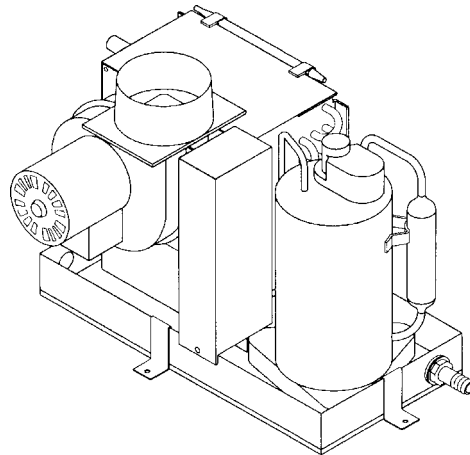


English



SELF-CONTAINED COOLING ONLY AC KITS

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Zephyr Cooling Only Units - Installation

Warning

This manual contains essential safety information concerning the safe and proper installation and operation of Zephyr self-contained direct expansion air conditioners. It is very important that you read and understand the contents of this manual thoroughly before attempting to install any Cruisair equipment. If there are any statements in this manual that you do not understand, contact the Taylor Made Environmental, Inc. Applications Department for assistance. Phone (804) 746-1313, Fax (804) 746-7248 (8:00am - 5:00pm United States Eastern Time).

Notice

As of July 1, 1992, United States federal law prohibits the intentional release of refrigerant gases into the environment, including the R-22 refrigerant mostly used in Cruisair air conditioning systems. Special care must be taken when installing, charging and servicing Cruisair equipment to prevent any loss of refrigerant.

Cruisair does not recommend the practice of using refrigerant to purge air and moisture from the system at installation. This formerly used practice of purging is in violation of United States federal law.

Introduction

You have just purchased the first complete built-in marine air conditioning system designed for self installation. We are confident you will find the added comforts experienced in your boat to be well worth the money spent. If, upon opening your new system, you discover any parts are missing, contact your dealer immediately.

Before attempting to install your new Zephyr air conditioning system, you must read this installation manual completely. Failure to perform certain tasks in the proper sequence could result in an inoperative system as well as a voided warranty.

Unpacking and Inspection

When the equipment is received, all items should be carefully checked against the packing list to ensure all cartons have been received. Move units in the normal "up" orientation as indicated by the arrows on each carton. Examine cartons for shipping damage, removing the units from the cartons if necessary. If the unit is damaged, the carrier should make the proper notation on the delivery receipt acknowledging the damage.

CAUTION: When unpacking and installing the control, care must be taken not to kink or break the copper cap tube when uncoiling the sensing bulb. The cap tube is hollow and kinking or sharp bends will inhibit system operation.

Safety Considerations

Never install your air conditioner in the bilge or engine room areas. Insure that the selected location is sealed from direct access to bilge and/or engine room vapors. Do not terminate condensate drain line within three (3) feet of any outlet of engine or generator exhaust systems, nor in a compartment housing an engine or generator, nor in a bilge, unless the drain is connected properly to a sealed condensate or shower sump pump.

Installation and servicing of this system can be hazardous due to system pressure and electrical components. When working on this equipment, always observe precautions described in the literature, tags and labels attached to the unit. Follow all safety codes. Wear safety glasses and work gloves and place a fire extinguisher close to the work area. The following is a summary of the labels on the unit:

! DANGER Electrical shock hazard. Disconnect voltage at main panel or power source before opening any cover. Failure to comply may result in injury or death.

! WARNING This component does not meet Federal requirements for ignition protection. Do not install in spaces containing gasoline engines, tanks, LPG/CPG cylinders, regulators, valves or fuel line fittings. Failure to comply may result in injury or death.

NOTICE This component is charged with hydrochlorofluorocarbon (HCFC) refrigerant R22. Effective July 1, 1992 it shall be unlawful for any person to knowingly vent or otherwise knowingly release any class 1 (CFC) or class 2 (HCFC) substance as a refrigerant in a manner which permits such substance to enter the atmosphere per the clean air act of 1990. Public law 101-549 Title IV Section 608-c. Failure to comply may result in severe penalties, including fines and imprisonment.

! WARNING To minimize the hazard of electrical shock and personal injury, this component must be effectively grounded. Refer to the installation guidelines for further information.

Placement Of System

Selecting a good location for your air conditioner is the most important part of your preparations. Be sure to consider the size

of the area you are cooling, the air distribution needs, and the size of the unit you have chosen. Keeping in mind that cool air has a tendency to fall, it is highly recommended that you locate the supply air grill as high as possible in the cabin. Figure 1a at the back of this manual shows the single duct application and Figure 1b shows a dual duct application.

The Zephyr unit should be installed as low as possible, **but never in the bilge or engine room areas. Insure that the selected location is sealed from direct access to bilge and/or engine room vapors.** Installing the unit as low as possible (such as under a V-berth, dinette seat or bottom of a locker) and ducting the supply air as high as possible, creates an ideal air flow condition. This type of installation will prevent short or premature cycling.

The unit should be positioned on a firm, level, horizontal surface and the condensate drain line should run downward from the unit to a suitable drain location. Plan all connections which must be made including ducting, condensate drain, seawater in and out, electrical power connections, location of control, and seawater pump placement, to assure easy access for routing and servicing.

Tools Required for Installation

- Screw drivers
- Pliers
- Pipe wrench
- Wire cutters/crimpers
- Drill & 7/8" bit
- Jig saw
- Duct tape
- Electrical tape
- Teflon tape
- Bedding compound to seal thru hull fittings
- Hardware to secure unit, pump, strainer, grills & control panel

Spacing Allowances & Unit Dimensions

The following space allowances should be considered when mounting the unit:

1. Allow a minimum of 6" around the perimeter of the unit in the area of the seawater and condensate drain piping.
2. Allow a minimum of 3" of air space in front of the evaporator coil for the return air intake if it is adjacent to a bulkhead.
3. Allow a minimum of 3" of air space for the electric blower motor ventilation.
4. For flexible ducting connection, allow 2" for the duct ring, 1" for the duct bend radius and add 4" or 6" for the diameter of the ducting to get the total distance as measured from the blower outlet. In other words, 7", 9" or 10" of clearance, depending on unit, is needed for the ducting connection (this also applies to clearance needed behind the supply air grill). Note that the blower and duct ring can be positioned either vertically or horizontally. See Figure 2 at the back of this manual.

The dimensions shown in the table of Figure 2 are suggested minimums. Enough space should be allocated for installation and serviceability.

How It Works

Your self-contained air conditioner consists of four main components and a refrigerant gas circulating through the system. The BLOWER draws warm cabin air across the fins on the EVAPORATOR where the heat from the air is transferred to the refrigerant in the evaporator coil. As the refrigerant evaporates from a liquid into a gas it absorbs the heat from the cabin air. The COMPRESSOR then compresses the refrigerant gas and pumps it through the outer tube in the CONDENSER COIL. The seawater pump circulates cool seawater through the inner tube in the condenser coil, this cools the refrigerant and condenses it into a liquid. The heat from the refrigerant is exchanged to the seawater and discharged overboard. The liquid refrigerant is then passed through the EVAPORATOR COIL and the cycle repeats. Removing heat from the cabin air lowers its temperature. The cooled air is blown through the ducting and out the supply air grill(s). See Figure 3 at the back of this manual for component identification.

Mounting Brackets

The air conditioning unit is supplied with a base pan that also serves as a condensate pan. Mounting clip brackets and screws (4) are provided to secure the base pan onto a flat, horizontal surface. See Figure 4 at the back of this manual.

Condensate Drains

The condensate drain pan is 1¾" high with two drain locations. During conditions of high humidity, condensate may be produced at a rate of approximately ½ gallon per hour. With this in mind, it is important to route condensate drains downward to a sump pump. It is not recommended to route condensate drains to the bilge. After the condensate drain installation is complete, test the installation by pouring a quart of water into the pan and checking for good flow.

For installation of the condensate drain (refer to Figure 5 at the back of this manual):

1. Remove the aft facing watertight plug from the base pan of the air conditioning unit.
2. Slip the solid washer and the liquid-seal washer onto the PVC fitting in that order.
3. Connect the fitting through the exposed hole in the base pan with the locking nut.
4. Securely tighten with two (2) wrenches to provide a proper seal.
5. Attach a 5/80 I.D. reinforced hose to the hose barb and secure with stainless steel hose clamps.

6. Install the condensate drain hose downhill from the unit and aft to a sump.
7. Two drain fittings may be used and the hoses teed together provided there is a minimum 2" drop from the bottom of the base pan to the tee connection.

Note:

Do not terminate condensate drain line within three (3) feet of any outlet of engine or generator exhaust systems, nor in a compartment housing an engine or generator, nor in a bilge, unless the drain is connected properly to a sealed condensate or shower sump pump.

Blower Assembly

With the Zephyr, you can achieve horizontal or vertical supply air discharge by rotating the blower as desired. Its design allows the blower to be rotated by removing the screws holding the blower plate to the evaporator coil shroud. Rotate the blower to allow the most direct flow of air to the supply air grill. **To rotate the 10-16K blowers, remove the two plastic plugs for access to the mounting screws.**

Supply & Return Air Grills and Transition Boxes

As previously indicated, install the supply air grill(s) as high as possible and the return air grill as low and close to the Zephyr as possible to insure direct uninterrupted airflow to the evaporator. The cut out for the 4" supply air grill for the 5K unit is 4" in diameter and the flange is 5½" in diameter. The cut out for the rectangular transition box used with the 10 & 12K units is 11⁵/₈" by 5⁵/₈" and 13⁵/₈" by 5⁵/₈" for the 16K unit. Connect the 6" or 7" oblong duct ring to the transition box by first placing the ring on the box and tracing the hole. Cut the oblong hole out of the box. Secure the ring to the box with rivets (trim ¼" from ring flanges if necessary). Completely seal the joint between ring and box with silicone. A minimum clearance of 3" plus the duct diameter size is required behind the grill for attaching the ducting (see earlier section, "Spacing Allowance and Unit Dimensions"). The return air filter, mounted to the front of the evaporator, removes debris from the air prior to the air being drawn across the evaporator coil and fins. Dust and lint can clog and reduce airflow across the evaporator coil resulting in poor performance. See the *Maintenance* section for filter cleaning instructions.

Ducting

Good airflow is critical for the performance of the entire system. It is highly dependent on the quality of the ducting installation. The ducting should be run as straight, smooth and taut as possible minimizing the number of 90 degree bends (two tight 90 degree bends can reduce airflow by 25 percent). The following is a summary of proper ducting connections:

1. Pull back the fiberglass insulation exposing the inner mylar duct hose.

2. Slide the mylar duct hose around the mount ring until it bottoms out.
3. Screw 3 or 4 stainless steel sheet metal screws through the duct hose into the transition ring. Make sure to catch the wire in the duct hose with the heads of the screws. Do not use band clamps, as the hose will slide off.
4. Wrap duct tape around the ducting and ring joint to prevent any air leaks.
5. Pull the insulation back up over the mylar to the ring and tape this joint.
6. Remove excess ducting and use the same connection method at the supply air grill.

