

# Zephyr (ZF)

## ❖ INSTALLATION • OPERATION

English

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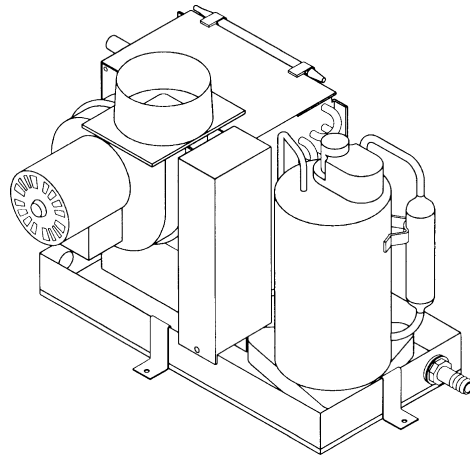
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# Zephyr Cooling Only Units - Installation

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## **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 Dometic Corporation 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.

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## **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 diameter of the ducting to get the total distance as measured from the blower outlet (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 5/8" 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 11⅝" by 5⅝" and 13⅝" by 5⅝" 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 2½" wide by 4¾" tall. The 3-knob panel is configured either vertically or horizontally. Dimensions for the 3-knob is 2<sup>15</sup>/<sub>16</sub>" x 7<sup>15</sup>/<sub>16</sub>". 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



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# Zephyr Cooling Only Units - Operation

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## **Operation**

### **Manual Control Panel Operation:**

2-knob (2KB), 5K unit; 3-knob (3KB), 10, 12, 16K units, see figures 6 & 7.

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. Turn THERMOSTAT control knob to the coolest position by rotating it fully clockwise.
5. Turn middle (FAN) control knob to highest setting (for 3KB switch only).
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.
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.

### **Important**

Do not turn the unit off and immediately turn it back on. Wait at least 30 seconds for system refrigerant pressures to balance.

## **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.

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# Zephyr Cooling Only Units - Maintenance

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## **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.

## **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, or ZF5CK 220V/50Hz

Condensate hose barb assembly with 4 mounting brackets included with unit.

| P/N        | Qty | Description                           |
|------------|-----|---------------------------------------|
| 226-600014 | 5'  | 4" Ducting, Insulated                 |
| 330571     | 1   | Grill, Circular Off White             |
| 332743     | 1   | Grill, 8x8TRA Anodized                |
| 222-110087 | 1   | ZFSA1-XB 2-Knob Control dual voltage  |
| 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)        |
| 332822     |     | PDS-250 115V Seawater Pump            |
| -OR-       | 1   | -OR- (kit has one pump, 115V or 220V) |
| 332831     |     | PDS-250C 220V Seawater Pump           |
| 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            |

## Zephyr ZF10 Kits

ZF10 115V, or 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 |     | ZFSA1-ZB 115V 3-Knob Mech. Control       |
| -OR-       | 1   | -OR- (kit has one control, 115V or 220V) |
| 222-110093 |     | ZFSA1-ZCB 220V 3-Knob Mech. 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)           |
| 332822     |     | PDS-250 115V Seawater Pump               |
| -OR-       | 1   | -OR- (kit has one pump, 115V or 220V)    |
| 332831     |     | PDS-250C 220V Seawater Pump              |
| 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

|            |     |                               |
|------------|-----|-------------------------------|
| 226-600014 | 10' | 4" Ducting Insulated Flexible |
| 229-000029 | 1   | Plenum Tee Box, 6", 6", 4"    |
| 339284     | 1   | 4" Plastic Grill, White       |

## Zephyr ZF12 Kits

ZF12 115V, or 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 |     | ZFSA1-ZB 115V 3-Knob Mech. Control       |
| -OR-       | 1   | -OR- (kit has one control, 115V or 220V) |
| 222-110093 |     | ZFSA1-ZCB 220V 3-Knob Mech. 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)           |
| 332822     |     | PDS-250 115V Seawater Pump               |
| -OR-       | 1   | -OR- (kit has one pump, 115V or 220V)    |
| 332831     |     | PDS-250C 220V Seawater Pump              |
| 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

|            |     |                               |
|------------|-----|-------------------------------|
| 226-600014 | 10' | 4" Ducting Insulated Flexible |
| 229-000029 | 1   | Plenum Tee Box, 6", 6", 4"    |
| 339284     | 1   | 4" Plastic Grill, White       |

## Zephyr ZF16 Kits

ZF16 115V, or 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 ABS14x6x4.5               |
| 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 |     | ZFSA1-ZB 115V 3-Knob Mech. Control       |
| -OR-       | 1   | -OR- (kit has one control, 115V or 220V) |
| 222-110093 |     | ZFSA1-ZCB 220V 3-Knob Mech. Control      |
| 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        |
| 332823     |     | PDS-500 115V Seawater Pump               |
| -OR-       | 1   | -OR- (kit has one pump, 115V or 220V)    |
| 332824     |     | PDS-500C 220V Seawater Pump              |
| 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

|            |     |                               |
|------------|-----|-------------------------------|
| 226-600014 | 10' | 4" Ducting Insulated Flexible |
| 229-800428 | 1   | Plenum Tee Box, 7", 7", 4"    |
| 339284     | 1   | 4" Plastic Grill, White       |

# Owner's Limited Warranty

As hereinafter described, Dometic Corporation limits the duration of any implied warranty to the duration of the underlying express warranty and also disclaims any liability for consequential or incidental damages arising from any application, installation, use or malfunction of any warranted product.

## Section I

### What does the Limited Warranty cover?

Products manufactured by Dometic Corporation (Dometic) are under limited warranty to be free from defects in workmanship or materials under normal use and service with the obligation of Dometic under this limited warranty being limited to replacing or repairing any component(s) which shall disclose defects within the time limits defined in **Section III** and which, upon examination by Dometic, shall appear to the satisfaction of Dometic to be defective or not up to specifications.

***This Limited Warranty is made in lieu of all other express warranties, obligations, or liabilities on the part of Dometic. In addition, Dometic shall not be responsible for 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 Dometic 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 above limitation may not apply to you. The terms and conditions of this warranty shall be governed by the laws of the Commonwealth of Virginia.

The Dealer is not an agent for Dometic except for the purpose of administering the above warranty to the extent herein provided, and Dometic does not authorize the dealer or any other person to assume for Dometic 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. Dometic shall not be responsible for any liability or expense except as is specifically authorized and provided in this section.

Dometic reserves the right to improve its products through changes in design or material without being obligated to incorporate such changes in products of prior manufacture, and to make changes at any time in design, materials, or part of units of any one year's model, without obligation or liability to owners of units of the same year's model of prior manufacture.

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 purposes for which such

goods are used. ***The duration of any implied warranty rights is limited to the duration of the express warranty as found in Section III.*** Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

## Section II

### What does this Limited Warranty not cover?

#### ***This Warranty Shall Not Apply to:***

1. Failures resulting from improper installation or use contrary to instructions.
2. Failures resulting from abuse, misuse, accident, fire, or submergence.
3. Any part manufactured by Dometic which shall have been altered so as to impair its original characteristics.
4. Any parts which fail as a result of misuse, improper application or improper installation.
5. Items not manufactured by Dometic, i.e., items which are purchased from another manufacturer and supplied as received by Dometic without alteration or modification except as any part of an Dometic-manufactured unit or component.
6. Components or parts used by or applied by the purchaser as an integral part of products not manufactured by Dometic.
7. Warranty does not cover damage to components that comprise a Custom Wrapped Box Evaporator refrigeration system (aka: catch boxes, fish boxes, etc.) when the box is installed in such a way that the customer can move it. These damages may include, but are not limited to: crimped refrigerant linesets (copper tubing or flexible linesets), refrigerant leaks, moisture ingress into the refrigeration system, subsequent damage to condensing unit from being operated with low refrigerant charge or moisture in the system, broken refrigerant connections, broken thermostat sensors, and/or broken constant pressure valves.

