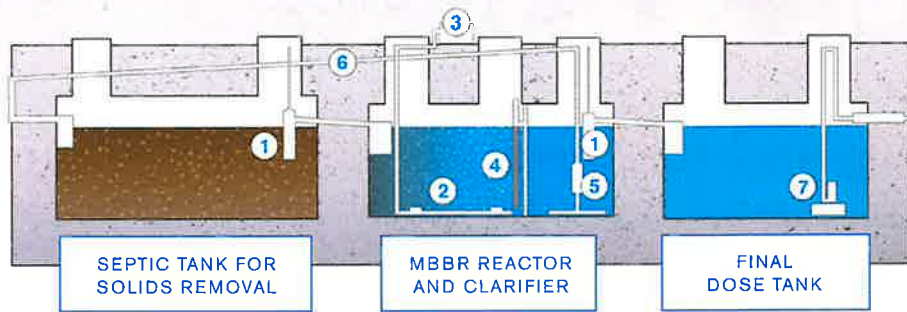


EQUIPMENT SPECIFICATIONS

WEXCO MBBR HIGH STRENGTH WASTE TREATMENT



GRAVITY FLOW

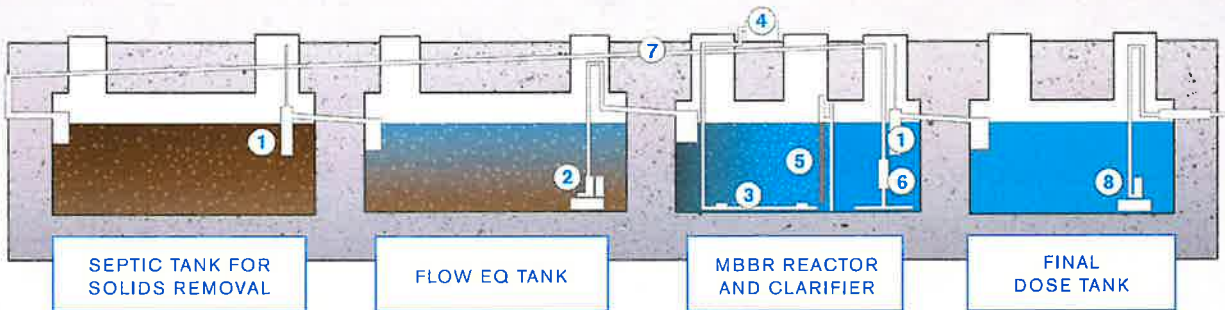


1. EFFLUENT FILTER 2. AIR DIFFUSER 3. BLOWER & HOUSING 4. MEDIA SEIVE
5. AIR LIFT SLUDGE RETURN PUMP 6. SLUDGE RETURN LINE 7. DOSE PUMP(S)

Gravity flow systems are ideal for **small or consistent flow applications** due to their simplicity. An air lift return pump recycles effluent to create a consistent flow through the system while improving effluent quality.



FLOW EQUALIZATION



1. EFFLUENT FILTER 2. TIME DOSE PUMPS 3. AIR DIFFUSER 4. BLOWER & HOUSING
5. MEDIA SEIVE 6. AIR LIFT SLUDGE RETURN PUMP 7. SLUDGE RETURN LINE 8. DOSE PUMP(S)

Flow equalization features a tank that holds wastewater for a specific period of time. A timer controlled pump doses a specific amount of the wastewater into the treatment system each day, providing a **steady feed rate** and ensuring optimal treatment.

THE **BENEFITS** OF HIGH STRENGTH WASTE TREATMENT

Small footprint.

Quick, economical installation.

Large surface area of biofilm carriers compared to other treatment technologies.

(Means you can do more in a smaller space)



Biofilm growth on media surface

Retrofit capabilities. *(in existing tanks)*

Can be designed for high strength and variable BOD loading.

Self-regulating biofilm ensures stability under shock loading conditions.

Operator friendly, and virtually maintenance free.

Passive denite with return sludge pump.

Can pretreat ahead of existing treatment if loading is too high.



THE **SMARTER** TREATMENT SOLUTION

Wexco MBBR (moving bed bioreactor) utilizes small biofilm carriers which provide a stable home for large populations of bacteria to grow and treat the wastewater. That, coupled with time tested aeration equipment, creates an **efficient treatment process** which can be used in most applications.

WHY USE MBBR?

Can work for small flows (hundreds of gallons per day) and **easily scales** to large flows (million gallons per day).

Flexible install, below ground fiberglass or concrete tanks, above ground steel, concrete, or fiberglass tanks.

High density of bacterial growth due to large surface area of media.

Expandable if flows or loading increases.

Add pretreatment to or expand existing systems without tank installation.

Works well in **cold climates**.

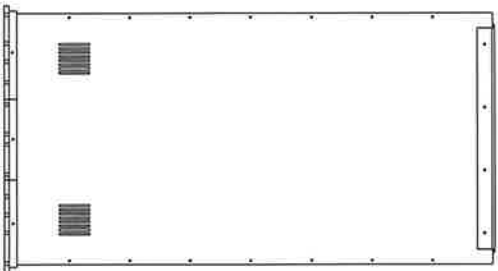
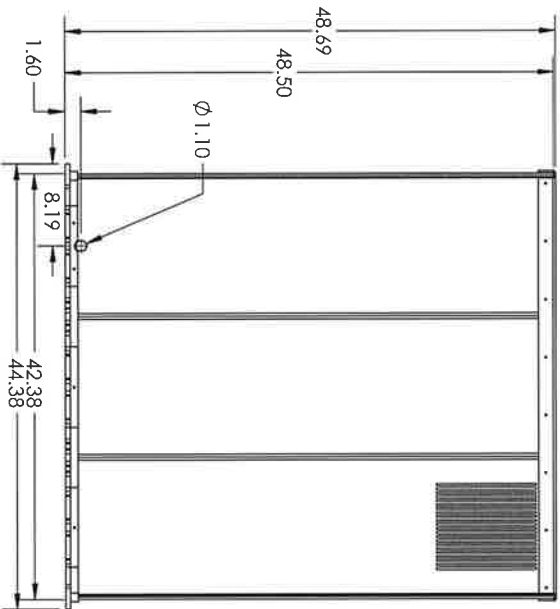
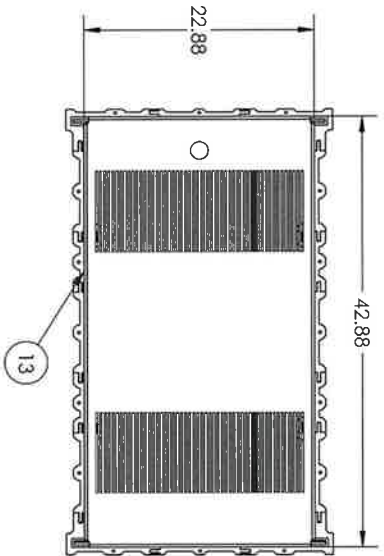
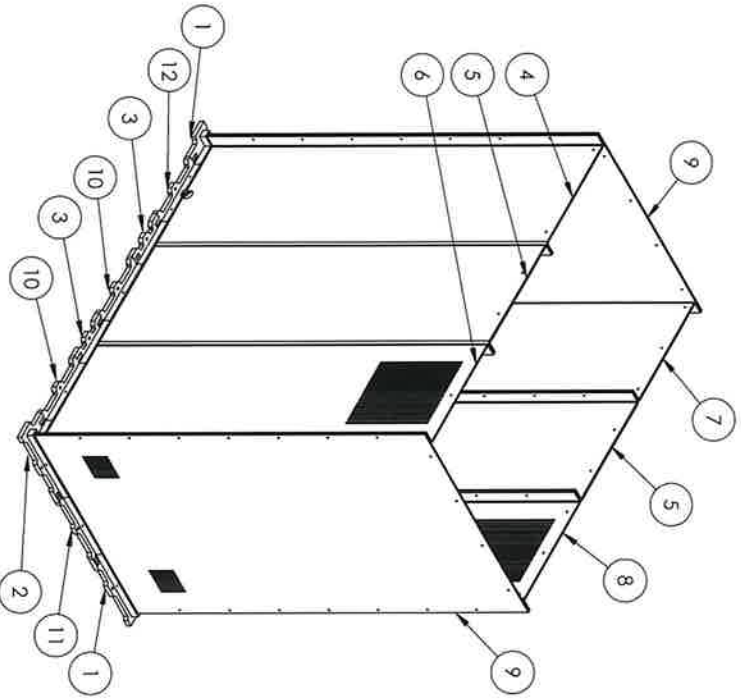
SIMPLE. EFFICIENT. CLEAN WATER.

