



WORLDWIDE HEATING SYSTEMS

RIXEN'S
ENTERPRISES, INC.

COMPLETE COMFORT CONTROL



MOBILE COMFORT SYSTEM 7

INSTALLATION MANUAL

TEI Certification and RVIA Compliant



WORLDWIDE HEATING SYSTEMS

RIXEN'S
ENTERPRISES, INC.

COMPLETE COMFORT CONTROL

RIXEN'S ENTERPRISES, INC.

37600 C RUBEN LN.

SANDY, OR 97055

PHONE: (503) 668-6090

NEW UPFITTER INQUIRIES: (503) 668-6090 EXT: 007

contact@rixens.com

www.rixens.com

The Mobile Comfort System 7

Installation Manual

1 Introduction to the MCS7

1.1 Please read first

- Before you start with the setting up and/or operation of the system please read these operating instructions through carefully.
- The operating instructions contain important information you require for the setting and safe operation of the heating system.
- Please keep the operating instructions in a safe place for future reference.
- Reference documents for individual components can be obtained from Rixen's website or Rixen's trained Service and Installation center.

1.2 Safety Instructions for operation

Warning! Scalding by hot water!

- Water temperatures over 52°C (125°F) can cause severe burns from scalding.
- Water temperature at the heat exchanger can be up to 85°C (185°F) during operation and possibly higher in the event of a malfunction.
- Use a temperature mixing valve to limit the hot water temperature at the faucet or shower.
- Feel water before bathing / showering. Exercise additional care when bathing children.

Warning! Water quality!

- Only potable water is to be heated.
- The user is responsible for the quality of water used and the sanitization of the water delivery system used with this heater.
- Take precautions to keep the water system free of debris and sanitized to prevent the growth of microorganisms.

Warning! Emergency electrical shut-off location!

- Emergency electrical shut-off location!
- Being aware of the location of the emergency shut-off is vital to safe operation of the furnace.
- Emergency shut-off location is vehicle and installation specific.
- Consult with the vehicle's instructions / manual for details.

1.3 Disclaimer

- Only use and operate the furnace within the scope of the intended use stated by the manufacturer and in compliance with all documentation.
- Any installation or service tasks must be performed according to local codes.
- The manufacturer is not liable for damage caused by improper use or incorrect operation. Failure to comply with the safety instructions make the warranty null and void and this leads to the exclusion of any liability of Rixen's Enterprises Inc.

1.4 Commissioning of the System

- Ensure to fill the coolant system with a generic automotive 50/50 premixed ethanol glycol before powering the unit. Do not use any propenyl or alcohol-based coolant.
- When the fuel line is installed, leave the hose off the furnace, and put it into a container (empty water bottle, etc.) Then use the prime function until fuel comes out of the hose. Then install the primed hose on the furnace.

2 System Introduction

2.1 Hydronic air and water heating system

- The heating system is designed to heat the air in the living area and provide hot water for your sink and shower. It works on the principal of heating and circulating a heated coolant and utilizing heat exchangers to heat the air and/or water.
- Air is heated by means of a heat exchanger with an integrated fan which will circulate the air within the RV. Additional heat exchangers can be added to the system depending on the vehicle configuration. The fan speed can be manually or automatically controlled by the Rixen touchscreen controller. It is recommended to have a return air inlet/routing for optimal air circulation. The further away from the air handler output the better heat circulation you will have.
- Water heating is accomplished via a thin plate double wall heat exchanger. Cold water is pumped into the plate heat exchanger when needed. There it absorbs heat from the system coolant. The resultant heated water is passed through a thermostatic mixing valve, to regulate the temperature, before going on to the fixtures. As water is heated only when needed there is no hot water storage tank.
- The primary heat source for the system is a diesel or gasoline burning coolant furnace (Eberspaecher Hydronic S3). If installed, an auxiliary electric heating element (1500W) can provide additional heat when connected to shore power. In addition to those two, there is a third option of capturing engine waste heat with optional kits available.
- When in operation the coolant furnace (Hydronic S3) works to maintain a constant coolant temperature by adjusting its output as needed. If there is little or no heat being extracted from the system the coolant furnace will automatically switch off, turning back on again when needed.
- The coolant furnace's combustion process is adjusted based on atmospheric pressure measured by the control board. Compensation will take place up to altitudes of at least 11,000ft.
- The main components of the system include: a touchscreen controller, Hydronic S3 coolant furnace, glycol circulating pump, air heat exchanger / blower, a water heat exchanger (plate type), thermostatic mixing valve, control board with altitude adjustment module, and coolant reservoir with integrated heating element.
- Optional components include engine waste heat, engine pre-heat and floor heat.

