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Introduction

Your IP-100 Immersion Probe Cooler can be used to achieve low-temperature capability with non-refrigerated circulating baths or boost the cooling capacity of refrigerated circulators. It is also excellent for trapping and Dewar-type applications, making it an economical alternative to dry ice or liquid nitrogen. A 6-ft. (1.83 m) flexible hose allows convenient placement of the cooling probe.

It will take you very little time to get your IP-100 installed and running. This operator’s manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

NOTE: The IP-100 operates at maximum cooling performance. Maximum temperature stability will be achieved in an agitated fluid and with a constant heat load. Allow ample time to reach the lowest achievable temperature.

General Information

General Safety Information

When installed, operated, and maintained according to the directions in this manual and common safety procedures, your IP-100 Immersion Probe Cooler should provide safe and reliable cooling. Please ensure that all individuals involved in the installation, operation, or maintenance of this unit read this manual thoroughly prior to working with the unit.

Read all instructions pertaining to safety, set-up, and operation. Proper operation and maintenance is the user's responsibility.
Safety Recommendations

To prevent injury to personnel and/or damage to property, always follow your workplace’s safety procedures when operating this equipment. You should also comply with the following safety recommendations:

- Always connect the power cord on this unit to a grounded (3-prong) power outlet. Make certain that the outlet is the same voltage and frequency as your unit.
- Never operate the unit with a damaged power cord.
- Always turn the unit OFF and disconnect Mains power before performing any maintenance or service.

- Never touch the immersion probe assembly while the unit is operating.
- Always allow the immersion probe to warm to ambient temperature before repositioning or working on the unit.
- Do not move the immersion probe assembly while the unit is operating.

Unpacking Your IP-100 Immersion Probe Cooler

Your IP-100 was packed in a special carton. You should keep the packaging, along with all packing materials, until the unit has been installed and you are certain it is working properly.

**IMPORTANT:** Remove any loose packing material that may have clung to the base or wand assembly.

**CAUTION:** Keep unit upright when moving. Be sure to follow your company’s procedures and practices regarding the safe lifting and relocation of heavy objects.

In the unlikely event that the unit was damaged or does not operate properly, contact the company where your IP-100 Immersion Probe Cooler was purchased.

Regulatory Compliance & Testing

**CSA UL** (60Hz units)
- CAN/USA C22.2 No 0-M91 — General Requirement Canadian Electrical Code, Part II.
- CAN/USA C22.2 No. 61010-1-04 — Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part I General Requirements.
- UL Std No. 61010-1 — Electrical Requirements for Laboratory Use, Part I: General Requirements.

**CE** (50Hz units)
- EC Low Voltage Directive 2006/95/EC
- IEC 61010-1-2001

**Highly Accelerated Life Test (HALT) and Vibration Tests per ASTM D4169-8** (All units)

Contents
The following items have been included with your IP-100 Immersion Probe Cooler:

- Operator's Manual
- IEC Electrical Cord
- Certificate of Compliance
Controls & Components

**IMPORTANT:** The temperature display is for reference only. The actual temperature of the immersion probe will be colder than the displayed temperature.

- Temperature Display
- Power Key
- Air Filter Compartment
- Rigid Coil Immersion Probe
- Immersion Probe Assembly

- Cold Finger Immersion Probe
- Flexible Immersion Probe

- Identification Label
- Power Switch / Circuit Breaker
- IEC Electrical Connection
### Quick-Start

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Position Immersion Probe</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Connect power. See Identification Label.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Turn main power ON.</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Turn Standby power ON. Allow approximately 10 minutes for the system to begin the cooling process.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Allow approximately 1 hour for system to reach -90°C.</td>
</tr>
</tbody>
</table>

**CAUTION:** Moving Immersion Probe Cooler while unit is operating may result in damage.
Installation & Startup
Your IP-100 Immersion Probe Cooler is designed to be simple to set-up and install. No tools are required.

General Site Requirements
Locate the unit on a level surface, free from drafts and out of direct sunlight. Do not place it where there are corrosive fumes, excessive moisture, high room temperatures, or where excessive dust is present.

