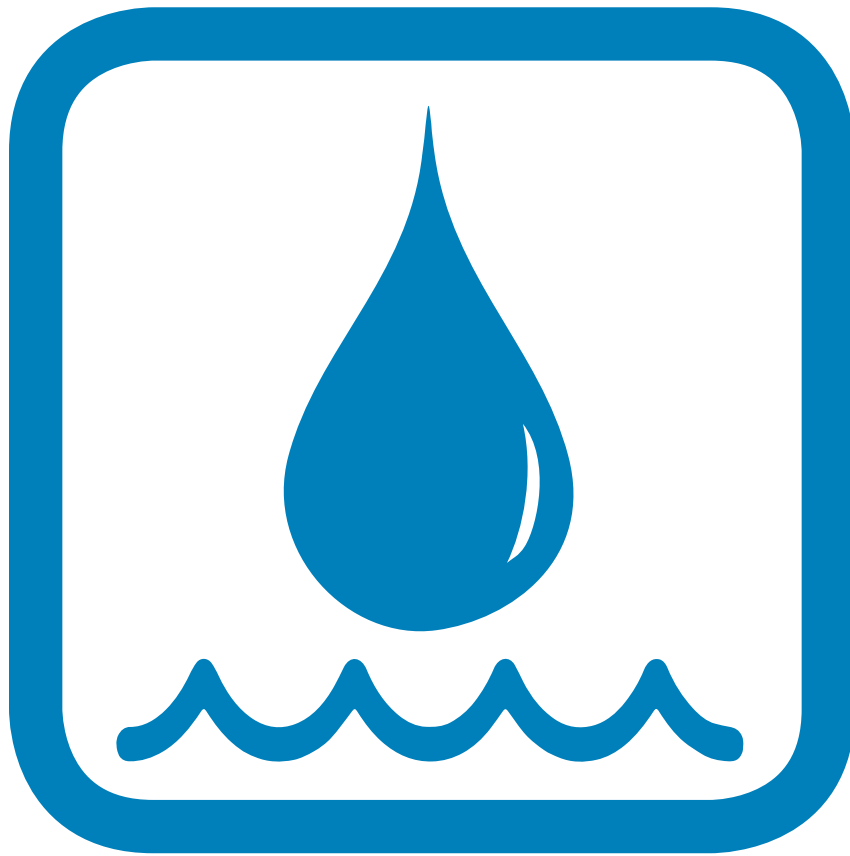




Made to fit.

Water



System Guide

Class A and Class C Motorhomes

About This Guide

Thank you for choosing Thor Motor Coach (TMC). This Water System Guide is intended to help you understand and operate the water system of your new motorhome. It includes information provided by your selling dealer during your new motorhome pre-delivery inspection (PDI), and much more.

This guide is not intended for use as a service manual, nor is it model specific. Although some information is specific to certain brands and models, it is of a general nature, and the illustrations and descriptions provided may differ from the components installed in your motorhome.

Contact Us

You are extremely important to us, and you can be assured Thor Motor Coach and your selling dealer will always strive to do everything possible to earn your trust and goodwill. Your selling dealer should be your first source for information regarding any questions or concerns you may have about your motorhome.

You can also contact TMC Customer Care anytime you have a question about your motorhome or the operation of any factory-installed appliance, equipment, or component.

By telephone, TMC Customer Care representatives are available Monday through Friday, 8:00 am to 5:00 pm EST. If you call off-hours, leave a detailed message and a representative will contact you ASAP.

Contact to a TMC Customer Care representative is also available via direct email or email through the Thor Motor Coach website.

You can also send or fax written requests to the address and number listed below:

Thor Motor Coach
Attn: Customer Care
PO Box 1486
Elkhart IN 46515-1486

Phone: (877) 855-2867 (24/7 assistance)
Fax: (574) 294-3816
Email: wsupport@tmcrv.com
Website: www.thormotorcoach.com

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Water Component Suppliers:

Black Tank Flush System: B & B Molders: <http://www.bandbmolders.com>

Holding Tank Heater: Dehco / Cast Products: www.dehco.com

Macerator: Pentair (Shurflo®): www.shurflo.com/rv-products/

Toilet: Dometic Corporation: www.dometic.com/en-us/us/
Thetford: www.thetford.com/products/

Water Filter (House): Intertek Distribution: www.intertekdistribution.com

Water Heater:

Tank type: Atwood Mobile Products: www.askforatwood.com

Tank-less, LP: Girard RV: www.greenrvproducts.com

Tank-less, Hydronic: Aqua-Hot: www.aquahot.com

Water Pump: Pentair (Shurflo®): www.shurflo.com/rv-products/

Anderson Water Valve: Anderson Brass Co.: www.andersonbrass.com

Other Resources:

Thor Motor Coach Customer Care: [877-855-2867](tel:877-855-2867)

Thor Motor Coach Customer Resources Web Site:
<https://thormotorcoach.com/motorhome-owners-resources/>

Thor Motor Coach YouTube Site: <https://www.youtube.com/user/ThorMotorCoach>

Safety

Safety Labels, Alerts, and Symbols

Safety labels and decals are placed throughout the motorhome in locations where the potential for a hazardous condition is present. Make sure that you and your traveling companions understand and follow all safety instructions. Never remove safety labels and decals. If a safety label should become damaged, illegible, or removed, it should be replaced as soon as possible. Contact Thor Motor Coach Customer Care for a replacement.

Thor Motor Coach uses the following signal words to warn you of possible safety concerns and to provide information to help prevent personal injury and/or damage to the motorhome:

NOTE: Provides helpful information on the topic being covered in the section.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death. This symbol may be used in conjunction with the following signal words and with a color that corresponds with the associated safety label.

DANGER

Danger indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This alert information is limited to the most extreme situations.

WARNING

Warning indicates a potentially hazardous situation that, if not avoided, may result in death or serious injury.

CAUTION

Caution indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

A Notice indicates a potential situation that, if not avoided, may result in property damage or damage to your motorhome.

Requirements for Safe Energy Use

Since the water system uses portions of the propane and electrical system for proper operation, follow all safety-related messages concerning safe propane and electrical system use.

Propane Requirements

In order to function properly, the water heater will require a safe and reliable source of propane gas (LP). Unless equipped with a hydronic heating system (which uses diesel fuel), your motorhome is furnished with a propane system that is designed to deliver an ample supply of propane, not only for the water heater, but for all factory-installed gas-fired appliances.

Propane gas pressures are factory set to 11 inches of water column. Do not adjust or bypass the gas regulator or modify any component of the propane system. If you experience problems with your water heater or any propane system component, promptly have a qualified propane service technician inspect the propane system make all necessary repairs.

Propane Safety

Familiarize yourself and follow all propane gas safety procedures listed within this document, the TMC Propane Gas System Guide, your Owner's Manual, and the documentation associated with all gas and electrical appliances of your motorhome.

NOTE: For information regarding the safe operation of the propane system and its components, refer to the TMC Propane System Guide, available in the Owner's Resource section of the TMC website:

www.thormotorcoach.com

DANGER

IF YOU SMELL PROPANE GAS

- 1. Extinguish any open flames and all smoking materials.**
- 2. Shut off the propane supply at the container valve(s) or propane supply connection.**
- 3. Do not touch electrical switches.**
- 4. Open doors and other ventilating openings.**
- 5. Leave the area until the odor clears.**
- 6. Have the propane system checked and leakage source corrected before using again.**

Ignition of flammable vapors could lead to a fire or explosion and result in death or serious injury.

⚠ DANGER

Turn OFF all pilot lights, appliances, and their igniters (see operating instructions) while the motorhome is traveling or in motion, and before refueling the motorhome's fuel tanks and/or propane containers.

Can cause ignition of flammable vapors, which can lead to a fire or explosion and result in death or serious injury.

⚠ CAUTION

Make sure the propane/carbon monoxide (LP/CO) detector and alarm is always kept in good working order. Test this device regularly and immediately replace if it is not functioning properly.

The LP/CO detector operates on house 12 volts DC and is only operational when the main battery switch is ON.

Electrical Requirements

Several components of the motorhome's water system require electricity for proper operation. Water and macerator pumps need 12 volts DC, as do igniters and control circuitry for water heaters. Hydronic water and house heating systems require 120 volts AC to operate supplementary heating elements. For safe and reliable operation, your motorhome must be able to supply electrical energy to these devices.

The main battery switch must be ON in order to use on-board pumps and to power water heater controls. Operating the generator or being connected to a shore power source will supply the water system with 120 volts AC if needed.

NOTICE

The electrical system of the motorhome must be in good working condition; being able to supply both 12 volts DC and 120 volts AC, in order to operate water system devices installed in your motorhome.

NOTE: For information regarding the safe operation of the electrical system and its components, refer to the TMC Electrical System Guide, available in the Owner's Resource section of the TMC website:

www.thormotorcoach.com

Electrical Safety

Familiarize yourself and follow all electrical system safety procedures listed within this document, the TMC Electrical System Guide, your Owner's Manual, and the documentation associated with all gas and electrical appliances of your motorhome.

DANGER

Use extreme caution when using metal tools near electrical system terminals, connections, and components. Short circuits can occur when metal tools bridge between electrical terminals of opposite polarity, causing sparks, possible equipment damage, potential of fire, explosion, bodily injury and/or electrocution.

WARNING

Whenever electrical system maintenance is required and before working on the electrical system of the motorhome:

- Turn OFF the main battery switch
- Disconnect the shore line power cord
- Turn OFF the generator
- Disable the automatic generator start functionality
- Disconnect the negative 12 VDC auxiliary (house) battery terminal(s)
- Attach an electrical lockout device to the electrical service panel

Before disconnecting your house and/or chassis batteries, always make sure the main battery switch is turned OFF, and the inverter/charger (if so equipped) is turned OFF.

CAUTION

Safety precautions must always be observed when using any electrical device or working with electrical wires and connections. Careless handling of electrical components can be fatal.

- Never touch or use electrical components or appliances while feet are bare, while hands are wet, or while standing in water or on wet ground.
- Always remove jewelry and wear protective clothing and eye covering.
- Avoid creating sparks, which could ignite nearby flammable materials.

Water System Introduction

The water system of your motorhome provides you and your traveling companions modern-day plumbing conveniences designed for safe and reliable use; wherever your travel adventures lead. It has the dual ability to be self-contained, with on-board storage, or to use water from an external source. In either case, a supply of safe, potable water, and water-related waste disposal, is always conveniently available. Plumbing components of the water system consist of strong, lightweight, corrosion-resistant materials that are designed to provide long life and easy maintenance. By following the instructions outlined in this guide, you can expect efficient, safe, and reliable service from your motorhome's water system.

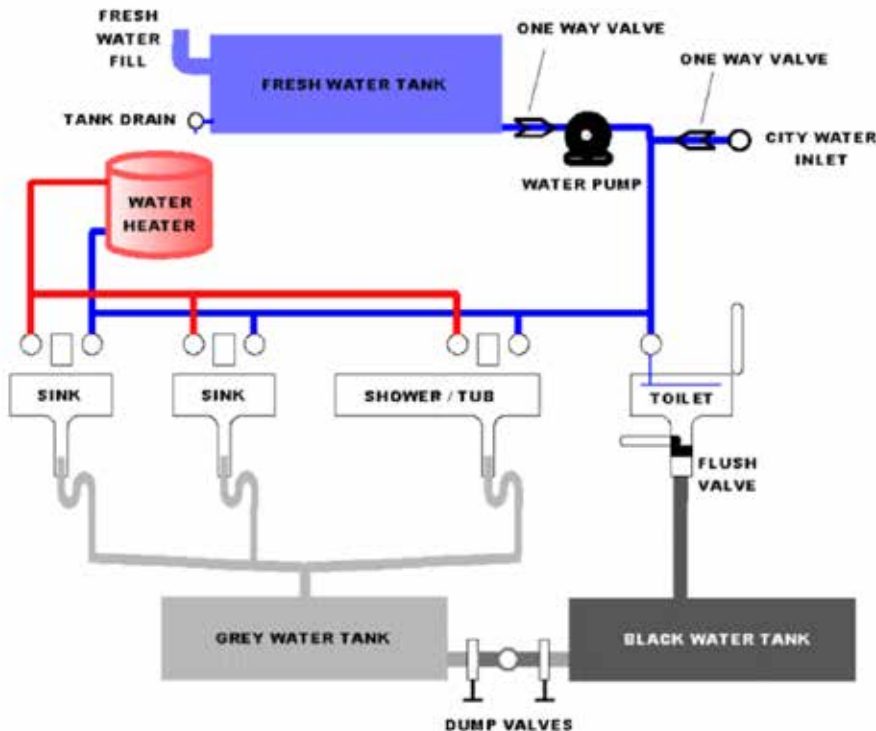
A motorhome's water system consists of these two separate sub-systems:

- Fresh water system, and the
- Waste water system

The fresh water system consists of components which are used to deliver potable, fresh water for your use, while the waste water system is comprised of plumbing drains and holding tanks, which store waste water until it can be properly disposed into a sewage collection system.

Illustrated below is a diagram of a typical motorhome water system. Note the sources of fresh water as being either from an external source (city water) or from the on-board fresh water tank. Within this guide, each component of the water system, and its operation, is described in detail.

NOTE: Your motorhome's water system is designed to provide you and your traveling companions with a generous supply of potable, fresh water.



The fresh water system must be pressurized in order to function properly. System pressurization is accomplished in two distinct ways; either by utilizing the water pressure of an external water supply (referred to as city water) or internally, by the on-board water pump. When connected to an external pressurized water source, the fresh water tank and the water pump are bypassed from the remainder of the motorhome's water system by in-line check valves. This prevents back-pressure from damaging system components, while also preventing the fresh water tank from being filled (and overfilled).

NOTE: Throughout this guide, the terms 'city' or 'city water' refer to an external fresh water source, whether this water supply is provided by a public municipality or privately owned.

⚠ CAUTION

Some external water sources develop high water pressure, particularly in mountainous regions. These campgrounds or hook-up locations may not have regulated water pressure, which could be considered excessive.

High water pressure is anything over 55 psi. Excessive pressure may cause leaks or damage to your water system.

