SuperTran VP-cryostats
STVP-100 / STVP-100-FTIR & STVP-200

SuperTran-VP Cryostats

STVP-100 and **STVP-100-FTIR** optical and **STVP-200** non-optical cryostats

The Lake Shore **STVP cryostats** provide a variable temperature environment with sample located in flowing vapor, for optical and/or electrical measurements to <2 K (with LHe) or 77 K (with LN_2). The STVP-100-FTIR is optimized for FTIR measurements. They are compact, easy to operate, cool quickly, and are supplied with a high-efficiency transfer line. They can be combined with the RGC4 recirculating cooler for cryogen-free operation.

Quantum Design

Quantum Design
1 avenue de l'Atlantique
Bâtiment Fuji-Yama
91940 Les Ulis - France

Tél. : +33 1 69 19 49 49
france@qd-europe.com
www.qd-europe.com

Lake Shore CRYOTRONICS

SuperTran VP-cryostats
STVP-100 / STVP-100-FTIR & STVP-200

STVP-100 and **STVP-100-FTIR** optical and **STVP-200** non-optical cryostats

The Lake Shore SuperTran-VP cryostats cool samples by immersion in a temperature-controlled flowing gas. Simple to operate, they use a high-efficiency transfer line to deliver LHe (or LN_2) to the sample chamber for cooling the sample from <2 K to 325 K (or 77 K to 325 K with LN_2). Built-in heaters and sensors provide precision dual-loop variable temperature capability. Temperatures below 4.2 K are achieved by reducing the venting helium gas pressure using a mechanical vacuum pump.

Samples are mounted on a top-loading sample positioner, and can be exchanged using a single quick-disconnect clamp. Samples can also be connected with cryogenic-service wiring (single conductor, twisted-pair, or coaxial cables) for electrical measurements in the STVP-100 optical models. The four-way optical sample chamber (with a numeric aperture of f1.0) can be used in both reflectance and transmission geometries. Standard windows are UV-grade fused silica offering transmission from the UV to near-IR regions. A wide range of other window materials are available, including wedged windows for reduced IR fringing, and thin film windows for far-IR transmission.

The STVP cryostats can be combined with the RGC4 recirculating gas cooler for fully cryogen-free operation throughout the entire temperature range. The RGC4 enables unattended cryostat operation, ideal for extended duration measurements.

Typical applications include spectroscopy (photoluminescence, FTIR, UV-visible, Raman), materials characterization (resistivity, Hall effect), as well as low-temperature and component testing. The STVP-100-FTIR is optimized for use with commercial FTIR spectrometers. Custom configurations include a larger or smaller diameter sample chamber and removable indium-sealed sample chamber windows.

Key features

- Sample-in-flowing-vapor configuration for uniform sample cooling
- Continuous-flow design, using a high-efficiency transfer line to deliver a steady stream of LHe to the vaporizer (heat exchanger) for subsequent cooling of the sample
- Top loading sample positioner with copper sample mount and sample holder
- The sample is accessed by opening a single clamp and removing the sample positioner from the cryostat
- Dual-loop temperature control (at vaporizer and sample mount) using calibrated silicon diode sensors enables rapid temperature sweeps and precise sample temperature control
- Continuous temperature range from <2 K to 325 K (or 77 K to 325 K with LN_2)
- Mounting flange compatible with most commercial FTIR spectrometers (STVP-100-FTIR only)
- O-ring sealed ports accept DC and RF electrical feedthroughs
- Optional DC and RF wires and cables for electrical measurements
- Four optical window ports can be used for optical measurements from UV to IR (STVP-100 models only)
- Compatible with RGC4 recirculating gas cooler for cryogen-free operation
- Optional isothermal sample zone extends the copper sample tube to above the level of the sample

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STVP-100/STVP-100-FTIR

Featured components

Removable indium-sealed windows for use with IR window materials (STVP-100)

38.1 mm (1.5 in) diameter sample tube

Dual-loop simultaneous temperature control at liquid vaporizer and sample mount using calibrated silicon diode control sensors

Removable top-loading sample positioner including copper sample mount and removable optical sample holder, housekeeping and experimental wiring feedthroughs, and two spare access ports.

