



**ACTIVATED CARBON
WATER FILTER SYSTEM
DCF6 SERIES**

**INSTALLATION, OPERATION, AND
MAINTENANCE MANUAL**

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WATER FILTER SYSTEM

1. INTRODUCTION

The Diamond H₂O Filter System produces high quality Filtered Water.

2. SYSTEM SPECIFICATIONS

MODEL #	DCF6-100-100	DCF6-150-100	DCF6-200-100	DCF6-250-100
Tank Size	10" X 44"	10" x 54"	12" x 52"	13" X 54"
Filter Media	1	1.5	2	2.5
Gravel #20	10	10	20	25
Inlet/Outlet	1" NPT	1" NPT	1" NPT	1" NPT
Drain	3/4" NPT	3/4" NPT	3/4" NPT	3/4" NPT
Service Rate	3 GPM	5 GPM	8 GPM	10 GPM
Backwash Rate	5.3 GPM	5.3 GPM	6.5 GPM	7.5 GPM
Height	52"	62"	60"	62"
Weight	70#	93#	125#	148#
Power	120 V, 1 PH	120 V, 1 PH	120 V, 1 PH	120 V, 1 PH

MODEL #	DCF6-18-125	DCF6-21-125
Tank Size	18" X 65"	21" X 62"
Filter Media	5	7
Gravel #20	80	100
Inlet/Outlet	1.25" NPT	1.25" NPT
Drain	3/4" NPT	3/4" NPT
Service Rate	9 GPM	12 GPM
Backwash Rate	15 GPM	20 GPM
Height	73"	70"
Weight	317#	406#
Power	120 V, 1 PH	120 V, 1 PH

Diamond H₂O

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3. GENERAL INSTALLATION INSTRUCTIONS

3.1. LOCATION

1. Select a position near a floor drain that has adequate carrying capacity to handle the filter backwash flow rate. Refer to the Specification Table on page 2 for the backwash flow rate.
2. Erect the filter on a level, firm foundation, preferably concrete. The valve and piping are normally in front.
3. Level the system.

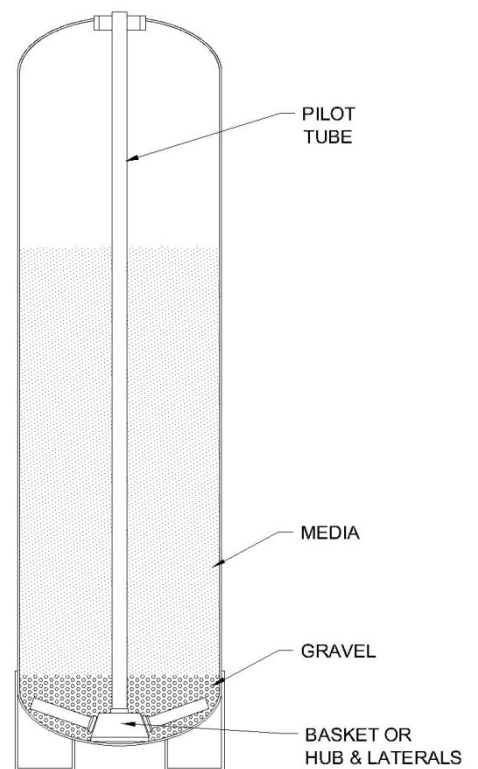
3.2. MECHANICAL

NOTE: Please verify that you have the proper amount of gravel and media on site before proceeding. If the amounts of gravel and media on site differs from what is listed in the Systems Specification table contact Diamond H2O for the correct amount.

NOTE: The control valve and bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

1. Thoroughly read and comply with the instructions provided in this manual.
2. Thread the control valve onto the fiberglass tank to determine the correct "Front Orientation". Mark the location on the tank with tape.

Note: After the gravel and media are loaded it is very difficult to move or rotate the tank.
3. Remove the control valve and install the PVC distributor system into the tank.
4. Locate the tank, with the proper front orientation, and then fill the tank approximately half full of water.
5. Cover the exposed end of the distributor pipe to prevent any gravel and/or media from falling into the riser.



