

CRYO -DLM

DUAL LEVEL MONITOR

SET-UP AND TECHNICAL MANUAL



* Includes information pertaining exclusively to the Cryo-DLM Dual Level Monitor, with the CryoSystem 4000 Series Vessel

Custom
BioGenic
Systems

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Leading the World with Innovative Cryopreservation Technology Solutions

- TABLE OF CONTENTS -

TESTING, PRODUCT WARRANTY - PAGE 1

SAFETY - PAGE 2, 3

FRONT PANEL CONTROL IDENTIFICATION - PAGE 4

LID TEMPERATURE MONITOR - PAGE 5

BACK PANEL POWER CONNECTION - PAGE 5

SET-UP AND OPERATION - PAGE 5

UNDERSTANDING SENSOR PROBE LEVELS - PAGE 6

FILL INSTRUCTIONS - PAGE 7

UNIT PARAMETERS - PAGE 8

TROUBLESHOOTING - PAGE 8

PARTS AND ACCESSORIES - PAGE 9

- IMPORTANT INFORMATION -

We at Custom BioGenic Systems are proud of our work, and appreciate your purchase of this product. With proper care, this equipment will be trouble-free for many years to come. Before setting up and using your new cryogenic system, first check to see that all parts are accounted for and that no damage has occurred during shipping. Also, read this manual completely before proceeding to set-up. If at any time you are unsure of the procedures for set-up and use of this product, please contact CBS or your CBS representative.

- TESTING UNIT PRIOR TO USE -

Although every unit tested it is recommended that dewars be tested again to ensure the viability and safety of stored media. Simply follow these steps before putting unit into service:

1. Unpack, open lid and remove foam plug
2. Fill unit to approximately 1/3 full (see instructions on page 6)
3. Remove foam plug and allow to stand for 24 hours
4. Measure the depth of the Liquid Nitrogen and make a note of this depth
5. Let unit stand for another 24 hours
6. Measure the depth a second time and make a note of this depth
7. The depth should go down no more than approximately 1/4" (6 mm) in 24 hours (the 4000 series vessel holds 5 liters for each inch of depth).

During this initial testing watch for signs of excess frosting or sweating on outside of dewar. Also take note of excess nitrogen boil off especially after the second weigh-in. Nitrogen should settle down (cease boiling) after an hour.

PRODUCT WARRANTY

Custom BioGenic Systems warrants all manufactured cryogenic equipment to be free from defects in workmanship and materials for a period of one year.

Custom BioGenic Systems' liabilities under the warranty shall be limited to correcting or replacing the defective workmanship or materials. A claimant under the warranty must notify Custom BioGenic Systems within ten (10) days after discovery of the defect and immediately discontinue use of the defective equipment.

Custom BioGenic Systems reserves the right, at their discretion, to correct the defect(s) in the field without return shipment to Romeo, Michigan.

This warranty does not cover defects on cryogenic equipment resulting from abusive handling and subsequent failure.

Serial Number _____

Model number _____

For Technical Assistance Call: 1.800.523.0072 (U.S. Only)

Phone: 586.331.2600 Fax: 586.331.2588

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IMPORTANT!

The following section on LIQUID NITROGEN SAFETY should be read carefully and followed completely, but is by no means a complete volume on the use of cryogenic liquids. All personnel should have a complete knowledge of the correct procedures, as well as the hazards of working with liquid nitrogen. Failure to do so could result in serious injury or death.

WARNING

LIQUEFIED GASES ARE EXTREMELY COLD LIQUIDS. LIQUID NITROGEN EXISTS AT -196°C. BECAUSE OF THESE TEMPERATURES, LIQUEFIED GASES WILL “BURN” IF THEY COME INTO CONTACT WITH SKIN. NEVER ALLOW DIRECT SKIN CONTACT WITH LIQUID NITROGEN OR SERIOUS BURNS WILL RESULT.

