NX48 and NX51 NXT Stager Controller

Service Manual

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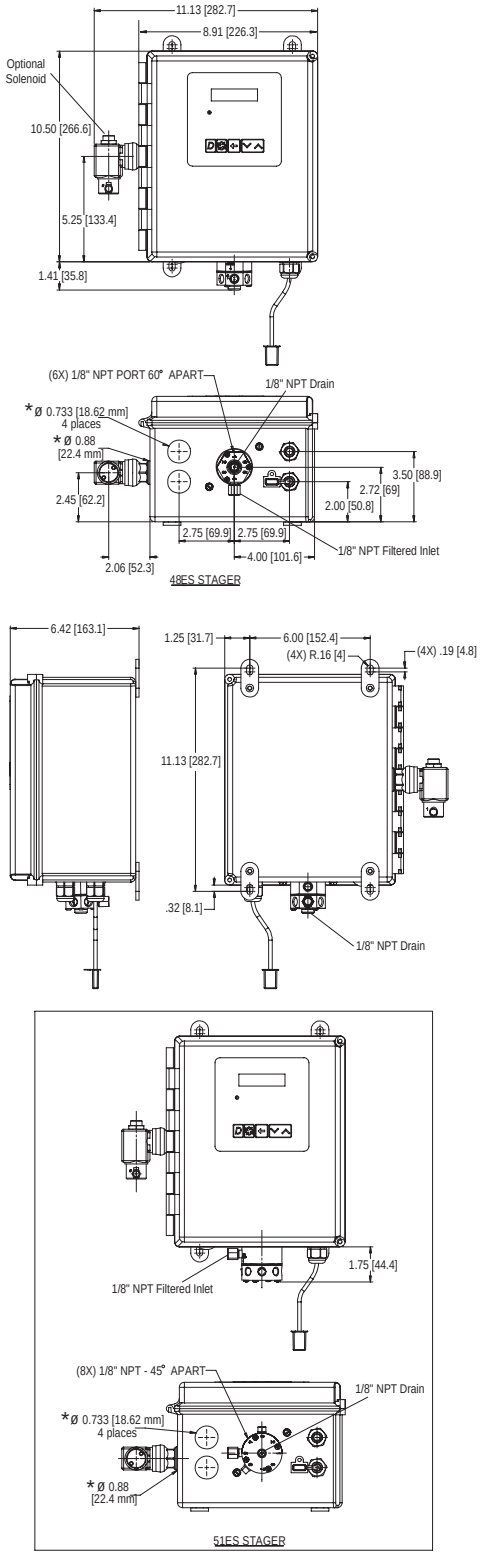
IMPORTANT PLEASE READ:

- The information, specifications and illustrations in this manual are based on the latest information available at the time of printing. The manufacturer reserves the right to make changes at any time without notice.
- This manual is intended as a guide for service of the controller only. System installation requires information from a number of suppliers not known at the time of control manufacture. This product should be installed by a plumbing professional.
- This product must be installed in compliance with all state and municipal plumbing and electrical codes. Permits may be required at the time of installation.
- If daytime operating pressure exceeds 80 psi, nighttime pressures may exceed pressure limits. A pressure reducing valve must be installed if pressure exceeds 125 psi.
- Do not install the unit where temperatures may drop below 32°F (0°C) or above 110°F (43°C).
- Do not place the unit in direct sunlight. Black units will absorb radiant heat increasing internal temperatures.
- Do not strike the controller or any of the components.
- Warranty of this product extends to manufacturing defects. Misapplication of this product may result in failure to properly condition water, or damage to product.
- A prefilter should be used on installations in which free solids are present.
- Correct and constant voltage must be supplied to the controller to maintain proper function.

NXT STAGER DIMENSIONS



***NOTE: Drill as required. These holes will only be drilled at factory if required.**

Figure 1

SYSTEM SPECIFICATIONS 48 AND 51 NXT SERIES

Generic Meter Guidelines

- Open collector output
- Pulse rate generated must not exceed 100 pulses per second (100 Hz), or 6,000 pulses per minute
- Support for meter outputs in the range of 1-255 gallons (25.5 m^3) for every 1-255 pulses
  Example: 35 gallons/100 pulses
  (=3.5 gallons/10 pulses, = 0.35 gallons/1 pulse)
- Meter must operate at 5 VDC

Electrical Rating

- 115 VAC ±20% input, 24 VAC output w/40 VA (maintain input voltage in this range)
- 230 VAC ±20% input, 24 VAC output w/40 VA (maintain input voltage in this range)
- Max Rated Power 15W

Humidity

- 95% RH, non-condensing

Temperature

- Maximum control fluid temperature 140°F (60°C)
- Operate where ambient temperatures are above 32°F and below 110°F

Pressure

- Maximum control fluid pressure 125 psi (8.5 bar)
- Control fluid can be either water or air and must be equal to or greater than system pressure.

SYSTEM DEFINITIONS

System Number	System Description	# of Tanks/ Controls	Type	Service Outlet Valve Controlled by...	Operation Discussion
4	Single Unit	1	Time Clock: No Meter Immediate: One Meter Delayed: One Meter Remote Signal Start: No Meter	Stager (no solenoid required)	Single tank configuration. During Regeneration no water available to service unless optional bypass valve #2A installed.
5	Interlocked	2, 3, or 4	Immediate: All Meters Remote Signal Start: No Meter	Stager (no solenoid required)	All tanks in parallel supplying treated water. Each unit in the system will have its own flow meter/sensor input. The control will delay the start of Regeneration if another unit is already in Regeneration. Once that unit has completed a Regeneration cycle, and has returned to Service,the unit with longest regeneration queue time will begin Regeneration. No more than one unit will be in Regeneration at a time.
6	Series Regeneration	2, 3, or 4	Immediate: One Meter Delayed: One Meter Remote Signal Start: No Meter	Stager (no solenoid required)	All tanks in parallel supplying treated water. Only #1 control will monitor flow meter/ sensor input. When a regeneration is required for the system, it will regenerate valve address #1 first, immediately followed by #2, then #3, then #4 if installed. No more than one unit will be in Regeneration at a time.
7	Twin Alternating	2	Immediate: One Meter Remote Signal Start: No Meter	Solenoid (plug stager port 2)	One tank online supplying treated water, one tank in Standby. Only #1 control will monitor its flow meter/sensor input. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by a solenoid connected to the service outlet valve of that tank.
9	Multiple Tank Alternating	2, 3, or 4	Immediate: All Meters Remote Signal Start: No Meter	Solenoid (plug stager port 2)	One, two, or three tanks online supplying treated water, one tank in Standby. Meter/ sensor input is required on each tank. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by a solenoid connected to the service outlet valve of that tank.
14	Demand Recall	2, 3, or 4	Immediate: All Meters	Solenoid (plug stager port 2)	Meter input is required on each tank. Unit #1 will begin In Service with #2, #3, and #4 (if installed) will begin in Standby. At least one unit is In Service at all times. When flow rate to the Primary Service Unit increases to a user specified rate, the next unit in sequence will move from Standby to Service. As the flow rate falls below the user specified rate subsequent tanks will return to Standby. When the Primary Service Unit regenerates, the next unit in sequence will become the new Primary Service Unit. As each units capacity is reached the controller will initiate a Regeneration of that unit. Depending on the number of units in the system, and flow rate demand the regenerated unit will then be placed either into Standby or Service. Only one unit will be in Regeneration at a time.

SYSTEM OPERATION IN SERVICE (SYSTEM 14-DEMAND)

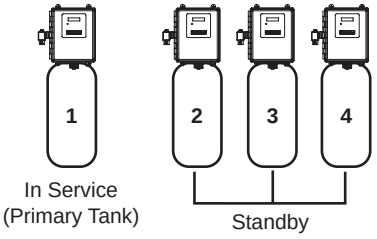
The system operates as part of a multi-tank regeneration system. This example applies to either a 2, 3 or 4 tank system.

Each tank in the system will have an active flow meter input, even in Standby.

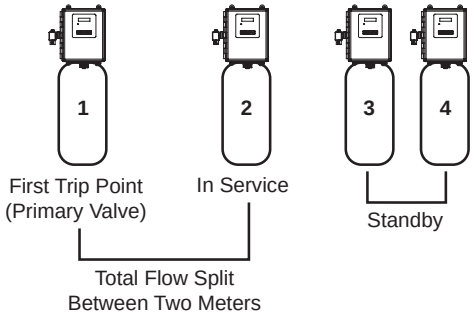
The number of tanks In Service depends on the flow rate.

Examples of a Four-Unit System:

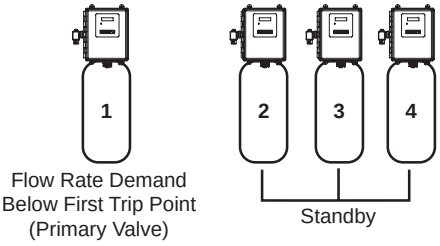
1. One Tank is In Service at all times (the "primary tank").



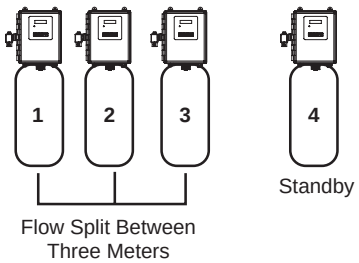
2. The total flow rate to the primary tank increased past the first trip point programmed rate. The flow stayed past the trip point delayed time. The next tank (least volume remaining) changes from Standby to In Service. This then splits the total flow between two meters.



