

# CS SERIES AQUA MAGIC



## Owner and Operational Manual

Model: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Install Date: \_\_\_\_\_

Installed By: \_\_\_\_\_

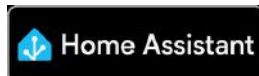
Service Phone: \_\_\_\_\_

Sold By: \_\_\_\_\_

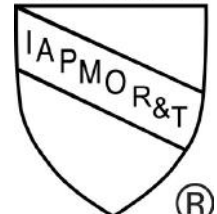


**Please read this manual carefully before proceeding with installation. Your failure to follow any of these instructions or operating parameters may lead to personal injury or damage to the equipment and/or personal property. Do not use this water treatment system with water that is microbiologically unsafe or of unknown quality, without adequate disinfection before or after the system. This water treatment system contains replaceable treatment components critical for effective performance. It is the user's responsibility to periodically test the product water to verify the system is performing satisfactorily. Failure to properly maintain this water treatment system may cause a health risk.**

**Save this manual for future reference**



NSF/ANSI/CAN 61



Aqua Magic DROP CS 121 Series  
4.17.2024 SB

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Register your product online at  
[www.chandlersystemsinc.com](http://www.chandlersystemsinc.com)

### WARNING:

#### Lubricants

Do NOT use Vaseline, oils, hydrocarbon lubricants or spray silicone anywhere! Petroleum base lubricants will cause swelling of o-rings and seals. The use of other lubricants may attack plastic Noryl®. It is recommended that Dow Corning® silicone grease be used as a lubricant for all control valves. Dow Corning® 7 Release Compound is used in the manufacture of Chandler Systems control valves. (Part # LT-150)

#### Sealants

Pipe dope and liquid thread sealers may contain a carrier that attacks some plastic materials. It is recommended that only Teflon® tape be used to seal plastic Noryl® threaded fittings.

# LEGACY VIEW

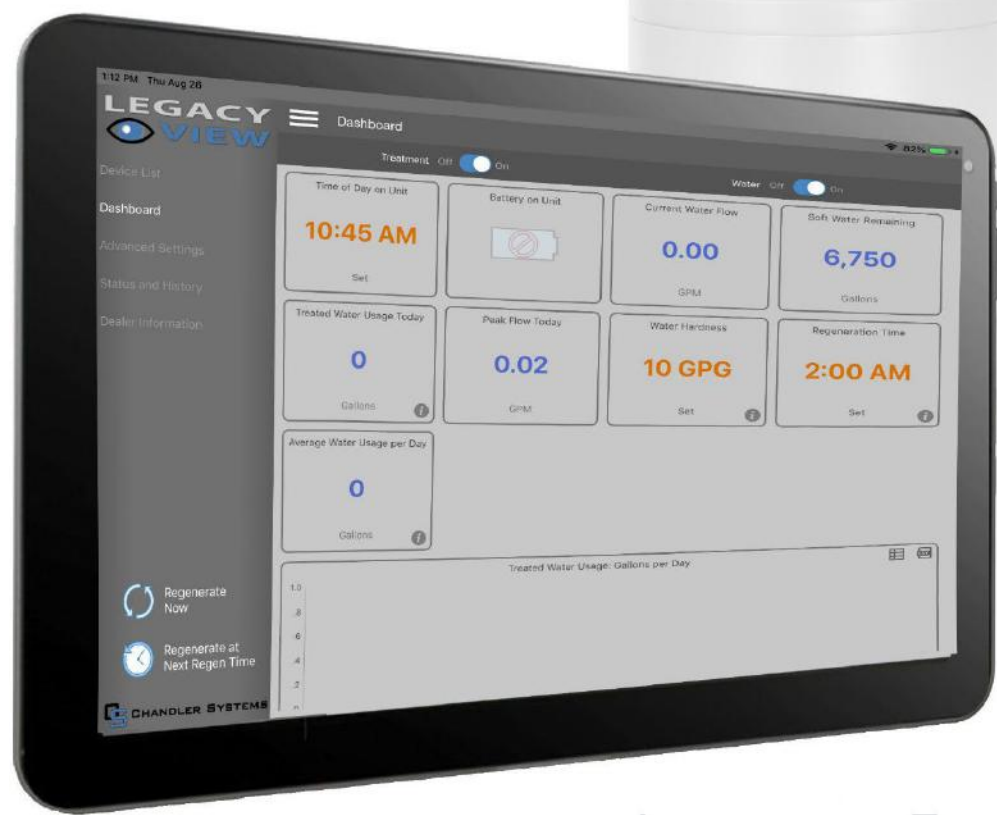
SETUP

CONTROL

VIEW HISTORY

MODIFY SETTINGS

MONITOR WATER USAGE



# Operations

## Detailed Valve Description

The DROP 121 valve is fully automatic control mechanisms to direct and regulate all cycles of the water treatment unit. The control valve has been designed to make it easily serviceable. The inlet, outlet, drain and access to the water meter are all hand only tighten nuts making them quick and convenient to service. Accessing the injector or the brine port plug is quick access plug-in style with a clip, possibly only needing a flat head screwdriver to open the plug. Accessing the piston and seals only requires removing 5 Philips head screws and separating a few plastic clips by hand. All of this means that the valve is quick and simple to service and you do not need any specialized tools to work on the valve.

The control valve has two piston options. The first is a hardwater bypass piston, which allows hard water to be bypassed from inlet to outlet during the valve regeneration cycle. This is typical on a single tank softening system. The other option is a non-hardwater bypass piston option, which does not bypass hardwater from the inlet to the outlet during the valve regeneration cycle. All pistons have a patented water shutoff position (U.S. Patents 9714715 & 10012319), which can be used by a DROP system to protect properties from the risk of water damage from leaks and water breaks. When combined with the non-hardwater bypass piston type, this feature allows the commercial DROP valves to be used in parallel without the need of external shut-off valves. When used in this way, the DROP system can provide continuous treatment of water. The DROP hub can command valves to be in service, providing treated water, or in stand-by with outlet water shut off waiting for when it is needed. During the regeneration process, inlet water is used to perform the steps of the regeneration of the softener tank and the outlet water port is shut off. For more detailed information about multiplexing DROP valves, see our “Multiplexing Filters and Softeners” Application Manual. The control valves / pistons are only available in downflow regeneration.

The DROP 121 valve include a turbine flow meter that is integral to the valve body. The meter is quick to access without having to separate any plumbing in case of needing to service the meter. Simply turn the bypass valve to bypass or turn the water off in the DROP App and loosen the nut securing the water meter, if necessary, use a flathead screwdriver under the edge to remove the flow meter from the outlet port of the valve. The meter is calibrated in Chandler Systems lab and has excellent accuracy at all flows above 0.75 gallons per minute. The meter allows the DROP system to properly protect a property and to notify the end user of usage and potential problems.

