

TwinFlo100e

Downflow Brining

Service Manual



TwinFlo100e

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TwinFlo100e

Valve Specifications

ELECTRICAL SPECIFICATIONS	220 or 110 volts, 50/60 Hz, using a plug-in transformer to reduce it to 24 volts
ELECTRONIC CONTROLLER	Non-Volatile memory. Set program is retained when power fails
TEMPERATURE LIMITS	34 - 110° F or 1 - 38° C
WATER PRESSURE RANGE	20 - 125 psi or 1.4 - 8.8 Kgf/sq. cm.
REGENERATION SETTINGS	Gallons/Liters/Cubic meters
INLET/OUTLET PIPE SIZE	3/4" and 1". See bypass valves for options.
VALVE BASE THREAD	2-1/2", 8 NPSM
RISER PIPE	1.05" Outside Diameter
REGENERATION TYPE	Upflow or Downflow
Valve Body Injector Piston Seals Spacers Rotor Seals Valve O-Rings Timer Available Flows	Noryl GTX® Noryl® Ethylene Propylene Noryl® Ethylene Propylene Ethylene Propylene Electronic Meter Service Cv = 3.8 Backwash Cv = 0.8
OPTIONS: INJECTORS DLFC BLFC	0000, 000, 00, 0, 1, 2 0.6 / 0.8 / 1.0 / 1.2 / 1.3 / 1.5 / 1.7 / 2.0 / 2.4 .125 / 0.25 / 0.5
BRINING SYSTEM	1610
ACCESSORIES:	2310 Plastic Safety Brine Valve 500 Air Check Upper and Lower Distributors (Fine / Standard / Wide slots)

TwinFlo100e

Calculating Meter Settings

Your TwinFlo100e consists of one valve/controller with a water meter that controls two tanks in an alternating mode. It can be used to remove Hardness, Alkalinity or Nitrates from the water. Consult factory for any other applications.

THE TwinFlo100e IS HIGHLY RECOMMENDED FOR (UP - FLOW) COUNTER CURRENT REGENERATION AS IT REGENERATES WITH SOFT WATER.

Your TwinFlo100e 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 (Ft³ or liters)

United States of America		Metric System	
15 lbs. of salt	30,000 grains	240 g/l of salt	68.7 g of CaCO ₃ /l
12 lbs. of salt	27,000 grains	192 g/l of salt	61.8 g of CaCO ₃ /l
9 lbs. of salt	24,000 grains	144 g/l of salt	55.0 g of CaCO ₃ /l
6 lbs. of salt	20,000 grains	96 g/l of salt	45.8 g of CaCO ₃ /l

If the selected timer settings are:

TIMER SETTINGS:

Fast Rinse = 8 minutes
Backwash = 8 minutes
Brine & Slow Rinse Time = 50 minutes
Refill Time = 8 minutes

METER 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

Since the TwinFlo100e regenerates with soft water, subtract the regeneration water from the Equipment capacity to get the meter settings.

REGENERATION WATER:

For a unit with a DLFC = 2, BLFC - 0.25 and #0 Injector.

Fast Rinse = (8 minutes) x (DLFC) = (8) x (2) = 16.0 gallons
Backwash = (8 minutes) x (DLFC) = (8) x (2) = 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

Set water meter at = (Equipment Capacity) - (Regeneration water)

Set water meter at = 900 gallons - 49.0 gallons = 851.0 gallons

TwinFlo100e - V2.0

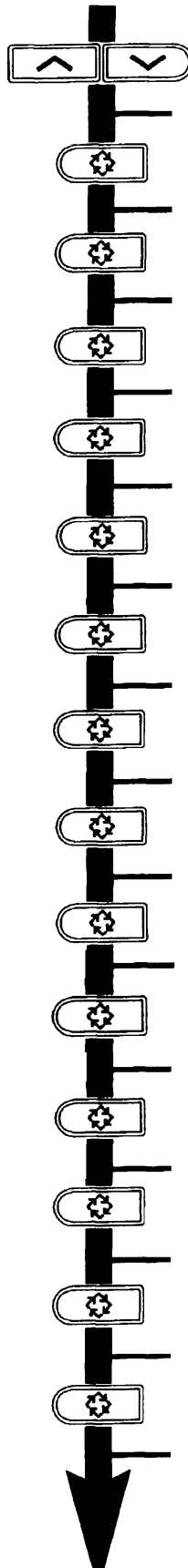
Quick Reference Programming Flow Chart

GENERAL INSTRUCTIONS

1. Push extra cycle button once per display until all displays are programmed and normal operation is resumed.
2. Option setting displays may be changed as required by pushing either the UP or DOWN arrows
3. Certain displays will not be viewed depending on current valve program.

TO PROGRAM:

1. Set time of day display to 12:01 P.M. for the US or 12:01 in the metric system.
2. To start programming, push and hold the UP and DOWN arrows simultaneously until the program light indicator comes on (approximately five seconds). Make sure that the time of day does not change:



Units

- U-1 = Gallons and US time
- U-2 = Liters & 24 Hr. time
- U-4 = Cubic meters & 24 Hr. time

Regeneration Type

- 7-1 = Timeclock delayed, 7-3 = Meter delayed,
- 7-2 = Meter immediate (TwinFlo100e)**

Treated Water Capacity

XXXX water meter setting in gallons, liters or cubic meters

Regeneration Time

This display will not be shown when regeneration type is meter immediate.

Regeneration Day Override

A-x, x = Sets maximum amount of days between regenerations. Water meter override
A-OFF = No override

Fast Rinse Of Standby Unit Before Going On Line

1-x, x = minutes

Backwash Exhausted Unit

2-x, x = minutes

Brine Draw And Slow Rinse Of Exhausted Unit

3-x, x = minutes

Brine Refill

4-x, x = minutes

Regeneration Cycle Step #5

5-Off, Off = Cancelled

Water Meter Pulse Rate

Set at 132 for (TwinFlo100e) US format
Set at 34.9 for (TwinFlo100e) metric formats

Control Valve Type

Set at 0-2 (TwinFlo100e)

Unit In Service (On Line) Indicator

-U1- or -U2- Set to match number on gear below motor

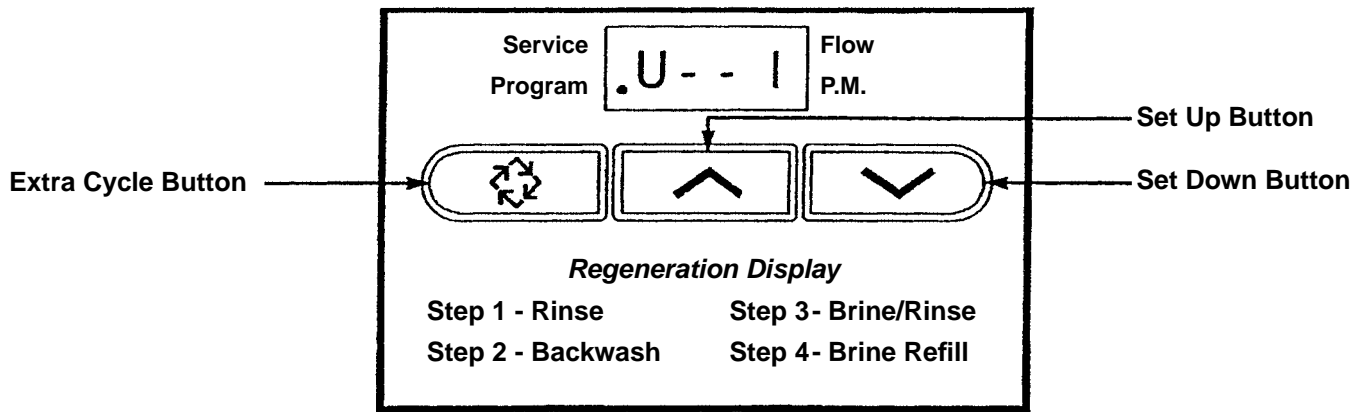
Electrical Line Frequency

LF60 = 60 Hertz (cycles)
LF50 = 50 Hertz

**Master Programming Mode is Exited
Normal Operation is Resumed**

TwinFlo100e

Master Programming Reference



NOTE #1: The time of day can be changed at any time during the service mode by depressing the UP or DOWN arrows.

NOTE #2: Manual regeneration can be initiated at any time during the service mode by depressing the Extra Cycle Button (ECB).

TwinFlo100e is to be programmed for immediate regeneration (7-2) and the manual regeneration starts immediately.

NOTE #3: Always change the timer factory settings to the ones for your specific application.

NOTE #4: When left inactive for five (5) minutes, in the programming mode, the control will exit this mode, without storing any new settings, and it will resume normal operation.

Enter the Master Programming Mode to view the current program or to re-program the unit. Depending on current option settings, some displays will not be shown.

Entering Master Programming Mode

Set time of day at 12:01 p.m. in the US System (U-1) or at 12:01 in the metric system (U-2, or U-4 for the 24 hours military time). Push and hold the UP and DOWN arrows simultaneously, making sure that the time of day does not change, until the program light indicator comes on (approximately five seconds) and the first display is viewed.

1. US/Metric Display Format (U)

This display is used to set the desired display format. This option setting is identified by the letter (U) in the first digit. There are three possible settings:

Example: [U - - 1] for US gallons

Metric format uses liters or cubic meters with a 24-hour timekeeping format. Regeneration timing in tenths of minutes.

Example: [U - - 2] for liters

[U - - 4] for cubic meters

The set UP or DOWN buttons will adjust this value.

Depress the Extra Cycle Button to proceed to the next step.

