

Operation and Maintenance Manual

Residential Systems CE and CEN Models

Rev. 1/26/17



Certified to
NSF/ANSI Standards 40 & 245

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



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:

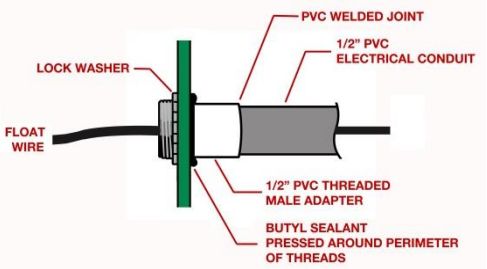
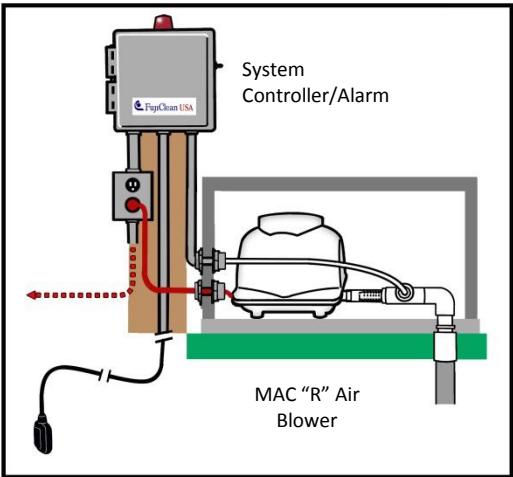
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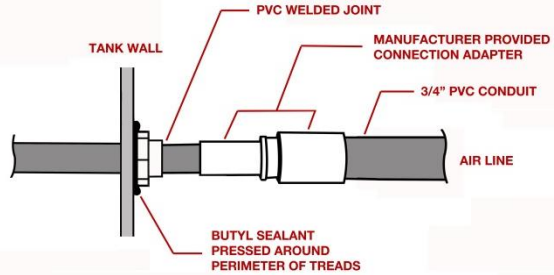
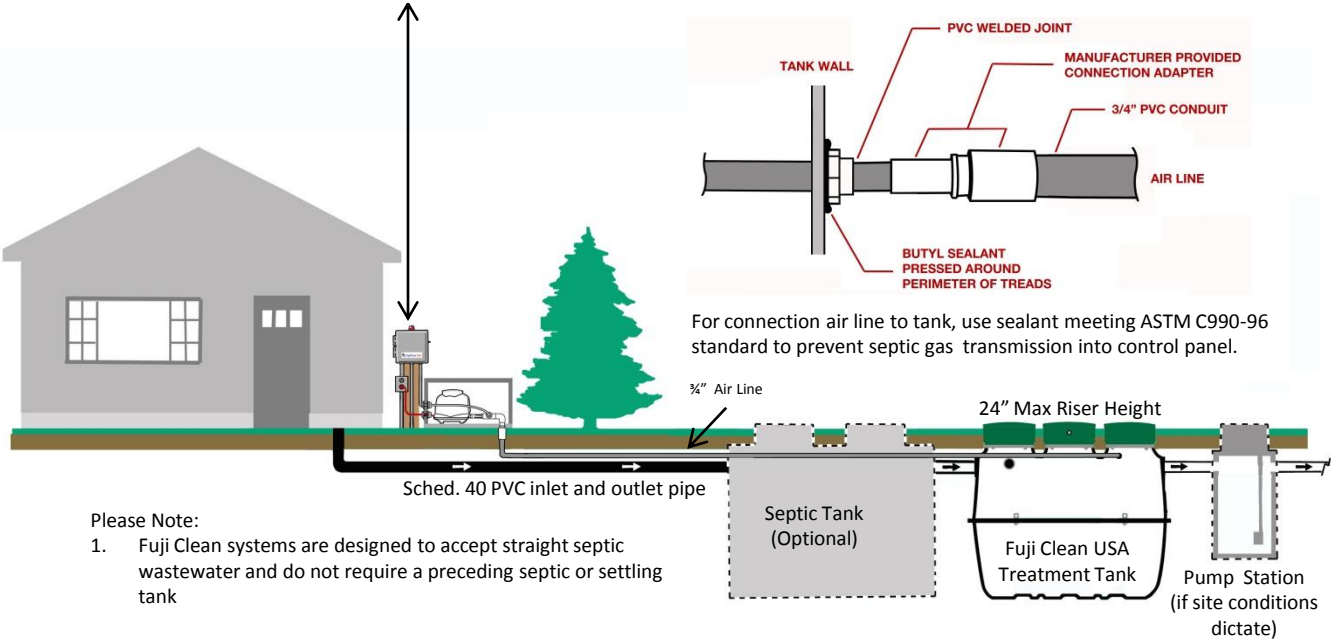
Appendices

Appendix 1	MACBlowers – Installation - Operator Manual
Appendix 2	Sampling Protocol

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.

FUJI CLEAN USA, LLC
NSF/ANSI Standard 40 Class 1
MODEL NO.: CE5 SERIAL NO.: F14D0002
CAPACITY (GPD): 450
 41-2 GREENWOOD RD. BRUNSWICK, ME 04011 207-406-2927

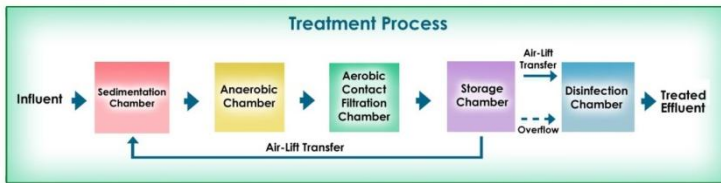



Using grommets or a waterproof adhesive, labels meeting NSF standards (supplied by Fuji Clean USA) shall be affixed in two locations, inside the riser and on the inside of the controller.

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.

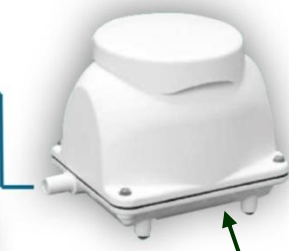


Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

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

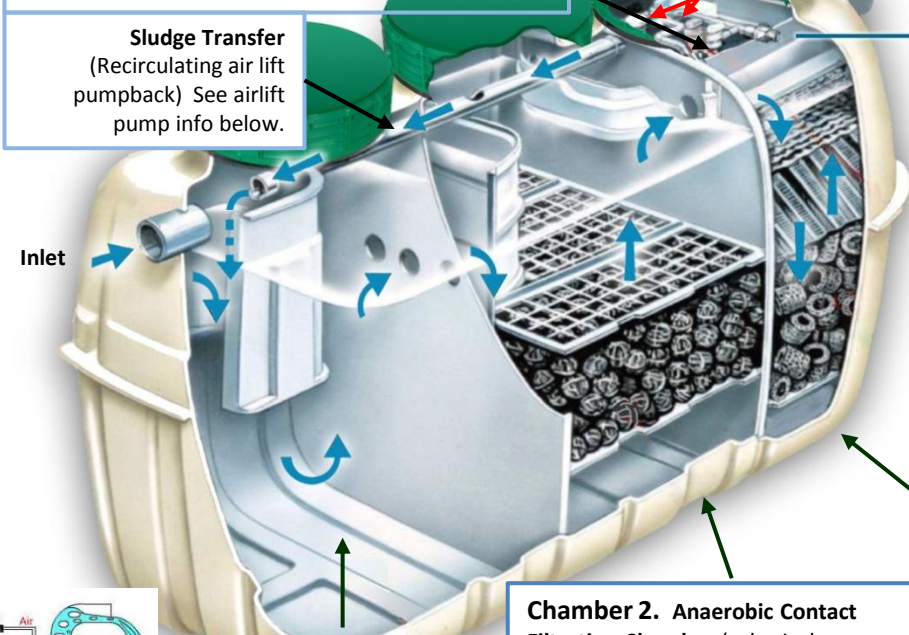
Chamber 3A. Storage Chamber (settling zone)

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



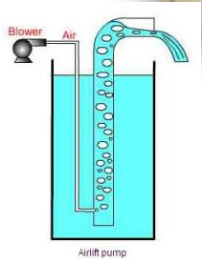
Powered by the MACBlower "R" Series Blowers State-of-the-art linear diaphragm air blowers manufactured by Fuji Clean Co sized to provide about 2.8 cubic feet per minute to most residential systems.

