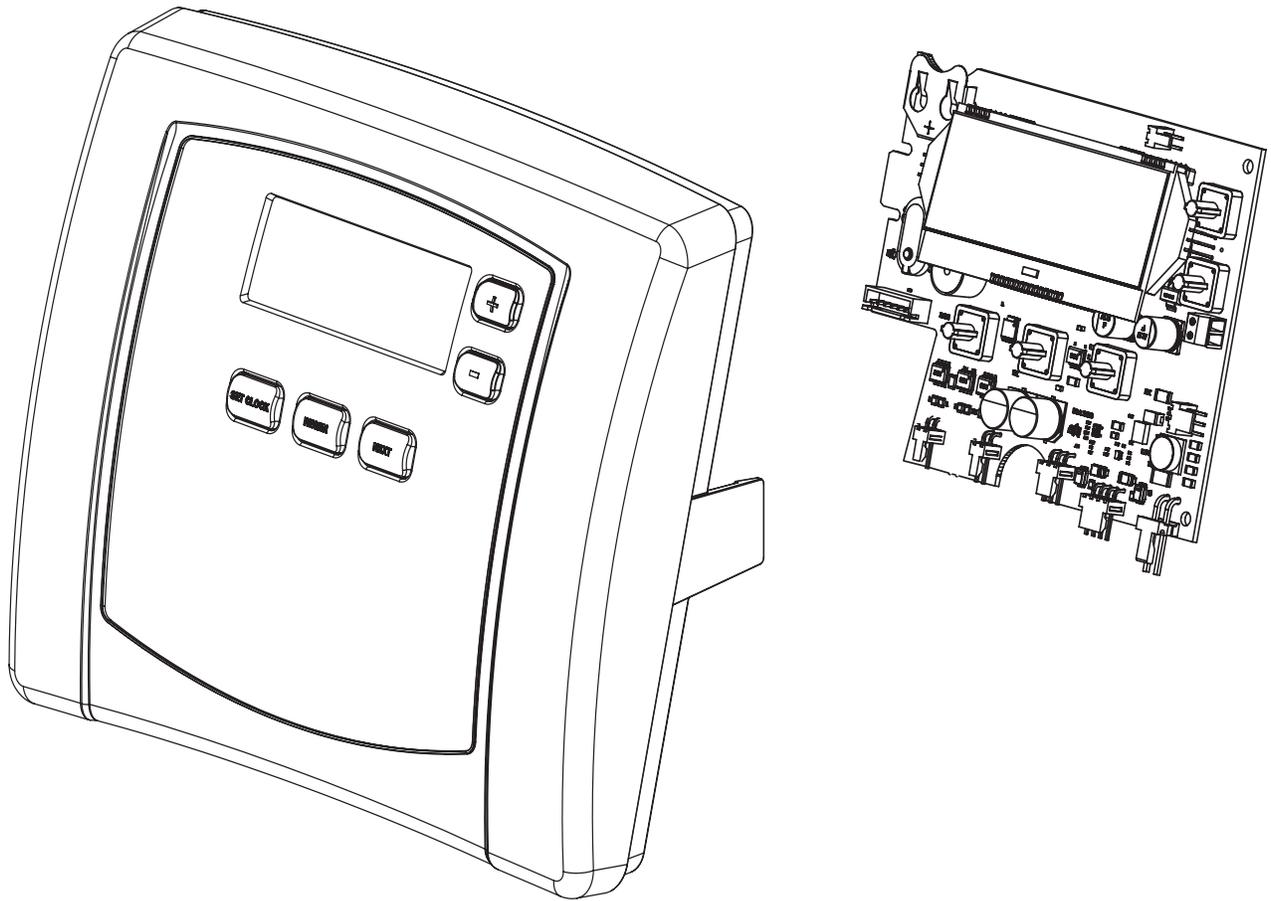


# Master Programming Guide

October 2019 Edition



## **For Models:**

- Impression
- Impression Plus
- Impression Twin

**Water Right**<sup>®</sup>  
The Right Water  
for Life

# Button appearance and position may be different than actual valve

Cycle times, sequences, and settings in this guide are only examples of how your system may be programmed. Actual settings are determined by the manufacturer. Please contact them if more information is needed.

## Important button sequences to note:

- 1. UNLOCK VALVE SETTINGS:** Press buttons in the following order: **−**, **NEXT**, **+**, **CLOCK**. This will allow a user to change manufacturer's settings. When finished, lock settings by inputting the same sequence.
- 2. CLEAR ERROR ON SCREEN:** Press and hold **NEXT** and **REGEN** for three seconds.
- 3. CLEAR SERVICE ALARM:** If service alarm is triggered, press and hold **+** and **−** buttons simultaneously for three seconds to reset to original set points. This will reset both gallon and year alarms.
- 4. REGEN BUTTON:** From a general operation screen, pressing the **REGEN** button schedules a regeneration for that night. Pressing it again will cancel the regeneration for that night. On most screens besides the general operation screens, the **REGEN** button works as a "back" button. Pressing it will return to the previous setting screen.

## General Operation Screens

Press **NEXT** button to toggle between one of four displays.  
Press **REGEN** button to schedule a regeneration for that night.

**TIME OF DAY MON**  
GPM 8 2:40 PM

**Displays current time**  
Unit defaults to this screen after a reset.

CLOCK REGEN NEXT + −

**FLOW RATE**  
8.0 GPM

**Displays current flow rate**  
"Current Flow Rate" is the amount of water currently flowing through, and being treated by, the unit. "GPM" and the flow rate flash while the turbine is rotating.

CLOCK REGEN NEXT + −

**CAPACITY REMAINING**  
GPM 8 1600 GAL

**Displays a unit's remaining capacity**  
This screen will not display if the unit's gallons of capacity is set to OFF. "REGEN TODAY" will alternate with the current screen header if a regen is expected that night.

