System Controller Programming Manual for V3030 and V3030-01

Version X200.00 or greater

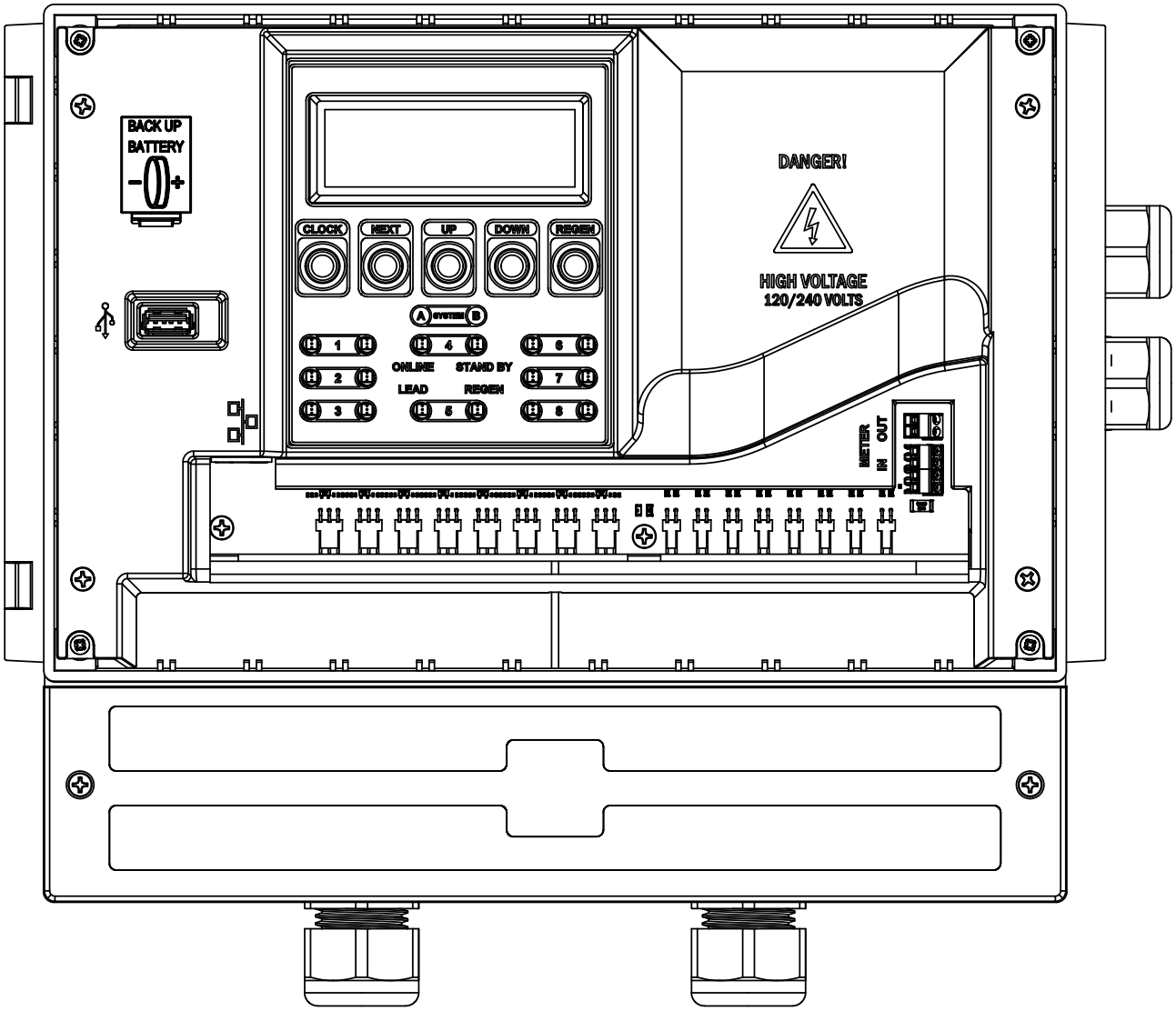


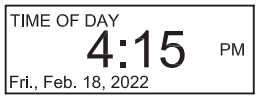
Table of Contents

General Button Operation

CLOCK	Set clock from any user screen. Exit and save from setup or program screens.
NEXT	Move to the next display.
REGEN	Used in initiating a manual regeneration. Moves back one display while in Program Mode.
UP OR NEXT	Change variable being displayed.
UP → NEXT → UP → CLOCK	Key sequence to lock and unlock software.

Additional Displays

USER 5
Displayed when the program lock feature is activated.

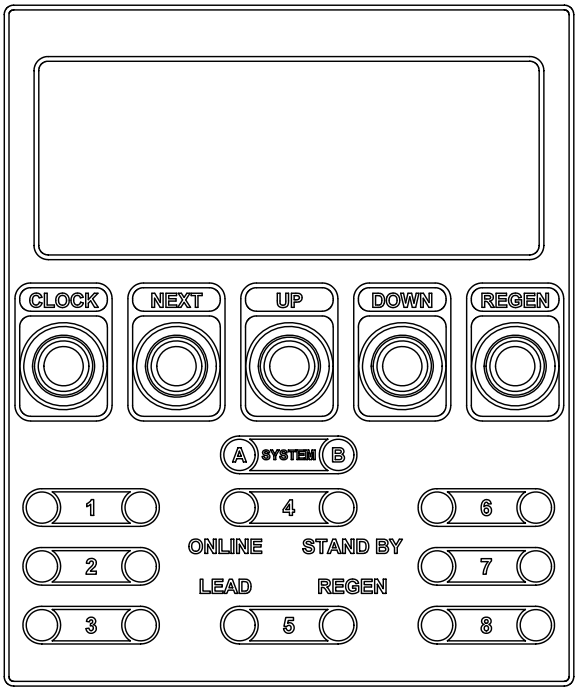


Time of Day display is viewed right after control has been reprogrammed or reset. US format is shown.

