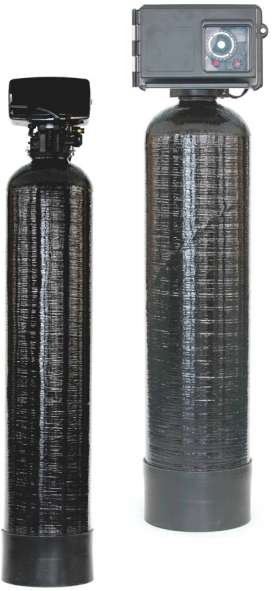
POWERLINE™

Softener Owners Manual



Models

PS 0840 Timer
PS 1040 Timer
PS 1054 Timer

PS 0840x Timer
PS 1040x Timer
PS 1054x Timer
PS 1353x Timer

PS 0840 Metered
PS 1040 Metered
PS 1054 Metered

PS 0840x Metered
PS 1040x Metered
PS 1054x Metered
PS 1353x Metered

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Product Line Overview

The PowerLine Softener system is designed for applications with levels of hardness <100 gpg and levels of iron <10 ppm. For applications with greater levels of hardness or iron, a duplex unit is recommended.

The PowerLine Softener is available in four (4) tank sizes, two (2) valve choices; fixed sequence times and adjustable sequence times and two regeneration control options; timered or metered. These options allow the ideal configuration to be used for your application.

PN	Description	Capacity	Valve	Control	Max Hardness / Iron*
13230	PS 0840 timer	21,000 grains	Fixed	Timer	40 / 2
13231	PS 1040 timer	30,000 grains	Fixed	Timer	40 / 2
13232	PS 1054 timer	45,000 grains	Fixed	Timer	40 / 2
13227	PS 0840 metered	21,000 grains	Fixed	Meter / time delay	40 / 2
13228	PS 1040 metered	30,000 grains	Fixed	Meter / time delay	40 / 2
13229	PS 1054 metered	45,000 grains	Fixed	Meter / time delay	40 / 2
13482	PS 0840x timer	21,000 grains	Adjustable	Timer	100 / 10
13486	PS 1040x timer	30,000 grains	Adjustable	Timer	100 / 10
13490	PS 1054x timer	45,000 grains	Adjustable	Timer	100 / 10
13494	PS 1353x timer	75,000 grains	Adjustable	Timer	100 / 10
13481	PS 0840x metered	21,000 grains	Adjustable	Meter / time delay	100 / 10
13485	PS 1040x metered	30,000 grains	Adjustable	Meter / time delay	100 / 10
13489	PS 1054x metered	45,000 grains	Adjustable	Meter / time delay	100 / 10
13493	PS 1353x metered	75,000 grains	Adjustable	Meter / time delay	100 / 10

* hardness in compensated grains/gallon = total hardness + 3x ferrous iron in mg/L
* as ferrous iron in mg/L

Valve Options

Two valve options are available:

Fixed Regeneration Sequence Time: This valve allows for a basic system setup and will provide for operation on inlet water supplied less than 40 grains hardness and 2 ppm of ferrous iron.

Adjustable Regeneration Sequence Time: This valve allows for higher levels of hardness and iron to be treated by the system. This valve allows for the time adjustment of each stage of regeneration. This additional control provides for improved performance and reduced water consumption.

Regeneration Control Options

There are two options for the type of regeneration control signals used on the PowerLine Softeners: timers and meters. Selection between these options will depend on your inlet water quality and desired system efficiency.

Timer Control: This system control will regenerate your softener on a given day of the week. Each PowerLine Softener is designed with a 12 day timer. Set-up is simple, with each day independently

selected to start regeneration. If the skipper wheel (day of the week wheel) is programmed to regenerate, then the unit will start a regeneration at 2:00 am on that day.

Metered with Time Delay: The metered systems provide improved efficiency over timer configurations, as these units regenerate based on the actual water used. The integrated system meter tracks the volume of water processed, and after the setpoint has been achieved and the unit's regeneration time is met (2:00 am), regeneration will start.

