WSI CONTROL VALVE SETUP INSTRUCTIONS

1" & 1-1/4" Control Valve

For Service Call:
863-559-3199

Introduction

This manual is about a control valve to be used on water softeners or water filters. The manual is designed to aid water treatment equipment manufacturers in the selection of the various control valve options. Information in this manual is different than what is needed for installation and servicing of a particular water treatment system. This manual is not intended to be used as a manual for a complete water softener or filter. Certain parts of the manual will serve as aids to manufacturers in the writing and layout of the manuals for installers and service personnel.

The following general warnings and the specifications in Table 1 must appear in the OEM's System Manual.

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.

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. **Avoid any type of lubricants, including silicone, on the clear lip seals.**

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.

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.

After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack from the printed circuit board (black wire) and plug back in. 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.

All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be a minimum of ½". Backwash flow rates in excess of 7 gpm or length in excess of 20' require ¾" drain line.

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.

Plug into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.)

Install grounding strap on metal pipes.

Control Valve Function and Cycles of Operation

This glass filled Noryl[1] (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. When the WS1CH control valve is manufactured as a softener, the control valve can be ordered to perform downflow or upflow regeneration. The WS1.25CH control valve is only available in downflow regeneration. When the WS1CH or WS1.25CH control valve is set up as a filter, the control valve can be set to perform downflow regeneration or simply backwash. The control valve can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days). The control valve can be set so that a softener can meet the Water Quality Association (WQA) Standard S100 or NSF/ANSI Standard 44 efficiency rating.

It is not recommended to change control valves from downflow to upflow brining or vice versa in the field. The valve bodies for downflow and upflow are unique to the regeneration type and and should not be interchanged. A mismatch of valve body and regeneration piston will result in hard water bypass during service.

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.

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. 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.

The control valve's unique design and electronics allow the OEM the flexibility shown in Tables 3 and 4.

Table 3
Regeneration Cycles Softening

WS1CH & WS1.25CH Downflow Regenerant Refill After Rinse	WS1CH & WS1.25CH Downflow Regenerant Prefill	WS1CH only Upflow Regenerant Refill After Rinse	WS1CH only Upflow Regenerant Prefill
1st Cycle: Backwash	1st Cycle: Fill	1st Cycle: UP Brine	1st Cycle: Fill
2nd Cycle: dn Brine	2nd Cycle: Softening	2nd Cycle: Backwash	2nd Cycle: Softening
3rd Cycle: Backwash	3rd Cycle: Backwash	3rd Cycle: Rinse	3rd Cycle: UP Brine
4th Cycle: Rinse	4th Cycle: dn Brine	4th Cycle: Fill	4th Cycle: Backwash
5th Cycle: Fill	5th Cycle: Backwash	5th Cycle: Service	5th Cycle: Rinse
6th Cycle: Service	6th Cycle: Rinse		6th Cycle: Service
	7th Cycle: Service		

[1] Noryl is a trademark of General Electric.

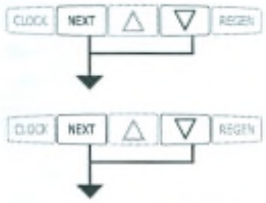
OEM Cycle Sequence

OEM Cycle Sequence instructions allows the OEM to set meter size, dPswitch or alternating valve, pre or post fill and dn or up brine where applicable. Fill and brine values are ignored when the system is set up as a filter. The OEM Softener System Setup or the OEM Filter System Setup allow the OEM to set how long cycles will last.

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.

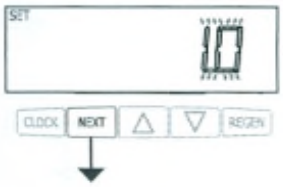
The following is an example of how to set a valve so that when regeneration is initiated BACKWASH occurs first, dn BRINE occurs second, RINSE occurs third, and FILL occurs fourth.

STEP 1C



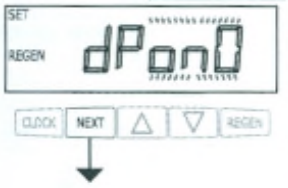
Step 1C – Press NEXT and ▼ simultaneously for 3 seconds and release. Then press NEXT and ▼ simultaneously for 3 seconds and release. If screen in Step 2C does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and SET CLOCK in sequence, then press NEXT and ▼ simultaneously for 3 seconds and release. Then press NEXT and ▼ simultaneously for 3 seconds and release.

STEP 2C



Step 2C – Use the ▲ or ▼ to select 1.0 for WS1CH or 1.25 for WS1.25CH valve. Press NEXT to go to Step 3C. Press REGEN to exit OEM Cycle Sequence.

STEP 3C



Step 3C – Allows selection of one of the following:

- an outside signal to initiate a regeneration;
- the Control Valve to act as an alternator; or
- the Control Valve to have no hard water bypass.

Selecting the use of an outside signal to initiate a regeneration:
Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Following is an explanation of the options:

dPon0 - If the dP switch is closed for an accumulative time of 2 minutes a regeneration will occur immediately.

dPdEL - If the dP switch is closed for an accumulative time of 2 minutes a regeneration will occur at the scheduled regeneration time.

HoLd - If the dP switch is closed a regeneration will be prevented from occurring.

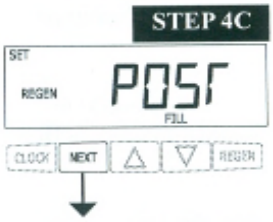
Selecting the Control Valve to act as an alternator:
Note: Also must do one of the following:

- If set up for a softener in Step 9S set Volume Capacity in GALLONS, in Step 10S select Regeneration Time Option "on 0" and in Step 3I select Day Override "oFF".
- If set up for a filter, in Step 8F set Volume Capacity in GALLONS, in Step 9F select Regeneration Time Option "on 0" and in Step 3I select Day Override "oFF".

Select ALTA for the control valve that has the two pin connector labeled DRIVE connected to the alternator valve motor.
Select ALTb for the control valve that will not be connected to the alternator valve motor.

Configuring the Control Valve for No Hard Water Bypass Operation:
Selection requires a connection to a Clack Two Way Motorized Valve or a Clack Motorized Alternator Valve (MAV) is made to the two pin connector labeled ALTERNATOR DRIVE located on the printed circuit board. The Clack Two Way Motorized Valve can be connected to the valve outlet in either direction. The B port of a MAV must be plugged and the valve outlet connected to the A port. The Clack Two Way Motorized Valve or a Clack Motorized Alternator Valve will be driven closed before the first regeneration cycle that is not FILL or SOFTENING or FILTERING, and be driven open after the last regeneration cycle that is not FILL.

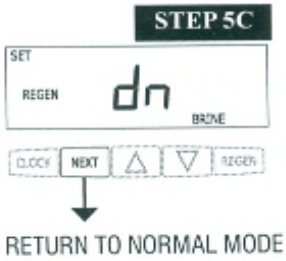
Press NEXT to go to Step 4C. Press REGEN to return to previous step.



STEP 4C – Set Refill option using ▼ or ▲ buttons:

- "PoST" to refill the brine tank after the final rinse; or
- "PrE" to refill the brine tank two hours before the regeneration time set.

If selecting "Filter" in Step 2F, "POST" should always be selected.
Press NEXT to go to Step 5C. Press REGEN to return to previous step.



STEP 5C – Set regenerant downflow or upflow using ▼ or ▲ buttons:

- "dn" if the regenerant is to flow downward through the media; or
- "UP" if the regenerant is to flow upward through the media. Step 2C must be set to 1 for a 1" valve.

Prior to selecting a regenerant flow direction, 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. This screen will not display if the unit is set up as a 1.25",1.5",2" or filter valve.
If selecting "Filter" in Step 2F, "dn" should always be selected.
Press NEXT to exit OEM Cycle Sequence. Press REGEN to return to previous step.

OEM Softener System Setup

In OEM Softener System Setup the OEM chooses the value for the specified cycles (the order of which is specified by the selections for Step 4C and Step 5C in OEM Cycle Sequence) and specifies other operating parameters for the system. If a cycle is present the value can be set to off. Fill is in pounds of salt and all other cycles are in minutes.

Step 4C	Step 5C	Cycle Order
Post	dn	Backwash, Brine, Backwash, Rinse, Fill
Pre	dn	Fill, Service, Backwash, Brine, Backwash, Rinse
Post	UP	Brine, Backwash, Rinse, Fill
Pre	UP	Fill, Service, Brine, Backwash, Rinse

Note: If "Pre" is selected in Step 4C and "UP" is selected in Step 5C, the proportional brining display will appear after the Grains Capacity display (Step 8S).

STEP 1S

Step 1S – Press NEXT and ▼ simultaneously for 3 seconds and release. If screen in Step 2S does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and SET CLOCK in sequence, then press NEXT and ▼ simultaneously for 3 seconds and release.

STEP 2S

Step 2S – Choose SOFTENING using the ▼ or ▲ button. Press NEXT to go to Step 3S. Press REGEN to exit OEM Softener System Setup.