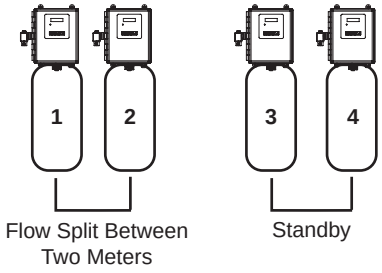
3. The flow rate demand decreased below the first trip point. The tank returns to Standby.



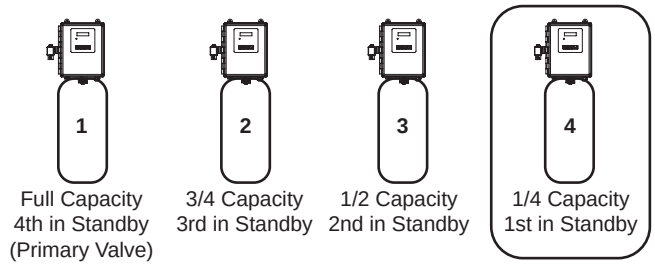
4. Total flow rate demand increased past a second trip point programmed rate. The second and third tank (least volume remaining) changes from Standby to In Service. The total flow is split between the three meters.



5. The third tank returns to Standby as demand decreases past the second trip point.

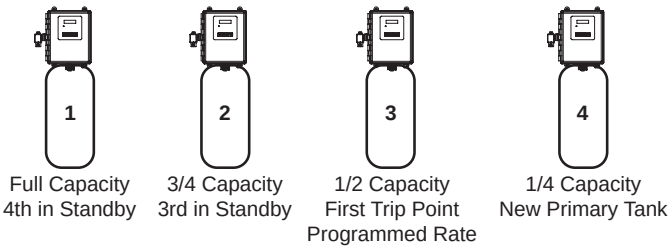


6. Tanks return to Standby due to decreased total flow rate and trip points programmed. The tank with the most remaining volume will be the first to go into Standby.



7. The primary tank regenerates. The next tank with the least remaining volume becomes the new primary tank. The tank with the next least volume remaining will be the first trip point programmed rate. Tanks continue operating in this order.

System Operation in Regeneration:



If two tanks are In Service and both reach Volume Remaining = 0, the other two tanks will shift from Standby to In Service. The lead tank with Volume Remaining = 0 will start Regeneration. The second tank with Volume Remaining = 0 will enter Standby. If flow increases past the trip point a third tank needs to enter In Service. The tank in Standby with Volume Remaining = 0 will shift into In Service to maintain a steady flow. Operating for extended periods in this mode may degrade the water quality.

TIMER DISPLAY FEATURES

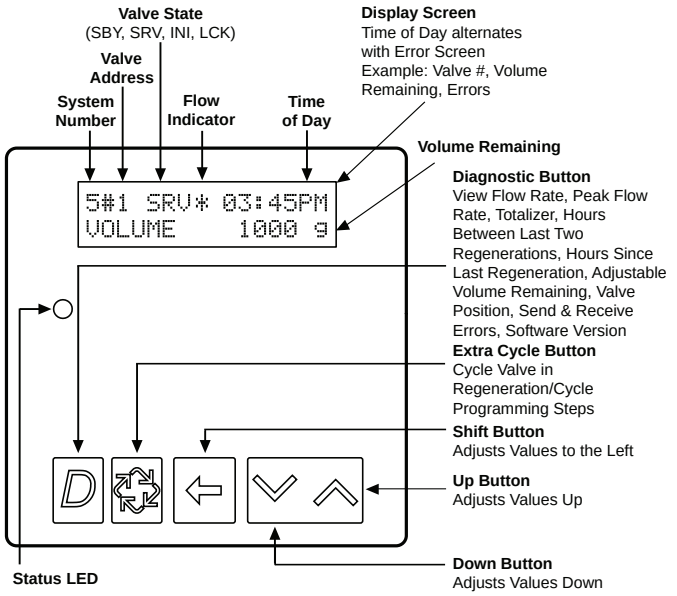


Figure 1

Valve State

INI (Initializing) - INI will display on the screen for 30 to 45 seconds when initializing after a power failure reset or programming.

RGQ (Regeneration Queued) -RGQ indicates that the reserve has been entered in a delayed system and regeneration has been queued. When in the main screen, press the Extra Cycle button to toggle service (SRV) with RGQ.

Service (SRV) - SRV will display when the unit is In Service.

LCK (Lock) - Lock will be displayed when contact closure is applied across the interlock terminals on the circuit board. See the “Network/Communication Cables & Connections” section of this manual.

LED Status Lights

Blue LED - Illuminates while the unit is In Service and no errors exist. The unit will always be In Service unless a regeneration trigger has occurred (green LED light will be displayed). A blinking blue light indicates the timer is In Service, and queued for regeneration.

Green LED - Illuminates when the unit is in Regeneration mode. A blinking green light indicates the timer is in Standby, and not in Regeneration.

Red LED- Illuminates when there is an error.

Flow Indicator

A rotating line (appearing as a rotating star shape) will display on the screen when flow is going through the meter.

NETWORK/COMMUNICATION CABLES & CONNECTIONS

Use a CAT5 Network/Communication cable.

Connect the network/communication cable to either port before programming.

The maximum cable length between timers is 100 feet.

Connect units together from one communication port to the next communication port. The order is not important.

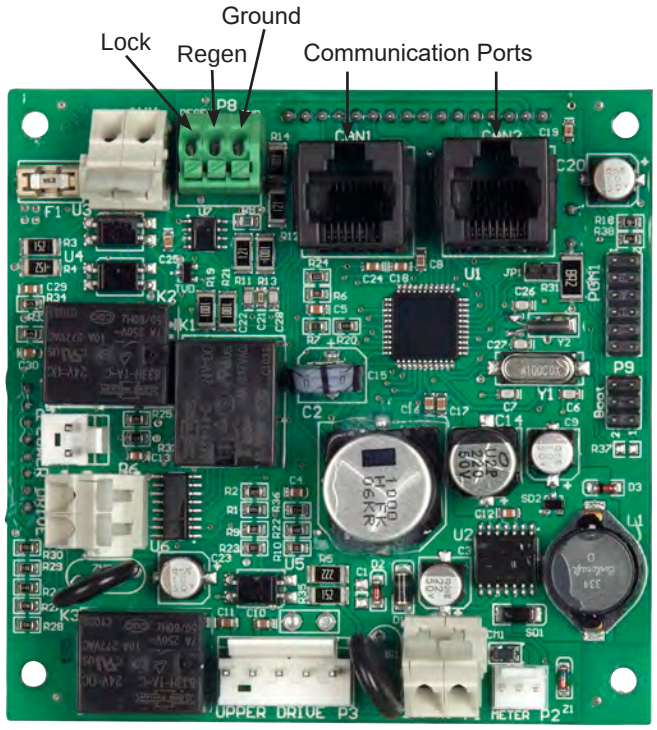


Figure 2 Current NXT Circuit Board

TIMER OPERATION

Set Time of Day

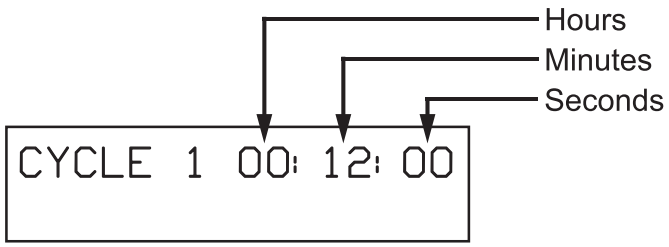
Hold the Up or Down button to change time. While in time change mode press Shift to adjust next digit over. On multiple tank systems change time on #1 control only. All other controls in system will mirror the time on control #1.

Manually Initiating a Regeneration

1. When timer is In Service or Stand By, press the Extra Cycle button on the main screen for five (5) seconds to force a manual regeneration if another unit is not in Regeneration.
2. The timer reaches Regeneration cycle Step #1.
3. Press the Extra Cycle button once to advance valve to the next Regeneration cycle.

Timer Operation During Regeneration

In the Regeneration cycle step display, the timer shows the current Regeneration cycle number the valve is in, or has reached, and the time remaining in that step. Once all regeneration steps are complete the timer returns to In Service and resumes normal operation.



Example: 12 minutes remaining in Cycle 1

Press the Extra Cycle button during a Regeneration Cycle to immediately advance the valve to the next cycle and resume normal timing.

Flow Meter Equipped Timer

During normal operation the Time of Day screen alternates with the Error screen (if errors are present).

As treated water is used, the Volume Remaining display counts down from the calculated system capacity to zero. When zero is reached a Regeneration cycle begins if no other units are in regeneration.

Timer Operation During Programming

The timer enters the Program Mode in Standby or Service Mode as long as it is not in regeneration. While in the Program Mode the timer continues to operate normally monitoring water usage. Timer programming is stored in memory permanently.

Timer Operation During A Power Failure

During a power failure all timer displays and programming are stored for use upon power re-application. The timer retains all values, without loss. The timer is fully inoperative and any calls for regeneration are delayed. The timer, upon power re-application, resumes normal operation from the point that it was interrupted.

NOTE: A flashing Time of Day display indicates a power outage. Hold the Up or Down button to reset time.

Remote Lockout

The timer does not allow the unit/system to go into Regeneration until the regeneration lockout input signal to the unit is cleared. This requires a contact closure to activate the lockout. The recommended gauge wire is 20 with a maximum length of 500 feet.

Regeneration Day Override Feature

If the Day Override option is turned on and the actual number of days since last regeneration exceeds the set regeneration day override value, the Regeneration cycle starts. If other units are in regeneration, it is added to a regeneration queue. This occurs regardless of the remaining volume available.

