GEYSER C 250 A

Commercial Air Source Heat Pump Water Heater Operations and Installation Manual

GEYSER 250A MANUAL
VERSION 2.3

Nyle Systems
12 Stevens Rd
Brewer, ME 04412

www.nyle.com
info@nyle.com
800-777-6953

GENERAL SAFETY INFORMATION

⚠WARNING **Read through entire manual before installing, operating, or servicing this unit.** Failure to follow any steps or guidelines could result in personal injury, death, destruction of property or may cause the unit to become inoperable. **This manual must be kept with the unit at all times**.

PRECAUTIONS

Do not operate unit if it or any of its parts:

- Have been exposed to fire.
- Have been submerged in water or exposed to flooding.
- Have been exposed to extreme temperatures.
- Have significant interior or exterior damage.
- Have been running without water.

In the case of any of the above, have the unit serviced by a qualified professional before continuing operation.

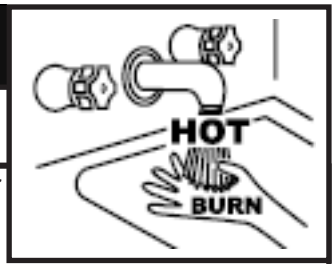
⚠WARNING

Explosion Hazard!

- DO NOT purge or pressurize this system with oxygen to test for leakage. Using oxygen may cause dangerous explosive reaction.
- Overheating water in the tank can cause explosion.
- Be sure to install correct temperature and pressure relief valves on storage tanks. Failure to do so may result in excessive pressure in the tank which can cause an explosion.

⚠WARNING

Burn Risk!



- Water temperatures over 125°F (52°C) can cause severe burns.
- Children, elderly and disabled peoples are at high risk of injury and require assistance.
- Test water for safe temperature before use.
- Water heater must have temperature limiting devices installed according to local building codes.

GROUNDING

Heat pump water heater must be grounded.

Failure to ground will result in unreliable performance or an inoperative unit.

You may chose to:

Ground by connecting unit to a grounded metal, permanent wiring system.

or

Ground by running an equipment grounding conductor with the circuit conductors and connecting those to the equipment grounding terminal or lead on the water heater.

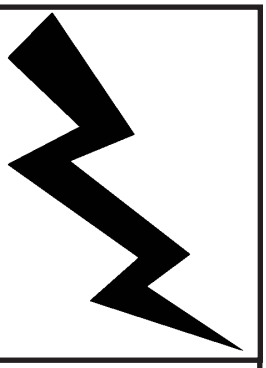
Grounding must be in accordance with national and local electrical codes. Please contact your municipal offices for more information on building codes.

⚠WARNING **Refrigerant!**

- Unit contains R-134a refrigerant under high pressure. Refrigerant must be recovered to relive pressure before servicing.
- **DO NOT use unapproved refrigerants, substitutes or additives.**
- Failure to abide by these guidelines can result in death, injury and property damages.
- Contact Nyle's service department for more information on refrigerant options.

⚠WARNING

Electrical Shock!



- **Turn off power to unit before service.**
- Make sure wires are labeled before disconnecting.
- Test unit after reconnecting wires.
- Failure to do the above could result in death or injury.

CONTENTS

GENERAL INFORMATION

INTRODUCTION

Nyle Systems air source heat pumps offer commercial and industrial users an energy efficient means of heating water to temperatures as high as 150°F. Nyle air source heat pumps work by gathering heat from the surrounding air, and through a refrigeration cycle, deposits the extracted heat into sanitary water at a usable temperature. Through this cycle both hot sanitary water and cool, dehumidified air is made available.

Nyle Systems C-250 air source heat pump is a single-package horizontally mounted unit with built in digital thermostats and manual controls. This unit is built specifically for use in large scale commercial applications where a large amount of sanitary water is needed at usable temperatures.

HOW IT WORKS

The Geyser C-250 is air sourced, meaning heat is extracted from the surrounding air and, utilizing heat pump technology, that energy is used to heat sanitary water to the desired temperature. As a by-product of heating water, the Geyser C-250 unit will also cool and dehumidify the surrounding air. This cooler, dehumidified air can be ducted to another location for

Performance for heat pumps is expressed in terms of Coefficient of Performance (COP). In typical installations the Geyser C-250 unit achieves COPs ranging from 3-5, depending on source and heated water temperatures. This means it creates 3-5 units of renewable heat from the air for every 1 unit of electricity required to run the unit. This 300% to 500% efficiency offers significant savings over gas, oil, or electric water heaters with efficiencies typically in the range of 70% to 95%.

