CFC-FREE
CB-60/CB-80 Cryobath
Low Temperature Bath

Thermo NESLAB Manual P/N U00551
Rev. 04/03/00

Instruction and Operation Manual

CB-60/CB-80 Cryobath Low Temperature
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Preface

Compliance

Products tested and found to be in compliance with the requirements defined in the EMC standards defined by 89/336/EEC as well as Low Voltage Directive (LVD) 73/23/EEC can be identified by the CE label on the rear of the unit. The testing has demonstrated compliance with the following directives:

LVD, 73/23/EEC	Complies with UL 3101-1:93
EMC, 89/336/EEC	EN 55011, Class A Verification
	EN 50082-1:1992
	IEC 1000-4-2:1995
	IEC 1000-4-3:1994
	IEC 1000-4-4:1995

For any additional information refer to the Letter of Compliance that shipped with the unit (Declaration of Conformity).

Unpacking

Retain all cartons and packing material until the unit is operated and found to be in good condition. If the unit shows external or internal damage, or does not operate properly, contact the transportation company and file a damage claim. Under ICC regulations, this is your responsibility.

Warranty

Units have a warranty against defective parts and workmanship for one full year from date of shipment. See back page for more details.

NES-care Extended Warranty Contract

- Extend parts and labor coverage for an additional year.
- Worry-free operation.
- Control service costs.
- Eliminate the need to generate repair orders.
- No unexpected repair costs.

Other contract options are available. Please contact Thermo NESLAB for more information.

After-sale Support

Thermo NESLAB is committed to customer service during and after the sale. If you have questions concerning the operation of your unit, contact our Sales Department. If your unit fails to operate properly, or if you have questions concerning spare parts or Service Contracts, contact our Service Department.

Before calling, please obtain the following information from the unit's serial number label:

- BOM number _____

- Serial number _____

Section I Safety

Warnings

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any questions concerning the operation of your unit or the information in this manual, contact our Sales Department.

Performance of installation, operation, or maintenance procedures other than those described in this manual may result in a hazardous situation and may void the manufacturer's warranty.

Transport the unit with care. Sudden jolts or drops can damage the refrigeration lines.

Observe all warning labels.

Never remove warning labels.

Never operate damaged or leaking equipment.

Always turn off the unit and disconnect the line cord from the power source before performing any service or maintenance procedures, or before moving the unit.

Always empty the bath before moving the unit.

Never operate equipment with damaged line cords.

Never operate the unit without fluid in the bath.

Refer service and repairs to a qualified technician.

In addition to the safety warnings listed above, warnings are posted throughout the manual. These warnings are designated by an exclamation mark inside an equilateral triangle with text highlighted in bold print. Read and follow these important instructions. Failure to observe these instructions can result in permanent damage to the unit, significant property damage, or personal injury or death.

Section II General Information

Description

The CB-60/CB-80 Cryobath low temperature baths are designed to be an all purpose cold bath providing continuous operation at temperatures as low as -50°C (-80°C for the CB-80). Temperature stability of ±0.5°C can be obtained by using the optional Cryotrol Temperature Controller.

Each unit consists of an air-cooled refrigeration system, a magnetic stirring mechanism, a stainless steel bath, bath parts, a gasketed PVC bath cover, and stainless steel brackets for mounting auxiliary equipment.

Specifications

	CB-60	CB-80
Lowest Temperature[1]	-50°C	-80°C
Temperature Stability[2]	±0.5°C	±0.5°C
Cooling Capacity[3]		
60Hz	75 Watts @ -30°C	120 Watts @ -50°C
50Hz	60 Watts @ -30°C	100 Watts @ -50°C
Bath Work Area (Diameter x Depth)		
Inches	6 ½ x 6	7 ¾ x 7 ¾
Centimeters	16.5 x 15.2	19.7 x 19.7
Bath Volume		
Gallons	1.0	2.0
Liters	3.8	7.6
Unit Dimensions (H x W x D)		
Inches	19¾ x 11¾ x 13¾	40 x 16 x 22½
Centimeters	50.2 x 29.8 x 34.9	101.6 x 40.6 x 57.2
Shipping Weight		
Pounds	75	176
Kilograms	34	80

1. Under no heat load. Temperatures will vary with use of magnetic stirrer.
2. Using optional Cryotrol Temperature Controller.
3. Operating using bath fluid with specific heat of 0.5.

Section III Installation

Site

Locate the unit on a sturdy table or bench top. Ambient temperatures should be within the range of +55°F to +95°F (+13°C to +35°C).

Never place the unit in a location where excessive heat, moisture, or corrosive materials are present.

The unit has an air-cooled refrigeration system. Air is drawn through front of the unit and discharged through the rear. The unit must be positioned so the air intake and discharge are not impeded. A minimum clearance of 12 inches (30 centimeters) on the front and rear of the unit is necessary for adequate ventilation. Inadequate ventilation will cause a reduction in cooling capacity and, in extreme cases, compressor failure.

