



Truck HVAC Systems with Qt Control For Split and Self-Contained Systems

INSTALLATION & OPERATIONS MANUAL

For Battery, Shore Power & APU Systems



Dometic Truck Division
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IMPORTANT NOTICES

STOP! READ THESE NOTICES AND WARNINGS BEFORE YOU PROCEED ANY FURTHER!

WARNING

Dometic Corporation (Dometic) manufacturer of Dometic Auxiliary Air Conditioning Systems, and Dometic Refrigerators and Freezers, 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 440VAC 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.

GAS - Dometic Air Conditioning and Refrigeration components utilize R-22 (Chlorodifluoromethane), R-134A refrigerant (Tetrafluoroethane), R-407C (which contains Difluoromethane [HFC-32], Pentafluoroethane [HFC-125], and 1.1.1.2 - Tetrafluoroethane [HFC-134A]), R-404A (R-125/R-143A/R-134 [44%/52%/4%]), or R-417A, 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, Dometic Air Conditioning and Refrigeration 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. If condensate is allowed to drip on a steel 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 in a vehicle when any equipment, which functions as a result of the combustion of a volatile fuel, is in operation (such as engines, generators, power plants, or oil-fired heaters, etc.). At any time, the exhaust system of such devices could fail, resulting in a build-up of LETHAL gases within the closed area.

Warning Revised: 6-5-06

SAFETY

This manual contains essential information concerning the safe and proper installation and operation of your air conditioning system. Read and follow all safety instructions in the manual and on the unit to reduce the risk of accident, injury or death. If there are any statements or procedures that you do not understand, contact your dealer.

ADDITIONAL DOCUMENTATION AVAILABLE

This manual contains basic instructions for installing and commissioning the system. Supplementary guidelines for installing the components and air distribution kits in specific truck models are also available. Check www.dometictruck.com and download the appropriate manuals before you start.

FOR APU-POWERED SYSTEMS

Generator installation and operating instructions will be provided by your APU system supplier.

FOR DOMETIC BATTERY-POWERED SYSTEMS

A separate manual covers installation of the batteries, inverter, alternator and other components. If you do not have that manual, you can download it from www.dometictruck.com.

ELECTRICAL REQUIREMENTS

VOLTAGE AND FREQUENCY

This air conditioning system must operate within the following requirements. If these conditions are not met, the system may not function properly and the warranty will not cover any damage caused by improper voltage or frequency.

Voltage	
Recommended: 115V - Lowest voltage allowed: 102V - Highest voltage allowed: 130V	Recommended: 230V - Lowest voltage allowed: 202V - Highest voltage allowed: 246V
Frequency	
Recommended: 60Hz - Lowest frequency allowed: 56Hz - Highest frequency allowed: 64Hz	Recommended: 50Hz - Lowest frequency allowed: 46Hz - Highest frequency allowed: 54Hz

BATTERY-POWERED

If your system is battery-powered, it is vitally important that it uses an inverter that has been tested and approved by Dometic engineering. Off-the-shelf inverters are usually built for operation of light appliances, such as a TV, microwave oven, refrigerator or computer. They are not designed to handle the heavy loads of an air conditioner for extended periods of time. Using a non-approved inverter may damage the air conditioning system and may void your warranty.



NOTE

VOLTAGE DROP - LOW VOLTAGE - BATTERY-BASED SYSTEMS - IMPORTANT !!

The voltage drop between the charging source and the battery farthest from the charging source must be .2V or less. If the voltage drop is more than this then charging will not be effective. This will result in lesser runtime than would be typical given the number, age, type and condition of the batteries.

Information on measuring and correcting voltage can be found on the Dometic website at www.dometictruck.com or at www.dometic.com/truck.

GENERATOR

If your system is powered by a diesel generator (genset), please note that although generators are set at the factory to conform to our Voltage and Frequency guidelines above, conditions can change the generator settings in the field. The generator may not conform to our requirements even though it is new and recently installed. Part of the responsibility of the generator installer and part of regular maintenance is to check that the generator conforms to the guidelines above while running the air conditioner in the cooling mode. In other words, with the air conditioning system on and the compressor running, the genset must be operating within the range of values above. Failure to have the generator running in this range will cause damage to tubing and to the unit, and the warranty may be voided.

SHOREPOWER

Shorepower connection should provide power within the same Voltage and Frequency guidelines above. A power cord that is too long and/or has a too small wire (gauge) could cause a voltage drop at the unit which would affect performance, could cause damage, may be a fire hazard, and may void the warranty.

Wire gauge requirements are as follows:

- 25' cable: 12 gauge
- 50' cable: 10 gauge
- 14' gauge is **not** recommended

ILLEGAL DISCHARGE OF REFRIGERANT

U.S. federal law prohibits the intentional release of refrigerant gases into the environment, including R-22, R-134A, R-410A, R-407C, and R-417A. Special care must be taken when installing, charging and servicing this equipment to prevent any loss of refrigerant. Only EPA-certified technicians with the proper equipment should perform service on the refrigerant circuit.

MOISTURE

Dometic will not be held responsible for damage caused by condensation of moisture on surfaces within the compartment. When humid outside air enters a cooled space, the moisture can condense on cool surfaces such as windows, walls or metal objects. Normal operation of the air conditioner removes moisture from the air, and you can help reduce secondary condensation by keeping openings to the outside closed.

INTRODUCTION

PRINCIPLES OF AIR CONDITIONING

The basic principle of an air conditioner is the transfer of heat from one place to another – in this case from inside your vehicle to the outside. This is accomplished by absorbing heat from the inside air into a refrigerant gas flowing through an evaporator coil. The refrigerant is then pumped to a condenser, where the heat is released to the outside air. The refrigerant, a chemical with a low evaporation temperature, flows around a closed loop, driven and pressurized by a compressor. As a part of the cooling process, the air conditioner also removes moisture from the inside air, which makes the area feel more comfortable and keeps the compartment dry and mildew-free.

ENGINE-OFF AIR CONDITIONING FOR TRUCKS

This Dometic air conditioning system runs on 115VAC power, which can be supplied by an onboard diesel genset, from a shorepower connection when an external AC power source is available, or from the truck's batteries using an inverter to invert the 12V battery output into usable 115VAC power.

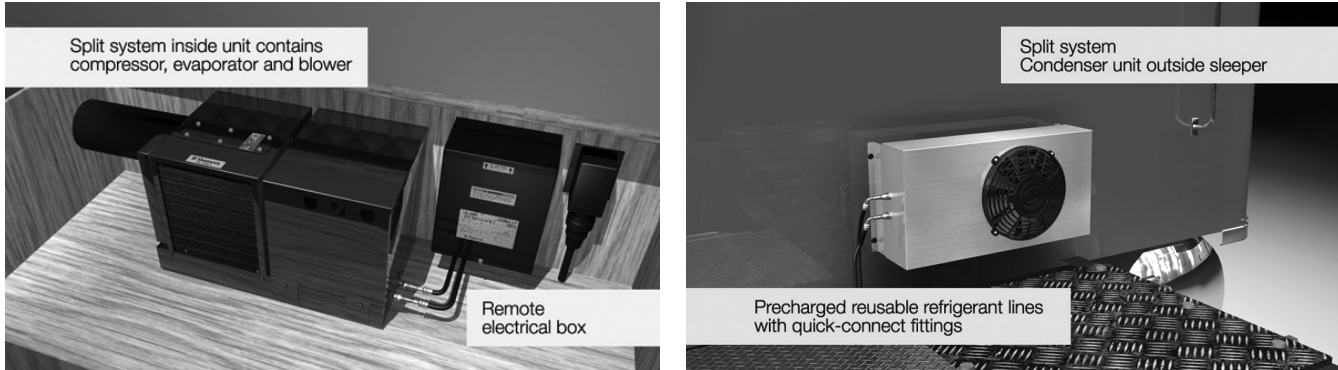
There are two basic types of auxiliary air systems:

- Split systems
- Self-contained "package" systems

SPLIT SYSTEMS

Dometic's patented split systems consist of two separate modules (Figure 1). The outside unit contains the condenser and cooling fan. It can be bolted to the sleeper either horizontally to the underside or vertically to the back. Dometic prefers mounting to the back of the sleeper. Hot air can be trapped under the sleeper, making the condenser less efficient.

The inside components contain the compressor, evaporator, blower, Power Logic Box (PLB) and other associated components. The inside unit is mounted under a bunk or seat or in a side storage locker. The two units are connected by reusable, precharged, quick-connect refrigerant linesets. The system is designed so that both units automatically charge to the correct refrigerant pressure as soon as the linesets are connected. No special tools are required.

Figure 1: Split system - inside unit (left) and Outside unit (right)

SELF-CONTAINED SYSTEMS

The self-contained unit (Figure 2) is designed to be wholly mounted inside the truck, usually under a berth or seat or inside a side storage locker.

All air conditioning components, including the compressor, condenser, evaporator, blower and power supply, are mounted on a single low-profile chassis with an aluminum sound shield. The system's closed refrigerant loop is precharged and sealed at the factory.

Hot inside air is pulled across the evaporator coil to cool, then the cooled air is blown back into the living area through a flexible duct and supply-air grille. Hot air is discharged from the condenser through cutouts in the floorboard.

Figure 2: Self-contained unit under a bunk

INSTALLATION

READ THIS MANUAL BEFORE PROCEEDING

Read this manual completely before you proceed with the installation. If you have questions or require assistance with installation of your A/C system and Qt control, contact the Dometic Truck Service Department at +1 804-746-1313.

The A/C system and Qt control are covered under existing Dometic Truck Warranty Policy. Incorrect installation, neglect and system abuse are not covered under the warranty policy.

