

System Controller Programming Manual

for V3030 and V3030-01

Version X105.01 or greater

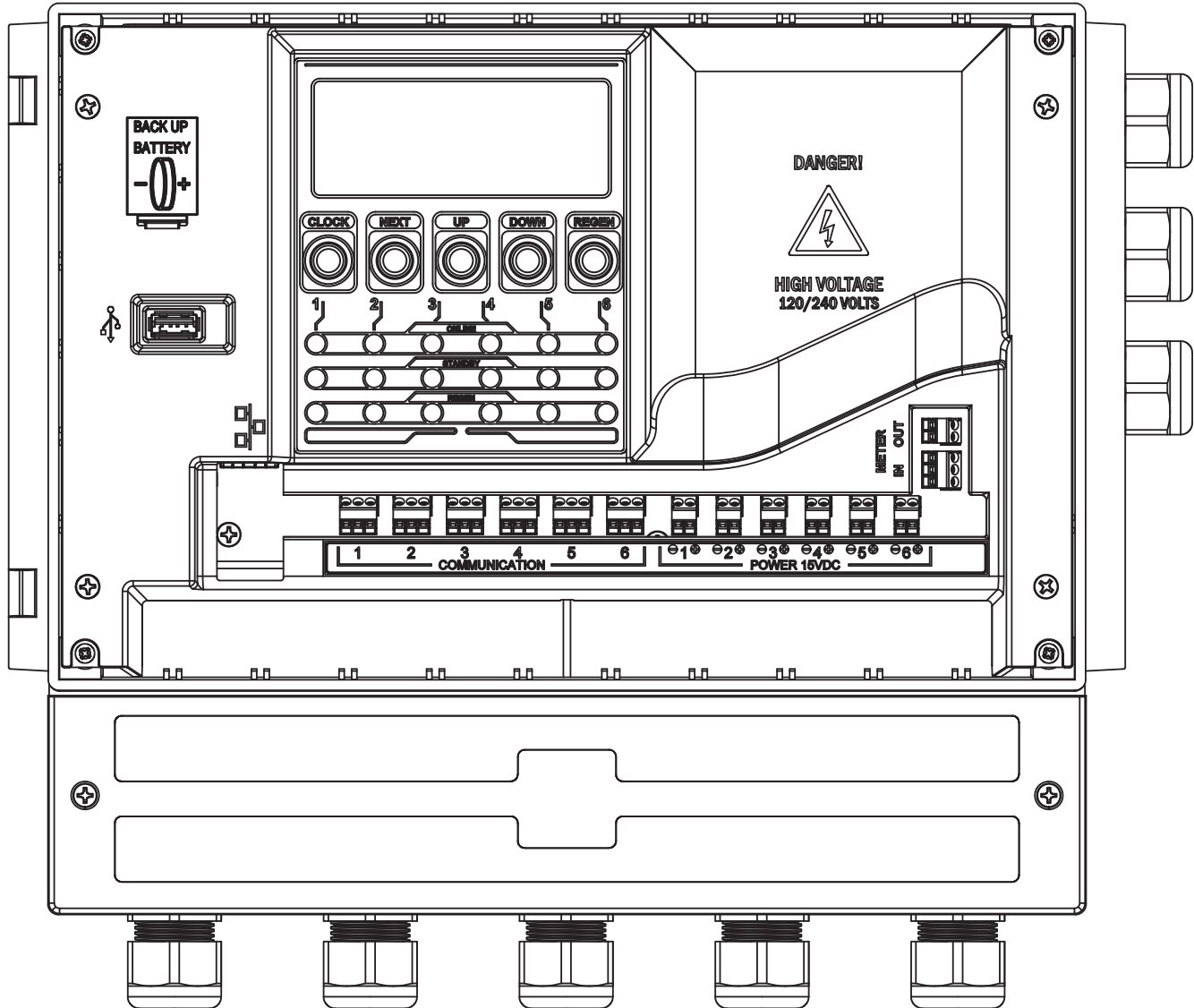


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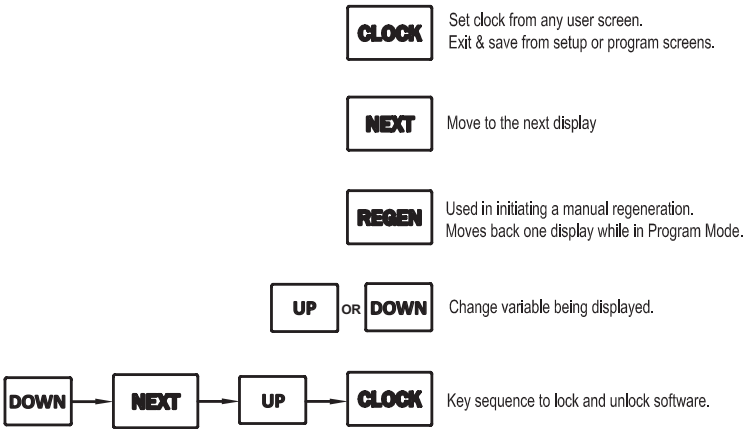
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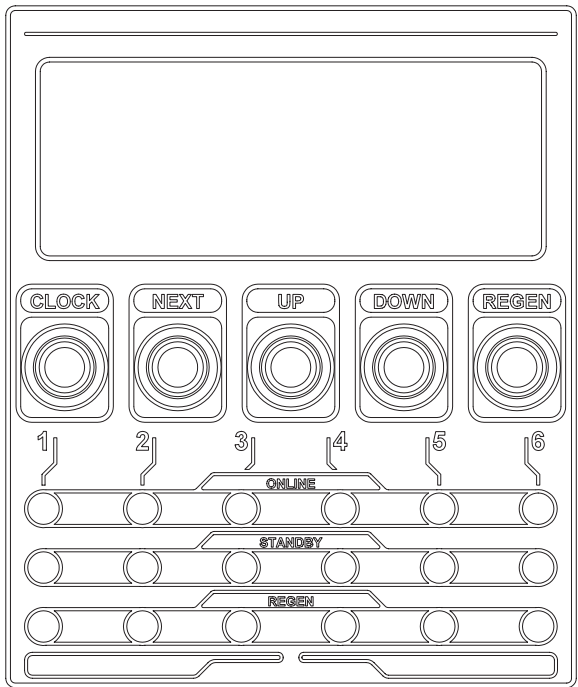
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General Button Operation and Other Displays



Additional Displays	
	USER 5 Displayed when the program lock feature is activated.
	USER 6 Displayed when the program lock feature is de-activated.
	Time of Day display is viewed right after control has been reprogrammed or reset. 12:00 PM and WED flashes. US format is shown. A padlock icon will appear in the upper right corner to indicate the Program Lock feature is active.
	Display viewed just prior to the initiation of a Reset.

