MARLO INCORPORATED ®

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

MGT 15M – 30M

SINGLE METERED 3/4” SXT SERIES

SYSTEM 4

COMMERCIAL WATER CONDITIONER

MODELS FROM JULY 2014

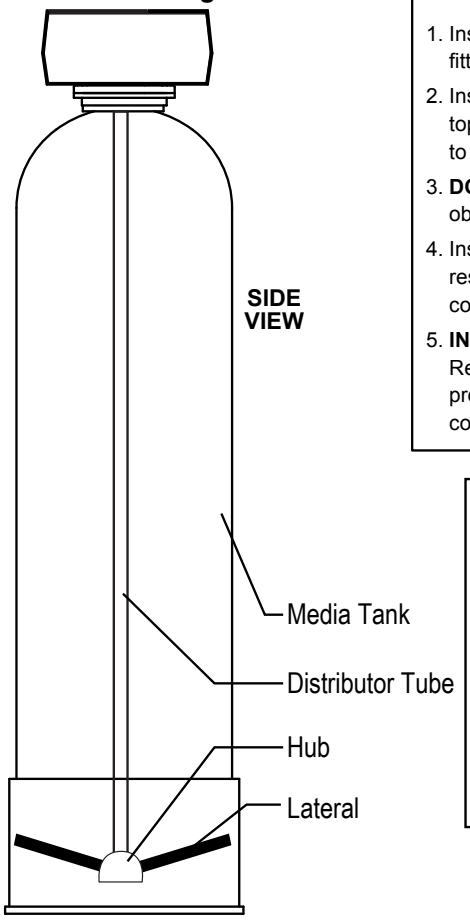
COMPLETE FOR FUTURE REFERENCE:

MODEL NO:
SERIAL NO:
DATE INSTALLED:
DEALER:

Marlo Incorporated
2227 South Street
P.O. Box 044170
Racine, WI 53404-7003
Ph. (262) 681-1300
Fax (262) 681-1318
Info@Marlo-Inc.com
www.Marlo-Inc.com

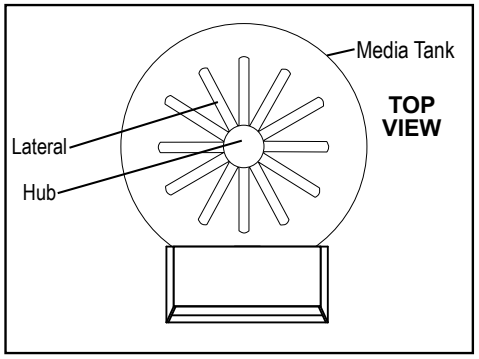
INSTALLATION WARNING

PRIOR TO Media Loading



Inspection Requirement Prior to Loading Media

1. Inspect condition of upper distributor piping. Verify fittings are tight and positioned as shown.
2. Inspect condition of strainers, laterals and hub through top or side access ports. Verify fittings are secured to hub.
3. **DO NOT** load media if damaged components are observed. Contact factory.
4. Installer is responsible for media loss into treated water resulting from failure to report and repair damaged components inside media tank prior to media loading.
5. **INSTALLER WARNING:** Refer to installation instructions for media loading procedure. Improper loading of media will damage components inside media tank.



AFTER Media Loading

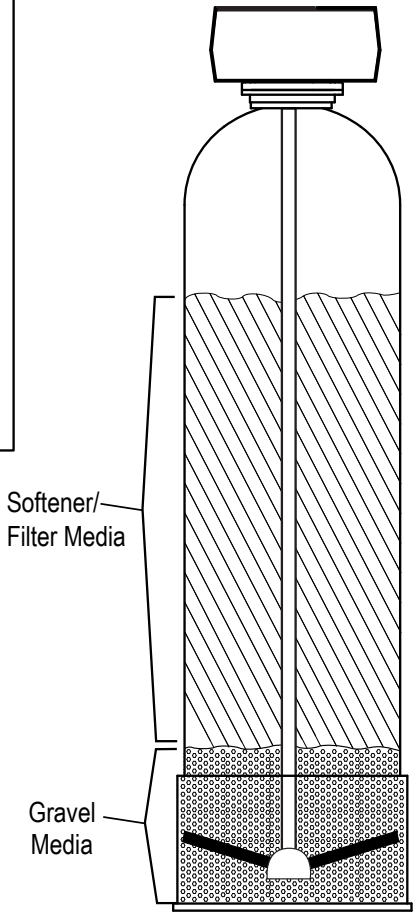


TABLE OF CONTENTS

Ordering:
Orders may be phoned, faxed, or emailed to Marlo Incorporated Purchase orders must include Marlo Incorporated part numbers and pricing. Purchase orders must also state if partial shipments are allowed. If you do not have the correct part numbers, pricing, or case quantities, please contact our customer service department.

Order Confirmations:
All purchase orders will be confirmed by phone, fax, or email. Any discrepancies in part numbers, pricing, descriptions, or case quantities will be listed in the order confirmation. It is the customer's responsibility to review the order confirmations and advise if any changes are to be made. If we do not hear from the customer regarding the confirmation within 24 hours, we will assume everything is correct and will invoice and ship accordingly.

Quotes & Prices:
Quotations are valid for a period of up to 45 days or for the term stated on the quote, whichever term is shortest. We make every effort to notify customers with price change information. However, prices are subject to change or correction without notice. Shipping weights, dimensions and anticipated ship dates are all approximate and subject to change.

Minimum Orders:
Minimum order accepted is $25.00, not including freight or taxes.

Taxes:
Taxes are not included. Quoted prices are exclusive of all taxes. Purchaser shall be responsible for payment of all applicable state/local taxes. Orders shipped within Wisconsin are subject to applicable state tax rates unless a completed resellers card or exempt certificate is on file.

Freight:
All shipments are F.O.B. Marlo Incorporated Racine, Wisconsin, unless otherwise specified.

Shipment:
The shipment method should be specified by the customer on the purchase order; otherwise, Marlo Incorporated will choose the best method of shipment.

Packaging:
Pricing includes packaging that is satisfactory for air, truck, or containerized shipment at no additional cost, unless otherwise stated. Ocean export crating will require an additional charge.

Terms - Domestic Customers:
Terms of payment on open accounts are net 30 days from the date of invoice, unless otherwise stated and mutually agreed upon by both parties. This agreement is subject to credit approval. Terms will only be issued to companies which reside in the United States of America. Orders will not be shipped if any account is past due and/or until payment by check has cleared.

Orders in excess of $60,000 will require partial payments prior to shipment. A specific progress payment schedule will be stated in the quotation. Partial payments may also be required for orders involving special engineering or custom ordered items regardless of order amount.

Interest will be charged on past due accounts. Interest charges will be calculated on the unpaid balance at 1.5% per month. All questions regarding invoices and terms must be addressed with our accounting department before invoices become due.

Unless specifically included as a separate item, prices quoted do not include any city, county, state or federal taxes, or transportation of merchandise.

Terms - International Customers:
All payments due are in U.S. dollars and must be made in advance by check (must clear before shipment), money orders, wire transfer, or credit card. Credit cards that are accepted are Visa, MasterCard, and American Express. Irrevocable Letters of Credit are accepted with a minimum order of $25,000.00 U.S. dollars, per order. Unless specifically included as a separate item, prices quoted do not include any city, county, state or federal taxes, or transportation of merchandise. A deposit may be required for special or custom ordered items.

Freight Claims:
Any damage, discrepancies and/or freight claims must be made immediately and directly, in writing within ten (10) days to Marlo Incorporated. Marlo Incorporated will help as much as possible in settling claims. However, Marlo Incorporated will not be held responsible for breakage or shortage after products are accepted by common carrier. All shipments must be inspected for damages and counted for shortages at the time of delivery.

Order Changes:
Additions to an order may be made at no charge prior to the processing of an order. Processing of an order typically begins within one hour of receipt of a purchase order and is typically accomplished within one working day.

Orders cancelled after the order has been processed and sent to shipping or engineering, will be subject to a minimum 10% cancellation fee, assuming manufacturing has not commenced, and no detailed engineering or special parts have been ordered. Additional fees may be charged depending on the level of completion of detailed engineering, manufacturing, and/or if any special parts have been ordered.

Returns & Restocking:
A Return Goods Authorization (RGA) number must be obtained from Marlo Incorporated before any product returns can be accepted and/or replacements shipped. All returns for warranty consideration are to be shipped prepaid and must be returned within ten (10) business days from the RGA issuance. Returns determined to be in warranty will be replaced or repaired and will be returned to Buyer prepaid. Products returned, other than valid warranty claims, may be subject to a restocking charge of up to 25%. Orders shipped incorrectly by Marlo Incorporated are not subject to restocking charges and correct items will be shipped to Buyer prepaid.

Excusable Delays:
Marlo Incorporated shall not be in default for failure to deliver or delay in delivery arising out of causes beyond its control and without its negligence, including but not limited to Acts of God or the public enemy; acts of the Government in either its sovereign or contractual capacity; fires; floods; epidemics; quarantine restrictions; strikes; shortages of materials or supplies; labor disputes; freight embargoes; delays in transit; consignments lost or damaged by freight agent(s); and unusually severe weather.

Warranty:
Marlo Incorporated warrants its products to be free from defects in design, material, or workmanship for a period of 18 months from shipment date or 12 months from installation, whichever occurs first, when said products are installed and operated in accordance with the written instructions provided. The fiberglass reinforced polyester (FRP) resin/media tanks used in certain products alone have an extended warranty period of five (5) years from the shipment date. 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.

