AQUA AIR
MARINE AIR CONDITIONING SYSTEMS

ALPHA 2-5 SERIES INSTALLATION & OPERATION

INSTALLATION

A. UNIT PLACEMENT

1. The Alpha Series chillers should be lifted into place by picking up on all four corners of the unit baseplate simultaneously. The unit should never be lifted by any of the components on top of the baseplate. The four corners are the only areas designed to support the unit.

2. The chiller unit can be mounted in almost any area of the boat. Because the unit is water cooled, high ambient temperatures such as those found in an engineroom do not adversely affect the unit. The unit should not be mounted in an area where seawater, salt air spray, bilge water or internal leakage could splash on the unit in any way.

B. SERVICE ACCESSIBILITY

The most important consideration to remember when installing the Alpha series chiller is that there must be service accessibilty to all components after the unit is installed. The primary components on the unit that will possibly need service accessibility are the main electrical box and compressor.
The compressor should be accessible from the top. There should be sufficient room to remove the compressor without moving the unit or having to move any equipment located around the unit.
The electrical box for the unit can be fastened to the top of the chiller, the sides or the front for ease of access. It can even be remote mounted from the unit.

C. SHOCK MOUNTING

The unit should be securely mounted on all four corners to prevent movement of the unit in the most severe conditions. It is recommended that the unit be mounted on vibration isolators to prevent any unit vibration from being transferred to the structure of the yacht. Make sure that the vibration isolators that you choose are of sufficient capacity to support the weight of the unit on each of the four corners. The unit weight is distributed as follows:

FRONT LEFT	20%
FRONT RIGHT	20%
REAR LEFT	30%
REAR RIGHT	30%

D. PIPING CONNECTIONS

All piping (both chillwater and seawater) connections to and from the Alpha series unit should be easily removeable for maintenance or repair. The chillwater inlet and outlet should have a flexible hose connection right at the inlet and outlet FPT fittings.
This flexible connection should be 6-8" long with two hose clamps on each end of the hose.
On the end of the hose, opposite of the chiller, there should be a shutoff valve.
This should be done for both the chillwater inlet and outlet lines. These can be used to isolate the unit during maintenance or repair.
The same type of flexible connections should be made at the seawater inlet and outlet tubes. It is not necessary to install valves in these lines.
All chillwater lines connecting to the unit must be insulated with a minimum of 1/2" wall foam insulation to prevent condensation.

E. DRAIN CONNECTION

Condensation that forms on the unit is collected at the bottom by the drain pan. The drain pan also serves as the unit base. There is a 5/8" OD hose barb connection on the front side bottom center of the unit. This should be connected to a hose and drained into a suitable area.

WARNING ! Failure to use the correct wire sizes, breaker sizes and wire connectors can result in equipment failure, voiding of the warranty, injury to the operator or death.

F. WIRING

Wiring for the compressor power inlets, seawater pumps and relays and flow switch must be of the proper size. The correct wire and breaker sizes are listed in the Unit Specification chart at the bottom. The wire should be rated for 105 degree Centigrade, 600 volt duty. Proper sized wire terminals should be used on all connections. All connections must be tight to prevent a high amperage condition from happening. All wires should be routed into the main electrical box through the plastic wire bushings provided in the side of the box.

OPERATION

Following are the step by step instructions for starting the Alpha Series chiller. If there are any questions regarding these instructions please contact Aqua Air for clarification.

WARNING ! Failure to accurately follow the startup procedure can result in equipment failure, voiding of the warranty, injury to the operator or death.

A. INTRODUCING FRESH WATER INTO THE CHILLWATER SYSTEM

1. Make sure that there is sufficient fresh water in the ship's pressurized fresh water system to fill the entire chillwater system.

2. Open the air bleeder on the highest fan coil to allow air to escape from the system while water is being introduced into the system.

3. Open the gate valve separating the ship's fresh water system from the chillwater make-up system and allow water to enter the chillwater system.

4. If there is a pressure gauge on the chillwater makeup line it should indicate between 12-15 psig. These are the normal operating pressures.

B. SEAWATER SYSTEM

1. Make sure that the seawater inlet valve is in the open position.

2. Check the seawater strainer to make sure that it is clean.

C. CHILLER UNIT PUMP STARTUP

Before you begin to bleed the chillwater loop of air, it is necessary to start the chiller pump . There must always be water in the head of the chiller pump during operation. Running this pump dry will burn up the seal and cause it to leak. To turn the chiller pump on put the SYSTEM switch on the remote panel in the ON position. The amber light above the switch will come on and the pump should start. If it does not, check the fuse directly below the SYSTEM switch to see if it is blown. On 3 phase units make sure that the motor is turning counter-clockwise as you are facing the front of the pump. If it is not, turn the unit off and switch any two leads of the power input wires to the chiller pump.

