

Warner Instruments Liquid Cooling System Model LCS-1



Warner Instruments
1125 Dixwell Avenue, Hamden, CT 06514
(800) 599-4203 / (203) 776-0664
(203) 776-1278 - fax

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INTRODUCTION

The **LCS-1 Liquid Cooling System** from Warner Instruments is a versatile and simple to use thermal control accessory. This apparatus circulates water through a fan/radiator housing and is designed to easily and quietly remove excess heat from the Peltier portion of all Warner devices employing this technology.

This heat exchanger, however, can be used with any application requiring quiet removal of heat energy from an apparatus via the movement of circulating water. A great deal of effort has been dedicated towards making this system both mechanically and electrically quiet.

CAUTION

This product is not registered with the FDA and is not for clinical use on human or veterinary patients. It is intended for research use only.



The LCS-1 comes supplied with POWER ADAPTER, two WATER JACKET CONNECTING TUBES, 2-10 foot rolls of Tygon tubing, and 2 small bottles containing anti-freeze.

WARNING: The LCS-1's pump can not be run "dry" for any period of time. Never power-on the system without sufficient liquid in the reservoir.

The ANTIFREEZE used in the LCS-1 contains Propylene Glycol and additives which may be harmful or fatal if swallowed.

SETUP

General procedure

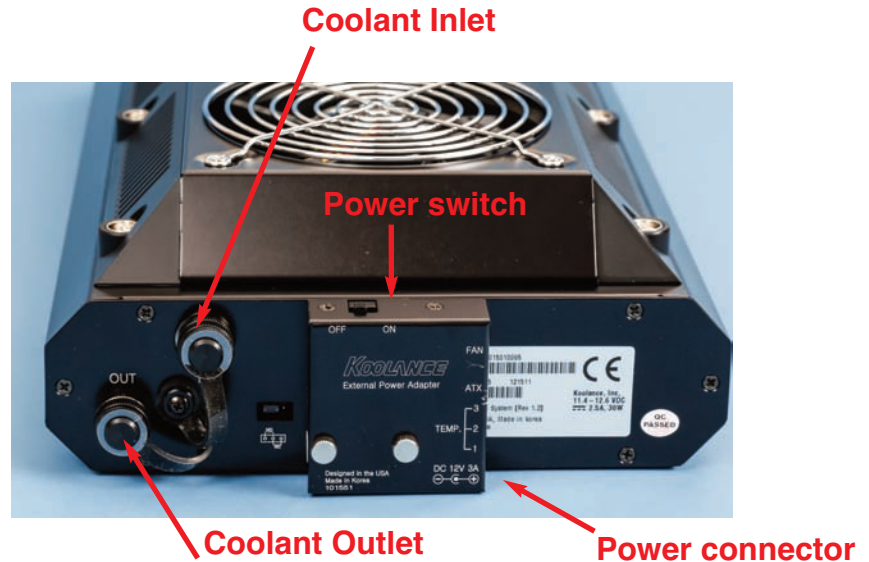
The general setup procedure is to run the **LCS-1** flow lines, fill the tank, power the LCS-1, fill the flow lines, and then place the **LCS-1** into its permanent (use) location.

Step 1: Run LCS-1 flow lines

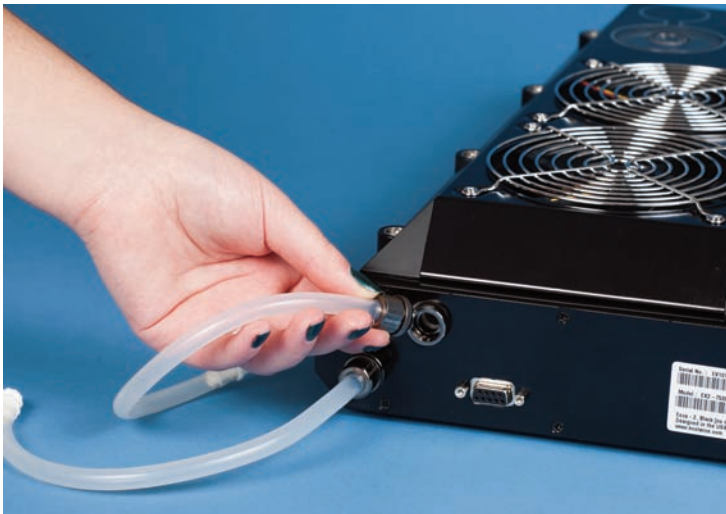
Assembly of the **LCS-1** is straightforward. Complete assembly of the flow lines will result in a closed loop running from the **LCS-1** to the Peltier device and back.

