



FLECK NXT2 TIMER

SERVICE MANUAL

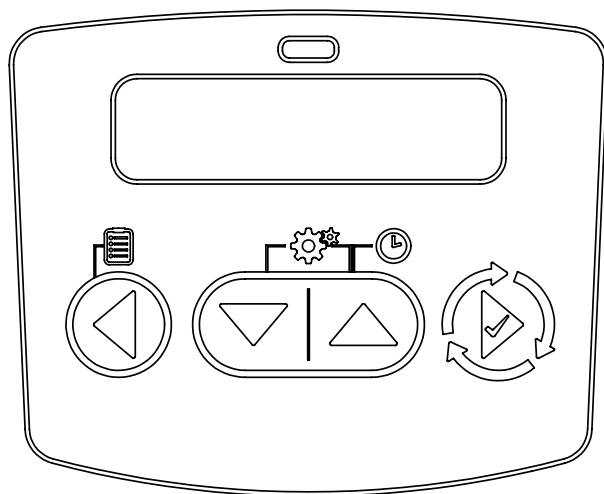


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IMPORTANT PLEASE READ:

- The information, specifications and illustrations in this manual are based on the latest information available at the time of release. The manufacturer reserves the right to make changes at any time without notice.
- This manual is intended as a guide for service of the valve only. System installation requires information from a number of suppliers not known at the time of manufacture. This product should be installed by a plumbing professional.
- This unit is designed to be installed on potable water systems only.
- 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.
- It is established that when daytime water pressure exceeds 80 psi (5.5 bar), the maximum pressure rating of 125 psi (8.6 bar) can be exceeded. A pressure regulator must be installed on this system or warranty is voided.
- Do not install the unit where temperatures may drop below 32°F (0°C) or above 120°F (52°C).
- Do not place the unit in direct sunlight. Black units will absorb radiant heat, increasing internal temperatures.
- Do not strike the valve 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, damage to product, or personal injury.
- A prefilter should be used on installations in which free solids are present.
- In some applications local municipalities treat water with Chloramines. High Chloramine levels may damage valve components.
- Correct and constant voltage must be supplied to the controller to maintain proper function.
- The system is intended to treat only potable quality water. It is not intended as the permanent primary treatment of water from a source that is contaminated, such as from radon, pesticides, insecticides, sewage or wastewater.
- This system is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children shall not play with the system.
- Cleaning shall not be made by children without supervision.
- Periodic cleaning and maintenance may be required to function properly.
- All plumbing and electrical should be done in accordance with local codes.
- An uninterrupted power supply is required. The control uses a transformer to supply 24 VDC. Please make sure your voltage supply is compatible with your unit before installation.

CALIFORNIA PROPOSITION 65 WARNING

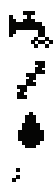
⚠ WARNING: This product contains chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.

