

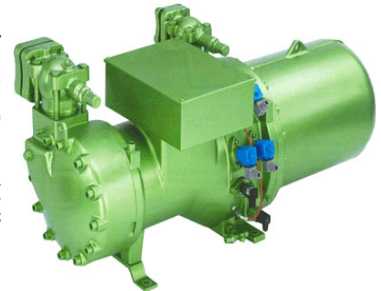


CHILLER UNIT SPECIFICATION OM100P2VGEK

COOLING CAPACITY: 100 tons [1,200,000 BTU/H] at 45° F leaving water temperature and 55° F returning water temperature. Chiller unit flow rate will be approximately 300 gpm. Condenser flow rate (each) is to be approximately 200 gpm entering at a temperature of 90° F. All ratings are at a fouling factor of 0.0005.

CONSTRUCTION & RATINGS: The chiller unit shall be constructed in accordance with ARI Standard 590-86 and shall comply with all applicable NEC and ASME codes for water cooled chillers. Input voltage to the unit will be 400-3-50.

COMPRESSORS: The chiller unit will have two, 50 ton Bitzer semi-hermetic screw compressors. Each compressor will be equipped with suction and discharge valves. Input voltage to the compressor motor will be 460-3-60. This will be achieved through the use of a variable frequency drive which will convert the incoming 400-3-50 to 460-3-60. Power consumption of each compressor is approximately 42 kW each at the rated temperatures. Refrigerant to be used is R-407C .



CAPACITY CONTROL: Infinite capacity control of each compressor from 100% down to 25% of total capacity will be achieved through the use of four unloaders on each compressor. These unloaders will be regulated by the Aqua-Air PLC to maintain a consistent set point under changing load conditions. The unloaders will also allow the compressor to be started unloaded. Each compressor will be connected to a Variable Frequency Drive (VFD). The VFD will control the compressor motor so that there is no current inrush, during starting, above the motor's standard running amperage. The VFD requires an input power supply of 400-3-50. The maximum output power will be 460-3-60 to the compressor motor.

COOLER: The unit is equipped with one 100 ton dual refrigerant circuit brazed plate heat exchanger. The plate heat exchanger has a single water circuit and two refrigerant circuits. Construction of the unit is of #316 stainless steel. The material used to braze the plates together is copper. Maximum test pressure for both circuits is 635 psig. The plate will be individually insulated with 1/2" thick closed cell insulation.



CONDENSER: The unit is equipped with two shell and tube marine condensers. The shell is constructed of ASME spec SA-53 steel pipe. Shells are shot blasted and cleaned before assembly. Tubes are high performance enhanced surface seamless 90/10 Cupro-Nickel tubes to ASME spec SB-359. Tubes are roller expanded into double grooved tubesheets to assure tight joints. Tubesheets are 90/10 Cupro-Nickel to ASME spec SB-171 Alloy 706. Tube supports are quality steel plug welded to the shell. Heads are cast bronze with integral pass partitions, ASME spec SB-62. Gaskets are die-cut providing effective sealing between tubesheets and machined heads. The refrigerant side is constructed and tested in accordance with Section VIII, Division 1 of ASME Code for unfired pressure vessels. Shell side design pressure (refrigerant side) is 350 psig at 250° F. Tube side (water side) is 150 psig at 150° F. Every condenser is tested per ASME Code prior to shipment. A pressure relief valve (set for 350 psig) on the shell is standard.



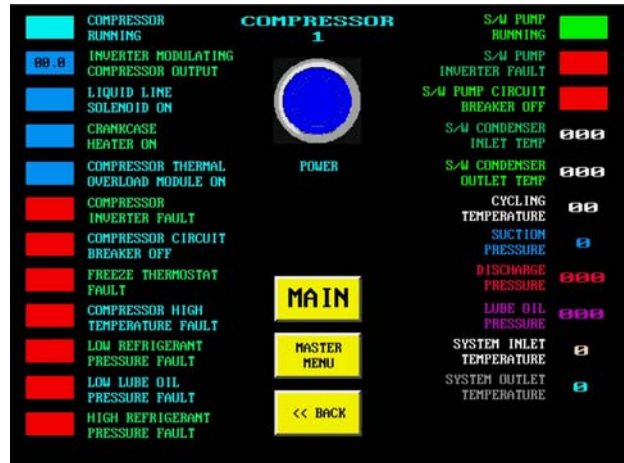
Each condenser will be equipped with a pressure actuated 3 way water regulating valve. This will maintain the system head pressure by modulating the amount of seawater flow through the condenser. Water that is not sent through the condenser will be bypassed to the return. Use of this valve is necessary because there is only one seawater pump providing water for the unit

REFRIGERANT CIRCUIT: Each of the two refrigerant circuits shall include an Electronic Expansion Valve (EEV) with integral sight glass and liquid line solenoid capability, liquid line ball valve, replaceable core liquid line filter drier with access fitting for refrigerant charging and isolation valves for the filter drier. All suction lines will be covered with a minimum of 1/2" closed cell insulation. All refrigerant pressure transducers, switches and controls will be installed with isolation valves.



CONTROL PANEL / ELECTRICAL BOX: The unit will have a NEMA 12 type enclosure for all of the electrical components. The chiller unit will be controlled by a programmable logic controller (PLC). The user interface for this PLC will consist of a touch screen mounted on the front of the electrical box. This touch screen will perform the following switching functions:

System Mode Switch
 Compressor On-Off Switch (2)
 Alternating Settings



Compressor Detail Screen

The touch screen will also display the following information:

- Digital refrigerant pressure readouts, suction and discharge, for each compressor
- Digital temperature display, in Centigrade, for the chillwater inlet and outlet temperatures
- Digital temperature display, in Centigrade, for the seawater outlet temperatures on each condenser
- Elapsed time meters showing the run times for all compressors and pumps
- Chillwater pump motor fault indication
- Chillwater pump selection, 1 or 2
- Compressor inverter operational (2)
- Cooling stage engaged (2)
- Cooling mode
- Chiller freeze thermostat engaged
- Low chillwater flow through the chiller
- Low compressor refrigerant pressure (2)
- High compressor refrigerant pressure (2)
- Compressor motor overload (2)
- High compressor discharge temperature (2)
- Compressor inverter fault indicator (2)
- Chillwater flow through the brazed plate heat exchanger

The Touchscreen & PLC also feature the Aqua-Air Global Link option. All you have to do is connect the touchscreen to your ship's Internet network via an Ethernet cable and it will allow us to remotely monitor and troubleshoot your system in the event of a system problem. We can look at the same screen that the engineer on the yacht is looking at.



As a precautionary measure there will be a hard-wired fail-safe emergency backup system to the PLC/Touchscreen system. This will enable the engineer to operate the chiller unit in case of a failure of the PLC or Touchscreen.

Circuit breakers will be provided for the compressors (2) and control circuitry. All wiring on the unit external to the electrical box will be enclosed in liquid-tite conduit or other approved protective sheathing.

FRAME: The frame for the unit will be constructed of appropriately sized steel channel, square tube and angle. All welds will be by MIG welding procedure. Completed frame will be sand blasted, primed and painted with Awlgrip Matterhorn White. Stainless steel drain pans with a non-corrosive internal coating will be installed under any condensate producing components.

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James D. Nall Co., Inc.

Serving the Yachting Public Since 1941

1050 E. 9th St. Hialeah, FL 33010 U.S.A.
Phone 305-884-8363 Toll Free 800-328-1043
Fax 305-883-8549 Email sales@aquair.com
www.aquair.com