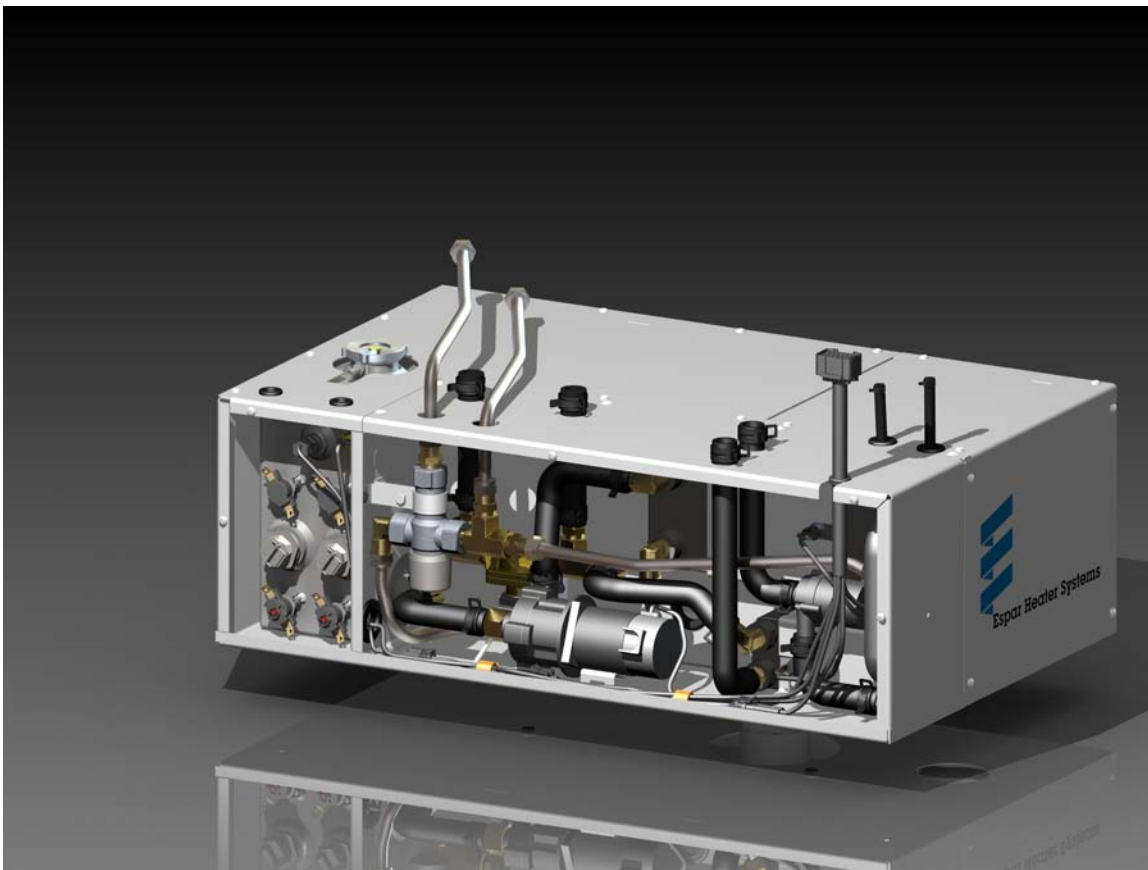


# Mobile Comfort System 16 Hydronic Heating System

## Installation Manual



2010 Espar Heating Systems

# 1 Concept of this manual

This manual contains necessary information to assist with the installation of the Espar Mobile Comfort when used in conjunction with the heater's technical description manual.

This manual has been divided into chapters for quick and easy reference as listed below.

## Please Note!

Additional information is to be found within the technical description and operating instruction manuals that accompany the heater. If you require information specific to your installation, which is not included in our manuals, please contact Espar.

1	<b>Introduction</b> Provides initial information, specifications, and safety advice.	8	<b>Component Identification and function</b> Identifies system components and how they operate.
2	<b>Planning the installation</b> Information and considerations before starting the installation.	9	<b>System operation</b> Information on using your heating system for the first time.
3	<b>Unit installation</b> Discusses suitable mounting locations and possibilities.	10	<b>Diagnostics</b> Troubleshooting Information.
4	<b>Exhaust and combustion air system</b> Advice on routing the exhaust and combustion air.	11	<b>Maintenance</b> Identifies system service and intervals.
5	<b>Electrical system</b> Information on the electrical connections.	12	<b>Winterization</b> Information for storage of your heating system.
6	<b>System plumbing</b> Connections and limitations of the Coolant circuit.	13	<b>Checklist</b> Documenting the installation.
7	<b>Fuel system</b> Connections and limitations of the fuel system.	14	<b>Warranty</b> Information on the Warranty documentation.

## Heater Warnings

### Warning To Installer

- Correct installation of this heater is necessary to ensure safe and proper operation. Read and understand this manual before attempting to install the heater. Failure to follow all these instructions could cause serious or fatal injury.

### Warning - Explosion Hazard

- Heater must be turned off while re-fueling.
- Do not install heater in enclosed areas where combustible fumes may be present.
- Do not install heaters in engine compartments of gasoline powered boats.

### Warning - Fire Hazard

- Install the exhaust system so it will maintain a minimum distance of 50mm (2") from any flammable or heat sensitive material.
- Ensure that the fuel system is intact and there are no leaks.

### Warning - Asphyxiation Hazard

- Route the heater exhaust so that exhaust fumes cannot enter any passenger compartments.
- If running exhaust components through an enclosed compartment, ensure that it is vented to the outside.

### Warning - Safety Hazard on Coolant Heaters Used With Improper Antifreeze Mixtures

- The use of Espar coolant heaters requires that the coolant in the system to be heated contain a proper mixture of water and antifreeze to prevent coolant from freezing or slushing.
- If the coolant becomes slushy or frozen, the heater's coolant pump cannot move the coolant causing a blockage of the circulating system. Once this occurs, pressure will build up rapidly in the heater and the coolant hose will either burst or blow off at the connection point to the heater.
- This situation could cause engine damage and/or personal injury. Extreme care should be taken to ensure a proper mixture of water and antifreeze is used in the coolant system.
- Refer to the engine manufacturer's or coolant manufacturer's recommendations for your specific requirements.

**Caution:** *During electrical welding work on the vehicle disconnect the power to the heater in order to protect the control unit.*

**Note:** All measurements contained in this manual contain metric and approximate SAE equivalents in brackets eg 25mm (1").

Direct questions to Espar Heater Systems:

Canada & U.S.A. 1-800-387-4800

This publication was correct at the time of print. However, Espar has a policy of continuous improvement and reserves the right to amend any specifications without prior notice.

## **1. Introduction**

Please read carefully the following instructions, these have been compiled to assist you with every aspect of installing your heater. Special attention is required to the Safety or Caution areas, which are found at the end of each section.

To ensure maximum performance from your heater and for your own safety, please adhere to the following instructions closely. Be aware that in the unlikely event of a heater failure during the warranty period, that warranty may be rejected if the heater is not installed in accordance with these instructions.

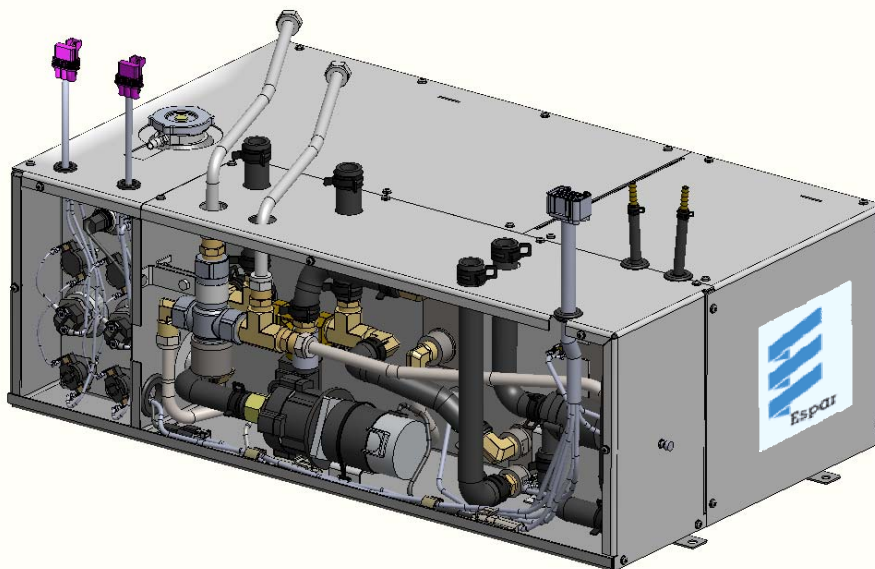
When installing the heater, for your own safety, please use all necessary personal protection/safety equipment where required.