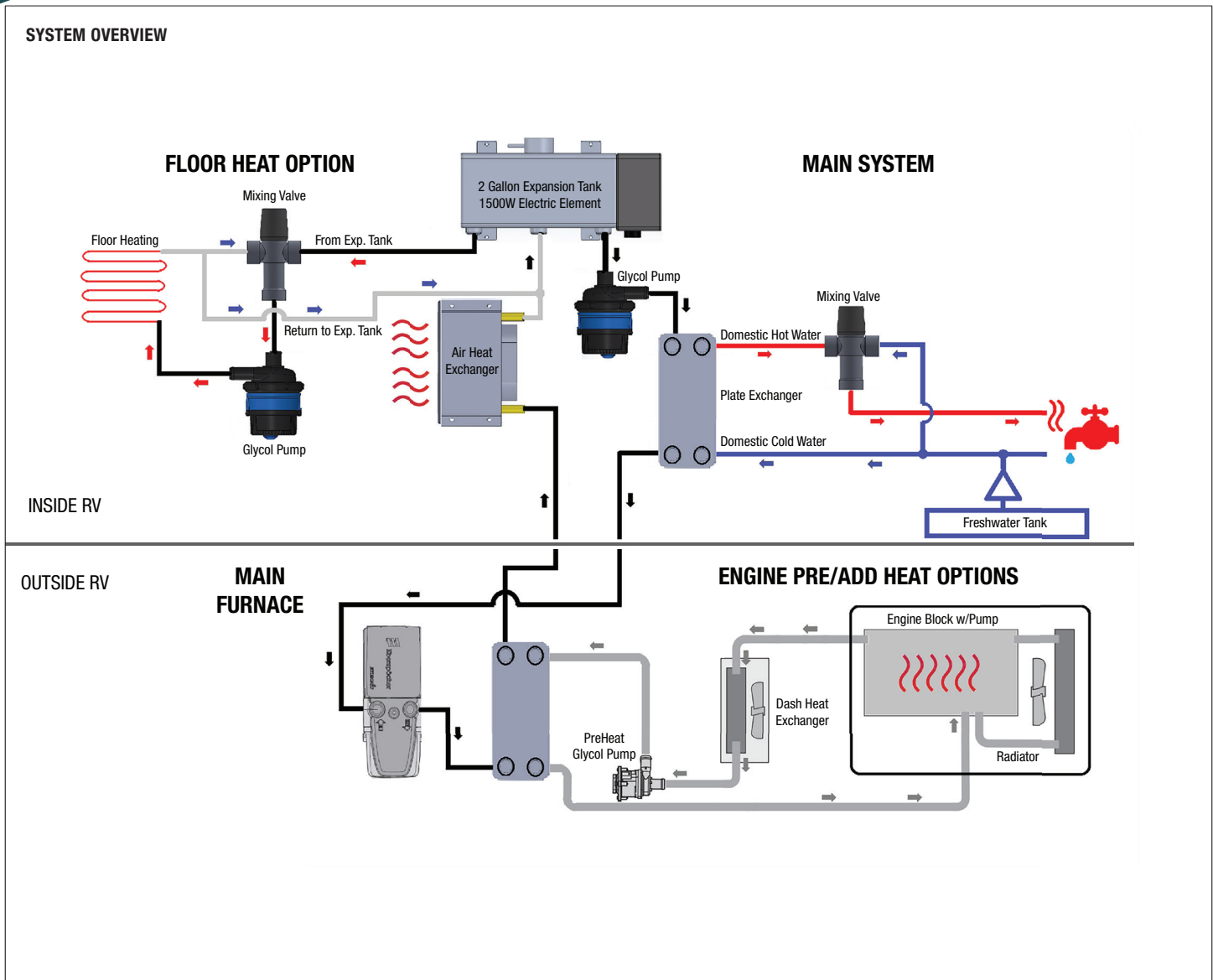


Figure 1

2.2 Heating with the Eberspaecher Diesel or Gasoline Furnace

- When the fuel operating coolant furnace (Hydronic S3) is selected as the heat source it will be activated whenever a heating function (air or water) is activated. The furnace will go through an ignition cycle and then work to maintain the system coolant at an operating temperature of 163F (73C).
- If the coolant furnace experiences a fault a notification will be displayed on the touchscreen controller.
- If the furnace fails to ignite or loses its flame while running it will attempt to restart three times before generating a fault.
- Note: Use of B20 Bio diesel is acceptable for the diesel furnace.

2.3 Assembly and Mounting of the Furnace

- The furnace will be delivered with straight barbs pre-assembled, also 90 Degree barbs are available upon request from Rixen's.
- There is also a fuel line adaptor pre-assembled for 1/8" rubber fuel hose.
- Where many orientations are allowed, we strongly recommend mounting the furnace vertically as shown below in Figure 3. This will allow for the cleanest burn possible and longest service cycle.
- One bolt holds the furnace to its mounting bracket. The holes in the furnace are not threaded. The bolt will cut the threads. There is no need for special tools.
- We recommend to pre-fit the bracket to the furnace on the bench. Install the bolt, thereby cutting the threads. Use that assembly to mark your holes for the bracket at the mounting location. Separate the bracket from the furnace and install.

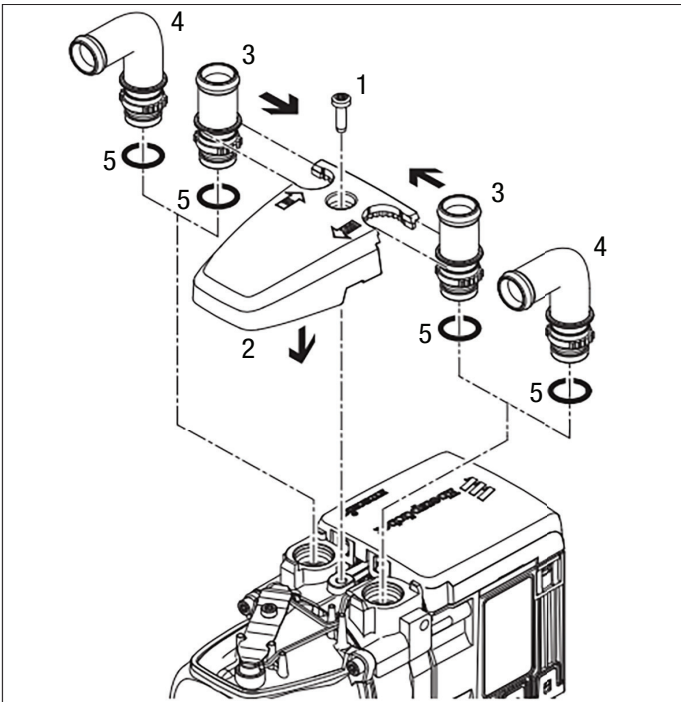


Figure 2

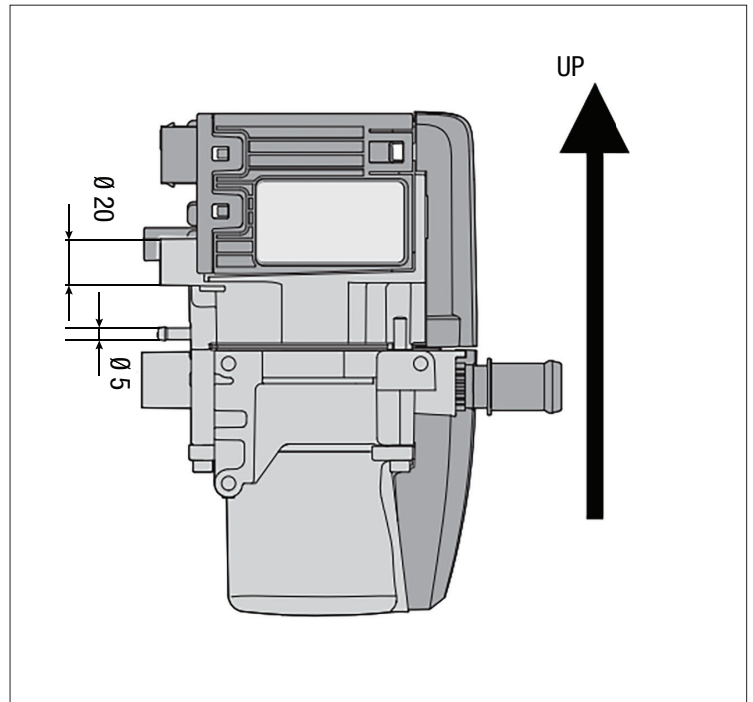


Figure 3

2.4 Mounting of the furnace fuel pump

- Mount the fuel pump on the exterior of the vehicle with the inlet (big nut) facing downward and the output facing upward. There is a fuel filter inside the big nut so we do not recommend adding any further filters to the inlet between the tank and pump.
- Preferred installation position within the range 15° - 35° as shown below in Figure 4.
- 0° - 15° is not allowed as it creates air bubbles in the line.
- When the fuel line is installed, leave the hose off the furnace and put it into a container (empty water bottle, etc.) Then use the prime function in the touchscreen until fuel comes out of the hose. The "Fuel Prime" is in the Menu dropdown in the "About" section. Then install the primed hose on the furnace.