3.2. MECHANICAL continued

6. SLOWLY pour the support gravel into the tank. See the System Specification on page 1 for the proper amount for your model.

CAUTION: The distributor system is constructed of PVC, which will break if the gravel is poured into the tank too quickly.

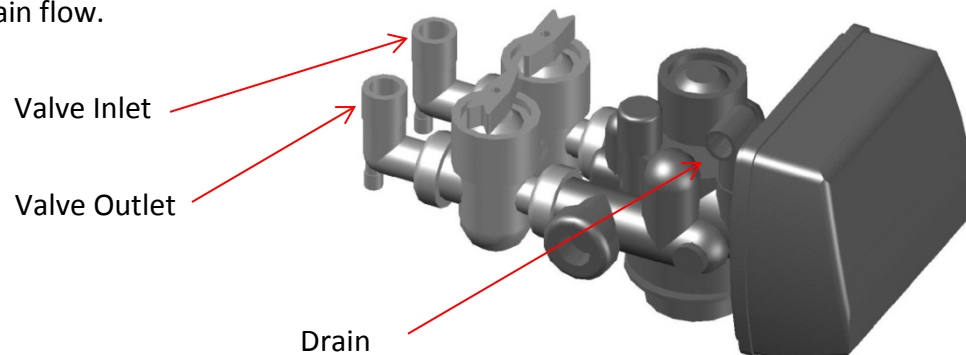
7. When all of the support gravel provided is in the tank, carefully rock the tank back and forth to level the gravel. Confirm that the gravel is covering the distributor basket or radials. If not contact Diamond H₂O.
8. Load the media provided into the tank in the same manner as the gravel. See the System Specification on page 1 for the proper amount for your model.
9. Fill the tank with water, if possible.
10. Verify that there is a large tank O-ring on the control valve adapter base.
11. Thread the control valve onto the tank. Make sure that the distributor slides easily into the riser O-ring and does not bind or cut the O-ring.
12. Tighten down the control valve and verify that the orientation is correct to install the plumbing.
13. Connect the facility plumbing to the control valve inlet following all local codes. Temporarily run the control valve outlet to drain at this time.

NOTE: Be sure all piping is free of thread chips and other foreign matter.

14. Pipe a drain line from the backwash flow control assembly to the drain. Use a minimum of elbows and increase or decrease the pipe size to connect to the backwash flow control assembly. Install a union near the backwash flow control assembly to facilitate cleaning, if required.

DO NOT install a valve in this line or use pipe smaller than listed in the Specification Table on page 1.

DO NOT make a direct connection to the drain. Provide an air gap of at least four times the diameter of the drain pipe to conform to sanitation codes and to permit the observation of the drain flow.



3.3. ELECTRICAL

The Water Filter use requires single-phase 110 volt, 1 phase, 60 hertz, 5 amp service and is equipped with a 10 foot electrical cord and a wall plug-in transformer.

NOTE: We recommend that a licensed electrician install your system in accordance with local and national electrical codes.

WARNING: To reduce the risk of electrical shock, the incoming power supply must include a protective earth ground.