ABOUT THE GEYSER C-250

The Geyser C-250 has a nominal heating capacity of 250,000BTUH, generating up to 500 gallons of hot water per hour. The C-250 also has a nominal cooling capacity of 178,000BTUH. These units can heat water efficiently up to 150°F and are ideally suited for restaurants, hotels/motels, apartment buildings, laundry facilities, health care facilities, schools, sports arenas, gyms, institutions such as prisons, military barracks, specific manufacturing plants, and more.

SAFETY INFORMATION

SAFETY CONSIDERATIONS

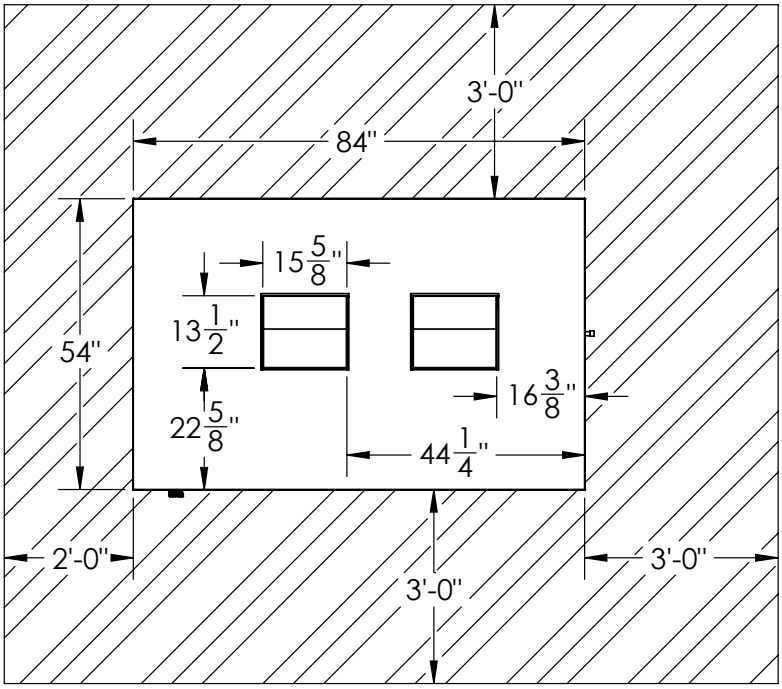
Installation and servicing of heat pump equipment can be hazardous due to system pressure and electrical components. Please note that only trained and qualified service personnel should preform installation, repairs, or service on the Geyser C-250. When preforming installation, repair, or service on the unit, observe precautions in the manual, tags, and labels attached to the unit. Follow all other safety precautions that may apply.

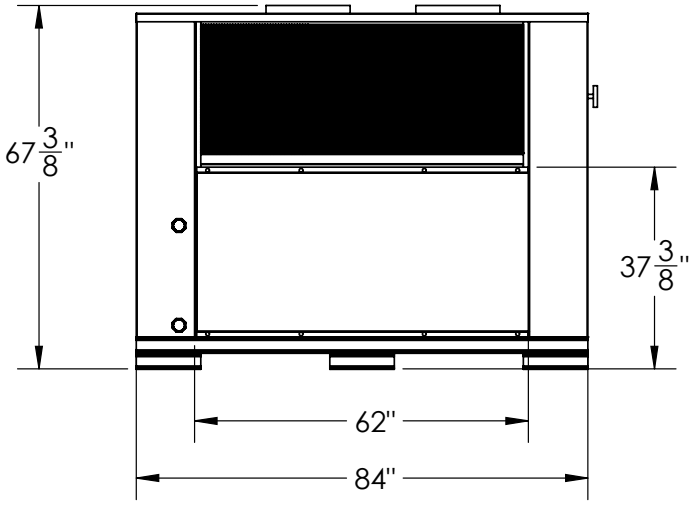
Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other hazardous conditions which may cause personal injury or property damage. Always consult a qualified installer, service agency, or your distributor for information or assistance.