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

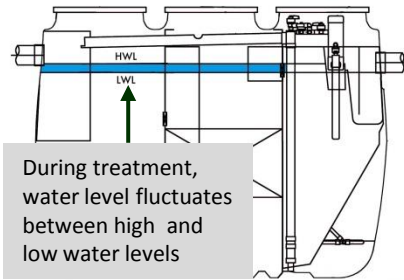


Chamber 1. Sedimentation Chamber (separates solids and greases)

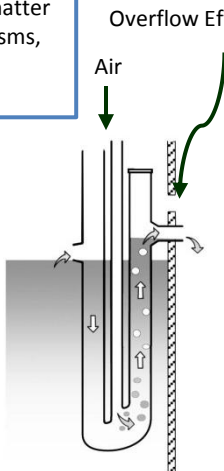
Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified



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

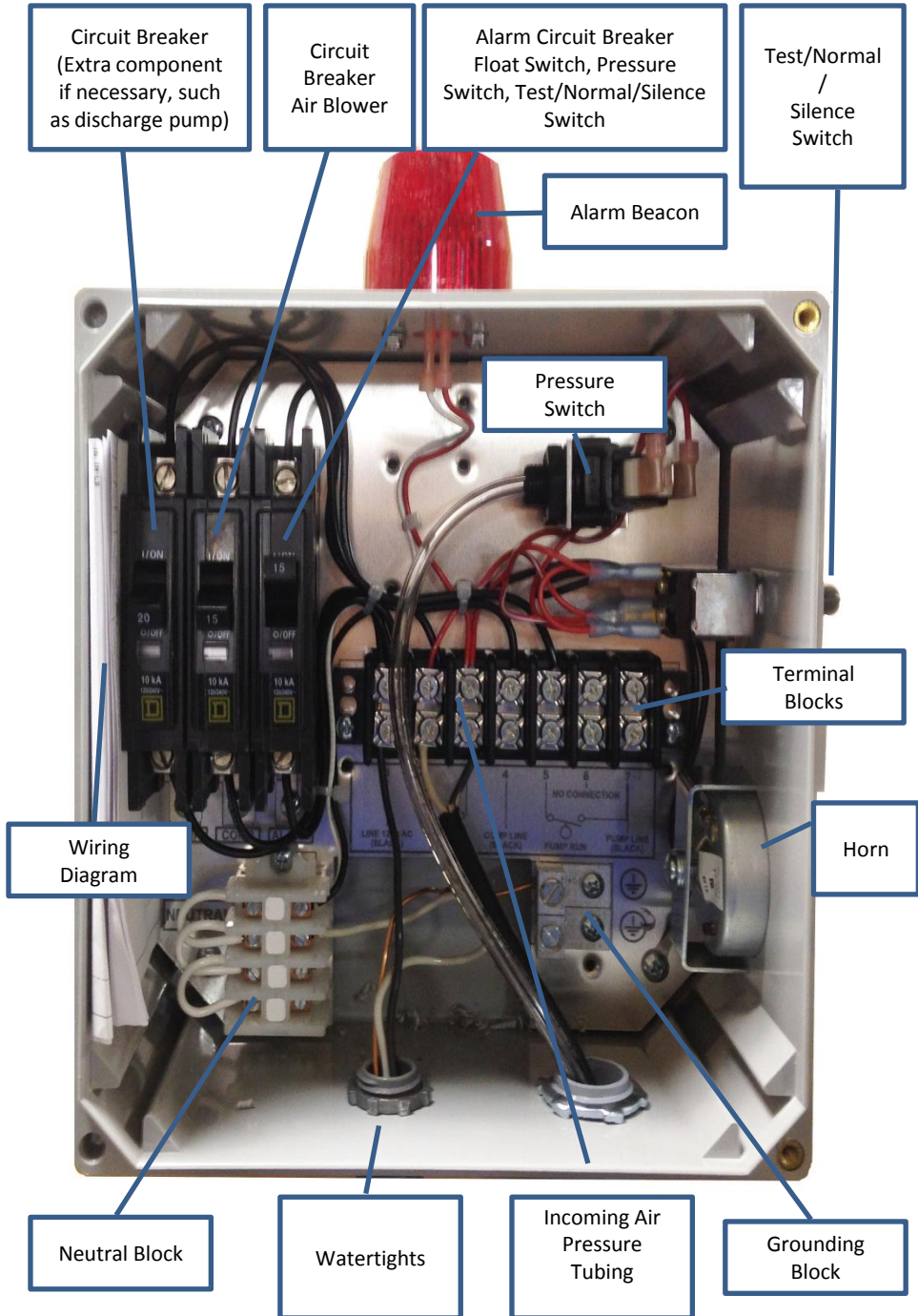
Housed in a NEMA 4X rated enclosure, the Alarm/Control Panel is connected to the treatment system and monitors tank water level and blower operation. An audible horn and red beacon light will activate in the event of either a tank high water condition or if the blower ceases to operate (causing a drop 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.

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



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		

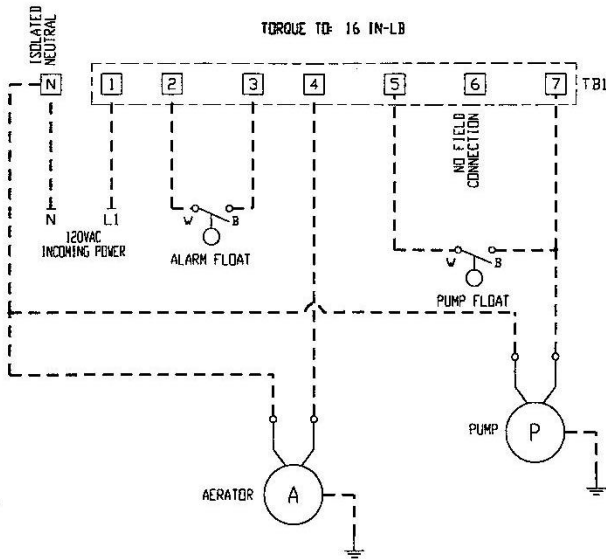
Enclosure Specifications							
Description	Make	Model #	Electrical Certifications	Overall Dimensions	Interior Dimensions	Material	Type
ENCLOSURE BOX	CARLON	NL884B	UL LISTED CSA	8X8X4		POLYCARBONATE	
ENCLOSURE COVER	CARLON	NJ88L	UL LISTED CSA	8X8		POLYCARBONATE	

