



User Guide & Installation Manual

BluOx 180 Laundry System

CONTENTS

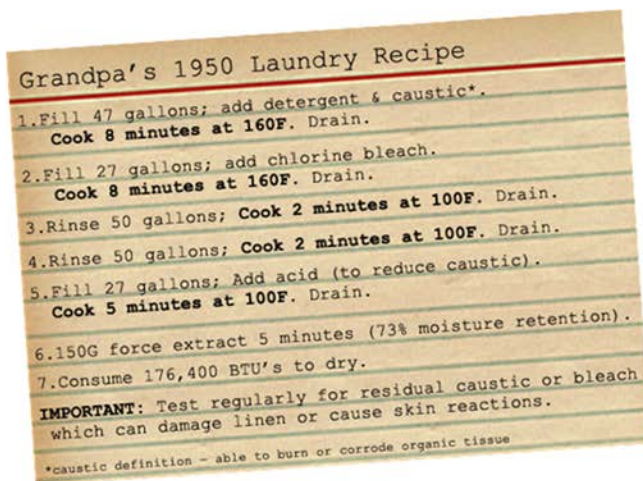
1. Part One - General Information	
a. About BluOx.....	2
i. Background.....	2
ii. Theory of Operation.....	3
iii. About This Guide.....	3
iv. Who Should Use This Guide.....	3
v. Health, Safety & Infectious Control.....	4
b. BluOx Ozone & Technology Overview.....	5
i. BluOx and Ozone Wash Chemistry.....	5
ii. Components of BluOx Laundry System Package.....	5
1. BluOx Oxygen Concentrator.....	6
2. BluOx Ozone Generator.....	6
3. Ozone Dissolving & Injection Assembly.....	6
4. BluComm	6
iii. Maintenance & Troubleshooting.....	7
2. Part Two - Getting Started: Installation and Setup	
a. BluOx Ozone Chemistry & Wash Formulas.....	8
i. Working with Chemical Suppliers.....	8
1. Ecolab Addendum.....	8
ii. BluOx Recommended Chemistry & Formulas.....	11
b. System Components & Installation.....	12
i. Sizing, Dimensions & Requirements.....	12
ii. BluOx Oxygen Concentrator.....	12
iii. BluOx Ozone Generator.....	13
iv. Ozone Dissolving & Injection Assembly.....	15
v. BluComm (PLC Component Manual).....	16
3. Appendix A	
a. PTI Plasma Block Ozone Cell Manual.....	18
4. Appendix B	
a. PTI Control Board Component Manual.....	19
5. Appendix C	
a. PTI Single Phase Soft Start Overview.....	20
6. Appendix D	
a. Warranty.....	21
7. Appendix E	
a. Glossary of Terms.....	22

Part One – General Information

About BluOx

Background

BluOx technology adds dimension to your laundry by transforming the way **light soil laundry** is processed. While traditional commercial laundry methods prescribe large quantities of caustic chemicals with searing water temperatures and multiple rinses, BluOx uses highly oxidized cold water to launder routine light soil laundry. The BluOx method reduces a laundry's dependence on both chemicals and excessive rinsing cycles while considerably shortening the wash and dry periods. Applying the exclusive BluOx technology lowers water, chemical and energy costs that can also extend average linen life.



Laundry operators turn to BluOx technology when they observe resources wasted by traditional laundry methods to remove trace amounts of body oil and dirt. Savings on chemicals, energy and water add to a laundry's bottom line and boost production. To ensure that operators continue to reap the benefits of BluOx laundering technologies, built-in remote diagnostic tools provide actionable reports and maintenance alerts that can be emailed directly to team members.

Industry operators at every level now migrate towards the safer technologies, remote capabilities and sustainable processes that BluOx delivers. Managers rely on the remote monitoring to supply actionable information, ensure smooth operations and help prolong equipment life.

Theory of Operation

By design, BluOx safely saturates the cold water supply with high levels of ozone gas before it enters the washer to minimize potential **off-gassing**. Water-cooled BluOx generators securely supply up to 10 times the oxidation levels of competitive systems for best results. The ozone injection assembly elevates the ozone dissolution rate to more than 90% (compared to 20-70% of other ozone systems) to maximize the amount of ozone used in the washer and exponentially lessen the volume of potential ozone off-gas.

Ozone (O₃) emerges when a third oxygen atom is attached to an oxygen molecule (O₂) already consisting of two conjoined oxygen atoms. Innate oxidation properties make ozone the most effective candidate for thorough cold-water cleaning and sanitizing as cold water keeps ozone molecules stable longer. Contrastingly, traditional hot water methods with caustic and corrosive chemical detergents require multiple hot water cycles to activate and remove compounds.

