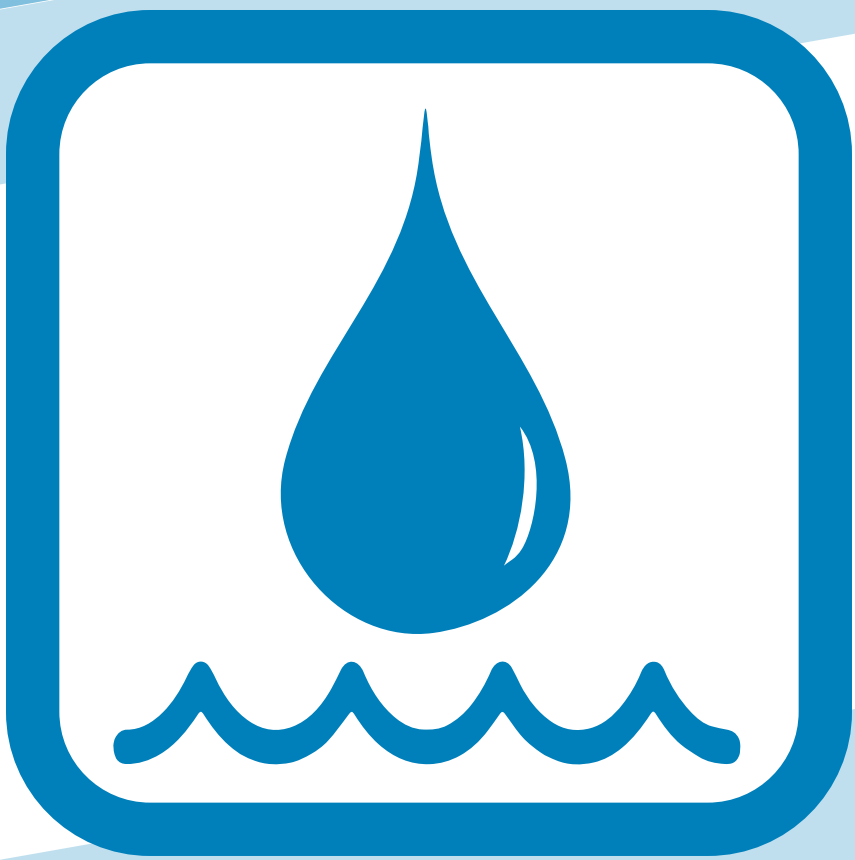
Water System Guide



Class A and C Motorhomes

thormotorcoach.com

THOR MOTOR COACH

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.

Thor Motor Coach's Continuing Commitment

Thor Motor Coach's continuing commitment is to provide quality and value for our motorhome customers. Features, options, and components will constantly change as new and improved devices become available and designed into TMC's line-up, with the goal of always providing recreational vehicles that meet and exceed expectations.

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: 574-294-3618
Email: wsupport@tmcrv.com
Website: www.thormotorcoach.com

TMC Part Number 0428790 Rev. 07/14/2022

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/**
Thetford: **www.thetford.com/products/**
REMCO: **www.remcoindustries.com/**

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**
  Truma: **https://www.truma.net/**
- Tank-less, Hydronic: Aqua-Hot: **www.aquahot.com**

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

Water Valve Panels: Anderson Brass Co.: **www.andersonbrass.com**
B&B Molders.: **www.bandbmolders.com**

Other Resources:

Thor Motor Coach Customer Care: **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**

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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.

Fire Safety

⚠ DANGER

NO SMOKING

Before dispensing fuel, turn OFF all engines, fuel-burning appliances, and their igniters (see operating instructions).

Do not dispense fuel within 20ft (6.1m) of an ignition source.

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

⚠ DANGER

Vehicles and equipment powered by internal combustion engines and placed in recreation vehicles may cause carbon monoxide poisoning or asphyxiation, which could result in death or serious injury.

The flammable liquids used to power these items can cause a fire or explosion, which can result in death or SERIOUS INJURY.

TO REDUCE RISK:

1. **Do not allow passengers to ride in the vehicle storage area when vehicles and fuel are present.**
2. **Close doors and windows in walls of separation (if installed) when any vehicle is present.**
3. **Run fuel out of engines or stored vehicles after shutting off fuel at the tank.**
4. **Do not store, transport, or dispense fuel inside this vehicle.**
5. **Open the windows, openings, or air ventilation systems provided for venting the transportation area when vehicles are present.**
6. **Do not operate propane appliances, pilot lights, or electrical equipment when motorized vehicles are present.**

⚠ CAUTION

Always replace the fire extinguisher with a similar Class B-C type.

- **Fire extinguishers must be replaced after any use, even if used briefly.**
- **Fire extinguishers have an effective service life. Replace expired fire extinguishers.**

⚠ CAUTION

Ensure the smoke detector and alarm is always kept in good working order. Test this device regularly and immediately replace if it is not functioning properly.

The smoke detector operates on an internal battery. Immediately replace battery when needed and/or on an annual schedule.

For the safety of you and your traveling companions, make sure that everyone traveling in the motorhome is familiar with the location of exits and operation of emergency exits, including emergency exit egress windows. The risk of fire can be reduced by following a few basic fire prevention rules:

Typical Class B-C fire extinguisher

- Know the location of your fire extinguisher(s) and keep them in a state of readiness.
- Never store flammable liquids inside the motorhome.
- Keep cooking surfaces clean and free of obstructions.
- Never use a flammable liquid or material as a cleaning agent.
- Never leave operational cooking appliances unattended.
- Never smoke in bed, around propane appliances and devices, and during fueling of the motorhome and/or propane system.
- Never allow children to play with propane gas or electrical equipment.
- Never use an open flame as an illumination device.
- Immediately repair or discard faulty or damaged wiring and electrical components.
- Never overload electrical circuits.
- Locate and repair propane gas leaks immediately.
- Don't allow rubbish to accumulate inside storage compartments, near or around appliances, propane, and electrical devices or equipment
- Apply flame retardant treatments to interior fabrics; renew treatment at manufacturers recommendations.
- Test and inspect circuit breakers and fuses on a regular basis.
- Maintain fresh batteries in the smoke alarm and perform regular tests to ensure proper operational condition.

NOTE: Know the location of the fire extinguisher installed in your motorhome, become familiar with its use, and keep it in good operating condition. Fire extinguishers have an effective service time-period; always replace expired fire extinguishers.

If a fire does start or smoke is detected, follow these basic rules of safety:

1. IMMEDIATELY evacuate everyone (including pets) from the motorhome!
2. After everyone is accounted for, clear and at a safe distance from the motorhome, call emergency responders.
3. Check the fire or source of smoke to determine if you can attempt to put it out.
4. If it is too large for the fire extinguishing tools you have, or the fire is fuel fed, stay clear of the motorhome and have the fire department and/or emergency responders manage the emergency.
5. ONLY if you have safe access to the shore power stand, turn OFF the main 120/240 VAC circuit breaker at the shore power source and disconnect the shore power cord from this source.
6. ONLY if you have safe access to the Master Battery Switch, turn it OFF.
7. ONLY if you have safe access to the main propane valve located on the propane tank, CLOSE the main propane valve (clockwise direction).
8. ONLY if you have safe access to the battery compartment(s), disconnect the negative battery cable(s) at the house battery and chassis battery
9. DO NOT attempt to use water to put out an electrical or grease fire. Water can spread many types of flammable materials, and electrocution is possible when the fire has an electrical source.

NOTE: Please strictly follow the instructions and heed the warnings of all safety labels affixed to your motorhome.

Electrical Safety

⚠ DANGER

The potential of electrical shock and fatal electrocution is an ever-present danger when working with electricity and electrical components.

⚠ WARNING

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 master battery switch**
- **Turn OFF shore power circuit breakers and 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 master 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.

All installations of the electrical system and components of your motorhome have been made in compliance with industry standards applicable on the date of manufacture. The electrical equipment and associated circuitry are designed and engineered into a dedicated system specific to your motorhome. Do not modify or make changes to the electrical system of your motorhome that are unauthorized by TMC Customer Care. Changes or modifications made after delivery may result in hazardous conditions, cause damage to factory-installed equipment, and may void TMC and equipment manufacturers warranties.

NOTE: Your motorhome's electrical system is engineered and tested for safety. Circuit breakers and fuses are designed to protect the electrical circuits from overloading.

If you plan to make modifications or additions to the electrical system, TMC strongly recommends consulting a qualified electrician for assistance to ensure continued integrity and safety of the electrical systems.

Please note that any modifications may void the TMC Limited Warranty or appliance and component manufacturers warranties.

Electrical Requirements

NOTICE

The electrical system of the motorhome must be in good working condition; being able to supply 12 volts DC to control circuits of the water heater and other gas appliances, along with power for the water pump, holding tank monitors, and multiplex systems.

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 when needed.

Electrical System Maintenance and Repairs

Always use extreme caution when performing maintenance or repairs on the electrical system, electrical components, and electrical devices of your motorhome. Service, maintenance, and/or modification of the electrical system should only be performed by qualified electrical technicians using approved materials, components, and installation methods that meet current safety and code requirements. Please consult your dealer's service department or TMC Customer Care for assistance.

Welding and Chassis Repairs

⚠ CAUTION

BEFORE performing welding repairs on the motorhome chassis, disconnect battery ground cables (negative) and ground lugs from all factory-installed wiring harnesses.

If your motorhome's chassis should ever require welding repairs, it is imperative to disconnect the negative cables from the house and chassis batteries and ground lugs from all TMC-installed wiring harnesses BEFORE welding. Disconnecting these ground terminals from the chassis will help prevent damage to sensitive electrical circuits and devices due to arc-welding.

After the welding repairs are completed, ensure all wiring harness ground lugs are properly re-installed BEFORE re-attaching the battery cables.

Diagrams indicating the location of wiring harness ground lugs for the chassis of your motorhome model can be obtained from a TMC Customer Service representative.

Propane System Safety

⚠ 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 or operate 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

Do not use gas cooking appliances for comfort heating. Can lead to carbon monoxide poisoning and/or depletion of oxygen, which can cause death or serious injury.

⚠ DANGER

All pilot lights, appliances, and their igniters (see operating instructions) shall be turned off before refueling of motor 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.

⚠ DANGER

NEVER TRAVEL WITH, AND/OR STORE PROPANE (LP) CONTAINERS OR CYLINDERS INSIDE YOUR MOTORHOME.

Propane cylinders are designed to vent whenever internal pressures reach a certain threshold. Therefore, the potential of a venting propane cylinder presents a gas leak hazard, which, if ignited, could lead to an EXPLOSION, FIRE, AND SERIOUS BODILY INJURY OR DEATH.

⚠ WARNING

ALL PROPANE GAS IS CONTAINED UNDER PRESSURE. DUE TO THE DANGEROUS POTENTIAL OF ANY COMPRESSED GAS, IT IS MANDATORY THAT THE FOLLOWING REQUIREMENTS FOR THE USE OF THIS TANK BE FOLLOWED:

Tanks are to be installed, fueled, and maintained in accordance with the state and local codes, rules, regulations, or laws and in accordance with the NFPA Pamphlet 58, division IV.

⚠ WARNING

Do not fill propane container(s) to more than 80 percent of capacity. A properly filled propane tank contains approximately 80 percent of its volume as liquid propane.

Overfilling the propane container(s) can result in uncontrolled propane flow, which could lead to a fire or explosion and result in death or serious injury.

⚠ WARNING

THIS PROPANE PIPING SYSTEM IS DESIGNED FOR USE WITH PROPANE ONLY:

- **Do not connect natural gas to this system.**
- **Securely cap inlet when not connected for use.**
- **After turning on propane, except after normal cylinder replacement, test propane piping and connections to appliances for leakage with soapy water or bubble solution.**
- **Do not use products that contain ammonia or chlorine to test for leaks. These substances may weaken piping components and cause gas leaks, leading to fire or explosion, which could result in death or serious injury.**

⚠ WARNING

ROAD VIBRATION CAN LOOSEN PROPANE FITTINGS. It is important to check the Propane System for leaks at least every 5,000 miles, and whenever the tank is filled. It is also recommended to have the entire Propane System checked annually by a qualified propane service technician.

⚠ WARNING

Gas cooking appliances need fresh air for safe operation.

BEFORE OPERATING:

- **Open vents or windows slightly or turn on exhaust fan prior to using cooking appliance.**
- **Gas flames consume oxygen, which should be replaced to ensure proper combustion.**
- **Improper use can result in death or serious injury.**

Warning labels are affixed throughout your motorhome to provide required information on propane safety. Read and follow the instructions listed, and exercise proper precautions when using propane and propane appliances.

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

Combination Carbon Monoxide/ Propane Alarm

⚠ WARNING

The carbon monoxide/propane (CO/LP) combination alarm installed is intended for use in ordinary indoor locations of recreation vehicles.

Actuation of this alarm indicates the presence of carbon monoxide and/or propane gas, which is a toxic gas that is colorless and odorless.

Do not disconnect the combination carbon monoxide/ propane alarm from its power source.

Individuals with medical problems may consider using warning devices that provide audible and visual signals for carbon monoxide concentrations under 30 PPM.

This alarm will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas.

⚠ WARNING

THE CO/LP COMBINATION DETECTOR OPERATES ON 12 VOLT HOUSE POWER; IT DOES NOT CONTAIN AN INTERNAL BACK-UP BATTERY. IT WILL BE DISABLED WHEN AUXILIARY BATTERIES ARE DISCONNECTED, OR SHORE POWER IS REMOVED, OR IF THE AUXILIARY BATTERY VOLTAGE DROPS BELOW THE OPERATING THRESHOLD VOLTAGE OF THE DETECTOR!

⚠ WARNING

Actuation of this alarm indicates the presence of propane gas and/or carbon monoxide. By displacing available breathable oxygen, the presence of these gases have the potential of causing death by suffocation.

Your motorhome is equipped with a combination carbon monoxide/propane alarm that is listed for use in recreation vehicles. The combination carbon monoxide/ propane alarm will only provide its intended protection if it is maintained in operational condition.

Typical combination carbon monoxide/propane alarm

The combination carbon monoxide/propane alarm is wired directly to the motorhome's 12 volt DC electrical system, with continuous power being supplied by the auxiliary battery. There is not a back-up battery in the combination carbon monoxide/propane alarm. If the auxiliary battery cable is disconnected at the battery terminals, the combination carbon

monoxide/propane alarm will not be powered, and therefore, will not function.

This alarm is designed to detect the toxic carbon monoxide gas that results from incomplete combustion, such as those emitted from appliances, furnaces, fireplaces, and auto exhaust, along with propane gas that may be present. A carbon monoxide/propane alarm is NOT A SUBSTITUTE for other combustible gas, fire or smoke detection alarms.

Please note that there are hazards against which carbon monoxide detection may not be effective, such as detection of natural gas and other harmful substances.

Although this alarm is designed to sense the presence of carbon monoxide and/or propane gas, there are other combustible fumes or vapors that may be detected by the sensor including, but not limited to: acetone, alcohol, butane, and gasoline.

These chemicals can be found in commonly used items such as deodorants, colognes, perfumes, adhesives, lacquer, kerosene, glues, wine, liquor, cleaning agents, and the propellants of aerosol cans. Be sure to read, understand, and follow the owner's information from the manufacturer of the combination carbon monoxide/propane alarm. This includes information regarding the limited service life of the alarm.

What to do if the Alarm Sounds

1. Operate the RESET/SILENCE button.
2. Immediately move to fresh air (outdoors, or by an open door or window).
3. Call emergency services (911 in the United States or a local fire department).
4. Do not re-enter the motorhome or move away from the open door or window until the emergency service responders have arrived, the motorhome has been aired out, and the alarm remains in its normal (OFF) condition.

If the alarm reactivates within a 24-hour period, repeat steps 1-through-4 and call a qualified appliance technician to investigate for sources of carbon monoxide and inspect for proper operation of this equipment. An inspection for propane leaks must also be performed. Make sure that motorized vehicle(s) and equipment are not, and have not been operating adjacent to the motorhome.

Have all identified problems corrected immediately. Note equipment inspected by the technician and the repairs that were made. Consult the manufacturer's instructions or contact the manufacturer directly for more information about carbon monoxide safety and this alarm.

Test

⚠ WARNING

Test the combination carbon monoxide/propane alarm after the motorhome has been in storage, before each trip, and at least once per week during motorhome use.

Failure to do so can result in an undetected faulty CO/LP alarm, which could lead to death or serious injury.

With the LP/CO detector ON (powered by the motorhome's 12 volt system), simply press the TEST switch located on the front of the detector. The LED should flash red and the alarm should trigger. Release the switch. This is the only and proper method of testing the detector. The test feature checks the full operation of the detector. If this detector does not test properly, have it repaired or replaced immediately.

The LP/CO detector has a self-check circuit that initiates when the detector is powered. In the event the detector senses an internal fault, a failure alarm will trigger. It is a continuous series of short beeping tones between long intervals and is distinctively different from the gas alarm. Repair or replace the detector if the failure alarm is triggered.

Maintenance

Vacuum the alarm cover at least once a year. Clean the cover by hand using a cloth dampened in clean water. Dry with a soft cloth. Do not spray the front panel of the alarm with cleaning agents or waxes. This action may damage the sensor causing an alarm or cause the alarm to malfunction. Do not paint the face of the alarm.

Replacement

⚠ CAUTION

Be sure to replace your LP/CO detector(s) by the "replace by" date on the cover, or according to the time-frame listed in the detector's user's manual.

The combination carbon monoxide/propane alarm has a limited service life and must be replaced following the alarm manufacturer's instructions and/or the expiration date listed on the device.

Conditions That May Trigger the LP/CO Detector

NEW COACH ODOR

The glues and other materials used in manufacturing the motorhome produce vapors which may be detected when the motorhome is stored for an extended period. Air out the motorhome thoroughly after it has been stored for an extended period of time.

HAIR SPRAY

Most aerosol hair sprays use butane gas as a propellant. Butane, like propane, is heavier than air and will settle to the floor level where it may be detected.

OTHER GASES

Other gases that can cause the detector to trigger an alarm include vapors from any fuel, liquor, alcohol, deodorants, colognes, perfumes, adhesives, lacquer, and solvent-based cleaning agents.

BEEPING NOISE

If you hear beeps about once every minute, even if power to the LP/CO detector is turned off, the source of the beeps may be the smoke alarm, not the LP/CO detector. Unlike the LP/CO detector, which is powered from the house (auxiliary) battery, the smoke alarm operates on an internal 9 volt battery. Replace the battery in the smoke alarm.

SLOW BEEP RATE

This could be the LP/CO detector's built-in failure warning alarm. It is a continuous series of short beeping tones between long intervals and is distinctively different from the alarm. This sound indicates that the LP/CO detector is not working properly and needs to be replaced.

If problems continues with the LP/CO detector, see your RV dealer or qualified propane service center for detector service or replacement.

Common Causes of Apparent LP/CO Detector Malfunctions

Some conditions do exist where the LP/CO detector will produce apparent false alarms. However, your **FIRST** response when an alarm is activated is to **ALWAYS AND IMMEDIATELY, HAVE ALL OCCUPANTS EVACUATE THE MOTORHOME**. Remember, although propane gas has a distinct order, carbon monoxide gas is odorless, and both are deadly.

