MODEL F90

Water Treatment Equipment Control Valve

Installation and Service Manual

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F90 Downflow

INSTALLATION SHEET

Equipment Supplier:

Address: Phone: _____

_____

_____

Installation Date: _____

Equipment Model: _____

Installer's name: _____

Influent Water Data:

Dynamic Inlet Water Pressure: ____ psi

Source: City: ☐Well: ☐ Lake: ☐ River: ☐

otal Hardness: _____ grains/gallon, _____ mg/l (grams/m^3)

Turbidity: _____ NTU, pH: _____ TDS: _____

Color (Organics): _____ Total Alkalinity: _____ ppm (mg/l),

Chlorine: _____ ppm (mg/l), Nitrates: _____ ppm (mg/l)

Arsenic: _____ ppm (mg/l)

Equipment Data:

Softener ☐ Suspended Solids Filter: ☐

Carbon Filter: ☐ Neutralizing Filter: ☐

Nitrate Removal Unit ☐ Dealkalizer: ☐

Arsenic Removal Unit ☐

Dimensions: Mineral tank: _____ Brine tank: _____ inches ☐ mm ☐

Active medias: Type: _____ Volume: _____ ft^3 ☐ Liters ☐

Support media: Type: _____Volume: _____ ft^3 ☐ Liters ☐

Salt used/regeneration: _____ lbs ☐ Kgrams ☐

Brining System: Small ☐ Medium ☐ Large ☐ Injector size _____

Backwash Flow Control _____ (gpm) Refill Flow Control _____ (gpm)

Equipment Program:

Regeneration start: By clock ☐ By meter ☐ Outside signal ☐

Equipment capacity: _____ gallons ☐ m^3 ☐

Regeneration days override: _____ Regeneration time: _____ am ☐ pm ☐

Cycle Programming in minutes:

1.- Backwash _____ 3.- Fast Rinse _____

2.- Draw and Slow Rinse _____ 4.- Refill _____

MODEL F90

General Commercial Pre-Installation Check List

WATER PRESSURE: A minimum of 25 pounds of water pressure is required for regeneration valve to operate effectively.

ELECTRICAL FACILITIES: A continuous 115 volt, 60 Hertz current supply is required. (Other voltages available.) Make certain the current supply is always hot and cannot be turned off with another switch.

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

LOCATION OF SOFTENER AND DRAIN: The softener should be located close to a drain.

BY-PASS VALVES: Always provide for the installation of a by-pass valve.

CAUTION: Water pressure is not to exceed 120 p.s.i., water temperature is not to exceed 110 F, and the unit cannot be subjected to freezing conditions.

INSTALLATION INSTRUCTIONS

1. Place the softener tank where you want to install the unit making sure the unit is level and on a firm base. (Maximum 7 feet apart for twin units.) To provide for expansion and contraction of plastic resin tanks and rigid plumbing loads, use FLEXIBLE FITTINGS at the valve.
2. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be the same size as the drain line flow control connection. Water meters are to be installed on soft water outlets. Twin units with (1) one meter shall be installed on common soft water outlet of units.
3. Make sure that the floor is clean beneath the salt storage tank and that it is level.
4. Place approximately 1" of water above the grid plate (if used) in your salt tank. Salt may be placed in the unit at this time.
5. Place in by-pass position. Turn on the main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material (usually solder) that may have resulted from the installation.
6. Place the by-pass in service position.
7. Manually index the softener control into “service” position and let water flow into the mineral tank. When water flow stops, close inlet valve, place control in “backwash” position to relieve head of air, then gradually open inlet valve to purge remaining air in tank. Return control to “service” position.
8. Electrical: All electrical connections must be connected according to codes. Use electrical conduit if applicable. Plug into power supply.

MODEL F90 CLOCK TIMER

Timer Setting Procedure

How To Set Days On Which Water Conditioner Is To Regenerate:

Rotate the skipper wheel until the number “1” is at the red pointer. Set the days that regeneration is to occur by sliding tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers to obtain the desired regeneration schedule.

How To Set The Time Of Day:

Press and hold the red button in to disengage the drive gear. Turn the large gear until the actual time of day is at the time of day pointer.

Release the red button to again engage the drive gear.

How To Manually Regenerate Your Water Conditioner At Any Time:

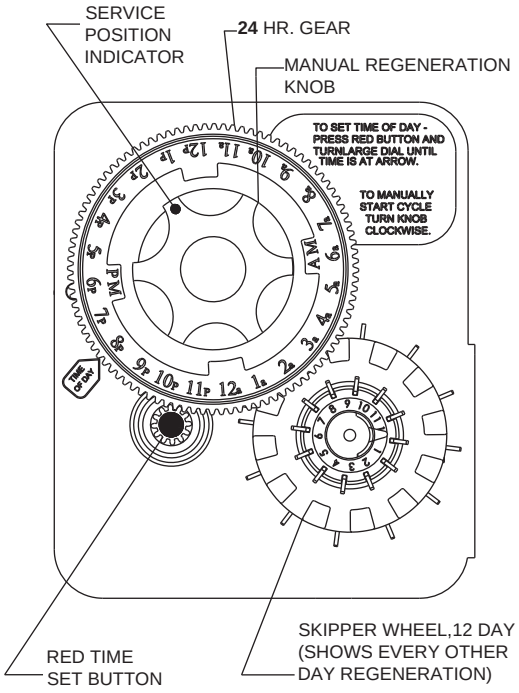
Turn the manual regeneration knob clockwise.

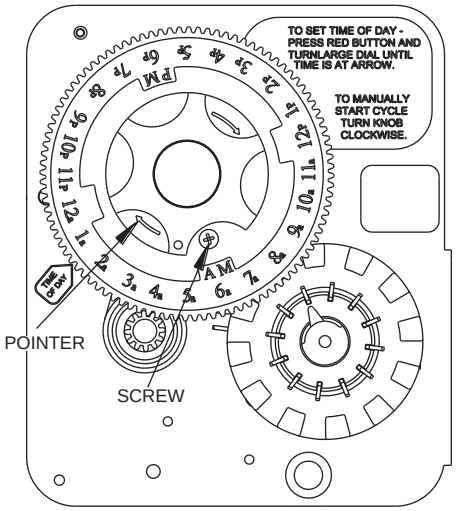
This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.The black center knob will make one revolution in the following approximately

three hours and stop in the position shown in the drawing. Even thought it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set only one half of this time.In any event, conditioned water may be drawn after rinsewater stops flowing from the water conditioner drain line.

How to Adjust Regeneration Time:

1. Disconnect the power source.
2. Locate the three screws behind the manual regeneration knob by pushing the red button in and rotating the 24 hour dial until each screw appears in the cut out portion of the manual regeneration knob.
3. Loosen each screw slightly to release the pressure on the time plate from the 24 hour gear.
4. Locate the regeneration time pointer on the inside of the 24 hour dial in the cut out.
5. Turn the time plate so the desired regeneration time aligns next to the raised arrow.
6. Push the red button in and rotate the 24 hour dial. Tighten each of the three screws.
7. Push the red button and locate the pointer one more time to ensure the desired regeneration time is correct.
8. Reset the time of day and restore power to the unit.





MODEL F90 METER TIMER

Commercial Demand Regeneration Control Timer Settings

Typical Programming Procedure

Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons required by lifting the gallon dial and rotating it so that the number of gallons required is aligned with the white dot on program wheel gear. Release and check for firm engagement with gear.

Note, drawing shows 8,750 gallon setting. The capacity (gallons) arrow denotes remaining gallons exclusive of fixed reserve.

Note:

To set Meter capacity at initial start-up either

1. Rotate manual regeneration knob one full revolution.

   —or—

2. Rotate program wheel manually clockwise or counter clockwise and align white dot with capacity arrow.

   This procedure must be followed any time the program wheel setting is changed.

How To Set The Time Of Day:

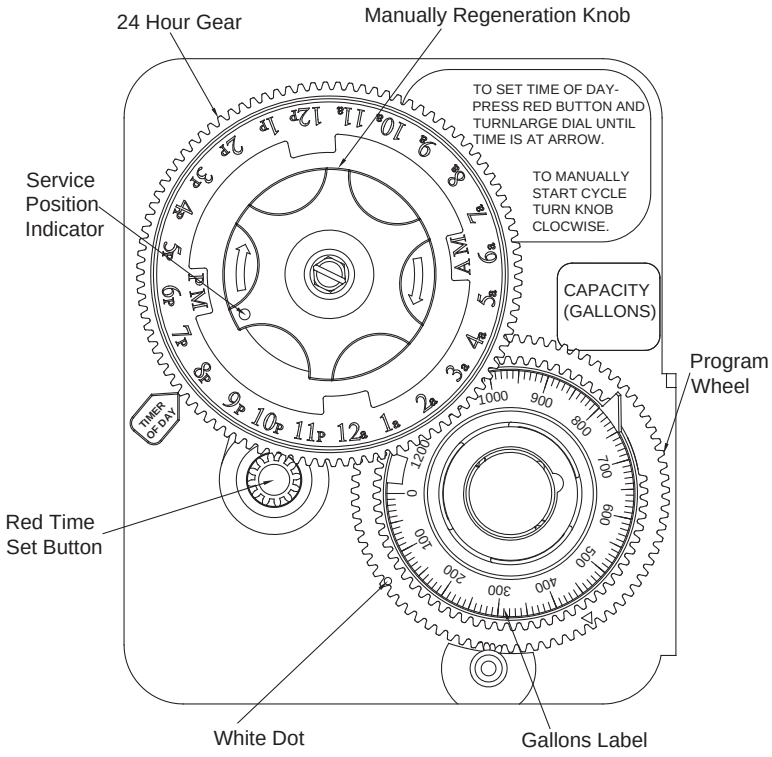
1. Press and hold the red button in to is engage the 24 hour gear.
2. Turn the 24 hour gear until the actual time of day is at the time of day pointer
3. Release the red button to again engage the 24 hour gear.

How To Manually Regenerate Your Water Conditioner At Any Time:

1. Turn the manual regeneration knob clockwise one “click.”
2. This slight movement of the manual regeneration knob engages the program wheel and starts the generation program.
3. The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.
4. Even though it takes three hours for this center knob to complete one revolution, the regenera tion cycle of your unit might be set for only one half of this time.
5. In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

Immediate Regeneration Timers:

These timers do not have a 24 hour gear. Setting the gallons on the program wheel and manual regeneration procedure are the same as previous instructions.



MODEL F90 TIMER SERIES

Regeneration Cycle Program Setting Procedure

(Brine Tank Refill Separate From Rapid Rinse)

How To Set Regeneration Cycle Program:

The regeneration cycle program on your water condi¯ tioner has been factory preset, however, portions of the cycle orprogram may be lengthened or shortened in time to suitlocal conditions.

F90 Series Timers (Figure to Right)

To expose cycle program wheel, grasp timer in upper left Hand corner and pull, releasing snap retainer and swinging timer to the right.

To change the regeneration cycle program, the program wheel must be removed. Grasp program wheel and squeeze protruding lugs toward center, lift program wheel off timer. (Switch arms may require movement to facilitate removal.)

Return timer to closed position engaging snap retainer in back plate. Make certain all electrical wires locate above snap retainer post.

Timer Setting Procedure for F90 Timer

How To Change The Length Of The Backwash Time:

The program wheel as shown in the drawing is in the service position. As you look at the numbered side of the program wheel, the group of pins starting at zero determines the length of time your unit will backwash. FOR EXAMPLE: If there are six pins in this section, the time of backwash will be 12 min. (2 min. per pin). To change the length of backwash time, add or remove pins as required. The number of pins times two equal the backwash time in minutes.

How To Change The Length Of Brine And Rinse Time:

The group of holes between the last pin in the back- wash section and the second group of pins determines the length of time that your unit will brine and rinse (2 min. per hole).

To change the length of brine and rinse time, move the rapid rinse group of pins to give more or fewer holes in the brine and rinse section. Number of holes times two equals brine and rinse time in minutes.

How To Change The Length Of Rapid Rinse:

The second group of pins on the program wheel determines the length of time that your water Conditioner will rapid rinse (2 min. per pin).