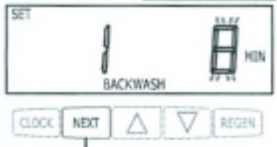
STEP 3S

Step 3S – Select the time for the first cycle (which in this example is BACKWASH) using the ▼ or ▲ button. Press NEXT to go to Step 4S. Press REGEN to return to previous step.

STEP 4S

Step 4S – Select the time for the second cycle (which in this example is dn BRINE) using the ▼ or ▲ button. 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 NEXT to go to Step 5S. Press REGEN to return to previous step.
NOTE: The display will flash between cycle number and time, and brine direction (dn or UP).

STEP 5S



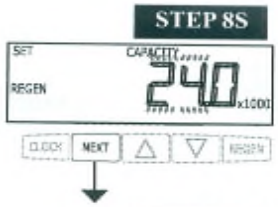
Step 5S – Select the time for the third cycle (which in this example is BACKWASH) using the ▼ or ▲ button. Press NEXT to go to Step 6S. Press REGEN to return to previous step.

STEP 6S

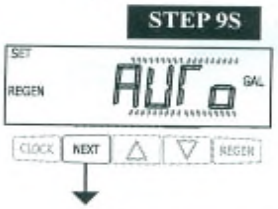
Step 6S – Select the time for the fourth cycle (which in this example is RINSE) using the ▼ or ▲ button. Press NEXT to go to Step 7S. Press REGEN to return to previous step.

STEP 7S

Step 7S – Select the LBS for the fifth cycle (which in this example is FILL) using the ▼ or ▲ button. Press NEXT to go to Step 8S. Press REGEN to return to previous step.

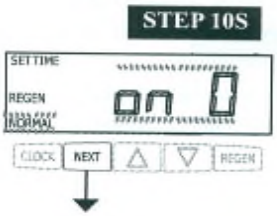


Step 8S –Set Grains Capacity using the ▼ or ▲ button. The ion exchange capacity is in grains of hardness as calcium carbonate for the system based on the pounds of salt that will be used. Calculate the pounds of salt using the fill time previously selected. The allowable grains capacity range varies from 5000 to 500,000 grains. Grains capacity is affected by the fill time. The grains capacity for the selected fill time should be confirmed by OEM testing. The capacity and hardness levels entered are used to automatically calculate reserve capacity when gallon capacity is set to AUTO. Press NEXT to go to Step 9S. Press REGEN to return to previous step.



Step 9S – Set Volume Capacity using the ▼ or ▲ button. If value is set to:
- "AUTO" capacity will be automatically calculated and reserve capacity will be automatically estimated;
- "oFF" regeneration will be based solely on the day override set (see Installer Display Settings Step 3I); or
- as a number (allowable range 20 to 250,000) regeneration initiation will be based off the value specified.

If "oFF" or a number is used, hardness display will not be allowed to be set in Installer Display Settings Step 2I. See Table 8 for more detail. Press NEXT to go to Step 10S. Press REGEN to return to previous step.

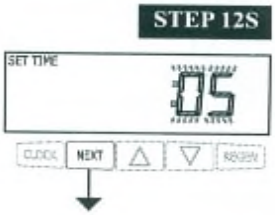


Step 10S – Set Regeneration Time Options using the ▼ or ▲ button. If value is set to:
- "NORMAL" means regeneration will occur at the preset time;
- "on 0" means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
- "NORMAL + on 0" means regeneration will occur at one of the following:
  - — the preset time when the gallons capacity falls below the reserve or the specified number of days between regenerations is reached, whichever comes first; or
  - — after 10 minutes of no water usage when the gallons capacity reaches 0 (zero). See Table 8 for more detail.

Press NEXT to go to Step 11S. Press REGEN to return to previous step.

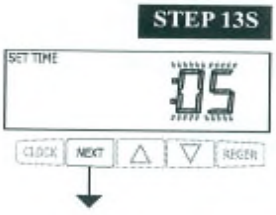
Step 11S – Set Relay operation using the ▼ or ▲ button. The choices are:
- Relay Actuation Time: After the start of a regeneration the amount of time that should pass prior to activating the relay. The start of regeneration is defined as the first backwash cycle, Dn brine cycle or UP brine cycle which ever comes first.
- Set Gal Softening on: Relay activates after a set number of gallons have been used while in service and then deactivates after a set period of time or after the meter stops registering flow, whichever comes first.
- Set Gal Softening Regen on: Relay activates after a set number of gallons have been used while in service or during regeneration and then deactivates after a set period of time or after the meter stops registering flow, whichever comes first.
- Set Gal HoLd: Relay closes every set number of gallons and releases when the ▲ button is pressed.
- Set Off: If set to Off, Steps 12S and 13S will not be shown.

Press NEXT to go to Step 12S. Press REGEN to return to previous step.



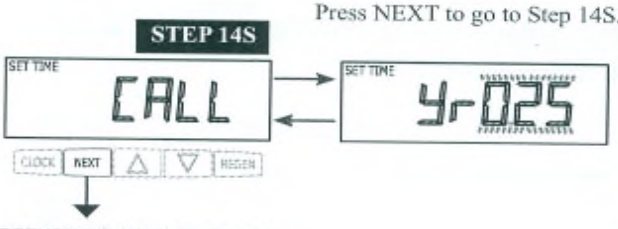
Step 12S: Set Relay Actuation Time or Gallons using the ▲ or ▼ buttons. The choices are:
- Relay Actuation Time: After the start of a regeneration the amount of time that should pass prior to activating the relay. The start of regeneration is defined as the first backwash cycle or Dn brine cycle, which ever comes first. Ranges from 1 minute to 500 minutes.
- Relay Actuation Gallons: Relay activates after a set number of gallons have passed. Ranges from 1 to 100 gallons.
- Relay HoLd: Relay closes every set number of gallons. Ranges from 1,000 to 99,000,000 gallons.

Press NEXT to go to Step 13S. Press REGEN to return to previous step.



Step 13S: Set Relay Deactivate Time using the ▲ or ▼ buttons.
- If Set Time on is selected in Step 11S the relay will deactivate after the time set has expired. Ranges from 1 second to 500 minutes.
- If Set Gal Softening on or Set Gal Softening Regen on is selected in Step 11S the relay will deactivate after the time set has expired or after the meter stops registering flow, whichever comes first. Ranges from 1 second to 500 minutes.
- Does not display for Gal HoLd selection.

Press NEXT to go to Step 14S. Press REGEN to return to previous step.

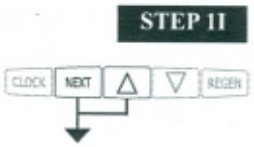


Step 14S: Set the Service Call Indicator by using the ▲ or ▼ buttons. Range is in ¼ of a year increments from 0.25 to 9.75 years. Selecting OFF will disable this feature.

Press NEXT to exit OEM Softener System Setup. Press REGEN to return to previous step.

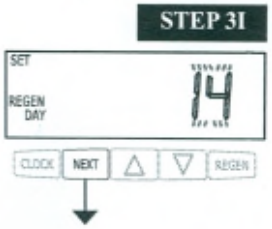
RETURN TO NORMAL MODE

Installer Display Settings



STEP 1I - Press NEXT and ▲ simultaneously for 3 seconds.

STEP 2I – Hardness: Set the amount of hardness in grains of hardness as calcium carbonate per gallon using the ▼ or ▲ buttons. The default is 20 with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon can be increased if soluble iron needs to be reduced. This display will show "–nA–" if "FILTER" is selected in Step 2F or if 'AUTO' is not selected in Set Volume Capacity in OEM Softener System Setup. Press NEXT to go to step 3I. Press REGEN to exit Installer Display Settings.



STEP 3I – Day Override: When volume capacity is set to "oFF", sets the number of days between regenerations. When volume capacity is set to AUTO or to a number, sets the maximum number of days between regenerations. If value set to "oFF", regeneration initiation is based solely on volume used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient volume of water were not used to call for a regeneration. Set Day Override using ▼ or ▲ buttons:

- number of days between regeneration (1 to 28); or
- "oFF".

See Table 8 for more detail on softener setup and Table 9 for more detail on filter setup. Press NEXT to go to step 4I. Press REGEN to return to previous step.

STEP 4I – Next Regeneration Time (hour): Set the hour of day for regeneration using ▼ or ▲ buttons. AM/PM toggles after 12. The default time is 2:00 AM. This display will show "on 0" if "on 0" is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup. Press NEXT to go to step 5I. Press REGEN to return to previous step.

STEP 5I – Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▼ or ▲ buttons. This display will not be shown if "on 0" is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup. Press NEXT to exit Installer Display Settings. Press REGEN to return to previous step.

To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The control valve may be stepped through the various regeneration cycles by pressing the "REGEN" button.

User Display Settings

General Operation

When the system is operating, one of five displays may be shown. Pressing NEXT will alternate between the displays. One of the displays is always the current time of day.