Installation and application of Dometic components is not warranted by Dometic because Dometic has no control or authority over the selection, location, application, or installation of these components.

## Section III

### What is the period of coverage?

See the Limited Warranty Periods, document # L-0694, for the period of coverage.

All Dometic components bear a data plate on which there are model and serial numbers. The serial number is date coded. To determine whether or not any Dometic component is in warranty, proceed as follows:

1. Determine the manufacture date of the component from the serial number on the data plate. If you are not familiar with the date code, write or call the Dometic Customer Service Department at (804)746-1313, to obtain the manufacture date. The hours of the Customer Service Department are 8:00 am - 5:00 pm (USA, Eastern Time Zone) Monday through Friday excluding holidays.
2. It is possible that there might exist a considerable time lag between the date a component is manufactured and the date it is put in service. In such instances, the date of manufacture could indicate that the item is out of warranty. However, based on the date the equipment is first put in service, the item may still be covered by the Dometic warranty described in **Section I**. For proof of date put in service, Dometic will require a copy of the bill of sale of the Dometic equipment from the installer or new boat dealer to the original owner.

## **Section IV**

**How do you get service? Please Read the following Warranty Procedure.**

### **WARRANTY PROCEDURE**

If the failure of a Dometic component is determined to be covered under the Dometic warranty and the time in service is determined to be within the warranty time limit, the owner has the following three options:

1. Preferred option: Have a Dometic authorized Servicing Dealer perform the work needed. The customer should call Dometic's Service Department for a recommendation as to the closest dealer. If the customer already knows an authorized servicing dealer, the dealer should be contacted directly.
2. If the customer contacts Dometic's Service Department for a Servicing Dealer and Dometic has no one in that particular area, Dometic will authorize the use of a local service company and Dometic will work with the local company to assist in any way possible.
3. The customer may send his equipment back to the factory to have the repair work done. Dometic will make every effort to return the equipment to the customer within a three week time period. If the claim represents a legitimate warranty problem, Dometic will pay the freight both ways. Dometic prefers option one and two, if at all possible.

The customer may contact the Dometic Service Department at (804) 746-1313.

## **WARNING**

Dometic Corporation (Dometic) 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 Dometic 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 Dometic product or group of Dometic 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 Dometic 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)), R404A (R125/R143a/R134 (44%/52%/4%)), or R417a, 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.

# Limited 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 Dometic Corporation 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) and Modulating Systems***

- 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**

## ***Grunert Refrigerators/Freezers/Fish Boxes***

The below warranty periods do not apply to systems that are installed as described in Section II, item #7, of the Owner's Limited Warranty, document # L-0123.

- New installation of entire system including condensing unit, line sets, evaporator, 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**

- New installation of condensing unit only, with line sets, evaporators, etc. done by others i.e. not Cruisair pre-charged line sets and evaporators.

**1 year warranty including parts and labor on mechanical and electrical parts of condensing unit only.**

## ***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**

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# Descriptions of Figures

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**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- MODE control knob: OFF - FAN - RUN
- 2- THERMOSTAT control knob: 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**

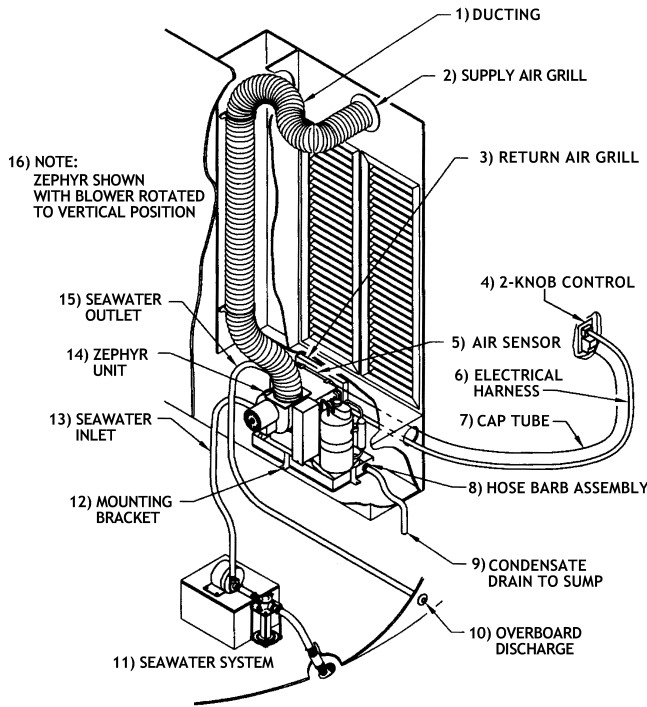
- 1) Thru hull
- 2) Seawater Hose
- 3) Zephyr
- 4) Seawater Pump
- 5) PVC Adapter and Coupling
- 6) PVC Adapter
- 7) Strainer
- 8) Seawater Intake
- 9) PVC Adapter
- 10) Waterline

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

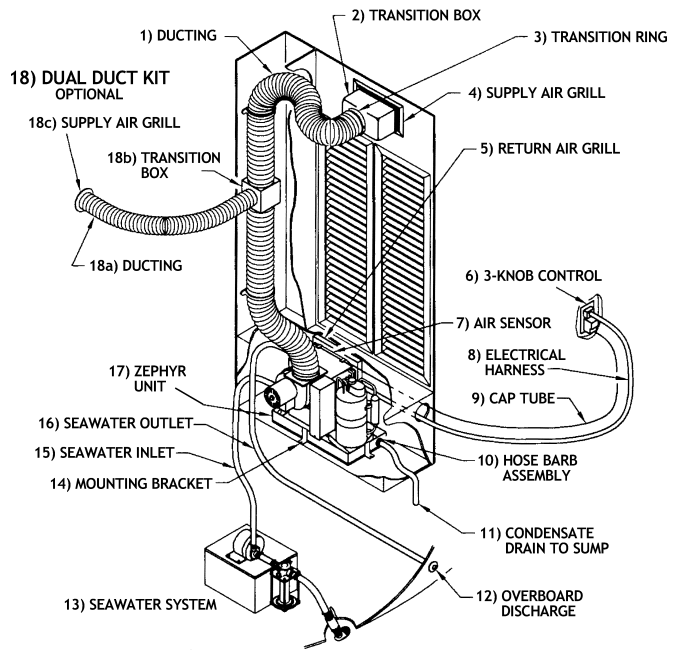
- 1) Thru hull
- 2) Seawater Hose
- 3) Zephyr
- 4) PVC Bushing
- 5) Seawater Pump
- 6) PVC Adapter
- 7) Strainer
- 8) Seawater Intake
- 9) PVC Adapter
- 10) Waterline



