



**INSTALLATION, OPERATION,
AND MAINTENANCE MANUAL**

**“MGTE” Series
1 1/2” Metered & Time Clock
COMMERCIAL WATER CONDITIONERS**

COMPLETE FOR FUTURE REFERENCE:

MODEL NO:

SERIAL NO:

DATE INSTALLED:

DEALER:

Marlo Incorporated
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COMMERCIAL AND INDUSTRIAL PRODUCT WARRANTY

Marlo, Inc. warrants all commercial and industrial water treatment products manufactured and/or distributed by it to be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. The fiberglass mineral tank(s) alone have a warranty for a period of five (5) year from the date of shipment. If within that period any products shall be proven to Marlo, Inc.'s satisfaction to be defective, those products will be replaced or the price refunded at Marlo Inc.'s option.

Marlo Inc.'s obligations or nonperformance, defective, or any damage caused by its products or their use, and buyer's exclusive remedy therefore, shall be limited to product replacement or refund and shall be conditioned upon Marlo Inc.'s receiving written notice together with a demand for such replacement or refund:

The foregoing warranty is exclusive and in lieu of all other expressed implied warranty (except of title) including but not limited to implied warranty of merchantability and fitness for particular purpose.

Marlo Inc. will not be subject to and disclaims the following:

1. Any other obligations or liabilities arising out of breach of contract or out of warranty.
2. Any obligations whatsoever arising from tort claims (including negligence and strict liability or arising under other theories of law with respect to products sold or services rendered by Marlo Inc. or any undertakings, acts, or omissions relating thereto.
3. All consequential, incidental, and contingent damages.

Labor charges, charge backs or handling charges are excluded from Marlo Inc.'s warranty provisions.

COMMERCIAL AND INDUSTRIAL WATER SOFTENER GUARANTEE

Under normal operating conditions:

1. The softener effluent shall be zero soft as determined by a soap test.
2. The loss of softening resin through attrition during the first three (3) years shall not exceed 3% per year.
3. The softening resin shall not be washed out of the system during backwash.
4. The color and turbidity of the softener effluent shall not be greater than the incoming water.

Any mechanical equipment proving defective in workmanship or material within one year after installation or eighteen (18) months after shipment, whichever comes first, shall be replaced FOB factory.

SPECIFICATION CHART

SYSTEM SIZE		1-1/2" MGTE MODEL	60	90	120	150	210	300	
		VALVE SIZE (IN)	1-½	1-½	1-½	1-½	1-½	1-½	
		MAX CAPACITY (KILOGRAINS)	60	90	120	150	210	300	
		MIN CAPACITY (KILOGRAINS)	40	60	80	100	140	200	
FLOWRATE (GPM)		CONTINUOUS FLOWRATE (GPM)	35	33	34	37	39	42	
		PEAK FLOWRATE (GPM)	48	45	46	54	52	56	
		BACKWASH & FAST FLUSH (GPM)	3.2	4.2	5.3	7.5	11.0	15.0	
		BRINE DRAW & RINSE (GPM)	1.3	2.2	2.4	3.2	4.4	5.6	
		BRINE TANK REFILL (GPM)	0.5	0.5	0.5	0.5	0.5	0.5	
TIMER SETTINGS		BACKWASH & FAST FLUSH (MIN)	10	10	10	10	10	10	
		BRINE DRAW & RINSE (MIN)	60	60	60	60	60	60	
		FAST FLUSH (MIN)	10	10	10	10	10	10	
		BRINE TANK REFILL (MIN)	30	45	60	75	105	150	
SOFTENER TANK		SIZE (IN)	13x54	14x65	16x65	18x65	21x62	24x72	
		GRAVEL (LBS)	0	30	35	40	80	120	
		RESIN (FT³)	2	3	4	5	7	10	
		FREEBOARD (IN)	16	21	21	24	18	21	
BRINE SYSTEMS		EQUIPMENT	TANK SIZE	18x40	18x40	24x40	24x40	24x50	24x50
			MAX SALT STORAGE (LBS)	290	290	565	665	575	430
			INJECTOR CODE	15C	15D	15E	15F	15G	15H
			INJECTOR COLOR	Red	White	Blue	Yellow	Green	Orange
		MAX	SALT DOSAGE (LBS)	30	45	60	75	105	150
			REFILL TIME (MIN)	20	30	40	50	70	100
		MIN	SALT DOSAGE (LBS)	12	18	24	30	42	60
			REFILL TIME (MIN)	8	12	16	20	28	40
		MAX	REGENERATION PER SALT REFILL	10	6	9	7	6	2
				26	15	23	17	17	6
REGENERATION WASTE VOLUME (GAL)			119	177	207	289	411	554	
DIMENSIONS (LxWxH)			37x18x65	38x18x76	46x24x76	48x24x78	51x24x78	54x24x86	

NOTES:

1. FLOW RATES

- Continuous: pressure loss does not exceed 15 psig.
- Peak: pressure loss does not exceed 25 psig
- Backwash & Flush: maximum flow to drain
- Brine & Rinse: Injector flow to drain @50 psi inlet pressure
- Brine Tank Refill: flow to refill Brine Tank

2. SOFTENER TANK

- Freeboard: distance in inches from surface of resin to top sealing flange of tank

3. SALT DOSAGE

- Maximum 15 lbs./cu.ft. - regeneration efficiency: 2,000 grains/pound of salt (factory setting)
- Maximum 6 lbs./cu.ft. - regeneration efficiency: 3,000 grains/pound of salt

4. REGENERATION WASTE VOLUME - Total gallons water discharged per regeneration

5. DIMENSIONS:

- Leave a minimum 24 inch clearance to the height of the unit for loading media.
- Dimensions are for general arrangement use only.





INSTALLATION INSTRUCTIONS**A. GENERAL**

1. Shut off all water at main supply valve.
2. **Shut off the fuel supply to water heater.**
3. Open faucets (hot and cold) nearest pump or water meter to relieve pressure and drain system.
4. Move softener into the installation position.
5. Level the unit. Place shims under cabinet or brine tank as needed. (**Do Not** use metal shims.)
6. Cut the **cold water** supply line as required.

B. PLANNING INSTALLATION

1. All installation procedures must conform to local plumbing, electrical and sanitation codes and ordinances.
2. It is recommended that outside faucets for lawn service be on the hard water line, ahead of the softener, to conserve softened water, save salt and prevent lawn damage.
3. CAUTION: The inlet water temperature MUST NOT exceed 110° F.
4. Do not locate softener where ambient temperature drops below 40° F.
5. Allow space around the softener for ease of servicing.
6. The softener drain lines must never be solidly connected to the sewer line. (Always provide an air gap at the END of the drain line). Valve drain line must not be elevated over 5' from the top of the softener on well systems, and not over 8' on municipal water systems.
7. The salt storage cabinet or brine tank is a gravity drain, and this drain line must be lower than the drain fitting on the side wall of the cabinet.
8. Move the softener into position. MGTE-60 systems have been pre-loaded at the factory. For systems larger than the MGTE-60, complete section C before continuing on to section D.
9. **IMPORTANT:** Be sure that the water inlet line is connected to the "inlet" side of the valve. If water lines are reverse, (inlet/outlet) resin may be forced from the water softener into the plumbing system. If this occurs, the plumbing system must be flushed clean.

C. LOAD SOFTENER TANK

Note: If the system is skid mounted, it will be prepiped and preloaded at the factory. Skip the following instructions.

1. On Model MGTE-60 the softening media has been pre-loaded at the factory. Skip this section and go to "Mounting Control Valve Assembly".
2. Fill a tank approximately 1/3 full of water using a hose, bucket, etc. Plug the PVC distributor manifold .. pipe using a plastic cap, cork, rag, etc. No gravel or resin should go into this distributor manifold pipe.
3. Verify the distributor manifold is center in the tank with the distributor resting on the bottom of the tank. Verify the riser pipe is still plugged.

Note: Reference the specification table in the front of this manual for the correct quantities of gravel and resin. Make sure you have the required amounts on site before you begin.

4. With care not to damage any lateral, pour in the gravel provided for each tank through the top opening in the tank and level out evenly. This will cover the distributor assembly.

Note: Wetting the gravel in the bags before loading will eliminate the normal amount of dust.

5. When gravel is loaded and leveling is completed, proceed as follows:
6. With the distributor riser pipe still plugged, add the proper amount of resin supplied through the top opening in the tank.

Caution: The softener resin is very slippery. Take care when stepping on any spilled resin. Remove spilled resin from standing surface immediately.

7. When loading is complete, remove plastic cap, cork, or rag that was used to plug the distributor riser pipe. Be careful not to let any foreign debris fall into the pipe. The result could be damage. Repeat steps 1-7 for each softener tank (if applicable).



INSTALLATION INSTRUCTIONS**D. MOUNTING CONTROL VALVE ASSEMBLY**

1. Verify that the distributor riser pipe is not plugged.
2. Lubricate the distributor o-ring on the bottom of the control valve with silicone.
3. Screw the control valve into top opening of tank making sure the distributor riser pipe slides easily through the distributor o-ring. Care must be taken not to "nick" this o-ring as hard water leakage could result.
4. Tighten down the control valve to ensure positive o-ring seal at top of tank.

E. CONNECT ALL FITTINGS

CAUTION: Care must be used when working with copper tubing. Do not allow the flame from torch to contact any noryl portion of the Valve assembly.