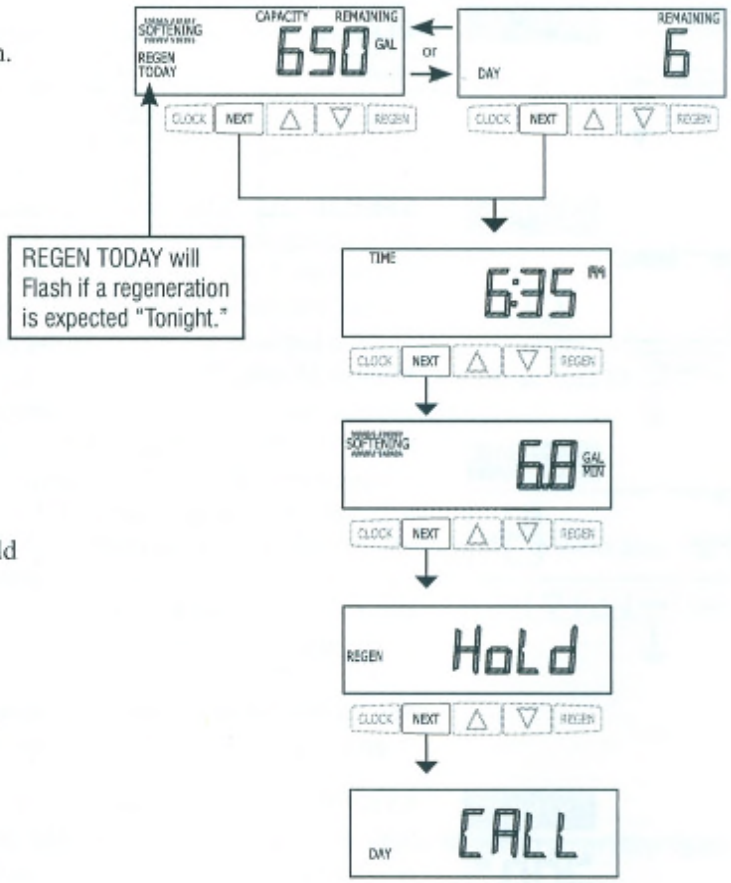
The second display is one of the following: days remaining or volume remaining. Days remaining is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the gallons that will be treated before the system goes through a regeneration cycle. Pressing the ▼ button while in the Capacity Remaining display will decrease the capacity remaining in 10 gallon increments and will also increase the volume used impacting the recorded values in Diagnostics Steps 3D, 4D and 5D and Valve History, Step 4VH.

The third display shows the current treated water flow rate through the system. The fourth display will show either dP or hold if the dP switch is closed.

The fifth display indicates the user should call for service. The fifth display will not appear if OFF is selected in Step 14S of OEM Softener System Setup or Step 13F of OEM Filter System Setup. To clear the Service Call reminder, press the ▲ and ▼ buttons simultaneously while CALL is displayed.

If the system has called for a regeneration that will occur at the preset time of regeneration, the words REGEN TODAY will appear on the display.

If a water meter is installed, the word "Softening" or "Filtering" flashes on the display when water is being treated (i.e. water is flowing through the system).



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 regenerating, untreated water will be used.

When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

Manual Regeneration

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

To initiate a manual regeneration at the preset delayed regeneration time, when the regeneration time option is set to "NORMAL" or "NORMAL + on 0", press and release "REGEN". The words "REGEN TODAY" will flash on the display to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request. Note: If the regeneration time option is set to "on 0" there is no set delayed regeneration time so "REGEN TODAY" will not activate if "REGEN" button is pressed.

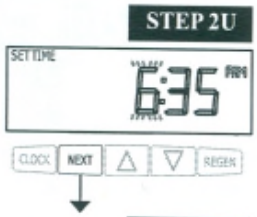
To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled.

Note: For softeners, if the brine tank does not contain salt, fill with salt and wait at least two hours before regenerating.

Set Time of Day

The user can also set the time of day. Time of day should only need to be set if the battery has been depleted because of extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The non rechargeable battery should also be replaced.

STEP 1U – Press SET CLOCK.



STEP 2U - Current Time (hour): Set the hour of the day using ▼ or ▲ buttons. AM/PM toggles after 12. Press NEXT to go to Step 3U.

STEP 3U - Current Time (minutes): Set the minutes of the day using ▼ or ▲ buttons. Press NEXT to exit Set Time of Day. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

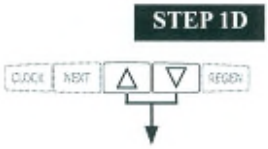
Power Loss

If the power goes out the system will keep time until the battery is depleted. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset and the battery replaced. The system will remember the rest.

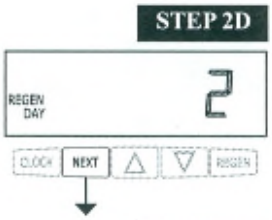
Error Message

If the word "ERROR," a number and the word "CALL" are alternately flashing on the display contact the OEM for help. A number indicates that the valve was not able to function properly.

Diagnostics

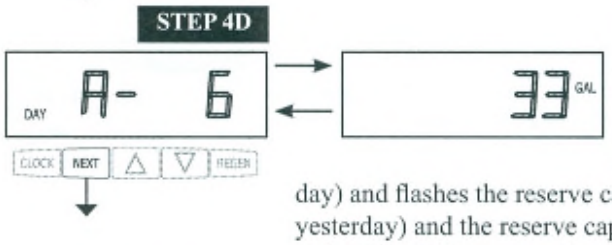


STEP 1D – Press ▲ and ▼ simultaneously for three seconds. If screen in step 2D does not appear in 5 seconds the lock on the valve is activated. To unlock press ▲, NEXT, ▼, and SET CLOCK in sequence, then press ▲ and ▼ simultaneously for 3 seconds.

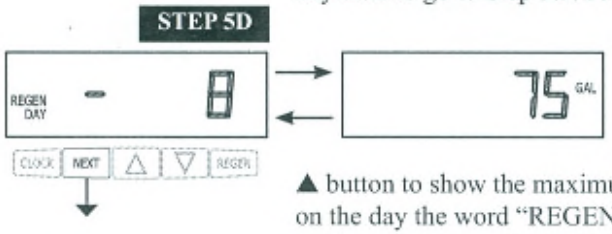


STEP 2D – Days, since last regeneration: This display shows the days since the last regeneration occurred. Press the NEXT button to go to Step 3D. Press REGEN to exit Diagnostics.

STEP 3D – Volume, since last regeneration: This display shows the volume of water that has been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4D. Press REGEN to return to previous step.



STEP 4D – Volume, reserve capacity used for last 7 days: If the valve is set up as a softener, a meter is installed and Set Volume Capacity is set to "Auto," this display shows 0 day (for today) and flashes the reserve capacity. Pressing the ▲ button will show day 1 (which would be yesterday) and flashes the reserve capacity used. Pressing the ▲ button again will show day 2 (the day before yesterday) and the reserve capacity. Keep pressing the ▲ button to show the capacity for days 3, 4, 5 and 6. The ▼ button can be pressed to move backwards in the day series. Press the NEXT button at any time to go to Step 5D. Press REGEN to return to previous step.



STEP 5D - Volume, 63-day usage history: This display shows day 1 (for yesterday) and flashes the volume of water treated yesterday. Pressing the ▲ button will show day 2 (which would be the day before yesterday) and flashes the volume of water treated on that day. Continue to press the ▲ button to show the maximum volume of water treated for the last 63 days. If a regeneration occured on the day the word "REGEN" will also be displayed. This display will show dashes if a water meter is not installed. Press the NEXT button at any time to go to Step 6D. Press REGEN to return to previous step.

STEP 6D – Flow rate, maximum last seven days: The maximum flow rate in gallons per minute that occurred in the last seven days will be displayed. This display will equal zero if a water meter is not installed. Press the NEXT button to exit Diagnostics. Press REGEN to return to previous step.

STEP 7D – Gallons, total used since start-up: This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 8D. Press REGEN to return to previous step.

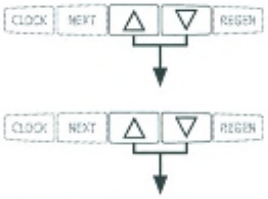
STEP 8D – Days, total since start-up: This display shows the total days since startup. Press the NEXT button to go to Step 9D. Press REGEN to return to previous step.

STEP 9D – Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to exit Diagnostics. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

When desired, all information in Diagnostics may be reset to zero when the valve is installed in a new location. To reset to zero, press NEXT and ▼ buttons simultaneously to go to the Service/OEM 1 screen, and release. Press ▲ and ▼ simultaneously to reset diagnostic values to zero. Screen will return to User Display.

STEP 1VH

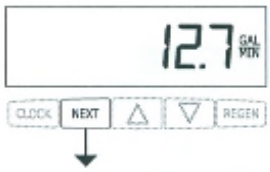


STEP 1VH – Press ▲ and ▼ simultaneously for three seconds and release. Then press ▲ and ▼ simultaneously and release. If screen in step 2VH does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, NEXT, ▲, and SET CLOCK in sequence, then press ▲ and ▼ simultaneously for 3 seconds and release. Then press ▲ and ▼ simultaneously and release.