CLOCK REGEN NEXT + −

**DAYS TO A REGEN**  
GPM 8 3

**Displays days remaining until a regen**  
This screen will not display if the unit's day override is set to off.

CLOCK REGEN NEXT + −

If set, a scrolling dealer name and phone number screen will alternate with the selected general operation screen.

555 5555555  
**DEALER NA**

**Displays scrolling dealer name and phone number**  
To change dealer name and phone number, see page 3.

CLOCK REGEN NEXT + −

## Set Time Screens

Accessed by pressing the **CLOCK** button.

**TIME HOUR**  
SET 2:00 AM

**Set hours with + or − buttons**  
AM/PM toggles after 12 AM.

CLOCK REGEN NEXT + −

**TIME MINUTES**  
SET 2:35 AM

**Set minutes with + or − buttons**  
AM/PM toggles after 12 AM.

CLOCK REGEN NEXT + −

**CURRENT DAY**  
SET WED

**Set current day with + or − buttons**  
The default setting is WED.

CLOCK REGEN NEXT + −

Return to general display

## Unlock and Lock Controller

The following screens will flash when the correct button sequence is inputted to unlock valve settings.

**PROGRAM UNLOCK**

**Indicates that the valve controller is unlocked**  
Unlocks access to advanced programming features within the controller.

CLOCK REGEN NEXT + −

**PROGRAM LOCK**

**Indicates that the valve controller is locked**  
It is strongly advised to lock the controller following any changes. This helps to prevent any accidental access to advanced programming settings.

CLOCK REGEN NEXT + −

The  symbol on the following pages indicates that the screens below it will not display unless the controller is unlocked.

## Typical Regeneration Screens

Only visible when unit is in regeneration

**BACKWASH REMAINING**  
2 3:30

**Displays time remaining in current regeneration cycle**  
"2" flashes for a second backwash if two backwashes are programmed.

CLOCK REGEN NEXT + −

**GENERATOR ON**  
53:45 MIN

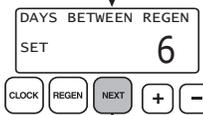
**Displays time remaining in current cycle**  
If a chlorine generator is connected and set to ON, the brine concentration will be checked during draw. Text will alternate between DRAW TIME & GENERATOR ON.

CLOCK REGEN NEXT + −

# Softener/Filter Installer/User Screens

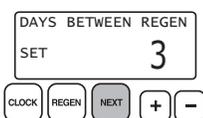
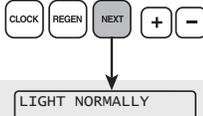
Accessed by pressing and holding **NEXT** and **+** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.

## Softeners

- 1**  **Set water hardness with + or – buttons**  
Adjustable from 1-150 grains, within limits determined by capacity settings as to not override gallons capacity setting. Default setting is 20 grains.  
NOTE: This screen will not display if the unit is set to "FILTERING" mode (see OEM FILTERING SECTION).
  - 2**  **Set days between a regeneration with + or – buttons**  
Adjustable from 1-28 days, or OFF.  
Default setting is 6.
  - 3**  **Set hour of regen time with + or – buttons**  
If IMMEDIATE REGEN is set (see Service OEM page), regen will be immediate once total capacity is exhausted and ON ZERO will be displayed.  
Default setting is 2:00 AM.
  - 4**  **Set minutes of regen time with + or – buttons**  
If IMMEDIATE REGEN is set (see Service OEM page), regen will be immediate once total capacity is exhausted and ON ZERO will be displayed.  
Default setting is 2:00 AM.
  - 5**  **Set backlight operation with + or – buttons**  
Default setting is ON.  
OFF will turn display backlight off after 5 minutes of keypad inactivity.
- Return to general display

Only appears on units that support a backlit display

## Filters

- 1**  **Set days between a regeneration with + or – buttons**  
Adjustable from 1-28 days, or OFF.  
Default setting is 3.
  - 2**  **Set hour of regen time with + or – buttons**  
If IMMEDIATE REGEN is set (see Service OEM page), regen will be immediate once total capacity is exhausted and ON ZERO will be displayed.  
Default setting is 12:00 AM.
  - 3**  **Set minutes of regen time with + or – buttons**  
If IMMEDIATE REGEN is set (see Service OEM page), regen will be immediate once total capacity is exhausted and ON ZERO will be displayed.  
Default setting is 12:00 AM.
  - 4**  **Set backlight operation with + or – buttons**  
Default setting is ON.  
OFF will turn display backlight off after 5 minutes of keypad inactivity.
- Return to general display