BEFORE YOU START

1. Read installation and operating instructions carefully before attempting to install and operate your air conditioning unit.
2. The manufacturer will not be liable for any damages, injury or death incurred due to failure to follow the instructions.
3. Installations must always comply with the National Electrical Code, SAE and any state/local codes or regulations.
4. Only a qualified service technician may service this unit. Any attempt to service the unit otherwise may void the warranty.
5. Make sure that you have the required parts and tools to complete the job, as this will help keep the installation time to a minimum.

WARNINGS



WARNING

Improper installation could damage equipment, endanger life, cause serious injury or property damage.

If you have any doubts that you can complete this installation safely and as the directions state, find a qualified technician to do it for you.



WARNING

Make sure that power is turned off at the source before making any connections. Failure to do so could cause injury or death.

INSTALLING A SPLIT AIR CONDITIONING SYSTEM

DESCRIPTION OF COMPONENTS

Split systems, also called split-gas or remote systems, have the air conditioning components mounted on two separate chassis that are installed in different locations and connected by flexible or copper refrigerant tubing.

The Condenser/Fan (CF) consists of the air-cooled condenser, fan and electrical components (Figure 3). It is mounted outside the truck, either horizontally under the sleeper or vertically on the back wall of the sleeper.

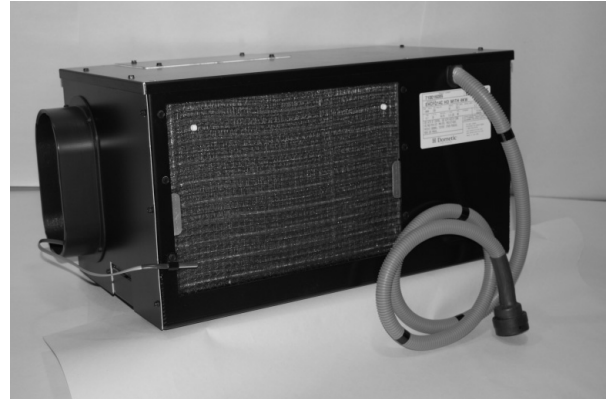
The Compressor, Heater, Evaporator and Blower (CHEB) is mounted on a chassis with a built-in condensate drain pan (Figure 4). The CHEB is mounted under the bunk or in one of the storage lockers on either side.

Other components of the system are air ducts, grilles, thermostat controls and Power Logic Box.

Figure 3: Condenser/Fan (CF) mounts outside



Figure 4: Compressor, Heater, Evaporator, Blower (CHEB) mounts inside



REQUIRED TOOLS

- Reciprocating saw
- Drill motor
- Hole saws: 1-5/8", 1-7/8", 2-1/2", 4", 4-1/2"
- Drill bits: 1/8", 5/32", 9/32"
- Nut drivers: 1/4", 3/8", 5/16"
- Phillips head screwdriver
- Open-end wrenches: (2) 7/16", (1 each) 15/16", 13/16", 3/4"
- Torque wrench may also be required

GETTING STARTED

1. Get started by unpacking all of the parts in the kit. Familiarize yourself with the parts that are included, their stated use and read this installation manual. Pick out and separate the parts that will go inside and outside of the truck.
2. Check the www.dometictruck.com website and download any supplemental manuals for your specific truck model.
3. If you are installing a battery-powered HVAC, you should have a separate manual for the battery-powered components.

Do not attempt to complete this installation unless you have all required manuals.

SELECTING LOCATION FOR SYSTEM COMPONENTS

CHEB

Air from the sleeper compartment is drawn into the CHEB through a return-air grille. The air is cooled or warmed and blown back into the compartment through a ducting system. An air filter is located on the cooling unit and must be cleaned regularly.

Air flow from this return-air grille to the CHEB must never be impeded.

The ideal location for the CHEB is under the sleeper bunk. Alternatively, if there is no space under the bunk, or the area is inaccessible, you can install it in one of the storage compartments (Figure 5). The passenger's side storage compartment is preferred over the driver's side. When placed under the bunk, the unit should be oriented so that there is an unobstructed flow of air from the return-air grille to the evaporator coil. The evaporator intake must have a minimum open area equal to the size of the coil face.

Ensure that the CHEB is placed so that all electrical wiring connections and refrigerant ports are easily accessible for future maintenance.

Figure 5: CHEB under bunk (left) or in storage locker (right)**Condenser/Fan Unit**

The CF unit may be installed either under or behind the cab or sleeper (Figure 6). **The preferred location is at the back of the cab.**

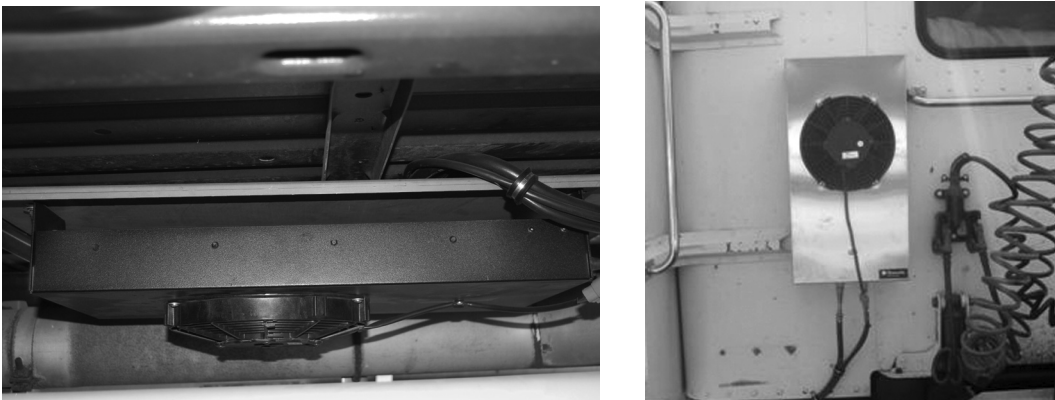
Under: If you plan to install the CF unit under the cab or sleeper (not the preferred location):

- The generator exhaust should be routed away from the CF unit as the unit needs to have the coolest air possible.
- On a truck that has full fairings, and the generator is installed under the fairings, it is recommended that the CF unit be mounted on the rear of the truck.

Behind: If the CF unit is mounted on the back of the sleeper, care, again, must be taken to ensure air flow. A headache rack can obstruct air flow, as well as other components.

**NOTE**

For rear-cab mounting, order Part 710035048, which contains the proper blind-threaded fasteners.

Figure 6: CF under the sleeper (left) or behind the sleeper (right)**Air Grilles**

The return-air grille should be placed in a location where there will be unobstructed flow across the unit's evaporator coil. Note that you should never stow pillows, blankets or other items in the space between the grille and the air conditioning unit. Blocked air flow will diminish system performance and may cause damage to the air conditioning components.

Discharge air should be ducted to one or more grilles in the space to be cooled. The optimum location for the grilles would be at the head or foot of the bunk to maximize cooling effect when sleeping. Dometic offers a variety of plenums for splitting the air flow to multiple discharge grilles.

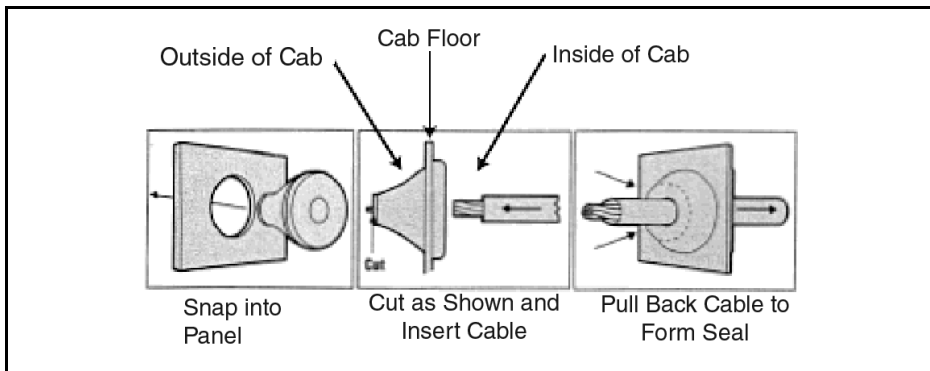
Control Panel

Mount the control panel on a wall where the driver will have easy access. The interconnect cable (CXP) from the panel will be routed through the wall or cabinet and then into the luggage compartment or under the bunk to the unit.

INSTALLATION STEPS FOR SPLIT SYSTEM

1. Remove the floor mat, if possible. Tape the template onto the floor in the location where you plan to mount the unit. Use the template to mark locations for holes to be cut in the floor. **Before cutting holes, check for obstructions, structural members, hydraulic lines, air or electric lines under the sleeper floor.**
2. Use the template provided to cut necessary holes. If there is a rubber floor mat, make sure to cut holes in it to match the holes cut into the cab floor. Use the 2-1/2" hole saw to cut through the floor mat and the 1-7/8" hole saw to cut through the metal floor.
3. Install snap-in grommets into the two large holes in the floor (first panel of Figure 7).

Figure 7: Snap-in grommets and cable insertion



NOTE: SPECIAL GUIDELINES FOR SPECIFIC TRUCK MODELS

Dometic has developed different installation kits and guidelines for various specific truck models. Before going any further, check www.dometictruck.com and see if there is a specific set of printed guidelines for your truck.