Check for possible sources of carbon monoxide gas, such as a malfunctioning furnace, clogged furnace or gas refrigerator vents, exhaust fumes from generators or vehicle engines. **NEVER ASSUME THAT THE ALARM IS FALSE, UNTIL ALL POSSIBLE SOURCES OF DEADLY GAS HAVE BEEN THOROUGHLY CHECKED AND DEEMED SAFE.**

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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.

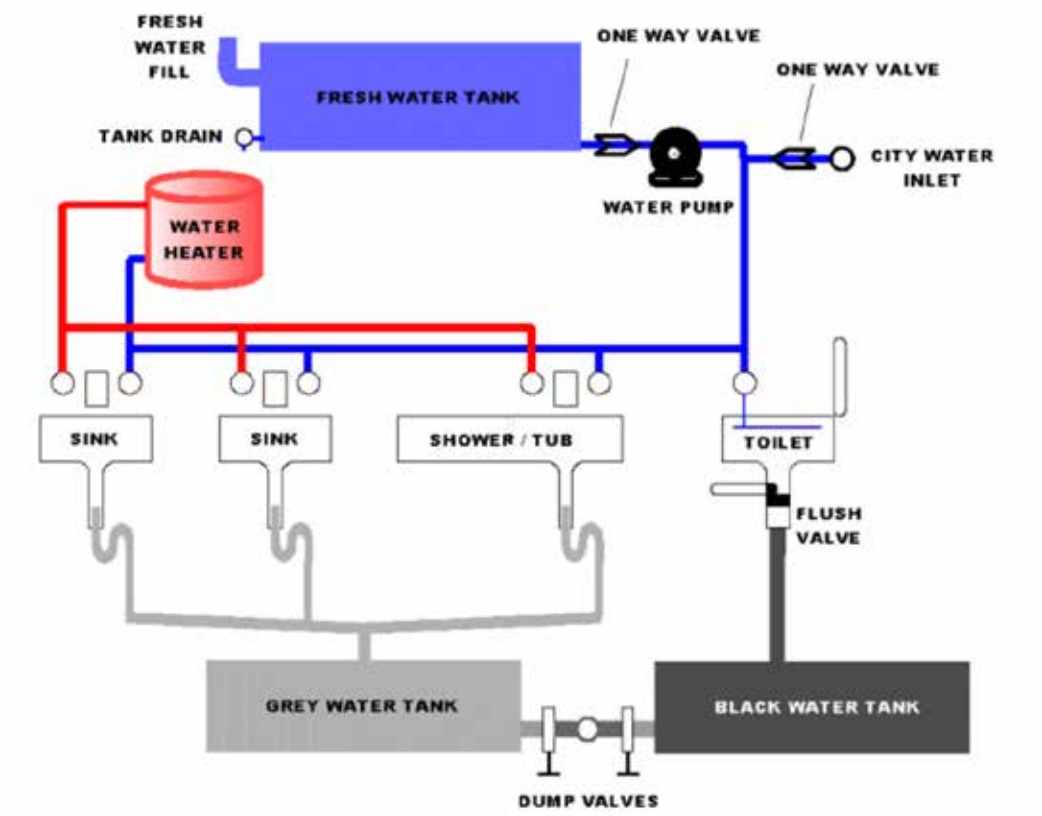
A motorhome's water system consists of these two separate sub-systems:

- Fresh water system, and;
- 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.

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 possibly 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.

Fresh Water System

⚠ 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.

⚠ 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.

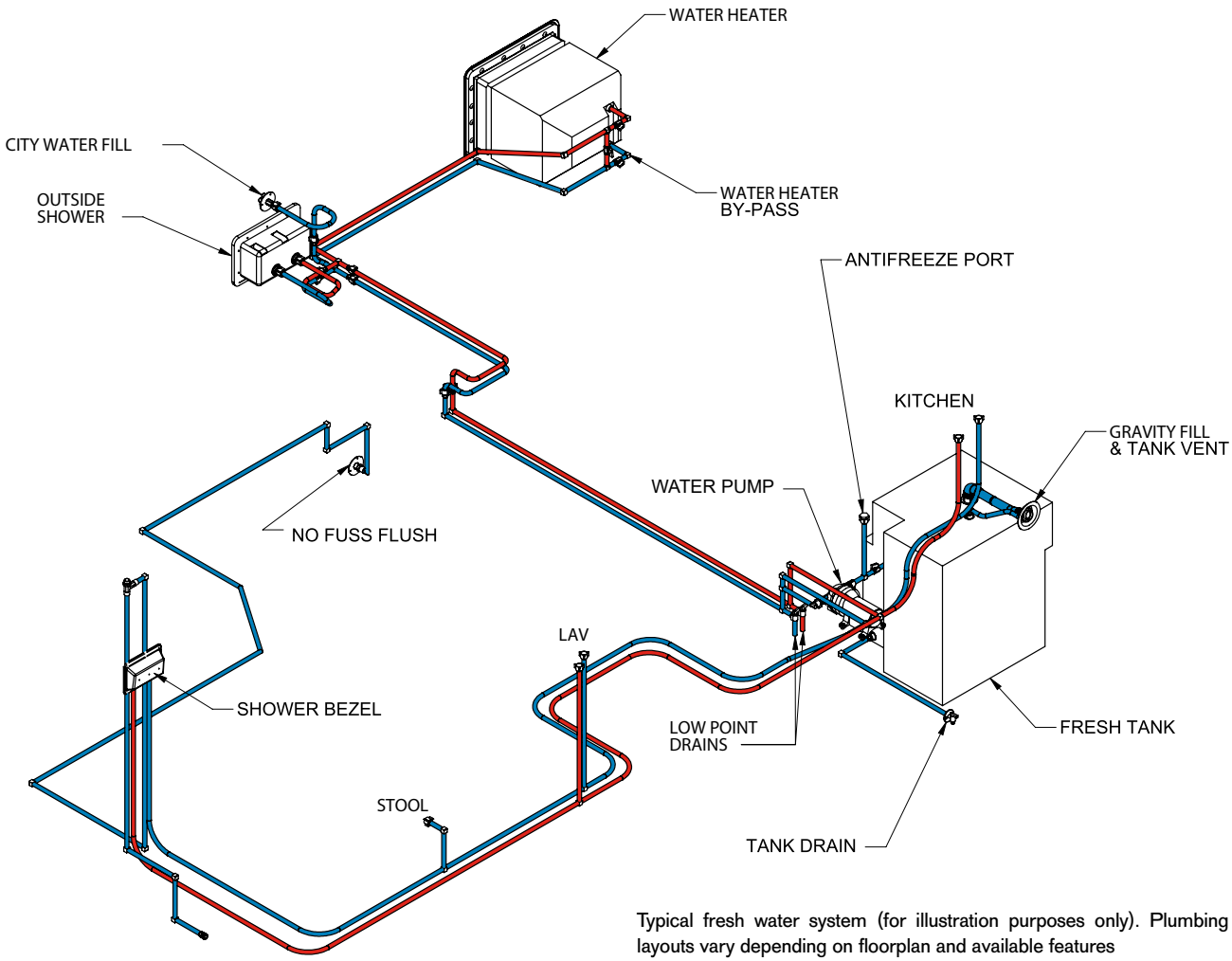
High water pressure is anything over 55 psi. Excessive pressure may cause leaks or damage to your water system.

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.

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

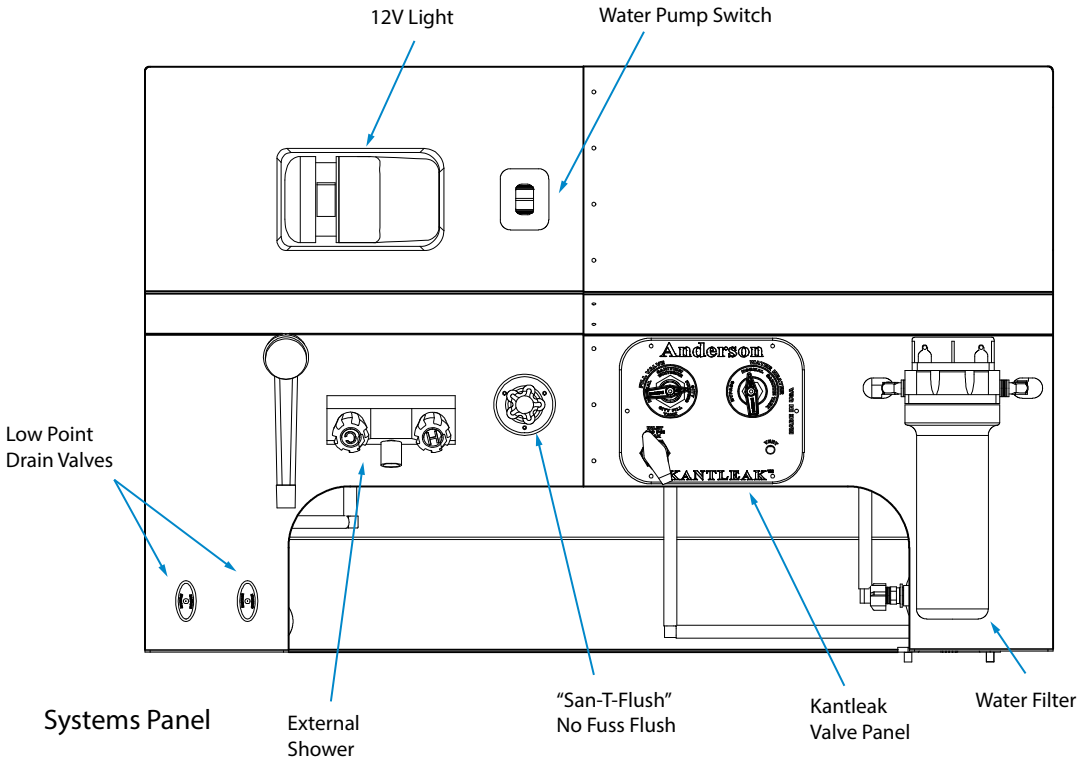


Typical fresh water system (for illustration purposes only). Plumbing layouts vary depending on floorplan and available features

- 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.

Water System Panel



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.

NOTE: Some motorhome models are equipped with a water systems panel, similar to this illustration.

However, if your motorhome is not equipped 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.

NOTE: Beginning with model year 2022, select Class A and Class C motorhomes will include a recirculating macerator control switch on the water panel. See Waste Water System Section.

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 it's 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.

NOTE: Monitor panel design, features, and functions vary depending on make, model year, and floor plan of the motorhome.

Typical Monitor Panel. Battery condition monitoring is usually located in the upper right corner.

Storage Tank Level Monitoring

The monitor panel contains a storage tank level monitoring system. The amount of fresh water, gray water and black water can be easily monitored in 1/3 increments compared to a full holding tank.

TO OPERATE:

1. Press and hold the FRESH, BLACK or GRAY switch;
2. One of an array of 4 LEDs will illuminate, indicating the level condition of the corresponding storage tank;
3. Read the level condition and release the switch.

Press the FRESH, BLACK, or GRAY momentary switch. A LED will illuminate, indicating the fluid level in the corresponding tank.

LED Condition Indicators

Holding Tank Level Condition Monitor

E=Empty 1/3=1/3 Full 2/3=2/3 Full F=Full

If your motorhome is equipped with a multiplex wiring system, tank level monitoring is usually found on the HOME menu screen. Tank monitoring is always active, so there is no need to press a button to display the level of fluids in the holding tanks,

NOTE: To prevent an over-filled tank, which could spill and create an unsanitary condition, empty the waste water storage tanks before they reach the full level.

Monitoring Tips

⚠ 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.

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.

Listed below are conditions that may lead to inaccurate holding tank fluid level readings, along with a few suggested remedies:

- 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.

If problems with your monitor panel persist, consult with your dealer or call TMC Customer Care for assistance.

Water System Monitoring with Multiplex Systems

Your motorhome may be equipped with a multiplex system that, among other features, will include integrated monitoring and control of water system features. Your multiplex system panel may look different than the illustrations below, but will function similarly.

TO OPERATE:

1. Select the HOME Menu by either touching the HOME icon along the edge of the multiplex panel, or touching the HOME icon on the panel screen.
2. Monitor the fresh and waste water tank levels.
3. Control water pump, water heater, Aqua-Hot burners (depending on model: diesel, propane, electric).

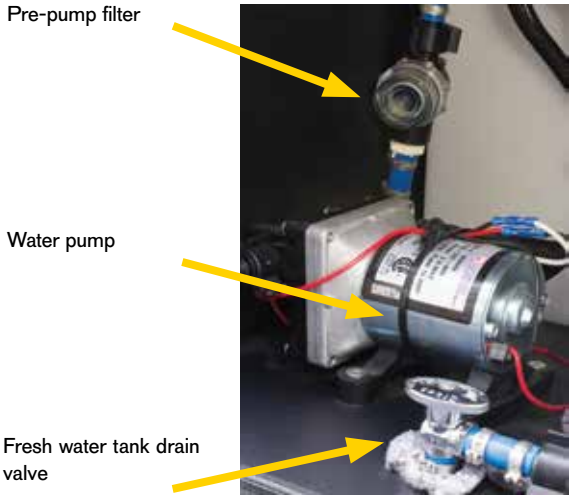
Typical multiplex main control panel. Electrical system monitoring is usually located on the main menu (house-shaped icon) screen.

For special multiplex system information, refer to the manufacturer's instructional manual included with your TMC Owner's Packet.

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. When city water is not available, a self-priming pump is installed to perform this function. The water pump 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.



Typical water pump and pre-pump filter installation

NOTICE

- **Do not turn the water pump ON if the fresh water tank is empty. Doing so could cause damage to the water pump.**
- **Do not turn ON the water pump when using water from an external source. Only run the water pump if using potable water stored in your fresh water tank.**
- **The water pump operates on 12 volts DC. The master battery disconnect switch must be ON for the water pump to operate.**
- **The water pump should be turned OFF when the motorhome is left unattended for a lengthy amount of time (four hours or more). This may help limit potential damage should something fail within the water system.**

Operating the Water Pump

The water pump is designed to operate automatically on an as-needed basis. Using the water pump continuously, such as leaving a faucet open for an excessive time period, or operating the water pump without water in the fresh water holding tank, will shorten its operational life and is not covered by warranty. The water pump has a check valve that prevents water from back-flowing into the fresh water tank.

DO NOT OPERATE THE WATER PUMP IF THE FRESH WATER HOLDING TANK IS EMPTY OR THE MOTORHOME IS CONNECTED TO AN EXTERNAL WATER SOURCE.

1. Make sure there is adequate supply of water in the fresh water holding tank.
2. Be sure the water heater bypass valves are set correctly according to your water system label. Do not operate the water heater if its water supply is bypassed.
3. The water pump operates on 12 volts DC. Before operating the water pump, turn ON the master battery disconnect switch.
4. Open all the faucets (first hot, then cold) including your interior and exterior shower faucets.
5. Turn the pump switch ON, and allow the water pump to fill the water lines and hot water heater tank (if installed). After water is flowing in a steady stream from all your faucets, turn the faucets OFF. The water pump should stop operation automatically when all faucets are closed. The pump should now run 'on-demand' when a faucet is opened, and stop when the faucet is closed.
6. The water pump switch must be ON to provide water to the toilet.
7. As long as you are nearby your motorhome, you can leave the water pump switch ON. To prevent potential damage in case a water system component fails, turn OFF the water pump when leaving the motorhome for an extended period of time.

The switch for the water pump is usually located on the Monitor Panel or Multiplex Main Control Panel (see illustrations).

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.

For additional information on the care and operation of the water pump, refer to the water pump manufacturer's information.

Water Pump Switch located on a typical Monitor Panel. The LED indicates power to the water pump.

Water Pump switch on a typical Multiplex control panel. Usually located on the Home Menu Screen, press the soft control to turn ON the water pump. Press again to turn OFF the water pump.

Water Pump Filter/Strainer

If equipped, the water pump strainer is located near the inlet to the water pump. It's primary function is to prevent debris from entering and damaging pump impellers. Periodically check the in-line water pump strainer for accumulated debris.

TO CLEAN THE WATER PUMP STRAINER:

1. Shut OFF the water pump.
2. Unscrew the clear cap.
3. Remove the reusable metal cartridge.
4. Clear any debris.
5. Reinstall the strainer and cap.

NOTES:

- The water pump strainer is not designed to be a water filter. It only prevents large particles from entering and damaging the pump. Water filtering is accomplished by installing water filters in-line with the fresh water supply.
- The water pump strainer should be checked after initial water system use of a new motorhome. Particles from the manufacturing and assembly process can quickly clog a water pump strainer. Water pump will not turn on or operate properly:

Troubleshooting Tips

If the water pump will not turn on or operate properly:

- Verify that the house battery disconnect switch is ON or shore power is connected and circuit breakers are ON.
- Verify that the water pump switch is turned ON at the Monitor Panel or Multiplex Control Panel.
- Winterizing valve on the pump (if installed) needs to be in the OFF position so pump can prime and draw water from the fresh tank.
- Check the 12 volt DC water pump fuse in the power load center to make sure it's not blown. Replace if necessary with the same type and rated fuse.
- Verify that there is water in the fresh water tank.
- Verify that there are no kinks or breaks in water lines.
- Verify that the strainer is not clogged with debris.
- Verify that there is not frozen water in the plumbing system.
- If there is already pressure in the system from a city water source being turned ON, do not use the water pump. Only use the water pump when city water pressure is not present.

Fresh Water Fixtures

Kitchen Faucets and Sinks

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.

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.

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

Potable Water Hose

To supply safe potable water to your motorhome, purchase and keep separate a sanitized water hose, whose sole function is for use with your potable water delivery and storage. Use a different water hose for other water-related activities, such as cleaning outdoor furniture, washing the motorhome, maintenance, or sewer system cleanup.

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.

In-Line Water Filter

In-line water filters are available that connect on the end of a potable water hose. These filters are used to prevent particulates from entering your fresh water holding tank and system. It is advisable to use a in-line water filter whenever filling your fresh water tank or when connected to a city water source.

Check with your dealer for details regarding water system accessories.

Shower and Sink Miser

The Shower Miser and Sink Miser are devices that help conserve water by returning water that has remained and cooled in the hot water lines, back to the on-board fresh water tank. Normally, when one turns on a hot water faucet, there is an initial stream of cool water until the hot water begins to flow. The Shower and Sink Misers allow the user to conserve this cool stream of water for future use. Not only is fresh water conserved by diverting this cooled water back to the fresh water tank, this action also saves water that would unnecessarily go down the drain into the gray water storage tank, thus helping to reduce on-board gray water volume.

The Shower and Sink Miser system consists of a diverter valve, a visual indicator, and behind-the-scene plumbing. Depending on installation, the visual indicator is in the form of a blue button (mushroom-shaped device) or a short, tube or pipe of blue plastic. This plastic indicator is specially formulated to change color in the presence of hot water, so when the indicator is blue, cold or cool water is present. When the indicator changes to a grayish-white color, hot water is present.