USER 6
Displayed when the program lock feature is deactivated.

Display viewed just prior to the initiation of a Reset.

System Controller LED Functions



The System Controller has two LEDs for each unit. Each LED for a unit represents if the unit is assigned to System 1 or System 2.

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 or the MAV/NHWBP is opening or closing. The Blue LED will also transfer to the unit that has the least capacity remaining with RANDOM and SERIES system types.

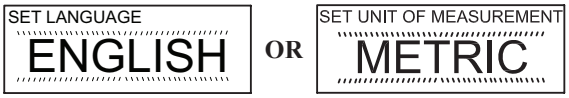
Green LED (ONLINE) – Indicates which unit is currently Online in the system. If the Green LED is flashing, then that unit has lost communication with the System Controller or the MAV/NHWBP is opening or closing.

Orange LED (STANDBY) – Indicates which unit is currently in Standby in the system. If the Orange LED is flashing, then that unit is detecting flow rate through its meter or the MAV/NHWBP is opening or closing.

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.

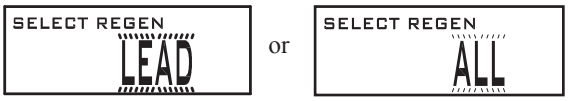
Language and Display Format Settings

When the System Controller is initially powered after a flash reprogramming, the language and 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.

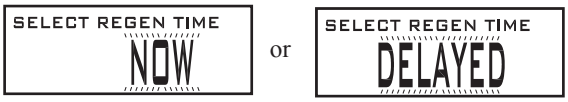


Manual Regeneration

When the REGEN button is held and then released, the following display will be shown for a single system. If two systems are enabled, the options will be LEAD SYSTEM 1, ALL SYSTEM 1, LEAD SYSTEM 2, and ALL SYSTEM 2.



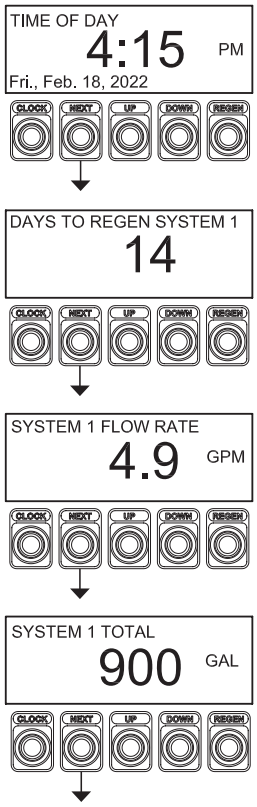
Use the UP or DOWN buttons to switch between “LEAD” or “ALL”. “LEAD” will regenerate the LEAD unit only (the blue LED light on the System Controller circuit board identifies which unit is the current LEAD unit). “ALL” will sequentially regenerate all the units in the system starting with the LEAD system. Press NEXT and select “NOW” for regeneration to begin immediately, or select “DELAYED” to schedule regeneration, as set in Step 6S.



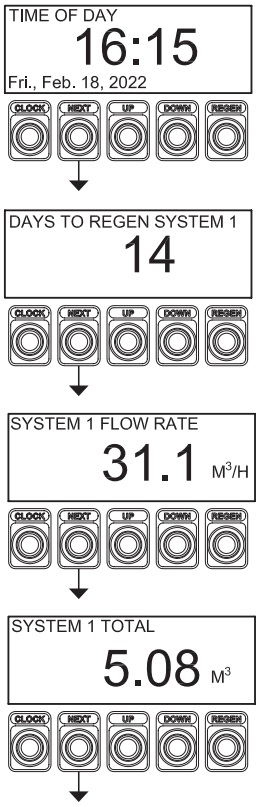
User Displays

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. The unit selection will affect the user displays. Use NEXT to scroll between the screens.

Typical US Format Displays



Typical Metric Format Displays

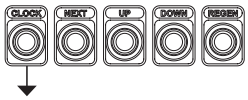


Set Time of Day and Day of Week

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.

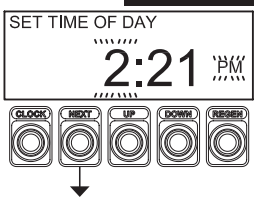
After five minutes of inactivity, Set Time of Day and Day of the Week will automatically be exited.

STEP 1U



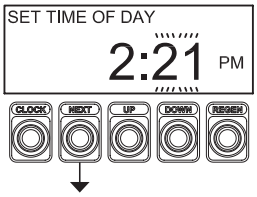
STEP 1U – Press CLOCK.

