C-SERIES

TIME CLOCK SERIES MODELS



1" & 1-1/4" CONTROL VALVE

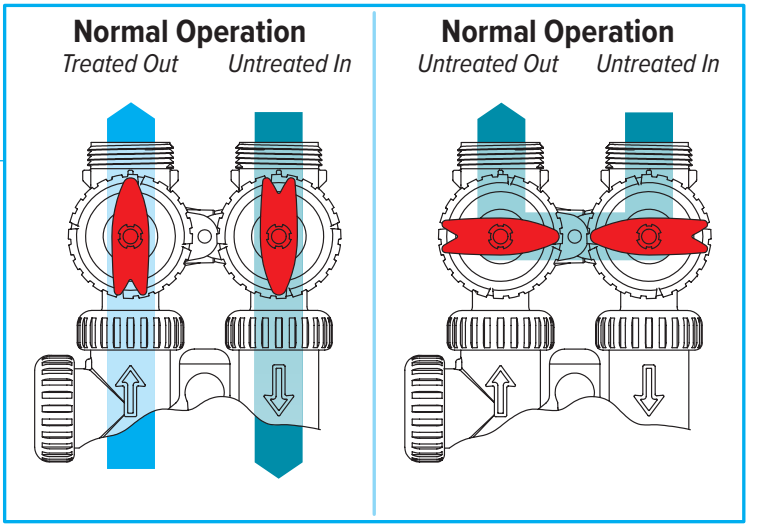
TIME CLOCK PROGRAMMING GUIDE

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BYPASS OPERATION

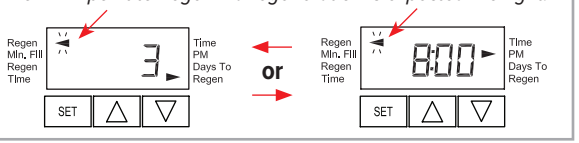
To shut off water to the system, please position arrow handles as shown in the bypass operation diagram below. If your valve doesn't look like the diagram below, contact your service technician for instructions on how to shut off water.



GENERAL OPERATION

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

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



MANUAL REGENERATION

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

If you need to initiate a manual regeneration, either immediately, or tonight at the pre-programmed time (typically 2 a.m.), complete the following steps.

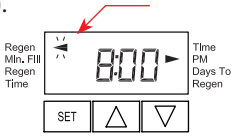
For Immediate Regeneration:

Press and hold ▲ and ▼ simultaneously until valve motor starts (typically 3 seconds).

For Regeneration Tonight:

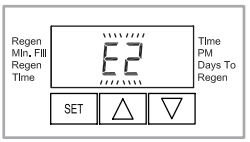
Press and release ▲ and ▼ simultaneously (notice that arrow points to Regen).

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



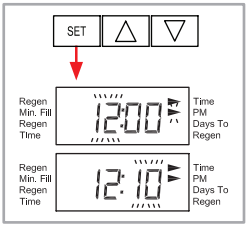
ERROR CODES

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



TO SET TIME OF DAY

In the event of a prolonged power outage, time of day flashes, indicating that it needs to be reset. All other information will be stored in memory no matter how long the power outage. Please complete the steps as shown to the right. To access this mode, press "**SET**."

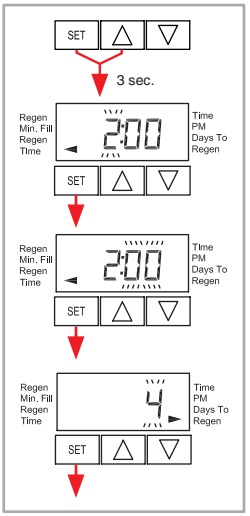


1. Accessed by pressing **SET** for approximately 3 seconds.
2. Adjust hour with ▲or▼. With 60 Hz line frequency detection on power-up, timekeeping is 12 hour with PM indicator. With 50 Hz line frequency detection on power-up, timekeeping is 24 hour without the PM indicator. Press **SET** to go to the next step.
3. Adjust minutes with ▲or▼.
4. Press SET to complete and return to normal operation.