Excessively dusty areas should be avoided and a periodic cleaning schedule should be instituted (see Section VI, Cleaning).

The unit will retain its full rated capacity in ambient temperatures to approximately +75°F (+24°C). Above +75°F, reduce the cooling capacity 1% for every 1°F above +75°F, to a maximum ambient temperature of +95°F. In °C, reduce the cooling capacity 1% for every 0.5°C above +24°C, to a maximum ambient temperature of +35°C.

Electrical Requirements

The unit construction provides extra protection against the risk of electrical shock by grounding appropriate metal parts. The extra protection may not function unless the power cord in connected to a properly grounded outlet. It is the user's responsibility to assure a proper ground connection is provided.

Refer to the serial number label on the rear of the unit to identify the specific electrical requirements of your unit.

Make sure the voltage of the power source meets the specified voltage, ±10%.

Fluids

Never use flammable or corrosive fluids with this unit.

A non-freezing fluid is required.

The selected fluid must have a viscosity of 50 centistokes or less at the lowest operating temperature.

Filling Requirements

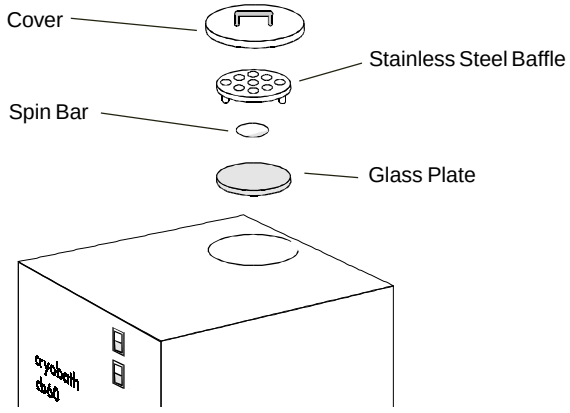
Fill the bath to within 1 inch of the top.

Bath Parts

The bath parts are the glass plate, spin bar, and stainless steel baffle that are included with the unit. The installation of the bath parts is necessary for proper operation.

Place the glass plate in the bottom of the bath. The glass plate prevents the spin bar from wearing a hole in the bottom of the bath.

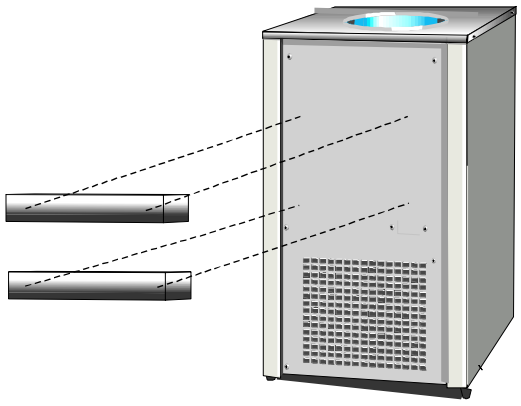
Set the spin bar on the glass plate and the stainless steel baffle over the spin bar and coils. The feet of the baffle should rest on the bottom of the bath.



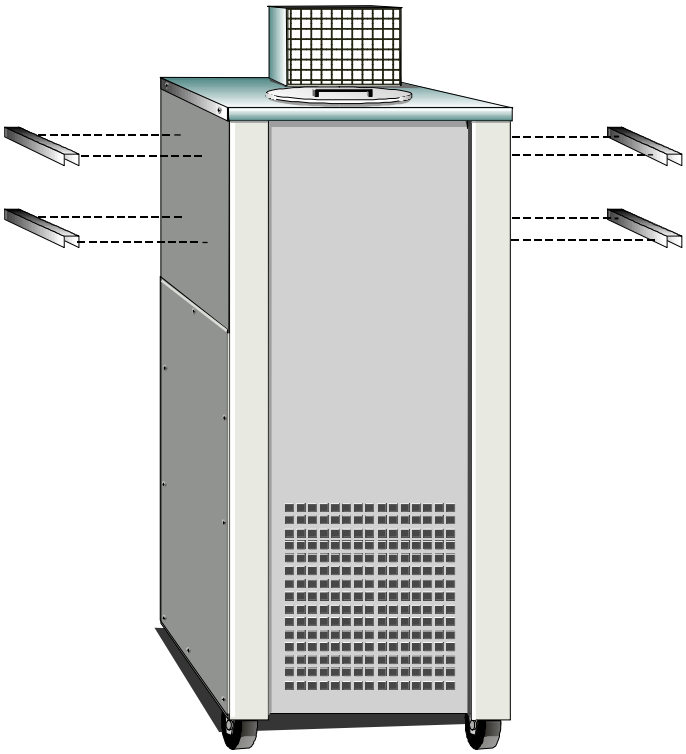
Replacement bath parts are available from Thermo NESLAB. Contact our Sales Department for more information (see Preface, After-Sale Support).