Only appears on units that support a backlit display

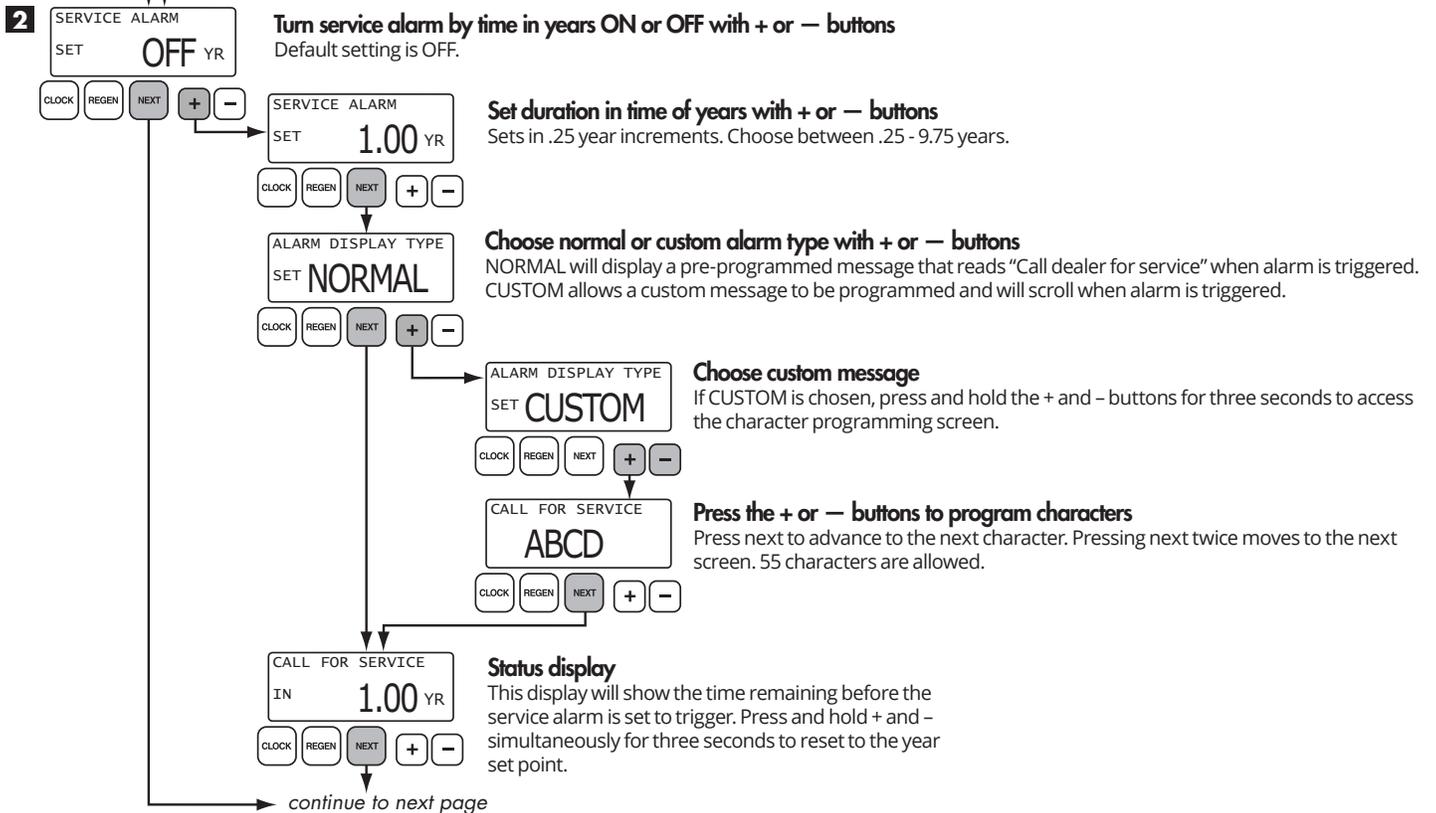
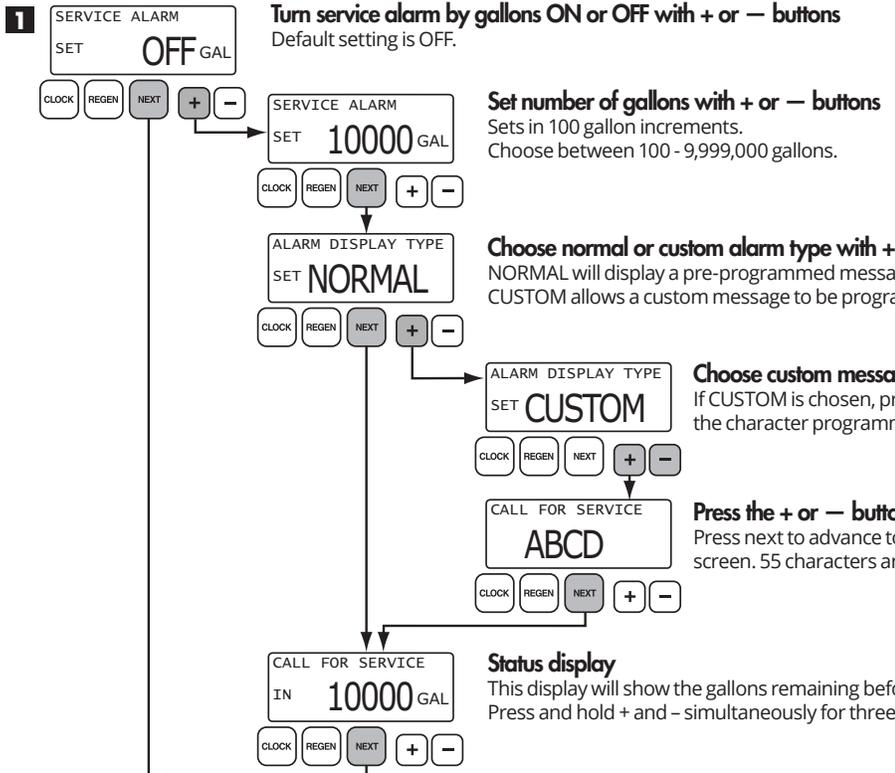
# Service Alarm/Dealer Setting Screens

Accessed by pressing and holding **NEXT** and **+** buttons simultaneously for three seconds. Once screen changes, press and hold **NEXT** and **+** buttons again for three seconds. Returns to general display after five minutes of inactivity.

The service alarm feature is used to warn the owner that the unit currently needs service. Some application examples includes reminding the owner when a filter needs replacement, when an R.O. system needs servicing, or when routine maintenance needs to be performed. This can be set by gallons, time, or both. Default is OFF for both.

**NOTE:**

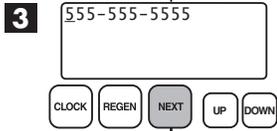
- When using custom screens, a different message can be programmed in both gallons and years.
- To reset a service alarm while in status display, press + and - simultaneously for three seconds. This will reset both gallon and year alarms.



