Professional Water Treatment Products

Operation Manual for Systems Using the CASCADIAN® 7G2x Advanced Microprocessor – Based Generation 2 Smart Controls

<u>7G2b</u> Smart Filter Controllers for *CASCADIAN*® Filter Systems Including:

AcidFIX™ - pH Raising Systems
ArsenicTRAP™ - Arsenic Removal System
OxiMax™ - Salt Free Iron, Manganese and H_2S Filter
SuperPOLISH™ - Activated Carbon Polishing Filter
SuperTRAP® - Sediment and Particle Filter

<u>7G2i</u> Smart Ion Exchange Controllers with AVR - Active Variable Reserve for *CASCADIAN*® Automatic Softener and Ion Exchange Filter Systems Including:

CHTC™ - Combined Hardness, Tannins & Color
FluorideTRAP™ - Fluoride Removal
NitrateTRAP™ - Nitrate Removal Filter
OrganicTRAP™ - Total Organics and Tannins
Pinnacle™ - Automatic Softener

IMPORTANT:
Fill in pertinent information on page 3 for future reference. The information, specifications and illustrations in this manual are based on the latest information available at the time of printing. CASCADIAN® reserves the right to make changes at any time without notice.

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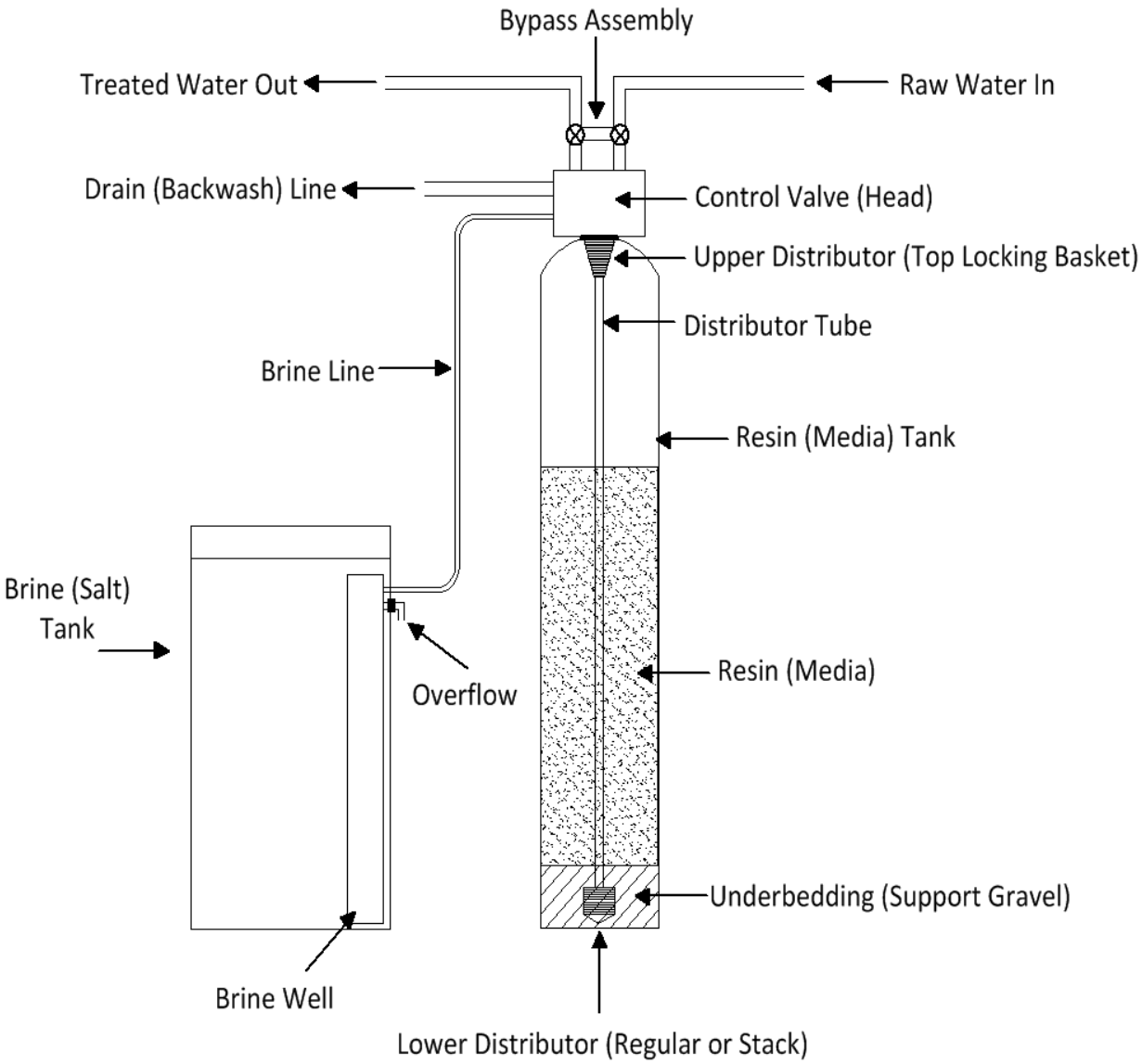
IMPORTANT PLEASE READ:

- The information, specifications and illustrations in this manual are based on the latest information available at the time of printing. O_3 Water Systems reserves the right to make changes at any time without notice.
- This manual is intended as a guide for service of the valve only. System installation requires information from a number of suppliers not known at the time of manufacture. This product should be installed by an Authorized CASCADIAN® Dealer or plumbing professional trained in water treatment system installations.
- This unit is designed to be installed on potable water systems only. If installation requires treatment of irrigation water please consult your water treatment professional.
- This product must be installed in compliance with all state and municipal plumbing and electrical codes.
- Correct and constant voltage must be supplied to the control valve to maintain proper function. A surge protector is recommended – an Uninterruptable Power Supply (UPS) is preferred.
- If daytime operating pressure exceeds 80 psi, nighttime pressures may exceed pressure limits. A pressure reducing valve must be installed.
- Do not install the unit where temperatures may drop below 34°F or above 110°F.
- Do not place the unit in direct sunlight. Black units will absorb radiant heat increasing internal temperatures.
- Do not strike the valve or any of the components.
- Warranty of this product extends to manufacturing defects. No warranty is made as to Fitness for a particular purpose. Misapplication of this product may result in failure to properly condition water, or damage to product.
- A prefilter should be used on installations in which free solids are present.
- In some applications local municipalities treat water with Chloramines. High Chloramine levels may damage valve components.

- **The term 7G2x is used when referring to both the 7G2b and 7G2i controls.**

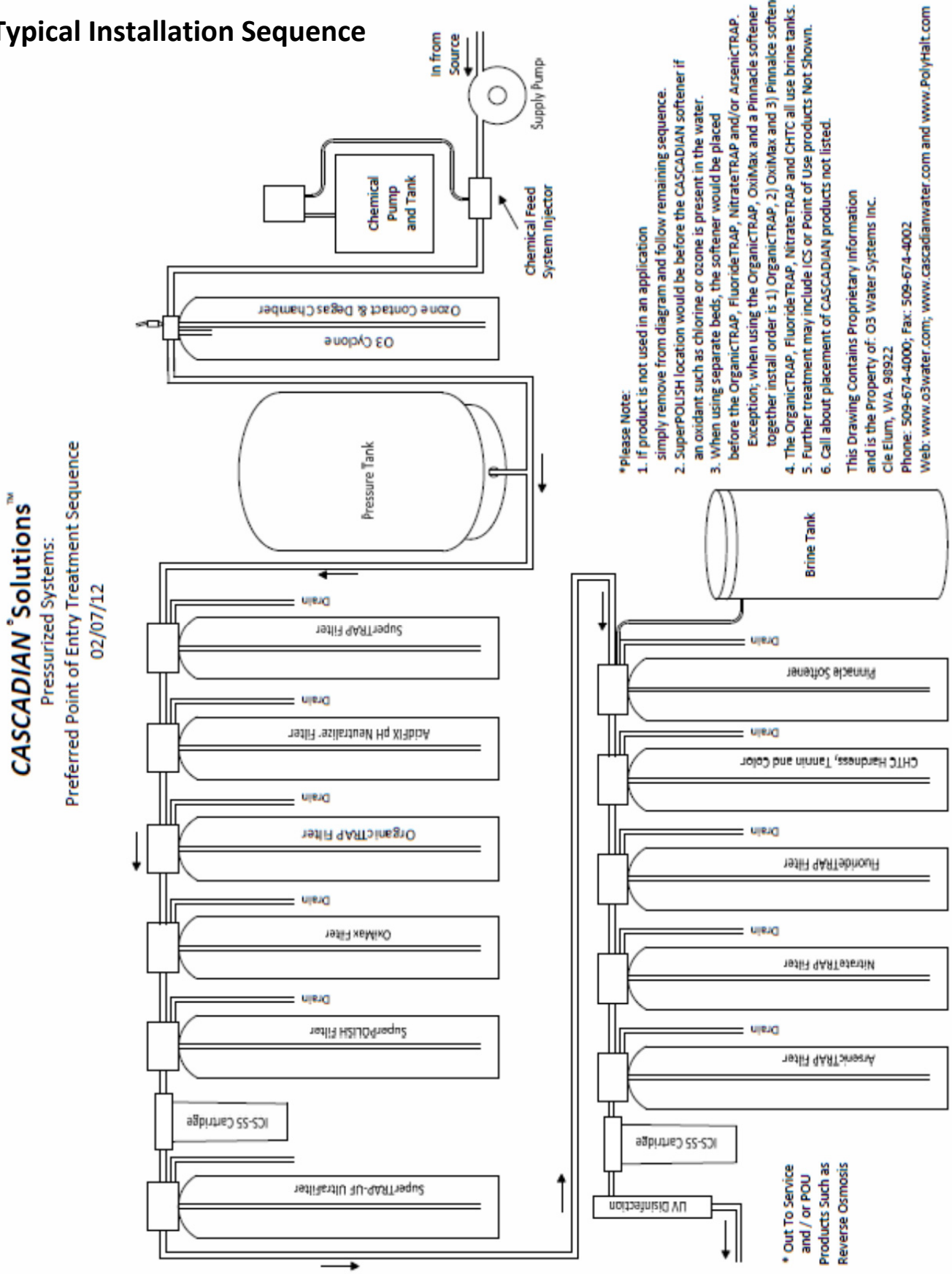
CASCADIAN® Automatic Solutions

Major Components Diagram



*Not all components included with every system

Typical Installation Sequence



Job Specifications Sheet

Circle and/or Fill in the Appropriate Data for Future Reference.
Job Number _____
CASCADIAN® Part Number _____
CASCADIAN® Serial Number (located on valve body) _____
Water Test Number _____
Maximum Flow Capacity of Unit _____

7G2x Valve used in this application: 7G2b or 7G2i

7G2b:	**7G2i:**
For regenerating CASCADIAN® Generation 2 backwashing filter systems including the AcidFIX™, ArsenicTRAP™, OxiMax™, SuperPOLISH™ and SuperTRAP®.	For regenerating CASCADIAN® Generation 2 Pinnacle Softeners and Ion Exchange filter systems including CHTC™, such as the FluorideTRAP™, NitrateTRAP™, and OrganicTRAP™.