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

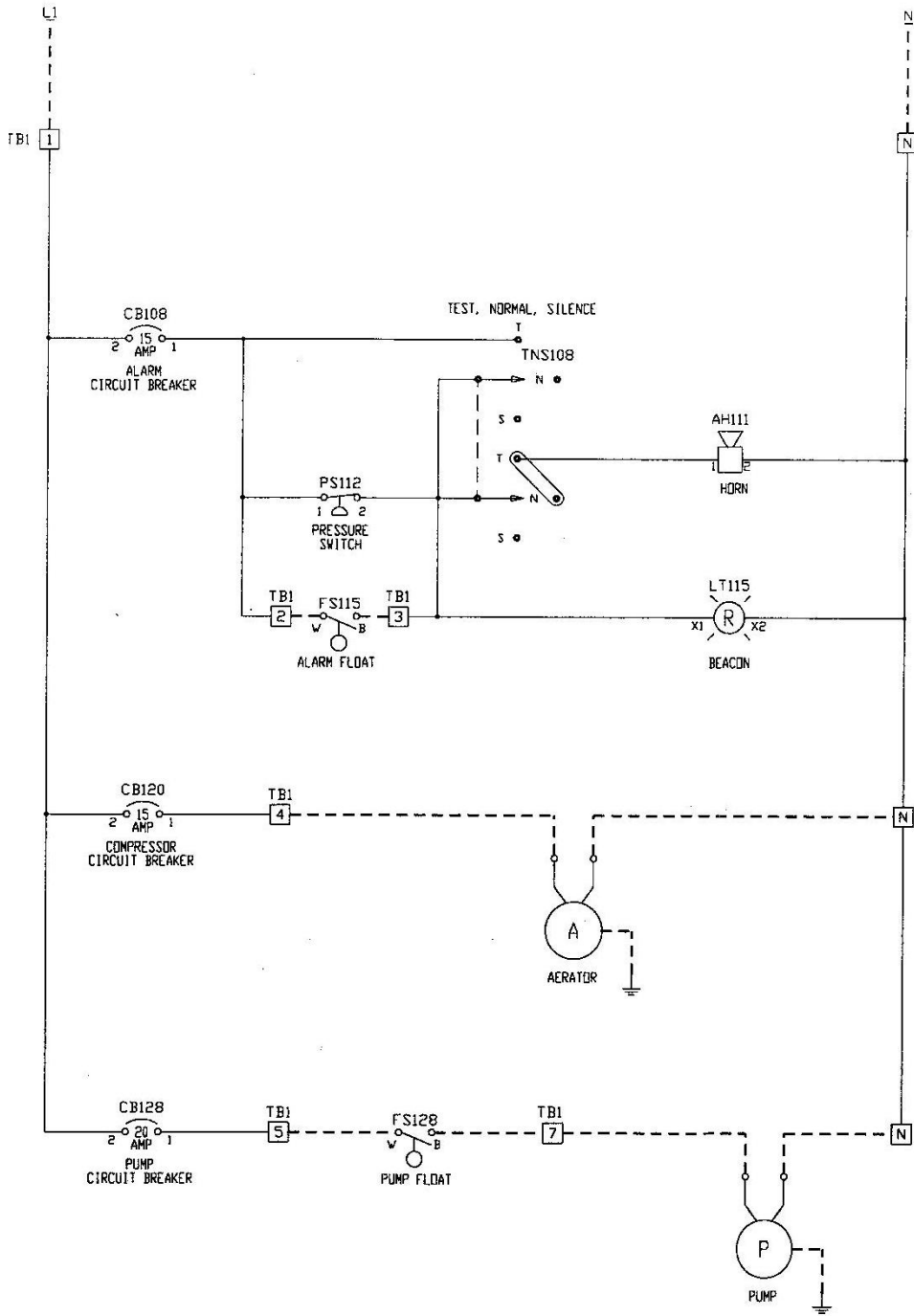
TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS MUST BE AT LEAST 140 DEG. F. (60 DEG. C.). TERMINAL STRIPS AND GROUND LUG USE COPPER CONDUCTORS ONLY.

CONNECT GROUND LUG IN PANEL TO A SECURE EARTH GROUND

DASHED LINES REPRESENT FIELD WIRING

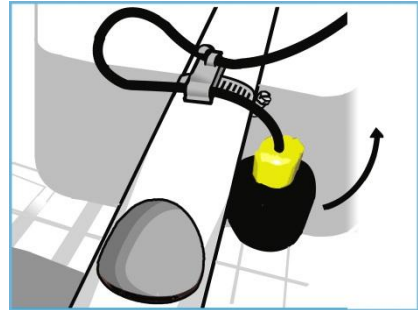
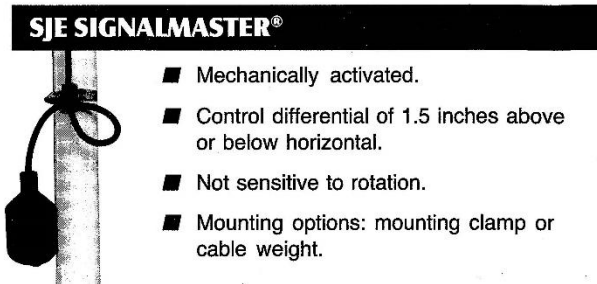
FIELD WIRING SECTION

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.



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.)**

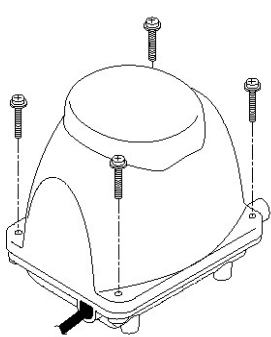
The blower contains an air filter and diaphragms, which are considered “consumables.” The air filter should be inspected and cleaned/replaced regularly. Diaphragms and their casings should be replaced regularly to maximize blower life and efficiency. The recommended frequency for each of these procedures is once annually. Please follow steps on the following page.

Blower Air Filter Cleaning / Replacement Procedure

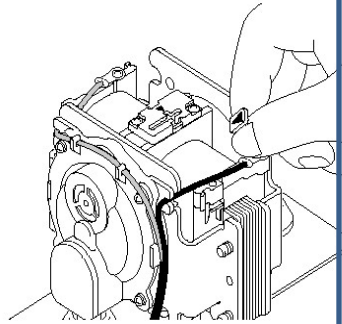
Replacing the blower air filter is very simple and consists of removing the filter cover with a Phillips screwdriver, removing the old, cleaning it (blow clean with air pressure) or replacing it with a new filter, and then screwing the cover back into place.



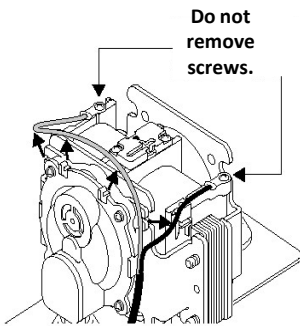
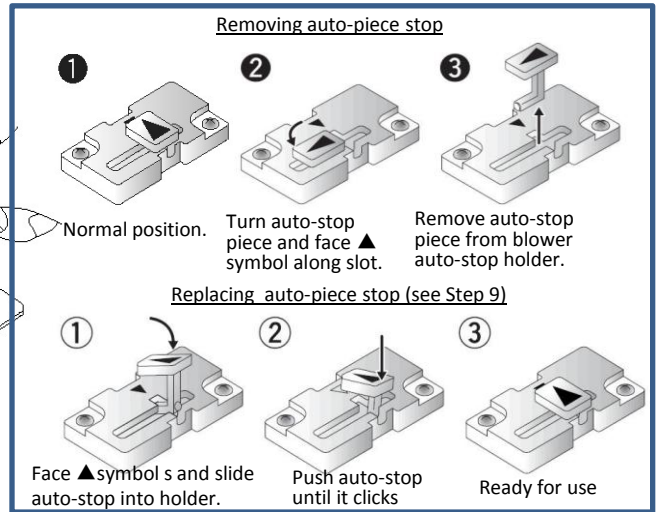
Blower Diaphragm Replacement Procedure



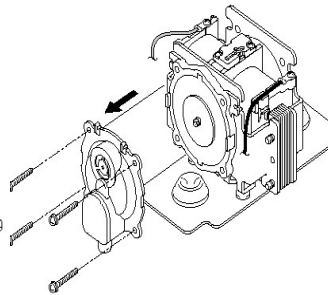
Step 1. Remove cover bolts and screw with 8mm socket and screwdriver



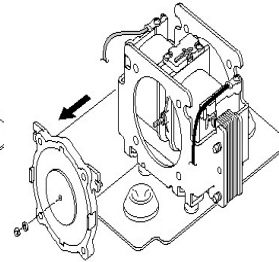
Step 2. Remove autopiece stop as shown:



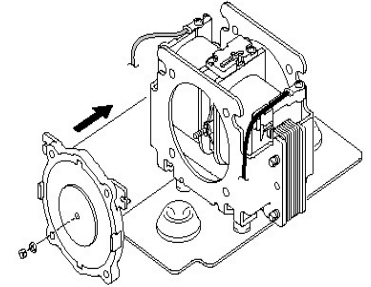
Step 3. Remove power cable from 4 hooks. **Do not remove screws.**



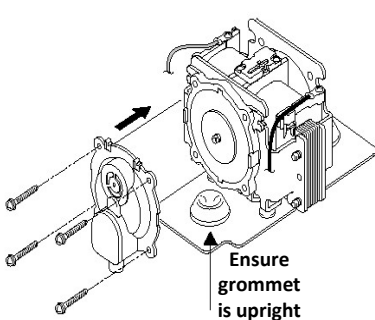
Step 4. Remove 4 screws from one casing.