SET TIME OF REGEN & DAYS BETWEEN REGEN

For initial set-up or to make adjustments, please complete the steps as shown.

Access this mode by pressing **SET** and ▲ for approximately 3 seconds. The number of days between regenerations may need to be varied based on usage and water conditions. (This step will not appear if the 7-day clock option is selected.)



1. Accessed by pressing **SET** and ▲ simultaneously for about 3 seconds.
2. Set Regeneration Time Hour. Set the time for regeneration to start. Press **SET** to go to the next step.
3. Set Regeneration Time Minutes. Press **SET** to go to the next step.
4. Set number of Days between regeneration cycles.
5. Press **SET** to complete and return to normal operation.

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 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 (1-99) 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 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 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 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:

- **Softener** - one or two backwashes occur and refill always occurs after the rinse cycle (P0 through P5)
- **Regenerative Filter** - one backwash occurs and refill always occurs after the rinse cycle (P6)
- **Backwashing Filter** - one backwash occurs (P7 through P9)

TABLE 1

Regeneration Cycles & Times for Different Programs
All Times in Minutes

Program	C1 1st BW	C2 Regen	C3 2nd BW	C4 Rinse	C5 Fill
P0	3	50	3	3	1-99
P1	8	50	8	4	1-99
P2	8	70	10	6	1-99
P3	12	70	12	8	1-99
P4	10	50	Skipped	8	1-99
P5	4	50	Skipped	4	1-99
P6	12	6	Skipped	12	1-99
P7	6	Skipped	Skipped	4	Skipped
P8	10	Skipped	Skipped	6	Skipped
P9	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.

- 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 "today" an arrow 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▼.

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

GENERAL PROGRAMMING 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
- Installer Displays & Settings (either 1-99 Days Between Regeneration option or 7-Day option)
- User Displays

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

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

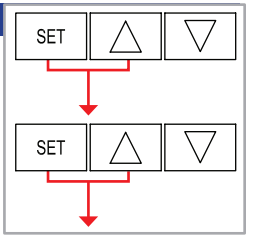
To quickly exit Installer Displays & Settings or Setup, simultaneously press **SET** + ▼. Any changes made prior to the exit are incorporated.

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

SYSTEM SETUP

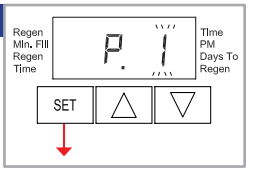
STEP 1SS

From normal mode, press **SET** + ▲ buttons simultaneously for 3 seconds and release. Then press **SET** + ▲ simultaneously for 3 seconds and release.



STEP 2SS

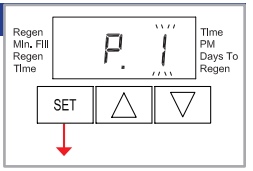
Choose the desired program by pressing ▲or▼. Prior to selecting a program, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations.



Press **SET** button to go to Step 3SS.

STEP 3SS

If program P0 through P6 (**Table 1**) 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.



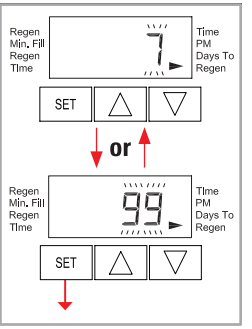
Press **SET** button to go to Step 4SS.

NOTE: For each minute of fill 0.5 gallons of water is added to the solution tank. With Sodium Chloride, each 0.5 gallon of water will dissolve 1.5 pounds of salt.

STEP 4SS

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.