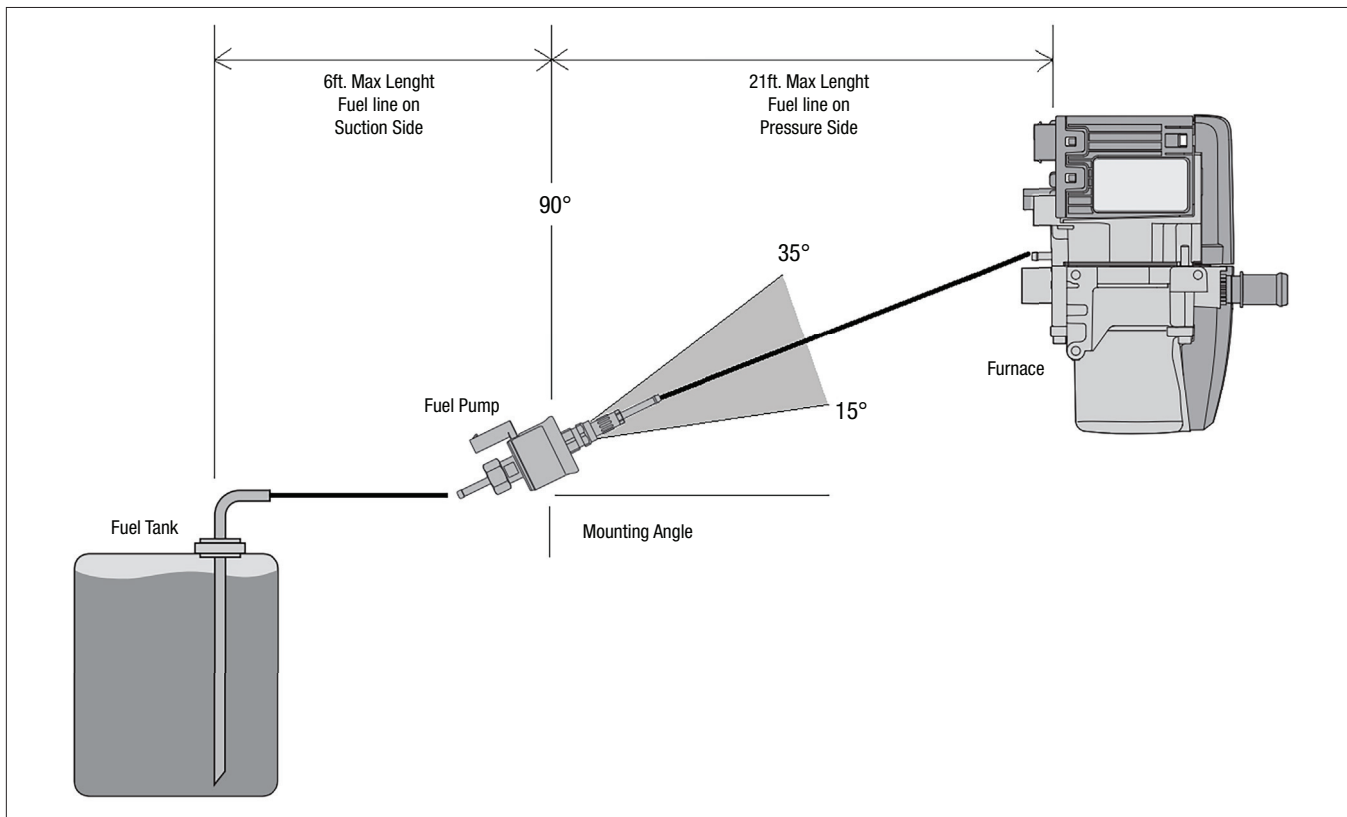


Figure 4

2.5 Mounting the Rixens Glycol Pump

- The furnace has been programmed to run without the factory glycol pump. The pump connector on the furnace is covered by a rubber cap. The Rixens pump is controlled via the MCS7 control board.
- The preferred position for the pump is 'hanging' under the tank (aka Comfort Hot). This insures that gravity feeds only fluid (no air bubbles) to the pump. The pump can push but it cannot pull the fluid to the pump.
- There are two speeds available through the touchscreen controller. Use High Speed during the initial commissioning (purging stage) of the coolant system. Otherwise use the low speed for optimal heat output of the system. To access the speed, go to "Menu" then "Hardware Setup".
- This is the 3rd generation of the pump can now be installed on the exterior or the interior of the vehicle.



Figure 5

2.6 Heating with Electricity

- The coolant expansion tank of the system can be equipped with a 1,500 W (5,100 BTU/h) electric element wired in series with a cycling thermostat and hi-limit/breaker switch.
- The system also provides an output for switching the electric element through shore power. This output (12 VDC) is activated when the electric heat source is selected and there is a heat demand on the system. The 120VAC side should have a 15A fuse inline to the RV panel.
- When in operation the cycling thermostat in the coolant reservoir will regulate the coolant temperature at a level higher than the start temperature of the furnace. As such, when both the electric element and furnace are activated together the electric element will hold a higher start temperature than the furnace.
- The intended usage of the electric element are situations where the heating requirements are low and when access to shore power is available. It may not have sufficient capacity to maintain a comfortable room temperature in colder ambient temperatures. In such scenarios the higher capacity fuel burning furnace should be utilized.
- When in operation the in-series thermostat installed in the coolant reservoir will regulate the coolant temperature at a level higher than the start temperature of the fuel burning coolant furnace. As such when both the electric element and fuel burning coolant furnace are activated together the electric element will not hold a higher start temperature than the furnace.
- The intended usage of the electric element are situations where the heating requirements are low and when access to an electric grid is available. It may not have sufficient capacity to maintain a comfortable room temperature in colder ambient temperatures or supply enough heated water. In such scenarios the higher capacity fuel burning furnace should be utilized.

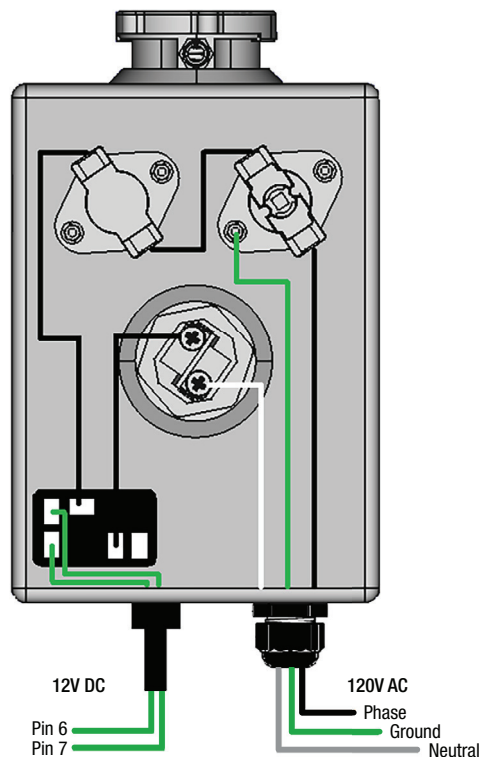


Figure 6

2.7 Heating with the Engine (Option)

- Utilize engine waste heat from vehicle to heat your interior air and water system.
- Installation of a series loop from the dash exchanger coolant outlet to a plate exchanger to add up to 30Kw of heat to the MCS7.
- Coolant loops between the vehicle and MCS7 still remain separated.
- Optional kit includes plate exchanger, brass fittings and clamps.

