


Series PWFGAC, PWFMZ, PWFCAL

Installation, Operation and Maintenance Manual

⚠ WARNING



Read this Manual **BEFORE** using this equipment.
Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.

THINK SAFETY FIRST

Keep this Manual for future reference.

⚠ WARNING

You are required to consult the local building and plumbing codes prior to installation. If the information in this manual is not consistent with local building or plumbing codes, the local codes should be followed. Inquire with governing authorities for additional local requirements.

⚠ WARNING

Need for Periodic Inspection/Maintenance: This product must be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant. All products must be retested once maintenance has been performed. Corrosive water conditions, and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal components helps assure maximum life and proper product function.

⚠ WARNING

Do not use with water that is microbiologically unsafe or of unknown quality adequate disinfection before and after the system.

NOTICE

Hydrocarbons such as Kerosene, Benzene, Gasoline, etc., may damage products that contain O-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. Do not use the product(s) contained in this document on water supplies that contain Hydrocarbons such as Kerosene, Benzene, Gasoline, etc.



PWFGAC PWFMZ PWFC Series

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Specifications

Feed Water Parameters

Minimum inlet pressure: 30 psig
 Maximum operating pressure: 125 psig
 Minimum water temperature: 40°F (5°C)
 Maximum water temperature: 110°F (43°C)

Power

Voltage: 120VAC
 Frequency: 60Hz
 Power consumption: 7 Watts Maximum

Installation

Location: Indoors (Protect from direct sunlight)
 Minimum ambient temperature: 40°F (5°C)
 Maximum ambient temperature: 110°F (50°C)

Drain Flow Rates

The drain system these filters are plumbed to must be able to accept the listed drain volumes for a period of 27 minutes.

Micro Z™ Filters

9" X 48", 1 cubic ft.	5.3 gpm
10" X 54", 1.5 cubic ft.	7.5 gpm
12" X 52", 2 cubic ft.	11 gpm
13" X 65", 3 cubic ft.	15 gpm

Carbon Filters:

9" X 48", 1 cubic ft.	4.2 gpm
10" X 54", 1.5 cubic ft.	5.3 gpm
12" X 52", 2 cubic ft.	7.5 gpm
13" X 65", 3 cubic ft.	10 gpm
16" X 65", 4 cubic ft.	11 gpm

Calcite Filters:

10" X 54", 1.5 cubic ft.	7.5 gpm
12" X 52", 2 cubic ft.	11 gpm
13" X 65", 3 cubic ft.	15 gpm

PWFMZ Series

MODEL NO.	VALVE	MINERAL TANK SIZE	MEDIA CUBIC FOOT	GRAVEL (LBS)	PEAK SERVICE FLOW (GPM)	PRESSURE DROP (PSI)	BACK WASH (GPM)	FLOOR SPACE LXWXH
PWFMZ1	Time Clock	9" X 48"	1	10	5 - 9	15	5.3	16" X 10" X 55"
PWFMZ15	Time Clock	10" X 54"	1.5	10	7 - 10	15	7.5	16" X 11" X 62"
PWFMZ2	Time Clock	12" X 52"	2	30	9 - 15	15	11	17" X 13" X 60"
PWFMZ3	Time Clock	14" X 65"	3	40	13 - 21	15	15	18" X 14" X 74"

PWFGAC Series

MODEL NO.	VALVE	MINERAL TANK SIZE	MEDIA CUBIC FOOT	GRAVEL (LBS)	PEAK SERVICE FLOW (GPM)	PRESSURE DROP (PSI)	BACK WASH (GPM)	FLOOR SPACE LXWXH
PWFGAC1	Time Clock	9" X 48"	1	10	4	<15	4.2	16" X 10" X 55"
PWFGAC15	Time Clock	10" X 54"	1.5	10	6	<15	5.3	16" X 11" X 62"
PWFGAC2	Time Clock	12" X 52"	2	30	8	<15	7.5	17" X 13" X 60"
PWFGAC3	Time Clock	14" X 65"	3	40	11	<15	10	18" X 14" X 74"
PWFGAC4	Time Clock	16" X 65"	4	60	14	<15	11	20" X 17" X 74"

PWFCAL Series

MODEL NO.	VALVE	MINERAL TANK SIZE	MEDIA CUBIC FOOT	GRAVEL (LBS)	PEAK SERVICE FLOW (GPM)*	PRESSURE DROP	BACK WASH (GPM)	FLOOR SPACE L X W X H
PWFCAL15	Time Clock	10" X 54"	1.5	10	7 - 10	<15	7.5	16" X 11" X 62"
PWFCAL2	Time Clock	12" X 52"	2	30	9 - 15	<15	11	17" X 13" X 60"
PWFCAL3	Time Clock	13" X 65"	3	40	13 - 21	<15	15	18" X 14" X 74"

***Note:** Peak service flow rate is for intermittent use only and is not to be interpreted as continuous service flow rate capability. These systems are designed to treat the domestic water used in a single family dwelling. For irrigation water treatment or higher volume applications please contact your Watts representative. Peak service flow rates are based on a 15 psi drop.

Optimum service flow rate is specific to water chemistry and will vary.

⚠ WARNING

General Installation Guidelines

This water conditioner's control valve conforms to UL/CE Standards. Generic valves were tested and certified for compliance as verified by the agency listing. This water conditioning system is to be used only for potable water. Inspect the water conditioning system for carrier shortage or shipping damage before beginning installation.

Operating Parameters:

- **Operating ambient temperature: 40° to 110°F (5° to 43°C).**
- **Operating water temperature: 40° to 110°F (5° to 43°C).**
- **Operating water pressure range : 25 to 120 psi (1.7 to 8.27bar).**

Installation Parameters: All plumbing should be done in accordance with local plumbing codes.