Operational Specifications

Description	Service Flow	Injector	Backwash	Resin Volume
PS 0840 – Timer & Metered	7 gpm	#1, white	1.5 gpm	0.7 ft^3
PS 1040 – Timer & Metered	9 gpm	#1, white	2.0 gpm	1.0 ft^3
PS 1054 – Timer & Metered	12 gpm	#1, white	2.4 gpm	1.5 ft^3
PS 0840x – Timer & Metered	7 gpm	#0, red	1.5 gpm	0.7 ft^3
PS 1040x – Timer & Metered	9 gpm	#1, white	2.0 gpm	1.0 ft^3
PS 1054x – Timer & Metered	12 gpm	#1, white	2.4 gpm	1.5 ft^3
PS 1353x – Timer & Metered	13 gpm	#3, yellow	4.0 gpm	2.5 ft^3

Operational Sequence Definitions

Service: Hard water enters unit at valve inlet and flows down through the mineral in the mineral tank. Conditioned water enters center tube through the bottom distributor, then flows up through the center tube, around the piston and out the outlet of the valve.

Preliminary Rinse: Slow rinse of the resin bed. Water flows down through the resin bed, up the bottom distributor and out the drain.

Backwash: Hard water enters unit at valve inlet, flows through the piston, down center tube, through the bottom distributor, and up through the resin, around the piston and out the drain line. Water is passed through the resin bed in the opposite direction of normal flow, which flushes suspended matter out of the resin tank. Backwashing also loosens the resin bed which becomes compacted during the softening (service) cycle.

Brine/Slow Rinse: Hard water enters the unit at valve inlet, flows up into the injector housing and down through the nozzle and throat to draw brine from the brine tank, brine flows down through resin and enters the center tube through the bottom distributor and out through the drain line. The resin beads are washed with the strong solution of salt water which is called the brine solution. Since the resin beads prefer calcium and magnesium ions, the slow rinse allows an overwhelming concentration of sodium ions to overpower and force the calcium and magnesium ions off of the resin beads and are then discharged down the drain.

Rapid Rinse: The resin bed is rinsed to remove excess brine solution from the tank, and the resin beads are then ready to produce soft water again. Hard water enters unit at valve inlet, flows through the piston, down the center tube, through the bottom distributor, and up through the resin bed, around the piston and out the drain line.

Brine Tank Refill: Hard water enters unit at valve inlet, flows up through the injector housing, through the brine valve to refill the brine tank. Valve is now delivering soft water to the home. Raw water is refilling the brine tank to make a brine solution for the next regeneration.

Regeneration: When the valve is in regeneration, raw water is being passed to service until rapid rinse is complete.

System Operational Sequences

Sequence	Fixed Valve	Adjustable Valve
Service	X	X
Preliminary Rinse	X	
Backwash	X	X
Brine / Slow Rinse	X	X
Rapid Rinse	X	X
Brine Tank Refill	X	X
Regeneration	X	X

Residential Checklist

Adding Salt
Ensure that the salt level in the brine tank is always above the water line.

Water Pressure
Inlet water pressure range of 20-125 psi is required for regeneration valve to operate effectively.

Electrical Facilities
An uninterrupted alternating current (A/C) supply is required. Please make sure voltage supply is compatible with unit before installation.

Existing Plumbing
Condition of existing plumbing should be free from lime and iron buildup. Replace piping that has heavy lime and/or iron buildup. If piping is clogged with iron, install a separate iron filter unit ahead of the water softener.

By-pass Valves
Always provide for the installation of a by-pass valve if unit is not equipped with one. If valve is leaking, turn by-pass from Service to the By-pass position.

NOTE: If the valve continues to leak after turning the by-pass to By-pass position, shut off the main water line and call your local service technician (preferably the one who installed the system) IMMEDIATELY.

CAUTION
- Do not exceed water pressure of 120 psi.
- Do not exceed water temperature of 110 ºF.
- Do not subject unit to freezing conditions.

Installation

Existing Plumbing
Condition of existing plumbing should be free from lime and iron buildup. Replace piping that has heavy lime and/or iron buildup.