Operators benefit every time they use BluOx ozone to wash their light soil linens. Each property cuts thousands in energy, water/sewer and chemical costs every year to improve their bottom line.

About This Guide

This manual provides reference material as to the application, use, installation and maintenance of your ozone laundry system. Part One of this manual contains information regarding the concepts, science and technology and Part Two includes installation and maintenance instructions for BluOx Laundry Systems.

For more information about installation and maintenance, please contact us at either (866) 458-0146 or support@bluoxlaundry.com. Questions about washers/dryers and chemical supplies should be directed towards your laundry machine vendor and chemical supplier respectively.

Who Should Use This Guide

This information is developed for three types of audiences: laundry operators, washing equipment vendors and commercial chemical suppliers.

For laundry operators, understanding the concepts and benefits behind ozone is essential to successful ozone application and ensuring long-term benefits.

For washing equipment vendors, refer to this manual when assisting laundry operators in connecting their BluOx ozone system to the supplied washing equipment.

For commercial chemical suppliers, use the information in this manual when configuring wash cycles and mixing chemical compounds. Note that BluOx Laundry Systems are designed to be used in **light soil laundry applications only**. For medium and heavy soil, operators simply use the traditional hot water formulas included in the washers.

Health, Safety & Infectious Control

Ozone has been proven to be effective at killing pathogens and bacteria in cold water. We have verified such claims with extensive field-testing and research for more than ten years. BluOx ozone application has proved its effectiveness for more than 15 years.

Year	Research Discovery
2000	Confirmed pathogen kill on soiled cloth diapers washed in cold ozonated water in working with the State of California.
2004	Confirmed pathogen kill on used rags to wipe cow udders at dairy farms located in Idaho.
2005	Tested and confirmed pathogen kills on hospital linens using our ozone technology in Mississippi.
2006	Confirmed MRSA pathogen kills in ozone laundry applications, tested in the United Kingdom.
2010	Established and observed 99.9999% pathogen kill rates without using bleach* in conjunction with ozone levels controlled at $\frac{1}{3}$ to $\frac{1}{2}$ the ozone levels of a typical BluOx application.

**While chlorine bleach is widely known as effective in killing pathogens, it should be noted that Ecolab does not make any claims as to kill rates from chlorine bleach and hot water.*

Laundry operators of all sizes turn to the BluOx ozone laundry application for sustainable laundry processing and long-term support.

The excerpt from the Water Quality Association below explains benefits of using ozone in laundry:

"Without question, ozone is a powerful oxidizing agent (as is chlorine), and as such should be treated cautiously. Like all other oxidizing gases, ozone is toxic above certain concentrations. Ozone occurs naturally in the environment. Average ambient values range from 0.01 to 0.15 ppm and levels can reach up to 1.0 ppm in heavily urbanized areas. Areas near arc welders have shown levels up to 10.0 ppm. Electrical equipment such as copying machines, motors, and transformers also produce ozone at levels as high as 0.5 ppm.

The current long term maximum permissible exposure level to ozone in air allowed by the Occupational, Safety and Health Administration (OSHA) is 0.1 ppm as a time-weighted average over eight hours, five days per week. The short-term exposure limit (STEL) is 0.3 ppm over a 15 minute period, not to be repeated more than two times in any eight hour period. Ozone is not listed by the U.S. EPA as either a confirmed or suspected carcinogen.

Ozone has had an excellent safety record over its more than 100 year history of use. Operating ozone generating equipment can be relatively safe, with respect to exposure, when compared to other gaseous oxidants such as chlorine. This is due to the short half-life of ozone and its threshold concentration nasal detection (0.02-0.04 ppm), which is less than half of the long term exposure level limit. The pungent odor of ozone, which will alert an individual to exposure, is well below dangerous levels. Prolonged exposure, however, may desensitize an individual to the aroma of ozone.

If leaks develop in the ozonation system, the smell of ozone will be noticeable. In such an event, simply cutting off the flow of electrical energy to the ozone generator will cease the production of ozone. Breathing traces of ozone in the air for a few minutes is of little health concern; but breathing high concentrations for prolonged periods of time can produce various physiological responses in human beings.

The odor threshold of ozone varies among individuals, but most people can detect 0.02 ppm (wt) in air. This is well below the level for general discomfort. Symptoms experienced when humans are exposed to ozone levels of 0.1 to 1 ppm are headache, dryness of throat, and irritation or burning of the eyes. Exposure to 1 to 100 ppm of ozone can cause asthma-like symptoms, e.g., tiredness, nausea, lack of appetite. Short-term exposure to higher concentrations can cause throat irritations, hemorrhaging, and pulmonary edema.

