

Warner Instruments
Thermal Cooling (Heat Exchanger) Module
Model TCM-1



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INTRODUCTION

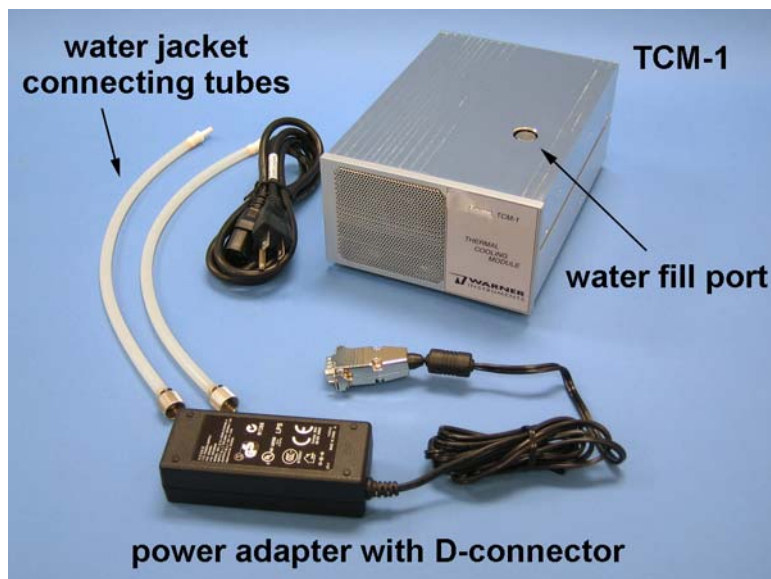
The **TCM-1 Thermal Cooling (Heat Exchanger) Module** from Warner Instruments is a versatile and simple to use thermal control accessory. This apparatus circulates water through a fan/radiator housing and is designed to easily and quietly remove excess heat from the Peltier portion of all Warner devices 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.

**THIS EQUIPMENT IS NOT DESIGNED NOR INTENDED
FOR USE ON HUMAN SUBJECTS**

SETUP

The **TCM-1** comes supplied with POWER ADAPTER WITH D-CONNECTOR, two WATER JACKET CONNECTING TUBES, 10 feet of Tygon tubing, and a small squirt bottle containing orange anti-freeze. The **TCM-1**, power adaptor, and connecting tubes are shown below.



General procedure

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

Step 1: Run TCM-1 flow lines

Assembly of the **TCM-1** is straightforward. Complete assembly of the flow lines will result in a closed loop running from the **TCM-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 TCM-1. Cut the supplied Tygon tubing into two pieces of this length.

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.

Finally, attach the metal knurled ends of the WATER JACKET CONNECTING TUBES to the rear of the **TCM-1** as is shown to the right.



Step 2: Fill the tank

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

Empty the supplied bottle of 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 TCM-1

The **TCM-1** does not have a power switch and is powered by connection of the D-connector on the power supply. Connect the D-connector to the rear of the **TCM-1** and plug the power supply into a convenient wall outlet. The pump will activate 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.

NOTE: If you accidentally overfill the tank, the spilled water will slowly leak out of the bottom of the **TCM-1**. This excess water will not damage the **TCM-1**. Do not, however, interpret this water as a flow line leak or as an internal leak in the **TCM-1**.



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

Unplug the power supply from the wall outlet and position the **TCM-1** into its permanent (use) location. In general, the **TCM-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 **TCM-1** is to place the wall plugs for the **CL-100** and the **TCM-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 **TCM-1**. This strategy will assure that the associated Peltier device will always have cooling water supplied to its water jacket.

SPECIFICATIONS

Pump rate:	180 l/hr (47.6 gal/hr)
Tygon tubing:	1/8 x 1/4 in (ID x OD)
Unit weight:	2.7 kg (6 lbs)
Chassis dimensions:	20.0 x 14.9 x 40.0 cm (D x W x H)
Chassis material:	Aluminum
Power:	100-120 VAC, 1.2 A max

WARRANTY AND SERVICE

Warranty

The **TCM-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.