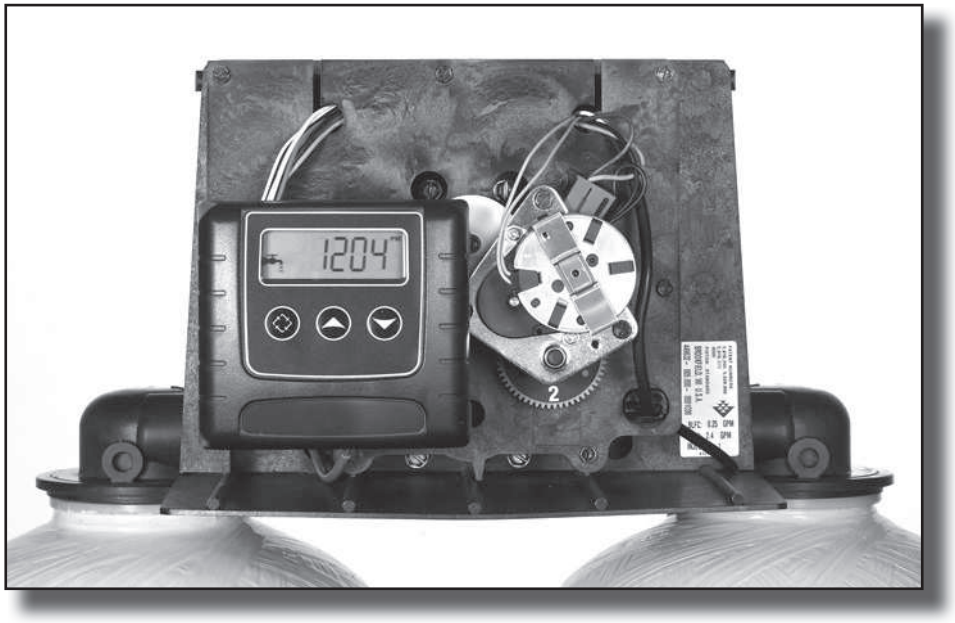
Model TwinFlo100SXT

Service Manual



IMPORTANT: Fill in Pertinent Information on Page 3 for Future Reference

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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. The manufacturer 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 a plumbing professional.
- This unit is designed to be installed on potable water systems only.
- This product must be installed in compliance with all state and municipal plumbing and electrical codes. Permits may be required at the time of installation.
- If daytime operating pressure exceeds 80 psi (5.5 bar), nighttime pressures may exceed pressure limits. A pressure reducing valve must be installed.
- Do not install the unit where temperatures may drop below 32°F (0°C) or above 110°F (43°C).
- 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. 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.
- Correct and constant voltage must be supplied to the control valve to maintain proper function.

Job Specification Sheet

Job Number: _____

Model Number: _____

Water Hardness: _____ ppm or gpg

Capacity Per Unit: _____

Mineral Tank Size: _____ Diameter: _____ Height:

Salt Setting per Regeneration: _____

1. **Type of Timer:**
   A. 7 Day or 12 Day B. Meter Initiated
2. **Downflow Upflow Upflow Variable**
3. **Meter Size:**
   A. 3/4” Std Range (125 - 2,100 gallon setting)
   B. 3/4” Ext Range (625 - 10,625 gallon setting)
   C. 1” Std Range (310 - 5,270 gallon setting)
   D. 1” Ext Range (1,150 - 26,350 gallon setting)
   E. 1 1/2” Std Range (625 - 10,625 gallon setting)
   F. 1 1/2” Ext Range (3,125 - 53,125 gallon setting)
   G. 2” Std Range (1,250 - 21,250 gallon setting)
   H. 2” Ext Range (6,250 - 106,250 gallon setting)
   I. 3” Std Range (3,750 - 63,750 gallon setting)
   J. 3” Ext Range (18,750 - 318,750 gallon setting)
   K. Electronic _____ Pulse Count _____ Meter Size
4. **System Type:**
   A. System #4: 1 Tank, 1 Meter, Immediate, or Delayed Regeneration
   B. System #4: Time Clock
   C. System #4: Twin Tank
   D. System #5: 2-5 Tanks, 2 Meters, Interlock
   E. System #6: 2-5 Tanks, 1 Meter, Series Regeneration
   F. System #7: 2-5 Tanks, 1 Meter, Alternating
   G. System #9: Electronic Only, 2-4 Tanks, Meter per Valve, Alternating
   H. System #14: Electronic Only, 2-4 Tanks, Meter per Valve. Brings units on and offline based on flow.
5. **Timer Program Settings:**
   A. Backwash: _____ Minutes
   B. Brine and Slow Rinse: _____ Minutes
   C. Rapid Rinse: _____ Minutes
   D. Brine Tank Refill: _____ Minutes
   E. Pause Time: _____ Minutes
   F. Second Backwash: _____ Minutes
6. **Drain Line Flow Control:** _____ gpm
7. **Brine Line Flow Controller:** _____ gpm
8. **Injector Size#:** _____
9. **Piston Type:**
   A. Hard Water Bypass
   B. No Hard Water Bypass

Installation Instructions

WATER PRESSURE: A minimum of 20 psi (1.3 bar) of water pressure is required for regeneration valve to operate effectively.

ELECTRICAL FACILITIES: An uninterrupted alternating current (A/C) supply is required. Note: Other voltages are available. Please make sure your voltage supply is compatible with your unit before installation.

EXISTING PLUMBING: Condition of existing plumbing should be free from lime and iron buildup. Piping that is built up heavily with lime and/or iron should be replaced. If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water softener.

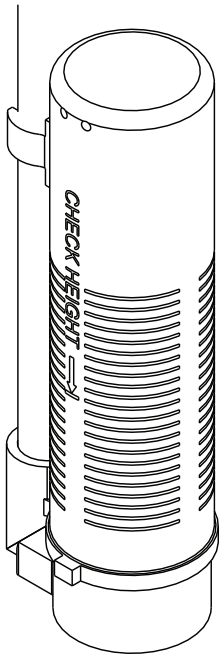
LOCATION OF SOFTENER AND DRAIN: The softener should be located close to a drain to prevent air breaks and back flow.

BY-PASS VALVES: Always provide for the installation of a by-pass valve if unit is not equipped with one.

CAUTION: Water pressure is not to exceed 125 psi (8.6 bar), water temperature is not to exceed 110°F (43.3°C), and the unit cannot be subjected to freezing conditions.

Installation Instructions

1. Place the softener tank where you want to install the unit making sure the unit is level and on a firm base.
2. During cold weather, the installer should warm the valve to room temperature before operating.
3. All plumbing should be done in accordance with local plumbing codes. The pipe size for residential drain line should be a minimum of 1/2" (13 mm). Backwash flow rates in excess of 7 gpm (26.4 Lpm) or length in excess of 20' (6 M) require 3/4" (19 mm) drain line. Commercial drain lines should be the same size as the drain line flow control.
4. Refer to the dimensional drawing for cutting height of the distributor tube. If there is no dimensional drawing, cut the distributor tube flush with the top of the tank.
5. Lubricate the distributor O-ring seal and tank O-ring seal. Place the main control valve on tank. Note: Only use silicone lubricant.
6. Solder joints near the drain must be done prior to connecting the Drain Line Flow Control fitting (DLFC). Leave at least 6" (15.2 cm) between the DLFC and solder joints when soldering pipes that are connected on the DLFC. Failure to do this could cause interior damage to the DLFC.
7. Teflon tape is the only sealant to be used on the drain fitting. The drain from twin tank units may be run through a common line.
8. Make sure that the floor is clean beneath the salt storage tank and that it is level.
9. Place approximately 1" (25 mm) of water above the grid plate. If a grid is not utilized, fill to the top of the air check in the salt tank. Do not add salt to the brine tank at this time.
10. On units with a by-pass, place in by-pass position. Turn on the main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material (usually solder) that may have resulted from the installation. Once clean, close the water tap.
11. Slowly place the by-pass in service position and let water flow into the mineral tank. When water flow stops, slowly open a cold water tap nearby and let run until the air is purged from the unit.
12. Plug unit into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted).



NOTE: Residential Air Check Valve Pictured Above

CAUTION
- **Do not exceed 125 psi water pressure**
- **Do not exceed 110°F (43°C) water temperature**
- **Do not subject unit to freezing conditions**

WARNING

The system MUST be depressurized before removing any connections for servicing.

The water softener should be installed with the inlet, outlet, and drain connections made in accordance with the manufacturer's recommendations, and to meet applicable plumbing codes.

1. Turn the manual regeneraton knob slowly in a clockwise direction until the program micro switch lifts on top of the first set of pins. Allow the drive motor to move the piston to the first regeneration step and stop. Each time the program switch position changes, the valve will advance to the next regeneration step. Always allow the motor to stop before moving to the next set of pins or spaces.
   NOTE: For electronic valves, please refer to the manual regeneration part of the timer operation section. If the valve came with a separate electronic timer service manual, refer to the timer operation section of the electronic timer service manual.
2. Position the valve to backwash. Ensure the drain line flow remains steady for 10 minutes or until the water runs clear (see above).
3. Position the valve to the brine / slow rinse position. Ensure the unit is drawing water from the brine tank (this step may need to be repeated).
4. Position the valve to the rapid rinse position. Check the drain line flow, and run for 5 minutes or until the water runs clear.
5. Position the valve to the start of the brine tank fill cycle. Ensure water goes into the brine tank at the desired rate. The brine valve drive cam will hold the valve in this position to fill the brine tank for the first regeneration.
6. Replace control box cover.
7. Put salt in the brine tank.

   NOTE: Do not use granulated or rock salt.

Calculating Volume Capacity Settings

Your valve regeneration cycles have been factory preset. **YOU MAY NEED TO CHANGE SETTINGS TO REFLECT EQUIPMENT SIZE, SALT DOSAGE AND OTHERS.**

Salt Dosage:

One gallon of water dissolves 3 lbs. of salt One liter of water dissolves 360 grams of salt

Calculations to Set Controller (Standard Downflow Resin Capacity per unit of resin (Ft^3 or liters))

United States of America	Metric System
15 lbs. of salt (30,000 grains)	240 g/L of salt (68.7 g of CaCO3/L)
12 lbs. of salt (27,000 grains)	192 g/L of salt (61.8 g of CaCO3/L)
9 lbs. of salt (24,000 grains)	144 g/L of salt (55.0 g of CaCO3/L)
6 lbs. of salt (20,000 grains)	96 g/L of salt (45.8 g of CaCO3/L)

Timer Settings:

Pre Rinse = 8 minutes

Backwash = 8 minutes

Brine & Slow Rinse Time = 50 minutes

Refill Time = 8 minutes

Volume Capacity Settings:

Example: For a 1 cu. ft. softening tank, regenerated with six pounds of salt per cubic foot of resin, installed to soften a water with Total Hardness 342 ppm.

Its a good practice to use a 0.9 factor to calculate the equipments capacity. It will give you a 10% safety margin.

Tank Total Capacity = (20,000 gr/cu.ft.)x(1 cu.ft./Regeneration)x(0.9)

Tank Total Capacity = 18,000 gr/Regeneration

Total Hardness(TH) = (342 ppm)/17.1 = 20 grains/gallon

Equipment Capacity = (18,000 gr/Regeneration)/(20 gr/gallon) = 900 gallons/Regeneration

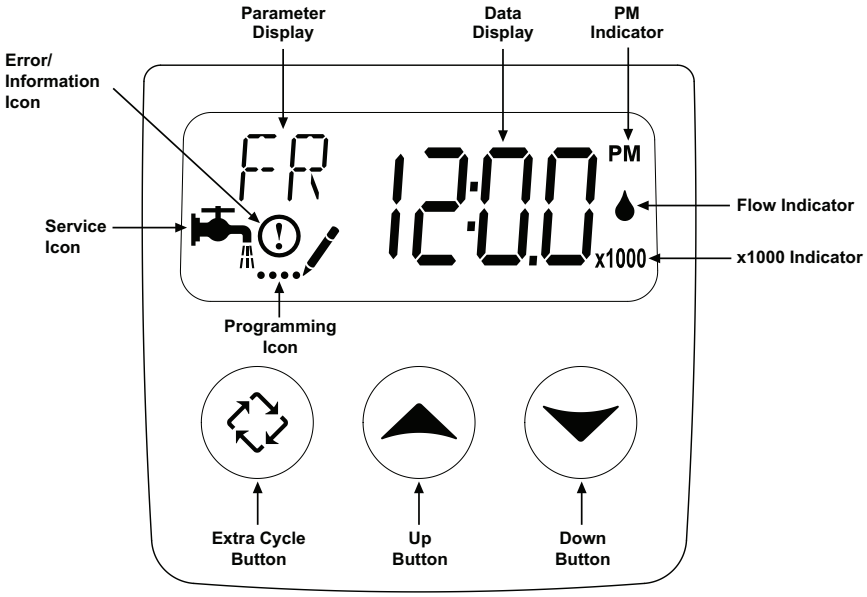
Delayed control valves subtract 75 gallons per person from the meter setting. Twin tank units subtract gallons used to regenerate the system. Immediate valves (other than twin tanks) do not need a reserve subtracted from the gallon setting..

