

## Filters Clack Model V125DTH Medical Series Operation and Service Manual



www.AmeriWater.com • 800-535-5585

AmeriWater LLC • 3345 Stop 8 Road • Dayton, OH 45414

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## 1.0 INTRODUCTION & WARNINGS – FILTERS

Congratulations on your decision to use AmeriWater Pretreatment Water Purification Equipment! Federal law restricts this device to be sold by or on the order of a physician for use as a water purification device for hemodialysis.

Your Water Purification Equipment was thoroughly tested and in excellent condition when it was shipped to you. However, because damage during shipment is possible, please unpack and carefully inspect as soon as you receive it. Please notify AmeriWater immediately if any problems or shipping damages are identified.

**Please read the Operations Manual before using the system.** Contact AmeriWater technical support with any questions at 1-800-535-5585 Monday through Friday 8:00 a.m. to 5:00 p.m. eastern standard time. For after hours emergencies call 1-800-535-5585 and follow the instructions on the recorded message. Our on-call technician will return your call as soon as possible.

- **NOTE:** This entire Operations Manual should be read before operating or servicing the device. This Operations Manual should then be kept near the device and used as a reference and troubleshooting guide.
- WARNING: The selection of water treatment equipment for dialysis and the maintenance of the equipment following its installation is the responsibility of the dialysis physician. The product water should be tested periodically to verify that all equipment is operating within specifications.
- WARNING: DO NOT operate the water purification system without properly functioning carbon filtration! Suspend dialysis treatments immediately if chlorine or chloramines level after the polisher tank exceeds 0.1 mg/L!
- WARNING: Carbon filtration, and multimedia filters are intended to be used as pretreatment for reverse osmosis or deionization; and are not meant to be used as the primary means of water purification.
- **NOTE:** Filter tanks must be loaded onsite during the installation process.

WARNING: No person should attempt to operate or service the system without prior authorization, instruction, and training from AmeriWater and/or your medical facility director!

## 2.0 Medical Series System Specifications

#### 2.1 Carbon Filter

#### FEATURES:

- A full flow 1<sup>1</sup>/<sub>4</sub>" valve for less pressure drop.
- The control valve utilizes the time proven piston-seal-spacer technology for durable, maintenance free service.
- All plastic construction will not corrode.
- Carbon is acid washed granular activated carbon, 12 x 40 mesh with an iodine number greater than 1000.
- Programmable electronic controller is flexible for all conditions. All times can be set to the minute.
- Included with the carbon filter is the reverse osmosis lock-out switch.
- Choose either a 1" or 1¼" bypass header that includes three true union ball valves, stainless steel liquid filled outlet pressure gauge and sample port. The header comes pre-assembled and can be installed using PVC schedule 80 piping. The header can be oriented from left to right flow or right to left flow.

#### **STANDARDS:**

- FDA 510K / ISO 13485 Registered Medical Device
- Health Canada Medical Device License 77645

SPECIFICATIONS							
Model	Service Flow* Rate GPM	Backwash Flow Rate GPM	Cubic Feet of Carbon	Media Tank Size In.	Overall Dimensions In. (W x D x H)	Shipping Weight in Lbs.	Media Installed
0095117	3.75	6.5	2	14 x 47	14 x 17 x 55	170	No
0095118	5.1	6.5	3	14 x 65	14 x 17 x 73	225	No
0095119	6.5	6.5	4	16 x 65	16 x 17 x 73	330	No
0095120	8.5	10	5	18 x 65	18 x 18 x 73	390	No
0095121	11.2	15	7	21 x 62	21 x 21 x 70	420	No
0095122	14.3	15	9	24 x 65	24 x 24 x 73	580	No
0095123	17.3	15	10	24 x 72	24 x 24 x 80	660	No

\* Based on 5 minute EBCT. Worker / Polisher arrangement is required.

	BYPASS HEADERS					
Model	Inlet/Outlet In.	Dimensions In. (W x H)				
009591	1 SOC	17 x 16				
009592	1¼ SOC	21 x 19				
	NO BYPASS HEA	DERS				
009588	1	17 x 16				
009589	1 1/4	21 x 19				





#### 2.2 Multimedia Filter

#### FEATURES:

- A full flow 1¼" valve with flow rates up to 34 GPM service flow rate.
- The control valve utilizes the time proven piston-seal-spacer technology for durable, maintenance free service.
- All plastic construction will not corrode.
- Media bed has three layers selected for particle size and specific gravity providing highly efficient removal of particulate matter from water. The top layer traps coarse debris, the middle layer traps medium size particles, and the bottom layer traps particles as small as 10 microns.
- The multimedia design offers the advantage of efficient filtering and long service runs between filter backwashes.
- Programmable electronic controller is flexible for all conditions. All times can be set to the minute.
- Included with the multimedia filter is the reverse osmosis lock-out switch.
- Choose either a 1" or 1¼" bypass header that includes three true union ball valves, stainless steel liquid filled outlet pressure gauge and sample port. The header comes pre-assembled and can be installed using PVC schedule 80piping. The header can be oriented from left to right flow or right to left flow.