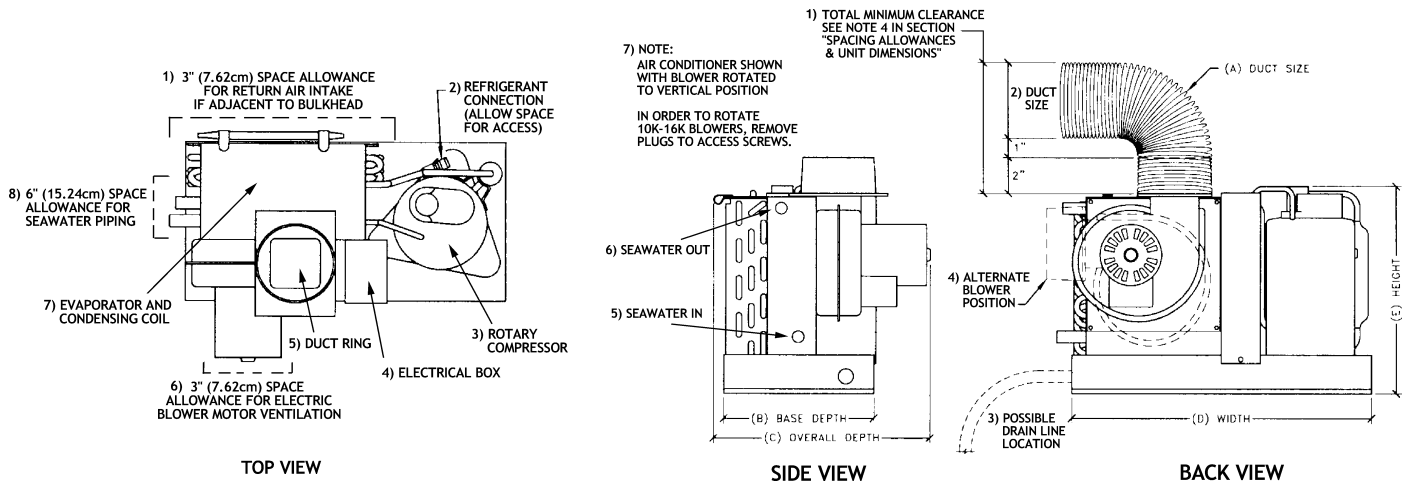
**Fig. 1a - Typical Single Duct Installation for ZF5**



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

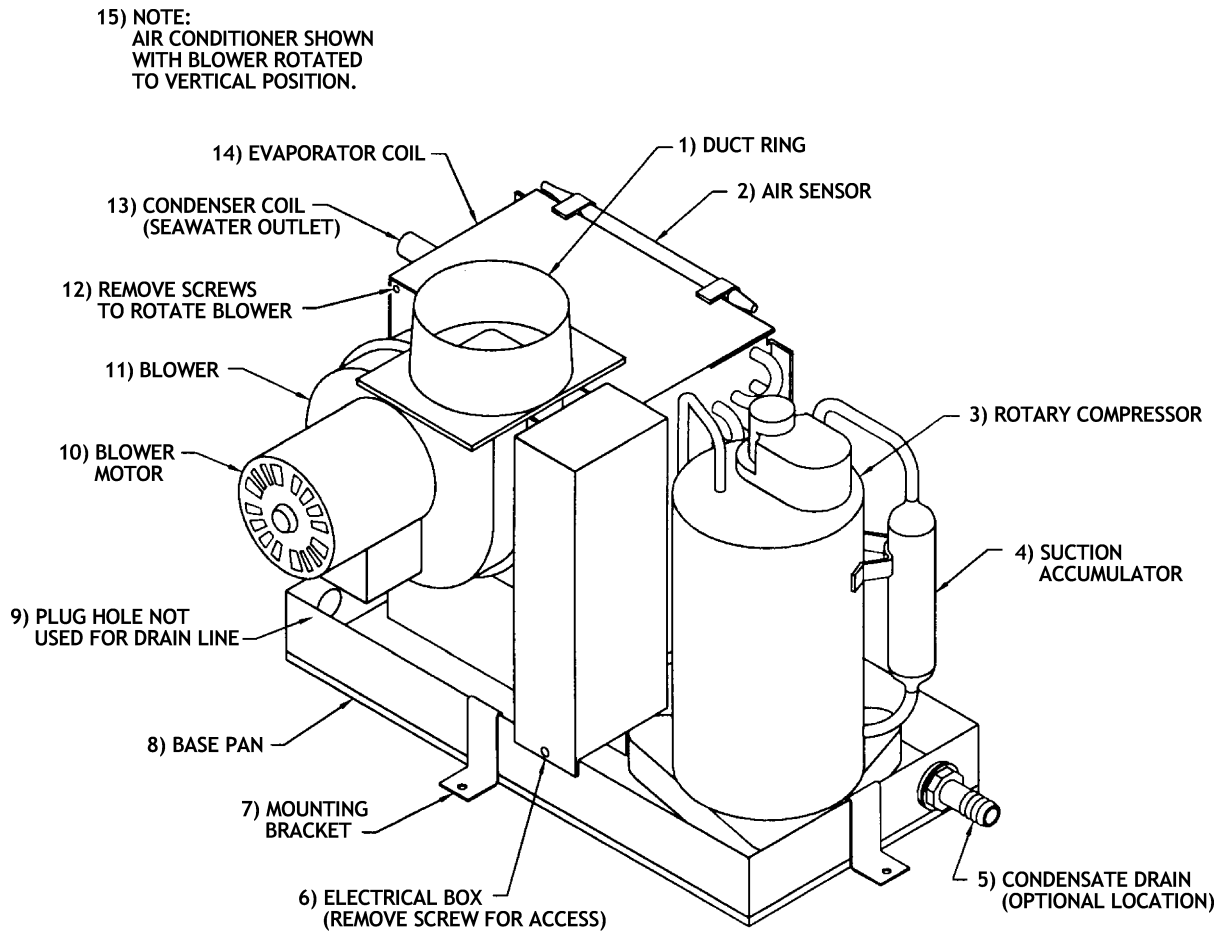


**Fig. 2 -Spacing Allowances & Unit Dimensions for Mounting**

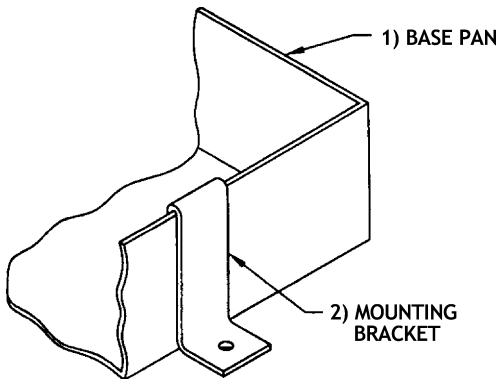


| DIMENSIONS        |                      |                       |                       |                       |
|-------------------|----------------------|-----------------------|-----------------------|-----------------------|
| Unit Capacity     | 5,000 BTU<br>(in/cm) | 10,000 BTU<br>(in/cm) | 12,000 BTU<br>(in/cm) | 16,000 BTU<br>(in/cm) |
| A – Duct Size     | 4.0/10.2             | 6.0/15.2              | 6.0/15.2              | 7.0/17.8              |
| B – Base Depth    | 8.0/20.3             | 8.4/21.3              | 8.4/21.3              | 10.25/26.1            |
| C – Overall Depth | 11.6/29.4            | 12.2/31.0             | 12.2/31.0             | 14.2/36.1             |
| D – Width         | 16.0/40.7            | 19.0/48.3             | 19.0/48.3             | 20.0/50.8             |
| E – Height        | 11.6/29.4            | 12.9/32.8             | 13.3/33.7             | 13.5/34.3             |

