



EnviroComfort (ECD)

INSTALLATION MANUAL



EnviroComfort Kit

Dometic Marine
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INTRODUCTION

THIS MANUAL

This manual provides proper installation information for the EnviroComfort™ air conditioning system. Where applicable, be sure to follow the instructions that pertain to your model. Improper installation procedures can result in unsatisfactory performance and/or premature failure of the air conditioning unit.

Before proceeding, read this manual completely. If there are any statements or procedures in this manual that you do not understand, contact the Applications Department of Dometic Marine for assistance. Phone (954) 973-2477 Monday through Friday, 8:00am - 5:00pm Eastern Time. After hours (evenings and weekends) technical support is offered through Dometic's 24/7 Hotline at (888) 440-4494, or by fax at 954-973-2477, or by email at sales@DometicEnviro.com.

In the interest of product improvement, Dometic's specifications and design are subject to change without prior notice.

THIS PRODUCT

The EnviroComfort air conditioning system provides year-round comfort on your boat with both cooling and heating capabilities. A compact Dometic Digital Display temperature control operates the system. For flexibility in connecting to ductwork, the high-velocity blower is rotatable to either a horizontal or vertical position. The compact, space-saving design is contained in a stainless-steel drain pan, and the pre-installed air filter is easily removable and cleanable. The plastic electrical box is remote-mountable for added convenience.

HOW IT WORKS

The basic principle of an air conditioning system is a liquid absorbs heat as it turns into a gaseous state (evaporates) and releases heat as it turns back into a liquid state (condenses). The system consists of five main components:

- **Evaporator** - Absorbs heat from air flowing across the coil.
- **Fan or Blower** - Blows air across the evaporator coil.
- **Condenser** - Releases heat to the seawater.
- **Compressor** - Drives the refrigerant through the loop.
- **Metering Device** - Meters the flow of refrigerant to the evaporator.

The air conditioner's refrigerant compound has a very low boiling point. It flows in a closed loop between an evaporator and a condenser, alternately absorbing and releasing heat. The heat absorbed by the refrigerant is transferred to the seawater. This process cools and dehumidifies a space by removing heat and moisture, replacing hot moist air with cool dry air. The moisture it removes condenses and drips into a collection pan, where it drains away. There should be a temperature difference of 15 to 20 degrees from the return air to the supply air.

A water pump circulates seawater through the inner tube in the condenser coil, which cools the refrigerant in the outer tube and condenses it from a gas into a liquid. The heat from the refrigerant is exchanged to the seawater and discharged overboard. The liquid refrigerant is then pumped through the evaporator coil and the cycle repeats.

When in Heating Mode, a reversing valve in the refrigerant line reverses the flow and the evaporator and condenser change roles. Heat is absorbed from seawater and released into conditioned space.

The Effect of Seawater Temperature

Whether in Cooling Mode or Heating Mode, the temperature of the seawater affects the air conditioner's efficiency and capacity.

In Cooling Mode, the system is most efficient when the water temperature is 55-80°F (13-27°C). At water temperatures above 90°F (32°C), the water's ability to absorb heat diminishes, so the capacity of the system decreases. Also, when water temperature increases above 90°F (32°C), the system could sustain a high-pressure shutdown to protect the compressor.

In Heating Mode, the system is most efficient when the water temperature is above 50°F (10°C). At water temperatures of 40°F (4.4°C) or below, the water's ability to provide heat diminishes, so the capacity of the system decreases. Also, as the water temperature decreases, the system could sustain a low-pressure shutdown to protect the compressor.



CAUTION

Extreme care should be taken in operating any unit below seawater temperatures of 40°F (4.4°C). The seawater could freeze in the condenser tubing, possibly causing it to burst, which is not covered by the warranty.

KIT CONTENTS

EnviroComfort is a complete marine air conditioning kit that includes everything needed for a professional installation. Each kit includes:

- Air conditioning unit with electrical box
- Dometic Digital Display temperature-control device
- Ducting
- Supply-air grille
- Return-air grille
- Seawater pump
- Strainer
- Speed scoop thru-hull
- Overboard fitting
- Seawater hose
- Fittings for pump and strainer

TOOLS REQUIRED FOR INSTALLATION

- Screwdrivers - both types
- Pliers
- Pipe wrench
- Wire cutters/crimpers
- Drill & 7/8" bit
- Power screwdriver
- Jig saw
- Hull saw
- Duct tape
- Electrical tape
- Threaded-seal tape
- Marine-grade waterproof (below waterline) bedding compound to seal thru-hull fittings
- Hardware to secure unit, pump, strainer, grilles, electrical box and control panel

UNPACKING AND INSPECTION

Before attempting to install your new 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.

If, upon opening your new system, you discover any parts are missing, contact your dealer immediately. Check all items carefully 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.

INSTALLATION PROCEDURES

VERY IMPORTANT SAFETY CONSIDERATIONS

This manual contains essential safety information concerning the safe and proper installation and operation of the EnviroComfort direct-expansion air conditioner. **It is very important that you read and understand the contents of this manual thoroughly before attempting to install any Dometic equipment.**

AVOID HARMFUL VAPORS

Consideration should be given to installing a trap in the condensate drain line(s) so that normal discharge of condensate can fill the trap and prevent the ingress of carbon monoxide (CO) or other potentially harmful vapors.



WARNING

Never install your air conditioner in the bilge or engine room areas. Ensure that the selected location is sealed from direct access to bilge and/or engine room vapors.

Do not terminate condensate drain line within three 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.

Failure to comply may allow bilge or engine room vapors to mix with the air conditioner's return air and contaminate living areas which 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.

ELECTRICAL SHOCK HAZARD



CAUTION

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

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

OTHER HAZARDS

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.



NOTE

United States federal law prohibits the intentional release of refrigerant gases into the environment, including the refrigerant used in this air conditioning system. Special care must be taken when installing, charging and servicing Dometic equipment to prevent any loss of refrigerant.

Dometic 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.

INSTALLATION CHECKLIST

Review this list prior to and after installation.

AIR CONDITIONER UNIT 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 line routed aft and down hill to a sealed sump (not bilge), and should have a trap.

GRILLES AND DUCTING

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

ELECTRICAL

- If pump wires need to be extended by butt connections, make sure they are tightly crimped and heat shrunk.
- AC power source installed and grounded/bonded in accordance with ABYC standards.
- Connect control wires to terminal strip with ring terminals.