Regeneration Water:

For a unit with a DLFC = 2.0 GPM, BLFC - 0.25 GPM and #0 Injector.

Pre Rinse	= (8 minutes) x (DLFC)	=	(8) x (2.0)	=	16.0 gallons
Backwash	= (8 minutes) x (DLFC)	=	(8) x (2.0)	=	16.0 gallons
Brine & Slow R.	= (50 minutes) x (Slow R.)	=	(50)x(0.3)*	=	15.0 gallons
Brine Tank Refill	= (8 minutes) x (BLFC)	=	(8)x(0.25)	=	2.0 gallons
	Total Regeneration Water			**=**	**49.0 gallons**

* 0.3 is based on the injector slow rinse rate of a #0 injector at 50 psi (3.4 bar). Please refer to the injector flow data for more information.



Features of the SXT:

- Power backup that continues to keep time and the passage of days for a minimum of 48 hours in the event of power failure. During a power outage, the control goes into a power-saving mode. It does not monitor water usage during a power failure, but it does store the volume remaining at the time of power failure.
- Settings for both valve (basic system) and control type (method used to trigger a regeneration).
- Day-of-the-Week controls.
- While in service, the display alternates between time of day, volume remaining or days to regeneration, and tank in service (twin tank systems only).
- The Flow Indicator flashes when outlet flow is detected.
- The Service Icon flashes if a regeneration cycle has been queued.
- A Regeneration can be triggered immediately by pressing the Extra Cycle button for five seconds.
- The Parameter Display displays the current Cycle Step (BW, BF, RR, etc) during regeneration, and the data display counts down the time remaining for that cycle step. While the valve is transferring to a new cycle step, the display will flash. The parameter display will identify the destination cycle step (BW, BF, RR, etc) and the data display will read “----”. Once the valve reaches the cycle step, the display will stop flashing and the data display will change to the time remaining. During regeneration, the user can force the control to advance to the next cycle step immediately by pressing the extra cycle button.

Setting the Time of Day

1. Press and hold either the Up or Down buttons until the programming icon replaces the service icon and the parameter display reads TD.
2. Adjust the displayed time with the Up and Down buttons.
3. When the desired time is set, press the Extra Cycle button to resume normal operation. The unit will also return to normal operation after 5 seconds if no buttons are pressed.

Timer Features

Queueing a Regeneration

1. Press the Extra Cycle button. The service icon will flash to indicate that a regeneration is queued.
2. To cancel a queued regeneration, press the Extra Cycle button.

Regenerating Immediately

Press and hold the Extra Cycle button for five seconds.

Meter Immediate Control

A meter immediate control measures water usage and regenerates the system as soon as the calculated system capacity is depleted. The control calculates the system capacity by dividing the unit capacity (typically expressed in grains/unit volume) by the feedwater hardness and subtracting the reserve. Meter Immediate systems generally do not use a reserve volume. However, in twin tank systems with soft-water regeneration, the reserve capacity should be set to the volume of water used during regeneration to prevent hard water break-through. A Meter Immediate control will also start a regeneration cycle at the programmed regeneration time if a number of days equal to the regeneration day override pass before water usage depletes the calculated system capacity.

Meter Delayed Control

A Meter Delayed Control measures water usage and regenerates the system at the programmed regeneration time after the calculated system capacity is depleted. As with Meter Immediate systems, the control calculates the system capacity by dividing the unit capacity by the feedwater hardness and subtracting the reserve. The reserve should be set to insure that the system delivers treated water between the time the system capacity is depleted and the actual regeneration time. A Meter Delayed control will also start a regeneration cycle at the programmed regeneration time if a number of days equal to the regeneration day override pass before water usage depletes the calculated system capacity.

Time Clock Delayed Control

A Time Clock Delayed Control regenerates the system on a timed interval. The control will initiate a regeneration cycle at the programmed regeneration time when the number of days since the last regeneration equals the regeneration day override value.

Day of the Week Control

This control regenerates the system on a weekly schedule. The schedule is defined in Master Programming by setting each day to either “off” or “on.” The control will initiates a regeneration cycle on days that have been set to “on” at the specified regeneration time.

Control Operation During Regeneration

During regeneration, the control displays a special regeneration display. In this display, the control shows the current regeneration step number the valve is advancing to, or has reached, and the time remaining in that step. The step number that displays flashes until the valve completes driving to this regeneration step position. Once all regeneration steps are complete the valve returns to service and resumes normal operation.

Pressing the Extra Cycle button during a regeneration cycle immediately advances the valve to the next cycle step position and resumes normal step timing.

Control Operation During Programming

The control only enters the Program Mode with the valve in service. While in the Program Mode, the control continues to operate normally monitoring water usage and keeping all displays up to date. Control programming is stored in memory permanently, eliminating the need for battery backup power.

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 (rapid rinse), and begins programmed time count down.
3. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #2 (backwash).
4. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #3 (brine draw & slow rinse).
5. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #4 (brine refill).
6. Press the Extra Cycle button once more to advance the valve back to in service.
   NOTE: If the unit is a filter or upflow, the cycle step order may change.
   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.

Timer Operation

Control Operation During A Power Failure

The SXT includes integral power backup. In the event of power failure, the control shifts into a power-saving mode. The control stops monitoring water usage, and the display and motor shut down, but it continues to keep track of the time and day for a minimum of 24 hours.

The system configuration settings are stored in a non-volatile memory and are stored indefinitely with or without line power. The Time of Day flashes when there has been a power failure. Press any button to stop the Time of Day from flashing.

If power fails while the unit is in regeneration, the control will save the current valve position before it shuts down. When power is restored, the control will resume the regeneration cycle from the point where power failed. Note that if power fails during a regeneration cycle, the valve will remain in it's current position until power is restored. The valve system should include all required safety components to prevent overflows resulting from a power failure during regeneration.

The control will not start a new regeneration cycle without line power. If the valve misses a scheduled regeneration due to a power failure, it will queue a regeneration. Once power is restored, the control will initiate a regeneration cycle the next time that the Time of Day equals the programmed regeneration time. Typically, this means that the valve will regenerate one day after it was originally scheduled. If the treated water output is important and power interruptions are expected, the system should be setup with a sufficient reserve capacity to compensate for regeneration delays.

Master Programming Mode Chart

Master Programming Options			
Abbreviation	**Parameter**	**Option Abbreviation**	**Options**
DF	Display Format	GAL	Gallons
		Ltr	Liters
		Cu	Cubic Meters
VT	Valve Type	St1b	Standard Downflow/Upflow Single Backwash
		St2b	Standard Downflow/Upflow Double Backwash
		Fltr	Filter
		UFbF	Upflow Brine First
		8500	TwinFlo100SXT
		Othr	Other
CT	Control Type	Fd	Meter (Flow) Delayed
		FI	Meter (Flow) Immediate
		tc	Time Clock
		dAY	Day of Week
NT	Number of Tanks	1	Single Tank System
		2	Two Tank System
TS	Tank in Service	U1	Tank 1 in Service
		U2	Tank 2 in Service
C	Unit Capacity		Unit Capacity (Grains)
H	Feedwater Hardness		Hardness of Inlet Water
RS	Reserve Selection	SF	Percentage Safety Factor
		rc	Fixed Reserve Capacity
SF	Safety Factor		Percentage of the system capacity to be used as a reserve
RC	Fixed Reserve Capacity		Fixed volume to be used as a reserve
DO	Day Override		The system's day override setting
RT	Regen Time		The time of day the system will regenerate
BW, BD, RR, BF	Regen Cycle Step Times		The time duration for each regeneration step. Adjustable from OFF and 0-199 minutes. **NOTE: If "Othr" is chosen under "Valve Type", then R1, R2, R3, etc, will be displayed instead**
D1, D2, D3, D4, D5, D6, & D7	Day of Week Settings		Regeneration setting (On or OFF) for each day of the week on day-of-week systems

CAUTION: Before entering Master Programming, please contact your local professional water dealer.

Master Programming Mode Chart

Master Programming Options			
CD	Current Day		The Current day of the week
FM	Flow Meter Type	t0.7	3/4” Turbine Meter
		P0.7	3/4” Paddle Wheel Meter
		t1.0	1” Turbine Meter
		P1.0	1” Paddle Wheel Meter
		t1.5	1.5” Turbine Meter
		P1.5	1.5” Paddle Wheel Meter
		Gen	Generic or Other Meter
K	Meter Pulse Setting		Meter pulses per gallon for generic/other flow meter

NOTES:
Some items may not be shown depending on timer configuration.
The timer will discard any changes and exit Master Programming Mode if any button is not pressed for sixty seconds.

CAUTION: Before entering Master Programming, please contact your local professional water dealer.

When the Master Programming Mode is entered, all available option setting displays may be viewed and set as needed. Depending on current option settings, some parameters cannot be viewed or set.

Setting the Time of Day

1. Press and hold either the Up or Down buttons until the programming icon replaces the service icon and the parameter display reads TD.
2. Adjust the displayed time with the Up and Down buttons.
3. When the desired time is set, press the Extra Cycle button to resume normal operation. The unit will also return to normal operation after 5 seconds if no buttons are pressed.

Entering Master Programming Mode

Set the Time Of Day display to **12:01 P.M.** Press the Extra Cycle button (to exit Setting Time of Day mode). Then press and hold the Up and Down buttons together until the programming icon replaces the service icon and the Display Format screen appears.

Exiting Master Programming Mode

Press the Extra Cycle button to accept the displayed settings and cycle to the next parameter. Press the Extra Cycle button at the last parameter to save all settings and return to normal operation. The control will automatically disregard any programming changes and return to normal operation if it is left in Master Programming mode for 5 minutes without any keypad input.

Resets:

Soft Reset: Press and hold the Extra Cycle and Down buttons for 25 seconds while in normal Service mode. This resets all parameters to the system default values, except the volume remaining in meter immediate or meter delayed systems and days since regeneration in the time clock system.

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.

1. Display Format (Display Code DF)

This is the first screen that appears when entering Master Programming Mode. The Display Format setting specifies the unit of measure that will be used for volume and how the control will display the Time of Day. This option setting is identified by “DF” in the upper left hand corner of the screen. There are three possible settings:

Display Format Setting	Unit of Volume	Time Display
GAL	U.S. Gallons	12-Hour AM/PM
Ltr	Liters	24-Hour
Cu	Cubic Meters	24-Hour

CAUTION: Before entering Master Programming, please contact your local professional water dealer.

2. Valve Type (Display Code VT)

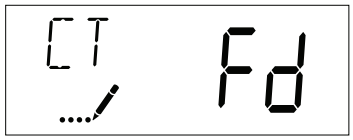
Press the Extra Cycle button. Use this display to set the Valve Type. The Valve Type setting specifies the type of cycle that the valve follows during regeneration. Note that some valve types require that the valve be built with specific subcomponents. Ensure the valve is configured properly before changing the Valve Type setting. This option setting is identified by “VT” in the upper left hand corner of the screen. There are 5 possible settings:

Abbreviation	Parameter
St1b	Standard Downflow/Upflow, Single Backwash
St2b	Standard Downflow/Upflow, Double Backwash
Fltr	Filter
UFbF	Upflow Brine First
8500	TwinFlo 100
Othr	Other

3. Control Type (Display Code CT)

Press the Extra Cycle button. Use this display to set the Control Type. This specifies how the control determines when to trigger a regeneration. For details on how the various options function, refer to the “Timer Operation” section of this service manual. This option setting is identified by “CT” in the upper left hand corner of the screen. There are four possible settings:

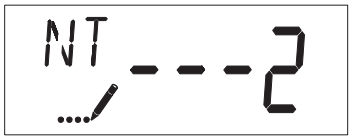
Meter Delayed: Fd
Meter Immediate: FI
Time Clock: tc
Day of Week: dAY



4. Number of Tanks (Display Code NT)

Press the Extra Cycle button. Use this display to set the Number of Tanks in your system. This option setting is identified by “NT” in the upper left hand corner of the screen. There are two possible settings:

Single Tank System: 1
Two-Tank System: 2



CAUTION: Before entering Master Programming, please contact your local professional water dealer.

5. Tank in Service (Display Code TS)

Press the Extra Cycle button. Use this display to set whether tank one or tank two is in service. This option setting is identified by “TS” in the upper left hand corner of the screen. This parameter is only available if the number of tanks has been set to 2. There are two possible settings:

Tank One in Service: U1
Tank Two in Service: U2

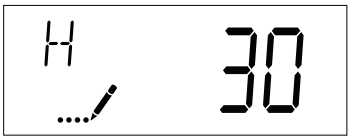
6. Unit Capacity (Display Code C)

Press the Extra Cycle button. Use this display to set the Unit Capacity. This setting specifies the treatment capacity of the system media. Enter the capacity of the media bed in grains of hardness when configuring a softener system, and in the desired volume capacity when configuring a filter system. This option setting is identified by “C” in the upper left hand corner of the screen. The Unit Capacity parameter is only available if the control type has been set to one of the metered options. Use the Up and Down buttons to adjust the value as needed.

