

# SuperTran cryostats ST-300 & ST-300T



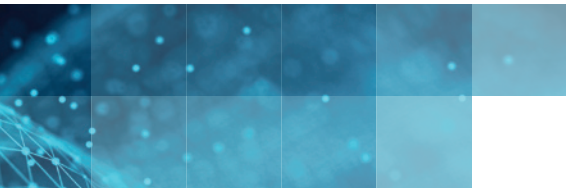
## *SuperTran Cryostats*

### **ST-300** optical and **ST-300T** non-optical compact cryostats

The ST-300 is the compact optical version and the ST-300T is the compact non-optical version of Lake Shore's SuperTran continuous flow cryostat. The compact vacuum shroud is optimized for use in narrow gap electromagnets and optical configurations with limited available space. They provide a variable temperature sample environment for optical (ST-300 only), electrical, and magnetic measurements from <2 K (with LHe) or 77 K (with LN<sub>2</sub>) to 500 K. They can be combined with the RGC4 recirculating cooler for cryogen-free operation.

# SuperTran cryostats

## ST-300 & ST-300T



### ST-300 and ST-300T compact cryostats

The Lake Shore SuperTran ST-300 and ST-300T are compact continuous flow cryostats offering operating temperatures from <2 K to 500 K (700 K optional). Simple to operate, they use a high efficiency transfer line to deliver LHe or LN<sub>2</sub> to the sample mount for cooling the user sample. A built-in heater and sensor provide precision variable temperature capability. Temperatures below 4.2 K are achieved by reducing the venting helium gas pressure, using a mechanical vacuum pump. High temperature capability (to 700 K) is provided using an optimized sensor (type E thermocouple) and heaters. Magnetic field independent Cernox® sensors can be installed for operation to 420 K.

Access to the sample compartment is provided by a quick disconnect clamp. Samples are mounted in a 36 mm (1.5 in) diameter vacuum space and can be connected with cryogenic-service wiring (single conductor, twisted-pair, or coaxial cables). In the ST-300, the four-way optical sample chamber can be configured for reflectance or transmission measurements. Standard windows are UV-grade fused silica offering transmission from the UV to near-IR regions. Optional window materials can be installed to span the far/mid-IR, VUV, and x-ray regions for a variety of spectroscopic measurements.

The ST-300 and ST-300T 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 for the ST-300/ST-300T include spectroscopy (photoluminescence, FTIR, UV-visible), materials characterization (resistivity, Hall effect), as well as low-temperature imaging and microscopy. When mounted to an electromagnet, magneto-electric and magneto-optical measurements are possible.

Custom configurations include replacement of the standard epoxy-sealed windows with o-ring-sealed windows for rapid window changes, rotatable vacuum shroud, sub-compact vacuum shroud, and extended length vacuum shroud.

#### Key features

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Sample-in-vacuum configuration, with continuous operation using the included high-efficiency transfer line

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Optional DC and RF wires and cables for electrical measurements

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Sample is easily accessed by opening a single clamp

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Four optical window ports can be used for optical measurements from UV to IR (ST-300 only)

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Continuous temperature range from <2 K to 500 K or 77 K to 500 K with optional 700 K high temperature

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Compatible with RGC4 recirculating gas cooler for cryogen-free operation

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O-ring sealed ports accept DC and RF electrical feedthroughs

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Variable temperature sample mount and sample holder, with temperature regulated by internal heater and calibrated silicon diode (and external temperature controller)

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# SuperTran cryostats ST-300 & ST-300T

## ST-300/ST-300T

### Featured components

- 22.4 mm (0.88 in) diameter copper sample mount
- Integrated control heater and calibrated silicon diode control sensor
- High-efficiency, flexible LHe/LN<sub>2</sub> transfer line
- Vacuum shroud with 4 epoxy-sealed window ports (ST-300 only)
- Polished aluminum thermal radiation shield
- 10-pin electrical feedthrough, 3 spare o-ring sealed feedthrough ports, evacuation valve, and safety pressure relief valve