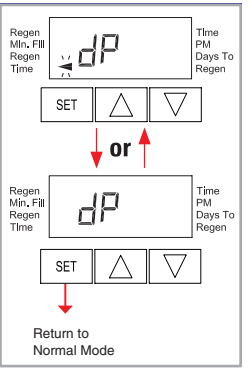


Press **SET** to go to Step 5SS.

STEP 5SS

If a differential pressure switch is installed and actuated for 2 minutes:

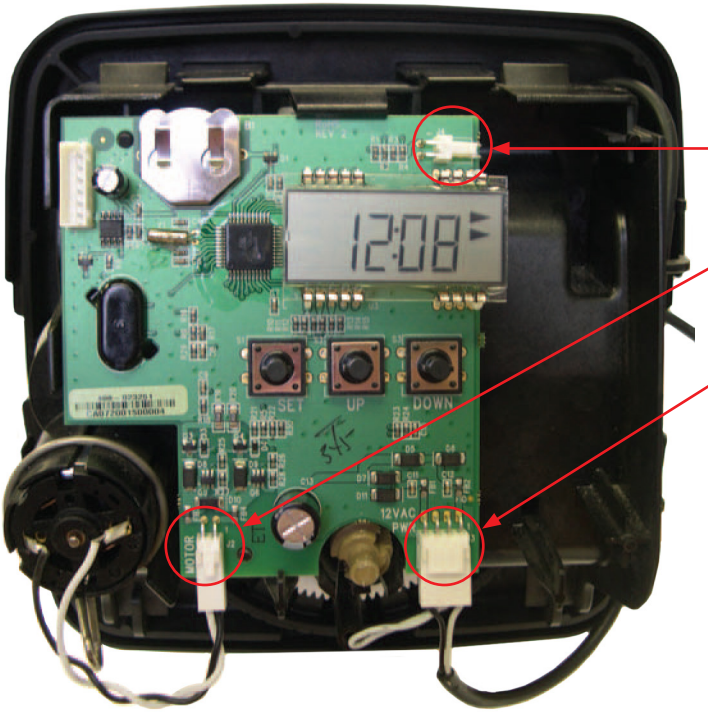
- a regeneration will occur immediately if no arrow points at Regen Time; or
- a regeneration will occur at the delayed regeneration hour if an arrow points at Regen Time.



Use ▲or▼ to switch between the two choices. If a differential switch is not installed the settings in this display are ignored. Press **SET** to exit system setup.

See Photo A next page.

SYSTEM SETUP



A. Differential pressure switch connection

B. Motor wire connection

C. AC adapter wire connection

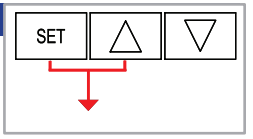
NOTE: A regeneration will be initiated or scheduled after the control has received a signal for two minutes to the DP Input (Item A).

INSTALLER DISPLAYS & SETTINGS

(1-99 DAYS BETWEEN REGENERATION OPTION)

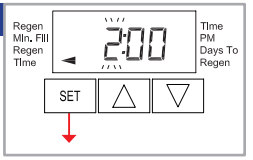
STEP 1ID

From normal mode, press **SET** + ▲ buttons simultaneously for 3 seconds and release.



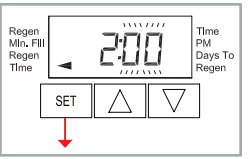
STEP 2ID

Regeneration Time Hour: Set the time for regeneration to start using ▲or▼. Press **SET** to go to the next step.



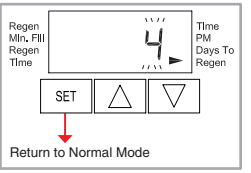
STEP 3ID

Regeneration Time Minutes: Set the time for regeneration to start using ▲or▼. Press **SET** to go to the next step.



STEP 4ID

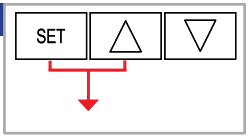
Days to Regen: Set the number of days between regenerations. The allowable range is 1 to 99. Press **SET** to exit Installer Displays and Settings.