SEAWATER COOLING SYSTEM

- Speed scoop located as far below the water line and as close to the keel as possible, with the scoop's strainer facing the bow. (See section C of Figure 1: Kit Installation Diagram, page 5.)
- Shut-off valve and speed scoop properly sealed and tight.
- Seawater pump at least one foot (305mm) below water line and securely mounted.
- Strainer mounted below pump with access to filter.
- Double/reversed stainless steel hose clamps on all hose connections.
- Threaded-seal tape on all threaded connections.
- Hose runs uphill from speed scoop to strainer, pump and air conditioning unit.
- Water flowing freely and steadily from overboard discharge while pump is running.

PREPARATION

PLACEMENT OF SYSTEM

Selecting a good location for your air conditioner is the most important part of your preparation. 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.

Install the unit as low as possible (such as under a V-berth, dinette seat or in the bottom of a locker) and duct the supply air as high as possible to create an ideal air-flow condition. This type of installation prevents short or premature cycling.

Position the unit on a firm, level, horizontal surface and run the condensate drain line downward from the unit to a suitable drain location.

Plan all connections, 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.

If your kit is supplied with a filtered return-air grille, the filter attached to the unit's evaporator **must be removed**. Two filters are **not** better than one, as the reduced air flow will decrease performance and possibly freeze the evaporator coil.

See Figure 1: Kit Installation Diagram, page 5 for an overview of the entire installation and Table 1: List of Parts Referenced in Kit Installation Diagram, page 6.



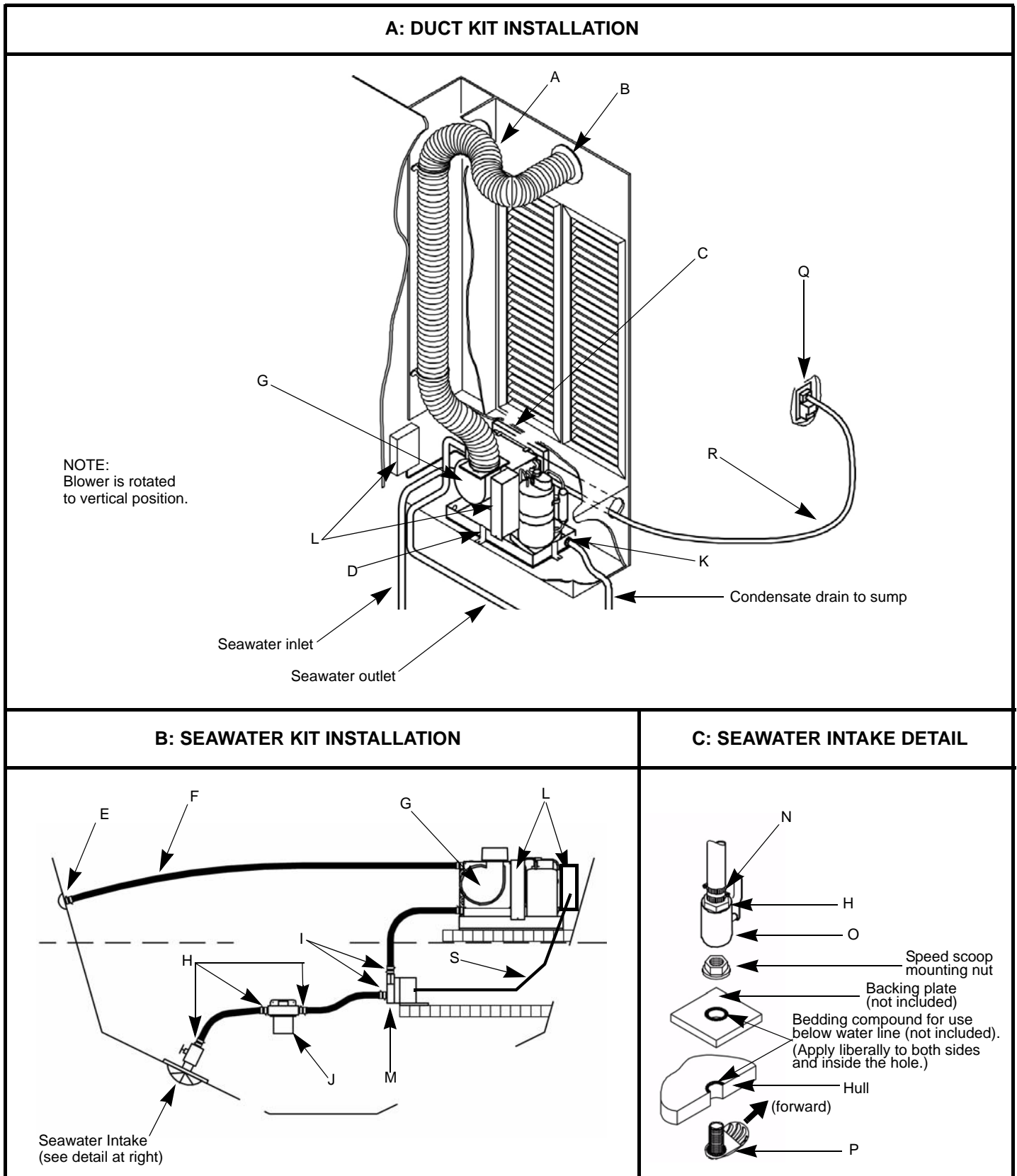
WARNING

Never install your air conditioner in the bilge or engine room areas. Ensure that the selected location is sealed from direct access to bilge and/or engine room vapors.

Do not terminate condensate drain line within three 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.

Failure to comply may allow bilge or engine room vapors to mix with the air conditioner's return air and contaminate living areas which may result in injury or death.

Figure 1: Kit Installation Diagram



See Table 1: List of Parts Referenced in Kit Installation Diagram on page 6.

Read "Installation Notes" on page 6.