2. Regeneration Type (7)

This display is used to set the regeneration type. This option setting is identified by the number (7) in the first digit. There are three possible settings with [7-2] being the desired option for TwinFlo100e:

Example: [7 - - 1] Timeclock delayed, not typically used with the TwinFlo100e

[7 - - 2] Meter immediate, the regeneration is started immediately after the meter zeroes down
Setting used with the TwinFlo100e.

[7 - - 3] Meter delayed, after the meter zeroes, the unit will regenerate at a pre-selected regeneration time. Setting not typically used with the TwinFlo100e.

The set UP or DOWN buttons will adjust this value.

Depress the Extra Cycle Button to proceed to the next step.

3. Treated Water Capacity (No display code)

This display is used to set the equipment capacity in volume of treated water (gallons/liters/cubic meters) between regenerations.

Example: Using UP and Down buttons to set the calculated volume figure [8 5 1]

It will be gallons, liters or cubic meters if it is [U - 1], [U - 2] or [U - 4]

Depress the Extra Cycle Button to proceed to the next step.

4. Regeneration Time (No Display Code)

It should not be viewed if the existent program is set for the TwinFlo100e, immediate regeneration. This model will regenerate immediately after the water meter setting comes down to zero regardless of the time of day.

Example: 2:00 am regeneration time [2:00] with P.M. indicator dot off.

2:00 pm regeneration time [2:00] with P.M. indicator dot on.

The set UP or DOWN buttons will adjust this value.

Depress the Extra Cycle Button to proceed to the next step.

5. Regeneration Day Override (A)

This display is used to set the maximum amount of days the unit can be in service without regenerating. This option setting is identified by the letter (A) in the first digit. When a Day Override has been selected, the unit will regenerate at the same point in time it regenerated the previous time if the unit has been programmed for immediate regeneration. With a timeclock or a meter delayed program, the unit will regenerate at the set Regeneration Time.

An [AOFF] setting will cancel this feature with all regeneration types except timeclock regeneration.

Example: Override every 7 days [A - - 7]

Cancel setting [A OFF] for meter immediate or delayed regeneration only.

The set UP and Down buttons will adjust this value.

Depress the Extra Cycle Button to proceed to the next step.

TwinFlo100e

Master Programming Reference (Cont'd.)

9. Tank In Service

This display is used to identify which tank is in service. Look for the number indicated on gear below motor. Tank #1 is on the right when you are facing the TwinFlo100e. Tank #2 is on the left.

Example: [o - U1] Tank #1 in service

[o - U2] Tank #2 in service

10. Line Frequency (LF)

This display is used to set the frequency of the power applied to the control. When properly set, all timekeeping functions will remain accurate. This option setting is identified by the letters LF in the first two digits. There are two possible selections.

Example: [L F 5 0] 50Hz Line frequency Operation.

[L F 6 0] 60Hz Line frequency Operation.

Exiting This Option Setting Level

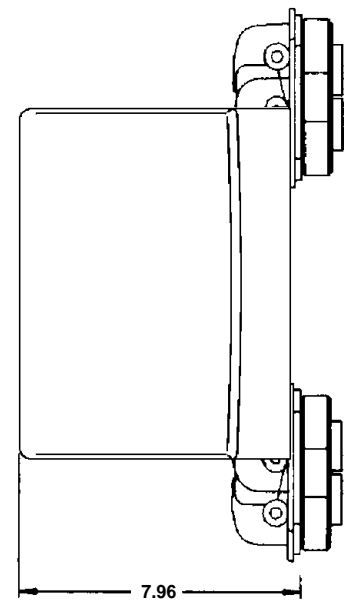
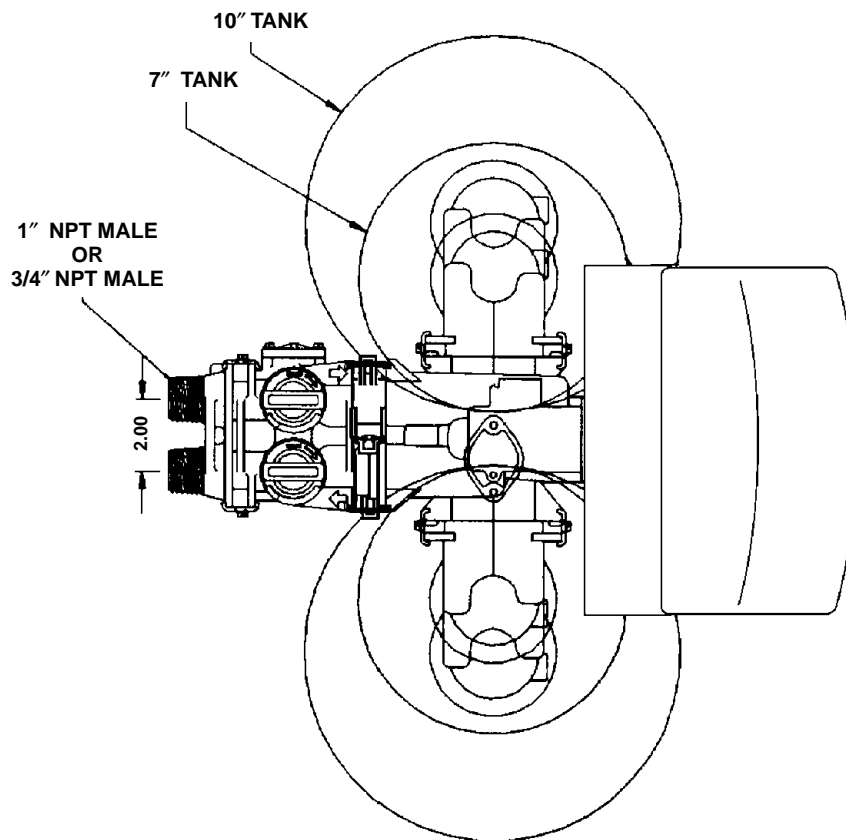
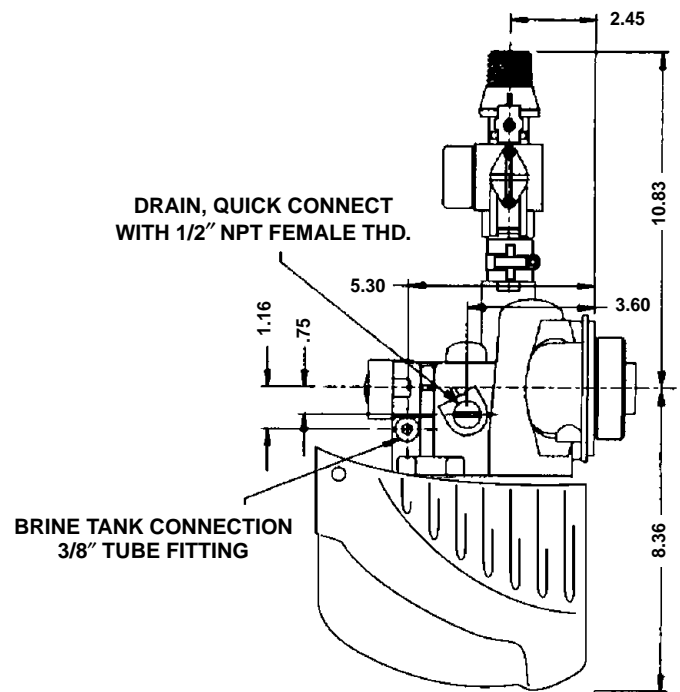
Push the Extra Cycle Button once per display until all have been viewed. The Program Mode will be exited and normal operation resumed.

Resetting Permanent Programming Memory -

Push and hold the Set Up and Down Buttons for 25 seconds or until the Time Of Day Display resets to 12:00 P.M. All option settings will then reset to default values. Control programming will then have to be reset as necessary.

TwinFlo100e

Installation/Assembly Drawing



TwinFlo100e

Installation & Start-Up

GENERAL NOTES:

1. Locate the two treatment tanks and the brine tank as close as possible to a floor drain and to each other on a smooth, clean, level and firm surface.
2. Water pressure must be between: 20 - 125 psi (1.4 - 8.8 Kg/sq.cm.). Install pressure reducer if necessary.
3. All electrical connections should be done according to local codes. A 120V, 50/60 Hz or 220V, 50/60 Hz electric supply is needed. Be sure that a remote switch can not turn off the receptacle. A power cord with a transformer is supplied to bring the power down to 24V to operate the valve.
4. Replace any existing plumbing, which is heavily scaled with hardness or fouled with corrosion products.
5. Allow 6" - 12" (150 - 300 mm) behind the TwinFlo100e and four feet (1.22 m) above it for ease of installation and service.
6. The existing drain must be able to handle the TwinFlo100e backwash flow rate.

TANKS:

1. Both treatment tanks must be the same height and diameter, and must be filled with equal amounts of media.
2. Place a 1.05" OD distributor tube with an installed collector on the bottom of each tank. Make sure the distributors are centered and rest at the lowest point in the bottom of each tank. Mark distributors flush with the top of each tank, remove and cut each tube evenly at the mark. File, cut, or sand an outside bevel on the tube assuring that there will be no o-ring damage when installing tank adapters.
3. After locating the tanks, install the distributor tubes with their openings temporarily covered to prevent resin from entering. Manually place enough water into each tank to be 2" over the lower distributors for cushioning purposes. If used, install and level under-bed material. Using a large funnel, and while keeping the tube centered, pour the proper volume of resin into each tank.
4. Using only silicone lubricant, lubricate both distributors o-rings (inside tank adapters) and tank o-rings (near tank thread on adapters). Uncover distributor tubes top openings and assemble the tanks, tank adapters, and distributor tubes, making sure that the distributor tubes properly engage into the tank adapters.
5. Align and install the tanks with tank adapters to the TwinFlo100e. Be sure to match the numbers on the tank adapters to the corresponding numbers on the TwinFlo100e. Number one is on the right of the valve as you face it.