# Service Alarm/Dealer Setting Screens

Accessed by pressing and holding **NEXT** and **+** buttons simultaneously for three seconds. Once screen changes, press and hold **NEXT** and **+** buttons again for three seconds. Returns to general display after five minutes of inactivity.

continued from previous page



## Access Scrolling Dealer Name and Phone Number Feature

The dealer phone name and phone number feature displays a scrolling phone number and name of the installing dealer. These screens alternate with the selected general operating display.

Set phone number by using the **+** or **-** buttons. Pressing the **NEXT** button will advance the cursor one position to the right. Continuing to press the **NEXT** button will advance to the contact name display.



## Scrolling contact name screen

Set contact name by using the **+** or **-** buttons. Pressing the **NEXT** button will advance the cursor one position to the right. (55 Characters Max)

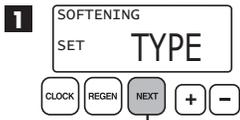
Return to general display

## To Turn Off Dealer Name/Number Screen

1. Clear the current phone number by pressing the **+** or **-** buttons to toggle to the "blank" character followed by the **NEXT** button.
2. Input two "blank" characters. The phone number will clear and advance to the dealer name setting.
3. Clear the current dealer name by pressing the **+** or **-** buttons to toggle to the "blank" character. Input blank characters to replace any existing characters. Press the **NEXT** button repeatedly to return to the general operating screens.

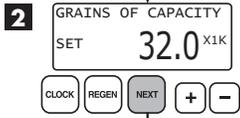
# Service/OEM SOFTENING Screens

Accessed by pressing and holding **NEXT** and **=** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.



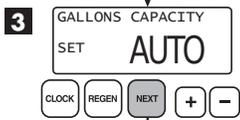
## 1 Select SOFTENING or FILTERING with + or = buttons

If you have selected FILTERING, please refer to "Service/OEM FILTERING screens", page 7-8.



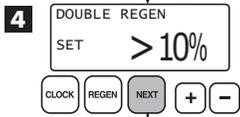
## 2 Set system's grains of capacity with + or = buttons

X1K = 1,000 grains.  
The default setting is 32.0



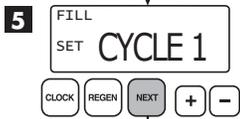
## 3 Set gallon capacity with + or = buttons

- AUTO automatically calculates gallon capacity.
- OFF will regen by days override setting only.
- GALS BETWEEN REGEN will regen by specific gallon setting.
- Default setting is AUTO.

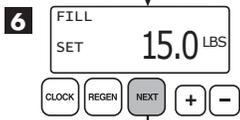


## 4 Set double regen point with + or = buttons

If unit's capacity is overrun by this percentage, the unit will regen two nights in a row. Default setting is 10%.



## 5 Set first cycle position with + or = buttons



## 6 Set salt pounds per regen with + or = buttons

The unit will deliver soft water during this position.  
Default setting is 15.0 pounds.

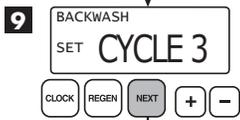


## 7 Set second cycle position with + or = buttons

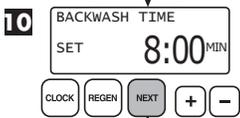


## 8 Set softening time with + or = buttons

This position is used between brine tank fill and the start of backwash.  
The unit will deliver soft water during this position.  
Default setting is 240:00 minutes.



## 9 Set third cycle position with + or = buttons



## 10 Set backwash time with + or = buttons

Default setting is 8:00 minutes.

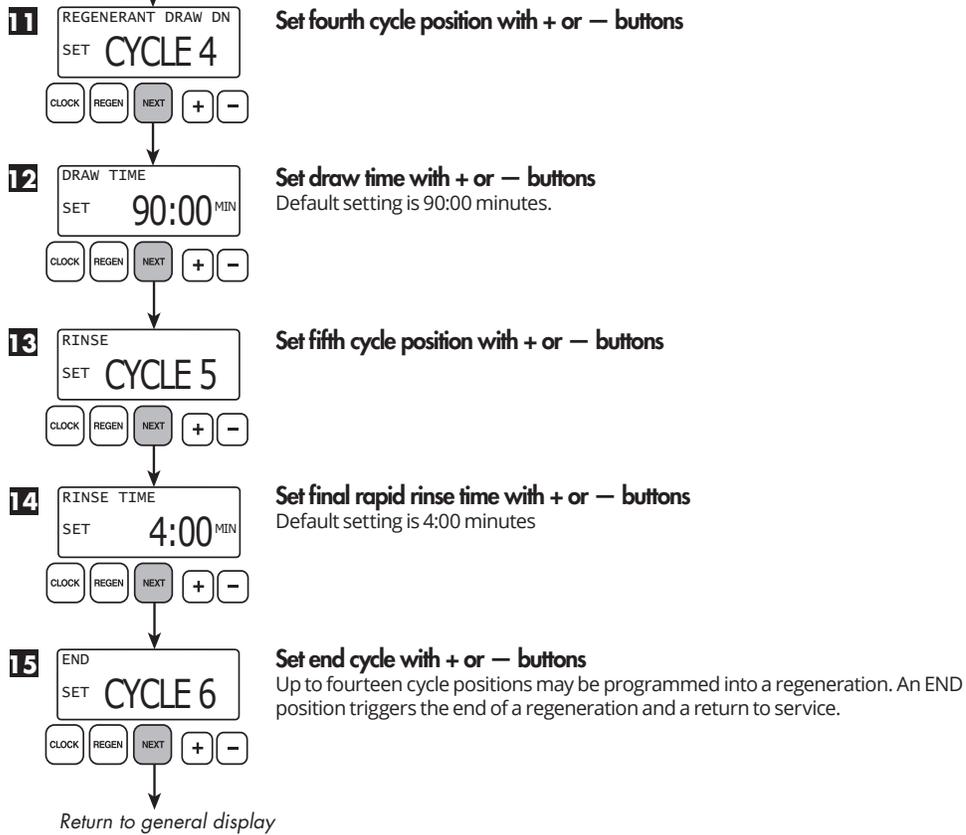
→ continue to next page

# Service/OEM SOFTENING Screens

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Accessed by pressing and holding **NEXT** and **-** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.