#### STANDARDS:

- FDA 510K / ISO 13485 Registered Medical Device
- Health Canada Medical Device License 77645

SPECIFICATIONS							
Model	Service Flow* Rate GPM	Backwash Flow Rate GPM	Cubic Feet of Media	Media Tank Size In.	Overall Dimensions In. (W x D x H)	Shipping Weight in Lbs.	Media Installed
0095124	7	7	1	10 x 54	10 x 17 x 62	167	No
0095125	12	12	2	14 x 47	14 x 17 x 55	270	No
0095126	13	12	3	14 x 65	14 x 17 x 73	340	No
0095127	16	15	4	16 x 65	16 x 17 x 73	485	No
0095128	16	20	5	18 x 65	18 x 18 x 73	560	No
0095129	16	25	7	21 x 62	21 x 21 x 70	625	No

At an initial pressure loss of 10 PSI.

	BYPASS HEADERS	
Model	Inlet/Outlet In.	Dimensions In. (W x H)
009591	1 SOC	17 x 16
009592	1¼ SOC	21 x 19





## 3.0 Carbon Filter Operation Summary

#### 3.1 DESCRIPTION

Carbon filtration removes chlorine and chloramines from the feed water supply to protect both the patients and the downstream water purification equipment (RO membranes). Removal of free chlorine and chloramines to a maximum level of 0.1 mg/L is necessary to protect dialysis patients from red cell hemolysis, and to prevent degradation of the RO membranes.

#### 3.2 HOW IT WORKS

Carbon adsorption filtration is composed of two or more carbon tanks in a series or parallel-series configuration with a total empty bed contact time (EBCT) of at least 10 minutes. The granular activated carbon (GAC) removes chlorine and chloramines through an adsorption process. Backwashing restores the carbon's adsorptive properties.



#### 3.4 MONITORING

- 1. For Backwashing Carbon Filters, verify at the beginning of each day that the control head timer is set to the <u>correct time</u> and <u>correct day</u>, record that this verification was done. This prevents inadvertent backwash during clinical operation, which would cause the RO to shut down via the interlock mechanism.
- 2 Verify and record that the product water total chlorine and chloramines levels are less than 0.1 mg/L prior to beginning each patient shift or at least every 4 hours. This sample is taken at the sample port between the worker (first tank) and polisher (second tank) in each series after at least 15 minutes of operation.

# WARNING: Suspend dialysis treatments immediately if chlorine or chloramines level after the polisher tank exceeds 0.1 mg/L!

3 Notify the Supervisor in charge immediately when samples from the first sampling port are positive for chlorine or chloramines. Operation may be continued for up to 72 hours until a replacement bed is installed provided that samples from the second sampling port remain negative. Log the actual times testing is done when operating on a single carbon bed.

# WARNING: DO NOT operate the water purification system without properly functioning carbon filtration!

## 4.0 Multimedia Filter Operation Summary

#### 4.1 DESCRIPTION

The Multimedia Filter removes coarse particulate matter (sediment) from the incoming water supply.

#### 4.2 HOW IT WORKS

The media bed has three layers (anthracite, sand, and garnet) selected for particle size and specific gravity providing highly efficient removal of particulate matter from water. The top layer traps coarse debris, the middle layer traps medium size particles, and the bottom layer traps particles as small as 10 microns. The density of each layer is such that garnet will settle to the bottom of the tank, the sand settles in the next layer, and the anthracite settles at the top during backwash.

Water enters at the top of the tank contacting the larger particles first which retains the largest particulate matter. The water flows through each successive layer, and each layer traps progressively smaller particles. During backwash, the sediment particles are swept away from the media and flushed to drain restoring the capacity of the filter to trap sediment.



#### 4.4 MONITORING

- 1. Verify at the beginning of each day that the control head timer is set to the correct time of day and record that this verification was done. This prevents inadvertent backwash during clinical operation, which would cause the RO to shut down via the interlock mechanism.
- 2. Monitor and record the pressure drop across the multimedia filter daily. Notify the Supervisor in charge if the delta pressure is  $\geq$  10 PSI above established. High delta pressure may cause improper operation of some of the downstream water purification components.

### 5.0 System Installation - Filters

#### 5.1 Installation Requirements

#### Water Pressure

A minimum of 20 psi inlet water pressure is required for the regeneration valve to operate effectively.

#### **Electrical Facilities**

An uninterrupted alternating current (A/C) supply is required. Make sure:

- Voltage supply is compatible with unit before installation.
- Current supply is always hot and cannot be turned off with another switch.