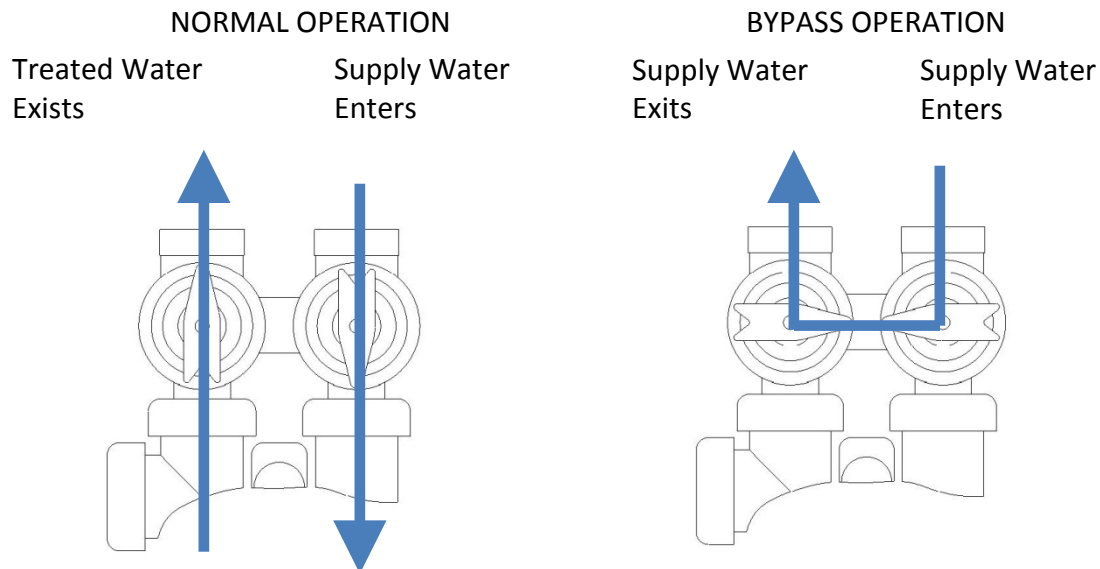
NOTE: Some Filters are supplied with an optional micro-switch the closes during Backwashing. The wires with connectors can be located coming out the back of the control valve. These wires connect with the RO controller to prevent RO start-up.

4. GENERAL START-UP INSTRUCTIONS

1. Thoroughly read and comply with the instructions provided in this manual.
2. All plumbing connections to the system must be complete.

Note: Start up only one unit at a time and repeat these instructions for multiple units.

3. With the inlet and outlet isolation valves closed and the system bypass open; verify service flow to the facility.



4. Connect power to the unit.
5. Set control valve time and day. Refer to Control Valve Instructions or page 6 for programming and set up.

4. GENERAL START-UP INSTRUCTIONS **continued**

6. Advance the control to the BACKWASH position by press and holding ▲ and ▼ buttons simultaneously on the valve panel until valve motor starts (typically 3 seconds) and then slowly open the manual inlet valve about 10% open. Water is now being directed into the bottom of the vessel, up through the media and out to the drain. If the vessel was not completely full of water, you will hear air coming out of the drain.

NOTE: The initial backwash water will contain some mineral particles. The media bed should be backwashed until the drain water is clear.

CAUTION: Media should never come out of the drain. If media begins to come out of the drain, close the manual inlet valve until the media is no longer present in the drain flow.

CAUTION: Activated Carbon media should be allowed to soak for 12 – 24 hours to pre-wet the carbon particles. If the Carbon media is not pre-soaked, it must be backwashed very slowly to prevent the media from being flushed into the drain.

7. Once all of the air has been purged and you have a constant, steady flow of water to the drain, completely open the manual inlet valve. Allow the unit to backwash to the drain for approximately 14 minutes, or until the flow to the drain is clear.
8. The control valve will advance to the FAST RINSE position. The water now flows at a high rate into the top of the tank, down through the media and out to the drain. Allow the unit to automatically fast rinse to the drain for the programmed time, approximately 8 minutes.
9. After the fast rinse time has been completed, the control valve will advance to the SERVICE position.

NOTE: If the drain water is still not clear, initiate another regeneration by press and holding ▲ and ▼ buttons simultaneously until valve motor starts (typically 3 seconds).

10. Test the filtered water for quality.

NOTE: For a Carbon Filter you should test the chlorine. For an Acid Neutralizer you should test for pH. See the Filter Application Guide on page 16 for a complete list.

11. If the Filter is operating properly, close the outlet valve of the control valve. Connect the facility plumbing to the control valve outlet following all local codes.

