



TECH-TC SERIES CONTROL VALVES

FILTERS, SOFTENERS, CONDITIONERS

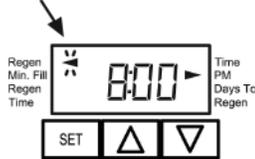


1 INCH TECH-TC SERIES CONTROL VALVE MODEL: WS1TC

1.25 INCH TECH-TC SERIES CONTROL VALVE MODEL: WS1.25TC

Quick Guide

Arrow will point to Regen if a regeneration is expected "Tonight."



MANUAL REGENERATION

NOTE: For softeners, if the brine tank does not contain salt, fill with salt and wait at least 2 hours before regeneration.

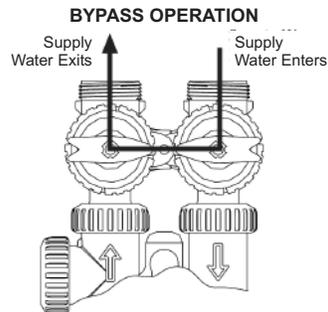
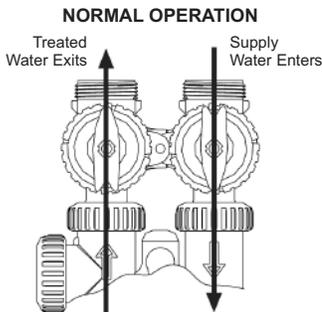
For Immediate Regeneration: Press and hold ▲ and ▼ simultaneously until the valve motor starts (typically 3 seconds).

For Regeneration Tonight: Press and release ▲ and ▼ simultaneously (notice that the arrow points to Regen).



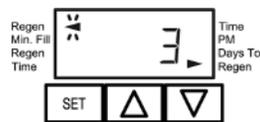
ERRORS

If the display shows "E1," "E2," "E3," or "E4" (for error), call a service technician.



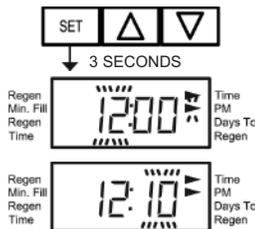
TO SHUT OFF WATER

To shut off the water to the system, position the arrow handles as shown in the Bypass Operation drawing to the left. If your valve doesn't look like the drawing, contact a service technician for instructions on how to shut off the water to the system.



NORMAL MODE

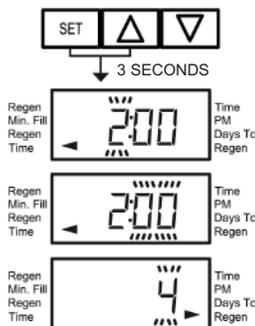
When the system is operating normally, one of two displays will be shown: time of day or days until the next regeneration. Press ▲ or ▼ to toggle between the two choices.



TO SET TIME OF DAY

If the time of day flashes following a power outage, it needs to be reset. All other information will be stored in memory no matter how long the power outage. Complete the following steps.

1. From Normal Mode, press SET for 3 seconds and release.
2. Adjust the hour using ▲ or ▼. Press SET to go to the next step.
3. Adjust the minutes using ▲ or ▼. Press SET to complete and return to Normal Mode.



TO SET TIME OF REGENERATION AND DAYS BETWEEN REGENERATION

For initial set-up or to make adjustments, complete the following steps.

NOTE: The following procedure is for 1-99 Days Between Regeneration Option only. If valve is set to 7 Day Option, refer to page 8 for details.

1. From Normal Mode, press SET and ▲ simultaneously for 3 seconds and release.
2. Use ▲ or ▼ to set the hour for regeneration to start. Press SET to go to the next step.
3. Use ▲ or ▼ to set the minutes for regeneration to start. Press SET to go to the next step.
4. Use ▲ or ▼ to set the number of days between regenerations (from 1 to 99 days). Press SET to complete and return to Normal Mode.

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Control Valve Function and Cycles of Operation

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 downflow regeneration water softener or filter.

The time clock control valve can be set to perform downflow regeneration or simply backwash. 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 to 99) between each regeneration; and
2. A seven-day option where the user can choose which day(s) of the week a regeneration should occur.

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 screwdriver, one large blade screwdriver, 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 1/2 inch above to 1/2 inch below the top of the 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 comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter is for dry location use only. The control valve maintains timekeeping for up to 8 hours if the power goes out and the battery is not depleted. After 8 hours, the only item that needs to be reset is the time of day (valve status and programming are permanently stored in the nonvolatile memory). If a power loss lasts less than 8 hours and the time flashes on and off, the time of day should be reset and the non-rechargeable battery should be replaced.