1. Attach a minimum of 3/4" drain line to drain elbow.
2. Do not elevate the drain line over 5' above the top of the valve (8' on municipal systems) or to exceed 25' in length at either height.

CAUTION: An air gap must be provided upon sewer entry. (Conform to local plumbing and sanitation codes and ordinances).

3. The salt storage cabinet or brine tank provides an overflow. Attach 1/2" ID flexible plastic tubing to the overflow fitting and direct it to the drain. **DO NOT** connect to the main drain line. Use a separate gravity flow line.

F. PRESSURE TEST THE INSTALLATION

The plumbing system can now be checked for any possible leaks

1. Put the unit into backwash. To do this, push and hold the REGEN button for 3-5 seconds. When the Valve stops cycling, unplug the unit. With water supply off, put the bypass into the service position.
2. Open water supply line valve very slowly. Water should escape slowly from the drain line. If water enters too quickly, resin may be lost to the drain.
3. When all of the air has been purged from the mineral tank (water flows steadily from the drain) open the main supply valve fully.
4. Allow water to run to drain until clear. **CHECK FOR LEAKS!**
5. Plug the unit back in.
6. Manually step the unit through the remaining steps, stopping at the fill cycle (to do this, push the REGEN button. The unit will say Brine on the screen). Once the piston has stopped moving, push the REGEN button again to the next cycle. Continue until Fill appears on the screen. The unit will now fill the brine tank to the appropriate level. (This sequence is for softeners with post fill brine)
7. Allow control to return to the home position.
8. Check for leaks!
9. Make sure the power cord is plugged into a properly grounded wall receptacle.

G. MANUAL REGENERATION

The user can initiate manual regeneration. The user has the option to request a manual regeneration at the delayed regeneration time or to have the regeneration occur immediately:

1. Pressing and releasing the REGEN button. "Regen Today" will flash on the display and the regeneration will occur at the delayed regeneration time. The user can cancel the request by pressing and releasing the REGEN button. This method of manually initiating regeneration is not allowed when the system is set to immediately regenerate when the gallon capacity reaches zero.
2. Pressing and holding the REGEN button for approximately 3 seconds will immediately start the regeneration. The user cannot cancel this request.



NOTE: Program Timer "Lockout" Feature

The Program Timer is initially set to allow access to all Programming, Diagnostic and History screens

The Installer can limit access to (lockout) most screens by activating the Lockout Feature.

Activating "Lockout" allows the user to view and change only Water Hardness, Days Override, Time of Regeneration and Time of day.

Activate "Lockout" Feature: Press DOWN then NEXT then UP then SET CLOCK in sequence. LOCK will briefly appear in the display.

De-activate "Lockout" Feature: Press DOWN then NEXT then UP then SET CLOCK. UNLOCK will briefly appear in the display.

When in operation normal user displays such as time of day, gallons remaining or days remaining before regeneration are shown. When stepping through a procedure if no buttons are pressed within five minutes the display returns to a normal user display. Any changes made prior to the five minute time out are incorporated. The one exception is current flow rate display under the diagnostic procedure. The current flow rate display has a 30 minute time out feature.

CONTROL VALVE FUNCTION AND CYCLES OF OPERATION

This low-lead brass fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter. When the control valve is set up as a softener, the control valve is set to perform down flow regeneration. When the control valve is set up as a filter, the control valve can be set to perform down flow regeneration or simply backwash. The control valve can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days).

The control valve is compatible with a variety of regenerants and resin cleaners. The control valve is capable of routing the flow of water in the necessary paths to regenerate or backwash water treatment systems. The injector regulates the flow of brine or other regenerants. The control valve regulates the flow rates for backwashing, rinsing and the replenishing of treated water into a regenerant tank, when applicable.

The 1-1/2" control valve is designed to deliver high service (70 gpm @ 15 psig) and backwash (52 gpm @ 25 psig) flow rates when the bypass has straight fittings and a 1.09" (1-1/2" Pipe) distributor. The control valve uses traditional fasteners (e.g. screws), instead clips, threaded caps, nuts and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screwdriver, pliers and a pair of hands. Disassembly for servicing takes much less time than comparable products currently on the market. Control valve installation is made easy because the distributor tube can be cut 1/2" above to 1/2" below the top of the tank thread. The distributor tube is held in place by an o-ring seal and the control valve also has a bayonet lock feature for upper distributor baskets.

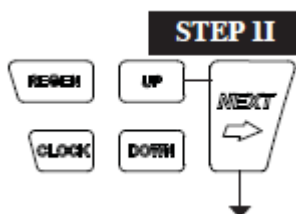
The transformer power pack comes with a 15-foot power cord and is designed for use with the control valve. The transformer power pack is for dry location use only. The control valve remembers all settings for up to 8 hours if the power goes out and the battery is not depleted. After 8 hours, the only item that needs to be reset is the time of day; other values are permanently stored in the nonvolatile memory. If a power loss lasts less than 8 hours and the time flashes on and off, the time of day should be reset and the non rechargeable battery should be replaced. The replacement battery is a commercially available 3 volt Lithium coin cell type 2032..

Table 3 shows the order of the cycles when the valve is set up as a softener.

Table 3 Regeneration Cycles Time		Down Flow Softener
Grains Capacity / LB NaCl		3500 to 2501
Lbs. NaCl/cu ft resin		7.5 to 1.2
Cycle Time In Minutes	1st Cycle: Backwash Normal	10 minute
	2nd Cycle: Brine Slowrinse	60 minutes
	3rd Cycle: Backwash Normal	0 minutes
	4th Cycle: Rinse	10 minute
	5th Cycle: Fill	minutes will vary depending on softener capacity
	6th Cycle: End	0.011–200



INSTALLER DISPLAY SETTINGS



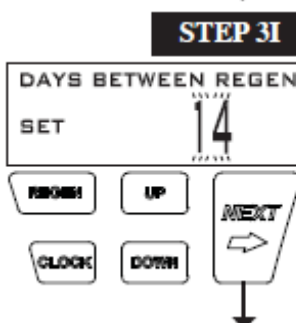
STEP 1I - Press NEXT and UP simultaneously for 3 seconds.



STEP 2I – Hardness: The default is 20 with value ranges from 1 to 150 in 1 grain increments. Note: The grains per gallon can be increased if soluble iron needs to be reduced.

Set the amount of hardness in grains of hardness as calcium carbonate per gallon using DOWN or UP.

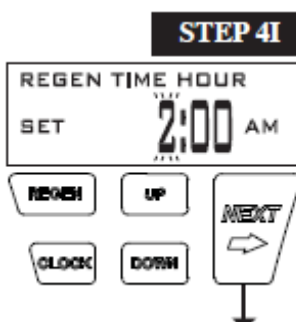
This display will not show if 'AUTO' is not selected in Set Volume Capacity in OEM Softener System Setup. Press NEXT to go to step 3I. Press REGEN to exit Installer Display Settings.



STEP 3I – Day Override: Number of days between regeneration (1 to 28); or "OFF".

If value set to "OFF", regeneration initiation is based solely on volume used. If value is set as a number (allowable range from 1 to 28) a regeneration initiation will be called for on that day even if sufficient volume of water were not used to call for a regeneration. Set Day Override using DOWN or UP.

When volume capacity is set to "OFF" (time clock), sets the number of days between regenerations. When volume capacity is set to AUTO or to a number (metered), sets the maximum number of days between regenerations. See Setting Options Table 8 for more detail on setup. Press NEXT to go to step 4I. Press REGEN to return to previous step.



STEP 4I – Next Regeneration Time (hour): The default time is 2:00 AM. AM/PM toggles after 12.

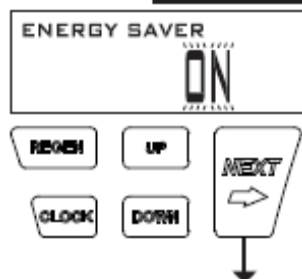
Used for DELAY regeneration. Set the "hour" of day for regeneration using DOWN or UP. If "IMMEDIATE" is selected in Set Regeneration Time Option in OEM Softener System Setup, this display will show "REGEN IMMEDIATE ON ZERO GAL". Press NEXT to go to step 5I. Press REGEN to return to previous step.



STEP 5I – Next Regeneration Time (minutes):

Used for DELAY regeneration. Set the "minutes" of day for regeneration using DOWN or UP. This display will not be shown if "IMMEDIATE" is selected in Set Regeneration Time Option in OEM Softener System Setup. Press NEXT to go to Step 6I. Press REGEN to return to previous step.

STEP 6I



RETURN TO NORMAL MODE

STEP 6I – Energy Saver operation: Set to “OFF” or “ON”.