4. Determine the best locations for vent holes for the return-air and supply-air grilles.

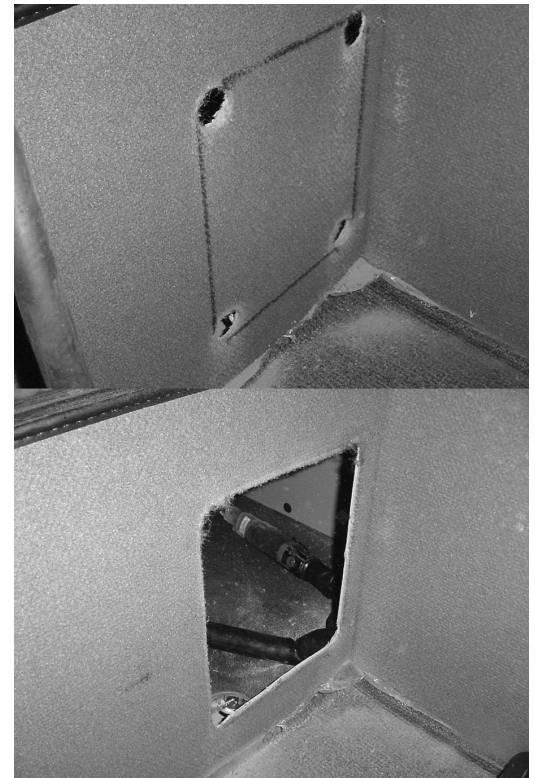
Where to Place Grilles: The return-air grille should be mounted under the bunk, as near as possible to the air conditioning unit. Take extra care to ensure there is an unobstructed flow of air from the vent to the evaporator coil.

If the air conditioning unit is mounted in the storage compartment, mount the return-air vent as close as possible at that end of the bunk. You will need to drill at least four large 4-1/2" holes in the wall between the under-bunk area and storage compartment to allow air to pass through to the evaporator.

Return-Air Grilles: Your package may contain either one large return-air grille with a mounting frame, or two or three smaller 12.5" x 5.5" surface-mount grilles. We suggest using a hole saw and reciprocating saw to cut out the hole for the large grille (Figure 8). If your package contains the two or three smaller rectangular grilles, use a 4-1/2" hole saw to cut at least two holes behind each grille, or use a reciprocating saw to cut holes matching the grille dimensions.

Supply-Air Grilles: Depending on the capacity of your system, your package may have two or three supply-air grilles supplied. You must use all grilles included with the kit to get rated air flow out of the system. The 4" round grilles may be located wherever you choose. Since hot air rises and cool air falls, it is recommended that at least one vent be installed high in the sleeper. It is also suggested that one supply vent is placed so that it blows air directly into the bunk for optimum comfort when sleeping.

Figure 8: Cutting vent holes for grilles



5. Cut vent holes as described above for return-air grille(s). **Before drilling, make sure there is nothing behind the location, such as electric wires or cables.**
6. Attach return-air grille frame(s) with four #8 x 3/4" sheet metal screws.
7. Insert return-air grille into frame with vanes pointing down.
8. Use a 4" hole saw to cut holes for supply vents. **Before drilling, make sure there is nothing behind the location, such as electric wires or cables.**
9. Insert the round plastic grilles into the holes with vanes pointing upward, and attach with sheet-metal screws.
10. Carefully lower the compressor end of the CHEB into position first. Ensure that the drain hole in the CHEB is over the 1-5/8" hole in the cab floor.
11. Mount the CHEB to the cab floor using the galvanized steel clips and 1/4" x 1-1/4" bolts, washers and nuts provided (Figure 9).
12. Route refrigerant lines and the condenser fan power cable from the power logic box (PLB) through the two larger grommets. Take care not to crimp or overbend the lines.
13. Determine where to mount the CF unit outside the truck:

Figure 9: Mounting clip**NOTE**

The CF unit may be mounted underneath the sleeper (mounted to the sleeper, not the frame) or it may be mounted to the rear of the sleeper. If you mount a generator under a sleeper that has fairings or you mount a generator radiator under a sleeper that has fairings, you may NOT put the CF unit under the sleeper.

**NOTE**

Some kits come supplied with a quick-mount bracket. Refer to that truck's specific manual for installation instructions.

Figure 10: Refrigerant lineset quick-connect fittings

- **If installing the CF under the truck:** Tape the template to the underside of the truck between the cab support structures. Realize that the lowest point of the CF unit must not hit frame structures, as the cab moves independently from the frame. You may want to completely discharge the air bags to confirm you have a suitable area for placement. Drill holes as instructed by the CF unit template. Re-inflate the cab air bags and raise the cab to its highest safe position. Under the truck, take the CF unit with the quick-connect fittings facing toward the large holes you cut for the CHEB (Figure 10). Position mounting legs over the holes you drilled, and use one 1/4" bolt and one 1/4" fender washer to push down through each hole. Secure on bottom with a 1/4" washer and a lock nut. Tighten with 7/16" wrenches.

**Figure 11: P-trap installed**

- **If installing the CF on the rear of the sleeper:** The CF unit can be mounted horizontally or vertically. If you mount it in vertical orientation, the refrigerant connections (Figure 10) should be at the bottom. Make sure you have the appropriate mounting bracket. (If not, order Part 710035048, which contains the proper blind-threaded fasteners.) Use the template to drill holes. Attach with bolts, washers and lock nuts.
14. Connect refrigerant linesets to CHEB and tighten by hand first, then use 15/16", 13/16" and 3/4" open-end wrenches. Torque to 10-12 ft. lbs. Do not over tighten. The CF power cable (small black cable with grey plug) should also be routed through one of the grommets.

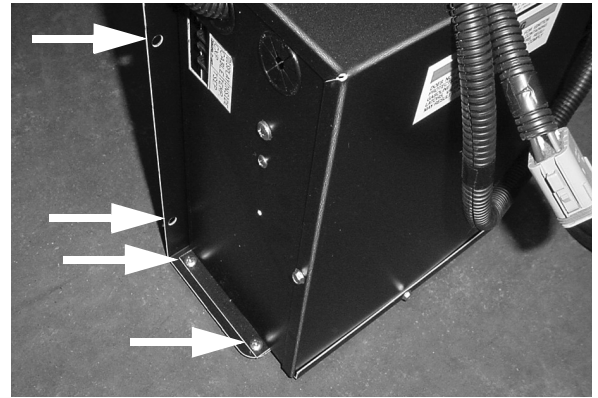


15. Route the refrigerant lines to the CF unit and connect. Tighten by hand first, then use 15/16", 13/16" and 3/4" open-end wrenches. Torque to 10-12 ft. lbs. Do not over tighten. Correct torque is very important.

**CAUTION**

When connecting the linesets, a "hissing" sound may occur if the fittings are not exactly aligned. Do not stop the tightening process! Continue tightening and the hissing will stop. There is no danger to the installer.

16. Attach the threaded plastic drain hose fitting into the drain hole on the unit. Then attach the P-trap hose to the fitting and secure with a small hose clamp (Figure 11). **It is very important that you use the P-trap to create a water seal to prevent hazardous or deadly fumes from entering the sleeper.**
17. Mount the Power Logic Box (PLB) in a suitable location within 4 feet of the CHEB unit. The PLB has an attached mounting plate that allows for mounting to a vertical surface. If you want to mount the PLB to the floor or other horizontal surface, first remove the mounting plate (Figure 12). Secure with four #8 x 1/2" screws.
18. Plug the wiring harness into the plug on the PLB.
19. Connect the temperature-sensor wire (TSEP) (it looks like a phone cable) from the front of the CHEB to the electrical box on the left-hand side in the slot marked TEMP.

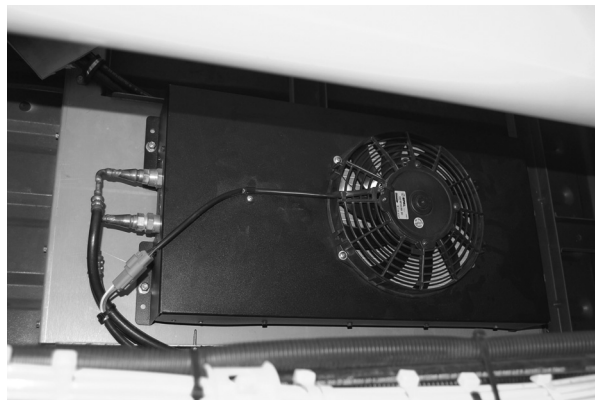
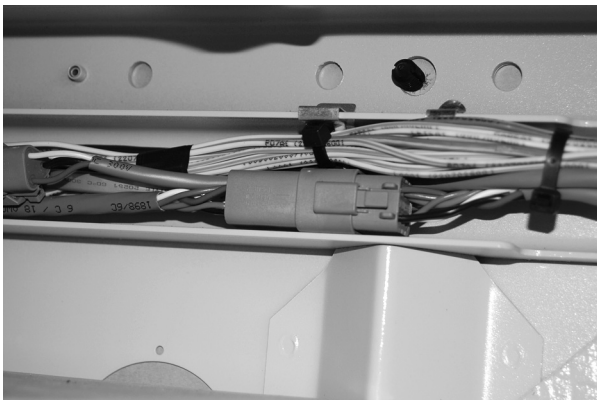
Figure 12: Mounting locations on PLB**WARNING**

Make sure all power is off before opening any electrical box.

**WARNING**

The CXP and TSEP transmit low-voltage DC signals and outside interference can affect their operation. Do not route these cables beside HVAC power cables, high voltage wiring or antenna wires. Keep the cable runs as short as possible to reduce the chance of interference.

20. Connect power cable to the power distribution box.
21. Connect the condenser fan power cable.
22. Using the supplied single-hole clamps, securely fasten the refrigerant lines and power cable for the CF unit to the truck. Secure the clamps with two #8 x 1/2" screws. Both hoses and the wire are contained within each clamp. Make sure that hoses will not rub anything. If needed, use cable ties to secure any extra hose to itself. Always use horizontal loops, never vertical loops.