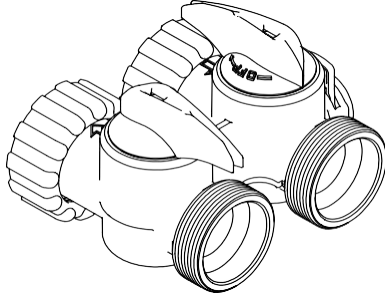
Combining these control valves with a DROP control system creates a water treatment system that is the easiest in the industry to install, setup and maintain. The DROP system gives the end user easy control, information, and history of the water treatment system. DROP is a unique water management system. Using the DROP Hub, DROP monitors water usage and manages the water-related devices throughout the entire installation. DROP can operate locally without an internet connection or has the added ability to send mobile alerts when connected to a WiFi network. This advanced system can allow remote monitoring and adjustments—all from your mobile device.

## Valve Operation

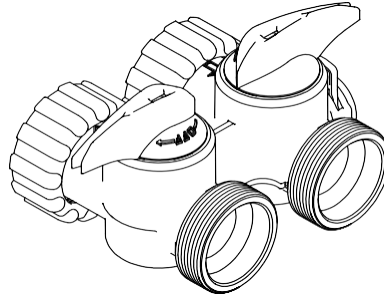
The DROP Users Guide (<https://dropconnect.com/knowledgebase-resources>) gives general information and help with connecting your DROP system to a WiFi network and connecting devices to your DROP Hub. It also gives some general information about making settings and navigating the user interface in your DROP app. It is also helpful to know that throughout the app’s user interface there are small info icons to help explain all the features in the app. The settings that are relevant for a DROP system with the 121 valve installed are found on the **System > Settings** page and the **Devices > Softener or Devices > Filter** pages in the DROP app.

# Operations

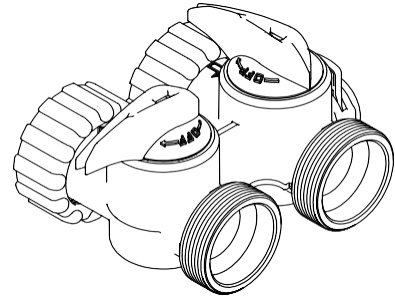
## CSD121 Bypass Operation



Service



Bypass



Off

# Operations Drop Valve - Lights - Regeneration

## DROP Lights - During Regeneration

When a treatment valve is in regeneration the lights will change color for each step in the regeneration process. While the valve is sitting in a step of the regeneration process the lights will be slowly fading from side to side (wobble). If the valve is moving to a position the lights will rotate according to the direction of the motor movement to get to that position. The colors for each position are as follows:



### Softener

Position	Color
Service	Green
Backwash	Purple
Brine Draw	Light Pink
2nd Backwash (Optional)	Purple
Rapid Rinse	Light Blue
Brine Fill	Spring Green



### Backwashing Filter

Position	Color
Service	Blue
Backwash	Purple
Rest	Light Yellow
Rapid Rinse	Light Blue

# Operations **Advanced Configurations**

## Advanced Configuration of Valve Device Components

The DROP valve board is used on several configurations of DROP products. These products will come with the board already setup, ready to use for most installations.

Valves from the factory are preset as follows:

- Softeners are set to device #1
- Backwashing filters are set to device #2
- Aeration valves are set to device #3

These factory presets allow for simple setup without the need for Advanced programming in a majority of installations. Some situations, however, may cause you to need to change the configuration of the board. There are up to three settings available on the commercial valve board configuration.

1. The valve type. The options are: Softener, Backwashing filter, Aeration filter.
2. The device number, which can be set from 1-4. Every stage of water treatment that you have needs to have a unique device number. (Note: The physical water treatment order of the devices in the system is unrelated to the device number.)
3. The softener resin capacity. This is available if the first option is set to Softener. The capacity can be set to 45k, 60k, 75k, 90k, 120k, 150k, and 210k. These are quick common settings, that should be set according to the amount of resin in the media tank. Full control of the resin capacity setting is available in the **Devices > Softener > Advanced** page in the App.

There are two main situations that might cause you to need to change the device configuration on a DROP valve control board. The first situation that may cause the need to change the device configuration is in the case of replacing a board in the system. If a generic DROP valve board is used, it may need configured to match the system that it is being installed into.

A less common reason to change this setting is as follows. A simple system will typically have 1 to 2 treatment stages each with only one tank. For example, a softener and a aeration filter. These will come from the factory already set up with a unique device number. Also, if you want to use two of the same type of treatment device in parallel to treat your water, the DROP system will automatically know to set up two softeners (which would have the same device number from the factory) as parallel units. However, the factory default value will not work properly when you have a system that needs two treatment steps using the same type of treatment device. For example, a backwashing carbon filter and a backwashing neutralizer filter that are used in series with each other. In this case the device number of one of the backwashing filters will need to change and it cannot be the same as any other valve device number already on the DROP system. Only DROP Softener and Filter devices have device numbers. This does not apply to other types of DROP devices.



# Operations **Advanced Configurations**

Steps for advanced configuring of valve device components

Follow the steps below to change the device configuration of a board, or these steps can be followed to find out what the current configuration of a board is set to.

1. If the valve is powered up, unplug it (and remove the battery if installed).
2. Depress the pushbutton on the valve board while plugging in the valve. The board will begin throbbing the LEDs white. Release the pushbutton.
3. The valve will display a light code to identify its configuration. Repeatedly give a short press on the button to select the correct device type according to this list:
  - a. 1 green LED: Softener
  - b. 1 blue LED: Backwashing filter
  - c. 2 blue LEDs: Backwashing filter with Aeration
  - d. 3 blue LEDs: Sidekick filter
  - e. 1 cyan LED: Cartridge filter
4. With the correct device type code displayed, hold the button down for 2 seconds and the LEDs will all turn green to indicate the selection is accepted.
5. Next, you will see 1 to 4 white LEDs. Repeatedly give a short press on the button to select the valve device number for the board with 1 to 4 lit LEDs. All the device components in the same logical device must use the same device number. (Example: a softener with multiple tanks). Device components of different types must use different device numbers. (Example: a softener and a filter). Hold the button for two seconds to accept the selection.
6. If the device type was selected to be a Softener in step 3, then one or more LEDs will be lit yellow. Repeatedly give a short press on the button to select the correct resin capacity according to this list:
  - a. 1 yellow LED: 40,000 grains capacity (1 ½ cu. ft. of softener resin is in media tank).
  - b. 2 yellow LEDs: 60,000 grains capacity (2 cu. ft. of softener resin is in media tank).
  - c. 3 yellow LEDs: 75,000 grains capacity (2 ½ cu. ft. of softener resin is in media tank).
  - d. 4 yellow LEDs: 90,000 grains capacity (3 cu. ft. of softener resin is in media tank).
  - e. 1 red LED: 120,000 grains capacity (4 cu. ft. of softener resin is in media tank).
  - f. 2 red LEDs: 150,000 grains capacity (5 cu. ft. of softener resin is in media tank).
  - g. 3 red LEDs: 210,000 grains capacity (7 cu. ft. of softener resin is in media tank).
7. With the correct capacity LED code displayed, hold the button down for 2 seconds and the LEDs will all turn green to indicate the selection is accepted. When the button is released, the valve will restart and is ready for use.