Table 1 (see below) shows the time for the backwash, regenerative, and rinse cycles for the ten available programming options. Six different programs are available for a softener, one for a regenerative filter, and three programs for backwash only filters. When the control valve is used as a:

1. Softener – one or two backwashes occur and refill always occurs after the rinse cycle (P0 through P5)
2. Regenerative Filter – one backwash occurs and refill always occurs after the rinse cycle (P6)
3. Backwashing Filter – one backwash occurs (P7 through P9)

Table 1
Regeneration Cycles and Times for Different Programs

| PROGRAM | ALL TIME IN MINUTES | | | | |
|--------------------------|---------------------|------------------|--------------------|-------------|------------|
| | C1 1ST BACKWASH | C2 REGENERATE | C3 2ND BACKWASH | C4 RINSE | C5 FILL |
| P0 (Softener) | 3 | 50 | 3 | 3 | 1-99 |
| P1 (Softener) | 8 | 50 | 8 | 4 | 1-99 |
| P2 (Softener) | 8 | 70 | 10 | 6 | 1-99 |
| P3 (Softener) | 12 | 70 | 12 | 8 | 1-99 |
| P4 (Softener) | 10 | 50 | Skipped | 8 | 1-99 |
| P5 (Softener) | 4 | 50 | Skipped | 4 | 1-99 |
| P6 (Regenerative Filter) | 12 | 6 | Skipped | 12 | 1-99 |
| P7 (Backwash Filter) | 6 | Skipped | Skipped | 4 | Skipped |
| P8 (Backwash Filter) | 10 | Skipped | Skipped | 6 | Skipped |
| P9 (Backwash Filter) | 14 | Skipped | Skipped | 8 | Skipped |

NOTE: During regeneration the display will show C1, C2, etc. If the cycle is skipped, that cycle number will not be displayed.

1. Noryl is a trademark of Sabic Innovative Plastics IP B.V. Company.

The user can initiate manual regeneration. The user has the option to request the manual regeneration at the delayed regeneration time or to have the regeneration occur immediately. Simultaneously press ▲ and ▼ to start a regeneration at the next delayed regeneration time. If a regeneration is to occur “tonight” an arrow on the display will point to Regen. For immediate regeneration, simultaneously press and hold ▲ and ▼ for three seconds.

When in regeneration, step through the different regeneration cycles by pressing ▲ or ▼.

General Instructions

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

- System Setup (see pages 6-7)
- Installation Settings (see pages 8-9)
- User Displays and Settings (see pages 10-11)

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

Normal Mode

When in operation, the Normal Mode display (see page 10) shows the time of day or days remaining before regeneration. Press ▲ or ▼ to toggle between the two choices.

Five Minute Time Out

When stepping through a procedure, if no buttons are pressed within five minutes, the display returns to Normal Mode. Any changes made prior to the five minute time out are incorporated.

Quick Exit from System Setup or Installation Settings

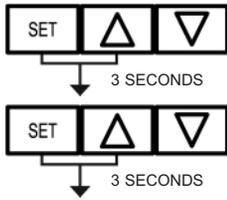
To quickly exit System Setup or Installation Settings, simultaneously press SET + ▼. Any changes made prior to the exit are incorporated.

Reinitializing the Control Valve

To reinitialize the control valve, check to make sure the valve is in Normal Mode. Then simultaneously press SET + ▼ or unplug the power source plug (4-pin connector) on the circuit board, wait 3 seconds, and plug back in.

System Setup

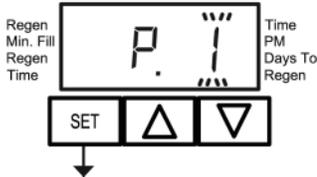
STEP 1-SS



STEP 1-SS – From Normal Mode, press SET + ▲ simultaneously for 3 seconds and release.

Then (repeat) press SET + ▲ simultaneously for 3 seconds and release.

STEP 2-SS



STEP 2-SS – Choose the desired program by pressing ▲ or ▼. (See Table below for Program Parameters.)

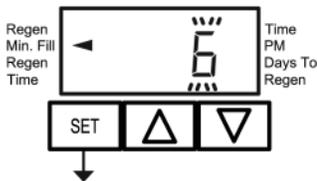
Prior to selecting a program, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations.

Press SET to go to the next step.

| PROGRAM | ALL TIME IN MINUTES | | | | |
|--------------------------|---------------------|------------------|--------------------|-------------|------------|
| | C1 1ST BACKWASH | C2 REGENERATE | C3 2ND BACKWASH | C4 RINSE | C5 FILL |
| P0 (Softener) | 3 | 50 | 3 | 3 | 1-99 |
| P1 (Softener) | 8 | 50 | 8 | 4 | 1-99 |
| P2 (Softener) | 8 | 70 | 10 | 6 | 1-99 |
| P3 (Softener) | 12 | 70 | 12 | 8 | 1-99 |
| P4 (Softener) | 10 | 50 | Skipped | 8 | 1-99 |
| P5 (Softener) | 4 | 50 | Skipped | 4 | 1-99 |
| P6 (Regenerative Filter) | 12 | 6 | Skipped | 12 | 1-99 |
| P7 (Backwash Filter) | 6 | Skipped | Skipped | 4 | Skipped |
| P8 (Backwash Filter) | 10 | Skipped | Skipped | 6 | Skipped |
| P9 (Backwash Filter) | 14 | Skipped | Skipped | 8 | Skipped |

NOTE: During regeneration the display will show C1, C2, etc. If the cycle is skipped, that cycle number will not be displayed.

