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cIAPMO-T®

Certified to ANSI Z21.10.3 / CSA4.3

LPG GAS ON DEMAND
WATER HEATER

Model ShowerMate M-550-EC

The Shower-Mate is a power vented automatic instantaneous water heater designed to be installed in ventilated marine applications. This appliance must be installed in a ventilated compartment and in compliance with any applicable Coast Guard and ABYC recommendations.

Every water heater is inspected and tested before it leaves the factory. In order for this unit to operate safely and effectively, all installation instructions must be followed. Failure to comply with all installation and operating instructions will void the warranty. PrecisionTemp, Inc. will not be responsible for anything that is a result of non-compliance.

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS

- Extinguish any open flame.
- Shut off the gas supply at the gas container or source
- Do not touch any electrical switch or use any phone or radio in the boat.
- Do not start the boat's engine or electrical generator.
- Contact the nearest gas supplier or qualified service technician for repairs.
- If you can not reach a gas supplier or qualified service technician, contact the nearest fire department.
- Do not turn on the gas supply until the gas leak(s) has been repaired.

FOR YOUR SAFETY

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

WARNING!

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the installation instructions and/or operating instructions provided with this appliance. A qualified installer service agency or the gas supplier must perform installation and service.

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Keep this book with the water heater at all times. It contains instructions regarding installation, operation and maintenance of your water heater. If you need further information, contact PrecisionTemp.

Critical Installation Warnings

- All combustion air must be supplied from outside the Boat, and all products of combustion must be vented to outside the Boat.
- DO NOT vent water heater with venting system serving another appliance.
- DO NOT modify water heater in any way.
- DO NOT alter water heater for a positive grounding system.
- DO NOT HI-POT water heater unless electronic ignition system (circuit board) has been disconnected.
- DO NOT use battery charger to supply power to water heater even when testing.

Please read these instructions thoroughly before starting your installation

Installation Instructions for the Shower-Mate Water Heater

The Shower-Mate water heater is designed to be installed in an area that is accessible for servicing and is well ventilated. At least 20 square inches of incoming air is necessary and the power vent of the unit should always be vented to the outside with 2" approved duct. **NEVER** install heater in such a manner that is not vented to the outside. Doing so will void the warranty and cause the heater to malfunction and could result in serious injury or death. Terminus of flue outside boat should be above the water line and not closable.

Selecting Installation Location

The water heater must not be installed in an area where the air intake can be covered and there is an opening to the outside of at least 20 square inches to supply combustion air. It should be mounted so that the 2" duct can be one continuous length to the outside of the boat and above the waterline. The water heater should be located in an area where leakage will not result in damage to other items or the boat structure. Install the heater as close to the gas supply as practical to minimize length of the gas line.

Although the ShowerMate can be mounted with zero clearance around the sides, top and bottom, be sure that the installation does not interfere with any wiring, plumbing inside the boat. There should be ready access to the front access cover for servicing and the fittings on the back and allow for the routing of the gas line into the back of the case.

Mounting Unit

Unit should be located to allow hookups on the back and access to the front panel for servicing. Note the locations of the bottom combustion air opening and mounting holes.

1. Mount the 2 brackets to the bottom of the unit on either side using the supplied 1/4" bolts.

Illustration 1.

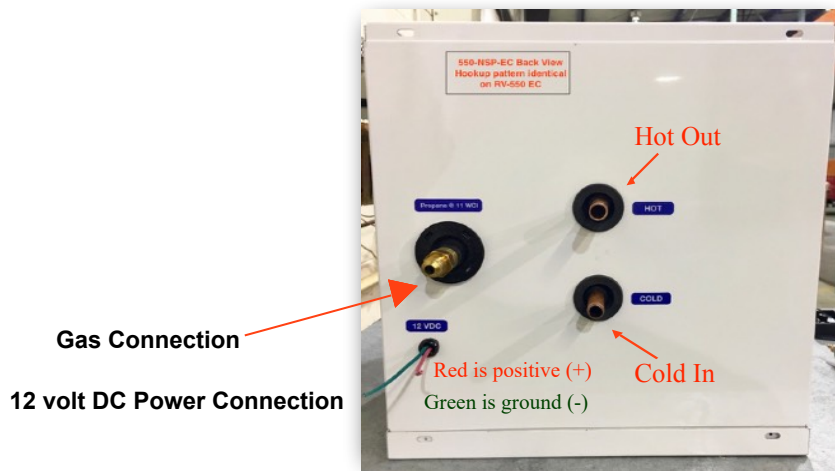
2. Cut 2 - 3/4" thick spacers the length of the mounting bracket and locate under mounting brackets to maintain 3/4" space under unit for combustion air to enter bottom.
3. Place unit and spacers into place to locate 4 mounting holes and mark their positions.
4. Remove the unit and drill the 4 pilot mounting holes in the mounting surface.
5. Screw or bolt unit and spacers into place.