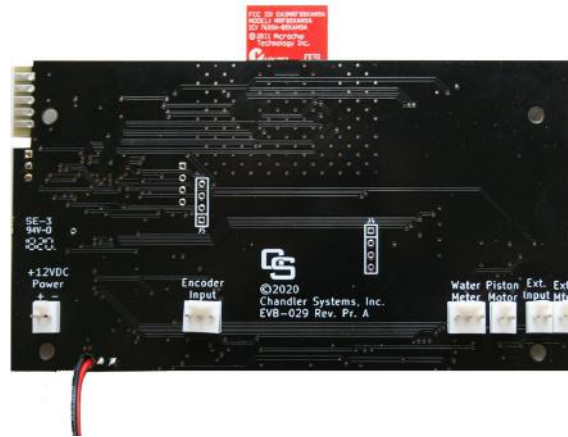
# Operations Quick Reference Table

## Valve specifications, Quick Reference Table

Valve Series - Piston Type Tank Opening	CSD125 - NHWB - 2.5" with Bypass Valve	CSD125 - HWB - 2.5" with Bypass Valve
Service Flow Rate @ 15 psig (with meter)	25.5	27.7
Service Flow Rate @ 25 psig (with meter)	32.2	35.6
Backwash Flow Rate @ 25 psig	27.2	24.4
Min./Max. Operating Pressure	20 - 125 psig	
Min./Max. Operating Temperature	40° F - 120° F	
Outlet water state during regeneration	Shut-off	Inlet Bypassed
Brine Refill Rate	3.0 gpm Brine Line Flow Control	
Drain Line Flow Controls	2.4 / 3.2 / 4 / 5 / 8 / 9 / 10 / 12 / 15 / 20 / 25 / 32 gpm	
Brine Draw Injector Rates @ 60 psi (see injector charts for details)	Red #0 (p/n: CS125-0#) - 0.25 gpm White #1 (p/n: CS125-1#) - 0.35 gpm Blue #2 (p/n: CS125-2#) - 0.5 gpm Yellow #3 (p/n: CS125-3#) - 0.63 gpm	
Distributor Tube Opening	1.32" O.D. (1" NPS)	
Tank Thread	2 ½" - 8 NPSM	
Drain Line Connection	1" NPT Male	
Brine Line Connection	½" Push-Lock	
Default Inlet / Outlet Connections	1 1/4" NPT Male, 1 1/2" NPT Male	
DROP Commercial Control Board	EVB-029	
Power Adapter	12 VDC, 2.5mm x 5.5mm Barrel, Center Positive, 1000 mA Min.	

# OPERATIONS *INJECTORS*

## Valve Control Board Connections



The valve board wiring connections are labeled clearly according to their function. “Ext. Input” and “Ext. Mtr.” are normally unused. For specific installations, the Ext. Mtr. output can be used to run an external valve.

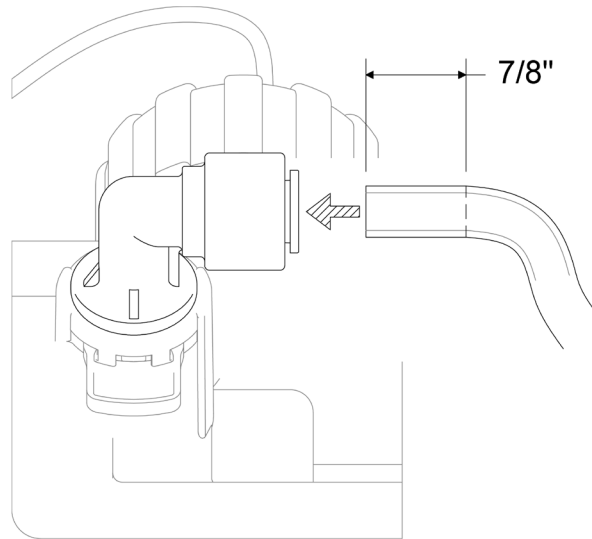
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# OPERATIONS CONNECTIONS

## Brine Line Push-Lock Connection

To connect the brine tubing to the brine port on the valve:

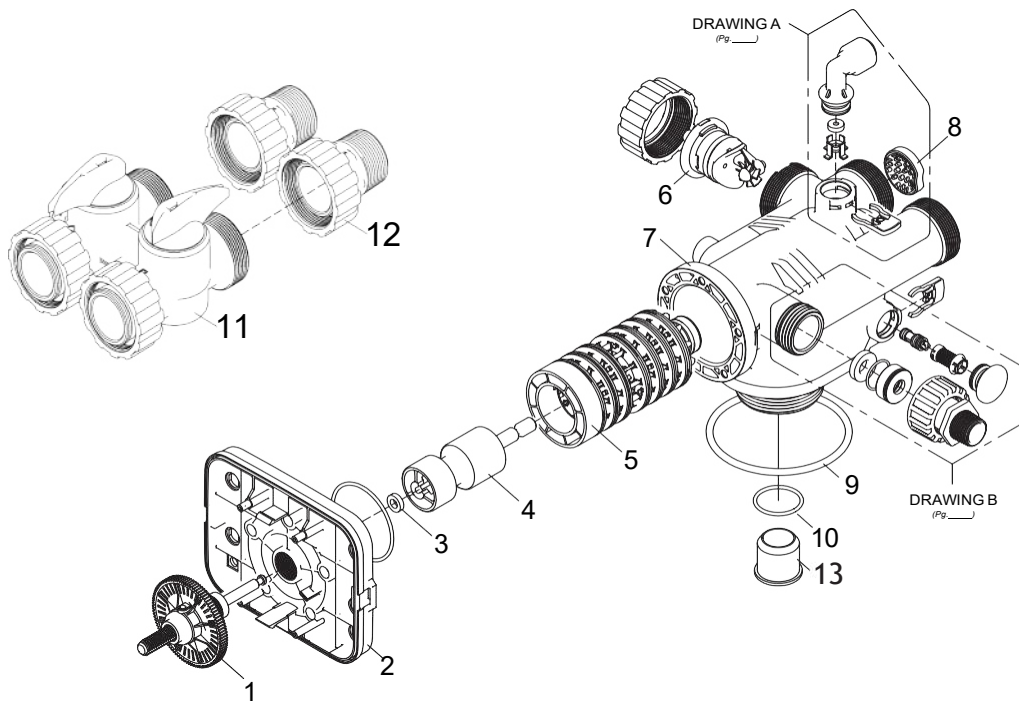
1. Make sure the 3/8" brine tubing is cut squarely on the end.
2. Push the tubing into the fitting 7/8" to be sure it is past the O-ring seal.