INSTALLER DISPLAYS & SETTINGS (7 DAY OPTION)

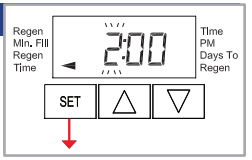
STEP 1|7

From normal mode, press **SET** + ▲ simultaneously for 3 seconds and release.



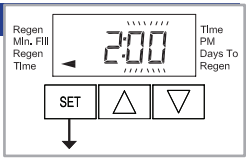
STEP 2|7

Regeneration Time Hour: Set the time for regeneration to start using ▲or▼. Press **SET** to go to Step 3|7.



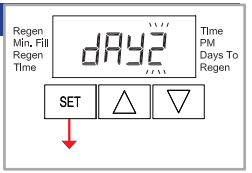
STEP 3|7

Regeneration Time Minutes: Set the time for regeneration to start using ▲or▼. Press **SET** to go to Step 4|7.



STEP 4|7

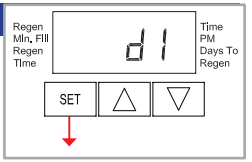
Current Day of Week: Set the current day of the week by using ▲or▼ (See chart at right for date codes). Press **SET** to go to STEP 5|7.



Display		Day of Week
Day 1	D1	Sunday
Day 2	D2	Monday
Day 3	D3	Tuesday
Day 4	D4	Wednesday
Day 5	D5	Thursday
Day 6	D6	Friday
Day 7	D7	Saturday

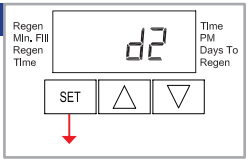
STEP 5|7

Sunday Regeneration: To regenerate on Sunday 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 STEP 6|7.



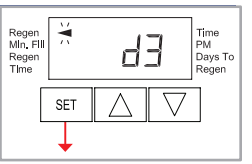
STEP 6|7

Monday Regeneration: To regenerate on Monday 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 STEP 7|7.



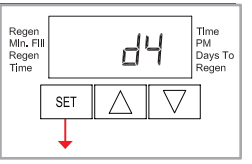
STEP 7|7

Tuesday Regeneration: To regenerate on Tuesday 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 STEP 8|7.



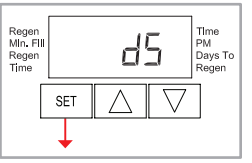
STEP 8|7

Wednesday Regeneration: To regenerate on Wednesday 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 STEP 9|7.



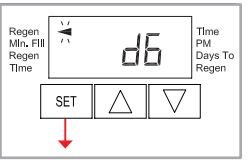
STEP 9|7

Thursday Regeneration: To regenerate on Thursday 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 STEP 10|7.



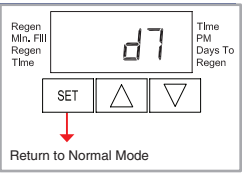
STEP 10|7

Friday Regeneration: To regenerate on Friday 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 STEP 11|7.



STEP 11|7

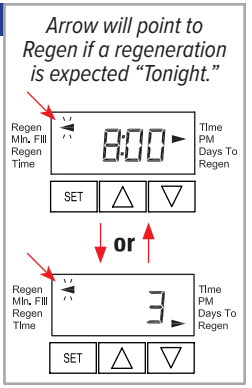
Saturday Regeneration: Saturday Regeneration: To regenerate on Saturday use ▲or▼ until the arrow points to **REGEN**. If the arrow does not point to **REGEN** a regeneration will not occur on Saturday. Press SET to exit Installer Displays & Settings.



NOTE: If all arrows are turned off in **d1-d7**, the program will default to **d7**.

USER DISPLAYS

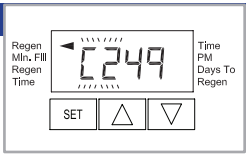
General Operation



When the system is operating 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, the arrow will point to **REGEN**.

