
PILOT STUDY PROTOCOL PROPOSAL

Ion Exchange Nitrate Removal System Treatment Process

Serving Delhi, OK

Sponsored by Beckham County RWD # 2

For Approval By

Oklahoma Department of Environmental Quality

April 2020



Contents

A.	General.....	2
1.	Current Situation	2
2.	Geography	2
3.	Water Source.....	2
B.	Objective	3
1.	Goal.....	3
2.	Deliverables	Error! Bookmark not defined.
C.	Background	3
1.	Need and Proposed Treatment Process	3
2.	Plumbing Layout	4
D.	Ion Exchange System	5
1.	Make and Model	5
2.	Certifications and Verifications	5
3.	Resin	5
4.	Preconditioning Procedures	6
5.	Installation and Testing of the Ion Exchange as per Manufacturer	6-8

Appendix

1. Ion Exchange Specifications
2. Manufacturers Data
3. Process Drawings

A. General:

1. Current Situation

Beckham County has high concentration of nitrates in their groundwater that exceed 10 PPM that needs to be treated before it treatment can be distributed as potable drinking water to the public. At the request of Delhi and Beckham County RWD # 2, ODEQ has placed this project on the Drinking Water State Revolving Fund (DWSRF) Project Priority List of projects to receive funding.get funded. The assigned project number is P40-2000510-01. Beckham County RWD # 2 is working with ODEQ and Delhi to possibly take over the Delhi Water System if a cost-effective treatment solution can be accomplished. Beckham County RWD # 2 and Cardinal Engineering are proposing a nitrate treatment pilot study to obtain funding for the construction necessary to supply water to the community of Delhi, OK.

2. Geography

Delhi is a town located in Beckham County, Oklahoma. Delhi is located 35°10'29"N 99°40'35"W. Beckham County is approximately 904 mi².

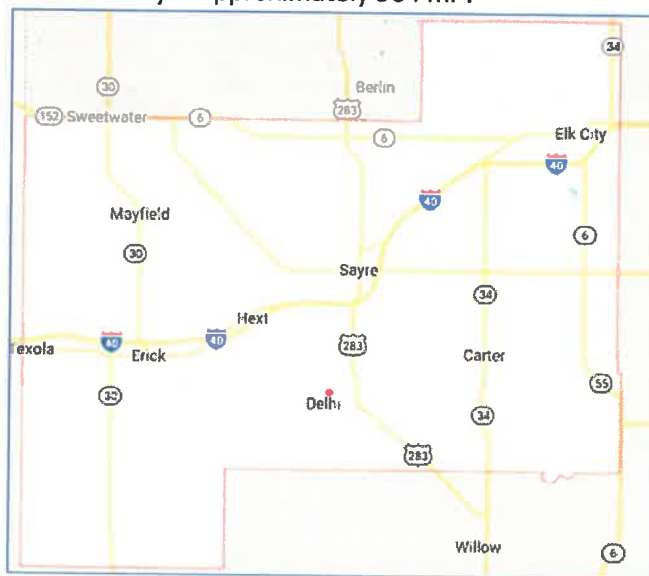


Figure 1: Location Map - Photo of Delhi, OK obtained from Google Earth

Delhi serves about 23 residential users and a few pasture taps around the Delhi community. RWD # 2 Beckham County serves most of the rural area surrounding Delhi.

3. Water Source

The public water system for the town of Delhi operates under PWSID Number OK200510. The water source is ground water from a well that produces 22 GPM. The groundwater is produced from an alluvium aquifer of the North Fork of the Red River. The well is located in the NW 1/4 of Section 6 T8N R23W about 2 miles north of Delhi.

B. Objectives:

1. **Goal:**

The goal and objective of Beckham County RWD # 2 and Delhi is to find a cost-effective treatment process and secure funding to construct a treatment facility to treat the influent nitrates from the community of Delhi water supply.

2. **Deliverables:**

The pilot study report will determine if the proposed Ion Exchange treatment system will meet the minimum nitrate removal for Delhi to comply with EPA and DEQ drinking water standards.

C. Background:

1. **Need and Proposed Treatment Process:**

On June 28, 2016, DEQ performed a routine inspection of the Delhi, OK public water supply. During the inspection, DEQ personnel collected a sample of the water for a nitrate analysis. The results contained 13.8 milligrams per liter (mg/l), which exceeds the maximum contaminated level (MCL) of 10.0 (mg/l). Over the next year the water source was tested several more times and each time had failed to meet the maximum nitrate concentration level of 10 PPM. On April 3, DEQ issued a Notice of Violation to the respondent requiring that the violations be corrected within fifteen days of receiving it. The respondent agreed to the terms of a subsequent consent order on July 12, 2017. Based on the Consent Order issued the respondent agreed to bring the existing well up to drinking water standards and to come within compliance by 8/4/17. This of course has not occurred.

Beckham County RWD # 2 is planning to sponsor this Pilot Plant Treatment Study to assist the small community of Delhi, OK. As stated previously, ODEQ has placed this project on the DWSRF Project Priority List for a loan of \$850,000 due to the NOV and Consent Order. The Notice of Violation states that the potable water source has a high concentration of nitrates and Delhi is responsible for reducing the concentrations to compliance levels. The purpose of the studying is to determine if the well water is conducive to treatment with the small scale Ion Exchange Treatment System to meet DEQ and EPA drinking water standards. When the permanent project is funded, Beckham County RWD # 2 and Delhi will construct a nitrate treatment facility in a separate building beside the existing well house along with a lagoon to handle the waste stream.

Beckham County RWD # 2, the community of Delhi, and Cardinal Engineering are proposing to implement an Ion Exchange Nitrate Removal System manufactured by Crystal Quest, a company in Florida, to remove nitrates from the influent raw water. The proposed Ion Exchange system will treat up to 60 gpm, the 22 GPM system based on average water usage will generate approximately 37.5 Gallons of wastewater per day. A trailer mounted portable poly tank will be located onsite to store the wastewater produced. During the proposed 7 day pilot study approximately 265 gallons of

wastewater will be produced and collected. This wastewater will be taken to a local wastewater disposal well at the expense of the Owner.

It is proposed to conduct the pilot study at the existing well facility. This pilot study will last a minimum of seven days while the proposed Ion Exchange Nitrate Removal System is placed in operation. Beckham County RWD # 2 and Delhi will collect data under the guidance of Cardinal Engineering for the following constituents:

1. Influent and effluent water flow rate – Water Operator, under supervision of the Engineer, will take flowrate readings from a flowmeter installed on the process piping as shown on the attached piping drawings
2. Backwash flow rate – Backwash performed during the pilot study will also be metered and wastewater sent to the trailer mounted poly wastewater tank.
3. Influent and Effluent Nitrate Concentration: The Water Operator, under supervision of the Engineer, will obtain bottles from State approved Lab, collect daily during the pilot study and submit to the State Certified lab for testing.
4. Influent and effluent pH Level – The Water Operator, under supervision of the Engineer, will utilize a Hach test kit to sample pH of raw water daily. The operating pH parameters for the this Ion Exchange system is 4.5 – 8.
5. Influent and effluent hardness - Water Operator, under supervision of the Engineer, will obtain bottles from State approved Lab, collect daily and submit to lab for testing.
6. Influent and effluent alkalinity - Water Operator, under supervision of the Engineer, will obtain bottles from State approved Lab, collect daily and submit to lab for testing.

The constituents listed above will be compiled into *Table 1: Water Testing Quality Testing Results* show below:

Table 1: Water Quality Testing Results

Date	Influent Raw Water Source					Effluent Treated Water					
	Flow Rate GPM	pH	Alkalinity mg/L	Total Hardness mg/L	Nitrate mg/L	Flow Rate GPM	pH	Alkalinity mg/L	Total Hardness mg/L	Nitrate mg/L	Backwash Rate GPM
Day 1											
Day 2											
Day 3											
Day 4											
Day 5											
Day 6											
Day 7											

The purpose of the collection of this data is to observe the effect of the Ion Exchange Nitrate Removal System for treatment of nitrates in the raw water source. An analysis will be performed on the following:

1. Effect on nitrate levels
2. Effect on hardness levels
3. Backwash and regeneration sequences to meet treatment objectives

The goal of this pilot study is for DEQ to provide the community of Delhi a construction permit to build a new small scale nitrate treatment facility, provided that the pilot study shows that the treated effluent water meets both the Environmental Protection Agency (EPA) and Oklahoma Department of Environmental Quality (DEQ) drinking water standards. A set of plans and specifications will be provided by Cardinal Engineering for ODEQ's approval for construction permitting.

2. Plumbing Layout:

The existing well pumps into both distribution and subsequently to a standpipe south of the community of Delhi. We are proposing to temporarily change existing piping as indicated on the drawings to plumb the proposed Ion Exchange system. This will accommodate proper flow measurements, testing, and sampling of water. The rejected effluent discharge from the Ion Exchange system will be plumbed to fill the proposed temporary poly tank on a storage trailer for rejected water to be hauled to a disposal well after the pilot study. Reference the *attached drawings* to view the layout of proposed system plumbing that is to be installed.

D. Ion Exchange System:

1. Make and Model

The Ion Exchange manufacturer is Crystal Quest Water Filters and the model number is CQE-CO-02086. The proposed system has timer control valves, heavy duty composite fiberglass tank, heavy duty brine tank, and all-brass motor drive control valve with fully adjustable regeneration cycles. The system uses a Crystal Quest 2900 2 control head. The system has a self-adjusting backwash controller and flow controller to limit the backwash flow. Some benefits of using this Ion Exchange system compared to other systems are reduced water consumption, reduced salt usage, and it is engineered for commercial and industrial use as compared to a residential system.

2. Certifications and Verifications:

It is reported by the manufacturer that these small scale Nitrate Removal Ion Exchange systems have been approved in several other States. Attached are brochures and data from Crystal Quest to support their system.

3. Resin:

The resin used in the Ion Exchange system is a microporous styrene-divinylbenzene strong base anion (Cl⁻) that has opaque, cream spherical beads specifically designed for the removal of nitrates from water for potable processes. This resin is particularly suitable for nitrate removal even when moderate-to-high concentrations of sulphate are present. The

suitable screen and particle size ranges are (16 – 50 mesh, wet) & (+1200mm <5%, -300mm <1%), respectively. The shipping weight of the resin is approximately 680 g/l (42.5 lb/ft³).

The resin has chemical characteristics that are worth noting. The moisture retention, Cl⁻ form, is 50-56% and reversible swelling is negligible (Cl⁻→SO₄/NO₃). The total exchange capacity, Cl⁻ form, for wet (volumetric) and dry (weight) are 0.9 meq/ml min and 2.8 meq/g min, respectively. Operating temperature of the Ion Exchange system is 100 °C (212 °F) and the operating pH range is 4.5-8.5.

4. **Preconditioning Procedures:**

The Ion Exchange system is processed to ensure that it meets the requirements for use in the treatment of potable water. On installation it is recommended that the resin be regenerated with two bed volumes of 6% NaCl followed by a rinse of four bed volumes of potable water, prior to use. Sodium chloride is generally preferred for regeneration for cost and efficiency purposes. Salt is available from Cargill at Freedom, OK.

The use of softened water for makeup of brine and rinse is often recommended to avoid the precipitation of calcium carbonate in and around the Eaglesorb-Nitrate I (or any other resin used in this application). Although the precipitation is not particularly detrimental in the short term, the long-term effects may include increased resin attrition and leakage of nitrates. The proposed nitrate treatment system will include a preconditioning water softening system to keep the resin integrity intact.

Prior to installing the Ion Exchange, the media needs to be installed inside the Ion Exchange. The materials required for assembly are a funnel for placing media, small amount of water to add to the tank, and media from separate package. For instruction on how to install the media into the Ion Exchange, reference steps 1-7 in the method of procedures is provided by the manufacturer. The minimum materials needed to connect the Ion Exchange to water supply are male thread adapters to plumb the system, wrenches, pipe cutter, thread seal tape, and sandpaper or emery cloth. For Ion Exchange connection to water supply instructions reference step 8-25 in the method of procedures provided by the manufacturer.

5. **Installation and Testing of the Ion Exchange as per Manufacturer:**

- A. Place the media funnel in the top of the media tank with the riser tube still inside and centered. Place a small amount of water in the tank before the media goes in.
- B. Gravel should already be in the tank. Begin placing media into tank. If more than one type of media is going into tank, place heavier media in tank first.
 - a. **IMPORTANT** – Make sure the riser tube is firmly on the bottom of the tank. If the riser tube is pulled out of the gravel once the media is added, it is impossible to put it back in without removing the other media
- C. Pour the resin/media into the funnel, slowly letting it fall inside the media tank around the riser tube.
- D. Remove the funnel and the slip plug or tape from the top of the riser tube.

- E. Brush any loose resin/media off the top of the tank. Clean the top edge with a cloth so the O-ring can seal securely to the valve base.
- F. Look at the bottom of the control valve and locate the upper basket. Inside the basket, the control valve has O-rings that will seal on the riser tube. Install the valve on the media tank, making sure the top of the riser tube inserts inside the opening of the upper basket. Guide the riser into the O-ring seal and tighten gently. Be careful not to over torque the valves, as the threads are plastic.
- G. Install the control valve onto the top of the tank.
 - a. For more details on plumbing installation reference appendix 2.
- H. Unscrew and remove the top cap from the unit.
- I. Unplug slip cap from the distributor/riser tube (also referred to as a PVC tube).
- J. To prevent leaks, lubricate the inner and outer O-rings on the bottom of control valve with any non-petroleum oil (do not use coconut oil).
- K. Twist and lock top distributor to the bottom of control valve. Ensure it is fully locked in place.
- L. Attach control valve to the tank by sliding distributor tube into top distributor. Turn control valve clockwise to tighten. Distributor tube needs to be equal to the top of the resin tank (not more than 1/4" above). Lubricate the inner O-ring prior to attaching the control valve to the tank.
- M. You may choose to install a flow reducer on the incoming line at control valve and plumb into the inlet port on the control valve. If brine tank included with system, attach drain line hose barb and compression nut of the brine tank by turning clockwise to tighten until snug.
- N. To prevent leaks, wrap threads of hose barb and compression nut with thread seal tape clockwise, approximately 3 times around.
- O. Coordinate with the community of Delhi and Beckham County RWD #2 to perform a facility shut down to install the nitrate removal system
- P. Turn off the main water shutoff valve.
- Q. Open all plumbing fixtures fed by filtration system, including all outside faucets, in order to drain the lines of all water.
- R. Cut and remove a section of the main incoming water line near where the system is to be installed. Allow this line to drain thoroughly. Downstream of the existing process piping and water main will be unaffected. Reference the process diagram for a visual representation of the Ion Exchange system bypass to the portable Poly tank.
- S. Check plumbing inlet and outlet to ensure the proper flow of water through the unit. Match plumbing inlet and outlet located on the sides of the valve head (shutoff valve, flowmeter, and sampling tap).
- T. Apply threaded seal tape onto the male adapters for the valve and securely tighten them to the valve. This is done before reattaching them onto the head of the valve/meter body assembly.
- U. Connect Ion Exchange effluent line to a storage tank. The tank will collect the effluent water that will be transported to a lagoon for treatment once it is at capacity. The tank will be stored on a trailer to be easily transported to and from the disposal well.

- V. Connect tubing to brine tank.
 - a. Slide the brass insert into brine tube and slide compression nut onto brine tube.
 - b. Turn compression nut clockwise with wrench to tighten. Do not overtighten.
 - c. Remove the black brine tank lid
 - d. Remove the small white lid from the inside of the brine tank. Lift out parts inside and unscrew bolt
 - e. Thread the screw through the pre-made hole, and use the bolt to secure in place. Remove the black plastic screw on opposite side and thread the hose through the tank. Place the black screw and additional parts around the hose and then screw securely into place
- W. Turn on the water to the unit and check for leaks. Leave all faucets turned off and open a single faucet (such as an outside faucet), letting the water run for 3-5 minutes. This rinses the new resin/media inside the tank, and any particles or color will rinse out through the drain tube.
- X. Open all plumbing fixtures fed by filtration system, including all outside faucets to drain the lines of all water.
- Y. Restore service to the treatment facility.
- Z. The plant operator will take influent and effluent samples daily and flow rate measurements for 7 days, under the guidance of the Engineer.
- AA. All flow measuring devices, rate-of-flow controllers, and laboratory equipment must be calibrated as specified by the manufacturer prior to beginning data collection. A description of the calibration methods and frequency must be included for verification of data.
- BB. Transport samples to lab to test for all constituent's concentration and flowrates in the influent and effluent water
- CC. Data recordings shall be provided to the Engineers to be compiled into a report. See Table 1 listed in the summary.
 - a. Water Quality Testing Results Spreadsheet
 - b. A breakthrough curve showing removal percentages of target contaminant(s) as a function of total bed volumes will be included in the report
- DD. On successful pilot testing, Cardinal Engineering will be providing drawings to add another building beside the well and a lagoon to permanently treat the water.

Appendix 1

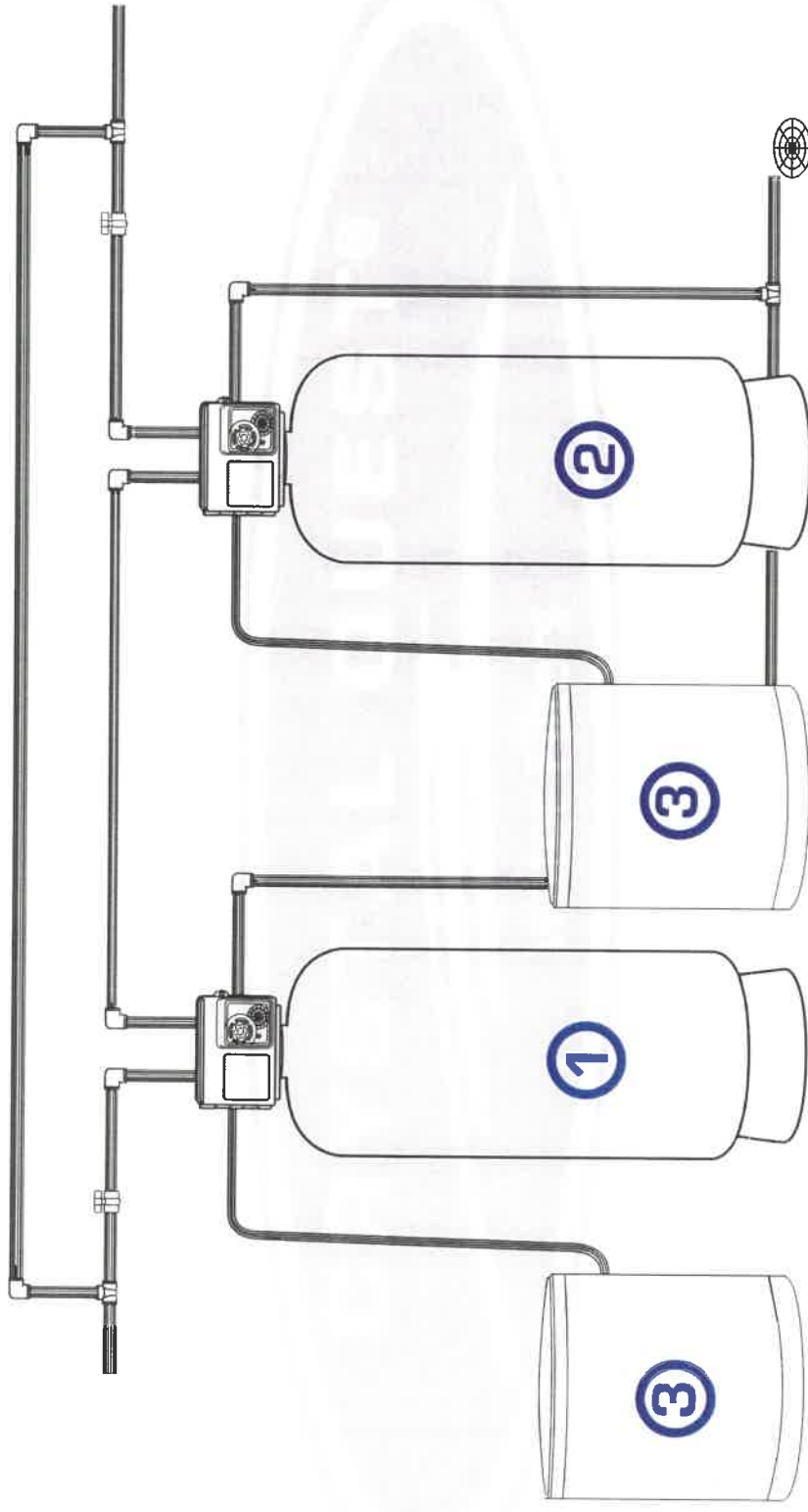
Ion Exchange Specifications

Ion Exchange Specifications	
Model	CQE-CO-02086
Valve	2900
Pipe	2"
PSI Range	35-60
Cu. Ft. Media	10
Quartz, lbs.	200
Mineral Tanks Size (in.)	24x72
Brine Tank Size (in.)	30x50
Service flow (gpm)	60
Peak flow (gpm)	95
Backwash flow (gpm)	15
Space Required (in.) (WxDxH)	64x32x95
Service flow (gpm)	60

Figure 2: Specification Table information for Ion Exchange sourced: [Click Here](#)

Appendix 2

Manufacturers Data

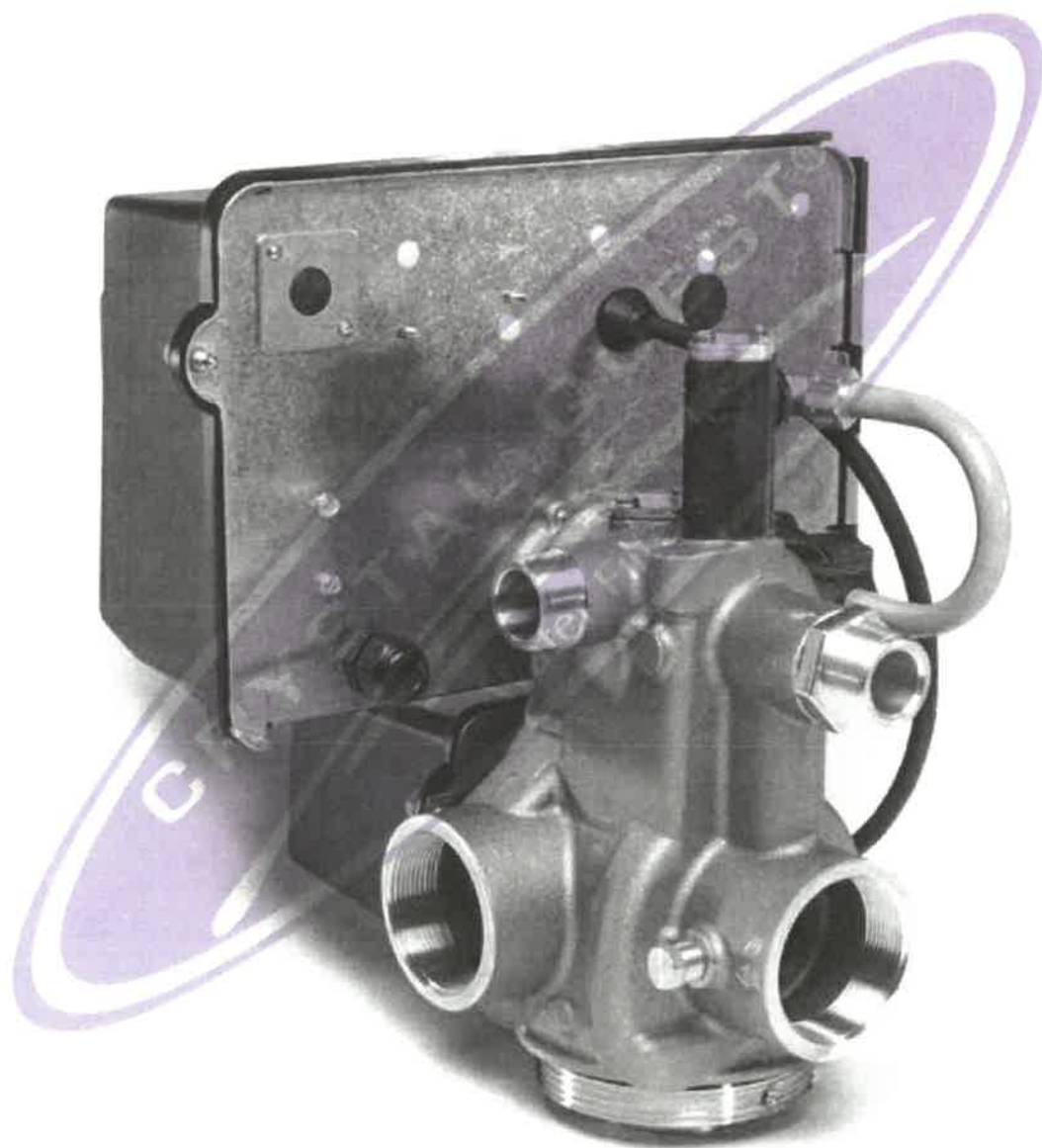


Control Head: 2900 Line Size: 2" Drain Line Size: 3/8" Space Required: 170L x 36W x 95H		ITEMS INCLUDED:		PRODUCT SKU:		DIMENSIONS:		UNIT FLOWRATES		UNLESS OTHERWISE SPECIFIED:		DATE: 04/02/2019 DRAWN BY: KEVIN	
①	10.0cu. ft. SOFTENER SYSTEM	CGE-CO-02046	26" x H 84"	SERVICE	35 GPM	DIMENSIONS ARE IN INCHES.		TITLE:		10.0 Cu SOFTENER AND NITRATE SYSTEM		SIZE	DWG. NO.
②	10.0cu. ft. NITRATE SYSTEM	CGE-CO-02086	26" x H 80"	PEAK	60 GPM	DRAWING IS NOT TO SCALE		DIMENSION KEY:		L	LENGTH	C	1
③	Brine Tank	CGE-	30" x H 50"	BACKWASH	12 GPM	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CRYSTAL QUEST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF CRYSTAL QUEST IS STRICTLY PROHIBITED.		W	WIDTH	H	HEIGHT	SCALE:	1:20
	...	...	...					D	DIAMETER	WEIGHT:		SHEET 1 OF 1	
										
										
										

Pipes and Fittings not supplied by CrystalQuest



Crystal Quest® 2900 2-Inch Control Head INSTALLATION AND OPERATION GUIDE



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INSTALLATION

Water Pressure

A minimum of 20 pounds (1.4 bar) of water pressure is required for regeneration valve to operate effectively.

Electrical Facilities

An uninterrupted alternating current (A/C) supply is required.

NOTE: OTHER VOLTAGES ARE AVAILABLE. PLEASE MAKE SURE YOUR VOLTAGE SUPPLY IS COMPATIBLE WITH YOUR UNIT BEFORE INSTALLATION.

Existing Plumbing

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

Location Of Softener And Drain

The softener should be located close to a drain to prevent air breaks and back flow.

Bypass Valves

Always provide for the installation of a bypass valve if unit is not equipped with one.

CAUTION: WATER PRESSURE IS NOT TO EXCEED 125 PSI (8.6 BAR), WATER TEMPERATURE IS NOT TO EXCEED 110°F (43°C), AND THE UNIT CANNOT BE SUBJECTED TO FREEZING CONDITIONS.

Installation Instructions

1. Place the softener tank where you want to install the unit making sure the unit is level and on a firm base.
2. During cold weather, the installer should warm the valve to room temperature before operating.
3. All plumbing should be done in accordance with local plumbing codes. The pipe size for residential drain line should be a minimum of 1/2 inch (13 mm). Backwash flow rates in excess of 7 gpm (26.5 Lpm) or length in excess of 20 feet (6 m) require 3/4 inch (19 mm) drain line. Commercial drain lines should be the same size as the drain line flow control.
4. Refer to the dimensional drawing for cutting height of the distributor tube. If there is no dimensional drawing, cut the distributor tube flush with the top of the tank.
5. Lubricate the distributor o-ring seal and tank o-ring seal with any non-petroleum oil (do not use coconut oil). Place the main control valve on tank.
6. **IMPORTANT:** For valves equipped with electromechanical timers and stainless steel meters, refer to the Meter Dome and Union Orientation section.
7. Solder joints near the drain must be done prior to connecting the Drain Line Flow Control fitting (DLFC). Leave at least 6 inches (15 cm) between the DLFC and solder joints when soldering pipes that are connected on the DLFC. Failure to do this could cause interior damage to the DLFC.
8. Thread seal tape is the only sealant to be used on the drain fitting. The drain from twin tank units may be run through a common line.
9. Make sure that the floor is clean beneath the salt storage tank and that it is level.

10. Place approximately 1 inch (25 mm) of water above the grid plate. If a grid is not utilized, fill to the top of the air check (Figure 1) in the salt tank. Do not add salt to the brine tank at this time.
10. On units with a bypass, place in bypass position. Turn on the main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material (usually solder) that may have resulted from the installation. Once clean, close the water tap.
11. Slowly place the bypass in service position and let water flow into the mineral tank. When water flow stops, slowly open a cold water tap nearby and let run until the air is purged from the unit.
12. Plug unit into an electrical outlet.

NOTE: ALL ELECTRICAL CONNECTIONS MUST BE CONNECTED ACCORDING TO LOCAL CODES. BE CERTAIN THE OUTLET IS UNINTERRUPTED.



Figure 1 Residential Air Check Valve



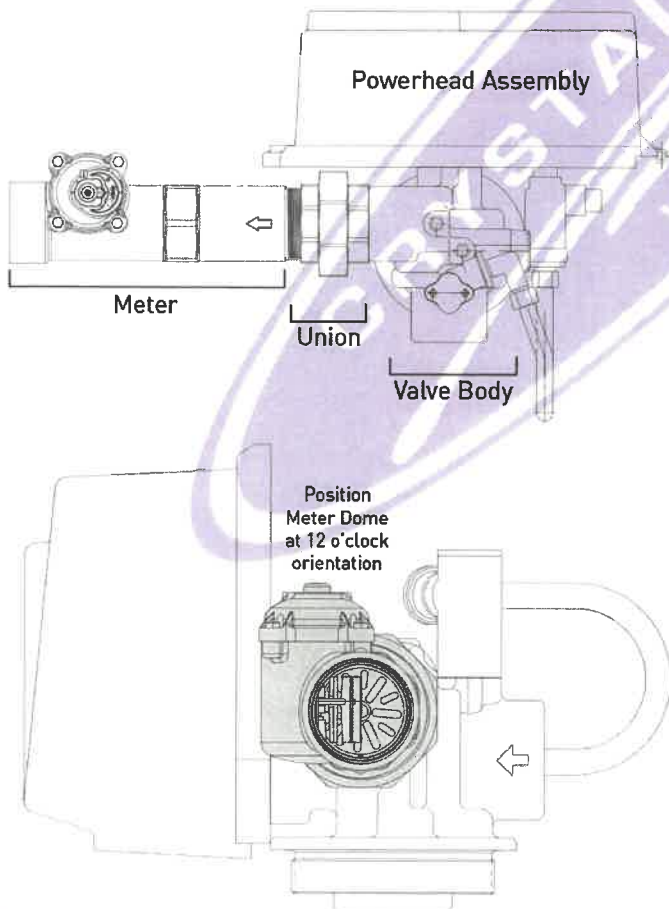
INSTALLATION *CONTINUED*

Meter Dome and Union Orientation

Control valves outfitted with an electromechanical timer and stainless steel water meter include a special male x female threaded stainless steel union to insure proper installation and operation of the water meter.

WARNING: THE LOCATION OF THIS UNION IN RELATION TO THE CONTROL VALVE AND WATER METER IS CRITICAL FOR PROPER OPERATION. DO NOT OMIT OR SUBSTITUTE THIS SPECIAL UNION; IT POSITIONS THE METER DOME AT THE CORRECT DISTANCE FROM THE CONTROL VALVE AND ALLOWS RE-POSITIONING THE WATER METER DOME FOR PROPER OPERATION.

1. Apply a suitable thread sealant to the male threads of the union and meter body.
2. Thread the union into the OUTLET port of the control valve, then thread the meter into the union. See illustrations below.
3. Rotate the water meter body so the meter dome is at the 12 o'clock position. Loosen the nut on the union to facilitate this if required. Once in position, tighten the union nut.
4. Connect the meter cable to the open port in the center of the meter dome.
5. Continue with the installation of the control valve.