Figure 13: Secured hoses & wiring inside truck (left) and under truck (right)

23. Mount the Qt Control panel in a convenient location (Figure 14). Drill a hole for the CXP cable to feed through. Mount the backing plate centered over the hole. Run the cable through the hole and plug it into the control panel. Snap the panel onto the backing plate, being careful not to crimp the cable.

24. Run the CXP cable to the PLB and plug into the socket marked Display.
25. Run flexible duct between adapters on CHEB and supply air grilles. Use only as much duct as needed. Make sure ducts do not crimp. Avoid sharp bends. Attach at each end with a large hose clamp.

The installation of the split system is now complete (Figure 1, page 4).
Proceed to “SYSTEM OPERATION WITH THE Qt CONTROL” on page 13.

Figure 14: Qt control panel installed



INSTALLING A SELF-CONTAINED A/C SYSTEM

DESCRIPTION OF COMPONENTS

The self-contained air conditioning unit includes the compressor, condenser, evaporator, blower and electrical power supply, on a single chassis with a built-in condensate drain pan and sheet metal cover. Other components of the system are air ducts, grilles and thermostat controls.

REQUIRED TOOLS

- Reciprocating saw
- Drill motor
- Hole saws: 1-5/8", 4", 4-1/2"
- Drill bits: 1/8", 5/32", 9/32"
- Nut drivers: 1/4", 3/8", 5/16"
- Phillips head screwdriver

GETTING STARTED

1. Get started by unpacking all of the parts in the kit. Familiarize yourself with the parts that are included, their stated use and read this installation manual.
2. Check the www.dometictruck.com website and download any supplemental manuals for your specific truck model.
3. If you are installing a battery-powered HVAC, you should have a separate manual for the battery-powered components.

Do not attempt to complete this installation unless you have all required manuals.

SELECTING LOCATION FOR SYSTEM COMPONENTS

The self-contained air conditioning system (Figure 15) pulls warm air from the sleeper compartment through a return-air grille and across the unit's evaporator coil, where it releases heat to the refrigerant flowing through a closed loop. Warm air is blown from the unit's condenser through a cutout in the floor.

The ideal location for the self-contained air conditioning unit is under the sleeper bunk. Alternatively, if there is no space under the bunk or the area is inaccessible, you can install it in one of the storage compartments. The passenger's side storage compartment is preferable to the driver's side.

When placed under the bunk, the unit should be oriented with its long dimension running lengthwise of the sleeper so that the evaporator intake is close to the bunk bulkhead. The evaporator intake must have a minimum open area equal to the size of the coil face.

Figure 15: Self-Contained Unit



Table 1: Recommended Duct & Minimum Grille Sizes

BTU/hr	7,000	10,000	14,000	15,000
Duct Size (in/mm)	5/127	5/127	7/178	7/178
Supply-Air Grille (sq in/cm)	50/325	60/390	80/520	80/520
Return-Air Grille (sq in/cm)	80/520	100/650	144/936	144/936

Ensure that the unit is placed so that all electrical wiring connections and refrigerant ports are easily accessible for future maintenance.

The return-air grille should be placed in a location where there will be unobstructed flow across the unit's evaporator coil. Note that you should never stow pillows, blankets or other items in the space between the grille and the air conditioning unit. Blocked air flow will diminish system performance and may cause damage to the air conditioning components.

Discharged air should be ducted to one or more grilles in the space to be cooled. The optimum location for the supply-air grilles would be at the head or foot of the bunk, to maximize cooling effect when sleeping. Dometic offers a variety of plenums for splitting the air flow to multiple supply-air grilles.

Mount the Qt Control/Display panel (Figure 14 on page 10) on a wall where the driver will have easy access. The interconnect cable (CXP) from the panel will be routed through the wall or cabinet and then into the luggage compartment or under the bunk to the unit.

INSTALLATION STEPS FOR SELF-CONTAINED SYSTEM

1. Tape the template on the floor in the location where you plan to mount the unit. Use the template to mark locations for holes to be cut in the floor. **Before cutting holes, check for obstructions, structural members, hydraulic and air lines or electric lines under the sleeper floor.**
2. When cutting the condenser inlet and outlet holes, use a hole saw to drill holes in all four corners, then use a reciprocating saw to cut the lines between holes.
3. Use the weather stripping provided and make a frame around the holes to create a tight seal when the air conditioning unit is mounted over them. **This will prevent engine exhaust or other potentially poisonous fumes from being drawn into the sleeper.**
4. Use the sheet-metal scoop and the #8 self-drilling screws to attach the scoop to the bottom of the truck. Affix the scoop over the discharge-air hole and **direct it away from** the return-air hold.
5. Use a 1 5/8" drill bit to cut the condensate drain hole.
6. Determine the best locations for vent holes for the return-air and supply-air grilles.

Where to Place Grilles: The return-air grille should be mounted under the bunk, as near as possible to the air conditioning unit. Take extra care to ensure there is an unobstructed flow of air from the vent to the evaporator coil.

If the air conditioning unit is mounted in the storage compartment, mount the return-air vent as close as possible at that end of the bunk. You will need to drill at least four large 4-1/2" holes in the wall between the under-bunk area and storage compartment to allow air to pass through to the evaporator.

Return-Air Grilles: Your package may contain either one large return-air grille with a mounting frame, or two or three smaller 12.5" x 5.5" surface-mount grilles. We suggest using a hole saw and reciprocating saw to cut out the hole for the large grille (Figure 16). If your package contains the two or three smaller rectangular grilles, use a 4-1/2" hole saw to cut at least two holes behind each grille, or use a reciprocating saw to cut holes matching the grille dimensions.

Supply-Air Grilles: Depending on the capacity of your system, your package may have two or three supply-air grilles supplied. You must use all grilles included with the kit to get rated air flow out of the system. The 4" round grilles may be located wherever you choose. Since hot air rises and cool air falls, it is recommended that at least one vent be installed high in the sleeper. It is also suggested that one supply vent is placed so that it blows air into the bunk for optimum comfort when sleeping.

Figure 16: Cutting vent holes for grilles

7. Cut vent holes as described above for return-air grille(s). **Before drilling, make sure there is nothing behind the location, such as electric wires or cables.**
8. Attach return-air grille frame(s) with four #8 x 3/4" sheet metal screws.
9. Insert return-air grille into frame with vanes pointing down.
10. Use a hole saw to cut holes for supply vents. **Before drilling, make sure there is nothing behind the location, such as electric wires or cables.**
11. Insert the round plastic grilles into the holes with vanes pointing upward, and attach with sheet-metal screws.
12. Carefully lower the A/C unit into place, ensuring that all holes line up correctly. Take care not to crush or break the drain fitting while moving the unit around.
13. Mount the unit to the floor using the 1/4" bolts, washers and nuts.
14. Attach the threaded plastic drain hose fitting into the drain hole on the unit. Then attach the P-trap hose to the fitting and secure with a small hose clamp (Figure 17).
It is very important that you use the P-trap to create a water seal to prevent hazardous or deadly fumes from entering the sleeper. Direct the trap to back of truck.

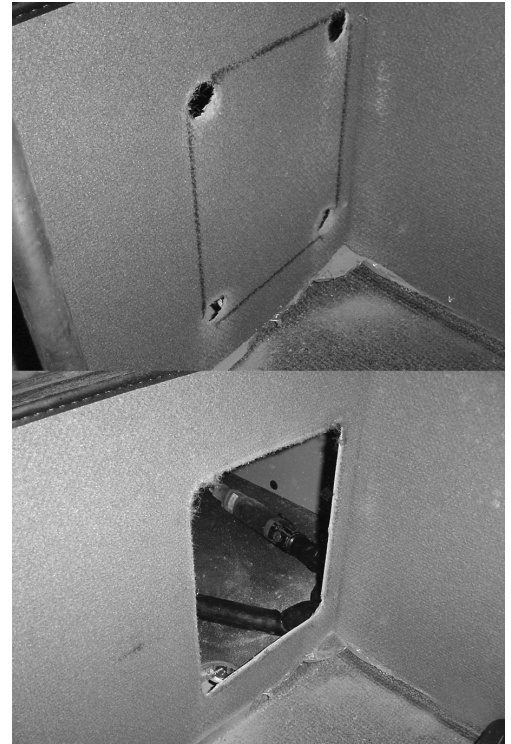


Figure 17: P-trap installed

15. Mount the Qt Control panel in a convenient location (Figure 18). Drill a hole for the CXP cable to feed through. Mount the backing plate centered over the hole. Run the cable through the hole and plug it into the control panel. Snap the panel onto the backing plate, being careful not to crimp the cable.
16. Run the CXP cable to the air conditioning unit.
17. Remove the metal cover from the self-contained unit and locate the power logic module. Plug the CXP cable into the socket marked Display.
18. Make power connections in accordance with the wiring diagrams provided.
19. Replace the metal cover.
20. Run flexible duct between the A/C unit and supply-air grille. Use only as much duct as needed. Make sure ducts do not crimp. Avoid sharp bends. Attach at each end with a large hose clamp.