Table 1: List of Parts Referenced in Kit Installation Diagram

LEGEND	AMOUNT	DESCRIPTION
A	12.5' (3.8m)	Insulated Ducting
B	1	Supply-Air Grille (the smaller grille in kit)
C	1	Return-Air Grille, filtered (the larger grille in kit)
D	4	Mounting Bracket (see Figure 3, page 8)
E	1	Thru-Hull, plastic 5/8"
F	25' (7.62m)	Seawater Hose, 5/8"
G	1	Air Conditioning Unit
H	3	Adapter, PVC 1/2" MPT x 1/2" HB
I (Pump PML 250)	2	Adapter, PVC 1/2" FPT x 1/2" HB
I (Pump PML 500)	1	Adapter, PVC 1/2" FPT x 1/2" HB
	1	Adapter, PVC 3/4" MPT x 1/2" HB
	1	Coupling, PVC 3/4" FPT x 3/4" FPT
J	1	Strainer with Bracket (1/2" FPT)
K	1	Hose Barb Drain Kit (see Figure 4, page 9)
L	1	Remote Electrical Box
M	1	Seawater Pump, PML250 (6K-12K units) or PML500 (16K units)
N	17	Hose Clamp
O	1	Ball Valve, bronze 1/2"
P	1	Speed Scoop, bronze 1/2"
Q	1	Digital Control Panel
R	1	Electrical Harness
S	1	Pump Power Harness

Installation Notes**Duct Kit Installation**

1. Do not install air conditioner in bilge or engine room areas. Do not terminate condensate drain line in bilge or any area that may be exposed to engine or generator exhaust fumes.
2. Install return-air grill low and supply-air grille high; supply-air grille should not blow toward return-air grille.
3. Install ducting as smooth and taut as possible, trim any excess, avoid any unnecessary bends or loops.

Seawater Kit Installation

Refer to Figure 8: Seawater Pump & Plumbing Diagrams, page 15.

1. Seawater system must have a steady upward flow from inlet to air conditioner, as shown in Figure 8, page 15.
2. Hoses must not have kinks, loops, or high spots where air can be trapped.
3. Pump and strainer must be below water line.

4. Speed scoop should be installed as far below the water line and as close to the keel as possible, facing forward.
5. Avoid or minimize 90-degree bends or elbows as much as possible. Rotate pump head toward direction of water flow.
6. **Electrical connections for power to unit and pump are to be made by qualified personnel only.**

DUCTING ROUTE

Good airflow is critical for the performance of the entire system.

Plan the ducting route to 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.)

SPACING ALLOWANCES & UNIT DIMENSIONS

The following space allowances are suggested minimums. Always allocate enough space for installation and serviceability. See Table 2: Unit Dimensions, page 7 and Figure 2: Spacing Allowances & Unit Dimensions for Mounting, page 8.

Plan for these space allowances when mounting the unit:

1. Allow a minimum of 6" (152mm) around the perimeter of the unit in the area of the seawater and condensate drain piping.
2. Allow a minimum of 3" (76mm) 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" (76mm) of air space for the electric blower motor ventilation.
4. For flexible ducting connection, allow 2" (51mm) for the duct ring, 1" (25mm) for the duct bend radius, and add diameter of the ducting to get the total clearance distance (2" [51mm] + 1" [25mm] + duct diameter) as measured from the blower outlet (this also applies to clearance needed behind the supply-air grille).



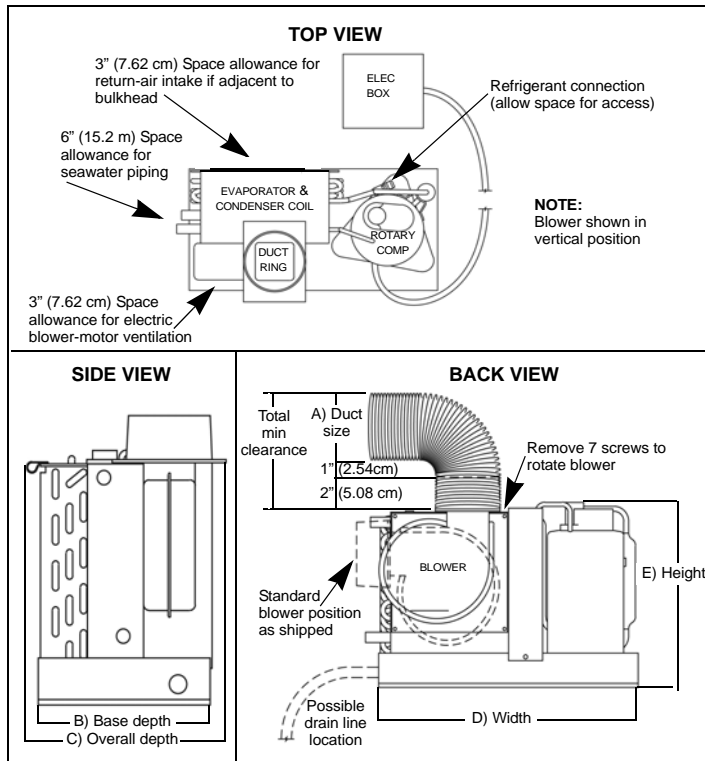
NOTE

United States federal law prohibits the intentional release of refrigerant gases into the environment, including the refrigerant used in this air conditioning system. Special care must be taken when installing, charging and servicing Dometic equipment to prevent any loss of refrigerant. Dometic 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.

Table 2: Unit Dimensions

DIMENSIONS	UNIT CAPACITIES			
	6,000 BTU IN/MM	10,000 BTU IN/MM	12,000 BTU IN/MM	16,000 BTU IN/MM
A - Duct Size	4.0/102	6.0/153	6.0/153	6.0/153
B - Base Depth	8.0/204	8.75/223	8.75/223	10.25/261
C - Overall Depth	9.0/229	9.63/245	9.63/245	11.25/286
D - Width	16.0/407	22.0/559	22.0/559	22.0/559
E - Height	11.25/286	13.50/343	13.50/343	13.5/343

Figure 2: Spacing Allowances & Unit Dimensions for Mounting



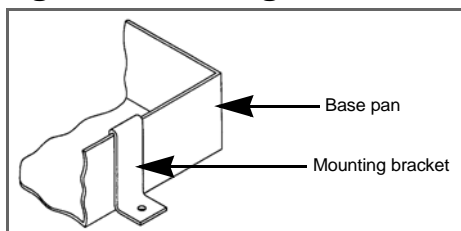
EnviroComfort Unit

For specific measurements, see Table 2: Unit Dimensions, below .

INSTALLING THE MOUNTING BRACKETS

The air conditioning unit is supplied with a base pan that also serves as a condensate pan. Use the mounting-clip brackets and screws (4) to secure the base pan onto a flat, horizontal surface. See Figure 3: Mounting Bracket, below.