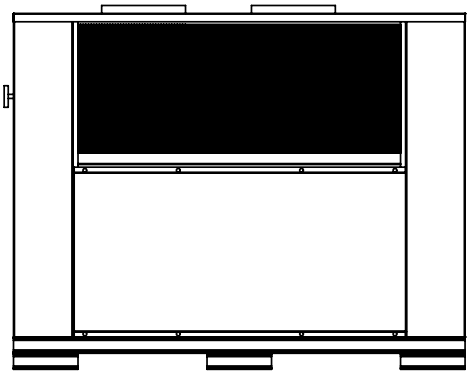
- Do not stand or sit on the unit
- Disconnect all power before opening the control panel.
- There is no need to open the control panel unless there is a malfunction internally. Only a licensed technician is to open the control panel.
- Disconnect all power before installing or servicing the Geyser C-250.
- Ensure the power receptacle is rated for the appropriate load. See Data Sticker on the unit.
- Ensure that the electrical supply has proper overload fuse or breaker protection rated for at least the appropriate amperage. See Data Sticker on the unit.
- All lifting of the Geyser C-250 heat pump water heater should be done with a fork lift or pallet jack to prevent back injuries. Never move the unit alone.
- If the pressure relief valve on the existing water heater tank is leaking or dripping, call a licensed plumber for repair. Do not plug or remove valve as this could result in an explosion.
- Water temperature over 125°F can cause severe burns resulting in scalding.
- Follow all safety instructions provided by the manufacturer of the existing water heater.

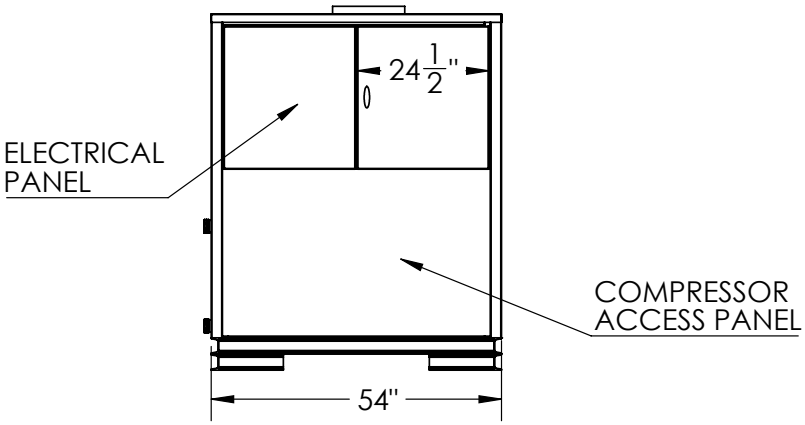
Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations and have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and the National Electrical Code (NEC) for special installation requirements.

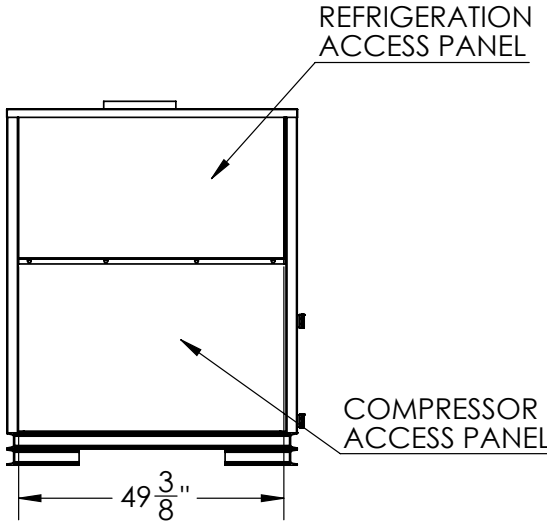
PHYSICAL DIMENSIONS











SPECIFICATIONS

UNIT SPECIFICATIONS

Model Number	C-250
Recovery Rate *	567 Gal/Hr
Heat Capacity *	249,800 BTUH
Power Input *	24 KW
Cooling Capacity*	178,00 BTUH
Compressor Type	Semi Hermetic
Refrigerant	R-134A
Max Water Temp.	150° F
Water Corrections	2” FNPT
Water Flow Rate Condenser **	50 Gal/Min
Condenser Pressure Drop**	7.5 PSI
Dimensions (LxWxH)	84” x 57” x 61”
Weight	1,700 LB

