



# Thermentor King MAX

*Compact High Power Fermentation Temperature Control*



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 front of 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 or operate the unit.



### 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.**



**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
- 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 Thermentor King MAX!



## Introduction

The Thermentor King MAX is a powerful and efficient temperature control system, utilising an advanced cryo-cooler heat pump for highly efficient cooling.

This innovative design from the Keg King Engineering Department incorporates 56 separate patents, and features technology used in military aircraft to cool instrumentation. The Thermentor King MAX was released in November 2021.

It has a generous capacity for heating (60 watts) that will keep a fermenter warm on the coldest days.

Cooling 30 - 35 liters of liquid inside a proper insulating jacket will achieve approximately 20 - 25°C (36 - 45°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 is utilised to push the coolant through heat exchangers combined with a heating unit and a Stirling Engine cooler.

A thermal cutout will stop the system if temperature in the liquid exceeds 40°C (104°F).

The unit is designed to work 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.



**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 vertically with the black reservoir cap on top.

## Included Items



1. The Thermentor King MAX 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



Cooling Coil  
e.g. [Apollo Cooling Coil](#)  
Keg King part code 11183



2 x [Liquid Ball Lock Disconnect](#)  
Keg King part code 8275



Coolant Tubing  
e.g. [EVA Fresh 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



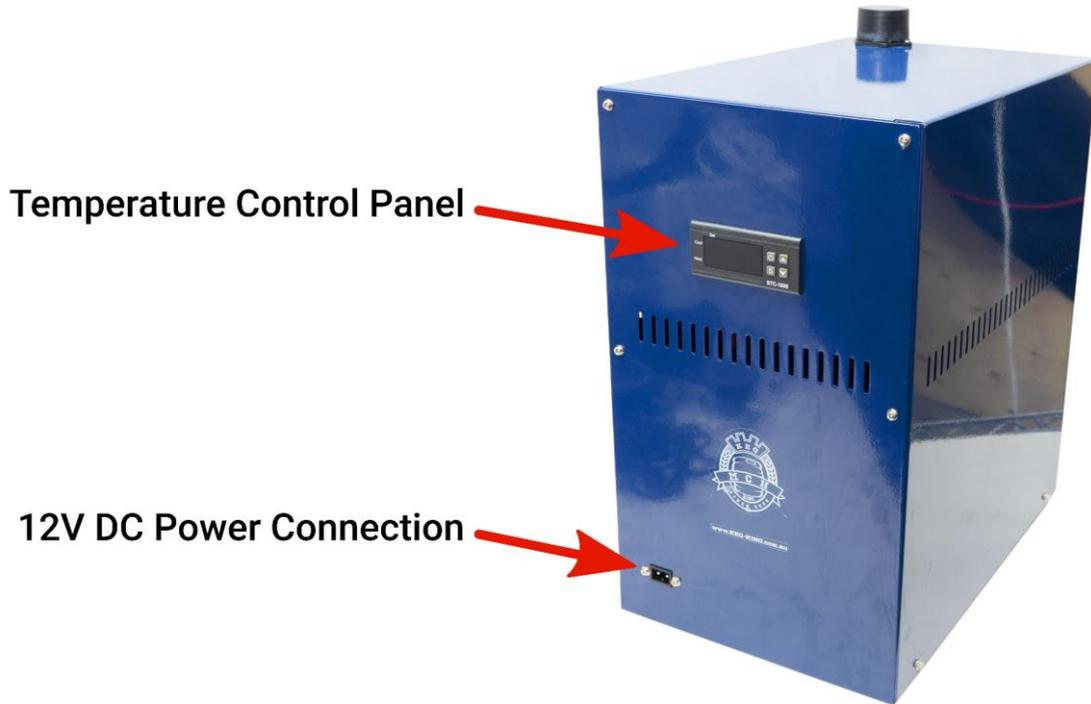
Pipe insulation sleeves  
for the coolant tubing  
Available from hardware stores