Manual Control Panel Installation

The manual control panel should be located within cap tube length of the Zephyr unit. The dimensions for the 2-knob panel is 3¼" x 5½". The cut out size for the 2-knob panel is 2" wide by 4¾" tall. The 3-knob panel is configured either vertically or horizontally. Dimensions for the 3-knob is 2^{15/16}" x 7^{15/16}". The cut out size for the 3-knob panel is 2" by 6¾". (Refer to Figures 6 and 7 at the back of this manual.) Once the cut out is made, carefully uncoil the copper cap tube with return air sensor (copper bulb) and route the control wires and cap tube through the hole and back to the unit **using caution not to kink the cap tube**. Mount the return air sensor into the clips provided on the evaporator coil. If the return air sensor cannot be mounted on the evaporator coil, mount it behind the return air grill. The sensor must be mounted in the return air stream. Make electrical connections according to the wiring diagrams provided. (See wiring diagrams, Figures 8 and 9 at the back of this manual.)

Electrical Connections, Grounding & Bonding

All Zephyr units have a five position terminal strip mounted inside the electric box. The terminal strip is labeled for proper connections of the electrical supply, ground wires and pump circuits. Wiring diagrams are provided in the electrical box and in this manual. The correct size circuit breaker should be used to protect the system as specified on the air conditioning unit's data plate label. A minimum of 12 AWG boat cable should be used to supply power to the air conditioning unit and to the seawater pump (see next paragraph). All connections to the terminal strip shall be made with ring terminals supplied with the Zephyr kit. **Turn off AC (alternating current) power supply circuit breaker before opening electrical box and accessing the terminal strip.**

Each air conditioning unit installed requires its own dedicated circuit breaker. If there is only one air conditioning unit installed, the seawater pump does not require a circuit breaker; the wiring from the seawater pump is connected to the terminal strip on the unit. A minimum of 12 AWG boat cable should be used to extend the wires on the pump, if necessary, using the butt slices

included with the kit. If two or more air conditioning units use the same seawater pump, the pump wires will be connected to a pump relay panel (PRP) which in turn has its own dedicated circuit breaker (see the wiring diagram furnished with the PRP). Any electrical connections in the bilge below the waterline should use heat shrink type butt splices.

The air conditioning unit must be connected to the boat's bonding system to prevent corrosion due to stray electrical current. All pumps, metallic valves and fittings in the seawater circuit that are isolated from the air conditioning unit by PVC or rubber hoses must be individually bonded to the boat's bonding system also. This will help eliminate any possibility of corrosion due to stray current.

Note

Failure to properly ground and bond the system will void the warranty!

Notice and ABYC Standards:

Field wiring must comply with ABYC (American Boat and Yacht Council) electrical standards. Power to the unit must be within the operating voltage range indicated on the data plate. Properly sized fuses and circuit breakers must be installed for branch circuit protection. See equipment rating plate for maximum size. All air conditioning units must be effectively grounded to minimize the hazard of electric shock and personal injury. The following standards apply:

1. AC (alternating current) grounding (green) wire must be provided with the AC power conductors and connected to the ground terminal (marked "GRND") at the AC power input terminal block of the unit(s), per ABYC standard E-8.
2. Connections between the vessel's AC system grounding conductor (green wire) and the vessel's DC (Direct Current) negative or bonding system should be made as part of the vessel's wiring, per ABYC standard E-9.
3. When servicing or replacing existing equipment containing a chassis-mounted "ground" stud, the service person or installer must check the vessel's wiring for the existence of the connection required in item 2 above.

ABYC standards are available from:

American Boat and Yacht Council
3069 Solomon's Island Road
Edgewater, MD 21036
Telephone: (410) 956-1050

Seawater Pump and Plumbing

Several guidelines should be followed during the installation of the seawater system. Since the circulation pump is centrifugal and not self-priming, it must be mounted so that it is always at least one foot below the water line regardless of which tack the vessel is on. Pump may be mounted horizontally or vertically,

however the discharge must always be above the inlet. Pump head should be rotated toward the direction of water flow.

Install the seawater speed scoop intake as far below the water line and as close to the keel as possible in any application, but especially on a sailboat, to keep the intake in the water when the boat heels over so that air does not get into the system. The speed scoop intake must face forward and not be shared with any other pump. A seawater strainer is mandatory between the shut off valve (seacock) and the pump to protect the pump from any foreign matter. **Failure to install a seawater strainer will void the pump warranty.**

The seawater system should be installed with an upward incline from the speed scoop & seacock, through the strainer, to the inlet of the pump and then up to the inlet of the air conditioning unit's condenser coil. The discharge from the air conditioning unit should then run to the seawater outlet thru-hull fitting which should be located where it can be visually checked for water flow and as close as practicable to the waterline to reduce noise. All hose connections shall be secured by means of double/reversed stainless steel hose clamps. Use teflon tape on all threaded connections. The following is a summary of the seawater system installation:

1. Install the speed scoop thru-hull inlet as close to the keel and as far below the water line as possible, facing forward. Bed the scoop with a marine sealant designed for underwater use.
2. Install a bronze, full flow seacock on the speed scoop thru-hull inlet.
3. Install a seawater strainer below the level of the pump with access to filter.
4. Mount the pump above the strainer and at least one foot below the waterline.
5. Connect the seacock and strainer with an uphill run of 5/8" reinforced marine grade hose.
6. Connect the discharge from the pump uphill to the bottom inlet of the air conditioning unit's condenser coil with 5/8" hose. Connect the discharge from the condenser coil to the overboard discharge thru-hull fitting with 5/8" hose.
7. Avoid loops, high spots or the use of 90° elbows with seawater hose (each 90° elbow is equivalent to 2.5' of hose and a 90° elbow on the pump outlet is equivalent to 20' of hose).
8. Double clamp all hose connections with stainless steel clamps, reversing the clamps.
9. Use teflon tape on all threaded connections.
10. **Connect all metallic parts in contact with seawater to the vessel's bonding system including the speed scoop inlet, strainer, pump and the air conditioner.**

Refer to Figure 10, 11a, and 11b at the back of this manual for seawater kit installation.

Installation Checklist (review prior to and after installation)

Seawater cooling system

- Speed scoop located as far below the water line and as close to the keel as possible
- Shut off valve and speed scoop properly sealed and tight
- Seawater pump at least one foot below water line and securely mounted
- Strainer mounted below pump with access to filter
- Double/reversed stainless steel hose clamps on all hose connections
- Teflon tape on all threaded connections
- Hose runs uphill from speed scoop to strainer, pump and air conditioning unit
- Water flowing freely from overboard discharge while pump is running

Mounting

- Not in engine room or bilge areas, must be sealed away from exhaust or fumes
- Proper spacing allowed around unit
- Attached to solid level platform with four hold down clips provided
- Condensate drain routed aft and down hill to a sealed sump (not bilge)

Electrical

- All butt connections on pump wire tightly crimped and heat shrunk
- AC power source installed and grounded/bonded in accordance with ABYC standards
- Control wires connected to terminal strip with ring terminals

Grills and Ducting

- Supply air grill mounted as high as possible
- Return air grill mounted as low and as close to the unit as possible
- Return air grill mounted away from exhaust and bilge vapors
- Ducting is pulled taut, straight and properly connected with no excess

Zephyr Cooling Only Units - Operation

Operation

Manual Control Panel Operation:

2-knob (2KB), 5K unit; 3-knob (3KB), 10, 12, 16K units

1. Ensure seawater intake ball valve (seacock) is open.
2. Turn top (MODE) control knob to OFF.
3. Turn on A/C circuit breaker. If the seawater pump has its own circuit breaker, turn that on too.
4. Turn top (MODE) control knob to FAN, this energizes the fan and seawater pump (3KB, see note). Turn THERMO-STAT control knob to the coolest position by rotating it fully clockwise.
5. Turn middle (FAN) control knob to highest setting (3KB switch).
6. Verify that the fan is running and that there is steady airflow out of the supply air grill.
7. Turn top (MODE) control knob to RUN (on 2KB switch) and ON (for 3KB switch). This will start the compressor and seawater pump (2KB, see note).
8. Check for a steady solid stream of seawater from the overboard discharge.
9. To set the thermostat, allow sufficient time for the unit to cool the area to the desired temperature. When the area is sufficiently cooled, turn the thermostat knob slowly toward the center position until it clicks once. The thermostat is now set to maintain a constant temperature.

Note

The seawater pump comes on with the fan on the 3KB (top switch set to FAN) and with the compressor on the 2KB (switch set to RUN).

Troubleshooting Guidelines

Before you call for service, review this list. It may save you time and expense. This list contains common occurrences that are not a result of defective workmanship or materials. If you need service after trying these procedures, call your nearest Cruisair dealer.

Problem: System will not start.

Possible Reason/Solution

1. **Air conditioner circuit breaker is off.** Turn circuit breaker on at ship's panel.
2. **Wiring at terminal strip is miswired.** Check wiring diagram; correct if necessary.
3. **Input line voltage is insufficient.** Check power source for proper voltage. Check wiring and terminals for proper sizes and connections.

Problem: No cooling.

Possible Reason/Solution

1. **Selector knob may not be in "cool" position.** Reset selector knob.
2. **Temperature set point is above ambient temperature.** Lower temperature setting.
3. **Obstructed water flow.** Clean seawater strainer. Check for good steady flow from overboard discharge.
4. **Pump may be air locked.** Remove hose from pump discharge to purge air from line.
5. **Coil iced.** See below.

Problem: Coil iced.

Possible Reason/Solution

1. **Thermostat set point is too low.** Check setting on temperature knob. If setting is extreme for conditions, raise set point.
2. **Improper air flow.** Clean return air filter or remove obstructions from return air stream. Check for crushed or restricted ducting. Ducting run must be as straight as possible, remove any excess ducting.

Problem: Short cycling compressor.

Possible Reason/Solution

1. **Cold supply air returning directly to return air grill.** Redirect supply air so that it is not directed into the return air stream.

Problem: System runs continuously.

Possible Reason/Solution

1. **Port hole or hatch open.** Close all port holes and hatches.
2. **Thermostat setting is excessive for conditions.** Raise thermostat setting to cycle compressor.

Zephyr Cooling Only Units - Maintenance

Seawater Strainer

Insure that your pump receives adequate seawater flow by regularly cleaning the strainer basket. Periodically check the overboard discharge for a steady stream of water. Check seawater intake speed scoop for obstructions. Make sure hoses are not looped, kinked or crushed.

Condenser Coil Cleaning

Coils can become fouled over a period of time due to marine growth or scale build-up. This both obstructs water flow and prohibits proper heat transfer. To clean coils, flush with a 5% muriatic or hydrochloric acid and fresh water solution. Disconnect system hoses from coil and pump solution through until clean. Rinse with fresh water and reconnect hoses. Follow manufacturer's safety guidelines for all cleaning solutions.

Blowers

Oil blower motor every six months with SAE20 or equivalent (i.e. fractional H.P. motor oil).

Return Air Filters

Check the return air filter about once a month and clean as necessary. To clean the filter, remove it from the unit, rinse with water, air dry and reinstall.

Winterization

There are several methods of winterization, some of which work better than others. The four various methods employed using a 50/50 non-polluting biodegradable anti-freeze/water solution are:

1. Pumping of anti-freeze solution into the overboard thru-hull fitting, and discharging through the intake thru-hull fitting.
2. Use of the seawater pump to pump anti-freeze solution through the system and discharging through the overboard thru-hull fitting. Close seacock, remove hose from strainer discharge, raise hose above pump (so pump does not lose its prime) and pour in anti-freeze solution. Pump solution through system. The strainer and hose to seacock will also need to be drained of water.
3. Use of pressurized air injected at the overboard discharge fitting and the water being discharged through the seawater intake fitting.
4. Use of pressurized air to force water from the intake through the overboard discharge.