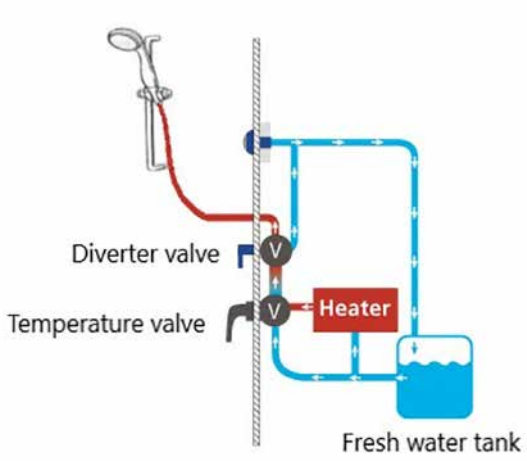
Using the Shower and Sink Miser:

⚠ CAUTION

CAUTION: Water coming through the shower-head will be HOT. Be sure to use the mixer valve to adjust shower water to a comfortable temperature.

1. Make sure the hot water system (tank or tankless) is ON and operating correctly.
2. If not connected to City Water hook ups, make sure the water pump is ON.
3. Determine the correct positions for the Shower or Sink Miser diverter valve:
   - Position #1 sends the water to the shower head or sink faucet.
   - Position #2 sends the water through the blue tube or button indicator (depending on your model), then back to the fresh water tank.
4. Turn the diverter valve knob to Position # 2.
5. Turn the hot water to the full ON position. Note: no water will come out of the shower head or sink faucet, but you may hear water running.
6. Observe the blue indicator (tube or button); once the hot water has arrived it will start to change color from blue to a grayish-white.
7. Once the hot water is flowing through the Shower or Sink Miser, mix the hot and cold water to your desired temperature. Initially, you may not know the exact position the water valve handle(s) should be placed,

Typical Shower Miser installation diagram.



Example of an installed Shower Miser. Note the blue indicator tube.

Example of an installed Sink Miser. Note the blue indicator button (mush-room).

The mushroom-shaped indicator button remains blue (left image) when cold water is present. When hot water is flowing (right image), the indicator changes to a grayish-white color.

but you will learn the correct position with a little experimentation. Perhaps marking the valve position with a small dot of permenant marker will be helpful.

NOTE: On-demand water heaters usually have a hot water temperature setting controller, which eliminates the need to mix hot and cold water for the desired water temperature.

8. Turn the Shower or Sink Miser diverter knob to position #1. Water will now flow from the shower head (wand) or sink faucet.

FOR ADDITIONAL WATER CONSERVATION WHILE SHOWERING:

9. Once you are completely wet, again turn the Shower Miser diverter knob back to position #2. You can now wash you hair or soap up; knowing you are not wasting water and that the water temperature has remained consistent for your rinse-off.
10. When you are ready to rinse-off, turn the Shower Miser diverter knob back to position #1.
11. Shut off water valve(s) when finished.

NOTE: To conserve water that is normally wasted by dripping and leaky faucets, keep the Shower and/or Sink Miser diverter valve in position #2 when the shower or sink is not in use.

FREQUENTLY ASKED QUESTIONS:

(Q) ***Are there any special steps when Winterizing?***

(A) Caution: When winterizing the RV's water system with anti-freeze, make sure the diverter valve is in Position #1, **NOT** in bypass mode or Position #2. Doing so will prevent anti-freeze solution from entering the fresh water tank.

To prevent antifreeze from getting into the freshwater tank, while ensuring all water is evacuated from the Shower and/or Sink Miser plumbing, do the following:

1. Close all faucets in the RV.
2. Turn all Shower and Sink Miser diverter valves to Position #2 (recycle position).
3. Connect an air compressor to the city water input port.
4. Turn ON the air compressor. Be sure air pressure does not exceed 50 PSI.
5. Keep the air compressor ON until air is felt coming from the overflow vent of the fresh water tank.

Then…

6. Turn OFF the air compressor and disconnect it from the city water input port.
7. Turn all Shower and Sink Miser diverter valves to Position #1 (the regular shower or sink operating position).
8. Continue to winterize following the your RV's factory recommended method.

(Q) ***I have a tankless water heater; will flow rate be affected?***

(A) No, assuming an average water pressure of 30-60 PSI, the Shower or Sink Miser will have a flow rate of approximately 2.2 gallons per minute.

(Q) ***What happens if the fresh water tank is full?***

(A) If you are in a camp ground with full hookups and you continue to use the Shower Miser; at some point the fresh water tank will become full. When this happens you have two choices:

1. Stop using the Shower Miser as the fresh water tank will over flow on to the ground through the overflow tube on the water tank.
2. Turn OFF the City Water and turn ON your water pump to start using the accumulated water from the fresh water tank that normally would have been wasted. After a day or two of washing dishes and taking showers there will be plenty of room in the tank to continue using the Shower Miser.

(Q) ***At what temperature does the indicator (tube or button) change color?***

(A) The indicator changes color at 91º Fahrenheit and above. Also, there is a 4 second delay from the time the 91(+)º water reaches the indicator and you see the color change. Given that it is 4 seconds later, hot water from the water heater to the shower head is fully available.

NOTE: The color change will happen in under 4 seconds at normal room temperatures. If the RV or Boat is exceptionally cold the change will take a little longer.

(Q) ***What is the proper care and maintenance of the Shower and/or Sink Miser?***

(A) To clean the surface, just use water and a soft cloth. No harsh chemicals or abrasives should be used on the indicator tube or button.

- Avoid direct sunlight on the indicator device. If parked in an area with direct or very bright sunlight, cover with a wash cloth when not in use.
- All of the Metal parts are of 100% brass construction with a less than 2% lead content. They should provide years of reliable use. Again just clean with water and a soft cloth.
- If any of the items become coated with a calcium build up, clean by spraying distilled vinegar on the parts, letting is sit for a few minutes then rinse with water and wipe dry with a soft cloth.

Fresh Water Holding 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.

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.

Holding Tank Heating Pads (Optional)

⚠ CAUTION

Holding tank heating pads will not protect other water system components from freeze damage. Protect water supply lines, drains, and water heater from freeze damage whenever sub-freezing temperatures are encountered.

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.

Select 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

Holding Tank Heater Control Switches

If installed, tank heating pad control switches are located on the monitor panel or the multiplex touch-panel (if equipped with a multiplex control system).

motorhome (refer to the furnace manufacturers 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.

Using the Water System in Cold Weather

⚠ CAUTION

Always be very cautious when using the motorhome's water system in freezing temperatures. Freezing water can severely damage water system components.

Take actions to prevent freezing to pipes, plumbing, and other water system components.

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). 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 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.

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.

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 water system. This includes draining the water heater and water supply lines. Also protect drain P-traps with antifreeze. Refer to your TMC Owners Manual or TMC Water System Guide for winterizing procedures.

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.

Typical Fresh Water Gravity Fill Port

NOTE: Always fill the fresh water holding 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.

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.

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.

Using a 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.

Typical fresh water hose connection to city water supply

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) 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.

To Disconnect from a City (External) 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.

NOTES:

- 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.
- The use of in-line water filters and pressure regulators (not supplied by TMC) is recommended whenever potable water is being delivered by an external source. Ask your dealer for details.
- If you will be away from your motorhome for a few hours or more, it is a good practice to disconnect or turn off the valve from the city water source. This will prevent or reduce any damage that could be caused by a pressure-induced leak in the motorhome's water system pipes or fittings.

Fresh Water System Drain Valves

Fresh Water Tank Drain Valve

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.

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.

Typical fresh water tank drain valve

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.

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.

Typical low-point drain valves

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.

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.

NOTE: Diagrams that indicate the location of the fresh water tank drain valve and the low point drain valves for your motorhome are available through your TMC Owners Resource on-line document service account. Review the fresh water system diagrams, which are included in the Schematic Diagrams set for your motorhome.

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. For some models, the drain plug associates with a sacrificial annode. Removing the annode effectively drains the water tank. Refer to your water heater owner's manual for tank draining instructions.

Water Heater Bypass Valves

⚠ WARNING

NEVER OPERATE A WATER HEATER IF ITS WATER SUPPLY SHUT-OFF OR BYPASSED. SEVERE DAMAGE TO THE WATER HEATER WILL RESULT, ALONG WITH A RISK OF FIRE.

NOTICE

Following the manufacturer's recommendation, some tankless water heater installations may not include bypass valves. Refer to the manufacturer's instructions regarding any cautions they may state pertaining to the introduction of sanitizing and winterizing chemicals to the water heater and its components.

A water heater bypass valve system may be installed and located inside your motorhome, usually behind the water heater, in a cabinet or maintenance access area. Bypass valves are generally used for water heater maintenance operations or when the manufacturer of the water heater cautions against introducing certain sanitizing and winterizing chemicals to the water heater and its components (see Sanitizing and Winterizing sections of this manual).

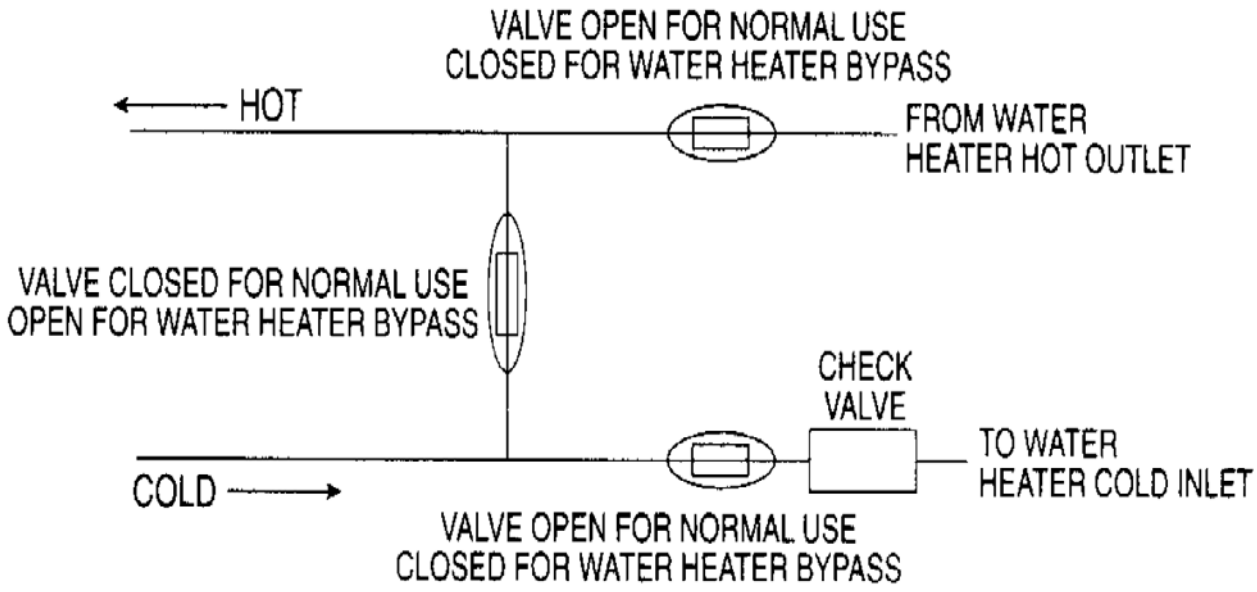
When the system is closed, water is shut off to the water heater. This will eliminate circulating an additional six to ten gallons of sanitizing or winterizing solutions through the water heater when performing these routine operations. When the water heater is bypassed for winterizing, be sure to remove the drain plug and drain the water heater's tank. Refer to the manufacturer's instructions for long term storage and winterization procedures.

When system sanitizing activities have ended or when putting the water heater back in service, be sure to open up the water heater bypass valves so that the water heater will have a fresh and replenishing supply of water for normal operations.

NEVER OPERATE A WATER HEATER WHEN IT IS BYPASSED AND NOT CONNECTED TO A SUPPLY OF FRESH WATER.

Some bypass valves are incorporated in Water Valve systems, which are described in the following pages of this manual. Follow the same cautionary water heater measures when using these bypass valve systems.

NOTE: For diagrams showing the location of water heater bypass valves for your motorhome, refer to the Fresh Water System Layout diagrams included in the Schematic Drawing Sets, available to you through your on-line Owners Resource account.



Water Heater Bypass Valve diagram

Anderson Water Valve Panels

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

Most Anderson valve panels provide four convenient functions:

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

Model 200RV

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

- **NORMAL** - Supply cold water to the water heater and supply hot water to the hot water fixtures
- **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
- **SANITIZE TANK** - Sanitize fresh water tank and hot and cold water lines, while bypassing water heater

Model 200RV-WHBS

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

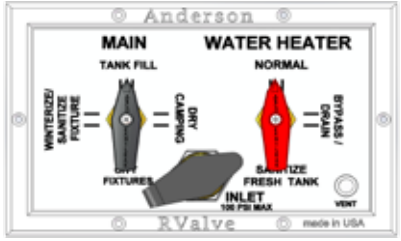
The Anderson **MAN102W** Flow Path valve panel, installed on select TMC Class A motorhomes, is similar in operation to the panels illustrated above. The MAN102W panel includes two multi-position valves and a water inlet. The valve functions are:

- **MAIN**, which includes the positions of Tank Fill, Dry Camping, City Fixtures and Winterize/Sanitize
- **WATER HEATER**, which includes the positions of Normal, Bypass/Drain, and Sanitize Fresh Tank

Model 200RV-WHBSD

All Anderson 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 MAN102W Flow Path

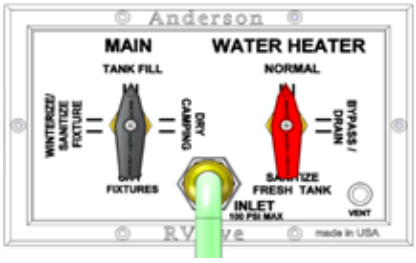
Filling the Fresh Water Tank

⚠ 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 the Anderson valve panel; turn ON water supply.
4. Water tank is full when water flows from vent/overfill; turn OFF water supply.



Tank Fill Position

PLUMBING DESCRIPTION

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

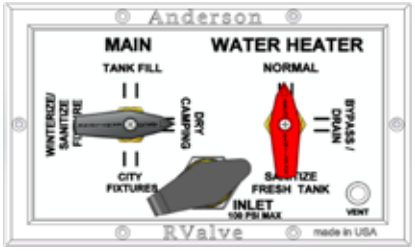
Normal (Dry Camping) Position: Water Supplied from the Fresh Water Tank

1. Rotate the Fill Valve to the NORMAL position; DRY CAMPING on the MAN102W.
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.

Normal (Dry Camping) Position

PLUMBING DESCRIPTION

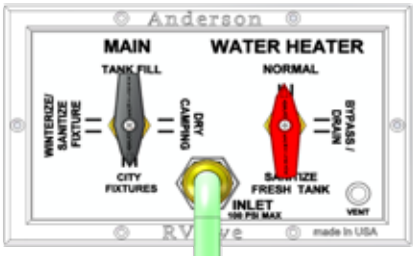
- Water from the fresh water tank (filtered when tank is filled) connects to the Anderson fill valve inlet
- Outlet from the Anderson fill valve connects to inlet of the water pump
- Outlet from the water pump connects to cold water lines of faucets, shower, toilet(s), exterior shower, and if installed; washer and ice maker



- Water is also supplied to the hot water heater through the Anderson water heater valve in the Normal position
- Hot water returns from the hot water heater to the Anderson water heater valve and distributes to the 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 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.



City Fixtures Position

PLUMBING DESCRIPTION

- City cold water supply connects to the Anderson inlet port
- Cold water passes through the Anderson inlet port to the fresh water filter
- From the fresh water filter, cold water flows to the Anderson fill valve and is supplied to all cold water fixtures
- Filtered cold water is also supplied to hot water heater through the Anderson water heater valve in Normal position
- Hot water returns from the hot water heater to the Anderson water heater valve and distributes to all hot water fixtures
- Water pump is bypassed

Sanitize/Winterize Position: To Sanitize the System

1. Turn OFF the hot water heater.
2. Drain the fresh water tank, hot water tank, and fresh water system (see Low Point Drains), then CLOSE drain valves. CLOSE valve to the 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 the City Water Inlet and place the free end into container of sanitizing solution.
5. Rotate the Anderson fill valve to SANITIZE / WINTERIZE position, rotate

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 described in this guide.

the water heater valve to SANITIZE TANK position.

- Rotating the 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 the 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 the faucets, CLOSE all faucets, FLUSH toilet(s). Allow remaining solution to enter water tank. Turn OFF the water pump when the 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.

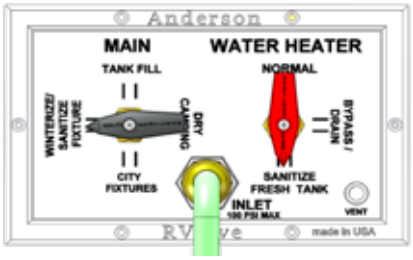
10. Drain fresh water system, then flush by connecting potable water hose to the city water supply, rotate the Anderson valve to CITY FIXTURES position, then turn ON the city water supply while all water faucets are open.

11. Flush hot and cold water lines until chlorine smell is no longer detected, then turn OFF all water faucets. Fill the fresh water tank and empty, repeat if necessary.

12. Reinstall filter cartridges.

13. Rotate water heater valve to the NORMAL position. OPEN hot water faucets to fill hot water heater tank. When tank is full, turn OFF faucets and if needed, turn ON hot water heater.

Sanitize/Winterize Position including fresh water tank

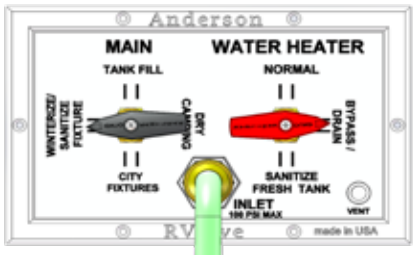


Sanitize/Winterize Position: To Winterize the System

⚠ WARNING

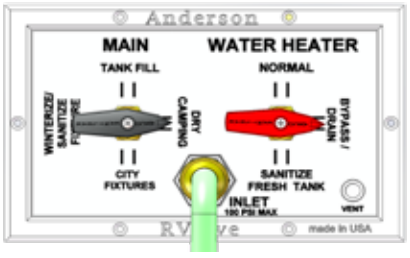
Automotive antifreeze (ethylene glycol) and windshield washer antifreeze (methanol) are poisonous. Never use these products in your fresh water system. These products are harmful and may be fatal if swallowed.

1. Turn OFF the 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 the city water inlet and place free end into a container of winterizing solution.
6. Rotate Anderson fill valve to SANITIZE / WINTERIZE position, rotate water heater valve to BYPASS position.
   - Rotating the water heater valve to Bypass position bypasses water heater, but draws winterizing solution into hot water lines.
   - Winterizing solution will NOT be pumped into the fresh water tank. Ensure fresh water tank is completely drained before winter storage.
7. Turn ON the water pump.
8. Open all faucets, both hot and cold.
   - Winterizing solution is drawn from the 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 the water pump.
11. To ensure drain p-traps contain 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, drain, and stow potable water hose.