12. Startup is now complete.

5. CONTROL VALVE INSTRUCTIONS

5.2. 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 ▼ buttons. 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 ▼ buttons.
4. Press SET to complete and return to normal operation.



Regen Min. Fill Regen Time
 12:00 PM
 Days To Regen



Regen Min. Fill Regen Time
 12:10 PM
 Days To Regen



5.2. TO SET TIME OF REGENERATION AND DAYS BETWEEN REGENERATION

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

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



Regen Min. Fill Regen Time
 2:00 PM
 Days To Regen



Regen Min. Fill Regen Time
 2:00 PM
 Days To Regen



Regen Min. Fill Regen Time
 4 Days To Regen



5. CONTROL VALVE INSTRUCTIONS continued

5.3. 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:

- An option where the user can choose the number of days (1-99) between each regeneration;
- 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.

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 the ▲ and ▼ buttons 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 the ▲ and ▼ buttons for three seconds.

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

5. CONTROL VALVE INSTRUCTIONS continued

5.4. OEM 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:

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

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

When in operation, normal user displays show the time of day or days remaining before 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 OEM Setup, simultaneously press SET and ▼. Any changes made prior to the exit are incorporated.

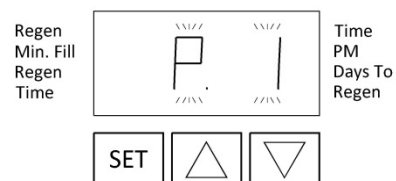
To reinitialize the control valve, check to make sure the valve is in the User Display. Then simultaneously press SET and ▼ or unplug power source plug (4-pin connector) on the circuit board, wait 3 seconds and plug back in.

5.5. OEM SYSTEM SETUP

STEP 1SS: From normal mode, press the SET and ▲ buttons simultaneously for 3 seconds and release. Then press the SET and ▲ buttons simultaneously for 3 seconds and release.



STEP 2SS: Choose the desired program by pressing the ▲ or ▼ buttons. Prior to selecting a program, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. See Valve Body Compliance Table in the WS1 and WS1.25 Drawings and Service Manual. Press SET button to go to Step 3SS.



5. CONTROL VALVE INSTRUCTIONS continued

5.5. OEM GENERAL INSTRUCTIONS continued

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 - P5)

Regenerative Filter: one backwash occurs and refill always occurs after the rinse cycle (P6)

Backwashing Filter: one backwash occurs (P7 through P9)

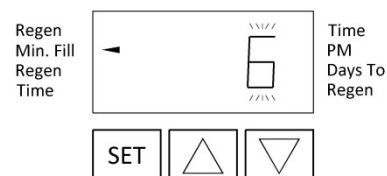
Table 1
Regeneration Cycles and Times for Different Programs

Program	All times in Minutes				
	C1 1 st Backwash	C2 Regenerate	C3 2 nd Backwash	C4 Rinse	C5 Fill
P0	3	50	3	3	1-99
P1	8	50	8	4	1-99
P2	8	70	10	6	1-99
P3	12	70	12	8	1-99
P4	10	50	Skipped	8	1-99
P5	4	50	Skipped	4	1-99
P6	12	6	Skipped	12	1-99
P7	6	Skipped	Skipped	4	Skipped
P8	10	Skipped	Skipped	6	Skipped
P9	14	Skipped	Skipped	8	Skipped

NOTE: Diamond H₂O used P9 as the default.

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

STEP 3SS: 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 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.

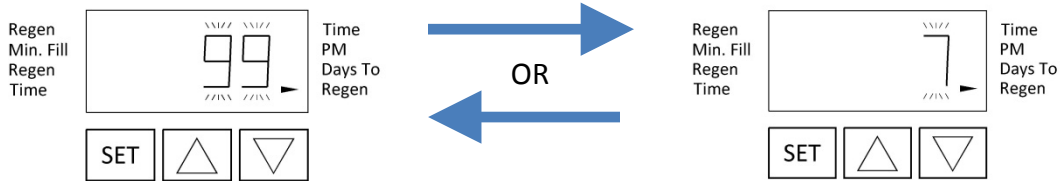


5. CONTROL VALVE INSTRUCTIONS continued

STEP 4SS: Use the ▲ or ▼ buttons to switch between:

- 1-99 Days 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.

