G20 Glycol Chiller | User Guide

KL16049 | KL47340 | G20 Glycol Chiller | User Guide

The Icemaster G20 is an efficient glycol chiller that has fantastic cooling performance.

It is compact, quiet and ideal for a domestic environment. It is powerful enough to chill well-insulated fermenters up to 200L in size or multiple smaller fermenters.

The G20 has 500watts of cooling power making it suitable for crash chilling even in hot ambient temperatures in your garage or brewery.

Specifications

- **Refrigerant**: r600a isobutane
- **Cooling Power**: 190watts (0.25hp) (Rated at 22C)
- **Power Consumption:** 110w
- **Tank**: 16.42L
- **Max Head (per pump)**: 5meter
- **Max Flow (per pump)**: 600L/Hr
- **Output Barb Size (KL16049)**: To suit 10mm ID tube
- **Output Barbs (KL47364)**: Dry Break **JoinTech 1/2" Male Fittings ↗ ~ Requires Dry Break Female JoinTechs for hosing (13mm ID) ↗**
- **Dimensions:** 510mm x 300mm x 460mm (L x W x H)

Initial Setup & Testing

G20 Glycol Chiller | Initial Setup & Testing

⚠️ **If Glycol Chiller has been moved/delivered do not turn it on unless it has been standing upright for at least 24 hours. Failure to do this will void warranty and may damage the unit. Leave the Glycol Chiller upright for at least 24 hours before plugging in mains power after receiving and unboxing**

⚠️ **Ensure there is at least 100mm of clearance on each side of the Glycol Chiller to allow adequate airflow. Failure to allow adequate ventilation will reduce performance, increase power consumption and void warranty**

⚠️ **This Glycol Chiller is not intended for cooling wort from boiling or temperatures above 50°C. Using the chiller to cool liquids above 50°C can overload the compressor and will void warranty**

⚠️ **Do not run the pumps dry or allow the reservoir to ice over. Ensure the pumps are always submerged when in operation. Running the pumps dry or increased resistance due to ice formation can damage the pumps.**

⚠️ **Whenever the glycol chiller is operating and cooling the reservoir the pumps should be operating to keep the liquid in the reservoir agitated and avoid ice formation**

⚠️ **Replace propylene glycol solution every 12 months to avoid potential damage to pumps, lines or reservoir**

Before Installation

1. Let the glycol chiller sit for at least 24 hours after delivery or after sitting on its side before turning the unit on
2. Ensure there is adequate ventilation (at least 100mm on each side of the glycol chiller)
3. Check for any signs of damage which may have occurred during shipping

Assembly | G20 KL16049

First, attach the Sight Glass to the G20 by firmly pushing the included 9.5mm duotight Tee Pieces onto the push fit tubing on the front of the unit as shown.

Check that there are 9.5mm duotight plugs in the opposite end. Install the EVABarrier Sight Glass bewteen the two fittings as shown. Pull firmly on the duotight fittings ensuring they are locked in place.

Next install two lengths of 10mm ID silicone tubing to the **OUT** barbs. Connect each of these to the adjacent **IN** barbs as shown. This is to loop the input and output for testing.

With the G20 unplugged fill the reservoir with water until the water level reaches the top of the sight glass

Install the temeprature probes - push the male connector of the temperature probe into the female socket by each temeprature controller.



Sight Glass and Silicon Tubing Installation

Assembly | KL47340 JoinTech G20

First, attach the preassembled Sight Glass to the G20 by threading the 1/2" Quick Swivel Connector onto the corresponding 1/2" male thread on the front of the G20 as shown.

Lock the Sight Glass assembly in place as indicated.



The JoinTech fittings form a dry break, so for testing there is no requirement to loop the input and output as with the non JoinTech G20.

With the G20 unplugged fill the reservoir with water until the water level reaches the top of the sight glass

Install the temeprature probes - push the male connector of the temperature probe into the female socket by each temeprature controller as in the above diagram.

