



FLECK 7000 NXT
SERVICE MANUAL



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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 system 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.
- It is established that when daytime water pressure exceeds 80 psi (5.5 bar), the maximum pressure rating of 125 psi (8.6 bar) can be exceeded. A pressure regulator must be installed on this system or warranty is voided.
- Do not install the unit where temperatures may drop below 32°F (0°C) or above 125°F (52°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 controller to maintain proper function.

JOB SPECIFICATION SHEET

NOTE: Some options may not be available depending on valve model or other options chosen.

Circle and/or fill in the appropriate data for future reference

1. System Type:

- A. Meter Immediate
- B. Time Clock Delayed
- C. Volume Override Delayed
- D. Volume Override Immediate
- E. Meter Delayed Weekly Reserve
- F. Meter Delayed Variable Reserve
- G. Meter Delayed Fixed Reserve

2. Valve Type: 7000NXT

3. Regenerant Flow:

- H. Downflow
- I. Filter
- J. Downflow Fill First

4. Display Format:

- K. U.S.
- L. Metric

5. Unit Capacity _____ Grains/Grams

6. Water Hardness _____ Grains/Grams

7. Capacity Safety Factor: Zero or _____ %

8. Volume Override: _____ Gallons or M³

9. Regeneration Day Override: Off or Every _____ Days

10. Regeneration Time: Immediate or Delayed _____ AM/PM

- M. Regeneration Cycle Step #1: __ : __ : __
- N. Regeneration Cycle Step #2: __ : __ : __
- O. Regeneration Cycle Step #2: __ : __ : __
- P. Regeneration Cycle Step #2: __ : __ : __
- Q. Regeneration Cycle Step #2: __ : __ : __
- R. Regeneration Cycle Step #2: __ : __ : __

11. Auxiliary Relay: Enabled or Disabled

- S. Auxiliary Relay Start #1: __ : __ : __
- T. Auxiliary Relay End #1: __ : __ : __

12. Chemical Pump: Enabled or Disabled

13. CPO Aux Relay Volume: _____ Gallons or M³

14. CPO Aux Relay: __ : __ : __

15. Flow Meter Size: 1.25" Turbine

16. Generic Flow Meter:

Maximum Flow Rate: Add __ Gallons every __ Pulses

INSTALLATION

Water Pressure

A minimum of 20 psi (1.4 bar) of water pressure is required for regeneration valve to operate effectively.

Electrical Facilities

An uninterrupted alternating current (A/C) supply is required. Make certain voltage supply is compatible with unit before installation and current supply is always on and cannot be turned off with another switch.

Existing Plumbing

Condition of existing plumbing should be free from lime and iron buildup. Replace piping that has heavy lime and/or iron build-up. If piping is clogged with iron, install a separate iron filter unit ahead of the water softener.

Location Of Softener And Drain

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

BYPASS VALVES

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

CAUTION Minimum water pressure is 20 psi (1.3 bar).
Water pressure is not to exceed 125 psi (8.6 bar).
Minimum water temperature is 34°F (1.1°C).
Water temperature is not to exceed 110°F (43°C).
Ambient temperature 34°F to 122°F (1.1 to 50°C).
Disconnect all power sources before servicing.
Always operate with cover in place.

NOTE: This product should be installed by qualified personnel. Comply with all plumbing codes when installing this product. Comply with all electrical codes when installing this product.

WARNING: This system must be depressurized before removing any connections for servicing.

Installation Instructions

1. Place the softener tank where you want to install the unit. Be sure the tank is level and on a firm, clean base.
2. Perform all plumbing according to local plumbing codes.
3. Refer to Figure 1. Cut the 1.05" (2.6 cm) distributor tube flush with the top of the tank (A). Deburr the outside of the tube (B) after cutting. Lubricate the O-ring (C) with non-petroleum based grease.
4. Lubricate the distributor O-ring seal and tank O-ring seal. Use only non-aerosol silicone lubricant.
5. Load media and place the control valve on the tank.
6. All soldering MUST be done on any connections requiring soldering prior to connecting the main control valve. The main control valve will be damaged if it is connected before soldering.

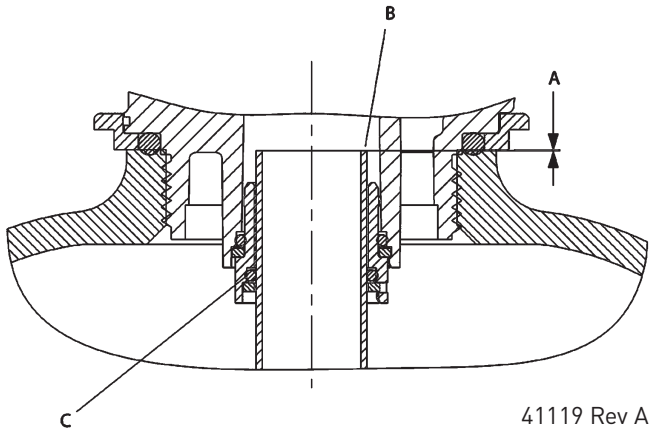
NOTE: Allow fittings to cool before connecting.

7. Apply plumber tape to all threaded fittings.
8. On units with a bypass, place in Bypass position. Turn on the main water supply. Open a cold soft water tap nearby and let water run a few minutes or until the plumbing is free of foreign material (usually solder) resulting from the installation. Close the water tap when water runs clean.
9. Make plumbing connections to valve.
10. Plug the valve into an approved power source. Make all

INSTALLATION *continued*

electrical connections according to codes.

11. Place the bypass In Service position. Cycle the valve to the Backwash position, and let the water flow slowly into the mineral tank until the air is purged from the unit.
12. Add water to the brine tank until the top of the air check is covered. Manually step the valve to the Brine Draw Position, and allow the valve to draw water from the brine tank until it stops. The air check will check at approximately the midpoint of the screened intake area.
13. Manually step the valve to the Brine Refill Position, and allow the valve to return to In Service automatically.
14. With the valve In Service, check that there is at least 1" (2.5 cm) of water above the grid (if used) in the brine tank.
15. Fill the brine tank with salt.
16. Allow the control to run automatically. Setup is now complete.



41119 Rev A

Figure 1

Multiple System Shutoff

For systems requiring no hard water bypass, a solenoid operated diaphragm valve can be installed in the service outlet pipe (see Figures 2, 3, and 4). The solenoid would be connected to the 24 VAC Bypass Relay terminal strip on the lower left portion of the NXT circuit board (Figure 6 7000NXT Circuit Board).

Plastic solenoid operated diaphragm valves are sold separately from the pipe adapter kits. For each valve ordered, one hardware kit, and one pipe adapter kit is required. Available plastic valve configurations include:

Valve	Hardware Kit (Includes 2 each nuts, O-ring, split ring)	Grooved Adapter Kit (Includes 2 adapters)
PN: 1071106 Model: K521-X200-1402F	PN: 1070244 Model: K521109	PN:1070226 - 1" Male Socket Weld Kit
		PN: 1070227 - 1" Male NPT Kit
		PN: 1070228 - 3/4" Female NPT Kit
		PN: 1071091 - 22 mm Male Socket Weld Kit

Valve	Hardware Kit (Includes 2 each nuts, O-ring, split ring)	Grooved Adapter Kit (Includes 2 adapters)
PN: 1071180 Model: K524-X200-1402F	PN: 1070246 Model: K524109	PN: 1070232 - 1.5" Male Socket Weld Kit
		PN: 1070233 - 1.5" Male NPT Kit
		PN: 1070234 - 1.25" Female NPT
		PN: 1071162 - 40 mm Male Socket Weld Kit

SYSTEM CONFIGURATIONS

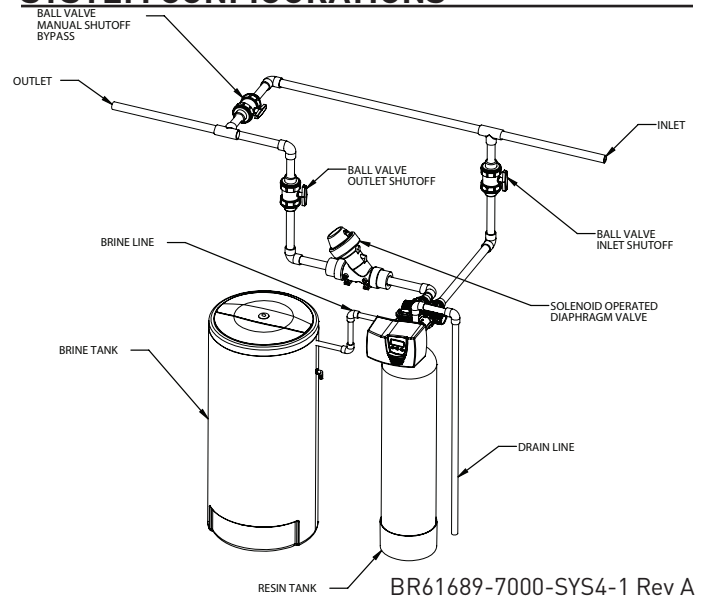


Figure 2 Single Tank Configuration (System 4)

SYSTEM CONFIGURATIONS *continued*

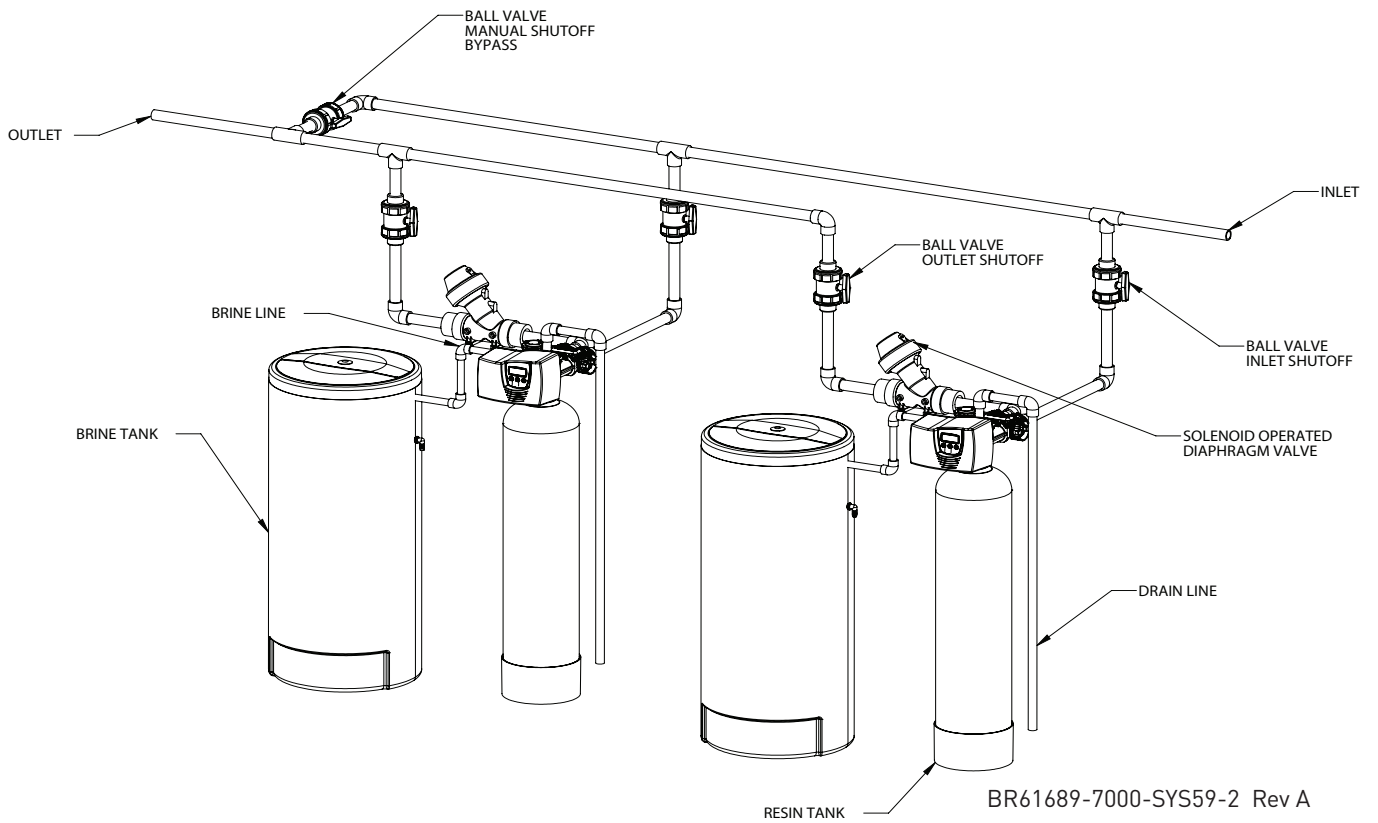


Figure 3 Interlocked / Multiple Tank Alternating Systems (Systems 5 and 9)