Figure 3: Mounting Bracket



INSTALLING THE CONDENSATE DRAINS

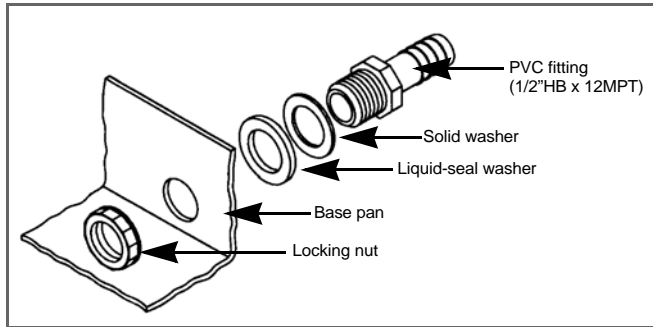
The condensate drain pan is 2.0" (51mm) high with two drain locations. During conditions of high humidity, condensate may be produced at a rate of approximately one-half gallon (1.9 liter) per hour. With this in mind, it is important to route condensate drains downward to a sump pump. It is not recommended to route condensate drains to the bilge.

After the condensate drain installation is complete, test the installation by pouring one quart (liter) of water into the pan and checking for good flow.

To install the condensate drain:

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. (See Figure 4: Condensate Drain Kit, page 9.)
3. Connect the fitting through the exposed hole in the base pan with the locking nut.
4. Securely tighten using two (2) wrenches to provide a proper seal.

5. Attach a 5/8" (16mm) 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. The hose should have a trap.
7. Two drain fittings may be used and the hoses teed together provided there is a minimum 2" (51mm) drop from the bottom of the base pan to the tee connection.

Figure 4: Condensate Drain Kit**WARNING**

Do not terminate condensate drain line within three 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.

Failure to comply may allow bilge or engine room vapors to mix with the air conditioner's return air and contaminate living areas which may result in injury or death.

INSTALLING A TRAP

Consideration should be given to installing a trap in the condensate drain line(s) so that normal discharge of condensate can fill the trap and prevent the ingress of carbon monoxide (CO) or other potentially harmful vapors.

ROTATING THE BLOWER

For greater flexibility in connecting to your ductwork, you can install the blower with either a horizontal or vertical supply-air discharge. Rotate the blower to allow the most direct flow of air to the supply-air grille.

HORIZONTAL DISCHARGE

The unit is shipped with the blower in a horizontal position. No adjustment is required.

VERTICAL DISCHARGE

For vertical discharge you must rotate the blower. Follow the steps below:

1. Remove wire tie holding blower wire harness to base pan and/or adjacent harness.
2. Remove and save the 7 screws holding the blower plate to the evaporator shroud. Remove 2 screws holding blower to drain pan.
3. Rotate the blower 90 degrees so the discharge is in the vertical position and aimed upward, then reinstall the screws to hold the blower plate to the evaporator shroud. (On some systems you may need to use the access hole in the base pan and a long screwdriver to reach one of the screws.)
4. Use mounting bracket supplied with unit to mount blower to drain pan.
5. Make sure the power wire is repositioned so it will not catch on anything during or after installation.

The vertical rotation is complete.

**NOTE**

The empty screw holes have no effect on system performance.

INSTALLING THE ELECTRICAL BOX

The electrical box must be mounted to a solid surface in a dry location and within 3.5 feet (1m) of the unit. It must also be within 15 feet (4.5m) of where the digital control will be installed. Use the 3 keyhole mounting slots in the back of the electric box to attach it to a suitable mounting surface. Use screws appropriate for that mounting surface (not included).

INSTALLING THE AIR GRILLES

Install the supply-air grille as high as possible and the return-air grille as low and close to the air conditioning unit as possible to ensure direct uninterrupted airflow to the evaporator. In no instance should the supply-air grille discharge be directed toward the return-air grille, as this will cause the system to short cycle.

To install grilles:

1. **Supply-air grille** - A minimum clearance of 3" (77mm) plus the duct diameter size is required behind the grille to attach the ducting (see earlier section, "Spacing Allowances & Unit Dimensions" on page 7 for more information). Cut the properly sized hole for the supply-air grille:
 - Measure the height and width dimensions of the grille's flange (see Figure 5, page 10). Add 1/8" (3mm) to each measurement and make the cutout that size. The cutout should be as small as possible to create a tight fit. Do not allow the cutout to exceed the distance to the grille's mounting holes. Remember to measure twice, cut once!
 - Mount the grille into the cutout and secure with screws in the mounting holes.
2. **Return-air grille** - A minimum clearance of 4" (107mm) is required in front of the return-air grille, free from any furniture or other obstructions. Cut the properly sized hole for the return-air grille:
 - Measure the height and width dimensions of the grille's flange (see Figure 5, page 10). Add 1/8" (3mm) to each measurement and make the cutout that size. The cutout should be as small as possible to create a tight fit. Do not allow the cutout to exceed the distance to the grille's mounting holes. Remember to measure twice, cut once!
 - Mount the grille into the cutout and secure with screws in the mounting holes.

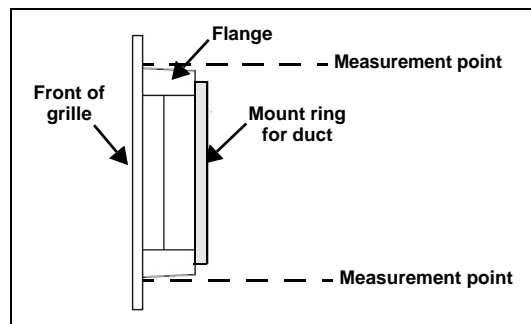
If your kit is supplied with a filtered return-air grille, the filter attached to the unit's evaporator **must be removed**. Two filters are **not** better than one, as the reduced air flow will decrease performance and possibly freeze the evaporator coil.



NOTE

The return-air filter, mounted either to the return-air grille or 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 "MAINTENANCE" on page 17 for filter cleaning instructions.

Figure 5: Side View of Grille



INSTALLING THE DUCTS

Good airflow is critical for the performance of the entire system, and airflow is highly dependent on the quality of the ducting installation. Run the ducting 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).

To make proper ducting connections:

1. Starting at either end (the air-discharge grille or the air conditioning unit), pull back the fiberglass insulation exposing the inner mylar duct hose.
2. Slide the inner mylar duct hose around the mount ring until it bottoms out.