Testing the system

Perform a leak test and cooling test on your system to ensure that all connections are water tight, the pumps are operational and the glycol chiller is chilling the reservoir correctly

1. With the G20 unplugged fill the reservoir with water until it reaches the top of the sight glass
2. Check for any signs of leaks around the exterior of the G20
3. Ensure 10mm ID silicone tubing is attached as shown above - not required for JoinTech
4. Plug the G20 in using the provided IEC cable and turn the red power switch on

5. Set the temperature on each temperature controller on the front of the G20 to 2°C
    a. Hold the 'Up' button for 3 seconds until the number is flashing (this flashing number is your set temperature)
    b. Press the 'Down' button to decrease the set temperature and press the 'Up' button to increase the set temperature
6. Check that each pump is operating correctly
    a. This can be determined by looking for water flow through the silicone tubes or by placing the outlet hose into a jug and ensuring that liquid is being pumped out of the hose into the jug
7. Set the temperature on the STC-1000 controller on the *rear* of the G20 above the IEC plug to 2°C
    a. Hold the 'S' button until **F1** is displayed
    b. Press '**S**' again which will enter temperature adjustment mode
    c. Then hold '**S**' *and* up or down buttons simultaneously to adjust the set point temperature of the reservoir
    d. Once the desired temperature has been entered, press and release the **power** key to save the parameter

NOTE: Refer here for the full **STC-1000 Instruction manual** ↗

Performing this test you can get a rough guide of the cooling factor of the glycol chiller when *not* under load. To determine this note the starting temperature of the water in the reservoir and then measure how long it takes to drop the temperature to 2°C

Leak Testing

Prior to putting any beer into the fermenter for cooling you should leak test your whole system. Refer to Fermenter Setup specific to the G20 for this.

Set the temperature on the temperature controller to 2C and test that there are no leaks in the system including into the fermenter itself.

After all testing is complete, empty the reservoir by removing the plug on the bottom 3/8" duotight fitting on the nylon sight tube. This can be achieved by removing the blue retaining clip on the duotight fitting and pushing in on the collar as you pull on the plug. After you have drained the reservoir put the plug retaining clip back in place.

The system has now been tested for cooling and leaks and is ready to be used to cool a fermenter.

Filling the Reservoir

The G20 can be operated with either just water in the reservoir or both water and glycol to reduce the freezing point of water.

For fermentation control, a glycol mix is greatly preferred as the cooling power of the G20 will be much higher than if used with water alone. This is because the glycol lowers the freezing point so the reservoir can be set to -5°C or lower (depending on ambient, the water/glycol mix and other factors)

IMPORTANT: If you are only using water in the reservoir and not glycol then do not set the temperature of the reservoir below 2°C

Fill the reservoir to the top of the sight glass with water or a water/glycol mix

if the reservoir is filled with water set the reservoir temperature controller to 2°C. If using glycol solution the reservoir temperature can be set below 2°C according to the table below.

Ensure the cooling coils are submerged. The amount of glycol required to be added to the reservoir depends on the desired set temperature of the reservoir which is dependent on a number of factors including how many fermenters are being cooled, the ambient temperature the fermenters are in and heat ingress etc. Use the table below to determine what percentage of glycol you require.

Settting Reservoir Temperature

The reservoir temperature is controlled with the STC-1000 Temperature Controller.

To set the reservoir temperature:

1. Hold the 'S' button until **F1** is displayed
2. Press '**S**' again which will enter temperature adjustment mode
3. Then hold '**S**' *and* up or down buttons simultaneously to adjust the set point temperature of the reservoir
4. Once the desired temperature has been entered, press and release the **power** key to save the parameter

NOTE: Refer here for the full **STC-1000 Instruction manual** ↗

Do not set the Set Point Temperature of the reservoir below 2°C if using water (instead of a glycol solution) in the reservoir (AKA an icebank setup)

Refer to the Glycol Percentage Chart below for recommended Set Point Temperatures with corresponding glycol percentage

Glycol Percentage Chart

Glycol Volume %	Freezing Point (°C)	Specific Gravity at 20°
0	0.0°C	1.000
10	-3.3°C	1.006
20	-7.8°C	1.015
30	-13.3°C	1.024

You can measure the glycol percentage using a calibrated refractometer and comparing to the specific gravity at 21°C in the above table.

We would advise running a 20% glycol solution. However, if you do not have a jacketed fermenter or have the fermenter in a very warm environment you can run it at a higher glycol concentration. **The pumps are not designed to be run with a glycol concentration higher than 30%** hence it is not advised to exceed this glycol concentration. Doing so may damage the pumps.