The symptoms of low-level ozone exposure are acute (short-term); that is, there appear to be no chronic (long-term) effects among normal, healthy people. This is because the human body has the ability to repair such damage. However, this is not the case with prolonged exposures by persons having chronic pulmonary problems, or when experiencing prolonged exposure to higher concentrations. *[This information provided with permission of the Water Quality Association, Ozone Reference Manual, Copyright 1999]*

BluOx Ozone & Technology Overview

BluOx Ozone & Wash Chemistry

A brief overview of ozone's potential and the BluOx Laundry System is instrumental in ensuring the cleanest linens and prolonging benefits for years to come. Specially tailored wash formulas paired with elevated ozone levels deliver the best results when used on light soil laundry including bed linens and towels.

Refer to page 8, Section 2.a for the recommended BluOx ozone wash formulas.

Traditional hot water wash formulas are still necessary to remove tougher stains found on food and beverage linens, mops, rags and **reclaim**.

Components of BluOx Laundry System Package

Constituted by a suite of products, the complete BluOx Laundry System integrates directly with your washing equipment to allow effective washing and monitoring of light soil laundry using ozone. Every laundry is unique and may require that any or all of the elements referenced below be modified to work best for your setup.

See the descriptions of the package components below and refer to detailed installation instructions that begin on page 12 of Section 2.b in this manual.

BluOx Oxygen Concentrator

Successful ozone laundering starts with high levels of concentrated oxygen that is then paired with additional oxygen atoms to create ozone.

The wall-mounted BluOx Laundry System utilizes the compact oxygen concentrator from Glenn Medical Systems which uses ambient room temperature air to provide 95% oxygen to the ozone generator. The self-contained oxygen concentrator requires minimal maintenance, specifically periodic cleaning of the air filter(s).

IMPORTANT: The oxygen concentrator uses an air filter that should be cleaned as often as needed as part of regular and preventive maintenance. Depending on the laundry environment, it is recommended that debris and lint on the air filter be discarded 1 to 2 times per week or more. Detailed installation instructions can be found on page 12.

BluOx Ozone Generator

Highly concentrated oxygen molecules (O₂) require a third oxygen atom in order to create ozone (O₃).

The BluOx ozone generator connects directly to the Glenn Medical oxygen concentrator referenced above. Oxygen filtered in the concentrator is pushed through the ozone generator to add a third oxygen molecule. The newly created ozone gas is then introduced into the water supply via the Ozone Dissolving and Injection Assembly before the water enters the washing machine. The ozone generator is water cooled and self-contained requiring virtually no regular maintenance.

Detailed installation instructions can be found on page 13.

Ozone Dissolving & Injection Assembly

The Ozone Dissolving and Injection Assembly optimizes the rate of dissolved ozone gas into the water stream before entering the wash drum. This assembly combines a venturi valve and flash reactor to control the injection of ozonated water and also provides a self-cooling water supply to the ozone cell component of the BluOx ozone generator. Depending on ambient air supply and water quality, ozone gas dissolution rates can exceed 90% in some cases.

Detailed installation instructions can be found on page 14.

BluComm

The BluComm module allows ***remote monitoring and diagnostics*** of your BluOx Laundry System via internet. Regular reports and early-warning alerts protect the equipment's integrity and give operators peace of mind.

The BluComm remote diagnostics module provides operators with the following:

- 1) Immediate alerts to perform routine maintenance,
- 2) Operation reports to ensure efficiencies, and
- 3) Minimized troubleshooting time to keep operations running.

IMPORTANT: BluComm requires either a wireless or direct Ethernet connection. Not all sites allow for BluComm remote diagnostics.

Detailed installation instructions can be found on page 16.

Maintenance & Troubleshooting

By design, the complete BluOx Laundry System requires minimal upkeep and offers remote monitoring for little oversight. Well-maintained BluOx Laundry Systems can last operations of all sizes for years. The hardware and wash formulas sustainably wash everyday light soil linens while the BluComm technology ensures equipment and production continue performing at optimal levels.

The ozone generator requires **no regular maintenance**.

The air filter located inside the oxygen concentrator should be cleaned **as often as needed** to ensure cool air circulation within the concentrator. Air filter cleaning is dependent on average usage and should be cleaned 1 to 2 times per week. Some laundry environments may require air filter daily cleaning.

Ozone fill valves are 24v and can experience typical weathering over time. Fill valves that experience enough use require repairs or replacements. The most common repair for damaged fill valves requires replacing both the solenoid coil and piston. Coils thread into the main housing of the valve and replacement coils are included with the BluOx Laundry System package.

Water pH, content and solid levels vary and are important as the diaphragm and valve housing of the valves can experience wear and tear if solids in the water supply are present. The entire valve is easily replaceable via a thread fitting on each side of the housing unit.

Contact BluOx with any questions you may have regarding the status, use and maintenance of your equipment at either (866) 458-0146 or support@bluoxlaundry.com.