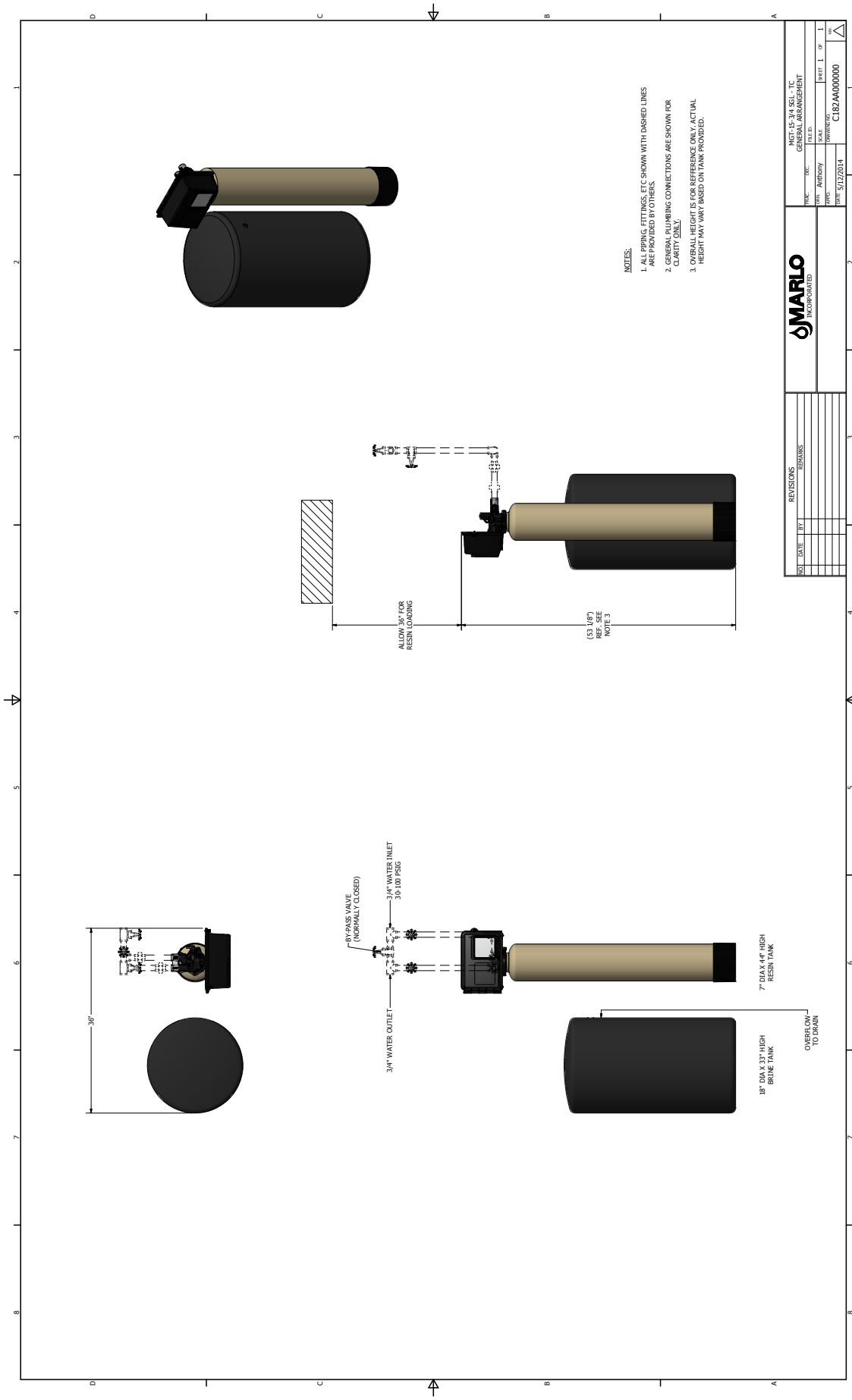
Marlo Inc. will not be subject to and disclaims the following:

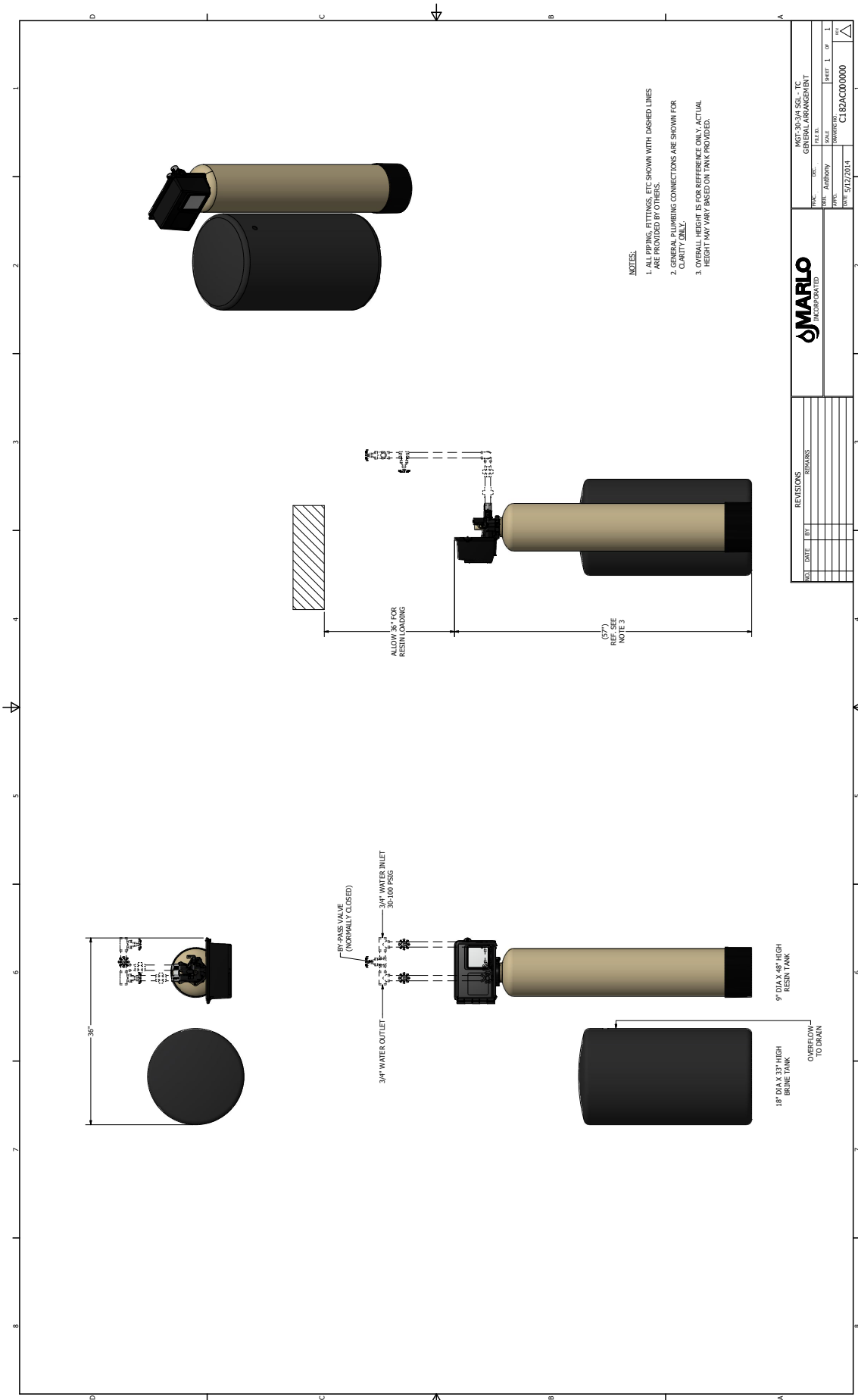
1. Any other obligations or liabilities arising out of breach of contract or out of warranty.

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 including labor charges, back charges or handling charges are excluded from Marlo Inc.'s warranty provisions.

Policy:
These terms and conditions may be superseded by specific provisions provided by Marlo Incorporated. However, should any of these terms and conditions be contrary to or inconsistent with any terms and conditions contained in any purchase order form or other document between Marlo Incorporated and the buyer, which is prepared by the buyer and whenever executed, the provisions hereof shall be controlling and shall supersede the conflicting terms and conditions which are contained in such other document. No changes shall be made to our terms and conditions unless prior written authorization by Marlo Incorporated


NOTES:
1. ALL PIPING, FITTINGS, ETC SHOWN WITH DASHED LINES ARE PROVIDED BY OTHERS.
2. GENERAL PLUMBING CONNECTIONS ARE SHOWN FOR CLARITY ONLY.
3. OVERALL HEIGHT IS FOR REFFERENCE ONLY. ACTUAL HEIGHT MAY VARY BASED ON TANK PROVIDED.
ALLOW 35" FOR RESIN LOADING
(53 1/8") REF. SEE NOTE 3
36"
BY-PASS VALVE (NORMALLY CLOSED)
3/4" WATER INLET 30-100 PSIG
3/4" WATER OUTLET
7" DIA X 44" HIGH RESIN TANK
18" DIA X 33" HIGH BRINE TANK
OVERFLOW TO DRAIN
REVISIONS
NO. DATE BY REMARKS
MARLO INCORPORATED
MGT-15-3/4 SGL - TC
GENERAL ARRANGEMENT
MFG. DEC.
DRN. Anthony
APPD.
DWG. 5/12/2014
FILE ID.
SCALE
SHEET 1 OF 1
DRAWING NO. C182AA000000
REV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2. GENERAL PLUMBING CONNECTIONS ARE SHOWN FOR CLARITY ONLY.
3. OVERALL HEIGHT IS FOR REFERENCE ONLY. ACTUAL HEIGHT MAY VARY BASED ON TANK PROVIDED.
REVISIONS
REMARKS
DATE
MGT-30-3/4 SQL - TC
GENERAL ARRANGEMENT
DRN: Anthony
DWG NO: C182AC000000
DATE: 5/12/2014
ALLOW 24" FOR RESIN LOADING
(57") REF. SEE NOTE 3
36"
BY-PASS VALVE (NORMALLY CLOSED)
3/4" WATER INLET 30-100 PSIG
3/4" WATER OUTLET
9" DIA X 48" HIGH RESIN TANK
18" DIA X 33" HIGH BRINE TANK
OVERFLOW TO DRAIN

DIMENSION CHART

MODEL	INLET SIZE (Inches)	TANK SIZE		LENGTH (Inches)	WIDTH (Inches)	HEIGHT* (Inches)
		SOFTENER (Inches)	BRINE (Inches)			
15	3/4	7x44	18x33	31	18	53
30	3/4	9x48	18x33	33	18	57
*Leave a minimum 24 inch clearance to the height of the unit for loading media. Dimensions are for general arrangement use only.						

SPECIFICATION CHART

		MODEL	15	30
SYSTEM SIZE		VALVE SIZE (IN)	3/4	3/4
		MAX CAPACITY (KILOGRAINS)	15	30
		MIN CAPACITY (KILOGRAINS)	10	20
FLOWRATE (GPM)		CONTINUOUS FLOWRATE (GPM)	7	10
		PEAK FLOWRATE (GPM)	10	14
		BACKWASH & FAST FLUSH (GPM)	1.2	2
		BRINE DRAW & RINSE (GPM)	0.4	.51
		BRINE TANK REFILL (GPM)	.25	.5
TIMER SETTINGS		BACKWASH & FAST FLUSH (MIN)	10	10
		BRINE DRAW & RINSE (MIN)	60	60
		FAST FLUSH (MIN)	10	10
		BRINE TANK REFILL (MIN)	8	8
SOFTENER TANK		SIZE (IN)	7x44	9x48
		GRAVEL (LBS)	0	0
		RESIN (FT^3)	0.5	1
		FREEBOARD (IN)	17	25
BRINE SYSTEMS	EQUIPMENT	TANK SIZE	18x33	18x33
		MAX SALT STORAGE (LBS)	280	280
		INJECTOR CODE	0	1
		INJECTOR COLOR	RED	WHT
	MAX	SALT DOSAGE- MAX (LBS)	7.5	15
		REFILL TIME - MAX (MIN)	10	10
	MIN	SALT DOSAGE- MIN (LBS)	3	6
		REFILL TIME - MIN (MIN)	4	4
	REGENERATION WASTE VOLUME (GAL)		40	116

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
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