### **MCS16**

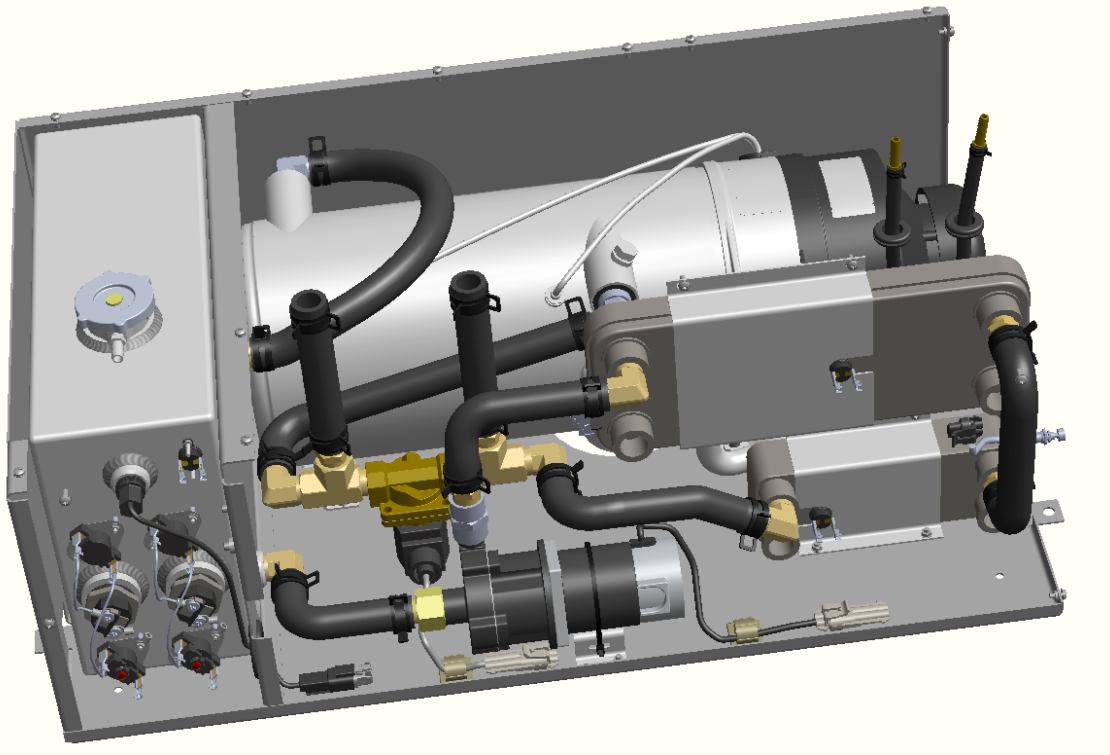
This is an all inclusive system based on our powerful Hydronic 16. All components are fitted into one box for installation convenience and space savings. It is capable of providing continuous hot water and coach heating at the same time.

Standard features include:

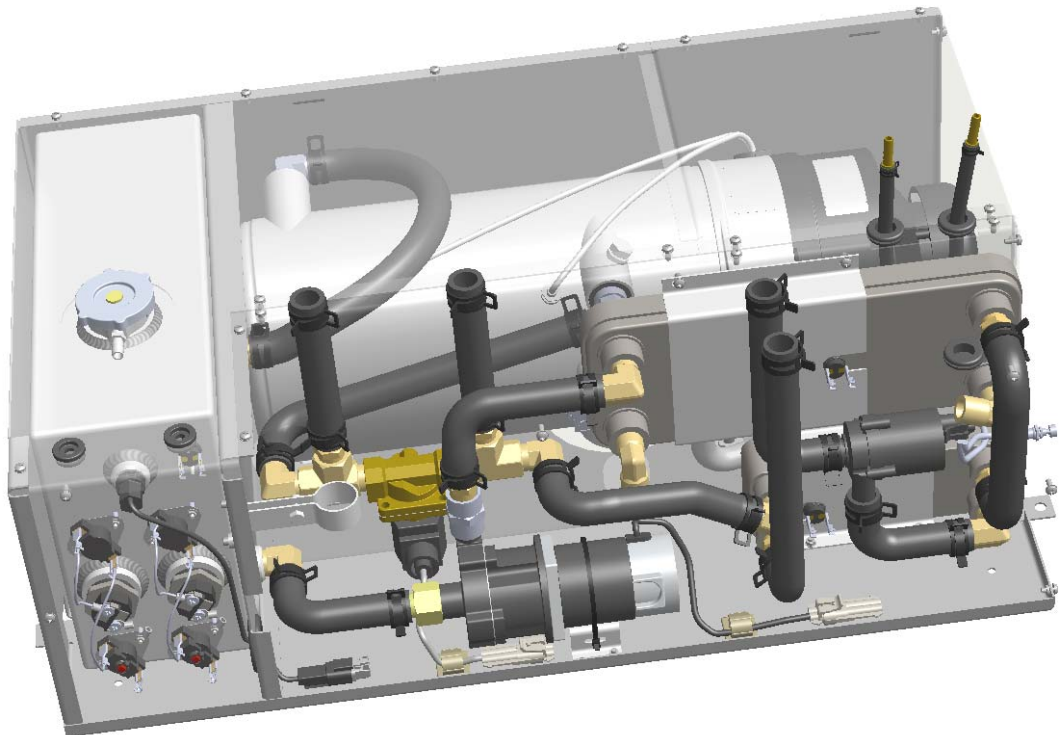
- 5 zone control board
- AC Electric
- Demand Hot Water
- Adjustable air intake
- Automatic switching of heat sources
- Winter and summer valve
- Easy component access
- Engine Coolant Interface w/ preheat