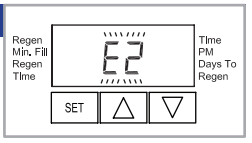
Regeneration Mode



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

Error Codes

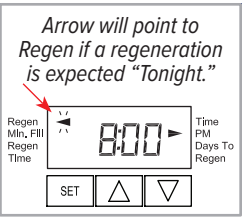


If the display shows "E1," "E2", "E3", or "E4" (for error), call a service technician.

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 at the point of interruption once power is restored.

Manual Regeneration



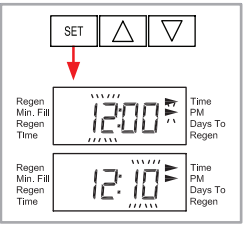
Sometimes there is a need to regenerate the system sooner than when the system calls for it, usually referred to as a manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

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 brine tank does not contain salt, fill with salt and wait at least two hours before regenerating.

To Set Time Of Day

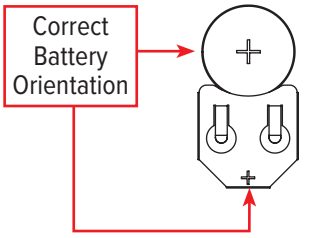


In the event of a prolonged power outage, time of day flashes, indicating that it needs to be reset. All other information will be stored in memory no matter how long the power outage. Please complete the steps as shown to the right. To access this mode, press "**SET**."

1. Accessed by pressing **SET** for approximately 3 seconds.
2. Adjust hour with ▲or▼. 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.
3. Adjust minutes with ▲or▼.
4. Press **SET** to complete and return to normal operation.

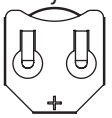
FRONT COVER AND DRIVE ASSEMBLY

Part No.	Description	Qty
CL3175TC-01	TC Front Cover Asy	1
CL3107-01	Motor Asy	1
CL3106-01	Drive Bracket	1
CL3818TC	TC PC Board 4-Digit	1
CL3110	Drive Reducing Gear 12 x 36 3	
CL3109	Drive Gear Cover	1
CL3002TC	TC Drive Assembly	*
Not Shown		
CL3186	AC Adapter 120V-12V	1
CL3186EU	AC Adapter 220-240V-12V EU	
CL3186UK	AC Adapter 220-240V-12V UK	
	V3186-01 WS1 AC Adapter Cord Only	

