Patriot Pro 1.0 - 2.9

Owners Manual

Intermountain Water
Manufacturing Excellence Since 1966
1-800-454-3429

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How your Patriot Pro Water System Works

Every day, thousands of billions of tons of water evaporate from the earth's surface.

As the heat of the sun evaporates the water and draws it from the earth's surface into the atmosphere, many impurities are left behind. The water vapor eventually cools to form clouds and then falls back to earth as precipitation. On it's way from the clouds to your faucet, soft rain water dissolves and absorbs a part of almost everything is passes. The falling rain cleans the air as it falls. Unfortunately the impurities that were removed from the air have not left us, they have just been relocated through the water onto the ground.

Gases and other contaminants cause undesirable tastes, colors and odors.

Water falls upon the ground, collecting sediments like rust, sand and algae. The water eventually finds its way to a surface water supply or percolates downward and collects in an aquifer. As it percolates through the earth, the water can absorb hardness minerals, iron, heavy metals, radioactivity, organic contaminants, and many other complex elements and compounds.

Water can also collect numerous harmful man-made chemical impurities throughout this cycle. These chemicals are generally odorless, colorless, tasteless and can often be life-threatening. The statement, "my parents drank this water for 75 years and it never killed them", is no longer a valid excuse to not be concerned with water quality.

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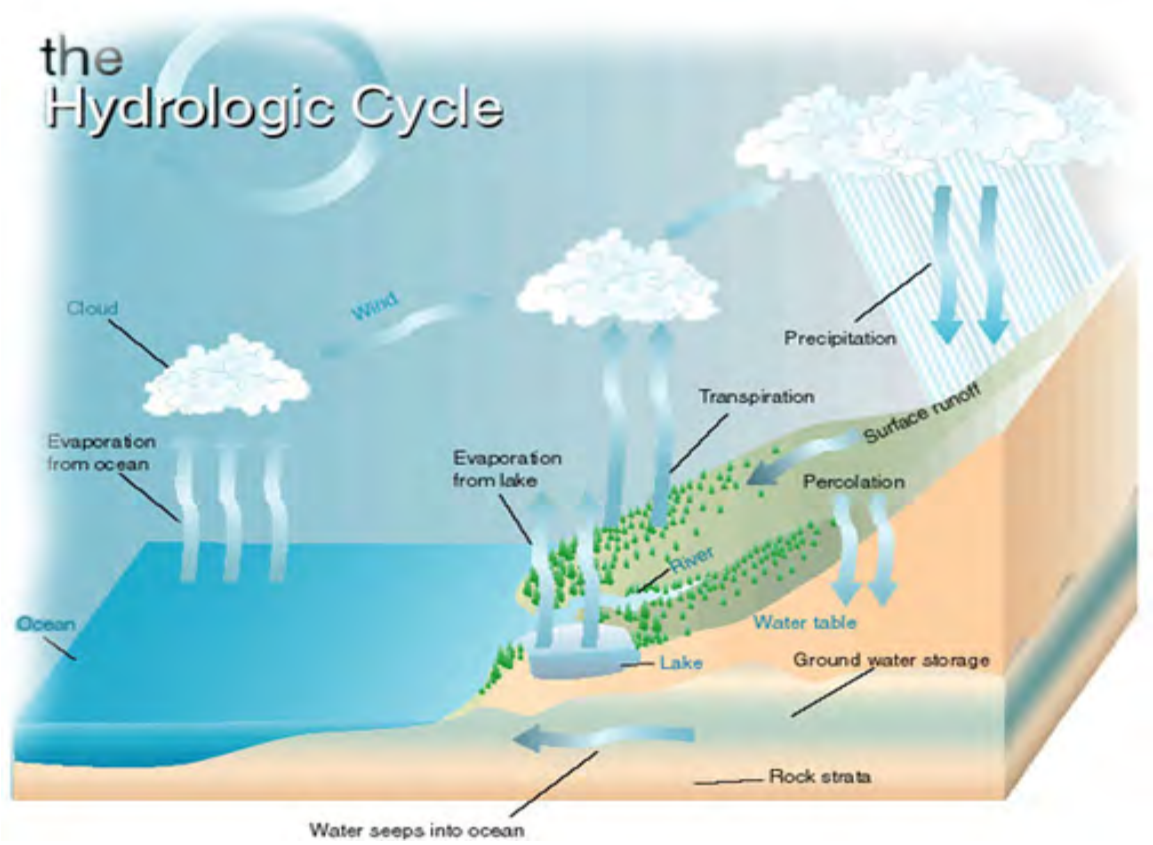

There has been a massive global increase in harmful chemical waste over the last 50 years.

