**• BE SAFE •**
**PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE OPERATING**

# COMMERCIAL LINE CHILLER INSTALLATION INSTRUCTIONS

**Thank you for your purchase.** The instructions below are intended as a guide to assist you with the installation and use of your BANKS Chiller System by Hydro Innovations. Should you have any questions, feel free to contact our support staff at 512-321-7575 or support@hydroinnovations.com. Our office hours are M-F from 9:30 AM to 6:30 PM CST.

## Installation

Location: Place the chiller on a flat, level surface. Acceptable surfaces are concrete slabs, a/c pads, or pressure treated wood. Be sure that the location is strong enough to support the considerable weight of the chiller (Refer to the spec sheet on page 4 for your chiller's dimensions and weight.) Be sure that the mounting surface is at least 6" larger than your chiller on all sides to prevent dirt and debris from entering the condenser, which will affect the efficiency of your chiller. Under no circumstances should your chiller be located directly on the ground. This will limit its efficiency and may cause damage to the unit that is not covered under warranty. Placing the unit directly on the ground can result in dirt and debris striking the condenser, which can reduce efficiency of heat exchange and can cause damage to the entire unit. Roof mounting is acceptable so long as the roof joists can support the weight of the chiller. Refer to local building codes for further details regarding roof mounting.

**IMPORTANT: BE SURE THAT THERE IS AT LEAST 24" OF CLEARANCE ON ALL SIDES OF YOUR CHILLER TO ENSURE PROPER AIR FLOW OVER THE CONDENSER. BE SURE THAT THERE ARE ABSOLUTELY NO VERTICAL OBSTRUCTIONS.**

## Electrical Connections

Contact an electrician if you are not familiar with basic electrical codes and standards. Your chiller's minimum ampacity is listed on the product label, and you can find recommended breaker sizes on the spec sheet on page 4. The size of wire to run to the breaker will be a product of the ampacity and the length of wire. Contact an electrician or use a wire size calculator to determine the proper gauge of wire to use. Single phase units (up to 5 tons) will have two power legs and one ground leg. Three phase units (7.5 tons and 10 tons) will have three power legs and one ground leg.



**PHOTO A. - Power comes in from the bottom of the contactor as shown. Single phase units will have 2 power legs and three phase units will have 3 power legs.**

**PHOTO B. - Ground leg should be connected to the silver terminal block located beneath the contactor.**

## DO NOT TURN ON YOUR CHILLER UNTIL WATER FLOW HAS STARTED.

For units with a 3 phase compressor (7.5 ton and 10 ton units) you must make sure that the compressor is running properly on initial startup. If compressor makes an unusual noise, you have installed the power backwards. If this is the case, immediately turn the unit off and switch 2 of the 3 power wires.

This unit could be equipped with a fan cycle switch. This means that the fan and the compressor may not run at the same time if outdoor temperatures are low. The fan may cycle on and off while the compressor is running. This is perfectly normal in cooler conditions.

This unit is equipped with a 5 min delay. When you turn the unit on for the first time it will not engage for 5 minutes. If the unit is switched off and then switched back on, it will be 5 minutes before it engages. This allows the system's refrigerant pressure to equalize before restart, which extends the life of the compressor.

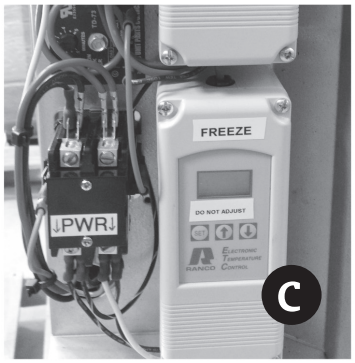



**PHOTO C.**
**The freeze thermostat is located inside the electrical panel, beneath the chiller's controller. This comes preset at 38 degrees and should not be adjusted.**

If the water in your chiller ever freezes, it can cause irreparable damage to the evaporator in the unit. This type of damage is not covered under warranty and you must ensure that you do not accidentally allow the water in the unit to freeze. Proper use of Propylene Glycol is imperative (see notes in the "plumbing" section). For additional protection against freezing, this unit is equipped with a flow switch that will turn off power to your controller if your water flow rate drops to dangerous levels. If you lose power to your controller, please ensure that you have adequate water flowing through the unit. Refer to the "plumbing" section and your spec sheet for flow rate requirements for your specific model. This unit is also equipped with an antifreeze thermostat. This thermostat comes from the factory preset at 38 degrees and should never be adjusted.