PLUMBING:

1. All plumbing should be done according to local codes.
2. Proper pipe alignment and support is required to prevent locking the turbine meter.
3. Install bypass valve or plumbing adapter being sure that the connecting clips are firmly seated and tightened. Failure to do so may cause meter malfunction. Inlet and outlet valve ports are identified with white arrows. Meter cable socket must be on top. Use only Teflon[®] tape on pipe threads. All necessary adjacent soldering must be done before connections to TwinFlo100e are made. Failure to do this may damage plastic parts. Installation of a bypass valve is recommended.
4. Install a 1/2" I.D. drain line making sure to keep its maximum height no more than 4' above the TwinFlo100e. Many plumbing code restrictions apply to drains (Air gaps, anti-siphon devices, others). Be sure these are understood and followed.
5. Connect a 3/8" O.D. x 1/4" I.D. polyethylene brine line between the TwinFlo100e and the 2310 safety brine valve in the brine tank. Add water to brine tank up to the top of the air check.

TwinFlo100e

Installation and Start-Up

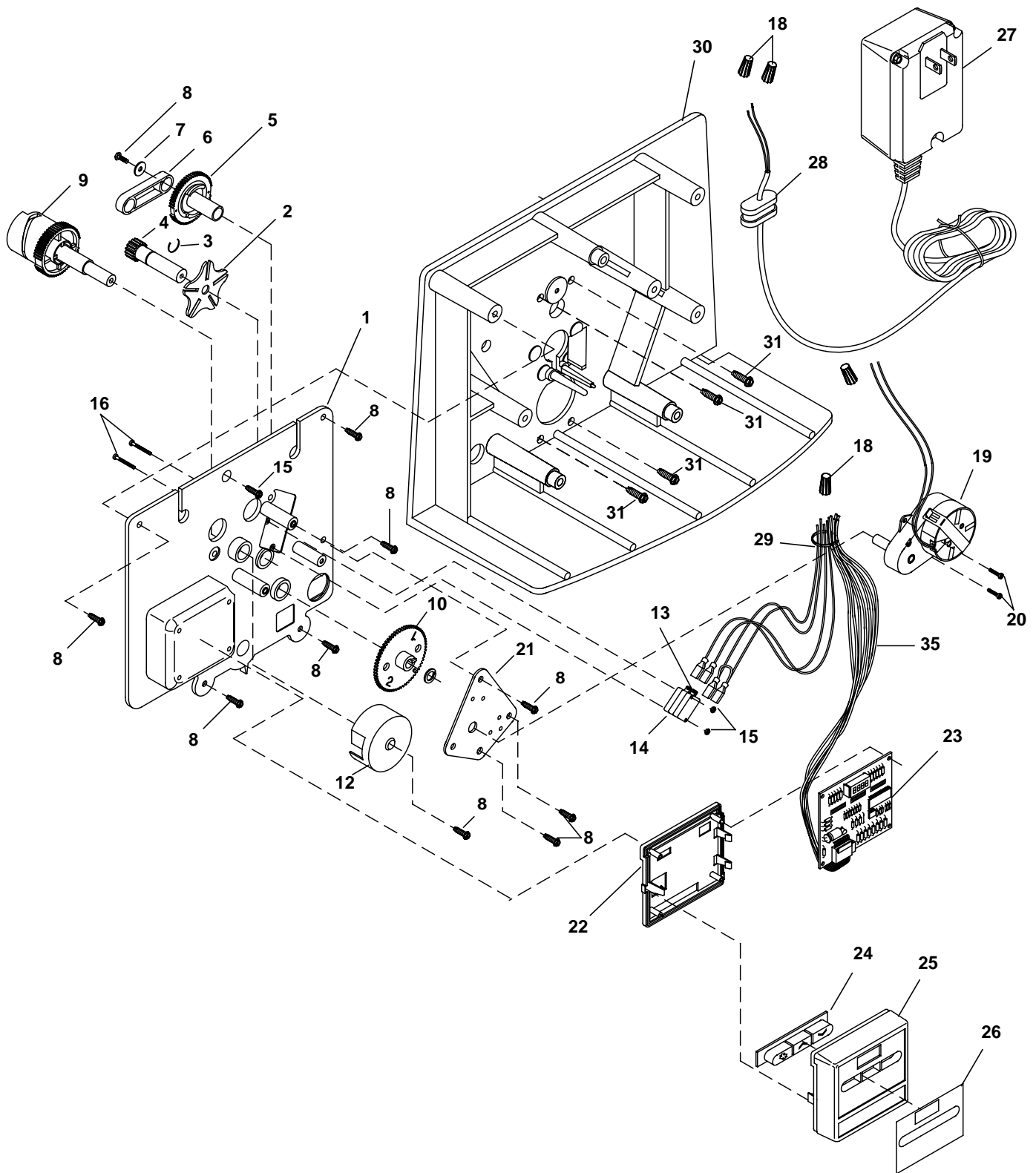
START-UP:

1. Open bypass valve and turn on the nearest treated cold water faucet. Allow water to run 2 - 3 minutes to clear pipes of solder or other material loosened during installation.
2. Plug TwinFlo100e to electrical outlet. Press up or down arrows to set the correct time of day. REVIEW QUICK REFERENCE PROGRAMMING FLOW CHART ON PAGE 6.
3. Position the bypass valve to service (close bypass). Allow water to enter slowly into the media tank. Run water for five minutes through the open faucet to rid tank of entrapped air. One tank is now full of water but still contains some air.
4. Push the "extra cycle button" to manually regenerate the tank just filled. The first cycle is to PRE RINSE the unit on standby before it goes to service. Allow water to enter slowly into the standby media tank. Run water for five minutes through the open faucet to rid tank of entrapped air. The standby media tank is now full of water but still contains some air.
5. Push the "extra cycle button" to manually advance valve to BACKWASH. Air is rapidly expelled in this cycle and media may be lost if flow is not restricted. . Be sure that the inlet shut off valve is only slightly open during this step.
6. Push the "extra cycle button" to manually advance the valve to the BRINE/RINSE position to draw the excess water in the brine tank down to the air check level.
7. Push the "extra cycle button" to manually advance the valve to the BRINE REFILL position. Allow the timer to run its predetermined time to ensure the proper refill volume for the desired salt dosage. Review that the water level in the brine tank is above the salt grid. Allow valve to automatically return to SERVICE.
8. Start another regeneration to remove the air from the first tank. Repeat all cycle steps, including the slightly open inlet valve but do not include neither drawing or refill time.
9. Fill brine tank with salt.

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Valve Powerhead

(See opposite page for parts list)