Figure 18: Qt control panel installed

The installation of the self-contained unit is now complete (Figure 2, page 4). **Proceed to "SYSTEM OPERATION WITH THE Qt CONTROL" on page 13.**



SYSTEM OPERATION WITH THE Qt CONTROL

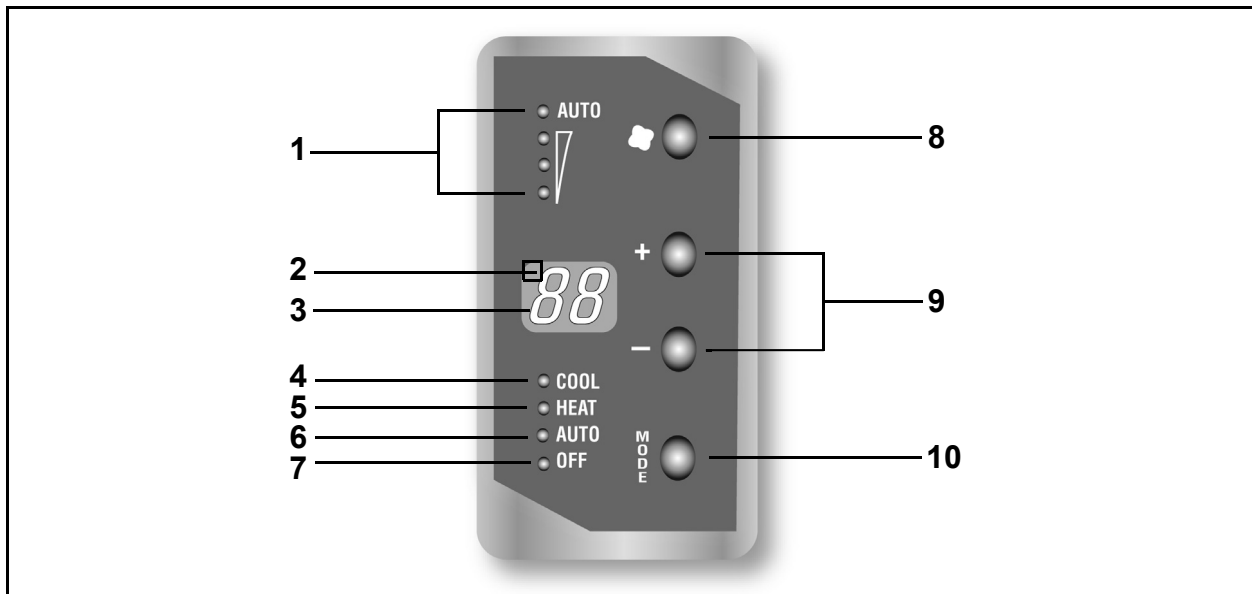
OVERVIEW

The Qt control is an advanced microprocessor system that provides a more comfortable environment and better system protection than mechanical controls. In addition, over 20 programmable functions let you customize the system to suit the specific needs of your environment.

The system consists of the following components:

- **Power Logic Board** - Monitors and controls all functions of the air conditioning unit.
- **Qt Control** - Easy-to-operate user interface with a digital readout and LED indicators.
- **Temperature-Sensing Element (TSEP)** - Plugs into the Power Logic Board and monitors air temperature.
- **Connecting Cable (CXP)** - Connects the control to the Power Logic Board.

Figure 19: The Qt Control



The Qt Control is designed for intuitive, logical operation:

1. **Fan Speed Indicators** - Row of four small LEDs beside the FAN button show whether the fan is in AUTO mode (top), or in a manual fan-speed mode of High (second from top), Medium (third from top), or Low (bottom). When AUTO fan LED is not lit, the fan is in manual mode and fan speed can be adjusted by pressing the FAN button.
2. **Cooling or Heating Indicator** - When COOL or HEAT mode is manually selected, a dot in the upper-left corner in the data display illuminates when the compressor is running in COOL mode or when the heater element is running in HEAT mode. Note: This indicator does not function during AUTO mode.
3. **Data Display** - Large LED readout indicates current setpoint, ambient temperature, programmed values, and fault/error messages.
4. **COOL Mode Indicator** - Lights when COOL mode is manually selected or when compressor is on during AUTO mode.
5. **HEAT Mode Indicator** - Lights when HEAT mode is manually selected or when heating element is on during AUTO mode.
6. **AUTO Indicator** - Lights when system is in automatic-changeover mode. This mode switches from cooling to heating as needed to maintain the setpoint. Fan speed is automatically selected.
7. **OFF Indicator** - Lights when the system is de-energized (by pressing the MODE button). Data display remains on. Setpoint, temperature display, and manual fan controls remain active when the system is in the OFF mode.
8. **FAN Button** - Selects manual fan control and manual fan speed. In OFF mode, press this button to start fan in manual mode.
9. **PLUS (+) and MINUS (-) Buttons** - Raise or lower the setpoint. In programming mode, these buttons change function numbers and corresponding values. Press and hold buttons for large changes.
10. **MODE Button** - Press and release to cycle through the different modes (designated by the mode indicators). The mode sequence is OFF, COOL, HEAT, AUTO, OFF.

QT QUICK START

1. Use the MODE button to set the desired function to COOL, HEAT, AUTO, or OFF.
2. To adjust setpoint, press PLUS (+) or MINUS (-) button to increase or decrease temperature in single increments or press and hold either button to scroll temperature until desired setpoint is reached. The PLUS (+) button allows the setpoint to increase and the MINUS button decreases the setpoint.
3. The fan speed automatically adjusts depending on the temperature difference between the setpoint and inside temperature, or it can be set manually by pressing the FAN button.

QT BASIC OPERATION

POWER ON

When AC power is applied to the system at the circuit breaker, the Qt Control microprocessor performs a self-check and retrieves, from permanent memory, the last operating configuration. This process takes about four seconds, after which the system begins operating just as it did when power was last turned off.

Note: The system has a two-minute compressor restart delay to allow system refrigerant pressures to equalize before starting. This delay begins when the compressor shuts down for any reason. This delay is increased by the Compressor Time Delay function so that vehicles with multiple units can be set to prevent all units from turning on at the same time if power is lost and restored.

SYSTEM OFF

Press the MODE button to turn the system to OFF mode. Note that the data display remains energized even when the system is off. You can run the fan manually when the system is in the OFF mode by pressing the FAN button.

Note: The Qt has built-in protection against sudden power interruptions. The system automatically stores the current operating configuration in permanent memory every time you make changes. (The new operation mode must be in effect for 30 seconds before it is saved into permanent memory.) When AC power is lost, the Qt system retains these settings, and when AC power is restored it resumes operation using the same settings.

SELECTING SETPOINT

The setpoint is the temperature you specify to be maintained in the area. Press either the PLUS (+) or MINUS (-) button once to display the current setpoint. Press either button once more to change the setpoint. Press and hold either button to scroll through the setpoint temperatures. While in setpoint mode, a dot appears in the top-middle of the display. After three seconds of no button presses, the new setpoint is applied, the dot disappears in the display and the current internal temperature is shown.

DISPLAYING TEMPERATURE

When the unit is in any mode (OFF, HEAT, COOL or AUTO), the display shows the internal ambient temperature.

COOL MODE

Press the MODE button until the COOL indicator lights. Note that the internal temperature must be above the setpoint by approximately 1.5 degrees before the compressor is energized and cooling begins. At this point a dot will be illuminated in the upper-left corner of the display indicating the compressor is on. When the internal temperature equals the setpoint the compressor is de-energized and the dot will go off. When the compressor cycles off in any mode, a two-minute compressor delay is initiated. When the compressor is called to run again, it will be delayed for the remaining time left in the two-minute delay and shown on the display.

Note: When the system is in AUTO mode, the COOL indicator will illuminate when the compressor is energized. When the compressor is de-energized, the COOL indicator will go off.

HEAT MODE

Press the MODE button until the HEAT indicator lights. Note that the internal temperature must be below the setpoint by approximately 1.5 degrees before the heat element is energized and heating begins. At this point a dot will be illuminated in the upper-left corner of the display indicating the heating element is on. When the internal temperature equals the setpoint the heating element is de-energized and the dot will go off.

Note: When the system is in AUTO mode, the HEAT indicator will illuminate when the heat element is energized. When the heat element is de-energized, the HEAT indicator will go off.

AUTO MODE

Press the MODE button until the AUTO indicator lights. Note that the COOL or HEAT indicator will be lit along with the AUTO indicator when either the compressor or heating element is energized. If the internal temperature equals the setpoint, only the AUTO indicator will be on.

AUTOMATIC FAN SPEED

For internal air flow, the fan runs continuously in any mode unless the system is turned off (except in Power Saver mode, see heading “P-15: Power Saver Mode” on page 17).

Fan operation in continuous AUTO mode is automatic (top LED will be lit) and is based on a temperature differential of internal temperature and setpoint.

In COOL mode or AUTO COOL, the fan speed increases one speed for every degree of change of internal temperature above the setpoint. After 3°F above setpoint is obtained, high fan speed is reached. As internal temperature decreases or approaches setpoint, the fan speed will decrease to medium speed at 2°F above setpoint and low speed at 1°F above setpoint. Upon a further drop in internal temperature, the compressor cycles off and the fan will continue to operate at low speed.

In HEAT mode or AUTO HEAT, the fan increases one speed until 3°F below the setpoint is obtained. At that point the fan will operate at medium speed. As the internal temperature increases or approaches the setpoint, the fan speed will decrease to low speed and stay at that speed.

MANUAL FAN SPEED CONTROL

OFF mode: Press the FAN button to start the blower in speed 1 (low speed, one LED lit, no AUTO fan LED). Subsequent presses of the FAN button moves the fan speed up one speed at a time until speed 3 is reached (high speed), and then it will move down one speed at a time until speed 1 is reached. At this time one more press will turn the fan off and no indicators will illuminate. At high speed, three LEDs will be lit, medium speed, two LEDs will be lit and low speed, only the bottom LED will be lit.

Note: The user cannot return the fan speed to AUTO mode while the control is in off mode.

