Model Number:_____ Serial Number:_____

Information Manual

Rev #

1.01

Installation and Troubleshooting Instructions for Electric Tankless Vacubreaker Heaters

The Vacubreaker units are used to raise the pressure in a low pressure chiller to enhance the

service process of these chillers. They are extremely powerful units and the utmost care must be used in their operation.

FOR MORE DETAILED SCHEMATICS AND WIRING DIAGRAMS VISIT,

HOTWATERHEATER.COM

http://www.hotwaterheater.com/vacubreakers-chillers-air-condition-servicing-products-vb-24-a.html

http://www.hotwaterheater.com/vacubreakers-chillers-air-condition-servicing-products-vb-32-a.html

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INFORMATION MANUAL for Commercial Heaters – Models

VB 24 A VB 32A

The “Vacubreaker” product discussed in this manual is a machine used to bring low pressure centrifugal chillers to atmosphere or for pressurizing for leak checking, by warming the refrigerant to the desired temperature and pressure.

Key specifications:

Weight:		60 pounds	
Dimensions:		21” x 16” x 10”	
Time in production:		The water heater itself has been in production for over 20 years as a commercial water heater and residential heater.	
Elements:		Four high watt density units with an incaloy sheath and manufactured by Emerson.	
Heat exchangers material:		304 stainless steel.	
Fusing:		Elements are individually fused	
Power cable:		Alligator cables available at an added cost	
Hoses:		Two 15 foot 5/8 hoses provided with each unit	
Voltage:		440/480/575 or 208/240	
Maximum AMP Draw		24	32
	208/240	100	135
	440/480/575	50	66
Heating capacity:		VB 24 A = 24KW VB 32 A = 32KW	
Wire Size		THHN 3	
Control mechanism:		Four bi metal discs to turn on the contactors and elements	
Electronic temperature Control:		To switch on the main circuit	
On/off switches:		Two switches allow the operator to use ½ or all the heater to afford greater control over the heat transfer speed to the refrigerant.	
Enclosure:		Standard is baked aluminum Nema 3 with Nema 4 available. If NEMA 4 is selected it comes with a cart and handle.	

How a Vacubreaker Works:

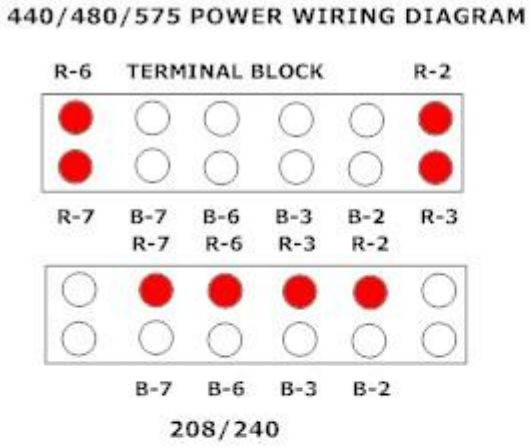
You must use extreme caution when using this high powered device. Read all documents in the manual associated with this device before proceeding.

Before you start complete the following checklist.

1. Plug in the 110 control that runs the contactors and lights up the inside of the unit.
2. Verify that the voltage you are using corresponds to the unit set up by looking thru the hole in the front of the box. All units ship wired for 480 but can be converted to 208/240. If not correct , start over and correct the wiring before proceeding. There is a label attached to the unit that shows the proper wiring set up. That same information is shown below**.**

R=RED WIRE OR B= BLACK WIRE

TYPICAL 440/480/575 V TO 208/240 V



CONVERSION TO 208/240 FROM 440/480/575 AND BACK

1. REMOVE RED WIRES R-2,3,6, &7 AND CONNECT
TO TOP OF BLACK TERMINALS 2,3,6, &7

2. FOR 208/240 BACK TO 440/480/575
REMOVE RED WIRES FROM R-2,3,6,&7 ON TOP AS SHOWN
ABOVE IN THE 208/240 DRAWING AND MOVE BACK TO THE
SIDE OF TERMINAL BLOCK FOR 440/480/575 AS SHOWN ABOVE
IN THE 440/480/575 DRAWING.

3. Turn off the 110 control/pump switch.
4. Hook up hoses to each end of the water heater and evaporator chiller and check for leaks.
5. Connect city water to make up connection on heater using female hoses supplied with the heater. Turn on city water to hoses and purge air from heater and system by opening the bleeder valve. Do not remove hoses or pressure to the heater.