STEP 2VH

STEP 2VH – Software Version: This display shows the software version of the valve. Press the NEXT button to go to Step 3VH. Press REGEN to exit Valve History.

STEP 3VH



STEP 3VH[9] – Flow rate, maximum since startup: This display shows the maximum flow rate in gallons per minute that has occurred since startup. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4VH. Press REGEN to return to previous step.

STEP 4VH

STEP 4VH – Gallons, total used since start-up: This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 5VH. Press REGEN to return to previous step.

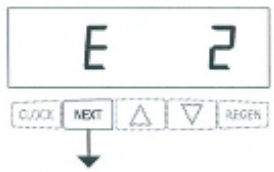
STEP 5VH

STEP 5VH – Days, total since start-up: This display shows the total days since startup. Press the NEXT button to go to Step 6VH. Press REGEN to return to previous step.

STEP 6VH

STEP 6VH – Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to go to Step 7VH. Press REGEN to return to previous step.

STEP 7VH



STEP 7VH – Error, number of occurrences since start-up: This display shows E and the total number of errors that have occurred since startup. Press the NEXT button to exit Valve History. Press REGEN to return to previous step.

RETURN TO NORMAL MODE

[9] Values in steps 2VH through 7VH cannot be reset.

WS1CH & WS1.25CH Front Cover and Drive Assembly

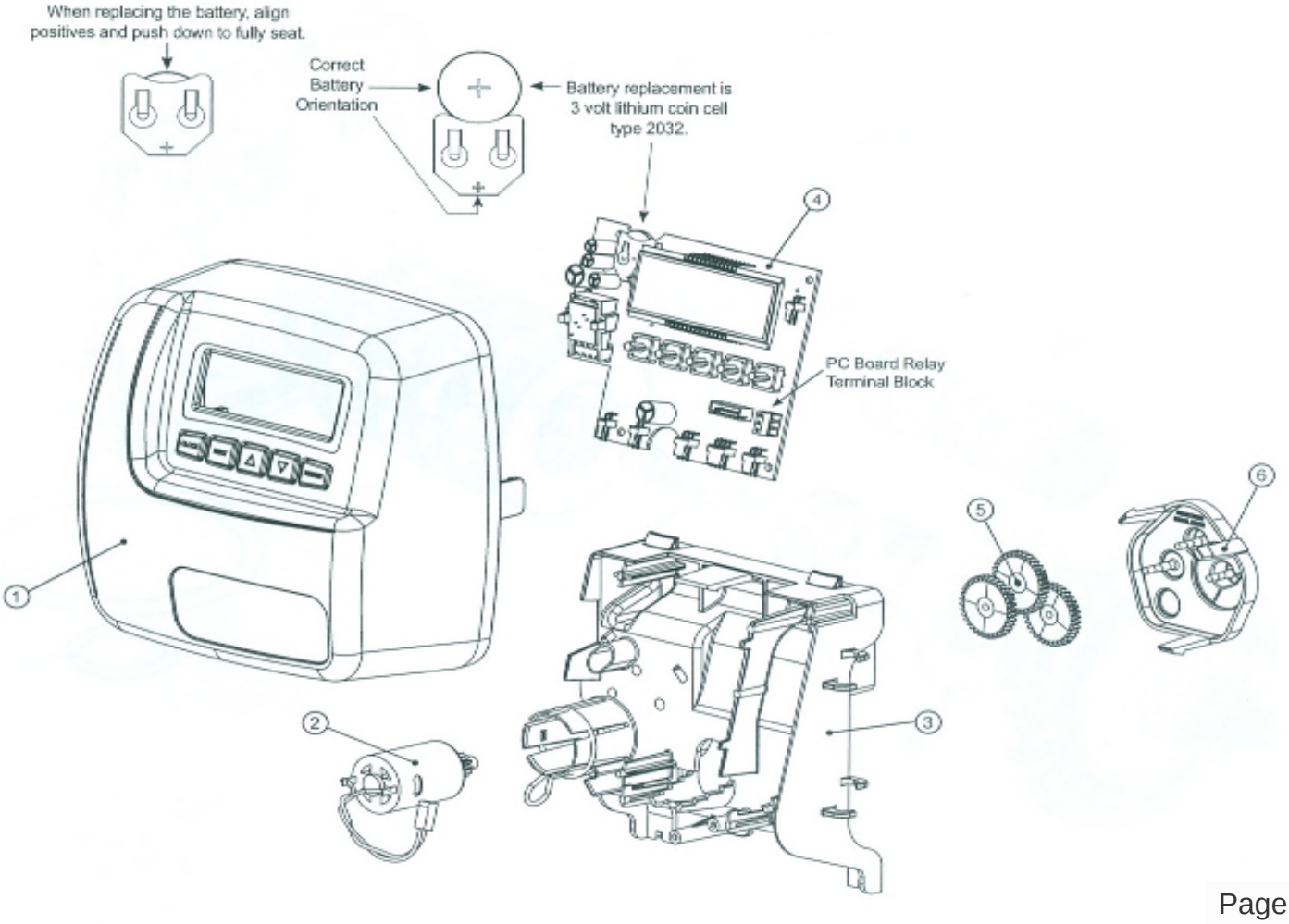
Drawing No.	Order No.	Description	Quantity
1	V3435-01	WS1CH Front Cover Assembly	1
2	V3107-01	WS1 Motor	1
3	V3106-01	WS1 Drive Bracket & Spring Clip	1
4	V3558CH	WS1/1.25/1.5/2L CH PC Board	1
5	V3110	WS1 Drive Gear 12x36	3
6	V3109	WS1 Drive Gear Cover	1
Not Shown	V3186	WS1 AC ADAPTER 110V-12V	1
	V3186EU	WS1 AC ADAPTER 220-240V-12V EU	
	V3186UK	WS1 AC ADAPTER 220-240V-12V UK	
	V3186-01	WS1 AC ADAPTER CORD ONLY	

Relay Specifications: To insure proper fit and correct operation the following relay and relay socket manufactured by Idec or the exact equivalent should be used.

	Idec Model and Description
Relay Socket	SH3B-05C 3 pole finger safe rail mount socket
Relay	RH2LB-U-AC12V 12vac, DPDT magnetic latching relay

The relay supplies 2 sets of dry contacts for user applications. The wiring of these contacts is application specific.

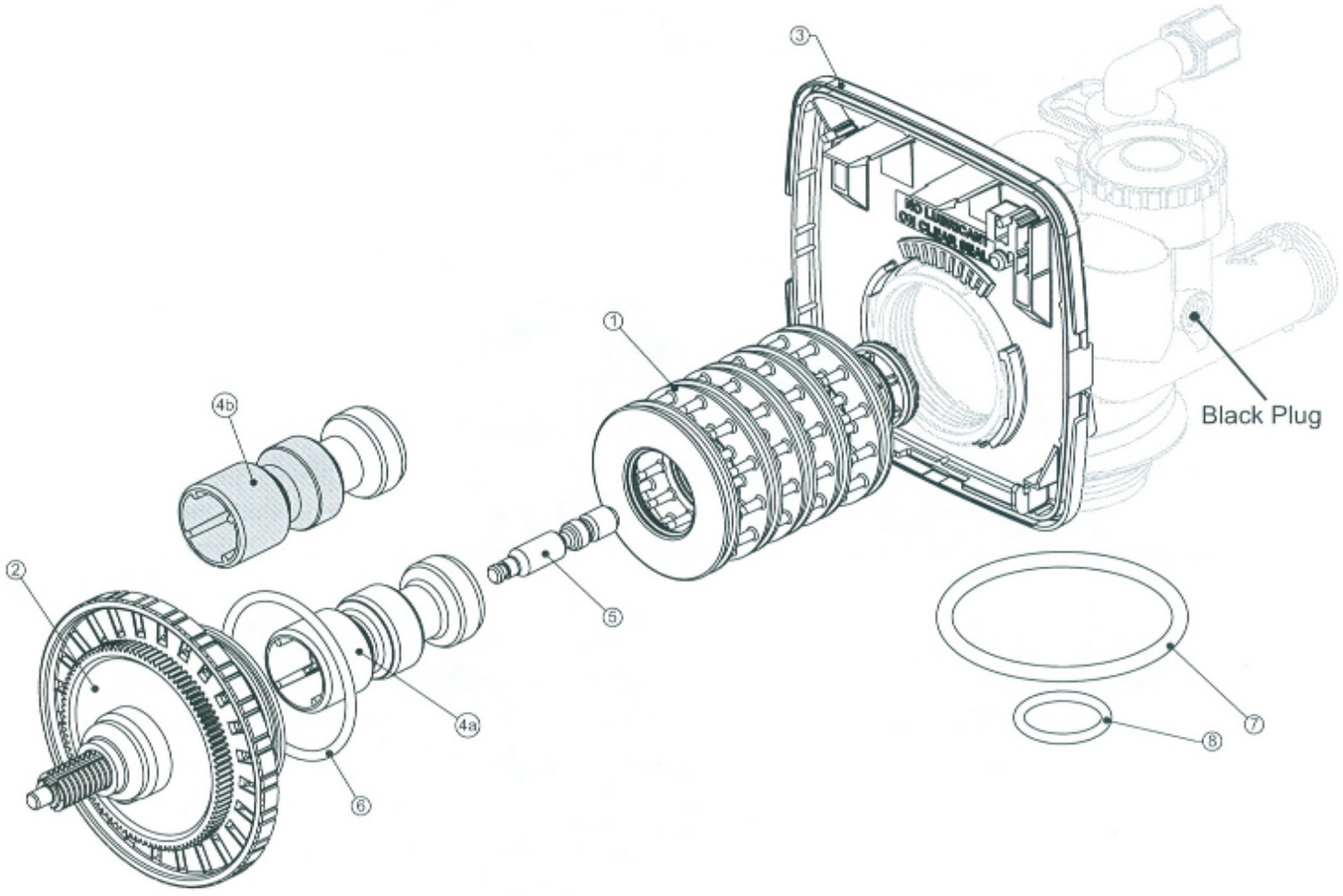
Wiring For Correct On/Off Operation	
PC Board Relay Terminal Block	Relay Socket
SET	#13
COM	#12 and #14
RES	#9