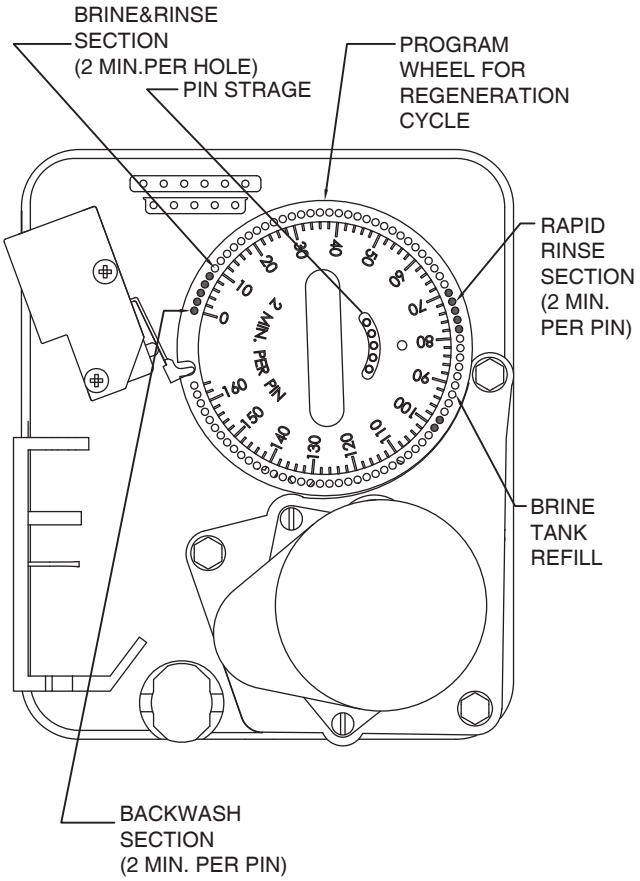
To change the length of rapid rinse time, add or remove pins at the higher numbered end of this section as required. The number of pins times two equals the rapid rinse time in minutes.

How To Change The Length Of Brine Tank Refill Time:

The second group of holes in the program wheel determines the length of time that your water condi- tioner will refill the brine tank (2 min. per hole).

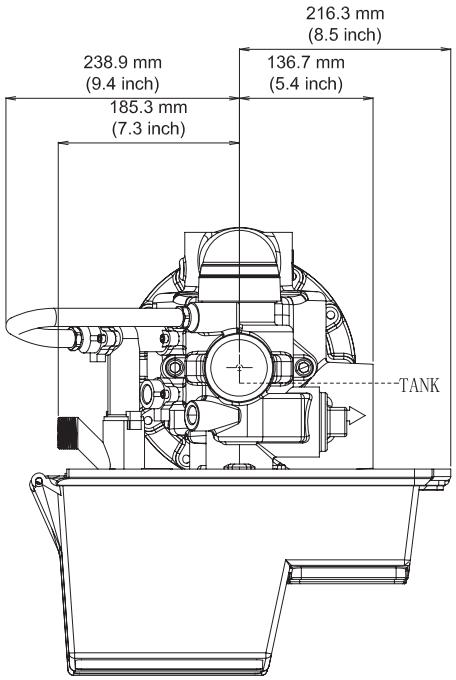
To change the length of refill time, move the two pins at the end of the second group of holes as required.

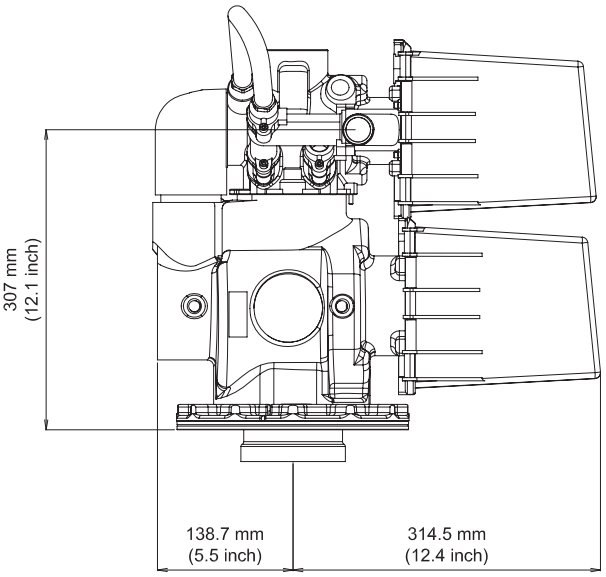
The regeneration cycle is complete when the outer microswitch is tripped by the two pin set at end of the brine tank refill section. The program wheel, however, will continue to rotate until the inner microswitch drops into the notch on the program wheel.