Location of Softener and Drain
Locate the system close to a clean working drain and connect according to local plumbing codes.

By-pass Valves
Always provide for the installation of a by-pass valve if unit is not equipped with one.

CAUTION
- Do not exceed water pressure of 120 psi.
- Do not exceed water temperature of 110 ºF.
- Do not subject unit to freezing conditions.

Valve Installation and Start-up Procedures
1. Place the softener tank where you want to install the unit. **NOTE:** Be sure the tank is level and on a firm base.

2. During cold weather it is recommended that the installer warm the valve to room temperature before operating.

3. Perform all plumbing according to local plumbing codes.
   - Use a ½ inch minimum pipe size for the drain.
   - Use a ¾ inch drain line for backwash flow rates that exceed 7 gpm or length that exceeds 20 ft (6 m).

4. Cut the 1 inch distributor tube (1.050 O.D.) flush with top of each tank.

5. Lubricate the distributor O-ring seal and tank O-ring seal. Place the main control valve on tank. **NOTE:** Only use silicone lubricant.

6. Solder joints near the drain must be done before connecting the Drain Line Flow Control fitting (DLFC). Leave at least 6 inches (152 mm) between the DLFC and solder joints when soldering pipes that are connected on the DLFC. Failure to do this could cause interior damage to DLFC.

7. Use only Teflon tape on the drain fitting.

8. Be sure the floor under the salt storage tank is clean and level.

9. If a setting of less than 9 lbs. is used, remove grid plate from salt storage tank.

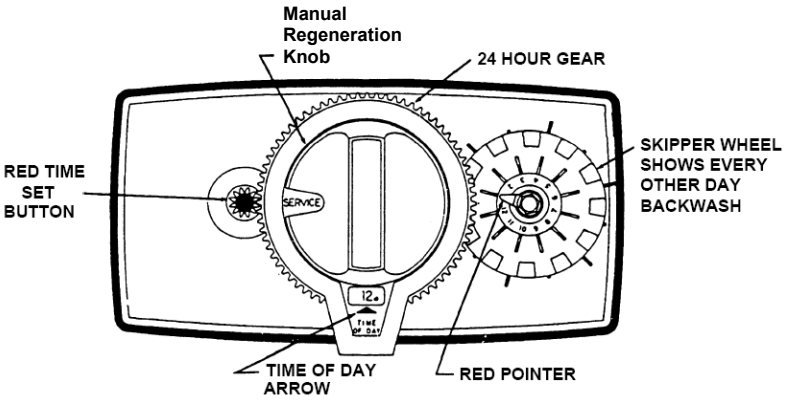
10. Place approximately 1 inch (25 mm) of water above the grid plate. If a grid is not utilized, fill to the top of the air check in the salt tank. Do not add salt to the brine tank at this time.

11. On units with a by-pass, place in By-pass position. Turn on the main water supply. Open a cold soft water tap nearby and let water run a few minutes or until the system is free of foreign material (usually solder) resulting from the installation. Close the water tap when water runs clean.

12. Place the by-pass in the Service position and let water flow into the softener tank. When water flow stops, slowly open a cold water tap nearby and let water run until air is purged from the unit. Then close tap. **Note:** There may be some initial “color throw” from the media in the tank.

13. Plug the valve into an approved power source. When the valve has power, it drives to the Service position.

PowerLine Fixed Regen, Timered Systems- Start-up Procedures



NOTE: Install the water softener with the inlet, outlet and drain connections made according to manufacturer's recommendations and to meet applicable plumbing codes.

1. Manually index the softener control into the Service position and let water flow into the resin tank. When the water flow stops, open a softened water tap until all air is released from the lines. Then close tap. **NOTE:** Manually dial the various regeneration positions by turning the knob on the front of the control until the indicator shows that the softener is in the desired position.

2. Manually index the control to the Backwash position and allow water to flow at the drain for 3 or 4 minutes.

3. Remove back cover plate.

4. Make sure that the salt dosage is set as recommended by the manufacturer. If necessary, set salt according to the setting instruction sheet. Manually index the control to the Brine Fill position, and allow the brine tank to fill to the top of the air check.

