Operator Manual
Immersion Cooler

110-263
11/06/08

Table of Contents

This symbol marks chapters and sections of this instruction manual that are particularly relevant to safety. When attached to the unit, this symbol draws attention to the relevant section of the instruction manual

Section 1 – General Information

1.1 Warranty

Thank you for purchasing this Immersion Cooler. We are confident it will serve you for a long time. Our warranty to you is as follows:

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 within the period as stated on the warranty card. 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.

1.2 Unpacking

Your immersion cooler is shipped in a special carton. Retain the carton and all packing materials until the unit is completely installed and working properly. Set up and run the unit immediately to confirm proper operation. Beyond one week, your unit may be warranty repaired, but not replaced. If the unit is damaged or does not operate properly, contact the transportation company, file a damage claim and contact the company where your unit was purchased immediately.
Remove any loose packing material that may have fallen into the reservoir during shipping. Before powering up, check that nothing remains around the immersion probe.

1.3 Package Contents

- Cooler Unit
- Operators Manual
- Warranty Card

1.4 General Description

Immersion Coolers with control provide convenient cooling and reduce the need for dry ice or liquid nitrogen in Dewar flasks. Maximum temperature stability will be achieved in an agitated fluid and a constant heat load. Allow ample time to reach the desired set point temperature. Actual stability will vary with each application. Immersion Coolers have a flexible hose connected to an immersible probe. The probe acts as the evaporator in the refrigeration cycle and is normally immersed in a Dewar flask or cold trap.

1.5 Specifications

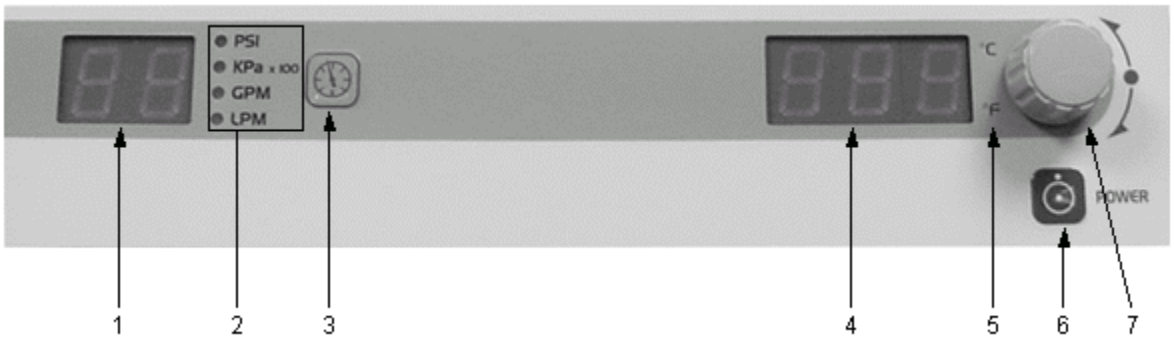
Power Requirements	120V, 60Hz,12A 240V, 50Hz, 6A
Default set point (adjustable only on controlled units)	-90.0ºC
Setpoint range (Controlled units only)	-40.0°C ~ -100°C
Readout Accuracy	±0.1°C
Cooling probe dimensions **(Probe type)** Cold Finger Flexible 3" rigid coil	5 ft (1.52 m) flexible hose with: 12" (30.48cm) L x .75" (1.91cm) O.D. 15" (38.1cm) L x .625" (1.59cm) O.D. 9" (22.86cm) L x 3" (7.62cm) dia
Overall Dim. In. (h x w x d) cm	21 x 15 x 20.125 53.34 x 38.10 x 51.12

Environmental conditions:

Indoor Use Only
Maximum Altitude: 2000 meters
Relative Humiditiy: 80% for temperatures to 30°C

Over Voltage: +/- 10%
Nominal Ambient: 20ºC
Max. Operating Ambient: 40ºC

Section 2 – Controller



Controller

1. Temperature Unit Display (ºC)
2. Not Used
3. Used to enable calibration on controlled units only.
4. Temperature Display
5. ºF Not Used
6. Power Button
7. Encoder

Section 3 – Operation

3.1 Safety Overload Warning

The compressors used are equipped with an internal safety overload switch. If the unit is turned off, sufficient time must be allowed for internal pressure and temperatures to stabilize before the unit is turned on again. **The time off before restarting should not be less than 10 minutes.** If the unit is turned on too quickly, the compressor may not start and the unit will not operate. If this happens, turn the unit off again and wait 10 minutes before restarting.