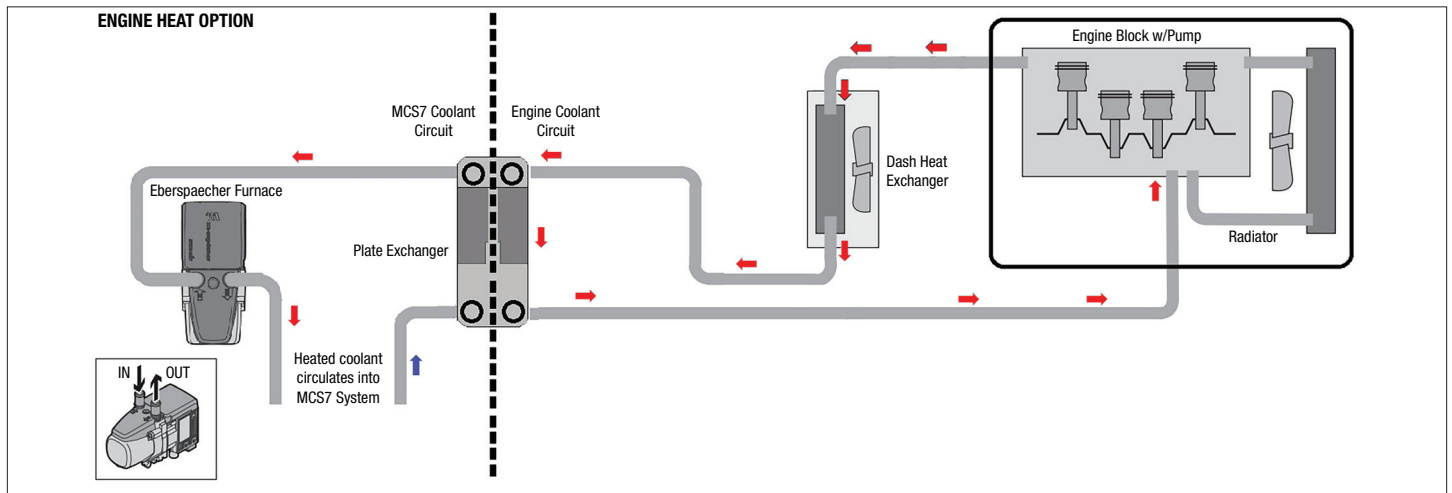


Figure 7

2.8 Preheating with the Engine (Option)

- The engine preheat option warms up an engine when it is not running for a preset time of 45 minutes. This ensures easier and faster engine starts and reduce wear and tear from cold starts/idling.
- Coolant loops between the vehicle and MCS7 still remain separated.
- Optional kit includes Glycol pump, plate exchanger, brass fittings and clamps.

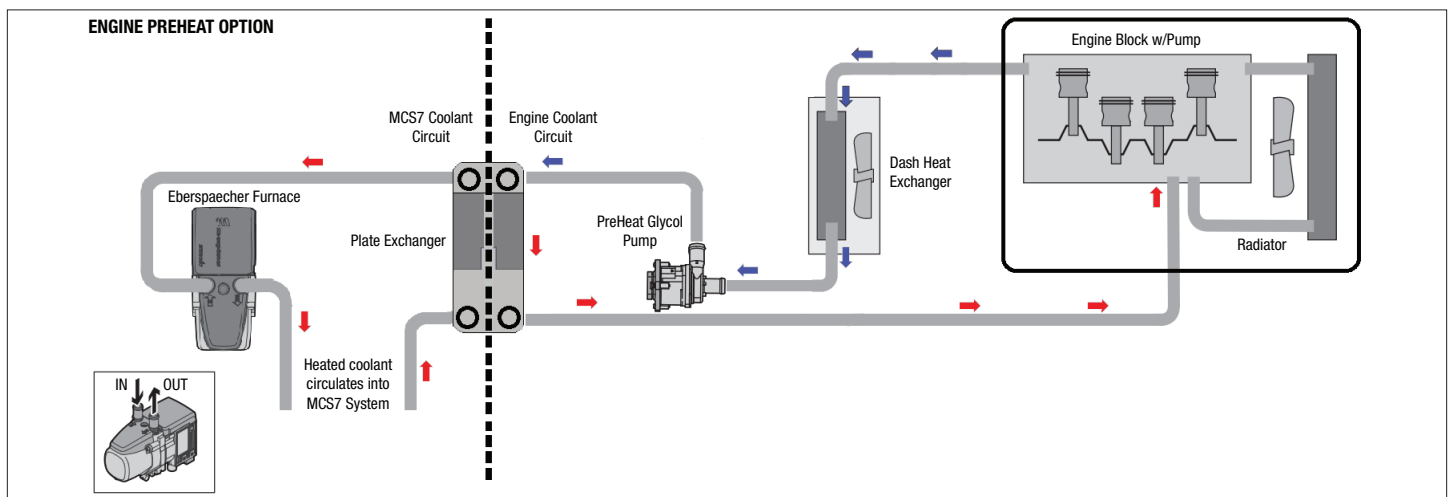


Figure 8

2.9 Heating with the Floor Option

- Circulate coolant throughout the floor for even heat distribution and eliminate cold spots.
- Rixen offers a kit (Glycol Pump/Mixing Valve/Fittings) which can be combined with pex tubing and floor fabrication for your own unique design or look into our precut fabricated kits.
- Vehicle model specific kits available, no cutting or drilling involved.
- The floor consists of CNC routed fiberglass-reinforced closed cell foam substructure with CNC mapped wood overlay with slight engravings that show where the PEX and heat transfer plates lie beneath.