Mounting Brackets

The unit is equipped with two stainless steel mounting brackets (not installed) that are designed to allow auxiliary equipment to be mounted on the unit. Installation of the mounting brackets is optional.



CB-60



CB-80

Locate the four screws on the unit. The CB-60 screws are on the rear of the unit, for the CB-80 they are on the sides. Remove the screws. Align the holes in the brackets with the screw holes in the unit. Secure the brackets using the original screws.

Section IV Operation

Start Up

Before starting the unit, double check all electrical connections and make sure the bath has been properly filled with cooling fluid.

All the functions of the unit are governed by front panel controls. The upper COOLING ON/OFF switch controls power to the refrigeration system and the Cryotrol receptacle. To start the unit, place the COOLING ON/OFF switch in the ON position. The green light behind the switch will light.

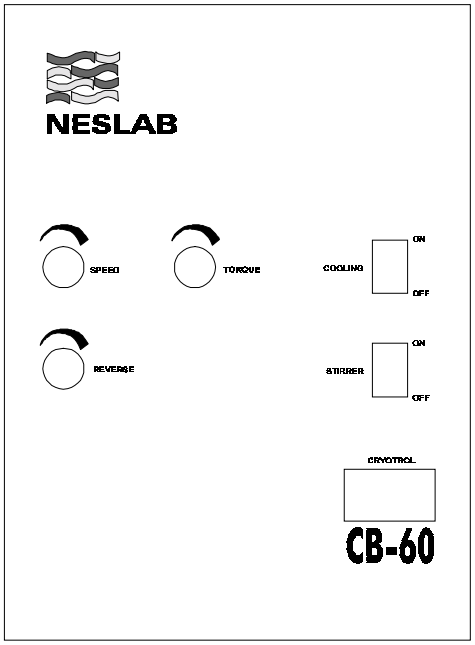
Once the unit is on, the refrigeration system will reduce the temperature of the cooling fluid to the lowest achievable temperature under the existing heat load conditions.

When the unit is shut off, wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur.

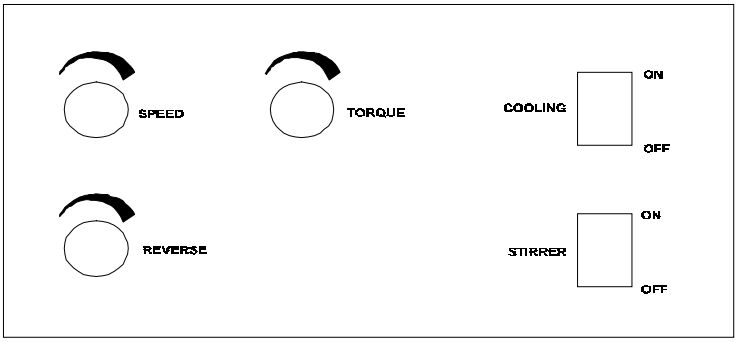
Temperature Adjustment

If temperature control is desired, a Cryotrol Temperature Controller is required. Refer to the Cryotrol Temperature Controller Instruction and Operation Manual for installation and operation instructions.

The CB-60/CB-80 is designed for continuous low temperature operation. Do not operate either unit above -25°C.



CB-60



CB-80

Stirring

The lower switch, labelled STIRRER ON OFF, controls power to the stirring mechanism in the unit. Power to the stirring mechanism is independent from the COOLING ON OFF switch; the stirrer can operate if the COOLING ON OFF switch is in the OFF position.

The knob labelled SPEED controls the speed of the stirring mechanism. The speed is adjustable from 0 to 1000 RPM. Turn the knob clockwise to increase the speed.

The knob labelled TORQUE controls the power of the stirring mechanism. Turn the knob clockwise to increase the power. Adjustments to the power may be required to maintain proper stirring in the bath as the cooling fluid becomes more viscous.

NOTE: The heat input in the bath increases as the torque increases. To ensure maximum cooling capacity, use the minimum power (torque) needed to maintain adequate stirring.

The knob labelled REVERSE, controls the period of the reversing feature of the stirring mechanism. The reversing feature automatically reverses the direction of stirring to minimize vortexing in the bath. Turn the knob fully counterclockwise to disable the reversing feature. Turn the knob clockwise to decrease the period of reversing and increase the speed (RPM).

Section V Maintenance and Service

Service Contracts

Thermo NESLAB offers on-site Service Contracts that are designed to provide extended life and minimal down-time for your unit. For more information, contact our Service Department (see Preface, After-sale Support).

Always turn the unit off and disconnect the line cord from the power source before performing any service or maintenance procedures.