START-UP INSTRUCTIONS

The water softener should be installed with the inlet, outlet, and drain connections made in accordance with the manufacturer's recommendations, and to meet applicable plumbing codes.

1. Turn the manual regeneration knob slowly in a clockwise direction until the program micro switch lifts on top of the first set of pins. Allow the drive motor to move the piston to the first regeneration step and stop. Each time the program switch position changes, the valve will advance to the next regeneration step. Always allow the motor to stop before moving to the next set of pins or spaces.

NOTE: FOR ELECTRONIC VALVES, PLEASE REFER TO THE MANUAL REGENERATION PART OF THE TIMER OPERATION SECTION. IF THE VALVE CAME WITH A SEPARATE ELECTRONIC TIMER SERVICE MANUAL, REFER TO THE TIMER OPERATION SECTION OF THE ELECTRONIC TIMER SERVICE MANUAL.

2. Position the valve to backwash. Ensure the drain line flow remains steady for 10 minutes or until the water runs clear (see above).
3. Position the valve to the brine / slow rinse position. Ensure the unit is drawing water from the brine tank (this step may need to be repeated).
4. Position the valve to the rapid rinse position. Check the drain line flow, and run for 5 minutes or until the water runs clear.
5. Position the valve to the start of the brine tank fill cycle. Ensure water goes into the brine tank at the desired rate. The brine valve drive cam will hold the valve in this position to fill the brine tank for the first regeneration.
6. Replace control box cover.
7. Put salt in the brine tank.

NOTE: DO NOT USE GRANULATED OR ROCK SALT.



3200 TIMER SETTING PROCEDURE

How To Set Days On Which Water Conditioner Is To Regenerate (Figure 2)

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

How To Set The Time Of Day

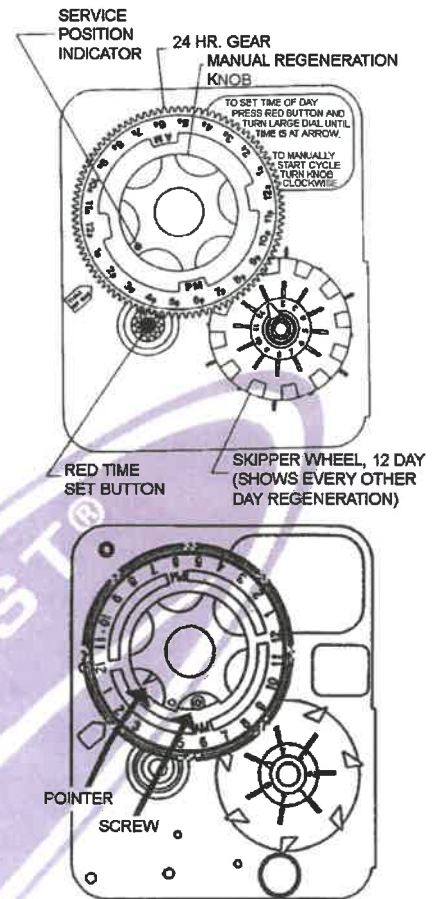
1. Press and hold the red button in to disengage the drive gear.
2. Turn the large gear until the actual time of day is at the time of day pointer.
3. Release the red button to again engage the drive gear.

How To Manually Regenerate Your Water Conditioner At Any Time

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

How to Adjust Regeneration Time

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



3200 ADJUSTABLE REGENERATION TIMER

Figure 2

IMPORTANT:
SALT LEVEL MUST ALWAYS BE ABOVE
WATER LEVEL IN BRINE TANK

3210 & 3220 TIMER SETTING PROCEDURE

Typical Programming Procedure

Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons available opposite the small white dot on the program wheel gear (Figure 3).

NOTE: DRAWING SHOWS 8,750 GALLON SETTING. THE CAPACITY (GALLONS) ARROW (15) SHOWS ZERO GALLONS REMAINING. THE UNIT WILL REGENERATE TONIGHT AT THE SET REGENERATION TIME.

How To Set The Time Of Day

1. Press and hold the red button in to disengage the drive gear.
2. Turn the large gear until the actual time of day is opposite the time of day pointer.
3. Release the red button to again engage the drive gear.

How To Manually Regenerate Your Water Conditioner At Any Time

1. Turn the manual regeneration knob clockwise.
2. This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.



3210 & 3220 TIMER SETTING PROCEDURE CONTINUED

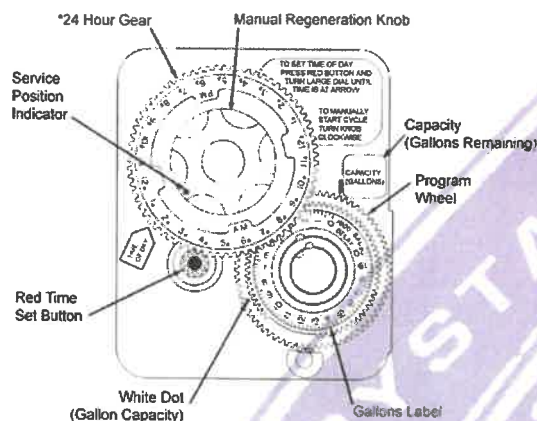
3. The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.
4. Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set for only one half of this time.
5. In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

Immediate Regeneration Timers

These timers do not have a 24 hour gear. Setting the gallons on the program wheel and manual regeneration procedure are the same as previous instructions. The timer will regenerate as soon as the capacity gallons reaches zero.

NOTE: THE PROGRAM WHEEL TO THE LEFT MAY BE DIFFERENT THAN THE PROGRAM WHEEL ON THE PRODUCT.

NOTE: TO SET METER CAPACITY ROTATE



*Immediate regeneration timers do not have a 24-hour gear. No time of day can be set.

Figure 3

3200, 3210, 3220, 3230 REGENERATION CYCLE SETTING PROCEDURE

How To Set The Regeneration Cycle Program

The regeneration cycle program on your water conditioner has been factory preset, however, portions of the cycle or program may be lengthened or shortened in time to suit local conditions.

3200 Series Timers (Figure 4)

1. To expose cycle program wheel, grasp timer in upper left-hand corner and pull, releasing snap retainer and swinging timer to the right.
2. To change the regeneration cycle program, the program wheel must be removed. Grasp program wheel and squeeze protruding lugs toward center, lift program wheel off timer. Switch arms may require movement to facilitate removal.
3. Return timer to closed position engaging snap retainer in back plate. Make certain all electrical wires locate above snap retainer post.

Timer Setting Procedure

How To Change The Length Of The Backwash Time

The program wheel as shown in the drawing is in the service position. As you look at the numbered side of the program wheel, the group of pins starting at zero determines the length of time your unit will backwash.

For example, if there are six pins in this section, the time of backwash will be 12 min. (2 min. per pin). To change the length of backwash time, add or remove pins as required. The number of pins times two equals the backwash time in minutes.

How To Change The Length Of Brine And Rinse Time

1. The group of holes between the last pin in the backwash section and the second group of pins determines the length of time that your unit will brine and rinse (2 min. per hole).
2. To change the length of brine and rinse time, move the rapid rinse group of pins to give more or fewer holes in the brine and rinse section. Number of holes times two equals brine and rinse time in minutes.

How To Change The Length Of Rapid Rinse

1. The second group of pins on the program wheel determines the length of time that your water conditioner will rapid rinse (2 min. per pin).
2. To change the length of rapid rinse time, add or remove pins at the higher numbered end of this section as required. The number of pins times two equals the rapid rinse time in minutes.

How To Change The Length Of Brine Tank Refill Time

1. The second group of holes in the program wheel determines the length of time that your water conditioner will refill the brine tank (2 min. per hole).
2. To change the length of refill time, move the two pins at the end of the second group of holes as required.
3. The regeneration cycle is complete when the outer microswitch is tripped by the two pin set at end of the brine tank refill section.
4. The program wheel, however, will continue to rotate until the inner micro switch drops into the notch on the program wheel.

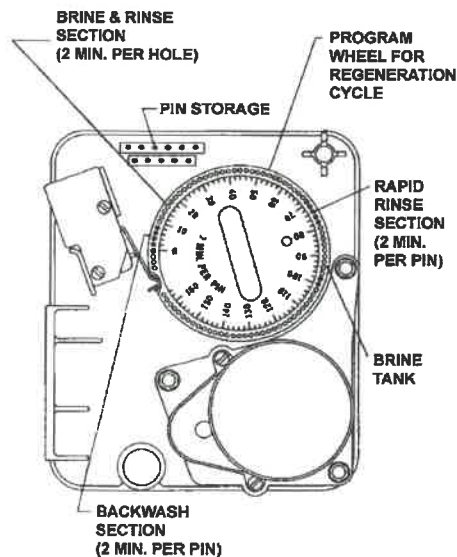
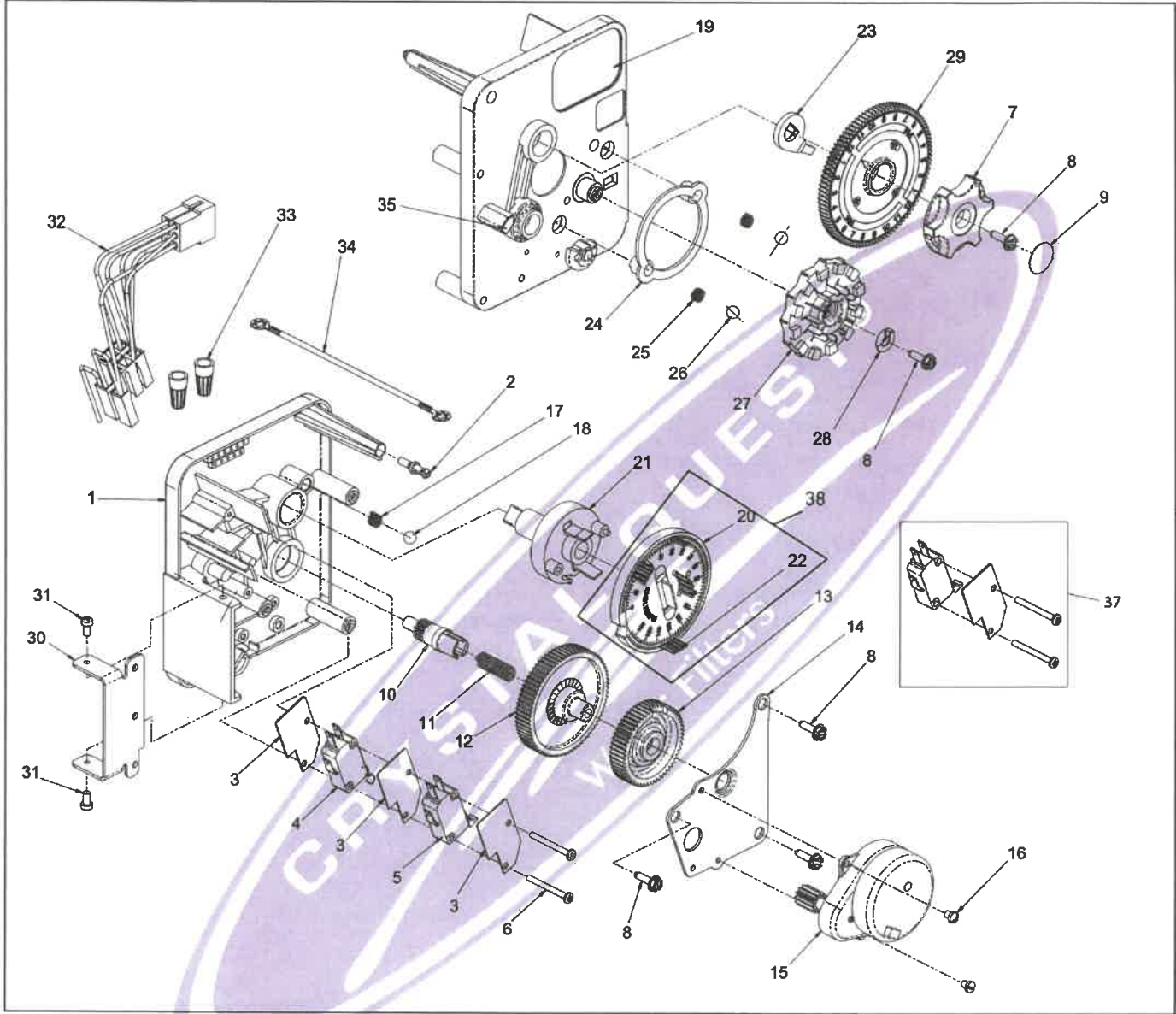


Figure 4

3200 TIME CLOCK TIMER ASSEMBLY





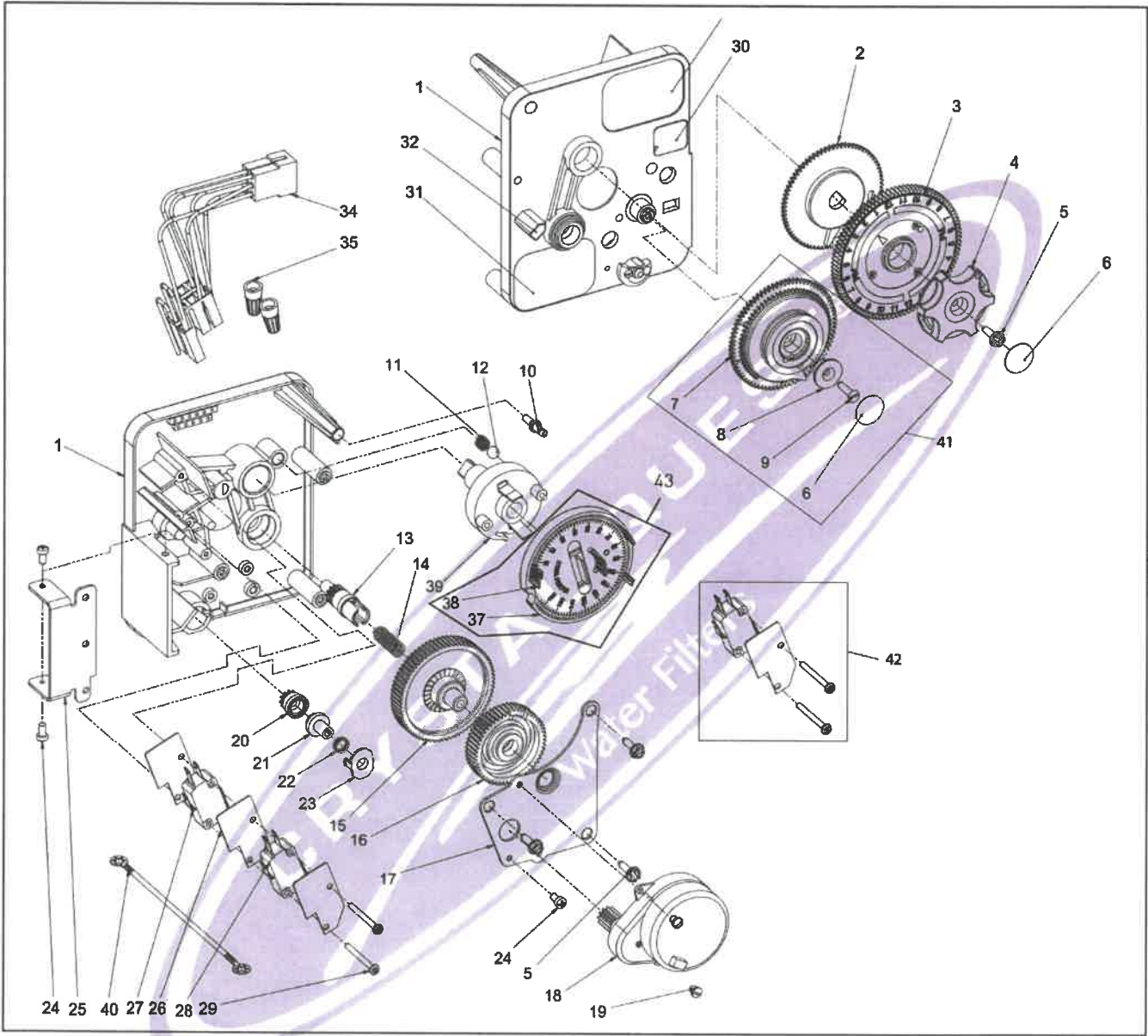
3200 TIME CLOCK TIMER ASSEMBLY
CONTINUED

Item No.	QTY	Part No.	Description
1	1	13870	Housing, Timer, 3200
2	1	14265	Clip, Spring
3	3	14087	Insulator
4	1	10896	Switch, Micro
5	1	15320	Switch, Micro, Timer
6	2	11413	Screw, Pan Hd Mach, 4-40 x 1-1/8
7	1	13886	Knob, 3200
8	5	13296	Screw, Hex Wsh, 6-20 x 1/2
9	1	11999	Label, Button
10	1	13018	Pinion, Idler
11	1	13312	Spring, Idler Shaft
12	1	13017	Gear, Idler
13	1	13164	Gear, Drive
14	1	13887	Plate, Motor Mounting
15	1	18743-1	Motor, 120V, 60Hz, 1/30 RPM
		18752-1	Motor, 100V, 50Hz, 1/30 RPM
		18824-1	Motor, 230V, 50Hz, 1/30 RPM
		18826-1	Motor, 24V, 50Hz, 1/30 RPM
		19659-1	Motor, 24V, 60Hz, 1/30 RPM
		19660-1	Motor, 230V, 60Hz, 1/30 RPM
16	2	13278	Screw, Slted Fillister Hd 6-32 x .156
17	1	15424	Spring, Detent, Timer
18	1	15066	Ball, 1/4-inch, Delrin
19	1	15465	Label, Caution
20	1	19210	Program Wheel Assy
21	1	13911	Gear, Main Drive, Timer
22	17	41754	Pin, Spring, 1/16 x 5/8 SS, Timer
23	1	13011	Arm, Cycle Actuator
24	1	13864	Ring, Skipper Wheel
25	2	13311	Spring, Detent, Timer
26	2	13300	Ball, 1/4-inch, SS

Item No.	QTY	Part No.	Description
27	1	14381	Skipper Wheel Assy, 12 Day
	1	14860	Skipper Wheel Assy, 7 Day
28	1	13014	Pointer, Regeneration
29	1	40096-24	Dial, 12 AM Regen Assy, Black
		40096-02	Dial, 2 AM Regen Assy, Black
30	1	13881	Bracket, Hinger Timer
31	2	11384	Screw, Phil, 6-32 x 1/4 Zinc
32	1	13902	Harness, 3200
33	2	40422	Nut, Wire, Tan
34	1	15354-01	Wire, Ground, 4 inches
35	1	14007	Label, Time of Day
36	1	*	Complete 3200 Time Clock Timer Assembly
37		60320-02	Switch Kit, 3200/9000 Timer Auxiliary, Optional
38		61420-03	Program Wheel, Gear Assy, Filter 2 Min Per Pin
		61420-04	Program Wheel, Gear Assy, Softener, 2 Min Per Pin

*Call your distributor for Part Number

3210 METER DELAYED TIMER ASSEMBLY



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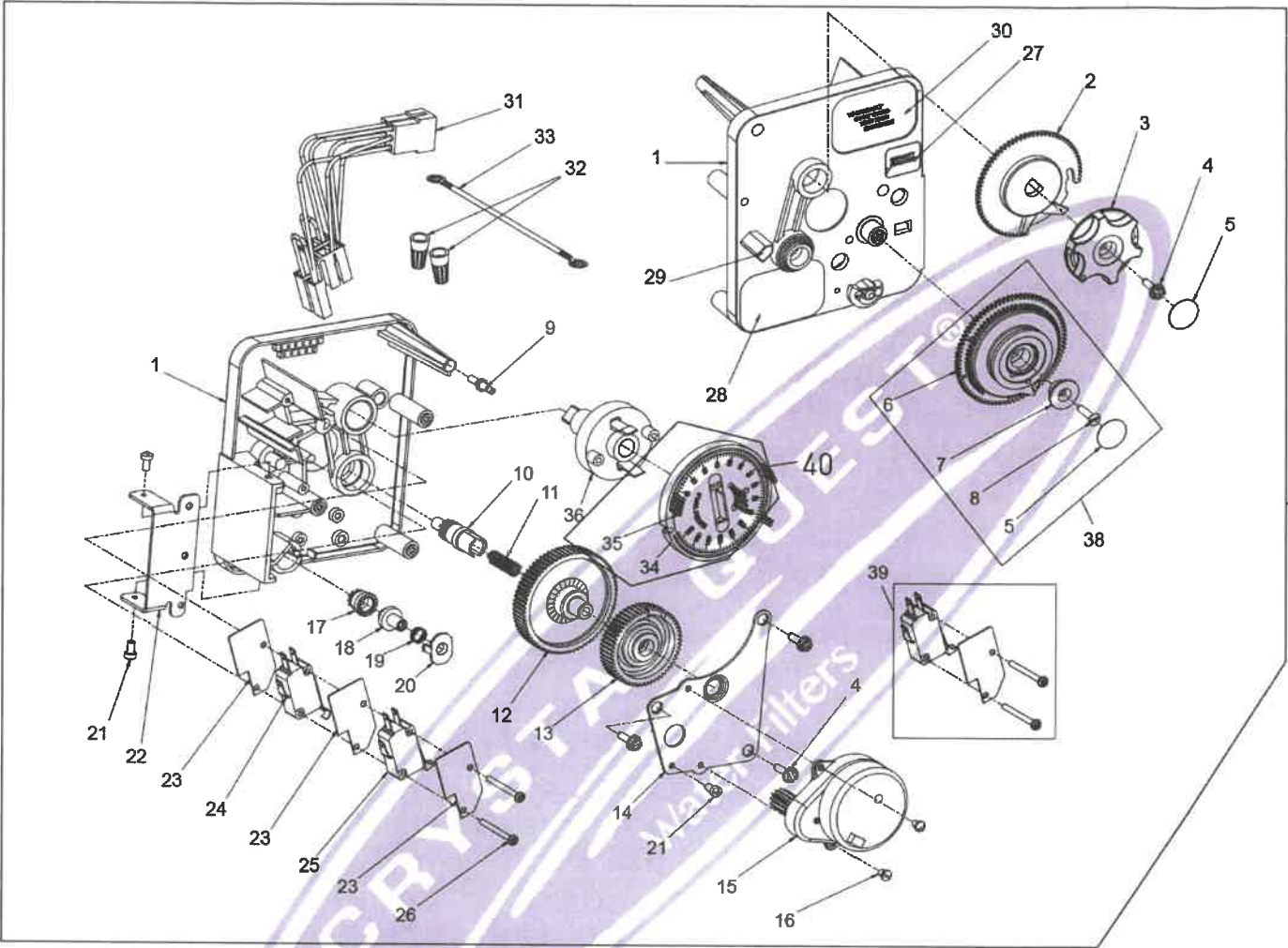
3210 METER DELAYED TIMER ASSEMBLY
CONTINUED

Item No.	QTY	Part No.	Description
1	1	13870	Housing, Timer, 3200
2	1	13802	Gear, Cycle Actuator
3	1	40096-02	Dial 2 AM Regen Assy, Black
4	1	13886	Knob, 3200
5	4	13296	Screw, Hex Wsh, 6-20 x 1/2
6	2	11999	Label, Button
7	1	13803	Gear, Program Drive Wheel
8	1	13806	Retainer, Program Wheel
9	1	13748	Screw, Flat Head St, 6-20 x 1/2
10	1	14265	Clip, Spring
11	1	15424	Spring, Detent, Timer
12	1	15066	Ball, 1/4-inch Delrin
13	1	13018	Pinion, Idler
14	1	13312	Spring, Idler Shaft
15	1	13017	Gear, Idler
16	1	13164	Gear, Drive
17	1	13887	Plate, Motor Mounting
18	1	18743-1	Motor, 120V, 60Hz 1/30 RPM
		18752-1	Motor, 100V, 50Hz, 1/30 RPM
		18824-1	Motor, 230V, 50Hz, 1/30 RPM
		18826-1	Motor, 24V, 50Hz, 1/30 RPM
		19659-1	Motor, 24V, 60Hz, 1/30 RPM
		19660-1	Motor, 230V, 60Hz, 1/30 RPM
19	1	13278	Screw, Fillister Hd, 6-32 x .156
20	1	13830	Pinion, Program Wheel Drive
21	1	13831	Clutch, Drive Pinion
22	1	14276	Spring, Meter, Clutch
23	1	14253	Retainer, Clutch Spring
24	3	11384	Screw, Phil, 6-32 x 1/4
25	1	13881	Bracket, Hinge Timer
26	3	14087	Insulator
27	1	10896	Switch, Micro
28	1	15320	Switch, Micro, Timer
29	2	11413	Screw, Pan Hd Mach, 4-40 x 1 1/8

Item No.	QTY	Part No.	Description
11	1	18563	Idler Shaft Spring
34	1	19210-05	Program Wheel Assembly, 9000/3230
35	17	41754	Pin, Spring, 1/16 x 5/8 Stainless Steel, Timer
36	1	15055	Gear, Main Drive
37	1	*	Complete 3220 Meter Immediate Timer Assy
38		60405-10	Program Wheel, w/3/4-inch STD Label 0-2,100 gal
		60405-20	Program Wheel, w/3/4-inch EXT Label 0-10,000 gal
		60405-11	Program Wheel, w/3/4-inch STD Metric Label 0-8 m3
		60405-21	Program Wheel, w/3/4-inch EXT Range 0-40 m3
39		60320-02	Switch Kit, 3200/9000 Timer Auxiliary, Optional
40		61420-06	Program Wheel, Gear Assy, Softener Immediate 2 Min Per
Pin		61420-42	Program Wheel, Gear Assy, Filter Immediate 2 Min Per Pin

*Call your distributor for Part Number

3220 METER IMMEDIATE TIMER ASSEMBLY





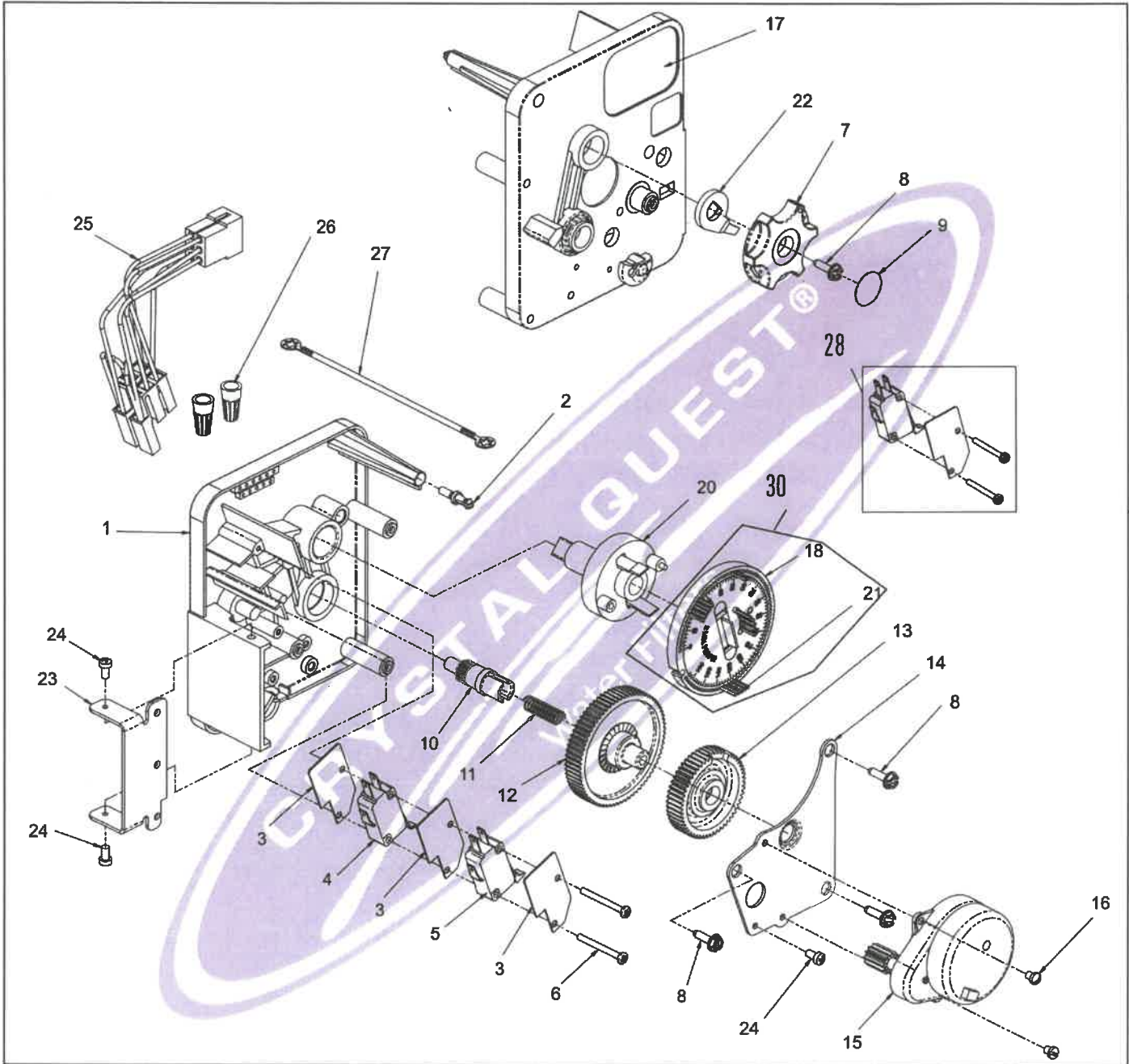
**3220 METER IMMEDIATE TIMER
ASSEMBLY CONTINUED**

Item No.	QTY	Part No.	Description
1	1	13870	Housing, Timer
2	1	15431	Gear, Cycle Actuator, System #5
3	1	13886	Knob, 3200
4	4	13296	Screw, Hex Wsh, 6-20 x 1/2
5	2	11999	Label, Button
6	1	13807	Gear, Program Drive Wheel
7	1	13806	Retainer, Program Wheel
8	1	13748	Screw, Flt Hd St, 6-20 x 1/2
9	1	14265	Spring Clip
10	1	13018	Pinion, Idler
11	1	18563	Idler Shaft Spring
12	1	13017	Gear, Idler
13	1	13164	Drive Gear
14	1	13887	Plate, Motor Mounting
15	1	18743-1	Motor, 120V, 60 Hz, 1/30 RPM
		18752-1	Motor, 100V, 50Hz, 1/30 RPM
		18824-1	Motor, 230V, 50Hz, 1/30 RPM
		18826-1	Motor, 24V, 50Hz, 1/30 RPM
		19659-1	Motor, 24V, 60Hz, 1/30 RPM
		19660-1	Motor, 230V, 60Hz, 1/30 RPM
16	2	13278	Screw, Slt'd Fillister Hd
17	1	14502	Pinion, Program Wheel
18	1	14501	Clutch, Drive Pinion
19	1	14276	Meter Clutch Spring
20	1	14253	Retainer, Clutch Spring
21	3	11384	Screw, Phil, 6-32 x 1/4 Zinc
22	1	13881	Bracket, Hinge Timer
23	3	14087	Insulator
24	1	15414-00	Micro Switch
25	1	15320	Switch, Micro, Timer
26	2	11413	Screw, Pan Hd Mach, 4-40 x 1-1/8
27	1	14198	Label, Indicator
28	1	15465	Label, Caution
29	1	14007	Label, Time of Day
30	1	15148	Label, Instruction

Item No.	QTY	Part No.	Description
31	1	40617	Harness, 3220
32	2	40422	Nut, Wire, Tan
33	1	15354-01	Wire, Ground, 4 inches
34	1	19210-05	Program Wheel Assembly, 9000/3230
35	17	41754	Pin, Spring, 1/16 x 5/8 Stainless Steel, Timer
36	1	15055	Gear, Main Drive
37	1	*	Complete 3220 Meter Immediate Timer Assy
38		60405-50	Program Wheel, w/2-inch STD Label 0-21,000 gal
		60405-60	Program Wheel, w/2-inch EXT Label 0-100,000 gal
		60405-61	Program Wheel, w/2-inch EXT Range 375 m3
39		60320-02	Switch Kit, 3200/9000 Timer Auxiliary, Optional
40		61420-06	Program Wheel, Gear Assy, Softener Immediate 2 Min Per Pin
		61420-42	Program Wheel, Gear Assy, Filter Immediate 2 Min Per Pin