Illustration 1

Making Connections

1. Connect plumbing to water lines taking care to make correct “COLD” and “HOT” orientation.
2. Connect 3/8” FM flared LP gas line to 3/8” M flared gas fitting. Hand tighten initial connection to assure it is not cross-threaded, then tighten with wrench while backing up fitting with a second wrench. **Note:** This flare fitting is a “dry” fitting, meaning no pipe dope or tape should be used when making the connection. The gas line should be an approved type of one, continuous, unbroken line from the propane locker to the appliance.
3. Turn on the gas and check the water heater and all connections for gas leaks with a leak detecting solution. Never use a flame to check for gas leaks.
4. Turn on water supply line and check for water leaks.



NOTE: The appliance must be disconnected from the gas supply piping system during any pressure testing of the system at test pressures in excess of ½ psi. The appliance must be isolated from the gas piping system during any pressure testing at test pressures equal to or less than ½ psi. Pressure inlet to valve, 13” W.C. maximum, 11” W.C. minimum. Pressure at outlet of valve is factory set at 10”. Burner manifold pressure is W.C. 8.9” W.C. +/- .2” at tap on burner manifold.

WARNING : NEVER install heater in a manner that is not vented to the outside. Doing so will void the warranty and cause the heater to malfunction and could result in serious injury or death. Terminus of flue outside boat should be above the water line.

Flue Pipe Installation

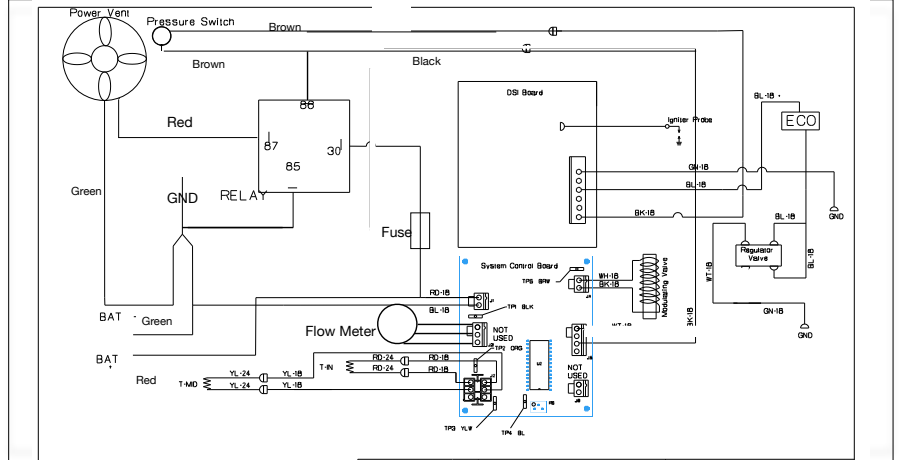
After the unit is secured into place, the exhaust pipe is installed as follows:

1. Locate and install the flue terminus on the outside of the vessel. It must be mounted well above the waterline, while keeping the flue pipe run under 10’. If PrecisionTemp’s optional mushroom vent is used, it can be mounted on a vertical or horizontal surface. It must be located so that no water can enter the flue system and no flue gasses can re-enter the living area through hatches or other air intakes.
2. Carefully measure and cut one, continuous length of flex flue pipe to run from the 2” flue pipe on the top of the appliance to the flue terminus. Keep length and bend of the pipe to a minimum. 2” stainless flex duct is recommended. Never use galvanized or CPVC pipe.
3. Now remove the pipe and coat the inside diameter of the flue pipe elbow with high temperature silicone sealant or equivalent.
4. Attach either end of the flex pipe to the appliance outlet and the flue terminus. This can be done with self-tapping screws or by pre-drilling the hole before inserting metal screws. At least two screws must be used to secure the pipe.