wexco
ENVIRONMENTAL

320.983.2447
WEXCOENVIRO.COM

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ITEM NO.	PART NUMBER	DESCRIPTION	WEIGHT	QTY.
1	1031	RH CORNER BLOCK	0.56	2
2	1032	RH CORNER BLOCK	0.56	2
3	1033	CENTER TEE BLOCK	0.37	4
4	1034	PANEL 1	5.45	1
5	1035	PANEL 2	5.46	2
6	1036	PANEL 3	5.15	1
7	1037	PANEL 4	5.45	1
8	1038	PANEL 5	5.15	1
9	1039	PANEL END 6	8.22	2
10	1041	BLOCK EXTENSION	0.39	4
11	1042	BLOCK EXTENSION	0.37	2
12	1043	BLOCK EXTENSION	0.38	2
13	1045	COVER	6.87	1



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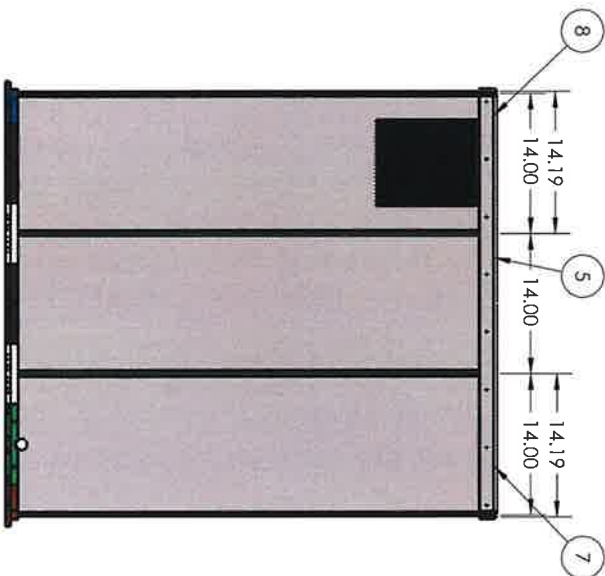
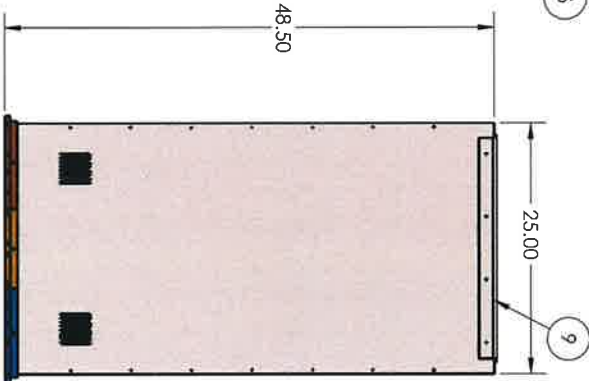
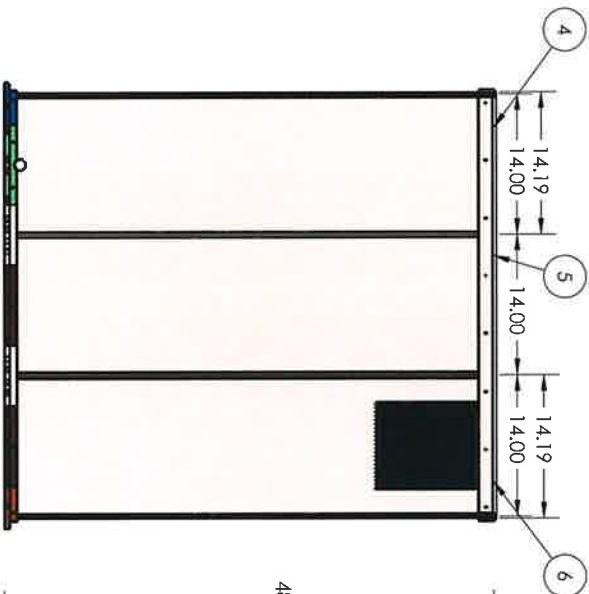
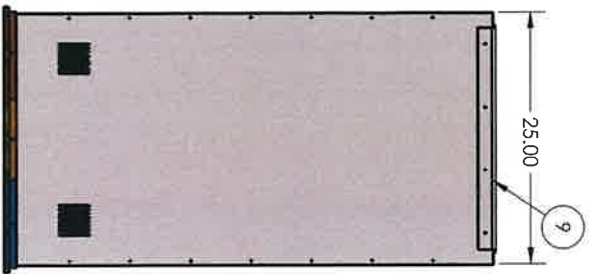
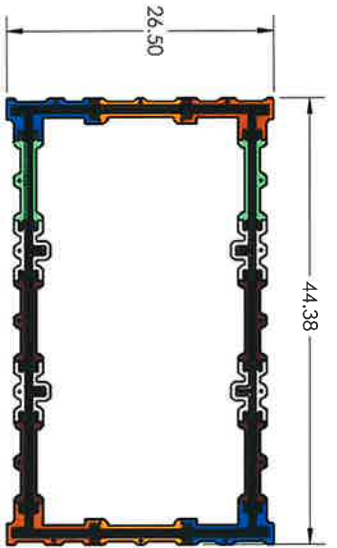


FINISH
 MATERIAL
 INTERPRET GEOMETRIC TOLERANCING PER
 COMMENTS

UNLESS OTHERWISE SPECIFIED	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	2/20/2022
TOLERANCES:	CHECKED	
FRACTIONAL: 1/32	ENG APPR	
DECIMAL: .015		
TWO PLACE DECIMAL: .05		
THREE PLACE DECIMAL: .005		

TITLE: **ALPHA FLEX ASSEMBLY**
 SIZE: **B** DWG. NO.: **1030**
 SCALE: 1:1.2 WEIGHT: 62.17
 SHEET 1 OF 3

REV **A**



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UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN INCHES
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 FRACTIONS 1/16" - .015
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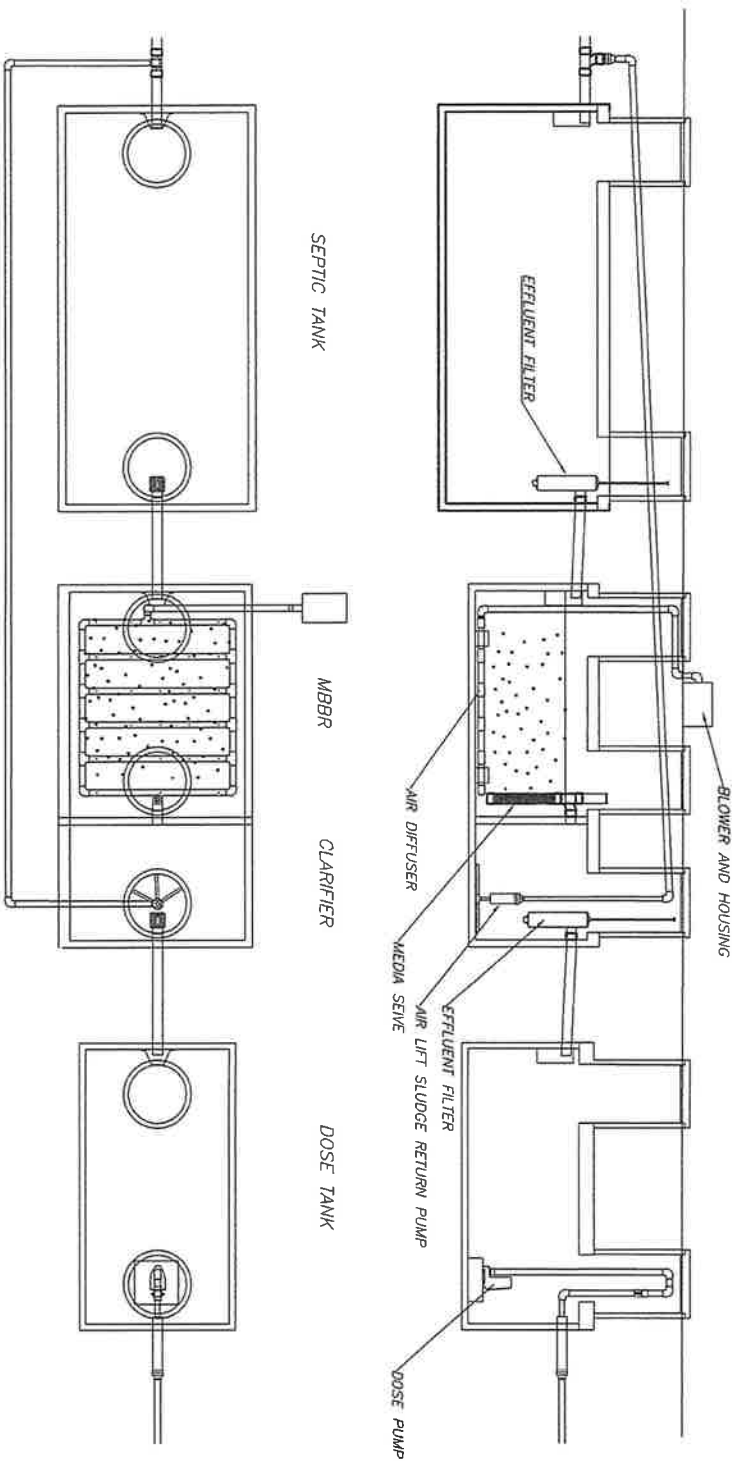
NAME
 DATE