WS1CH Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston and Spacer Stack Assembly

Drawing No.	Order No.	Description	Quantity
1	V3005	WS1 Spacer Stack Assembly	1
2	V3004	Drive Cap ASY	1
3	V3178	WS1 Drive Back Plate	1
4a	V3011*	WS1 Piston Downflow ASY	1
4b	V3011-01*	WS1 Piston Upflow ASY	
5	V3174	WS1 Regenerant Piston	1
6	V3135	O-ring 228	1
7	V3180	O-ring 337	1
8	V3105	O-ring 215 (Distributor Tube)	1
Not Shown	V3001	WS1 Body ASY Downflow	1
	V3001-02	WS1 Mixing Valve Body ASY	
	V3001UP	WS1 Body ASY Upflow	
	V3001-02UP	WS1 Mixing Valve Body Upflow ASY	

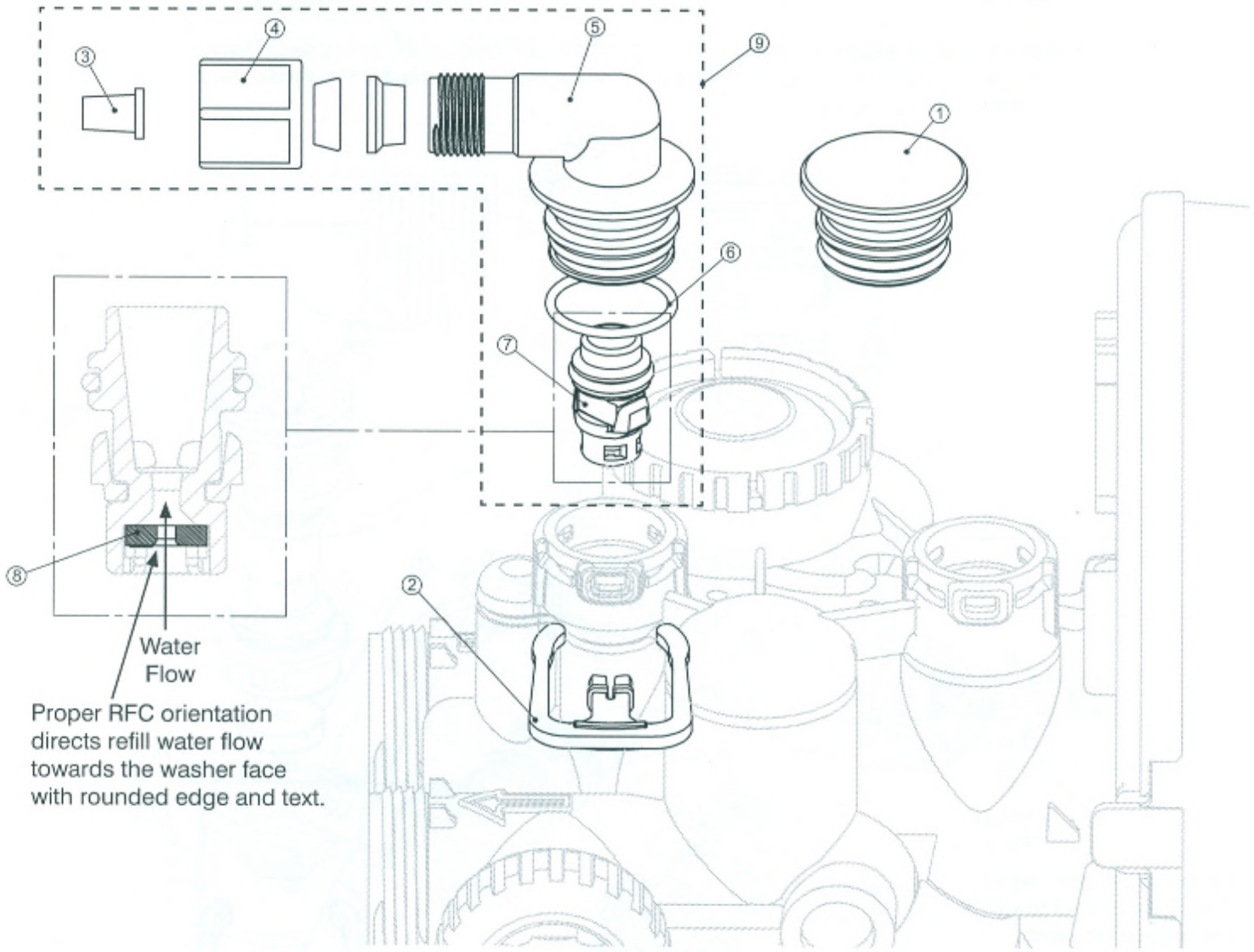
*V3011 is labeled with DN and V3011-01 is labeled with UP.
Note: The regenerant piston is not used in backwash only applications.



Refill Flow Control Assembly and Refill Port Plug

Drawing No.	Order No.	Description	Quantity
1	V3195-01	WS1 Refill Port Plug Asy	This part is required for backwash only systems
2	H4615	Elbow Locking Clip	1
3	JCP-P-6	Polytube insert 3/8"	1
4	JCPG-6PBLK	Nut 3/8"	1
5	H4613	Elbow Cap 3/8"	1
6	V3163	0-ring 019	1
7	V3165-01*	WS1 RFC Retainer Asy	1
8	V3182	WS1 RFC	1
9	V3330-01	WS1 Brine Elbow Asy w/RFC 3/8"	Option
Not Shown	V3552	WS1 Brine Elbow Asy w/RFC 1/2"	Option
Not Shown	H4650	Elbow ½" with nut and insert	Option

*Assembly includes V3182 WS1 RFC.

