



MRC150/300

Benchtop Recirculating Chiller

Specification and User Manual Rev 13

www.lairdthermal.com

MRC150/300-Benchtop-Recirculating-Chiller-User-Manual-083120

Any information furnished by Laird and its agents, whether in specifications, data sheets, product catalogues or otherwise, is believed to be (but is not warranted as being) accurate and reliable, is provided for information only and does not form part of any contract with Laird. All specifications are subject to change without notice. Laird assumes no responsibility and disclaims all liability for losses or damages resulting from use of or reliance on this information. All Laird products are sold subject to the Laird Terms and Conditions of sale (including Laird's limited warranty) in effect from time to time, a copy of which will be furnished upon request.

© Copyright 2020 Laird Thermal Systems, Inc. All rights reserved. Laird™, the Laird Ring Logo, and Laird Thermal Systems™ are trademarks or registered trademarks of Laird Limited or its subsidiaries.

Table of Contents

Revision History	4
1. Introduction	5
2. Incoming Inspection	6
3. Product Handling	6
4. Technical Specifications	7
Standard Features	7
Model Number Nomenclature	7
MRC 150 Performance Charts.....	8
MRC 300 Performance Charts.....	9
Dimensioned Drawings	10
5. Installation and Operation Instructions	11
Recommended Fluid Couplings	11
6. Digital Controller	12
7. Troubleshooting Guide	13
8. Serviceability	14
9. Warranty	15
10. Return Procedure	16

Revision History

REV	DATE	DESCRIPTION
13	3/04/24	Updated Pump performance curve
12	8/31/20	Updated performance chart, return procedure
11	07/29/20	Updated photo with correct label, warranty statement
10	04/30/20	Updated template, references to Laird <i>Thermal Systems</i> , URL:s, Removed DH4 RS-485 option
9	03/22/19	Update isometric dwgs
8	07/31/19	Removed delay requirement for pump
7		Added ul file number

1. Introduction

Laird Thermal Systems' solid-state recirculating liquid chillers are designed to provide cooling for a wide range of water solutions, and can be used for cooling in many medical, laser, and test laboratory applications. They are intended to work in "closed loop" systems that separate the coolant from the outside environment, protecting the purity of the cooled product.

This manual provides the necessary general information for proper installation and operation and has been developed to achieve the best results when using the Laird Thermal Systems' chiller.

2. Incoming Inspection

Laird Thermal Systems chiller units are designed, built, and packaged to withstand the shock and vibration normally associated with shipment by common carriers. Occasionally, improper handling during shipment, such as excessive vibration, crushing, etc., will cause damage to the product. Therefore, a thorough inspection should be provided upon receipt of all shipments. Any packaging tears, dents, scratches, or loose objects are signs of damage and should be noted on the Freight Bill. Packages should be opened promptly and units inspected for concealed damage. **If damage is found, an immediate claim must be filed with the freight carrier and an inspection requested.** Retain all packing materials. Laird Thermal Systems cannot be responsible for Consignee's failure to file a timely freight claim.

3. Product Handling

- Do not operate this unit before reading this manual.
- Before operating Laird Thermal Systems' recirculating liquid chiller, be certain that:
 1. The unit is positioned vertically.
 2. The liquid reservoir and entire recirculating system are filled with coolant.
 3. The air inlet and outlet are at least 12" away from any restrictions.



DANGER



Electrical Shock Hazard

- Do not operate unit without coolant in the system.
- Ensure that there is a circuit breaker on the line and that it complies with nameplate rating.
- Plug unit into grounded electrical outlet only.
- If the electrical supply cord is damaged, it must be replaced by a cord with an equal or higher rating.

Failure to follow the above precautions could result in electrical shock, fire, personal injury, or damage to the unit, and will void the warranty.