The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the *National Electrical Code, ANSI/NFPA 70* and/or the *CSA C22.1, Canadian Electrical Code*.

Never replace fuse with one rated over 5 amps.

RED is 12V DC Positive power IN.
GREEN is 12V DC Ground



THIS VALVE IS A SAFETY COMPONENT AND MUST NOT BE REMOVED FOR ANY REASON OTHER THAN REPLACEMENT. This water heater is equipped with a pressure relief valve that complies with the standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Systems, ANSI Z21.22 / CSA 4.4.

If you use a discharge line, do not use a reducing coupling or other restriction smaller than the outlet of the relief valve. Allow complete drainage of both valve and line.

- DO NOT install anything less than a pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of product of listed equipment or materials, as meeting requirements for Relief Valves and Automatic Gas Shutoff Devices of Hot Water Supply Systems, ANSI Z21.22 / CSA 4.4. Valve must have maximum set pressure **not to exceed 100 psi**.
- Install replacement valve into opening provided and designated for this purpose on water heater.
- Installation must conform with local codes or in the absence of local codes, Standard on Recreational Vehicles, ANSI A119.2 or CAN/CSA-Z240RV.

- 1) Pressurize the water system by turning on pump or city water pressure.
- 2) Purge all air from the system by turning on the faucets until a steady stream of water flows.
- 3) Turn on the 12V DC power supply.
- 4) Turn on the LP supply at the tank and the manual gas valve (if installed). The water heater will remain dormant until a water tap is opened and the heater senses water flow of at least 0.5 GPM.
- 5) Turn on the hot water tap to full open. The heater will fire up and hot water will flow from the tap in the time it takes to traverse the lines from the heater to the faucet. (If this is the first usage, you may have to turn the water on and off several times to purge the LP gas lines of air. If the heater fails to light, turn the power switch OFF, then ON to reset the ignition control. After ignition, water flow can be reduced and cold water added as desired.
- 6) To shut off the water heater, shut off the water. Shut off power at remote switch or breaker.
- 7) Should overheating occur or the gas supply fail to shut off, turn off the "ON/OFF" power switch.

A Note About “Navy Showers”

It is recommended to take a shower just like you would at home. That is, leave the water running through the entire shower. The hot water system is designed to deliver a continuous, comfortable flow of hot water and that's the way it works best.

Shutting off the shower with the shower head button wastes water. Each time this is done, the shower head “trickles”, filling the hot water line with cold water. This cold water has to be purged from the line each time the shower head is turned back on. Tests have shown that this will not save water and sometimes uses more water than leaving the shower run continuously.

Winter Operation and Winterizing Water

This heater is equipped with freeze protection that will prevent freezing under most conditions. In order for it to function, 12 VOLT AND GAS SUPPLY MUST REMAIN TURNED ON. This allows the burner to fire and electric elements to protect the system. Any freezing of the water heater or other plumbing components can cause severe damage that is not covered by warranty.

Winter Operation:

If LPG appliances must remain off

when boat in freezing conditions. If this is the case, drain heater as follows:

1. Turn off water pump and the power and gas to the heater. Open the pressure relief valve by lifting the handle to a 90° position from the normal position.
2. Open at least one hot and cold water tap in the boat. This should drain the system.

Winterizing Procedure:

Before storing the system for the winter, the plumbing system must be winterized. This can be done by either of the following methods:

1. All water should be drained from the system. To do this, open one tap at a time using compressed air to purge the system of all water.
2. Recommendations of your boat manufacturer should be followed. The water system can be filled with RV, non-toxic anti-freeze. When you see the anti-freeze coming from the hot water tap, the heater is protected.

Note: This Illustration Show Unit with Bottom Venting Rather Than Top Venting. All Illustrated Components are Identical on Both Models.

A photograph of a cryogenic system for a quantum device. The system is mounted on a white base plate. It features a large copper cryostat (7) with a central vertical tube (9) and a horizontal tube (10). A compressor (2) is connected to the system via a red hose. Various valves and sensors are labeled with numbers: 1 (a small white valve), 2 (the compressor), 3 (a circular component), 4 (a valve), 5 (a small white valve), 6 (a small blue valve), 7 (the main copper cryostat), 8 (a metal plate), 9 (the central vertical tube), 10 (the horizontal tube), 11 (a black cable), 12 (a black cable), 13 (a blue cable), 14 (a brass valve). The system is connected to a power supply and a control unit.