- Do not use pipe dope or other sealants on threads. Use Teflon tape on the threaded inlet, outlet and drain fittings. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.
- All plastic connections should be hand tightened. Teflon® tape may be used on connections that do not use an O-ring seal. Do not use pipe dope type sealants on the valve body. **Do not use pliers or pipe wrenches.**
- Observe drain line requirements.
- Keep the media tank in the upright position. Do not turn upside down or drop. Turning the tank upside down or laying the tank on its side can cause media to enter the valve.
- The pipe size for the drain line should be a minimum of ½". Backwash flow rates in excess of 7 gpm (26.5 lpm) or length in excess of 20' (6.1m) require ¾" drain line.
- Do not support the weight of the system on the control valve fittings, plumbing, or the bypass.

Environmental:

- Use only regenerants designed for water conditioning. Do not use ice melting salt, block salt or rock salt. During cold weather it is recommended that the installer warm the valve to room temperature before operating. Teflon® is a trademark of E.I. duPont de Nemours.
- Do not use petroleum-based lubricants such as Vaseline, oils or hydrocarbon-based lubricants. Use only 100% silicone lubricants.
- Do not allow this water conditioning system to freeze. Damage from freezing will void this water conditioning system's warranty.
- **HYDROCARBONS SUCH AS KEROSENE, BENZENE, GASOLINE, ETC., MAY DAMAGE PRODUCTS THAT CONTAIN O-RINGS OR PLASTIC COMPONENTS. EXPOSURE TO SUCH HYDROCARBONS MAY CAUSE THE PRODUCTS TO LEAK. DO NOT USE THE PRODUCT(S) CONTAINED IN THIS DOCUMENT ON WATER SUPPLIES THAT CONTAIN HYDROCARBONS SUCH AS KEROSENE, BENZENE, GASOLINE, ETC.**
- **THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL OR HEALTH EFFECT APPLICATIONS.**
- Do not use Vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicone lubricant may be used on black o-rings but is not necessary.

Electrical:

- Use only the power transformer supplied with this water conditioning system.
- All electrical connections must be completed according to local codes.
- The power outlet must be grounded.
- All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.)
- Install grounding strap on metal pipes.
- The power adapter comes with a 15 foot power cord and is designed for use with the control valve. The power adapter is for dry location use only. The control valve remembers all settings until the battery power is depleted if the power goes out.
- After the battery power is depleted, the only item that needs to be reset is the time of day; other values are permanently stored in the nonvolatile memory. The control valve battery is not rechargeable but is replaceable.
- No user serviceable parts are on the PC board, the motor or the power adapter. The means of disconnection from the main power supply is by unplugging the power adapter from the wall.
- Install an appropriate grounding strap across the inlet and outlet piping of the water conditioning system to ensure that a proper ground is maintained.
- To disconnect power, unplug the AC adapter from its power source.

Soldering:

- Use only lead-free solder and flux, as required by federal and state codes, when installing soldered copper plumbing.
- Use caution when installing soldered metal piping near the water conditioning system. Heat can adversely affect the plastic control valve and bypass valve.
- Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
- When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.

Control Valve:

- This glass filled Noryl¹ (or equivalent) fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter.
- The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.
- The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place a screwdriver in the slots on caps and/or tap with a hammer.
- After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons unplug power source jack from the printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for 3

General Warnings (continued)

⚠ WARNING

Installation Guidelines:

seconds. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

- The control valve is compatible with a variety of regenerants and resin cleaners. The control valve is capable of routing the flow of water in the necessary paths to regenerate or backwash water treatment systems. The injector regulates the flow of brine or other regenerants. The control valve regulates the flow rates for backwashing, rinsing, and the replenishing of treated water into a regenerant tank, when applicable.
- Control valve installation is made easy because the distributor tube can be cut ½" above to ½" below the top of tank thread. The distributor tube is held in place by an o-ring seal and the control valve also has a bayonet lock feature for upper distributor baskets.

How To Use This Manual

This installation manual is designed to guide the installer through the process of installing and starting up water conditioning systems featuring the PWF controller.

This manual is a reference and will not include every system installation situation. The person installing this equipment should have:

- Training on the control valve.
- Knowledge of water conditioning and how to determine proper control settings.
- Adequate plumbing skills.

Control Valve Function and Cycles of Operation

The time clock control valve has two calendar options for regeneration frequency: 1. an option where the user can choose the number of days (1-99) between each backwash; and 2. a seven-day option where the user can choose which day(s) of the week a backwash should occur.

The control valve uses no traditional fasteners (e.g. screws); instead clips, threaded caps and nuts and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screw driver, one large blade screw driver, pliers and a pair of hands. A plastic wrench is available which eliminates the need for screwdrivers and pliers. Disassembly for servicing takes much less time than comparable products currently on the market. Control valve installation is made easy because the distributor tube can be cut ½" above to ½" below the top of tank thread. The distributor tube is held in place by an o-ring seal and the control valve also has a bayonet lock feature for upper distributor baskets.

The AC adapter power pack comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter power pack is for dry location use only. If the power goes out, only the time of day needs to be reset. All other values are permanently stored in the nonvolatile memory.

Installation Preview

Conduct a visual check of all equipment for any damage that may have occurred during shipment.

NOTICE

If there is obvious damage to any equipment, it should be noted on the carrier's Bill Of Lading. Open and inspect the contents of all closed crates, cartons, etc. and inspect for concealed damage. The manufacturer is not liable for any damage during transit.

Position the equipment in its proper location, setting on a flat surface. Level equipment as required. Equipment out of plumb can exhibit poor flow characteristics, which will affect the performance of the system.

NOTICE

Units are shipped with media (resin & gravel), distributions tube, and control valve installed. Double-check the valve installation on the tank. Tighten if necessary.

Unit should be positioned with the valve control facing forward.

Check the main line water pressure. The softener is designed for a minimum of 20 psi and a maximum of 125 psi working pressure. If the line pressure exceeds this limit, a pressure-reducing valve should be installed.

Maximum allowable water temperature is 40°F (4°C) – 110°F (38°C). A 120vac 60 cycle electrical source must be available for operation of the controller.

Connect raw water supply line to the inlet valve connection. Connect treated water outlet to service line. It is suggested that the pipe size be equal or one size larger than the valve connection.