Begin by determining the length of tubing needed to make a run from your Peltier device (SC-20, BLM-TC, etc.) to the use location of the **LCS-1**. Cut the two 10 foot rolls of supplied Tygon tubing to identical lengths.

On the rear panel of the **LCS-1** the coolant inlets and outlets and the power connector can be found.



Attach the metal knurled ends of the **WATER JACKET CONNECTING TUBES** to the rear of the **LCS-1** as is shown to the right.



Attach one end of each Tygon tube to the white barbed connector on each **WATER JACKET CONNECTING TUBE**. Attach the other end of the Tygon tubes to the water jacket input and output ports on your Peltier device.



Step 2: Fill the tank

Begin by opening the water fill port on the top of the **LCS-1**.



Empty two bottles of supplied orange antifreeze into the tank. The now empty squirt bottle can be used to complete the filling of the water tank and flow lines in this and later steps. We recommend using the squirt bottle rather than a funnel as this will allow you to more easily monitor the fill state of the tank and prevent overflow during filling.



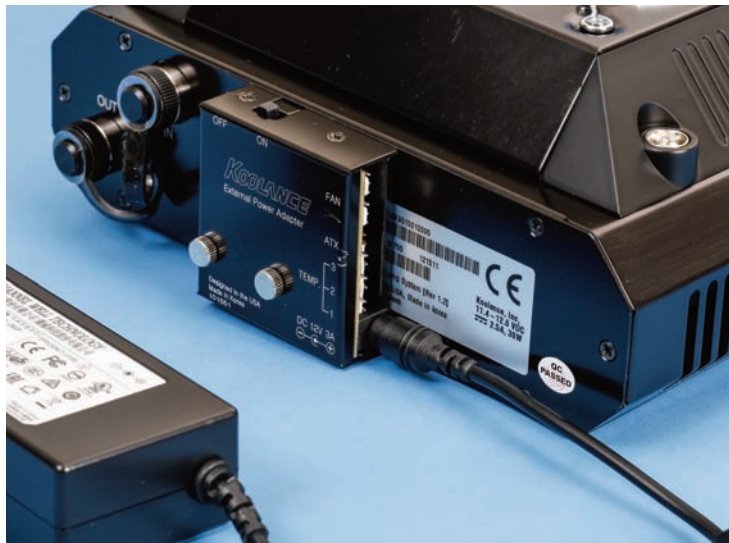
Using the squirt bottle, fill the tank to about 90% of capacity with distilled water.

Step 3: Power the LCS-1

The **LCS-1**'s power switch is located on the rear panel.

Connect the 12 volt wall adapter to line power then connect the 5.5 mm plug to the power input connector as shown in photo.

Turning the power switch to the **ON** position will activate the pump and solution will begin to move into the flow lines until the tank empties. Allow the pump to continue to run during the next step.



Step 4: Fill the flow lines

Using the squirt bottle, continue to add distilled water to the tank until the flow lines are completely filled. Make sure all the flow lines and internal spaces within your Peltier device are completely filled with water. Finally, fill the tank to approximately 95% of capacity. With the pump running, check all flow lines and attachment points for leaks and correct as necessary.