System Controller LED Functions



- Blue LED (ONLINE)** – Indicates which unit is the current “Lead” unit in the system. If the Blue LED is flashing then that Lead unit has lost communication with the System Controller. The Blue LED will also transfer to the unit that has the least capacity remaining with RANDOM and SERIES system types.
- Green LED (ONLINE)** – Indicates which unit that is currently On-line in the system. If the Green LED is flashing then that unit has lost communication with the System Controller.
- Orange LED (STANDBY)** – Indicates which unit that is currently in Stand-by in the system. If the Orange LED is flashing then that unit is detecting flow rate through its meter.
- Red LED (REGEN)** – Indicates which unit is currently in regeneration in the system. If the Red LED is flashing then that unit is in error.
- Green & Orange LEDS** – Indicates that a unit is transferring between On-line and Stand-by.
- Orange & Red (flashing) LEDS** – Indicates that a unit is in error and the MAV/ NHWBP valve is closed.
- Green & Red (flashing) LEDS** – Indicates that a unit is in error and the MAV/ NHWBP valve is open.

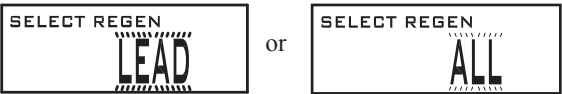
Display Format Settings

When the system controller is initially powered after a flash reprogramming, the display format of the control will need to be set. Select US Format for 12 hour AM/PM timekeeping and US volume units. Select Metric Format for 24 hour timekeeping and metric volume units.

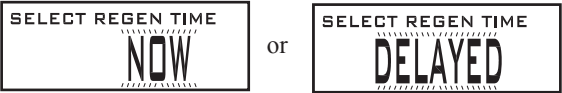


Manual Regeneration

When the REGEN button is held and then released the following display will be shown.



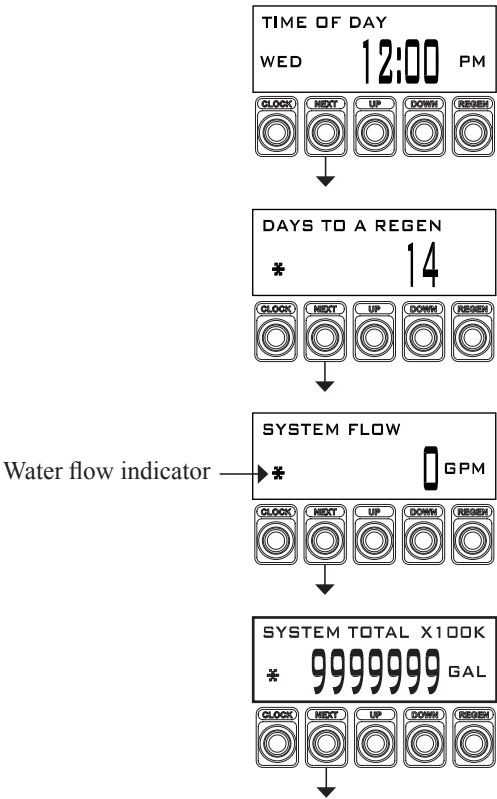
Use the UP or DOWN buttons to switch between “LEAD” or “ALL”. “LEAD” will regenerate the lead unit only (i.e. the blue led light on the system controller circuit board identifies which unit is the current lead unit). “ALL” will sequentially regenerate all the units in the system starting with the lead system. Press NEXT and select “NOW” for regeneration to begin immediately, or select “DELAYED” to schedule regeneration as set in Step 5SS.



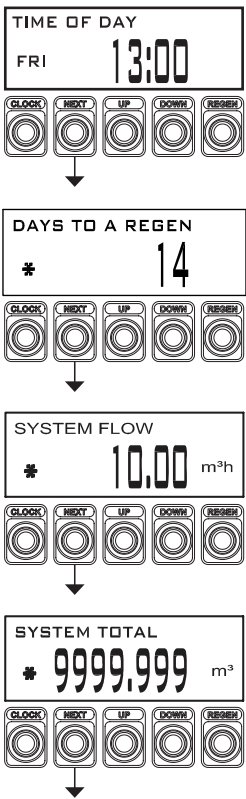
User Displays

When the system is operating, one of four displays may be shown: time of day, days remaining before a regeneration, current system flow rate and total system volume since last reset. With metric units set, these displays will appear somewhat different than the typical US format displays. Use NEXT to scroll between the screens.

Typical US Format Displays



Typical Metric Format Displays

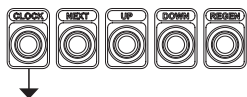


Set Time of Day and Day of Week

The user can also set the Time of Day, year, month and day. Time of day should only need to be set if the battery has been depleted because of extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The non-rechargeable battery should also be replaced.

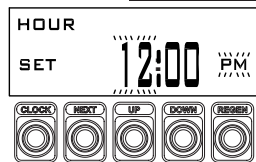
After five minutes of inactivity Set Time of Day and Day of the Week will automatically be exited.

STEP 1U



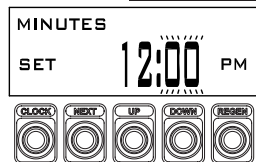
STEP 1U – Press CLOCK.

STEP 2U



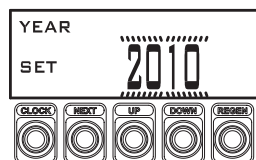
STEP 2U – Current Time (hour): Set the hour using the UP or DOWN buttons. Press NEXT to go to Step 3U. With metric units set, AM/PM indication will not appear and timekeeping will be shown in the 24 hour format.

STEP 3U



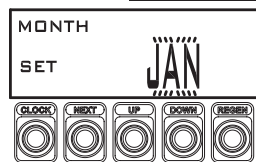
STEP 3U – Current Time (minutes): Set the minutes using the UP or DOWN buttons. Press NEXT to go to Step 4U.

STEP 4U



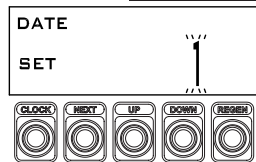
STEP 4U – Current Day of the year: Set the year using the UP or DOWN buttons. Press NEXT to Step 5U.