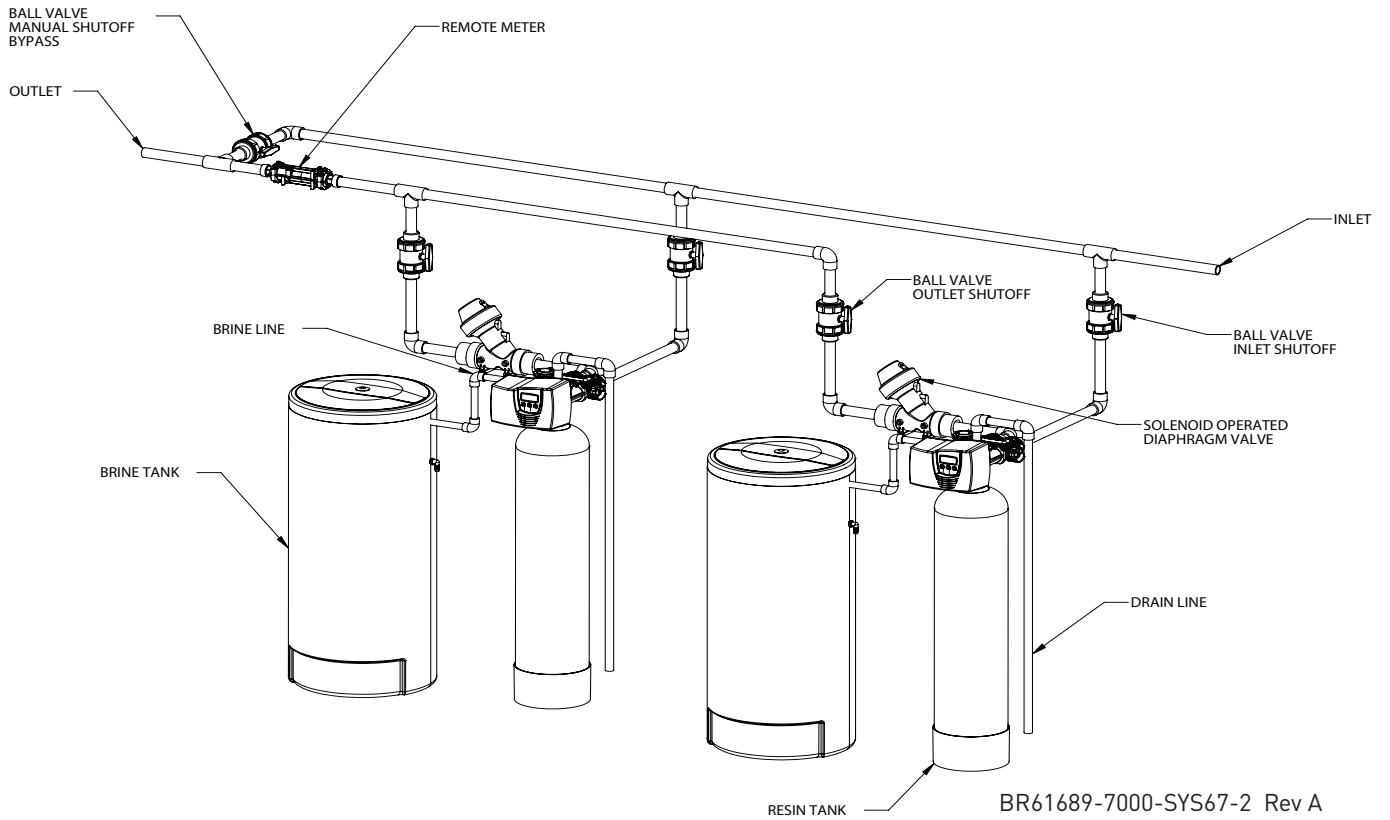


Figure 4 Series Regeneration / Twin Alternating Systems (Systems 6 and 7)

SYSTEM DEFINITIONS

System Number	System Description	# of Tanks/ Controls	Type	Operation Discussion
4	Single Unit	1	Time Clock: No Meter Immediate: One Meter Delayed: One Meter Remote Signal Start: No Meter	Single tank configuration.
5	Interlocked	2, 3, or 4	Immediate: All Meters Remote Signal Start: No Meter	All tanks in parallel supplying treated water. Each unit in the system will have its own flow meter/sensor input. The control will delay the start of Regeneration if another unit is already in Regeneration. Once that unit has completed a Regeneration cycle, and has returned to Service, the unit with longest regeneration queue time will begin Regeneration. No more than one unit will be in Regeneration at a time.
6	Series Regeneration	2, 3, or 4	Immediate: One Meter Delayed: One Meter Remote Signal Start: No Meter	All tanks in parallel supplying treated water. Only #1 control will monitor flow meter/sensor input. When a regeneration is required for the system, it will regenerate valve address #1 first, immediately followed by #2, then #3, then #4 if installed. No more than one unit will be in Regeneration at a time.
7	Twin Alternating	2	Immediate: One Meter Remote Signal Start: No Meter	One tank online supplying treated water, one tank in Standby. Only #1 control will monitor its flow meter/sensor input. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by the 24 VAC solenoid bypass on the NXT circuit board.
9	Multiple Tank Alternating	2, 3, or 4	Immediate: All Meters Remote Signal Start: No Meter	One, two, or three tanks online supplying treated water, one tank in Standby. Meter/sensor input is required on each tank. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by the 24 VAC solenoid bypass on the NXT circuit board.

TIMER OPERATION

Timer Operation During Programming

The timer enters the Program Mode in Standby or Service Mode as long as it is not in regeneration. While in the Program Mode the timer continues to operate normally monitoring water usage. Timer programming is stored in memory permanently.

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 all stored during a power failure. These settings 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).

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.

Remote Lockout

The timer does not allow the unit/system to go into Regeneration until the Regeneration Lockout Input signal to the unit is cleared. This requires a contact closure to activate the unit. The recommended gauge wire is 20 with a maximum length of 500 feet.

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 if no other networked unit is in Regeneration. If other units are in regeneration, it is added to a regeneration queue. This occurs regardless of the remaining volume available.

⚠ WARNING: Transformer must be grounded and ground wire must be terminated to the circuit board grounding screw before installation. Supplied 40VA transformer must be used.

TIMER DISPLAY FEATURES

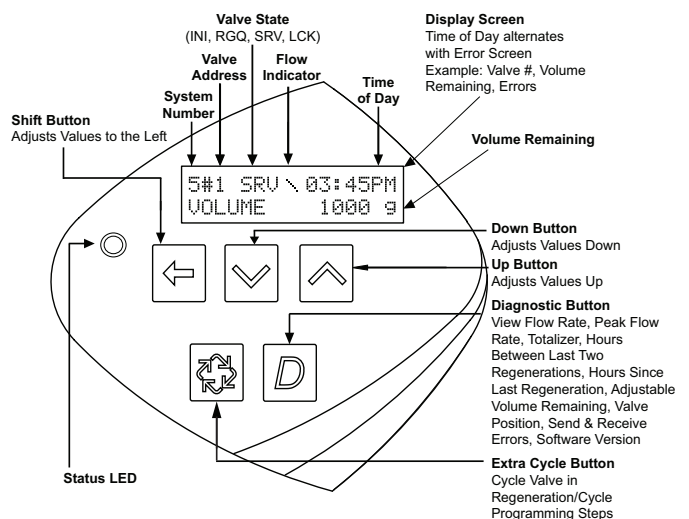


Figure 5

TIMER DISPLAY FEATURES *continued*

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 Extra Cycle button to toggle service (SRV) with RGQ.

SRV (Service) - SRV will display when the unit is In Service.

LCK (Lock) - Lock will be displayed when the terminal/remote input block P4 on the circuit board is switched to "lock". See the "Network/Communication Cables & Connections" section of this manual.

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). A blinking blue light indicates the timer is In Service, and queued for regeneration.

Green LED - Illuminates when the unit is in Regeneration mode, unless an error condition exists. A blinking green light indicates the timer is in Standby, and not in Regeneration.

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 flow is going through the meter.

TIMER DISPLAY - SCREEN EXAMPLES

- In Service: System 4 Time Clock

```

4#  SRV  03:45PM
REGEN IN 07 DAYS
    
```

- In Service: System 4 Flow Meter Initiated or System 4 Flow Meter Delayed

```

4#  SRV / 05:38PM
VOLUME: 1000 g
    
```

- In Service: System 5 Flow Meter Initiated (Lead Unit)

```

5#1 SRV / 05:38PM
VOLUME: 1000 g
    
```

- In Service: System 5 Flow Meter Initiated (Lag Unit #3)

```

5#3 SRV  03:45PM
VOLUME  1000 g
    
```

- In Service: System 6 Flow Meter Initiated (Lead Unit)

```

6#1 SRV / 05:38PM
SYSVOL 4000 g
    
```

NETWORK/COMMUNICATION CABLES AND CONNECTIONS

Use a CAT5 Network/Communication cable.

Connect the network/communication cable first before programming.

The maximum cable length between timers is 100 feet.

Connect each unit together from one communication port to the next communication port. It does not matter which one goes to the next one.

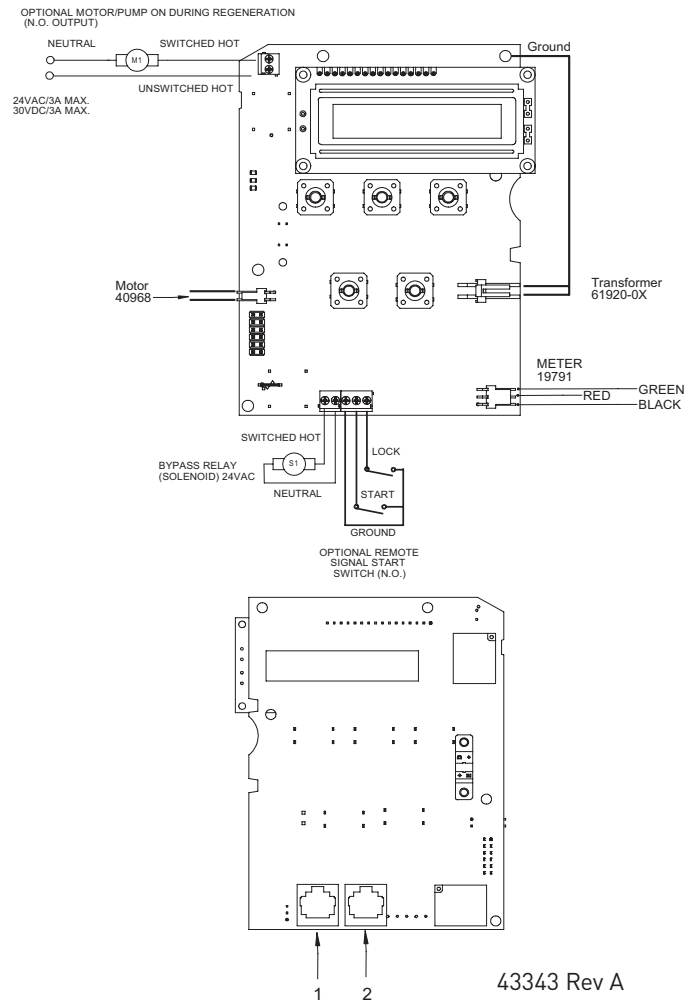


Figure 6 7000NXT Circuit Board

The number of network/communication cables needed for setup is one less than the total number of valves.

Two-Unit System: One network/communication cable

Three-Unit System: Two network/communication cables

Four-Unit Systems: Three network/communication cables

NXT Multi Language Programming Parameters and Ranges

System Type	4 Time Clock				4 Metered Immediate				4 Metered Delayed				5 Interlock				6 Series				7 Alternating				9 Alternating				Programming Parameter Ranges
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Valve Address																													1 thru 4
Select Language	x				x				x				x				x				x								English, Espanol 1 thru 4
System Size																													
Regen Type	x				x				x				x				x				x								Time Clock, Metered Delayed, Metered Immediate
Regenerant Flow	x				x				x				x				x				x								Downflow, Upflow, Upflow Fill First
Remote Signal Start	x				x				x				x				x				x								Off, 00:01:00 - 04:00:00
Display Format	x				x				x				x				x				x								Metric - Liters
Unit Capacity	x				x				x				x				x				x								9000 - 9900000 Grains 0 - 50%
Capacity Safety Factor																													
Feed Water Hardness																													1 - 199 Grains/Gallons 2 - 199 mg/l
Regeneration Day Override	x								x				x																Off, 1 - 99
Regeneration Time	x								x				x																12:00 a.m. - 11:59 p.m. 00:00:00 - 04:00:00
Cycle 1	x								x				x																00:00:00 - 04:00:00
Cycle 2	x								x				x																Off, 00:00:00 - 04:00:00
Cycle 3	x								x				x																Off, 00:00:00 - 04:00:00
Cycle 4	x								x				x																Off, 00:00:00 - 04:00:00
Cycle 5	x								x				x																Off, 00:00:00 - 04:00:00
Cycle 6	x								x				x																Off, 00:00:00 - 04:00:00
Auxiliary Relay																													Enabled, Disabled
Aux Relay Output Start																													00:00:00 to Total Regeneration Time - 1
Aux Relay Output End																													Start Time + 1 to Total Regeneration Time
Chemical Pump																													Enabled, Disabled
CPO Aux Relay Volume																													1 - 999 gallons 00.1 - 99.9 liters
CPO Aux Relay Time																													00:00:01 - 02:00:00 00:00:01 - 02:00:00
Flow Meter																													1.2t (7000), Generic
Generic																													
Maximum Flow Rate																													20 - 2000 GPM 2.0 - 200.0 m ³ /m
Add Gallons or m ³																													1 - 255 Gallons 1.0 - 25.5 m ³
Every Pulses																													1 - 255 1 - 255

o - Regeneration Time will only be viewed if Regeneration Day Override is used.

u - If Auxiliary Relay is Enabled then Chemical Pump Relay will not be viewed or if Chemical Pump Relay is Enabled then Auxiliary Relay will not be viewed.

c - All Relay Output parameters programming will be viewed if Enabled

a - If Generic Flow Meter is chosen, then programming parameters will be viewed.