STEP 2U



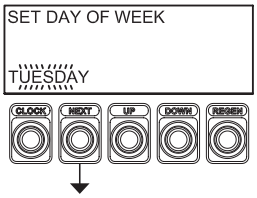
STEP 2U – Current Time (hour): Set the hour using the UP or DOWN buttons. With metric units set, AM/PM indication will not appear and timekeeping will be shown in 24-hour format. Press REGEN to exit Set Time of Day. Press NEXT to go to Step 3U.

STEP 3U



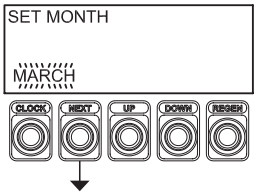
STEP 3U – Current Time (minutes): Set the minutes using the UP or DOWN buttons. Press REGEN to return to previous step. Press NEXT to go to Step 4U.

STEP 4U



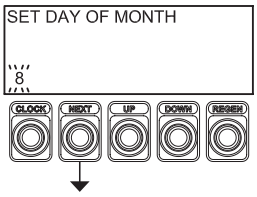
STEP 4U – Current Day of the Week. Set the day of the week using the UP or DOWN buttons. Press REGEN to return to previous step. Press NEXT to go to Step 5U.

STEP 5U



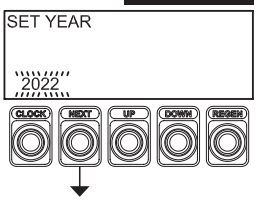
STEP 5U – Current Month: Set the month using the UP or DOWN buttons. Press REGEN to return to previous step. Press NEXT to go to Step 6U.

STEP 6U



STEP 6U – Current Day of the Month: Set the day using the UP or DOWN buttons. Press REGEN to return to previous step. Press NEXT to go to Step 7U.

STEP 6U



STEP 7U – Current Year: Set the year using the UP or DOWN buttons. Press REGEN to return to previous step. 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 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. All control valves must be set for immediate regeneration and require the day override setting to be 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.

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.

Relay Functions
If only one system is set up, both relays can be used for that system. If two systems are set up, relay 1 will be assigned to System 1 and relay 2 will be assigned to System 2.

Meter Signal Inputs 1 and 2
Meter signal inputs 1 and 2 can also be used as auxiliary inputs, but never both at the same time. If either auxiliary input is set to something other than "OFF" (Step 8S), the input cannot be used as a meter input.
If using the inputs for meters, Signal 1 will be assigned to System 1 and Signal 2 will be assigned to System 2. For the inputs to become active, the system must be set up for Water Monitor mode or set up as a two-unit alternator system.
If set up as a two-unit alternator, the meter can be connected to the valve control or the meter input signal on the System Controller, but never both. Connecting a meter to both will cause the System Controller to not record usage or flow information properly.

Auxiliary Inputs 1 and 2
Auxiliary inputs 1 and 2 are assigned to System 1 and System 2, respectively. If either input is set to something other than "OFF" (Step 8S), the input can not be used for a meter input signal.

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 online to meet flow demands. Units will be brought online 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 online. 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 <u>all</u> 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 online 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 online 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

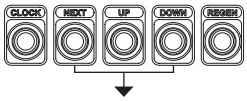
Regardless of the system type set, if an error is detected or if communication is lost, system operation will not shut down completely. Instead, the System Controller will continue to operate the system in as normal a manner as possible with the remaining units that are functioning properly.

> 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 display to alert the operator. Once the valve error is cleared at that unit, 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.

System Setup Displays

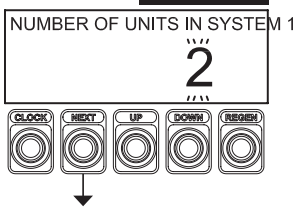
STEP 1S



Note: Screens with text extending past the end of the display indicate scrolling text.

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

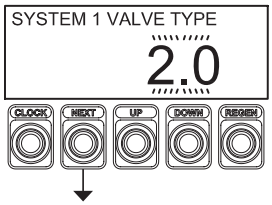
STEP 2S



STEP 2S – Select the total number of units in System 1. Available selections: 2, 3, 4, 5, 6, 7, 8 or WATER MONITOR. If the number of units is set for 2 – 8, press NEXT to go to Step 3S.

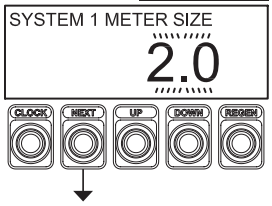
If WATER MONITOR is selected, then Step 3S, Step 5S, Step 6S, Step 7S, and Step 8S will not appear during programming. WATER MONITOR mode will allow the System Controller to operate with an inline water meter. Press REGEN to return to previous step. Press NEXT to go to Step 3S.

STEP 3S



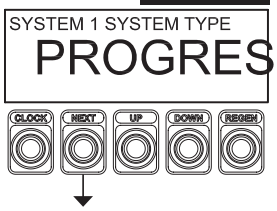
STEP 3S – Select valve type. Available selections: 1.0, 1.25, 1.5, or 2.0. Press REGEN to return to previous step. Press NEXT to go to Step 4S.

STEP 4S



STEP 4S – 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 REGEN to return to previous step. Press NEXT to go to the next step. If WATER MONITOR is selected in Step 2S, it will display Step 2S for System 2. Otherwise, it will display Step 5S.