TITLE:
ALPHA FLEX ASSEMBLY

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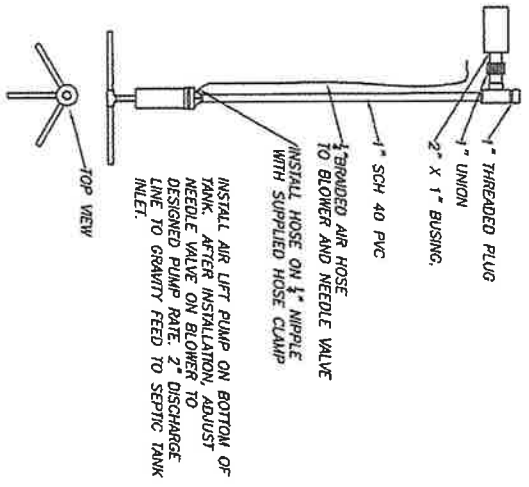
REV **A**
 SHEET 2 OF 3

MOVING BED BIOREACTOR BASIC DESIGN

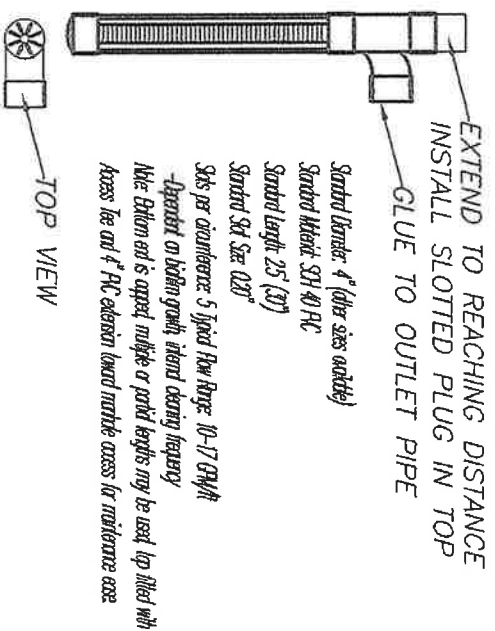


PREPARED FOR: SMART TREAT LAYOUT	PROPERTY LOCATION	LEGAL DESCRIPTION	WEXCO ENVIRONMENTAL 8074 KEYSTONE RD MILACA, MN 56353 (320)-583-2447 (FAX) (320)-583-2151	I hereby certify that this site plan was prepared by me or under my direct supervision. DATE 3/9/2016	PAGE TITLE MBBR OVERVIEW	SHEET NUMBER 1 OF 2
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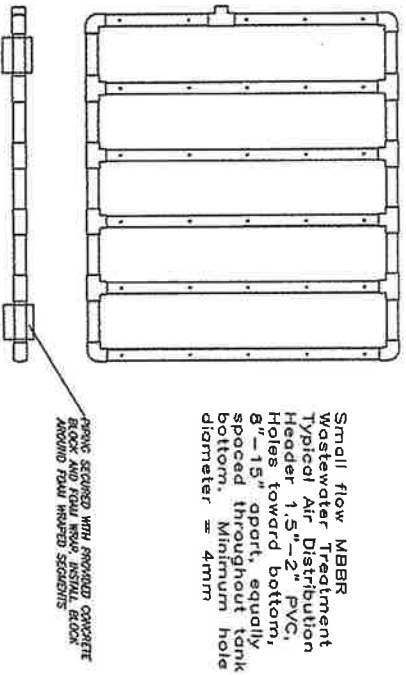
AIR LIFT SLUDGE RETURN PUMP



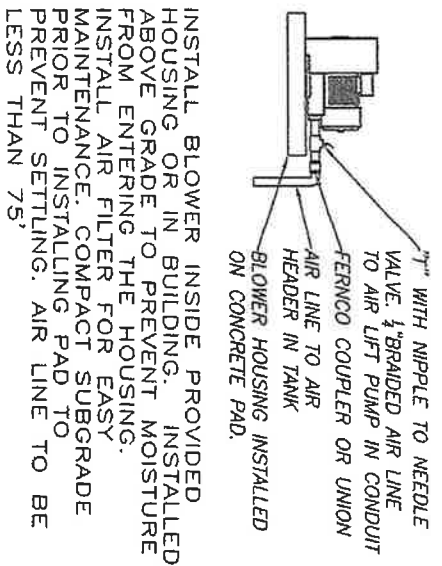
Strainer/Sieve Information



Typical MBBR Air Distribution Header (Length and width dependent on tank size)



TYPICAL BLOWER DETAIL



<p>PROPERTY TITLE SMART TREAT DETAIL</p>	<p>PROPERTY LOCATION</p>	<p>LEGAL DESCRIPTION</p>	<p>MEXICO ENVIRONMENTAL 6074 WESTON RD MILWAUKEE, WI 53233 (320)-983-2447 (FAX) (320)-983-2151</p>	<p>I hereby certify that this site plan was prepared by me or under my direct supervision.</p>	<p>PAGE TITLE MBBR DETAIL</p>	<p>SHEET NUMBER 2 OF 2</p>
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Onsite MBBR System Installation Manual

Wexco Environmental Moving Bed Bioreactor (MBBR) Installation Manual

Rev: 2020

**MBBR Theory
Design concepts
Installation guidelines
Start-up process**

Onsite MBBR System Installation Manual

Moving Bed Bio-Reactor Theory

Moving Bed Bio-Reactors (MBBR) are a combined fixed film and suspended growth reactors. The MBBR process utilizes fixed film media freely floating inside an aerobic reactor. The fixed film media provides a resilient population of good bacteria that can withstand residential wastewater and high strength waste streams. Since the media is in constant movement, it is considered self-regulating. Sludge buildup on the media is sloughed off when it becomes too thick or heavy. This sludge by product is settled out in a clarifier. Sludge that settles in this chamber is returned to a septic tank for storage and additional treatment.

The MBBR media provides a high density of surface area for biofilm to become established which allows very compact reactor sizes and treatment of variable waste strength loads and shock loading. MBBR reactors can be designed with high surface area loading rates for high through put roughing treatment or very low surface area loading rates for complete denitrification systems.

Pic: MBBR media



MBBR Benefits:

- **Compact:** The amount of biomass within a given volume can be doubled.
Ease of Operation/ Virtually maintenance free. Essentially nutrient levels and DO levels are the only controls for this system.
- **Flexible:** BOD and Nitrogen removal can be included. For retrofits, existing tanks can be used.
- **Easy Upgrade & Expansion:** Upgrade of existing activated sludge plants to achieve nitrification.
- **Stable:** Self-regulating biofilm ensures stable treatment under variable loads.
- **Sludge Production:** Efficient particle separation and sludge treatment. No sludge return and no clogging.
- **Low Capital Cost**

Onsite MBBR System Installation Manual

Design Phase:

Using estimated BOD loading for new facilities requires some research into other existing facilities actual waste strength. If existing facility data is not available, it is recommended that a 25% safety factor be added to the estimated waste strength. In addition, the reactor sizing should not exceed a 50% fill rate to provide extra space for additional media to be added if treatment levels are not met. Existing facilities should be sampled at least twice before determining the influent design characteristics. Use the design survey form to determine sample parameters.

When using existing tanks, the dimension shall be provided by the manufacture or measured in the field. Depth of existing tanks and interior dimensions of tank are the most important to determine actual operating parameters of the blower and media fill rates.

Once a design flow and organic loading rates are determined, an MBBR design worksheet will be completed by the manufacture. This worksheet will calculate media quantities and the aeration system design based on the specific site and effluent goals.

Septic tank: The septic tank sizing will be based on system use. Generally speaking, 24 hours of detention time is required for solids removal. Additional septic tank capacity may be required for systems with high levels of Oil & Grease such as a restaurant. The outlet of all septic tanks should be equipped with a gravity effluent screen to prevent excess solids from moving forward in the treatment process. An effluent screen reed switch alarm may be a consideration for systems with long maintenance intervals or if the LGU requires them.

Restaurant systems: when possible separate kitchen waste line from bathroom/other waste line. Grease trap should be 24 hr DT of kitchen flow. The septic tank capacity shall be 48 hours total DT.

Residential waste: 24 hrs DT min. for flow EQ, if non flow EQ use 48 hours DT.

Commercial waste: 1.5 to 2 times design flow for flow EQ, if non flow EQ use 3 times design flow. Always consider a separate grease trap if possible. If no flow EQ, use peak flow on a gallon per minute basis

Industrial waste: 48 hrs plus or DAF.

