

# BioBarrier® Service Manual

FOR USE WITH

NSF/ANSI Std. 40 Class I / Std. 350 Class R

**BioBarrier® 0.5, 1.0, and 1.5**

NSF/ANSI Std. 245

**BioBarrier® 0.5-N, 1.0-N, and 1.5-N**



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# SERVICE MANUAL

## GENERAL INFORMATION

The BioBarrier® 0.5, 1.0 and 1.5 systems are certified by the NSF International/ American National Standards Institute Organizations to meet NSF/ANSI Standard 40, Class 1 certification for single residence wastewater treatment devices, NSF/ANSI Standard 245 for nitrogen reduction, and NSF/ANSI Standard 350 Class R for residential water reuse applications. All BioBarrier® products are ETL certified for safety (electrical, environmental, etc.). If you have questions regarding any Bio-Microbics products please contact us at:

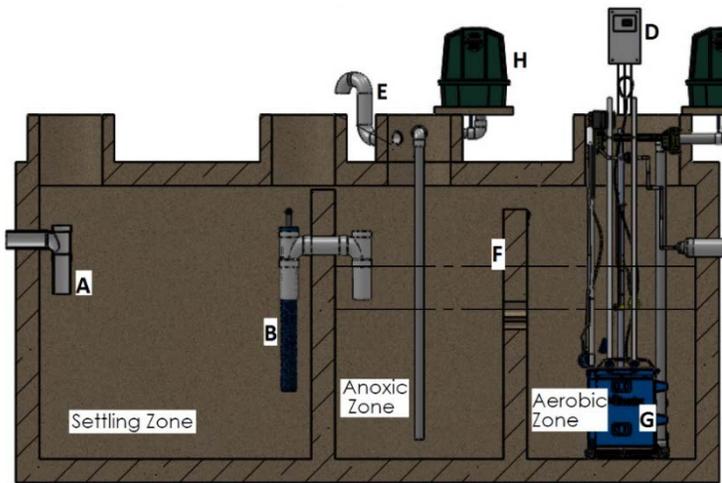
**1-800-753-FAST (3278) or +1 (913) 422-0707**  
**E-mail: onsite@biomicrobics.com**

## DELIVERY INSPECTION

The BioBarrier® system has been carefully manufactured, checked and tested at the factory before shipment. Before and after uncrating the unit, check the packaging for signs of shipping damage. If there is evidence of damage or abuse reject the shipment notify Bio-Microbics, Inc. immediately at 1-800-753-3278 or +1(913)422-0707.

## THE BIOBARRIER® SYSTEM

The BioBarrier® Membrane Bioreactor combines the activated sludge treatment process with the exceptional clarification properties of a membrane. The System is installed in locally approved tanks, in a two compartment tank, or multiple tanks, with the membrane module always in the last compartment/ tank. Primary treatment consists of sedimentation and separation of floatables and solids, and occurs in the first compartment. The



A. Influent
B. SaniTEE®
C. Blower & Housing
D. Control Panel
E. Vent
F. Optional baffle wall
G. BioBarrier Reactor
H. Optional Mixing blower

second compartment/tank can be used to enhance the BioBarrier's nitrogen reducing capabilities. The second compartment houses the BioBarrier system. The BioBarrier's blower aerates the wastewater for naturally occurring bacteria (biomass) to grow and treat the sewage. The membrane prevents most particles from being discharged into the receiving environment.

The clean water is discharged to the receiving environment by the effluent pump. The aerator also helps limit the rate of fouling on the membrane sheets. This is a continuous process provided the biomass is supplied with waste (food) and air in a suitable environment. A vent pipe allows for venting of non-harmful by-products created by the process. The entire process produces effluent with very low levels of bacteria, organic matter (BOD), solids (TSS)

and Total Kjeldal Nitrogen.

When nitrogen removal is needed the system (The BioBarrier® 0.5-N, 1.0-N, 1.5-N) consists of a tank with three compartments, or two tanks totaling at least three compartments, with exactly two compartments in the second or final tank. The first compartment or tank provides primary treatment - sedimentation and separation of floatables and solids, and is equipped with an outlet screening device called SaniTEE®. The second and third compartments must be in the same tank, and the second compartment is where denitrification takes place under anoxic conditions. The third compartment, the aeration/membrane zone, is separated from the anoxic zone by a baffle wall between the two zones to allow nitrified waste to enter into the anoxic area for denitrification.



**WARNING** Only qualified service persons should open any access port or cover on the system. Hazards such as electric shock and infectious organisms exist in these areas. Persons coming in contact with wastewater, must immediately wash and disinfect all exposed areas and contact your personal physician. Failure to do so could result in severe sickness or death.

### NSF Standard 350 Class R Restricted Indoor Urban Reuse Water

The BioBarrier® system has been tested under NSF Standard 350 Class R (Residential) and is capable of treating residential wastewater for restricted indoor urban water reuse, which is toilet and urinal flushing. The system design requires a holding tank and plumbing system for reuse water and shall meet all applicable codes: have proper backflow prevention and protection against cross connections; and is the responsibility of the local designer/installer. When the reuse water is used for toilet and urinal flushing, additional disinfection should be considered to provide adequate assurance in preventing microorganism growth in the treated reuse water storage tank and as required by applicable codes. The reuse tank shall be located after the BioBarrier® system. This tank shall also incorporate an overflow that allows excess reuse water to be dispersed in a locally

approved soil dispersal system or released into a sanitary sewer system. A potable water make up system shall also be available to supply water when treated reuse water is not available. This potable water make up system shall include a properly designed backflow preventer that meets all applicable codes.