6. Be sure the two heater switches are off.
7. Turn on the pump switch and 110 control switch.
8. Open air purge valve to verify water is circulating. Close air purge valve.
9. Connect pressure safety line to pressure switch on the heater and to the chiller and set the ETC to your desired settings. The recommended setting is 104 F. Our tests indicate that temperature is approximately 3 psi in the chiller.
10. Turn off main power to the chiller and connect temporary power cord clamps to starter terminals and ground. **Be very sure the power clamps are secure.**
11. Turn on right half of heater for 50% power and then the left half for 100% power.
12. Feel outlet side of the heater to see if water is circulating thru the system. It should be warmer than the inbound side. If not, turn off the switches and start over at step 7.
13. Verify the settings on the ETC are where you want them to be.
14. Turn on the left half of the heater if you want it to heat the refrigerant slower than normal

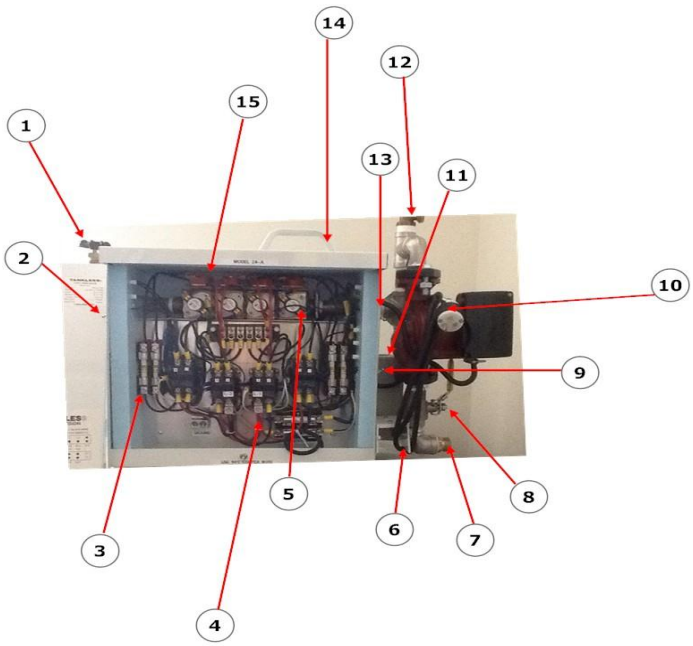
The heat exchanger maintains the fluid temperature as a type of mini boiler if the power is on.

Obviously, the unit requires fluid and power before it will work. The operator must flush the unit of all air before the unit is turned on.

The amount of energy needed/used is in direct proportion to the volume of fluid being pumped thru the unit. When the pump is turned off, the flow of energy eventually turns off as well. Thus, it is imperative to have the pump running any time the heater is turned on.

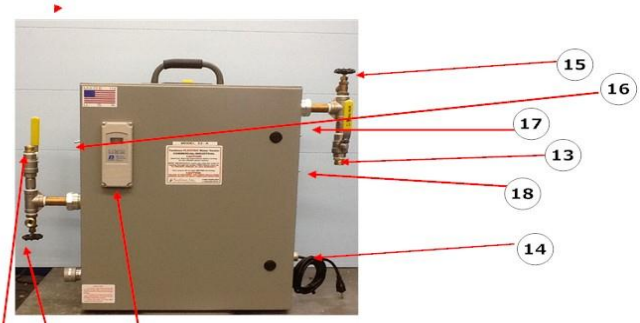
The following assembly drawings refer to the parts of the vacubreaker units. One drawing is of the unit in a NEMA 3 enclosure which is way 90% of the units are made. The other drawing is the same unit in a NEMA 4 enclosure with a cart and wheels.