5. Manually index the control to the Brine Draw position, and allow the control to draw water from the brine tank until it stops.

6. Plug in the electrical cord, and look in the sight hole in the back of the motor to see that it is running. Set the days that regeneration is to occur by sliding tabs on skipper wheel outward to expose trip fingers.
   - Each tab is one day.
   - Finger at red pointer is tonight.
   - Moving clockwise from red pointer, extend or retract fingers to obtain the desired regeneration schedule.

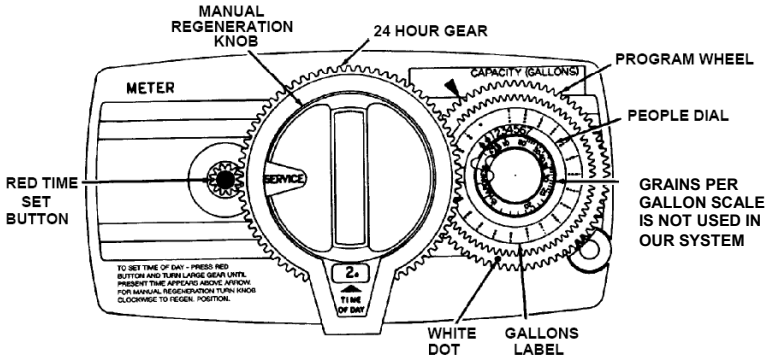
7. Manually advance the control to the beginning of the Brine Fill position, and allow the control to return to the Service position automatically.

8. Fill the brine tank with salt.

9. Replace back cover on the control.

10. Make sure that any by-pass valving is left in the normal Service position.

PowerLine Fixed Regen, Metered Systems- Start-up Procedures



1. Manually index the softener control to the Service position and let water flow into the resin tank. When the water flow stops, open a softened water tap until all air is released from the lines. Then close tap. **NOTE:** The various regeneration positions may be dialed manually by turning the knob on the front of the control until the indicator shows that the softener is in the desired position.
    - To set time of day, press red time set button and turn 24-hour gear until present time of day is at “time of day.”

    - Programming procedures calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons available at the small white dot on program wheel gear. Note, drawing shows 850 gallon setting. The capacity (gallons) arrow denotes remaining gallons exclusive of fixed reserve.

      ie: Calculated gallon capacity of system is 1000 gallons. Number of people using the system is 4. Use 75 gallons per person for a safe reserve capacity - 300 gallons reserve = 700 gallons available. This number should be set opposite the white dot on program wheel.

2. Rotate program wheel counterclockwise until it stops at Regeneration position.

3. Manually index the control to the Backwash position, and allow water to flow at the drain for 3 or 4 minutes.

4. Remove back cover plate.

5. Make sure that the salt dosage is set as recommended by the manufacturer. Manually index the control to the Brine Fill position, and allow the brine tank to fill to the top of the air check.

System Description	Brine Setting
PS 0840 – Timer & Metered	10.5 lbs.
PS 1040 – Timer & Metered	15 lbs.
PS 1054 – Timer & Metered	22.5 lbs.
PS 0840x – Timer & Metered	10.5 lbs.
PS 1040x – Timer & Metered	15 lbs.
PS 1054x – Timer & Metered	22.5 lbs.
PS 1353x – Timer & Metered	31.5