Sanitize/Winterize Position with water heater bypass

NOTE: To bypass the water heater for maintenance, position the valves as shown below:



Nautilus P2.5 Water Panel

⚠ CAUTION

Read all cautionary instructions and statements supplied by the manufacturer before performing any operations or functions of the Nautilus water panel.

⚠ CAUTION

Never push the check valve located inside the CITY WATER connection when there is pressure in the system. Doing so will cause irreparable damage to the check valve.

The Nautilus P2.5 Panel System will allow the user to perform the following functions:

- Power fill your fresh water tank for remote or dry camping
- Use your pump to supply water to fixtures from fresh water tank
- Use your pump to siphon fill or sanitize your fresh water tank from a bucket
- Connect to city water at the camping site to supply water to fixtures
- Winterize your plumbing lines and fixtures
- Rinse black tank to help control odors and prevent sewage buildup
- Connect up to three (3) coax lines with satellite, cable and auxiliary

THE GREEN HANDLE

Receives water from water inlet on front of panel

- Sideways - water goes from inlet to pump
- Down – water goes to fresh water tank

THE BLUE HANDLE

Receives water from the white handle valve/water inlet on front of panel

- Sideways - water goes to fixtures (cold)
- Down – water goes to or come from fresh water tank

Connecting Coax for Cable and/or Satellite

1. For cable TV connection, connect the threaded coax from the source to the “CABLE” connection.
2. For satellite TV connection, connect the threaded coax from the satellite dish to the “SAT” connection.
3. Consult your Owner’s Manual to see if the “AUX” connection has an application.

TANK FILL - FILLING THE FRESH WATER TANK

1. Connect garden hose to inlet labeled “CITY WATER” Fig 1).
2. Turn handles to TANK FILL position as shown
   - BLUE diverter handle should be facing down
   - GREEN diverter handle should be facing left.
3. Connect other end of hose to water supply source (Fig 2).
4. Turn water supply on at source. Fresh water tank should begin to fill (Fig 3).

NOTE: Consult your Owner’s Manual for tank capacity. DO NOT OVERFILL TANK!

5. When desired level in fresh water tank is reached, turn water off at source.
6. Disconnect garden hose from inlet on Nautilus panel.

Figure 1

Figure 2

COAX Connection

Figure 3

SANITIZE - Fill or Sanitize Fresh Water Tank Via the Water Pump

1. Connect garden hose to inlet labeled "SANITIZE / WINTERIZE" (Fig 4).
2. Turn handles to '"SANITIZE" position as shown
   - BLUE - diverter handle should be facing down.
   - GREEN - diverter handle should be facing left.
3. Place other end of hose in container holding water or sanitizing solution (Fig 5).

Figure 5

Figure 4

Figure 6

4. Push "PUMP" switch to turn pump on (Fig 6).

NOTE: LED indicator light below the pump switch will be lit if pump has power.

5. Pump should be running and fresh water tank should begin to fill.

NOTE: Consult your Owner's Manual for tank capacity. DO NOT OVERFILL TANK!

6. When desired level in fresh water tank is reached, push "PUMP" switch to turn pump off.

NOTE: LED indicator light below the pump switch will not be lit.

7. Disconnect garden hose from inlet on Nautilus panel.

DRY CAMPING - Using the Water Pump to Supply Fresh Water from the Fresh Water Tank

1. Make sure fresh water tank has necessary supply of water.
2. Turn handles to "DRY CAMPING" position as shown (Fig 7).
   - BLUE diverter handle should be facing right.
   - GREEN diverter handle should be facing down
3. Push "PUMP" switch to turn pump on.

NOTE: LED indicator light below the pump switch will be lit if pump has power.

4. Water should be available to all fixtures.

NOTE: The pump will run when a plumbing fixture is open.

5. Make sure pump is turned off when not in use.

Figure 7

CITY WATER - Water from a Pressurized Source

1. Connect garden to hose to inlet "CITY WATER" (Fig 8)
2. Turn handles to "CITY WATER" position.
   - BLUE diverter handle should be facing right.
   - GREEN diverter handle should be facing left.
3. Connect other end of hose to water supply source (Fig 9).
4. Open faucet at water supply source. Water should be available to all fixtures (Fig 10).

Figure 8

NOTE: Refer to OEM Owner's Manual for safe operating pressures. Over pressurizing water lines may cause damage to plumbing lines and fixtures.

Figure 9

Figure 10

WINTERIZE - Using the Water Panel to Winterize the Water System

1. Turn handles to “TANK FILL” position as shown (Fig 11).
   - BLUE diverter handle should be facing down.
   - GREEN diverter handle should be facing left.
2. Open low point drain(s) on RV to remove water in plumbing lines. Open both a hot and cold faucet to help drainage process.
3. Open drain plug on hot water heater to drain water if unit is equipped with hot water holding tank.

NOTE: Contact your dealer or manufacturer for exact location of low point drains and hot water heater.

4. Once most water has been drained from plumbing lines, turn BLUE & GREEN handles so they are at a 45 degree angle as shown (Fig 12).
5. Using “CITY WATER” inlet or low point drain, blow out plumbing lines (40 PSI max) with handles still at 45 degree angle as shown. This will ensure any trapped water in plumbing harness is removed (Fig 13).
6. Close drains on hot water tank & low point drains
7. Remove apparatus used to blow out plumbing lines from “CITY WATER” inlet.
8. Turn handles to “WINTERIZE” position as shown.
   - BLUE diverter handle should be facing right.
   - GREEN diverter handle should be facing left.
9. Connect a short section of garden hose to inlet labeled “SANITIZE / WINTERIZE“ (Fig 14).

   Important! Make sure you BY-PASS your water heater if your unit requires it. Contact your RV manufacturer for more information.
10. Place other end of garden hose in container holding approved winterizing solution (Fig 15).

NOTE: A short or cut off section of garden hose should help the pump to prime easier.

Figure11

Figure12

Figure13

11. Push “PUMP” switch to turn pump on (Fig 16).

NOTE: LED indicator light below the pump switch will be lit if pump has power.

12. Pump should be running and winterizing solution should begin to flow through pump into plumbing lines and fixtures.

NOTE: The pump will run when a plumbing fixture is open.

13. Open one plumbing fixture, keeping it open until winterization solution appears, then close.

14. Follow above procedure until all inside & outside plumbing fixtures have been winterized hot & cold sides of plumbing fixtures.

    Important! Make sure to run winterizing solution through hot & cold lines on exterior shower.

15. Push “PUMP” switch to turn off pump (Fig 17).

NOTE: LED indicator light below the pump switch will not be lit.

16. Disconnect garden hose from “CITY WATER” inlet.

NOTE: It is normal for some winterizing solution to be present as hose is being disconnected.

Figure14

Figure16

Figure15

Figure17

TANK FLUSH - Rinsing the Waste (Black Water) Tank

1. Connect flexible sewer hose to 4” dump outlet on unit (Fig 18).
2. Open black waste holding tank valve and leave open to allow black tank to drain (Fig 19).
3. Attach a garden hose to inlet labeled “TANK FLUSH” (Fig 20).
4. Connect other end of hose to water supply source (Fig 21).
5. Fully open faucet at water supply source (40 psi minimum). Flush tank until water appears clear in 4” discharge hose (Fig 22).
6. Completely close faucet at water supply source.
7. Disconnect garden hose from water source.
8. Disconnect garden hose from “TANK FLUSH” inlet
9. Close black waste holding tank valve.

NOTE: To help ensure debris does not clog tank sprayer orifices, use “TANK FLUSH” every time waste holding tank is emptied.

Figure 18 (Above); Figure 19 (Below)

Figure 20

Figure 21

Figure 22

Swan Quick-Fill™ Valve

Some older TMC motorhomse may have Swan Quick-fill Valves as a component of the fresh water system. When installed, the Swan Quick-Fill™ Valve allows filling the fresh water tank of your motorhome from an external fresh water source while remaining connected to the external water supply for your water needs. This valve diverts incoming water (from an external water supply) to the fresh water tank for filling. It eliminates the need to fill the fresh water tank via the gravity fill port.

When installed, the Swan Quick-Fill™ Valve is internally plumbed to the city water supply side of the motorhome's fresh water system.

The Swan Valve handle should remain in the LOCAL SUPPLY position until you are ready to fill the fresh water tank.

To Fill the Fresh Water Tank Through the Swan Valve:

NOTE: If not already connected to an external water source, perform all steps. If already connected to an external water source, skip to step 3:

1. Attach a potable water hose to the city water supply spigot and let the water flow for a few minutes in order to clear the supply piping of any deposits that may be present.
2. Turn the water supply OFF and attach the free end of the water hose to the city water inlet port of the motorhome.
3. Turn the handle on the Swan Valve to Fresh Water Tank position
4. Turn on the water supply and monitor the tank as it fills. Monitoring can be observed with the tank level indicator on the monitor panel. DO NOT OVERFILL THE TANK.
5. Once the fresh water tank is filled, rotate the handle on the Swan Valve to the Local Supply Position. It is not necessary to turn off the water supply before rotating the valve handle.
6. If needed, turn off the water supply, detach and stow hoses.

Swan Valve

NOTE: Never leave the tank filling process unattended. While filling, always monitor the water level of the tank by observing the tank level indicator, located on the monitor panel. Turn off the water source used for tank filling when the tank level indicator registers full.

Although the tank has an overfill vent, and overfill water will escape through this vent and onto the ground below, this vent cannot support the same volume of a filling hose. Therefore, a condition of potential water leakage and damage exists if the tank filling process is not properly managed.

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Gas Water Heaters: Tank and Tankless

⚠ DANGER

Before operating the water heater, review all manufacturer's information and instructions. If the information provided by the manufacture is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- **Evacuate ALL persons from vehicle.**
- **Shut off gas supply at gas container or source.**
- **DO NOT touch any electrical switch, or use any phone or radio in vehicle.**
- **DO NOT start vehicle's engine or electric generator.**
- **Contact nearest gas supplier or qualified service technician for repairs.**
- **If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.**
- **DO NOT turn on gas supply until gas leak(s) has been repaired**
- **Installation and service must be performed by a qualified installer, service agency, or gas supplier.**

⚠ 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.**
- **Gas-fired water heaters have electronic igniters that must be OFF whenever fueling the vehicle or re-filling the propane tank.**
- **Gas appliances must never be operated while the vehicle is in motion. Unpredictable wind currents may be created which could cause flame reversal in the burner tube, which could result in fire damage. The thermal cut off fuse could also be unnecessarily activated resulting in a complete shutdown of the water heater requiring replacement of the thermal cut off device.**

Basic Operation

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

- Tank-type (6 and 10 gallon, Gas/Electric or Gas-only)
- Tank-less (Gas, on-demand)
- Hydronic (diesel or LP, on-demand)

Exterior cover of a typical RV water heater. Peep hole in the cover is used to check for pilot light ignition.

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, refer to the information available through your TMC Owners Resource Account, or visit the manufacturer's website. Hydronic water heaters are not described in this publication.

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

The main water heater ON/OFF switch is located on the Monitor or Multiplex 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 disconnect switch must also be ON for the water heater to operate. Refer to the TMC Electrical System Guide or TMC Quick Start Guide for main battery disconnect 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.

Water heater switch located on a typical Monitor Panel. Some water heaters are gas-only, while other models may feature both gas and electric heating modes.

Water heater switch on a typical Multiplex control panel. Usually located on the Home Menu Screen, press the soft control to turn ON the water heater, selecting either gas or electric heating modes.

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

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.

NOTE: For motorhomes with multiplex systems, the water heater control switches are integrated 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.

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 the motorhome could occur.

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 or multiplex 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.

In addition to the gas burner, some water heater models also include an electric element to aid in quicker recovery. The electric element operates on 110 volts AC, therefore, in order to operate in this mode, the motorhome will need to be connected to shore power or have the generator running. If operating on generated power, ensure the total electrical load capacity of the generator is not exceeded while simultaneously using the water heater and other appliances.

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

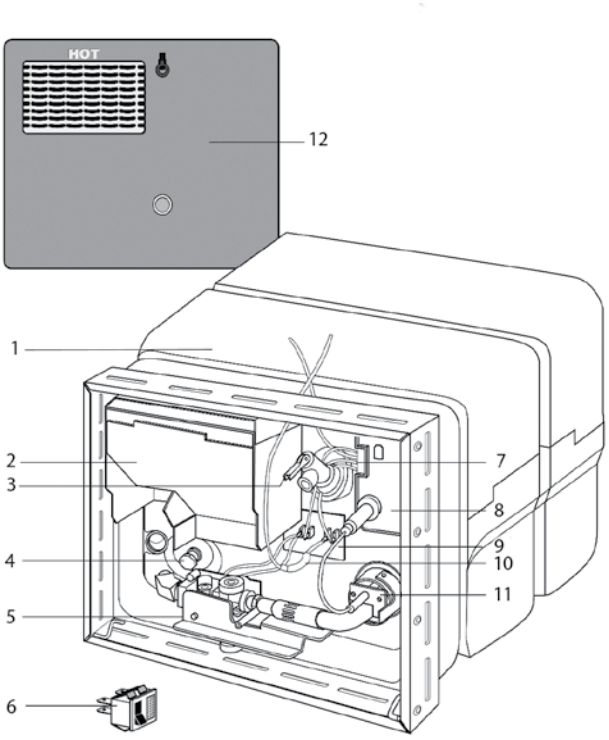
⚠ WARNING

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.

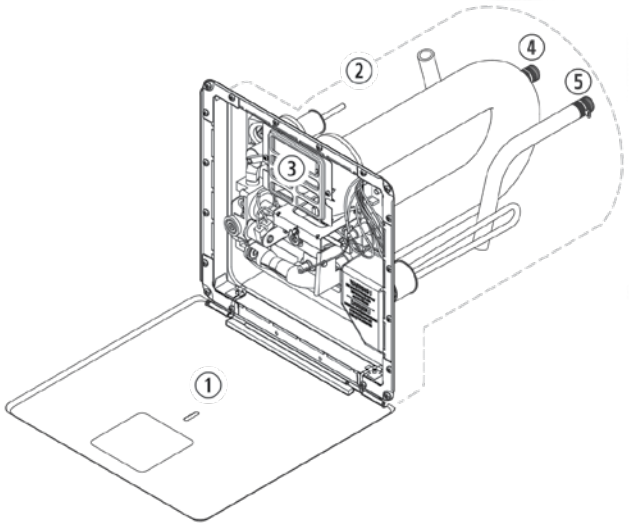
Illustrated here are the main components of a tank-type water heater. These controls are accessed by removing a service panel located on the exterior of the motorhome. Be cautious when accessing these components. If your water heater is in use, some components will be HOT and present a burn hazard.

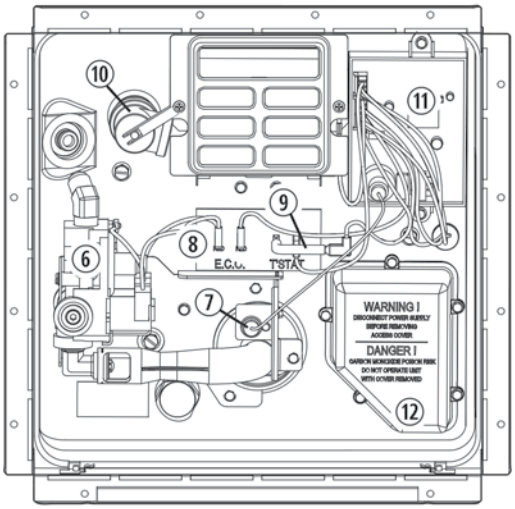
Typical Atwood Water Heater



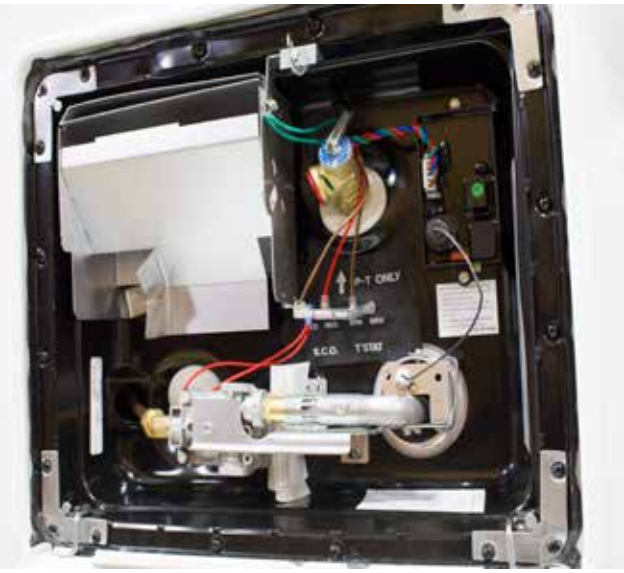
1 Supply Tank
2 Flue Box Assembly
3 Pressure Relief Valve
4 Drain Plug
5 Solenoid Valve
6 On/Off Switch (located on Monitor Panel)
7 Wiring Harness
8 Circuit Board
9 Thermostat Control
10 Thermal Cut-off
11 Spark Probe
12 External Cover

Typical Dometic Water Heater





1 Access Door
2 Water Heater Tank
3 Flue Assembly
4 Hot Water Outlet
5 Cold Water Inlet
6 Gas Valve
7 Electrode
8 E.C.O./Thermostat
9 Thermal Cut-off
10 P/T Relief Valve
11 DSI Control Board
12 Electric Junction Box/Element Access Cover (cover must be sealed



Water heater controls accessed from an exterior cover

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.**
- **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. Turn ON the main battery disconnect switch.
2. Ensure the water heater supply tank is filled with fresh water.
   - Turn ON the water pump or connect to a pressurized city water source.
   - Open a hot water faucet. When water is continuously flowing, the water heater's tank is supplied with water.
3. 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.
4. Turn ON the water heater power switch, located on the monitor or multiplex 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.

ELECTRIC OPERATION

When the electric switch is turned on, the relay at the rear of the unit will close and allows 110 volts AC to the heating element. If the thermostat were to fail, an energy cut-off device (ECO) will open and lockout the system. To correct, check the thermostat to assure good contact with the tank and reset the control by turning the electric switch off, then on.

GAS/ELECTRIC OPERATION

The unit can be run in both gas and electric modes simultaneously for quick recovery. Note: if the gas fails to ignite, the gas mode will lockout, but the lockout lamp will not illuminate since the electric mode is still operational. Should you notice slow recovery, indicating the gas is not working, turn the electric switch off. The lamp will then illuminate indicating a lockout has occurred on the gas side. Correct the problem and turn the switches back on.

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. DO 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 or multiplex 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.

Maintenance (Tank-type Models):

NOTICE

Bypass the water heater when sanitizing the fresh water system. Chlorine solutions can damage internal components of the water heater. Water heater bypass valves are installed in most motorhome water systems. Refer to your fresh water system diagram for bypass valve location.