Nema 3 enclosure

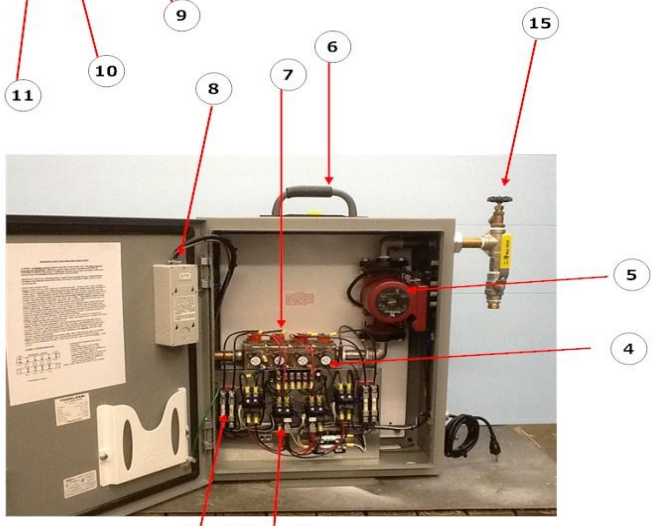


1. Bleeder Valve
2. On/off Switch left side
3. Individual fuses
4. Contactors(240A)
5. Thermostats(145 T)
6. Plug in for contactors/control circuit
7. Bushing to attach to hose
8. Flow valve
9. Right Side on/off switch
10. Pump
11. Electronic Temperature Control
12. Make up water Valve
13. Pump switch
14. Handle
15. Elements

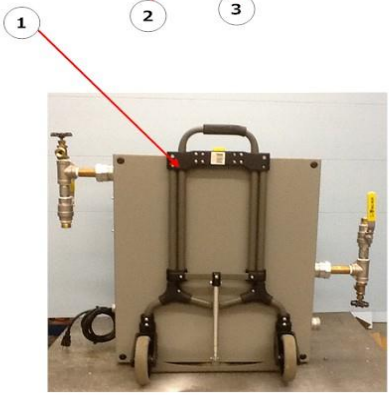
Nema 4 enclosure



Closed Front View



Front Open View



Back View

1. Cart
2. Individual fuses
3. Contactors(240A)
4. Thermostats(145 T)
5. Pump
6. Cart Handle
7. Elements
8. Electronic Temperature Control
9. Electronic Temperature Control
10. Air Bleeder Valve
11. Flow valve
12. Air Bleeder Valve
13. Bushing to hose connector
14. Plug in for contactors/control circuit
15. Make up water valve
16. Left side switch
17. Pump and control circuit switch
18. Right Side side switch

Electronic Temperature Control- Instructions

The electronic temperature control monitors when the unit turns on and off.

Inbound fluid temperature- A thermistor installed in a tube next to the exchangers reads the return fluid temperature and sends a signal to the Electronic Temperature control. The (ETC) has four settings. Press the select button to begin the set up process.

1. F (Fahrenheit) or C(Centigrade). You must select one or the other.
2. Desired system temperature. The customer provides this information and can adjust the level using the Electronic temperature control. This is generally set at or below 104 F.
3. Difference—This is the amount the fluid temperature coming back to the unit must be below the set temperature to allow the unit to come on. For example if you set the desired temperature to be 104 and the difference to 2 the unit will come on if the incoming fluid is below 102 F.
4. H (Heat) or C for (Cool) It must be set to H for the heater to work.

Trouble shooting

You will need the following items to test the units: continuity tester, Voltage meter, Amp meter, and Ohms meter.

The lights on the sides of the units are to show which contactors are engaged. If you have a NEMA 4 unit you have only pilot lights outside and the contactors will indicate their engagement or lack therof by the buttons on the contactors pulling in or not.

If the fluid passing the thermostats is below their setting the thermostats close and create a circuit and activate the contactors. With normal operation at maximum flow or when you first turn on the switch all lights will be on …. all contactor buttons pulled in as long as there is water pressure coming to the unit. The lights and buttons will go on or off in series as the elements are engaged. The heater is designed to only use the thermostats, contactors, and elements necessary to heat the water needed at any given time.

Note: Where the heater fails to maintain the desired temperature you may be running the water faster than the heater is capable of heating the water.

Use the following steps to diagnose a problem.

Step 1: **Turn off all power supply** CAUTION FAILURE TO TURN OFF ALL POWER COULD RESULT IN SERIOUS INJURY OR DEATH FROM ELECTROCUTION.

Step 2: **Check for any loose connections**,

Step 3: **Turn off the switches to the heater.**

Step 4: **Check the fuses on the elements for continuity.**

Step 5: **Purge the heater.** Run water thru the heater to cool it down. This will reset the thermostats.

Step 6: **Turn the water flow on by turning on the 110 control switch and pump.** Turn the main breaker back on. Turn on the heater switches.