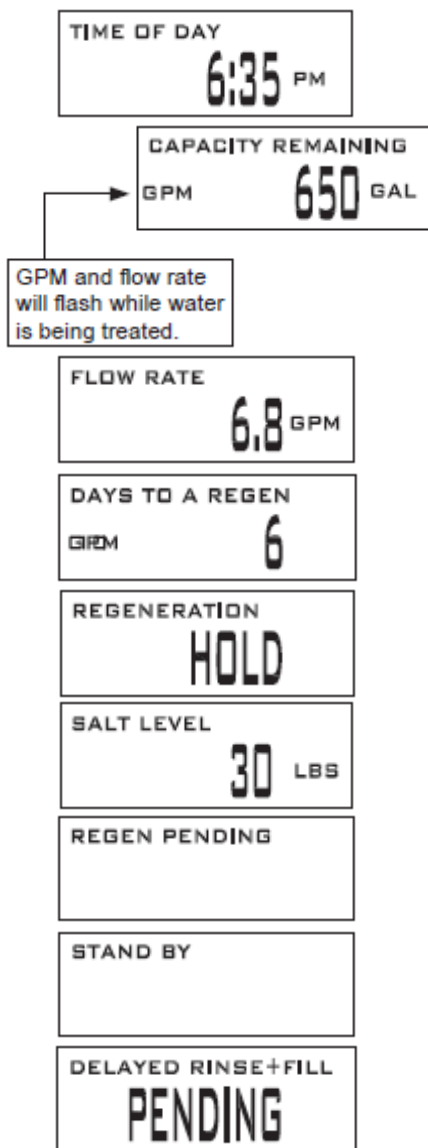
When set to OFF, the display backlight is always on. When set to ON, the display backlight will go off after 5 minutes of no keypad activity.

A valve error or salt level alert will activate the display backlight, and prevent deactivation until the error or alert is reset by the user. Press NEXT to exit Installer Display Settings. Press REGEN to return to the previous step.

User Display Settings

When the system is operating, several displays may be shown. Pressing NEXT will alternate between the displays.

- Current TIME OF DAY.
- CAPACITY REMAINING is the gallons that will be treated before the system goes through a regeneration cycle (Metered units only). Pressing DOWN while in the Capacity Remaining display will decrease the capacity remaining in 10 gallon increments and will also increase the volume used impacting the recorded values in Diagnostics Steps 3D, 4D and 5D and Valve History, Step 4VH.
- If a water meter is installed, GPM flashes (and alternates with the flow rate) on the display when water is being treated (i.e. water is flowing through the system).
- DAYS TO A REGEN is the number of days left before the system goes through a regeneration cycle. Pressing UP or DOWN while in this screen will temporarily increase or decrease the displayed value by 1 day.
- Contact information will be displayed if it was edited. For concerns with phone number or banner text displays, contact OEM for instructions.
- DP or HOLD if the dP switch is closed.
- REGEN TODAY will alternate with the header on the display if the system has called for a regeneration that will occur at the pre-set time of regeneration.
- If Salt Level Monitor has been set to ON in Step 16S, the SALT LEVEL screen will appear. To adjust the salt level, press CLOCK, and use UP or DOWN to set the current value. The salt level is adjustable from 0 to 500 lbs. in 10 lb. increments
- REGEN PENDING will be displayed in Alternator Systems whenever a unit is waiting to initiate the first cycle step of regeneration.
- STAND BY will be displayed in Alternator Systems when a valve is in Standby state.
- DELAYED RINSE+FILL PENDING will be displayed whenever a zero-capacity tank has transferred to an off-line state and is currently waiting to initiate the second portion of a regeneration cycle. Viewed only when Delayed Rinse and Fill is set to ON.





Regeneration Mode

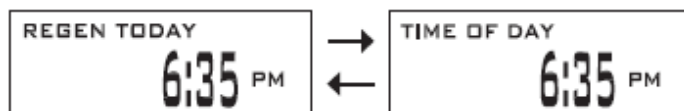
Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is regenerating, untreated water will be used.

When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.



Manual Regeneration

Sometimes there is a need to regenerate the system sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day. To initiate a manual regeneration at the preset delayed regeneration time, when the regeneration time option is set to "DELAYED REGEN" or "DELAY + IMMEDIATE", press and release "REGEN".

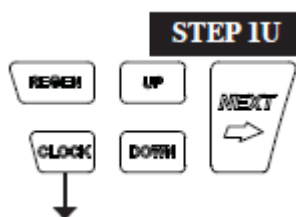


The words "REGEN TODAY" will periodically be shown on the display to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request.

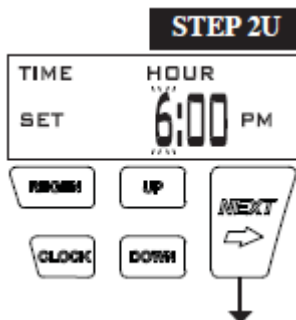
Note: If the regeneration time option is set to "IMMEDIATE" there is no set delayed regeneration time so "REGEN TODAY" will not activate if "REGEN" button is pressed. To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled. Note: For softeners, if brine tank does not contain salt, fill with salt and wait at least two hours before regenerating.

Set Time of Day

The user can also set the time of day. Time of day should only need to be set if the battery has been depleted because of extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The non rechargeable battery should also be replaced.



STEP 1U – Press CLOCK

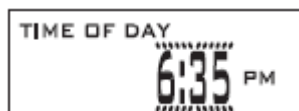


STEP 2U - Current Time (hour): Set the hour of the day using DOWN or UP. AM/PM toggles after 12. Press NEXT to go to Step 3U.



RETURN TO NORMAL MODE

STEP 3U - Current Time (minutes): Set the minutes of the day using DOWN or UP. Press NEXT to exit Set Time of Day. Press REGEN to return to previous step.



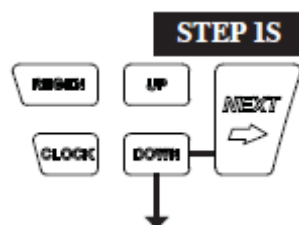
Power Loss

If the power goes out the system will keep time until the battery is depleted. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset and the non rechargeable battery replaced. The system will remember the rest.



Error Message

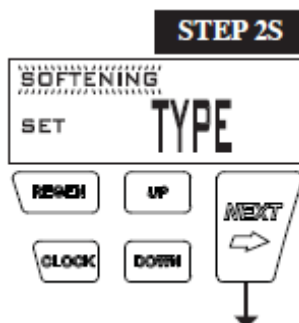
If the word "ERROR" and a number are displayed contact the OEM for help. This indicates that the valve was not able to function properly. If the number and banner text in the Contact Screens has been edited, the two displays below will alternate.



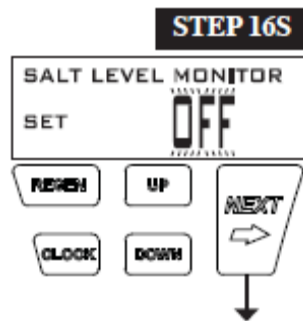
Manufacturers Softener System Setup

Step 1S – Press NEXT and DOWN simultaneously for 3 seconds and release. If screen in Step 2S does not appear in 5 seconds the lock on the valve is activated. To unlock press DOWN, NEXT, UP, and SET CLOCK in sequence, then press NEXT and DOWN simultaneously for 3 seconds and release.

It is not necessary for the installer or end user to program these screens. All screens have been programmed for your specific equipment.



Step 2S – Choose SOFTENING using UP or DOWN. Press NEXT to go to Step 3S. Press REGEN to exit OEM Softener System Setup.



Step 16S: Marlo does not turn this option on. Set Salt Level Monitor. This screen will not appear if Step 2CS is set to 2.0. Press NEXT to exit Softener System Setup. Press REGEN to return to the previous step.

All Marlo equipment has "OFF" as the default.

SETTING OPTIONS TABLE 8

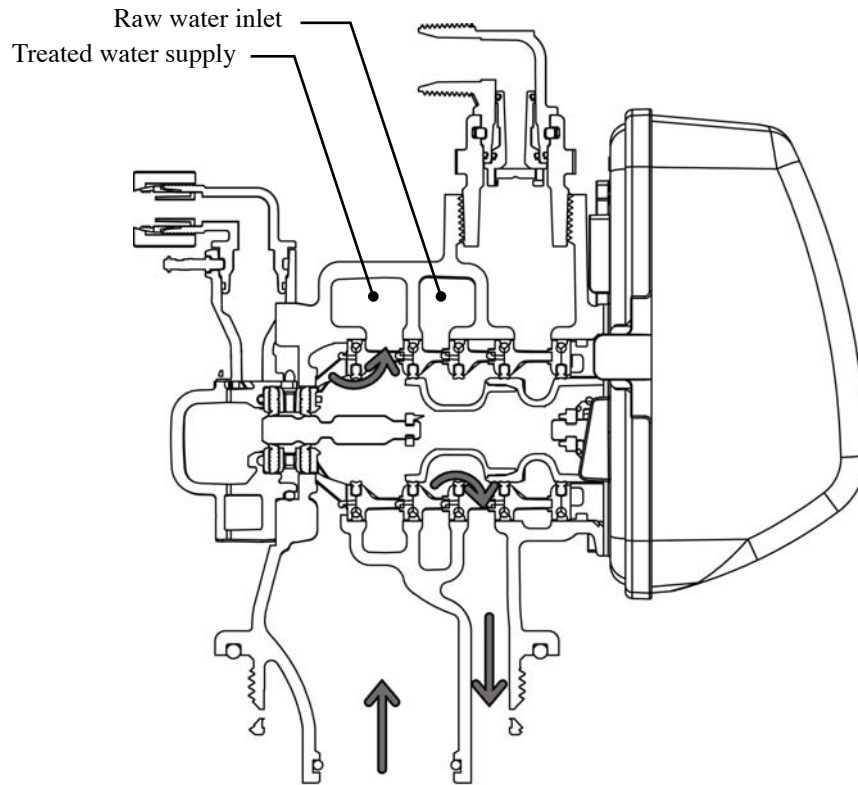
Volume Capacity	Regeneration Time Option	Day Override	Result ⁴
AUTO	DELAYED REGEN	OFF	Reserve capacity automatically estimated. Regeneration occurs when volume capacity falls below the reserve capacity at the next Regen Set Time
AUTO	DELAYED REGEN	Any number	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity falls below the reserve capacity or the specified number of days between regenerations is reached.
Any number	DELAYED REGEN	OFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity reaches 0.
OFF	DELAYED REGEN	Any number	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached.
Any number	DELAYED REGEN	Any number	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity reaches 0 or the specified number of days between regenerations is reached.
AUTO	IMMEDIATE	OFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs immediately when volume capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur when volume capacity reaches 0.
Any number	IMMEDIATE	OFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs immediately when volume capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur when volume capacity reaches 0.
AUTO	DELAY + IMMEDIATE	OFF	Reserve capacity automatically estimated. Regeneration occurs when volume capacity falls below the reserve capacity at the next Regen Set Time or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
AUTO	DELAY + IMMEDIATE	Any number	Reserve capacity automatically estimated. Regeneration occurs at the next Regen Set Time when volume capacity falls below the reserve capacity or the specified number of days between regenerations is reached or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Any number	DELAY + IMMEDIATE	Any number	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next Regen Set Time when the specified number of days between regenerations is reached or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.