If air is trapped in the chiller pump head remove the top brass plug and allow the air to escape. Before replacing the plug put pipe thread sealant on it and then install and tighten.

D. BLEEDING AIR FROM THE SYSTEM

1. Turn on each individual room thermostat to the full cooling position. Verify that the water valve is open on the fan coil. A simple way to check if the valve is open is to try and move the water valve lever. If the lever moves without resistance from side to side then the valve is energized and open. If you feel spring tension against the lever then it is not open.

2. Starting with the lowest fan coil in the boat, progressing to the highest, begin bleeding each fan coil. On the coils with schrader fittings depress the pin inside of the fitting to release the trapped air. On fan coils with the screw head type bleeder turn the screw counter-clockwise until the trapped air is released. After only water comes out turn the screw clockwise to tighten.

3. Continue this procedure until all of the air has been purged from the system. Any air that is trapped in the chillwater loop can be heard passing though the coils or the pump head. Any air in the chillwater loop will reduce the systems capacity and must be purged.

E. CHOOSING THE OPERATING MODE

On cooling only units (A2-5C and A2-5D) as soon as you turn the SYSTEM switch on you are in the cooling mode automatically. On reverse cycle units (A2-5HC and A2-5HD) the remote panel has a MODE switch. This is used to select whether the unit will operate in the cooling or heating mode. This switch can be changed at any time, even while the chiller(s) is running.

F. STARTING THE CHILLER(S)

The starting procedure that applies to your particular situation depends upon whether you have a single chiller or multiple chillers. Procedures are listed below for both.
One feature of the Alpha series chillers is the use of the solid state digital thermostat to control all of the functions of the chiller. One of the features of the unit is its built-in anti-short cycle timer. Whenever power is first applied to the control circuitry of the chiller the thermostat locks the circuit out for 210 seconds (3.5 minutes). This only occurs when the chiller has been turned off at the remote panel or at the circuit breaker supplying power for the remote panel. This also prevents the chiller from immediately coming back on after a power outage.

SINGLE CHILLER STARTUP

When the SYSTEM switch on the remote panel is placed in the on position, the control circuitry is energized for the chiller. After the thermostat countdown (as described above) has been completed the chiller will energize. The chillwater pump will start as soon as the SYSTEM switch has been turned on. The seawater pump should start as soon as the compressor starts. Verify that there is a good stream of water coming out of the seawater overboard.

MULTIPLE CHILLER STARTUP

When the SYSTEM switch on the remote panel is turned on the chillwater pump will energize. It is now possible to select any or all of the chiller units. The individual chiller units are turned on by placing the CHILLER UNIT switch in the ON position, energizing the chillers control circuitry. The unit will now go through the thermostat countdown and then the compressor will come on. If the seawater pump has not already been energized by the other chillers it will now start pumping. Verify that there is a good stream of water coming out of the seawater overboard.

3. CHILLER SETTINGS

SINGLE CHILLER SETTINGS

The Alpha chillers are test run at the factory before shipment. The digital thermostat on each chiller is set according to the following temperatures:

STAGE 1.	COOLING	42 degrees F	3 degree diff	COOL
STAGE 2.	FREEZE-UP	38 degrees F	5 degree diff	COOL
STAGE 3.*	HEATING	100 degrees F	10 degree diff	COOL

* Reverse cycle (heating/cooling) units only

According to these settings the chiller will stop operation when the chillwater inlet temperature reaches 42 degees F. The chiller will restart when the inlet temperature reaches 45 degrees F. If the chiller does not receive a sufficient flow of chillwater and the chillwater outlet temperature reaches 38 degrees F. the chiller will shut off on stage 2. This acts as freeze-up protection.
If the unit is operated in the heating mode it will stop running when the water outlet temperature reaches 110 degrees F. The unit will start again when the water outlet temperature decreases to 100 degrees F.

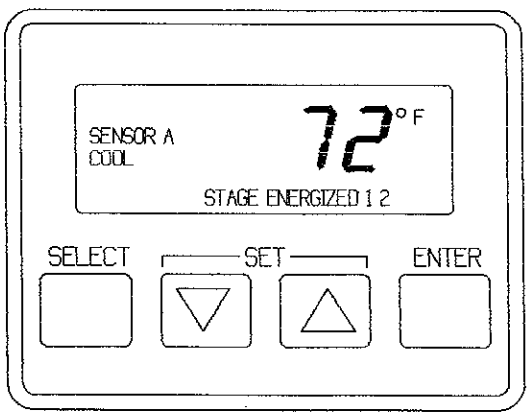
MULTIPLE CHILLER SETTINGS

If more than one chiller is operated in parallel with other chillers, the settings should be changed as shown below. The settings for chiller #1 will remain at the factory settings while the settings for chillers 2-? will change. The freeze-up setting of 38 degrees F will not change.