STEP 5U



STEP 5U – Current Month: Set the month using the UP or DOWN buttons. Press NEXT to Step 6U.

STEP 6U



STEP 6U – Current Day of the Month: Set the day using the UP or DOWN buttons. Press NEXT to exit.

RETURN TO
NORMAL MODE

System Setup

Step 1

Verify that all required connections between the control valves and the System Controller have been properly made. For typical wiring, reference the V3115-46 or V3115-48 System Controller Manual.

Step 2

After all wiring connections have been made and verified, plug the System Controller power cord into an approved electrical outlet with uninterrupted power.

Step 3

Program all control valves to the OEM's specifications for the application and size of the units. Control valves that have the default "AUTO" calculation feature currently set will need to be reprogrammed to a fixed treated water capacity, as determined from the ionic exchange capacity and compensated water hardness of the system. (It also may be desirable in some applications to add in an additional small reserve to this new fixed gallon capacity.) All control valves must be set for immediate regeneration and require the day override setting turned off. Control valves that need to regenerate with brine or some other solution need to be set up with a post fill regeneration cycle program. Reference the Programming and Front Cover Manual for the specific valve type for additional programming information.

Note: During the programming of each control valve, do not activate the System Controller feature; leave it turned off until all valves in the system have been programmed.

Step 4

After all control valves have been programmed, return to valve programming and set each control to now operate with the System Controller.

Step 5

Program the System Controller as required for proper operation with the control valves in the system.

Available System Types

Progressive Flow

Each control valve in the system will require a separate, individual meter to operate properly. In a Progressive Flow System a unit flow rate add-point must be set. This add-point is the flow rate at which one or more units will be brought on-line to meet flow demands. Units will be brought on-line after the system flow rate has passed this pre-set add-point and maintain that flow demand for 30 seconds. If the flow rate increases rapidly past the add-point by 120%, then units will be added immediately to meet the flow demand. Units will be taken off-line once flow rate demand falls below 90% of the unit add-point for 1 minute.

Alternator

Each control valve in the system will require a separate, individual meter to operate properly, unless the system is a 2 unit alternator where one meter (wired into the System Controller) can be used. In an Alternator system, one unit will always be in Standby or Regeneration, with all other units on-line. Alternator systems have unique logic that will automatically stagger the units based on capacities so that there will be enough capacity while one unit is in regeneration. For 2" control valve types, an additional screen setting in the System Controller is available to set a Pre-Service Alternator Rinse. When the lead unit has 10% or less remaining capacity, the next unit is rinsed before being brought online.

With 1", 1.25", and 1.5" control valve types there is a programming setting available for Delayed Rinse and Fill. If used, this feature must only be activated after you have first programmed the valve to function with the system controller. After all control valves have been programmed for system controller operation, return to valve programming and set each control to now operate with the Delayed Rinse and Fill feature. This setting will appear right after the system controller activation screen.

Random

Each control valve in the system will require a separate, individual meter to operate properly. All units will be on-line unless one unit is in regeneration. Only one unit will be allowed to regenerate at a time. Any given unit in the system may be allowed to regenerate when necessary.

Series

Each control valve in the system will require a separate, individual meter to operate properly. All units will be on-line unless one unit is in regeneration. Only one unit will be allowed to regenerate at a time. If any one unit flags a regeneration, that unit will be the first to go into regeneration, followed by all other units in series.

Error Handling/Communication Loss

Regardless of the system type set, if an error is detected or if communication is lost, system operation will not shut down completely. Instead, the system controller will continue to operate the system in as normal a manner as possible with the remaining units that are functioning properly.

For Example: If the system is a 4-unit alternator and Unit #2 has an error, the system would continue to operate as if it were a 3-unit alternator with the remaining units - #1, #3, and #4.

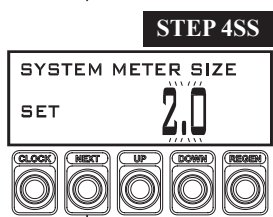
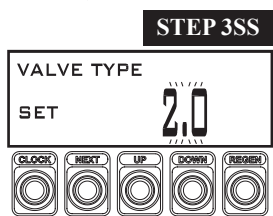
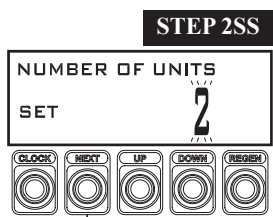
If a control valve is taken out of the system operation due to a unit error, the RED Status LED corresponding to this unit will flash and the System Controller will also display VALVE "X" REPORTED ERROR 412 message on the LCD to alert the operator. Once the valve error is cleared at that unit then the error screen and the associated flashing red LED will be automatically cleared. Should a unit lose communication, the GREEN Status LED for that unit will flash and the System Controller will also display a COMMUNICATION ERROR 412 message on the LCD to alert the operator. Once communication is re-established, the error screen and the associated flashing green LED will be automatically cleared by the controller.

<p>COMMUNICATION ERROR 412</p>

<p>VALVE X REPORTED ERROR 412</p>
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When a valve error occurs the top line will be used to display which valve currently has reported the error.

System Setup Displays



STEP 1SS – Press NEXT and DOWN simultaneously for three seconds and release. If display in Step 2SS does not appear in 5 seconds the lock on the valve is activated. To unlock press DOWN, NEXT, UP and CLOCK in sequence, then press NEXT and ▼ simultaneously for three seconds and release.

STEP 2SS – Select the total number of units in the system. Available selections: 2, 3, 4, 5, 6, or WATER MONITOR. If the number of units is set for 2 – 6 then press NEXT to go to Step 3SS.

If WATER MONITOR is selected then Step 3SS, Step 5SS, Step 6SS, and Step 7SS will not appear during programming. WATER MONITOR mode will allow the System Controller to operate with an inline water meter. Press NEXT to go to Step 4SS.

STEP 3SS – Select valve type. Available selections: 1.0, 1.25, 1.5, or 2.0. Press NEXT to go to Step 4SS.

STEP 4SS – Select system meter calibration size. Available selections: 1.0, 1.25, 1.5, 2.0, 3.0 or Variable Meter (0.1 – 150.0 Pulses Per Gallon or Pulses Per Liter.) Press NEXT to go to Step 5SS.

STEP 5SS – Select system type. Available options are the following:
PROGRESSIVE FLOW: Individual metered regeneration with progressive flow operation. Selecting PROGRESSIVE FLOW and then pressing NEXT will show Step 5SSA which will allow setting of the maximum flow rate for a unit tank before another tank is bought on line.

