KEG KING

User Instruction Manual

Designed & Engineered by Keg King

Warnings and General Safety

⚠️ **WARNING**

Beware of electricity around liquids!
Ensure power supply packs and power cords are placed well away
from any potential spills and pooling condensation.

⚠️ **WARNING**

When plugging the 12V Power Supply Pack into the backof the unit, ensure the plug is in the correct orientation, and that the groove in the plug matches up with the key in the 12V DC Power Connection

⚠️ **WARNING**

The pump turns on when power is supplied.
Only provide power when you are ready to prime the pump with coolant.

⚠️ **WARNING**

Do not operate the unit with the pump running dry for extended periods
as this will dramatically shorten the life of the pump.

⚠️ **WARNING**

Although it is highly unlikely that coolant will make its way into the wort/beer, we recommend the use of food-grade glycol diluted with water for the coolant.
Keg King sells food-grade glycol for this application.

ℹ️ **Please read the entire manual before operating.**

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Keg King

Whether you're a brewer or someone wanting to put drinks on tap in your own home, cafe or office, Keg King offers beverage creation and keg dispense solutions for amateurs and pros!

We don't just sell products, we innovate, design and manufacture our equipment to bring your beverage ambitions to life!

Our brands include:

- King Kegs, our Australian Made P.E.T. kegs
- Apollo P.E.T. Pressure Fermenters & Unitanks
- Apollo Titan Stainless Steel Pressure Fermenters
- KegMaster™ Kegerators
- Atomic 15 Brewery Cleaners
- UltraTap Twist FC Faucets
- Spundy spunding valves
- the KegMaster™ Solstice Fridge
- and more!

Check the resellers map on our website to find where our products are available in North America, UK, EU, Aus, NZ and South Africa.
https://www.kegking.com.au/retailers

Since 2009, Keg King's mission is to make the best brewing & dispensing equipment in the world!

Check out our helpful instructional videos on the **Keg King YouTube Channel**
https://www.youtube.com/c/KegKingvideos

Enjoy your Chilli Heating And Cooling!

Introduction

The Chilli Heating and Cooling System is a powerful and efficient temperature control unit.

Released in November 2023, this innovative design from the Keg King Engineering Department packs serious cooling capability into a very small space.

The Chilli also has capacity for heating (36 watts) that will keep a fermenter warm on the coldest days.

Cooling 30 – 35litres (7.9 to 9.2 Gallons) of liquid inside a proper insulating jacket will achieve approximately
20 - 25°C (77 - 95°F) of temperature differential to ambient depending on configuration.

The unit is controlled by an industry standard STC-1000 temperature controller which allows the user to set their desired temperature.

An integral pump with a small priming reservoir pushes the coolant through a heat exchanger and heating element.

A thermal cutout will stop the system if temperature in the liquid exceeds 60°C (140°F).

The unit. works with 12 volts DC and is powered with the included mains DC power pack. It may also be powered by batteries, solar or a mix of these that can provide 12 volts at 5 amps or more.
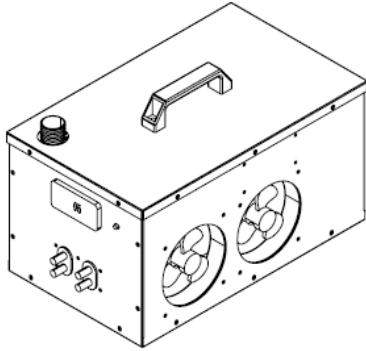
> ℹ️ **NOTE: Power packs must carry local approvals of the power authorities in your jurisdiction.**

Unboxing

Please check that the unit is free of damage and note that it is designed to operate standing horizontally as shown.