UNIT	COOLING STAGE 1	HEATING STAGE 3
CHILLER 1	42	100
CHILLER 2	45	95
CHILLER 3	48	90
CHILLER 4	51	85
CHILLER 5	54	80

Instructions for changing the thermostat set points are in the section of this maunual titled "DIGITAL THERMOSTATS 222118.9 SERIES". Turn to the third page and read the section titled "PROGRAMMING STAGE CONTROL VALUES". T775A thermostats (222118 series) are used on cooling only units. T775B thermostats are used on all heating/cooling (reverse cycle) units.

REMEMBER THAT THE FREEZE-UP SETTING SHOULD ALWAYS BE 38 DEGREES F.



61095-4

UNIT SPECIFICATIONS

		A2		A3		A4		A5	
NOMINAL CAPACITY	BTUH KCAL	24,000 6,000		36,000 9,000		48,000 12,000		60,000 15,000	
NOMINAL TONS		2		3		4		5	
WEIGHT	LBS KG	120 55		151 69		167 76		181 83	
NO. OF COMPRESSORS		1		1		1		1	
LENGTH	IN MM	24 610		24 610		24 610		24 610	
WIDTH	IN MM	12 305		12 305		12 305		12 305	
HEIGHT	IN MM	18 458		18 458		18 458		18 458	
VOLTAGE	②	208-240		200-240		208-240		200-240	
PHASE		1	3	1	3	1	3	1	3
FREQUENCY		60	50/60	60	50/60	60	50/60	60	50/60
AMPERAGE DRAW	1 PH	9.3	6.0	14.0	7.6	20.0	13.0	25.0	16.0
CHILLWATER	INLET OUTLET	3/4" FPT 3/4" FPT		3/4" FPT 3/4" FPT		1" FPT 1" FPT		1-1/4" FPT 1-1/4" FPT	
MIN. CHILLWATER FLOW	GPM LPM	4.8 18.3		7.2 27.4		9.6 36.5		12.0 45.6	
CHILLWATER PUMP	①	AQPM-05C		AQPM-10C		E100-25B		E100-33B	33BD
CHILLWATER PUMP AMPS		1.0		1.2		5.8		7.2	1.8
SEAWATER CONNECTIONS		5/8" O.D		1" O.D		1" O.D		1" O.D	
MIN. SEAWATER FLOW	GPM LPM	8 31		12 48		16 61		20 76	
SEAWATER PUMP	①	AQPM-05C		AQPM-10C		E100-25B		E100-33B	33BD
SEAWATER PUMP AMPS		1.0		1.2		5.8		7.2	1.8
RECOMMENDED WIRE SIZES	COMPRESSOR PUMPS (EACH) FLOW SWITCH	14ga 16ga 16ga	14ga 16ga 16ga	12ga 16ga 16ga	14ga 16ga 16ga	10ga 16ga 16ga	14ga 16ga 16ga	10ga 16ga 16ga	12ga 16ga 16ga
CIRCUIT BREAKER SIZE		20A	10A	30A	15A	30A	20A	40A	30A

6005-5

① CHILLWATER AND SEAWATER PUMPS FOR A2-4 SIZES ARE ONLY AVAILABLE IN SINGLE PHASE

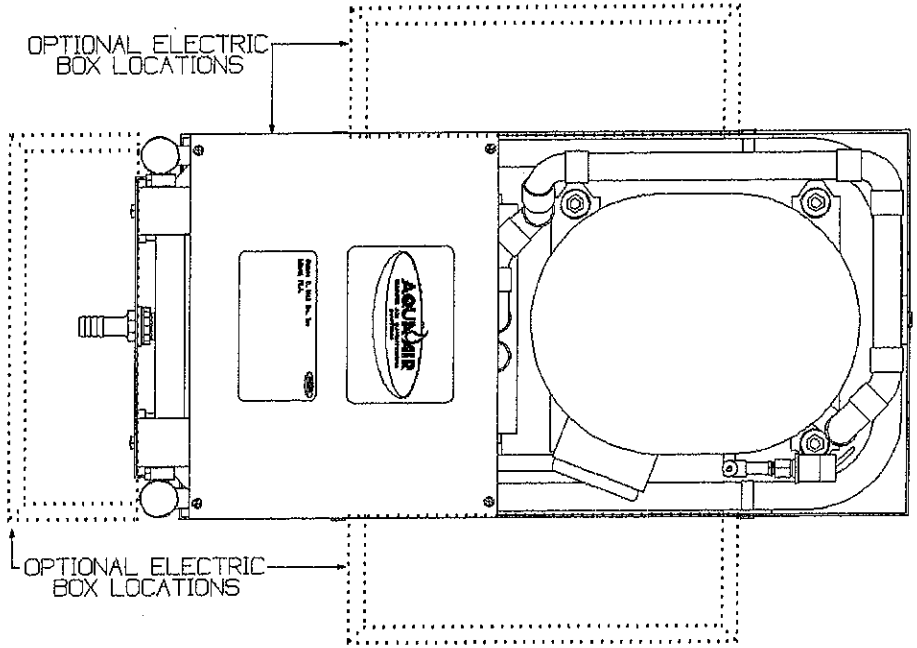
② UNITS ARE ALSO AVAILABLE IN 460-3-60 AND 380-3-50 POWER INPUT. CONSULT THE FACTORY FOR SPECIFIC INFORMATION