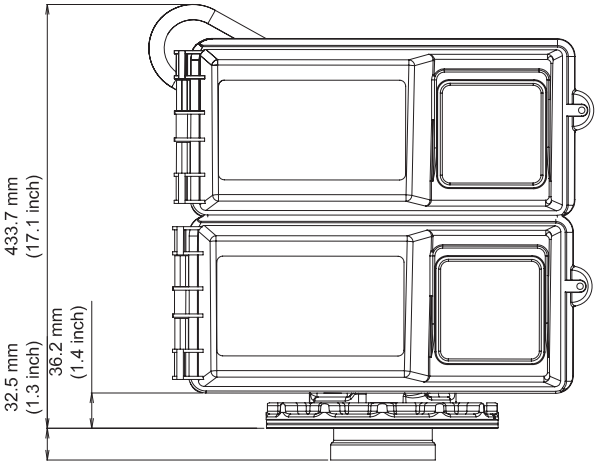


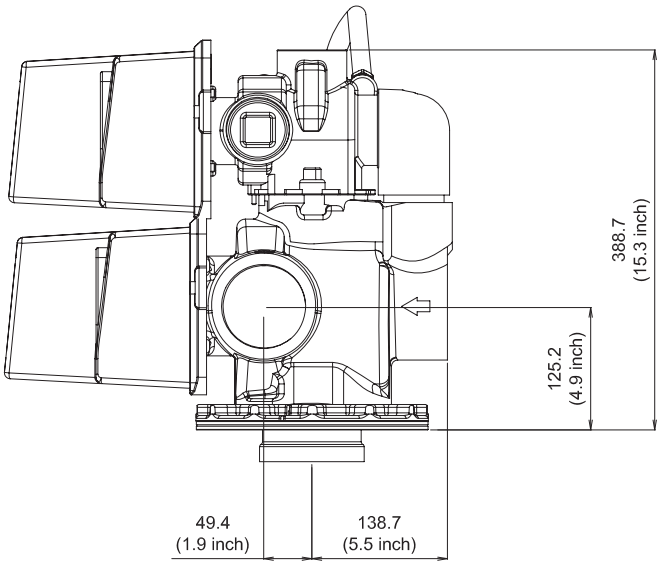
F90 Downflow

Dimensional Drawing





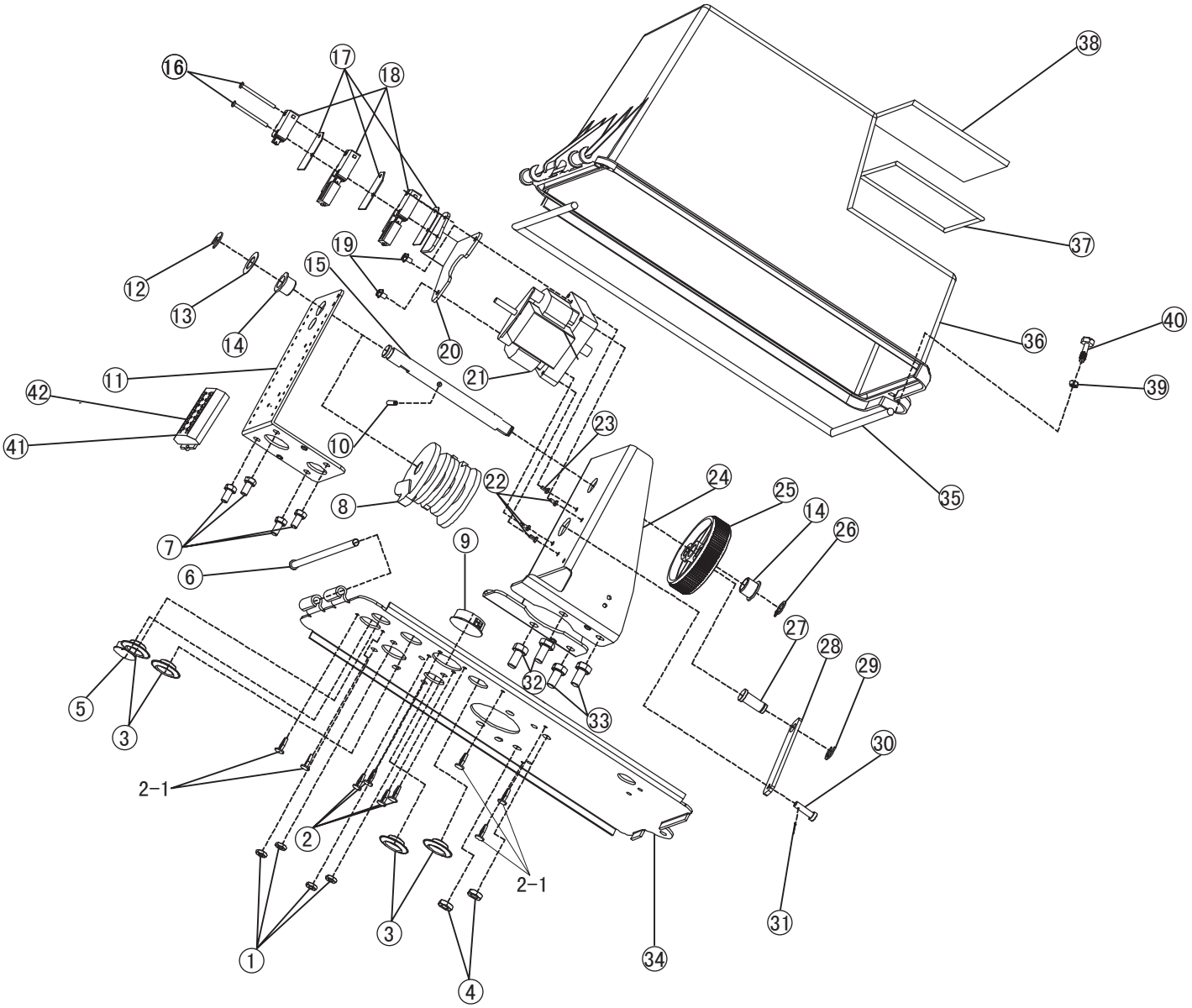




F90 Downflow

Assembly Drawings and Part Numbers

Upper Control Drive Assembly



F90 Downflow

Assembly Drawings and Part Numbers

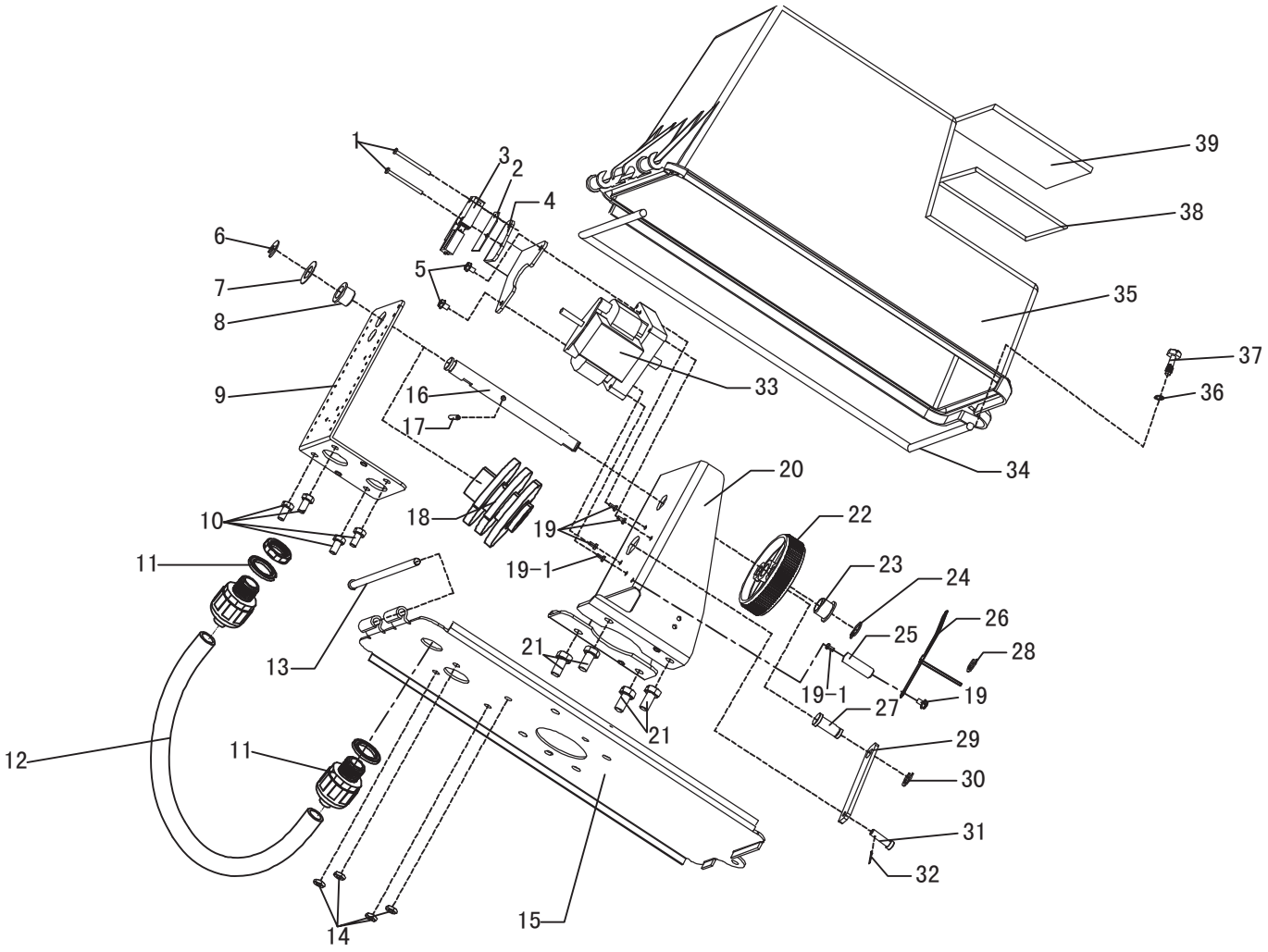
Upper Control Drive Assembly

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	4	066-00032-00	Nut	22	3	066-00015-00	screw
2	4	051-00280-00	Pin	23	1	066-00039-00	screw
2-1	4	051-00192-00	Pin	24	1	052-00090-00	Bracket-Motor Mounting
3	4	051-00273-00	Plug	**25**	**1**	**057-00013-00**	**Driver Gear**
4	2	066-00031-00	Nut	26	1	068-00002-00	Pin
5	1	051-00270-00	Plug	27	1	052-00082-00	Bearing-Drive Link
6	1	051-00407-00	Pin	28	1	052-00092-00	Drive Link
7	4	066-00035-00	screw	29	1	068-00011-00	E-Ring
8	1	051-00169-00	Cam	30	1	052-00083-00	Pin-Drive Link
9	1	078-00011-00	Plug	31	1	068-00017-00	Drive Link
10	1	068-00014-00	Pin	32	2	066-00030-00	screw
11	1	052-00089-00	Bracket-Brine Side	33	2	066-00034-00	screw
12	1	068-00010-00	retaining ring	34	1	052-00088-00	Back Plate
13	1	052-00093-00	Washing	35	670mm	060-00054-00	seal, Cover
14	2	051-00179-00	Bushing	36	1	051-00168-00	Cover, Black
15	1	052-00077-00	Cam shaft	37	410mm	060-00089-00	seal, Cover
16	2	066-00000-00	screw	38	1	051-00416-00	Window,Upper Cover
17	3	052-00049-00	Insulator - Timer Ass'Y	39	1	060-00037-01	O-Ring
18	**3**	**043-00009-00**	**Switch**	40	1	052-00087-00	Screw-cover
19	2	066-00040-00	screw	41	3	043-00007-00	Terminal Block
20	1	052-00228-00	Bracket-Switch Mounting	42	1	043-00008-00	Terminal Block
21	**1**	**053-00005-00**	**Drive Motor(220V)**	**21-A**	**1**	**053-00008-00**	**Drive Moto(24V)**

F90 Downflow

Assembly Drawings and Part Numbers

Lower Control Drive Assembly



F90 Downflow

Assembly Drawings and Part Numbers

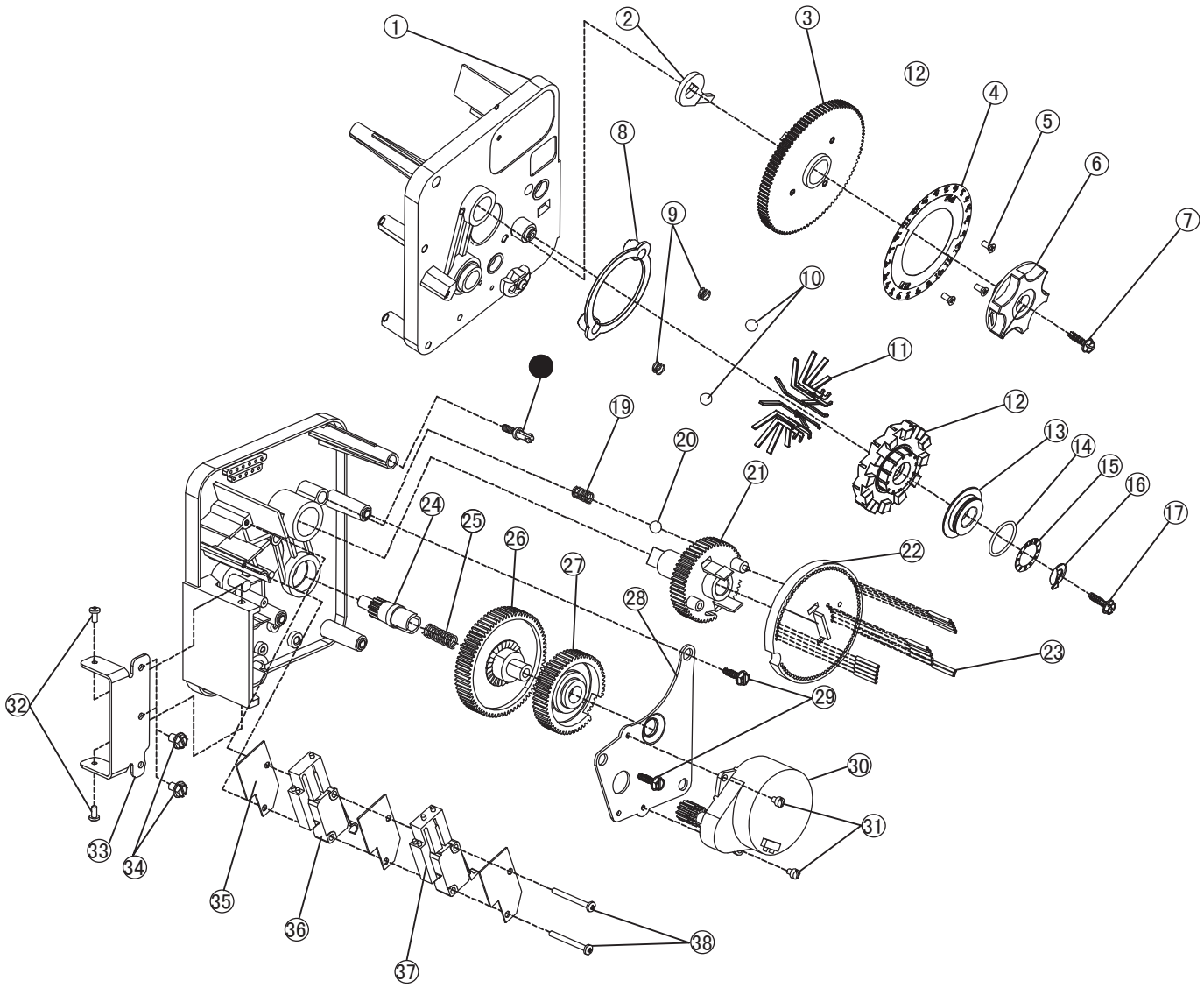
Lower Control Drive Assembly

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	2	066-00047-00	screw	21	4	066-00030-00	screw
2	1	052-00049-00	Insulation sheet	**22**	**1**	**057-00027-00**	**Drive Gear**
3	**1**	**043-00009-00**	**switch**	23	1	051-00179-00	Bushing
4	1	052-00091-00	Bracket/switch/mounting	24	1	068-00002-00	Clip,PIN
5	2	066-00066-00	screw	25	1	052-00124-00	Copper indicator
6	1	068-00010-00	retaining ring	26	1	052-00229-00	Condition/sate hand
7	1	052-00093-00	Washer	27	1	052-00248-00	Bearing-drive link
8	1	051-00179-00	Bushing	28	1	068-00011-00	retaining ring
9	1	052-00089-00	Bracket-Brine Side	29	1	052-00092-00	Drive Link
10	4	066-00035-00	screw	30	1	068-00011-00	retaining ring
11	2	051-00293-00	Fix head-water hammer tube	31	1	052-00083-00	Pin-Drive Link
12	0.4M	051-00292-00	Water-proof Nylon tube	32	1	068-00017-00	retaining ring
13	**1**	**051-00416-00**	**PIN**	**33**	**1**	**053-00005-00**	**Drive Motor (220V)**
14	4	066-00032-00	NUT 1/4-20	**33-A**	**1**	**053-00008-00**	**Drive Motor (24V)**
15	1	052-00225-00	Back plate	34	670mm	060-00054-00	Seal
16	1	052-00077-00	Cam shaft	35	1	051-00168-00	Cover, Black
17	1	068-00014-00	PIN	36	1	060-00037-01	O-Ring - AS008
18	1	051-00391-00	Cam	37	1	052-00087-00	Screw-Cover
19	4	066-00015-00	screw	38	410mm	060-00089-00	Seal, window
19-1	2	066-00039-00	screw	39	1	098-00008-00	Window, front cover
20	1	052-00228-00	Bracket-Motor Mounting				

