SYNERGY MFG. 870 INDUSTRIAL WAY, SAN LUIS OBISPO, CA (805) 242-0397

4040 SIT-SHOWER-SHAVE INSTRUCTIONS

GENERAL NOTES:

- These instructions are also available on our website; www.synergymfg.com. Check the website before you begin for any updated instructions and additional photos for your reference.
- This is a universal kit that can be installed on any water cooled vehicle which runs at an approximate water temp between 190-210 deg F.
- The following instructions show the installation of a complete 4040 Sit Shower Shave Kit onto a 2012 Jeep JK wrangler. Use these instructions as a guide when installing it on another vehicle.
- Installation of this kit will require the use of simple hand tools, a drill with a quality ¼" diameter metal cutting drill bit, and some thread sealant or Teflon tape.
- **NOTE** Installation can be done on either inlet or outlet side of heater core. To determine which side is the inlet side, start vehicle after it has completely cooled and take note of which heater core line gets hot first, this is the inlet side of the heater core. It is important to determine this now because some vehicles feature a check valve on the heater core which will only allow coolant to flow freely if the heater is running.
    a) Splicing into the inlet side of the heater core will allow for a consistent operating temperature of the shower. However, the ability to adjust the temperature of the shower itself is not as effective when adjusting heater output in the vehicle. Thus, the shower will really only run at one given temperature.
    b) Splicing into the outlet side of the heater core will likely require the heater to be running in the vehicle for the shower to get up to temp. However, the ability to better control the temperature of the shower is more effective by adjusting heater output in the vehicle. Thus, the shower temperature can vary more by turning the heater from low to high.
    c) Installation is up to the installer. The following instructions are done on the inlet side for simplicity's sake.

PARTS LIST (Complete 4040 Kit):

- **4040-10 Heat Exchanger Kit**

    - (1) Brazed Copper Plate Heat Exchanger
    - (1) Heat Exchanger Mount
    - (4) 1/4"-20 UNC x 1" long hex head bolts
    - (4) 1/4"-20 UNC nylock nuts
    - (8) 1/4" GR8 flat washers

• 4040-11 Shower Pump

- (1) Diaphragm Water Pump (12V, 2.2GPM, 7.5A Max Draw)
- (2) 1/2" Female NPT to 1/2" Barb Fittings
- (1) Fine Mesh Filter (Servicable)

• 4040-12 Shower Head

- (1) Angled Shower Head w/ On/Off Switch
- (1) 25' Shower Hose

• 4040-13 Bathroom Bucket Kit

- (1) 5 USG Bucket
- (1) 5 USG Toilet Seat Bucket Lid
- (6) Double Doodie Wag Bags

• 4040-14 Shower Fitting Kit

- (2) 1/2" Male NPT x 3/4" F PP Cam & Groove Fittings
- (2) 1/2" Male barb x 3/4" C PP Cam & Groove Fittings
- (2) 3/4" DC PP Cam & Groove Fittings
- (2) 1/2" NPT Male to 5/8" Male Barbs
- (2) 1/2" NPT Male to 1/2" Male Barbs
- (1) 1/2" Coarse Filter/Strainer
- (1) 50’ Length Fiber Reinforced Rubber Hose
- (5) #8 Stainless Hose Clamps

Parts / Tools Needed to complete installation:

- Basic simple hand tools.
- Drill with 1/4” metal cutting drill bit.
- Thread sealant or Teflon tape.
- 3’-4’ of coolant hose (Size will depend on vehicle application).
- Coolant to top off system.
- Basic electrical knowledge and supplies (Butt connectors, 10 amp fuse, 10 or 12 gauge wire, and switching mechanism of choice).

INSTALLATION:

1) **WARNING** be sure vehicle is completely cool before beginning installation.
2) We will begin by assembling the fittings onto the heat exchanger itself.
3) Start first by determining the size of the heater core coolant line which you will be tapping into on the vehicle. These are commonly 1/2" or 5/8" coolant hoses. The 4040-14 shower fitting kit includes provisions for tapping into both of these sizes. Disconnect a heater core line and utilizing the brass barbed fittings, determine which size fits best.
    - **Caution** Heater core hoses will have coolant in them, so be prepared to catch coolant when removing.
    - Draining some of the coolant from the radiator prior to disconnecting a heater core hose is a good idea to avoid making a mess.

