



Liberator Acid Neutralizer (AN) Product Manual



Inspect the packaging of the equipment to confirm that nothing was damaged during shipping. (Figure 1)

Remove the resin tank(s) and valve(s) from the packaging.
Make sure everything is included and without damage.

_____ 1) Control Valve (Figure 2)

_____ 2) Media Tank (Figure 3)

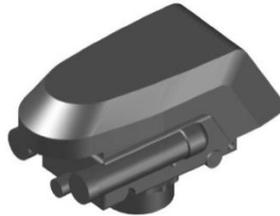


Figure 2: Control Valve

_____ 3) Correct Amount of Media
(from Model and Media Requirements Table on page 2)



Figure 1: Original Packaging of DCS6 Twin Tank System
This is how the packages will generally arrive

Liberator Acid Neutralizer (AN)

Calcite is a crushed and screened white marble media used to neutralize acidic or low pH water. Acidic waters, on contact with Calcite, slowly dissolve the calcium carbonate media to raise the pH. The sacrificial media will have to be periodically added as it dissolves. Calcite increases hardness and a water softener may have to be added after the neutralizing filter.

Filters using Calcite only work best when the alkalinity is less than 150 PPM. Consult the factory if the influent water alkalinity is higher.

Diamond Water's media consists of 30% magnesium oxide (Corosex) and 70% calcium carbonate (Calcite). This ratio must be maintained to treat acidic water effectively.

Call Diamond H2O right away if anything is missing. Contact the freight company **immediately** if anything is damaged. Diamond H2O will not be liable for any damage received after shipping.



Figure 3: Media Tank

Packaged By: _____

Date: _____

Received By: _____

Date: _____

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Table 1: System Specifications and Media Requirements

Model Number	AN-100A-LOGIX	AN-150A-LOGIX	AN-200A-LOGIX	AN-250A-LOGIX
Tank Size (in)	10 X 44	10 x 54	12 x 52	13 X 54
Filter Media (ft³)	1	1.5	2	2.5
Service Rate (gpm)	3	5	8	10
Pressure Drop @ Service Flow (psi)	1.5	3.3	4.3	5.4
Capacity (gal)	500	750	1000	1250
Gravel #20 (lbs)	10	10	20	25
Inlet/Outlet	1" NPT	1" NPT	1" NPT	1" NPT
Drain	3/4" NPT	3/4" NPT	3/4" NPT	3/4" NPT
Backwash Rate (gpm)	5.3	5.3	6.5	7.5
Power	120 V, 1 PH			

1. Obtain the required tools listed below:

- A. Utility Knife
- B. Pliers
- C. Phillips Screwdriver
- D. Hammer

2. Place the tank near a water source.

- A. Select a position near a floor drain that has adequate carrying capacity to handle the backwash flow rate. Refer to the specification Table 1 on page 2 for the appropriate backwash flow rate.

- B. Place the tank on a level, firm foundation, like concrete.

C. Determine the “front” of the tank:

- a. Make sure that the distributor riser is flush with the top of the resin tank.
- b. Before placing any water, gravel, or media in the media tank, screw in a control valve to the point where it is secure. The valve does not need to be forced on, but should be snug.
- c. Mark the “front” of each media tank (shown in Figure 4) with either a marker or tape. The front of the media tank is determined by the location of the face of the control valve once it has been secured to the face of the control valve. Make sure that the system is positioned in a way that the plumbing can be installed.

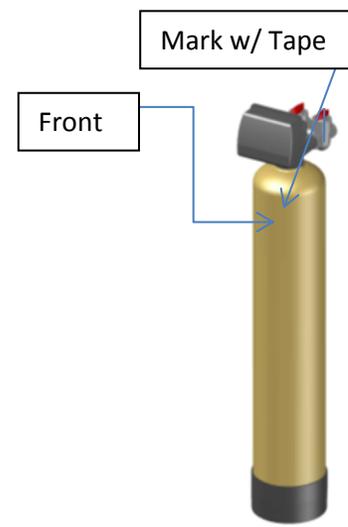


Figure 4:
Resin Tank

D. Before Filling the Tanks:

- a. Remove the valve(s)
- b. Ensure that the front of the tank is positioned correctly. Once filled, the resin tank will be very difficult to move.
- c. Cover the exposed end of the distributor riser to make sure no media gets inside. Covering up the riser with duct tape is one option, shown in Figure 4.
- d. Obtain a funnel to assist placing the media in the media tank. (A funnel designed specifically for our resin tanks can be ordered from Diamond H2O Conditioning. The part numbers for the two types of funnels can be found in Table 2 on Page 2.)