4. Technical Specifications

Standard Features

- Programmable Digital Temperature Controller
- Low and High Temperature Alarm Signals
- Low Fluid Level Indicator
- Fluid inlet and outlet quick disconnect, 3/8" flow female valves (see Page 11 for recommended system male connectors)

MRC general series specifications	
Input voltage, VAC	115 to 230
Operating environment temperature range, °C (°F) ¹	4.4 to 45 (40 to 113)
Control temperature range, distilled H ₂ O as coolant, °C (°F) ²	2 to 40 (35 to 104)
Control temperature range, using 70% distilled H ₂ O and 30% Ethylene Glycol as coolant, °C (°F) ²	-12 to 40 (10.4 to 104)
Controller accuracy, °C	±0.16
Frequency, Hz	50/60
UL Rating	UL61010-1/IEC61010-1

Chiller model	MRC 150	MRC 300
Cooling capacity, Watt (BTU/hr) ³	149 (508)	290 (990)
Current, Amperes, 115VAC (230VAC)	4.7 (2.4)	8.5 (4.3)
Input power, Watts	294	507
Fluid capacity, mL (oz.)	250 (8.4)	450 (15.2)
Dimensions HxWxD, cm (inches)	30.4×19.5×35.1 (12.0×7.7×13.8)	39.1×20.3×33.8 (15.4×8.0×13.3)
Weight, kg (lbs)	10.9 (24)	13.6 (30)
Maximum flow rate, LPM (GPM) ⁴	2.9 (0.76)	3.3 (0.87)

1 For ambient conditions outside this range, please contact Laird Thermal Systems.

2 For temperature settings below 2°C, an appropriate coolant must be used.

3 Capacity rating is given at a temperature of 25°C (77°F) for the ambient air and exiting fluid.

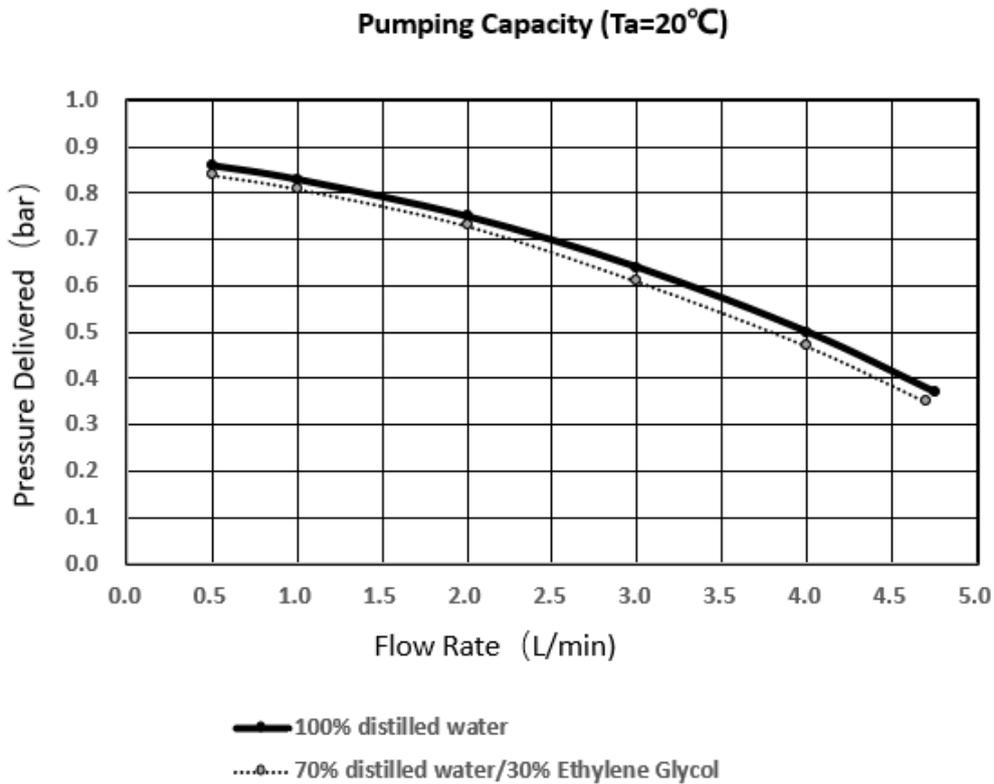
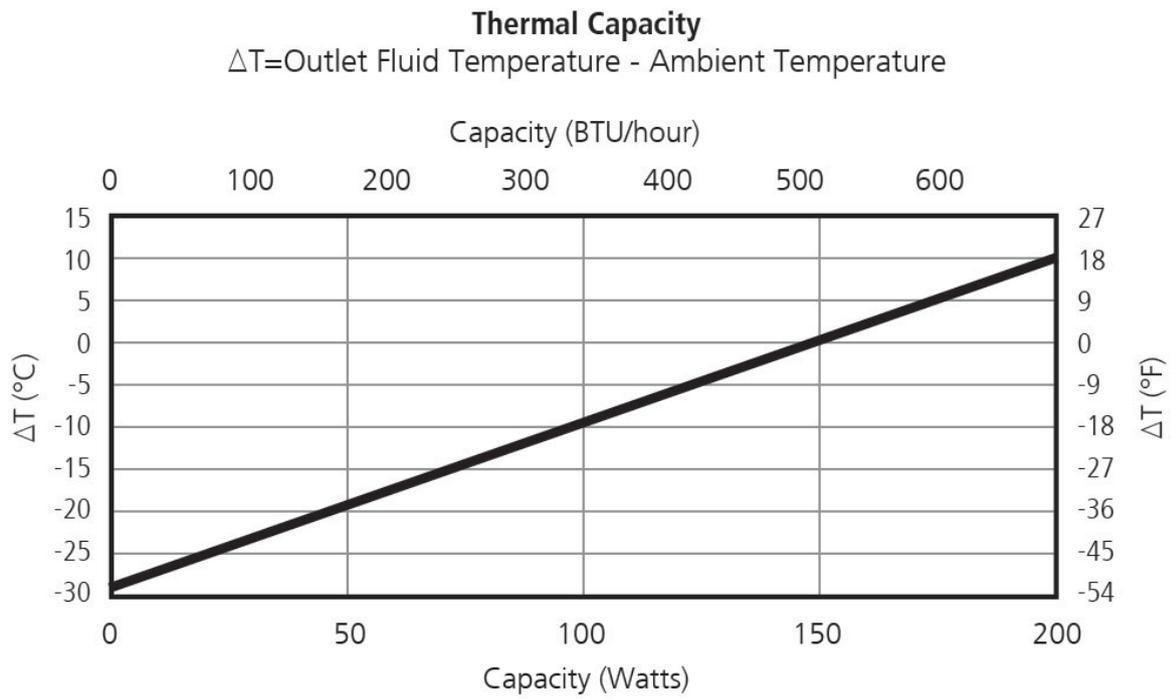
4 For more information see pump capacity charts.