Notes

MASTER PROGRAMMING MODE FLOW CHART

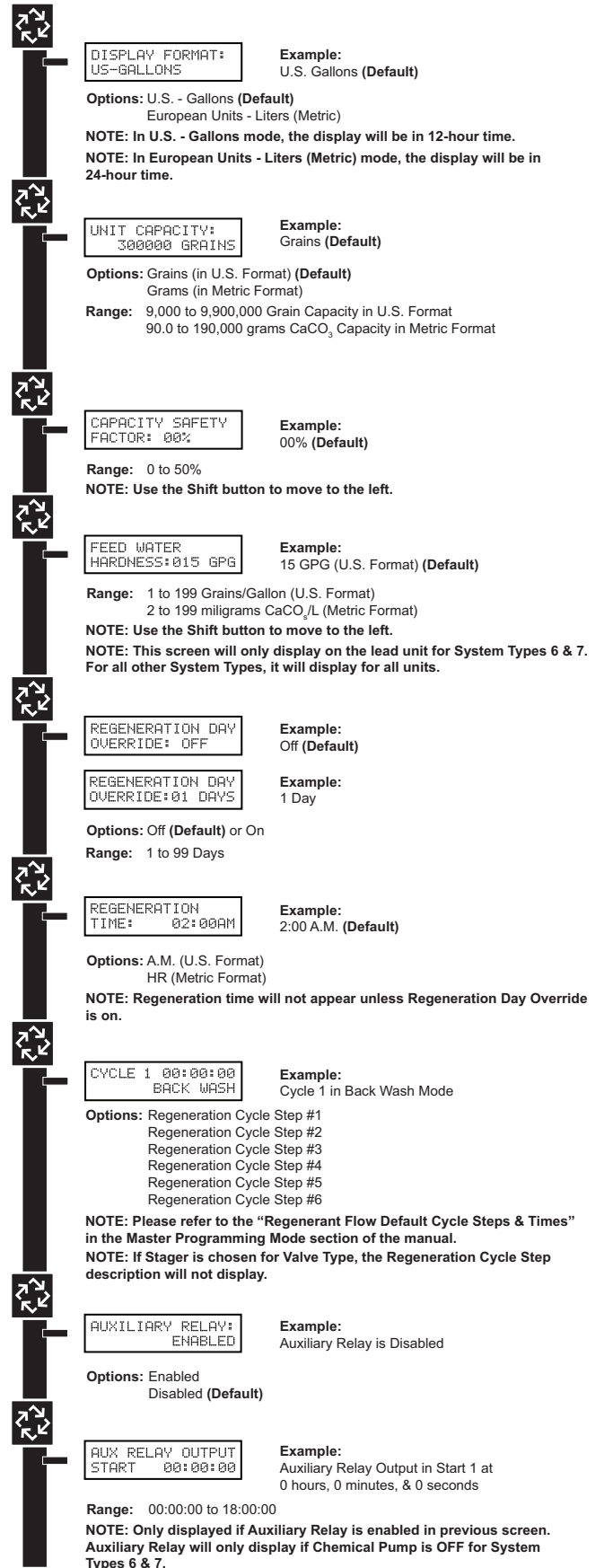
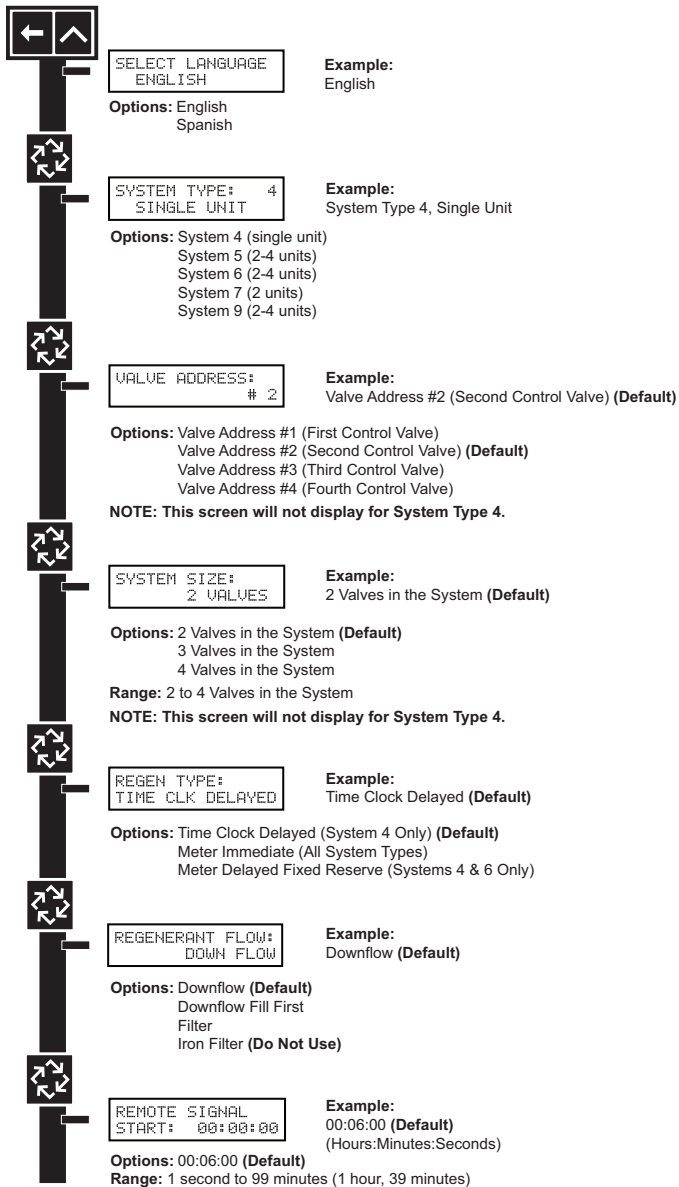
CAUTION Before entering Master Programming, please contact your local professional water dealer.

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

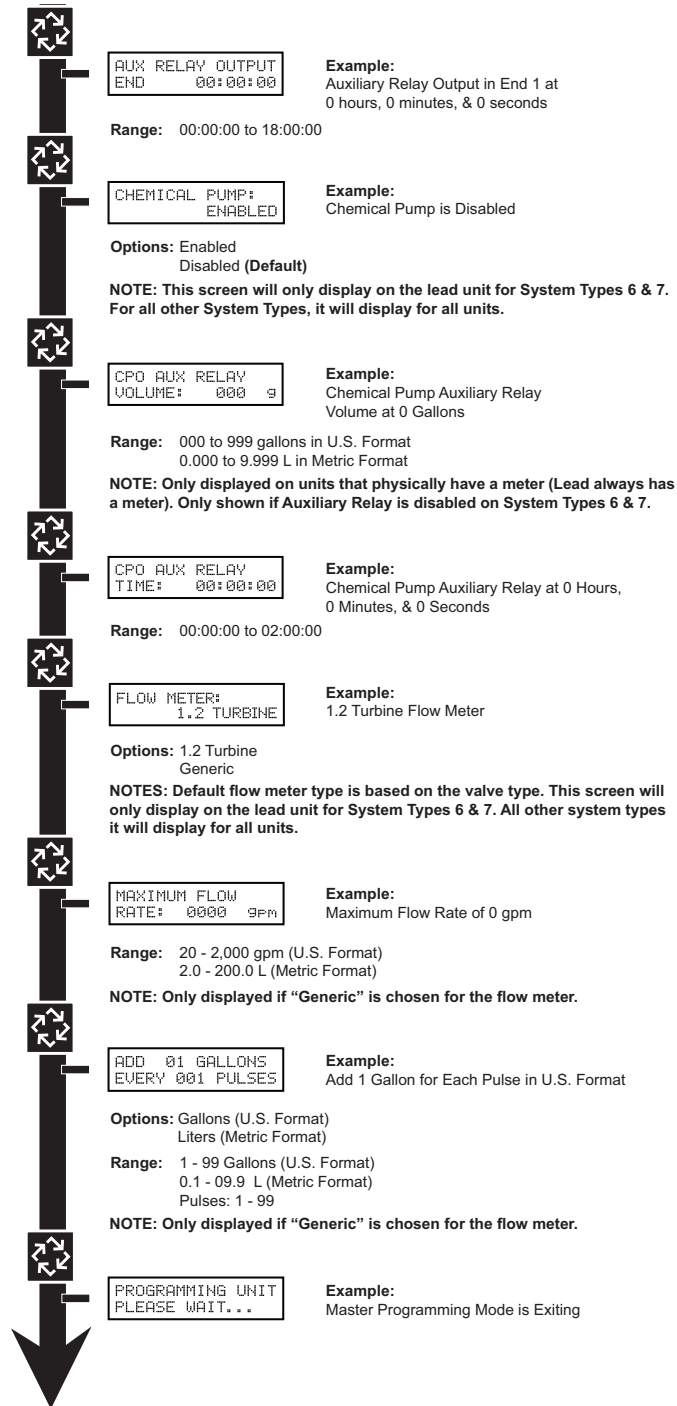
Entering Master Programming Mode

- Press and hold the Shift and Up buttons for 5 seconds. Press the Extra Cycle button once per display until all displays are viewed and Normal Display is resumed. Option setting displays may be changed as required by pressing either Up or Down button. Use the Shift button to move one space to the left.
- Depending on current valve programming, certain displays may not be viewed or set.

NOTE: If the "D" button is pressed while in master programming, no changes will be saved.



MASTER PROGRAMMING MODE FLOW CHART *continued*



MASTER PROGRAMMING GUIDE

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

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

Entering Master Programming Mode:

1. Press and hold the Shift and Up buttons for 5 seconds.
- OR
2. Set the time of day display to 12:01 PM or 12:01HR (See the "Setting the Time of Day" section on the "Timer Operation" page). Then go to the main display screen, press the Up and Down buttons at the same time for 5 seconds.

Exiting Master Programming Mode

1. Press the Extra Cycle button once per display until all are viewed. Master Programming Mode is exited and the normal display screen appears.
2. To exit the Master Programming Mode without saving changes, 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 saved, 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 prior to this procedure.

1. Choice of Language

This option selects the language for programming and display.

1. Use Up or Down to select language.
2. Press the Extra Cycle button.

```
SELECT LANGUAGE
ENGLISH
```

2. System Type

This program type selects the system type (4, 5, 6, 7, or 9).

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
SYSTEM TYPE: 4
SINGLE UNIT
```

3. Valve Address

This program step selects the valve address (1, 2, 3, or 4) within the network. The address is needed for each timer for communication. The #1 is the "master" or "lead" which contains programmed parameters, that will be used by all of the timer(s) in the network to control Regeneration, in Service, or Standby of all the valve(s) in the system. This option will be skipped if System 4 is selected.

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
VALVE ADDRESS:
# 2
```

MASTER PROGRAMMING GUIDE

continued

4. System Size

This program step is used to set up the number of valves (2, 3, or 4) in the system. This option will be skipped if System 4 is selected.

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
SYSTEM SIZE:
      2 VALVES
```

5. Regeneration Type

This program step is used to set up the trigger type.

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
REGEN TYPE:
TIME CLK DELAYED
```

6. Regenerant Flow

This program step selects the regenerant flow type (Downflow, Downflow Fill First, Filter, or Iron Filter).

CAUTION Do not select the Iron Filter option when programming this control. This selection is incompatible with the valve and may cause the valve to operate incorrectly.

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
REGENERANT FLOW:
      DOWN FLOW
```

7. Remote Signal Start

This program step selects the remote signal start. Hours, minutes, and seconds can be changed. When Remote Signal Start is active, the main screen will display. The options are either Off or set to the desired time.

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
REMOTE SIGNAL
START: 00:00:00
```

```
5#1 SRV / 05:38PM
SIGNAL 00:06:00
```

Example of setting Remote Signal Start to 6 minutes. The display counts down to 0. If Remote Signal Start is detected for 6 minutes, it will remotely signal start.

8. Display Format

This program step is used to set the desired volume display format. This option must be the same on all system units. U.S. will display volumes in gallons and is in 12 hour timekeeping. Metric will display volumes in liters and is in 24 hour timekeeping.

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```
DISPLAY FORMAT:
US-GALLONS
```

9. Unit Capacity

This program selects the individual timer's total capacity of hardness that can be removed. The unit capacity is measured in grains if in U.S. mode and grams CaCO₃ in Metric mode.

U.S. Range: 9,000 to 9,900,000 Grains
(Default = 300,000 Grains)

Metric Range: 90.0 to 199,000.0 grams CaCO₃
(Default = 300.0 grams CaCO₃)

1. Use the Shift button to select the digit you want to modify.
2. Use Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```
UNIT CAPACITY:
300000 GRAINS
```

10. Capacity Safety Factor

This program step is used to adjust the capacity of the system. This is a percentage by which the unit's capacity is reduced.

Range: 0 – 50% (Default = 0%)

1. Use the Shift button to select the digit you want to modify.
2. Use Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```
CAPACITY SAFETY
FACTOR: 00%
```

11. Feed Water (Hardness)

This program step is used to set the feed water hardness. The system will automatically calculate volume remaining based on the Unit Capacity, Capacity Safety Factor and Feed Water Hardness entered.

U.S. Range: 1 – 199 gpg (Grains per Gallon) (Default = 15)

Metric Range: 2 – 199 milligrams CaCO₃/Liter (Default = 30)

1. Use the Shift button to select the digit you want to modify.
2. Use Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```
FEED WATER
HARDNESS: 015 GPG
```

12. Regeneration Day Override

This program step sets the maximum amount of time (in days) the unit can be In Service without a Regeneration.

Default: OFF

Range: 1 - 99 Days

NOTE: If "On," the screen for regeneration time will display.

1. Use the Shift button to select the digit you want to modify.
2. Use Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```
REGENERATION DAY
OVERRIDE: OFF
```

```
REGENERATION DAY
OVERRIDE: 01 DAYS
```

MASTER PROGRAMMING GUIDE

continued

13. Regeneration Time

This program step sets time of day for a delayed regeneration to occur, or regeneration day override.

Default U.S.: 02:00 AM

Default Metric: 02:00 HR

1. Use the Shift button to select the digit you want to modify.
2. Use Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```

REGENERATION
TIME:      02:00AM
    
```

14. Regeneration Cycle Steps

This program step programs the Regeneration Cycle step times 1 through 5. Please refer to the chart below for regenerant flow default cycle steps and times.

Regenerant Flow	Cycle 1	Time	Cycle 2	Time
Downflow	Backwash	10 Minutes	Brine Draw/ Slow Rinse	60 Minutes
DF Fill First	Brine Tank Fill	10 Minutes	Brine Making	60 Minutes
Filter	Backwash	10 Minutes	Rapid Rinse	10 Minutes

Regenerant Flow	Cycle 3	Time	Cycle 4	Time
Downflow	2nd Backwash	10 Minutes	Rapid Rinse	12 Minutes
DF Fill First	Backwash	10 Minutes	Brine Draw/ Slow Rinse	10 Minutes
Filter	NA	NA	NA	NA

Regenerant Flow	Cycle 5	Time	Cycle 6	Time
Downflow	Brine Fill	12 Minutes	NA	NA
DF Fill First	2nd Backwash	5 Minutes	Rapid Rinse	10 Minutes
Filter	NA	NA	NA	NA

15. Auxiliary Relay Output

The next two displays are part of a series of settings used to program the optional relay output. The first setting turns the output On/Off during Regeneration only. The second turns the output On during Service only, every time a set volume of water used has accumulated.

```

AUXILIARY RELAY:
ENABLED
    
```

16. Timed Auxiliary Relay Output Window (Start & End Time Setting, If Auxiliary Relay is Enabled)

This option setting consists of two displays. The first display sets the turn-on time of the output, referenced to the start of the first Regeneration Cycle. The second display sets the output turn-off time, referenced again to the start of first Regeneration Cycle.

Start Time: Anytime during Regeneration (Except Last Minute of the Regeneration Time)

End Time: At start time, and anytime during the regeneration cycle.

```

AUX RELAY OUTPUT
START      00:00:00
    
```

```

AUX RELAY OUTPUT
END        00:00:00
    
```

17. Chemical Pump Auxiliary Relay Output Window

This option setting consists of two displays. The first display sets the volume of water flow at which the output turns On. The second display sets the time of the output.

U.S. Range: 0 – 999 Gallons (1 – 999 Seconds)

Metric Range: 0.00 – 9.99 m³ (1 – 999 Seconds)

1. Activate Output After Volume Set is Reached.
2. Use the Shift button to move one space to the left for each number entered.
3. Use Up or Down buttons to adjust this value.
4. Press the Extra Cycle button.

```

CHEMICAL PUMP:
ENABLED
    
```

```

CPO AUX RELAY
VOLUME:    000  g
    
```

```

CPO AUX RELAY
TIME:      00:00:00
    
```

18. Flow Meter Size (Default to Valve Type)

This program step sets the size of the flow meter.