Step 5: Place the LCS-1 into its permanent (use) location

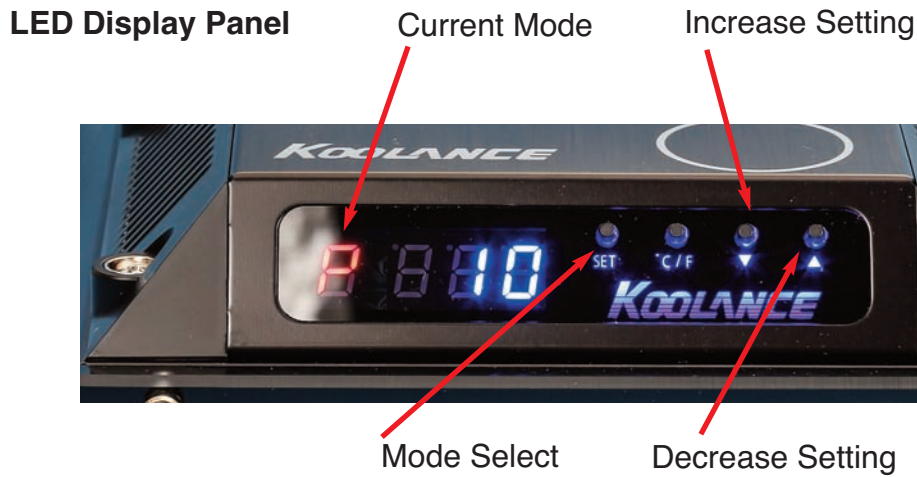
Unplug the power supply from the wall outlet and position the **LCS-1** into its permanent (use) location. In general, the **LCS-1** will be attached to a Peltier device which will be controlled by an external controller (e.g. Warner's CL-100).

Step 6: Power the unit

A convenient approach to power management for the **LCS-1** is to place the wall plugs for the CL-100 and the **LCS-1** onto the same power strip. Then, if you use the power strip to power off and on the CL-100 you will also automatically power on and off the **LCS-1**. This strategy will assure that the associated Peltier device will always have cooling water supplied to its water jacket.

Panel display and settings

The fan and pump speeds should be set to 10, since 10 is the default speed for both no action is required.



PUMP SPEED

The pump speed should be set to 10, since 10 is the default pump speed no action is required.



FAN SPEED

The fan speed should be set to 10, since 10 is the default fan speed no action is required.



SPECIFICATIONS

| | |
|--------------------------|---|
| Pump rate | 420l/hr (111 gal/hr) |
| Power Input | Universal Input 100-240 1.7 A VAC 50/60Hz |
| Power Output | 12 VDC 5.0 A (60 Watts) |
| Power Connector Type | 5.5 mm phone plug |
| Physical Dimensions | |
| Chassis Size (D x W x H) | 49.5 x 21.3 x 9.5 cm |
| Weight | 2.7 kg (6 lbs) |
| Chassis material | Aluminum |
| Water Jacket Ports | Male thread to 1/4" Barb Fittings |
| Warranty | One Year |

WARRANTY AND SERVICE

Warranty

The **LCS-1** is covered by our Warranty to be free from defects in materials and workmanship for a period of one year from the date of shipment. If a failure occurs within this period, we will either repair or replace the faulty component(s). This warranty does not cover instrument failure or damage caused by physical abuse or electrical stress (inputs exceeding specified limits).

Service

In the event that repairs are necessary, shipping charges to the factory are the customer's responsibility. Return charges will be paid by Warner Instruments.

Normal business hours are 8:30 AM to 5:30 PM (EST), Monday through Thursday and 8:30 AM to 5:00 PM on Friday. Our offices are located at 1125 Dixwell Avenue, Hamden, CT 06514, and we can be reached by phone at (800) 599-4203 or (203) 776-0664. Our fax number is (203) 776-1278.

In addition, we can be reached by e-mail at support@warneronline.com or through the internet at <http://www.warneronline.com>.

IMPORTANT - CUSTOMERS OUTSIDE OF THE U.S.: Please be sure to contact us before return shipping any goods. We will provide instructions so that the shipment will not be delayed or subject to unnecessary expense in clearing U.S. Customs.