Part Two - Getting Started: Installation and Setup

BluOx Ozone Chemistry & Wash Formulas

Ozonated **light soil laundry** utilizes cold water without corrosive or caustic chemicals. BluOx chemistry delivers the best results when applied to everyday fabrics like bed linens and towels that are exposed to small amounts of body oils and dirt. Traditional hot water formulas are recommended for more heavily stained linen including (but not limited to) materials used in food and beverage, mops, rags and **reclaim**.

The BluOx formulas administer 3 to 5 times more ozone than traditional ozone laundry systems. Cold water saturated with ozone allows BluOx to clean linens without using chlorine bleach or alkali to raise the water's pH. Eliminating dependence on bleach and alkali permits BluOx to skip multiple rinse cycles traditionally needed to flush residual chemicals.

Working with Chemical Suppliers

BluOx works with nearly all major chemical suppliers in the hospitality industry. Extensive collaboration with the Ecolab technical support team brings unique and specific application knowledge.

The formulas discussed in this manual are specifically designed to work with Ecolab products. Any adjustments made to these formulas should be with a BluOx representative to ensure compatibility and best results at either (866) 458-0146 or support@bluoxlaundry.com.

Ecolab Addendum

The specific wash formulas and chemistry included in this manual is specifically designed to work with Ecolab products. The referenced formulas build off of the research and best recommended practices in using BluOx in conjunction with Ecolab chemical suppliers. Products described below are specific to the Ecolab product line and are for reference purposes only.

BluOx offers this manual to all involved chemical suppliers as a reference guide. Please refer to "Working with Chemical Suppliers" above regarding any changes to the recommended chemistry and wash formulas.

Alkali: (Do not use any alkali for lightly soiled laundry in conjunction with BluOx ozone.)

Break III Extra – This compound is not commonly used for sheet/towels, but works well with Food & Beverage – 5 gallons.

Builder OZ: This alkali compound is designed to work with traditional ozone systems, but is **not recommended** for BluOx accounts.

Builder C – Same description as Break III Extra in 15 gallons.

Bleach

Destainer: Normally not recommended for use on BluOx ozone accounts. Some laundries may need to add some destainer on their light soil linens, but dosing should be 50 ppm or less.

Oxygen Bleach (Peroxide): This can be used in BluOx accounts at the end of the rinse to reduce ozone levels.

Detergents:

Detergent 1: As ozone gas destroys Detergent 1's surfactants, this product is **not recommended** for use with BluOx ozone. It can be used to boost detergency for Food & Beverage cycles that use hot water.

Detergent OZ: This detergent works well with BluOx ozone, especially on sheets and towels. Detergent OZ should be used alone. **Do not use in conjunction with an alkali** on light soil laundry. If food and beverage or medium to heavy soils are laundered, we recommend adding hot water and an aggressive alkali like Break III Extra.

Fluff2000: Presenting the same issues as with Detergent 1, this product is **not recommended** for use with BluOx ozone.

Formula 1: Ozone should destroy the enzymes present in Formula 1. Some ozone installations successfully operate using Formula 1 but more testing should be done before recommending use in conjunction with BluOx ozone.

L-2000 XP: BluOx requires a neutral detergent and L2000 XP is a built, high alkali product **not recommended** for use with BluOx.

Solid Products: More field-testing and research needs to be performed before recommending this line of products in conjunction with BluOx ozone.

SolarBrite: Similar to the L-2000 XP compound with additional optical brighteners that may not rinse out sufficiently in ozone cycles. BluOx requires a neutral detergent and SolarBrite is a built, high alkali product **not recommended** for use with BluOx.

Surlite: This product is **not recommended** for use with BluOx ozone.

Turbo Boost: When mixed with ozone gas, TurboBoost forms formaldehydes and **SHOULD NEVER BE USED WITH OZONE.** It is Ecolab's policy not to have TurboBoost at an ozone account even if not intended for use with ozone cycles.

Softener

SoFresh: This softener is optional and not typically needed on BluOx ozone installations.

Sour

Neutralizer: This product is **not recommended** for use with BluOx ozone unless sheets are being processed thru an ironer and pH is too high for the ironer.

Sour VII: This sour is recommended for use with BluOx ozone if any iron is present in the water.

Stain Packs

Red Stain Packs: This product is effective in reclaiming linen stained with cosmetics, shoe polish, and other grease/oil related stains. The red stain pack should be run on a hot water, non-ozone cycle, preferably including an extended wash cycle to start.

Yellow Stain Packs: This product is effective in removing iron/rust stains. It should be run on a hot water, non-ozone cycle, preferably including an extended wash cycle to start.