## Selections

### Temperature

- 500 K: standard using silicon diode sensor
- 420 K: replaces standard sensor with calibrated field-independent Cernox® sensor
- 700 K: replaces standard sensor with type E thermocouple

### Vacuum shroud

- Rotatable
- Extended length
- Sub-compact diameter

### Transfer line

- 6 ft (183 cm) standard flex length
- Custom flex length [consult Lake Shore](#)
- Right angle leg(s) [consult Lake Shore](#)

## 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.



- 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™

# SuperTran cryostats ST-300 & ST-300T

## Options

### Windows

ST-300 only. Custom window options are available, including fused silica, sapphire, ZnSe, CaF<sub>2</sub>, KBr, and TPX. Contact Lake Shore for more information.

### Mounting plates

Black anodized aluminum baseplate compatible with commercial optical tables.

Baseplate (imperial threads) [BASE-ST-VPF](#)

Baseplate (metric threads) [BASE-ST-VPF-M](#)

### Sample holders

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

Optical (to 500 K) [SH-OPTICAL-0.88-STD](#)

Optical (to 700 K) [SH-OPTICAL-0.88-700](#)

Blank (to 500 K) [SH-BLNK-0.88-STD](#)

Blank (to 700 K) [SH-BLNK-0.88-700](#)

Resistivity [SH-RESISTIVITY-0.88-STD](#)

## 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

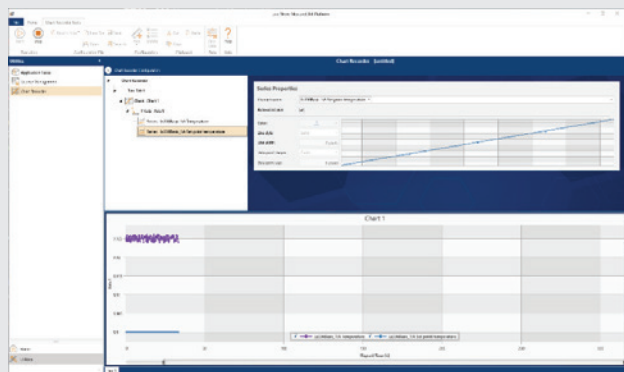
Easily create nested, multi-level measurement loop sequences

See real-time internal cryostat temperatures in Process View

Charts and log all system variables with Chart Recorder

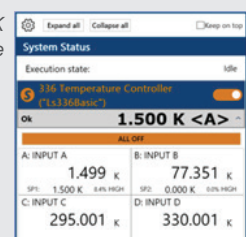
No programming required — drag and drop to create temperature sweeps, access measurements, and add third-party instruments

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™

# SuperTran cryostats ST-300 & ST-300T

## 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](#)
- Thermocouple, Type E [consult Lake Shore](#)

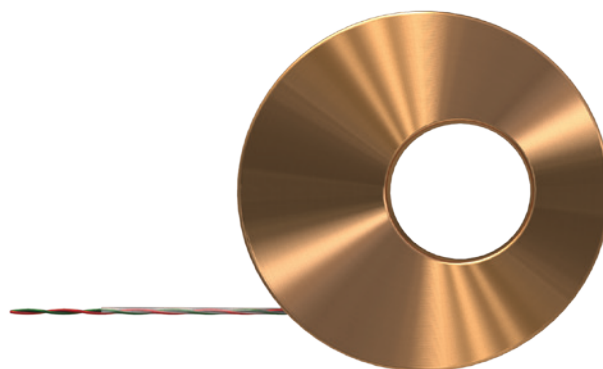
### Installed wiring

- (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](http://www.lakeshore.com)

- LHe storage Dewar [CF-100](#)
- LN<sub>2</sub> storage Dewar [LN-50](#)
- Vacuum pumping station [10RVP, 10DDP, or TS-85-D](#)
- Temperature controller [325, 335, or 336](#)