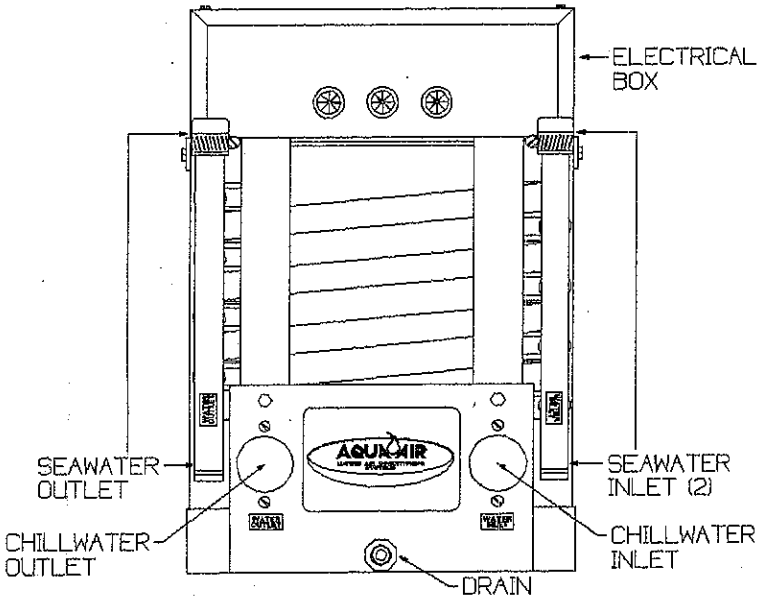
FEATURES

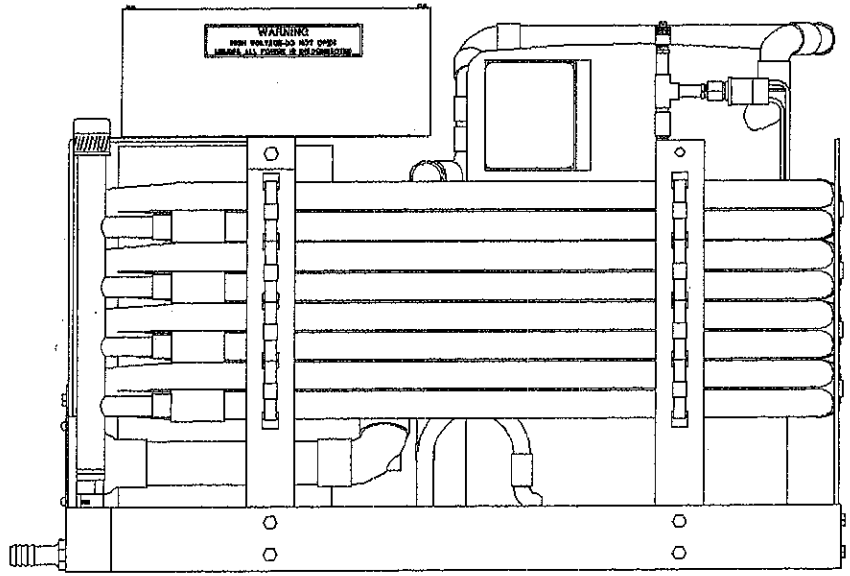
* AVAILABLE IN 208/230, 380 & 460 1 or 3 PHASE, 50-60 CYCLE
* LOW REFRIGERANT PRESSURE CUTOUT
* HIGH REFRIGERANT PRESSURE CUTOUT
* SOLID STATE TEMPERATURE CONTROL
* ELECTRICAL BOX CAN BE MOUNTED ON THE UNIT IN ANY ONE OF FOUR LOCATIONS
* OR REMOTELY MOUNTED UP TO 10' AWAY
* FULL UNIT SIZE CONDENSATE PAN
* MOST COMPACT CHILLER AVAILABLE
* MULTI-CIRCUIT CUPRONICKEL CONDENSERS
* BRAZED PLATE CHILLER
* SERVICE ACCESS PORTS FOR HIGH & LOW REFRIGERANT PRESSURE READINGS

