

Installation Manual

For use with:

MicroFAST® 4.5, 9.0

HighStrengthFAST® 4.5, 9.0

NitriFAST® 4.5, 9.0

MyFAST® 1.0



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GENERAL INFORMATION

Thank you for purchasing a BioMicrobics FAST® system. One or more of the following patents protects this process: 3,966,599; 3,966,608; 3,972,965; 5,156,742. If you have questions regarding any BioMicrobics products, please contact us:

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

e-mail: onsite@biomicrobics.com

ABOUT FAST

The FAST® (Fixed Activated Sludge Treatment) system uses naturally occurring bacteria (biomass) to treat sewage for dispersal into the environment. This continuous process provides the biomass with food (waste) and air in a suitable environment. Dead bacteria and non-biodegradable waste settle and accumulate in the bottom of the tank for periodic removal.

The FAST assembly consists of two components: the treatment module and blower. The blower provides air to the system via the air supply pipe. The air supply pipe and draft tube create an airlift, which mixes oxygen and waste throughout the media inside the tank. Bacteria, supported by air from the airlift, grows on the media and digests the waste. Finally, a vent pipe expels vapors created by the process.



Always secure all access covers to prevent unauthorized people from entering the tank. Only qualified service personnel should open access ports and/or covers.

Infectious organisms also exist in a septic tank. So if any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death.

DO NOT use an open flame or cause a spark near a septic tank's access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled.

1. GENERAL

The treatment system is complete with all needed equipment as shown on the drawings and specified herein. The following items of equipment are provided by BioMicrobics, Inc., with purchase of the system: (a) the FAST system sub-assembly, (b) foot top and foot bottom, (c) blower assembly, and (d) blower controls and alarms. All other items needed for installation and operation are not included.

The contractor will install the FAST® treatment system as manufactured by BioMicrobics, Inc. The contractor will ensure the proper fabrication of the tank, coordinate between the tank suppliers and FAST® system suppliers, arrange delivery to the job site, and oversee the installation of the FAST® unit. The tank must provide adequate pump-out access and must conform to local, state, and all other applicable codes. The tank must also be level within $\pm 1/2$ in [12 mm].

2. MEDIA

The FAST media is made of rigid PVC, polyethylene, or polypropylene, and it is supported by the polyethylene insert. The media will be fixed in position and contain no moving or wearing parts, and it will not corrode. The media has been designed (and will be installed) to ensure that sloughed solids descend through the media to the bottom of the septic tank for easy cleanout.

3. REMOTE MOUNTED BLOWER

The blower must be set in a dry, stable place, and its elevation must be higher than the normal flood level. A two-piece, rectangular housing is included with the unit. The discharge air line from the blower to the FAST system is not included and must be provided and installed by the contractor.

4. ELECTRICAL

The electrical source should be within 150 ft [45 m] of the blower; consult local codes for longer wiring distances. Wiring distances must prevent significant voltage loss. All wiring must conform to all applicable codes (IEC, NEC, etc.). Actual power consumption varies with site conditions. All conduit and wiring must be supplied by the contractor.

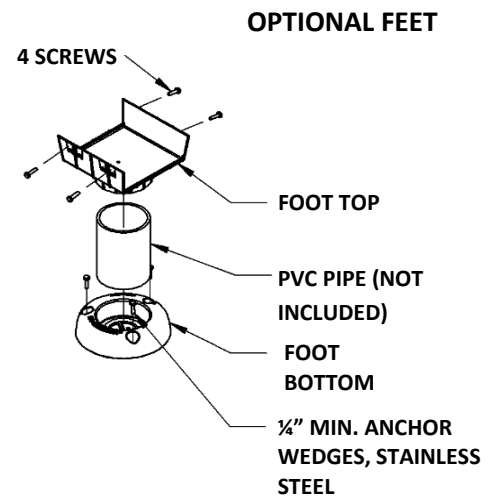
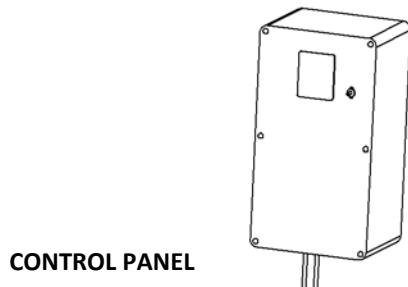
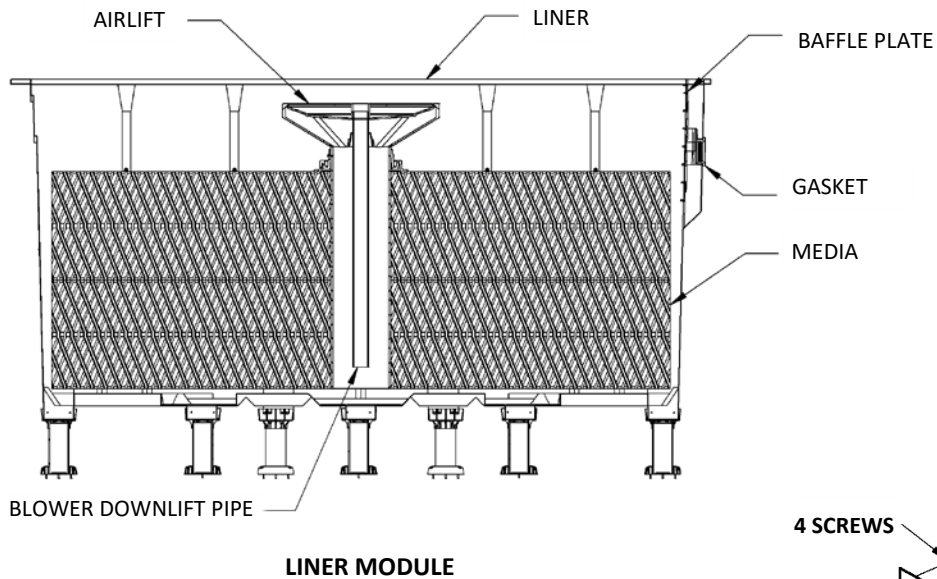
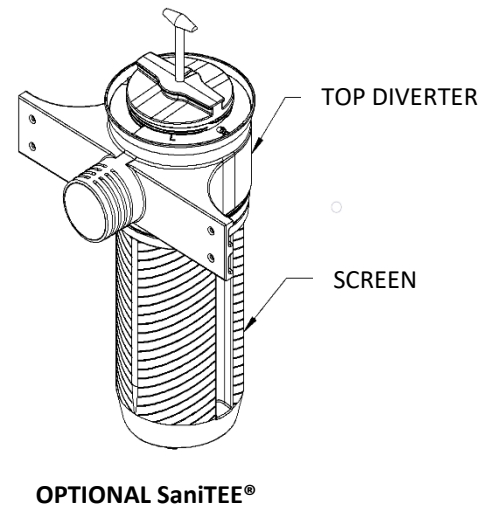
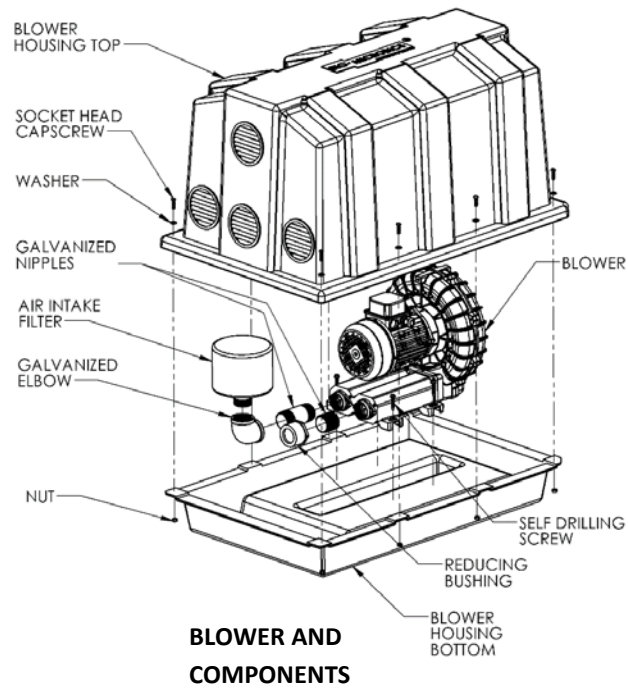
5. CONTROLS

The control panel, which provides power to the blower, comes with an alarm system consisting of a visual and audible alarm that will signal blower circuit failure and high motor load. The control panel is equipped with an SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

