KOOLANCE

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ISO
9001

Printed in Korea

KOOLANCE®

Superior Liquid Cooling Systems

VLX-2000
User's Manual

English v1.0

This User Manual is updated regularly. Please be sure to check our support page for a newer version of this guide: www.koolance.com

GENERAL PRECAUTION

Please read this manual carefully before beginning the installation of your Koolance system. This manual assumes the user has basic experience in building and configuring computer systems. Information referring to traditional hardware assembly is intentionally brief.

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.

TRADEMARKS

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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

CAUTION: Always keep the chiller upright during operation. Additionally, THE UNIT MUST BE KEPT UPRIGHT FOR AT LEAST 24 HOURS BEFORE POWERING ON. This is to allow enough oil to reach the compressor. Powering-on the unit too early can permanently damage the compressor and is not covered by the product warranty.

CAUTION: This cooling system can chill liquid below the ambient air temperature, which may cause condensation to form on tubing and cold plates. It is highly recommended to keep the temperature at or above the ambient temperature. (See “TEMP SET” for details.)

CAUTION: Do not use a temperature set-point that is below the coolant’s freezing point. This may damage the cooling unit and is not covered by the product warranty. It is recommended to always keep the temperature set-point at or above ambient temperature.

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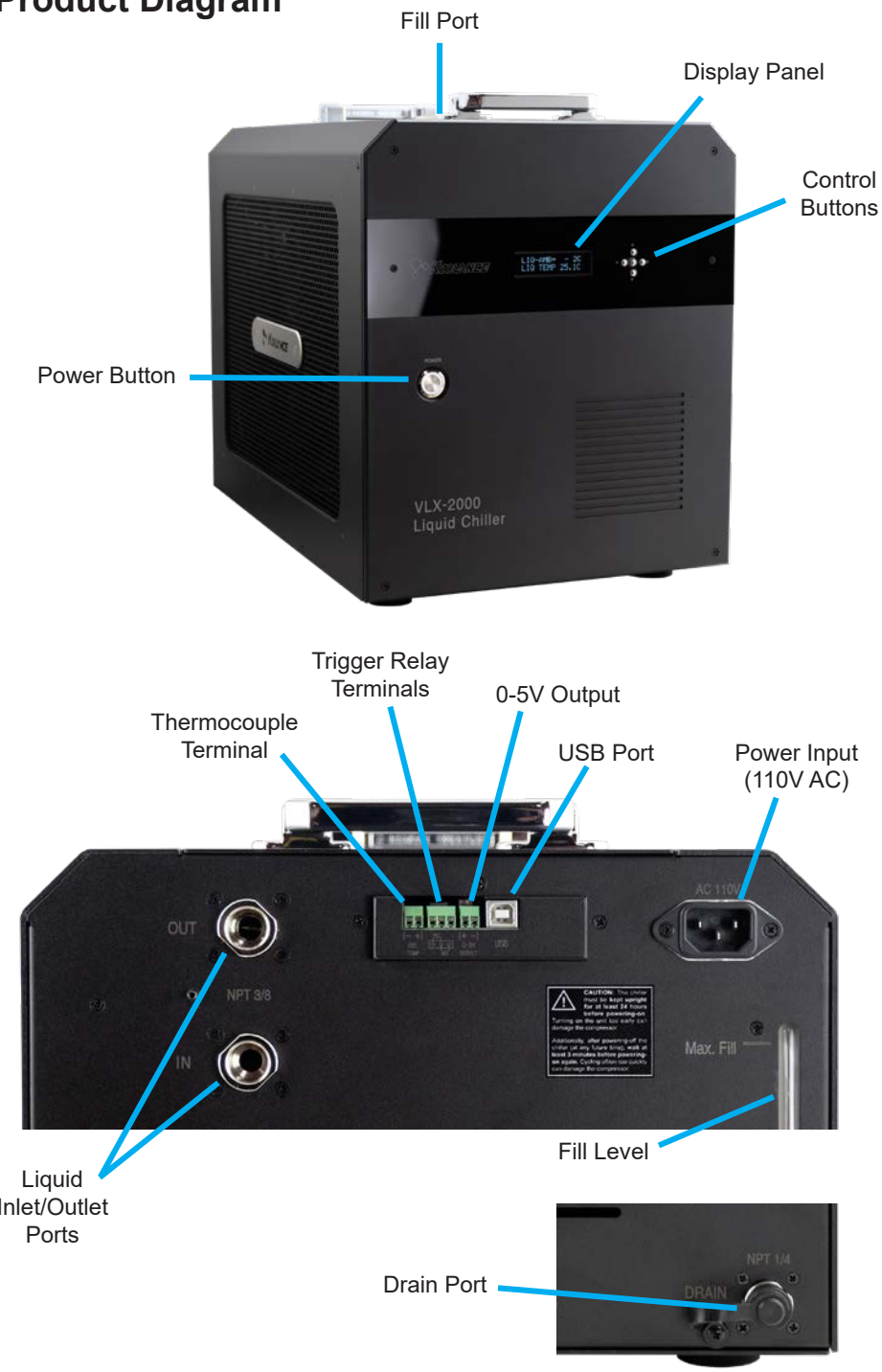
Product Specifications