Model Number Nomenclature

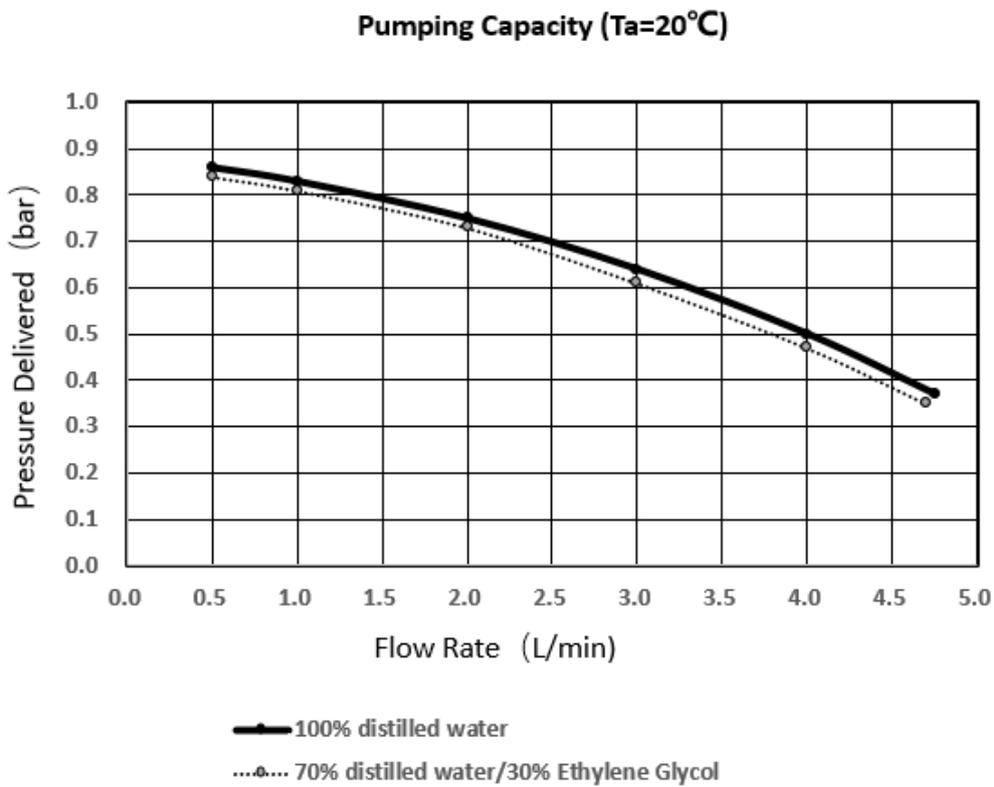
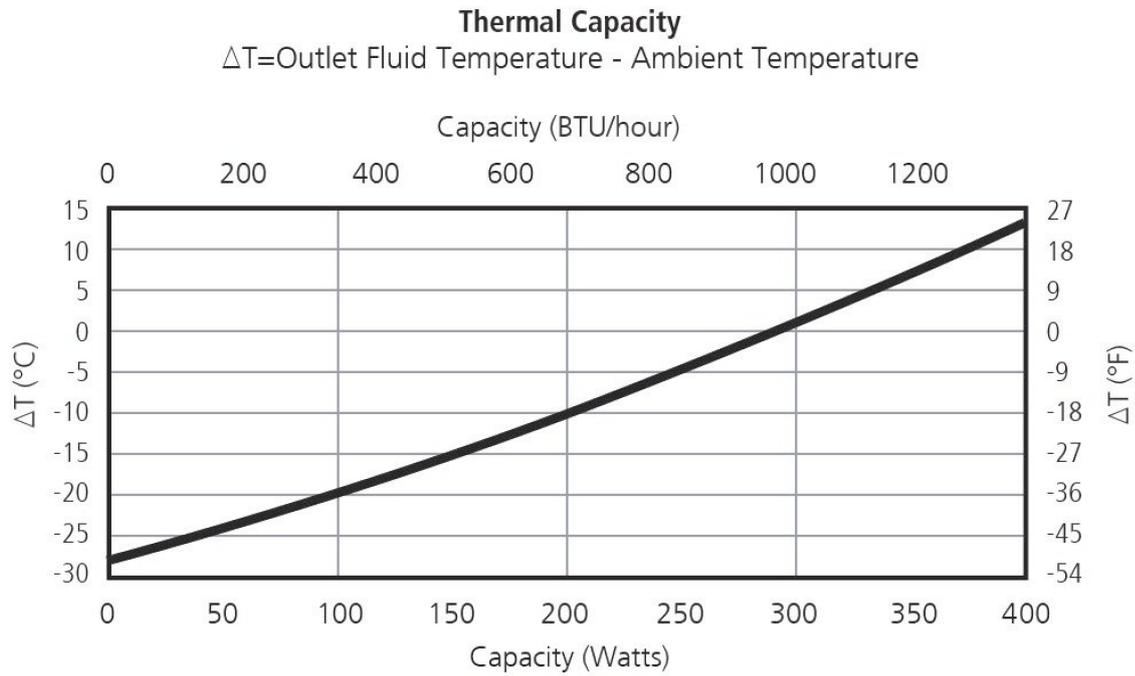


A = 115 VAC (North American)
N = 230 VAC (North American)
E = 230 VAC (European)