⚠ WARNING: This unit is not designed to drive/power external devices. Transformer must be grounded. Ground wire must be terminated to the back plate where grounding label is located.

Auxiliary Relay Output

The Auxiliary Relay Output on the circuit board can be programmed to be closed during a window of time within the regeneration sequence. The Aux Relay Output Start time sets the turn-on time referenced to the start of regeneration. The Aux Relay Output End time sets the turn-off time referenced to the start of regeneration. The Auxiliary Relay Output shares the same relay as the Chemical Pump Output. See wiring diagram for connection information.

Chemical Pump Output

When the Chemical Pump Output feature is enabled, the control will calculate volume of water used and close the relay when the set CPO Aux Relay Volume is reached. Once activated, the relay will stay closed for the amount of time set in CPO Aux Relay Time. The Chemical Pump Output only functions while in service, and the CPO volume is reset to zero each regeneration. The Chemical Pump Output shares the same relay as the Auxiliary Relay Output. See wiring diagram for connection information.

MASTER PROGRAMMING MODE FLOW CHART

CAUTION **Before entering Master Programming, please contact your local professional water dealer.**

When the Master Programming Mode is entered, parameters can be set to make the timer(s) function as needed.

NOTE: Depending on current option settings, some displays cannot be viewed or set.

Entering Master Programming Mode

1. Press and hold the Shift and Up buttons for 5 seconds.

   OR

2. Set the time of day display to 12:01 PM or 12:01HR. Press and hold Up or Down buttons to set the time. Then press the Up and Down buttons at the same time for 5 seconds.

Exiting Master Programming Mode

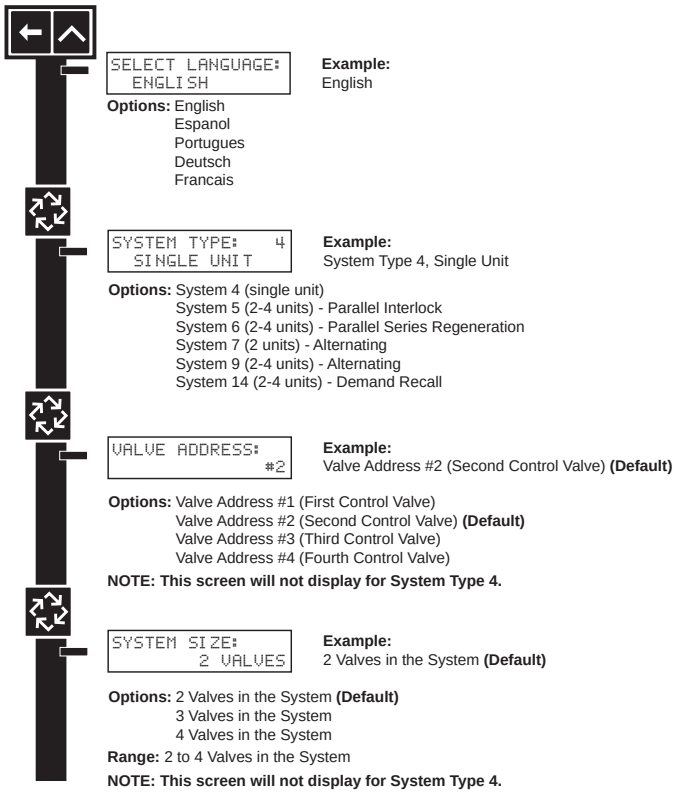
1. Press the Extra Cycle button once per display until all are viewed. Master Programming Mode is exited and the normal display screen appears.
2. To exit the Master Programming Mode without saving changes, press the Diagnostic button.

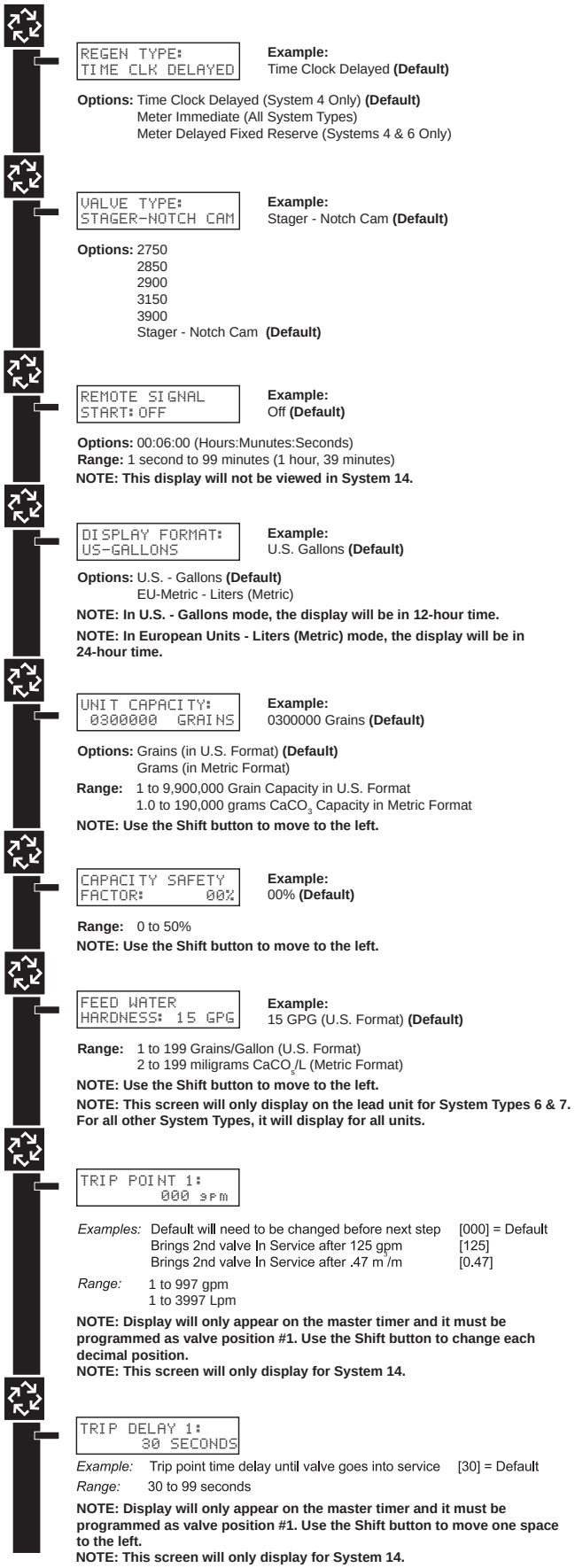
NOTE: If no keypad activity is made for 5 minutes while in the Master Programming Mode, or if there is a power failure, no changes will be saved, and the unit will go back to the main display screen.

Resets

Soft Reset: Press and hold the Up and Down buttons for 25 seconds until 12:00PM (or 12:00HR) appears. This resets all parameters except for the flow meter totalizer volume.

Master Reset: Hold the Extra Cycle button while powering up the unit. This resets all of the parameters in the unit. Check and verify the choices selected in Master Programming Mode.





MASTER PROGRAMMING MODE FLOW CHART *continued*

TRIP POINT 2:
GPM

Examples: Brings 3rd valve In Service after 250 gpm [250]
Brings 3rd valve In Service after .95 m^3/m [0.95]

Range: 2 to 998 gpm
1 to 3997 Lpm

NOTE: Display will only appear on the master timer and it must be programmed as valve position #1. System size must be 3 or 4 to appear. Use the Shift button to move one space to the left.
NOTE: This screen will only display for System 14.

TRIP DELAY 2:
30 SECONDS

Example: Trip point time delay until valve goes into Service [30] = Default

Range: 30 to 99 seconds

NOTE: Display will only appear on the master timer and it must be programmed as valve position #1. System size must be 3 or 4 to appear. Use the Shift button to move one space to the left.
NOTE: This screen will only display for System 14.

TRIP POINT 3:
GPM

Examples: Brings 4th Valve In Service after 350 gpm [350]
Brings 4th Valve In Service after 1.32 m^3/m [1.32]

Range: 3 to 999 gpm
1 to 3997 Lpm

NOTE: Display will only appear on the master timer and it must be programmed as valve position #1. System size must be 4 to appear. Use the Shift button to move one space to the left.
NOTE: This screen will only display for System 14.

TRIP DELAY 3:
30 SECONDS

Example: Trip point time delay until valve goes to Service [30] = Default

Range: 30 to 99 seconds

NOTE: Display will only appear on the master timer and it must be programmed as valve position #1. System size must be 4 to appear. Use the Shift button to move one space to the left.
NOTE: This screen will only display for System 14.

REGENERATION DAY
OVERRIDE:OFF

Example:
Off **(Default for Meter)**
On **(Default for Time Clock)**

REGENERATION DAY
OVERRIDE:01 DAYS

Example:
1 Day

Options: Off **(Default for Meter)** or On **(Default for Time Clock)**

Range: 1 to 99 Days

REGENERATION
TIME: 02:00AM

Example:
2:00 A.M. **(Default)**

Options: A.M. (U.S. Format)
HR (Metric Format)

NOTE: Regeneration time will not appear unless Regeneration Day Override is on.

