipping dimensions (cryostat only) <sup>4</sup>	762 × 508 × 508 mm (30 × 20 × 20 in)
Shipping dimensions (transfer line)	2057.4 × 660.4 × 127 mm (81 × 26 × 5 in)

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

<sup>2</sup> Cryogen consumption may be higher during non-vertical operation

<sup>3</sup> Pressure measured at room temperature prior to adding cryogen

<sup>4</sup> May be larger for long cryostats



# SuperTran cryostats ST-400

## 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.

# SuperTran cryostats

## ST-400

## Configure your cryostat

### 1. Select cryostat variant

<b>ST-400</b>	2 K to 500 K, calibrated temperature sensor
<b>ST-400-H</b>	2 K to 800 K, type E thermocouple
<b>CUSTOM</b>	Custom configurations are available to fit your experiment needs—contact Sales for details

### 2. Select cryostat wiring

ST-400 Series cryostats come standard with a UHV feedthrough. Custom options are available—contact us for more information.

### 3. Select cryostat configurations

#### ConFlat flange

Choose from 2.75 in, 4.5 in, and 6 in options.

#### Distance from sample mount to ConFlat flange

Specify distance from 15.75 cm (6.2 in) to 152 cm (60 in). Custom distances longer than 152 cm are possible—contact us for more information.

#### Radiation shield

**CONSULT** Larger 1.5 in diameter radiation shield

### 4. Select optional system configurations

#### Cryogen-free operation

<b>RGC4-10</b>	Recirculating cooler with base temperature <4.0 K
<b>RGC4-12</b>	Recirculating cooler with base temperature <3.6 K
<b>RGC4-15</b>	Recirculating cooler with base temperature <2.9 K
<b>RGC4-20</b>	Recirculating cooler with base temperature <2.6 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

### 5. 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
---------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### 6. 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 (ST-400-H only)
<b>CF-100</b>	LHe storage Dewar
<b>LN-50</b>	LN <sub>2</sub> storage Dewar configured for use with SuperTran cryostats

*Copyright © Lake Shore Cryotronics, Inc. All rights reserved. Specifications are subject to change.*

070323 9:27