Included Items

1. The Chilli Heating And Cooling Unit

2. Temperature Sensor Cable
The sensor probe end is waterproof and can be submerged in liquid.

3. 6A 12V DC Power Supply Pack

4. Mains Power Cord

Additional Items (not included)

Fermenter or Keg
e.g. Apollo 30L Fermenter
Keg King part code 10605

An Insulating Jacket
e.g. Apollo Jacket
Keg King part code 10667

DualTemp Vest
e.g. DualTemp Vest
Keg King part code 12913

2 x Duo Connector Female
Keg King part code 12777

Coolant Tubing
e.g. EVAFresh Beer Line
Keg King part code 5207

"Flow and Tell" visual flow
indicator
(Optional, but recommended)
Keg King part code 11244

Glycol
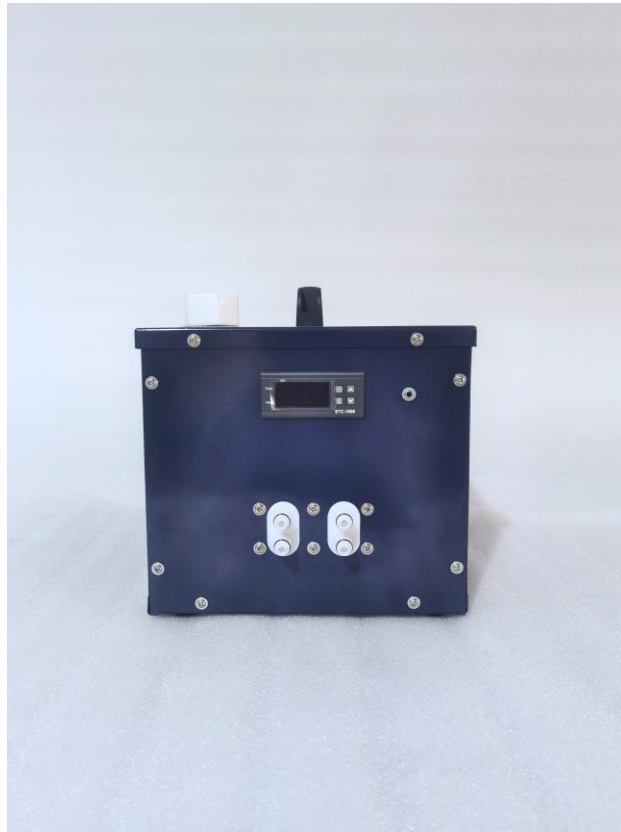(Optional, but recommended)
Keg King part code 8336-500

Pipe insulation sleeves
for the coolant tubing
Available from hardware stores

12913Cooling Coil
e.g. Apollo Cooling Coil
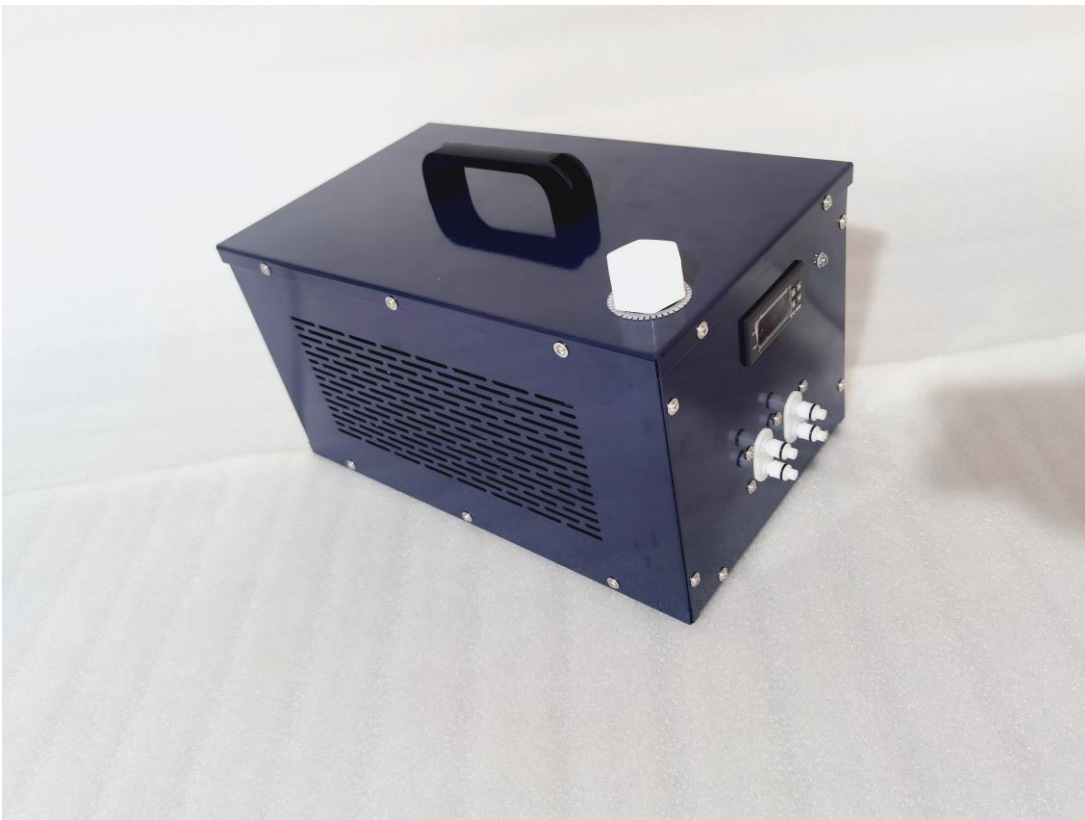Keg King part code 11183