Range: 1-999,900 grain capacity

7. Feedwater Hardness (Display Code H)

Press the Extra Cycle button. Use this display to set the Feedwater Hardness. Enter the feedwater hardness in grains per unit volume for softener systems, or 1 for filter systems. This option setting is identified by “H” in the upper left hand corner of the screen. The feedwater hardness parameter is only available if the control type has been set to one of the metered options. Use the Up and Down buttons to adjust the value as needed.



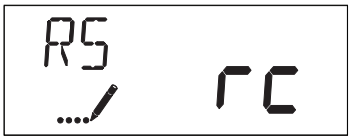
Range: 4-199 hardness

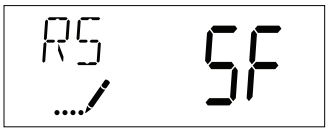
CAUTION: Before entering Master Programming, please contact your local professional water dealer.

8. Reserve Selection (Display Code RS)

Press the Extra Cycle button. Use this display to set the Safety Factor. Use this display to select the type of reserve to be used in your system. This setting is identified by “RS” in the upper left-hand corner of the screen. The reserve selection parameter is only available if the control type has been set to one of the metered options. There are two possible settings.

SF	Safety Factor
rc	Fixed Reserve Capacity





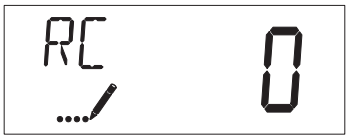
9. Safety Factor (Display Code SF)

Press the Extra Cycle button. Use this display to set the Safety Factor. This setting specifies what percentage of the system capacity will be held as a reserve. Since this value is expressed as a percentage, any change to the unit capacity or feedwater hardness that changes the calculated system capacity will result in a corresponding change to the reserve volume.This option setting is identified by “SF” in the upper left hand corner of the screen. Use the Up and Down buttons to adjust the value from 0 to 50% as needed.

Range: 0-50%

10. Fixed Reserve Capacity (Display Code RC)

Press the Extra Cycle button. Use this display to set the Reserve Capacity. This setting specifies a fixed volume that will be held as a reserve. The reserve capacity cannot be set to a value greater than one-half of the calculated system capacity. The reserve capacity is a fixed volume and does not change if the unit capacity or feedwater hardness are changed. This option setting is identified by “RC” in the upper left-hand corner of the screen. Use the Up and Down buttons to adjust the value as needed.

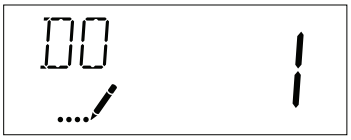


Range: 0-half the calculated capacity

CAUTION: Before entering Master Programming, please contact your local professional water dealer.

11. Day Override (Display Code DO)

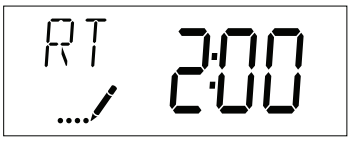
Press the Extra Cycle button. Use this display to set the Day Override. This setting specifies the maximum number of days between regeneration cycles. If the system is set to a timer-type control, the day override setting determines how often the system will regenerate. A metered system will regenerate regardless of usage if the days since last regeneration cycle equal the day override setting. Setting the day override value to “OFF” disables this function. This option setting is identified by “DO” in the upper left hand corner of the screen. Use the Up and Down buttons to adjust the value as needed.



Range: Off-99 days

12. Regeneration Time

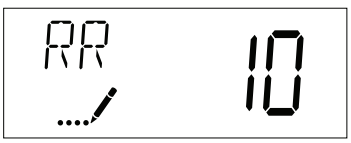
Press the Extra Cycle button. Use this display to set the Regeneration Time. This setting specifies the time of day the control will initiate a delayed, manually queued, or day override triggered regeneration. This option setting is identified by “RT” in the upper left hand corner of the screen. Use the Up and Down buttons to adjust the value as needed.



13. Regeneration Cycle Step Times

Press the Extra Cycle button. Use this display to set the Regeneration Cycle Step Times. The different regeneration cycles are listed in sequence based on the valve type selected for the system, and are identified by an abbreviation in the upper left-hand corner of the screen. The abbreviations used are listed below. If the system has been configured with the “OTHER” valve type, the regeneration cycles will be identified as R1, R2, R3, R4, R5, and R6. Each cycle step time can be set from 0 to 199 minutes, or “OFF.” Setting a cycle step to “OFF” will disable all of the following steps. Setting a cycle step time to 0 will cause the control to skip that step during regeneration, but keeps the following steps available. Use the Up and Down buttons to adjust the value as needed. Press the Extra Cycle button to accept the current setting and move to the next parameter.

Cycle Step	Abbreviation
BD	Brine Draw
BF	Brine Fill
BW	Backwash
RR	Rapid Rinse
SV	Service

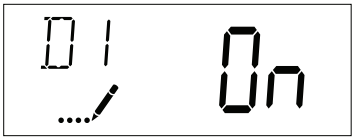


Range: 0-199 minutes

CAUTION: Before entering Master Programming, please contact your local professional water dealer.

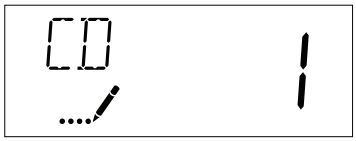
14. Day of Week Settings

Press the Extra Cycle button. Use this display to set the regeneration schedule for a system configured as a Day of Week control. The different days of the week are identified as D1, D2, D3, D4, D5, D6, and D7 in the upper left-hand corner of the display. Set the value to “ON” to schedule a regeneration or “OFF” to skip regeneration for each day. Use the Up and Down buttons to adjust the setting as needed. Press the Extra Cycle button to accept the setting and move to the next day. Note that the control requires at least one day to be set to “ON.” If all 7 days are set to “OFF”, the unit will return to Day One until one or more days are set to “ON.”



15. Current Day (Display Code CD)

Press the Extra Cycle button. Use this display to set the current day on systems that have been configured as Day of Week controls. This setting is identified by “CD” in the upper left-hand corner of the screen. Use the Up and Down buttons to select from Day 1 through Day 7.



16. Flow Meter Type (Display Code FM)

Press the Extra Cycle button. Use this display to set the type of flow meter connected to the control. This option setting is identified by “FM” in the upper left-hand corner of the screen. Use the Up and Down buttons to select one of the 7 available settings.

t0.7	Fleck 3/4” Turbine Meter
P0.7	Fleck 3/4” Paddle Wheel Meter
t1.0	Fleck 1” Turbine Meter
P1.0	Fleck 1” Paddle Wheel Meter
t1.5	Fleck 1 1/2” Turbine Meter
P1.5	Fleck 1 1/2” Paddle Wheel Meter
GEn	Generic/Other Meter

CAUTION: Before entering Master Programming, please contact your local professional water dealer.

17. Meter Pulse Setting (Display Code K)

Press the Extra Cycle button. Use this display to specify the meter pulse setting for a non-standard flow meter. This option setting is identified by “K” in the upper left-hand corner of the screen. Use the Up and Down buttons to enter the meter constant in pulses per unit volume.

18. Press the Extra Cycle button to save all settings and exit Master Programming Mode.

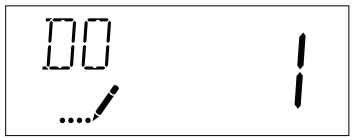
User Programming Mode

User Programming Mode Options		
Abbreviation	**Parameter**	**Description**
DO	Day Override	The timer's day override setting
RT	Regeneration Time	The time of day that the system will regenerate (meter delayed, timeclock, and day-of-week systems)
H	Feed Water Hardness	The hardness of the inlet water - used to calculate system capacity for metered systems
RC	Reserve Capacity	The fixed reserve capacity
CD	Current Day	The current day of week

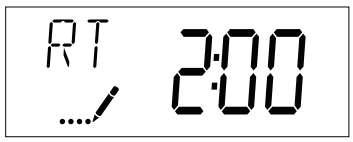
NOTES:
Some items may not be shown depending on timer configuration.
The timer will discard any changes and exit User Mode if any button is not pressed for sixty seconds.

User Programming Mode Steps

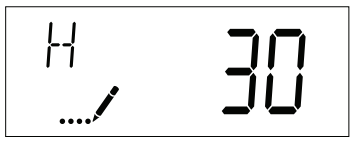
1. Press the Up and Down buttons for five seconds while in service, and the time of day is NOT set to 12:01 PM.
2. Use this display to adjust the Day Override. This option setting is identified by "DO" in the upper left hand corner of the screen.



3. Press the Extra Cycle button. Use this display to adjust the Regeneration Time. This option setting is identified by "RT" in the upper left hand corner of the screen.

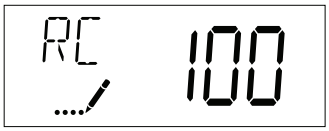


4. Press the Extra Cycle button. Use this display to adjust the Feed Water Hardness. This option setting is identified by "H" in the upper left hand corner of the screen.



Range: 4-199 hardness

5. Press the Extra Cycle button. Use this display to adjust the Fixed Reserve Capacity. This option setting is identified by “RC” in the upper left-hand Corner of the screen.



6. Press the Extra Cycle button. Use this display to set the Current Day of the Week. This option setting is identified by “CD” in the upper left hand corner of the screen.

7. Press the Extra Cycle button to end User Programming Mode.

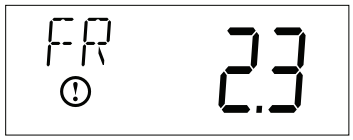
Diagnostic Programming Mode

Diagnostic Programming Mode Options		
Abbreviation	**Parameter**	**Description**
FR	Flow Rate	Displays the current outlet flow rate
PF	Peak Flow Rate	Displays the highest flow rate measured since the last regeneration
HR	Hours in Service	Displays the total hours that the unit has been in service
VU	Volume Used	Displays the total volume of water treated by the unit
RC	Reserve Capacity	Displays the system's reserve capacity calculated from the system capacity, feedwater hardness, and safety factor
SV	Software Version	Displays the software version installed on the controller

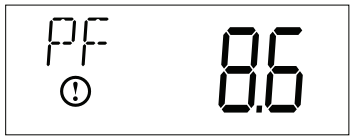
NOTES:
Some items may not be shown depending on timer configuration.
The timer will exit Diagnostic Mode after 60 seconds if no buttons are pressed.

Diagnostic Programming Mode Steps

1. Press the Up and Extra Cycle buttons for five seconds while in service.
2. Use this display to view the current Flow Rate. This option setting is identified by "FR" in the upper left hand corner of the screen.



3. Use this display to view the Peak Flow Rate since the last regeneration cycle. This option setting is identified by "PF" in the upper left hand corner of the screen.

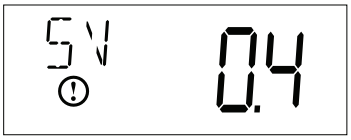


4. Use this display to view the Hours in Service since the last regeneration cycle. This option setting is identified by "HR" in the upper left hand corner of the screen.

5. Use this display to view the Volume Used since the last regeneration cycle. This option setting is identified by "VU" in the upper left hand corner of the screen.