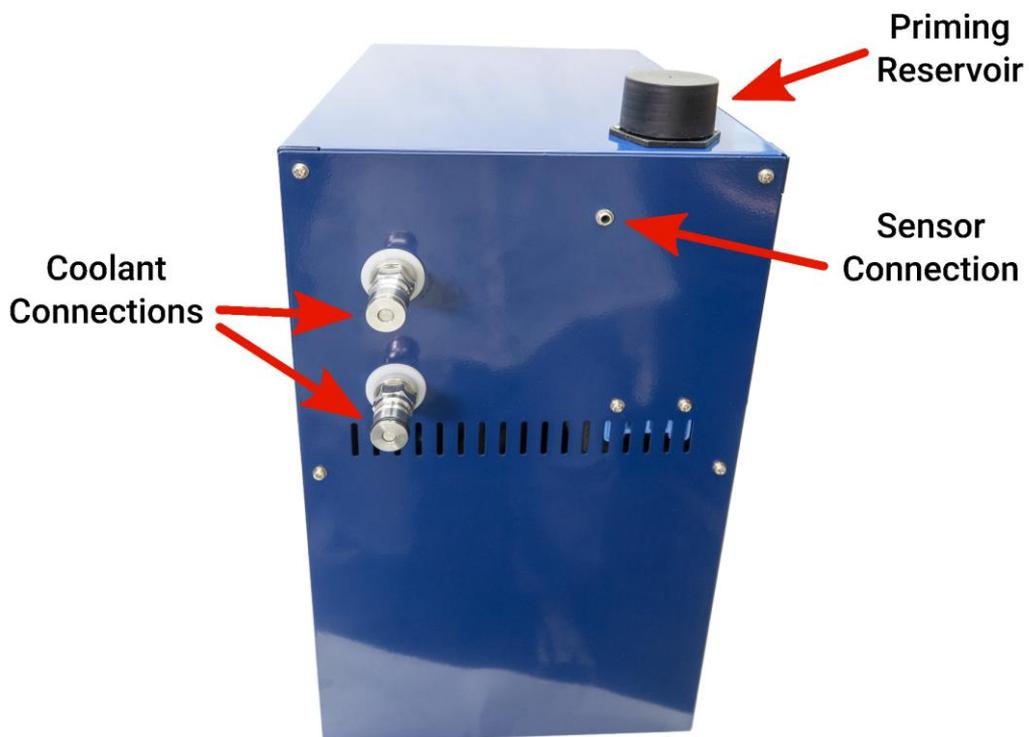
Water for the circulating coolant  
250 - 350ml

# Getting to Know the Unit

## The Front



## The Back



## The Temperature Control Panel



-  Power ON & OFF  
Confirm & save the set value
-  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	Temperature 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  $RT \geq ST$  (set temperature) + F2 (hysteresis value)

During Cooling mode, the Cooling Indicator is illuminated.

If the **Cooling Indicator is flashing**, it indicates the cooling equipment is undergoing the compressor / cooling delay (not necessary for this unit).

When  $RT \leq ST$  the cooling stops, and the Cooling Indicator is no longer illuminated.

**Heating Mode:** when  $RT \leq ST$  (set temperature) – F2 (hysteresis value)

During Heating mode, the Heating Indicator is illuminated.

When  $RT \geq ST$ , 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  $RT \geq 13^\circ\text{C}$  and stops when  $RT \leq 10^\circ\text{C}$

Heating Mode starts when  $RT \leq 7^\circ\text{C}$  and stops when  $RT \geq 10^\circ\text{C}$

### Specifications

**Temperature measuring range:** -50~99°C

**Resolution:** 0.1°C

**Accuracy:**  $\pm 1^\circ\text{C}$  (-50~70°C)

**Sensor error delay:** 1 minute

**Power supply:** 12V DC

**Power consumption:**  $\leq 3\text{W}$

**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 Thermentor King MAX.

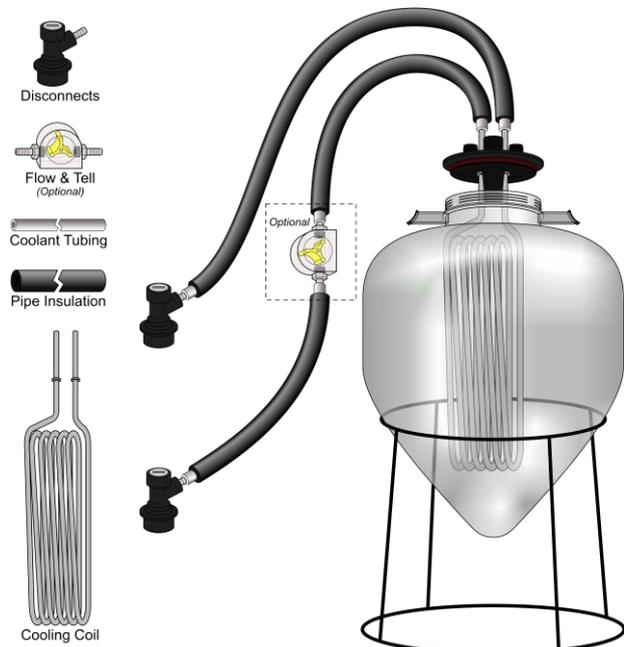


### Constructing the Coolant Circuit

You will need to acquire tubing with ball lock (liquid) disconnects to make the coolant circuit between the Thermentor King MAX 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

1. Connect the coolant lines from the **coolant connections** on the Thermentor King MAX to the fermenter Cooling Coil
2. Connect the temperature sensor cable to the **sensor connection** 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, preferably below the beer/wort level
4. Ensure the Insulating Jacket fully encloses the vessel, especially at the bottom.