ALTHOUGH LIQUID NITROGEN ITSELF IS NON-TOXIC, WHEN RELEASED IN TO A CONFINED SPACE IT CAN DISPLACE OXYGEN CAUSING ASPHYXIATION. ENTERING AN OXYGEN DEFICIENT ROOM CAN CAUSE UNCONSCIOUSNESS WITHOUT WARNING. ALWAYS CHECK AIR QUALITY UPON ENTERING A ROOM WHERE CRYOGENIC LIQUIDS ARE BEING USED AND IF POSSIBLE, HAVE A RESPIRATOR AVAILABLE.

INTRODUCING EQUIPMENT WHICH IS AT ROOM TEMPERATURE INTO LIQUID NITROGEN IS ALWAYS SOMEWHAT HAZARDOUS. BEWARE OF SPLASHING AND “BOILING” WHICH MAY OCCUR. ALL PERSONNEL PERFORMING THESE OPERATIONS SHOULD BE FULLY INFORMED OF PROPER HANDLING PROCEDURES AND SHOULD ALWAYS WEAR A FACE SHIELD AND PROTECTIVE CLOTHING.

LIQUEFIED GASES SHOULD NEVER BE USED IN COMBINATION WITH OTHER SUBSTANCES WITHOUT KNOWING WHAT THE RESULT WILL BE. WHEN IN DOUBT, CONTACT A COMPETENT AUTHORITY.

HANDLING

Personnel handling liquefied gases should be thoroughly instructed as to the nature of these materials. Proper training is essential to safety and will ensure the accident-free use of this equipment.

Because of their low temperatures, liquefied gases will burn the skin much the same way as hot liquids can. For this reason, always wear the proper protective clothing when handling these materials. It is advised that during use, handlers of liquid nitrogen should protect themselves by wearing goggles or face shields, heavy rubber gloves large enough to allow quick removal and a heavy rubber apron. It is preferable that shoes worn at these times have high tops as to not permit accidentally spilled liquid from entering as well as pant legs which come down over the tops of shoes for further protection.

Also because of the extremely low temperatures, liquid nitrogen should only be handled and transported in approved containers. Many materials become brittle and may shatter when put into contact with liquid nitrogen and other cryogenic liquids.

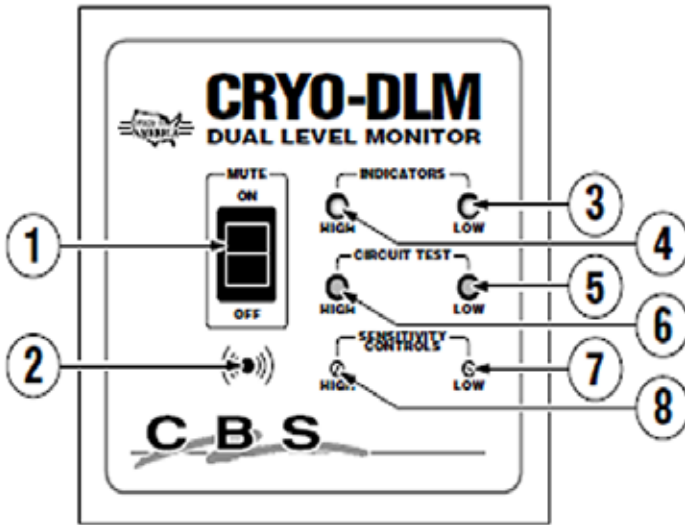
FIRST AID

In the event a person is burned by liquefied gas, the following first aid treatment should be given while awaiting the arrival of medics or a doctor:

1. If the material has contacted skin or eyes, flood those areas with large quantities of unheated water and protect frozen areas with loose, bulky, dry and sterile dressings.
2. If the skin is blistered or there is a chance that the eyes have been affected, seek medical help immediately.

- FRONT PANEL CONTROL IDENTIFICATION -

CRYO-DLM Front Panel



- 1. "MUTE" Switch**
Enables and disables audible LOW LEVEL INDICATOR HORN (#2).
- 2. LOW Level Indicator Horn**
Gives audible alert when liquid level reaches low level set-point. May be muted by setting "MUTE" Switch (#1) to the ON position.
- 3. "LOW" Indicator Light**
Signals that the programmed LOW liquid level has been reached.
- 4. "HIGH" Indicator Light**
Signals that the programmed HIGH liquid level has been reached.
- 5. "LOW" Test Switch**
Use this switch to test the LOW Indicator circuit integrity.
- 6. "HIGH" Test Switch**
Use this switch to test the HIGH Indicator circuit integrity.
- 7. "LOW" Sensitivity Control**
Use this adjustment to set the sensitivity level of the LOW indicator circuitry.
- 8. "HIGH" Sensitivity Control**
Use this adjustment to set the sensitivity level of the HIGH indicator circuitry.