F90 Downflow

Assembly Drawings and Part Numbers

Timer Assembly



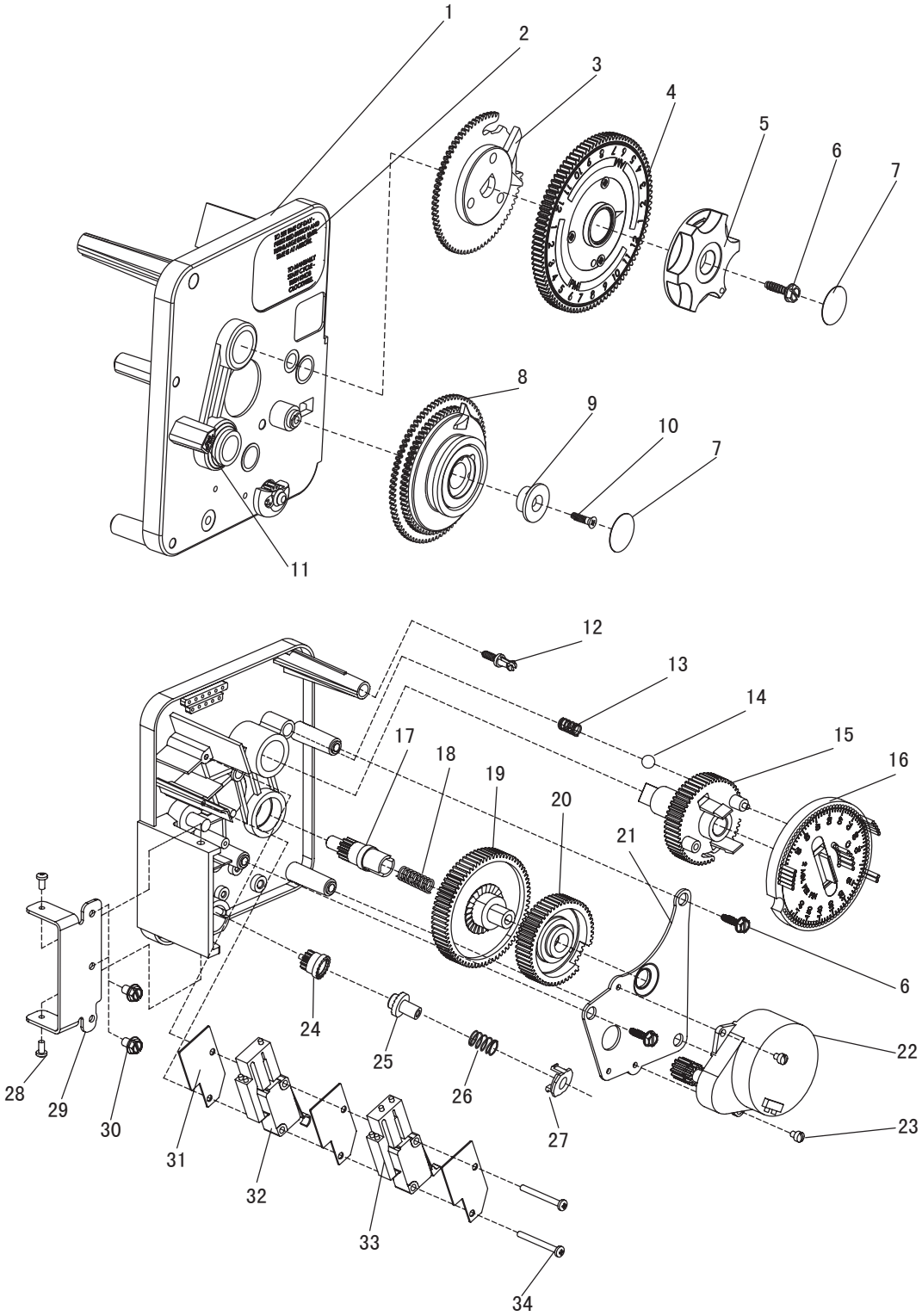
Timer Assembly

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	1	051-00078-00	Timer Housing Asm	20	1	051-00081-00	Plastical Ball-0.25inch Dia
2	1	051-00074-00	Cycle Actuator Gear	21	1	057-00023-00	Main Dirve Gear
3	1	057-00015-00	24 Hour Gear	22	1	051-00094-00	Program Wheel
4	1	052-00047-00	Timer Plate	23	17	068-00000-00	Pin
5	3	066-00007-00	Screw	24	1	057-00016-00	Idler Shaft
6	1	051-00089-00	Knob	25	1	058-00001-00	Spring - Idler
7	3	066-00002-00	Screw	26	1	057-00014-00	Idler Gear
8	1	051-00070-00	Skipper Wheel Ring	27	1	057-00013-00	Driver Gear
9	2	058-00003-00	Spring-Detent-Skipper Wheel	28	1	052-00046-00	Bracket-Motor
10	2	078-00008-00	BALL	29	3	066-00010-00	Screw
11	12	052-00036-00	Tab	30	1	053-00004-00	Motor
12	1	051-00048-00	Skipper Wheel	31	3	066-00007-00	Screw
13	1	051-00073-00	Ring Plate	32	2	066-00011-00	Screw
14	1	060-00027-00	O-Ring	33	1	052-00041-00	Hinge Bracket
15	1	069-00054-00	Labal-SWA	34	2	066-00012-00	Screw
16	1	051-00071-00	Regeneration Pointer	35	3	052-00048-00	Insulator - Drive Ass'Y
17	1	066-00002-00	Screw	36	1	043-00003-00	switch 3
18	1	052-00013-00	Spring Clip	37	1	043-00002-00	switch 2
19	1	058-00002-00	Spring-Denent-Main	38	2	066-00000-00	Screw

F90 Downflow

Assembly Drawings and Part Numbers

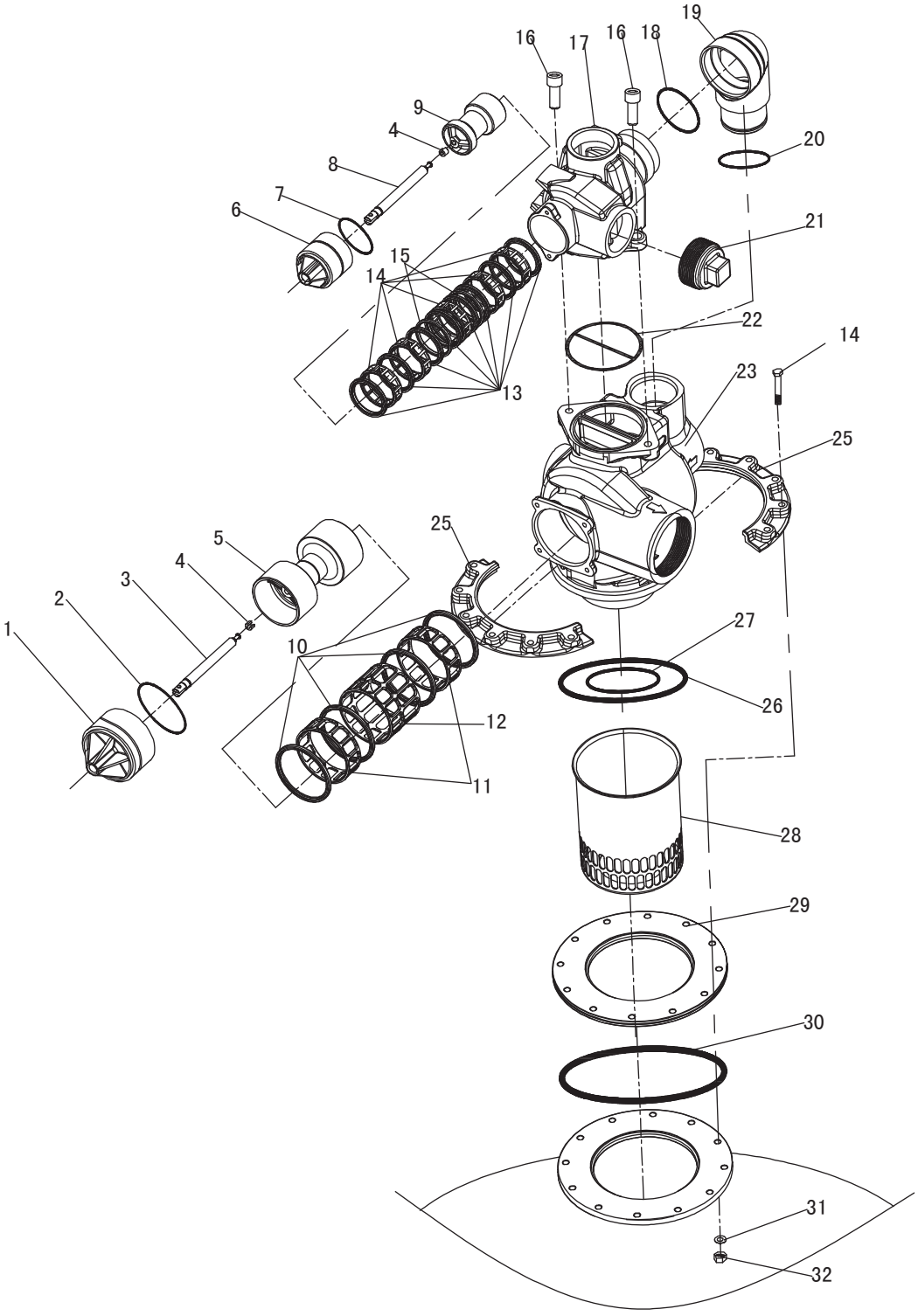
Meter Timer Assembly



Meter Timer Assembly

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	1	051-00078-00	Timer Housing	20	1	057-00013-00	Driver Gear
2	1	069-00188-00	Decal-Instructions 2	21	1	052-00046-00	Motor mounting plate
3	1	051-00087-00	Cycle Actuator Gear-SM	22-1	1	053-00002-00	Motor2 Ass 'Y - 110V
4	1	057-00032-00	24 Hour Gear, Dial 12 AM Regen	22-2	1	053-00008-00	Motor2 Ass 'Y - 24V
5	1	051-00089-00	Knob	22-3	1	053-00004-00	Motor2 Ass 'Y -220V
6	4	066-00002-00	Screw	23	3	066-00010-00	Screw
7	2	069-00179-00	Button Decal	24-1	1	057-00004-00	Drive Pinion-Program Wheel SM
8	1	099-01538-00	Program skipper wheel Ass'y	24-2		057-00021-00	Drive Pinion-Program Wheel
9	1	051-00068-00	Program Wheel Retainer	25-1	1	051-00067-00	Clutch-Drive Pinion SM
10	1	066-00026-00	Screw	25-2		051-00085-00	Clutch-Drive Pinion
11	1	069-00181-00	Decal-Time of Day	26	1	058-00004-00	Spring
12	1	052-00013-00	Spring Clip	27	1	051-00069-00	Spring Retainer
13	1	058-00002-00	Spring-Denent-Main Gear	28	2	066-00011-00	Screw
14	1	051-00081-00	Plastical Ball-0.25inch Dia	29	1	052-00041-00	Hinge Bracket
15	1	057-00024-00	Main Drive Gear(SM)	30	2	066-00012-00	Screw
16	1	099-00737-00	Program Wheel(SM) Ass'y	31	3	052-00048-00	Insulator
17	1	057-00020-00	Idler Shaft	32	1	043-00004-00	Switch
18	1	058-00001-00	Spring - Idler	33	1	043-00002-00	Switch
19	1	057-00014-00	Idler Gear	34	2	066-00000-00	Screw

Valve Body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F90 Downflow

Assembly Drawings and Part Numbers

Valve Body

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	1	051-00392-00	End Plug Asm	18	1	060-00092-00	O-Ring
2	1	060-00090-00	O-Ring	19	1	052-00217-00	Adapter
3	**1**	**052-00247-00**	**Piston Rod**	20	1	060-00091-00	O-Ring
4	**2**	**051-00171-00**	**Clip-Piston Rod**	21	1	052-00074-00	Pipe Plug
5	**1**	**052-00216-00**	**Piston NHWB**	22	1	060-00042-00	O-Ring
6	1	051-00415-00	End Plug Asm	**23**	**1**	**052-00244-00**	**F90 Valve Body**
7	1	060-00021-00	O-Ring	24	12	066-00060-00	Screw
8	**1**	**052-00097-00**	**Piston Rod**	25	2	052-00223-00	Upper flange ring
9	**1**	**052-00061-00**	**Piston**	26	1	060-00095-00	O-Ring
10	**4**	**060-00087-00**	**F90 Valve Seal**	27	1	060-00094-00	O-Ring
11	**2**	**051-00396-00**	**Spacer, port**	28	1	052-00226-00	Upper distributor
12	**1**	**051-00397-00**	**Double layer Spacer**	29	1	052-00224-00	Lower flange ring
13	**8**	**060-00084-00**	**F60 Valve Seal**	30	1	060-00096-00	O-Ring
14	**5**	**051-00165-00**	**Spacer-Port**	31	12	066-00062-00	Washing
15	**2**	**051-00166-00**	**Spacer**	32	12	066-00061-00	Nut
16	2	066-00028-00	Screw				
17	**1**	**052-00060-00**	**F60 Valve Body**				

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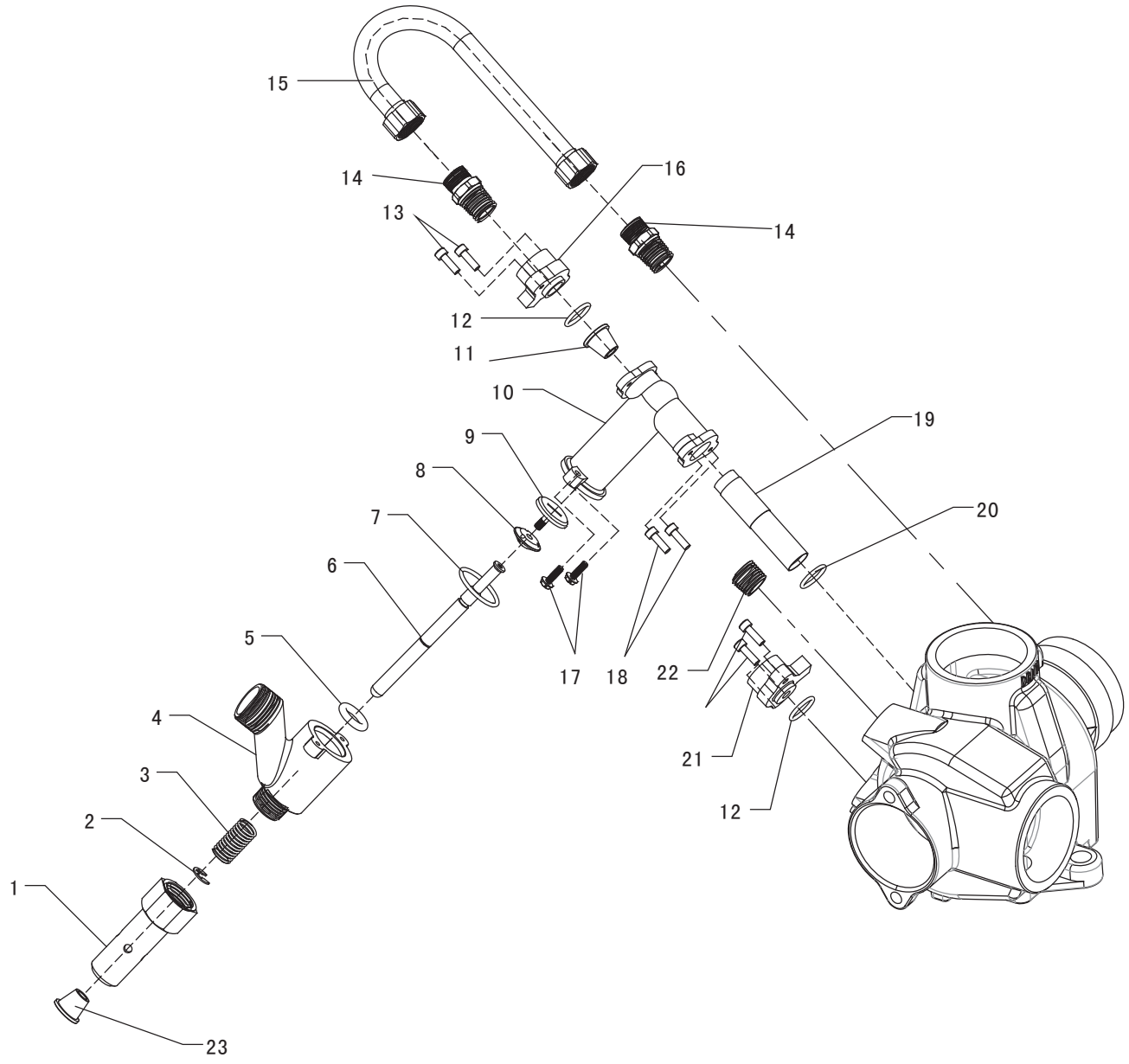
Assembly Drawings and Part Numbers

