Sample in flowing vapor cryostats
VNF-100 / VNF-100T

Sample in Flowing Vapor Cryostats

VNF-100 optical and **VNF-100T** non-optical 77 K cryostats

Ideal for cooling samples with poor thermal conductivity, VNF-100 cryostats provide uniform cooling for liquids, powders, and irregularly shaped samples. Samples are located in a stream of nitrogen vapor, eliminating the need for careful thermal anchoring. The VNF-100 is ideal for both optical and electrical measurements from 65 K to 325 K.

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Lake Shore CRYOTRONICS environment by JANIS

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The Lake Shore VNF-100 Series are liquid nitrogen cooled, variable temperature cryostats with the sample located in flowing vapor. Ideal for experiments with samples that are difficult to thermally anchor such as liquid or powder samples, these cryostats are a low-cost alternative to liquid helium or cryocooler based systems when temperatures below 65 K are not required. The VNF-100 Series features a top-loading sample chamber for rapid sample exchange, and four-way, f = 1.0 optical access to the sample chamber.

The sample is easily accessed by removing the top-loading sample positioner. Samples can be connected with cryogenic-service wiring (single conductor, twisted-pair, or coaxial cables) for electrical measurements, while the four-way optical sample chamber enables both reflectance or transmission geometries. Standard fused silica windows provide transmission from the UV to near-IR regions. Alternatively, optional window materials can be installed for IR measurements.

The VNF-100T provides similar performance, but in a compact non-optical configuration. The small diameter non-optical tail of the VF-100T can be inserted into an electromagnet for use in magnetoelectric applications.

Typical applications for the VNF-100 Series include spectroscopy (photoluminescence, FTIR, UV- visible—VNF-100 only) and electrical materials characterization.

Key features

- Top-loading sample-in-flowing-vapor configuration
- Internal LN_2 reservoir with integrated cryopump enables all-day unattended operation
- Optimized for two-loop temperature control, LN_2 is vaporized and temperature controlled with a calibrated silicon diode as it enters the sample chamber; a second heater and sensor on the sample mount is used for rapid temperature sweeps and precise sample temperature control
- Sample is accessed by opening a single clamp and removing the top-loading sample positioner
- Continuous temperature range from 65 K to 300 K (500 K optional with VNF-100T)
- O-ring sealed ports accept DC and RF electrical feedthroughs
- Optional DC and RF wires and cables for electrical measurements
- Four optical window ports (f = 1.0) can be used for optical measurements from UV to IR

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VNF-100 Series

Featured components

- Sample in flowing vapor for uniform sample cooling
- Integrated control heater and calibrated silicon diode control sensor
- Dual-loop heater configuration for rapid and precise sample temperature control (simultaneous control at liquid vaporizer and sample mount)
- Integrated LN_2 reservoir provides 6 to 8 h of operation between refills
- Adjustable cooling power using integrated needle valve
- Removable sample positioner including copper sample mount, removable optical sample holder, housekeeping feedthrough, 10-pin feedthrough for experimental wiring, and two spare o-ring sealed sample access ports
- Optical vacuum shroud with four o-ring sealed window ports (VNF-100 only)

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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Options

Windows

Custom window options are available, including UV or IR grade fused silica, or sapphire. Contact Lake Shore for more information.

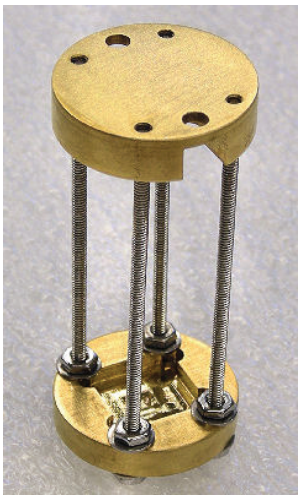
Mounting flange

Black anodized aluminum flange compatible with commercial spectrofluorometers BASE-VNF-2

Sample holders

Custom sample holders are available for the VNF-100T. Contact Lake Shore for more information. The options listed below are for the VNF-100 only.