Equalization Tank: EQ tanks are generally used for medium to large flow facilities, for properties that have limited space for drain field capacity, or for systems that use large volumes of water in a short period of time. If required an EQ tank will be installed to store wastewater to be dosed out over a period of time.

The EQ tank will be set up to operate on a transducer or floats to operate at different time dosing run times based on the level in the tank. There would need to be 5 levels in the EQ tank; stop/low level, timer enable, two additional floats for adjusted timer settings, high level float/override timer/send. The EQ pumps would typically be set up to run in an alternating mode at an adjustable timer setting for the three floats. Three back up floats will be installed to operate the system in case of transducer failure. The panel should feature a button to switch from transducer and float controls as needed.

Transducer operation

1. Level 1: stop level: this level will shut of the EQ pumps
2. Level 2: timer enable: this level will activate the pumps in the time dosing sequence. A standard timer on and off setting will be required.
3. Level 3: tank at 50% capacity: this level will increase the timer on and/or off time to pump more frequently or more volume forward.
4. Level 4: tank at 75% capacity: this level will increase the timer on and/or off time to pump more frequently or more volume forward.
5. Level 5: high level / override: this level will send out notification the tank has reached a hig level status, and will also activate both pumps until it reaches the 75% level in the tank.

Back up float operation

1. Float 1: timer on/off: activates the timer
2. Float 2: override: activate both pumps
3. Float 3: high level: sends out notification of high level.

Onsite MBBR System Installation Manual

MBBR Reactors: All MBBR reactors will include 1-2 blowers which will provide air to an aeration grid installed in the bottom of all aeration tanks. Some systems with larger blowers will be installed with VFD's to manage air flow by adjusting the Hz. All blowers will be set with the option to run on timer to meet the actual demand of the system once it's installed. Blowers shall be installed in a provided enclosure or inside a building. All blowers are to be installed with a pressure relief valve and an inlet air filter.

- **Basic HSW System: (up to 2500 GPD)** Most HSW MBBR reactors are designed to treat a specific influent BOD loading to meet the permitted effluent requirements.
- **Mid-size HSW/Nitrogen BMP: (2500 – 5000 GPD)** Are designed with some recycle to an anoxic tank to meet a nitrogen limit of <20 mg/l.
- **Mid to large Nitrogen removal: (5000 + GPD)** Are designed with recycle to a pre and/or post anoxic tank in addition to chemical feed system which doses carbon when the system is carbon deficient. Total nitrogen permit limits are generally <10 mg/l.
 - **Pre DN:** The pre DN tanks are designed to receive influent from the EQ tank along with the nitrified recycle from the last stage of the MBBR system. This tank needs to maintain a DO of <0.5 mg/l in order to achieve optimal denitrification. Additional carbon may be added in this stage if the system is carbon deficient. An electric/mechanical mixer may be utilized in this stage of treatment to facilitate even mixing. This style of mixer will run on a timer or constant depending on the design. These mixers are also to be installed with a VDF to control the motor speed as necessary to meet effluent limits. If using starburst air mixers, a small blower will be installed and mixing will be controlled by using a small ball valve.
 - **Post DN / Swing tank:** Some systems with higher than normal influent nitrogen concentrations may require a post DN swing tank to provide additional anoxic capacity along with the ability to aerate for short periods of time to reduce BOD generated by adding chemical.

Chemical Feed: The chemical feed pump will be set up to operate on a timer, and will turn on when the EQ pumps turn on. The time that the chemical feed pump will run has to be able to be adjustable for each of the three level/float levels that operate the EQ pumps.

Nitrate Recycle: In a DN system, a recycle pump will generally be installed in the final stage of the treatment system to return fully nitrified effluent to the septic tank or pre DN tank to facilitate total nitrogen removal. The recirc. pump would have a timer setting that automatically adjusts to a different operator controlled settings that corresponds to the three operation levels/floats in the EQ tanks. These timer settings must be adjustable for each level/float.

Clarifier / Biosolids removal: A clarifier is required for all MBBR systems. Clarifier tanks are sized to meet the demands of the flow and TSS permit limits. Generally, an 8 hour detention time is the minimum requirement to settle solids. The outlets of clarifying tanks are also equipped with a gravity effluent screen to reduce fine solids from leaving the tank. A polylok PL 625 is generally the preferred filter.

A biosolids pump will also be installed in the center of the clarifier if possible. This pump may be an air lift or mechanical pump. Airlift pumps will run off the air generated by the blower for the system and are adjusted using the provided needle valve. Mechanical pumps are to be sewage handling pumps able to process up to 2" solids. If using an electric/mechanical pump, the control panel is to be set up to operate this pump on a timer which can be set by the operator to meet the sludge removal demands of the system during operation.

Drainfield Dose tank: Most drainfield dose tanks will consist of 2-6 pumps that will dose in alternating sequence. The dose pumps should have 3 floats; off/timer on, override timer (override timer would send out a message to operator, and high level alarm message to operator. The pumps can pump automatically interchangeably or independently with different run times adjustable by the operator. The run time needs to be used to calculate the total flow for each pump and the total flow to the drainfield.

Onsite MBBR System Installation Manual

Controls:

Flow monitoring: run times on the drainfield dose pumps will be used to calculate daily flow totals. Pumps will be calibrated periodically, so the panel will be required to have a space to enter updated calibrate GPM ratings for the pumps if they change overtime. A daily total log that can be exported into a report is a permit requirement for most facilities.

Remote monitoring should allow the operator to check alarm, pump and float status. All texts/emails should be able to be programmed by operator to go out to up to 4 parties. The CP must be accessible by internet to change timer, pump, DO, settings and other inputs. It should be able to call out with an alarm if the panel loses power. A battery back up system will be required.

Optional: Allow extra inputs to add a dissolved oxygen, ammonia, nitrate, ph, meter input from three locations? This reading would send out a message if the DO deviated from a high and low parameter at each location; each input would be different. If we have trouble getting less than 10 N then we could add these to the system for more operator control. I think this would need to simply alarm the operator and allow him to make the actual adjustments if necessary. These could be added in the future.

Onsite MBBR System Installation Manual

Installation of new tanks:

The installation contractor is responsible for setting the treatment and clarifier tank in the designed location. The tank should be level in all directions and the tank should be properly bedding in granular material per manufacture specifications. It is preferred to install the MBBR system in the tank prior to backfilling and before risers are set to provide better access. The MBBR can be installed after risers are set and in existing tanks. In this scenario, having two 24" risers in the aeration chamber is preferred for access and proper venting of the tank while the installer is working. Once the tank is set and safe entry into the tank is possible, the aeration grid is the first step to complete.

Installation of aeration grid:

Installation tools required

- Hammer drill with ¼" rotary bit. (tape bit at 2" of depth)
- Hammer
- 7/16" ratchet
- Sawzall
- Tape measure
- Handheld amp meter
- Glue and primer
- Ladder
- Confined space entry equipment
- Proper (PPE)
- Bucket and rope
- Work Light

Installing the aeration grid in an existing tank requires thorough cleaning of the tank prior to entry. Always use proper confined space safety equipment when entering an underground tank. After entering the tank, lower all equipment and parts into the tank. It is recommended to place 4" concrete blocks under the aeration grid for anchoring. After the concrete blocks are placed, layout the aeration grid piping and verify all dimensions are accurate. Each lateral and end cap should be at least 1" from the tank wall and aeration grid spacing should be 12" from each end wall and the proper distance between laterals based on the treatment system design. Use a tape measure to verify equal spacing in all directions from the tank walls and between the aeration grid laterals. After verifying all dimensions and spacing, the lateral network can be assembled.

After the lateral network is assembled, the laterals must be anchored using stainless steel pipe clamps provided and stainless-steel anchor bolts. These ¼" anchor bolts secure the pipe clamps to the concrete blocks permanently. It is important these anchors are secure and tight to prevent floating or lifting of the aeration network during operation.

When securing anchors to the floor of a tank, take extra precautions to drill the anchors 2" or less into the concrete floor. Most tanks have a 3" – 6" floor thickness so maintain a 2" depth will ensure the floor is not punctured.

Once the grid is assembled and securely anchored to blocks or the tank floor, the aeration drop pipe can be installed into the riser or access to grade. Cut the drop leg at 12-18" below grade. A 90 degree elbow will be installed on this pipe to exit the tank access riser using an appropriately sized rubber grommet to provide a water tight seal. The underground piping should be installed atleast 12" below grade to the blower location. Before existing the tank, install the provided media sieve on the inlet and outlet of the tank. Make sure each sieve has a cap installed on the top to prevent media from plugging the sieve.