#### Location of Softener and Drain

Locate the softener close to a clean working drain and connect according to local plumbing codes.

#### **Bypass Valves**

Always provide for installation of a bypass valve, if unit is not equipped with one.



**Note:** This product should be installed by qualified personnel.

Comply with all plumbing codes when installing this product.

Comply with all electrical codes when installing this product.

- 1. Always install devices as shown on the AmeriWater Piping and Instrumentation Drawing (P&ID) provided with the water purification system. Failure to do so may adulterate the marketing clearance on the device and void all AmeriWater warranties.
- 2. Place the tank where you want to install the unit. Verify that the tank is level and on a firm base, and that the tank label and control face are visible. Here are some additional things to consider when choosing an installation location.
  - a) Is there sufficient space available to mount the Bypass Header?
  - b) Will the hoses reach from the Bypass Header to the control valve connections?
  - c) Will the control valve power cord reach the 120-volt GFI receptacle?
  - d) Will the control valve drain hose reach the drain?
  - e) Are there any obstructions that interfere with reading the labels, reading the controller screen, programming the controller, or performing maintenance?
- After the tank is loaded with media it may be too difficult to reposition. Perform the following steps to establish the final location of the control valve in relation to the tank body.
   [The "front" of the tank may not be where you think it is.]
  - a) Install the control valve and sealing o-ring into the tank.
  - b) Tighten to the same torque you expect to use after the media is loaded.
  - c) Mark the junction of the control valve to the tank body with a small ink pen mark or mark from a marker pen or a piece of tape.
  - d) Remove the control valve and sealing o-ring from the tank being careful not to disturb the alignment marks just made.
  - e) Reposition the tank now if needed to keep the control valve in the desired position.
- 4. Place the distibutor basket and riser pipe into the empty tank. Measure down from the tank opening to the top of the distributor basket. Pull the tape measure back up 1" to 2". Record this measurement.

[This is done because a visual inspection will not be possible once water is added.]

- 5. Fill the tank approximately 1/4 of the way up the tank side with water to protect the Distributor from falling media during media loading.
- 6. Cover, plug, or otherwise protect the open end of the riser pipe from the media being loaded.
- 7. Load the gravel media. While loading periodically take measurements from the tank opening to the top of the gravel media layer. Stop loading when the measurement taken previously is reached. Refer to the loading charts provided for the approximate amount of gravel to be used for your particular model number.

- 8. Load the carbon media or the multimedia media. Refer to the loading charts provided for the amount required to be used for your particular model number. Multimedia loading requires several layers of media loaded in a precise order or sequence. Reference the diagram that accompanies the loading chart.
- 9. Remove the plug or cover from the riser pipe and clean the tank opening threads and surrounding surface of media loading debris.
- 10. Clean & lubricate the control valve o-ring seals and any surfaces they will seal against.
- 11. Install the control valve into the tank opening threads. Tighten to the mark established Previously in the procedure.
- 12. Connect all plumbing in accordance to your local plumbing codes. The filter should be installed using the appropriate AmeriWater Bypass Header. This allows the device to be bypassed for service.
- 13. Make plumbing connection to the Clack V125DTH valve head.

MODEL	W×D×H	CARBON 12X40(34310456)	SMALL GRAVEL(33-0070)
0095117	14" x 17" x 55"	2 CU FT	.5 CU FT
0095118	14" x 17" x 73"	3 CU FT	.5 CU FT
0095119	16" x 17" x 73"	4 CU FT	.5 CU FT
0095120	18" x 18" x 73"	5 CU FT	.5 CU FT
0095121	21" x 21" x 70"	7 CU FT	1.00 CU FT
0095122	24" x 24" x 73"	9 CU FT	1.00 CU FT
0095123	24" x 24" x 80"	10 CU FT	1.00 CU FT

## CLACK V125DTH CARBON FILTERS

NOTE: ALL TANKS ARE FIELD LOADED







MODEL	WxDxH	ANTHRACITE (36770114)	SAND (33-0020)	GARNITE (36770115)	GRAVEL (33-0050)
0095124	10" x 17" x 62"	0.33 CU FT	0.66 CU FT	0.10 CU FT	0.3597 CU FT
0095125	14" x 17" x 55"	1.00 CU FT	0.75 CU FT	0.16 CU FT	0.25 CU FT
0095126	14" x 17" x 73"	1.00 CU FT	1.00 CU FT	0.2 CU FT	0.5 CU FT
0095127	16" x 17" x 73"	1.50 CU FT	1.50 CU FT	0.3 CU FT	0.5 CU FT
0095128	18" x 18" x 73"	1.80 CU FT	1.80 CU FT	0.32 CU FT	0.75 CU FT
0095129	21" x 21" x 70"	2.50 CU FT	2.50 CU FT	0.5 CU FT	1.00 CU FT