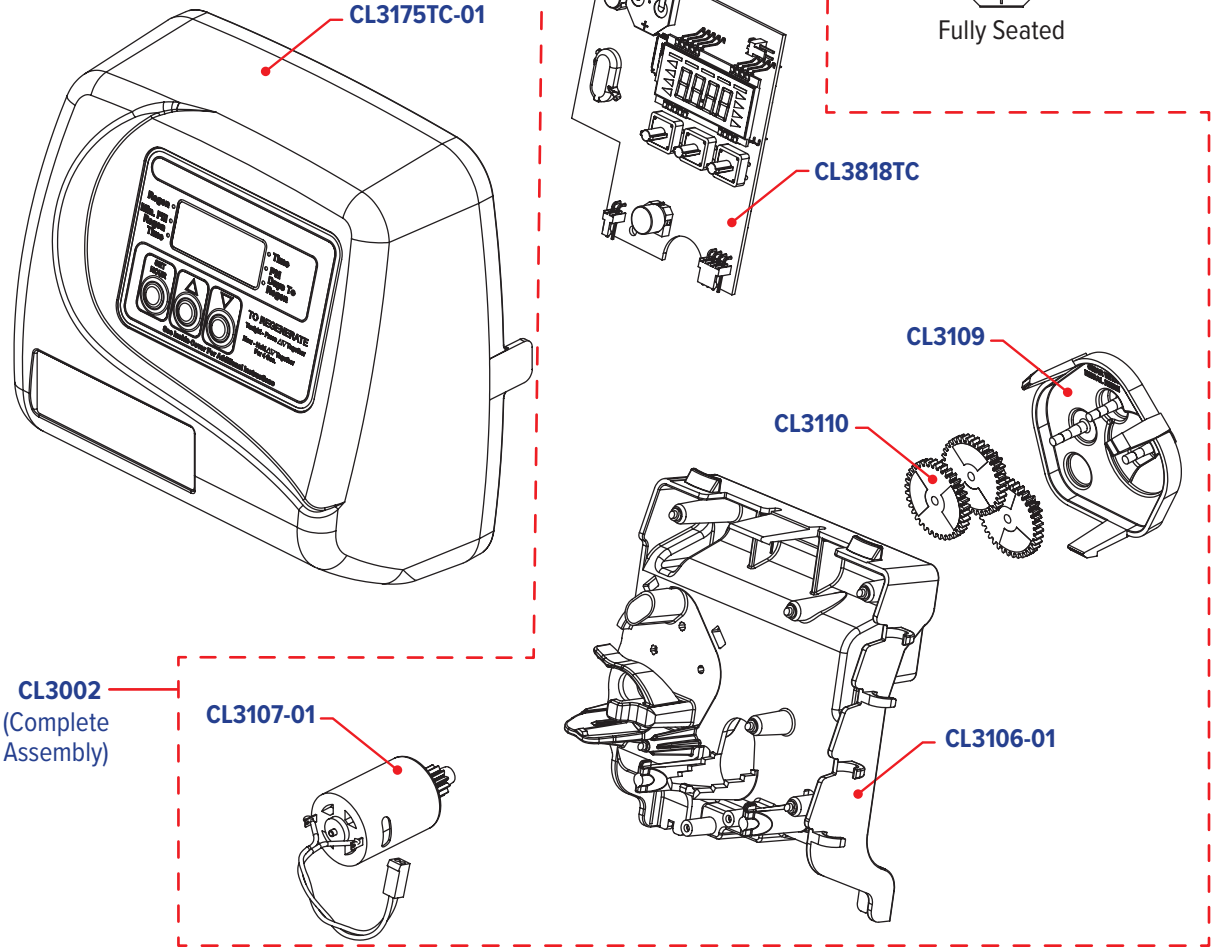


Battery replacement is 3 volt lithium coin cell type 2032.

When replacing the battery, align positives and push down to fully seat.