Safety Information

This water conditioner's control valve conforms to UL/CE Standards. Generic valves were tested and certified for compliance as verified by the agency listing.

- Please review the entire Installation and Operation Manual before installing the water conditioning system.
- As with all plumbing projects, it is recommended that a trained professional water treatment dealer install the water conditioning system. Please follow all local plumbing codes for installing this water conditioning system.
- This system will not make microbiologically unsafe water safe. Water that is unsafe must be treated separately from this conditioner.
- This water conditioning system is to be used only for potable water.
- Inspect the water conditioning system for carrier shortage or shipping damage before beginning installation.
- Use only lead-free solder and flux, as required by federal and state codes, when installing soldered copper plumbing.
- Use caution when installing soldered metal piping near the water conditioning system. Heat can adversely affect the plastic control valve and bypass valve.
- All plastic connections should be hand tightened. Teflon® tape may be used on connections that do not use an O-ring seal. Do not use pipe dope type sealants on the valve body. **Do not use pliers or pipe wrenches.**
- Use only the power transformer supplied with this water conditioning system.
- All electrical connections must be completed according to local codes.
- The power outlet must be grounded.
- Install an appropriate grounding strap across the inlet and outlet piping of the water conditioning system to ensure that a proper ground is maintained.
- To disconnect power, unplug the AC adapter from its power source.
- Observe drain line requirements.
- **Operating water temperature: 40° to 110°F (4° to 43°C).**
- Keep the media tank in the upright position. Do not turn upside down or drop. Turning the tank upside down or laying the tank on its side can cause media to enter the valve.
- Use only regenerants designed for water conditioning. Do not use ice melting salt, block salt or rock salt. During cold weather it is recommended that the installer warm the valve to room temperature before operating. Teflon® is a trademark of E.I. duPont de Nemours.
- Do not use petroleum-based lubricants such as Vaseline, oils or hydrocarbon-based lubricants. Use only 100% silicone lubricants.
- Do not support the weight of the system on the control valve fittings, plumbing, or the bypass.
- Do not allow this water conditioning system to freeze. Damage from freezing will void this water conditioning system's warranty.
- **Observe all warnings and notes that appear in this manual**

Pre-Installation Considerations (continued)

G. Pre Installation and Loading of Media

Systems that are 13" in diameter and larger are not loaded with media. These systems must be loaded with media before placing into service. To load a system follow the below steps.

1. Cap the top open end of the distributor tube with tape and plastic sheeting to keep foreign debris from entering the distributor tube. This cap must be secure and not come off during media loading.
2. Place the distributor tube, screen end down, into the mineral tank and center it in the bottom. The top of the distributor tube should be flush with the top of the tank.
3. Make sure the plastic and tape cap is secure to the top of the distributor tube, place a funnel on the top of the tank and load first the gravel (if different sizes of gravel are used load the largest gravel first, then the smaller gravel) then the resin media into the tank. The cap must not come off of the distributor tube during the loading of the media.
4. Remove the plastic cap from the distributor tube. **DO NOT PULL UP ON THE DISTRIBUTOR TUBE** when removing the cap. The distributor tube top must remain flush with the top of the tank.
5. Clean any media from the threads and top of the mineral tank.
6. Lubricate the O-rings on the bottom of the control valve (distributor pilot O-ring and top of tank O-ring). Use non-petroleum based silicone lubricant only.
7. Place the control valve on top of the tank. When doing this step, seat the top of the distributor tube inside the centered O-ring sealed port on the bottom of the valve first then press the valve down until the tank threads come in contact with the valve threads. This ensures that the distributor tube is properly seated into the bottom of the control valve. Thread the valve on to the tank clockwise. Be careful not to cross thread the valve or over tighten it. A hand tight snug fit is appropriate for the control valve torque. A wrench is not necessary. Do not use thread sealant or PTFE tape on the valve base threads.
8. The system is now ready for installation. Follow the Installation Section in the Installation, Operation and Maintenance Manual.

⚠ WARNING

Do not exceed water pressure of 120 psi (8.2 bar). Do not exceed 110°F (43.3°C). Do not subject unit to freezing conditions.

General Installation Instructions

1. Turn off water heater(s).
2. Turn off the main water supply to the home and open an inside faucet (cold and hot) to relieve any pressure within the plumbing system.

Select Location

1. Place the system in the desired installation location. Make sure that the location is level and sturdy enough to support the weight of the system once it is in operation.
2. You will need to locate the filter system at least 10 feet away from the hot water heater so that hot water does not backup and damage the filter system.
3. You will need a drain close by for disposal of regenerated wastewater.
4. If installing the filter system in an outside locations, make sure to protect softener from the elements, such as freezing temperatures, rain, sunlight and contamination

Install a By-Pass

NOTICE

Always install a bypass, either a 3-way valve system or the standard bypass for the valve you have. This will allow you to shut off the water supply to the softener, but still have water in the house if the softener is in need of repair.

After a location has been determine install bypass onto the control valve. (On page 7, Figures 1 and 3 show standard bypass on valve.) (Figures 2 and 4 show 3-way by pass plumbing.)

NOTICE

If installing a 3-way bypass valve, do so now.

Close main water supply valve, at the well or at the water meter.

Shut off electrical or fuel supply to the water heater.

Open all faucets to drain pipes.