Fermenter Setup

G20 Glycol Chiller | Fermenter Setup

Once the G20 has been setup and tested, and is filled with a glycol solution of the appropriate ratio, we are ready to attach the lines to the fermenter(s)

Typical Fermenter Setup | KL47340 JoinTech G20

IMPORTANT: Prior to connecting the G20 to the fermenter ensure that the temperature of the liquid in the fermenter is below 50°C. The G20 is not designed to cool from boiling to 50°C and instead normal tap water should be recirculated through the cooling coils first to drop the temperature of the liquid

KL47340 JoinTech G20 has KL41096 JoinTech Male Connector with Auto Shut Off ↗ fittings as standard. This works in conjunction with KL41102 JoinTech 13mm Barb x Female Connector with Auto Shut Off ↗

The 13mm barb on the female JoinTech fitting is ideally suited for KL40587 Red Glycol Insulation Hose - 2m Roll x 12mm ID x 16mm OD - Foam 15mm Thick ↗ and KL40570 Blue Glycol Insulation Hose 2m Roll x 12mm ID x 16mm OD - Foam 15mm Thick ↗

It is recommended to secure the insulated glycol tubing to the JoinTech barb using KL06729 Bag of 20 x 18.5mm S.S. Stepless Clamps(suit 16-18mm OD) ↗ as illustrated



For best performance, insulate the hosing between the G20 (if not using pre-insulated tubing as above) and the fermenter and try and minimise
the distance between the Glycol Chiller and fermenter(s)

1. Before connecting the Glycol Chiller to the fermenter ensure that the liquid in the fermenter is below 50°C. The Glycol Chiller is not designed to cool liquids above 50°C so the liquid in the fermenter must be cooled below 50°C before the Glycol Chiller is connected
2. Connect a suitable length of 12mm ID tubing for your application to the desired outlet (OUT) port on the G20 using JoinTech fittings
3. Connect the tubing to the cooling coil or jacket inlet on your fermenter
4. Run a length of 12mm ID tubing from the coil or jacket outlet back into the inlet (IN) adjacent to the outlet chosen on the G20 using JoinTech fittings
5. Insert the temperature probe into the thermowell of the fermenter being controlled. If there is no thermowell, tape and insulate the temperature probe to the side of the fermenter
6. Set the temperature on the temperature controller to the set temperature of fermentation
7. Set the temperature on the temperature controller for the reservoir to between -2° and -6°C if using glycol. Do not set this to a temperature lower than recommended according to this table. **If you are only using water in the reservoir and not glycol then do *not* set the temperature of the reservoir to below 2°C**

Typical Fermenter Setup | G20 KL16049

The Glycol Chiller has 10mm barbs as standard, suited to KL18142 10x15mm Heavy Duty Silicone Tubing ↗

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The Glycol Chiller has 10mm barbs as standard, suited to KL18142 10x15mm Heavy Duty Silicone Tubing ↗

For best performance, insulate the hosing between the G20 and the fermenter and try and minimise the distance between the Glycol Chiller and fermenter(s)

1. Before connecting the Glycol Chiller to the fermenter ensure that the liquid in the fermenter is below 50°C. The Glycol Chiller is not designed to cool liquids above 50°C so the liquid in the fermenter must be cooled below 50°C before the Glycol Chiller is connected
2. Connect a suitable length of 10mm ID silicone tubing for your application to the desired outlet (OUT) port on the G20

3. Connect the silicone tubing to the cooling coil or jacket inlet on your fermenter
4. Run a length of 10mm ID silicone tubing from the coil or jacket outlet back into the inlet (IN) adjacent to the
   outlet chosen on the G20
5. Insert the temperature probe into the thermowell of the fermenter being controlled. If there is no thermowell, tape and insulate the temperature probe to the side of the fermenter
6. Set the temperature on the temperature controller to the set temperature of fermentation
7. Set the temperature on the temperature controller for the reservoir to between -2° and -6°C if using glycol. Do not set this to a temperature lower than recommended according to this table. **If you are only using water in the reservoir and not glycol then do *not* set the temperature of the reservoir to below 2°C**

NOTE: When under load such as when cooling a fermenter it can take a longer time than the cooling factor you have measured to cool the reservoir down to the set temperature This time is dependent on a number of variables including but not limited to:

- Jacketing of the fermenter (jacketed or non-jacketed)
- Number of fermenters being cooled
- Ambient temperature
- Heat ingress
- Line legth and type
- Insulation of the system

An ideal setup would include some or all of the following features.