STEP 3-SS

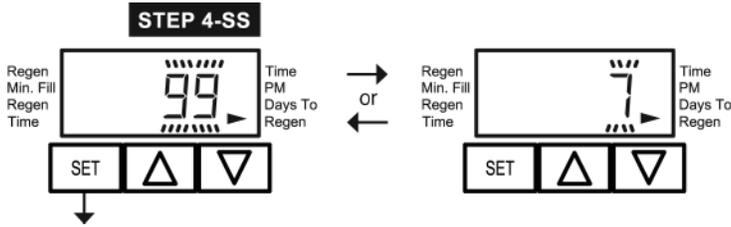


STEP 3-SS – If program P0 through P6 was selected, enter in the minutes of fill using ▲ or ▼. The allowable values vary from a low of 1 to a high of 99.

If program P7, P8, or P9 was selected, this screen will not appear.

Press SET to go to the next step.

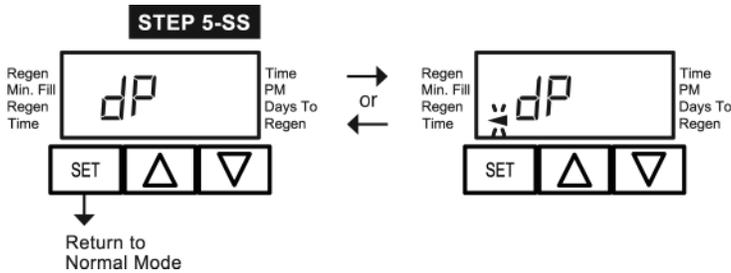
Note: For each minute of fill, 0.5 gallon of water is added to the solution tank. With sodium chloride (salt), each 0.5 gallon of water will dissolve 1.5 pounds of salt.



STEP 4-SS – Use ▲ or ▼ to switch between:

- 1-99 Days Between Regeneration – Regeneration is determined by the number of days that have passed since the last regeneration scheduled.
- 7 Day – Regeneration is scheduled for specific days of the week.

Press SET to go to the next step.



STEP 5-SS - If a differential pressure switch is installed and actuated for 2 minutes:

- a regeneration will occur immediately if no arrow points at Regen Time; or
- a regeneration will occur at the delayed regeneration hour if an arrow points at Regen Time.

Use ▲ or ▼ to switch between the two choices. If a differential pressure switch is not installed, the settings in this display are ignored.

Press SET to exit System Setup and return to Normal Mode.

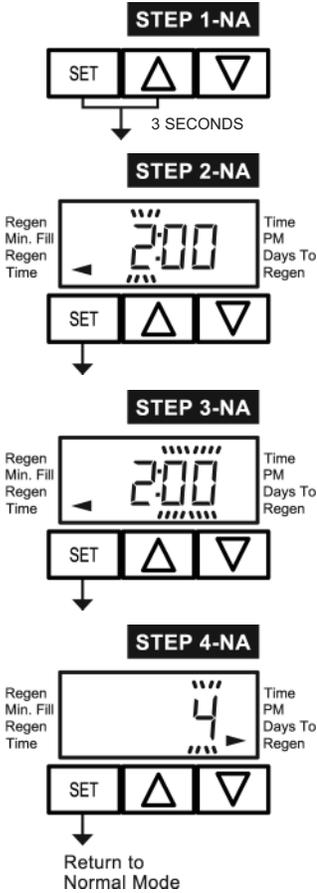


- A. Differential pressure switch connection
- B. Motor wire connection
- C. AC adapter wire connection

NOTE: A regeneration will be initiated or scheduled after the control has received a signal for two minutes to the DP Input (Item A in photo to the left).

Installation Settings

1-99 Days Between Regeneration Option



STEP 1-NA – From Normal Mode, press SET + ▲ simultaneously for 3 seconds and release.

STEP 2-NA – *Regeneration Time (Hour)*: Use ▲ or ▼ to set the hour of the day for regeneration to start.

Press SET to go to the next step.

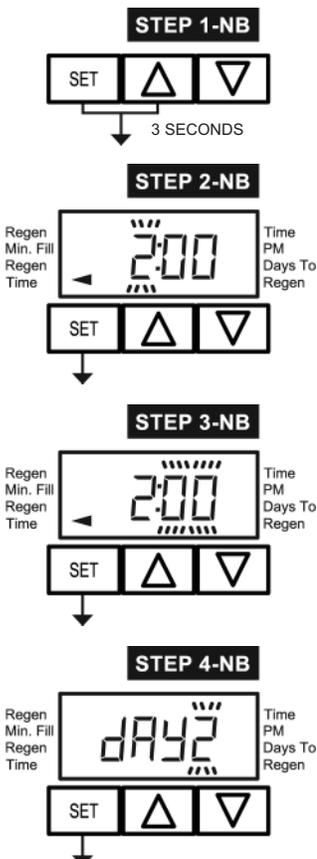
STEP 3-NA – *Regeneration Time (Minutes)*: Use ▲ or ▼ to set the minutes of the hour for regeneration to start.

Press SET to go to the next step.

STEP 4-NA – *Days to Regeneration*: Use ▲ or ▼ to set the number of days between regenerations. The allowable range is 1 to 99.

Press SET to exit Installation Settings and return to Normal Mode.