- 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.
- Keep vent and combustion air grill clear of any obstructions.
- Spiders, mud wasps, and other insects can build nests in the burner tube. This causes poor combustion, delayed ignition or ignition outside the combustion tube. Inspect and clean on a regular schedule.
- Periodically compare flame of main and pilot burners to the illustration contained within the manufacturers owners manual. Refer to the manufacturer's instructions for flame adjustment procedures.
- Drain the water heater's supply tank 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.
- When the water heater is not in use (for an extended length of time) set the temperature control to its lowest position (if adjustable and recommended by the manufacturer). 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.
- 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.

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.

Winterizing and Flushing Instructions

To insure the best performance of your water heater and add to the life of the tank, periodically drain and flush the water heater tank. Before long term storage or freezing weather drain and flush the tank.

1. Turn off main water supply (the pump or water supply hook up source).
2. Drain water heater tank by removing the drain plug. If the water flows sporadically or trickles instead of a steady stream of water, we recommend the following action; first open the pressure temperature relief valve to allow air into the tank and secondly, take a small gauge wire or coat hanger and poke through the drain opening to eliminate any obstructions.
3. After draining the tank, because of the placement of the drain plug, approximately two quarts of water will remain in the tank. This water contains most of the harmful corrosive particles. To remove these harmful corrosive particles flush the tank with either air or water. Whether using air or water pressure, it may be applied through the inlet or outlet on the rear of the tank or the pressure temperature relief valve. (If using the pressure temperature relief valve the support flange must be removed). The pressure will force out the remaining water and the corrosive particles.

   If you use water pressure, pump fresh water into the tank with the assistance of the on-board pump or use external water for 90 seconds to allow the fresh water to agitate the stagnant water on the bottom of the tank and force deposits through the drain opening. Continue repeating adding water and draining until the particles have been cleared from the water remaining in the tank.
4. Replace the drain plug and close the pressure temperature relief valve. The approximately two quarts of water remaining in the tank after draining will not cause damage to the tank should freezing occur.

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.**
- **Turn OFF the water heater and all other igniters when fueling the vehicle or re-filling the propane tank.**

⚠ WARNING

IT IS DANGEROUS TO OPERATE A TANK-LESS WATER HEATER UNATTENDED.

Damage may occur 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.

NOTICE

Some tankless water heater systems do not include bypass valves. Refer to the manufacturer's instructions regarding the introduction of sanitizing and winterizing chemicals to the water heater and its components.

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

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

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 Girard 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 115º 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 95º F to 124º 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.

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.

ANTI-FREEZING PROTECTION FEATURE OF THE WATER HEATER

NOTICE

To allow the Antifreezing 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.

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 38º F and will automatically shut off when it senses a temperature in excess of 58º 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.
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.

Winterization

Freezing of the water heater and its plumbing components will result in severe damage and is not covered by the manufacturer's 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 where freezing temperatures may be encountered. 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. Winterize the water heater by following either of these methods recommended by the manufacturer:

1. **Compressed air method:** drain all water from the system opening one tap at a time and using compressed air to purge all remaining water.

2. **Anti-freeze method:** Follow the recommendations of the recreational vehicle manufacturer and fill the system with a non-toxic anti-freeze. Make sure that the anti-freeze flows from each tap to complete the process.

Tips and Troubleshooting (all water heater types)

Water heater not working or producing hot water:

- **Will not ignite** – verify that the power switch is turned ON at the control panel.
- **Will not ignite** – verify that the 120VAC circuit breaker (if equipped) is turned ON and not tripped.
- **Will not ignite** – verify that the gas supply is not empty and the main gas valve is OPEN.
- **Will not ignite** – Check the main battery disconnect switch; it must be ON.
- **No hot water** – verify the city water connection and the water source is turned ON to supply water.
- **No hot water** – verify that the fresh tank has water and the water pump is turned ON to supply water.
- **No hot water** – verify that the water heater bypass valves are in NORMAL mode to allow a supply of water.
- On Suburban water heaters, check the gas and 110VAC reset buttons to determine if tripped from high temperature.
- On Suburban units, check rocker switch behind gas valve.

Aqua-Hot® 250, 250-P, and 400D Hydronic Heating Systems

⚠ 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.**
- **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.**

Aqua-Hot Main Unit

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.**

NOTE: Depending upon coach model, your TMC motorhome may be installed with an Aqua-Hot 400D or a 250-P hydronic heating system. Other than the main burner fuel source (diesel or propane), both systems operate similarly and the following instructions will apply to both. For complete system information, please refer to the manufacturer's instructional manuals included within your TMC Owner's Packet.

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.

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.

Aqua-Hot Main Unit, top view

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).

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.

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

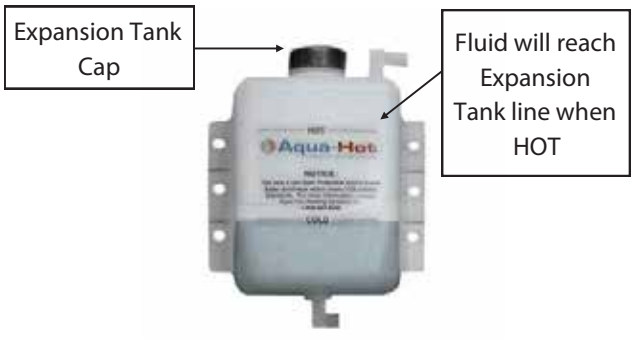
- **For complete operation and maintenance information, refer to the manufacturer's owner's manual, included with your Owner's Packet.**
- **Questions regarding the operation and/or maintenance of the Aqua-Hot hydronic system can be directed to TMC Customer Care or to the manufacturer.**

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.

Truma Combi Furnace/Water Heater

⚠ WARNING

CARBON-MONOXIDE POISONING HAZARD!

Failure to follow instructions could result in severe personal injury or death due to carbon-monoxide poisoning if combustion gases enter the RV.

Check that all openings in the outside wall around the vent (and air intake) pipe(s) are sealed to prevent combustion gases entering the RV.

Check that furnace vent and air intake are not obstructed in any way.

Never operate the combination furnace/water heater when the vehicle is parked in an enclosed or confined space.

This combination furnace/water heater presents danger of hot surfaces and hot gases. Do not touch the area around the wall cowl and do not lean any objects against the wall cowl (furnace exhaust).

IMPORTANT! Read and follow the manufacturer's instructions regarding safety, operation, maintenance, and winterization of the furnace/water heater.

Truma Combi Furnace/Water Heater

Your motorhome is equipped with a factory-installed LP-fired combination furnace and water heater, designed specifically for recreational vehicles (also refer to the Water Section of this manual). The furnace/water heater combination unit is a tank design and holds a volume of 2.6 gallons of water. Some models use a combination of LP gas and electric to rapidly heat water and provide warm air.

For complete safety, operational, and maintenance information on the furnace/water heater unit installed in your motorhome, please refer to the manufacturer's instructions contained in your Owner's Packet or visit the water heater manufacturer's website. Product information is also available in the TMC Water System Guide and from the on-line TMC Owners Resource document service. TMC Customer Care representatives are also available to answer any question you may have; call, toll free at:

(877) 855-2867

NOTE: Do not allow water to freeze within the furnace/water heater unit. When winterizing the water system, the water tank of the unit MUST be drained. DO NOT use compressed air to drain the unit. Do not place anti-freeze solutions in the tank of the water heater/furnace unit.

Freeze damage is not covered under either the manufacturer's or TMC warranty!

Safe Operation While Moving the RV

- Shut OFF gas and the LPG tank when moving the RV. This disables all gas appliances and pilot lights. Gas appliances must never be operated while vehicle is in motion.
- Shut OFF the Combi furnace when refueling or pumping gas.
- To avoid damage, make sure no spray water enters the Combi furnace when cleaning the RV, e.g., do not spray directly into the wall cowl.

Safe Handling of Malfunctions

- Switch OFF the gas supply and the Combi furnace if anything seems to be out of the ordinary.
- Danger of fire or explosion when attempting to use a flood-damaged Combi furnace or if the RV has been involved in an accident! A qualified service technician must inspect the furnace. In the case of moisture damage, the qualified service technician must replace damaged gas controls, control system parts and/or electrical parts, or provide a new furnace.
- Only a qualified service technician may perform repairs.
- Have a qualified service technician immediately remedy any malfunctions.
- Remedy a malfunction yourself only if a remedy is specified in the troubleshooting chart, included with the manufacturer's instructions.

- After any misfire, a qualified service technician must inspect the Combi furnace and the exhaust tube.

Safe Maintenance and Repair

- Only a qualified service technician may clean and maintain the furnace.
- Any alteration to the Combi furnace or its controls can cause unforeseen serious hazards and will void the manufacturer's warranty.
- After a long period of winterizing: Flush all hot/cold water hoses and the Combi furnace thoroughly with drinking water before using it.

Safety Features

THE COMBI FURNACE IS EQUIPPED WITH THE FOLLOWING SAFETY DEVICES:

- **Switch for gas shut-off valve**
  The switch (Fig. 2 – 4) shuts off the power to the safety gas valve and the gas supply to the furnace. If you want to make sure that the gas supply to the furnace is off, turn the switch to the OFF position.
- **Flame monitoring**
  If the flame goes out, the gas supply is switched off.
- **Low-voltage shut down**
  If the voltage drops below 10 volts DC, the gas supply is automatically switched off.
- **Overcurrent protection**
  If there is a short circuit in the Combi furnace (>10 amps), a fuse on the control unit is activated and the Combi furnace is automatically switched off.
- **Monitoring of hot water temperature**
  A water over temperature switch avoids excessively high water temperatures.
- **Monitoring of hot air temperature**
  An air over temperature switch avoids excessively high air temperatures.

How the Combi Furnace/Water Heater Works

NOTICE

DAMAGE TO THE COMBI FURNACE CAN BE CAUSED BY FREEZING!

The Combi furnace does not have a frost-protection function. If the heating is not used and there is a risk of freezing, all water must be drained from the water container (refer to "Draining the water container").

The Combi furnace was developed exclusively for use in recreational vehicles (RVs). The Combi is a furnace with a supplementary, indirect hot water heater.

All Combi models are powered by propane and a 12 volt DC power supply.

- The Main Battery Disconnect Switch must be ON
- If 30 amp Shore Power is available, connect to it; this will eliminate auxiliary battery drain
- The Main Propane Valve must be ON

The Combi eco plus and Combi comfort plus models are also powered by electrical heating elements for operation with a supply voltage of 120 volts AC.

Room air is drawn into the furnace by a fan, heated up and conveyed via flexible ducts to the RV's interior.

The Combi furnace with supplementary water heating is installed between the RV's fresh water supply line and its hot water system.

A comfortable water temperature at all water spigots is reached by mixing both hot and cold faucets.

A wall cowl allows combustion air to flow into the furnace and exhaust gas to flow out. The wall cowl and the furnace are connected by a tube in the tube exhaust venting system: an exhaust tube inside and a combustion air intake tube outside.

NEVER BLOCK OR OBSTRUCT THE INLET AIR AND EXHAUST VENT.

System Layout

Illustrated here is a typical installation . The installation in your vehicle may vary.

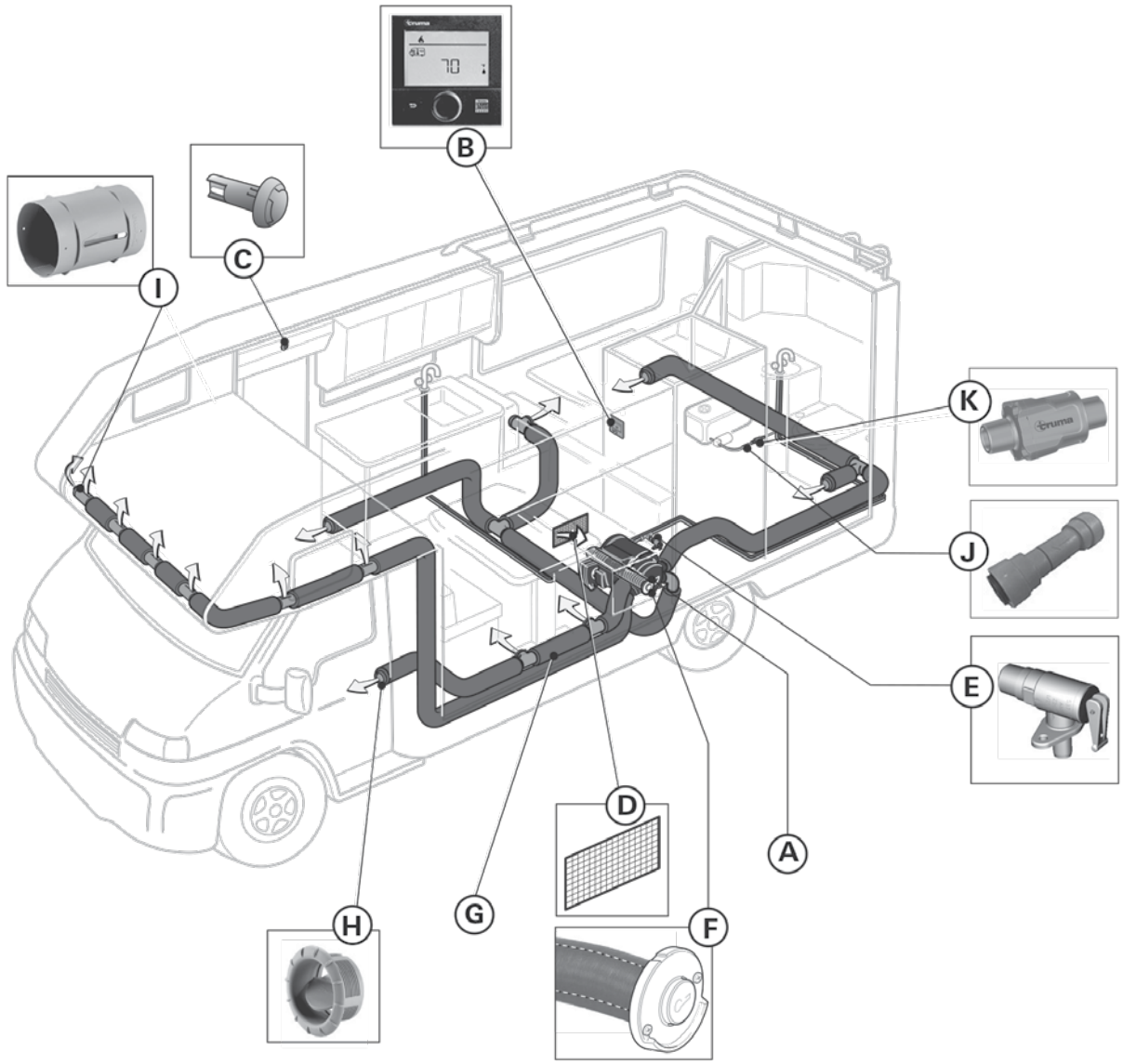


Figure 1

LEGEND:

A Combi furnace

B CP Plus control panel

C Room temperature sensor

D Opening for circulation air intake (with mounted grill)

E Truma Pressure relief/drain valve

F Wall cowl with exhaust venting system

G Warm air ducts with insulation sleeve

H Warm air end outlet with air throttle

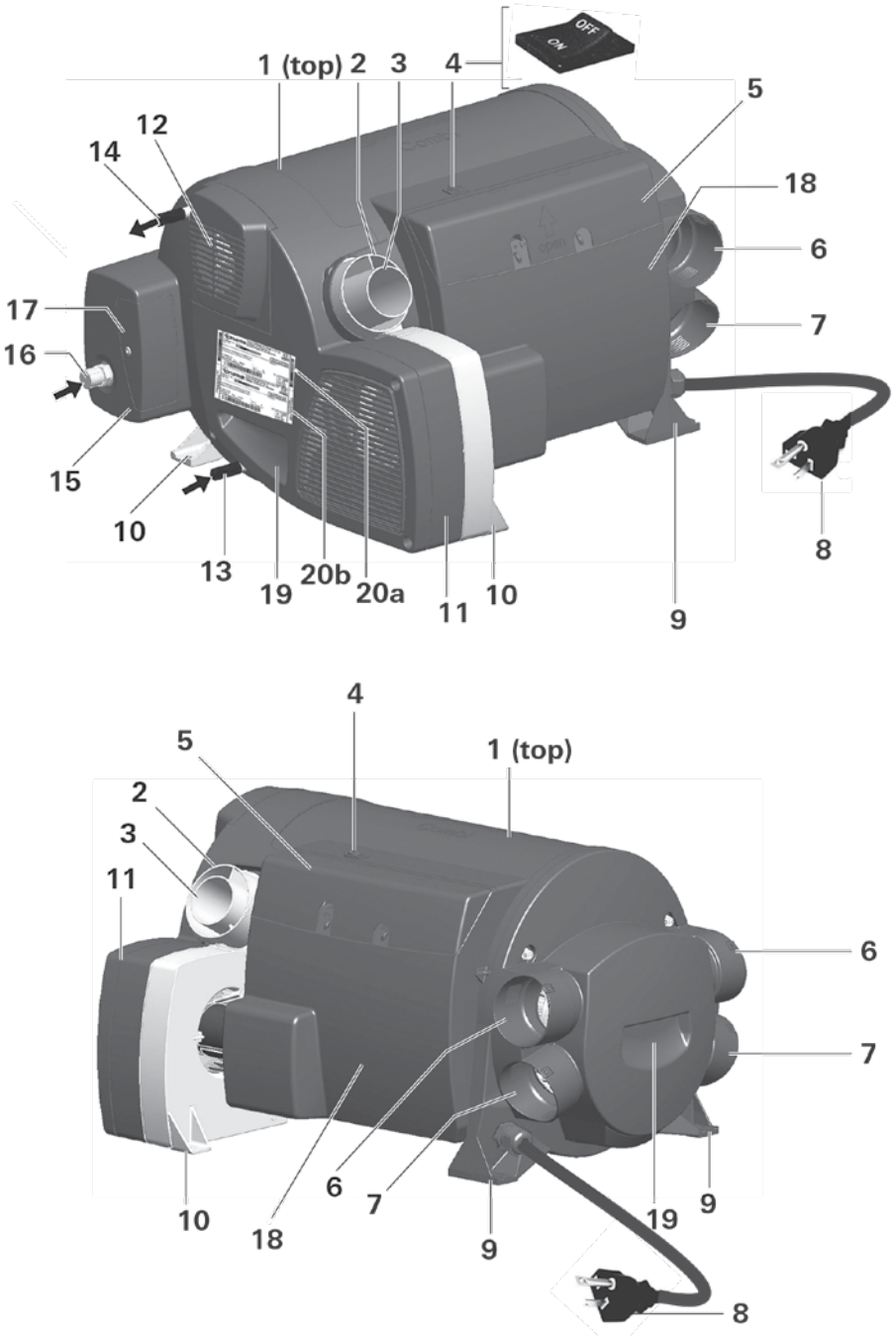
I Wall outlet vent

J Non-return valve

K Truma water pressure regulator

Truma Combi Diagram

Figure 2 and 3



LEGEND:

1 Combi furnace with supplementary indirect water heating

2 Connection for combustion air supply tube

3 Connection for exhaust tube

4 Switch for gas shut-off valve

5 Connection cover

6 Warm air outlets (upper)

7 Warm air outlets (lower)

8 2-pole, 3-wire 120 volt electrical plug (only on Combi eco plus and Combi comfort plus models)

9 Plastic frame feet

10 Aluminum frame feet

11 Circulated air fan

12 Fan for combustion air

13 Cold water connection (inlet)

14 Hot water connection (outlet)

15 Gas shut-off valve (behind the cover)

16 Gas connection (inlet)

17 Test connection (gas) (behind the cover)

18 Electronics housing cover

19 Recessed grips

20a Original type plate

20b Duplicate type plate

⚠ WARNING

SCALDING INJURIES CAUSED BY HOT WATER!