CYCLE 1 00:10:00

Example: Backwash
00:10:00 **(Default 48-00 Stager & 51-09 Stager)**
(Hours:Minutes:Seconds)

CYCLE 2 01:00:00

Example: Brine
01:00:00 **(Default 48-00 Stager & 51-09 Stager)**
(Hours:Minutes:Seconds)

Options: 01:00:00 for Conditioner for the 48-00 Stager & 51-09 Stager **(Default)**
00:00:00 for Filter for the 48-00 Stager

CYCLE 3 00:10:00

Example: Fast Rinse
00:10:00 **(Default 48-00 Stager & 51-09 Stager)**
(Hours:Minutes:Seconds)

CYCLE 4 OFF

Example:
Off **(Default 48-00 Stager)**

CYCLE 4 00:12:00

Example: Refill
00:12:00 **(Default 51-09 Stager)**
(Hours:Minutes:Seconds)

CYCLE 5 OFF

Example:
Off **(Default 51-09 Stager)**

NOTE: This screen will only display when cycle 4 is not OFF.

AUXILIARY RELAY:
DISABLED

Example:
Auxiliary Relay is Disabled

Options: Enabled
Disabled **(Default)**

AUX RELAY OUTPUT
START 1 00:00:00

Example:
Auxiliary Relay Output Start 1 at
0 hours, 0 minutes, & 0 seconds

Range: 00:00:00 to 18:00:00

NOTE: Only displayed if Auxiliary Relay is enabled in previous screen. Auxiliary Relay will only display if Chemical Pump is OFF for System Types 6 & 7.

AUX RELAY OUTPUT
END 1 00:00:00

Example:
Auxiliary Relay Output End 1 at
0 hours, 0 minutes, & 0 seconds

Range: 00:00:00 to 18:00:00

CHEMICAL PUMP:
DISABLED

Example:
Chemical Pump is Disabled

Options: Enabled
Disabled **(Default)**

NOTE: This screen will only display on the lead unit for System Types 6 & 7. For all other System Types, it will display for all units.

CPO AUX RELAY
VOLUME: 000 9

Example:
Energize Chemical Pump relay every 50 gals (50)
Energize Chemical Pump relay every 200 L (200)

Range: 1 to 999 gallons in U.S. Format
1 to 9999 L in Metric Format

CPO AUX RELAY
TIME: 00:00:00

Example:
Each time chemical pump relay is on, run for
30 seconds (00:00:30)

Range: 00:00:00 to 02:00:00

FLOW METER:
1.0 PADDLE

Example:
1.0 Paddle Flow Meter

Options: 1.0 Paddle
1.0 Turbine
1.5 Paddle
1.5 Turbine
2.0 Paddle
3.0 Paddle
Generic

NOTE: Default flow meter type is based on the valve type. This screen will only display on the lead unit for System Types 6 & 7. All other system types it will display for all units.

MAXIMUM FLOW
RATE: 0000 GPM

Example:
Maximum Flow Rate of 0 gpm

Range: 20 - 2000 gpm (U.S. Format)
20 - 2000 Lpm (Metric Format)

NOTE: Only displayed if "Generic" is chosen for the flow meter.

ADD 01 GALLONS
EVERY 001 PULSES

Example:
Add 1 Gallon for Each Pulse in U.S. Format

Options: Gallons (U.S. Format)
Liters (Metric Format)

Range: 1 - 99 Gallons (U.S. Format)
0.1 - 09.9 L (Metric Format)
Pulses: 1 - 99

NOTE: Only displayed if "Generic" is chosen for the flow meter.

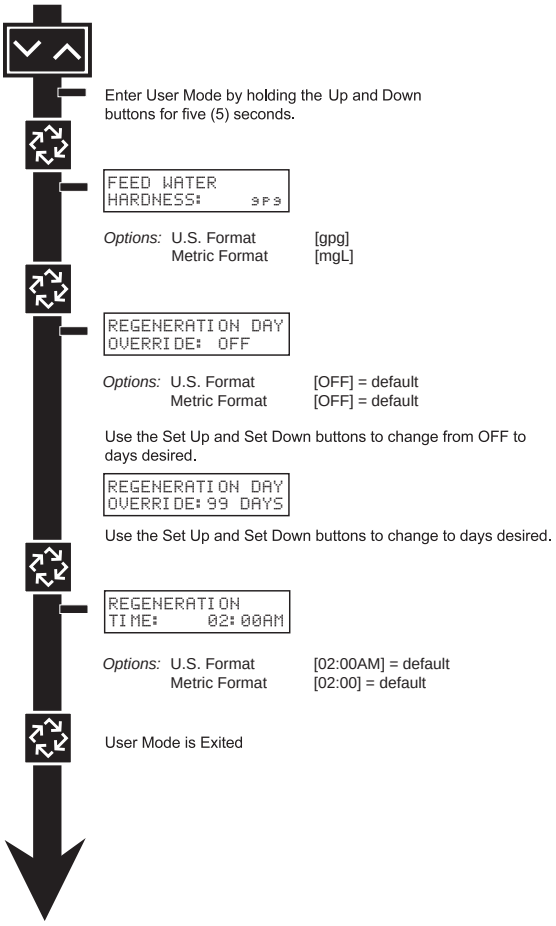
PROGRAMMING UNIT
PLEASE WAIT...

Example:
Master Programming Mode is Exiting

USER PROGRAMMING MODE FLOW CHART

Entering User Programming Mode

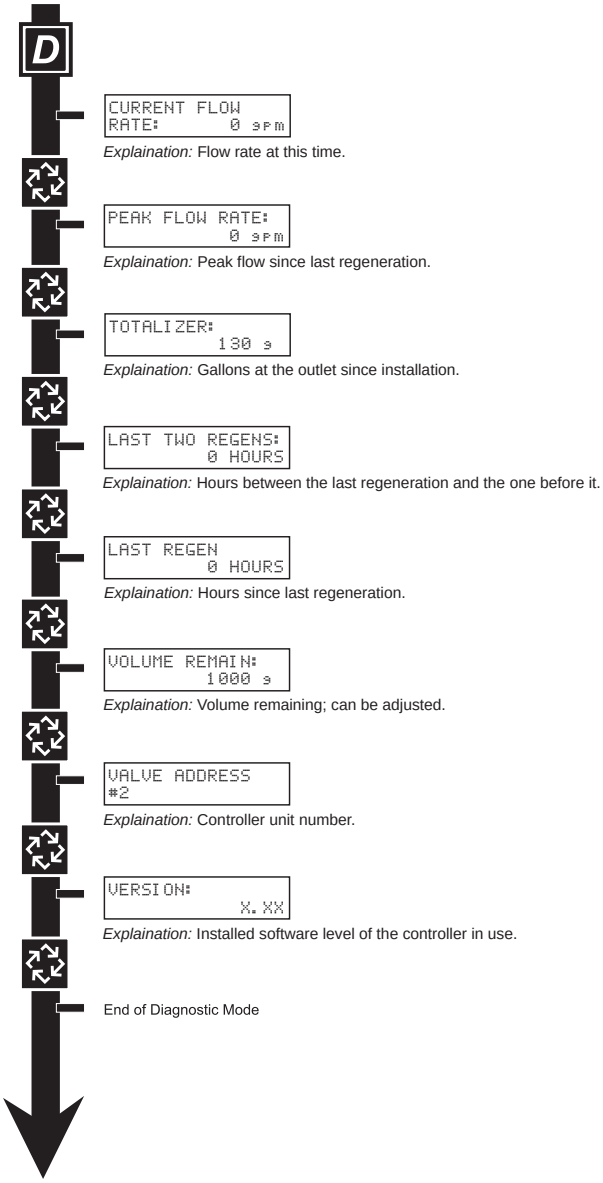
Hold the Up and Down buttons for 5 seconds.



DIAGNOSTIC PROGRAMMING MODE FLOW CHART

Entering Diagnostic Programming Mode

1. Push and release the "D" button.
2. Press the Extra Cycle button once per display until all displays are viewed and Normal Display is resumed.
3. Push and release the"D" button at anytime during diagnostic mode and the timer will exit the mode.
4. Depending on the current controller programming, certain displays may not be able to be viewed or set.