# CLACK V125DTH MULTIMEDIA FILTERS







#### 5.3 Startup Instructions

- 1. Completely program the control valve or verify it has been programmed correctly. [Programming instructs the control head how to operate, as a softener or a filter.]
- Perform these steps to flush pipe cutting debris & other debris from the piping prior to putting water into the control valve and vessel.
   [ Debris can enter the control valve and cause an easily avoided failure. ]
  - a) Place the Bypass Header valves into the "Bypassed" position. [ Allows any possible debris to bypass the control head.]
  - b) Turn on the main water supply feeding the Bypass Header.
  - c) Open a sample port downstream of the Bypass Header and let the water run for a few minutes or until the system is free of foreign material resulting from installation. Close the sample port when the water runs clean.
     [ Obtain the highest flow possible for the best flushing results. ]
  - d) Place the Bypass Header valves into the "Service" position.
- 3. Plug the control valve into a 120-volt GFI receptacle. [Necessary to reposition the control valve.]
- 4. On the Bypass Header, shut the filter inlet valve and filter outlet valve. [Uncontrolled water flow into the control valve is undesirable at this time.]
- 5. On the control valve, cycle the valve into the "Backwash" position. Once the control valve is in the "Backwash" position, unplug the control valve from the 120-volt GFI receptacle. [Backwash position is to vent the air, unplugging the control valve allows for unlimited time to complete the filling and venting.]
- The control valve and vessel are now ready to be filled with water and the air vented. Slowly open the filter inlet valve until it is approximately 25% open.
   [Filling too quickly before the carbon or anthracite is fully hydrated can result in carbon or anthracite "floating" out and to the drain. ]
- 7. The control valve and vessel are now slowly filling with water and the air vented thru the drain hose. When air stops venting thru the drain hose and water exits instead, slowly shut the filter inlet valve.

 Continuing with a backwash at this point could result in a loss of carbon or anthracite. To avoid this allow the carbon or anthracite to soak as it is overnight. After soaking perform a rapid (fast or final) rinse. If waiting for the soak is unacceptable proceed directly to the rapid (fast or final) rinse.

[ This will help to fully hydrate the carbon or anthracite granules and remove the carbon "fines". ]

- a) Plug the control valve into a 120-volt GFI receptacle.
- b) On the control valve, cycle the valve into the "Rinse" position. Once the control valve is in the "Rinse" position, unplug the control valve from the 120-volt receptacle.
   [ Rinse position is to send the water thru the carbon or anthracite and out the drain, unplugging the control valve allows for unlimited time to complete the "fines" or color rinseout. ]
- c) Slowly open the filter inlet valve until it is fully open. Water will be flowing rapidly from the drain hose. This water will be discolored from the new carbon or anthracite. *[Flow rate will be controlled by the Backwash Flow Control.]*
- d) When the water from the drain hose becomes light gray or mostly clear, slowly shut the filter inlet valve.
   [ A white background helps with this such as a wall, sheet of paper, or foam cup. ]
- e) Plug the control valve into a 120-volt GFI receptacle. [Necessary to reposition the control valve.]
- 9. On the control valve, cycle the valve into the "Service" position. [ The control valve cannot be made to advance in the reverse direction to get to a previous cycle. It has to be forward advanced out of the programming mode, if needed, then back into the programming mode and forward advanced into the desired cycle. ]
- 10. On the Bypass Header, open the filter inlet valve and filter outlet valve.
- Refer to section 4.4, Monitoring for Carbon Filters (or section 5.4 for Multimedia Filters), and satisfy the requirements listed. To check the polisher carbon filter in a two filter "worker-polisher" carbon filter arrangement, the worker will have to be bypassed during the checks.

[The polisher carbon filter cannot be checked for chlorine/chloramines removal until it is supplied with the same source water as the worker carbon filter.]

12. Pre-Treatment lock-out must be set up as shown in 10.0

## 6.0 Programming Charts and System Programming

### CARBON FILTER- MEDICAL

Model Number	0095117	0095118	0095119	0095120	0095121	0095122	0095123
Tank Size ( <u>Dia</u> x Height)	14 x 47	14 x 65	16 x 65	18 x 65	21 x 62	24 x 65	24 x 72
Cubic Feet Carbon	2	3	4	5	7	9	10
Backwash Flow Control (GPM)	6.5	6.5	6.5	10	15	15	15

### MULTIMEDIA FILTER- MEDICAL

Model Number	0095124	0095125	0095126	0095127	0095128	0095129
Tank Size ( <u>Dia</u> x Height)	10 x 54	14 x 47	14 x 65	16 x 65	18 x 65	21 x 62
Cubic Feet Media	1.50	2.50	3.00	4.00	5.50	7.00
Backwash Flow Control (GPM)	6.5	10	10	15	20	25