Medium Brining System Assembly



F90 Downflow

Assembly Drawings and Part Numbers

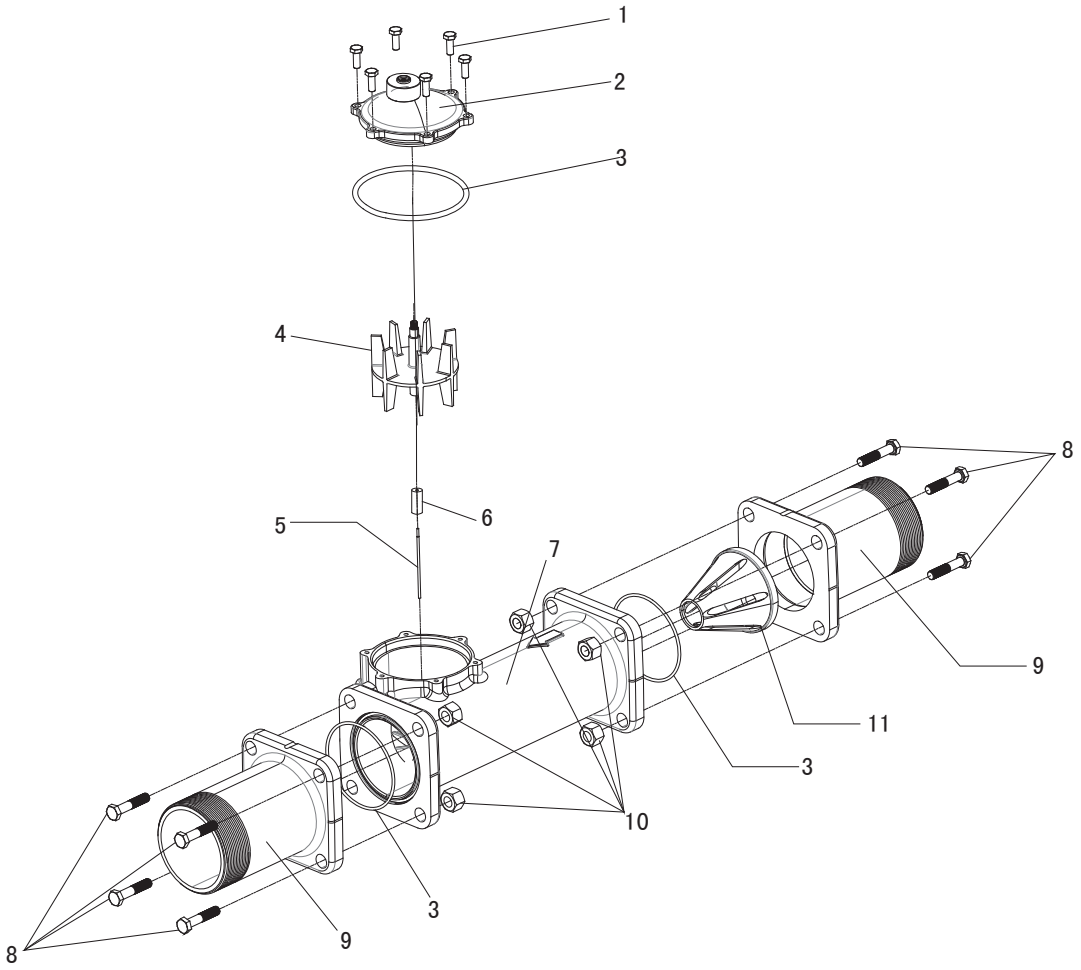
Medium Brining System Assembly

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	1	052-00081-00	Stem Guide Asm	13	2	066-00029-00	Screw
2	1	068-00011-00	retaining ring	14	2	052-00075-00	Pipe Plug
3	1	058-00006-00	Spring - Brine Valve	15	1	052-00059-00	Brine Tube
4	1	052-00064-00	Brine Vale Body	16	1	052-00066-00	Injector Cover
5	1	060-00002-00	O-Ring	17	2	066-00005-00	Screw
6	1	052-00080-00	Piston Rod	18	4	066-00029-00	Screw
7	1	060-00060-00	O-Ring	19	1	051-00175-00	Injector Throat
8	1	052-00079-00	Piston Rod Retainer	20	1	060-00049-00	O-Ring
9	1	052-00078-00	Piston Rod head	21	1	052-00068-00	Cover
10	1	052-00065-00	Injector Body	22	1	052-00074-00	Pipe Plug-1/2NPT
11	1	051-00176-00	Injector Nozzle	23	1	051-00177-00	End plug
12	2	060-00023-00	O-Ring				

F90 Downflow

Assembly Drawings and Part Numbers

3" Meter Assembly



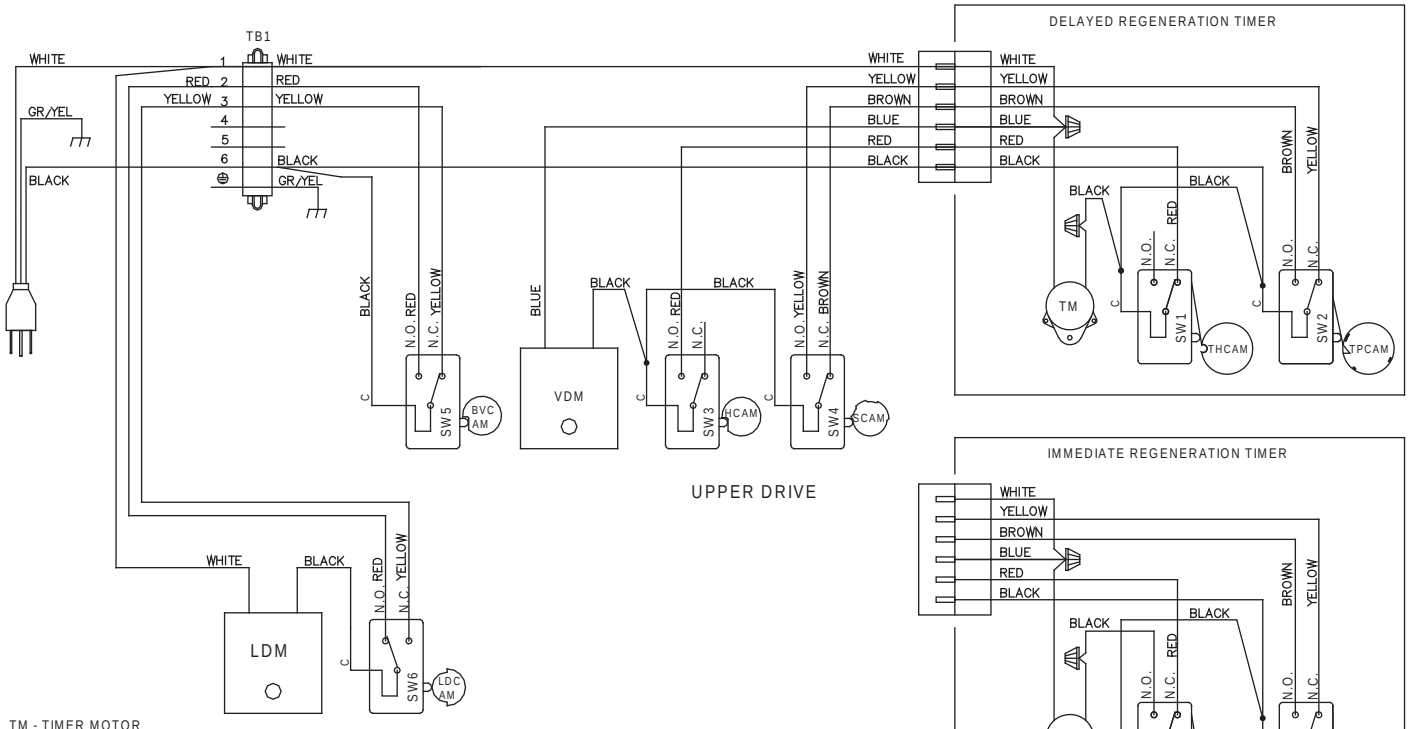
P/N:100-00048-00

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
1	6	066-00020-00	Screw	7	1	052-00218-00	Meter Body
2	1	100-00049-00	Meter Cover Assembly	8	8	066-00063-00	Screw
3	3	060-00093-00	O-ring	9	2	052-00219-00	Meter Connector
4	1	051-00394-00	Impeller	10	8	066-00064-00	Nut
5	1	052-00085-00	Impeller Shaft	11	1	051-00393-00	F90 Catchment Cover
6	1	051-00180-00	Impeller Shaft Retainer				

F90 Downflow

Wiring Diagrams

System #4 - Single Valve Regeneration



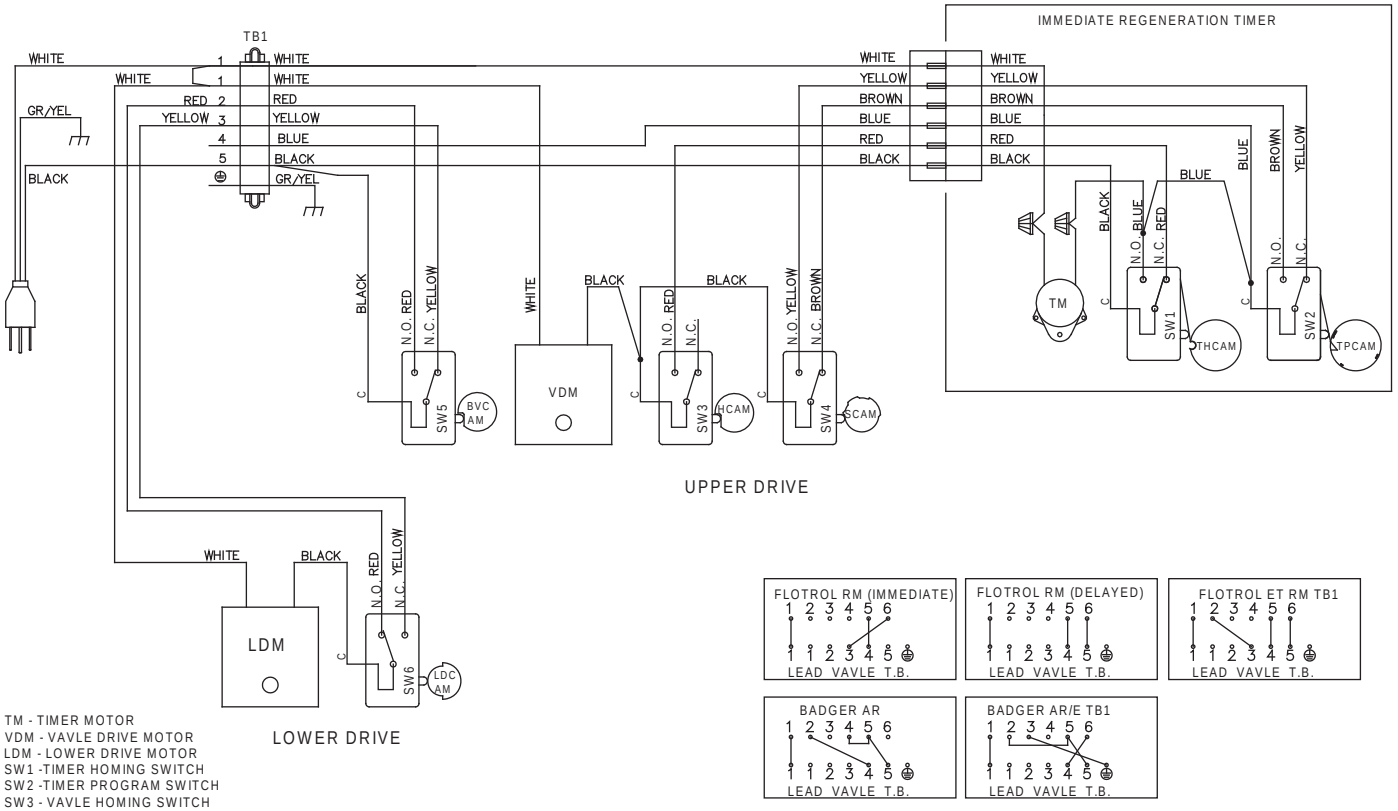
TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

NOTE :
SINGLE TANK TIMECLOCK, METER DELAYED, OR METER IMMEDIATE REGENERATION.