NXT Multi Language
Programming Parameters and Ranges

System Type	4 Time Clock	4 Metered Immediate	4 Metered Delayed	5 Interlock				6 Series				7 Alternating		9 Alternating				14 Demand Recall				Programming Parameter Ranges	
																						Gallons	Liters
Valve Address				1	2	3	4	1	2	3	4	1	2	1	2	3	4	1	2	3	4	1 thru 4	
Select Language	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	English, Espanol, Portugues, Deutsch, Francais	
System Size				x				x				x		x				x				1 thru 4	
Regen Type	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Time Clock, Metered Delayed, Metered Immediate	
Valve Type	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2750, 2850, 2900, 3150, 3900, Stager	
Regenerant Flow	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Downflow, Upflow, Upflow Fill First	
Remote Signal Start	x	x	x	x	x	x	x	x				x		x	x	x	x					Off, 00:00:01 - 01:39:00	
Display Format	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	US - Gallons	EU - Metric-Liters
Unit Capacity		x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	1 - 9900000 Grains	1 - 198000 gCaCO3
Capacity Safety Factor		x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	0- 50%	
Feed Water Hardness		x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	1 - 199 Grains/Gallons	1 - 1999 mgL
Trip Point 1																		x				0 - 997gpm	0 - 3997 Lpm
Trip Delay 1																		x				30 - 99 Seconds	30 - 99 Seconds
Trip Point 2																		x				Trip Point 1 + 1 - 998 gpm	Trip Point 1 + 1 - 3998 Lpm
Trip Delay 2																		x				30 - 99 Seconds	30 - 99 Seconds
Trip Point 3																		x				Trip Point 2 + 1 - 999 gpm	Trip Point 2 + 1 - 3999 Lpm
Trip Delay 3																		x				30 - 99 Seconds	30 - 99 Seconds
Regeneration Day Override	x	x	x	x	x	x	x	x				x		x	x	x	x	x	x	x	x	Off, 1 - 99	
Regeneration Time	x	o	o	o	o	o	o	o				o	o	o	o	o	o	o	o	o	o	12:00 a.m. - 11:59 p.m.	00:00 - 23:59 Hour
Cycle 1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	00:00:00 - 04:00:00	
Cycle 2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Off, 00:00:00 - 04:00:00	
Cycle 3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Off, 00:00:00 - 04:00:00	
Cycle 4	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Off, 00:00:00 - 04:00:00	
Cycle 5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Off, 00:00:00 - 04:00:00	
Auxiliary Relay	x	x	x	x	x	x	x	u	x	x	x	u	x	x	x	x	x	x	x	x	x	Enabled, Disabled	
Aux Relay Output Start	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	00:00:01 to Total Regeneration Time - 1	
Aux Relay Output End	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	Start Time + 1 to Total Regeneration Time	
Chemical Pump		x	x	x	x	x	x	u				u		x	x	x	x	x	x	x	x	Enabled, Disabled	
CPO Aux Relay Volume		c	c	c	c	c	c	c				c		c	c	c	c	c	c	c	c	1 - 999 gallons	0001 - 9999 Liters
CPO Aux Relay Time		c	c	c	c	c	c	c				c		c	c	c	c	c	c	c	c	00:00:01 - 02:00:00	00:00:01 - 02:00:00
Flow Meter		x	x	x	x	x	x	x				x		x	x	x	x	x	x	x	x	1" 1.5" Paddle or Turbine, 2" Paddle, 3" Paddle, Generic	
Generic		x	x	x	x	x	x	x				x		x	x	x	x	x	x	x	x		
Maximum Flow Rate		a	a	a	a	a	a	a				a		a	a	a	a	a	a	a	a	20 - 2000 GPM	20 - 2000 LPM
Add _ _ _ Gallons or Liters		a	a	a	a	a	a	a				a		a	a	a	a	a	a	a	a	1 - 255 Gallons	001 - 255 Liters
Every _ _ _ Pulses		a	a	a	a	a	a	a				a		a	a	a	a	a	a	a	a	1 - 255	1 - 255

Notes

o - Regeneration Time will only be viewed if Regeneration Day Override is used.

u - If Auxiliary Relay is Enabled then Chemical Pump Relay will not be viewed or if Chemical Pump Relay is Enabled then Auxiliary Relay will not be viewed.

c - All Relay Output parameters programming will be viewed if Enabled.

a - If Generic Flow Meter is chosen, then programming parameters will be viewed.

Stager Operation

Stagers are motor driven, rotary multi-port valves used to control a set of valves in a predefined sequence. They function by internally connecting inlet pressure to a defined set of control ports and allowing other control ports be vented through a drain. Control ports are used to open and close valves in a preset sequence. As the stager advances to various positions, different valves are open and closed in a system. The control port pressure and vent sequence is preset at the factory and cannot be field altered.

Stager Installation

1. Connect a constant pressure water or air source to the 1/8" NPT stager inlet. Control fluid pressure must be equal to or greater than system pressure. To ensure long trouble free operation, a 100 micron filter in the control pressure line is recommended.
2. Stager drain port should be left open or discharged to unrestricted or open drain. DO NOT plug or restrict drain port.
3. Connect the 1/8" NPT control ports to appropriate valves. Refer to tubing schematic provided in the Plumbing Diagrams section of this manual. Tubing inside diameter should be 1/8" or larger.

Inverted Type Stagers

Stagers that are ordered inverted would be used on systems with all normally closed valves. Inverted Stagers send pressure signals to open valves and vent signals to close valves.

Filter Operation Using 48-00 Stagers

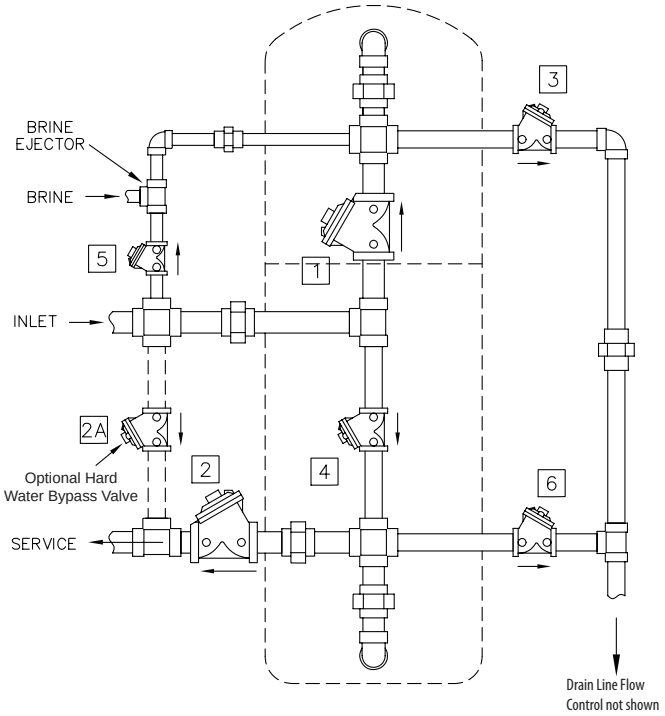
When using a 48-00 Stager to operate a filter:

1. Plug stager port #5 using a 1/8" pipe plug

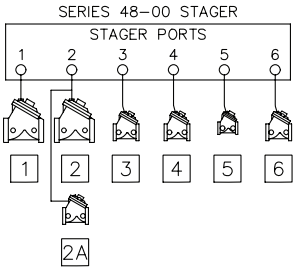
2. Program cycle 2 time to 0:00:00 or the desired settle time

PLUMBING DIAGRAMS

4 Position Softener (48-00 Stager)



4 POSITION SOFTENER

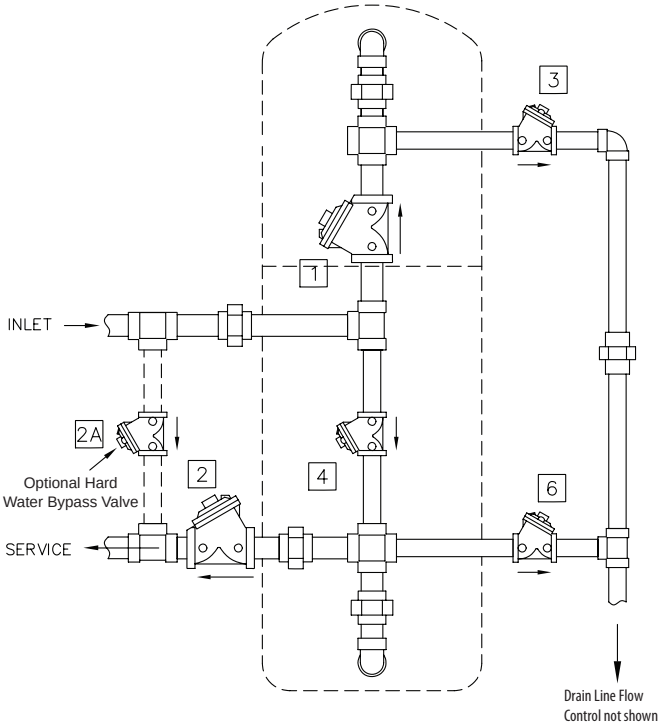


NOTCH	POS.	FUNCTION	PORTS VENTED[B]	VALVES OPEN[A]
A	4	SERVICE	1,2	1,2
B				
C	1	BACKWASH	3,4	3,4,2A
D				
E	2	BRINE	5,6	5,6,2A
F	3	RINSE	1,6	1,6,2A

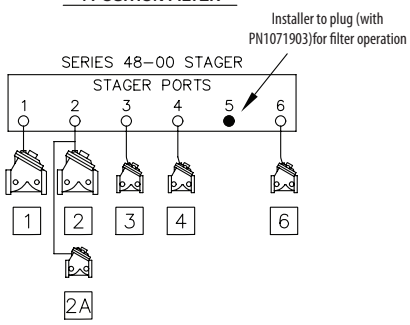
Note A: All valves normally open except optional valve 2A.
Note B: Inverted Stager types will have these ports pressurized. Inverted Stager to be used with all valves normally closed except optional valve 2A.