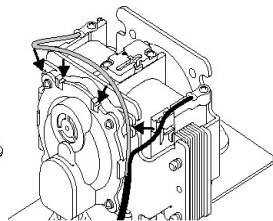
Step 5. Remove nylon nut and diaphragm from body



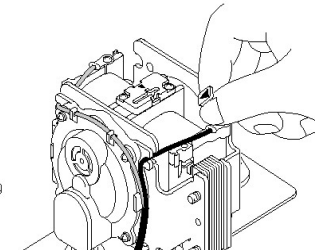
Step 6. Install new diaphragm using new nylon nut provided. Torque tighten to about 1 Nm.



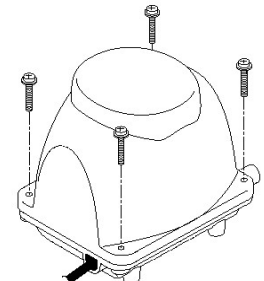
Step 7. Insert casing air outlet into rubber grommet. Secure with 4 screws. Repeat Steps 4-7 for 2nd diaphragm.



Step 8. Fit power cable onto 4 hooks.



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



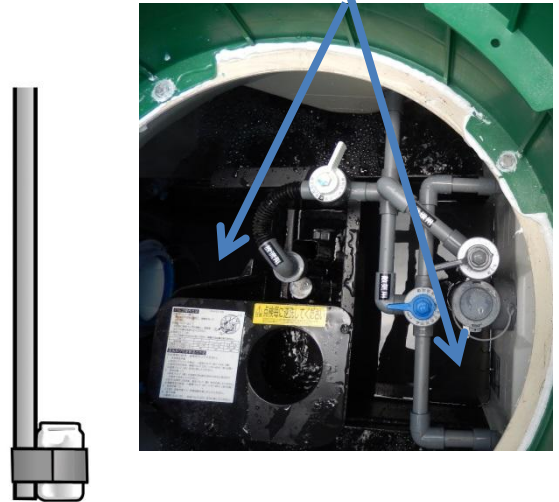
Step 10. Replace cover bolts and screw.

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).

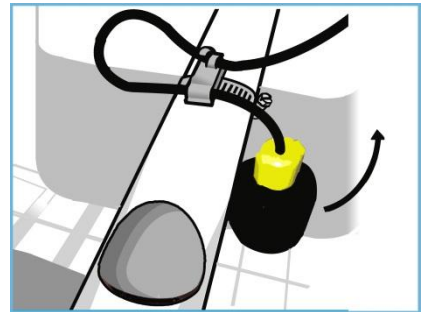
5. Treated Effluent Check. (Recommended frequency: 1x every 6 months)

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).



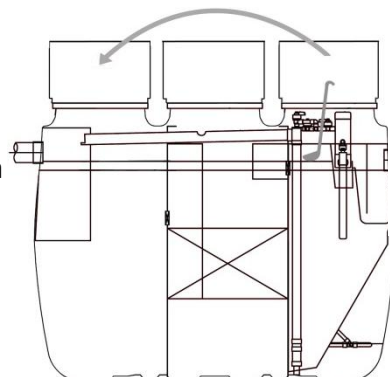
7. Inflow Pipe Check. (Recommended frequency: Start-up and 1x every 6 months)

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%. 17

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. It is essential to carry out this backwash operation and sludge transfer at every maintenance visit.

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.

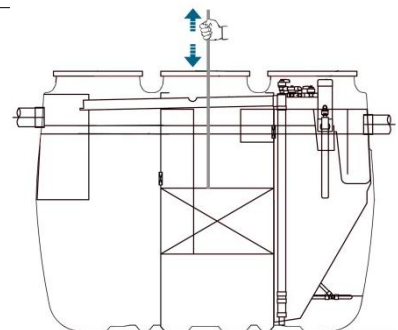
Step 8. Flush the Effluent Control Valve (white) by rotating the valve back and forth from 0 to 100 several times.



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. This is a simple but essential procedure to assure uniform media contact and filtration.



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 (grey 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).

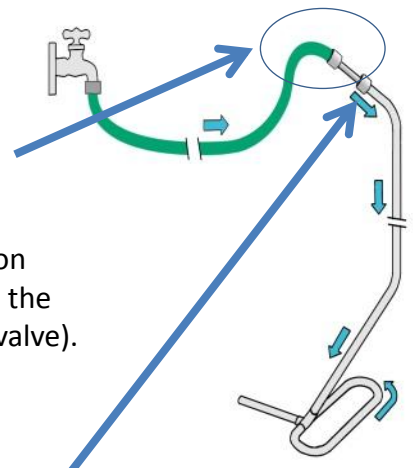
Step 2. Turn off the blower.

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

Clean With Hose: (Use for standard cleaning)

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)



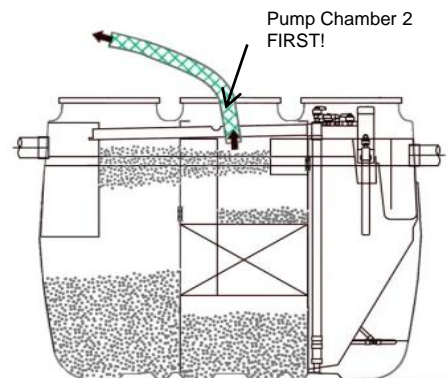
17. Measure Sludge and Pump Out if Necessary (Recommended frequency: 1x every 2 years or as required)

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:

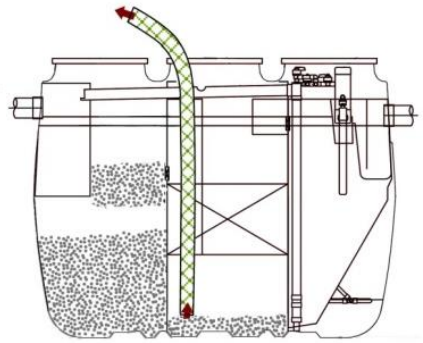
- Biological treatment performance is severely deteriorated due to excessive amounts of oil or chemicals which interfere with the bacterial activity.
- Excessive scum or sludge builds up in the sedimentation chamber. Specifically, for residential models, when sludge levels reach more than 35-inches in 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

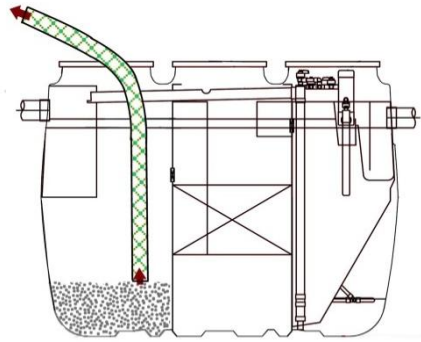
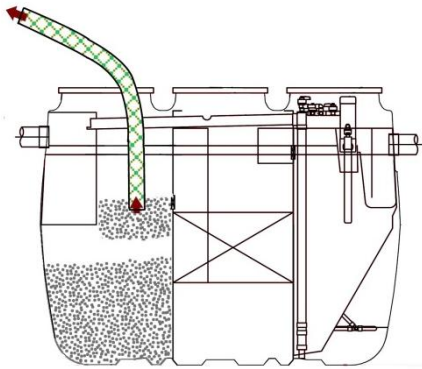
- Step 1.** Turn off all electrical components.
- Step 2.** Clean the inlet and outlet pipe.
- Step 3.** Transfer suspended solids and scum from Chamber 3 and 3A back to Chamber 1.
- Step 4.** With pumpout hose, remove scum and sediment build-up on the filtration media from Chamber 2 **FIRST!** Otherwise 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.

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.	<p>During the first few weeks of operation there may be noticeable odor from the system. This should cease once the bacteria are established.</p> <p>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.</p> <p>If odor continues to persist, please contact manufacturer for instructions. Installation of a vent may be necessary.</p>
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.)	<p>Perform a degassing operation on the filtration media. (Poke media with a section of PVC pipe. See O&M procedure #12).</p> <p>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.</p>
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.	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Clean the aeration pipes
Recirculation flow rate is too low	<ul style="list-style-type: none">• Clean the recirculation airlift pump.
Excessive foaming.	<p>• Some foaming may occur during the early stage of operation.</p> <p>This should cease once the bacteria are established. Seeding may also be effective. Please contact your distributor for additional seeding information.</p>
Excessive suspended solids.	<ul style="list-style-type: none">• Perform a backwash operation.
Cold water is hampering treatment	<p>The following measures will allow greater oxygen penetration into biofilm.</p> <ul style="list-style-type: none">• Increase frequency of backwash• Increase blower size• Perform desludge operation (i.e. sludge pumpout)

TROUBLESHOOTING

Chamber 3a. Storage Chamber

SYMPTOM	SOLUTION
Scum forming.	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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)	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• Clean the wall with brush or water pressure and transfer solids to the sedimentation chamber.
Effluent airlift pump is not working.	<ul style="list-style-type: none">• 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



Installation - Operator Manual

MACBlower Model Number:

MAC60R

MAC80R

MAC40R

MAC100R

MAC120R

MAC150R

MAC 200R

Serial # _____



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.