Note:

Collect all discharged liquids and recycle or dispose of in a proper manner.

Any method that causes the anti-freeze solution to flow downward is the method of choice. By this means, the anti-freeze solution will displace any water trapped and eliminate the possibility of freezing in hidden areas.

In addition, since the seawater pump utilizes a magnetically driven impeller, the impeller should be removed from the wet end assembly, wiped with an alcohol solution, and stored in a warm, dry area until commissioning takes place.

Zephyr Kit Parts List

Zephyr ZF5 Kits

ZF5 115V, ZF5CK 220V/50Hz

Condensate hose barb assembly with 4 mounting brackets included with unit

P/N	Qty	Description
338422	5'	Ducting, Insulated 4"
330571	1	Grill, Circular Off Wht
332743	1	Grill, 8x8TRA Anodized
222-110087	1	ZFSA1-XB 2-Knob Mechanical Control
334220	1	Thru Hull, 5/8" Plastic
226-600006	25'	Hose, Seawater 5/8"
335360	1	Bush, PVC Red 1/2" MPT x 1/4" FPT
335120	3	Adapt, PVC 1/2" MPT x 1/2" HB
335080	2	Adapt, PVC 1/2" FPT x 1/2" HB
225-600021	1	Strainer (w/ Bracket 1/2" FPT)
225-500103	1	PC400 Pump, PDA-250 115V Seawater <i>(or for 220V model - PC400 Pump, PDA-250C 220V Seawater)</i>
369617	17	Clamp, Hose #06SS Thin
330482	1	Ball Valve 1/2" SS Hndl (Bronze)
369699	1	Strainer, Speed Scoop 1/2" Bronze
338439	3	Terminal Butt Splice 16-14 Blue
336750	6	Terminal Ring 10-12 Yellow

Optional Dual Duct Kit

206004	6'	4" Ducting Insulated Flexible
5068771	1	Plenum Tee Box, 4", 4", 4"
V4 Rnd Black	1	Plastic Grill, Black

Zephyr ZF10 Kits

ZF10 115V, ZF10CK 220V/50Hz

Condensate hose barb assembly with 4 mounting brackets included with unit

P/N	Qty	Description
226-600015	10'	6" Ducting, Insulated Flexible
229-800025	1	Transition Box ABS 12x6x4.5
228-700017	1	6" ABS Oblong Transition Ring
217-300131	1	12x6TV Alum Supply Air Grill
217-300125	1	12x12TRA Alum Return Air Grill
222-110088	1	ZFSA1-ZB 115V 3-Knob Mech. Control <i>(or for 220V model - ZFSA1-ZCB 220V 3-Knob Mech. Control)</i>
334220	1	Thru Hull, 5/8" Plastic
226-600006	25'	Hose, Seawater 5/8"
335360	1	Bush, PVC Red 1/2" MPT x 1/4" FPT
335120	3	Adapt, PVC 1/2" MPT x 1/2" HB
335080	2	Adapt, PVC 1/2" FPT x 1/2" HB
225-600021	1	Strainer (w/ Bracket 1/2" FPT)
225-500103	1	PC400 Pump, PDA-250 115V Seawater <i>(or for 220V model - PC400 Pump, PDA-250C 220V Seawater)</i>
369617	17	Clamp, Hose #06SS Thin
330482	1	Ball Valve 1/2" SS Hndl (Bronze)
369699	1	Strainer, Speed Scoop 1/2" Bronze
338439	3	Terminal Butt Splice 16-14 Blue
336750	6	Terminal Ring 10-12 Yellow

Optional Dual Duct Kit

206004	13'	4" Ducting Insulated Flexible
5068753	1	Plenum Tee Box, 6", 6", 4"
V4 Rnd Black	1	Plastic Grill, Black

Zephyr ZF12 Kits

ZF12 115V, ZF12CK 220V/50Hz

Condensate hose barb assembly with 4 mounting brackets included with unit

P/N	Qty	Description
226-600015	10'	6" Ducting, Insulated Flexible
229-800025	1	Transition Box ABS 12x6x4.5
228-700017	1	6" ABS Oblong Transition Ring
217-300131	1	12x6TV Alum Supply Air Grill
217-300125	1	12x12TRA Alum Return Air Grill
222-110088	1	ZFSA1-ZB 115V 3-Knob Mech. Control <i>(or for 220V model - ZFSA1-ZCB 220V 3-Knob Mech. Control)</i>
334220	1	Thru Hull, 5/8" Plastic
226-600006	25'	Hose, Seawater 5/8"
335360	1	Bush, PVC Red 1/2" MPT x 1/4" FPT
335120	3	Adapt, PVC 1/2" MPT x 1/2" HB
335080	2	Adapt, PVC 1/2" FPT x 1/2" HB
225-600021	1	Strainer (w/ Bracket 1/2" FPT)
225-500103	1	PC400 Pump, PDA-250 115V Seawater <i>(or for 220V model - PC400 Pump, PDA-250C 220V Seawater)</i>
369617	17	Clamp, Hose #06SS Thin
330482	1	Ball Valve 1/2" SS Hndl (Bronze)
369699	1	Strainer, Speed Scoop 1/2" Bronze
338439	3	Terminal Butt Splice 16-14 Blue
336750	6	Terminal Ring 10-12 Yellow

Optional Dual Duct Kit

206004	13'	4" Ducting Insulated Flexible
5068753	1	Plenum Tee Box, 6", 6", 4"
V4 Rnd Black	1	Plastic Grill, Black

Zephyr ZF16 Kits

ZF16 115V, ZF16CK 220V/50Hz

Condensate hose barb assembly with 4 mounting brackets included with unit

P/N	Qty	Description
226-600000	10'	7" Ducting, Insulated Flexible
229-800026	1	Transition Box ABS 14x6x4.5
228-700019	1	7" ABS Oblong Transition Ring
217-300134	1	14x6TV Alum Supply Air Grill
217-000221	1	14x12TRA Alum Return Air Grill
222-110088	1	ZFSA1-ZB 115V 3-Knob Mech. Control <i>(or for 220V model - ZFSA1-ZCB 220V 3-Knob Mech. Control)</i>
334220	1	Thru Hull, 5/8" Plastic
226-600006	25'	Hose, Seawater 5/8"
335120	3	Adapt, PVC 1/2" MPT x 1/2" HB
335080	2	Adapt, PVC 1/2" FPT x 1/2" HB
225-600021	1	Strainer (w/ Bracket 1/2" FPT)
300823	1	Adapt, PVC 3/4" MPT x 1/2" HB
332724	1	Coupling, PVC 3/4" FPT x 3/4" FPT
225-500103	1	PC400 Pump, PDA-250 115V Seawater <i>(or for 220V model - PC400 Pump, PDA-250C 220V Seawater)</i>
369617	17	Clamp, Hose #06SS Thin
330482	1	Ball Valve 1/2" SS Hndl (Bronze)
369699	1	Strainer, Speed Scoop 1/2" Bronze
338439	3	Terminal Butt Splice 16-14 Blue
336750	6	Terminal Ring 10-12 Yellow

Optional Dual Duct Kit

206004	13'	4" Ducting Insulated Flexible
5068382	1	Plenum Tee Box, 7", 7", 4"
V4 Rnd Black	1	Plastic Grill, Black

Manufacturers Limited Warranty Agreement

As hereinafter described, Taylor Made Environmental, Inc. (TME) limits the duration of any implied warranty to the duration of the express warranty provided herein and also disclaims any liability for consequential damages arising from any application, installation, use or malfunction of any warranted product.

Section I

What does the limited Warranty cover?

Products manufactured by Taylor Made Environmental, Inc. (TME) are under limited warranty to be free from defects in workmanship or materials under normal use and service with the obligation of TME under this limited warranty being limited to replacing or repairing any components(s) which shall disclose defects within one year from date of purchase and which upon examination by TME or an authorized TME Service Center shall appear to the satisfaction of TME to be defective or not up to specifications. For warranty claims/repair, please contact Taylor Made Environmental, Inc., P.O. Box 15299, Richmond, Virginia 23227 or call (804) 746-1313.

This limited Warranty is made in lieu of all other express warranties, obligations, or liabilities on the part of TME. In addition, TME shall not be responsible for, without limitation, any incidental or consequential damages. In those instances in which a cash refund is made, such refund shall effect the cancellation of the contract of sale without reservation of rights on the part of the purchaser. Such refund shall constitute full and final satisfaction of all claims which purchaser has or may have against TME due to any actual or alleged breach of warranty, either express or implied, including, without limitation, any implied warranty of merchantability or fitness for a particular purpose. Some states do not allow the exclusion or limitation of incidental or consequential damages so the foregoing limitation or exclusion may not apply to you. The terms and conditions of the warranty shall be governed by the laws of the Commonwealth of Virginia.

The Dealer is not an agent for TME except for the sole purpose of administering the above warranty to the extent herein provided, and TME does not authorize the dealer or any other person to assume for TME any liability in connection with such warranty, or any liability or expense incurred in the replacement or repair of its products other than those expressly authorized herein. TME shall not be responsible for any liability or expense except as is specifically authorized and provided in this section.

This warranty gives you, the purchaser, specific legal rights, and you may also have other rights which vary from state to state. You also have implied warranty rights, including an implied warranty of merchantability, which means that your product must be fit for the ordinary purposed for which such goods are used.

The duration of any implied warranty is limited to the duration of the foregoing express warranty. Some states

do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty extends only to the original purchaser (or, in the case of resale by TME, to the purchaser from TME) of TME warranted equipment and any other such person who is entitled, under applicable state law, to enforce against TME the obligations of the warranty.

Section II

What does the limited Warranty not cover?

The limited warranty and any implied warranty shall not apply to:

1. Failures resulting from abuse, accident, fire or submergence or failure to adhere to the foregoing installation, operation and care and cleaning instructions provided by TME.
2. Any part manufactured by TME which shall have been altered.

GENERAL: Since it is the responsibility of the consumer to establish the warranty period by verifying the original purchase date, Taylor Made Environmental, Inc. recommends that a bill of sale, or some other appropriate record be kept for that purpose.

WARNING

Taylor Made Environmental, Inc. (TME) manufacturers of Cruisair, Grunert, Marine Air, Sentry and Tundra Products, makes the following safety warnings concerning the application, installation, use and care of its products. Although these warnings are extensive, there may be specific hazards which may arise out of circumstances which we have not outlined herein. Use this as a guide for developing an awareness of potential hazards of all kinds. Such an awareness will be a key factor in assuring your SAFETY and comfort.

ELECTRICITY - Many TME products operate on 115, 230 or 440 volt AC power. Such voltages can be LETHAL; therefore, the chassis, cabinets, bases, etc., on all components must be grounded together and connected to the vessel's grounding system. Sparks can occur as switches, thermostats and relays open and close in the normal operation of the equipment. Since this is the case, ventilating blowers for the removal of hazardous fumes or vapors should be operated at least 5 minutes before and during operation of any TME product or group of TME products. All electrical connections must be covered and protected so accidental contact cannot be made by persons using the equipment, as such contact could be LETHAL.