7 Day (Days of the Week) Option



STEP 1-NB – From Normal Mode, press SET + ▲ simultaneously for 3 seconds and release.

STEP 2-NB – *Regeneration Time (Hour)*: Use ▲ or ▼ to set the hour of the day for regeneration to start.

Press SET to go to the next step.

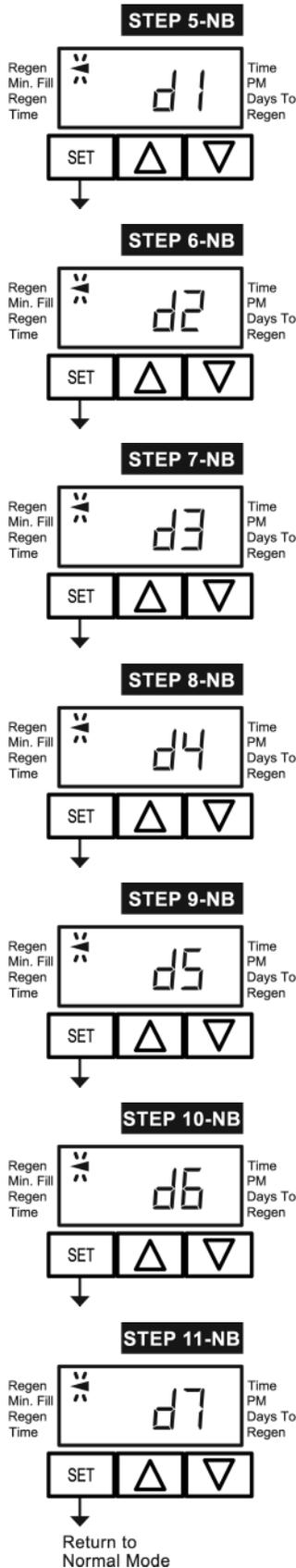
STEP 3-NB – *Regeneration Time (Minutes)*: Use ▲ or ▼ to set the minutes of the hour for regeneration to start.

Press SET to go to the next step.

STEP 4-NB – *Current Day of Week*: Set the current day of the week by using ▲ or ▼.
(See list of codes below.)

- | | | | |
|----------------|--------------|---------------|-----------------|
| d1 = Sunday; | d2 = Monday; | d3 = Tuesday; | d4 = Wednesday; |
| d5 = Thursday; | d6 = Friday; | d7 = Saturday | |

Press SET to go to the next step.



STEP 5-NB – Sunday (d1) Regeneration: To regenerate on Sunday (d1) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Sunday.

Press SET to go to the next step.

STEP 6-NB – Monday (d2) Regeneration: To regenerate on Monday (d2) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Monday.

Press SET to go to the next step.

STEP 7-NB – Tuesday (d3) Regeneration: To regenerate on Tuesday (d3) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Tuesday.

Press SET to go to the next step.

STEP 8-NB – Wednesday (d4) Regeneration: To regenerate on Wednesday (d4) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Wednesday.

Press SET to go to the next step.

STEP 9-NB – Thursday (d5) Regeneration: To regenerate on Thursday (d5) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Thursday.

Press SET to go to the next step.

STEP 10-NB – Friday (d6) Regeneration: To regenerate on Friday (d6) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Friday.

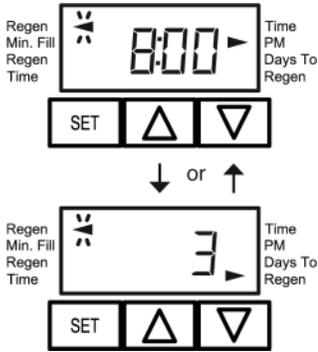
Press SET to go to the next step.

STEP 11-NB – Saturday (d7) Regeneration: To regenerate on Saturday (d7) use ▲ or ▼ until the arrow points to Regen. If the arrow does not point to Regen a regeneration will not occur on Saturday.

Press SET to exit Installation Settings and return to Normal Mode.

NOTE: If all arrows are turned off in d1 through d7 (Step 5-NB through Step 11-NB), the program will default to d7 (Saturday Regeneration).

User Displays & Settings



Normal Mode

When the system is operating in Normal Mode, one of two displays will be shown. Pressing ▲ or ▼ will alternate between the displays. One of the displays is always the current time of day. The second display is the days remaining until the next regeneration. If the days remaining is equal to one, a regeneration will occur at the next preset regeneration time. The user can scroll between displays as desired.

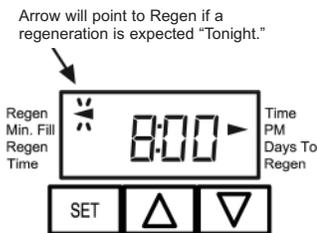
If the system has called for a regeneration that will occur at the preset time of regeneration, an arrow on the display will point to Regen.



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 regenerating, untreated water will be used.

When the system begins to regenerate, the display will change to the Regeneration Cycle Display to indicate the current regen cycle step and time remaining. 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 regeneration is completed.