To release the brine tubing from the brine port on the valve:

1. Remove the orange locking clip from the brine port fitting.
2. Push in on the gray ring surrounding the brine tube, at the same time pull out on the brine tube.

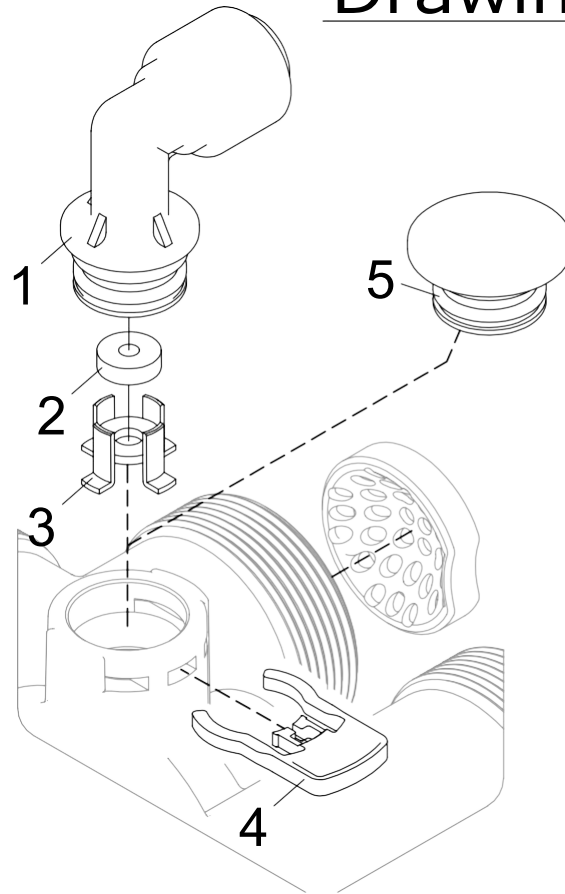
# CSD121 Valve Parts - Valve Breakdown



No.	Part No.	Description	Qty.
1	20125X001	Encoder Wheel and Piston Rod Assy.	1
2	20125X002	Valve Body Seal Plate with O-Ring	1
3	20125X003	Piston Spacer / Stall Ring	1
4	20125X004	Softener Piston (Hardwater Bypass)	1
	20125X005	Softener Piston (No Hardwater Bypass)	
	20125X023	Filter Piston (Hardwater Bypass)	
	20125X024	Filter Piston (No Hardwater Bypass)	
5	20125X006	Seal & Spacer Stack	1
6	20125X007	Water Meter	1
	20125X007-P	Water Meter / Pressure Sensor Combo (Optional)	
7	20125X008	CS121 Valve Body (HW)	1
	20125X013	CS121 Valve Body (NHW)	
8	20125X032	Flow Straightener	1
9	20125X010	Tank Seal O-ring	1
10	20125X011	Riser Tube O-ring	1
11	CS125-BP	1.25" CS Bypass (Optional)	1
12	20125X030	1" NPT Yoke for Inlet / Outlet	1
13	HPS210430	Distributor Tube Adapter	1

# CSD121 Valve Parts -Brine Connection

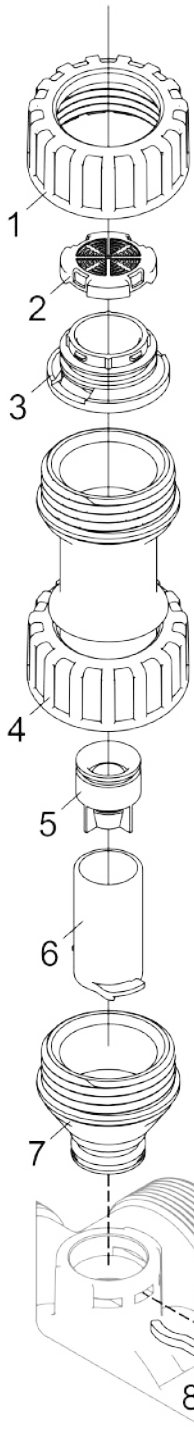
## Drawing A



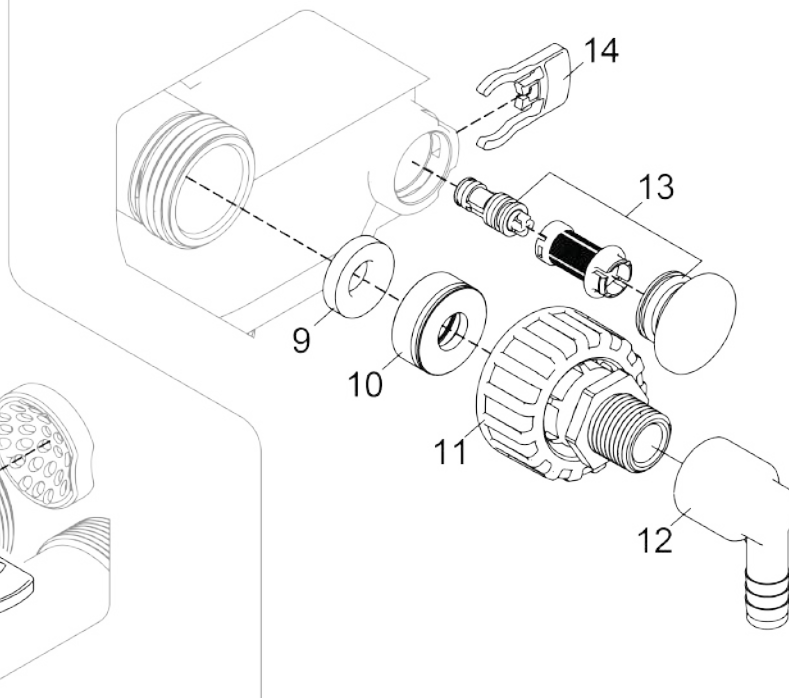
No.	Part No.	Description	Qty.
1	20125X034	3/8" Push-Lock Brine Line Fitting	1
2	20125X035	Brine Line Flow Control, 1.0 gpm	1
3	20125X014	Brine Line Flow Control Retainer	1
4	20125X015	Red Locking Clip	1
5	20125X025	Optional Brine Plug for Filter Valves	1