Optical	consult Lake Shore
Blank	consult Lake Shore
Resistivity	consult Lake Shore
LCC	consult Lake Shore
DIP	consult Lake Shore
Cuvette	consult Lake Shore

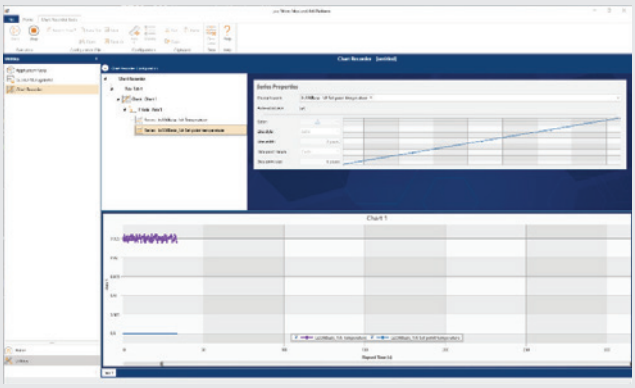


Optical VNF-100 cuvette sample holder

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

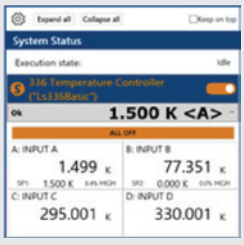
Our optional MeasureLINK software enables a wide range of capabilities including charting and logging, system monitoring with a cryostat-specific process view, and even controlling Lake Shore equipment as well as some third-party instrumentation, in a non-programming environment. You can also create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

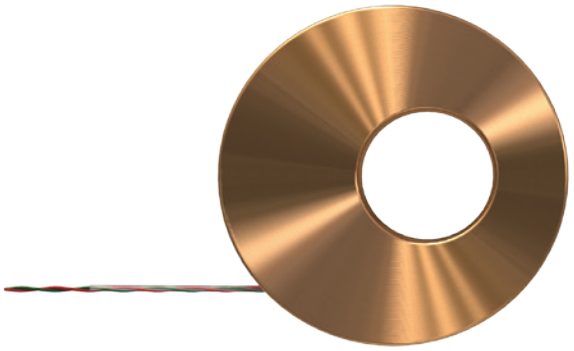
Installed wiring

(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

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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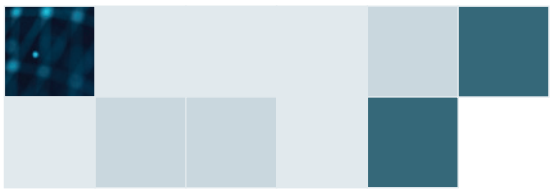

Specifications

	VNF-100	VNF-100T
Initial cooldown time (to 65 K)	~30 min	
Temperature range	65 K to 300 K (500 K optional with VNF-100T)	
Typical temperature stability[1]	±50 mK	
LN_2 capacity (nominal)	1.2 L	
Working time (typical)	6 to 8 h	
Sample exchange time (typical)	<5 min	

Size

Height	583 mm (23 in)	812.8 mm (32 in)
Inner diameter (at sample region)[2]	30 mm (1.18 in)	22.35 mm (0.88 in)
Sample mount diameter[2]	25.4 mm (1 in)	16 mm (0.62 in)
Weight (approximate)	11.5 kg (25.4 lb)	
Shipping weight (approximate)	15.9 kg (35 lb)	
Shipping dimensions (approximate)	762 × 508 × 431.8 mm (30 × 20 × 17 in)	

[1] Measured with temperature controller

[2] VNF-100

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Ordering information

Options

Windows

Custom window options are available, including UV or IR grade fused silica, or sapphire. Contact Lake Shore for more information.

Mounting flange

BASE-VNF-2	Black anodized aluminum flange compatible with commercial spectrofluorometers

Sample holders

Custom sample holders are available for the VNF-100T. Contact Lake Shore for more information. The options listed below are for the VNF-100 only.

CONSULT	Optical
CONSULT	Blank
CONSULT	Resistivity
CONSULT	LCC
CONSULT	DIP
CONSULT	Cuvette

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

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

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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