MRC 150 Performance Charts

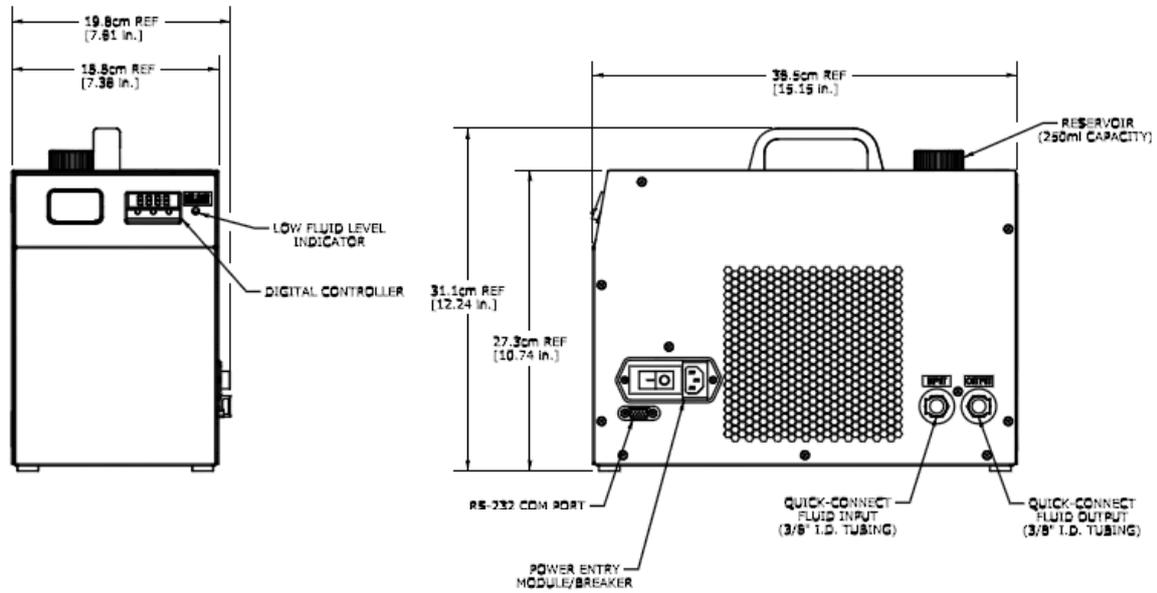


MRC 300 Performance Charts

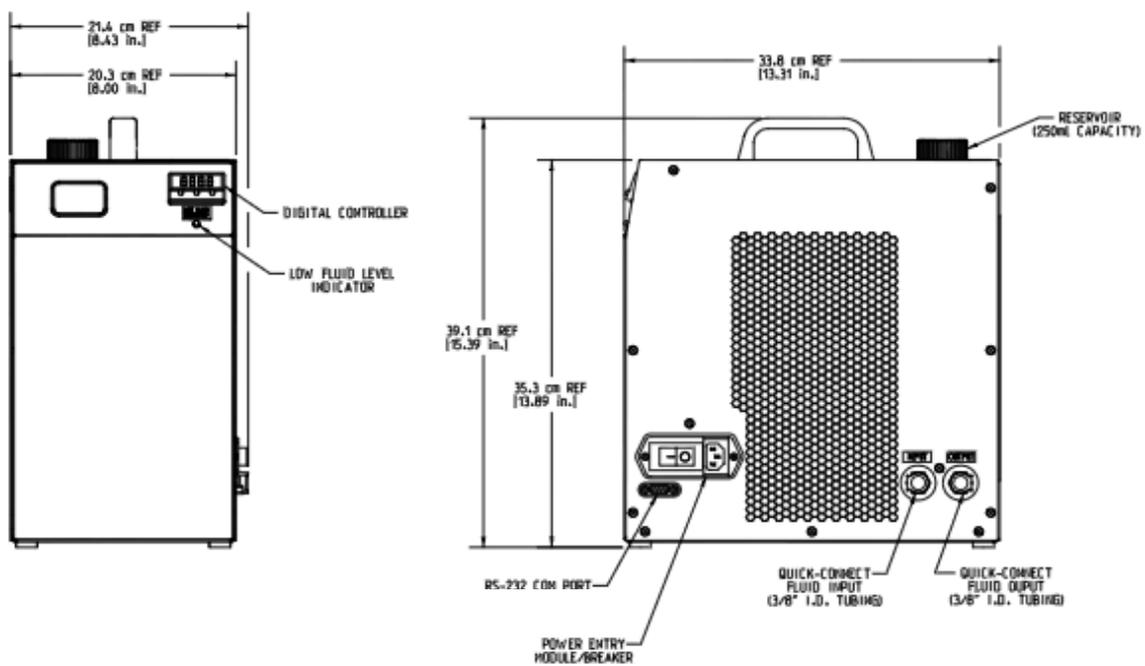


Dimensioned Drawings

MRC 150



MRC 300



5. Installation and Operation Instructions

1. Install Laird Thermal Systems chiller on a level surface capable of supporting the weight of the Unit. Allow 30 cm (12") clearance around the air inlet and discharge areas to insure proper air circulation. If obstacles block the airflow, the unit may overheat. This reduces performance can lead to failure.
2. Fill the reservoir 2/3 full with fluid (see *Notes below).
3. Connect the Unit to an AC power outlet.
4. Connect the Unit to the liquid lines of your system using the input and output quick connections on the side of the Unit.
5. Turn power switch ON.
6. Watch the reservoir and keep filling as the fluid level drops.
7. Once the reservoir maintains a 1/2 full level, keep the chiller running for 10 seconds before you top off the reservoir.
8. If there is any doubt that the system has been purged of air, then check the fluid level and fill reservoir to the top. (If possible, raise the recirculating system above the chiller reservoir level for a few seconds to enable air to gather at the highest point. Then bring system below chiller fluid inlet and outlet connections for a few seconds to allow that air to travel to the chiller reservoir. If it is not possible to move the system, move chiller first down, and then up with respect to the system.)
9. Set digital controller to the desired temperature, as shown on Page [13](#).
10. Run the Unit and check system for possible leaks.
11. The Unit is ready for continuous operation.

*Note 1: For exiting fluid temperature above 2°C (35°F), 100%-distilled water is recommended as the coolant.

*Note 2: For exiting fluid temperature below 2°C (35°F), a coolant solution of >30%-glycol or alcohol by volume is recommended.

*Note 3: Include 10% Optishield® Plus Inhibitor Solution to minimize algae build up.

Recommended Fluid Couplings

For the fluid line connections, Laird Thermal Systems recommends the following

Chiller model	Tubing Inner Diameter	CPC (Colder Products Co.) Part Number
MRC 150, MRC 300	1/4"	PLCD22004
	5/16"	PLCD22005
	3/8"	PLCD22006*

* A pair of the indicated couplings is included with each chiller unit.

For technical questions about these couplings, or to locate a distributor, please visit CPC's website, <https://www.cpcworldwide.com/>.

6. Digital Controller