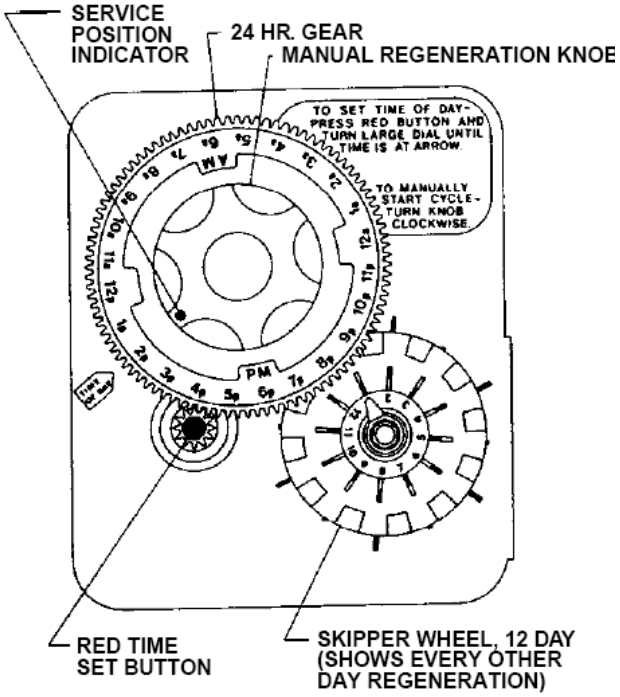
6. Manually index the control to the Brine Rinse position, and allow the control to draw water from the brine tank until it stops.

7. Plug in the electrical cord and look in the sight hole in the back of the monitor to see that it is running.

8. Manually advance the control to the beginning of the Brine Fill position, and allow the control to return to the Service position automatically.

9. Fill the brine tank with salt.

PowerLine Adjustable Regen, Timered Systems- Start-up Procedures



NOTE: Install the system with the inlet, outlet and drain connections made according to manufacturer's recommendations and to meet applicable plumbing codes.

1. Remove control box cover.

2. Set "Time of Day" and "Program Wheel." Rotate program wheel counter clockwise until it stops at regeneration position.

3. Observe regeneration cycle settings. Arrange cycle times as determined.

4. **Note**: To set the various positions listed in #5 below: turn the manual regeneration knob slowly in a clockwise direction until the Program Micro Switch lifts on top of the first set of pins. Allow the drive motor to move the piston to the next regeneration step. Always allow the motor to stop before moving to the next set of pins or spaces.

5. Control Valve Positions
   a. Service — Drive shaft out
   b. Backwash — Drive shaft in
   c. Brine/Slow Rinse — Drive shaft ½ way out
   d. Rapid Rinse — Drive shaft ¾ way out

6. Position valve to backwash, and check to make sure that the drain line flow remains steady for ten (10) minutes or until clear (see above).

7. Position valve to rapid rinse, and check the drain line flow. Run for five (5) minutes or wait until the water is clear. (**Note:** Rapid rinse and backwash flow rates should be the same).

8. Replace control box cover.

PowerLine Timer Setting Procedures

1. How to Set Days on Which System is to Backwash
Rotate skipper wheel until the number "1" is at the red pointer.

Set the days that regeneration is to occur by sliding tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight.

Moving clockwise from the red pointer, extend or retract fingers to obtain the desired regeneration schedule.

2. How to Set the Time of Day
Press and hold in the red button to disengage the drive gear.

Turn the large gear until the actual time of day is at the time of day pointer.

Release the red button to again engage the drive gear.

3. How to Manually Regenerate Your Water Softener at Any Time
Turn the manual regeneration knob clockwise.

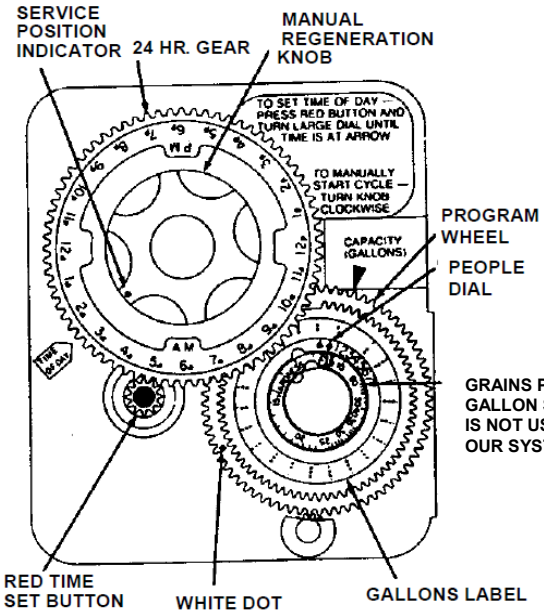
The slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

The black center knob will make one revolution in the following three (3) hours (approximately) and stop in the position shown in the previous drawing.