The IP-100 must be a minimum of 6 inches / 15.24 cm away from walls or vertical surfaces so that airflow around the unit is not restricted. It should not be placed in cabinets or where exiting warm air or warm air from other devices will be drawn into the air intake on the front of the unit.

![NOTE: It is recommended that your unit be run in ambient temperatures below 95°F / 35°C. While the unit will operate at higher ambient temperatures, it may not be able to achieve maximum cooling performance.]

Positioning the Immersion Probe Assembly
When installing the IP-100, make sure that the Immersion Probe Assembly is properly positioned. It should not be twisted. Incorrect positioning of the Wand Assembly will cause your IP-100 to perform below specifications.

![CAUTION: Moving the Immersion Probe Assembly while the unit is operating may result in damage.]
Electrical Power

**IMPORTANT INFORMATION FOR 100V APPLICATIONS:**
On 100V 50Hz applications a step-up transformer IS NOT NEEDED and MUST NOT be used. 
On 100V 60Hz applications a step-up transformer MUST be used.

**WARNING:** Make certain that the electrical outlet is the same voltage and frequency as your IP-100. The correct voltage and frequency for your unit are indicated on the Identification Label on the back panel.

**IMPORTANT:** The use of an extension cord is not recommended. If one is necessary, it must be properly grounded and capable of handling the total wattage of the unit. The extension cord must not cause more than a 10% drop in voltage to the unit.

Attach the 6-ft / 1.8 m power cord to the IEC electrical connector on the back of the IP-100 and then plug the male connector into the Mains electrical outlet.

Place the Power Switch / Circuit Breaker on the back of the IP-100 in the ON position. Three decimal points will appear on the Temperature Display. This indicates that the unit is in Standby mode.

Your IP-100 is now ready to begin normal operation.

**Normal Operation**

**Turning Your IP-100 ON**

Press the Power Key on the front panel. After a brief initialization message, the probe temperature will appear on the Temperature Display and the first stage compressor and fan will turn on to begin the cooling process.

During this start-up phase, the displayed temperature will remain near or at ambient temperature.

After approximately 10 minutes, the second stage compressor will turn on, refrigerant will begin circulating through the system, and the displayed temperature will begin decreasing. It generally takes approximately 60 minutes from power up for the IP-100 to reach -90°C.

**NOTE:** The IP-100 operates at maximum cooling performance.

**IMPORTANT:** To protect the IP-100’s compressors from damage, the unit incorporates a special safety switch that delays compressor startup for 10 minutes whenever power is applied. This 10 minute delay will occur even when power is only momentarily disrupted.
Main Operational Display

The actual temperature of the IP-100’s immersion probe is displayed in degrees C on the unit’s digital readout. Due to the location of the temperature sensor, this temperature is a few degrees warmer than the surface temperature of the immersion probe.

Display Messages

<table>
<thead>
<tr>
<th>Temperature Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><strong>Standby Mode</strong> — Indicates that the Power Switch / Circuit Breaker on the back panel is in the ON position and unit is ready to operate.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td><strong>Power On / Start-Up</strong> — Appears briefly when IP-100 is turned ON by pressing the Power Key on the front panel. The information represents the firmware version.</td>
</tr>
</tbody>
</table>
| ![Image](image3.png) | **Main Operational Display** — Indicates IP-100 is ON and operating. Displayed temperature is in degrees C.  
   Note: Displayed temperature is to one tenth of a degree (X..X) until it reaches -10°. |
| ![Image](image4.png) | **Warning Display** — Indicates that the external temperature sensor is not functioning properly. Unit will continue to cool. |

Loss of Power Restart

In the event that electrical power is disrupted during operation, the unit will begin operating automatically when power is restored. As with normal start-up, it will take approximately 60 minutes for the unit to reach -90°C.
Routine Maintenance & Troubleshooting

Cleaning Exterior Surfaces
Only mild detergents and water or an approved cleaner should be used on the painted surfaces of the IP-100. Do not allow cleaning liquids or sprays to come in direct contact with the digital display.