The controller is available with either RS232 or RS485 serial communication and controls exiting fluid temperature to $\pm 0.16^{\circ}\text{C}$. A separate manual from the controller manufacturer is included with each unit.

1. **To display set point** Press and hold the * button. The display will now show the temperature set point and alternately the units ($^{\circ}\text{C}$ or $^{\circ}\text{F}$).
2. **To enter new set point** (Factory pre-set at 10°C) Hold the * button (displaying set temperature) while pressing either \blacktriangle or \blacktriangledown to increase or decrease the set point. While holding the * button, release \blacktriangle or \blacktriangledown buttons to display the new set point. Release the * button and the default display (actual exiting fluid temperature) will reappear.

To adjust other functions of the controller Press \blacktriangle and \blacktriangledown together for 3 seconds. \blacktriangle or \blacktriangledown will scroll through the functions available on that menu level and pressing either * and \blacktriangle together or * and \blacktriangledown together will change menu levels. The following table gives some information concerning some of the common operational functions of the controller. To change functions other than those shown (recommended for advanced users only), please consult the separate manual for the controller.

Function	Code	Unit	Factory setting	Available range of values	Recommended range
Set Point	N/A	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	10°C	-200°C to 400°C	-15°C to 40°C
Set Scale Max (High Set Point Limit)	Hi.Sc	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	40°C	400°C	40°C
Set Scale Min (Low Set Point Limit)	Lo.Sc	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	0°C	-200°C	2°C above coolant freezing point
High Temp. Alarm ¹	SP2.A then d U . h i	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	5°C	400°C	Customer defined
Low Temp. Alarm ¹	SP2.A then d U . l o	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	-1°C	-200°C	Customer defined
Hysteresis ¹ (Alarm Differential)	b n d . 2	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	5°C	From 0.1° to full scale	1°C to 5°C
Zero Adjustment (Sensor Offset)	2Ero	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	Variable	0 to 25% of Full Scale	Customer defined
Select Display Units	U n i t	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	Customer defined
Set point Lock	S P . L K	N/A	OFF	OFF or On	Customer defined
Security Lock	LoCK	N/A	nonE	nonE, EU3, LEU2, ALL	Customer defined