NOTICE

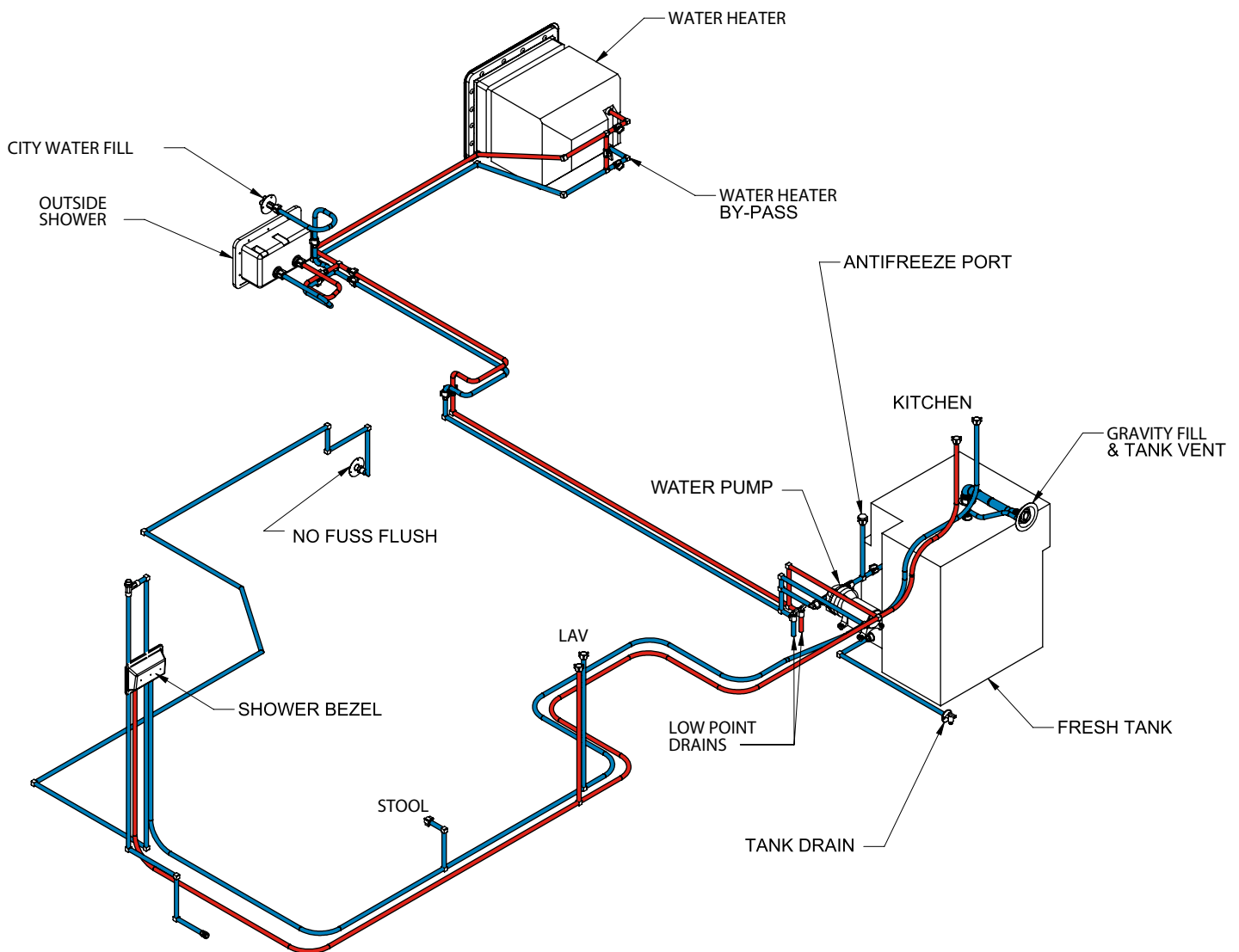
When connected to an external water source, it is strongly recommended that a water pressure regulator is used in-line with the water supply delivery hose. Water pressure regulators are designed to reduce high external water supply pressures to a level that is safe for your motorhome's water system; preventing potential damage. RV water pressure regulators can be obtained at RV suppliers or dealers.

Fresh Water System

The fresh water system of your motorhome is designed to provide clean, safe, potable water for the water needs of you and your traveling companions. Your motorhome's fresh water system will include these features:

- Fresh water holding tank
- Water pump
- Water heater
- City fresh water inlet
- Gravity fill fresh water inlet
- Hot and cold piping and fittings
- Fresh water tank drain valve
- Low point drain valves (for both hot and cold water lines)
- Hot and cold water fixtures (bath, kitchen and external)
- Water filter (standard on some models, optional on others)
- Holding tank heat pads (optional)

NOTE: Although the plumbing piping and fittings are designed to withstand higher pressures, water pressure should be limited to 45-55 PSI maximum.



Typical fresh water system (for illustration purposes only). Plumbing layouts vary depending on floorplan and available features

Monitor Panel

Conveniently located just inside the main entry of the motorhome, the monitor panel contains several useful features and system controls. Although monitor panels may vary from model to model, in its basic form, the monitor panel provides these functions:

- Generator ON/OFF switch and hour meter
- Slideout extend and retract switch
- Coach battery condition
- Fluid level Monitoring of the holding tanks (full to empty)
- Water heater ON/OFF switch
- Water pump ON/OFF switch
- Holding tank heaters ON/OFF switch (optional on some models)

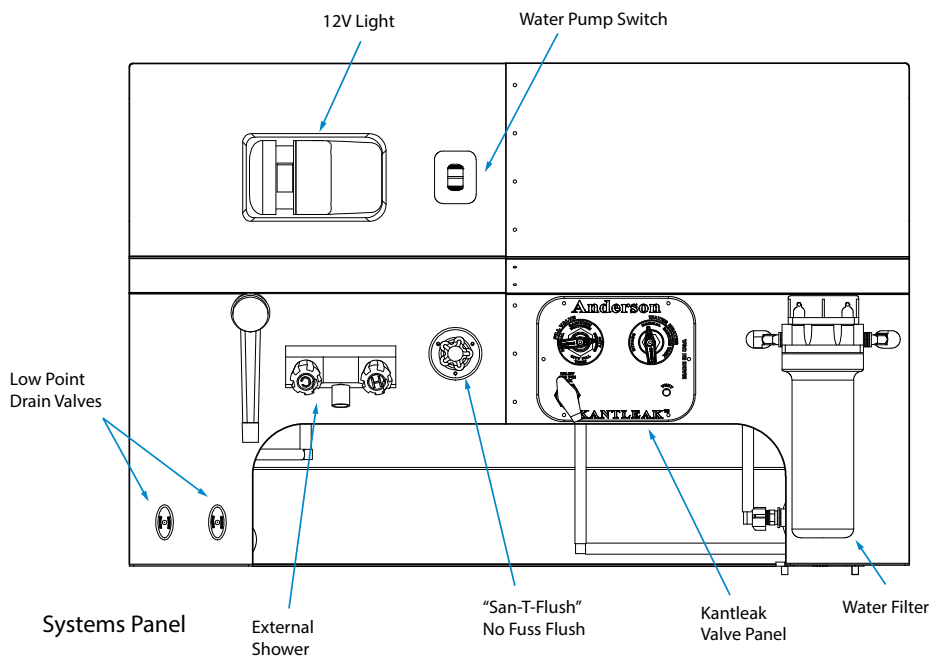
Several controls for the water system are located on the monitor panel. In this system guide, **only** the features that are associated with the water system will be described. Refer to other TMC System Guides for information relating to electrical, propane, heating, slideout, and other motorhome features and functions.



Typical Monitor Panel.

NOTE: Motorhomes equipped with a multiplex control system have touch-screen panels, uniquely different than the monitor panel shown here

Water System Panel



NOTE: Some motorhome models are equipped with a water systems panel, similar to this illustration, while others are not equipped with a water system panel.

However, if your motorhome is not fitted with a water systems panel, it will include most, if not all features depicted; just located in other areas of the motorhome.

Your dealer or TMC Customer Care representative can assist you in locating water system features of your particular model of motorhome.

Illustrated here is a typical water system panel for a Class A motorhome. It is located inside a driver's-side service compartment. The fresh water tank drain valve and termination valves for the gray and black water holding tanks are usually located in or near this service compartment.

Water Pump

Water from the fresh water tank must be pressurized in order to flow to the faucets, shower, and toilet(s) of your motorhome. A self-priming pump is installed to perform this function (when city water is not available) and is located near the fresh water tank. The fresh water system employs a system of check valves that ensure proper directional flow. The water pump is a demand-type pump, meaning that it will automatically cycle ON when water demand is present; sensed by the opening of a water faucet (and a drop in water pressure). The pump will automatically turn OFF after the system returns to its pre-set pressure. **HOWEVER, THE PUMP ONLY OPERATES IF THE WATER PUMP SWITCH IS ON** (located on the monitor panel). For convenience, some motorhome models may also include a water pump switch located on a bathroom wall.

NOTICE

The water pump must **ONLY** be used when these two conditions are present:

- There is water in the fresh water holding tank, and
- The motorhome's fresh water system is not being pressurized by an external water supply

NOTICE

The water pump operates on 12 volts DC. The main battery switch must be **ON** for the water pump to operate.

Water Pump ON/Off Switch

Located on the monitor panel, the water pump ON/OFF switch controls the power to the fresh water pump. When the water pump switch is ON, the pump will cycle on and off as water demand requires it to do so. Refer to the water pump section for details regarding the fresh water pump.

START-UP PROCEDURE FOR THE SELF CONTAINED WATER SYSTEM:

1. Make sure the fresh water tank is filled with water.
2. Open all the faucets in the motorhome, both hot and cold.
3. Turn ON the water pump switch, located on the monitor panel.
4. Allow time for the hot water tank to fill. Shut off each faucet as the flow becomes steady and free of air. When the last faucet is shut off, and the system builds to a set pressure, the pump should also shut off.
5. If necessary, top off the fresh water tank

The fresh water system is now ready for use.

Pre-pump filter



Water pump

Fresh water tank drain valve

Typical water pump and pre-pump filter installation

NOTE: Power to the water pump should be turned OFF when the motorhome is left unattended.

This will reduce the possibility of damage to the water pump should the water supply be turned off or become depleted.

NOTE: The hot water line(s) may take longer to pressurize due to the additional volume of water required to fill the hot water tank.

NOTICE

If the pump fails to operate, confirm the motorhome's 12 volt DC electrical system is operating correctly; the main battery switch must be ON.

Check the fuse labeled 'Water Pump' located in the fuse panel. If the fuse is 'blown,' turn the water pump switch off (at the main panel) and replace the blown fuse with a good fuse of the same amperage rating.

Turn the water pump switch ON. If the fuse blows a second time, turn the pump switch OFF and contact an qualified RV service center for repairs.

DO NOT ATTEMPT TO OPERATE THE WATER PUMP WITH A FUSE OF LARGER AMPERAGE RATING.

Pre-Pump Filter

All TMC fresh water systems have a pre-pump filter that is designed to remove water-borne particulates from entering the impeller of the water pump. Since inert material particles may be present in the fresh water tank from the manufacturing process, the pre-pump filter should be disassembled and cleaned after the first few tank-fills of fresh water. Then, afterward every month or so of use.

1. To remove the cover, press in firmly and twist counterclockwise about one eighth turn.
2. Pull the mesh screen out of the bowl and rinse clean.
3. Reassemble in the reverse fashion.

For more information, refer to your water pump owner's manual included in your TMC Owner's Packet.



Typical pre-pump filter installation

Fresh Water System Drain Valves

Fresh Water Tank Drain Valve

The fresh water tank drain valve is an important component used in fresh water system maintenance. This drain valve is located near the fresh water tank, either in a service compartment or a spigot on the outside of the motorhome.

Use this drain valve to lower or empty the volume of water in the fresh water tank. The fresh water tank has vents that facilitate pressure equalization when draining the tank. If water flow from the valve seems slow, check the tank vents for possible blockages.



Typical fresh water tank drain valve

Low Point Drain Valves

For the purpose of maintenance or winterization, low point drains are provided to facilitate draining the fresh water plumbing lines, both hot and cold. These valves are labeled **LOW POINT DRAIN** from the factory. The specific location of these drain valves varies by motorhome model and floorplan.

These valves are used when an entire fresh water system draining is needed, such as flushing the fresh water system, sanitizing or winterizing the system. Opening the drain valves for the fresh water tank and water heater alone will not drain water from the system's plumbing lines.

It is important to know the location of these drain valves when service, maintenance, or winterization of your fresh water system is required. If in doubt of their location, have your dealer point out the location of these drain valves for you. They are plumbed so that when opened, water contained in the hot and cold water lines will simply discharge to the ground underneath the motorhome. Opening hot and cold faucets aid the draining process. Be sure the water pump is OFF. If your waterlines contain sanitizing or winterizing fluids, you may need to place a catch basin underneath the discharge pipes to collect and properly dispose of these fluids.



Typical low-point drain valves

NOTICE

When draining the entire on-board fresh water system, make sure to open faucets; then open the water heater drain valve, system low point drain valves, and the fresh water tank drain valve.

Water Heater Drain Valve or Drain Plug

⚠ WARNING

SCALDING INJURY

Turn off water heater and allow time for the water to cool before removing the drain plug to either drain or flush the water heater's holding tank.

The manufacturers of tank-type water heaters install a tank drain valve or drain plug to facilitate water heater service and maintenance. Refer to your water heater owner's manual for tank draining instructions.

Water Heater

Depending on motorhome model, your motorhome will be equipped with one of these three types of water heaters:

- Tank-type (6 and 10 gallon)
- Tank-less (on-demand)
- Hydronic (on-demand)

For complete safety information and operational instructions on the particular water heater of your motorhome, please refer to the water heater manufacturer's guide contained in your Owner's Packet or visit the manufacturer's website. For information concerning your particular motorhome's installed equipment, contact TMC Customer Care.

ON/OFF Switch: Tank and Tank-less Water Heaters

WARNING

NEVER travel with the water heater ON. Before traveling, always turn the main switch to the water heater OFF and close the propane supply valve at the propane tank.

Traveling with the main propane valve OFF will help prevent propane gas leaks in the event that the motorhome is involved in a vehicular accident.