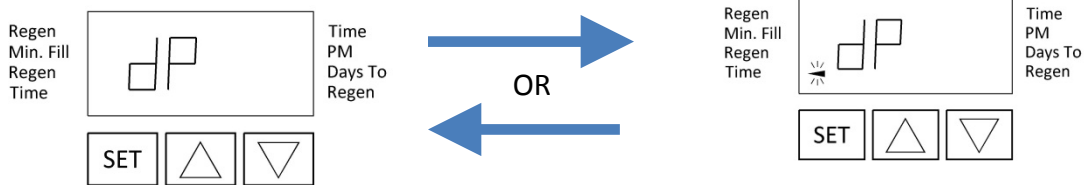
Press SET to go to Step 5SS.



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.

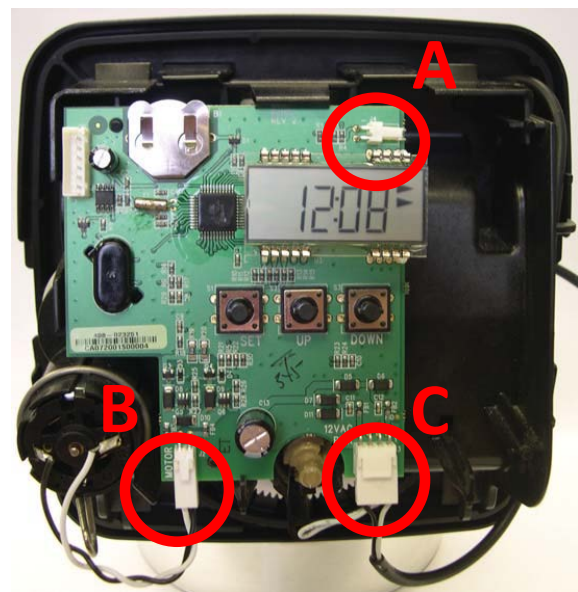
Use ▲ or ▼ to switch between the two choices. If a differential switch is not installed the settings in this display are ignored. Press SET to exit OEM system setup.



NOTE:

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

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



5. CONTROL VALVE INSTRUCTIONS continued

INSTALLER DISPLAYS & SETTINGS (1-99 Days between Regeneration Option)

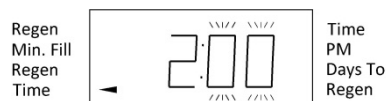
STEP 1ID: From normal mode, press SET and ▲ buttons simultaneously for 3 seconds and release.



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 1I7: From normal mode, press SET and ▲ buttons simultaneously for 3 seconds and release.



STEP 2I7: Regeneration Time Hour: Set the time for regeneration to start using ▲ or ▼. Press SET to go to Step 3I7.



STEP 3I7: Regeneration Time Minutes: Set the time for regeneration to start using ▲ or ▼. Press SET to go to Step 4I7.



STEP 4I7: 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 5I7.



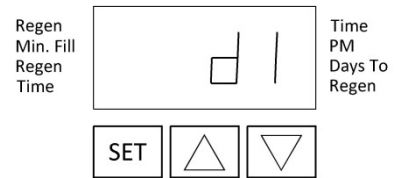
Display	Day of Week
day 1 d1	Sunday
day 2 d2	Monday
day 3 d3	Tuesday
day 4 d4	Wednesday
day 5 d5	Thursday
day 6 d6	Friday
day 7 d7	Saturday

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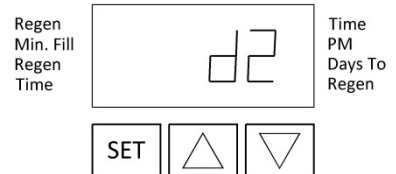
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5. CONTROL VALVE INSTRUCTIONS continued

STEP 517: 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 617.