4) Once heater core coolant line size has been determined, assemble the appropriate barbed fittings onto one side of the heat exchanger. Use a quality thread sealant or Teflon tape on the threads before assembly.
    - Snug fittings tight. The fittings are all standard 1/2" NPT threads, so do not over tighten. Pipe threads of this size are typically assembled 1-2 turns past finger tight. DO NOT clamp heat exchanger into a vise and crank away. Simply hold the heat exchanger by hand and tighten as described above using a standard wrench.
    - After installing the appropriate brass fittings, install the 2 male cam lock fittings on the opposite side of the heat exchanger which are provided in the kit. Again use a quality thread sealant or Teflon tape on the threads.
    - At this point, the heat exchanger should appear as pictured below.

5) Now, find a suitable location for the heat exchanger and bracket to mount. Somewhere on the firewall near the heater core outlet / inlet is ideal. On a Jeep JK, the passenger fender well, below the battery tray is an ideal mounting location. Simply relocate factory wiring connectors above the battery as shown. See picture 5.1 & 5.2 below.

Pic 5.1; Factory wiring harness on a 2012 3.6L JK relocated from under the battery to above it.

Picture 5.2; Heat exchanger assembly positioned on the passenger side firewall / inner fender well area.

6) Once a suitable location is found, use the heat exchanger / bracket as a guide and mark the location of the 4 mounting holes which will need to be drilled. Be sure the area behind the bracket location is accessible and clear of wiring, carpeting, etc.

7) Center punch and drill the four holes using a quality 1/4” drill bit. Clean up any sharp edges after drilling.

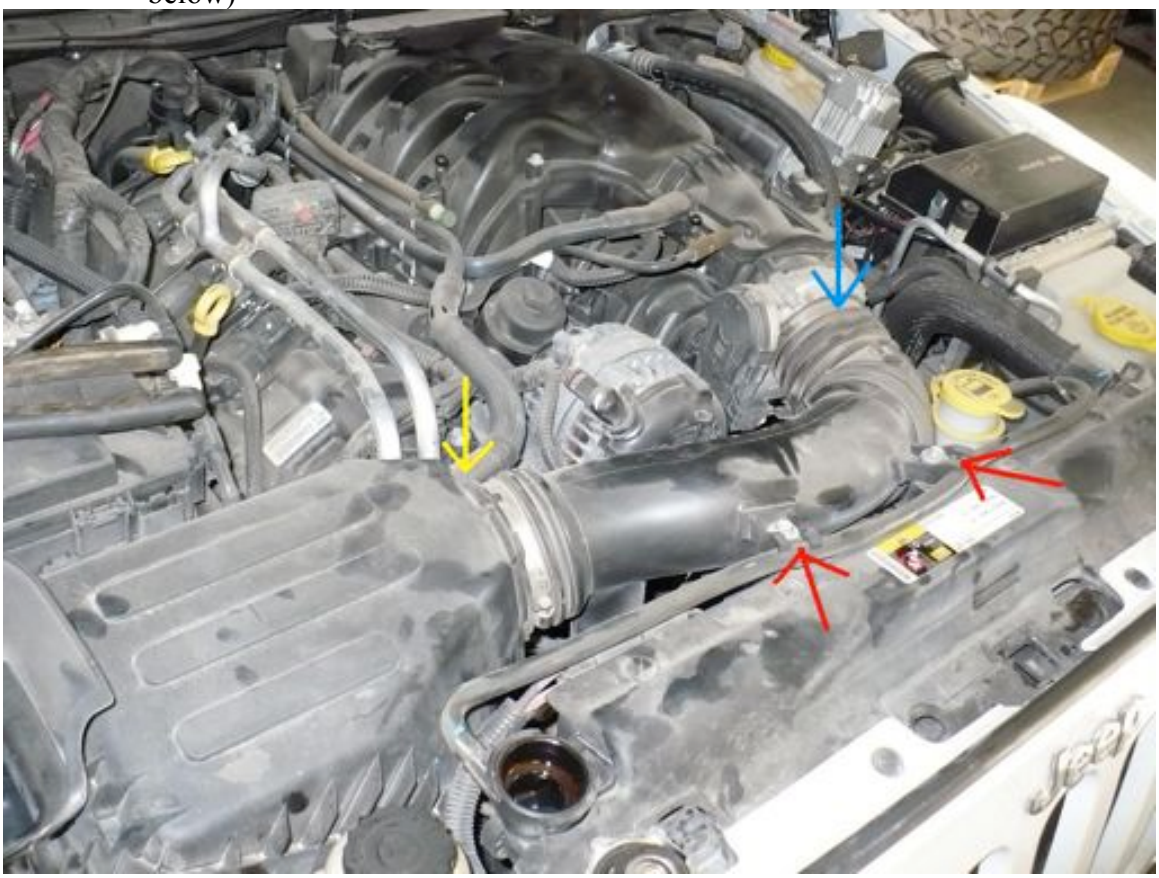
8) Bolt in the heat exchanger and bracket with the 1/4”-20 UNC x 1.0” long bolts provided in the kit. Use the nylock nuts provided on the back side and use a washer under both the head of the bolt and nut as pictured below. Tighten all 4 bolts.

