FujiClean USA™ LLC
Toward Clean Water…

August 4, 2017

Marcia J. Degen, Ph.D., P.E.
Onsite Water and Sewage, Marina, and Engineering Programs
Virginia Department of Health
109 Governor St., 5th Floor
Richmond, VA 23219

Subject: Fuji Clean USA CE- and CEN-Series Submittal for TL-3 Approval in Accordance with GMP2016-03

Dear Dr. Degen:

I am pleased to submit the Fuji Clean USA CEN5, CEN7, and CEN10 for performance verification under GMP2016-03 and Chapter 613, Regulations for Alternative Onsite Sewage Systems. Fuji Clean wastewater treatment systems have been in continuous service for over 40 years with over 2 million units have been sold in Japan and internationally. The products provide consistent reliable services for millions of customers. We request your prompt review and approval of our request to verify performance consistent with TL-3.

Attached you will find the following:

- Technical Plans and Specifications as a separate attachment;
- Signed VDH "Manufacturer Agreement—Memorandum of Understanding and Agreement";
- Operation and Maintenance Agreement;
- Virginia-licensed P.E. certification that the O&M manual reflects the service and maintenance requirements of the product, a that the unit is expected to comply with GMP 147 treatment standards.

Thank you for advising us when your review is complete. Fuji Clean has already executed contracts with 3-Engineering, LLC, and Microbac Laboratories, Inc., to conduct multi-state sampling and analysis. Attached is a copy of a Virginia-specific contract with 3-Engineering, LLC.

Third-party sampling is already elsewhere including other Chesapeake Bay states. Performance data may be provided from other installations as appropriate.

41-2 Greenwood Road • Brunswick, Maine 04011 • Tel: 207-406-2927 • Fax: 207-406-2929

Fuji Clean USA, LLC, appreciates your continued cooperation both in Virginia and as a representative to the Chesapeake Bay states. You can be assured of our cooperation in matters of mutual concern.

Sincerely,

Scott Samuelson
Managing Director

Attachments:

Attachment 1: GMP2016-03 Application Form
Attachment 2: Manufacturer Agreement-Memorandum of Understanding, Signed
Attachment 3: Engineer Certification
Attachment 4: Contract with Engineer to Conduct Third-Party Sampling, Signed
Attachment 5: Engineer QA/QC Procedures for Sampling and Sampling Locations
Attachment 6: NSF/ANSI Standard 40 Technology Report, CEN5
Attachment 7: NSF/ANSI Standard 245 Technology Report, CEN5
Attachment 8; NSF Fecal Coliform Performance Report
Attachment 9; Technical Presentation and Manuals

- Operation and Maintenance Manual
- Installation Manual
- Owner's Manual

APPENDIX 1

Appendix A2:

Virginia Department of Health
Office of Environmental Health Services

Application Checklist

WASTEWATER TREATMENT TECHNOLOGY LISTING for TL-3

Please supply all requested information (form will expand as information is entered). Incomplete applications will be returned to the applicant.

Product Identification (name and model designation(s)): FUJI CLEAN CEN5, CEN7, and CEN10
Is the unit generally approved for Secondary (TL-2) Treatment in Virginia?: ☒ Yes ☐ No

Application Request (Check One): ☐ Evaluation Completed – Required data set included (see GMP 2015-3 for details)
☒ Evaluation Requested – Required data set not included

APPLICANT CONTACT INFORMATION		CERTIFYING ENGINEER INFORMATION	
Name and Title:	S□□tt Sa□uel□□n, Managing Me□ □er	Name:	Bennette D. Bur□□, □.E.
Signature and Date:		Company Name:	3-Engineering, LLC
Address:	□1 Green□ □□d Rd., Ste. 2	Address:	151□ □ ill□□ La□n Dr., Ste. 200
Telephone:	Brun□□i□□, ME 0□011 207-□0□-2□27	Telephone:	Ri□h□ □nd, □A 23230 □0□-□73-5000
Email:	□□□tt□ □uji□eanu□a.□□□	Email:	□ur□□□ 3-eng.□□□

If you checked 'Evaluation Completed' above, please supply the following information.
(If a variance to 12VAC5-613-70 is desired, please attach the variance request. See GMP 2015-3 for details.)

- ☐ Technical plans and specifications for each unit (model) proposed for TL-3 listing.
- ☐ Data set with completed statistics (minimum of 20 units sampled quarterly for one year). ***Electronic submittal (Excel format) is required. All data must be from units serving Virginia residences with year-round occupancy. All data must be submitted. Review GMP 2015-3 for more information.***
- ☐ Discussion of data set validity, including data source(s), verification of independent 3rd party sample collection, sampling protocol, sample analytical methods, unit maintenance, justification for data exclusion, etc.
- ☐ Virginia-licensed P.E. certification that the unit is expected to comply with TL-3 treatment standards.
- ☐ Operation and Maintenance (O&M) Manual. ***Electronic submittal (PDF or Word format) is required.***
- ☐ Virginia-licensed P.E. certification that the O&M Manual accurately reflects the service and maintenance requirements of the product.

If you checked 'Evaluation Requested' above, please supply the following information.

- ☒ Technical plans and specifications for each unit (model) proposed for TL-3 listing.
- ☒ Completed and signed "Memorandum of Understanding and Agreement"
- ☒ Copy of 3rd party contract and QA/QC Plan for sample collection and analysis with required submittals.
- ☐ If a partial data set is included, discussion of data set validity, including data source(s), verification of 3rd party sample collection, sampling protocol, sample analytical methods, unit maintenance, justification for data exclusion, etc. ***All data must be from units serving Virginia residences with year-round occupancy.***
- ☒ Operation and Maintenance (O&M) Manual. ***Electronic submittal (PDF or Word format) is required.***
- ☒ Virginia-licensed P.E. certification that the O&M Manual accurately reflects the service and maintenance requirements of the product.
- ☒ Virginia-licensed P.E. certification that the unit is expected to comply with TL-3 treatment standards.

Submit completed form with all attachments to: Marcia J. Degen, Ph.D., P.E. (Marcia.Degen@vdh.virginia.gov)
Onsite Water and Sewage, Marina, and Engineering Programs
Virginia Department of Health
109 Governor Street, 5th Floor
Richmond, Virginia 23219

Electronic submittals via email are encouraged; electronic data and O&M Manual submittals are required.

APPENDIX 2

Appendix B:

Memorandum of Understanding and Agreement

This Memorandum of Understanding and Agreement, made this _____ day of _____, 20 17 , is by and between the Commissioner of Health, with delegated authority to the Director of the Division of Onsite Sewage, Water Services, Environmental Engineering, and Marina Programs (the Division or Division Director) and Fuji Clean USA, LLC, the "Manufacturer."

The Manufacturer agrees to test and evaluate the efficacy of the CEN5, CEN7, and CEN10, also known as the "Treatment Unit", in accordance with the evaluation protocol set forth below and in Guidance, Memoranda and Policy 2015-03 or successor policy. The Manufacturer and the Division agree to:

1. As described in this Agreement, GMP 2016-3 or its successor, or as outlined in an approved variance, within three years of the date this Agreement is executed, complete an evaluation of a minimum of 20 Treatment Units located and installed in the Commonwealth of Virginia. The Manufacturer must conclude the evaluation on or before June 30, 2020. The Treatment Units will be jointly agreed upon by the Manufacturer and Division.

    i. Each of the 20 Treatment Units selected for evaluation must be designed and used for a single-family residential dwelling with a design flow less than or equal to 1,000 GPD, used as expected for a permanently occupied home for 12 months. Residential design flows shall be calculated using the rate of 150 GPD/bedroom. For existing data sets, the manufacturer must demonstrate the appropriateness of the Treatment Unit population represented by the data.

    ii. No evaluation or testing will be accepted for seasonal occupancy or seasonal rental use.

    iii. When new performance data is to be collected for evaluation, the Manufacturer will contact the Division when a viable Treatment Unit for that evaluation is installed or identified. Upon notice by the Manufacturer, the Division will confirm whether the Treatment Unit is suitable for testing

    iv. The Manufacturer will maintain an electronic database of Treatment Units selected for evaluation and report that database to the Division on a quarterly basis, along with the results of influent and effluent sampling conducted as described in section v (below). The Manufacturer will retain copies of the Chain of Custody forms for sample collection, transport, and measurement and provide them to the Division within five days of submitting the quarterly database report.

    v. The Manufacturer will hire and use a third party, as described in this section and accepted by the Division, to oversee and administer the testing and evaluation protocol. At a minimum, four consecutive quarterly influent and effluent samples are to be collected for 12 months from each of the 20 Treatment Units. Quarters shall run from January 1 to

March 31, April 1 to June 30, July 1 to September 30, and October 1 to December 31. Treatment Units must be in operation for at least 3 months before sampling begins.

All procedures to collect, transport, and measure samples, with proper chain of custody, must be conducted under the supervision of a suitable third party such as a faculty member in an appropriate program of an accredited college or university, a licensed professional engineer experienced in the field of environmental engineering, or by a testing firm acceptable to and pre-approved by the Division.

vi. Failure of the Manufacturer to report in accordance with section iv (above), or failure of the Manufacturer to make progress toward the goal as evidenced by the installation and monitoring of the Treatment Units, may result in the termination of this Agreement.

vii. All units must be operated and maintained in accordance with the site specific Operation and Maintenance (O&M) manual required by12VAC 5-613-170. A manufacturer may ensure that a unit is in proper working order at the start of the study; however O&M during the course of the study must be conducted by an independent, properly licensed operator identified to the Division. O&M must be conducted in accordance with the approved O&M manual. The impact of any additional O&M on the final results must be assessed in the final report. The O&M must be submitted for each site with the final report.

2. The Manufacturer will provide a copy of the contract with the third party overseeing the project to the Division, which becomes an addendum to the Agreement. The contract describes the duties to be performed by both the third party and the Manufacturer. A Quality Assurance and Quality Control (QA/QC) plan, drafted jointly by the Manufacturer and the third party, is also provided and is an addendum to the Agreement. The QA/QC plan includes information on the collection, transport, and handling of samples.

i. The third party is: 3-Engineering, LLC, 1518 Willow Lawn Dr., Richmond, VA 23230

Contact information: Bennette. D. Burks, P.E., 804-873-5000 and burks@3-eng.com

ii. If requested by the Division, the Manufacturer agrees the third party will provide at least 72 hours notice before collecting samples and allow for joint collection with the Division upon request.

iii. The Manufacturer agrees to place and assure that at least two inspection and sampling ports are available on each Treatment Unit to allow the third party to adequately sample influent and effluent. Each inspection and sampling port must be located to accurately characterize the influent and effluent generated during expected residential use.

iv. The Manufacturer agrees to test and report influent results for pH, BOD_5, and TSS. The Manufacturer agrees to test and report effluent results for flow, pH, BOD_5, and TSS. Flow may be estimated from water meter readings, pump run time meters, pump run counters, number of persons in the household, or other method detailed in the QA/QC plan.

Influent testing is required to verify that the treatment unit is receiving residential strength wastewater. If influent data is not practical to collect, then the Manufacturer may report effluent from the primary settling tank (septic tank or trash tank) as influent or another point acceptable to the Division. Flow may be induced through the unit to obtain an effluent sample, provided the induced flow rate does not exceed 5 gallons per minute and shall only extend until a suitable sample volume is collected. The Division can waive influent sampling if it is not practical to obtain valid samples.

3. Hire and use a lab accepted by the Division to perform measurements using the *Standard Methods for the Examination of Water and Wastewater* for influent and effluent, in accordance with 40 CFR 136. Composite or grab samples for TSS and BOD_5 may be used. The Manufacturer will ensure the third party provides proper chain of custody for each sampling event, which will be provided with the quarterly report.

   The certified lab: Microbac Laboratories, Inc., 2028 Dabney Rd., Richmond, VA 23230

   Contact information: Curtis Read, Project Manager, 804-353-1999, Curtis.Read@microbac.com

4. Maintain an electronic database or spreadsheet of all system installations, and report the database to the Division Director by the 15th day of January, April, July, and October of each year the evaluation continues. The report will include the following information:

   i. Sample results for influent and effluent.

   ii. Interim observations about the Treatment Unit's performance with respect to the pass/fail criteria.

   iii. For each Treatment Unit, the level of effluent treatment required for installation.

5. The pass/fail criteria for effluent will be as follows:

Effluent Parameter	Upper 99% Confidence Interval of Log-Transformed Data Converted Back to Native Units
BOD_5 (mg/l)	Less than or equal to 10 mg/l
TSS (mg/l)	Less than or equal to 10 mg/l

   Each of the four quarterly samples for each Treatment Unit shall be log transformed and then averaged before applying the statistical manipulation. A one tailed t-test shall be applied with n-1 degrees of freedom where "n" is equal to the number of test sites/units. The method detection level must be reported for the required parameter analyses. For the purposes of data manipulation, values below the method detection level will be treated as one-half of the method detection level.

6. At the conclusion of its evaluation in accordance with the Agreement, the Manufacturer will have the third party submit a final report with the following minimum information:
   i. Description of each site selected, typical installation, and how each site was selected;
   ii. Geographic locations of systems tested;

iii. O&M logs and an assessment of O&M performed;
iv. Chain of Custody forms;
v. List of key participants;
vi. Description of sampling and analytical methods;
vii. All testing results, including sample data, statistical analyses or other evaluations;
viii. Rationale for exclusion of data or removal of a system from the statistical analysis, if necessary; and
ix. An overall evaluation and assessment of the study data in relation to the pass/fail criteria.

The report must include an electronic copy of the data in Excel format in the provided spreadsheet for statistical analysis or as otherwise agreed to by the Division.

7. In return for the above considerations, the Division agrees to maintain a list of Treatment Units installed in Virginia and their sampling results. Upon conclusion of the testing and evaluation in accordance with this Agreement, the Division will render a case decision regarding whether the Treatment Unit has met the effluent performance expectations.

8. This Agreement may be amended by mutual consent of the parties and may be terminated by either party.

8. The undersigned agree to the conditions of this Agreement.

Dwayne Roadcap
Division Director

Manufacturer

APPENDIX 3

3-ENGINEERING, LLC
WATER MANAGEMENT SOLUTIONS

May 30, 2017

Allen Knapp, Onsite Program Manager
Division of Onsite Sewage and Water Services
Virginia Department of Health
109 Governor St.
Richmond, VA 23219

Dear Sir:

Subject: Certification that Fuji Clean USA Manual Reflects Service and Maintenance Requirements
Certification that the Fuji Clean CEN5, CEN7, and CEN10 Complies with GMP2016-03

I am an engineering consultant to Fuji Clean USA, LLC. In this capacity I have become familiar with and understand the capabilities and limitations of the Fuji Clean CEN-Series of onsite wastewater treatment products. I certify that in my professional opinion:

- Fuji Clean Operation and Maintenance Manual reflects the service and maintenance requirements of the product; and

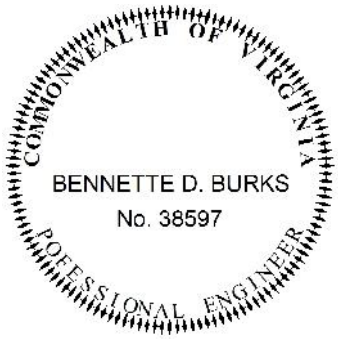
- Fuji Clean CEN5, CEN7, and CEN10 can be expected to produce effluent at the end-of-pipe that will likely meet the treatment expectations identified within GMP2016-03 as it is promulgated on May 6, 2016.

Designers may specify the installation of a Salcor 3-G to provide additional disinfection. Information on the Salcor 3-G is included in the manufacturer's submittal.

Sincerely,

Bennette D. Burks

Bennette D. Burks, P.E.



APPENDIX 4

3-ENGINEERING, LLC
WATER MANAGEMENT SOLUTIONS

August 16, 2017

Scott Samuelson
Fuji Clean USA, LLC
41-2 Greenwood Road
Brunswick, ME 04011

Dear Sir:

Subject: Professional Engineering Services
Virginia Department of Health TL-3 and TN Removal Sampling and Analysis

Project Title: Fuji Clean CEN-Series Sampling for TL-3 Performance

Scope of Work:

This letter is an addendum to the existing Letter of Engagement. The scope of work for this project are professional engineer activities required under GMP2016-03 and Chapter 613, Alternative Onsite Sewage System Regulations ("Regulations"), all issued by the Virginia Department of Health (VDH). These activities include, but are not limited, to:

- Certification that the Fuji Clean CEN5, CEN7, AND CEN10 can be expected to produce effluent likely to meet treatment expectations identified in the regulations;

- Certification that the operation and maintenance activities accurately reflect the servicing and maintenance activities of the Fuji Clean CEN5, CEN7, AND CEN10;

- Supervision of Sample Collection and analysis for at least 20 installations for TL-3 performance. Sampling will be conducted quarterly for at least 12 months and include influent and effluent BOD_5, and TSS. The complete and entire data set will be submitted to the VDH.

- Supervision of Sample Collection and analysis for TN performance. Sampling will be conducted quarterly for 12 months and include influent and effluent BOD_5, TSS, Alkalinity TKN, Ammonia, NO_2, and NO_3 and fecal coliform. Sampling will incorporate automatic 24-hour composite or grab sampling from 20 residential installations. None of the installations will incorporate a separate primary treatment tank. Fuji Clean USA, LTD, will identify the locations and type of sampling to be conducted. The complete and entire data set will be submitted to the VDH.

Standards of Performance:

1. A schedule of dates and locations will be established for collecting samples. Sampling will proceed in accordance with the schedule.

2. Samples will collected from sampling ports and transported to certified laboratories, both in conformance to *Standard Methods for the Examination of Water and Wastewater* and QA/AC protocol submitted with the TL-3 TN performance application.

3. The standard of care for services will be the care and skill ordinarily used in professional engineering practiced under current circumstances and in the Commonwealth of Virginia.

Schedule and Activities:

The Engineer proposes to commence activities upon approval of the contract. Activities will continue until the data set is complete, submitted to the VDH, and a final decision received.

Conformance to Virginia Department of Health Requirements

1. **Submission of Sampling Results.**

   Sampling results will be submitted to the Virginia Department of Health no later than the 15th day following analysis of the sample.

2. **Collection, Transport, and Testing of Samples.**

   All persons who collect, transport, or test samples will be properly trained by employees or agents of Consolidated Treatment Systems, Inc., as to the proper procedures to complete their tasks."

Sincerely,

Bennette D. Burks

Bennette D. Burks, P.E.
Principal

ACCEPTED BY CLIENT:

Scott Samuelson
Fuji Clean USA, LLC

APPENDIX 5

QA/QC Procedures for the Collection, Transport, and Analysis of Fuji Clean Samples
Virginia Department of Health Evaluation
August 16, 2017

Notes:

- **All collection and transport will conform to the latest edition *Standard Methods for the Examination of Water and Wastewater*.**
- **Units will be inspected prior to sampling to confirm the ability to obtain samples in accordance with these procedures.**
- **Sampling Ports will be required as a part of new installations and will be encouraged as a part of existing installations.**

1. Preliminary Procedures
    a. Schedule with the Testing Laboratory[1] the collection, transport, and transfer of samples
        i. Identify and Follow specific procedures the Testing Laboratory requires
        ii. Establish and Maintain with the Testing Laboratory a protocol to conduct verification analyses on duplicate samples collected and transported.
    b. Obtain Appropriate Sample Containers from Testing Laboratory
        i. BOD_5
        ii. TSS
        iii. Nitrogen Series (TKN, NH_3, NO_2, and NO_3)
        iv. Alkalinity
    c. Confirm Presence and Fitness for Use of Ancillary Sampling Equipment, if needed.
        i. Dipper
        ii. Vacuum bulb
    d. Prepare Sample Transport Container
        i. Insulated Container with fastening lid
        ii. Container filled with sufficient crushed ice to cool and cushion sample containers
    e. Examine Personal Protective Equipment for Availability and Fitness for Use
        i. Safety Glasses

[1] Fuji Clean USA, LLC, has ongoing multi-state contracts with Microbac Laboratories, Inc, for sample collection and analysis and with 3-Engineering, LLC, for sample collection coordination and sampling data analysis.

ii. Surgical Mask
iii. Gloves
iv. Disinfectant in spray bottle
v. Disinfecting cleaner
vi. Alcohol towelettes

f. Confirm Sample Collection Log is Complete
    i. Sample Locations
        1. Owner
        2. Address
    ii. Sample Number
    iii. Date
    iv. Time
    v. Weather Conditions and Temperature
    vi. Analysis Requested
    vii. Photographs Taken Y/N
    viii. Notes

2. General Sample Collection Procedures
    a. The transport container will be secured in a trunk or locked vehicle.
    b. Samples will be transported to the testing laboratory within the time limits and on the days and times established by the testing laboratory.
    c. A Chain of Custody log will be maintained for all samples.
    d. Sample collection will be conducted only by Bennette Burksor those persons whom Mr. Burks has personally trained and certified to collect samples.
    e. Sample containers will be labeled with an indelible ink pen.
        i. Date
        ii. Time
        iii. Location
        iv. Analysis
        v. Sample Number

vi. Other information as directed by the testing laboratory

f. Two samples for each analysis will be collected.
    i. Inspect piping and area in proximity to sample location to confirm the absence of any object or item that could affect the validity of the sample to be collected.
    ii. Debris, which could include but is not limited to insects, spider webs, small animals or vegetation, settled solids, or any other substance, will be removed prior to sampling, if necessary, such that a representative sample is collected.
    iii. Induce flow for at least 30 seconds before collecting sample.
        1. Measure time with a stop watch or by manual count
    iv. Collect sample
        1. Directly into sample container, if possible.
        2. Using a *disinfected* dipper or vacuum bulb and transfer immediately into the sample container. Disinfection will be accomplished by wiping with an alcohol towelette and/or rinsing with a chlorine solution and then drying the sampling instrument immediately prior to sample collection.

3. Influent Sample Collection
    a. Collect samples from the discharge piping to the dose tank, if installed, or treatment tank
4. Effluent Sample Collection
    a. Collect samples from sealed, designated sampling port attached to the Fuji Clean treatment tank, if installed.
        i. Sampling port will be purged prior to sampling, if necessary.
        ii. Debris will be removed, if necessary, such that a representative sample of the effluent is collected.
        iii. Wipe pipe with alcohol towelette to disinfect the pipe in preparation for the fecal coliform sample.

   b. Collect the fecal coliform sample first.
   c. Collect sample from discharge to effluent pump tank, if effluent pumping is conducted.
   d. Collect sample using a dipper or vacuum bulb from top of weir plate in the center of a filter media opening. Immediately transfer sample to sample container.
5. Place samples in insulated transport container.
6. Transport Samples to the Testing Laboratory.
7. Complete the Chain of Custody log.
   a. Complete and Sign forms required by the Testing Laboratory
   b. Maintain receipts issued by the Testing Laboratory.
8. Request Duplicate Sample Analysis in Accordance with the QA/QC protocol.
9. Distribution of Sampling Results
   a. Documentation of all sampling events will be available through an electronic portal.
   b. Sampling Results will be available through an electronic portal.

APPENDIX 6

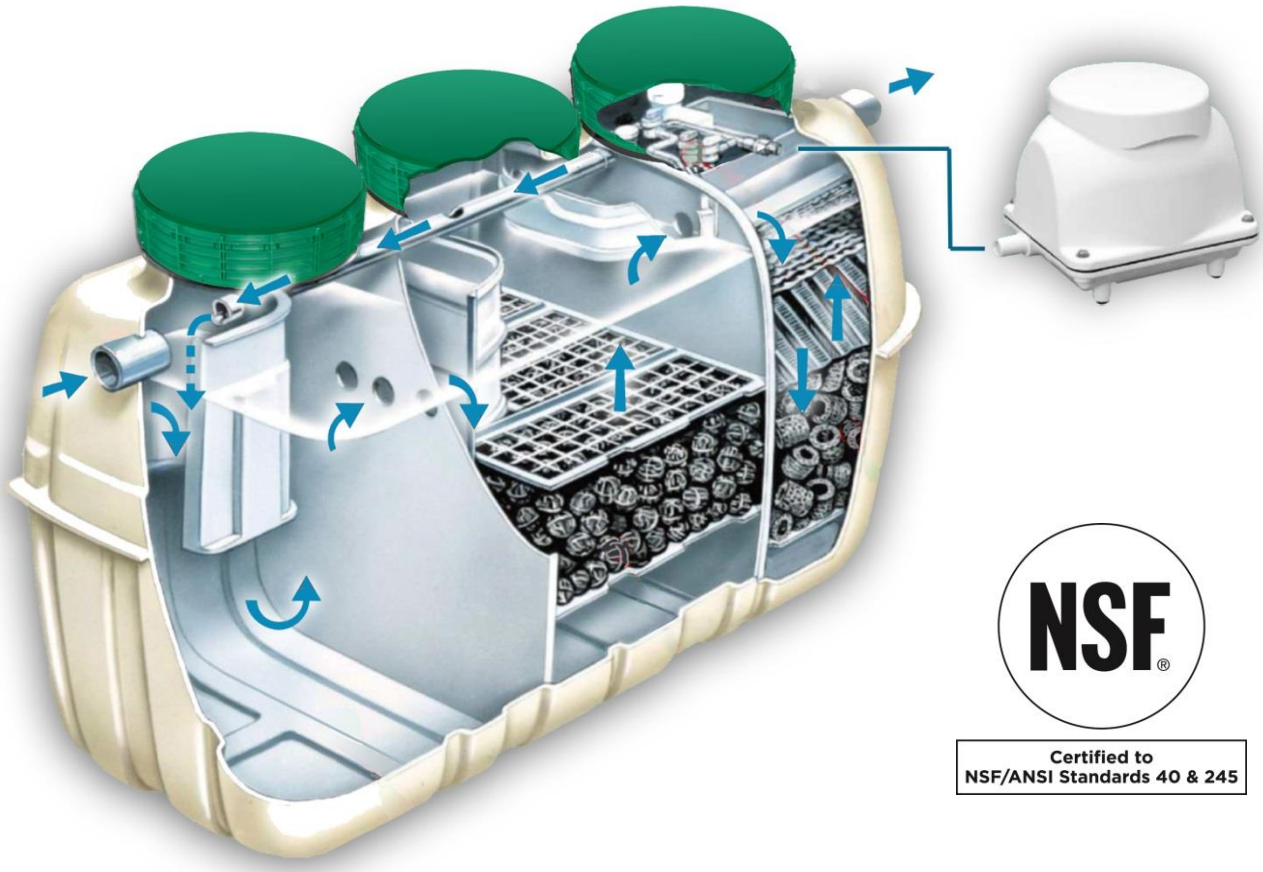
APPENDIX 9

FujiClean USA™ LLC

Toward Clean Water…

Owner's Manual – Residential Systems

Rev. 1-13-16



NSF®

Certified to
NSF/ANSI Standards 40 & 245

Intelligently Engineered Treatment Systems for Domestic Wastewater

Service Provider:

Name: _____

Company: _____

Address: _____

Telephone: _____

Email: _____

Model:

□ **CE5** □ **CE7** □ **CE10**

□ **CEN5** □ **CEN7** □ **CEN10**

CE models are certified to NSF/ANSI 40 Standards

CEN models are certified to NSF/ANSI 40/245 Standards

System Serial # _____

Blower Serial # _____

Fuji Clean USA ● 41-2 Greenwood Road ● Brunswick Maine 04011 ● Tel: 207-406-2927 ● Fax: 207-406-2929 ● www.fujicleanusa.com

Thank You!
Thank you for choosing a Fuji Clean USA treatment system. You have selected a technology from the world's #1 onsite treatment manufacturing company with over 2 million treatment systems installed and operating world-wide. We want you to understand your treatment system and how to treat it wisely. We also understand that you just want it to work. No drama! Your Fuji Clean system investment will not only assure the long-term health of your drainfield, but will also enhance the ecological health of your outside home environment.

What it Does
Your Fuji Clean treatment system is essentially your own personal wastewater treatment plant. Dirty "domestic" (i.e. household, from bathrooms, kitchen, sinks etc.) wastewater goes in and clean water comes out, which then flows into the environment, such as into a leachfield. Designed to produce a consistent, high-quality treated effluent, your Fuji Clean treatment system is a living biological ecosystem that relies on billions of living microbes to consume the pollutants in wastewater. Oxygen is introduced to keep the microbes alive and healthy (hence the air blower) and various forms of high surface area plastic "media" are incorporated into the system to provide space for microbes to live and consume waste material.

Why do I Have this System?
Not every onsite septic system requires treated effluent. The designer of your system likely specified treatment because site conditions (such as lot size, soil conditions, proximity to an environmentally sensitive area or effluent requirements) demanded treatment. Your Fuji Clean treatment system is simply an appliance to assure the long term health of wastewater disposal on your home site. It works for you. Thank you for treating it with respect and care.

The Fuji Clean Story
The lack of available land in Japan for on-site wastewater disposal has driven Japanese on-site wastewater treatment technology way ahead of the standard we typically experience in America. In Japan, treated domestic wastewater has to be discharged directly into storm water drains, so the quality of treated water must be consistently high to avoid serious public and environmental health issues.

In its 50-year history of manufacture and sales of wastewater treatment systems, Fuji Clean's innovative R&D scientists and engineers have continuously improved and refined the product into the compact, highly effective, and efficient wastewater treatment system that it is today and helped Fuji Clean Company grow into a world-wide market leader in the onsite wastewater treatment industry.

Fuji Clean USA offers you "boots-on-the-ground" in the U.S. market. We provide final pre-installation assembly and quality control inspection checks on all Fuji Clean systems. We pride ourselves on friendly, respectful and effective customer service, clear communication in all forms and offering first rate training support to your system distributor, contractor and service provider.

Service and Support
Your local distributor will provide you with a trained and certified service provider and a service plan, which will be in effect from the date of system installation. Please contact Fuji Clean USA directly if you need assistance locating your distributor or a certified service provider in your area.