* Water was heated from 70° F to 130°F with 75°F entering air condition

** Based on performance with 10° F rise across condenser.

PROGRAMMABLE LOGIC CONTROLS

PLC CONTROLLER

Your Geyser C-Series may be equipped with a Programmable Logic Controller (PLC) and Human-Machine Interface (HMI) for controlling the water heating process. Sensors within the system provide operating information to the PLC which uses this information to safely control the heating process. The control comes with a factory water high temperature setpoint of 120°F. The control is limited to a maximum water high temperature setpoint of 150°F. Operating at higher temperatures could void the warranty.

TEMPERATURE & SETPOINTS

To view and adjust the temperature setpoint, follow these steps.

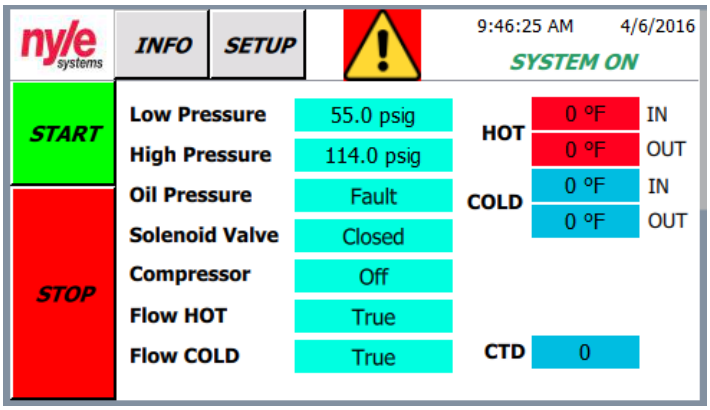
- View the HMI mounted on the electrical panel door. Locate the “High Temp” value on the setup screen.
- Touch the box representing the current value. A keypad and cursor will appear.
- Enter the desired temperature setpoint (maximum 150°F)
- Touch the return, or enter key on the keypad. The display will return to the info screen, and your entered value should be displayed in the “high Temp” value box. The unit is now set to heat up to the new setpoint temperature.

Note: Until the Return key is pressed, the unit will run based upon the previous setpoint temperature.

SETPOINT RANGES & SAFETIES		
SAFETY	**FACTORY SETTING**	**ACTION**
Low Flow (heating or cooling side)	< 4.4 Gal/Min	Shutoff
Low water temperature Safety (leaving evaporator)	36°F	Shutoff
Low Water Temperature Alarm (leaving evaporator)	38°F	Alarm
High Water Temperature Safety (leaving condenser)	155°F	Shutoff
Temperature Setpoint Range	100°F - 150°F	-
High Refrigerant Pressure Cut-out	380 psi	Shutoff/Alarm
High Refrigerant Pressure Cut-in	340 psi	-
Low Refrigerant Pressure Cut-out	15 psi	Shutoff/Alarm
Low Refrigerant Pressure Cut-in	35 psi	-
Low Refrigerant Pressure Bypass Time Delay	30 sec	-
Low Oil Pressure Differential Cut-out	9 psi	Shutoff/Alarm
Low Oil Pressure Differential Cut-in	13 psi	-
Low Oil Pressure Differential Time Delay	120 sec	-
Compressor Anti-Short Cycle Delay	180 sec	-

CONTROL SCREENS

INFO SCREEN



"START": Starts heat pump

"STOP": Stops heat pump

"Low Pressure": indicates current pressure on low side of refrigeration system

"High Pressure": indicates current pressure on high side of refrigeration system

"Oil Pressure": indicates status of compressor oil pressure differential (OK, Fault)

"Solenoid Valve": indicates status of suction line solenoid valve (Open, Closed)

"Compressor": indicates running status of compressor (On, Off)

"Flow HOT": indicates water flow status on condenser side of system (True, False)