- LID TEMPERATURE MONITOR -

The Cryo-DLM has a built-in Temperature Monitor which displays the temperature inside the vessel. The temperature is shown in degrees **celsius**.

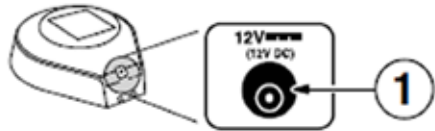
NOTE: DO NOT TOUCH adjustment buttons on the Temperature Monitor or the factory settings may be changed requiring service.



- BACK PANEL POWER CONNECTION -

The Cryo-DLM Back Panel Connection is found on the backside of the hinged lid, just beyond the top edge of the front panel located on the lid top.

1. 12 Volts --- (Volts DC) Power Connection
The power adapter for the units plugs in here.



- SET-UP AND OPERATION -

After following the test procedure outlined at the beginning of this manual, the unit is ready for set-up and operation. Use the following steps to properly set the unit up.

1. Sensor probe settings are pre-set at the factory. For more information about the pre-set levels see "Understanding Sensor probe Levels" pg 5.
2. Connect the 12 Volt DC power plug to it's socket on the back panel, then plug power cord into an appropriate power source and power up.
3. At this point the unit can be filled with liquid nitrogen to the desired level. Follow the special Cryo-DLM filling instructions on page 6.
4. Push the HIGH and LOW CIRCUIT TEST buttons to test the system integrity. Also test the MUTE switch and become familiar with the sound of audible alarm.
5. Double check set-up including all connections to ensure accurate trouble-free operation.

A special feature of the Cryo-DLM is the **Circuitry Voltage Supply Backup**. This feature allows for 3-4 hours of level monitoring without being connected to a power source.

NOTE: This feature is active only after six hours of continuous connection to an active power source.

- UNDERSTANDING SENSOR PROBE LEVELS -

This section describes how the sensor probes are set-up to give a high level alert (when filling), and a low level alert (when in use). The probe levels are pre-set at the factory at specific locations shown in figure C. below. If there is a need to change these pre-set levels or if probe replacement becomes necessary, contact a responsible party for further instruction. Do not attempt to make adjustments without proper knowledge of the procedure.

The following dimensions and diagrams are provided to help the users of this equipment understand the function of the probe level settings.

Note: This unit has three sensor probes, each with unique wire colors to identify them from one another. The HIGH level sensor has blue wiring, the LOW level sensor has red wiring; and the TEMPERATURE sensor has brown wiring.

FIGURE C.

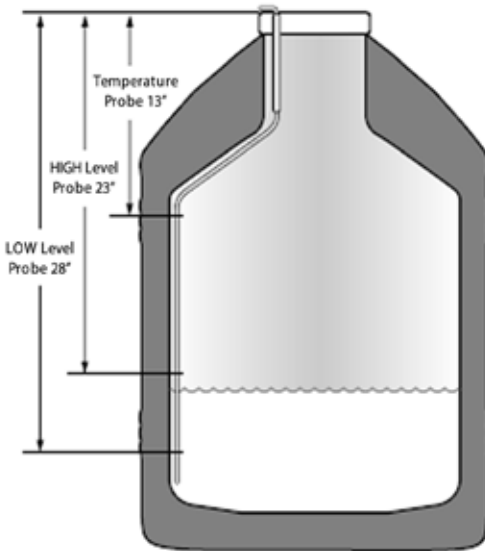
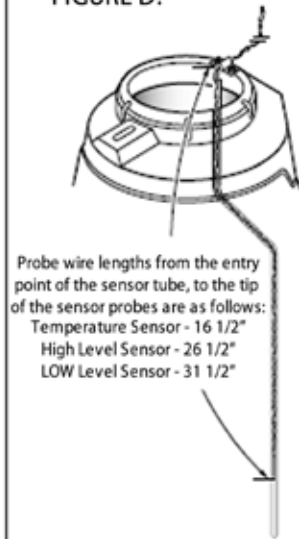


FIGURE D.