### NSF Standard 350 Class R Unrestricted Outdoor Urban Reuse Water

The BioBarrier® system has been tested under NSF Standard 350 Class R (Residential) and is capable of treating residential wastewater for unrestricted outdoor urban water reuse, which is

acceptable for use in surface and subsurface irrigation, including irrigation of edible crops without the edible portion being in direct contact with the treated water. A reuse tank may be required if the irrigation system requires it. The holding tank and plumbing system for reuse water shall meet all applicable codes; have proper backflow prevention and protection against cross connections; and is the responsibility of the local designer/installer. Additional disinfection should be considered to provide adequate disinfection to prevent microorganism growth in the treated reuse water storage

tank and as required by applicable codes. If a reuse tank is required for irrigation, it shall be located after the BioBarrier® system. This tank shall also incorporate an overflow that allows excess reuse water to be dispersed in a locally approved soil dispersal system or released into a sanitary sewer system. If a potable water make up system is required for irrigation, it shall include a properly designed backflow preventer that meets all applicable codes.

## EVALUATION OF SYSTEM PERFORMANCE

A general evaluation of a BioBarrier® system's performance can be made using some simple observations which are outlined in the "Trouble Shooting" guide below. Normal operation of the system should include the following:

NORMAL OPERATING CONDITIONS	
<b>SOUND</b>	The BioBarrier® system's blower makes a constant humming noise, much like a household refrigerator. Under normal conditions, the blower should last 5+ years without need for replacement. If an unusual noise is heard, refer to the <b>Trouble-Shooting Guide</b> .
<b>SMELL</b>	A musty, earthy-type of odor is normal. However, if a sewage odor (rotten egg smell) is detected, refer to the <b>Trouble-Shooting Guide</b> .
<b>SIGHT</b>	A properly loaded and operated BioBarrier® system will produce effluent that looks like tap water. If the effluent is turbid, opaque, or suddenly changes, refer to the <b>Trouble-Shooting Guide</b> .

## OPERATION & MAINTENANCE



**WARNING** Persons coming in contact with wastewater, must immediately wash all exposed areas with disinfecting cleaner and contact your personal physician. Failure to do so could result in severe sickness or death.

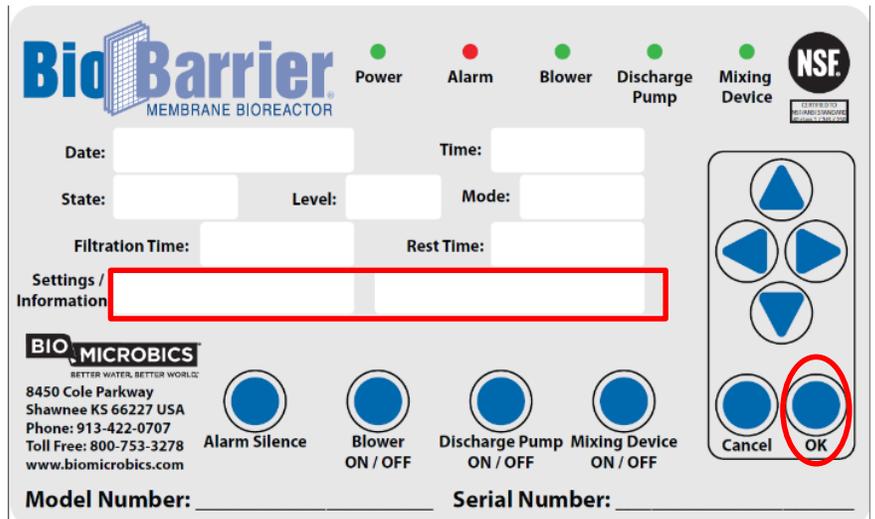


**WARNING** Only qualified service persons should open any access port or cover on the system. Hazards such as electric shock and Infectious organisms exist in these areas. Persons coming in contact with wastewater, must immediately wash and disinfect all exposed areas and contact your personal physician. Failure to do so could result in severe sickness or death.

### CONTROL PANEL

When the control panel powered up, the system goes into AUTOMATIC run mode, the "Setting / Information" screen in the front face should be blank.

Press  button once to reach each in the "Setting / Information" screen. Line 1 to Line 4 are display information only, Line 5 to Line 14 allows changing certain parameters



### AUTOMATIC MODE

Automatic mode is the standard running mode for the system. When the panel is in the AUTOMATIC mode the blower and pumps operate according to the inputs given by the float switches, and the settings programmed into the controller. There are two states of operation when the system is in AUTOMATIC mode; FILTRATION MODE (FLIT) and LONG TERM RELAXATION PERIOD (LTRP).