Main Coolant Loop

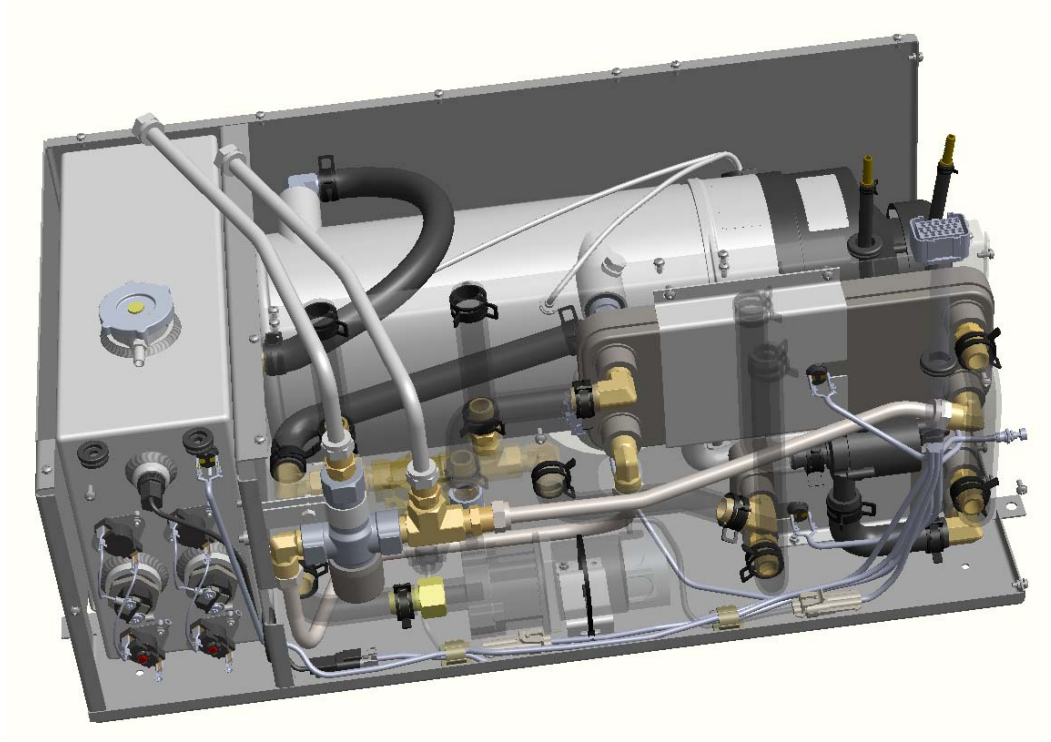


Engine Pre-Heat Coolant Circuit

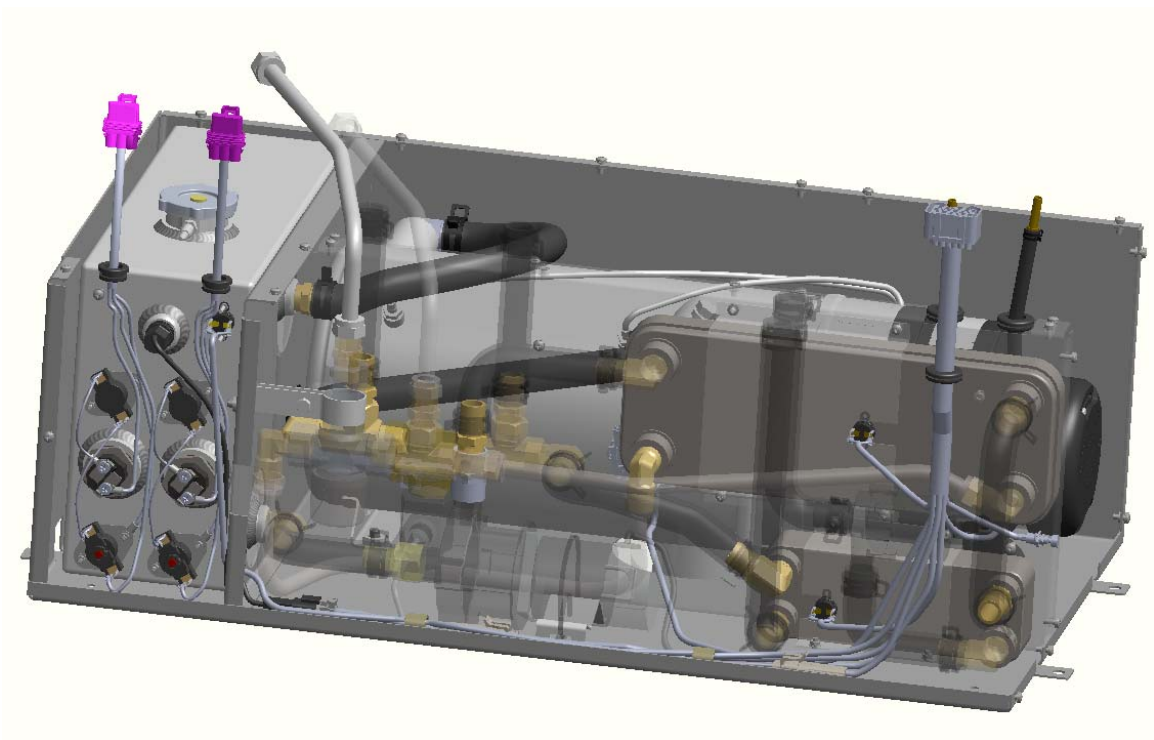




## Domestic Water Circuit



## Electrical System

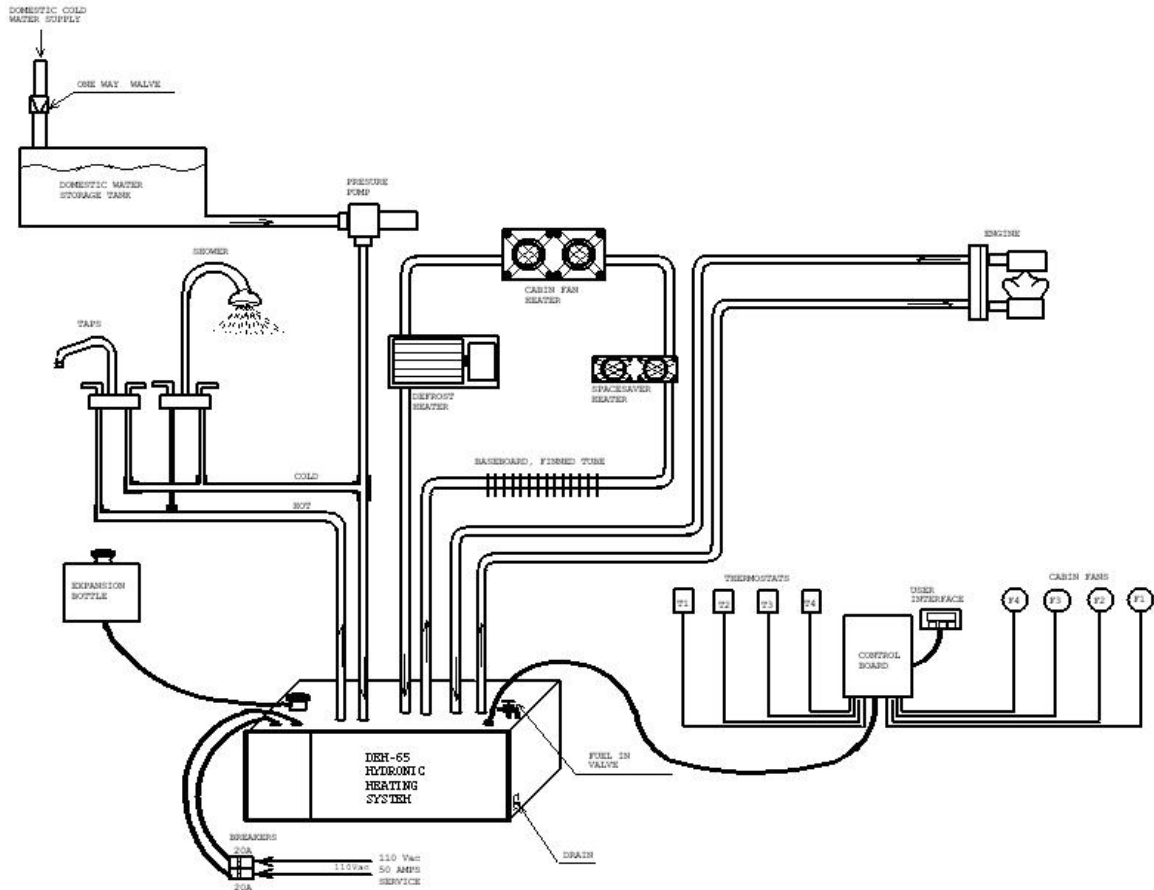


## Specifications

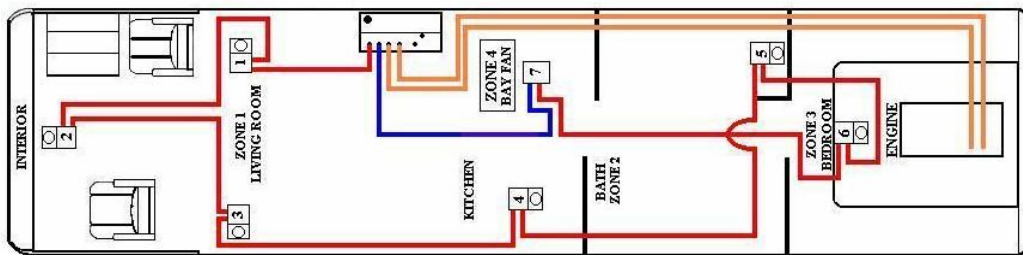
• <b>Dimensions</b>	30L X 18W X 10H inches		
• <b>Weight</b>	110 lbs. (dry), 160 lbs. (wet)		
• <b>Heat Output electric heaters</b>	14,000 BTU/H		
• <b>Voltage electric heaters</b>	110Vac		
• <b>Amperage per heater</b>	16.3A		
• <b>Total amperage electric heaters</b>	32.6A		
• <b>Electric heaters</b>	2		
• <b>Heat Output diesel heater</b>	55,000 BTU/H		
• <b>Controls operating Voltage</b>	12 Vdc or 24 Vdc		
• <b>System Average DC Current</b>	<b>Item</b>	<b>12 Vdc</b>	<b>24 Vdc</b>
	Heater	4.2A	2.1A
	Circulation Pump (one)	3.5A	
	Cabin fans (up to 10)	1A each	
	Engine pre-heat pump	2A	
	<b>Total average current</b>	<b>16A</b>	<b>2.1A</b>
• <b>Burner</b>	High temperature Stainless Steel burner tube		
• <b>Fuel Consumption</b>	0.5 gal/hr.		
• <b>Fuel Types</b>	Diesel #1, #2 or Arctic		
• <b>Exhaust Size</b>	2 3/4 inch		
• <b>CO output</b>	less than 60 ppm		
• <b>System Coolant</b>	50/50 Water/Anti-freeze (Ethylene Glycol)		
• <b>Required Flow Rate</b>	Minimum 3 GPM, Maximum 6 GPM		
• <b>Capacity heating solution</b>	average 6 gallons		
• <b>Connections heating loops</b>	3/4" Hose barb		
• <b>Connections hot water lines</b>	5/8" PEX tube or 3/4" brazed hose		
• <b>Operating pressure</b>	Maximum 7 PSI		
• <b>Domestic Water Output</b>	2.5 GPM continuous @ 55 degree F dT		

## 2. Planning

### Component Relationships



### Typical installation





## **2. Planning**

### **Controls**

- **Main Control Board:** The Main Control Board is located in the bay near the furnace system.
- **The Interior Switch Panel:** The interior switch panel is located in the living area.
- **The Fan Switch:** In some installations, there is a fan switch that regulates the air fan output. It is typically labeled high-off-low. Some installations have no speed regulation for the air fans.
- **The Thermostats:** Each heated zone has a thermostat. These may be the multi-zone digital type or a simple single zone household analog type. They should not be mounted on outside walls because this could cause false temperature readings.