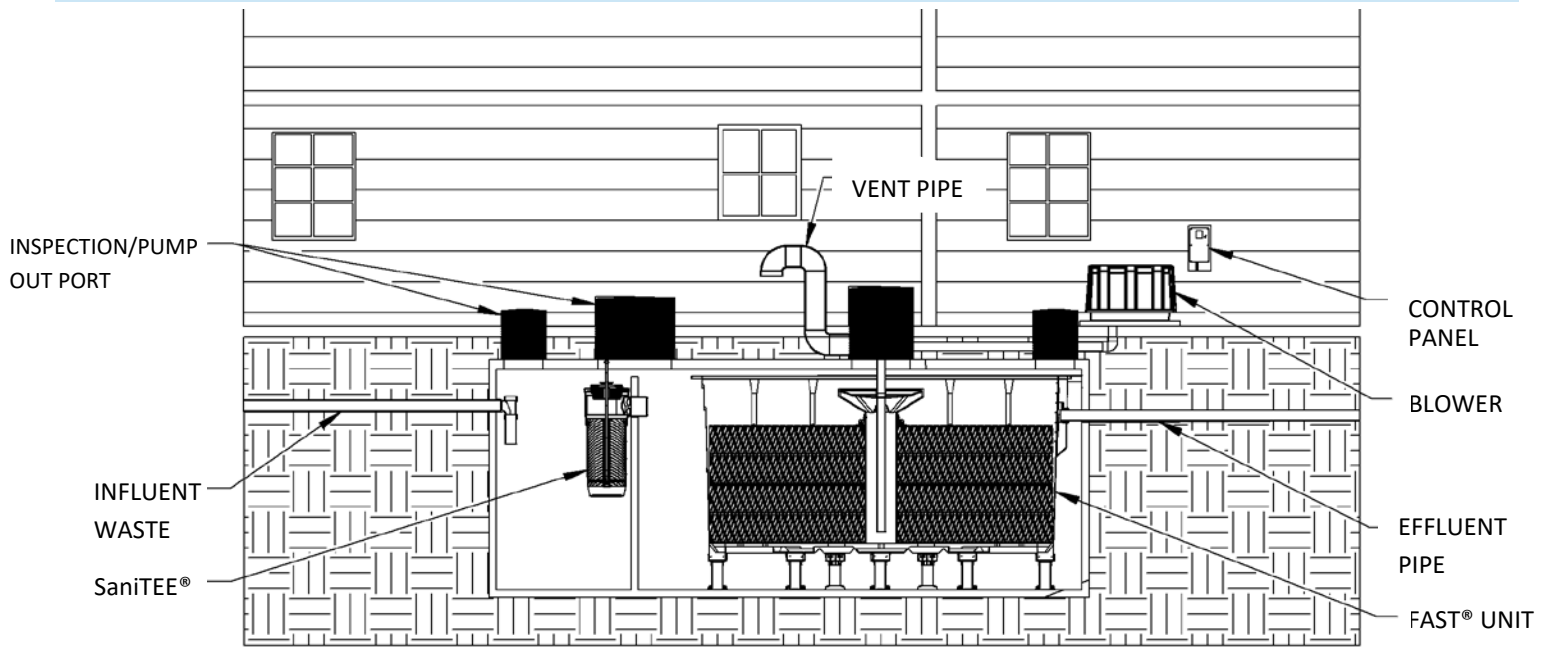
6. INSTALLATION AND OPERATING INSTRUCTIONS

Written instructions for proper installation, use, and service of the FAST® system (manuals) are included with the product and are available online at the BioMicrobics website. Installation of the FAST® system must be carried out in accordance with the written instructions provided in the Installation Manual. Moreover, all work related to the installation must be done in accordance with local codes and regulations.

MAJOR COMPONENTS



LAYOUT



LOCATION



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

FAST® systems may be located in the same position relative to a structure and water supply as any conventional septic system. However, some basic guidelines should be followed:

1. The FAST® system must be located so that sufficient slope ($\geq 2\%$, $\frac{1}{4}$ in/ft) is provided for the influent and effluent lines.
2. Excessive back pressure must not be applied to the blower. Follow all installation guidelines.
3. The method and arrangement for effluent discharge must not interfere with the treatment plant's operation.



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



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.

NON-SUPPLIED TOOLS AND MATERIALS

NOTE: Other tools may be required to complete installation

1. Septic tank that meets all applicable requirements and standards
2. Safe lifting mechanism to move the FAST® unit
3. Anchor wedges (stainless steel) for securing FAST® unit to the tank and blower housing to the base
4. Piping for observation/vent port, air lines, vent lines and leg extensions
5. PVC pipe saw
6. Pipe lubricant/soap
7. PVC primer and glue
8. Base for blower assembly
9. Mounting screws for control panel
10. Electrical conduit, fittings, and specified wires
11. Hammer drill and masonry bits
12. 3" galvanized or metal pipe for air supply line

DETAILS OF FAST SUB-ASSEMBLIES

FAST® Model	Unit Dimension W X H X L	SUB-ASSEMBLY WITH FEET	NUMBER OF FEET
MicroFAST 4.5	82 X 52 X 156 in [209 x 132 x 396 cm]	550 lbs [250 kg]	13
MicroFAST 9.0	82 X 76 X 156 in [209 x 193 x 396 cm]	880 lbs [400 kg]	13
MyFAST 1.0	82 X 88 X 156 in [209 x 224 x 396 cm]	1220 lbs [554 kg]	15

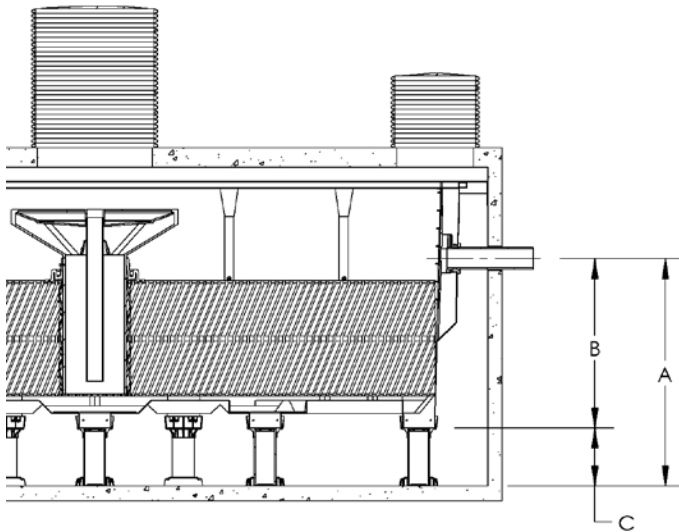
MODULE INSTALLATION

FEET INSTALLATION

1. Determine length of pipe needed for legs.

Note: Build legs using 4" [10 cm] PVC schedule 40 pipe. If legs are longer than 18" [46 cm], then schedule 80 PVC or stronger pipe must be used. Consult factory to extend legs longer than 36" [90 cm].

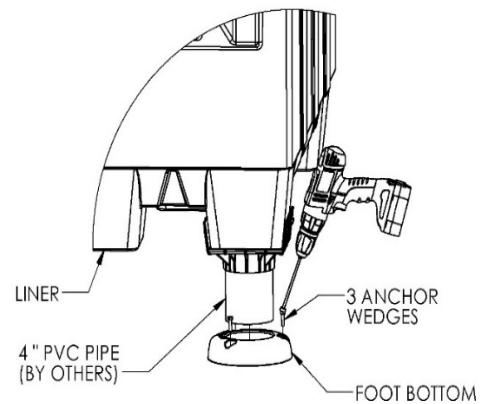
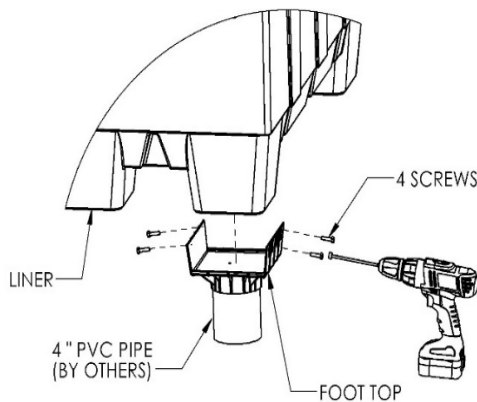
2. Glue the pipe to the bottom and top leg pieces. Attach the leg extensions to the liner using supplied self-tapping screws. Stainless Steel hardware is required for installation.
3. Carefully lower liner into tank using a jib crane or other approved method that meets the lifting weight of the liner. Secure foot bottom to the base of the tank with stainless steel anchor bolts (not provided).
4. At least three anchor wedges are required per leg extension.



To determine pipe length for legs
(dimension C):

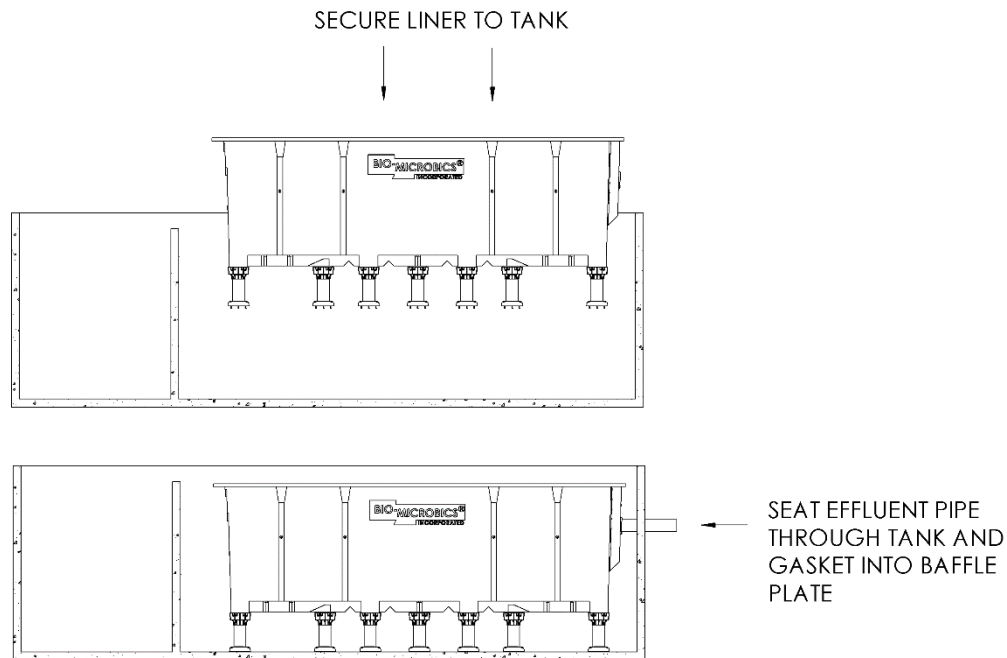
$$A - B - \frac{1}{4} \text{ in } [0.64\text{cm}] = C$$

Where $\frac{1}{4}$ in [0.64cm] is the
thickness of foot top and foot



OUTLET INSTALLATION

1. Insert the liner into the tank, ensuring holes line up between tank outlet and liner outlet.
2. Insert 4" schedule 40 PVC pipe for use as an effluent line through tank into liner gasket until it hits the baffle plate. Use a gasket, grout, mortar, or bituminous sealant (mastic) in the tank effluent hole for a watertight seal between hole and effluent pipe.