STEP 5S



STEP 5S – 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 5S(A) which will allow setting of the maximum flow rate for a unit tank before another tank is brought online.

ALTERNATOR: Always one tank off-line. As another unit goes into regeneration the off-line unit comes online.
If ALTERNATOR is selected and 2.0 was selected in Step 3S, Step 5S(B) will be shown.

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

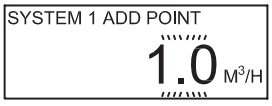
SERIES: If one unit goes into regeneration, the remaining units will regenerate in series until all units are regenerated.

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

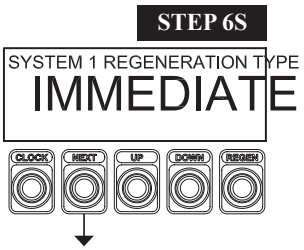
STEP 5S(A)

or

STEP 5S(A)

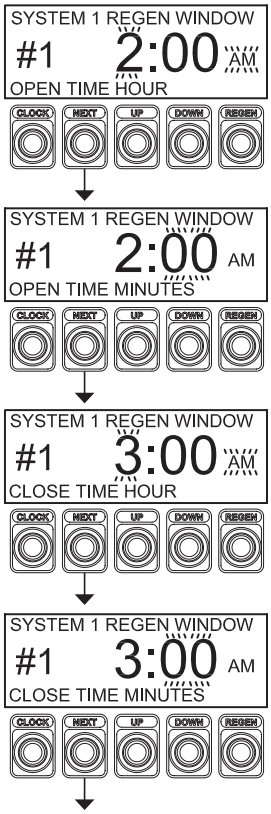


STEP 5S(B)



STEP 6S – Set when regeneration will be allowed to start. The available settings are the following:
IMMEDIATE = Units regenerate immediately upon reaching 0 capacity.
DELAY-1 = One window of opportunity for regeneration to begin.
DELAY-2 = Two windows of opportunity for regeneration to begin.
DELAY-3 = Three windows of opportunity for regeneration to begin.
DELAY-4 = Four windows of opportunity for regeneration to begin.

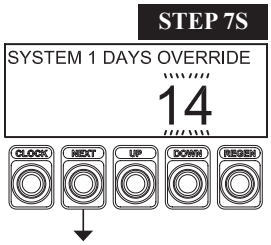
If DELAY-1, DELAY-2, DELAY-3 or DELAY-4 is selected, a series of displays will be shown to set the hours and minutes for when the window opens and closes. An example for DELAY 1 WINDOW is shown. With metric units set, timekeeping will be shown in the 24-hour format. The UP or DOWN buttons are used to set the hours or minutes, pressing NEXT moves to the next display.



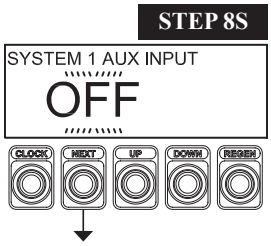
System Controller Operation with Delayed Regeneration Set

RANDOM and SERIES system types: If a delayed regeneration window is selected, any units that become exhausted and/or require regeneration will remain online 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 online 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 Standby pending regeneration) until the next available delayed regeneration time window. Should another unit become exhausted and/or require regeneration, it must remain online until the previous unit has been fully regenerated. This is required to prevent the system from being overrun.
Press REGEN to return to previous step. Press NEXT to go to Step 7S.

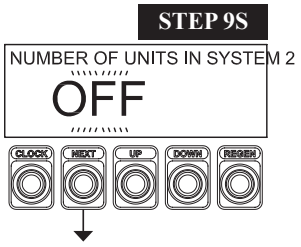


STEP 7S – Set the maximum number of days that may occur between regenerations. For system types Progressive, Alternator and Random only the unit with the least capacity remaining will be forced to regenerate per day interval. In a Series system type, the unit with the least capacity will be forced to regenerate per day interval followed by all other units in series. Press REGEN to return to previous step. Press NEXT to go to Step 8S.



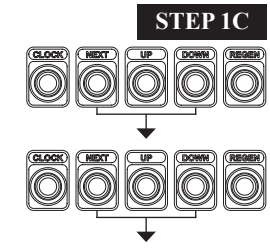
STEP 8S – If you are using a DP switch, it is possible to connect the DP switch to the Meter In connector. Look at the System Controller Exploded Parts View and Wiring for V3030 and V3030-01 manual for DP switch wiring to the Meter In connector.
The following settings are available for the DP switch. If Water Monitor mode is selected in Step 2S, this menu will not be available.
OFF - DP switch input is not enabled. This is the default setting.
REGEN - After two minutes of switch closure, the LEAD unit will be scheduled for regeneration.
HOLD -While the switch is closed, no units will be regenerated. Press REGEN to return to previous step. Press NEXT to go to Step 9S.

STEP THROUGH SETTING UP SYSTEM 2 OR BACK TO NORMAL MODE.

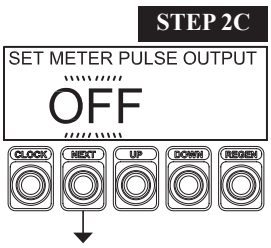


STEP 9S – Select the total number of units in System 2. The number of units available will depend on the number of units selected for System 1. WATER MONITOR mode is also available.