- 6.



550-EC OPERATING INSTRUCTIONS

The 550-EC is designed to give a continuous flow of hot water as long as required and maintain temperature within the capacity of the heater (85°F temperature rise at one GPM). The temperature on your water heater has been factory set to approximately 120°F. It is not recommended that you change this setting. Doing so could result in dangerously hot temperatures that could result in severe injury. If it is necessary to change the setting refer to the Service Manual or call PrecisionTemp.

The heater is dormant until a hot water tap is opened. The heater will not fire at very low flows; i.e., under 0.5 GPM. During normal operation the 550-EC will have a steady flashing green LED light on the green control board. A red flashing LED indicates a self diagnostic trouble code; refer to the Service Manual or call PrecisionTemp for assistance. When adjusting water temperature it is best to start with hot only and slowly add cold into the mix until the desired temperature is reached.

NOTE: When using an "on/off" button on a showerhead or an outside wash down box, always turn off the hot and cold water valves when finished. Not doing so will result in cold water bleeding into the hot water system. This will either cause the water heater not to ignite or result in alternating warm and cold water.

Dry Camping

RV showerheads are designed to drip when turned off and will allow the hot water line to be filled with cold water. When showering it is recommended that you leave the water running as you would at home. You will not run out of hot water and you will not waste additional water waiting for the cold water to purge from the water line every time the water is turned back on.

Winter Operation

When operating the 550-EC in cold climate conditions the flow of water may have to be slightly restricted or slowed at the faucet to maintain the set temperature of 120 degrees.

NOTE: Your 550-EC is equipped with the Cold Weather Protection Package. 12vdc power and propane must be left on to protect the 550-EC from freezing in cold climate conditions.

Winter Driving Instructions: Under no circumstances should you travel in freezing conditions without first draining water from the unit. Follow the winter driving draining instructions prior to driving in freezing temperatures. Freezing is not covered under the product warranty

550-EC Water Heater

Winter Driving Draining Instructions

1. Turn off water supply.
2. Open all hot water faucets.
3. Remove the 550-EC door and open the Pressure Relief Valve by moving the lever to the open position.
4. The water lines and the 550-EC will now drain.
5. When all water is drained from the hot water lines and the 550-EC Flowmeter is empty reinstall the water heater door. Leave the Pressure Relief Valve and hot water faucets open while driving.
6. The heater is now safe to drive in freezing temperatures.
7. Once your destination is reached close the 550-EC Pressure Relief Valve. Turn on water supply and close all hot water faucets once air is purged from the lines.



Routine Maintenance

All faucet aerators and showerhead screens should be cleaned regularly. It is recommended that the 550-EC be inspected by a qualified service technician at least once a year.

Particular attention should be paid to the following:

1. Inspect the air inlet openings and flue area to be clear of any debris or obstructions, (leaves, bug nests, spider webs, etc.)
2. Check that the heater mounting is secure to the coach and there are no areas for potential water leaks.
3. Open the cover of the heater and inspect for debris or obstructions under the burner or in flue hood.
4. Visually inspect wiring. Be sure there is no chafing of the insulation. Be sure that the direct spark ignition cable (black) wire is secured to the spark probe located at the lower right heat exchanger area.
5. Check for soot around the flue. Soot is a sign of incomplete combustion. If you find soot a qualified service technician should be notified to correct the problem.
6. The pressure relief valve should be manually activated once a year by moving the lever on the top of the valve 90° while power is turned off. Never perform this operation while the burner is operating or scalding could occur. Never plug the pressure relief valve. If the valve is actuating too frequently contact PrecisionTemp or replace valve.
7. Unplug all connectors and reconnect with power turned off. Inspect and clean corrosion from the ignition cable/spark probe connection and the ground wire connection.

NOTE: Should overheating occur or the gas supply fails to shut off, turn off gas valve at the supply tank. Immediately call a qualified service technician

WARNING: Always turn off the 12-volt power supply to the heater while the vehicle is moving and during any fueling operations. Operating this water heater or any other ignition source during fueling could cause a fire or explosion, which could result in serious injury or death. Trying to produce hot water while driving or moving may damage the 550-EC electrical components and cause a fire.