Manual Regeneration

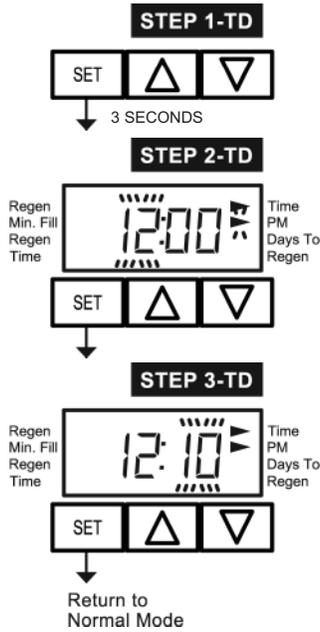
Sometimes there is a need to regenerate the system sooner than when the system calls for it, usually referred to as a manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

To initiate a manual regeneration at the preset delayed regeneration time, simultaneously press ▲ and ▼ and release. The arrow will point to the word Regen if a regeneration is expected "tonight." To cancel the regeneration simultaneously press ▲ and ▼ and release.

To initiate a manual regeneration immediately, simultaneously press ▲ and ▼ 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



STEP 1-TD – From Normal Mode, press SET for approximately 3 seconds and release.

STEP 2-TD – *Current Time (Hour)*: Adjust the hour with ▲ or ▼.

Note: With 60 Hz line frequency detection on power-up, timekeeping is 12 hour with PM indicator. With 50 Hz line frequency detection on power-up, timekeeping is 24 hour without the PM indicator.

Press SET to go to the next step.

STEP 3-TD – *Current Time (Minutes)*: Adjust minutes with ▲ or ▼.

Press SET to exit Set Time of Day and return to Normal Mode.

Power Loss

Only the current time of day will need to be reset if power is lost for greater than 8 hours. If power is lost while the system is regenerating, the control will complete regeneration from the point of interruption once power is restored.



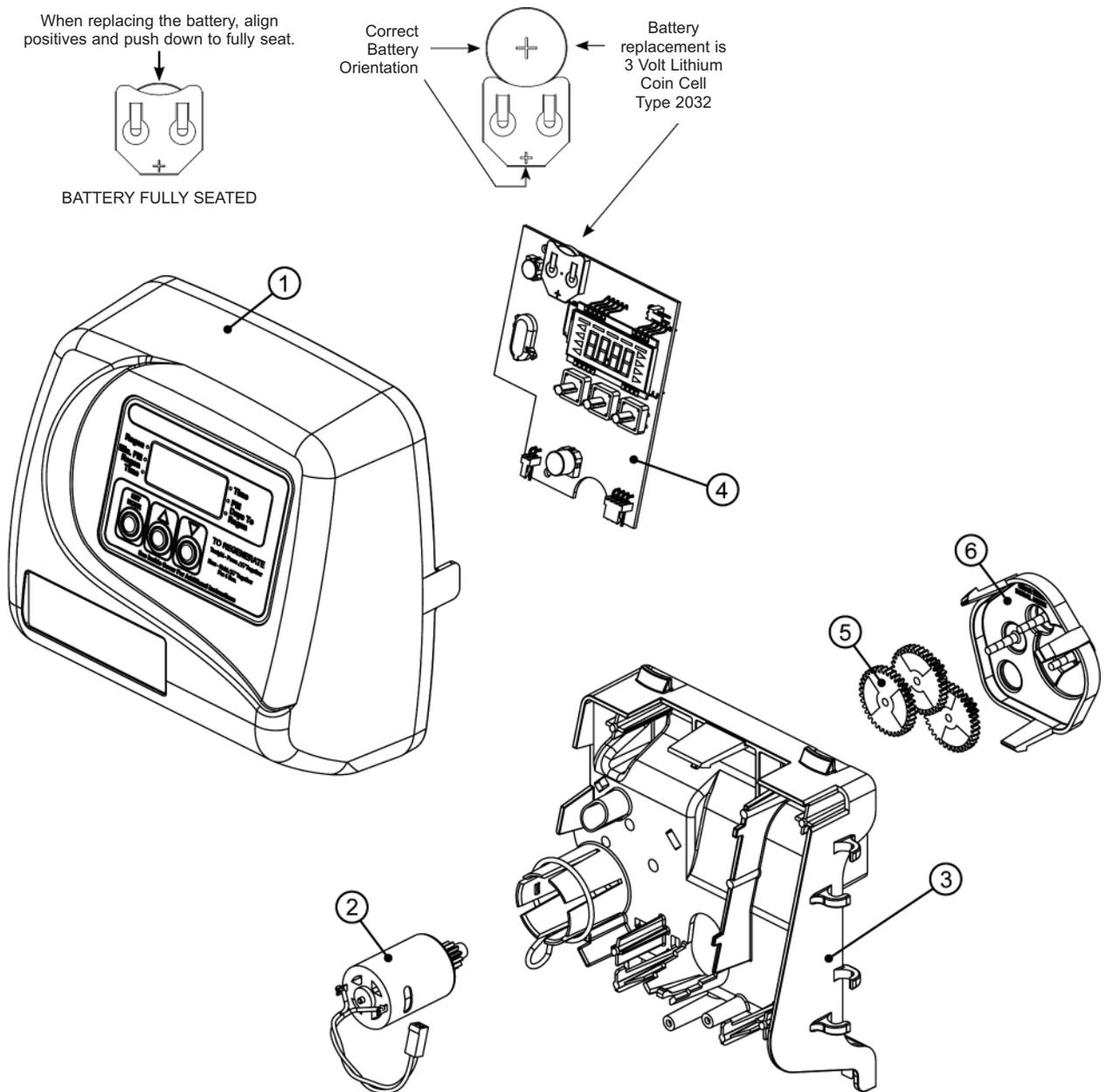
Error Message

If “E1,” “E2,” “E3,” or “E4” appears on the display, contact a service technician. This indicates that the valve did not function properly.