5 TON ASHC UNIT SHOWN

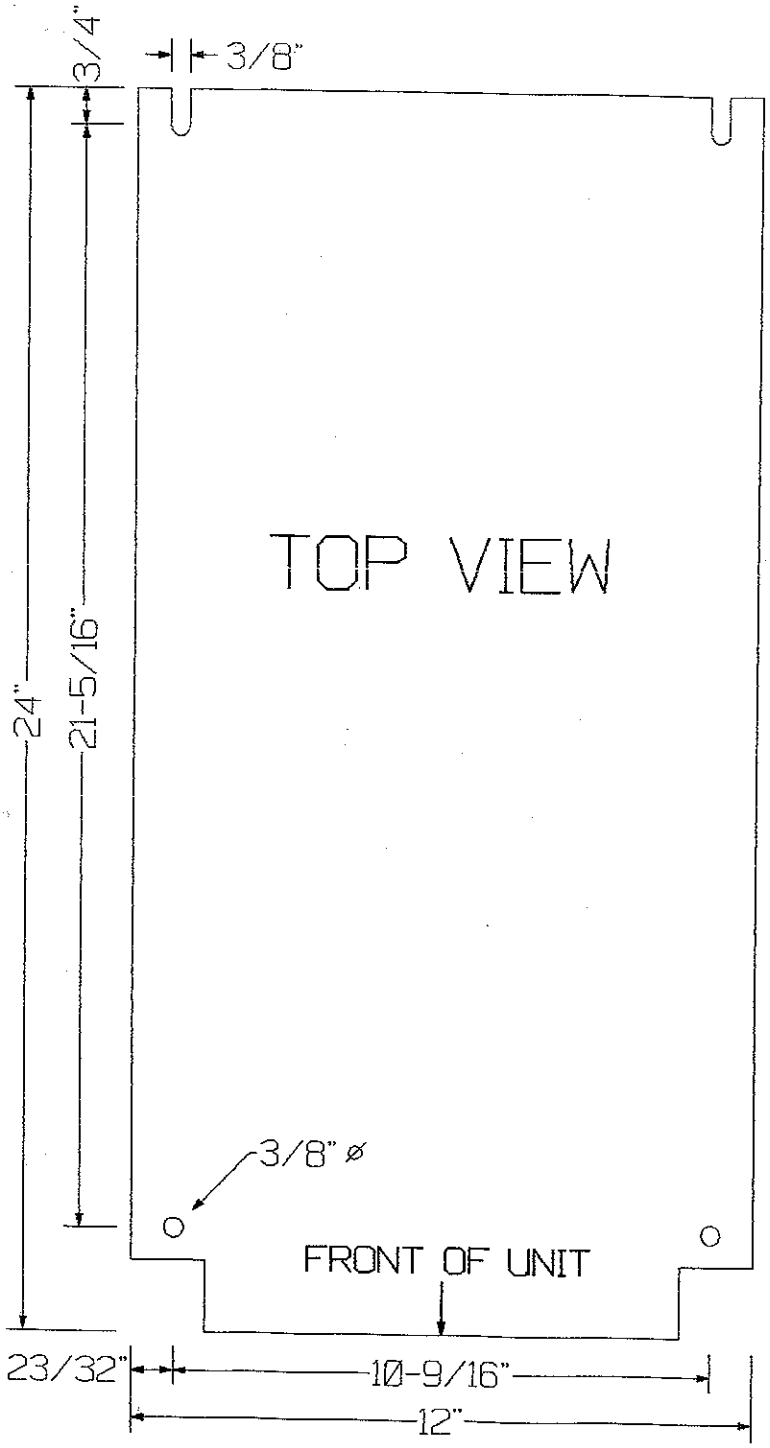
ELECTRIC BOX (WHEN MOVED TO FRONT OR SIDES) ADDS 4 1/2" TO THAT DIMENSION



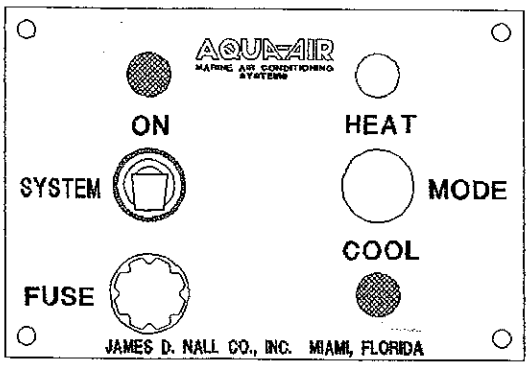




A2-5 SERIES CHILLER MOUNTING DIMENSIONS



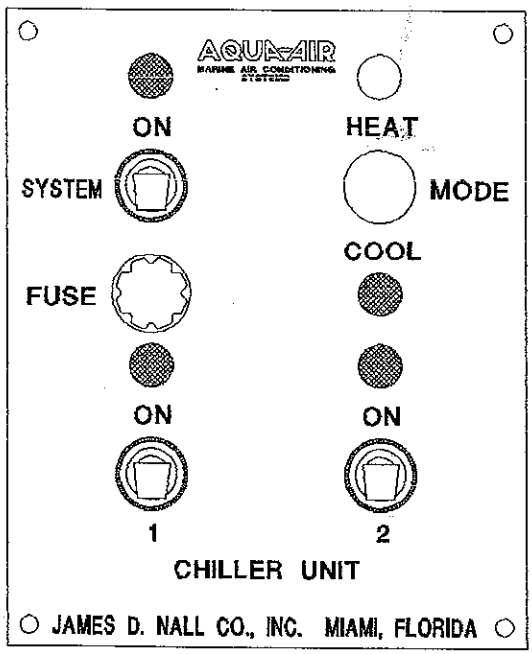
REMOTE PANELS
COOLING ONLY



CONTROL PANEL 1 CHILLER

SYSTEM STARTUP