ELECTROLYSIS - Electrical leakage of any component can cause electrolytic deterioration (electrolysis) of thru-hull components which could result in leakage serious enough to sink a vessel which could result in loss of life. All TME components must be kept clean and dry and checked periodically for electrical leakage. If any electrical leakage is detected, the component should be replaced or the fault causing the leakage corrected before the component is put back into service.

GAS - CRUISAIR, MARINE AIR, GRUNERT and TUNDRA components utilize R-22 (Chlorodifluoromethane), R134a refrigerant (Tetrafluoroethane), R-407C (which contains Difluoromethane (HFC-32), Pentafluoroethane (HFC125), and 1.1.1.2 - Tetrafluoroethane (HFC134a)), or R404A (R125/R143a/R134 (44%/52%/4%)) which are non-toxic, non-flammable gases; however, these gases contain no oxygen and will not support life. Refrigerant gas tends to settle in the lowest areas of the compartment. If you experience a leak, evacuate all personnel, and ventilate area. Do not allow open flames in the area of leaks because refrigerant gas, when burned, decomposes into other potentially LETHAL gases. Refrigerant components operate at high pressure and no servicing should be attempted without gloves, long-sleeved clothing and eye protection. Liquid refrigerant gas can cause severe frost burns to the skin and eyes.

VENTILATION - To cool or heat air, CRUISAIR, MARINE AIR and GRUNERT components are designed to move air through a heat exchanger by a blower or propeller fan. This design necessarily produces a suction on one side of the air handling component and a pressure on the other side. Air handling components must be installed so that the suction-pressure action does not: (1) pressurize an area to the extent that structural failure occurs which could cause harm to occupants or bystanders, or (2) cause a suction or low pressure in an area where hydrogen gas from batteries, raw fuel vapor from fuel tanks, carbon monoxide from operating propulsion engines, power generators or heaters, methane gas from sewage holding tanks, or any other dangerous gas or vapor could exist. If an air handling unit is installed in such a manner that allows potentially lethal gases or vapors to be discharged by the air handling unit into the living space, this could result in loss of life.

Maximum protection against the introduction of dangerous gases or vapors into living spaces can be obtained by providing living spaces which are sealed from all other spaces by use of airtight bulkheads and decks, etc., and through the introduction of clean air into the living space. Bear in mind that the advent of air conditioning, whether it be for cooling or for heating, naturally leads to the practice of closing a living space tightly. Never close all windows and doors unless auxiliary ventilating systems, which introduce clean outside air into the living space, are used. Always leave enough window and door openings to provide adequate ventilation in the event potentially lethal gases or fumes should escape from any source.

CONDENSATE - All cooling units produce water condensate when operating on the cooling cycle. This water must be drained from the cooling unit overboard. If condensate is allowed to drip on a wooden structure, rotting or decay and structural failure may occur which could result in loss of life. If condensate is allowed to drip on electrical components, deterioration of the electrical components could result in hazardous conditions. When an air conditioning system is in operation, condensate drains may be subjected to negative pressure. Always locate condensate drains as far as possible from points where engine waste and other dangerous gases are exhausted so no such dangerous gases can be drawn into the condensate drains.

Warning

Never sleep in a closed area on a boat when any equipment, which functions as a result of the combustion of a volatile fuel, is in operation (such as engines, generators, power plants, or oil-fired heaters, etc.). At any time, the exhaust system of such devices could fail, resulting in a build-up of LETHAL gases within the closed area.

Warning Revised: 7-19-01

Cruisair and Sentry Limited Warranty

WARRANTY PERIODS

Please read and keep this document with your important paperwork. Use it as a reference in the future. If you have any questions, please contact the Cruisair Service Department at (804)746-1313 for clarification.

Note: Any model or replacement part that has been installed due to a warranty failure will carry **only** the remainder of the original warranty. All warranties begin when the customer takes possession of the equipment. The warranty is extended to all owners of the equipment commencing the date the original owner takes possession of it. Proof of original purchase may be required. **Fuses** and **MOV's** are used as safety devices to protect Cruisair equipment against over-current conditions caused by lightning or inductive switching environments. **These are not covered under warranty.** We reserve the right to change our warranty policies and procedures as well as our warranty allowances without notice.

Cruisair Direct Expansion (DX)

- New, complete system installation using any member of the SMX family.

The warranty includes the pump.

2 year warranty including Parts and Labor

- New, complete system installation using an electro-mechanical control (3-knob).

The warranty includes the pump.

1 year warranty including Parts and Labor

- New, complete model sold as a partial system retrofit to an existing system.

Includes SMX family.

1 year warranty including Parts and Labor

Cruisair Tempered Water

- New, complete system installation using any member of the SMX family.

2 year warranty including Parts and Labor

NOTE: Excludes pump which has a 1 year warranty

- New, complete model sold as a partial system retrofit to an existing system.

Includes SMX family.

1 year warranty including Parts and Labor

Sentry Battery Chargers

- New SM or FR series installation.

2 year warranty including Parts and Labor

- New G-series installation.

1 year warranty including Parts and Labor

Cockpit Freezers/Refrigerators-Fish Boxes

- New installation of entire system including condensing unit, line sets etc.

1 year warranty including Parts and Labor

- New complete model sold as a partial system retrofit to an existing Cruisair system.

1 year warranty including Parts and Labor

Replacement Parts

- Replacement parts and components - example: A-509, 40401-30.

90 day warranty, Parts only

- Replacement Compressors for other than Tempered Water Systems - example: R3101-16T, DX equipment - installed in an existing Cruisair system or a competitor's system.

1 year warranty including Parts and Labor

- Replacement compressors for Tempered Water - example: 30130-36 installed in an existing Cruisair system.

1 year warranty including Parts and Labor

- A Tempered Water compressor - example: 30130-36 installed with competitor's equipment.

90 day warranty, Parts only

Descriptions of Figures

Fig. 1a Single Duct Installation

- 1) Ducting
- 2) Supply Air Grill
- 3) Return Air Grill
- 4) 2-Knob Control
- 5) Air Sensor
- 6) Electrical Harness
- 7) Cap Tube
- 8) Hose Barb Assembly
- 9) Condensate Drain to Sump
- 10) Overboard Discharge
- 11) Seawater System
- 12) Mounting Bracket
- 13) Seawater Inlet
- 14) Zephyr Unit
- 15) Seawater Outlet
- 16) Note: Zephyr shown with blower rotated to vertical position

Fig.1b Dual Duct Installation

- 1) Ducting
- 2) Transition Box
- 3) Transition Ring
- 4) Supply Air Grill
- 5) Return Air Grill
- 6) 3-Knob Control
- 7) Air Sensor
- 8) Electrical Harness
- 9) Cap Tube
- 10) Hose Barb Assembly
- 11) Condensate Drain to Sump
- 12) Overboard Discharge
- 13) Seawater System
- 14) Mounting Bracket
- 15) Seawater Inlet
- 16) Seawater Outlet
- 17) Zephyr Unit
- 18) Dual Duct Kit (Optional)
 - a) Ducting
 - b) Transition Box
 - c) Supply Air Grill

Fig. 2 Spacing Allowances & Unit Dimensions for Mounting

Top View

- 1) 3" (7.62cm) Space allowance for return air intake if adjacent to bulkhead
- 2) Refrigerant connection (allow space for access)
- 3) Rotary compressor
- 4) Electrical box
- 5) Duct ring
- 6) 3" (7.62cm) Space allowance for electric blower motor ventilation
- 7) Evaporator and condensing coil
- 8) 6" (15.24cm) Space allowance for seawater piping

Side View & Back View

- 1) Total minimum clearance - See note 4 in section "Spacing Allowances & Unit Dimensions"
- 2) Duct size
- 3) Possible drain line location
- 4) Alternate blower position
- 5) Seawater in
- 6) Seawater out
- 7) Note: Air conditioner shown with blower rotated to vertical position. In order to rotate 10K-16K blowers, remove plugs to access screws.
 - A) Duct Size
 - B) Base Depth
 - C) Overall Depth
 - D) Width
 - E) Height

Fig. 3 Component Identification

- 1) Duct ring
- 2) Air sensor
- 3) Rotary compressor
- 4) Suction accumulator
- 5) Condensate drain (optional location)
- 6) Electrical box (remove screw for access)
- 7) Mounting bracket
- 8) Base pan
- 9) Plug hole not used for drain line
- 10) Blower motor
- 11) Blower
- 12) Remove screws to rotate blower
- 13) Condenser coil (seawater outlet)
- 14) Evaporator coil
- 15) Note: Air conditioner shown with blower rotated to vertical position.

Fig. 4 Mounting Bracket Drawing

- 1) Base Pan
- 2) Mounting Bracket

Fig. 5 Condensate Drain Drawing

- 1) PVC Fitting 1/2" HB x 1/2" MPT
- 2) Solid Washer
- 3) Liquid-seal Washer
- 4) Base Pan
- 5) Locking Nut

Fig. 6 Three-Knob Switch Assembly

Fig. 7 Typical Two-Knob Switch Assembly

- 1- Off -FAN-Run
- 2-Warmer ↔ Cooler

Fig. 8 Wiring Diagram of ZF5

Fig. 9 Wiring Diagram of ZF10-16

Fig. 10 Seawater Pump and Plumbing Drawings

- A) **Correct:** Steady upward flow from inlet to unit then downward to outlet. Hoses double/reversed clamped.
- 1- Air Conditioner Condensing Coil
 - 2- Seawater Pump
 - 3-Double hose clamps to be reversed
 - 4-Strainer
 - 5-Ball Valve
 - 6-Scoop Type Thru Hull Inlet
 - 7-Inlet Flow
 - 8-Waterline
 - 9-Seawater Outlet
 - 10- Outlet Flow
- B) **Incorrect:** Hoses must not have kinks, loops or high spots where air can be trapped.
- 1- Air Conditioner Condensing Coil
 - 2- Seawater Pump
 - 3-Strainer
 - 4-Ball Valve
 - 5-Scoop Type Thru Hull Inlet
 - 6- Waterline
 - 7- Seawater Outlet
- C) **Incorrect:** Strainer must be below pump. Hoses must be double clamped.
- 1- Air Conditioner Condensing Coil
 - 2- Seawater Pump
 - 3-Strainer
 - 4-Ball Valve
 - 5-Scoop Type Thru Hull Inlet
 - 6- Waterline
 - 7- Seawater Outlet
 - 8-Must be double clamped (typ)
- D) **Incorrect:** Pump & stainer must be below water line
- 1- Air Conditioner Condensing Coil
 - 2- Seawater Pump
 - 3-Strainer
 - 4-Ball Valve
 - 5-Scoop Type Thru Hull Inlet
 - 6- Waterline
 - 7- Seawater Outlet

Fig. 11b Seawater Installation for ZF16

- 1) Thru hull
- 2) Seawater Hose
- 3) Zephyr
- 4) Seawater Pump
- 5) PVC Adapter and Coupling
- 6) PVC Adapter
- 7) Strainer
- 8) Seawater Intake
- 9) PVC Adapter
- 10) Waterline

Fig. 11a Seawater Installation for ZF5-12

- 1) Thru hull
- 2) Seawater Hose
- 3) Zephyr
- 4) PVC Bushing
- 5) Seawater Pump
- 6) PVC Adapter
- 7) Strainer
- 8) Seawater Intake
- 9) PVC Adapter
- 10) Waterline