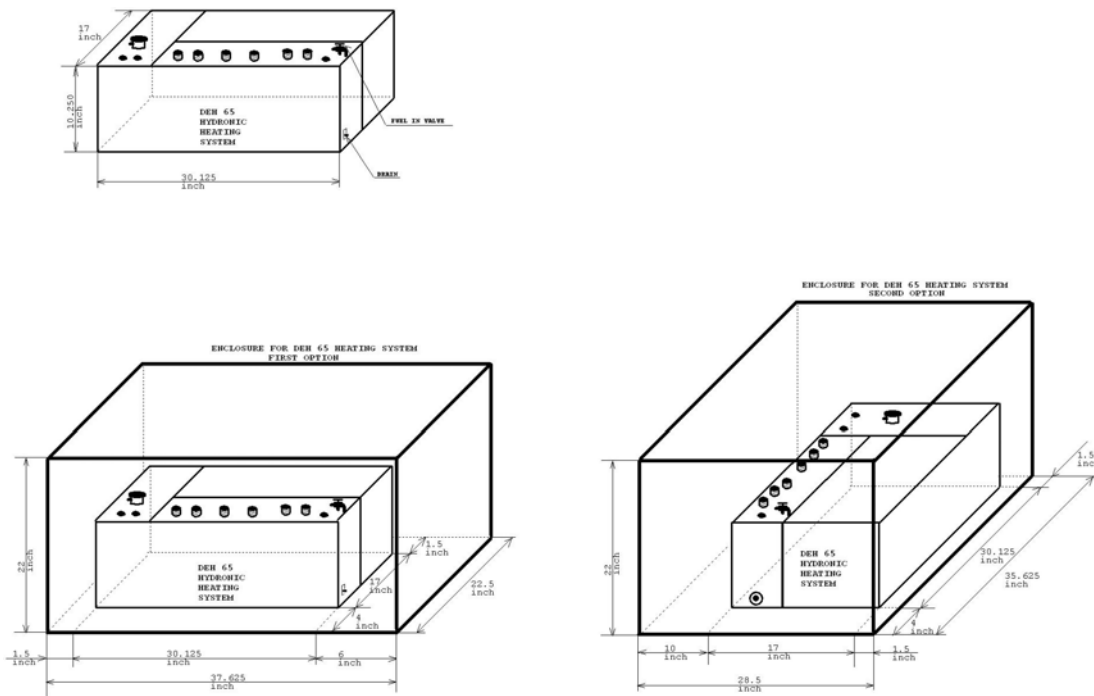
### **Furnace**

The MCS16 unit is installed into a bay in the basement of the coach.

### **Fans Units**

The fan units are placed according to your heating zones. There are different units available and they can be located under cabinets or in remote areas when using ducting.

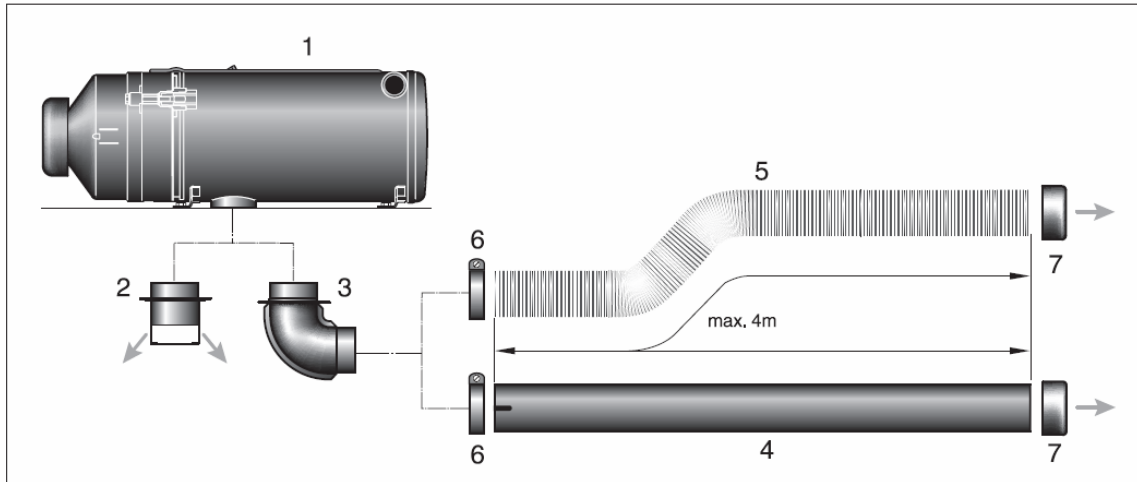
### 3. Unit Mounting



REV	DESCRIPTION	DATE
1	ENCLOSURE DEH 65	10/1/11

1. Locate an area to mount the unit allowing for adequate clearances for servicing.
2. Place the unit and mark the corners of the unit.
3. Remove the unit, measure for exhaust placement.
4. Cut a 4" hole through the bottom of the compartment for the exhaust outlet.
5. Optional fresh air intake: There is a 3" hole in the bottom of the furnace unit for fresh air intake. Refer to section 4.
6. Place unit and secure in place with mounting tabs.

## 4. Exhaust and Combustion air system



- 1 Heater
- 2 Exhaust connection
- 3 Exhaust pipe elbow 90°
- 4 Exhaust pipe
- 5 Flexible exhaust pipe
- 6 Pipe clip
- 7 End sleeve

**Exhaust** – Refer to H16 manual page 19 for further information.

The exhaust should be placed to eliminate exhaust gases from entering the interior of the vehicle.

1. Mount the exhaust elbow to the furnace.
2. Route 2 ¼" exhaust piping to the desired location and secure into place.
3. Optional muffler: a muffler can be installed if necessary. The muffler should be a flow through type with out baffles. This can be purchased at an auto parts store or muffler shop.

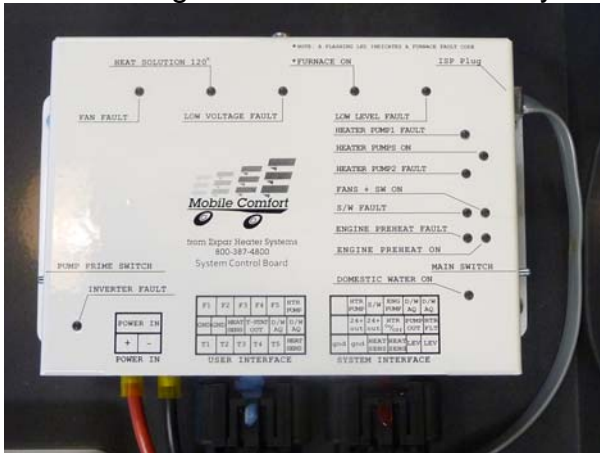
### Combustion Air

- The compartment where the unit is located should be vented to allow for combustion air with a minimum opening of 9 square inches.
- A 3" hole can be cut through the bottom of the compartment for fresh air intake. A screen should be installed on this opening.
- The air intake on the burner is adjustable for high altitude operation.

## 5. Wiring

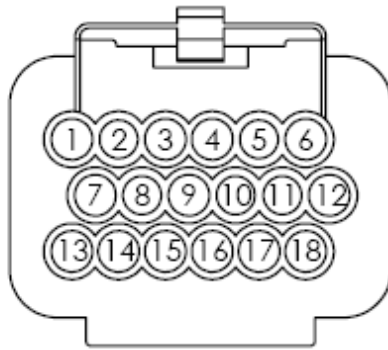
### Main Control Board

- This is usually located in close proximity to the heating unit for servicing convenience.
- It should be located so that the face is visible to monitor system operations and troubleshooting.
- The system “Main Switch” is located on the right hand side and must be “ON” for the system to operate.
- The “Pump Prime Switch” is located on the left hand side and is used during commencement of the system.