**Fig. 3 - Component Identification**



**Fig. 4 - Mounting Bracket**



**Fig. 5 - Condensate Drain**

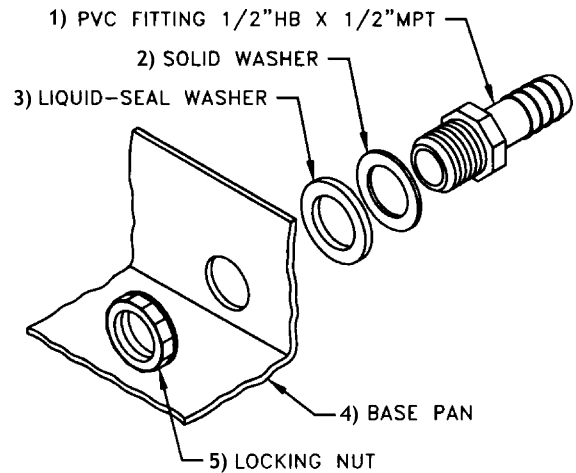
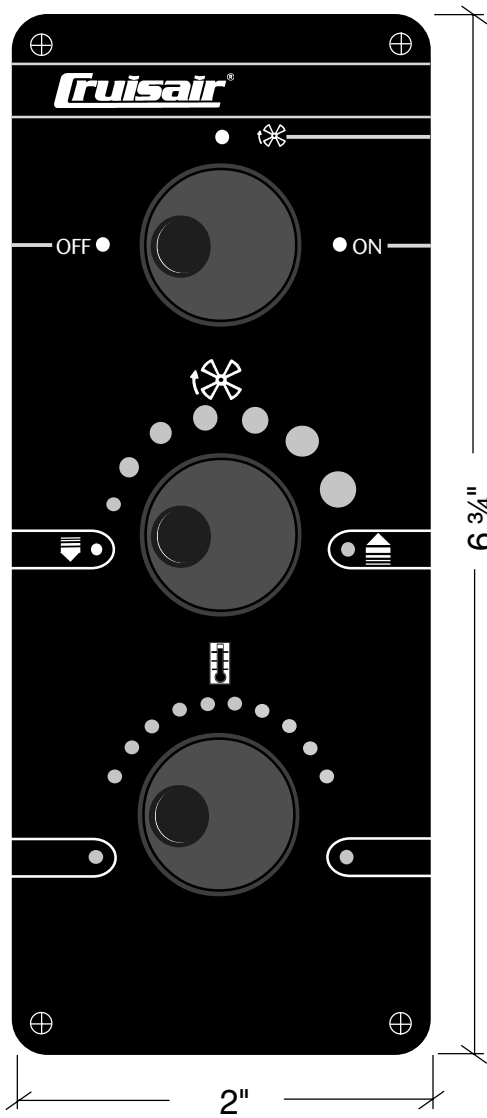
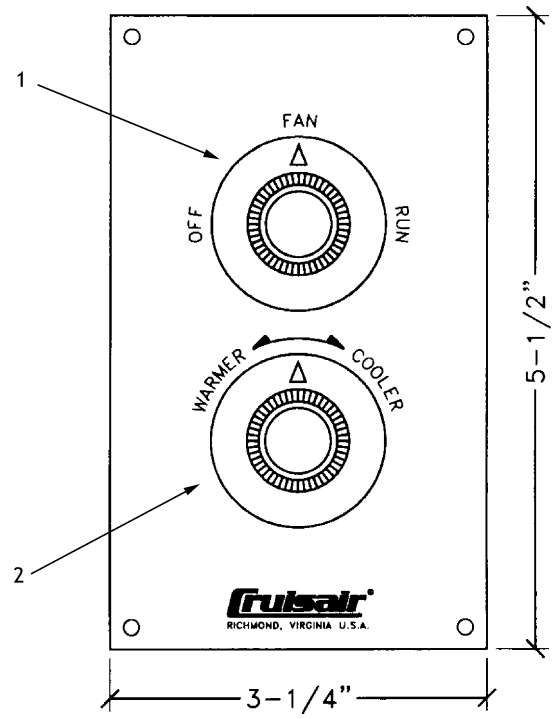