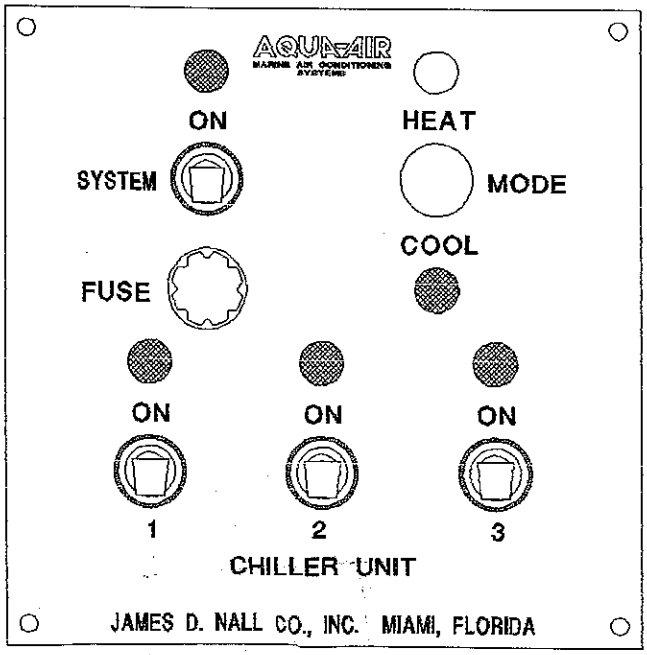
1. TURN SYSTEM SWITCH ON



CONTROL PANEL 2 CHILLERS

SYSTEM STARTUP

1. TURN SYSTEM SWITCH ON
2. TURN ON DESIRED NUMBER OF COMPRESSORS



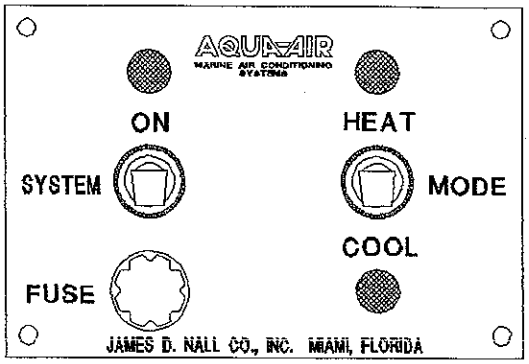
CONTROL PANEL 3 CHILLERS

SYSTEM STARTUP

1. TURN SYSTEM SWITCH ON
2. TURN ON DESIRED NUMBER OF COMPRESSORS

REMOTE PANELS
HEATING/COOLING