The blower can be up to 50' from the aeration tank. If the blower is further than 50', consult with the manufacture to ensure the blower and air line is properly sized for the proposed distance. A separate ½" air line will be plumbed to the main aeration line and will serve the airlift sludge return pump installed in the clarifier. A ½" PVC ball valve will be installed inside the riser where the sludge pump is housed to throttle air to the return pump. Connect the provided ¼" barbed fitting and braided air line to the sludge pump and secure with stainless steel band clamps.

The last step once all plumbing is complete inside the tank is to pour the designed amount of media inside the tank. This can be completed using an excavator or skid loader. Center the media bag over the manhole and untie the draw string on the provided media Shute on the bottom of the bag. Once the media bag is empty, shake the bag to get all the media out of the bag.

Onsite MBBR System Installation Manual

Pic: aeration grid in existing tank



Pic: aeration grid in new tank



Onsite MBBR System Installation Manual

Pic: Air lift sludge return pump and braided hose



Install the blower pad near the control panel location and run the sch 80 underground airline to the front of the enclosure. The blower is provided with iron pipe 6" below grade. Use a threaded male adaptor to transition from the iron pipe to sch 80 PVC. Install SOJW cord or flexible conduit from the junction box on the blower to the control panel. Follow the wiring diagram provided with the blower and ensure the connection match the voltage of the service.

Pic: Blower



Onsite MBBR System Installation Manual

Start up:

Once all plumbing is completed and the blower has electrical connection made, it is time to bump power to the blower. Using a handheld clamp meter, place the clamp over one of the blower leads in the panel and turn the meter to amps. Before turning the power on to the blower, check the motor plate to determine the proper running amps. Bump power to the blower and let the amperage stabilize. If the amperage is out of the normal range for the motor, shut power down immediately and determine the cause of the issue.

Next, fill the reactor tank and clarifier with water. Once full turn the blower on and inspect the movement of the media and make sure the aeration is equal to all parts of the tank. Adjust the sludge return pump value to return a burst of sludge every 30 seconds. This can be adjusted once the system is operational to improve treatment results as necessary.

Pic: proper movement in reactor tank



TECHNICAL CHARACTERISTICS

- Aluminium alloy construction
- Smooth operation
- High efficiency impeller
- Maintenance free
- Mountable in any position
- Recognized TEFC - cURus motor

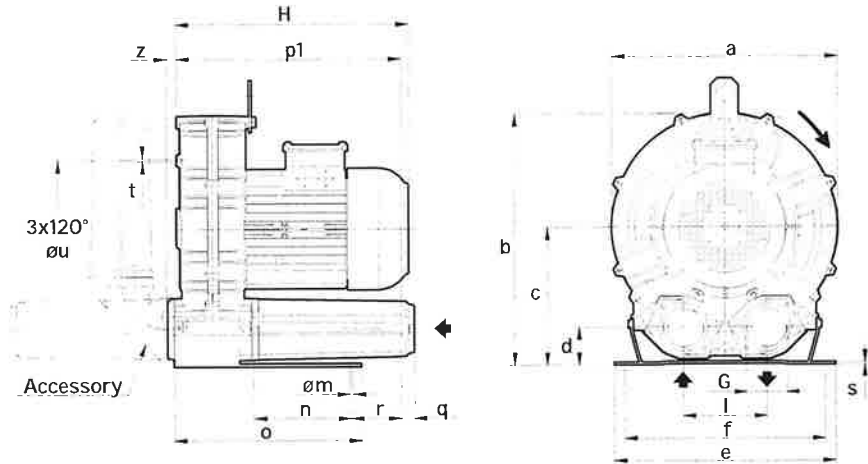
OPTIONS

- Special voltages (IEC 38)
- Surface treatments

ACCESSORIES

- Inlet and/or inline filters
- Additional inlet/outlet silencers
- Safety valves
- Flow converting device
- Optional connectors

Dimensions in inches.
Dimension for reference only.



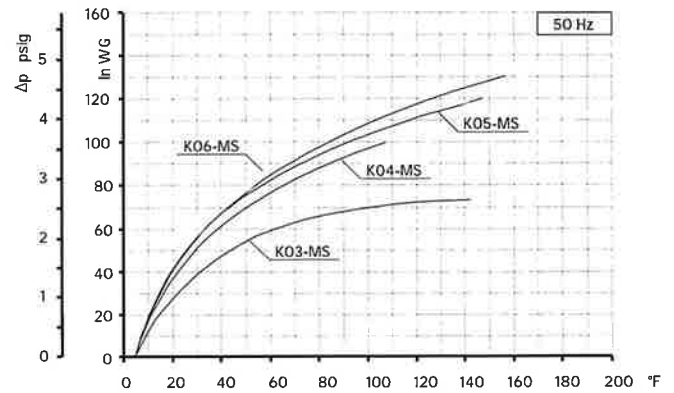
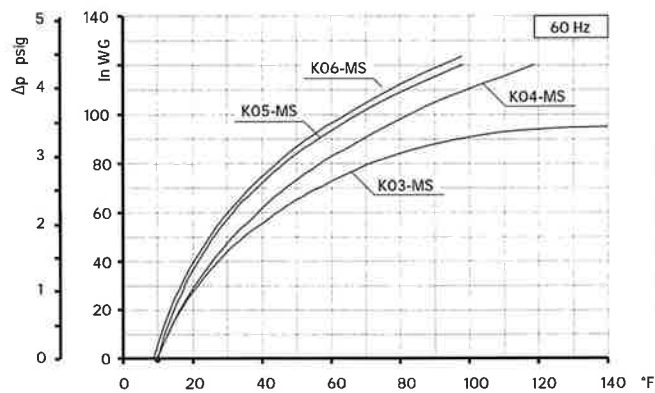
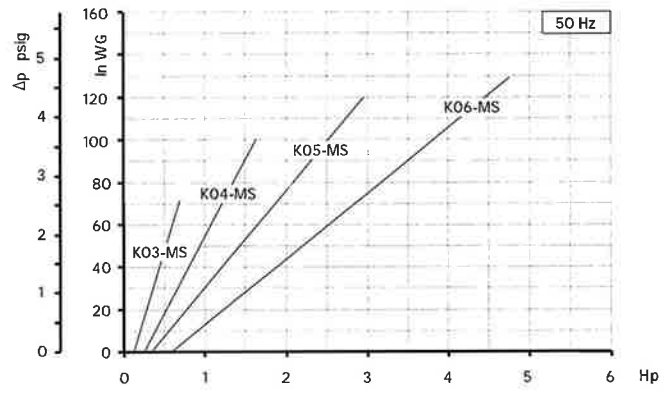
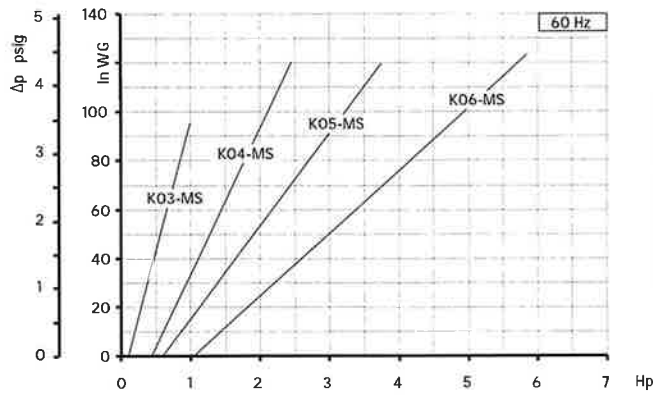
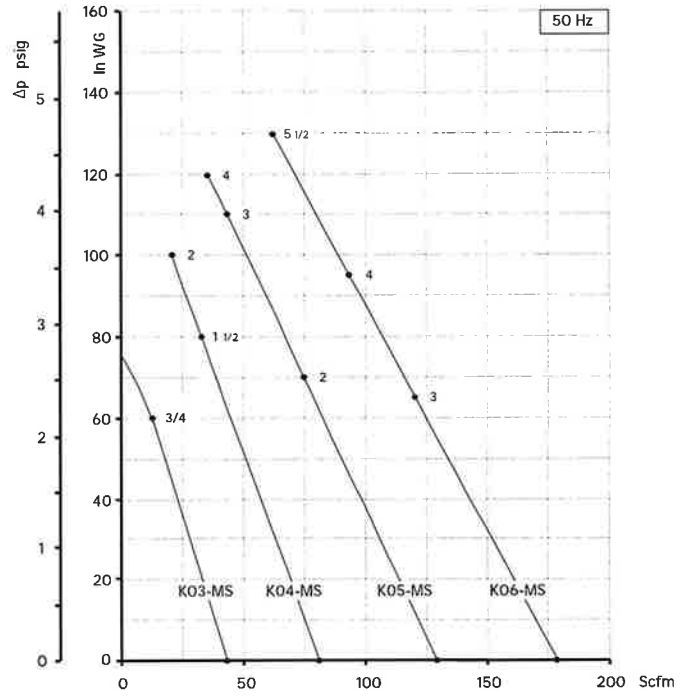
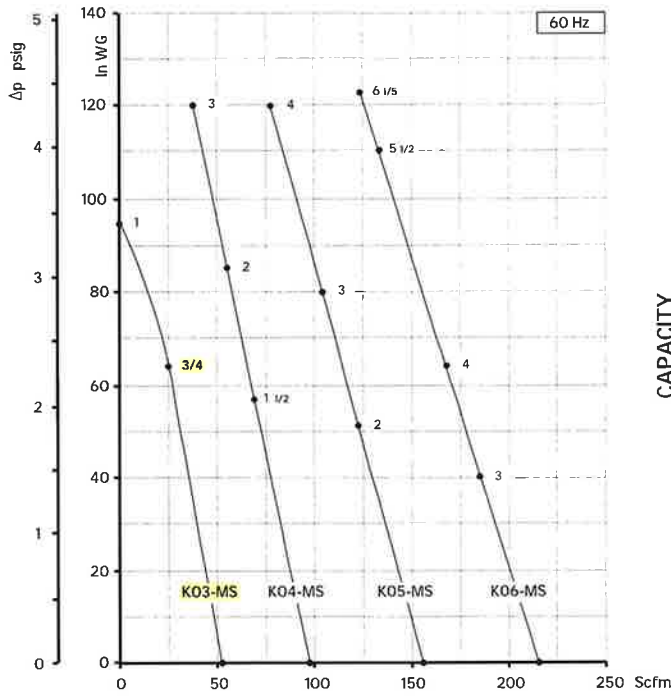
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K03-MS	9.49	10.55	5.79	1.69	9.06	8.07	1" 1/4 NPT	3.39	0.39	3.27	5.59	8.07	0.71	2.95	0.16	M6	5.51	0.47
K04-MS	11.22	12.40	6.77	1.93	10.04	8.86	1" 1/2 NPT	4.02	0.47	3.74	6.73	8.74	0.71	2.76	0.16	M6	6.89	0.71
K05-MS	12.87	14.37	7.87	2.13	12.60	10.24	2" NPT	4.72	0.59	4.53	10.43	12.60	0.71	3.86	0.16	M8	7.87	0.75
K06-MS	14.80	15.47	8.07	2.13	12.80	11.42	2" NPT	4.92	0.59	5.51	10.71	13.15	0.71	3.35	0.16	M8	9.45	0.75