NOTE: For motorhomes with multiplex systems, the main water heater switch is included on the user-interface panel of the multiplex control system. Refer to the TMC Multiplex System Guide or the manufacturer's instructions included in your Owner's Packet.

NOTICE

Water heater control circuitry operates on 12 volts DC. The main battery switch must be ON for the water heater to operate.

The main water heater ON/OFF switch is located on the Monitor Panel. It is used to turn on and off the water heater as needed. This switch allows for operating the water heater independently of other 12 volt appliances. Since the electronic controls of the water heater operate on 12 volts DC, the main battery switch must also be ON for the water heater to operate. Refer to the TMC Electrical System Guide for main battery switch information.

For user convenience, there may also be a water heater switch installed on the bathroom wall. Inquire with your dealer if your motorhome has this feature.

Be certain these two conditions exist **BEFORE** turning **ON** the water heater's main power:

1. Turn on the water heater **ONLY** after the motorhome is either connected to a city water supply or the fresh water tank is full and the fresh water system is pressurized. These conditions will ensure there is sufficient water within and flowing to the water heater's supply tank for safe operation.
2. Turn on the water heater **ONLY** after the propane gas supply is turned on at the propane tank. Refer to the TMC Propane System Guide or your vehicle's owner's manual for complete propane gas safety instructions.

Tank-Type Water Heater

WARNING

Never operate a tank-type water heater without water in the water heater's supply tank. Severe damage to the water heater and possibly the motorhome could occur.

WARNING

Never operate a propane-fired water heater or other gas appliance while the vehicle is in motion. Turn OFF the propane gas at the tank and turn OFF the water heater power switch, located on the monitor panel.

A tank-type water heater is most commonly used in TMC motorhomes. This type of water heater uses a propane burner to heat a volume of water contained in the water heater's supply tank. Cold water flows into the tank, is heated by the propane burner, then flows to the hot water fixtures when needed. Exiting hot water is continually replaced by incoming cold water, while the temperature sensor cycles the burner to maintain a consistent hot water temperature. Most models have an electronic igniter that will automatically ignite the propane gas-fired burner when the temperature of the water drops to a preset level.

Please familiarize yourself with all safety and manufacturer's instructions before using your motorhome's water heater. The following instructions are basic operating and maintenance procedures that pertain to all propane gas-fired water heaters. Your water heater may have unique features or instructions that are not covered in this guide.

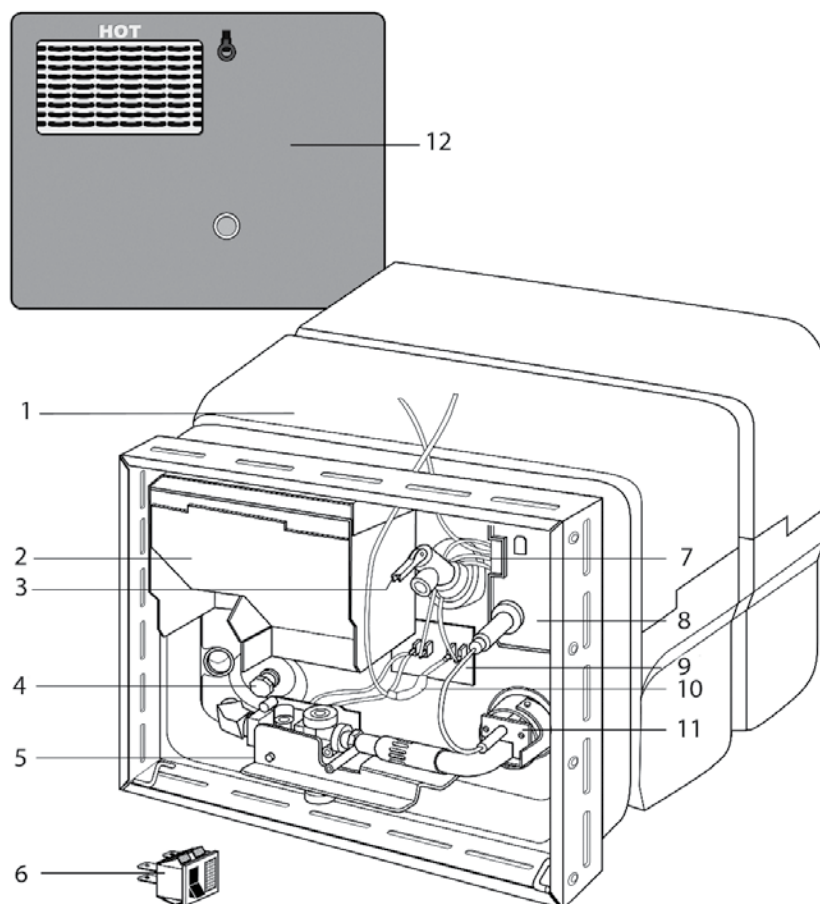
Water Heater Components

⚠ WARNING

THE WATER HEATER IS SUPPLIED WITH A PRESSURE RELIEF VALVE. THIS VALVE IS A SAFETY COMPONENT AND MUST NOT BE REMOVED FOR ANY REASON OTHER THAN REPLACEMENT.

The pressure relief valve complies with the standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Systems, ANSI Z21.22.

Illustrated here are the main components of a tank-type water heater. These controls are accessed by removing a service panel located on the exterior of the motorhome. Be cautious when accessing these components. If your water heater is in use, some components will be HOT and present a burn hazard.



- | | | | |
|---|---|----|--------------------|
| 1 | Supply Tank | 7 | Wiring Harness |
| 2 | Flue Box Assembly | 8 | Circuit Board |
| 3 | Pressure Relief Valve | 9 | Thermostat Control |
| 4 | Drain Plug | 10 | Thermo Cut-off |
| 5 | Solenoid Valve | 11 | Spark Probe |
| 6 | On/Off Switch
(located on Monitor Panel) | 12 | External Cover |



Water heater controls accessed from an exterior panel

Operating the Water Heater

⚠ WARNING**EXPLOSION / BURN INJURY**

Shut off gas supply at LP tank before disconnecting a gas line.

Keep control compartment clean and free of gasoline, combustible materials, and flammable liquids and vapors.

Do not alter water heater, it will void warranty.

Do not use after-market heating elements, they may lack critical safety controls.

⚠ WARNING**SCALDING INJURY**

Turn off water heater and allow time for the water to cool before removing the drain plug to either drain or flush the supply tank.

⚠ WARNING**SCALDING INJURY**

The mixing valve of the water heater is a safety component and must not be removed or tampered with for any reason other than replacement. Remove and replace by a certified technician only.

⚠ CAUTION

Never operate the water heater with an empty supply tank. Always ensure the fresh water system is pressurized, either by the system's water pump or by connecting to a pressurized city water supply.

Hydrogen Gas - Do not smoke or have an open flame near an open faucet.

1. Ensure the water heater supply tank is filled with fresh water.
2. Turn ON the propane gas supply at the LP tank. However, before doing so, ensure that all other gas appliances are in a condition of readiness for propane gas.
3. Turn ON the main battery switch.
4. Turn ON the water heater power switch, located on the monitor panel. This will initiate the ignition of the water heater gas burner.

5. The water temperature is pre-set at the factory. Allow adequate time for the gas burner to heat the water within the water heater's supply tank. When the water in the supply tank reaches its set temperature, the gas burner will automatically turn off.
6. Open the hot water faucets to use hot water. Adjust to desired temperature by mixing with the cold water faucet.
7. As the water in the supply tank cools or is replaced, the gas burner will automatically cycle on and off to maintain the set water temperature.

Additional Information (Tank-type Models)

- The water heater equipped in your TMC motorhome has an electronic igniter and does not use a pilot light. Turning on the water heater power switch will power the control circuitry of the water heater and initiate the water heating cycle. The main battery switch must also be ON.
- The water heater is designed with an ignition safety feature. With the gas supply ON and the main power switch ON, the water heater will make three attempts to light. For any reason there is no ignition, the unit will lockout and the red lockout lamp will illuminate (located on the monitor panel).
- If the thermostat fails, the unit will also lockout. Determine the reason for no ignition (for instance, the gas supply is off or empty, or insects have nested in the burner tubes), correct it, and reset the gas ignition sequence by turning the main switch OFF, then ON. If your water heater still fails to operate, take it to a qualified service center for inspection and repairs.
- The temperature setting of the water heater is pre-set at the factory and should not be adjusted. If you experience problems with water temperature (too hot or too cold), contact a qualified service center for repairs.
- If the water heater has not been used for more than two weeks, hydrogen gas may form in its internal water lines. Under these conditions and to reduce the risk of injury, open HOT water faucets for several minutes at the kitchen sink before using any gas or electrical appliances. If hydrogen gas is present, you will probably hear sounds like air escaping through the pipe as water begins to flow. Be sure to NOT have an open flame near the open HOT water faucet.
- Located on the exterior of your motorhome is a panel that allows access to main components of the water heater. By turning the tab at the top and allowing the door to hinge downward, you will be able to check for insect nests and other maintenance issues. There, you will find a water heater supply tank drain valve (or plug), a safety pop-off valve and other important water service components.
- Exhaust vents can become very hot to the touch. Exercise caution when working with the water heater access panel. Ensure the exhaust vents remain clear of debris and obstructions. If burner vents are clogged or blocked, carbon monoxide gas could leak into the motorhome.

Preparing the Water Heater for Travel

1. Turn OFF the water heater power switch located on the monitor panel.
2. Turn OFF the propane gas supply at the LP Tank. Be sure other gas appliances are also prepared for gas supply shut-off.

General Maintenance of your water heater (tank-type models):

- Propane gas pressure must be set at 11 inches of water column with three appliances operating; measured by a certified LP gas technician. **DO NOT ATTEMPT TO ADJUST THE LP REGULATOR ON YOUR OWN.**
- Drain water heater at regular intervals (at least once a year). This helps remove mineral deposits that build up within the tank. Drain the tank as part of the water system winterizing procedure. There is a drain valve or plug located behind the water heater access panel for this purpose.
- Bypass the water heater when sanitizing the fresh water system. Chlorine solutions can damage internal components of the water heater.
- Keep vent and combustion air grill clear of any obstructions.
- Periodically, compare flame of main and pilot burners by comparing flame with the illustration contained within the manufacturers owners manual.
- When the water heater is not in use (for an extended length of time) set the temperature control to its lowest position. This will reduce the effects of low outdoor temperatures on calibration of the temperature control mechanism.
- Presence of soot indicates the need to adjust the flue.
- Spiders, mud wasps, and other insects can build nests in burner tube. This causes poor combustion, delayed ignition or ignition outside the combustion tube. Inspect and clean on a regular schedule.
- Due to the placement of the drain plug, it is normal that approximately two quarts of water will remain in the tank after draining. This amount of water will not harm the water heater if it freezes. However, this water may become stagnant and collects most of the mineral deposits. An annual flushing of the tank is recommended. Refer to the manufacturers owners manual for this procedure.

Tank-less Water Heaters

⚠ WARNING

NEVER travel with the water heater **ON**. Before traveling, always turn the main switch to the water heater **OFF** and close the propane supply valve at the propane tank.

Traveling with the main propane valve **OFF** will help prevent propane gas leaks in the event that the motorhome is involved in a vehicular accident.

⚠ WARNING

It is dangerous to operate a tank-less water heater unattended. This may occur accidentally if a sufficient leak develops in the water system or if a faucet is left open. For this reason, the tank-less water heater installed in this motorhome will turn off after operating for 20 minutes and displays **ERROR "En"** on the display.

NOTICE

Water heater control circuitry operates on 12 volts DC. The main battery switch must be **ON** and the main gas valve must be **ON** for the water heater to operate.

With a tank-less, or on-demand water heater, water is heated as it flows through a propane-fired heat exchanger, which is set to a specified temperature by a user-controlled panel. By eliminating the need for a hot water storage tank, the user can enjoy instantaneous hot water, without waiting. Water is only heated when water flows through the heat exchange coils, triggered by the opening of a hot water faucet. If the water temperature is set correctly on the controller, there is no need to mix hot and cold water at the faucet in order to adjust for desired water temperature. An automatically controlled electronic igniter is used to ignite the propane gas as needed.

The Model GSWH-2 Tank-less Water Heater is controlled from the User Control Panel (UCP), which includes the power **ON/OFF** switch. This water heater can be operated in two different ways:

1. Like a conventional tank-type water heater; the user sets the temperature, usually 115° F, turns on the hot water and adds cold water to achieve the desired warm water temperature mix.
2. Select the desired temperature by adjusting temperature settings up or down. The UCP settings are from 95° F to 124° F. The unit will maintain the set temperature. Simply set the desired hot water temperature and only open the hot water faucet; no mixing with cold water required.



Tank-less water heater User Control Panel (UCP) mounted on a bathroom wall

FOR NORMAL OPERATION:

1. Turn **ON** the power. The panel will light and will display the current temperature at the inlet of the unit.
2. Press a temperature selection arrow (up or down) to see the current set temperature.
3. Adjust the set temperature to the user's preference.
4. Turn on the hot water faucet.
5. As long as a hot water faucet is opened, water from the fresh water tank or a city supply will flow into the water heater's heat exchanger and will be heated to the set temperature and flow to the open faucet.
6. The main gas valve must be on for the water heater to operate. Gas ignition will cycle on and off automatically with the demand for hot water.

Winter Use**NOTICE**

To allow the Antifreeze Device to operate you must have sufficient LP gas supply and 12 volts DC power available and you must leave the unit powered with the ON/OFF switch in the ON position at all times that freezing temperatures may occur. It will NOT protect the entire RV's plumbing system.

Freezing of the water heater and its plumbing components will result in severe damage not covered by the manufacturers warranty. For this reason it is advisable to follow the recommendations below if the unit is to be stored in a freezing environment or for long periods of time. At the start of the winter season or before traveling to a location where freezing conditions are likely, the unit must be winterized. The very small amount of water present in the heat exchanger **DOES NOT** require the installation of a bypass kit. Winterization can be accomplished using the methods described in this guide.