Fig. 6 - Three-Knob Switch Assembly



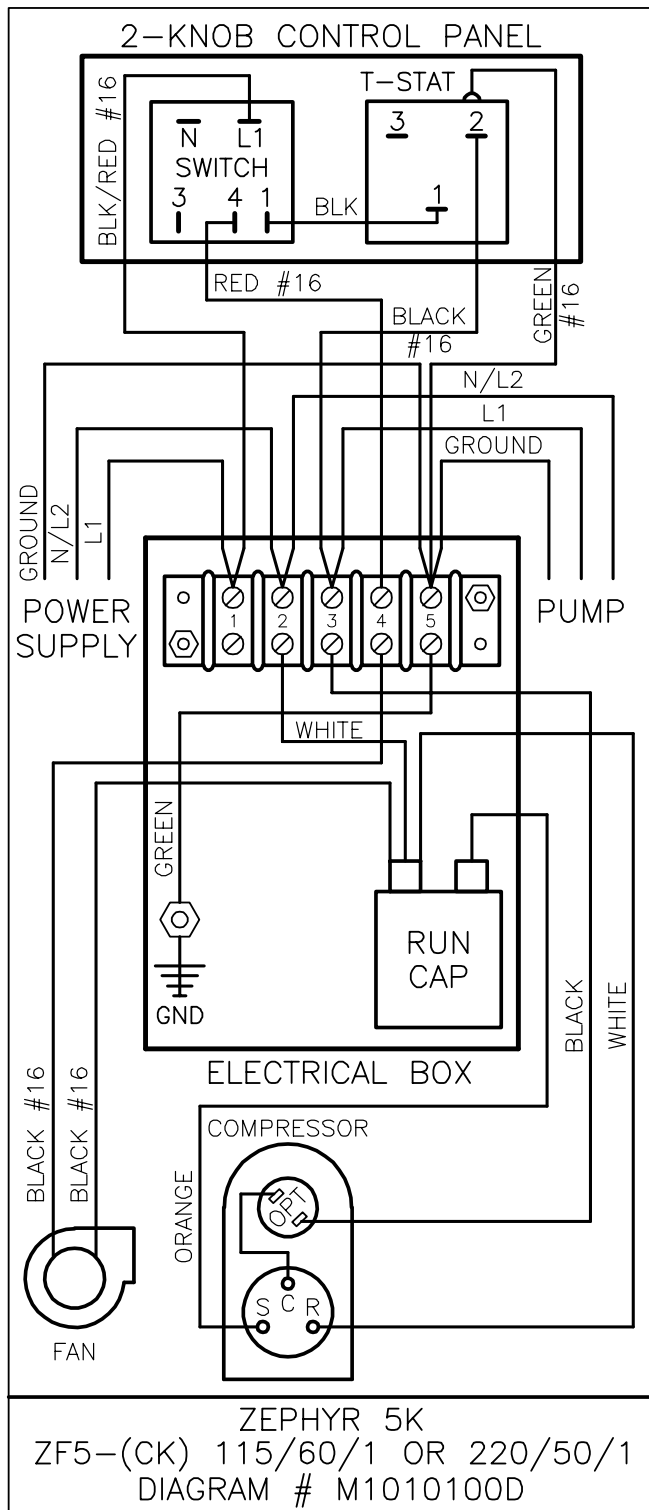
3 Knob Switch

Fig. 7 - Typical Two-Knob Switch Assembly



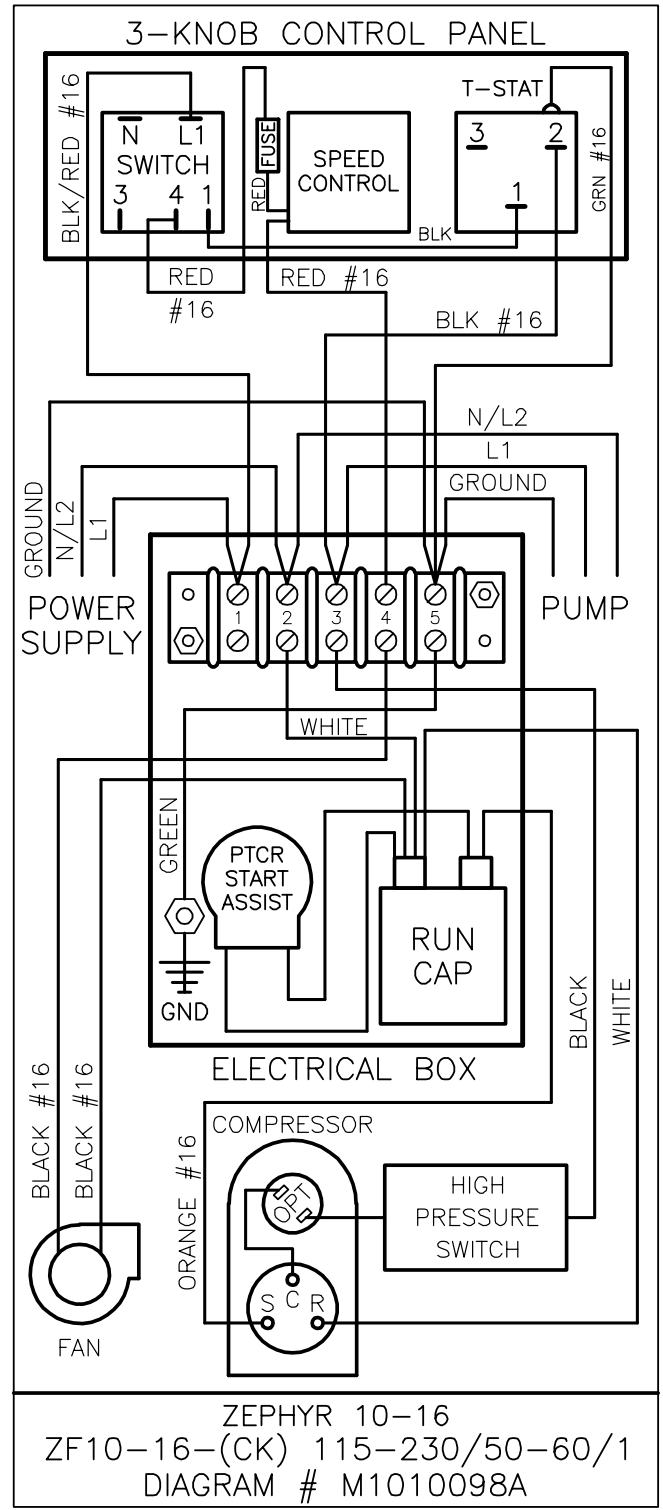
2 Knob Switch

**Fig. 8 - ZF5 Wiring Diagram**



ALL WIRES 12 GA  
UNLESS OTHERWISE NOTED

**Fig. 9 - ZF10-16 Wiring Diagram**



ALL WIRES 12 GA  
UNLESS OTHERWISE NOTED

**Fig. 10 - Seawater Pump & Plumbing Diagrams**

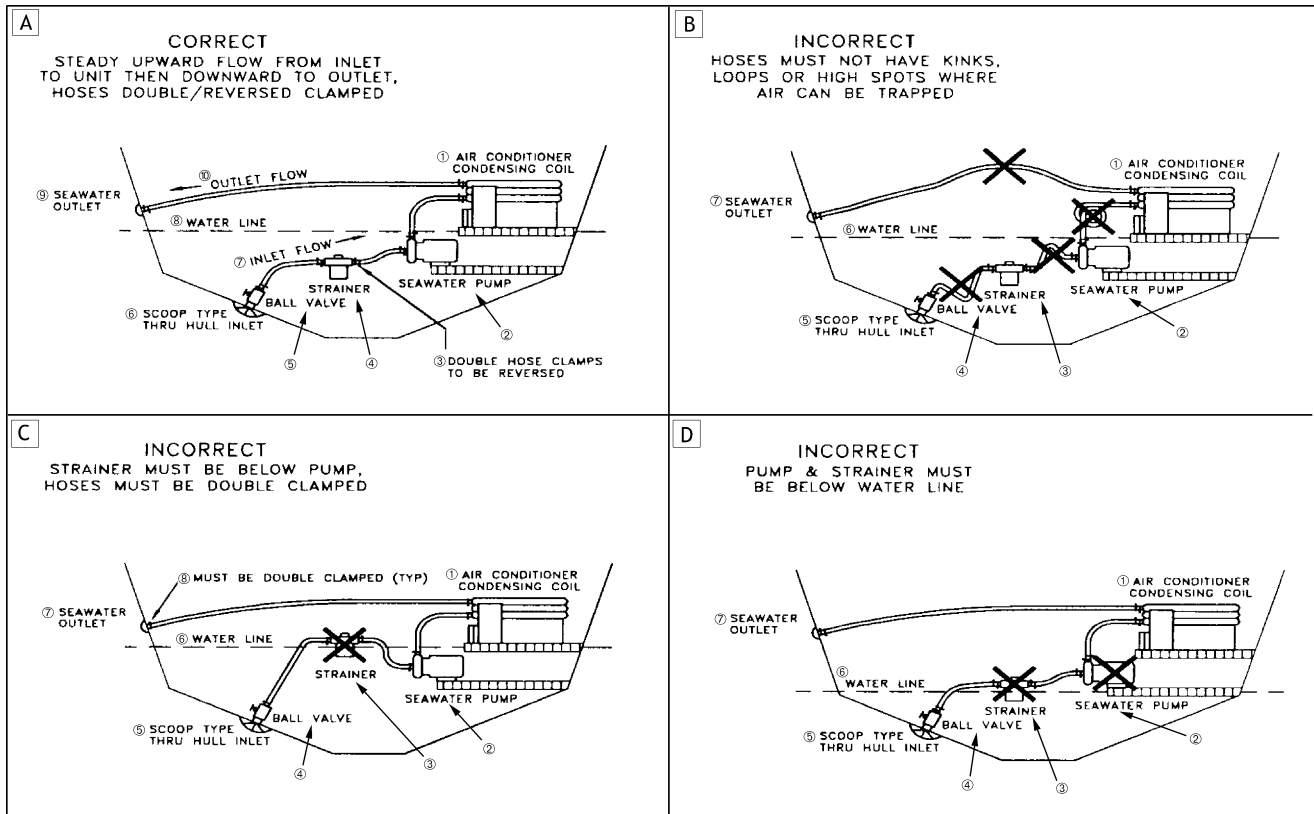


Fig. 11a - Seawater Kit Installation for ZF5-12

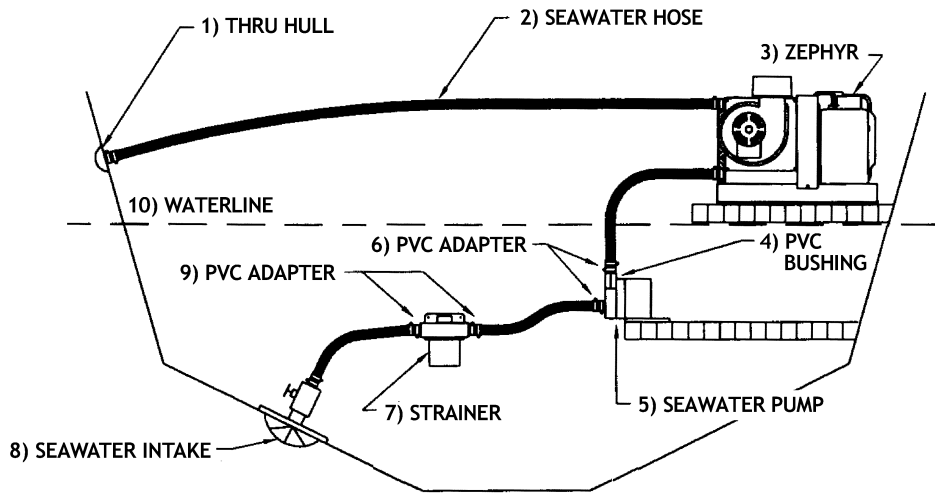
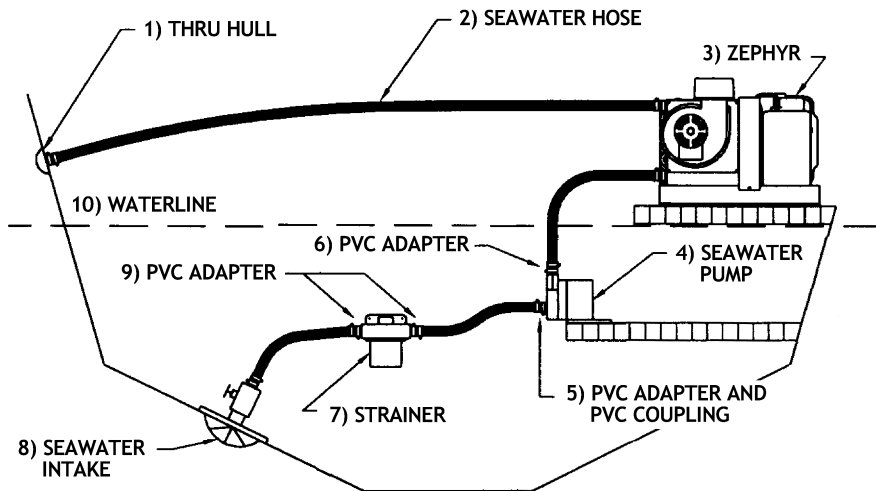


Fig. 11b - Seawater Kit Installation for ZF16



# 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.

**Dometic Marine Systems— Europe** is the Distribution Point for Europe and the Middle East. 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>**

## Domestic

### USA

#### AAP Inc.

Location: Milford, VA, USA  
Phone: 804-633-9454  
Fax: 804-633-5499  
Web: [www.aap.com](http://www.aap.com)

#### Alabama

#### Thom Chase Heating and A/C

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

#### California

#### Romaine Marine

Location: Richmond, CA, USA  
Phone: 510-232-1996

#### Southern California Marine Enterprises

Location: San Diego, CA, USA  
Phone: 888-657-1606  
Fax: 619-226-0496  
Email: [sales@southerncalmarine.com](mailto:sales@southerncalmarine.com)  
Web: [www.southerncalmarine.com](http://www.southerncalmarine.com)

#### Connecticut

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Territory: CT, DE, MD (N.of Baltimore) NJ, NY, PA, OH, RI  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### Charles S. Miller Yacht Engine Service

Location: Old Saybrook, CT, USA  
Phone: 860-388-9183  
Fax: 860-388-2223

#### Delaware

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### Florida

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

Location: Dania, FL, USA  
Phone: 954-920-0300  
Fax: 954-920-0301  
Email: [tkalley@aol.com](mailto:tkalley@aol.com)  
Web: [www.cruisair-southeast.com](http://www.cruisair-southeast.com)

#### Ward's Marine Electric, Inc.

Location: Ft. Lauderdale, FL, USA  
Phone: 954-523-2815  
Fax: 954-523-1967  
Email: [info@wardsmarine.com](mailto:info@wardsmarine.com)

#### Cruisair Suncoast, Inc.

Location: St. Petersburg, FL, USA  
Phone: 727-526-7875  
Fax: 727-528-9519  
Email: [cruisairsuncoast@aol.com](mailto:cruisairsuncoast@aol.com)