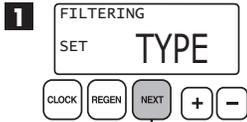
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# Service/OEM FILTERING Screens

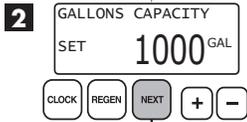
Accessed by pressing and holding **NEXT** and **-** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.

**NOTE:** Numbers and cycles used as examples on this page are typical of AIR FILTER systems.



**Select SOFTENING or FILTERING with + or - buttons**

If you have selected SOFTENING, please refer to "Service/OEM SOFTENING screens", page 5-6.



**Set gallons of capacity with + or - buttons**

To turn off, set below 0. OFF does not use metered water to determine a regen and will not be an option of days override is not set. Default setting is 1000 gallons.



**Set double regen point with + or - buttons**

If unit's capacity is overrun by this percentage, the unit will regen two nights in a row. Default setting is OFF.



**Set first cycle position with + or - buttons**

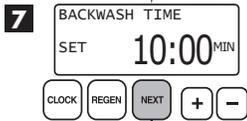


**Set backwash-air position time with + or - buttons**

Default setting is 20 seconds.

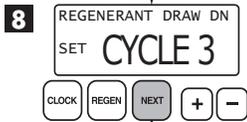


**Set second cycle position with + or - buttons**



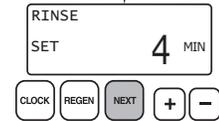
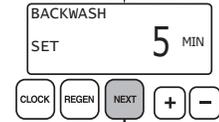
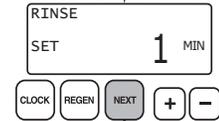
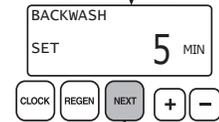
**Set backwash time with + or - buttons**

Default setting is 10:00 minutes.



**Set third cycle position with + or - buttons**

→ continue to next page



**Cycle Sequence for Backwashing Filters**

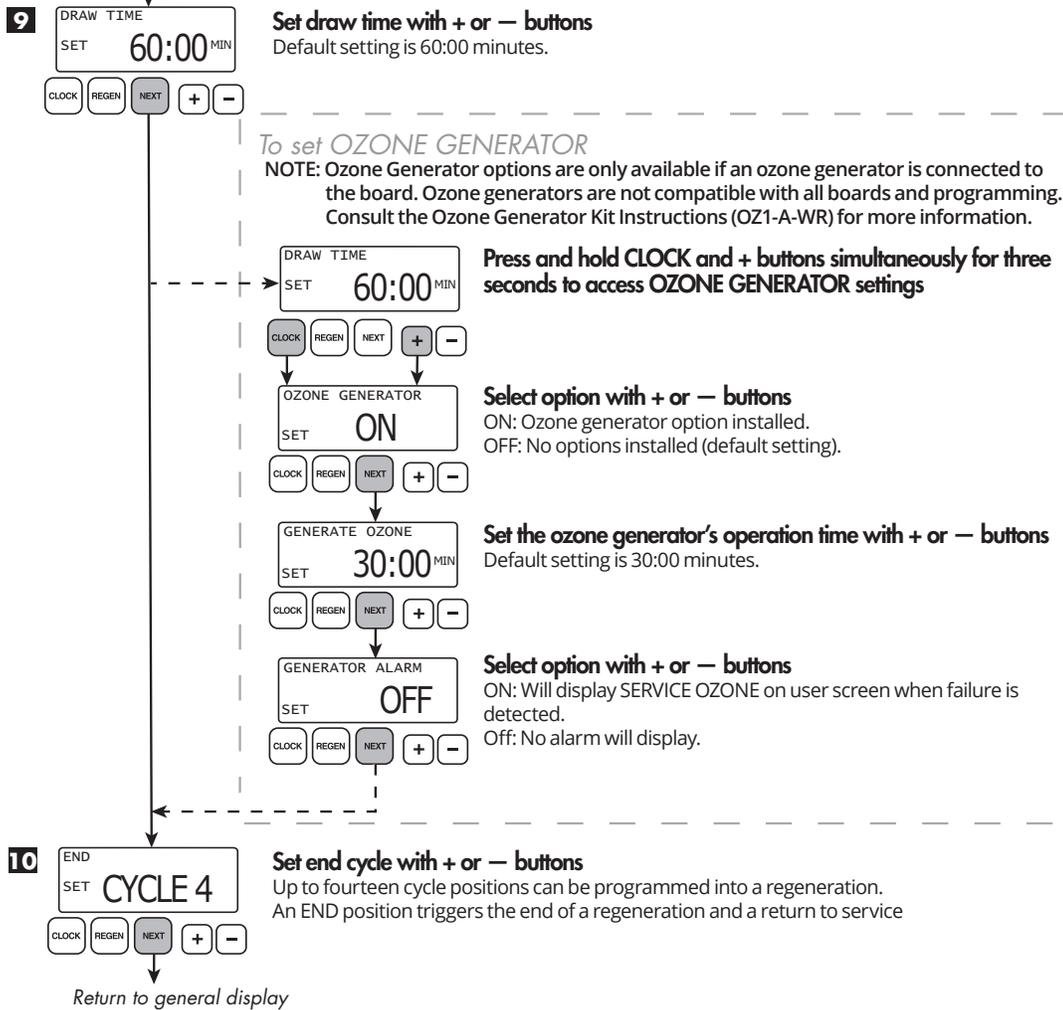
# Service/OEM FILTERING Screens

cont'd

Accessed by pressing and holding **NEXT** and **-** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.