## Plumbing

Reservoir: Reservoir size is dependent upon the type and amount of equipment that you are cooling. However, if your chiller is properly sized, reservoirs larger than 50 gallons are rarely necessary.

**IMPORTANT:** YOU MUST USE A MIXTURE OF PROPYLENE GLYCOL IN YOUR RESERVOIR. YOUR RESERVOIR SHOULD BE A MINIMUM OF 30% PROPYLENE GLYCOL/70% WATER AND A MAXIMUM OF 50% PROPYLENE GLYCOL/50% WATER. WE RECOMMEND A 50/50 MIXTURE FOR BEST RESULTS, ESPECIALLY IN COLD ENVIRONMENTS. FAILURE TO USE APPROPRIATE AMOUNTS OF PROPYLENE GLYCOL IN YOUR SYSTEM WILL CAUSE EFFICIENCY DEGRADATION AND CAN DESTROY YOUR CHILLER'S EVAPORATOR, WHICH IS NOT COVERED UNDER WARRANTY.

DO NOT use standard car antifreeze (ethylene glycol). Propylene Glycol is commonly sold as marine and RV coolant and can be purchased at a 50/50 premix with water at many common locations.

Depending on the size of your unit, the plumbing connections will be either 1" or ¾". Refer to the spec sheet on page 4 for the plumbing inlet/outlet size on your unit. It is our recommendation that you run tubing or piping to the unit that is at least ¼" larger than the plumbing connections on the unit (use appropriate adapter to make the connection to the chiller). This ensures maximum water flow without restriction.

Make sure you install the water connections to the appropriately labeled "IN" and "OUT" connections on the chiller. This is very important as your chiller will not work properly if the in and out connections are backwards.

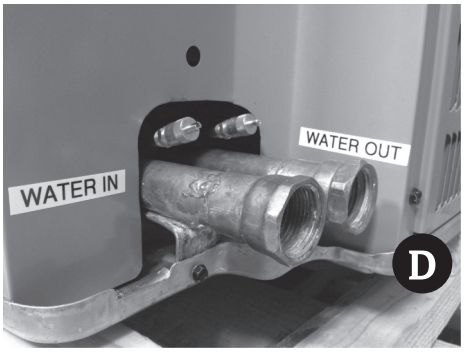



**PHOTO D**
**Water "In" and "Out" must be installed correctly or your chiller will not come on. The brass ports above the water inlet and outlet are refrigeration access points and should never be accessed except by a licensed refrigeration technician.**

Your chiller arrived with a brass strainer and a flow meter. The brass strainer is to remove debris from the water supply and must be installed between your pump and the chiller's "In" water connection. The flow meter allows you to monitor your flow rate and must also be installed between your pump and the chiller's "In" water connection. Failure to use the brass strainer can result in debris building up in your chiller's evaporator, which can restrict efficiency and cause damage to your chiller. If you do not use the supplied flow meter, you will not know how much water flow your chiller is receiving and will not be able to make adjustments accordingly. Both the flow meter and the strainer can be installed at any point between the pump and your chiller's supply, but we recommend that you install them in an easily accessible area so you can monitor the flow rate at a glance and so you can remove and clean the brass strainer as necessary.

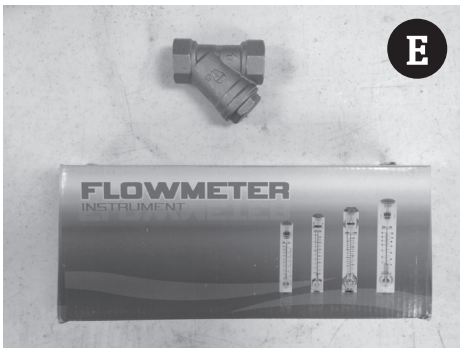



**PHOTO E**
**Flow meter and brass strainer provided with the unit should be installed in an accessible location between the pump and the chiller's "In" water port. Follow the directions on the flow meter and the arrow on the brass strainer for proper direction of flow.**

