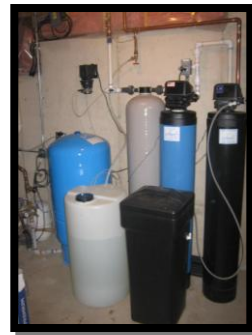




## CHLORINE INJECTION FILTER SYSTEM



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# Filter Manual

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*Manufactured by:*  
**ANGEL WATER, INC.**  
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Phone: 847-382-7800 • Fax 847-382-1991  
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This owner's manual is designed to assist owners and installers with the operation, maintenance and installation of your new water filter. It is our sincere hope that this manual is clear, concise and helpful to both owner and installer. We have included detailed instructions on general operating conditions, pre-installation and installation instructions, start-up, and timer and meter programming. We have included a troubleshooting guide, service instructions and parts diagrams to assist you.

Owners will appreciate the simplified, illustrated format for operation, programming and troubleshooting. **In the event that you need professional assistance for servicing your water filter, please contact the Angel dealer who installed this system.**

**The Chlorine Injection System is designed to remove bacteria from well water and provide odor free water to your home or business. The Chlorine Injection system will also oxidize organics from your water including iron (orange color) and hydrogen sulfide (gray color).**

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## JOB SPECIFICATION SHEET

### MODEL NO. ANG-A300

#### \*WATER TEST AT TIME OF INSTALLATION

\_\_\_\_\_ Hardness CaCO<sub>3</sub> (gpg)

\_\_\_\_\_ Iron (ppm)

\_\_\_\_\_ pH

\_\_\_\_\_ Hydrogen Sulfide (ppm)

\_\_\_\_\_ No Hard By-pass enabled

#### OPTIONAL RELAY SETTINGS

##### Relay 1

\_\_\_\_\_ **On Time**

\_\_\_\_\_ Start Time, Minutes into Regeneration

\_\_\_\_\_ Run Time

\_\_\_\_\_ **On Gallons**

Pulse per \_\_\_\_\_ Gallons \_\_\_\_\_

Time Relay Closed \_\_\_\_\_ **On**

##### **Regen Gallons**

Pulse per \_\_\_\_\_ Gallons \_\_\_\_\_ Time Relay Closed \_\_\_\_\_ **Service Alarm**

\*INSTALLATION DATE

\*SERIAL NUMBER

NOTES

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# PRE-INSTALLATION CHECK LIST

(All electrical & plumbing should be done in accordance to all local codes)

**Water Pressure:** A minimum of 25 pounds of water pressure (psi) is required for regeneration. Maximum 125 psi.

**Water Quality:** On rural water supplies there is often a problem with sand or sediment in the water. (This problem occasionally occurs in public water supplies.) If the water is not filtered before being treated, the sand and sediment may restrict flow through the filter bed. This problem often requires rebedding of the mineral tank. **Note:** *Well and/or pump problems affecting the operation of the filter are repairs that are not covered under warranty. To prevent these unnecessary and expensive repairs that are not covered under warranty, installation of an in-line filter system ahead of a water filter is recommended when sand or sediment issues are present.*

**Electrical:** A continuous 110 volt 60 cycle current supply is required. *Make certain the current supply is uninterrupted and cannot be turned off with another switch. All electrical connections must be connected per local codes. Surge protection is recommended with all electric controls.*

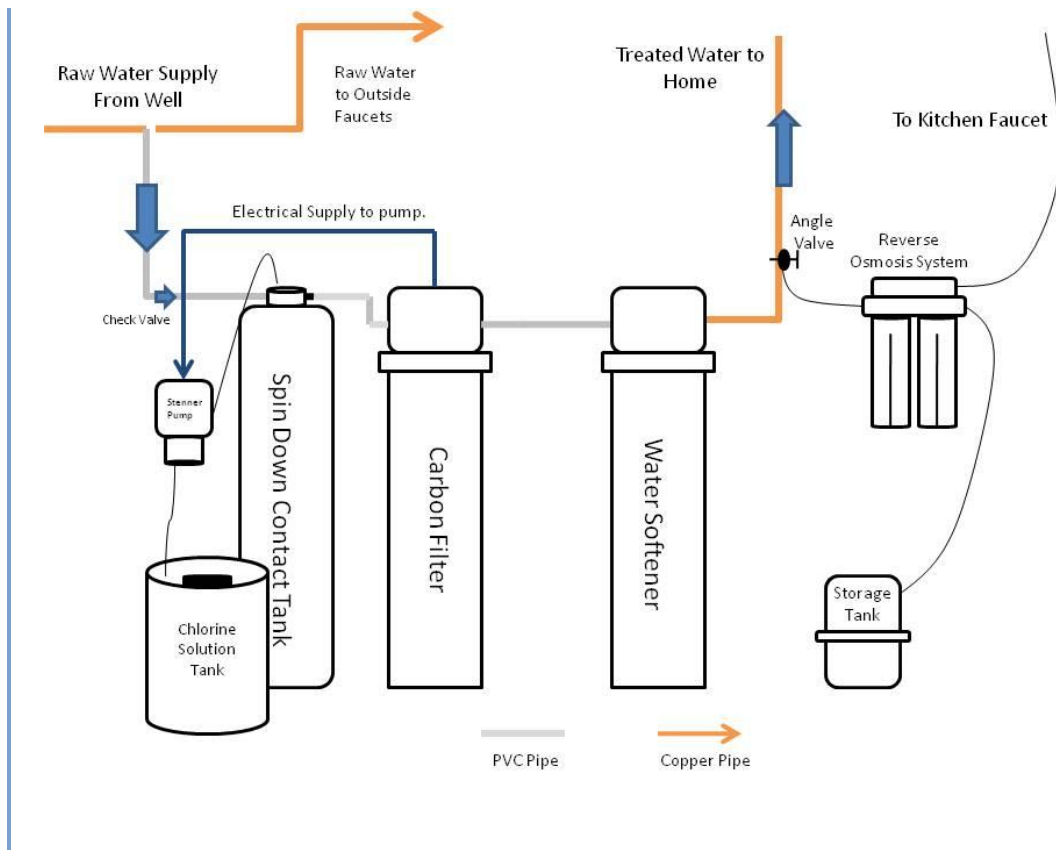
**Existing Plumbing:** Condition of existing plumbing must be free from lime and iron build-up. Piping that is built-up heavily with lime and/or iron must be replaced. If piping is blocked with iron, correct problem prior to installing the filter.

**Drain Line:** The filter should be located close to a drain. Avoid overhead drain lines if possible to prevent back pressure. Overhead drains are not to exceed 8 feet above the floor and no more than 20 feet in length. The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 1" drain line.

**Bypass Valves:** Always provide for the installation of a bypass valve.

**Caution:** Water temperature is not to exceed 110°F; the conditioner cannot be subject to freezing conditions, or to a vacuum due to loss of pressure (such as a water main break).