⁴ Reserve capacity estimate is based on history of water usage

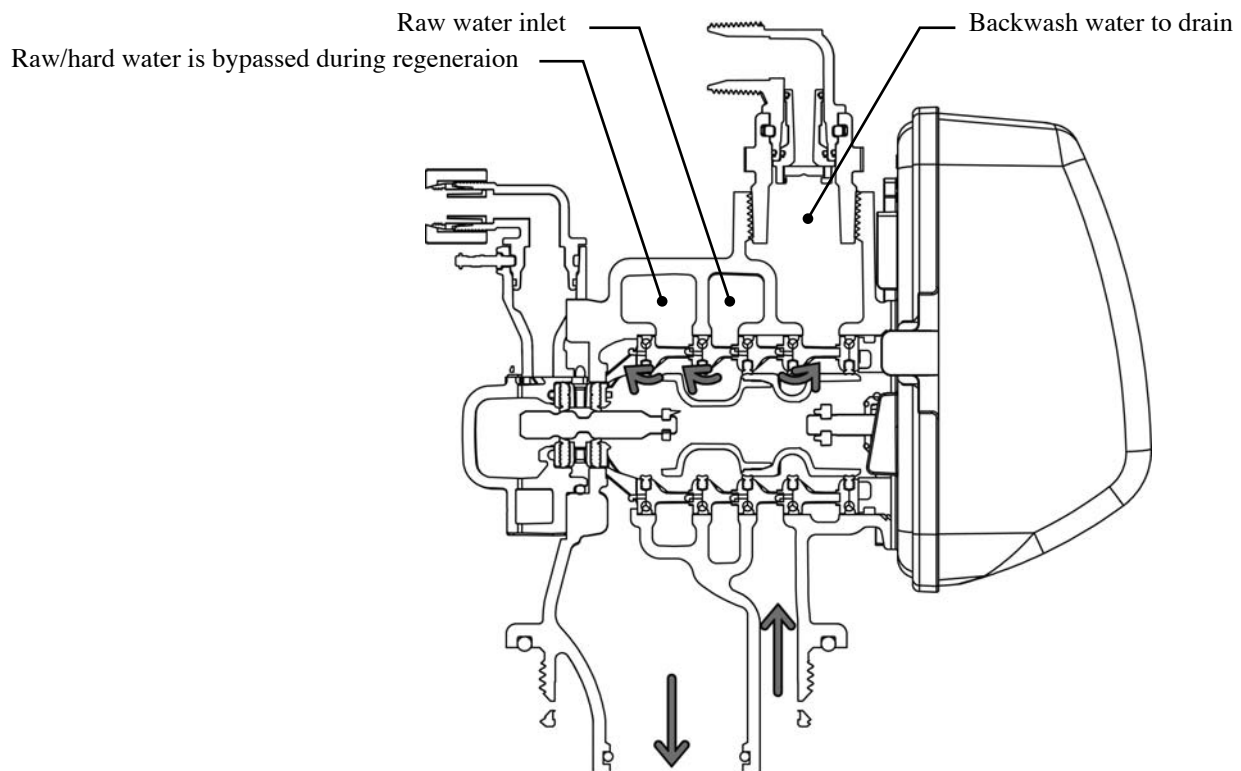


MGTE 1-1/2" VALVE CYCLE POSITIONS

SERVICE

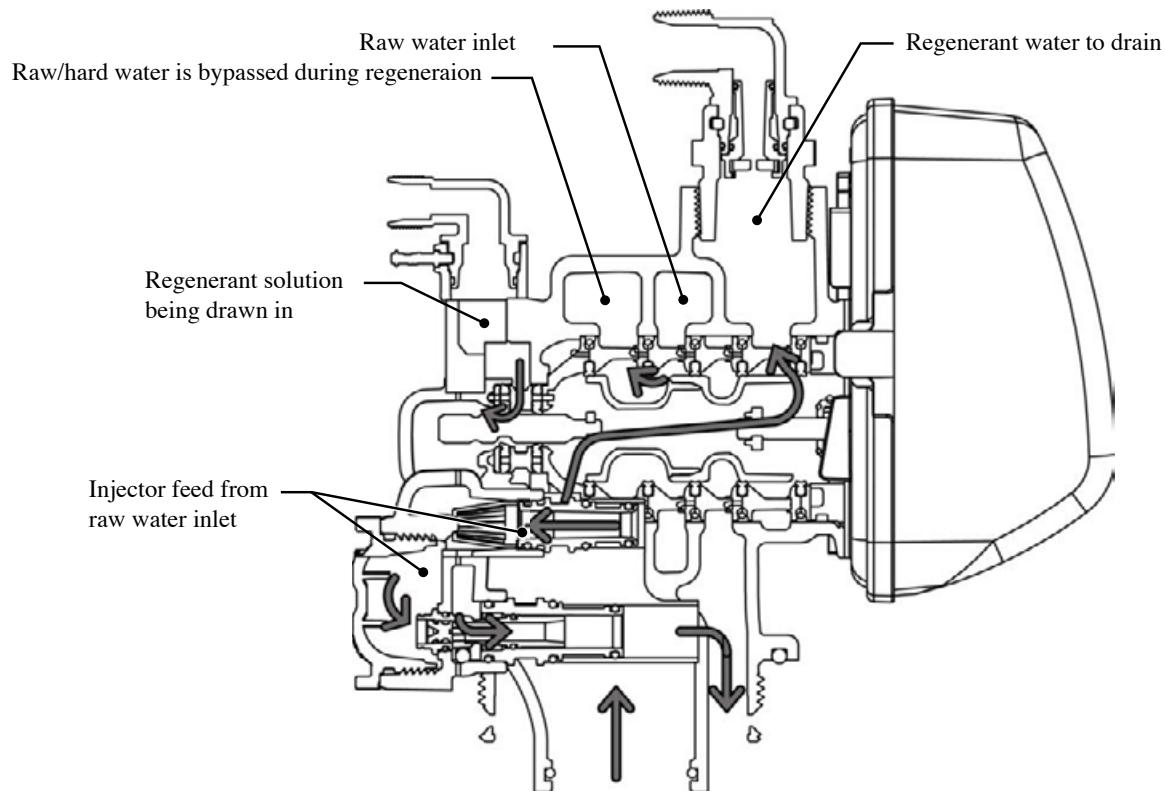


BACKWASH

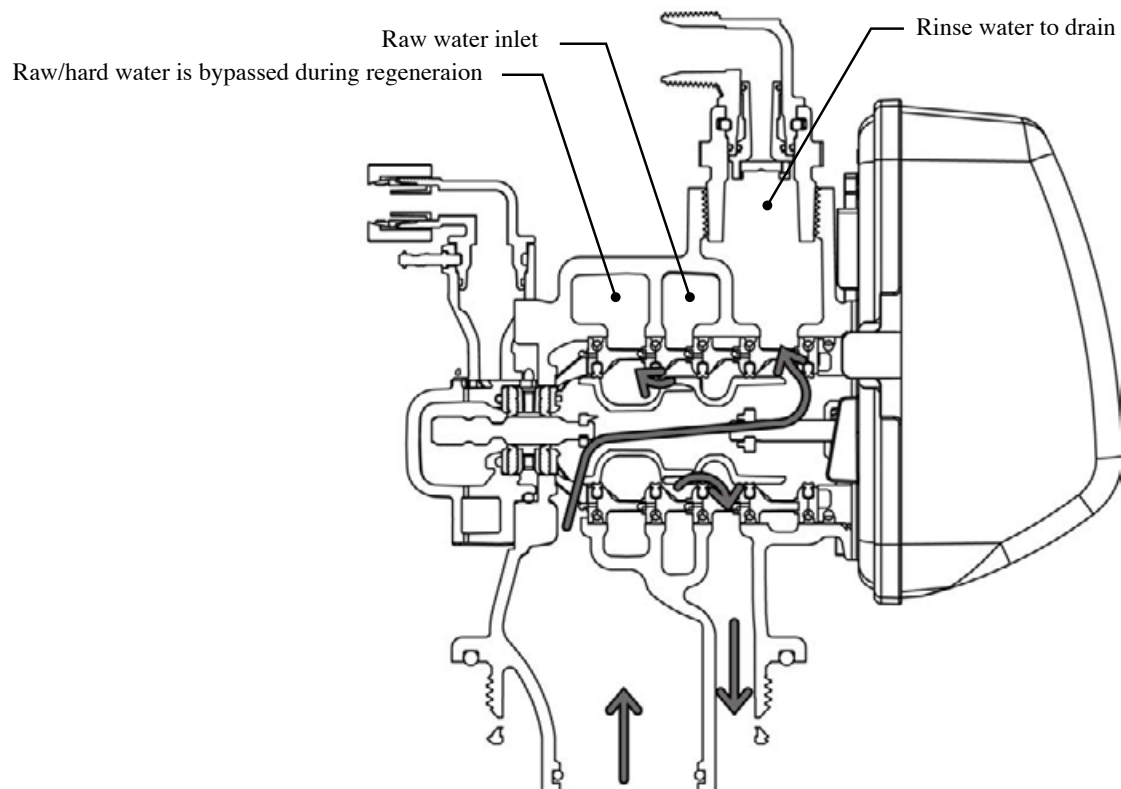


MGTE 1-1/2" VALVE CYCLE POSITIONS

DRAW

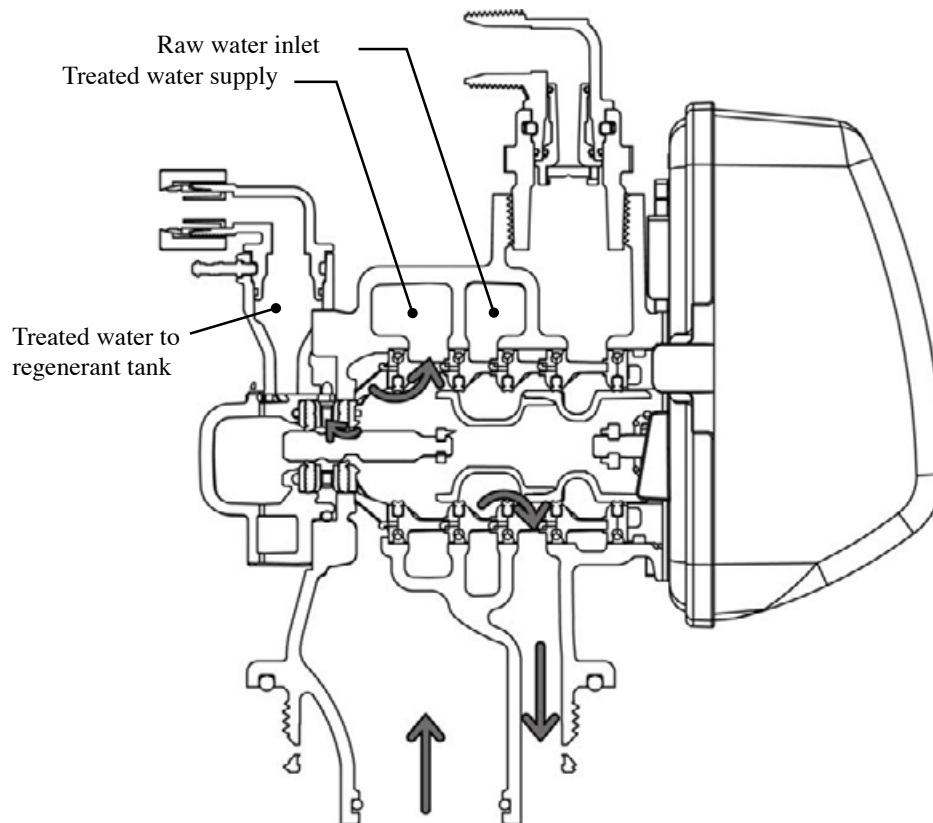


RINSE

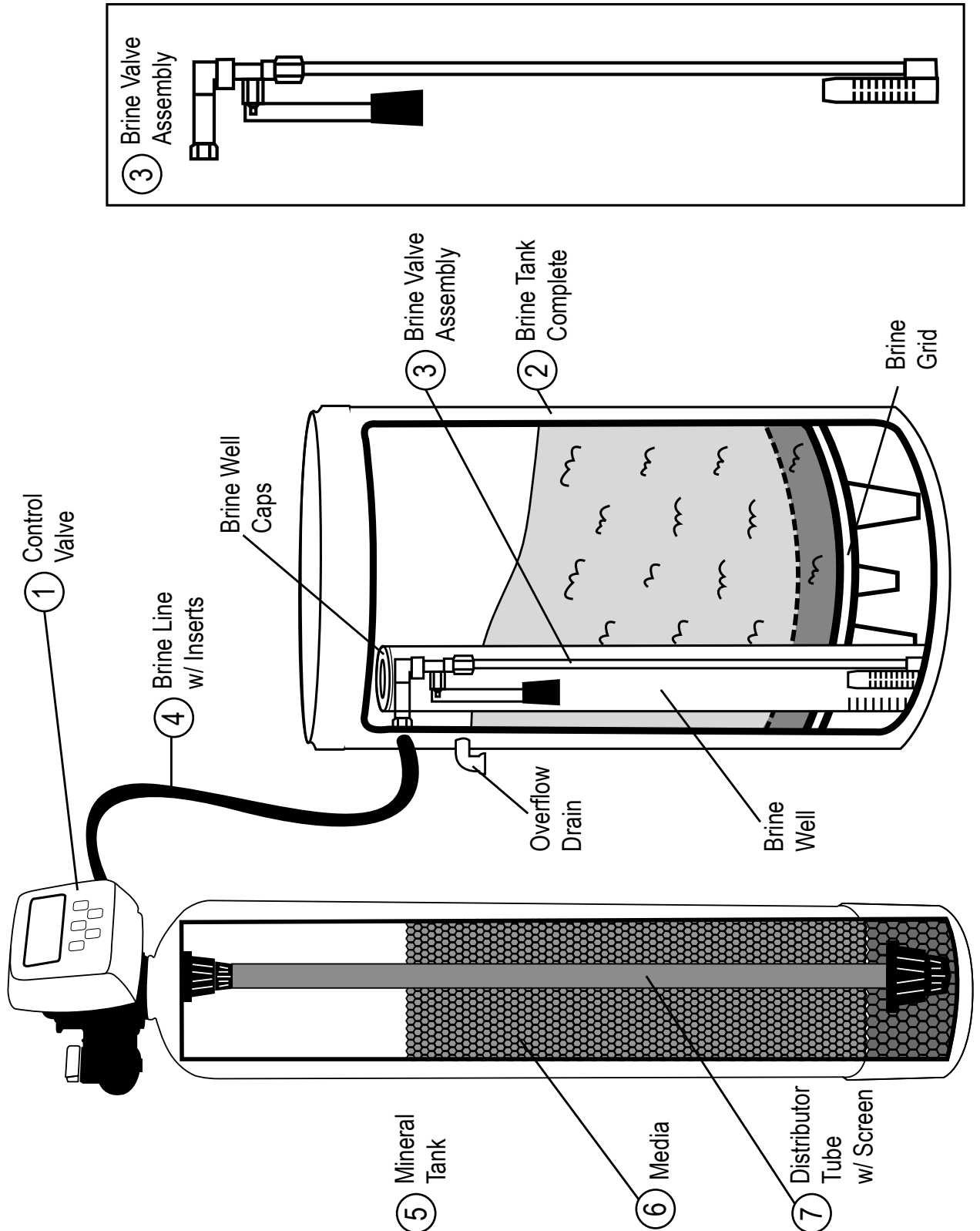


MGTE 1-1/2" VALVE CYCLE POSITIONS

TREATED WATER REFILL



MGTE

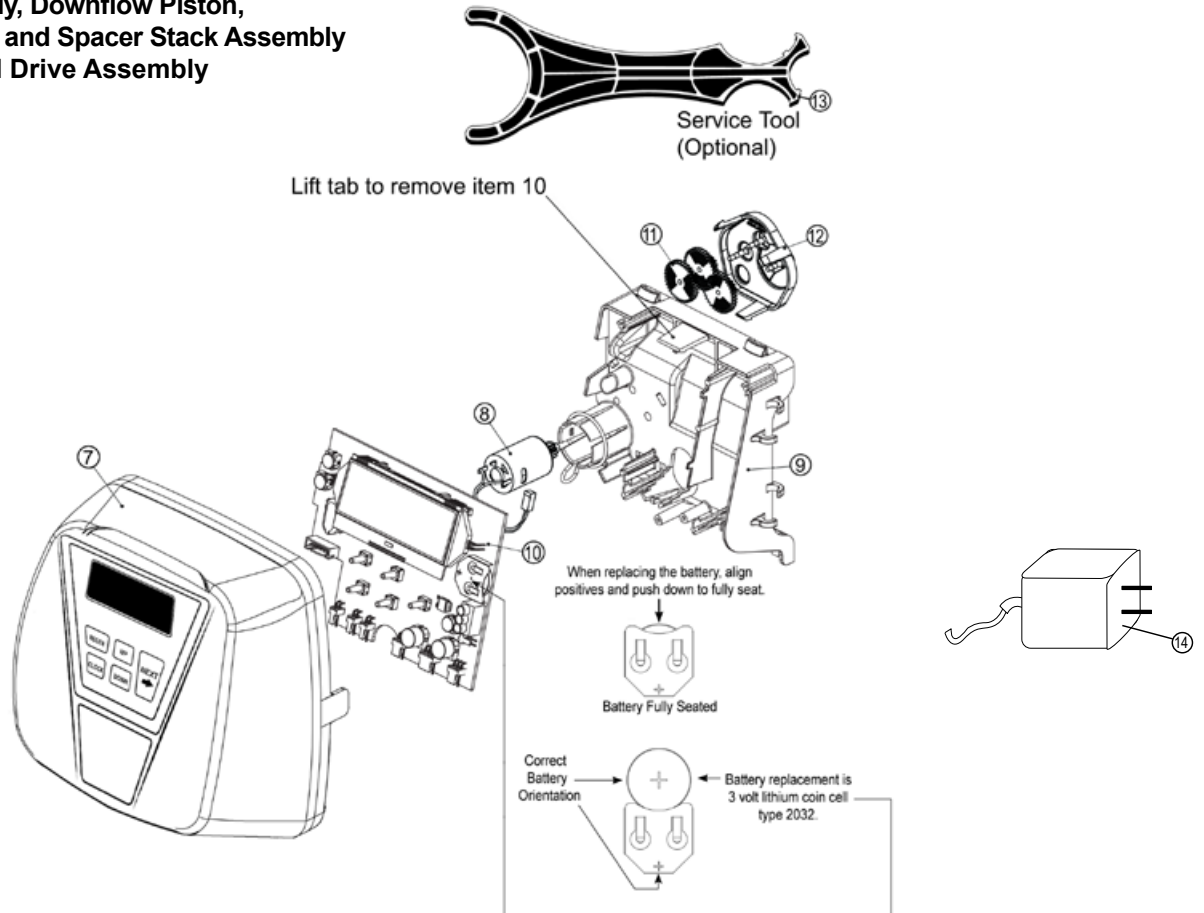


MGTE CONTROL VALVE PARTS LISTING

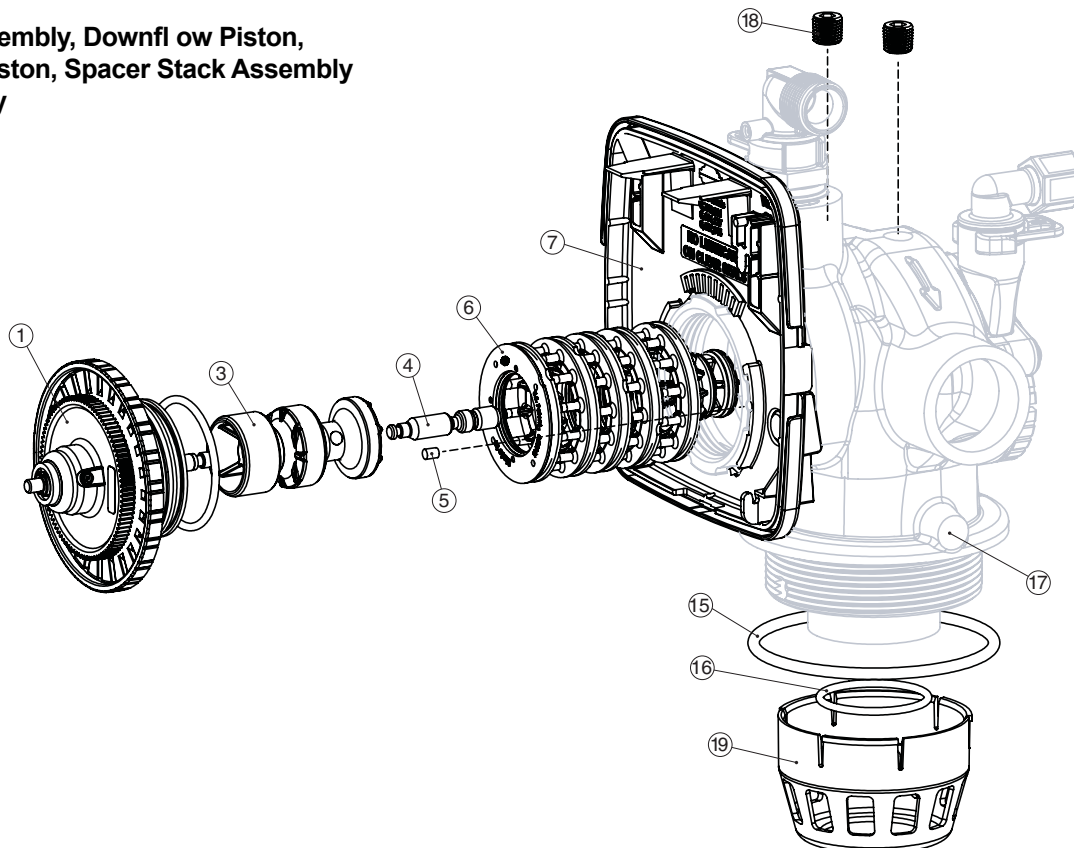
Part Number	No.	Description
B3950391	1	Complete control valve for MGTE-60-1-1/2 Time Clock
B3950411	1	Complete control valve for MGTE-60-1-1/2 Metered
B3950392	1	Complete control valve for MGTE-90-1-1/2 Time Clock
B3950412	1	Complete control valve for MGTE-90-1-1/2 Metered
B3950393	1	Complete control valve for MGTE-120-1-1/2" Time Clock
B1074066	1	Complete control valve for MGTE-120-1-1/2" Metered
B3950394	1	Complete control valve for MGTE-150-1-1/2" Time Clock
B3950414	1	Complete control valve for MGTE-150-1-1/2" Metered