#### Georgia

#### Beard Marine/Savannah

Location: Savannah, GA, USA  
Phone: (912) 356-5222  
Fax: (912) 692-1006  
Email: [lpstorkbms@aol.com](mailto:lpstorkbms@aol.com)

#### Kansas

#### A.E.R. Supply, Inc.

Location: Seabrook, TX, USA  
Phone: 281-474-3276  
Fax: 281-474-2714  
Email: [rsmiller@aersupply.com](mailto:rsmiller@aersupply.com)

#### Kentucky

#### Thom Chase Heating and A/C

Location: Chattanooga, TN, USA  
Phone: 423-344-6356  
Fax: 423-344-6356  
Email: [thomchase@aol.com](mailto:thomchase@aol.com)

#### Louisiana

#### Sea Chest Marine Distr.

Location: New Orleans, LA, USA  
Phone: 800-535-8630  
Fax: 504-288-1758

#### Maryland

#### Annapolis Cruisair

Location: Annapolis, MD, USA  
Phone: 410-224-0970  
Fax: 410-224-0050  
Email: [cruisair45@aol.com](mailto:cruisair45@aol.com)

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Territory: CT, DE, MD (N.of Baltimore) NJ, NY, PA, OH, RI  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### Massachusetts

#### World Wide Enterprises

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

#### Michigan

#### J & S Marine Sales & Service

Location: Detroit, MI, USA  
Territory: Michigan, Canada (Windsor to Toronto)  
Phone: (586) 463-3400  
Fax: (586) 463-1792  
Email: [jandsmarine@sbcglobal.net](mailto:jandsmarine@sbcglobal.net)

#### Minnesota

#### Midwest Cruisair

Location: Red Wing, MN, USA  
Phone: 651-388-4881  
Fax: 651-388-9186  
Email: [estelter@redwing.net](mailto:estelter@redwing.net)

#### Mississippi

#### Thom Chase Heating and A/C

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

#### Sea Chest Marine Distr.

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

#### Missouri

#### A.E.R. Supply, Inc.

Location: Seabrook, TX, USA  
Phone: 281-474-3276  
Fax: 281-474-2714  
Email: [rsmiller@aersupply.com](mailto:rsmiller@aersupply.com)

#### New Jersey

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### New York

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### North Carolina

#### Martin's Marine

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

#### Ohio

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### Oklahoma

#### A.E.R. Supply, Inc.

Location: Seabrook, TX, USA  
Territory: TX, MO, KS, OK  
Phone: 281-474-3276  
Fax: 281-474-2714  
Email: [rsmiller@aersupply.com](mailto:rsmiller@aersupply.com)