**This water filter is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after treatment.**



## BYPASS VALVE OPERATION

By-passing the water equipment may be required in order to stop a leak on the system itself or in order to allow other plumbing within the building to be accomplished. Figure 2 is a diagram of how the bypass valve looks in normal operation.

Figure 2 is a diagram of how to bypass the water filter in the event of a leak on the filter itself. Simply turn each knob clockwise a quarter of a turn.

Figure 3 is a diagram of how to put the system in a diagnostic mode.

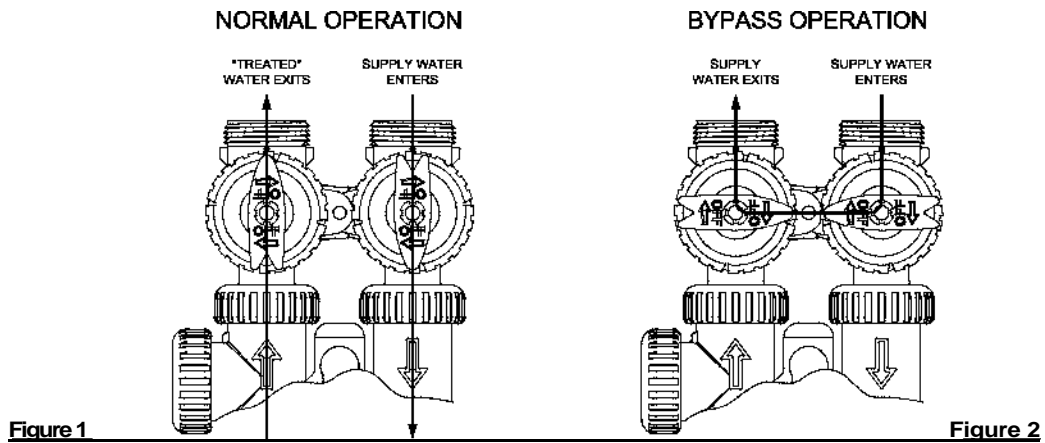


Figure 1

Figure 2

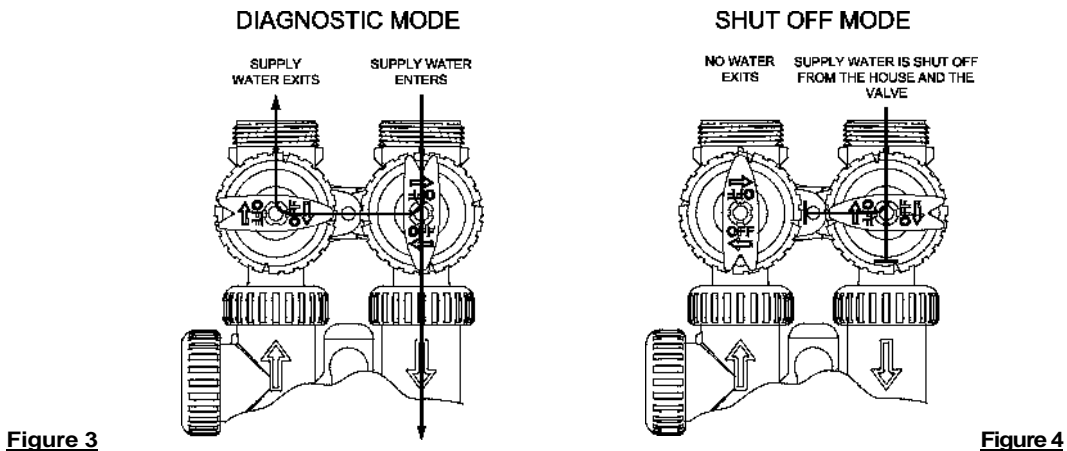


Figure 3

Figure 4

# INSTALLATION INSTRUCTIONS

(All electrical & plumbing should be done in accordance to all local codes)

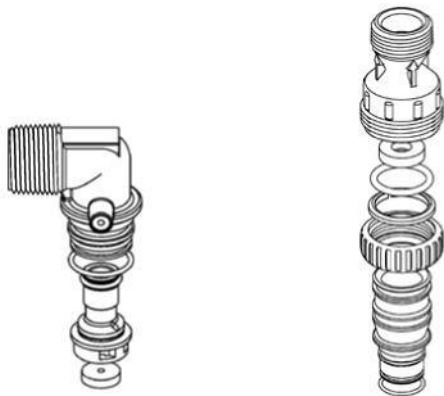
## CAUTION:

- Do not use vaseline, oils or other hydrocarbon lubricants or spray silicone anywhere. A silicon lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals.**
- Do not use pipe dope or other sealants on threads. Only teflon tape may be used on threads. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.
- The pipe size for the drain line should be a minimum of 3/4". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 1" drain line.

1. Place the filter where you want to install it, making sure it is on a clean, level and firm base.
2. Do all necessary plumbing (inlet to inlet, outlet to outlet and drain line to drain). The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.
3. When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.
4. A jumper ground wire may be installed between the inlet and outlet pipe whenever the metallic continuity of a water distribution piping system is interrupted. Install grounding strap on metal pipes.

5. The drain connection may be made using either 3/4" female or 1" female adapter. If soldering, joints near the drain fitting must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
6. The regenerant refill flow control assembly is installed in an easy to access refill elbow located on top of the control valve. The refill flow control assembly is attached to the control valve with a locking clip. The locking clip allows the elbow to rotate 270 degrees so the outlet can be orientated towards the salt tank.
7. Connect the regenerant line found in the regenerant tank to the regenerant connection on the control valve. The control valve has a standard refill elbow to which a 3/8" flexible tube can be connected, see figure 6a, page 6. (An optional elbow can be ordered which accommodates a 1/2" flexible tube for a high regenerant draw rate situation). Both elbows use the same refill flow control and retainer. Make sure the floor is clean beneath the regenerant tank and that it is level and smooth.
8. A 1/2" (inside diameter) gravity drain line should be connected to the overflow elbow on the side of the brine tank and run to a drain below the level of the elbow. This overflow drainage system provides protection from water damage in the event of a regenerant shut-off malfunction. Tubing is not provided to do this.