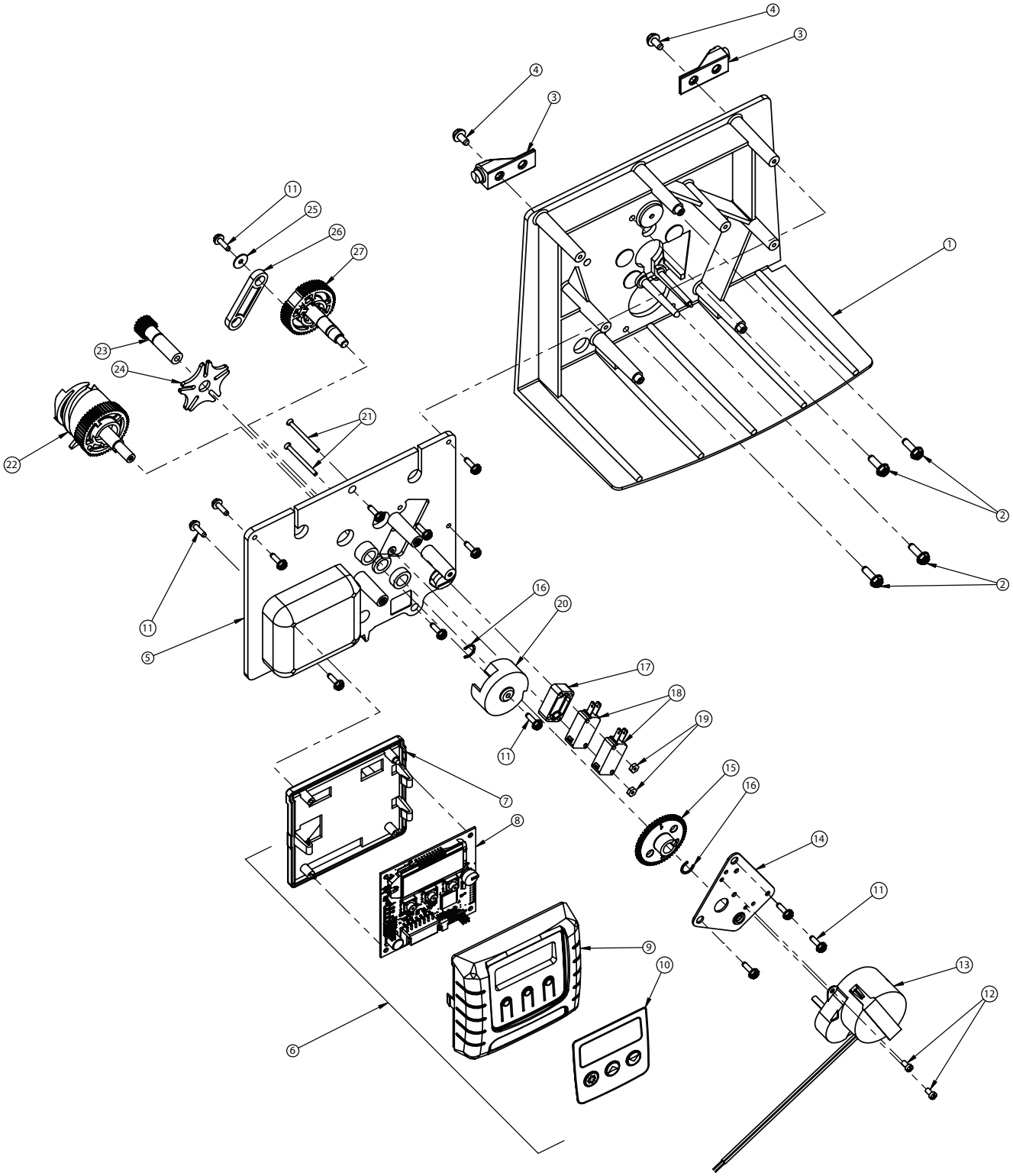
6. Press the Up button. Use this display to view the Reserve Capacity. This option setting is identified by “RC” in the upper left hand corner of the screen.

7. Press the Up button. Use this display to view the Software Version. This option setting is identified by “SV” in the upper left hand corner of the screen.



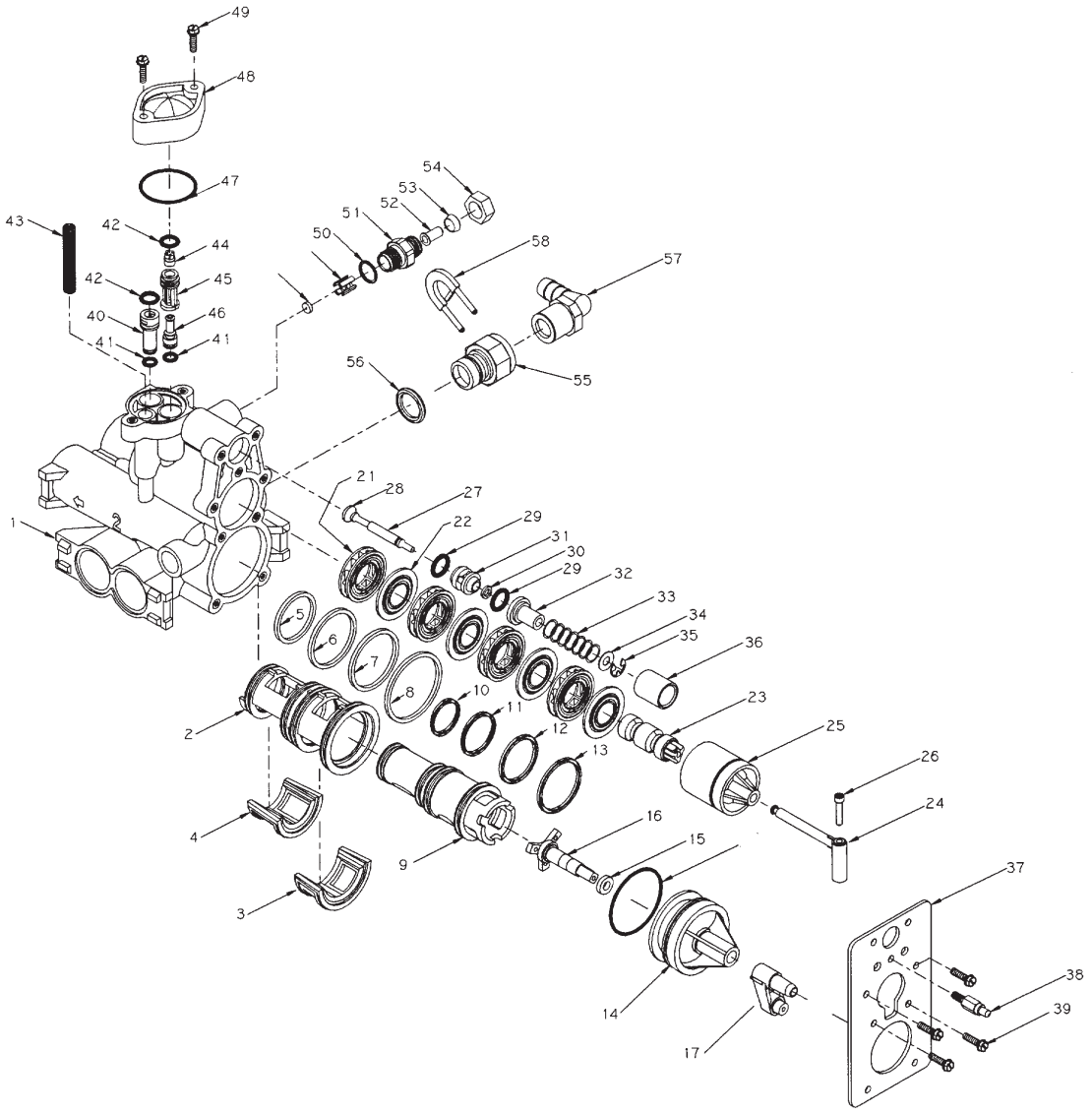
8. Press the Extra Cycle button to end Diagnostic Programming Mode.

Powerhead Assembly



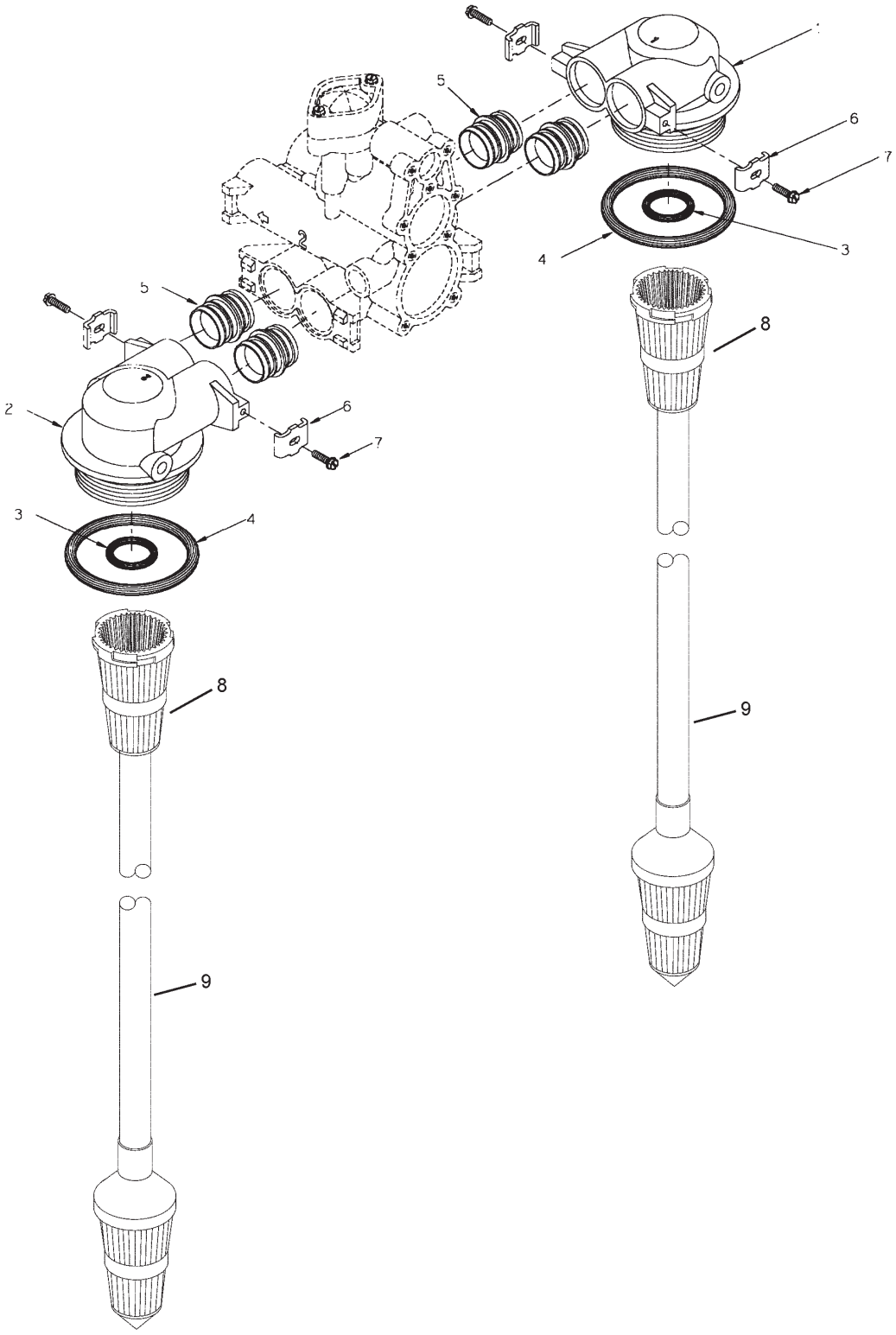
Item No.	Quantity	Part No.	Description
1	1	18798	Backplate 8510
2	4	12473	Screw, Hex Wsh, 10-24 x 5/8
3	2	40232	Bracket, TwinFlo
4	2	12758	Screw, Hex Wsh, 10 x 3/8
5	1	19890	Plate Center, Electronic
6	1	42771-01	Timer Assy, SXT, 8500
7	1	19889	Housing, Circuit Board
8	1	42196	Circuit Board, SXT Control
9	1	42635-01	Cover SXT, Square Black
10	1	42637	Label, Display, SXT
11	13	13296	Screw, Hex Wsh, 6-20 x 1/2
12	2	11384	Screw, Phil. 6-32 x 1/4 Zinc
13	1	18898	Motor, 24/60, 1RPM, CCW
14	1	18807	Plate, Motor Mounting
15	1	19354	Gear & Label Assy, TwinFlo100
16	2	15810	Ring Retaining
17	1	18803	Spacer Switch
18	2	10218	Switch Micro
19	2	10339	Nut Hex, 4-40 Zinc Plated
20	1	19940	Cam, Switch, Elec, Std
21	2	19111	Screw, Slow Flat Hd, 4-40 x 1-1/2
22	1	19061	Gear and Cam Assy Downflow
23	1	18796	Pinion Drive, TwinFlo100
24	1	14896	Wheel Geneva
25	1	13363	Washer Plain, .145 ID SS
26	1	18785	Link, Transfer, TwinFlo100
27	1	19062	Gear and Pin Assy