Multi-position sample holder provides easy shifting between a reference position and multiple samples (STVP-100-FTIR)

Optical vacuum shroud with four o-ring sealed window ports

Polished aluminum thermal radiation shield

Mounting flange compatible with most commercial FTIR spectrometers (STVP-100-FTIR)

High-efficiency, flexible LHe/LN_2 transfer line

Selections

Cooled radiation shield windows

Fused silica windows for enhanced operation below 4 K (STVP-100 only)

Maximum temperature

325 K: Standard, using calibrated silicon diode sensor

500 K: STVP-200 only

Isothermal sample zone

Copper sample chamber

FTIR mounting flange (STVP-100-FTIR only)

Specify commercial FTIR spectrometer manufacturer and model

Sample positioner

Single rotation about the vertical axis (standard)

Precision sample positioner with (manual) linear translation stage and graduated (manual) rotation

Motorized operation of linear translator

Motorized operation of rotary stage

Double rotating sample positioner, permitting rotation around both the vertical axis and the horizontal optical axis

Easily add DC, AC, and mixed DC+AC measurement capabilities to your cryostat with an M81-SSM

This modular, multichannel system 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. The modules also leverage patent-pending MeasureSync™ real-time sampling technology to ensure synchronous sourcing and measuring across all channels. Plus, by having both DC and AC sourcing and measurement in one instrument, the M81-SSM can eliminate the need for mixed-instrument setups, greatly simplifying the setup of complex characterization configurations.

M81-SSM synchronous source measure system

Real-time sampling architecture for synchronous sourcing/measuring

All source and measure channels are capable of DC and AC to 100 kHz signals

100% linear circuitry for the lowest possible source/measure noise

Optimized for fundamental, harmonic, and phase AC plus DC biased measurements

Unique, flexible instrument/distributed module architecture

Provides the absolute precision of DC plus the detection sensitivity performance of AC instrumentation

Uses a clean, simple UI and common programming API for fast setup

Included MeasureLINK software enables full end-to-end measurement and cryostat temperature control

MeasureLINK™

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Selections

Transfer line

6 ft (182.8 cm) standard flex length

Custom flex length consult Lake Shore

Right angle leg(s) consult Lake Shore

Options

Windows (STVP-100 models only)

Custom window options are available, including diamond, polypropylene/polyethylene combination, or wedged windows. Contact Lake Shore for more information.

UV-grade fused silica consult Lake Shore

Sapphire consult Lake Shore

ZnSe consult Lake Shore

Mounting flange

Black anodized aluminum flange compatible with commercial spectrofluorometers or optical benches

Sample holders

Custom sample holders are available. Contact Lake Shore for more information.

Blank consult Lake Shore

Resistivity consult Lake Shore

Fixed-probe (DLTS) consult Lake Shore

LCC consult Lake Shore

DIP consult Lake Shore

STVP-100 with load lock for mounting samples in a glove box

Special STVP-100-2 with manually controlled precision linear manipulator for vertical positioning of samples with 2 in travel, drum dial indicator for vertical axis sample positioner rotation

For total control of measurements performed in a cryostat, add our MeasureLINK software

Our optional MeasureLINK software enables a wide range of capabilities including charting and logging, system monitoring with a cryostat-specific process view, and even controlling Lake Shore equipment as well as some third-party instrumentation, in a non-programming environment. You can also create unlimited functionality using the scripting development environment.

Create multiple configurations to support separate measurements

Monitor temperature and change setpoints with the monitor pane

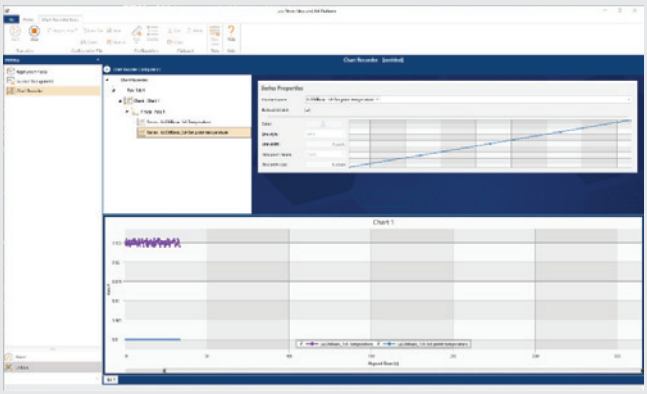
Easily create nested, multi-level measurement loop sequences

See real-time internal cryostat temperatures in Process View

Charts and log all system variables with Chart Recorder

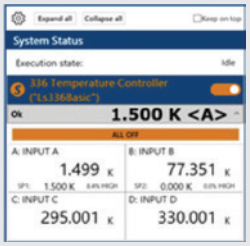
No programming required — drag and drop to create temperature sweeps, access measurements, and add third-party instruments

Custom scripting function allows you to construct new and edit existing measurement scripts



The chart recorder utility enables charting and logging of all system variables, for example, so you can keep a close eye on temperature trends in a cryostat experiment in real-time; it also helps you determine when steady-state conditions have been reached.