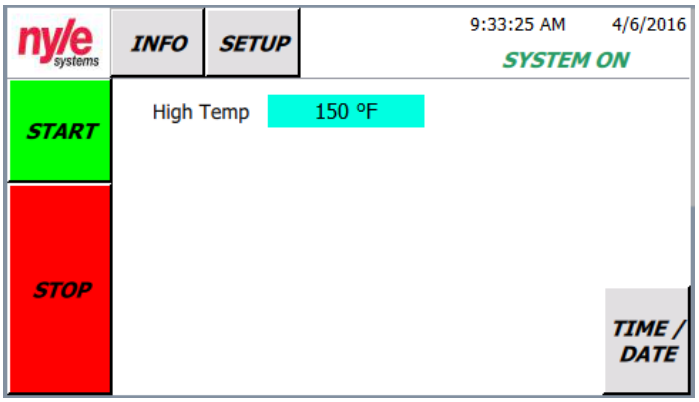
"Flow COLD": indicates water flow status on evaporator side of system (True, False)

"HOT IN/OUT": indicates water temperatures entering and leaving the condenser side of system

"COLD IN/OUT": indicates water temperatures entering and leaving the evaporator side of system

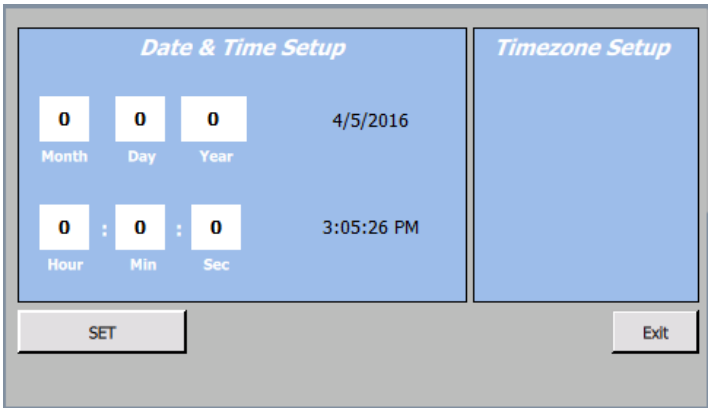
"CTD": indicates remaining time in compressor time delay countdown

SETUP SCREEN



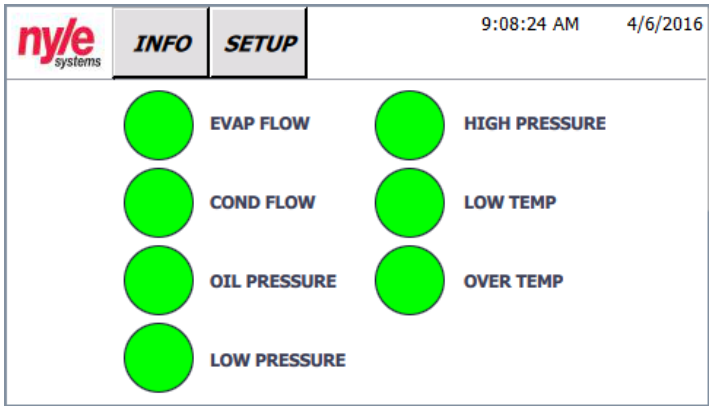
"High Temp": indicates current user-selected high water temperature setpoint

"Time/Date": press to set time and date on control screen:



CONTROL SCREENS

ALARM SCREEN



The alarm screen is accessible when the flashing warning symbol is displayed in the screen header. Press the flashing warning symbol to access the alarm screen.

Only one alarm will display at a time. If more than one alarm is active, the most recently activated alarm will display. Once the indicated alarm condition is resolved, the next active alarm, if any, will display until all alarm conditions are resolved.

”EVAP FLOW”: GREEN indicates evaporator flow switch is closed, or enough water flow is present. RED indicates evaporator flow switch is open, or not enough water flow is present.

“COND FLOW”: GREEN indicates condenser flow switch is closed, or enough water flow is present. RED indicates condenser flow switch is open, or not enough water flow is present.

“OIL PRESSURE”: GREEN indicates that the compressor differential oil pressure is within the normal operating range. RED indicates that the compressor differential oil pressure is outside of the normal operating range.

“LOW PRESSURE”: GREEN indicates that the refrigeration suction pressure is above the “cut-out” value. RED indicates that the refrigeration suction pressure is below the “cut-out value.