## - IMPORTANT PLUMBING TIPS -

- Always use back up wrench when installing any water fitting. Failure to use a back up wrench can cause damage to the copper lines, which is not covered under warranty.
- Always use brass strainer provided with chiller on the supply side of the chiller. This keeps particles out of the heat exchanger to help maintain proper flow and efficiency.
- Periodically check and clean strainer to maintain proper water flow. We recommend installing a water valve inline before the strainer and inline after the strainer. This allows you to turn off the valves to clean the strainer without losing glycol. As we recommend using pipe or tubing that is one size larger than the chiller fittings, the strainers provided are always the next size larger than the fitting provided with chiller.
- If 90 degree bends are required, we recommend using long turn 90's or flexible spa tubing to reduce restriction of water flow. Spa tubing can be glued with PVC fitting and PVC glue. In either case, we recommend using tubing or piping that is one size larger than the fittings on the chiller.
- Your chiller requires a flow rate of 2.5 GPM per ton (or 12.5 GPM for a 5 ton unit, 25 GPM for a 10 ton unit, etc). Failure to ensure proper minimum flow rates will reduce the efficiency of the chiller and may damage the evaporator and compressor.
- Your chiller is supplied with a flow meter so you can ensure proper flow through the chiller. Always install flow meter supplied with chiller INDOORS where it can easily be monitored. The flow requirement of your chiller is critical for efficiency and to keep from freezing the evaporator.
- The proper pump size will vary based on distances, the equipment you're pumping to, lift ratings, etc. For assistance with choosing a pump, contact Hydro Innovations.

## Temperature Settings

After you have made all the plumbing connections and ensured proper water flow through your chiller, you can power it on and set your temperatures.

- Turn the chiller on using the switch located on the temperature controller.
- Press “Set” once: Use the up or down arrows to choose Celsius or Fahreneheit.
- Press “Set” twice: Use the up and down arrows to choose the chiller’s set point (NEVER set this below 45 degrees Fahrenheit)
- Press “Set” three times: This is your temperature differential and should ALWAYS be set at the factory preset of 3 degrees. Reducing this number will result in rapid cycling of your chiller’s compressor, which could shorten its life. Increasing this number may result in temperature spikes.
- Press “Set” four times: This setting should always say C1 per the factory preset. Setting it to anything other than C1 will cause the chiller not to come on.
- All other settings should always stay at their factory presets and should never be changed.
- When using your chiller with water cooled air handlers, start with a temperature setting of 55 degrees Fahrenheit and adjust up or down based on cooling and dehumidification needs. Never set it lower than 45 degrees.
- When using your chiller with other water cooled equipment such as Ice Boxes, HydroGEN or MiniGEN, or CoolCoils, start with a temperature setting of 65 degrees and adjust up or down based on cooling needs and dewpoint temperature in the space. Never set it lower than 45 degrees.
- Never adjust the freeze thermostat, which comes preset from the factory at 38 degrees.

## Maintenance and Recommendations

1. Always maintain a clean condensing coil for maximum efficiency. If using your chiller indoors you’ll need to check this more often as dust will build up faster on indoor units. (Outdoor units are often washed by rainfall).

2. Always maintain at least 24” of clearance around the sides of the unit and make sure that the chiller has plenty of fresh air for proper heat exchange.

3. Units 3.5 tons and larger come with a freeze stat that should never be adjusted for any reason. This monitors the outgoing water temperature and will turn off the unit if the water gets near freezing. Frozen water will destroy the evaporator in the chiller, which is the reason for this protection.

4. Do not use chiller indoors without proper ventilation. If the area where the chiller is installed ever reaches 100 degrees there is not sufficient ventilation.

5. If using the chiller below freezing temperatures, a compressor heater must be installed to prevent damage to the compressor. Damage caused by failure to use a compressor heater is not covered under warranty. Compressor heaters can be installed at the factory or can be purchased and installed aftermarket by a qualified technician.

6. Always supply at least 2.5 gallons per minute of water flow per ton of cooling to prevent freezing of the evaporator and to achieve maximum efficiency.