Picture 8.1; Backside of heat exchanger mounting on 2012 Jeep JK underneath the passenger foot well carpeting.

9) Now we can begin running coolant lines to the heat exchanger itself. Often one of the factory coolant hoses on the vehicle can be rerouted from the motor to the heat exchanger. On this install, we will

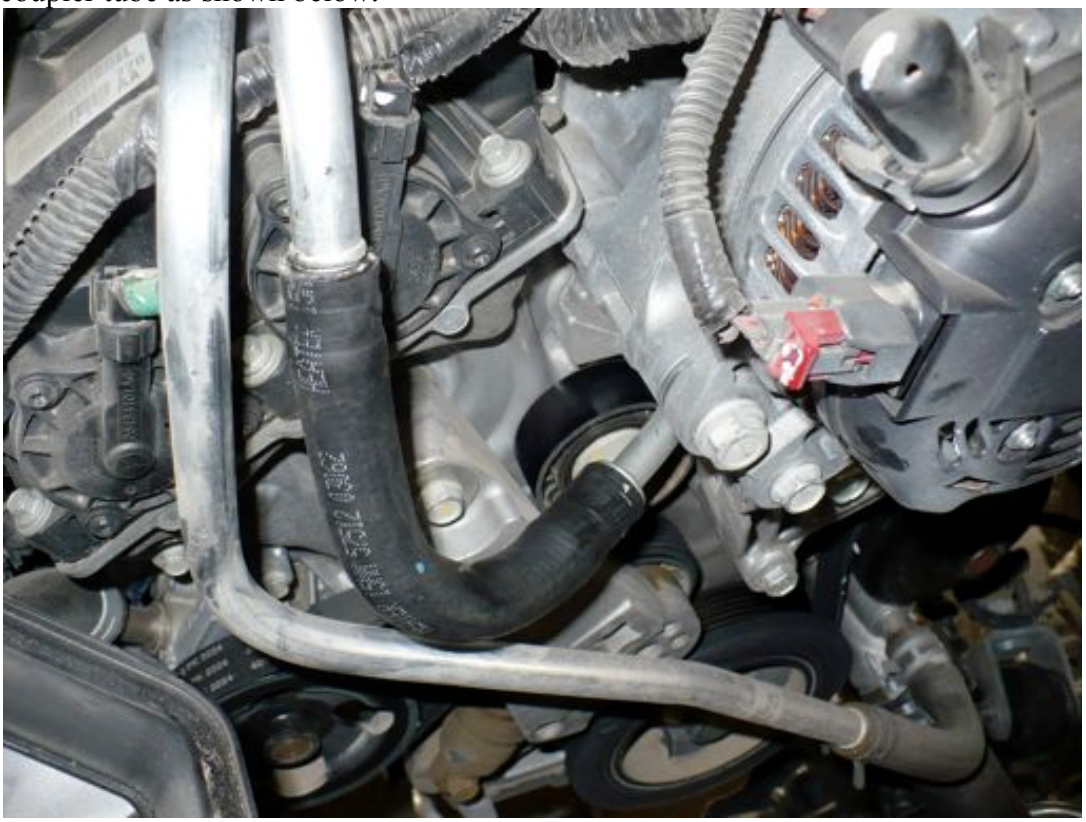
remove a small coupler piece of 5/8” coolant hose and replace it with 2 longer pieces which will connect to the heat exchanger.