Service providers typically will provide you with a service plan tailored to your system and state and local regulations. At a minimum, here is what you should expect from your Initial Service Policy covering the first two years of your system warranty:

1. Name and contact information for your service provider including emergency contact information. (Note: print this information on the cover of this Manual and be certain that your service provider has affixed contact information to inside of the alarm/control panel.

2. Provisions for 4 inspection/service visits made within 2 years of initial system installation.

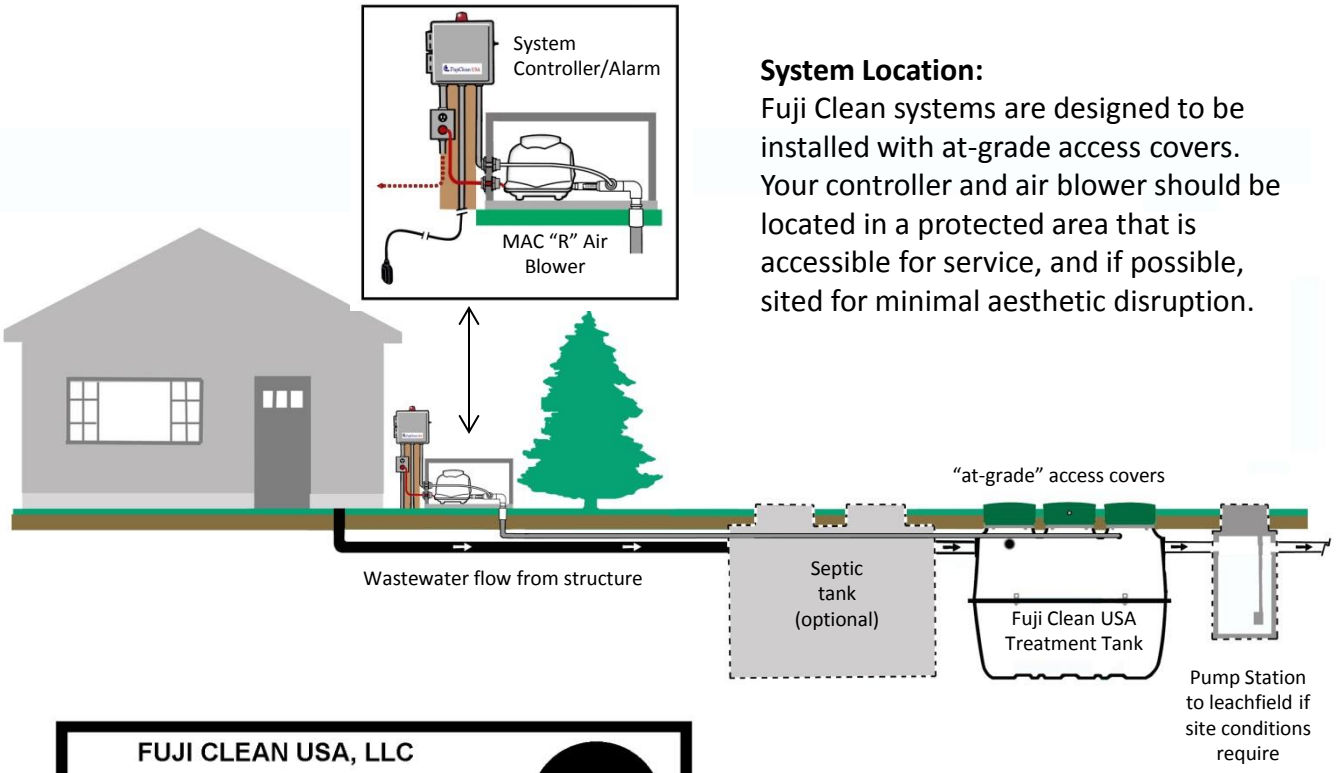
3. A service plan that includes a check sheet or inspection report made available after each visit that includes at least the following information:
    a. Date.
    b. Purpose of visit.
    c. Evidence of inspection and specific maintenance to your treatment system (including the air blower).
    d. Reports of any problem or concern with a plan and schedule for corrective action.
    e. Report on effluent quality that includes description of effluent color, turbidity, scum overflow and odor.
    f. A clause that states that the owner shall be notified in writing about improper system operations that cannot be remedied at the time of inspection.
    g. Information on an extended service policy available for purchase by the owner with terms comparable to those in the initial service policy.

Fuji Clean USA requires that an "Extended Service Policy" is in place following the expiration of the Initial Service Policy (2 years from date of installation). Implementation of the Extended Service Policy shall be provided by a trained and certified service technician (trained by either Fuji Clean USA or one of its distributors).

System Layout:
Your Fuji Clean treatment system is designed to accept wastewater directly from your house, clean it using a proprietary "contact filtration" process and prepare it for final discharge such as to a soil absorption leachfield or drainfield. Oxygen, necessary for treatment, is introduced via a Fuji Clean Company manufactured, MAC "R" Series air blower, which is a state-of-the-art, top-in-class, linear diaphragm air pump. An alarm/controller monitors treatment activity and is triggered if the system floods or the blower stops operating.

Some sites may also include a septic or settling tank prior to treatment, often installed because of local or state requirements and some sites may also include a separate post-treatment pump station if treated water must be pumped uphill for final discharge.

Your Fuji Clean USA system has been engineered to be simple to operate, quiet and hassle-free. It should be inspected and maintained on a semi-annual basis.



System Location:
Fuji Clean systems are designed to be installed with at-grade access covers. Your controller and air blower should be located in a protected area that is accessible for service, and if possible, sited for minimal aesthetic disruption.

This NSF label, located both on the control/alarm panel and inside the treatment system (typically on the inside riser) of all Fuji Clean USA systems , will indicated that this system meets the requirements set forth in NSF/ANSI Standard 40 & 245, which is a purification performance standard for the treatment of domestic strength wastewater. If you are interested in additional details on this 3rd party testing and certification process, please contact Fuji Clean USA, your distributor or NSF International (www.nsf.org).

Treatment Process Overview

Fuji Clean's "contact filtration" treatment is a simple, well engineered process that consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see diagram below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.

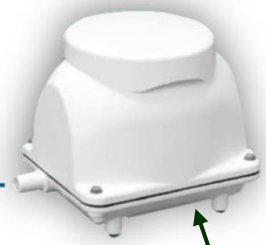
Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

Chamber 3B. Disinfection Chamber (final zone before discharge – option for chlorination tablet disinfection)

Chamber 3A. Storage Chamber (settling zone)

Sludge Transfer (Recirculating air lift pumpback) See airlift pump info below.

Outlet



Inlet

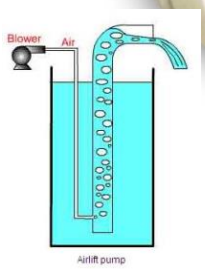
Powered by the MACBlower "R" Series Blowers State-of-the-art linear diaphragm air blowers manufactured by Fuji Clean Co sized to provide about 2.8 cubic feet per minute to most residential systems.

Chamber 3. Aerobic Contract Filtration Chamber (both board and cylindrical hollow mesh media) oxygen rich zone for aerobic microbe digestion activity, solids filtration and nitrification of ammoniac nitrogens to nitrates

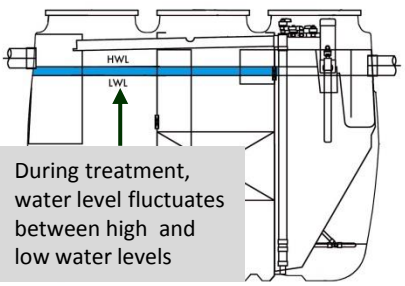
Overflow Effluent Weir

Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified

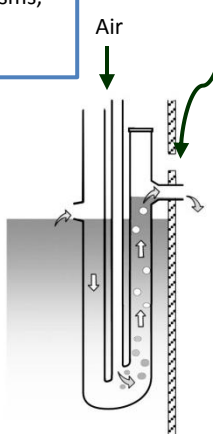
Chamber 1. Sedimentation Chamber (separates solids and greases)



Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.



During treatment, water level fluctuates between high and low water levels



Flow Equalization When water level exceeds LWL, treated water is discharged through Chamber 3B via the Effluent Air Lift pump. If water level exceeds HWL, then treated water is also discharged through an overflow effluent weir.

Which Fuji Clean System Do I Have?

Your system designer or engineer has specified your specific Fuji Clean USA system model based on three main criteria:

1. Wastewater Volume (or Hydraulic Load, typically expressed as gpd, or gallons per day): Usually based on the number of bedrooms in a residential house
2. Wastewater Strength (or Biologic Load): For example, wastewater characteristics from a restaurant will differ and typically be of higher strength than domestic wastewater coming from a residential house.
3. Effluent Requirements: Typically based on state or local regulations, designating how much of what type of pollutants may be discharged to the environment.

Fuji Clean USA has two major residential series models; the CE-Series and the CEN-Series. Both models are designed to remove organic pollutants (as measured by BOD_5, which stands for "Biochemical Oxygen Demand," and is a measure of the concentration of oxygen, expressed as mg/L, utilized by microorganisms in the oxidation of organic matter during a 5-day period at a temperature of 68-degrees F) and solids (as measured by TSS, Total Suspended Solids, which is the quantity of solids, expressed as mg/L, which can be readily removed from a well-mixed sample with standard laboratory filtering procedures).

While the CE models remove some of the nutrient, Nitrogen, (expressed as TN for Total Nitrogen), from the waste stream, the CEN-Series systems are specifically designed to remove higher levels of nitrogen from the waste stream, hence the "N" designation.

The table below, specifies size, expected measure of treatment based on residential strength waste and the associated size and power draw for each Fuji Clean USA system model.

FUJI CLEAN USA DESIGN SPECIFICATION TABLE	Residential CE Series BOD, TSS, TN*			Residential CEN Series BOD, TSS, TN (Enhanced Nitrogen Removal)		
Model	**CE5**	**CE7**	**CE10**	**CEN5**	**CEN7**	**CEN10**
Load (Bedrooms)	4	6	8	4	6	8
Effluent (assumes domestic strength influent):						
BOD (mg/L)	10-20	10-20	10-20	10	10	10
TSS (mg/L)	10-20	10-20	10-20	10	10	10
TN (mg/L)	10-20	10-20	10-20	10	10	10
Tank Detail:						
Tank Volume Total (gallons)	540	749	1,069	749	1,069	1,498
Height (inches)	61.8	65.7	73.6	65.7	73.6	77.4
Length (inches)	85	95.7	98.8	95.7	98.8	118.9
Width (inches)	43.7	49.2	56.7	49.2	56.7	68.9
Weight (lbs.)	397	463	73.6	463	705	926
Inlet Invert (inches to 1/8")	49	53	61	53	61	62
Outlet Invert (inches, to1/8")	47	51	59	51	59	59.5
Power Use (kWh/day)	1.27	1.27	1.92	1.27	1.92	1.92
* TN data was obtained during CE testing, but not to NSF245 testing protocol. CEN testing was to NSF245 protocol.						

How to Keep Your System Healthy

So, you've made an investment in your Fuji Clean treatment system. You have a service provider and service plan. Now, you just have to respect your system and treat it right.

Here's the common-sense bottom line…. Remember that your treatment system is a living system. Billions of living microbes consume pollutants from your wastewater. Excessive fats, oils and greases can smother living microbes. Toxic substances can poison them. Therefore, please refrain from introducing items such as these into your system.

KEEP THESE ITEMS OUT OF YOUR SYSTEM!
THEY WILL HARM THE LIVING ORGANISMS
WORKING TO CONSUME POLLUTANTS FROM YOUR WASTEWATER!

CHEMICALS

Excessive Bleach
Paint & Paint Thinners
Herbicides & Insecticides
Motor Oil and Antifreeze
Antibiotic Pills
Chemical De-Clogging Agents

TRASH

Sanitary Napkins
Cigarette Butts
Baby Wipes
Dental Floss
Condoms
Kitty Litter
Paper Towels

FOOD

Excessive Cooking Grease
Coffee Grounds
Fruit and Vegetable Peels

GARBAGE DISPOSALS

Garbage disposals are not recommended for this or any onsite septic system. These devices inject heavy and inconsistent organic loads into the system, which can interfere with normal processing.

WELL DISINFECTING

Sometimes a contaminated well must be disinfected with bleach. In this event, we recommend that you flush chlorinated water from the system through outdoor faucets to prevent an excessive slug of chlorine from entering your treatment system.

System Components: Controller and Alarm

Your Fuji Clean system is equipped with a simple control panel that monitors system operation. There are two types of events that will trigger an alarm (both audio and visual).

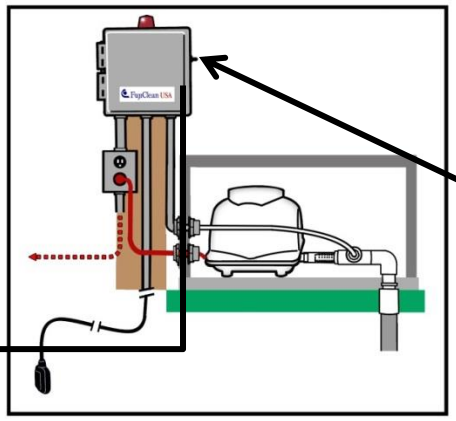
1. High-Water Alarm: Triggered if the water in the tank reaches levels well above standard operating levels. This is a very rare event, but may occur for example if run-off ground water infiltrates the treatment tank or if a post-treatment discharge pump station malfunctions and water backs up.

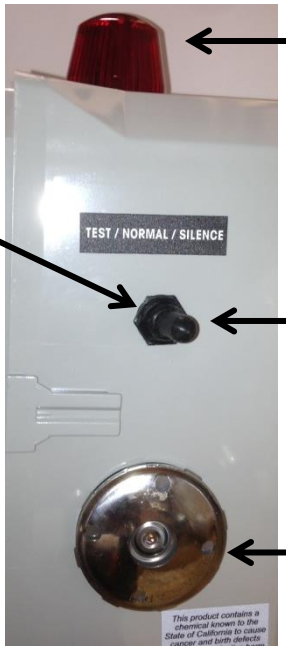
2. Blower Fault Alarm: Triggered if the air blower stops operating and there is a drop in air pressure to the system.

In either case, if the alarm is triggered, push the toggle switch to "Silence," and contact your service provider for assistance. If requested, system reference information is posted on the data plate affixed to the alarm controller panel. (See detail) Your service provider may be able to resolve the problem over the phone (for example there may be debris blocking the air intake to the air blower), or may need to come onsite to service the system.

Please note, following an alarm event, the red beacon will remain on while the system is in "silent" mode, until the system controller is reset to run in "Normal" mode.

At any time, you may pull the Toggle Switch to the "Test" position to assure that the light beacon and horn alarm are operating properly. Reset the switch to "Normal" for normal operation.





Red Beacon

Toggle Switch

Alarm Horn

You may reference the NSF data plate located inside the alarm panel in communication with your service provider.

System Components: MAC Blower
A separate Owner's Manual is provided for your air blower. Please keep both manuals together and accessible to your system service provider.

Frequently Asked Questions:

Our system is on our vacation home. Should I turn it off when we are not home? Fuji Clean systems are designed to accommodate variable and intermittent flows, including only weekend use, but this assume that the air blower operates continuously regardless of inflow. However, for seasonal use properties, the air blower may be shut down if the system is not going to be used for an extended period of time. The blower should be re-started at least three days in advance of system use if possible.

What if there is a power outage? During a power outage, the blower will cease operation and after about 24-hours, treatment quality may begin to diminish. However, the Fuji Clean system will still allow wastewater to pass through the system and will not create a backup in the house unless a separate pump station has been installed.

Does my system need servicing? Your Fuji Clean system is designed to require minimal service, but inspection and service every 6-months is necessary during the first two years of service to assure proper operation. States vary in terms of mandatory service requirements after the initial 2-year warranty/service period expires, but Fuji Clean USA's extended service policy mandates that your system be maintained properly, which calls for semi-annual inspection/service visits from a trained and certified service provider. (This schedule may be altered for seasonal, and part-time sites). Your certified service provider will review details of initial (first two years) and extended (2 years +) service.

Does my system need to be pumped out? Like an ordinary septic tank, sludge must be removed from your system periodically (such as once every 2 years). Your service provider will measure sludge build-up during each inspection and will provide pump-out guidance for you. Pump out frequency depends on waste stream strength and use. Please consult with your service provider to help determine the pump-out frequency that is best for you.

How much will it cost in electricity to run my system? Since your Fuji Clean USA system has been designed to operate continuously, it is easy to calculate power cost. All residential units draw 1.3 kWh of power per day except for the CE10, CEN7 and CEN10, which draw 1.9 kWh of power per day. Simply multiply your local cost of power by the draw per day to calculate daily power cost.

Can I use a garbage disposal with my system?
As noted in another section of this manual of how to maintain your system's health, garbage disposals are not recommended for this or any onsite septic system due to the heavy and inconsistent organic loads injected into the system, which can interfere with normal processing. Use of a garbage disposal may increase the frequency of sludge pumpouts.

Fuji Clean USA, LLC Limited Warranty

Period of Coverage
Fuji Clean USA, LLC warrants the parts in each treatment unit to be free of defects in material and workmanship for a period of two years from date of system installation at the site where residential wastewater is to be treated. An Extended Warranty shall be made available by Fuji Clean USA, its authorized dealers or service providers after the initial two-year coverage period.

Obligations of Fuji Clean USA, LLC
At its sole expense, Fuji Clean USA, LLC will service and repair the installed unit including all parts and labor that show evidence of defect or unacceptable performance for any reason when operated within design parameters, provided that all financial obligations of the owner/purchaser are in compliance the Sales Agreement provided by an authorized dealer of Fuji Clean USA treatment systems. Determination of defect or unacceptable performance shall be made by a Fuji Clean USA authorized dealer, distributor and/or service provider.

Exclusions
This Warranty does not apply to Fuji Clean USA units that have been tampered with or altered by unauthorized persons, improperly installed or have been subject to external physical damage or acts of god. Further, this Warranty does not cover systems that have been flooded by external means or damage done by altered or improper wiring or overload protection. Additionally, this Warranty does not apply if the system has been operated beyond its maximum design capacity or permit, if the approved design has been altered after the fact, or if the system has been contaminated with disinfecting tablets, excessive use of bleach or other chemicals injurious to biological growth.

Other Provisions
This Warranty only applies to the Fuji Clean USA, LLC treatment processing system and does not include any wiring, plumbing, drainage, disposal or leaching systems. Fuji Clean USA, LLC or its dealers or authorized service providers also reserves the right, to furnish a component part which, in their judgment, is equivalent to the company part replaced. Further, owner agrees to provide to Fuji Clean USA, or its authorized dealers or service providers with clear access to the processor covers on a year round basis.

Under no circumstances will Fuji Clean USA, LLC be liable for direct or consequential damages including but not limited to lost profits, lost income, labor charges, delays in production or idle production time or habitability which results from any defects in material and/or workmanship of Fuji Clean USA, LLC's system or units.

This Warranty is expressly in lieu of any other expressed or implied warranties. Further, any implied warranties for merchantability and fitness for a particular purpose are hereby disclaimed.

This Warranty provides the owner/purchaser specific legal rights. You may have other rights, which vary from state to state.

Troubleshooting Guide

This Troubleshooting Guide is provided to help identify system malfunctions or problems. However, please be aware that in most cases, system inspection, maintenance, repair and adjustment requires the services of your trained service provider, whose contact information can be found on the cover of this manual and/or on the inside of your control/alarm panel. System covers should only be opened by a trained and certified service technician!

You are always welcome to contact Fuji Clean USA for additional assistance or if you have comments or questions.

TROUBLESHOOTING	
General	
SYMPTOM	**SOLUTION**
Water is ponding around risers and covers	Landscaping is necessary (possibly involving addition of fill material) so that water drains away from risers and covers. Note: risers may be added to the unit as necessary, but service personnel must be able to reach into the unit and move controls. Recommended maximum riser height is 24-inches.
Strong and unusual odor exists even with the manhole lids closed.	During the first few weeks of operation there may be noticeable odor from the system. This should cease once the bacteria are established. If odor persists, seeding material may be added to both anaerobic and aeration chambers, and/or the recirculation rate may be increased to 35%, the upper end of the normal operation range. If odor continues to persist, please contact manufacturer for instructions. Installation of a vent may be necessary.
Blower is making an unusually loud noise	Normal blower operation is quiet. Typically a loud or rattling blower noise is created when the blower is in contact with its housing, or has slipped off its base platform.

TROUBLESHOOTING

General

SYMPTOM	SOLUTION
Alarm beacon is lit and/or audible alarm horn is sounding.	System alarm is triggered by either too much water flowing through the system or the air from the blower is not reaching the system. Please silence the horn by pushing the toggle switch located on the right side of the alarm/control panel the “Silent” mode. Please call you service technician for assistance. Service technician contact information can be found on the cover of this Manual or on the inside of the alarm/control box. Please note: Alarm beacon will stay lit even if horn is silenced.
There is a water back-up in the house	Fuji Clean systems are equipped with a system overflow relief weir so it is extremely unlikely that a septic system backup is caused by your Fuji Clean system. More likely any backup will be the result of clogging in a preceding septic tank (usually the effluent filter) or possible from a pump station that is not operating. However, a pump station fault should trigger an alarm. Contact your service provider immediately.

Troubleshooting Guide – for Service Professionals

This Troubleshooting Guide is provided to assist your service professional. A much more detailed guide as well as explanation of service procedures is provided in the Fuji Clean USA Operation and Maintenance Manual. Please do not remove system covers unless you are a trained and certified Fuji Clean USA service technician.

TROUBLESHOOTING

Chamber 1. Sedimentation Chamber

SYMPTOM	SOLUTION
Inlet pipe is blocked	Remove the blockage.
Excessive scum accumulations. (Scum layer reaches the top of the influent baffle)	Measure sludge level. If the depth of sludge accumulation is less than 24-inches (or 18-inches in Chamber 2), break the scum layer, otherwise have the plant pumped out.
Excessive sludge accumulations. (Depth of sludge layer exceeds 24-inches)	If the sludge exceeds the holding capacity, have the plant pumped out.
Foreign materials, excessive oil or fat entering the system.	Remind the homeowner to refrain from disposing harmful substances into their system. (Please refer to Homeowner's Manual for listing.)

TROUBLESHOOTING

Chamber 2. Anaerobic Filtration Chamber

SYMPTOM	SOLUTION
Excessive scum accumulation. (less than 4-inches)	If Chamber 1, the Sedimentation Chamber still has the remaining sludge holding capacity, (less than 24-inches of sludge build-up), transfer the scum to the sedimentation chamber, otherwise have the plant pumped out.
Excessive scum accumulation. (more than 4-inches)	Have the plant pumped out.
Excessive sludge accumulations	If the bottom sludge layer is thicker than 18-inches and excessive sludge has accumulated on the filtration media, have the plant pumped out.
Filtration media is blocked up. (The water level in Chamber 2's media is lower than that in the baffle.)	Perform a degassing operation on the filtration media. (Poke media with a section of PVC pipe. See O&M procedure #12). If the problem still persists even after the degassing and sludge transfer operation, pressure wash the filtration media using an effluent pump and hose affixed to a PVC pipe.
Foreign materials, excessive oil or fat entering the system.	Remind the homeowner to refrain from disposing prohibited substances and limited-use substances.

TROUBLESHOOTING

Chamber 3. Aerobic Contact Filtration Chamber

SYMPTOM	SOLUTION
Bubbles are not evenly distributed throughout the chamber or there are no bubbles at all.	• Adjust the aeration control valve. • Check to make sure that there is no leakage from the aeration pipework. • Check to make sure that the blower operates properly. • Clean the aeration pipes • Perform a backwash operation. (O&M Procedure #12).
Dissolved Oxygen is less than 1.0mg/L.	• Check to make sure that the blower operates properly. • Perform a backwash operation. (O&M Procedure #12).
Recirculation rate is unable to be adjusted or no recirculation at all.	• Adjust the recirculation control valve. • Check to make sure that there is no leakage from the aeration pipework. • Check to make sure that the blower operates properly.
Recirculation flow rate is too high	• Clean the aeration pipes
Recirculation flow rate is too low	• Clean the recirculation airlift pump.
Excessive foaming.	• Some foaming may occur during the early stage of operation. This should cease once the bacteria are established. Seeding may also be effective. Please contact your distributor for additional seeding information.
Excessive suspended solids.	• Perform a backwash operation.
Cold water is hampering treatment	The following measures will allow greater oxygen penetration into biofilm. • Increase frequency of backwash • Increase blower size • Perform desludge operation (i.e. sludge pumpout)

TROUBLESHOOTING

Chamber 3a. Storage Chamber

SYMPTOM	SOLUTION
Scum forming.	• Transfer the scum to Chamber 1, the Sedimentation Chamber, using a pump, ladle or suitable container. • Increase the recirculation rate (within the normal operating range).
Excessive sludge accumulations.	• Transfer the sludge to Chamber 1, the Sedimentation Chamber, using a pump, ladle or suitable container.
pH is too low or too high. (pH < 5.8 or pH > 8.6)	• Check to make sure the recirculation rate is appropriate. • Remind homeowner of what cannot be put into this system (refer to Homeowner's Manual). • Install a slow-release lime dispersal system into the sedimentation chamber to raise the pH. Please contact Fuji Clean USA for details.
Excessive biofilm on the chamber wall.	• Clean the wall with brush or water pressure and transfer solids to the sedimentation chamber.
Effluent airlift pump is not working.	• Clean the airlift pump. • Flush the effluent control valve. • Check to make sure there is no leakage from the blower pipework. • Check to make sure that the blower operates properly.

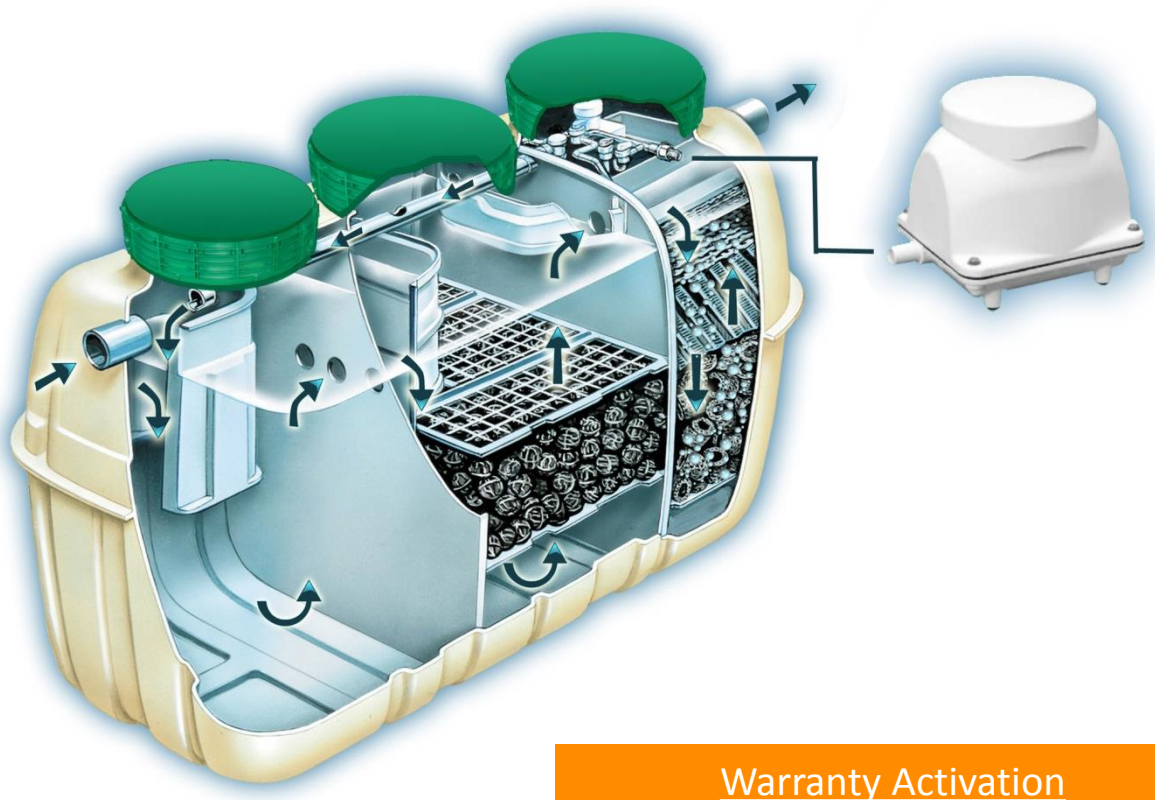
TROUBLESHOOTING

Air Blower

What to observe	Status	How to solve the problem
Blower is not working		
Power plug	Power plug is disconnected.	Connect the power plug to the outlet.
Alarm triggered (if alarm exists)	Diaphragm is damaged. Auto-stop function is activated.	Replace the diaphragm kit. Re-insert the auto-stop piece.
	Check if blower is electrified.	Replace the power cable.
		Replace the auto-stop piece.
		Replace the electric magnet.
	Internal flat terminal has fallen out.	Secure the terminal.
Blower is making an abnormal or excessive operating noise.		
Installed condition	Blower is not secured.	Secure blower in horizontal position.
Oscillator	Oscillator is damaged.	Clean the inside of aeration pipe by rotating valve and adjust aeration level to be even.
	Oscillator nut is loose.	Tighten oscillator nut.
Low air volume or misplaced air from aeration pipes (treatment plant)		
Faulty diaphragm	Diaphragm, outlet.	Replace diaphragm using diaphragm kit.
Aeration leak	Grommet partition	Check internal parts assembly and re-attach the pump.
Air filter is clogged	Air filter	Clean or replace air filter.
Aeration pipes	Pipes are disconnected.	Reattach / repair pipes.
	Clogging	Clean the inside of aeration pipes.

FujiClean USA™ LLC

Toward Clean Water…



Warranty Activation

To activate system warranty, Fuji Clean USA must receive Warranty Activation Card! Please see page 13.