**FAN FAULT**----- A SHORT IN ANY FAN CIRCUIT ----- **RED LED**  
**HEAT SOLUTION 120\***----- AT THIS TEMPERATURE THE FANS WILL TURN ON-----**GREEN LED**  
**LOW VOLTAGE FAULT**----- BELOW 11 VOLTS DC UNIT WILL SHUT DOWN-----**RED LED**  
**FURNACE ON**----- FURNACE RUNNING IN NORMAL OPERATION----- **GREEN LED**  
**FURNACE LED FLASHING CHECK PATTERN OF FLASHES TO INDICATE THE FAULT. THERE IS A TWO SECOND PAUSE AND THE FLASHING SEQUENCE WILL REPEAT.**  
**LOW LEVEL FAULT**----- COOLANT IN EXPANSION TANK UNDER 7 LB----- **RED LED**  
**RADIATOR CAP IS LOW**  
**HEATER PUMP 1 FAULT**-----SHORT IN PUMP 1 -----**RED LED**  
**HEATER PUMP 2 FAULT**-----SHORT IN PUMP 2 -----**RED LED**  
**HEATER PUMPS ON**----- POWER TO BOTH HEATER PUMPS -----**GREEN LED**  
**FANS + SW ON**----- POWER TO FANS AND SUMMER/WINTER CIRCUIT----- **GREEN LED**  
**S/W FAULT**-----SHORT IN SUMMER/WINTER CIRCUIT-----**RED LED**  
**ENGINE PREHEAT FAULT**-- SHORT IN PRE HEAT PUMP ----- **RED LED**  
**ENGINE PRE HEAT ON**----- ENGINE PRE HEAT PUMP RUNNING ----- **GREEN LED**  
**AUTO SHUT DOWN IN 15 MINUTES**  
**DOMESTIC WATER ON**----- AQUA STAT CLOSED TO HEAT-----**GREEN LED**  
**DOMESTIC WATER 140\* OFF 125\* ON**  
**INVERTER FAULT**----- NO 24 VOLT DC POWER TO ESPAR BURNER-----**RED LED**  
**REMOTE PLUG**-----8 PIN PHONE CORD CONNECTS TO REMOTE SWITCH IN COACH  
**MAIN SWITCH**-----POWER FOR SYSTEM  
**PUMP PRIME SWITCH**-----MOMENTARY SWITCH TO CHECK PUMP AND FLUID FLOW IN EXPANSION TANK  
**POWER IN**-----MAIN POWER IN MUST BE ON A FUSE OR BREAKER (20 AMP MIN.) MUST HAVE AT MIN 10 GAUGE WIRE  
**USER INTERFACE**-----OUTPUT TO FANS, THERMOSTATS, DOMESTIC WATER, HEAT SENSORS AND HEATER PUMP  
**SYSTEM INTERFACE**-----OUTPUT TO FURNACE

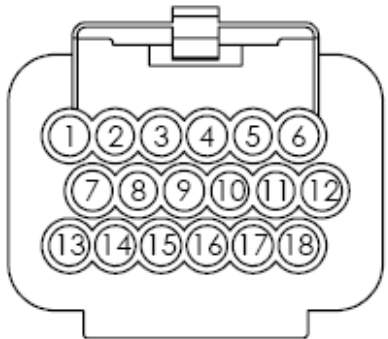
## Internal System Harness



CABLE ENTRY VIEW  
SYSTEM INTERFACE

PIN	COLOUR	FUNCTION
1	EMPTY	EMPTY
2	RED/WHITE	HEATER PUMP
3	RED/BLACK	SUMMER WINTER VALVE (V+)
4	GREEN	ENGINE PRE HEAT PUMP (V+)
5	BLUE/WHITE	HOT WATER AQUASTAT
6	BLUE	HOT WATER AQUASTAT
7	EMPTY	EMPTY
8	RED	ESPAR HEATER CONTROLS (24VDC+)
9	ORANGE/RED	ESPAR HEATER WATER PUMP (24VDC+)
10	ORANGE	ESPAR HEATER ON/OFF
11	ORANGE/BLACK	ESPAR HEATER PUMP SIGNAL (24V+)
12	GREEN/WHITE	ESPAR HEATER FAULT CODE SIGNAL
13	BLACK	GROUND (TO HEATER)
14	BLACK/WHITE	SYSTEM GROUND
15	WHITE	SOLUTION TEMP
16	WHITE/BLACK	SOLUTION TEMP
17	BLUE/BLACK	LEVEL SWITCH
18	GREEN/BLACK	LEVEL SWITCH