Figure 4: How to Block
Distributor Tube

3. Setting up the tank

- A. Fill the tank up to about 30% full of water.
- B. Check the system specifications (Table 1) on page 2 to determine the correct amount of gravel and resin needed for your system.
- C. Position the distributor tube so it is in the center of the tank, shown in Figure 5. About one inch of the distributor tube should be sticking out of the top of the tank.
- D. **SLOWLY**, pour the correct amount of support gravel into the tank without getting any gravel into the distributor tube.



Figure 5: Centered Distributer Tube

- a. **CAUTION: The distributor system is made of PVC and will break if the gravel is poured in too quickly.**
- E. When all of the support gravel provided is in the tank, carefully rock the tank back and forth to level the gravel. Confirm that the gravel is covering the distributor basket or radials. If not contact Diamond H2O.

- F. **SLOWLY**, pour the correct amount of media into the tank. Again, try to keep the media level by carefully rocking the tank back and forth. The correct amount of media necessary for your model can be found in Table 1.
- G. Fill the rest of the tank with water to prevent air from getting in the tanks and potentially losing media.

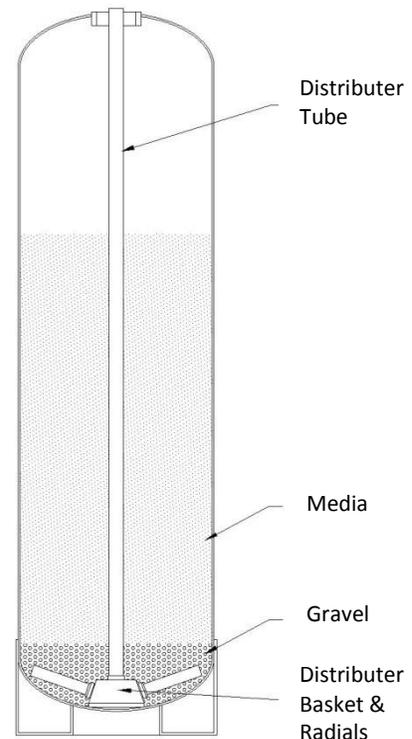


Figure 10: Media Tank Diagram

- H. Verify that there is a large O-ring on the control valve adapter base.
- I. Place the control valve on the tank, making sure that the distributor tube fits into the bottom of the control valve.
- J. Tighten the control valve onto the tank to the point that it is snug. The finished tank is shown in Figure 10. Double check that the valve is in a correct position to be able to install the plumbing.

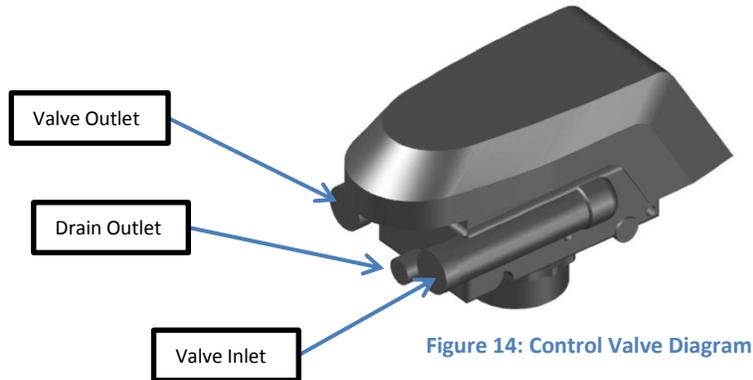


Figure 14: Control Valve Diagram

4. Connect the Valves to the Water Source

- A. Requirements for Source Water
 - a. Water Pressure: 25-100psi
 - b. Water Temperature: 33-100°F
 - c. Firm Level Surface for Tank(s)
 - d. 115/120V, 60Hz uninterrupted outlet

- B. Pipe or tube a line from the Control Valve Drain (Figure 14) to the drain.