Contractor Installation Manual

Residential Systems
CE and CEN Models

Rev. 8-2-16

NSF

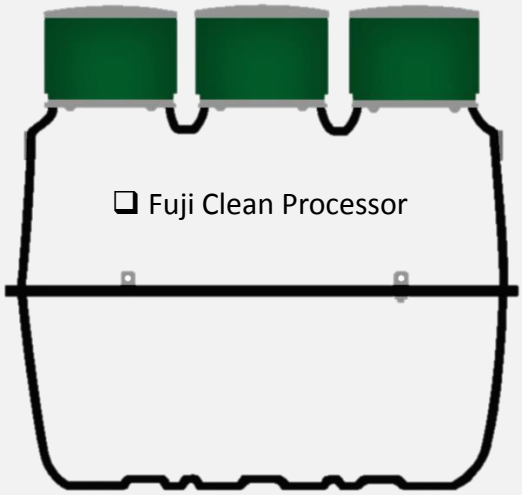
Certified to NSF/ANSI Standards 40 & 245

Fuji Clean USA ● 41-2 Greenwood Road ● Brunswick Maine 04011 ● Tel: 207-406-2927 ● Fax: 207-406-2929 ● www.fujicleanusa.com

Fuji Clean USA™ LLC
Toward Clean Water…

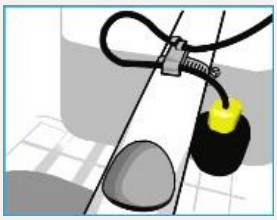
Thank you for choosing to install a Fuji Clean USA treatment system. We care that the system is installed properly and thoughtfully. Fuji Clean USA or your qualified distributor will train and certify you for proper installation. PLEASE contact your distributor or Fuji Clean USA for assistance or with ANY questions.

Equipment Supplied by Fuji Clean USA

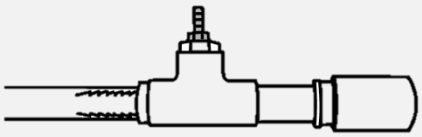


❑ Fuji Clean Processor

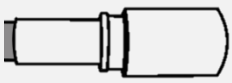
❑ SJE Rhombus Signalmaster Float Switch (Center chamber with 3-1/2" tether).



❑ Air Vent Plug

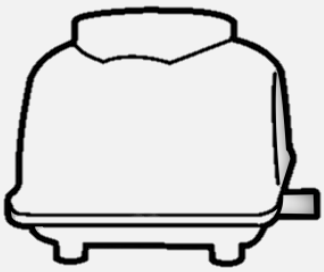


❑ Blower Adaptor Fitting with Barb



❑ Tank Adaptor Fitting

❑ NEMA 4X Rated Alarm/Controller



❑ Fuji Clean MAC "R Series"
❑ UL Approved Air Blower

❑ Installation Manual
❑ Owner's Manual

❑ NSF 40/245 Dataplates as Required

❑ 1/8" (ID) Vinyl Micro-Tubing for Air Pressure Sensing Alarm

Fuji Clean USA ● 41-2 Greenwood Road ● Brunswick Maine 04011 ● Tel: 207-406-2927 ● Fax: 207-406-2929 ● www.fujicleanusa.com

Equipment Supplied by Contractor

Risers and Covers per Site & Regulatory Requirements
Note: Tuf-Tite Risers in 6" or 12" height increments and covers are available from your distributor or Fuji Clean USA. If not already installed, please refer to page 5 for installation instructions.
Model CE5: Three (3) Tuf-Tite 20" Risers
Models CE7, CE10 and CEN Series: Two (2) Tuf-Tite 20" Risers plus One (1) 24-inch Riser and One (1) Tuf-Tite 24-RTT Adaptor and Two (2) Tuf-Tite RTR Adaptors (optional) for height parity.

Insulation for Cold Climate Installations
To maintain optimal treatment conditions, Fuji Clean recommends insulated risers and covers as well as foam board or insulating material (min. R-Value 8) over the upper half of the treatment tank.

Septic Tank and/or Pump Station.
If local code or site conditions mandate. Fuji Clean system are designed to accept straight wastewater.

Fresh Water
Systems must be filled with fresh water to Low Water Mark (LWM) before start-up. Approx. gallons required per model: (CE5: 435; CE7: 610; CE10: 925; CEN5: 610; CEN7: 925; CEN10: 1,230).

Piping/Conduit
- 4" Schedule 40 for inlet and outlet lines.
- ¾" PVC conduit for air line.
- Electrical conduit for float switch line (or use direct burial line).

Electrical
- Please use licensed electrician and adhere to applicable national/local electrical code(s).
- Two (2) standard 115V, 15A circuits for control/alarm panel connection.
- Float Switch Wire: #18 AWG (comes with standard if extension <50-ft. is required).
- Float Switch: Comes pre-installed in treatment system. For electrical hookup, please refer to SJE Rhombus installation instructions.
- Miscellaneous fittings and connectors to assure watertight connections.

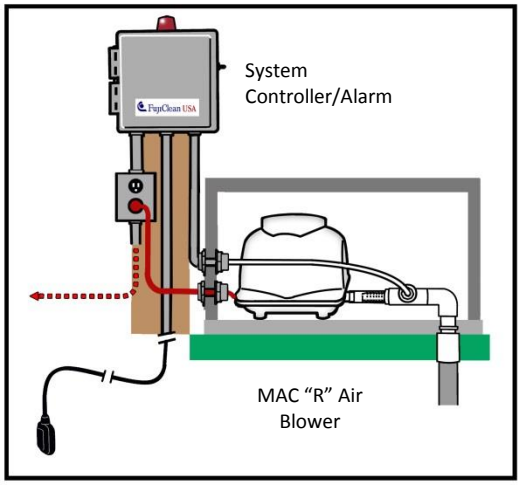
Anti-Float Devices, if necessary
- Please refer to high water, anti-float recommendations in this manual.

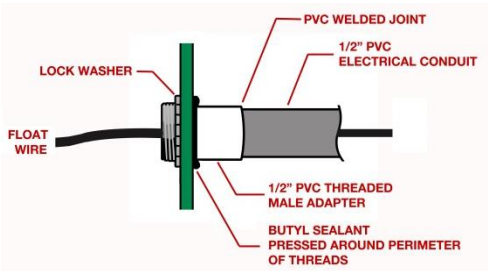
Materials for Blower / Controller Installation
- Concrete base (or equivalent) on which to set air blower.
- Protective cover for air blower (vented and able to achieve free airflow in all conditions).
- Materials or location on which to mount control panel and protect from elements.

Crushed Stone, Fill, Loam etc.
- Fuji Clean USA is not responsible for design, installation or materials associated with leachfield or treated wastewater disposal area.

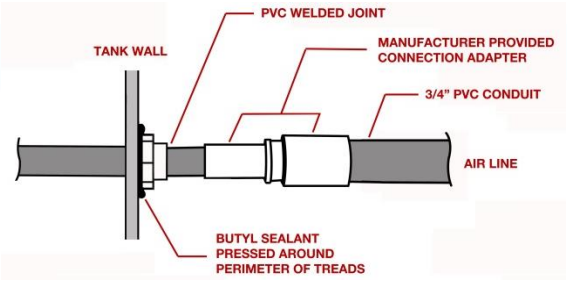
Please note: Proper installation permitting is the responsibility of the installing contractor.

Installation Overview





For connection of float switch cord to alarm panel, drill hole in riser and use male fitting and electrical conduit. Plug fitting with sealant standard that meets ASTM C990-96 to assure water-tight seal and to prevent septic gas transmission into control panel.



For connection air line to tank, use sealant meeting ASTM C990-96 standard to prevent septic gas transmission into control panel.

Please Note:

1. Fuji Clean systems are designed to accept straight septic wastewater and do not require a preceding septic or settling tank

2. "Clearwater" water softener backwash should be discharged directly to footer (if regulations allow) or diverted around Fuji Clean system to drainfield.

Sample Label

Using grommets or a waterproof adhesive, labels meeting NSF standards (supplied by Fuji Clean USA) shall be affixed in two locations., inside the riser and on the inside of the controller.

Treatment Process Overview

Fuji Clean's "contact filtration" treatment is a simple, well engineered process that consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see diagram below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.

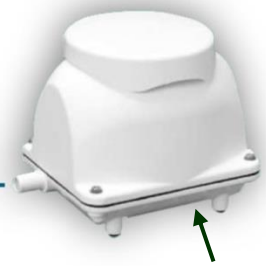
Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

Chamber 3B. Disinfection Chamber (final zone before discharge – option for chlorination tablet disinfection)

Chamber 3A. Storage Chamber (settling zone)

Sludge Transfer (Recirculating air lift pumpback) See airlift pump info below.

Outlet



Inlet

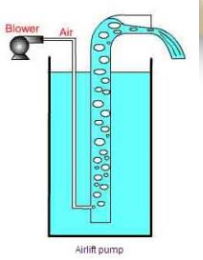
Powered by the MACBlower "R" Series Blowers State-of-the-art linear diaphragm air blowers manufactured by Fuji Clean Co sized to provide about 2.8 cubic feet per minute to most residential systems.

Chamber 3. Aerobic Contract Filtration Chamber (both board and cylindrical hollow mesh media) oxygen rich zone for aerobic microbe digestion activity, solids filtration and nitrification of ammoniac nitrogens to nitrates

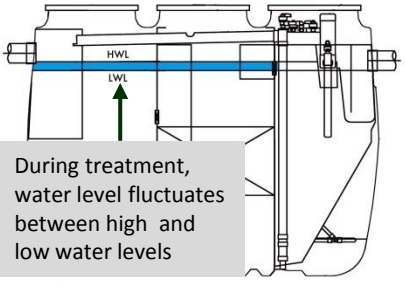
Overflow Effluent Weir

Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified

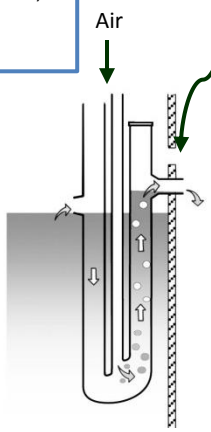
Chamber 1. Sedimentation Chamber (separates solids and greases)



Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.



During treatment, water level fluctuates between high and low water levels



Flow Equalization When water level exceeds LWL, treated water is discharged through Chamber 3B via the Effluent Air Lift pump. If water level exceeds HWL, then treated water is also discharged through an overflow effluent weir.

Riser Installation

Please note: Systems typically are delivered with risers pre-installed. These instructions are provided only in cases where risers are not in place. Fuji Clean systems accept Tuf-Tite brand risers.

Trim tab struts (on 6" Tuf-Tite risers) with vibrating cutting tool and apply mastic or caulk along inside as shown. (Note: Sealant must meet at least ASTM C990-96 Standard).

Apply sealant for watertight seal.

Please Note! Shown with removed gray cover adaptor. Use end nipper pliers to cut plastic rivets. (Note: adaptors can be left in place for 20" openings – contractor's choice)

Press down until tabs are flush with access port rim.

Secure with stainless hardware.

After the Tuf-Tite 24-RTT adaptor is used, adjust for riser height differential on the remaining two 20-inch access ports using a Tuf-Tite 20-RTR Adaptor (provided by distributor) secured to the top of each riser. Please Note: Gray Fuji Clean adaptor and covers may be used or green Tuf-Tite covers as desired.

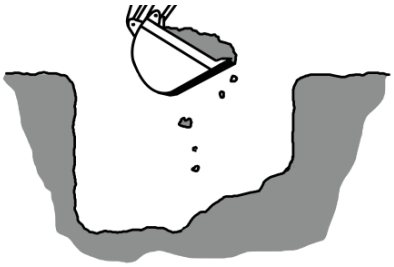
Two alternative riser configuration options are shown. The first includes using the Tuf-Tite risers installed and secured to the tank in an <u>upside down</u> configuration and then using the gray Fuji Clean adaptor ring and Fuji Clean cover as shown. The second (good for 20" risers only), shows an intact adaptor ring.

Use sealant that meets ASTM C990-96 Standard here.

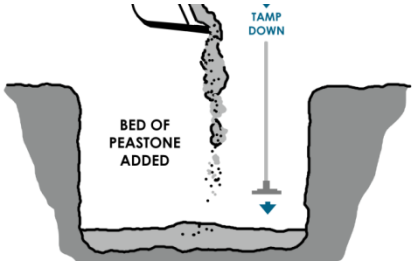
Installation Procedure

Unloading Instructions:

- ❑ Upon delivery, inspect Fuji Clean tank, both outside and inside for possible damage incurred during transport. If you find damage, or have a question, please contact your distributor immediately.



❑ **Step 1: Prepare excavation to be at least 1 to 2 feet larger than Fuji Clean system dimensions as listed below. Important Note: Riser height should not exceed 24".**



❑ **Step 2. Prepare 4"- 6" bed of stone (¼" to ½"), level to within 1/8".**

FUJI CLEAN USA DESIGN SPECIFICATION TABLE	Residential CE Series BOD, TSS, TN*			Residential CEN Series BOD, TSS, TN (Enhanced Nitrogen Removal)		
Model	CE5	CE7	CE10	CEN5	CEN7	CEN10
Load (Bedrooms)	4	6	8	4	6	8
Tank Volume Total (gallons)	540	749	1,069	749	1,069	1,498
Height (inches)	61.8	65.7	81.3	81.3	73.6	77.4
Length (inches)	85	95.7	152.8	152.8	98.8	118.9
Width (inches)	43.7	49.2	72.4	72.4	56.7	68.9
Weight (lbs.)	397	463	1,168	1,168	705	926
Inlet Invert (inches to 1/8")	49	53	61	53	61	62
Outlet Invert (inches, to1/8")	47	51	59	51	59	59.5
Blower Size (Standard**)	80 L/min	80 L/min	100 L/min	80 L/min	100 L/min	100 L/min
Power Use (kWh/day)	1.27	1.27	1.92	1.27	1.92	1.92

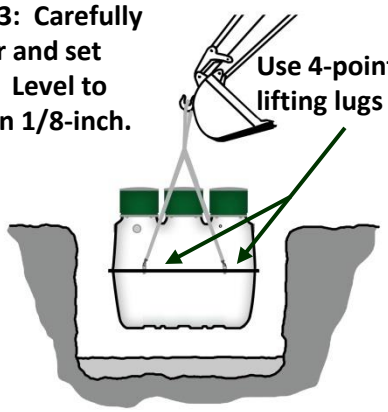
* TN data was obtained during CE testing, but not to NSF245 testing protocol. CEN testing was to NSF245 protocol.

** Assumes blower siting conforms to parameters outlined in Step 8 of this Manual and site is below 10,000 ft. in altitude. If site if above 10,000 ft., please refer to table below for recommended blower sizing.

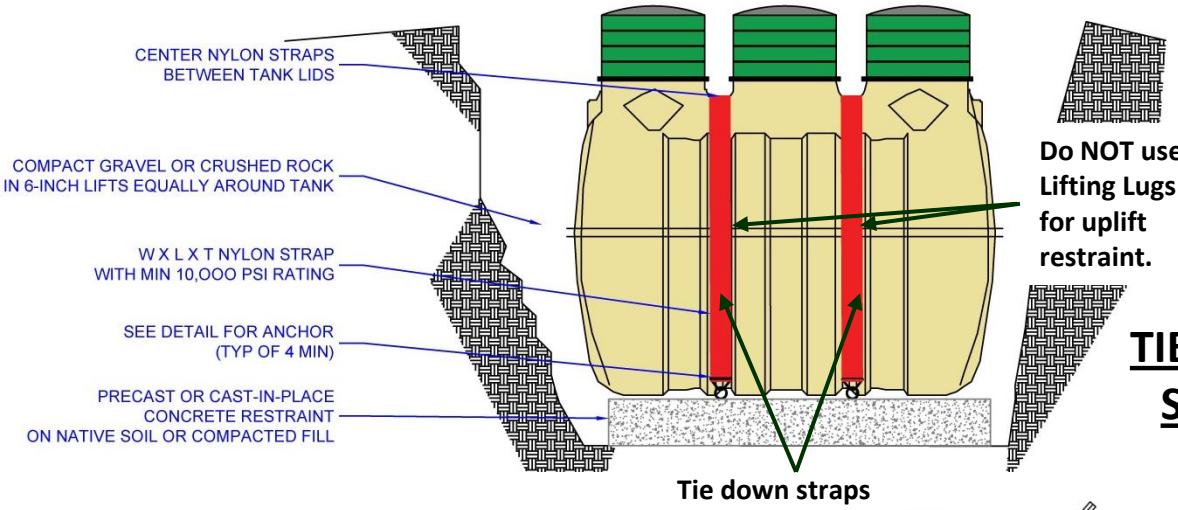
Recommended blower sizing for site above 10,000 ft. above sea level.

Blower Capacity vs Altitude		
	Blower Size (L/min)	
Model	0-10,000 ft	> 10,000 ft
CE5/CEN5	80	100
CE7/CEN7	80	100
CE9/CEN9	100	120

❑ **Step 3: Carefully lower and set tank. Level to within 1/8-inch.**

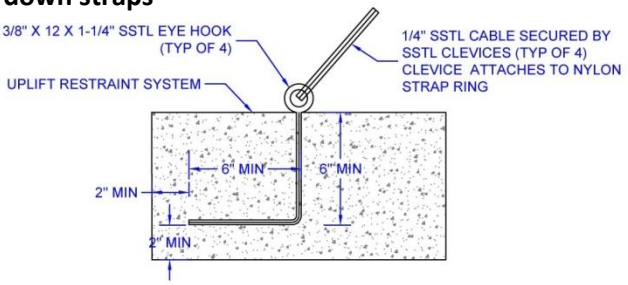


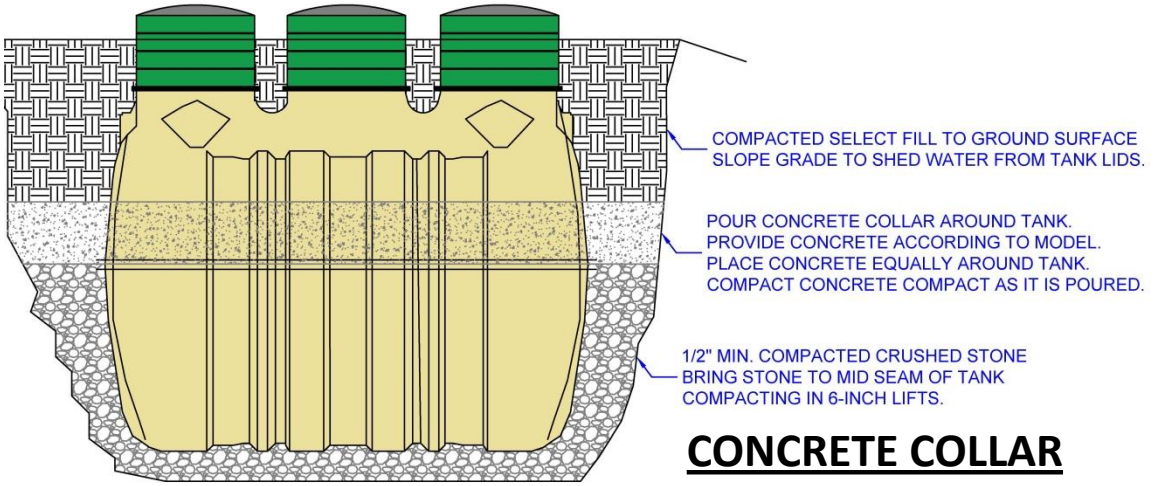
❑ **Step 4: If any part of the tank is below the estimated seasonal high water table, then engineer shall provide buoyancy calculations to assure adequate tank uplift restraint.**



TIE-DOWN STRAPS

Suggested uplift restraint configurations include tie down straps using deadmen and concrete collar. Alternative design restraint systems are acceptable so long as they are approved in advance by the administrative authority and design engineer.

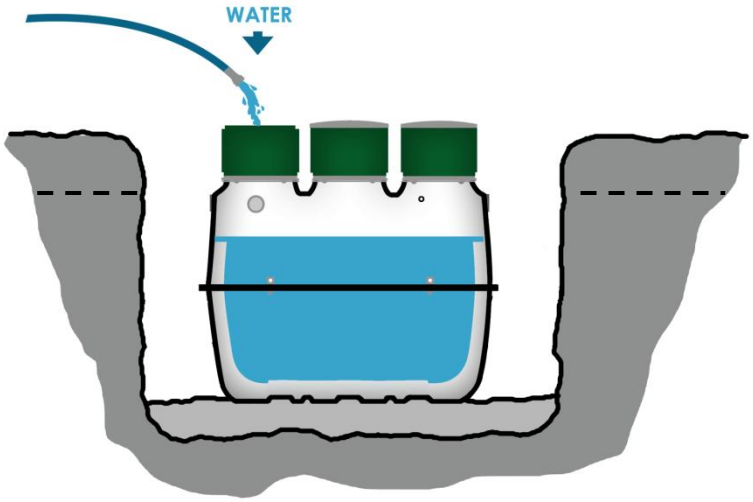




CONCRETE COLLAR

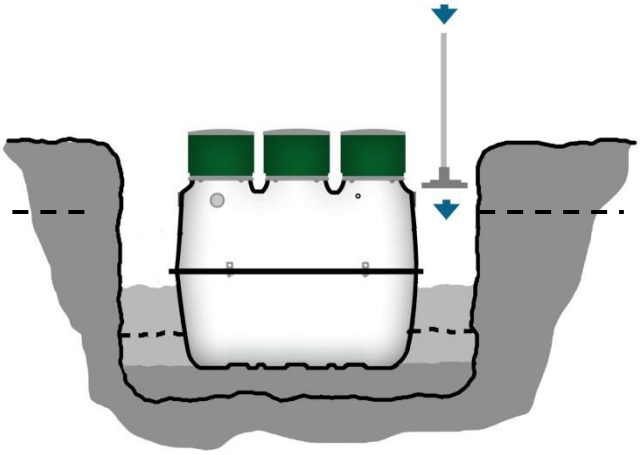
Model	CE5	CE7	CE10	CEN5	CEN7	CEN10
Weight (Lbs.)	397	463	705	463	705	926
Approx. Weight Bearing Soil Interface (sq. ft.)	22	29	35	29	35	53
Empty tank buoyancy (Lbs.)	5,270	7,210	10,400	7,210	10,400	14,500

- **Step 5: After rechecking that tank is level to 1/8-inch, (fore and aft as well as side to side), fill tank with fresh water to the low water line mark. Note: Alternate chambers while filling for evenly balanced fill.**



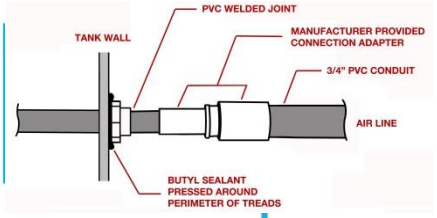
Low water line in sedimentation chamber

Please note: To assure tank water tightness, please check in 24 hours to be sure that the water level has not dropped. Please contact your distributor or Fuji Clean USA if water level has dropped.

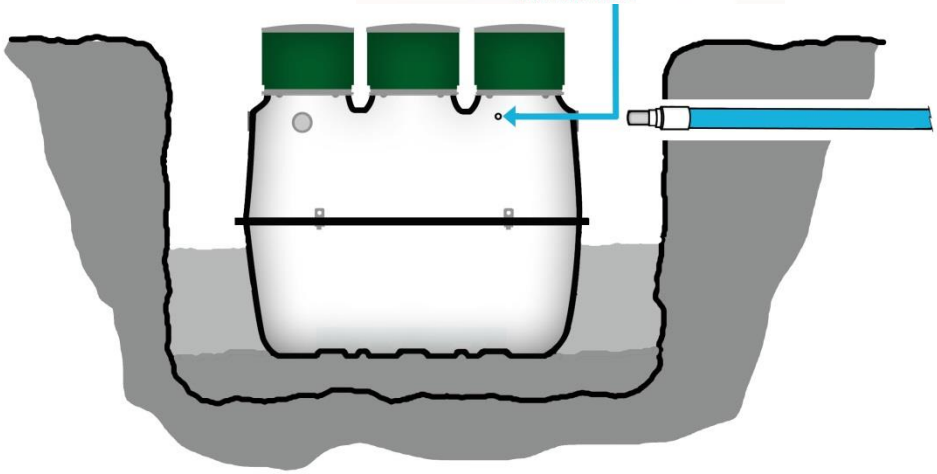


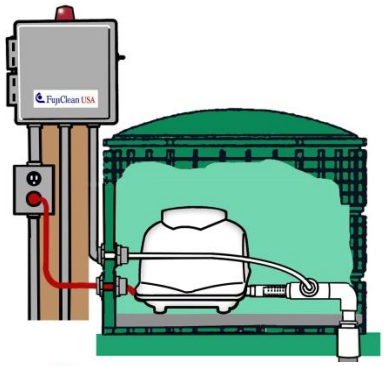
- **Step 6: Backfill about ¾ way up tank in layered, compacted 6" lifts using peastone or equivalent material that form-fits into tank corrugations.**

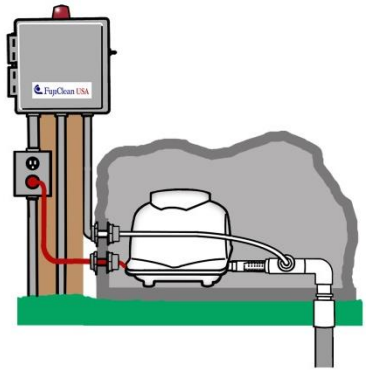
❑ **Step 7: Using supplied adaptors and fittings, attach air pipe fitting to tank and connect to ¾" conduit in prepared trench (min. 6" deep) to location of air blower. Please note: ¾" flexible irrigation line, 100 PSI Max, may also be used for the airline.**



For connection air line to tank, use sealant meeting ASTM C990-96 standard to prevent septic gas transmission into control panel.







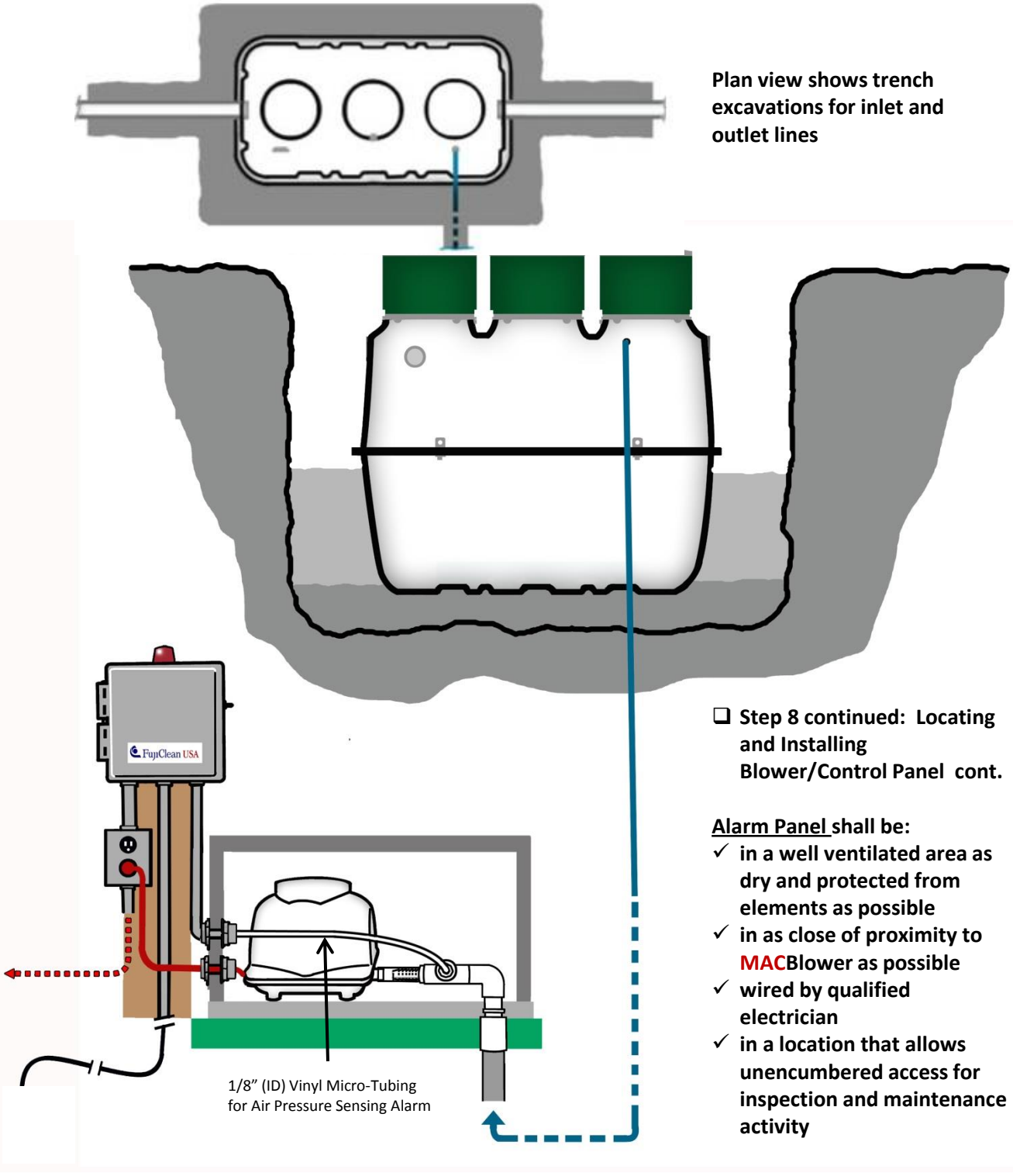
Two possible blower protection options. Be sure to <u>vent</u> covers to allow free air draw even in deep snow pack.

