

# RUSTY

*Iron Removal System*

## Installation & Operation Manual

featuring the Fleck 2510 AIO Valve



**DWV**  
A DIVISION OF THE DUFF COMPANY  
*Products for Quality Water*

# MODEL 2510

## control valve assembly

(parts list)

Item No.	No. Req'd	Part No.	Description
1	1	19328	Valve Body
2	1	10757	End Spacer
3	6	10545	Seal Ring
4	5	11451	Spacer
5	1	15168	Piston
6	1	14309	Piston Rod Retainer
7	1	14452	Piston Rod
8	1	10209	Seal Quad Ring
9	1	40078	Seal "O" Ring - End Plug
10	1	10598	End Plug Assembly
11	1	11475	Injector Body Gasket
12	1	17776	Injector Body - Plastic
13	1	10227	Injector Screen
14	1	10914	Injector Throat (Specify Size)
15	1	10913	Injector Nozzle (Specify Size)
16	1	10229	Injector Cover Gasket
17	1	11893	Injector Cap (Plastic Body)
18	2	10692	Injector Body Screw
19	1	18312	Drain Retainer
20	1		Flow Control Washer
21	1	11183	(Specify Flow Rate in GPM) Seal "O" Ring
22	1	11385	Flow Control Housing
23	1	12338	1/2 Pipe x 1/2 Hose x 90° Drain Fitting
24	1	19936	Base Seal
25	1	19322	Adapter Base (2 1/2-8 Thd)
26	1	19197	Slip Ring
27	1	18303	Tank O-Ring
28	1	13304	Distributor O-Ring
29	1	13030	Retainer, Distributor Tube O-Ring
30	1	60503	Clamp Assembly
31	1	19998	Clamp Pivot
32	1	40057	Clamp Screw
	1	40000	Pin Hinge (not shown)
NOTE: FOR BACKWASH FILTER VALVE - REPLACE ITEMS 12-18			
17	1	11893	Injector Cap
34	2	15137	Screw Flat Cap
11	1	11475	Injector Body Gasket



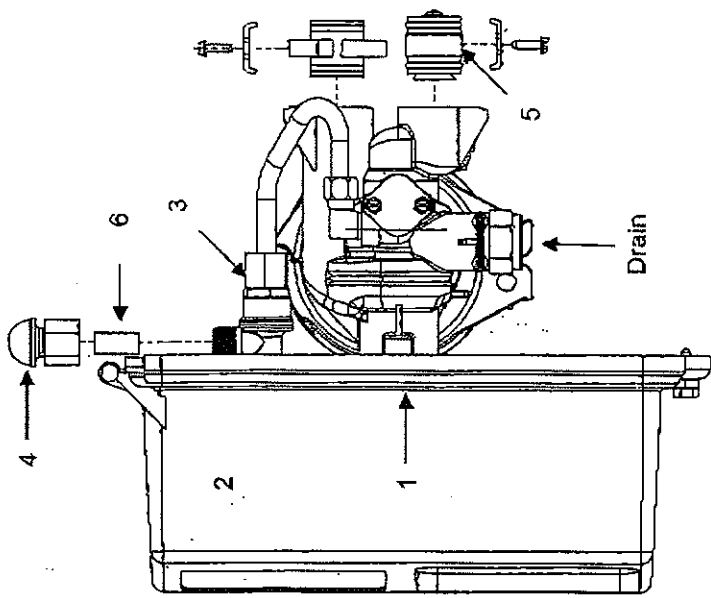
### Installation Overview:

Install the AIO valve after the supply lines to the outside faucets (unless outside faucets need to be free of contaminants in water). The AIO valve is generally installed before a water softener or any taste/odor cartridges, if applicable.

Insure the inlet check valve is connected as shown to the inlet side of the AIO valve. The drain should be installed in accordance with plumbing codes. Due to the release of air during regeneration, the drain line should be anchored through out the run and secured at the end of the drain line. The drain line should be sized for the backwash rate and friction loss.

The drain line flow control should accommodate the size tank and backwash rate for the filter media being used.

The injector size (slow rinse rate based on pressure) should be size the same as the service flow rate of the filter media being used.