“HIGH PRESSURE”: GREEN indicates that the refrigeration discharge pressure is below the “cut-out” value. RED indicates that the refrigeration discharge pressure is above the “cut-out” value.

“LOW TEMP”: GREEN indicates that the water temperature leaving the evaporator is above the shutoff value. RED indicates that the water temperature leaving the evaporator is below the shutoff value.

“OVER TEMP”: GREEN indicates that the water temperature leaving the condenser is below the shutoff value. RED indicates that the water temperature leaving the condenser is above the shutoff value.

RECEIVING, STORAGE & PLACEMENT

RECEIVING UNIT

IMPORTANT: Please read this entire manual before installation. Be sure to follow all installation steps. Failure to conform to these instructions may decrease the heat pump performance and could cause severe injury or death. Only qualified, licensed persons should install the heat pump equipment and electrical supply. Installation must conform to all local, state, and federal applicable codes.

RECEIVING

When receiving shipment at the job site, carefully inspect the shipment against the bill of lading. Please make sure that all unit's have been received as ordered. Inspect each units shipping crate/packaging and inspect each unit for damage. If there is a problem, notify the shipping company to make proper notation of any shortages or damage on all copies of the freight bill.

Check The Following:

1. Compare the electrical data on the unit data sticker with ordering and shipping information to verify that the correct unit has been delivered.
2. Verify that the unit is the correct model for the entering water temperature of the job.
3. Verify that the refrigerant tubing is free of kinks or dents.
4. Inspect all electrical connections. Be sure connections are clean and tight at the terminals.

NOTE:

It is the responsibility of the purchaser to file all necessary claims with the shipping company.

PLACEMENT & STORAGE

UNIT LOCATION

1. This unit is designed for indoor/outdoor use.
2. Provide sufficient space for water and electrical connections.
3. Locate unit in an area that allows for easy access and removal of access panels.
4. Allow enough space for service personnel to perform maintenance. It is recommended to allow 3ft clearance on all sides. Clearance for electrical should follow all local codes and regulations.

CLEANING AND FLUSHING

1. If the heat pump is to be connected to an existing storage tank, the old tank must be drained and cleaned of sediment before the heat pump is installed.
2. Prior to start-up of any heat pump, the water circulating system must be cleaned and flushed of all dirt and debris.

STORAGE

If the equipment is not needed for immediate installation upon its arrival at the job site, it should be left in its shipping carton and stored in a clean, dry area of the building. Units must be stored in an upright position at all times. Do not remove any equipment from its shipping package until it is needed for installation.

INSTALLATION & SYSTEM USAGE

INSTALLATION

IMPORTANT: Please read this entire manual before installation. Be sure to follow all installation steps. Failure to conform to these instructions may decrease the heat pump performance and could cause severe injury or death. Only qualified, licensed persons should install the heat pump equipment and electrical supply. Installation must conform to all local, state, and federal applicable codes.

CONNECTING WATER PIPING

All plumbing should be performed by a licensed professional, and should adhere to all local and state codes.

1. For maximum efficiency, the heat pump should have the coldest water from the hot water supply tank running through the condensing heat exchanger and the warmest possible air passing through the evaporating. This is done to make efficient use of the temperature difference. Therefore, the lowest connection in the hot water supply tank should be used for the condenser supply (Hot Water Inlet) to the heat pump and the condenser return (Hot Water Outlet) from the heat pump should be installed higher up on the tank, but not near the top. Installing the return at the top of the tank can cause cooler water to mix with the hottest water at the top of the tank.
2. Lines to and from the heat pump must be properly sized for the correct flow rate. Too much or too little water flow will decrease efficiency. Water tank ports must also be large enough to ensure peak water demands can be handled. For the Geyser C-250 the line size should be 2".
3. Some municipal codes require installation of temperature and pressure relief valves on plumbing sections. Others may require dielectric plumbing fittings. Use copper or bronze fittings. All hot water pipes must be insulated.
4. All plumbing must be sized for peak water flow demands.
5. Tanks with dip tubes should be used with caution or avoided altogether, because the dip tube can restrict flow and cause heat pump malfunction.

CONNECTING WIRING

All electrical work should be performed by a licensed professional, and should adhere to all local and state codes.