❑ **Step 8: Locating and Installing Blower/Control Panel.**

✓ **USING ¾-INCH CONDUIT, LOCATE BLOWER WITHIN 100-FT. OF TREATMENT TANK AND WITH NO MORE THAN FIVE (5) ELBOWS. <u>If site conditions prevent this, please contact your distributor or Fuji Clean USA for technical assistance</u>.**

<u>Air Blower</u> shall be:

- ✓ **in as close proximity to control panel as possible**
- ✓ **on a solid (e.g. concrete) pad to minimize vibrations**
- ✓ **in a location <u>above</u> water level**
- ✓ **away from grease exhaust fans.**
- ✓ **away from bedroom windows and other locations where operational sounds (although minimal) may be a nuisance**
- ✓ **In a location that allows unencumbered access for inspection and maintenance activity**
- ✓ **with proper electrical grounding**
- ✓ **with wiring and electrical connections made by a licensed electrician.**
- ✓ **with no objects on top of electrical cord.**
- ✓ **in a well-ventilated space out of direct sunlight and protected from elements such as direct rain or snowfall.**



Plan view shows trench excavations for inlet and outlet lines

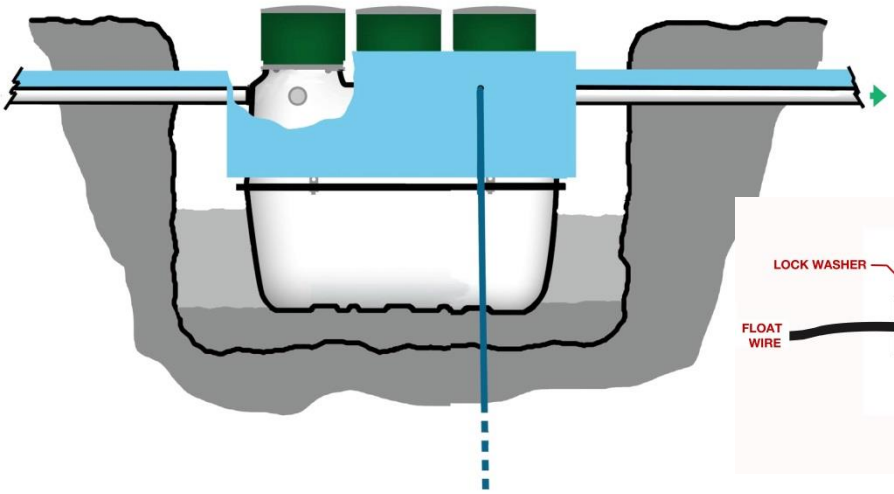
❑ **Step 8 continued: Locating and Installing Blower/Control Panel cont.**

<u>Alarm Panel</u> shall be:

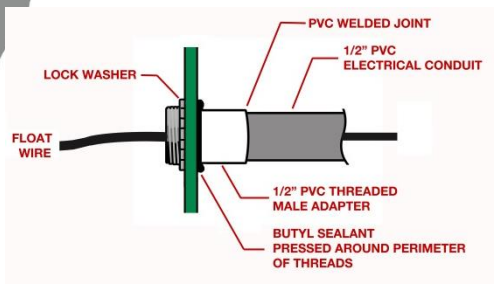
- ✓ **in a well ventilated area as dry and protected from elements as possible**
- ✓ **in as close of proximity to MACBlower as possible**
- ✓ **wired by qualified electrician**
- ✓ **in a location that allows unencumbered access for inspection and maintenance activity**

❑ **For additional important detail about installing and maintaining blower, please review and refer to provided <u>MACBlower Installation-Maintenance Manual, which is provided inside the blower box.</u>**

❑ **Step 9: For cold climate installations, please install insulated risers and covers and cover upper half of treatment unit with min. R-8 value insulating material (i.e. foam board)**



For connection of float switch cord to alarm panel, drill hole in riser and use male fitting and electrical conduit. Plug fitting with sealant standard that meets ASTM C990-96 to assure water-tight seal and to prevent septic gas transmission into control panel.



❑ **Step 10: Install Float Switch on pumpback line in 2nd chamber with 3-1/2" tether. Float switch electrical cord should exit riser wall through male adaptor (caulked watertight to prevent gas leakage) or watertight fitting. An interior connection to direct burial cable is also acceptable.**

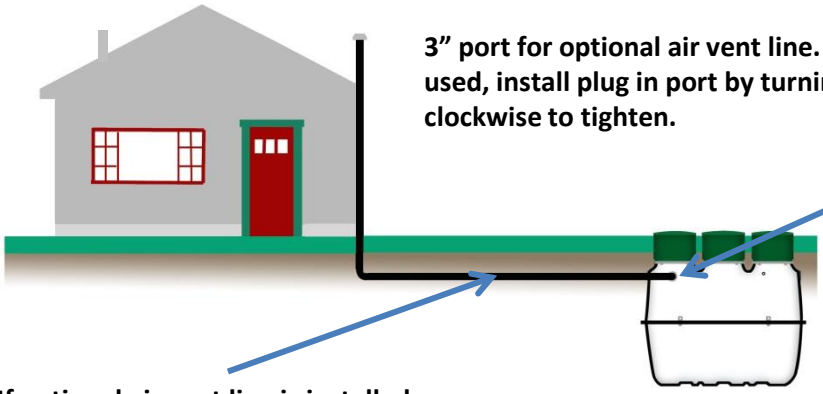
3-1/2" tether for float switch

❑ **Step 11: Prepare Tank Inlet and Outlet for 4" Sched. 40 Inlet and Outlet Lines**

Seal around inlet and outlet tank fittings using a sealant that meets ASTM C990-96 standards

Apply primer and cement to 4" Sched. 40 PVC inlet and outlet pipe sections

❑ **Step 12: In nearly all cases, the Fuji Clean system will vent properly through the house septic influent line. In cases where there is a influent pump, or in severe downdraft locations, a separate vent should be considered. If you do choose to install a vent, be sure that the vent slopes toward the tank so that any moisture accumulation drips back down toward the tank.**

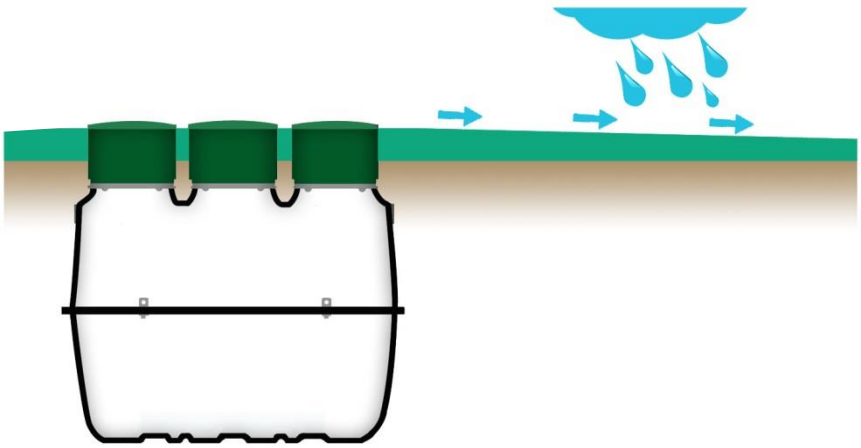


3" port for optional air vent line. If not used, install plug in port by turning clockwise to tighten.

If optional air vent line is installed, slope conduit toward tank to prevent moisture accumulation

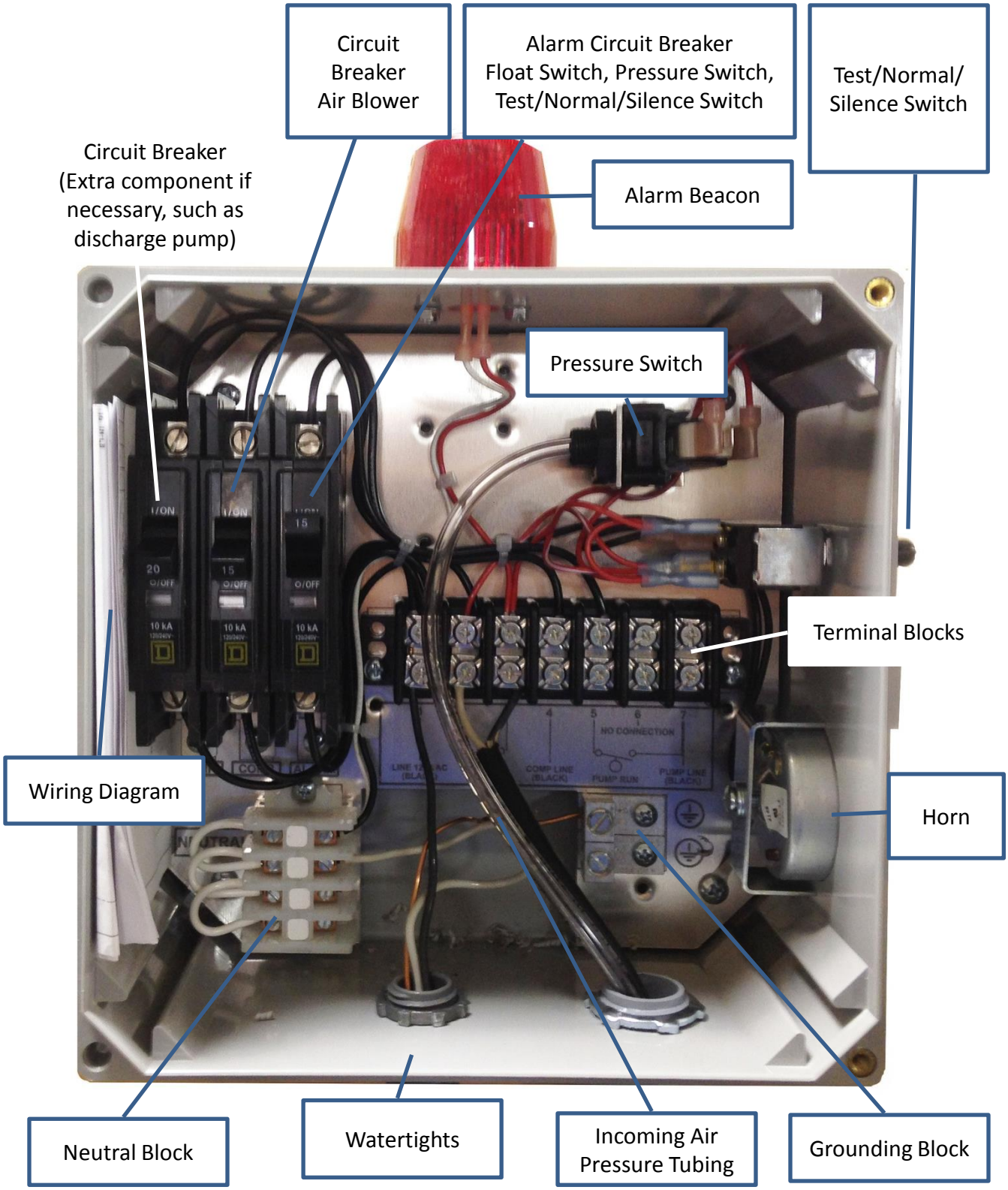
❑ **Step 13: During final landscaping, seeding etc., be sure to pitch final grade away from covers to sweep surface water away from treatment tank.**

24" Max Riser Height



❑ **Step 14: Fill out Warranty Activation Card (received with this Installation Manual) and return to Fuji Clean USA to activate system Warranty. If this card cannot be found, please contact Fuji Clean USA for voice or online Warranty activation. 207-406-2927.**

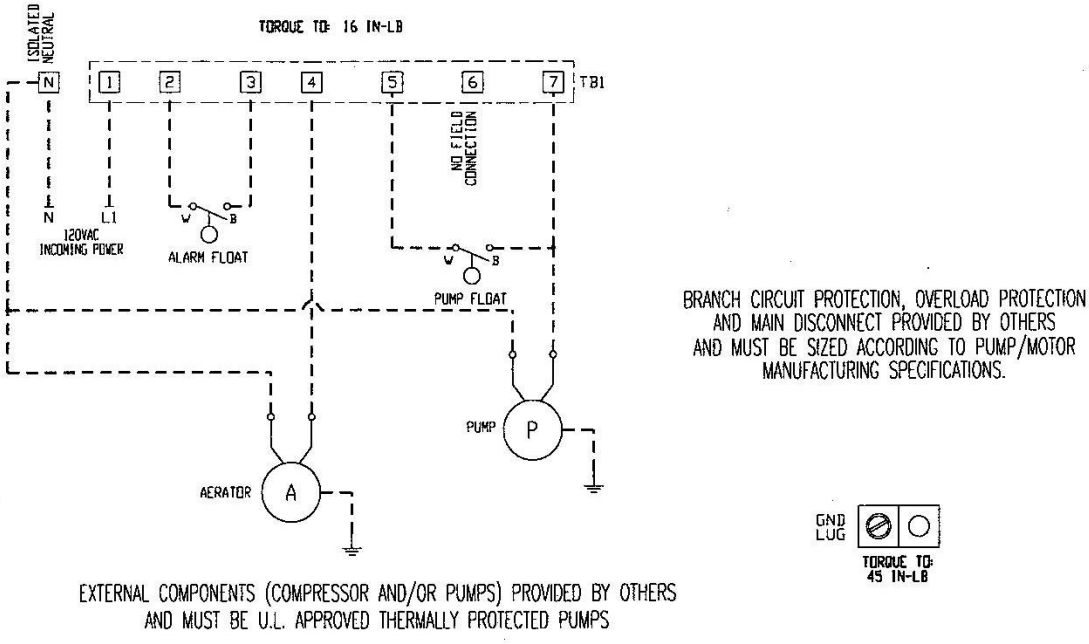
❑ **Step 15: Finalize Controller Wiring. Please have licensed electrician refer to wiring diagram in this manual and enclosed separately in alarm/control panel. An upgraded Fuji Clean USA controller is available if telecommunications or alarm count is required. Please contact Fuji Clean USA for details.**



Control Panel Wiring Diagram p.1

Please provide wiring diagram to licensed electrician for making proper electrical connections. (A copy of this diagram is also provided inside NEMA 4X rated control panel enclosure).

Please Note: The basic Fuji Clean control panel does not come equipped with a timer or timing device. Please contact your distributor for this and other alarm/controller upgrade options.



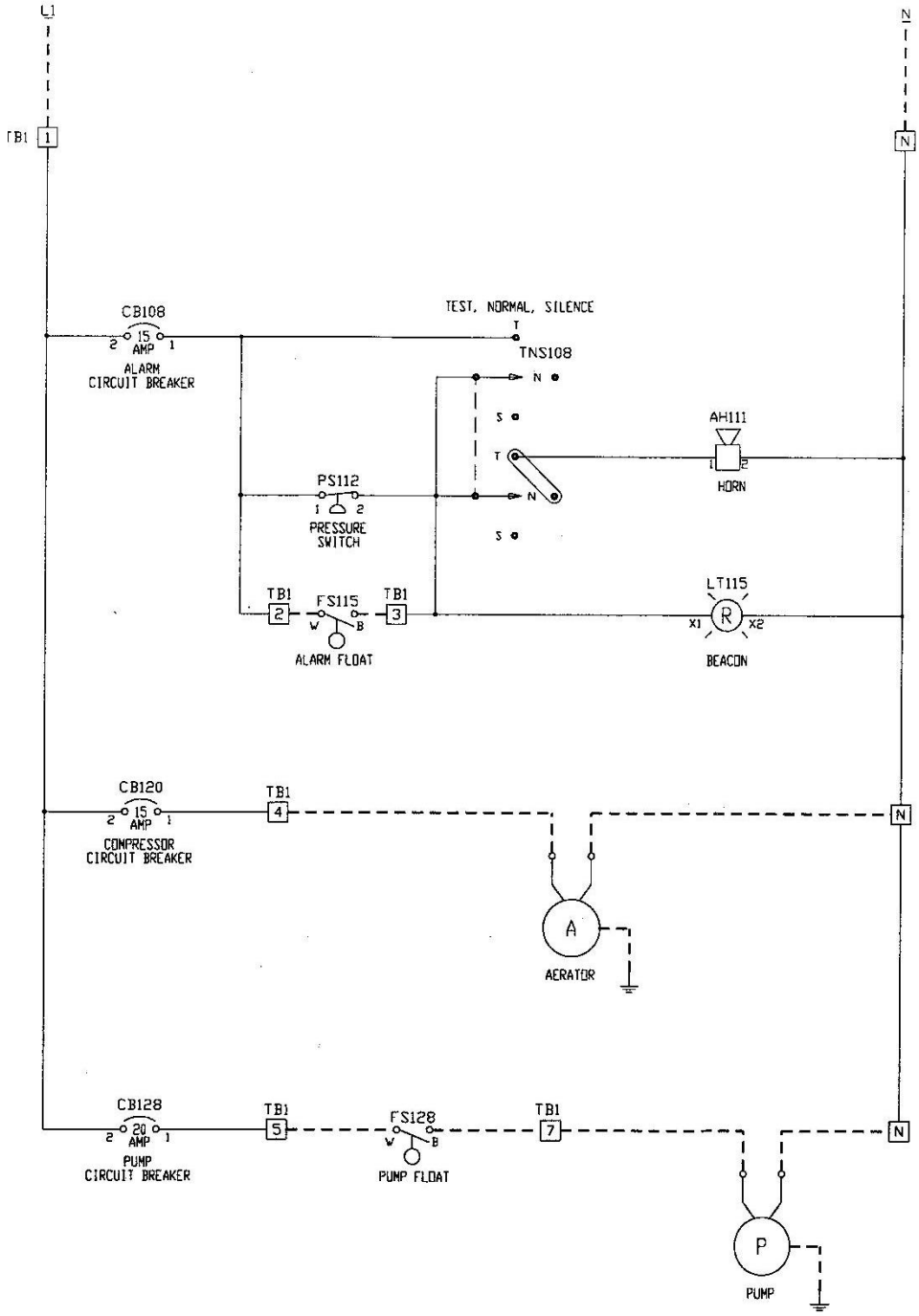
TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS MUST BE AT LEAST 140 DEG. F. (60 DEG. C.). TERMINAL STRIPS AND GROUND LUG USE COPPER CONDUCTORS ONLY.

CONNECT GROUND LUG IN PANEL TO A SECURE EARTH GROUND

DASHED LINES REPRESENT FIELD WIRING

FIELD WIRING SECTION

Control Panel Wiring Diagram p.2



Float Switch Information

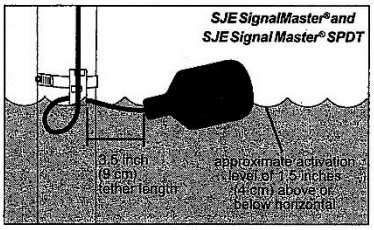
The SJE Rhombus Signalmaster float switch is pre-mounted in Fuji Clean USA treatment systems. This information from SJE Rhombus is supplied for informed, proper handling during the installation process.

SJE SIGNALMASTER®

- Mechanically activated.
- Control differential of 1.5 inches above or below horizontal.
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

Note: All hose clamp components are made of 18-8 stainless steel material. See your SJE-Rhombus® supplier for replacements.

Figure A



ELECTRICAL SHOCK HAZARD
Disconnect power before installing or servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.

EXPLOSION OR FIRE HAZARD
Do not use this product with flammable liquids. Do not install in hazardous locations as defined by National Electric Code, ANSI/NFPA 70.

Failure to follow these precautions could result in serious injury or death. Replace product immediately if switch becomes damaged or severed. Keep these instructions with warranty after installation. This product must be installed in accordance with National Electric Code, ANSI/NFPA 70 so as to prevent moisture from entering or accumulating with in boxes, conduit bodies, fittings, float housing, or cable.

PREVENTATIVE MAINTENANCE

- **Periodically check the product. Check that the cable has not become worn or that the housing has not been damaged so as to impair the protection of the product. Replace the product immediately if any damage is found or suspected.**
- **Periodically check to see that the float is free to move and operate the switch.**
- **Use only SJE Rhombus replacement parts.**
- **The Sensor Float and Sensor Float Mini control switches contain mercury and MUST be recycle or disposed of according to local, state and federal codes.**

SJE-RHOMBUS® THREE-YEAR LIMITED WARRANTY

SJE-RHOMBUS® warrants to the original consumer that this product shall be free of manufacturing defects for three years after the date of consumer purchase. During that time period and subject to the conditions set forth below, **SJE-RHOMBUS®** will repair or replace, for the original consumer, any component which proves to be defective due to defective materials or workmanship of **SJE-RHOMBUS®**.

THIS EXPRESS WARRANTY DOES NOT APPLY TO THE MOTOR START KIT COMPONENT. SJE-RHOMBUS® MAKES NO WARRANTIES OF ANY TYPE WITH RESPECT TO THE MOTOR START KIT.

ELECTRICAL WIRING AND SERVICING OF THIS PRODUCT MUST BE PERFORMED BY A LICENSED ELECTRICIAN.

THIS WARRANTY DOES NOT APPLY: (A) to damage due to lightning or conditions beyond the control of **SJE-RHOMBUS®**; **(B)** to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; **(C)** to failures resulting from abuse, misuse, accident, or negligence; **(D)** to units which are not installed in accordance with applicable local codes, ordinances, or accepted trade practices, and **(E)** to units repaired and/or modified without prior authorization from **SJE-RHOMBUS®**.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE: The consumer shall assume all responsibility and expense for removal, reinstallation, and freight. Any item to be repaired or replaced under this warranty must be returned to **SJE-RHOMBUS®**, or such place as designated by **SJE-RHOMBUS®**.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. SJE-RHOMBUS® SHALL NOT, IN ANY MANNER, BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF A BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.

Start-Up Procedures

☐ **1. Outside Environment Check.**

The system is accessible and nothing inhibits access to maintenance.

- Surface water is draining away from risers and covers.
- No signs of physical damage to the treatment system, piping, alarms or components
- No unusual smells around the system.
- No unusually loud blower noise, such as rattling.

☐ **2. Blower Box Check.**

- Open the blower box, make sure that it is operating properly.
- Inspect all fittings and vents to ensure they are clean and dry and that blower is located so that it is protected from dust and particles, will remain dry and not be submerged.

☐ **3. Blower Operation and Blower Alarm Check.**

- Make sure the blower operates properly.
- Turn off the blower (unplug or turn off at alarm/control panel breaker switch) for few moments to check that the alarm is triggered.

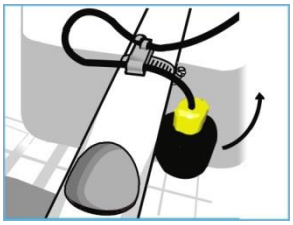
Open all access covers and secure the area around the access openings.

☐ **4. Water Level is at LWL.**

- Check that tank has been filled to LWL mark in Chamber 1.

☐ **5. High Water Float Switch Check.**

- Check that the high water float switch is operating freely. Lift up the high water float switch to check that the alarm is triggered.
- (Note: Float should have 3.5" tether. Activation horizon is 1.5" above or below level horizon).



☐ **6. Set Recirculation Control Valve. (gray)**

The recirculation valve (gray) should be set to its default setting range according to the table below for ALL flows. At the discretion of the system's start-up technician, <u>within each default range</u>, the valve shall be at the lower end for anticipated below average hydraulic flows and at the higher end for hydraulic flows that are anticipated to be above average.

Model	CE5	CE7	CE10
Default Valve Setting (%)	30% to 35%	25% to 30%	25% to 30%

☐ **7. Check Recirculation Flow Rate.**

- Normal recirculation flow should be level with the top edge of the airlift pumpback line cut-out spilling into Chamber 1, the Sedimentation Chamber.

☐ **8. Check/Set Aeration Balance Control Valve (blue).**

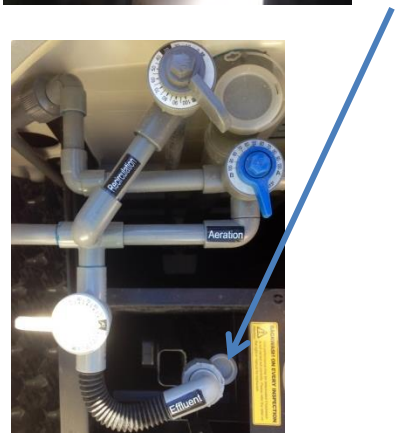
- The default, normal setting for the Aeration Control Valve is 50%.

- Visually observe the airflow rates on each side of the plant by checking to see if bubbles are evenly distributed on both sides of Chamber 3, The Aeration Chamber. If there is an obvious discrepancy in airflow between the two sides, adjust the Aeration Balance Control Valve so that the airflow is equal. Important!

☐ **9. Check/Set Effluent Airlift Valve (white).** The Effluent Control Valve is initially set to 40% and there is typically no need for it to be adjusted under standard conditions.

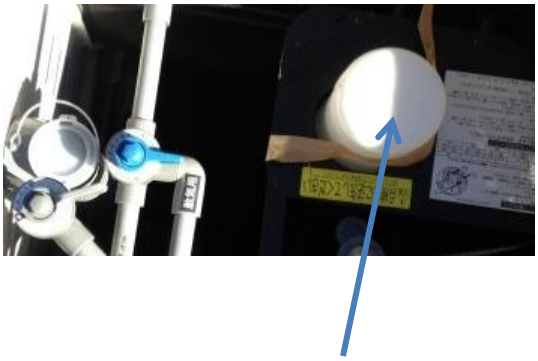
☐ **10. Check Effluent Airlift Pipe.**

Check the observation port in the airlift line to see if there is smooth water flow from the effluent airlift pump. If not, then check to be sure that there isn't a clog in the airlift pipe with a cleaning brush.



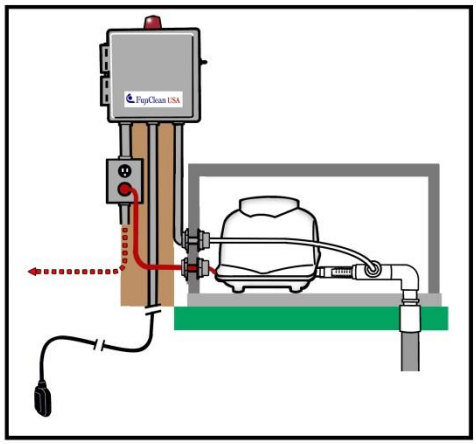
☐ **11. Add Disinfectant Tablets to Chlorinator (if appropriate)**

- If chlorine tablets are to be used for disinfection, check to be sure that they are removed from packaging and placed in the disinfectant cylinder.
- Be sure that disinfectant cylinder remains closed for all start-up steps to prevent corrosive activity to exposed metallic surfaces.
- Note: Chlorine dissolve rate can be adjusted by rotating the bottom cap of the Chlorinator.



☐ **12. Check Alarm/Control Panel**

- Check to be sure that Alarm/Control Panel is located in a secure, accessible location.
- Check fittings and wire connections are tight and secure. This includes connection between air hose and pressure switch.
- Important: Check to be sure that all panel penetrations are air and watertight. Be sure no gas from treatment system can leak into Alarm/Controller.
- Be sure electrical cord between blower and outlet is free and clear and no object is on cord.
- Check to be sure that panel is closed, secure and toggle switch is set to "Normal" setting.

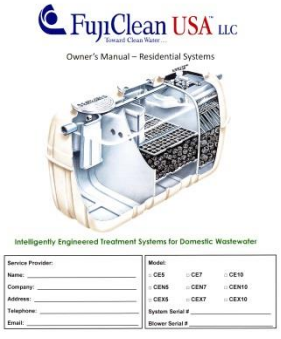


☐ **13. Final Site Preparation**

- Close and secure all access covers.
- Close and secure blower cover.

☐ **14. Owner Communication**

- Be sure that home/business owner has a copy of the Fuji Clean USA Owner's Manual (with Warranty information included).
- Be sure that service provider contact information is affixed to Alarm/Control Panel as well as on Homeowner's Manual.



TROUBLESHOOTING

Air Blower

What to observe	Status	How to solve the problem
Blower is not working		
Power plug	Power plug is disconnected.	Connect the power plug to the outlet.
Alarm triggered (if alarm exists)	Diaphragm is damaged. Auto-stop function is activated.	Replace the diaphragm kit. Re-insert the auto-stop piece.
	Check if blower is electrified.	Replace the power cable.
		Replace the auto-stop piece.
		Replace the electric magnet.
	Internal flat terminal has fallen out.	Secure the terminal.
Blower is making an abnormal or excessive operating noise.		
Installed condition	Blower is not secured.	Secure blower in horizontal position.
Oscillator	Oscillator is damaged.	Clean the inside of aeration pipe by rotating valve and adjust aeration level to be even.
	Oscillator nut is loose.	Tighten oscillator nut.
Low air volume or misplaced air from aeration pipes (treatment plant)		
Faulty diaphragm	Diaphragm, outlet.	Replace diaphragm using diaphragm kit.
Aeration leak	Grommet partition	Check internal parts assembly and re-attach the pump.
Air filter is clogged	Air filter	Clean or replace air filter.
Aeration pipes	Pipes are disconnected.	Reattach / repair pipes.
	Clogging	Clean the inside of aeration pipes.

FujiClean USA™ LLC
Toward Clean Water…

Fuji Clean USA Installation Procedure Checklist

Note: Please consult Installation Manual for detailed instructions.

Unloading Instructions:

- ❑ Upon delivery, inspect Fuji Clean tank, both outside and inside for possible damage incurred during transport. If you find damage, or have a question, please contact your distributor immediately.