Valve Programming (quick site specific information)

System Type: Meter Immediate / Time Clock Delayed / Volume Override Delayed / Volume Override Immediate / Meter Delayed Weekly Reserve / Meter Delayed Variable Reserve / Meter Delayed Fixed Reserve

Treated Water Capacity _____ (Gallons)

Regeneration Volume Override _____ (Gallons)

Safety Factor % _____

Regeneration Day Override _____ (Maximum Days Between Backwashes)

Regeneration Time _____ (A.M.) (P.M.) NOTE: When treatment solution requires multiple filter and / or softener units be sure to stagger backwash / regeneration times so only one unit backwashes or regenerates at any one time.

7G2i Timer Program Settings:	**7G2b Timer Program Settings:**
1. Cycle 1 - Backwash: _____Minutes 2. Cycle 2 - Brine Draw: _____Minutes 3. Cycle 3 - 2nd Backwash: _____Minutes 4. Cycle 4 - Rapid Rinse: _____Minutes 5. Cycle 5 - Brine Tank Fill: _____Minutes	6. Cycle 1 Backwash: _____Minutes 7. Cycle 2 Rapid Rinse: _____Minutes

Auxiliary Relay: Enabled or Disabled

Auxiliary Relay Output Start 1: __ __ : __ __ : __ __ Auxiliary Relay Output End 1: __ __ : __ __ : __ __ (times from beginning of regeneration cycle)

Auxiliary Relay Output Start 2: __ __ : __ __ : __ __ Auxiliary Relay Output End 2: __ __ : __ __ : __ __ (times from beginning of service cycle)

Chemical Pump Output: Enabled or Disabled; CPO Aux Relay Volume _____ Gallons; CPO Aux Relay Time __ __ : __ __ : __ __

Flow Meter: 1.25” Turbine

Drain Line Flow Control: _____ gpm

Notes:

Residential Installation Checklist

1. Water Pressure and Temperatures
   A minimum of 25 psi inlet water pressure is required for the 7G2x valve to operate effectively.
2. Electrical Facilities
   a. An uninterrupted alternating current (A/C) supply is required. Current draw is 7 watts at 24 VAC.
   b. Voltage supply 115 / 120 VAC, 60Hz unless otherwise specified.
   c. Current supply is always hot and cannot be turned off with a switch, must be unswitched – always on..
   d. It is recommended that a UPS (Uninterruptable Power Supply) be installed to protect the system electronics.
3. Existing Plumbing
   Condition of existing plumbing should be free from lime, iron and bacteria buildup. Replace piping that has heavy lime and/or iron build-up. Water test results may indicate additional treatment is required before or after this system. It is recommended irrigation and all outside taps be separated from the treated water stream.
4. Location of System and Drain
   a. Locate the system on a hard level surface and as close as possible to a clean working drain. Connect according to local plumbing codes.
   b. A vacuum relief valve is recommended.
   c. Locate upstream of any hot water tank so a minimum of 10 feet of piping is between the unit outlet and hot water heater inlet.
   d. In Well Water applications the unit is located after the pressure tank.
5. Bypass Valves
   Always provide for the installation of a bypass valve if unit is not equipped with one.

CAUTION:
- Minimum water pressure 25 psi.
- Maximum water pressure 125 psi.
- Minimum water temperature 34° F.
- Maximum water temperature 110° F.
- Ambient temperature 34° to 122° F
- Disconnect all power sources before servicing.
- Always operate with cover in place.

NOTE:
- This product should be installed by qualified professional. An Authorized CASCADIAN® Solutions™ Dealer is recommended.
- Comply with all plumbing codes when installing this product.
- Comply with all electrical codes when installing this product.

WARNING:
- The controller MUST be depressurized before removing any quick connection clips for servicing. Once pressurized the connectors must be unlocked before attempting to remove them.

Factory Programming

Your CASCADIAN® water treatment system has had the unit's sequence of cycles, cycle times, salt dose, exchange capacity, day override, brine tank refill time and time of regeneration preset at the factory. A default is set for hardness. Should a reset be performed on a control please verify proper programming for your system.

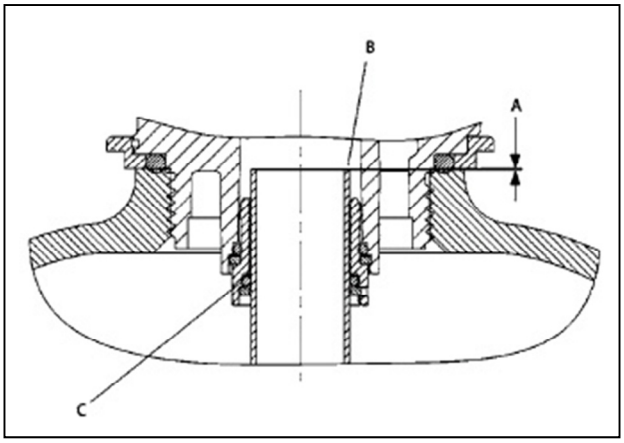
Additional Requirements

The installer must:
1. Read and understand this guide.
2. Verify proper settings for specific installation (having water quality data ready) call for assistance with setting Volume Override, Day Override (preset to 7 days), Time of Regeneration (preset to 12:00 A.M. for 7G2b and 2:00 A.M. for 7G2i controls).
3. Set Time of Day.
4. Instruct owner as to required maintenance, how to adjust time of day and other adjustments as appropriate for the specific system.
5. Present owner with completed 7G2x Basic Operation Insert.

Basic Installation and Start-up Procedures

Installation Instructions

1. Prepare the Media Tank.
   a. Place the Media tank where you want to install the system making sure the tank is plumb and on a firm base.
   b. During cold weather warm the valve to room temperature before installing.
   c. Perform all plumbing according to local plumbing codes. Drain line size should be the same as the drain line flow control. A vacuum relief valve is recommended.
   d. If needed glue distributor basket to one end of the distributor tube.
   e. Place tube with basket into center of tank and if needed, cut the distributor tube flush with top of tank (A) and deburr the outside of the tube (B) after cutting.
   f. Lubricate the distributor 0-ring seal (C) and tank 0-ring seal. Use only silicone based lubricant.
   g. Temporarily block top opening of distributor tube to prevent media from entering the tube while filling tank.
   h. Load media keeping distributor basket and tube centered in tank. When using multiple media be sure to load in the recommended order.
   i. Remove temporary block from distributor tube.



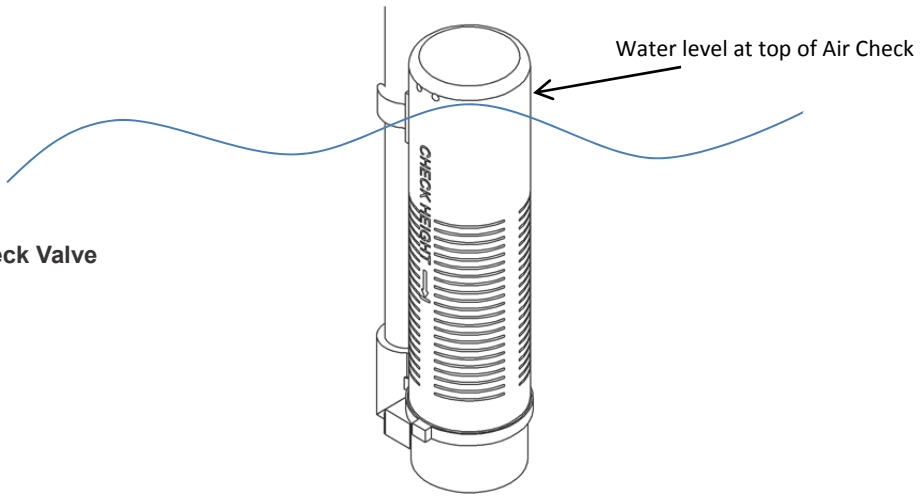
2. Install 7G2x Control Valve and position Media Tank.
   a. If a locking upper distributor basket is included with your system place and lock the distributor to the bottom of the valve.
   b. Place the valve over the distributor tube and spin the valve onto the tank ensuring the threads are not cross-threaded. Rotate the valve freely without force until it comes to a stop. Rotate valve an additional ¼ to ½ turn. The valve is now properly tightened.
   c. If needed, rotate or reposition the tank with unit to its final position.

> **NOTE:**
> All soldering MUST be done on any connections requiring soldering prior to connecting the main control. The main control will be damaged if it is connected at the time of soldering.

3. Connect Plumbing and electrical.
   a. Make plumbing connections to Inlet, Outlet and drain fittings on valve assembly. A vacuum relief valve is recommended. Note: Teflon tape is the only sealant to be used on valve fittings.
   b. If the buildings electrical system is grounded to the plumbing make certain ground is continuous after installation. Plumbing must be done in accordance with all applicable local codes.
   c. Place unit Bypass into the Bypass Position (see page 21) and slowly turn on the main water supply and check for leaks.
   d. Slowly open a cold treated water tap nearby and let water run a few minutes or until the system is free of foreign material resulting from the installation. Close the water tap when water runs clean.
   e. Plug the valve into an approved un-switched power source. NOTE: make all electrical connections according to codes.

4. Prepare and connect Brine Tank (7G2i controls only).
   a. Make sure the floor is clean below the Brine (salt) Tank location and that it is level. Since salt must be periodically added to the brine tank it should be located where it is easily accessible.
   b. Place approximately 1" of water above the grid plate. If a grid is not utilized, fill to the top of the Air Check (see page 8) in the salt tank. Do not add salt to the brine tank at this time.
   c. Install the ⅜" O.D. Polyethylene tube from the brine line fitting on the 7G2i Control Valve to the brine valve (see page 22) on in the brine tank.
   d. An overflow drain line is recommended where a brine overflow could damage furnishings or the building structure. Your CASCADIAN® system is equipped with a brine tank safety valve which greatly reduces the chance of an accidental brine overflow. In the event of a malfunction an overflow line connection will direct the "overflow" to the drain instead of spilling on the floor where it could cause considerable damage. This connection is an elbow fitting on the side of the brine tank.
      i. Attach a length of ½" I.D. tubing to the fitting and run to drain.
      ii. Do Not elevate overflow line to more than 3" below the bottom of the fitting.
      iii. Do Not connect this tube to the drain line of the control valve. Overflow line must be a direct separate line from fitting to drain.
      iv. Allow an air gap.