**In all cases where an overflow could result in water damage for various reasons, this overflow protection must be used. Do not connect the tubing to the drain line on the control valve discharge line and do not run this line above the overflow elbow height at any point. Provide air gap.**



3/4" Drain Line Elbow

1" Drain Line Connection

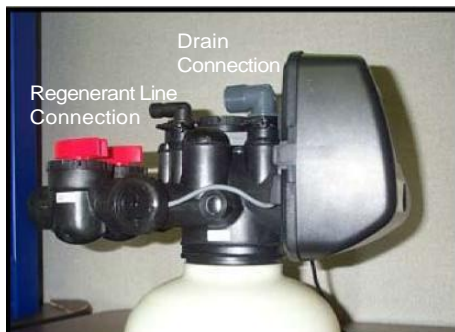


Figure 6a

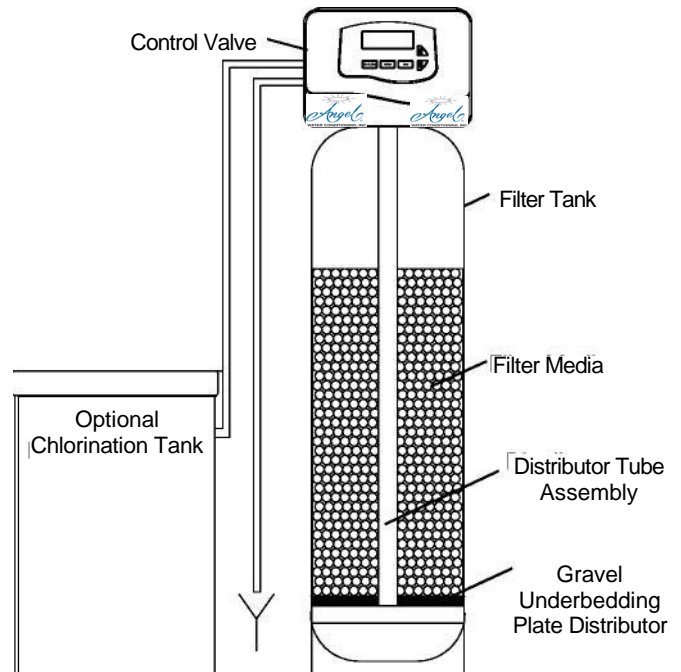


Figure 6b

# PROGRAMMING

## General Information

The ANG A-300 control valve is the “brain” of your water filter. It consists of the valve body and powerhead with solid state microprocessor.

The display panel (see Figure 7) consists of the LCD display and five push buttons which are used in displaying and programming the water filter settings.

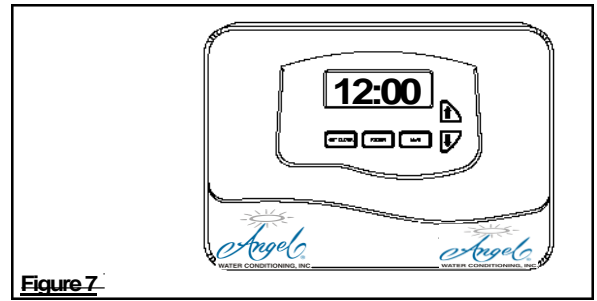


Figure 7

## Initial Start Up

The initial start up will probably be done by the technician installing the filter system. If not, the following instructions will step through the process.

Some filters should not be backwashed in first 24 hours. This start-up procedure allows rinsing without passing through backwash mode under water pressure.

Filter control is sent from factory in RINSE position; to verify position, remove cover and confirm piston is completely back in barrel away from PC board. In service position, piston is completely out, flush with PC board.

Complete all plumbing connections; inlet, outlet and drain line.

1. Verify filter tank is in bypass position.
2. Flush cold water piping to nearest outlet/faucet until air gone and water clear.
3. Open inlet valve slowly to fully open position.
4. DO NOT PLUG IN FILTER CONTROL NOW.

5. Let filter run to drain for 10 minutes or until water clear. Filter is in rinse position.
6. CLOSE INLET TO FILTER; WAIT UNTIL WATER STOPS RUNNING TO DRAIN.
7. Plug filter control into 120V outlet. Remove filter cover and plug power wire to 4-prong, connect (second from right) at bottom of circuit board, labeled 12VAC PWR. Electronics will move piston to service position. Replace filter cover.
8. Open inlet and outlet to filter.
9. Push SET CLOCK button and use up & down arrows to set time of day. Additional programming can be modified if desired.

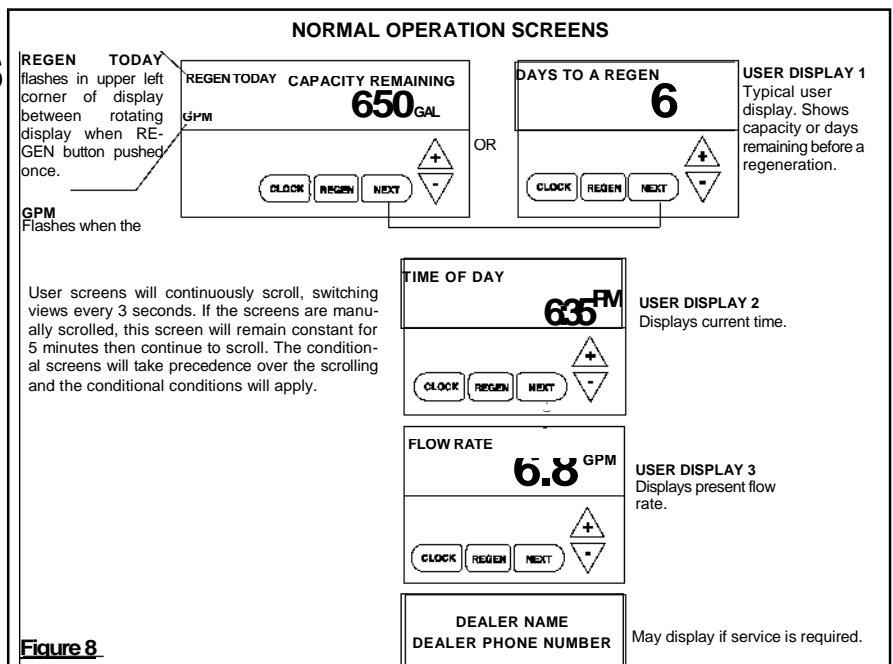
Failure to follow proper start-up may result equipment malfunction not covered by warranty.

## USER DISPLAYS/SETTINGS

### General Operation

When the system is operating, one of three displays may be shown. Pressing NEXT will alternate between the displays. One of the displays is the current time of day. The second display is one of the following: days to a regen or gallons remaining. Days To A Regen is the number of days left before the system goes through a regeneration cycle. Capacity remaining is the number of gallons that will be treated before the system goes through a regeneration cycle. The third display is current flow in gal/min. The user can scroll between the displays as desired by pushing NEXT or display will scroll automatically.

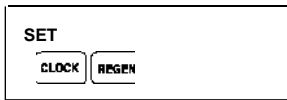
When water is being treated (i.e. water is flowing through the system) the word "GPM" flashes on left side of display when other than flow rate is displayed.



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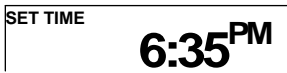
## SETTING TIME OF DAY



Step 1

= **A** Up  Arrow       = **V** Down Arrow

**Step 1** - Press SET CLOCK.

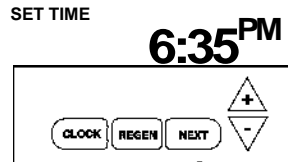


Step 2

**Step 2** - Current Time (**hour**): Set the hour of the day using **A** or **V** buttons. AM/PM toggles after 12. Press NEXT to go to step 3.