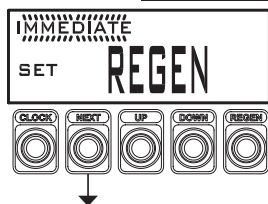
ALTERNATOR: Always one tank off line. As another unit goes into regeneration the off line unit comes on line.
 If ALTERNATOR is selected in Step 5SS and 2.0 was selected in Step 3SS, Step 5SSB will be shown.

RANDOM: All units are on line. When one unit goes into regeneration all other units are prevented from going into regeneration.

SERIES: If one unit goes into regeneration, the remaining units will regenerate in series until all units are regenerated.

Press NEXT to go to Step 6SS or CLOCK to exit.



STEP 6SS

STEP 6SS – Set when regeneration will be allowed to start. The available settings are the following:

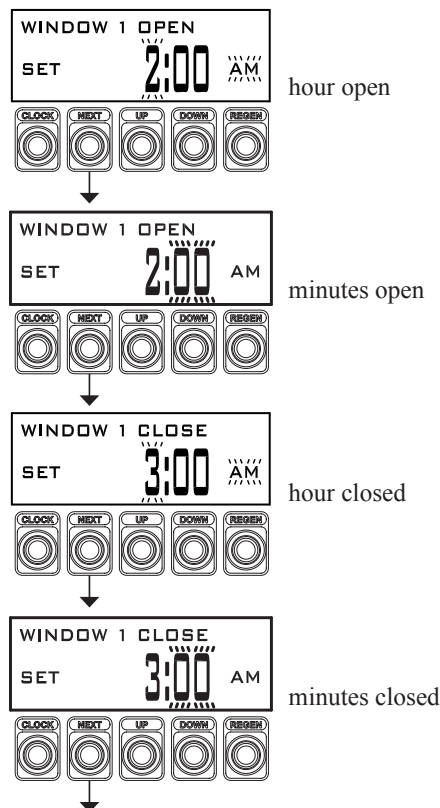
IMMEDIATE = Units regenerate immediately upon reaching 0 capacity.

DELAYED 1 WINDOW = One window of opportunity for regeneration to begin.

DELAYED 2 WINDOW = Two windows of opportunity for regeneration to begin.

DELAYED 3 WINDOW = Three windows of opportunity for regeneration to begin.

If DELAYED 1 WINDOW, DELAYED 2 WINDOW or DELAYED 3 WINDOW is selected a series of displays will be shown allowing to set the hours and minutes for when the window opens and closes. An example for DELAYED 1 WINDOW is shown. With metric units set, timekeeping will be shown in the 24 hour format. The UP or DOWN buttons are used to set the hours or minutes, pressing NEXT moves to the next display.

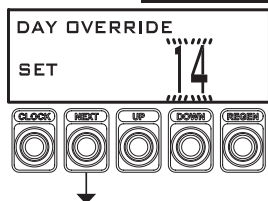


System Controller Operation with Delayed Regeneration Set

RANDOM and SERIES system types: If a delayed regeneration window is selected, any units that become exhausted and/or require regeneration will remain on-line pending regeneration until the delayed regeneration window time occurs.

PROGRESSIVE and ALTERNATOR system types: If a delayed regeneration window is selected and the Lead unit requires regeneration, the next unit in sequence will be brought on-line and the Lead unit status will be transferred. Once the new Lead unit status is established, the unit that requires regeneration will be allowed to go off-line (into Stand-by pending regeneration) until the next available delayed regeneration time window. Should another unit become exhausted and/or require regeneration, it must remain on-line until the previous unit has been fully regenerated. This is required to prevent the system from being overrun.

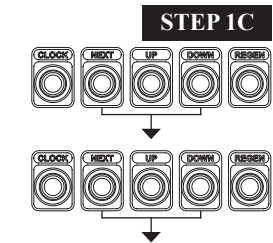
Press NEXT to go to Step 7SS.

STEP 7SS

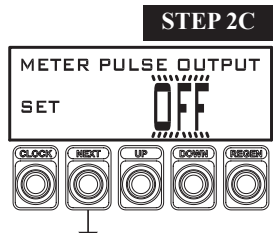
RETURN TO NORMAL MODE

STEP 7SS – Set the maximum number of days that may occur between regenerations. For system types Progressive, Alternator and Random only the unit with the least capacity remaining will be forced to regenerate per day interval. In a Series system type the unit with the least capacity will be forced to regenerate per day interval followed by all other units in series. Press NEXT to exit.

Configuration Displays



STEP 1C – Press NEXT and DOWN simultaneously for approximately three seconds, then release. Press NEXT and DOWN simultaneously for approximately 3 seconds and release. If display in Step 2C does not appear in 5 seconds the lock on the valve is activated. To unlock press DOWN, NEXT, UP and CLOCK in sequence, then press NEXT and DOWN simultaneously for approximately three seconds and release. Then press NEXT and DOWN simultaneously for three seconds and release.



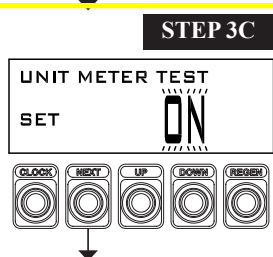
STEP 2C – Set Meter Pulse Output operation using UP or DOWN.

The available selections are:

US Format = OFF, 0.10, 0.25, 0.50, 0.75, 1.00, 2.00, 3.00, 4.00 and 5.00 Pulses Per Gallon

METRIC Format = OFF, 1, 5, 10, 25, 50 and 100 Pulses Per Liter

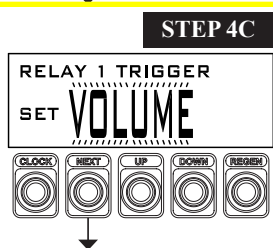
Press NEXT to go to Step 3C.



STEP 3C – Set Unit Meter Test ON or OFF using UP or DOWN.

- ON - Activates unit meter check logic
- OFF - Deactivates unit meter check logic

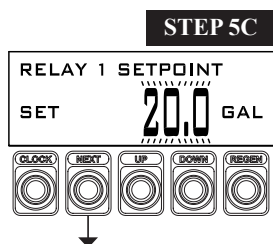
Press NEXT to go to Step 4C.