CROSS BRACE

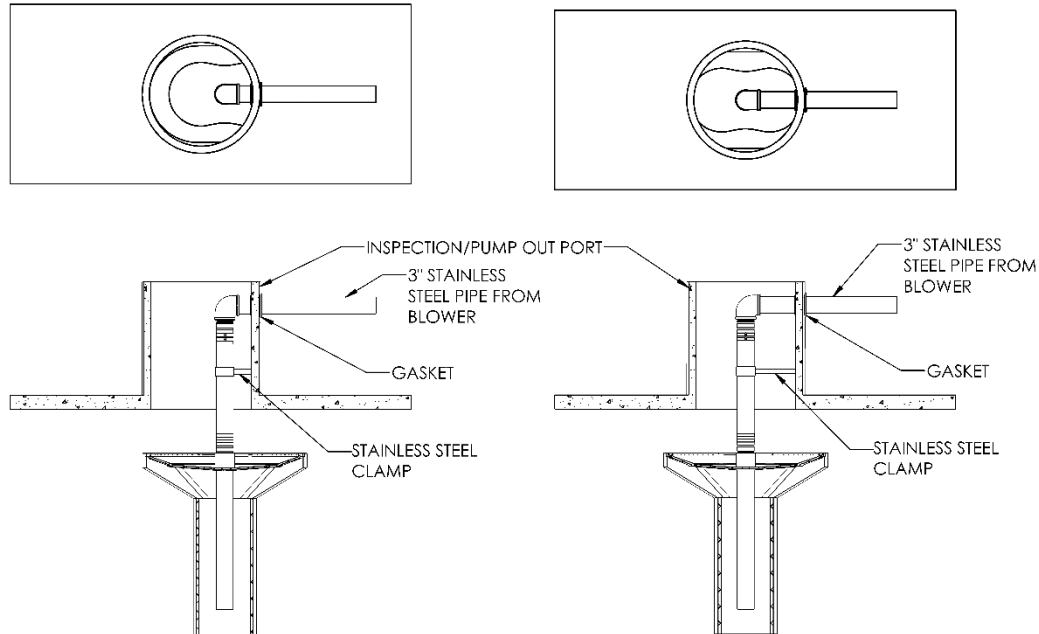
1. Use the supplied stainless steel cross braces to secure the top of the unit to the tank wall to prevent lateral movement.
2. Use stainless steel hardware to mount the cross brace to the liner and the tank wall.



COMPONENT INSTALLATION

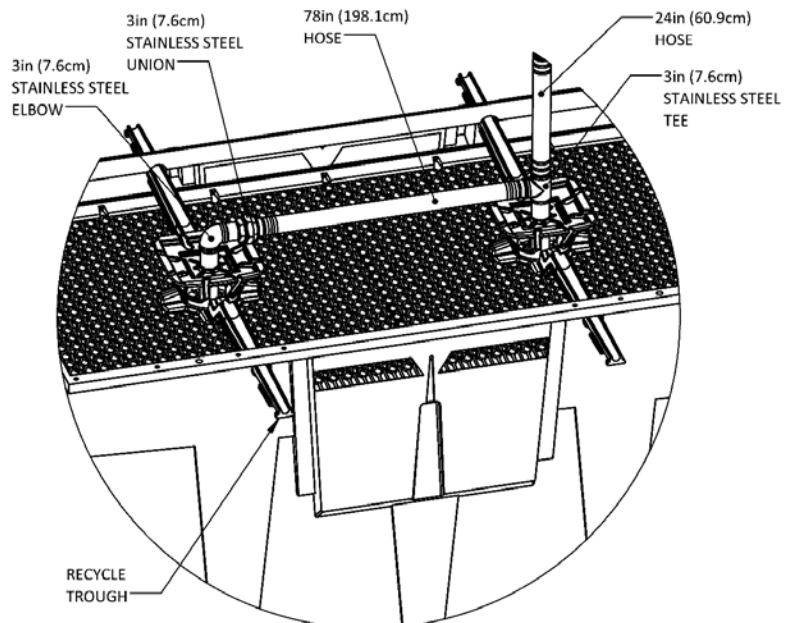
BLOWER AIR SUPPLY LINE

1. The air supply line inside the tank must be secured with non-corrosive clamps every 2 ft to prevent breaking. The diagram below is for the MicroFAST®, HighStrengthFAST®, and NitrifAST® 4.5 & 9.0.



SECURING RECYCLE TROUGHS AND BLOWER AIR LINES

1. The diagram to the right is for the MyFAST® 1.0. The recycle troughs for this unit ship loose inside the liner.
2. Insert each of the four recycle troughs through the hole in the liner. Attach the recycle trough with its mounting point on the airlift and then use the provided 3/4" screws to secure it into place.
3. Connect the supplied 78" [198 cm] hose between the union and tee. Connect the 24" [61 cm] hose between the tee and the air supply line. Airline piping to FAST® unit should not exceed 100 ft [30.5 m] with no more than four elbows. All connections must be air- and watertight.



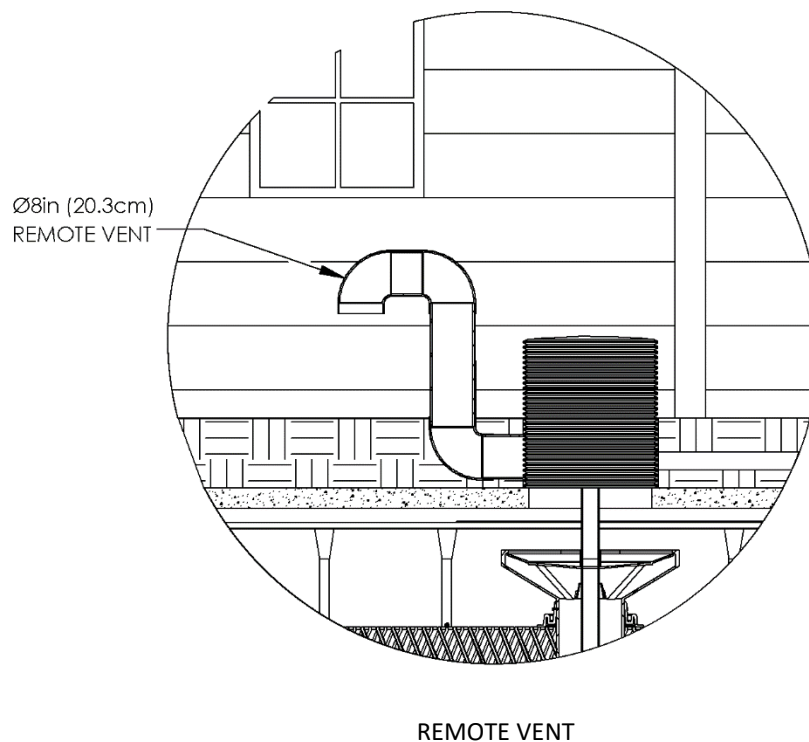
There are several options for proper venting. Two of the most common are mentioned here. The vent system must be sized properly to avoid excessive back pressure in the system (see table below). It also must not allow surface water to enter the system and must allow internal condensation to drain.

REMOTE VENT: Branch off of the airlift manhole riser or manhole below grade. Run the vent pipe to the desired location and terminate above grade. Provide a cover that meets safety standards. Water accumulating in the vent piping must be drained to prevent back pressure.

NOTE: *The vent should not exceed 100 ft [30.5 m] in length.*

BIOFILTER: Please contact BioMicrobics for guidance on how to build a buried vent using wood chips and pipe. (BioFilter not shown).