- ❑ **Step 1: Prepare excavation to be at least 1 to 2 feet larger than the Fuji Clean tank dimensions. Note: Riser height should not exceed 24".**

- ❑ **Step 2: Prepare 4"- 6" bed of stone (¼" to ½"), level to within 1/8".**

- ❑ **Step 3: Use 4-point lifting lugs. Carefully lower and set tank. Level to within 1/8-inch.**

- ❑ **Step 4: If any part of the tank is below the estimated seasonal high water table, adequate tank uplift restraint measures should be taken. Please refer to Installation Manual for recommended options.**

- ❑ **Step 5: Re-check that tank is level to 1/8-inch, (fore and aft as well as side to side) and then fill tank with fresh water to the low water line (marked inside tank). Start 24-hour water tightness test. (Please contact your distributor or Fuji Clean USA if water level has dropped after 24 hours).**

- ❑ **Step 6: Backfill about ¾ way up tank in layered, compacted 6" lifts using peastone or equivalent material that form-fits into tank corrugations.**

- ❑ **Step 7: Using supplied adaptors and fittings, attach air pipe fitting to tank and connect to ¾" or 1" conduit in prepared trench (min. 6" deep) to location of air blower. Please note: flexible irrigation line, 100 PSI Max, may also be used for the airline.**

- ❑ **Step 8: Locate blower within 100-ft. of treatment tank with no more than 5 elbows. If site conditions prevent this configuration, please contact your distributor or Fuji Clean USA for technical assistance.**

Air Blower shall be:

- ✓ **in as close proximity to control panel as possible**
- ✓ **on a solid (e.g. concrete) pad to minimize vibrations**
- ✓ **in a location above water level**
- ✓ **away from grease exhaust fans.**
- ✓ **away from bedroom windows and other locations where operational sounds (although minimal) may be a nuisance**
- ✓ **In a location that allows unencumbered access for inspection and maintenance activity**
- ✓ **with proper electrical grounding**
- ✓ **with wiring and electrical connections made by a licensed electrician.**
- ✓ **with no objects on top of electrical cord.**
- ✓ **in a well-ventilated space out of direct sunlight and protected from elements such as direct rain or snowfall.**

Fuji Clean USA Installation Procedure Checklist cont.

Alarm Panel shall be:

- ✓ **in a well ventilated area as dry and protected from elements as possible**
- ✓ **in as close of proximity to MACBlower as possible**
- ✓ **wired by qualified electrician**
- ✓ **in a location that allows unencumbered access for inspection and maintenance activity**

- ❑ **Step 9: For cold climate installations, please install insulated risers and covers and cover upper half of treatment unit with min. R-8 value insulating material (i.e. foam board)**

- ❑ **Step 10: Float switch electrical cord should exit riser wall through a male adaptor (caulked watertight to prevent septic gas leakage) or watertight fitting. An interior connection to direct burial cable is also an acceptable option.**

- ❑ **Step 11: Prepare Tank Inlet and Outlet for 4" Sched. 40 Inlet and Outlet Lines (secure with PVC cement).**

- ❑ **Step 12: In nearly all cases, the Fuji Clean system will vent properly through the house septic influent line. In cases where there is an influent pump, or in severe downdraft locations, a separate vent should be considered. If you do choose to install a vent, be sure that the vent slopes toward the tank so that any moisture accumulation drips back down toward the tank.**

- ❑ **Step 13: During final landscaping, seeding etc., be sure to pitch final grade away from covers to sweep surface water away from treatment tank.**

- ❑ **Step 15: Finalize Controller Wiring. Please have licensed electrician refer to wiring diagram (in Installer Manual and enclosed separately in alarm/control panel). Upgraded Fuji Clean USA controllers are available if telecommunications, elapsed time meter or other functions are required. Please contact Fuji Clean USA for details.**

- ❑ **Step 16: Follow start-up procedure detailed in Installation Manual:**
  - ☐ **1. Outside Environment Check.**
  - ☐ **2. Blower Box Check.**
  - ☐ **3. Blower Operation and Blower Alarm Check**
  - ☐ **4. Water Level is at LWL.**
  - ☐ **5. High Water Float Switch Check.**
  - ☐ **6. Set Recirculation Control Valve. (gray)**
  - ☐ **7. Check Recirculation Flow Rate.**
  - ☐ **8. Check/Set Aeration Balance Control Valve (blue).**
  - ☐ **9. Check/Set Effluent Airlift Valve (white).**
  - ☐ **10. Check Effluent Airlift Pipe.**
  - ☐ **11. Add Disinfectant Tablets to Chlorinator (if appropriate)**
  - ☐ **12. Check Alarm/Control Panel**
  - ☐ **13. Final Site Preparation**
  - ☐ **14. Owner Communication - Service Provider and Manual Delivery**

FujiClean USA™ LLC
Toward Clean Water…

Fuji Clean USA Installation Procedure Checklist

Note: Please consult Installation Manual for detailed instructions.

Unloading Instructions:

- ❑ Upon delivery, inspect Fuji Clean tank, both outside and inside for possible damage incurred during transport. If you find damage, or have a question, please contact your distributor immediately.

- ❑ **Step 1: Prepare excavation to be at least 1 to 2 feet larger than the Fuji Clean tank dimensions. Note: Riser height should not exceed 24".**

- ❑ **Step 2: Prepare 4"- 6" bed of stone (¼" to ½"), level to within 1/8".**

- ❑ **Step 3: Use 4-point lifting lugs. Carefully lower and set tank. Level to within 1/8-inch.**

- ❑ **Step 4: If any part of the tank is below the estimated seasonal high water table, adequate tank uplift restraint measures should be taken. Please refer to Installation Manual for recommended options.**

- ❑ **Step 5: Re-check that tank is level to 1/8-inch, (fore and aft as well as side to side) and then fill tank with fresh water to the low water line (marked inside tank). Start 24-hour water tightness test. (Please contact your distributor or Fuji Clean USA if water level has dropped after 24 hours).**

- ❑ **Step 6: Backfill about ¾ way up tank in layered, compacted 6" lifts using peastone or equivalent material that form-fits into tank corrugations.**

- ❑ **Step 7: Using supplied adaptors and fittings, attach air pipe fitting to tank and connect to ¾" or 1" conduit in prepared trench (min. 6" deep) to location of air blower. Please note: flexible irrigation line, 100 PSI Max, may also be used for the airline.**

- ❑ **Step 8: Locate blower within 100-ft. of treatment tank with no more than 5 elbows. If site conditions prevent this configuration, please contact your distributor or Fuji Clean USA for technical assistance.**

Air Blower shall be:

- ✓ **in as close proximity to control panel as possible**
- ✓ **on a solid (e.g. concrete) pad to minimize vibrations**
- ✓ **in a location above water level**
- ✓ **away from grease exhaust fans.**
- ✓ **away from bedroom windows and other locations where operational sounds (although minimal) may be a nuisance**
- ✓ **In a location that allows unencumbered access for inspection and maintenance activity**
- ✓ **with proper electrical grounding**
- ✓ **with wiring and electrical connections made by a licensed electrician.**
- ✓ **with no objects on top of electrical cord.**
- ✓ **in a well-ventilated space out of direct sunlight and protected from elements such as direct rain or snowfall.**

Fuji Clean USA Installation Procedure Checklist cont.

Alarm Panel shall be:

- ✓ **in a well ventilated area as dry and protected from elements as possible**
- ✓ **in as close of proximity to MACBlower as possible**
- ✓ **wired by qualified electrician**
- ✓ **in a location that allows unencumbered access for inspection and maintenance activity**

- ❑ **Step 9: For cold climate installations, please install insulated risers and covers and cover upper half of treatment unit with min. R-8 value insulating material (i.e. foam board)**

- ❑ **Step 10: Float switch electrical cord should exit riser wall through a male adaptor (caulked watertight to prevent septic gas leakage) or watertight fitting. An interior connection to direct burial cable is also an acceptable option.**

- ❑ **Step 11: Prepare Tank Inlet and Outlet for 4" Sched. 40 Inlet and Outlet Lines (secure with PVC cement).**

- ❑ **Step 12: In nearly all cases, the Fuji Clean system will vent properly through the house septic influent line. In cases where there is an influent pump, or in severe downdraft locations, a separate vent should be considered. If you do choose to install a vent, be sure that the vent slopes toward the tank so that any moisture accumulation drips back down toward the tank.**

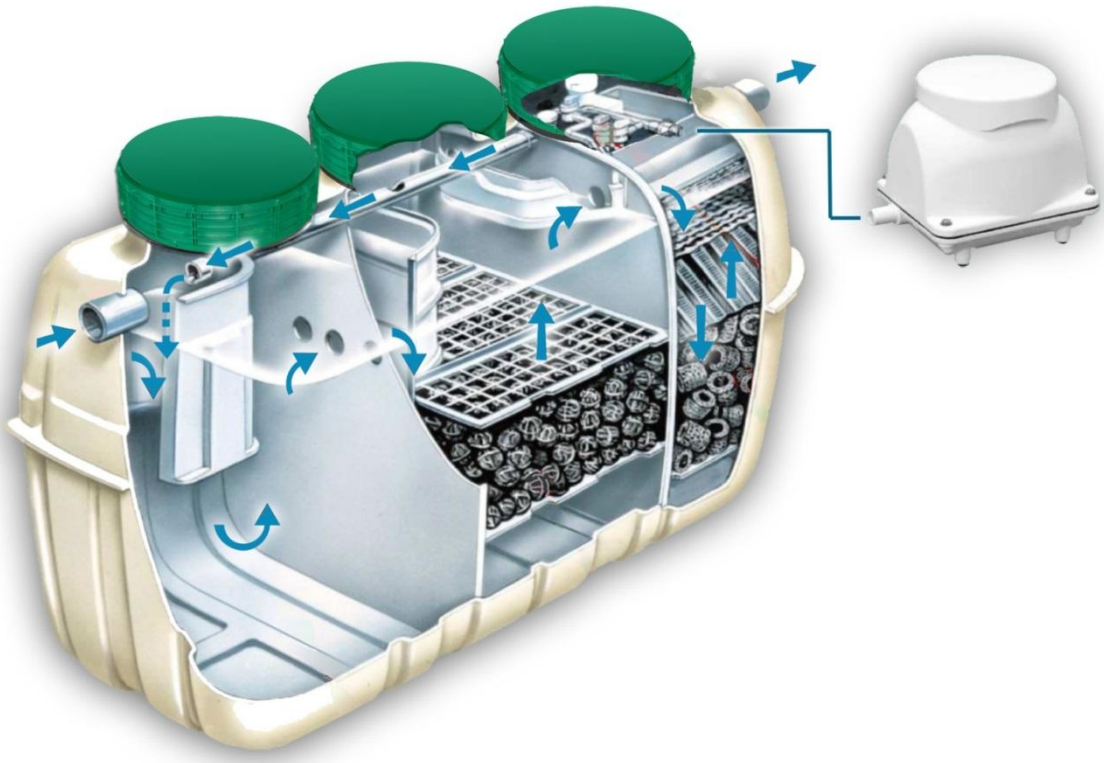
- ❑ **Step 13: During final landscaping, seeding etc., be sure to pitch final grade away from covers to sweep surface water away from treatment tank.**

- ❑ **Step 15: Finalize Controller Wiring. Please have licensed electrician refer to wiring diagram (in Installer Manual and enclosed separately in alarm/control panel). Upgraded Fuji Clean USA controllers are available if telecommunications, elapsed time meter or other functions are required. Please contact Fuji Clean USA for details.**

- ❑ **Step 16: Follow start-up procedure detailed in Installation Manual:**
  - ☐ **1. Outside Environment Check.**
  - ☐ **2. Blower Box Check.**
  - ☐ **3. Blower Operation and Blower Alarm Check**
  - ☐ **4. Water Level is at LWL.**
  - ☐ **5. High Water Float Switch Check.**
  - ☐ **6. Set Recirculation Control Valve. (gray)**
  - ☐ **7. Check Recirculation Flow Rate.**
  - ☐ **8. Check/Set Aeration Balance Control Valve (blue).**
  - ☐ **9. Check/Set Effluent Airlift Valve (white).**
  - ☐ **10. Check Effluent Airlift Pipe.**
  - ☐ **11. Add Disinfectant Tablets to Chlorinator (if appropriate)**
  - ☐ **12. Check Alarm/Control Panel**
  - ☐ **13. Final Site Preparation**
  - ☐ **14. Owner Communication - Service Provider and Manual Delivery**

FujiClean USA™ LLC

Toward Clean Water…



Operation and Maintenance Manual

Residential Systems
CE and CEN Models

Rev. 1/26/17

NSF®

Certified to
NSF/ANSI Standards 40 & 245

Please Note:
Product warranty requires proper system operation and maintenance as described in this Manual.

Fuji Clean USA ● 41-2 Greenwood Road ● Brunswick Maine 04011 ● Tel: 207-406-2927 ● Fax: 888-789-1977 ● www.fujicleanusa.com

Operation and Maintenance Manual – Residential Systems

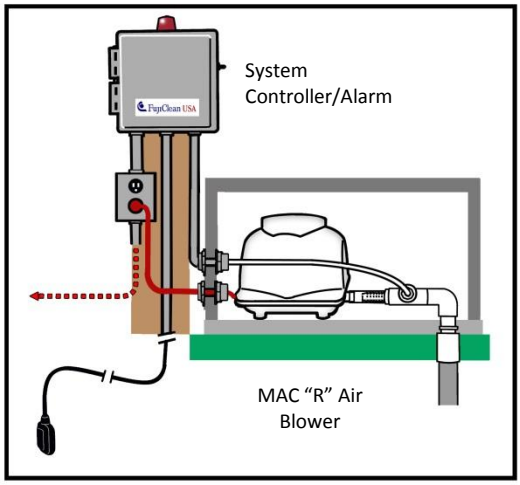
Introduction

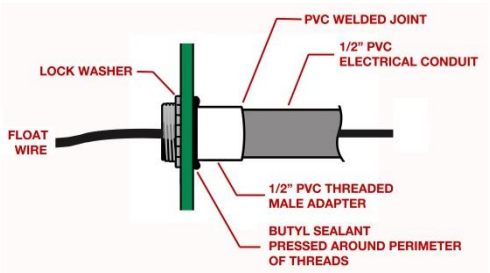
This manual describes operation and maintenance (O&M) procedures necessary to assure proper function and operation of Fuji Clean USA wastewater treatment systems, including start-up and routine procedures. The manual is divided into the following sections:

Sections

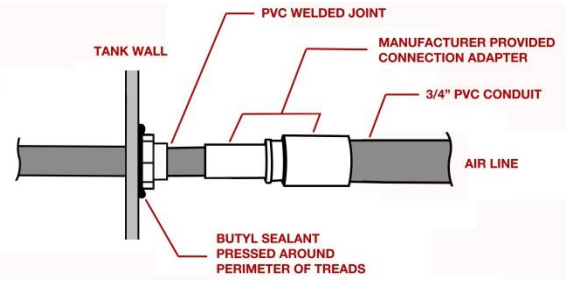
Appendices

Installation Overview





For connection of float switch cord to alarm panel, drill hole in riser and use male fitting and electrical conduit. Plug fitting with sealant standard that meets ASTM C990-96 to assure water-tight seal and to prevent septic gas transmission into control panel.



For connection air line to tank, use sealant meeting ASTM C990-96 standard to prevent septic gas transmission into control panel.

Please Note:

1. Fuji Clean systems are designed to accept straight septic wastewater and do not require a preceding septic or settling tank

2. "Clearwater" water softener backwash should be discharged directly to footer (if regulations allow) or diverted around Fuji Clean system to drainfield.

Using grommets or a waterproof adhesive, labels meeting NSF standards (supplied by Fuji Clean USA) shall be affixed in two locations., inside the riser and on the inside of the controller.

Section 2. Treatment Process Overview

Fuji Clean's "contact filtration" treatment is a simple, well engineered process that consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see diagram below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.

Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

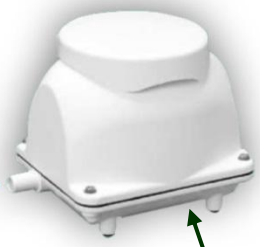
Chamber 3B. Disinfection Chamber (final zone before discharge – option for chlorination tablet disinfection)

Chamber 3A. Storage Chamber (settling zone)

Sludge Transfer (Recirculating air lift pumpback) See airlift pump info below.

Outlet

Inlet



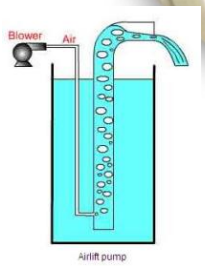
Powered by the MACBlower "R" Series Blowers State-of-the-art linear diaphragm air blowers manufactured by Fuji Clean Co sized to provide about 2.8 cubic feet per minute to most residential systems.

Chamber 3. Aerobic Contact Filtration Chamber (both board and cylindrical hollow mesh media) oxygen rich zone for aerobic microbe digestion activity, solids filtration and nitrification of ammoniac nitrogens to nitrates

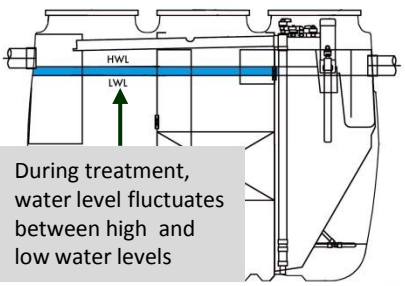
Overflow Effluent Weir

Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified

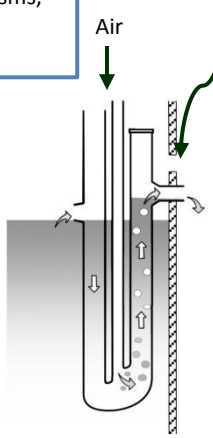
Chamber 1. Sedimentation Chamber (separates solids and greases)



Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.



During treatment, water level fluctuates between high and low water levels



Flow Equalization When water level exceeds LWL, treated water is discharged through Chamber 3B via the Effluent Air Lift pump. If water level exceeds HWL, then treated water is also discharged through an overflow effluent weir.

Section 3a. System Components and Specifications - Summary

FUJI CLEAN USA RESIDENTIAL SYSTEM SPECIFICATION TABLE	CE Series BOD, TSS, TN*				CEN Series BOD, TSS, Enhanced TN		
Model	**CE5**	**CE7**	**CE10**	**CE14**	**CEN5**	**CEN7**	**CEN10**
Fuji Clean USA Load Rating (Bedrooms)	4	6	8	N/A	4	6	8
Load Hydraulic (GPD)**	450	630	900	1000	450	630	900
Effluent* (assumes domestic strength influent)**							
BOD (mg/L)	10-20	10-20	10-20	10	10	10	10
TSS (mg/L)	10-20	10-20	10-20	10	10	10	10
TN (mg/L)	10-20	10-20	10-20	10	10	10	10
Blower Model / CFM (Standard)	MAC80R 2.8 CFM	MAC80 R 2.8 CFM	MAC100R 3.5 CFM	MAC100R 3.5 CFM	MAC80R 2.8 CFM	MAC100R 2.8 CFM	MAC100R 3.5 CFM
Power Use (kWh/day)	1.27	1.27	1.92	1.92	1.27	1.92	1.92
Tank Detail:							
Material	Fibre-reinforced plastic				Fibre-reinforced plastic		
Height (inches)	61.8	65.7	73.6	77.4	65.7	73.6	77.4
Length (inches)	85	95.7	98.8	118.9	95.7	98.8	118.9
Width (inches)	43.7	49.2	56.7	68.9	49.2	56.7	68.9
Weight (lbs.)	397	463	705	926	463	705	926
Inlet Invert (inches, to 1/8")	49	53	61	62	53	61	62
Outlet Invert (inches to 1/8")	47	51	59	59.5	51	59	59.5
Access Ports (number)	3	3	3	3	3	3	3
Access Port Diameter (inches)	3@20"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"
Volume Total (gallons)	540	749	1069	1498	749	1069	1498
Volume Chamber 1, Sedimentation (gal)	198	277	397	558	277	397	558
Vol Chamber 2, Anaerobic(gal)	198	278	396	556	278	396	556
Vol Chamber 3, Aeration (gal)	95	127	181	248	127	181	248
Vol Chamber 3a, Storage (gal)	44	63	90	124	63	90	124
Volume Chamber 3b, Disinfection (gal)	4	4	6	12	4	6	12

* TN data was obtained during CE testing, but not to NSF245 testing protocol. CEN testing was to NSF245 protocol.
** Please consult with distributor or Fuji Clean USA for commercial models designed to treat hydraulic flows above those listed in this table.
*** Please consult with distributor or Fuji Clean USA for system specification and sizing in cases where influent biologic strength is greater than domestic strength.

Section 3b. System Components and Specifications - Structural Drawings

Structural drawings of all residential models are presented in Appendix 1 of this Manual, and available in both .dwg and pdf formats online at www.fujicleanusa.com

Section 3c. System Components - MACBlowers

The Table below includes specifications for "R" Series MACBlowers, which power treatment in Fuji Clean USA Systems. The table includes blower models associated with each standard system installation. However, blowers associated with larger Fuji Clean systems are also provided since some installations may require upsized blowers based on overall distance (i.e. air conduit length and diameter) and number of elbows from blower to treatment system. Please refer to the **Fuji Clean USA Installation Manual** for details.

Additional O&M information specific to the MACBlower component of the Fuji Clean USA system is provided in the **MACBlower Installation and O&M Manual**, provided in Appendix 2 of this Manual.

Fuji Clean USA Treatment System Model (Number of MACBlowers)			**CE5 (1) CE7 (1) CEN5 (1)**	**CE10 (1) CE14 (1) CEN7 (1) CEN10 (1)**
MACBlower Model	**MAC40R**	**MAC60R**	**MAC80R**	**MAC100R**
Air Flow Volume	40 L/min 1.4 cfm	60 L/min 2.1 cfm	80 L/min 2.8 cfm	100 L/min 3.5 cfm
Normal Pressure	12 kPa 1.7 psi	15 kPa 2.2 psi		18 kPa 2.6 psi
Rated Voltage	120V			
Frequency	60Hz			
Outlet Pipe Size	13mm ID (18mm OD) 33/64 inch ID (45/64 inch OD)			
Weight	4.5kg 9 lbs. 14 oz.	5.0kg 11 lbs.		
Power Consumption	34W 0.045 HP	45W 0.060 HP	54W 0.072 HP	83W 0.111 HP
Amperes	0.8A	1.3A	1.0A	1.7A
Power Cable	3×18AWG×1.8m (5ft.11in.)			
Manufacturer	Made in Japan by Fuji Clean			

System Components – MACBlowers (Commercial Systems)

Fuji Clean Treatment System Model (Number of MACBlowers)		**CE21 (1)**	**CE30 (1) CEN21 (1)**
MACBlower Model	**MAC120R**	**MAC150R**	**MAC200R**
Air Flow Volume	120 L/min 4.2 cfm	150 L/min 5.3 cfm	200 L/min 7.0 cfm
Normal Pressure	18 kPa / 2.6 psi		
Rated Voltage and Current	120V		
Frequency	60Hz		
Outlet Pipe Size	20mm ID (26mm OD) 25/32 inch ID (1-1/32 inch OD)		
Weight	8.5kg 18 lbs. 12 oz.	9.0kg 19 lbs. 13 oz.	
Power Consumption	98 W 0.131 HP	120 W 0.160 HP	170 W 0.227 HP
Power Cable	3×18AWG×1.8m (5ft.11in.)		
Manufacturer	Made in Japan by Fuji Clean		

Section 3e. System Components - Alarm / Control Panel

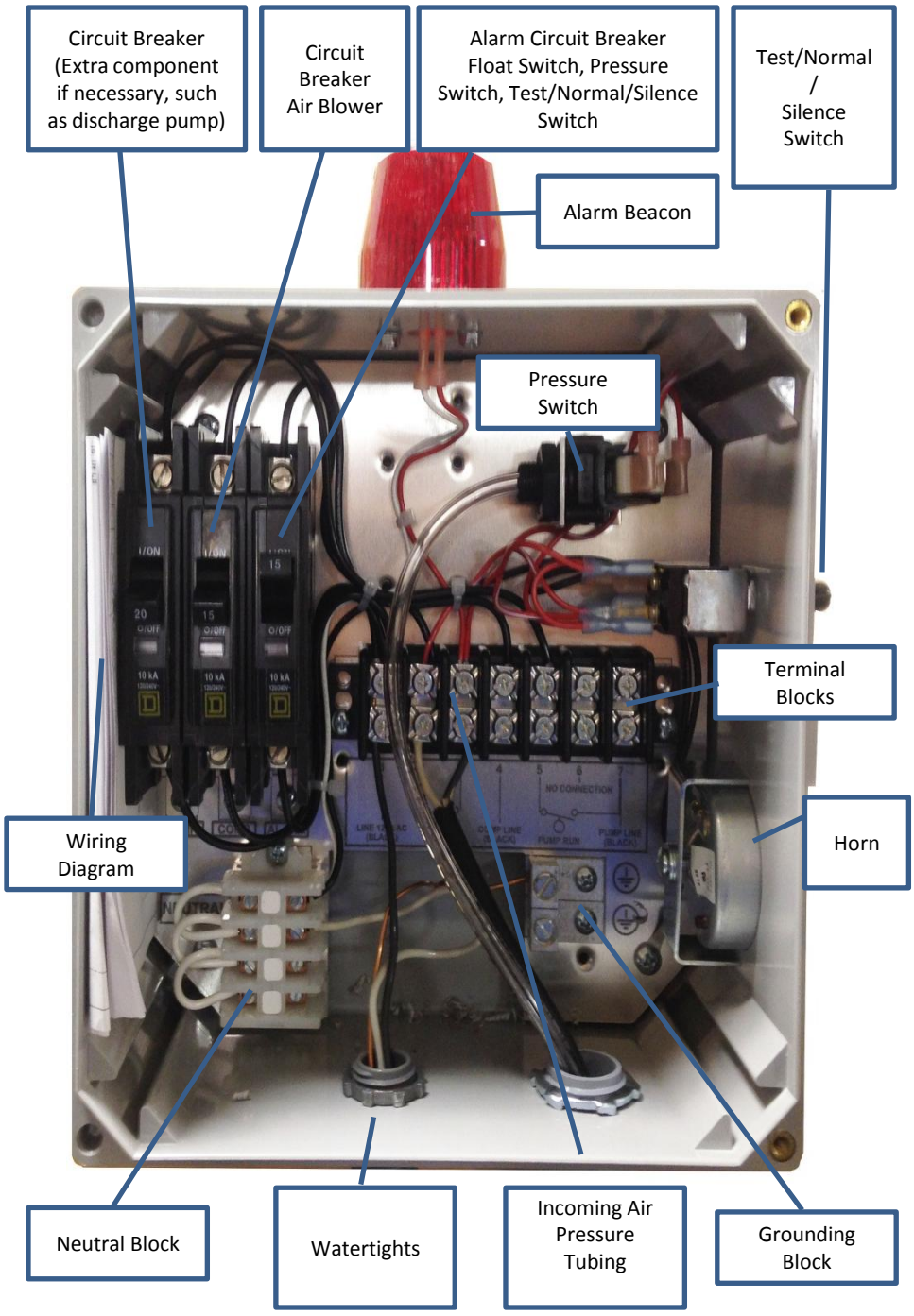
Housed in a NEMA 4X rated enclosure, the Alarm/Control Panel is connected to the treatment system and monitors tank water level and blower operation. An audible horn and red beacon light will activate in the event of either a tank high water condition or if the blower ceases to operate (causing a drop in air pressure). Please note: upgraded controllers with telecommunication, alarm tracking and data logging capabilities are available. (Summarized on following page).

The Alarm/Control panel is equipped with a 3-way toggle switch (Test-Normal-Silence) that allows check for proper operation by toggling the side panel switch to "Test" mode. The horn will sound and the red beacon will activate so long as the switch is held in the "Test" position. When switch it released, it will return to normal operation.

In the event of an alarm condition the "Silence" switch may be engaged to silence the audible alarm. However, the beacon will continue to flash until normal operation is restored (i.e. blower air pressure is restored or high water float is deactivated), in which case the alarm will reset and both audible and visual alarms will clear.

If at any stage a new alarm condition occurs, the "Silence" mode will expire and the unit's horn will begin sounding again.

<u>All conduits between panel and treatment tank must be sealed to prevent gas leakage into panel.</u>



Fuji Clean USA offers a choice of Fuji Clean USA customized alarm/control panels manufactured by SJE Rhombus, Inc., each with different features. Control panel customization is also available to match unique site or job requirements Please consult Fuji Clean USA for details.

The table below summarizes Fuji Clean standard system controller selections.

Please contact Fuji Clean USA for details and additional technical specifications.