If you intend to use your motorhome in the winter months or when encountering freezing temperatures, use the water heater's anti-freezing feature:

ANTI-FREEZING PROTECTION FEATURE OF THE WATER HEATER

If you wish to operate the water heater in potentially freezing conditions the model GSWH-2 has a built in thermostat that will start the burner whenever the temperature of the Heat Exchanger falls below 38° F and will automatically shut off when it senses a temperature in excess of 58° F. Refer to the manufacturer's operational guide for details.

Maintenance

The manufacturer recommends monthly inspections of the water heater by the user and annual inspections by a qualified service technician. A routine inspection includes:

1. Inspect the integrity of the sealing (caulking or tape) between the side wall and the door of the water heater and ensure that the unit is solidly mounted to the vehicle.
2. Verify that the air inlet openings (louvers) are completely open and clear of any debris including mud, leaves, twigs, insects etc. Remove all obstructions to allow full air flow.
3. Insects, including mud wasps and spiders, can build nests in the Exhaust Tube Outlet which will affect the performance of the unit. Inspect the Flue Outlet Tube to make sure that it is unobstructed and that the screen is clean. If debris or insects are present, clean and vacuum to remove all debris. **THE USE OF ANY TYPE OF AFTER-MARKET SCREEN TO COVER THE VENT IS NOT PERMITTED AND WILL VOID THE WARRANTY.**
4. Open the door and verify that no debris or extraneous combustible materials are present anywhere (especially in the area of the burner and the gas controls); remove any item present and wipe the bottom of the housing clean.
5. Inspect the interior surface of the housing for any cracks or corroded areas that could allow penetration of gases into or out of the interior of the vehicle. Check especially around the hot water, cold water, gas and electrical connections.
6. There is a filter screen on the water heater inlet water line connection, unscrew the water line connection from water inlet and check the screen to ensure no debris is present.
7. Check that all wire connections are firmly in place and there are no signs of chafing or cracks on the insulation. Verify that the spark ignition cable between the control board and the igniter is securely in place and not shorted to any metal component.
8. Check relief valve to ensure it has not been leaking (no water residue).
9. Turn ON the power to the water heater and open a hot water faucet to inspect the flame of the burner. The flame should be of the normal bluish appearance that indicates proper combustion. This can be accomplished by opening the water heater door and observing the flames by looking at the burner under the edge of the heat exchanger.
10. If unit overheats often and the relief valve discharges periodically, contact your service center for repairs.

Aqua-Hot® Hydronic Heating System

⚠ DANGER

The heater must be switched OFF when refueling.

DO NOT operate the Aqua-Hot's diesel-burner inside an enclosed building.

⚠ WARNING

Read and follow all safety warnings affixed to the Aqua-Hot boiler unit and published in the manufacturer's manual.

⚠ CAUTION

Read the manufacturer's instructional guide before using your Aqua-Hot heating system to reduce the risk of injury to persons or damage to equipment.

Have your dealer show you the location and operation of all switch operations and valve settings.

DO NOT repair or service the system, unless specifically recommended in the literature accompanying the Aqua-Hot product. All service should be referred to a qualified technician.

An interlock switch prevents the Aqua-Hot heater from operating when the cover is not installed in the correct position.

Propylene glycol based antifreeze; generally recognized as safe by the FDA, must be utilized for antifreeze and water heating solution.

Interior heat can still be used even after the water heating system has been drained and winterized.

Use propylene glycol; generally recognized as safe RV and marine antifreeze specifically for winterizing application ONLY.

NOTICE

The hydronic system uses 12 volts DC for control circuitry and 120 volts AC for the supplemental electric heating element.

Be sure that the electrical system is operational before attempting to operate the hydronic system.



Aqua-Hot Main Unit

⚠ CAUTION

The hot water temperature is set at the mixing valve to 120°F/48.9°C at the factory.

DO winterize the heating system when freezing temperatures are expected to avoid serious damage to the hot water system.

DO NOT operate the burner or electric heating element without antifreeze or water heating solution in the boiler tank, to avoid damage to the heater.

Aqua-Hot's exhaust is **HOT**. **DO NOT** park in dry areas when operating to avoid fire and injury to persons.

At maximum operating temperatures, the coolant will be very hot and scalding hot vapor or coolant may result in serious burns or injury.

Before cleaning or servicing disconnect all power supplies.

The heater must be switched OFF when refueling.

Hydronic Water Heater

A hydronic water heater is a demand water heater, which operates similarly to the tankless-type previously described; with the addition that the hot water heat exchanger is also used to warm the living space of the motorhome. This is accomplished by plumbed closed-loop heat zones, (separate from the hot water lines), that are connected to individual heat exchange units located throughout the motorhome. These heat exchangers have blowers that force cabin air through them, warming the air as it passes over coils. Fluid in the heat zone piping is continuously circulated to the main heating unit, re-heated and sent again to the zoned heat exchangers. Heat zones are individually temperature-controlled.

Hydronic heaters use both a diesel-fueled burner and an electric heating element to heat water (for hot water use) and the heating fluid, which contains anti-freezing agents (for cabin heating).

Select TMC diesel motorhomes may be equipped with an Aqua-Hot® Hydronic Heating System. This is a low-emissions system that provides both hot water and cabin heating. The Aqua-Hot Heating System is three systems in one:

- Interior Heating System: provides quiet, comfortable interior heat with independent temperature zones that provide cabin-wide even temperature control.
- Bay Heating System: keeps pipes and tanks from freezing in the bay storage area.
- Tank-less Hot Water System: provides a steady flow of continuous hot water.



Aqua-Hot Main Unit, top view

The Aqua-Hot Heating System is powered by TribridHot™ technology and uses one or a combination of the following energy sources:

- The 120 volts AC Electric Element: When plugged into shore and/or on-board generated power, the electric element provides heat and meets light-duty hot water needs.
- The Diesel Burner: This is the Aqua-Hot's most powerful heat source and provides all the heating and hot water needs in cold temperatures and dry camping.

The Hot Water System

The Aqua-Hot system is known as an on-demand hot water heating system because hot water is not stored within the motorhome. Instead, when the burner and/or electric element switch is ON and the Aqua-Hot is at operating temperature, the water is automatically heated as it is being used. Therefore, simply open an hot water faucet once the system is up to operating temperature, and a continuous supply of hot water will be present within a few seconds.

CONTROL SWITCHES

The Aqua-Hot heating system is controlled by two switches, the burner switch and the electric element switch. When one or both of these switches are in the ON position, it will supply the necessary heat to the boiler tank. Keep in mind that the Aqua-Hot unit must be at operating temperature for the heating zones and hot water delivery.

Using the Hot Water System

To operate the Aqua-Hot hot water system, you will need to locate the interior switch panel located inside your motorhome. If you are unable to locate the switch panel, contact your dealer to guide you in the location and operation of all switch operations.

Once you have located the interior switch panel, turn the burner switch ON. This action will activate the diesel-burner and the indicator light located adjacent to the diesel-burner switch. Allow 10-20 minutes for the Aqua-Hot system to reach operating temperature. Please note that the diesel-burner is the primary heat source for heating the interior and providing hot water.

TO OPERATE THE ELECTRIC HEATING ELEMENT:

- Turn the electric switch ON. This action will activate the 120 volt AC electric heating element and the indicator light located adjacent to the electric switch.
- Allow 1-2 hours for the Aqua-Hot system to reach operating temperature (if only using the electric heating element).
- For **MAXIMUM** water heating capacity, activate both the diesel burner and electric element.



Aqua-Hot Switch Panel



NOTE: If your motorhome is equipped with a multiplex control system, all controls and switches for the Aqua-Hot system are integrated into the multiplex user interface panel(s).

Maintenance and Other Important System Information

⚠ DANGER

When the Aqua-Hot is at maximum operating temperature, the coolant will be very HOT! If the Aqua-Hot's heating system is accessed, scalding hot vapor or coolant could result. Before cleaning or servicing, disconnect all power and turn off burners.

⚠ WARNING

Not winterizing the Aqua-Hot when freezing temperatures are present will result in **SERIOUS** damage to the Aqua-Hot's domestic Water Heating System.

Only use anti-freeze solution approved by the manufacturer in the Aqua-Hot system. **NEVER** use automotive antifreeze/coolant in the Aqua-Hot system.

NOTICE

DO NOT operate the diesel-burner and/or electric element without the antifreeze and water heating solution in the Aqua-Hot's boiler tank. Failure to do so will cause serious damage to the heater.

NOTICE

The Aqua-Hot system contains copper tubing which is not compatible to prolonged exposure to sodium hypochlorite (bleach or liquid bleach). Using products containing bleach for sanitization of the water heater may cause corrosion of the water coil, resulting in catastrophic failure of the Aqua-Hot system, by creating leaks that cannot be repaired.

NOTICE

For complete operation and maintenance information, refer to the manufacturer's owner's manual, included with your Owner's Packet.

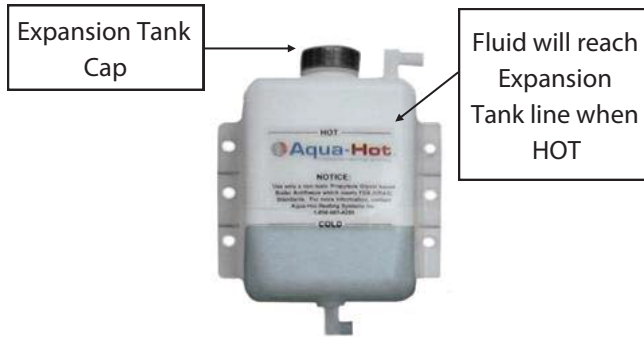
Questions regarding the operation and/or maintenance of the Aqua-Hot hydronic system can be directed to TMC Customer Care or to the manufacturer.

NOTE: The labels affixed to the Aqua-Hot control panel and unit provide a ready reference to specifications, test standards, and important safety notices.

The Aqua-Hot system requires minimal maintenance if monthly, annual, and proper winterization procedures are followed accurately. It is extremely important to follow the instructions precisely and carefully to receive the best results and promote the longevity of your Aqua-Hot system.

MONTHLY MAINTENANCE

It is particularly important to check the Aqua-Hot's antifreeze and water heating solution to ensure it is at the proper level for operation. This can be easily accomplished by visibly checking the coolant level in the Aqua-Hot's expansion tank.



Aqua-Hot System Fluid Level. Check monthly and top off when necessary with approved fluid.

At maximum operating temperature, the antifreeze and water heating solution should be at the level marked **HOT** on the expansion tank. The coolant level should be checked **ONLY** when the Aqua-Hot is at **MAXIMUM OPERATING TEMPERATURE**. Therefore, this procedure should be done immediately after the diesel-burner cycles **OFF**. If the system needs fluid, reference the **FLUIDS** section of the Aqua-Hot's owners manual.

ANNUAL MAINTENANCE

In order to keep the Aqua-Hot running at its full potential, it is highly recommended to have the diesel-burner tuned-up on an annual schedule. This tune-up consists of replacing these two components:

- Fuel nozzle
- Fuel filter

Always use OEM parts. Reference the Aqua-Hot owner's manual for ordering information, or contact your dealer's service department to schedule a service appointment.

Aqua-Hot Winterization

NOTICE

The Aqua-Hot closed-loop heating system uses a solution with anti-freeze properties that IS NOT the same as the RV antifreeze used to winterize the water system of your motorhome.

ONLY USE Aqua-Hot approved solution in the fluid reservoir of the Aqua-Hot system and **ONLY USE** RV antifreeze for winterizing the water system of the motorhome.

When it is time to store your motorhome for the winter months or when freezing temperatures are expected, it is crucial to properly winterize the Aqua-Hot system **AND** the water system of your motorhome. Damage due to improper cold weather storage or preparation is not covered under the manufacturers warranty. The process of winterization consists of completely draining the domestic water from the water system and pumping RV winterization antifreeze throughout to flush and purge the system of water.

- Refer to the Winterization Section of this guide to winterize the water system of your motorhome. Only use RV winterizing antifreeze solution for the plumbing and fixtures of the water system.
- To ensure your Aqua-Hot closed-loop heating system is properly winterized, only used approved antifreeze solution with the Aqua-Hot system and add antifreeze solution to the expansion tank as needed. Refer to the manufacturer's recommendations for Aqua-Hot antifreeze solution.

Aqua-Hot De-winterization

To de-winterize the Aqua-Hot system, completely fill the fresh water storage tank. Open and close the interior and exterior faucets, one at a time, until only clear water is present.

Fresh Water Fixtures

Kitchen Faucets and Sinks

The faucet and sinks installed in your motorhome operate just like those in your home. As long as there is water system pressure, provided by the on-demand pump or city source, hot and cold water is conveniently available for washing and food preparation.

NOTICE

Only waste water should be disposed of down the drain. Always use the sink drain strainer to capture food and other particles. Never put grease, food, or other liquid or solid materials down the drain because you may plug the drain pipes and holding tank. Your motorhome's kitchen sink is not equipped from the factory with a garbage disposal.



Kitchen Sink and Faucet

Bathroom Shower

The shower operates just like the shower at your home. It has two knobs that control the temperature mix and flow of water, and a center valve to divert water into the shower head. The shower hose is provided with a vacuum breaker to prevent the head from siphoning water back into the fresh water system.



Typical bathroom sink and shower

Exterior Water Spray Station

Your TMC motorhome may be furnished with an exterior wand-type water faucet and spray station, which is conveniently located in the termination compartment, near the sewer drainage outlet. Both hot and cold running water are available at this station. This water supply provides a convenient rinse station for cleaning campsite equipment, pets, and sewer connections.



Exterior Water Spray Station

Fresh Water Tank

⚠ WARNING

Potable water only. Sanitize, flush, and drain water tank before using. See owner's manual for instructions, care, and maintenance information. Failure to maintain tank can result in death or serious injury.

If an external source of fresh water is unavailable, your motorhome is capable of supplying your fresh water needs from the self-contained fresh water tank. The fresh water tank **MUST** be sanitized before using (see Warning Label). Sanitizing procedures are outlined in the Sanitization Section of this guide.

After sanitizing and flushing the fresh water tank and water system, fill the tank with fresh, potable water prior to use. Your motorhome may provide two methods of filling the fresh water tank. One is by using the gravity fill port, located on the side of the motorhome. The other, and **ONLY IF INSTALLED**, is by connecting to an external spigot of pressurized fresh water supply via a flexible fresh water hose, and filling the fresh water tank through the Swan Bypass Valve or Anderson Kantleak™ Valve; both described in this guide. Remember, anytime an **EXTERNAL** water source is used, the fresh water tank and water pump are normally bypassed. Therefore, never run the water pump while connected to an external water supply source.

