		OptistatDN	**Optistat**DN-V
OPTIDN	Optistat DN cryostat	✓	✗
OPTIDNV	Optistat DN-V cryostat	✗	✓
SR	Sample rod	✓	✗
SH3	Optical sample holder	✓	✓
ITC502	Temperature controller	✓	✓
CC1	3m cryostat cable - 10 pin connector	✓	✓
SKDN	Spares kit	✓	✓

System components

		OptistatDN	**Optistat**DN-V
ITC503	Temperature controller	✓	✓
ITC601PT	Temperature controller	✓	✓
SH1	Plain sample holder	✓	✓
SH7	Cuvette holder	✓	✗
CV	Cuvette	✓	✗
QH	Quartz liquid cell	✓	✗
OPTIDNHT	Optistat DN, 500 K	✓	✗
OPTIHTR	Simple height adjust/rotate	✓	✗
OPTIHTRPS	Precision height adjust/rotate	✓	✗
LX10	Wired 10 pin seal	✓	✓
CX1	Wired miniature coax connector	✓	✓
TSP	Wired platinum sensor	✓	✗
HVP4	High vacum pumping system	✓	✓
	Spec B windows	✓	✓
	Spec WF windows	✓	✓
	500 K sapphire/Spec B windows	✓	✗
	Z-cut Quartz windows	✓	✓
	Mylar windows	✓	✓
	Aluminised mylar windows	✓	✓
	Polythene windows	✓	✓
	KRS5 windows	✓	✓
	Zinc selenide windows	✓	✓
	Polypropylene windows	✓	✓
	Calcium fluoride windows	✗	✓
	Sapphire windows	✗	✓

Optional items

	OptistatDN	**Optistat**DN-V
Sample space (mm)	20 diameter	20 x 50 mm to fit on sample holder
Temperature range (K)	77-300 (77-500 option*)	77-500
Temperature stability (K)	±0.1 K	±0.1 K
Cool down from ambient (mins)	~20	~20
Liquid nitrogen capacity (l)	1.2	1.2
Hold time at 77 K (hours)	≥15	≥15
Sample change time (mins)	5	60
Cryostat weight (kg)	5	5

Specifications

Notes:

* For operation between 300 K and 500 K, high temperature sapphire windows are required on the inner window ports.

Visit our web site at **www.oxford-instruments.com**

Ref: OI 565 02.01

Oxford Instruments Superconductivity

UK
Tubney Woods, Abingdon
Oxfordshire OX13 5QX
Tel: +44 (0) 1865 393 200
Fax: +44 (0) 1865 393 333

Germany
Otto-von Guericke Ring 10
D-65205 Wiesbaden
Tel: +49 6122 937 171
Fax: +49 6122 937 175

Italy
Via Irone Tolstoi 86
20098 San Giuliano
Milanese
Milan
Tel: (02) 982 531
Fax: (02) 982 41407

Japan
Haseman Building
2-11-6 Tomioka, Koto-ku
Tokyo 135-0047
Tel: 03 5245 3261
Fax: 03 5245 4472

Spain
Avda Mata Piñonera, 2
28700 San Sebastian de los Reyes
Madrid
Tel: +34 91 659 0740
Fax: +34 91 654 6794

U.S.A.
130A Baker Ave. Ext.
Concord, MA 01742-2121
Tel: (978) 369-9933
Fax: (978) 369-6616

E-mail: superconductivity@oxinst.co.uk
www.oxford-instruments.com

Product Guide

OptistatDN & **Optistat**DN-V

Nitrogen bath cryostats

Introduction

The **Optistat**DN-V and **Optistat**DN are nitrogen bath cryostats providing cryogenic environments for optical measurements. The designs combine excellent optical access with the capability to operate in the temperature range 77 to 500 K.

Benefits include:

- Wide optical access for light collection measurements
- Optimised clear beam throughput allowing a large illumination area for small signal measurements
- Optimised thermal design providing excellent control and stability of the sample temperature
- A range of demountable windows for spectroscopy from the near ultraviolet to the far infrared
- Data acquisition software to automate experiments

Optical access

The **Optistat**DN and **Optistat**DN-V have excellent optical access (f/1). The large acceptance angle makes them ideal for light collection measurements (for example, luminescence and Raman studies). The large clear access (15 mm diameter in transmission) is important for small signal measurements that benefit from a large illumination area (for example in FTIR and UV/visible absorption spectroscopy).