STEP 4C – Set Relay 1 TRIGGER operations using UP or DOWN. The choices are:

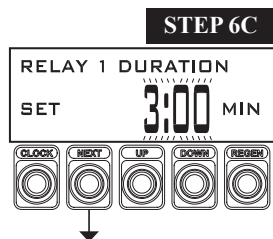
- VOLUME - Relay closes for the set duration for every set volume of system flow.
- ERROR - Relay closes whenever any system valve is in an error mode. Relay opens when error is reset.
- REGEN - Relay closes whenever any unit enters regeneration. Relay opens when the regeneration is complete.
- oFF - Deactivates this output.

Press NEXT to go to Step 5C.



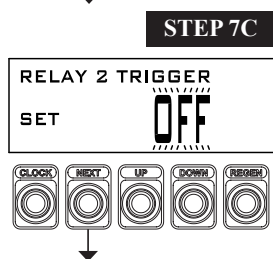
STEP 5C – When Relay 1 is set to Volume, set Setpoint in Gallons or Liters using UP or DOWN.

Press NEXT to go to Step 6C.



STEP 6C – Set Relay 1 Closure Duration in Minutes using UP or DOWN.

Press NEXT to go to Step 7C.



STEP 7C – Set Relay 2 TRIGGER operations using UP or DOWN. The choices are:

- VOLUME - Relay closes for the set duration for every set volume of system flow.
- ERROR - Relay closes whenever any system valve is in an error mode. Relay opens when error is reset.
- REGEN - Relay closes whenever any unit enters regeneration. Relay opens when the regeneration is complete.
- oFF - Deactivates this output.

Press NEXT to exit Configuration displays

RETURN TO NORMAL MODE

Relay #1 and #2 Output Setup (US Display Format)				
Setpoint Programming				
Mode	Setpoint	Range	Increment	Default
Volume	Gallons (GAL)	1 - 20 20 - 100	1 2	20
Duration Programming				
Mode	Duration	Range	Increment	Default
Volume	Minutes	:01 - 1:00	:001	3:00
	: Seconds	1:00 - 10:00	:005	
		10:00 - 500	1	

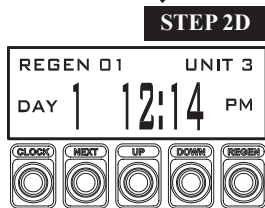
Relay #1 and #2 Output Setup (Metric Display Format)				
Setpoint Programming				
Mode	Setpoint	Range	Increment	Default
Volume	Liters (l)	1.0 - 40.0	.5	50
		40.0 - 400	1	
		400 - 1,000	10	
Duration Programming				
Mode	Units	Range	Increment	Default
Volume	Minutes	:01 - 1:00	:001	3:00
	: Seconds	1:00 - 10:00	:005	
		10:00 - 500	1	

Diagnostic Displays



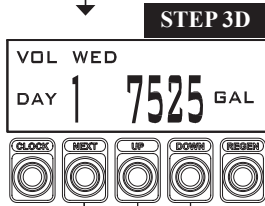
STEP 1D

STEP 1D – Press UP and DOWN simultaneously for three seconds and release.



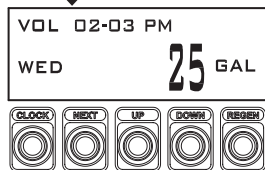
STEP 2D

STEP 2D – Press UP or DOWN to scroll through the last 60 regenerations. Information displayed includes the unit, day and time of the regeneration. Press NEXT to go to Step 3D.

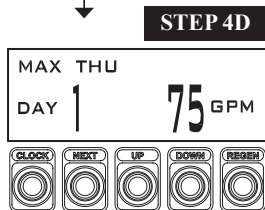


STEP 3D

STEP 3D – Press UP or DOWN to view the daily treated water usage for the last 99 days. To view each day's hourly system usage, press and hold UP and DOWN on the day's usage to be viewed. When set to US, units are Gallons. When set to METRIC, units are m3. Press NEXT to go to Step 4D. Press REGEN to return to the previous step.

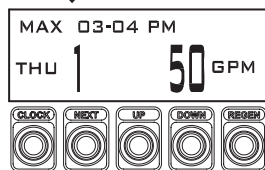


STEP 3DA – Press UP or DOWN to scroll through the treated water usage for each hour of the day selected. Press NEXT to go back to Step 3D.

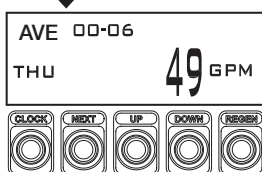
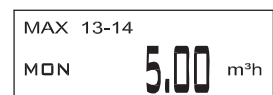


STEP 4D

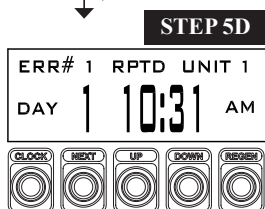
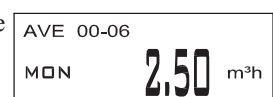
STEP 4D – Press UP or DOWN to view the maximum flow rate recorded for the last 99 days. To view each day's hourly maximum system flow rate, press UP and DOWN on the day's flow rate to be viewed. When set to US, units are GPM. When set to METRIC, units are m3/h. Press NEXT to go to Step 5D. Press REGEN to return to the previous step.



STEP 4DA – Press UP or DOWN to scroll through the maximum flow rate for each hour of the day selected. To view the average flow rate for a particular hour, in 6 minute increments, press UP and DOWN on the hour selected. Press NEXT to go back to Step 4D.



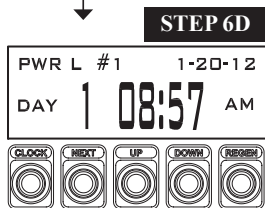
STEP 4DB – Press UP or DOWN to scroll through the average system flow rate for the selected hour, in 6 minute intervals. Press NEXT to return to Step 4DA.



STEP 5D

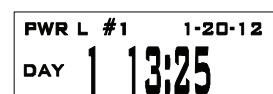
STEP 5D – Error Log.

Lists the last 20 valve errors or losses of communication that have occurred during system controller operation. Use arrows to scroll through the log. "DAY XX" indicates the number of days ago that this error actually occurred (if > 99 days this value will flash). Communication errors are noted in the display top line as "COM". For COM errors, a "-" will appear in the top line of this display to indicate that a communication loss occurred with the unit # indicated and was not restored, "+" will replace "-" to indicate that this loss was finally restored. Valve errors are noted in the display top line as "RPTD" which indicates that a valve error occurred with the unit # indicated and was not reset, "CLRDR" will replace "RPTD" to indicate that this error was finally reset.