IMPORTANT COLD WEATHER PROTECTION INFORMATION

WARNING: Do not disconnect the electrical supply or turn off the propane supply when temperatures are near or below freezing. The 550-EC freeze protection system will not work if the electrical power source or propane is disconnected. Your heater is equipped with the cold weather protection package (call PrecisionTemp for details).

WARNING: Under no circumstances should you travel during freezing conditions without first draining water from the 550-EC.

WINTERIZING

Draining

1. Turn off the power and gas supply to the 550-EC.
2. Turn off main water supply.
3. Open all hot water taps. (bathroom, kitchen, laundry, etc.)
4. Drain all water from plumbing lines.
5. Open pressure relief valve to drain remaining water from the 550-EC flowmeter and heat exchanger.
6. After completely draining the water system the heater can be winterized like any other RV by purging remaining water out of water lines.

DO NOT evacuate heater using compressed air, let the heater gravity drain by opening the Pressure Relief Valve, once completed leave the valve in the open position. The other method is to pump RV antifreeze solution through the hot and cold water system; no bypass valve is required.

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TROUBLESHOOTING

Most problems are easily remedied by consulting the trouble-shooting guide. If problems still persist, contact PrecisionTemp for assistance. Only a qualified technician should do any work involving the gas system.

A periodic visual check of the burner flames should be done by observing the flame through the “peep hole” in the heat exchanger. There should be blue flame with minimum or no yellow tipping. There should be nothing obstructing the flow of combustion and ventilation air.

Burner maintenance should be performed by a PrecisionTemp Authorized Service Technician.

NOTE: The heater is dormant until it senses water flow. When a water tap is turned on to at least .5 GPM the burner will fire until water flow is turned off and the heater again goes dormant.

Heater Does Not Come On When The Water is turned on. (Power vent not running)

1. Be sure power is on and panel breaker is not tripped.
2. Check electrical contacts. Be sure the connector is plugged into board. Using a voltmeter, check for 12Volts on this connector.
3. Be sure all electrical connectors are secure and the polarity is correct. (Red wire to positive terminal).
4. Fuse in power wire might be blown. Replace fuse.
5. Locate the ECO, high temperature switch (two red wires) at the upper left hand of the heat exchanger. Check for open circuit condition.
6. Be sure there is a battery in the system. Never connect the heater directly to a power converter. Some converters have circuits that are not pure DC. This can cause malfunctions or damage to the heater and is not covered by warranty.
7. Be sure that no water-mixing valve has been left in the on position or using the shower head as a shut off. This will permit water to bypass the water heater and bleed cold water into the hot water system. Always turn off both hot and cold water valves after using.

There Is No Ignition When Water Is On (Power vent is running)

1. Be sure the gas valve at the tank is “On”, there is gas in the tank and the gas line is purged of all air.
2. Be sure that flue terminus is not blocked
3. Check that the ignition wire is plugged into the spark tower on the ignition control and is not touching anything else.
4. Check flame site hole to see if igniter is sparking from the probe to the burner. Bend ignition wire to adjust to proper gap or contact *PrecisionTemp* or your nearest authorized service representative.
5. Check that there are no cuts or breaks in the ignition wire.
6. Be sure that the power vent fan has 12 volts to it when there is water flowing and there are no obstructions in the flue pipe.
7. Safety vacuum switch may be out of adjustment. Contact PrecisionTemp or your nearest authorized service representative.

No Water Flows From Tap When Tap is Turned on.

1. Be sure that water supply is turned on and that there are no obstructions.
2. Check for plumbing bypass.

Burner Turns On But Temperature Fluctuates Erratically.

1. May be caused by excessive restriction at the water outlets, shower heads, aerators or water strainers. These should be cleaned and any shower head flow restrictor removed.
2. If temperature fluctuates as the pump cycles, a pressure accumulator tank is needed in the water system. If you have an accumulator tank, check to see if it has become filled with water. If it has, drain it so that it contains air only.

Heater Comes On But Rapidly Cycles On And Off.

1. Water flow is too low. Increase flow at a tap. Clean all aerators and shower head screens to assure at least .5 GPM of water flow
2. Water pump is not functioning properly. Repair or replace pump.
3. If the heater cycles as the pump cycles, a pressure accumulator tank is needed in the water system. If you have an accumulator tank, check to see if it has become filled with water. If it has, drain it so that it contains air only.
4. Air is in the water line. Bleed air by turning on all water taps.