	Programming	
Step	Description	
1F	Enter into First Tier programming	Press NEXT and Down Arrow simultaneously for 5 seconds and release.
2F	Choose Filtering (Backwash)	Choose FILTERING using ▲ or ▼. Press NEXT to go to Step 3F.
3F	Select Time for first cycle (10 minutes) Backwash Cycle	Select the time for the first cycle using ▲ or ▼, Press NEXT to go to Step 4F.
4F	Select Time for second cycle (10 minutes) Fast Rinse Cycle	Select the time for the first cycle using ▲ or ▼, Press NEXT to go to Step 5F.
5F	Select Regen Trigger (OFF)	Set Regeneration trigger using $\blacktriangle$ or $\blacktriangledown$ , Press NEXT to go to Step 6F.
6F	Select 7 Day timer	Set the 7 day using ▲ or ▼.
7F	Set Relay Operation (OFF)	Set Relay Operation using ▲ or ▼. Press NEXT to display time.
11	To enter Installer Display (Second Tier programming)	Press NEXT and UP Arrow simultaneously for 5 seconds and release.
21	Set Current Day of the Week Set to Desired Day:D1 = Sun, D2 = Mon, D3 = Tue, D4 = Wed, D5 = Thurs, D6 = Fri, D7 = Sat	Set the current day of the week using ▲ or ▼. Select D1, D2, D3, etc. for that particular day.
31	Set day to Regen Regen Days of Week, Set to Desired Days:D1 = Sun, D2 = Mon, D3 = Tue, D4 = Wed, D5 = Thurs, D6 = Fri, D7 = Sat D1 = ON or OFF, D2 = ON or OFF, D3, D4, D5, D6, D7	Set the day for regeneration using ▲ or ▼. Select On or Off for that particular day.
41	Regeneration Time Hour (2:00AM)	Set the hour of day for regeneration using $\blacktriangle$ or $\blacktriangledown$ .
51	Set Time of Day	Push NEXT until time of day screen is displayed. Press and hold ▼ until SET TIME is displayed and the hour flashes once. Press ▲ or ▼ until the correct hour is displayed. Then press NEXT. The minutes will flash. Press ▲ or ▼ until the correct minute is displayed.