Model	Maximum flow Scfm		Installed power Hp		Maximum differential pressure Δp (In WG)		Noise level Lp dB (A) (1)		Overall dimensions H Inches	Weight Lbs
	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm		
K03-MS	52	43	3/4	3/4	64	60	62.0	60.0	10.43	24.3
			1	1	95	72	62.3	60.3	12.0	32.0
			1 1/2	1 1/2	58	80	64.8	62.8	11.65	40.3
K04-MS	98	81	2	2	85	100	65.0	63.0	13.78	48.0
			3	-	120	-	65.2	-	13.78	52.5
			2	2	52	70	70.5	68.5	13.20	56.7
K05-MS	156	129	3	3	80	110	70.8	68.8	13.20	60.6
			4	4	120	120	71.1	69.1	14.40	77.2
			3	3	40	65	73.0	71.0	13.80	69.0
K06-MS	216	179	4	4	64	95	73.3	71.3	14.17	82.5
			5 1/2	5 1/2	110	130	73.6	71.6	15.5	85.3
			6 1/5 (2)	-	122	-	73.9	-	16.3	95.5
			2	2	52	70	70.5	68.5	13.20	56.7

(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.

(2) No cURus motor

- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperature from +5° to +104°F.
- Specifications subject to change without notice.



Curves refer to air at 68°F temperature and 29.92 In Hg atmospheric pressure (abs) measured at inlet port.
Values for flow, power consumption and temperature rise: +/- 10% tolerance.
Data subject to change without notice.



FEATURES

Impeller: Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

Casing: Cast iron volute type for maximum efficiency. 2" NPT discharge.

Mechanical Seal: Silicon Carbide vs. Silicon Carbide sealing faces. Stainless steel metal parts, BUNA-N elastomers.

Shaft: Corrosion-resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.

Fasteners: 300 series stainless steel.

Capable of running dry without damage to components.

Designed for continuous operation when fully submerged.

EXTENDED WARRANTY AVAILABLE FOR RESIDENTIAL APPLICATIONS.

WE Series Model 3885

SUBMERSIBLE EFFLUENT PUMPS



Wastewater

APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

SPECIFICATIONS

Pump

- Solids handling capabilities: 3/4" maximum
- Discharge size: 2" NPT
- Capacities: up to 140 GPM
- Total heads: up to 128 feet TDH
- Temperature: 104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

MOTORS

- Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- Class B insulation on 1/3 - 1 1/2 HP models.
- Class F insulation on 2 HP models.

Single phase (60 Hz):

- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.

- SJTOW or STOW severe duty oil and water resistant power cords.
- 1/3 - 1 HP models have NEMA three prong grounding plugs.
- 1 1/2 HP and larger units have bare lead cord ends.

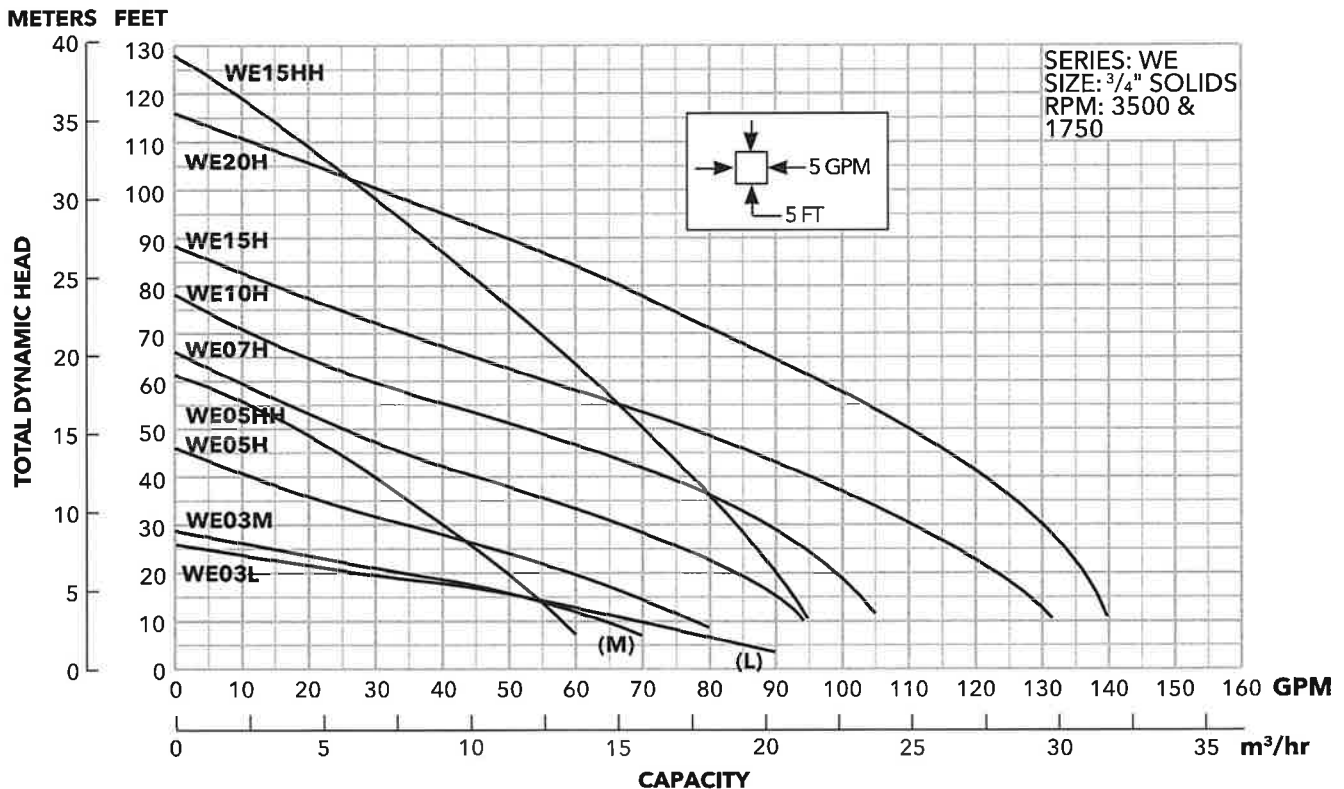
Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