**Step 3** - Current Time (**minutes**): Set the minutes of day using **A** or **V** buttons. Press NEXT to exit Set Clock. Press REGEN to return to previous step.



Step 3

**Power Loss** - Lithium battery on circuit board provides up to 2 years of time clock backup during power outages. If the power is out when battery is depleted, only time of day needs to be reset, all other values are stored in non-volatile memory. When time of day is flashing, replace lithium coin type 2032 battery.

Battery back-up feature will be activated after 24 hours of power. Do not forget to reset for daylight savings time.

RETURN TO ROTATING DISPLAY

## Manual Regeneration

Sometimes there is a need to regenerate the system, sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

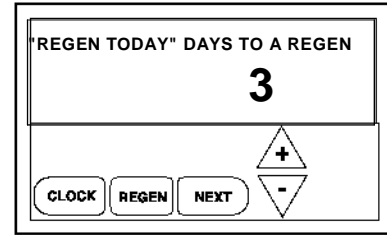
To initiate a manual regeneration at the **preset** delayed regeneration time, press and release "REGEN". The words "REGEN TODAY" will flash in left corner of display to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request.

To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled. You must cycle all the way through the cycles to make it stop. PLEASE NOTE: This will reset the meter.

## Regeneration Mode

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

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



Regeneration Step  
(shows time remaining in regen step  
is 8 minutes, 22 seconds)

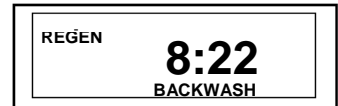


Figure 11

## GENERAL FILTER BACKWASH FLOW RATES

| Tank Diameter      | 10"   | 12"   | 13"   | 14"  | 16"  | 18"  |
|--------------------|-------|-------|-------|------|------|------|
| Square Ft Area     | 0.545 | 0.785 | 0.921 | 1.07 | 1.38 | 1.76 |
| Back wash Rate GPM | 5     | 8     | 10    | 12   | 15   | 20   |

Backwash rates illustrated above are based upon 8-12 GPM per square foot of area and water with a temperature of 50° F. These flow rates are typical for use with medias such as Carbon; Multi-Media, Neutralizing Media, or Birm. Specific media and conditions may require specific flow rates.

### Factory Settings:

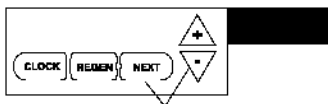
#### 8" Through 13" Diameter Tanks

| Regeneration Cycle |             | Minutes |
|--------------------|-------------|---------|
| 1st Cycle          | Backwash    | 12      |
| 2nd Cycle          | Rapid Rinse | 6       |

#### 14" and Larger Diameter Tanks

| Regeneration Cycle |             | Minutes |
|--------------------|-------------|---------|
| 1st Cycle          | Backwash    | 20      |
| 2nd Cycle          | Rapid Rinse | 10      |

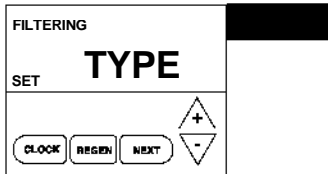
All filters factory set to backwash every 3 days except neutralizers set to backwash every 2 days.



### FILTER SETUP

▲ = **A** Up Arrow    ▼ = **V** Down Arrow

**STEP 1S** – Press NEXT and **V** simultaneously for 3 seconds. If screen in Step 2S does not appear in 5 seconds the lock on the valve is activated.



**STEP 2S** – Select between softening or filtering. A flashing "SOFTENING" or "FILTERING" will appear. Choose FILTERING using **V** or **A** button. **Factory setting is Filtering.** Press NEXT to go to Step 3S. Press REGEN to exit Filter System Setup.



**STEP 3S** – Select the time for the first cycle (which in this example is BACKWASH) using the **V** or **A** button. Press NEXT to go to Step 4S. Press REGEN to return to previous

RINSE TIME  
SET **60** MIN

CLOCK REGEN NEXT

+  
-

**STEP 4 S – Select the time for the second cycle** (which in this example is RINSE) using **V** OR **A** button. Press NEXT to go to Step 5S. Press REGEN to return to the previous step.

GALLONS CAPACITY  
SET **OFF**

CLOCK REGEN NEXT

+  
-

**STEP 5 S – Set Gallons Capacity** using **V** or **A** button. If value is set to:

- “Off” regeneration will be based solely on the day override set (see Installer Display/Settings Step 3, page 6 or
- as a number of gallons (allowable range 20 to 250,000) regeneration will be based on the value specified. Increment increase is 20 for the range 20 to 2000, 100 for the range of 2000 to 10,000 and 500 for the range of 10,000 to 50,000 and 2000 for range of 50,000 to 250,000.

Press NEXT to go to Step 6S. Press REGEN to return to previous step.

DELAYED  
SET **REGEN**

CLOCK REGEN NEXT

+  
-

**STEP 6 S – Set Regeneration Time Options** using the **V** or **A** button. If value is set to:

- “DELAYED” means regeneration will occur at the preset time;
- “IMMEDIATE” means regeneration will occur immediately when the gallons capacity reaches 0 (zero); or
- “DELAYED + IMMEDIATE” means regeneration will occur at one of the following: - the preset time when the gallons capacity falls below the reserve or the specified number of days between regenerations is reached, whichever comes first; or - immediately after 10 minutes of no water usage when the gallon capacity reaches 0 (zero). See page 26 for more options. **Factory Setting is Delayed.** Press NEXT to go to Step 7S. Press REGEN to return to previous step.

RELAY 1 “TIME”  
SET **TRIGGER**

CLOCK REGEN NEXT

+  
-

**STEP 7 S – Set Relay to activate by Time, Gallons, Regen Gallons, Off or Service Alarm** by using **V** or **A** buttons. A relay can be used to operate a chemical feed pump or solenoid. The choices are:

- Relay Triggered on Time - Relay activates after set number of minutes after start of regeneration. Start of regeneration is defined by first backwash cycle, dn brine or up brine, whichever is first. Relay deactivates after set time.
- Relay Triggered on Gallons - Relay activates every set number of gallons while in service and deactivates after set time.
- Relay Triggered on Regen Gallons - Relay activates after set number of gallons in service or gallons used during regeneration and de-activates after set time or when meter stops registering flow, whichever comes first.
- Service Alarm - Relay activates on service alarm setting: gallons, time or both, see step 23S.
- **Off** - If off is selected, Steps 8S – 16S will not be shown. **Factory setting = OFF.** Press NEXT to go to step 8S or other selection for relay settings, or 17S if OFF selected.

RELAY 1 SET POINT  
SET **10** MN

CLOCK REGEN NEXT

+  
-

**STEP 8 S –** If off was selected in previous step, this screen does not appear. **If Time chosen to Activate Relay**, use up and down arrows to set # of minutes AFTER START OF REGEN to activate relay. Start of regeneration is defined as first Backwash or Regenerant Draw mode. Press NEXT to go to Step 9S.

