KOOLANCE®

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KOOLANCE®

Superior Liquid Cooling Systems

EXC-800 Chiller

LIQ SET=   20C
AMB TEMP 25.2C

ON
I
O
OFF

EXC-800
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 Please be sure to check our support page for a newer version of this guide: www.koolance.com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.

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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 EXC-800 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: The EXC-800 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: 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.

KOOLANCE CONTACT INFORMATION

Koolance Incorporated (USA)

Address:	2840 W. Valley Hwy. N., Auburn, WA, USA 98001
Telephone:	+01-253-249-7669
Fax:	+01-253-249-7453
Sales Email:	sales@koolance.com
Tech Email:	tech@koolance.com
Web:	www.koolance.com

Table of Contents

Product Specifications

- Weight: 26kg (approx.)
- Dimensions: 270 x 360 x 245mm (approx.)
- Operating Temperature Range: Ambient 0-40°C, Water 0-40°C
- Cooling Capacity: 800W (2730 BTU/hr) @ 25°C liquid/ambient
- Refrigerant: R-134a
- Pump: Koolance P/N PMP-500
- Power Input: (Depends on model), either 110VAC or 220VAC
- Power Consumption: 450W @ 25°C, 650W @ 35°C (approx.)

System Diagram

Fill Port

Carrying Handles

LED Display Panel

Control Panel

Power Switch

EXC-800 Chiller

Condenser Fans

Relay & Thermocouple
Terminals (Optional)

AC 110V

Power Connection

Max. Fill

Reservoir Level

Coolant Inlet
& Outlet

Min. Fill

EXC-800 101341

DRAIN

Drain Plug
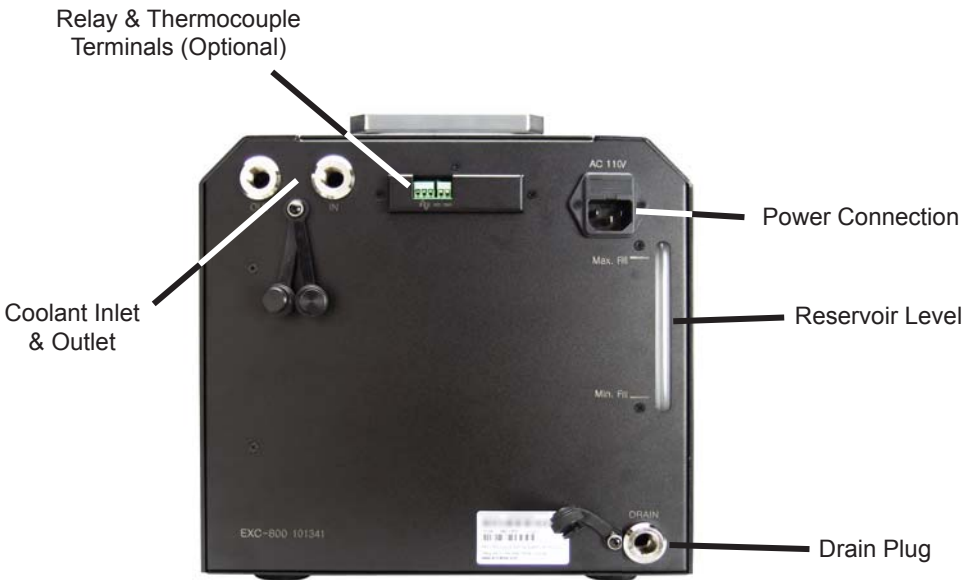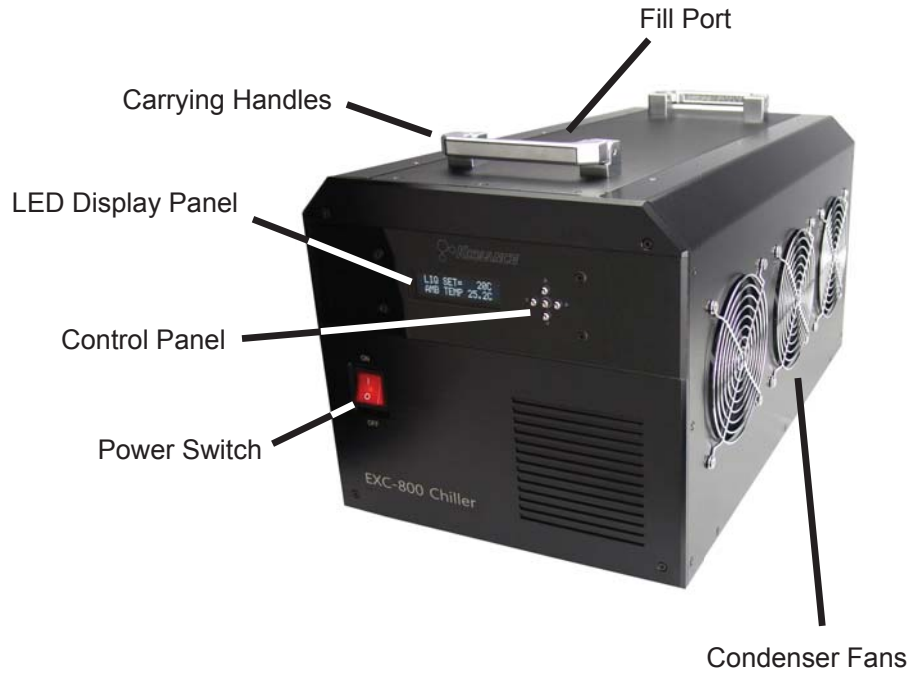
Positioning the System