Control Valve Assembly



Item No.	Quantity	Part No.	Description
1	1	18770-01	Valve Body, Twinflo 100/8510 Machined
2	1	18783	Cage, Twinflo 100/8510
3	1	19004	Seal, Molded, Inlet, Twinflo 100
4	1	19005	Seal, Molded, Outlet, Twinflo 100
5	1	19054	O-ring, -124
6	1	19055	O-ring, -128, Twinflo 100/8510
7	1	19056	O-ring, -129, Twinflo 100/8510
8	1	19057	O-ring, -133, Twinflo 100/8510
9	1	18782	Piston, Rotor, Twinflo 100/8510
10	1	18874	Quad Ring, -118, Modified Twinflo 100/8510
11	1	18875	Twinflo 100/8510 Twinflo 100/8510
12	1	18876	Quad Ring, -123, Modified Twinflo 100/8510
13	1	18877	Quad Ring, -123, Modified Twinflo 100/8510
14	1	18781	Plug, End, Twinflo 100/8510, Lower
15	1	14926	Quad Ring, -012
16	1	18776	Shaft, Rotor Drive, Twinflo 100
17	1	18784	Crank, Transfer, Twinflo 100/8510
18	1	15820	O-ring, -134
19	1	13245	Retainer, BLFC
20	1	60022-XX	BLFC Button, Specify Size
21	4	18871	Spacer, Regen, Twinflo 100/8510
22	4	18870	Seal, Regen, Twinflo 100/8510
23	1	19667	Piston, Twinflo 100, Regeneration
24	1	18779	Rod, Piston, Twinflo 100/8510
25	1	19237	End Plug Assy, Twinflo 100, 560cd
26	1	18808	Pin, Drive Roller, Twnflo 100/8510
27	1	14925	Brine Valve Stem, 9000
28	1	12626	Seat, Brine Valve
29	2	13302	O-ring, -014
30	1	12550	Quad ring, -009
31	1	13167	Spacer, Brine Valve
32	1	13165	Cap, Brine Valve
33	1	11973	Spring, Brine Valve
34	1	16098	Washer, Nylon Brine
35	1	11981-01	Ring, Retaining
36	1	18786	Spacer, Brine, Twinflo 100/8510
37	1	18777	Plate, Retainer,Twinflo 100/8510
38	1	18809	Pin, Cam Bearing, Twnflo 100/8510
39	4	12112	Screw, Hex Hd Mach, 10-24 x 1/2
40	1	18276	Plug, Injector
41	2	10141	O-ring, -010
42	2	13771	O-ring, -012
43	1	18810	Screen, Injector
44	1	18273	Plug, Injector
45	1	18274-XXX	Injector Nozzle - Specify Size
46	1	18275-XXX	Injector Throat - Specify Size
47	1	15243	O-ring, -028
48	1	18774	Cap, Injector, Twinflo 100
49	2	17063	Screw, Hex Wsh Hd, 10-24 X 1
50	1	12977	O-ring, -015
51	1	13244-01	Adapter Assy, BLFC w/O-ring
52	1	10332	Fitting, Insert, 3/8
53	1	10330	Fitting, Sleeve, 3/8 Celcon
54	1	10329	FItting, Tube, 3/8 Nut, Brass
55	1	11385-01	Housing, Flow Control, Plastic
56	1	11183	O-ring, -017
57	1	12338	Fitting, Elbow, 90 Deg. 1/2 Black
58	1	18312	Retainer, Drain

Tank Adapter Assembly



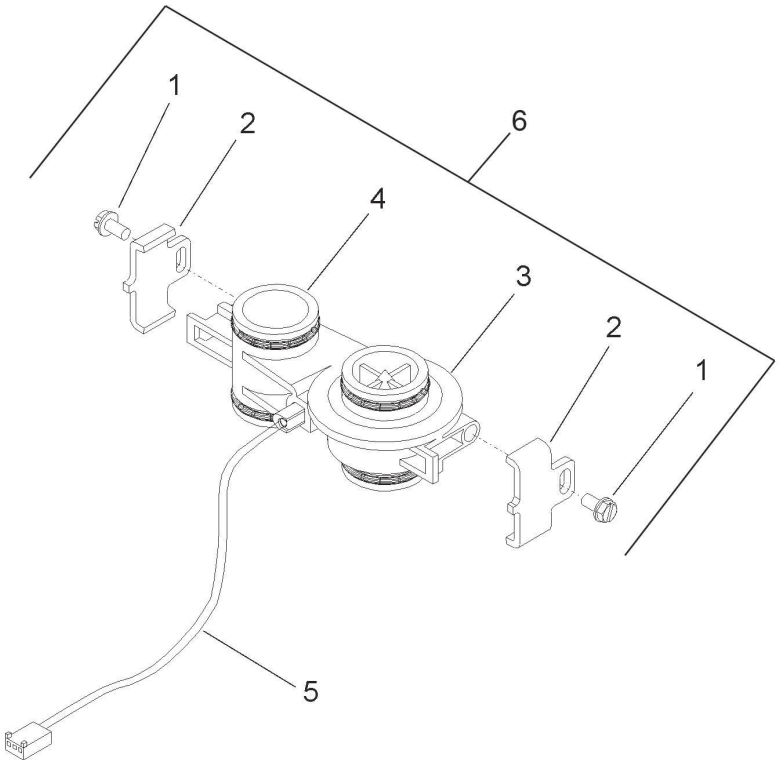
For Service Assembly Numbers, See the Back of this Manual

Tank Adapter Assembly

Item No.	Quantity	Part No.	Description
1	1	19242-01	Adapter Assy, Tank #1, 6”-8” 8500, Std O-rings
	1	19242-03	Adapter Assy, Tank #1, 9”-10” 8500, Std O-rings
2	1	19242-02	Adapter Assy, Tank #2, 6”-8” 8500, Std O-rings
	1	19242-04	Adapter Assy, Tank #2, 9”-10” Twinflo 100, Std O-ring
3	2	13304	O-ring, -121
4	2	18303	O-ring, -336
5	4	15078-01	Adapter Assy, 1”Coupling w/O-ring
6	4	13255	Clip, Mounting
7	4	13314	Screw, Slot Ind Hex, 8-18x.60
8	2	18280	Collector, Top,1” x .011, Gray Bayonet
			(.010 - .012 Slot Size)
		18280-01	Collector, Top,1” x .020, White Wide Slot, Bayonet
			(.019 - .022 Slot Size)
		18280-02	Collector,Top,1” x .008, Red Narrow Slot, Bayonet
			(.007 - .009 Slot Size)
9	2	60795 -00	Distributor Assy, 1”, Std Gray, .011, w/72” Tube
			(.010 - .012 Slot Size)
		60795-01	Distributor Assy, 1”, Wide White, .020, w/72” Tube
			(.019 - .022 Slot Size)
		60795-02	Distributor Assy, 1” Narrow Red .008, w/72” Tube

For Service Assembly Numbers, See the Back of this Manual

3/4” Turbine Meter Assembly

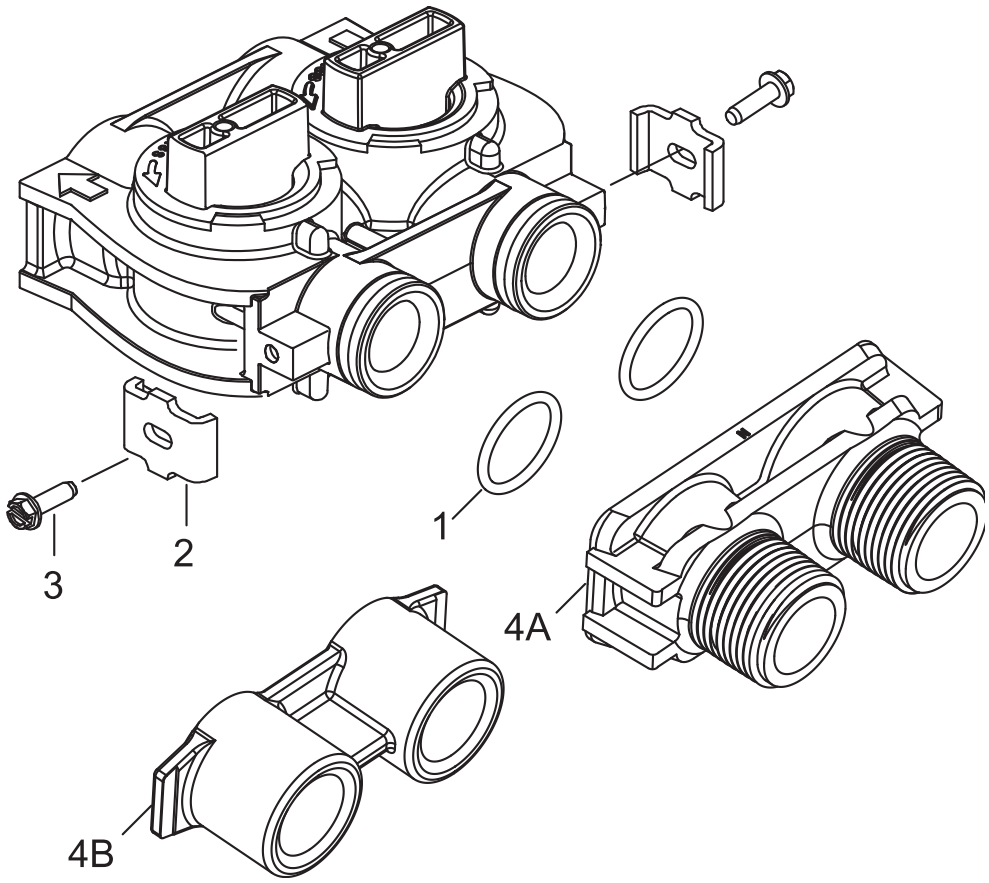


Item No.	Quantity	Part No.	Description
1	2	13314	Screw, Hex Washer, 8-18 x 5/8
2	2	19569	Clip, Flow Meter
3	1	19797	Meter Body Assembly, 3/4” Turbine
4	4	13305	O-ring, 119
5	1	19791-01	Harness Assembly, Flow Meter
	1	19791-02	Meter Cable Assy, 35”
6	1	60626	Meter Assy, Turbine, Electronic, 3/4” with Clips and Screws, Less Meter Cable

Not Shown:

	1	14613	Flow Straightener

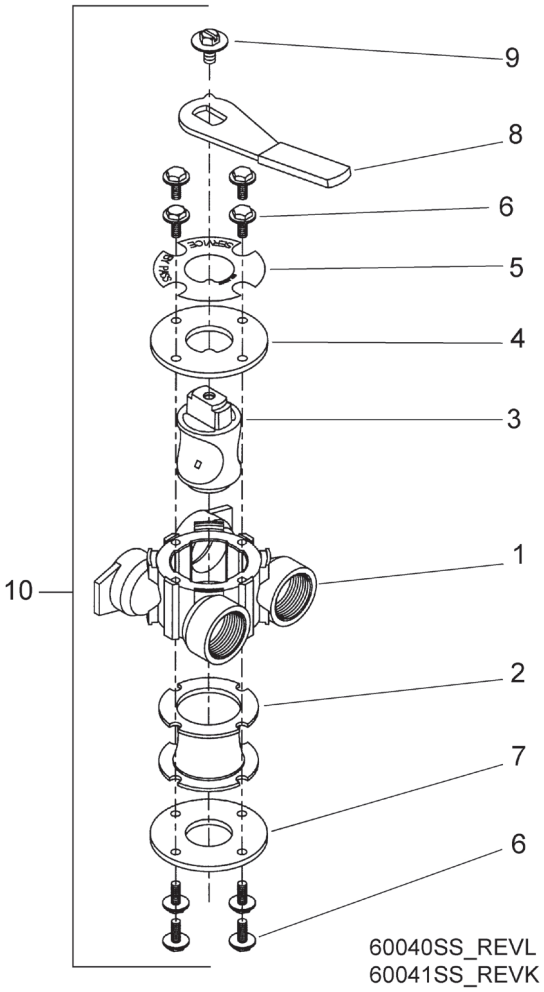
Bypass Valve Assembly (Plastic)



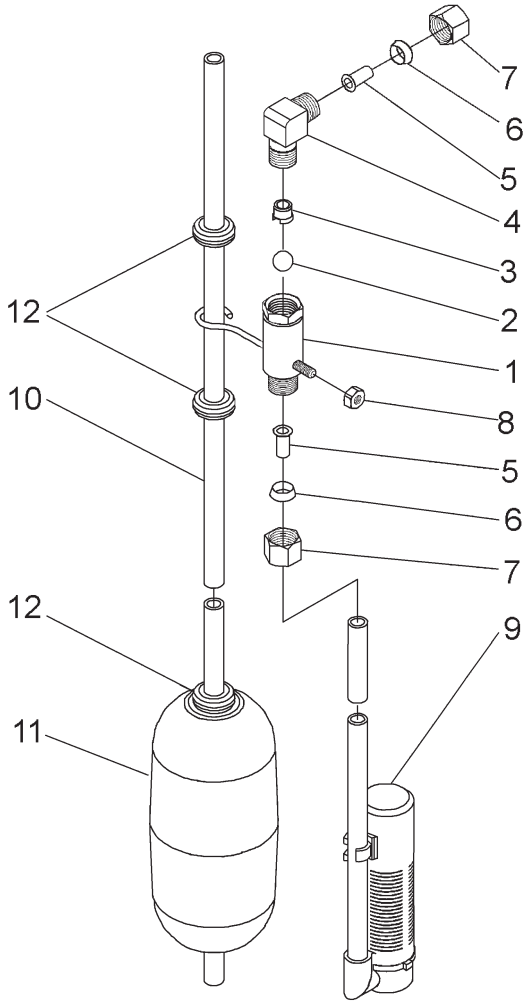
Item No.	Quantity	Part No.	Description
1	2	13305	O-ring, -119
2	2	13255	Clip, Mounting
3	2	13314	Screw, Slot Ind Hex, 8-18 x .60
4A	1	18706	Yoke, 1”, NPT, Plastic
		18706-02	Yoke, 3/4”, NPT, Plastic
4B	1	13708-40	Yoke, 1”, Sweat
		13708-45	Yoke, 3/4”, Sweat
		19275	Yoke, Angle 90 Deg, 3/4”, NPT
		19275-45	Yoke, Angle 90 Deg, 3/4” Sweat
		19620-01	Yoke Assy, 3/4”, R/Angle, 90 Deg w/O-rings, Clips & screws
		40636	Yoke, 1-1/4”, NPT
		40636-49	Yoke, 1-1/4”, Sweat
		41027-01	Yoke, 3/4”, NPT, Cast, Machd
		41026-01	Yoke, 1”, NPT, Cast, Machd, Stainless Steel