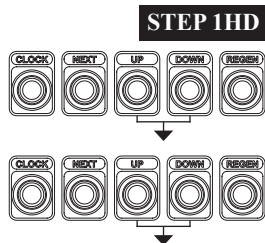
STEP 6D

STEP 6D – Press UP or DOWN to view the last 20 power events. Press NEXT to exit Diagnostics. Press REGEN to return to the previous step.

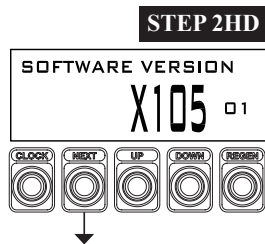


RETURN TO NORMAL MODE

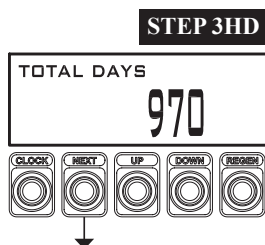
History Displays



STEP 1HD – Press UP and DOWN simultaneously for three seconds and release. Then press UP and DOWN simultaneously for three seconds and release. If display in Step 2HD does not appear in 5 seconds the lock on the valve is activated. To unlock press DOWN, NEXT, UP and CLOCK in sequence. Press NEXT and DOWN simultaneously for three seconds and release. Then press UP and DOWN simultaneously for three seconds and release.



STEP 2HD – Displays software rev level. Press NEXT to go to Step 3HD.



STEP 3HD – Displays total days since startup. Press NEXT to exit.

**RETURN TO
NORMAL MODE**

Data Extraction from System Controller

Data Extraction Procedure:

1. Ensure the USB memory device is formatted for the FAT32 file system and that the allocation unit size is set for 4096 bytes. To check on formatting plug USB into a computer, right click on drive and click on format.
2. Ensure that the System Controller is powered on.
3. Plug the USB memory device into the System Controller USB port.
4. During the extraction process, a series of status displays will appear. When the “USB COMPLETE” message appears, remove the USB device from the System Controller. This could take several minutes.
5. The extracted data can then be imported into the Clack Data Extraction spreadsheet.



USB 1 – Whenever a USB memory device is not inserted into a powered controller.



USB 2 - Whenever a USB memory device is inserted into a powered controller, there will be a delay before the system controller recognizes that the device is actually installed. Once this occurs, “DRIVE FOUND” will show on the top line of the display.



USB 3 – Whenever a USB memory device is inserted into a powered controller, and a valid network connection is active, this display will become active to indicate that the web page data for this control is currently being uploaded from the USB memory device into the controller. A percentage value will activate to indicate that this data is currently being saved by the control to the USB memory device.



USB 4 – Whenever a USB memory device is inserted into a powered controller, this display will become active to indicate that the configuration data for this control is currently being downloaded into the USB memory device from the controller. A percentage value will activate to indicate that this data is currently being saved by the control to the USB memory device.



USB 4 – Whenever a USB memory device is inserted into a powered controller, this display will become active to indicate that the diagnostic data for this control is currently being downloaded into the USB memory device from the controller. A percentage value will activate to indicate that this data is currently being saved by the control to the USB memory device.



USB 5 – Once the system controller begins writing data to the USB memory device, the top line of the display will read “SAVING USAGE” with a percentage value activating to indicate that this data is currently being saved by the control to the USB memory device.



USB 6 – Once the controller has finished writing data to the USB memory device, the display will show “COMPLETE”.

Flash Programming of System Controller

1. Ensure the USB memory device is formatted for the FAT32 File System. If not, consult the manufacturer of the USB memory device for the latest in formatting instructions.
 2. Ensure that the System Controller is powered off.
 3. Plug the USB memory device into the System Controller USB port.
 4. Apply power to the System Controller.
 5. The LCD backlight will appear blue; blue means “working”. The LCD will show no characters and all LEDs will remain off for the duration of programming. When the LCD turns green, the process is complete and successful.
 6. Remove the power from the System Controller.
 7. Remove the USB memory device from the System Controller.
 8. Reapply power to the System Controller. Normal functionality should be present.
- NOTE: On power-up, the software version will display. Verify the new program version.

Troubleshooting:

If the System Controller LCD backlight turns red at any time during the process, an error has occurred and the programming process has failed.

Common causes of programming failure are:

- A USB memory device is present on power-up and the avr32fwupgrade.uc3 file is not present
- The avr32fwupgrade.uc3 file is corrupt.



Flash Reprogramming Status Display

Blue Display = Control is being reprogrammed

Green Display = Control has been reprogrammed

Red Display = An error occurred during control reprogramming, and the reprogramming process has failed

Network Webpage Setup Procedure

1. Open the WEB.zip file.
2. Copy the “Web” folder to a USB memory device.
3. Ensure that the System Controller is powered on.
4. Plug the USB memory device into the System Controller USB port.
5. During the network web page setup process, a series of status displays will appear. When the “USB COMPLETE” message appears, remove the USB device from the System Controller.



USB 1 – Whenever a USB memory device is not inserted into a powered controller.



USB 2 - Whenever a USB memory device is inserted into a powered controller, there will be a delay before the system controller recognizes that the device is actually installed. Once this occurs, “DRIVE FOUND” will show on the top line of the display.



USB 3 – Whenever a USB memory device is inserted into a powered controller, and a valid network connection is active, this display will become active to indicate that the web page data for this control is currently being uploaded from the USB memory device into the controller. A percentage value will activate to indicate that this data is currently being saved by the control to the USB memory device.



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USB 4 – Whenever a USB memory device is inserted into a powered controller, this display will become active to indicate that the diagnostic data for this control is currently being downloaded into the USB memory device from the controller. A percentage value will activate to indicate that this data is currently being saved by the control to the USB memory device.



USB 5 – Once the system controller begins writing data to the USB memory device, the top line of the display will read “SAVING USAGE” with a percentage value activating to indicate that this data is currently being saved by the control to the USB memory device.



USB 6 – Once the controller has finished writing data to the USB memory device, the display will show “COMPLETE”.

Follow instructions for Network Configurations Displays.

Network Configuration Displays

Items that should be completed before going to the site:

Verify that the system controller circuit board has a MAC address on it.