⚠️ **CAUTION:** Always keep the EXC-800 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.
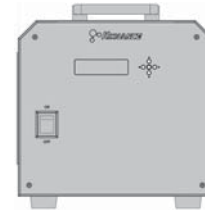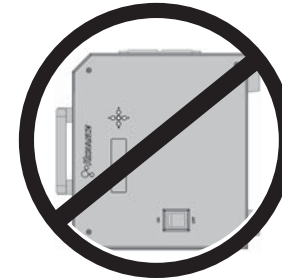
OK!   **NO!**   **NO!**

External Fittings

Install the G 1/4 BSPP threaded fittings you purchased for your cooling system. It's recommended to hand-tighten all fittings to avoid damaging the cooling unit.

Parallel threads seal at the included o-ring. Do not use any plumber's tape or putty on the threads, which can interfere with the o-ring seal.

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

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

Squeeze the tube while pushing it firmly over the fitting. Tubing should completely cover the fitting or barb.

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

## 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.

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

The fill port is located on top of the system over the reservoir. Remove the large slot-headed screw with a screwdriver or large coin.
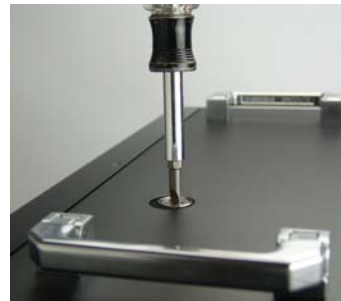
Slowly fill the system with coolant. **To maintain the product warranty, use only Koolance approved coolant.** Many alternative liquids and additives can cause permanent damage to the cooling unit (through chemical reaction, corrosion, biological growth, thermal expansion, viscosity, etc.).
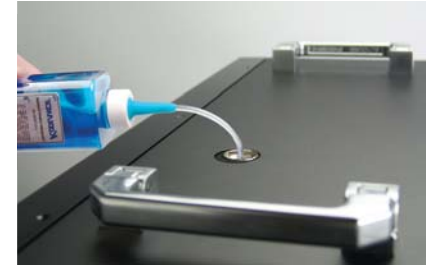
Replace the fill port on the reservoir. **Do not overtighten the fill port.**

Power on the cooling unit. Set the pump to the highest speed setting until most of the air in the cooling loop has been pushed into the reservoir. Once this occurs, the liquid noise will drop. This process can take several minutes, depending on the filling technique and what's connected to the system.

During this process, components 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.

Maximum and minimum fill markings are provided on the back side of the unit to help maintain the coolant level.
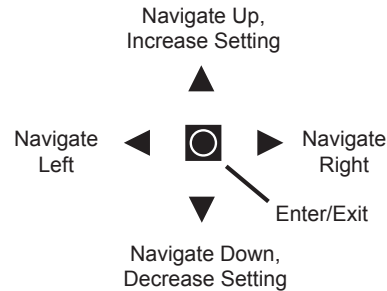
CAUTION: The EXC-800 chiller is specific to one input voltage (either 110VAC or 220VAC) and will not auto-switch between these voltages. Supply only the proper input voltage, as labeled above the AC plug on the rear of the unit. Supplying the improper voltage can damage the unit and is not covered by the product warranty.