*Call your distributor for Part Number

3230 REMOTE START TIMER ASSEMBLY



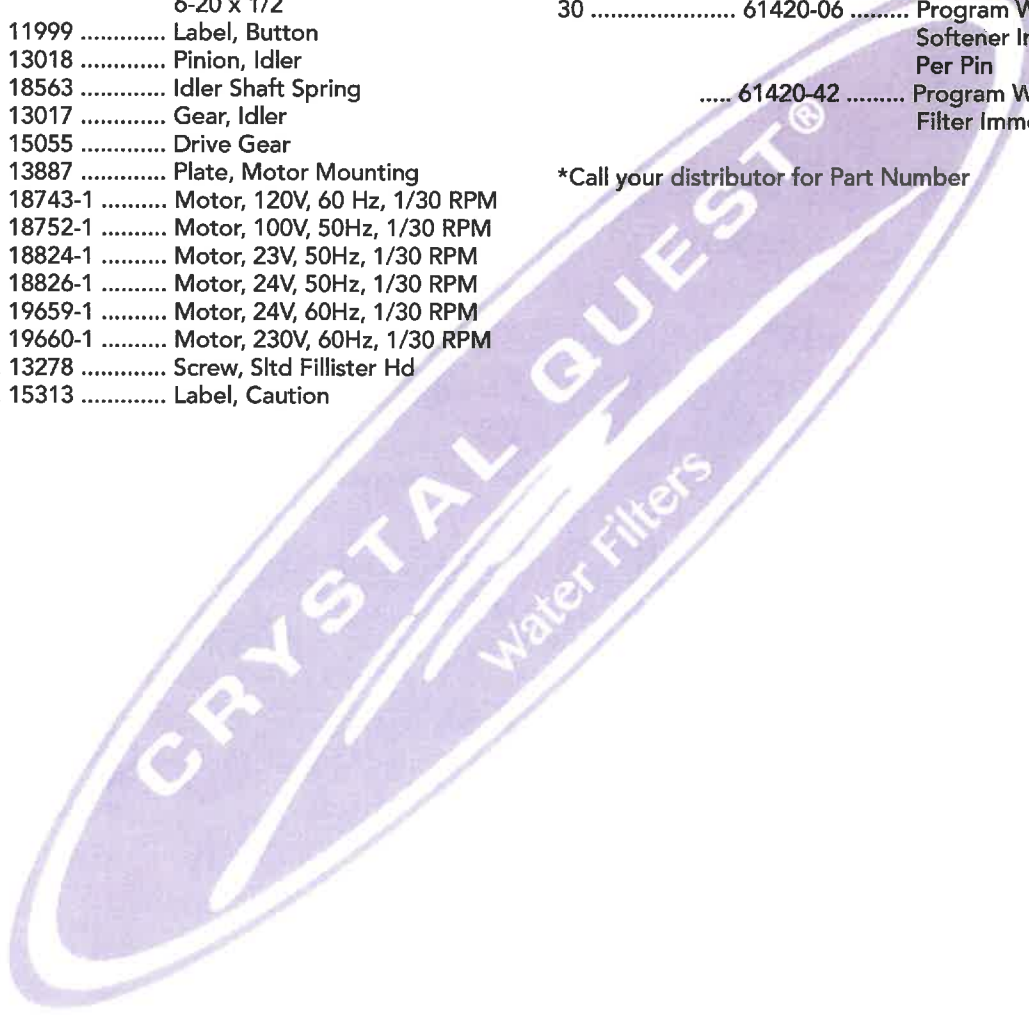


3230 REMOTE START TIMER ASSEMBLY
CONTINUED

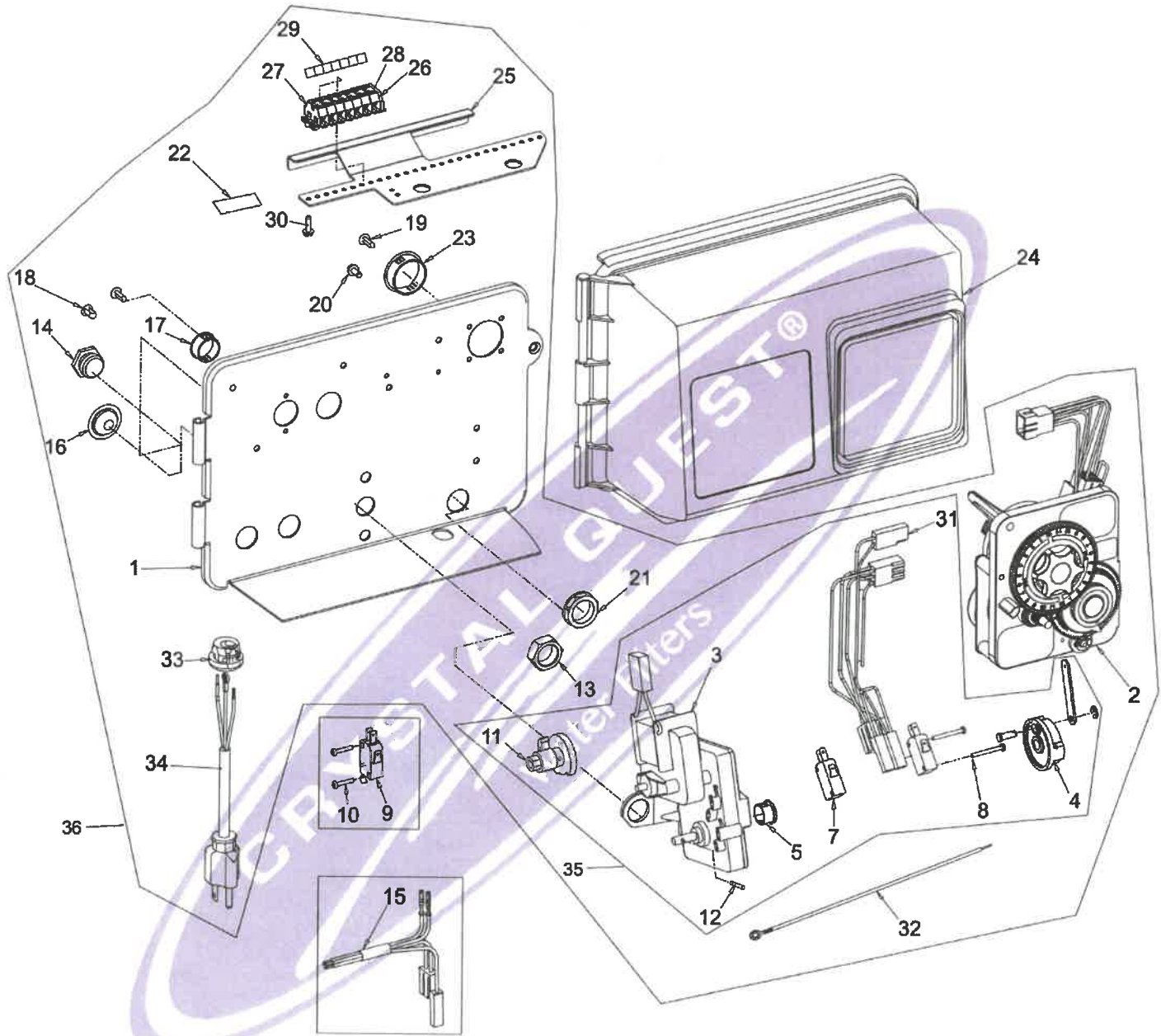
Item No.	QTY	Part No.	Description
1	1	13870	Housing, Timer
2	1	14265	Spring Clip
3	3	14087	Insulator
4	1	15314	Micro Switch
5	1	15320	Switch, Micro, Timer
6	2	11413	Screw, Pan Hd Mach, 4-40 x 1-1/8
7	1	13886	Knob, 3200
8	4	13296	Screw, Hex Wsh, 6-20 x 1/2
9	1	11999	Label, Button
10	1	13018	Pinion, Idler
11	1	18563	Idler Shaft Spring
12	1	13017	Gear, Idler
13	1	15055	Drive Gear
14	1	13887	Plate, Motor Mounting
15	1	18743-1	Motor, 120V, 60 Hz, 1/30 RPM
		18752-1	Motor, 100V, 50Hz, 1/30 RPM
		18824-1	Motor, 23V, 50Hz, 1/30 RPM
		18826-1	Motor, 24V, 50Hz, 1/30 RPM
		19659-1	Motor, 24V, 60Hz, 1/30 RPM
		19660-1	Motor, 230V, 60Hz, 1/30 RPM
16	2	13278	Screw, Slt'd Fillister Hd
17	1	15313	Label, Caution

Item No.	QTY	Part No.	Description
18	1	19210-05	Program Wheel Assembly, 3200
20	1	15055	Main Drive Gear
21	17	41754	Pin, Spring, 1/16 x 5/8 Stainless Steel, Timer
22	1	13011	Cycle Actuator Arm
23	1	13881	Bracket, Hinge Timer
24	3	11384	Screw, Phil, 6-32 x 1/4 Zinc
25	1	16336	Harness, 3230R
26	2	40422	Nut, Wire, Tan
27	1	15354-01	Wire, Ground, 4 inches
28		60320-02	Switch Kit, 3200/9000 Timer Auxiliary, Optional
29	*		3230 Timer Assy
30		61420-06	Program Wheel, Gear Assy, Softener Immediate 2 Min Per Pin
		61420-42	Program Wheel, Gear Assy, Filter Immediate 2 Min Per Pin

*Call your distributor for Part Number



UPPER ENVIRONMENTAL POWERHEAD ASSEMBLY





UPPER ENVIRONMENTAL POWERHEAD ASSEMBLY CONTINUED

Item No.	QTY	Part No.	Description
1	1	18697-15	Backplate, Hinged
2	1		Clock Timer Assembly 3200 Meter Timer Assembly
3	1	41543	Motor, Drive, 115V, 50/60 Hz
		42579	Motor, Drive, 24VAC/DC, 50/60 Hz
		41545	Motor, Drive, 230V, 50/60 Hz
4	1	60160-15	Drive Cam Assembly, STF, Blue, 2900
		60160-30*	Drive Cam Assembly, Upflow
		60160-31*	Drive Cam Assembly, Upflow, Variable
5	1	17904	Bushing, Heyco 1/2, Heyco #2073
7	2	10218	Switch, Micro
8	2	14923	Screw, Pan Hd Mach, 4-40 X 1 MS Steel Zinc
9	1	10896	Switch, Mlcro
10	2	11805	Screw, Rd Hd, 4-40 X 5/8 TYPE 1 Steel Zinc
11	1	12472	Cam Assy, Tri-Stack, After RR
		12777	Cam, Shut-Off Valve
		15770	Cam Assy, Special Tri- Stack, After Brine Fill
		15805	Cam, SVO
		19887*	Cam, Brine, 2750 U/F, Std
12	2	10338	Pin, Roll 3/32 x 7/8
13	1	10269	Nut, Jam, 3/4-16
14	1	43560	Fitting, Brine Valve
15	1	14822	Harness, 2900
16	2	19691	Plug, .750 Dia Recessed, Black
17	1	15806	Plug, Hole, Heyco #2693
18	1	19801	Plug, .190 Dia, White Heyco 0307
19	7	19800	Plug, .140 Dia, White Heyco 0304
20	4	10300	Screw, Slot Hex Wsh, 8-18 X 3/8 Type "B" RC 44-47
21	1	18691-02	Nut, Conduit Fitting 1/2-inch
22	1	40038-03	Label, Voltage, 120V, 3200ET
23	1	17421	Plug, 1.20 Hole Heyco #2733
24	1	60219-02	Cover Assembly, Environmental, Black w/ Clear Window

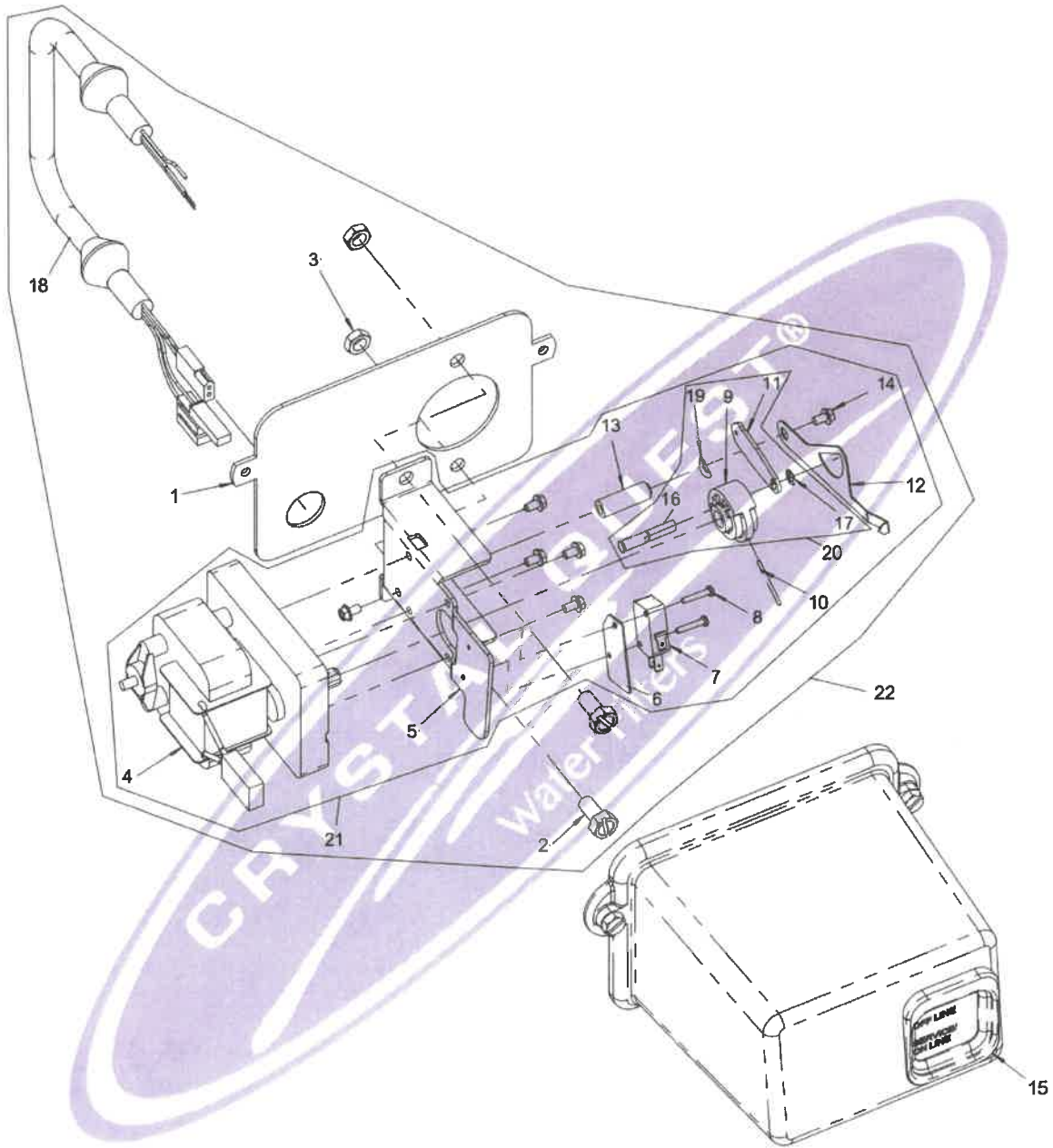
Item No.	QTY	Part No.	Description
25	1	19772	Bracket, Terminal Block
26	1	40174	Terminal Block, Green/ Yellow Commercial, 809- 260/141
27	6	41084	Terminal Block, Segment, Gray
28	1	41085	Endplate, Terminal Block, Gray
29	2	15250	Label, Terminal Strip
30	2	13296	Screw, Hex Wsh, 6-20 6-20 x 1/2 Type 25 Steel Zinc
31	1	40400	Harness, Drive, Designer/ Environmental
32	1	40175-01	Wire, Ground, Commercial Valves
33	1	13547	Strain Relief, Flat Cord Heyco #30-1
		13547-01	Strain Relief, Euro Round Cord
		13547-02	Strain Relief, U.S. Round
34	1	11545	Powercord, 4-foot European, Black
		19303	Powercord, 8-foot, Australian
		40084-12	Powercord, 12-foot US, Round, 120V,Sys 5,6,7&2900/3150/3900
		40085-12	Powercord, 12-foot US, Round, 240V
35		60050-23	Drive Assy, 2750, STF, 24V 50/60 Hz, Downflow Less Lower Drive Brine Cam Switch, Item 9 & 10
		60050-22	Drive Assy, 2750, STF, 220V 50/60 Hz, Downflow Less Lower Drive Brine Cam Switch, Item 9 & 10
		60052-21	Upper Drive Assy, 2900, STF 120V, Downflow
		60052-217	Upper Drive Assy, 2900, STF 120V, System 7, Downflow
36	**		Upper Powerhead Assembly

Not Shown:

1	15216	Meter Cable Assembly, 15.25 inch long, 2 inch Brass Meter
1	15513	Meter Cable Assembly, 17.5 inch long 2 inch Stainless Steel Meter
1	15879	Cable Guide Assembly, 2900

*Upflow Only
**Call your distributor for Part Number

LOWER ENVIRONMENTAL POWERHEAD ASSEMBLY





LOWER ENVIRONMENTAL POWERHEAD ASSEMBLY *CONTINUED*

Item No.	QTY	Part No.	Description
1	1	18709	Backplate, Lower
2	2	11224	Screw, Slotted Hex Head
3	2	16346	Nut, Hex, Jam, 5/16-18, 18-8-SS (only used for shipping)
4	1	40387	Motor, Drive, 115V, 60 Hz, SP FAM
		42580	Motor, Drive, 24 Vac/Dc, 50-60 Hz, Fam 2
		40389	Motor, Drive, 220V, 50/60 Hz, SP
5	1	14769	Bracket, Motor, 2900
6	1	10302	Insulator, Limit Switch
7	1	10218	Switch, Micro
8	2	19849	Screw, Pan HD, 4-40 x 5/8
9	1	14775	Cam, Main Drive, 2900 Lower
10	1	41022	Pin, Roll 2900 Lower
11	1	14759	Link, Piston Rod
12	1	18725	Indicator, Service/Standby
13	1	18726	Spacer, Indicator
14	6	10872	Screw, Hex WSH, 8-32 x 5/16
15	1	60217-02	Cover Assy, 2900, Lower, Black
16	1	42979	Bearing, Connecting Rod
17	1	42980	Ring, Retaining
18	1	42446	Harness, Lower Drive SYS4, ENV
		40405	Harness, Lower Drive, Sys 4 Remote Start
		40406	Harness, Lower Drive, Sys 5 & 6, Duplex, Enviromental
		40405	Harness, Lower Drive Syst 5 Multiple, Enviromental
		40405	Harness, Lower Drive Syst 6 Multiple, Lead, Enviromental
		40406	Harness, Lower Drive, Sys 6, Multiple, Middle/Lag, Enviromental
		40407	Harness, Lower Drive, Syst #7, Duplex, Lead, Enviromental

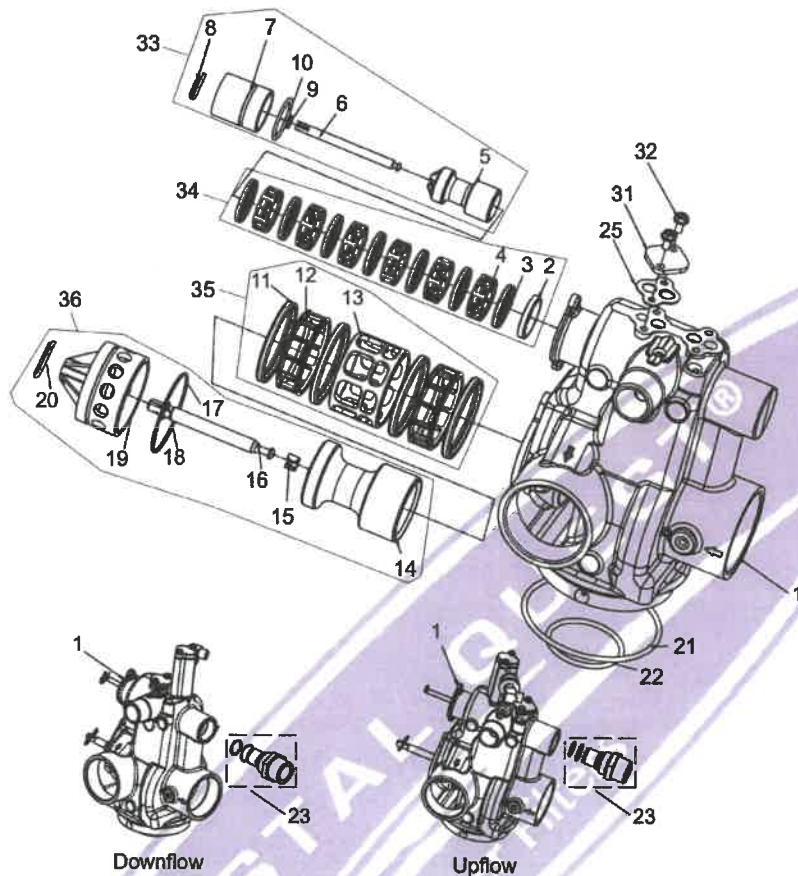
Item No.	QTY	Part No.	Description
		40408	Harness, Lower Drive, Syst 7, Duplex, Lag, Enviromental
		40398	Harness, Lower Drive, Syst #7, Multiple, Enviromental
19	1	18727	Washer, Curved Spring, /265 ID
20		60160-22	Drive Cam Assy, Link, Enviromental, 2900 Lower Drive
21		60055-53	Lower Drive Assy, 2900, 24/60, System #4
		60055-51	Lower Drive Assy, 2900, 120, System #4
		60055-52	Lower Drive Assy, 2900, 220, System #4
		60255-51	Lower Drive Assy, 2900, 120, System #5 and #6, Lead/Lag
		60056-51	Lower Drive Assy, 2900, 120, System #7, Lead
		60056-61	Lower Drive Assy, 2900, 120, System #7, Lag
22	*		2900 Lower Powerhead Assembly

Not Shown:

1	14044	Tie, Cable, HeyCo VNT # 4-18
1	43062	Grease, Lubriplate, 630-2
	60320-11	Switch Kit, 2900 Lower Drive, Adding Second Switch
	60320-08	Switch Kit, 2900 Lower Drive, Adding Third Switch

*Call your distributor for Part Number

CONTROL VALVE ASSEMBLY



Item No.	QTY	Part No.	Description
1	1	41428-01	Valve Body, 2900s, Machd, NPT U.S. Tap
		41428-09	Valve Body, 2900s, Machined, w/Soft Water Adapter
		41428-01NP	Valve Body, 2900s, MCHD, NPT, NP, U.S. Tap, Top Coll
		41428-03	Valve Body, 2900s, MACHD, NPT, U.S. Tap, Aux Tap, Top Coll
		41428-03NP	Valve Body, 2900s, MCHD, NPT, NP, U.S. Tap, Aux Tap, Top Coll
		41428-05	Valve Body, 2900s, NPT, U.S. Tap, SVO, Top Coll
		41428-07	Valve Body, 2900s, MACHD, NPT, U.S. Tap, Aux Tap, SVO, Top Coll
		41428-09	Valve Body, 2900s, MACHD, NPT, U.S. Tap, Soft ADAPT, Top Coll

Item No.	QTY	Part No.	Description
		41428-09NP	Valve Body, 2900S, MCHD, NPT, NP, U.S. Tap, Soft ADAPT, Top Coll
		41428-11	Valve Body, 2900S, NPT, U.S. Tap, Aux Tap, SFT ADPT, Top Coll
		41428-13	Valve Body, 2900S, MACHD, NPT, U.S. Tap, SVO, Soft ADAPT, Top Coll
		41428-15	Valve Body, 2900S, MACHD, NPT, U.S. Tap, SVO, SFT ADPT, AX TP Top
		41428-21	Valve Body, 2900S, MACHD, BSP, Metric Tap, Top Coll
		41428-21NP	Valve Body, 2900S, MCHD, BSP, NP, Metric Tap, Top Coll
2	1	10757	Spacer, End
		10757B	Spacer, End, Brass, HW
3	7	10545	Seal, Piston
		10545-01	Seal, Piston, Viton
		10545-02	Seal, Piston, Silicone



CONTROL VALVE ASSEMBLY *CONTINUED*

Item No.	QTY	Part No.	Description
4	6	11451	Spacer, 12 Hole
		16589	Spacer, Hot Water
5	1	14451	Piston, 2750
		19454*	Piston, 2750, Upflow
6	1	41424	Rod, Piston, 2900S, Upper
7	1	41131	Plug, End
	1	10212	Plug, End, 1500/2750, Brass
8	1	10909	Pin, Link
9	1	10209	Quad Ring, -010
10	1	40078	O-ring, 28mm X 2mm
		10234-01	O-ring, -024, Hot Water
11	4	11720	Seal, Piston, 2900/3150
		10545-02	Seal, Piston, Silicone
12	2	10369	Spacer, 2-inch, 2900/3150
		14241-01	Spacer, Hot Water
13	1	14753	Spacer, 2900
		16589	Spacer, Hot Water
14	1	14757	Piston, HWBP
		14752	Piston, 2900, NHWBP
15	1	14818	Ring, Piston Rod, Snap
16	1	14758	Rod, Piston, 2900
17	1	14922	O-ring, -035, Piston
18	1	14926	Quad Ring, -012
19	1	14754-00	End Plug Assy, 2900
		14754-01	Plug, End, White, Machined
		14754-10	End Plug Assembly, 2900/2930, NHWBP
		19276-01	End Plug Assembly, 2900S, Brass, HW
		41427-01	Plug, End, 2900S, Lower, White
		41427-11	Plug, End, 2900S, Lower, Black
20	1	14813	Pin, Spring, Connecting Rod
21	1	13575	O-ring, -240
		15210	O-ring, -343, Park Tank
22	1	13577	O-ring, -226
23	1	61525	Softwater Adapter Kit, 2900S
25	2	19925	Gasket, Injector Body, 1700
31	1	11893	Cap, Injector, Stainless Steel
32	2	15137	Screw, Hex Wsh Mach, 10 - 24 x 3/8
33		61540	Piston Assy, 2900S Downflow, Upper
		61540-01	Piston Assy, 2900S, Downflow, Upper, Hot Water

Item No.	QTY	Part No.	Description
		61545	Piston Assy, 2900S, Upflow, Upper
		61545-01	Piston Assy, 2900S, Upflow, Upper, Hot Water
34		61530	Seal & Spacer Kit, 2900s, Upper
		61530-01	Seal & Spacer Kit, 2900S, Upper, Hot Water
		61530-02	Seal & Spacer Kit, 2900S, Upper, VITON, Chemical Resistant
35		60128	Seal & Spacer Kit, 2900, Lower
		60128-01	Seal & Spacer Kit, 2900, Lower, Hot Water
		60128-10	Seal & Spacer Kit, 2900, Lower, Silicone
36		61550	Piston Assy, 2900S, HWBP, Lower
		61550-03	Piston Assy, 2900S, HWBP, Lower, Hot Water
		61555	Piston Assy, 2900S, NHWBP, Lower
		61555-03	Piston Assy, 2900S, NHWBP, Lower, Hot Water

Not Shown:

60366-00	DLFC, 1-inch F x 3/4-inch F, NPT, No Button
60366-06	DLFC, 1-inch F x 3/4-inch F, NPT, 0.6 gpm
60366-08	DLFC, 1-inch F x 3/4-inch F, NPT, 0.8 gpm
60366-10	DLFC, 1-inch F x 3/4-inch F, NPT, 1.0 gpm
60366-12	DLFC, 1-inch F x 3/4-inch F, NPT, 1.2 gpm
60366-13	DLFC, 1-inch F x 3/4-inch F, NPT, 1.3 gpm
60366-15	DLFC, 1-inch F x 3/4-inch F, NPT, 1.5 gpm
60366-17	DLFC, 1-inch F x 3/4-inch F, NPT, 1.7 gpm
60366-20	DLFC, 1-inch F x 3/4-inch F, NPT, 2.0 gpm
60366-24	DLFC, 1-inch F x 3/4-inch F, NPT, 2.4 gpm
60366-30	DLFC, 1-inch F x 3/4-inch F, NPT, 3.0 gpm
60366-35	DLFC, 1-inch F x 3/4-inch F, NPT, 3.5 gpm
60366-40	DLFC, 1-inch F x 3/4-inch F, NPT, 4.0 gpm



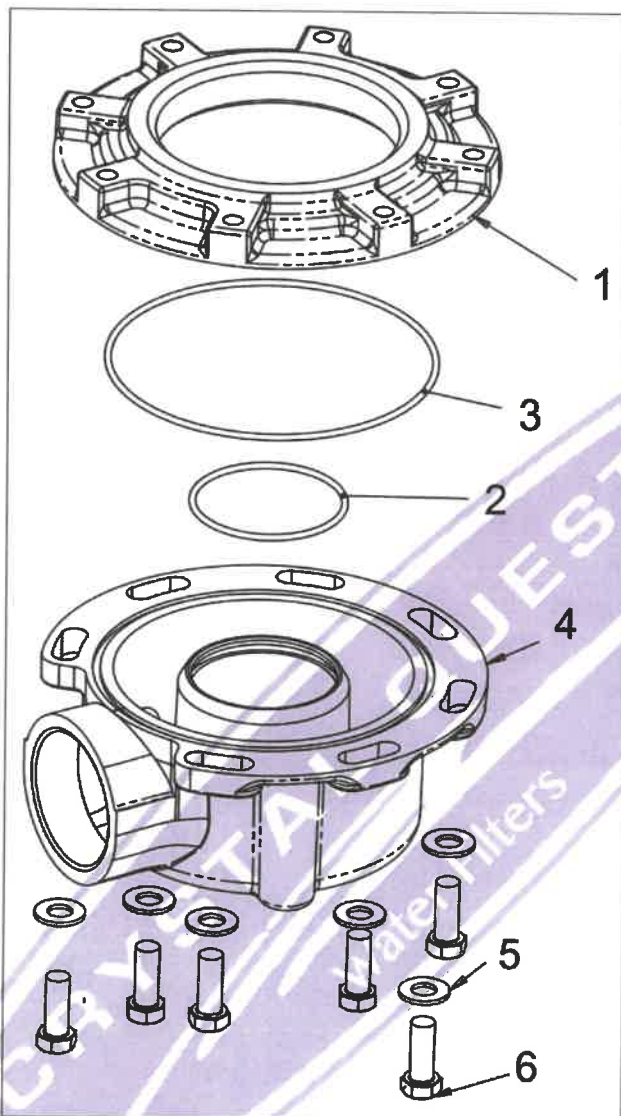
CONTROL VALVE ASSEMBLY *CONTINUED*

Item No.	QTY	Part No.	Description
.....		60721-30	DLFC, 1-inch F x 1-inch F, NPTF, 3.0 gpm
.....		60721-35	DLFC, 1-inch F x 1-inch F, NPTF, 3.5 gpm
.....		60721-40	DLFC, 1-inch F x 1-inch F, NPTF, 4.0 gpm
.....		60721-45	DLFC, 1-inch F x 1-inch F, NPTF, 4.5 gpm
.....		60721-50	DLFC, 1-inch F x 1-inch F, NPTF, 5.0 gpm
.....		60721-60	DLFC, 1-inch F x 1-inch F, NPTF, 6.0 gpm
.....		60721-70	DLFC, 1-inch F x 1-inch F, NPTF, 7.0 gpm
.....		60702-00	DLFC, 1-inch M x 1-inch F, NPT, Brass, No Button
.....		60702-8.0	DLFC, 1-inch M x 1-inch F, NPT, 8.0 gpm
.....		60702-9.0	DLFC, 1-inch M x 1-inch F, NPT, 9.0 gpm
.....		60702-10	DLFC, 1-inch M x 1-inch F, NPT, 10 gpm
.....		60702-12	DLFC, 1-inch M x 1-inch F, NPT, 12 gpm
.....		60702-15	DLFC, 1-inch M x 1-inch F, NPT, 15 gpm
.....		60702-20	DLFC, 1-inch M x 1-inch F, NPT, 20 gpm
.....		60702-25	DLFC, 1-inch M x 1-inch F, NPT, 25 gpm
.....		13640	Flow Control, Dole, 30 gpm
.....		60711-35	DLFC, 2-inch NPT, 35 gpm