Model Features	Controller A	Controller C	Controller D	Controller E
SJE Rhombus Model #	1041972	1045040	IFS41W914X6A8 AC10E27D	IFI41W914X6A8A C10E27D
NEMA 4X Weather Proof Enclosure	X	X	X	X
Three 120 Volt AC Breakers (Pump, Compressor, Alarm)	X	X	X	X
Alarm/Test/ Normal/Silence Switch	X	X	X	X
Compressor Low Pressure Alarm Switch	X	X	X	X
Communication Contacts (Alarm Aux)		X	X	X
Elapsed Time Meter		X	X	X
Duplex Pump Demand or Timed Dosing Control			X	X
Data Logging Panel via USB Port to Flash Drive				X
UL Listed to Meet and/or Exceed Industry Safety Standards			X	X
Dual Safety Certification for U.S and Canada			X	X

Alarm / Control Panel Component Specifications

Manufacturer: SJE-Rhombus
Model #: 1017273 / Mechanical Aerobic w/o timer

Switches, Horn and Light Component Specifications						
Description	Make	Model #	Electrical Certifications	Voltages	Amps	Action
HORN	WORLDWIDE TECHNOLOGIES	16004146SSFRONT/4HOL	UL RECOGNIZED (UCST2)	120V		
SINGLE POLE 20A BREAKER	SCHNEIDER ELECTRIC	QOU120	CSA IEC UL LISTED	120/240	20	
SINGLE POLE 15A BREAKER	SCHNEIDER ELECTRIC	QOU115	CSA IEC UL LISTED	120/240	15	
TOGGLE SWITCH	CARLING	6GG5B-73	UL CSA VDE	250	15	
PRESSURE SWITCH	HERGA	6871-OEO-U126	UL CSA		21	
LED BEACON	SJE-RHOMBUS	1023163	UL	120		

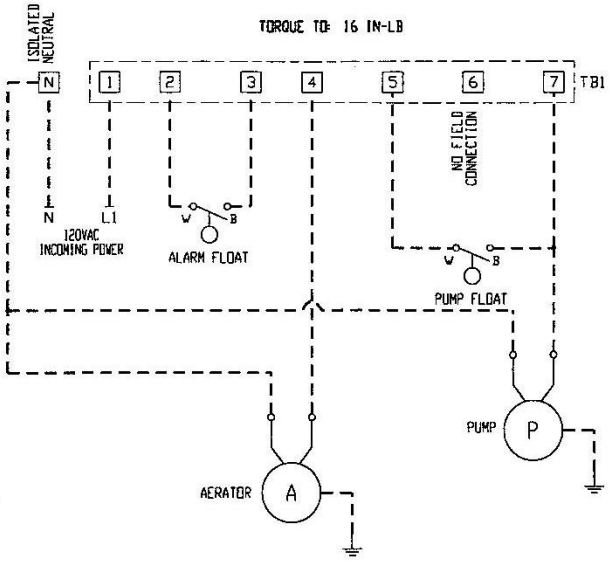
Enclosure Specifications							
Description	Make	Model #	Electrical Certifications	Overall Dimensions	Interior Dimensions	Material	Type
ENCLOSURE BOX	CARLON	NL884B	UL LISTED CSA	8X8X4		POLYCARBONATE	
ENCLOSURE COVER	CARLON	NJ88L	UL LISTED CSA	8X8		POLYCARBONATE	

Miscellaneous Component Specifications										
Description	Make	Model #	Electrical Certifications							
GROUND LUG	ILSCO	TA-6-S	UL 486A/B 90° C Listed and is CSA certified.							
TERMINAL BLOCK	SCHNEIDER ELECTRIC	9080GK6	CE CSA (LR62144/6228 01) UL listed (E60616/XCFR2)							
TERMINAL BLOCK	USD/COOPER/MAGNUM	TB300-07-SP	UL/CSA IEC COMPLIANCE CE CERTIFIED							

Alarm/Control Panel Wiring Diagram p.1

Please provide wiring diagram to licensed electrician for making proper electrical connections. (A copy of this diagram is also provided inside NEMA 4X rated control panel enclosure).

Please Note: The basic Fuji Clean control panel does not come equipped with a timer or timing device. Please contact your distributor for this and other alarm/controller upgrade options.



BRANCH CIRCUIT PROTECTION, OVERLOAD PROTECTION AND MAIN DISCONNECT PROVIDED BY OTHERS AND MUST BE SIZED ACCORDING TO PUMP/MOTOR MANUFACTURING SPECIFICATIONS.

EXTERNAL COMPONENTS (COMPRESSOR AND/OR PUMPS) PROVIDED BY OTHERS AND MUST BE U.L. APPROVED THERMALLY PROTECTED PUMPS

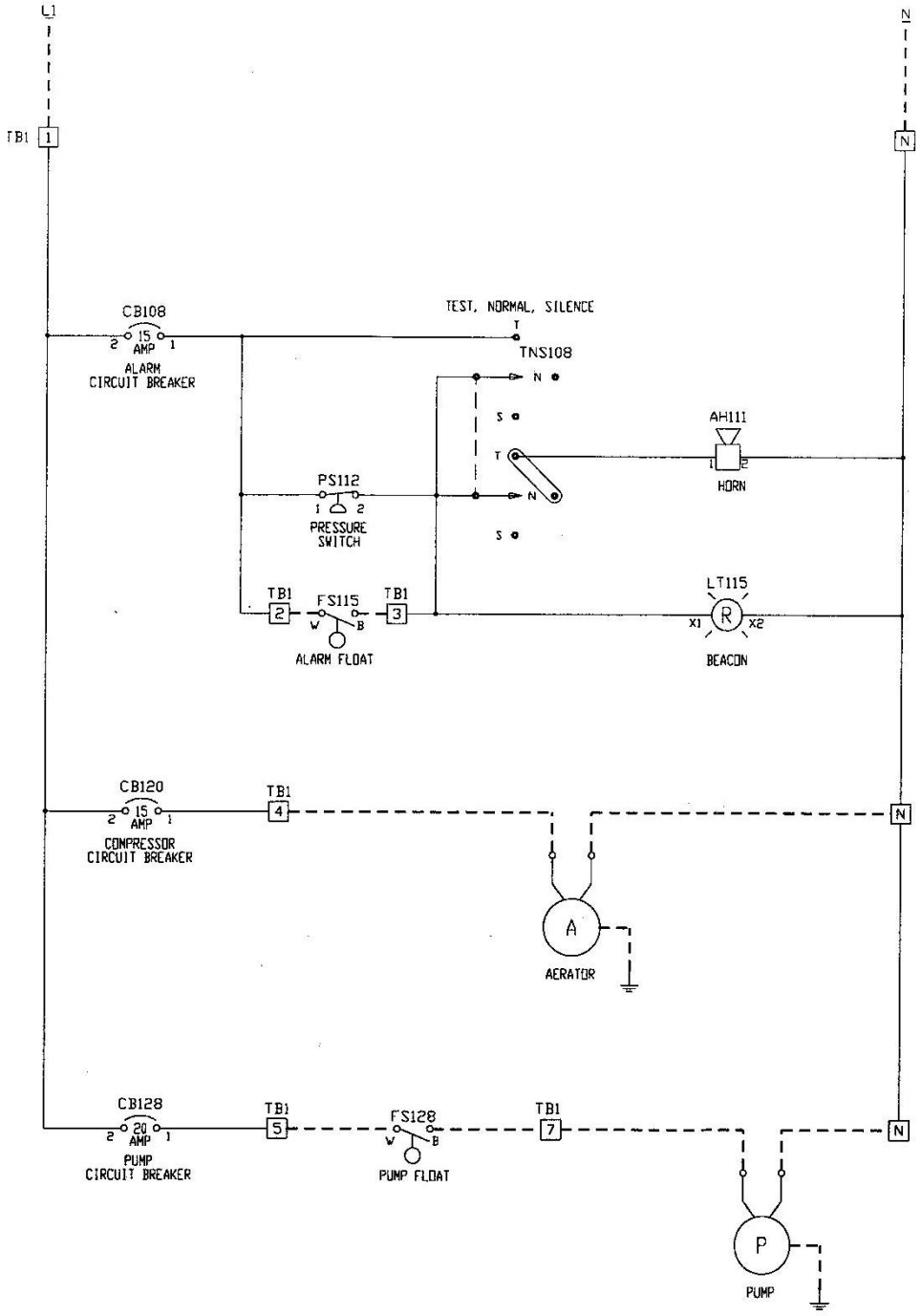
TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS MUST BE AT LEAST 140 DEG. F. (60 DEG. C.). TERMINAL STRIPS AND GROUND LUG USE COPPER CONDUCTORS ONLY.

CONNECT GROUND LUG IN PANEL TO A SECURE EARTH GROUND

DASHED LINES REPRESENT FIELD WIRING

FIELD WIRING SECTION

Alarm/Control Panel Wiring Diagram p.2

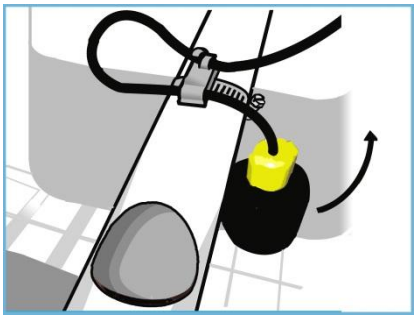


Section 3e. System Components - Float Switch

The SJE Rhombus Signalmaster float switch may be pre-mounted in Fuji Clean USA treatment systems. In the event that the float switch needs to be installed or replaced, this information from SJE Rhombus is supplied for informed, proper handling during the installation process.

SJE SIGNALMASTER®

- Mechanically activated.
- Control differential of 1.5 inches above or below horizontal.
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.



Mounting the Switch

Install on the pumpback line using the provided hose clamp and mounting fixture in the center of Chamber 2, (Anaerobic Contact Filtration Chamber) with 3-1/2" (9 cm) of electrical cord tether.

ELECTRICAL SHOCK HAZARD
Disconnect power before installing or servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.

EXPLOSION OR FIRE HAZARD
Do not use this product with flammable liquids. Do not install in hazardous locations as defined by National Electric Code, ANSI/NFPA 70.

Failure to follow these precautions could result in serious injury or death. Replace product immediately if switch becomes damaged or severed. Keep these instructions with warranty after installation. This product must be installed in accordance with National Electric Code, ANSI/NFPA 70 so as to prevent moisture from entering or accumulating with in boxes, conduit bodies, fittings, float housing, or cable.

PREVENTATIVE MAINTENANCE

- **Periodically check the product. Check that the cable has not become worn or that the housing has not been damaged so as to impair the protection of the product. Replace the product immediately if any damage is found or suspected.**
- **Periodically check to see that the float is free to move and operate the switch.**
- **Use only SJE Rhombus replacement parts.**
- **The Sensor Float and Sensor Float Mini control switches contain mercury and MUST be recycle or disposed of according to local, state and federal codes.**

SJE-RHOMBUS® THREE-YEAR LIMITED WARRANTY

SJE-RHOMBUS® warrants to the original consumer that this product shall be free of manufacturing defects for three years after the date of consumer purchase. During that time period and subject to the conditions set forth below, **SJE-RHOMBUS®** will repair or replace, for the original consumer, any component which proves to be defective due to defective materials or workmanship of **SJE-RHOMBUS®**.

THIS EXPRESS WARRANTY DOES NOT APPLY TO THE MOTOR START KIT COMPONENT. SJE-RHOMBUS® MAKES NO WARRANTIES OF ANY TYPE WITH RESPECT TO THE MOTOR START KIT.

ELECTRICAL WIRING AND SERVICING OF THIS PRODUCT MUST BE PERFORMED BY A LICENSED ELECTRICIAN.

THIS WARRANTY DOES NOT APPLY: (A) to damage due to lightning or conditions beyond the control of **SJE-RHOMBUS®**; **(B)** to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; **(C)** to failures resulting from abuse, misuse, accident, or negligence; **(D)** to units which are not installed in accordance with applicable local codes, ordinances, or accepted trade practices, and **(E)** to units repaired and/or modified without prior authorization from **SJE-RHOMBUS®**.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE: The consumer shall assume all responsibility and expense for removal, reinstallation, and freight. Any item to be repaired or replaced under this warranty must be returned to **SJE-RHOMBUS®**, or such place as designated by **SJE-RHOMBUS®**.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. SJE-RHOMBUS® SHALL NOT, IN ANY MANNER, BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF A BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.

Section 4. Maintenance Program

Scheduled Maintenance – General

If sampling is required, please draw samples prior to maintenance protocol. Refer to Appendix 3 for proper sampling procedure.

Regularly scheduled maintenance by a qualified service professional is necessary for efficient operation of this system. The recommended frequency of scheduled maintenance is semi-annually and will typically take a service professional about 20 minutes to complete per visit. Proper maintenance also requires sludge be pumped out from the system on a periodic basis. The frequency of pump-out depends on the system's loading but is recommended approximately once every two years, and more frequently for systems that treat heavy flows and loads.

Consumable parts for the blower such as the blower diaphragms and air filter should be replaced regularly. The recommended replacement interval for these parts is 12 months, although site conditions (such as air quality) may warrant a longer or shorter interval.

Regular Maintenance Procedures

1. **Outside Environment Check. (Recommended frequency: start-up and 1x every 6 months)**
   - The system is accessible and nothing inhibits access to maintenance.
   - Surface water is draining away from risers and covers.
   - No signs of physical damage to the treatment system, piping, alarms or components
   - No unusual smells around the system.
   - No unusually loud blower noise, such as rattling.

2. **Blower Box Check. (Recommended frequency: Start-up and 1x every 6 months)**
   Open the blower box, make sure that it is operating properly.
   Inspect all fittings and vents to ensure they are clean and dry.

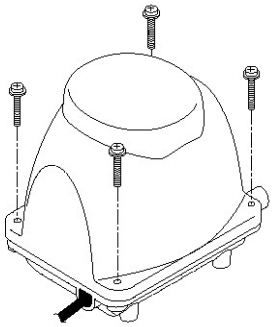
3. **Blower Operation and Blower Alarm Check. (Recommended frequency: Start-up and 1x every 6 months)**
   Make sure the blower operates properly. Clean the air filter or replace it, if necessary. Turn off the blower for few moments to check that the alarm is triggered.

4. **Blower Consumable Components (Recommended frequency: air filter inspection 1x every 6 months. Diaphragm replacement as required.)**
   The blower contains an air filter and diaphragms, which are considered “consumables.” The air filter should be inspected and cleaned/replaced regularly. Diaphragms and their casings should be replaced regularly to maximize blower life and efficiency. The recommended frequency for each of these procedures is once annually. Please follow steps on the following page.

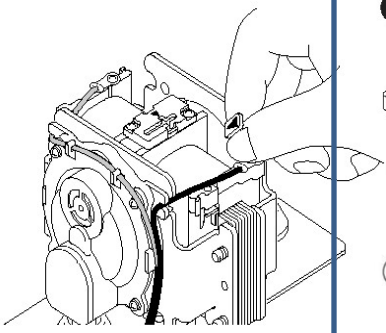
Blower Air Filter Cleaning / Replacement Procedure

Replacing the blower air filter is very simple and consists of removing the filter cover with a Phillips screwdriver, removing the old, cleaning it (blow clean with air pressure) or replacing it with a new filter, and then screwing the cover back into place.

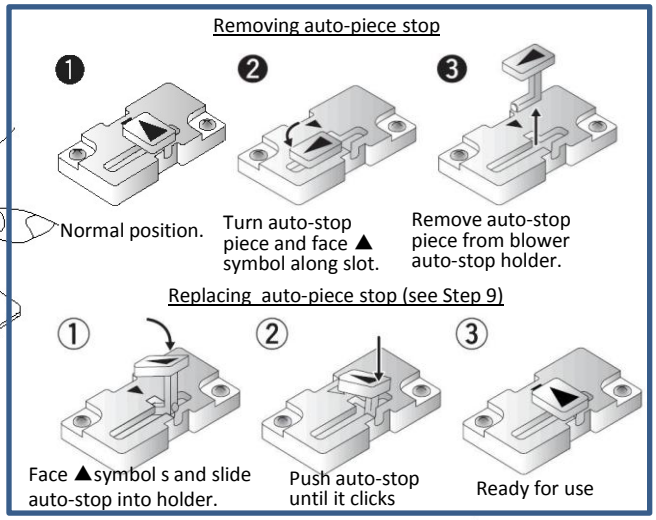
Blower Diaphragm Replacement Procedure

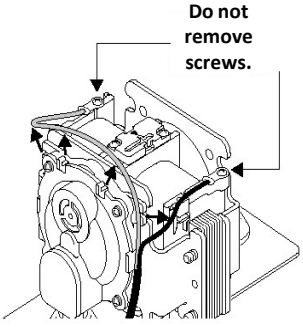


Step 1. Remove cover bolts and screw with 8mm socket and screwdriver

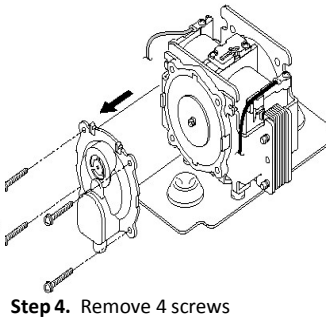


Step 2. Remove autopiece stop as shown:

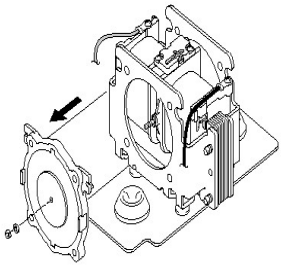




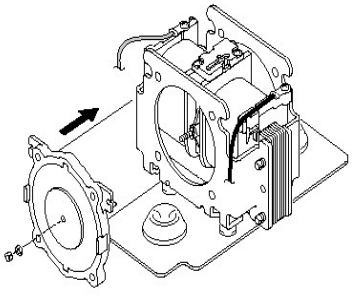
Step 3. Remove power cable from 4 hooks. **Do not remove screws.**



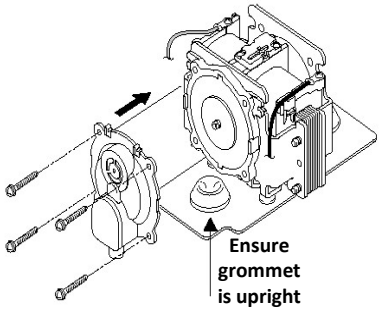
Step 4. Remove 4 screws from one casing.



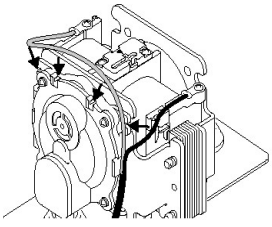
Step 5. Remove nylon nut and diaphragm from body



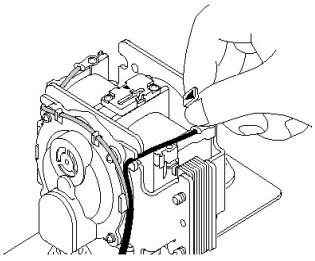
Step 6. Install new diaphragm using new nylon nut provided. Torque tighten to about 1 Nm.



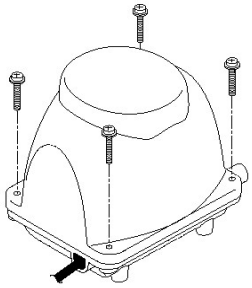
Step 7. Insert casing air outlet into rubber grommet. Secure with 4 screws. Repeat Steps 4-7 for 2nd diaphragm.



Step 8. Fit power cable onto 4 hooks.



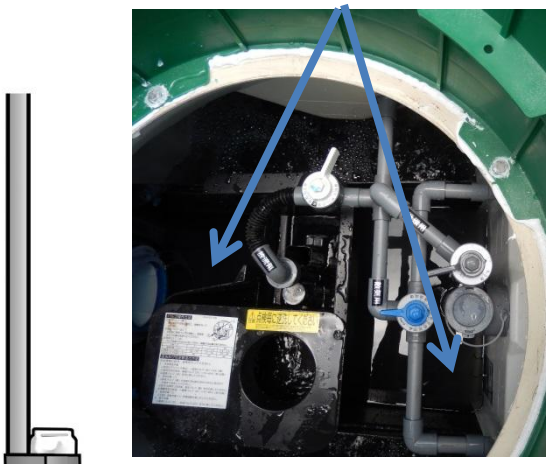
Step 9. Re-set auto-piece stop as shown above



Step 10. Replace cover bolts and screw.

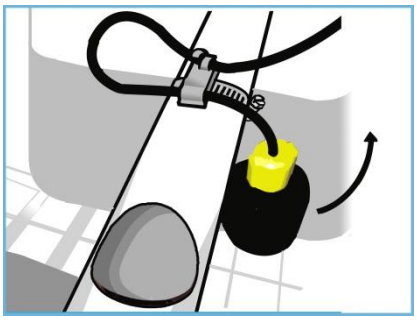
Open all access covers and secure the area around the access openings.

Take samples from either "Storage Chamber" or "Disinfection Chamber" (unless chlorine is used).



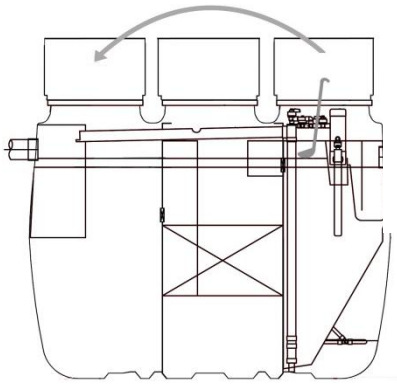
5. **Treated Effluent Check. (Recommended frequency: 1x every 6 months)**
   Collect a sample of treated effluent from the aeration chamber and evaluate for clarity and odor and pH. Sample should be nearly clear and with a faint musty smell. If sample is cloudy or exhibits a septic odor, then the system is not treating properly and requires maintenance. Please refer to the Troubleshooting Guide for direction. pH should be checked. If too low, procedures should be implemented to correct. (see Troubleshooting Guide).

6. **High Water Float Switch Check. (Recommended frequency: Start-up and 1x every 6 months)**
   Check that the high water float switch is operating freely. Lift up the high water float switch to check that the alarm is triggered. (Note: Float's activation horizon is 1.5" above or below level horizon).



7. **Inflow Pipe Check. (Recommended frequency: Start-up and 1x every 6 months)**
   Make sure that the inflow pipe is not blocked.

8. **Transfer Scum. (Recommended frequency: 1x every 6 months)**
   If any scum appears in the Chamber 3, scoop with a ladle or a collection jar and transfer it into the sedimentation chamber.



Use ladle or sample jar to transfer scum back to Chamber 1.

9. Set Recirculation Control Valve. (gray) (Recommended frequency: Start-up and 1x every 6 months)
The recirculation valve (gray) should be set to its default setting range according to the table below for ALL flows.

Model	Default Setting (%)
CE5	30% to 35%
CE7	25% to 30%
CE10	25% to 30%
CEN5	40% to 45%
CEN7	35% to 40%
CEN10	35% to 40%

At start-up, and for standard operation, the Recirculation Control Valve (gray) should be set according to the table and instructions listed under Procedure #9. NOTE: CEN systems have a higher recirculation rate than CE systems.

CE Systems

CEN Systems

(Within the ranges shown in the table above, set at lower end for projected below average hydraulic flows and at the higher end for higher average projected hydraulic flows.)

Important! Normal recirculation flow should be level with the top edge of the airlift pumpback line cut-out spilling into Chamber 1. If backflow is too high or too low, this typically indicates that service cleaning is required (O&M Steps 12-16).

10. Check/Set Aeration Balance Control Valve (blue). (Recommended frequency: Start-up and 1x every 6 months).
The default, normal setting for the Aeration Control Valve is 50%. Visually observe the airflow rates on each side of the plant by checking to see if bubbles are evenly distributed on both sides of the aeration chamber. If there is an obvious discrepancy in airflow between the two sides, adjust the Aeration Balance Control Valve so that the airflow is equal. Important! If adjustment of this valve is ineffective, then the likely cause of uneven bubbles is usually a blockage in the aeration pipes and is corrected with aeration pipe cleaning: See O&M Step # 14.

At start-up, and for standard operation, the Aeration Balance Control Valve (blue) should be set to 50%,

11. Check/Set Effluent Airlift Valve (white). (Recommended frequency: Start-up and 1x every 6 months)
The Effluent Control Valve is initially set to 40% and there is typically no need for it to be adjusted under standard conditions.

At start-up, and for standard operation, the Effluent Airlift Valve (white) should be set to 40%.

12. Backwash and Sludge Transfer. (Recommended frequency: 1x every 6 months) Perform a backwash and sludge transfer operation.

Excessive biofilm growth on the contact and filter media (Chambers 2 and 3) may cause partial clogging or short circuiting and deteriorate the performance of the system. <u>It is essential to carry out this backwash operation and sludge transfer at every maintenance visit</u>.

Step 1. Shut off the Effluent Air-lift Pump by turning the Effluent Control Valve (white valve) clockwise until it won't turn any more.

Step 2. Transfer the sludge on the bottom of the aeration chamber by turning the Recirculation Control Valve (grey valve) to 70-80 and wait for one minute.

Step 3. Reset the Recirculation Control Valve (grey valve) to the original position.

CE Systems

CEN Systems

Step 4. Aerate one side of the chamber by turning the Aeration Balance Control Valve (blue valve) fully one way. Wait for one minute, and then turn the valve fully to the opposite direction. Wait for another minute, and then reset the valve to the original position

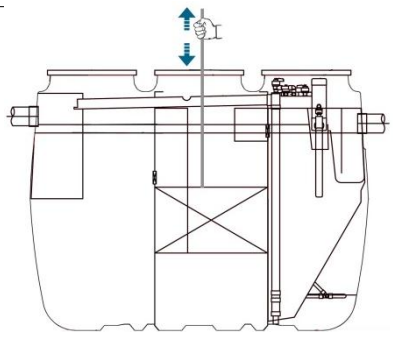
Step 5. Repeat Steps 2 - 4 three times.

Step 6. Final repeat of Step 2.

Step 8. Flush the Effluent Control Valve (white) by rotating the valve back and forth from 0 to 100 several times.

Step 9. Reset the Recirculation Control Valve (grey valve) and the Effluent Control Valve (white valve) to their original positions. Make sure that the aeration is working properly.

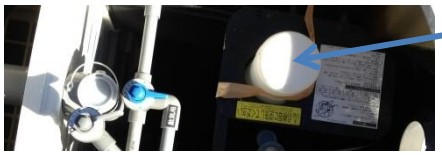
Step 10. Poke and penetrate into the anaerobic filtration media with a small diameter PVC pipe (e.g. ½-inch) gently and evenly throughout Anaerobic Filtration Chamber for media degassing. <u>This is a simple but essential procedure to assure uniform media contact and filtration.</u>



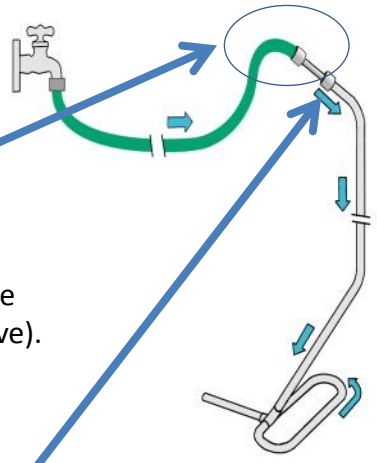
13. Check / Clean Effluent Airlift Pipe. (Recommended frequency: Start-up and 1x every 6 months)
Check the observation port in the airlift line to see if there is smooth water flow from the effluent airlift pump. If there is uneven flow or a disruption in flow, then clean the airlift pipe with a cleaning brush.

14. Clean Recirculation Air-lift Pump (Recommended frequency: 1x every 6 months)
Excessive biofilm build-up in the recirculation air-lift pump may affect the recirculation rate. Remove the plastic cap on the air-lift head, clean inside the pipe with a pipe cleaning brush. Also clean the recirculation pumpback line as shown.

15. Refill the chlorinator (if applicable). Place refill chlorination tablets in the chlorinator tube and adjust the dissolve rate by rotating the bottom cap of the chlorinator.



16. Cleaning Aeration Pipes (Recommended frequency: 1x every 6 months or as required)
Aeration Pipes should be cleaned at especially if bubbles are unevenly distributed even after adjusting the aeration balance or the recirculation flow rate has increased considerably without resetting Recirculation Valve (gray valve).



Use hose adaptor supplied by Fuji Clean USA.

Step 1. Close the Recirculation Control Valve (grey valve) and the Effluent Control Valve (white valve).

Step 2. Turn off the blower.

Step 3. Disconnect a barrel union. HINT: Just unscrew union and pull off air line. Do not totally disconnect barrel union.

Clean With Hose: (<u>Use for standard cleaning</u>)
Attach adaptor with check valve (provided by manufacturer) to garden hose and connect with aeration pipe. Run water from spigot for 1 minute. Repeat for the 2nd aeration pipe.

Step 4. Reconnect aeration pipes, turn on blower and re-set standard valve settings (see O&M Procedure #'s 10-12)

17. Measure Sludge and Pump Out if Necessary
(Recommended frequency: 1x every 2 years or as required)

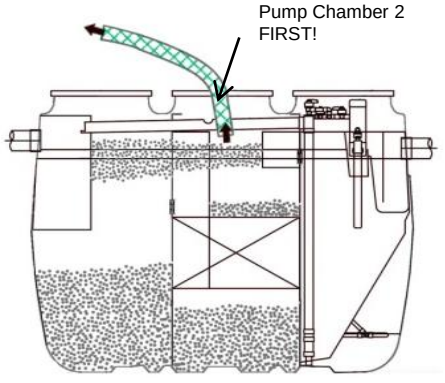
Sludge removal is required to remove accumulated solids from the treatment system. Since the frequency of sludge removal varies widely based on individual system use, it is difficult to provide "standard" pump-out frequency intervals, although as a general rule, we recommend a sludge removal interval once every 2 years. System conditions indicating the necessity for pump out include the following:

- Biological treatment performance is severely deteriorated due to excessive amounts of oil or chemicals which interfere with the bacterial activity.

- Excessive scum or sludge builds up in the sedimentation chamber. Specifically, for residential models, when sludge levels reach more than 35-inches in Chamber 1 (Sedimentation Chamber) or more than 16-inches in Chamber 2 (Anaerobic Contact Filtration Chamber). Please contact your distributor for a sludge measuring tool if necessary.

- Abnormal rise of the water level

- Excessive scum builds up in Chamber 2, the Anaerobic Filtration Chamber and large amounts of solids flow into Chamber 3, the Aerobic Filtration Chamber, even after performing a sludge transfer operation (O&M procedure #12).



Pumpout and Desludging Procedures

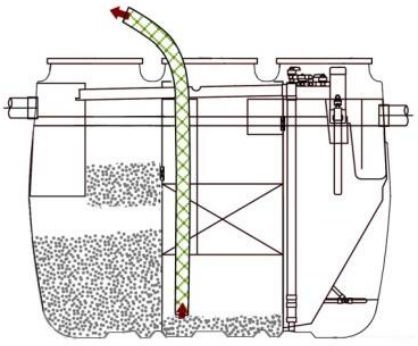
Step 1. Turn off all electrical components.

Step 2. Clean the inlet and outlet pipe.

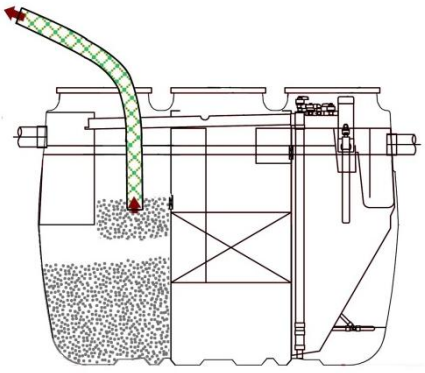
Step 3. Transfer suspended solids and scum from Chamber 3 and 3A back to Chamber 1.