5. Bring the system online.
   a. Manually cycle the 7G2i control valve to the Backwash Position (see page 10). Open the inlet side of the Bypass just enough to hear water flow and air escape the unit and let the water flow slowly into the media tank until the air is purged from the unit. After air is purged slowly open the Bypass inlet all the way.
   b. 7G2i Controls Only:
      i. Manually step the valve to the Brine Draw position (see page 10), verify water is being drawn from the brine tank and allow the valve to draw water from the brine tank until it stops. NOTE: The air check will check at approximately the midpoint of the screened intake area.
      ii. Manually step the valve past the 2nd Backwash and Rapid Rinse cycles to the Brine Tank Fill cycle (see page 10), verify water is being added to the brine tank and allow the valve to return to In Service automatically.
      iii. With the valve In Service, check that there is at least 1" of water above the grid in the brine tank (if a grid is used) or to the top of the Air Check.
      iv. Fill the brine tank with salt and place cover on tank. Solar salt in pellet form is recommended, DO NOT use rock salt.
6. Open the Bypass outlet and manually initiate a regeneration cycle.
   a. Clean filter media: If your systems is a filter with the 7G2b control the media contains fines that must be backwashed out of the media, continue backwashing the unit until backwash water running to drain is clear. Gently tap the side of the tank while in backwash cycle just enough to vibrate the media. Caution: Tapping too hard may damage the media tank, a damaged tank do to excessive force will not be warranted. If tapping the side causes the backwash water turn color wait till it runs clear again and repeat this process until it does not turn color after tapping. This step is essential for proper installation and system function, it must not be skipped.
   b. After a complete regeneration your CASCADIAN® softener / filter unit is now in service.
7. Inform owner about reading operating and display instructions. Point out that the clock may need to be re-set if the power goes out and will need to be reset for changes in daylight savings time.



Residential Air Check Valve

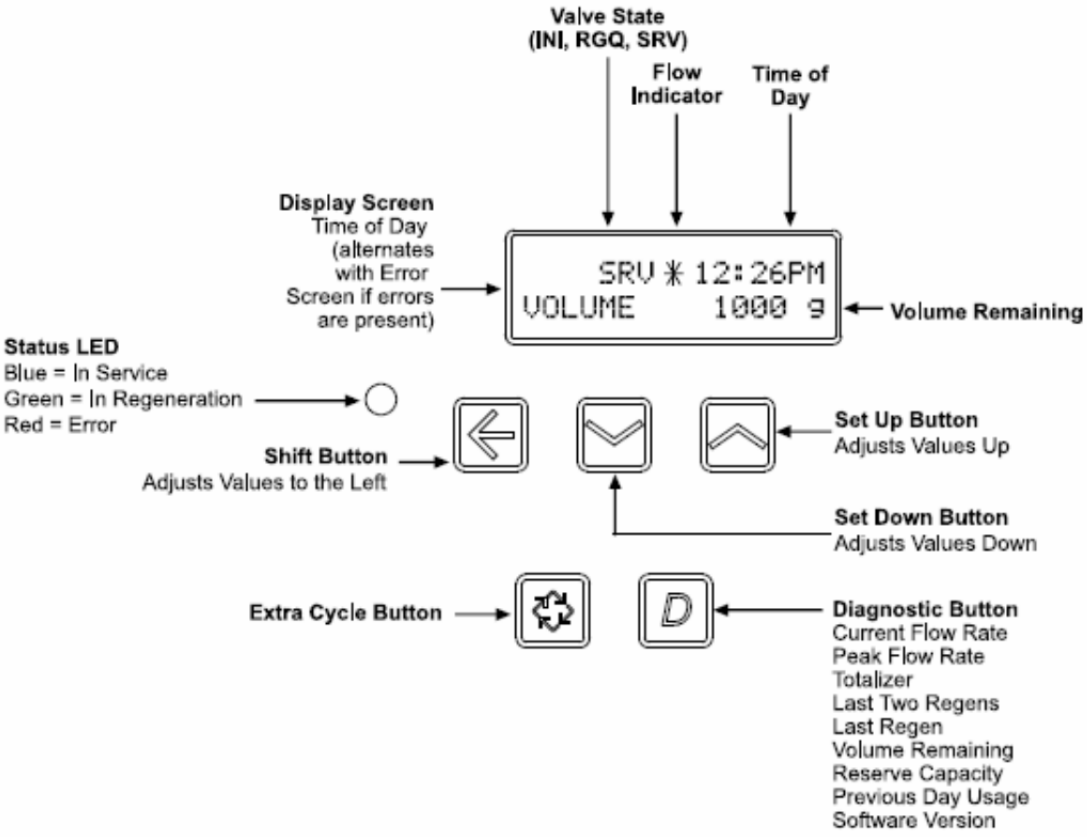
7G2x Control Operation and Settings

NOTE:
The words Regeneration and Backwash may be used interchangeably to describe the sequence of events the 7G2x Control performs to periodically clean or recharge the treatment system.

Basic Control Description

The 7G2x Control is a Generation 2 Advanced, Microprocessor – Based, Metered, Smart Controller and the most efficient control available. The 7G2x regenerates or backwashes the system based on actual water quality and volume used resulting in lower volume of water used in the automatic cleaning process and a significantly reduce amount of salt use. The 7G2x Smart Controller is the most efficient water treatment system available.

Control Display Panel



Parameter Display Codes:

Valve State:
INI (Initializing): INI will display on the screen for 30 to 45 seconds when initializing after a power failure reset or programming.

RGQ (Regeneration Queued): RGQ indicates that the reserve has been entered in a delayed system and regeneration has been queued. When in the main screen, press the Shift button to toggle service (SRV) with RGQ.

SRV (Service): SRV will display when the unit is in service.

LED Status Lights:

Blue LED: Illuminates while the unit is in service and no errors exist. The unit will always be in service unless a regeneration trigger has occurred green LED light will be displayed).

Green LED: Illuminates when the unit is in Regeneration mode, unless an error condition exists.

Red LED: Illuminates when there is an error.

Flow Indicator: A rotating line (appearing as a rotating star shape) will display on the screen when treated water flow is going through the meter (does not meter water going to drain).

Control Valve / Timer Operation

System Type	Regeneration Trigger
Time Clock Delayed	A) Day override parameter is reached and B) the time of day matches the regeneration day override time
Meter Immediate	Regenerates as soon as the volume remaining has been depleted
Meter Delayed Fixed Reserve	A) Volume remaining has been depleted to the fixed reserve volume and B) the regeneration time has been reached
Meter Delayed Variable Reserve	A) Volume remaining has been depleted to the variable reserve volume and B) the regeneration time has been reached
Meter Delayed Weekly Reserve (standard for 7G2i controls)	A) Volume remaining has been depleted to the weekly variable reserve volume and B) the regeneration time has been reached
Volume Override Immediate	As soon as the programmed volume remaining has been depleted from the tank
Volume Override Delayed (standard for 7G2b controls)	As soon as soon as the programmed volume remaining has been depleted from the tank and the regeneration time has been reached

Setting the Time of Day

1. Press and hold the Up or Down button for 2 seconds.
2. Press the Shift button to select the digit you want to modify.
3. Press the Up or Down buttons to adjust the value.
4. Press the Extra Cycle button to return to the normal display screen, or after a 5 second timeout.

NOTE: The "D" button (Diagnostic) can be pressed to exit without saving.

Manually Initiating a Regeneration

1. When timer is in service, press the Extra Cycle button for 5 seconds on the main screen.
2. The timer advances to Regeneration Cycle Step #1, and begins programmed time count down and will automatically advance to the next cycle until finished.
3. After the timer begins to count down for a cycle pressing the Extra Cycle button once will advance to the next regeneration step.
4. Press the Extra Cycle button once more to advance the valve back to in service.

NOTE: A queued regeneration can be initiated by pressing the Extra Cycle button. To clear a queued regeneration, press the Extra Cycle button again to cancel. If regeneration occurs for any reason prior to the delayed regeneration time, the manual regeneration request shall be cleared.

Queued Regeneration (RGQ): From the display screen, while the unit is in service, hold down the Extra Cycle button until "RGQ" displays. The valve will regenerate when the set regeneration time has been reached.

Timer Operation During Regeneration: In the main display screen, the timer shows the current regeneration cycle and the time for that step. The green LED light will display when the unit is in regeneration. Once all regeneration steps are complete, the timer returns to in service, and displays a blue LED light.

Timer Operation During Programming: The timer enters program mode (unit must be in service). While in the program mode the timer continues to operate normally, monitoring water usage. Timer programming is stored in memory permanently upon a normal exit from programming mode.

Timer Operation During A Power Failure: All program settings are stored in permanent memory. Current valve position, cycle step time elapsed, and time of day are stored during a power failure, and will be restored upon power re-application. Time is kept during a power failure, and time of day is adjusted upon power up (as long as power is restored within 12 hours). It is recommended that a UPS (Uninterruptable Power Supply) be installed to protect the system.

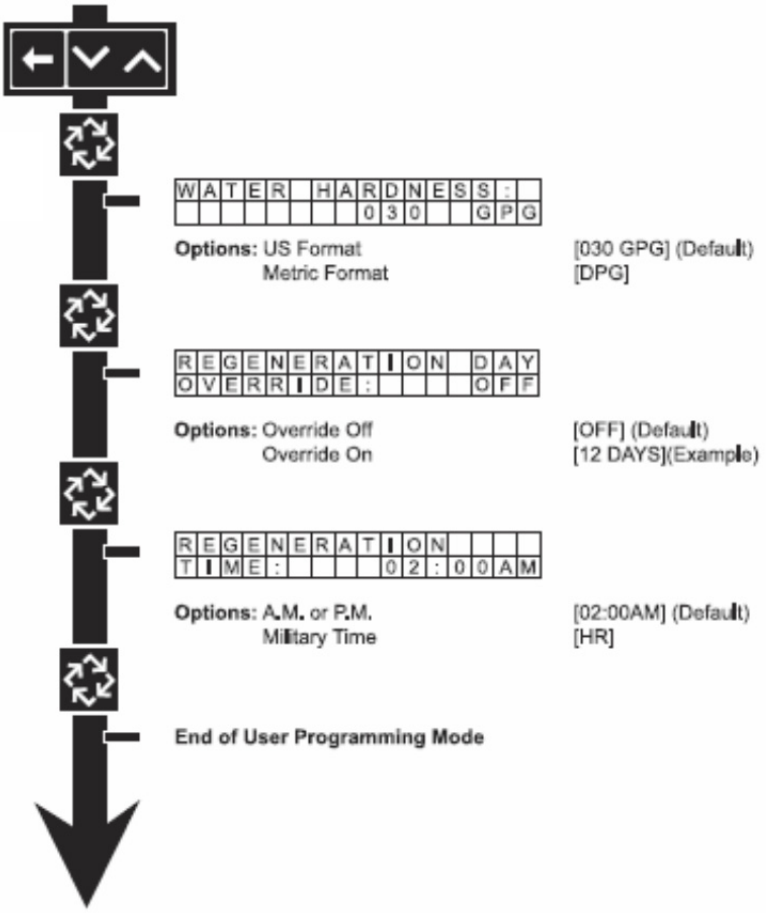
NOTE: The time of day on the main display screen will flash for 5 minutes when there has been a power outage. The flashing of the time of day can be stopped by pressing any button on the display.