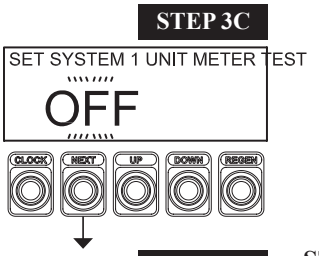
Configuration Displays



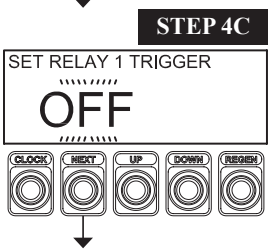
STEP 1C – Press NEXT and DOWN simultaneously for three seconds and release. Then, press NEXT and DOWN simultaneously for three seconds again and release. If display in Step 2C does not appear in 5 seconds, the lock on the valve is activated. To unlock, press DOWN, NEXT, UP, and CLOCK in sequence, and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



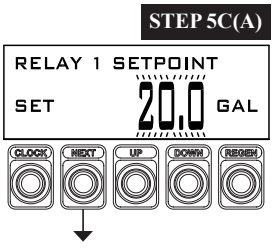
STEP 2C – Set Meter Pulse Output operation using UP or DOWN. The meter pulse output is only available for System 1.
The available selections are:
US Format = OFF, 0.10, 0.25, 0.50, 0.75, 1.00, 2.00, 3.00, 4.00, and 5.00 Pulses Per Gallon
METRIC Format = OFF, 1, 5, 10, 25, 50, and 100 Pulses Per Liter
Press REGEN to return to previous step. 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 REGEN to return to previous step. Press NEXT to go to Step 4C.

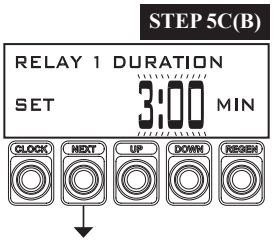


STEP 4C – Set Relay 1 TRIGGER operations using UP or DOWN. The choices are:
• VOLUME - Relay closes for the set duration for every set volume of system flow.
• ERROR - Relay closes whenever any system valve is in an error mode. Relay opens when error is reset.
• REGEN - Relay closes whenever any unit enters regneration. Relay opens when the regeneration is complete.
• FLOW RATE - Relay activates when the flow rate rises above the setpoint and deactivates when the flow rate falls below the setpoint.
• OFF - Disables this output.
Press REGEN to return to previous step. Press NEXT to go to the next step. If VOLUME has been selected, it will display Step 5C(A). If FLOW RATE has been selected, it will display Step 6C(A). Otherwise, it will display Step 7C.



STEP 5C(A) – When Relay 1 is set to Volume, set Setpoint in Gallons or Liters using UP or DOWN.
Press REGEN to return to previous step.
Press NEXT to go to Step 5C(B).

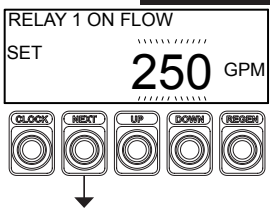
Relay #1 and #2 Output Setup (US Units)					
Mode	Parameter	Units	Range	Increment	Default
Volume	Setpoint	Gallons	1.0-20.0	1.0	20.0
	Duration	MM:SS	0:01-1:00 1:00-10:00 10:00-500:00	0:01 0:05 1:00	3:00
Flow Rate	On Rate	GPM	20-100 100-500 500-1000	5 10 20	250
	Off Rate	GPM	20-100 100-500 500-1000	5 10 20	240



STEP 5C(B)– Set Relay 1 Closure Duration in Minutes using UP or DOWN.
Press REGEN to return to previous step.
Press NEXT to go to Step 7C.

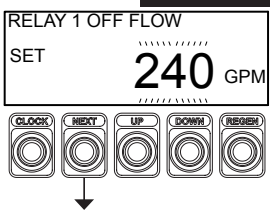
Relay #1 and #2 Output Setup (Metric Units)					
Mode	Parameter	Units	Range	Increment	Default
Volume	Setpoint	Gallons	1.0-20.0	1.0	20.0
	Duration	MM:SS	0:01-1:00 1:00-10:00 10:00-500:00	0:01 0:05 1:00	3:00
Flow Rate	On Rate	LPM	2-20 20-370	1 10	250
	Off Rate	LPM	2-20 20-370	1 10	240

STEP 6C(A)



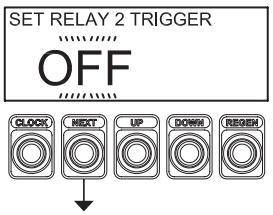
STEP 6C(A) – When Relay 1 is set to Flow Rate, using UP or DOWN, set the flow rate threshold that will energize the relay if exceeded. Press REGEN to return to previous step. Press NEXT to go to Step 6C(B).

STEP 6C(B)



STEP 6C(B) – Using UP and DOWN, set the flow rate threshold that will de-energize the relay. The flow rate must remain below the threshold for 10 seconds or longer before de-energizing.
Press REGEN to return to previous step. Press NEXT to go to Step 7C.