*Upflow Only

Item No.	QTY	Part No.	Description
.....		60366-00	DLFC, 1-inch F x 3/4-inch F, NPT, 4.5 gpm
.....		60366-45	DLFC, 1-inch F x 3/4-inch F, NPT, 4.5 gpm
.....		60366-50	DLFC, 1-inch F x 3/4-inch F, NPT, 5.0 gpm
.....		60366-60	DLFC, 1-inch F x 3/4-inch F, NPT, 6.0 gpm
.....		60366-70	DLFC, 1-inch F x 3/4-inch F, NPT, 7.0 gpm
.....		60708-00	DLFC, 1-inch F x 3/4-inch F, NPT, No Button
.....		60708-8.0	DLFC, 1-inch F x 3/4-inch F, NPT, 8.0 gpm
.....		60708-9.0	DLFC, 1-inch F x 3/4-inch F, NPT, 9.0 gpm
.....		60708-10	DLFC, 1-inch F x 3/4-inch F, NPT, 10.0 gpm
.....		60708-12	DLFC, 1-inch F x 3/4-inch F, NPT, 12.0 gpm
.....		60708-15	DLFC, 1-inch F x 3/4-inch F, NPT, 15.0 gpm
.....		60708-20	DLFC, 1-inch F x 3/4-inch F, NPT, 20.0 gpm
.....		60708-25	DLFC, 1-inch F x 3/4-inch F, NPT, 25.0 gpm
.....		60721-00	DLFC, 1-inch F x 1-inch F, NPT, No Button
.....		60721-06	DLFC, 1-inch F x 1-inch F, NPT, 0.06 gpm
.....		60721-08	DLFC, 1-inch F x 1-inch F, NPT, 0.08 gpm
.....		60721-10	DLFC, 1-inch F x 1-inch F, NPT, 1.0 gpm
.....		60721-12	DLFC, 1-inch F x 1-inch F, NPT, 1.2 gpm
.....		60721-13	DLFC, 1-inch F x 1-inch F, NPT, 1.3 gpm
.....		60721-15	DLFC, 1-inch F x 1-inch F, NPT, 1.5 gpm
.....		60721-00	DLFC, 1-inch F x 1-inch F, NPTF, No Button
.....		60721-17	DLFC, 1-inch F x 1-inch F, NPTF, 1.7 gpm
.....		60721-20	DLFC, 1-inch F x 1-inch F, NPTF, 2.0 gpm
.....		60721-24	DLFC, 1-inch F x 1-inch F, NPTF, 2.4 gpm

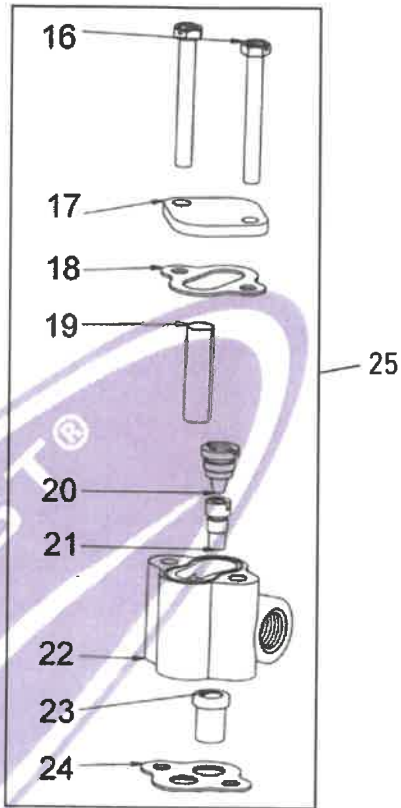
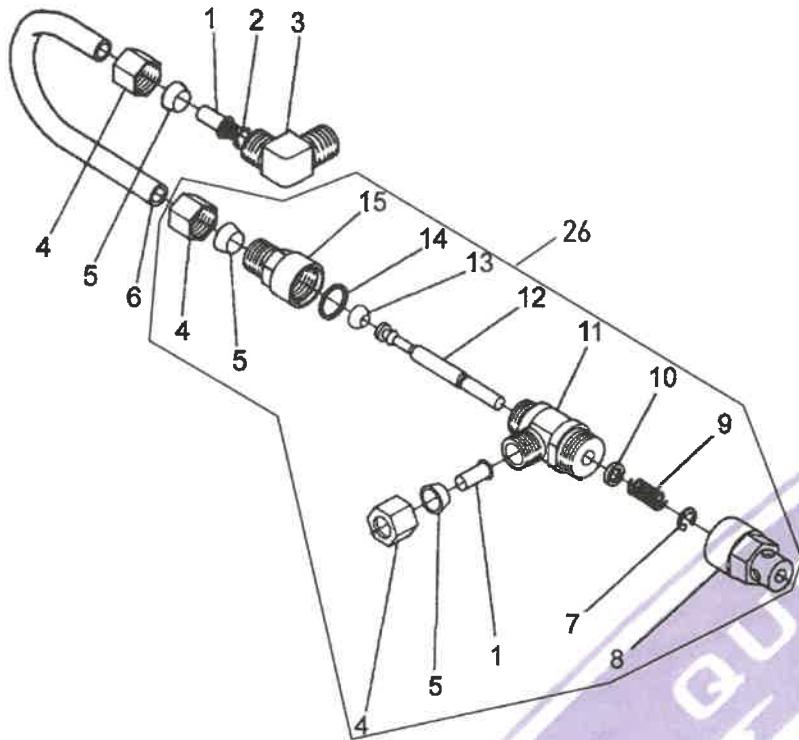
CONTROL VALVE SIDE MOUNT ADAPTER



Item No.	QTY	Part No.	Description
1	1	40316	Adapter, Sidemount
2	1	40372	O-ring - 142
3	1	40368	O-ring - 160, Sidemount, Flange
4	1	40310	Base, 2850/2900/3930, Rotating
5	7	40375	Washer, Flat, 3/8, Type A, N-SERS
6	7	19768	Screw, Hex Hd, 3/8 - 16 x 1, Cap 18-8
7	1	61415	Adapter Assy, Sidemount 2850/2900/2930
		61415NP	Adapter Assy, Sidemount, NP 2850/2900/2930
		61415-20	Adapter Assy, Sidemount, BSP/MTC 2850/2900/2930
		61415-20NP	Adapter Assy, Sidemount, BSP/NP 2850/2900/2930



1600 SERIES BRINE SYSTEM



Item No.	QTY	Part No.	Description
1	2	10332	Fitting, Insert, 3/8
2	1	12767	Screen, Brine
3	1	10328	Fitting, Elbow, 90 Deg. 1/4 PT x 3/8 Tube
4	3	10329	Fitting, Tube, 3/8 Nut, Brass
5	3	10330	Fitting, Sleeve, 3/8 Celcon
6	1	16508	Tube, Brine, 1600, PVC
	1	16508-01	Tube, Brine Valve, 2850/2900s
	1	12774	Tube, Brine Valve, 1500
	1	40027	Tube, Brine Valve, 2510
	1	15221	Tube, Brine Valve, 2750/2900
	1	42184	Tube, Brine Valve, 2850s
	1	41683*	Tube, Brine Valve, UF, 1600/1650
7	1	10250	Ring, Retaining
8	1	11749	Guide, Brine Valve Stem
9	1	10249	Spring, Brine Valve
10	1	12550	Quad Ring, -009
11	1	12748	Brine Valve Body Assy, 1600 w/Quad Ring
12	1	12552-02	Brine Valve Stem, 1600, with Seat
13	1	12626	Seat, Brine Valve
14	1	11982	O-ring, -016
15	1	60020-25	BLFC, .25 GPM, 1600
	1	60020-50	BLFC, .50 GPM, 1600
	1	60020-100	BLFC, 1.0 GPM, 1600
16	2	10692	Screw, Slot Hex Hd, 10 - 24X 18-8 Stainless Steel

Item No.	QTY	Part No.	Description
17	1	11893	Cap, Injector, SS
18	1	10229	Gasket, Injector Cap, 1600
19	1	10227	Screen, Injector
20	1	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
		12973-0	Nozzle, Injector #0, PVC, Grey
		12973-1	Nozzle, Injector #1, PVC, Grey
		12973-2	Nozzle, Injector #2, PVC, Grey
		12973-3	Nozzle, Injector #3, PVC, Grey
		12973-4	Nozzle, Injector #4, PVC, Grey
		10225-0	Nozzle, Injector #0, Stainless Steel
		10225-1	Nozzle, Injector #1, Stainless Steel
		10225-2	Nozzle, Injector #2, Stainless Steel
		10225-3	Nozzle, Injector #3, Stainless Steel
		10225-4	Nozzle, Injector #4, Stainless Steel

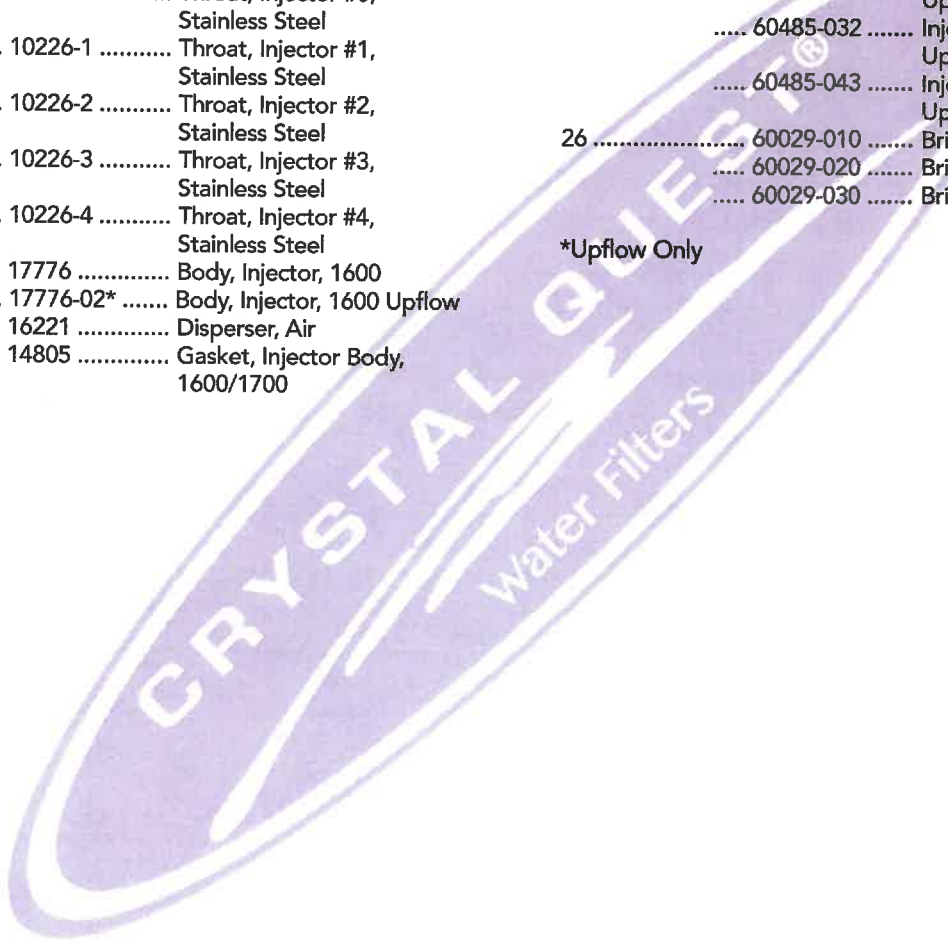


1600 SERIES BRINE SYSTEM *CONTINUED*

Item No.	QTY	Part No.	Description
21	1	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
		12974-0	Throat, Injector #0, PVC, Grey
		12974-1	Throat, Injector #1, PVC, Grey
		12974-2	Throat, Injector #2, PVC, Grey
		12974-3	Throat, Injector #3, PVC, Grey
		12974-4	Throat, Injector #4, PVC, Grey
		10226-0	Throat, Injector #0, Stainless Steel
		10226-1	Throat, Injector #1, Stainless Steel
		10226-2	Throat, Injector #2, Stainless Steel
		10226-3	Throat, Injector #3, Stainless Steel
		10226-4	Throat, Injector #4, Stainless Steel
22	1	17776	Body, Injector, 1600
	1	17776-02*	Body, Injector, 1600 Upflow
23	1	16221	Dispenser, Air
24	1	14805	Gasket, Injector Body, 1600/1700

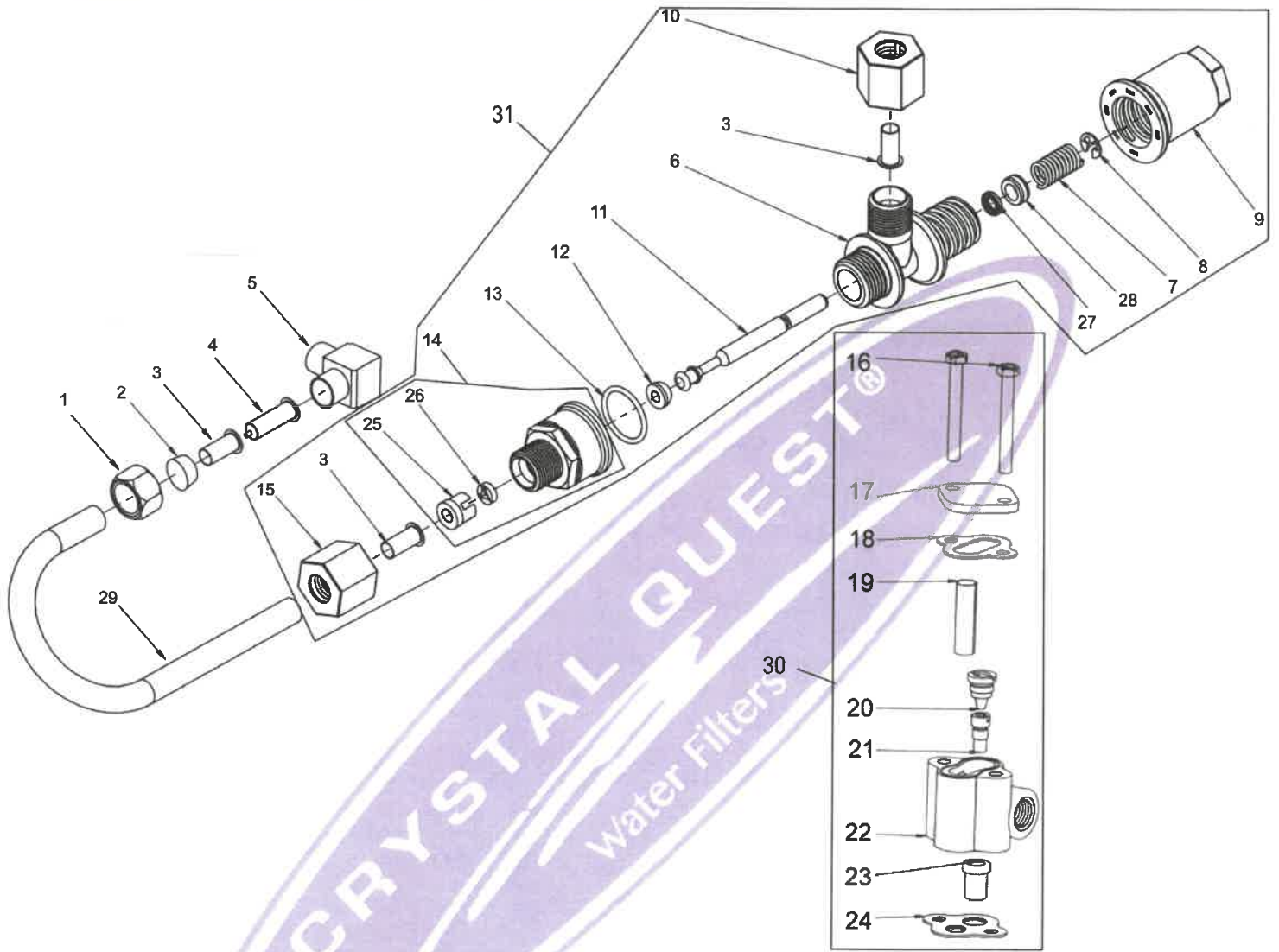
Item No.	QTY	Part No.	Description
25		60480-01	Injector Assy, 1600, #1, Plastic
		60480-02	Injector Assy, 1600, #2, Plastic
		60480-03	Injector Assy, 1600, #3, Plastic
		60480-04	Injector Assy, 1600, #4, Plastic
		60481-21	Injector Assy, 1600, #1, S.S. Brass
		60481-22	Injector Assy, 1600, #2, S.S. Brass
		60481-23	Injector Assy, 1600, #3, S.S. Brass
		60080-11	Injector Assy, 1600, #1, PVC
		60080-12	Injector Assy, 1600, #2, PVC
		60080-14	Injector Assy, 1600, #4, PVC
		60485-003	Injector Assy, 2900/1600, Upflow, #0, w/Reg Cap, 20 psi
		60485-012	Injector Assy, 2900/1600, Upflow, #1, w/Reg Cap, 20 psi
		60485-022	Injector Assy, 2900/1600, Upflow, #2, w/Reg Cap, 20 psi
		60485-032	Injector Assy, 2900/1600, Upflow, #3, w/Reg Cap, 20 psi
		60485-043	Injector Assy, 2900/1600, Upflow, #4, w/Reg Cap, 20 psi
26		60029-010	Brine Valve, 1600, 0.25 gpm
		60029-020	Brine Valve, 1600, 0.50 gpm
		60029-030	Brine Valve, 1600, 1.0 gpm

*Upflow Only





1650 BRINE SYSTEM ASSEMBLY



Item No.	QTY	Part No.	Description
1	1	10329	Fitting, Tube, 3/8 Nut, Brass
2	1	10330	Fitting, Sleeve, 3/8 Celcon
3	3	10332	Fitting, Insert, 3/8
4	1	12767	Screen, Brine
5	1	10328	Fitting, Elbow, 90 Deg 1/4 NPT x 3/8T
6	1	17884	Brine Valve Body Assy, 1650
7	1	10249	Spring, Brine Valve
8	1	10250	Ring, Retaining
9	1	17906	Guide, Brine Valve Stem
10	1	19625	Nut Assy, 3/8-inch, Plastic
11	1	12552-02	Brine Valve Stem, 1600
12	1	12626	Seat, Brine Valve
13	1	16924	O-ring, -018
14	1	60010-25	BLFC, 1650, .25 GPM, Plastic (Includes items 25 and 26)
	1	60010-50	BLFC, 1650, .50 GPM, Plastic

Item No.	QTY	Part No.	Description
	1	60010-100	BLFC, 1650, 1.0 GPM, Plastic
15	1	19625	Nut Assy, 3/8-inch, Plastic
16	2	10692	Screw, Slot Hex Hd, 10 - 24X 18-8 Stainless Steel
17	1	11893	Cap, Injector, Stainless Steel
18	1	10229	Gasket, Injector Cap, 1600
19	1	10227	Screen, Injector
20	1	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
		12973-0	Nozzle, Injector #0, PVC, Grey
		12973-1	Nozzle, Injector #1, PVC, Grey
		12973-2	Nozzle, Injector #2, PVC, Grey



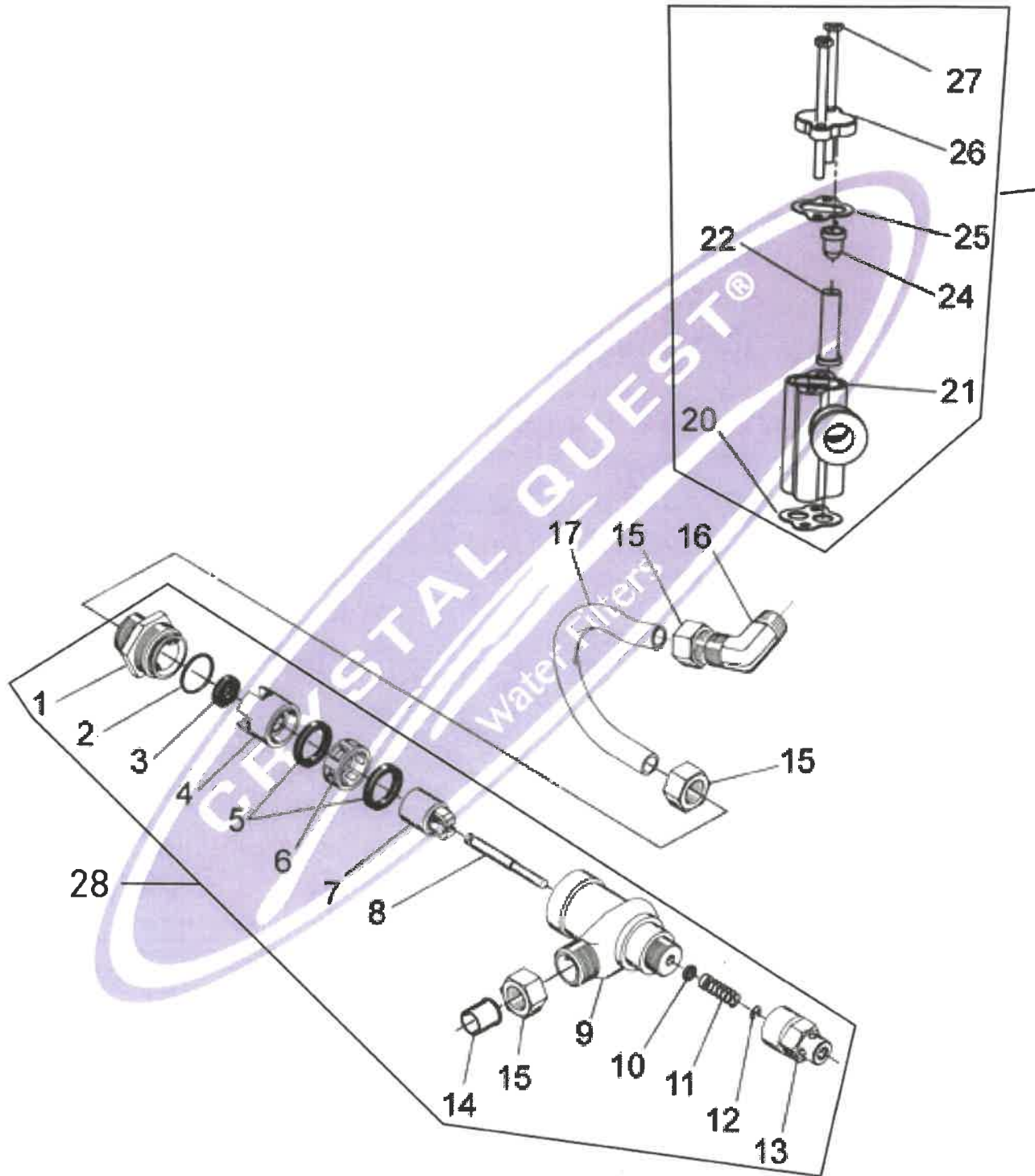
1650 BRINE SYSTEM ASSEMBLY CONTINUED

Item No.	QTY	Part No.	Description
		..... 12973-3	Nozzle, Injector #3, PVC, Grey
		..... 12973-4	Nozzle, Injector #4, PVC, Grey
		..... 10225-0	Nozzle, Injector #0, Stainless Steel
		..... 10225-1	Nozzle, Injector #1, Stainless Steel
		..... 10225-2	Nozzle, Injector #2, Stainless Steel
		..... 10225-3	Nozzle, Injector #3, Stainless Steel
		..... 10225-4	Nozzle, Injector #4, Stainless Steel
21	1	..... 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
		..... 12974-0	Throat, Injector #0, PVC, Grey
		..... 12974-1	Throat, Injector #1, PVC, Grey
		..... 12974-2	Throat, Injector #2, PVC, Grey
		..... 12974-3	Throat, Injector #3, PVC, Grey
		..... 12974-4	Throat, Injector #4, PVC, Grey
		..... 10226-0	Throat, Injector #0, Stainless Steel
		..... 10226-1	Throat, Injector #1, Stainless Steel
		..... 10226-2	Throat, Injector #2, Stainless Steel
		..... 10226-3	Throat, Injector #3, Stainless Steel
		..... 10226-4	Throat, Injector #4, Stainless Steel
22	1	..... 17776	Body, Injector, 1600
	1	..... 17776-02*	Body, Injector, 1600 Upflow
23	1	..... 16221	Dispenser, Air
24	1	..... 14805	Gasket, Injector Body, 1600/1700
25	1	..... 12098	Retainer, Flow Control
26	1	..... 12095	Washer, Flow Control .50 GPM
	1	..... 12094	Washer, Flow Control .25 GPM
	1	..... 12097	Washer, Flow Control 1.0 GPM

Item No.	QTY	Part No.	Description
27	1	..... 12550	Quad Ring -009
	1	..... 12550-01	Quad Ring -009 560CD
28	1	..... 17908	Sleeve, Brine Valve Stem
29	1	..... 16508-01	Tube, Brine Valve, 2850/1600
	1	..... 40027	Tube, Brine Valve, 2510
	1	..... 42184	Tube, Brine Valve, 2850s
	1	..... 12774	Tube, Brine Valve, 1500
	1	..... 15221	Tube, Brine Valve, 2750
	1	..... 41683*	Tube, Brine Valve, UF, 1600/1650
30		..... 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
		..... 60481-21	Injector Assy, 1600, #1, S.S. Brass
		..... 60481-22	Injector Assy, 1600, #2, S.S. Brass
		..... 60481-23	Injector Assy, 1600, #3, S.S. Brass
		..... 60080-11	Injector Assy, 1600, #1, PVC
		..... 60080-12	Injector Assy, 1600, #2, PVC
		..... 60080-14	Injector Assy, 1600, #4, PVC
		..... 60485-003	Injector Assy, 2900/1600, Upflow, #0, w/Reg Cap, 20 psi
		..... 60485-012	Injector Assy, 2900/1600, Upflow, #1, w/Reg Cap, 20 psi
		..... 60485-022	Injector Assy, 2900/1600, Upflow, #2, w/Reg Cap, 20 psi
		..... 60485-032	Injector Assy, 2900/1600, Upflow, #3, w/Reg Cap, 20 psi
		..... 60485-043	Injector Assy, 2900/1600, Upflow, #4, w/Reg Cap, 20 psi
31		..... 60011-010	Brine Valve, 1650, 0.25 gpm
		..... 60011-020	Brine Valve, 1650, 0.50 gpm
		..... 60011-030	Brine Valve, 1650, 1.0 gpm

* Upflow Only

1700 BRINE SYSTEM ASSEMBLY





1700 BRINE SYSTEM ASSEMBLY *CONTINUED*

Item No.	QTY	Part No.	Description
1	1	14792	Plug, End, Brine Valve
2	1	13201	Quad Ring, -020
3	1	12085	Washer, Flow, 1.2 GPM
	1	12086	Washer, Flow, 1.5 GPM
	1	12087	Washer, Flow, 2.0 GPM
	1	12088	Washer, Flow, 2.4 GPM
	1	12089	Washer, Flow, 3.0 GPM
	1	12090	Washer, Flow, 3.5 GPM
	1	12091	Washer, Flow, 4.0 GPM
	1	12092	Washer, Flow, 5.0 GPM
4	1	14785	Retainer, Flow Control
5	3	14811	O-ring, -210, 560CD, Brine
6	1	14798	Spacer, 1700, Brine
7	1	14795	Piston, Brine Valve
8	1	14797	Brine Valve Stem
9	1	14790	Brine Valve Body
10	1	12550	Quad Ring, -009
11	1	15310	Spring, Brine Valve
12	1	10250	Retaining Ring
13	1	15517	Guide, Stem
14	1	15415	Fitting, Insert, 1/2-inch, Tube
15	3	15414	Nut, 2900, w/Sleeve
16	1	15413	Fitting, Elbow, Male, 1/2T x 3/8 NPT
17	1	15416	Tube, Brine, 2900/2750
	1	16460	Tube, Brine, 2850/2900s
	1	41447*	Tube, Brine, 2900s, U/F
	1	42183	Tube, Brine, 1700, 2850s
20	1	14805	Gasket, Injector Body 1600/1700
21	1	17777	Body, Injector, 1700
	1	17777-02*	Body, Injector, 1700 U/F
22	1	14802-03c	Throat, Injector, #3c, Yellow
		14802-04c	Throat, Injector, #4c, Green
		14802-05c	Throat, Injector, #5c, White
		14802-06c	Throat, Injector, #6c, Red
24		14801-03c	Nozzle, Injector, #3c, Yellow
		14801-04c	Nozzle, Injector, #4c, Green

Item No.	QTY	Part No.	Description
		14801-05c	Nozzle, Injector, #5c, White
		14801-06c	Nozzle, Injector, #6c, Red
25	1	10229	Gasket, Injector Cap, 1600
26	1	11893	Cap, Injector, Stainless Steel
	1	10228	Cap, Injector
27	2	14804	Screw, Hex Hd Mach, 10 - 24 x 2-3/4-inch 18-8 Stainless Steel
28	1	60034-00	Brine Valve, 1700, Blank
		60034-10	Brine Valve, 1700, 1.0 gpm
		60034-12	Brine Valve, 1700, 1.2 gpm
		60034-15	Brine Valve, 1700, 1.5 gpm
		60034-20	Brine Valve, 1700, 2.0 gpm
		60034-24	Brine Valve, 1700, 2.4 gpm
		60034-30	Brine Valve, 1700, 3.0 gpm
		60034-40	Brine Valve, 1700, 4.0 gpm
		60034-50	Brine Valve, 1700, 5.0 gpm
29	1	60381-03	Injector Assy, 1700, #3c, Complete
		60381-04	Injector Assy, 1700, #4c, Complete
		60381-05	Injector Assy, 1700, #5c, Complete
		60381-06	Injector Assy, 1700, #6c, Complete

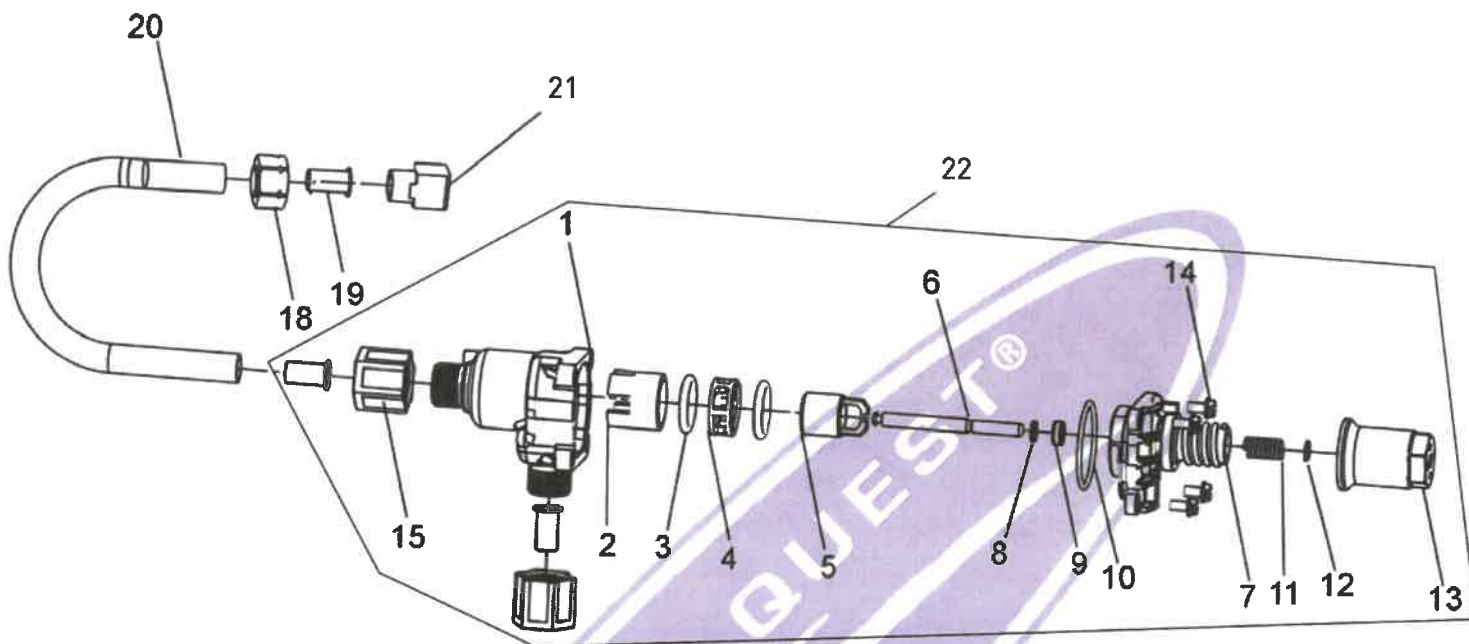
Not Shown:

1	16974	Fitting, Plastic, Female, 3/4 x 3/4 Slip
1	17996	Dispenser, Air, Injector

*Upflow Only

NOTE: ITEM NUMBER 26 (11893) IS USED ON INJECTOR SIZES 2 THROUGH 5C. PART NUMBER 10228 IS USED ON INJECTOR SIZES 6C.