Cleaning the Air Filter
To keep the refrigeration system operating at optimum cooling capacity, the front and back air vents and reusable filter should be kept free of dust and dirt. They should be checked on a scheduled basis and cleaned as required.

The reusable filter is easily accessed by simply sliding it out of the side of the front grill. Use a mild detergent and water solution to wash off any accumulated dust and dirt and then rinse and dry thoroughly before reinstalling.

Draining Residual Oil from the Immersion Probe Assembly
A thin film of oil may build up within the Immersion Probe Assembly with extended use and adversely affect the IP-100’s cooling efficiency. To ensure maximum cooling performance, we recommend that this oil be drained from the Immersion Probe Assembly after every 200 hours of use or whenever you see a drop in cooling performance.

1. Place the IP-100 in the Standby mode by pressing the Power Key on the front panel.
2. Elevate the Immersion Probe Assembly as high as possible above the IP-100’s enclosure for 10 to 15 minutes to allow residual oil to drain back into the compressor. Do not allow the assembly to twist or dip as oil may pool internally in these areas.

| CAUTION: Moving Immersion Probe Assembly while unit is operating may result in damage. |
| IMPORTANT: Should you experience frequent drops in cooling performance due to the accumulation of oil in the Immersion Probe Assembly, verify that it is properly installed, without any twists. See Positioning the Immersion Probe Assembly under Installation & Startup. |
## Troubleshooting

**CAUTION:** Always turn the Power Switch / Circuit Breaker OFF and disconnect the electrical cord from the power source before servicing the unit.

<table>
<thead>
<tr>
<th>Problem Description</th>
<th>Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit does not run (Temperature Display is blank)</td>
<td>No power to unit</td>
<td>Check that electrical cord is secure and plugged into an operating electrical outlet. Place Power Switch / Circuit Breaker in ON position.</td>
</tr>
<tr>
<td>Unit does not run (Power Switch / Circuit Breaker in OFF position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit does not run (Unit in Standby mode)</td>
<td></td>
<td>Press Power Key on front panel.</td>
</tr>
<tr>
<td>Unit does not run (Temperature Display reading increasing or at ambient)</td>
<td>Compressor overload switch has tripped</td>
<td>Allow approximately 10 minutes for unit to restart. Check air filter and air vents for blockages. Check that airflow around unit is not restricted and that room temperatures does not exceed 95°F / 35°C. Check compressor fan for operation (listen for fan noise, check for airflow through unit).</td>
</tr>
<tr>
<td>No or insufficient cooling</td>
<td>Blocked air flow</td>
<td>Check air filter and air vents for blockages.</td>
</tr>
<tr>
<td></td>
<td>High ambient temperature</td>
<td>Check that airflow around unit is not restricted and that room temperatures does not exceed 95°F / 35°C.</td>
</tr>
<tr>
<td></td>
<td>Oil in Immersion Probe Assembly</td>
<td>Drain oil from Immersion Probe Assembly.</td>
</tr>
<tr>
<td></td>
<td>Improper line voltage and/or frequency</td>
<td>Verify that Mains voltage during start cycle is within 10% of rated voltage.</td>
</tr>
<tr>
<td>Gradual loss of cooling</td>
<td>Blocked air flow</td>
<td>Check air filter and air vents for blockages.</td>
</tr>
<tr>
<td></td>
<td>High ambient temperature</td>
<td>Check that airflow around unit is not restricted and that room temperatures does not exceed 95°F / 35°C.</td>
</tr>
<tr>
<td></td>
<td>Oil in Immersion Probe Assembly</td>
<td>Drain oil from Immersion Probe Assembly.</td>
</tr>
<tr>
<td>Compressor shakes, stalls, or continually restarts</td>
<td>Compressor cycling or overloaded</td>
<td>Check air filter and air vents for blockages. Check that airflow around unit is not restricted and that room temperatures does not exceed 95°F / 35°C. Verify that Mains voltage during start cycle is within 10% of rated voltage. Check compressor fan for operation (listen for fan noise, check for airflow through unit).</td>
</tr>
</tbody>
</table>
Technical Information

Performance Specifications

Temperature Set Point: -100°C (non-adjustable)