For Service Assembly Numbers, See the Back of this Manual

Bypass Valve Assembly (Metal)



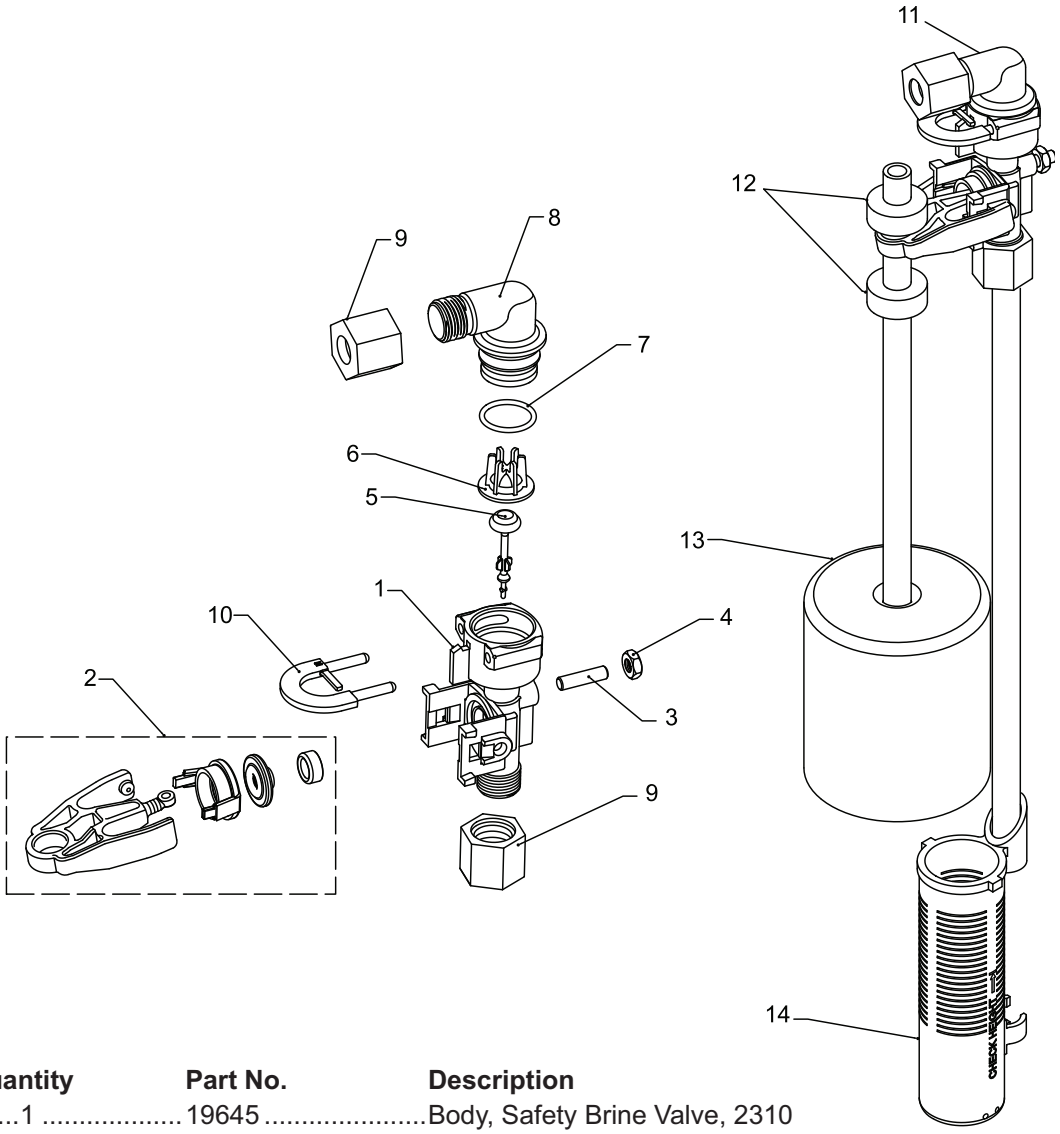
Item No.	Quantity	Part No.	Description
1	1	40614	Bypass Body, 3/4”
		40634	Bypass Body, 1”, Stainless Steel
2	1	14105	Seal, Bypass, 560CD
3	1	11972	Plug, Bypass, w/Wax
4	1	11978	Plate, Bypass, Top
5	1	13604-01	Label, Bypass, Standard Mount
6	8	15727	Screw, Hex Wsh Hd, 10-24 x 1/2
7	1	11986	Plate, Bypass, Bottom
8	1	11979	Lever, Bypass
9	1	11989	Screw, Sltd Indent, 1/4 - 14 x 1-1/2
10	1	60040SS	Bypass Valve, 5600, 3/4” NPT Blk Grip Lever, Stainless Steel
		60041SS	Bypass Valve, 5600, 1” NPT Blk Grip Lever, Stainless Steel



Item No.	Quantity	Part No.	Description
1	1	60027-00	Safety Brine Valve, 2300, Less Elbow
2	1	10138	Ball, 3/8”, Brass
3	1	11566	Ball Stop, Slow Fill
4	1	10328	Fitting, Elbow, 90 Deg. 1/4 NPT x 3/8T
5	1	10332	Fitting, Insert, 3/8
6	1	10330	Fitting, Sleeve, 3/8 Celcon
7	1	10329	Fitting, Tube, 3/8 Nut, Brass
8	1	10186	Nut, Hex, 10-32
9	1	60002-34	Air Check, #500, 34” Long
		60003-34	Air Check, #500, HW, 34” Tube
10	1	10149	Rod, Float
11	1	10700	Float Assy, White
12	3	10150	Grommet, .30 Dia

For Service Assembly Numbers, See the Back of this Manual

2310 Safety Brine Valve



Item No.	Quantity	Part No.	Description
1	1	19645	Body, Safety Brine Valve, 2310
2	1	19803	Safety Brine Valve Assy
3	1	19804	Screw, Sckt Hd, Set, 10-24 x .75
4	1	19805	Nut, Hex, 10-24, Nylon Black
5	1	19652-01	Poppet Assy, SBV w/O-ring
6	1	19649	Flow Dispenser
7	1	11183	O-ring, -017
8	1	19647	Elbow, Safety Brine Valve
9	2	19625	Nut Assy, 3/8” Plastic
10	1	18312	Retainer, Drain
11	1	60014	Safety Brine Valve Assy, 2310
12	2	10150	Grommet, .30 Dia
13	1	60068-30	Float Assy, 2310, w/30” Rod
14	1	60002-34	Air Check, #500, 34” Long

For Service Assembly Numbers, See the Back of this Manual

Problem	Cause	Correction
1. Water conditioner 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 water.	A. By-pass valve is open.	A. Close by-pass valve.
	B. No salt is in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Injector screen plugged.	C. Clean injector screen.
	D. Insufficient water flowing into brine tank.	D. Check brine tank fill time and clean brine line flow control if plugged.
	E. Hot water tank hardness.	E. Repeated flushings 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. Unit used too much salt.	A. Improper salt setting.	A. Check salt usage and salt setting.
	B. Excessive water in brine tank.	B. See problem 7.
4. Loss of water pressure.	A. Iron buildup in line to water conditioner.	A. Clean line to water conditioner.
	B. Iron buildup in water conditioner.	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. Iron in conditioned water.	A. Fouled mineral bed.	A. Check backwash, brine draw, and brine tank fill. Increase frequency of regeneration. Increase backwash time.
7. Excessive water in brine tank.	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.

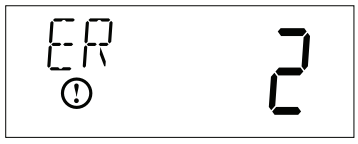
Problem	Cause	Correction
8. Softener fails to draw brine.	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean injector
	C. Injector screen plugged.	C. Clean screen.
	D. Line pressure is too low.	D. Increase line pressure to 20 psi (1.3 bar)
	E. Internal control leak	E. Change seals, spacers, and piston assembly.
	F. Service adapter did not cycle.	F. Check drive motor and switches.
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.

Error Codes

Note: Error codes appear on the In Service display.

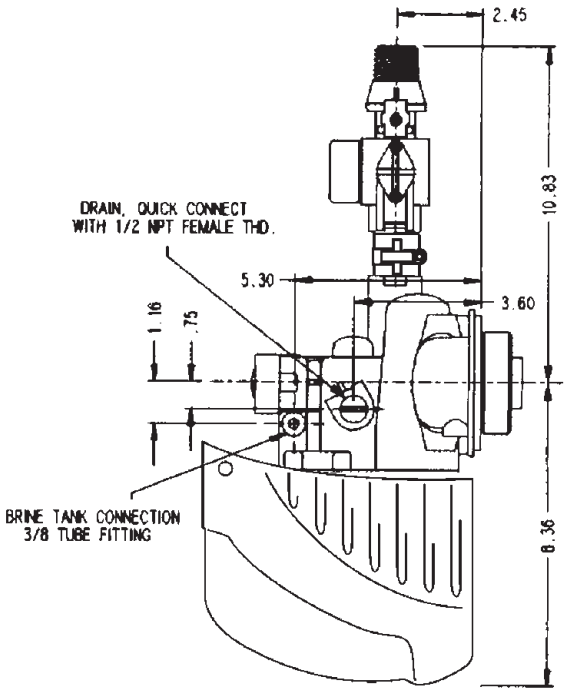
Error Code	Probable Cause	Recover and Resetting
[Err 0]	Drive motor is stalled	Unplug the unit from the power source
[Err 1]	Drive motor is running continuously	When power is restored to the unit, the Err _ display code clears. If the condition causing the error has not been resolved the Err _ code reappears in the four digit display. Do not attempt to troubleshoot this problem any further.
[Err 2]	There have been more than 99 days since the last Regeneration. If the Day of the Week mode of regeneration is selected and days since last regeneration exceeds 7 days. **[7 - - 5]**: There have been more than 7 days since the last regeneration. All individual settings (d1, d2, d3, d4, d5, d6, d7) are set to 0.	Regeneration must occur for the unit to recover, the display to clear and the valve to function normally. **[7 - - 5]**: To recover from [Err2], the user must initiate a regeneration or set at least one individual day to 1.
[Err 3]	Control board memory failure.	Perform a Master Reset. If the error returns, do not attempt to troubleshoot this problem any further.