BluOx Recommended Chemistry & Formulas

Sheets/Towels:

Suds	Detergent OZ	PIC 16561 (5 gal.)	3-6 oz./100#
		PIC 16175 (15 gal.)	
Bleach	Oxygen bleach	PIC 16527 (5 gal.)	3-5 oz./100#
		PIC 16006 (15 gal.)	

If ironer is used and pH is too high for ironer, add:

Sour	Sour VII	PIC 16878 (5 gal.)	2-3oz./100#
		PIC 16659 (15 gal.)	

If laundering Food & Beverage, add:

Alkali	Break III Extra	PIC 16558 (5 gal.)	2-5oz./100#
		PIC 17517 (15 gal.)	
Bleach	Destainer	PIC 15982 (5 gal.)	4-6oz./100#
		PIC 16146 (15 gal.)	

Reclaim:

Grease/oil stains	Red Stain Packs	PIC 10370
Iron/rust stains	Yellow Stain Packs	PIC 16700

System Components & Installation

Sizing, Dimensions & Requirements

Refer to the chart below before beginning installation of your BluOx Laundry System. Specifications not met may impact your ozone performance.

	BluOx 180	BluOx 375	BluOx 650
Maximum Combined Washing Capacity	180	375	650
Minimum Combined Washing Capacity	60	181	376
Ozone (ppm)	4-6 ppm	4-6 ppm	5-7 ppm
Water Fill Rate	6-7 gpm	12-14 gpm	30-36 gpm
Minimum Water Supply	3/4"	1"	1 1/4"
Minimum Port Size into Washer	3/4"	1"	1 1/4"
Water Cooling Line Size	1/4"	1/4"	3/8"
Electrical Power	120 v	120 v	208-240/1
Breaker	20 amp	20 amp	20 amp
Signal Voltage	24 VAC	24 VAC	24 VAC
Ozone Generator	1	1	1
Oxygen Supply	1	1	1
Remote Diagnostics	Standard	Standard	Standard
Ozone Dimensions (inches)	20Wx24Hx10D	20Wx24Hx10D	20Wx24Hx10D
Oxygen Dimensions (inches)	16Wx20Hx10D	16Wx20Hx10D	16Wx20Hx10D
Combined Equipment Weight	127	146	148
Combined Shipping Weight	291	309	312

BluOx Oxygen Concentrator

The BluOx Ozone Laundry System includes the air concentrator from Glenn Medical Systems that strips nitrogen from ambient air in the environment to supply the laundry system with 95% oxygen.

To connect the oxygen concentrator to the BluOx ozone generator, follow the steps below:

1. **Wall-mount the oxygen concentrator** within 25 feet of the ozone generator and laundry equipment.
2. **Run 1/4" inner diameter (ID) Tygon tubing** from the oxygen concentrator outlet into the ozone generator.
3. **Secure each connection with a stainless steel hose clamp** to ensure that no air leaks.
4. Set the oxygen concentrator to **flow 1-2 lpm (liters per minute)** or 20% on the clear flow meter to indicate flow volume.
5. Plug the oxygen concentrator into an **110v outlet located on the bottom of the BluOx ozone generator**.

A **Programmable Logic Controller (PLC)** located inside the ozone generator controls power to the oxygen concentrator. When the laundry cycle initiates and calls for ozone, the ozone generator activates the oxygen concentrator. The oxygen concentrator spends a few seconds pressurizing before turning on the ozone cell. If the PLC does not receive a signal for more than 20 minutes, the oxygen concentrator shuts down to preserve the integrity of the equipment.

When the oxygen concentrator and ozone generator are both engaged, the oxygen flow rate should be 20% during an ozone fill. The needle valve located inside the ozone generator can be manually adjusted during the fill in order to achieve the 20% flow. When properly adjusted, the output pressure reading will exceed 3 psi.

BluOx Ozone Generator

The BluOx 180 uses a 30 gram water-cooled Plasma Block Ozone Cell to convert concentrated oxygen to ozone. When following the steps outlined in this manual, the oxygen concentrator should already be connected to the ozone generator.

To connect the ozone generator to the ozone dissolution assembly, follow the steps below:

1. **Wall-mount the ozone generator as close to the oxygen concentrator as possible, preferably 25 feet from the washing equipment.**
2. **Connect the ozone generator outlets to the Ozone Dissolving and Injection with 1/4" ID with a minimum 150 psi rating reinforced tubing** both before (upstream) and after (downstream) the venturi valve. Outlets are located on the left side of the ozone generator.
3. **Attach Tygon tubing with 1/4" ID and 7/16" outer diameter (OD)** from the ozone output on the left side of the ozone generator directly to the venturi valve.
4. **Secure these connections with stainless steel clamps** to prevent water and ozone gas leaks.
5. **Connect each washer via a signal cord (2 wire, 24v) to the PLC* input relay inside the ozone generator.** Chemical signal "8" is the recommended connection as it is not commonly used by chemical suppliers.
6. Plug the ozone generator into a **120v, single phase.** The 4 wire is necessary to accommodate controlling the 110v power supply to the oxygen concentrator.