- CRYO-DLM FILLING INSTRUCTIONS -

Follow these steps for filling the Cryo-DLM:

1. Using the proper equipment as shown in the diagram, connect all the fill hardware to the supply tank.

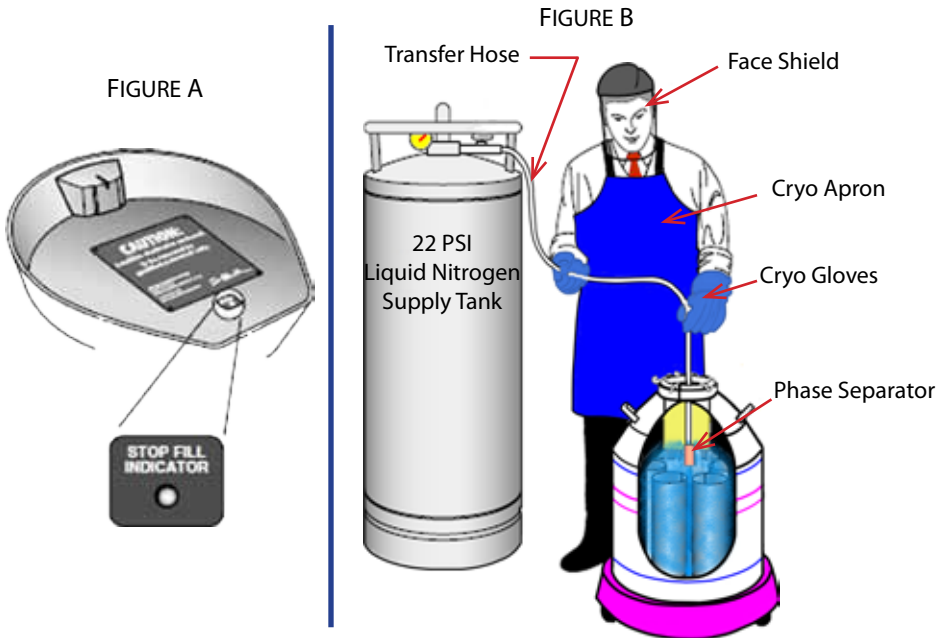
CAUTION:

Always closely follow the instructions on the containers and accessories when transferring liquid nitrogen. See the safety section of this manual on page 2 & 3 for important information on the dangers of proper first aid for liquid nitrogen accidents.

2. User should dress in the appropriate safety gear.
3. Place Phase Separator into neck opening and hold in place while opening supply valve with the free hand.

The Cryo-DLM has a “Stop Fill Indicator” light mounted on the underside of the lid which lights up when the vessel has been filled to capacity. This indicator works in conjunction with the HIGH Indicator on the main control panel, but remains visible when the lid is opened for filling and the main panel is out of view of the user (see figure below).

Note: In figure B, the lid is removed to show the fill process more clearly.



- UNIT PARAMETERS BY MODEL -

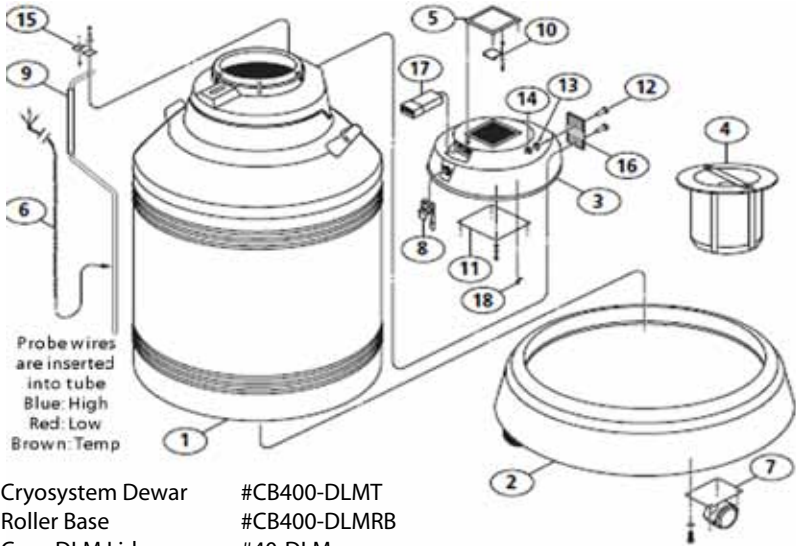
Use this section to become familiar with capacities, dimensions and normal liquid nitrogen use of your specific model.