1710 BRINE SYSTEM ASSEMBLY



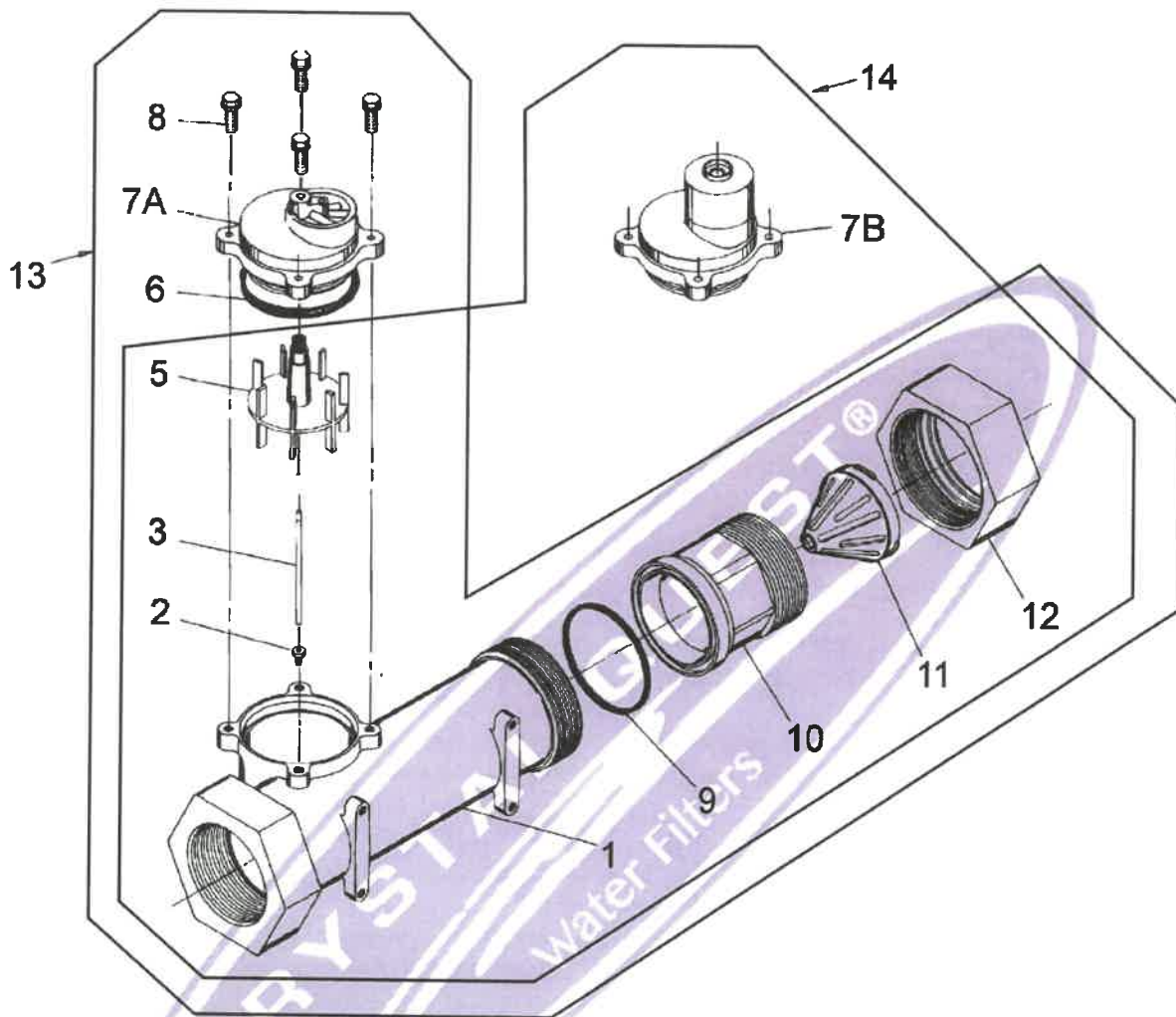
Item No.	QTY	Part No.	Description
1	1	41202	Brine Valve, 1700, Plastic, Top
2	1	14785-01	Retainer, Flow Control
3	1	14811	O-Ring, -210, 560CD, Brine
4	1	14798	Spacer, 1700, Brine
5	1	14795	Piston, Brine Valve
6	1	41203	Stem, Brine, 1710, Plastic, 2900
7	1	41201	Brine Valve, 1700, Plastic, Bottom
8	5	17908	Sleeve, Brine Valve Stem
9	1	12550	Quad Ring, -009
10	3	41547	O-Ring, 2mmx35mm
11	2	15310	Spring, Brine Valve
12	2	10250	Ring, Retaining
13	1	17906	Guide, Brine Valve Stem
14	2	14202-01	Screw, Hex Wsh Mach, 8-32 X 5/16
15	2	41056	Nut Assembly, 1/2-inch Plastic
18	1	15414	Nut, 2900, w/Sleeve
19	1	15415	Fitting, Insert, 1/2-inch, Tube
20	1	16460	Tube, Brine, 2850, 2900s
	1	42183	Tube, Brine, 1700/2850s
	1	15416	Tube, Brine, 2900/2750
	1	41447*	Tube, Brine, 2900s U/F
21	1	15413	Fitting, Elbow, Male, 1/2T X 3/

Item No.	QTY	Part No.	Description
22		60605-00	Brine Valve, 1710, 2750, Blank
		60605-10	Brine Valve, 1710, 2750, 1.0 gpm
		60605-12	Brine Valve, 1710, 2750, 1.2 gpm
		60605-15	Brine Valve, 1710, 2750, 1.5 gpm
		60605-20	Brine Valve, 1710, 2750, 2.0 gpm
		60605-24	Brine Valve, 1710, 2750, 2.4 gpm
		60605-30	Brine Valve, 1710, 2750, 3.0 gpm
		60605-40	Brine Valve, 1710, 2750, 4.0 gpm
		60605-50	Brine Valve, 1710, 2750, 5.0 gpm

Not Shown

1	19151	Washer, Flow, 1.0 gpm
1	17996	Dispenser, Air, Injector
1	414193-00	Label, Blank, BLFC, 1710

2-INCH BRASS METER ASSEMBLY



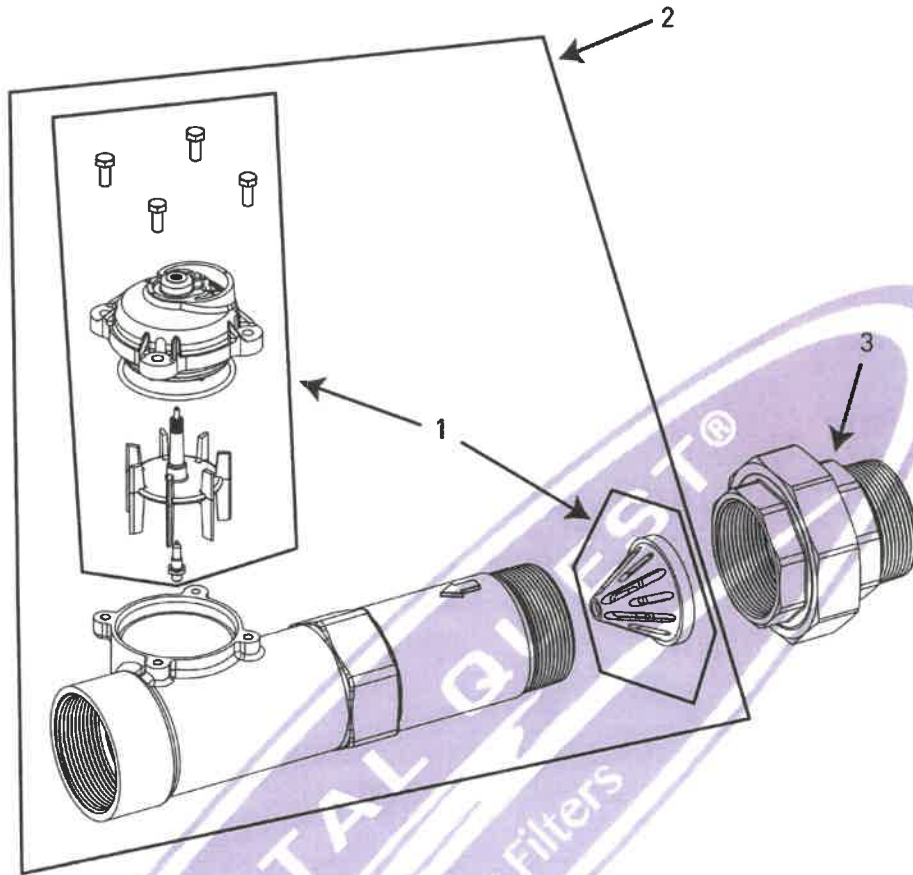
Item No.	QTY	Part No.	Description
1	1	14456	Body, Meter, 2-inch
		14456-20	Body, Meter, 2-inch, BSP, Metric
2	1	15532	Seat, Impeller Shaft, Hex
3	1	15432	Shaft
5	1	15374	Impeller Assy, 2-inch Meter
6	1	13847	O-ring, -137, Std/560CD, Meter
7A	1	14038	Meter Cap Assembly, Std, Plastic
7B	1	15150	Meter Cap Assembly, 3/4-inch to 2-inch, Ext Plastic, Pdl
8	4	12112	Screw, Hex Hd Mach, 10-24 x 1/2 18-8 Stainless Steel
		15886	Screw, Hex Hd, M5 x 12 SS, Metric
9	1	14679	O-ring, -227, Meter
10	1	14568	Fitting, Nipple, 2-inch
		14568-10	Fitting, Nipple, 2-inch BSP, Brass

Item No.	QTY	Part No.	Description
11	1	14680	Flow Straightener
12	1	14569	Nut, 2900 Meter
13			Meter Assy, 2-inch Inline, NPT, STD, Brass, Paddlewheel
			Meter Assy, 2-inch Inline, BSP, STD, Brass, Paddlewheel
14			Meter Assy, 2-inch Inline, NPT, EXT, Brass Paddlewheel
			Meter Assy, 2-inch Inline, BSP, EXT, Brass, Paddlewheel

Not Shown

.....	61439	Meter Sleeve w/O-rings, 1-1/2 inch
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2-INCH STAINLESS STEEL METER ASSEMBLY



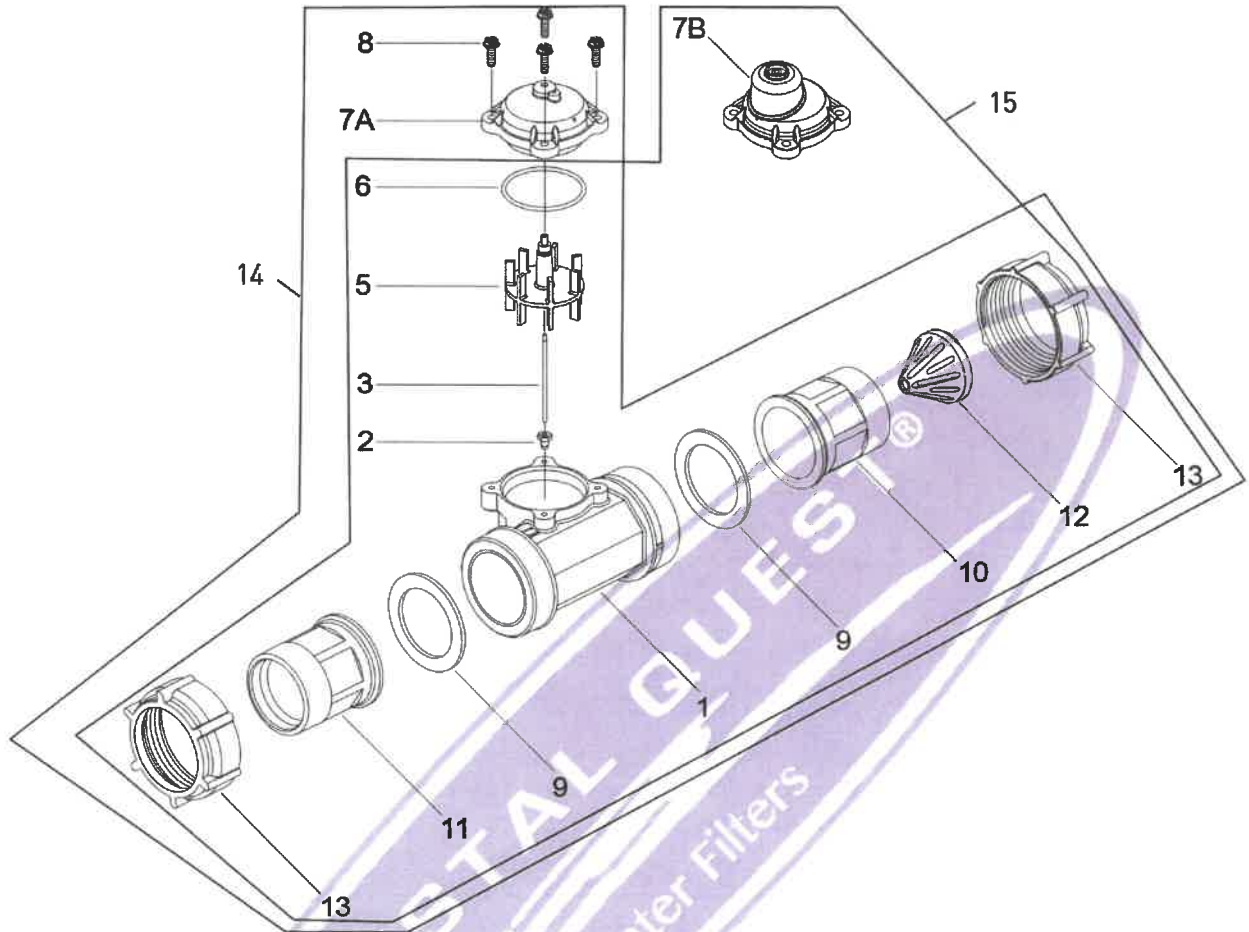
IMPORTANT: FOR VALVES EQUIPPED WITH ELECTROMECHANICAL TIMERS AND STAINLESS STEEL METERS, REFER TO THE METER DOME AND UNION ORIENTATION SECTION.

Item No.	QTY	Part No.	Description
1	1	62048-01	Service Kit, 2 inch Meter, Standard Range
	1	62048-02	Service Kit, 2 inch Meter, Extended Range
2	1	61934-10	Meter Assy, 2 inch, Inline, Stainless Steel, NPT Standard Range
	1	61934-11	Meter Assy, 2 inch, Inline, Stainless Steel, NPT Extended Range
	1	61934-20	Meter Assy, 2 inch, Inline, Stainless Steel, BSP Standard Range
	1	61934-21	Meter Assy, 2 inch, Inline, Stainless Steel, BSP Extended Range
3	1	44026	Union, 2 inch, NPT (Optional on models with electronic controls)
	1	44027	Union, 2 inch, BSP (Optional on models with electronic controls)

Item No.	QTY	Part No.	Description
Not Shown	1	62073	Meter Sleeve, 2 inch to 1-1/2 inch (optional)



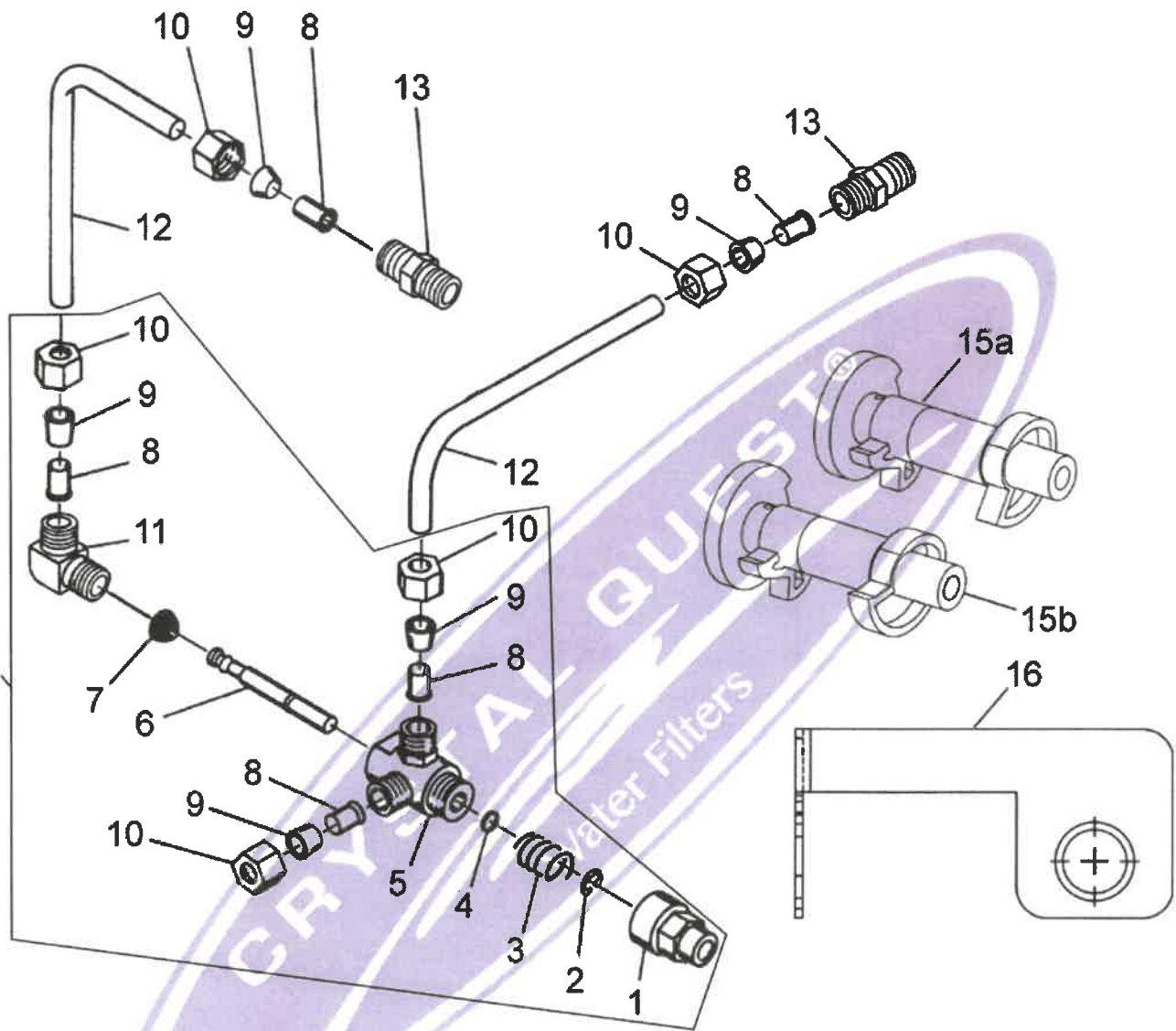
2-INCH PLASTIC METER ASSEMBLY



Item No.	QTY	Part No.	Description
1	1	17689	Body, Meter, 2-inch Plastic w/Impeller Shaft Seat
2	1	15532	Seat, Impeller Shaft, Hex
3	1	15432	Shaft, Impeller, Stainless Steel
5	1	15374	Impeller Assy, 2-inch Meter
6	1	13847	O-ring, -137, Std/560CD, Meter
7A	1	14038	Meter Cap Assembly
7B	1	15150	Meter Cap Assembly, EXT
8	4	12473	Screw, Hex Wsh, 10-24 x 5/8 18-8 Stainless Steel
9	2	40666	Seal, Face, 2-inch, Plastic Meter
10A	1	17987-001	Fitting, Nipple, 2-inch, Plastic, NPT, Machined, Flow Straightener
10B	1	17987-101	Fitting, Nipple, 2-inch, Plastic, BSP, Machined, Flow Straightener
11A	1	17987-000	Fitting, Nipple, 2-inch, Plastic, NPT
11B	1	17987-100	Fitting, Nipple, 2-inch, Plastic, BSP
12	1	14680	Flow Straightener
13	2	17988	Nut, 2-inch Meter

Item No.	QTY	Part No.	Description
14	1	60620	Meter Assy, 2-inch, Inline, NPT, STD, Plastic, w/Plastic Nipples, Paddlewheel
		60620-01	Meter Assy, 2-inch, Inline, NPT, STD, Plastic, w/Brass Nipples, Paddlewheel
		60620-10	Meter Assy, 2-inch Inline, BSP, STD, Plastic, Plastic Nipples, Paddlewheel
		60620-11	Meter Assy, 2-inch, Inline, BSP, STD, Plastic, Brass Nipples, Paddlewheel
15	1	60621	Meter Assy, 2-inch, Inline, NPT, EXT, Plastic, w/Plastic Nipples, Paddlewheel
		60621-01	Meter Assy, 2-inch, Inline, NPT, EXT, Plastic, w/Brass Nipples, Paddlewheel
		60621-10	Meter Assy, 2-inch Inline, BSP, EXT, Plastic, Plastic Nipples, Paddlewheel
		60621-11	Meter Assy, 2-inch, Inline, BSP, EXT, Plastic, Brass Nipples, Paddlewheel

1600 SERVICE VALVE OPERATOR (NEW STYLE)

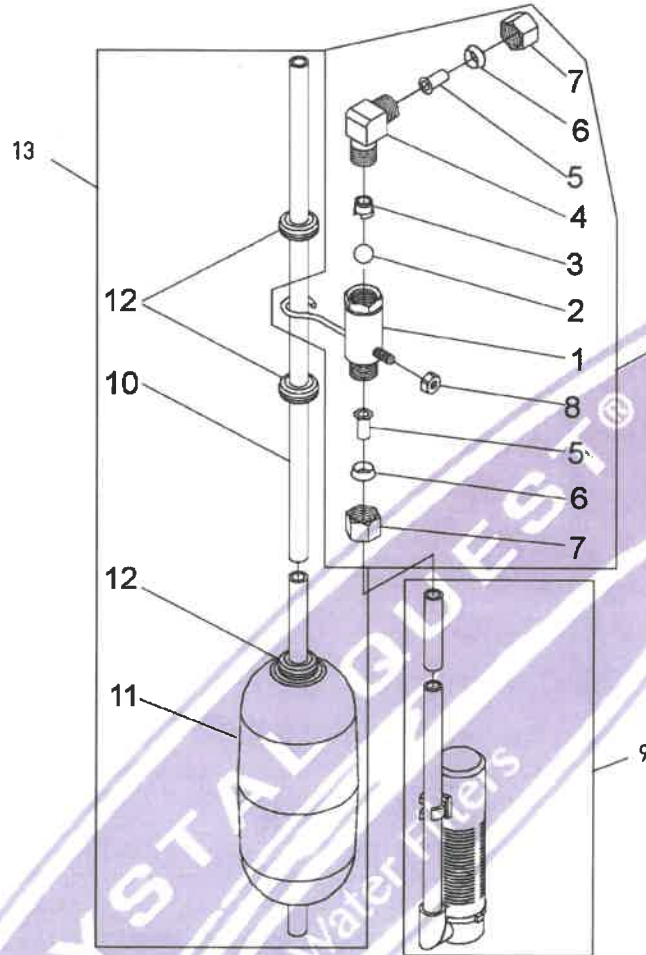


Item No.	QTY	Part No.	Description
1	1	11749	Guide, Brine Valve Stem
2	1	10250	Ring, Retaining
3	1	10249	Spring, Brine Valve
4	1	12550	Quad Ring, -009
5	2	10785	SVO Body Assy Brass Valves
6	1	12552	Brine Valve Stem, 1600
7	1	12626	Seat, Brine Valve
8	5	10332	Fitting, Insert, 3/8-inch
9	5	10330	Fitting, Sleeve, 3/8-inch Celcon
10	5	10329	Fitting, Tube, 3/8 Nut, Brass
11	1	10328	Fitting, Elbow, 90 Deg 1/4 NPT x 3/8 Tube
12	2	12897	Tube, Fitting, 3/8 x 9 3/4
13	1	16730	Fitting, Male, 1/4 x 1

Item No.	QTY	Part No.	Description
14	2	15415	Fitting, Insert, 1/2-inch Tube
15a	1	12472	Cam Assembly, Tri-Stack, After RR
15b	1	15770	Cam Assembly, Special Tri-Stack After Brine Fill
16	1	12114	Bracket, Motor Outboard, Coated
17	1	60150-01	Service Valve Operator Assembly, 1600, New Style, Item No's 1-11



2300 SAFETY BRINE VALVE

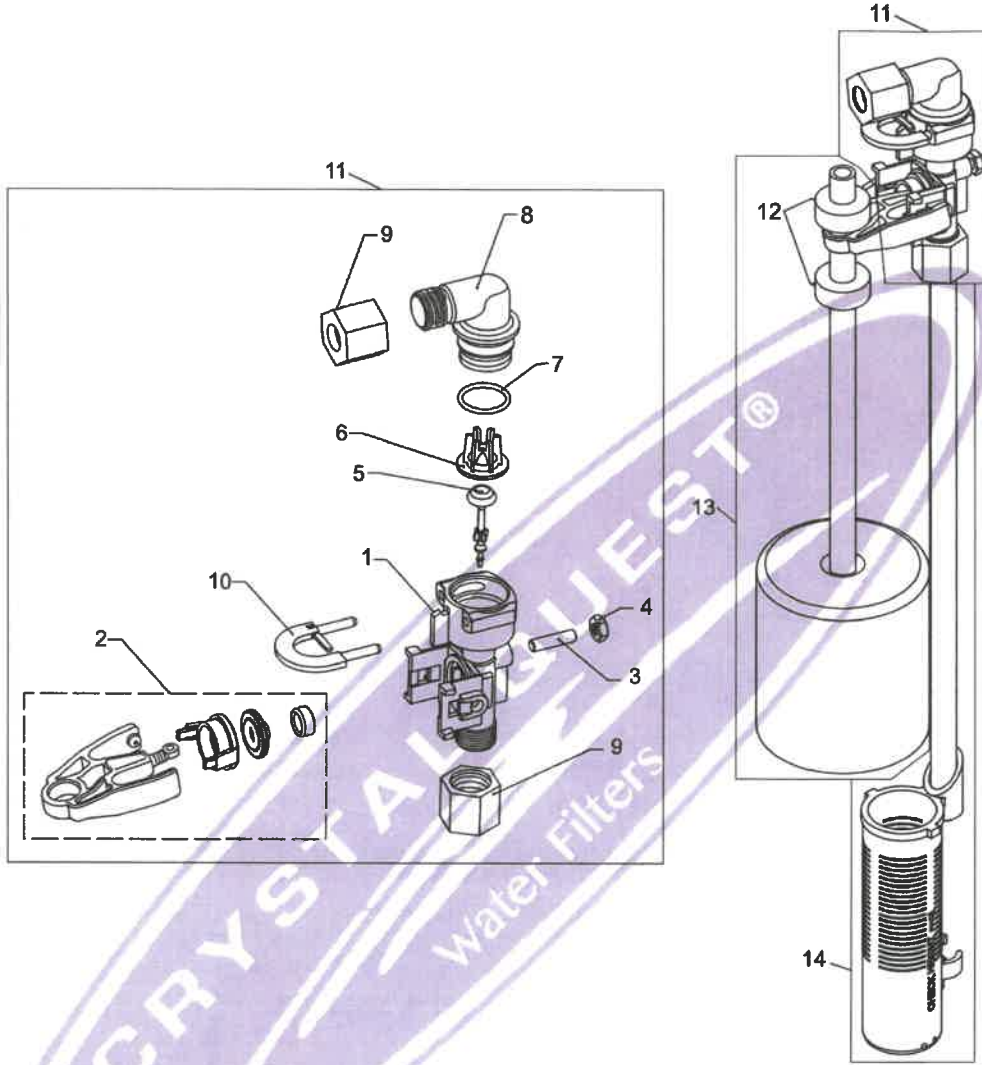


Item No.	QTY	Part No.	Description
1	1	60027-00	Safety Brine Valve, 2300, Less Elbow
2	1	10138	Ball, 3/8-inch, Brass
3	1	11566	Ball Stop, Slow Fill
4	1	10328	Fitting, Elbow, 90 Deg. 1/4 NPT x 3/8 Tube
5	1	10332	Fitting, Insert, 3/8
6	1	10330	Fitting, Sleeve, 3/8 Celcon
7	1	10329	Fitting, Tube, 3/8 Nut, Brass
8	1	10186	Nut, Hex, 10-32
9	1	60002-10	Air Check, #500, American Hydro
		60002-11.38	Air Check, #500, 11.38 inches Long
		60002-24	Air Check, #500, 24 inches Long
		60002-27	Air Check, #500, 27 inches Long
		60002-32	Air Check, #500, 32 inches Long
		60002-34	Air Check, #500, 34 inches Long

Item No.	QTY	Part No.	Description
		60002-36	Air Check, #500, 36 inches Long
		60002-48	Air Check, #500, 48 inches Long
		60002-26.25	Air Check, #500, 26.25 inches Long
		60002-33.25	Air Check, #500, 33.25 inches Long
10	1	10149	Rod, Float, 30-inch
11	1	10700	Float Assy, White
12	3	10150	Grommet, .30 Dia
13	1	60028-30	Float Assy, 2300, 30-inch White
14	1	60027-FFA	Safety Brine Valve, 2300, Fitting Facing Arm
	1	60027-FFS	Safety Brine Valve, 2300 Fitting Facing Stud



2310 SAFETY BRINE VALVE

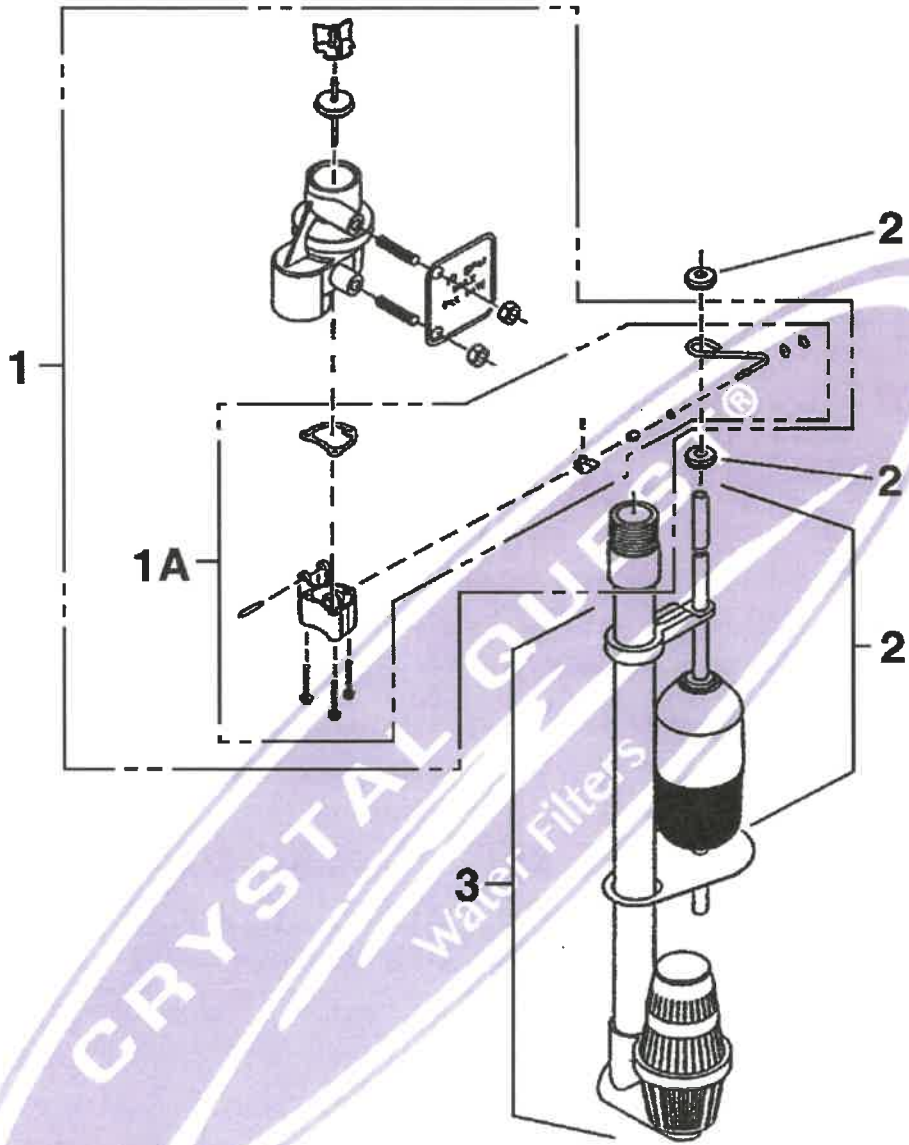


Item No.	QTY	Part No.	Description
1	1	19645	Body, Safety Brine Valve, 2310
2	1	19803	Safety Brine Valve Assy
3	1	19804	Screw, Sckt Hd, Set, 10-24 x .75
4	1	19805	Nut, Hex, 10-24, Nylon Black
5	1	19652-01	Poppet Assy, SBV w/O-ring
6	1	19649	Flow Dispenser
7	1	11183	O-ring, -017
8	1	19647	Elbow, Safety Brine Valve
9	2	19625	Nut Assy, 3/8-inch Plastic
10	1	18312	Retainer, Drain
11	1	60014	Safety Brine Valve Assy, 2310
12	2	10150	Grommet, .30 Dia
13	1	60068-8.06	Float Assy, 2310, w/8.06-inch Rod
		60068-10.5	Float Assy, 2310, w/10.5-inch Rod
		60068-11.5	Float Assy, 2310, w/11.5-inch Rod
		60068-20	Float Assy, 2310, w/20-inch Rod

Item No.	QTY	Part No.	Description
		60068-30	Float Assy, 2310, w/30-inch Rod
14	1	60002-10	Air Check, #500, American Hydro
		60002-11.38	Air Check, #500, 11.38-inch Long
		60002-24	Air Check, #500, 24-inch Long
		60002-27	Air Check, #500, 27-inch Long
		60002-32	Air Check, #500, 32-inch Long
		60002-34	Air Check, #500, 34-inch Long
		60002-36	Air Check, #500, 36-inch Long
		60002-48	Air Check, #500, 48-inch Long
		60002-26.25	Air Check, #500, 26.25-inch Long
		60002-33.25	Air Check, #500, 33.25-inch Long



2350 SAFETY BRINE VALVE



Item No.	QTY	Part No.	Description
1	1	60038	Safety Brine Valve, 2350
1A	1	61024	Actuator Assy, 2350 Brine
2	1	60028-30	Float Assy, 2350, 30-inch Wht
	1	60026-30SAN	Float Assy, 2350, 30-inch Hot Water
3	1	60009-00	Air Check, #900, Commercial Less Fittings
	1	60009-01	Air Check, #900, Commercial, Hot Water Less Fittings

Not Shown

1	18603	Fitting Assy, 900 Air Check 2350
1	18602	Fitting Assy, 900 Air Check



GENERAL SERVICE HINTS FOR METER CONTROL

Problem: Softener delivers hard water

Reason: Reserve capacity has been exceeded.