#### Pennsylvania

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### Rhode Island

#### Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA  
Phone: 631-956-3456  
Fax: 631-956-3479  
Email: [sales@nauticalair.com](mailto:sales@nauticalair.com)  
Web: [www.nauticalair.com](http://www.nauticalair.com)

#### Cay Electronics

Location: Portsmouth, Rhode Island, USA  
Phone: 401-683-3520  
Fax: 401-683-3633  
Web: [www.cayelectronics.com](http://www.cayelectronics.com)

## South Carolina

### **Atlantic Boat ACR**

Location: Charleston, SC, USA  
Phone: (843) 402-0220  
Fax: (843) 402-0206  
Email: abacr@aol.com

### **Martin's Marine**

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

## Tennessee

### **Thom Chase Heating and A/C**

Location: Chattanooga, TN, USA  
Phone: 423-344-6356  
Fax: 423-344-6356  
Email: thomchase@aol.com

## Texas

### **A.E.R. Supply, Inc.**

Location: Seabrook, TX, USA  
Phone: 281-474-3276  
Fax: 281-474-2714  
Email: rsmiller@aersupply.com

## Washington

### **Sure Marine Services Inc.**

Location: Seattle, WA, USA  
Phone: 206-784-9903  
Fax: 206-784-0506  
Email: sales@suremarine.com

## **International**

### **Angola**

#### **Southern Power Products**

Location: Cape Town, South Africa  
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: 419-858-0544  
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  
Web: www.trimer.ar

### **Australia**

#### **Seabreeze Industries**

Location: Eagle Heights, QLD, (Gold Coast), Australia  
Phone: 61-755299808  
Fax: 61-755454426  
Email: seabreez@bigpond.net.au  
Web: www.seabreeze-industries.com.au

### **Austria**

#### **Nautica Centis di Nespolo Cinzia & C. Sne**

Location: Bevazzana de Latisana (UD), Italy  
Phone: 390-431-53-644  
Fax: 390-431-53-460  
Email: nautica.centis@nauticacentis.it  
Web: www.nauticacentis.it

### **Bahamas**

#### **Nixon's Refrigeration**

Location: Abaco, Bahamas  
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: freezingpoint@bahamas.net.bs

### **Bahrain**

#### **International Agencies**

Location: Manama, Bahrain  
Phone: 973-728691  
Fax: 973-728412  
Email: service@intercol.com

### **Belgium**

#### **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: 441-293-5740  
Fax: 441-293-5740  
Email: bermudabanger@ibl.bm

### **Botswana**

#### **Southern Power Products**

Location: Cape Town, South Africa  
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 3154-9990  
Fax: 55 (0) 21 2494-7223  
Email: sailing@sailing.com.br

#### **Sailing Products**

Location: Sao Paulo, Brazil  
Phone: 55 (0) 11 81 1985  
Fax: 55 (0) 11 81 1936

### **British Virgin Islands**

#### **Parts And Power**

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

#### **Cay Electronics Ltd.**

Location: Tortola, British Virgin Islands  
Phone: 284-494-2400  
Fax: 284-494-5389  
Email: caybvi@candwbvi.net  
Web: www.cayelectronics.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: Richmond, BC, Canada  
Phone: 604-270-2040  
Fax: 604-270-3888  
Email: dmairon@telus.net  
Web: www.aironhvac.com

#### **Accutemp Refrigeration and Air Conditioning**

Location: Victoria, BC, Canada  
Territory: Western Canada  
Phone: 250-475-2665  
Fax: 250-475-1957  
Email: info@accutemp.ca  
Web: www.accutemp.ca

## Ontario

### **J & S Marine Sales & Service**

Location: Detroit, MI, USA  
Phone: (586) 463-3400  
Fax: (586) 463-1792  
Email: jandsmarine@sbcglobal.net

### **Northland Supply Company**

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

### **China**

#### **Tritex Equipment Pte. Ltd.**

Location: Singapore  
Phone: (65) 6861 1188  
Fax: (65) 6861 4263  
Email: tritex@pacific.net.sg  
Web: www.tritex.com.sg

#### **Chi-Mo Inc.**

Location: Shanghai, China  
Phone: 8621-5917-1111  
Fax: 8621-5917-1166  
Email: sales@springfieldmarine.com.cn  
Web: www.springfieldmarine.com.cn

#### **Tritex Equipment (H.K.) Ltd**

Location: Shanghai, Beijing, Guangzhou, Wuhan, China  
Phone: 8621-5240-2638  
Fax: 8621-5240-2153  
Email: tritex@public.sta.net.cn  
Web: www.tritex.com.sq

### **Costa Rica**

#### **Metro Marine**

Location: Herradura, Costa Rica  
Phone: 506-643-3942  
Fax: 506-643-2426

### **Croatia**

#### **Nautica Centis di Nespolo Cinzia & C. Sne**

Location: Bevazzana de Latisana (UD), Italy  
Phone: 390-431-53-644  
Fax: 390-431-53-460  
Email: nautica.centis@nauticacentis.it  
Web: www.nauticacentis.it

### **Cyprus**

#### **Tuti Mare Trading Ltd**

Location: Limassol, Cyprus  
Phone: 35 725 431313  
Fax: 35 725 431300

### **Dominican Republic**

#### **May Day Marine**

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

#### **Agencias Navieras B&R S.A.**

Location: Santo Domingo, Dominican Republic  
Phone: 809-562-3353  
Fax: 809-562-3383  
Email: hsosa@navierasbr.com

### **Egypt**

#### **Climate Company**

Location: Cairo, Egypt  
Phone: 20-2-2598092  
Fax: 20-2-4523028  
Email: climate@tedata.net.eg

### **England**

#### **Domestic Marine Systems (Europe)**

Location: Poole, Dorset, United Kingdom  
Phone: 44 (0) 870 3306101  
Fax: 44 (0) 870 3306102

### **Equador**

#### **Navas-Bustos Representaciones**

Location: Guayaquil, Equador  
Phone: 593-2-252542  
Fax: 593-2-251-421



## Eritrea

### DM Electrical Engineering

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

## France

### Reya Electricite Marine

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

## French West Indies

### Iceberg Refrigeration

Location: Guadeloupe, French West Indies  
Phone: 590-24 35 35  
Fax: 590-24 35 35  
Email: iceberg.refrigeration@wanadoo.fr

### C.S. Services

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

## Germany

### GEMO GmbH

Location: Travemunde, Germany  
Phone: 49-4502-2466  
Fax: 49-4502-2425  
Email: gemo\_gmbh@t-online.de  
Web: www.gemo\_online.de

## Greece

### Polifrost Technical Ltd.

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

## Grenada

### Outfitters International

Location: St. Georges, Grenada  
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: info@automotoresymarina.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: 852-2792-6567  
Email: funcle@netvigator.com  
Web: www.astral.com.hk

## Indonesia

### Tritex Equipment Pte. Ltd.

Location: , Singapore  
Phone: (65) 6861 1188  
Fax: (65) 6861 4263  
Email: tritex@pacific.net.sg  
Web: www.tritex.com.sg

## Israel

### Yamit Mil Ltd.

Location: Tel-Aviv, Israel  
Phone: 972-3-5271778  
Fax: 972-3-5271772  
Email: mil@yamitysb.co.il