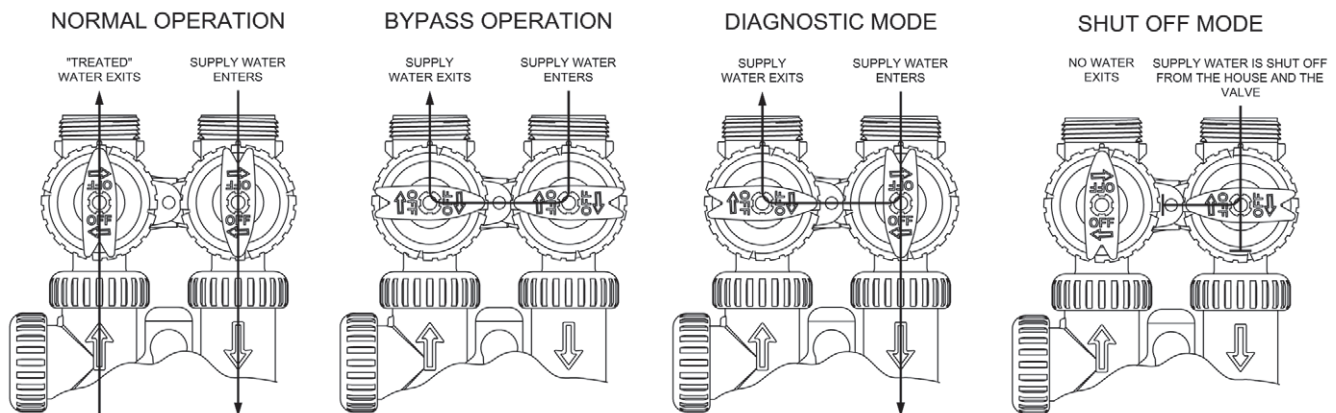
NOTICE

The bypass (provided) easily connects to the valve body using nuts that only require hand tightening. The split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage.

Make certain the nut is placed on first, then the split retainer ring, followed by the o-ring to make the seal. A silicon lubricant may be used on the black o-ring seals. This design allows for an approximate 2-degree misalignment of the plumbing. This design will allow for minor plumbing misalignments, but should never handle the weight of the plumbing system.

Once by-pass installed, place the by-pass valve in the by-pass position

System Components Described



Bypass Valve Installation

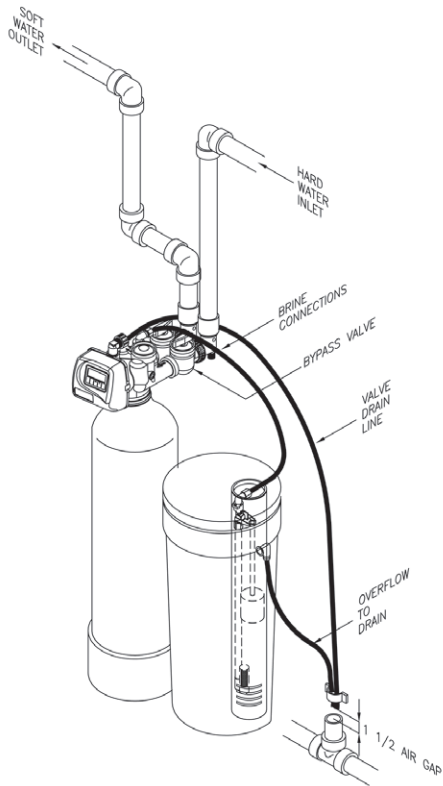


Figure 1: Plumbing with by pass (Standard).

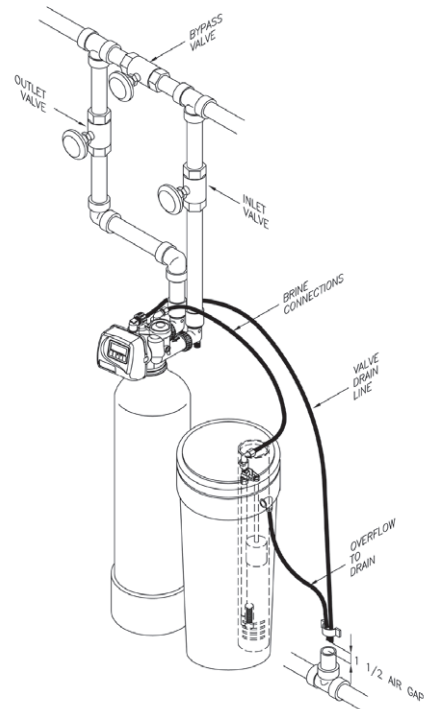


Figure 2: Plumbing with 3-way b pass.

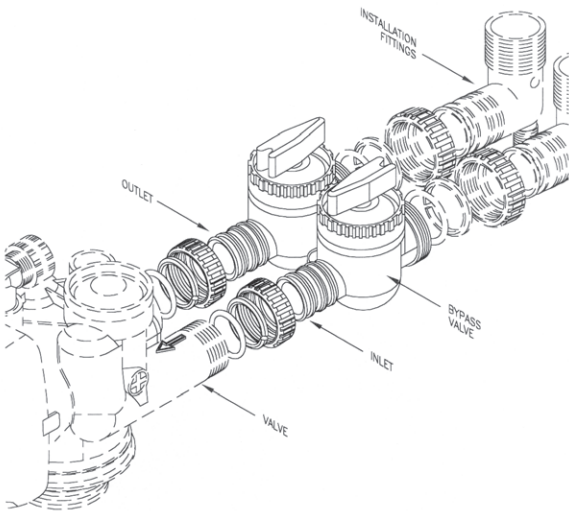


Figure 3: Bypass (standard).

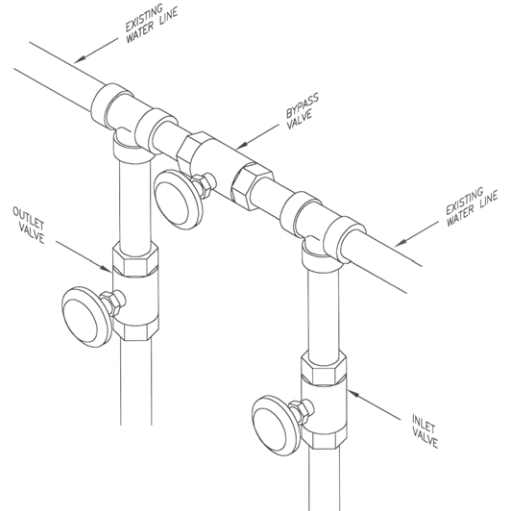


Figure 4: 3-way bypass plumbing.