Water temperatures over 127 °F (52 °C) can cause severe burns or scalding and in extreme cases even death.

Water in the hot water container can become as hot as 162 °F (72 °C) during operation. If there is a malfunction, the water can reach 205 °F (96 °C).

- **Always use potable water to fill the hot water container. The person operating the furnace is responsible for the quality of this water.**
- **Before using a hot water faucet or using the shower, allow the hot water to run until the water temperature no longer increases and mix with cold water.**
- **Test the temperature of the water before placing a child in the bath or shower.**
- **Do not leave a child or an infirm person in the bath unsupervised.**

NOTICE

DANGER OF FAULTY OPERATION!

Always use the CP Plus control panel to operate the Combi furnace. Operating instructions for the CP Plus control panel are included in your Owner's Packet and available through the on-line TMC Owners Resource.

READ AND FOLLOW THE "CONSUMER SAFETY INFORMATION" (CONTAINED WITHIN THE MANUFACTURER'S INSTRUCTIONS) BEFORE OPERATING THE COMBI FURNACE.

Selectable Modes of Operation

The CP Plus control panel (Fig. 1 – B) is used to switch between modes of operation (refer to the CP Plus Controller manual for additional instructions).

1. Heating mode
   The furnace automatically selects the proper operating level based on the difference between the desired temperature set at the control panel and the current room temperature. If there is any water in the water container, it will be heated automatically. The water temperature will not be regulated, but it will reach a maximum of 162 °F (72 °C).

2. Hot water mode
   (Only if water container contains water)

   Hot water mode is ideal if only hot water is required. The lowest burner setting suffices for heating water. In hot water mode, the burner will switch off as soon as the water reaches the temperature selected in the CP Plus control panel.

   Both modes of operation can be combined.

Selectable Modes of Power Input

NOTICE

To avoid damage to the Combi unit, only a 120 volt AC sine-wave generator may be used. 120/220 volt AC shore power is also acceptable.

The CP Plus control panel is used to select various modes of energy for the Combi eco plus and Combi comfort plus models.

No Combi furnace operates in any mode without a 12 volt DC power source.

1. LP gas for gas mode
   All Combi furnaces run on LP gas (propane).

2. Electricity for electric mode
   The Combi eco plus and Combi comfort plus furnaces can be powered by electricity if the RV is connected to shore power or a generator.

3. LP gas and electricity (mixed mode)
   The Combi eco plus and Combi comfort plus furnaces run simultaneously on LP gas (propane) and electricity.

IF THE SELECTED OPERATING MODE IS:

1. Heating mode: The Combi eco plus and Combi comfort plus run simultaneously with LP gas (propane) and electricity.

2. Hot water mode: The Combi eco plus and Combi comfort plus run in electric mode with a preselected power output setting of 850 W (Mix 1) or 1700 W (Mix 2).

When the RV is disconnected from a 120 volt AC source*, the furnace will automatically switch to LP gas (propane).

* as long as there is a sufficient supply of 12 volts DC and LP gas (propane).

Switch for Gas Shut-off Valve

The switch (Fig. 4) shuts off the power to the safety gas shut-off valve and with this the gas supply to the Combi furnace. To make sure that the gas supply to the furnace is off, turn the switch to the OFF position.

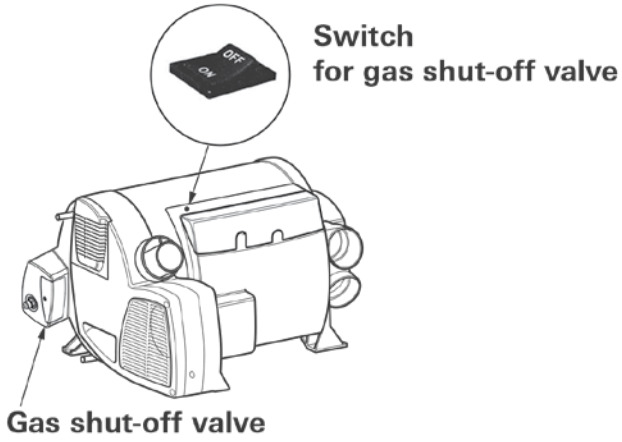


Figure 4

SWITCH POSITIONS OF THE SWITCH FOR GAS SHUT-OFF VALVE:

OFF = gas shut-off valve is closed

ON = gas shut-off valve is open

NOTE: This switch does not affect gas supply to other gas appliances within the motorhome, nor does it affect the main gas valve switch of the motorhome.

Room Temperature Sensor

A room temperature sensor (Fig. 1 – C) measures the temperature inside the RV.

The installation location for the room temperature sensor depends on the model and floorplan.

Truma Pressure Relief/Drain Valve

⚠ WARNING

RISK OF SCALDING INJURY FROM HOT WATER AND/OR TAMPERING WITH THE PRESSURE RELIEF/DRAIN VALVE!

- **Never actuate the pressure relief/drain valve as long as the Combi furnace is still hot.**
- **Do not place a plug or reducing coupling on the outlet part of the valve. If you use a discharge line, allow the valve and the line to drain completely.**
- The Truma pressure relief/drain valve provides both the pressure relief function and a drain function.
- The pressure relief/drain valve is a safety component and must not be removed for any reason other than replacement.
- The pressure relief/drain valve is not serviceable; if defective, it must be replaced. It must be replaced by a certified service technician.
- It must only be replaced by the Truma pressure relief/drain valve rated for 65.25 psi (4.5 bar) which is CSA certified and registered.
- Tampering with the pressure relief/drain valve will void the warranty.

The Combi furnace with supplementary indirect water heating must be installed with the Truma pressure relief/drain valve (Fig. 5) that complies with the standard for Relief Valves for Hot Water Systems, ANSI Z21.22.

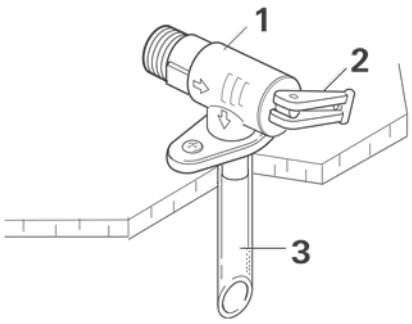


Figure 5

1. Truma pressure relief/drain valve
2. Lever
3. Drainage socket (extends through RV's undercarriage to outside)

OPENING THE TRUMA PRESSURE RELIEF/DRAIN VALVE

- Move the lever so that it is in the "draining" position (Fig. 6 – c). Water will drain from the hot water container via the drainage socket (Fig. 5 – 3).

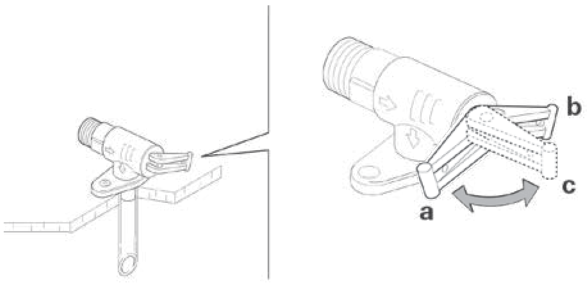


Figure 6

CLOSING THE TRUMA PRESSURE RELIEF/ DRAIN VALVE

NOTICE

DANGER OF DAMAGE TO THE COMBI AND THE RV DUE TO AN OBSTRUCTED DRAINAGE SOCKET!

The drainage socket (Fig. 5 – 3) must be unobstructed and kept clear of obstructions such as slush, ice, or leaves to ensure that water can drain properly. No warranty claims for frost damage will be accepted.

- Move the lever so that it is in the "closed" position (Fig. 6 – a or 6 – b)

  a,b = lever in "valve closed during furnace operation" position

  c = lever in "draining" position

Starting the Combi Furnace

⚠ WARNING

DANGER OF COMBUSTION AND DAMAGE TO PERSONS AND THE MOTORHOME!

- **Keep the area around the Combi furnace free from combustible materials, gasoline, and other flammable vapors or liquids.**
- **Switch the gas supply and the Combi furnace off:**
  - **if anything seems to be out of the ordinary.**
  - **if you smell gas.**
  - **if you move the motorhome.**
  - **before entering a gas station.**
  - **before entering a tunnel.**
  - **before entering a ferry boat.**

⚠ WARNING

DANGER OF OVER-TEMPERATURE AND TOXIC EXHAUST GASES!

- **Use with LP gas (propane) only. Butane or any mixtures containing more than 10 % of butane must not be used.**
- **Keep the air inlet and exhaust gas outlet free of obstructions. Do not lean any objects against the wall cowl on the RV or place any objects within a range of 2 feet (61 cm) of the wall cowl.**

INSPECTIONS BEFORE EACH USE

Check the Combi furnace for the following points before each use. In case of damage, contact an authorized Truma service provider and do not operate the Combi furnace.

- Inspect the furnace (Fig. 1 – A), exhaust venting system (Fig.1 – F), and wall cowl (Fig.1 – F) for damage. Verify that connections are tight and fasteners are secure.
- The wall cowl (Fig. 1 – F) for drawing in combustion air and emitting exhaust must be free from obstructions such as slush, ice or leaves. The furnace will not function properly if the combustion-air inlet or exhaust tube is partially or completely obstructed.
- The warm air outlets (Fig. 1 – H), the wall outlet vents (Fig. 1 – I) and the openings for the circulated air intake (Fig. 1 – D and Fig. 2 – 11) must be free from obstructions to ensure that the furnace functions properly. Any obstructions might cause the furnace to overheat. If this happens, the built-in temperature limiter will interrupt the flow of gas to the furnace. Once the furnace has cooled, it will switch on again automatically.
- Access to adequate quantities of LP gas (fuel inlet pressure 11 – 13 in. wc (27.4 – 32.4 mbar)) and 12 volts DC power must be available.

THE COMBI ECO PLUS AND COMBI COMFORT PLUS MODELS

NOTICE

DANGER OF DAMAGE TO THE POWER CORD DUE TO OVERHEATING!

If you use an extension cord on a cable drum to connect the motorhome to the campground power system, make sure the cord is fully extended.

- Make sure that the shore power voltage's fuse protection of the campground suffices for operating the furnace in electric mode. The furnace needs up to 1,700 watts (14.2 amps) in operating mode 2. If the

supply voltage's fuse protection is not sufficient, the furnace can be operated in operating mode 1 with up to 850 watts (7.1 amps).

Filling the Water Container

NOTICE

DAMAGE TO THE WATER CONTAINER!

The water pressure on the inlet side must be limited to 40.6 psi (2.8 bar), otherwise internal components of the appliance will be damaged. On (city) water connections with a pressure higher than 40.6 psi (2.8 bar) a pressure regulator is strongly recommended.

1. Close the pressure relief/drain valve, if open (refer to "Closing the Truma pressure relief/drain valve").
2. Close open bypass lines, if present.
3. Turn on the fresh water supply or switch on the water pump.
4. Fill the plumbing system:
   - Open all water-release points, e.g. cold and hot water faucets, showers, toilets.
   - Once water flows, the plumbing system is purged of air.

Switching on the Furnace

⚠ WARNING

SCALDING INJURIES CAUSED BY HOT WATER!

Water temperatures over 127 °F (52 °C) can cause severe burns or scalding and in extreme cases even death.

- **Before using a hot water faucet or using the shower, mix with cold water and allow the hot water to run until the water temperature no longer increases.**
- **Test the temperature of the water before placing a child in the bath or shower.**
- **Do not leave a child or an infirm person in the bath unsupervised.**

⚠ WARNING

SCALDING INJURIES CAUSED BY HOT AIR!

Ventilation air can reach 250 °F (121 °C) at the warm air outlet and it can cause severe burns or scalding and in extreme cases even death.

- **Always check the air temperature before varying the air throttle position (Fig. 1 – H).**

1. Switch ON the main battery disconnect switch.
2. If necessary, fill the water container with water (refer to "Filling the water container"). If no hot water is needed, the Combi furnace can be operated without being filled.
3. Make sure the supply of LP gas is turned on at the main gas valve.
4. Make sure the gas shut-off valve, on the Combi unit, is switched ON (refer to "Switch for gas shut-off valve").
   - Operation without gas supply is possible for the Combi eco plus and the Combi comfort plus (120 volt AC). The maximum heating power is then 1,700 watts.
5. Use the CP Plus control panel to switch on the Combi furnace (refer to the CP Plus manual for additional instructions).
   - There may be a variation between the temperature delivered from the Combi furnace and the temperature at the faucet due to water conditions or the length of pipe from the Combi furnace.
   - The presence of a flow restrictor in the hot water line may limit the water flow.
6. If using hot water:
   - Use the CP Plus control panel to select the desired water temperature level.
   - To obtain the desired water temperature at the faucet or in the shower, mix cold and hot water.
   - Make sure that the water temperature has stabilized before any person or animal enters the shower.
7. If using hot air:
   - Use the CP Plus control panel to set the desired room temperature.

NOTE: For the furnace to work properly, there must be enough LP gas (propane >11 in. wc) and 12 volts DC power. Optionally, for electric or mixed mode with the Combi eco plus and Combi comfort plus, an additional 120 volts AC power supply is needed.

Switching Off the Furnace

1. Switch off the Combi furnace using the CP Plus control panel. Due to internal processes, it may take some time until the furnace is completely shut down.
2. If the Combi furnace and any other gas-powered device is not needed anymore, turn OFF the LP main gas valve.
3. Switch off the Combi furnace's electrical power supply (main battery disconnect switch, unless other 12 volt devices are being used.
    - If you intend to put the RV into storage or if you switch off the Combi furnace during freezing temperatures, refer to the "Winterizing" section.

Draining the Water Container

NOTICE

DAMAGE TO THE COMBI FURNACE CAUSED BY FREEZING!

The Combi furnace does not have a frost-protection function. The water container must be drained if the motorhome will not be used whenever there is a risk of frost.

No warranty claims for frost damage are accepted by the manufacturer or Thor Motor Coach.

To make sure that all water drains properly from the water container, place a big enough vessel underneath the drainage socket of the pressure relief/drain valve (> 2.64 gallons (10 liters)).

1. Use the main battery disconnect switch or pump switch to switch off the power to the water pump.
2. Turn off or disconnect the city water connection, if present.
3. Open all water release points, e.g. cold and hot water faucets, showers, toilets.
4. Open the pressure relief/drain valve (refer to "Opening the Truma pressure relief/drain valve").

The water container will drain via the drainage socket of the pressure relief/drain valve.

NOTE: This procedure will not drain the entire water system. Refer to Winterizing in the Water Section of your Owner's Manual, or the TMC Water System Guide.

Winterizing

NOTICE

SEVERE DAMAGE TO THE PLUMBING COMPONENTS AND THE COMBI FURNACE IS POSSIBLE!

- **Damage due to freezing or an unsuitable winterizing fluid is not covered by warranty.**
- **Follow the recommendations below if the Combi furnace will be stored under freezing conditions or for an extended period of time.**
- **Winterize the Combi furnace at the start of the winter season or before traveling to a location where freezing conditions are likely.**

For winterizing, drain the Combi furnace, refer to "Draining the water container" on page 13.

After draining the water, the Combi furnace is protected against freezing conditions.

OPTIONAL: WINTERIZING THE RV WITH A WINTERIZING FLUID

1. Drain the water container (refer to "Draining the water container" on page 13).
2. Turn the valves of the bypass kit according to the supplier's or RV manufacturer's guidelines.
3. Flush the water system with a suitable winterizing fluid according to the supplier's or RV manufacturer's guidelines.
    - Before using the Combi furnace again in hot water mode, remove the winterizing fluid and flush the water system with potable water.

NOTE: Winterizing the RV with a winterizing fluid is only possible with an installed bypass kit (not in scope of supply), refer to the RV manual.

Winter Operation

To operate the Combi furnace in potentially freezing conditions, the following requirements must be ensured:

- There must be sufficient LP gas (propane; fuel inlet pressure 11 – 13 in. wc (27.4 – 32.4 mbar)) in the tank.
- In addition, the Combi eco plus and Combi comfort plus models require a supply voltage of 120 V if they are to be operated in electric or mixed mode.
- For hot water operation, the water container must be filled (refer to “Filling the water container” on page 12). You must leave the furnace powered ON whenever freezing might occur.

Winter operation will not protect the RV’s entire plumbing system. The RV must be prepared for freezing conditions. Refer to 'Cold Weather Use of the Water System,' contained in the Water Section of your Owner's Manual.

Maintenance and Service

Refer the manufacturer's instructions for maintenance and service details.

Truma CP Plus Furnace/Water Heater Controller

⚠ WARNING

Use the CP plus control panel only when it is in a technically sound condition.

- **Have a specialist immediately remedy any malfunctions. Remedy the malfunction yourself only if a remedy is specified in the troubleshooting chart in these operating instructions.**
- **Have a defective CP plus control panel repaired only by the manufacturer or its service department.**
- **Any alteration to the appliance or its controls can be dangerous and will void the warranty.**

Your Combi Furnace/ Water Heater is operated by a panel-mounted controller, identified as the CP Plus Control Panel. Depending on the floorplan of the motorhome, this control panel is typically mounted on the kitchen cabinetry.

Water heater/furnace wall-mount controller

IMPORTANT! Read and follow the manufacturer’s instructions regarding safety, operation, maintenance, and winterization of the furnace/water heater and CP Plus Control Panel.

Description

- A rotary push button (8) is used to select menu items in the menu lines (3 + 4) and to adjust settings.
- Information is shown on a back-lit display (1).
- The Back button (9) is used to go back to a previous menu.

Display and Operating Elements

Figure 1

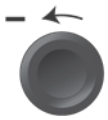
1 Display
2 Status line
3 Menu line (top)
4 Menu line (bottom)
5 Power supply display - 120 volts AC shore power
6 Time switch display
7 Settings/values
8 Rotary push button
9 Back button

ROTARY PUSH BUTTON

The rotary push button (8) is used to select and change set-points and parameters; it is then tapped to save the values. Selected menu items flash.

Turn clockwise

- The menu is scrolled through from left to right
- Increase values (+)



Turn counterclockwise

- The menu is scrolled through from right to left
- Reduce values (-)

Tap

- Save a selected value
- Select a menu item, go to the setting level

Press (3 seconds)

Main switching function – control panel on/off

BACK BUTTON

Press the Back button (9) to go back to a previous menu and cancel settings. This means that the previous values remain unchanged.

NOTE:

- If there is an interruption to the power supply, the clock has to be reset.
- If a new furnace is connected to the bus system of the control panel, repeat the procedure described in “Initial start-up”.