- Short runs of line to/from the G20 and the fermenter
- Insulation of the lines
- Insulation of the fermenter
- Gycol rather than water (to allow the reservoir temperature to drop below 0°C)
- Controlled ambient temperature
- G20 and fermenter out of direct sunlight

Cooling fermenters a large distance from the G20

The G20 is capable of cooling 200L jacketed fermenters. However, if your fermenter is a large distance away from the G20 then the submersible pumps may not be able to handle this increased resistance. Hence, it is suggested for fermenters at a distance that an external pump be used to transfer the glycol to the fermenter.

It is also important that thermal losses in the system are minimised as much as possible by insulation of all parts of the system.

1. Connect an external pump to an external temperature controller
2. Remove the retaining clip and 3/8” plug from the bottom duotight fitting on the nylon sight tube. Attach 9.5mm (3/8”) EVABarrier tubing (KL06248) to the duotight fitting and connect this tubing to your external pump
3. Attach tubing to the outlet of the external pump and attach this tube to the cooling coils or jacket on your fermenter
4. Run tubing from the outlet of the fermenter cooling coils back into the reservoir of the G20
5. Set the temperature on the temperature controller for the reservoir to between -2° and -6°C if using glycol. Do not set this to a temperature lower than recommended according to this table. If you are only using water in the reservoir and not glycol then do *not* set the temperature of the reservoir to below 2°C. For long runs using a glycol mixture is *strongly* recommended
6. Insert the temperature probe of the external temperature controller into the thermowell on your fermenter
7. Set the temperature on your external temperature controller to your desired fermentation temperature. This will cycle the pump on and off to supply cold glycol solution only when the temperature of the fermenter increases above the set fermentation temperature

Operation

G20 Glycol Chiller | Operation

Temperature Adjustment | Reservoir

The temperature of the reservoir is controlled by the STC-1000 controller at the rear of the G20.



Setting the reservoir temperature:

1. Locate the **STC-1000 Temperature Controller**
2. Hold the **S Button** until **F1** is displayed
3. Press **S Button** again which will enter temperature adjustment mode
4. Then hold the **S Button** *and* **Up** ▲ or **Down** ▼ **buttons** simultaneously to adjust the set point temperature of the reservoir
5. Once the desired temperature has been entered, press and release the ⏻ **power** key to save the parameter

Set the temperature on the temperature controller for the reservoir to between -2° and -6°C if using glycol.

Do not set this to a temperature lower than recommended according to this table. If you are only using water in the reservoir and not glycol then do *not* set the temperature of the reservoir to below 2°C

NOTE: Refer here for the full **STC-1000 Instruction manual** ↗

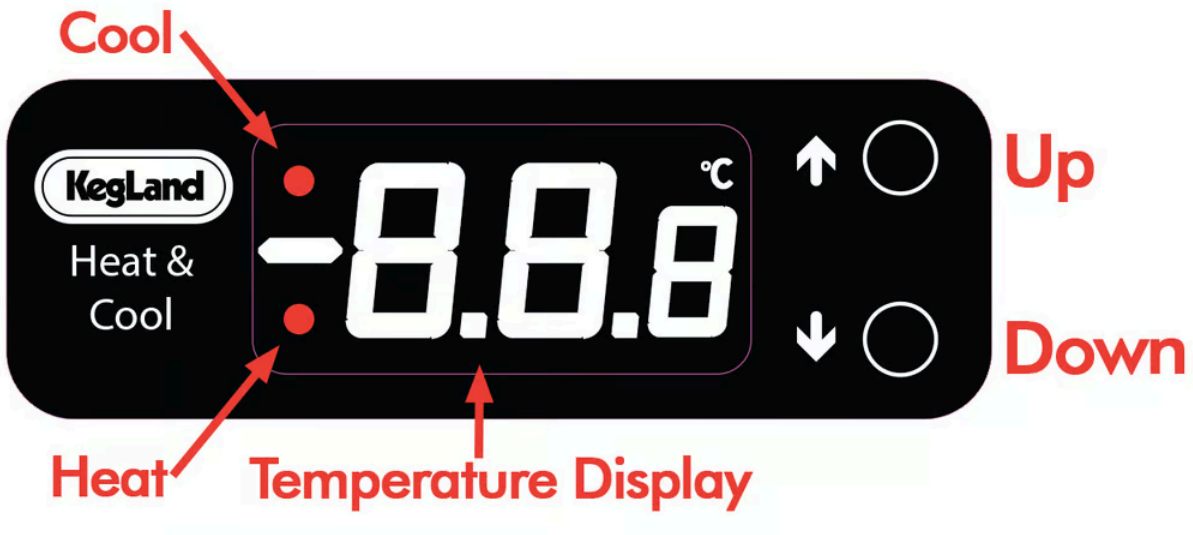
For fermentation control, a glycol mix is greatly preferred as the cooling power of the G20 will be much higher than if used wit water alone. This is because the glycol lowers the freezing point so the reservoir can be set to -5°C or lower (depending on ambient, the water/glycol mix and other factors)