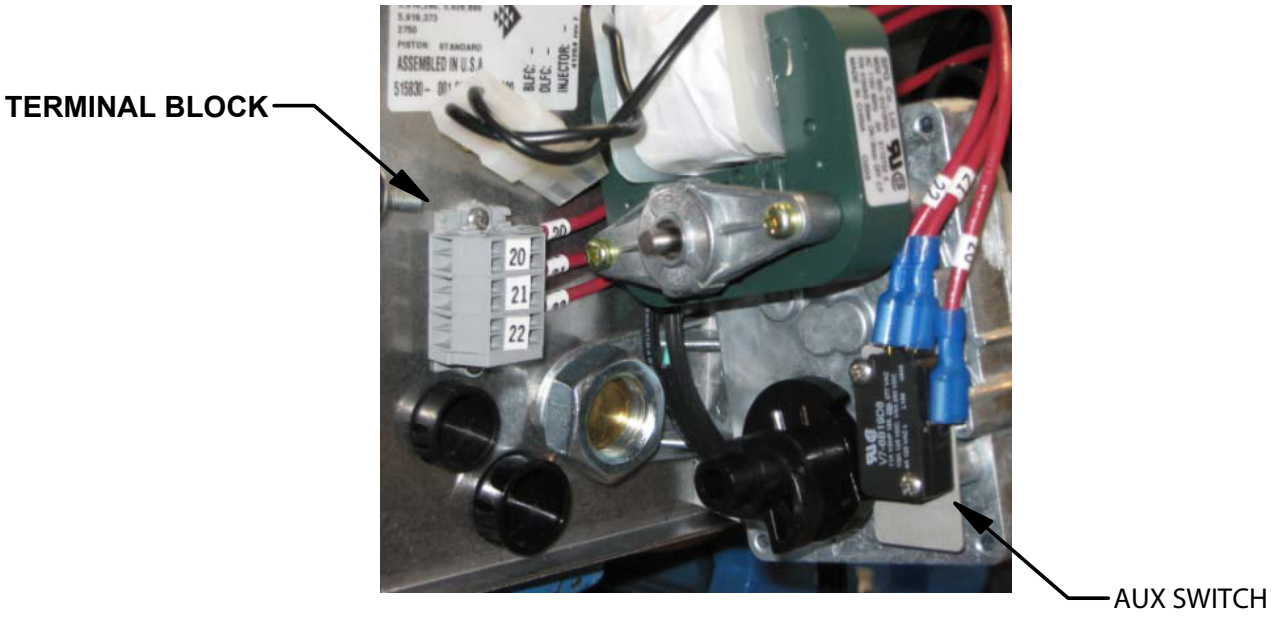
3. SALT DOSAGE
Maximum 15 lbs./cu.ft. - Regeneration efficiency: 2,000 grains/pound of salt (factory setting)
Maximum 6 lbs./cu.ft. - Regeneration efficiency: 3,000 grains/pound of salt

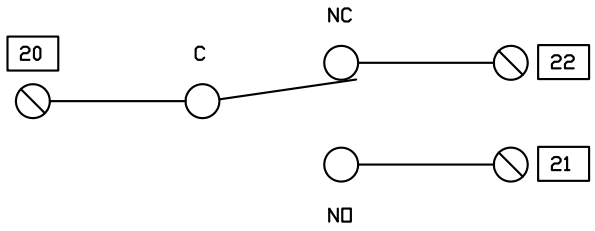
4. REGENERATION WASTE VOLUME - Total gallons water discharged per regeneration

AUX SWITCH (OPTIONAL)

The Aux Switch Option provides an extra switch on the brine valve cam assembly that ties to the terminal strip located on the back-plate of the valve. The switch provides a dry contact circuit that changes status dependent on filter valve's step. It is most commonly used to lockout an RO activate a pump, or activate separate source inlet valves.

The switch is normally closed during service and normally open during regeneration.





STEP	DRY CONTACT STATUS	
	OPEN	CLOSED
SERVICE	20-21	20-22
BACKWASH/ / REGENERATION	20-22	20-21

Contact Rating: 220 VAC Max. / 2.0 AMP Max.

CONSTRUCTION NOTES:

1. INSTALL MICROSWITCH ASSEMBLY NEXT TO BRINE VALVE CAM ASSEMBLY ON VALVE.
2. INSTALL THE 3 TERMINALS AND LABEL THE TERMINALS NUMBERS 20, 21, 22.
3. WIRE THE MICROSWITCH USING 16 AWG RED WIRE.
4. WIRE AS FOLLOWS:
   COMMON TO 20
   NORMALLY OPEN TO 21
   NORMALLY CLOSED TO 22

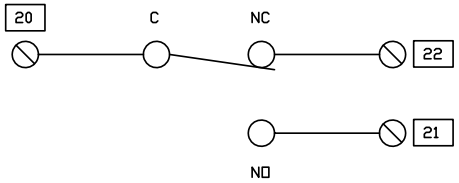
LOCKOUT SWITCH NOTES:

2900 AND 3900 VALVE ALREADY USES THIS SWITCH FOR ITS OPEERATION.
3150 VALVE SYSTEM 4 THIS SWITCH IS ALREADY INSTALLED ON THE VALVE
AND IS AVAILABLE FOR RO LOCKOUT USE.

PN	QTY	DESCRIPTION
MICROSWITCH ASSEMBLY		
A2154001	1	MICROSWITCH VALVE / STAGER RO LOCKOUT
A2083027	2	SCREW 4-40 X 1/2 SELF TAP PHIL MACH
A2490014	1	CAM SHUTOFF VALVE (12777)
A2098012	1	ROLL PIN .09375 X .875 (10338)
A2158001	1	INSULATOR LIMIT SWITCH (10302)
TERMINAL STRIP ASSEMBLY		
A2445043	1	END STOP W / FIXING FLANGE
A2307015	3	TERMINAL BLOCK GRAY 15A 300V
A2457003	2	SCREW 6-32 X 3/8 MACH RD HD SS
A2095048	2	6-32 NUTS SS
A2486021	2	WASHER LOCK #6 SPLIT SS
A2173009	3 FT	WIRE 16 RED

WIRINIG DIAGRAM OF AUXILLIARY SWITCH (5 AMP MAXIMUM)

SWITCH ON NORMALLY CLOSED SIDE DURING SERVICE. NORMALLY OPEN DURING REGENERATION.



REVISIONS			
NO.	DATE	BY	REMARKS

MARLO INCORPORATED

BRINE VALVE CAM SWITCH ADDITION TO TOP MOUNT MULTIPORT VALVE

FRAC.±	DEC. ±	FILE ID.	B1055006
DRN.	JEC	SCALE	NTS
APP'D.		DRAWING NO.	B1055006
DATE	2-3-04	REV.	0

SHEET 1 OF 1

INSTALLATION INSTRUCTIONS

GENERAL INFORMATION

1. Operating pressure range is 30-100 psi. If pressures over 100 psi are encountered, a regulator must be installed.

2. Power requirements are shown on inside cover of the control valve.

3. Standard units are designed to soften unheated water not to exceed 100F. Special valve assemblies are available to handle heated water supplies exceeding 100 F. Consult factory if applicable.

4. Each softener tank is shipped with distributor manifold and control valve preassembled. Take care when uncrating and erecting so that no items are damaged.

5. The distributor assembly has been shipped inside the fiberglass mineral tank. Check to make sure that there is no damage to the riser pipe, baskets, laterals or hub (if applicable).

LOCATE SOFTENER

1. Select a location that is accessible and near a floor drain that has adequate carrying capacity to handle the softener backwash flow (see specification table).

2. Erect the softener tank(s) on a concrete or other firm foundation and level.

3. Position the brine tank according to the illustration and supplementary brine tank information. Keep the brine tank as close as possible to the softener tank(s).

Note: The distance between the softener and brine tanks will affect the brine injector performance, as the distance increases the injector performance decreases. This may cause an inadequate regeneration.

4. A grounded electric receptacle is required for the control valves.

LOADING TANK

1. On Model MGT - 15, 30, 45 and 60 the softening media has been pre-loaded at the factory. Skip this section and go to "Mount Control Valve Assembly".

2. Fill tank(s) 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. Note that these quantities are for each tank. 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 for each tank 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 to system.

8. Repeat instruction steps 1-7 for each softener tank (if applicable).

MOUNT 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. Insert disperser in threaded base of control valve. The threaded base has a groove machined into the inside of the threaded part of the base to allow for the installation of this disperser.

4. Screw 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.

5. Tighten down the control valve to ensure positive o-ring seal at top of tank.

6. Repeat instruction steps 1-5 for each softener tank (if applicable).

INSTALLATION OF CONNECTION PIPING

NOTE:

- Use thread sealing tape on all threaded piping connections.
- Install the piping conforming to federal, provincial, and local codes.
- Union or flanges are recommended at the control valve's inlet, outlet, and drain connections
- To enhance the monitoring of the system's performance sample valves and pressure gauges can be installed at the inlet and outlet piping to each control valve.
- If distance of drain line is over a 10 ft. vertical or 25 ft. horizontal run, increase drain line one pipe size over that provided on the control valve.
- Do not make a direct connection to the drain. Provide an air gap of at least four times the diameter of the pipe to conform to sanitation codes and to permit observation of the flow.
- It is not recommended that an overhead or a long horizontal drain run be used. The increase of backpressure will cause problems when drawing brine.

Caution: All piping must be properly supported. The tank and valve assemblies are not meant to support the connecting piping.

1. Install piping as shown on installation diagram. It is recommended that unions be installed on inlet and outlet connections to facilitate service of unit. Be sure piping is free of thread chips and other foreign matter. The connecting piping should be the same size or larger then the service inlet and outlet of the control valve. On multiple units that are both in service at the same time the common service inlet and outlet headers should be up-sized to accommodate the total flow

2. Verify that the flow arrow stamped on the flow controller is pointing away from the control valve. See installation diagram or valve manual for the location. Install a drain line from backwash control assembly to an appropriate drain using a minimum of elbows. Install a union near the backwash control to facilitate cleaning. **Do not install a valve on the drain line.**

3. Connect the brine line tubing to the softener(s) and to the brine tank. Verify that the brine line tubing is not kinked or restricted.

4. Run flexible tubing from the brine tank over flow fitting to an appropriate, non-elevated, open drain.

START-UP PROCEDURES

Again, make sure all plumbing is complete and tight, including drain line and brine line. Make sure all electrical components, including the communication cables (multi tank systems only) are properly installed and connected.