STEP 7C



RETURN TO NORMAL MODE

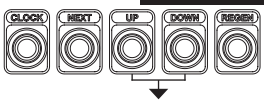
STEP 7C – Set Relay 2 TRIGGER operations using UP or DOWN. The choices are:
• VOLUME - Relay activates for the set duration for every set volume of system flow.
• ERROR - Relay activates whenever any system valve is in an error mode and deactivates when error is reset.
• REGEN - Relay activates whenever any unit enters regeneration and deactivates when the regeneration is complete.
• FLOW RATE - Relay activates when the flow rate rises above the setpoint and deactivates when the flow rate falls below the setpoint.
• OFF - Disables this output.

Press REGEN to return to previous step.
Press NEXT to go to the next step. If VOLUME has been selected, it will display Step 5C(A) for Relay 2. If FLOW RATE has been selected, it will display Step 6C(A) for Relay 2.

If Relay 2 has been set up or any other selection has been made, it will exit Configuration Displays.

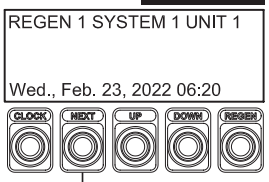
Diagnostic Displays

STEP 1D



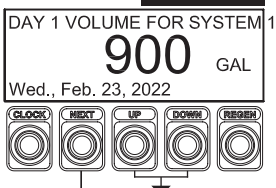
STEP 1D – Press UP and DOWN simultaneously for three seconds and release.

STEP 2D

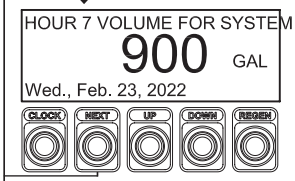


STEP 2D – Press UP or DOWN to scroll through the last 60 regenerations. Information displayed includes the unit, day, and time of the regeneration.
Press REGEN to exit Diagnostic Displays.
Press NEXT to go to Step 3D.

STEP 3D

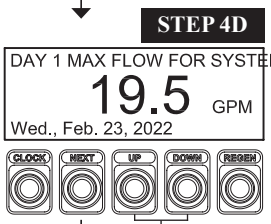


STEP 3D – Press UP or DOWN to view the daily treated water usage for the last 99 days. To view each day's hourly system usage, press and hold UP and DOWN simultaneously on the day's usage to be viewed. When set to US, units are Gallons. When set to METRIC, units are m^3. Press REGEN to return to previous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

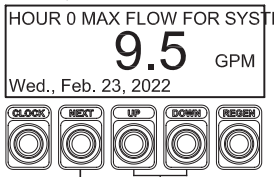


STEP 3D(A) – Press UP or DOWN to scroll through the treated water usage for each hour of the day selected. Press NEXT to return to Step 3D.

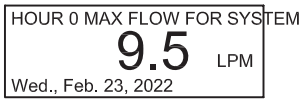
STEP 4D

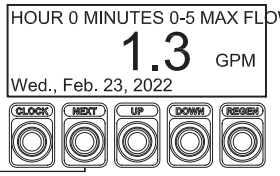


STEP 4D – Press UP or DOWN to view the maximum flow rate recorded for the last 99 days. To view each day's hourly maximum system flow rate, press UP and DOWN simultaneously on the day's flow rate to be viewed. When set to US, units are GPM. When set to METRIC, units are m^3/h. Press REGEN to return to previous step. Press NEXT to go to Step 5D.

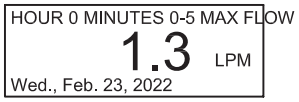


STEP 4D(A) – Press UP or DOWN to scroll through the maximum flow rate for each hour of the day selected. To view the average flow rate for a particular hour in 6 minute increments, press UP and DOWN simultaneously on the hour selected. Press NEXT to return to Step 4D.





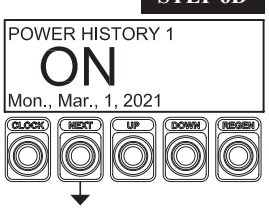
STEP 4D(B) – Press UP or DOWN to scroll through the average system flow rate for the selected hour in 6 minute intervals. Press NEXT to return to Step 4D(A).



STEP 5D

STEP 5D – Error Log.
Lists the last 10 valve errors or losses of communication that have occurred during System Controller operation. Use arrows to scroll through the log. Communication errors are displayed as "COMM-", when the error occurred, and "COMM+", when communication is 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, "CLRD" will replace "RPTD" to indicate that this error was finally reset. Press REGEN to return to previous step. Press NEXT to go to Step 6D.

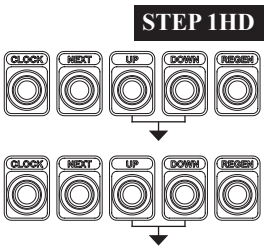
STEP 6D



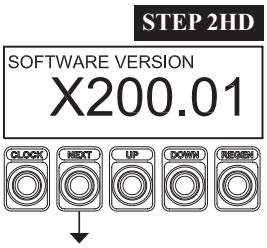
STEP 6D – Press UP or DOWN to view the last 10 power events. Press REGEN to return to previous step. Press NEXT to exit Diagnostics.

RETURN TO NORMAL MODE

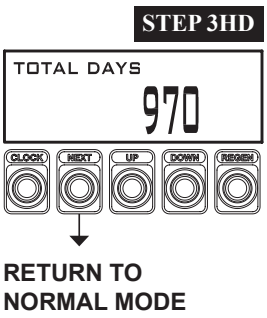
History Displays



STEP 1HD – Press UP and DOWN simultaneously for three seconds and release. Then, press UP and DOWN simultaneously for three seconds again 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, and try again.