Do:

- Minimize the distance between the drain and water filter
- Use rigid piping for the drain line

DO NOT

- install a valve in this line
- use a pipe smaller than one inch
- make a direct connection to the drain
 - Provide an air gap at least four times the diameter of the drain pipe to conform to sanitation codes and be able to observe the drain flow.
- use an excessive amount of elbows in the plumbing
- use Vaseline, oils, other hydrocarbon lubricants, or spray silicon anywhere
- use pipe dope or other sealants on threads

- C. Connect the facility plumbing to the control valve inlet following all local codes.
- D. Temporarily run the control valve outlet to the drain.

NOTE: Make sure all piping is free of thread chips and other foreign matter.

NOTE: If this valve is being installed on metallic water supply systems being used as an electrical ground; install a properly sized electrical bonding jumper across the inlet/outlet pipes serving these devices to ensure the valve does not interrupt the electrical continuity of the path to ground.

5. Electrical

The Water Filter use requires single-phase 110 volt, 1 phase, 60 hertz, and 5 amp service; it is equipped with a 10 foot electrical cord and a wall plug-in transformer.

NOTE: We recommend that a licensed electrician install your system in accordance with local and national electrical codes.

WARNING: To reduce the risk of electrical shock, the incoming power supply must include a protective earth ground.

NOTE: Some Filters are supplied with an optional micro-switch that closes during Backwashing. The wires with connectors can be located coming out the back of the control valve.

6. Start up the system for the first time.

- A. Fill the tank with water.
 - a. Manually put the control valve into regeneration by simultaneously the holding ▲ and ▼ and release (Section 11)
 - b. A mixture of air and water will flow from the drain line.
 - c. Slowly open the bypass valve's inlet to allow water to slowly enter the tank. (shown in figure 15)
 - d. Once the tank is filled, only water will be coming out of the drain line. Put the system back into bypass operation. Run each step of the regen cycle for a few minutes.
- B. When no air is flowing through the drain line
 - a. The tank is now filled with water.
 - b. Wait until the system is finished regenerating or press ▼ repeatedly until the system stops regenerating.
 - c. Open the bypass valve into normal operation (Figure 17)
- C. Program the Valve.
 - a. Most of the settings (OEM Settings) were pre-programmed by Diamond H2O. However, all programmable functions are shown in section 9.