AGENCY LISTINGS



Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association File #LR38549



Wastewater

MODELS

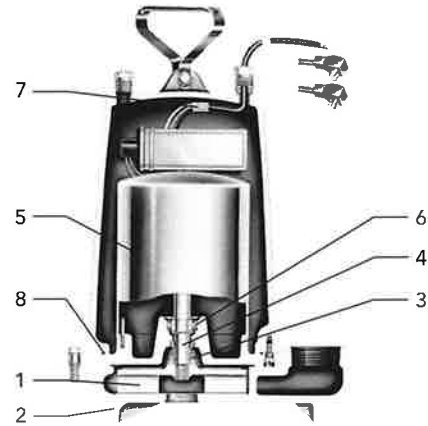
Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance		Power Cable Size	Weight (lbs.)										
										Start	Line-Line												
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56										
WE0318L			208			6.8	19.5	K	51	9.1	4.2												
WE0312L			230			4.9	14.1	L	53	14.5	8.0												
WE0311M			115			10.7	30.0	M	54	11.9	1.7												
WE0318M			208			6.8	19.5	K	51	9.1	4.2												
WE0312M			230			4.9	14.1	L	53	14.5	8.0												
WE0511H	0.5	1	115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60										
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3											
WE0512H			230			7.3	34.5	M	53	9.6	4.0	14/4											
WE0538H			3			200	4.9	22.6	R	68	NA			3.8									
WE0532H						230	3.3	18.8	R	70	NA			5.8									
WE0534H						460	1.7	9.4	R	70	NA	23.2											
WE0537H		575	1.4		7.5	R	62	NA	35.3	14/3													
WE0511HH		1	115		14.5	46.0	M	54	7.5		1.0												
WE0518HH			208		8.1	31.0	K	68	9.7		2.4	16/3											
WE0512HH			230		7.3	34.5	M	53	9.6		4.0	14/4											
WE0538HH			3		200	4.9	22.6	R	68		NA			3.8									
WE0532HH					230	3.6	18.8	R	70		NA			5.8									
WE0534HH					460	1.8	9.4	R	70	NA	23.2												
WE0537HH		575	1.5		7.5	R	62	NA	35.3	14/3													
WE0718H		0.75	1		208	4.06	11.0	31.0	K		68	9.7		2.4	14/3	70							
WE0712H					230												10.0	27.5	J	65	12.2	2.7	
WE0738H			3		200												6.2	20.6	L	64	NA	5.7	14/4
WE0732H					230												5.4	15.7	K	68	NA	8.6	
WE0734H	460			2.7	7.9								K				68	NA	34.2				
WE0737H	575			2.2	9.9					L			78				NA	26.5					
WE1018H	1	1	208	4.44	14.0	59.0	K	68	9.3	1.1	14/3	80											
WE1012H			230										12.5	36.2	J	69	10.3	2.1					
WE1038H		3	200										8.1	37.6	M	77	NA	2.7	14/4				
WE1032H			230										7.0	24.1	L	79	NA	4.1					
WE1034H			460										3.5	12.1	L	79	NA	16.2					
WE1037H			575										2.8	9.9	L	78	NA	26.5					
WE1518H	1.5	1	208	4.56	17.5	59.0	K	68	9.3	1.1	14/3	80											
WE1512H			230										15.7	50.0	H	68	11.3	1.6					
WE1538H			3										200	10.6	40.6	K	79	NA	1.9	14/4			
WE1532H													230	9.2	31.7	K	78	NA	2.9				
WE1534H													460	4.6	15.9	K	78	NA	11.4				
WE1537H													575	3.7	13.1	K	75	NA	16.9				
WE1518HH		1	1	208	5.50	17.5	59.0	K	68	9.3	1.1		14/3	83									
WE1512HH				230											15.7	50.0	H	68	11.3	1.6			
WE1538HH			3	200											10.6	40.6	K	79	NA	1.9	14/4		
WE1532HH				230											9.2	31.7	K	78	NA	2.9			
WE1534HH				460											4.6	15.9	K	78	NA	11.4			
WE1537HH				575											3.7	13.1	K	75	NA	16.9			
WE2012H	2	1	230	5.38	18.0	49.6	F	78	3.2	1.2	14/3	83											
WE2038H			3										200		12.0	42.4	K	78	NA	1.7			
WE2032H		230											11.6		42.4	K	78	NA	1.7				
WE2034H		460											5.8		21.2	K	78	NA	6.6				
WE2037H		575											4.7		16.3	L	78	NA	10.5				

PERFORMANCE RATINGS (gallons per minute)

Order No.	WE-03L	WE-03M	WE-05H	WE-07H	WE-10H	WE-15H	WE-05HH	WE-15HH	WE-20H
	HP	1/3	1/3	1/2	3/4	1	1 1/2	1 1/2	2
	RPM	1750	1750	3500	3500	3500	3500	3500	3500
5	86	-	-	-	-	-	-	-	-
10	70	63	78	94	-	-	58	95	-
15	52	52	70	90	103	128	53	93	138
20	27	35	60	83	98	123	49	90	136
25	5	15	48	76	94	117	45	87	133
30	-	-	35	67	88	110	40	83	130
35	-	-	22	57	82	103	35	80	126
40	-	-	-	45	74	95	30	77	121
45	-	-	-	35	64	86	25	74	116
50	-	-	-	25	53	77	-	70	110
55	-	-	-	-	40	67	-	66	103
60	-	-	-	-	30	56	-	63	96
65	-	-	-	-	20	45	-	58	89
70	-	-	-	-	-	35	-	55	81
75	-	-	-	-	-	25	-	51	74
80	-	-	-	-	-	-	-	47	66
90	-	-	-	-	-	-	-	37	49
100	-	-	-	-	-	-	-	28	30

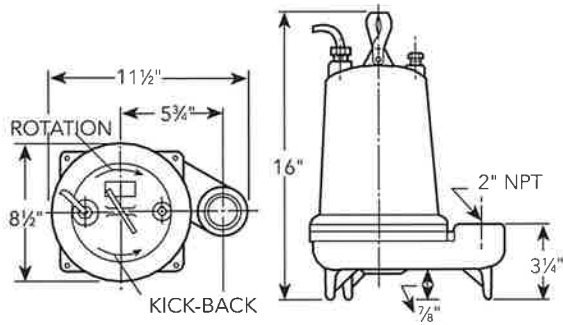
COMPONENTS

Item No.	Description
1	Impeller
2	Casing
3	Mechanical Seal
4	Motor Shaft
5	Motor
6	Ball Bearings
7	Power Cable
8	Casing O-Ring



DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)



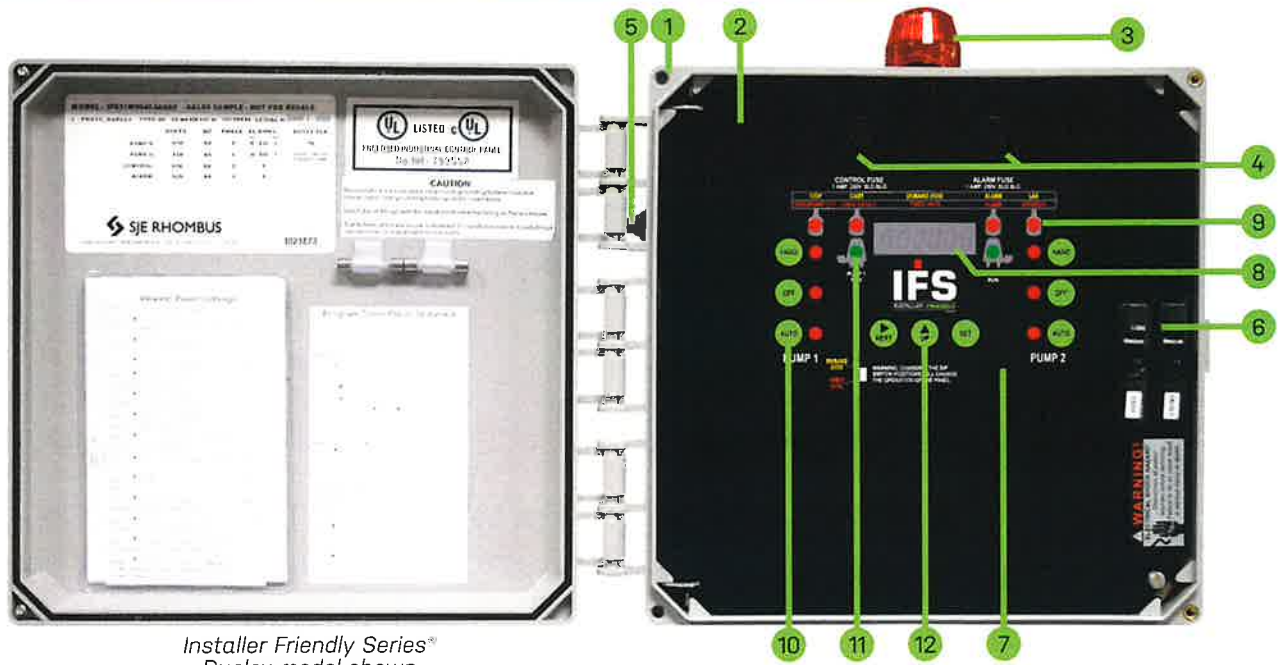
xylem
Let's Solve Water

Xylem Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (866) 325-4210
Fax: (888) 322-5877
www.gouldswatertechnology.com

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INSTALLER FRIENDLY SERIES®

Advanced Single Phase Simplex or Duplex Control Panels



Installer Friendly Series®
Duplex model shown



The IFS control panels utilize an innovative circuit board design to control one or two 120/208/240V pump(s) in on-site wastewater applications. IFS panels feature an easy-to-use touch pad on inner door for programming and system monitoring: level status indicators, HOA buttons, pump run indicator(s) and menu buttons. Includes digital LED display for mode (TD), pump elapsed time, events (cycles), alarm counts, float error counts and more!