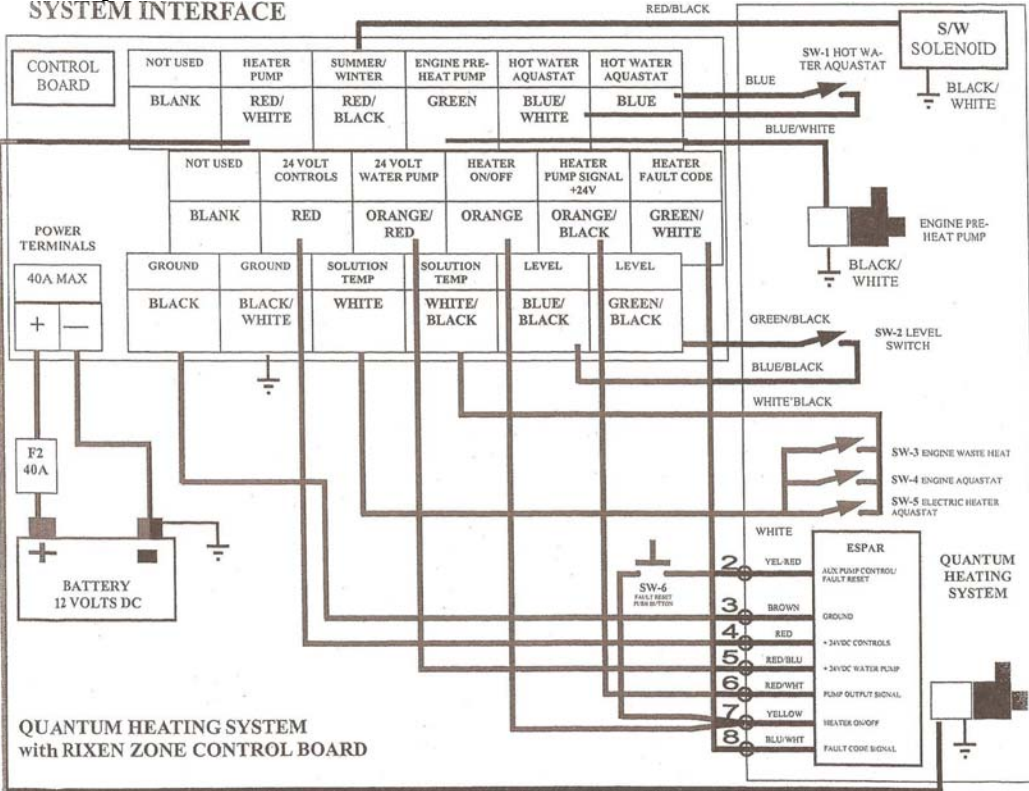
## Outside System / User Harness



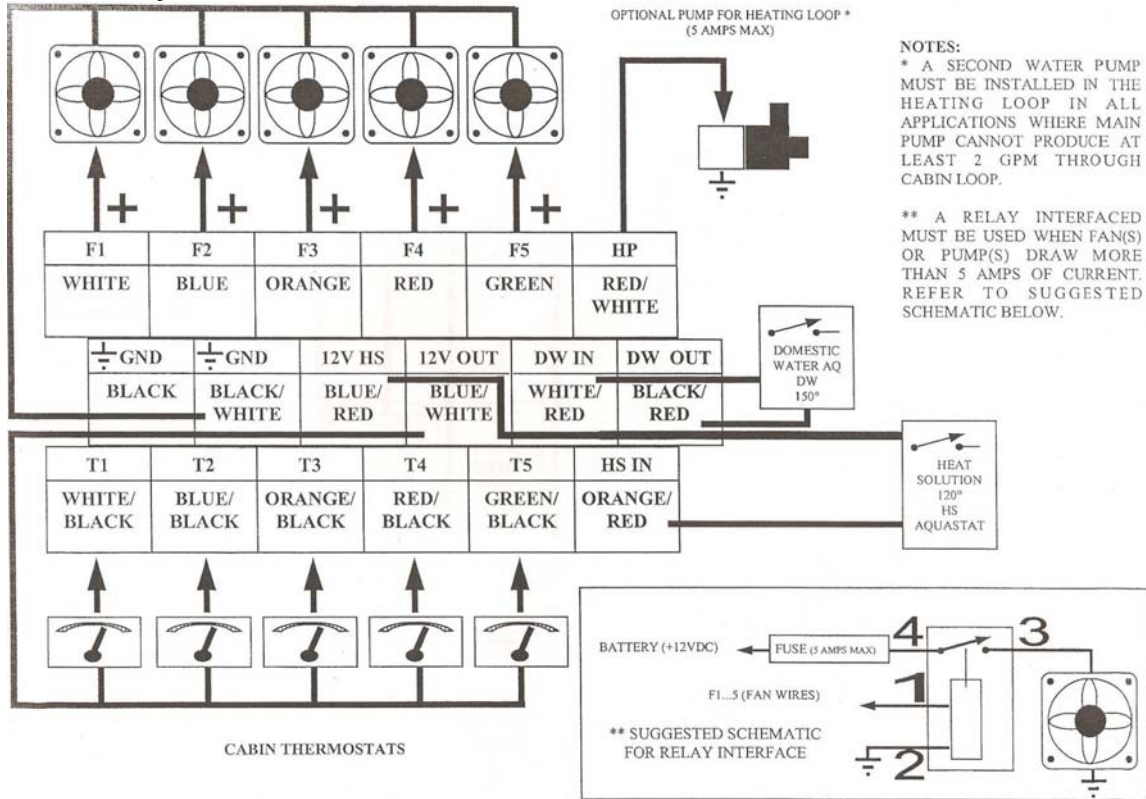
CABLE ENTRY VIEW  
USER INTERFACE

PIN	COLOUR	FUNCTION
1	WHITE	CABIN BLOWER SYSTEM 1 (V+)
2	BLUE	CABIN BLOWER SYSTEM 2 (V+)
3	ORANGE	CABIN BLOWER SYSTEM 3 (V+)
4	RED	CABIN BLOWER SYSTEM 4 (V+)
5	GREEN	CABIN BLOWER SYSTEM 5 (V+)
6	RED/WHITE	EXTERNAL PUMP (OPTIONAL, V+)*
7	BLACK	GROUND
8	BLACK/WHITE	BLOWER SYSTEM GROUND
9	BLUE/RED	12V HEAT SOLUTION AQ 120°F
10	BLUE/WHITE	12V OUT CABIN THERMOSTATS
11	WHITE/RED	DOMESTIC WATER AQ IN 150°F
12	BLACK/RED	DOMESTIC WATER AQ OUT 150°F
13	WHITE/BLACK	CABIN THERMOSTAT SYSTEM 1 (V+)
14	BLUE/BLACK	CABIN THERMOSTAT SYSTEM 2 (V+)
15	ORANGE/BLACK	CABIN THERMOSTAT SYSTEM 3 (V+)
16	RED/BLACK	CABIN THERMOSTAT SYSTEM 4 (V+)
17	GREEN/BLACK	CABIN THERMOSTAT SYSTEM 5 (V+)
18	ORANGE/RED	HEAT SOLUTION AQ IN 120°F

# Internal System Harness



# Outside System / User Harness

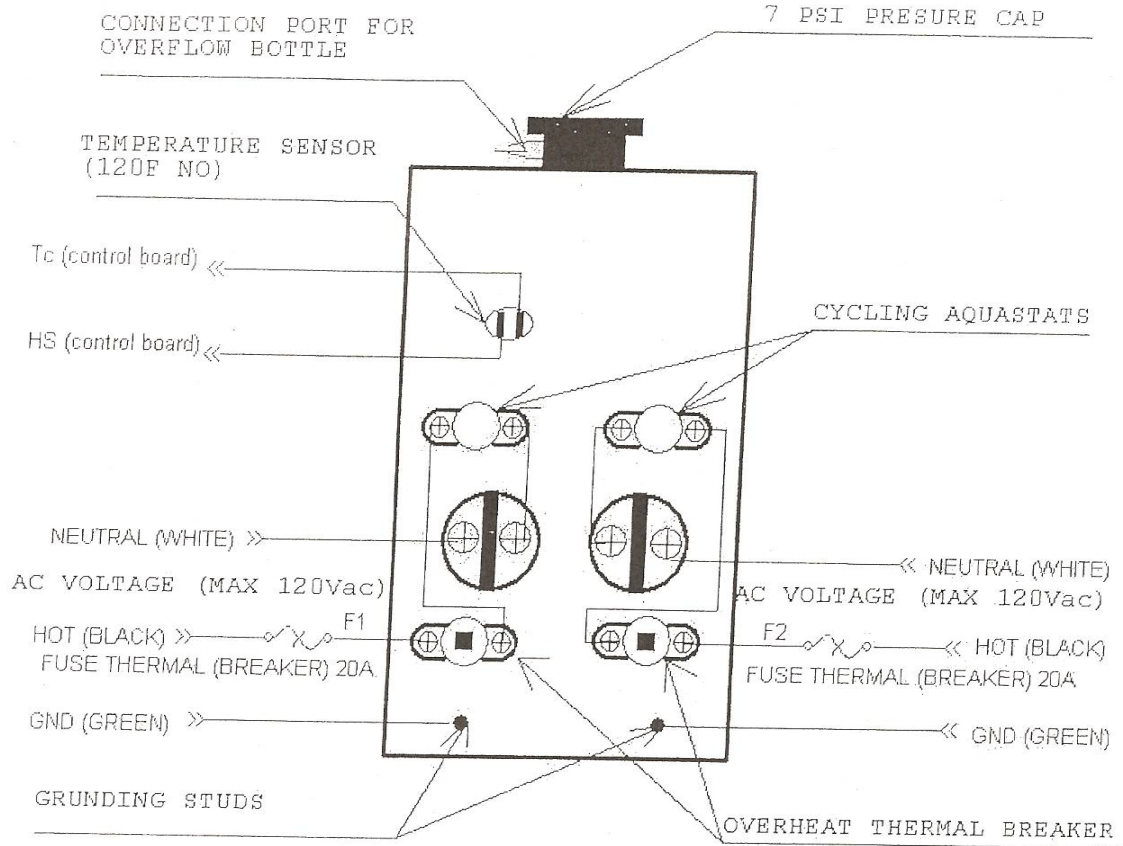




**AC Electric**

*USE*

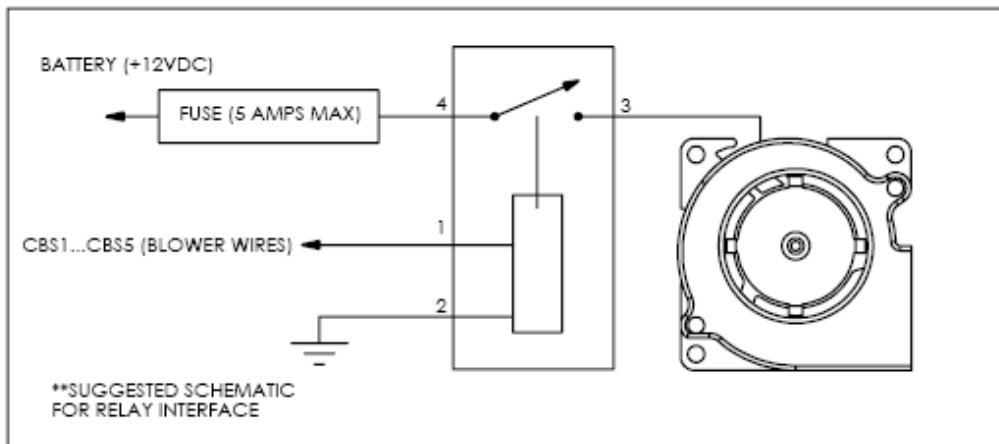
**ComfortHOT Diagrams**



**Interior switch panel** – This panel is wired with an 8-pin phone cord routed between the Main Control Board and the switch panel.



### Second Water Pump (Optional)



**NOTES:**

\* A SECOND WATER PUMP MUST BE INSTALLED IN THE HEATING LOOP IN ALL APPLICATIONS WHERE MAINPUMP CANNOT PRODUCE AT LEAST 2GPM THROUGH CABIN LOOP

\*\* A RELAY INTERFACED MUST BE USED WHEN FAN(S) OR PUMP(S) DRAW MORE THAN 5 AMPS OF CURRENT. REFER TO SUGGESTED SCHEMATIC

**6. System Plumbing** - refer to H16 manual page 21 for further information. The system coolant flow is essential for optimum heating and for the operation of the heater. A properly designed system is more efficient and less troublesome.

- **System Plumbing** – There are three main types of plumbing for a hydronic system. The MCS16 is normally installed as a series system.
  - Series system – This is a common simple system where the system coolant flows from one component to the next and returns to the heater. A robust system pump can push air through the system essentially purging it without the use of air bleeds.
  - Parallel system or Flow and Return (two pipe system) – There is one main coolant loop that flows from the heater and returns. The components are installed with tees. The feed to a component is in the first half of the loop and the return from the component is into the second half of the loop. All components receive a feed line before any return lines are integrated into the main loop. Balancing valves are used to provide even coolant flow to all components.
  - Manifold system – The output from the heater flows into a large manifold. From the manifold smaller coolant lines feed specific components, in series or parallel, and then into a return manifold. The return manifold returns to the heater. Balancing valves are used to provide even coolant flow to each system loop.
- **Routing hoses**
  - Coolant lines should be as short as possible and routed to prevent any kinking if they are too short or too long. They expand when heated and a hard line should not be mounted rigidly, use a clamp with a rubber insert.
  - Avoid sharp objects or edges and route away from high heat sources.
- **Hose connections**
  - The hose connections depend on what materials are used for the system plumbing.
  - Connections should be done according to manufacturer's recommendation.
  - All connections between Pex type tube and brass or copper fittings should have a 5" rubber hose. This will allow a component to be removed by clamping the hose to prevent coolant leakage.
- **System priming**
  - The Main Control Board has a "pump prime switch" on the left hand side. It is a momentary on switch.
  - Fill the system with antifreeze (40% to 60%) / water solution.
  - Operate the pump from time to time to push the water through the system (an average system holds between 5 and 7 gallons of coolant).
  - After filling the system operate the pump continuously for at least 1 minute and watch for water circulation in the fill neck of the expansion tank.
- **Optional boost pump** – A second water pump may be needed in a system that has several restrictive components or a hose run of more than 160'.
  - The second pump is put into the system plumbing where it is most convenient.
  - The wires are routed to Pin # 6 (Red/White) on the user interface harness.
  - This pump is triggered by the thermostats and operates when space heating is required.