1. Using a bucket or hose, fill brine tank with water to 2" above salt platform. Do not add salt at this time.

2. Make sure inlet and outlet isolation valves are closed, and then turn on power to the system.

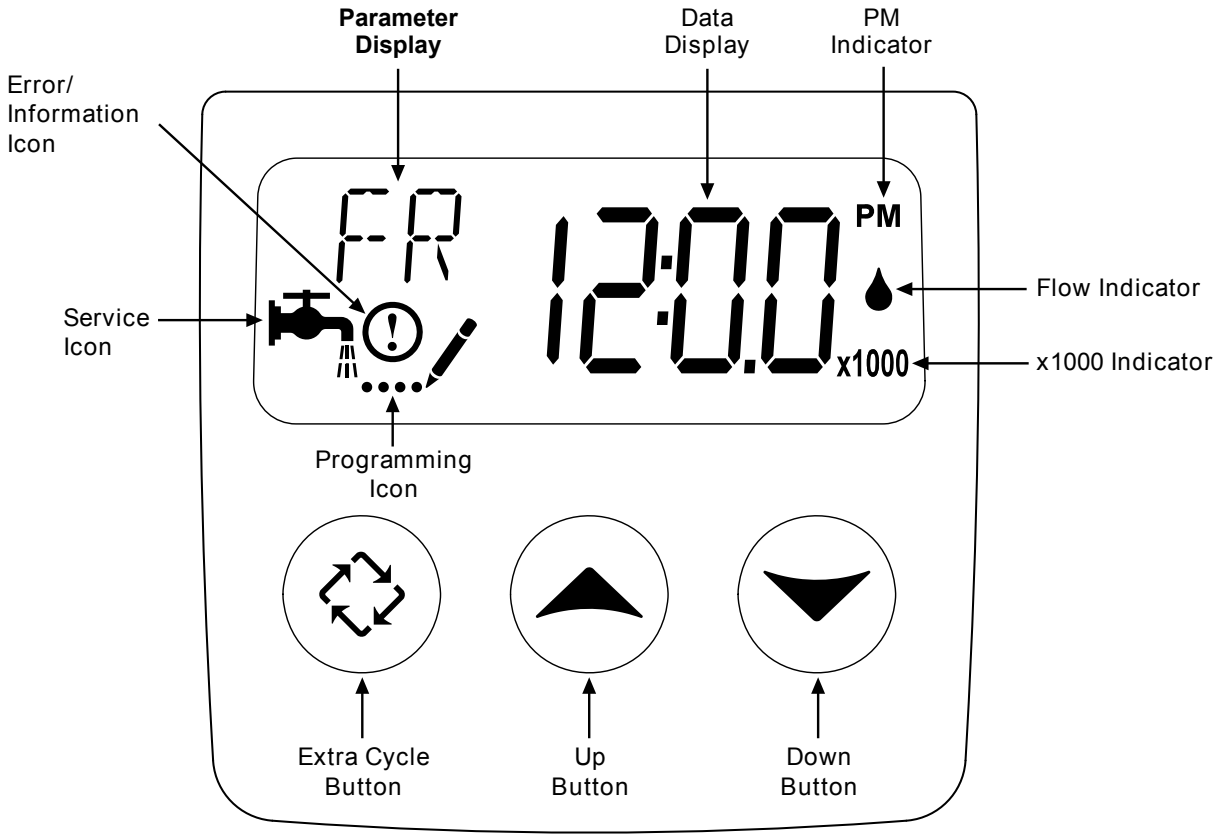
Note: Start up only one (1) tank at a time.

3. Open the manual bypass valve. The manual inlet and outlet valves are to remain closed.

4. Connect electrical power to the control valve by plugging in the valve. Once the valve is powered it will drive to the service position.

5. Program the SXT controller. The water hardness, day override, time of regeneration, and time of day will need to be set on site to the desired settings. (Refer to the User Mode Programming section of the manual.) The softener settings are pre-programmed at the factory. Instructions for changing these settings are in the Master Programming Guide section.
6. Locate the extra regeneration button  on the front side of the timer. Press the button for 5 seconds. The softener control valve will advance to Backwash position. Be patient this will take several minutes.
7. Remove electrical power from unit, and then slowly open inlet water valve approximately half open. Water will begin to fill through bottom distributor into tank. When tank is full, water will begin to flow out of drain line. Slowly open inlet valve until full open. Allow water to flow from drain line for approximately 15 minutes.Warning: Monitor this drain water flow carefully. There is a problem if you see softener resin in the drain water. Turn off inlet water immediately and then consult factory.
8. Restore electrical power to unit. Advance the control valve to Brine Draw / Slow Rinse position, using the same method as step 5. Make sure unit draws water from brine tank. There should also be reduced flow at the drain line.
9. Advance the control valve to the Fast Rinse position. Remove electrical power to the unit. Let water run to drain position for approximately 5 minutes or until water runs clear.
10. Restore electrical power to unit. Advance the control valve to Brine Refill position. Water should begin to refill brine tank. Allow the brine tank to refill until water in salt tank is again 2" above the salt platform. There should be no flow to drain in this valve position.
11. Advance control valve to Service position. Brine tank refill should stop. Open outlet valve and run water at the nearest cold water faucet to the water softener system for
12. Repeat instruction steps 1-10 for each softener tank.
13. Add salt to the brine tank. **Use pelletized or solid salt**, 99.0 – 99.8% pure salt containing less than 0.5% insoluble.
14. Use the test kit provided to check water for softness. Check the water hardness daily the first week in order to establish how often the softener should be regenerated. approximately 5 minutes.

TIMER FEATURES



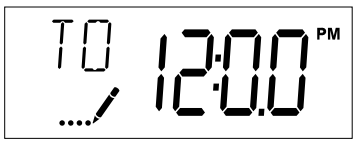
FEATURES OF THE SXT:

- 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.

TIMER FEATURES

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.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.

CONTROLLER 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.

CONTROLLER OPERATION (continued)

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 initiates 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 (backwash), and begins programmed time count down.
3. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #2 (brine draw & slow rinse).
4. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #3 (rapid 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 regener-ation, 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.

TIMER FEATURES

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**	**Entered Values**
DF	Display Format	GAL ╪	Gallons	
		Ltr	Liters	
VT	Valve Type	dF1b ╪	Standard Downflow/Upflow Single Backwash	
		dF2b	Standard Downflow/Upflow Double Backwash	
		Fltr	Filter	
		UFbd	Upflow Brine First	
		UFtr	Upflow Filter	
		Othr	Other	
CT	Control Type	Fd	Meter (Flow) Delayed	
		FI ╪	Meter (Flow) Immediate	
		tc	Time Clock	
		dAY	Day of Week	
NT	Number of Tanks	1	Single Tank System	
		2 ╪	Two Tank System	
TS	Tank in Service	U1 ╪	Tank 1 in Service	
		U2	Tank 2 in Service	
C	Unit Capacity		Unit Capacity (Grains)	
H	Feedwater Hardness		Hardness of Inlet Water	
RS	Reserve Selection	SF ╪	Percentage Safety Factor	
		rc	Fixed Reserve Capacity	
SF	Safety Factor	10	Percentage of the system capacity to be used as a reserve	
RC	Fixed Reserve Capacity		Fixed volume to be used as a reserve	
DO	Day Override		The system's day override setting	
RT	Regen Time		The time of day the system will regenerate	
BW, BD, RR, BF	Regen Cycle Step Times	BW: 10 BD: 10 RR: 10 BF: See Note	The time duration for each regeneration step. Adjustable from OFF and 0-199 minutes. **NOTE: If "Othr" is chosen under "Valve Type", then R1, R2, R3, etc, will be displayed instead**	
D1, D2, D3, D4, D5, D6, & D7	Day of Week Settings		Regeneration setting (On or OFF) for each day of the week on day-of-week systems	
CD	Current Day		The Current day of the week	
FM	Flow Meter Type	t0.7	3/4" Turbine Meter	
		P0.7	3/4" Paddle Wheel Meter	
		t1.0	1" Turbine Meter	
		P1.0	1" Paddle Wheel Meter	
		t1.5	1.5" Turbine Meter	
		P1.5	1.5" Paddle Wheel Meter	
		P2.0	2" Paddle Wheel Meter	
		Gen	Generic or Other Meter - Enter K-value below	
K	Meter Pulse Setting	*	Meter pulses per gallon for generic/other flow meter	

* Refer to programming guide for optional (generic) meter types and K-values
╪ Indicates factory setting

NOTE:

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.

BF Setting: Refer to specification table for recommended cycle times by model #.

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

MASTER PROGRAMMING MODE

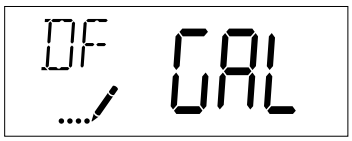
ENTERING MASTER PROGRAMMING MODE

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.

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.

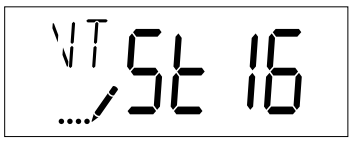
1. **Display Format (Display Code DF)**
   This is the first screen that appears when entering Master Programming Mode. The Display Format setting specifies the unit of measure that will be used for volume and how the control will display the Time of Day. This option setting is identified by "DF" in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

DISPLAY FORMAT SETTING	UNIT OF VOLUME	TIME OF DISPLAY
GAL	U.S. Gallons	12-hour AM/PM
Ltr	Liters	24-Hour
Cu	Cubic Meters	24-Hour



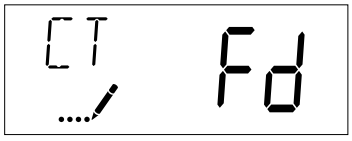
2. **Valve Type (Display Code VT)**
   Press the Extra Cycle button. Use this display to set the Valve Type. The Valve Type setting specifies the type of cycle that the valve follows during regeneration. Note that some valve types require that the valve be built with specific subcomponents. Ensure the 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
Fltr	Filter
UFbF	Upflow Brine First
Othr	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:

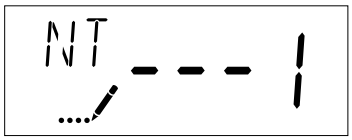
   Meter Delayed: Fd
   Meter Immediate: FI
   Time Clock: tc
   Day of Week: dAY



MASTER PROGRAMMING MODE (continued)

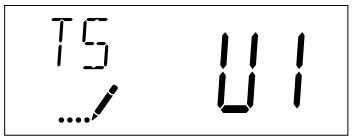
4. **Number of Tanks (Display Code NT)**
   Press the Extra Cycle button. Use this display to set the Number of Tanks in your system. This option setting is identified by "NT" in the upper left hand corner of the screen. There are two possible settings:

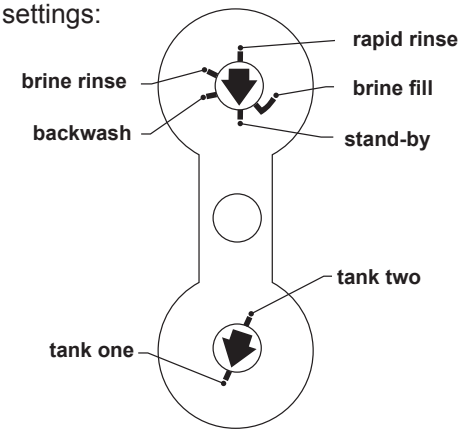
   Single Tank System: 1
   Two-Tank System: 2



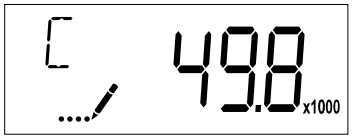
5. **Tank in Service (Display Code TS)**
   Press the Extra Cycle button. Use this display to set whether tank one or tank two is in service. This option setting is identified by "TS" in the upper left hand corner of the screen. This parameter is only available if the number of tanks has been set to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

   Tank One in Service: U1
   Tank Two in Service: U2

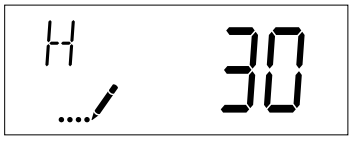




6. **Unit Capacity (Display Code C)**
   Press the Extra Cycle button. Use this display to set the Unit Capacity. This setting specifies the treatment capacity of the system media. Enter the capacity of the media bed in grains of hardness when configuring a softener system, and in the desired volume 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.



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.

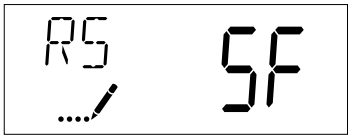


CAUTION: Before entering Master Programming, please contact your local professional water dealer.