Regeneration Day Override Feature: If the Day Override option is turned on and the valve reaches the set Regeneration Day Override value, the Regeneration Cycle starts at the programmed regeneration time.

Flow Meter Equipped Control: As treated water is used, the Volume Remaining display counts down from the calculated system capacity, less the reserve volume. Once capacity reaches the reserve volume, the system will regenerate based on the set regeneration time. If set for an Immediate system, the unit will regenerate immediately once it reaches zero capacity. If it is a Fixed, Variable, or Weekly reserve, the unit will queue a regeneration (RGQ) and count down Reserve Volume until the set regeneration time.

User Programming Mode

NOTES:
1. Depending on current option settings, some displays cannot be viewed or set.
2. If no keypad activity is made for 5 minutes while in Programming Mode, or if there is a power failure, no changes will be made, and the unit will go back to the main display screen.
3. Feed Water Hardness will not be shown in Volume Override or Time Clock system types.



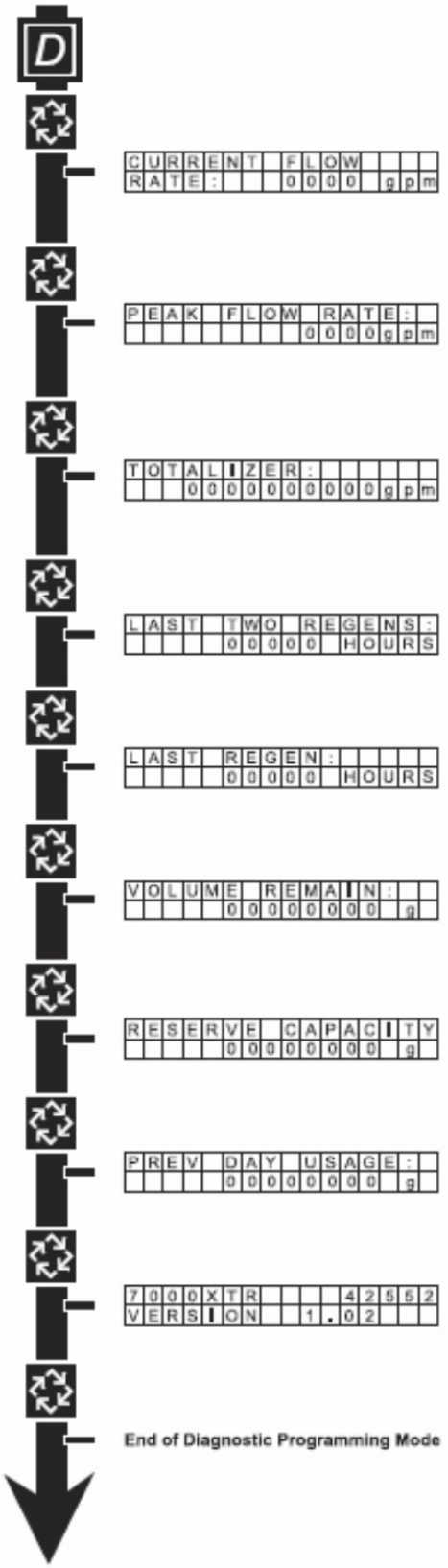
1. Enter User Mode
   a. Press and hold the Up and Down buttons for 5 seconds.
2. Set Feed Water Hardness: Note; Feed Water Hardness will not be shown in Volume Override or Time Clock system types
   a. Press the Shift, Up, and Down buttons to move the cursor and change the value of the numbers.
      — Press the Extra Cycle button.
3. Set Regeneration Day Override
   a. To turn on and set the days, press the Down button.
   b. Press the Shift, Up, and Down buttons to move the cursor and change the value of the numbers.
      — Press the Extra Cycle button.
4. Regeneration Time
   a. Press the Shift, Up, and Down buttons to move the cursor and change the value of the numbers.
      — Press the Extra Cycle button.
5. End of User Programming Mode

Diagnostic Programming Mode

NOTE: Depending on current option settings, some displays cannot be viewed.

Enter Diagnostic Mode:

1. Press and release the “D” button.
2. Press the Extra Cycle button once per display until all displays are viewed and the normal display screen appears.
3. Press and release the “D” button during while in diagnostic mode to exit the Diagnostic Mode.
4. Depending on current option settings, some displays cannot be viewed.



NOTE: Depending on current option settings, some displays cannot be viewed.

Overview of Diagnostic Mode:
The current Diagnostic Programming Mode screen will display until either the Extra Cycle button is pressed through for each screen, or the Diagnostic button is pressed. In the event of regeneration occurring while in the Diagnostic Programming Mode, the regeneration step and time remaining will be displayed. When regeneration completes, the display will return to the normal time of day display screen.

Entering and Exiting Diagnostic Mode:
Press and release the "D" button to enter the Diagnostic Programming Mode. Pressing the Extra Cycle button will move to the next diagnostic screen. Press the Extra Cycle button once per display until all are viewed. Pressing the Diagnostic button while in Diagnostic Mode will cause the unit to leave the Diagnostic Mode and return to the normal time of day display screen.

1. Current Flow Rate
This program step displays the current flow rate. The maximum flow rate for the 1.25" Turbine on the 7G2x series valves is 40 gpm.
— Press the Extra Cycle button.

2. **Peak Flow Rate**
This program step displays the peak flow rate (1 minute average) since the last regeneration.
— Press the Extra Cycle button.

3. **Totalizer**
This program step displays the total volume of treated water that passes through the meter. Reset to zero by holding the Up and Down buttons for five seconds while in the totalizer screen.
— Press the Extra Cycle button.

4. **Hours Between Last Two Regenerations**
This program step displays the time between the last two regenerations saved.
— Press the Extra Cycle button.

5. **Hours Since Last Regeneration**
This program step displays the hours since the last regeneration.
— Press the Extra Cycle button.

6. **Volume Remaining**
This program step displays the volume remaining. The timer will regenerate if the volume remaining is set to zero. The maximum ranges are the same as the maximum volume calculated on the main screen.
— Press the Extra Cycle button.

7. **Reserve Capacity**
This program step displays the reserve capacity, ensuring conditioned water is available at all times.
— Press the Extra Cycle button.

8. **Previous Day's Water Usage**
This program step displays the previous day's water usage.
— Press the Extra Cycle button.

9. **Software Version This program step displays the timer's software program version number.**
— Press the Extra Cycle button to exit.

NOTE: Diagnostic Programming Mode will stop if the system goes into regeneration.

7G2b Master Programming Mode: Recommended for trained CASCADIAN® professional dealers only.

The *CASCADIAN*® 7G2b is an Advanced Generation 2 Microprocessor – Based, Metered, Smart Controller for Automatic Backwashing Filters: For the 7G2i Control see page 16.

7G2b Smart Filter Controllers for *CASCADIAN*® Filter Systems Including:

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ArsenicTRAP™ - Arsenic Removal System
OxiMax™ - Salt Free Iron, Manganese and H_2S Filter
SuperPOLISH™ - Activated Carbon Polishing Filter
SuperTRAP® - Sediment and Particle Filter

IMPORTANT CAUTION:
It is recommended that any programming changes made in the Master Programming Mode be done by a trained CASCADIAN® professional water treatment dealer. Mistakes can cause unnecessary problems that may necessitate a service call and/or cause damage to the system or facility.

Your CASCADIAN® water treatment system is programmed with factory defaults. The ✓ symbol indicates a default setting.
The installer must:

- Read and understand this guide and have access to the Installer Manual.
- Verify proper settings for each component in the water treatment system.
- Set Time of Day.

Master Programming:

When the Master Programming Mode is entered, parameters can be set to make the timer function as needed.

NOTE: Depending on current option settings, some displays cannot be viewed or set.

Entering Master Programming Mode: Press and hold the Shift and Up buttons for 5 seconds.

Exiting Master Programming Mode: Press the Extra Cycle button once per display until all are viewed. Master Programming Mode is exited and the normal display screen appears. To exit the Master Programming Mode without saving, press "D" (the Diagnostic button).

NOTE: If no keypad activity is made for 5 minutes while in the Master Programming Mode, or if there is a power failure, no changes will be made, and the unit will go back to the main display screen.

Resets:

Soft Reset: Press and hold the Up and Down buttons for 25 seconds until 12:00PM (or 12:00HR) appears. This resets all parameters except for the flow meter totalizer volume.

Master Reset: Hold the Extra Cycle button while powering up the unit. This resets all of the parameters in the unit. Check and verify the choices selected in Master Programming Mode.

IMPORTANT Note:
Either a Soft or Master Reset removes any programming done at the CASCADIAN® factory for your specific system. After a Reset the 7G2x control may require complete reprogramming – Consult your Authorized CASCADIAN® Solutions™ Dealer.

Master Programming Mode Chart – 7G2b

7G2b Control Only.

Note: Options available change based upon selections.		
Parameter:	Options:	2nd Level Options:
SYSTEM TYPE: 4	1) TIME CLK DELAYED ✓ **2) VOL OVERRIDE DLY** 3) VOL OVERRIDE IMM 4) MTR DLY WEEK RSV 5) MTR DLY VAR RSV 6) MTR DLY FIX RSV 7) METER IMMEDIATE	None
VALVE TYPE:	✓ **7000XTR**	None
REGENERANT FLOW:	DOWN FLOW (do not select this option) ✓ **FILTER** DF FILL FIRST (do not select this option) DF VAR BRINING (do not select this option)	None
DISPLAY FORMAT:	✓ **US-GALLONS** METRIC- m3, PPM METRIC- m3, G° DEG METRIC- m3, F° DEG	None
VOLUME OVERRIDE:	✓ **- 500** Number of gallons between backwashes.	None
CAPACITY SAFETY FACTOR:	✓ **15%** - Percent of capacity to put into reserve.	None
REGENERATION DAY OVERRIDE:	✓ **07** - Maximum number of days between backwashes.	None
REGENERATION TIME:	✓ **12:00AM** - On multiple unit installations stagger regeneration times. From left to right space regeneration times 30 minutes apart.	None
CYCLE 1 - BACK WASH CYCLE 2 - RAPID RINSE	✓ **00:15:00** ✓ **00:10:00**	None
AUXILIARY RELAY:	ENABLED	AUX RELAY OUTPUT START 1: HH:MM:SS AUX RELAY OUTPUT END 1: HH:MM:SS AUX RELAY OUTPUT START 2: HH:MM:SS AUX RELAY OUTPUT END 2: HH:MM:SS
	✓ **DISABLED**	None
CHEMICAL PUMP OUTPUT:	ENABLED	CPO AUX RELAY VOLUME: XXX g CPO AUX RELAY TIME: HH:MM:SS
	✓ **DISABLED**	None
FLOW METER:	✓ **1.25 TURBINE**	None
	GENERIC	MAXIMUM FLOW RATE: gpm
		ADD xxx GALLONS EVERY xxx PULSES

7G2b Control Only.