FAST® MODEL SIZE	MIN. VENT DIAMETER	VENT OPENING
FAST® 4.5	8 in [20.3 cm]	29.0 in ² [187 cm ²]
FAST® 9.0, MyFAST® 1.0	10 in [25.4 cm]	39 in ² [252 cm ²]



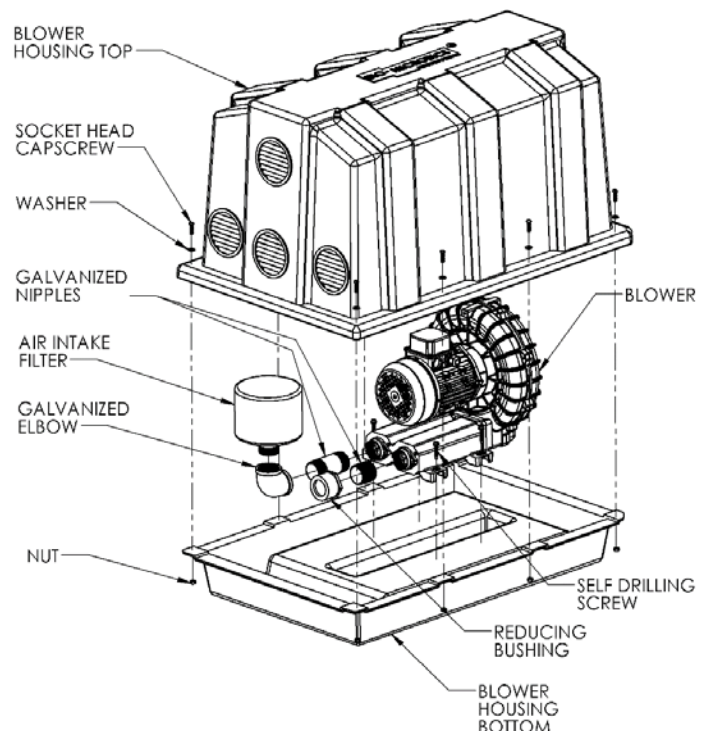
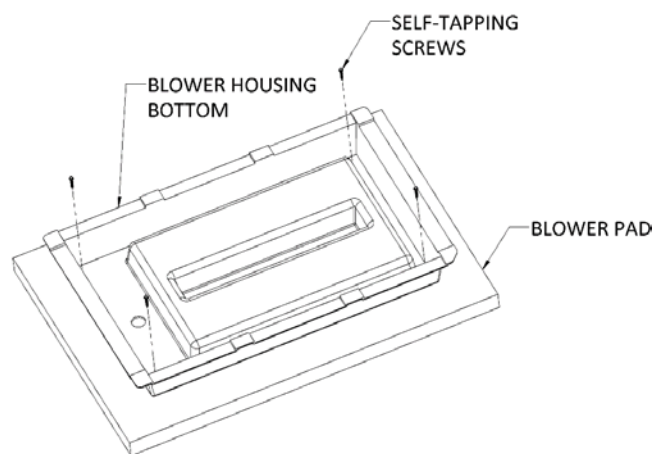


Always have all utility lines and equipment marked by a locating service provider prior to performing any work.



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

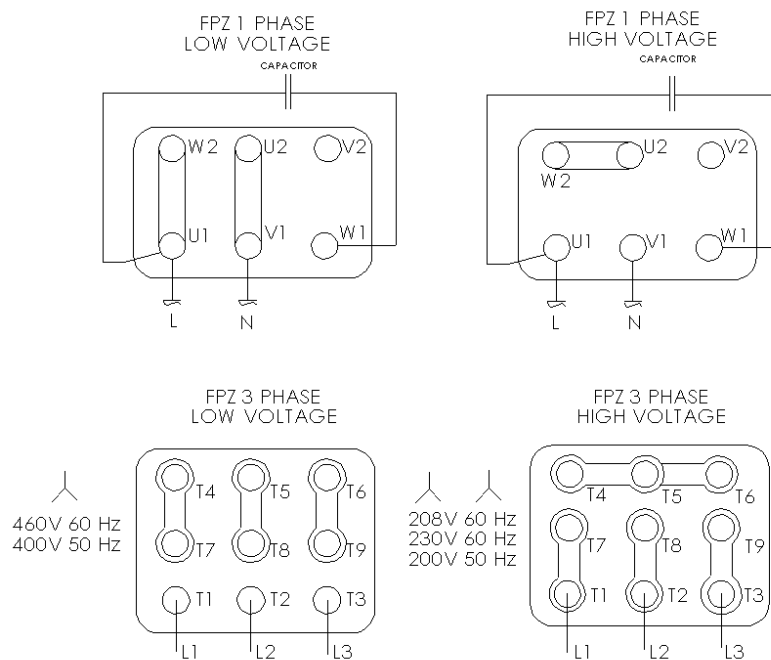
1. The blower and blower housing must be mounted on a pad to avoid settling. All conduit/piping should pass through the pad from below. Blower must be located above flood levels.
2. Secure lower blower housing to pad using 4 supplied #14 x 1½" self-tapping screws. Drill screws directly into blower pad.
3. Connect initial blower fittings (right).
4. Connect airline from FAST® unit to blower outlet using required piping. We recommend a union be installed inside the housing on the blower outlet piping for easy removal of blower. Keep all debris out of airline. All connections must be air-/watertight.
5. Connect incoming power to the blower at the blower junction box. Be sure to follow the supplied wiring diagram for the voltage at your specific location. All blowers are dual voltage and must be connected according to the proper diagram. Blower diagrams can be found on the blower's shipping box and at the end of this manual.