## Italy

### Nautica Centis di Nespolo Cinzia & C. Sne

Location: Bevazzana de Latisana (UD), Italy  
Phone: 390-431-53-644  
Fax: 390-431-53-460  
Email: nautica.centis@nauticacentis.it  
Web: www.nauticacentis.it

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

Location: Milan, Italy  
Phone: 390-2-253-6115  
Fax: 390-2-253-6115  
Email: geolino@tiscalinet.it

### Cummins Diesel Italia S.P.A

Location: Milan, Italy  
Phone: 390 2 516 558 1  
Fax: 390 2 516 558 55  
Email: luigi.casaburi@cummins.com

## Japan

### Gunji Corporation

Location: Osaka, Japan  
Phone: 81-6-6451-5615  
Fax: 81-6-6454-0056  
Email: gunji@gunji.com  
Web: www.gunji.com

## Kuwait

### Mantech

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

### Seas & Deserts

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

## Luxembourg

### ASA Boot Electro BV

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

## Malaysia

### Tritex Equipment Pte. Ltd.

Location: Singapore  
Phone: (65) 6861 1188  
Fax: (65) 6861 4263  
Email: tritex@pacific.net.sg  
Web: www.tritex.com.sg

## Maldives

### Tritex Equipment Pte. Ltd.

Location: Singapore  
Phone: (65) 6861 1188  
Fax: (65) 6861 4263  
Email: tritex@pacific.net.sg  
Web: www.tritex.com.sg

### Wheel Engineering Services

Location: Malé, Maldives  
Phone: 960-327806  
Fax: 960-324145  
Email: wes@avasmail.com.mv

## Malta

### Inmartech Ltd

Location: St Maida, Malta  
Phone: 35 699 498502  
Fax: 35 621 376476  
Email: inmartech@waldonet.net.mt

## Mexico

### Servicios Técnicos Marinos

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

### Performance Yachts

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

## Monaco

### Reya Electricite Marine

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

## Mozambique

### Southern Power Products

Location: Cape Town, South Africa  
Phone: 27-21-511-0653  
Fax: 27-21-510-3049  
Email: sales@southernpower.co.za

## Myanmar

### Tritex Equipment Pte. Ltd.

Location: Singapore  
Territory: China, Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore  
Phone: (65) 6861 1188  
Fax: (65) 6861 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

### First Needs Co.

Location: Curacao, Netherlands Antilles  
Phone: 599 966 69139  
Fax: 599 976 79003  
Email: hcraft@attglobal.net  
Web: www.firstneedscuracao.com

### Enertech N.V.

Location: Simpson Bay, St. Maarten/St. Martin, Netherland Antilles  
Phone: 599-551-2145  
Fax: 305-675-5857 (USA)  
Email: service@enertechnv.com

## New Caledonia

### Altomarine

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

## New Zealand

### Whiting Power Systems

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

## Norway

### Refnor A.S.

Location: Østerås, Norway  
Phone: 47-67 14 07 50  
Fax: 47-67 14 70 88  
Email: refnor.as@c2i.net

## 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@cyber.net.pk

## Panama

### Productos Marine Air

Location: La Chorrera, Panama  
Phone: 507-232-5406  
Fax: 507-232-7648  
Email: masters@sinfo.net

## 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  
Phone: (65) 6861 1188  
Fax: (65) 6861 4263  
Email: tritex@pacific.net.sg  
Web: www.tritex.com.sg

## Portugal

### Nauticool Lda

Location: Ferragudo, Algarve, Portugal  
Phone: 351 93 408 0354  
Fax: 351 282 461 818  
Email: nauticool@clix.pt

## Puerto Rico

### Sun Cool Air Conditioning Copr

Location: Carolina, Puerto Rico  
Phone: 787-791-6971  
Fax: 787-791-3885  
Email: suncool1@coqui.net

### Cool-Tech Air Conditioning

Location: Fajardo, Puerto Rico  
Phone: (787) 860-2615  
Fax: (787) 801-2050  
Email: cooltech@isprr.net

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

Location: San Juan, Puerto Rico  
Phone: 787-781-1313  
Fax: 787-781-2020  
Email: jdonato@technicalhouse.com  
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

### Centro Cruisair de Puerto Rico

Location: Santurce, Puerto Rico  
Phone: 787-727-3637  
Fax: 787-727-3637  
Email: fernan\_moreno@hotmail.com

## 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: 966-2-6991024

## Scandinavia

### Refnor A.S.

Location: Østerås, Norway  
Phone: 47-67 14 07 50  
Fax: 47-67 14 70 88  
Email: refnor.as@c2i.net

## Singapore

### Tritex Equipment Pte. Ltd.

Location: Singapore  
Phone: (65) 6861 1188  
Fax: (65) 6861 4263  
Email: tritex@pacific.net.sg  
Web: www.tritex.com.sg

## Slovenia

### Nautica Centis di Nespolo Cinzia & C. Sne

Location: Bevazzana de Latisana (UD), Italy  
Phone: 390-431-53-644  
Fax: 390-431-53-460  
Email: nautica.centis@nauticacentis.it  
Web: www.nauticacentis.it

## South Africa

### Southern Power Products

Location: Cape Town, South Africa  
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: 94-1-2691966  
Fax: 94-1-2691751  
Email: gandm@sri.lanka.net

## Sweden

### S.A.L.T. Sea Life AB

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

## Switzerland

### Marine Parts Heimgartner

Location: Volketswil, Switzerland  
Phone: 41-1-997 40 90  
Fax: 41-1-997 40 94  
Email: info@marineparts.ch  
Web: www.marineparts.ch

## 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@ji-net.com

## Trinidad & Tobago

### Nau-T-Kol Marine Refrigeration

Location: Chaguaramas, Trinidad  
Phone: 868-634-2174  
Fax: 868-634-2174  
Email: nautkol@cablet.net  
Web: www.nautkol.com

## Turkey

### Egemar Mühendislik Ltd

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

## U.S. Virgin Islands

### St. Croix Marine Corp.

Location: St. Croix, U.S. Virgin Islands  
Phone: 340-773-0289  
Fax: 340-778-8974  
Email: stxmarine@vipowernet.net

### Coral Bay Marine Service

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

### Dr. Ice

Location: St. Thomas, US Virgin Islands  
Phone: 340-775-4540  
Fax: 340-775-6575

### Reefco

Location: St. Thomas, U.S. Virgin Islands  
Phone: 340-776-0038  
Fax: 340-776-0038  
Email: dennyedy@viaccess.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

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

### Domestic Marine Systems (Europe)

Location: Poole, Dorset, United Kingdom  
Phone: 44 (0) 870 3306101  
Fax: 44 (0) 870 3306102

## Uruguay

### Free Port Colonia

Location: Colonia 70.000, Uruguay  
Phone: 598-522-3814

## Venezuela

### Rich Marine Center, C.A.

Location: Puerto La Cruz,, Estado Anzoategui, Venezuela  
Phone: 58 281 4180324, 25, or 26  
Fax: 58 281 2811630  
Email: richmarine@telcel.net.ve  
Web: www.tuyate.net

## 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  
Phone: 27-21-511-0653  
Fax: 27-21-510-3049  
Email: sales@southernpower.co.za

## Zimbabwe

### Southern Power Products

Location: Cape Town, South Africa  
Phone: 27-21-511-0653  
Fax: 27-21-510-3049  
Email: sales@southernpower.co.za





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