The scientific and medical community has not had time or the ability to study the long-term health effects of the more than 70,000 harmful chemicals that can be found in use today.

Approximately 1,000 new synthetic chemical compounds are entering the industrial marketplace each and every year. Precipitation falls upon commercial and municipal dumpsites, toxic waste sites, industrial refuse depots, military test sites, leach fields, mining operations, farmers fields etc... Where it dissolves minute amounts of the toxic chemicals present and carries them along.

The United States Government estimated in 1986 that close to two percent of the nation's ground water supplies were moderately polluted by sources such as hazardous waste dumps and leaking landfills.

Industrial wastewater is also a major source of water contamination. When certain chemicals come in contact with others, they create new compounds.

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Chemicals that are considered generally acceptable in controlled amounts may react with other elements and/or chemicals to form new compounds that could be highly carcinogenic.

Chlorine is one of the best-publicized examples; it reacts with organic matter in water and forms deadly trihalomethanes.

Hard water is probably the single largest threat facing the American home in the 21st century. Hard water can coat your family, your home and your appliances with thousands of pounds of inorganic mineral rock-scale each and every year; Hard water slowly destroys everything it touches. Left untreated, hard water costs you money, ruins your lifestyle and can even lower the value of your home.

No one needs to tell you that you're living with Hard Water though. Soap doesn't lather easily, glasses are cloudy after washing, a ring forms around the bathtub, faucets and shower heads are crusty, laundering results are poor and there are many other easily recognized signs.

There are several degrees of Water Hardness. Even if it is moderately hard, it can seriously damage the plumbing system in your home and, in time, cause inconvenient and expensive problems.

Hard water is a poor solvent because it is loaded with a variety of impurities. These dissolved impurities react with certain chemicals found in soap to form a gummy, insoluble curd.

This soap curd clings stubbornly to everything it touches. The ring around your bathtub is curd. That same curd causes your hair to become dull and hard to manage.

Soap curd clogs skin pores and prevents your natural oils from moisturizing your skin. This dryness causes itching and also aggravates skin conditions like psoriasis, eczema and acne.

Soap curd is especially noticeable by the scummy film it forms on dishes, glassware, walls and floors. Hardness and other dissolved solids combine to form the residue you see as spots on glasses, crockery, cutlery and shower enclosures.

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Hard water harms fabrics

Laundry washed in hard water takes on a gray color and wears out faster than expected. With hard water in your washing machine, it's almost impossible to wash clothes white - even when you use large amounts of detergent and bleach Minerals and insoluble particles in hard water trap dirt and soap curd in the fabric of your clothes and linens. These deposits give fabric a dull gray "washed-out" look and cause the clothing fibers to be brittle. Your clothes and linens then feel harsh and rough - they deteriorate faster.

Hard water harms foods

Some vegetables such as peas and beans become tough and unpalatable when cooked in hard water. Baking with hard water imparts an undesirable taste from the hardness minerals into your food. Tea, Coffee and other beverages prepared with hard water taste awful and often contain flakes of hardness.

Hard water affects your house plumbing

Perhaps the greatest damage done by hard water is the damage that you can't easily see. Water heaters, humidifiers, boilers and household pipes become lined with an increasingly thick layer of calcium and magnesium scale.

As this scale builds up, the water flow in your pipes diminishes to such a point that new piping is usually the only realistic option to remedy the situation.

Hard water scale inside a water heater forms an insulating layer that prevents the burners or heating elements from heating the water efficiently. Just 1/8" of scale inside the tank can require up to 30% more fuel to heat the water to the desired temperature.

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How water hardness is measured

Water hardness is measured in imperial Grains per Gallon (gpg). A grain, in this case, is the weight of an average dry grain of wheat, approximately 1/7000th of a pound. The water treatment industry generally uses the following standards to classify water hardness.

Soft Water	0 - 0.5 gpg
Slightly Hard Water	.5 - 3.5 gpg
Moderately Hard Water	3.5 - 7 gpg
Very Hard Water	7 - 10.5 gpg
Extremely Hard Water	10.5 gpg and greater

THE CRIMES OF HARD WATER

Increased Water Heating Costs

Damaged Clothing

Excessive Soap Consumption

Pipe Scaling

Faucet and Fixture Deterioration

Skin Problems

Unpalatable Food

Undesirable Tastes and Odors

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Principles of Ion Exchange

The smallest units that make up chemical compounds and still retain the properties of those compounds are called molecules. Molecules are made up of atoms or groups of atoms. Electrically charged atoms are called ions. The charge of a single ion can be either positive or negative - Ions of metals and of hydrogen are usually positively charged and are called cations. Ions such as chlorine, nitrate, phosphate, fluoride and sulfates are negatively charged and called anions.