Even though it takes three (3) hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set only ½ of this time.

In any event, conditioned water may be drawn after water stops flowing from the water filter drain line.

PowerLine Adjustable Regen, Metered Systems- Start-up Procedures



1. **Programming Procedure**
   Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons available opposite the small white dot on the program wheel gear. Note, drawing shows 850 gallon setting. The capacity (gallons) arrow denotes remaining gallons exclusive of fixed reserve.

   ie: Calculated gallon capacity of system is 1000 gallons. Number of people using the system is 4. Use 75 gallons per person for a safe reserve capacity - 300 gallons reserve = 700 gallons available. This number should be set opposite the white dot on program wheel.

2. **How To Set The Time Of Day**
   Press and hold in the red button to disengage the drive gear. Turn the large gear until the actual time of day is at the time of day pointer. Release the red button to again engage the drive gear.

3. **How To Manually Regenerate Your Water Conditioner At Any Time:**
   Turn the manual regeneration knob clockwise.

   This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

The black center knob will make one revolution in the following three hours (approximately) and stop in the position shown in the drawing.

Even thought it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set only one half of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

PowerLine Softener Troubleshooting

Softener fails to regenerate.	A. Electrical service to unit has been interrupted. B. Timer is defective. C. Power failure.	A. Assure permanent electrical service (check fuse, plug, pull chain or switch). B. Replace timer. C. Reset time of day.
Softener delivers hard water.	A. By-pass valve is open. B. No salt in brine tank. C. Injectors or screen is plugged. D. Insufficient water flowing into brine tank. E. Hot water tank hardness. F. Leak at distributor tube. G. Internal valve leak.	A. Close by-pass valve. B. Add salt to brine tank and maintain salt level above water level. C. Replace injectors and screen. D. Check brine tank fill time and clean brine line flow control if plugged. E. Repeated flushings of the hot water tank is required. F. Make sure distributor tube is not cracked. Check O-ring and tube pilot. G. Replace seals and spacers and/or piston.
Unit uses too much salt.	A. Improper salt setting. B. Excess water in brine tank.	A. Check salt usage and salt setting. B. See excessive water in brine tank.
Loss of water pressure.	A. Iron buildup in line to water softener. B. Iron buildup in water softener. C. Inlet control plugged due to foreign material loose from pipes by recent work done on plumbing system.	A. Clean line to water filter. B. Clean control and add media cleaner to media bed. Increase frequency of regeneration. C. Remove piston and clean control.
Loss of media through drain line.	A. Air in water system.	A. Assure that well system has proper air elimination control. Check for dry well condition.
Iron in conditioned water.	A. Fouled media bed.	A. Check backwash, brine draw and brine tank fill, increase frequency of regeneration, increase backwash time.
Excessive water in brine tank.	A. Plugged drain line flow control.	A. Clean flow control.

Salt water in service line.	A. Plugged injector system. B. Timer not cycling. C. Foreign material in brine valve. D. Foreign material in brine line flow control.	A. Clean injector and replace screen. B. Replace timer. C. Clean or replace brine valve. D. Clean brine line flow control.
Softener fails to draw brine.	A. Draw line flow control is plugged. B. Injector is plugged. C. Injector screen plugged. D. Line pressure is too low. E. Internal control leak.	A. Clean drain line flow control. B. Clean or replace injectors. C. Replace screen. D. Increase line pressure (minimum 20 psi). E. Change seals, spacers and/or piston assembly.
Control cycles continuously.	A. Faulty timer mechanism.	A. Replace timer.
Drain flows continuously.	A. Foreign material in control. B. Internal control leak. C. Control valve jammed in brine or backwash position. D. Timer motor stopped or jammed.	A. Remove piston assembly and inspect bore, remove foreign material and check control in various regeneration positions. B. Replace seals and/or piston assembly. C, Replace seals and/or piston assembly. D. Replace timer.

Notes:

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