STEP 617: 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 717.



STEP 817: 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 917.



STEP 917: 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 1017.



STEP 1017: 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 1117.



STEP 1117: 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.

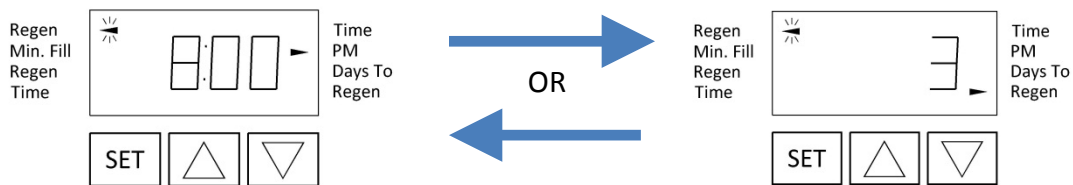
5. CONTROL VALVE INSTRUCTIONS continued

5.6. USER DISPLAYS

5.6.1. 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 are 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.



5.6.2. 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.

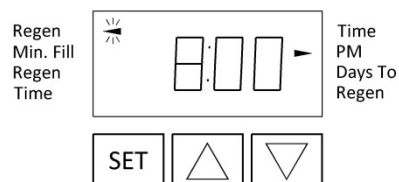


When the system begins to regenerate, the display will change to the Regeneration Cycle Display to indicate the current regen cycle step and time remaining. An arrow will also point to Regen. The system will run through the steps automatically and will reset itself to provide treated water when the regeneration is completed.

5. CONTROL VALVE INSTRUCTIONS continued

5.6.3. 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.

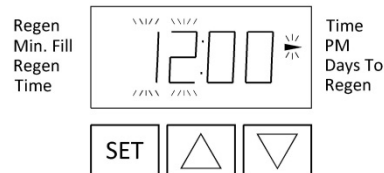
To initiate a manual regeneration immediately, simultaneously press ▲ and ▼ for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled.

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

5.6.4. SET TIME OF DAY

STEP 1U: Press SET

STEP 2U: Current time: 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 Step 3U.



STEP 3U: Adjust minutes with ▲ or ▼. Press SET to exit Set Time of Day.

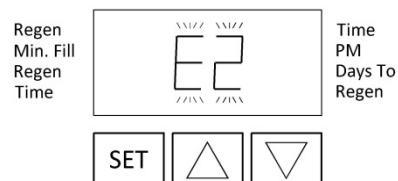


5.6.5. POWER LOSS

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.

5.6.6. ERROR MESSAGE

If "E1," "E2," "E3" or "E4" appears on the display contact the OEM for help. This indicates that the valve did not function properly.



6. FILTER APPLICATION GUIDE

Activated Carbon (AC) A granular activated carbon is an excellent filtration medium, having a high density with a balanced pore-structure for more efficient adsorption. One of the most common applications for High Activity Carbon (HAC) is the reduction of the undesirable tastes and odors present in many chlorinated water supplies. HAC has been successful for many years in the reduction of free **chlorine** from water supplies. The water to be filtered should be relatively free of iron and turbidity for maximum service life

7. SPARE PARTS LIST

VALVE SIZE	ITEM	PART NUMBER
1", 1 ¼"	Battery, 3 volt lithium coin cell	Type 2032
1", 1 ¼"	Motor Assembly	V3107-01
1", 1 ¼"	PC Board 4 – Digit	V3818TC
1", 1 ¼"	AC Adaptor 110V - 12V	V3186
1", 1 ¼"	O-ring 228	V3135
1", 1 ¼"	O-ring 337	V3180
1"	O-ring 215 (Distributer Tube 1")	V3105
1 ¼"	O-ring 219 (Distributer Tube, 1.32")	V3358