FEATURES

- On-screen multilingual support: English, Francais, Deutsch, Italiano, Espanol, Nederlands, Portugues
- Time of day super capacitor backup for 12-hour power loss
- 2 to 4 line scrolling text OLED display, high contrast easy to read in low light conditions and at a distance
- Full functional user interface with easy programming allowing forward and backwards menu navigation
- Network two to eight valves via CAT5 or better cables
- LED Status Indicator
 - Blue: In Service
 - Flashing Blue: Regeneration Queued
 - Green: Regeneration
 - Flashing Green: Standby
 - Red: Error condition present
- Two 1/2" NPT Brass Valves (1515) (1513) (1511) (1510) (1509) (1508) (1507) (1506) (1505) (1504) (1503) (1502) (1501) (1500) (1499) (1498) (1497) (1496) (1495) (1494) (1493) (1492) (1491) (1490) (1489) (1488) (1487) (1486) (1485) (1484) (1483) (1482) (1481) (1480) (1479) (1478) (1477) (1476) (1475) (1474) (1473) (1472) (1471) (1470) (1469) (1468) (1467) (1466) (1465) (1464) (1463) (1462) (1461) (1460) (1459) (1458) (1457) (1456) (1455) (1454) (1453) (1452) (1451) (1450) (1449) (1448) (1447) (1446) (1445) (1444) (1443) (1442) (1441) (1440) (1439) (1438) (1437) (1436) (1435) (1434) (1433) (1432) (1431) (1430) (1429) (1428) (1427) (1426) (1425) (1424) (1423) (1422) (1421) (1420) (1419) (1418) (1417) (1416) (1415) (1414) (1413) (1412) (1411) (1410) (1409) (1408) (1407) (1406) (1405) (1404) (1403) (1402) (1401) (1400) (1399) (1398) (1397) (1396) (1395) (1394) (1393) (1392) (1391) (1390) (1389) (1388) (1387) (1386) (1385) (1384) (1383) (1382) (1381) (1380) (1379) (1378) (1377) (1376) (1375) 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System Type	4 - Single Unit 5 - Parallel Interlock (2-8 Unit) 6 - Parallel Series Regeneration (2-8 Units) 7 - Alternating Interlock (2 Units) 8 - Alternating Delayed (2 Units) 9 - Alternating with Standby Units (2-8 Units) 14 - Demand Recall (2-8 Units)
Valve Type	2510 2750 2815 2850 2900 3150 3900
Regeneration Type	Softener/Filter Meter Delayed Softener/Filter Meter Immediate Time Clock Day of the Week Remote Regeneration
Regeneration Flow	Downflow Upflow Filter
Electrical Rating	24V DC

Display Icons



TIMER OPERATION

Setting the Time of Day

NOTE: Set Time of Day on any unit and the rest of the units in the system will update the Time of Day automatically.

1. Press and hold the Up button for 2 seconds. The "Time" value is displayed. Press the Up or Down buttons to adjust as desired.
2. Press the Extra Cycle button to advance to the "Year" field. Press the Up or Down buttons to adjust as desired.
3. Press the Extra Cycle button to advance to the "Month" field. Press the Up or Down buttons to adjust as desired.
4. Press the Extra Cycle button to advance to the "Calendar Day" field. Press the Up or Down buttons to adjust as desired.
5. Press the Extra Cycle button to return to the normal display screen.

NOTE: Press and hold the Left button to exit without saving.

Manually Initiating a Regeneration

1. When timer is In Service or Standby, press and hold the Extra Cycle button on the main screen.
2. The timer advances to Regeneration Cycle Step #1, and begins programmed time count down.
3. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #2 (if active).
4. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #3 (if active).
5. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #4 (if active).
6. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #5 (if active).
7. Press the Extra Cycle button once more to advance the valve back to In Service.

NOTE: A manually initiated or queued regeneration can be cleared by pressing and holding the Back button. A system queued regeneration can only be cleared by stepping through a manual regeneration. If regeneration occurs for any reason prior to the delayed regeneration time, the manual regeneration request shall be cleared. Pressing the Extra Cycle button while in regeneration will cause the upper drive to advance to the next step immediately.

Timer Operation During Regeneration

In the Regeneration Cycle step display, the timer shows the current regeneration cycle name 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.

CYCLE 1/5
BACKWASH 00:10:00



CYCLE 2/5
DRAW 00:60:00



CYCLE 3/5
RAPID RINSE 00:10:00



CYCLE 4/5
TANK REFILL 00:12:00



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

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

All program settings are stored in permanent memory. Current valve position, cycle step time elapsed, and time of day are all stored during a power failure, and will be restored when power is re-applied. Time is kept during a power failure, and time of day is adjusted upon power up (as long as power is restored within 12 hours).

NOTE: The time of day on the main display screen will flash for 5 minutes when there has been a power outage. The flashing of the time of day can be stopped by pressing any button on the display.

Flow Meter Equipped Timer

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 FEATURES

Remote Lock

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 unit. The recommended gauge wire is 16 AWG with a maximum wire length run of 50 feet.