B3950395	1	Complete control valve for MGTE-210-1-1/2" Time Clock
B3950415	1	Complete control valve for MGTE-210-1-1/2" Metered
B3950396	1	Complete control valve for MGTE-300-1-1/2 Time Clock
B3950416	1	Complete control valve for MGTE-300-1-1/2 Metered
B1300021	2	Brine Tank Complete for MGTE-60 & MGTE-90
B1295022	2	Brine Tank Complete for MGTE-120-1-1/2"
B1295016	2	Brine Tank Complete for MGTE-150-1-1/2"
B1295018	2	Brine Tank Complete for MGTE-210-1-1/2"
B1295021	2	Brine Tank Complete for MGTE-300-1-1/2"
A2071003	3	Brine Well for MGTE-60, 90 & 120
B1015008	3	Brine Well for MGTE-150-1-1/2" through MGTE-300-1-1/2"
A2072003	4	Brine Well Cap for MGTE-60, 90 & 120
A2072001	4	Brine Well CAP for MGTE-150-1-1/2" through 300-1-1/2"
A2250003	5	Overflow Elbow 1/2" w/Nut - All
B1180004	6	Brine Valve Assembly MGTE-60 & 90
B1180021	6	Brine Valve Assembly MGTE-120-1-1/2"
B1180015	6	Brine Valve Assembly MGTE-150-1-1/2"
B1180017	6	Brine Valve Assembly MGTE-210-1-1/2"
B1180020	6	Brine Valve Assembly MGTE-300-1-1/2"
B1020003	7	Brine Line w/Inserts
A2126093	8	Mineral Tank Only MGTE-60
A2126106	8	Mineral Tank Only MGTE-90
A2126107	8	Mineral Tank Only MGTE-120