COOL, HEAT or AUTO mode: The default is AUTO fan mode (see “Automatic Fan Speed” above). When FAN button is pressed, the fan goes into manual operation at speed 1 (low speed). Subsequent presses of the FAN button move the fan speed up one speed at a time until speed 3 is reached (high speed) and then it will move down one speed at a time until speed 1 is reached. At this time one more press will return fan back to AUTO mode. During HEAT mode operation, if in AUTO fan mode, maximum speed is medium speed. However, if manual fan mode is initiated, then all three speeds are available.

ADJUSTING DISPLAY BRIGHTNESS

Press the MODE and PLUS (+) buttons simultaneously to adjust the LED through high, medium and low brightness levels.

PROGRAMMING THE QT CONTROL SYSTEM

Qt Control systems are programmed at the factory for optimum performance. Programming changes are to be made by a trained technician or with the aid of a factory technician.

ENTER PROGRAM MODE

All programming is done in the OFF mode. Enter Program mode by pressing the MODE and MINUS (-) buttons simultaneously for three seconds. The display will flash “PO” during those three seconds. After the three-second flash, a flashing 1 will appear in the display. This 1 represents function #1. (See Table 2: Programmable Parameters Chart, page 19.) While in Program mode, the OFF Indicator will flash indicating Program mode.

SCROLL THROUGH AND CHANGE FUNCTIONS

Press the PLUS (+) or MINUS (-) button to scroll through the different function numbers. When the desired function number is displayed, press the MODE button to display the current value. Adjust this value by using the PLUS (+) or MINUS (-) button.

Note: Some functions denote values or test operations that cannot be adjusted.

SAVE CHANGES AND EXIT PROGRAM MODE

Press the FAN button to save information. This action returns you to the current function number. Continue to change and/or observe values by scrolling as described above or press the FAN button again to exit Program mode and return to OFF mode. When you exit Program mode the OFF Indicator stops blinking and remains lit.

DETERMINING THE VERSION AND REVISION LEVELS

- **Version Level** - Viewable for 5 seconds at power-on and also at P-10 (for example “V12”).
- **Revision Level** - Viewable at P-11 (for example “R03”).

PROGRAMMABLE PARAMETERS

Enter Program mode to make changes to any of the following parameters.

Factory Memory Reset

To restore programmed functions to factory settings: Press the PLUS (+) and MINUS (-) buttons simultaneously for three seconds. During the three seconds, the display will flash "00" and then a 1 will alternate across the screen until the reset is complete.

P-1: Compressor Time Delay

Factory Default: 2

You can increase the compressor time delay an additional 2 to 4 minutes, programmable in 5-second increments. Each sequential parameter number increases the time delay by 5 seconds from 2 minutes (0) up to 4 minutes (24).

P-2: Fahrenheit/Celsius Display

Factory Default: Fahrenheit

Press the MODE button to display the current °F or °C value. Use the PLUS (+) or MINUS (-) button to change the value. Press the FAN button once to save the change.

P-3: Compressor Differential

Factory Default: 12

You can set the temperature deadband range that the compressor will respond to, for example "12" for 1.5°F. Press the MODE button and the current value displays. Use the PLUS (+) or MINUS (-) button to change the value within the range of 2 to 31. Press the FAN button once to save the change.

P-4: Fan Response Differential

Factory Default: 8

You can adjust the temperature differential of inside temperature and setpoint that regulates fan operation in continuous auto fan mode (default). Press the MODE button and the current value displays. Use the PLUS (+) or MINUS (-) button to change the value within the range of 2 to 31. Press the FAN button once to save the change.

P-5: Low Fan Speed Adjustment

Factory Default: 38

You can adjust the lowest fan speed to suit individual preferences. For instance, you may wish to decrease the low fan speed setting in the sleeper compartment to minimize fan noise. Use the PLUS (+) or MINUS (-) button to change the value within the range of 2 (slowest) to 57 (fastest). Press the FAN button once to save the change.



CAUTION

Setting the fan speed too low may cause an icing condition.

P-6: High Fan Speed Adjustment

Factory Default: 85

You can adjust the highest fan speed to suit individual preferences. This setting adjusts the maximum high-speed voltage to the threshold of the blower high-speed response. Use the PLUS (+) or MINUS (-) button to change the value within the range of 41 (slowest) to 99 (fastest). Press the FAN button once to save the change.

P-7: Fan Mode

Factory Default: C

You can select the continuous fan operation or instruct the fan to cycle on and off with the system compressor. Use the PLUS (+) or MINUS (-) button to change the value to "I" (intermittent) or "C" (continuous). Press the FAN button once to save the change.



NOTE

For best operation using intermittent fan mode, relocate internal air sensor (thermistor) from the return-air duct to an inside wall to best sense room air temperature. Check with your dealer or call the Dometic Applications Department for more information.

P-8: AC Line Voltage Calibration

This parameter is preset at the factory but should be confirmed at installation. Enter parameter 8 and you will see two numbers displayed: a) For a battery-based system using an inverter set at 112V, "12" would display; b) For a generator-based system,

these two numbers should match the last two digits of the voltage displayed on your voltmeter. Use the PLUS (+) or MINUS (-) buttons to adjust to the correct value on your voltmeter. Press the FAN button once to save this change.

To check power source input: Run unit in COOL mode with the compressor energized. Measure the voltage at the input terminals inside the Dometic power electrical box. Check the voltage at the Qt control as stated above. Adjust as needed.

Ensure that the source of input power is 102VAC-130VAC (or 202VAC-246VAC). If not, adjust the power source. Consult the recommendations of the generator manufacturer or call the inverter manufacturer.

P-9: Temperature Calibration

Displays the inside temperature within a range +/- 1%. Typically, the temperature sensor is within +/- 2 degrees of actual room temperature. To check or calibrate the sensor, turn AC unit off and press the MODE button to display the temperature value. Place an accurate thermometer beside the system's thermistor and compare the temperatures. If the temperature is not correct, use the PLUS (+) or MINUS (-) button to enter the correct value. Press the FAN button once to save the change.

P-10: Software Version

Displays the current version of software used by the control for 5 seconds each time power is cycled. Prior to calling a dealer or the factory for service assistance, it's helpful to know the software version and revision level for the Q-Logic system. To obtain the Version, access parameter #10 and press MODE. To obtain the Revision, access parameter #11, and press MODE. The Version and Revision numbers will each be displayed as a two digit number, for instance an '11' obtained in parameter #10 would be Version 11.

P-11: Software Revision

Displays the current revision level of software used by the control. Prior to calling a dealer or the factory for service assistance, it's helpful to know the software version and revision level for the Q-Logic system. To obtain the Version, access parameter #10 and press MODE. To obtain the Revision, access parameter #11, and press MODE. The Version and Revision numbers will each be displayed as a two digit number, for instance an '03' obtained in parameter #11 would be Revision 03.

P-12: High-Pressure Switch Test

Displays "OA" if the switch is okay, or "FA" if a fault is detected in the switch.

P-13: LED Segment Test

Lights all LED segments of the display.

P-14: LED Sleep Mode

Factory Default: ON

When in Sleep mode, the LEDs and display dim in brightness 10 seconds after last button is pressed. The first press of any button to perform an operation will bring the display and indicators to full brightness (additional presses of a button will then change a value). The display LEDs will remain at full brightness until 10 seconds have passed after the last button press. Use the PLUS (+) or MINUS (-) button to change the value to "SL" (Sleep mode) or "ON" (continuous illumination). Press the FAN button once to save the change.

P-15: Power Saver Mode

Factory Default: --

Power Saver mode allows the air conditioning unit to conserve power while operating on an inverter. Use the PLUS (+) or MINUS (-) button to change the value to "--" (Normal Mode), "P1" (Power Saver Mode 1) or "P2" (Power Saver Mode 2). Press the FAN button once to save the change.

Power Saver Mode 1

- The setpoint lowest setting is 68°F.
- The internal blower is set on "intermittent" operation.
- The compressor will cycle off for the programmed compressor time delay every 10 minutes even if the thermostat is calling for continuous cooling (this will be the maximum run time available). The evaporator fan continues to run during this occurrence.

Power Saver Mode 2

- The setpoint lowest setting is 70°F.
- The internal blower is set on "intermittent" operation.
- If the system is calling for neither cooling or heating, the evaporator fan will run at the slowest speed for 1 minute every 10 minutes to help circulate air.
- The heating cycle temperature is limited to 78°F.

P-16: Frequency Selection*Factory Default: 60*

Set by the factory for the system's operating frequency to specify whether your system is running on 60Hz or 50Hz. Use the PLUS (+) or MINUS (-) button to change the value to "60" (60Hz) or "50" (50Hz). Press the FAN button once to save the change.

P-17: Transformer Configuration*Factory Default: 1*

Set by the factory to specify the part number (P/N) and configuration of the power transformer as shown on the electrical box sticker near the name-plate data. This selection will correctly calibrate the control to the transformer. Use the PLUS (+) or MINUS (-) button to change the value to "1" for P/N 4170035 (115/24VAC, 190VA); "2" for P/N 4170034 (115/24VAC, 300VA); "3" for P/N 4170038 (230/24VAC, 190VA); "4" for P/N 4170052 (230/24VAC, 240VA); or "5" for P/N 4170036 (115/24VAC, 24VA). Press the FAN button once to save the change. Not affected by factory reset.