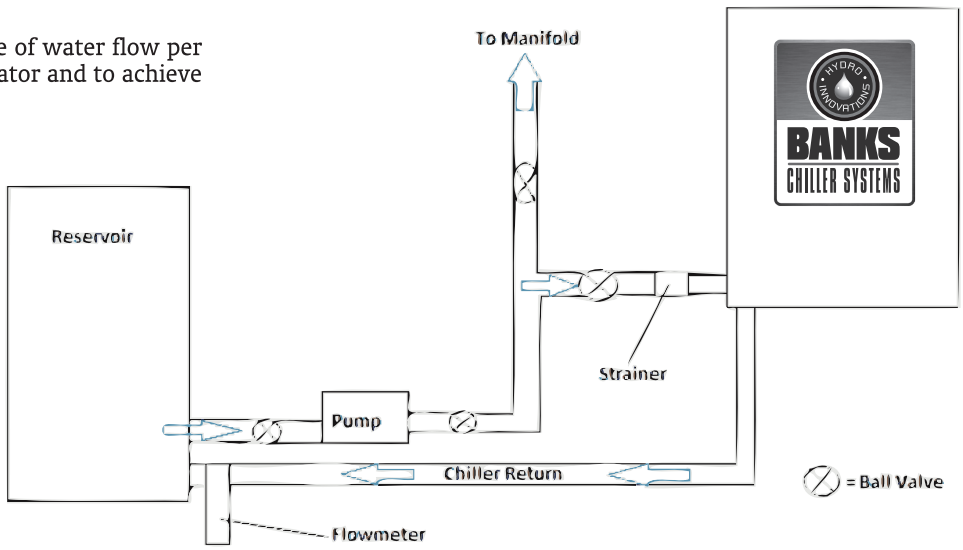
7. Always use the strainer/filter (supplied with chiller) to prevent heat exchanger from clogging up with debris.

8. We strongly recommend a 50/50 propylene glycol/water mixture but at minimum the system should have a 30/70 mixture. Glycol is a lubricant, rust inhibitor and corrosion inhibitor that will keep your system working at peak efficiency. ***Important: Glycol also prevents freezing of the evaporator when temperatures outside are below freezing or if using the chiller at low temperatures.***

9. Never set the chiller below 45 degrees or risk freezing the evaporator, which is not covered under warranty.

10. Use properly sized breakers and wire or damage to the compressor could occur. The further the unit is away from the breaker box the larger the wire must be to carry sufficient amperage when the compressor starts. Damage caused by improper wiring is not covered under warranty. Employ the services of an electrician if you aren’t sure.

11. Chillers must be installed on concrete or an a/c condenser pad. Failure to do so can cause the condenser to become dirty sooner from splashing dirt when it rains. It will also cause premature rusting of the chiller base where it contacts the ground.