### FILTRATION MODE (FILT)

The system is actively filtering wastewater and producing high quality effluent while in this state of operation. The system's **BLUE FLOAT** will be in the **UP** position. The system's component operations are:

<b><u>BLOWER:</u></b>	Always ON
<b><u>DISCHARGE PUMP:</u></b>	(On timer) 30 MIN ON, 5 MIN OFF
<b><u>STATE:</u></b>	FILT (Displayed)
<b><u>Filtration Time:</u></b>	Showing how long the system has been filtering ( HH:MM) and counting up
<b><u>Rest Time:</u></b>	Showing how long the system has been resting (HH:MM), in the most recent LTRP cycle



## Long Term Relaxation Period (LTRP) – REST MODE

The system enters this state of operation as soon as FILTRATION is finished, there is no effluent being discharged during LTRP mode, the system's BLUE FLOAT will be in the DOWN position. The system's component's operations are:

<b>BLOWER:</b>	On Timer (30 Min. ON – 90 Min OFF)
<b>DISCHARGE PUMP:</b>	Always ON
<b>STATE:</b>	LTRP (Displayed)
<b>Filtration Time:</b>	Showing how long it took the system to filter the last batch.
<b>Rest Time:</b>	Showing how long the system has been resting (HH:MM), and it is counting.

The screenshot shows a control panel with the following fields: Date (01/01/01), Time (00:00), State (LTRP), Level (OK), Mode (AUTO), Filtration Time (04:38), and Rest Time (00:02). There is also a 'Settings / Information' button at the bottom.

## BLOWER TIMER FEATURE-SFR®

While in LTRP the blower is cycled ON and OFF, this is the SFR feature. The default SFR timer setting is for 30 mins ON/ 90 mins OFF. Please contact the factory to adjust the timer.

## MANUAL MODE

Manual mode allows the operator to manually run the BioBarrier's components regardless of the float position. To get the system into MANUAL mode, Press button multiple times to reach MODE in the "Setting / Information" screen. To change the MODE press the right arrow key , the cursors will move to the next screen (AUTO), use the up or down arrow to change the mode to (MANUAL). Once you set the desired mode press the "Ok" button to save.

## IN MANUAL MODE

Turn blower ON and OFF by pressing the BLOWER ON/OFF button. The discharge pump can be switched ON and OFF by pressing the DISCHARGE PUMP ON/OFF button. **DO NOT run the discharge pump manually for longer than 3 minutes.** The optional sludge mixing pump can be manually run by depressing the MIXING PUMP ON/OFF button.

## CERTIFICATIONS

**BioBarrier® 0.5, 1.0, and 1.5 systems** are NSF/ANSI Standard 40 (Class I), 245 (nitrogen reduction), and 350 (class R water reuse) tested/ certified to:

## COLLECTION OF EFFLUENT SAMPLE

If an effluent sample is required for regulatory purposes, it should be collected at a point in the BioBarrier® pump discharge line as close to the pump as is feasible. For guidance, please ask for the "Testing Protocol" document. If an effluent sample is required, follow this recommended procedure:

1. Collect it at a free falling point after the discharge from the BioBarrier® system OR from the outlet piping of the filtrate pump.
2. All samples must be collected, stored, transported and tested according to the most current version of **Standard Methods**.
3. A sample can be collected while the system is in AUTOMATIC MODE/ ACTIVE FILTRATION or in Manual mode.

PARAMETER		NSF LIMIT
CBOD5	30 day avg.	25 mg/L
	7 day avg.	40 mg/L
TSS	30 day avg.	30 mg/L
	7 day avg.	45 mg/L
pH		6-9 s.u.
Total Nitrogen		50% reduction of influent

# REGULAR MAINTENANCE SCHEDULE



Persons coming in contact with wastewater, must immediately wash all exposed areas with disinfecting cleaner and contact your personal physician. Failure to do so could result in severe sickness or death.

MAINT AREA	MAINT. NEED	PROCEDURE
BLOWER	OPERATION	Open blower housing, check to confirm that blower is running (be sure blower is not OFF due to SFR® timer in LTRP state).
	INTAKE FILTER	Remove wing nut from intake assembly on blower, remove all debris from filter element. Put assembly back together.
CONTROL PANEL	AUDIO & VISUAL FUNCTION	Check the "Setting/Information" screen on the panel for Alarm message and make sure screen is NOT showing an alarm message.
REACTION CHAMBER	BEING AERATED	Remove cover from manhole over BioBarrier® system and check to be sure vigorous boiling is occurring (unless system is in LTRP with SFR® activated).
	SOLIDS REMOVAL	Check "Bio-Solids Removal" procedure under "DO'S & DON'T'S -in the yard" section of this manual.
WATER QUALITY	VIEW EFFLUENT	Visually observe final effluent of system of BioBarrier system. Effluent should be very clear.
	CHECK ODOR	Smell odor at BioBarrier vent, it should be a damp, earthy odor.
	COLLECT SAMPLE	Refer to the "COLLECTION OF EFFLUENT SAMPLE" section of this manual.
MEMBRANE CARTRIDGE CHEMICAL CLEANING	CLEAN IN PLACE	Check filtration time on control panel. If it exceeded 16:00 hrs in one day and the system floats are operating correctly, then perform the CIP procedure according to the instructions below.
	INTENSE OXIDATIVE CLEANING & CITRIC ACID CLEANING	Perform this cleaning procedure after four consecutive CIP procedures have been performed. See instructions below for proper procedures.

## CHEMICAL CLEANING PROCEDURES

### NOTICE

The membrane plates are fragile. Care must be used in cleaning them. Carefully follow the instructions below. Always keep the membrane plates thoroughly wetted.



Only authorized service personnel are to perform chemical cleaning on the BioBarrier. Hazardous chemicals and infectious waste material are present when cleaning the system. Proper protective clothing, equipment and practices must be implemented when attempting the procedures described below.

### CIP (CLEAN IN PLACE) PROCEDURE

The following procedure is to be performed for each membrane module/stack in the entire system.