P-18: CAN Bus Unit ID#*Factory Default: 1*

Requires Power Logic Board with V12 R03 (or later) firmware and an installed CAN Bus Adapter (P/N 4250042). Used only when there are multiple units linked together with a CAN bus system. Setting each unit with the same ID # allows control of all units simultaneously from the Main Display. Setting each unit with a unique ID # allows for individual control from the main display. For example, a control that has P-18 set to 5 will respond to commands with a destination address of 5. Once the system is set up, refer to the Main Display unit to confirm which ID numbers allow for correct operation. For information about MASTER/SLAVE programming, see "P-19: CAN Bus Group ID#". Use the PLUS (+) or MINUS (-) button to change the value to a number within the range of 0 to 99. Press the FAN button once to save the change.

P-19: CAN Bus Group ID#*Factory Default: 51*

This parameter allows Power Logic Boards with V12 R03 (or later) firmware and an installed CAN Bus Adapter (P/N 4250042) to be grouped together in a network system and communicate with the CAN Bus system (with additional translator equipment in some cases). This feature provides a unique Group ID for the truck HVAC unit, and allows it to be slaved with other IDs in that group with the first system on the CAN Bus as the master. In other words, you would set up with MASTER/SLAVE association by setting each unit to have the same Group ID number, and give the 'MASTER' unit the Unit ID #1. 'SLAVE' units would have the same Group ID number, but a higher Unit ID number. Use the PLUS (+) or MINUS (-) button to change the value to a number within the range of 0 to 99. Press the FAN button once to save the change.

P-20: Memory Restart*Factory Default: 1*

When this parameter is set to 1 (Manual), the control goes into OFF mode when AC power is interrupted and it requires you to enter a mode for operation. If this parameter is set to 2 (Auto), the unit resumes operation in the same mode when AC power is interrupted and comes back on. This parameter is not affected by factory reset.

P-21: Set Point Display*Factory Default: 1*

When this parameter is set to 1 (Ambient Temp), the control continuously displays the ambient temperature unless the PLUS (+) or MINUS (-) buttons are pressed, which will cause the set point to display for 3 seconds. When this parameter is set to 2 (Set Point), the control continuously displays the set point. Temperature calibration works as normal and the inside temperature can still be viewed with parameter 9. This parameter is not affected by factory reset.

P-22: Frequency Shut Down Routine*Factory Default: 0*

When this parameter is set to 0, the Hi and LO Frequency Shut Down Routines are disabled/off. When this parameter is set to 1, the Hi and LO Frequency Shut Down Routines are enabled/on. This parameter is not affected by factory memory reset.

P-23: High Voltage Shut Down Routine*Factory Default: 0*

When this parameter is set to 0, the feature is off and the unit will not have High A/C Voltage shutdown. When this parameter is set to 1, the feature is on and the unit will use a High A/C Voltage shut down routine. This parameter is not affected by factory memory reset.

PROGRAMMABLE PARAMETERS QUICK REFERENCE

Table 2: Programmable Parameters Chart

PARAMETER NUMBER	FUNCTION	DISPLAY INDICATORS (WITH FACTORY SETTINGS)	RANGE	FACTORY SETTING
1	Compressor Time Delay	Programmable from 2 to 4 minutes in 5-second increments. Each sequential number increases the time delay by 5 seconds from 2 minutes (0) up to 4 minutes (24). Displays '0', and OFF mode flashes.	0 = 2:00 minutes 1 = 2:05 minutes 2 = 2:10 minutes 3 = 2:15 minutes ... 23 = 3:55 minutes 24 = 4:00 minutes	0
2	Fahrenheit/Celsius	Displays 'F', and OFF mode flashes.	F or C	F
3	Compressor Differential	Displays '12', and OFF mode flashes.	2 to 31	12 (12/8 = 1.5F)
4	Fan Response Differential	Displays '8', and OFF mode flashes.	2 to 31	8 (8/8 = 1F)
5	Low Fan Speed	Displays '38', OFF mode flashes. Low fan LED lights.	25 to 57	38
6	High Fan Speed	Displays '85', and OFF mode flashes. All fan speed LEDs light.	41 to 99	85
7	Fan Mode	Displays 'C', and OFF mode flashes.	C or I	C
8	AC Line Voltage Calibration	Displays the last two digits of actual line voltage, and OFF mode flashes.	+/- 1%	--
9	Temperature Calibration	Displays the inside temperature, and 'OFF' flashes.	+/- 1%	--
10	Software Version	Displays device's board version, and 'OFF' flashes.	Current version number (see Note below)	
11	Software Revision	Displays device's software revision, and 'OFF' flashes.	Current revision number (see Note below)	
12	High Pressure Switch Test	Displays 'OA' or 'FA', and 'OFF' and 'COOL' flash.	OA = Okay FA = Fault	--
13	LED Segment Test	Displays all LED segments. OFF mode flashes.	Lights all LED Segments	--
14	LED Sleep Mode	When in Sleep mode, the LEDs will dim 10 seconds after last button is touched.	ON = Continuous Illumination SL = Sleep Mode	ON
15	Power Saver Mode	Displays '--', and OFF mode flashes.	"--" = Normal Mode "P1" = Power Saver Mode 1 "P2" = Power Saver Mode 2	--
16	Frequency Selection	Displays '60' for 60Hz; '50' for 50Hz; OFF mode flashes.	60 = 60Hz 50 = 50Hz	60
17	Transformer Configuration	Displays number for selected transformer configuration; OFF mode flashes. (Not affected by factory memory reset.)	1 = 115/24VAC, 190VA (P/N 4170035) 2 = 115/24VAC, 300VA (P/N 4170034) 3 = 230/24VAC, 190VA (P/N 4170038) 4 = 230/24VAC, 240VA (P/N 4170052) 5 = 115/24VAC, 24VA (P/N 4170036)	1
18	CANbus Unit ID #	Displays '1', and OFF mode flashes.	0 to 99	1
19	CANbus Group ID #	Displays '51', and OFF mode flashes.	0 to 99	51
20	Memory Restart	Displays '1' or '2' (Not affected by factory memory reset.)	1 = Manual 2 = Auto	1
21	Set Point Display	Displays '1' or '2' (Not affected by factory memory reset.)	1 = Ambient Temperature 2 = Set Point	1
22	Frequency Shut Down Routine Control	Displays '0' or '1' (Not affected by factory memory reset.)	0 = Frequency Shut Down Routine off 1 = Frequency Shut Down Routine on	0
23	High A/C Voltage Shut Down Routine Control	Displays '0' or '1' (Not affected by factory memory reset.)	0 = A/C Voltage Shut Down Routine off 1 = A/C Voltage Shut Down Routine on	0

Note: This chart (with the exception of the CAN bus related information) relates to Truck Qt Power Logic boards with software Version 11, Revision 12 and later. Power Logic Boards with Version 12, Revision 03 or later will contain the CAN bus functions. Boards of Version 10 and higher will display the Version number (as a 2-digit display) for 5 seconds upon power up.

Upon CLB bootup, the Q-TR 4240701 will show the revision level of the firmware load for 5 seconds prior to going into normal operations. This will allow verification of firmware prior to board installation and full sensory hook up, which is currently required prior to being able to go to program mode for the normal viewing of the revision.

TROUBLESHOOTING

OPTIMIZING PERFORMANCE

To improve the air conditioner's performance on a hot day, you can reduce the heat load by parking in a shaded area, covering the windows with reflective shades to block out direct sunlight and pulling the curtain between the sleeper and cab. Make sure windows and doors are tightly closed and turn off any other heat-producing appliances.

ANTI-ICE ROUTINE

If at any time during normal operation in the COOL mode, the suction line sensor detects a temperature lower than 34°F, the control will initiate the anti-ice routine.

Upon initiation of the routine, the evaporator fan will be automatically raised to HIGH speed. If this does not cause the suction-line sensor to rise above 34°F within two minutes, then this routine will shut off the compressor to allow the ice build-up to melt. The compressor will restart once the suction-line temperature has risen above 34°F AND at least two minutes have elapsed since compressor shutdown. If this situation persists, consider running the evaporator fan on a higher speed.

MAXIMUM & MINIMUM VOLTAGES & FREQUENCIES

Refer to the table below for the range of acceptable voltages and frequencies for system operation.

Table 3: Maximum & Minimum Voltages & Frequencies

POWER SUPPLY VARIABLE	115VAC/60Hz	230VAC/60Hz	220VAC/50Hz	VAC OR HZ
Low Voltage (COOL Mode)	102 (+/-2)	202 (+/- 2)	202 (+/- 2)	VAC
Low Voltage (HEAT Mode)	96 (+/- 2)	196 (+/- 2)	202 (+/- 2)	VAC
High Voltage	130 (+/-2)	246 (+/- 2)	246 (+/- 2)	VAC
Low Frequency	56 (+/- 2)	56 (+/- 2)	46 (+/- 1)	Hz
High Frequency	64 (+/-1)	64 (+2/-1)	54 (+2/-1)	Hz

FAULT SHUTDOWNS AND ERROR MESSAGES

The Qt Control contains built-in safeguards designed to protect the air conditioning system from damaging conditions. If an operational failure occurs, the Qt Control will flash one of the following code messages. You can cancel the display of a fault or error code message by pressing the MODE button.

When power is lost, the system resumes operating in the same mode prior to power loss once power is regained. All program values are retained in a non-volatile memory.

- **If system was in HEAT or COOL mode:** Unit will operate and the display will flash "Error Code" until the MODE button is pressed. After the MODE button is pressed, display will show steady "—" until fault is corrected.
- **If system was in AUTO mode:** Unit will shut down until MODE button is pressed. Display will show "—" and unit will run.

Refer to the following table for a list of fault/error codes and their meanings.