# CSD121 Valve Parts -Check Valve & DLFC

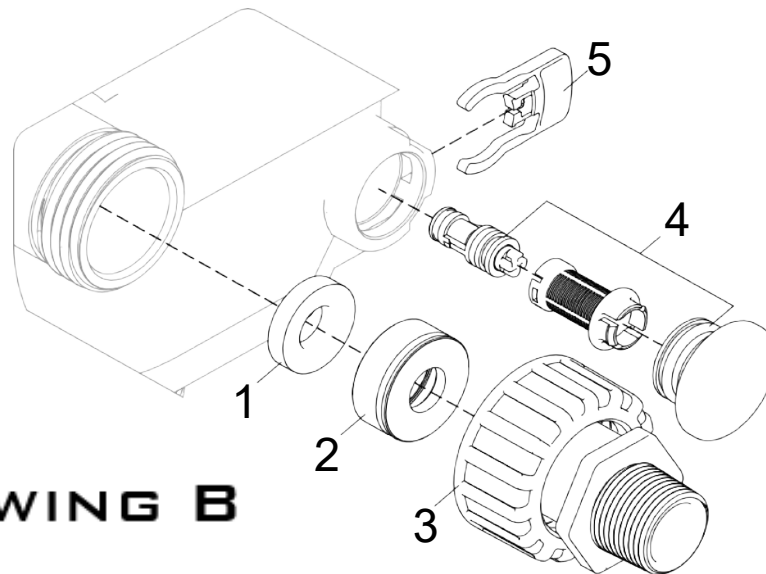
No.	Part No.	Description	Qty.
1	20017X301	Fitting Nut	1
2	20018X313	Screen	1
3	20018X312	Screen Body	1
4	20017X292	Check Valve Housing	1
5	20121X005	Air Inlet Check Valve	1
6	20017X002	Check Valve Retainer	1
7	CS-AD-BLFC-3	CS Valve Injection Adapter	1
8	20125X015	Red Retainer Clip	2



No.	Part No.	Description	Qty.
9	CS-DLFC	Drain Line Flow Control Button	1
10	20125X016	Drain Line Flow Control Housing	1
11	20125X033	Drain Line Fitting, 1/2" NPT	1
12	20017X266	90 Degree 1/2" NPT Hose Barb	1
13	CS125-1#	Injector Assembly	1
14	20125X015	Red Retainer Clip	2