1. Shut OFF air to unit(s) to be cleaned.
2. Open ball valve on vent/CIP pipe to membrane's discharge pump.
3. Mix chlorine cleaning solution
  - a. Each single stack module - Premix 0.8 L (~1/4 gal) household bleach (5.2 – 6.2% NaOCl (sodium hypochlorite)) into 10 gallons of tap water. Warm water is best (~80°F/26°C).
4. Use a funnel to pour this mixture into the CIP pipe.
5. Close CIP pipe ball valve.
6. Let the unit sit **NOT RUNNING** for at least 4 hours (longer is better).
7. After 4 hours, turn **ON** the power to the unit (should return to **AUTOMATIC** operation).



### INTENSE OXIDATIVE CLEANING PROCEDURE:



Chlorine and chlorine gas can be lethally toxic. Proper safety precautions as detailed in the Material Safety Data Sheets for the chemical being used must be followed. Use **ONLY** the substances mentioned in these instructions. Using additional substances could be lethally hazardous.

1. Remove membrane unit from the aeration tank. Remove the membrane module from its housing.
2. Carefully remove any large solids or sludge cake from the surface of the membrane by rinsing each membrane plate with a garden hose. **DO NOT** touch the surface of the membrane sheet with any foreign substance including a hand.
3. Prepare a chlorine cleaning solution in a container large enough to fully submerge the membrane module. For every 10 gallons of water mix 0.8 L (~1/4 gal) household bleach (5.2 – 6.2% NaOCl (sodium hypochlorite)). Typically, 30 gallons of water is needed per module for complete submergence of the module.
4. Soak the membrane modules in this solution for a **minimum** of four (4) hours. The entire module must be submerged for the entire cleaning period.
5. Perform citric acid cleaning procedure, if necessary. Place the cleaned membrane back into the aeration tank.
6. The membrane plates **MUST ALWAYS** remain thoroughly wetted, whether during cleaning, storage and transportation.

### CITRIC ACID CLEANING PROCEDURE:



Citric acid can be lethally toxic. Proper safety precautions as detailed in the Material Safety Data Sheets for the chemical being used must be followed. Use **ONLY** the substances mentioned in these instructions. Using additional substances could be lethally hazardous.

1. Clean the membrane module using the above described Intense Oxidative Cleaning method **BEFORE** performing this procedure.
2. Prepare a citric acid and tap water solution in a container large enough to fully submerge the membrane. Powder citric acid and warm water (~80°F/26°C) are best. Approximately 100g of citric acid/ gallon of water (25 g/L) will be required. The amount of citric acid will vary greatly depending on the chemistry of the tap water. The resulting solution must have a pH of 2.0 – 2.5 for proper cleaning. A pH testing device/kit is recommended for determining the pH level.
3. Soak the membrane module in the acid solution for four (4) to eight (8) hours. The entire module must be submerged for the entire cleaning period
4. Place the cleaned membrane back into the aeration tank.
5. The membrane plates **MUST ALWAYS** remain thoroughly wetted, whether during cleaning, storage and transportation.

## TANK PUMPING PROCEDURE:



*Only qualified service personnel should open access ports/covers. If any contact is made with wastewater, immediately wash and disinfect all exposed areas and contact a doctor. Failure to do so could result in severe sickness or death.*



*Avoid pumping down after periods of heavy rain or when the ground water is likely to be above the bottom of the concrete tank. Emptying the tank under these conditions could cause the tank to float up and become dislodged. Always secure all access covers in place so that people cannot enter the tank, control panel or blower without the use of proper tools. DO NOT use flame or spark near a septic tank's access points. Gasses emanating from septic tanks can explode if ignited or deadly if inhaled.*

**DETERMINE IF SOLIDS WASTING IS REQUIRED:** The BioBarrier system operates under very high MLSS. The traditional “settleable solids” test may not provide accurate results for sludge wasting determination. If accurate MLSS concentration is not available, use the formula below to estimate the number of months in between solids removal service:

US units: 
$$\frac{\text{Treatment Tank Liquid Volume (US gal)}}{215 \times \# \text{ of people}} \times 12 = \text{estimated \# of months until solids removal}$$

1. Open the access ports/cover(s) and insert the hose (it is important that the membrane not be touched by the hose). Be sure to leave about 5 inches of mixed liquor in the tank.
2. Once the treatment tank has been pumped out, immediately refill the tank with enough clean water to cover the membrane unit and to reduce the risk of the tank floating. Membranes have to stay wet at all times. Once filled close the access ports/cover(s) making sure it is watertight.
3. Properly dispose of the solids removed in compliance with local regulations.

## MAINTENANCE CHECKLIST

**TRAFFIC** Check to ensure that the BIOBARRIER® system has not been damaged due to excessive weight loading (>1,750 lb. point load). Reinforce with the owner that only normal yard traffic (lawn mowers, etc.) is acceptable. Traffic bearing (H-20) tanks can be made for using BIOBARRIER® (w/ feet) under roadways.

**PANEL AND VACUUM GUAGE READINGS.** If FILT hours on panel exceed 16 hours in one day or vacuum reading on the filtration pump is -7 psi (-14 “Hg) or less perform a CIP. See procedure for cleaning the membrane in this manual. Check the filtration pump operation. If the system is in the LTRP mode, put the system in the MANUAL mode then turn on the pump by pressing the DISCHARGE pump bottom. Make sure the system is returned to the AUTO Mode after testing the pump. **DO NOT OPERATE THE SYSTEM IN MANUAL MODE FOR MORE THAN 3 MINUTES.**

**BLOWER OPERATION** DO NOT turn off the blower. Check the blower for proper function. Clean the blower’s inlet air filter element. Contact your local Bio-Microbics distributor for more information. If the blower is malfunctioning for an unknown reason, please refer to the “Troubleshooting Guide” or Blower replacement section located in this manual.