Contact the company at which the installation will occur. Obtain the name, phone number and e-mail address for the following:

- The person who will be monitoring the web information from the system controller
- The Network Administrator

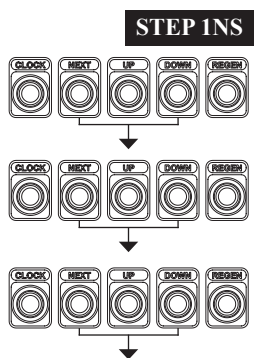
Tell the Network Administrator who will be monitoring the web pages and that the desktop or laptop they will be monitoring from must be connected to the same network connected to the system controller. The Network Administrator needs to provide the installer with a static IP address and a Subnet Mask that will be entered into the system controller software. The Network Administrator may request the MAC address. Both the static IP address and Subnet Mask consists of four sets of numbers separated by a decimal point. Each set of numbers may be 1 to 3 digits. The system controller can be updated with this information before reaching the installation site. If multiple system controllers are being installed at the same site a separate static IP address will be needed for each system controller and sometimes a separate Subnet Mask may be needed. If multiple system controllers are set up at the same sight it is recommended that the installer change the Host Name.

The unit is shipped from the factory without an Ethernet cable. Verify that there is an Ethernet outlet near where the system controller is going to be installed. A CAT5 or better Ethernet cable is required to connect the system controller to the Ethernet outlet.

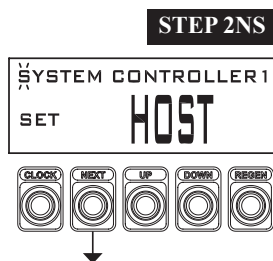
Give the person who will be monitoring the web information a copy of the document entitled “Web Page Displays” and the static IP address.

If a need arises where the software needs to be reflashed on to the system controller connected to an Ethernet cable the following will all have to be reentered:

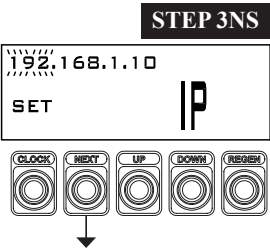
- static IP address
- Subnet Mask
- Web pages



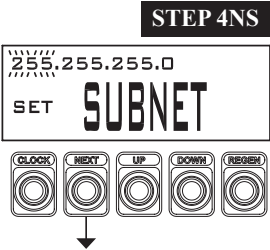
STEP 1NS – Press NEXT and DOWN simultaneously for approximately 3 seconds and release. If Step 2SS does not appear in 5 seconds, the Program Lock feature is activated. To unlock, press DOWN, NEXT, UP and CLOCK in sequence. Press NEXT and DOWN until Step 2SS appears. Press NEXT and DOWN until Step 2C appears. Then press NEXT and DOWN until Step 2NS appears.



STEP 2NS – Set the desired Host Name to identify this controller on the network. Pressing CLOCK will select the first letter, use UP or DOWN to change each letter. Press NEXT to forward to the next character. Press NEXT to go to Step 3NS. Press REGEN to return to the previous step.



STEP 3NS – IP Addressing – Set the proper static IP address. Each IP address has four sections separated by decimal points. Pressing **CLOCK** will select the first section of the address to be changed. Press **UP** or **DOWN** to adjust each section, using **NEXT** to advance to the next section. Press **NEXT** to go to Step 4NS. Press **REGEN** to return to the previous step.



STEP 4NS – Subnet Masking – Set the proper Subnet Mask. Each Subnet Mask has four sections separated by decimal points. The System Controller will only be able to communicate with other devices within the same subnet. Pressing **CLOCK** will select the first section of the address to be changed. Press **UP** or **DOWN** to adjust each section, using **NEXT** to advance to the next section. Press **NEXT** to go to Step 5NS. Press **REGEN** to return to the previous step.



STEP 5NS – MAC address – The controller’s unique ID code that is set at the factory. This information is read-only for information purposes. Press **NEXT** to exit Network Configuration. Press **REGEN** to return to the previous step.

Modbus Information

Beginning with software version X105.01 and hardware platform Rev. 9, System Controllers will have the capability of interfacing to industrial automation systems using the Modbus TCP/IP (also known as Modbus-TCP) protocol on Ethernet. The Modbus TCP/IP listener uses port 502 to listen for and receive messages on Ethernet.

Holding Registers

Modbus Register	Description	Properties																																		
40001	Year	Read																																		
40002	Month	Read																																		
40003	Day	Read																																		
40004	Hour (24 Hour Format)	Read																																		
40005	Minute	Read																																		
40006	Seconds	Read																																		
40007	Days left until next regeneration	Read																																		
40008	System flow rate x 10 (GPM or LPM)	Read																																		
40009	System Total High Word (GAL or L)	Read																																		
40010	System Total Low Word (GAL or L)	Read																																		
40011	Error Code High Word Possible Values: <table><tr><th>Description</th><th>Value</th></tr><tr><td>Valve 1 Communication Error</td><td>0x0001</td></tr><tr><td>Valve 2 Communication Error</td><td>0x0002</td></tr><tr><td>Valve 3 Communication Error</td><td>0x0004</td></tr><tr><td>Valve 4 Communication Error</td><td>0x0008</td></tr><tr><td>Valve 5 Communication Error</td><td>0x0010</td></tr><tr><td>Valve 6 Communication Error</td><td>0x0020</td></tr><tr><td>Valve 1 Error Reported</td><td>0x0040</td></tr><tr><td>Valve 2 Error Reported</td><td>0x0080</td></tr><tr><td>Valve 3 Error Reported</td><td>0x0100</td></tr><tr><td>Valve 4 Error Reported</td><td>0x0200</td></tr><tr><td>Valve 5 Error Reported</td><td>0x0400</td></tr><tr><td>Valve 6 Error Reported</td><td>0x0800</td></tr><tr><td>Checksum Failure Error</td><td>0x1000</td></tr><tr><td>Version Number Mismatch Error</td><td>0x2000</td></tr><tr><td>Invalid MAC Error</td><td>0x4000</td></tr><tr><td>Valve No Flow Error</td><td>0x8000</td></tr></table>	Description	Value	Valve 1 Communication Error	0x0001	Valve 2 Communication Error	0x0002	Valve 3 Communication Error	0x0004	Valve 4 Communication Error	0x0008	Valve 5 Communication Error	0x0010	Valve 6 Communication Error	0x0020	Valve 1 Error Reported	0x0040	Valve 2 Error Reported	0x0080	Valve 3 Error Reported	0x0100	Valve 4 Error Reported	0x0200	Valve 5 Error Reported	0x0400	Valve 6 Error Reported	0x0800	Checksum Failure Error	0x1000	Version Number Mismatch Error	0x2000	Invalid MAC Error	0x4000	Valve No Flow Error	0x8000	Read
Description	Value																																			
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Invalid MAC Error	0x4000																																			
Valve No Flow Error	0x8000																																			