# PRODUCT SPECIFICATIONS
## BANKS CHILLER SYSTEMS BY HYDRO INNOVATIONS

| Part Number | BANKS24-1 | BANKS42-1 | BANKS60-1 | BANKS90-3 | BANKS120-3 |
|---|---|---|---|---|---|
| **Description** | 2 Ton Banks Chiller | 3.5 Ton Banks Chiller | 5 Ton Banks Chiller | 7.5 Ton Banks Chiller | 10 Ton Banks Chiller |
| **BTU/h Capacity** | 24,000 | 42,000 | 60,000 | 90,000 | 120,000 |
| **Refrigerant Type** | R410A | R410A | R410A | R410A | R410A |
| **Refrigerant Charge** | As Labeled | As Labeled | As Labeled | As Labeled | As Labeled |
| **Length** | 23" | 29" | 32” | 36" | 36" |
| **Width** | 23" | 29" | 32” | 36" | 36" |
| **Height** | 26" | 37" | 40" | 42" | 42" |
| **Weight** | 140 | 215 | 235 | 325 | 325 |
| **Minimum Ampacity** | 17.6 Amps | 23.9 Amps | 32.8 Amps | 36.9 Amps | 43.2 Amps |
| **Max Overcurrent** | 30 Amps | 40 Amps | 50 Amps | 60 Amps | 70 Amps |
| **Electrical Conduit Size** | 1/2" or 3/4" | 1/2" or 3/4" | 1/2" or 3/4" | 1/2" or 3/4" | 1/2" or 3/4" |
| **Voltage/Phase** | 208/230 Single | 208/230 Single | 208/230 Single | 208/230 Three | 208/230 Three |
| **Water In** | 3/4" NPT | 3/4" NPT | 1" NPT | 1" NPT | 1" NPT |
| **Water Out** | 3/4" NPT | 3/4" NPT | 1" NPT | 1" NPT | 1" NPT |
| **Flow Rate** | 5 GPM | 8.75 GPM | 12.5 GPM | 18.75 GPM | 25 GPM |
| **Approved Liquids** | Water/Propylene Glycol (Up to 50% glycol mix) | Water/Propylene Glycol (Up to 50% glycol mix) | Water/Propylene Glycol (Up to 50% glycol mix) | Water/Propylene Glycol (Up to 50% glycol mix) | Water/Propylene Glycol (Up to 50% glycol mix) |
| **Fan Motor HP** | 1/8 | 1/4 | 1/4 | 1 | 1 |
| **Decibels** | 75 | 75 | 77 | 84 | 84 |

## Troubleshooting

This unit is equipped with safety sensors that may include high and low pressure sensors for the refrigeration circuit and also a water flow meter to help prevent freezing if there is a pump failure or other loss of flow. If any of these sensors are not satisfied they will not allow the chiller to come on.

Some of the troubleshooting steps listed below can be performed by the end user and some of these steps need to be performed by a licensed HVAC technician. Retain this guide should your chiller ever require service in the future.

**Temperature controller has no power:**

1. Check and make sure switch is in the on position.
2. Check breaker for proper function.
3. Check flow meter for adequate water flow (2.5GPM per ton). The flow meter controls power to the temperature controller.
4. Check for proper voltage at the unit with an electric meter.
5. Visually check for any loose wires.
6. Remove the front cover of the temperature sensor and check voltage. If 120 volts is present and all wires are installed and tight, then most likely the controller will need to be replaced. If there is no voltage present see the next step.
7. The controller is wired so that it will not come on if there is not sufficient water flow. If there is no voltage at the controller check flow and make sure that you are getting 2.5 gallons per minute for each ton of cooling. If there is sufficient flow see next step.
8. Check connections of flow sensor (sensor installed in the water line) to make sure you are getting 120v across the sensor while sufficient water is flowing. If there is not voltage across the sensor with proper flow then the sensor needs to be replaced.
9. Check direction of flow, if water is flowing backwards, flow meter will not allow power to the temperature controller.

**Temperature controller is on but unit will not start**

1. Unit has a 5 min delay on startup and restart. Before troubleshooting, ensure that 5 minutes has passed.
2. Check setpoint of controller to make sure it's below water temperature setpoint PLUS differential. If the setpoint is 65 degrees for example and the differential is 3 degrees then the chiller will not start until the water reaches 68 degrees.
3. Check the temperature differential, which is factory set for 3 degrees and should not be changed.
4. Check to make sure the controller is set to C1.
5. Check freeze controller to make sure it doesn't read less than its set point. The freeze controller is set to 37 degrees F and should never be changed. If the temperature reads 37 or below, it will not allow the chiller to run. Turn off the chiller, wait for the water temperature to reach 38 degrees or higher, and turn it back on. If your freeze sensor engages often, you have the temperature set too low or the water flow isn't high enough.
6. Check voltage at relay (spade terminals on each side), which should be 120v. If there is not 120v while the temperature controller is calling for cooling then check for a loose wire on the controller. If none are found check for power at the relay inside the controller. If you have power there the other cause would be a tripped high/low pressure sensor, in which case an HVAC technician will need to service your unit. He should check refrigeration pressures with a gauge set to verify there is not a problem with pressures. If no problems are found with pressure the high/low pressure sensor may need to be replaced.
7. Check power across the ENDS of the main relay with a meter, this should be 240v on each side when the temperature controller is calling for cooling. If there is not 240V on each side the relay is malfunctioning and needs to be replaced.
8. If there is power across the relay when the temperature controller is calling for cooling and the compressor, fan, or both are not coming on, the capacitor could be malfunctioning and needs to be replaced. Check voltage across capacitor to verify. Bulging capacitors are an indication of a problem.
9. If both compressor and fan are not engaging then the problem is almost certainly an easily replaced bolt on component not with the fan or compressor themselves. If one of the two components is not running after these trouble shooting steps have been taken, there could be a problem with one of those components and they need to be replaced. The fan motor is simple to replace and can be done by the end user. If compressor replacement is required, it MUST be done by a licensed refrigeration technician.
10. If the refrigerant charge of the unit is in question the best avenue for checking this is to recover and weigh the charge (HVAC technicians only). The amount of refrigerant in the system is written on the product label.