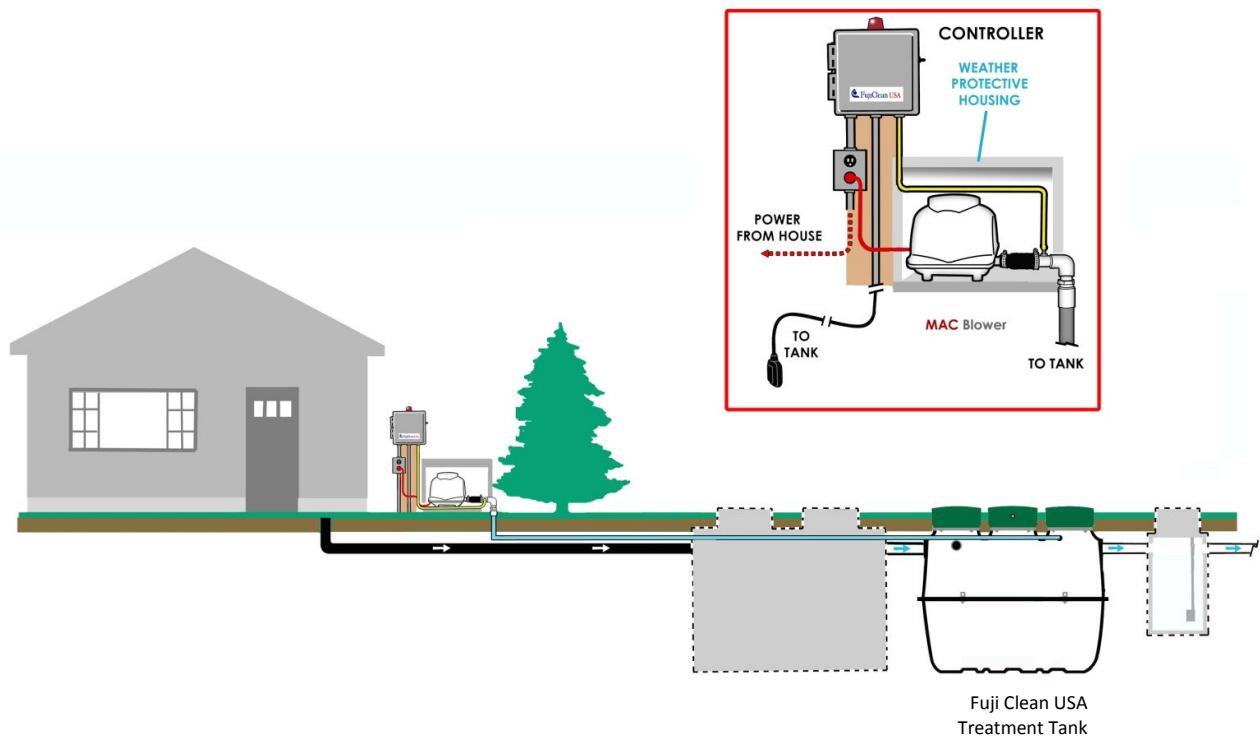
SAFETY CAUTIONS AND WARNINGS

- 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 $\pm 20\%$ of the normal pressure which is specified on the blower name plate.

Suggested Installation for Onsite Wastewater Treatment System Applications



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 $\pm 20\%$ 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)

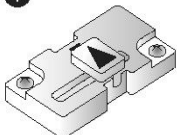


Warning

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

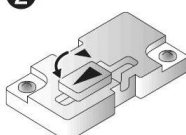
(1) How to remove an auto-stop piece

1



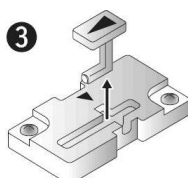
Normal position.

2



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

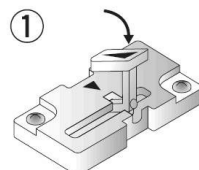
3



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

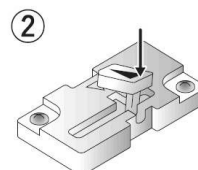
(2) How to set an auto-stop piece

1



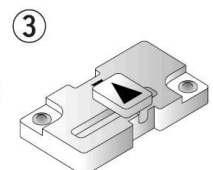
Face ▲ symbol from auto-stop piece towards auto stop holder and slide the piece into the holder.

2



Push in until it clicks.

3

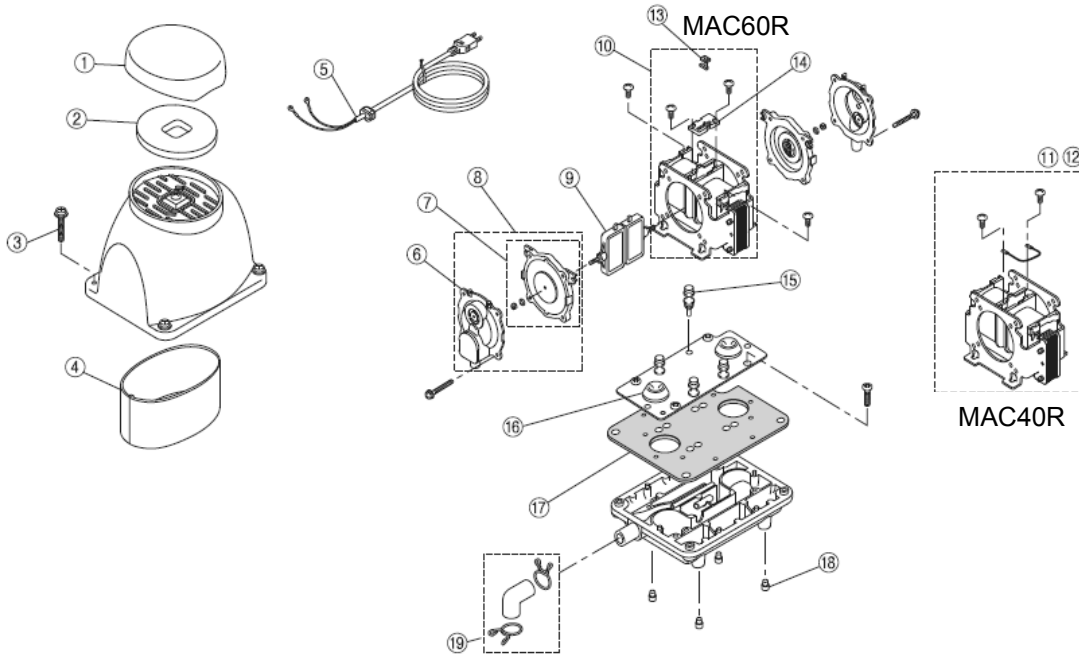


Ready for use.