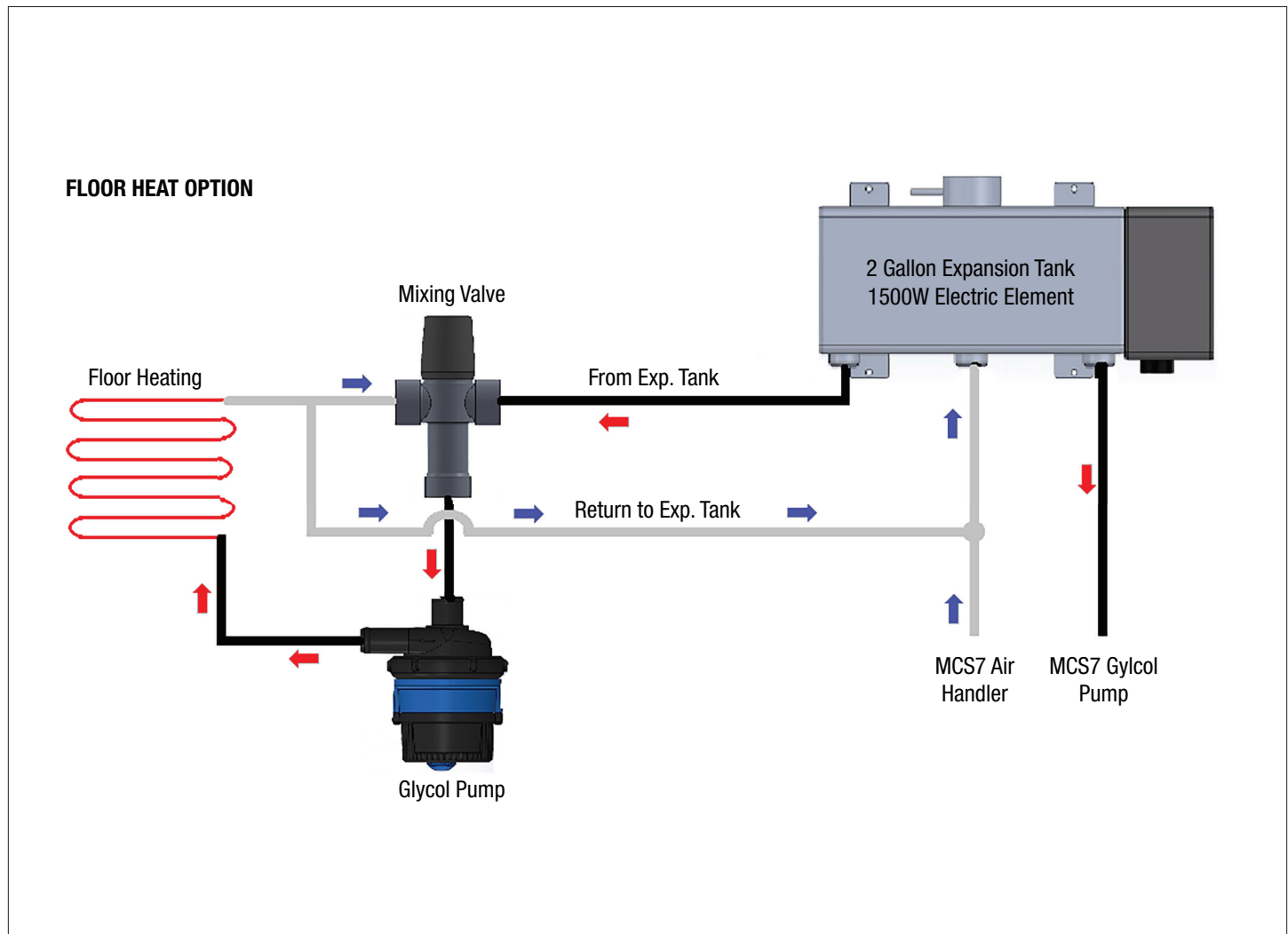


Figure 9

2.10 System Coolant

- The system uses a generic automotive 50/50 premixed ethanol glycol available at any automotive store.
- The fluid level must be checked regularly, and the reservoir tank should be kept close to full. Due to the expansion of the system and