Front Cover and Drive Assembly

| Drawing No. | Part No. | Description | Quantity |
|-------------|---------------|-----------------------------------|----------|
| 1 | LC-V3175TC-01 | WS1TC Front Cover Assembly | 1 |
| * | LC-V3002TC * | WS1TC Drive Assembly | 1 |
| 2 | LC-V3107-01 | WS1 Motor Assembly | 1 |
| 3 | LC-V3106-01 | WS1 Drive Bracket and Spring Clip | 1 |
| 4 | LC-V3818TC | WS1TC PC Board 4-Digit | 1 |
| 5 | LC-V3110 | WS1 Drive Reducing Gear 12 x 36 | 3 |
| 6 | LC-V3109 | WS1 Drive Gear Cover | 1 |
| Not Shown | LC-V3186 | WS1 AC Adapter 120V-12V | 1 |
| | LC-V3186EU | WS1 AC Adapter 220-240V-12V EU | 1 |
| | LC-V3186UK | WS1 AC Adapter 220-240V-12V UK | 1 |
| | LC-V3186-01 | WS1 AC Adapter Cord Only | 1 |

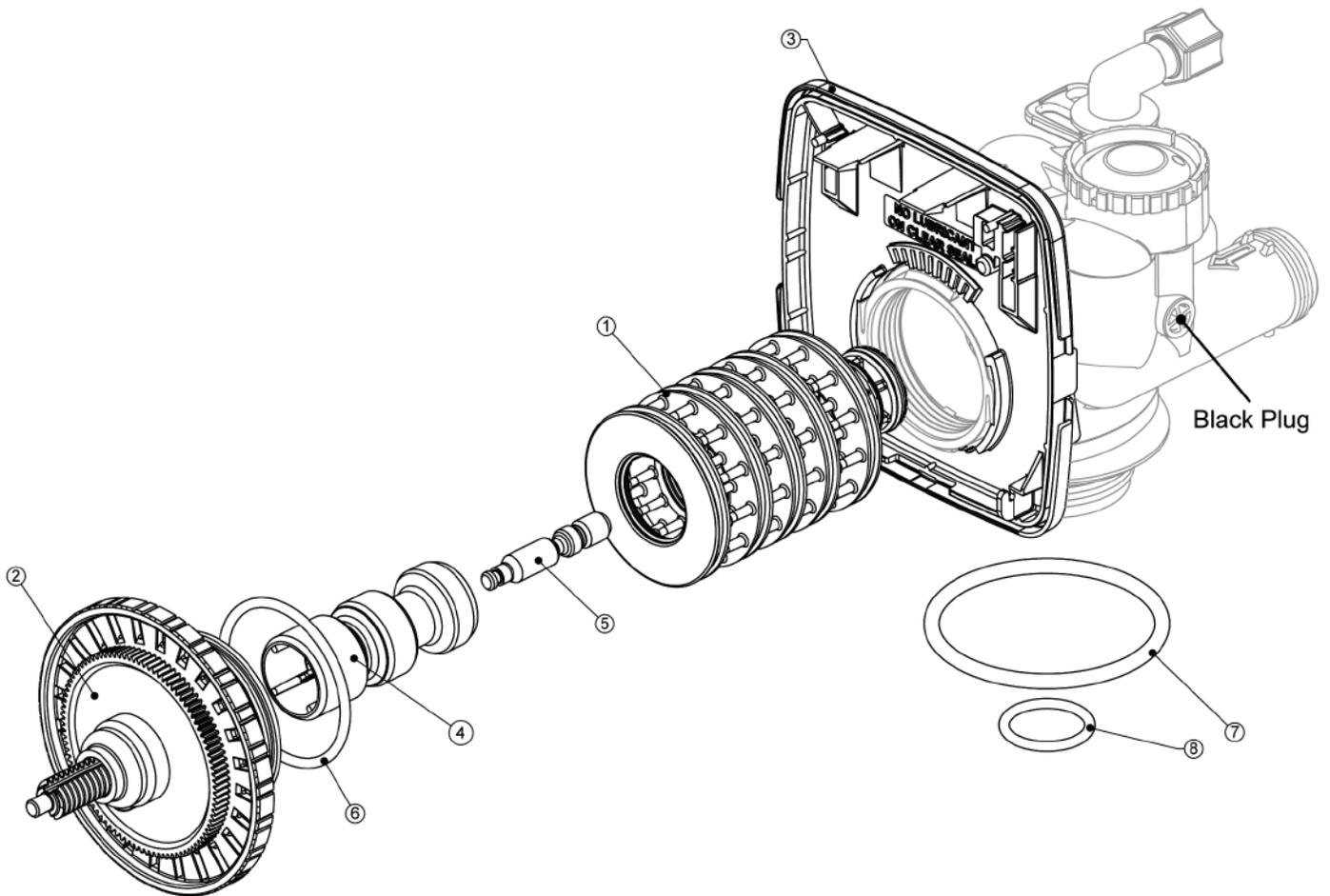
* Drawing Number Parts 2 through 6 may be purchased as a complete assembly: Part No. LC-V3002TC, WS1TC Drive Assembly.