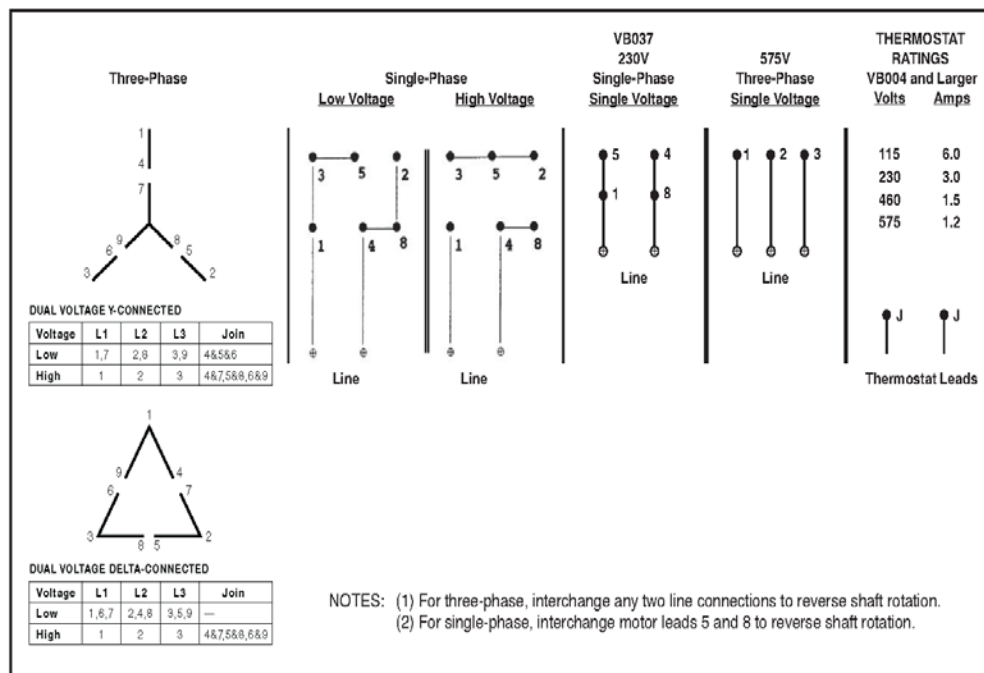
BLOWER WIRING DIAGRAM

1 AND 3 PHASE BLOWER WIRING DIAGRAMS

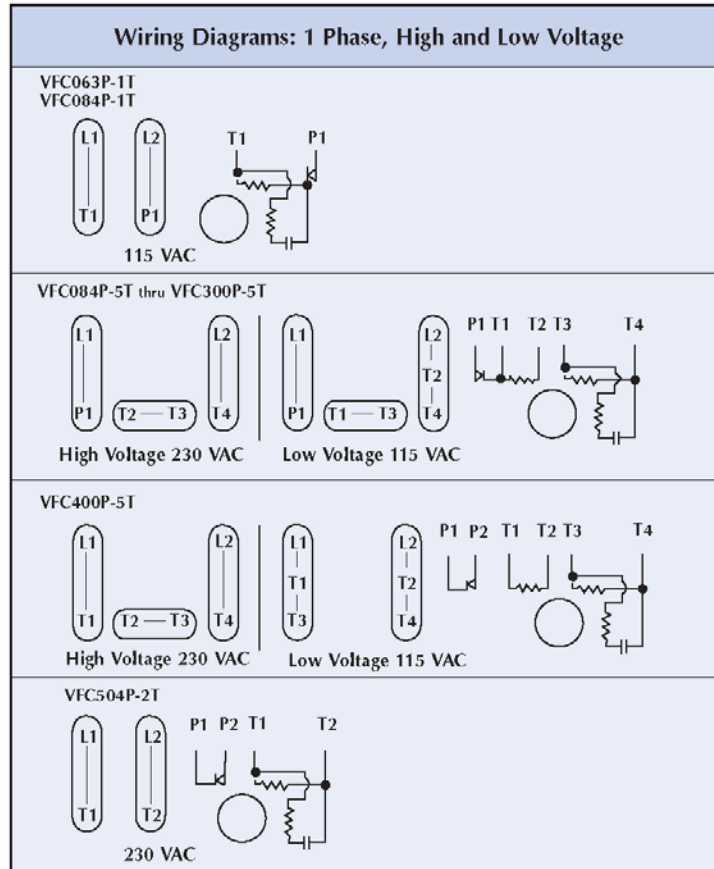
FPZ BLOWER 1 PH & 3 PH



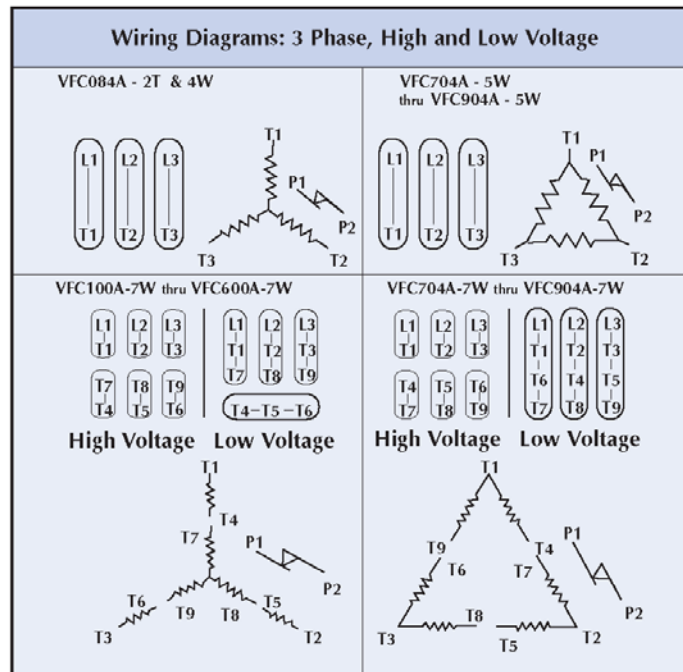
SPENCER BLOWER 1 PH & 3 PH MOTOR WIRING CW Rotation



FUJI BLOWER 1 PH



FUJI BLOWER 3 PH



GAST BLOWER 1 PH

ELECTRICAL WIRING DIAGRAMS		
Models R1102, R2103, R2105, R3105-1, R3105-12, R4110-2		Model R6150J-2
Low Voltage Single Phase	High Voltage Single Phase	Low Voltage Single Phase
Blue P1 ————— Line Brown P2 ————— Black 5 ————— Tie together Orange 3 ————— & Insulate White 2 ————— Yellow 4 ————— Tie together Line	P1 ————— Line P2 ————— Insulate 5 ————— 3 ————— Tie together 2 ————— & Insulate 4 ————— Line	T1 ————— Line T4 ————— Line Brown ————— Thermostat Wht/Yel ————— Thermostat
Models R4P115, R5125-2, R6125-2		
Low Voltage Single Phase	High Voltage Single Phase	
Purple ————— L1 Brown ————— Tie together Orange ————— & Insulate Blue ————— White ————— L2 Red —————	Purple ————— L1 Brown ————— Insulate White ————— Tie together Orange ————— & Insulate Blue ————— Red ————— L2	

CONTROL PANEL INSTALLATION



Always have all utility lines and equipment marked by a locating service provider prior to performing any work.



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.

All FAST® system electrical parts are certified for safety. The control panel enclosures meet NEMA4X standards for all-weather use (not explosive or submerged environments).

1. Examine wiring directions for the supplied FAST® control panel.

Note: *Make sure the facility electrical supply matches the label on the control panel and is compatible with the blower (voltage, phase, frequency, amperage, etc.).*

2. A dedicated breaker is required in the building's master electrical panel. Make connections between the master panel and FAST® control panel.
3. Make connections between blower and FAST® control panel per the electrical diagram.
4. BioMicrobics control panels can also be used with optional external inputs and outputs, such as dry contact input and output for alarm signaling.
5. BioMicrobics manufactures control panels that control UV systems and sewage pumps. The track system (or other auto-dialer) can also be connected to the panel.
6. For voltage, see ETL label on control panel box.

CONTROL PANEL DETAILS

With every FAST® unit, BioMicrobics provides a control panel that will match the electrical supply selected and the power requirements of the blower. The table below summarizes the control panel details for the various configuration options.

Enclosure Type	Dimensions Height, Width, Depth	Voltage	Phase	Frequency Hz	Horsepower
Box-lid	14 1/8 x 7 7/8 x 6 in [35.9 x 19.7 x 15.2 cm]	200 - 240VAC	1	60/50	2 - 5 HP
Box-lid	14 1/8 x 7 7/8 x 6 in [35.9 x 19.7 x 15.2 cm]	200 - 240VAC	3	60/50	1/2 - 10 HP
Box-lid	14 1/8 x 7 7/8 x 6 in [35.9 x 19.7 x 15.2 cm]	380 - 400VAC	3	50	1/2 - 10 HP
Box-lid	14 1/8 x 7 7/8 x 6 in [35.9 x 19.7 x 15.2 cm]	460 - 480VAC	3	60	1/2 - 10 HP

LARGE CONTROL PANEL

The larger FAST® control panels are provided with box-lid enclosures. The face of the enclosure features model and serial numbers, power indicator lamp, alarm indicator lamp, alarm silence button, and blower switch. The electrical details of the control panel are printed on a label affixed to the outside of the enclosure. The inside of the control panel enclosure contains a printed circuit board, and a contactor and overload rated for the blower motor horsepower, voltage, and phase.

Some panels will also contain a transformer mounted next to the contactor. Terminations for incoming and outgoing power are made in the field between the circuit board, contactor and overload, and blower, based on the electrical diagram supplied for each panel specifically.

Note: *The overload amperage setting supplied for a given motor size is pre-set to the appropriate place at the factory and does not need field adjustment.*

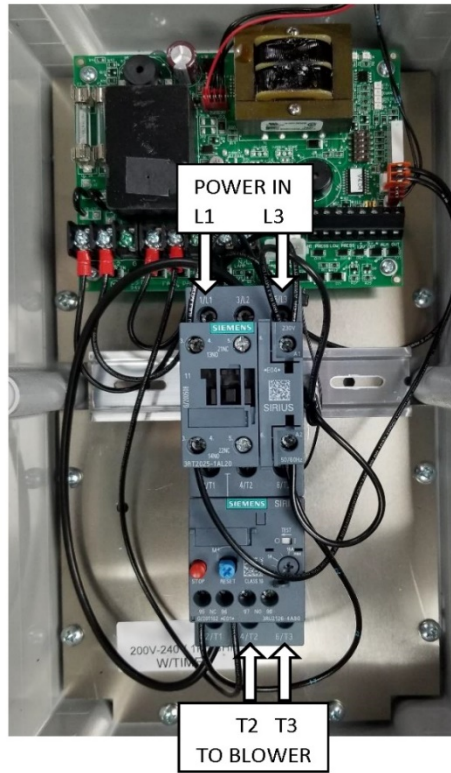
If an overload trips when energized, make sure to double-check all connections and electrical details for the control panel, blower, and facility power supply.

The circuit board has two sets of normally open dry contacts for optional connections such as a float switch or pressure switch. The normally open contacts will activate the panel alarm when closed. Next to these contacts are a 12VDC terminal that can be used to power an external dialer device, and an alarm output terminal that can be used to signal an external device when the panel goes into alarm. The alarm output is a normally open switch that will close during an alarm condition.