Notes:

1. ✓ This symbol appears next to an option when the option is the CASCADIAN® programmed default.
2. Some items may not be shown depending on timer configuration.
3. To exit programming without saving changes press the “D” (the diagnostic button).

7G2i Master Programming Mode: Recommended for trained CASCADIAN® professional dealers only.

The *CASCADIAN*® 7G2i with Active Variable Reserve is an Advanced Generation 2 Microprocessor – Based, Metered, Smart Controller for Automatic Ion Exchange Control: For the 7G2b Control see page 14.

7G2i Smart Ion Exchange Controllers with AVR - Active Variable Reserve for *CASCADIAN*® Automatic Softener and Ion Exchange Filter Systems Including:

CHTC™ - Combined Hardness, Tannins & Color
FluorideTRAP™ - Fluoride Removal
NitrateTRAP™ - Nitrate Removal Filter
OrganicTRAP™ - Total Organics and Tannins
Pinnacle™ - Automatic Softener

IMPORTANT CAUTION:
It is recommended that any programming changes made in the Master Programming Mode be done by a trained CASCADIAN® professional water treatment dealer. Mistakes can cause unnecessary problems that may necessitate a service call and/or cause damage to the system or facility.

Your CASCADIAN® water treatment system is programmed with factory defaults. The ✓ symbol indicates a default setting.
The installer must:

- Read and understand this guide and have access to the Installer Manual.
- Verify proper settings for each component in the water treatment system.
- Set Time of Day.

Master Programming:

When the Master Programming Mode is entered, parameters can be set to make the timer function as needed.

NOTE: Depending on current option settings, some displays cannot be viewed or set.

Entering Master Programming Mode: Press and hold the Shift and Up buttons for 5 seconds.

Exiting Master Programming Mode: Press the Extra Cycle button once per display until all are viewed. Master Programming Mode is exited and the normal display screen appears. To exit the Master Programming Mode without saving, press the Diagnostic button.

NOTE: If no keypad activity is made for 5 minutes while in the Master Programming Mode, or if there is a power failure, no changes will be made, and the unit will go back to the main display screen.

Resets:

Soft Reset: Press and hold the Up and Down buttons for 25 seconds until 12:00PM (or 12:00HR) appears. This resets all parameters except for the flow meter totalizer volume.

Master Reset: Hold the Extra Cycle button while powering up the unit. This resets all of the parameters in the unit. Check and verify the choices selected in Master Programming Mode.

IMPORTANT Note:
Either a Soft or Master Reset removes any programming done at the CASCADIAN® factory for your specific system. After a Reset the 7G2x control may require complete reprogramming – Consult your Authorized CASCADIAN® Solutions™ Dealer.

Master Programming Mode Chart – 7G2i

7G2i Control Only.

Note: Options available change based upon selections.		
Parameter:	Options:	2nd Level Options:
SYSTEM TYPE: 4	1) TIME CLK DELAYED 2) VOL OVERRIDE DLY 3) VOL OVERRIDE IMM ✓ **4) MTR DLY WEEK RSV** 5) MTR DLY VAR RSV 6) MTR DLY FIX RSV 7) METER IMMEDIATE	None
VALVE TYPE:	✓ **7000XTR**	None
REGENERANT FLOW:	✓ **DOWN FLOW** FILTER (do not select this option) DF FILL FIRST DF VAR BRINING (do not select this option)	None
DISPLAY FORMAT:	✓ **US-GALLONS** METRIC- m3, PPM METRIC- m3, G° DEG METRIC- m3, F° DEG	None
UNIT CAPACITY:	Unit Specific – Contact Authorized Dealer	None
WATER HARDNESS:	✓ **15** GPG	None
VOLUME OVERRIDE:	Number of gallons between regenerations, calculated by control.	None
CAPACITY SAFETY FACTOR:	Automatically Calculated by Control	None
REGENERATION DAY OVERRIDE:	✓ **07** - Maximum number of days between regenerations.	None
REGENERATION TIME:	✓ **02:00AM -** On multiple unit installations stagger regeneration times. From left to right space regeneration times 2 hours apart.	None
CYCLE 1 - BACK WASH CYCLE 2 - BRINE DRAW CYCLE 3 - 2ND BACKWASH CYCLE 4 - RAPID RINSE CYCLE 5 - BRINE TANK FILL	✓ **00:10:00** ✓ **01:00:00** ✓ **00:07:00** ✓ **00:10:00** Unit Specific – Contact Authorized Dealer	None
AUXILIARY RELAY:	ENABLED	AUX RELAY OUTPUT START 1: HH:MM:SS AUX RELAY OUTPUT END 1: HH:MM:SS AUX RELAY OUTPUT START 2: HH:MM:SS AUX RELAY OUTPUT END 2: HH:MM:SS
	✓ **DISABLED**	None
CHEMICAL PUMP OUTPUT:	ENABLED	CPO AUX RELAY VOLUME: XXX g CPO AUX RELAY TIME: HH:MM:SS
	✓ **DISABLED**	None
FLOW METER:	✓**1.25 TURBINE**	None
	GENERIC	MAXIMUM FLOW RATE: gpm
		ADD xxx GALLONS EVERY xxx PULSES

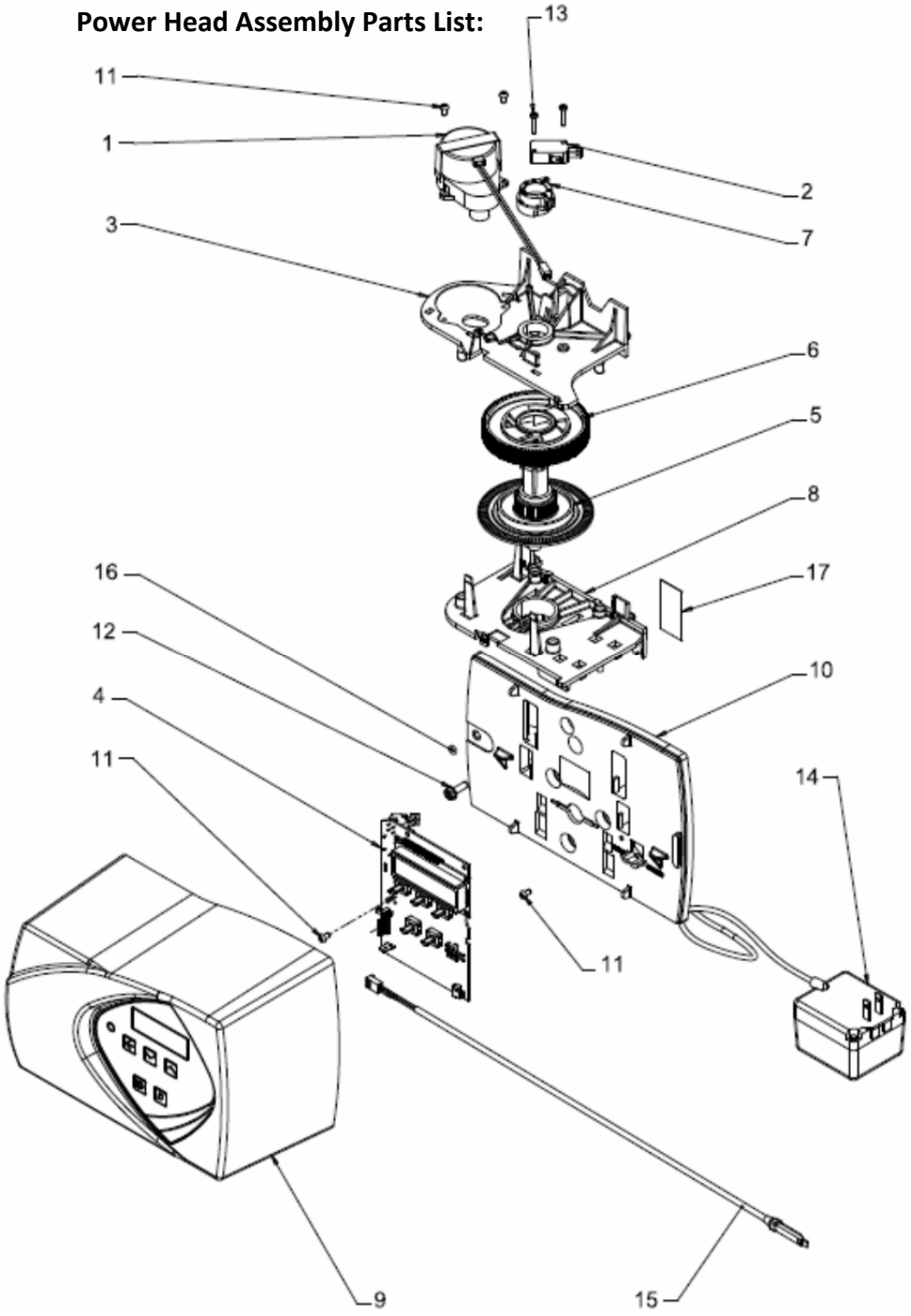
7G2i Control Only.

Notes:

1. ✓ This symbol appears next to an option when the option is the CASCADIAN® programmed default.
2. Some items may not be shown depending on timer configuration.
3. To exit programming without saving changes press the “D” button.