The heat pump control is housed in the front of the unit. Follow the name plate information located on the unit for proper voltage, phase, ampacity, breaker sizing and wire sizing. Locate a fuse disconnect as close as possible to the heat pump.

SYSTEM USAGE

BEFORE START UP

Verify the following:

- ➤ High voltage is correct and matches nameplate
- ➤ Piping is complete and the water system has been cleaned and flushed.
- ➤ Air is purged from closed loop system.
- ➤ Isolation valves are open and water control valves or loop pumps are wired.
- ➤ Service panels are in place.
- ➤ Unit controls are in "off" position.
- ➤ Locate the fan/blower direction arrows on the fan/blower guard.
- ➤ Use the arrow to check that the fan/blower and compressor is rotating in the correct direction. The compressor will always be running in the same direction as your fan/blower.
    - If your fan/blowers is rotating in the wrong direction then your compressor is <u>also</u> rotating backwards and needs to be corrected. To correct the rotation, change the two legs feeding the main distribution block to the unit.

MAINTENANCE & TROUBLESHOOTING

MAINTENANCE

UNIT HEAT EXCHANGER MAINTENANCE

1. Keep all air out of the water or solution.
2. Keep the system under pressure at all times. Closed loop systems must have positive static pressure.

REPLACEMENT PROCEDURES

When contacting Nyle for service or replacement parts, refer to the model number and serial number of the unit as stamped on the serial plate attached to the unit. If replacement parts are required, mention the date of installation of the unit and the date of failure, along with an explanation of the malfunctions and a description of the replacement parts required.

TROUBLE SHOOTING

COMPRESSOR WILL NOT RUN

1. The breaker may be open or the circuit breaker is tripped. Check electrical circuits and motor windings for shorts or grounds. Investigate for possible overloading. Replace fuse or reset circuit breakers after fault is corrected.
2. Supply voltage may be too low. Check it with a volt meter.
3. Control system may be faulty. Check control for correct wiring and check the transformer for proper voltage.
4. Wires may be loose or broken. Replace or tighten.
5. The low pressure switch may have tripped due to one or more of the following:

   a) Heating

   1) Air restricted to evaporator

   2) Evaporator needs cleaning

   3) Air temperature too cold

   4) Low refrigerant

   b) Cooling

   1) Heated water flow too low

   2) Low refrigerant

6. The high pressure switch may have tripped due to one or more of the following:

   a) Heating

   1) Condenser heat exchanger clogged

   2) Heated water flow too low

   3) Heated water too hot

   b) Cooling

   1) Condenser heat exchanger clogged

   2) Heated water flow too low

   3) Air source too hot

7. Water temperatures are outside of their acceptable ranges.

INSUFFICIENT COOLING OR HEATING

1. Check for restriction in water flow.
2. Check refrigerant subcooling and superheat for proper refrigerant charge and expansion valve operation

UNIT OPERATION IS NOISY

1. Check compressor for loosened mounting bolts. Make sure compressor is floating free on its isolator mounts. Check for tubing contact with the compressor or other surfaces.
2. Check screws on all panels
3. Check for chattering or humming in the contractor or relays due to low voltage or a defective holding coil. Replace the component.
4. Check for proper installation of vibration absorbing material under the unit.
5. Check for abnormally high discharge pressures
6. Check for any loose panels or parts that maybe in contact with each other, vibrations from the compressor may cause them to chatter against one another.

WARRANTY

LIMITED WARRANTY

The equipment supplied by Nyle is warranted to be free from defects in workmanship and materials for a period of one year from the date of the original installation or 15 months from the date of delivery, whichever comes first. A new or remanufactured part will be supplied by Nyle providing the defective part is first returned to Nyle for inspection. The replacement part assumes the unused portion of the warranty. The warranty does not include labor or other costs incurred for diagnosis, repairing or removing, installing or shipping the defective or replacement parts.

Nyle makes no warranty as to the fitness of the equipment for a particular use and shall not be liable for any direct, indirect or consequential damages in conjunction with this contract and/or the use of its equipment. Buyer agrees to indemnify and save harmless Nyle from any claims or demands against Nyle for injuries or damages to third parties resulting from buyer's use or ownership of the equipment.

No other warranties, expressed or implied, will be honored unless in writing by an officer of Nyle Systems.

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