Certain insoluble materials are made up of large ions forming a skeletal structure containing oppositely charged ions. These ions can be exchanged with other similar ions in an ion exchange.

The first commercial application of ion exchange was water softening in 1905. Since then, ion exchange has been the most reliable method of softening and conditioning water in homes and industry.

The Conditioning of water by ion exchange relies on the replacement of the calcium and magnesium ions in the water by an equivalent number of sodium ions.

The Conditioning process may be illustrated by the following equation:-

R2. Na +	$Ca(HCO3)_2$ =	R2 . Ca +	$2NaHCO_3$
Sodium Ion Exchange Resin	Calcium Bicarbonate in water	Calcium Ion Exchange Resin	Sodium Bicarbonate in Water

Obviously, the system can only exchange a certain amount of hardness and other contaminants. This is referred to as the capacity of the resin. The capacity of the resin is referred to as grains of calcium carbonate hardness removed per cubic foot of resin or Milliequivalents per liter. When the capacity has been exhausted, the resin needs to be regenerated with a solution of sodium chloride (brine) as follows:-

R2.Ca +	2NaCl =	2 R.Na +	CaCl2
Calcium Ion Exchange Resin	Sodium Chloride Brine	Sodium Ion Exchange Resin	Calcium Chloride Waste

Your Hydropro Water Conditioning System can be regenerated with Potassium Chloride if desired.

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Over the years, the composition of ion exchange media has advanced, reflecting global technological advances.

Ion exchange resins used in your Patriot Pro Water System are made in the USA, without harmful toxic solvents. Designed to be physically and chemically strong while removing the maximum amount of hardness contamination from water.

Decades of explosive population growth and drought conditions have created extreme water chemistry conditions that require specialized treatment methods to ensure your home is comprehensively protected from contaminants that could be lurking in your water.

Intermountain Water's reputation for outstanding equipment quality and premiere support has been forged over many years, making us the professional's choice since 1966.

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Your responsibilities as an equipment owner

Your Patriot Pro System is manufactured to be efficient and very reliable. To ensure continued performance and keep your system operating within manufacturer's specifications, the following operating conditions must be ensured by you, the equipment owner:

Water Pressure Regulator

The influent water pressure into this water system must be regulated by a code-compliant pressure-regulating device not to exceed 75psi.

Power Protection

Power to this system must be supplied by an unswitched 110VAC supply. Surge protection is mandatory and is to be supplied by you, the equipment owner. The use of a UPS (Uninterruptible Power Supply) is encouraged.

Salt

This water system uses salt to clean itself. The brine tank must be filled with a high quality pellet or cubed salt to ensure system operation. Rock salt is not suitable for this system, as it usually contains high levels of impurities that can possibly compromise the system functionality.

Pur-Gard

The Pur-Gard performance injector should be kept full to ensure proper system operation and maximum efficiency. Check the level of your Pur-Gard feeder each time you fill your brine tank with salt.

Annual Inspection

Water chemistry changes over the years and will have an effect on your system's ability to do its job. Natural attrition on the system will usually occur at 3-5% per year when protected with Pur-Gard. Your system should be inspected and recalibrated annually to ensure your system is performing at optimum levels and that you stay current with the latest technologies. Annual inspections are free of charge to Platinum customers.

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System Programming & Adjustments

The Patriot Pro System incorporates a highly sophisticated microprocessor control system, making it as efficient and reliable as possible. All system settings are pre-programmed at the factory and then carefully calibrated by your installer for your exact water chemistry.

Your Patriot-Pro Water System Control incorporates EEPROM memory and a 24-hour power backup system, which means that your system programming never has to be reset, even in the event of an extended power outage.

End-user programming is generally not necessary. If you need to change programming, the following procedure should be used:-

1. Press the STAR button to **enter programming mode.**
   - Use the UP & DOWN buttons to set the **current time of day**.
     The time of day is very important to the correct operation of the system.

2. Press the STAR button.
   - Use the UP & DOWN buttons to set the **current water hardness level**.
     The water hardness level should only be changed after a complete water analysis has been performed.