## Preparing the Coolant

Depending on the circulating coolant tube length, you will need approximately 250-350ml of liquid.

It is possible to operate with just water, but there is a chance of blockage due to ice forming in the cooling unit.

To avoid ice forming, it is recommended to use a mixture of glycol and water made with 3 to 4% glycol  
 e.g. mix 330ml water with 10 to 14 ml glycol.



**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 3 to 4% glycol to water.

## 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.

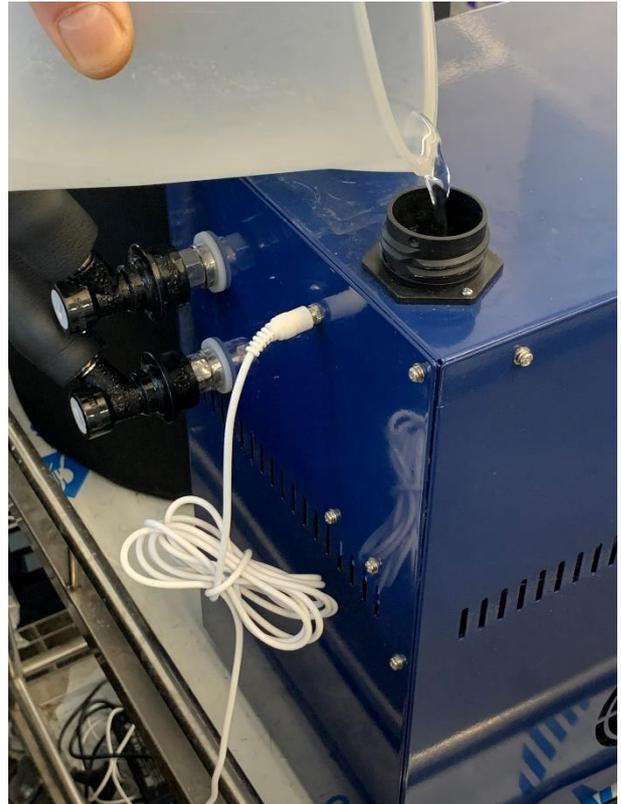
The pump will turn on automatically when power is supplied. Before applying power, ensure you have coolant ready.



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

1. Position the Thermentor King MAX roughly level with the beer/wort vessel (or even a bit higher to get started).
2. Unscrew the black cap off the **priming reservoir**.
3. Fill the priming reservoir with coolant, without overflowing it.
4. Connect the unit to power and power it on.  
You should hear the integral pump start up. It may sound strongly as there is not yet enough liquid to fill the coolant circuit.
5. If the Temperature Control Panel lights up, press and hold the  power button until the Temperature Control Panel turns off.

**NOTE: the pump will continue to run, even if the Temperature Control Panel is turned off.**



6. Slowly pour more coolant mixture into the priming reservoir.  
You should be able to hear the pump starting to move the coolant.
7. Continue to top-up the priming reservoir, without overflowing it.  
You should be able to observe the coolant level drop as the coolant circuit fills.
8. Keep topping up until the coolant level remains steady.  
Some bubbles may escape while the coolant circuit continues to fill.  
Once the bubbles have stopped and the level remains steady, the pump noise should subside to a quiet whirr.
9. Replace the black cap on the priming reservoir and tighten gently, but firmly.
10. If the pump sounds like it is labouring, check that there are no kinks or blockages in the tubes.



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 is what 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 fermenter 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**

**F1** is the temperature setting for the sensor to reach.

**F2**

**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**

**F3** is a cooling delay setting which can be set to zero as the Thermentor King MAX can switch between cooling and heating without ill effects. If the unit has been actively cooling and stops due to reaching the set temperature, it will not start cooling again until the cooling delay is passed (and the temperature is above the set hysteresis value).

**F4**

**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.  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.  
 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.  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 Thermentor King MAX and leave off for 1 hour. After this time, the coolant should return to liquid form and be ready to operate again.