# CSD121 Valve Parts - Injector Assembly

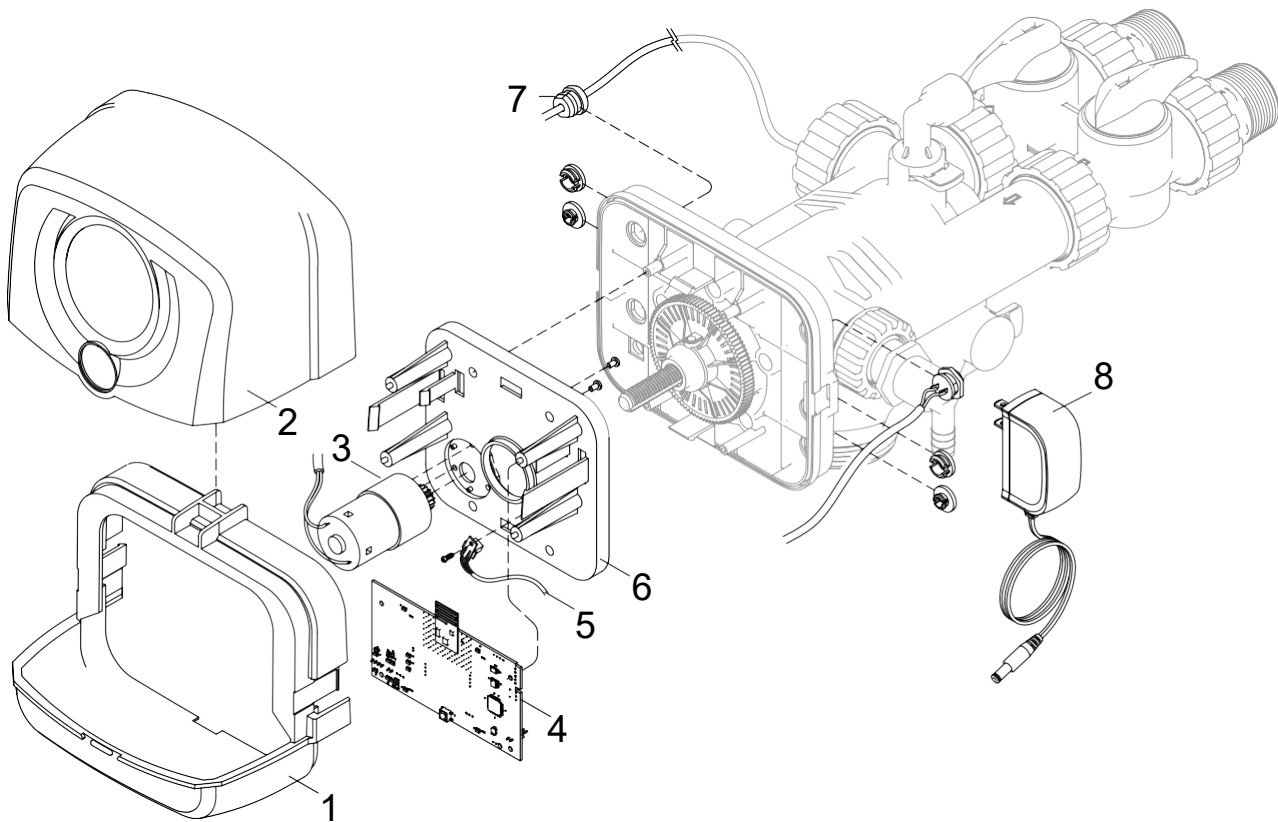


**DRAWING B**

No.	Part No.	Description	Qty.
1	CS-DLFC-2.4	Drain Line Flow Control, 2.4 gpm	1
	CS-DLFC-3.5	Drain Line Flow Control, 3.5 gpm	
	CS-DLFC-4	Drain Line Flow Control, 4 gpm	
	CS-DLFC-5	Drain Line Flow Control, 5gpm	
	CS-DLFC-8	Drain Line Flow Control, 8 gpm	
	CS-DLFC-9	Drain Line Flow Control, 9 gpm	
	CS-DLFC-10	Drain Line Flow Control, 10 gpm	
	CS-DLFC-12	Drain Line Flow Control, 12 gpm	
	CS-DLFC-15	Drain Line Flow Control, 15 gpm	
	CS-DLFC-20	Drain Line Flow Control, 20 gpm	
	CS-DLFC-25	Drain Line Flow Control, 25 gpm	
CS-DLFC-32	Drain Line Flow Control, 32 gpm		
2	20125X016	DLFC Retainer	1
3	20125X033	1" NPT Drain Line Connector	1
4	CS125-0#	Red #0 Injector, with screen and cap, CS125	1
	CS125-1#	White #1 Injector, with screen and cap, CS125	
	CS125-2#	Blue #2 Injector, with screen and cap, CS125	
	CS125-3#	Yellow #3 Injector, with screen and cap, CS125	
	20125X026	Brine Injector Plug for Filters, with screen and cap	
5	20125X015	Red Locking Clip	1



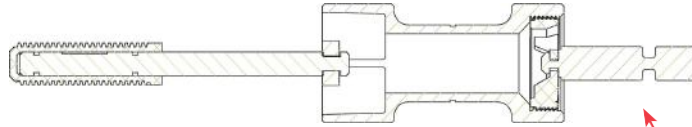
# CSD121 Power Head



No.	Part No.	Description	Qty.
1	20125X017	Commercial Slide Cover Bracket	1
2	20125X018	Commercial Slide Cover	1
3	20125X019	Geared Piston Motor	1
4	EVB-029	Commercial Control Board	1
5	20125X020	Optical Position Encoder	1
6	20125X021	Commercial Power Head Backplate	1
7	20125X007	Meter Assembly	1
8	20125X027	Power Supply 1A 12VDC 10 ft. Cord	1