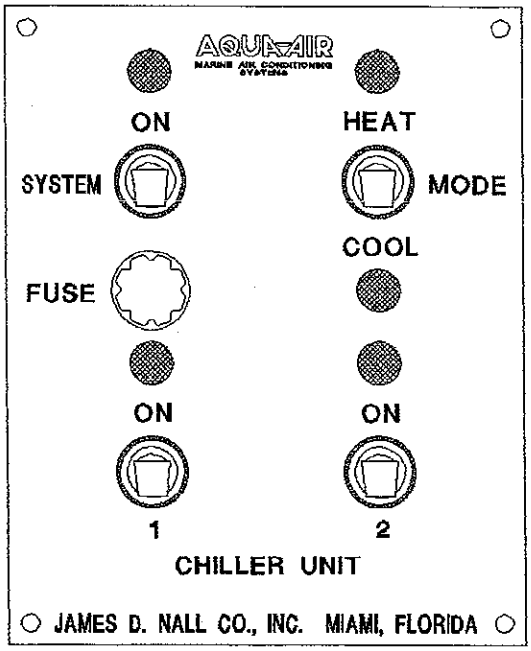
CONTROL PANEL 1 CHILLER



SYSTEM STARTUP

1. TURN SYSTEM SWITCH ON
2. SELECT COOL OR HEAT MODE

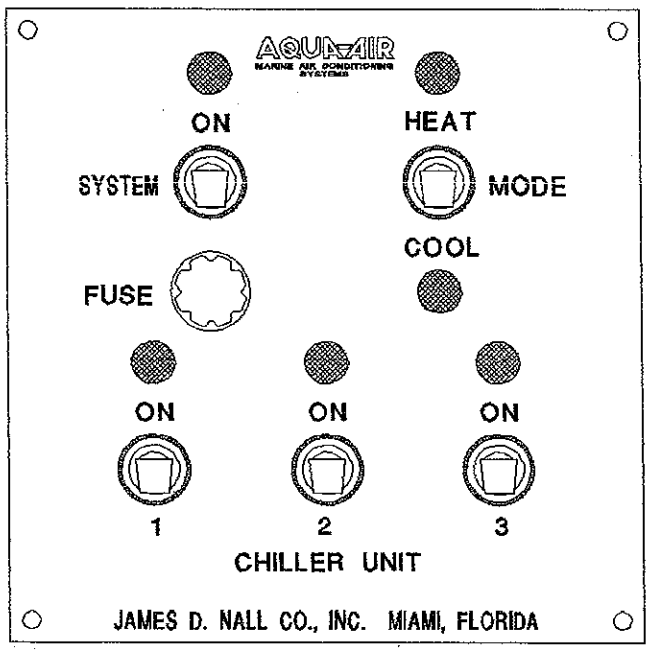
CONTROL PANEL 2 CHILLERS



SYSTEM STARTUP

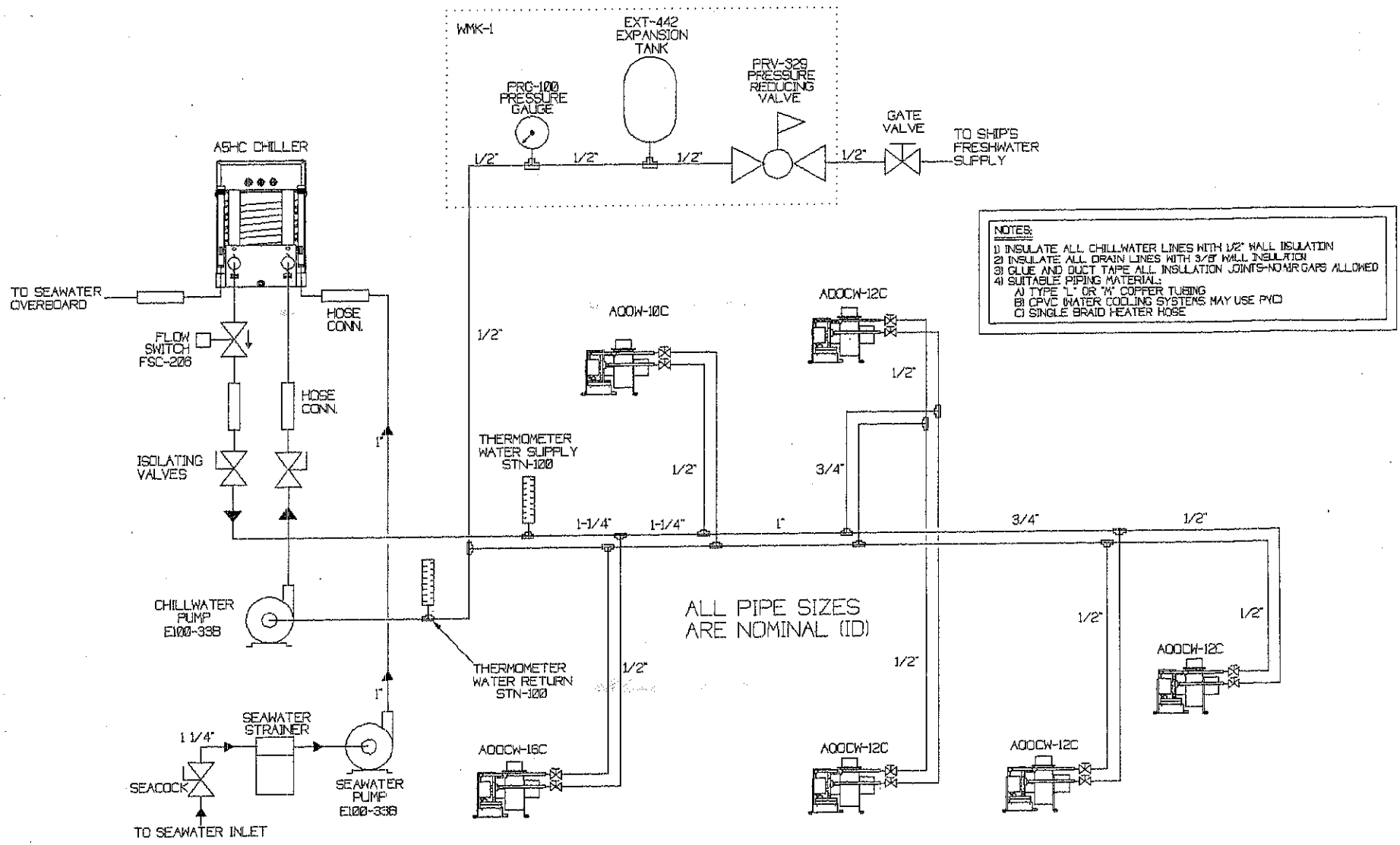
1. TURN SYSTEM SWITCH ON
2. SELECT COOL OR HEAT MODE
3. TURN ON DESIRED NUMBER OF COMPRESSORS