Fully Seated



DRIVE CAP ASSEMBLY, DOWNFLOW PISTON, REGENERANT PISTON & SPACER STACK ASSEMBLY

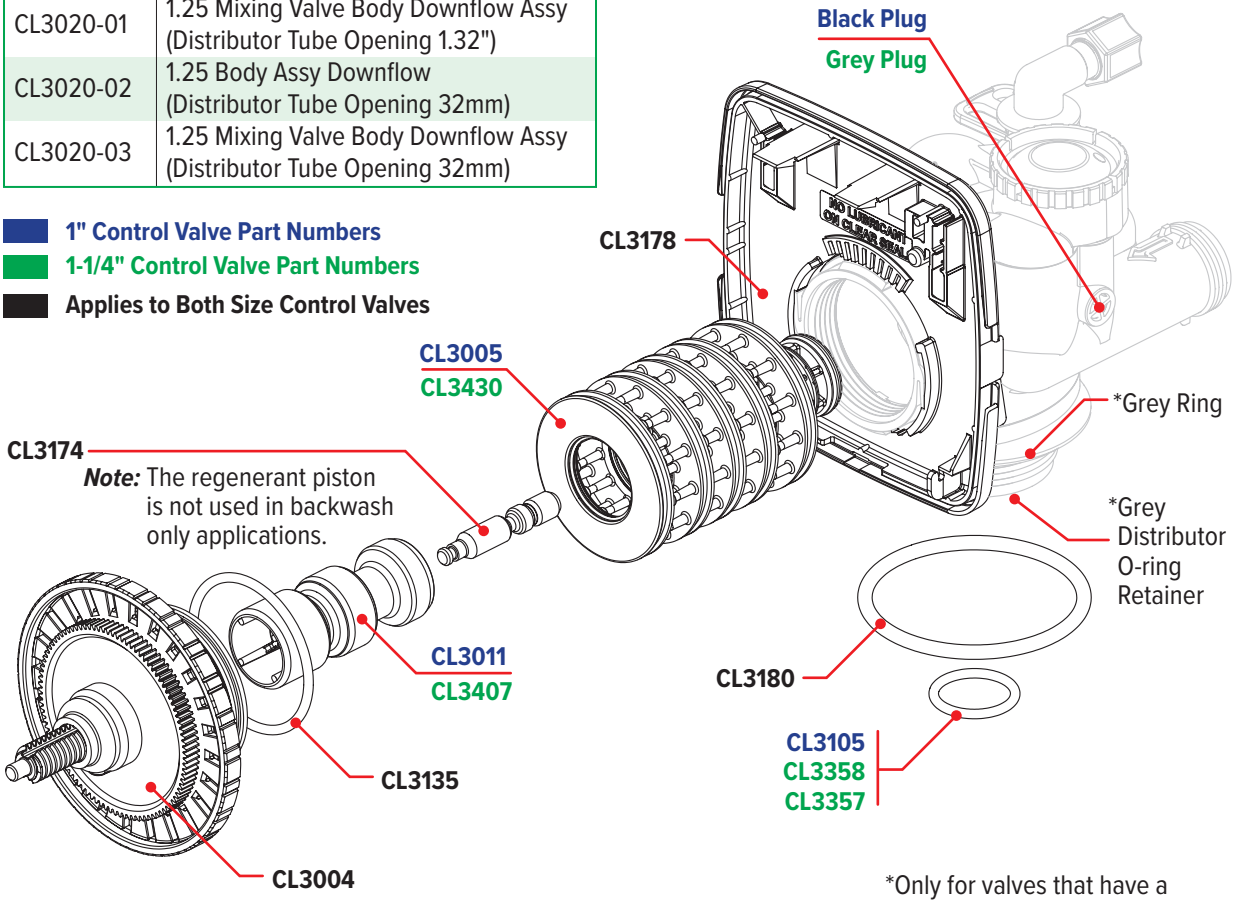
1-1/4" Control Valve Part Numbers		
Part No.	**Description**	**Qty**
CL3430	Spacer Stack Assembly	1
CL3004	Drive Cap ASY	1
CL3178	Drive Back Plate	1
CL3407	Piston Downfl ow ASY	1
CL3174	Regenerant Piston	1
CL3135	O-ring 228	1
CL3180	O-ring 337	1
CL3358	O-ring 219 (Dist. Tube Opening 1.32")	1
CL3357	O-ring 218 (Dist. Tube Opening 32mm)	
Not Shown		
CL3020	Body ASY Downflow (Distributor Tube Opening 1.32")	
CL3020-01	1.25 Mixing Valve Body Downflow Assy (Distributor Tube Opening 1.32")	
CL3020-02	1.25 Body Assy Downflow (Distributor Tube Opening 32mm)	
CL3020-03	1.25 Mixing Valve Body Downflow Assy (Distributor Tube Opening 32mm)	

1" Control Valve Part Numbers		
Part No.	**Description**	**Qty**
CL3005	1" Spacer Stack Assembly	1
CL3004	Drive Cap Assembly	1
CL3178	Drive Back Plate	1
CL3011	Piston Downflow Assembly	1
CL3174	Regenerant Piston	1
CL3135	O-ring 228	1
CL3180	O-ring 337	1
CL3105	O-ring 215 (Distributer Tube)	1
Not Shown		
CL3001	Body ASY Downflow	1
CL3001-02	Mixing Valve Body ASY	