**ALARM PANEL AND ALARM SOUNDS** The alarm has a ~10 second built-in delay. Test the audible alarm by pressing the ENTER/MODE bottom. To silence the alarm, use the “RESET” button on the panel’s front. If the alarm is activated for an unknown reason, please refer to the “Troubleshooting Guide” located in this manual.

**VENTS, ODORS, AND INTAKES** Keep the BioBarrier® system’s vent clear of debris such as leaves and snow. Do not allow the blower housing

louvers to become blocked with any debris. Clean the blower’s inlet filter at least annually.

**SANITEE® EFFLUENT SCREEN.** Clean by using the built in swab or other method.

**WATER QUALITY** effluent should be clear and odorless.

**SLUDGE WASTING OF SETTLING TANK** Scheduling sludge removal depends on the size and design of the septic tank and the number of people in the home.

**SOLIDS WASTING OF TREATMENT TANK.** The pump out schedule is predetermined using the formula under the TANK PUMPING PROCEDURE found in this manual.

### OTHER SYSTEM COMPONENTS (IF APPLICABLE)

**LIXOR® PRE-AERATION DEVICE** blower, inlet filter, blower housing, and air delivery system for proper function.

**INFLUENT BIOSTEP® PUMP(S)** for proper function. Clean the screening device by using built in swab or other method.

**DISPERSAL SYSTEM** (not by Bio-Microbics) follow manufacturer’s recommendation.

*All stricter, applicable regulations supersede these operational directions. Always pump out both zones, even if only one zone may require it.*

## DO'S & DON'TS.....DOWN THE DRAIN

Please refer to the list below for important information on how to help keep your treatment system performing, as it should. Do not put these items down the drain:

ANIMAL BONES/SKIN	EGG SHELLS	PESTICIDES
AUTOMOTIVE FLUIDS	FILM DEVELOPING WASTE	PLASTICS
BANDAGES	FLOOR STRIPPER	RAGS
CAT LITTER	HERBICIDES	RV WASTE
CAUSTIC CLEANERS	HOME BREWERY WASTE	SANITARY NAPKINS
CIGARETTE BUTTS	MELON RINDS	SOLVENTS
COFFEE GROUNDS	METAL OBJECTS	STICKS
CONDOMS	MODELING CLAY	STRING
CORN COBS	PAINT	THINNERS
DISPOSABLE DIAPERS	PAPER TOWELS	WET WIPES

**RECORD KEEPING** Keep a copy of all pertinent literature such as drawings/plans (this manual), and service records about your wastewater system along with other home appliance documents. Record all applicable information at the back of this manual.

**REGULAR MAINTENANCE** should be performed by a qualified service company. Regular, professional maintenance is the best method for ensuring long life for your system.

**LAUNDRY/WATER USAGE** Spread wash loads throughout the week. Instead of liquid fabric softener, dryer sheets should be used. Use low-suds, biodegradable and low phosphate detergents. Always follow manufacturer's directions. A wastewater treatment system will perform most efficiently when water consumption is spread evenly throughout the week.

**LEAKY FIXTURES** Large quantities of water are added to your wastewater treatment system when you have leaking fixtures and can reduce the life of the BioBarrier® MBR. Timely detection and repair can help to maximize the life of your system).

**WATER SOFTENERS** CAN HARM THE SYSTEM. The BioBarrier® process may tolerate discharge from demand initiated regeneration softeners. However, these discharges can possibly damage other parts of the septic system.

**FOOD WASTES** from a garbage disposal is acceptable, if allowed by your local regulatory authority. Be aware too much food and FOG (Fats, Oils, and Grease) through the garbage disposal may overload or prevent the system from operating correctly. Both natural FOG (i.e. animal fat, canola, oil, etc.) and synthetic oils can prevent the bacteria from fully breaking down the waste.

**DISINFECTANTS/CLEANERS** Use according to the manufacturer(s)'s recommendations. Products containing quaternary ammonia sanitizers (active ingredient listed as ammonium chloride, etc.) or pine oil cleaners should not be used. Use drain cleaners as a last resort to unclog pipes.

**PERSONAL CARE PRODUCTS** Be aware that some hair care products add harmful oils and chemicals to the system. Use anti-bacterial products and other personal cleaning products according to product instructions.

**MEDICINES** ALL antibiotic medicines are harmful to the treatment quality. Unused medications should be returned to your pharmacy, doctor, or thrown away in the trash. **DO NOT FLUSH THEM DOWN A DRAIN.** As the human body only absorbs ≤20% of these substances, please notify your service provider if a person in the house is using medicine. This could reduce troubleshooting efforts and possibly your maintenance bill.

**SEPTIC TANK ADDITIVES/ENZYMES** should not be used. These may do more harm than good. The natural sewage present in the system contains all required bacteria and enzymes for proper operation.

**HARSH CHEMICALS/TOXINS** Should NOT be put into the system. This includes, but is not limited to: floor stripper, paint, solvents, thinners, caustic cleaners, pesticides, herbicides, film processing waste, etc.