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



STEP 3HD – Displays total days since startup. Press REGEN to return to previous step. Press NEXT to exit History.

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, “WRITING” will be displayed. When it is complete, the screen will return to the normal user screen.

Flash Programming of System Controller

1. Make sure you have all parameters written down. Newer software versions may require a reset of the parameters.
2. 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. Do not insert the USB device at this time.
3. Make sure the USB device contains the latest version of the file named “sysctrl.bin”.
4. Press UP + DOWN until the Regen History screen appears and then release the two buttons.
5. Press UP + DOWN until the Software Version screen appears and then release the two buttons.
6. Press SET CLOCK + DOWN until the backlight turns off and the LEDs begin “pulsing”.
7. Insert the USB device. The “pulsing” should stop when the device is being updated. Once the LEDs turn off, remove the USB device.

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 extraction process, “WRITING” will be displayed. When it is complete, the screen will return to the normal user screen.

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.

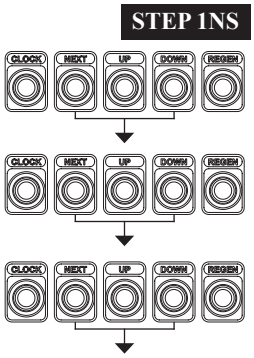
Contact the company at which the installation will occur. Obtain the name, phone number, and e-mail address for the following:
• The person who will be monitoring the web information from the System Controller
• The Network Administrator

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 consist 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 site, it is recommended that the installer change the Host Name.

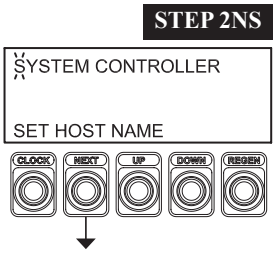
The unit is shipped from the factory without an Ethernet cable. Verify that there is an Ethernet outlet near where the System Controller is going to be installed. A CAT5 or better Ethernet cable is required to connect the System Controller to the Ethernet outlet.

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 re-entered:
• static IP address
• Subnet Mask
• Web pages

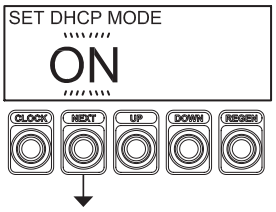


STEP 1NS – Press NEXT and DOWN simultaneously for approximately 3 seconds and release. If Step 2S does not appear in 5 seconds, the Program Lock feature is activated. To unlock, press DOWN, NEXT, UP and CLOCK in sequence, and try again. Once Step 2S appears, press NEXT and DOWN again until Step 2C appears.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



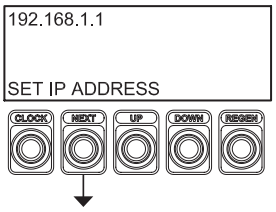
STEP 2NS – Set the desired Host Name to identify this controller on the network. Pressing CLOCK will select the first letter, use UP or DOWN to change each letter. Press NEXT to forward to the next character. Press REGEN to return to previous step. Press NEXT to go to Step 3NS.

STEP 3NS



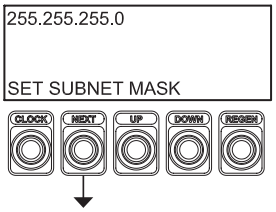
STEP 3NS – DHCP Enable/Disable – Use UP or DOWN to select ON or OFF. If the System Controller is connected to a network that has a DHCP server, setting this option to ON will allow the System Controller to request the network settings. It is recommended to restart the system if changes are made to this setting.
Press REGEN to return to previous step. Press NEXT to go to Step 4NS.

STEP 4NS



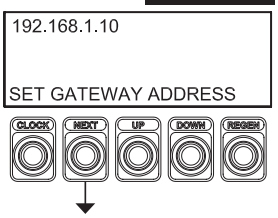
STEP 4NS – IP Addressing – Set the proper static IP address. Each IP address has four sections separated by decimal points. Pressing CLOCK will select the first section of the address to be changed. Press UP or DOWN to adjust each section, using NEXT to advance to the next section. Press REGEN to return to previous step. Press NEXT to go to Step 5NS.

STEP 5NS



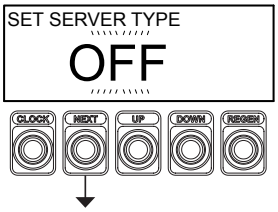
STEP 5NS – Subnet Masking – Set the proper Subnet Mask. Each Subnet Mask has four sections separated by decimal points. The System Controller will only be able to communicate with other devices within the same subnet. Pressing CLOCK will select the first section of the address to be changed. Press UP or DOWN to adjust each section, using NEXT to advance to the next section. Press REGEN to return to previous step. Press NEXT to go to Step 6NS.