¹ Not available when the heating option is included with the chiller

7. Troubleshooting Guide

Problem	Possible Reason	Corrective Action
Unit will not start, with power switch turned ON. Controller display is off and fans are not spinning	Power not applied	Check power supply and ensure proper voltage in the line
Unit runs for a period of time and then shuts OFF. Controller display turns off and fans stop spinning	Line circuit breaker tripped due to overload.	Ensure line circuit breaker matches maximum fuse size on nameplate. Check that there are no other electrical components on this line.
Unit is running, but does not maintain desired liquid temperature	1) The heat load is too high	1) Refer to performance charts on pages 7 and 8 . Correct heat load, if necessary
	2) Controller has incorrect temperature setting	2) Correct set point according to Digital Controller instructions on pages 11 and 12 of this manual
	3) Digital Temperature Controller is not operating properly	3) Consult Factory
Unit is running, but the Low Fluid Indicator LED is lit	Insufficient fluid level in reservoir	Fill up reservoir following air purge instructions on page 10 of this manual
Unit is running, but the liquid level in reservoir is decreasing	Unit or outside System has a leak	Check the System for leaks. Fix if possible. If the leak is suspected to be within the Unit, shut the Unit OFF and disconnect from outlet, then consult Factory
Unit is running, but there is no coolant flow. Low Fluid Indicator LED on the front panel is not lit	1) System coolant line is clogged	1) Check outside System coolant line for clogged tubing, closed valves, or for a kink in the tubing
	2) The System head is too great for the pump	2) Relieve System pressure by removing or redesigning flow restrictions. Consult pump capacity charts on pages 7 and 8
	3) Fluid is frozen in the Unit	3) Change the set point to an appropriate temperature or change the liquid mixture to lower the freezing point
	4) The Unit pump is not running	4) After checking 1-4 above, Consult Factory
Unit still does not run or perform to specifications		Consult Factory

8. Serviceability

No special maintenance is required when using Laird Thermal Systems Recirculating Liquid Chillers.

For continued optimal performance and extended life of the unit, it is recommended to clean the heat sinks periodically, using compressed air. If a unit is not performing properly, use the troubleshooting chart shown above Troubleshooting table to find the problem, or consult the factory.

If using any kind of coolant solutions, it is recommended to periodically check the concentration.

9. Warranty

Laird Thermal Systems Recirculating Chillers adhere to the highest quality standards and are free from defects in material, components, and workmanship. This warranty covers repair or replacement of product, to be done at a Laird Thermal Systems facility, for a period of one (1) year from date of shipment. Customer is responsible for shipping product to Laird Thermal Systems freight prepaid. Laird Thermal Systems in turn will return the warranted product to customer freight prepaid, if within the time period specified above.

Warranty coverage is in effect when the following operating conditions are continuously satisfied:

- Ambient Temperature Range within 4.4°C (40°F) to 45°C (113°F).
- Control Temperature Range within 2° C (35° F) to 40° C (104° F) when using 100% water or -12°C (10°F) to 40°C (104°F) with an appropriate coolant.
- Line Voltage variation within plus or minus 10% of nameplate rating.

In addition, the following criteria must be met:

- Electrical installation and grounding must comply with local electrical and safety codes.
- Recirculating Chiller must be used in the environment for which it is designed.
- Customer cannot abuse or mishandle the product in any way. Any modifications to the original unit will also void warranty.
- Compliance to User's Manual or any other instructional guide provided by Laird Thermal Systems for the product.

This warranty does not cover the following:

- Applications where product is being misapplied. This includes inappropriate selection of Liquid Chiller for the environment and conditions in which it is to be used.
- Damages caused by shipping carrier or any other accident after product has left Laird Thermal Systems. Shipping claims are the responsibility of the customer and are to be completed in a timely manner.
- Reimbursement of labor for installation or removal of warranted product, or for parts and labor resulting from repairs performed by any other source besides Laird Thermal Systems.

This is the complete warranty and is in lieu of any other warranty expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Laird Thermal Systems will in no way be liable for incidental or consequential damage whatsoever or for any other claims by the customer for damages in connection with Laird Thermal Systems products, even if advised in advance of the possibility of such damage.

10. Return Procedure

All returns must be assigned a Return Materials Authorization number (RMA#) in advance. To start a return process, simply fill out the form at <https://www.lairdthermal.com/about/product-return-policy>

Returns received without RMA # may be refused. All returns must be securely packed to prevent shipping damage and must be clearly marked with the RMA# on the box. Consignor shall pay freight charges on all returns.

For any questions, please contact us via the website <https://www.lairdthermal.com/contact>