- Weight: 34.4kg (approx.)
- Dimensions: 315x 484 x 399.5mm (approx.)
- Operating Temperature Range: Ambient 0-40°C, Water 0-40°C
- Cooling Capacity: 2000W (6824BTU/hr) @ 25°C liquid/ambient
- Refrigerant: R-134a
- Pump: Koolance P/N PMP-700
- Power Input: 110VAC

Product Diagram

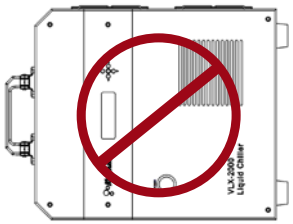


Positioning the System

CAUTION: Always keep the chiller upright during operation. Additionally, THE UNIT MUST BE KEPT UPRIGHT FOR AT LEAST 24 HOURS BEFORE POWERING ON. This is to allow enough oil to reach the compressor. Powering-on the unit too early can permanently damage the compressor and is not covered by the product warranty.

The chiller must be run upright at all times. Upon arrival of this product via transport or courier shipping, **it must be kept upright FOR AT LEAST 24 HOURS BEFORE BEING POWERED ON** to allow enough oil to reach the compressor.

This product must be operated in an upright orientation (shown below). Alternative orientations can prevent the compressor and coolant pump from operating properly.



Tube Fittings

Tube fittings are purchased separately.

Threading for the tube fittings is tapered 3/8-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.

Squeeze the tube while pushing it firmly over the fitting. The tubing should completely cover the fitting. This step can be made easier by first dipping the end of the tubing in warm water.

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

Coolant Filling and Power-On

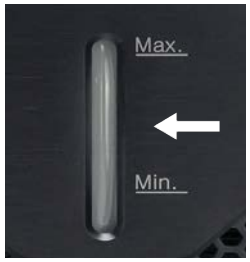
WARNING: Most coolants are electrically conductive. Use caution when filling the system, and keep all liquids away from electronics and power cables. Keep the primary AC power cable unplugged whenever filling or draining coolant.

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 external components (such as cold plates and manifolds) have been properly connected to the cooling system with tubing, the coolant can be added.

The fill port is located on top of the cooling system above the reservoir. Remove the large metal cap.

Maximum and minimum fill markings are provided on the back side of the unit to help maintain the coolant level.



To avoid spilling, a large funnel is recommended. Coolant should only be added up to the line labeled “Max Fill”. **Never completely fill or “top-off” the reservoir.** An air gap is needed to accommodate thermal expansion of the liquid.