1.2" Turbine

Generic Flow Meter

1. Use Up or Down buttons to adjust this value.
2. Press the Extra Cycle button.

```

FLOW METER:
1.2 TURBINE
    
```

MASTER PROGRAMMING GUIDE

continued

19. Maximum Flow Rate

This program step sets maximum flow rate of the generic flow meter.

1. Press the Shift button to select the digit you want to modify.
2. Press the Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```
MAXIMUM FLOW  
RATE: 0000 GPM
```

20. Pulses per Gallon/Liter

This program step sets the pulses per gallon/liter for generic flow meters.

1. Press the Shift button to select the digit you want to modify.
2. Press the Up or Down buttons to adjust this value.
3. Press the Extra Cycle button.

```
ADD 01 GALLONS  
EVERY 001 PULSES
```

22. End of Master Programming Mode

```
PROGRAMMING UNIT  
PLEASE WAIT...
```

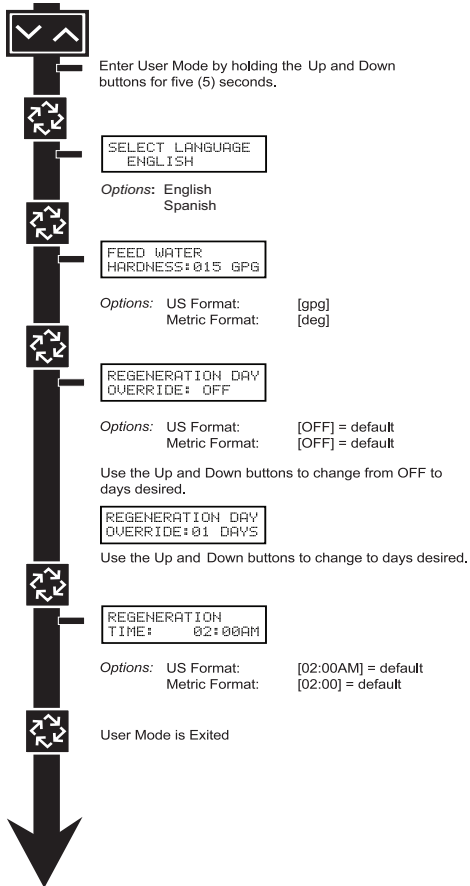
USER PROGRAMMING MODE FLOW CHART

NOTE: User Mode is only displayed when a metered option is chosen under System Type. Depending on current option settings, some displays cannot be viewed or set.

Entering User Mode

Hold the Up and Down buttons for 5 seconds.

NOTE: User Mode cannot be entered on the Lag unit for System 6.



1. Enter User Mode

- Press and hold the Up and Down buttons for 5 seconds.

2. Set Language Option

- Press Up or Down to select language.
- Press the Extra Cycle button to proceed to the next step.

3. Set Feed Water Hardness

- Press the Shift, Up, and Down buttons to move the cursor and change the value of the numbers.
- Press the Extra Cycle button to proceed to the next step.

NOTE: Only displayed when a metered option is chosen under System Type.

4. Set Regeneration Day Override

- To turn On and set the days, press the Down button.
- Press the Shift, Up, and Down buttons to move the cursor and change the value of the numbers.
- Press the Extra Cycle button to proceed to the next step.

5. Regeneration Time

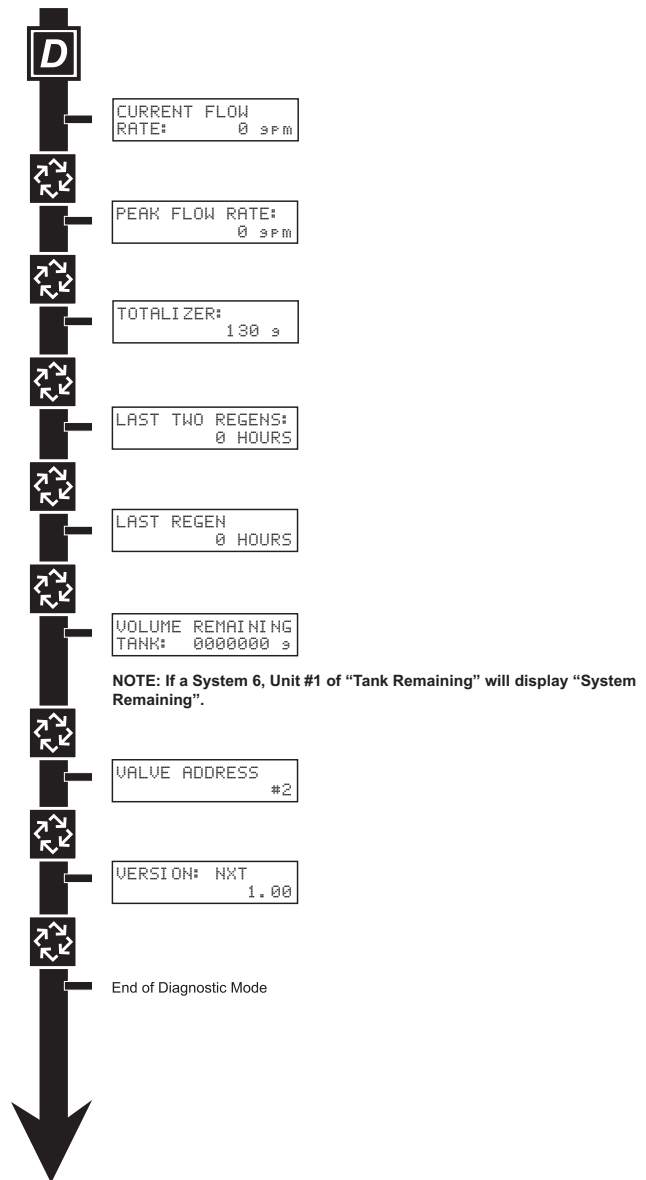
- Press the Shift, Up, and Down buttons to move the cursor and change the value of the numbers.
- Press the Extra Cycle button.

6. End of User Programming Mode

DIAGNOSTIC PROGRAMMING MODE FLOW CHART

Entering Diagnostic Mode

1. Push and release the "D" button.
2. Press the Extra Cycle button once per display until all displays are viewed and Normal Display is resumed. Changes will be saved.
3. Push and release the "D" button at anytime during diagnostic mode and the timer will exit the mode. No changes will be saved.
4. Depending on the current controller programming, certain displays may not be able to be viewed or set.



DIAGNOSTIC PROGRAMMING GUIDE

When the Diagnostics Mode is entered, all available displays are viewed as needed. Depending on current option settings, some displays cannot be viewed.

Overview Diagnostic Mode

The current diagnostic will be displayed until Extra Cycle key is pressed. There is no time limit on each display. The timer will display individual valve information, not system information. In the event of regeneration occurring while displaying diagnostics, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to the normal Time of Day display.

Entering and Exiting Diagnostic Mode

Push and Release the "D" button to enter. Pressing the Extra Cycle button will move to the next diagnostic to be displayed. Push the Extra Cycle button once per display until all are viewed. Pressing the Diagnostic button, while in the Diagnostic Mode, will cause the unit to leave the Diagnostic Mode and return to the normal time of day display.

Current Flow Rate

Flow Rate for this particular Timer will be calculated and displayed. Flow rates will be calculated every second. The display updates once per second. Flow rates are dependent upon the meter used.

- 1.2" Turbine Meter: 40 gpm

1. Press the Extra Cycle button.

```
CURRENT FLOW
RATE:      0 gpm
```

Peak Flow Rate

The Peak Flow Rate since the last regeneration will be captured.

Range: 0 to Maximum Number

1. Press the Extra Cycle button.

```
PEAK FLOW RATE:
                0 gpm
```

Totalizer

The total volume of treated water that passes through a meter will be counted.

NOTE: The user cannot edit below the current volume remaining.

1. Reset to zero by holding the Up and Down arrow keys for 5 seconds during the Totalizer display.
2. Press the Extra Cycle button.

```
TOTALIZER:
            0000000 g
```

Hours Between Last Two Regenerations

The hours between the last two regenerations will be saved and displayed.

1. Depress the Extra Cycle button.

```
LAST TWO REGENS:
                0000 HOURS
```

Hours Since Last Regeneration

The hours since the last regeneration will be saved and displayed.

1. Depress the Extra Cycle button.

```
LAST REGEN:
            0000 HOURS
```

Volume Remaining (This Tank Only)

Volume remaining in the current tank will be adjustable when displayed in this mode. Regeneration will occur if set to zero.

NOTE: Volume Remaining will not display for System Type 6.

The maximum ranges are the same as the maximum volume calculated on the main screen.

1. Press the Shift button to select the digit you want to modify.
2. Use Up or Down buttons to adjust this value.
3. Depress the Extra Cycle button

```
VOLUME REMAINING
TANK: 0000000 g
```

Volume Remaining (System)

Volume remaining in the system cannot be edited when displayed in this mode, except for the Lead unit. It can only be viewed on the Lag unit.

1. Depress the Extra Cycle button

```
VOLUME REMAINING
SYS: 000000000 g
```

Valve Address

This diagnostic display is for 2 control valves or more in a system. Single valve systems (System 4) do not display this option.

1. Depress the Extra Cycle button.

```
VALVE ADDRESS:
                # 2
```

Software Version

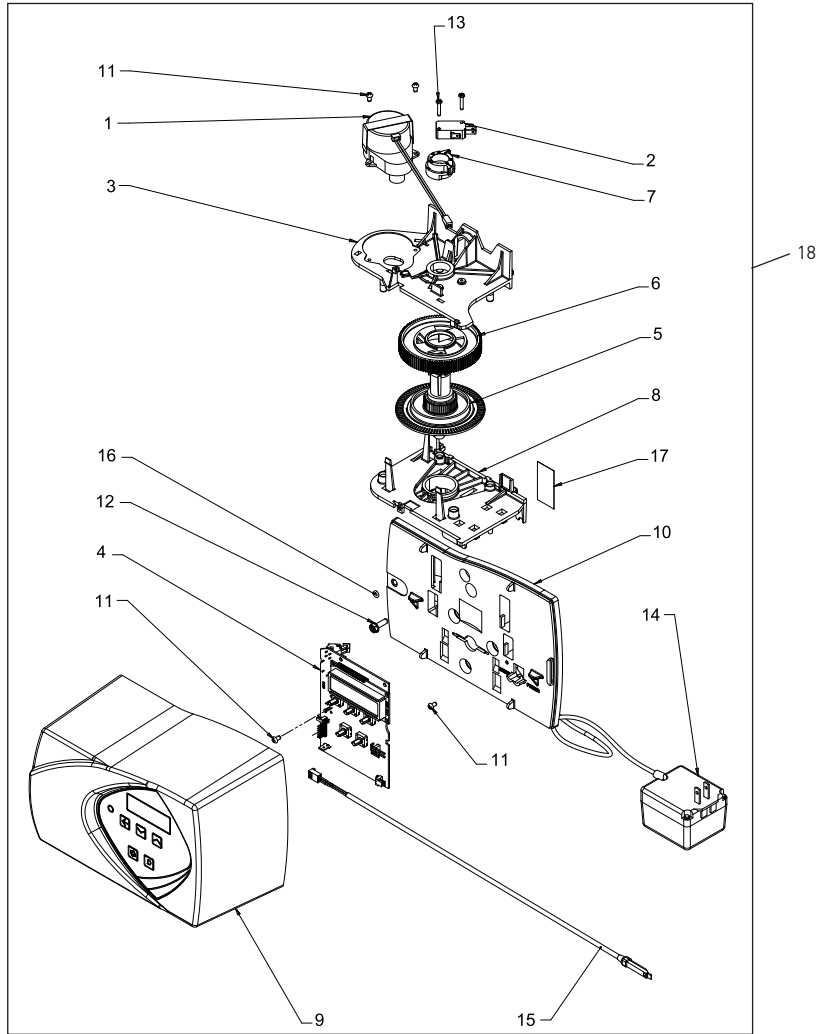
The electronic timer's software program version number will be displayed.

1. Depress the Extra Cycle button to exit.