IMPORTANT: If you are only using water in the reservoir and not glycol then do not set the temperature of the reservoir below 2°C

Set Point Temperature | Fermentation Control

The G20.1 includes temperature controllers on the front of the G20 which controls the switching on and off of the submersible pumps and can also be wired to control an external heating source.

To maintain the desired fermentation temperature, set the front controller(s) connected to the fermenter cooling coil or jacket to the desired set point temperature. Ensure the temperature probe for that controller is in a thermowell for the correct fermenter, or taped to the outside of the fermenter and insulated.



To
adjust the parameters of the temperature controllers on the front of the G20 follow these steps

Operation | Front Controllers

Cooling/Heating Indicators

- The Cool Indicator flashes during startup delay
- The Cool Indicator illuminates when cooling is active
- The Heat Indicator* flashes during startup delay
- The Heat Indicator* illuminates when heating is active

Heating is not installed in the Glycol Chiller. The heating relay can be optionally connected to a heating device

Turn Controller On or Off

- Hold the **Down** button for 3 seconds to turn the controller **on** or **off**

Display Set Point Temperature

- Hold the **Up** button for 3 seconds to display the current **Set Point** T**emperature**

Adjust the Set Point Temperature

1. The **Set Point Temperature** can be adjusted whether the controller is On or **Off**
2. Hold the '**Up**' button for 3 seconds until the number on the display starts flashing (this number is the current set point temperature)
3. Press the '**Down**' button to decrease the set temperature or press the '**Up**' button to increase the set temperature
4. Once the correct **Set Point Temperature** is reached, release the buttons and the temperature will be saved once the display stops flashing. If the controller was off when this procedure started it will also turn off.

Cancel Alarm

- If the unit emits an alarm, press any key to cancel the alarm

Parameter Adjustment

1. Hold the "**Up**" and "**Down**" buttons simultaneously for 3 seconds. The first menu code **FO** will appear on the display
2. Press the "**Up**" or "**Down**" buttons to cycle through the parameters **F0**-**F13**
3. Press *both* the "**Up**" and "**Down**" buttons simultaneously to alter the parameter which appears on the display
4. Press the "**Up**" or "**Down**" buttons to change the set value of the parameter selected

If there is no key operation within 5 seconds then the parameter will be set with the displayed value.

The parameters which can be modified are outlined below

Parameters

Parameter	Function	Range	Default	Units
F0	SetPoint range	-40.0 - 90.0	10.0	°C
F1	Minimum value for Set Point	-40.0 - F0	-40.0	°C
F2	Maximum value for Set Point	F0 - 90.0	90.0	°C
F3	Cooling Hysteresis	0.1 - 10.0	0.5	°C
F4	Heating Hysteresis	0.1 - 10.0	0.5	°C
F5	Temperature Probe Calibration	-10.0 - 10.0	0	°C
F6	Cooling Start Delay	1.0 - 10.0	1	Minute
F7	Cooling Start Delay after Power Failure	0 - 300	10	Second
F8	Heating Start Delay	1 - 10.0	1	Minute
F9	Heating Start Delay after Power Failure	0 - 300	10	Second
F10	Max temperature before alarm activation	F11 - 99.9	90.0	°C
F11	Min temperature before alarm activation	-45.0 - F10	-40.0	°C
F12	Alarm Delay	1 - 120	1	Minute
F13	Toggle Celsius/Fahrenheit	0-1	F	N/A

To change any settings on the rear STC-1000 Temperature Controller please refer here for the full **STC-1000 Instruction manual** ↗

Maintenance

If the glycol solution has been stored for an extended period of time then it is suggested to replace the solution, despite glycol having antimicrobial properties.