Fig. 1a - Typical Single Duct Installation for ZF5

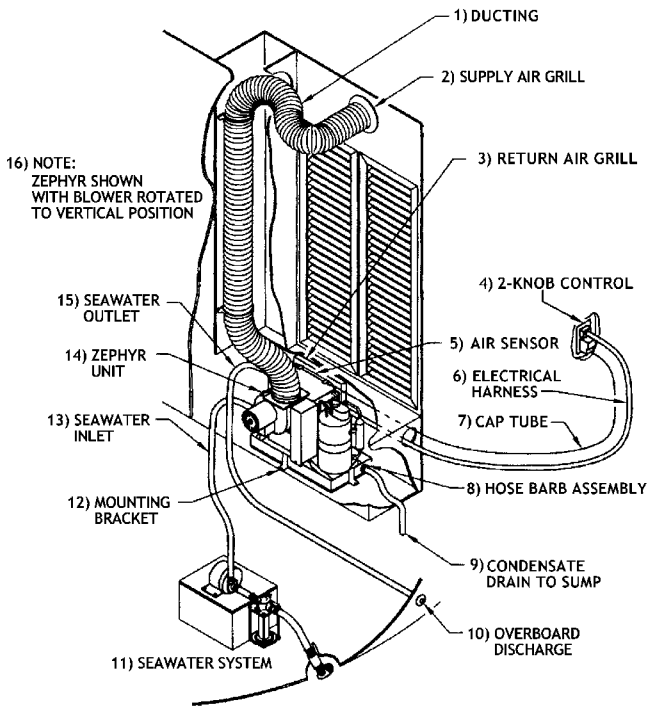


Fig. 1b- Typical Dual Duct Installation for ZF10-16

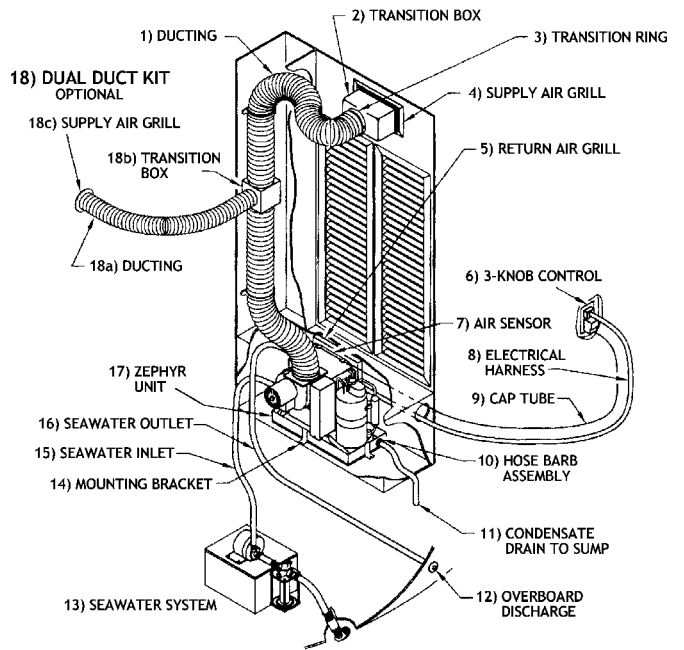
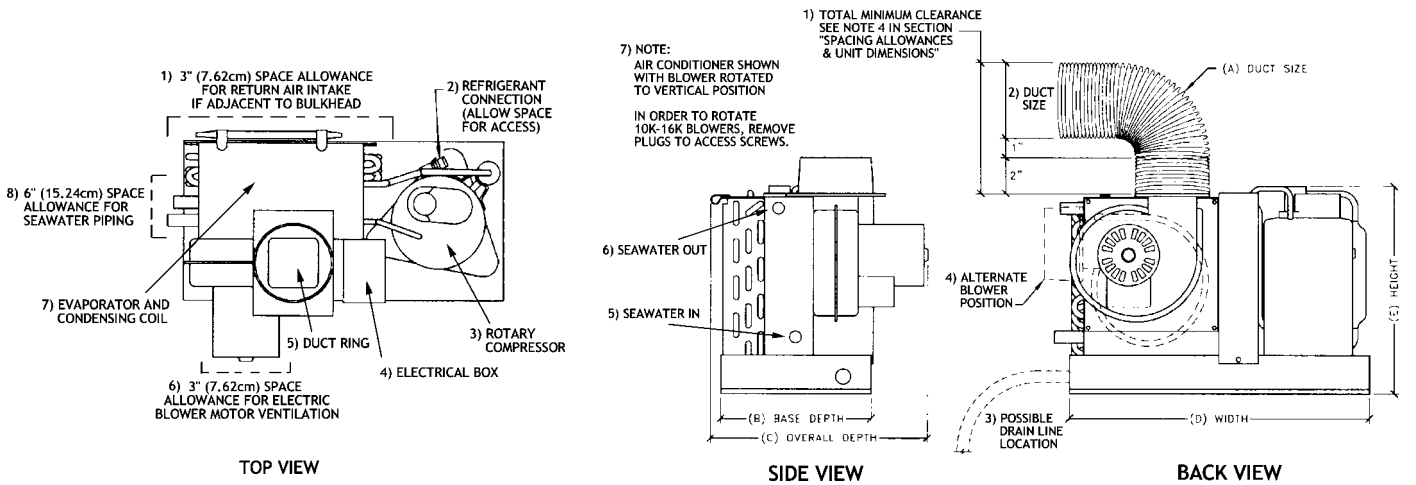


Fig. 2 -Spacing Allowances & Unit Dimensions for Mounting



DIMENSIONS				
Unit Capacity	5,000 BTU (in/cm)	10,000 BTU (in/cm)	12,000 BTU (in/cm)	16,000 BTU (in/cm)
A – Duct Size	4.0/10.2	5.0/12.7	6.0/15.2	7.0/17.8
B – Base Depth	8.0/20.3	9.0/22.9	10.0/25.4	11.5/29.2
C – Overall Depth	11.5/29.2	12.8/32.5	13.8/35.1	16.0/40.6
D – Width	16.0/40.6	20.0/50.8	20.0/50.8	20.0/50.8
E – Height	11.5/29.2	13.0/33.0	13.5/34.3	13.5/34.3