**7. Fuel connections** - refer to H16 manual page 22 for further information. The large hydronic furnace requires a feed and return line.

- **Locating a fuel source**
  - Most manufactures will have additional ports available on the fuel tank. If there is not one available it may be necessary to drill the tank and install a fuel pick up pipe.
  - It may be possible to tee into a generator supply line. A check valve should be installed after the tee to the generator.
- **Routing fuel line**
  - The fuel line must be properly sized for the furnace in use (refer to H16 manual page 22).
  - Avoid sharp objects or edges and route away from high heat sources.
  - Secure the fuel line in place.
- **Hose connections**
  - Fuel lines should be cleanly cut and butted together to prevent the possibility of trapping air.
  - Fuel line clamps need to be properly placed and tightened to prevent fuel leakage and air from entering.
- **System priming**
  - The fuel pump begins operation when the heater is started and should be able to prime the system. It may take several start attempts to accomplish this.
  - If the heater does not start after several tries check to make sure there is adequate fuel in the tank.

## 9. System Function and Operation

### Interior Switch Panel – 4-place



#### **Master switch**

- Completely shuts off power to the system (allows the furnace to complete it's shut down cycle)
- Powers the thermostats and hot water switch
- The thermostat will power the fan(s) and pump

#### **Diesel Furnace switch**

- Enables the furnace
- Shows flash code for diagnostics

#### **Hot Water switch**

- Aqua stat (closed) – sends power to water pump and enables furnace
- Sends power to the cycling aqua stat on domestic water exchanger
- Aqua stat – closed at 130\* F, open at 150\* F

#### **Engine pre-heat switch**

- Activates the engine circulation pump for 20 minutes
- The cycle can be repeated by turning the switch off and then on.
- Furnace needs to be enabled and should be up to temperature

#### **Wiring Cord**

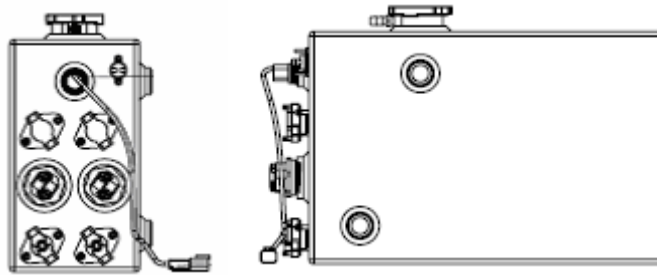
- 8 pin cord connects to main control board located with furnace to the interior switch panel.
- This is a phone cord where the wire color codes will match when facing each other. On a computer cord they will be opposite.

### AC Electric 120VAC Switches:

The heating unit has two 2000 watt 120 VAC electrical elements that are enabled by two switches, one for each element. The individual switches allow operation of one element only if there are other power demands or if there is only 30 amps

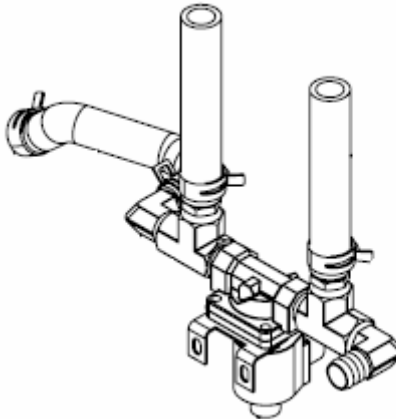
of shore power available. The function of the electric elements is to provide limited heating for the coach interior and preheating for quick response to domestic water function.

- Operation – If the element(s) are powered they will cycle normally. The “Master” switch needs to be “ON” for operation in this mode.
- Wiring/switching – This is wired in the AC electrical panel (like a house) it can be activated by the panel circuit breakers or a properly rated on/off switch.
- Float switch – interrupts power to the system when the system coolant is low (engages master shutdown).
- Pump/fan aqua stat – enables system pump and fans to operate – 120°F set point
- AC Element(s) – heats the system coolant when powered.
- Cycling aqua stat – controls operation of the AC element (150° F to 160° F)
- High limit aqua stat – automatically shuts off power to element when the temperature exceeds 205° F – resettable push button.



### **Summer/winter valve**

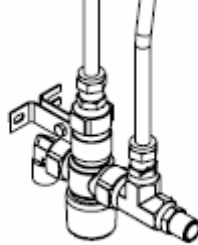
- Normally open – allowing water to bypass system coolant loop for domestic water heating only.
- Closes with signal from thermostat (.5 amp draw) - diverts system coolant to flow through fan units for space heating.
- Espar PN 20 2800 90 0020 0A





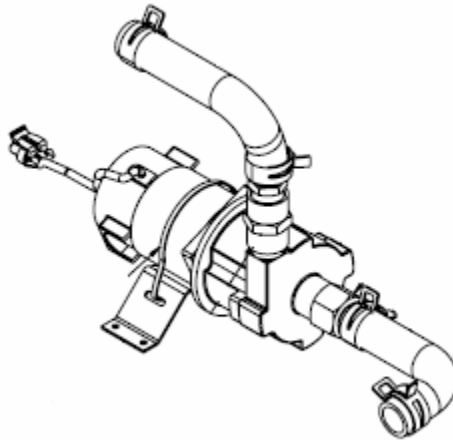
**Tempering valve** – Domestic water supply

- Blends cold water into hot to maintain consistent hot water output temperature.
- Adjustable from 80\* F to 130\* F
- Espar PN 5590175



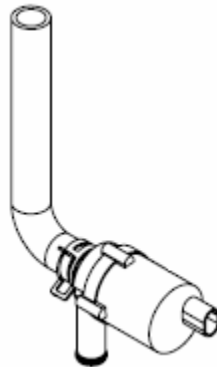
**System Circulation Pump**

- 12 Volt DC Magnetic Pump
- 8 GPM
- Circulates heated fluid from the MCS16 unit and through the heat exchanger's series circuit in the coach.
- Espar PN 5520055



**Engine Pre Heat Pump**

- 12 Volt DC Magnetic Pump
- 3.3 GPM
- Espar PN 330 00 012



## **9. System Operation**

The “Main Switch” on the control board must be “ON”.

The “Master Switch” on the interior panel must be “ON”.

The system will operate from the interior switch panel as follows:

**Coach Heat- Diesel:** Turn on the diesel furnace switch. Set the thermostat(s) to the required temperature. Set the air fan switches to the desired output. The burner will light and then go into its normal cycle and run for approximately 10 minutes and off for approximately 5-10 minutes. The air fans will run until the thermostats are satisfied.

**Coach Heat- Engine:** With the coach engine at temperature and under load, set the thermostats to the desired temperature and set the air fans as discussed above.

**Coach Heat-Electric:** Turn on one or both elements, depending on the service available and the load in the coach. Set the thermostats and air fans. If the diesel furnace switch is on, it is probable that the diesel burner will cycle on. This is determined by the thermostat temperature setting and the heat demand on the system.

**Domestic Water:** Turn on the diesel furnace and hot water switch, Turn on a hot water tap. The burner should light and run as long as you have the tap on. The electric side of the furnace will provide limited hot water with both electric elements on. With one electric element on, the unit is pre-heated only.

**Engine Pre-Heat:** Turn on the diesel furnace switch, allow the system to come to temperature. Turn on the engine pre-heat switch, it will run for at least 20 minutes. It can be reset by turning off the switch and back on.