## 7.0 Troubleshooting

Problem	Possible Cause	Solution
	a. No power at electric outlet	a. Repair outlet or use working outlet
	<ul> <li>b. Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection</li> </ul>	b. Plug Power Adapter into outlet or connect power cord end to PC Board connection
1. No Display on PC Board	c. Improper power supply	<ul> <li>Verify proper voltage is being delivered to PC Board</li> </ul>
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC Board	e. Replace PC Board
	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/ or GFI switch
2. PC Board does not display correct time of day	c. Power outage	c. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	d. Defective PC Board	d. Replace PC Board
	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
<ol> <li>Display does not indicate that water is flowing.</li> <li>Refer to user instructions for how the display</li> </ol>	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
indicates water is flowing	d. Meter wire not installed securely into three pin connector	<ul> <li>d. Verify meter cable wires are installed securely into three pin connector labeled METER.</li> </ul>
	e. Defective meter	e. Replace meter
	f. Defective PC Board	f. Replace PC Board
	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	b. Time of day not set correctly	b. Reset to correct time of day
4. Control valve regenerates at wrong time of day	c. Time of regeneration set incorrectly	c Reset regeneration time
	d. Control valve set at "on 0" (immediate regeneration)	<ul> <li>Check programming setting and reset to NORMAL (for a delayed regen time)</li> </ul>
	e. Control valve set at "NORMAL + on 0" (delayed and/ or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive
		Assembly drawing for instructions.
6. Control valve does not regenerate automatically	a. Broken drive gear or drive cap assembly	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly
<ol> <li>Control valve does not regenerate automatically when the correct button(s) is depressed and held. For Your head head head head head head head head</li></ol>	a. Broken drive gear or drive cap assembly b. Broken Piston Rod	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod
6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&▼. For all other valves the button is REGEN	a. Broken drive gear or drive cap assembly b. Broken Piston Rod c. Defective PC Board	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board
6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&♥. For all other valves the button is REGEN	a. Broken drive gear or drive cap assembly b. Broken Piston Rod c. Defective PC Board a. Bypass valve in bypass position	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board a. Turn bypass handles to place bypass in service position
6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&♥. For all other valves the button is REGEN	a. Broken drive gear or drive cap assembly b. Broken Piston Rod c. Defective PC Board a. Bypass valve in bypass position b. Meter is not connected to meter connection on PC Board	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board a. Turn bypass handles to place bypass in service position b. Connect meter to three pin connection labeled METER on PC Board
<ol> <li>Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all other valves the button is REGEN</li> <li>Control valve does not regenerate automatically but does when the correct button(s) is depressed and</li> </ol>	a. Broken drive gear or drive cap assembly     b. Broken Piston Rod     c. Defective PC Board     a. Bypass valve in bypass position     b. Meter is not connected to meter connection on         PC Board     c. Restricted/ stalled meter turbine	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board a. Turn bypass handles to place bypass in service position b. Connect meter to three pin connection labeled METER on PC Board c. Remove meter and check for rotation or foreign material
<ol> <li>Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all other valves the button is REGEN</li> <li>Control valve does not regenerate automatically but does when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all</li> </ol>	a. Broken drive gear or drive cap assembly     b. Broken Piston Rod     c. Defective PC Board     a. Bypass valve in bypass position     b. Meter is not connected to meter connection on         PC Board     c. Restricted/ stalled meter turbine     d. Incorrect programming	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board a. Turn bypass handles to place bypass in service position b. Connect meter to three pin connection labeled METER on PC Board c. Remove meter and check for rotation or foreign material d. Check for programming error
<ul> <li>6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all other valves the button is REGEN</li> <li>7. Control valve does not regenerate automatically but does when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all other valves the button is REGEN</li> </ul>	a. Broken drive gear or drive cap assembly     b. Broken Piston Rod     c. Defective PC Board     a. Bypass valve in bypass position     b. Meter is not connected to meter connection on     PC Board     c. Restricted' stalled meter turbine     d. Incorrect programming     e. Meter wire not installed securely into three pin     connector	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board a. Turn bypass handles to place bypass in service position b. Connect meter to three pin connection labeled METER on PC Board c. Remove meter and check for rotation or foreign material d. Check for programming error e. Verify meter cable wires are installed securely into three pin connector labeled METER.
<ul> <li>6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all other valves the button is REGEN</li> <li>7. Control valve does not regenerate automatically but does when the correct button(s) is depressed and held. For TC valves the buttons are ▲&amp;▼. For all other valves the button is REGEN</li> </ul>	a. Broken drive gear or drive cap assembly     b. Broken Piston Rod     c. Defective PC Board     a. Bypass valve in bypass position     b. Meter is not connected to meter connection on     PC Board     c. Restricted/ stalled meter turbine     d. Incorrect programming     e. Meter wire not installed securely into three pin     connector     f. Defective meter	Assembly drawing for instructions. a. Replace drive gear or drive cap assembly b. Replace piston rod c. Defective PC Board a. Turn bypass handles to place bypass in service position b. Connect meter to three pin connection labeled METER on PC Board c. Remove meter and check for rotation or foreign material d. Check for programming error e. Verify meter cable wires are installed securely into three pin connector labeled METER f. Replace meter

Troubleshooting TC control valves do not have meters so shaded ares are not applicable for TC control valves

Problem	Possible Cause	Solution	
	a. Bypass valve is open or faulty	a. Fully close bypass valve or replace	
	b. Media is exhausted due to high water usage	<ul> <li>b. Check program settings or diagnostics for abnormal water usage</li> </ul>	
	c. Meter not registering	<ul> <li>Remove meter and check for rotation or foreign material</li> </ul>	
	d. Water quality fluctuation	<ul> <li>d. Test water and adjust program values accordingly</li> </ul>	
8. Hard or untreated water is being delivered	e. No regenerant or low level of regenerant in regenerant tank	e. Add proper regenerant to tank	
	f. Control fails to draw in regenerant	f. Refer to Trouble Shooting Guide number 12	
	g. Insufficient regenerant level in regenerant tank	g. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace	
	h. Damaged seal/stack assembly	h. Replace seal/stack assembly	
	i. Control valve body type and piston type mix matched	<ol> <li>Verify proper control valve body type and piston type match</li> </ol>	
	j. Fouled media bed	j. Replace media bed	
	a. Improper refill setting	a. Check refill setting	
9. Control valve uses too much regenerant	b. Improper program settings	<li>b. Check program setting to make sure they are specific to the water quality and application needs</li>	
	c. Control valve regenerates frequently	<ul> <li>c. Check for leaking fixtures that may be exhausting capacity or system is undersized</li> </ul>	
	a. Low water pressure	<ul> <li>a. Check incoming water pressure – water pressure must remain at minimum of 25 psi</li> </ul>	
10. Residual regenerant being delivered to service	b. Incorrect injector size	<ul> <li>Replace injector with correct size for the application</li> </ul>	
	c. Restricted drain line	<ul> <li>Check drain line for restrictions or debris and clean</li> </ul>	
	a. Improper program settings	a. Check refill setting	
	b. Plugged injector	b. Remove injector and clean or replace	
	c. Drive cap assembly not tightened in properly	c. Re-tighten the drive cap assembly	
a beneficial a second second second	d. Damaged seal/ stack assembly	d. Replace seal/ stack	
11. Excessive water in regenerant tank	e. Restricted or kinked drain line	e. Check drain line for restrictions or debris and or un-kink drain line	
	f. Plugged backwash flow controller	f. Remove backwash flow controller and clean or replace	
	g. Missing refill flow controller	g. Replace refill flow controller	
	a. Injector is plugged	a. Remove injector and clean or replace	
	b. Faulty regenerant piston	b. Replace regenerant piston	
	c. Regenerant line connection leak	c. Inspect regenerant line for air leak	
12. Control valve fails to draw in regenerant	d. Drain line restriction or debris cause excess back pressure	d. Inspect drain line and clean to correct restriction	
	e. Drain line too long or too high	e. Shorten length and or height	
	f. Low water pressure	f. Check incoming water pressure – water pressure must remain at minimum of 25 psi	