RELAY 1 DURATION  
SET **3:00** MIN

CLOCK REGEN NEXT

+  
-

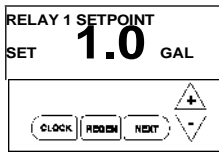
**STEP 9 S –** Use Up and Down arrows to set duration of relay activation in minutes. Time Range = Negative 20 minutes to a positive 500 minutes. Press NEXT to go to Step 16S. Press REGEN to return to previous step.

RELAY 1 “GALLONS”  
SET **TRIGGER**

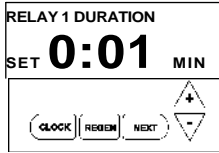
CLOCK REGEN NEXT

+  
-

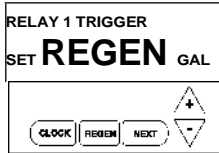
**STEP 10 S –** Gallons chosen to activate relay. If Off or Time was selected in previous steps, this screen does not appear. Meter does not read during regeneration.



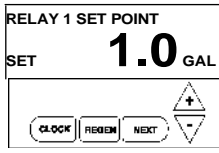
**STEP 10S** – Use up and down arrows to select number of gallons per relay activation of regen gallon setting. Range = 0.1-100 gallons. Press NEXT to go to Step 11S.



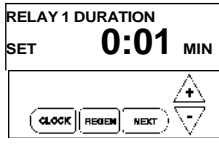
**STEP 11 S** – Use up and down arrows to set duration of relay activation in minutes. Range = 1 second - 500 minutes. Press NEXT to go to Step 12S. Press REGEN to return to previous step.



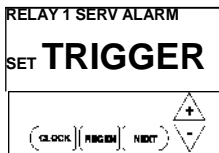
**STEP 12 S** – If **REGEN gallons chosen to activate relay**. Relay activates after set number of gallons have been used in service or during regeneration and then deactivates after set period of time or after flow stops, whichever comes first. Meter reads during regeneration. Press NEXT to go to Step 13S.



**STEP 13 S** – Use up and down arrows to select number of gallons to activate relay (range 1-100 gallons). Press NEXT to go to step 14S.

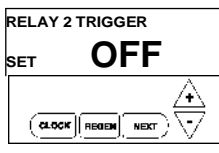


**STEP 14 S** – Use up and down arrows to set duration of relay activation in minutes. Range: 1 second - 500 minutes. Press NEXT to go to Step 15S.



**STEP 15S**

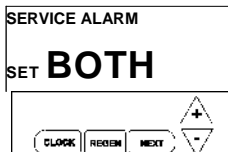
1. If Service Alarm chosen to activate relay, relay closes whenever Service Alarm has triggered. Programming for relay closure on service reminder is done on Step 17S. Relay opens when service alarm reset. Press NEXT to go to Step 16S to set Relay 2 Settings. If off selected for Relay 2, service reminder programming.
  - Relay closes on Gallons
  - Relay closes on Time
  - Relay closes on Both
  - Off



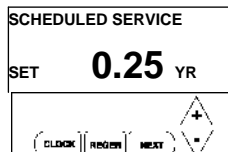
**STEP 16 S** – Relay 2 programming includes identical options as Relay 1.

Figure 12b

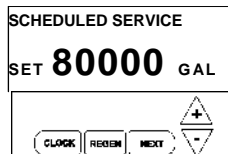
## SERVICE REMINDER



**STEP 17S** – Set scheduled service alarm using **A** or **V** buttons. Available options are OFF, TIME, ON GAL or BOTH. Selecting OFF disables this feature. If OFF is selected press NEXT to exit System Setup. If TIME, ON GAL or BOTH is selected press NEXT to select the TIME and/or ON GAL values. See Steps 18S and/or 19S. Press REGEN to return to the previous step.



**STEP 18S** – Service alarm for TIME ranges from 0.25 to 9.75 years. Use **A** or **V** buttons to select value. Press NEXT to either exit System Setup or if BOTH was selected go to Step 19S. Press REGEN to return to the previous step.

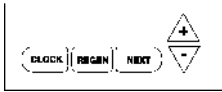


**STEP 19S** – Service alarm for ON GAL ranges from 100 to 9,999,900 gallons. Use **A** or **V** buttons to select value. Press NEXT to exit System Setup. Press REGEN to return to the previous step.

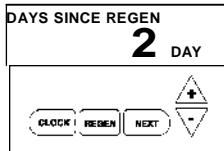
RETURN TO NORMAL MODE

# DIAGNOSTICS

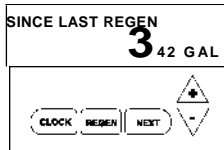
To reset diagnostic data push "Next" and **V** button until TYPE appears in window, then press "**A** & **V**" button simultaneously for 3 seconds.



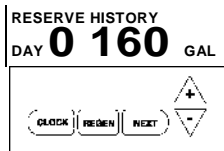
**STEP 1D** – Press **V** or **A** simultaneously for three seconds. If screen in step 2D does not appear in 5 seconds the lock on the valve is activated.



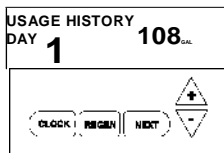
**STEP 2D** – **Days, since last regeneration:** This display shows the days since the last regeneration occurred. Press the NEXT button to go to Step 3D. Press REGEN to exit Diagnostics.



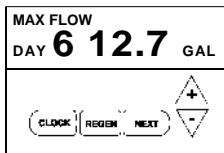
**STEP 3D** – **Volume, since last regeneration:** This display shows gallons of water that has been treated since the last regeneration. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4D. Press REGEN to return to previous step.



**STEP 4D** – **Volume of reserve capacity used for last 7 days:** If the unit is set up as a softener, a meter is installed and Set Volume Capacity is set to "Auto", this display shows 0 day (for today) and the reserve capacity. Pressing the **A** button will show day 1 (which would be yesterday) and displays the reserve capacity. Pressing the **A** button again will show day 2 (the day before yesterday) and the reserve capacity. Keep pressing the **A** button to show the capacity for days 3, 4, 5 and 6. The **V** button can be pressed to move backwards in the day series. Press NEXT button at any time to go to Step 5D. Press REGEN to return to previous step.



**STEP 5D** – **Volume of water used, 63-day usage history:** This display shows day 0 (for today) and 1 (for yesterday) will show day 2 (which would be the day before yesterday) and flashes the volume of water treated on that day. Continue to press the **A** button to show the volume of water treated for the last 63 days. If a regeneration occurred on the day the "letter R" will also be displayed. This display will show dashes if a water meter is not installed. Press the NEXT button at any time to go to Step 6 D. Press REGEN to return to the previous step.



**STEP 6D** – **Flow rate, maximum of each of last seven days:** The maximum flow rate in gallons per minute that occurred in each of the last seven days will be displayed. Press **A** arrow to display maximum flow rate today = 0, yesterday = 1. This display will equal zero if a water meter is not installed. Press the NEXT button to exit Diagnostics. Press REGEN to return to the previous step.