3. Press the STAR button.
   - Use the UP & DOWN buttons to set **day override**.

     The day override setting is designed to help protect your system from potential bacterial growth. This setting allows you to choose how often a mandatory regeneration is performed to ensure that the water is not allowed to stagnate. 7 Days is the factory recommended setting.

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4. Press the STAR button.
   - Use the UP & DOWN buttons to set the **regeneration time**.

     When the system determines that regeneration is necessary, it will clean itself at the designated regeneration time. During regeneration, the system bypasses itself automatically from the house water to protect you from the salt and hydroclear used during the cleaning process. The regeneration time should be scheduled during a period of no water usage activity, such as 2am in the morning.

5. Press the STAR button.
   - Within 10 Seconds, system will start a **manual regeneration cycle.**
     This will clean the system and reset the capacity counter. During a cycle, the individual steps can be interrupted and advanced to the next step by pressing the STAR button. Interrupting a regeneration cycle is not recommended.

6. Press the STAR button one more time to exit programming.

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System Diagnostics Mode

System Diagnostic Mode is designed to help you or your Authorized Intermountain Water Repair Agent understand the dynamics of the operation of your system.

To enter diagnostics mode, press the **UP ARROW** for 5 seconds

The system will display various program statistics and settings as follows: -

Press the **STAR** button to view the next setting/statistic

Hardness
The hardness setting programmed into the system
Programmed in Grains per Gallons (GPG)

Regen XXX Days ago
The number of days since the system last regenerated.
If 0 (zero) is displayed, then the system cleaned today

In Service XXXX Days
The number of days since the system was originally installed

Number of Regens XXXX
The number of regenerations since the system was installed

Peak Flow xx gpm
The peak rate at which you have ever used water in your home since installation of the system.

Average Volume XX GL/Day
The average consumption of water per day in your home.

Power Outage XX
The number of power outages sensed by the system since original installation.

Power Surge/Sage XX
The number of power surges and/or sags since original system installation.

XXXXXX XXXXX.XX
The system software revision & default program setting code

EXIT
Press the UP arrow to exit diagnostics mode or scroll though the settings again with the STAR button

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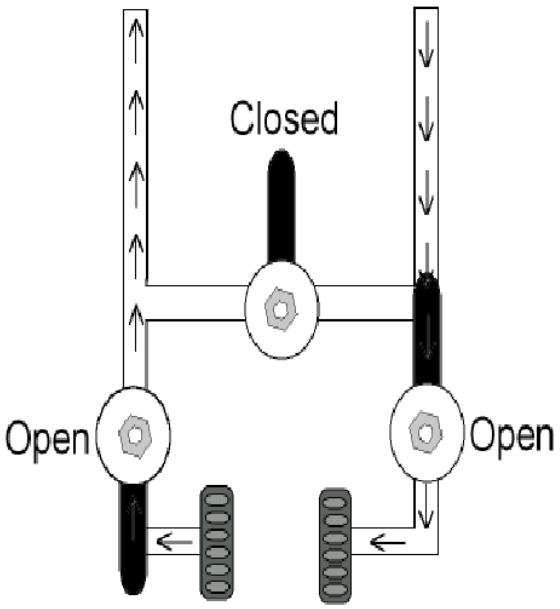
When and How to Bypass your Patriot Pro Water System

Your Patriot Pro System is supplied with a code compliant bypass device. This bypass allows the System to be completely isolated from the household plumbing.

Normal System Operating Mode

Turn the left and right handles so they are parallel with the pipe; and turn the top handle so it is perpendicular to the pipe as shown below. Water enters the system on the right side, and exits the system on the left side.



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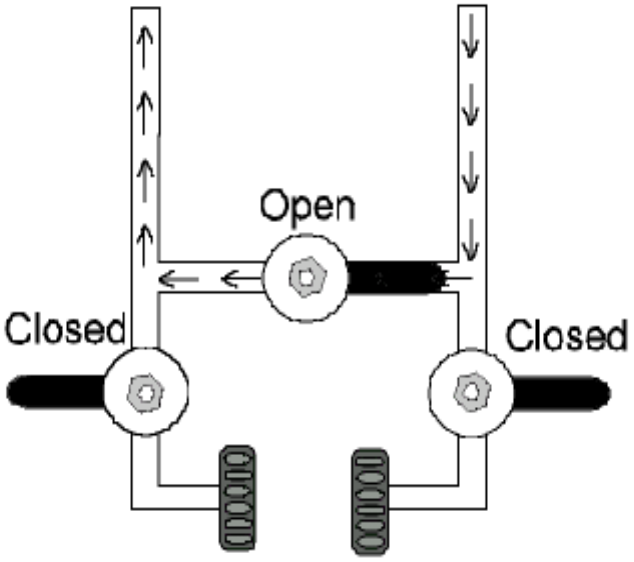
System Bypass Mode

Turn the left and right handles so they are perpendicular to the pipe; and turn the top handle so it is parallel to the pipe as shown below. Water enters the bypass on the right side, and exits the bypass on the left side. Water does not pass through the system at any time.



