



 **Koolance**<sup>®</sup>  
*Superior Liquid Cooling Systems*



# ALR-4500 User's Manual

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9001

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A newer version of this User Manual may exist. Please be sure to check our support page for the latest version of this guide: [www.koolance.com](http://www.koolance.com)

## GENERAL PRECAUTION

Please read this manual carefully before beginning the installation of your Koolance system.

### ABOUT SIGNS

Throughout this document, critical information is highlighted in gray-colored boxes. The following symbols are intended to help prevent any situation which may cause personal injury and/or damage to equipment:



**WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or be life-threatening.



**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in damage to equipment or property.



**PROHIBITED:** Indicates a prohibited action.

## PROHIBITED USE

This product is designed, developed and manufactured as contemplated for general use, including without limitation: general office use, personal use and household use, but is not designed, developed and manufactured as contemplated for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss, including without limitation: nuclear power core control, airplane control, air traffic control, mass transport operation control, life support, or weapon launching control. If these products are used in such hazardous environments, Koolance Incorporated does not warrant them.

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**WARNING:** The Koolance liquid coolant contains chemicals which may be harmful or fatal if swallowed. KEEP THIS AND ALL DANGEROUS CHEMICALS OUT OF THE REACH OF CHILDREN. Please refer to the coolant MSDS available on our website: [www.koolance.com](http://www.koolance.com)

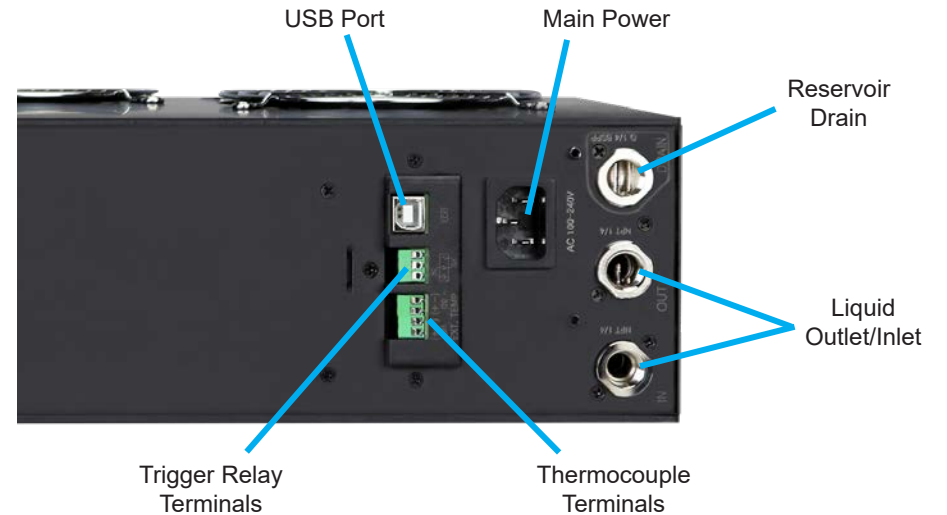
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## KOOLANCE CONTACT INFORMATION

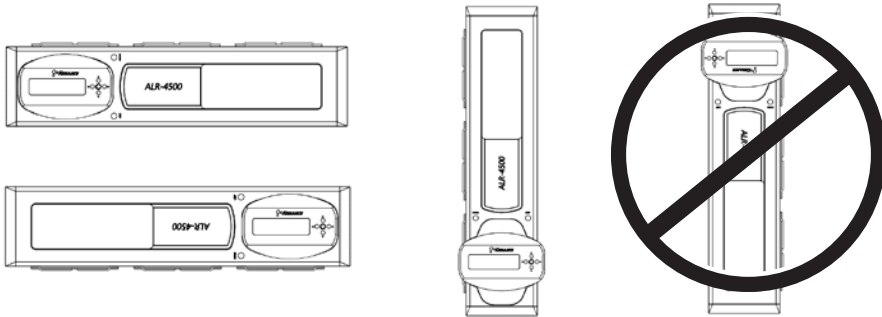
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## Product Diagram



## Positioning the System

This product must be operated in a valid upright orientation (shown below). Invalid orientations can prevent the coolant pump from operating properly.



Squeeze the tube while pushing it firmly over the fitting. Tubing should completely cover the fitting or barb. This step can be eased by first dipping the end of the tubing in water.

Tighten the connection by sliding the compression nut down over the fitting and screwing securely. For barbed fittings, use pliers to move the clamp into the proper position before releasing.