- We will begin by accessing the coolant lines at the front of the motor. It is easiest to do this by removing the air intake.
- Disconnect the 4 air box retaining clips as if you were replacing the air filter.
- Next, remove the crankcase breather tube which connects to the air box (Yellow arrow in picture 12.1 below)
- Remove the two 10mm bolts which secure the intake tube to the radiator. (Red Arrows in picture 12.1 below)
- Loosen up the hose clamp at the throttle body and disconnect the electrical connection to the intake temp sensor on the underside of the intake tube. (Blue Arrow in picture 12.1 below)



Picture 12.1

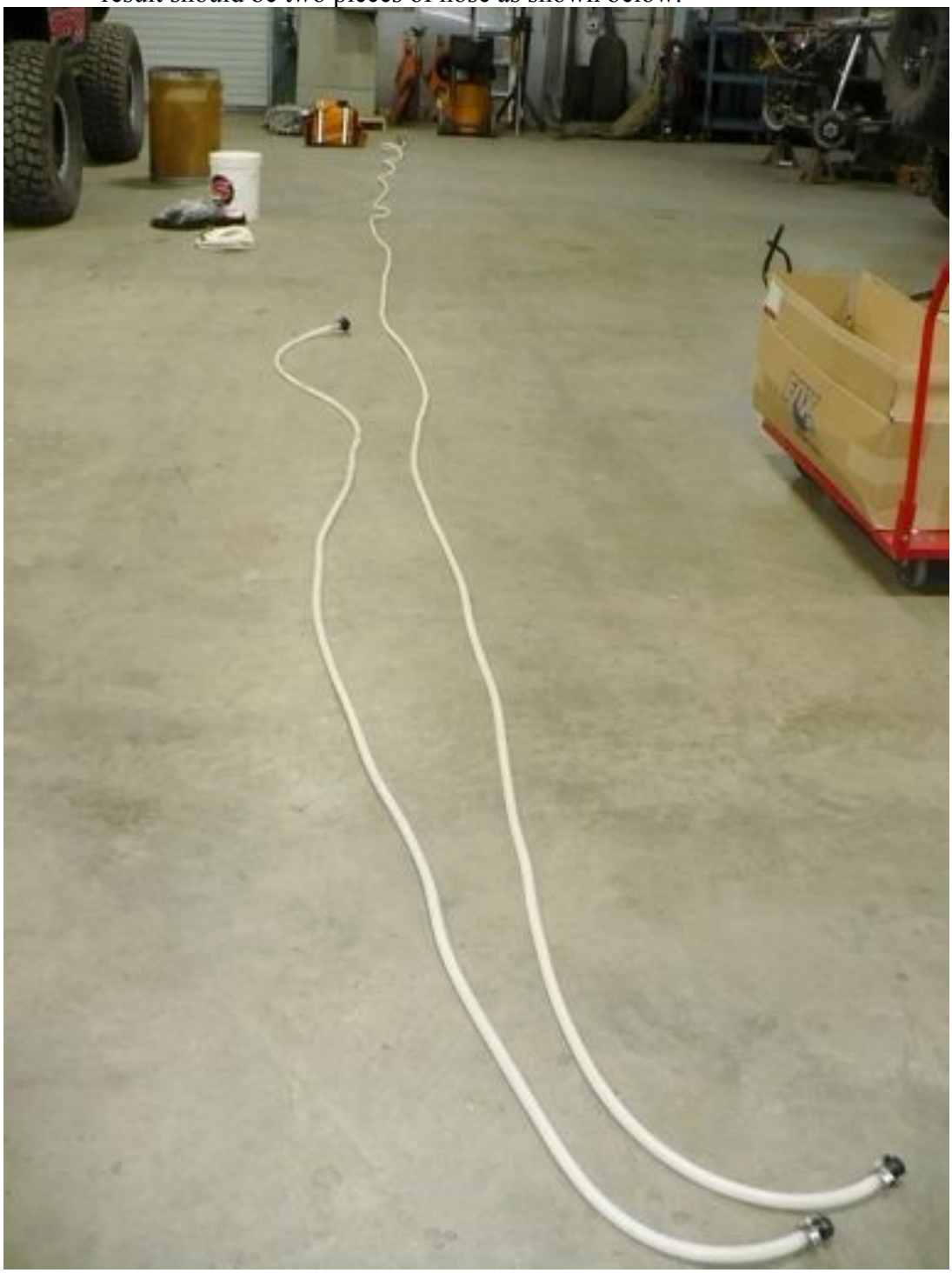
10) With the air intake tube removed, we can access the heater core hose which we will be rerouting to the heat exchanger. Now, remove the spring clamps from the factory upper hose and remove the small 90 degree coupler tube as shown below.