```
VERSION: NXT
                X.XX
```

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

POWERHEAD ASSEMBLY



61501-7000XT Rev A

Item No.	QTY	Part No.	Description	
1	1	42349	Motor, 24V, 2 RPM, 7000	
2	1	10218	Switch, Micro	
3	1	40978	Plate, Upper Support	
4	1	61729	Circuit Board Assy, 7000 NXT	
5	1	40702	Shaft, Encoder, 7000	
6	1	40703	Gear, Main	
7	1	40704	Cam, Brine, Downflow	
8	1	40979	Plate, Lower Support	
9	1	61635-01	Cover Assy, 7000-II, Black	
		1	61634-01	Cover Assy, 7000-II, Gray
10	1	40980-20	Backplate, 7000NXT	
11	4	13602	Screw, Phil Rd Hd, 6-32 x 5/16	
12	1	12473	Screw, Hex Wsh, 10-24 x 5/8	
13	2	11805	Screw, Rd Hd, 4-40 x 5/8 Type 1	
14	1	61920-01	Transformer Assy, 7000NXT, 40VA, US	
		61920-02	Transformer Assy, 7000NXT, 40VA, Japan	
		61920-03	Transformer Assy, 7000NXT, 40VA, Europe	
		61920-04	Transformer Assy, 7000NXT, 40VA, Australia	
15	1	19791-01	Meter Cable Assy, Turbine/SE	

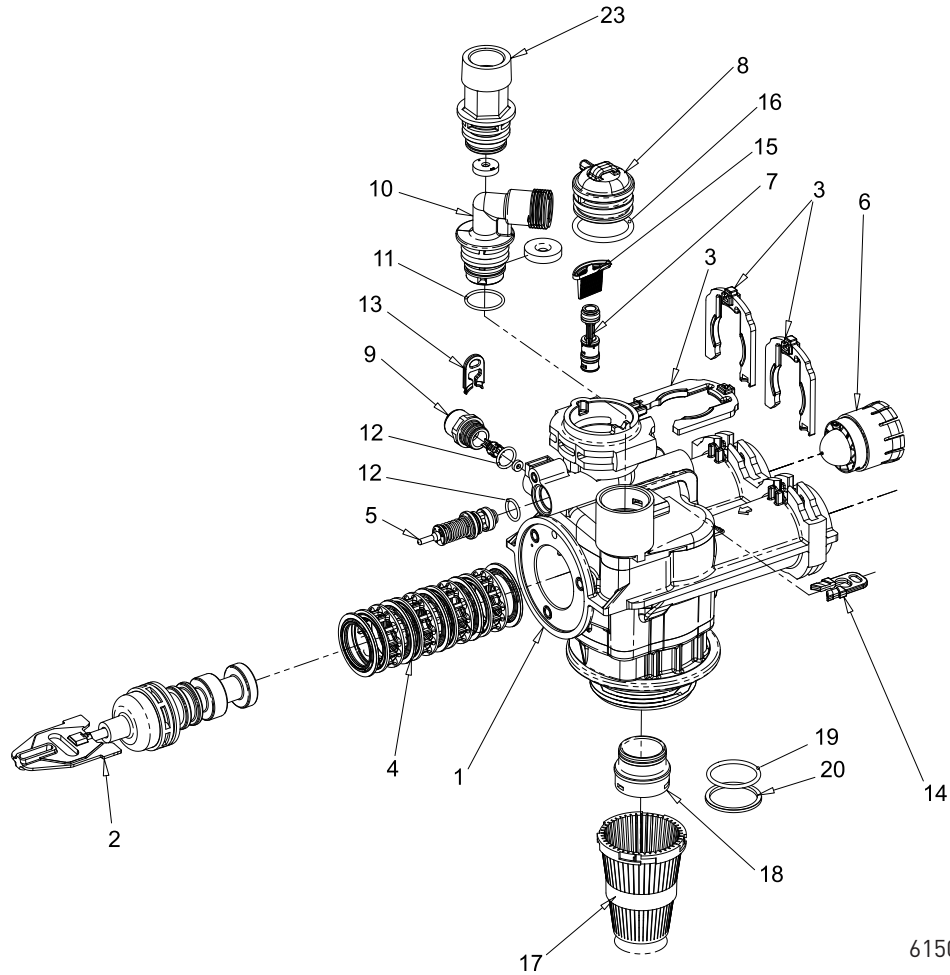
16	1	41122	O-ring, -007
17	1	40960-03	Label, UL Nameplate, 7000, US/24
18	*		7000 Complete Powerhead

Not Shown:

1..... 61763Kit, CAN Communication Cable

*Call your distributor for Part Number

CONTROL VALVE ASSEMBLY



61500-7000EXP Rev C

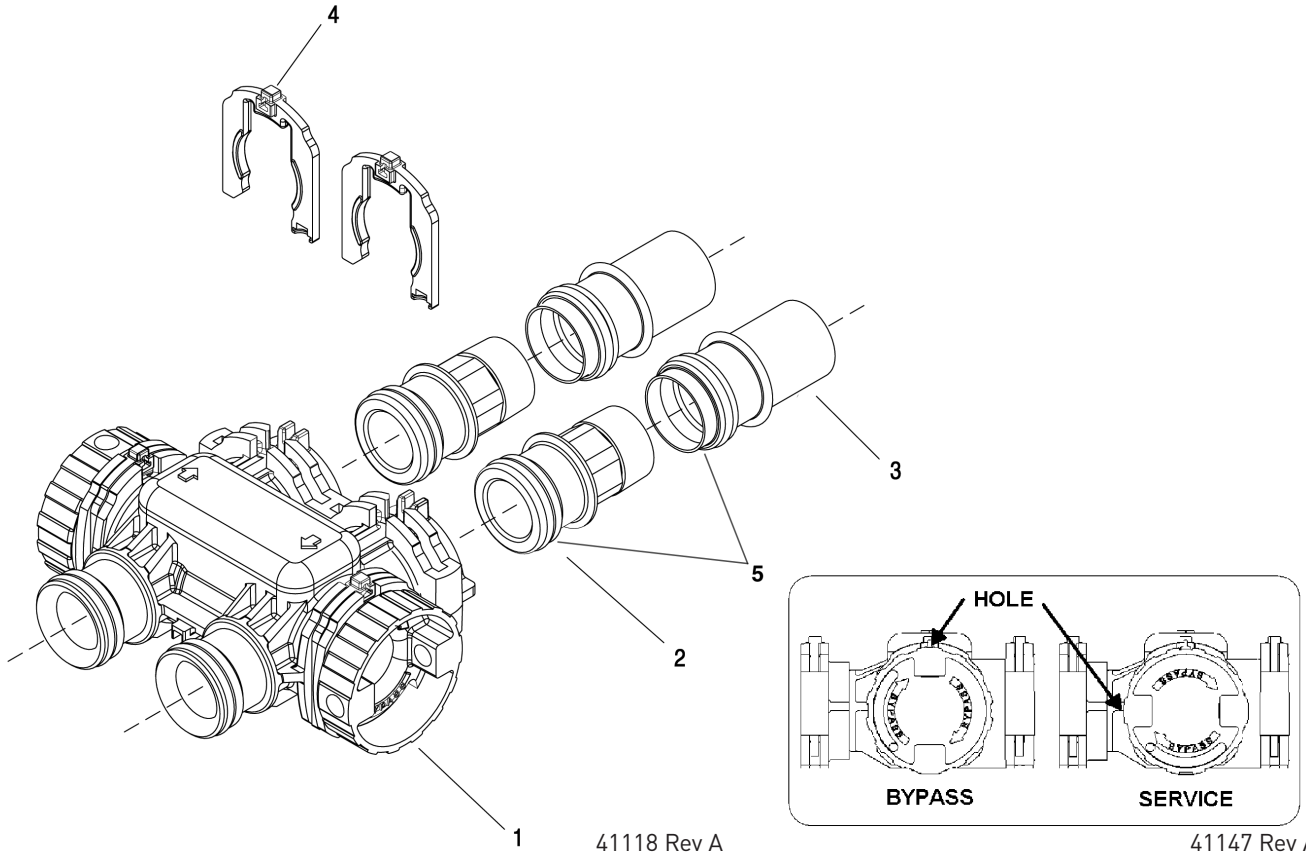
Item No.	QTY	Part No.	Description
1	1	61050	Valve Body Assy, 7000, 32 mm Dist
2	1	61542-10	Piston Assy, 7000, Softener, D/F 35 gpm
		61453-10	Piston Assy, 7000, Softener, D/F 28 gpm
		61452-20	Piston Assy, 7000, Filter 35GPM
3	3	40576	Clip, H, Plastic, 7000
4	1	61438	Seal & Spacer Kit, 7000, D/F
5	1	60016-01	Brine Valve Assy, 7000, 560CD
6	1	40577	Turbine Meter Assy, 7000
7	1	61XXX	Injector Assy, 7000
8	1	40556	Cap, Injector
9	1	61XXX	BLFC Assemblies
10	1	61XXX	DLFC Assemblies
11	1	43776	O-ring, -021, 7000, CSTM
12	2	13302-01	O-ring, -014, 560CD

Item No.	QTY	Part No.	Description
13	1	40946	Clip, Brine Retaining
14	1	40945	Clip, Drain Retaining
15	1	40950	Screen, Injector, 7000
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

Not Shown:

.....	40677	Tube, Distributor, 32MM
.....	40924	Distributor, 32MM
.....	40697-02	Collector, 32MM Bayonet
.....	12763-10	Stuffer Tool Assy, 7000
.....	40947-01	Plug, Brine Valve, w/O-ring
.....	40990-01	Plug, Injector, w/O-ring

BYPASS ASSEMBLY



41118 Rev A

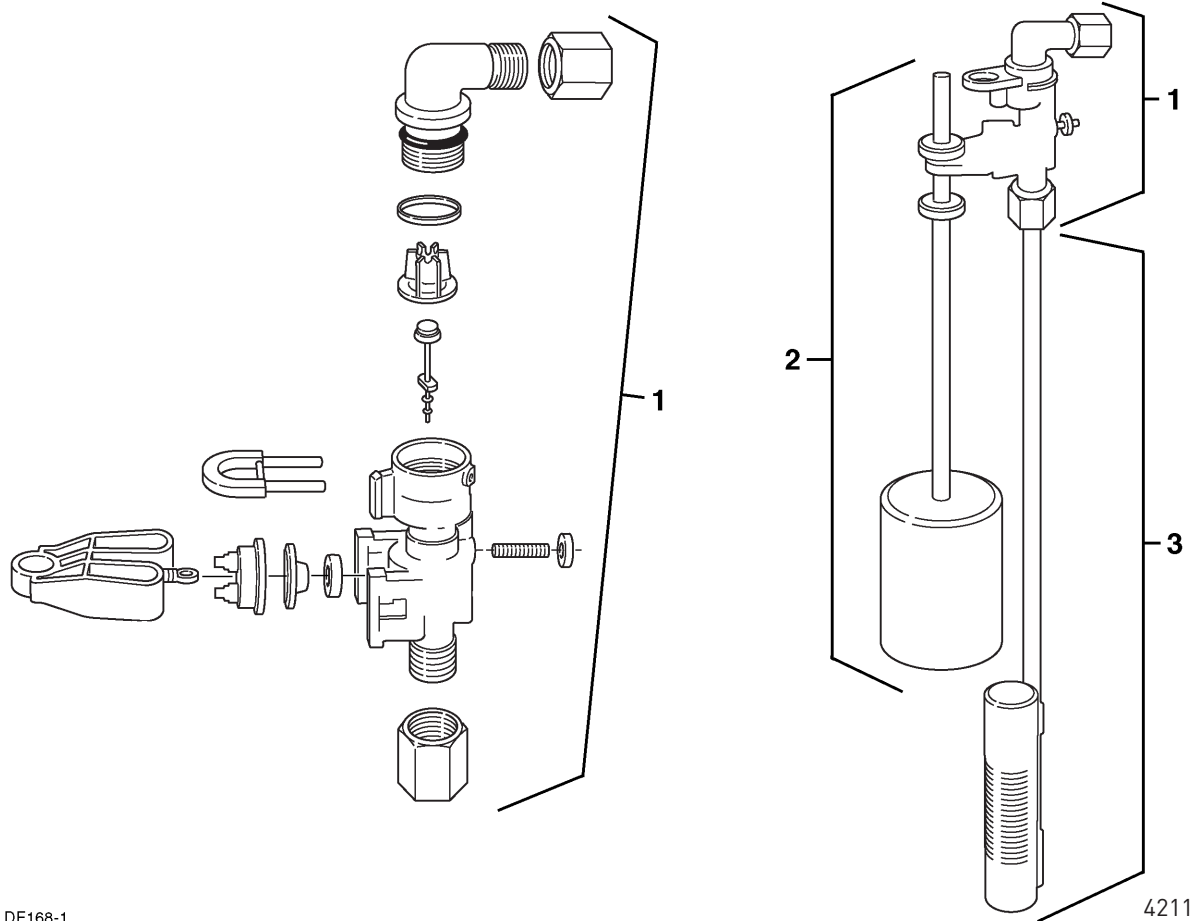
41147 Rev A

Item No.	QTY	Part No.	Description
1.....	1.....	40569.....	Bypass Assembly, 7000, Less Clip
2.....	2.....	40563-01.....	Connector Assy, 1" NPT, w/O-ring
		..... 40563-11.....	Connector Assy, 1" BSP, w/O-ring
		..... 40565-01.....	Connector Assy, 1 1/4" NPT w/O-ring
		..... 40565-11.....	Connector Assy, 1 1/4" BSP w/O-ring
3.....	2.....	41242-01.....	Connector Assy, 1" & 1/4" Sweat, w/O-ring
		..... 41243-01.....	Connector Assy, 1 1/4" & 1 1/2" Sweat, w/O-ring
4.....	2.....	40576.....	Clip, H, Plastic, 7000
5.....	1.....	40951.....	O-ring, -220

Not Shown:

1.....	61462.....	By-Pass Service Kit, 7000 (Includes all internal parts for 7000 bypass assembly - bypass body not included)
--------	------------	--

2310 SAFETY BRINE VALVE



DF168-1

42112 Rev A

Item No.	QTY	Part No.	Description
1.....	1.....	60014	Safety Brine Valve Assy, 2310
2.....	1.....	60068-30.....	Float Assy, 2310, w/30" Rod
3.....	1.....	60002-34.....	Air Check, #500

TROUBLESHOOTING

Detected Errors

NOTE: It can take up to 30 seconds for an error to be detected and displayed. All errors on each timer in the system must be displayed before the errors can be corrected.

If a communication error is detected, an Error Screen will alternate with the Main (time of day) Screen every few seconds.

- All units In Service remain in the In Service position.
- All units in Standby go to In Service.
- Any unit in Regeneration when the error occurs completes Regeneration and goes to In Service.
- No units are allowed to start a Regeneration Cycle while the error condition exists, unless they are manually forced into Regeneration.
- When an error is corrected and the error no longer displays (it may take several seconds for all of the units in a system to stop displaying the error message), the system returns to normal operation.

NOTE: During the error condition the control continues to monitor the flow meter and update the volume remaining. Once the error condition is corrected all units return to the operating status they were in prior to the error. Regeneration queue is rebuilt according to the normal system operation. Or, if more than one unit has been queued for regeneration, then the queue is rebuilt according to which one communicates first.

Cause For Error	Correction
One or more units have a missing or bad communication cable.	Connect the communication cables and/or replace.
One or more units has a communication cable plugged into the wrong receptacle.	Connect the communication cable as shown in the wiring diagrams.
One or more units is not powered.	Power all units.

Programming Errors

During the error condition the control continues to monitor the flow meter and update the remaining capacity. Once the error condition is corrected all units return to the operating status they were in prior to the error and regeneration is queued according to the normal system operation. If reprogramming the unit in the Master Programming Mode clears the error, the volume remaining may be reset to the full unit capacity (i.e. as though it were just regenerated).

- All units in Standby go In Service.
- Any unit in regeneration when the error occurs completes regeneration and goes to In Service.
- No units are allowed to start a regeneration cycle while the error condition exists.

When the problem is corrected and the error no longer displays (it may take several seconds for all of the units in a system to stop displaying the error message), the system returns to normal operation.

Programming Errors Detected

- Duplicate unit addresses or numbers
- Size of system ex: if sized for a 4 units, and only have 2 units
- Display format mismatches

Solution

- Program the units correctly in the Master Programming Mode.

NOTE: If these errors are detected, numbers 1 through 3 become true, and the main screen (time of day) will alternate with an error screen.

Cause For Error	Correction
Any or all of two or more units programmed with the same unit number (Matching Address Error)	Program the units correctly in the Master Programming Mode
Flashing/blinking display	Power outage has occurred
Format Mismatch (Units have both U.S. and Metric Formats)	Verify all units have same Format selected (all U.S. or all Metric)
No messages displayed/small black squares appear in display	Turn the contrast button on the back of unit until text appears
Size Error (Units not correctly numbered/more than one unit has the same number assigned)	Check each unit and verify each as the correct number, and that each number is used once
Com Error (Communication Error)	Check the wiring of the system and verify it is correct and that all are connected

TROUBLESHOOTING *continued*

Example Error Screens

Detected Error