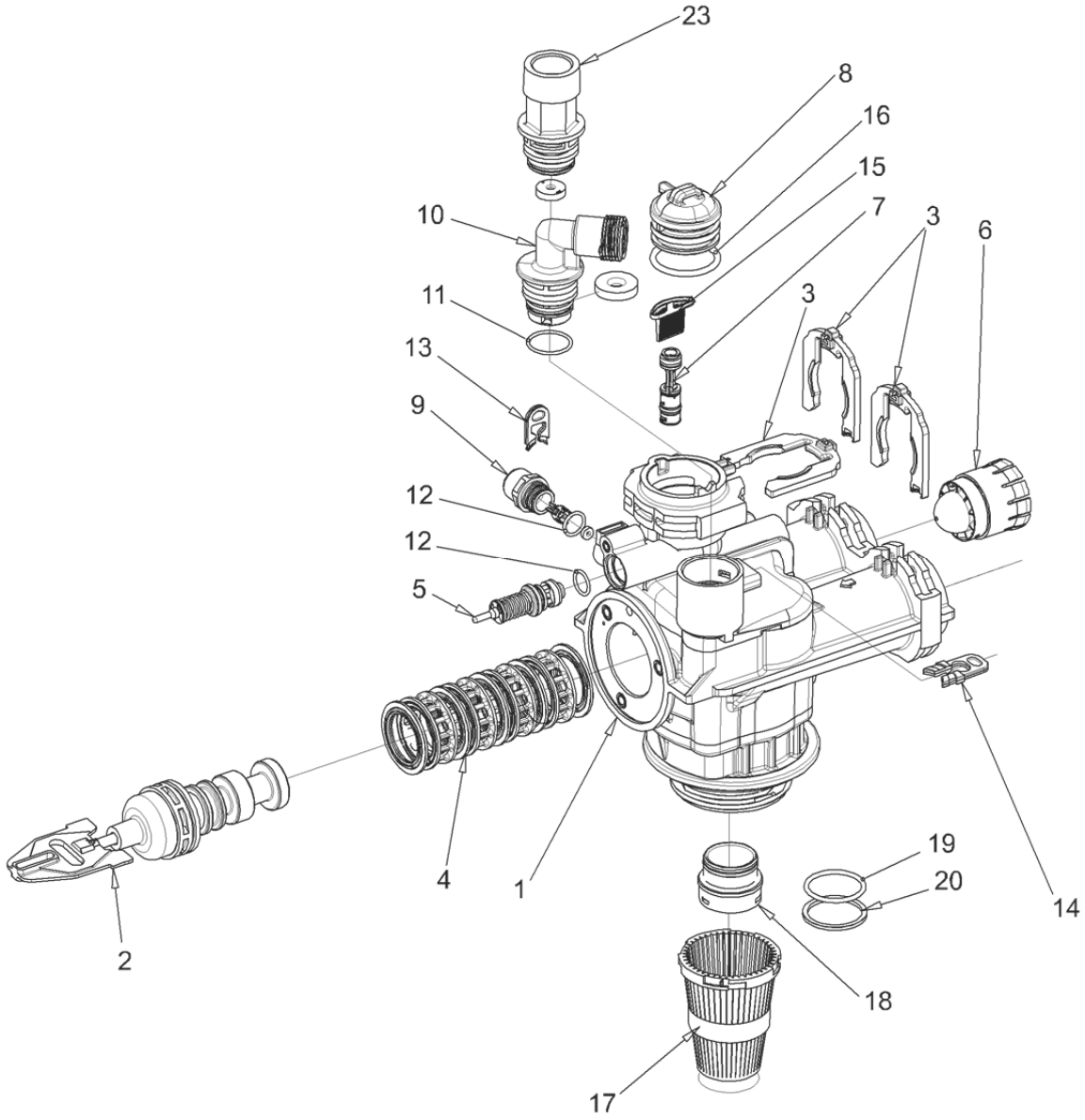
Power Head Assembly Parts Diagram

Power Head Assembly Parts List:



Item No.	Qty	Part No.	Description
1	1	42349	Motor, 24V, 2 rpm, 7G2x
2	1	10218	Switch, Micro
3	1	40978	Support, Upper Support
4	1	61656	Circuit Board, 7G2x
5	1	40702	Shaft, Drive/Encoder
6	1	40703	Gear, Main Drive
7	1	40704	Cam, Brine, Downflow
8	1	40979	Plate, Lower Support
9	1	61635-01	Cover Assy, 7G2x black
	1	61693-02	Cover Assy, 7G2x gray
10	1	40980	Back Plate
11	4	13602	Screw, Phil Rd Hd, 6-32 x 5/16
12	1	12473	Screw, Hx Wshr Hd, #10-24 x .625
13	2	11805	Screw, Rd Hd, 4-40 x 5/8 Type 1
14	1	40981	Transformer, US 24V, 9.6 VA
15	1	19791-01	Meter Cable Assy, Turbine
16	1	41122	O-ring, -007
17	1	40960-03	Label, UL Nameplate, 7000, US/24
Not Shown	1	19367	Screw, Designer Cover, Thumb

Valve Assembly Parts Diagram



Valve Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	61050	Valve Body Assembly, 70xx, 32mm Dist
2	1	61542-10	Piston Assembly, 7G2i-HF, Softener, D/F 35 gpm
		61453-10	Piston Assembly, 7G2i-SF, Softener, D/F 28 gpm
		61452-20	Piston Assembly, 7G2b, Filter 35GPM
3	3	40576	Clip, H, Plastic, 7000
4	1	61438	Seal & Spacer Kit, 7000, D/F
5	1	60016-01	Brine Valve Assembly, 7G2i-xx, 560CD
6	1	40577	Turbine Meter Assembly, 7G2x
7	1	61XXX	Injector Assembly, Not used on the 7G2b Control
8	1	40556	Cap, Injector
9	1	61XXX	BLFC Assemblies, Not used on the 7G2b Control
10	1	61XXX	DLFC Assemblies, (see below)
11	1	13303-01	O-ring, -021, 560CD
12	2	13302-01	O-ring, -014, 560CD, Not used on the 7G2b Control
13	1	40946	Clip, Brine Retaining, Not used on the 7G2b Control
14	1	40945	Clip, Drain Retaining
15	1	40950	Screen, Injector, Not used on the 7G2b Control
16	1	40951	O-ring, -220
17	1	18280	Collector, Top, 1" x .011, Gray
18	1	61419	Kit, 1.05" Distributor, Adapter
19	1	19054	O-ring, -124
20	1	18303-01	O-ring, - 336, 560CD
23	1	61XXX	DLFC Kits

Injector Assemblies: *Injector Assemblies not used on 7G2b controls.

Part Number	Injector Number	Part Number	Injector Number
61454-000	000 Brown	61454-2	#2 Blue
61454-00	00 Violet	61454-3	#3 Yellow
61454-0	0 Red	61454-4	#4 Green
61454-1	1 White	61454-5	#5 Gray

Drain Line Flow Control Assemblies

Part No.	DLFC Size	GPM
61455-00	3/4"	Blank
61455-17	3/4"	1.7
61455-20	3/4"	2.0
61455-24	3/4"	2.4
61455-30	3/4"	3.0
61455-35	3/4"	3.5
61455-40	3/4"	4.0
61455-45	3/4"	4.5
61455-50	3/4"	5.0
61455-60	3/4"	6.0
61455-70	3/4"	7.0
61456-00	1"	Blank
61456-8.0	1"	8.0
61456-9.0	1"	9.0
61456-10	1"	10.0
61456-12	1"	12.0
61456-15	1"	15.0
61456-20	1"	20.0
61456-25	1"	25.0
61456-30	1"	0.0

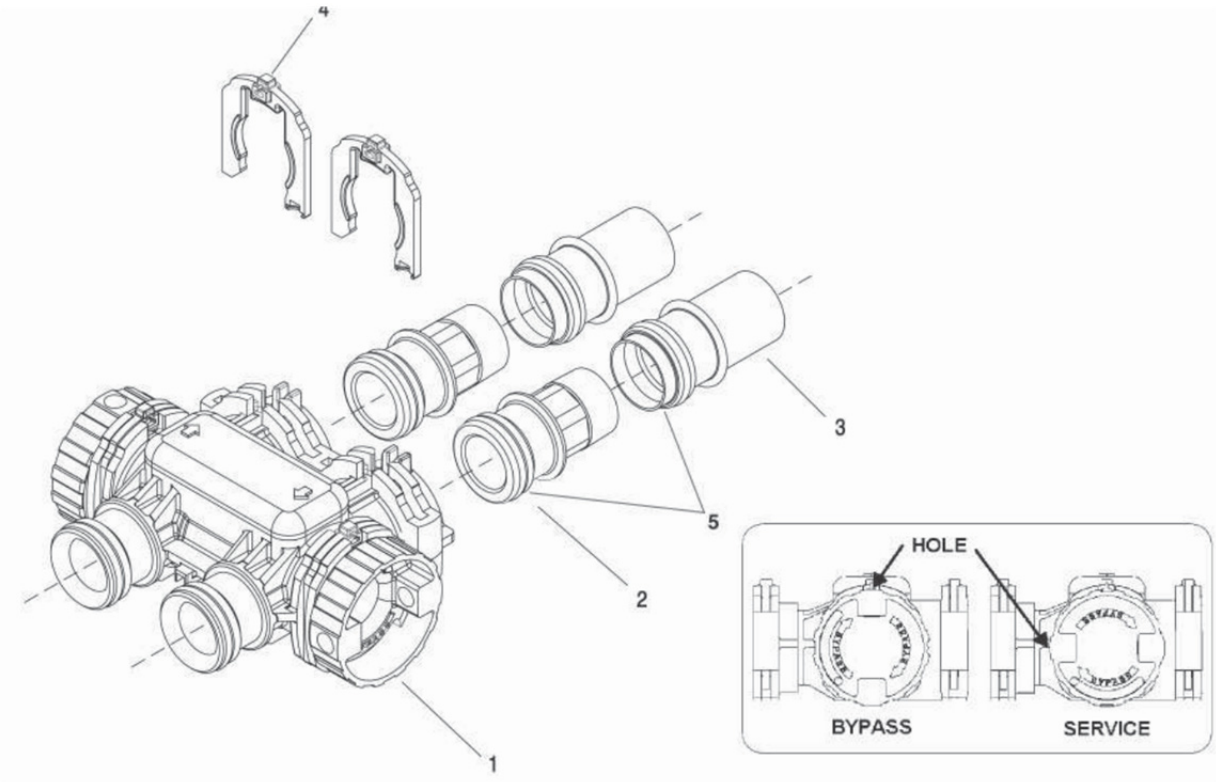
Brine Line Flow Assemblies: Not used on 7G2b controls.

Part No.	BLFC Size	GPM
61450-00	3/8"	Blank
61450-12	3/8"	0.125
61450-25	3/8"	0.25
61450-50	3/8"	0.50
61450-100	3/8"	1.0
61451-00	1/2"	Blank
61451-12	1/2"	0.125
61451-25	1/2"	0.25
61451-50	1/2"	0.50
61451-100	1/2"	1.0

Not Shown

DP32-72	Tube, Distributor, 32MM
BD32	Distributor, 32MM
TD32L	Collector, 32MM Bayonet
12763-10	Stuffer Tool Assy, 70xx
18303	O-ring, -336, Top of Tank

Bypass Assembly



	IMPORTANT To bypass the valve, slowly turn bypass knob on both sides of the valve to bypass position. When returning to service, slowly put the inlet into service before the outlet.