MASTER PROGRAMMING MODE (continued)

8. Reserve Selection (Display Code RS)

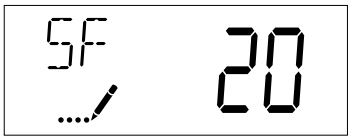
Press the Extra Cycle button. Use this display to set the Safety Factor. Use this display to select the type of reserve to be used in your system. This setting is identified by "RS" in the upper left-hand corner of the screen. The reserve selection parameter is only available if the control type has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



RS	SF - Safety Factor
rc	Fixed Reserve Capacity

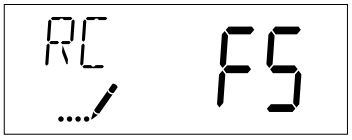
9. Safety Factor (Display Code SF)

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.



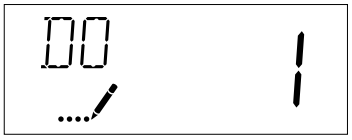
10. Fixed Reserve Capacity (Display Code RC)

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.



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.

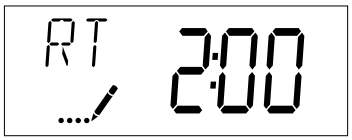


CAUTION: Before entering Master Programming, please contact your local professional water dealer.

MASTER PROGRAMMING MODE (continued)

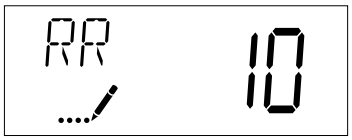
12. Regeneration Time (RT)

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.



13. Regeneration Cycle Step Times

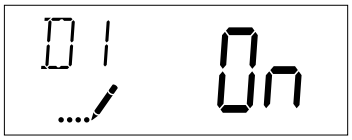
Press the Extra Cycle button. Use this display to set the Regeneration Cycle Step Times. The different regeneration cycles are listed in sequence based on the valve type selected for the system, and are identified by an abbreviation in the upper left-hand corner of the screen. The abbreviations used 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

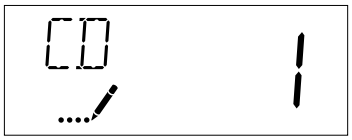
14. Day of Week Settings

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.



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

MASTER PROGRAMMING MODE (continued)

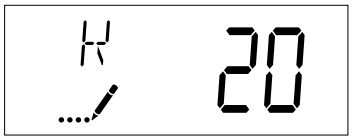
16. Flow Meter Type (Display Code FM)

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
GEn	Generic/Other Meter

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.



K-FACTOR TABLE - SIGNET 2536

(Pulses per Gallon)

PIPE SIZE (inches)	GENERIC FLOW METER SETTINGS		
	TEE GALVANIZED	TEE PVC	SADDLE IRON
1	213	352	
1-1/4	128	177	
1-1/2	94	118	
2	59	67	54
2-1/2		43	38
3		27	23

Note: Make sure to select the proper K-factor for the fitting and pipe size of your system.

AUTO TURBINE METER

METER SIZE	K-FACTOR
1	65
2	15

CLACK METER

METER SIZE	K-FACTOR
1-1/2	37
2	20
3	8

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

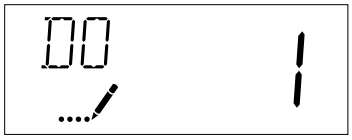
USER PROGRAMMING MODE

USER PROGRAMMING MODE OPTIONS		
ABBREVIATIONS	**PARAMETER**	**DESCRIPTION**
DO	Day Override	The timer's override setting
RT	Regeneration Time	The time of day that the system will regenerate (meter delayed, timeclock, 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

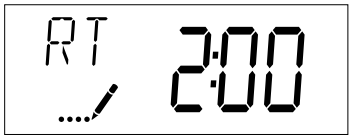
NOTES: Some items may not be shown depending on timer configuration.The timer will discard any changes and exit User Mode if any button is not pressed for sixty seconds.

START-UP

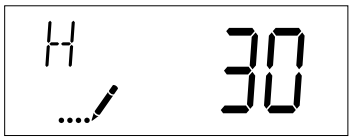
1. Press the Up and Down buttons for five seconds while in service, and the time of day is NOT set to 12:01 PM.
2. Use this display to adjust the Day Override. This option setting is identified by "DO" in the upper left hand corner of the screen.



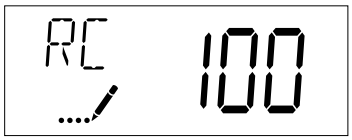
3. Press the Extra Cycle button. Use this display to adjust the Regeneration Time. This option setting is identified by "RT" in the upper left hand corner of the screen.



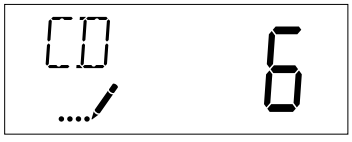
4. Press the Extra Cycle button. Use this display to adjust the Feed Water Hardness. This option setting is identified by "FH" in the upper left hand corner of the screen.



5. Press the Extra Cycle button. Use this display to adjust the Fixed Reserve Capacity. This option setting is 18 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.

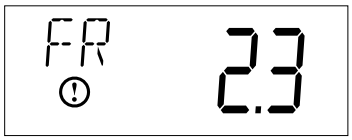
DIAGNOSTIC PROGRAMMING MODE

DIAGNOSTIC PROGRAMMING MODE OPTIONS		
ABBREVIATIONS	**PARAMETER**	**DESCRIPTION**
FR	Flow Rate	Displays the current outlet flow rate
PF	Peak Flow Rate	Displays the highest flow rate measured since the last regeneration
HR	Hours In Service	Displays the total hours that the unit has been in service
VU	Volume Used	Displays the total volume of water treated by the unit
RC	Reserve Capacity	Displays the system's reserve capacity calculated from the system capacity, feedwater hardness, and safety factor
SV	Software Version	Displays the software version installed on the controller

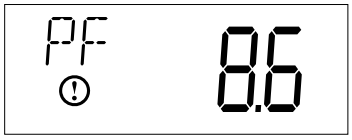
NOTES: Some items may not be shown depending on timer configuration.The timer will discard any changes and exit User Mode if any button is not pressed for sixty seconds.

Diagnostic Programming Mode Steps

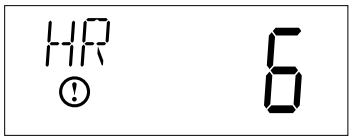
1. Press the Up and Extra Cycle buttons for five seconds while in service.
2. Use this display to view the current Flow Rate. This option setting is identified by "FR" in the upper left hand corner of the screen.



3. Press the UP button. Use this display to view the Peak Flow Rate since the last regeneration cycle. This option setting is identified by "PF" in the upper left hand corner of the screen.



4. Press the UP button. Use this display to view the Hours in Service since the last regeneration cycle. This option setting is identified by "HR" in the upper left hand corner of the screen.



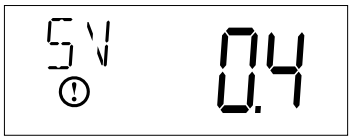
5. Press the UP button. Use this display to view the Volume Used since the last regeneration cycle. This option setting is identified by "VU" in the upper left hand corner of the screen.

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

DIAGNOSTIC PROGRAMMING MODE

6. Press the Up button. Use this display to view the Reserve Capacity. This option setting is identified by “RC” in the upper left hand corner of the screen.

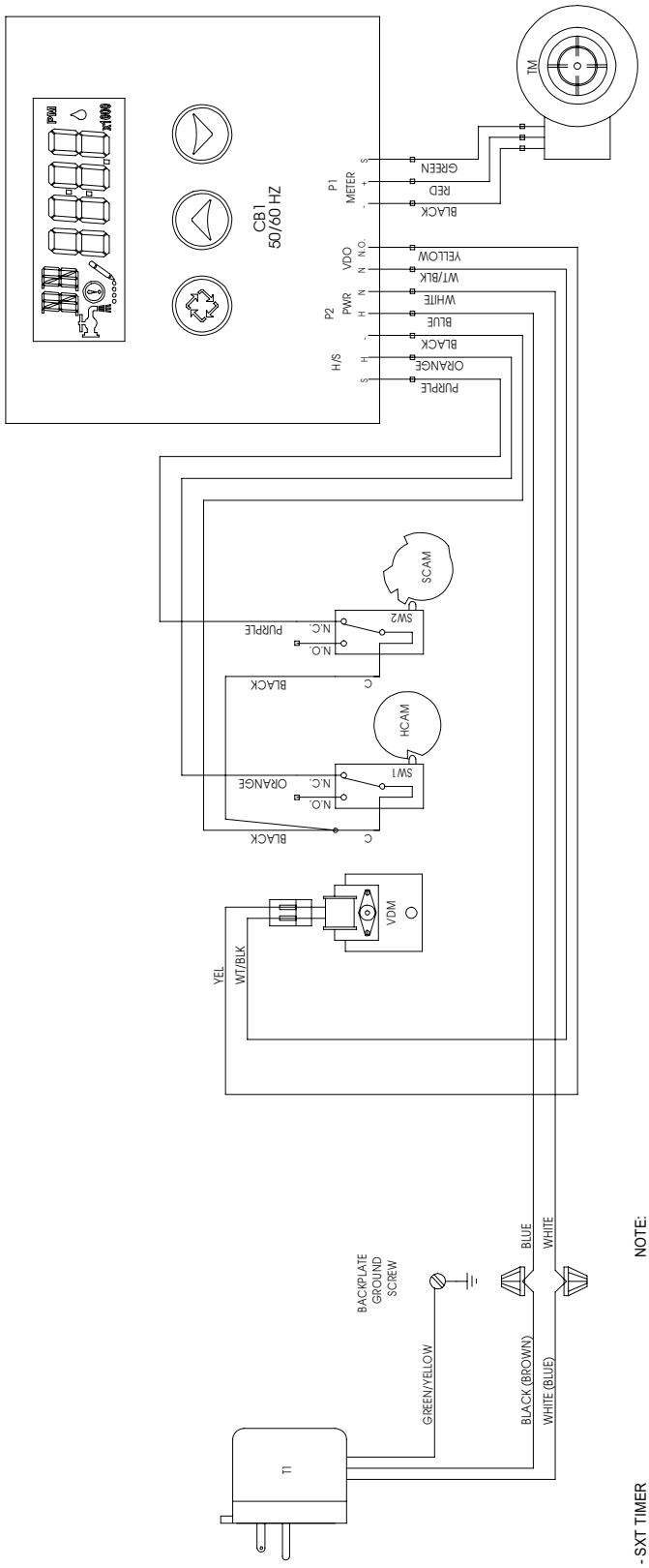
7. Press the Up button. Use this display to view the Software Version. This option setting is identified by “SV” in the upper left hand corner of the screen.