To fill the fresh water tank via the gravity fill port, simply uncap the port and pour fresh, potable water into the tank from a container of fresh water or from a potable water hose connected to a fresh water source. Always use clean water containers and potable water hoses. Do not mix the use of fresh water containers with fuels, chemicals, or other liquid or solid materials.

Holding Tanks and Capacities

The capacities of water system holding tanks varies, depending on the available space of particular motorhome models and floorplans. All TMC motorhomes are furnished with fresh water tank of at least a 30 gallons of capacity. Some Class A motorhomes can carry over 90 gallons of fresh water. Most TMC motorhomes have separate gray and black water holding tanks, while some models use one tank for all waste water collection. By design, the total capacity of waste water collection is at least equal to the volume of fresh water storage of your motorhome.

When determining the total volume of fresh water that can be contained and transported in your motorhome, please consider the water volume that is also stored in the water heater. Refer to the specifications of your particular motorhome. Most TMC motorhomes are furnished with a 6 or 10 gallon water heater. Other models feature tank-less, on-demand water heating systems.

NOTE: It is known that a siphoning effect can occur through the fresh water tank vent when certain travel conditions are encountered. You may arrive at your destination with less water in the fresh water tank than you expected.

NOTE: Since water weighs approximately 8 pounds per gallon, traveling with full water holding tanks will reduce the available weight capacity to carry other gear in your motorhome. You may want to consider traveling with partially filled water tanks. Refer to the Gross Vehicle Weight Rating (GVWR) of your motorhome before loading and traveling. This rating can be found on a label near the driver's door or compartment.

NOTE: When draining the fresh water tank, make sure the water pump has been turned OFF. Depending on model and floorplan, the fresh water tank drain valve is either located in an external compartment below and near the fresh water fill spout or it is a drain cock installed on the lower outside surface of the motorhome. Water in the tank can be drained by turning the drain cock perpendicular to the motorhome body. To close the valve, turn the lever parallel to the motorhome body.

Your TMC motorhome is designed to adequately supply the water requirements of a typical family for a self-contained period of a few days. However, the volume of water used by a typical family over a period of time varies greatly depending on a number of factors. The best guide for your particular water needs and the rate of water use is your own travel experience.

Here is a suggestion: over the first few travel trips, keep a log of your water fill-ups and how long it takes to fill your gray and black water holding tanks. You will soon be able to estimate the amount of water you and your travel companions will require during travel excursions.

Filling the Fresh Water Tank Via the Gravity Fill Port

⚠ CAUTION

Do not leave the motorhome unattended while filling the fresh water tank.

Although the tank has an overfill vent, the capacity of the vent is smaller than the fill port. Incoming water could overcome the capacity of the vent.

1. Locate and remove the cap on the Gravity Fill Port, located on the side of the motorhome. On some motorhome models, the gravity fill port is located inside a service compartment. This port is usually labeled **POTABLE WATER ONLY**.
2. Using a clean hose (designated for potable water use), bucket, or portable container suitable for potable water transport, fill the container with fresh water, or if using a hose, place the end of the hose into the fill port.
3. Pour water into the port until a desired amount of water is placed in the fresh water tank. If using a hose, run the water until the tank is filled. When filling the tank, water level can be monitored by observing the fill level on the main control panel.
4. Replace the cap to the fill port. The cap will prevent dirt and debris from entering the fresh water tank.



Typical Fresh Water Gravity Fill Port

NOTE: Always fill the tank with clean potable water from a known safe source. Make sure to re-cap the fill spout when the tank has been is filled.

Monitoring Fluid Levels of the Holding Tanks

APPLIES TO FRESH WATER AND WASTE WATER HOLDING TANKS

Electrical sensors installed within the holding tanks send signals to the monitor panel that enable the fluid level of the holding tanks to be visually represented. On the Monitor Panel, there is a press-and-hold switch assigned for each holding tank of the water system. To check fluid levels, press and hold the switch designated for the tanks you wish to monitor. An approximate level of fluid in the tank will be displayed on the panel. The indicator is proportioned in one-thirds with each light being lit corresponding to the nearest actual fluid level within the tank.

Press the FRESH, BLACK, or GRAY switch. An LED will illuminate; indicating the approximate fluid level of the corresponding holding tank



LED Fluid Level Indicators:
E = Empty
1/3 Full
2/3 Full
F = Full

Although the sensors and electronics of the monitor panel have been designed to provide reliable information, there are certain conditions where inaccurate tank level readings may be encountered. Occasionally, verify the accuracy of the monitor panel by comparing the panel indicator to a known condition of the tanks; for instance, when the tanks are either completely full or completely empty.

⚠ WARNING

Do not use strong detergents or toxic cleaning agents to clean the FRESH WATER TANK. Use of toxic chemicals could contaminate the drinking water supply and lead to severe illness or death.

Consult your RV dealer for safe and recommended FRESH WATER TANK cleaning agents.

Listed below are conditions that may lead to inaccurate holding tank fluid level readings, along with a few suggested remedies. If problems with your monitor panel persist, consult with your dealer or call TMC Customer Care for assistance.

- Over time, mineral residues such as lime and iron can build up on the sides of a tank, which can prevent the sensors from reading the tank level accurately.

- Water with a low or unusual mineral content may cause inaccurate readings.
- Certain cleaning products and food by-products can build up on the inside walls of the waste water holding tanks, producing a layer of deposits that can cause the monitoring system to return inaccurate readings.

To correct these problems, holding tanks should be periodically flushed and cleaned. Inquire with your dealer or TMC Customer Care for holding tank cleaning instructions.

Holding Tank Heaters (Optional)

Some TMC motorhomes are equipped with holding tank heating pads. These pads reside underneath the holding tanks and are used to prevent the liquid contents of the holding tanks from freezing when cold weather conditions are encountered.

If provided, there will be an ON/OFF switch located on the Monitor Panel for the holding tank heating pads. The heating pads are not controlled by a timer or thermostat. Only use the holding tank heating pads when outside temperatures drop below 32° F (0° C).

If your motorhome is not equipped with holding tank heaters, it is designed to use heated air from the motorhome's furnace to circulate through the holding tank compartments. As long as your furnace is operating properly (keeping the interior of the motorhome above 40° F), the fluids in the holding tanks will not freeze. Observe all safety-related issues when operating the furnace of your motorhome (refer to the furnace manufacturer's owner's manual and the TMC HVAC System Guide for furnace operating details).

You can determine whether or not your motorhome has holding tank heaters by the inclusion or absence of holding tank heater switches on the monitor panel.

If you have any questions or concerns about encountering weather conditions that may freeze the fluids in your holding tanks, please consult with your dealer or call TMC Customer Care for advice on preparing and using your motorhome in cold weather conditions.

NOTE: Holding tank heaters may operate on 12 volts DC. If you are not connected to Shore Power, be sure to run your generator sufficiently to keep your house (auxiliary) battery charged.

NOTICE

DO NOT TO ALLOW FLUIDS IN THE HOLDING TANKS TO FREEZE.

Tank heating pads operate on electrical energy. Some heating pads are dual voltage, while others only operate on 12 volts DC. If your motorhome is supplied with 12 volt DC only heating pads, operating the pads for an extended length of time can deplete the energy stored in your house (auxiliary) battery.

City Fresh Water Source

⚠ CAUTION

Some external water sources develop high water pressure, particularly in mountainous regions. These campgrounds or hook-up locations may not have regulated water pressure, which could be considered excessive.

High water pressure is anything over 55 psi. Excessive pressure may cause leaks or damage to your water system.

NOTICE

When connected to an external water source, it is strongly recommended that a water pressure regulator is used in-line with the water supply delivery hose. Water pressure regulators are designed to reduce high external water supply pressures to a level that is safe for your motorhome's water system; preventing potential damage. RV water pressure regulators can be obtained at RV suppliers or dealers.

Most campgrounds or RV parks offer full water and electric hook-ups. And if available, the spigot of fresh water supply will have a standard garden hose thread. If in doubt, check with the site manager about connecting to a fresh water source and inquire about the water pressure of the external system. The incoming water pressure should be limited to 45-55 PSI maximum. It is good practice to obtain a water pressure regulator and install it between the external water supply and your motorhome's fresh water inlet.

After arriving at your destination, you will want to determine whether to connect to the fresh water source provided by the park, or draw your fresh water needs from your on-board system.

To Connect to a City (External) Fresh Water Source:

1. Connect your potable water hose to the campsite water supply spigot and turn on the water, letting it flow for a few minutes. This will clear any deposits that may be in the water supply piping due to inactivity. It also clears any stagnant water that may be present in the potable water hose.
2. Turn OFF the water supply and locate and remove the cap from the fresh water inlet, labeled **CITY WATER**, on the side of the motorhome and attach the free end of the fresh water supply hose to this inlet connection. It is always recommended that a water pressure regulator is used in-line with the water supply hose.
3. Turn the external water source spigot ON and gradually open both hot and cold faucets in the motorhome to release air from the water lines. This procedure also fills the supply tank of your hot water heater. Close the faucets when water flows freely.



Typical fresh water hose connection to city water supply

NOTE: Not all garden hoses are made of materials designed for potable water. Purchase and use a water supply hose that is designed for fresh, potable water use. Keep this hose separate from other hoses. Water supply hoses of this type can be obtained at RV suppliers or dealers.

NOTE: The water pump is bypassed when using a city water source. To prevent damage to the water pump, do not turn the water pump on when using water from an external supply.

To Disconnect from a City (External) Fresh Water Source:

1. Shut off the spigot of the external water source, then open the faucets in your motorhome, to release the water pressure.
2. Disconnect the supply hose from this spigot and from the water inlet port of the motorhome.
3. Drain and roll-up the supply hose and connect the ends together. This will prevent debris from getting into the hose.
4. Stow the hose and pressure regulator (if used) and re-cap the water inlet port.

Anderson Kantleak™ Water Valve

All TMC Class A diesel and several TMC Class A gas motorhomes feature Anderson Kantleak™ water valves installed on the water system panel, located within a driver-side compartment of the motorhome.

The Anderson Kantleak™ Valve provides four convenient functions:

1. **NORMAL** - Supply water to the fixtures from the fresh water tank (via pump)
2. **CITY** - Supply water to the fixtures directly from an external water hook-up
3. **TANK** - Fill the on-board fresh water holding tank from an external water hook-up
4. **SANITIZE / WINTERIZE** - Supply sanitizing/winterizing solution to the fixtures from the inlet connection (via on-board water pump)

The model 200RV-WHBS valve panel also includes a convenient 3-position water heater valve that provides these functions:

1. **NORMAL** - Supply cold water to the water heater and supply hot water to the hot water fixtures
2. **BYPASS** - Divert water supply from the hot water fixtures and hot water heater, isolating the water heater for sanitize/winterize function or water heater maintenance
3. **SANITIZE TANK** - Sanitize fresh water tank and hot and cold water lines, while bypassing water heater.

Similar to the above model, the 200RV-WHBSD valve panel allows the user to **BYPASS** and **DRAIN** the water heater tank for system maintenance.

All Anderson Kantleak™ valve panels include a City Water Inlet Port for water supply hose connection.

Outlined in this section are instructions on how to use the Anderson Kantleak™ Valve for each function.



Model 200RV



Model 200RV-WHBS



Model 200RV-WHBSD

Filling the Fresh Water Tank

⚠ CAUTION

Do not leave the motorhome unattended while filling the fresh water tank. Although the tank has an overfill vent, the capacity of the vent is smaller than the fill port. Incoming water could overcome the capacity of the vent.

1. Rotate Fill Valve to **CITY FILL TANK** position.
2. Rotate Water Heater Valve to **NORMAL** position.
3. Connect potable water hose from city water supply to the Inlet Port on Anderson Kantleak™ Valve Panel; turn ON water supply.
4. Water tank is full when water flows from vent/overfill; turn OFF water supply.

PLUMBING DESCRIPTION

- Fresh city water supply connects to Anderson Kantleak™ Panel through the Inlet Port
- Inlet Port connects to the inlet of the fresh water filter
- Outlet from fresh water filter connects to Anderson Kantleak™ Fill Valve
- From Anderson Kantleak™ Fill Valve, fresh, filtered city water flows to the inlet of the fresh water tank
- Excess water is vented through Fresh Water Tank Vent/Overfill port
- Water pump and water heater are bypassed

Normal Position: Water Supplied from the Fresh Water Tank

1. Rotate the Fill Valve to the **NORMAL** position.
2. Rotate the Water Heater Valve to the **NORMAL** position.
3. Turn ON the water pump.
4. OPEN a hot and cold faucet, usually at the kitchen sink. This will purge the water lines of air and ensure water is flowing to the water heater.
5. Shut OFF the faucets when water flows freely from both the hot and cold lines.
6. Turn ON the water heater.



Tank Fill Position



Normal Position

PLUMBING DESCRIPTION

- Water from fresh water tank (filtered when tank is filled) connects to Anderson Kantleak™ Fill Valve inlet
- Outlet from Anderson Kantleak™ Fill Valve connects to inlet of water pump
- Outlet from water pump connects to cold water lines of faucets, shower, toilet(s), exterior shower, and if installed; washer and ice maker
- Water also supplied to hot water heater through Anderson Kantleak™ Water Heater Valve in Normal position
- Hot water returns from hot water heater to Anderson Kantleak™ Water Heater Valve and distributes to hot water fixtures

City Fixtures Position: Water Supplied from City Source

1. Connect potable water hose from the city water source to the inlet of the Anderson Kantleak™ Valve panel.
2. Rotate the Fill Valve to the **CITY FIXTURES** position.
3. Rotate the Water Heater Valve to the **NORMAL** position.
4. OPEN a hot and cold faucet, usually at the kitchen sink. This will purge the water lines of air and ensure water is flowing to the water heater.
5. Shut OFF the faucets when water flows freely from both the hot and cold lines.
6. Turn ON the water heater.