Insert the main power cable into the cooling unit and connect the other end to an appropriate AC wall outlet. **Be sure the supply voltage matches what's labeled on the unit.** The product will not accept both 110VAC and 220VAC

Display Panel

The Koolance display panel allows control and monitoring of various aspects of the cooling unit. 4 buttons are used, with directional arrows to navigate or change settings, and a center button to select/exit.


```
LIQ SET=  20C
AMB TEMP 24.7C
```

Navigate Up, Increase Setting
▲

Navigate Left ◄ ◉ ► Navigate Right

Enter/Exit

Navigate Down, Decrease Setting
▼

• 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 SET:   Temperature set-point adjustment
ALARM SET:  Alarm settings
RELAY SET:  Relay Trigger settings
PUMP SET:   Pump speed settings
DISPLAY SET: LCD display settings
```

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

External Sensor

This unit provides a terminal on the rear for connecting a K-type thermocouple (not included) for external monitoring and temperature configuration.
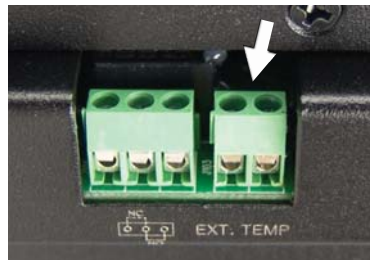
TEMP SET

> **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: 1 to 50°C)
EXT TEMP:  Rear sensor, if attached (Range: 1 to 149°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 5°C above ambient)
```

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

With these settings, it's possible to set the liquid temperature below the environmental air temperature. If liquid temperatures reach the ambient dew point, condensation (water droplets) can form on tubing and cold plates connected to the chiller. Unless condensation is prepared for, **it is recommended to keep the chiller on "LIQ-AMB" with a minimum value of 0°C (which keeps liquid at ambient).**

ALARM SET

This menu affects when the built-in audio alarm will sound. Upon entering the alarm menu, the temperature delta-t value will flash. Press ▼ or ▲ to adjust this value. Press ◉ to accept and return to the previous menu.

```
ALARM SET
(TEMP SET) ± 5C
```

In the above example, the alarm will sound if the temperature exceeds a 5°C difference (+ or -) from the chiller's currently active temperature sensor (see "TEMP SET"). The maximum delta-T setting range for the alarm is 49°C.

The regular audio alarm is a repeating beep. If a steady alarm tone is heard, this indicates the relay has also been triggered (see "RELAY SET").

NOTE: The alarm temperature must be at least 1°C (1-2°F) lower than the relay temperature. If an alarm temperature can not be increased, first increase the relay temperature. Likewise, if a relay temperature can not be decreased, first decrease the alarm temperature.

RELAY SET

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

To adjust the relay trigger point, enter the "RELAY SET" menu. Press ▼ or ▲ to adjust this value. Press ◉ to accept and return to the previous menu.

```
RELAY SET
(TEMP SET) ± 40C
```

In the above example, the relay will trigger if the temperature exceeds a 40°C difference (+ or -) from the chiller's currently active temperature sensor (see "TEMP SET"). The maximum delta-T setting range for the relay is 50°C.

NOTE: The relay temperature must be at least 1°C (1-2°F) higher than the alarm temperature. If an alarm temperature can not be increased, first increase the relay temperature. Likewise, if a relay temperature can not be decreased, first decrease the alarm temperature.
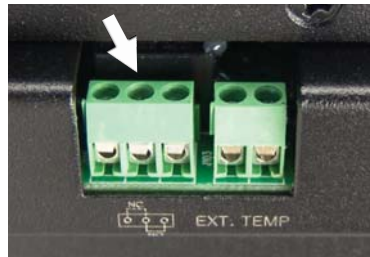
PUMP SET

⚠ **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 thereby damaging the pump) is not covered under the Koolance product warranty.

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:

```
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

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 chiller 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 chiller in various directions to assist with bleeding air from the cooling loop. If it becomes necessary to tilt the chiller to assist with priming, close the fill port and power-off the unit before doing so.

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

   The active 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.

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

   Check that the fittings on the rear inlet/outlet and drain plug are securely tightened (by hand, not with tools). They are parallel type threads, so no plumber's tape or putty should be used or this can interfere with proper sealing.

   If during operation the outsides of your tubing or cold plates is wet, this can indicate condensation. The chiller temperature setting should not be lower than the ambient room air temperature. (See "TEMP SET" for recommendations.)

5. 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.

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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