Problem	Possible Cause	Solution
	a. Power outage during regeneration	<ul> <li>a. Upon power being restored control will finish the remaining regeneration time. Reset time of day.</li> </ul>
13. Water running to drain	b. Damaged seal/ stack assembly	b. Replace seal/ stack assembly
-	c. Piston assembly failure	c. Replace piston assembly
	<ul> <li>Drive cap assembly not tightened in properly</li> </ul>	d. Re-tighten the drive cap assembly
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement	a. Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. PC Board not properly snapped into drive bracket	b. Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Missing reduction gears	c. Replace missing gears
	a. Foreign material is lodged in control valve	a. Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
15. E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	b. Mechanical binding	b. Check piston and seal/stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Main drive gear too tight	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Improper voltage being delivered to PC Board	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Problem	Possible Cause	Solution
	a. Motor failure during a regeneration	a. Check motor connections then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
16. E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position	<ul> <li>Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor</li> </ul>	b. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	c. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
17. Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position	<ul> <li>Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface</li> </ul>	a. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	a. Control valve programmed for ALT A or b, nHbP, SEPS, or AUX MAV with out having a MAV or NHBP valve attached to operate that function	a. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting
<ol> <li>Err - 1006, Err - 106, Err - 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position</li> <li>Motorized Alternating Valve = MAV</li> </ol>	b. MAV/ NHBP motor wire not connected to PC Board	b. Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	c. MAV/ NHBP motor not fully engaged with reduction gears	c. Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
19. Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position	a. Foreign material is lodged in MAV/ NHBP valve	a. Open up MAV/ NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

## 8.0 Parts Lists and Repair Diagrams

DRAWING NUMBER	ORDER NO.	DESCRIPTION	QUANTITY
1.	050-0319	CLACK,SPACER STACK ASSY,V125DTH	1
2.	050-0320	CLACK,PISTON ASSEMBLY, DOWNFLOW,V125DTH	1
3.	050-0321	CLACK,WS1 REGENERANT PISTON,V125DTH	1
4.	050-0308	O-RING, 228,CLACK V125DTH, KIT FOR ALL O-RINGS IS 911-50-0385	1
5.	050-0310	O-RING, 337,CLACK V125DTH, KIT FOR ALL O-RINGS IS 911-50-0385	1
6.	050-0312	O-RING, 219,CLACK V125DTH, KIT FOR ALL O-RINGS IS 911-50-0385	1
7. NOT SHOWN	050-0307	CIRCUIT BOARD,CLACK V125DTH,EE PROGRAM LOGIC	1
8. NOT SHOWN	50-0405	CLACK,WS1 AUXILIARY MICROSWITCH ASSEMBLY	1
9. NOT SHOWN	050-0328	CLACK, MOTOR ASSY, V125DTH	1
10. NOT SHOWN	911-50- 0385- 0002	KIT,DOWNFLOW PISTON AND SPACER STACK ASSY,CLACK V125DTH	1
11. NOT SHOWN	911-50- 0385- 0005	KIT,MOTOR AND CIRCUIT BOARD ASSY,CLACK V125DTH	1



DRAWING NUMBER	ORDER NO.	DESCRIPTION	QUANTITY
1.	050-0317	CLACK, INJECTOR CAP, V125DTH	1
2.	050-0309	O-RING, 135,CLACK V125DTH, KIT FOR ALL O-RINGS IS 911-50-0385	1
3.	050-0318	CLACK, INJECTOR SCREEN CAGE, V125DTH	1
4.	50-0411	CLACK, INJECTOR, PLUG, V125DTH	1
5.	50-0386	CLACK,INJECTOR,V125DTH,BLUE,0.9GPM TOTAL FLOW (10x54 Tank)	1
	50-0387	CLACK,INJECTOR,V125DTH,GREEN,1.23GPM TOTAL FLOW (14x47,14x65,16x65 Tanks)	1
	50-0388	CLACK,INJECTOR,V125DTH,ORANGE,1.7GPM TOTAL FLOW (18x65 Tank)	1
	50-0389	CLACK,INJECTOR,V125DTH,LIGHT BLUE,2.1GPM TOTAL FLOW (21x62 Tank)	1
6. NOT SHOWN	911-50- 0385- 0001	KIT,INJECTOR CAP,SCREEN AND PLUG ASSY,CLACK V125DTH	1