Regeneration Day Override Feature

If the Day Override option is turned on and the valve reaches the set Regeneration Day Override value, the Regeneration Cycle starts if no other unit is in Regeneration. If other units are in regeneration, it is added to a regeneration queue. This occurs regardless of the remaining volume available.

Lock Settings (access to Master Programming)

Lock Settings prevents the user from accessing Master Programming. In Master Programming, select the desired Lock Settings option (Off, Time Based, Delayed, or Enter Code).

Time Based - User must set clock to 12:01 pm to unlock

Delayed - User must press and hold the Left and Down buttons for 60 continuous seconds to unlock

Enter Code - User must input code "1201" to unlock

Capacitive Buttons

Capacitive button entry warrant different consideration than tactile button entry. Do not wear gloves. Be sure to keep your hands and the capacitive buttons free of debris, grease, or water. Buttons may become temporarily unresponsive if environmental conditions change such as sudden humidity or temperature changes. If buttons become unresponsive, wait 5 to 10 minutes for the buttons to recalibrate.

LED Status indicator

Blue - Unit in Service
Flashing Blue - Regeneration Queued
Green - Regeneration
Flashing Green - Standby
Red - Error with codes

Power Loss Backup

Time of day super capacitor backup for power loss; rated to last minimum 12 hours

Continuous Flow Detect

Alert appears when specified continuous flow rate is detected during service over a specified duration. Continuous flow rate is adjustable from 0.1 to 999.9 GPM/LPM (accuracy of flow rate detected will vary based on capability of meter). Duration range is adjustable from 1 to 255 hours.

Remote Regeneration

Ability to trigger a regeneration via a remote input.

Regeneration Types

Softener/Filter Meter Delayed - When volume remaining reaches zero and the scheduled regeneration time is reached (default 2 a.m. softener; 12 a.m. filter), the unit will regenerate.

Softener/Filter Meter Immediate - When volume remaining reaches zero, the unit will regenerate.

Time Clock - Once volume remaining reached zero and the selected regeneration time is reached (default 2 a.m. softener; 12 a.m. filter), the unit will regenerate.

Day of the Week - Once volume remaining reaches zero and the selected Day of the Week is reached, the unit will regenerate.

Remote Regeneration - Regeneration begins or is queued after a contact closure meets or exceeds for the length of time specified in the Remote Signal Duration (Range 1-30 seconds Service; 60-300 seconds Standby). Unit regenerates will occur based on the Remote Regeneration specified method (Immediate or Delayed). Immediate Regeneration will immediately initiate a regeneration. Delayed Regeneration will initiate a regeneration based on the programmed regeneration time selected.

Reset to Factory Defaults

While powering up the unit, when the Pentair logo appears, press and hold the Extra Cycle button to access the Reset menu then select Reset to Factory Defaults. Press the Extra Cycle Button to confirm your selection and to advance to the service screen. Furthermore, you may select Reset to Non-Factory Defaults to save a set of unique control parameters.



Power on the unit.
When Pentair logo appears,
press and hold the Extra Cycle button.
The Reset menu appears.



Use the up/down buttons to select.



Press the Extra Cycle button to set the
desired option and return to the
Service screen.

Lock Window

Lock Window prevents the unit from regenerating during a specified time frame. Two lock windows are available (Lock Window #1 and Lock Window #2). In Master Programming, enable a Lock Window then select the desired Lock Start time and Lock End time.

Settings Review

To prevent unintentional changes to Master Programming, enable Settings Review to view and navigate through Master Programming settings without the ability to edit.

Auxiliary Relays

The NXT2 has two auxiliary relays available based on cycle, time, or volume.