F90 Downflow

Wiring Diagrams

System #4 - with Remote Starter



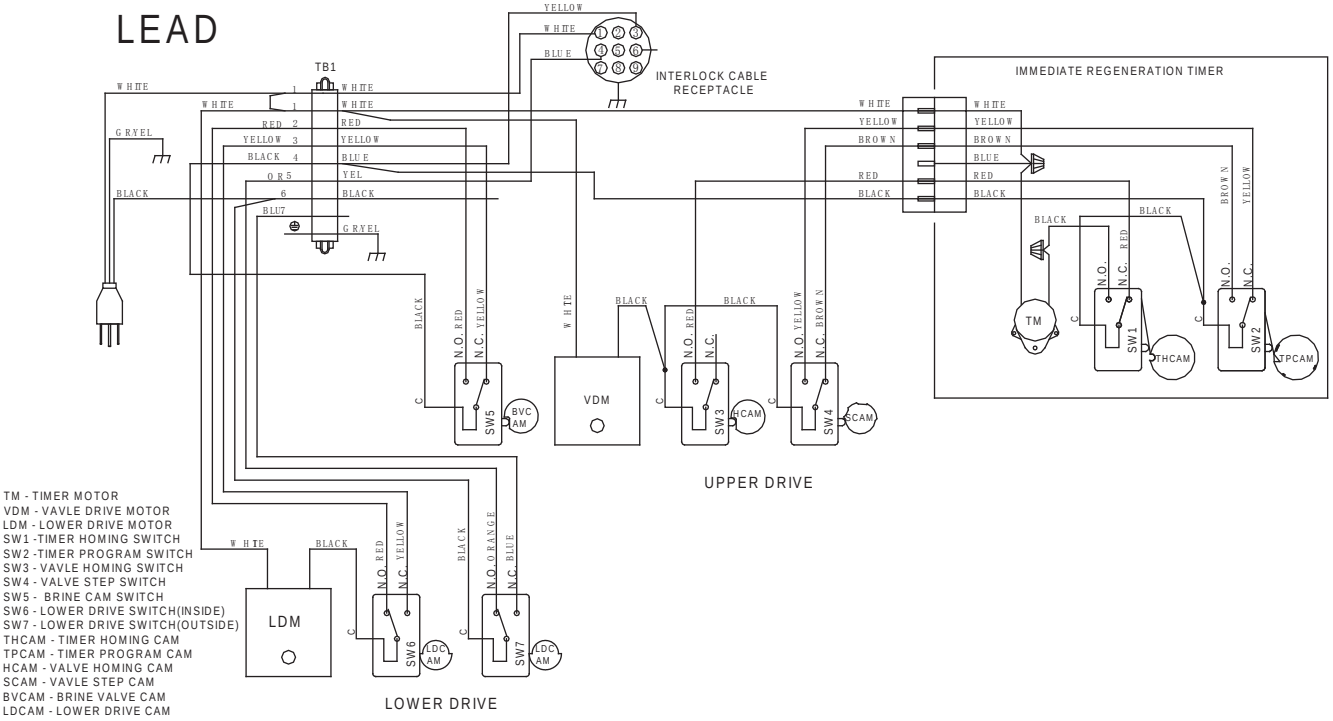
TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

NOTE :
SINGLE TANK REMOTE METER DELAYED, OR IMMEDIATE REGENERATION.

F90 Downflow

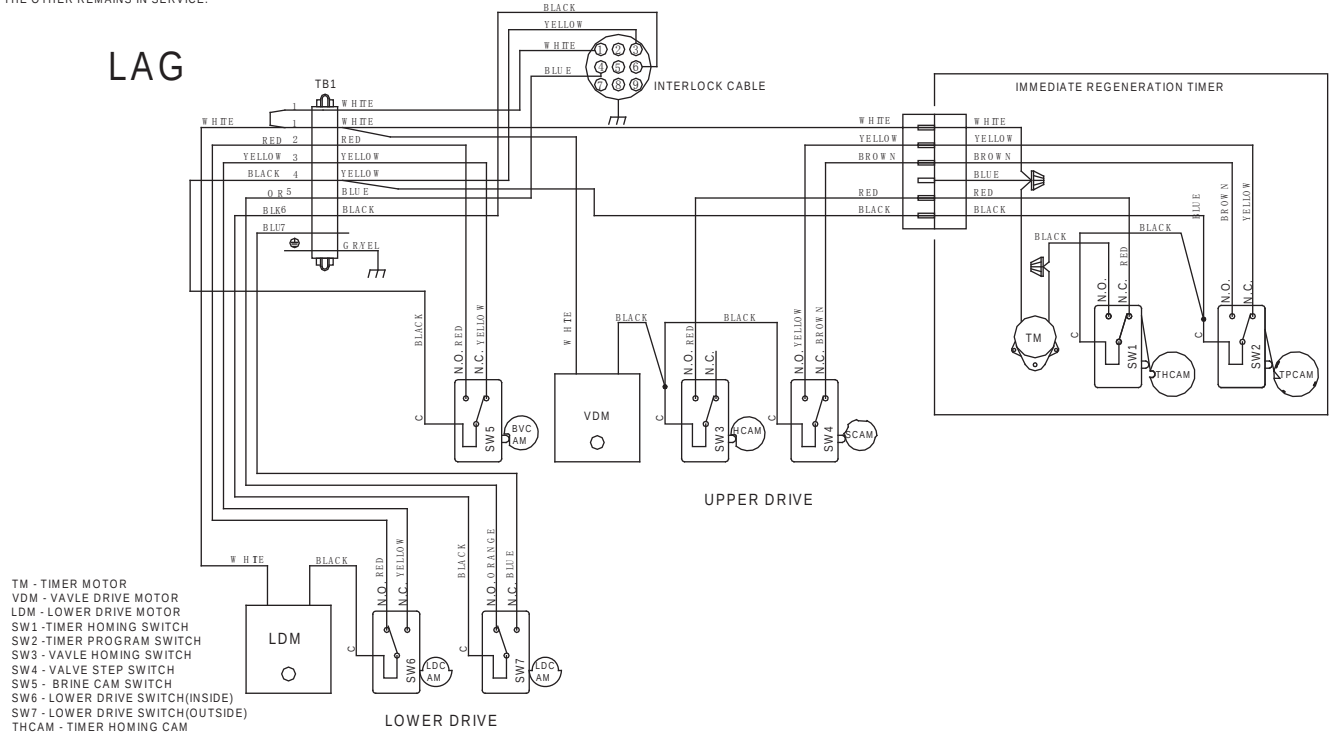
Wiring Diagrams

System #5 - Interlocked Regeneration



TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH(INSIDE)
SW7 - LOWER DRIVE SWITCH(OUTSIDE)
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

NOTE :
TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.
BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION,
THE OTHER REMAINS IN SERVICE.

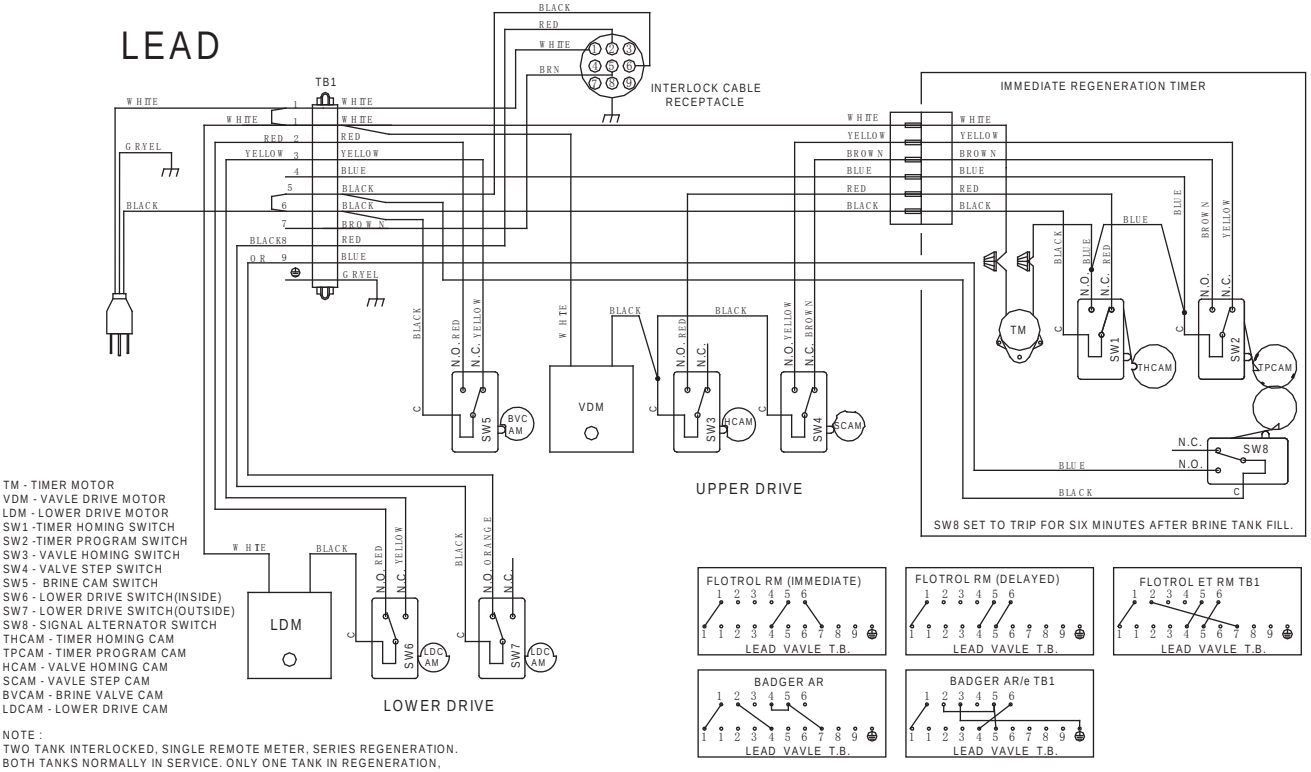


TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH(INSIDE)
SW7 - LOWER DRIVE SWITCH(OUTSIDE)
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