Figure 15:
Opening bypass valve's inlet

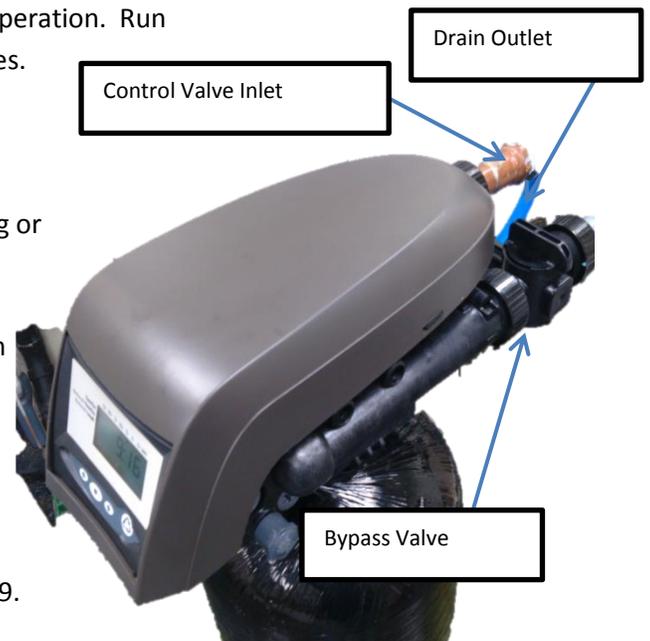


Figure 16: Finished System

7. Bypass Valve Operations

A. The red controls of the bypass valve can be turned 90° resulting in four modes of operation.

“Treated”
Water Exits Supply Water
Enters

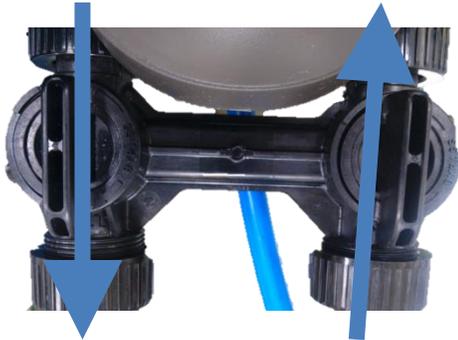


Figure 17: Normal Operation

Supply Water Supply Water
Exits Enters



Figure 18: Bypass Operation

Supply Water Supply Water
Exits Enters

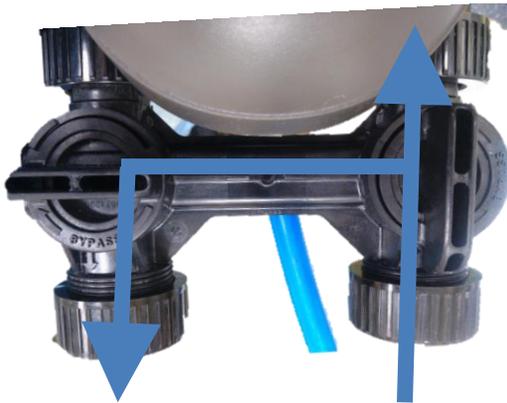


Figure 19: Diagnostic Mode

No Water Supply Water is Shut
Exits Off from the House
and the Valve.

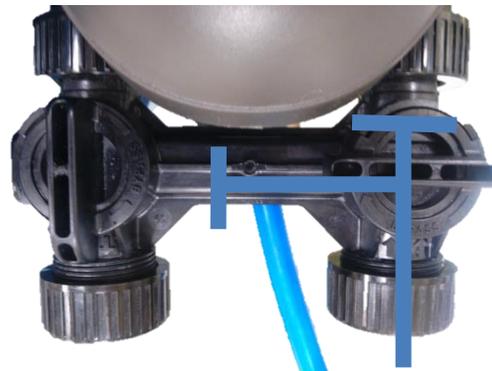


Figure 20: Shut Off Mode

8. Main Operating States

Figure 21 shows the main operating states for the software and how they interact.

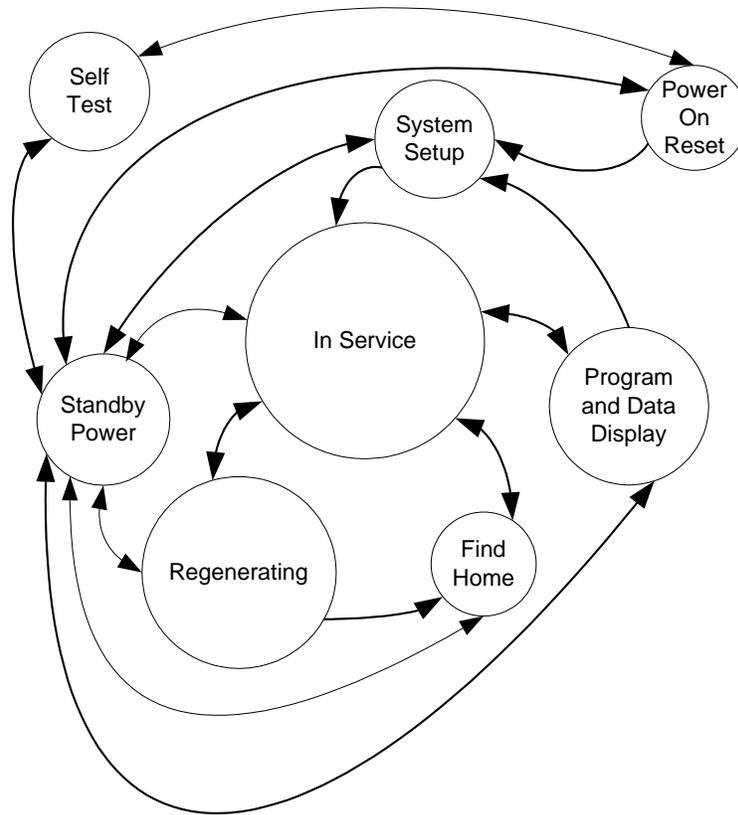


Figure 21: 762 State Diagram

- A. Power On Reset
This will monitor the AC input to determine if the control is operating on 50 or 60 hertz power. Function will pass to the self-test routine if the set key is pressed. The routine initializes all ports and time bases. It reads data from the information memory and checks the validity of the data. The control will set a flag indicating the time of day needs to be set.
- B. Self-Test
The self-test routine will enter from and return to the power on reset routine. The self-test routine will test all inputs and outputs. A simple test fixture will be used to connect to the outputs and inputs.
- C. Standby Power
The standby power routine is called anytime the unregulated voltage falls to a level indicating that AC power has been lost. The microcontroller is placed in a sleep mode waking to maintain

the current time of day. Power to operate the microcontroller is supplied by a super capacitor. The display will show the programmed valve number when it wakes from standby power.