To replace the glycol empty the reservoir using the drainage port and then refill with the required concentration of glycol using a refractometer to confirm the concentration.

NOTE: It is recommended to drain and replace the gylcol solution every 12 months to avoid freezing issues, as glycol can break down and lose effectiveness over time

Clean out dust from the radiator periodically to maintain optimum efficiency

Heating Relay Instructions

G20 Glycol Chiller | Heating Relay Instructions

⚠️ WARNING ⚠️

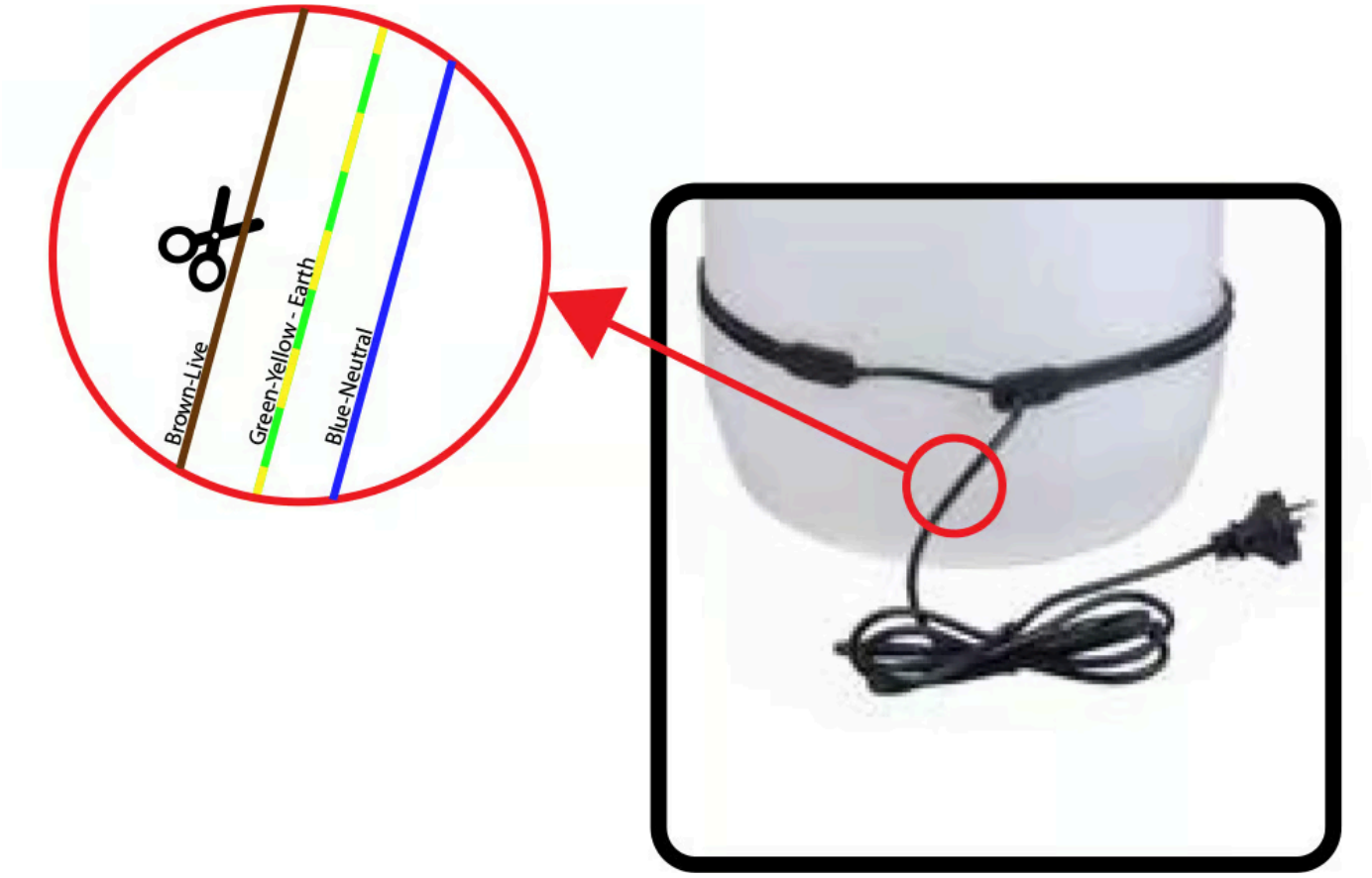
All electrical works must be carried out or inspected by a licensed electrician