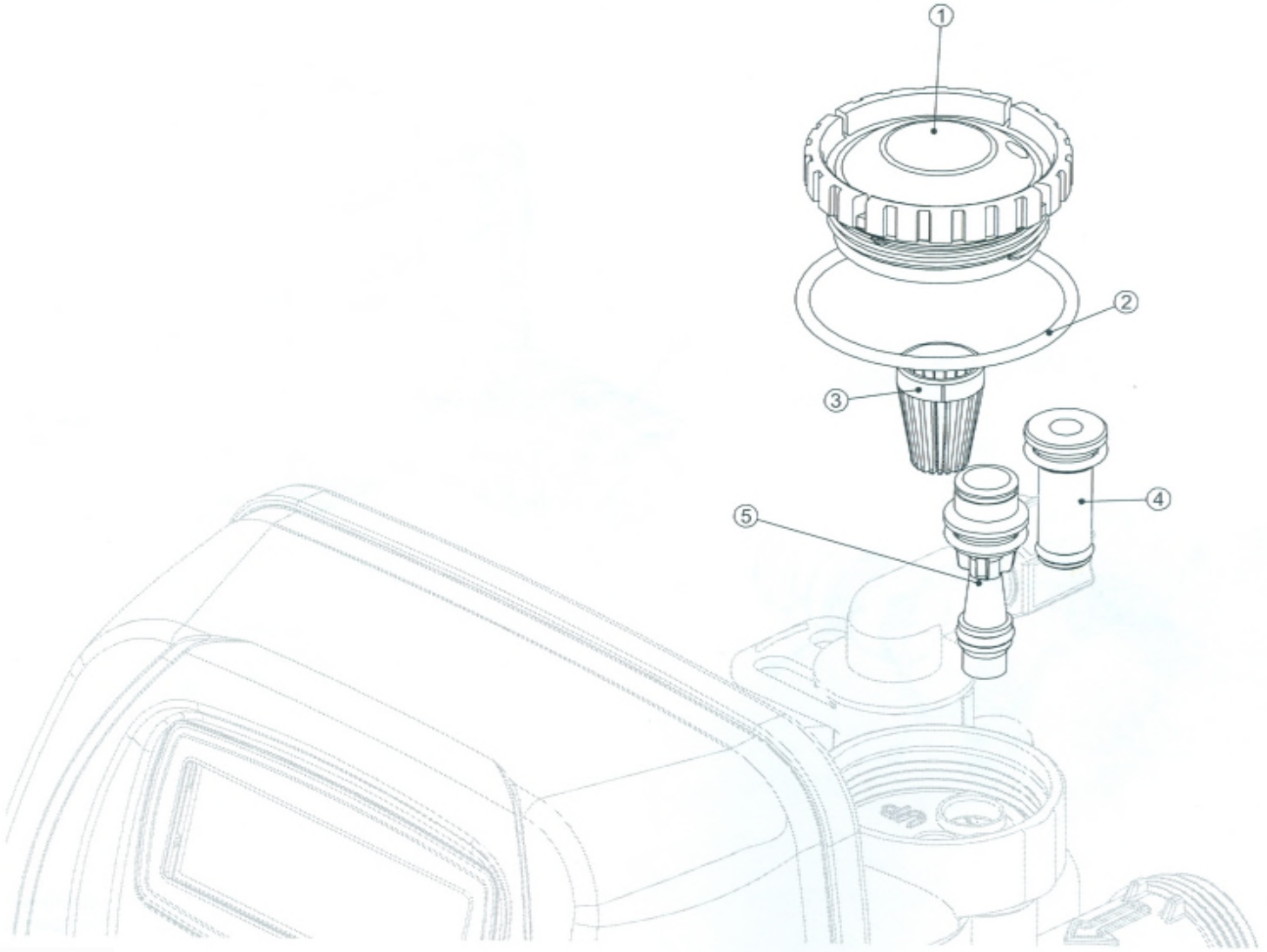


Injector Cap, Injector Screen, Injector, Plug and O-Ring

Drawing No.	Order No.	Description	Quantity
1	V3176	INJECTOR CAP	1
2	V3152	O-RING 135	1
3	V3177-01	INJECTOR SCREEN CAGE	1
4	V3010-1Z	WS1 INJECTOR ASY Z PLUG	1
5	V3010-1A	WS1 INJECTOR ASY A BLACK	1
	V3010-1B	WS1 INJECTOR ASY B BROWN	
	V3010-1C	WS1 INJECTOR ASY C VIOLET	
	V3010-1D	WS1 INJECTOR ASY D RED	
	V3010-1E	WS1 INJECTOR ASY E WHITE	
	V3010-1F	WS1 INJECTOR ASY F BLUE	
	V3010-1G	WS1 INJECTOR ASY G YELLOW	
	V3010-1H	WS1 INJECTOR ASY H GREEN	
	V3010-1I	WS1 INJECTOR ASY I ORANGE	
	V3010-1J	WS1 INJECTOR ASY J LIGHT BLUE	
	V3010-1K	WS1 INJECTOR ASY K LIGHT GREEN	
Not Shown	V3170	O-RING 011	*
Not Shown	V3171	O-RING 013	*

* The injector plug and the injector each contain one 011 (lower) and 013 (upper) o-ring.

Note: For upflow position, injector is located in the up hole and injector plug is in the other hole. WS1CH upflow bodies are identified by having the DN marking removed. For a filter that only backwashes, injector plugs are located in both holes.

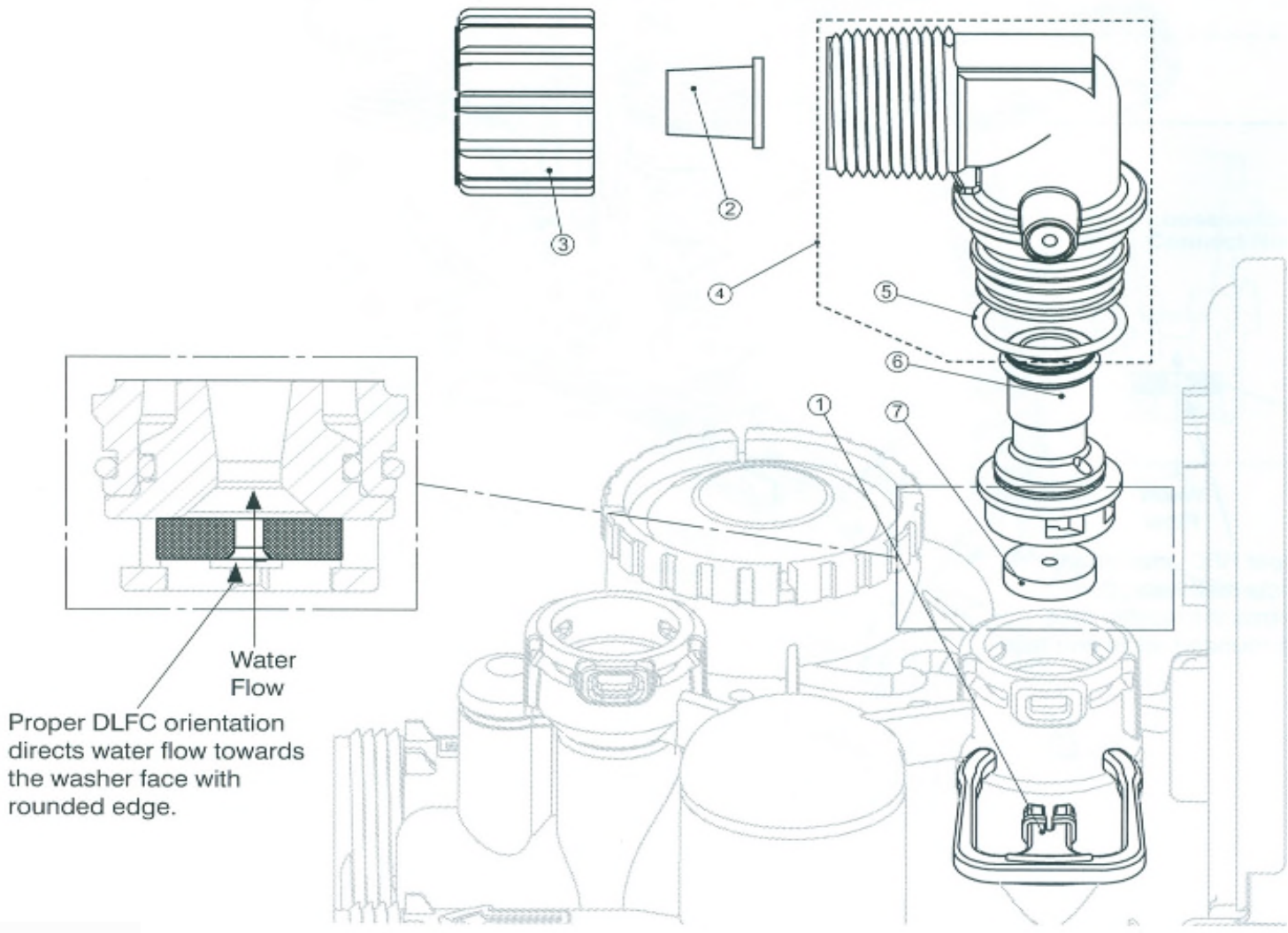


Drain Line – 3/4"

Drawing No.	Order No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	PKP10TS8-BULK	Polytube insert 5/8	Option
3	V3192	WS1 Nut ¾ Drain Elbow	Option
4*	V3158-01	WS1 Drain Elbow ¾ Male	1
5	V3163	O-ring 019	1
6*	V3159-01	WS1 DLFC Retainer ASY	1
7	V3162-007	WS1 DLFC 0.7 gpm for ¾	One DLFC must be used if ¾ fitting is used
	V3162-010	WS1 DLFC 1.0 gpm for ¾	
	V3162-013	WS1 DLFC 1.3 gpm for ¾	
	V3162-017	WS1 DLFC 1.7 gpm for ¾	
	V3162-022	WS1 DLFC 2.2 gpm for ¾	
	V3162-027	WS1 DLFC 2.7 gpm for ¾	
	V3162-032	WS1 DLFC 3.2 gpm for ¾	
	V3162-042	WS1 DLFC 4.2 gpm for ¾	
	V3162-053	WS1 DLFC 5.3 gpm for ¾	
	V3162-065	WS1 DLFC 6.5 gpm for ¾	
	V3162-075	WS1 DLFC 7.5 gpm for ¾	
	V3162-090	WS1 DLFC 9.0 gpm for ¾	
	V3162-100	WS1 DLFC 10.0 gpm for ¾	

*4 and 6 can be ordered as a complete assembly - V3331 WS1 Drain Elbow and Retainer Asy

Valves are shipped without drain line flow control (DLFC) - install DLFC before using. Valves are shipped without ¾ nut for drain elbow (polytube installation only) and 5/8" polytube insert (polytube installation only).