TwinFlo100e

Powerhead

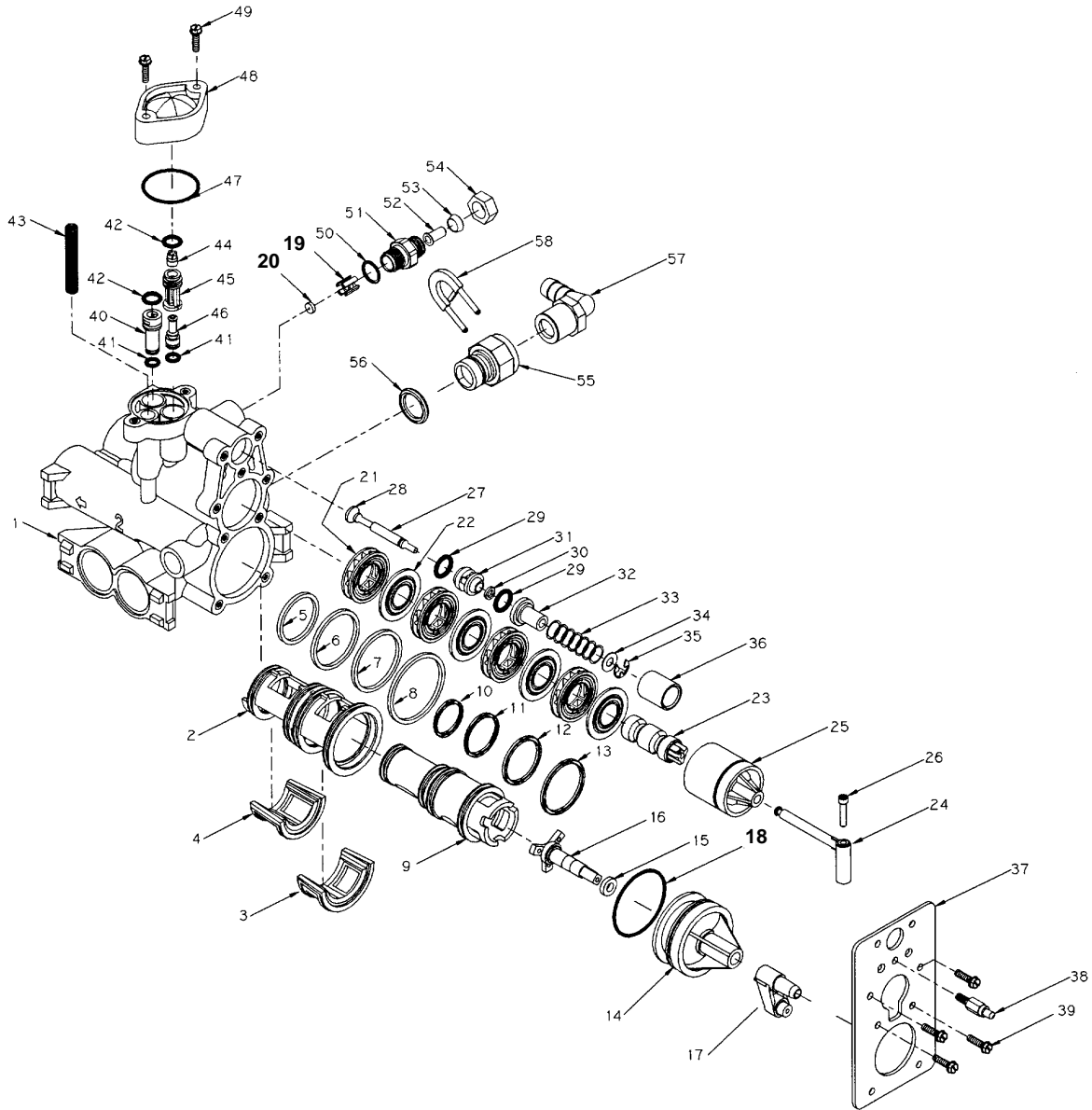
Parts List

Item No.	Quantity	Part No.	Description
1	1	19890	Center Plate
2	1	14896	Geneva Disk
3	2	15810	Retaining Ring
4	1	18796	Pinion
5	1	19062	Gear and Pin Assembly
6	1	18785	Link, Transfer
7	1	13363	Washer
8	14	13296	Screw, 6 x 1/2" Hex Hd.
9	1	19061	Gear and Cam Assembly Downflow
10	1	19354	Gear and Label Assembly
12	1	19940	Switch, Cam
13	2	10218	Switch
14	1	18803	Spacer
15	2	10339	Nut, 4-40
16	2	19111	Screw, 4-40 x 1-1/2" Fl. Hd.
18	4	12681	Wire Nut
19	1	19046	Motor, 24V/50 Hz
		18898	Motor, 24V/60 Hz
20	2	11384	Screw, 6 x 1/4" Fill. Hd.
21	1	18807	Plate, Drive Motor Mtg.
22	1	19889	Housing, Circuit Board
23	1	40283	Circuit Board, SE Timer
24	1	19473	Buttons, Conductive
25	1	19471-02	Cover, Front Panel, Black
26	1	19697-03	Label, Display 5600SE
27	1	19674	Transformer, US 120V/24V
		25651	Transformer, European 230V/24V
28	1	13547	Strain Relief
29	1	14044	Cable Tie
30	1	18798-01	Back Plate
31	4	12473	Screw, 10-20 x 5/8"
32	1	40231	Cover, Smoke, Not shown
33	2	40232	Bracket, Hinge, Not shown
34	2	40274	Screw, 1/4-20 x 3/8", Not shown
35	1	19474-01	Power Harness

TwinFlo100e

Control Valve

(See opposite page for parts list)



Item No.	Quantity	Part No.	Description
1.....	1	18770-01	Valve Body, Machined
2.....	1	18783	Cage
3.....	1	19004	Seal, Molded Inlet
4.....	1	19005	Seal, Molded Outlet
5.....	1	19054	Seal, O-Ring, -124
6.....	1	19055	Seal, O-Ring, -128
7.....	1	19056	Seal, O-Ring, -129
8.....	1	19057	Seal, O-Ring, -133
9.....	1	18782	Rotor
10.....	1	18874	Seal, Q-Ring, -118
11.....	1	18875	Seal, Q-Ring, -121
12.....	1	18876	Seal, Q-Ring, -123

TwinFlo100e

Control Valve

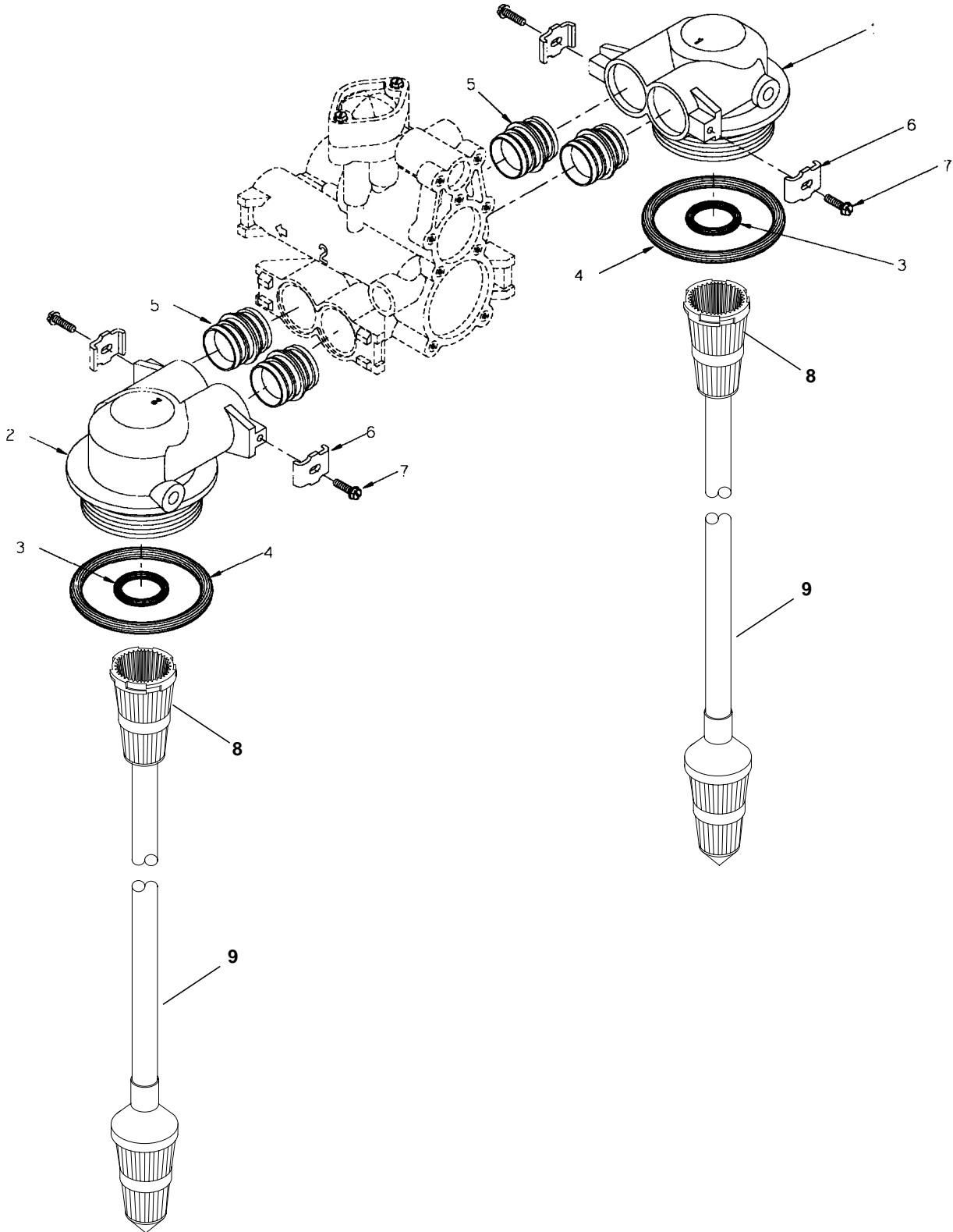
Parts List

Item No.	Quantity	Part No.	Description
13	1	18877	Seal, Q-Ring, -126
14	1	18781	End Plug, Rotor
15	1	14926	Seal, Q-Ring, -012
16	1	18776	Shaft, Rotor Drive
17	1	18784	Crank, Transfer
18	1	15820	Seal, O-Ring, -134
19	1	13245	Retainer, BLFC Button
20	1	60022-xx	BLFC Button, Specify Size
21	4	18871	Spacer, Regeneration
22	4	18870	Seal, Regeneration
23	1	19667	Piston, Regeneration
24	1	18779	Piston Rod
25	1	19237	End Plug Assembly
26	1	18808	Pin, Drive Roller
27	1	14925	Brine, Valve Stem
28	1	12626	Seat, Brine Valve
29	2	13302	Seal, O-Ring, -014
30	1	12550	Seal, Q-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
35	1	11981-01	Retaining Ring
36	1	18786	Spacer, Brine Valve
37	1	18777	Plate, Retainer
38	1	18809	Pin, Cam Bearing
39	4	12112	Screw, 10 x 1/2"
40	1	18276	Plug, Injector
41	2	10141	Seal, O-Ring, -010
42	2	13771	Seal, O-Ring, -012
43	1	18810	Screen, Injector
44	1	18273	Vortex Generator
45	1	18274-XXX	Injector Nozzle - Specify Size
46	1	18275-XXX	Injector Throat - Specify Size
47	1	15243	Seal, O-Ring, -028
48	1	18774	Cover, Injector
49	2	17063	Screw, 10 x 1"
50	1	12977	Seal, O-Ring, -015
51	1	13244-01	Adapter, BLFC
52	1	10332	Insert, 3/8"
53	1	10330	Sleeve, 3/8", Delrin
54	1	10329	Nut, 3/8" Tube Fitting
55	1	11385-01	Flow Control Hsg., Plastic
56	1	11183	Seal, O-Ring, -017
57	1	12338	Hose Barb
58	1	18312	Retainer, DLFC

TwinFlo100e

Tank Adapter Assembly

(See opposite page for parts list)