D. System Setup

The initial programming routine is used to load a set of programmable variables based on the resin volume in the softener. The system setup is a two-step process. First the valve is selected, and then the resin volume is selected. The system setup routine is normally entered from the power on reset routine if the initial setting (resin volume) is “no setting”. The initial setting can be cleared in the Program and Data Display State.

E. Program and Data Display

The program and data display state consists of several routines that allow for setting and displaying programmable values.

F. In Service

The in service state uses several routines that handle the monitoring and display function while the valve is in service.

G. Regenerating

The regenerating routine handles the operation of the motor to position the cam in various positions as needed to perform regeneration of the resin bed.

9. Program the Valve

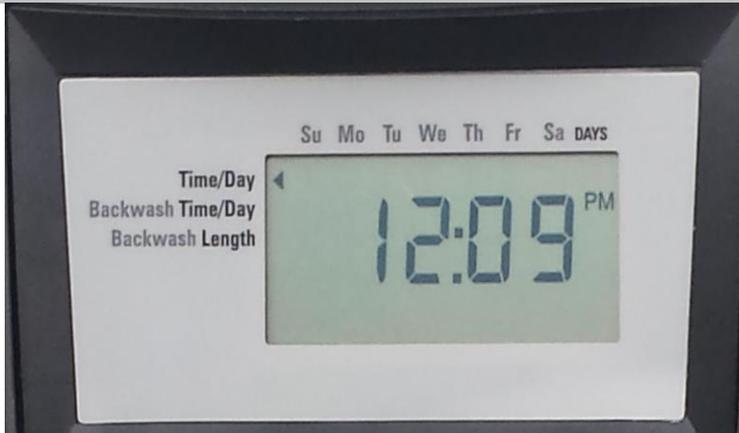
All of the parameters on the valve can be displayed on the LCD Display. Use the Down Key and Up Keys to navigate through the parameters. Each parameter can be edited by pressing the Set Key. After the value has been changed, the value can be saved by pressing the Set Key again. Most of the parameters have already been set by Diamond H₂O. All of the parameters are shown in Table 2, 3 and 4.



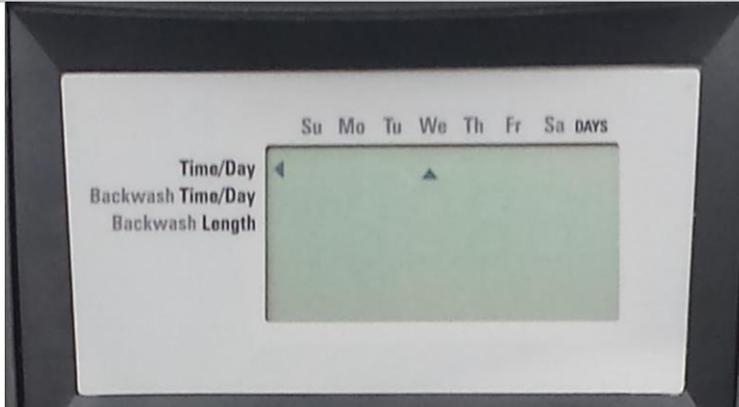
Figure 22: Key Pad and LCD Display

Table 2: Level I Programming

Parameter Description	Range of Values	Minimum Increment	Default	Units of Measure	Notes
P1 Time of Day	1:00 - 12:59 AM or PM 0:00 - 23:59	1 minute	12:00 PM	hour minute	Range depends on value selected for P10