Getting to Know the Unit

The Front

The Back

The Temperature Control Panel

⏻	Power ON & OFF Confirm & save the set value
S	Set key, Entry and Set parameter
⏶	Increase value / Select Function
⏷	Decrease value / Select Function
Cool ●	Cooling indicator
Heat ●	Heating indicator
Set ●	Setting indicator

Code	Function	Set Range	Recommended value
F1	Temperature set value	-50 to 99°C	The yeast fermentation temperature (e.g. 18°C)
F2	Hysteresis	1 to 10°C	0.5°C
F3	Compressor / Cooling delay	1 to 10 minutes	0 minutes
F4	Temperture calibration value	-10 to +10°C	0°C

Instructions

Power ON: hold ⏻ for 5 seconds. **Power OFF:** hold ⏻ for 3 seconds

During normal operation, the screen displays the **real-time temperature** (**RT**)
The controller switches between heating and cooling modes.

Cooling Mode: when **RT ≥ ST (set temperature) + F2 (hysteresis value)**
During Cooling mode, the Cooling Indicator is illuminated.
If the **Cooling Indicator is flashing**, it indicates the compressor / cooling delay is timing out.

When **RT ≤ ST** the cooling stops, and the Cooling Indicator is no longer illuminated.

Heating Mode: when **RT ≤ ST (set temperature) – F2 (hysteresis value)**
During Heating mode, the Heating Indicator is illuminated.
When **RT ≥ ST**, the heating stops, and the Heating Indicator is no longer illuminated.

Example:

ST is set to 10°C, and **F2** is set to 3°C
Cooling Mode starts when **RT ≥ 13°C** and stops when **RT ≤ 10°C**
Heating Mode starts when **RT ≤ 7°C** and stops when **RT ≥ 10°C**

Specifications

Temperature measuring range: -50~99°C
Resolution: 0.1°C
Accuracy: ±1°C (-50~70°C)
Sensor error delay: 1 minute
Power supply: 12V DC
Power consumption: ≤3W (STC-1000 only)
Sensor: NTC sensor (1PC)
Relay contact capacity: Cool 10A/250VAC; Heat 10A/250VAC
Ambient temperature: 0~60°C
Storage temperature: -30~75°C
Relative humidity: 20%~85% (No condensate)

Initial Setup

Fermenter / Keg Preparation

1. Wrap the fermenter / keg vessel in a thermally efficient insulating jacket.

2. The jacket is recommended to have high quality insulating foam at least 5cm thick.

3. Keg King offers various insulating jackets to suit their conical fermenter vessels.
   If you make your own insulation, ensure the sides and bottom have no gaps for cool air to leak from.

4. Position the vessel where it is going to stay, as it will be more difficult to move once connected to the Chilli Heating And Cooling.