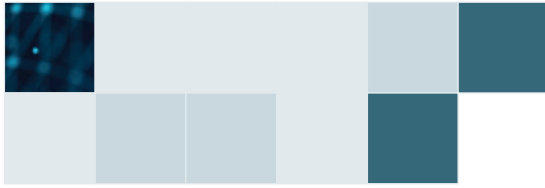
Cernox CU-HT sensor



336 temperature controller

# SuperTran cryostats

## ST-300 & ST-300T



### Specifications



ST-300



ST-300T

Initial cooldown time (LHe to 5 K)	15 min
Temperature range	<2 K to 500 K (700 K optional)
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>-5</sup> Torr

### Size

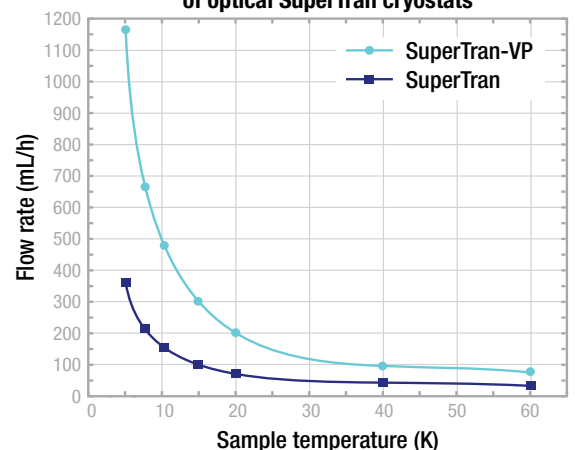
Height	583 mm (23 in)
Inner diameter (at sample region)	29 mm (1.13 in)
Sample mount diameter	22.4 mm (0.88 in)
Weight (excluding transfer line, nominal)	4.6 kg (10 lb)
Shipping weight (cryostat only)	8.6 kg (19 lb)
Shipping weight (transfer line)	9.1 kg (20 lb)
Shipping dimensions (cryostat only)	762 × 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

Typical cryogen consumption of optical SuperTran cryostats





# SuperTran cryostats ST-300 & ST-300T

## Ordering information

### Options

#### Windows

ST-300 only. Custom window options are available, including fused silica, sapphire, ZnSe, CaF<sub>2</sub>, KBr and TPX. Contact Lake Shore for more information.

#### Mounting plates

Black anodized aluminum baseplate compatible with commercial optical tables.

<b>BASE-ST-VPF</b>	Baseplate (imperial threads)
<b>BASE-ST-VPF-M</b>	Baseplate (metric threads)

#### Sample holders

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

<b>SH-OPTICAL-0.88-STD</b>	Optical (to 500 K)
<b>SH-OPTICAL-0.88-700</b>	Optical (to 700 K)
<b>SH-BLNK-0.88-STD</b>	Blank (to 500 K)
<b>SH-BLNK-0.88-700</b>	Blank (to 700 K)
<b>SH-RESISTIVITY-0.88-STD</b>	Resistivity

#### Electrical feedthroughs

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

#### Additional temperature sensors

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

#### Installed wiring

<b>CABLEASSY-63340</b>	(1), (2), or (6) coaxial cables, SMA
<b>CABLEASSY-63342</b>	(1), (2), or (6) coaxial cables, BNC
<b>CABLEASSY-63341</b>	(1) or (6) triaxial cables
<b>WIRE-PHBR</b>	(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.