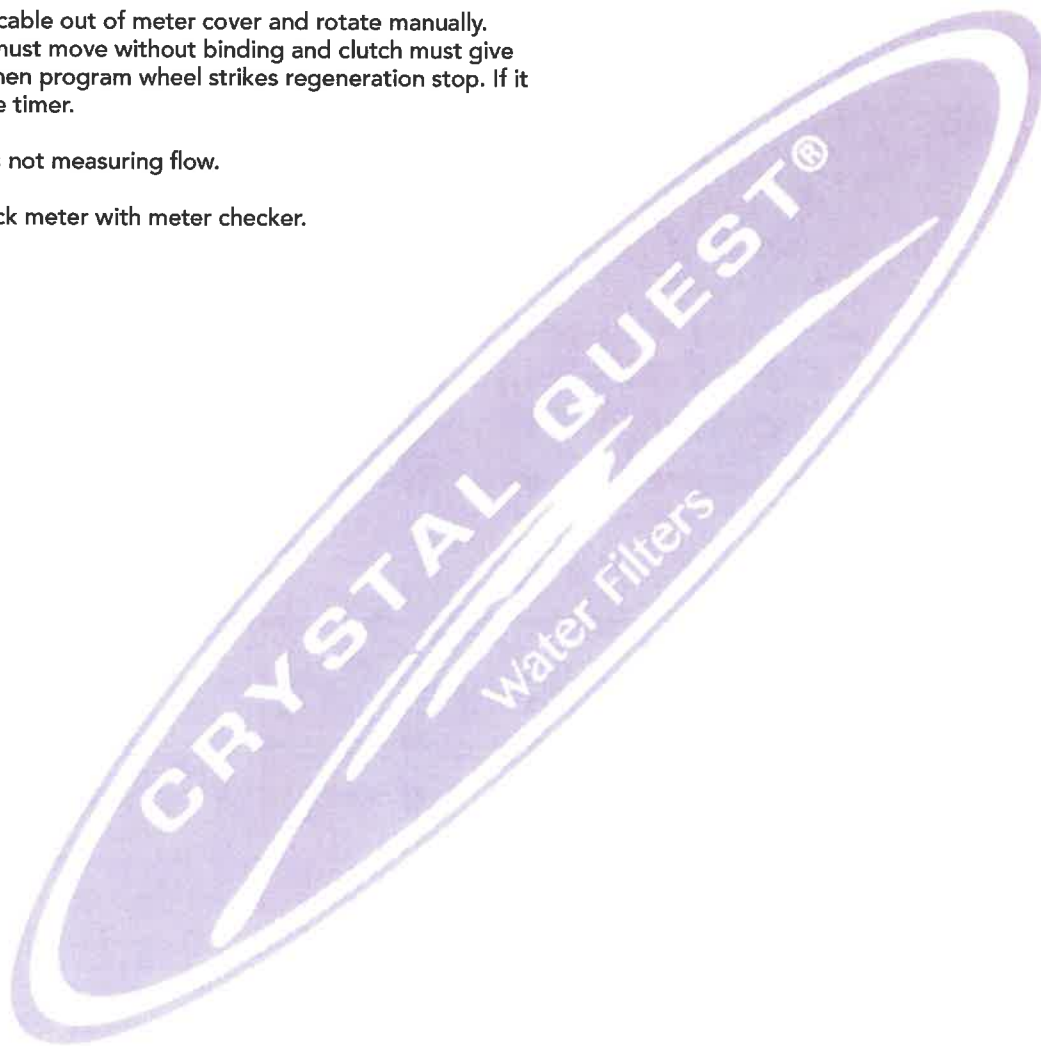
Correction: Check salt dosage requirements and reset program wheel to provide additional reserve.

Reason: 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.

Reason: Meter is not measuring flow.

Correction: Check meter with meter checker.



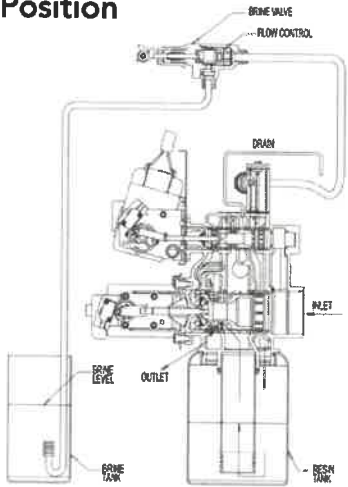


TROUBLESHOOTING

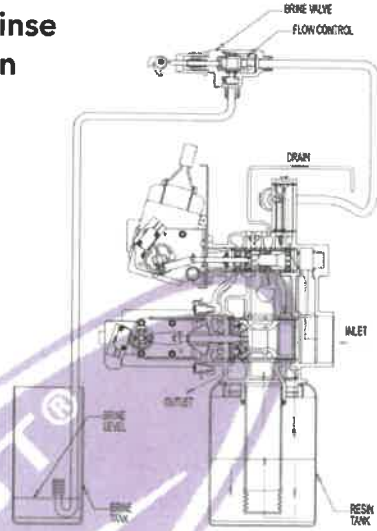
Problem	Cause	Correction
Water conditioner fails to regenerate.	Electrical service to unit has been interrupted.	Assure permanent electrical service (check fuse, plug, pull chain, or switch)
	Timer is defective.	Replace timer.
	Power failure.	Reset time of day.
Hard water.	By-pass valve is open.	Close by-pass valve.
	No salt is in brine tank.	Add salt to brine tank and maintain salt level above water level.
	Injector screen plugged.	Clean injector screen.
	Insufficient water flowing into brine tank.	Check brine tank fill time and clean brine line flow control if plugged.
	Hot water tank hardness.	Repeated flushings of the hot water tank is required.
	Leak at distributor tube.	Make sure distributor tube is not cracked. Check o-ring and tube pilot.
	Internal valve leak.	Replace seals and spacers and/or piston.
Unit used too much salt.	Improper salt setting.	Check salt usage and salt setting.
	Excessive water in brine tank.	See "Excessive water in brine tank".
Loss of water pressure.	Iron buildup in line to water conditioner.	Clean line to water conditioner.
	Iron buildup in water conditioner.	Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration.
	Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	Remove piston and clean control.
Loss of mineral through drain line.	Air in water system.	Check for proper drain rate.
	Improperly sized drain line flow control.	Check backwash, brine draw, and brine tank fill. Increase frequency of regeneration. Increase backwash time.
Excessive water in brine tank.	Plugged drain line flow control.	Clean flow control.
Excessive water in brine tank.	Plugged injector system.	Clean injector and screen.
	Timer not cycling.	Replace timer.
	Foreign material in brine valve.	Replace brine valve seat and clean valve.
	Foreign material in brine line flow control.	Clean brine line flow control.
Softener fails to draw brine.	Drain line flow control is plugged.	Clean brine line flow control.
	Injector is plugged.	Clean injector.
	Injector screen plugged.	Clean screen.
	Line pressure is too low.	Increase line pressure to 20 psi
	Internal control leak	Change seals, spacers, and piston assembly.
	Service adapter did not cycle.	Check drive motor and switches.
Control cycles continuously.	Misadjusted, broken, or shorted switch.	Determine if switch or timer is faulty and replace it, or replace complete power head.
Drain flows continuously.	Valve is not programming correctly.	Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	Foreign material in control.	Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	Internal control leak.	Replace seals and piston assembly.

WATER CONDITIONER FLOW DIAGRAMS - DOWNFLOW

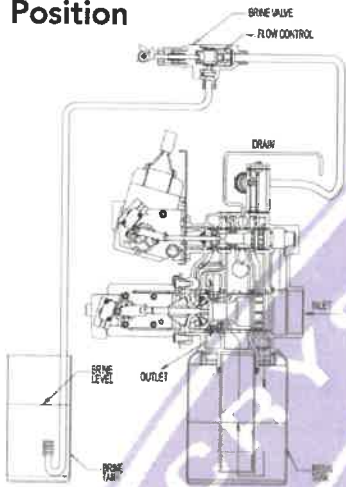
1 Service Position



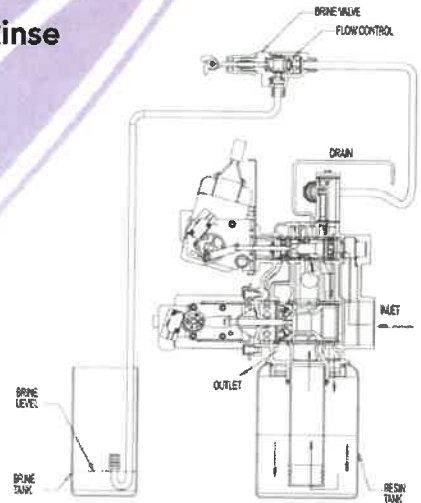
4 Slow Rinse Position



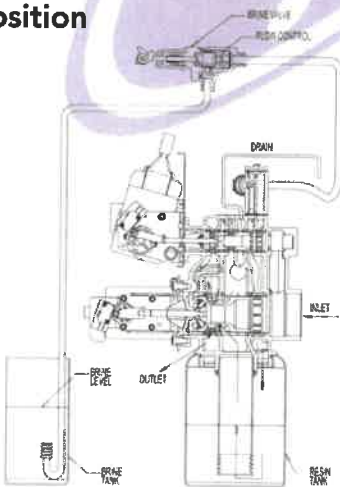
2 Backwash Position



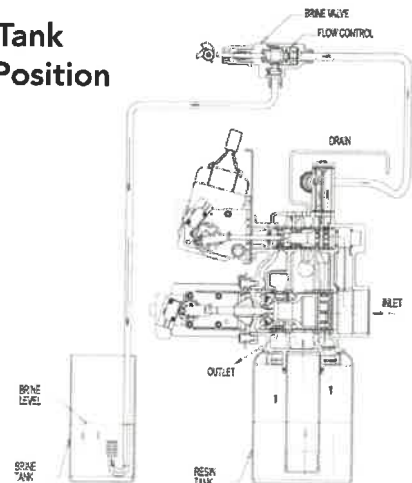
5 Rapid Rinse Position



3 Brine Position

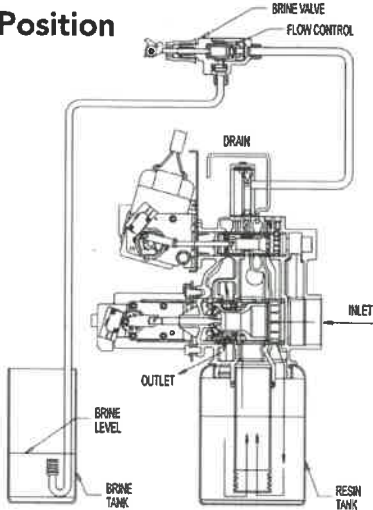


6 Brine Tank Refill Position

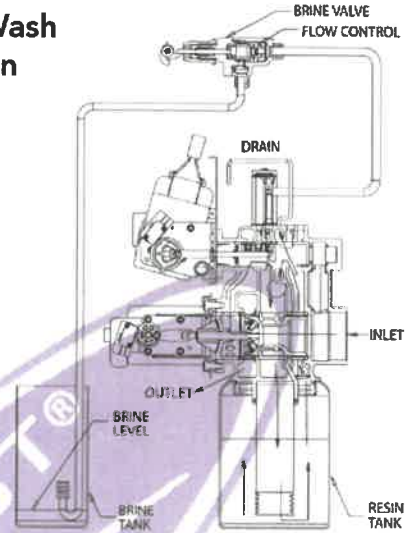


WATER CONDITIONER FLOW DIAGRAMS - UPFLOW

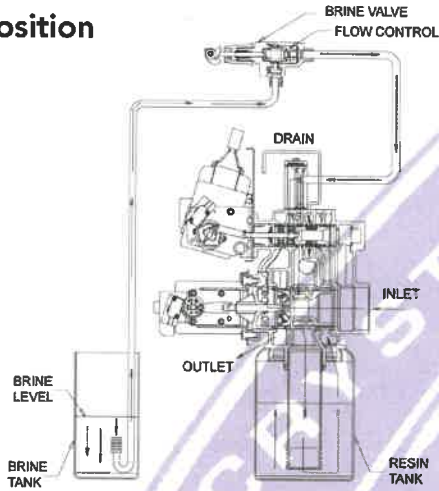
1 Service Position



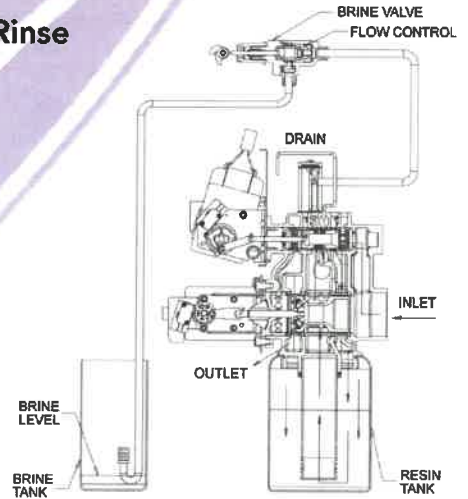
4 Back Wash Position



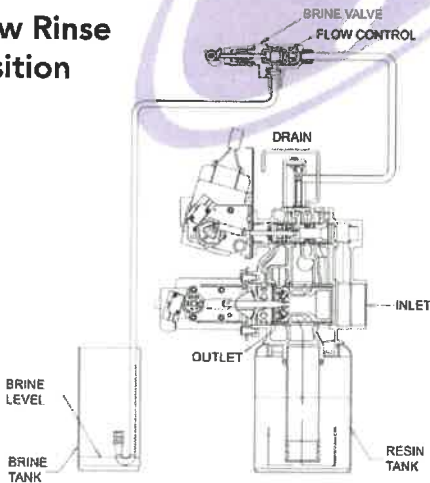
2 Brine Position



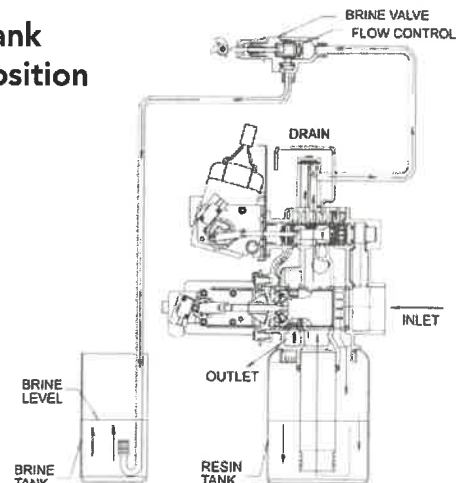
5 Rapid Rinse



3 Slow Rinse Position

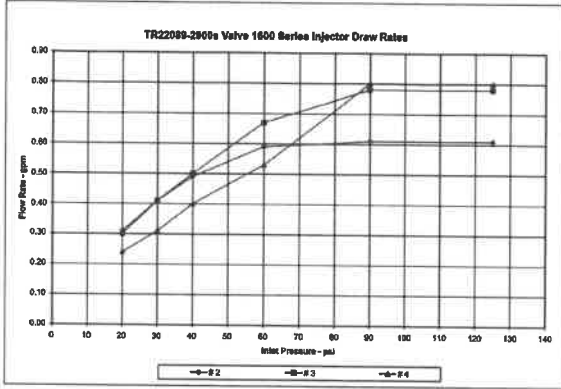


6 Brine Tank Refill Position



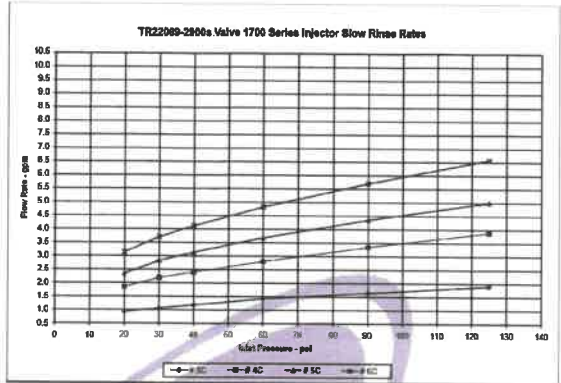


FLOW DATA & INJECTOR DRAW RATES - DOWNFLOW



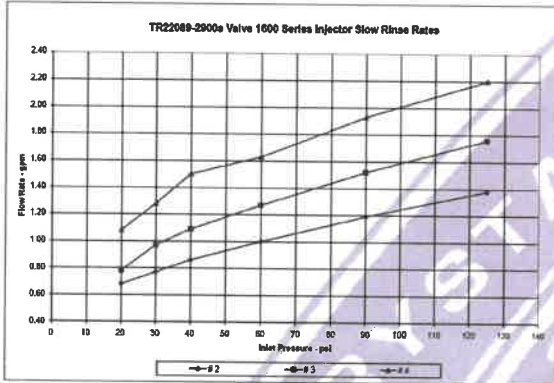
1600 series injectors		Draw Rate - gpm		
pressure	# 2	# 3	# 4	
20	0.31	0.30	0.24	
30	0.41	0.41	0.31	
40	0.49	0.50	0.40	
60	0.59	0.67	0.53	
90	0.61	0.78	0.80	
125	0.61	0.78	0.80	

all injectors used the steel cap and an air disperser



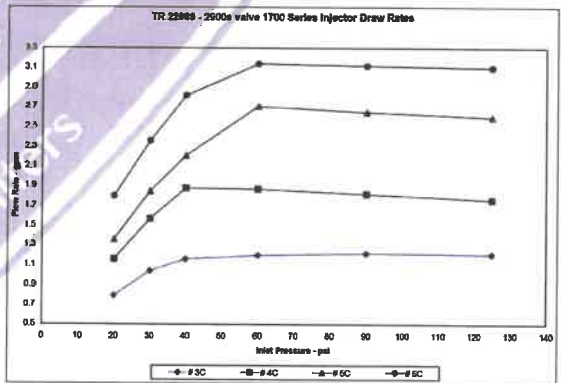
1700 series injectors		Slow Rinse - gpm			
pressure	# 3C	# 4C	# 5C	# 6C	
20	0.93	1.84	2.34	3.13	
30	1.06	2.18	2.82	3.70	
40	1.18	2.40	3.14	4.12	
60	1.42	2.80	3.68	4.82	
90	1.64	3.34	4.36	5.70	
125	1.60	3.58	5.00	6.58	

3C - steel cap, no o-ring, air disperser
 # 4C & 5C - steel cap, o-ring, air disperser
 # 6C & 7C - brass cap, o-ring, no air disperser



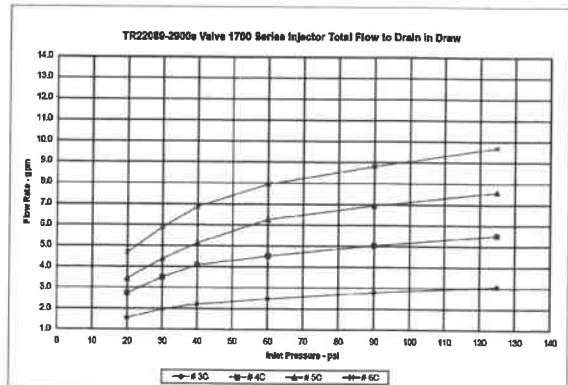
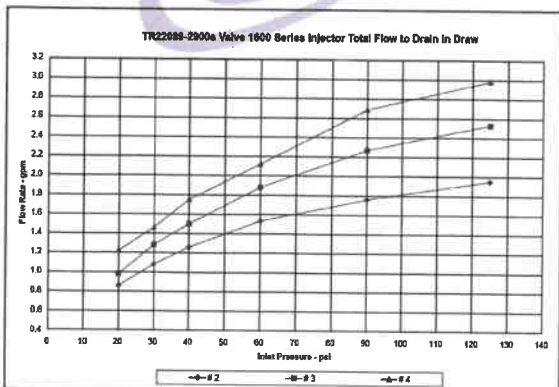
1600 series injectors		Slow Rinse Rates - gpm		
pressure	# 2	# 3	# 4	
20	0.68	0.78	1.08	
30	0.77	0.97	1.28	
40	0.88	1.09	1.50	
60	1.00	1.27	1.83	
90	1.19	1.52	1.93	
125	1.38	1.76	2.20	

all injectors used the steel cap and an air disperser



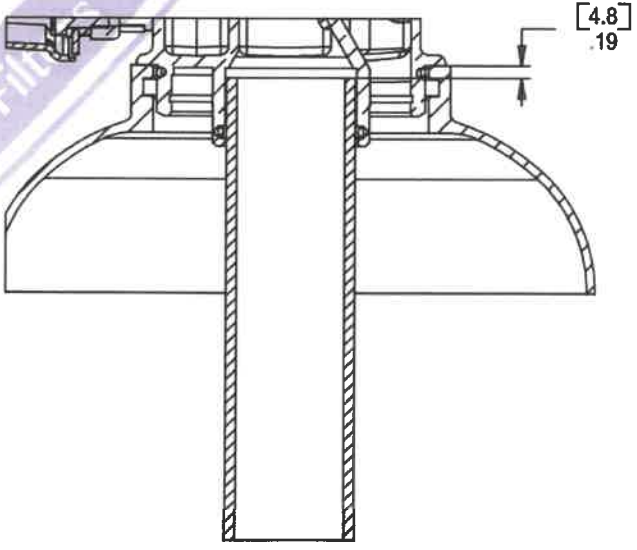
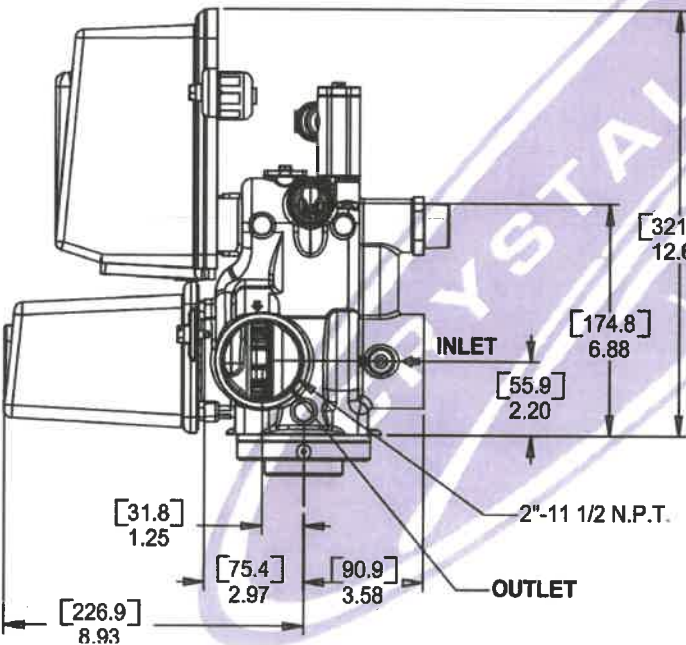
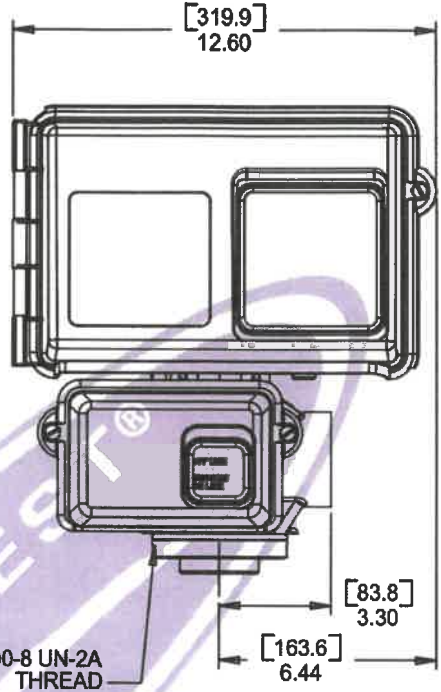
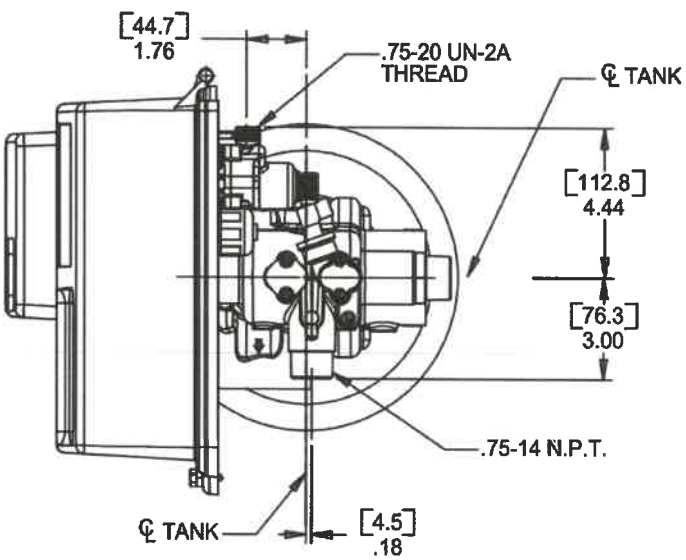
1700 series injectors		Draw Rate - gpm			
pressure	# 3C	# 4C	# 5C	# 6C	
20	0.79	1.16	1.96	1.80	
30	1.04	1.57	1.85	2.36	
40	1.16	1.88	2.21	2.82	
60	1.20	1.87	2.71	3.14	
90	1.22	1.82	2.65	3.12	
125	1.21	1.76	2.60	3.10	

3C - steel cap, no o-ring, air disperser
 # 4C & 5C - steel cap, o-ring, air disperser
 # 6C - brass cap, o-ring, no air disperser