F90 Downflow

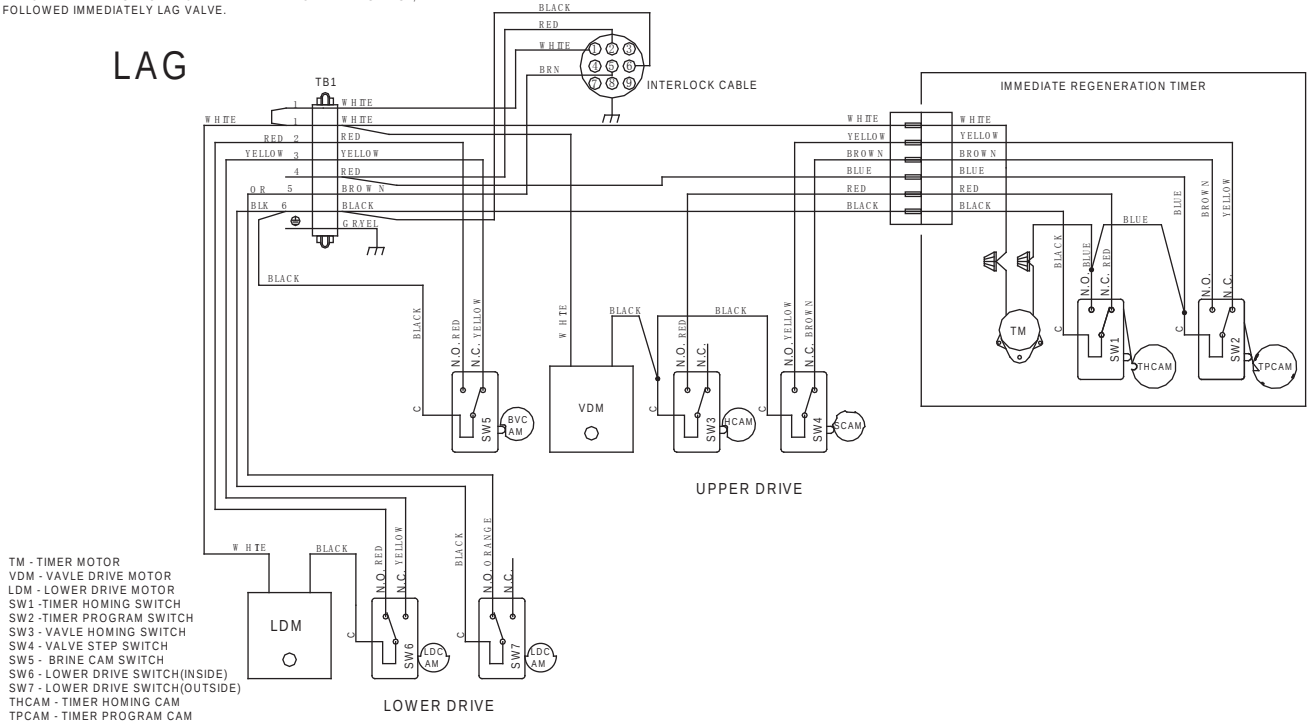
Wiring Diagrams

System #6 - Series Regeneration



TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH(INSIDE)
SW7 - LOWER DRIVE SWITCH(OUTSIDE)
SW8 - SIGNAL ALTERNATOR SWITCH
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

NOTE :
TWO TANK INTERLOCKED, SINGLE REMOTE METER, SERIES REGENERATION.
BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION,
THE OTHER REMAINS IN SERVICE. LEAD VALVE REGENERATES FIRST,
FOLLOWED IMMEDIATELY LAG VALVE.

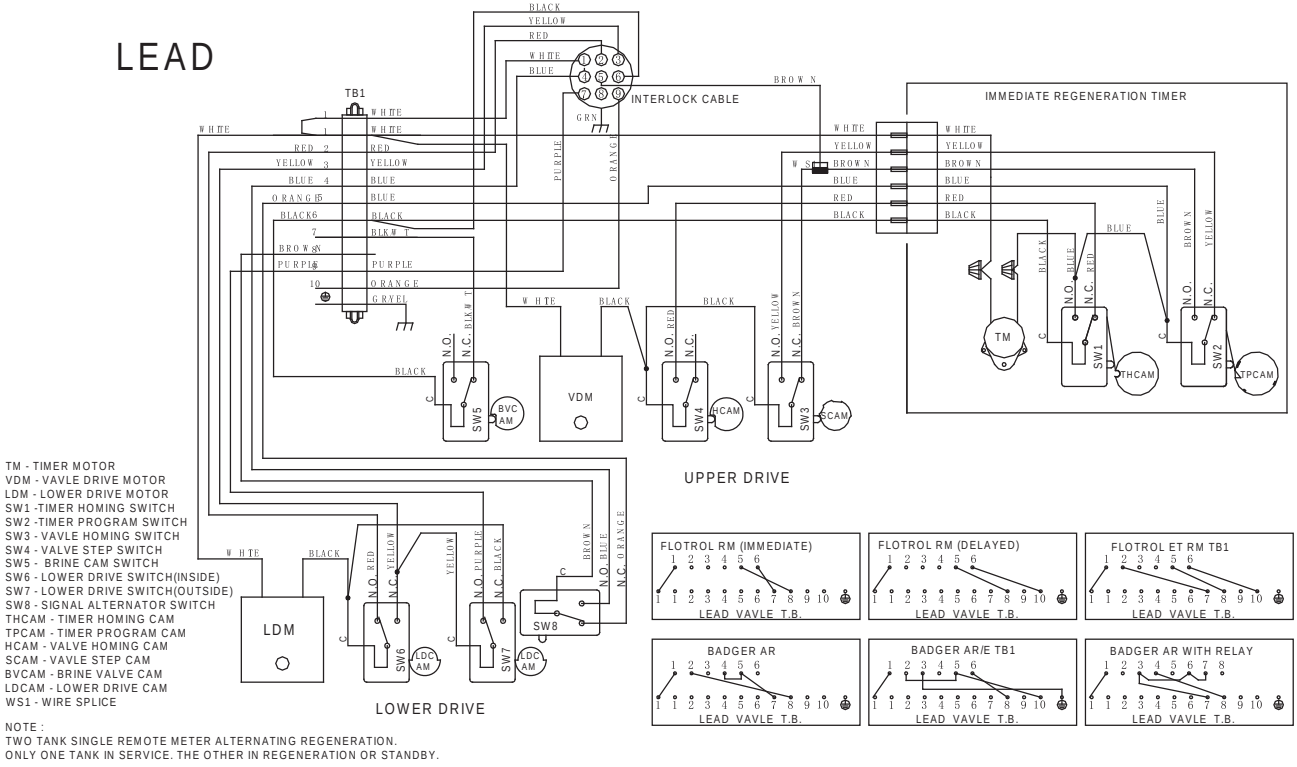


TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH(INSIDE)
SW7 - LOWER DRIVE SWITCH(OUTSIDE)
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

F90 Downflow

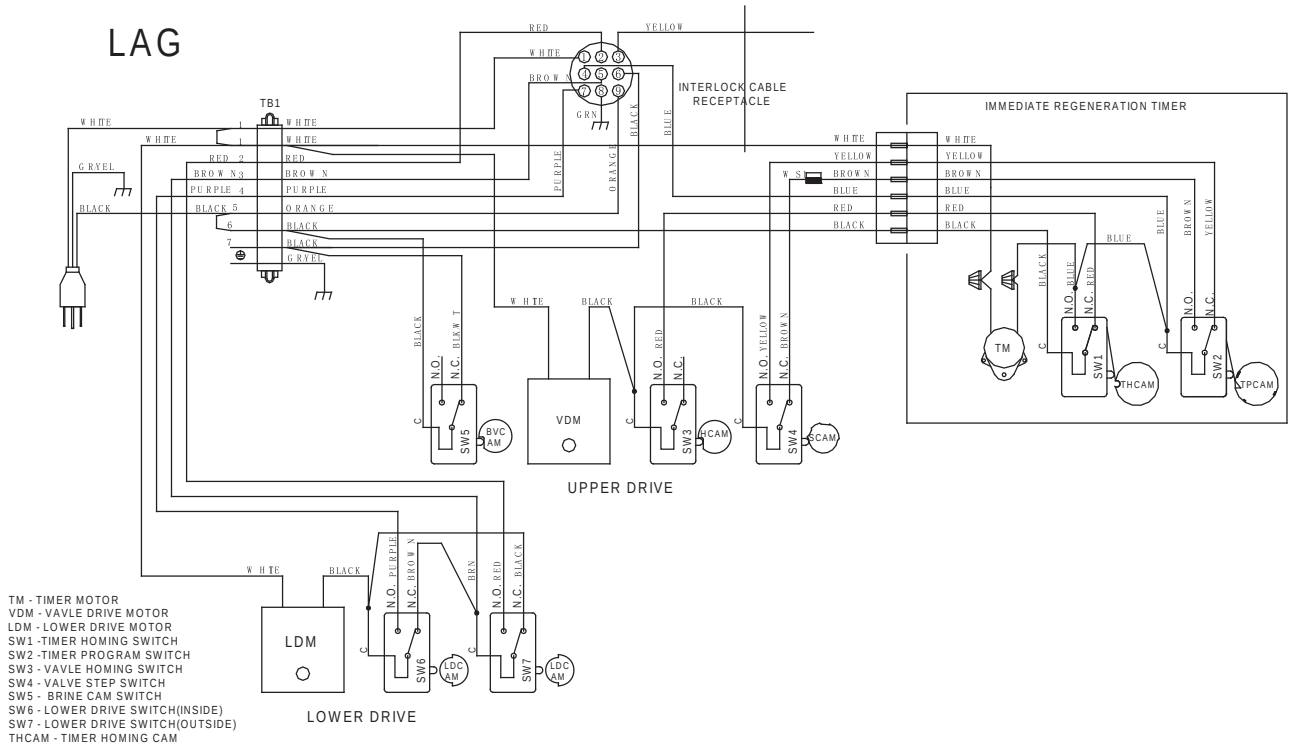
Valve Wiring Diagrams

System #7 - Alternating Regeneration



TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH(INSIDE)
SW7 - LOWER DRIVE SWITCH(OUTSIDE)
SW8 - SIGNAL ALTERNATOR SWITCH
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM
WS1 - WIRE SPLICE

NOTE :
TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.
ONLY ONE TANK IN SERVICE. THE OTHER IN REGENERATION OR STANDBY.



TM - TIMER MOTOR
VDM - VAVLE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 -TIMER HOMING SWITCH
SW2 -TIMER PROGRAM SWITCH
SW3 - VAVLE HOMING SWITCH
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SW6 - LOWER DRIVE SWITCH(INSIDE)
SW7 - LOWER DRIVE SWITCH(OUTSIDE)
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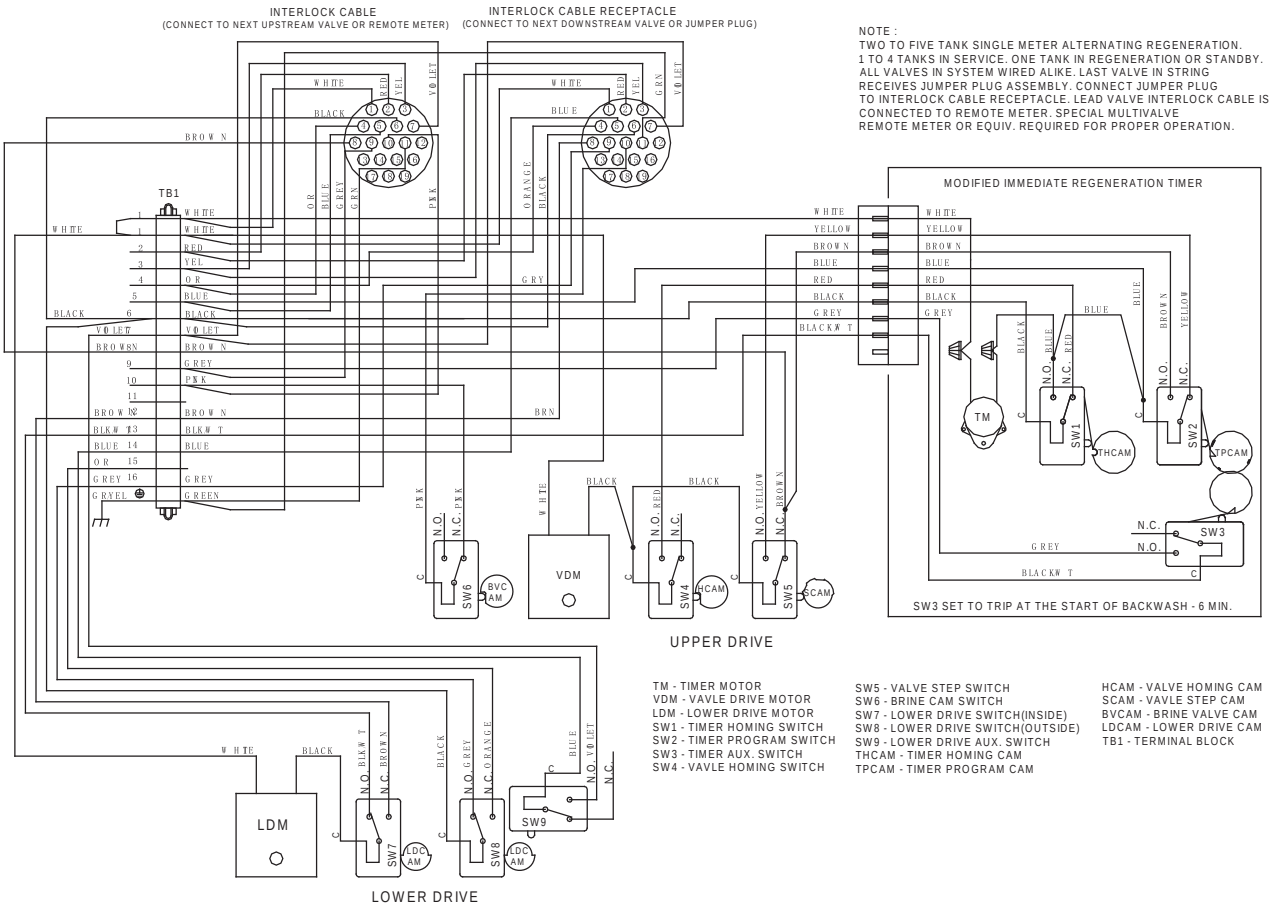
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VAVLE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM
WS1 - WIRE SPLICE