Check to see which contactors pull in. When you first turn on the right side switch the two contactors on the right side should pull in. If that is the case then turn on the left side switch to see if the left side contactors pull in and proceed to step 8. If the contactors do not pull in ….lights do not go on or the buttons do not pull in on the contactors … do the continuity test as shown in step 6.

Step 7: **Testing the thermostats.** Turn off the power supply at the chiller and the switches to the heater. CAUTION FAILURE TO TURN OFF ALL POWER COULD RESULT IN SERIOUS INJURY OR DEATH FROM ELECTROCUTION.

Because the thermostats are in series any thermostat that fails will prevent any thermostat after it in the series to work and correspondingly any later contactor to pull in and connect the elements.

The thermostats have two funtions: one to regulate the turn on and off side of the units and to act as a safety in case of overheating. The thermostat can fail if the contactor fails to close in time and the water in the chamber overheats and if it goes over 260 degrees Fahrenheit the fuse side of the thermostat will burn and the thermostat will never work again. This slowness to close will happen after the contactor has 100,000 plus operations because the contactor spring will weaken over time and it will be slower to close than when it was new. The thermostat will have continuity if the fuse side of the thermostat is still good.

The thermostats condition is determined by a continuity check AFTER POWER IS OFF AND AFTER COLD WATER HAS BEEN RUN THRU THE HEATER TO RESET THE THERMOSTATS.

Continuity is tested between the arms on the thermostat. Occasionally, you get a false positive on a thermostat. It may read as good but have a weak connection.

If a thermostat tests as “no continuity” the thermostat should be replaced and either the contactor should be replaced or the technician should determine what else could have caused the thermostat to fail. It is possible for the operator to shut off the cold water supply to the heater and blow all the thermostats but that is an abnormal occurrence.

The unit has a pressure switch to shut the heater down in that case but there is no 100% protection against air entering the unit on its restart.

Step 8: **Ohms Test:** If the contactors are pulling in and you still have bad performance(not hot enough, fluctations) you may have a failed element. Check each element with an OHMs meter for correct readings. If the

elements reads 0 or flickers it is bad and needs to be replaced. If the failed element looks like it was split from the inside it probably failed due to air in the heater and you need to check the water source for a problem.

6KW 240 volts= 10 OHMS

6 KW 208 volts= 7.2 OHMS

Step 8: **Testing the contactors**

The buttons or the lights will tell you if the contactors are engaging. The buttons on the contactors pull in when they engage.

There is no legitimate test to determine the age of the contactors for how much life they have left.

If the thermostat has continuity the contactor should pull in. If the buttons do not pull in then the contactor needs to be replaced. If a thermostat has failed the contactor that is controlled by that thermostat should be replaced as the thermostat failure is an indication that thecontactor may have stuck in the on position.

Step 9: **Checking for leaks**

If you have a leak there are four possible reasons

1. A plumbing leak that can be fixed at the site. Pipes not tight or valve not tight.
2. The o ring on the element failed.
3. The o ring on the thermostat failed.
4. Other leaks from the exchanger which is a more serious problem that will probably require a factory repair. This an extremely unlikely situation.

Turn off the main power and all switches.

Take paper towel and dry off the heater. Take another paper towel to find the leak source….either around the element or the thermostat. If the leak is at the element or thermostat; then

1. Drain all water from the heater
2. Take the element out and examine it for damage and test it for OHMS see step 8
3. Test the thermostat for continuity.
4. Order a new element or thermostat
5. Put in a new o ring if neither part failed but there is a leak at the part. You should have some in your spare parts kit. If you install a new element o ring be sure to not overtighten the element on reinstall.

If neither of these is the entire problem the unit will have to be sent back to the factory.

Call us at 800 826 5537 for assistance if you have any questions.

If the unit is still not putting out the temperature of fluid you expect you need to do the following tests.

Set the temperature to a high enough temperature and flow level that the heater will need maximum draw to fulfill the task.

Test for full load AMP draw with an AMP meter after referring to the engineering chart on page 3 that shows FLA by unit size and voltage..

Shut the unit off and do an ohms test on each element as shown in step 1 above .

If all elements are good re do the continuity test on the thermostats. If they all have the proper resistance they are good and are not the problem.

If all the above checks out and you do not get the output you should then you should call us at 800 826 5537 for help or at any other time during this process.