MAC40R / 60R Blower

Service Manual and Parts Description

Exploded View and Parts List



MAC40R / 60R Repair Parts List

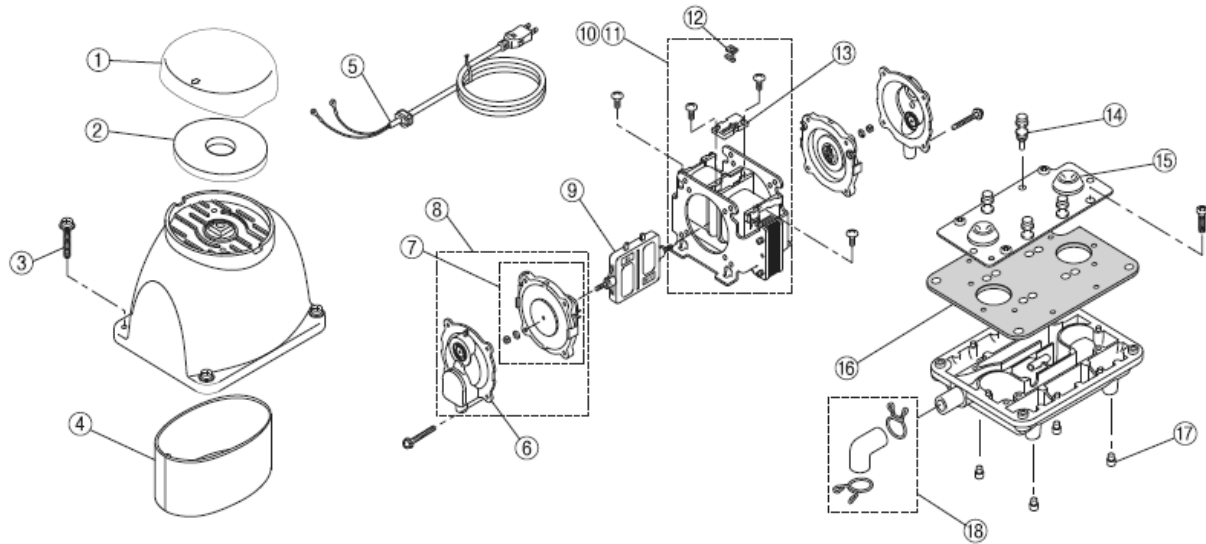
No	PN	Item Name	40R	60R
1	H612	N6 Filter cover	○	○
2	H507	N6 Air filter (white)	○	○
3	H684	M5-20 Cross recessed hexagonal head bolt (4 pcs.)	○	○
4	H657	N6 Sound absorbing filter	○	○
5	H706	N6 Power cable	○	○
6	H115	N6 Casing assembly	○	○
7	H012	N6 Diaphragm*	○	○
8	H150	N6 Diaphragm assembly*	○	○
9	H317	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

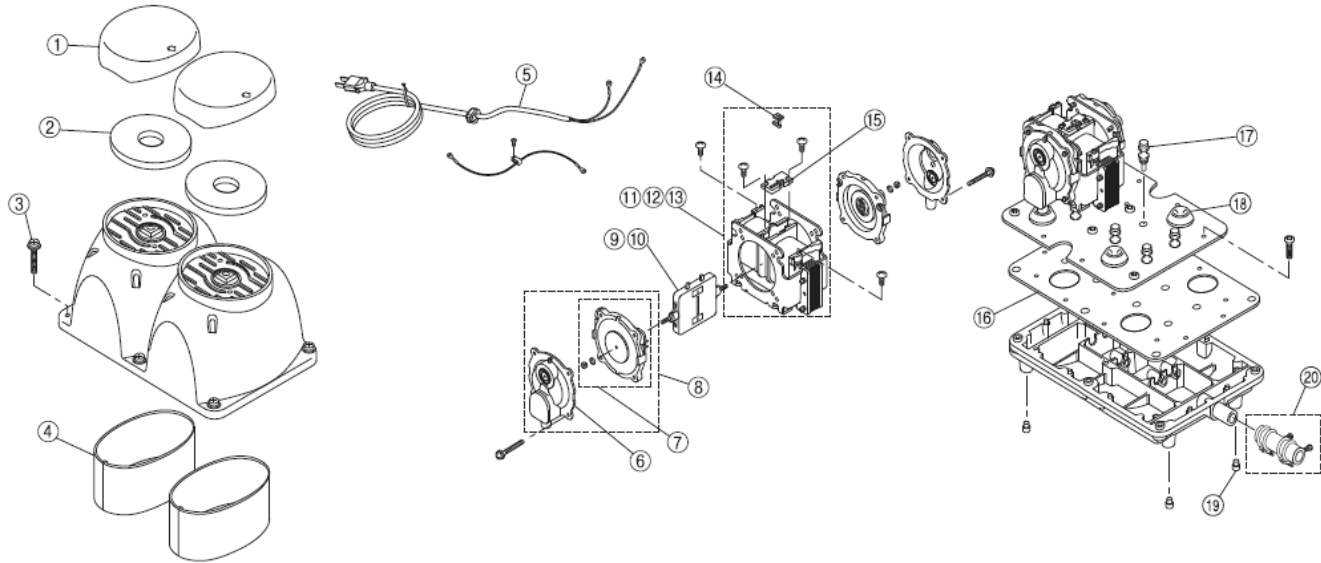
No	PN	Item Name	80R	100R
1	H613	N8 Filter cover	○	○
2	H508	N8 Air filter	○	○
3	H684	M5-20 Cross recessed hexagonal head bolt (4 pcs.)	○	○
4	H657	N6 Sound absorbing filter	○	○
5	H706	N6 Power cable	○	○
6	H116	N8 Casing assembly	○	○
7	H013	N8 Diaphragm *	○	○
8	H151	N8 Diaphragm assembly*	○	○
9	H317	R10 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	○	○	○

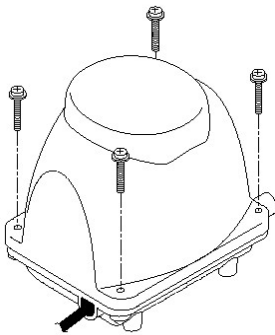
* Including nut and flat washer.

■ Specifications

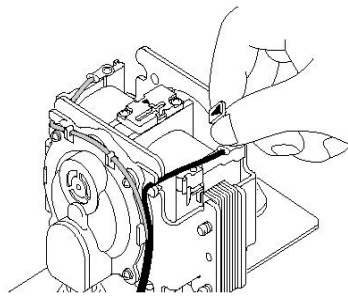
Model	MAC40R	MAC60R	MAC80R	MAC100R
Air Flow Volume	40 L/min 1.4 cfm	60 L/min 2.1 cfm	80 L/min 2.8 cfm	100 L/min 3.5 cfm
Normal Pressure	12 kPa 1.7 psi	15 kPa 2.2 psi		18 kPa 2.6 psi
Rated Voltage	120V			
Frequency	60Hz			
Outlet Pipe Size	13mm ID (18mm OD) 33/64 inch ID (45/64 inch OD)			
Weight	4.5kg 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		

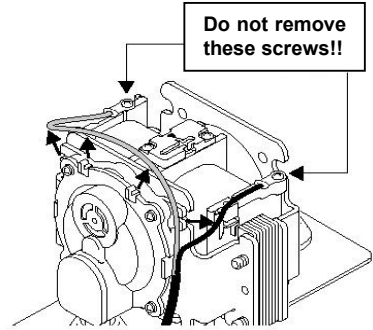
Diaphragm Replacement Procedure



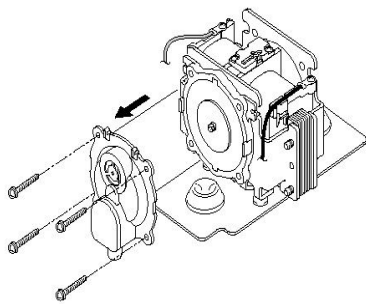
1. Unplug blower. Remove cover bolts using an 8mm-box



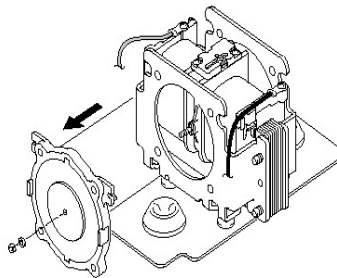
2. Remove an auto-stop piece as instructed above.



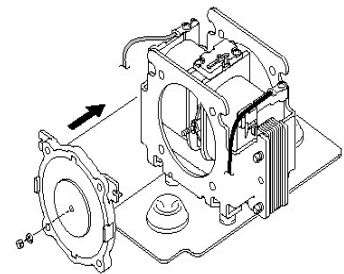
3. Remove a power cable from 4 hooks. **Do not remove screws!!**



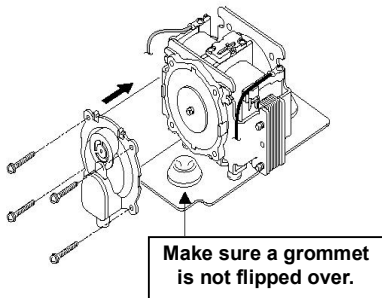
4. Remove 4 screws from a casing.