<b>M81-SSM-2</b>	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
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<b>M81-SSM-4</b>	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
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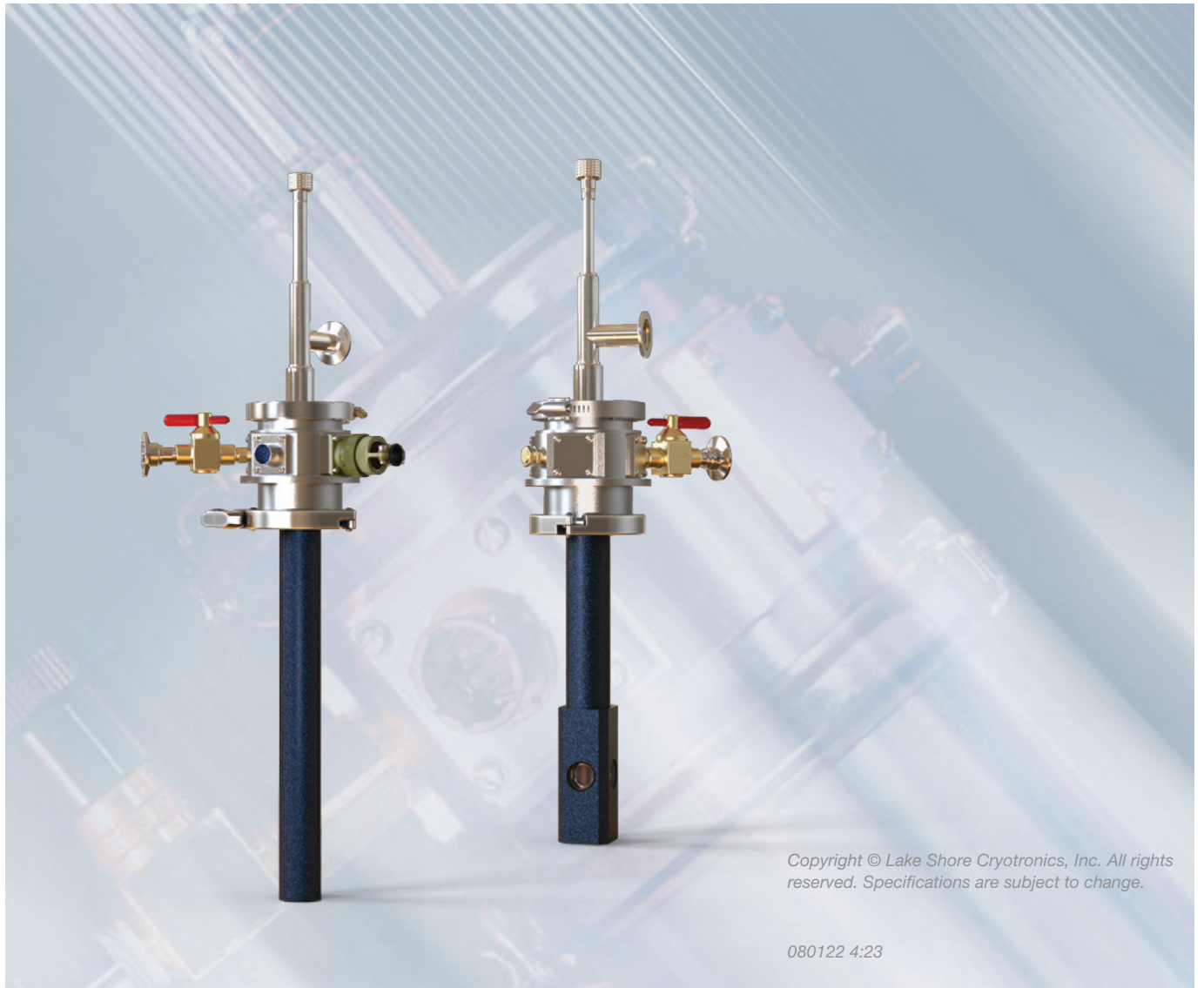
<b>M81-SSM-6</b>	M81-SSM instrument with 3 source and 3 measure channels, including M81-SSM accessory kit (USB-A to USB-C adapter, USB-A male to USB-B male cable, terminal connectors for digital I/O, terminal connectors for chassis ground, quick-start guide) and a 2 m (6.6 ft) LEMO to BNC adapter cable
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<b>ML-MCS</b>	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.
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#### Other accessories

<b>CF-100</b>	100 L LHe storage Dewar
<b>LN-50</b>	50 L LN <sub>2</sub> storage Dewar
<b>10RVP</b>	Vacuum pumping station
<b>10DDP</b>	Vacuum pumping station
<b>TS-85-D</b>	Turbomolecular pumping station
<b>336</b>	Model 336 temperature controller
<b>335</b>	Model 335 temperature controller
<b>325</b>	Model 325 temperature controller

# SuperTran cryostats ST-300 & ST-300T



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