MeasureLINK Monitor Pane



MeasureLINK™

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Options

Electrical feedthroughs

(1) BNC grounded	EF-BNC-1-B-AL
(2) BNC grounded	EF-BNC-2-S-AL
(6) BNC grounded	EF-BNC-6-G
(1) BNC insulated	EF-BNC-1-B-NC
(2) BNC insulated	EF-BNC-2-S-NC
(6) BNC insulated	EF-BNC-6-I
(1) triaxial grounded	EF-TRIAX-1-B-AL
(6) triaxial grounded	EF-TRIAX-6-G
(1) triaxial insulated	EF-TRIAX-1-B-NC
(6) triaxial insulated	EF-TRIAX-6-I
(2) SMA grounded	EF-SMA-2-B-AL
(6) SMA grounded	EF-SMA-6-G
(2) SMA insulated	EF-SMA-2-B-NC
(6) SMA insulated	EF-SMA-6-I
10-pin	10P-ASSEMBLY
19-pin	19P-ASSEMBLY
26-pin	26P-ASSEMBLY
32-pin	32P-ASSEMBLY

Additional temperature sensors

One Lake Shore calibrated diode is now included on every cryostat as the control sensor

Silicon diode, calibrated	DT-670-CU-HT-1.4L
Cernox® magnetic field independent, calibrated	CX-1050-CU-HT-1.4M

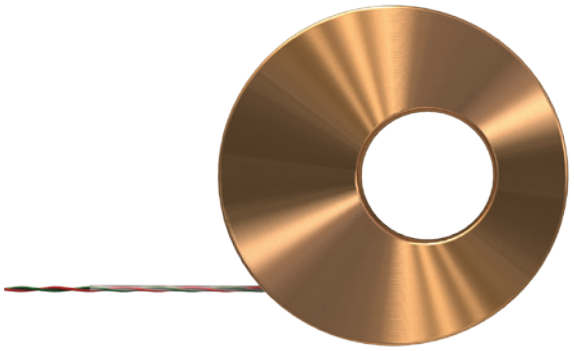
Installed wiring

(1), (2), or (6) coaxial cables, SMA	CABLEASSY-63340
(1), (2), or (6) coaxial cables, BNC	CABLEASSY-63342
(1) or (6) triaxial cables	CABLEASSY-63341
(10), (19), (26), or (32) PhBr wires	WIRE-PHBR

Accessories

Available at www.lakeshore.com

LHe storage Dewar	CF-100
LN_2 storage Dewar	LN-50
Vacuum pumping station	10RVP, 10DDP, or TS-85-D
Temperature controller	325, 335, or 336



Cernox CU-HT sensor

336 temperature controller

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Specifications

STVP-100

STVP-100-FTIR

STVP-200

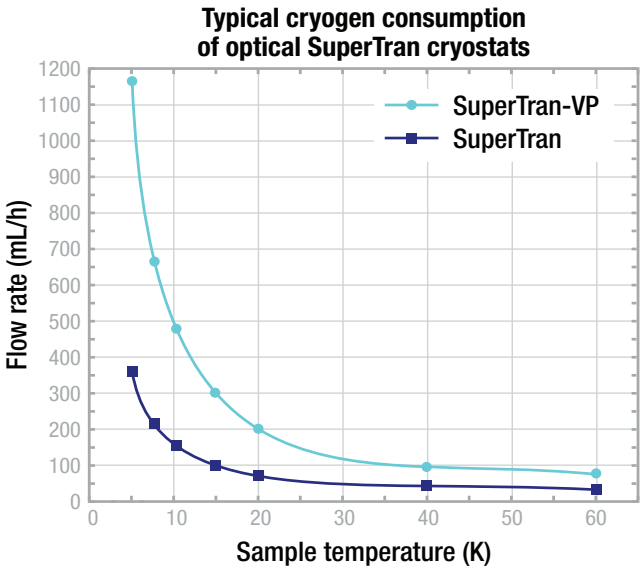
Initial cooldown time (LHe to 5 K)	15 min		
Temperature range	<2 K to 300 K (LHe); 77 K to 300 K (LN_2) (500 K optional in STVP-200)		
Typical temperature stability[1]	±50 mK		
Orientation[2]	Vertical for operation <4.5 K		
Cryogen consumption (LHe room temp to 4.2 K)	0.5 L		
Cryogen consumption (LHe at 5 K)	1.3 L/h		