PLUMBING DESCRIPTION

- City cold water supply connects to Anderson Kantleak™ Inlet Port
- Cold water passes through Anderson Kantleak™ Inlet Port to the fresh water filter
- From the fresh water filter, cold water flows to Anderson Kantleak™ Fill Valve and is supplied to all cold water fixtures
- Filtered cold water also supplied to hot water heater through Anderson Kantleak™ Water Heater Valve in Normal position
- Hot water returns from hot water heater to Anderson Kantleak™ Water Heater Valve and distributes to all hot water fixtures
- Water pump is bypassed



City Fixtures Position

Sanitize/Winterize Position: To Sanitize the System

1. Turn OFF hot water heater.
2. Drain fresh water tank, hot water tank, and fresh water system (see Low Point Drains), then CLOSE drain valves. CLOSE valve to ice maker and clothes washer (if installed).
3. Prepare properly diluted sanitizing solution (based on fresh water tank capacity) and place in an external container.
4. Connect potable water hose to City Water Inlet and place free end into container of sanitizing solution.
5. Rotate Anderson Kantleak™ Fill Valve to **SANITIZE / WINTERIZE** position, rotate Water Heater Valve to **SANITIZE TANK** position.
 - Rotating Water Heater Valve to Sanitize Tank position bypasses water heater, but solution is pumped into hot water lines and the fresh water tank
 - Sanitizing solution (chlorine) may damage internal heat exchangers of certain water heaters; bypassing water heater is recommended
 - Some water filter cartridges are not compatible with sanitizing (chlorine) solutions; water filters may need to be bypassed or remove cartridge
6. Turn ON water pump.
7. OPEN all faucets, both hot and cold.
 - Sanitizing solution is drawn from container via water pump; into water lines and fresh water tank. The water lines contain sanitizing solution when solution flows out all faucets.
8. After solution flows from faucets, CLOSE all faucets, FLUSH toilet(s). Allow remaining solution to enter water tank. Turn OFF water pump when container of solution is empty.
9. Allow sanitizing solution to remain in fresh water lines and tank for several hours. If possible, a short drive is recommended to slosh solution in tank.
10. Drain fresh water system, then flush by connecting potable water hose to city water supply, rotate Anderson Valve to **CITY FIXTURES** position, then turn ON city water supply while all water faucets are open.
11. Flush hot and cold water lines until chlorine smell is no longer detected, then turn OFF all water faucets. Fill fresh water tank and empty, repeat if necessary.
12. Reinstall filter cartridges.
13. Rotate Water Heater Valve to **NORMAL** position. OPEN hot water faucets to fill hot water tank. When tank is full, turn OFF faucets and if needed, turn ON hot water heater.



Sanitize/Winterize Position

NOTE: There are several ways to sanitize the water system. This method draws sanitizing solution from an external container. Other methods require placing sanitizing solution directly into the fresh water tank via the gravity fill port. That method is also listed in this guide.

Sanitize/Winterize Position: To Winterize the System

⚠ WARNING

Automotive antifreeze (ethylene glycol) and windshield washer antifreeze (methanol) are poisonous. Never use these products in your fresh water system. These products are harmful and may be fatal if swallowed.

1. Turn OFF hot water heater.
2. Drain fresh water tank, hot water tank, and fresh water system (see Low Point Drains), then CLOSE drain valves.
3. Disconnect ice maker water line (or open drain valve if applicable).
4. Prepare winterizing solution and place in an external container.
5. Connect potable water hose to City Water Inlet and place free end into container of winterizing solution.
6. Rotate Anderson Kantleak™ Fill Valve to **SANITIZE / WINTERIZE** position, rotate Water Heater Valve to **BYPASS** position.
 - Rotating Water Heater Valve to Bypass position bypasses water heater, but draws winterizing solution into hot water lines.
 - Winterizing solution will NOT be pumped into fresh water tank. Ensure fresh water tank is completely drained before winter storage.
7. Turn ON water pump.
8. Open all faucets, both hot and cold.
 - Winterizing solution is drawn from container via the water pump; when solution flows out all faucets, the water lines contain winterizing solution.
9. After winterizing solution flows from faucets, CLOSE all faucets.
10. Flush toilet(s) several times, then turn OFF water pump.
11. To ensure drain p-traps have winterizing solution, pour several cups of solution into each drain.
12. Disconnect water lines from washer (if installed) and open valves. Pour several cups of solution down both hot and cold water lines and washer drain.
 - All water must be removed from appliances, such as clothes washers and refrigerators. See appliance manufacturer's owner's manuals for details.
13. Flush and drain both gray and black water holding tanks.
14. Flush and stow potable water hose.



Sanitize/Winterize Position

NOTE: As with sanitizing the water system, there are several ways to winterize the water system. This method draws winterizing solution from an external container. Other methods require placing winterizing solution directly into the fresh water tank via the gravity fill port. That method is also listed in this guide.

Waste Water System

The waste water system of your motorhome is designed to be completely self-contained. It will safely collect and hold all waste water until it is necessary to empty the holding tanks. Other than flexible sections of drain hose that accommodates slideouts, the drain system is very similar to what is found in your home. Drain pipes and fittings are made of ABS plastic, which is durable, impervious to most chemicals, and easy to maintain.

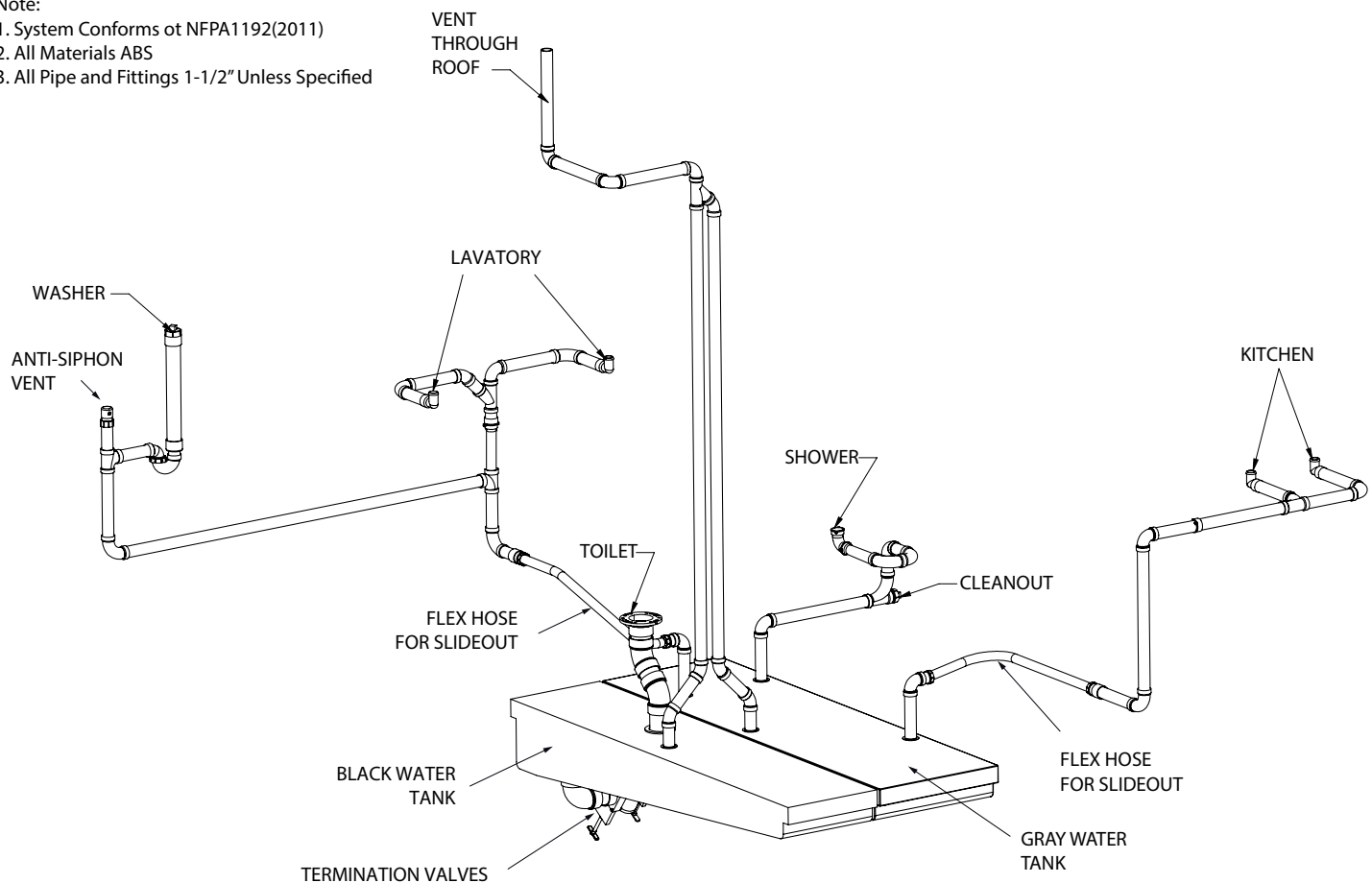
THE WASTE WATER SYSTEM INCLUDES THESE COMPONENTS:

- Waste water holding tank, or separate gray and black water tanks
- Termination valve(s) for emptying waste water tank(s)
- Sewer hose connection
- Black tank flush
- Drain pipes and fittings
- Drainage vents (through roof and check-vents)
- Sink drains
- Toilet(s)
- Macerator pump(s) (select floorplans)

NOTE: On some models bathroom sinks may be plumbed to drain into the black tank instead of the gray tank.

Note:

1. System Conforms to NFPA1192(2011)
2. All Materials ABS
3. All Pipe and Fittings 1-1/2" Unless Specified



Typical waste water drainage system (for illustration purposes only). Drainage layouts vary depending on floorplan and available features.

Waste Water Fixtures

Toilet Operation

The toilet(s) installed in your motorhome are designed to provide convenient and trouble-free operation when used properly. Unlike most residential toilets, RV toilets are usually tank-less, meaning that the user fills the bowl just prior to use. Most toilets are operated by a foot-actuated pedal, located either on the right side or front of the toilet bowl.

TO USE:

First add water to the bowl, depress the lever or pedal half way. This will open the water valve, filling the bowl, and keep the waste valve closed. Water in the toilet bowl will aid waste evacuation.

To flush, depress the lever or pedal all the way, which opens the waste valve and evacuates the bowl to the black tank. Hold down the lever (pedal) until rinse clears the bowl. Be sure to release the lever or pedal slowly.

In some installations, a macerator pump is employed to grind and pump waste to the black holding tank. Operation of the macerator pump is automatic, see Macerator Pump section.

NOTICE

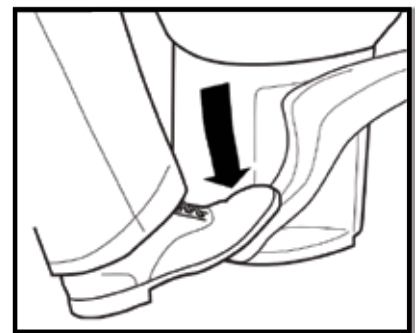
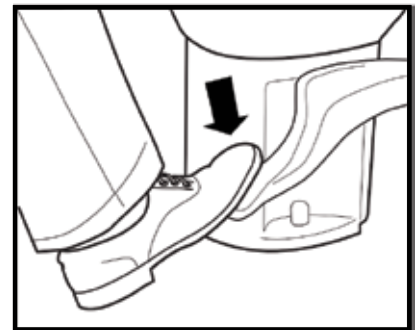
Unless connected to a city water supply, unnecessary frequent flushing of the toilet will quickly deplete the fresh water supply within the fresh water holding tank. There is black tank overflow protection built into the waste water system. If the black water holding tank becomes full, you will no longer be able to flush the toilet until the black water tank is emptied.

It is a good practice to always check the toilet bowl for water as part of your prepping process for departure. Flush (empty) the toilet bowl before departure. If not, water remaining in the toilet bowl could slosh onto the bathroom floor while traveling.

Follow the toilet manufacturer's recommendations supplied with the toilet for cleaning, troubleshooting, and maintenance. If you have a toilet that differs from the description given here, make sure to follow the manufacturer's operating instructions.



Typical motorhome toilet installation



Macerator Pump

TMC motorhome models may utilize a waste material macerator pump; either as part of the toilet, or as a separate pumping unit. The macerator is a device that grinds toilet waste material into fine particles, then pumps the waste to the black holding tank; making waste decomposition and disposal more efficient. Macerators are typically used where the toilet installation is somewhat removed from the black water holding tank location. They are also used where a bathroom toilet is installed in a slideout, making toilet wastes easily pumped into the black water holding tank.

Please refer to your TMC Owner's Packet to determine if your motorhome is equipped with a macerator pump and if so, look for any special care and maintenance procedures.

NOTICE

The macerator pump operates automatically, turning on and off whenever a discharge from the toilet is sensed.

The macerator pump operates on 12 volts DC. The main battery switch must be ON for the macerator pump to operate as intended.



Typical 12 volt Macerator Pump

Waste Water Pipes and Vents

Drain Pipes and Traps

The drain pipes have 'P-traps' installed to help prevent waste water system odors from entering the motorhome. During travel, water normally contained in P-traps may be displaced, which will permit drainage odors to enter the motorhome. These odors come from food particles and other wastes decomposing in the holding tank(s). By placing a few ounces of water down the drains, the P-traps will again function as intended.

Using a RV approved deodorizing agent can also help reduce waste water system odors by dissolving waste particles faster and will help keep the drain lines and tanks cleaner and free flowing. These chemicals are available at RV supply stores.

The drain piping of your motorhome is made of ABS material and is resistant to most chemicals. The P-traps at the sinks and showers are detachable, which provides useful drain clean-outs if necessary.

As an alternate to the P-trap, some installations may use a waterless trap, known as a Hepvo trap or valve. The Hepvo trap uses an internal membrane that allows water to pass through, but blocks waste-related gases from passing back through the drain opening. Hepvo traps are mainly used in confined spaces where there is not enough room to install a standard P-trap. Hepvo traps do not retain water, like a P-trap, therefore, winterizing solutions are not required.



P-trap drain



Typical HEPVO valve drain valve

NOTICE

Remove the waterless trap before using mechanical drain-cleaning devices, such as a drain snake. Waterless trap can be damaged.