P2 Day of Week	N/A	1 day	None	N/A	Uses arrows under days of week on overlay.
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P3 Time of Regeneration	1:00 - 12:59 AM or PM 0:00 - 23:59	1 minute	2:00 AM	hour minute	Range depends on value selected for P10
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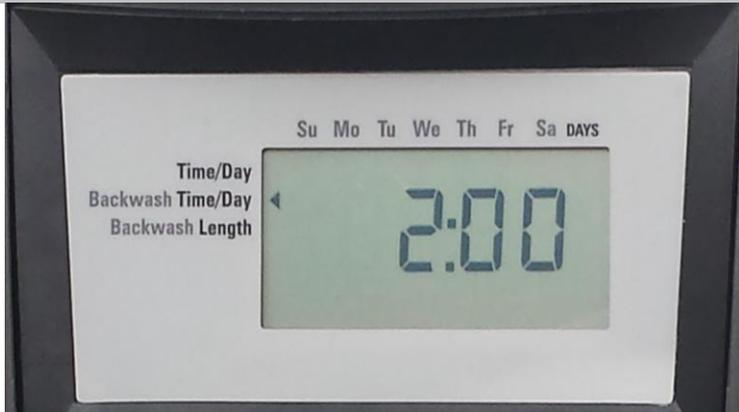
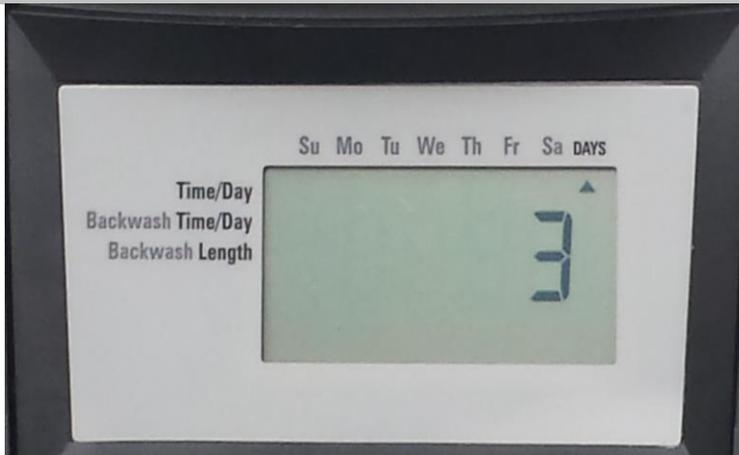


Table 3: Level I Programming (2).

Parameter Description	Range of Values	Minimum Increment	Default	Units of Measure	Notes
P4 Calendar Override	0-99	1	3	days	0 = no calendar override, 0.5 = regeneration twice a day at time of regeneration and 12 hours later. Calendar Override skipped if at least one Day of Regeneration selected. Can be locked out of changes in Level I programming.



P6 Backwash Time (3 cycle filter mode)	0-200	1	14	Minutes of backwash in 3 cycle filter mode.
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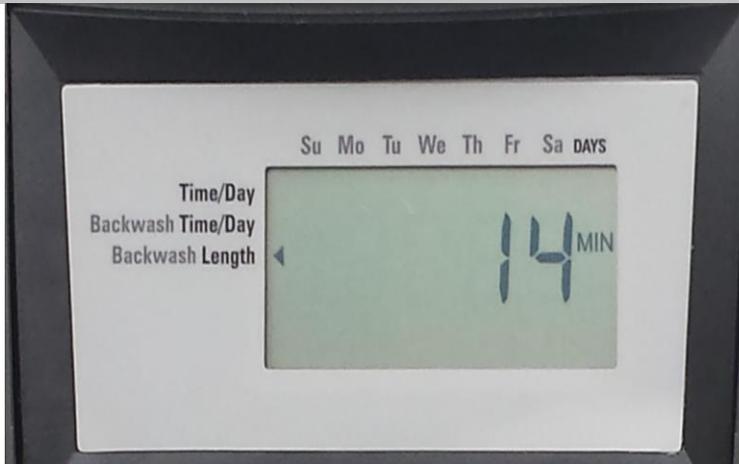
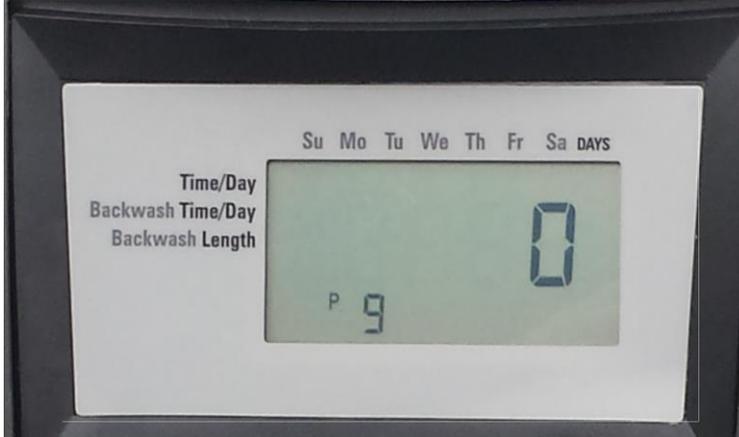
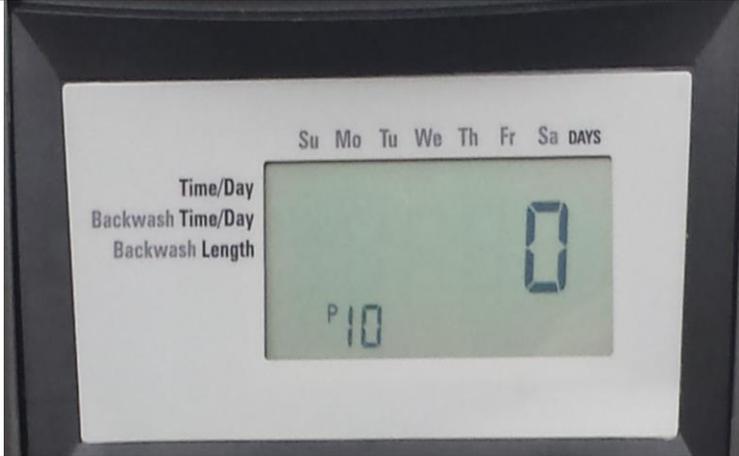