the variability of system configurations the exact maximum fill level will vary according to the installation.
- Leave a one-inch air space at the top of the tank for coolant expansion.

3 System Schematics

3.1 Component Layout

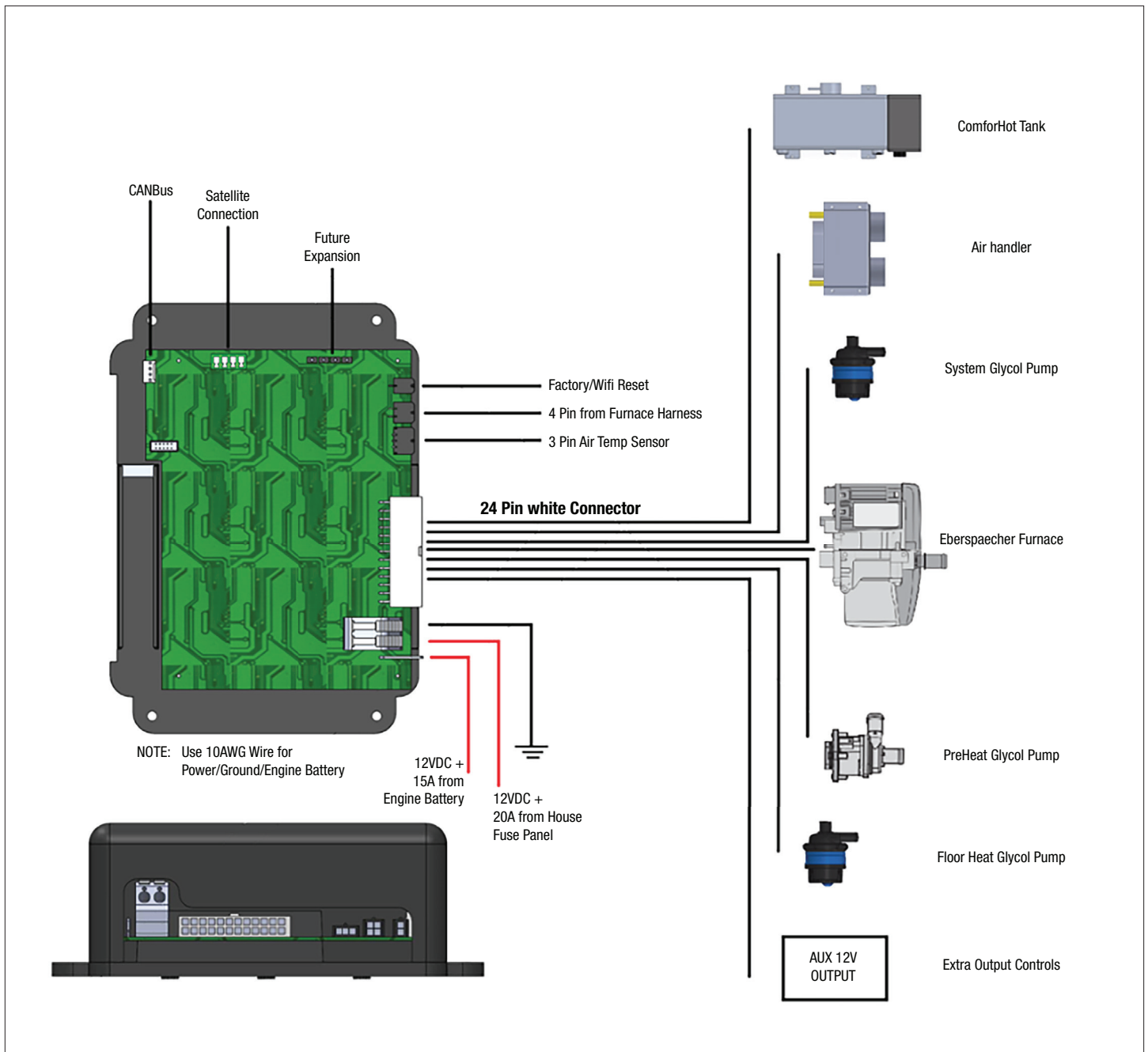
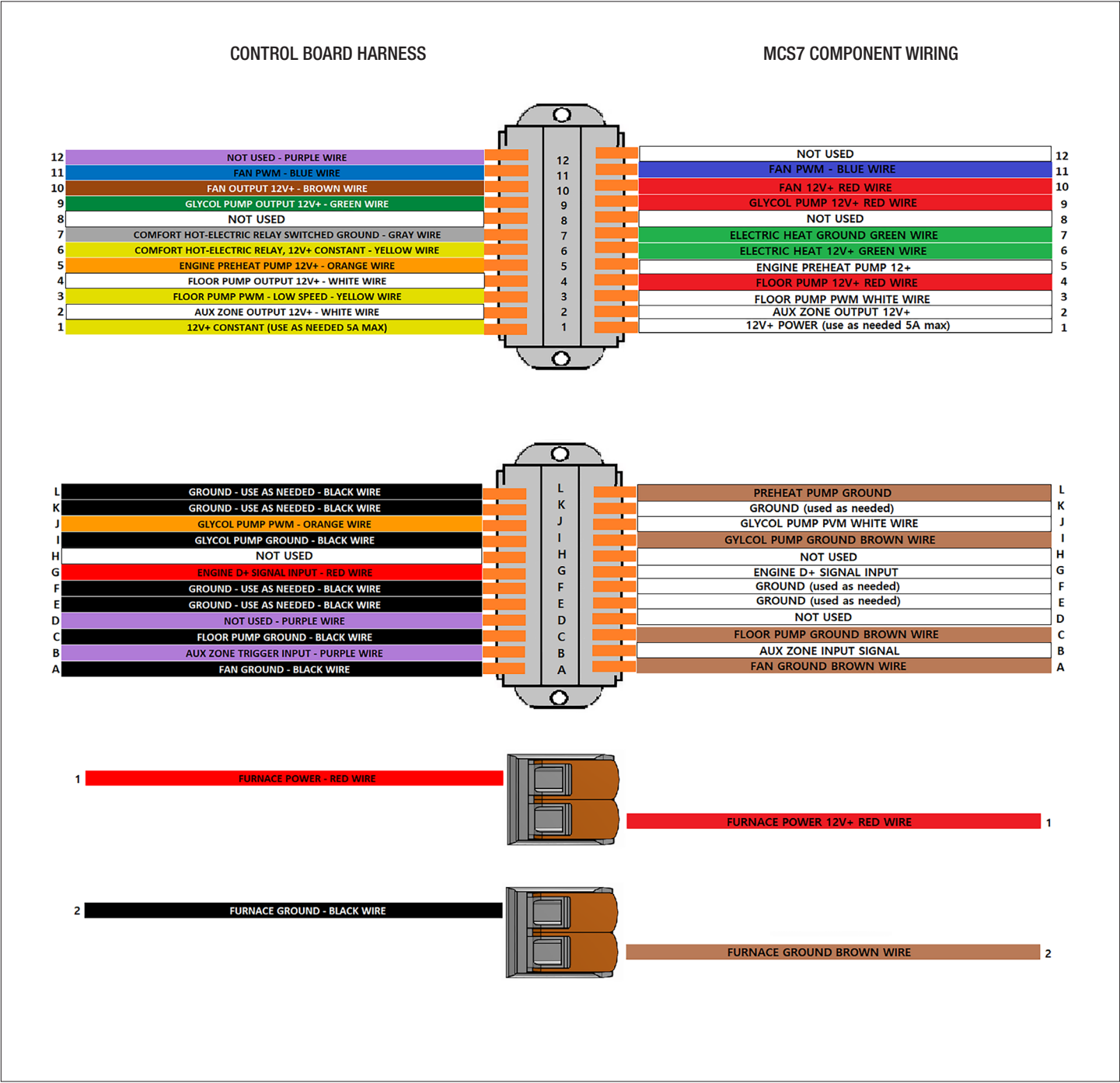