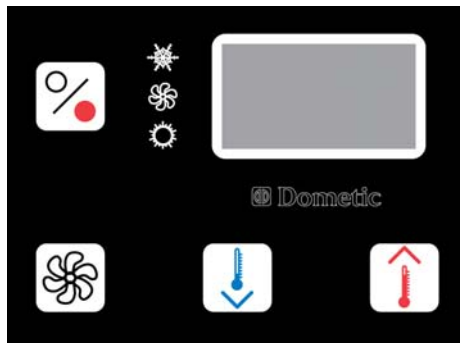
3. Screw 3 or 4 stainless-steel sheet-metal screws through the duct hose into the mount ring. Make sure to catch the wire in the duct hose with the heads of the screws. Do not use band clamps, as the hose will slide off.
4. Wrap duct tape around the ducting and ring joint to prevent any air leaks.
5. Pull the insulation back up over the mylar to the ring and tape this joint.
6. Run the ducting to the other end, keeping it as straight, smooth, and taut as possible. Minimize the number of 90-degree bends and dips that can reduce airflow.
7. Remove excess ducting before attaching the duct to the opposite end. Follow the procedure above to attach the duct as described in steps 1 through 5.

INSTALLING THE CONTROL PANEL

Mount the control panel on an inside wall, slightly higher than mid-height of the cabin, in a location with freely circulating air where it can best sense average temperature. Do not mount the control panel above or below the supply-air or return-air grille, in the supply-air stream, in direct sunlight, near any heat-producing appliances, or in a bulkhead where temperatures radiating from behind the panel may affect performance.

1. The control panel must be mounted within 15 feet (4.5m) of the electrical box.
2. Make the cut out for installation of the control. The cut out size for the digital control panel is **2.5" (64mm) wide by 1.88" (48mm) tall**. The actual dimensions of the control panel are 3.19"x 2.50"x 0.94" (81mm x 64mm x 24mm). See Figure 6: Digital Control Assembly below.
3. Use the supplied 8-conductor RJ-45 ribbon cable to make electrical connections according to the wiring diagram in Figure 7: Wiring Diagram for EnviroComfort Digital Control Panel, page 13.

Figure 6: Digital Control Assembly



ELECTRICAL CONNECTIONS, GROUNDING & BONDING

TERMINAL STRIP

All units have a five-position terminal strip mounted inside the electrical box. The terminal strip is labeled for proper connection of the electrical supply, ground wires, and pump circuits. Wiring diagrams are provided in the electrical box and in the "Wiring Diagram" section of this manual, starting on page 13. The correct size circuit breaker must be used to protect the system as specified on the air conditioning unit's data plate label.

Use a minimum of 12 AWG boat cable to supply power to the air conditioning unit and to the seawater pump (see "Circuit Breaker" on page 11). Connections should be made per ABYC electrical standards.

Make all connections to the terminal strip with ring terminals. Turn off the alternating-current (AC) power supply circuit breaker before opening the electrical box and accessing the terminal strip.

CIRCUIT BREAKER

Each air conditioning unit 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. For a wiring diagram, see Figure 7: Wiring Diagram for EnviroComfort Digital Control Panel, page 13.

Use a minimum of 12 AWG boat cable to extend the wires on the pump if necessary. Connections should be made per ABYC electrical standards.

If two or more air conditioning units use the same seawater pump, the pump wires will connect 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.

GROUNDING

The air conditioning unit must connect to the boat's bonding system to prevent corrosion due to stray electrical current. Ensure the AC ground of the air conditioning unit is properly connected to the AC ground of the boat.

Within the boat itself, ensure the AC ground bus is connected to the DC ground bus at exactly one place (no more, no less). 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 helps eliminate any possibility of corrosion due to stray current.



NOTE

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

ELECTRICAL ABYC STANDARDS

Field wiring must comply with ABYC 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 ABYC standards apply:

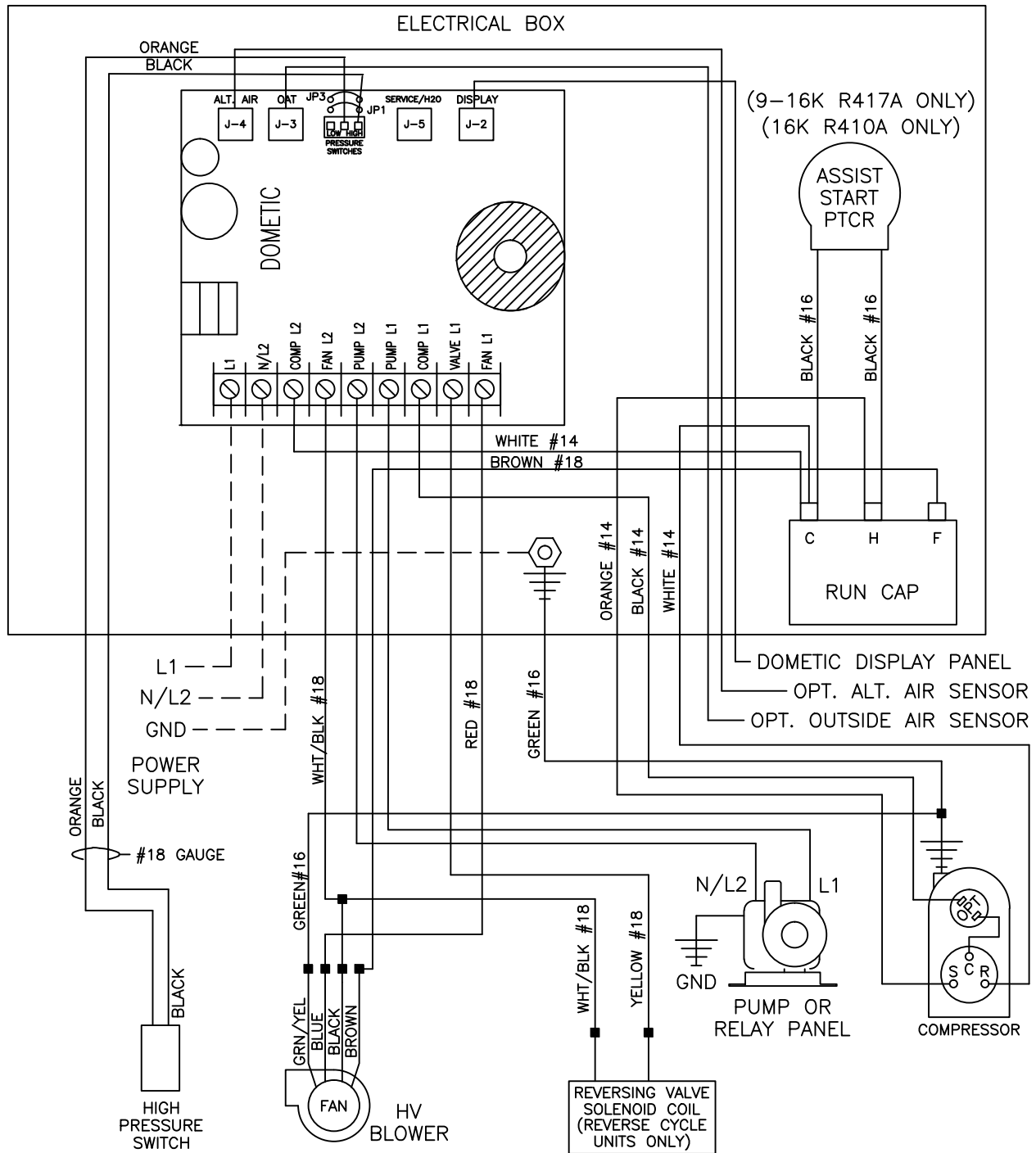
- Alternating current (AC) grounding (green) wire must be provided with the AC power conductors and connected to the ground terminal (marked "GRND") at the AC power input terminal block of the unit(s), per ABYC standard E-8.
- Connections between the vessel's AC system grounding conductor (green wire) and the vessel's Direct Current (DC) negative or bonding system should be made as part of the vessel's wiring, per ABYC standard E-9.
- 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 via:

Phone: (410) 990-4460
Fax: (410) 990-4466
URL: www.abycinc.org

WIRING DIAGRAM

Figure 7: Wiring Diagram for EnviroComfort Digital Control Panel



INSTALLING SEAWATER PUMP AND PLUMBING

Refer to Figure 1: Kit Installation Diagram, page 5 for an overview of the pump and plumbing installation, and refer to Figure 8: Seawater Pump & Plumbing Diagrams, page 15 for proper and improper installation techniques.

CIRCULATION PUMP

Mounting Requirements

Since the circulation pump is centrifugal and not self-priming, it must be mounted so it is always at least one foot (305mm) below the water line regardless of which tack the vessel is on.

The pump may be mounted horizontally or vertically, however the discharge must always be above the inlet. The pump head should be rotated toward the direction of water flow. See Figure 8: Seawater Pump & Plumbing Diagrams, page 15.



NOTE

In rare situations and under certain variable conditions of direction and speed, a boat moving very fast could trigger the pump to shut down due to the extra water flow coming through the speed scoop. Normal pump function will resume when the boat slows or stops. Or, if the condition was sustained, the pump might lock out and require a reset by turning the pump's power off then on again.

SEAWATER SPEED SCOOP

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 submerged so air does not get into the system when the boat heels over.

The speed scoop intake must face forward and not be shared with any other pump. See Table 1: Kit Installation Diagram, page 5.

SEAWATER STRAINER

A seawater strainer is mandatory between the shut off valve (seacock) and the pump to protect the pump from any foreign matter.



NOTE

Failure to install a seawater strainer will void the pump warranty and possibly damage the system.

PROCEDURE

Install the seawater system with an upward incline from the speed scoop and 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 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.

Secure all hose connections with two stainless-steel hose clamps per fitting as close together as possible by putting the screws of the two clamps on opposite sides. Use threaded-seal tape on all threaded connections.

For an installation overview, refer to Figure 1: Kit Installation Diagram, page 5. For more plumbing details, see Figure 8: Seawater Pump & Plumbing Diagrams, page 15.

Follow these steps to install the seawater system:

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 (305mm) below the waterline. (See Figure 8: Seawater Pump & Plumbing Diagrams, page 15 for correct pump-head orientation positions.)
5. Connect the seacock and strainer with an uphill run of 5/8" (16mm) 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" (16mm) reinforced marine-grade hose.
7. Connect the discharge from the condenser coil to the overboard discharge thru-hull fitting with 5/8" (16mm) reinforced marine-grade hose.

8. Avoid loops, high spots or the use of 90-degree elbows with seawater hose. Each 90-degree elbow is equivalent in pressure drop to 2.5 feet (76.2cm) of hose and a 90-degree elbow on the pump outlet is equivalent to 20 feet (609.6cm) of hose.
9. Double-clamp all hose connections with stainless-steel clamps, reversing the clamps.
10. Use threaded-seal tape (2 to 3 wraps only) on all threaded connections. Tighten one and a half turns beyond hand tight. Do not over-tighten!