Each Temperature Controller has a Heating Relay as standard. This allows a heating device to be wired directly to the Temperature Controller so that it can be turned on or off by the controller.

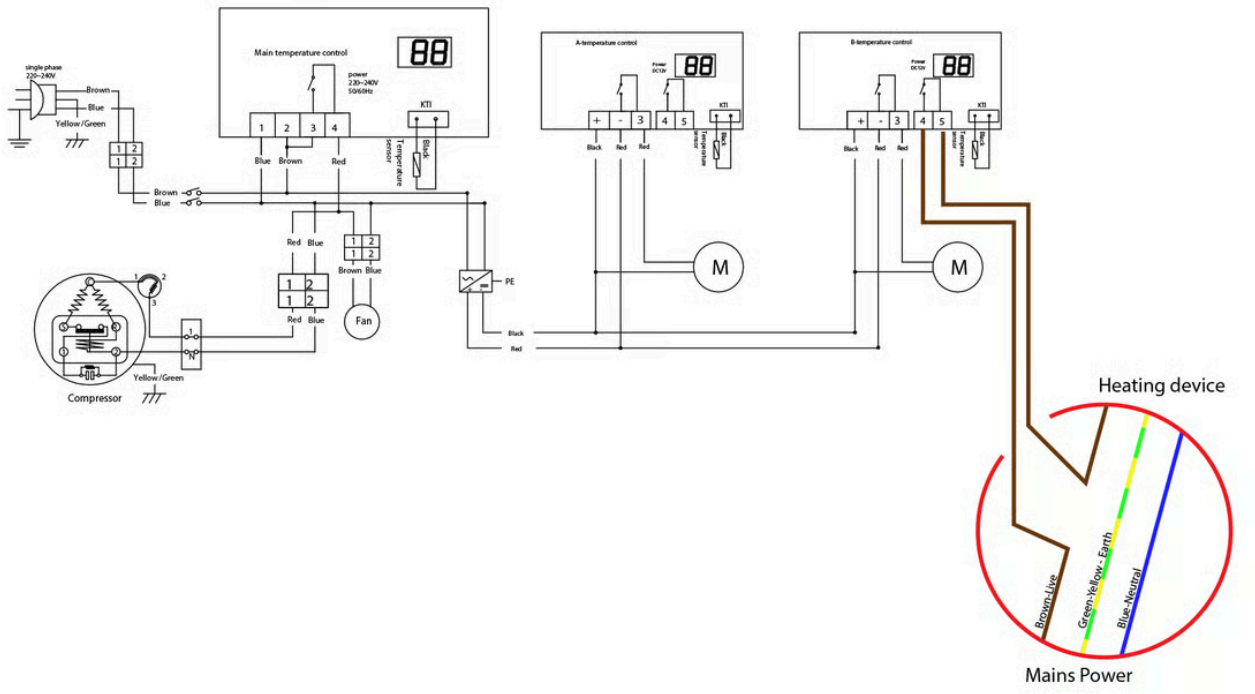
This work must be performed by a licensed electrician.

The heating relay is rated to 240V

1. Unplug the power source for the heating device and the Glycol Chiller
2. Locate and cut the active wire to your heating device (see diagram). Most active wires are brown or red but this should be double checked with an electrician.