Figure 10

3.2 Control Board Wiring



L

GROUND - USE AS NEEDED - BLACK WIRE

K

GROUND - USE AS NEEDED - BLACK WIRE

J

GLYCOL PUMP PWM - ORANGE WIRE

I

GLYCOL PUMP GROUND - BLACK WIRE

H

NOT USED

G

ENGINE D+ SIGNAL INPUT - RED WIRE

F

GROUND - USE AS NEEDED - BLACK WIRE

E

GROUND - USE AS NEEDED - BLACK WIRE

D

NOT USED - PURPLE WIRE

C

FLOOR PUMP GROUND - BLACK WIRE

B

AUX ZONE TRIGGER INPUT - PURPLE WIRE

A

FAN GROUND - BLACK WIRE

L

PREHEAT PUMP GROUND

K

GROUND (used as needed)

J

GLYCOL PUMP PWM WHITE WIRE

I

GLYCOL PUMP GROUND BROWN WIRE

H

NOT USED

G

ENGINE D+ SIGNAL INPUT

F

GROUND (used as needed)

E

GROUND (used as needed)

D

NOT USED

C

FLOOR PUMP GROUND BROWN WIRE

B

AUX ZONE INPUT SIGNAL

A

FAN GROUND BROWN WIRE

1

FURNACE POWER - RED WIRE

2

FURNACE GROUND - BLACK WIRE

1

FURNACE POWER 12V+ RED WIRE

2

FURNACE GROUND BROWN WIRE

Figure 11

3.3 Component Wiring

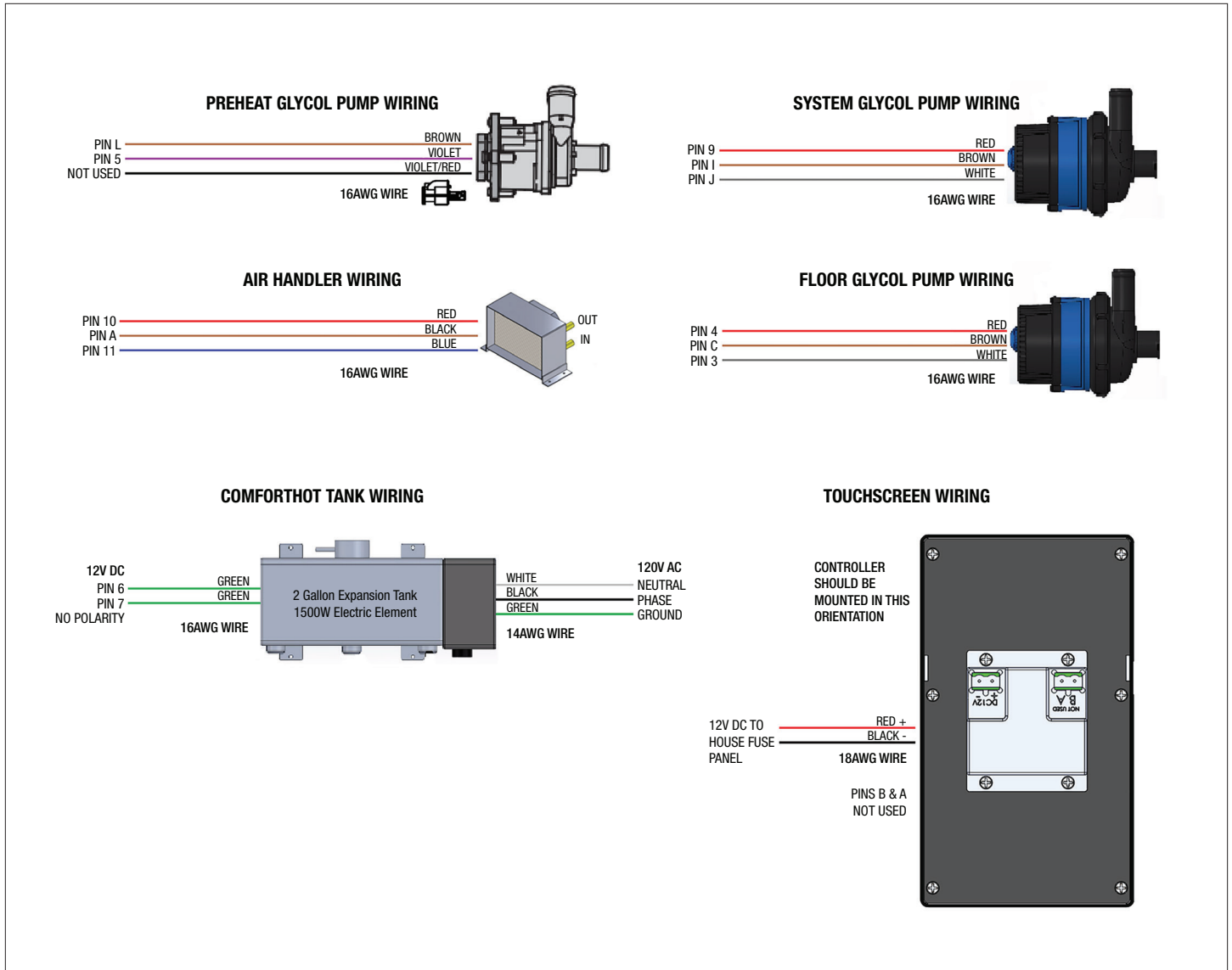


Figure 12

3.4 Furnace Wiring

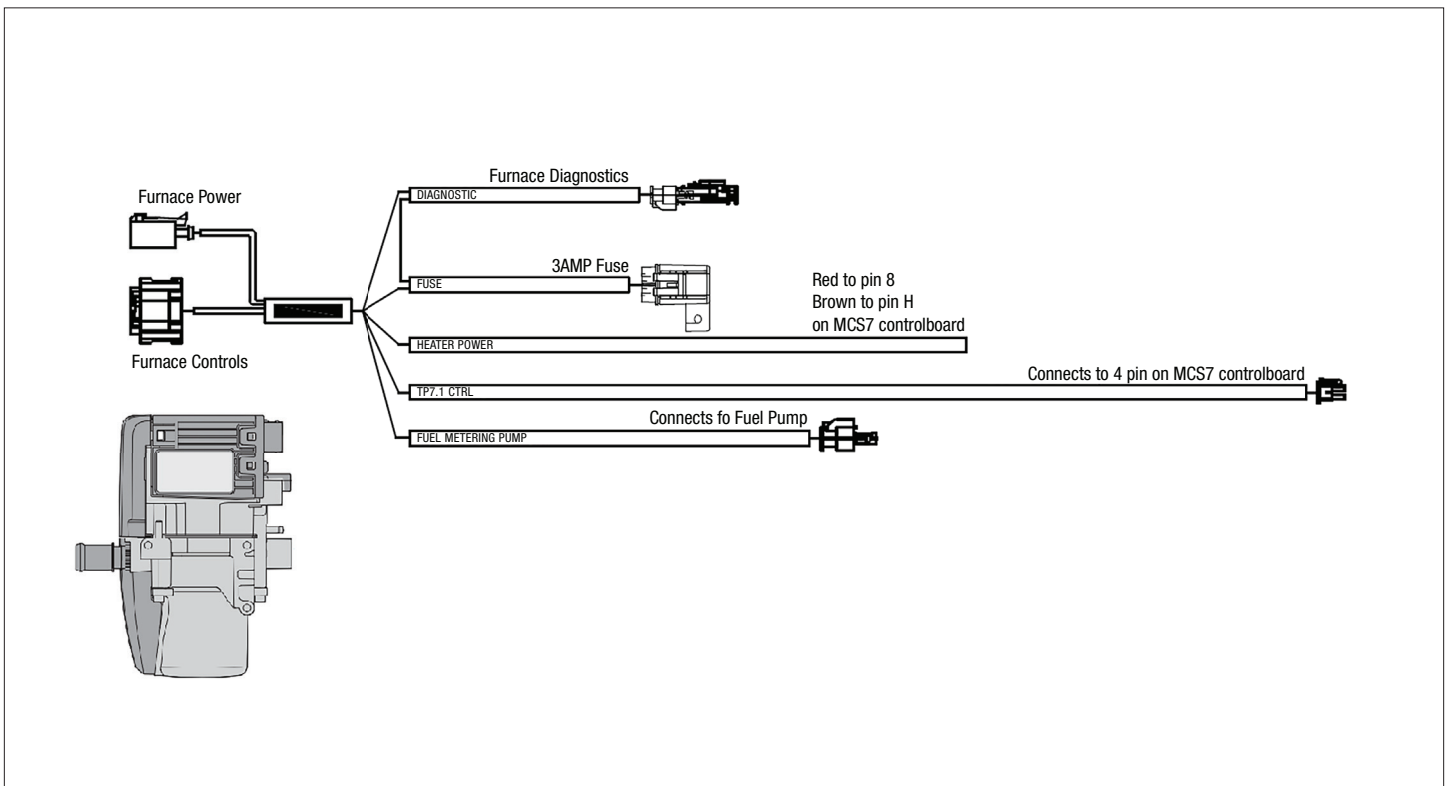


Figure 13

3.5 Mixing Valves

- Rixen's offers two different mixing valves depending on customer preference as shown below.
- Mix temperature range recommended is between 110-120F.