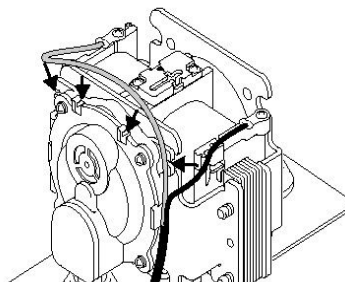
5. Remove Nylon nut and remove diaphragm from body.



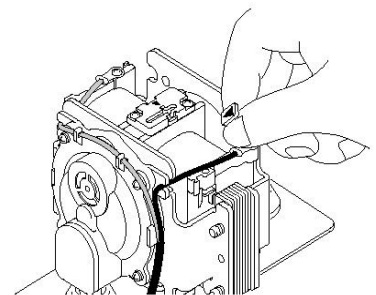
6. Install new diaphragm using new Nylon nut provided. *Tightening torque – about 1 Nm



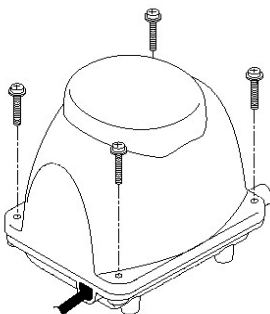
7. Insert casing air outlet into rubber grommet. Secure with 4 screws.



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 both sides of diaphragm/casing assembly at the same time.



Attention

Please do not attempt to lubricate any internal blower components.

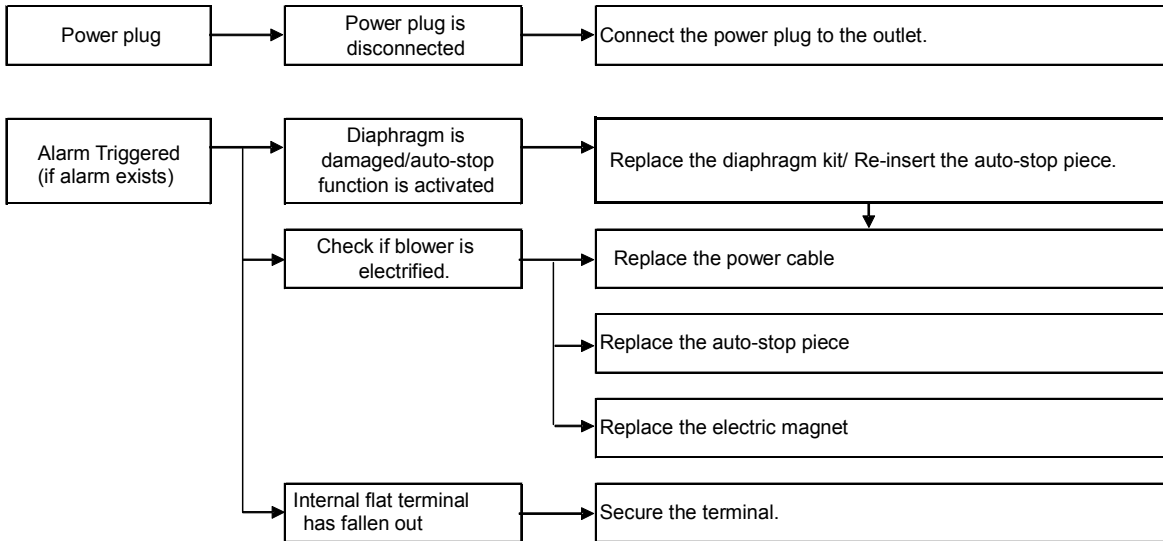
Troubleshooting Guide

<What to observe >

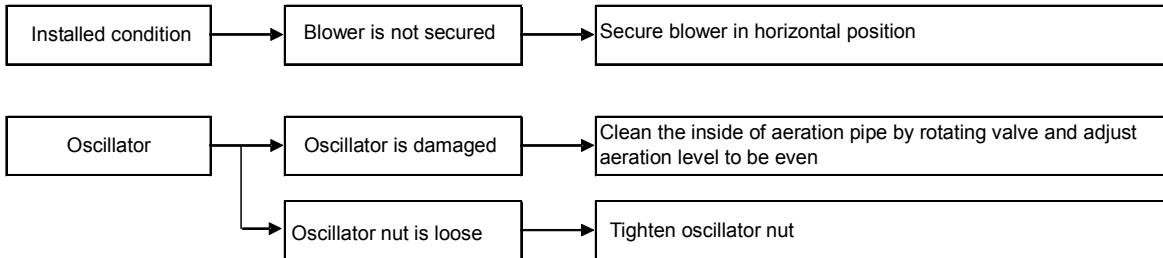
<Status>

< How to solve the problem >

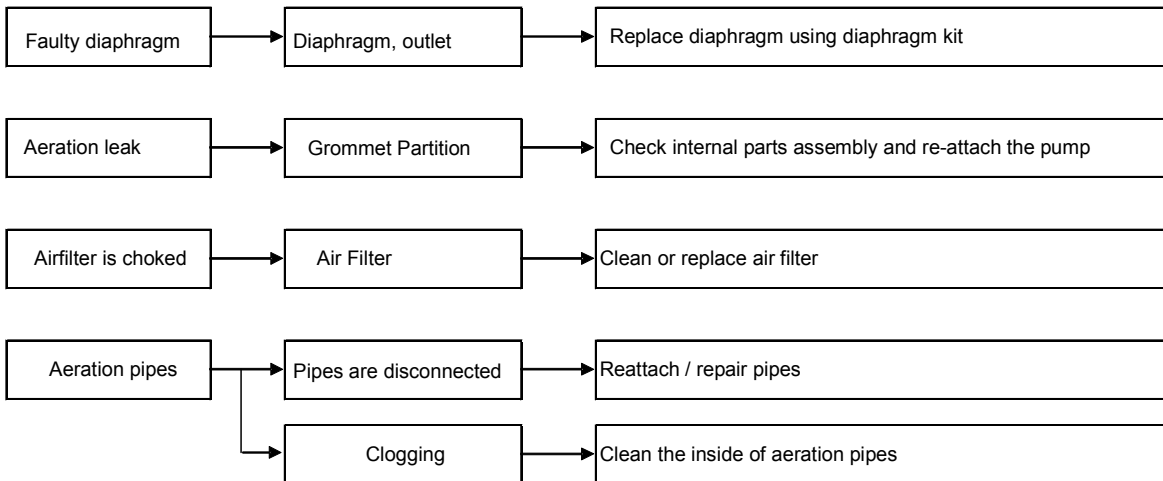
Blower is not working



Blower is making an abnormal or excessive operating noise.