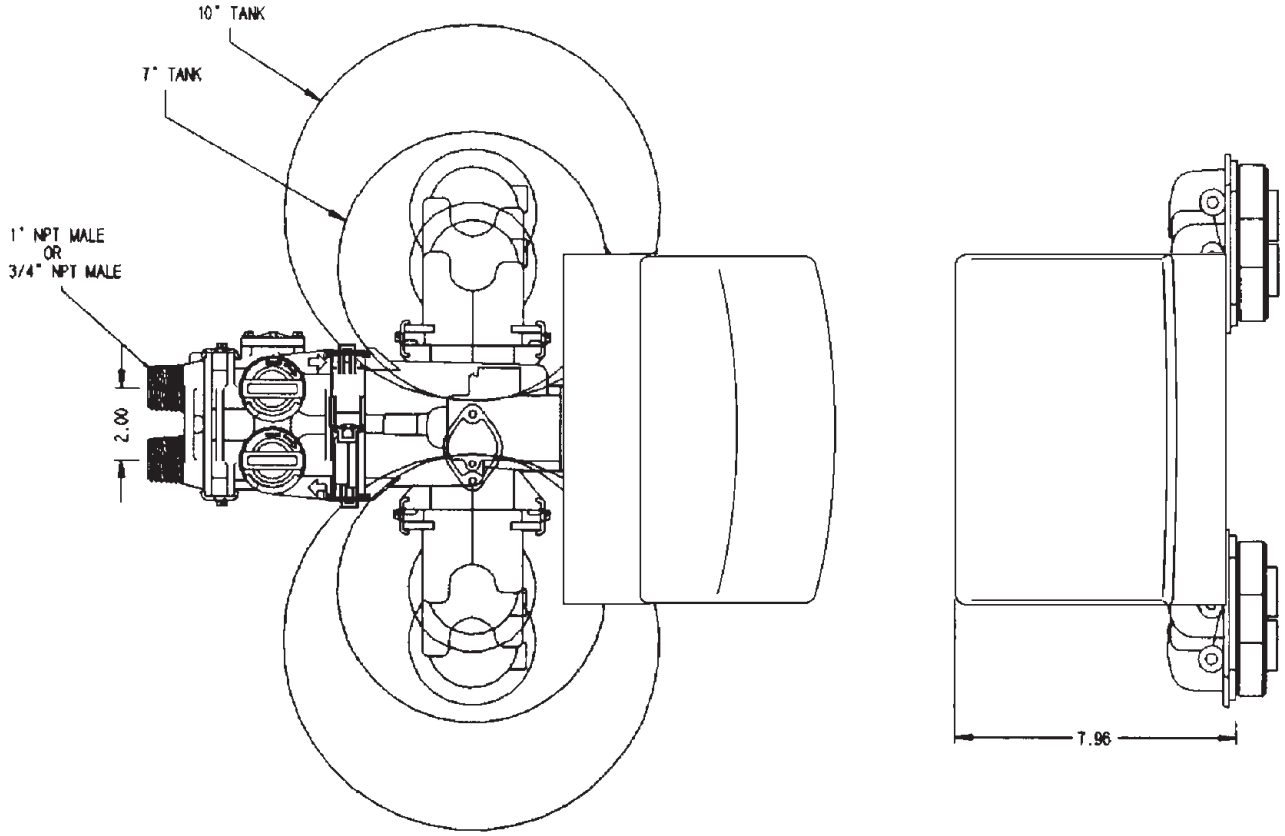
Error Display Example

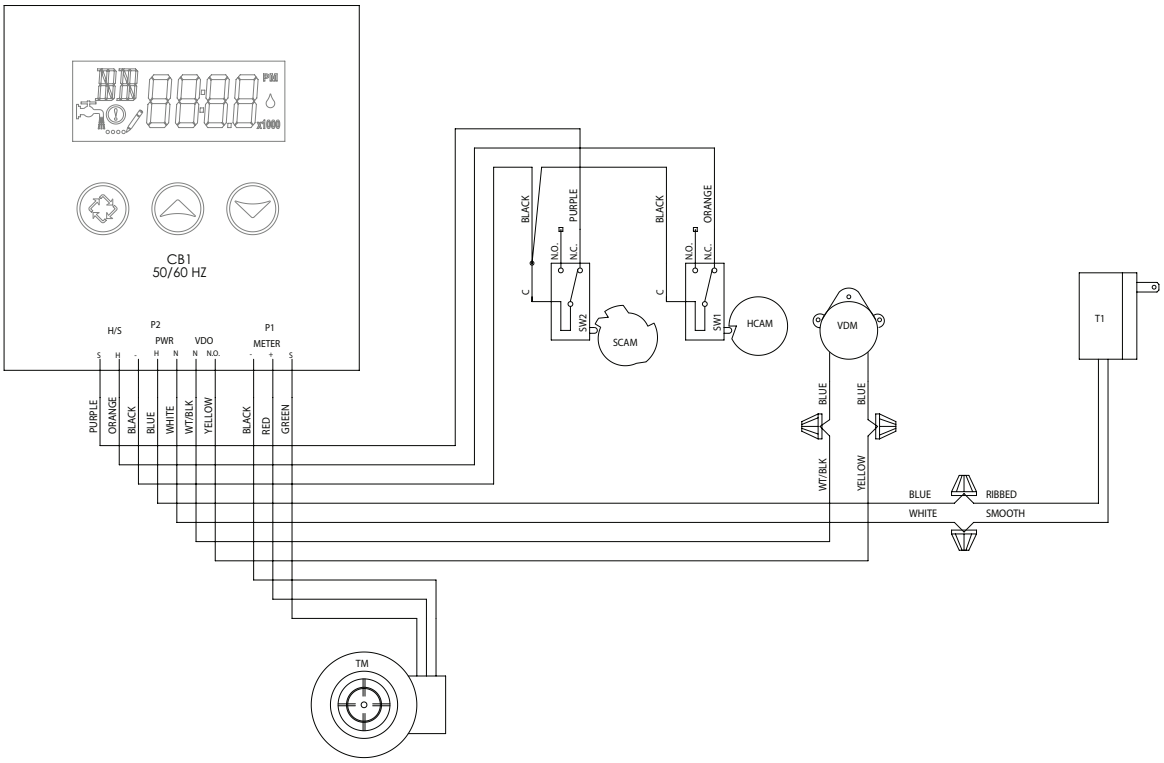


NOTE: Unit will flash when an error exists.

Dimension Drawing







SCAM - Valve Step
CAM HCAM - Valve Homing
CAMSW2 - Valve Step Switch
SW1 - Valve Homing Swith
VDM - Valve Drive Motor
TM - 3/4” Turbine Flow Meter (Optional)
T1 - 24V Transformer
CB1 - SXT Timer

Remove / Install Center Plate

1. Cycle control valve to put tank 2 in service and timer in brine/rinse (Regeneration Cycle Step #3). Unplug electrical cord from outlet. Unplug meter cable at turbine meter. To unplug meter cable see Remove/Install Turbine Meter.
2. With a 1/4” nut driver, remove 7 screws, securing center plate only to backplate, then pull away. All components are mounted to this plate.
3. To install center plate, be certain that tank 2 is in service and the timer is in the brine/rinse position (Regeneration Cycle Step #3). Ensure transfer link is resting on alignment pin. (The alignment pin is molded at the bottom back of center plate). Rotate transfer crank to its lowermost position (See Figure 1). Feed meter cable thru hole in backplate and position center plate on backplate. Align the backplate post pilots into center plate as the transfer link into transfer crank.
4. With a 1/4” nut driver, replace 7 screws, and plug in the meter cable.
5. Plug electrical cord into outlet and cycle control to the service position.

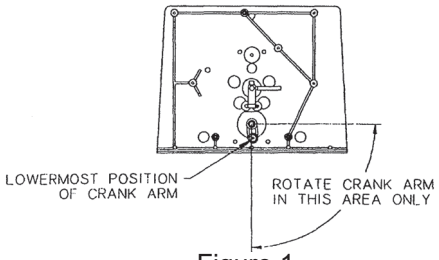


Figure 1

Remove / Install Backplate

1. Cycle control valve and put tank 2 in service and timer in brine/rinse position (Regeneration Cycle Step #3). Unplug electrical cord from outlet. Unplug meter cable at turbine meter. To unplug meter cable see Remove/Install Turbine Meter.
2. With a magnetic 5/16” socket and extension, remove 4 screws, securing backplate to valve body, then pull backplate away. The locations of 4 screws are on each side of the switch cam in back, below the timer and gear and label assembly in back.
3. To install backplate, ensure tank 2 is in service and timer is in the brine/rinse position (Regeneration Cycle Step #3). Ensure transfer link is resting on alignment pin. (The alignment pin is molded at the bottom back of the center plate). Rotate the transfer crank to its lowermost position (See Figure 1) and rotate the piston rod in the vertical position. **NOTE:** Rotate transfer crank in the area indicated in Figure 1. Ensure the drive roller pin is inserted in the piston rod. Place backplate on valve body. Align the transfer link into transfer crank.
4. With a magnetic 5/16” socket and extension, replace 4 screws and plug in meter cable.
5. Plug electrical cord into outlet and cycle control valve to the service position.

Remove / Install Drive Motor

1. Unplug electrical cord from outlet.
2. Remove 2 wire nuts securing the drive motor leads to the electrical wires.
3. With a Phillip screwdriver, remove the 2 screws, securing the drive motor to the drive motor mounting plate. Pull the drive motor out of the pinion gear.
4. Install the drive motor into the pinion gear. If the mounting holes of the drive motor do not line up, lift the motor slightly, and rotate it clockwise until the holes line up. Push drive motor against drive motor mounting plate and install the 2 screws.
5. Reconnect motor leads to electrical wires with wire nuts.
6. Plug electrical cord into outlet and cycle control valve to service position (if needed).

Remove / Install Cage and Rotor

1. Turn off water to control valve.
   a. If water softener has a three-valve bypass, first open the valve in the bypass line, and then close the valves at the inlet and outlet.
   b. If water softener has a bypass valve, put it in bypass position.
   c. If there is only a shut off valve, close it.
2. Cycle control valve and put tank 2 in service and the timer in the brine/rinse (Regeneration Cycle Step #3). Unplug meter cable at turbine meter. To unplug meter cable, see Remove/Install Turbine Meter.
3. With a magnetic 5/16” socket and extension, remove the 4 screws securing the backplate to the valve body, then pull backplate away. The locations of the 4 screws are on each side of the switch cam in back, below the timer and gear and label assembly in back.
4. Pull the transfer crank from the rotor drive shaft. With a 5/16” socket, remove the 4 screws and cam bearing pin from the valve body. Lift the retainer plate off of the valve.
5. With pliers, grasp a rib on the rotor end plug, and pull out of the valve body.
6. With a screwdriver (See Figure 2), insert under rotor and pry rotor from the cage.
7. With the cage puller tool, insert into the cage, and insert the screwdriver thru hole in puller and pry cage valve body. Use care, as the inlet and outlet molded seal may fall from cage as it is removed from valve body.

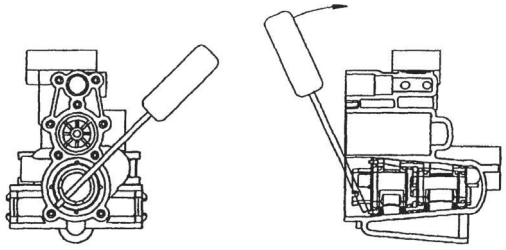


Figure 2

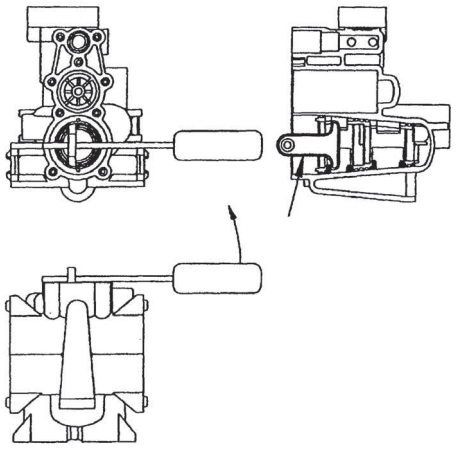


Figure 3

8. To install cage and rotor, replace and lubricate (silicone grease) the 4 rotor quad ring seals, using care to ensure the quad ring seals are not twisted around the rotor. Replace and lubricate (silicone grease) the 4 cage O-ring seals. Install rotor until it snaps into cage. Face rotor ports to large openings of cage, using a slight back and forth rotation of rotor to assist in seating the rotor quad ring seals properly in cage.
9. Replace and lubricate (silicone grease) the molded inlet and outlet seals, placing on large openings of cage. **NOTE:** There is only one correct position for each molded inlet outlet seals to be placed on cage. Keep the molded inlet and outlet seals facing up until the cage and rotor is inside valve body then rotate 180 degrees to properly position cage in valve body. Push rotor flush with valve body face.
10. Replace and lubricate (silicone grease) the quad seal and O-ring seal on end plug. To replace quad seal, pull out rotor drive shaft from end plug. Install new quad seal into bottom of end plug. Leave rotor drive shaft out of end plug.
11. Place rotor drive shaft arms into mating slots in rotor. There is only one correct position. **NOTE:** The thickest arm of the rotor drive shaft should be in the odd slot of the rotor. Do not force rotor drive shaft arms into slots.

12. Push end plug over rotor drive shaft and rotate around until cage pins pick up slots in the end plug, then continue to push end plug and cage into valve body until end plug is almost flush with valve body face. There are internal keys in the valve that only allow the cage to be in one proper position. A slight rotation may be necessary to obtain this position.
13. Install retainer plate, securing with 4 screws and the cam bearing pin. Install the transfer crank on rotor drive shaft.
14. To install backplate, ensure tank 2 is in service and the timer is in the brine/rinse position (Regeneration Cycle Step #3). Ensure the transfer link is resting on the alignment pin (the alignment pin is molded at the bottom back of the center plate). Rotate the transfer crank to it's lowermost position (See Figure 1), and rotate the piston rod to the vertical position. **NOTE:** Rotate the transfer crank in the area as indicated in Figure 1. Ensure the drive roller pin is inserted in the piston rod. Place backplate on valve body, aligning the transfer link into the transfer crank.
15. With a magnetic 5/16" socket and extension, replace the 4 screws, and plug in the meter cable.
16. Return bypass to the normal service position.
17. Check for leaks at all seal areas. Cycle valve to each position on both tanks for proper operation. Put control valve in service.