PLUMBING DIAGRAMS *continued*

4 Position Filter (48-00 Stager)



4 POSITION FILTER



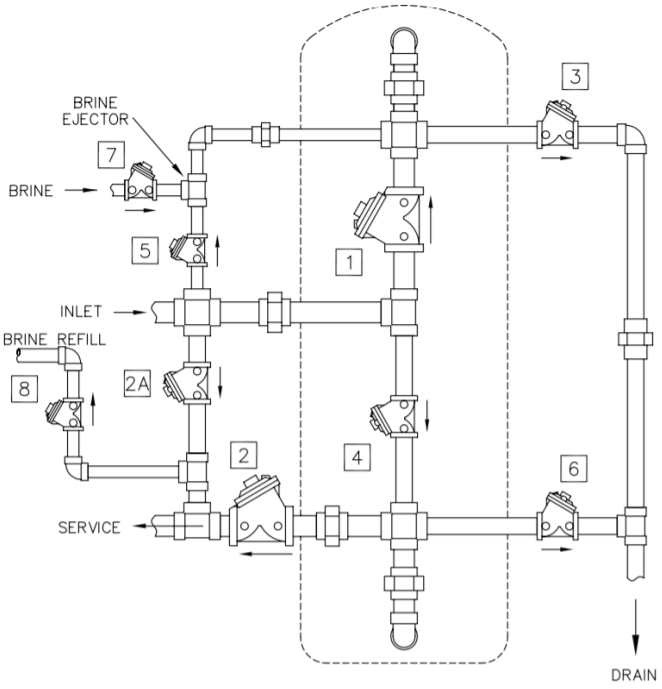
NOTCH	POS.	FUNCTION	PORTS VENTED [B]	VALVES OPEN [A]
A	4	SERVICE	1,2	1,2
B				
C	1	BACKWASH	3,4	3,4,2A
D				
E	2	BRINE [C]	5,6	5,6,2A
F	3	RINSE	1,6	1,6,2A

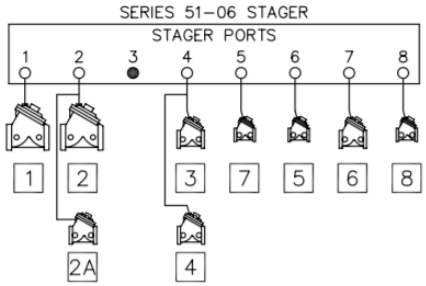
Note A: All valves normally open except optional valve 2A.

Note B: Inverted Stager types will have these ports pressurized. Inverted Stager to be used with all valves normally closed except optional valve 2A.

Note C: Program Cycle 2 time to 00:00:00 for filter operation.

5 Position Softener w/Timed Brine Refill (51-06 Stager)





NOTCH	POS.	FUNCTION	PORTS VENTED (NOTE 1)	VALVES OPEN
A	0	SERVICE	1,2	1,2
B				
C	1	BACKWASH	4	3,4,2A
D				
E	2	BRINE	5,6,7	5,6,7,2A
F	3	SLOW RINSE	6,7	5,6,2A
G	4	FAST RINSE	1,7	1,6,2A
H	5	BRINE REFILL	1,2,8	1,2,8

NOTE:

1. ALL OTHER PORTS PRESSURIZED.

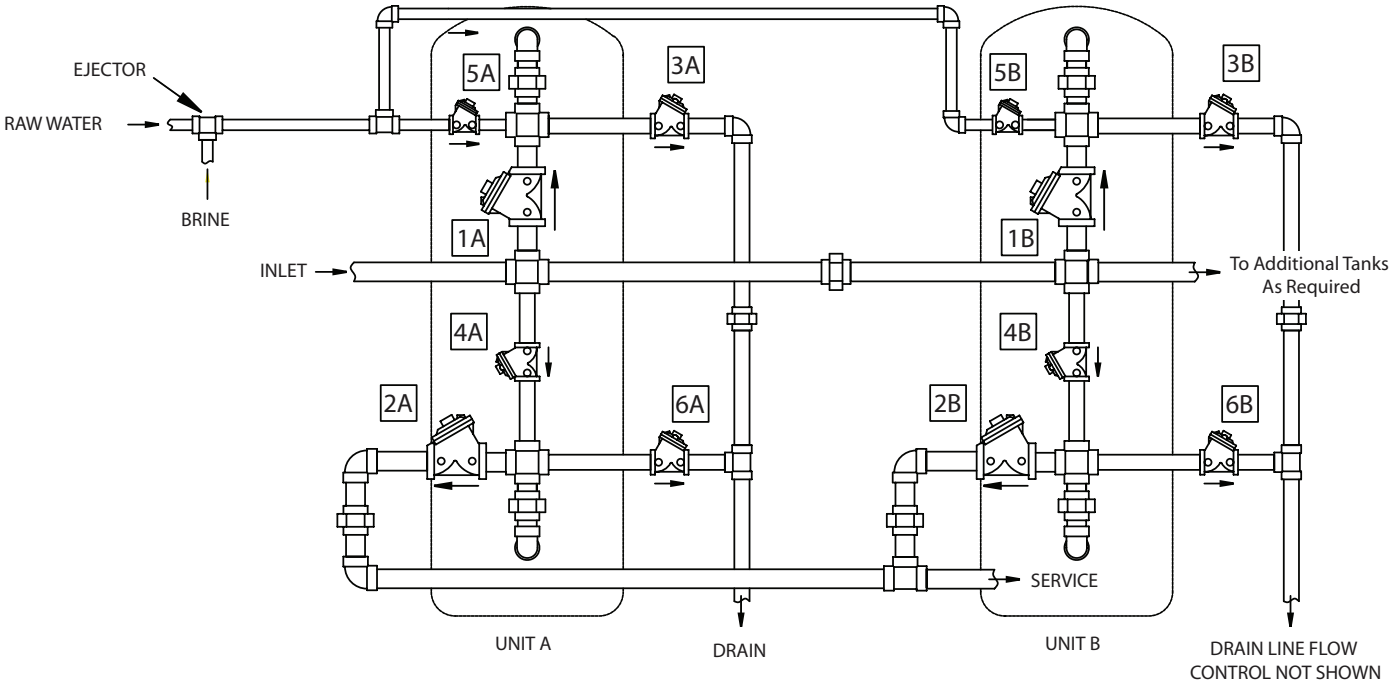
2. ALL VALVES (EXCEPT NO. 2A) NORMALLY OPEN, PRESSURE TO CLOSE. VALVE 2A NORMALLY CLOSED.

3. VALVE 2A REQUIRED FOR RAW WATER BYPASS DURING REGENERATION.

4. DRAIN LINE FLOW CONTROLLER NOT SHOWN.

PLUMBING DIAGRAMS *continued*

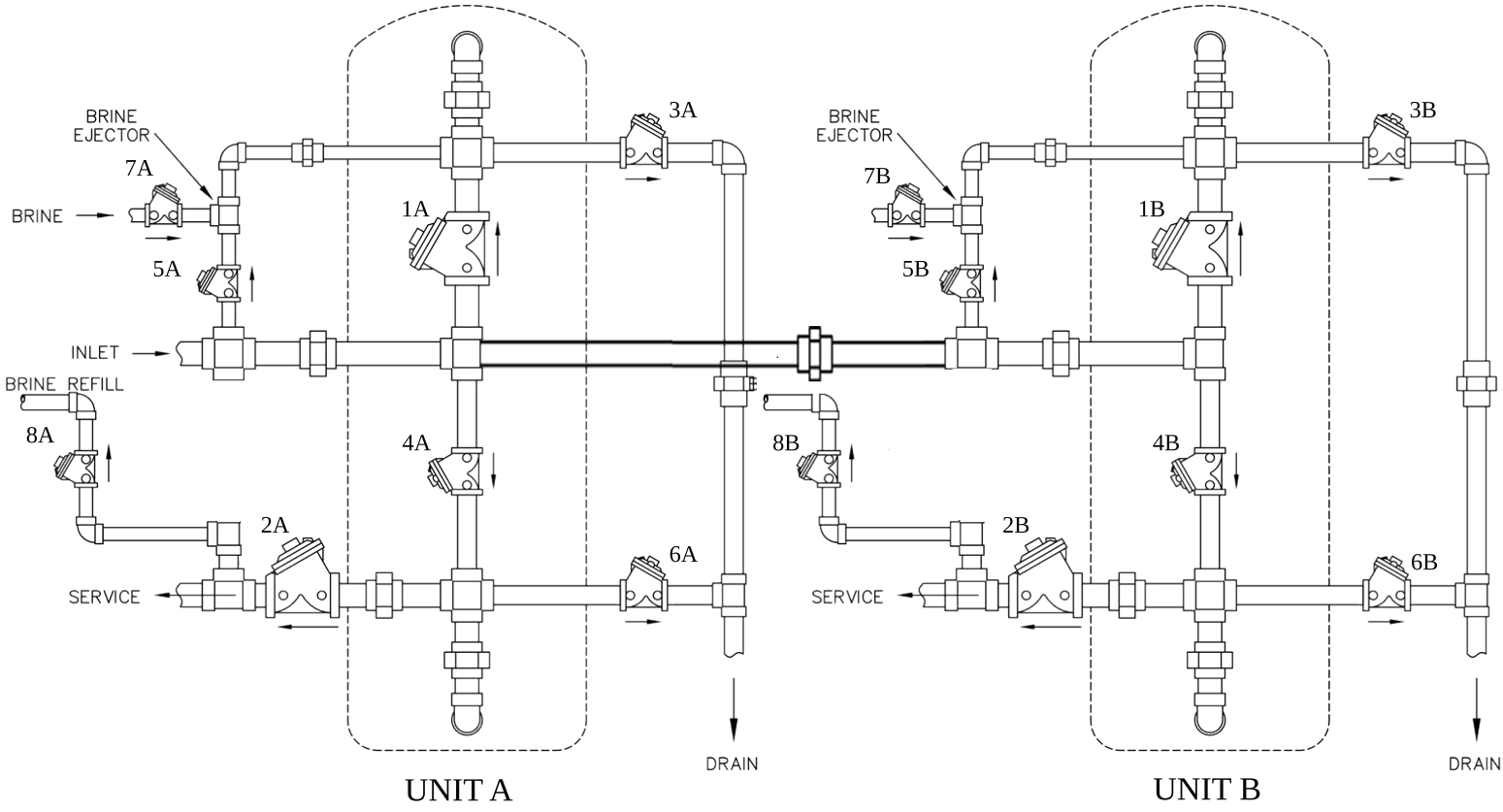
Multiple Tank 4 Position Softener (48-00 Stager)



NOTE: All valves normally open, pressure to close.