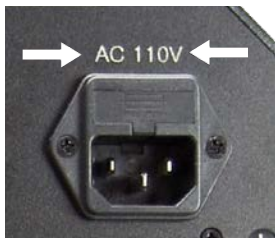
Slowly fill the system with coolant. **To maintain the product warranty, use only Koolance approved coolant.** Many alternative liquids and additives can cause permanent damage to the system through chemical reaction, corrosion, biological growth, high thermal expansion, viscosity, etc.

Replace the fill port cap on the reservoir, while ensuring the rubber o-ring remains on the cap. To avoid damaging the reservoir threads, do not overtighten**.**

CAUTION: The chiller is specific to one input voltage (either 110VAC or 220VAC) and will not auto-switch between these voltages. Supply only the proper input voltage, as labeled above the AC plug on the rear of the unit. Supplying the improper voltage can damage the unit and is not covered by the product warranty.

CAUTION: After powering-off the chiller at any time, wait at least 3 minutes before switching it back on. Cycling off/on too quickly can damage the compressor. The chiller has a power-up delay feature which prevents quick power cycling. If the unit does not turn on, wait 3 minutes and try again.

Insert the main power cable into the cooling unit. **Be sure the supply voltage matches what’s labeled on the unit.** The product will not accept both 110VAC and 220VAC.



After filling, plug the power cable back into the wall outlet, and power on the cooling system. Coolant should begin flowing through the tubing, and the reservoir level will quickly decrease. Unplug the AC cable from the wall outlet before adding more coolant.

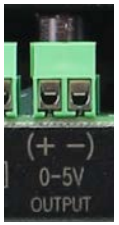
This process can take several minutes, depending on the external components and filling technique. To help eliminate large air pockets, some components on the tubing may need to be temporarily lifted or tilted.

Draining

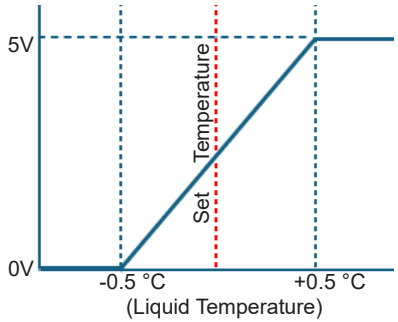
A maintenance drain is located on the rear of the unit to release the coolant. While draining, the fill port can be opened to allow air into the top of the reservoir.

USB, 0-5V, and External Sensor

This product supports the Koolance System Monitor (KSM) software application for control and logging over the USB port. It is recommended to use the included USB cable, which is shielded. The latest version of KSM can be downloaded from: https://koolance.com/software



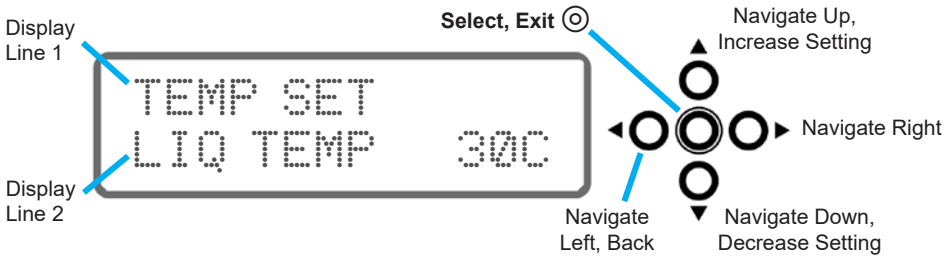
A 0-5V differential voltage output is provided for industrial process monitoring. The output is based on the difference between the user’s setpoint and the internal liquid temperature. Please see the graph for details.



The reservoir contains an internal liquid temperature sensor. For monitoring or setpoint control based on an external sensor, a rear terminal is provided for one K-type thermocouple (not included), labeled “EXT. TEMP”.

Display Panel

The Koolance display panel allows monitoring and control of the cooling system's functions. Five buttons are used, with directional arrows to navigate or change settings, and a center button to select or exit.