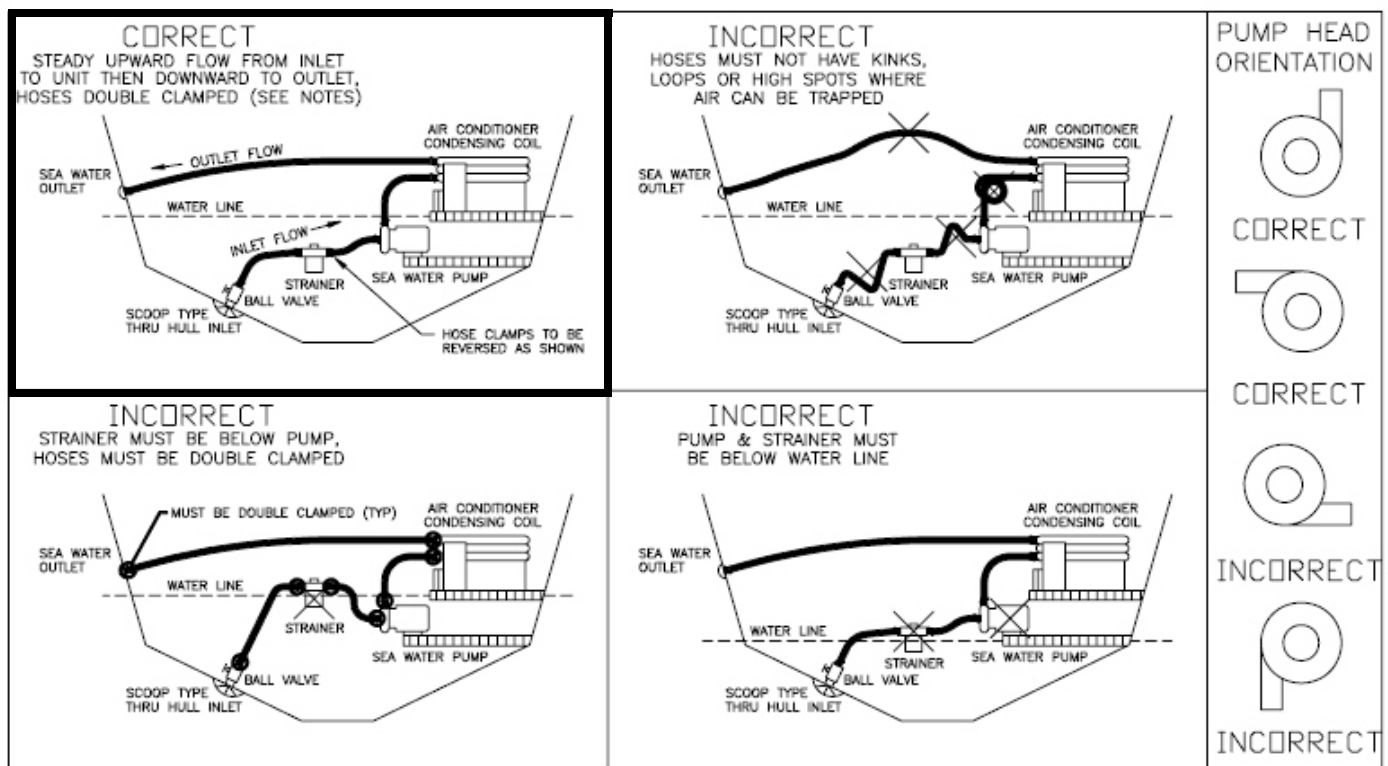


NOTE

Over-tightening can create eventual cracks within hours or days. Be sure to check for leaks before commissioning the boat. If you are unsure about this procedure, ask a qualified marine technician to avoid sinking your boat.

11. 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.

Figure 8: Seawater Pump & Plumbing Diagrams



NOTES:

- 1) THRU HULL INLET, BALL VALVE, HOSE AND STRAINER SHOULD BE SIZED NO SMALLER THAN PUMP INLET.
- 2) INSTALL THRU HULL FITTING AS FAR BELOW THE WATER LINE AS POSSIBLE.
- 3) PUMP NEEDS DEDICATED THRU HULL NOT SHARED WITH OTHER PUMPS.
- 4) AVOID OR MINIMIZE 90° ELBOW FITTINGS AS MUCH AS POSSIBLE, ROTATE PUMP HEAD TOWARDS DIRECTION OF WATER FLOW.

REVIEW THE INSTALLATION CHECKLIST

Return to "Installation Checklist" on page 3 and make sure you have completed all the steps.

OPERATION

OPERATION OF THE DIGITAL CONTROL PANEL

Refer to the separate *Dometic Digital Control Operations Manual* for full operating instructions.

INITIAL STARTUP

1. Ensure seawater intake ball valve (seacock) is open.
2. Make sure the control is powered OFF.
3. Turn on air conditioning unit circuit breaker. If the seawater pump has its own circuit breaker, turn that on too.
4. Press the Fan button. Verify that the fan is running and that there is steady airflow out of the supply-air grille.
5. Select a temperature set point lower than the current cabin temperature. This starts the compressor and seawater pump.
6. Check for a steady solid stream of seawater from the overboard discharge.



NOTE

Do not turn the digital control off and immediately turn it back on. Wait at least 30 seconds for system refrigerant pressures to balance, otherwise the breaker will trip.

OVERVIEW

Power On – Press the Power button once to engage the system. The display indicates room temperature when the system is on and is blank when the system is off.

Set Temperature – Press the Up or Down button to set the desired room temperature. The set point can be viewed by momentarily pressing and releasing the Up or Down button.

Fan Speed – Fan-speed operation is automatic, allowing fan speed to decrease as the set point temperature is approached in the Cool Mode. The fan operates at low speed when set point is satisfied. Use the Fan button to select manual fan speeds.

You can program the fan to run only when cooling or heating is required. Normally the automatic fan-speed operation is reversed in the Heating Mode, however, the fan can be programmed to operate the same as in the Cooling Mode.

Memory – The control's nonvolatile memory requires no batteries or backup power. When power is lost, the operating parameters are retained indefinitely. When power is restored, the control resumes operating as last programmed.

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 Dometic dealer.

Table 3: General Troubleshooting Guidelines

PROBLEM	POSSIBLE REASONS & SOLUTIONS
System will not start.	<ol style="list-style-type: none"> 1. Air conditioner circuit breaker is off. Turn circuit breaker on at ship's panel. 2. Wrong wiring at terminal strip. 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.
No cooling.	<ol style="list-style-type: none"> 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.

Table 3: General Troubleshooting Guidelines (continued)

PROBLEM	POSSIBLE REASONS & SOLUTIONS
Coil iced.	<ol style="list-style-type: none"> 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.
Short-cycling compressor.	<ol style="list-style-type: none"> 1. Supply air returning directly to return-air grille. Redirect supply air so that it is not directed into the return-air stream.
System runs continuously.	<ol style="list-style-type: none"> 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.
Pump not working.	<ol style="list-style-type: none"> 1. No water flow. Remove obstructions. 2. Pump is in run-dry protection mode. If water flow is available, wait for the pump's next restart sequence, or if locked out, disconnect then reconnect power.

MAINTENANCE

REVERSING VALVES

Units that both cool and heat have a reversing valve; the valve must be energized periodically to keep the internal parts moving freely. To do this, switch the air conditioner unit into heat for a few seconds once a month.

SEAWATER STRAINER

Ensure 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

A marine-growth-fouled coil reduces efficiency, raising total system pressure and decreasing its ability to produce cold air.