Bypass Assembly Parts List

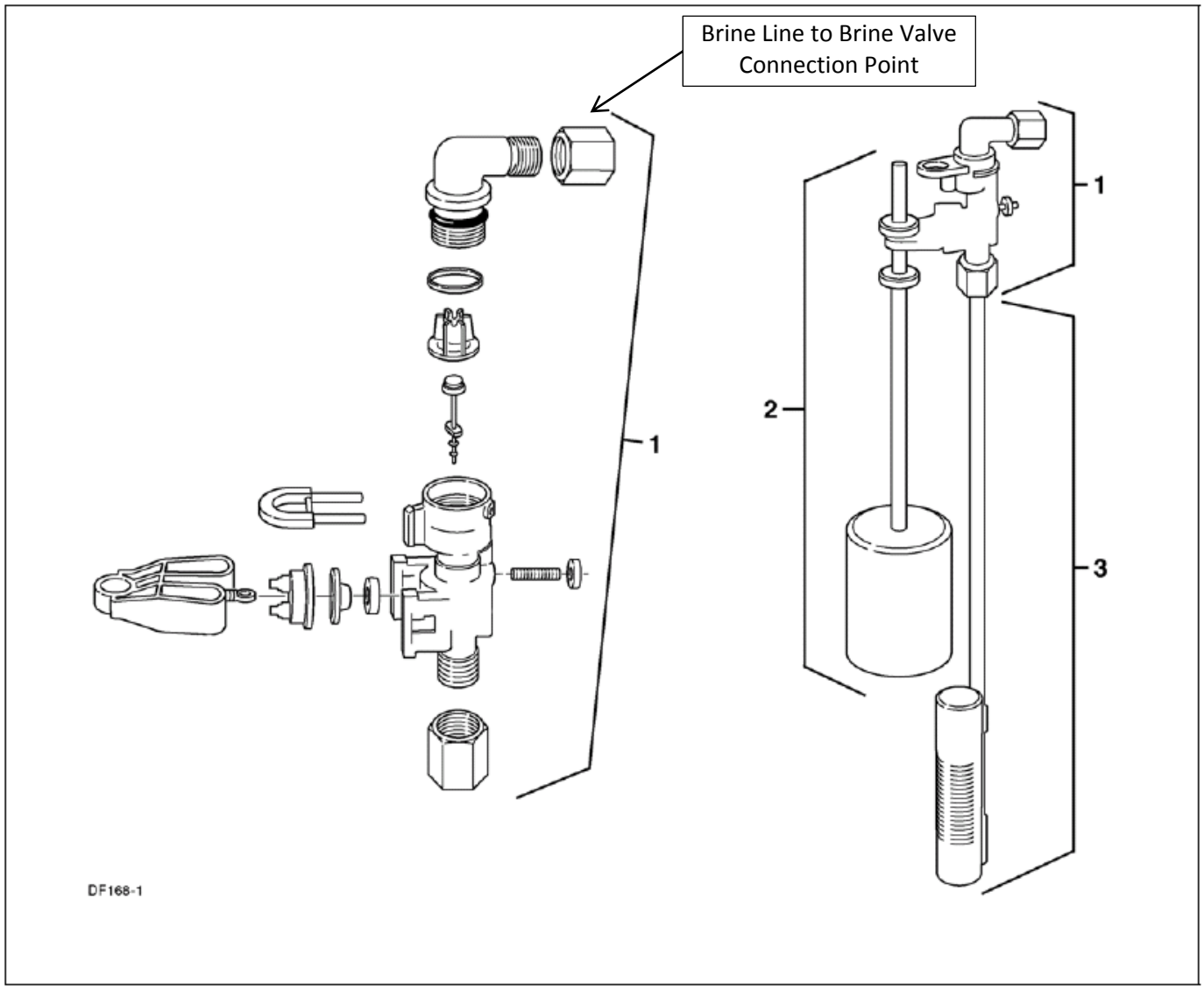
Item Number	Quantity	Part Number	Description
1	1	40569	7G2x bypass assembly
2	2	40563-01	connector, 1" NPT
		40565-01	connector, 1-1/4" NPT
		42241-01	connector, 1-1/2" NPT
3	2	40953	connector, 1-1/4" sweat, copper
4	2	40576	clip, H, plastic
5	1	40951	o-ring
Not Shown	1	61462	7G2x valve bypass service kit (includes all internal parts for 7G2x bypass assembly– bypass body not included)

Optional Elbow Kit (2 required).

Elbow Kit parts list

Part No.	Quantity	Description
61601	2	Elbow Kit, 7G2x, 2 required per system control (shortens distance from control valve to wall).

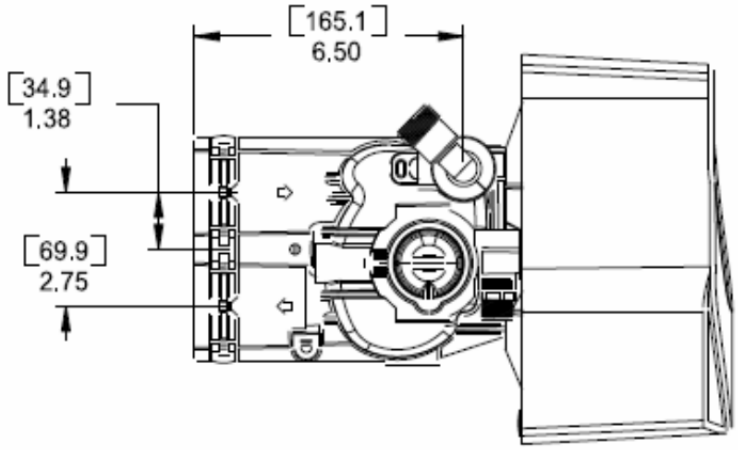
2310 Safety Brine Valve Diagram

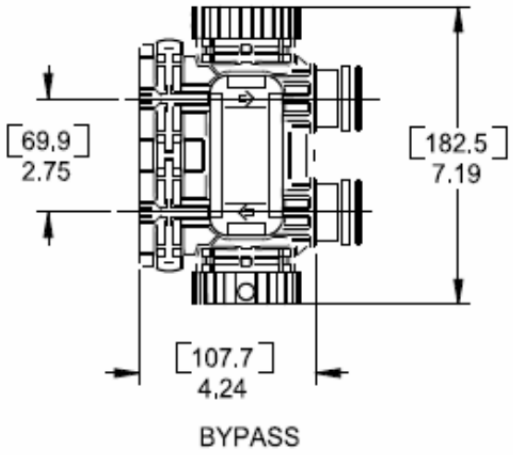


2310 Safety Brine Valve Parts List

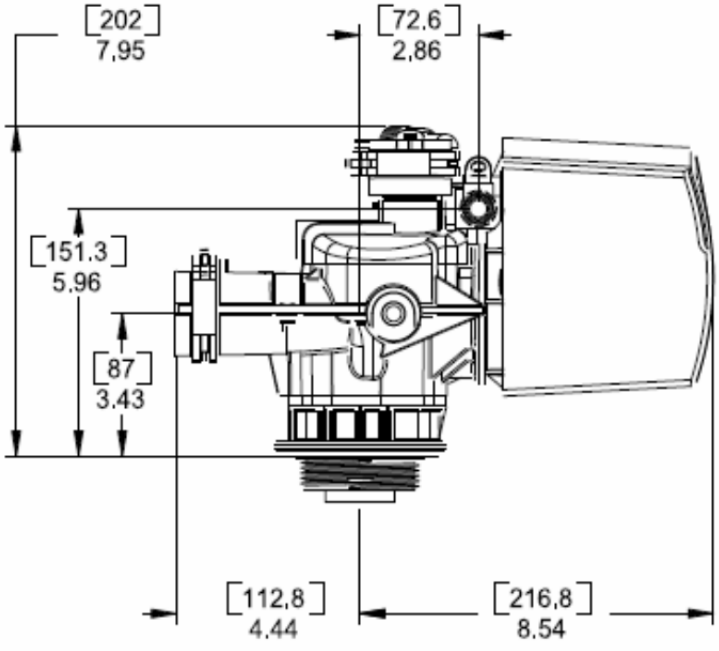
Item #	*Quantity*	*Part Number*	*Description*
1	1	60014	**2310** safety brine valve
2	1	60068	**2310** float assembly
3	1	60002	#500 air check

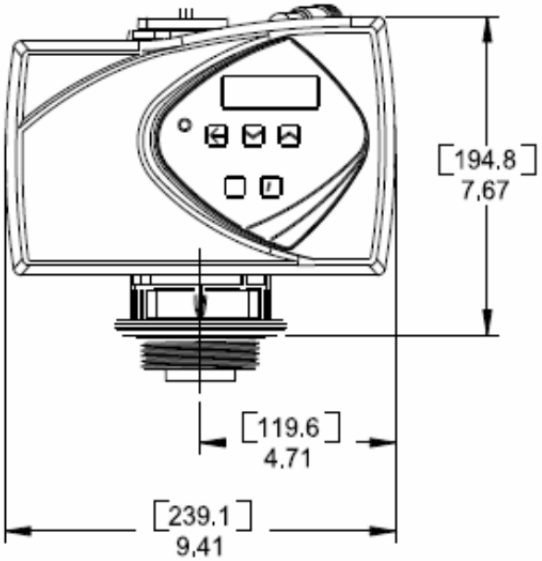
Dimensional Drawings





BYPASS





General Service Hints For Metered Controls

Problem: Filter / Softener delivers dirty / hard water
Reason 1: Reserve capacity has been exceeded.
Correction: Check salt dosage requirements and reset reserve capacity to provide additional reserve.

Reason 2: Meter is not measuring flow.
Correction for Electronic Meter: Check for a short in the meter cable. Ensure that it is programmed as a meter, and that the turbine and impeller can move freely.

Auxiliary Relay and Chemical Pump Output Relay:

Enabling the Auxiliary Relay and / or Chemical Pump Output in Master Programming allows programmed switching of an onboard dry contact with a maximum 3 amp capacity. There is one dry contact for all of these choices.
General:

1. There is one connection point on the back of the 7G2x circuit board that is controlled by programming the Auxiliary Relay and Chemical Pump Output Relay windows. The dry contact is located on the back of the control board.
2. You may Enable or Disable the Auxiliary Relay and Chemical Pump Output Relay options independently.
3. This is a “dry contact”, there is no current provided.
4. The maximum ampacity of the dry contact is 3 amp.

Auxiliary Relay:
Enabling the Auxiliary Relay allows you to control the dry contact during the regeneration cycle.

1. The program times related with this option enabled are relative to the beginning of the regeneration cycle.
    a. Minimum Start Time is 00:00:00 – Switch closes and signal begins immediately.
    b. Maximum End Time is the sum of all regeneration step times.
2. If enabled both windows must be programmed.
3. If only one window is desired:
    a. Program Start Time 1 and End Time 1.
    b. Program Start Time 2 and End Time 2 using the same time as End Time 1: this effectively disables window 2.