## **10. Diagnostics -** Refer to H16 manual page 26 for further information.

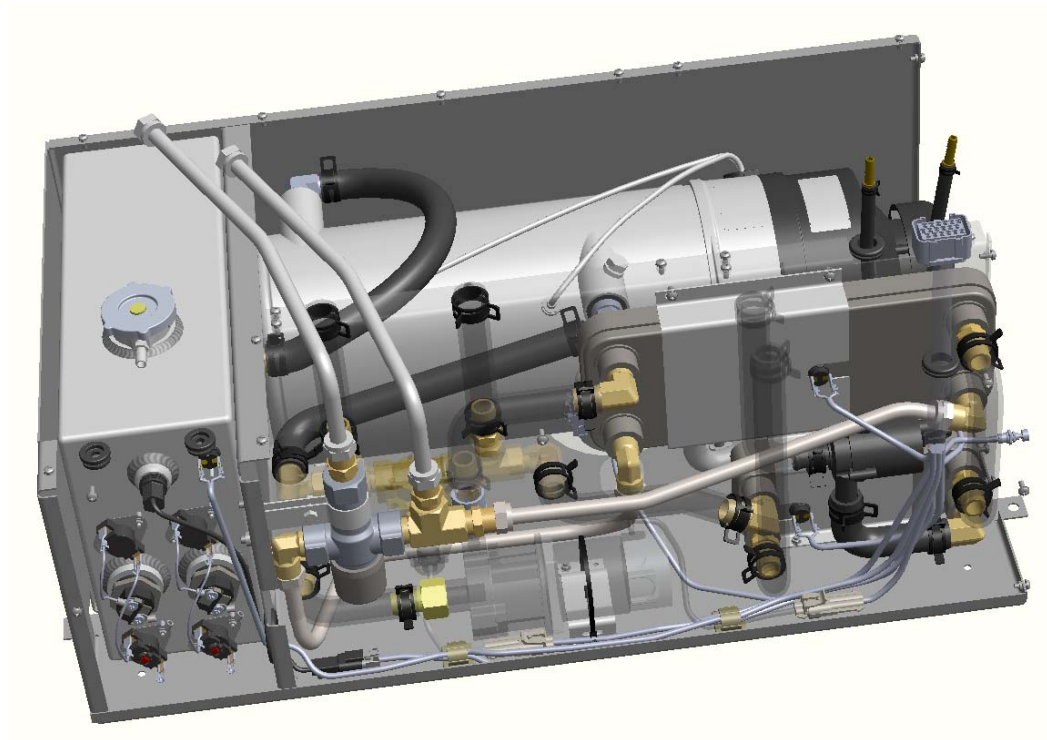
- System -The system diagnostics are visible on the Main Control Board.
- Furnace – Should the furnace fault it will be indicated with a “flash” code. The lights will flash in sequence to indicate the furnace fault, please refer to the furnace manual for interpretation.
  - The flash code is visible on the Interior Switch Panel – Master Switch.
  - The flash code is visible on the Main Control Board – Furnace On (located at the top of the main control board).

## **11. Maintenance** - Refer to H16 manual page 34 for further information.

- System -The system does not require annual maintenance.
  - It is recommended to test the alkalinity in the system coolant annually.
- Furnace
  - Combustion chamber
    - Remove access cover and the burner head.
    - Remove the flame tube and clean with a vacuum or brush.
  - Fuel atomizer nozzle
    - Carefully remove the nozzle. A wrench should be used on the nozzle holder to prevent damage.
    - Clean with a toothbrush and carburetor cleaner.
    - Inspect the stone fuel filter and replace if it is blackened.
  - Exhaust system – the exhaust system should be inspected annually for damage.

## **12. Winterization**

- System coolant
  - The system coolant should be a water/anti-freeze mixture and does not require winterization.
  - The system coolant can be tested for it's freeze protection value.
- Domestic water system
  - The domestic water circuit needs to be drained or protected using propylene-glycol.
  - Draining is accomplished by removing the braided stainless steel lines from the tempering valve. Light air pressure can be applied to ensure all the water is removed. Other water fixtures may also require draining.
  - Propylene-glycol can be pumped through the system using the domestic water pump and opening both hot and cold valves at a plumbing fixture.



### 13. Checklists

#### Heater/system installation checklist – Marine and RV

Purpose – The purpose of this form is to record information pertinent to the heater system installation for future reference to aid in service and troubleshooting.

Date \_\_\_\_\_

Installer Name \_\_\_\_\_ Company \_\_\_\_\_

Phone number \_\_\_\_\_ Location \_\_\_\_\_

Installation Level

OEM     Aftermarket     Replacement

OEM type

New Installation     Installation Revision

Manufacture/Model Year \_\_\_\_\_

Specific Model(s) \_\_\_\_\_

Heater installation

- Proper orientation
- Adequate mounting and support
- Free from water exposure
- Ambient air temperature below 122\* F (50\* C)
- Accessible for servicing

Combustion Air

- Source:  Fresh air     Compartment air     Both
- Combustion air is not drawn from accommodation spaces
  - Combustion air is not under pressure
  - Adequate ventilation (competition from other engines)

Air intake: length \_\_\_\_\_ location \_\_\_\_\_

- Silencer used: type \_\_\_\_\_
- Combustion intake is away from all other sources of exhaust
- Properly supported and secured from abrasion and chaffing

Exhaust

Type \_\_\_\_\_ Size \_\_\_\_\_ Length \_\_\_\_\_

- Exhaust vents directly to atmosphere

- Exhaust outlet positioned to avoid negative air pressure
- Properly wrapped/insulated and routed
- Properly supported and secured from abrasion and chaffing
- Exhaust route prevents water ingress

Exit location \_\_\_\_\_

**Marine**  Condensate drain properly positioned and secured

**Marine**  Through hull used: height above waterline \_\_\_\_\_

**Marine**  Through hull is not obstructed

**Marine**  Through hull position does not affect fenders, ropes, or rubrail

### Fuel System

Line Type \_\_\_\_\_ Size \_\_\_\_\_

Fuel source \_\_\_\_\_ Location \_\_\_\_\_

Fuel pick up standpipe: style \_\_\_\_\_ Height \_\_\_\_\_

Standpipe properly deburred and off the bottom of the tank

Fuel line to pump: input length \_\_\_\_\_ output length \_\_\_\_\_

Fuel pump mounting angle (15-35 degrees, wiring on high side)

Type of mount \_\_\_\_\_ Location \_\_\_\_\_

Properly routed away from sharp edges and hot components

Properly supported and secured from abrasion and chaffing

Deburred, butted, and watertight fuel line connections

An auxiliary fuel filter is recommended for the larger heaters that require a fuel return line.

Auxiliary filter used: type \_\_\_\_\_ location \_\_\_\_\_

### Electrical

Power source \_\_\_\_\_ location \_\_\_\_\_

Wire size \_\_\_\_\_ length \_\_\_\_\_ Fuse \_\_\_\_\_

Properly routed away from sharp edges and hot components

Properly supported and secured from abrasion and chaffing

Proper terminals and watertight connections

Controller(s)

Type \_\_\_\_\_ location \_\_\_\_\_

Harness length to controls \_\_\_\_\_

- controller positioned away from heat sources, sunlight, breezeways
- Thermostat(s) used: location(s) \_\_\_\_\_

Hydronic Hot Water System

Type of system

- Series  Flow and return  Manifold (parallel)  Chilled water

Expansion Tank

Model \_\_\_\_\_ Type  Standard – single line  Flow through  
Location \_\_\_\_\_

\*AC Electric – # of elements \_\_\_ Voltage \_\_\_\_\_ Watts \_\_\_\_\_

Water pump

Model \_\_\_\_\_ Type \_\_\_\_\_ Voltage/amperage \_\_\_\_\_  
Location \_\_\_\_\_

Plumbing

- Hose  Tubing Line Size \_\_\_\_\_ Line Type \_\_\_\_\_
- Properly routed away from sharp edges and hot components
- Properly supported and secured from abrasion and chaffing
- Hoses not too long or short at bends and pass throughs (kinking)
- Hoses allow for servicing of components

Routing Description \_\_\_\_\_

Accessory parts/components

Fan unit(s)

Model \_\_\_\_\_ Type \_\_\_\_\_ Voltage/amperage \_\_\_\_\_  
Location \_\_\_\_\_

Fan unit(s)

Model \_\_\_\_\_ Type \_\_\_\_\_ Voltage/amperage \_\_\_\_\_  
Location \_\_\_\_\_

- Fan units properly mounted

Return Air

Source:  Fresh air  Recirculated air  Both



Hot Air System

- Permanently open duct run is within heater rating parameters
- Duct outlets are not restricted
- Ducting is routed to prevent crushing from gear, tools, etc...
- Ducting is properly supported and secured from abrasion and chaffing
- Duct connections are properly secured

Return Air

Source:  Fresh air  Recirculated air  Both

Air intake is located to prevent restrictions or blockage

Air intake: length \_\_\_\_\_ location \_\_\_\_\_

Installers signature \_\_\_\_\_

installer is certified and trained by Espar and/or Certified Dealer

Espar's acceptance

Reviewed by \_\_\_\_\_

Company \_\_\_\_\_

Signature \_\_\_\_\_

onsite review  offsite review

**14. Warranty**

There is a Two Year warranty on this product. Please refer to our warranty manual on our website. [www.espar.com](http://www.espar.com)