*The PLC located within the ozone generator can only read a 24v chemical call signal from the washer to activate the ozone cell. If the signal is not 24v, please contact BluOx immediately to substitute the appropriate relay.

IMPORTANT: In order to minimize the chance for off-gas and to protect the ozone cell, there are three prerequisites that must be satisfied before the PLC controller activates the ozone cell:

1. **There must be pressure on the oxygen inlet side of the cell.** The PLC reads the Pressure Switch (upstream of the needle valve) inside the ozone generator to confirm back pressure on the cell. This maximizes the efficiency of the ozone production and protects the cell against damage which can occur if the ozone cell is activated without incoming flow pressure.
2. **There must be vacuum present on the ozone outlet.** This confirms that there is water flowing through the venturi valve sufficient to create a vacuum and therefore sufficient to dissolve the ozone gas into the water stream
3. **There must be a signal calling for ozone from the washer.** This prevents the activation of the ozone in the event the washer fill valve sticks opens which would provide the requisite vacuum and pressure to turn on the ozone even if the washer is not actively calling for ozone.

The BluOx ozone generator has the option of including Remote Monitoring via the internet. See the BluComm component manual on page 16 for more information and requirements of this unit.

Ozone Dissolving & Injection Assembly

The Ozone Dissolving and Injection Assembly (Figure A) optimizes the rate of ozone gas dissolution into the water stream where rates can exceed 90%. This component combines the venturi and flash reactor to control the injection of ozonated water into the washer and provide water cooling to the ozone cell.

The components are pre-assembled in the following order:

1. Tee Connection with 1/4" Barb Fitting
2. Venturi (584)
3. Flash Reactor
4. Tee Connection with 1/4" Barb Fitting
5. Ozone Resistant Solenoid Fill Valve
6. 3/4" Hose Barb Fitting

A 1/4" hose connection should be run from each of the (2) tee connections to the respective water cooling inlet and outlet on the ozone generator. See "BluOx Ozone Generator" instructions on page 13.

The signal wire (24v) from the chemical signal should be run to the fill valve along with the same signal going to the ozone generator as is outlined on page 13.

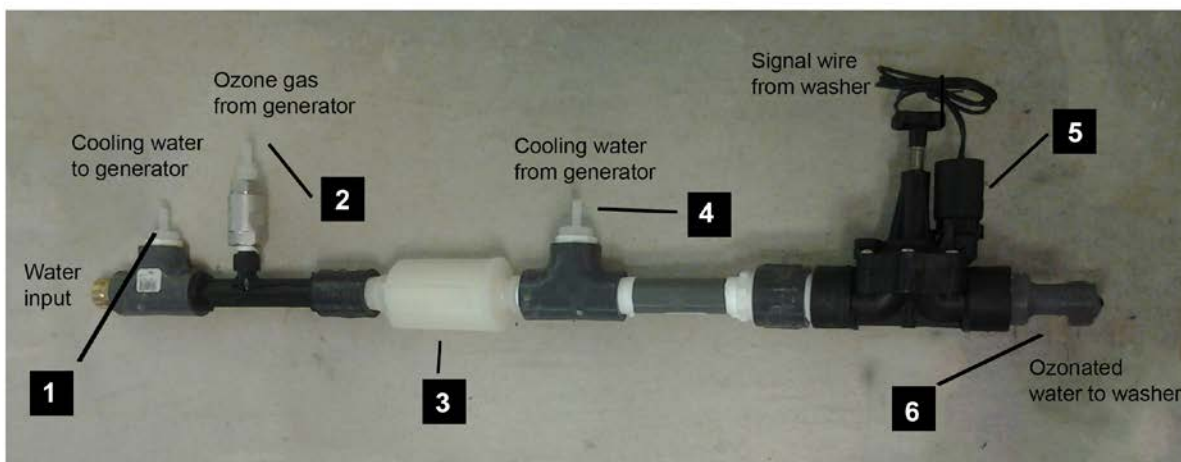


Figure A

Ozone Dissolution & Injection Assembly

To complete installation of the BluOx Ozone Laundry System, follow the final steps below:

1. **Tap a 3/4" barb fitting into the washer drum** to as a fill port for the ozone water.
2. **Connect 3/4" ID hosing (braided PVC or silicon)** from the barb fitting to the ozone fill on the washer drum (Step 1) to the barb fitting on the end of the Ozone Dissolving and Injection Assembly.

When the water fill valve for ozone opens, the ozone generator receives the same signal in order to activate the ozone. Standard cold and hot water valves on the washing machine are not affected or altered in any way.