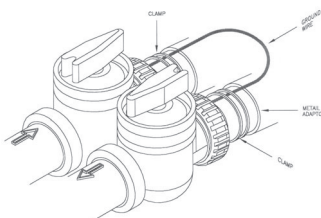


Figure 5:

When installing sweat copper follow state and federal codes by using a lead free solder and flux. Use a joint compound to seal threaded pipe. Some homes use the cold water pipes for an electrical ground (metal only). When finished with plumbing, a ground wire should be connected to the copper pipes to complete the ground circuit. Use two clamps and #4 copper for this.

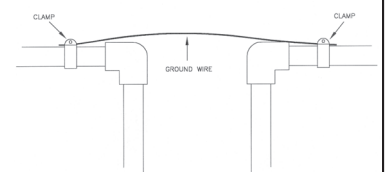


Figure 6:

Move Filter System Into Place

1. Connect the cold water supply to the inlet of the water conditioning system. While constructing the supply line, install a master supply valve (user supplied) in the supply line and close it.
2. Connect the feed water line to the home to the outlet of the system.
3. Make sure floor is level.

Measure, cut, and install pipe and fittings to the bypass valve (dry fit only to make sure you have a proper fit) inlet and outlet side. Be sure hard water is supplied to the inlet side. Trace pipe to be sure.

The installation fittings connect to the control valve or the bypass valve using nuts that only require hand tightening. Hand tighten nut connections between control valve and installation fittings, control valve and bypass valve, and bypass valve and installation fittings allow for easy serviceability. Do not use a pipe wrench to tighten nuts on installation fittings. Hand tighten only.

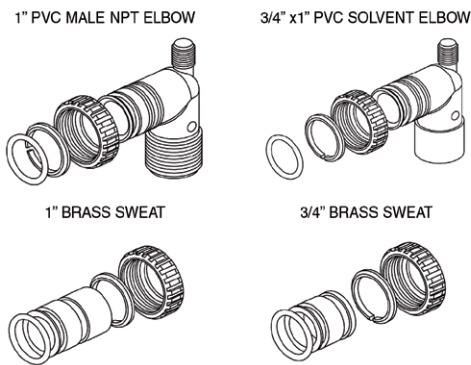
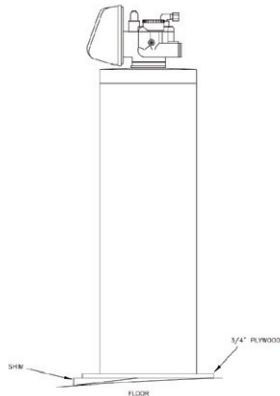


Figure 8: Four types of installation fittings.

NOTICE

When assembling the installation fitting package, connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring, and o-ring. Make sure solder joints are cool before assemble is started.

Split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage. The split ring design, incorporated into the installation fittings allows approximately 2 degrees off axis alignment to the plumbing system. The installation fittings are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

When assembling the installation-fitting package, connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring, or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring, and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, and bypass valve or control valve. Solvent cements and primers should be used in accordance with the manufacturer's instructions.

Slip the nut onto the fitting first, then the split ring second and the o-ring last. Hand tighten the nut. If the fitting is leaking tightening the nut will not stop the leak. Remove the nut, remove the fitting, and check for damage or misalignment of the o-ring.

Do not use pipe dope or other sealant on threads. Teflon tape must be used on the threads of the 1" NPT elbow and the 1/4" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.

Connect the Drain Line

1. Plumb the drain line to an appropriate drain abiding by all local, city, and state codes. Use a 3/4" drain line for backwash flow rates of 7 gpm or for drain lines of 7 gpm and less that exceed 20' in length. Use a 1" drain line for backwash flow rates of 10 gpm and 12 gpm.
2. If the drain line is a 5/8" flexible poly tube, slide the nut onto the poly tube, then place the poly tube insert into the end of the poly tube and tighten the nut on to the 3/4" drain line fitting. The nut is only designed for use with flexible poly tube. Use other nuts if attaching different materials. Run line to a drain. Making sure you have a 1 1/2" airgap. You may use a floor drain, standpipe or any open type drain (see Fig 7).

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on the black o-ring.

Use a pliers or crescent wrench to tighten or unscrew the nut. Do not use a pipe wrench to tighten or loosen nut. Do not use pipe dope or other sealant on threads. Use Teflon tape on the threads of the drain line control fitting when installing 3/4" NPT or 1" straight fitting.

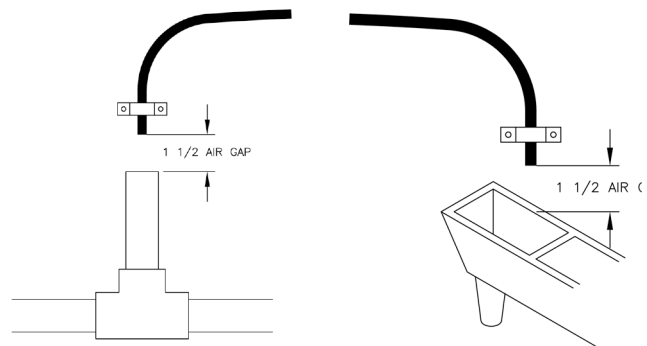


Figure 7: Also be sure drain line has an air gap.