When should I bypass my system ?

Your system should be bypassed if any of the following occurs:-

- System leaks
- Unusual noises from system

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System Installation & Startup Procedures

1. Clear the installation area and sweep the area where the brine tank will be placed.
2. Test home water pressure and make sure it is 75psi static or below.
3. Check to confirm that the water heater has adequate heat expansion protection to protect the System from hot water damage.
4. Connect to house plumbing using code approved methods & materials and ensure that a bypass device is installed.
5. Install surge protector or UPS for Conditioner.
6. Plug Conditioner in to power.
7. Install 3/8" ID PEX pipe or equivalent to the Conditioner drain fitting and terminate to drain in a code-approved manner.
8. Connect brine tank to Conditioner using 3/8" OD polytube supplied with brine tank
9. Bypass Conditioner.
10. Run bathtub cold to purge piping of debris and chemical residue from installation, this will take approx. 5 minutes at 3gpm.
11. Leave bathtub running and slowly open the inlet valve to the water Conditioner.
12. Slowly open the outlet valve from the water Conditioner.
13. Observe flow of water from the bathtub. Water will become a dark amber color. This color is caused by the system disinfectant/preservative. Allow water to run until clear. Observe water for resin particles. If resin particles are found in the water, immediately bypass the system and call tech-support.
14. Turn off bathtub cold
15. Press the star button to enter programming mode
    a. Set the clock with the up & down arrows, then press star
    b. Enter the measured water hardness at the installation location, then press star
    c. Enter the anti-bacterial override interval (7 is the default), then press star
    d. Set the time of regeneration, then press star
    e. The system will countdown for 10 seconds before it begins a regeneration.
       Press star to cancel, or let it begin regeneration.
16. Observe the system during each cycle and advance to the next cycle by pressing the star button
17. Leave the system in the Refill cycle to fill the brine tank with water.

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Intermountain Water

Limited Lifetime Warranty

1st year of ownership

This residential water system is warranted as to workmanship and material for a period of one year from date of original installation at the original installation site, if properly installed by an Intermountain Water Certified Installer. Should any component in your system prove defective in the first year, it will be repaired, rebuilt or replaced at our option, provided it is returned directly to us.

After the 1st year of ownership, should any component in your system prove defective after the first year, it will be repaired, rebuilt or replaced at our option for a maximum charge of $50.00, provided it is returned directly to us. Labor, transportation, shipping or other charges incurred in the diagnosis, replacement or repair of defective components are not covered by this warranty.

If you choose not to send a defective component back to us, repairs to your system can be conducted in your home by a factory authorized service technician if your home is within the operating radius of an Intermountain authorized repair center. This warranty does not cover transportation, shipping, diagnosis, replacement and repair charges resulting from your in-home repair request.

Intermountain Water or its subsidiaries will not be held responsible for loss or damage caused by any defective component.

This warranty must be presented at time of claim and all claims must be presented within 30 days of occurrence.

This warranty is void if your water system is not installed in compliance with prevailing plumbing codes, or if the influent water temperature is hotter than 90^{0}F or where the static water pressure is less than 25psi, or more than 90psi. Intentional/malicious damage, misuse, neglect, unauthorized modifications or accidental damage to the system are not covered by this warranty. This warranty does not cover damage caused by pressure surges, water hammer, power surges or sags, lightning, fire, flood, freezing, earthquake, acts of God or other casualty.

Your water system is subject to normal wear and tear during its usable service life.

Wear and tear is not regarded as a product defect and is not covered by this warranty.

Your water system includes a Pur-Gard performance-enhancing injection system in the salt tank. The Pur-Gard performance-enhancing additive is essential to proper functioning of your system. If Pur-Gard is not added to the injection system at the prescribed interval in your owner's manual, this warranty will be void.

This limited lifetime warranty is only valid if registered within 10 days of initial installation.

If unregistered, this warranty is only valid for 1 year from the date of original manufacture.

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