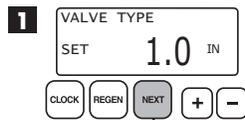
**NOTE:** Numbers and cycles used as examples on this page are typical of AIR FILTER systems.

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# Configuration Screens

Accessed by pressing and holding **NEXT** and **-** simultaneously for three seconds.  
Once screen changes, press and hold **NEXT** and **-** simultaneously again for three seconds.



## 1 Select meter size with + or - buttons

Set to 1", 1.25", 1.5", 2" or 1.0T (for twin units). Upflow brining will not be an option if set to anything other than 1" or 1.0T.

### With 1.0T set:

- Meter calibration will be fixed.
- MAV 1 setting will not be viewed, but forced to be set to Alternator Mode w/ Immediate Regen and Post Fill Brining.
- The Backwash-Air regeneration step will not be available.
- Default setting is 1"



## 2 Set regen time control with + or - buttons

- DELAYED sets regen to specified regen time.
- DELAY + IMMEDIATE sets regen to occur after 10 minutes of no water usage.
- IMMEDIATE sets an immediate regen upon zero gallons of remaining capacity.
- Default setting is DELAYED.

Only appears  
on units set to  
1.0T Mode



## Set pre-service rinse time with + or - buttons

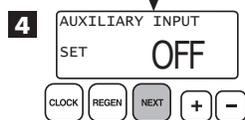
*This option is only available if the valve type is set to 1.0T (twin).*  
Range is 0-20 minutes. Default setting is OFF.



## 3 Set first MAV drive control with + or - buttons

- ALT A and ALT B are only used in twin configurations (see MAV manual for more details).
- SYSTEM CONTROLLER configures board to operate with the Clack System Controller.
- SEPARATE SOURCE changes state at the start and end of regen cycle.
- NO HARD BYPASS configures MAV as a no hard water bypass.
- TIME changes state at a set time referenced to the start of regen, for a preset duration of time independent of actual regen status. Inactive during alternate regeneration cycle.
- Default setting is OFF.

**WARNING:** Leaving valve in ALT A, ALT B or ENABLED without proper hardware will result in errors.



## 4 Set auxiliary input with + or - buttons

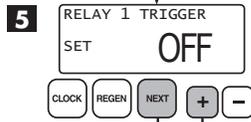
- IMMED indicates unit will regen immediately.
- DELAY indicates that after a 2 minute signal from external contact, unit will regen at delayed regen time.
- HOLD indicates that unit will not regen while external contacts are closed.
- ALARM indicates that control valve's internal alarm will sound upon external contact closure.
- Default setting is OFF.

**WARNING:** External contact is needed to operate any of the above settings properly. If no external contact is connected, no setting is needed.

→ continue to next page

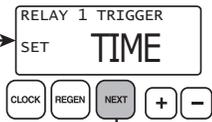
Accessed by pressing and holding **NEXT** and **-** simultaneously for three seconds.  
Once screen changes, press and hold **NEXT** and **-** simultaneously again for three seconds.

continued from previous page



**5** Set first relay trigger with + button. Press + to reach desired triggering event. If not using a relay, make sure OFF is selected and press NEXT. OFF indicates that no external devices are being used. Default is OFF.

Return to General Display



Set relay trigger with + or - buttons  
TIME indicates that relay will be energized for a specified period of time during regen only. To set by this, press NEXT.



Set relay setpoint with + or - buttons  
This is the delay time period after regen starts that relay will initially energize. 0 indicates an immediate start.



Set relay duration with + or - buttons  
This is the duration of time, after relay setpoint, that relay will remain energized.

NOTE: Can be all or any part of total regen time, but will turn off at end of regen.

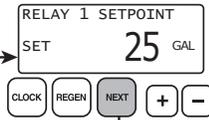
Return to General Display

### If using Relay:

1. Press + to engage one of the following Relay Triggers:
  - Time
  - Gallons
  - Regen
  - Error
  - Flow
  - Pulse
2. Press **NEXT** to program Setpoints and Durations



Set relay trigger with + or - buttons  
GALLONS indicates that relay will be energized after a specified number of gallons are expended in service position only. To set by this, press NEXT.



Set relay setpoint with + or - buttons  
This is the gallons that will be expended before relay will initially energize.



Set relay duration with + or - buttons  
This is the duration of time, after relay setpoint, that relay will remain energized. Adjustable from 1 sec to 500 min.