```
DETECTED ERROR=  
E2      RESET UNIT
```

1. Go through Master Programming to program the unit.

No Message #1

```
DETECTED ERROR=  
NO MESSAGE #1
```

1. Make sure all communication cables are connected.
2. If "No Message #1" ensure it is the lead unit.
3. Ensure #1 is configured for the correct system type.

No Message #3

```
DETECTED ERROR=  
NO MESSAGE #3
```

1. Make sure all communication cables are connected.
2. If "No Message #3" ensure it is unit #3.
3. Ensure #3 is configured for the correct system type.

Program Mismatch

```
DETECTED ERROR=  
PROGRAM MISMATCH
```

1. Ensure the units on the network are not configured the same as #1/the Lead unit.

Exceed Unit Size

```
DETECTED ERROR=  
EXCEED UNIT SIZE
```

1. There are more units on the system than the Lead is programmed for.

Matching Address

```
DETECTED ERROR=  
MATCHING ADDRESS
```

1. The unit is programmed the same # as another unit.

NOTE: The rest of the system will still function without this unit.

GENERAL SERVICE HINTS FOR METER CONTROL

Problem: Softener delivers hard water

Reason: Reserve capacity has been exceeded.

Correction: Check salt dosage requirements and review programmed unit capacity, capacity safety factor, and feed water hardness settings.

Reason: Meter is not measuring flow.

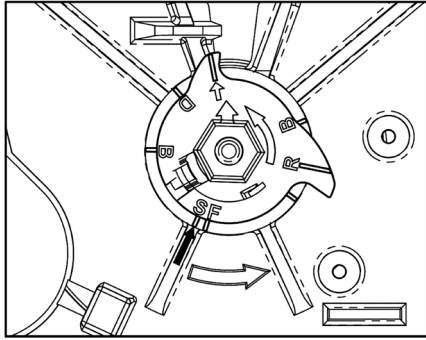
Correction: Check meter with meter checker.

TROUBLESHOOTING *continued*

Problem	Cause	Correction
Water conditioner fails to regenerate.	Electrical service to unit has been interrupted	Assure permanent electrical service (check fuse, plug, pull chain, or switch).
	Timer is defective.	Replace timer.
	Power failure.	Reset time of day.
Hard water.	By-pass valve is open.	Close by-pass valve.
	No salt is in brine tank.	Add salt to brine tank and maintain salt level above water level.
	Injector screen plugged.	Clean injector screen.
	Insufficient water flowing into brine tank.	Check brine tank fill time and clean brine line flow control if plugged.
	Hot water tank hardness.	Repeated flushings of the hot water tank is required.
	Leak at distributor tube.	Make sure distributor tube is not cracked. Check O-ring and tube pilot.
	Internal valve leak.	Replace seals and spacers and/or piston.
Unit used too much salt.	Improper salt setting.	Check salt usage and salt setting.
	Excessive water in brine tank.	See "Excessive water in brine tank".
Loss of water pressure.	Iron buildup in line to water conditioner.	Clean line to water conditioner.
	Iron buildup in water conditioner.	Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration.
	Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	Remove piston and clean control.
Loss of mineral through drain line.	Air in water system.	Assure that well system has proper air eliminator control. Check for dry well condition.
	Improperly sized drain line flow control.	Check for proper drain rate.
Iron in conditioned water.	Fouled mineral bed.	Check backwash, brine draw, and brine tank fill. Increase frequency of regeneration. Increase backwash time.
Excessive water in brine tank.	Plugged drain line flow control.	Clean flow control.
	Plugged injector system.	Clean injector and screen.