<div><div>▼</div><div>x x ✓ x x x</div></div>	Activates during selected cycle step
<div></div>	Activates upon selected start time (Range: 0-91 minutes)
<div></div>	Deactivates upon selected end time (Range: Start Time plus 1 minute)
<div>▼ ▲</div>	Activates when selected volume (gallon) is reached (Range: 0-99999)
<div></div>	Selected Duration in Seconds (Range: 0-9999 seconds)

SYSTEM DEFINITIONS

System 4 - Single Unit

Single Tank configuration
Time Clock: No Meter
Immediate: One Meter
Delayed: One Meter
Remote Signal Start

System 5 (2-8 Units) Parallel Interlock)

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 the longest regeneration queue time will begin Regeneration. No more than one unit will be in Regeneration at a time.

System 6 (2-8 Units) Parallel Series Regeneration

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.

System 7 (2 Units) Alternating Immediate

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 the relay on the NXT2 circuit board.

System 8 (2 Units) Alternating Delayed




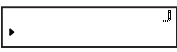

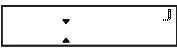

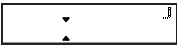

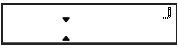

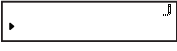





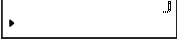

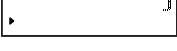



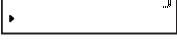

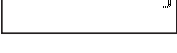

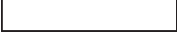

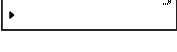

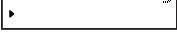

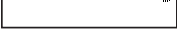

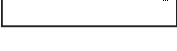

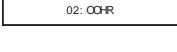
Immediate Transfer Delayed Regeneration
One tank online supplying treated water, one tank in Standby. Only #1 control will monitor its flow meter/sensor input. Online unit depletes its volume. Once this occurs the offline unit comes online. The previously online unit goes offline and delays its regeneration until the programmed regeneration time has been reached.

System 9 (2-8 Units) Alternating with Standby Units

Up to 7 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 the relay on the NXT2 circuit board.

System 14 (2-8 Units) Demand Recall

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 unit's 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.

		Example: On: View settings without the ability to alter settings. Off: User has ability to alter settings.
		Example: English, Francais, Duetsch, Italiano, Espanol, Nederlandse, Portugues
		Example: 12 characters maximum.
		Example: 12 characters maximum.
		Example: 14 characters maximum.
		Example: 4, 5, 6, 7, 8, 9, 14
		
		
		
		
		Example: 2510, 2750, 2815, 2900, 3150, 3900
		Example: Upflow Downflow Filter
		Example: Softener Meter Delayed Softener Meter Immediate Time Clock Day of the Week.
		Example: Metric US
		Example: Range: 0-9,999,999 grains
		Example: Range: 0-199 GPG
		Example: Fixed Volume Weekly Reserve Variable Reserve Fixed %
		Example: Off, Immediate, Delayed
		Example: Range: 1-90 seconds (Service) 60-300 seconds (Standby)
		Example: Range: Off - 99 Days
		Example: Range: 0 - 23 Hours 59 Minutes.

1

MASTER PROGRAMMING MODE

FLOW CHART



▶

⌋

Example:
Start Lock Window
End Lock Window



▶

⌋

Example:
Range: 0 - 240 M



◦

Example:
Range: 0 - 240 M



DIAGNOSTIC PROGRAMMING MODE FLOW CHART

Diagnostic Programming Mode

1. Press and hold the Left button to enter Diagnostic Programming mode.
2. To navigate, press the Extra Cycle button to advance to the next value. Press the Left button to retreat to the previous value.
3. Where applicable, use the Up and Down buttons to adjust a value as desired.
4. To reset/clear a value (such as Totalizer or Error Log), while on the value, press and hold the Up and Down buttons simultaneously.
5. After progressing through all available values, the timer will return to Normal operation.
6. To exit diagnostic mode, press and hold the Left button at anytime or after 5 minutes of inactivity the timer will return to normal operation automatically.
7. Depending on the current controller programming, certain values may not be able to be viewed or set.
8. The timer will display local information, not system information.
9. In the event of a regeneration occurring while displaying diagnostics, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to the main screen.



Example:
Record of error events chronologically.



Example:
Average usage from past Sunday.