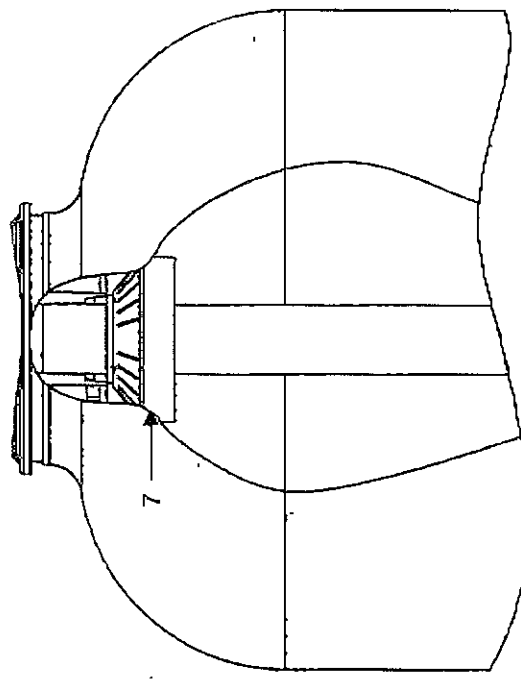
### AIO Specific Parts:

Item#	Part #	Description
1	*61662	PISTON ASSY, 2510AIO
2	*12777-02	CAM, AIR DRAW
3	*41861	CHECK VALVE, AIR DRAW
4	43154	SCREEN, AIO
5	43234	CHECK VALVE, INLET
6	13147-1.5	TUBE, DRAW
7	1030043	DEFLECTOR, AIO

\* Part not shown but illustration showing location

### Deflector Installation:

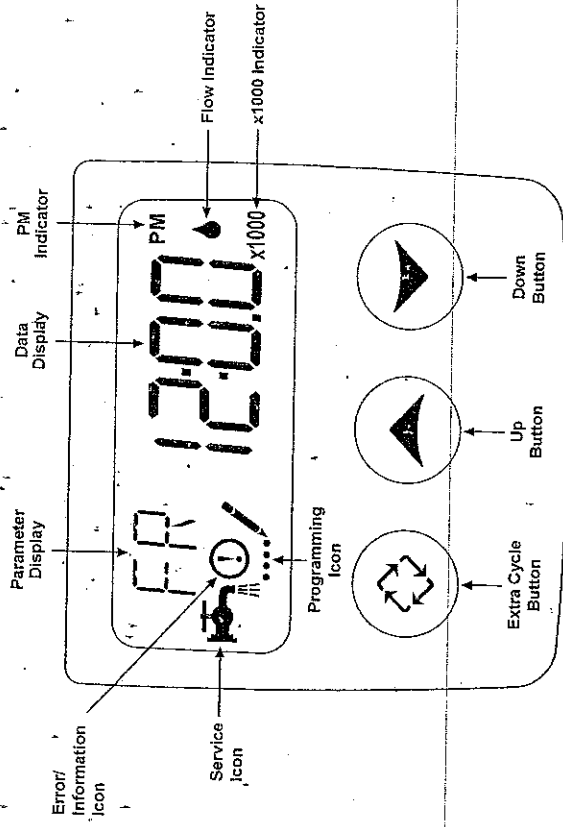
Put a thin layer of silicone lube around inside diameter of the deflector. Slowly slide the deflector over the distributor tube down about 1". When threading the AIO valve to the tank, the bottom of the threads will slide the deflector down. As shown in diagram.



Reference the 2510 service manual for information on the following:

- Trouble shooting
- Parts list

## Timer Features

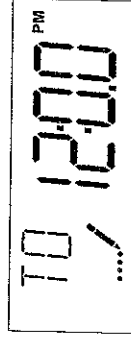


### Features of the SXT:

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

### Setting the Time of Day

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



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## Timer Features

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### Queueing a Regeneration

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

### Regenerating Immediately

Press and hold the Extra Cycle button for five seconds.

## Timer Operation

### Meter Immediate Control

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

### Meter Delayed Control

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

### Time Clock Delayed Control

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

### Day of the Week Control

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

### Control Operation During Regeneration

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

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

### Control Operation During Programming

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

### Manually Initiating a Regeneration

1. When timer is in service, press the Extra Cycle button for 5 seconds on the main screen.
2. The timer advances to Regeneration Cycle Step #1 (rapid rinse), and begins programmed time count down.
3. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #2 (backwash).
4. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #3 (brine draw & slow rinse).
5. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #4 (brine refill).
6. Press the Extra Cycle button once more to advance the valve back to in service.