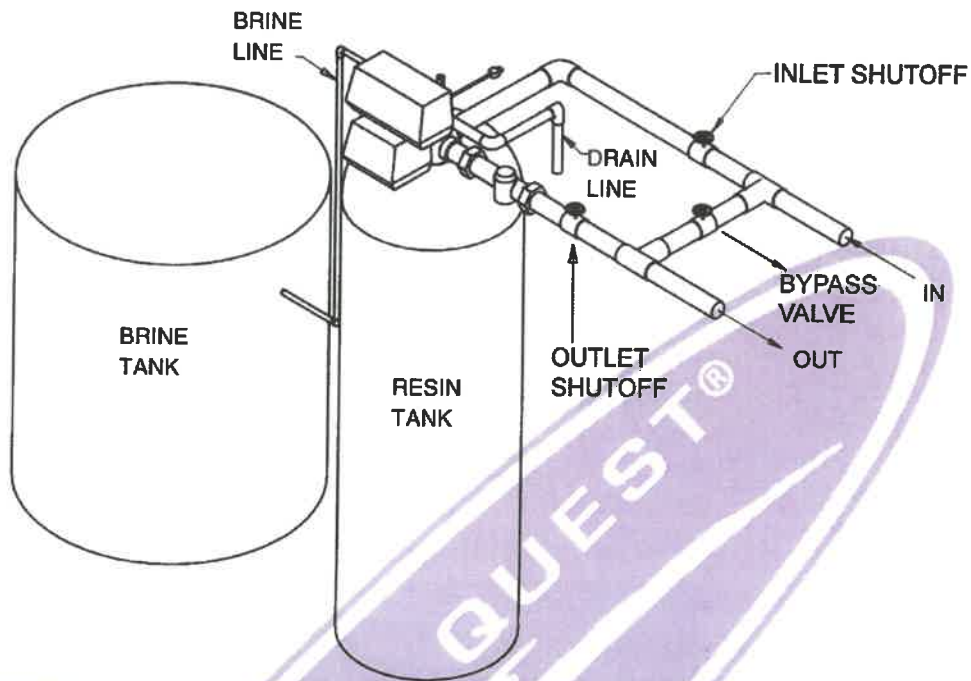


ENVIRONMENTAL BACKPLATE DIMENSIONS



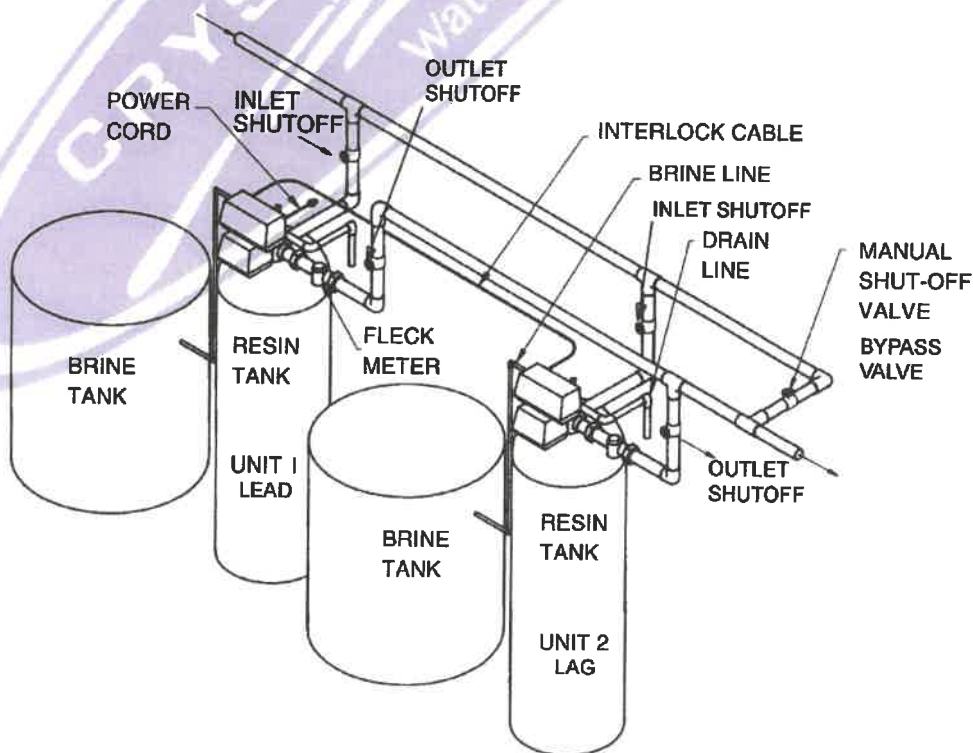
SYSTEM #4

Typical Single Tank Installation with Optional Meter



SYSTEM #5 INTERLOCK

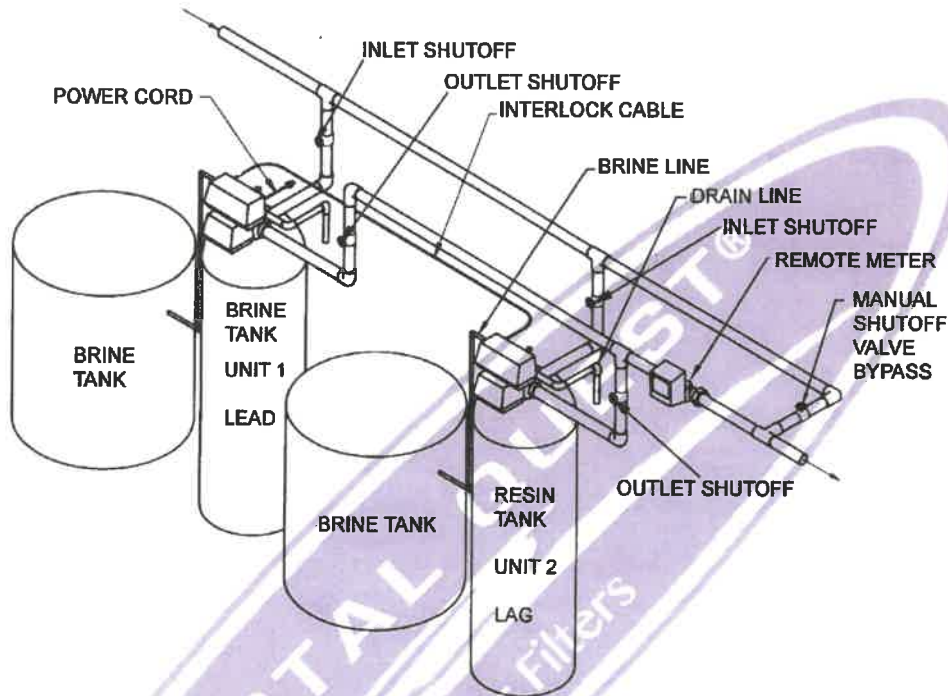
Typical Twin Tank Installation with Optional Meter Interlock and No Hard Water Bypass



SYSTEM #6 & #7

Twin Series Regeneration Installation with a Remote Meter

Twin Alternator Installation

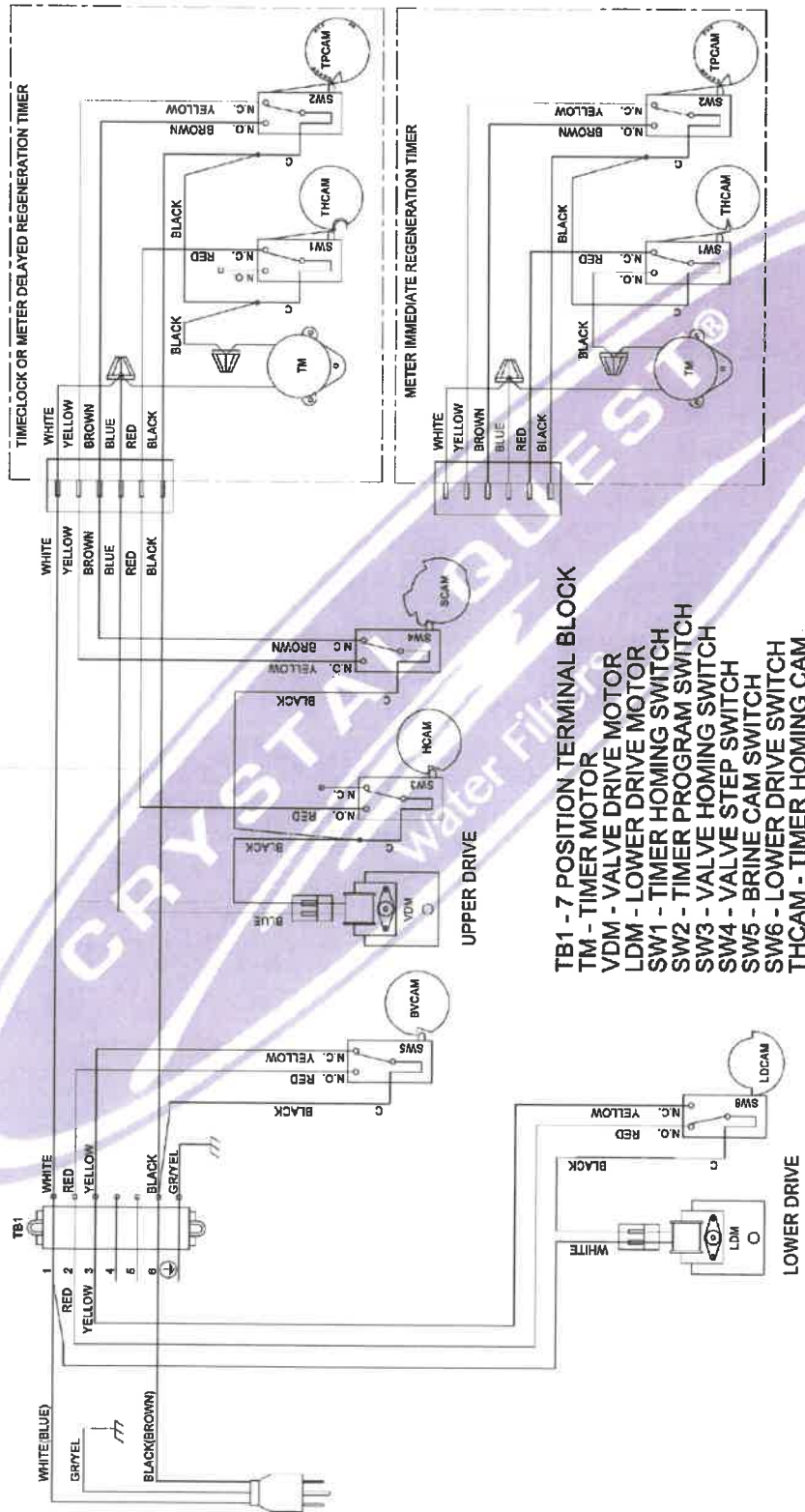


NOTE: ON SYSTEM 7, THE POWER CORD IS ON UNIT 2.

NOTE: SYSTEM 7 CAN RUN WITH EITHER ONE OR TWO BRINE TANKS. TWO BRINE TANKS SHOULD BE USED IF REGENERATION IS LESS THAN 4 HOURS.

SYSTEM #4 WIRING

Single Valve Regeneration Immediate and Delayed Valve Wiring

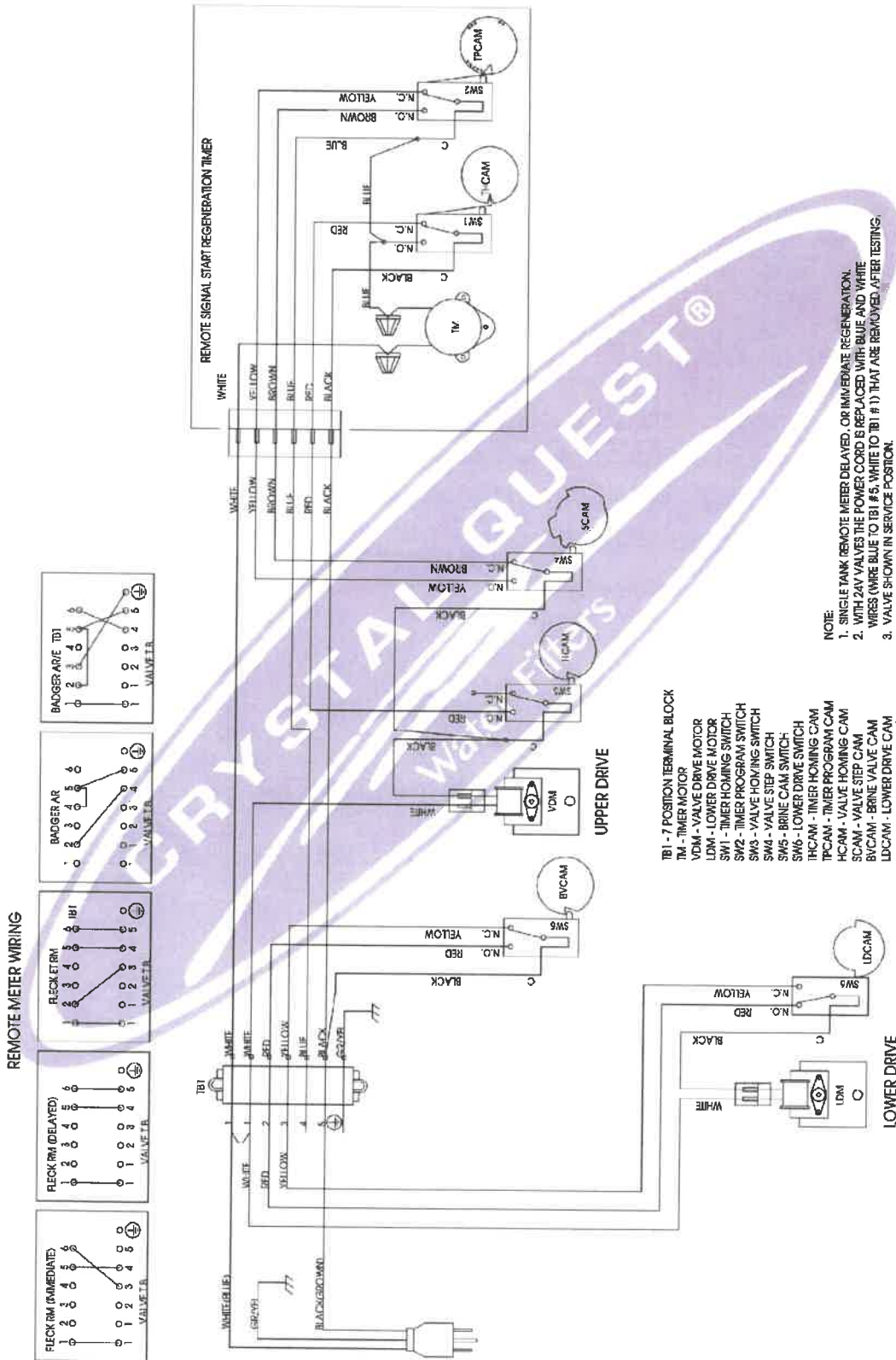


- TB1 - 7 POSITION TERMINAL BLOCK**
TM - TIMER MOTOR
VDM - VALVE DRIVE MOTOR
LDM - LOWER DRIVE MOTOR
SW1 - TIMER HOMING SWITCH
SW2 - TIMER PROGRAM SWITCH
SW3 - VALVE HOMING SWITCH
SW4 - VALVE STEP SWITCH
SW5 - BRINE CAM SWITCH
SW6 - LOWER DRIVE SWITCH
THCAM - TIMER HOMING CAM
TPCAM - TIMER PROGRAM CAM
HCAM - VALVE HOMING CAM
SCAM - VALVE STEP CAM
BVCAM - BRINE VALVE CAM
LDCAM - LOWER DRIVE CAM

NOTE:
 1. SINGLE TANK TIMECLOCK, METER DELAYED, OR METER IMMEDIATE REGENERATION.
 2. VALVE SHOWN IN SERVICE.

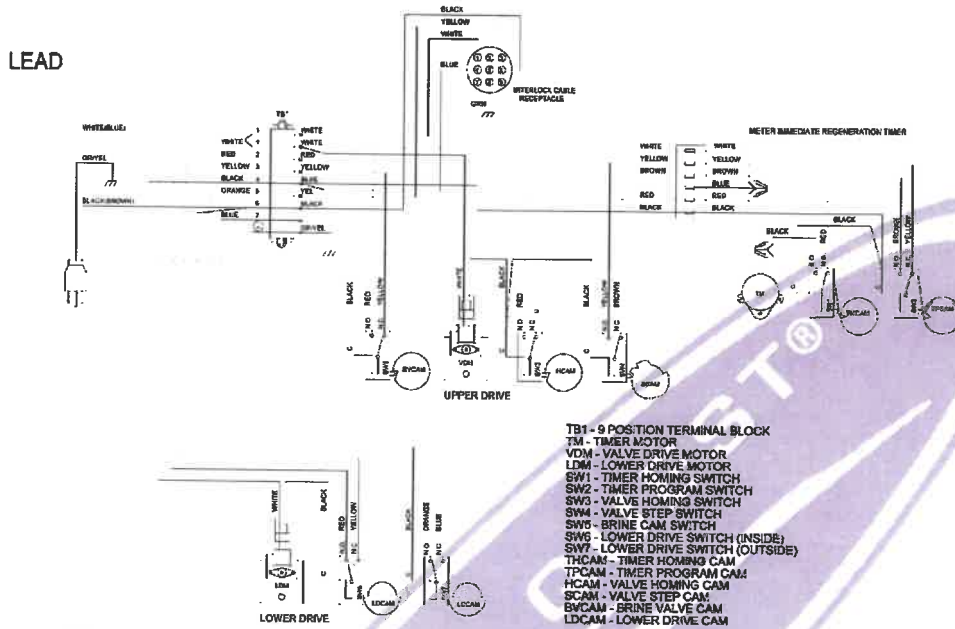
SYSTEM #4 WIRING CONTINUED

With Remote Starter Valve Wiring

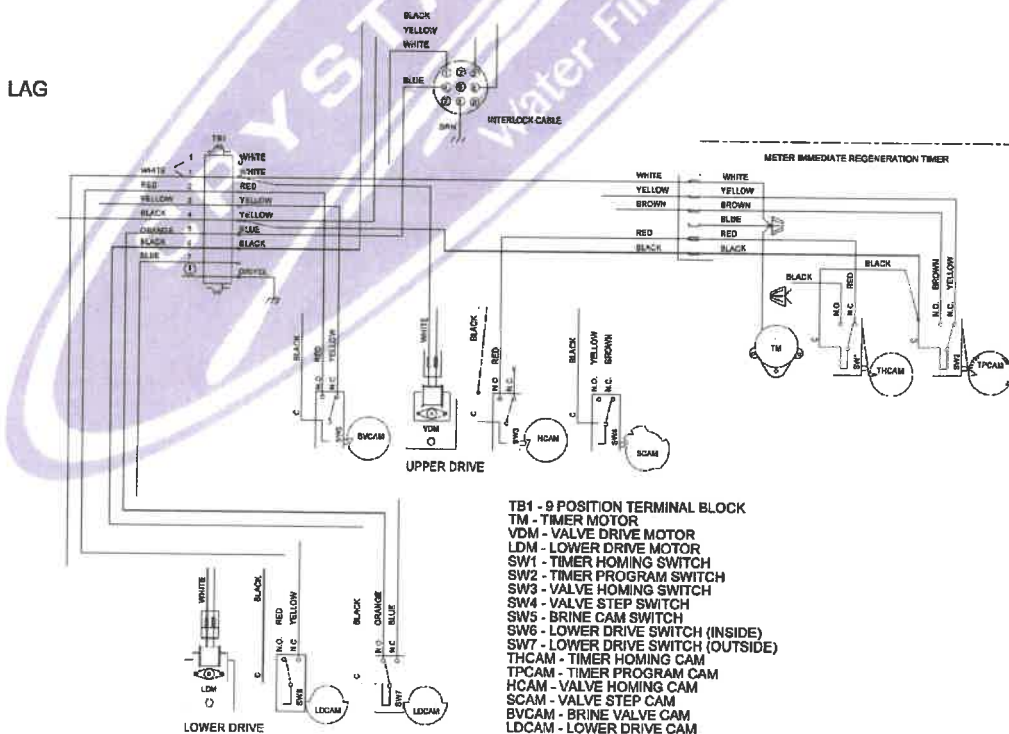


SYSTEM #5 WIRING

Interlocked Regeneration Valve Wiring



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

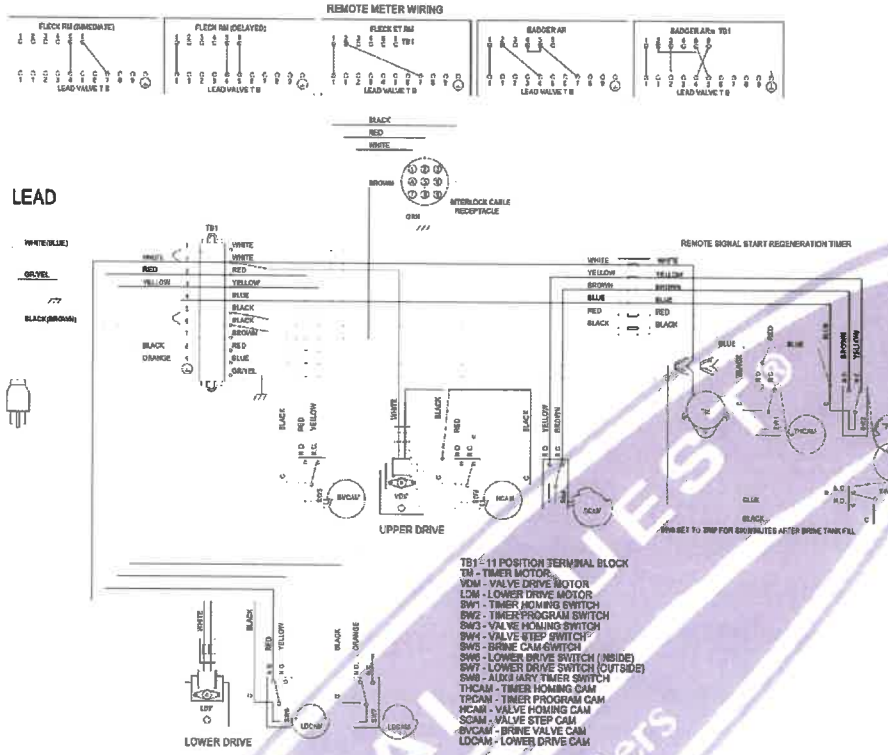


NOTE:
 1. TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.
 2. BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION, THE OTHER REMAINS IN SERVICE.
 3. VALVE SHOWN IN SERVICE.

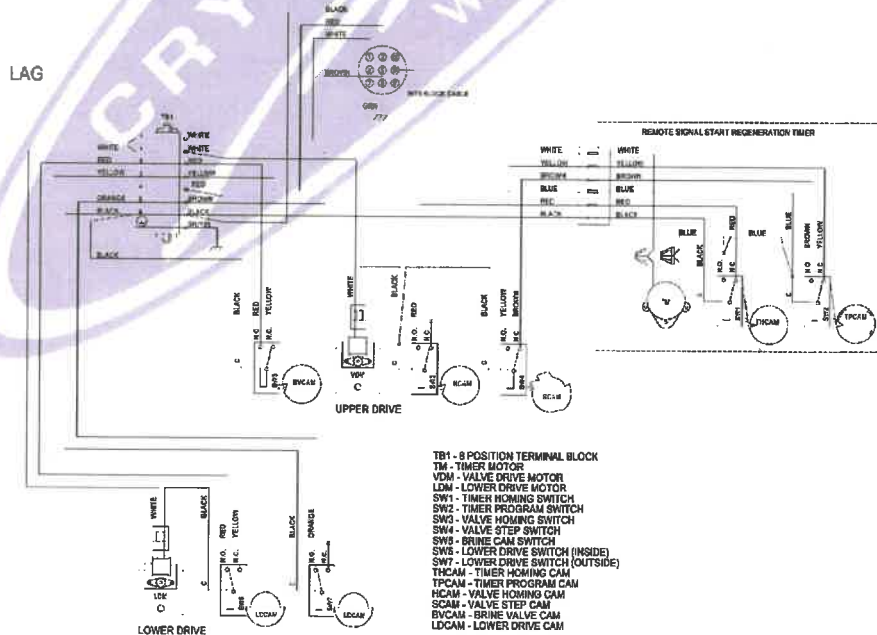


SYSTEM #6 WIRING

Series Regeneration Valve Wiring



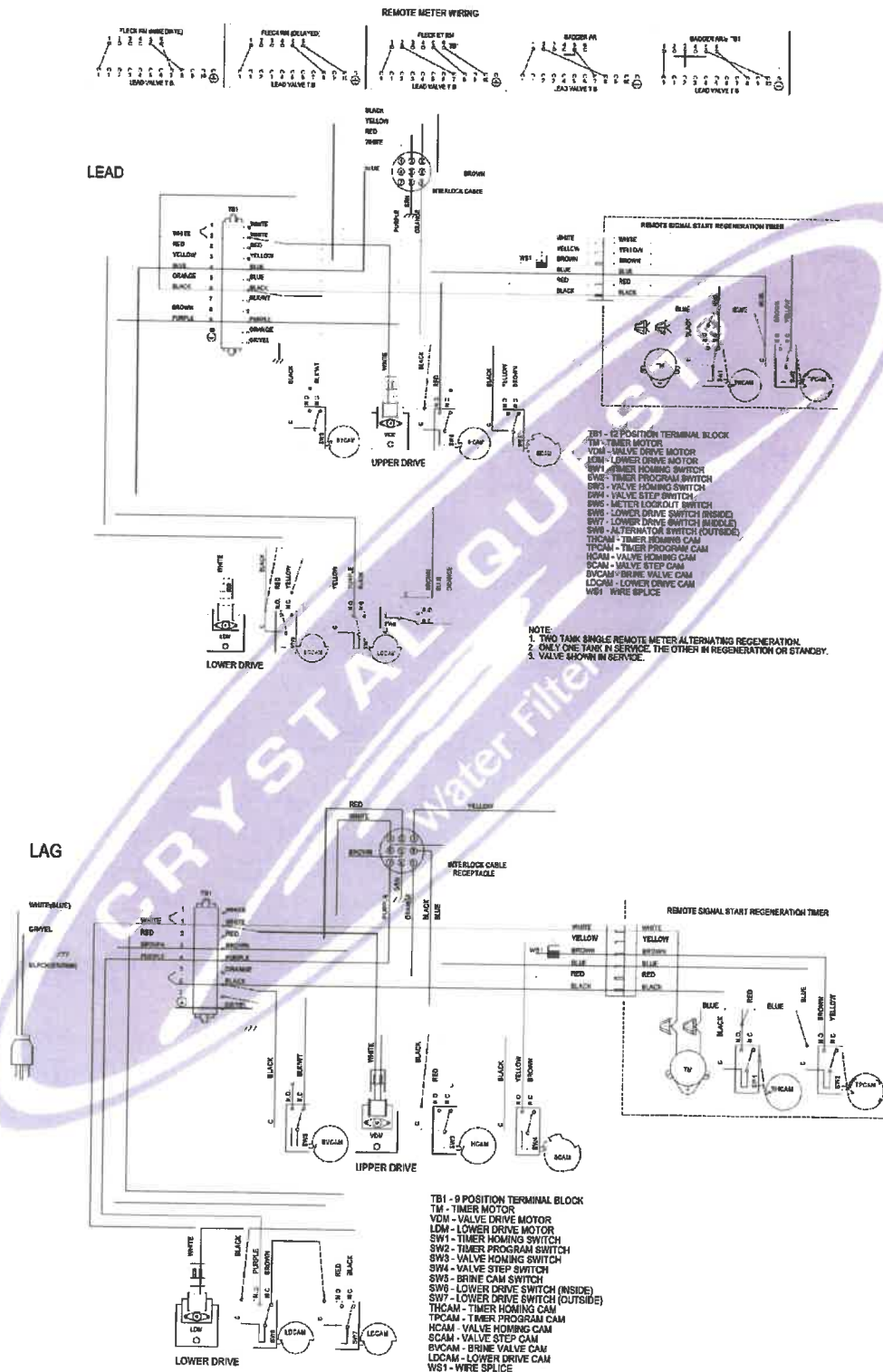
- NOTE:**
1. TWO TANK INTERLOCKED, SINGLE REMOTE METER, SERIES REGENERATION.
 2. BOTH TANKS NORMALLY IN SERVICE.
 3. ONLY ONE TANK IN REGENERATION, THE OTHER REMAINS IN SERVICE.
 4. LEAD VALVE REGENERATES FIRST, FOLLOWED IMMEDIATELY BY LAG VALVE.



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

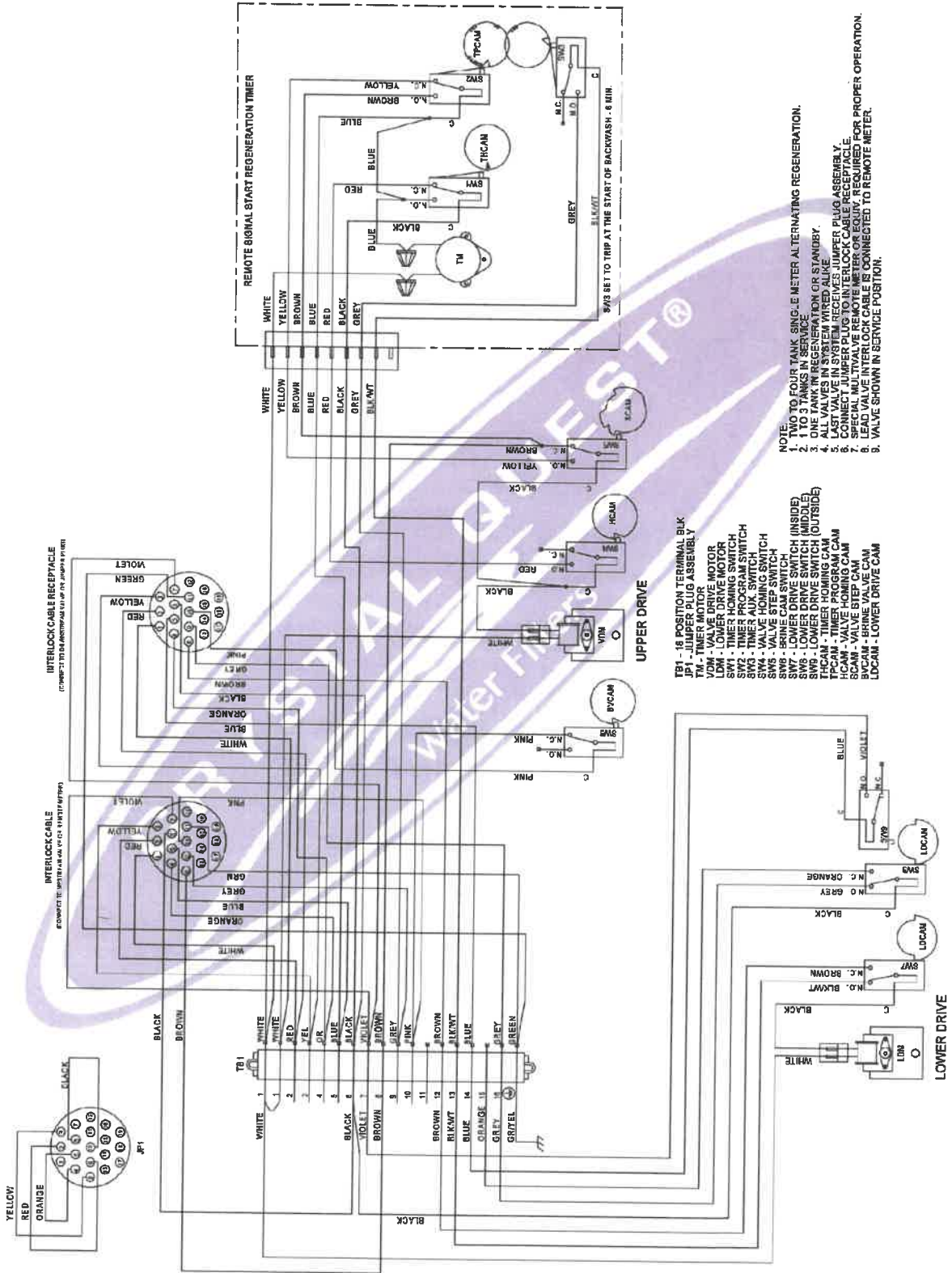
SYSTEM #7 WIRING

Alternating Regeneration Valve Wiring



SYSTEM #7 WIRING CONTINUED

JUMPER PLUG WIRING
JUMPER PLUG PLACED ON LAST VALVE IN SYSTEM



- NOTE TO FOUR TANK SINGLE ALTERNATING REGENERATION.**
1. 1 TO 3 TANKS IN SERVICE.
 2. ONE TANK IN REGENERATION OR STANDBY.
 3. ALL VALVES IN SYSTEM WIRING ASSEMBLY.
 4. LAST VALVE IN SYSTEM RECEIVES JUMPER PLUG ASSEMBLY.
 5. SPECIAL MULTI-VALVE REMOTE INTERLOCK CABLE REQUIRED.
 6. SPECIAL MULTI-VALVE REMOTE INTERLOCK CABLE REQUIRED FOR PROPER OPERATION.
 7. LEAD VALVE INTERLOCK CABLE IS CONNECTED TO REMOTE METER.
 8. VALVE SHOWN IN SERVICE POSITION.