Since these devices use an internal membrane, any mechanical method of drain unclogging, such as a rotary drain snake, can permanently damage the Hepvo trap. To unclog a Hepvo trap, simply remove it from the drain pipes and flush it with running water. After the clog is removed, re-install it to the drain pipes.

Vents

Vent pipes release gases to the atmosphere that are created within the holding tanks as a byproduct of the decomposition process. They also aid in the efficient draining of waste water by equalizing atmospheric pressures caused by water flowing through the pipes and into the holding tanks. Depending on the plumbing layout, vent pipes exit through the roof of the motorhome in one or more locations and are terminated with a vent cap. This exterior vent cap is attached to the roof, and must be kept clear of debris and obstructions to perform as intended. On some motorhome models, the vent pipe may be part of the drainage system referred to as a “wet vent” (water flows downward as air flows upward in the same pipe).

Routinely inspect the drain vent caps for damage and blockages. They may require periodic re-sealing with an appropriate RV sealant.



Typical drain vent caps

Anti-Siphon Trap Vent Device (ASTVD)

To aid in efficient drainage system venting, anti-siphon trap vent devices (ASTVD) are installed in strategic locations in the drainage plumbing. Also known as “check vents”, these devices allow air into the drainage system, but prohibit drain gases from escaping. Anti-siphon vents are installed at or near P-traps, usually inside sink cabinets and elevated 6 inches or so above the P-trap. They allow for atmospheric pressure equalization as water passes through the pipes and into the holding tanks.

ASTVD's have a membrane material that may, over time, lose its sealing properties. If drainage gases are detected near your bathroom or kitchen sink cabinet, it is possible that the membrane of the anti-siphon vent has dried or has become stuck in the open position.

Unscrew the ASTVD from its fitting and moisten the membrane with a lubricant, such as Dow 111. Afterwards, re-install the anti-siphon vent.



Typical anti-siphon vent (ASTVD)

Waste Water Holding Tanks

Most motorhome waste water systems are designed with dual holding tanks with individual termination valves. The black water holding tank collects all the waste material from the toilet. The gray water tank collects waste water from kitchen sinks, bathroom sinks, and shower drains. Depending on plumbing layout, some motorhome models may have the bathroom sink draining into the black water holding tank, while some models with two bathrooms may have a secondary black and/or gray water tank installed.

Each waste water holding tank has its own termination valve, which is plumbed to a “Y” connection, joining the waste outlets of both tanks into a single waste discharge outlet. This waste discharge outlet is provided with a twist-to-lock cap to prevent unwanted spillage of sewage to the environment should one of the termination valves happen to open unexpectedly.

The holding tanks have fluid level sensors mounted to the tank. Generally, fluid levels are incremented in 1/3 volumes, from empty to full. Holding tank levels are monitored on the Main Monitor Panel (see page 11).

A flexible sewer hose (available from RV suppliers or dealers) is required to make the connection between the waste water holding tanks and a waste water dumping station or site sewer hook-up.

⚠ CAUTION

The holding tanks are enclosed sewer systems, and must be drained into an approved dump station. Tanks should be thoroughly drained and rinsed to prevent any accumulation of sludge on the interior of the tanks.

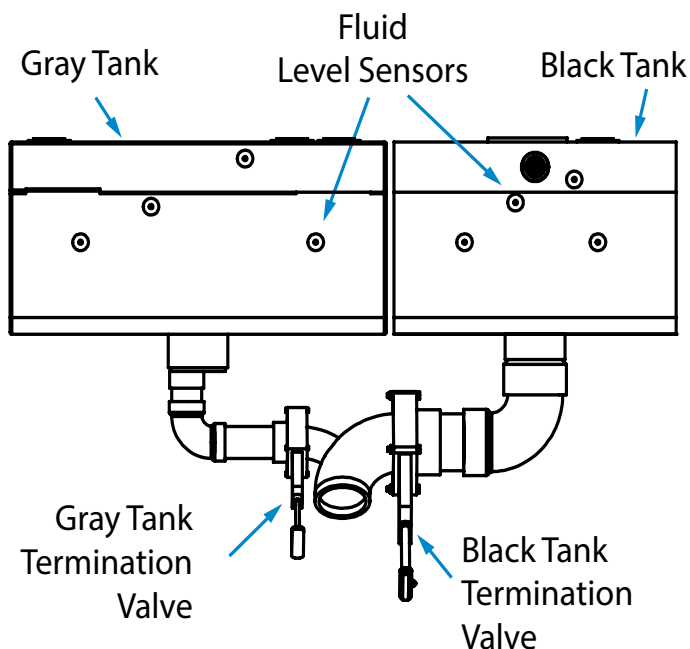


Illustration of a typical termination valve layout. The larger slide-valve is always the black waste water termination valve.

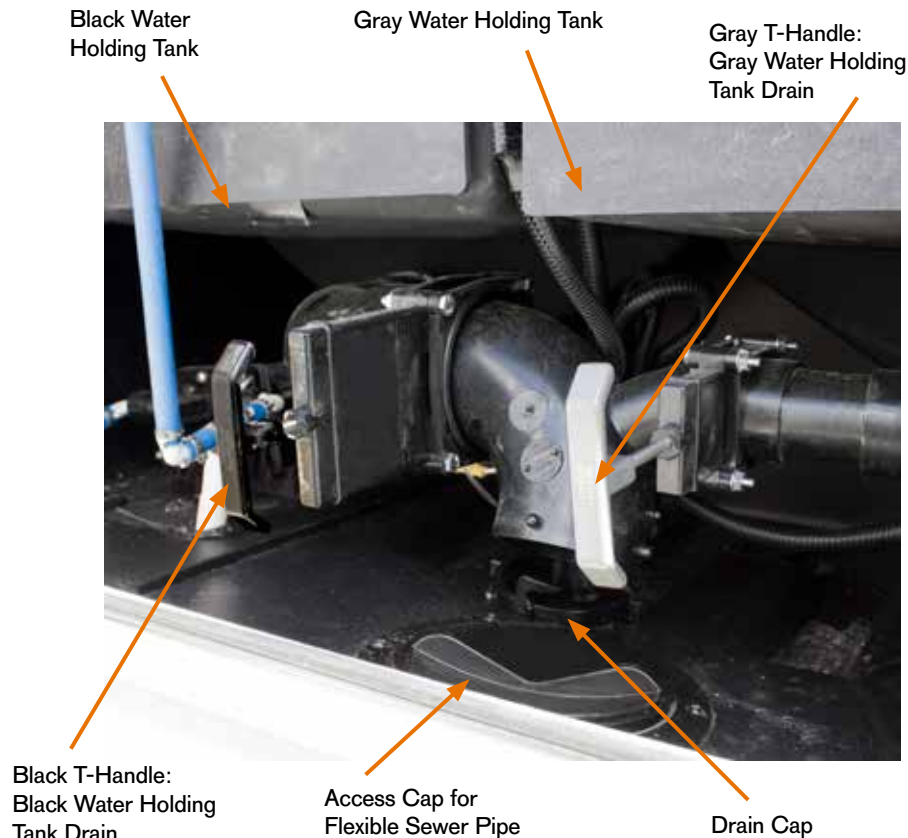
Termination Compartment Components

The termination compartment contains many important components. Please note that due to the variety of TMC motorhome models and floorplans, the items described in this section are general in nature and may or may not pertain to your termination valve configuration.

COMPONENTS USUALLY INCLUDED IN THE TERMINATION COMPARTMENT:

1. Termination valve handles for both gray and black water holding tanks. To open, grab handle, and pull outward. Make sure that the sewer drain hose is connected before opening these valves.
2. Termination cap. Remove this to install the sewer hose. Be sure that the termination valves are closed before removing this cap.
3. Sewer holding tank flush attachment. Attach the city pressure hose and allow the water to flow for three minutes. Refer to the Dumping the Holding Tanks section of this guide.
4. Hatch cover. Open this and pass your city pressure hose through. Close with hose passing through small opening in the cover.
5. Access cap for sewer pipe. Located directly under sewer drain, remove cap and feed sewer hose up and attach to drain pipe.
6. Exterior faucet. For mixing the water temperature for the exterior shower head.

NOTE: It is important to familiarize yourself with your motorhome's waste drainage system, as some models have two gate valves on a single 'Y' drain outlet, while other models may have a secondary black tank located at the rear of the motorhome.



Typical Termination Valve Compartment



Typical Class C termination valve layout

Termination Valve Maintenance

If termination valves become sticky or leak, they may need to be disassembled, cleaned, and re-lubricated. Typically, the holding tank termination valves are bolted in place between two adapter fittings using a universal, four-bolt pattern.

After draining and flushing the tanks (be sure the holding tanks remain empty), the bolts can be removed and the valve detached from the adapter fittings and removed. Each termination valve can then be cleaned, dried, lubricated and reinstalled. Unless damaged physically, old seals can be rejuvenated by lubricating them with the same Dow 111 grease as is recommended to be used with anti-siphon valve maintenance.



Termination valve components

Dumping Waste Water Holding Tanks

Preparation

⚠ WARNING

Sewage contains many pathogens and bacteria that can be harmful if ingested or left on exposed skin for prolonged periods. Every care should be taken to minimize contact with effluent at all times. Any exposed area should be thoroughly cleaned including hands, clothing, shoes, feet, tools, etc.

Always use personal protective equipment when working with or around the waste holding and disposal system of your motorhome.

⚠ CAUTION

DO NOT ALTER THIS SYSTEM IN ANY WAY, SUCH AS BY ADDING CHECK VALVES, ETC.

DON'T USE the same hose to fill your potable (fresh) water tank that is used for holding tank flushing and clean-up.

NOTICE

Whenever dumping the waste water holding tanks, use personal protective gear, such as rubber gloves and eye protection.

NOTE: Do not dump effluent of the gray and black holding tanks on the ground. If you do not have access to a sewage dump station, hold off on dumping the gray and black tanks until you can move the motorhome to a sewage dumping station and properly use its facilities.

When it comes time to empty the waste water holding tanks, this somewhat unpleasant task can be made a little more tolerable and much more efficient with just a bit of preparation. Always have these items assembled and ready to use before approaching the dumping station (these items are not included with your motorhome from the factory):

- Disposable rubber or vinyl gloves for handling the sewer hoses and other items that come in contact with sewage
- Protective eyewear
- Rinse water hose (not the one used for fresh water) for the black water flush and general clean-up
- Flexible sewer hose. You may find that at certain dumping stations a sewer hose extension is useful
- Coupler for the sewer hose extension (if needed)
- A clear sewer hose adapter, that fits between the motorhome's sewer outlet and the sewer hose. This item allows you to see when the sewage stops flowing from the tank
- Hand sanitizer

When to Dump the Holding Tanks

If possible, wait until tanks are at least 2/3's full before emptying the tanks. If you need to empty the tanks sooner, add water to the tanks through the sinks and/or toilet to bring the level up to the 2/3's mark. This will help keep the solids suspended in water, which will aid in tank evacuation.

Holding Tank Dumping Procedure

1. Drive to the RV dump station and line up the termination drain valves as close to the opening of the dump station as possible. This will ensure that if there is an sewage spill, it will be contained in the dumping area.
2. Put on latex or other disposable gloves and get the sewer hose out. Before removing the cap on the holding tank drain outlet, ensure both the gray and black water termination valves are closed.
3. Attach your flexible sewer hose to the dump station inlet first! Insert the end of the sewer hose into the dump station's hole about eight to twelve inches (if you only insert the hose a few inches the hose may come out when dumping the tanks, causing a sewage spill). Use the hole's cover, a rock, or something heavy enough to hold the sewer hose in place so it doesn't pop out of the hole (Do not use an object that is small enough that it could fall into the hole and plug the dump station inlet).
4. Connect the flexible sewer hose to the motorhome's waste water discharge opening. Start by removing the cap with the open end of the sewer hose positioned underneath to catch any drips. When any drips have stopped, attach the sewer hose, ensuring the clips are completely secured on the tabs of the discharge opening.

NOTE: It may be helpful to obtain and use an elbow and adapter ring to make secure connections to the dump station's inlet. Inquire with an RV supplier or dealer regarding these and other useful waste water-related products.

5. Once the sewage hose is secured, pull open the black water tank valve first (the larger of the two valves). You will hear the effluent rush through the hose, start to slow down, and finally reduce to a trickle.
6. If your motorhome has a black tank rinse system (San-T-Flush, or similar rinse port), connect it to the dump station water supply with a garden hose reserved for this task. Do not use a fresh water hose for the black tank rinse and do not turn on the water until step 5 has been completed. Some solids may be left at the bottom of the black water tank as well as on the tank sidewalls. The black tank flush is designed to help rinse and flush the black tank. Turn on the water, let it run for several minutes to help remove solids left in the tank. Be sure the termination valve remains open during the flushing process.

⚠ CAUTION

Termination valve must be open any time there is a hose (water supply) connected to the tank flushing system.

DO NOT LEAVE A HOSE (WATER SUPPLY) connected to this system when not in use. Can result in an unsanitary condition, leading to illness or personal injury.

7. After flushing the tank, shut off the water and disconnect the garden hose from the motorhome. Keep the other end of the hose attached to the water supply. You may need it to rinse off your sewer hose, other items, or the area around the dump station inlet. Note: the flush system is equipped with a check valve that prevents waste water from flowing out the flush port.
8. Now close the black water tank drain valve by pushing the handle completely closed.
9. Open the gray tank valve. As in step 5, you'll hear water flow, then slow, and stop. Next, close the gray tank termination valve.
10. Recheck that both black and gray water tank termination valves are closed and then disconnect the sewer hose from your tank outlet on the RV.
11. Lift the end of the sewer hose (the end just disconnected) to completely drain the hose into the dump station. Rinse the inside of the sewer hose with the garden hose attached to the station's water supply. Remove the sewer hose from the dump station hole and rinse the outside of the hose. Rinse the area around the dump station hole to ensure that any spillage has been cleaned up and cover the dump station inlet. Replace the drain cap on the motorhome's sewage outlet.
12. If possible, connect the two ends of the flexible sewer hose together to seal the contents of the hose. Stow the sewer hose, garden hose and other supplies away.
13. Dispose of the latex gloves into the garbage bin (NOT down the dump station). Wash and/or sanitize your hands.