RETURN TO NORMAL MODE

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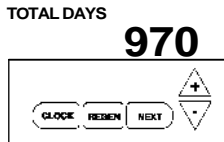
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## VALVE HISTORY

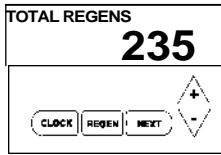
(Cannot be reset)



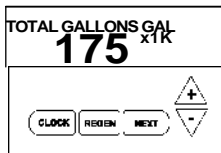
**STEP 1VH** – Press **V** and **A** simultaneously for three seconds and release, then press **V** and **A** simultaneously and release. If screen in step 2VH does not appear in 5 seconds the lock on the valve is activated.



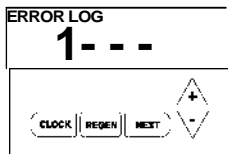
**STEP 2VH** – **Days, total since start-up:** This display shows the total days since startup. Press the NEXT button to go to Step 3VH. Press REGEN to return to previous step.



**STEP 3VH** – **Regenerations, total number since start-up:** This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to go to Step 4VH. Press REGEN to return to previous step.



**STEP 4VH** – **Volume, total used since start-up:** This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press NEXT button to exit Valve History. Press REGEN to return to previous step.



**STEP 5VH** – **Error Log history:** up to 10 errors. If no errors have occurred " - - - -" is displayed.

RETURN TO NORMAL MODE

# CYCLE SEQUENCE

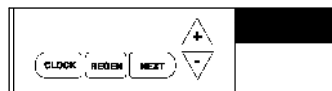
Anytime cycle sequence is modified, filter set-up will revert to manufacturer setting and must be reprogrammed as desired.

Cycle Sequence instructions allows the operator to set the order of the cycles. The Filter System Setup allows the operator to set how long the cycles will last. The operator may choose up to 9 cycles in any order.

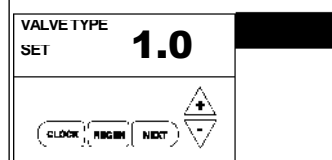
END must be used as the last cycle option. The FILTERING cycle should only be used in regenerant prefill applications.

| Cycle Options |                 |      |
|---------------|-----------------|------|
| BACKWASH      | REGENERANT DRAW | FILL |
| RINSE         | FILTERING       | END  |

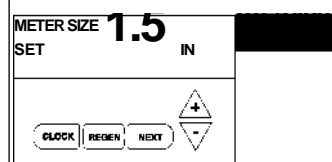
See Step 9CS for an example of how to set a valve so that when regeneration is initiated, BACKWASH occurs first, REGENERANT DRAW DN occurs second, RINSE occurs third, and FILL occurs fourth.



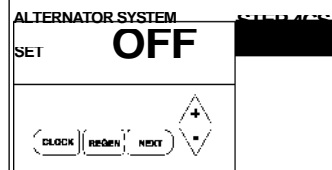
**STEP 1CS** – Press NEXT and **Y** simultaneously until display changes and release. Then press NEXT and **V** simultaneously again until valve type displayed and release. If screen in step 2CS does not appear in 5 seconds the lock on the valve is activated.



**STEP 2CS – Valve Type.** Use the **A** or **V** to select from 1.0", 1.25", 1.50", 2.0L", 2.0" valve. ANG A-300 is a 1.0" meter. Press NEXT to go to Step 3CS.

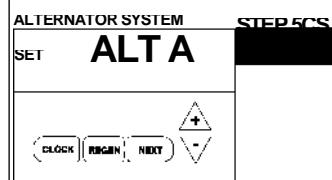


**STEP 3CS – Meter Size.** This display is only viewed when 2.0" or 2.0L" is selected in Step 2CS.



**STEP 4CS** – Use the **A** or **V** to select one of the following:

- OFF; or
- Twin Alternating – Select Alt A or Alt B, Step 5CS System; or
- No Hard Water Bypass During Regeneration – Step 7CS.
- System Board - Allows Demand Recall Programming.
- **Factory Setting is OFF** - Press NEXT to go to Step 8CS.



**STEP 5CS –Twin Alternating System** – Allows automatic alternation between two units to provide filtered water 24 hours a day.

Use **A** or **V** buttons to select ALT A or ALT B

Select ALT A for the control valve that has the two pin connector labeled MAV DRIVE connected to the alternator valve motor.

Select ALT B for the control valve that will be connected via three prong connector labeled INTERCONNECT. Press NEXT to go to Step 6CS.

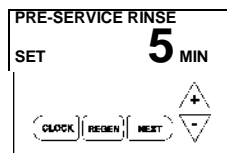
For Alternating System, must do one of the following:

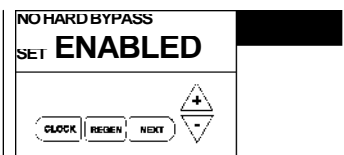
- If set up for a softener, Volume Capacity in GALLONS, select Regeneration Time Option "IMMEDIATE" and select DAYS BETWEEN REGEN "OFF".
- For complete programming, see MAV manual.



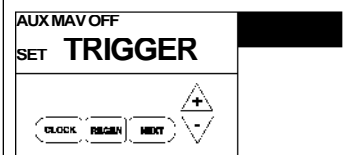
**STEP 6CS** – Use the **A** or **V** to select refresh rinse or preservice rinse:

- Refresh Rinse - If no alternation has occurred due to capacity reduction, Alternator MAV changes to service mode on Standby unit every 6:00am & 6:00pm for a preset bed refresh volume, then returns to previous unit. Press NEXT to select "volume" of rinse, selectable from 5-100 gallons.
- Pre-Service Rinse - Auxiliary MAV of standby value will drive to rinse for preset time before returning to service. MAV must be plumbed to drain for this selection. Press NEXT to select time duration of pre-service rinse.
- **Off - Factory setting is off**





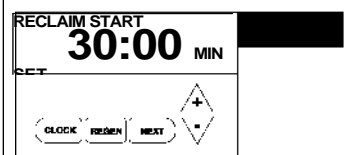
**STEP 7CS – No Hard Water Bypass Enabled** - Use **A** or **V** buttons to select NO HARD WATER BYPASS ENABLE. Selection requires that a connection to a Motorized Alternator Valve (MAV) is made to the two pin-connector labeled ALTERNATOR MAV DRIVE located on the printed circuit board. The MAV will be driven closed before the first regeneration cycle that is not FILL or SOFTENING or FILTERING, and be driven open after the last regeneration cycle that is not FILL. Press NEXT to go to Step 8C.