MODEL	Cryosystem 4000	Electronic Specs
Storage Capacities Number of racks Boxes per rack Total vial capacity	4 10 4000	Power requirements 120/220 V ~ (volts AC) 12 V ---- internal (Volts DC)
Liquid Nitrogen Usage & Capacities Liquid Nitrogen capacity (liters) Static evaporation rate (liters/day) Working volume (liters) Normal working days	121 .99 111 70	
Dimensions Neck opening (inches/cm) Overall height (inches/cm) With Roller Base add 3.5 inches (8.9 cm) Outside diameter (inches/cm)	8.5 (21.6) 40.5 (102.9) 22 (55.9)	

- TROUBLESHOOTING -

CONDITION	CAUSE	SOLUTION
<ul style="list-style-type: none"> ♦ LOW Indicator light on and audible alert is sounding ♦ LOW Indicator light is on but no audible alert is heard ♦ HIGH Indicator lights are on 	<ul style="list-style-type: none"> ♦ Liquid level has fallen below the low set-point ♦ Audible alert is muted ♦ Liquid level has risen to the high set-point during filling 	<ul style="list-style-type: none"> ♦ Fill the vessel above the low liquid level ♦ Set the MUTE switch (#1, page 3) to the OFF position ♦ Stop filling immediately
<ul style="list-style-type: none"> ♦ No lights when TEST buttons are pushed 	<ul style="list-style-type: none"> ♦ No power to controller ♦ AC power supply not plugged into live source ♦ Power adapter plug not plugged into "12 Volts DC" socket on unit back panel 	<ul style="list-style-type: none"> ♦ Check for live power source ♦ Plug AC adapter into an appropriate power source ♦ Plug power adapter properly into back panel using diagram on page 4

- CRYO-DLM ASSEMBLY AND PARTS LIST -



- | | | |
|---------------------------|---------------|-------------------------|
| 1. Cryosystem Dewar | #CB400-DLMT | |
| 2. Roller Base | #CB400-DLMRB | |
| 3. Cryo-DLM Lid | #40-DLM | |
| 4. Neck Plug | #CB40-DLMNP | |
| 5. Alarm Control Panel | #40-DLMP | 12. Lid Hinge Bolt |
| 6. Sensor Assembly | #40-DLMSP | 13. Lid Hinge Washer |
| 7. Castor Wheel | #40-DLMCW | 14. Lid Hinge Nut |
| 8. Lock Assembly | #40-DLMLA | 15. Probe Holder Clamp |
| 9. Probe Holder Tube | #CB400-DLMPHT | 16. Lid Hinge |
| 10. Printed Circuit Board | #40-DLMCB | 17. Lid temp Monitor |
| 11. Access panel | #40-DLMAP | 18. Stop Fill Indicator |
| | | #40-DLMLHB |
| | | #40-DLMLHW |
| | | #40-DLMLHN |
| | | #40-DLMPHC |
| | | #40-DLMLH |
| | | #40-DLMLTM |
| | | #40-DLMSFI |

- AVAILABLE ACCESSORIES 1-800-523-0072 1-586-331-2600 -



AVAILABLE FROM CBS

Liquid Nitrogen Equipment Including:

Freezers & Dewars
Controlled Rate Freezing Systems
Freezer Racks and Boxes
Transfer Lines
Solenoid Valves
Liquid Level & Temperature Alarms
Liquid Level & Temperature Controls
Temperature Recorders / Monitors
Cryogenic Accessories



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