Initial Start-up

PERFORM THE FOLLOWING STEPS FOR INITIAL START-UP:

- Switch on the 12 VDC power supply of the control panel and the furnace. With Truma Combi eco plus and Truma Combi comfort plus, also switch on the 120 VAC power supply (mains supply).
- Start searching for the furnace in menu item “Settings” –> “RESET” –> “PR SET”.

When you have confirmed the selection, the control panel is initialized. During this process, “INIT ..” is shown on the display. The recognized furnace is recorded in the control panel.

Start-up

START/STAND-BY SCREEN

When the control panel is connected to the power supply, after a few seconds a start screen is displayed.

- After repairs or upgrades, the procedure described in “Initial start-up” has to be repeated.
- The first time you switch on the control panel, any Truma Combi device that is connected is not switched on automatically.

Control Panel On/Off

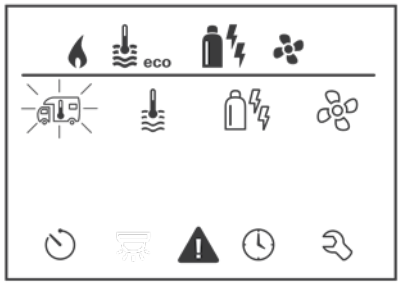
Press the rotary push button (8) for more than 3 seconds.

- Previously set values and operating parameters are active again when the panel is switched on.
- When you switch off the control panel, any Truma Combi device that is connected is also switched off automatically.
- Because of internal time lags for the heating, the switching-off process can take a few minutes.

Select Setting Level

Tap the rotary push button (8).

- The display shows the setting level. The first icon flashes

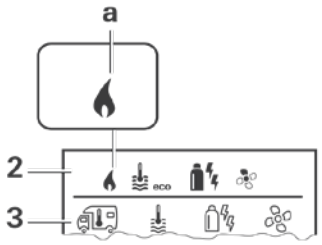


Functions

The functions of menu lines (3, 4) of the CP plus control panel can be selected in any sequence. The operating parameters are shown in the status line or in the displays (5, 6).

Change Room Temperature

- Use the rotary push button (8) to select the icon in the menu line (3).
- Tap the button to go to the setting level.
- Select the desired temperature with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.



Adjustable temperature range:

Temperature display	Range	Increments
Fahrenheit	40-86° F	1° F
Celsius	5-30° C	1° C

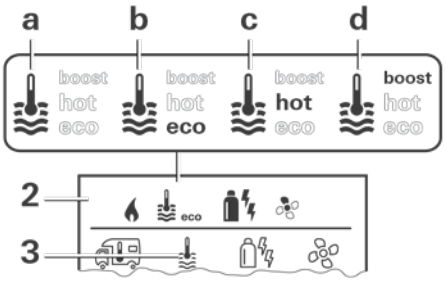
a = Furnace* is switched on

* This icon flashes until the desired room temperature is reached.

- The temperature can be changed quickly using the rotary push button (8) (on the stand-by screen).

Change Hot Water Level

- Use the rotary push button (8) to select the icon in the menu line (3).
- Tap the button to go to the setting level.
- Select the desired hot water level with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.



a = Boiler*
b = eco**
c = hot
d = boost*

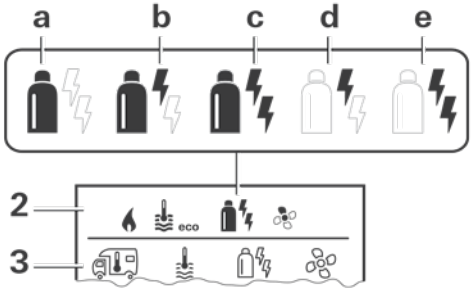
- Hot water generator is ON.
- Water temperature 1040 F (400 C).
- Water temperature 1400 F (600 C).
- Boiler content is heated quickly (boiler priority) for up to 40 minutes. The water temperature is then kept at the higher level (about 1440 F (620 C) for two subsequent heating cycles. When the water temperature is reached, the room is heated again.

* This icon flashes until the desired water temperature is reached.

** The water temperature 104 °F (40 °C) can be kept in "Heating and hot water mode" for a limited time only (heating priority).

Select Energy Mode

- Use the rotary push button (8) to select the icon in the menu line (3).
- Tap the button to go to the setting level.
- Select the desired energy mode with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.



Icon	Operating Mode	Energy Mode
a	LP gas	LP gas
b	MIX 1 *	Electricity 850 W + gas
c	MIX 2 *	Electricity 1700 W + gas
d	EL 1 *	Electricity 850 W
e	EL 2 *	Electricity 1700 W

* Mixed mode and electricity mode Possible only with Truma Combi eco plus and Truma Combi comfort plus furnaces with electric heating elements.

When the furnace is switched on (room temperature, hot water level active), the energy mode selected in the previous heating process is shown in the status line. The factory setting is gas.

SPECIAL FEATURES IN MIXED MODE

- Interruption in the 120 VAC power supply:

  The furnace automatically switches to gas mode. When the 120 VAC power supply is restored, the furnace automatically switches back to mixed mode.

- Fault in combustion process (e.g. fuel shortage):

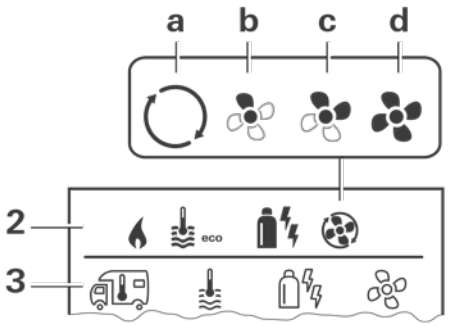
  The furnace automatically switches to electric mode. If the furnace is to run in mixed mode again, the cause of the malfunction must be remedied and the furnace has to be started again by going to the menu item 'Malfunction' and pressing the rotary push button. See Malfunction.

SPECIAL FEATURES IN ELECTRICITY MODE

- When the 120 VAC power supply is interrupted and the 12 VDC supply is on, an error code is displayed on the control panel.
- When the 120 VAC power supply is reconnected, the furnace will restart automatically with the previous settings without any user interaction. The error code on the control panel will disappear.

Select Fan Speed

- Use the rotary push button (8) to select the icon in the menu line (3).
- Tap the button to go to the setting level.
- Select the desired fan speed with the rotary push button (8).
- Confirm with the rotary push button (8).



Icon	Operating Mode	Description
–	OFF	Fan is switched off (can be selected only if furnace is switched off)
a	VENT *	Circulating air, if furnace is switched off. Speed can be selected in 10 increments
b	ECO	Low fan speed
c	HIGH **	High fan speed
d	BOOST	Fast room heating. Available if the difference between the selected and the current room temperature is >180 F (100 C)

* Can increase wear and tear on the motor, depending on how often it is used.

** HIGH fan speed uses more electricity, is louder, and increases wear and tear on the motor.

When the furnace is switched on (room temperature, hot water level set), the fan speed selected in the previous heating process is shown in the status line (2). The factory setting is ECO.

Set the Time Switch

⚠ WARNING

RISK OF CARBON MONOXIDE POISONING!

The enabled time switch turns the furnace on, even when the recreational vehicle (RV) is parked. The exhaust gas from the furnace can cause poisoning in enclosed spaces (e.g. garages, repair shops).

If you park the RV in an enclosed space:

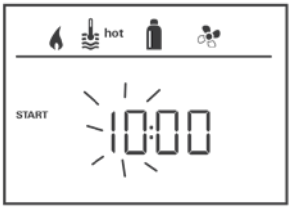
- **Shut off the gas feed to the furnace.**
- **Disable the time switch (OFF).**
- **Switch the furnace off. (On the Truma CP plus control panel, press the rotary push button (8) for 3 seconds.)**

- The time switch can be selected only if the clock was set on the control panel.
- If the time switch is ON, the “Disable time switch (OFF)” menu is displayed.
- Use the rotary push button (8) to select the icon in the menu line (4).
- Tap the button to go to the setting level.

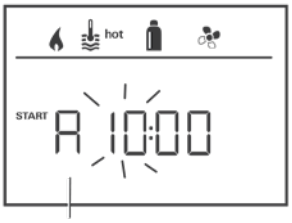
ENTER THE START TIME

- Use the rotary push button (8) to set the hours and then the minutes.

24 h mode



12 h mode



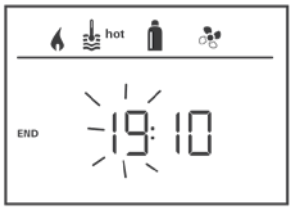
A = a. m.
P = p. m.

- If the start/end time is later than the time when you entered the settings, the operating parameters are not active until the next start/end time is reached. Until then, the operating parameters set outside the time switch remain valid.

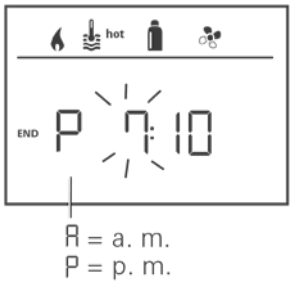
ENTER THE END TIME

- Use the rotary push button (8) to set the hours and then the minutes.

24 h mode



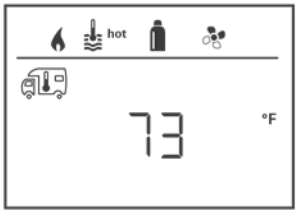
12 h mode



- If the start/end time is later than the time when you entered the settings, the operating parameters are not active until the next start/end time is reached. Until then, the operating parameters set outside the time switch remain valid.

SET THE ROOM TEMPERATURE

- Select the desired room temperature with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.



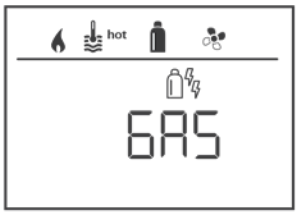
Example: Temperature display in ° F

SET THE HOT WATER LEVEL

- Select the desired hot water level with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.

SELECT ENERGY MODE

- Select the desired energy mode with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.
- The “Select energy mode” menu is displayed only if a furnace with electric heating elements is connected (Truma Combi eco plus or Truma Combi comfort plus).



SELECT FAN SPEED

- Select the desired fan speed with the rotary push button (8).
- Tap the rotary push button (8) to confirm the value.
- The “Select fan speed” menu is displayed only if the room temperature was set.

ENABLE THE TIME SWITCH (ON)

- Enable the time switch (ON) with the rotary push button (8)
- Tap the rotary push button (8) to confirm the value.
- The time switch remains enabled, even for several days, until it is disabled (OFF). If the time switch is programmed and enabled, the time switch icon is shown in the status line (2). If the time switch is active, the icon flashes.

DISABLE THE TIME SWITCH (OFF)

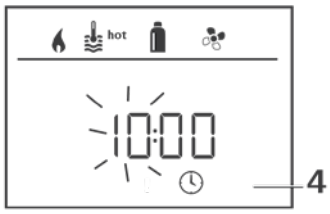
- Tap the rotary push button to go to the setting level.
- Disable the time switch (OFF) with the rotary push button (8)
- Tap the rotary push button (8) to confirm the value.

Set Clock

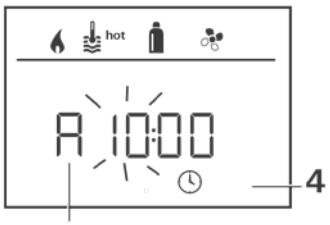
- Use the rotary push button (8) to select the “Set clock” icon in the menu line (4).

  The hour display flashes.
- Use the rotary push button (8) to set the hour.
- Tap the rotary push button (8) again and the minute display flashes.
- Use the rotary push button (8) to set the minutes.
- Tap the rotary push button (8) to confirm the value.

Display 24 h mode



Display 12 h mode



Settings

- Use the rotary push button (8) to select the “Settings” icon in the menu line (4).
- Tap the button to go to the setting level.

SHOW VERSION NUMBER OF CONNECTED DEVICES

- Display the version number of furnace and control panel.

BACKLIGHTING

- Change the backlighting of the CP plus control panel in 10 increments.

LANGUAGE

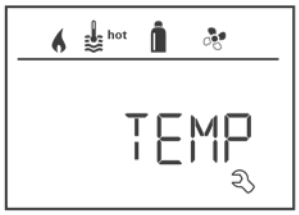
- Select the desired language (English, German, French, Italian).

12 H / 24 H MODE

- Display in 12 h (a. m., p. m.) / 24 h mode.
- Default 12 h mode.

5°C / °F TEMPERATURE DISPLAY

- Select temperature display °C (Celsius) or °F (Fahrenheit).
- Default °F (Fahrenheit)



CALIBRATE TEMPERATURE SENSOR (OFFSET)

The temperature sensor of the connected furnace can be adjusted individually to suit the size of the vehicle.

- Default ° F (Fahrenheit)

Setting the offset:

Temperature display	Increments	Range
° F (Fahrenheit)	1	± 10° F
° C (Celsius)	1	± 5° C

FACTORY SETTING (RESET)

The reset function resets the control panel to the factory settings. All your settings are deleted. Newly connected devices are recognized and recorded in the control panel.

- Switch on the 12 VDC power supply of the control panel and the furnace. With Truma Combi eco plus and Truma Combi comfort plus, also switch on the 120 VAC power supply (mains supply).

RESET

- Select RESET with the rotary push button (8).
- Tap the rotary push button (8).
- PR SET is shown in the display.
- Tap the rotary push button (8) to confirm.

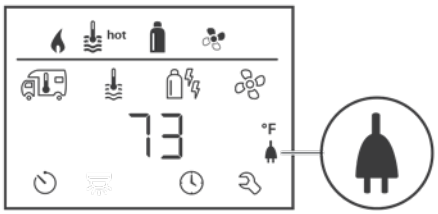
When you have confirmed the selection, the control panel is initialized.

During this process, INIT... is shown in the display.

Display power supply 120 VAC

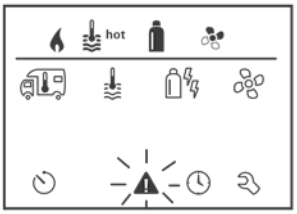
The icon shows that the 120 VAC power supply (mains supply) is available.

- The icon is displayed only in combination with a Truma Combi eco plus or Truma Combi comfort plus.



Warning

This icon indicates that an operating parameter has reached an undefined status. In this case, the furnace continues to operate. When the operating parameter returns to the set range, this icon extinguishes automatically.



DISPLAY WARNING CODE

- Select the icon with the rotary push button (8).
- Tap the rotary push button (8). The code of the current warning is displayed. The troubleshooting chart can be used to determine the cause of the warning and remedy the error.

W = Warning
42 = Error Code
H = Furnace

CAUSE REMEDIED / RETURN TO SETTING LEVEL

Tap the rotary push button (8).

CAUSE NOT REMEDIED / RETURN TO SETTING LEVEL

Press the Back button (9).In this case, the warning is not acknowledged in the control panel and the icon remains. The furnace remains in warning status.

Malfunction

In case of a malfunction, the control panel immediately goes to the menu level "Malfunction" and displays the error code of the malfunction.

The troubleshooting chart can be used to determine the cause of the warning and remedy the error.

E = Malfunction
112 = Error Code
H = Furnace

CAUSE REMEDIED / RETURN TO SETTING LEVEL

Tap the rotary push button (8).

The furnace is restarted. This may take a few minutes because of internal time lags of the connected furnace. If the cause was not remedied, the malfunction will occur again and the control panel will again go to the "Malfunction" menu level.

CAUSE NOT REMEDIED / RETURN TO SETTING LEVEL

Press the back button. In this case, the malfunction is not acknowledged in the control panel and the icon remains. The furnace remains in the malfunction status.

Maintenance

- This control panel is maintenance-free.
- To clean the front, you can use a non-abrasive cloth moistened with water (and a neutral soap solution).
- For additional operational and maintenance information, refer to the manufacturer's instructions regarding this controller.

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. Chlorine is poisonous to humans and animals. Keep children and pets away from area when performing sanitization procedures.

NOTICE

DO NOT CONNECT TO A CITY OR AN EXTERNAL WATER SUPPLY WHILE PERFORMING THIS PROCEDURE. The fresh water holding tank could be bypassed, preventing proper sanitization and flushing of the fresh water system.

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.

Sanitizing will help keep your water system fresh, safe, and discourage the growth of viral and bacterial contamination.

The fresh water system must be sanitized and disinfected:

- Upon delivery of the motorhome;
- At least once per year during continuous use;
- Prior to using the motorhome after it has been unused for prolonged periods of time;
- And, if you suspect the fresh water system has been contaminated in any way.

DO NOT POUR BLEACH STRAIGHT INTO THE FRESH WATER HOLDING TANK. Chlorine bleach must be diluted with clean, fresh water before it can be used as a safe sanitizing agent.

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.

Examples:

Prepare 2-2/3 gallons of solution for a 40 gallon tank.

Prepare 3-1/3 gallons of solution for a 50 gallon tank.

Prepare 5-1/3 gallons of solution for an 80 gallon tank.

Prepare 6-2/3 gallons of solution for 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.

1. Turn off the water heater at the main switch and close the LP tank valve. **BYPASS THE WATER HEATER. CHLORINE CAN DAMAGE WATER HEATER COMPONENTS!**
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.
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-of the fresh water tank again.

   Allow the system to stand undisturbed for at least 3 hours.

After the time period has ended:

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. Close all drain valves and faucets and fill the fresh water tank as you normally would. Make sure the water system is purged of air
10. If chlorine is still detected, empty the fresh water holding tank and refill.
11. Finally, close the water heater bypass valve(s) and confirm that the water heater's storage tank is full before turning on the water heater.

NOTES:

- 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.
- 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.

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 system.
   - Locate and OPEN the drain valve for the fresh water holding tank
   - Locate and OPEN the low point drain valves for both the hot and cold water lines.
2. Remove or by-pass the potable (drinking) water filter (if equipped).
3. Disconnect and cap (or by-pass) the:
   - Refrigerator ice maker inlet water line (if equipped)
   - Dishwasher inlet line (if equipped)
   - Clothes washer inlet line (if 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 water heaters have both 12 volt DC and 120 volt AC heating elements.
5. Turn OFF the gas valve at the water heater or turn off the power to tank-less water heater (if equipped).
6. Turn the water heater bypass valves (if equipped) to the BYPASS or WINTERIZE position. (A tank-less water heater may not have bypass valves).

   NOTE: DO NOT allow antifreeze to enter the water heater; it can damage water heater components
7. Drain the water heater tank. CAUTION: water may be HOT.
8. Close the fresh water holding tank drain valve and both low point drains valves.
9. Attach a short length of water hose to the city water fill (6 to 8 foot) 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, place the container on an object so that it is 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.

    NOTE: Allow enough antifreeze to flow so that the drain traps are filled with antifreeze.
13. Pour a cup-full of antifreeze down the shower drain.
14. Flush the toilet a few times until antifreeze appears in the bowl.

When you are done adding RV antifreeze:

15. Remove the hose from the city water fill port.
16. To prevent staining, wipe the RV antifreeze out of the sinks, shower, and toilet using a soft, dry cloth.