## Tube Fittings



Tube fittings are purchased separately.

Threading for the tube fittings is tapered 1/4-inch NPT. Plumber's tape (PTFE) is required to seal them properly.



After wrapping with tape, the inlet and outlet fittings should be inserted by hand, then finished with a wrench for the last 1-2 rotations.



Cut tubing into two segments. You will need to connect each to the rear fittings.

Each tubing connection will use a threaded compression ring or tube clamp to keep it secure. Be sure to thread the compression ring or tube clamp onto the tubing before attaching it.



## Coolant Filling and Powering-On



**WARNING:** Most coolants are electrically conductive. Use caution when filling the system, and keep all liquids away from electronics and power cables. Keep the primary AC power cable unplugged whenever filling or draining coolant.



**CAUTION:** The cooling system's pump can not be run dry for any period of time. Do not power-on the unit without sufficient liquid in the reservoir. Dry-running (and thereby damaging the pump) is not covered under the Koolance product warranty.



Once all devices (cold plates, fittings, etc.) have been connected with tubing, the system can be filled with coolant.


The fill port is located above the reservoir. With the fill port oriented upright, remove the large reservoir cap by hand or with a hex wrench.




Coolant will be filled to about 1/2-inch (13mm) from the top of the reservoir. **Never completely fill or “top-off” the reservoir.** An air gap must always remain to accommodate thermal expansion of the liquid.



Slowly fill the system with coolant. **To maintain the product warranty, use only Koolance approved coolant.** Many alternative liquids and additives can cause permanent damage to the cooling unit (through chemical reaction, corrosion, biological growth, high thermal expansion, viscosity, etc.).

 Replace the fill port on the reservoir (hand tightening is recommended). **Do not overtighten the fill port.**

 Power on the cooling unit, and increase the pump speed to move coolant if needed. When most of the air has been pushed out of the tubing, the liquid noise will decrease. This process can take several minutes, depending on the filling technique and components attached to the cooling system.

During this process, liquid components (or the cooling system itself) may need to be tilted gently to assist with air evacuation. The reservoir level will decrease during this procedure. Remove the fill port cap and add more liquid as needed.

## Draining

There is a drain on the rear of the unit for emptying or replacing the coolant. Before opening the drain plug, remove the top coolant fill port to allow air into the reservoir.

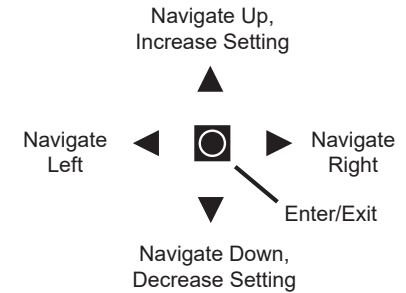
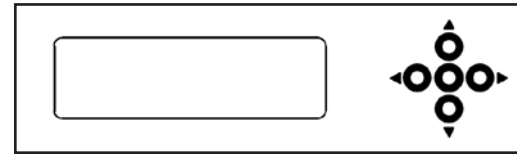






## Software Feature

This product supports Koolance’s “System Monitor” application for adjusting and logging cooling system values from a computer via the USB port. Visit [www.koolance.com/software](http://www.koolance.com/software) to download the latest version of the program. Please consult the application’s readme.txt for further details.

## Display Panel



The Koolance display panel allows control and monitoring of various aspects of the cooling unit. 5 buttons are used, with directional arrows to navigate or change settings, and a center button to select/exit.





- On the main screen, hold  for 3 seconds to change display units between °C/°F and LPM/GPM.
- You can exit any menu and return to the main screen by holding  for 2 seconds.
- To reset **ALL** settings to default, hold  +  for 3 seconds.

## Main Menu

To enter the main menu, briefly press . The selected option will begin flashing. Use  and  to navigate this menu.

-  TEMP/FAN SET: Temperature set-point adjustment
- ALARM SET: Alarm settings
- RELAY SET: Relay Trigger settings
- PUMP SET: Pump speed settings
-  DISPLAY SET: LED display settings

When in the top menu, press  to enter one of the above categories. To exit from here, press .

## External Sensors

This unit has an integrated liquid temperature sensor in the reservoir. It also provides terminals for connecting up to two K-type thermocouples (not included) for external temperature monitoring and set point options.





**CAUTION:** To avoid permanent damage to the pump and other cooling system components, do not allow the liquid temperature to exceed 60°C (140°F) by set-point or other methods. This is the maximum temperature supported by the cooling system.