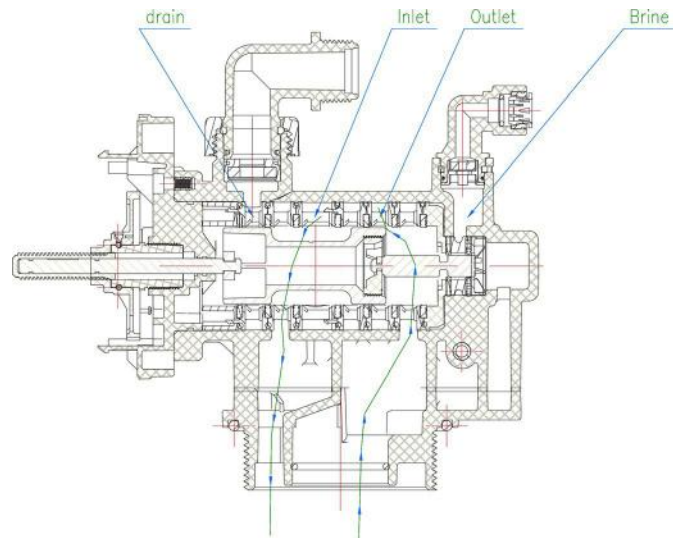
# Valve Body Flow Diagrams

## Untreated water bypassing during regeneration piston

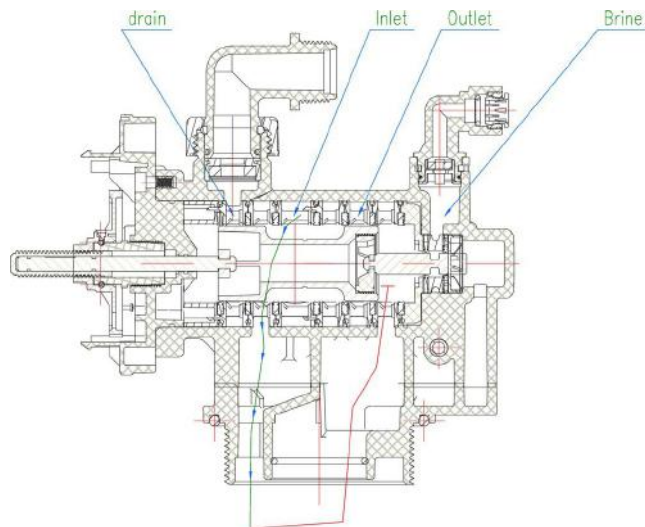


Note: Brine Piston for Softeners only

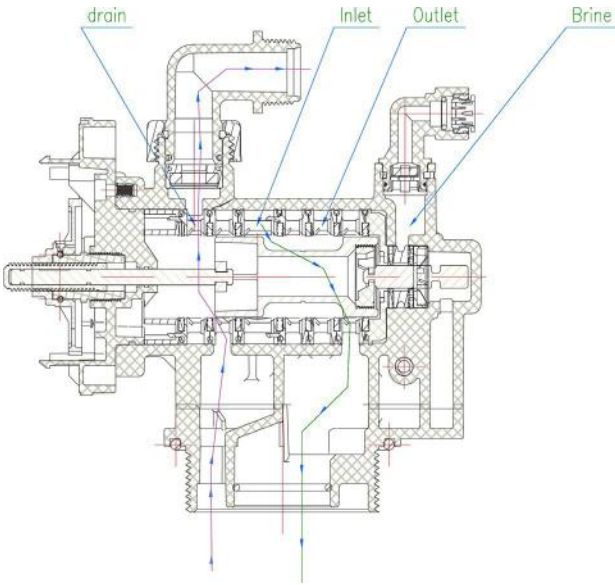
## Service



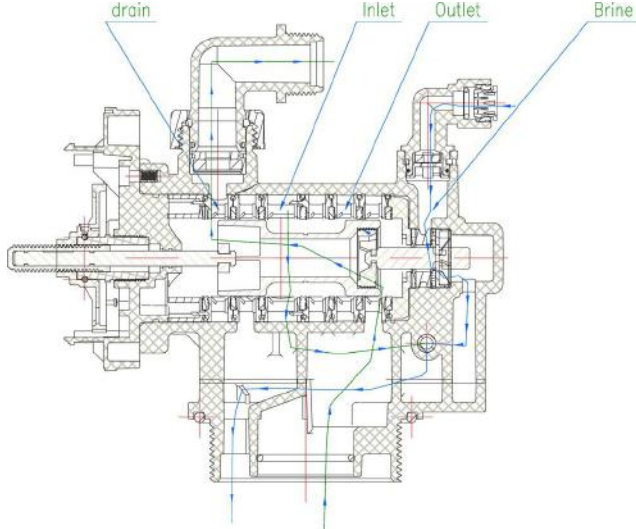
## Outlet Shutoff



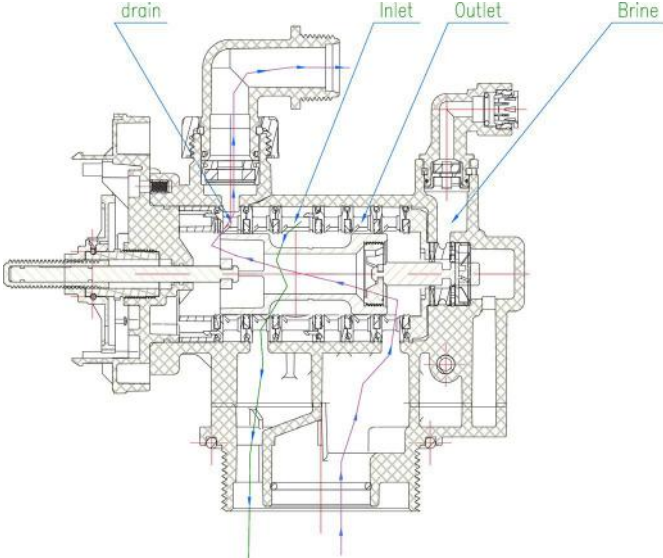
**Backwash**



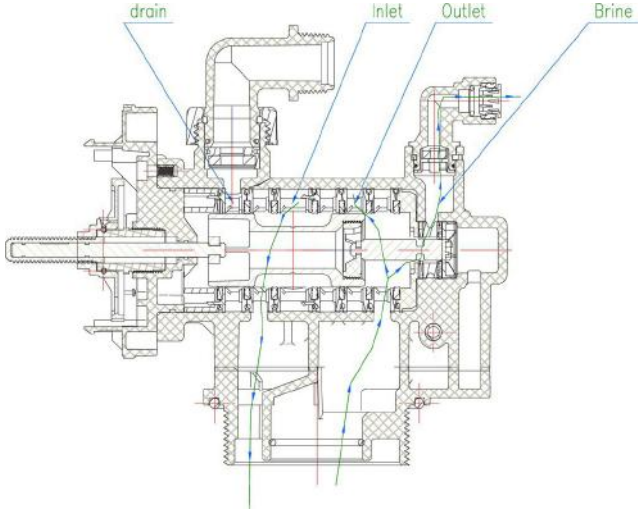
**Downflow Brine**



**Rinse**

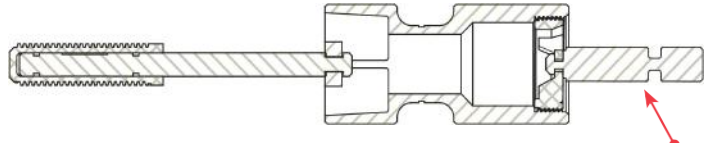


**Brine Fill**



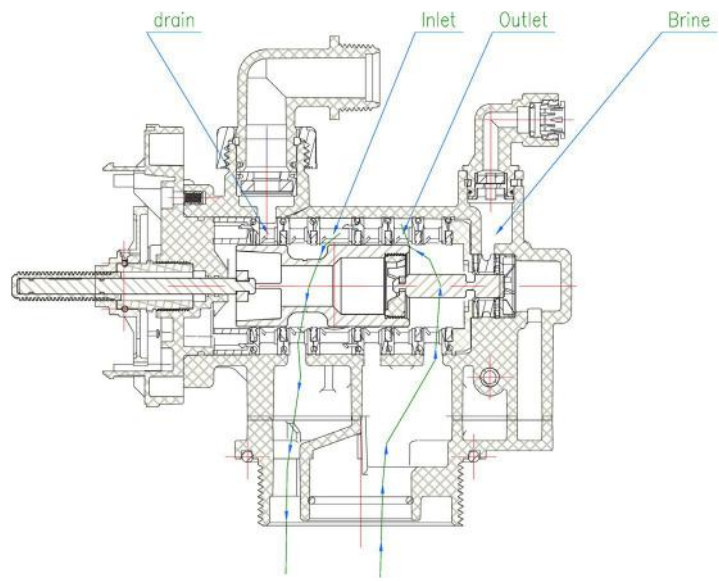
# Valve Body Flow Diagrams

## Outlet water shutoff during regeneration piston

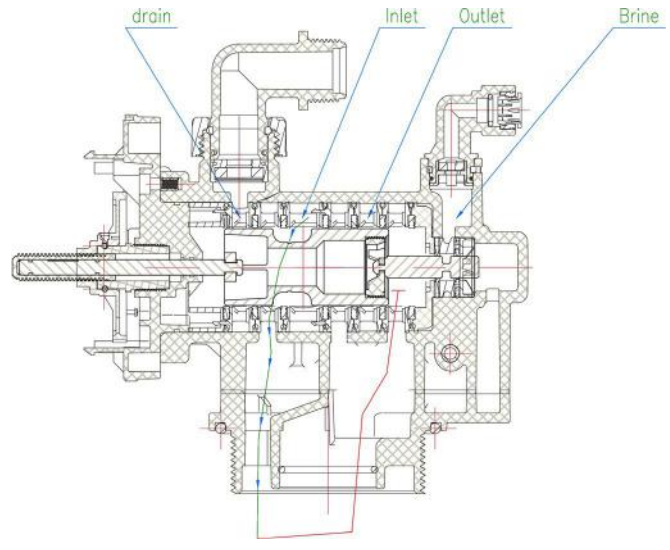


Note: Brine Piston for Softeners only

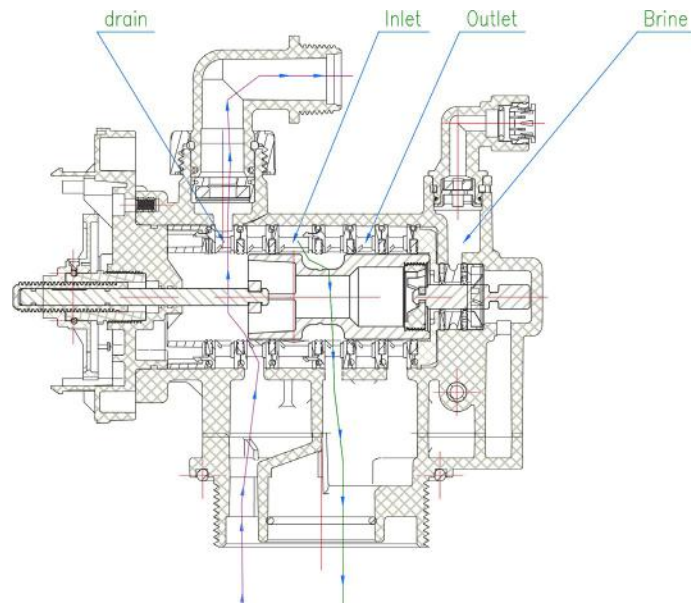
## Service



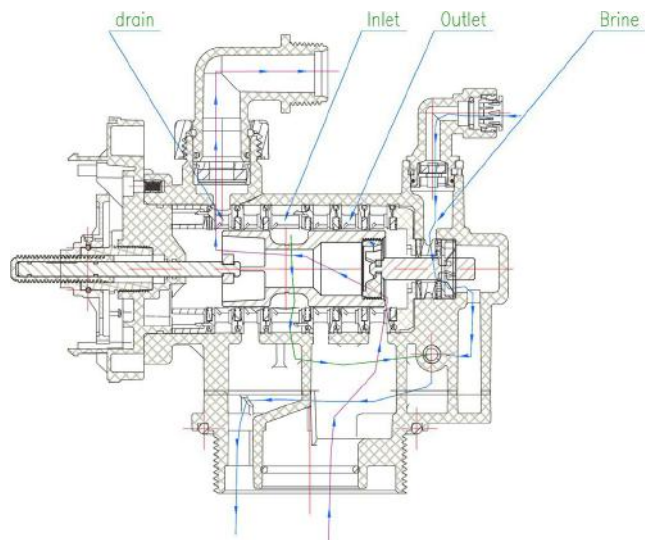
## Outlet Shutoff



## Backwash

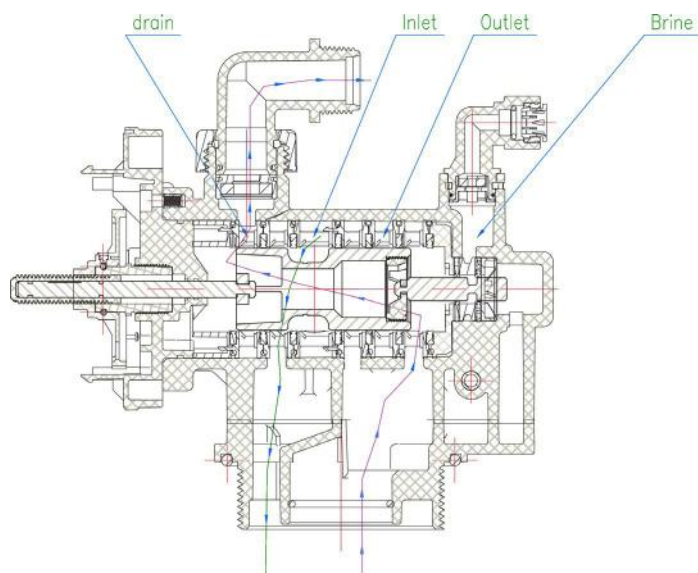


## Downflow Brine

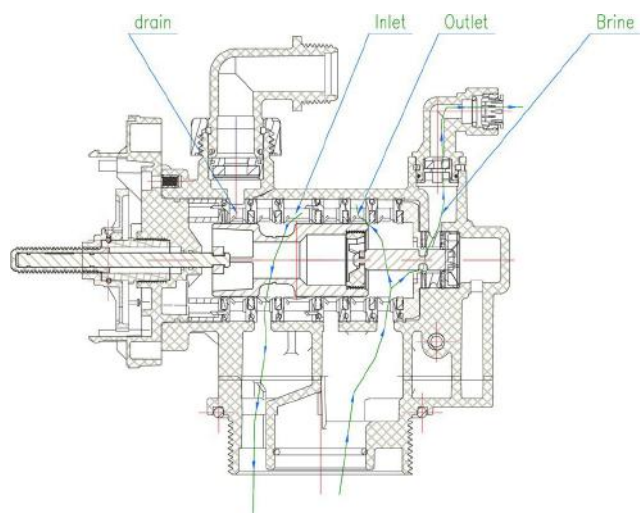




## Rinse



## Brine Fill





## Water Treatment System Warranty

This quality FRAKCO water softener is designed and built to provide many years of satisfactory performance under normal use. FRAKCO, INC. pledges to the original owner that for sixty months, all non-wearable items of the above-described water treatment system proven to be defective due to workmanship and/or materials will be replaced or repaired. FRAKCO also pledges that the fiberglass media tank is covered under this warranty for ten years if owned by the original purchaser. Our pledge does not apply if the damage is caused by defective installation; water pressure in excess of eighty pounds per square inch; water temperature in excess of 110° F.; misuse; unauthorized alterations; freezing; accident; fire; neglect; or damage caused by shipping.