	Timer not cycling.	Replace timer.
	Foreign material in brine valve.	Replace brine valve seat and clean valve.
	Foreign material in brine line flow control.	Clean brine line flow control.
Softener fails to draw brine.	Drain line flow control is plugged.	Clean drain line flow control.
	Injector is plugged.	Clean injector.
	Injector screen plugged.	Clean screen.
	Line pressure is too low.	Increase line pressure to 20 psi (1.3 bar).
	Internal control leak	Change seals, spacers, and piston assembly.
	Service adapter did not cycle.	Check drive motor and switches.
Control cycles continuously.	Misadjusted, broken, or shorted switch.	Determine if switch or timer is faulty and replace it, or replace complete power head.
Drain flows continuously.	Valve is not programming correctly.	Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	Foreign material in control.	Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	Internal control leak.	Replace seals and piston assembly.
No hard water bypass solenoid not operating	Incorrect power transformer.	Replace with 40VA transformer (P/N 61920-0X).

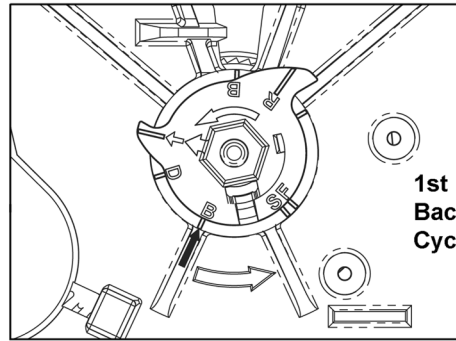
WATER CONDITIONER FLOW DIAGRAMS

In Service Position

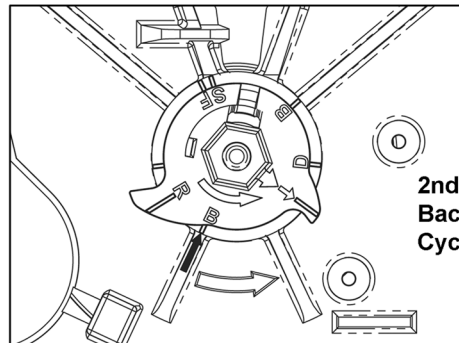


40988 Rev A

Backwash Position

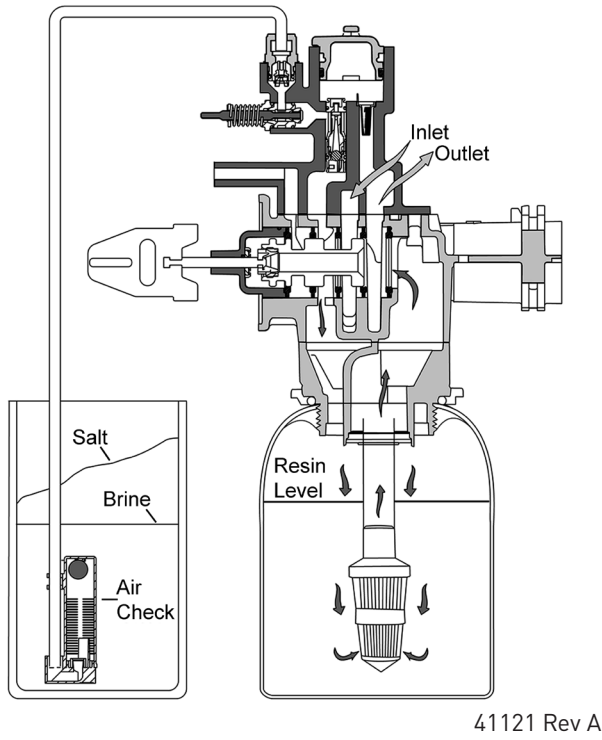


1st Backwash Cycle

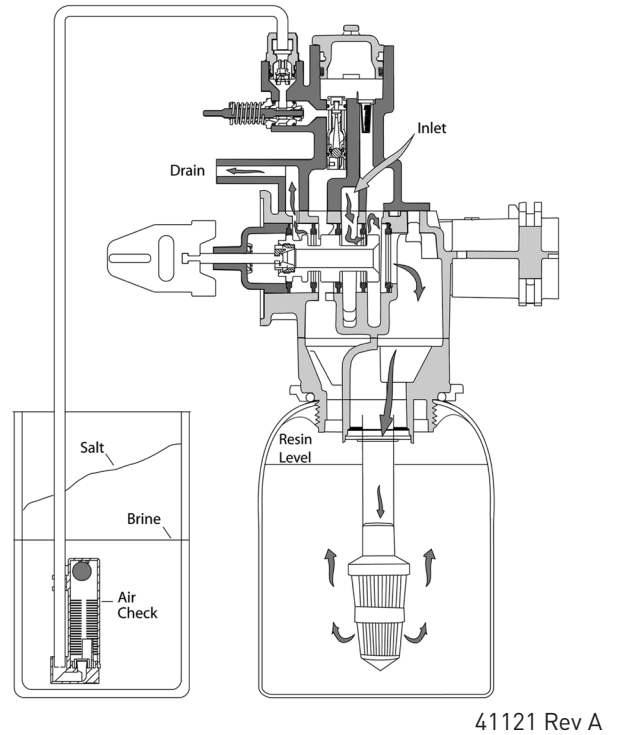


2nd Backwash Cycle

40988 Rev A



41121 Rev A

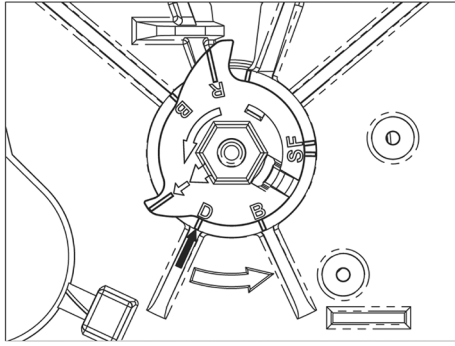


41121 Rev A

WATER CONDITIONER FLOW DIAGRAMS

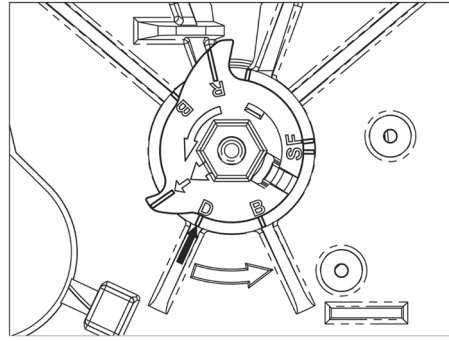
continued

Brine Position

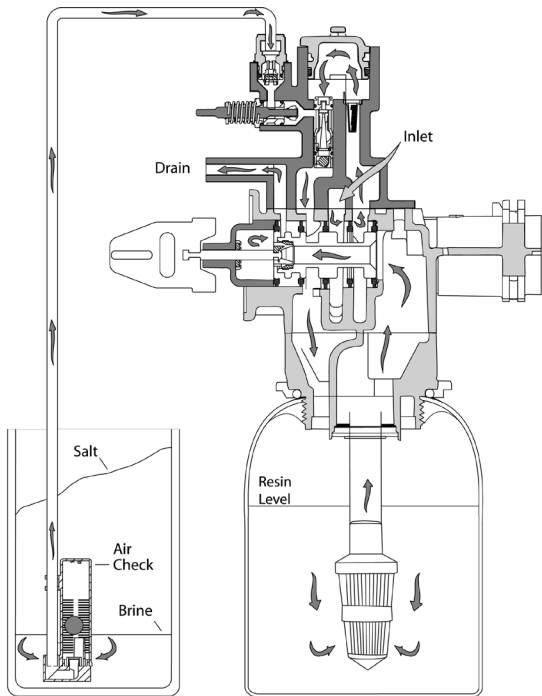


40988 Rev A

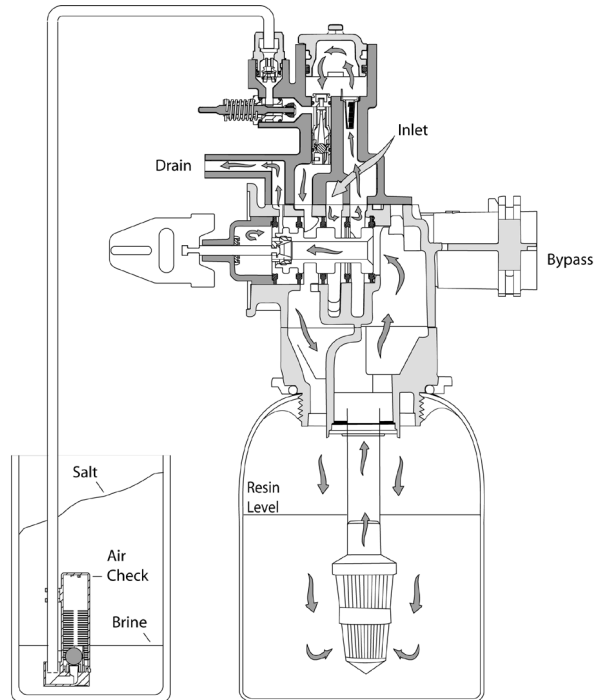
Slow Rinse Position



40988 Rev A



41121 Rev A

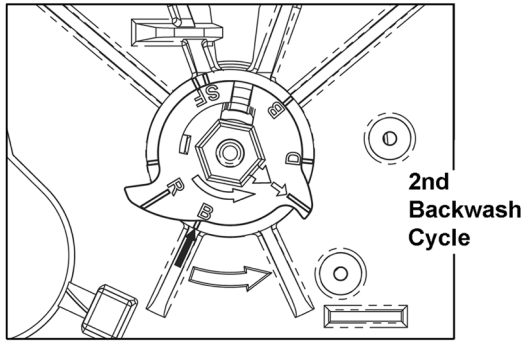


41121 Rev A

WATER CONDITIONER FLOW DIAGRAMS

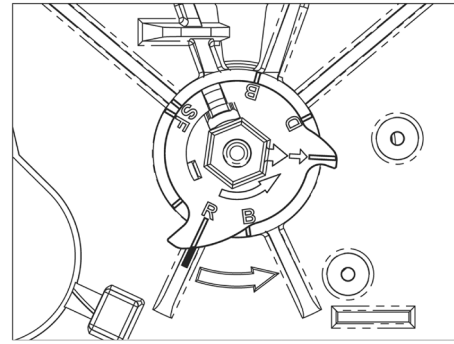
continued

Second Backwash Position

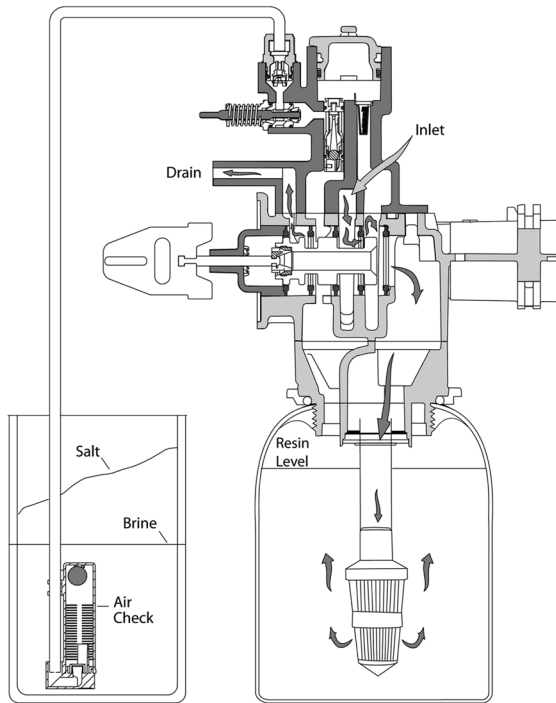


40988 Rev A

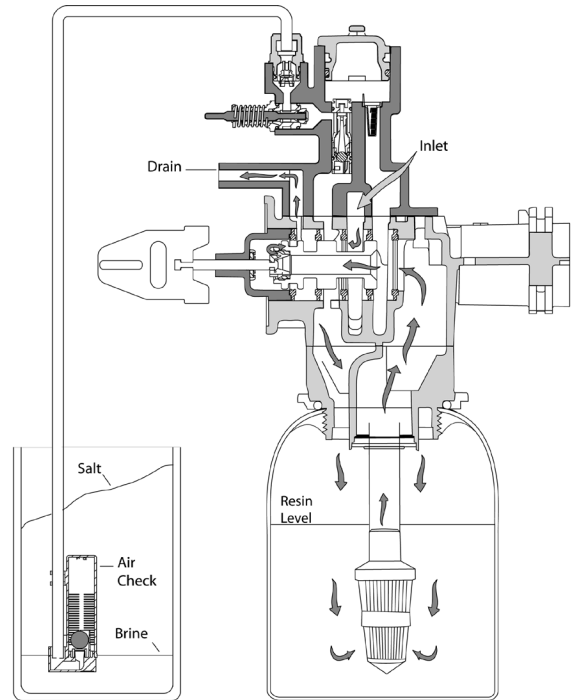
Rapid Rinse Position



40988 Rev A



41121 Rev A

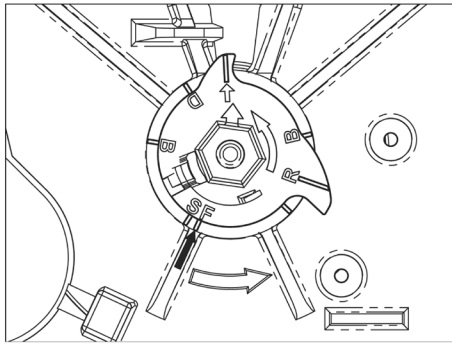


41121 Rev A

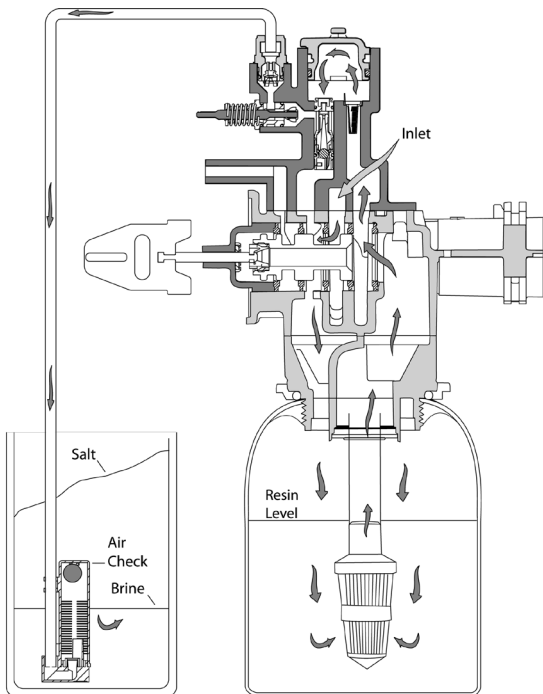
WATER CONDITIONER FLOW DIAGRAMS

continued

Brine Tank Refill Position

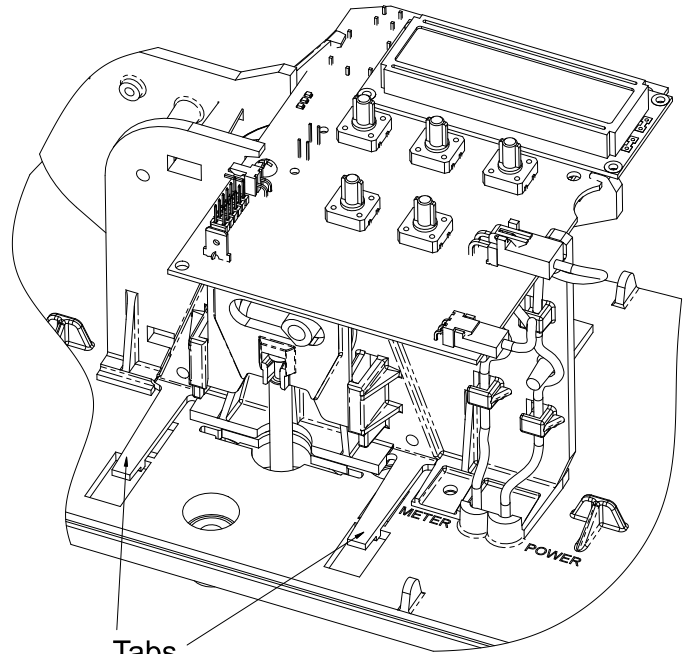


40988 Rev A

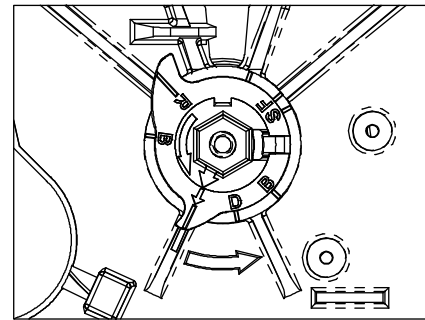


41121 Rev A

REMOVING THE GEAR BOX ASSEMBLY



42554 Rev A



40988 Rev A

Figure 7

1. Unplug the power source.
2. With a 3/8" nut driver, turn the cycle cam counter-clockwise to the position shown in the illustration above.
3. Remove brine cam if equipped.
4. Slightly pull the two tabs outward and push the gearbox slightly upward to remove.
5. When returning the valve to service after powerhead disassembly, manually step valve through regeneration using the Extra Cycle button until the valve is In Service.

INSERTING THE CIRCUIT BOARD

1. To insert circuit board, align notches on left side of board with flexible finger on power head. Apply pressure to left while rotating the board back.

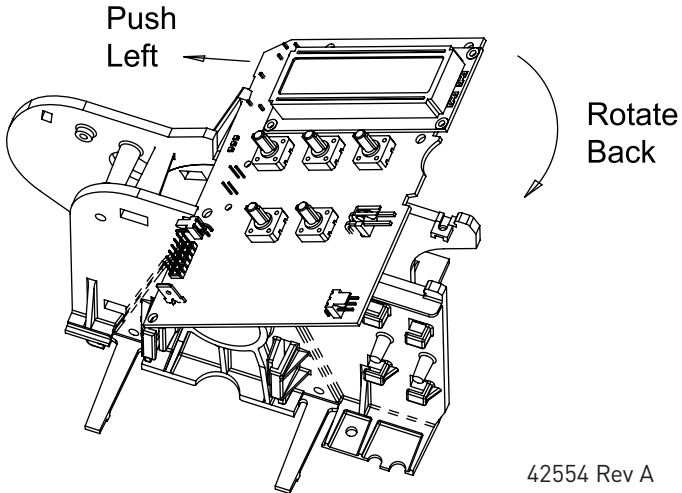


Figure 8

2. When all the way down, snap the circuit board into place under the notches on the right.