Optical measurements that cover a broad range of wavelengths may exceed the transmission band of a particular window material. All windows in the **Optistats** are demountable. Windows for different regions of the optical spectrum are quickly and easily exchanged. Oxford Instruments offers a range of window materials permitting spectroscopic measurements from the near ultraviolet to the far infrared.

Benefits of vacuum loading and exchange gas cryostats

The **Optistat**DN-V and **Optistat**DN are vacuum loading and static exchange gas cryostats respectively. There are a number of benefits associated with each design:

Benefits of static exchange gas cryostats include:

- Rapid sample change times

OXFORD INSTRUMENTS

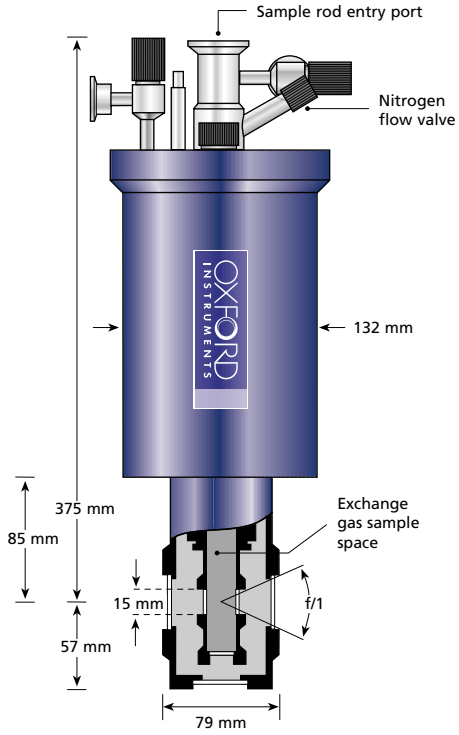
- Uniform sample cooling
- Flexible, in situ sample positioning
- Large variety of sample holder options, including cuvettes for liquid samples

Benefits of vacuum loading cryostats:

- Fewer windows maximise optical throughput
- Large sample spaces
- High temperatures can be used with all window options

OptistatDN

The **Optistat**DN is a top loading, static exchange gas cryostat with optical access provided via four sets of radial and one set of axial windows. The sample is located in a central space surrounded by exchange gas giving extremely uniform cooling.



Changing the sample simply involves removing the sample rod, replacing the sample and inserting the rod back into the cryostat. There is no need to break the insulating vacuum or warm the cryostat up. The resulting sample change times are very short, typically a few minutes.

Sample cooling is achieved as follows. A liquid nitrogen reservoir surrounds the upper part of the central sample tube and supplies liquid nitrogen via a capillary tube to a heat-exchanger. During operation, the gravity fed flow of liquid is controlled by a valve, in the exhaust line, on the cryostat top plate. In static exchange gas cryostats the circulating cryogen does not come into contact with the sample, a separate exchange gas being present in the sample region. This gas is in good thermal contact with the heat exchanger, thus cooling the sample by conduction through the exchange gas.

A vacuum case surrounds the nitrogen reservoir and heat exchanger. An activated charcoal sorb is fitted to the nitrogen reservoir and provides pumping of the vacuum space when the system is cold.

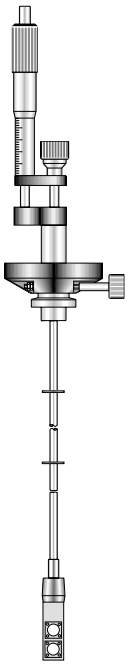
Sample positioning

A range of sample rods and accessories is available for use with the **Optistat**DN.

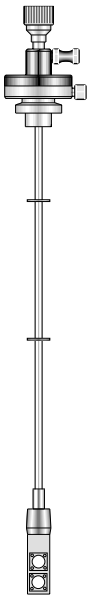
The simple height adjust and rotate sample rod provides sliding adjustment with locking screws to hold a fixed position. The range of vertical motion is 32 mm; positioning accuracy is 0.5 mm (height) and 1° (rotation). The sample rod is supplied fitted with a double sample holder making it ideal for reference measurements.