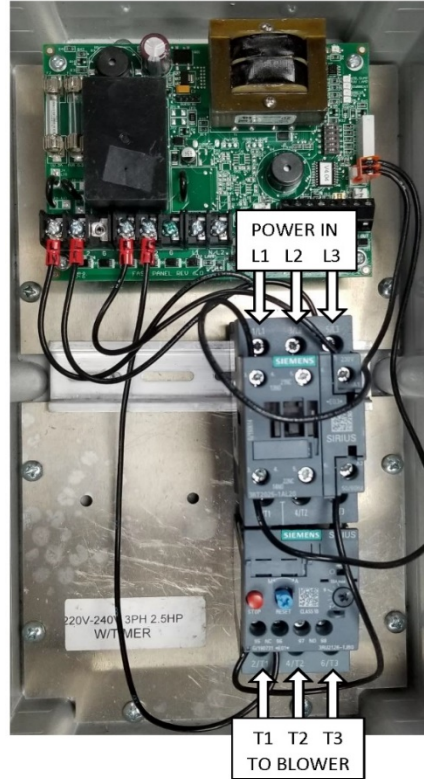
LARGE CONTROL PANEL



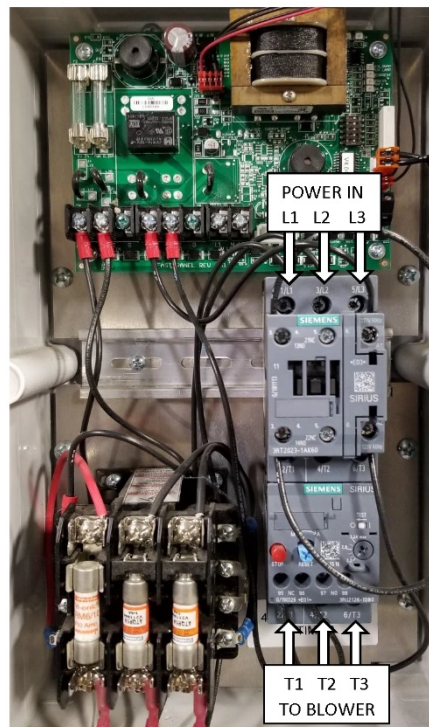
1PH 208V-240V



3PH 208V-240V

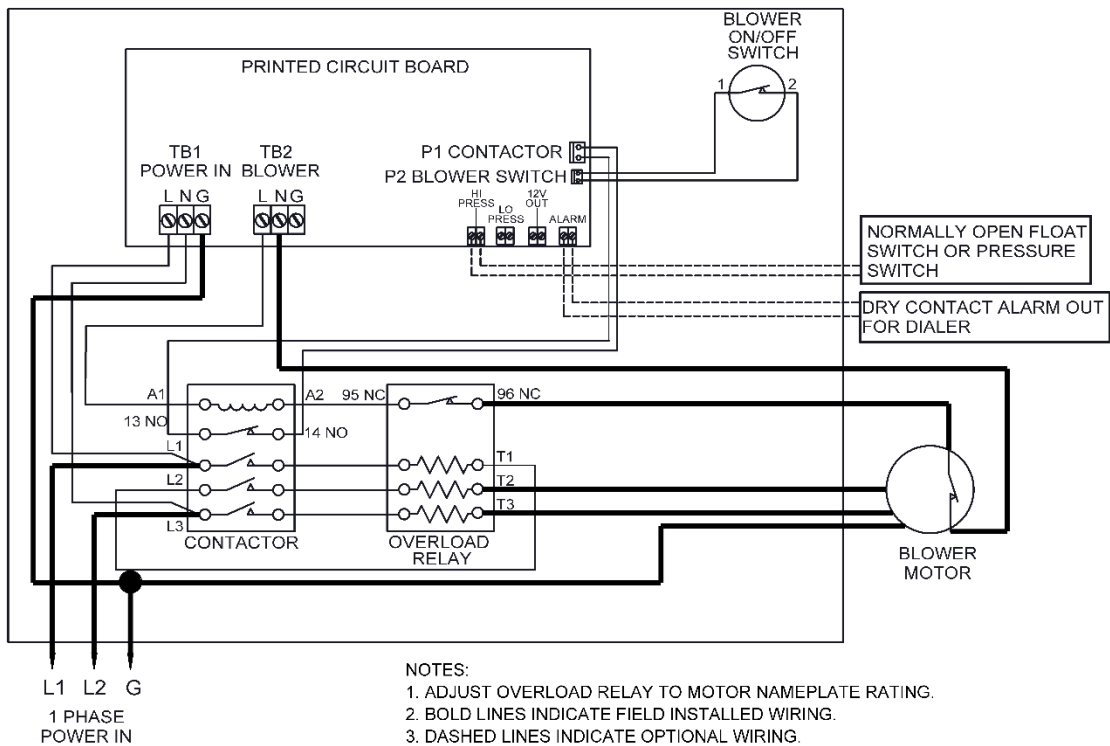


3PH 460V

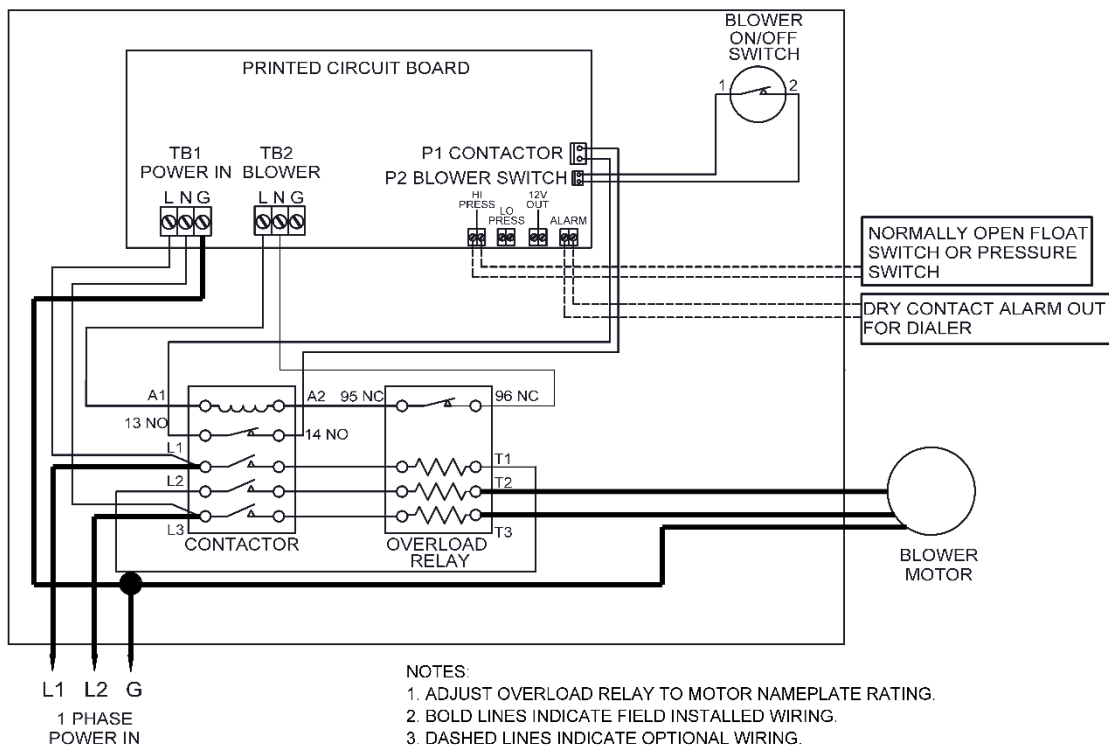


CONTROL PANEL SCHEMATICS

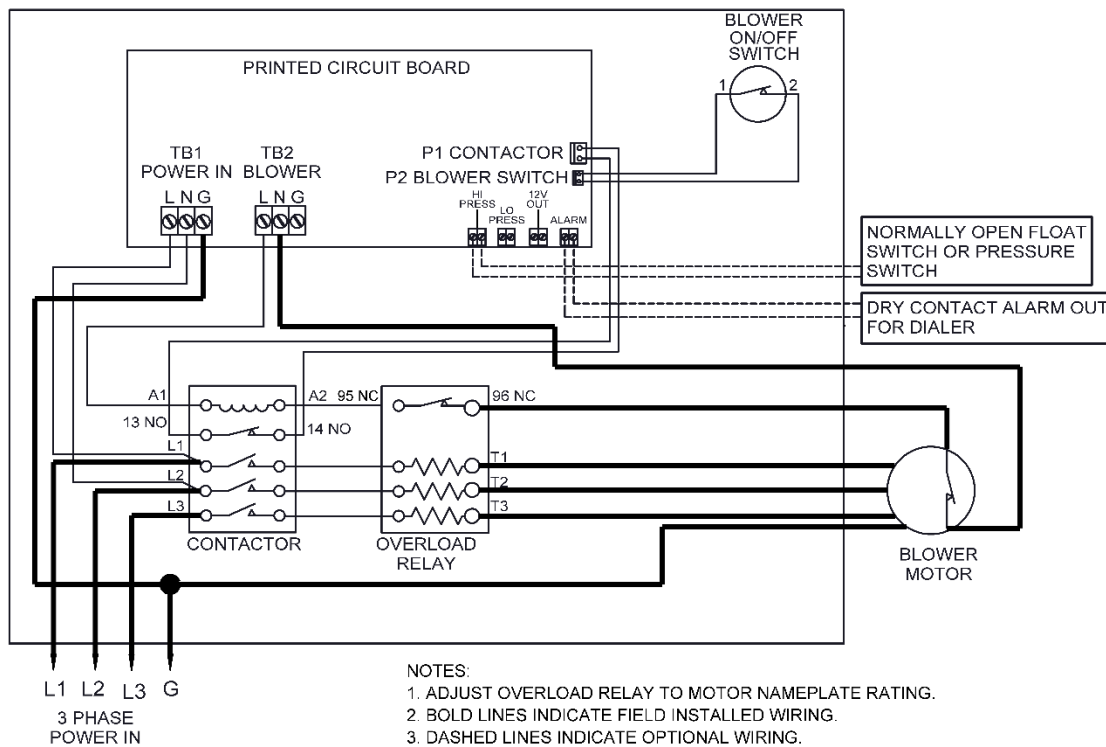
1-PHASE 200-240V CONTROL PANEL WITH THERMAL PROTECTION