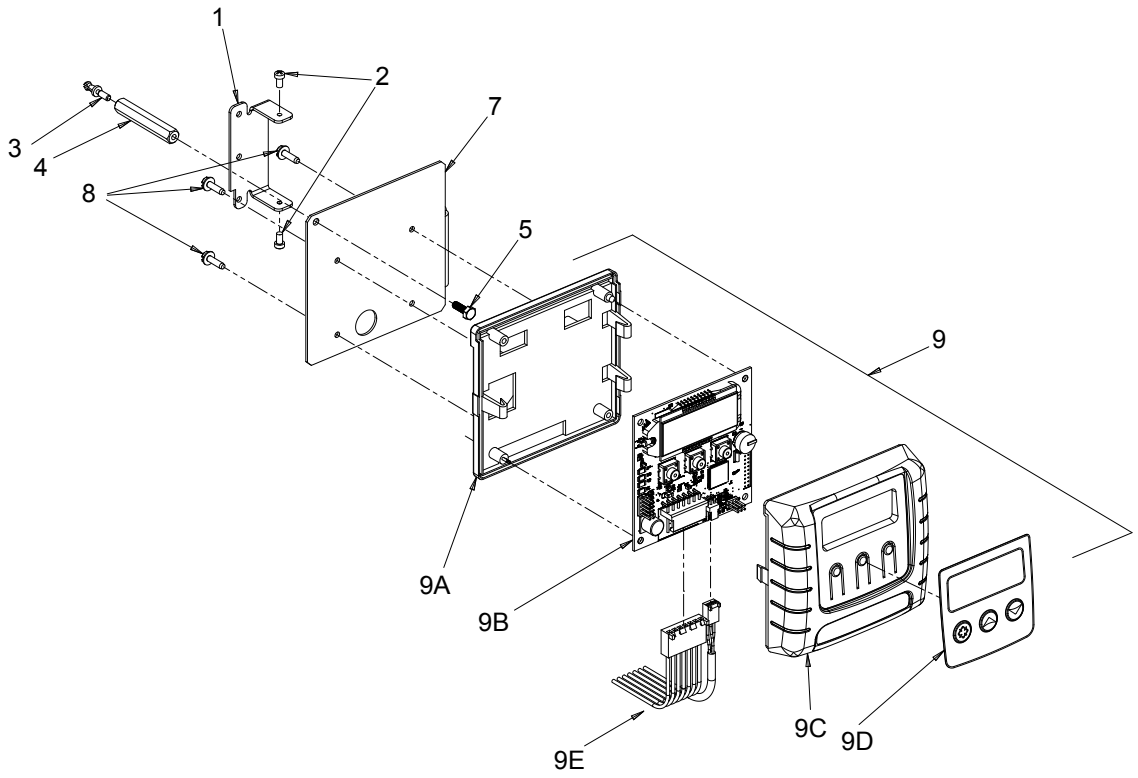
8. Press the Extra Cycle button to end Diagnostic Programming Mode.

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

2510 SXT WIRING DIAGRAM

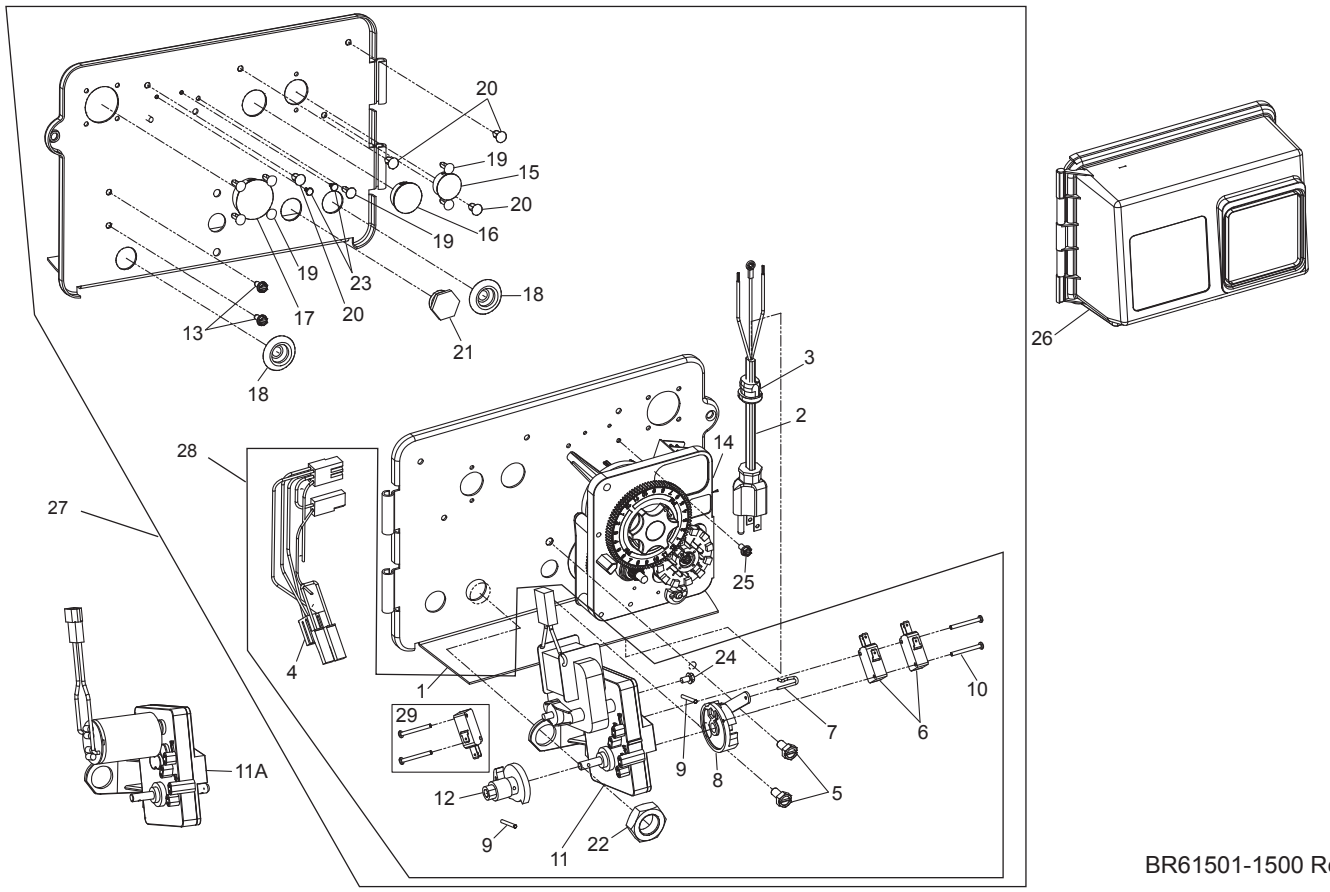


2510/2750/2850S TIMER ASSEMBLY



Item No.	QTY	Part No.	Description
1	1	13881	Bracket, Hinge Timer
3	1	14265	Clip, Spring
4	1	27172	Stand-off, Timer, 2510SXT, 2750SXT
5	1	21363	Screw, Hex HD, M4 X 12 MM
7	1	27168	Bracket, Timer, 2510SE/2750SXT
8	3	13296	Screw, Hex Washer, 6-20 X 1/2
9	1	42778	Timer, SXT, 2510/2750, DF
9A	1	19889	Housing, Circuit Board
9B	1	42196	Circuit Board, SXT
9C	1	42635-01	Cover, Front, SXT, Square
9D	1	42637	Label, Display, SXT
9E	1	42864	Wire Harness, SXT

POWERHEAD ASSEMBLY (ENVIRONMENTAL)



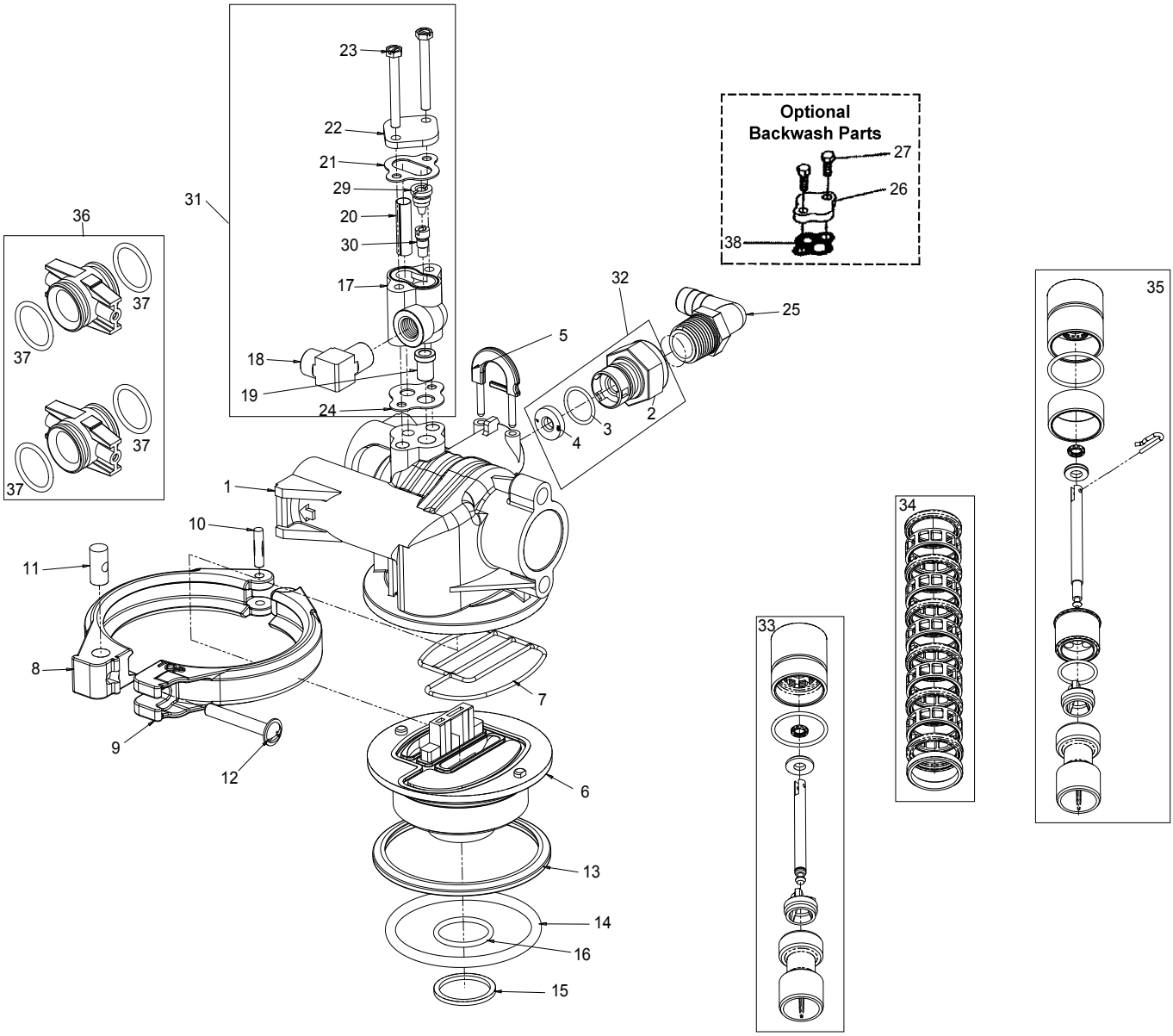
BR61501-1500 Re

Item No.	QTY	Part No.	Description
1	1	18697-15	Backplate, Hinged
2	1	19674	Transformer, 24V, 9.6VA
		19303-01	Power Cord, 6', Austrailian
		19885-01	Power Cord, 6', Japanese
		11545-01	Power Cord, 6', European
3	1	13547	Strain Relief, Cord
4	1	40400	Harness, Drive Designr/Envirmtl
5	2	10231	Screw, Slot Hex 1/4-20 x 1/2 35 IN-LBS ±20%
6	2	10218	Switch, Micro
7	1	10909	Pin, Connecting Rod Spring
8	1	60160-15	Drive Cam Assy, STF, Blue, 2900
9	2	10338	Pin, Roll, 3/32 x 7/8
10	2	14923	Screw, Pan Hd MACH, 4-40 x 1 5.0 IN-LBS ±10%
11A		42579	Motor, Drive, 24 VAC/DC, 50-60 Hz, Fam 1
12	1	12777	Cam, Shut-off Valve
13	2	10300	Screw, Hx Wash Head, 8 x 3/8 20 IN-LBS ±20%
14	1	SXT	Timer Assy
15	1	15806	Hole Plug, (HeyCo)