3. Divert the active wire into the blade connects (terminals 4 and 5 shown below)



4. Plug both the Glycol Chiller and heating device into mains power

NOTE: This is the same process for each temperature controller. So repeat this step to wire multiple controllers in the same way

KegLand is not liable for electrical work not performed by a licensed electrician

Troubleshooting

Problem	Possible Cause	Solution
Front Controllers not working	Not turned on	Turn controller on by holding **Down** button for 3 seconds*
	Transformer issue	Check transformer to ensure 12V DC is output
EE Error	Probes not plugged in	The Front Controllers will display EE and the alarm will sound if they are turned on when the temperature probe is not installed. Install the temperature probe or turn the controller off to clear the EE error
Front Controllers cycling on and off	Time Delay issue	Set a time delay on one of the controllers - adjust Parameter F6 to any value other than 1 to do this
	Pump Blockage	If the pumps are blocked due to contaminaints or ice build up in the reservoir this cn cause excessive power draw. Empty, clean and flush the reservoir then test again
	Pump Faliure	If a pump has failed for some reason (for example, ice build up) this can cause power cycling. Turn each controller off by holding the down button for 3 seconds, then turn on one by one to isolate this. If the issue is isolated to one controller test that pump
Reservoir not reaching Set Point Temperature	Thermal Loss	If the reservoir does not reach the Set Point Temperature when cooling, this can be due to thermal loss in the system. See Checking System for Thermal Loss below
	Insufficient Clearance	A minimum of 100mm clearance is required on each side of the glycol chiller to ensure adequate heat dissipation for the condensers. Move the unit into open space to improve cooling efficiency
	Set Point may be incorrect	Check the **Set Point Temperature** and adjust if needed.

Pumps not working	Set Point Temperature not correct	The pumps will cycle on or off as called by the cooling relay of the front controller. If the ambient temperature is higher than the set point, the pump will activate. Check that the set point temperature is lower than the measured temperature
	Temperature probe in wrong location	For the most accurate results use a thermowell in the fermenter wto insert the temperature probe
	Faulty or blocked pumps	See above for troubleshooting steps
Heat Relay on but unit is not getting wram/hot	No Heating Device installed	Refer to Heating Relay Instructions to install an (optional) heating device

*__NOTE__: The display will illuminate
if the up button is pushed whether or not the controller is turned on. If the display immediately goes off this indicates the controller is not
turned on.

Checking System for Thermal Loss

The cooling power of the Glycol Chiller is independent of the cooling power of the system - IE the system when connected to fermenter(s). For best results it is important to minimise thermal loss by insulating all lines and fermenters, running as short a line as possible, and ensuring inlets and outlets of cooling coils or jackets are correctly connected.

If the Glycol Chiller is not cooling as expected, or if it is not cooling to the current set point, this can indicate that the thermal losses in the system are too great for the Glycol Chiller to overcome.

To determine if this is an issue with the unit or if it is an issue with the setup it is important to test the cooling Power of the Glycol Chiller independently.

To do this, the Glycol Chiller must be isolated from the fermenters and tubing connecting to the fermenters. We want to only test the cooling power of the reservoir. To do this, remove any existing tubing and run a short length of 10mm ID tubing from the outlet and linlet of each pump as below:



When disconnected, fill the reservoir with fresh glycol solution or with water. **NOTE: If using water do not set the reservoir temperature below 2° as this may cause freezing issues.**

Make a note of the starting temperature - this will be the ambient temperature or thereabouts. Make a note of the time this reading is taken.

Set the reservoir to 0°C (if using glycol) or 2°C if using water.

Leave the Glycol Chiller to run, checking every 10 minutes to observe and note the temperature of the reservoir.

When the set point temperature has been reached, make a note of the total time taken to reach this temperature.

If the Glycol Chiller takes a long time to reach the set point temperature - in excess of 6 hours* then there may be an issue with the Glycol Chiller preventing it from cooling effectively - see **Reservoir not reaching Set Point Temperature** Troubleshootiing above.

***NOTE**: This number is a guide only and external factors will play a part in performance.

If the set point temperature is reached in a reasonable timeframe then it is likely that **any cooling issues are caused by thermal loss in the system**. To combat this, reduce the line length, check that the inlet and outlet are the right way round and insulate the fermenter(s).

It is recommended to set the reservoir temperature to around -5°C when using glycol solution when crash cooling (for example)