TwinFlo100e

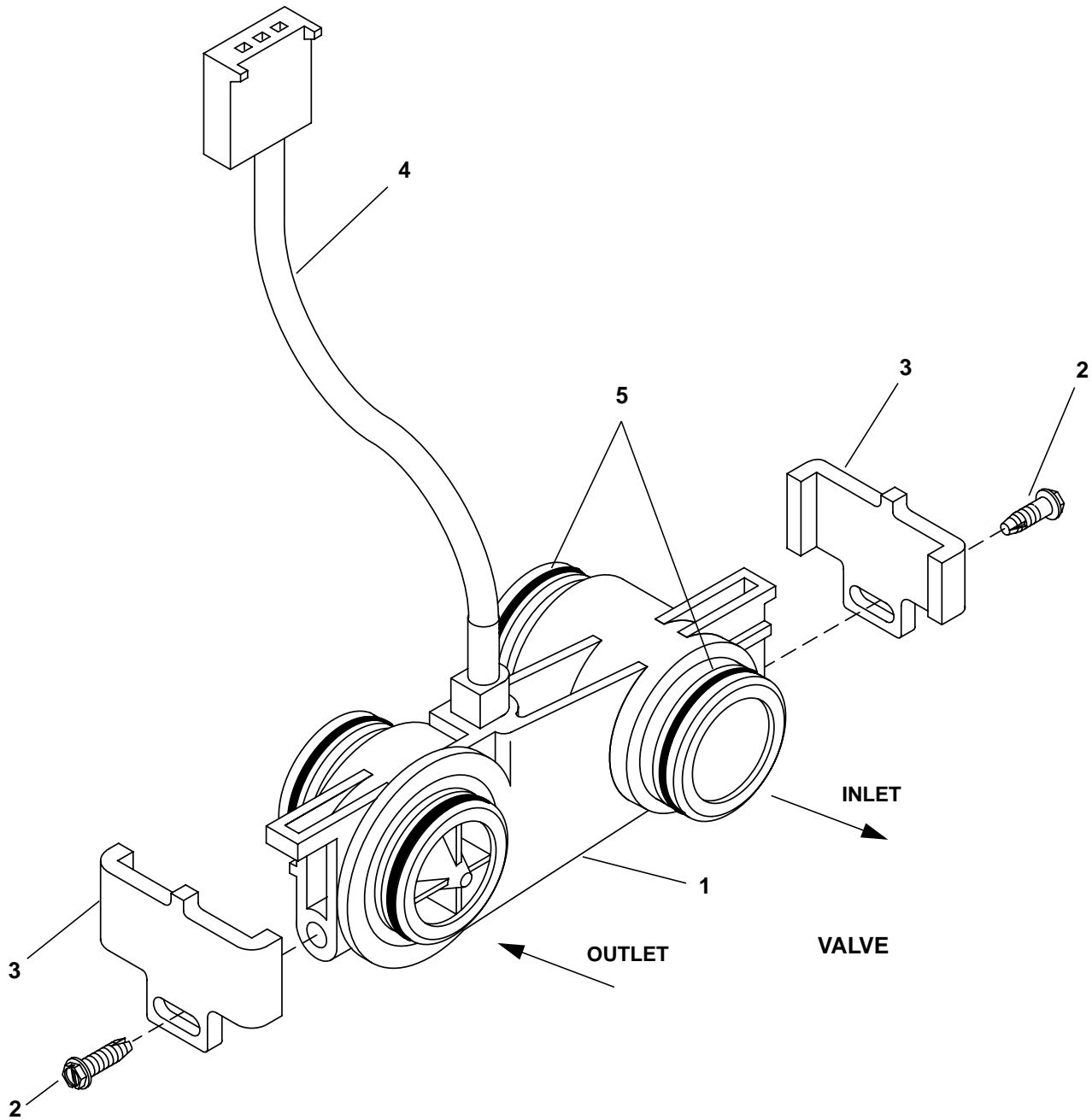
Tank Adapter Assembly

Parts List

Item No.	Quantity	Part No.	Description
1.....	1	19242-01.....	Adapter Assembly, Tank 1, 6"-8" Tanks
	1	19242-03.....	Adapter Assembly, Tank 1, 9"-10" Tanks
2.....	1	19242-02.....	Adapter Assembly, Tank 2, 6"-8" Tanks
	1	19242-04.....	Adapter Assembly, Tank 2, 9"-10" Tanks
3.....	2	13304	Seal, O-Ring, -121
4.....	2	18303	Seal, O-Ring, -336
5.....	4	15078-01.....	Adapter Coupling
6.....	4	13255	Clip, Mounting
7.....	4	13314	Screw, 8 x 5/8"
8.....	2	18280	1" Standard Slot (.010 - .012 slot size)
		18280-01.....	1" Wide Slot (.019 - .022 slot size)
		18280-02.....	1" Narrow Slot (.007 - .009 slot size)
9.....	2	60795 -00	1" x 72" Standard Slot (.010 - .012 slot size)
		60795-01.....	1" x 72" Wide Slot (.019 - .022 slot size)
		60795-01.....	1" x 72" Narrow Slot (.007 - .009 slot size)

TwinFlo100e

3/4" Electronic Turbine Meter

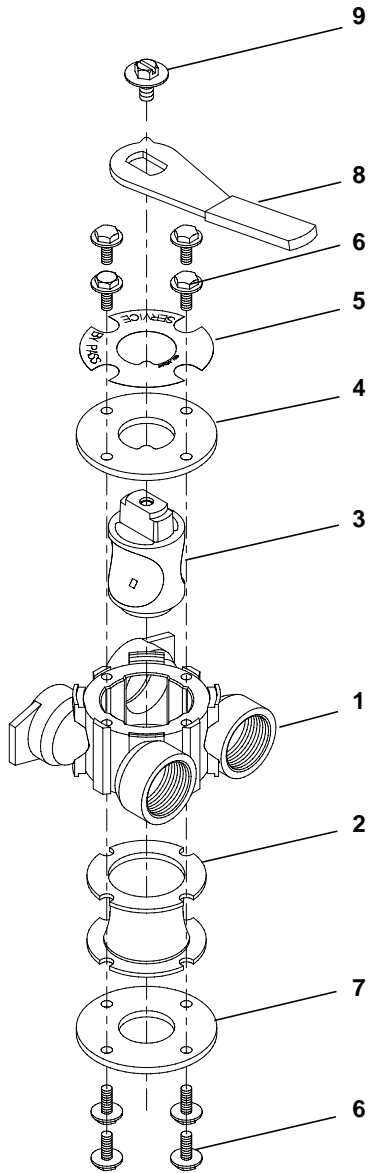


Parts List

Item No.	Quantity	Part No.	Description
1	1	19797	Meter Body Assembly
2	2	13314	Screw, Hex Washer, 8-18 x 5/8"
3	2	19569	Clip, Flow Meter
4	1	19791-01	Electrical Harness
5	4	13305	O-Ring, -119

TwinFlo100e

By-Pass Valve Assembly, Brass



By-pass Assemblies

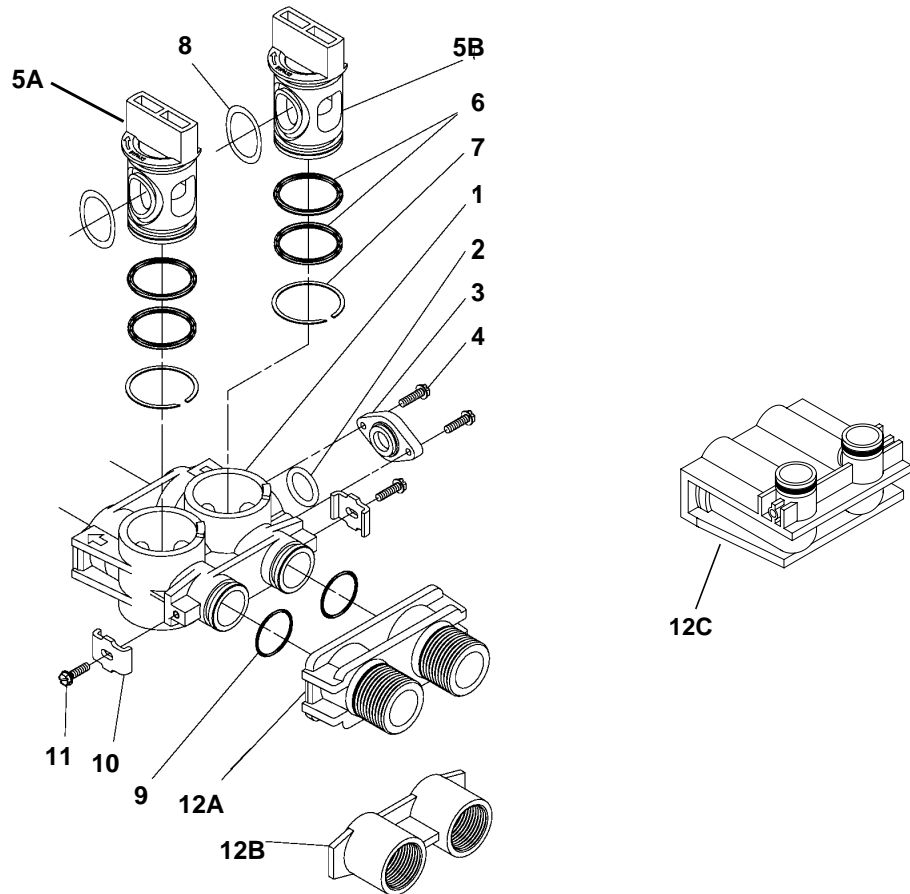
60040	3/4" By-Pass, NPT
60040-10	3/4" By-Pass, BSP
60040NP	3/4" By-Pass, NPT, Nickel Plated
60040-10NP	3/4" By-Pass, BSP, Nickel Plated
60041	1" By-Pass, NPT
60041-10	1" By-Pass, BSP
60041NP	1" By-Pass, NPT, Nickel Plated
60041-10NP	1" By-Pass, BSP, Nickel Plated