NOTE: Valve 2 for each tank is controlled by solenoid for system 7, 9, 14

Multiple Tank 5 Position Softener (51-06 Stager)

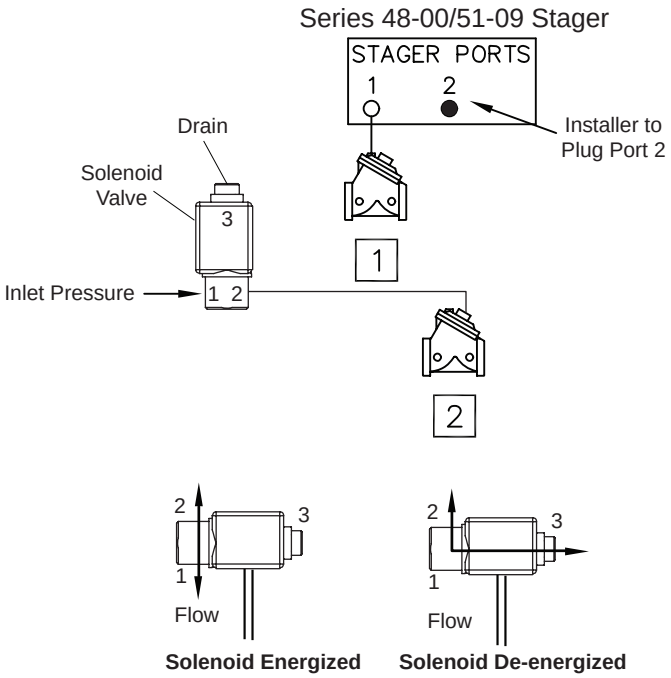


NOTE: All valves normally open, pressure to close.

NOTE: Valve 2 for each tank is controlled by solenoid for system 7, 9, 14

SOLENOID USE

Solenoids only required for Systems 7, 9 and 14



Solenoid Energized **Solenoid De-energized**

Energized To Close

The NXT Stager control can operate an optional 24 VAC solenoid to control when a tank is off line. This solenoid is electrically connected to the "lower drive" connection on the circuit board, and control pressure is run through the solenoid to the service outlet diaphragm valve.

The solenoid installed at the factory is a universal type. It is plumbed in an energize to close configuration when service outlet valve is normally open.

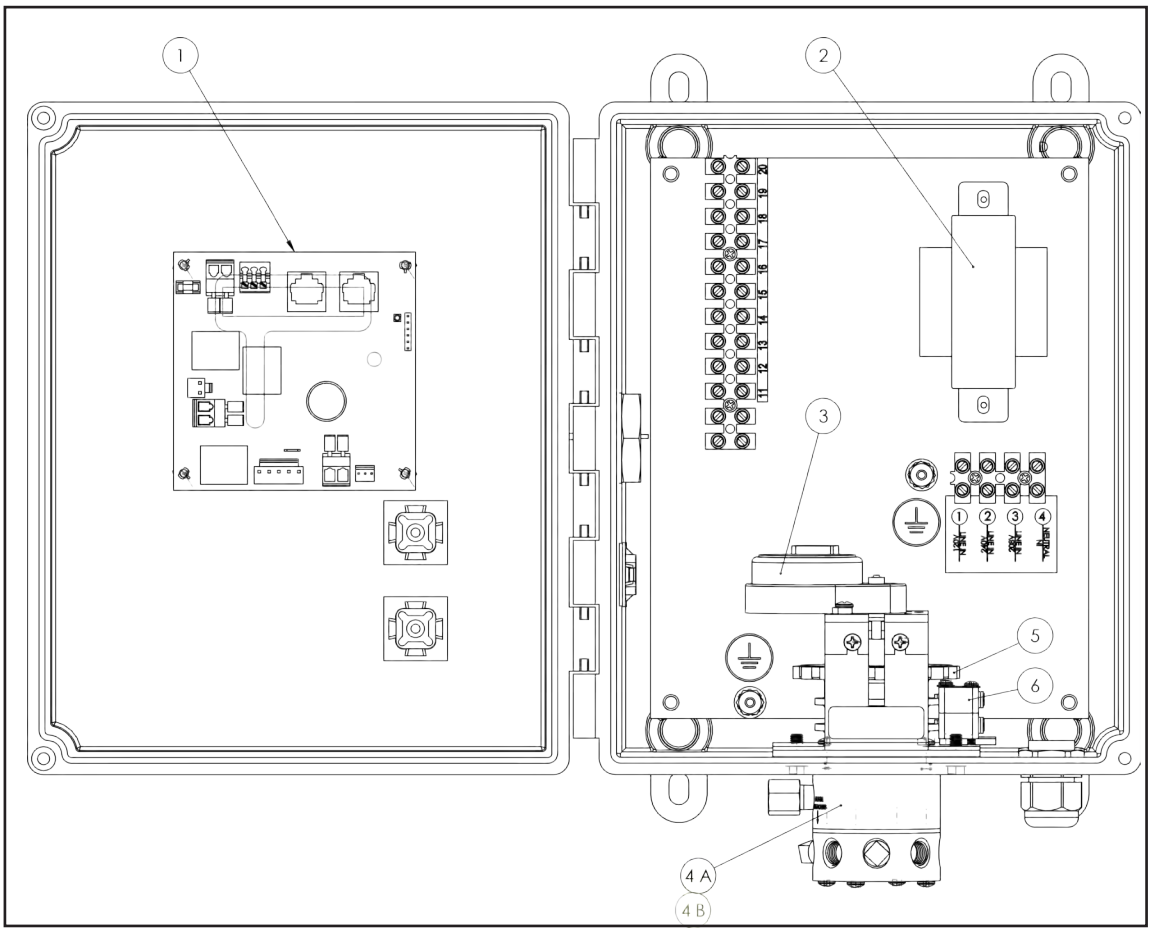
When a tank enters Regeneration or Standby the solenoid is energized. Pressure from solenoid port 1 passes to port 2. The diaphragm valve #2 will close.

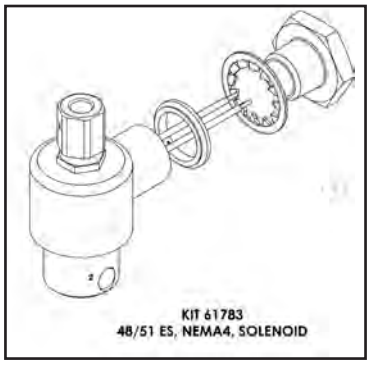
When a tank enters In Service the solenoid is de-energized. The inlet pressure to solenoid port 2 is stopped. The diaphragm valve is vented through solenoid port 2 to port 3 (drain). The valve #2 opens.

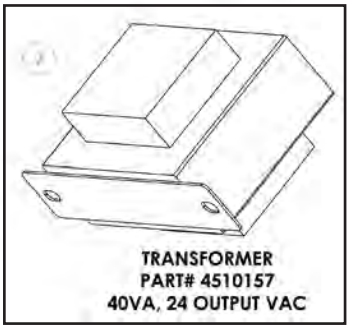
Inverted Stagers Only - Energize to Open

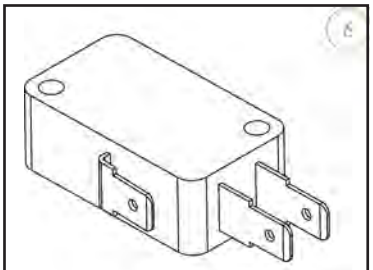
If the service outlet vavle is normally closed, connect constant pressure source to solenoid port 3. Connect solenoid port 2 to service outlet valve. Solenoid port 1 is drain.

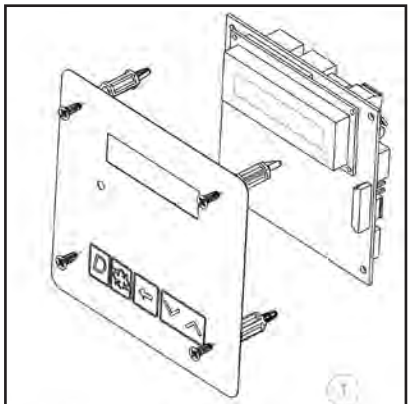
STAGER CONTROLLER, 51 & 48, NXT, NEMA 4
24V/50-60Hz ASSEMBLY