Constructing the Coolant Circuit

THERE ARE TWO OPTIONS: Cooling Coils or Dual Temp Vest

You will need to acquire tubing with ball lock (liquid) disconnects to make the coolant circuit between the Chilli Heating And Cooling and a cooling coil in your fermenter or Keg.
This tubing should be as short as practically possible and be fully covered by foam pipe insulation (available from hardware stores etc.).
It is recommended that the "Flow and Tell" visual flow indicator be added to the coolant tubing (best position is close to the Coolant Outlet), so that it will be obvious that the coolant is flowing through the circuit at a reasonable rate.
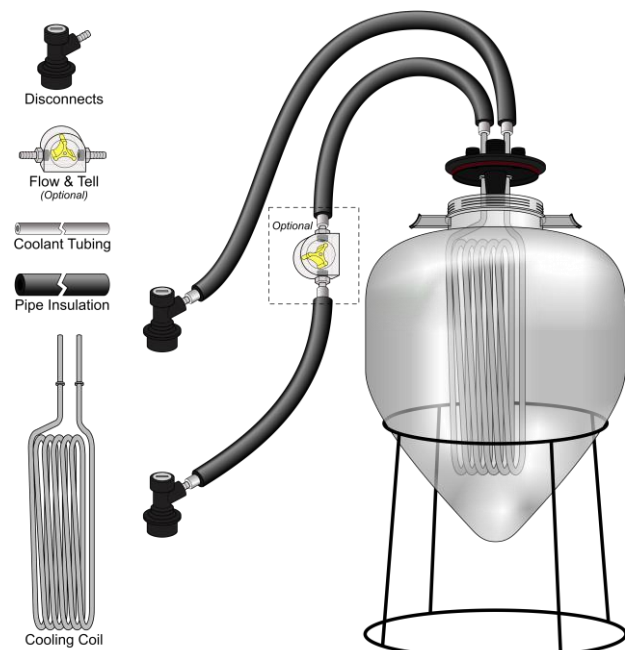
1. Cut the coolant tubing to the required lengths

2. Cut the pipe insulation to the required lengths, allowing extra length to cover connections

3. Thread the coolant tubing into the pipe insulation.

4. Connect a section of coolant tubing to each side of the cooling coil as shown in the diagram to the right

5. Optionally, connect the "Flow and Tell" to the coolant tubing as shown in the diagram to the right

6. Connect disconnects to the coolant tubing as shown in the diagram to the right

Connecting to the Fermenter

OPTION 1 COOLING COILS

1. Connect the coolant lines from the coolant connections on the Chilli to the fermenter Cooling Coil

2. Plug the temperature sensor cable to the sensor jack on the unit.

3. Insert the temperature sensor into the fermenter thermowell. If the fermenter does not have a thermowell, you can tape the sensor to the outside of the fermenter, below the beer/wort level.

4. Ensure the Insulating Jacket fully encloses the vessel, especially at the bottom. Insulate the coolant between the Chilli and fermenter.

Preparing the Coolant

For either method of temperature control (coils or wrap) you will require water with a 10% glycol solution to create the liquid coolant required for operation.

Coils will require a small quantity of only 250ml to 350ml coolant in total depending on the coil variety

The wrap will require up to 2.5L depending on the size of the fermenter.

For the wrap, we would recommend mixing 2.7L of water with 0.3L of glycol to create the liquid coolant. The entire amount of coolant may not be required.

> **NOTE: Although glycol is recommended to protect against freezing, glycol is an inefficient thermal conductor, and using a coolant mixture with too high a ratio of glycol will reduce efficiency.**
> **We recommend a ratio of 10% glycol to water.**

OPTION 2 The DualTemp Vest

1. Attach the x2 lengths of tubing to the connections on the DualTemp Vest. Ensure the tubing is cut long enough to reach to your Chilli Unit.

2. Cover the tubing in pipe insulation sleeves.

3. Cut a small 15cm portion off the Chilli side end of one of the tubes, install the optional Flow and Tell visual flow indicator Keg King part code 11244 on the tube and place the 15cm offcut of the tube on the other end of the visual flow indicator. The flow indicator can be installed to either tube.

4. Wrap the empty DualTemp Vest around your fermenter vessel so that as much of the vessel surface as possible is in direct contact with the DualTemp Vest wrapped reasonably tight.

5. Ensure the fermenter vessel is in a size appropriate insulated jacket like the 30L Apollo Insulated Jacket Keg King part code 10667.