Table 4: Fault/Error Code Chart

FAULT/ERROR CODE DISPLAY	FAULT	COMMENT/RECOMMENDATIONS
'LO' then 'AC'	Low-Voltage Shutdown	Incoming voltage was <102VAC Cool or 96VAC Heat (115VAC systems) or <202VAC Cool or 196VAC Heat (230VAC systems) for more than 3 minutes. Check power source.
'HI' then 'AC'	High-Voltage Shutdown	Incoming voltage was >130VAC (115VAC systems) or >246VAC (230VAC systems) for more than 3 minutes. Check power source.
'LO' then 'FC'	Low-Frequency Shutdown	Incoming frequency was <56Hz (115/230VAC 60Hz systems) or <46Hz (230VAC 50Hz systems) for more than 3 minutes. Check power source.
'HI' then 'FC'	High-Frequency Shutdown	Incoming frequency was >64Hz (115/230VAC 60Hz systems) or >54Hz (230VAC 50Hz systems) for more than 3 minutes. Check power source.
'HI' then 'PS'	High-Pressure Shutdown	System's high-side pressure has exceeded the safety switch.
'HI' then '--' (when system is OFF.)	High-Pressure Circuit Failure	High-Pressure Switch or wiring has failed open. Check high-pressure switch wiring for an 'open' circuit. If still fails, then replace switch.
'IS' then '--'	Internal temperature sensor has failed 'open' or missing.	Replace internal temperature sensor (TSEP) and cable. Replacement must be an original Dometic part.
'CS' then '--'	Compressor Discharge Temperature Sensor failure	Replace Compressor Discharge Sensor and cable. Replacement must be an original Dometic part.
'--' (steady)	Unit is operating in 'Limp' mode.	If the Compressor Discharge Sensor fails or is missing, the unit can be run in 'Limp' mode by pressing MODE to shutdown, then MODE to COOL mode. '--' will display until the problem is repaired.
'LO' then 'ES'	Low Evaporator Temperature Shutdown	Evaporator outlet temperature is <34°F. Cooling will resume once the temperature rises above 34°F AND the unit has been off for at least 2 minutes.

QUICK TROUBLESHOOTING GUIDE

If control is displaying a fault/error code, please refer to the "Fault/Error Code Chart" on page 21.

Table 5: Quick Troubleshooting

PROBLEM	POSSIBLE REASON/SOLUTION
Display not on.	1. Circuit breaker is off. Turn circuit breaker on. 2. CXP cable disconnected. Check CXP cable and connections. 3. Control is inoperative. Replace the control. 4. Power Logic Board is inoperative. Replace the Power Logic Board. <i>WARNING: The Power Logic Board operates at 115VAC or 230VAC. Make sure the power is off before removing the cover of the Power Logic Box. Contact an authorized servicing dealer if the problem continues or for replacement parts.</i>
Erratic temperature display.	1. Programming errors. Perform a Factory Memory Reset. 2. Bad temperature sensor. Check temperature sensor, cable, and connections. 3. No temperature sensor. Ensure the temperature sensor is installed properly. 4. Inaccurate temperature setting. Calibrate temperature. 5. Power Logic Board is malfunctioning. Replace the Power Logic Board. <i>WARNING: The Power Logic Board operates at 115VAC or 230VAC. Make sure the power is off before removing the cover of the Power Logic Box. Contact an authorized servicing dealer if the problem continues or for replacement parts.</i>

Table 5: Quick Troubleshooting (continued)

PROBLEM	POSSIBLE REASON/SOLUTION
Erratic system operation.	1. Programming errors. Perform a Factory Memory Reset. 2. CXP cable disconnected. Check CXP cable and connections. 3. Bad temperature sensor. Check temperature sensor, cable, and connections. 4. Control is malfunctioning. Replace the control. 5. Power Logic Board is malfunctioning. Replace the Power Logic Board. <i>WARNING: The Power Logic Board operates at 115VAC or 230VAC. Make sure the power is off before removing the cover of the Power Logic Box. Contact an authorized servicing dealer if the problem continues or for replacement parts.</i>
No cooling or heating, no fan operation, and Qt control is on.	1. Temperature setpoint is satisfied. Lower or raise setpoint. 2. Control is programmed for COOL or HEAT only. Change the operating mode. 3. Problem with generator. Ensure the generator is running at the correct frequency. 4. Problem with batteries. Check that the batteries are fully charged. 5. Problem with shorepower (if being used). Check that the shorepower is connected properly. 6. Problem with inverter (if equipped). Ensure the inverter is connected properly and fuse/breaker (DC and/or AC) is not tripped. 7. Circuit breaker is off. Turn circuit breaker on.
No cooling or heating, but the fan is running.	1. Control (Mode) is OFF. Turn the control ON. 2. A fault has occurred. Check the control's display for a fault/error code and refer to "Fault/Error Code Chart" on page 21. 3. Temperature setpoint is satisfied. Lower or raise setpoint. 4. Control is programmed for COOL or HEAT only. Change the operating mode.
No cold air.	1. Temperature set point is satisfied. Lower the setpoint. 2. Clogged air filter. Check the evaporator air filter and clean as needed. 3. Wrong operating mode. Set to COOL or AUTO mode. 4. Airflow is blocked. Remove any obstructions in return-air stream. Clean return-air filter and grille. Check for crushed or restricted ducting; ducting must be as straight, smooth and taut as possible. 5. Dirty condenser coil. Clean as needed. 6. Frozen evaporator coil. Turn temperature setpoint so the compressor stops running, then turn the fan to maximum speed. Allow unit to defrost, then resume cooling.
No warm air.	1. Temperature set point is satisfied. Raise the setpoint. 2. Clogged air filter. Check the evaporator air filter and clean as needed. 3. Wrong operating mode. Set to WARM or AUTO mode. 4. Airflow is blocked. Remove any obstructions in return-air stream. Clean return-air filter and grille. Check for crushed or restricted ducting; ducting must be as straight, smooth and taut as possible. 5. Dirty condenser coil. Clean as needed. 6. Fan speed too high. Manually lower the fan speed and air temperature should warm up.
Insufficient cooling or heating.	1. Temperature set point is satisfied. Adjust the setpoint. 2. Clogged air filter. Check the evaporator air filter and clean as needed. 3. Dirty condenser coil. Clean as needed. 4. Area over stressed. Close curtains over windows and between the cab and sleeper. 5. Repairs needed. Call a service technician; do not attempt internal repairs yourself.

Table 5: Quick Troubleshooting (continued)

PROBLEM	POSSIBLE REASON/SOLUTION
Low airflow.	Airflow is blocked. Remove any obstructions in return-air stream. Clean return-air filter and grille. Check for crushed or restricted ducting; ducting must be as straight, smooth and taut as possible. Fan speed is set to Manual Low. If the fan speed is set to Manual Low, press and release the Fan button until the desired fan speed and airflow are reached. If automatic fan-speed control is desired, press and release the Fan button until the LED next to the word AUTO is lit.
System runs continuously.	Setpoint temperature is improperly set: Too low for cooling or too high for heating. Raise or lower set point. Windows or doors open. Close all windows and doors. Improper air sensor location. Ensure the temperature sensor is installed properly..
Quick Troubleshooting - Specific to Battery-Based Systems Using an Inverter	
Dometic Display is not lit.	No power to the unit: Inverter not on. Turn inverter switch on. Check main battery switch. Turn battery switch on. Batteries not connected to inverter. Connect batteries. Very poor battery connection. Clean, tighten connections. Inverter not connected to system. Connect inverter.
Inverter on, Dometic control/display lights momentarily then cuts off.	No power to the inverter from the batteries. Check for power to the inverter. The capacitor in the inverter has enough charge to power the display for only a short period. Check for power to the inverter.
Run time not as expected.	Batteries not holding charge: Check age of batteries. Check each battery with proper equipment (must be individually checked with no electrical connection to other batteries). Battery life is always suspect. Voltage drop between charging source and batteries. Must be no more than 0.2 VDC. See Note on page 2. Electrical connections are loose, dirty. Clean, tighten connections. Check alternator output. Alternator must be either 270 amp or 300+ amps.

MAINTENANCE

COMPONENT MAINTENANCE LIST

Table 6: Component Maintenance List

COMPONENT	NECESSARY ACTION
Compressor	No maintenance is necessary.
Condenser Fan	No maintenance is necessary.
Evaporator Blower	No maintenance is necessary.
Heater	No maintenance is necessary.
Evaporator Filter	Remove and wash with soapy water or blow out with compressed air monthly.
Condenser Coil	Clean with water and soap once yearly to remove any oil or debris. Verify proper drainage.
Drain Tubing	Check for obstructions and positioning before the cooling season.
Outside Wires & Refrigerant Lines (split systems)	Occasionally check for chafe.

NOTE: Dometic's auxiliary air systems, both split and self-contained, are designed so that you should never need to recharge the refrigerant loop under normal circumstances. If the refrigerant level ever needs to be adjusted, federal law requires that it must be done by an EPA-licensed HVAC technician with the proper tools to avoid accidental discharge of any refrigerant gas into the air.

RETURN-AIR FILTER

You should inspect and clean the air filter regularly to ensure good air flow across the evaporator coil. You will find the filter in the return air path, either directly behind the grille or in front of the evaporator coil. Make sure you do not block the air flow between the return air grille and evaporator coil with pillows, blankets, papers or other objects.

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.

CONDENSATE DRAIN

Check the condensate drain often to make sure water is draining properly. Make sure the drain fittings do not get clogged. Note that the drain hose under the truck should be tied in a loop so as to form a natural trap. This will help prevent outside air and exhaust discharge from getting inside.

CONDENSER COIL

If you have a split system with an external condensing unit, make sure you inspect and clean any debris from the condenser coil area to ensure good air flow.

NOTES

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