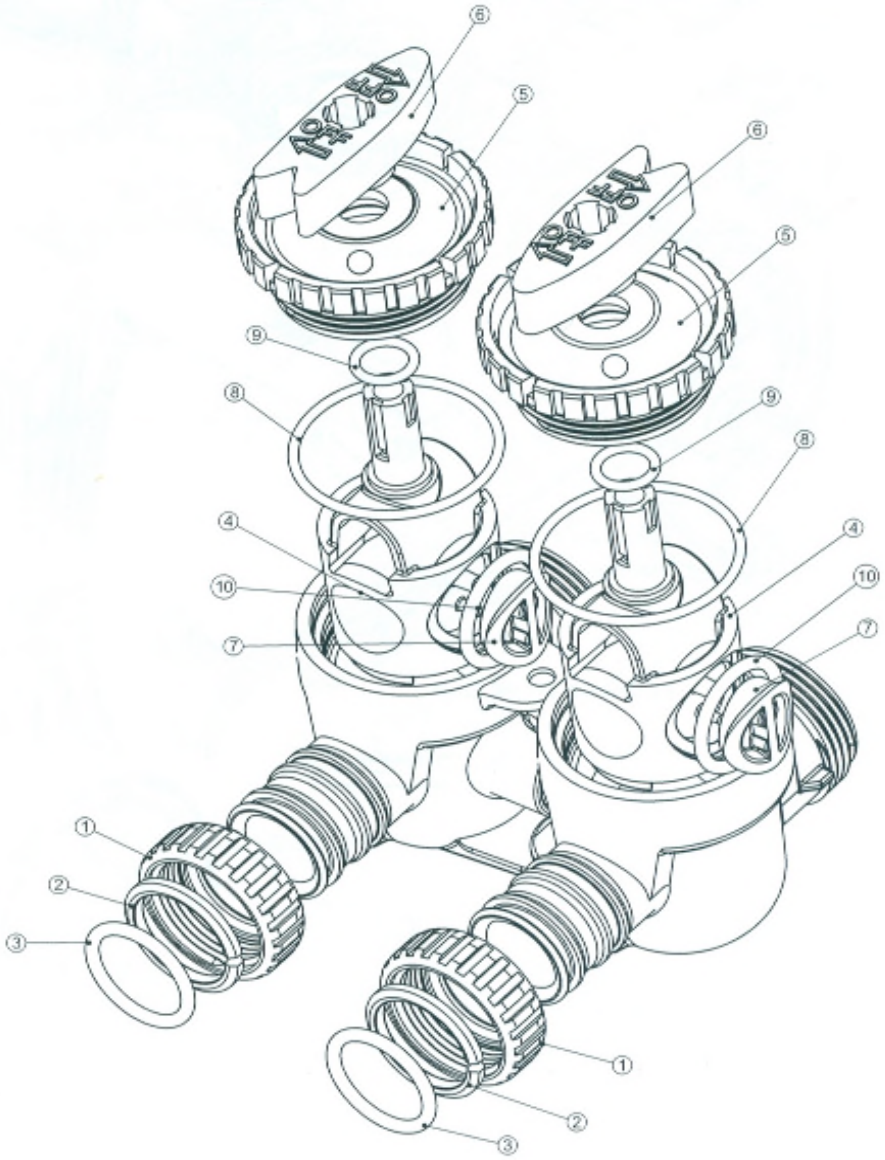


Bypass Valve

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3145	WS1 Bypass 1" Rotor	2
5	V3146	WS1 Bypass Cap	2
6	V3147	WS1 Bypass Handle	2
7	V3148	WS1 Bypass Rotor Seal Retainer	2
8	V3152	O-ring 135	2
9	V3155	O-ring 112	2
10	V3156	O-ring 214	2

(Not Shown) Order No. V3191-01, Description: WS1 Bypass Vertical Adapter Assembly

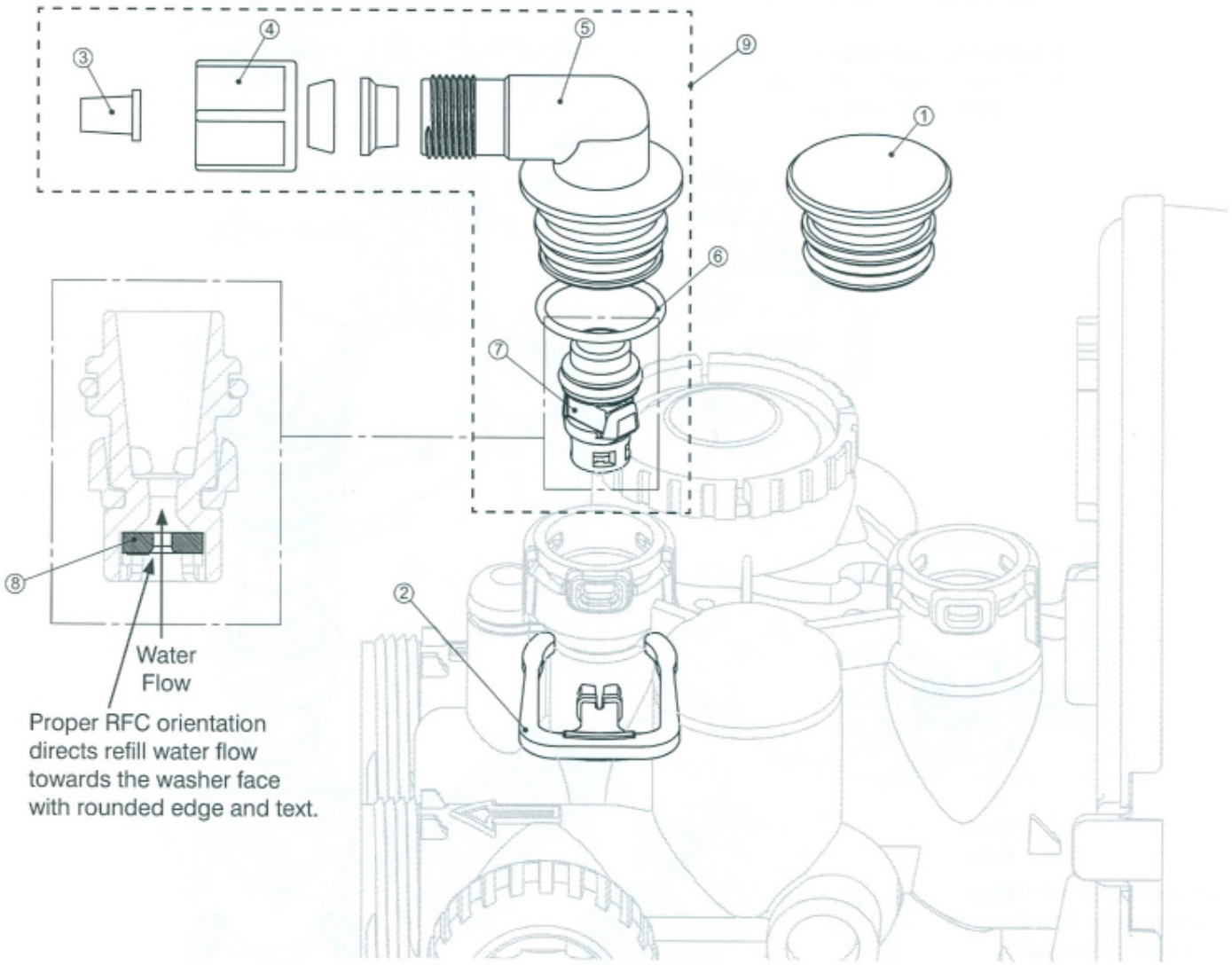
Order No.	Description	Quantity
V3151	WS1 Nut 1" Quick Connect	2
V3150	WS1 Split Ring	2
V3105	O-Ring 215	2
V3191	WS1 Bypass Vertical Adapter	2



Refill Flow Control Assembly and Refill Port Plug

Drawing No.	Order No.	Description	Quantity
1	V3195-01	WS1 Refill Port Plug Asy	This part is required for backwash only systems
2	H4615	Elbow Locking Clip	1
3	JCP-P-6	Polytube insert 3/8"	1
4	JCPG-6PBLK	Nut 3/8"	1
5	H4613	Elbow Cap 3/8"	1
6	V3163	0-ring 019	1
7	V3165-01*	WS1 RFC Retainer Asy	1
8	V3182	WS1 RFC	1
9	V3330-01	WS1 Brine Elbow Asy w/RFC 3/8"	Option
Not Shown	V3552	WS1 Brine Elbow Asy w/RFC 1/2"	Option
Not Shown	H4650	Elbow ½" with nut and insert	Option

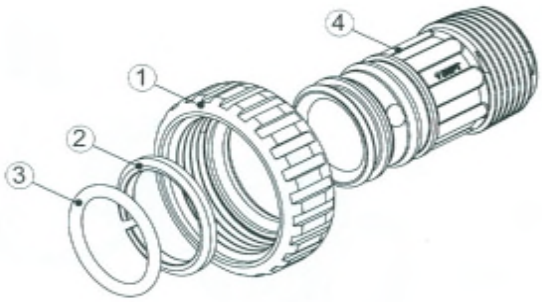
*Assembly includes V3182 WS1 RFC.