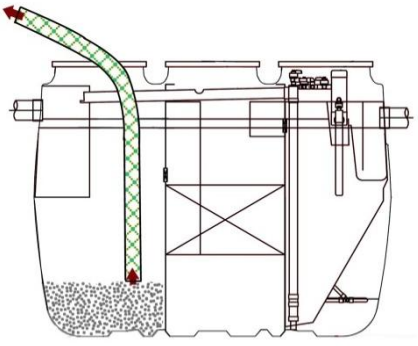
Step 4. With pumpout hose, remove scum and sediment build-up on the filtration media from Chamber 2 FIRST! Otherwise you risk solids being drawn up into the media in Chamber 2.

Step 5. Insert suction hose into the baffle. Remove sludge from the bottom Chamber 2 while washing the filtration media and chamber wall with high pressure water.



Step 6. Remove scum and sludge in the sedimentation chamber.





Step 7. Re-fill the system with water to LWL.

Low water line in Chamber 1

Step 8. Turn on all electrical components.

FujiClean USA™
Toward Clean Water…

SYSTEM INSPECTION CHECKLIST REPORT – Fuji Clean CE & CEN Systems

To be completed by authorized service provider at each inspection/service visit - once every 6 months. Please follow the O&M Maintenance Program in the Fuji Clean O&M Manual. Contact Fuji Clean USA with questions, comments and/or troubleshooting assistance. Authorized Service Provider must maintain a copy of this report in records.

SYSTEM SITE

Name: _____

Address: _____

_____

Town/State: _____

Contact: _____

Contact Info: _____

AUTHORIZED SERVICE PROVIDER

SERVICE DATE: _____

Name: _____

Company: _____

Town/State: _____

License No. (if applicable): _____

Contact Info: _____

SERVICE PROCEDURE / OPERATION	**COMMENT / DATA / OBSERVATION** (use reverse if nec.)
□ 1. Outside Environment Check	_____
□ 2. Blower Box Check	_____
□ 3. Blower Operation and Blower Alarm Check	_____
□ 4. Replace blower Consumable Components if nec.	_____
□ 5. Treated Effluent Check	
Clarity (Required)	_____
Odor (Required)	_____
pH (Required)	_____
DO (Recommended)	_____
□ 6. High Water Float Switch Check	_____
□ 7. Inflow Pipe Check	_____
□ 8. Transfer Scum to Sedimentation Chamber	_____
□ 9. Check/Set Recirculation Control Valve	_____
□ 10. Check/Set Aeration Balance Control Valve	_____
□ 11. Check/Set Effluent Airlift Valve	_____
□ 12. Backwash and Sludge Transfer (Important!)	_____
□ 13. Check/Clean Effluent Airlift Pipe	_____
□ 14. Check/Clean Recirculation Airlift Pipe	_____
□ 15. Refill Chlorinator (if applicable)	_____
□ 16. Clean Aeration Pipes (if necessary)	_____
□ 17. Measure Sludge and Pump out if necessary*	
Sedimentation Chamber (Chamber 1)	_____
Anaerobic Chamber (Chamber 2)	_____
□ 18. Check Flow Monitor Component (if Applicable)	_____

* Pump out reminder. If 35" or more of sludge accumulates in the Sedimentation Chamber (1st chamber) or 16" or more in the Anaerobic Chamber (2nd chamber), the system should be pumped. Pump Anaerobic Chamber (2nd chamber) first, followed by the Sedimentation Chamber (1st chamber). Please refer to Fuji Clean USA O&M Manual.

TROUBLESHOOTING

General

SYMPTOM	SOLUTION
Water is ponding around risers and covers	Landscaping is necessary (possibly involving addition of fill material) so that water drains away from risers and covers. Note: risers may be added to the unit as necessary, but service personnel must be able to reach into the unit and move controls. Recommended maximum riser height is 24-inches.
Strong and unusual odor exists even with the manhole lids closed.	During the first few weeks of operation there may be noticeable odor from the system. This should cease once the bacteria are established. If odor persists, seeding material may be added to both anaerobic and aeration chambers, and/or the recirculation rate may be increased to 35%, the upper end of the normal operation range. If odor continues to persist, please contact manufacturer for instructions. Installation of a vent may be necessary.
Blower is making an unusually loud noise	Normal blower operation is quiet. Typically a loud or rattling blower noise is created when the blower is in contact with its housing, or has slipped off its base platform.

TROUBLESHOOTING

Chamber 1. Sedimentation Chamber

SYMPTOM	SOLUTION
Inlet pipe is blocked	Remove the blockage.
Excessive scum accumulations. (Scum layer reaches the top of the influent baffle)	Measure sludge level. If the depth of sludge accumulation is less than 24-inches (or 18-inches in Chamber 2), break the scum layer, otherwise have the plant pumped out.
Excessive sludge accumulations. (Depth of sludge layer exceeds 24-inches)	If the sludge exceeds the holding capacity, have the plant pumped out.
Foreign materials, excessive oil or fat entering the system.	Remind the homeowner to refrain from disposing harmful substances into their system. (Please refer to Homeowner's Manual for listing.)

TROUBLESHOOTING

Chamber 2. Anaerobic Filtration Chamber

SYMPTOM	SOLUTION
Excessive scum accumulation. (less than 4-inches)	If Chamber 1, the Sedimentation Chamber still has the remaining sludge holding capacity, (less than 24-inches of sludge build-up), transfer the scum to the sedimentation chamber, otherwise have the plant pumped out.
Excessive scum accumulation. (more than 4-inches)	Have the plant pumped out.
Excessive sludge accumulations	If the bottom sludge layer is thicker than 18-inches and excessive sludge has accumulated on the filtration media, have the plant pumped out.
Filtration media is blocked up. (The water level in Chamber 2's media is lower than that in the baffle.)	Perform a degassing operation on the filtration media. (Poke media with a section of PVC pipe. See O&M procedure #12). If the problem still persists even after the degassing and sludge transfer operation, pressure wash the filtration media using an effluent pump and hose affixed to a PVC pipe.
Foreign materials, excessive oil or fat entering the system.	Remind the homeowner to refrain from disposing prohibited substances and limited-use substances.

TROUBLESHOOTING

Chamber 3. Aerobic Contact Filtration Chamber

SYMPTOM	SOLUTION
Bubbles are not evenly distributed throughout the chamber or there are no bubbles at all.	• Adjust the aeration control valve. • Check to make sure that there is no leakage from the aeration pipework. • Check to make sure that the blower operates properly. • Clean the aeration pipes • Perform a backwash operation. (O&M Procedure #12).
Dissolved Oxygen is less than 1.0mg/L.	• Check to make sure that the blower operates properly. • Perform a backwash operation. (O&M Procedure #12).
Recirculation rate is unable to be adjusted or no recirculation at all.	• Adjust the recirculation control valve. • Check to make sure that there is no leakage from the aeration pipework. • Check to make sure that the blower operates properly.
Recirculation flow rate is too high	• Clean the aeration pipes
Recirculation flow rate is too low	• Clean the recirculation airlift pump.
Excessive foaming.	• Some foaming may occur during the early stage of operation. This should cease once the bacteria are established. Seeding may also be effective. Please contact your distributor for additional seeding information.
Excessive suspended solids.	• Perform a backwash operation.
Cold water is hampering treatment	The following measures will allow greater oxygen penetration into biofilm. • Increase frequency of backwash • Increase blower size • Perform desludge operation (i.e. sludge pumpout)

TROUBLESHOOTING

Chamber 3a. Storage Chamber

SYMPTOM	SOLUTION
Scum forming.	• Transfer the scum to Chamber 1, the Sedimentation Chamber, using a pump, ladle or suitable container. • Increase the recirculation rate (within the normal operating range).
Excessive sludge accumulations.	• Transfer the sludge to Chamber 1, the Sedimentation Chamber, using a pump, ladle or suitable container.
Ph is too low or too high. (Ph < 5.8 or Ph > 8.6)	• Check to make sure the recirculation rate is appropriate. • Remind homeowner of what cannot be put into this system (refer to Homeowner's Manual). • Install a slow-release lime dispersal system into the sedimentation chamber to raise the pH. Please contact Fuji Clean USA for details.
Excessive biofilm on the chamber wall.	• Clean the wall with brush or water pressure and transfer solids to the sedimentation chamber.
Effluent airlift pump is not working.	• Clean the airlift pump. • Flush the effluent control valve. • Check to make sure there is no leakage from the blower pipework. • Check to make sure that the blower operates properly.

TROUBLESHOOTING

Air Blower

What to observe	Status	How to solve the problem
Blower is not working		
Power plug	Power plug is disconnected.	Connect the power plug to the outlet.
Alarm triggered (if alarm exists)	Diaphragm is damaged. Auto-stop function is activated.	Replace the diaphragm kit. Re-insert the auto-stop piece.
	Check if blower is electrified.	Replace the power cable.
		Replace the auto-stop piece.
		Replace the electric magnet.
	Internal flat terminal has fallen out.	Secure the terminal.
Blower is making an abnormal or excessive operating noise.		
Installed condition	Blower is not secured.	Secure blower in horizontal position.
Oscillator	Oscillator is damaged.	Clean the inside of aeration pipe by rotating valve and adjust aeration level to be even.
	Oscillator nut is loose.	Tighten oscillator nut.
Low air volume or misplaced air from aeration pipes (treatment plant)		
Faulty diaphragm	Diaphragm, outlet.	Replace diaphragm using diaphragm kit.
Aeration leak	Grommet partition	Check internal parts assembly and re-attach the pump.
Air filter is clogged	Air filter	Clean or replace air filter.
Aeration pipes	Pipes are disconnected.	Reattach / repair pipes.
	Clogging	Clean the inside of aeration pipes.

Appendix 1

MACBlowers

Installation - Operator Manual

MACBlowers

by FujiClean of Japan

Installation - Operator Manual

MACBlower Model Number:

☐ MAC40R ☐ MAC60R ☐ MAC80R ☐ MAC100R ☐ MAC120R ☐ MAC150R ☐ MAC 200R

Serial # _____

Fuji Clean USA ● 41-2 Greenwood Road ● Brunswick, Maine 04011 ● 207-406-2729

www.macblowers.com

MACBlowers – The Intelligent Choice

Thank you for choosing a MACBlower by Fuji Clean. Your selection of a Fuji Clean product is a quality choice and you will benefit from a company focused on continual product improvement through relentless R&D and intelligent engineering innovation.

Our "R" Series of MACBlowers represents our commitment to manufacture the highest quality linear diaphragm blowers in the world. Incorporating electromagnets, smaller diaphragms and innovative compression chamber configuration, our state-of-the-art blowers offer top-in-class performance operating cooler, quieter and more efficiently than comparable competitive products.

SAFETY

Please read this manual before installing and operating your Fuji Clean MACBlower.

WARNING

Indicates a potentially hazardous situation which could result in death or serious injury.

Electrical Cord Inspection. Please inspect the electrical cord on this unit before operating. If the cord or connection to the MACBlower is damaged in any way, the cord must be replaced by the manufacturer, its service agent or a qualified technician.

Preventing Electrical Shock. Do not try to open or repair the pump yourself. Please contact your certified maintenance provider.

Electrical Cord Safety. Avoid placing objects on electrical cord. A damaged cord could result in a fire hazard or electrical shock.

This Product is Not a Toy. Please supervise children accordingly.

CAUTION

Indicates a potentially hazardous situation which could result in injury and/or property damage.

Working Blower is Hot. When in operation, the lower part of the blower gets hot. Do not touch directly.

Do Not Place Flammable Material Near Blower.

Do Not Stand or Place Objects on the Blower. Excessive weight may damage blower.

MACBlowers – Installation Notes

- Install in a well-ventilated space out of direct sunlight and protected from elements such as direct rain or snowfall.
- Do not install in areas near grease exhaust fans.
- For residential installations (such as home wastewater treatment systems), be aware of quiet blower operational noise and avoid installing near bedroom windows and other locations where operational sounds may be a nuisance.
- Please install MACBlower in a location that allows unencumbered access for inspection and maintenance activity.

SAFETY CAUTIONS AND WARNINGS

- For installations in water environments (e.g. wastewater, pond or aquaculture applications) the MACBlower must be installed in a location above water level and not submerged.
- MACBlower's must be installed with proper electrical grounding.
- Wiring and electrical connections must be performed by a licensed electrician.
- Do not place objects on top of electrical cord.
- MACBlowers are designed for use on a nominal 120V circuit and include a grounding plug. If a properly grounded outlet is not available, a temporary adaptor may be used to connect this plug to a 2-pole receptacle, but shall only be temporary until a properly grounded outlet is installed by a qualified electrician. Whenever an adaptor is used, it must be held in place by a security screw.

Notes for Wastewater Treatment System Installation

- Install the MACBlower within 30-feet of treatment system and with no more than five (5) elbows. If site conditions won't allow for this, please contact Fuji Clean USA for additional instructions (which typically involves upsizing the MACBlower to accommodate).

- MACBlowers should be installed on an independent, level, concrete base positioned at least 8-inches from building wall so as not to transfer the vibration.

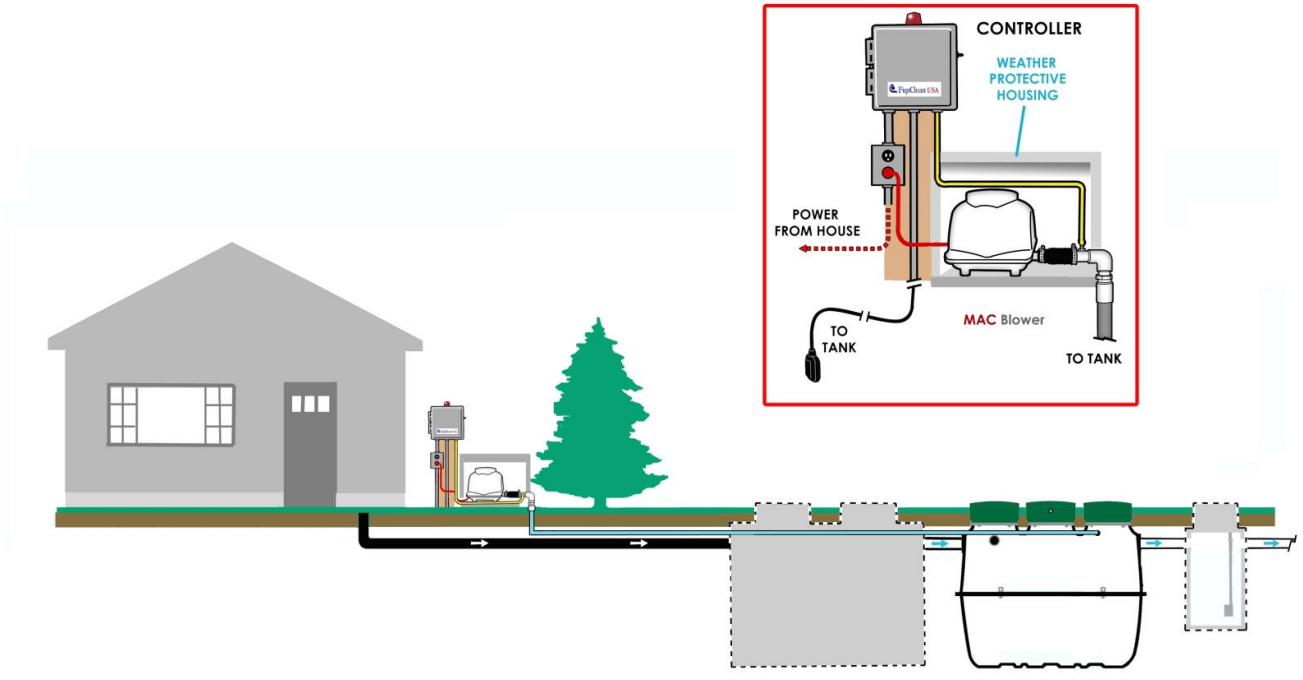
- Please follow Fuji Clean Treatment System Installation Manual to connect the MACBlower to the Fuji Clean treatment system.

- The MACBlower must be connected to a grounded, metallic, permanent wiring system, or an equipment-grounding terminal or lead on the product.

- Be certain that treatment system is properly filled with water before turning on the MACBlower.

- .As required in the Fuji Clean Installation Start-up Manual, measure the working pressure between the unit and pump. The accepted value for the pressure is ± 20% of the normal pressure which is specified on the blower name plate.

Suggested Installation for Onsite Wastewater Treatment System Applications



Fuji Clean USA
Treatment Tank

Inspection and Maintenance Schedule

(1) Air Filter

Inspect and clean once every 3 or 4 months.

Replace every year

Frequency of filter cleaning will increase in high dust and debris environments.

Attention

Failure to clean and/or replace filter may result in abnormal heat generation, an air flow volume decrease and/or premature deterioration of the diaphragm.

(2) Diaphragm / Casing

Replace every year

If the diaphragm assembly is damaged, the automatic -stop function engages and the blower will stop operating.

Attention

Failure to annually replace the diaphragm casing assembly raises the risk of blower breakdown.

(3) Pressure

High Pressure Operation is Prohibited

The accepted value for the working pressure between equipment and blower is ± 20% of the normal pressure as specified on the blower data plate.

Attention

Operating with sustained, higher than specified pressure may result in irregular heat generation and premature diaphragm breakage.

(4) Power Plug

Warning

Fire Prevention

Check whether any dirt and/or dust has built up on the power plug at least once a year.
Dirt/dust accumulation and/or a faulty connection may cause electric shock and/or a fire accident.

(5) Auto-stop Function

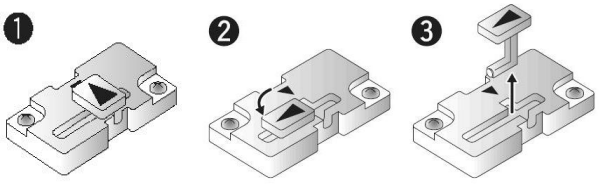
Test Auto-Stop Function When Diaphragm / Casing Assembly is Replaced

Remove the auto-stop piece and put in the plug to ensure the auto-stop function works properly. After checking, disconnect the plug from the power point and set the auto-stop piece in the right position. (See below)

Warning

To avoid electric shock, power must be disconnected when replacing the diaphragm/casing assembly and/or handling the auto-stop piece.

(1) How to remove an auto-stop piece

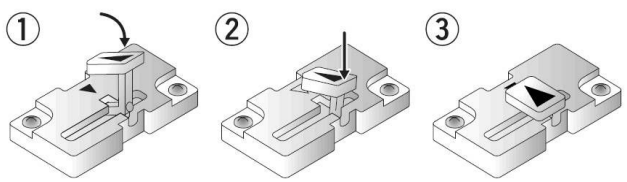


Normal position.

Turn auto-stop piece and face ▲ symbol along slot.

Remove auto-stop piece from blower auto-stop holder.

(2) How to set an auto-stop piece



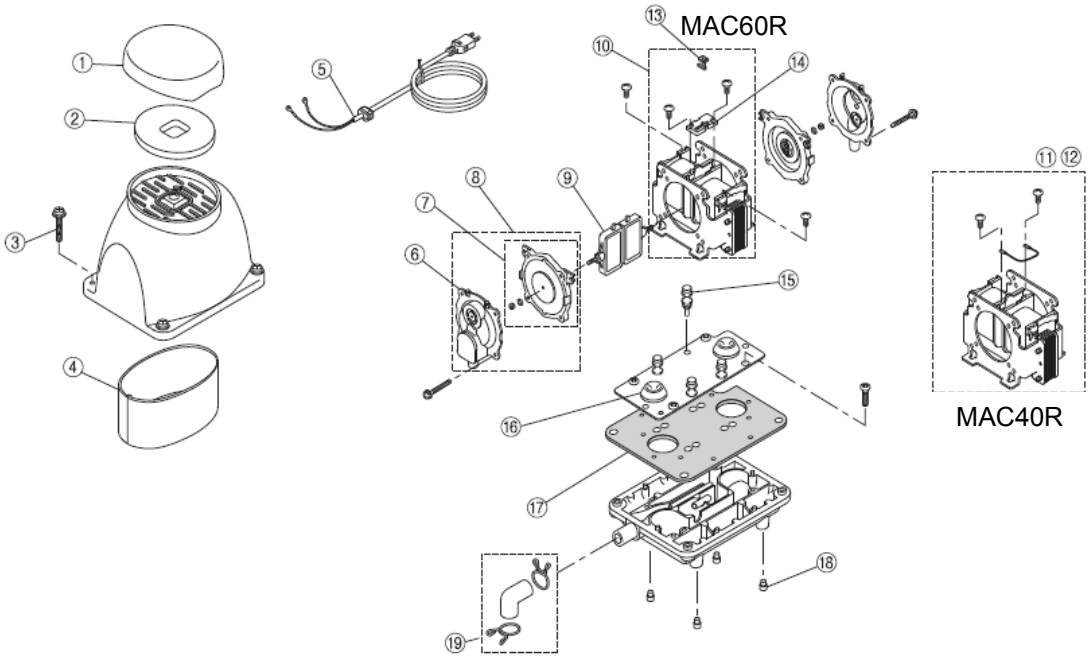
Face ▲symbol from auto-stop piece towards ▲symbol on auto stop holder and slide the piece into the holder.

Push in until it clicks.

Ready for use.

MAC40R / 60R Blower
Service Manual and Parts Description

Exploded View and Parts List



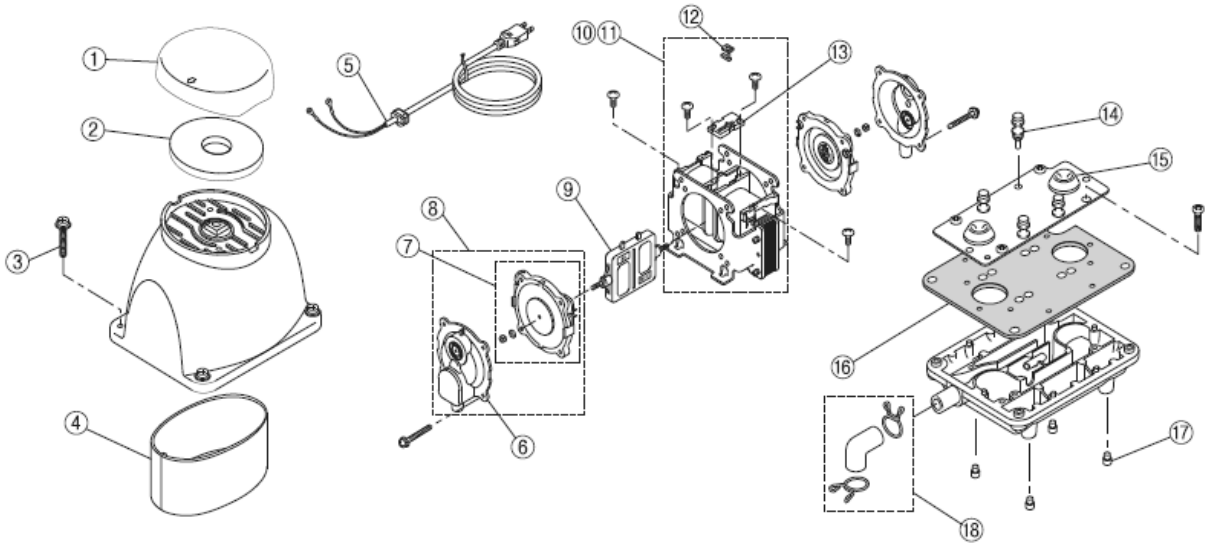
MAC40R / 60R Repair Parts List

No	PN	Item Name	40R	60R
1	H612	N6 Filter cover	○	○
2	H507	N6 Air filter (white)	○	○
3	H684	M5-20 Cross recessed hexagonal head bolt (4 pcs.)	○	○
4	H657	N6 Sound absorbing filter	○	○
5	H706	N6 Power cable	○	○
6	H115	N6 Casing assembly	○	○
7	H012	N6 Diaphragm*	○	○
8	H150	N6 Diaphragm assembly*	○	○
9	H317	R10 Oscillator rod*	○	○
10	H4060R	R6 Solenoid (with Auto stop assembly / 8 Screws)	—	○
11	H4040R	R4 Solenoid (with Auto stop assembly / 8 Screws)	○	—
12	H4030R	R3 Solenoid (with Auto stop assembly / 8 Screws)	—	—
13	H256	N6 Auto-stop piece	—	○
14	H275	N6 Auto-stop holder	—	○
15	H658	N6 Shock absorbing rubber (4 pcs.)	○	○
16	H821	N6 Rubber grommet	○	○
17	H636	N6 Tank gasket	○	○
18	H659	N6 Rubber foot (4 pcs.)	○	○
19	H812	Exhaling rubber hose assembly	○	○

* Including nut and flat washer.

MAC80R / 100R Blower
Service Manual and Parts Description

Exploded View and Parts List



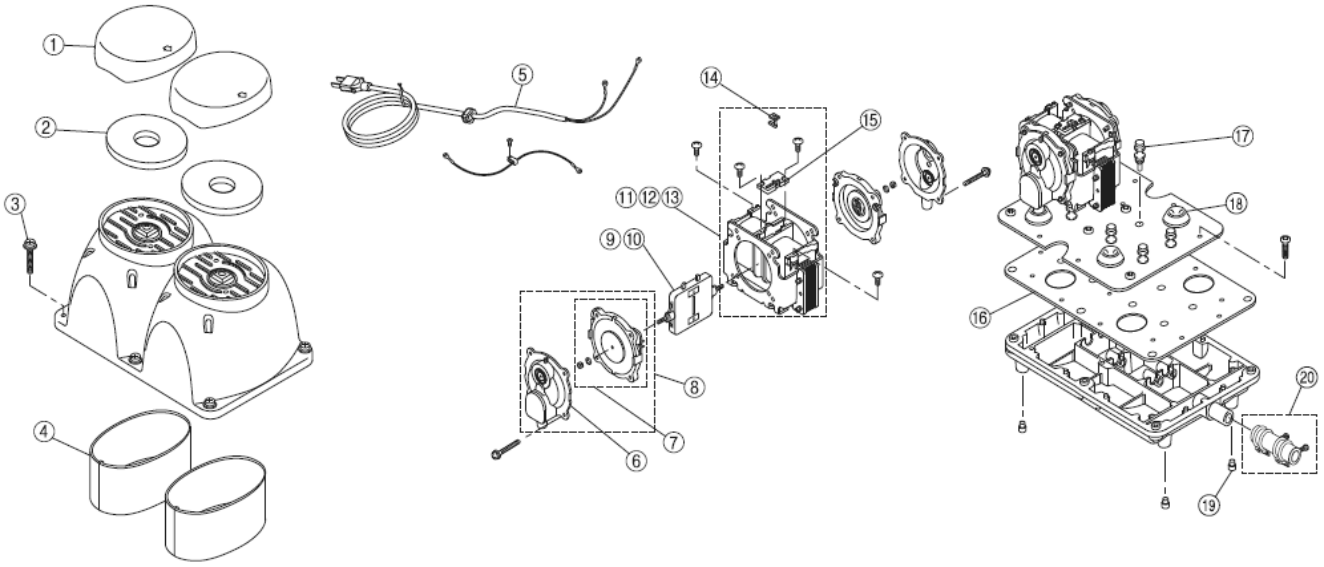
MAC80R / 100R Repair Parts List

No	PN	Item Name	80R	100R
1	H613	N8 Filter cover	○	○
2	H508	N8 Air filter	○	○
3	H684	M5-20 Cross recessed hexagonal head bolt (4 pcs.)	○	○
4	H657	N6 Sound absorbing filter	○	○
5	H706	N6 Power cable	○	○
6	H116	N8 Casing assembly	○	○
7	H013	N8 Diaphragm *	○	○
8	H151	N8 Diaphragm assembly*	○	○
9	H317	R10 Oscillator rod*	○	○
10	H4080R	R8 Solenoid (with Auto stop assembly / 8 Screws)	○	—
11	H4100R	R10 Solenoid (with Auto stop assembly / 8 Screws)	—	○
12	H256	N6 Auto-stop piece	○	○
13	H275	N6 Auto-stop holder	○	○
14	H658	N6 Shock absorbing rubber (4 pcs.)	○	○
15	H821	N6 Rubber grommet	○	○
16	H636	N6 Tank gasket	○	○
17	H659	N6 Rubber foot (4 pcs.)	○	○
18	H812	Exhaling rubber hose assembly	○	○

* Including nut and flat washer.

MAC 120R / 150R / 200R Blower
Service Manual and Parts Description

Exploded View and Parts List



MAC120R/150R/200R Repair Parts List

No	PN	Item Name	120R	150R	200R
1	H613	N8 Filter cover	○	○	○
2	H508	N8 Air filter (white)	○	○	○
3	H685	M5-20 Cross recessed hexagonal head bolt (6 pcs.)	○	○	○
4	H657	N6 Sound absorbing filter	○	○	○
5	H708	N0 Power cable	○	○	○
6	H117	N0 Casing assembly	○	○	○
7	H014	N0 Diaphragm*	○	○	○
8	H152	N0 Diaphragm assembly*	○	○	○
9	H317	R10 Oscillator rod*	○	—	—
10	H318	R16 Oscillator rod*	—	○	○
11	H4120N	N2 Solenoid (with Auto stop assembly / 8 Screws)	○	—	—
12	H4150R	R15 Solenoid (with Auto stop assembly / 8 Screws)	—	○	—
13	H4200R	R20 Solenoid (with Auto stop assembly / 8 Screws)	—	—	○
14	H256	N6 Auto-stop piece	○	○	○
15	H275	N6 Auto-stop holder	○	○	○
16	H638	N0 Tank gasket	○	○	○
17	H658	N6 Shock absorbing rubber (4 pcs.)	○	○	○
18	H821	N6 Rubber grommet	○	○	○
19	H659	N6 Rubber foot (4 pcs.)	○	○	○
20	H814	E2 Exhaling rubber hose assembly	○	○	○

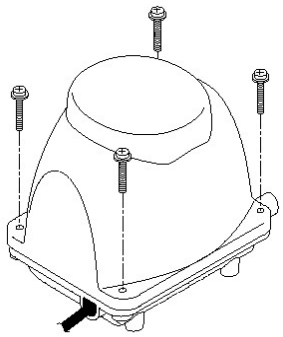
* Including nut and flat washer.