Typical black tank flush

NOTE: If the RV does not have a black tank rinse system, you can fill the toilet bowl with water using the internal pump and water from your fresh tank. Ask your partner to flush the toilet to duplicate the action of black tank rinse system. This step may need to be done several times. Please be sensitive to others waiting to use the dump station facilities.

NOTE: Soapy residue can also build up in the gray water tank. Periodically, flush and rinse the gray water tank by filling it to 2/3 full (after it's initial dumping) and then open the gray tank termination valve once more, allowing the tank rinse water to flow into the dump station. If others are waiting to use the dump station, be courteous and skip this step.

14. Now add about two to four gallons of water (about three to four full toilet bowl flushes) to your black tank and then add the appropriate amount of holding tank treatment to the last bowl. If you use a treatment for your gray tank, do that as well. It is good practice to keep about one inch of water in your black tank. This prevents solids from drying and causing tank blockages, and if freezing temperatures are encountered, this small amount of fluid will not harm your tank.

Stowing Sewage-Related Items

Always stow sewage-related equipment and supplies in a segregated place to avoid contact and cross-contamination with other items. Routinely sanitize all sewage-related tools and hoses by soaking in a solution of bleach (1/4 cup per gallon of water) for four hours minimum. Regularly check all hoses and adapters for leakage. Replace when necessary. Over time, hoses become brittle and can easily crack.

Preventing Blockages in Holding Tanks and Drain Pipes

The most common waste water system problem is clogged drain pipe or a blockage in the black water tank. These problems can be minimized by following a few simple suggestions:

- Never put food particles, grease, or other kitchen waste down the drain
- Use drain strainers or screens to catch debris before it gets down the drain
- Always use plenty of water when flushing the toilet
- Do not flush facial tissue, paper, baby wipes, or sanitary napkins down the toilet
- Use only approved, biodegradable, toilet tissue designed specifically for RV waste water systems
- Do not put solid objects into the holding tanks (such as drain snakes) which could puncture or damage the inside of the tanks
- Do not leave the termination valves in the open position or open them prior to having the sewer hose connected. Do not remove the termination cap with the termination valves in the open position.
- Only use approved for RV use, chemicals or conditioners in your motorhome's waste water system. The best additives are enzyme-based that aid in the break-down of solids. Avoid additives that contain formaldehydes or phenol-based compounds. Some parks and campgrounds may ban the evacuation of holding tanks if such chemicals are used.
- Prior to dumping, make sure your holding tanks are at least 2/3 full
- After dumping and rinsing the tanks, place a few gallons of water in the black tank. This will aid in the decomposition process and help ensure that any remaining solids do not dry and cling to the inside of the tank.

Sanitizing the Fresh Water System

⚠ CAUTION

When using chlorine, pay particular attention to the cautions on the bottle label. Chlorine may burn skin. Use rubber gloves. Use safety glasses or face shield to protect eyes from material splashing. Chlorine splashed onto clothing can fade colors. Keep children and pets away from area when performing sanitization procedures.

You must sanitize and disinfect the fresh water system upon delivery of the motorhome, at least once per year during continuous use, and prior to using the motorhome after it has been unused for prolonged periods of time. It is also vital to sanitize the system if you suspect the system has been contaminated in any way. Sanitizing will help keep your water system fresh and discourage the growth of viral and bacterial contamination.

Prepare a solution of 1/4 cup household liquid chlorine bleach (5% sodium hypochlorite) to one gallon of water for every 15 gallons of tank capacity. Do not pour bleach straight into tank. Chlorine bleach must be diluted with clean water before it can be used as a safe sanitizing agent.

Example: Add 4-2/3 gallons of solution to a 70 gallon tank.

Add 5-1/3 gallons of solution to a 80 gallon tank.

Add 6 gallons of solution to a 90 gallon tank.

Add 6-2/3 gallons of solution to a 100 gallon tank.

This mixture creates a 50 PPM (parts per million) residual chlorine concentration for the sanitization process. This will act as quick-kill dosage for some harmful bacteria, viruses, and slime-forming organisms. Concentrations higher than 50 PPM may damage water lines and/or tank.

NOTICE

TO PROPERLY SANITIZE THE FRESH WATER SYSTEM, DO NOT CONNECT TO A CITY OR AN EXTERNAL WATER SUPPLY WHILE PERFORMING THIS PROCEDURE.

1. Turn off the water heater at the main switch and close the LP tank valve. Bypass the water heater.
2. Open all faucets and drain the fresh water tank by opening the tank drain valve. Close all faucets and the tank drain valve after the fresh water tank is empty.

NOTE: Chlorine solutions may damage components of some water heaters and heat exchangers. It is recommended to bypass the water heater when sanitizing the fresh water system.

NOTE: Chlorine solutions may damage the filtration cartridge of some water filters and/or water softeners. Bypass water filters, or remove filter cartridges when sanitizing the fresh water system.

3. With the fresh tank empty and all faucets and drains closed, pour the sanitizing solution into the fresh water tank via the gravity fill port. Be sure to add the proper amount of solution, depending on the size of your fresh water tank.
4. Top-off (completely fill) the fresh water tank.
5. Turn on the pump switch. Open all faucets (cold and hot) until the air is purged and water flows freely.
6. Close all faucets and top-off the fresh water tank again. Allow the system to stand undisturbed for at least 3 hours.
7. Drain and flush the entire system by opening all faucets, the fresh water tank drain valve and the low point drain valves, while running the water pump AND adding potable water through the fresh water gravity fill port.

Be sure there is a continuous supply of fresh, potable water flowing into the gravity fill port while performing this flushing process.

8. Continue this flushing process for several minutes and until the chlorine odor is not detected at the faucets.
9. Finally, close all drains and faucets and fill the fresh water tank as you normally would. Make sure the water system is purged of air and confirm that the water heater's storage tank is full before turning on the water heater.
10. If chlorine is still detected, empty the fresh water holding tank and refill.

NOTICE

Chlorine is poisonous to humans and pets. Be sure to only use a diluted chlorine solution as a sanitizer and flush the water system thoroughly. Recap bottle and clean-up any utensils or appliances with soap and water.

Winterizing the Fresh Water System

⚠ WARNING

Automotive antifreeze (ethylene glycol) and windshield washer antifreeze (methanol) are poisonous. Never use these products in your fresh water system. These products are harmful and may be fatal if swallowed.

⚠ CAUTION

Do not operate the water heater or use the motorhome's plumbing system after the water system has been winterized.

Preparing for colder weather or storage is **EXTREMELY** important. The motorhome should be winterized at the end of the camping season, or when exposed to temperatures that will fall at or below 32°F (0°C). Repairs due to freezing are not covered by warranty. Add only RV antifreeze to the fresh water system to ensure freeze protection.

1. Level the motorhome and drain the fresh water plumbing system.
2. Remove or by-pass your potable (drinking) water filter (if so equipped).
3. Disconnect and cap (or by-pass) your:
 - Refrigerator ice maker inlet water line (if so equipped)
 - Dishwasher inlet line (if so equipped)
 - Clothes washer inlet line (if so equipped)
 - If you have a dishwasher, ice maker, or clothes washer, follow the appropriate appliance manufacturer's instructions pertaining to winterization (and de-winterization)
4. Turn OFF all water heater power switches. Some motorhomes may have water heaters that use both 12 volt DC and 120 volt AC.
5. Turn OFF the gas valve at the water heater or turn off the power to tank-less water heater (if installed).
6. Turn the water heater bypass valves (if so equipped) to the BYPASS position. (A tank-less water heater may not have bypass valves).
7. Move the valves to the WINTERIZE position, as shown on your water system label.
8. Close the low point drains.

9. Attach a hose to the city water fill and insert the other end of the hose into a gallon container of RV antifreeze (this quantity should be enough to winterize the motorhome). To assist the siphoning process, put the container on a surface approximately two feet above ground level.
10. Turn the water pump ON. If the water pump fails to self-prime, temporarily open the low point drains. Close the low point drains as soon as the water pump primes (RV antifreeze will begin draining out), and before continuing to the next step.
11. Open the hot water side on all faucets (kitchen, lavatory, shower, and exterior shower) until RV antifreeze begins to flow continuously.
12. Close the faucet hot water lines and repeat with the cold water lines on all the faucets.
13. Flush the toilet a couple of times until you see antifreeze in the bowl.

WHEN YOU ARE DONE ADDING RV ANTIFREEZE:

14. Remove the water hose from the container of RV antifreeze.
15. To prevent staining, wipe the RV antifreeze out of the sinks, shower (or tub) and toilet using a soft, dry cloth.

NOTE: Although RV antifreeze is biodegradable, you may want to use a catch basin under the low point drain and fresh water tank outlets to collect and properly dispose the used antifreeze solution.

De-winterizing Your Motorhome

1. Drain the holding tanks (fresh water, waste water, and sewage).
2. Open the low-point drain valves and drain the water lines of anti-freeze. Opening a hot and cold faucet will help drain the water lines more effectively.
3. Close the low-point drain valves and all holding tank drain valves.
4. Attach a garden hose to the fresh water fill, and fill the fresh water tank.
5. Turn ON the water pump switch and open the cold water side of all faucets and shower fixtures. Shut OFF the faucet and shower fixtures after the water runs clear (no pink residue), and repeat for the hot water side.
6. Flush the toilet until clear water runs into bowl.
7. Dump the holding tanks again.
8. Sanitize the fresh water system (refer to Sanitizing Section).
9. If a potable (drinking) water filter has been installed: drain the water lines, remove the assembly, clean and reinstall using a new potable (drinking) water filter cartridge.
10. When ready to use the water heater, open the bypass valve allow water to enter and fill the water heater tank (remember, if equipped, the water heater bypass valve must NOT be in the BYPASS position for normal water heater operation).

Cold Weather Use of the Water System

⚠ DANGER

**DO NOT USE GAS APPLIANCES FOR COMFORT HEATING.
CAN LEAD TO CARBON MONOXIDE POISONING, WHICH CAN LEAD
TO DEATH OR SERIOUS INJURY.**

Many owners choose to use their motorhomes throughout the entire year or encounter freezing temperatures during travel. Due to the risk of severe damage, prolonged use in severely cold weather is not recommended. However, winter traveling can be safe for you and your motorhome's water system if you follow the precautions outlined here. Refer to the Winterizing Quick Start Guide, the Winterizing Section of this guide, or your Owner's Manual for proper winterizing instructions.

To avoid damage caused by freezing, the water system and storage tanks of your motorhome are dependent on the ambient temperature of the motorhome remaining above 32° F (0° C) (refer to the Holding Tank Heating section of this guide). When fully functioning and the temperature is set properly, the furnace will provide enough heat to protect the water system. In severe cold however, it is wise to monitor the water temperature in the tank, and take appropriate steps to drain and winterize if necessary. In severe cold weather, it may also be necessary to open the lower cabinet doors at night in both the bath and kitchen areas to keep warmer air circulating around the water pipes, drain pipes, and fixtures. Always ensure you have an adequate supply of LP fuel to keep the furnace operational and regularly test your LP/CO detector to ensure breathable air inside the motorhome remains safe.

If you are going to leave the motorhome unheated for any length of time in severe cold conditions, you must drain all water from the system. This includes draining the water heater and water supply lines. Also protect drain P-traps with antifreeze. Refer to the system winterizing procedures outlined in this guide.

In cold weather conditions, it may work best to carry cooking and drinking water with you in plastic jugs instead of using the on-board fresh water system. If you decide to use bottled or carried water, be cautious of water being placed down drains or being flushed through the toilet. Water that remains in P-traps and holding tanks is susceptible to freezing. If available, use campground bathhouse facilities.

Optional Features - *Standard on Select Models*

As delivered from the factory, your motorhome may have been equipped with one or more of the following water system-related features. If you have any questions regarding these features, please consult with your dealer or call TMC Customer Care.

Optional Water Connections

Your motorhome may come equipped with additional fresh water connections and associated drain plumbing. These connections may include:

- Cold water connection for ice maker and in-the-door chilled water (household-type refrigerator)
- Hot and cold water connections for clothes washer
- Hot water connection for dishwasher

House Water Filter

Select TMC motorhomes are equipped with a full house water filtration system. This cartridge type filter is usually mounted in an interior compartment, underneath a kitchen or bath sink. With some floorplans, the filter may be located in an exterior compartment, on the system water panel, or near the fresh water inlet. For filter information and maintenance, consult your TMC Owner's Packet.

Exterior Kitchen Unit

When equipped, the exterior kitchen unit provides a convenient outdoor food preparation and clean-up station. The outside kitchen unit is accessed by an exterior compartment door, usually located at the rear, curb-side (right side) of the motorhome. Compared model-to-model, the kitchen unit may contain different features, but all will have a sink, with hot and cold running water, a refrigerator, and a GFCI-protected 120 volts AC receptacle.

As with the interior kitchen and bathroom sinks, do not put solid particles down the drain of the exterior kitchen sink. Solid particles could clog the drain pipe and the waste water holding tank.

Clothes and Dish Washers

Select motorhomes may be equipped with clothes and/or dishwashers. Details regarding these appliances can be located in the TMC Appliance and Entertainment System Guide and from the appliance manufacturer's owner's manuals, included with your Owner's Packet.



Typical House Water Filter



Optional exterior kitchens are available for many TMC motorhome models

Recommended For Your Travels

There are several items that are not supplied from the motorhome manufacturer that will aid in proper use and maintenance of your motorhome's water system. These items can be obtained from your RV dealer or a RV retail supplier. If you have any questions regarding your motorhome's water system, please contact TMC Customer Care.

- Potable fresh water supply hose
- Fresh water fill container
- Water pressure regulator
- Flexible RV sewer hose
- Sewer hose extension and coupler
- RV toilet paper products
- Standard garden hose for waste tank flush and general clean-up
- RV black water tank sanitizer and/or decomposition chemicals
- Slip pliers and other hand tools for making minor plumbing repairs
- Teflon tape and RV sealants for sealing pipe threads and repairing water leaks

Additional information regarding the features and functions of your motorhome can be obtained from your motorhome dealer, TMC Customer Care, or from information available on the Thor Motor Coach website.



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