Readout Accuracy: ±1.0°C

Compressors: Two nominal ½ HP low back pressure reciprocating compressors

Cooling Probe Assembly: 6 ft. / 1.83 m flexible hose

Cooling Probe:
- Rigid Coil: 3 in. / 76.2 cm diameter; 8.75 in. / 22.2 cm length
- Cold Finger: 0.75 in. / 1.91 cm diameter; 3.75 in. / 9.53 cm length
- Flexible: 0.625 in. / 1.59 cm diameter; 15 in. / 38.1 cm length

Dimensions (H x W x D): 21 x 15 x 20.125 in. / 53.34 x 38.1 x 51.12 cm

Electrical Requirements:
- 120V, 60Hz, 11.5A
- 240V, 50Hz, 7.5A
- 100V, 50Hz, 11.5A
- 100V, 60Hz, 11.5A (step-up transformer required)

Environmental Conditions:
- For indoor use only
- Maximum altitude: 6562 ft. / 2000 m
- Relative humidity: 80% for temperatures up to 95°F / 35°C
- Over voltage: ±10%
- Nominal ambient: 68°F / 20°C
- Maximum recommended operating ambient: 95°F / 35°C
- Installation Category II
- Pollution Degree 2

IMPORTANT INFORMATION FOR 100V APPLICATIONS:
- On 100V 50Hz applications a step-up transformer IS NOT NEEDED and MUST NOT be used.
- On 100V 60Hz applications a step-up transformer MUST be used.
Equipment Disposal (WEEE Directive)

This equipment is marked with the crossed out wheeled bin symbol to indicate it is covered by the Waste Electrical and Electronic Equipment (WEEE) Directive and is not to be disposed of as unsorted municipal waste. **Any products marked with this symbol must be collected separately, according to the regulatory guidelines in your area.**

It is your responsibility to correctly dispose of this equipment at lifecycle-end by handing it over to an authorized facility for separate collection and recycling. It is also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect the persons involved in the disposal and recycling of the equipment from health hazards. By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Requirements for waste collection, reuse, recycling, and recovery programs vary by regulatory authority at your location. Contact your local responsible body (e.g., your laboratory manager) or authorized representative for information regarding applicable disposal regulations.

Service & Technical Support

If you have followed the troubleshooting steps and your IP-100 Immersion Probe Cooler fails to operate properly, contact the distributor or manufacturer from whom the unit was purchased. Have the following information available for the customer service person.

- Model, Serial Number, and Voltage (from back panel)
- Date of purchase and your purchase order number
- Suppliers’ order number or invoice number
- A summary of your problem
Warranty

The manufacturer's warranty is one year for parts and labor and two years for parts. Please contact your supplier for additional warranty details and service contract information.

The manufacturer agrees to correct for the original user of this product, either by repair, or at the manufacturer's election, by replacement, any defect that develops after delivery of this product for the warranty period(s) stated above. In the event of replacement, the replacement unit will be warranted for 90 days or warranted for the remainder of the original unit's parts or labor warranty period, whichever is longer. If a replacement unit is sent, the defective unit must be returned to the manufacturer within 30 days of receipt of the replacement unit. If the defective unit is not received within 30 days, the manufacturer reserves the right to bill for the replacement unit.

If this product requires service, contact the manufacturer/supplier's office for instructions. If return of the product is necessary, a return authorization number will be assigned and the product should be shipped, (transportation charges pre-paid), to the indicated service center. To insure prompt handling, the return authorization number should be placed on the outside of the package and a detailed explanation of the defect enclosed with the item.

This warranty shall not apply if the defect or malfunction was caused by accident, neglect, unreasonable use, improper service, or other causes not arising out of defects in material or workmanship. There are no warranties, expressed or implied, including, but not limited to, those of merchantability or fitness for a particular purpose which extends beyond the description and period set forth herein.

The manufacturer's sole obligation under this warranty is limited to the repair or replacement of a defective product and shall not, in any event, be liable for any incidental or consequential damages of any kind resulting from use or possession of this product. Some states do not allow: (A) limitations on how long an implied warranty lasts; or (B) the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights. You may have other rights that vary from state to state.

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