**PAPER PRODUCTS** Use white toilet paper products. Avoid any toilet paper over two ply thickness and choose the non-quilted brand.

## SEASONAL / INTERMITTENT USE PROPERTIES

**WARNING** Only qualified service personnel should open access ports/covers. If any contact is made with wastewater, immediately wash and disinfect all exposed areas and contact a doctor. Failure to do so could result in severe sickness or death.

The BioBarrier® will function normally even if no wastewater flows during short periods of vacancy. Typical examples and suggested operational procedures:

- **Summer use property** (shut down all winter) - Turn off the power at end of summer and restarted upon return.
- **Weekend property** (used at least once every three weekends) - maintain normal operation. If necessary consult your service provider and local regulations prior to any system changes.

**Note Before Return:** If the system was shut down completely for an extended period of time (i.e. Summer use only), we suggest to restart the system a week or two in advance of the owners returning to the property. Check with local regulations.

# TROUBLESHOOTING GUIDE

Contact factory or local distributor for all other issues: 1-913-422-0707

POSSIBLE CAUSE / SOLUTION				
	(Settings/Information) display	Description	Possible cause	What to Do
Alarm is activated (sounding)	ALARM BL A MIN	Blower amp draw below the minimum set point	Blower is not running	Check and verify the wiring
			Bad fuse	Replace fuse
			Min Amp set point is High	Lower the set point below the operation amp draw
	ALARM BL A MAX	Blower amp draw higher than the maximum set point	Max Amp set point is low	increase the set point above the operation amp draw
			Blower is overheating and drawing more amps	Check Vent(s) or airline is blocked or undersized, water level inside the tank. Intake air filter
	ALARM DC A MIN	Discharge pump amp draw below the minimum set point	Pump is not running	Check and verify the wiring
			Bad fuse	Replace fuse
			Min Amp set point is High	Lower the set point below the operation amp draw
	ALARM DC A MAX	Discharge amp draw higher than the maximum set point	Max Amp set point is low	increase the set point above the operation amp draw
			pump is overheating and drawing more amps	Check if pumps is seized
ALARM MX A MIN	Mixing pump /blower amp draw below the minimum set point	Blower is not running	Check and verify the wiring	
		Bad fuse	Replace fuse	
		Min Amp set point is High	Lower the set point below the operation amp draw	
		Mixing is NOT Used	Disable Mixing Apparatus	
ALARM MX A MAX	Mixing pump/blower amp draw higher than the maximum set point	Max Amp set point is low	increase the set point above the operation amp draw	
		Blower is overheating and drawing more amps	Check Vent(s) or airline is blocked or undersized, water level inside the tank. Intake air filter	
ALARM LEVEL HI	High Water Alarm	Water level inside the tank is high	Investigate the system.	
		Stuck or incorrect float location	Relocate the float location according to drawing	
ALARM BL THERM	Blower Thermal alarm	Blower overheated and stopped	Investigate blower	
Septic Odor	Blower operating – NO, check "blower is not running" above, YES <i>see next step</i>			
	Proper aeration in reaction chamber – NO – air line is broken, find break and repair			
	Create bio-filter vent - create a remote vent by placing a well perforated vent line in a trench with shredded bark mulch - contact local installer			
Blower Runs Backward	3-Phase - Power connection was wired incorrectly or power out of phase. Switch any two "hot legs" at the panel or blower AFTER turning OFF the power. Only a QUALIFIED electrician cando this work. After rewiring, it may be necessary to dry the blower's internal parts. .			
	Single Phase - was wired incorrectly. Some blowers have wires numbered "5" and "8". After turning OFF the power, switch these two wires. Only a QUALIFIED electrician can do this work. After re-wiring, it may be necessary to dry the blower's internal parts.			
Blower Sound is Bothersome or Loud	Blower housing can be supplemented with additional sound reducing measures, contact your service provider.			
	Blower may be re-located from its current location and can be placed up to 40 ft away from unit.			
	Blower bearings are going bad - replace blower.			
	Vibration between the blower and housing – tighten or place rubber washers in mounting screws between blower and housing			
Effluent is Dirty/No water produced	Damaged Membrane - Replace membrane module. Contact local distributor.			
	Check Connections - Inspect all connections under water between membrane module and the effluent line.			
	Check Pump Operation – Replace filtrate pump if necessary			
Water in blower/housing	Move blower above flood level			
	Check blower rotation – see "Blower runs backwards" section above			
	Move blower to location higher than the BioBarrier® system			

# CONTROL PANEL & FLOATS REPLACEMENT

**CAUTION** Always have all utility lines and equipment marked by a local service company prior to performing any work.

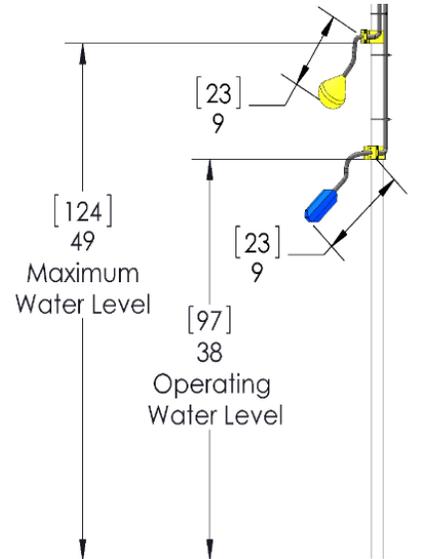
**WARNING** All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.