- You can exit any menu and return to the main screen by holding ◎ for 2 seconds. The display will also return to the main screen automatically if there are no button presses for 10 seconds.
- From the main screen, hold ◎ for 3 seconds to toggle display units between °C/LPM and °F/GPM.
- To reset all cooling system 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 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 ◄.

TEMP SET

CAUTION: This cooling system can chill liquid below the ambient air temperature, which may cause condensation to form on tubing and cold plates. It is highly recommended to keep the temperature at or above the ambient temperature. (See below for details.)

CAUTION: Do not use a temperature set-point that is below the coolant's freezing point. This may damage the cooling unit and is not covered by the product warranty. It is recommended to always keep the temperature set-point at or above ambient temperature.

Under "TEMP SET", you can select the active temperature sensor and set-point the chiller will try to follow. There are four temperature options to select from. Press ▼ and ▲ to scroll among these options:

- LIQ TEMP: Liquid temperature (Range: -20 to 40°C)
- EXT TEMP: Rear sensor, if attached (Range: -20 to 120°C)
- LIQ-AMB: Delta-T between liquid & ambient (Range: -50 to 50°C)
- EXT-AMB: Delta-T between rear sensor & ambient (Range: -50 to 50°C)

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

LIQ TEMP= 28C	Maintain coolant coming from the chiller at 28°C
EXT TEMP= 50C	Maintain the external sensor at 50°C (if attached)
LIQ-AMB= -5C	Maintain a difference between the liquid and ambient air of -5°C (keep liquid 5°C below ambient)
EXT-AMB= 5C	Maintain a difference between the external sensor and ambient air of +5°C (keep sensor 5ºC above ambient)

Press ◎ again to exit configuration of the sensor. Press ◄ to return to the previous menu.

Depending on the heat load, it may be possible to reduce the liquid temperature to below the ambient room dew point. To avoid condensation (water droplets) from forming on tubing and cold plates connected to the chiller, **it is recommended to keep the chiller on "LIQ-AMB" with a value of 0°C or higher.**

ALARM SET

This menu configures the audio alarm, which is a repeating beep while the offending sensor flashes on the display. There are five simultaneously active options. Upon entering the alarm menu, the last edited line will flash. Press ▼ and ▲ to change it. Press ◎ to edit the value, and again to return to the previous menu. To disable an alarm, increase or decrease the value until " --- " is displayed.

- ▲ (TEMP SET) : Difference from Set Point Temperature; Range: +/- 1 to 50°C
- FAN: Condenser Fan Speed; Range: 100 to 10,000RPM ("----" to disable)
- PUMP: Pump Speed; Range: 100 to 10,000RPM ("----" to disable)
- FLOW: Coolant Flow Rate; Range: 0.1 to 20.0LPM ("----" to disable)
- ▼ 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 output relay. If triggered, the offending sensor will also flash on the display. The relay wires can be connected for a normally-closed (NC) or normally-open (NO) signal, as labeled.

There are five simultaneously active options. 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 " --- ".

- ▲ (TEMP SET) : Difference from Set Point Temperature; Range: +/- 1 to 50°C
- FAN: Condenser Fan Speed; Range: 100 to 10,000RPM ("----" to disable)
- PUMP: Pump Speed; Range: 100 to 10,000RPM ("----" to disable)
- FLOW: Coolant Flow Rate; Range: 0.1 to 20.0LPM ("----" to disable)
- ▼ LEVEL: Low Coolant Level in Reservoir (ON, or OFF to disable)

PUMP SET

WARNING: The cooling system's pump can not be run dry for any period of time. Never power-on the chiller without sufficient liquid in the reservoir. Dry-running and damaging the pump is not covered under the Koolance product warranty.