- LEGEND:**
- TB1 - 15 POSITION TERMINAL BLK
 - IB1 - INTERLOCK CABLE PLUG ASSEMBLY
 - TM - TIMER MOTOR
 - VDM - VALVE DRIVE MOTOR
 - LDM - LOWER DRIVE MOTOR
 - SW1 - TIMER HOMING SWITCH
 - SW2 - VALVE HOMING SWITCH
 - SW3 - TIMER AUX SWITCH
 - SW4 - VALVE HOMING SWITCH
 - SW5 - VALVE STEP SWITCH
 - SW6 - BRINE CAM SWITCH (INSIDE)
 - SW7 - LOWER DRIVE SWITCH (INSIDE)
 - SW8 - LOWER DRIVE SWITCH (OUTSIDE)
 - TPCAM - TIMER HOMING CAM
 - IPCAM - TIMER PROGRAM CAM
 - BCAM - BRINE VALVE CAM
 - LOCAM - LOWER DRIVE CAM



1600/1700 SYSTEM NOZZLE & THROAT CHART

1600 Brine System

Standard

Size	Color	Nozzle	Throat
#0	Red	10913-0	10914-0
#1	White	10913-1	10914-1
#2	Blue	10913-2	10914-2
#3	Yellow	10913-3	10914-3
#4	Green	10913-4	10914-4

PVC

Size	Color	Nozzle	Throat
#0	Gray	12973-0	12974-0
#1	Gray	12973-1	12974-1
#2	Gray	12973-2	12974-2
#3	Gray	12973-3	12974-3
#4	Gray	12973-4	12974-4

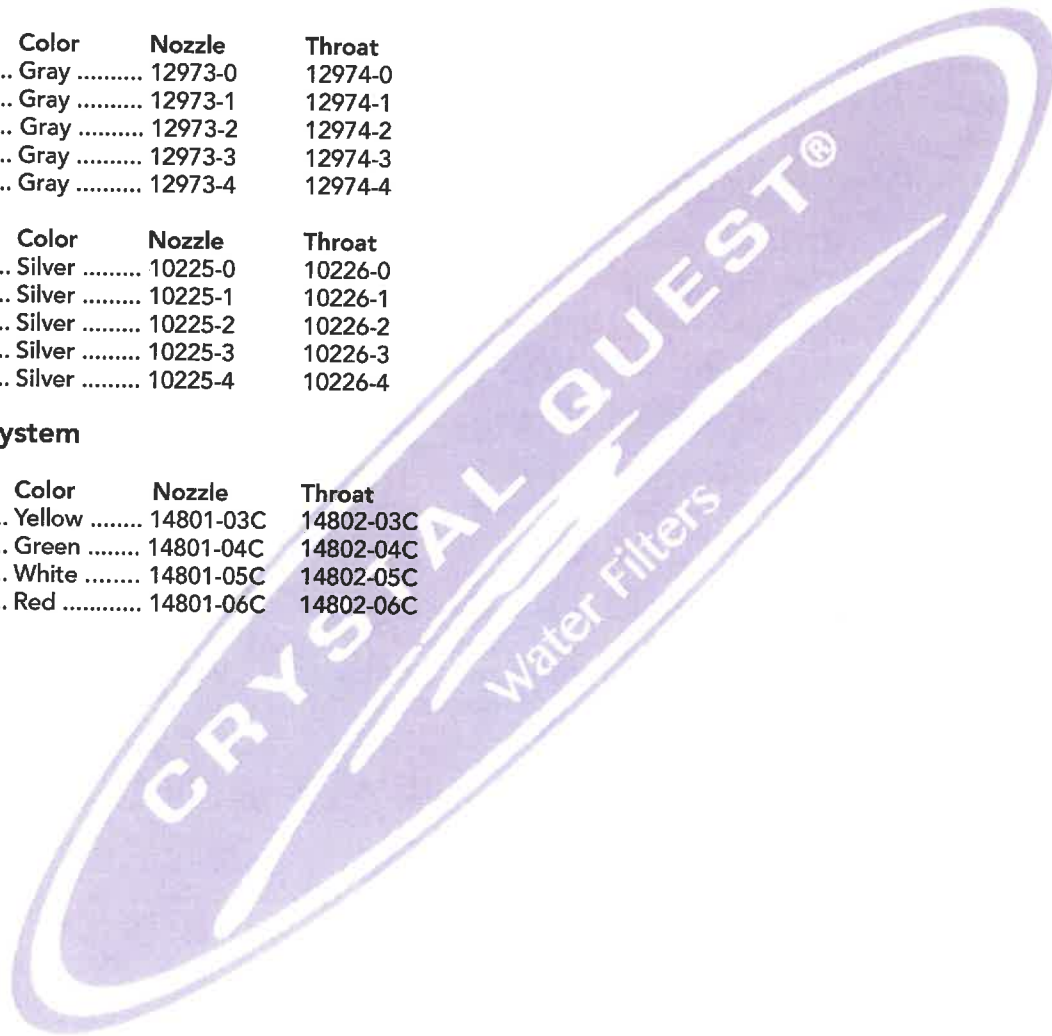
Stainless Steel

Size	Color	Nozzle	Throat
#0	Silver	10225-0	10226-0
#1	Silver	10225-1	10226-1
#2	Silver	10225-2	10226-2
#3	Silver	10225-3	10226-3
#4	Silver	10225-4	10226-4

1700 Brine System

Standard

Size	Color	Nozzle	Throat
#3	Yellow	14801-03C	14802-03C
#4	Green	14801-04C	14802-04C
#5	White	14801-05C	14802-05C
#6	Red	14801-06C	14802-06C





SERVICE ASSEMBLIES

Adapters:

- 61525 Softwater Adapter Kit, 2900s
- 61415 Adapter Assy, Sidemount
2850/2900/2930
- 61415NP Adapter Assy, Sidemount, NP
2850/2900/2930
- 61415-20 Adapter Assy, Sidemount, BSP/MTC
2850/2900/2930
- 61415-20NP Adapter Assy, Sidemount, BSP/NP
2850/2900/2930

Air Checks:

- 60002-34 Air Check, #500, 34 inches Long
- 60003-34 Air Check, #500, HW, 34 inches Tube
- 60009-01 Air Check, #900, Commercial, HW Less
Fittings

Auxiliary Micro Switch:

- 60320-02 Switch Kit, 3200/9000 Timer Auxiliary
- 60320-11 Switch Assy, 2900, Lower Drive (For
Adding 2nd Switch)
- 60320-08 Switch Assy, 2900, Lower Drive Aux
(For Adding Third Switch)

Brine Line Flow Controls (BLFC):

- 60020-25 BLFC, .25 GPM, 1600
- 60020-50 BLFC, .50 GPM, 1600
- 60020-100 BLFC, 1.0 GPM, 1600
- 60011-090 Brine Valve, 1650, Short Stem
- 60010-25 BLFC, 1650, .25 GPM, Plastic
- 60010-50 BLFC, 1650, .50 GPM, Plastic
- 60010-100 BLFC, 1650, 1.0 GPM, Plastic

Brine Valves:

- 60011 Brine Valve, 1650, Less BLFC
- 60029 Brine Valve, 1600, Short Stem Brass,
Std O-rings
- 60029HW Brine Valve, 1600, Short Stem Hot
Water
- 60034-XX Model 1700 brine valve assy (specify
flow control 1.0 - 5.0)
- 60604-XX Model 1710 brine valve assy (specify
flow control 1.0 - 5.0)

Covers:

- 60217-02 Environmental Lower Cover, Black
- 60219-02 Environmental, Cover, Black
- 60232-XX Designer 2 Piece
- 60232-110 Cover, Designer, 1 Piece Black
- 14800-02 Cover, Dust, Lower, 2900, Black

Drain Line Flow Controls (DLFC):

- 60366-XX 1-inch FNPT x 3/4-inch FNPT (specify
flow control .6 - 7.0)
- 60701-XX 1-inch FNPT x 1-inch FNPT (specify
flow control 8.0 - 25.0)
- 60702-XX 1-inch FNPT x 1-inch MNPT (specify
flow control 8.0 - 25.0)
- 60708-XX 1-inch FNPT x 3/4-inch FNPT (specify
flow control 8.0 - 25.0)
- 60721-XX 1-inch FNPT x 1-inch FNPT (specify
flow control .6 - 7.0)

Cam Assemblies:

- 60160-00 Drive Cam Assy, RR, White
- 60160-20 Drive Cam Assy, Std
- 60160-22 Drive Cam Assy, Link, Environmental
2900 Lower Drive
- 60160-30* Drive Cam Assy, Upflow
- 60160-31* Drive Cam Assy, Upflow, Variable

24-Hour Gear Assemblies:

- 19205 Gear Assy, 24 Hour, Silver, 5600, 12 A.M.
- 60519-02 Gear Assy, 3200 24 Hour 2 Times/Day, w/
Silver Label
- 60519-03 Gear Assy, 3200, 24 Hour 3 Times/Day,
w/Silver Label
- 60519-04 Gear Assy, 3200, 24 Hour 4 Times/Day,
w/Silver Label
- 60519-06 Gear Assy, 3200, 24 Hour (12:00) 6
Times/Day, w/Silver Label

Injector Assemblies (Complete):

- 60480-XX 1600/1650 - 3/8-inch brine (specify size
of injector)

Meters:

- 60393 Meter Assy, 2900, 2-inch Std
- 60394 Meter Assy, 2900, 2-inch Ext
- 60616 Meter Assy, Elec 2-inch
- 60620 Meter Assy, 2-inch Plastic, Std
- 60621 Meter Assy, 2-inch Plastic, Ext
- 60625 Meter Assy, 2-inch Plastic Electronic
- 61439 Meter Sleeve w/O-ring, Machd

Piston Assemblies:

- 60103 Piston Assy, 2900/2930, HWBP Lower
- 60103-01 Piston Assy, 2900/2930, HWBP, HW,
Lower
- 60104 Piston Assy, 2900/2930, NHWBP Lwr,
2900s, Soft Wtr Rgn
- 60104-01 Piston Assy, 2900/2930, NHWBP, HW
Lwr, 2900s Soft Wtr Rgn
- 61540 Piston Assy, 2900s, Downflow Upper
- 61540-01 Piston Assy, 2900s Downflow Upper, HW
- 61545* Piston Assy, 2900s, Upflow Upper
- 61545-01* Piston Assy, 2900s, Upflow Upper, HW
- 61550 Piston Assy, 2900s, HWBP Lower
- 61550-03 Piston Assy, 2900s, HWBP Lower, HW
- 61555 Piston Assy, 2900s, NHWBP Lower
- 61555-03 Piston Assy, 2900s, NHWBP Lower, HW

Program Wheel Assemblies:

- 60405-20 Program Wheel, w/3/4-inch Ext Label
1-1/2 inch Std Set @ 100
- 60405-50 Program Wheel, w/2-inch Std Label Set
@ 21
- 60405-60 Program Wheel, w/2-inch Ext Label
- 60405-70 Program Wheel, w/1-1/2 inch Ext Label



SERVICE ASSEMBLIES CONTINUED

Safety Brine Valves:

- 60014 Safety Brine Valve Assy, 2310
- 60038 Safety Brine Valve , 2350
- 60027-FFA Safety Brine Valve Body, 2300 Fitting Facing Arm
- 60027-FFS Safety Brine Valve Body Fitting Facing Stud
- 60026-30SAN Float Assy, 400A/2350, 30-inch HW
- 60028-30 Float Assy, 2300, 30-inch White
- 60028-30 Float Assy, 2300, 30-inch, Blue/White
- 60068-30 Float Assy, 2310, w/30-inch Rod

Sales & Service Aids:

- 40738 Literature, 2900 Spec Sheet
- 41689 Literature, 2900s S/Manual
- 40717 Literature, Catalog Assy, PWT Residential/Commercial

Seal & Spacer Kits:

- 61530 Seal & Spacer Kit, 2900s Upper
- 61530-01 Seal & Spacet Kit, 2900s, HW Upper
- 60128 Seal & Spacer Kit, 2900/2930 Lower
- 60128-01 Seal & Spacer Kit, 2900/2930, HW Lower

Service Equipment:

- 11098 Stuffer Tool Assy, Complete
- 12682 Puller Tool Assy, 2900/3150
- 12683 Stuffer Tool Assy, 2900/3150
- 13061 Puller Assy, Port Ring
- 16174 Silicone, 2 oz. Tube
- 60460 Meter Checker Kit, Std
- 60461 Meter Checker Kit, Ext
- 16586-8 Silicone, Dow #7 8 Lb

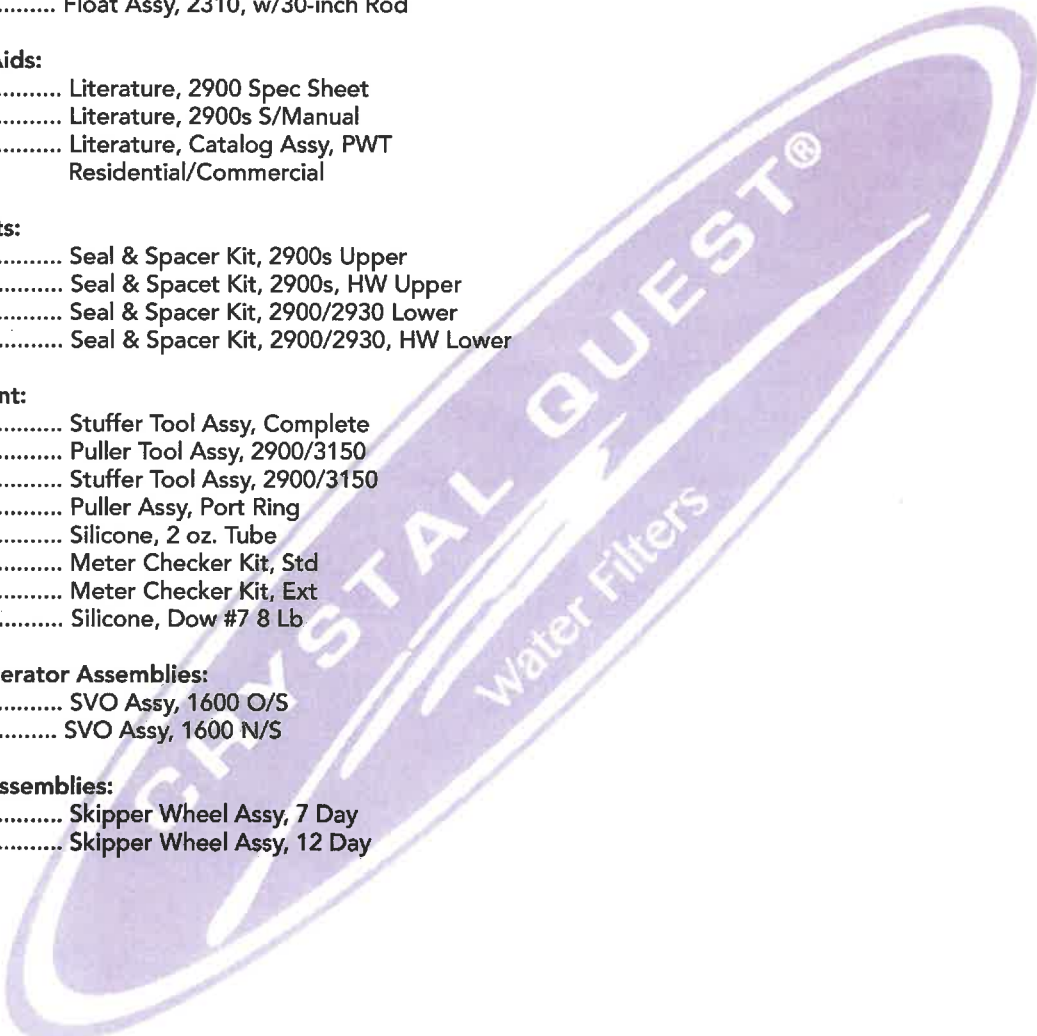
Service Valve Operator Assemblies:

- 60150 SVO Assy, 1600 O/S
- 60150-01 SVO Assy, 1600 N/S

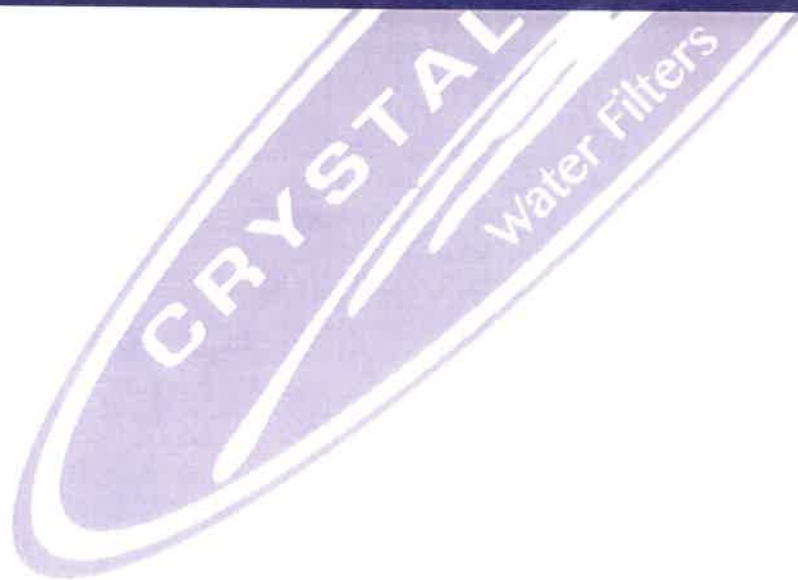
Skipper Wheel Assemblies:

- 14860 Skipper Wheel Assy, 7 Day
- 14381 Skipper Wheel Assy, 12 Day

*Upflow Only



**KEEP THIS MANUAL FOR FUTURE
REFERENCE AND UNIT MAINTENANCE.**
Product design is subject to change without notice.



Appendix 3

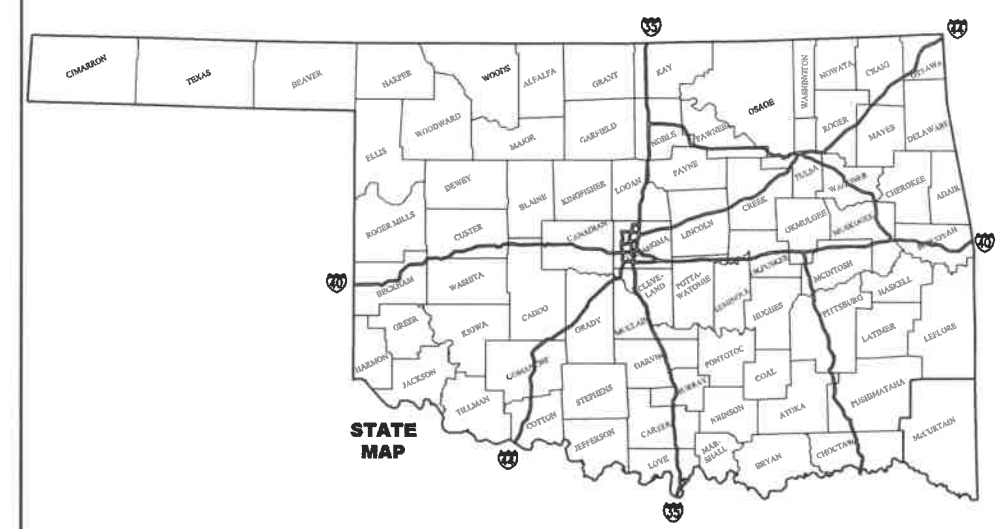
Process Drawings

STATE OF OKLAHOMA BECKHAM COUNTY

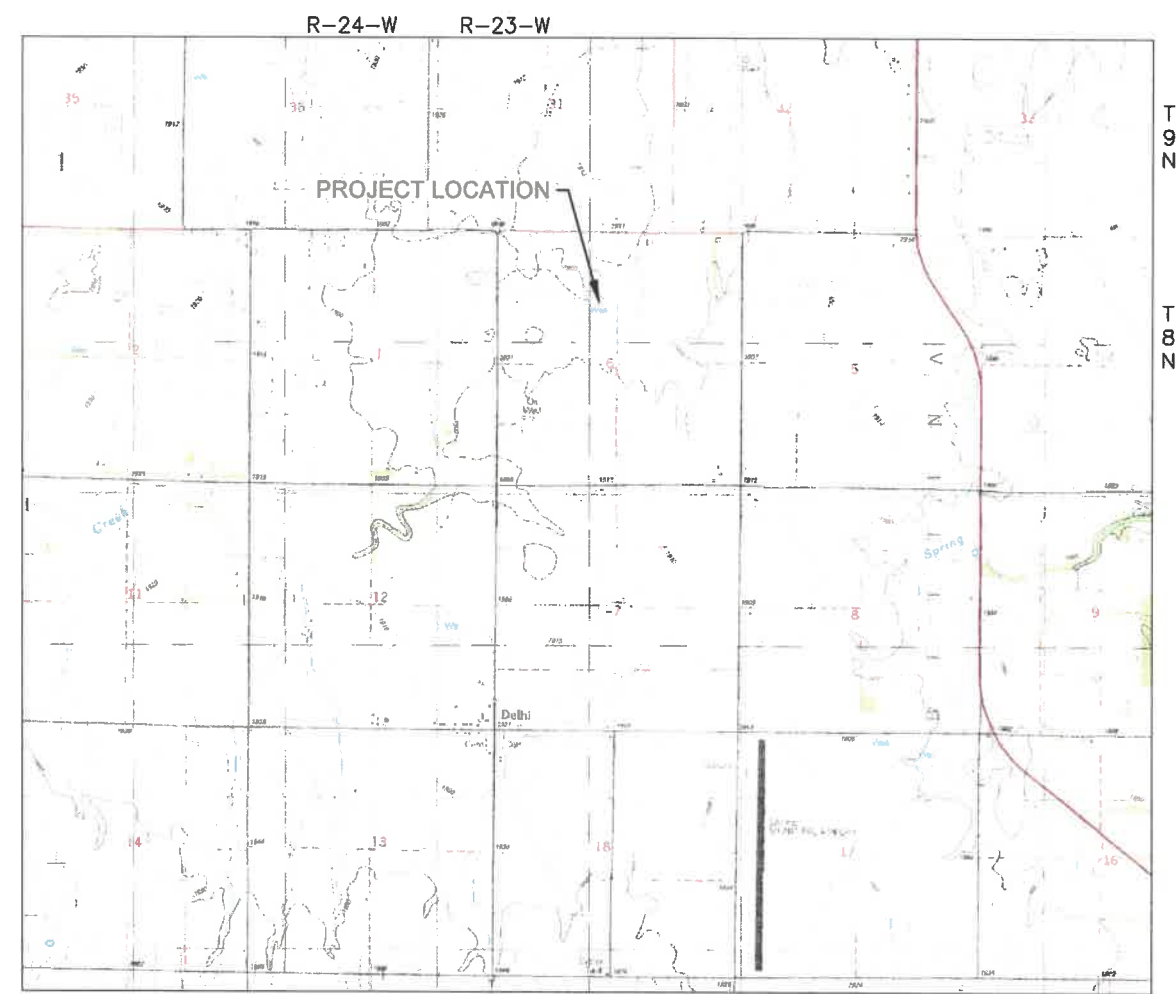
PLANS OF PROPOSED NITRATE PILOT STUDY TO SERVE DELHI

CARDINAL ENGINEERING, L.L.C. PROJECT No. BCWC18054_103

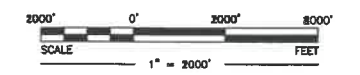
BECKHAM COUNTY RWD #2



VICINITY MAP



Sheet List Table	
Sheet Number	Sheet Title
1	TITLE
2	EXISTING WELL BUILDING LAYOUT
3	EXISTING WELL BUILDING NEW LAYOUT
4	10 CU FT SOFTENER AND NITRATE SYSTEM PIPING LAYOUT



CONVENTIONAL SIGNS LEGEND	
	INTERSTATE HIGHWAY
	U.S. HIGHWAY
	STATE HIGHWAY

UTILITY LOCATION NUMBERS

STATE-WIDE 1-800-522-6543
OUT-OF-STATE 1-800-654-8249

THESE NUMBERS ARE TO BE USED FOR INFORMATION ON THE LOCATION OF ALL UNDERGROUND UTILITIES. CONTACT THESE NUMBERS PRIOR TO ANY EXCAVATION.

PREPARED BY:

CARDINAL ENGINEERING

5-12-2020
DATE

N. Rick Schlegel
N. RICK SCHLEGEL, P.E.
SENIOR ENGINEER, BRANCH
MANAGER, WOODWARD, OK

CA NO. 7110 (EXP. 06.30.2020)

REVISIONS		
No.	Description	Date

KEY PLAN

SIGNATURE/SEAL

5-12-2020
DATE

PROJECT

NITRATE PILOT STUDY TO SERVE DELHI

LOCATION
BECKHAM COUNTY, OK

PREPARED FOR
BECKHAM COUNTY RWD #2

DRAWING TITLE

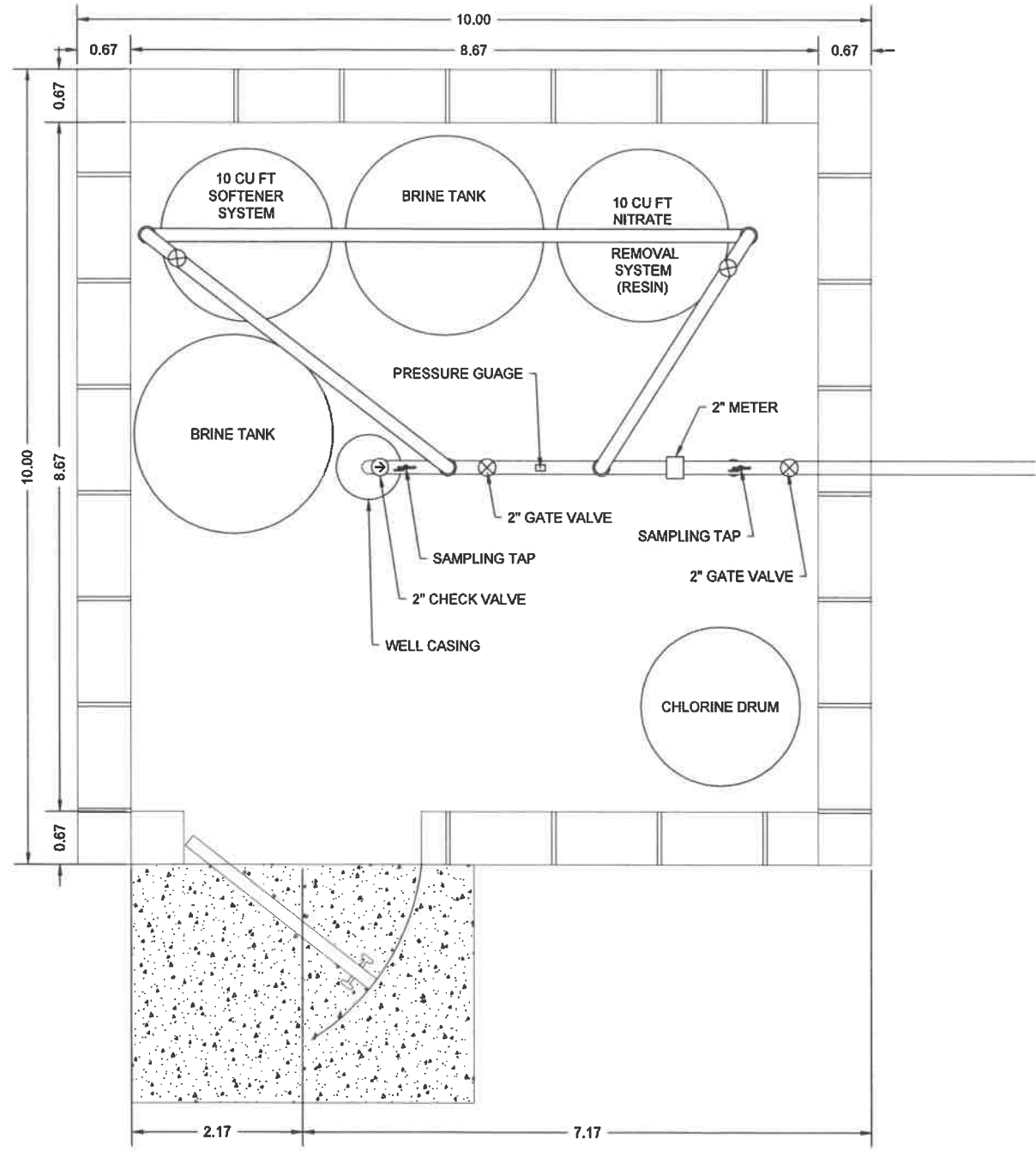
TITLE

Project No. BCWC18054_103
Drawn By C.W.T.
Checked By N.R.S.
Date 5-12-2020
Scale 1"=2000'
Used For CONSTRUCTION
Drawing No. 1

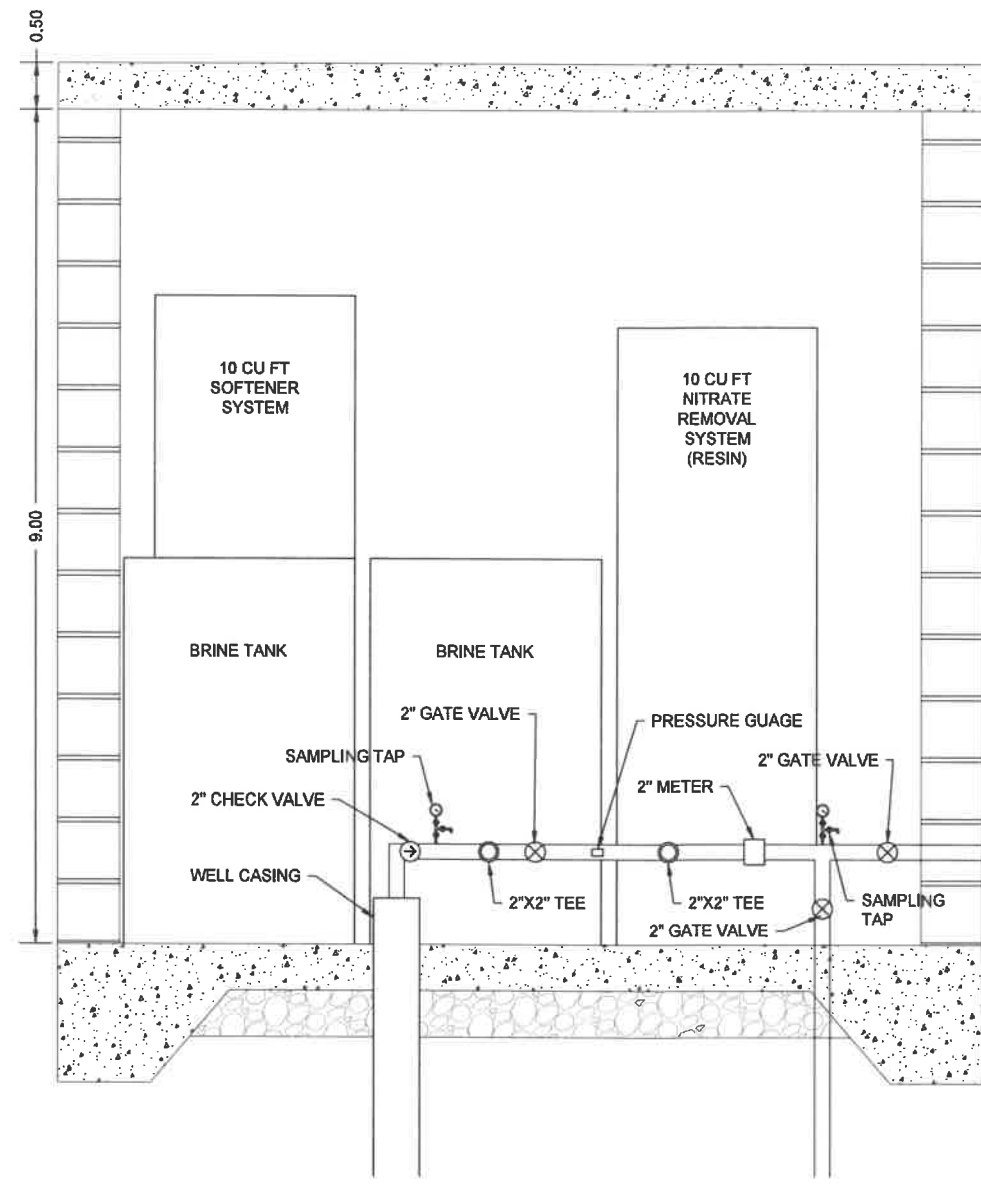
CARDINAL ENGINEERING

3300 Oklahoma Ave., Suite 1100
Woodward, OK 73801
Phone 580.254.3514
Fax 580.254.3518
http://www.cardinalengineers.com
CA# 7110, expiration date 06.30.2020

NOTE:
 1. PIPING SHOWN IS FOR REFERENCE ONLY.
 2. PIPING TO BE INSTALLED AS SHOWN ON SHEET 4.



1 PLAN VIEW
 Scale: 1"=1'



2 SECTION VIEW
 Scale: 1"=1'

REVISIONS		
No.	Description	Date

KEY PLAN

SIGNATURE/SEAL

[Signature]

5-12-2020
DATE

PROJECT
NITRATE PILOT STUDY TO SERVE DELHI

LOCATION
 BECKHAM COUNTY, OK

PREPARED FOR
 BECKHAM COUNTY RWD #2

DRAWING TITLE
EXISTING WELL BUILDING NEW LAYOUT

Project No. BCWC18054_103
 Drawn By C.W.T.
 Checked by N.R.S.
 Date 5-12-2020
 Scale NONE
 Issued For CONSTRUCTION
 Drawing No. **3**

CARDINAL ENGINEERING

3300 Oklahoma Ave., Suite 1100
 Woodward, OK 73801
 Phone 580.254.3514
 Fax 580.254.3518
<http://www.cardinalengineers.com>
 CA# 7110, expiration date 06.30.2020

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