**NOTE:** If the unit is a filter or upflow, the cycle step order may change.

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

### Control Operation During A Power Failure

The SXT includes integral power backup. In the event of power failure, the control shifts into a power-saving mode. The control stops monitoring water usage, and the display and motor shut down, but it continues to keep track of the time and day for a minimum of 48 hours.

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

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

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

## Master Programming Mode Chart

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

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



## Master Programming Mode Chart

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

**NOTES:**

Some items may not be shown depending on timer configuration.

The timer will discard any changes and exit Master Programming Mode if any button is not pressed for sixty seconds.

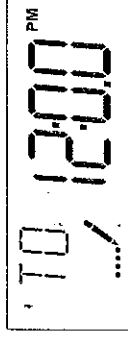
**CAUTION:** Before entering Master Programming, please contact your local professional water dealer.

## Master Programming Mode

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

### Setting the Time of Day

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



### Entering Master Programming Mode

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

### Exiting Master Programming Mode

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

### Resets:

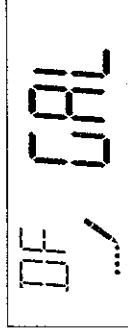
**Soft Reset:** Press and hold the Extra Cycle and Down buttons for 25 seconds while in normal Service mode. This resets all parameters to the system default values, except the volume remaining in meter immediate or meter delayed systems and days since regeneration in the time clock system.

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

### 1. Display Format (Display Code DF)

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

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



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

## Master Programming Mode

### 2. Valve Type (Display Code VT)

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

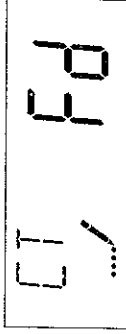
Abbreviation	Parameter
St1b	Standard Downflow/Upflow, Single Backwash
St2b	Standard Downflow/Upflow, Double Backwash
Filtr	Filter
UFbF	Upflow Brine First
8500	TwinFlo 100
Other	Other



### 3. Control Type (Display Code CT)

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

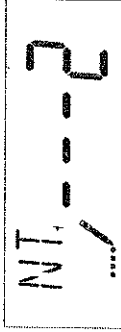
Meter Delayed: Fd  
Meter Immediate: FI  
Time Clock: tc  
Day of Week: dAY



### 4. Number of Tanks (Display Code NT)

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

Single Tank System: 1  
Two-Tank System: 2



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

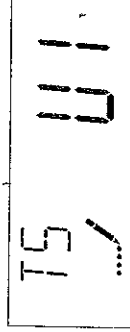
## Master Programming Mode

### 5. Tank in Service (Display Code TS)

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

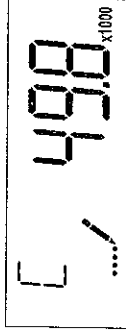
Tank One in Service: U1

Tank Two in Service: U2



### 6. Unit Capacity (Display Code C)

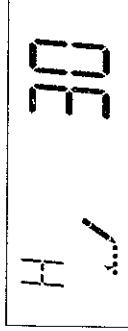
Press the Extra Cycle button. Use this display to set the Unit Capacity. This setting specifies the treatment capacity of the system media. Enter the capacity of the media bed in grains of hardness when configuring a softener system, and in the desired volume capacity when configuring a filter system.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



Range: 1-999,900 grain capacity

### 7. Feedwater Hardness (Display Code H)

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



Range: 4-199 hardness

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

## Master Programming Mode

### 8. Reserve Selection (Display Code RS)

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

SF	Safety Factor
rc	Fixed Reserve Capacity



### 9. Safety Factor (Display Code SF)

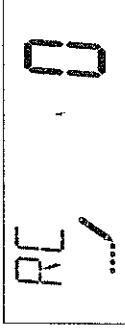
Press the Extra Cycle button. Use this display to set the Safety Factor. This setting specifies what percentage of the system capacity will be held as a reserve. Since this value is expressed as a percentage, any change to the unit capacity or feedwater hardness that changes the calculated system capacity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