40012	<div>Error Code Low Word Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Usage Checksum Failure Error</td><td>0x0001</td></tr><tr><td>Menu Checksum Failure Error</td><td>0x0002</td></tr><tr><td>SSU Checksum Failure Error</td><td>0x0004</td></tr><tr><td>SBT Checksum Failure Error</td><td>0x0008</td></tr><tr><td>Diagnostic Checksum Failure Error</td><td>0x0010</td></tr><tr><td>Extended Memory Failure Error</td><td>0x0020</td></tr><tr><td>Invalid Units Error</td><td>0x0040</td></tr><tr><td>Bad Clock Error</td><td>0x0080</td></tr><tr><td>Units Checksum Failure Error</td><td>0x0100</td></tr><tr><td>Fatal FRAM Error</td><td>0x0200</td></tr><tr><td>Data Flash Error</td><td>0x0400</td></tr><tr><td>Reserved</td><td>0x0800</td></tr><tr><td>Reserved</td><td>0x1000</td></tr><tr><td>Reserved</td><td>0x2000</td></tr><tr><td>Reserved</td><td>0x4000</td></tr><tr><td>Reserved</td><td>0x8000</td></tr></tbody></table>	Description	Value	Usage Checksum Failure Error	0x0001	Menu Checksum Failure Error	0x0002	SSU Checksum Failure Error	0x0004	SBT Checksum Failure Error	0x0008	Diagnostic Checksum Failure Error	0x0010	Extended Memory Failure Error	0x0020	Invalid Units Error	0x0040	Bad Clock Error	0x0080	Units Checksum Failure Error	0x0100	Fatal FRAM Error	0x0200	Data Flash Error	0x0400	Reserved	0x0800	Reserved	0x1000	Reserved	0x2000	Reserved	0x4000	Reserved	0x8000	Read
Description	Value																																			
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Reserved	0x1000																																			
Reserved	0x2000																																			
Reserved	0x4000																																			
Reserved	0x8000																																			
40013	<div>Relay 1 Status Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Inactive</td><td>0</td></tr><tr><td>Active</td><td>1</td></tr></tbody></table>	Description	Value	Inactive	0	Active	1	Read																												
Description	Value																																			
Inactive	0																																			
Active	1																																			
40014	<div>Relay 2 Status Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Inactive</td><td>0</td></tr><tr><td>Active</td><td>1</td></tr></tbody></table>	Description	Value	Inactive	0	Active	1	Read																												
Description	Value																																			
Inactive	0																																			
Active	1																																			
40015	<div>Battery Status Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Good</td><td>0</td></tr><tr><td>Low</td><td>1</td></tr></tbody></table>	Description	Value	Good	0	Low	1	Read																												
Description	Value																																			
Good	0																																			
Low	1																																			

40016	Valve 1 Status Note: If using Water Monitor mode, all unit status flags will be 0. Possible Values:		Read
	Description	Value	
	Unit is not enabled (not part of the system)	0	
	Unit is Lead	1	
	Unit is not Lead but is Online	2	
	Unit is in Standby Mode	3	
	Unit is in Standby Mode but is seeing flow	4	
	Unit is in transition to Online	5	
	Unit is in transition to Standby	6	
	Unit is regenerating	7	
	Unit is transitioning to regeneration mode	8	
	Unit is in Rinse Mode	9	
	Unit is in Error	10	
	Unit is in no flow	11	
	Unit state is unknown	12	
40017	Valve 1 Flow Rate (GPM or LPM)	Read	
40018	Valve 1 Capacity Remaining High Word (GAL or L)	Read	
40019	Valve 1 Capacity Remaining Low Word (GAL or L)	Read	
40020	Valve 2 Status (see Status Code Listing in Valve 1 Status Register)	Read	
40021	Valve 2 Flow Rate (GPM or LPM)	Read	
40022	Valve 2 Capacity Remaining High Word (GAL or L)	Read	
40023	Valve 2 Capacity Remaining Low Word (GAL or L)	Read	
40024	Valve 3 Status (see Status Code Listing in Valve 1 Status Register)	Read	
40025	Valve 3 Flow Rate (GPM or LPM)	Read	
40026	Valve 3 Capacity Remaining High Word (GAL or L)	Read	
40027	Valve 3 Capacity Remaining Low Word (GAL or L)	Read	
40028	Valve 4 Status (see Status Code Listing in Valve 1 Status Register)	Read	
40029	Valve 4 Flow Rate (GPM or LPM)	Read	
40030	Valve 4 Capacity Remaining High Word (GAL or L)	Read	
40031	Valve 4 Capacity Remaining Low Word (GAL or L)	Read	
40032	Valve 5 Status (see Status Code Listing in Valve 1 Status Register)	Read	
40033	Valve 5 Flow Rate (GPM or LPM)	Read	
40034	Valve 5 Capacity Remaining High Word (GAL or L)	Read	
40035	Valve 5 Capacity Remaining Low Word (GAL or L)	Read	
40036	Valve 6 Status (see Status Code Listing in Valve 1 Status Register)	Read	
40037	Valve 6 Flow Rate (GPM or LPM)	Read	
40038	Valve 6 Capacity Remaining High Word (GAL or L)	Read	
40039	Valve 6 Capacity Remaining Low Word (GAL or L)	Read	

40040	<div>User Lock</div> <div>Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Disabled</td><td>0</td></tr><tr><td>Enabled</td><td>1</td></tr></tbody></table>	Description	Value	Disabled	0	Enabled	1	Read		
Description	Value									
Disabled	0									
Enabled	1									
40041	<div>Domestic/International</div> <div>Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Domestic</td><td>0x5A (90)</td></tr><tr><td>International</td><td>0xA5 (165)</td></tr></tbody></table>	Description	Value	Domestic	0x5A (90)	International	0xA5 (165)	Read		
Description	Value									
Domestic	0x5A (90)									
International	0xA5 (165)									
40050	<div>Start Regen</div> <div>Note: The system controller writes 0 to the register when a regen option is queued.</div> <div>Possible Values:</div> <table><thead><tr><th>Description</th><th>Value</th></tr></thead><tbody><tr><td>Off</td><td>0</td></tr><tr><td>Lead</td><td>1</td></tr><tr><td>All</td><td>2</td></tr></tbody></table>	Description	Value	Off	0	Lead	1	All	2	Read/Write
Description	Value									
Off	0									
Lead	1									
All	2									