PARTS LIST

Item No.	Quantity	Part No.	Description
1	1	17290	By-Pass Valve Body, 3/4"
	1	17290NP	By-Pass Valve Body, 3/4" Nickel Plate
	1	13399	By-Pass Valve Body, 1"
	1	13399NP	By-Pass Valve Body, 1", Nickel Plate
2	1	11726	Seal, By-Pass
3	1	11972	Plug, By-Pass
4	1	11978	Side Cover
5	1	13604-01	Label
6	8	15727	Screw
7	1	11986	Side Cover
8	1	11979	Lever, By-Pass
9	1	11989	Screw, Hex Head, 1/4-14

TwinFlo100e

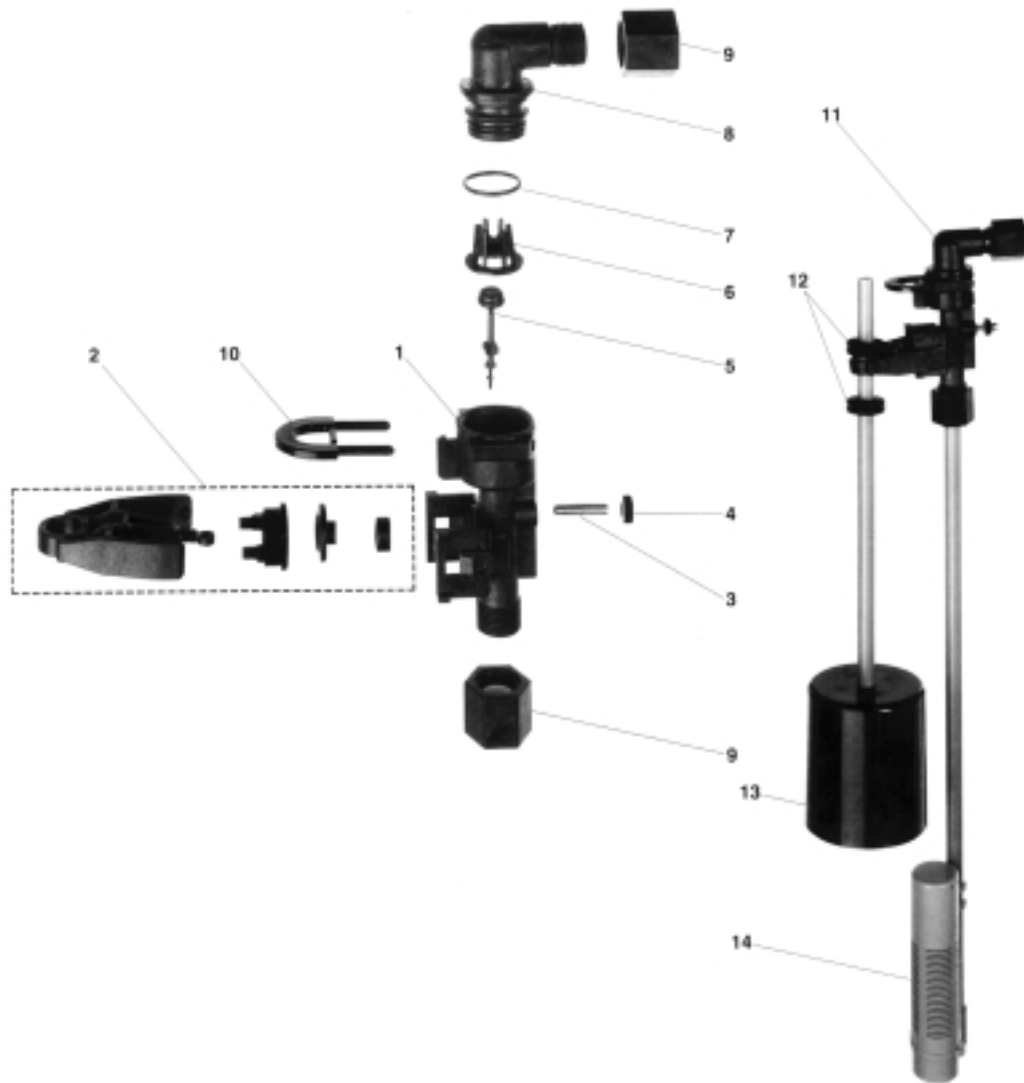
By-Pass Valve Assembly, Plastic



Item No.	Quantity	Part No.	Description
1	1	19723	By-Pass Valve Body, Plastic
2	1	11183	O-Ring, -015
3	1	19724	Cap, By-Pass
4	2	17512	Screw, Hex Washer Head, #6-24 x 3
5A	1	17820	Plug, By-Pass, Inlet (White)
5B	1	17820-01	Plug, By-Pass, Outlet (White)
6	4	18661	O-Ring, -218
7	2	18662	Retaining Ring
8	2	18660	O-Ring
9	2	13305	O-Ring, -119
10	2	13255	Clip, Mounting
11	2	13314	Screw, Hex Washer Head, 8-18 x 5/8
12A	1	18706	Yoke, Plastic, 1" NPT
	1	18706-02	Yoke, Plastic, 3/4" NPT
12B	1	13708	Yoke, Brass, 3/4" NPT
	1	13708NP	Yoke, 3/4" NPT Nickel Plated
	1	13398	Yoke, Brass, 1" NPT
	1	13398NP	Yoke, 1" NPT Nickel Plated
12C	1	19620	Yoke, Plastic, 3/4", 90° NPT

TwinFlo100e

2310 Safety Brine Valve



Item No.	Quantity	Part No.	Description
1	1	19645	Safety Brine Valve Body
2	1	19803	Safety Brine Valve Arm Assembly
3	1	19804	Stud, 10-24
4	1	19805	Nut, 10-24
5	1	19652-01	Poppet & Seal
6	1	19649	Flow Dispenser
7	1	11183	O-Ring, -017
8	1	19647	Elbow, Safety Brine Valve
9	2	19625	Nut Assembly, 3/8
10	1	18312	Retaining Clip
11	1	60014	Safety Brine Valve, 2310 (includes items 1-10)
12	2	10150	Grommet (included with item 13)
13	1	60068	Float Assembly, 2310
14	1	60002	500 Air Check Assembly

TwinFlo100e

Troubleshooting Guide

Note #5: Is this an old or a new unit? An old unit may develop problems due to mechanical, chemical or operating conditions.

Note #6: Consult the manufacturer if you are unsure of the compatibility of any chemicals you would like to use with the control valve.

SYMPTOM	CAUSE	CORRECTION
1. Failure to regenerate.	A. Loss of electrical power. B. Defective timer. C. Locked water meter. D. Motor failure.	A. Reestablish power/Reset time of day. B. Replace timer. C. Correct pipe misalignment or clean the meter. D. Replace motor.
2. Hard water to service.	A. Unit failed to regenerate. B. By-pass valve is open. C. Lack of salt in brine tank. D. Brine draw failure. E. Low brine refill level. F. Loss of resin. G. Mushy resin (chlorine damage). H. Leak at distributor tube. I. Increased water hardness. J. Hot water hard. Cold water soft.	A. See #1 above. B. Close by-pass. C. Add salt. Keep salt level above water at all times. D. See problem #5. E. Reset refill time/clean brine line flow control. F. Air in resin tank. See problem #9. G. Replace resin. Remove chlorine with carbon filtration. H. Check for cracks or O-ring failure at valve base and distributor. Fix. I. Modify timer/settings accordingly. J. System ran short, review gallon settings.
3. Salty water to service.	A. Poor brine draw. B. Brine valve seat leaks. C. Reduced inlet water pressure.	A. Clean injector and its screen. Unplug DLFC/BLFC. Check for brine liner air leaks. B. Inspect brine valve seals/change if needed. C. Adjust pressure or change injector for new pressure.
4. Excessive salt use.	A. Excessive water in brine tank. B. Improper salt setting. C. Regenerates too often.	A. Check refill time, brine valve seals. B. Check refill time or BLFC. C. Review gallon settings.

TwinFlo100e

Troubleshooting Guide (Cont'd.)

SYMPTOM	CAUSE	CORRECTION
5. Unit fails to draw brine.	A. Damaged inlet/outlet cage seals. B. Plugged injector/screen/D&BLFC. C. Dropped inlet water pressure. D. Excessive demand to service. E. Drawing air in brine line.	A. Replace cage seals. B. Clean them. C. Reset to original pressure or change injector for new pressure. D. Install flow control on service line. E. Check brine line and fittings for air leaks.
6. Excessive water in brine tank.	A. Unit fails to draw brine. B. Brine valve seat leaks.	A. See item #4 and #5. B. Review brine valve seals/change if needed.
7. Unit fails to refill brine tank.	A. Excessive demand to service. B. Plugged injector/BLFC.	A. Install flow control on service line B. Clean them.
8. Excessive Pressure drop.	A. Plugged upper distributor. B. Chlorine damaged resin. C. Compacted resin bed.	A. Clean or replace them. Prevent. B. Replace resin. Install equipment to remove chlorine. C. Clean DLFC/Excessive demand to service. Check for proper size DLFC.
9. Loss of mineral to drain.	A. Air or gas in raw water. B. Air check not sealing. C. Cracked lower distributor.	A. Install air eliminator. B. Review air check/Clean brine tank. C. Replace.
10. Iron in conditioned water.	A. Galvanic corrosion. B. Colloidal iron.	A. Check/fix piping metallurgy. B. Test for colloidal iron.