Burner Ignites But Water Temperature Is too low

1. The water flow may be so high as to exceed the capacity of the heater particularly if your supply water is very cold. Slow the water flow.
2. The gas pressure may be too low. Be sure the tanks are full and tank selector is not in center position.
3. Check the dynamic gas pressure while the water is on at full flow. The LPG pressure should be the "manifold pressure" as shown on the specification label while the heater is running. A gas-testing gauge should be installed on the manifold tap so that it may be read while heater is running. If it is too low, turn up the gas regulator to the proper pressure. Regulator may be defective and needs to be replaced. This should only be done by a qualified technician.
4. The gas flow may be too low due to improper gas line diameter (under 3/8 inch outside diameter). The gas line may be excessively long (over 20-30 feet) or the on/off solenoid at the tank (if you have one) may have an orifice that is too small (under 3/16th of an inch).
5. Check the heater air inlet openings and flue pipe for airflow obstructions and clean.

Low Heat Rise and Excessive Water Flow Is Required To Trigger Water Heater

If you find that your heater requires excessive flow to activate it (much over .5 gallon per minute), it is likely that you have cold water bleeding into the hot water side of your water system.

1. Check that valves and faucets are closed when not in use. If there is an on/off button on your shower head, always turn the water valves off after the shower to prevent cold water from bleeding into the hot water system. This will keep the heater from functioning properly.
2. Be sure that the bypass valve at the water plumbing connections is in the "off" position. An open valve can also permit water to bypass heater, causing it not to fire.

If any problem persists, contact an *PrecisionTemp*.

***PrecisionTemp, Inc.* WATER HEATER LIMITED WARRANTY**

PrecisionTemp, Inc warrants to the original owner and subject to the below mentioned conditions, that this product will be free of defects in material or workmanship for a period of two years from the original date of purchase. PrecisionTemp's liability hereunder is limited to the replacement of the product, repair of the product, or replacement of the product with a reconditioned product at the discretion of the manufacturer. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material workmanship. This warranty extends to the original owner of the product only and is subject to the following conditions:

1. For two years from the date of purchase, PrecisionTemp will repair or replace any part defective in material or workmanship. Some warranty parts may require a prepay before shipping. Once the defective part is returned and tested the prepay charge may be refunded based on findings.
2. This warranty includes labor charges pre-authorized by PrecisionTemp required to remove and replace the part.
3. Service/Travel calls to the customers location are not considered part of these charges and are therefore the responsibility of the owners. This warranty does not cover the following items classified as normal maintenance:

- a. adjustment of gas pressure
- b. cleaning or replacement of burner orifices
- c. cleaning or adjustment of burner assembly
- d. cleaning or adjustment of flue
- e. adjustment of pressure relief valve
- f. adjustment of spark probe

4. In the event of a warranty claim, the owner must contact, in advance, either an authorized PrecisionTemp Service Center or the PrecisionTemp Service Department. Warranty claim service must be performed at an authorized PrecisionTemp Service Center (a list will be provided at no charge) or as approved, PrecisionTemp, Inc

3428 Hauck road Suite Cincinnati, OH 45241, 800-934-9690 Ext. 110.
5. Return parts (or water heater) must be shipped to PrecisionTemp "Prepaid". The defective parts (or water heater) become the property of PrecisionTemp and must be returned to the Service Department, PrecisionTemp, Inc. 3428 Hauck Road Suite G Cincinnati, OH 45241

6. This warranty applies only if the unit is installed according to the installation instructions provided and complies with local and state codes.
7. The warranty period on replacement parts (or water heater) is the unused portion of the original warranty period or ninety (90) days, whichever is greater.
8. Damage or failure resulting from misuse (including failure to seek proper repair service), misapplication, alterations, water damage, or freezing are the owner's responsibility.
9. PrecisionTemp does not assume responsibility for any loss of use of vehicle, loss of time, inconvenience, expense for gasoline, telephone, travel, lodging, loss or damage to personal property or revenues. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.
10. Any implied warranties are limited to two (2) years. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.
11. Replacement parts purchased outside of the original water heater warranty carry a 90 day warranty. This includes the part at no charge. This PrecisionTemp heater is designed for use in recreational vehicles, park models, tiny homes, mobile food carts and marine applications for the purpose of heating water as stated in the "data plate" attached to the water heater. Any other use, unless authorized in writing by the PrecisionTemp Engineering Department, voids this warranty.

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