Example:
Average usage from past 3 Sundays.



Example:
Average usage from past Monday.



Example:
Average usage from past 3 Mondays.



Example:
Average usage from last Tuesday.



Example:
Average usage from past 3 Tuesdays.



Example:
Average usage from last Wednesday.



Example:
Average usage from past 3 Wednesdays.



Example:
Average usage from last Thursday.



Example:
Average usage from past 3 Thursdays.



Example:
Average usage from last Friday.



Example:
Average usage from past 3 Fridays.



Example:
Average usage from last Saturdays



Example:
Average usage from past 3 Saturdays.

TIME OF DAY PROGRAMMING MODE



FLOW CHART

Setting the Time of Day



NOTE: Set Time of Day on any unit and the rest of the units in the system will update the Time of Day automatically.

1. Press and hold the Up button for 2 seconds.
The "Time" value is displayed. Press the Up or Down buttons to adjust as desired.
2. Press the Extra Cycle button to advance to the "Year" field.
Press the Up or Down buttons to adjust as desired.
3. Press the Extra Cycle button to advance to the "Month" field.
Press the Up or Down buttons to adjust as desired.
4. Press the Extra Cycle button to advance to the "Calendar Day" field. Press the Up or Down buttons to adjust as desired.
5. Press the Extra Cycle button to return to the normal display screen.



NOTE: Press and hold the Left button to exit without saving.