Remove / Install Regeneration Piston, Seals, and Spacers

1. Turn off water to the control valve.
   a. If the water softener has a three-valve bypass, first open the valve in the bypass line, and then close the valves at the inlet and outlet.
   b. If water softener has a bypass valve, put it in the bypass position.
   c. If there is only a shut off valve, close it.
2. Cycle the control valve, and put tank 2 in service, and the timer in the brine/rinse position (Regeneration Cycle Step #3). Unplug the meter cable at the turbine meter. To unplug the meter cable, see Remove/Install Turbine Meter.
3. With a magnetic 5/16" socket and extension, remove the 4 screws, securing the backplate to the valve body. Pull the backplate away. The 4 screws are located on each side of the switch cam in back, below the timer and gear and label assembly in back.
4. Grasp the piston rod, pulling the end plug assembly and regeneration piston straight out of the control valve.
5. Remove all 4 regeneration seals and spacers.
6. Inspect the seals and piston for damage, replacing if necessary.
7. Lubricate (silicone grease) the regeneration seals, and install by starting with a spacer, then alternating each.
8. Lubricate (silicone grease) the regeneration piston, and install into seal/spacer stack.
9. Place the rotor drive shaft arms into mating slots in rotor. There is only one correct position. **NOTE:** The thickest arm of the rotor drive shaft should be in the odd slot of the rotor. Do not force rotor drive shaft arms into slots.
10. Push the end plug over the rotor drive shaft, rotating it around until the cage pins pick up the slots in the end plug. Continue to push the end plug and cage into the valve body until the end plug is almost flush with valve body face. There are internal keys in the valve that only allow the cage to be in one proper position. A slight rotation may be necessary to obtain this position.
11. Install the retainer plate, securing it with the 4 screws and the cam bearing pin. Install the transfer crank on rotor drive shaft.
12. To install the backplate, ensure tank 2 is in service and the timer is in the brine/rinse position (Regeneration Cycle Step #3). Ensure the transfer link is resting on the alignment pin, which is molded at the bottom back of the center plate. Rotate the transfer crank to it's lowermost position (See Figure 1). Rotate the piston rod to the vertical position. **NOTE:** Rotate the transfer crank in the area indicated in Figure 1. Ensure the drive roller pin is inserted in the piston rod. Place the backplate on the valve body, aligning the transfer link into the transfer crank.
13. With a magnetic 5/16" socket and extension, replace the 4 screws, and plug in the meter cable.

14. Return the bypass to the normal service position.
15. Check for leaks at all seal areas. Cycle the valve to each position on both tanks for proper operation. Put the control valve in the service position.

Remove / Install Brine Valve

1. Turn off water to the control valve.
   a. If the water softener has a three-valve bypass, first open the valve in the bypass line, then close the valves at the inlet and outlet.
   b. If the water softener has a bypass valve, put it in the bypass position.
   c. If there is only a shut off valve, close it.
2. Cycle the control valve. Put tank 2 in service, and the timer in the brine/rinse position. Unplug the meter cable at the turbine meter. To unplug the meter cable, see Remove/Install Turbine Meter.
3. With a magnetic 5/16” socket and extension, remove the 4 screws, securing the backplate to the valve body, pulling the backplate away. The 4 screws are located on each side of the switch cam in back, below the timer and gear and label assembly in back.
4. Grasp the brine valve stem with pliers, and pull out of the control valve. Save the white brine valve spacer
5. Remove and replace the bottom O-ring seal of the brine valve assembly. **NOTE:** This O-ring usually stays in the valve body when the brine valve is pulled out.
6. Lubricate (silicone grease) the O-ring on the brine valve assembly, pushing it into the valve body. Install the white brine valve spacer over the brine valve. The top of the brine valve spacer should be flush with the valve body face.
7. Install the retainer plate, securing it with 4 screws and the cam bearing pin. Install the transfer crank on the rotor drive shaft.
8. To install the backplate, ensure tank 2 is in service, and the timer is in the brine/rinse position (regeneration cycle step # 3). Ensure the transfer link is resting on the alignment pin, which is molded at the bottom back of the center plate. Rotate the transfer crank to it’s lowermost position (See Figure 1), and rotate the piston rod into the vertical position. **NOTE:** Rotate the transfer crank in the area indicated in Figure 1. Ensure the drive roller pin is inserted into the piston rod. Place the backplate onto the valve body, aligning the transfer link into the transfer crank.
9. With a magnetic 5/16” socket and extension, replace the 4 screws, and plug in the meter cable.
10. Return the bypass to the normal service position.
11. Check for leaks at all seal areas. Cycle the valve to each position on both tanks for proper operation. Put the control valve in the service position.

Remove / Install Injector Assembly

1. Turn off water to the control valve.
   a. If the water softener has a three-valve bypass, first open the valve in the bypass line, then close the valves at the inlet and outlet.
   b. If water softener has a bypass valve, put it in the bypass position.
   c. If there is only a shut off valve, close it.
2. Cycle the valve to the rinse (Regeneration Cycle Step #1) position to relieve pressure in the valve. Unplug the electrical cord from the outlet.
3. With a 5/16” nut driver, remove the 2 screws, securing the injector cover. Remove the injector cover, discarding the O-ring seal. Pry the injector nozzle and throat assembly from the valve with a screwdriver. **NOTE:** There is a slot that goes around injector nozzle to pry with a screwdriver.
4. Push in the new injector nozzle and throat assembly until it snaps into the valve. Clean or replace the injector screen.
5. Lubricate (silicone grease) the new O-ring seal place on the injector pad. Place the injector cover on the control valve, lining up the screw holes. Tighten securely with 2 screws.
6. Return the bypass to the normal service position.
7. Check for leaks at all seal areas. Cycle the valve to each position on both tanks for proper operation. Put the valve into the service position.

Remove / Install Control Valve

1. Turn off water to the valve.
   a. If the water softener has a three-valve bypass, first open the valve in the bypass line, then close the valves at the inlet and outlet.
   b. If the water softener has a bypass valve, put it in the bypass position.
   c. If there is only a shut off valve, close it.
2. Cycle the valve to the rinse (Regeneration Cycle Step #1) position to relieve pressure in the alve. Unplug the electrical cord from the outlet.
3. With a 1/4” nut driver, remove the 2 screws and mounting clips on the side of the valve at either adapter assembly.
4. Pull resin tank with adapter assembly away from the valve.
5. Temporarily support the valve, repeating steps 2 and 3 for remaining adapter.
6. With a 1/4” nut driver, remove the 2 screws and clips from the meter at the yoke or bypass.
7. Pull the valve and meter away from plumbing connections.
8. Replace and lubricate (silicone grease) the O-ring seals on the meter into the yoke or bypass. Attach with clips and screws, ensuring certain clips are seated firmly against the meter body.
9. Replace and lubricate (silicone grease) the O-ring seals on all couplings, and install in the valve.
10. Push the resin tank and adapter assembly into the couplings that are in the valve. With a 1/4” nut driver, attach the clips and screws, ensuring certain clips are seated firmly against the adapter assembly.
11. Repeat steps 8 and 9 for remaining resin tank.
12. Return the bypass to the normal service position.
13. Check for leaks at all seal areas. Cycle the valve to each position on both tanks for proper operation. Put the control valve in the service position.

Remove / Install Turbine Meter

1. Turn off water to control valve.
   a. If the water softener has a three-valve bypass, first open the valve in the bypass line, then close the valves at the inlet and outlet.
   b. If the water softener has a bypass valve, put it in the bypass position.
   c. If there is only a shut off valve, close it.
2. Cycle the valve to the rinse (Regeneration Cycle Step #1) position to relieve pressure in the valve. Unplug the electrical cord from the outlet.
3. With a 1/4” nut driver, remove the 2 screws and the flow meter clip. Secure the turbine meter to the valve and yoke or bypass.
4. Pull the meter out from the valve and bypass or yoke. Turn the turbine meter upside down.
5. Remove the meter cable. Use a screwdriver at the bottom of the meter (turbine or outlet side), pushing down the snap clip on the meter cable. Pull out the cable from the top of the turbine.
6. Replace and lubricate (silicone grease) the O-ring seals on the turbine meter, and install to the valve, and into the yoke or bypass. With a 1/4” nut driver, attach the clips and screws, ensuring certain clips are seated firmly against the turbine meter.
7. Install the meter cable into the turbine meter.
8. Return the bypass to the normal service position.
9. Plug electrical cord into the outlet. Check for leaks at all seal areas. Put the valve into the service position.

Brine Line Flow Controls (BLFC)
60022-12 ..... BLFC, .125 GPM, 5000/5600/9000
60022-25 ..... BLFC, .25 GPM, 5000/5600/9000
60022-50 ..... BLFC, .50 GPM, 5000/5600/9000

Brine Valve
60350..... Brine Valve Assy, 9000

Cage & Rotor
60147..... Cage & Rotor, Kit, Twinflo 100
19314..... Cage Assy, Twinflo100

Collectors, Upper
18280..... Collector, Top, 1" x .011, Gray,
..... Bayonet (.010 - .012 slot size)
18280-01 ..... Collector, Top, 1" x .020, White,
..... Wide Slot, Bayonet
..... (.019 - .022 slot size)
18280-02 ..... Collector, Top, 1" x .008, Red,
..... Narrow Slot, Bayonet
..... (.007 - .009 slot size)

Cover
40231..... Cover, Twinflo

Distributors
60795 -00 ..... Distributor Assy, 1", Std,
..... Gray, .011, w/72" Tube
..... (.010 - .012 slot size)
60795-01 ..... Distributor Assy, 1", Wide,
..... White, .020, w/72" Tube
..... (.019 - .022 slot size)
60795-02 ..... Distributor Assy, 1"
..... Narrow Red .008, w/72" Tube
..... (.007 - .009 slot size)

Drain Line Flow Controls
60705-xx..... Drain Line Flow Control

Flow Control Washers
Brine Line Flow Controls
17307..... Washer, Flow, .125 gpm
12094..... Washer, Flow, .25 gpm
10759..... Label, .5 gpm, 1.5 lbs
..... Salt/Min
Drain Line Flow Controls
19153..... Washer, Flow, .6 gpm
19151..... Washer, Flow, 1.0 gpm
19152..... Washer, Flow, .8 gpm
12085..... Washer, Flow, 1.2 gpm
19150..... Washer, Flow, 1.3 gpm
12086..... Washer, Flow, 1.5 gpm
19149..... Washer, Flow, 1.7 gpm
12087..... Washer, Flow, 2.0 gpm
12088..... Washer, Flow, 2.4 gpm

Injectors (1610)
18272-000 ..... Injector Assy, 1610, #000, Brown
18272-00 ..... Injector Assy, 1610, #00, Violet
18272-0 ..... Injector Assy, 1610, #0, Red
18272-1 ..... Injector Assy, 1610, #1, White
18272-2 ..... Injector Assy, 1610, #2, Blue

Meter Module
60626..... Meter Assy, Turbine,
..... Electronic 3/4" w/Clips and Screws
60626-01 ..... Meter Assy, Turbine, 3/4" w/Clips,
..... Screws, Mtr/Cable
19797..... Meter Assy, 3/4" Dual Port, SLP

Piston
60112..... Piston Assy, Twinflo 100, D/F

Safety Brine Valve
60014..... Safety Brine Valve Assy, 2310
60027-FFA..... Safety Brine Valve Body,
..... 2300 Fitting Facing Arm
60027-FFS..... Safety Brine Valve Body
..... Fitting Facing Stud

Seals & Spacers
60148..... Seal & Spacer Kit,
..... Twinflo100 Upper

Timer
42771..... Timer Assy, SXT, 8500

Yokes
41027-01 ..... Yoke, 3/4", NPT, Cast, Machd
41027-02 ..... Yoke, 3/4", BSP, Cast, Machd
13708-45 ..... Yoke, 3/4", Sweat
13708-45NP ..... Yoke, 3/4", Sweat/NP
13708-40 ..... Yoke, 1", Sweat
13708-40NP ..... Yoke, 1", Sweat/NP
41026-01 ..... Yoke, 1", NPT, Cast, Machd,
..... Stainless Steel
41026-02 ..... Yoke, 1", BSP, Cast, Machd,
..... Stainless Steel
41026-01 ..... Yoke, 1", NPT, Cast, Machd,
..... Stainless Steel
18706..... Yoke, 1", NPT, Plastic
18706-10 ..... Yoke, 1", BSP, Plastic
18706-02 ..... Yoke, 3/4", NPT, Plastic
18706-12 ..... Yoke, 3/4", BSP, Plastic
19275..... Yoke, Angle 90 Deg., 3/4", NPT
19275-45 ..... Yoke, Angle 90 Deg.,
..... 3/4 Sweat
19275-45NP ..... Yoke, Angle 90 Deg., 3/4"
..... Sweat/NP
19620-01 ..... Yoke Assy, 3/4", R/Angle, 90
..... Deg. w/O-rings, Clips and
..... Screws

P/N 42774 Rev. B 1/09