De-winterizing Your Motorhome

1. Drain the holding tanks (fresh, grey, and waste water tanks).
2. Open the low-point drain valves and drain the water lines of antifreeze. 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 potable water 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.
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 (the water heater bypass valve must NOT be in the BYPASS position for normal water heater operation).

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.

Water System Use in Cold Weather

⚠ DANGER

Do not use gas appliances for comfort heating.

Can lead to carbon monoxide poisoning, which can lead to death or serious injury.

⚠ CAUTION

Always be very cautious when using the motorhome's water system in freezing temperatures. Freezing water can severely damage water system components.

Take actions to prevent freezing to pipes, plumbing, and other water system components.

NOTICE

Operate holding tank heating pads only when the inside temperature of the motorhome is expected to reach 40°F or below.

Operate heating pads only if there is at least a small volume of fluid (a few gallons) in the holding tanks. Damage to the pads or bottom of the storage tanks could occur if fluid is not present.

Holding tank heaters will not protect other water system components from freeze damange. To protect water lines and other components (if the water system is not winterized), operate the furnace when the inside temperature is expected to be below 40°F and set the furnace to maintain at least 40°F inside temperature. Open cabinets doors to allow warm air to circulate around plumbing pipes and fixtures.

Be sure to prevent freeze damage to the water heater. Either operate the water heater or ensure the water heater's tank is drained when encountering outside temperatures at or below 32° F.

The best method of preventing freeze damage to the water system is to winterize the water system.

Freeze damage to the water system or any component of the water system is not covered under TMC's limited warranties.

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 of the water system in severely cold weather is not recommended. However, winter traveling can be safe for your motorhome's water system if you follow a few precautions.

- 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). 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 weather below freezing, 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 your motorhome is left unheated for any length of time in cold weather conditions, you must winterize the water system. This includes draining the holding tanks, water supply lines, and water heater. Use RV antifreeze to protect water and drain lines that may still contain water. Refer to the system winterizing procedures outlined in this manual.

- In cold weather conditions, it may be best to carry cooking and drinking water with you in plastic bottles or jugs instead of using the on-board fresh water system. If you decide to use bottled 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.

HOLDING TANK HEATERS (IF EQUIPPED)

Some TMC motorhomes are equipped with water holding tank heaters. These devices are heat-pads installed underneath the tanks and are manually activated by a switch, usually located on the main monitor panel or multiplex main touch-panel. Activate holding tank heaters whenever encountering sub-freezing temperatures. Other TMC motorhomes may be designed with furnace heating ducting directed to the water storage bays, which is designed to effectively prevent freeze damage to the water storage tanks. Ask your dealer if your motorhome is equipped with supplemental water storage tank freeze protection.

NOTES:

- When operating your propane system in sub-freezing conditions, regulator freeze-up is possible, which can disrupt the gas flow. Ensure the on-board propane gas supply contains anti-freezing properties.
- Anti-freezing properties of the on-board propane will ensure proper operation of your furnace, water heater and other gas appliances. Consult with your propane dealer about the anti-freezing properties of the propane you purchase.
- For additional information on your motorhome's water system, refer to the Winterizing Quick Start Guide and the TMC Water Systems Guide available through the TMC Owners Resource on-line document service.

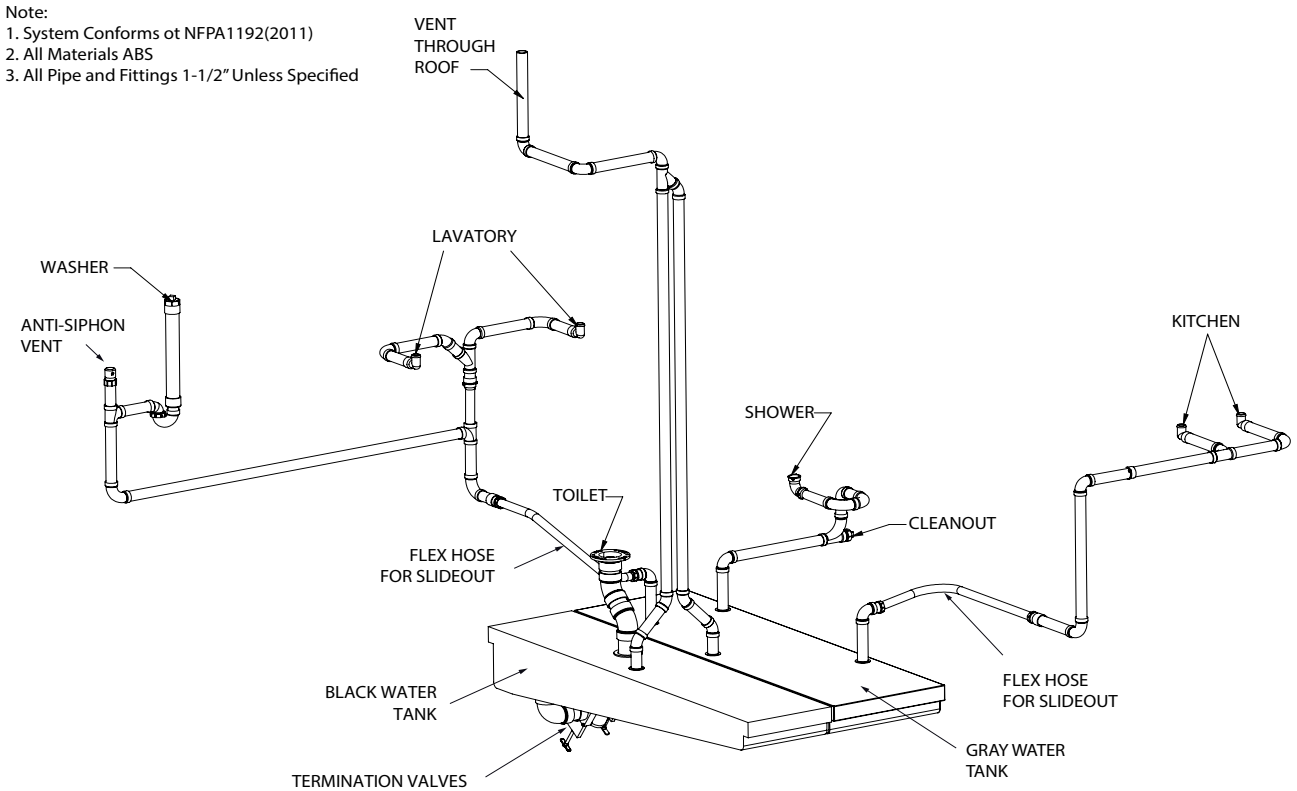
Waste Water System

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

- 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 motorhome models bathroom sinks may be plumbed to drain into the black tank instead of the gray tank.



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

NOTICE

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

Waste Water Pipes and Vents

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.

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.

Drain 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).

P-trap drain

Typical HEPVO valve drain valve

Typical drain vent caps

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

Typical anti-siphon vent (ASTVD)

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, loose 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.

Bathroom Toilet

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.

Typical motorhome toilet installation

The toilet(s) installed in your motorhome are designed to provide convenient an 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:

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

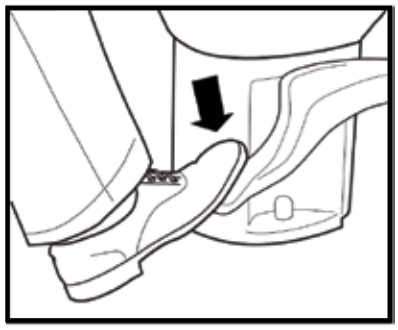
2. To flush, depress the lever or pedal all the way, which opens the waste valve and evacuates the bowl to the black tank. Hold down the lever (pedal) until rinse water clears waste from the bowl. Be sure to release the lever or pedal slowly.

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.

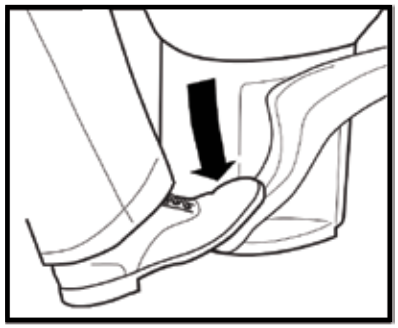
Follow the toilet manufacturer's recommendations supplied with the toilet for cleaning, troubleshooting, and maintenance. If you have a toilet that differs from the description given here, make sure to follow the manufacturer's operating instructions.

Toilet Flushing Procedure:

1. Depress lever 1/2 way to add fresh water to toilet bowl.



2. After using toilet, depress lever to the floor, which rinses the bowl with fresh water and opens the waste valve, flushing waste into the black water holding tank.



NOTES:

- IMPORTANT - Only use RV or Marine toilet paper with your motorhome's waste system. These paper products are specially formulated to break-down more readily than standard toilet paper products and help prevent waste system clogging.
- Do not flush hygiene, paper towels, plastics, or other non-biodegradable wastes into the waste water system.
- The toilet manufacturer may also recommend using particular cleaning products or chemicals that deodorize or aid waste decomposition.

Macerator Toilet and Pump

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 or macerator toilet to operate as intended.

Several TMC motorhome models 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 uses where a bathroom toilet is installed in a slideout, making toilet wastes easily pumped into the black water holding tank.

Macerator Toilet Operation:

1. **Turn on water supply** (on-board water pump or city water).

2. **Add water to the toilet bowl**. Press ADD WATER switch (**1**) and hold until desired water level is achieved. Do not overfill (or overflow) the bowl.

3. **Flushing Toilet**. Press FLUSH switch (**2**) down and hold for a few seconds after waste drains from toilet bowl (about 5 seconds). This switch activates a built-in macerator pump that siphons water and waste from the bowl, macerates, and propels effluent through the discharge line/holding tank. To use less water for liquid-only flushes, press FLUSH switch for a shorter period of time.

4. **Dry Bowl Operation**. During periods of rough travel, water in a toilet bowl can splash out and onto the bathroom floor. To avoid this situation, press DRY BOWL switch (**3**) to drain water completely from toilet bowl. Water is not added to bowl during or after pressing the DRY BOWL switch.

Turbo Macerator Pump

NOTICE

DO NOT operate the macerator pump in recirculating mode when the black tank is empty. Only operate the macerator pump in recirculating mode when the level of the black tank is at least 1/3 full. This will ensure the pump mechanism is not damaged by operating in a dry condition.

In some Class A and Class C motorhome sewage system applications, a turbo macerator pump is installed and used as a recirculating pump for the black water waste tank. As it performs this function, it is reducing waste solids to very fine particles, thus decreasing the chance of waste solids build-up on the tank surfaces and tank level sensors. If this function is available, there will be a macerator-recirculating switch located on a bathroom wall switch panel, along with a switch located near or on the outside water control panel.

TO OPERATE:

1. Always add a few gallons of water back into the black tank after emptying the holding tank. Doing this step ensures the turbo macerator pump has enough liquid to operate correctly.

Typical 12 volt Macerator Pump

Typical 12 volt Macerator Toilet

This can be easily accomplished by holding down the toilet flush for 1 minute (both the master battery switch and water pump must be ON).

2. After using the toilet, operate the turbo macerator pump for 5-10 seconds, or longer if needed. This will chop and recirculate the sludge to the deep end of the black holding tank.

NOTE: Be sure the flush valve on the toilet is closed when operating the turbo macerator pump. If not, toilet waste can splash back through the open valve.

DUMPING HOLDING TANKS:

When dumping the holding tanks, operate the turbo macerator pump for a minute or so before emptying the black water tank. After dumping the tanks **and** while using the black tank flush system (San-T-Flush), operate the turbo macerator pump for a few seconds. This will help rinse the turbo blades with fresh water. **DO NOT to operate the turbo macerator pump with a dry black tank**.

WINTERIZING TIPS:

When Winterizing the waste water storage system, pour 1/2 gallon of RV antifreeze into the black tank, via the toilet, and operate the macerator pump for a few seconds. This will ensure some antifreeze solution will get into the pump housing and prevent freeze damage to the pump. This instruction applies to both the standard macerator pump and the turbo (recirculating) macerator pump.

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

NOTES:

- IMPORTANT - Only use RV or Marine toilet paper with your motorhome's waste system. These paper products are specially formulated to break-down more readily than standard toilet paper products and help prevent waste system clogging.
- Do not flush hygiene, paper towels, plastics, or other non-biodegradable wastes into the toilet or waste water system.
- Avoid pouring grease, cooking oils, and food particles down the sinks. These materials can create clogs in the gray water holding system.
- The toilet manufacturer may also recommend using particular cleaning products or chemicals that deodorize or aid waste decomposition.

Waste Water Holding Tanks

⚠ CAUTION

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

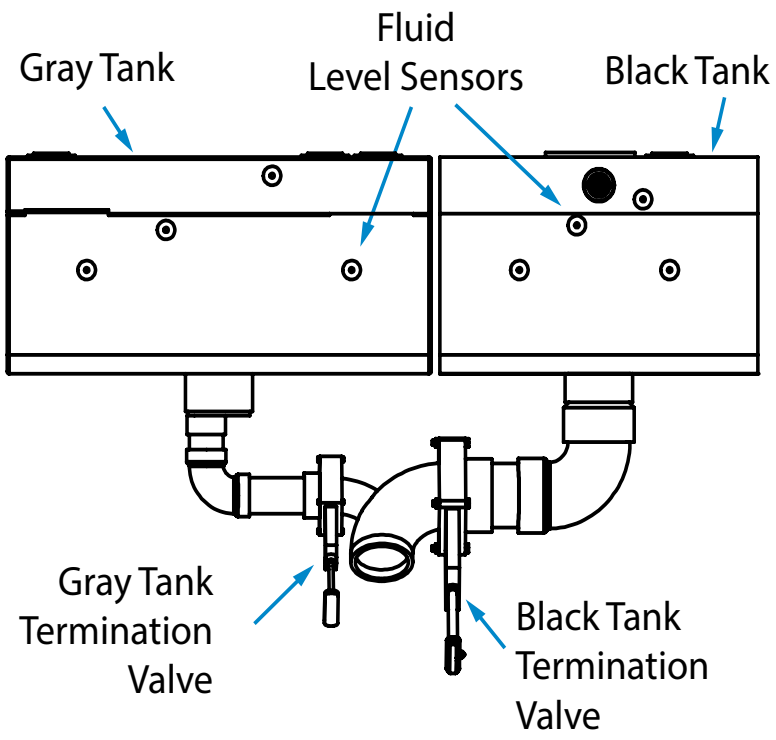


Illustration of a typical termination valve layout. The larger slide-valve is always the black waste water termination valve.

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.

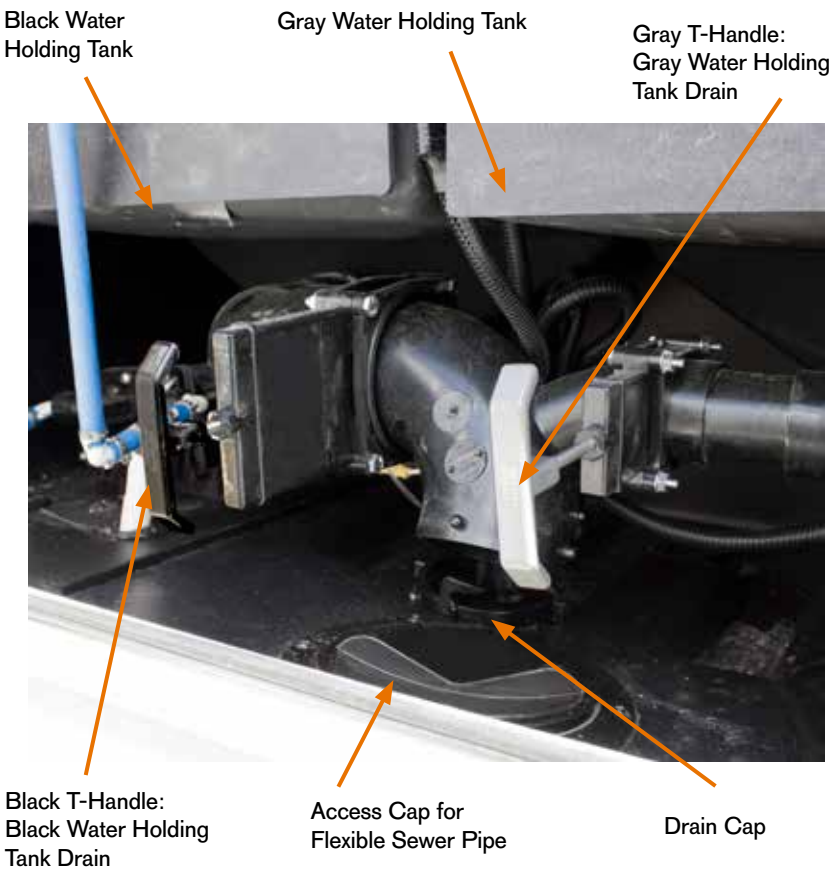
3. Sewer holding tank flush attachment. Attach the city pressure hose and allow the water to flow for three minutes. Refer to the Dumping the Holding Tanks section of this guide.

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: Flexible sewer hoses are not typically supplied by TMC. Your dealer should be able to help with selecting a suitable sewer hose.



Typical Termination Valve Compartment

Typical Class C termination valve layout

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.

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.

Termination valve components

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.

Dumping Waste Water Holding Tanks

⚠ 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.

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.

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.

Preparation

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

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.

Holding Tank Dumping Procedure

⚠ CAUTION

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

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 or place the end of the flexible sewer hose into the dump station inlet first! Insert the end of the sewer hose into the dump station's inlet 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 inlet's cover, a rock, or something heavy enough to hold the sewer hose in place so it doesn't pop out of the inlet (Do not use an object that is small enough that it could fall into the inlet pipe 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.

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.

Typical black tank flush

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.
   - If your motorhome is equipped with a turbo macerator pump, operate the pump for a few seconds while fresh water is still rinsing the tank. This will help clean the chop blades of the pump.

7. After flushing the tank, shut off the water and disconnect the garden hose from the flush port. Keep the other end of the hose attached to the water supply; you may need it to rinse off you 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 splashing out the flush port.

NOTE: If the RV does not have a black tank rinse system, you can use fresh water from the toilet to help rinse the black tank.

With the black tank termination valve OPEN, ask your partner to flush the toilet, holding the flush valve open for a minute or so. This will place several gallons of fresh water into the black tank; aiding in the rinsing action. This step may need to be done several times, so please be sensitive to others waiting to use the dump station facilities.

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.

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.

NOTE: Soapy residue can also build up in the gray water tank. Periodically, flush and rinse the gray water tank by placing several gallons of fresh water into it after it's initial dumping.

This can easily be accomplished by opening a cold water faucet (kitchen or bath), along with turning ON the on-board water pump. Let water run for a few minutes, then turn off the faucet (and water pump) and 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.

Stowing Sewage-Related Items

Always stow sewage-related equipment and supplies in a segregated place or separate container 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.

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.

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
- In-line water pressure regulator (for city water hook-up)
- In-line fresh water filter (for filling fresh water tank and city water hook-up)
- 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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