Item No.	QTY	Part No.	Description
16	1	16493	Plug, Hole, HeyCo, .88 Dia
17	1	17421	Plug, 1.20 Hole
18	2	19691	Plug, .750 Dia. Hole, Flush
19	7	19800	Plug (Hole Size: Dia .140)
20	4	19801	Plug, Dia .190
21	1	10712	Fitting, Brine Valve (Used on Filter Valves)
22	1	10269	Nut, Jam, 3/4-16 (Used on FII Valves) Wrench Tighten
23	2	41581	Plug, Hole .125 Dia, White
24	1	10872	Screw, Hex WSH, 8-32 x 5/16 20 IN-LBS ±20%
25	1	14202-01	Screw, Hex Washer #8-32 x 5 Hand Tighten
26	1	60219-02	Cover Assy, Environmental, Black, Clear Window
27	1	*	Powerhead Assembly
28	1	60050-23	Drive Motor Assy, 24 VAC/DC 50-60 Hz FAM 1
29		60320-12	Switch Kit, 1500-2850 Drive

*Call your distributor for Part Number

2510 CONTROL VALVE BODY



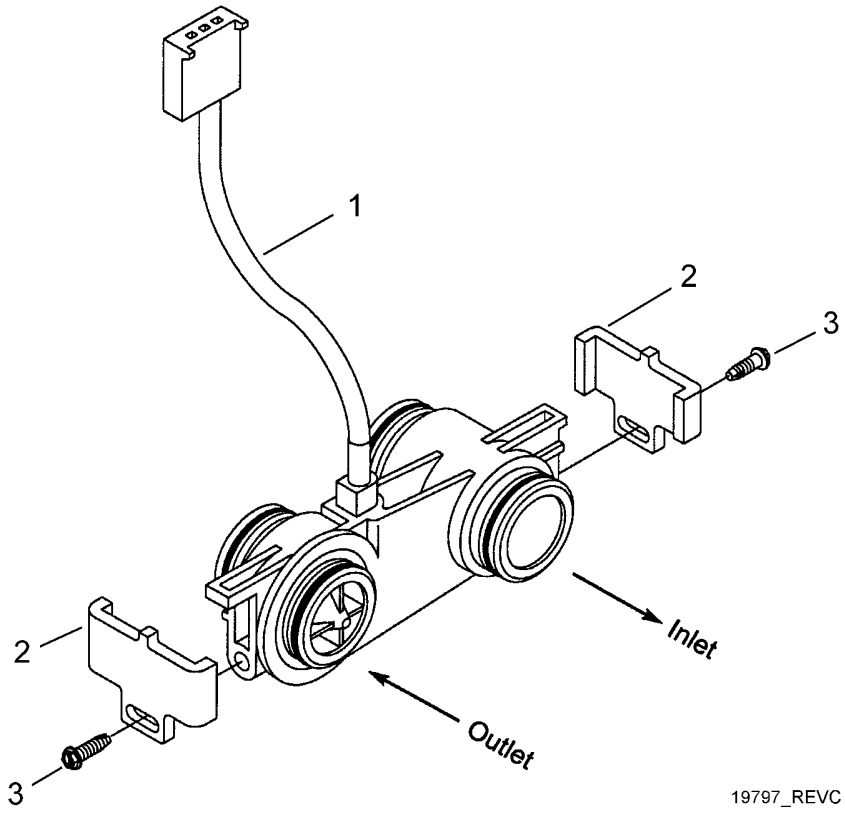
2510 CONTROL VALVE PARTS LIST

Item No.	QTY	Part No.	Description
1	1	19328	Valve Body, 2510
2	1	11385-01	Housing, Flow Control, Plastic
3	1	11183	O-ring, -017
4	1	12408	Washer, Flow, 7.0 GPM
5	1	18312	Retainer, Drain
6	1	19322	Adapter Base, 2510
7	1	19936	Seal, 2510, Base
8	1	19899	Clamp, Female, 2510
9	1	19900	Clamp, Male, 2510
10	1	40000	Pin, Hinge, Clamp
11	1	19998	Pivot, Clamp, 2510
12	1	40057	Screw, Comb Hd, 114-20, 2"
13	1	19197	Ring, Slip
14	1	18303	O-ring, -336
15	1	13030	Retainer, Dist Tube, O-ring
16	1	13304	O-ring, -121
17	1	17776	Body, Injector, 1600
18	1	10328	Fitting, Elbow, 90 Deg. 1/4" NPT x 3/8" Tube
19	1	16221	Disperser, Air
20	1	10227	Screen, Injector
21	1	10229	Gasket, Injector Cap, 1600
22	1	11893	Cap, Injector, SS
23	2	10692	Screw, Slot Hex Hd, 10-24 x 1-5/8"
24	1	14805	Gasket, Injector Body, 1600/1700
25	1	12338	Fitting, Elbow, 90 Deg. 1/2" NPT x 1/2" Barb
26	1	11893	Cap, Injector, Stainless Steel
		10228	Cap, Injector, Brass
27	1	15137	Screw, Hex Wsh Mach, 10-24 x 3/8
28	1	10757	Spacer, End
29	1	12973-0	Nozzle, Injector, #0, PVC
		12973-1	Nozzle, Injector, #1, PVC
		12973-2	Nozzle, Injector, #2, PVC
		12973-3	Nozzle, Injector, #3, PVC
		12973-4	Nozzle, Injector, #4, PVC
		10913-000	Nozzle, Injector, #000 Brown
		10913-00	Nozzle, Injector, #00 Violet
		10913-0	Nozzle, Injector, #0 Red
		10913-1	Nozzle, Injector, #1 White
		10913-2	Nozzle, Injector, #2 Blue
		10913-3	Nozzle, Injector, #3 Yellow
		10913-4	Nozzle, Injector, #4 Green
30	1	12974-0	Throat, Injector, #0, PVC
		12974-1	Throat, Injector, #1, PVC
		12974-2	Throat, Injector, #2, PVC
		12974-3	Throat, Injector, #3, PVC
		12974-4	Throat, Injector, #4, PVC
		10914-000	Throat, Injector, #000 Brown
		10914-00	Throat, Injector, #00 Violet
		10914-0	Throat, Injector, #0 Red
		10914-1	Throat, Injector, #1 White
		10914-2	Throat, Injector, #2 Blue
		10914-3	Throat, Injector, #3 Yellow
		10914-4	Throat, Injector, #4 Green

Item No.	QTY	Part No.	Description
31	1	60480-000	Injector Assy, 1600 #00, Plastic
		60480-00	Injector Assy, 1600 #0, Plastic
		60480-01	Injector Assy, 1600 #1, Plastic
		60480-02	Injector Assy, 1600 #2, Plastic
		60480-03	Injector Assy, 1600 #3, Plastic
		60480-04	Injector Assy, 1600 #4, Plastic
32	1	60705-00	DLFC, Plastic Blank
		60705-06	DLFC, Plastic 0.60 gpm
		60705-08	DLFC, Plastic 0.80 gpm
		60705-10	DLFC, Plastic 1.0 gpm
		60705-12	DLFC, Plastic 1.2 gpm
		60705-13	DLFC, Plastic 1.3 gpm
		60705-15	DLFC, Plastic 1.5 gpm
		60705-17	DLFC, Plastic 1.7 gpm
		60705-20	DLFC, Plastic 2.0 gpm
		60705-24	DLFC, Plastic 2.4 gpm
		60705-30	DLFC, Plastic 3.0 gpm
		60705-35	DLFC, Plastic 3.5 gpm
		60705-40	DLFC, Plastic 4.0 gpm
		60705-45	DLFC, Plastic 4.5 gpm
		60705-50	DLFC, Plastic 5.0 gpm
		60705-60	DLFC, Plastic 6.0 gpm
		60705-70	DLFC, Plastic 7.0 gpm
		60706-8.0	DLFC, QC x 3/4"F, 8.0 gpm
		60706-9.0	DLFC, QC x 3/4"F, 9.0 gpm
		60706-10	DLFC, QC x 3/4"F, 10 gpm
		60706-12	DLFC, QC x 3/4"F, 12 gpm
		60706-15	DLFC, QC x 3/4"F, 15 gpm
		60706-20	DLFC, QC x 3/4"F, 20 gpm
33	1	60090	Piston Assy, 1500, 2510, 2750
34	1	60121	Seal Kit, 1500, 2510, 2750
	1	60121-10	Seal and Spacer Kit, 2510, 2750, Silicone
35	1	60101-01	Piston Assy, NHWBP
36	2	19228-01	Adapter Assy, Coupling w/O-ring
37	4	13305	O-ring, -119
38	1	14805	Gasket, Injector Body, 1600/1700
Not Shown			
	1	11098	Stuffer Tool Assy, 2510/2750
	1	13061	Puller Assy, Port Ring 2510/2750
	1	12874	Hook, Seal

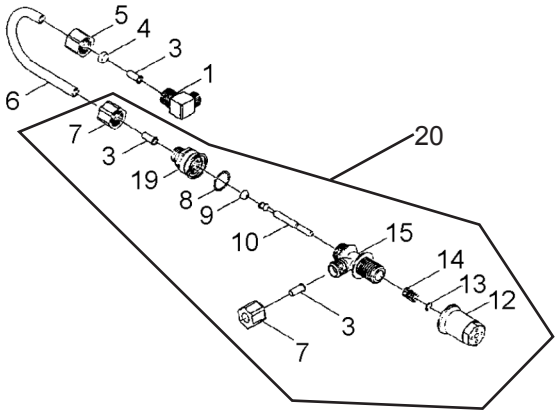
NOTE: For optimal seal life, the use of lubricants is not recommended.