NOTE: Will shut off if a regen is initiated

Return to General Display

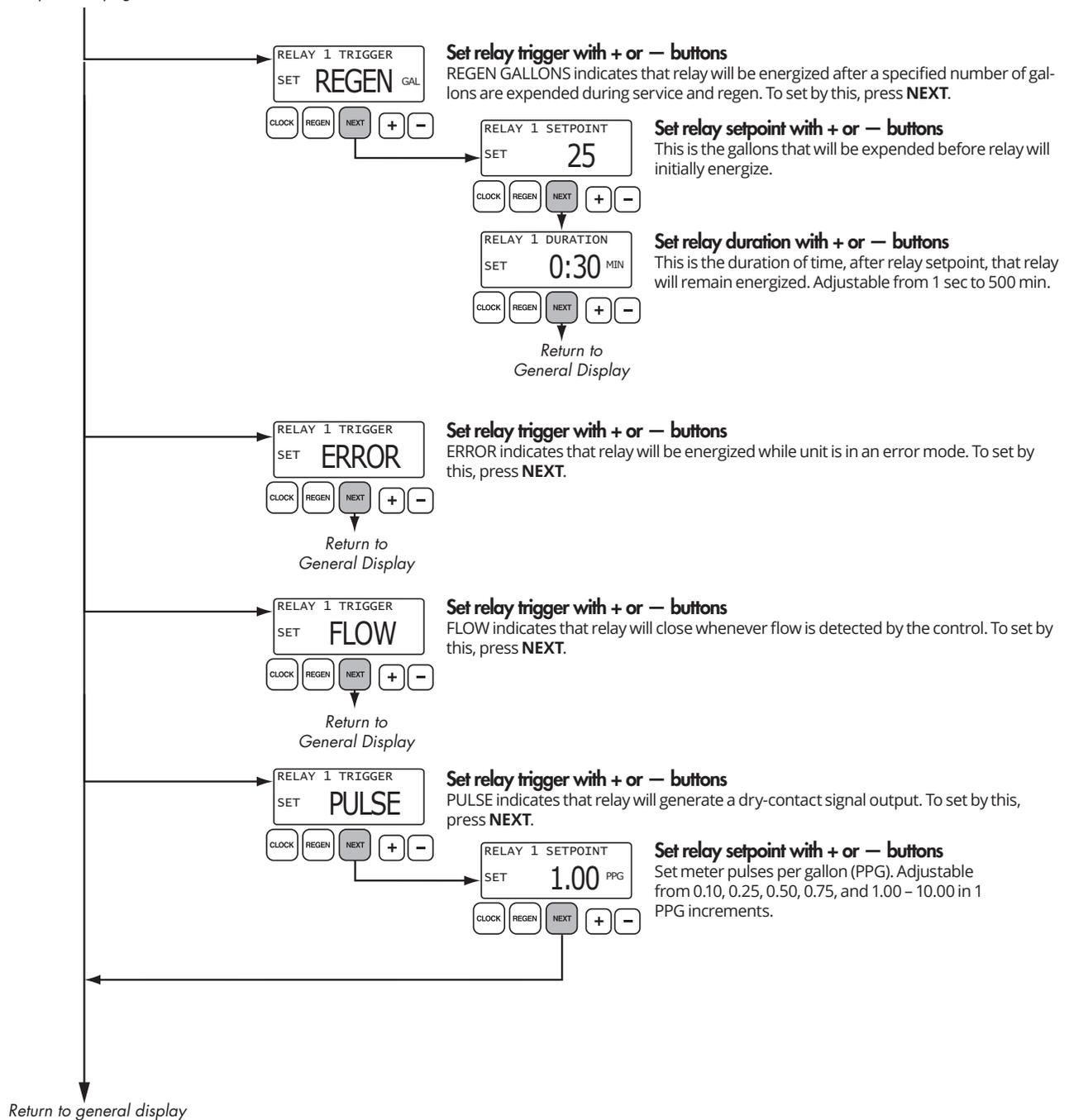
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# Configuration Screens

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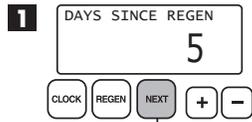
Accessed by pressing and holding **NEXT** and **-** simultaneously for three seconds.  
Once screen changes, press and hold **NEXT** and **-** simultaneously again for three seconds.

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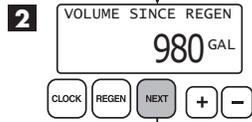


# First Level History Screens

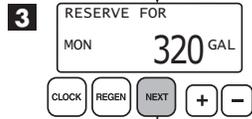
Accessed by pressing and holding **+** and **-** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.



**Displays number of days since last regen**



**Displays number of gallons since last regen**



**Displays reserve capacity**

Use **+** or **-** buttons to scroll through each day of the week to view calculated reserve capacity.

**NOTE:** Reserve capacity takes 21 days to generate.



**Displays gallon usage history**

Use **+** or **-** buttons to scroll through past 90 days of water usage history.  
1.0T Mode: T1 and T2 usage for this day combined in this display

- “R” indicates a regen has occurred that day.
- “S” indicates a step through manual regeneration.
- “M” indicates a manual regeneration.
- “E” indicates a valve error has occurred.

**Only appears on units set to 1.0T Mode**



**Displays tank transfer history**

Use **+** or **-** buttons to scroll through last 10 tank transfers. Visible in 1.0T Mode only.

- “1” indicates most recent tank transfer.
- “A” indicates service flow transferring away from tank.
- “B” indicates service flow transferring to tank.
- “3” indicates days ago of transfer (99 day max)
- “0.00” indicates gallons used at time of transfer.

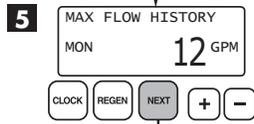
→ continue to next page

# First Level History Screens

cont'd

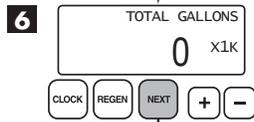
Accessed by pressing and holding **+** and **-** simultaneously for three seconds.  
Returns to general display after five minutes of inactivity.

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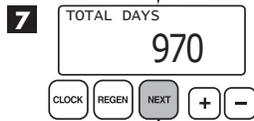
### Displays peak flow rate history

Use **+** or **-** buttons to scroll through last 7 days to view peak flow rate for that day.

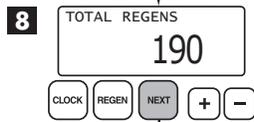


### Displays total gallons used by Meter 1 input since last reset

Push and hold **+** and **-** buttons simultaneously for three seconds to reset this value back to 0 gallons.