To obtain service under this warranty, notify FRAKCO, INC in writing of any defects in workmanship within thirty days of the appearance of such defects. Such written notice must include the date of purchase, the part number, and a description of the defect. Upon receiving such notice and determining that the defect is covered by this warranty, FRAKCO, INC. will replace or repair the defective item. Replacement of a defective item will be at FRAKCO'S factory in Luverne, MN, and the purchaser must ship the defective item at its own expense to FRAKCO'S factory. Replacement items will be shipped by FRAKCO F.O.B. Luverne, Minnesota, with a shipping carton furnished. In the event certain models or colors of the replacement item are out of stock, FRAKCO, INC. may, after notifying the purchaser, furnish another model or color of the replacement item. The factory will not pay for service charges and will not perform any repair or service functions other than at its home office.

Please follow the enclosed instructions and local codes in installing your water treatment system. Failure to do so will void this warranty. Nothing in the warranty may be construed as involving the factory in the relationship between Dealer and Owner.

This warranty gives the purchaser specific legal rights. The purchase may also have implied warranty rights. In the event of a problem with warranty service or performance, the purchaser may be able to go to a Small Claims Court, a State Court, or a Federal District Court. This warranty complies with the 1975 Federal Warranty Law.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Date Installed \_\_\_\_\_ Dealer \_\_\_\_\_

Address \_\_\_\_\_

*MANUFACTURED BY: FRAKCO, INC.  
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MINNESOTA 56156 [WWW.FRAKCO.COM](http://WWW.FRAKCO.COM)*