Fig. 3 - Component Identification

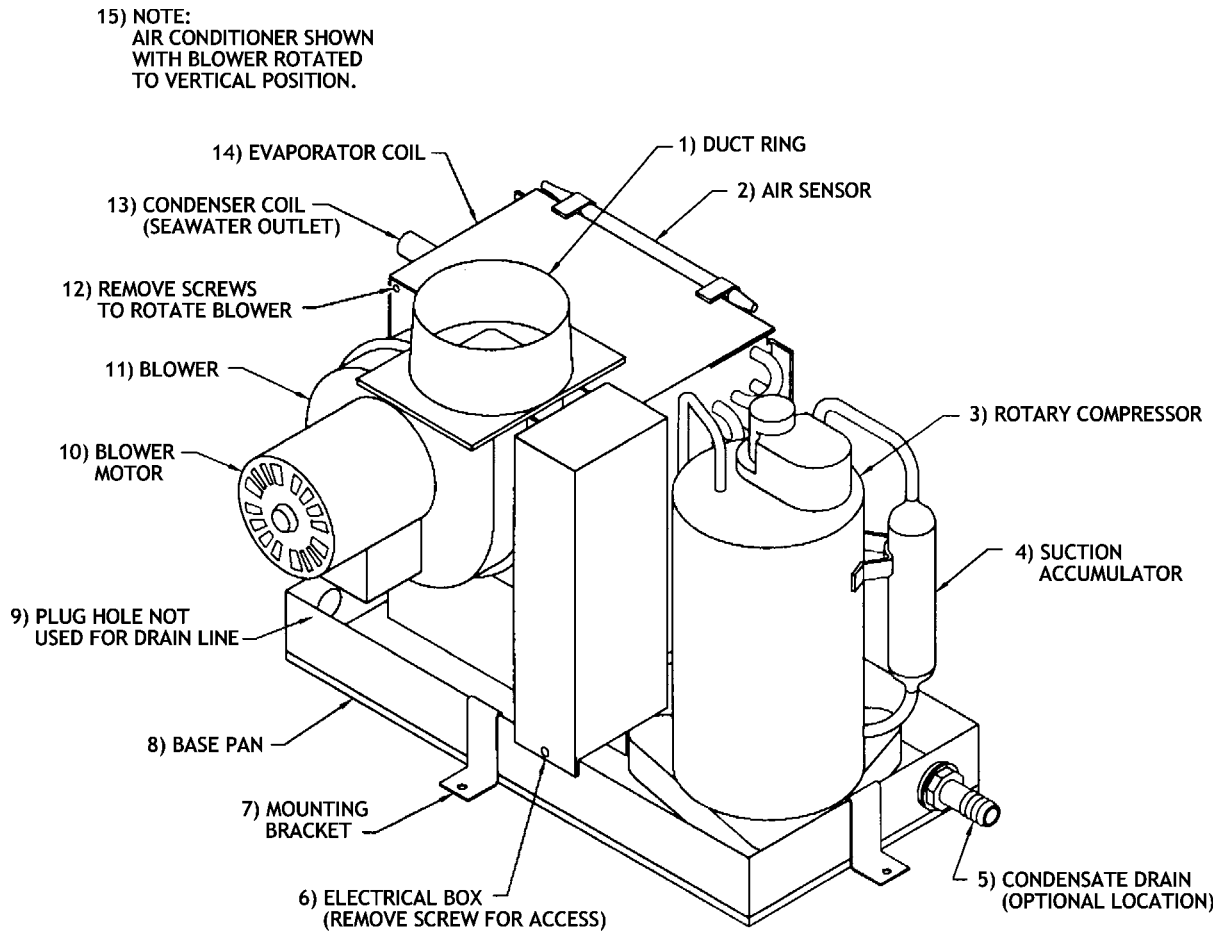


Fig. 4 - Mounting Bracket

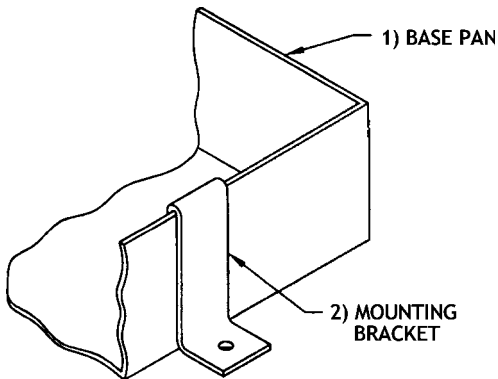


Fig. 5 - Condensate Drain

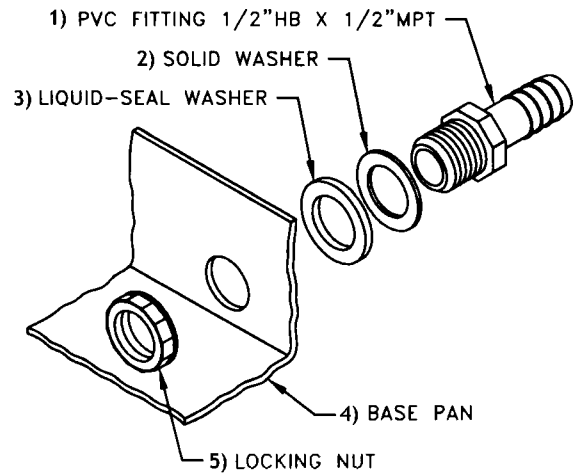
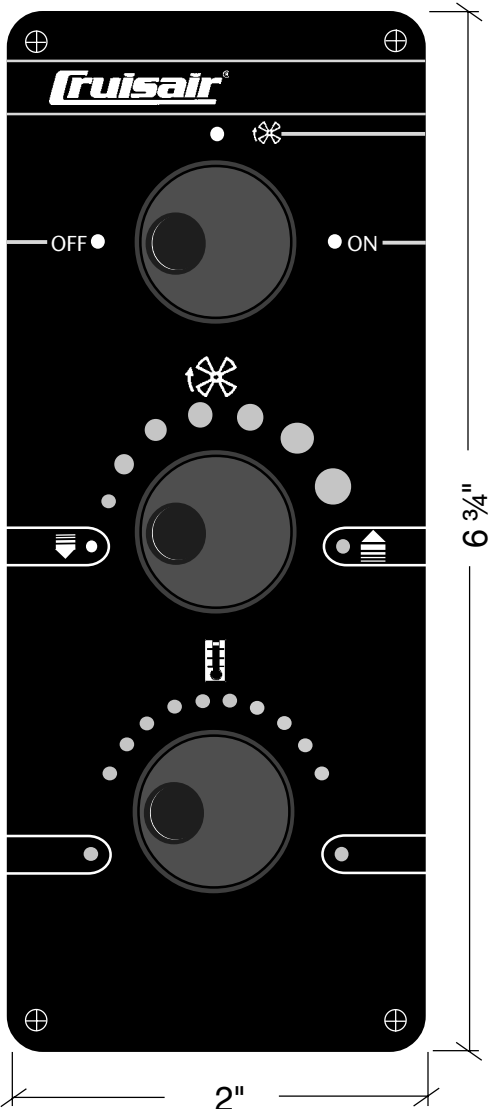
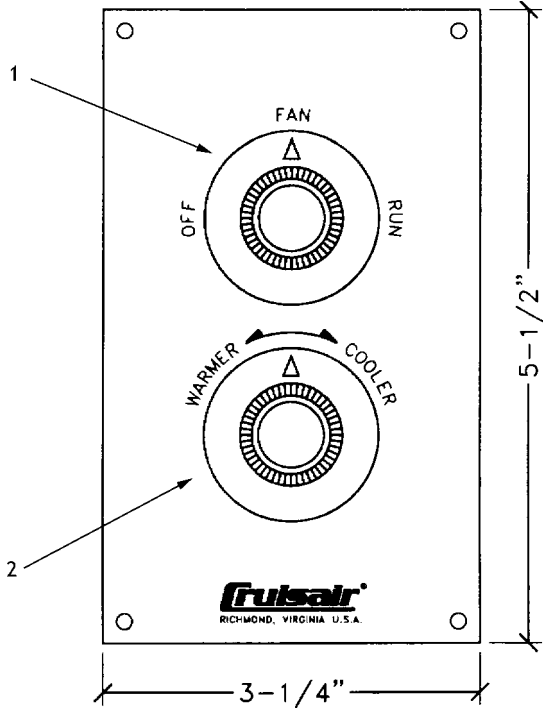