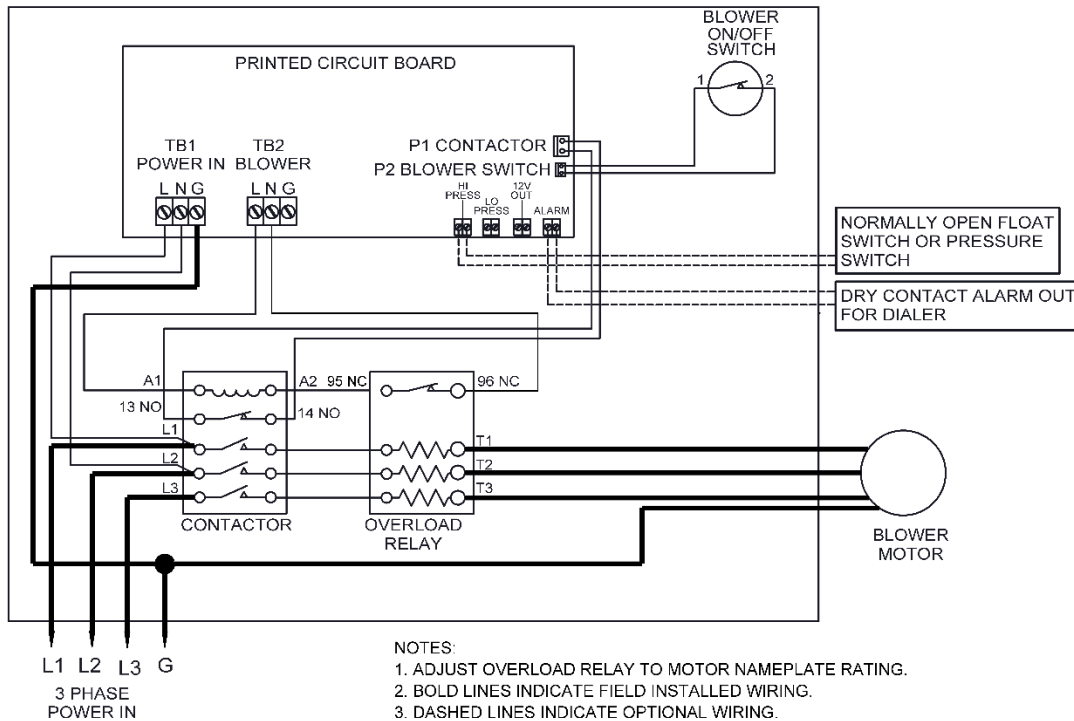
1-PHASE 200-240V CONTROL PANEL WITHOUT THERMAL PROTECTION



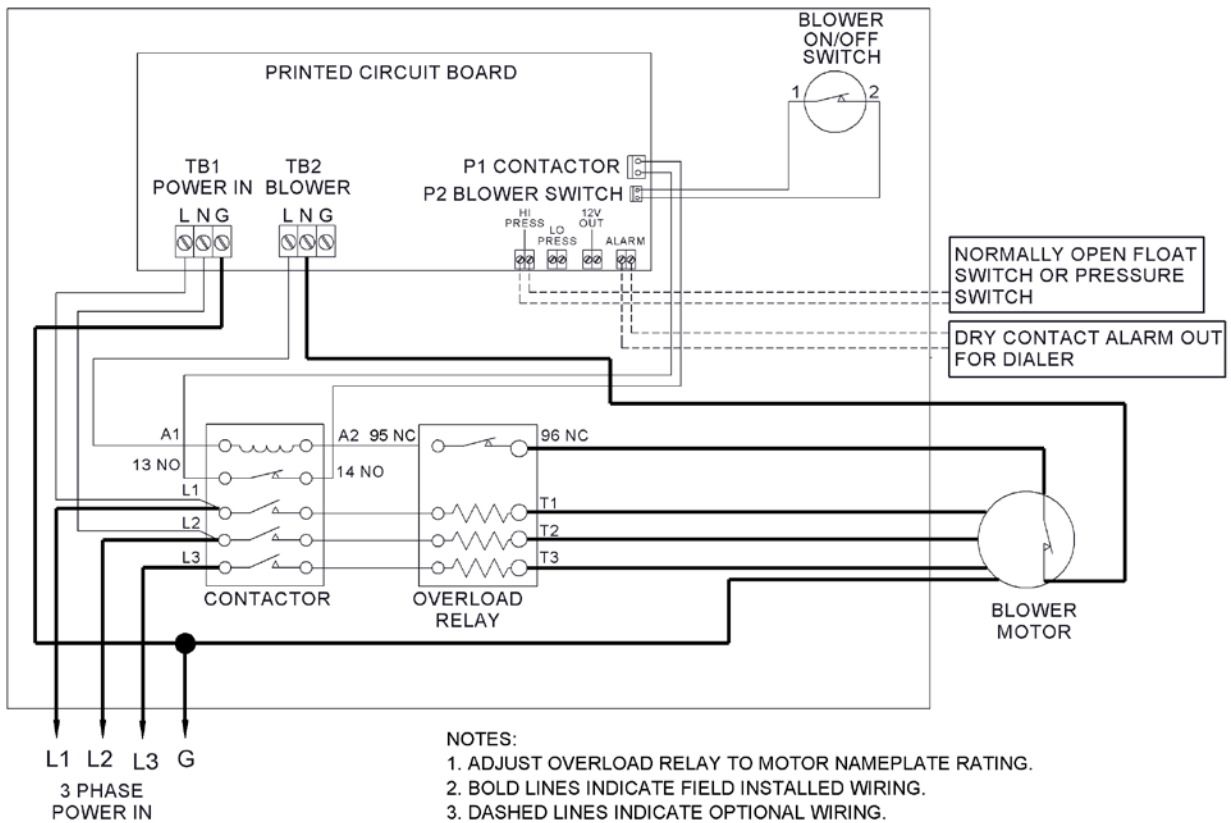
3-PHASE 200-240V CONTROL PANEL WITH THERMAL PROTECTION