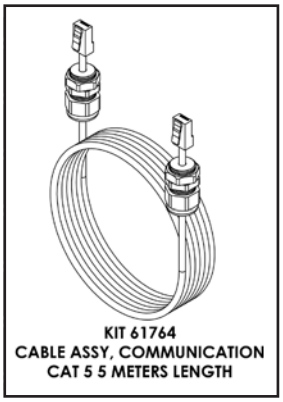


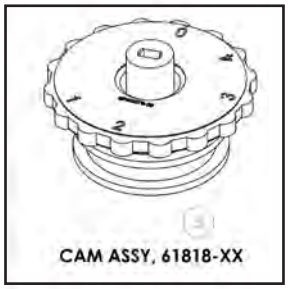

KIT 61783
48/51 ES, NEMA4, SOLENOID

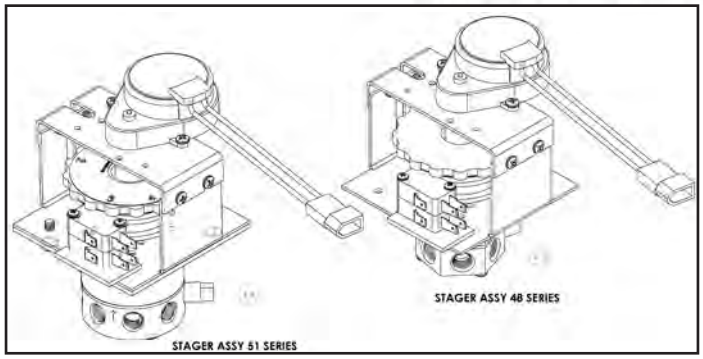

TRANSFORMER
PART# 4510157
40VA, 24 OUTPUT VAC


PART# 1075499
MICRO SWITCH


KIT 61784
48/51 ES, 3214NXT, CKT BOARD & KEYPAD


KIT 61764
CABLE ASSY, COMMUNICATION
CAT 5 5 METERS LENGTH

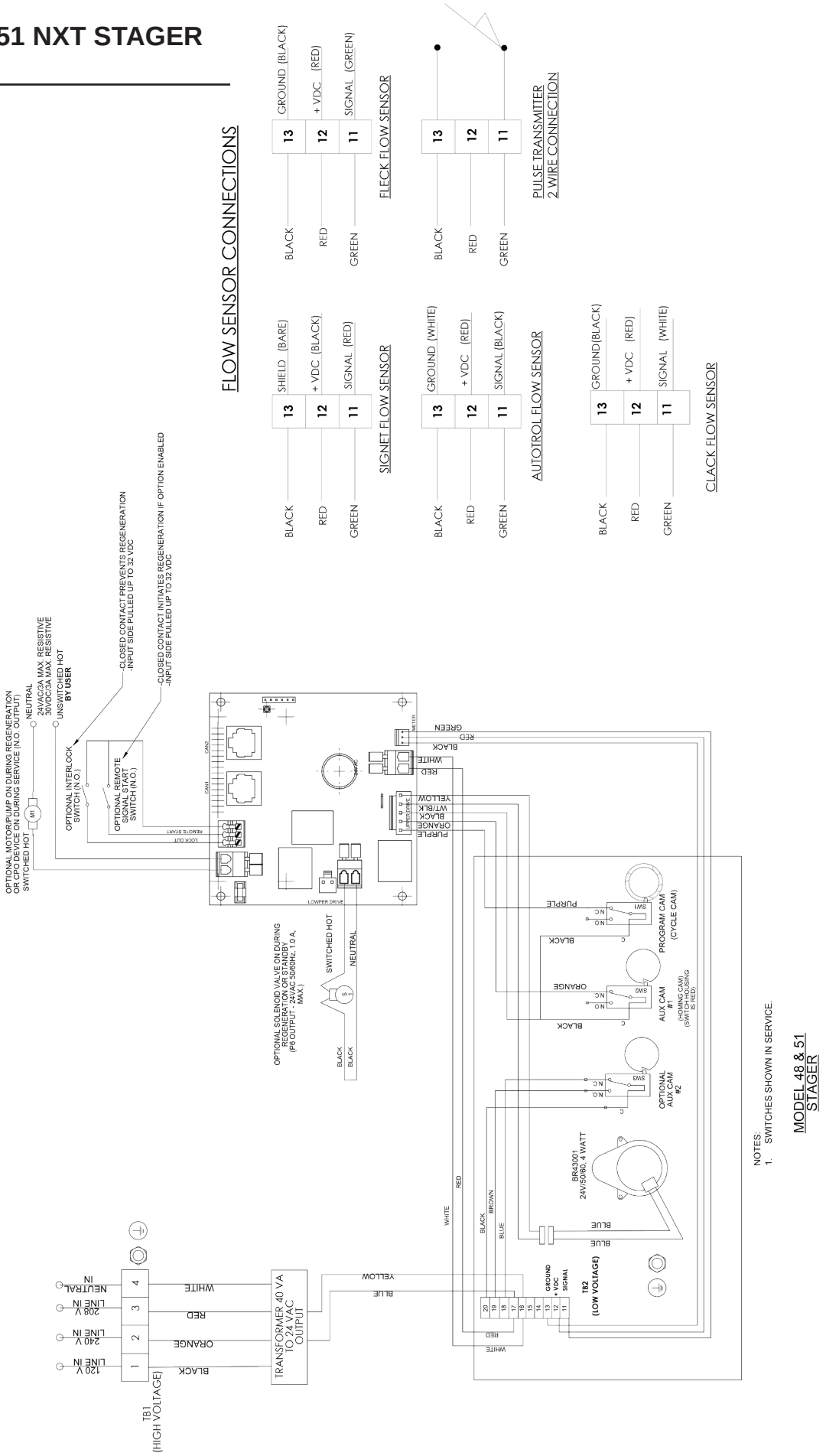

CAM ASSY, 61818-XX



Service Parts Common To Both 48 & 51 NXT Stager Control

61783.....Kit, 48/51 ES NEMA4, Solenoid
61784.....Kit 48/51 ES, 3214 NXT, CKT Board & Keypad
61764.....Cable Assy, Communication, CAT 5, 5 Meters Long
1075499.....Switch, Micro
40941.....Wire Harness, Upper Drive
1075502.....Wire Harness, 2nd Aux Switch
43001.....Motor
4510157.....Transformer
See Service Assemblies Section for Stager and Cam Assemblies

WIRING DIAGRAM 48/51 NXT STAGER CONTROLLER



TROUBLESHOOTING

Detected Errors

If a communication error is detected, an Error Screen will alternate with the main (time of day) screen every few seconds.

- All units In Service remain in the In Service position.
- All units in Standby go to In Service.
- Any unit in Regeneration when the error occurs completes Regeneration and goes to In Service.
- No units are allowed to start a Regeneration Cycle while the error condition exists, unless they are manually forced into Regeneration.
- When an error is corrected and the error no longer displays (it may take several seconds for all of the units in a system to stop displaying the error message), the system returns to normal operation.

NOTE: During the error condition the control continues to monitor the flow meter and update the volume remaining. Once the error condition is corrected all units return to the operating status they were in prior to the error. Regeneration queue is rebuilt according to the normal system operation. Or, if more than one unit has been queued for regeneration, then the queue is rebuilt according to which one communicates first.

Message Displayed	Cause For Error	Correction
Flashing time	Power outage.	Program time by holding UP on Unit #1.
Detected Error = Matching Address	Two or more units programmed with the same valve address number.	Program each unit with unique valve address number in Master Programming.
Detected Error = Program Mismatch	Master program parameters do not match between two or more controls.	Confirm Master Programming for each unit.
Detected Error = No Message #1	No power to Control #1.	Power Control #1.
	Communication Cable to Valve Address #1 bad or missing.	Connect or replace Communication Cable.
Detected Error = No Message #2	No power to Control #2.	Power Control #2.
	Communication Cable to Valve Address #2 bad or missing.	Connect or replace Communication Cable.
Detected Error = No Message #3	No power to Control #3.	Power Control #3.
	Communication Cable to Valve Address #3 bad or missing.	Connect or replace Communication Cable.
Detected Error = No Message #4	No power to Control #4.	Power Control #4.
	Communication Cable to Valve Address #4 bad or missing.	Connect or replace Communication Cable.
Detected Error = E2 Reset Unit	This message appears after a software reset.	Reprogram control using Master Programming section.
Test Mode	Circuit Board was not programmed at factory.	Replace Circuit Board.
Black Squares on screen	Bad Circuit Board.	Replace Circuit Board.
INI on screen for more than 2 minutes	Circuit board not getting feedback from cycle switch.	Inspect Motor - should be rotating.
		Connect wire harness to cycle switch.
		Check Cycle Micro Switch.
CHG on screen for more than 2 minutes	Control programmed incorrectly as 2900 or 3900 valve type.	Reprogram unit as Stager Valve type.

SERVICE ASSEMBLIES

48-00 ES Stager Assembly

61808-01 .....Stager Assy, 48-00, NXT 24VAC, HMG No 2nd Aux Switch
61808-02 .....Stager Assy, 48-00, NXT 24VAC, SA, 2nd Aux Notched in Service
61808-03 .....Stager Assy, 48-00, NXT 24VAC, SC, 2nd Aux Notched In Backwash
61808-10 .....Stager Assy, 48-00, Inverted, NXT 24VAC, HMG No 2nd Aux Switch
61808-20 .....Stager Assy, 48-00, Inverted, NXT 24VAC, SA, 2nd Aux Notched in Service
61808-30 .....Stager Assy, 48-00, Inverted, NXT 24VAC, SC, 2nd Aux Notched In Backwash
1074817.....Kit, Internal Parts, 48-00 Stager
61817-01 .....Cam Assy, 48-00 NXT, HMG, no 2nd Aux Cam
61817-02 .....Cam Assy, 48-00 NXT, SA, 2nd Aux Notched in Service
61817-03 .....Cam Assy, 48-00 NXT, SC, 2nd Aux Notched in Backwash

51-06 ES Stager Assembly

61967-01 .....Stager Assy, 51-06, NXT 24VAC, HMG, No 2nd Aux Switch
61967-02 .....Stager Assy, 51-06, NXT 24VAC, SA, 2nd Aux Notched in Service
61967-03 .....Stager Assy, 51-06, NXT 24VAC, SC, 2nd Aux Notched in Backwash
61967-04 .....Stager Assy, 51-06, NXT 24VAC, SH, 2nd Aux Notched in Refill
1074888.....Kit, Internal Parts, 51-06 Stager
61968-01 .....Cam Assy, 51-06 NXT, HMG, No 2nd Aux Switch
61968-02 .....Cam Assy, 51-06 NXT, SA, 2nd Aux Notched in Service
61968-03 .....Cam Assy, 51-06 NXT, SD, 2nd Aux Notched in Backwash