**Fan turns on and off even though compressor is running.**

1. Unit is most likely equipped with a fan cycle switch, in which case the fan will come on only when absolutely needed. The cycling of the fan is most common in cooler weather.

# WARRANTY INFORMATION

If you are missing parts or believe you have a warranty issue, DO NOT return this item to your store. You must contact Hydro Innovations at 512-321-7575 for troubleshooting and service instructions.

Thank you for choosing Banks Chiller Systems by Hydro Innovations! Because your chiller is built with leading technology and the highest quality components, with proper care and maintenance, it will provide you with years of worry free service. Please examine the unit upon arrival to be sure there is no damage as a result of shipping. If shipping damage has occurred please note the damage on the receiving slip and contact Hydro Innovations immediately.

## Limited Warranty

90 days all inclusive-parts, labor, and shipping, including refrigerant. Choice of repair facility and technician is at the discretion of Hydro Innovations.

1 Year-Any defective part, including refrigerant. Choice of repair facility and technician is at the discretion of the chiller's owner, although Hydro Innovations is happy to assist with locating a technician. If Hydro Innovations chooses the technician, limited labor coverage may apply.

5 Years-Standard compressors, excluding refrigerant and labor. Choice of repair facility and technician is at the discretion of the chiller's owner, although Hydro Innovations is happy to assist with locating a technician.

10 Years-High Efficiency compressors, excluding refrigerant and labor. Choice of repair facility and technician is at the discretion of the chiller's owner, although Hydro Innovations is happy to assist with locating a technician.

**NOTE: Extended warranty for parts, labor and shipping are available for purchase for a nominal fee. Contact Hydro Innovations within 15 days of your chiller's arrival if you would like to purchase an extended warranty.**

**Limitation of Liability:**
To the extent allowable under applicable law, Hydro Innovations' liability for consequential and incidental damages is expressly disclaimed. Hydro Innovations' liability in all events is limited to and shall not exceed the cost of repair. Shipping damage is not covered under warranty. In the event that the item(s) arrive with shipping damage, Hydro Innovations will assist with the repair or replacement of the damaged item ONLY if the damage is noted on the delivery receipt.

**Warranty Disclaimer:**
*Hydro Innovations provides product information in this literature for the sole purpose of identification, and does not state or imply that the products are merchantable, or fit for a particular purpose, or that the products will conform to the descriptions.*

**Product Suitability:**
Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Hydro Innovations attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and be sure that the product, installation and use will comply with them.

**Service Under Warranty**

1. This product is warranted by us against defects due to fault workmanship or materials.

2. If the product has been damaged under normal use, it will be entitled to warranty service of the type described and within the timeframes outlined. Damage caused by abnormal use, or after the timeframes outlined have expired, carry no such guarantee. Service under warranty is provided only upon presentation of reasonable evidence (purchase receipt) that the date of claim is within the warranty period.

**Service NOT Under Warranty**
1. The warranty is not valid if the defect is due to accidental damage, misuse, shipping damage, or neglect and in case of alterations or repair carried out by unauthorized persons. Hydro Innovations can, at its discretion, assist the consumer with shipping claims in the case of damage incurred during shipping, so long as the customer follos the instructions outlined above.

Hydro Innovations
1924 Highway 95 North
Bastrop, Texas 78602

You Can View Informative Videos About This And Other Products By Visiting Hydro Innovations On youtube.com