TOOLS FOR SERVICING

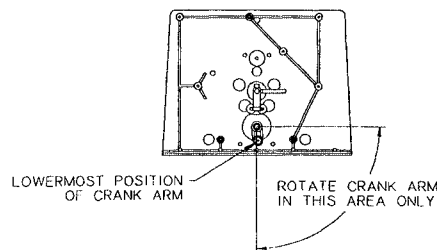
<u>Part Number</u>	<u>Description</u>
12664	1/4" Nut Driver
12874	Seal Hook
16908	Phillips Bit Large, 1/4" Drive
16909	5/16" Magnetic Socket, 1/4" Drive
16174	Silicone Grease 2 oz. Tube
16586-8	Silicone Grease 8 lb. Pail
19640	Cage Puller
40157	Wrench, Plastic By-Pass
60136-xxxx	Service Repair Kit

How to Disassemble and/or Assemble

A. REMOVE/INSTALL CENTER PLATE

1. Cycle control valve to put tank 2 in SERVICE and SE Timer is in the BRINE/RINSE position (Regeneration cycle step # 3). Unplug electrical cord from outlet. Unplug meter cable at turbine meter. To unplug meter cable see letter I. Remove/Install Turbine Meter.
2. With a 1/4" nut driver, remove 7 **Screws** (Page 15, item # 8) 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 SE Timer is in the BRINE/RINSE position (Regeneration cycle step # 3). Make sure **Transfer Link** (Page 15, item # 6) is resting on alignment pin. (The alignment pin is molded at the bottom back of center plate). Rotate **Transfer Crank** (Page 17, item # 17) to its lowermost position (See fig. 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, plug in meter cable.
5. Plug electrical cord into outlet and cycle control to SERVICE position.

FIG. 1



B. REMOVE/INSTALL BACKPLATE

1. Cycle control valve and put tank 2 in SERVICE and SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Unplug electrical cord from outlet. Unplug meter cable at turbine meter. To unplug meter cable see letter I. Remove/Install Turbine Meter.
2. With a magnetic 5/16" socket and extension, remove 4 **Screws** (Page 15, item # 34) securing backplate to valve body, then pull backplate away. The locations of 4 screws are on each side of the **Switch Cam** (Page 15, item #12) in back, below the SE Timer and **Gear and Label Assembly** (Page15, item # 10) in back.
3. To install backplate be certain that tank 2 is in service and SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Make sure **Transfer Link** (Page 15, item # 6) is resting on alignment pin. (The alignment pin is molded at the bottom back of center plate). Rotate **Transfer Crank** (Page 17, item # 17) to its lowermost position (See fig. 1) and rotate the **Piston Rod** (Page 17 item # 24) in the vertical position. Note: rotate transfer crank in the area indicated in figure 1. Make sure the **Drive Roller Pin** (Page 17, item # 26) is inserted in piston rod. Place backplate on valve body; align transfer link into transfer crank.
4. With a magnetic 5/16" socket and extension, replace 4 screws, plug in meter cable.
5. Plug electrical cord into outlet and cycle control valve to the SERVICE position.

C. REMOVE/INSTALL DRIVE MOTOR

1. Unplug electrical cord from outlet
2. Remove 2 wire nuts securing **Drive Motor** (Page 15, item # 19) leads to electrical wires.
3. With a Phillip screwdriver remove 2 **Screws** (Page 15, item # 20) securing drive motor to **Drive Motor Mounting Plate** (Page 15, item # 21) and pull drive motor out of **Pinion Gear** (Page 15, item # 4).

How to Disassemble and/or Assemble (Cont'd.)

4. Install drive motor into pinion gear, if mounting holes of drive motor do not line up, lift motor slightly and rotate clockwise until holes line up. Push drive motor against drive motor mounting plate and install 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.

D. 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 SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Unplug meter cable at turbine meter. To unplug meter cable, see letter I. Remove/Install Turbine Meter.
3. With a magnetic 5/16" socket and extension, remove 4 **Screws** (Page 15, item # 34) securing backplate to valve body, then pull backplate away. The locations of 4 screws are on each side of the **Switch Cam** (Page 15, item # 12) in back, below the SE Timer and **Gear and Label Assembly** (Page 15, item # 10) in back.
4. Pull **Transfer Crank** (Page 17, item # 17) from **Rotor Drive Shaft** (Page 17, item # 16). With a 5/16" socket remove 4 **Screws** (Page 17, item # 39) and **Cam Bearing Pin** (Page 17, item # 38) from valve body. Lift **Retainer Plate** (Page 17, item # 37) off of valve.
5. With pliers grasp a rib on **Rotor End Plug** (Page 17, item # 14) and pull out of valve body.
6. With a screwdriver (See fig. 2) insert under **Rotor** (Page 16, item # 9) and pry rotor from **Cage** (Page 16, item # 2).
7. With the cage puller tool (Part # 19640), insert into cage (See fig. 3) and insert screwdriver thru hole in puller and pry cage valve body. Use care as **Inlet and Outlet Molded Seal** (Page 16, item #'s 3 and 4) may fall from cage as it is removed from valve body.

FIG. 2

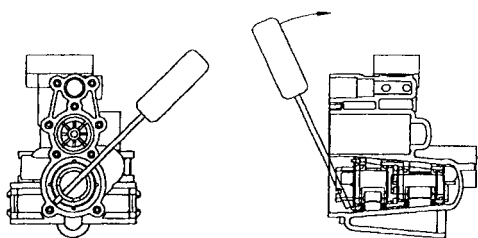
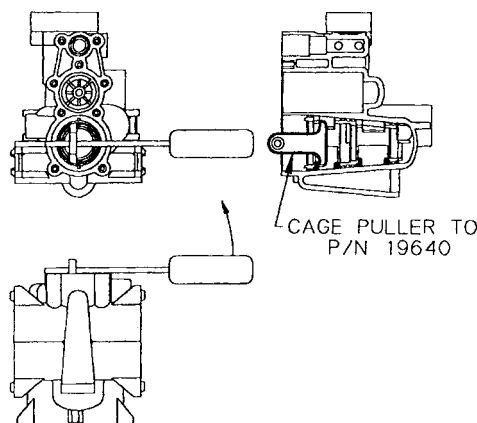


FIG. 3



8. To install cage and rotor, replace and lubricate (Silicone grease) 4 rotor **Quad Ring Seals** (Page 16 & 17, item #'s 10, 11, 12, 13), use care to assure that quad ring seals are not twisted around the rotor. Replace and lubricate (Silicone grease) 4 cage **O-Ring Seals** (Page 17, item #'s 5, 6, 7, 8). Install rotor until it snaps into cage. Face rotor ports to large openings of cage; use a slight back and forth rotation of rotor to assist in seating the rotor quad ring seals properly in cage.

How to Disassemble and/or Assemble (Cont'd.)

9. Replace and lubricate (Silicone grease) molded inlet and outlet seals and place 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 cage and rotor is inside valve body then rotate 180 to properly position cage in valve body. Push rotor flush with valve body face.
10. Replace and lubricate (Silicone grease) the **Quad Seal** (Page 17, item # 15) and **O-Ring Seal** (Page 17, item # 18) 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 rotor drive shaft should be in odd slot of 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 valve that only allow cage to be in only one proper position, a slight rotation may be necessary to obtain this position.
13. Install retainer plate and secure with 4 screws and cam bearing pin. Install transfer crank on rotor drive shaft.
14. To install backplate be certain that tank 2 is in service and SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Make sure **Transfer Link** (Page 15, item # 6) is resting on alignment pin. (The alignment pin is molded at the bottom back of center plate). Rotate **Transfer Crank** (Page 17, item # 17) to its lowermost position (See fig. 1) and rotate the **Piston Rod** (Page 17 item # 24) in the vertical position. Note: rotate transfer crank in the area indicated in figure 1. Make sure the **Drive Roller Pin** (Page 17, item # 26) is inserted in piston rod. Place backplate on valve body; align transfer link into transfer crank.
15. With a magnetic 5/16" socket and extension, replace 4 screws, plug in meter cable.
16. Return bypass to 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.

E. REMOVE/INSTALL REGENERATION PISTON, SEALS, AND SPACERS

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 SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Unplug meter cable at turbine meter. To unplug meter cable, see letter I. Remove/Install Turbine Meter.
3. With a magnetic 5/16" socket and extension, remove 4 **Screws** (Page 15, item # 31) securing backplate to valve body, then pull backplate away. The locations of 4 screws are on each side of the **Switch Cam** (Page 15, item # 12) in back, below the SE Timer and **Gear and Label Assembly** (Page 15, item # 10) in back.
4. Grasp piston rod and pull **End Plug Assembly** (Page 17, item # 25) and **Regeneration Piston** (Page 17, item # 23) straight out of control valve.
5. Remove all **Regeneration Seals** and **Spacers** (Page 17, item #'s 21, 22). There are 4 seals and spacers.
6. Inspect seals and piston for damage, replace as necessary.
7. Lubricate (Silicone grease) regeneration seals and install starting with a spacer then alternate each.
8. Lubricate (Silicone grease) regeneration piston and install into seal/spacer stack.
9. Place rotor drive shaft arms into mating slots in rotor. There is only one correct position. Note; the thickest arm of rotor drive shaft should be in odd slot of rotor. Do not force rotor drive shaft arms into slots

How to Disassemble and/or Assemble (Cont'd.)