Cleaning

Condenser

The unit pulls substantial amounts of air through a finned condenser. A build up of dust or debris on the fins of the heat exchanger will cause a reduction in cooling capacity, and, in extreme cases, compressor failure.

Periodic vacuuming of the heat exchanger is necessary. The frequency of cleaning depends on the operating environment. We recommend making a monthly visual inspection of the heat exchanger after initial installation. After several months, the cleaning frequency will be established.

Bath

Periodically clean the case and stainless steel bath using a mild soapy solution. Do not use steel wool; it is too abrasive and can initiate rusting. Dry the bath using a soft cloth.

Cooling Fluid

The cooling fluid should be replaced periodically when operating at low temperatures. The concentration of water in the cooling fluid will increase over time, causing a reduction in cooling capacity.

Refer to Section III, Filling Requirements for cooling fluid replacement instructions.

Section VI Troubleshooting

Checklist

Unit will not start.
Check power source. Refer to the serial number label on the rear of the unit for the specific electrical requirements of your unit. Make sure the voltage of the power source meets the specified voltage, ±10% (see Section III, Electrical Requirements).

Unit will not cool.
Make sure the unit has adequate ventilation. Air is drawn through the front of the unit and discharged through the rear. The unit must be positioned so the intake and discharge are not impeded. A minimum clearance of 12 inches (30 centimeters) on the front and rear of the unit is necessary for adequate ventilation. Inadequate ventilation will cause a reduction in cooling capacity, and, in extreme cases, compressor failure (see Section III, Site; Section V, Cleaning).

When the unit is shut off, wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur (see Section IV, Operation).

Check for ice build up in the bath. If ice has accumulated, replace the cooling fluid (see Section V, Cleaning).

Spin bar does not operate.
Contact Thermo NESLAB service department.

Service Assistance

If, after following these troubleshooting steps, your units fails to operate properly, contact our Service Department for assistance (see Preface, After-sale Support). Before calling, please obtain the following information:

Part number
Serial number
Voltage of unit
Voltage of power source
Ambient temperature where unit is located

Technical Support

Our Service Department can provide you with a wiring diagram and complete list of spare parts for your unit (see Preface, After-sale Support). Before calling, please obtain the following information:

Part number
Serial number

WARRANTY

Thermo NESLAB Instruments, Inc. warrants for 12 months from date of shipment any Thermo NESLAB unit according to the following terms.

Any part of the unit manufactured or supplied by Thermo NESLAB and found in the reasonable judgment of Thermo NESLAB to be defective in material or workmanship will be repaired at an authorized Thermo NESLAB Repair Depot without charge for parts or labor. The unit, including any defective part must be returned to an authorized Thermo NESLAB Repair Depot within the warranty period. The expense of returning the unit to the authorized Thermo NESLAB Repair Depot for warranty service will be paid for by the buyer. Thermo NESLAB's responsibility in respect to warranty claims is limited to performing the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or recision of the contract of sales of any unit.With respect to units that qualify for field service repairs, Thermo NESLAB's responsibility is limited to the component parts necessary for the repair and the labor that is required on site to perform the repair. Any travel labor or mileage charges are the financial responsibility of the buyer.

The buyer shall be responsible for any evaluation or warranty service call (including labor charges) if no defects are found with the Thermo NESLAB product.

This warranty does not cover any unit that has been subject to misuse, neglect, or accident. This warranty does not apply to any damage to the unit that is the result of improper installation or maintenance, or to any unit that has been operated or maintained in any way contrary to the operating or maintenance instructions specified in Thermo NESLAB's Instruction and Operation Manual. This warranty does not cover any unit that has been altered or modified so as to change its intended use.

In addition, this warranty does not extend to repairs made by the use of parts, accessories, or fluids which are either incompatible with the unit or adversely affect its operation, performance, or durability.

Thermo NESLAB reserves the right to change or improve the design of any unit without assuming any obligation to modify any unit previously manufactured.

THE FOREGOING EXPRESS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Thermo NESLAB'S OBLIGATION UNDER THIS WARRANTY IS STRICTLY AND EXCLUSIVELY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE COMPONENT PARTS AND Thermo NESLAB DOES NOT ASSUME OR AUTHORIZE ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION.

Thermo NESLAB ASSUMES NO RESPONSIBILITY FOR INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO LOSS OR DAMAGE TO PROPERTY, LOSS OF PROFITS OR REVENUE, LOSS OF THE UNIT, LOSS OF TIME, OR INCONVENIENCE.

This warranty applies to units sold in the United States. Any units sold elsewhere are warranted by the affiliated marketing company of Thermo NESLAB Instruments, Inc. This warranty and all matters arising pursuant to it shall be governed by the law of the State of New Hampshire, United States. All legal actions brought in relation hereto shall be filed in the appropriate state or federal courts in New Hampshire, unless waived by Thermo NESLAB.