11) Next, measure the amount of hose needed to go from each fitting to the heat exchanger. Cut the appropriate length of hose and hook up to the heat exchanger as shown below.

12) Secure the new coolant lines to the motor using the factory spring clamps. Secure the hoses to the brass fittings on the heat exchanger with the hose clamps provided in the kit.
    - Reconnect any intake components or other various parts removed for installation and refill the cooling system. Be sure to bleed out any air bubbles in the cooling system and check for leaks before moving onto the next step.

13) Next, unspool the 50 ft bundle of clear fiber reinforced 1/2” ID hose included in the kit. This hose needs to be cut into two pieces. One length which will be used between the water source and pump. With the other length used between the pump and heat exchanger. Keep this in mind when cutting the hose.
    - We recommend cutting the hose to result in one piece at 40 ft, and one piece at 10 ft. The result should be two pieces of hose as shown below.



14) Attach one of the 1/2” male barb pipe fittings which are included with the pump kit to one end of each piece of hose. Secure with a hose clamp provided in the kit.

15) On the opposite end of the longer piece of hose. Attach the stainless suction strainer. This is a tight fit, so heating the hose under warm water or using some water soluble lubricant for installation is helpful. No hose clamp is needed on this end.

16) On the opposite end of the short hose. Attach one of the 1/2” male barb quick connect fittings to the hose. Again, this is a tight fit so heating the hose under warm water or using some water soluble lubricant for installation is helpful. No hose clamp is needed on this end.

17) Use the last remaining 1/2” male barb quick connect fitting on the free end of the white shower head hose. This is a very tight fit, so run the end of the hose under hot water until it is soft and easy to work

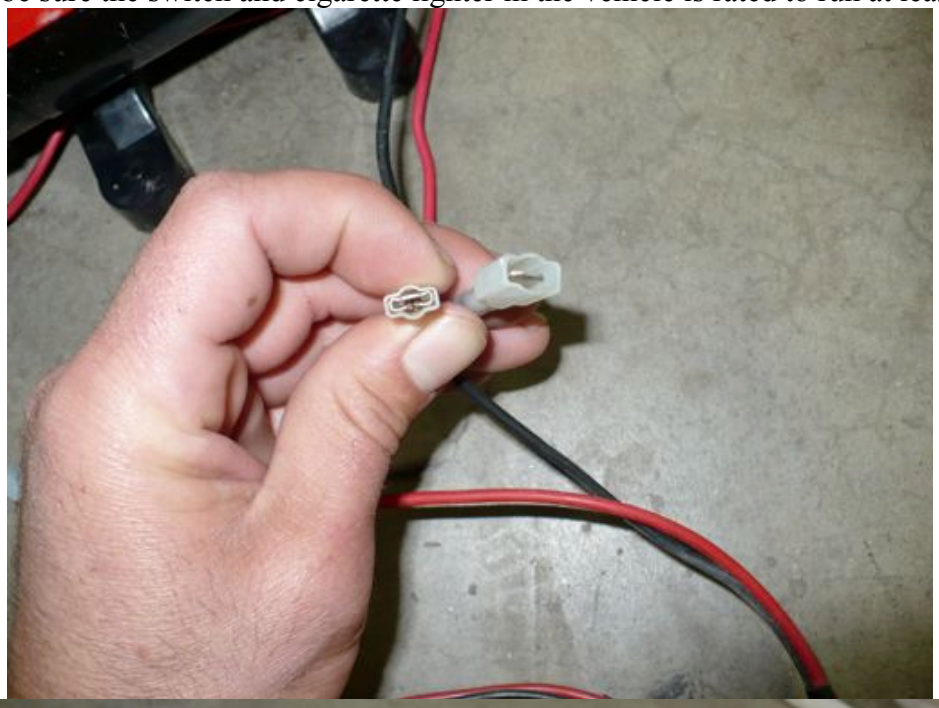
with. Additionally, use some form of lubricant on the barb fitting and press it into the end of the hose. As this end will be under high heat and pressure, use a hose clamp as shown below.