10. 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 valve that only allow cage to be in only one proper position, a slight rotation may be necessary to obtain this position.
11. Install retainer plate and secure with 4 screws and cam bearing pin. Install transfer crank on rotor drive shaft.
12. To install backplate be certain that tank 2 is in service and SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Make sure **Transfer Link** (Page 15, item # 6) is resting on alignment pin. (The alignment pin is molded at the bottom back of center plate). Rotate **Transfer Crank** (Page 17, item # 17) to its lowermost position (See fig. 1) and rotate the **Piston Rod** (Page 17 item # 24) in the vertical position. Note: rotate transfer crank in the area indicated in figure 1. Make sure the **Drive Roller Pin** (Page 17, item # 26) is inserted in piston rod. Place backplate on valve body; align transfer link into transfer crank.
13. With a magnetic 5/16" socket and extension, replace 4 screws, plug in meter cable.
14. Return bypass to normal service position.
15. Check for leaks at all seal areas. Cycle valve to each position on both tanks for proper operation. Put control valve in SERVICE position.

F. REMOVE/INSTALL BRINE VALVE

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 SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Unplug meter cable at turbine meter. To unplug meter cable, see letter I. Remove/Install Turbine Meter.
3. With a magnetic 5/16" socket and extension, remove 4 **Screws** (Page 15, item # 34) securing backplate to valve body, then pull backplate away. The locations of 4 screws are on each side of the **Switch Cam** (Page 15, item # 12) in back, below the SE Timer and **Gear and Label Assembly** (Page 15, item # 10) in back.
4. Grasp **Brine Valve Stem** (Page 17, item # 27) with pliers and pull out of control valve, save the white **Brine Valve Spacer** (Page 17, item # 36).
5. Remove and replace bottom **O-Ring Seal** (Page 17, item # 29) of brine valve assembly. Note: this o-ring usually stays in valve body when brine valve is pulled out.
6. Lubricate (Silicone grease) o-ring on brine valve assembly and press into valve body. Install white brine valve spacer over brine valve, top of brine valve spacer should be flush with valve body face.
7. Install retainer plate and secure with 4 screws and cam bearing pin. Install transfer crank on rotor drive shaft.
8. To install backplate be certain that tank 2 is in service and SE Timer is in the BRINE/RINSE position (regeneration cycle step # 3). Make sure **Transfer Link** (Page 15, item # 6) is resting on alignment pin. (The alignment pin is molded at the bottom back of center plate). Rotate **Transfer Crank** (Page 17, item # 17) to its lowermost position (See fig. 1) and rotate the **Piston Rod** (Page 17 item # 24) in the vertical position. Note: rotate transfer crank in the area indicated in figure 1. Make sure the **Drive Roller Pin** (Page 17, item # 26) is inserted in piston rod. Place backplate on valve body; align transfer link into transfer crank.
9. With a magnetic 5/16" socket and extension, replace 4 screws, plug in meter cable.
10. Return bypass to normal service position.
11. Check for leaks at all seal areas. Cycle valve to each position on both tanks for proper operation. Put control valve in SERVICE position.

How to Disassemble and/or Assemble (Cont'd.)

G. REMOVE /INSTALL INJECTOR ASSEMBLY

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 to RINSE (Regeneration cycle step # 1) position to relieve pressure in control valve. Unplug electrical cord from outlet.
3. With a 5/16" nut driver remove 2 **Screws** (Page 17, item # 49) securing **Injector Cover** (Page 17, item # 48). Remove injector cover and discard **O-Ring Seal** (Page 17, item # 47). Pry **Injector Nozzle and Throat** (Page 17, item #'s 45, 46) assembly from control valve with a screwdriver. Note: There is a slot that goes around injector nozzle to pry with a screwdriver.
4. Push in new injector nozzle and throat assembly until it snaps into control valve. Clean or replace **Injector Screen** (Page 17, item # 43).
5. Lubricate (Silicone grease) new o-ring seal place on injector pad. Place injector cover on control valve, line up screw holes and tighten securely with 2 screws.
6. Return bypass to normal service position.
7. Check for leaks at all seal areas. Cycle valve to each position on both tanks for proper operation. Put control valve in SERVICE position.

H. REMOVE/INSTALL CONTROL VALVE

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 to RINSE (Regeneration cycle step # 1) position to relieve pressure in control valve. Unplug electrical cord from outlet.
3. With a 1/4" nut driver remove 2 **Screws** (Page 19, item # 7) and **Mounting Clips** (Page 19, item # 6) on side of control valve at either **Adapter Assembly** (Page 19, item # 2).
4. Pull resin tank with adapter assembly away from control valve.
5. Temporarily support control valve, and repeat steps 2 and 3 for remaining adapter.
6. With a 1/4" nut driver remove 2 screws and clips from meter at the yoke or bypass.
7. Pull valve and meter away from plumbing connections.
8. Replace and lubricate (Silicone grease) **O-Ring Seals** (Page 20, item # 5) on meter into yoke or bypass. Attach with clips and screws, being certain clips are seated firmly against meter body.
9. Replace and lubricate (Silicone grease) o-ring seals on all **Couplings** (Page 19, item # 5) and install in control valve.
10. Push resin tank and adapter assembly into couplings that are in control valve and with a 1/4" nut driver attach clips and screws, being certain clips are seated firmly against adapter assembly.
11. Repeat steps 8 and 9 for remaining resin tank.
12. Return bypass to normal service position.
13. Check for leaks at all seal areas. Cycle valve to each position on both tanks for proper operation. Put control valve in SERVICE position.

I. REMOVE/INSTALL TURBINE METER

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 to RINSE (Regeneration cycle step # 1) position to relieve pressure in control valve. Unplug electrical cord from outlet.
3. With a 1/4" nut driver remove 2 **Screws** (Page19, item # 2) and **Flow Meter Clip** (Page 19, item # 3) securing turbine meter to control valve and yoke or bypass.
4. Pull meter out from control valve and bypass or yoke. Turn turbine meter upside down.
5. Remove **Meter Cable** (Page19, item # 4) Use a screwdriver at the bottom of meter (turbine or outlet side) push down the snap clip on the meter cable and pull out cable from top of turbine.
6. Replace and lubricate (Silicone grease) **O-Ring Seals** (Page 19, item # 8) on turbine meter and install to control valve and into yoke or bypass. With a 1/4" nut driver attach clips and screws, being certain clips are seated firmly against turbine meter.
7. Install meter cable into turbine meter.
8. Return bypass to normal service position.
9. Plug electrical cord into outlet. Check for leaks at all seal areas. Put control valve in SERVICE position.

TwinFlo100e

Service Assemblies

BRINE LINE FLOW CONTROLS (BLFC)

60022-12	Model 1600 with .125 GPM Flow Control
60022-25	Model 1600 with .25 GPM Flow Control
60022-50	Model 1600 with .50 GPM Flow Control

BRINE VALVE

60350	Brine Valve
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CAGE & ROTOR

60147	Cage and Rotor Kit
19314	Lower Cage Assembly

COLLECTORS, UPPER

18280	1" Standard Slot (.010 - .012 slot size)
18280-01	1" Wide Slot (.019 - .022 slot size)
18280-02	1" Narrow Slot (.007 - .009 slot size)

COVER

48260-00	Smoked Cover
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DISTRIBUTORS

60795 -00	1" x 72" Standard Slot (.010 - .012 slot size)
60795-01	1" x 72" Wide Slot (.019 - .022 slot size)
60795-02	1" x 72" Narrow Slot (.007 - .009 slot size)

DRAIN LINE FLOW CONTROLS

60705 -	Drain Line Flow Control
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FLOW CONTROL WASHERS

Brine Line Flow Controls	
17307	.125 GPM
12094	.25 GPM
10759	.50 GPM
Drain Line Flow Controls	
19153	.06 GPM
19151	.08 GPM
19152	1.0 GPM
12085	1.2 GPM
19150	1.3 GPM
12086	1.5 GPM
19149	1.7 GPM
12087	2.0 GPM
12088	2.4 GPM

INJECTORS (1610)

18272-000	#000 Brown Injector
18272-00	#00 Violet Injector
18272-0	#0 Red Injector
18272-1	#1 White Injector
18272-2	#2 Blue Injector

METER MODULE

60626	3/4" Turbine Meter
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PISTON

60112	Upper Piston Assembly Downflow
60112-60	Upper Piston Assembly Upflow

POWER HEAD

60429-03	Powerhead 110V, 60 Hz
60429-04	Powerhead 220V, 50 Hz

SAFETY BRINE VALVE

60014	2310 Plastic
60027-FFA	2300 Brass Fitting Facing Arm
60027-FFS	2300 Brass Fitting Facing Stud

SALES & SERVICE AIDS

40237	TwinFlo 100 Brochure
40249	Service Manual
16700	Product Line Brochure

SEALS & SPACERS

60148	Upper Seal and Spacer Kit
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TIMER

60327-01	SE Timer Assembly
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YOKES

13708	3/4" NPT
13708-10	3/4" BSP
13708NP	3/4" NPT, Nickel Plated
13708-10NP	3/4" BSP, Nickel Plated
13708-45	3/4" Sweat
13708-45NP	3/4" Sweat, Nickel Plated
13708-40	1" Sweat
13708-40NP	1" Sweat, Nickel Plated
13398	1" NPT
13398-10	1" BSP
13398NP	1" NPT, Nickel Plated
13398-10NP	1" BSP, Nickel Plated
18706	1" Plastic, MNPT
18706-10	1" Plastic, MBSP
18706-02	3/4" Plastic, MNPT
18706-12	3/4" Plastic, MBSP
19275	3/4" 90° Angle, NPT
19275-10	3/4" 90° Angle, BSP
19275NP	3/4" 90° Angle, NPT, Nickel Plated
19275-10NP	3/4" 90° Angle, BSP, Nickel Plated
19275-45	3/4" 90° Angle Sweat
19275-45NP	3/4" 90° Angle Sweat, Nickel Plated
19620-01	90° Adapter Coupling

Notes