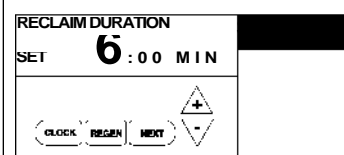
**STEP 8CS –** Use the **A** or **V** buttons to select one of the following:

- Reclaim
- Seperate Source
- Off

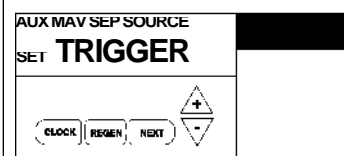
Press NEXT to go to Step 9CS. Press REGEN to return to previous step.



**STEP 9CS –** Only displays if reclamation is enabled in Step 8CS. Use the **A** or **V** buttons to select the number of minutes after the start of regeneration before the MAV will divert waste water from the plumbing drain receptacle to a specified drain. Start of regeneration is defined as first mode that is NOT draw or filtering. Press NEXT to go to Step 10CS. Press REGEN to return to previous step.

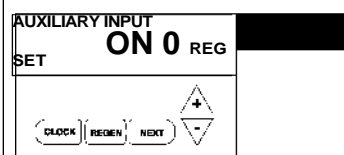


**STEP 10CS –** Only displays if reclamation is enabled in Step 8CS. Use the **A** or **V** buttons to select the number of minutes to divert the brine waste water. After the minutes count down to zero, the waste water will once again be diverted to the plumbing drain receptacle. Press NEXT to go to Step 11CS. Press REGEN to return to previous step.



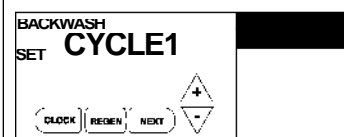
**STEP 11CS –** Separate source selection requires connection of motorized alternator valve (MAV) to Auxiliary Drive two-pin connection on board.

Auxiliary MAV Drive set to operate with a Separate Source trigger. Auxiliary MAV transitions to Bypass before the start of regen cycle #1, AFTER Alternator MAV motor transition. Auxiliary MAV transitions back to Service at the completion of the last programmed regen cycle, once the Valve Motor deactivates and BEFORE Alternator MAV transition (if scheduled). Auxiliary MAV will NOT automatically return to Service while manually stepping valve through regen, MAV will remain in Bypass until regen cycle end. Press NEXT to go to Step 12CS. Press REGEN to return to previous step.

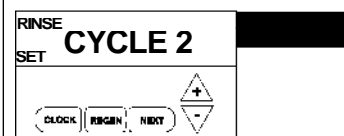


**STEP 12CS –** This display will be available to select the use of an outside signal to control the initiation of a regeneration. Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Following is an explanation of the options:

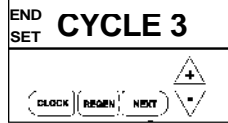
- ON 0 REGEN – If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur immediately.
- DELAY REGEN – If the dP switch is closed for an accumulative time of 2 minutes, a regeneration will occur at the schedule regeneration time.
- HOLD REGEN – If the dP switch is closed a regeneration will be prevented from occurring. Press NEXT to go to Step 13CS. Press REGEN to return to previous step.



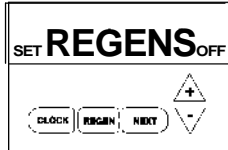
**STEP 13CS –** Press the **A** or **V** buttons until selection of first cycle appears in left upper corner, in this example BACKWASH is selected. Press NEXT to go to Step 14CS. Press REGEN to return to previous step.



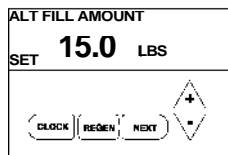
**STEP 14CS –** Press the **A** or **V** buttons until selection of third cycle appears in left upper corner, in this example RINSE is selected. Press NEXT to go to Step 15CS. Press REGEN to return to previous step.



**STEP 15CS** – Press the **A** or **V** buttons until last regeneration cycle; END appears. (Up to 9 regeneration modes are possible). **END MUST BE SELECTED AS LAST CYCLE.**



**STEP 16CS** – Press the **A** or **V** button to select number of standard regenerations which would trigger one alternate fill amount. Range: 1-99. **Factory setting is Off.** Press NEXT to go to Step 17CS.



**STEP 17CS** – Select amount of regenerant to be used when alternate regeneration requested. This screen is not displayed if off is selected in previous step. Range 1-200 lbs.

# TROUBLE SHOOTING

## PROBLEM

## CAUSE

## CORRECTION

After resolving the cause of any error code or any service valve, press NEXT & REGEN simultaneously for 5 seconds or disconnect power supply for 5 seconds at PC board and reconnect to resynchronize software with piston position.

### VALVE ERROR CODES

|  |  |  |
|--|--|--|
| <p><b>Error Code 101</b> - Unable to recognize</p>   | <p>A1. Control not reading piston position</p>   | <p>A1. Resynchronize software with piston position by start of regeneration pressing start of regeneration NEXT and REGEN buttons simultaneously for 5 seconds, until screen changes. Initiate regeneration to verify function by pressing and holding REGEN button until regeneration initiates, step through regeneration modes by pushing REGEN button each time motor stops.<br/> A2. Verify motor connection to PC board; motor wires intact and motor fully inserted to engage pinion.<br/> A3. Verify correct assembly; PC board snapped onto drive bracket and wires are in backplate guides and drive bracket snapped onto backplate. Verify three drive gears are in place on drive bracket.</p>   |
| <p><b>Error Code 102</b> - Unexpected stall</p>  | <p>B1. Mechanical Binding</p> <p>Buildup on piston<br/> Improper voltage being delivered</p> | <p>B1a. Check for any foreign material in stack assembly impeding piston movement and remove; verify seals intact and in place, if not, replace stack assembly and piston.<br/> B1b. Check for incorrect assembly, drive bracket not snapped into place, motor pushed inside of barrel of drive bracket (black gear on motor end should be flush with end of shaft).<br/> B1c. Drive gears unable to rotate freely - replace gear(s) if not rotating freely.<br/> B2. Clean with soft cloth and vinegar, or replace piston<br/> B3. Motor unable to move piston, check voltage is present to board on 12V DC motor at start of regeneration modes. Transformer should provide 12 volts when plugged into outlet and not attached to board - if not replace transformer</p> |
| <p><b>Error Code 103</b> - Motor ran too long, timed out trying to reach next position</p> | <p>C1. High drive forces on piston</p>   | <p>C1. Loosen drive cap gear 1/4 turn<br/> C2. Address high drive forces<br/> C3. Motor failure during regeneration-replace motor</p>  |
| <p><b>Error Code 104</b> - Motor ran too long, timed out trying to reach home position</p> | <p>D1. Piston unable to reach home position</p>  | <p>D1. Incorrect assembly; check drive bracket is correctly seated and snapped into place on backplate, wires outside of guides on backplate can impede drive bracket from correct position.<br/> D2. Check PC board is seated on posts and snapped into place on drive bracket<br/> D3. Drive gear labels dirty or missing, missing or broken gear, replace as needed</p>   |

### MAV ERROR CODES

After resolving any MAV error or servicing MAV, resynchronize software with piston positioning by pressing NEXT and REGEN buttons simultaneously for 5 seconds or disconnecting power from PC board for 5 seconds and reconnecting.