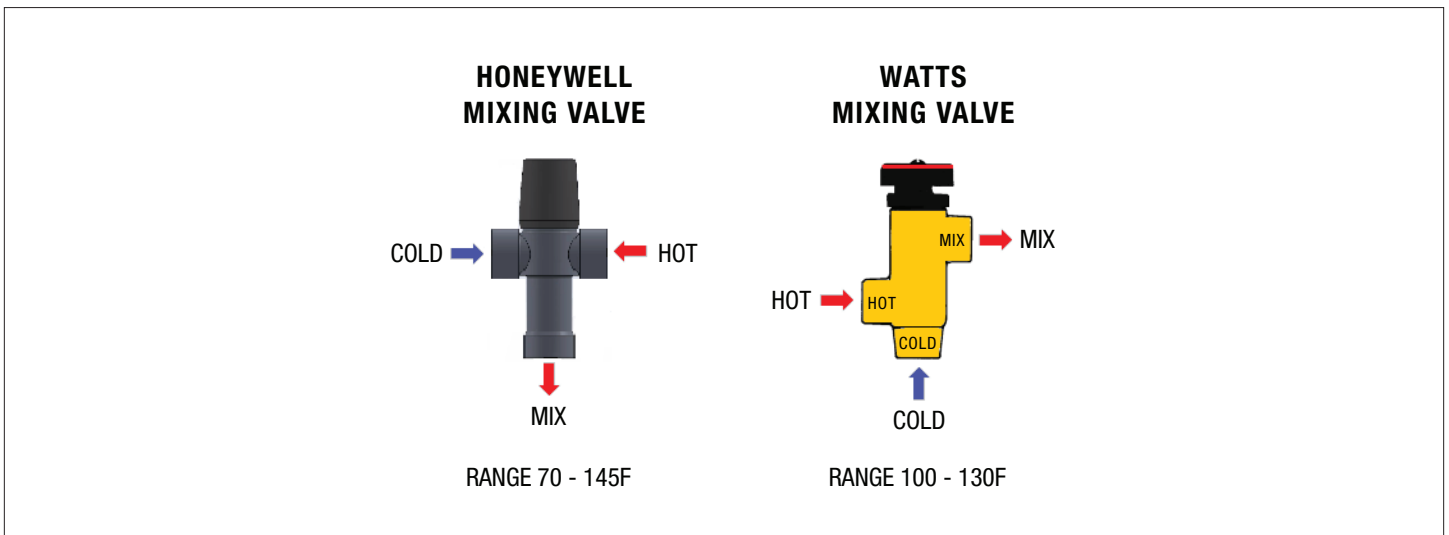


Figure 14

3.6 Touchscreen Controller Dimensions

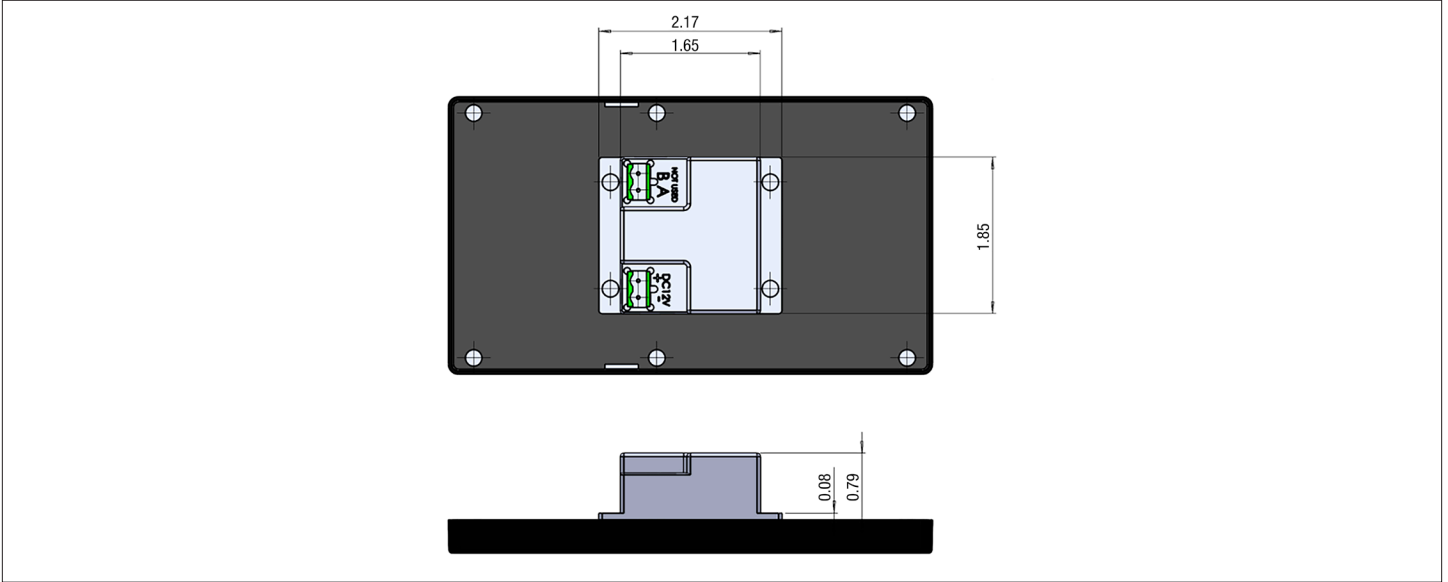


Figure 15

3.7 Optional Controller Mounting Plate Dimensions

For applications where no hard mount is available inside the van (sold separately).

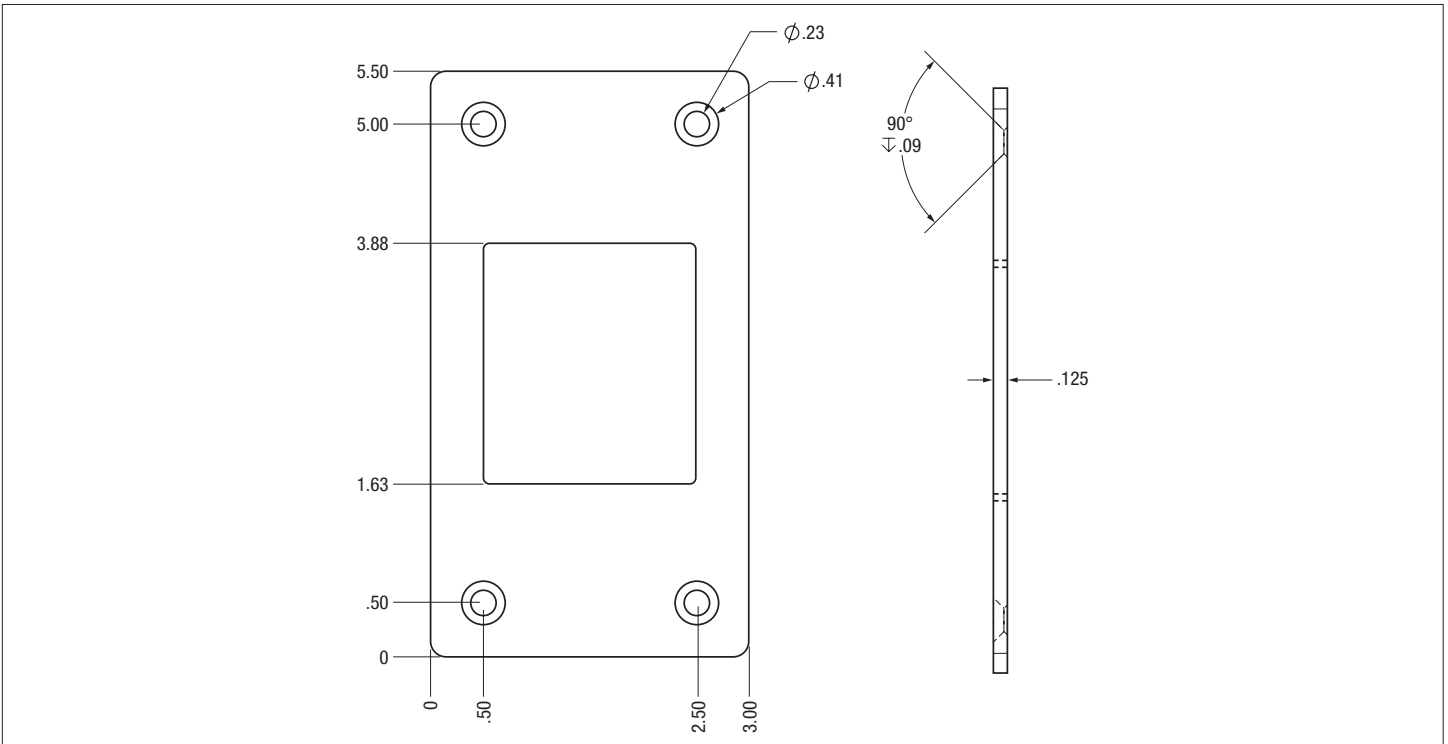


Figure 16

3.8 Air Temperature Sensor Mounting

When installing the air temp sensor make sure it is fully connected to the control board. If not, an ERROR will appear on the touchscreen controller. Make sure to mount the temperature sensor approximately mid-height on an interior van wall. Do not install the sensor inside a cabinet or next to a heat source i.e. An outlet vent, microwave, coffee pot etc.



Figure 17



RIXEN'S ENTERPRISES, INC.

37600 C RUBEN LN.
SANDY, OR 97055

- ☎ PHONE: 503-668-6090 EXT: 007
- ☎ AFTER HOURS TECH SUPPORT PHONE LINE AVAILABLE BY CALL
- ☎ OR TEXT: (503) 744-2408
- ☎ SALES PHONE: (647) -569-6606
- ✉ contact@rixens.com
- 🌐 www.rixens.com