The BioBarrier® systems, including all electrical parts, are ETL (UL equivalent) certified for electrical safety. The control panel meets NEMA4X standards for all weather use (not explosive or submerged environments).

1. Examine wiring directions inside the supplied BIOBARRIER® control panel (also found at the end of this Manual).
2. Confirm a dedicated breaker is supplied for the system in the building's master electrical panel.
3. Make connections between the electro-mechanical devices of the system and BioBarrier® control panel per the electrical diagram.

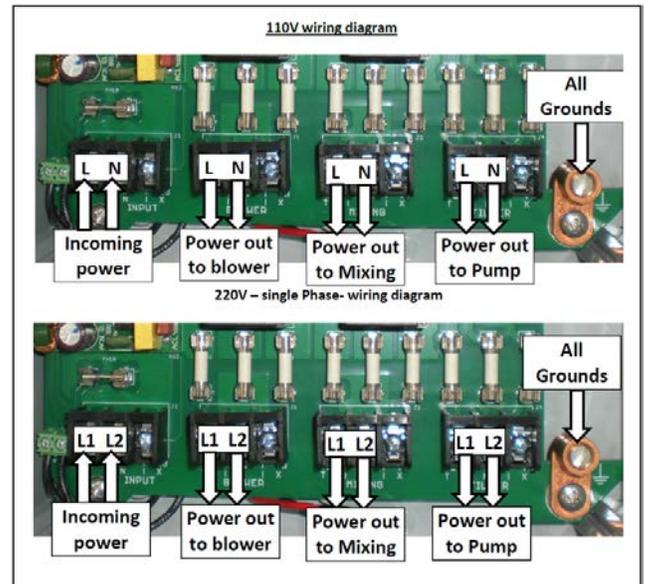
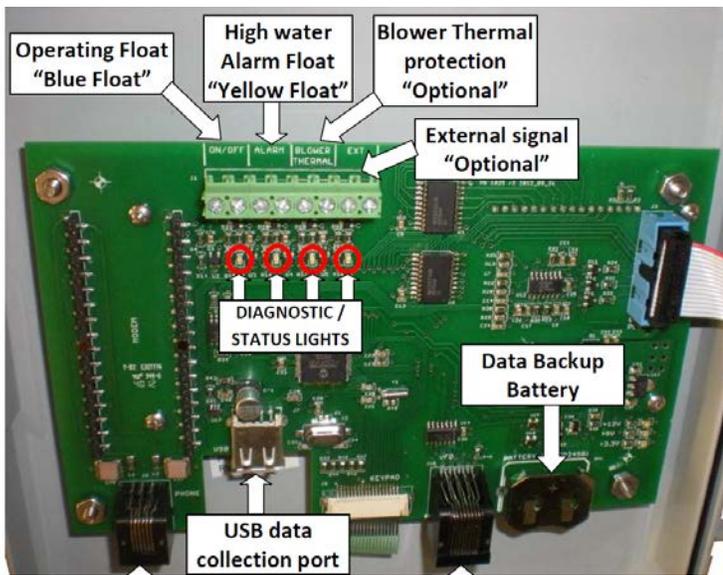
**WARNING** Always have all utility lines and equipment marked by a local service company prior to performing any work. Failure to do so could result in severe bodily injury or death.

1. Attach the blue and yellow floats to the float tree line at the locations shown. The **BLUE** switch MUST be installed at the minimum height (or higher) shown in the picture for the single-stacked units. The **YELLOW** switch MUST be installed no higher than 2 inches [5 cm] below the tank's inlet.
2. In the treatment tank, make connections to facilitate exiting of the wiring from the discharge pump and the float switches. If a junction box is used inside the treatment tank manhole, waterproof connectors must be used.
3. Insure the float wires are run in separate conduit from any power wires.
4. Mount the BioBarrier control panel in a location that is accesible to a service party, meets all code requirements and prevents a voltage drop. The 110VAC panel requires a 15A breaker minimum. The 220VAC control requires a 20A breaker minimum.
5. Make connections inside the control panel as shown in the diagrams.



## ELECTRICAL WIRING DIAGRAMS

Only the BioBarrier® 0.5, 1.0, and 1.5 system diagrams are displayed here. Information for larger BioBarrier® systems ships with the units or can be obtained from Bio-Microbics



# BLOWER REPLACEMENT



**WARNING**

All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.



**WARNING**

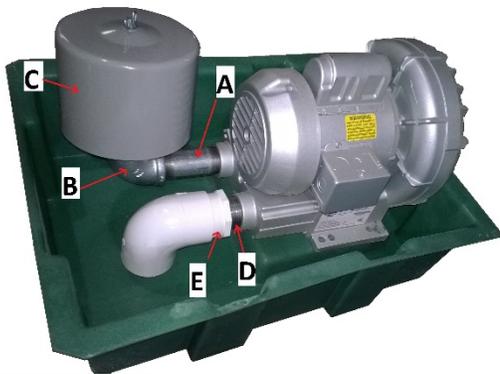
Hazards exist in confined spaces such as a septic tank. All confined space precautions must be followed if entering a tank. Always keep tank openings covered during storage and installation

If installing a new blower and/or blower housing, place the blower housing on the original concrete slab. Pass the air supply line and electrical conduit through the concrete slab from below grade. Run the electrical supply conduit from the control panel to the desired blower location.