18) Assembly of the shower is now complete. The last step to tackle before use is the wiring of the pump.

- Wire the pump as desired.
- The 12V pump has an average amperage draw of 3 amps and a max draw of 7 amps.
- Use a 10 amp fuse between your power source and switching mechanism.

- The red wire is for +12V power and the black wire is for a good ground.

19) Using standard male / female spade connectors to a cigarette lighter switch is one example of wring the pump. Just be sure the switch and cigarette lighter in the vehicle is rated to run at least at 10 amps.



20) Although it is possible to easily mount the pump on the vehicle as well, we do not recommend this as it may limit its use and lead to longer and more difficult priming of the pump. Ultimately, it is up to the installer's preference.

21) With wiring complete, the shower kit may now be tested. The kit is designed to be laid out as shown below for use.


WARN
OUTLET OF PUMP
TO BOTTOM OF HEAT
EXCHANGER
SHOWER HEAD HOOKED UP
TO TOP OF HEAT
EXCHANGER
12V POWER SOURCE
PREFILTER
ASSEMBLED TO INLET
OF PUMP
FILTER TO WATER
SOURCE

22) With the shower kit hooked up as shown above, the final step before use is to prime the system. The pump will self prime and eliminate all air from the system using the following steps.
    - Fill the 5 gallon bucket with water from the water source you will be pulling from and bring it next to the pump.
    - Place the strainer filter into the bucket.
    - Turn the shower head to the on position.
    - Turn the water pump on.
    - Water will begin to flow and you will see air bubbles get pulled through the hose. Re-circulate the water until a steady stream of water is achieved.
    - Once a steady stream of water is coming out of the shower head, walk the bucket down to your water source (creek, river, lake, etc.) and transfer the strainer filter from the bucket to the water source without exposing it to air. The pump is now bled and will easily draw water 40 ft vertically to the shower head.

SHOWER OPERATION NOTES

1. The operation temperature of the shower will vary depending on the efficiency of the vehicle's cooling system and the initial temperature of the water source which you will be pulling from.
2. The heat exchanger included in this kit is designed to work well when pulling from approximately 50 deg F water and ran through a vehicle which runs between 195 and 210 degrees F.

3. With the vehicle running at idle and at its normal operating temperature, you can increase the heat of the water coming through the shower by setting a higher idle on the vehicle.
4. If the water coming through the shower is simply too hot, turn the heater on in the vehicle or turn the vehicle off completely and just use the residual heat of the heat exchanger to heat the shower water.
5. **WARNING** If at any time you turn the shower head to the "off" position, know that the water sitting in the heat exchanger at that time will be continuously heated and will become very hot. Be careful of this "hot spot" in the shower line when you turn the shower head back to the "on" position. It is for this reason; we recommend not turning the shower head to the "off" position when using the shower. Just keep it running until finished with the unit and turn the pump off.
6. The 12V pump features a 70 psi internal pressure switch which will trigger and turn the pump off if the shower head is turned to the "off" position and 70psi of pressure is built up in the system. The pump will automatically turn back on once the shower head is turned back to the "on" position.

Installation is Complete