This system continually flushes cold water throughout the ozone generator via the Ozone Dissolving and Injection Assembly to keep the unit cooled. The self-contained and self-cooling design of the BluOx Laundry System requires minimal regular maintenance.

BluComm (PLC Component Reference Guide)

The BluOx Laundry System builds on a self-contained, scalable PLC (Figure A) platform that gives operators the capability to log and send data via the internet in real-time. A VPN (virtual private network) (Figure B) modem reads data stored on a micro-SD card (Figure C) housed within the PLC to monitor basic ozone generator data points and logic functions to report usage and expedite remote troubleshooting. Monitored data is arranged into management reports and is available for export (.CSV Excel format only).

The BluComm VPN modem connects to the internet through a dedicated Cat5 cable or a sufficient wireless signal and reads data from the system's PLC. **The internet source must be specified before ordering a BluOx Ozone Laundry System for complete configuration.**



Figure A
PLC Base Unit



Figure B
VPN Modem



Figure C
Micro-SD Card

Each PLC Base Controller (Figure D) can monitor up to five washers using ozone wash formulas simultaneously and requires either a 24 volts AC or 24 volts DC at 1 amp max in order to communicate. Multiple configurations should be consulted with BluOx prior to connection.



Figure D
Base Controller

Configuring the BluComm diagnostics module requires one or both of the following*:

1. A reliable internet connection (direct or wireless) along with dedicated static public IP address(es).
2. A (recommended) 1 GB standard micro-SD card.

*Option 2 should only be available when there is no reliable internet connection present. Operators must manually remove and replace micro-SD cards in order to export and continue data collection. Providing a dependable internet connection ensures remote diagnostics and provides more thorough reporting.

Changes and updates made to the collected data points are made frequently. Any new data points, reporting and remote diagnostic functions will be made aware to the operator before its availability.

For more details, please contact BluOx as wireless setups including dedicated IP address and pinhole requirements may vary at either (866) 458-0146 or support@bluoxlaundry.com.

Appendix A

PTI Plasma Block Ozone Cell Manual

The cover to the PTI Plasma Block Ozone Cell manual is shown for your reference below. BluOx users receive the manual to all included components electronically in addition to the BluOx Ozone Laundry System manual as separate attachments. See the supplied additional information or request the manual be resent by contacting BluOx at either (866) 458-0146 or support@bluoxlaundry.com.



For added application information, see the Plasma Block® Application Guide manual

Appnote PBW-150g V1e
6/27/13

Plasma Technics Inc. 1900 William Street Racine, WI 53404-1875 Phone : (262) 637-7180 Fax: (262) 637-7157
Web Page: <http://www.plasmatechnics.com> E-Mail: sales@plasmatechnics.com Page 1

Appendix B

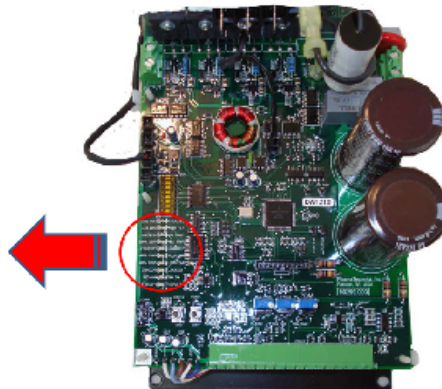
PTI Control Board Component Manual

The cover to the PTI Control Board Component manual is shown for your reference below. BluOx users receive the manual to all included components electronically in addition to the BluOx Ozone Laundry System manual as separate attachments. See the supplied additional information or request the manual be resent by contacting BluOx at either (866) 458-0146 or support@bluoxlaundry.com.



DAT210 Board LED Indicators, Programming and Troubleshooting

- FAULTED
- IGBT FLT
- HS TEMP
- HOT LOAD
- LOAD FLT
- HIGH FWR
- LOW FWR
- LOCKED
- INV CN
- +5 VCLTS



The DAT210 board on all Plasma Block® products contains 10 LED's which are used to indicate status during normal operation, board programming and troubleshooting of the unit.