3.2 Immersion Cooler Location

Locate the Immersion Cooler 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.
Immersion Coolers must be a minimum of six inches (152.4mm) away from walls or vertical surfaces so airflow around the unit is not restricted.

3.3 Power and Startup

Before proceeding, be sure the circuit breaker on the back of the controller is in the OFF position.

Plug the unit into a properly wired, grounded outlet with the same voltage and frequency indicated on the identification label on the back of the unit. Use of an extension cord is not recommended. If necessary, use a cord that is properly grounded and will handle the total wattage of the unit. The extension cord must not cause more than a 10% voltage drop to the Cooler. Setting the circuit breaker to the ON position will cause the unit to begin cooling. Press the power button to stop cooling and place the unit in standby mode. Depress the power button again to resume cooling.

3.4 Setting Set-Point – Controlled models only

With unit powered on, press and release the encoder knob. The decimal point will flash. Rotate encoder clockwise until desired set point is displayed. Depress encoder again to accept the setting. Set point can be adjusted between -40ºC to -100ºC.

3.5 Enabling/Disabling the Local Lockout - Controlled models only

This feature is used to prevent unauthorized or accidental changes to set point and other operational values. To enable the local lockout, press and hold the Set/Select Knob until LLO is displayed (approximately 10 seconds). Once enabled, LLO will appear momentarily when the Set/Select Knob is pressed to display the set point. To disable the local lockout, press and hold the Set/Select Knob until CAn is displayed (approximately 10 seconds).

3.6 Controller Display Messages – Controlled models only

Left Display	Right Display	Description	Action Required
..	...	Standby mode	Normal — Indicates that the Circuit Breaker/Power Switch is ON and the Controller Power Switch is OFF
Lx	XXX	Controller code version	Normal — Appears when Power Key is held when in Standby mode
C	XX.X	Temperature Display Units	Normal — Indicates temperature displayed is in ºC. When temperature goes below 0ºC, a "-" will be displayed next to the "C".
c	XX.X	Calibration mode	Normal — Indicates unit is in calibration mode (controlled units only. See section 4)
E	HA	Warning	Warning — Displayed if ambient temperature is higher than 45ºC. An audible alarm will sound. Unit will continue to run.
F	03	Alarm	Alarm — Displayed when temperature of probe is higher than 60ºC. Accompanied by audible alarm. Reduce process temperature. Unit will shut down.
F	11	Alarm	Alarm — Displayed if probe temperature sensor is not functioning properly. Unit will shut down. Contact vendor.
F	12	Alarm	Alarm — Displayed when system is internal fault. Unit will shut down and an audible alarm will sound. Contact vendor.
F	16	Alarm	Alarm — Displayed when ambient temperature is higher than 50ºC. An audible alarm will sound. Unit will shut down.
F	18	Alarm	Alarm — Displayed when if a system fault occurs. Unit will shut down. Contact vendor.

3.7 Controller Display Messages – Non-controlled models only

Left Display	Right Display	Description	Action Required
..	...	Standby mode	Normal — Indicates that the Circuit Breaker is in the ON position and the Controller Power Button is OFF
Lx	XXX	Controller code version	Normal — Appears when Controller Power Button is held when in Standby mode
C	XX.X	Temperature Display Units	Normal — Indicates temperature, displayed in °C.
c	XX.X	Calibration mode	Normal — Indicates unit is in calibration model (See Sec. 4.1)
	EHA	Warning	Warning — Flashes if PCB temperature reaches 42°C (see Sec. 3.5)
	On	Warning	Warning — Displayed if external (T1) temperature sensor is not functioning properly. Unit will continue to run.
	F 12	Fault	Fault — Displayed if an internal (T2) temperature sensor fault occurs. Unit will shut down. Contact vendor.
	F 16	Fault	Fault — See also EHA alarm. Displayed if unit shuts off due to high ambient temperature. Unit will shut down. (See Sec. 3.5)
	F 18	Fault	Fault — Displayed if a system fault occurs. Unit will shut down. Contact vendor.

3.8 Application Notes

1. **Refrigeration will remain inactive if fluid temperature is above 30ºC.**
2. To obtain maximum temperature stability, a circulation pump or stirrer should be used to agitate fluid around probe and temperature sensor.

WARNING

Do NOT use combustible or toxic fluids such as pure methanol. Do NOT use fluids corrosive to stainless steel.