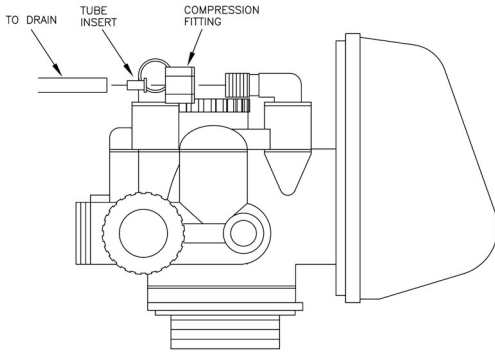


Figure 8: Drain Line Connection

Start Up

1. Confirm that the bypass valve is in the bypass position (see images 9, 10 & 11 below)
2. Place the bypass valve in the “bypass” position or mode (see figures 12-14 below.)
3. Open the user supplied feed water valve. Check for leaks and repair as needed.
4. Open the outlet valve of the bypass.
5. Open a couple inside hot and cold faucets until all air has been purged from the plumbing system. then close the faucets.
6. Initiate an Immediate Manual Regeneration by pressing and holding the “REGEN” button for 3 seconds. This will place the system into “Backwash” mode, unplug the system from its electrical outlet once it has cycled into the backwash position. This will stall the unit in the “Backwash” mode so all air can be purged from the tank.
7. Close the bypass valve.
8. Adjust the user supplied feed water valve to 1/4 open and place the bypass valve into the “Service/Operating Mode” position.
9. Air will come out of the drain line until the backwashing tank is completely purged of air. Then water will flow to drain. Allow water to flow to drain for 15 minutes or until the water to drain is clear of resin color throw.
10. Plug the system back into the electrical outlet and manually cycle the control valve through the remaining regeneration steps by pressing the “Next” button until it arrives in the Service position.
11. Check for system for leaks and repair as needed.
12. Installation is now complete and the system is ready for programming.

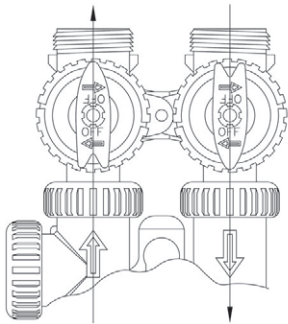


Figure 9: Operating Mode

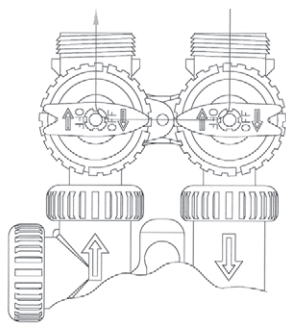


Figure 10: Bypass Mode

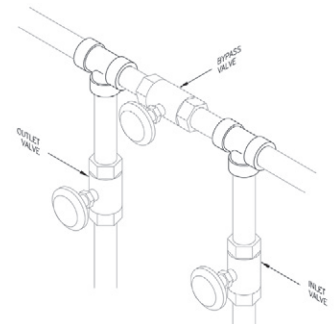


Figure 11: Bypass Mode

PWF System Programming

PWF Quick Programming Guide

A quick programming guide has been listed below for convenience specifically for the PWF series filter systems. For other programming requirements not listed in the Quick Programming Guide, please see the detailed programming section of this manual.

NOTICE

The electronics in the PWF control valve are used across a wide variety of control valves and applications, including backwashing filters. All programming for the electronics has been included in this manual for reference however the valve must be programmed for Twin Alternating Softening Applications when called for during valve programming.

PWF Quick Programming Guide

NOTICE

Chart 1: Setting Time of Day

Press the Set button approximately 5 seconds	Adjust hours using the Up and Down arrow buttons
Press the Set button to advance to the minutes.	Adjust minutes with the Up and Down arrow buttons.
Press the Set button to set time	To Exit

NOTICE

Once in the programming settings, simply use the **UP** and **DOWN** arrow buttons to change values

Chart 2: Master Programming

To enter the Master Programming mode, press and hold the SET and UP arrow buttons simultaneously for 3 – 5 seconds	The Hour display will start flashing again.
Press and Hold the SET and UP arrow buttons simultaneously for 3 - 5 seconds, again.	Screen will change from the time to " P " with a number flashing. This indicates you are now in the Master Programming Mode. Using the Up and Down arrow buttons, set this to " P9 " for Filter Systems
Press the SET Button	Next you will set Days to REGEN , set this to 99 Days
Press the SET Button	Next you will set " dP " (Differential Pressure Switch). For Watts units, there should be an arrow pointing to REGEN TIME . If not, press the Up arrow one time.
Press the SET Button	This will complete Master Programming Steps

NOTICE

Next you will need to set up Installer Programming, this **MUST** be done in addition to the Master Programming

Chart 3: Installer Programming

To enter Installation Display Setting Programming mode, press and hold the SET and UP arrow buttons simultaneously for 3 - 5 seconds	Set the Regeneration Time clock to the hour the regeneration should occur by using the Up and Down arrow buttons (an arrow points to PM after 12:00 noon). Late night/midnight is best, this is the time when no water is likely to be used.
Press SET Button	Adjust minutes with the Up and Down arrow buttons.
Press SET Button	Next you set the Days to Regen. Set the number of days between regenerations, normally 3 days for Filter Systems (the allowable range is from 1 to 99 days). Watts recommends filter systems to regenerate every 3 days
Press SET Button	This will complete the Installer Programming

Programming completed, Valve will return to normal mode and will be in service.

General Operation

When the system is operating one of two displays will be show: time of day (hour only) or days until the next backwash. Pressing the Up or Down buttons will toggle between the two displays.

If you have additional questions regarding your water softener programming, please contact Pure Water Technical Support at 1.800.224.1299, then press #2

Advance Programming Features

The following section explains the advanced programming features of the valve. It is intended for use by the Service Technician or Water Treatment Dealer. DO NOT attempt to access these features if you are not qualified. Improper settings can cause the unit to malfunction and could have a negative effect on the water quality.

Programming

The control valve offers multiple procedures that allow the valve to be modified to suit the needs of the installation. These procedures are:

- OEM System Setup
- Installer Displays & Settings (either 1-99 Days Between Regeneration option or 7-Day option)
- User Displays

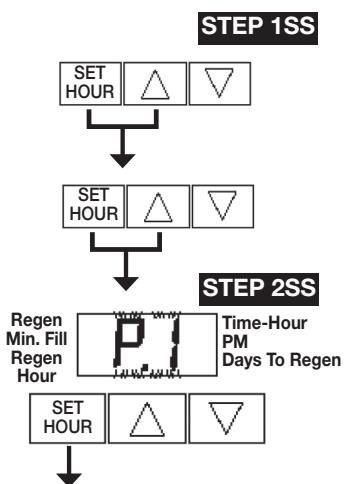
These procedures can be accessed in any order. Details on each of the procedures are provided below and on the following pages.