Table 4: Level II Programming.

Parameter Description	Range of Values	Minimum Increment	Default	Units of Measure	Notes
P9	Units of measure	0-1	1	0	0 = US 1 = Metric.



P10	Clock mode	0-1	1	0	0 = 12 hour clock 1 = 24 hour clock.
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10. Backwashing

The backwashing cycle of the AN-100A-LOGIX is shown in Table 5. Larger backwashing times will be required for larger systems.

Table 5: AN-100A-LOGIX Backwash Cycle.

Step #	Description	Time (Minutes)
C1	Backwash	14
C4	Re-pressurize	2
C5	Fast Rinse	14
C6	2 nd Backwash	1
C7	2 nd Fast Rinse	1

11. Troubleshooting

A. Manual Backwashing

Delayed Manual Backwash

A delayed manual regeneration is programmed by pressing the REGENERATION key. The regeneration icon on the LCD will flash indicating regeneration will start when the time of day reaches the programmed time of regeneration. Pressing the REGENERATION key again will turn off the regeneration icon and cancel the delayed regeneration.

Immediate Manual Backwash

An immediate manual regeneration is programmed by pressing and holding the REGENERATION key for three seconds. The regeneration icon on the LCD will turn on. The control will go to the regenerating mode.

Delayed Second Backwash

A delayed second regeneration is programmed by pressing the REGENERATION key while the control is in the regenerating mode. The x2 icon next to the regeneration icon will flash indicating a second regeneration will start when the time of day reaches the programmed time of regeneration.

Double Immediate Manual Backwash

Back to Back manual regenerations are programmed by pressing and holding the REGENERATION key for three seconds while the control is in the regenerating mode. The x2 icon next to the regeneration icon will turn on indicating a second manual regeneration will start immediately after current regeneration is complete.

B. Power Loss

Only the current time of day will need to be reset if power is lost for greater than 8 hours. If power is lost while the system is regenerating, the control will complete regeneration at the point of interruption once power is restored.

12. Control Error Codes

Problem	Possible Cause	Solution
Err1	both locations of the 742/762 designation are corrupt	Overwrite the primary and secondary locations for the 742/762 designations with 762N for 60Hz and 762W for 50Hz
	NOVRAM data corrupt	Overwrite all NOVRAM locations except the primary and secondary locations for the 742/762 designation with zeroes and re-compute the checksum if any key is pressed
Err2	A "North American" control is being operated with a 50Hz supply.	Change Supply
Err3	Turn on motor. The photo interrupter is blocked when it should be open in the service position	Run motor until the service position is found
	Turn on motor. The control detects the service position before the end of a regeneration cycle	Run motor until the service position is found