Appendix C

PTI Single Phase Soft Start Overview

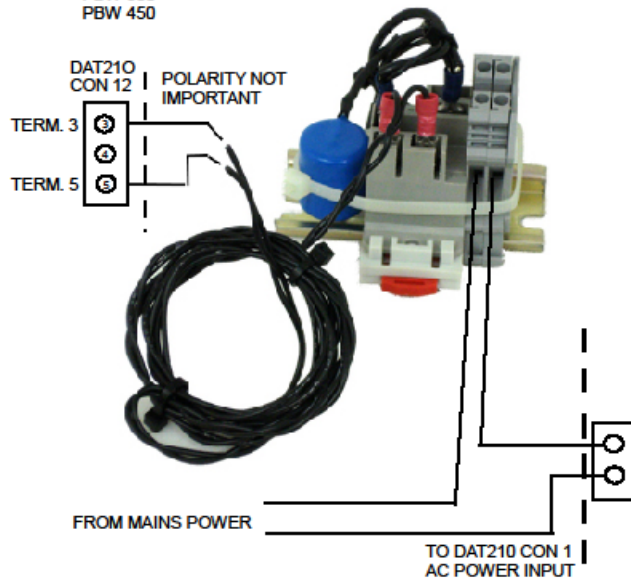
The cover to the PTI Single Phase Soft Start Overview manual is shown for your reference below. BluOx users receive the manual to all included components electronically in addition to the BluOx Ozone Laundry System manual as separate attachments. See the supplied additional information or request the manual be resent by contacting BluOx at either (866) 458-0146 or support@bluoxlaundry.com.

PART NUMBER 70258

DIN RAIL SINGLE PHASE 110-240 VAC SOFT START

RECOMMENDED FOR:

- PBA 30
- PBA 50
- PBA 60
- PBA 120
- PBW 150
- PBW 300
- PBW 450



Note:

The device may not be necessary on smaller generators if slo-blo line fuses are sized significantly above the running current. The soft start is necessary for fuses sized close to the running current. Because of the wide variety of fuse types it is not feasible to offer a more specific recommendation.

Appendix D

Warranty

PolarWash Laundry, LLC d/b/a BluOx Laundry (“BluOx”) warrants to the party purchasing from BluOx (“original purchaser”) the BluOx 650 Ozone Laundry System to be free from defect in parts and workmanship for one year from the date of start-up, not to exceed twelve (12) months from the date of shipment to the original purchaser, under normal use, maintenance and operation. TO THE EXTENT PERMITTED UNDER APPLICABLE LAW, ALL WARRANTIES WITH RESPECT TO SUCH UNIT SHALL ONLY EXTEND TO AND BE FOR THE BENEFIT OF THE ORIGINALPURCHASER AND SHALL NOT BE ASSIGNABLE TO, EXTEND TO OR BE FORTHE BENEFIT OF ANY OTHER PARTY. BluOx’s obligations under this warranty are limited, at BluOx’s option, to the repair, replacement or refunding the purchase price of any such unit of equipment (or part thereof) found by BluOx to be defective in parts or workmanship; provided, however, that BluOx shall have no obligation hereunder with respect to a defective part unless it receives written notice of such defect prior to the expiration of the applicable warranty period as referenced above.

Each unit of equipment for which a warranty claim is asserted shall, at the request of BluOx, be returned on a prepaid basis with proof of purchase date to the BluOx factory specified by BluOx at the expense of the original purchaser. Replacement parts shall be warranted as stated above for the unexpired portion of the original warranty. This warranty does not extend to any unit or part subjected to misuse (at BluOx’s sole determination), accident, improper maintenance or application, or which has been repaired or altered outside of the BluOx factory without the express prior written authorization of BluOx.

Notwithstanding anything to the contrary contained herein, during the applicable warranty period, as specified above, BluOx will pay the cost of return freight charges to the original purchaser, provided an authorized BluOx representative approved return of the unit or parts, for any equipment found by BluOx to be defective. For warranty repairs performed during the first 90 days from the date of invoice, BluOx will pay freight both ways. After the applicable parts warranty period has expired, the original purchaser is responsible for freight both ways.

Appendix E

Glossary of Terms

Lightly soiled laundry: Common hospitality or guest linens including bed linens, sheets and towels that are exposed to trace amounts of body oils and dirt by guests. Lightly soiled laundry is the only materials that BluOx recommends applying its ozone technology to for laundering.

Off-gassing: Ozone gas not pushed into the wash drum that escapes into the laundry air environment.

Ozone (O₃): A molecule consisting of three oxygen atoms that is relatively unstable. Ozone is created when a third oxygen atom is introduced to an oxygen (O₂) molecule consisting of two oxygen atoms.

Programmable Logic Controller (PLC): Built-in technology component to the BluOx ozone generator that houses all usage data and programming functions.

Reclaim: Any laundry processed that does not meet cleaning quality standards as set by an operator due to extensive staining. BluOx recommends that reclaimed laundry be washed with a traditional hot water method before moving the item(s) back to a BluOx formula.

Remote Diagnostics & Monitoring: The ability to access, monitor, troubleshoot, view usage and obtain management reports of your ozone laundry equipment via an internet connection. This feature is only available in operations where the BluComm component is engaged and supplied a secure internet connection.

Tygon tubing: Heavy-duty, durable tubing that is ozone resistant to extend production. All BluOx Ozone Laundry Systems include Tygon tubing in its installation and setup.