### Displays total days unit has been in service



### Displays total regens since startup

Only appears when OZONE GENERATOR is on.

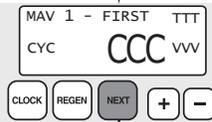


### Displays ozone current history

Use **+** or **-** buttons to review ozone generator performance during the past 50 regenerations. A regen sequence indicator (A) will alternate being viewed with "mA" if the Alternate Regen Feature was active for this regen. Regens with multiple regenerate draws will only record the first one in the sequence. Values displayed are determined immediately after a low output current is detected, or will be the average values measured during generator period of operation.  
AAA = Generator current draw in mA  
VVV = Generator voltage in VDC

Visible only if SERVICE/OEM is set to OZONE ON.

Only appears on units equipped with MAV.



### Displays MAV drive time history for an active MAV 1 output

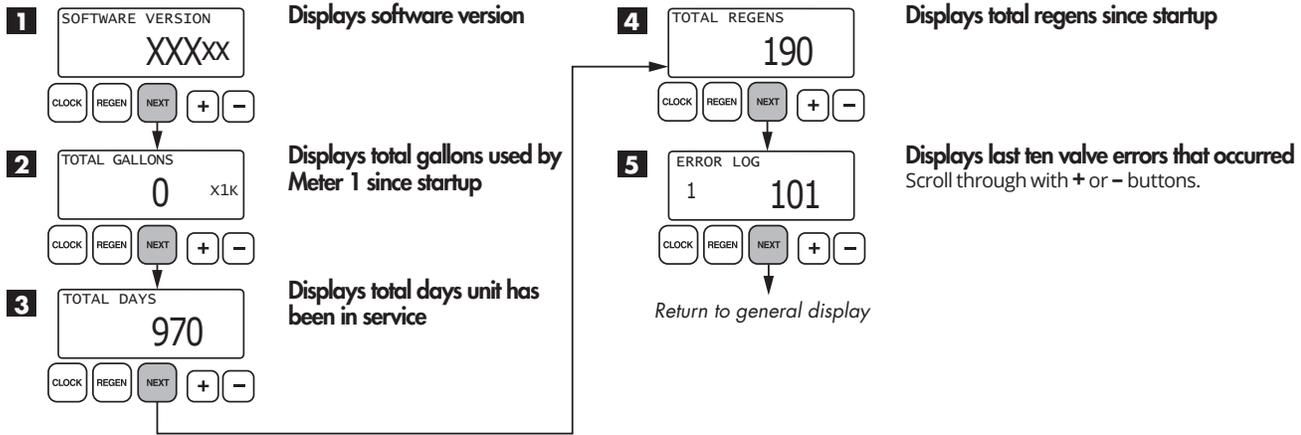
Use **+** or **-** buttons to select a MAV output. Pushing both **+** and **-** buttons will reset this display.  
First = Average of the first three drive times measured for that MAV in that direction.  
Last = Last drive time measured for that MAV in that direction.  
Ave = Current average drive time calculated for that MAV in that direction.  
TTT = Relative MAV drive time measured (First/Last/Ave).  
CCC = Total number of cycles in/out for that MAV.  
VVV = Relative MAV drive voltage measured (First/Last/Ave).

Return to general display

# Second Level History Screens

Accessed by pressing **+** and **-** simultaneously for three seconds.  
Once screen changes, press **+** and **-** simultaneously again for three seconds.

Non-resettable history.



## Error Codes and Descriptions

Error Code	Error Code Description	
101	UNABLE TO START:	Valve not sensing valve movement with motor energized.
102	MOTOR STALLED:	Valve unable to find next cycle position (stalled).
103	MOTOR RAN TOO LONG:	Valve unable to find next cycle position.
104	VALVE HOMING:	Valve unable to find Home position.
106	MAV 1 RAN TOO LONG:	MAV 1 motor ran too long. Unable to find proper park position.
107	MAV 1 STALLED:	MAV 1 motor ran too short. Unable to find proper park position (stalled).
109	INVALID MOTOR STATE:	Control can no longer operate properly due to detection of an invalid motor state.
116	MAV 2 RAN TOO LONG:	MAV 2 motor ran too long. Unable to find proper park position.
117	MAV 2 STALLED:	MAV 2 motor ran too short (stalled). Unable to find proper park position.
201	INVALID REGEN STEP:	Control can no longer operate properly due to detection of an invalid regeneration cycle step. Internal software issue.
204	LEAK DETECTED	
402	POWER DOWN MEMORY:	Check sum error for operational data and status section of EEPROM memory - specific type of memory error.
403	PROGRAM MEMORY:	Check sum error for programming section of EEPROM memory - specific type of memory error.
404	DIAGNOSTIC MEMORY:	Check sum error for diagnostic section of EEPROM memory - specific type of memory error.
405	HISTORY MEMORY:	Check sum error for history section of EEPROM memory - specific type of memory error.
406	CONTACT MEMORY:	Check sum error for contact screen section of EEPROM memory - specific type of memory error.
407	STATUS RAM MEMORY FAILURE:	Control can no longer operate properly due to corrupted data detected in the Operational Data and Status Section of RAM memory. Once generated, the Error Mode is not entered nor an error displayed, instead previously stored data (<6 hours old) is used to maintain control operation.
408	DIAGNOSTIC RAM MEMORY FAILURE:	Control can no longer operate properly due to corrupted data detected in the Operational Data and Status Section of RAM memory. Once generated, the Error Mode is not entered nor an error displayed, instead previously stored data (<6 hours old) is used to maintain control operation.
410	CONFIG DOWNLOAD:	Configuration file downloaded to the control was not originally uploaded from another control with the identical software revision.

**REMINDER:** Press and hold **NEXT** and **REGEN** for three seconds to perform a soft reset and clear an error on screen.



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