## TEMP/FAN SET

Under “TEMP/FAN SET”, you can select the active set-point temperature the system will attempt to follow, or else operate the fans at a fixed power level. There are four options to select from. Press ▼ and ▲ to scroll among them:

↑ LIQ TEMP: Liquid Temperature (Range: -30 to 90°C)  
 CH1 TEMP: Thermocouple #1, if attached (Range: -20 to 120°C)  
 CH2 TEMP: Thermocouple #2, if attached (Range: -20 to 120°C)  
 ↓ FAN PWR: Static fan power setting (Range: 0 to 100%)

**The sensor currently displayed in this menu is what the system will follow.** Only one can be active. Press ● to adjust the target value using ▼ and ▲. Below are some examples:

LIQ TEMP= 32C Maintain coolant coming from the system at 32°C  
 CH1 TEMP= 50C Maintain the first thermocouple at 50°C, if attached  
 CH2 TEMP= -5C Maintain the second thermocouple at -5°C, if attached.  
 (This is not a sub-ambient system. Without external assistance, this temperature may not be reached.)  
 FAN PWR= 45% Keep fans at 45% power, regardless of temperature.

Press ● again to exit configuration of the sensor. Press ◀ to return to the previous menu.

## ALARM SET

This menu affects when the built-in audio alarm will sound. There are seven options which are simultaneously active. Upon entering the alarm menu, the last edited line will flash. Press ▼ or ▲ to change it. Press ● to edit the value, and again to return to the previous menu. To disable an alarm, increase or decrease its setting to “-----”.

↑ LIQ TEMP: Liquid Temperature (Range: 0 to 99°C)  
 CH1 TEMP: Thermocouple #1, if attached (Range: 0 to 119°C)  
 CH2 TEMP: Thermocouple #2, if attached (Range: 0 to 119°C)  
 FAN: Fan Speed (Range: 100-10,000RPM)  
 PUMP: Pump Speed (Range: 100-10,000RPM)  
 FLOW: Coolant Flow Rate (Range: 0.1 to 20.0LPM)  
 ↓ LEVEL: Low Coolant Level in Reservoir (ON, or OFF to disable)

The regular audio alarm is a repeating beep.

## RELAY SET

Terminals are provided for a configurable relay. Wires can be connected as normally-open (NO), or normally-closed (NC), labeled near the terminals.



There are seven options which are simultaneously active. Upon entering the relay menu, the last edited value will flash. Press ▼ or ▲ to adjust this value. Press ● to edit the value, and again to return to the previous menu. To disable the relay, increase or decrease its setting to “-----”.

↑ LIQ TEMP: Liquid Temperature (Range: 0 to 99°C)  
 CH1 TEMP: Thermocouple #1, if attached (Range: 0 to 119°C)  
 CH2 TEMP: Thermocouple #2, if attached (Range: 0 to 119°C)  
 FAN: Fan Speed (Range: 100-10,000RPM)  
 PUMP: Pump Speed (Range: 100-10,000RPM)  
 FLOW: Coolant Flow Rate (Range: 0.1 to 20.0LPM)  
 ↓ LEVEL: Low Coolant Level in Reservoir (ON, or OFF to disable)

## PUMP SET

The pump speed can be manually set from 1 (lowest) to 10 (highest):


PUMP (1-10) 7LV : Pump Speed Level

The pump speed level will flash. Press ▼ or ▲ to adjust. Press ● to return to the previous menu.

## DISPLAY SET

The display settings configure which values you wish to appear on the front display and how they are shown:

```
DISPLAY
FIXED   CYCLIC : Show 2 fixed values or cycle multiple values
```

The first option, "FIXED", will flash. Press ◀ or ▶ to change between these options. Press  to configure one of the selections, or press ▲ to exit. If "FIXED" is selected, two lines will be shown:


```
FAN SET      50% : First line display option
LIQ TEMP     30.5C : Second line display option
```

The first line will flash. Press ▼ or ▲ to change what this line will display:

↑ FAN SET : (Field varies) Shows current active set-point or fan power  
LIQ TEMP : Shows reservoir liquid temperature  
CH1 TEMP : Shows first external sensor temperature (if connected)  
CH2 TEMP : Shows second external sensor temperature (if connected)  
FAN : Shows radiator fan RPM  
PUMP : Shows pump impeller RPM  
↓ FLOW : Shows liquid flow rate through the unit

Press  to move to line 2, and similarly use ▼ or ▲ to choose what will be displayed on the second line. Press  again to exit.