### AUXILIARY MAV DRIVE - ERROR CODES 106 & 107

|   |  |  |
|---|--|--|
| <p><b>Error Code 106</b> - Alternating MAV ran too long</p> | <p>A1. Control valve is programmed for alternating or as NHWB without having MAV connected to board. Reprogram valve to proper setting or connect MAV to alternating MAV drive on PC board<br/> A2. MAV motor not fully engaged with gears</p> | <p>A1. Control valve is programmed for alternating or as NHWB without having MAV connected to board. Reprogram valve to proper setting or connect MAV to alternating MAV drive on PC board<br/> A2. MAV motor not fully engaged with gears</p> |
| <p><b>Error Code 107</b> - Alternating MAV stalled</p>      | <p>B1. Open MAV and check for foreign material on stack assembly, remove if present, verify seals intact and in place. If not, replace stack assembly<br/> B2. Drive gear should spin freely-replace if necessary</p>                          | <p>B1. Open MAV and check for foreign material on stack assembly, remove if present, verify seals intact and in place. If not, replace stack assembly<br/> B2. Drive gear should spin freely-replace if necessary</p>                          |

### ALTERNATING MAV DRIVE - ERROR CODES 116 & 117

|   |  |  |
|---|--|--|
| <p><b>Error Code 116</b> - Auxiliary MAV ran too long</p> | <p>A1. Control valve is programmed for auxiliary MAV without having MAV connected to board. Reprogram valve to proper setting or connect MAV to two-pin connection labeled auxiliary drive on PC board<br/> A2. MAV motor not fully engaged with gears</p> | <p>A1. Control valve is programmed for auxiliary MAV without having MAV connected to board. Reprogram valve to proper setting or connect MAV to two-pin connection labeled auxiliary drive on PC board<br/> A2. MAV motor not fully engaged with gears</p> |
|---|--|--|

# TROUBLE SHOOTING

| PROBLEM  | CAUSE  | CORRECTION   |
|--|--|--|
| <p><b>Error Code 117 - Auxiliary MAV stalled</b></p>     | <p>B2. Mechanical Binding</p>  | <p>B1. Open MAV and check for foreign material on stack assembly, remove if present, verify seals intact and in place. If not, replace stack assembly<br/>                     B2. Drive gear and reducing gears should spin freely, replace if necessary</p>  |
| <p>1. Control valve stalled in regeneration</p>          | <p>A. Motor not operating<br/>                     B. No electric power at outlet<br/>                     C. Defective transformer<br/> <br/>                     D. Defective PC board<br/>                     E. Broken drive gear or drive cap assembly<br/>                     F. Broken piston retainer<br/>                     G. Broken main or regenerant piston</p> | <p>A. Replace Motor<br/>                     B. Repair outlet or use working outlet<br/>                     C. Should provide 12 volts when plugged into outlet, if not, replace transformer<br/>                     D. Replace PC board<br/>                     E. Replace drive gear or drive cap assembly<br/>                     F. Replace drive cap assembly<br/>                     G. Replace main or regenerant piston</p> |
| <p>2. Blank or incomplete LED display</p>                | <p>A. Transformer unplugged<br/>                     B. No electric power at outlet<br/>                     C. Defective transformer<br/> <br/>                     D. Short in meter<br/>                     E. Check battery, should be greater than 3 volts<br/>                     F. Defective PC board</p>  | <p>A. Connect to power<br/>                     B. Repair outlet or use working outlet<br/>                     C. Should provide 12 volts when plugged into outlet, if not, replace transformer<br/>                     D. Unplug meter from PC board, if LED lights appropriately, replace meter assembly.<br/>                     E. Replace battery if less than 3 volts<br/>                     F. Replace PC board</p>          |
| <p>3. Control does not display correct</p>               | <p>A. Power outage &gt; 2 years<br/>                     B. time of day<br/>                     Power outage &lt; 2 years, time of day flashing, battery depleted</p>   | <p>A. Reset time of day, replace lithium coin type battery on circuit board<br/>                     B. Reset time of day, replace lithium coin type battery on circuit board</p>  |
| <p>4. No "filtering" display when water is flowing</p>   | <p>A. Bypass valve in bypass position<br/>                     B. Meter connection disconnected<br/>                     C. Restricted/stalled meter turbine<br/> <br/>                     D. Defective meter<br/>                     E. Defective PC board</p>  | <p>A. Put bypass valve in service position<br/>                     B. Connect meter to PC board<br/>                     C. Remove meter and check for rotation, clean foreign material<br/>                     D. Replace meter<br/>                     E. Replace PC board</p>  |
| <p>5. Control valve regenerates at wrong time of day</p> | <p>A. Power outages<br/>                     B. Time of day not set correctly<br/>                     C. Time of regeneration incorrect<br/>                     D. Control valve set at "on 0"<br/>                     E. (immediate regeneration)<br/>                     Control valve set at NORMAL + on 0</p>  | <p>A. Reset control valve to correct time of day<br/>                     B. Reset to correct time of day<br/>                     C. Reset regeneration time<br/>                     D. Check control valve set-up procedure regeneration time option (see page 26)<br/>                     E. Check control valve set-up procedure regeneration time option (see page 26)</p>  |

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## NOTES

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Angel Water, Inc.  
214 S Hager Ave. Barrington, Illinois 60010

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Phone 847-382-7800

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## A300 SERIES Water Filter Limited Warranty

Angel Water, Inc. warrants to the original consumer purchaser that the A300 Series and the parts listed below will be free from defects in material and/or workmanship from the date of the original installation for the following time periods:

Angel Water Conditioning Inc. will repair or replace without cost for a period of one year after purchase, any part or portion, which our examination shall disclose to be defective. At the expiration of this service policy, a service fee will be charged.

- Angel warranties to the original owner all parts\* related to equipment for a period of 5 years.
- A300 Series Water Filter will provide a 10 Year warranty on the water filter vessel to the original owner.

A charge will be made for service required because of misuse, alteration, freezing, neglect, used in rental property, accident, foreign matter, change in water content, customer error, customer imagination, or other causes beyond Angel's control.

"Manufacturing Defect" does not include damage to the unit or its parts caused by abuse, negligence, freezing, fire, heat, direct exposure to weather or sunlight, water pressures exceeding 100 psi, flooding, other causes not considered normal operating conditions, or an act of God.

\*Wearable parts not covered by this warranty include screens, injectors, valve disks which are wearable and may be damaged by water itself.

### *Owners Obligation*

The unit must be installed and operated within the design limitations according to the installation and maintenance manual provided.

This warranty is valid to the original owner when installed by an Angel representative only. (Warranty transfers may be purchased)

Customer must properly maintain the unit per the manufactures service schedule.

- Water Filters - Must properly provide chlorine for Chlorine Injection System and set timer to correct time of day. Must have Angel Water Conditioning perform an annual (every year) inspection, service and cleaning of unit.