Installation Fitting Assemblies

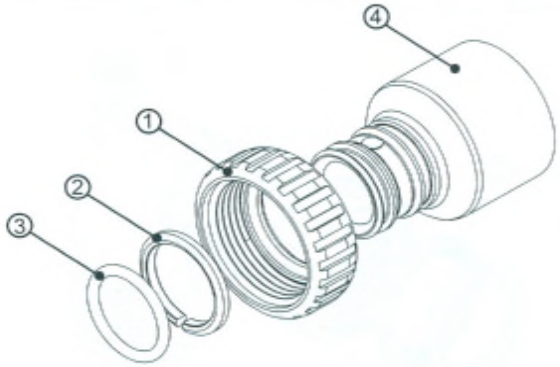
Order No: **V3007-06**
Description: **WS1 Fitting 1" Plastic Male BSPT Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3316	WS1 Fitting 1" Plastic Male BSPT	2



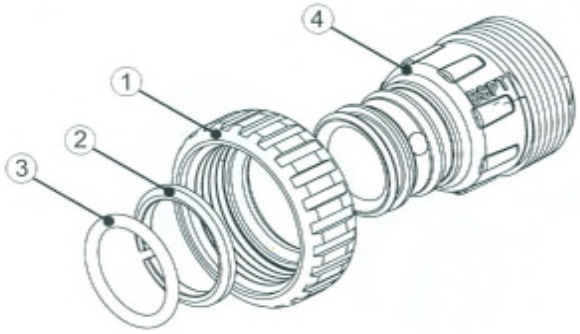
Order No. **V3007-07**
Description: **WS1 Fitting 1¼" & 1½" PVC Solvent Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3352	WS1 Fitting 1¼"&1½" PVC Solvent	2



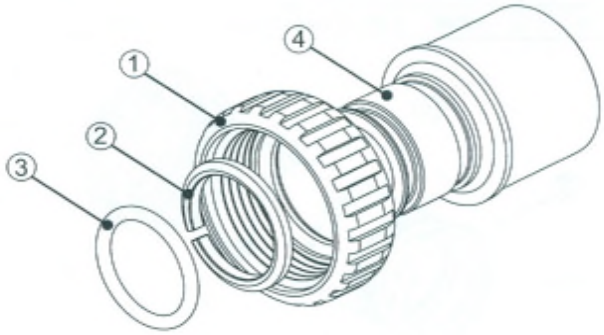
Order No. **V3007-08**
Description: **WS1 Fitting 1-1/4" Plastic Male BSPT Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3361	WS1 Fitting 1-1/4" Plastic Male BSPT	2



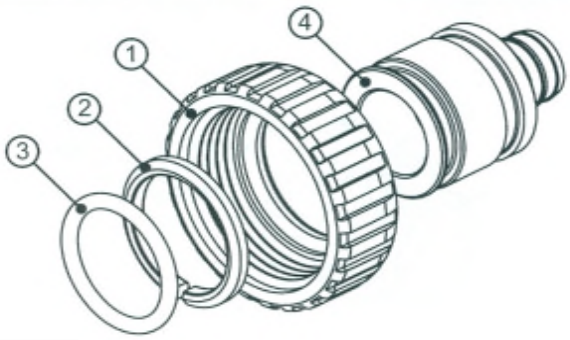
Order No: **V3007-09**
Description: **WS1 Fitting 1¼" & 1½" Brass Sweat Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3375	WS1 Fitting 1¼" & 1½" Brass Sweat	2



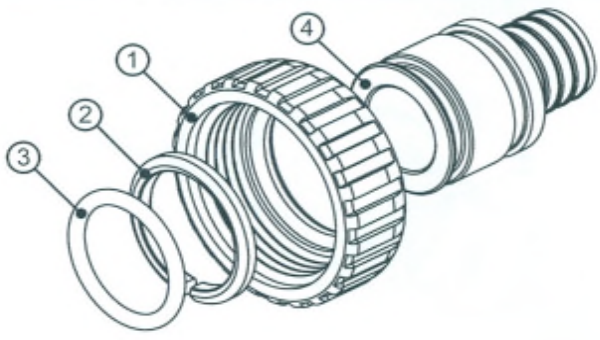
Order No. V3007-10
Description: WS1 Fitting 3/4" PEX Assembly

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3535	WS1 Fitting 3/4" PEX	2



Order No. V3007-11
Description: WS1 Fitting 1" PEX Assembly

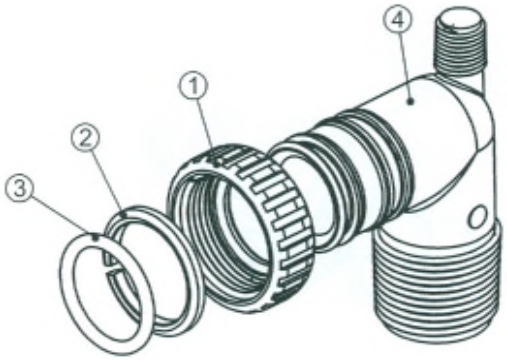
Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3515	WS1 Fitting 1" PEX	2



Installation Fitting Assemblies

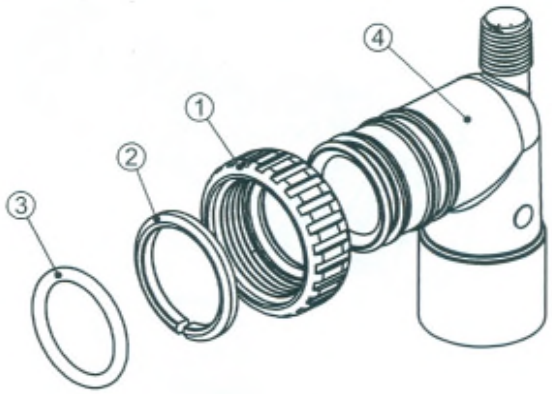
Order No: **V3007**
Description: **WS1 Fitting 1" PVC Male NPT Elbow Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3149	WS1 Fitting 1 PVC Male NPT Elbow	2



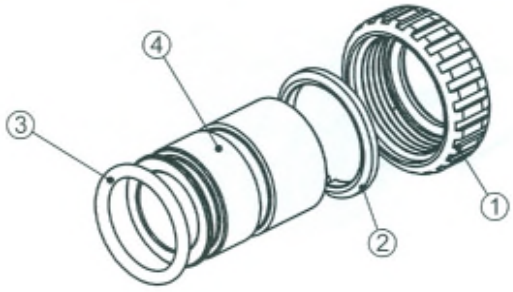
Order No: **V3007-01**
Description: **WS1 Fitting ¾" & 1" PVC Solvent 90° ASY**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3189	WS1 Fitting ¾&1 PVC Solvent 90	2



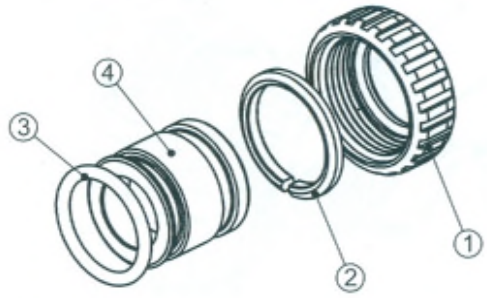
Order No: **V3007-02**
Description: **WS1 Fitting 1" Brass Sweat Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3188	WS1 Fitting 1 Brass Sweat Assembly	2



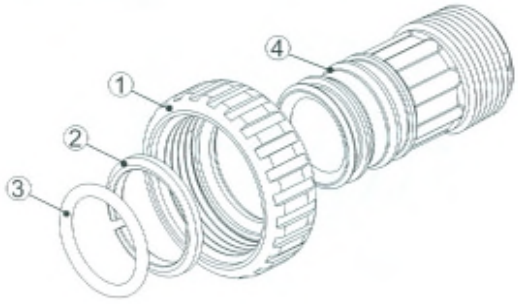
Order No: **V3007-03**
Description: **WS1 Fitting ¾" Brass Sweat Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3188-01	WS1 Fitting ¾ Brass Sweat	2



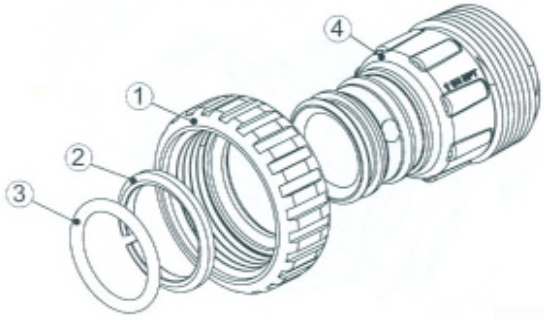
Order No: **V3007-04**
Description: **WS1 Fitting 1" Plastic Male NPT Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3164	WS1 Fitting 1" Plastic Male NPT	2



Order No: **V3007-05**
Description: **WS1 Fitting 1-¼" Plastic Male Assembly**

Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" Quick Connect	2
2	V3150	WS1 Split Ring	2
3	V3105	O-Ring 215	2
4	V3317	WS1 Fitting 1-¼" Plastic Male NPT	2



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