

Description:

Chilled Water Installation Instructions

Unit Type: Chilled Water System - Chiller Configuration

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CHILLER SYSTEM INSTALLATION INSTRUCTIONS AND OPERATORS MANUAL

Please read prior to installation!

Warning! Freeze damage of any kind voids your warranty!!!

Use a 33% antifreeze chilled water solution:

To prevent freeze damage (ruptured evaporator) Flagship Marine chillers have a low pressure switch as well as a freeze control switch, however with "Spot Freezing" there is no safety device that will protect your chiller from freeze damage other than an antifreeze solution.

We strongly suggest a 33% POLYPROPYLENE chilled water solution. Polypropylene is non-toxic and environmentally friendly - do NOT use the highly toxic glycol anti freeze, and in any event the chilled water loop should be isolated from the domestic water on board your vessel.

If the make up water line is connected to the domestic drinking water you should isolate it from the domestic water with a check valve as well as a gate valve that must be closed unless you are adding water to the system.

If stored or shipped (especially air freight) we suggest the evaporator as well as the condenser be winterized or all water removed from the system.

You may wish to have us install or supply a flow switch as well to give you additional protection.

Flush your system to remove debris and install a strainer:

Most modern chillers use flat plate evaporators with very small distances between the alternating plates that can easily get blocked by debris in the chilled water loop. This can cause "Spot Freezing" from an area of the evaporator that has little or no water flow causing a rupture. We suggest you flush out the system and install a 20 mesh strainer just before the return to the chiller.

Purge all air from the system:

PRIOR to the initial chiller start up you must purge the chilled water loop of all air and confirm you have a consistent flow of chilled water that is a minimum of two gallons per minute of flow for every ton of capacity (12,000BTUs=one ton). For example, a ten ton chiller needs a MINIMUM 20 gallons/minute flow of chilled water (target 2.5 GPM/ton = 25GPM). The sea water loop needs a MINIMUM of 2.5 GPM/ton of cooling = 25GPM (target 3GPM/ton = 30GPM). An ammeter on the pump is useful for testing this - if all of a sudden there is a momentary amperage drop this would be from the pump sucking a bubble and free-wheeling.

Flagship Marine installs air bleeder valves at the top of all our air handlers to eliminate any trapped air that will diminish the performance of the air handler.

At a high point in the system we suggest installing an expansion tank that is open to atmospheric pressure - see typical system drawing.

Install a storage tank that buffers rapid compressor cycling:

Flagship suggests a chilled water storage tank that will prevent the compressor from excessive cycling due to sudden temperature changes when air handlers kick in. You don't want the compressor cycling on and off 40 times/hour. Rapid cycling can be diminished by programming in a larger temperature differential as well. We program the Ranco controller with a 5°F differential and a 46°F cut off temperature - 51° on and a 46° off. A ten degree differential will reduce this frequency - 56° on and 46° off. We suggest a minimum 6G/Ton storage tank.

We suggest the pump suction is from the bottom of this storage tank so it can't suck a bubble.

Don't expect the chiller to stabilize in some cases for a few WEEKS!:

If you install a chiller system on a vessel that is 95°F for example, do not expect the system to bring down the thousands of tons of steel to 75° overnight! With a larger ship it's typical for the entire mass to drop maybe one degree/day! It may take a few WEEKS of running 24/7 to bring this down to normal operating conditions and attain the 46°F temperature and start cycling. Do NOT attempt to adjust the refrigerant charge or adjust ANYTHING until the system is down to temperature and stabilized.

We often supply single phase pumps with three phase units so as to prevent out of phase problems which may be more difficult to detect with a pump. Be sure to ascertain the pump voltage and phase before wiring the pump.

Do not bypass the low pressure switch except for diagnostic purposes, and then for only a second or two at a time. An ohm meter is a better way to check for continuity. If there is no chilled water flow, repeatedly energizing the compressor even for a few seconds at a time will eventually rupture the evaporator by freezing the water inside it, voiding the warranty.

The safety switches are all in series, so any malfunction will stop the compressor by triggering a lockout relay and energize the red LED on the control box. To reset the lockout relay, turn the unit off and back on. This low voltage loop monitors refrigerant high and low pressure as well as evaporator low temperature (freeze control).

We suggest a minimum 46° F setting for the CW controller with straight water and 42° F with a 33% polypropylene solution.

If you are powering the unit with triple phase current, on initial startup if the wiring is out of phase the compressor will make a "rattling" sound and not cool. Swap any two wires and try again! Running the compressor out of phase may cause permanent damage and voids the warranty. The compressor should make a smooth humming sound.

If you have a reverse cycle chiller, when going into the heat mode turn the unit off and turn the heat/cool switch to the "heat" position. Then turn the unit back on and program the Ranco controller to be in the heat mode and reprogram a desired heat temperature. See the controller instructions provided. We suggest you keep this booklet in a watertight envelope near the control box.

Be careful to correctly wire the two pumps on the controller terminal block to the correct position. When the chiller is energized the chilled water pump will immediately start and run 24/7. The sea water pump energizes only when the compressor energizes.

If your chiller is equipped with a sight glass, DO NOT add refrigerant until the sight glass is clear. Flagship Marine chillers are designed for extreme conditions at which point the sight glass will be clear. Excessive amperage and head pressures will result at these extreme conditions if the unit is overcharged.

Be CERTAIN to not to reverse the chilled water flow direction of the chilled water loop. The temperature sensor MUST measure the chilled water temperature as it is leaving the chiller, not when it is returning to the chiller. The water in is at the top of the evaporator and the sensor is at the bottom of the evaporator.

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