1. With the system turned off at the circuit breaker on the ship's panel, disconnect the inlet and outlet connections of the condenser coil.
2. Use chemical-resistant hoses (MAS white PVC 5/8" I.D., etc.) to connect the inlet of the condenser coil to the outlet of a chemical resistant, submersible pump (MAS P-500 pump, etc.) and let the hose connected to the coil outlet flow freely into the container mentioned below.
3. Place a strainer or piece of screen over the inlet of the pump and submerge the pump into a container filled with a 5% solution of muriatic or hydrochloric acid and fresh water or use a premixed over-the-counter solution. Use as large a container as possible to hold the solution (5-25 gallons [19-95 liters]).



CAUTION

Avoid spilling or splashing the solution. Follow all warnings and recommendations given by the manufacturer of any acids or premixed solutions.

4. Power the pump and circulate the solution through the condenser coil for 15-45 minutes depending upon the size of the coils and the extent of the contamination. Visual inspection of the solution in the container should indicate when the contamination removal has stopped.
5. Circulate fresh water through the coil to flush any residual acid from the system.
6. Restart the system and check operational parameters to ensure thorough cleaning has taken place. Additional cleaning may be necessary with extreme contamination.



WARNING

For the purpose of protecting the environment, dispose of any contaminated acid solutions in accordance with federal, state and/or local regulations.

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 (if unit installed) or from the filter (if filter installed), rinse with water, air dry and reinstall.

If your kit is supplied with a filtered return-air grille, the filter attached to the unit's evaporator **must be removed**. Two filters are **not** better than one, as the reduced air flow will decrease performance and possibly freeze the evaporator coil.

WINTERIZATION

There are several methods of winterization, some of which work better than others. Any method that causes the antifreeze solution to flow downward is the method of choice. By this means, the antifreeze solution displaces any trapped water and eliminates the possibility of it freezing in hidden areas.

Choose the method that works best for you. In the following four methods, the first two use a 50/50 nonpolluting biodegradable antifreeze/water solution:

- Pump antifreeze solution into the overboard thru-hull fitting, and discharge through the intake thru-hull fitting.
- Use the seawater pump to pump antifreeze solution through the system and discharge through the overboard thru-hull fitting: Close sea cock, remove hose from strainer discharge, raise hose above pump (so pump does not lose its prime) and pour in antifreeze solution. Pump solution through system. The strainer and hose to sea cock need to be drained of water.
- Use pressurized air injected at the overboard discharge fitting to force system water through the seawater intake fitting, thus expelling any trapped water from the system.
- Use pressurized air injected at the seawater intake fitting to force system water through the seawater overboard discharge fitting, thus expelling any trapped water from the system.

In addition, since the seawater pump utilizes a magnetically driven impeller, remove the impeller from the wet-end assembly, wipe with an alcohol solution, and store in a warm, dry area until commissioning takes place.



NOTE

Collect all discharged liquids and recycle or dispose of in a proper manner in accordance with federal, state and/or local regulations.

OWNERS LIMITED WARRANTY

As hereinafter described, Dometic 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'S COVERED

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. This being 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 limits defined in **Section III**. 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 the 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 or 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 Dealer is not an agent for Dometic, except for the purpose of administering the above warranty to the extent herein provided. 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. Dometic can make changes at any time in design, materials, or part of units of any one, model year, 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'S NOT COVERED

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 a 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. Labor resulting from difficult access to a Dometic product. The original installer or OEM is responsible for accessibility of unit.
8. Leaks due to improper installation of split systems and refrigeration systems, for example; packing glands, flare nuts, quick disconnects. The adjustment of the refrigerant charge on a split system should be charged to the original installer or OEM.
9. Freight Damage (see page 10 for instructions for handling freight damage).
10. Pumps that have been run dry, are water damaged or have blown freeze plugs.
11. Pumps with cracked heads.
12. Pump seals are not covered.
13. UV light bulbs are not covered.
14. Liquid line filter dryers are not covered.
15. Blowers with water damage.
16. Logic boards with water damage.
17. Logic boards with blown MOV's (Power Surge)
18. Mis-programmed displays.
19. Display heads with water damage.
20. Dirty Condensers and/or Evaporators.
21. Failures due to improper winterization.
22. Unit damage as a result of improper return packaging.
23. Replacement of freon with substitute without authorization from factory.
24. Environmental and/or Recovery Fees.
25. Welding and Nitrogen Fees.
26. Travel costs are included in the hourly labor allowances and should not be billed as a separate item without preapproval from the factory.

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 - COVERAGE PERIOD

What is the period of coverage?

(See **Limited Warranty Periods** at the end of this book).

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 to obtain the manufacture date. The hours of the Customer Service Department are 8:00 a.m. - 5:00 p.m. (USA, Eastern Standard 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 as 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 - GETTING SERVICE

How do you get service?

Please read the following 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 needs to call Dometic Customer 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. Second option: If the customer contacts Dometic 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. Third option: 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 first, option two second, and option three only if one and two are not available.

The customer may contact the Dometic Service Department at (954) 973-2477 Monday through Friday, 8:00am - 5:00pm Eastern Time.

After hours (evenings and weekends) technical support is offered through Dometic's 24/7 Hotline at (888) 440-4494.

TABLE OF WARRANTY PERIODS

DOMETIC AIR CONDITIONING		
Important Notes:		
<ol style="list-style-type: none"> 1. Warranty periods begin from the date of possession of the boat by the first owner if OEM installed or date of installation if dealer installed, but not to exceed three (3) years from date of production. The warranty is transferable and will carry the remainder of the original owner's warranty based on the original date of purchase or date of installation. 2. Proof of purchase or installation may be required to verify warranty coverage. 3. Any unit or replacement part installed due to a warranty failure carries the remainder of the original warranty. Warranty coverage does not start over from the repair/replacement date. 4. Warranty coverage shall not exceed three (3) years from the date of production. 5. These warranty periods are effective March 1, 2010. 		
DOMETIC - Direct Expansion, Self-Contained and Split-Systems		
Product	Sale Type	Warranty Coverage
ECD	Catalog Sales	Parts: 1 year from date of purchase of unit. Labor: 6 months from date of purchase of unit. Not to exceed three (3) years from the date of manufacture.
	OEM or Dealer Installed	1-Year Warranty, parts and labor. Not to exceed three (3) years from date of manufacture.
DOMETIC - Air Conditioning Accessories		
Product	Sale Type	Warranty Coverage
In-Duct Breathe Easy Air Purifiers	Aftermarket sales	1-Year warranty, parts only UV bulb is not covered under warranty.
SmartStart Control	Aftermarket sales	1-Year warranty, parts only