CONTROL PANEL 3 CHILLERS



SYSTEM STARTUP

1. TURN SYSTEM SWITCH ON
2. SELECT COOL OR HEAT MODE
3. TURN ON DESIRED NUMBER OF COMPRESSORS



SAMPLE PIPING DIAGRAM

01-956B

AQUA AIR
MARINE AIR CONDITIONING SYSTEMS

ALPHA CHILLER SPARE PARTS

ELECTRICAL BOX

START RELAY

141301-00	A2(H)C
141301-02	A3(H)C
141303-00	A4.5(H)C

RUN CAPACITOR

140401-35	A2.3(H)C
203511-00	A4(H)C
203510-00	A5(H)C

START CAPACITOR

140405-43	A2(H)C
203502-01	A3(H)C
203509-00	A4.5(H)C

CONTACTORS

205104-00	A2.3(H)C
205107-00	A4.5(H)C
205101-01	A2-5(H)D

TIME DELAY

217001-00	ALL UNITS

DIGITAL TEMPERATURE CONTROLLER

222118-15	TEMPERATURE SENSOR
222119-00	COOLING ONLY CHILLERS
222119-18	REVERSE CYCLE CHILLERS

CHILLER ASSEMBLIES

PCA-24	ALL A2 SERIES
PCA-36	ALL A3 SERIES
PCA-48	ALL A4 SERIES
PCA-60	ALL A5 SERIES

CONDENSER ASSEMBLIES

13600-A2	ALL A2 SERIES
13600-A3	ALL A3 SERIES
13600-A4	ALL A4 SERIES
13600-A5	ALL A5 SERIES

COMPRESSORS

SINGLE PHASE

203711-00	A2(H)C
203713-03	A3(H)C
203719-01	A4(H)C
203718-01	A5(H)C

THREE PHASE

203711-03	A2(H)D
203713-02	A3(H)D
203719-00	A4(H)D
203718-00	A5(H)D

REVERSING VALVES

140702-00	ALL UNITS
217901-00	ALL A2.3 SERIES
217902-00	ALL A4.5 SERIES

PRESSURE SWITCHES

210909-02	HIGH PESSURE SWITCH
210910-00	LOW P[RESSURE SWITCH

DRIERS

306603-00	A2.3 COOLING ONLY
206615-01	A4.5 COOLING ONLY
206616-38	A2.3H REVERSE CYCLE
206616-50	A4.5H REVERSE CYCLE

MISCELLANEOUS

204100-00	PLASTIC HOSE CLAMP
COND PLUG KIT	S/W CONDENSER PLUG ASSEMBLY

81095-11

AQUA AIR
MARINE AIR CONDITIONING SYSTEMS

AQCWP SPARE PARTS

PLASTIC COVERS

100196-05	TERMINAL BLOCK COVER FOR AQCWP(H)-01C
100196-08	TERMINAL BLOCK COVER FOR AQCWP(H)-02,3C

PANEL LIGHTS

212210-01	PANEL LIGHT RED 230V
212211-01	PANEL LIGHT BLUE 230V
212213-01	PANEL LIGHT AMBER 230V
214100-32	PANEL LIGHT RETAINING CLIP

ENGRAVED PANELS

216612-00	PANEL FOR AQCWP(H)-01C
216613-00	PANEL FOR AQCWP(H)-02C
216614-00	PANEL FOR AQCWP(H)-03C

SWITCHES

221422-00	SYSTEM SWITCH, COMPRESSOR SWITCH ALL UNITS
221423-00	HEAT/COOL MODE SWITCH ALL UNITS

MISCELLANEOUS

140904-00	FUSE HOLDER, ALL UNITS
141215-10	FUSE 10A SLO-BLO
222618-00	TERMINAL SECTION, 1 POLE 30 A WHITE

AQUA AIR MANUFACTURING, div of the JAMES D. NALL CO., INC.
1050 E. 9th STREET, HIALEAH, FLORIDA 33010 U.S.A.
PH. 305-884-8363 FAX. 305-883-8549