Section 4 – Calibration and Maintenance

4.1 Calibration Offset (°C) (controlled models only)

This menu item allows you to adjust the immersion cooler's displayed temperature reading to match that of a traceable standard. It allows you to offset the displayed temperature value by as much as ±5.0°C.

1. Press and hold the menu button and uppercase small ºC will be displayed. At mean time the offset temperature will be displayed.
2. Press and release the encoder the decimal point begins to flash. The offset and bath temperature will be displayed alternately.
   Rotate the encoder to the desired temperature or offset. Depress the encoder again or wait for the menu to time out to accept the change.

4.2 Cleaning & Maintenance

Only mild detergents and water or an approved cleaner should be used on the painted surfaces of the Immersion Cooler. Do not allow cleaning liquids or sprays to enter the Controller vents.

To keep the refrigeration system operating at optimum cooling capacity, the condenser, 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 from the front panel of the unit. Slide the filter out of either side of the front grill. Use a mild detergent and water solution to wash off any accumulated dust and dirt and then rinse thoroughly and dry before reinstalling.

Section 5 - Troubleshooting

5.1 Does not run

- Check that the power cord is plugged in to an operating electrical outlet.
- Check that the Circuit Breaker/Power Switch is ON.
- Check that the Controller Power Switch is ON.
- Unplug unit, remove cover. Check that condenser fan blade moves freely. If not, check fan bracket or blade for misalignment.

5.2 No Cooling

- Compressor may be cycling on overload. Shut off the power for at least 10 minutes, then restart.
- Improper line voltage, frequency, or both. Check voltage at power source during start cycle. Voltage must be within 10% of rated voltage. Avoid extension cords, which can cause voltage drops.
- Check for blocked airflow through ventilation screens.

5.3 Insufficient Cooling Power

- See Sect. 4.2 Cleaning & Maintenance. Check for airflow exiting the back of the unit. Air vents should not be closer than 6 in. from a wall, or unit placed inside a cabinet. Place where exiting warm air will not return to the intake or near warm air from other sources. High room temperature reduces Cooler's capacity
- Improper line voltage, frequency, or both. Check voltage at power source during start cycle. Voltage must be within 10% of rated voltage. Avoid extension cords, which can cause voltage
- Check for blocked airflow through ventilation screens.
- Unplug unit, remove cover. Check that condenser fan blade moves freely. If not, check fan bracket or blade for misalignment.

5.4 Runs 5 minutes, compressor shakes or stalls. Restarts 5 minutes later.

- Compressor may be cycling on overload. Shut off the power for at least 10 minutes, then restart.

- Improper line voltage, frequency, or both. Check voltage at power source during start cycle. Voltage must be within 10% of rated voltage. Avoid extension cords, which can cause voltage drops.
- Unplug unit, remove cover. Check that condenser fan blade moves freely. If not, check fan bracket or blade for misalignment.

5.5 Compressor will not start; clicks every 30 seconds.

- Compressor may be cycling on overload. Shut off the power for at least 10 minutes, then restart.
- Improper line voltage, frequency, or both. Check voltage at power source during start cycle. Voltage must be within 10% of rated voltage. Avoid extension cords, which can cause voltage drops.
- Unplug unit, remove cover. Check that condenser fan blade moves freely. If not, check fan bracket or blade for misalignment.

5.6 Gradual loss of cooling

- See Sect. 4.2 Cleaning & Maintenance. Check for airflow exiting the back of the unit. Air vents should not be closer than 6 in. from a wall, or unit placed inside a cabinet. Place where exiting warm air will not return to the intake or near warm air from other sources. High room temperature reduces Cooler's capacity

5.7 Condenser fan not running or making loud noise

- Unplug unit, remove cover. Check that condenser fan blade moves freely. If not, check fan bracket or blade for misalignment.

Section 6 - Service and Technical Support

If you have followed the troubleshooting steps and your chiller 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

Section 7 – WEEE Directive

A label with a crossed-out wheeled bin symbol and a rectangular bar indicates that the product 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.

or

The objectives of this program are to preserve, protect and improve the quality of the environment, protect human health, and utilize natural resources prudently and rationally.
Specific treatment of WEEE is indispensable in order to avoid the dispersion of pollutants into the recycled material or waste stream. Such treatment is the most effective means of protecting the customer's environment.

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.

Contact PolyScience at the web site listed below for information.

Web address: www.polyscience.com

Customer Care: 1-800-229-7569 (inside the USA)
(+1) 847-647-0611 (outside the USA)
Fax 1-847-647-1155