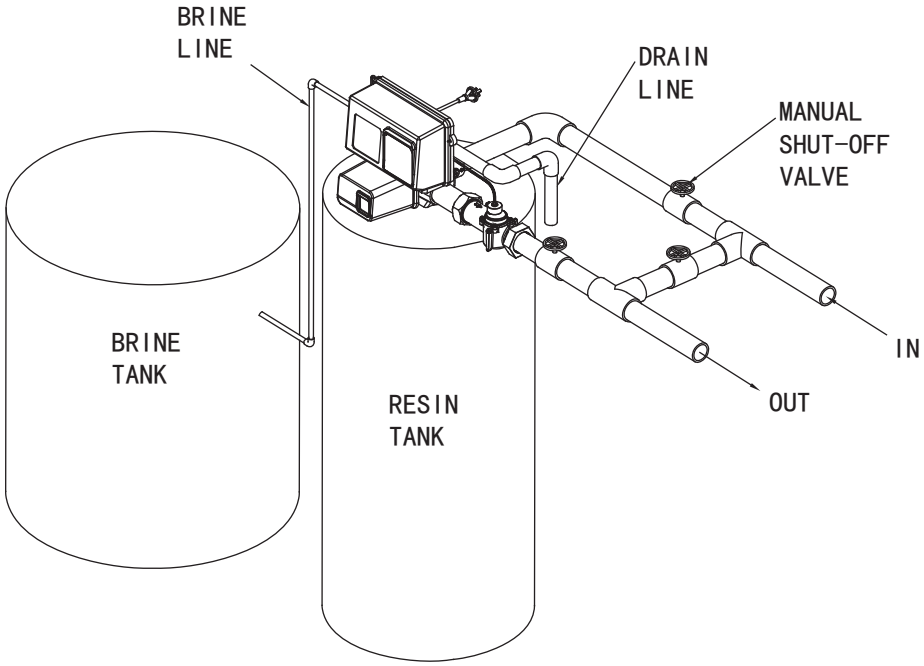
F90 Downflow

Multi-Valve System Wiring

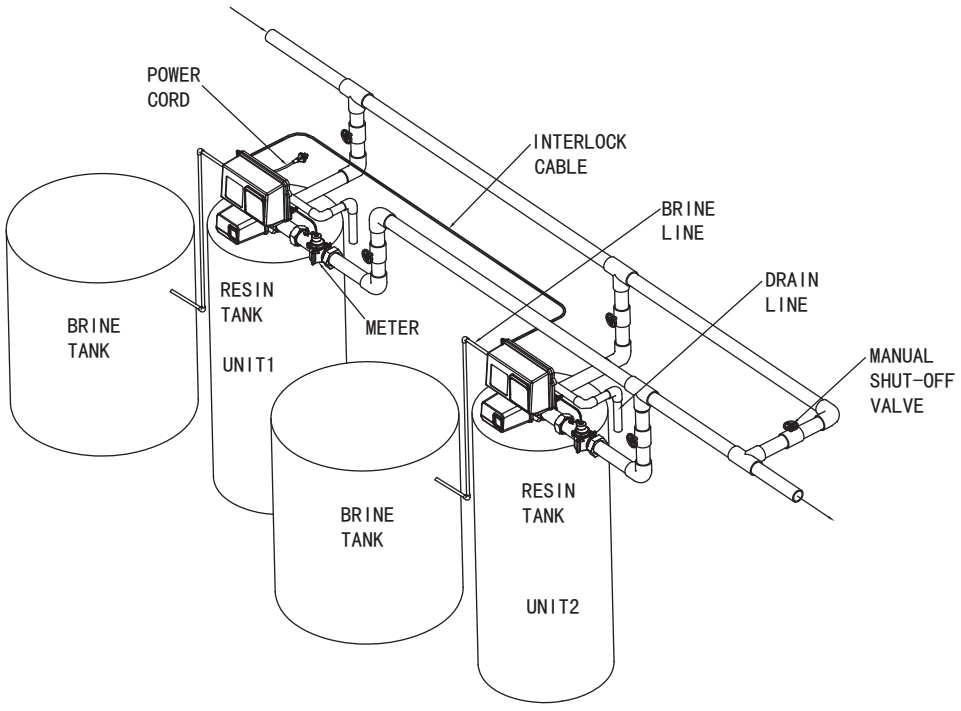
System #7 - Alternating Regeneration



System #4 - Typical Single Tank Installation With Optional Meter



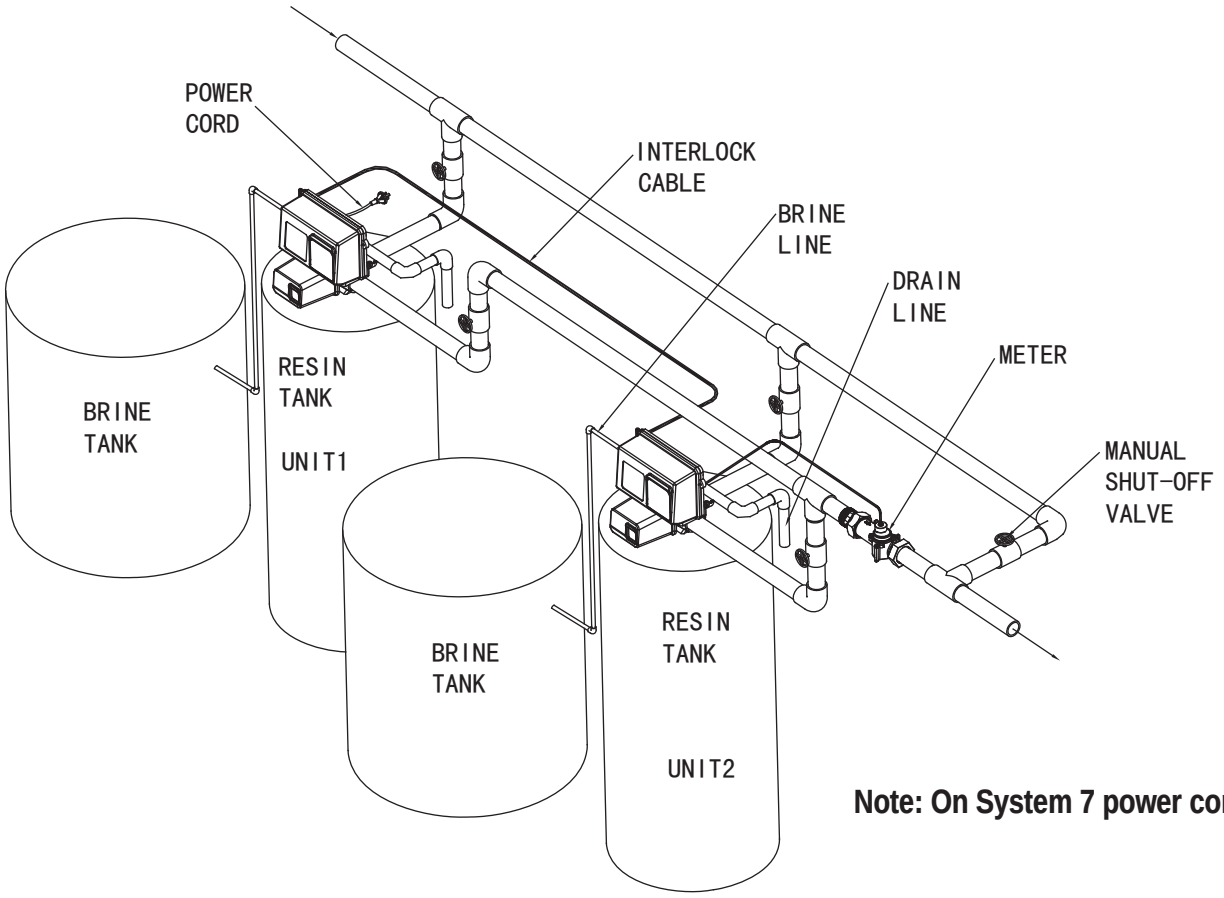
System #5- Interlock - Typical Twin Tank Installation With Optional Meter Interlock And No Hard Water Bypass



F90 Downflow

System #6 - Twin Series Regeneration

System #7 - Twin Alternator Installtion



Note: On System 7 power cord is on Unit 2.

F90 Downflow

Trouble Shooting

Problem	Cause	Correction
1. Water conditioner fails to regenerate.	A. Electrical service to unit has been interrupted	A. Assure permanent electrical service (check fuse, plug, pull chain, or switch)
	B. Timer is defective.	B. Replace timer.
	C. Power failure.	C. Reset time of day.
2. Hard water.	A. By-pass valve is open.	A. Close by-pass valve.
	B. No salt is in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Injector screen plugged.	C. Clean injector screen.
	D. Insufficient water flowing into brine tank.	D. Check brine tank fill time and clean brine line flow control if plugged.
	E. Hot water tank hardness.	E. Repeated flushings of the hot water tank is required.
	F. Leak at distributor tube.	F. Make sure distributor tube is not cracked. Check O-ring and tube pilot.
	G. Internal valve leak.	G. Replace seals and spacers and/or piston.
	H.Service adapter did not return to service.	H.Check drive motor and switch.
3. Unit used too much salt.	A. Improper salt setting.	A. Check salt usage and salt setting.
	B. Excessive water in brine tank.	B. See problem 7.
4. Loss of water pressure.	A. Iron buildup in line to water conditioner.	A. Clean line to water conditioner.
	B. Iron buildup in water condi tioner.	B. Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration.
	C. Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	C. Remove piston and clean control.
5. Loss of mineral through drain line.	A. Air in water system.	A. Assure that well system has proper air eliminator control. Check for dry well condition.
	B. Improperly sized drain line flow control.	B. Check for proper drain rate.
6. Iron in conditioned water.	A. Fouled mineral bed.	A. Check backwash, brine draw, and brine tank fill. Increase frequency of re generation. Increase backwash time.
7. Excessive water in brine tank.	A. Plugged drain line flow control.	A. Clean flow control.
	B. Plugged injector system.	B. Clean injector and screen.
	C. Timer not cycling.	C. Replace timer.
	D. Foreign material in brine valve.	D. Replace brine valve seat and clean valve.
	E. Foreign material in brine line flow control.	E. Clean brine line flow control.

PROBLEM	CAUSE	CORRECTION
8. Softener fails to draw brine.	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean injector.
	C. Injector screen plugged.	C. Clean screen.
	D. Line pressure is too low.	D. Increase line pressure to 20 P.S.I.
	E. Internal control leak.	E. Change seals, spacers and piston assembly.
	F. Service adapter did not cycle.	F. Check drive motor and switches.
9. Control cycles continuously.	A. Missadjusted, broken or shorted switch.	A. Determine if switch or timer is faulty and replace it, or replace complete power head.
10. Drain flows continuously.	A. Valve is not programing correctly.	A. Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	B. Foreign material in control.	B. Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	C. Internal control leak.	C. Replace seals and piston assembly.

General Service Hints For Meter Control

Problem: Softener Delivers Hard Water.

Cause could be that . . . Reserve Capacity Has Been Exceeded.

Correction: Check salt dosage requirements and reset program wheel to provide additional reserve. Cause could be that . . . Program Wheel Is Not Rotating With Meter Output.

Correction: Pull cable out of meter cover and rotate manually. Program wheel must move without binding and clutch must give positive “clicks” when program wheel strikes regeneration stop. If it does not, replace timer.

Cause could be that . . . Meter Is Not Measuring Flow.

Correction: Check meter with meter checker.