The pump speed can be manually set from 0 (OFF) to 10 (highest):

PUMP (0-10) 7LV : Pump Speed Level

The pump speed level will flash. Press ▼ or ▲ to adjust. Press ◎ to return to the previous menu. **NOTE: Level 0 will disable the coolant pump, and should not be selected for most applications.**

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:

LIQ SET 20C : First line display option
EXT TEMP 21.4C : Second line display option

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

- ▲ LIQ SET : (Field varies) Shows current active sensor and user set-point
- AMB TEMP : Shows ambient air temperature
- LIQ TEMP : Shows reservoir liquid temperature
- EXT TEMP : Shows external sensor temperature (if connected)
- FAN : Shows condenser 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:

*LIQ SET : (Field varies) Show current active sensor and user set-point
*AMB TEMP : Show ambient air temperature
LIQ TEMP : Hide liquid temperature
*EXT TEMP : Show external sensor temperature (if connected)
FAN : Hide condenser fan RPM
PUMP : Hide pump impeller RPM
*FLOW : Show liquid flow rate through the unit

Press ◄ to return to the previous menu, or press ► to exit DISPLAY SET.

Troubleshooting

Below is a list of operational issues 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...

   Make sure the pump has not been disabled (see “PUMP”), and check the flow rate and pump RPM values on the display (see “DISPLAY”). If the reservoir was recently filled with coolant and there is no flow rate value (“0 LPM”), but the pump RPM is higher than 0, it may not have finished priming.

   Open an upward-facing reservoir fill port, and try increasing or decreasing the pump speed to help push out the air. If necessary, the cooling system can be temporarily tilted to assist with priming after closing its reservoir fill port.

2. The alarm sounds for an unknown reason...

   The offending sensor and value will flash in the front display whenever an alarm sounds. Check if the corresponding alarm or relay trigger is configured as desired (see “ALARM” and “RELAY”). The alarm and relay settings can be defaulted by holding ▼ + ▲ for 3 seconds. This will also reset all other cooling system settings to their default values.

3. The alarm sounds and “TOO HOT” flashes in the display...

   The liquid temperature has reached a critical level of 60°C (140°F). Turn off the cooling system and allow it to cool-down before diagnosing the problem.

4. The system seems to be leaking coolant...

   Check that all fittings are properly installed and tightened. This product uses NPT 3/8-inch threaded fittings. Thread tape is required to seal the fittings, which should be wrapped in the appropriate direction and amount on the thread.

5. The front display is not responding to button presses...

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

6. The pump is not operating at low speed settings...

   Due to variations in pumps, the motor may not always operate at the lowest speed settings. The pump should be kept at a setting which allows for the coolant to flow continuously. During power up, the pump will briefly operate at maximum speed before changing to the user’s preset level.

Limited Warranty

Koolance Incorporated warrants that on the date of original purchase and for a period of one (1) year thereafter, this Product will be free from defects in material or workmanship. If, during the warranty period, this Product is found to be defective in material or workmanship, it will be repaired or exchanged at Koolance's option.

All warranty claims must be accompanied by the original proof of purchase. Koolance does not provide a warranty for products purchased from unofficial dealers or 3rd-party marketplaces. This warranty is non-transferable.

THIS WARRANTY DOES NOT COVER DAMAGE RESULTING FROM ACCIDENT, MISUSE OR ABUSE, LACK OF REASONABLE CARE, PHYSICAL DAMAGE, CORROSION, SHIPPING DAMAGE, MODIFICATIONS, THE AFFIXING OF ANY ATTACHMENT NOT PROVIDED WITH THE PRODUCT, OR OPERATING COMPONENTS OUTSIDE OF THEIR INTENDED SPECIFICATIONS.

Use of 3rd-party coolants or coolant additives will void this warranty. Koolance Incorporated will not pay for warranty service performed by a 3rd-party repair or diagnostic service and will not reimburse the consumer for damage resulting from warranty service performed by a 3rd-party repair service. No responsibility is assumed for any special incidental or consequential damages due to a defective Koolance product. No other warranty, written or oral, is authorized by Koolance Incorporated.

Return shipments without a valid RMA number will be refused. 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.

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