A2126108	8	Mineral Tank Only MGTE-150
A2126117	8	Mineral Tank Only MGTE-210
A2126118	8	Mineral Tank Only MGTE-300
A2121047	9	Resin - Please order the quantity indicated next to your unit
	9	MGTE-60 - qty. 2
	9	MGTE-90 - qty. 3
	9	MGTE-120 - qty. 4
	9	MGTE-150 - qty. 5
	9	MGTE-210 - qty. 7
	9	MGTE-300 - qty. 10
A2123001	9	Gravel Subfill - Please order the qty indicated next to your unit - 30, 45 & 60 do not use subfill
	9	MGTE-90 - qty. 30#
	9	MGTE-120 - qty. 35#
	9	MGTE-150 - qty. 40#
	9	MGTE-210 - qty. 80#
	9	MGTE-300 - qty. 120#
B1200005	10	Distributor Tube Assembly for MGTE-60
B1199001	10	Distributor Tube Assembly for MGTE-90
B1199002	10	Distributor Tube Assembly for MGTE-120
B1199003	10	Distributor Tube Assembly for MGTE-150
B1199004	10	Distributor Tube Assembly for MGTE-210
B1199005	10	Distributor Tube Assembly for MGTE-300

MGTE CONTROL VALVE PARTS DIAGRAM (see parts listing on next page)

Drive Cap Assembly, Downflow Piston,
Regenerant Piston and Spacer Stack Assembly
& Front Cover and Drive Assembly



Drive Cap Assembly, Downflow Piston,
Regenerant Piston, Spacer Stack Assembly
and Main Body