When in operation, normal user displays show the time of day or days remaining before backwash. When stepping through a procedure, if no buttons are pressed within five minutes the display returns to a normal user display. Any changes made prior to the five minute time out are incorporated.

To quickly exit Installer Displays & Settings or OEM Setup, simultaneously press SET HOUR + DOWN. Any changes made prior to the exit are incorporated.

To reinitialize the control valve, check to make sure the valve is in the User Display. Then simultaneously press SET HOUR + DOWN or unplug power source plug (black wire) on the circuit board, and plug back in.

OEM System Setup

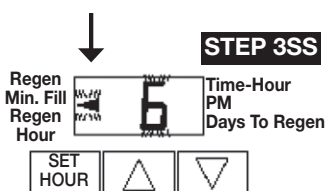


STEP 1SS – From normal mode, press SET HOUR + UP buttons simultaneously for 3 seconds and release. Then press SET HOUR + UP buttons simultaneously for 3 seconds and release.

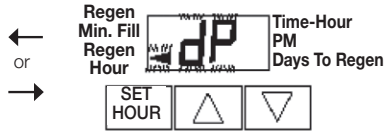
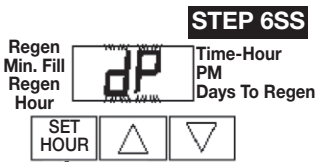
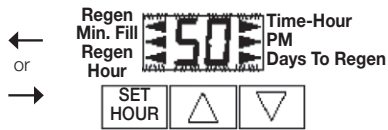
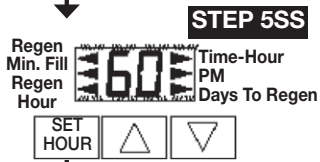
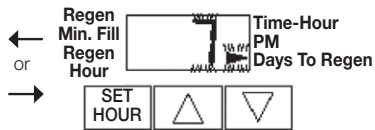
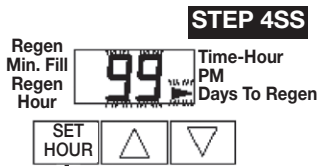
STEP 2SS – Choose the desired program by pressing the UP or DOWN buttons. Prior to selecting a program, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. See Compliance Table in Service Instructions under Injector Cap, Screen, Injector Plug and Injector section and Figure 6. Press SET HOUR button to go to Step 3SS.

Regeneration Cycles and Times for Different Programs

Program	Cycle Sequence, Adjustable Default Times (minutes)				
	C1 1st Backwash	C2 Regenerate	C3 2nd Backwash	C4 Rinse	C5 Fill
P0	3	50	3	3	1-99
P1	8	50	8	4	1-99
P2	8	70	10	6	1-99
P3	12	70	12	8	1-99
P4	10	50	Skipped	8	1-99
P5	4	50	Skipped	4	1-99
P6	12	6	Skipped	12	1-99
P7	6	Skipped	Skipped	4	
P8	10	Skipped	Skipped	6	



STEP 3SS – If program P0 through P6 was selected, enter in the minutes of fill using the UP or DOWN buttons. The allowable values vary from a low of 1 to a high of 99. If program P7, P8 or P9 was selected, dashes will appear for minutes of fill. Press SET HOUR button to go to Step 4SS. Note: For each minute of fill 0.5 gallons of water



Return to Normal Mode

is added to the solution tank. With salt (sodium chloride) this equates to approximately 1 1/2 pounds of salt per minute of fill.

STEP 4SS — Use UP or DOWN buttons to switch between:

- 1-99 Days Between Regen; or
- 7-Day.

Press SET HOUR button to go to Step 5SS.

STEP 5SS — Use UP or DOWN buttons to switch between 60 Hz or 50 Hz option. Press SET HOUR button to go to Step 6SS.

STEP 6SS — If a differential pressure switch is installed and actuated:

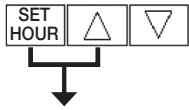
- a backwash will occur immediately if no arrow points at Regen Hour; or
 - a backwash will occur at the delayed regeneration hour if an arrow points at Regen Hour.
- Use UP or DOWN buttons to switch between the two choices. If a differential switch is not installed the settings in this display are ignored.



NOTE: A backwash will be initiated or scheduled after the control has received a signal for two minutes.

- Differential pressure switch connection
- Motor wire connection
- AC adapter wire connection

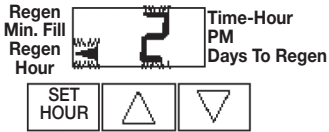
STEP 11D



settings in this display are ignored. Press SET HOUR to exit OEM system setup.

Installer Displays & Settings (1-99 Days Between Regeneration option)

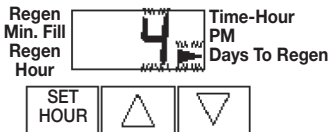
STEP 21D



STEP 11D – From normal mode, press SET HOUR + UP buttons simultaneously for 3 seconds and release.

STEP 21D – Backwash Time: Set the clock to the hour the regeneration should occur by using the UP or DOWN buttons. An arrow points to PM after 12. Press SET HOUR to go to STEP 31D.

STEP 31D

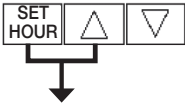


STEP 31D – Days To Backwash: Set the number of days between backwash. The allowable range is 1 to 99. Press SET HOUR to exit Installer Displays & Settings.

Return to Normal Mode

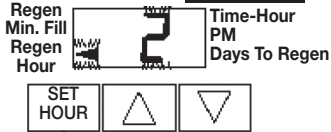
Installer Displays & Settings (7 day option)

STEP 117



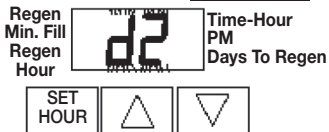
STEP 117 – From normal mode, press SET HOUR + UP buttons simultaneously for 3 seconds and release.