The precision height adjust and rotate sample rod provides height adjust with a resolution of 10 µm and a goniometer for setting the rotation angle with a resolution of 12 minutes.

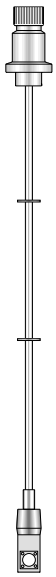
Note: Some sample holder options have a reduced clear aperture in transmission.



Precision height adjust and rotate sample rod



Simple height adjust and rotate sample rod



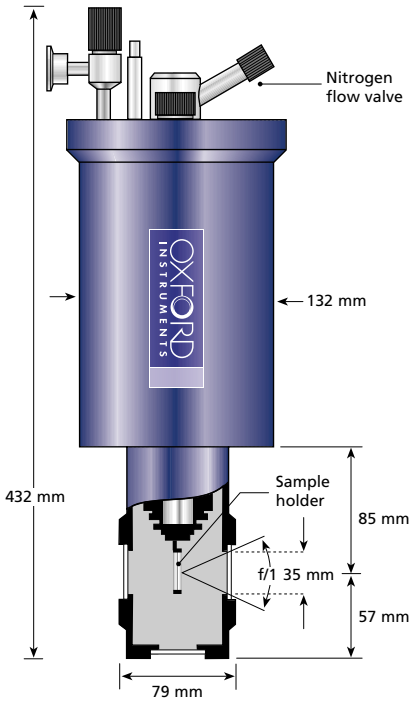
Standard sample rod

Electrical access

For electrical measurements, wires may be terminated at pins above the sample holder. This provides maximum flexibility for different experimental configurations. This applies to both the **Optistat**DN and the **Optistat**DN-V

OptistatDN-V

The **Optistat**DN-V is a vacuum loading cryostat with optical access provided by four radial windows and one axial window. With the sample in vacuum, there is no additional central sample space tube with windows. The effect of this is to increase the available space for samples and to improve optical throughput, as losses due to window absorptions and reflections are reduced.



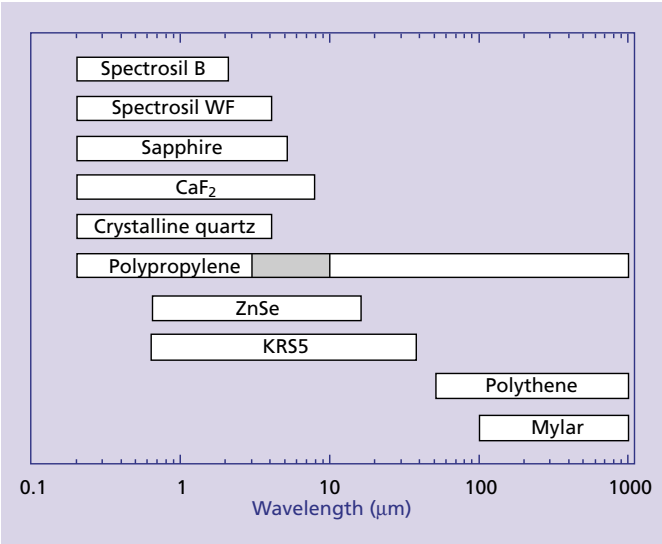
The choice of window materials for use with vacuum loading cryostats is greater than for static exchange gas systems. This is due to the less exacting temperature demands resulting from the window being separated from extreme temperatures by an isolating vacuum space.

Sample cooling is achieved as follows. Liquid nitrogen is drawn from a reservoir located in the top of the cryostat through a capillary, into the heat exchanger. In a vacuum loading cryostat, the sample space is evacuated and the sample holder located directly on the heat exchanger.

Effective sample cooling is achieved due to good thermal contact between the sample holder and the heat exchanger.

Automated operation

Oxford Instruments' ObjectBench software, included with the ITC temperature controller used on **Optistat**DN and **Optistat**DN-V systems, automates data acquisition. The software, which runs on a PC, takes measurements from any independent instruments (with a computer interface) at different user defined temperatures. In addition, the cryostat flow control valve may be set for operation from 77 to 300 K (500 K with the high temperature option). With these features, frequently run measurements may be automated for "hands off" operation.



Transmission ranges of standard windows