WS1TC Drive Cap Assembly, Downflow Piston, Regenerant Piston, and Spacer Stack Assembly

| Drawing No. | Part No. | Description | Quantity |
|-------------|-------------|--------------------------------|----------|
| 1 | LC-V3005 | WS1 Spacer Stack Assembly | 1 |
| 2 | LC-V3004 | Drive Cap Assembly | 1 |
| 3 | LC-V3178 | WS1 Drive Backplate | 1 |
| 4 | LC-V3011 | WS1 Piston Downflow Assembly | 1 |
| 5 | LC-V3174 | WS1 Regenerant Piston | 1 |
| 6 | LC-V3135 | O-ring 228 | 1 |
| 7 | LC-V3180 | O-ring 337 | 1 |
| 8 | LC-V3105 | O-ring 215 (Distributor Tube) | 1 |
| Not Shown | LC-V3001 | WS1 Body Downflow Assembly | 1 |
| | LC-V3001-02 | WS1 Mixing Valve Body Assembly | 1 |

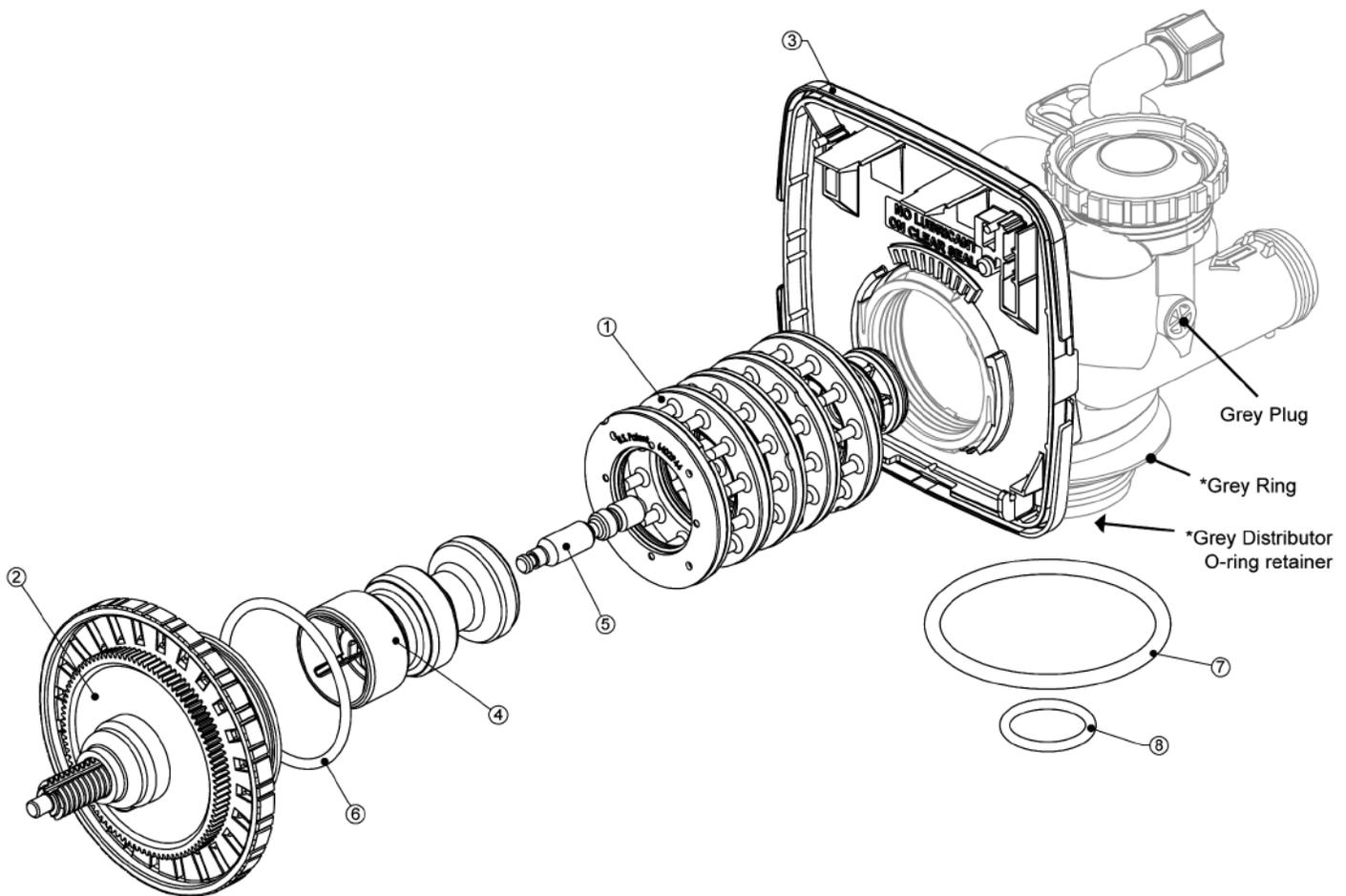
NOTE: The regenerant piston is not used in backwash only applications.