STEP 217



STEP 217 – Regeneration Time: Set the clock to the hour the regeneration should occur by using the UP or DOWN buttons. An arrow points to PM after 12. Press SET HOUR to go to STEP 317.

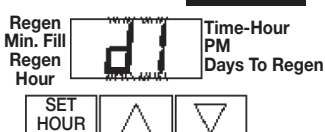
STEP 317



STEP 317 – Current Day of Week: Set the current day of the week by using the UP or DOWN buttons (See chart at right for date codes). Press SET HOUR to go to STEP 417.

Display	Day of Week
d1	Sunday
d2	Monday
d3	Tuesday
d4	Wednesday
d5	Thursday
d6	Friday
d7	Saturday

STEP 417

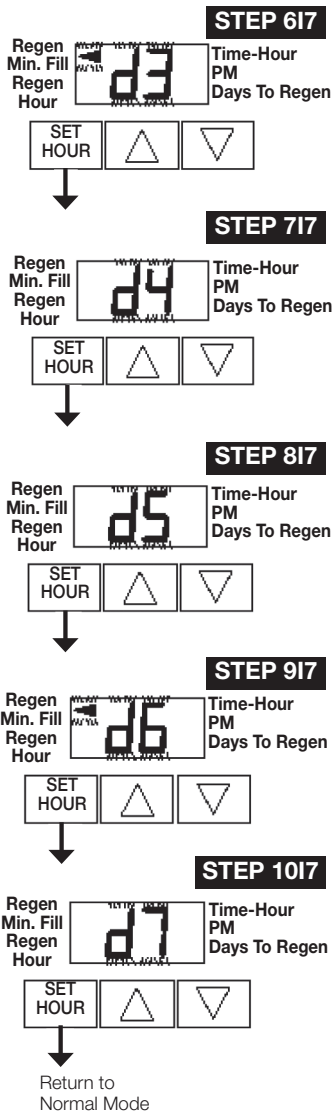


STEP 417 – Sunday backwash: To backwash on Sunday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Sunday. Press SET HOUR to go to STEP 517.

STEP 517



STEP 517 – Monday Backwash: To regenerate on Monday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Monday. Press SET HOUR to go to STEP 617.



STEP 617 – Tuesday Backwash: To regenerate on Tuesday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Tuesday. Press SET HOUR to go to STEP 717.

STEP 717 – Wednesday Backwash: To regenerate on Wednesday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Wednesday. Press SET HOUR to go to STEP 817.

STEP 817 – Thursday Backwash: To regenerate on Thursday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Thursday. Press SET HOUR to go to STEP 917.

STEP 917 – Friday Backwash: To regenerate on Friday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Friday. Press SET HOUR to go to STEP 1017.

STEP 1017 – Saturday Backwash: To backwash on Saturday use the UP or DOWN button until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Saturday. Press SET HOUR to exit Installer Displays & Settings.

NOTE: If all arrows are turned off in d1-d7, Days to Regen in the User Displays will always read 7 and a regeneration will never occur.

User Displays

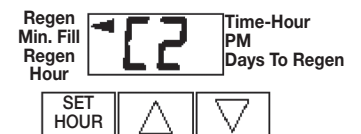
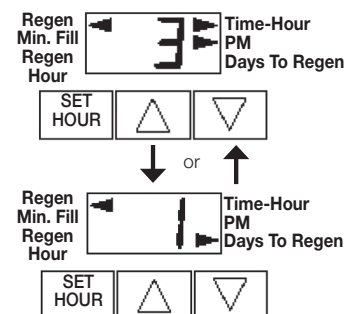
General Operation

When the system is operating one of two displays will be shown. Pressing UP or DOWN button will alternate between the displays. One of the displays is always the current time of day (to the nearest hour). The second display is the days remaining until the next backwash. If the days remaining is equal to one, a backwash will occur at the next preset regeneration time. The user can scroll between displays as desired.

If the system has called for a backwash that will occur at the preset time of backwash, the arrow will point to Regen.

Regeneration Mode

Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is backwash, untreated water will be used.



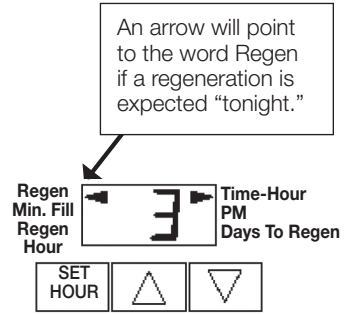
When the system begins to backwash, the display will change to indicate the cycle of the backwash process (see Table 3) that is occurring and an arrow will also point to Regen. The system will run through the steps automatically and will reset itself to provide treated water when the backwash is completed.

Manual Backwash

Sometimes there is a need to backwash the system sooner than when the system calls for it, usually referred to as a manual backwash. There may be a period of heavy water usage because of guests or a heavy laundry day.

To initiate a manual backwash at the preset delayed backwash time, simultaneously press UP + DOWN buttons together and release. The arrow will point to the word Regen if a regeneration is expected "tonight." To cancel the backwash simultaneously press UP + DOWN buttons and release.

To initiate a manual backwash immediately, simultaneously press UP + DOWN buttons together for three seconds. The system will begin to backwash immediately. The request cannot be cancelled.



Set Time of Day

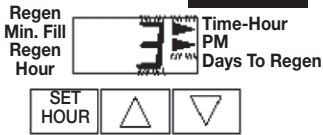
STEP 1U

STEP 1U – Press SET HOUR



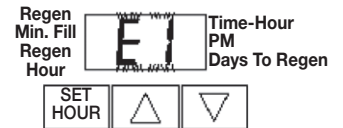
STEP 2U

STEP 2U – Current time: Set the clock to the closest hour by using the UP and DOWN button. An arrow points to PM after 12. After a power outage, the time of day will need to be reset. Press SET HOUR to exit.



Power Loss

If the power goes out current time of day will need to be reset. If the power goes out while the system is backwashing, the cycle picks up where it was interrupted when the power returns.



NOTES

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
For more information: www.watts.com/prop65

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