Chemical Pump Output:
Enabling the CPO Relay allows you to control the dry contact during the service cycle.

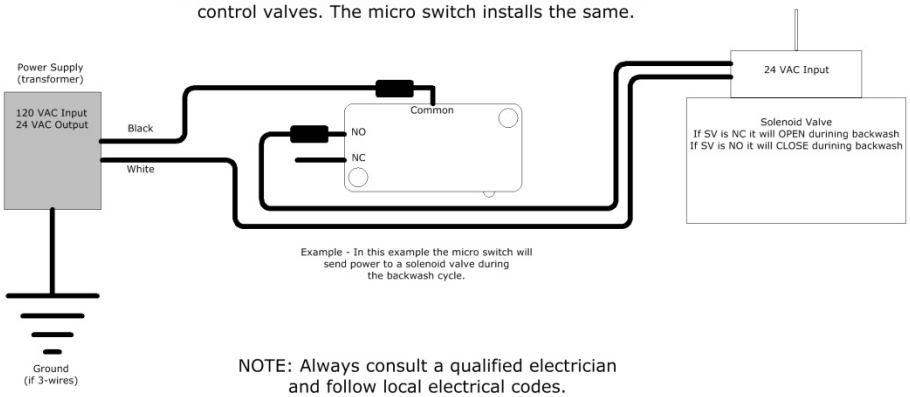
1. The CPO Relay Volume is the metered volume of water treated and is only active while the 7G2x is in the “Service” State.
2. Once the programmed volume is measured the dry contact will close for the programmed duration.
3. Once the programmed volume is measured the dry contact will close and the control begins measuring the volume from zero immediately.
4. The programmed volume and duration cycle will continue to repeat.
5. If while the dry contact is closed the control measures the programmed volume the dry contact will stay closed for the programmed duration again.

Note:
To control a separate device during the service and / or backwash cycle you can install a “Micro-Switch”. The Micro-Switch is a mechanical – nonprogrammable dry contact with a maximum ampacity of 11.

CASCADIAN® 7G2x Series Control Valve
Micro Switch Mounting and Terminal Identification

NOTE: Drive Cam looks different on Filter and Softener control valves. The micro switch installs the same.

Micro-Switch Wiring Diagram



NOTE: Always consult a qualified electrician and follow local electrical codes.

Troubleshooting

Problem	Cause	Correction
1. Control fails to regenerate.	A. Electrical service to unit has been interrupted	A. Assure permanent electrical service (check fuse, plug, pull chain, or switch)
	B. Timer is defective.	B. Replace timer.
	C. Power failure.	C. Reset time of day.
2. Hard / Unfiltered water.	A. By-pass valve is open.	A. Close by-pass valve.
	B. No salt is in brine tank. (7G2i only)	B. Add salt to brine tank and maintain salt level above water level.
	C. Injector screen plugged. (7G2i only)	C. Clean injector screen.
	D. Insufficient water flowing into brine tank. (7G2i only)	D. Check brine tank fill time and clean brine line flow control if plugged.
	E. Hot water tank hardness.	E. Repeated flushing of the hot water tank is required.
	F. Leak at distributor tube.	F. Make sure distributor tube is not cracked. Check O-ring and tube pilot.
	G. Internal valve leak.	G. Replace seals and spacers and/or piston.
3. Uses too much salt.	A. Improper salt setting. (7G2i only)	A. Check salt usage and salt setting.
	B. Excessive water in brine tank. (7G2i only)	B. See problem 7.
4. Loss of water pressure.	A. Iron buildup in water line to Control.	A. Clean water line to Control.
	B. Iron buildup in Control.	B. Clean Control and add mineral cleaner to mineral bed. Increase frequency of regeneration.
	C. Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	C. Remove piston and clean control.
5. Loss of mineral through drain line.	A. Air in water system.	A. Assure that well system has proper air eliminator control. Check for dry well condition.
	B. Improperly sized drain line flow control.	B. Check for proper drain rate.
6. Dirty treated water.	A. Fouled mineral bed.	A. Check backwash, brine draw, and brine tank fill. Increase frequency of re- generation. Increase backwash time.
		B. Have both raw and treated water analyzed, other treatment may be necessary.
7. Excessive water in brine tank (if present)	A. Plugged drain line flow control.	A. Clean flow control.
	B. Plugged injector system.	B. Clean injector and screen.
	C. Timer not cycling.	C. Replace timer.
	D. Foreign material in brine valve.	D. Replace brine valve seat and clean valve.
	E. Foreign material in brine line flow control.	E. Clean brine line flow control.
8. Control fails to draw brine (7G2i only)	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean injector
	C. Injector screen plugged.	C. Clean screen.
	D. Line pressure is too low.	D. Increase line pressure to 20 P.S.I. minimum
	E. Internal control leak	E. Change seals, spacers, and piston assembly.
	F. Service adapter did not cycle.	F. Check drive motor and switches.
	G. Brine Tank Air Check Stuck	G. Check and free if necessary
9. Control cycles continuously.	A. Misadjusted, broken, or shorted switch.	A. Determine if switch or timer is faulty and replace it, or replace complete power head.
10. Drain flows continuously.	A. Valve is not programming correctly.	A. Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	B. Foreign material in control.	B. Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	C. Internal control leak.	C. Replace seals and piston assembly.
	D. Programming and piston do not match	D. Valve Type in programming does not match the internal piston. Contact technical support.

Error Codes

If an error is detected, an error screen will alternate with the main display screen every few seconds, and the **LED light will be red**.

During an error condition, the control continues to monitor the flow meter and update the remaining capacity. Once an error condition is corrected, the control returns to the operating status it was in prior to the error, and regeneration resumes according to normal programming. If an error is cleared by reprogramming the control in the Master Programming Mode, the volume remaining may be reset to the full unit capacity (as though it had just regenerated). If an error is present, a regeneration can only occur manually by pressing and holding the Extra Cycle button for 5 seconds. If the unit was in regeneration when the error occurred, it will complete the regeneration cycle and go into service.

When the problem is corrected, and the error no longer displays (it may take several seconds for the control to stop displaying the error message), the control will return to normal operation. The **LED light** will no longer be **red**, and will turn **Green** if the unit is regenerating, or **Blue** if the unit is in service.

Problem	Correction
A. Flashing/blinking display	A. Power outage has occurred. Either wait 5 minutes for blinking to stop, or press any key on the keypad.
B. Unit not responding after going into regeneration	B. Verify the unit is configured correctly (ex: wiring valve type). Perform a Master Reset by holding the Shift button and cycling power. Check and verify the choices selected in Master Programming Mode.
C. Unit displays “ERROR CODE: REPLACE UNIT” (corrupted UAP)	C. Contact your Authorized CASCADIAN® Solutions™ Dealer.

Error Code	Display Message	Correction
01	ERROR CODE: PROGRAM UNIT	Go through all screens in Master Programming Mode.
02	ERROR CODE: PROGRAM UNIT	Go through all screens in Master Programming Mode.
03	ERROR CODE: SERVICE UNIT	Perform a Master Reset by holding the Shift button and cycling power. Go through all screens in Master Programming Mode. Manually initiate a regeneration cycle by pressing the Extra Cycle button for 5 seconds.
04	ERROR CODE: SERVICE UNIT	Perform a Master Reset by holding the Shift button and cycling power. Go through all screens in Master Programming Mode. Manually initiate a regeneration cycle by pressing the Extra Cycle button for 5 seconds.
05	ERROR CODE: SERVICE UNIT	Contact your Authorized CASCADIAN® Solutions™ Dealer as soon as possible. Leave the unit running (do not unplug).

Note: if the above corrections do not work, please contact your Authorized CASCADIAN® Solutions™ Dealer as soon as possible. Leave the unit running (do not unplug).

Notes:

O_3 Water Systems, Inc.

"Limited" CASCADIAN®
Water Treatment Equipment Warranty

During the time periods and subject to the conditions hereinafter set forth, O_3 WATER SYSTEMS, will repair or replace to the original user or consumer, any portion of your new CASCADIAN® product which proves defective due to defective materials or workmanship of O3WS. Contact your nearest authorized CASCADIAN® dealer for warranty service. At all times O3WS shall have and possess the sole right and option to determine whether to repair or replace defective equipment, parts, or components. Damage due to conditions beyond the control of O3WS is **NOT COVERED BY THIS WARRANTY**.

WARRANTY PERIODS:

Item	*10 Years	*5 Years	*3 Years	*2 Years	*1 Years
Residential Mineral Tanks	♦				
Commercial Mineral Tanks		♦			
Softener / Filter Control Valves		♦			
Brine Tank Assemblies			♦		
Cartridge Filter Systems				♦	
Other Accessories & Parts					♦
* From Date of Sale					

LABOR, ETC., COSTS: O3WS shall **IN NO EVENT** be liable for cost of removal, installation, transportation, or any other charges which may arise in connection with a Limited Warranty claim.

THIS WARRANTY WILL NOT APPLY: (a) To defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with good trade practices of water treatment professionals; (b) to products which are not installed in accordance with applicable local codes and ordinances (c) to products modified at any place other than the point of original manufacture (d) to products moved from the original installation location; (e) to normal maintenance services and parts used in connection with such service; (f) to failures resulting from the abuse, accident or negligence; (g) to products used for purposes other than for what they were designed and manufactured, and (h) filter media and exchange resins.

RETURN OF REPLACED COMPONENTS: To obtain specific performance under this Limited Warranty, the defective product must be returned freight prepaid to O3WS in Cle Elum Washington or other such place as O3WS may designate together with proof of purchase, installation date, failure date, and supporting technical data.

PRODUCT IMPROVEMENTS: O3WS reserves the right to change or improve its products or any portions thereof without being obliged to provide such change or improvement of units sold and/or shipped prior to such change or improvement.

WARRANTY EXCLUSIONS: As to any specific O3WS product, after the expiration of the time period of the warranty applicable thereto as set forth under the heading "Warranty Periods" above, **THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTENDS BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE.**

WARRANTY LIMITATION: O3WS WILL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL or SPECIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This Limited Warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction. This Warranty does not apply to products installed or used outside the United States of America.

For your warranty protection (Magnason-Moss Warranty Act) the **WARRANTY REGISTRATION CARD MUST BE COMPLETED AND RETURNED TO O3WS WITHIN TEN (10) DAYS OF INSTALLATION.** In the absence or other suitable proof of installation date, the effective date of this warranty will be based upon the date of manufacture plus thirty (30) days.
Direct all notices, etc. To: Service Department, O_3 Water Systems, Inc., 5301 Airport Rd, Cle Elum WA, 98922