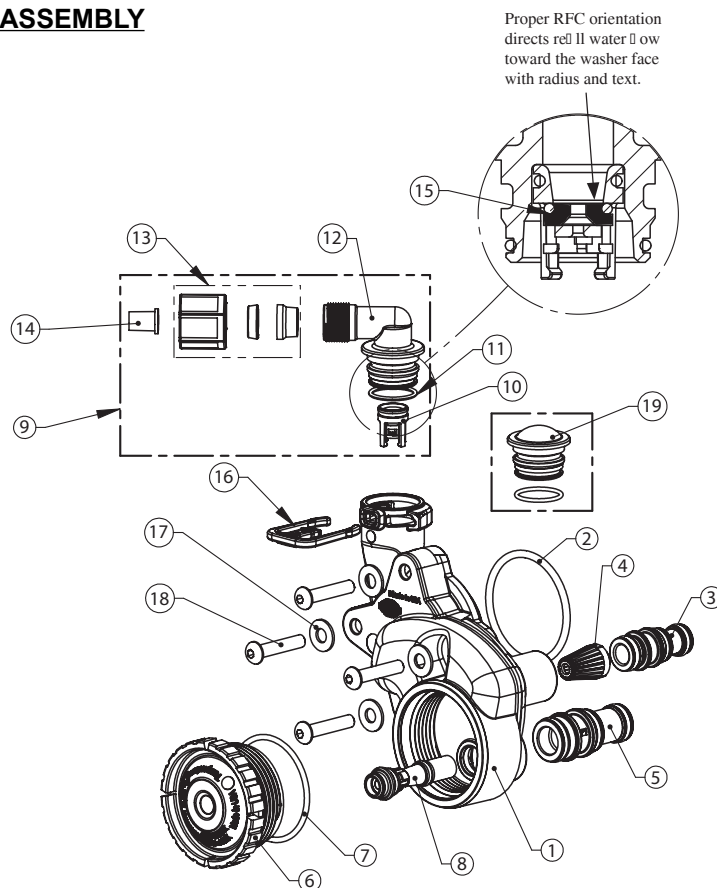
1-1/2" MGTE CONTROL VALVE PARTS LISTING (see parts diagram on previous page)

Drive Cap Assembly, Downflow Piston
Regenerant Piston and Spacer Stack Assembly

Item No.	Marlo Part No.	Description	Quantity	Clack Part No.
1	A2080077	WS1 Drive Cap Assembly	1	V3004
2	A2077180	O-ring 228	1	V3135
3	A2309057	WS1.25/1.5 Piston Downflow Assembly	1	V3407
4	A2438033	WS1 Regenerant Piston	1	V3174*
5	A3001008	WS1.5 Backplate Dowel	1	V3423
6	A2466054	WS1.5 Spacer Stack Assembly	1	V3430
7	A2103160	Front Cover ASSY	1	V3948-01
8	A2085050	Motor	1	
9	A2328046	Drive Bracket & Spring Clip	1	
10	A2341035	PC Board	1	V3955MA
11	A2393046	Drive Gear 12x36	1	
12	A2103132	Drive Gear Cover	1	
13	A2491086	Service Tool	1	
14	A2242054	Transformer 110V - 12V	1	
15	A2077230	O-ring 347	1	V3419
16		O-ring 225 for valve bodies with NPT threads	1	V3641
17		WS 1.5 NPT Valve Body, Gen 2	1	V3950-01
18		Test Port Plug, 1/4" NPT	2	V3468
19		Top Baffle Diffuser, 1.5/50MM	1	D1300



INJECTOR BODY, REFILL ASSEMBLY

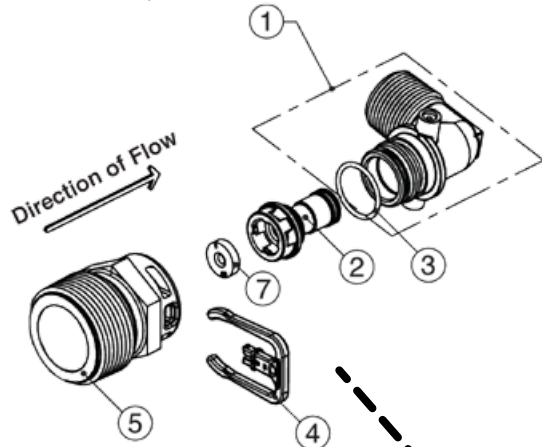


DRAWING NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
1	V3967	WS1.5 Injector Body, Welded Assembly	1
2	V3441	O-ring -226	1
3	V3968***	WS1.5 Injector Feed Tube	1
4	A2142016	WS1 Injector Screen	1
5	V3969 ***	WS1.5 Injector Draw Tube	1
6	A2080079	WS1 Injector Draw Tube	1
7	A2077182	O-ring -135	1
8	A2079025	Injector Assembly A - Black	1
8	A2079065	Injector Assembly B - Violet	1
8	A2079066	Injector Assembly C - Red	1
8	A2079067	Injector Assembly D - White	1
8	A2079068	Injector Assembly E - Blue	1
8	A2079069	Injector Assembly F - Yellow	1
8	A2079070	Injector Assembly G - Green	1
8	A2079071	Injector Assembly H - Orange	1
8	A2287081	Injector Plug	1
8	A2077226	O-Ring 013 (Not Shown)	1
8	A2077233	O-Ring 012 (Not Shown)	1
9	A2078050**	Refi II Flow Control, 1/2"	1
10	A2104038**	WS 1.5 Refi II Retainer Assembly (0.5 GPM)	1
11	A2077179	O-ring, -019	1
12	A2099074	Regenerant Elbow w/Flow Control	1
13	A2095075	Nut, Compression, 1/2" Black	1
14	A2409010	Insert, Polytube 1/2"	1
15	A2253108	Refi II Flow Control (0.5 GPM)	1
16	A2411015	Retaining Clip	1
17	V3724	Washer, Flat Stainless Steel	1
18	V3642	Bolt, BHCS Stainless Steel 1/4-20x 1 1/4	1
19	A2287059	Refi II Port Plug	1

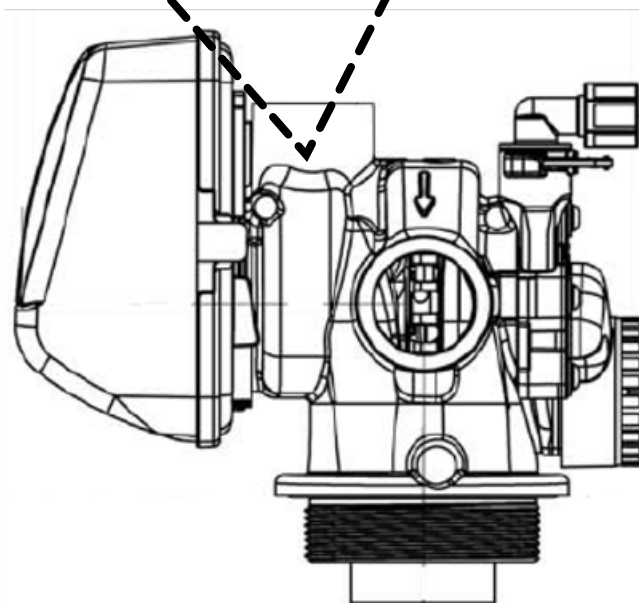
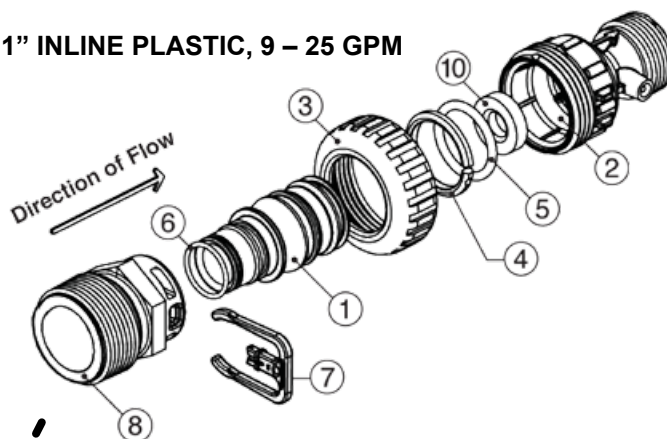


DRAIN LINE FLOW CONTROLS

3/4" PVC ELBOW, 0.7 – 10 GPM



1" INLINE PLASTIC, 9 – 25 GPM



3/4" PVC ELBOW, 0.7 – 10 GPM

DRAWING NO.	PART NO.	DESCRIPTION	QTY
1	A2355019	WS Drain Fitting, 3/4" Elbow ONLY	1
1	A2099056	Drain Elbow, 3/4 NPT	1
2	A2104034	DLFC Retainer Assembly	1
3	A2077179	O-ring, -019	1
4	A2411015	Locking Clip	1
5	A2526013	WS1.5 DLFC Adapter	1
7	A2253085	DLFC 3.2 gpm (12.1 lpm) for 3/4"	1
7	A2253086	DLFC 4.2 gpm (15.9 lpm) for 3/4"	1
7	A2253087	DLFC 5.3 gpm (20.1 lpm) for 3/4"	1
7	A2253111	DLFC 6.5 gpm (24.6 lpm) for 3/4"	1
7	A2253112	DLFC 7.5 gpm (28.4 lpm) for 3/4"	1
7	A2253105	DLFC 9.0 gpm (34.1 lpm) for 3/4"	1
7	A2253132	DLFC 10.0 gpm (37.9 lpm) for 3/4"	1