Fig. 6 - Three-Knob Switch Assembly



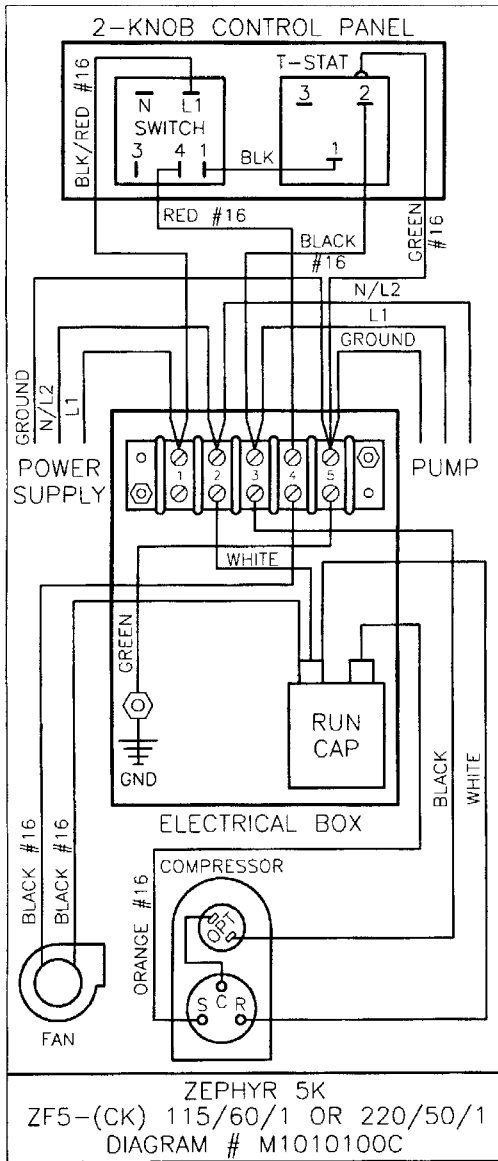
3 Knob Switch

Fig. 7 - Typical Two-Knob Switch Assembly



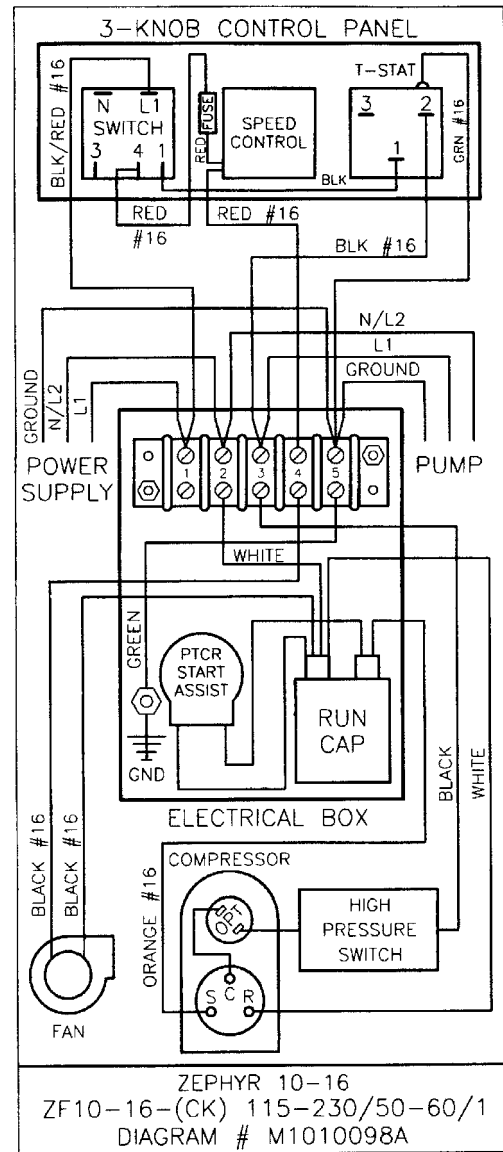
2 Knob Switch

Fig. 8 - ZF5 Wiring Diagram



ALL WIRES ARE 12 GA
UNLESS OTHERWISE NOTED

Fig. 9 - ZF10-16 Wiring Diagram



ALL WIRES ARE 12 GA
UNLESS OTHERWISE NOTED

Fig. 10 - Seawater Pump & Plumbing Diagrams

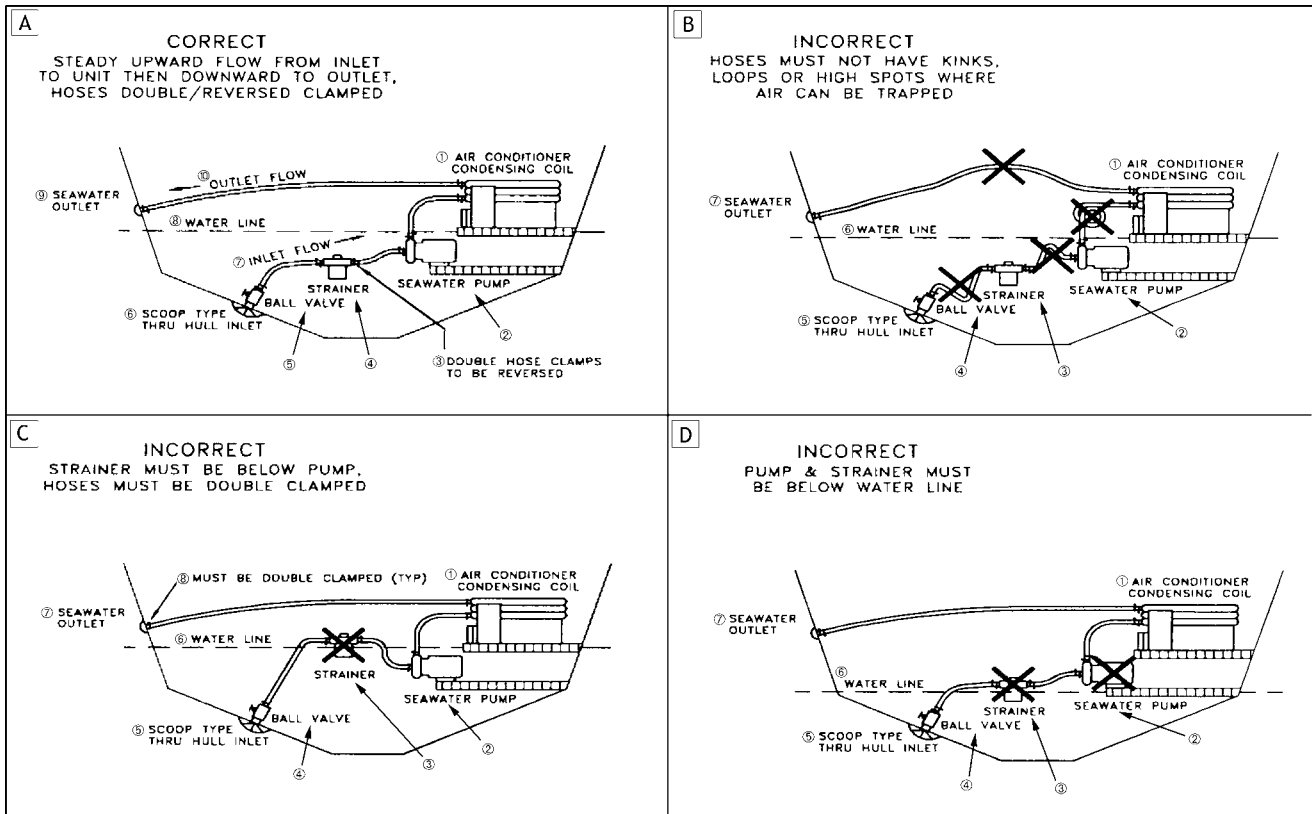


Fig. 11a - Seawater Kit Installation for ZF5-12

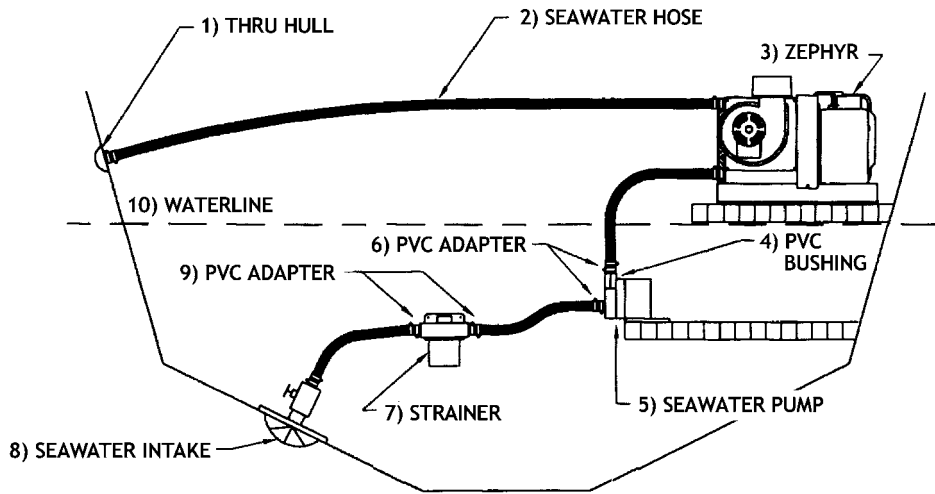
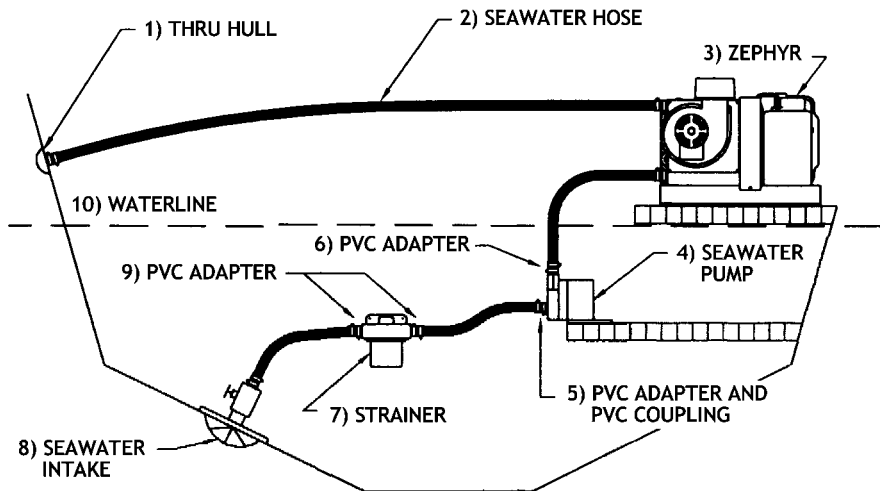


Fig. 11b - Seawater Kit Installation for ZF16



Cruisair Worldwide Service Dealer Locator

The service listings displayed for the United States are key members of the national Cruisair network. If you need service, please contact the closest company shown. In most cases they will direct you to a service port. We have over 500 Cruisair dealers in the national Cruisair network, and one should be convenient to you.

The international companies listed are capable of managing the majority of service requests for the countries listed. In some cases they will refer you to a local service port.

You may also contact us directly via the web site or call us in the US at (804) 746-1313.

Taylor Made Environmental – Europe is the Distribution Point for Europe and the Middle East. A large inventory is maintained at this location. This office can assist with quoting, service issues and sales issues. Look for more information under "England".

For a complete and up-to-date Dealer locator list, please visit our website at <http://www.cruisair.com/cruisair/dealer.html>

USA

AAP Inc.

Location: Ladysmith, VA
Territory: National Coach & Mobile Products Only
Phone: 804-633-9454
Fax: 804-633-5499
www.aap.com

California

Romaine Marine

Location: Richmond, CA
Territory: Northern California
Phone: 510-232-1996

A to Z Marine Services

Location: San Diego, CA
Territory: California
Phone: 619-224-1606
Fax: 619-226-0496
Email: sales@atozmarine.net

Connecticut

Nautical Air Conditioning, Inc.

Location: Copiague, NY
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: nauticalair@mindspring.com
Web: www.nauticalair.com

Charles S. Miller Yacht Engine Service

Location: Old Saybrook, CT
Territory: Connecticut River Area
Phone: 860-388-9183
Fax: 860-388-2223

Florida

Cruisair Southeast, A Division of T.K. Alley, Inc.

Location: Dania, FL
Territory: Southeast Florida
Phone: 954-920-0300
Fax: 954-920-0301
Email: tkalley@aol.com
Web: www.cruisair-southeast.com

Ward's Marine Electric, Inc.

Location: Ft. Lauderdale, FL
Territory: Battery Chargers Only
Phone: 954-523-2815
Fax: 954-523-1967
Email: info@wardsmarine.com

Cruisair Suncoast, Inc.

Location: St. Petersburg, FL
Territory: Tampa, St. Petersburg and surrounding areas
Phone: 727-526-7875
Fax: 727-528-9519
Email: cruisairsuncoast@ij.net

Kansas

A.E.R. Supply, Inc.

Location: Seabrook, TX
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

Louisiana

Sea Chest Marine Distr.

Location: New Orleans, LA
Territory: Gulf Coast (LA & MS)
Phone: 800-535-8630
Fax: 504-288-1758

Maryland

Annapolis Cruisair

Location: Annapolis, MD
Territory: Baltimore & Areas South
Phone: 410-224-0970
Fax: 410-224-0050

Hoss Marine Service

Location: Havre-de-Grace, MD
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Massachusetts

World Wide Enterprises

Location: Cape Cod, MA
Phone: 508-540-0963

Michigan

J & S Marine Sales & Service

Location: Detroit, MI
Territory: Michigan, Canada (Windsor to Toronto)
Phone: 810-463-3400
Fax: 810-463-1762
Email: jandsmarine@earthlink.net

Minnesota

Marine Specialties

Location: Red Wing, MN
Territory: Minnesota and Western Wisconsin
Phone: 651-388-4991
Fax: 651-388-3592

Mississippi

Sea Chest Marine Distr.

Location: New Orleans, LA
Territory: Gulf Coast (LA & MS)
Phone: 800-535-8630
Fax: 504-288-1758

Missouri

A.E.R. Supply, Inc.

Location: Seabrook, TX
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

New Jersey

Nautical Air Conditioning, Inc.

Location: Copiague, NY
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: nauticalair@mindspring.com
Web: www.nauticalair.com

Hoss Marine Service

Location: Havre-de-Grace, MD
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

New York

Nautical Air Conditioning, Inc.

Location: Copiague, NY
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: nauticalair@mindspring.com
Web: www.nauticalair.com

North Carolina

Martin's Marine

Location: Wilmington, NC
Territory: North Carolina and Myrtle Beach, SC
Phone: 910-799-9362
Fax: 910-793-4267

Ohio

Hoss Marine Service

Location: Havre-de-Grace, MD
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Oklahoma

A.E.R. Supply, Inc.

Location: Seabrook, TX
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

Pennsylvania

Hoss Marine Service

Location: Havre-de-Grace, MD
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Rhode Island

Nautical Air Conditioning, Inc.

Location: Copiague, NY
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: nauticalair@mindspring.com
Web: www.nauticalair.com

Cay Electronics

Location: Portsmouth, Rhode Island
Territory: Rhode Island
Phone: 401-683-3520
Fax: 401-683-3633

Tennessee

Thom Chase Heating and A/C

Location: Chattanooga, TN
Territory: Tennessee, Northern Alabama, Western Kentucky, Northern Mississippi
Phone: 423-344-6356
Fax: 423-344-6356
Email: thomchase@aol.com

Texas

A.E.R. Supply, Inc.

Location: Seabrook, TX
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

Washington

Sure Marine Services Inc.

Location: Seattle, WA
Territory: Northwest
Phone: 206-784-9903
Fax: 206-784-0506
Email: suremarine@aol.com

International

Angola

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Antigua

Aboard Refrigeration

Location: English Harbour, Antigua
Phone: 268-460-1690
Fax: 268-460-1690
Email: aboardrf@candw.ag

The Signal Locker

Location: English Harbour, Antigua
Phone: 268-460-1528
Fax: 268-460-1148
Email: lockers@candw.ag

Argentina

Trimer S.A.

Location: Buenos Aires, Argentina
Phone: 5411-4580-0444
Fax: 5411-4580-0440
Email: trimer@trimer.com.ar

Australia

Seabreeze Industries

Location: Wongawallan, QLD, (Gold Coast),
Phone: 61-7-5529-9808
Fax: 61-7-5529-9808
Email: seabreez@onthenet.com.au

Austria

Bruno Centis Assistenza Nautica

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460

Bahamas

Nixon's Refrigeration

Location: Abaco, Bahamas
Territory: Abaco Island only
Phone: 242-367-5219
Fax: 242-367-5219
Email: seannixon@email.com

Freezing Point, Ltd.

Location: Nassau, Bahamas
Phone: 242-325-3589
Fax: 242-356-5271
Email: rolandknowles@bahamas.net.bs

Bahrain

International Agencies

Location: Manama, Bahrain
Phone: 973-728691
Fax: 973-728412
Email: intcolma@batelco.com.bh

Benelux

ASA Boot Electro BV

Location: Watergang, Netherlands
Phone: 31 204 369 100
Fax: 31 204 369 109
Email: asaboot@worldonline.nl

Bermuda

Flatt's Marine

Location: St. Georges, Bermuda
Phone: 441-298-9395
Fax: 441-293-5740
Email: bermudabanger@ibl.bm

Botswana

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Brazil

Sailing Products

Location: Rio de Janeiro, Brazil
Phone: 55 (0) 21 494 7222
Fax: 55 (0) 21 494 7223
Email: sailing@sailing.com.br

British Virgin Islands

Cay Electronics Ltd.

Location: Tortola, British Virgin Islands
Phone: 284-494-2400
Fax: 284-494-5389
Email: caybvi@candwbvi.net

Parts And Power

Location: Tortola, British Virgin Islands
Phone: 284-494-2830
Fax: 284-494-1584
Email: partspwr@surfvi.com

British West Indies

Marine Power

Location: Grand Cayman Island, British West Indies
Phone: 345-947-1945
Fax: 345-947-1909
Email: mpower@candw.ky

Caribbean Marine & Diesel

Location: Turks and Caicos Islands, British West Indies
Phone: 649-941-5903
Fax: 649-941-5902
Email: caribmarinediesel@tcway.tc

Canada

British Columbia

Airon Heating And Air Conditioning

Location: Vancouver, BC, Canada
Phone: 604-270-2040
Fax: 604-270-3888

Accutemps Refrigeration and Air Conditioning

Location: Victoria, BC, Canada
Phone: 250-475-2665
Fax: 250-475-1957

Ontario

J & S Marine Sales & Service

Location: Detroit, MI, USA
Territory: Michigan, Canada (Windsor to Toronto)
Phone: 810-463-3400
Fax: 810-463-1762
Email: jandsmarine@earthlink.net

Northland Supply Company

Location: Keswick, ON, Canada
Phone: 905-478-2244
Fax: 905-478-2295
Email: norsupco@aol.com

Croatia

Bruno Centis Assistenza Nautica

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460

Cyprus

Tuti Mare Trading Ltd

Location: Limassol, Cyprus
Phone: 35 75 431313
Fax: 35 75 431300

Dominican Republic

May Day Marine

Location: San Juan, Puerto Rico
Territory: Puerto Rico, Dominican Republic
Phone: 787-720-9628
Fax: 787-790-2551

Inversiones Bastilla Internacional, S.A.