Example:
12 or 24 hour formats available



Example:
Set current year



Example:
Set current month

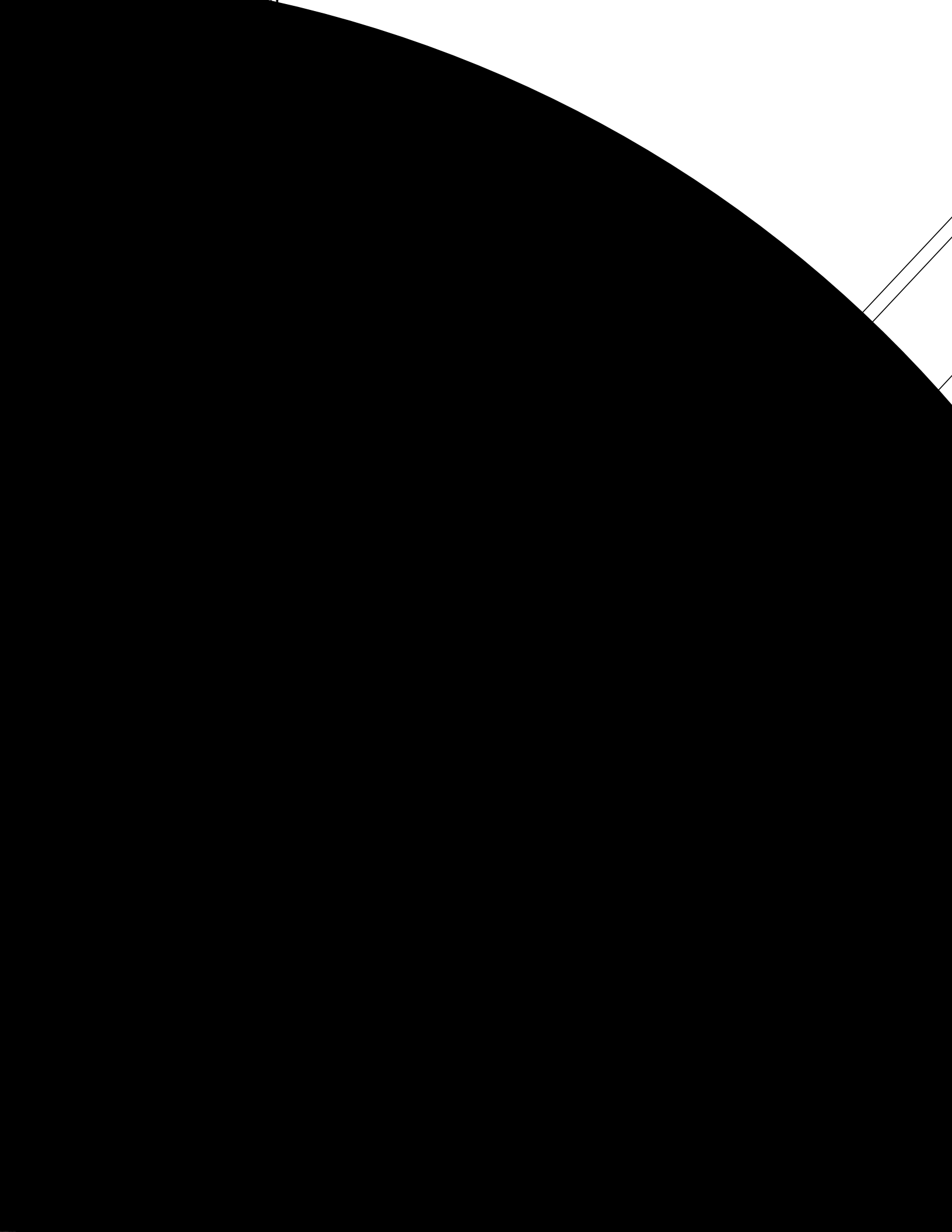


Example:
Set current day

[illegible]

NXT2 TIMER ASSEMBLY
(2510, 2750, 2850, 2900, 3150, 3900 VALVES)