WS1.25TC Drive Cap Assembly, Downflow Piston, Regenerant Piston, and Spacer Stack Assembly

| Drawing No. | Part No. | Description | Quantity |
|-------------|-------------|--|----------|
| 1 | LC-V3430 | WS1.5 Spacer Stack Assembly | 1 |
| 2 | LC-V3004 | Drive Cap Assembly | 1 |
| 3 | LC-V3178 | WS1 Drive Backplate | 1 |
| 4 | LC-V3407 | WS1.5 Piston Downflow Assembly | 1 |
| 5 | LC-V3174 | WS1 Regenerant Piston | 1 |
| 6 | LC-V3135 | O-ring 228 | 1 |
| 7 | LC-V3180 | O-ring 337 | 1 |
| 8 | LC-V3358 | O-ring 219 (Distributor Tube Opening 1.32 inch) | 1 |
| | LC-V3357 | O-ring 218 (Distributor Tube Opening 32mm) | 1 |
| Not Shown | LC-V3020 | WS1.25 Body Downflow Assembly (Distributor Tube Opening 1.32 inch) | 1 |
| | LC-V3020-01 | WS1.25 Mixing Valve Body Downflow Assembly (Distributor Tube Opening 1.32 inch) | 1 |
| | LC-V3020-02 | WS1.25 Body Downflow Assembly (Distributor Tube Opening 32mm) | 1 |
| | LC-V3020-03 | WS1.25 Mixing Valve Body Downflow Assembly (Distributor Tube Opening 32mm) | 1 |

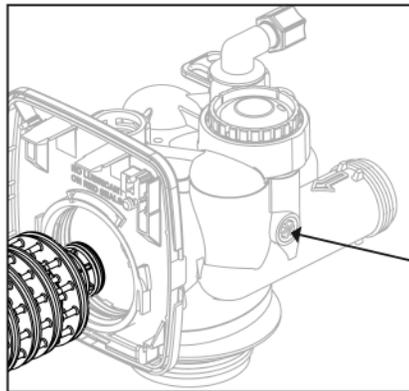
NOTE: The regenerant piston is not used in backwash only applications.



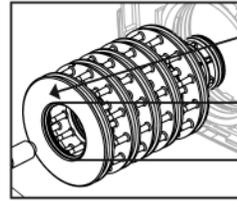
*Only for valves that have a 32mm Distributor Tube Opening

Figure 6: WS1 & WS1.25 Identification

WS1 with 1.050 inch Distributor Tube Opening Identification

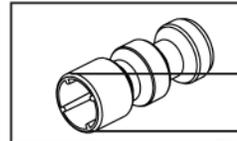


Black Plug



Spacer Color: Grey

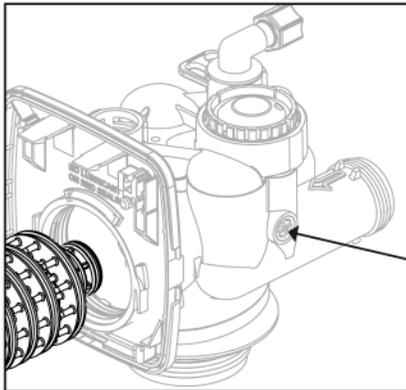
1.25 inch



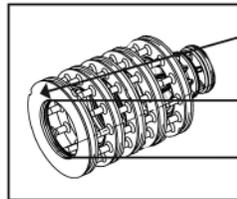
1.25 inch

NOTE: The WS1 downflow piston is a solid amber color.

WS1.25 with 1.32 inch Distributor Tube Opening Identification

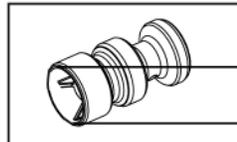


Grey Plug



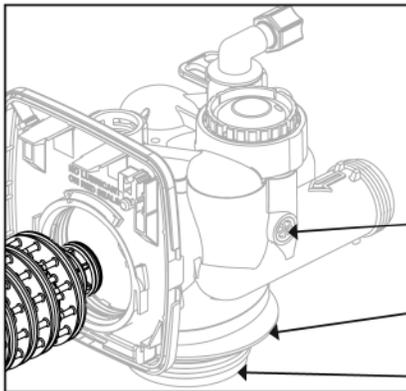
Spacer Color: Black

1.5 inch



1.5 inch

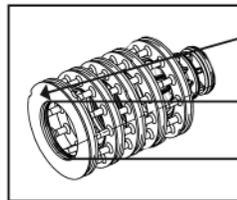
WS1.25 with 32mm Distributor Tube Opening Identification



Grey Plug

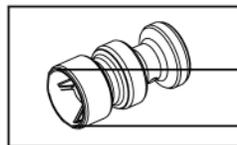
Grey Ring

Grey
Distributor
O-ring
Retainer



Spacer Color: Black

1.5 inch



1.5 inch