DRAWING NUMBER	ORDER NO.	DESCRIPTION	QUANTITY
1.	50-0412	CLACK, BRINE REFILL, PLUG, V125DTH	1
2.	050-0322	CLACK,ELBOW LOCKING CLIP,REFILL FLOW CONTROL ASSY,V125DTH	1
3.	050-0323	CLACK,ELBOW 3/8" LIQUIFIT,REFILL FLOW CONTROL ASSY,V125DTH	1
4.	050-0314	O-RING, 019,CLACK V125DTH, KIT FOR ALL O-RINGS IS 911-50-0385	1
5.	050-0324	CLACK,REFILL FLOW CONTROL RETAINER ASSY,V125DTH	1
6.	050-0316	ELBOW,.38 LIQUIFIT ASSY, WITH REFILL FLOW CONTROL	1
7. NOT SHOWN	911-50- 0385- 0003	KIT,REFILL FLOW CONTROL ASSY,CLACK V125DTH	1



DRAWING NUMBER	ORDER NO.	DESCRIPTION	QUANTITY
1. NOT SHOWN	050-0326	CLACK,DRAIN LINE ASSY,3/4 INCH,V125DTH	1
2. NOT SHOWN	050-0327	CLACK,DRAIN LINE ASSY,1 INCH,V125DTH	1
3. NOT SHOWN	50-0392	CLACK,DRAIN LINE FLOW CONTROL,2.7GPM,V125DTH (10x54 Tank)	1
4. NOT SHOWN	50-0393	CLACK,DRAIN LINE FLOW CONTROL,5.3GPM,V125DTH (14x47, 14x65 Tank)	1
5. NOT SHOWN	50-0394	CLACK,DRAIN LINE FLOW CONTROL,6.5GPM,V125DTH (14x47, 14x65,16x65 Filter Tank)	1
6. NOT SHOWN	50-0395	CLACK,DRAIN LINE FLOW CONTROL,9.0GPM,V125DTH (18x65 Tank)	1
7. NOT SHOWN	50-0396	CLACK,DRAIN LINE FLOW CONTROL,11.0GPM,V125DTH (21x62 Tank)	1
8. NOT SHOWN	50-0397	CLACK,DRAIN LINE FLOW CONTROL,15.0GPM,V125DTH (21x62, 24x65,24x72 Filter Tank)	1
9. NOT SHOWN	50-0398	CLACK,DRAIN LINE FLOW CONTROL BODY,1 INCH,V125DTH (21x62, 24x65,24x72 Filter Tank)	1
10. NOT SHOWN	50-0399	CLACK,DRAIN LINE FLOW CONTROL,10.0GPM,V125DTH (16x65,18x65 Filter Tank)	1
11. NOT SHOWN	50-0400	CLACK,DRAIN LINE FLOW CONTROL,7.5GPM,V125DTH (16x65 Tank)	1

DRAWING NUMBER	ORDER NO.	DESCRIPTION	QUANTITY
1.	50-0403	CLACK,WRENCH,REPAIR AND BREAK APART,V125DTH	1



## 9.0 Pre-Treatment Lockout





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This product can expose you to chemicals such as vinyl chloride (used in the production of PVC) or Nickel (used in the production of stainless steel), that are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Dear Valued Customer,

California Proposition 65 (Prop 65) is the Safe Water and Toxic Enforcement Act of 1986. The State of California began enforcing amendments to California Prop 65 at the end of August 2018. Prop 65 requires manufacturers to provide a clear and reasonable warning to residents of California about chemicals used in products that they purchase that are included on the Prop 65 Chemical List. The chemicals included on the list are chemicals that are known to the State of California to cause cancer, birth defects, or other reproductive harm. One such chemical is Vinyl Chloride, a compound used to produce Polyvinyl Chloride (PVC). The AmeriWater system you have purchased may contain PVC or stainless steel parts. While warnings are only required in the State of California regulations. Please note that the above warning does not necessarily mean that the product that you have purchased is unsafe. Products that have been cleared for market by FDA have been determined to be safe and effective by the United States Food and Drug Administration. The warning is simply a requirement by the State of California. If you wish to obtain additional information, please visit: p65warnings.ca.gov. You may also contact your AmeriWater representative if you have any questions.

Thank you for your understanding and we look forward to continuing to serve you.