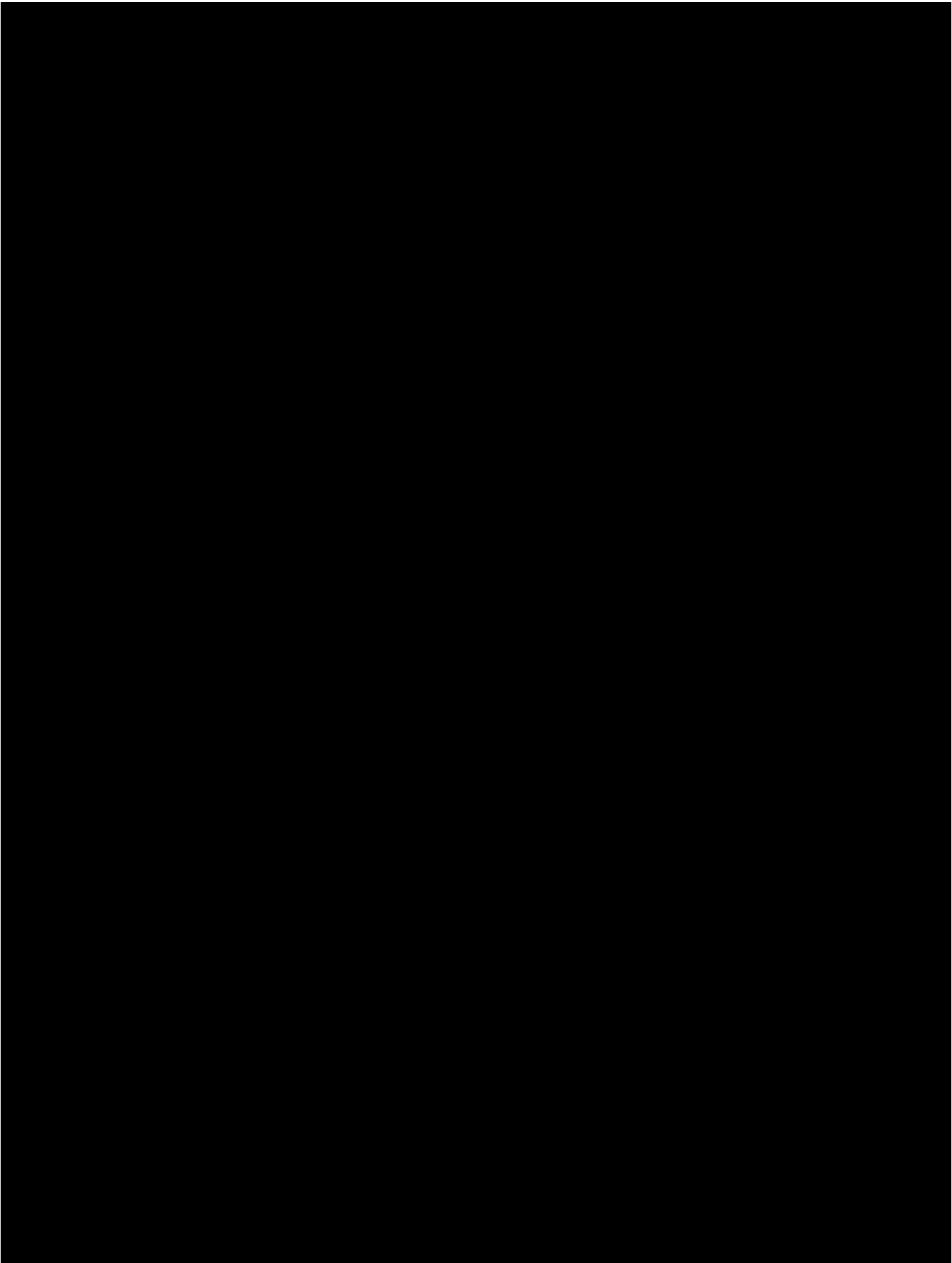
Item No.	QTY	Part No.	Description
1.....	1.....	62115	Timer Assy, NXT2
Service Assemblies			
2.....	1.....	62120	Control Panel Assy, NXT2, Programmed
3.....	1.....	40941	Wire Harness, Upper Drive