6. Install the tube ends onto the barbs of a Female Duo Connector.

7. Connect the female end of the Duo Connector onto one set of the male Duo Connect posts on the front of the Chilli Unit.

8. Connect the temperature sensor cable to the **sensor connection** on the front of the Chilli unit.

9. Place the temp sensor end into the thermowell of your fermenter vessel. If the fermenter does not have a thermowell, you can tape the sensor to the outside of the fermenter, preferably below the beer/wort level

10. Have your coolant liquid prepared in a jug and remove the cap from the reservoir on top of the Chilli unit.

11. Power On the Chilli Unit- You should hear the pump start.

12. Pour your coolant liquid into the reservoir until the liquid being pumped through the tubing loop remains at a level just underneath the cap threads of the reservoir without gurgling noises or bubbling.

13. Once the unit is filled, the pump will operate quietly. Check there are no air bubbles in the line.

14. Replace the cap on the reservoir.

Priming the Pump

⚠️ **Do not operate the unit with the pump running dry for extended periods as this will dramatically shorten the life of the pump.**

The pump will turn on automatically when power is supplied. Before applying power, ensure you have coolant ready.

ℹ️ **Using a flow indicator is recommended to show that coolant is flowing correctly.**

ℹ️ **If using a flow indicator, some bubbles may get caught in it. To remove the bubbles, tilt the flow indicator vertically so that the coolant flows through it in the upward direction. The bubbles should work their way up and out.**

General Operation

The temperature sensor provided determines the cooling or heating. When it senses the set temperature is reached, the unit will pause heating or cooling, until the temperature change is sufficient to cause it to continue.

Ideally, you will use this unit with an Apollo Conical Fermenter or similar with a thermowell for the temperature sensor probe. This allows the temperature inside the liquid to be measured. Alternatively, you can tape the sensor probe to the outside wall of the fermenter or keg, however, this will not be quite so accurate.

Setting the Temperature and Other Settings

This is done via the STC-1000 Temperature Control Panel. It should be preset to 18°C (64.4°F).

There are four settings that can be configured on the STC-1000 temperature controller.

F1 is the temperature setting for the sensor to reach.

F2 is the hysteresis setting. Once the temperature set via F1 is achieved, the unit pauses any heating or cooling.
The hysteresis value is the temperature difference threshold at which the unit resumes heating or cooling. Setting this value too small will result in excessive heat / cool cycling. Typically, 0.5°C (1°F) should work well.

Example: with a hysteresis value of 1° and a temperature setting of 5°, the unit will reach 5° and then pause actively heating or cooling. If temperature rises by 1° above 5°, it will then start cooling until it reaches 5° again. Or if the temperature drops by 1° below 5°, it will start heating until it reaches 5°.

F3 is a cooling delay setting which is set to 1 minute.

F4 is a temperature calibration offset value. Set this value if you test the sensor in a liquid with a known, validated (from an accurate thermometer) temperature, and the STC-1000 reads a different temperature.
Set this value to the difference between the cabinet sensor reading and the validated temperature

To set any of the above settings:

If the unit does not have power supplied, connect it to power via the 12V DC Power Supply Pack

You should hear the pump start up.

1. ⏻ If the Temperature Control Panel is off, press and hold the power button until it turns on.

2. S Press and **hold** the "S" Setting button for 3 seconds or more.
   The setting mode is active when indicated by the SET LED on the display.
   F1 The display will show F1, which indicates the temperature setting mode.
   To set the temperature, go to step 4.

3. 🔼 Use the up and down arrow buttons to change the "F" setting that you need to
   🔽 change.
   (F1, F2, F3, F4 as detailed above)

4. S Press and **hold** the "S" button again to activate the function setting mode

5. 🔼 While continuing to hold the "S" button, use the up and down arrow buttons to set the
   🔽 desired value.

6. ⏻ Press the power button to save the set value.

Troubleshooting

Issue	Remedy
Coolant is frozen & not flowing. Or coolant is flowing too slowly.	Turn off the mains power to the Chilli Heating and Cooling and leave off for 1 hour. After this time, the coolant should return to liquid form and be ready to operate again.