1" Control Valve Part Numbers

1-1/4" Control Valve Part Numbers

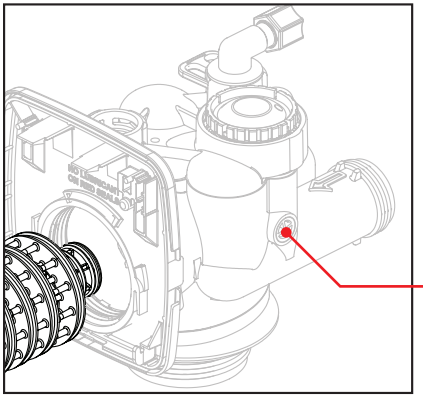
Applies to Both Size Control Valves

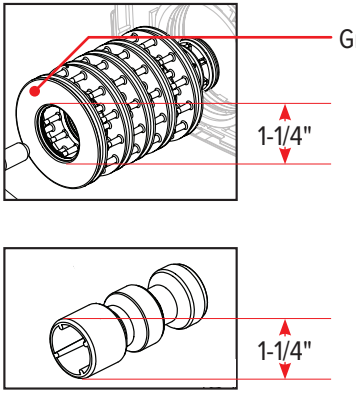


*Only for valves that have a 32mm Distributor Tube Opening

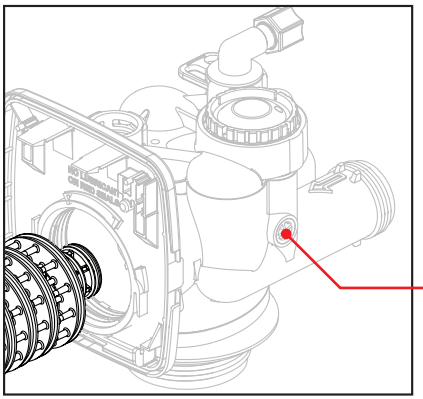
C-SERIES 1" & 1-1/4" CONTROL VALVE IDENTIFICATION

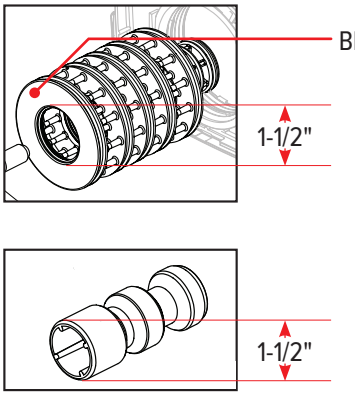
C-Series with 1.050" Distributor Tube Opening Identification



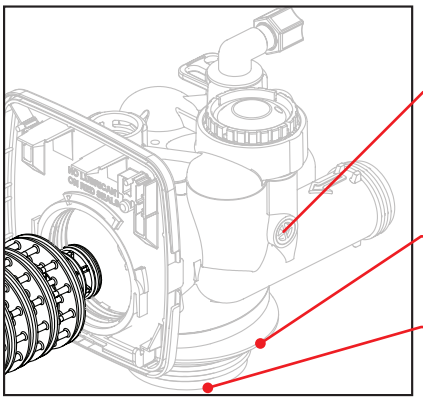


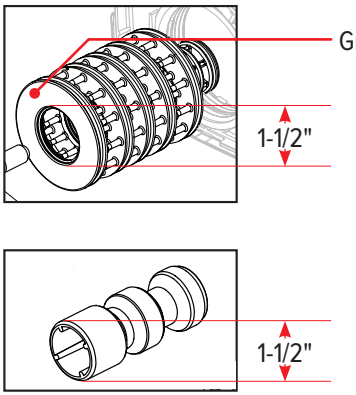
C-Series 1-1/4" with 1.32" Distributor Tube Opening Identification





C-Series 1-1/4" with 32mm Distributor Tube Opening Identification





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