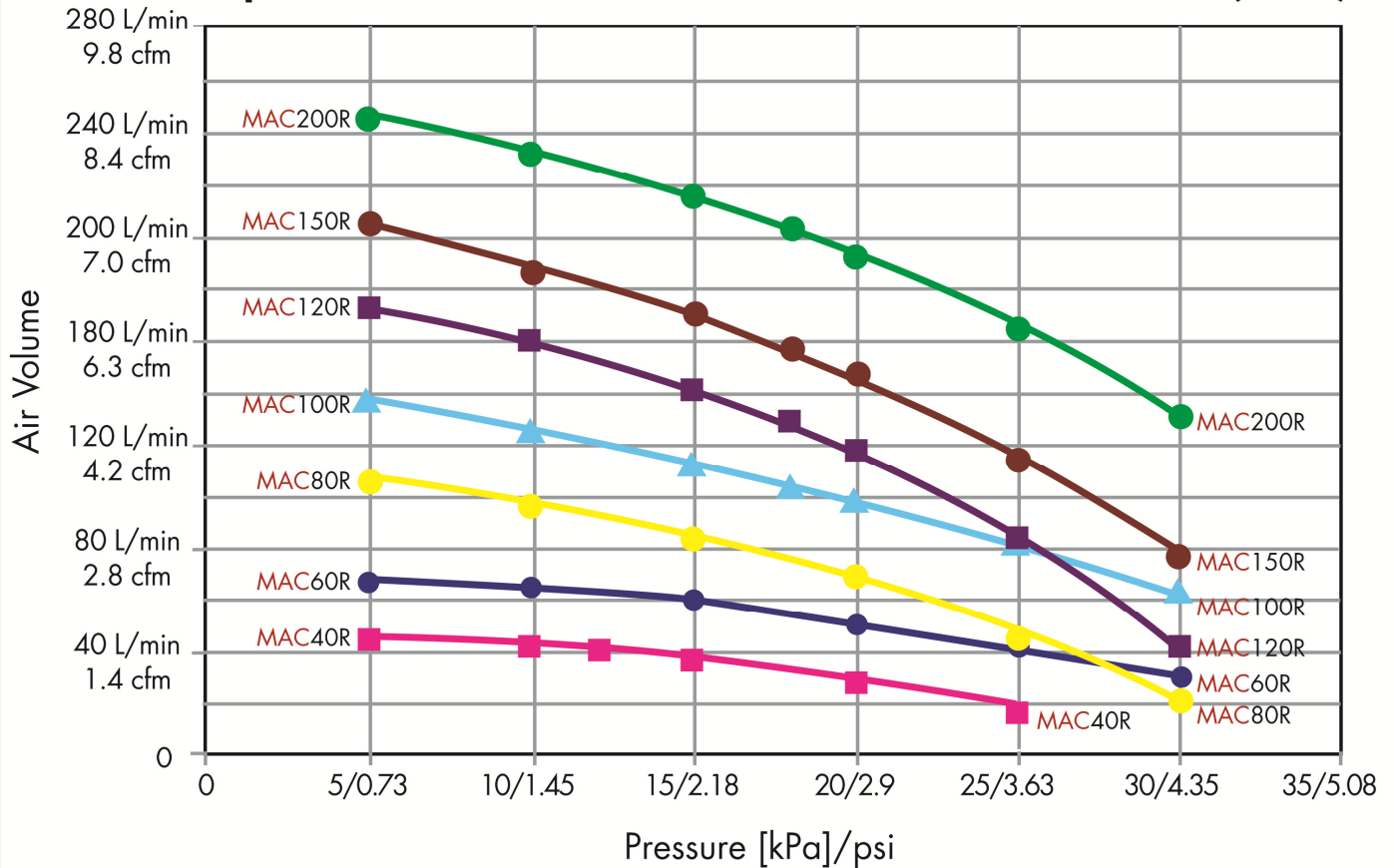


Low air volume or misplaced air from aeration pipes (treatment plant)

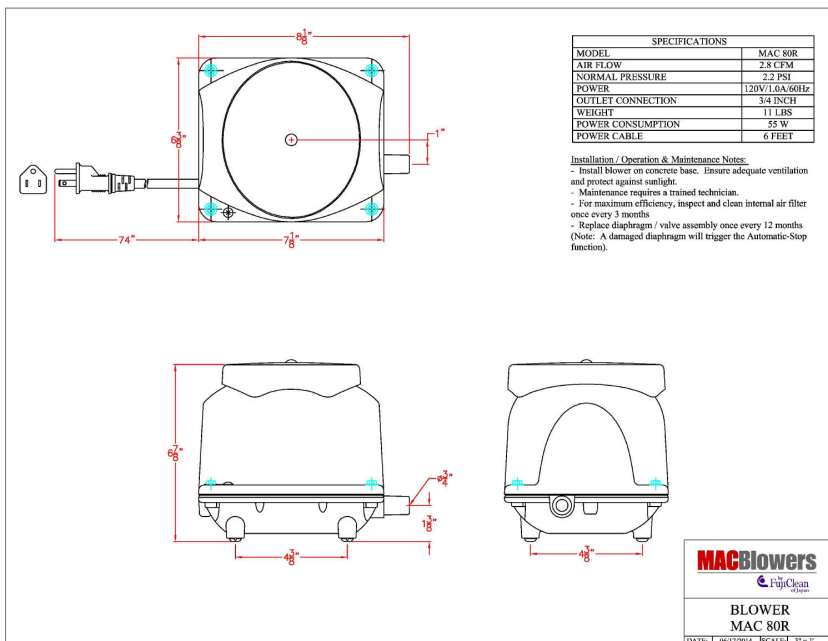


Performance Curves

Fuji Clean Blowers - MAC Series "R" Performance Curves (60Hz)



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):

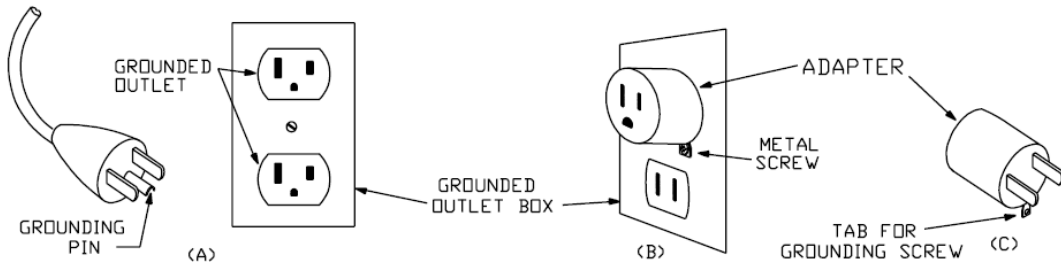
1) This product is for use on a nominal 120-V circuit, and has a grounding plug similar to the plug illustrated in sketch A in Figure 69.1. A temporary adapter similar to the adapter illustrated in sketches B and C may be used to connect this plug to a 2-pole receptacle as shown in sketch B when a properly 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



AA200

Table 69.1
Minimum gauge for extension cords

Ampere Rating Range	Voltage	Length of cord in ft								
		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

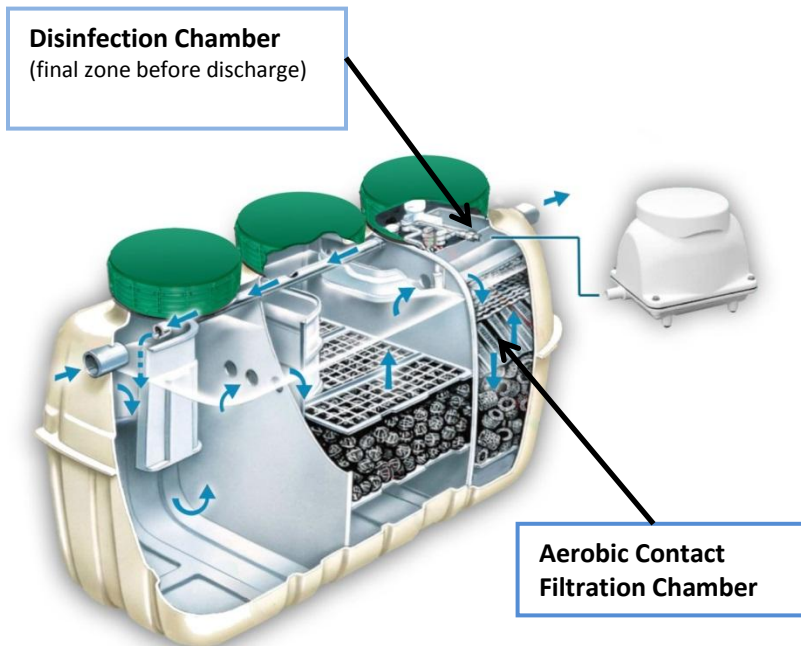
Appendix 2

Sampling Protocol

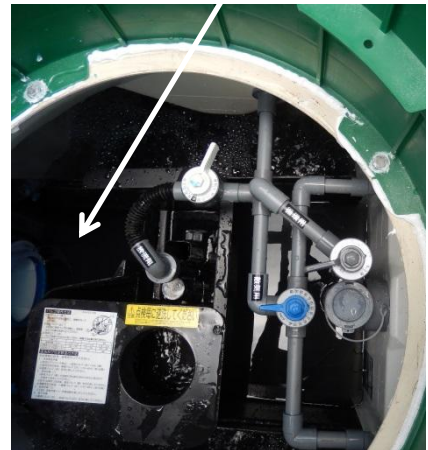
Fuji Clean USA Treatment System Sampling Protocol

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 ₂ SO 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 ₂ SO 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 ₂ SO 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 ₂ SO ₄ to pH<2, cool 4°C ⁷	28 days
Total Kjeldahl Nitrogen (TKN)	P, G	H ₂ SO 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 minimum 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.