If "CYCLIC" is chosen from the DISPLAY SET menu, multiple values can be rotated through the front display.

The first line will flash. Use ▼ and ▲ to navigate to other lines. Press  to enable or disable each value. This will remove the asterisk, thereby hiding that line from being shown on the main screen:

↑ \*FAN SET : (Field varies) Shows current active set-point or fan power  
\*LIQ TEMP : Shows reservoir liquid temperature  
CH1 TEMP : Shows first external sensor temperature (if connected)  
CH2 TEMP : Shows second external sensor temperature (if connected)  
FAN : Shows radiator fan RPM  
\*PUMP : Shows pump impeller RPM  
↓ \*FLOW : Shows liquid flow rate through the unit

Press ◀ to return to the previous menu, or press ▶ to exit DISPLAY SET.

## Troubleshooting

We hope your Koolance system will provide you with years of reliable cooling performance. To help avoid unnecessary RMA issues, we have prepared this list of possible operational problems, and their most common solutions.

1. After filling the reservoir with coolant and turning on the system, there are no visible signs of liquid movement...

Check the flow meter value (see "DISPLAY SET"). If there is no detected flow immediately after filling the reservoir, or the flow rate is very low or periodic, this usually indicates the pump has not finished priming. Open the fill port on top of the reservoir and temporarily set the pump speed to 10 (see "PUMP SET") to help push out the air.

If possible while the pump is running, gently tilt your cold plates or other components connected to the system in various directions to assist with bleeding air from the cooling loop. If it becomes necessary to significantly tilt the unit to assist with priming, close the fill port and power-off the unit before doing so.

2. The temperature alarm sounds and I'm not sure why...

The offending temperature sensor and value will flash in the front display whenever an alarm sounds. Check that your currently selected temperature sensor and alarm are configured as desired (see "TEMP SET" and "ALARM SET"). If you are certain the cooling system is working properly otherwise, try resetting all system settings by holding ▼ + ▲ for 3 seconds.

3. My system appears to be leaking fluid or water...

Check that all fittings are properly installed and tightened. This product uses NPT 1/4in threaded fittings. Plumber's tape is required to seal the fittings.

4. The front display is locked up or not responding.

Reset all system settings by holding ▼ + ▲ for 3 seconds. After a reset, all configuration settings (temperature, alarm, fans, etc.) must be updated again.

5. The pump is not operating at lower power level settings.

Due to variations in pumps, the motor may not always operate at the lowest speed settings. This is more likely to occur if the speed is increased from a very low level rather than decreased from a higher level. The pump speed must be kept on a level that allows the motor to operate continuously. Note that during system power-up, the pump automatically throttles to maximum speed before dropping to the user's preset level (to help prevent stalling).

## Limited Warranty

**Koolance Incorporated (“Koolance”) warrants each new Koolance liquid-cooled system (“the system”), against defects in materials or workmanship for a period of one year from the date of purchase, and agrees to repair or replace any defective Koolance system without charge. Shipping costs are non-refundable.**

This warranty is non-transferable. All warranty claims must be accompanied by the original proof of purchase.

THIS WARRANTY DOES NOT COVER DAMAGE RESULTING FROM ACCIDENT, MISUSE OR ABUSE, LACK OF REASONABLE CARE, SHIPPING DAMAGE, MODIFICATIONS, THE AFFIXING OF ANY ATTACHMENT NOT PROVIDED WITH THE PRODUCT, LOSS OF PARTS, OR OPERATING COMPONENTS AT SPEEDS OR FUNCTIONS OTHER THAN THOSE SPECIFIED BY THEIR MANUFACTURERS.

Use of unauthorized replacement parts or liquids will void this warranty. Koolance Incorporated will not pay for warranty service performed by a non-authorized repair or diagnostic service and will not reimburse the consumer for damage resulting from warranty service performed by a non-authorized repair service. No responsibility is assumed for any special incidental or consequential damages due to a defective Koolance product.

In order to obtain warranty service, contact our RMA department for information. The product must be shipped postage prepaid to an authorized Koolance service location. It is suggested that, for your protection, you return shipments of product by insured mail, insurance prepaid. Damage occurring during shipment is not covered by this warranty. Shipping costs are non-refundable. No other warranty, written or oral, is authorized by Koolance Incorporated.

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