3/4” TURBINE METER



Item No.	Quantity	Part No.	Description
1	1	19791-01	Meter Cable Assy, Turbine/SXT
2	2	19569	Clip, Flow Meter
3	2	13314	Screw, Slot Ind Hex, 8-18 x .60

1650 BRINE SYSTEM



Item No.	Quantity	Part No.	Description
60011 Brine Valve Assembly, Includes Items 3-15 (Less BLFC 60010-)			
1	1	10328	Elbow, 90 1/4 NPT x 3/8
3	3	10332	Insert, 3/8
4	1	10330	Sleeve, 3/8 Nut Brine
5	1	10329	Tube Fitting, 3/8 Nut Brine
6	1	40027	Tube, Brine Valve
7	2	19625	Assy., GFN Nut
8	1	16924	O-ring
9	1	12626	Seat, Brine Valve
10	1	12552	Brine Valve Stem, 1600
12	1	17906	Guide, Brine Valve Stem
13	1	10250	Retaining Ring
14	1	10249	Spring, Brine Valve
15	1	17884	Brine Valve Body Assy., Plastic
19	1	60010-xx	BLFC Assy.
20		60011-010	Brine Valve, 1650, Short Stem, 0.25 gpm
		60011-020	Brine Valve, 1650, Short Stem, 0.50 gpm
		60011-030	Brine Valve, 1650, Short Stem, 1.00 gpm

60010-25 BLFC Assy. (Parts)

1	17907	Housing
1	12128	.25 GPM Label
1	12094	.25 Flow Washer
1	12098	Retainer

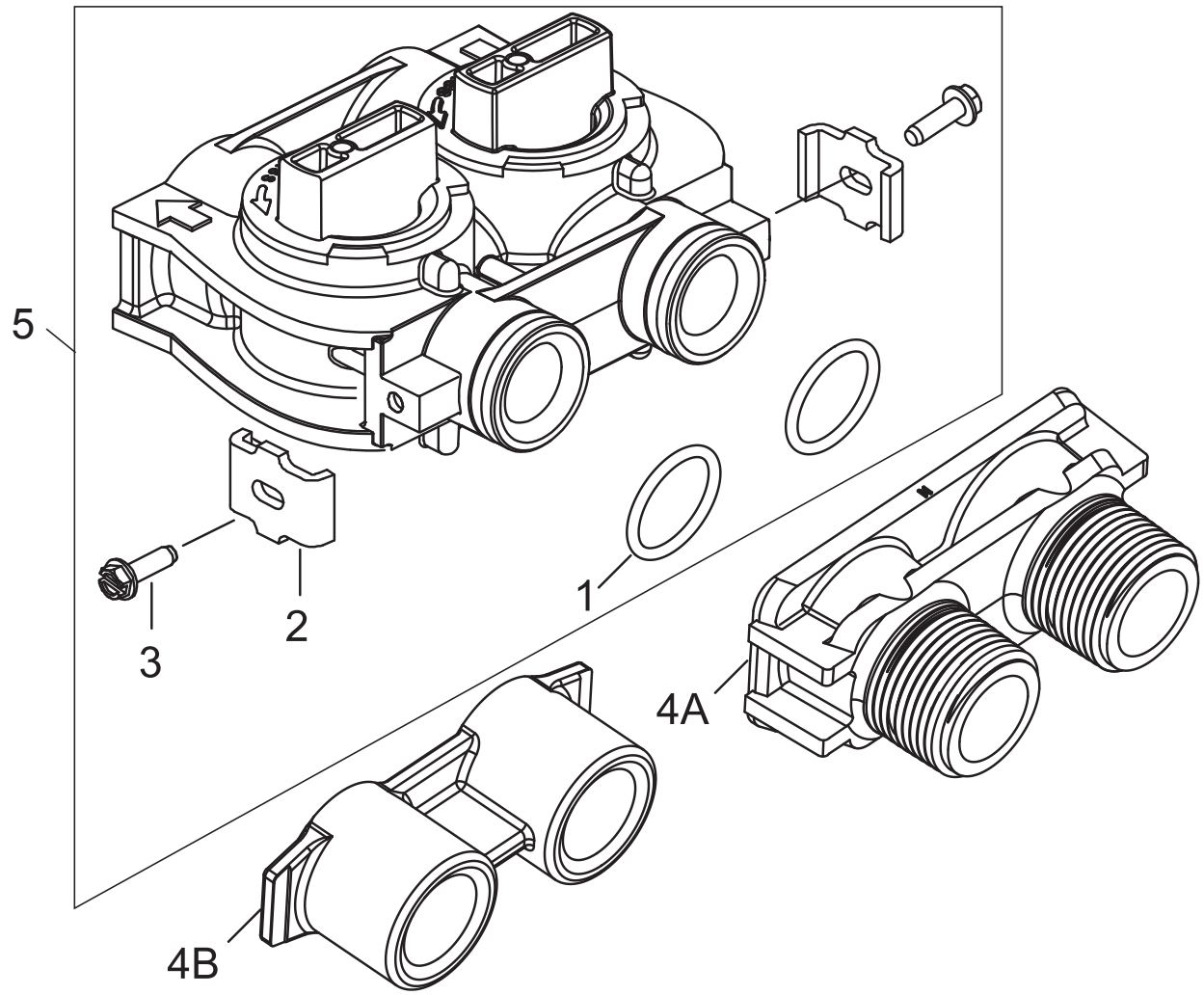
60010-50 BLFC Assy. (Parts)

1	17907	Housing
1	10759	.50 GPM Label
1	12095	.50 Flow Washer
1	12098	Retainer

60010-100 BLFC Assy. (Parts)

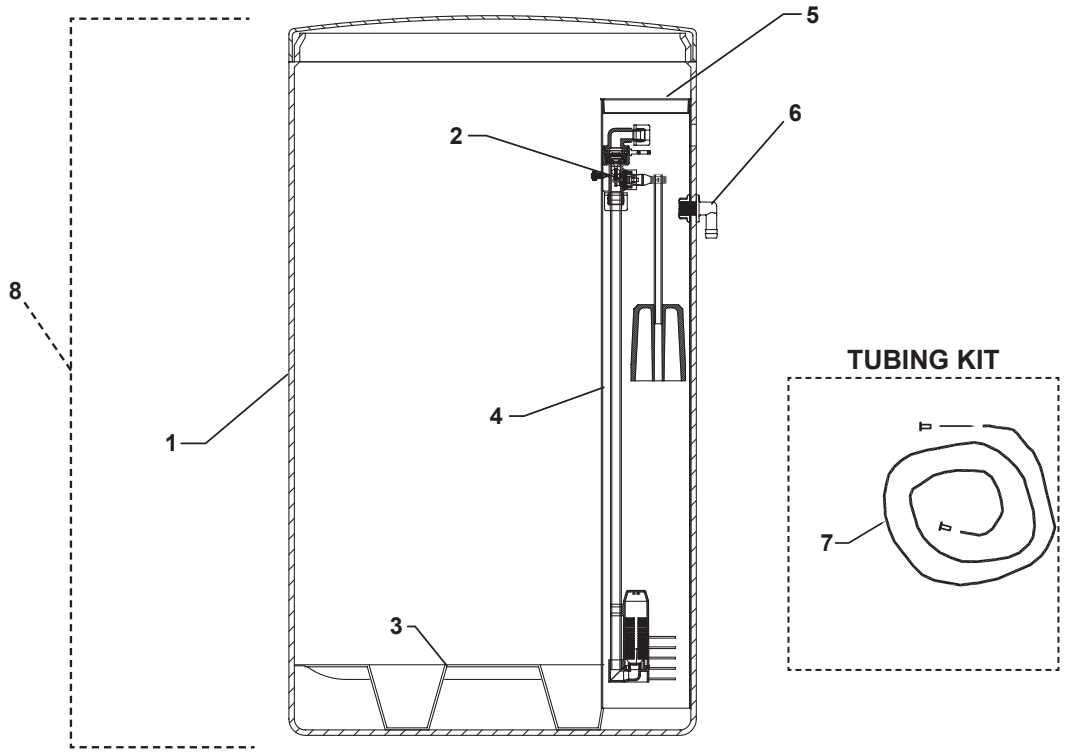
1	17907	Housing
1	10760	1.0 GPM Label
1	12097	1.0 Flow Washer
1	12098	Retainer

BYPASS VALVE ASSEMBLY (PLASTIC)



Item No.	QTY	PartNo.	Description
1	2	13305	O-ring, -119
2	2	13255	Clip, Mounting
3	2	13314	Screw, Slot Ind Hex, 8-18 x .60
4B	1	41027-01	Yoke, 3/4", NPT, Cast, Machined
5	1	60049	Bypass Plastic - Optional (Not Included)

BRINE SYSTEM FOR MGT 15M-30M



Item Number	Description	Part Number
1	Brine Tank 18” x 33” / Black Molded Cover - MGT-15M-30M	A2042020
2	Brine Safety Valve Assembly 3/8”	A2005058
3	3” Grid Plate - Plastic - MGT 30M	A2284017
4	Slotted Brine Well - 4” x 28” - MGT 15M-30M	A2071005
5	4” Brine Well Cap	A2118010
6	1/2” Overflow Elbow w/ Nut	A2165007
7	3/8” x 1/4” Tubing Kit	A2207018
8	Complete Brine Tank Assembly for MGT 15M-30M	A2042062

SERVICE ASSEMBLIES

BRINE VALVES

B1042011	Model 1600 brine valve assy. - 0.25 GPM
B1042012	Model 1600 brine valve assy. - 1 GPM

BRINE LINE FLOW CONTROLS

A2389001	BLFC .25 GPM
A2389002	BLFC .50 GPM
A2389004	BLFC 1.0 GPM

COVERS

A2103095	Environmental Cover

CAM ASSEMBLY

60160-15	Drive Cam Assy, STF, Blue

PISTON ASSEMBLIES

60090	Piston Assy 1500,2510, 2750

SEAL & SPACER KITS

A2435025	Seal and Spacer Kit

SERVICE EQUIPMENT

A2475001	Seal & Spacer stuffer tool upper
A2474001	Spacer puller tool upper
A2423002	Silicone, 2 oz. Tube

TROUBLESHOOTING

ERROR CODES

NOTE: Error codes appear on the In Service display.

ERROR CODE	PROBABLE CAUSE	RECOVER & RESETTING
[Err0]	Drive motor is stalled	Unplug the unit from the power source[
[Err1]	Drive motor is running continuously	When power is restored to the unit, the Err _ display code clears. If the condition causing the error has not been resolved the Err _ code reappears in the four digit display. Do not at-tempt to troubleshoot this problem any further.
[Err2]	There have been more than 99 days since the last Regeneration. If the Day of the Week mode of regeneration is selected and days since last regeneration exceeds 7 days. **[7 - - 5]:** There have been more than 7 days since the last regen-eration. All individual settings (d1, d2, d3, d4, d5, d6, d7) are set to 0.	Regeneration must occur for the unit to recover, the display to clear and the valve to function normally. **[7 - - 5]:** To recover from [Err2], the user must initiate a regeneration or set at least one individual day to 1.
[Err3]	Control board memory failure.	Perform a Master Reset. If the error returns, do not attempt to troubleshoot this problem any further.

ERROR DISPLAY EXAMPLE

NOTE: Unit will flash when error exists.

TROUBLESHOOTING VALVE

PROBLEM	CAUSE	CORRECTION
1. Softener 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 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.
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 No. 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 Conditioner.	B. Clean Control and Add Mineral Cleaner to Mineral Bed. Increased 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 Regeneration. Increase Backwash Time.

TROUBLESHOOTING VALVE (CONTINUED)

PROBLEM	CAUSE	CORRECTION
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.
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. Misadjusted, 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 Programming 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.

MARLO INCORPORATED®
2227 South Street • P.O. Box 044170 • Racine, WI 53404-7003
Ph. (262) 681-1300 • Fax (262) 681-1318 • Info@Marlo-Inc.com • www.Marlo-Inc.com