Location: Santiago, Dominican Republic
Phone: 809-299-2848
Fax: 809-226-0459
Email: ibinter@hotmail.com

Egypt

Climate Company

Location: Cairo, Egypt
Phone: 20-2-2598092
Fax: 20-2-452302
Email: climate@gega.net

England

Taylor Made Environmental, Ltd./Europe, European Office & Distribution Point

Location: Poole, Dorset, United Kingdom
Territory: Europe, Gulf States
Phone: 44 (0) 870 3306101
Fax: 44 (0) 870 3306102
Email: sales@tmenviro-eu.com
Web: www.tmenviro-eu.com

Equador

Navas-Bustos Representaciones

Location: Guayaquil, Equador
Phone: 593-2-252542
Fax: 593-2-251-421
Email: navashur@uio.sainet.net

Eritrea

DM Electrical Engineering

Location: Asmara, Eritrea
Phone: 291-1-126737
Fax: 291-1-127650

France

Reya Electricite Marine

Location: Cannes, La Bocca, France
Phone: 33-493.90.47.00
Fax: 33-493.47.42.57
Email: reya@reya.com

French West Indies

Caraibe Yachts

Location: Guadeloupe, French West Indies
Phone: 590-90-81-61
Fax: 590-90-80-13
Email: mecamar@caraibe-yachts.com

C.S. Services

Location: Martinique, French West Indies
Phone: 596-749113
Fax: 596-749174

Germany

GEMO GmbH

Location: Lubeck-Travemunde, Germany
Phone: 49-4502-2466
Fax: 49-4502-2425
Email: gemo_gmbh@t-online.de

Greece

Polifrost Technical Ltd.

Location: Piraeus, Greece
Phone: 30-1-461-3370
Fax: 30-1-461-4376

Grenada**Footloose Yacht Charters & Outfitters**

Location: St. Georges, Genada
Phone: 473-440-7949
Fax: 473-440-6680
Email: footloos@caribsurf.com

Guam**Fentress Refrigeration Service Co.**

Location: Tamuning, Guam
Phone: 671-565-4038
Fax: 671-565-3315

Guatemala**Automotores y Marina, S.A.**

Location: Villa Nueva, Guatemala
Phone: 502-631-2033
Fax: 502-631-2034
Email: automari@quik.guate.com

Hong Kong**Tritex Equipment (H.K.) Ltd.**

Location: Kowloon, Hong Kong
Phone: 852-2341-3329
Fax: 852-2343-1830
Email: tx1607@netvigator.com

Astral Marine, Ltd.

Location: Sai Kung, NT, Hong Kong
Phone: 852-2719-5982
Fax: 852-2335-0580
Email: funcle@netvigator.com

Indonesia**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Myanmar, Philippines, Singapore
Phone: (65) 861 1188
Fax: (65) 861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Israel**Yamit Y.S.B. Ltd.**

Location: Tel-Aviv, Israel
Phone: 972-3-5271778
Fax: 972-3-5271772
Email: yamittd@netvision.net.il

Italy**Bruno Centis Assistenza Nautica**

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460

E.T.N. S.A.S.

Location: Milan, Italy
Territory: Northwest Italy
Phone: 390-2-253-6115
Fax: 390-2-253-6115
Email: 0022536115@iol.it

Cummins Diesel Italia S.P.A

Location: Rome, Italy
Territory: Central & Southern Italy
Phone: 390-2-6-650-7746
Fax: 390-2-6-650-6524

Japan**Gunji Corporation**

Location: Osaka, Japan
Phone: 81-66-451-5615
Fax: 81-66-454-0056
Email: gunji@gunji.com

Kuwait**Amiry International Marine W.L.L.**

Location: Safat, Kuwait
Phone: 965-4849212
Fax: 965-4845346

Malaysia**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Myanmar, Philippines, Singapore
Phone: (65) 861 1188
Fax: (65) 861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Malta**Iceberg, Ltd.**

Location: Santa Venera, Malta
Phone: 356-483082
Fax: 356-484317

Mexico**Servicios Técnicos Marinos**

Location: Mexico City, Mexico
Phone: 525-294-0562
Fax: 525-294-9688
Email: rpidal@performance.com.mx

Performance Yachts

Location: San Diego, CA, USA
Territory: Mexico
Phone: 619-222-2400
Fax: 619-223-6484

Mozambique**Southern Power Products**

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Myanmar**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Myanmar, Philippines, Singapore
Phone: (65) 861 1188
Fax: (65) 861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Nambia**Southern Power Products**

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Netherlands**ASA Boot Electro BV**

Location: Watergang, Netherlands
Phone: 31 204 369 100
Fax: 31 204 369 109
Email: asaboot@worldonline.nl

Netherlands Antilles**Necol N.V.**

Location: St. Maarten, Netherlands Antilles
Phone: 599 545 2230
Fax: 599 545 2349
Email: necol@sintmaarten.net

New Caledonia**Altomarine**

Location: Noumea, New Caledonia
Phone: 687 25 96 12
Fax: 687 25 43 30
Email: altomar@canl.nc

New Zealand**Whiting Power Systems**

Location: Auckland, New Zealand
Phone: 64-9-358-2050
Fax: 64-9-358-0285
Email: sales@whiting.co.nz

Norway**Refscan A.S.**

Location: Oslo, Norway
Phone: 47-22-46-58 65
Fax: 47-22-56 54 30

Oman**Hi-Tech Projects LLC**

Location: Muscat, Oman
Phone: 968-595056/57/58
Fax: 968-595054
Email: hitech1@omantel.net.om

Pakistan**Communications & Machinery Corp.**

Location: Karachi, Pakistan
Phone: 92-21-5678252
Fax: 92-21-5683283
Email: cmcorp@khi.sdnpk.org

Papau New Guinea**Lohberger Engineering Pty**

Location: Pors Moresby, Papua New Guinea
Phone: 675-321-2122
Fax: 675-321-2704
Email: loheng@online.net.pg

Philippines**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Myanmar, Philippines, Singapore
Phone: (65) 861 1188
Fax: (65) 861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Portugal**Navegador Construções Nauticas, LDA.**

Location: Seixal, Portugal
Phone: 351 212277912
Fax: 351 212277914

Puerto Rico**William Moreno**

Location: San Juan, Puerto Rico
Phone: 787-727-3637
Fax: 787-727-3637
Email: fernan_moreno@hotmail.com

Technical House (E.T.S. Inc.)

Location: San Juan, Puerto Rico
Territory: Sentry Battery Chargers Only
Phone: 787-781-1313
Fax: 787-781-2020
Email: jdonato@technicalhouse.co
Web: www.technicalhouse.com

May Day Marine

Location: San Juan, Puerto Rico
Territory: Puerto Rico, Dominican Republic
Phone: 787-720-9628
Fax: 787-790-2551

Qatar**Laffan Marine**

Location: Doha, Qatar
Phone: 974-4326893/4328021
Fax: 974-4327452

Saudi Arabia**Samaco Marine**

Location: Jeddah, Saudi Arabia
Phone: 966-2-6990064
Fax: 966-2-6404534

Scandinavia**Refscan A.S.**

Location: Oslo, Norway
Phone: 47-22-46-58 65
Fax: 47-22-56 54 30

Singapore

Tritex Equipment Pte. Ltd.

Location: Singapore
Territory: Indonesia, Malaysia, Myanmar, Philippines, Singapore
Phone: (65) 861 1188
Fax: (65) 861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Slovenia

Bruno Centis Assistenza Nautica

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460

South Africa

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Spain

Acastimar

Location: Tarragona, Spain
Phone: 349-77-362118
Fax: 349-77-362687
Email: acastimar@acastimar.com

Sri Lanka

G&M Enterprises

Location: Colombo, Sri Lanka
Phone: 94-1-691966
Fax: 94-1-691751
Email: gandm@sri.lanka.net

Sweden

S.A.L.T.

Location: Alvesta, Sweden
Phone: 46 472 106 10
Fax: 46 472 166 77
Email: salt@hall-miba.se

Taiwan

Ing Hai Company, Ltd.

Location: Kaohsiung, Taiwan
Phone: 886-7-802-1809
Fax: 886-7-802-1809

Ing Hai Company, Ltd.

Location: Taipei, Taiwan
Phone: 886-2-2531-2088
Fax: 886-2-2523-6531
Email: inghai@tpts6.seed.net.tw

Thailand

Thai Kolon Co. Ltd.

Location: Bangkok, Thailand
Phone: 66-2-745-6468-77 (10 lines)
Fax: 66-2-745-6152
Email: thkolon@infonews.co.th

Trinidad & Tobago

Nau-T-Kol Refrigeration

Location: CrewsInn, Chaguaramas, Trinidad
Phone: 868-634-2174
Fax: 868-634-2174
Email: NauTKol@cable.nett.net
Web: www.nautkol.com

Turkey

Egemar Muhendislik Danismanlik San. Ve Tic. Ltd. Sti

Location: Istanbul, Turkey
Phone: 90 (0) 216 494 21 68
Fax: 90 (0) 216 494 22 18
Email: ekarman@superonline.com
Web: www.egemar.com

U.S. Virgin Islands

St. Croix Marine Corp.

Location: St. Croix, U.S. Virgin Islands
Phone: 340-773-0289
Fax: 340-778-8974

Coral Bay Marine Service

Location: St. John, U.S. Virgin Islands
Phone: 340-776-6859
Fax: 340-776-6859

Reefco

Location: St. Thomas, U.S. Virgin Islands
Phone: 340-776-0038
Fax: 340-776-0038
Email: denny.reefco.vi@worldnet.att.net

United Arab Emirates

Technical Supplies & Services Co.

Location: Abu Dhabi, United Arab Emirates
Phone: 971-26-44-7912
Fax: 971-26-44-0175

Mantech HFL

Location: Dubai, United Arab Emirates
Phone: 971 4 333 25 42
Fax: 971 4 333 06 49
Email: mge@emirates.net.ae

Exalto Emirates Ltd

Location: Sharjah, United Arab Emirates
Phone: 971 6 5325597
Fax: 971 6 5325723
Email: exalto@emirates.net.ae

United Kingdom

Taylor Made Environmental, Ltd./Europe, European Office & Distribution Point

Location: Poole, Dorset, United Kingdom
Territory: Europe, Gulf States
Phone: 44 (0) 870 3306101
Fax: 44 (0) 870 3306102
Email: sales@tmenviro-eu.com
Web: www.tmenviro-eu.com

Venezuela

Rich Marine Center, C.A.

Location: Pto. La Cruz, Venezuela
Phone: 58 (0)14-9807217
Fax: 58 (0)281-2811630
Email: sm6011@telcet.net.ve

West Indies

Regis Electronics (St Lucia) LTD.

Location: St. Lucia, West Indies
Phone: 758-452-0205
Fax: 758-452-0206
Email: stlucia@regiselectronics.com

Zambia

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Zimbabwe

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za



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