Range: 0-50%

### 10. Fixed Reserve Capacity (Display Code RC)

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



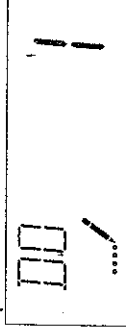
Range: 0-half the calculated capacity

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

## Master Programming Mode

### 11. Day Override (Display Code DO)

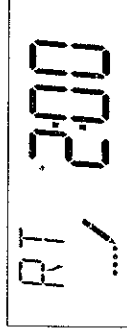
Press the Extra Cycle button. Use this display to set the Day Override. This setting specifies the maximum number of days between regeneration cycles. If the system is set to a timer-type control, the day override setting determines how often the system will regenerate. A metered system will regenerate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

The LCD display shows the code "DO" in the upper left corner and the number "1" in the center. There are three dots in the lower right corner of the display area.

Range: Off-99 days

### 12. Regeneration Time

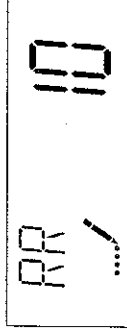
Press the Extra Cycle button. Use this display to set the Regeneration Time. This setting specifies the time of day the control will initiate a delayed, manually queued, or day override triggered regeneration. This option setting is identified by "RT" in the upper left hand corner of the screen. Use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

The LCD display shows the code "RT" in the upper left corner and "2:00" in the center. There are three dots in the lower right corner of the display area.

### 13. Regeneration Cycle Step Times

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

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

The LCD display shows the code "RR" in the upper left corner and "10" in the center. There are three dots in the lower right corner of the display area.

Range: 0-199 minutes

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

## Master Programming Mode

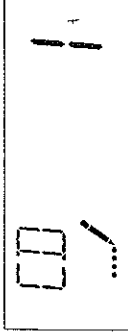
### 14. Day of Week Settings

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



### 15. Current Day (Display Code CD)

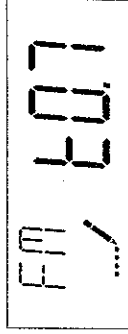
Press the Extra Cycle button. Use this display to set the current day on systems that have been configured as Day of Week controls. This setting is identified by "CD" in the upper left-hand corner of the screen. Use the Up and Down buttons to select from Day 1 through Day 7.



### 16. Flow Meter Type (Display Code FM)

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

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



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

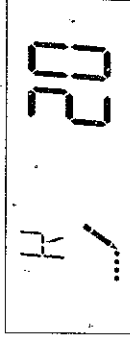
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## Master Programming Mode

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### 17. Meter Pulse Setting (Display Code K)

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



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



## User Programming Mode

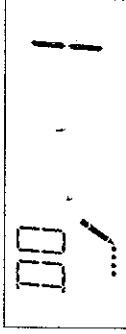
User Programming Mode Options		
Abbreviation	Parameter	Description
DO	Day Override	The timer's day override setting
RT	Regeneration Time	The time of day that the system will regenerate (meter delayed, timelock, and day-of-week systems)
H	Feed Water Hardness	The hardness of the inlet water used to calculate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

**NOTES:**

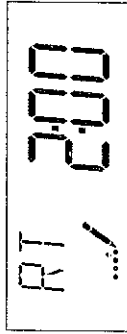
Some items may not be shown depending on timer configuration. The timer will discard any changes and exit User Mode if any button is not pressed for sixty seconds.

**User Programming Mode Steps**

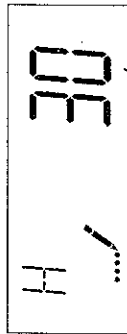
1. Press the Up and Down buttons for five seconds while in service, and the time of day is NOT set to 12:01 PM.
2. Use this display to adjust the Day Override. This option setting is identified by "DO" in the upper left hand corner of the screen.



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



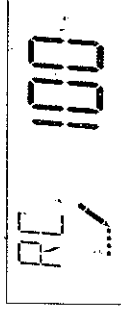
4. Press the Extra Cycle button. Use this display to adjust the Feed Water Hardness. This option setting is identified by "H" in the upper left hand corner of the screen.



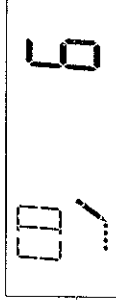
Range: 4-199 hardness

## User Programming Mode

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



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



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

# MODEL 2510

*control valve assembly*

*(see opposite page for parts list)*