1" INLINE PLASTIC, 9 – 25 GPM

DRAWING NO.	PART NO.	DESCRIPTION	QTY
1	A2355020	WS Drain Fitting, 1" Straight	1
1	A2097040	WS Drain Fitting Adapter, 1" NPT	1
2	A2005075	Drain Fitting Body	1
3	A2095069	WS1 Nut, QC	1
4	A2453012	WS1 Split Ring	1
5	A2077178	O-ring -215	1
6	A2077179	O-ring -019	1
7	A2411015	Locking Clip	1
8	A2526013	WS1.5 DLFC Adapter	1
10	A2253117	DLFC 9.0 gpm (37.1 lpm) for 1"	1
10	A2253133	DLFC 10.0 gpm (37.9 lpm) for 1"	1
10	A2253118	DLFC 11.0 gpm (41.6 lpm) for 1"	1
10	A2253119	DLFC 13.0 gpm (49.2 lpm) for 1"	1
10	A2253106	DLFC 15.0 gpm (56.8 lpm) for 1"	1
10	A2253120	DLFC 17.0 gpm (64.4 lpm) for 1"	1
10	A2253121	DLFC 20.0 gpm (75.7 lpm) for 1"	1
10	A2253122	DLFC 25.0 gpm (94.6 lpm) for 1"	1

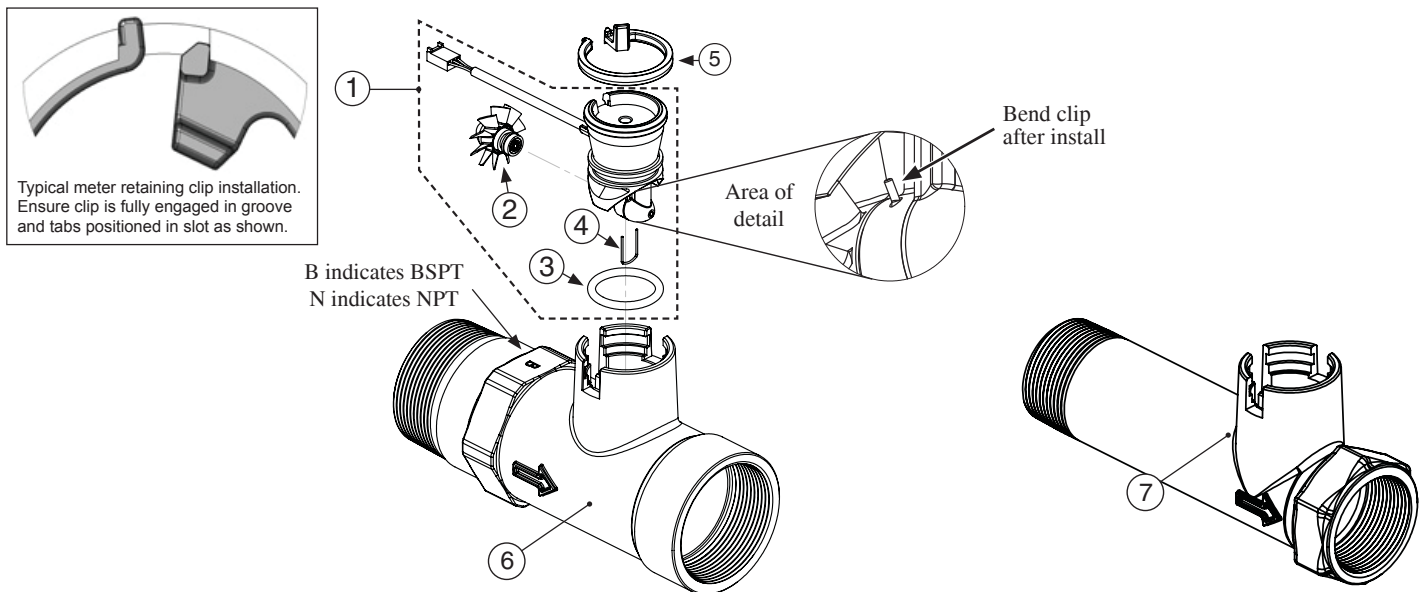


1-1/2" AND 2" METER ASSEMBLIES

Note: Be sure the paper meter size is programmed in the software.

Service or replace the turbine by:

1. Turn the bypass for the system on and relieve the pressure on the system before removing the meter.
 2. Press downward on the remote meter assembly to relieve tension on the retaining clip V3632. Remove the clip and take the meter assembly out of the housing.
 3. Remove the bend from the two exposed tips of the retaining clip (item 5) and remove clip.
 4. Service or replace the Turbine Assembly and place it back on the turbine shaft.
 5. Insert the Turbine Clip and re-bend the exposed ends of the clip. The V3118-03 turbine has a groove to line up with the Turbine Clip.
 6. Insert meter assembly back into the meter housing.
 7. Re-install the meter retaining clip as shown below.
 8. Open the bypass for the system slowly to bring back into service and check to be sure you have no water leaks.
- The Turbine Assembly has a groove to line up with the V3501 WS1.5/2 Turbine Clip.



DRAWING NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
	A2360069	1.5" NPT Meter, 15' Cable	1
	A2426203	2" NPT Meter, 15' Cable	1
1	A2360061	Commercial meter assembly, 15' Cable	1
2	A2100029	Commercial meter turbine assembly	1
3	A2077178	O-ring, -215	1
4	V3501	Turbine clip	1
5	A2411021	Meter Retaining Clip	1
6	V3754-01	WS2 Meter Housing NPT	1
7	V3401-04	WS1.5 Meter Housing NPT	1

WHEN INSTALLING THE METER, MAKE SURE THE ARROW ON THE METER BODY IS GOING THE SAME DIRECTION AS THE WATER FLOW.

THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL OR HEALTH EFFECT APPLICATIONS.

OPERATING PRESSURES: 20 PSI MINIMUM / 125 PSI MAXIMUM • OPERATING TEMPERATURES: 40°F MINIMUM / 110°F MAXIMUM

*The meter can be installed in either horizontal or vertical applications.

TABLE 15 - TROUBLESHOOTING

Problem	Possible Cause	Solution
1. Timer does not display time of day	a. Transformer unplugged	a. Connect power
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective transformer	c. Replace transformer
	d. Defective PC board	d. Replace PC board
2. Timer does not display correct time of day	a. Switched outlet	a. Use uninterrupted outlet
	b. Power outage	b. Reset time of day
	c. Defective PC board	c. Replace PC board
3. No softening/filtering display when water is flowing	a. Bypass valve in bypass position	a. Put bypass valve in service position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
4. Control valve regenerates at wrong time of day	a. Power outages	a. Reset control valve to correct time of day
	b. Time of day not set correctly	b. Reset to correct time of day (a.m./p.m.)
	c. Time of regeneration incorrect	c. Reset regeneration time (a.m./p.m.)
	d. Control valve set at "on 0" (immediate regeneration)	d. Check control valve set-up procedure regeneration time option
	e. Control valve set at NORMAL + on 0	e. Check control valve set-up procedure regeneration time option
Display screen will turn red and flash the Installer's Name and phone number to call for service. 5.ERROR followed by code number 1001 Error Code - Unable to recognize start of regeneration 1002 Error Code - Unexpected stall 1003 Error Code - Motor ran to long, timed out trying to reach next cycle position 1004 Error Code - Motor ran to long, timed out trying to reach home position If other Error Codes display contact the factory ERROR Reset Procedure: 1. Correct error condition. 2. Press NEXT and REGEN simultaneously for three seconds.	a. Control valve has just been serviced	a. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	b. Foreign matter is lodged in control valve	b. Check piston and spacer stack assembly for foreign matter
	c. High drive forces on piston	c. Replace piston(s) and spacer stack assembly
	d. Control valve piston not in home position	d. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	e. Check motor and wiring. Replace motor if necessary
	f. Drive gear label dirty or damaged, missing or broken gear	f. Replace or clean drive gear(s)
	g. Drive bracket incorrectly aligned to back plate	g. Reseat drive bracket properly
	h. PC board is damaged or defective	h. Replace PC board
	i. PC board incorrectly aligned to drive bracket	i. Ensure PC board is correctly snapped on to drive bracket

TABLE 15 - TROUBLESHOOTING (CONTINUED)

Problem	Possible Cause	Solution
6. Control valve stalled in regeneration	a. Motor not operating	a. Replace motor
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective transformer	c. Replace transformer
	d. Defective PC board	d. Replace PC board
	e. Broken drive gear or drive cap assembly	e. Replace drive gear or drive cap assembly
	f. Broken piston retainer	f. Replace drive cap assembly
	g. Broken main or regenerant piston	g. Replace main or regenerant piston
7. Control valve does not regenerate automatically when REGEN button is depressed and held	a. Transformer unplugged	a. Connect transformer
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Broken drive gear or drive cap assembly	c. Replace drive gear or drive cap assembly
	d. Defective PC board	d. Replace PC board
8. Control valve does not regenerate automatically but does when REGEN button is depressed	a. By-pass valve in bypass position	a. Put control valve in service position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
	f. Set-up error	f. Check control valve set-up procedure
9. Time of day flashes on and off	a. Power has been out more than two hours, the transformer was unplugged and then plugged back into the wall outlet, the transformer plug was unplugged and then plugged back into the board or the NEXT and REGEN buttons were pressed to reset the valve.	a.. Reset the time of day



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