## REPLACEMENT BLOWER CONNECTION

### CONNECT BLOWER PIPING

- Longest pipe
- Elbow
- Air filter assembly
- Shortest pipe
- Reducer bushing



**NOTE: USE TEFLON SEALANT TAPE ON ALL PIPE CONNECTIONS.**

- Secure blower assembly to base using four (4) 14# X 1 1/2 " self-tapping screws (supplied with unit). Drill screws directly into blower base.
- Connect air line (supplied by contractor) from blower outlet to BioBarrier® unit airgrid using required piping (check unit specs). Blower piping to BioBarrier® may not exceed 40 ft (12 m) total length and use a maximum of 4 elbows. ALL CONNECTIONS MUST BE AIR-TIGHT AND PERMANENT. Keep all debris out of the air line.
- Wire the blower to accept the proper voltage for your specific location according to the diagrams of each blower.

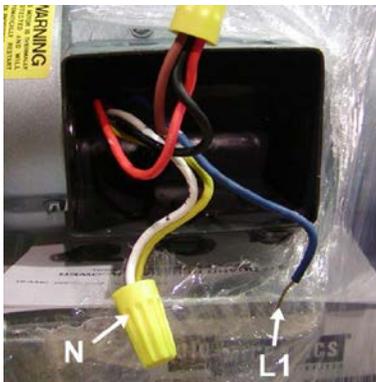


**CAUTION**

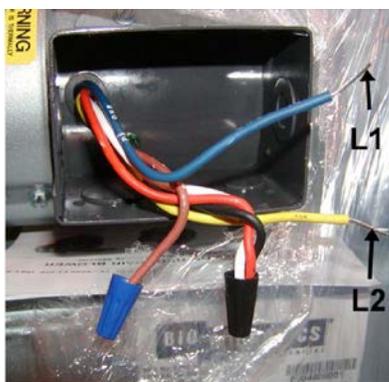
Introducing harmful or damaging substances into the BioBarrier® system may void the warranty.

### Blower for BioBarrier® 0.5

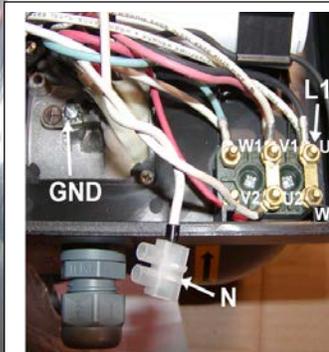
### Blower for BioBarrier® 1.0 & 1.



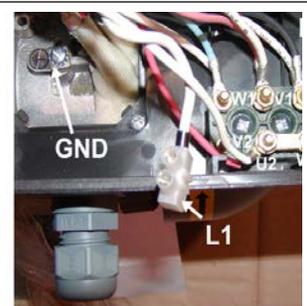
Model: GAST R4110-2, R3105-12, R2103, R1102  
Power: 110VAC  
- L1 to P1  
- N to 2,4  
- P2,5,3 cap together



Model: GAST R2103, R1102, R4110-2, R3105-12  
Power: 220VAC 1ø  
- L1 to P1  
- L2 to 4  
- 5, 3 and 2, cap together  
- P2 cap off



Model: FPZ SCL06  
Power: 110VAC  
- Jumper U2 to V1  
- Jumper W2 to U1  
- L1 to "terminal block"  
- N to white connector



Model: FPZ SCL06  
Power: 220VAC, 1ø  
- L1 to "terminal block"  
- L2 to V1  
- Jumper W2 to U2

# Keep for Your Records

BioBarrier Serial Number: \_\_\_\_\_

System Designer Name: \_\_\_\_\_

Designer Phone: \_\_\_\_\_

Health Official Name: \_\_\_\_\_

Health Official Phone: \_\_\_\_\_

Manufacturer Name: Bio-Microbics, Inc.

Manufacturer Phone: 1-800-753-FAST (3278)

Installed By: \_\_\_\_\_

Installer Phone: \_\_\_\_\_

Maintenance Provider Name: \_\_\_\_\_

Maintenance Provider Phone: \_\_\_\_\_



NSF/ANSI Standard 40 class I  
NSF/ANSI Standard 245  
NSF/ANSI Standard 350 Class R

## NSF<sup>®</sup> INTERNATIONAL CERTIFIED SYSTEMS SERVICE POLICY

All NSF (National Sanitation Foundation)/ANSI Standard 40 Class I / Standard 245 / Standard 350 Class R certified wastewater treatment systems (BioBarrier<sup>®</sup> 0.5, 0.5-N, 1.0, 1.0-N, 1.5, 1.5-N) have an initial two-year service agreement included with the system's initial purchase price (two service calls per year). The NSF service calls **ONLY** cover NSF certified systems; other components of the septic system are NOT covered.

If there are any deficiencies in the BioBarrier<sup>®</sup> system's operation or components, the service person will notify the owner in writing and detail when these deficiencies can be fixed.

The company listed on the blower housing or control panel label performs this service. During an NSF service call, the service company shall inspect the blower for proper operation, visually inspect the system's effluent for clarity, clean the blower air filter and assure proper function of the control panel. If these service calls are not performed on your NSF certified system, or not all of the items are checked, please call Bio-Microbics at:

**800-753-FAST(3278) or 1-913-422-0707**

For continual service of NSF certified systems beyond the first two years, an extended service agreement is available through your local Distributor or current service provider. This policy should provide the same services and may include any additional services that are required by local regulation.