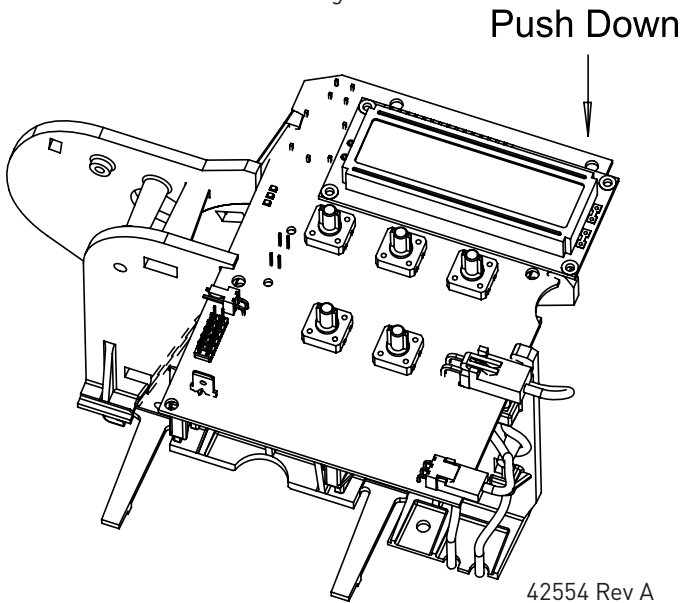


Figure 9

CONNECTING THE CIRCUIT BOARD

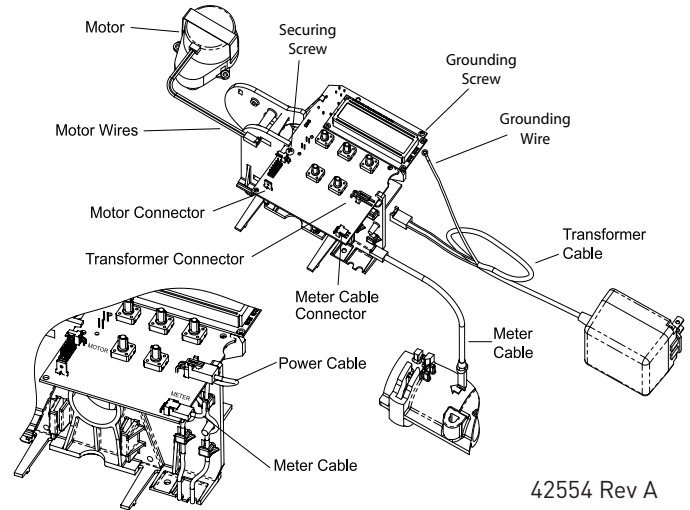
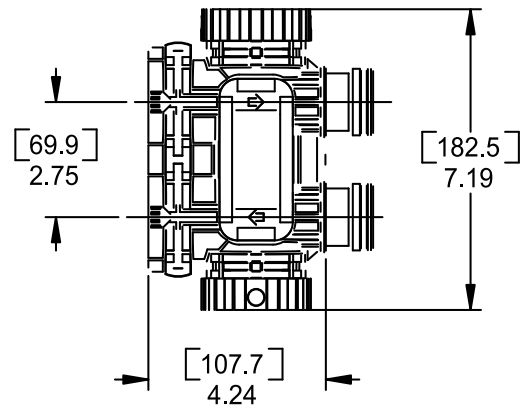
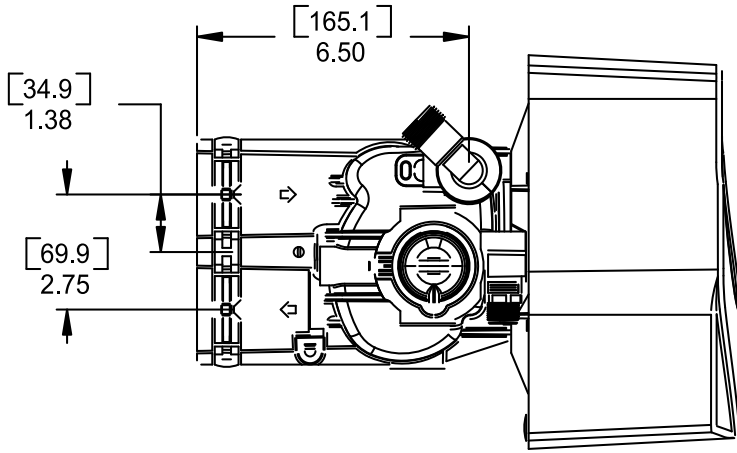


Figure 10

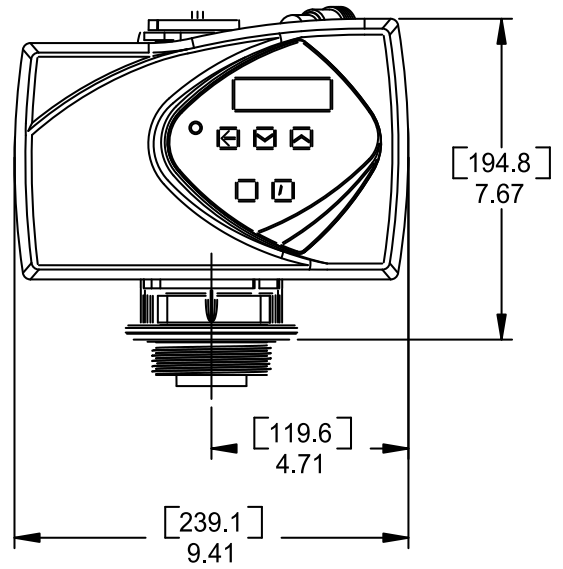
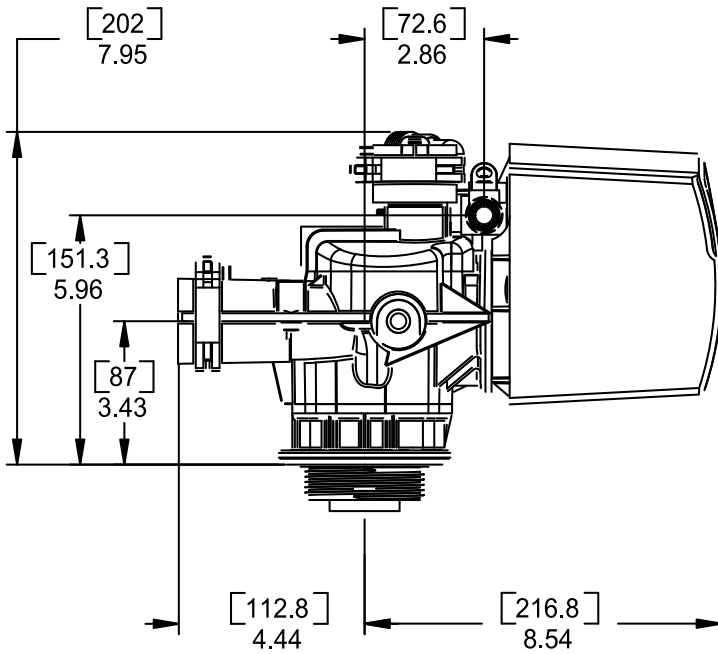
After the circuit board is installed:

1. Connect the motor wires to the motor connector on the circuit board.
2. Connect the transformer cable to the transformer connector on the circuit board.
3. Connect transformer grounding cable to grounding screw on top corner of circuit board.
4. Connect the meter cable to the meter cable connector on the circuit board.
5. Connect the meter cable sensor end to the opening on the valve body.
6. Thread the meter cable and power cable along the path shown in the above illustration.
7. Insert screw to secure circuit board.

DIMENSIONAL DRAWINGS



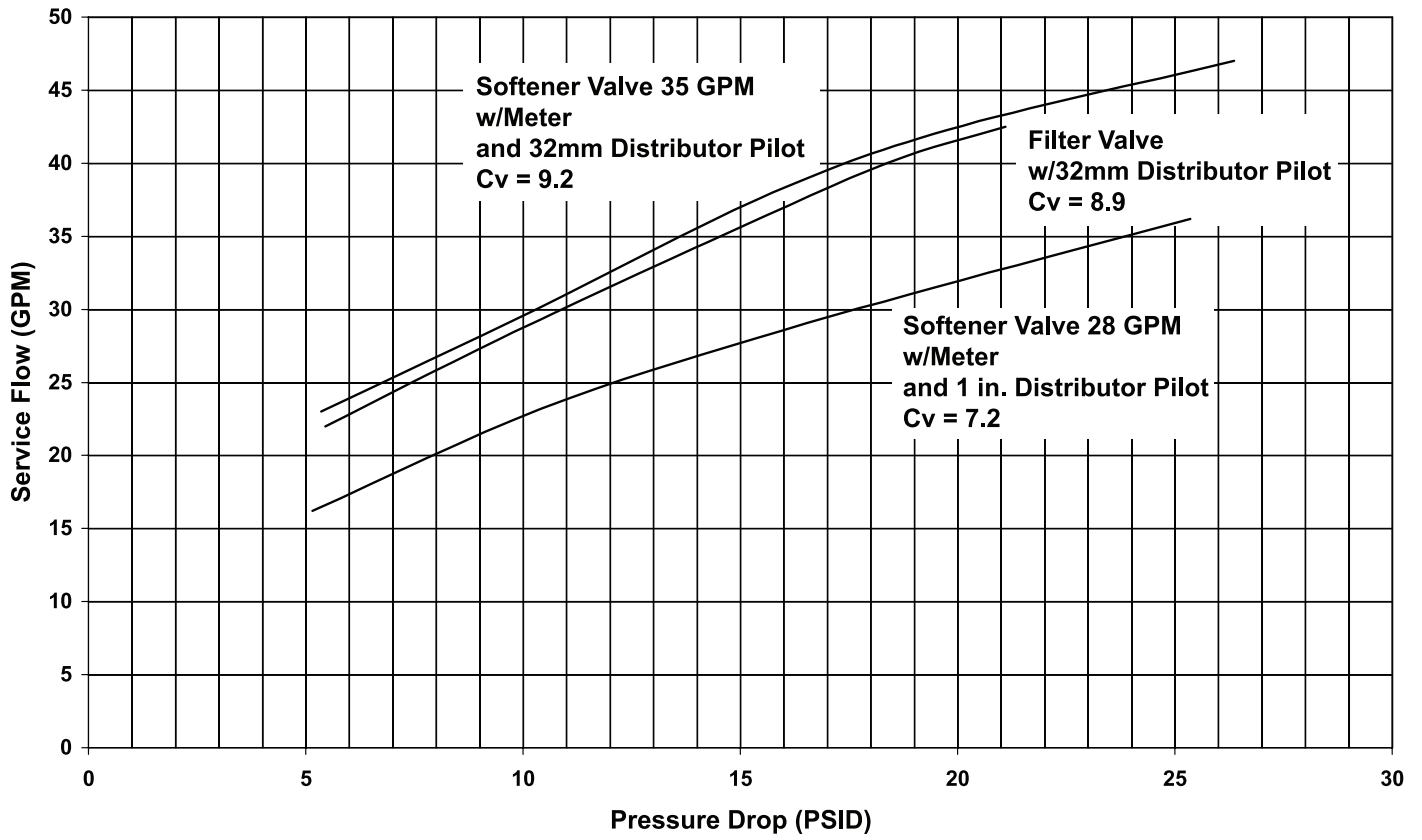
BYPASS



61500-7000XTR-LNE Rev A

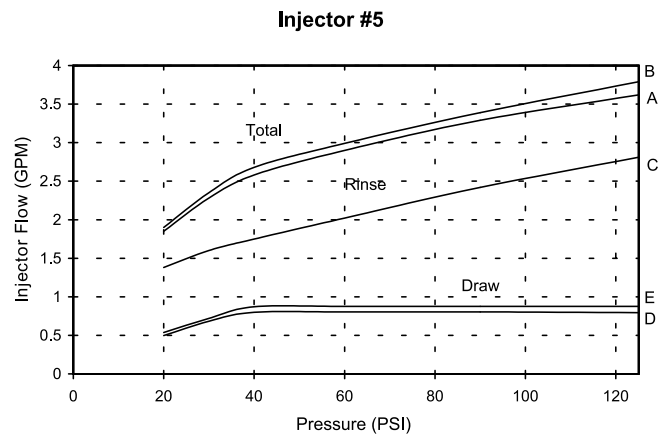
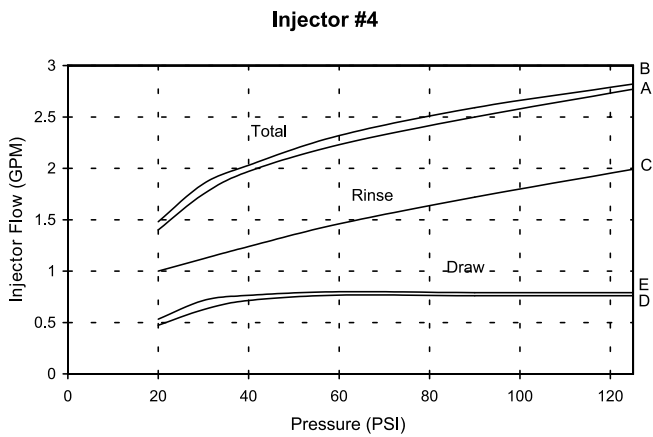
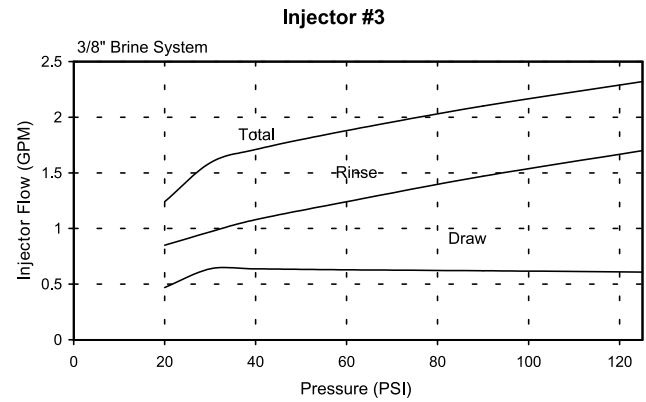
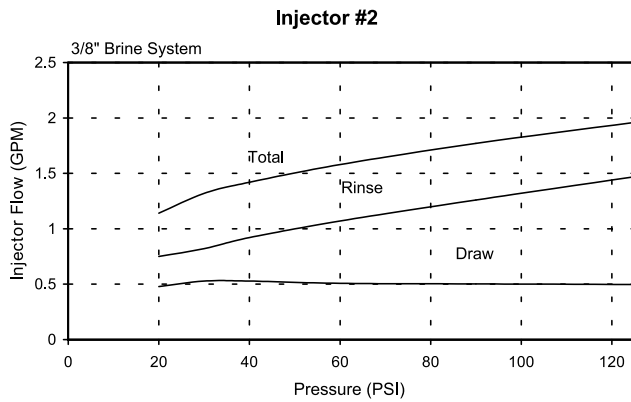
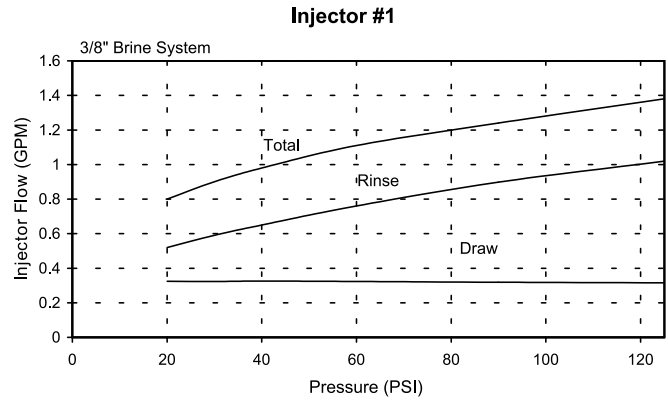
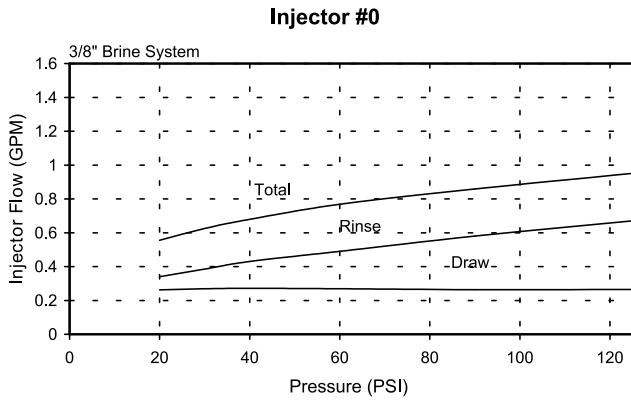
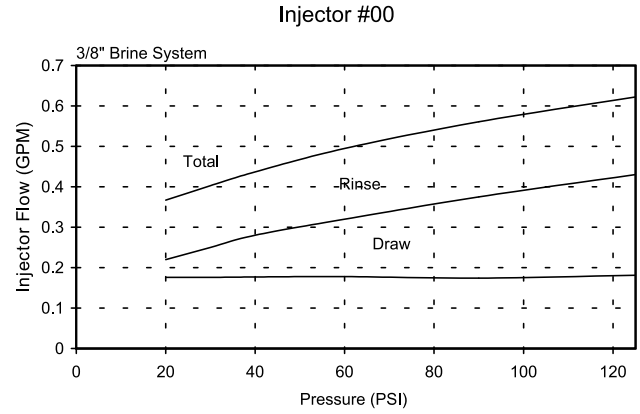
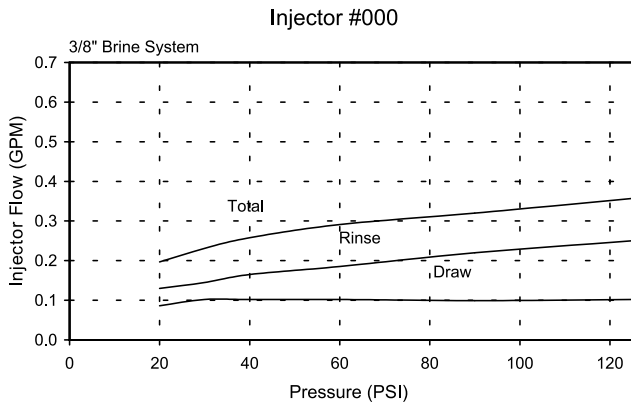
METER FLOW DATA

7000NXT VALVE



TR18753 Softener
TR18688 Filter
41140-02 Rev A

INJECTOR FLOW DATA



A) Total Flow, 3/8" Brine System B) Total Flow, 1/2" Brine Line C) Rinse D) Brine Draw, 3/8" Brine System E) Brine Draw, 1/2" Brine Line

NOTE: All data taken with 2310 Safety Brine Valve and 500 Air Check

TR18755 Rev B

SERVICE ASSEMBLIES

Brine Line Flow Control (BLFC)

61450-00	.....	BLFC, 3/8", Blank
61450-12	.....	BLFC, 3/8", 0.125 GPM
61450-25	.....	BLFC, 3/8", 0.25 GPM
61450-50	.....	BLFC, 3/8", 0.5 GPM
61450-100	.....	BLFC, 3/8", 1.0 GPM
61451-00	.....	BLFC, 1/2", Blank
61451-12	.....	BLFC, 1/2", 0.125 GPM
61451-25	.....	BLFC, 1/2", 0.25 GPM
61451-50	.....	BLFC, 1/2", 0.5 GPM
61451-100	.....	BLFC, 1/2", 1.0 GPM

Drain Line Flow Controls

61455-00	.....	DLFC, 3/4", Blank
61455-17	.....	DLFC, 3/4", 1.7 GPM
61455-20	.....	DLFC, 3/4", 2.0 GPM
61455-24	.....	DLFC, 3/4", 2.4 GPM
61455-30	.....	DLFC, 3/4", 3.0 GPM
61455-35	.....	DLFC, 3/4", 3.5 GPM
61455-40	.....	DLFC, 3/4", 4.0 GPM
61455-45	.....	DLFC, 3/4", 4.5 GPM
61455-50	.....	DLFC, 3/4", 5.0 GPM
61455-60	.....	DLFC, 3/4", 6.0 GPM
61455-70	.....	DLFC, 3/4", 7.0 GPM
61456-00	.....	DLFC, 1", Blank
61456-8.0	.....	DLFC, 1", 8.0 GPM
61456-9.0	.....	DLFC, 1", 9.0 GPM
61456-10	.....	DLFC, 1", 10.0 GPM
61456-12	.....	DLFC, 1", 12.0 GPM
61456-15	.....	DLFC, 1", 15.0 GPM
61456-20	.....	DLFC, 1", 20.0 GPM
61456-25	.....	DLFC, 1", 25.0 GPM
61456-30	.....	DLFC, 1", 30.0 GPM

Injectors

61454-000	.....	#000
61454-00	.....	#00
61454-0	.....	#0
61454-1	.....	#1
61454-2	.....	#2
61454-3	.....	#3
61454-4	.....	#4
61454-5	.....	#5

Transformers

61920-01	.....	Transformer Assy, 7000NXT, 40VA, US
61920-02	.....	Transformer Assy, 7000NXT, 40VA, Japan
61920-03	Transformer Assy, 7000NXT, 40VA, Europe
61920-04	Transformer Assy, 7000NXT, 40VA, Australia

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