STEP 6NS



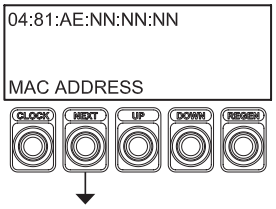
STEP 6NS – Gateway Address – Set the proper Gateway Address. Each Gateway Address has four sections separated by decimal points. Pressing CLOCK will select the first section of the address to be changed. Press UP or DOWN to adjust each section, using NEXT to advance to the next section. Press REGEN to return to previous step. Press NEXT to go to Step 7NS.

STEP 7NS



STEP 7NS – Press UP or DOWN to select MODBUS or HTTP server type. The default is OFF. Press REGEN to return to previous step. Press NEXT to go to Step 8NS.

STEP 7NS



STEP 8NS – MAC address – The controller's unique ID code that is set at the factory. This information is read-only for information purposes. Press REGEN to return to previous step. Press NEXT to exit Network Configuration.

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 (0 - 99)	R/W
40002	Month (1 - 12)	R/W
40003	Day of Month (1-31 depending on month)	R/W
40004	Hour (0 - 23)	R/W
40005	Minute (0 - 59)	R/W
40006	Seconds (0 – 59)	R/W
40007	System 1 Days Remaining	R
40008	System 1 Flow Rate x 10 (GPM or LPM)	R
40009	System 1 Total High Word (GAL or L)	R
40010	System 1 Total Low Word (GAL or L)	R
40011	Error Code High Word Possible Values 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	R

40012	Error Code Low Word Possible Values: 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	R
40013	Relay 1 Status Possible Values: Description — Value Inactive — 0 Active — 1	R
40014	Relay 2 Status Possible Values: Description — Value Inactive — 0 Active — 1	R
40015	Battery Status Possible Values: Description — Value Good — 0 (>=3.1V) Low — 1 (< 3.1V)	R

40016	Valve 1 Status Note: If using Water Monitor mode, all unit status flags will be 0. Possible Values: 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	R
40017	Valve 1 Flow Rate (GPM or LPM)	R
40018	Valve 1 Capacity Remaining High Word (GAL or L)	R
40019	Valve 1 Capacity Remaining Low Word (GAL or L)	R
40020	Valve 2 Status (see Status Code Listing in Valve 1 Status Register)	R
40021	Valve 2 Flow Rate (GPM or LPM)	R
40022	Valve 2 Capacity Remaining High Word (GAL or L)	R
40023	Valve 2 Capacity Remaining Low Word (GAL or L)	R
40024	Valve 3 Status (see Status Code Listing in Valve 1 Status Register)	R
40025	Valve 3 Flow Rate (GPM or LPM)	R
40026	Valve 3 Capacity Remaining High Word (GAL or L)	R
40027	Valve 3 Capacity Remaining Low Word (GAL or L)	R
40028	Valve 4 Status (see Status Code Listing in Valve 1 Status Register)	R
40029	Valve 4 Flow Rate (GPM or LPM)	R
40030	Valve 4 Capacity Remaining High Word (GAL or L)	R
40031	Valve 4 Capacity Remaining Low Word (GAL or L)	R
40032	Valve 5 Status (see Status Code Listing in Valve 1 Status Register)	R
40033	Valve 5 Flow Rate (GPM or LPM)	R
40034	Valve 5 Capacity Remaining High Word (GAL or L)	R
40035	Valve 5 Capacity Remaining Low Word (GAL or L)	R
40036	Valve 6 Status (see Status Code Listing in Valve 1 Status Register)	R
40037	Valve 6 Flow Rate (GPM or LPM)	R
40038	Valve 6 Capacity Remaining High Word (GAL or L)	R
40039	Valve 6 Capacity Remaining Low Word (GAL or L)	R

40040	User Lock Possible Values: Description Value Disabled 0 Enabled 1	R
40041	Domestic/International Possible Values: Description Value Domestic 0x5A (90) International 0xA5 (165)	R
40042	Valve 7 Status (see Status Code Listing in Valve 1 Status Register)	R
40043	Valve 7 Flow Rate (GPM or LPM)	R
40044	Valve 7 Capacity Remaining High Word (GAL or L)	R
40045	Valve 7 Capacity Remaining Low Word (GAL or L)	R
40046	Valve 8 Status (see Status Code Listing in Valve 1 Status Register)	R
40047	Valve 8 Flow Rate (GPM or LPM)	R
40048	Valve 8 Capacity Remaining High Word (GAL or L)	R
40049	Valve 8 Capacity Remaining Low Word (GAL or L)	R
40050	Start Regen Note: The System Controller writes 0 to the register when a regen option is queued. Possible Values: Description Value Off 0 Bank 1 Lead 1 Bank 1 All 2 Bank 2 Lead 3 Bank 2 All 4 Bank 1 Unit 11-18 Bank 2 Unit 21-28	R/W
40051	Day of Week (0 – 6)	R/W
40052	System 2 Days Remaining	R
40053	System 2 Flow Rate x 10 (GPM or LPM)	R
40054	System 2 Total High Word (GAL or L)	R
40055	System 2 Total Low Word (GAL or L)	R

Revision History:

12/7/2017

COVER PAGE:
New drawing
Version X105.06 or greater

PAGE 11:
Added Step 8SS

PAGE 23:
Added to 40050 additional description/value

11/16/2022

Many changes and updates.

2/3/2023

Updated cover illustration
Page 9: Added scrolling text notice
Page 11: Added Step 9S
Various grammatical and formatting changes throughout