■ Specifications

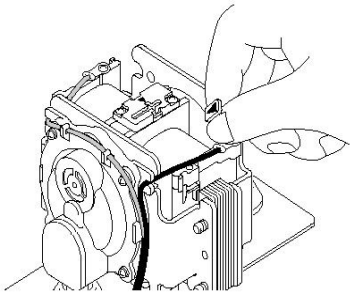
Model	*MAC40R*	*MAC60R*	*MAC80R*	*MAC100R*
Air Flow Volume	40 L/min 1.4 cfm	60 L/min 2.1 cfm	80 L/min 2.8 cfm	100 L/min 3.5 cfm
Normal Pressure	12 kPa 1.7 psi	15 kPa 2.2 psi		18 kPa 2.6 psi
Rated Voltage	120V			
Frequency	60Hz			
Outlet Pipe Size	13mm ID (18mm OD) 33/64 inch ID (45/64 inch OD)			
Weight	4.5kg 9 lbs. 14 oz.	5.0kg 11 lbs.		
Power Consumption	34W	45W	54W	83W
Power Cable	3×18AWG×1.8m (5ft.11in.)			
Manufacturer	Made in Japan by Fuji Clean			

Model	MAC120R	MAC150R	MAC200R
Air Flow Volume	120 L/min 4.2 cfm	150 L/min 5.3 cfm	200 L/min 7.0 cfm
Normal Pressure	18 kPa / 2.6 psi		
Rated Voltage and Current	120V		
Frequency	60Hz		
Outlet Pipe Size	20mm ID (26mm OD) 25/32 inch ID (1-1/32 inch OD)		
Weight	8.5kg 18 lbs. 12 oz.	9.0kg 19 lbs. 13 oz.	
Power Consumption	98 W	120 W	170 W
Power Cable	3×18AWG×1.8m (5ft.11in.)		
Manufacturer	Made in Japan by Fuji Clean		

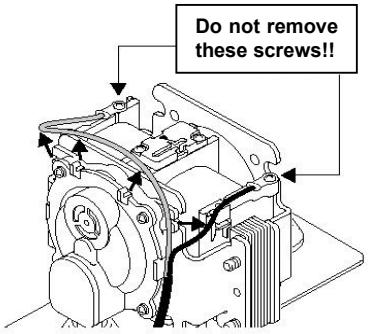
Diaphragm Replacement Procedure



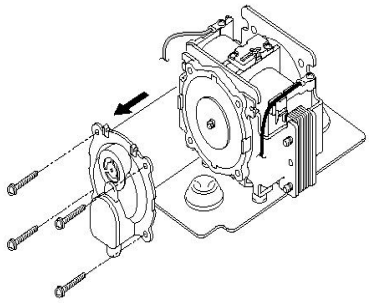
1. Unplug blower. Remove cover bolts using an 8mm-box



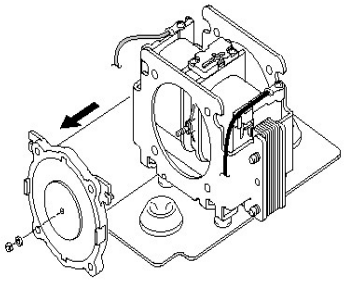
2. Remove an auto-stop piece as instructed above.



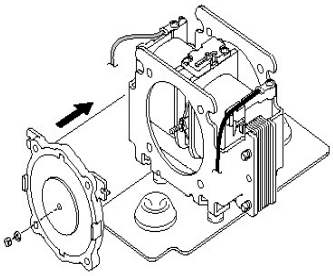
3. Remove a power cable from 4 hooks. **Do not remove screws!!**



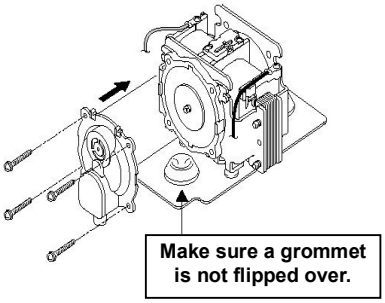
4. Remove 4 screws from a casing.



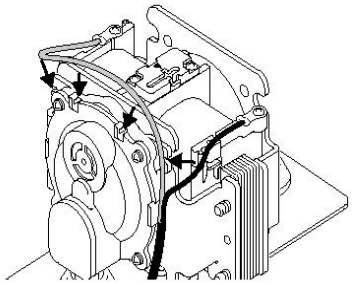
5. Remove Nylon nut and remove diaphragm from body.



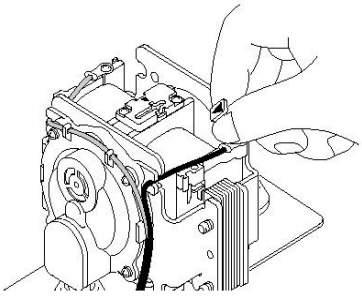
6. Install new diaphragm using new Nylon nut provided. *Tightening torque – about 1 Nm



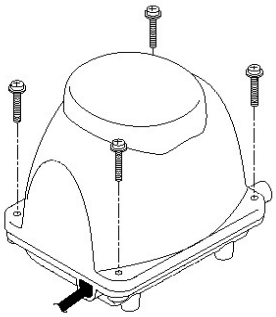
7. Insert casing air outlet into rubber grommet. Secure with 4 screws.



8. Fit power cable into 4 hooks.



9. Set auto-stop piece as instructed above.



10. Affix cover bolts using an 8mm-box wrench or screwdriver.

Warning

To avoid electric shock, power must be disconnected when replacing the diaphragm/valve assembly.

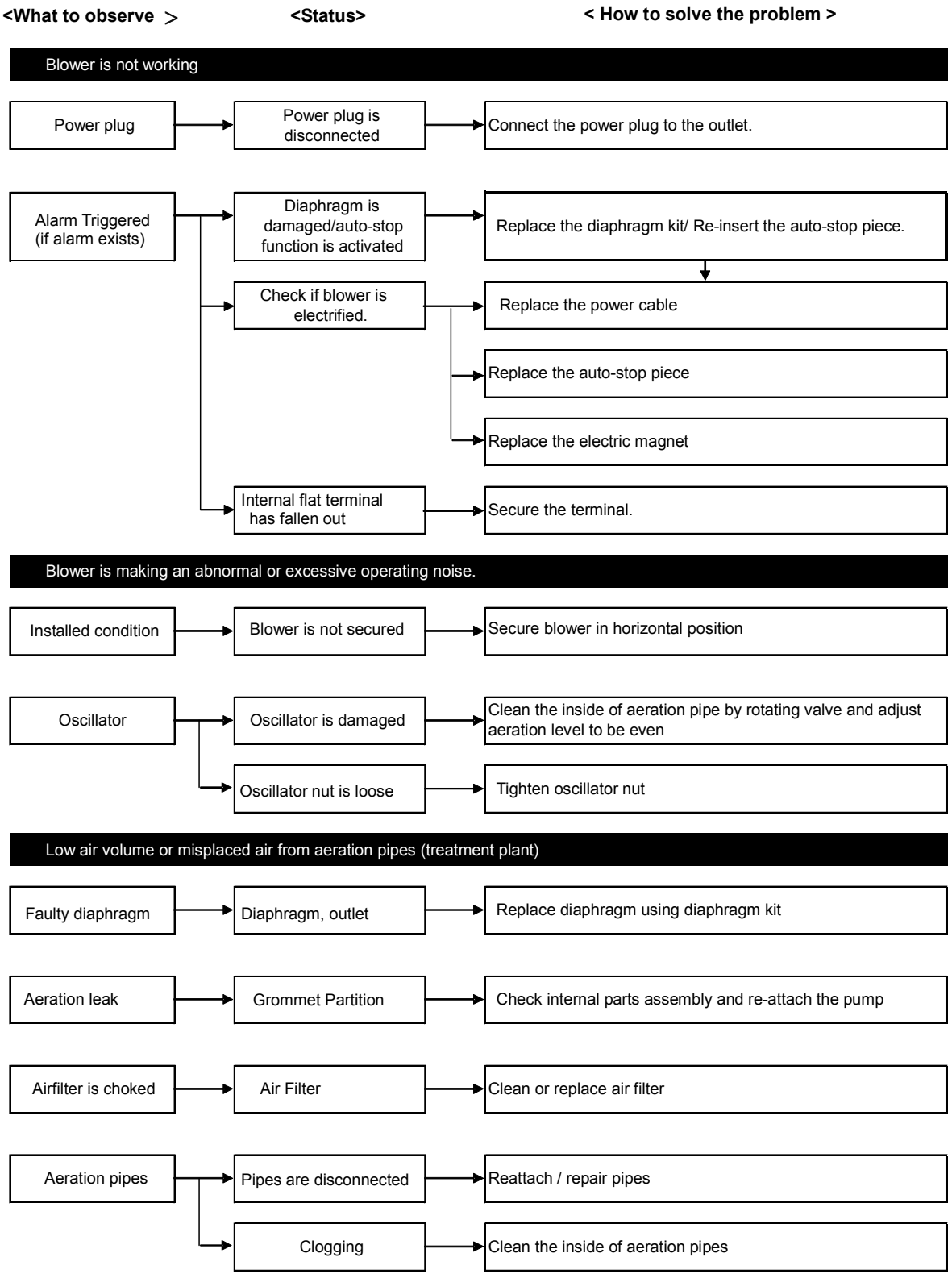
Attention

To avoid premature diaphragm breakage, replace <u>both</u> sides of diaphragm/casing assembly at the same time.

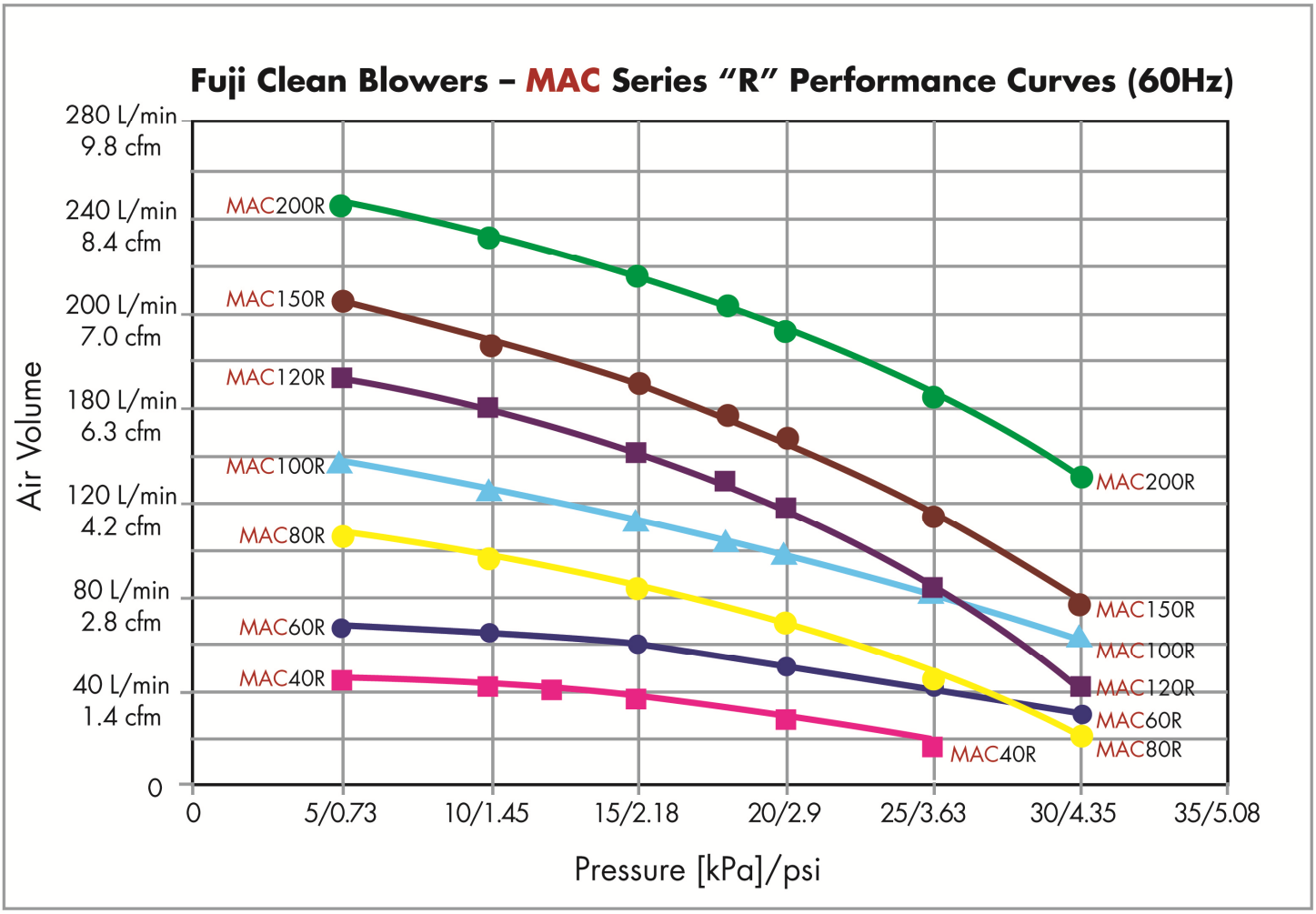
Attention

Please do not attempt to lubricate any internal blower components.

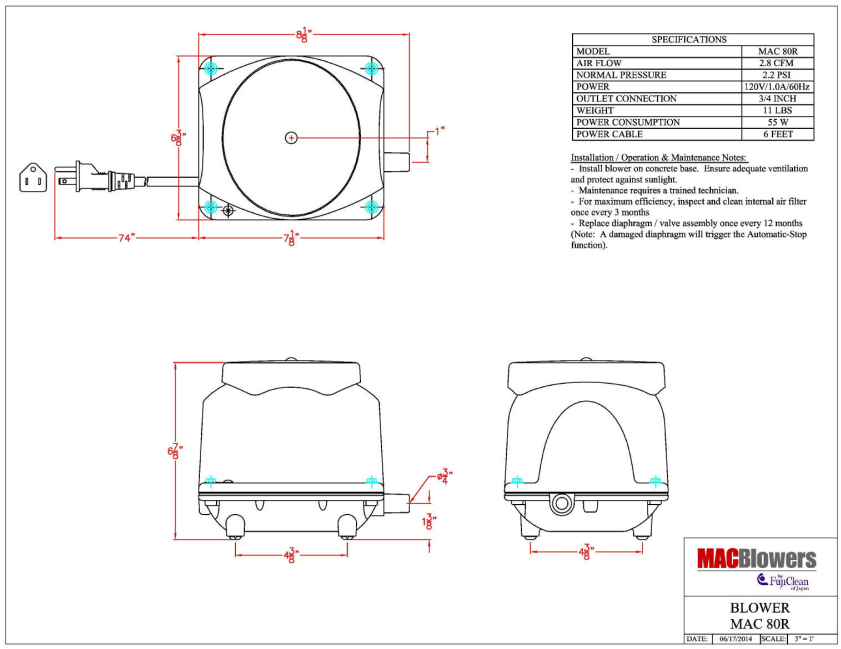
Troubleshooting Guide



Performance Curves



Please note: Individual MACBlower model performance curves are available on website, www.macblowers.com.



Drawings

Drawings for specific models with U.S. standard dimensions are available on website, www.macblowers.com.

GROUNDING INSTRUCTIONS

This product must be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This product is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

WARNING – Improper installation of the grounding plug is able to result in a risk of electric shock. When repair or replacement of the cord or plug is required, do not connect the grounding wire to either flat blade terminal. The wire with insulation having an outer surface that is green with or without yellow stripes is the grounding wire.

Check with a qualified electrician or serviceman when the grounding instructions are not completely understood, or when in doubt as to whether the product is properly grounded. Do not modify the plug provided; if it does not fit the outlet, have the proper outlet installed by a qualified electrician.

b) For a grounded, cord-connected product rated less than 15 A and intended for use on a nominal 120-V supply circuit, the instructions in either (1) or (2):

1) This product is for use on a nominal 120-V circuit, and has a grounding plug similar to the plug illustrated in sketch A in Figure 69.1. A temporary adapter similar to the adapter illustrated in sketches B and C may be used to connect this plug to a 2-pole receptacle as shown in sketch B when a properly grounded outlet is not available. The temporary adapter shall be used only until a properly grounded outlet (sketch A) is installed by a qualified electrician. The green colored rigid ear, lug, or similar part extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box cover. Whenever the adapter is used, it must be held in place by a metal screw.

2) This product is for use on a nominal 120-V circuit and has a grounding plug similar to the plug illustrated in sketch A in Figure 69.1. Only connect the product to an outlet having the same configuration as the plug. Do not use an adapter with this product.

Extension Cords:

Use only a 3-wire extension cord that has a 3-blade grounding plug, and a 3-slot receptacle that accepts the plug on the product. Make sure your extension cord is not damaged. When using an extension cord, be sure to use one heavy enough to carry the current your product draws. An undersized cord results in a drop in line voltage and loss of power and overheating. (NOTE: Table 69.1 shows the correct size to use depending on cord length and nameplate ampere rating. When in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.)

Figure 69.1
Grounding methods

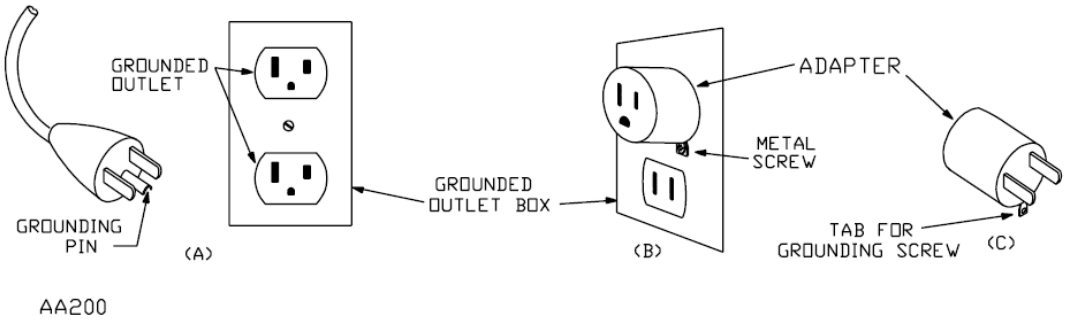


Table 69.1
Minimum gauge for extension cords

Ampere Rating Range	Voltage	Length of cord in ft								
	120V	25 ft	50 ft	100 ft	150 ft	200 ft	250 ft	300 ft	400 ft	500 ft
	240V	50 ft	100 ft	200 ft	300 ft	400 ft	500 ft	600 ft	800 ft	1000 ft
0 – 2		18	18	18	16	16	14	14	12	12
2 – 3		18	18	16	14	14	12	12	10	10
3 – 4		18	18	16	14	12	12	10	10	8
4 – 5		18	18	14	12	12	10	10	8	8
5 – 6		18	16	14	12	10	10	8	8	6
6 – 8		18	16	12	10	10	8	6	6	6
8 – 10		18	14	12	10	8	8	6	6	4
10 – 12		16	14	10	8	8	6	6	4	4
12 – 14		16	12	10	8	6	6	6	4	2
14 – 16		16	12	10	8	6	6	4	4	2

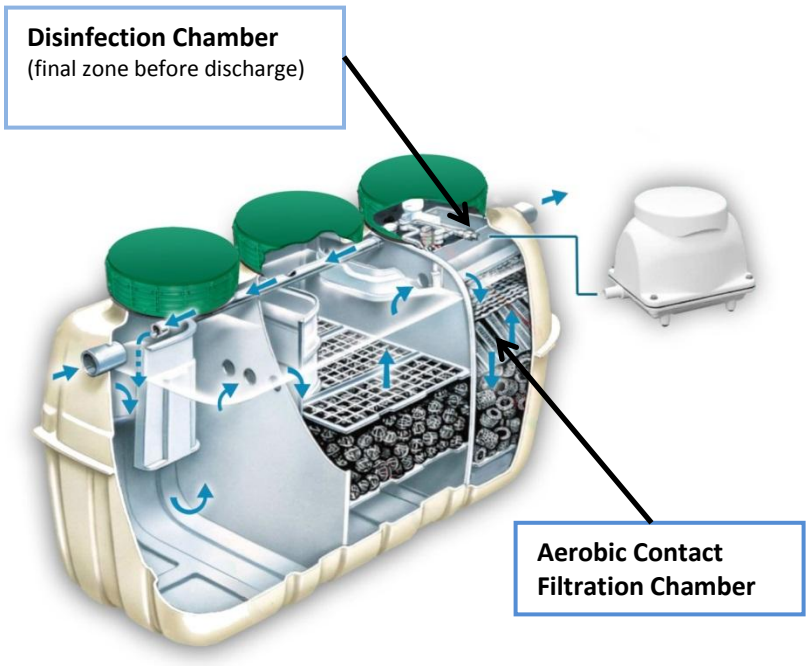
Appendix 2

Sampling Protocol

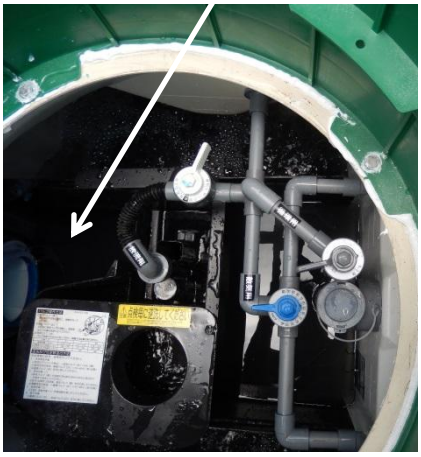
Fuji Clean USA Treatment System Sampling Protocol

The following wastewater sampling protocol applies to all Fuji Clean CE and CEN model treatment system and is intended to provide direction for proper sample collection, storage and preservation as well as proper tracking, analysis and reporting.

1. Sample collection location shall be from the Disinfection Chamber within the Aeration Chamber of each system, which is the final location before discharge. point



Take samples from here; the final "Disinfection Chamber."



Sample Procurement Methodology:

Grab Sample Collection

a. Open cover over the Aerobic Contact Filtration Chamber (the cover closest to system discharge) and observe the appearance of water including floating or suspended matter on the Sample Collection Sheet).
b. Prepare sample bottle labels (per procedure Step #6 below) supplied by certified state laboratory and affix securely to bottles.
c. Plunge sample dipper below water surface (about 2-3 inches) and allow to fill (note: multiple retrievals may be necessary to obtain the necessary volume).
d. Transport to the accredited laboratory as soon as possible within the holding time frame for the target analytes as shown in the Sample and Preservation Holding Time Table, which follows:

Sampling Preservation/Holding Times/Volumes

	Wastewater		
INORGANICS	container[1]	preservation[2]	holding time[3,4]
Alkalinity	P, G - 200 ml[5]	cool 4°C	14 days
Ammonia-N	P, G - 100 ml	H_2SO_4 to pH<2, cool 4°C [7]	28 days
BOD_5	P, G - 1000 ml	cool 4°C	**24 hours**
$CBOD_5$	P, G - 1000 ml	cool 4°C	**24 hours**
Chloride	P, G	cool 4°C	28 days
COD	P, G - 60 ml	H_2SO_4 to pH<2, cool 4°C [7]	28 days
Color	P, G - 100 ml	cool 4°C	**48 hours**
Conductivity/specific conductance/salt toxicity	P, G - 100 ml	cool 4°C	28 days
Hardness	P, G - 60 ml	HNO_3 to pH<2[6]	6 months
Nitrate-N	P, G - 60 ml	cool 4°C	**48 hours**
Nitrite-N	P, G - 60 ml	cool 4°C	**48 hours**
Oil & Grease	1000 ml amber glass, teflon lined cap	H_2SO_4 or HCl to pH<2, cool 4°C	28 days
Orthophosphate-P	P, G - 100 ml	Filter immediately,[10] cool 4°C	**48 hours**
pH	P, G - 100 ml	none required	**immediately**[6]
Phosphorus, total	P, G - 100 ml	H_2SO_4 to pH<2, cool 4°C[7]	28 days
Total Kjeldahl Nitrogen (TKN)	P, G	H_2SO_4 to pH<2, cool 4°C [7]	28 days
Turbidity	P, G - 100 ml	cool 4°C	**48 hours**
SOLIDS			
Settleable solids	P, G - 1000 ml	cool 4°C	**49 hours**
(TDS)	P, G - 200 ml	cool 4°C	7 days
Total suspended solids (TSS)	P, G - 1000/200 ml	cool 4°C	7 days
Total solids	P, G - 200 ml	cool 4°C	7 days
Total volatile solids (TVS) and Loss on Ignition (LOI)	P, G - 200 ml	cool 4°C	7 days
BACTERIOLOGY			
Total Coliform	P, G - 200 ml	cool 4°C	6 hours[7]
Fecal Coliform	P, G - 200 ml	cool 4°C	6 hours[7]

Sample Acceptance Criteria

Sample Documentation - The laboratory provides chain of custody forms for complete documentation including sample specific comments and the following information: client specific information, sample id, sampler name, sampling date and time and location , sample matrix, type of container and preservation, analytical parameters and custody signatures with date and time Sample Labeling – Samples must be assigned a unique identifier documented with indelible ink on a secure sample label and on the chain of custody form. Water resistant, permanent labels are available.

Temperature- EPA and MADEP require solid and aqueous samples be cooled to 4°C.

Notes:

1 P = high density polyethylene, precleaned (HDPE), G = glass, precleaned

2 Immediate preservation in the field is preferred. Preserve each aliquot at time of collection for composite sampling , if possible. When using an automatic sampler, cool sampler to 4°C until compositing is completed.

3 Holding times listed are the maximum that samples may be held before analysis or extraction.

4 Holding times listed start at time of sampling for grab samples and end of composite period for composites.

5 The volumes listed may be reduced or increased depending analyte combinations, detection limits and sample specific quality control . Contact the laboratory for minumum volumes for specific analytical combinations.

6 EPA defines "immediately" as within 15 minutes of collection. If not possible, analyze within 15 minutes of arrival at laboratory.

7 Deliver samples to the lab as soon as possible if 6 hours is not achievable. Add 0.008% sodium thiosulfate if the presence of residual chlorine is indicated by potassium iodide test paper.

e.

2 Adequately trained sample collection personnel shall be provided by a Fuji Clean distributor or if required by state regulation, by a certified laboratory independent of Fuji Clean USA, its authorized service provider and system design engineer of record.

3 All samples shall be collected in sample containers supplied a state certified laboratory. Sample containers shall contain laboratory prepared sample preservatives when applicable.

4 Samples should be collected directly into the containers in which they will be submitted for analysis. Where this is not possible, a dedicated, disposable sampling device (such as a polyethylene bailer) may be used provided it is unwrapped immediately prior to use and properly disposed of after collecting the sample(s) from a single system.

5. A state certified laboratory supplied chain-of-custody and sample analysis request form shall accompany all sample containers and shall document
    a. the name of all individuals in possession of the sample containers
    b. the time
    c. the date
    d. reason for the sample container transfer
    e. In addition, the form shall be used to specify each sample analysis request (e.g. TKN, Nitrate-nitrogen, chloride, etc.), method of sample preservation, and shall document the time of sample collection, the point of collection, the method used to induce sample flow and any anomalous events and observations which occur during the sample collection.

6. All sample containers shall be pre-labeled prior to sample collection. Labels shall provide the location (street address and site name if applicable) of the sample, parameter to be sampled; date and time of sample collection; sampler's initials; preservative (if any).

7. All samples shall be collected and immediately place in a laboratory supplied cooler and chilled on ice to 4°C.

8. All samples shall be collected as grab samples. Composite sampling is prohibited unless specifically authorized by the Executive Director.

9. Analysis protocol for nitrogen: When nitrogen is collected for analysis, the laboratory shall report:
    a. Nitrate-nitrogen, nitrite-nitrogen, ammonia-nitrogen, total kjeldahl nitrogen and chlorides.
    b. In addition the laboratory shall report total nitrogen as the sum of nitrate-nitrogen, nitrite-nitrogen, plus total kjeldahl nitrogen from samples collected during a common sampling date.
    c. When laboratory results indicate ammonia-nitrogen concentration to be greater than total kjeldahl nitrogen concentrations, the results will not be accepted and re-

sampling for all required parameters shall be required.

10. All sample collection, storage, and transport procedures shall be in conformance with all relevant state mandated field sampling procedures.

11. All laboratory analytical procedures shall be in accordance with all relevant state mandated laboratory methodology.

UV Systems

Fuji Clean systems that include sampling from UV disinfection units shall be sampled in the separate pump tank as follows:

a. Pre-UV sampling will follow the sampling protocol listed above.

b. Post-UV samples will be drawn through a ¼" ballcock and Tygon tubing. Sampling protocol is as follows:

Sampling Equipment and Supplies

- Sampling Device – ¼-inch ball valve fitting (supplied by Fuji Clean) and Tygon tubing

Grab Sample Collection

- Follow all pre-sampling procedures described in standard "grab sample" protocol.
- Cut new section of Tygon tubing
- Install ball valve and Tygon tubing in discharge pressure port
- Activate discharge pump for 60 seconds. Then open sample collection container, put Tygon tubing into sample collection container, fill container and immediately cap container and place in cooler with ice.
- Transport to the laboratory as soon as practicable per respective holding times for the target analytes as shown in the Sample and Preservation Holding Time Table.