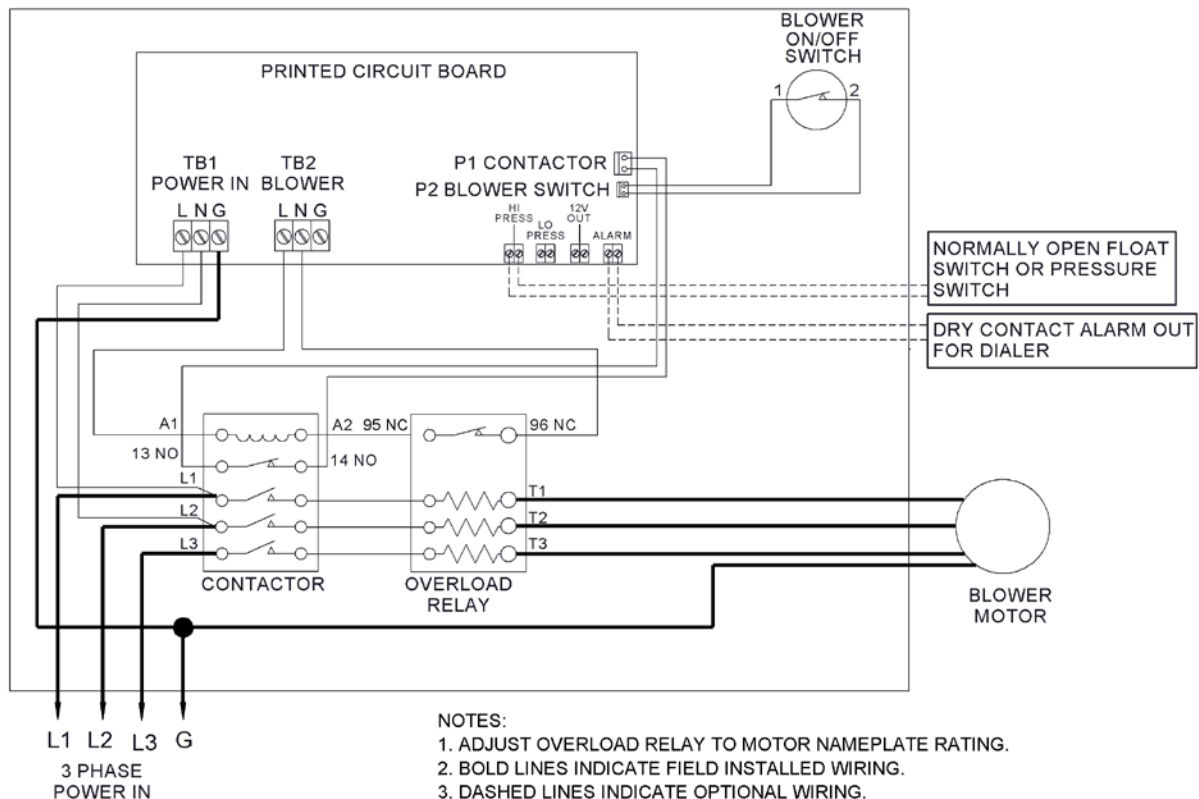
3-PHASE 200-240V CONTROL PANEL WITHOUT THERMAL PROTECTION



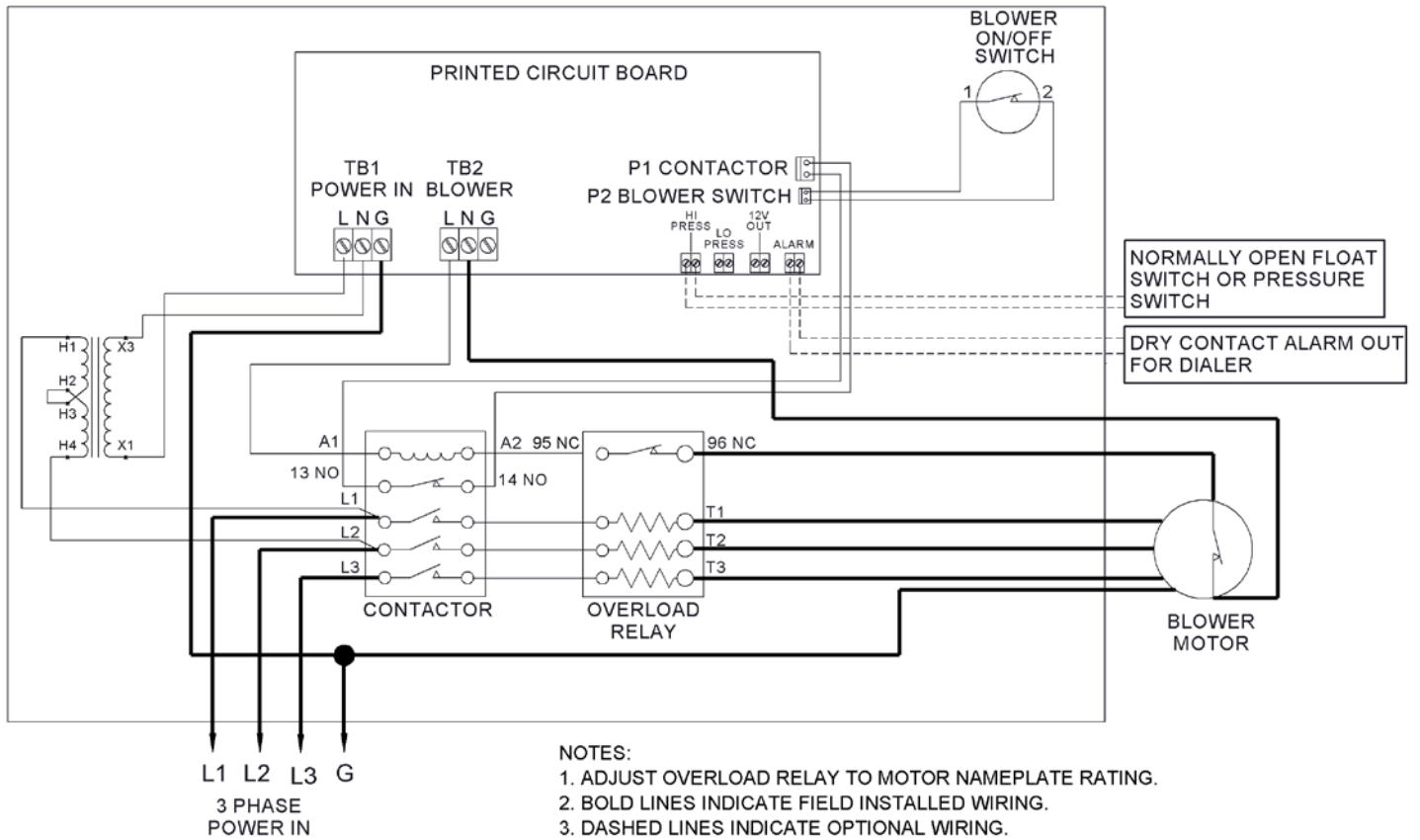
3-PHASE 208-220V CONTROL PANEL WITH THERMAL PROTECTION



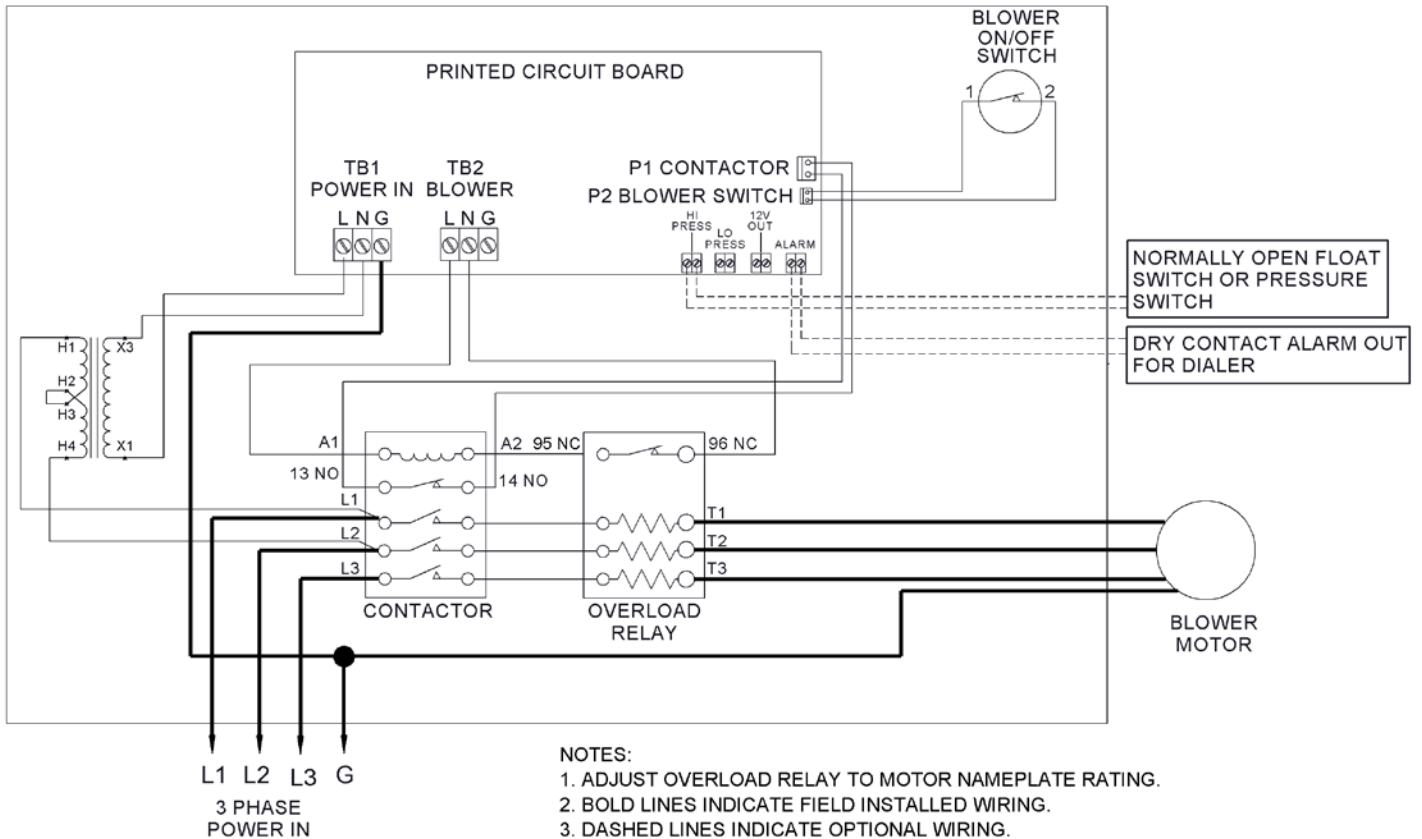
3-PHASE 208-220V CONTROL PANEL WITHOUT THERMAL PROTECTION



3-PHASE 380-480V CONTROL PANEL WITH THERMAL PROTECTION



3-PHASE 380-480V CONTROL PANEL WITHOUT THERMAL PROTECTION



It is the responsibility of the installer to ensure that the tank will not float due to hydraulic conditions at the site. Your local FAST® Systems distributor may provide installation inspection services. If you have questions, call BioMicrobics at 800-753-FAST (3278) or (913) 422-0707.

BEFORE THE UNIT IS BACKFILLED:

1. Fill the tank to the normal operating level.
2. Check for leaks in all water-tight seals.
3. Turn the blower on and observe the operation of the air lift. A robust splash should be present.
4. Check for excessive back pressure:
Seal all access covers, place hand about 8 in [20 cm] from FAST® vent. If you feel air flow then there is excessive back pressure and the system's vent must be upgraded.
5. Check for proper water level over media. The normal water line should be ~2 in [5 cm] over the media.
6. Check for proper alarm function:
Turn off the blower circuit breaker and wait for the alarm to sound. If the alarm does not sound after 30 seconds, review the electrical installation procedures.
7. Turn the blower back on.
8. Backfill the excavation.
9. Finally, record the FAST® unit's serial number in the service manual.

LIMITED WARRANTY

BioMicrobics, Inc. warrants the following systems

RetroFAST® 0.15, 0.25, 0.375

Residential MicroFAST® 0.5, 0.625, 0.75, 0.9, and 1.5

BioBarriers 0.5, 1.0, 1.5, 0.5-N, 1.0-N, and 1.5-N

STAAR® 0.5, 0.75, 1.0, 1.2, and 1.5

against defects in materials and workmanship, for a period of two years after installation or 30 months from date of shipment. For all other systems and spare parts, BioMicrobics Inc. warrants against defects in materials and workmanship for a period of one year after installation, or eighteen months from date of shipment, whichever occurs first, subject to the following terms and conditions.

TERMS AND CONDITIONS

Note: For this warranty to be effective, BioMicrobics must have received the product registration for the system.

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions that BioMicrobics, Inc. has provided, BioMicrobics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to BioMicrobics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty shall be borne by the owner. This warranty does not cover general system misuse, aerator components that have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment system and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. BioMicrobics, Inc. reserves the right to revise, change or modify the construction and/or design of the BioMicrobics system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. BioMicrobics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIOMICROBICS, INC. SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIOMICROBICS, INC. ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS.

KEEP FOR YOUR RECORDS

FAST® SYSTEM SERIAL NUMBER: _____

INSTALLATION DATE: _____

SYSTEM DESIGNER: _____

SYSTEM INSTALLER: _____

TANK MANUFACTURER: _____