NXT TO NXT2 CONVERSION KITS

Item No.	QTY	Part No.	Description
	1.....	62121-01.....	Conversion Kit, NXT2, US
	1.....	62121-02.....	Conversion Kit, NXT2, Euro
	1.....	62121-03.....	Conversion Kit, NXT2, Aust
	1.....	62121-04.....	Conversion Kit, NXT2, Japan

**NOTE: Conversion Kits do not include wiring harness; save and reuse existing NXT wiring harness.
Region-specific power supply is included.**



POWER SUPPLY CONNECTIONS

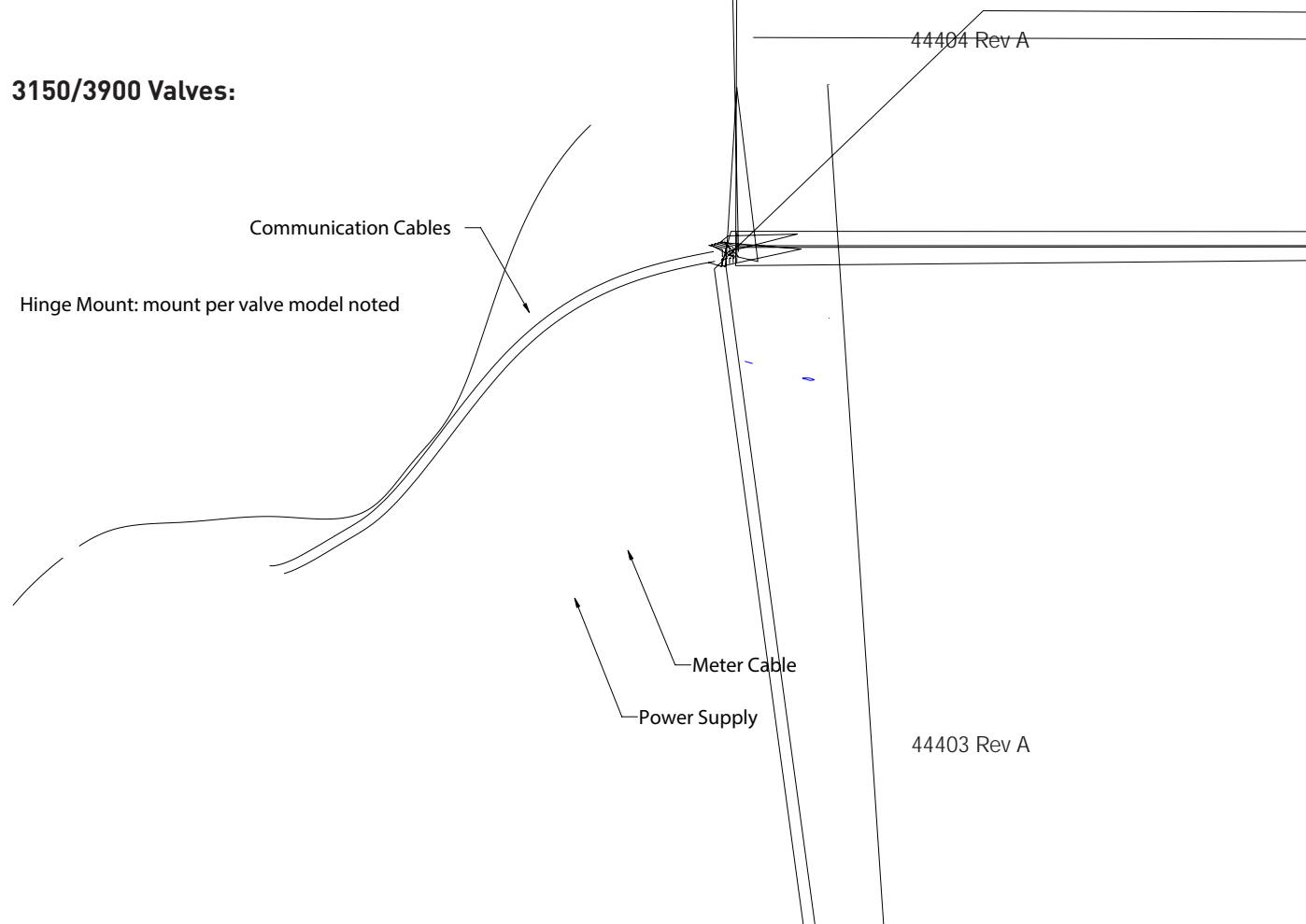
Installing the Power Supply:

NOTE: Power Supply includes a harness with 2 black wires that connect to circuit board, see page 15.

1. Insert black and black transformer wires into 24VDC input of control.

2510/2750/2815/2850/2900 Valves:

3150/3900 Valves:



ERROR CODES AND TROUBLESHOOTING

Detected Errors

If a communication error is detected, an Error Screen will appear.

- 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
Error Valve Count Mismatch	Number of NXT2 detected does not match selected system type in Master Programming	Push correct valve settings in Master Settings
Motor Stall No Changes Detected in the Optical Sensor for 6 Seconds	The motor is on but no encoder pulses are detected within a given duration while homing.	Check the P11 connection and trigger a manual regeneration.
Motor Run-On No CAM Switch Change Detected	The motor is on but no encoder pulses are detected or CAM Switches change state within a given duration.	Verify correct valve type is chosen. Trigger a manual regeneration.
Optical Sensor Undesired change detected by the Optical Sensor	The motor is off but additional encoder pulses are detected.	Trigger a manual regeneration.
Over-Current Motor Over-Current is Detected	Motor current exceeds thresholds.	Trigger a manual regeneration.
Flow Meter Error Continuous Flow Detected	Flow exceeded specified threshold for a specific duration.	Trigger a manual regeneration.
Error Send/Receive Failure	During a setting push, a packet was missing.	Reconnect communication cables and push setting in Master Settings.
Error System Type Mismatch on Network	The system type among connected units does not match.	Push correct system settings in Master Settings.
Microcontroller Error	Calibration or manufacturing test was not performed	Contact your Pentair representative.
100 Days Without Regen	100 Days have expired without a regeneration	Trigger a manual regeneration

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