Size

Height		~762 mm (~30 in)	
Inner diameter (at sample region)	38.1 mm (1.5 in) consult Lake Shore for other sizes		
Sample mount diameter	31 mm (1.25 in)		
Weight (excluding transfer line, approximate)	7 kg (15.4 lb)	8 kg (17.6 lb)	7 kg (15.4 lb)
Shipping weight (cryostat + line)	61 kg (135 lb)	62 kg (137 lb)	61 kg (135 lb)
Shipping dimensions (cryostat + line)	1905 × 990.6 × 431.8 mm (75 × 39 × 17 in)		

[1] Measured with temperature controller

[2] Cryogen consumption may be higher during non-vertical operation



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Ordering information

Options

Windows
Custom window options are available, including diamond, polypropylene/polyethylene combination, or wedged windows. Contact Lake Shore for more information.

CONSULT	UV-grade fused silica
CONSULT	Sapphire
CONSULT	ZnSe

Mounting flange
Black anodized aluminum flange compatible with commercial spectrofluorometers or optical benches.

Sample holders
Custom sample holders are available. Contact Lake Shore for more information.

CONSULT	Blank
CONSULT	Resistivity
CONSULT	Fixed-probe (DTLS)
CONSULT	LCC
CONSULT	DIP

Electrical feedthroughs

EF-BNC-1-B-AL	(1) BNC grounded
EF-BNC-2-S-AL	(2) BNC grounded
EF-BNC-6-G	(6) BNC grounded
EF-BNC-1-B-NC	(1) BNC insulated
EF-BNC-2-S-NC	(2) BNC insulated
EF-BNC-6-I	(6) BNC insulated
EF-TRIAX-1-B-AL	(1) triaxial grounded
EF-TRIAX-6-G	(6) triaxial grounded
EF-TRIAX-1-B-NC	(1) triaxial insulated
EF-TRIAX-6-I	(6) triaxial insulated
EF-SMA-2-B-AL	(2) SMA grounded
EF-SMA-6-G	(6) SMA grounded
EF-SMA-2-B-NC	(2) SMA insulated
EF-SMA-6-I	(6) SMA insulated
10P-ASSEMBLY	10-pin
19P-ASSEMBLY	19-pin
26P-ASSEMBLY	26-pin
32P-ASSEMBLY	32-pin

Additional temperature sensors

DT-670-CU-HT-1.4L	Silicon diode, calibrated (one included with cryostat)
CX-1050-CU-HT-1.4M	Cernox® magnetic field independent, calibrated
CONSULT	Thermocouple, Type E

Installed wiring

CABLEASSY-63340	(1), (2), or (6) coaxial cables, SMA
CABLEASSY-63342	(1), (2), or (6) coaxial cables, BNC
CABLEASSY-63341	(1) or (6) triaxial cables
WIRE-PHBR	(10), (19), (26), or (32) PhBr wires

Accessories

M81-SSM electronic synchronous source measure system
Contact us for standard/optical sample mounts or for interface cables/adapters for M81-SSM system/cryostat integration.
Also available: specially priced preconfigured M81-SSM/cryostat packages for certain cryostat models—contact Sales for details.

M81-SSM-2	M81-SSM instrument with 1 source and 1 measure channel, including M81-SSM accessory kit (USB-A to USB-C adapter, USB-A male to USB-B male cable, terminal connectors for digital I/O, terminal connectors for chassis ground, quick-start guide) and a 2 m (6.6 ft) LEMO to BNC adapter cable
M81-SSM-4	M81-SSM instrument with 2 source and 2 measure channels, including M81-SSM accessory kit (USB-A to USB-C adapter, USB-A male to USB-B male cable, terminal connectors for digital I/O, terminal connectors for chassis ground, quick-start guide) and a 2 m (6.6 ft) LEMO to BNC adapter cable
M81-SSM-6	M81-SSM instrument with 3 source and 3 measure channels, including M81-SSM accessory kit (USB-A to USB-C adapter, USB-A male to USB-B male cable, terminal connectors for digital I/O, terminal connectors for chassis ground, quick-start guide) and a 2 m (6.6 ft) LEMO to BNC adapter cable
ML-MCS	MeasureLINK-MCS software with scripting development license. Includes complete MeasureLINK installation with Lake Shore instrument drivers, chart recorder functionality and drag-and-drop measurement sequences. Some application packs sold separately.

Other accessories

CF-100	100 L LHe storage Dewar
LN-50	50 L LN_2 storage Dewar
10RVP	Vacuum pumping station
10DDP	Vacuum pumping station
TS-85-D	Turbomolecular pumping station
336	Model 336 temperature controller
335	Model 335 temperature controller
325	Model 325 temperature controller

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