Each panel can be easily converted to either demand dose to timed dose in the field. Float-based or C-Level™ floatless sensor options available. IFS panels are also available for three phase, capacitor start/run and drip irrigation applications.

PART NO. MODEL NUMBER

- **1022726** FS21W114H8AC17G (Simplex)
- **1022727** FS41W114H8AC17G (Duplex)

COMPONENTS

1. NEMA 4X enclosure for indoor/outdoor use
2. Inner door for added safety
3. Red alarm beacon
4. Separate alarm and control power and fuses
5. Test/Normal/Silence switch
6. Circuit breakers provide pump disconnect and branch circuit protection
7. Easy to use touch pad for programming pump control
8. Digital LED display
9. Float status indicators
10. Hand/Off/Auto buttons with indicators to control pump mode
11. Pump run indicators
12. Menu navigation buttons



9500012B Rev 08/18
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www.sjerhombus.com

Toll Free 888-342-5753

Phone 218-847-1317



Installer Friendly Series® SJE Rhombus® Type IFS

Installation Instructions and Operation/Troubleshooting Manual



Warranty void if panel is modified.

Call factory with servicing questions:
1-800-RHOMBUS
(1-800-746-6287)

Manufactured by:



SJE RHOMBUS

Technical support: +1-800-746-6287
techsupport@sjeinc.com
www.sjerhombus.com

PN 1022888E 06/19
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This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes.

All conduit running from the sump or tank to the control panel must be sealed with conduit sealant to prevent moisture or gases from entering the panel. **NEMA 4X enclosures are for indoor or outdoor use**, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water. **Cable connectors must be liquid-tight in NEMA 4X enclosures.**

Installation

This Installer Friendly Series® (IFS) control panel was designed to control pump(s). The controller records pump status, number of cycles, elapsed run time, current float status, and float error counts.

Mounting the Control Panel

Note: The control panel should not be mounted in a location that may be subject to submersion.

1. Determine mounting location for panel. If distance exceeds the length of either the float cables or the pump power cables, splicing will be required. For outdoor or wet installation, we recommend the use of an SJE Rhombus® liquid-tight junction box with liquid-tight connectors to make required connections. **You must use conduit sealant to prevent moisture or gases from entering the panel.**
2. Mount control panel with mounting devices furnished.
3. Determine conduit entrance locations on control panel. Check local codes and schematic for the number of power circuits required. **(Float cables require separate conduit from power and pump cables.)**

Note: Be sure the proper power supply voltage, amperage, and phase meet the requirements of the pump motor(s) being installed. If in doubt, see the pump identification plate for voltage/phase requirements.

4. Drill proper size holes for type of connectors being used.

Note: If using conduit, be sure that it is of adequate size to pull the pump cable(s) through.

5. Attach cable connectors and/or conduit connectors to control panel.

**FOR INSTALLATION REQUIRING
A SPLICE, FOLLOW STEPS 6-10;
FOR INSTALLATION WITHOUT A
SPLICE, GO TO STEP 11.**

6. Determine location for mounting junction box according to local code requirements. **Do not** mount the junction box inside the sump or basin.
7. Mount junction box to proper support.
8. Run conduit to junction box. Drill proper size holes for the type of conduit used.

Installation Instructions

9. Identify and label each wire before pulling through conduit into control panel and junction box. Make wire splice connections at junction box.
10. Firmly tighten all fittings on junction box.
11. If a junction box is not required, pull cables through conduit into control panel.
12. Connect pump wires per wiring diagram or schematic and float wires to the proper terminals as shown on the schematic.
13. Connect pump, control, and alarm incoming power conductors to proper position on terminals. See schematic for terminal connections.

VERIFY CORRECT OPERATION OF CONTROL PANEL AFTER INSTALLATION IS COMPLETE.

Installation of Floats

CAUTION: If control switch cables are not wired and mounted in the correct order, the pump system will not function properly. Control switches need to run in separate conduit from pump and power lines.

WARNING: Turn off all power before installing pump wires in pump chamber. Failure to do so could result in serious or fatal electrical shock.

1. Determine your normal operating level and desired float configuration, as illustrated in **Figures 2-5**.
2. Mount float switches at appropriate levels. Be sure that floats have free range of motion without touching each other or other equipment in the basin.
3. For mounting clamp installation: place the cord into the clamp as shown in **Figure 1**. Locate the clamp at the desired activation level and secure the clamp to the discharge pipe as shown in **Figure 1**.

NOTE: Do not install cord under hose clamp.

4. Tighten the hose clamp using a screwdriver. Over tightening may result in damage to the plastic clamp. Make sure the float cable is not allowed to touch the excess hose clamp band during operation.

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

5. If using an optional redundant off float, mount slightly below the timer enable float.
6. The alarm float can be positioned anywhere that the alarm level is desired.

Figure 1

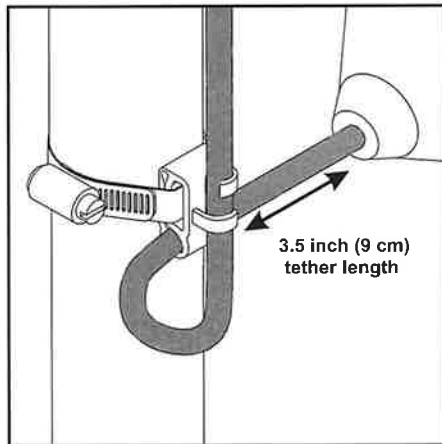


Figure 2
Simplex/Duplex Timed Dose

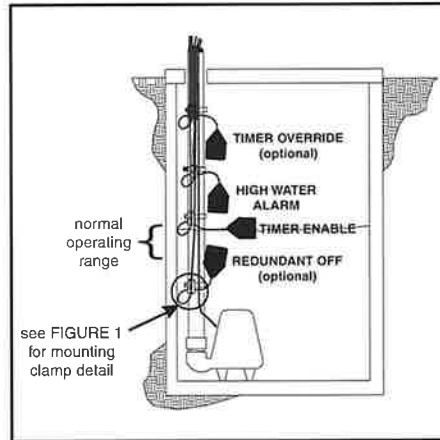


Figure 3
Simplex Demand

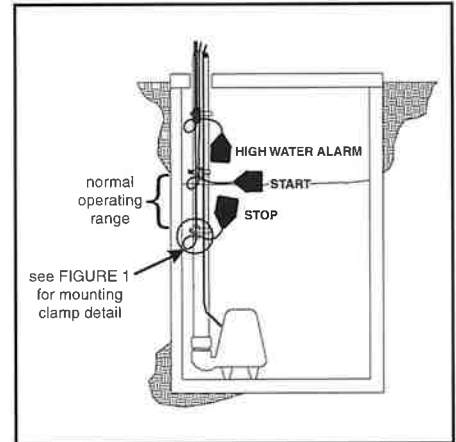


Figure 4
Duplex Demand 3 Float

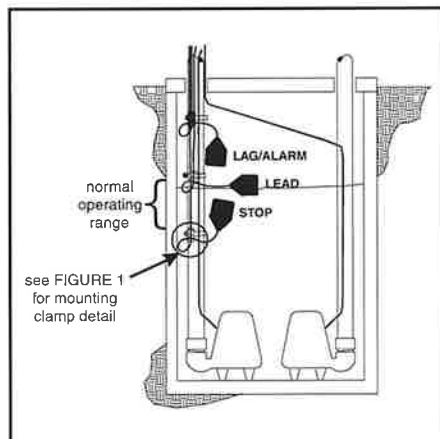
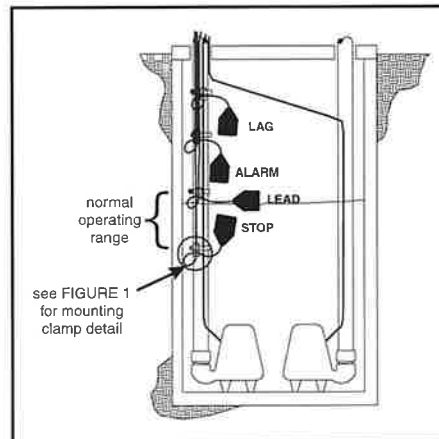


Figure 5
Duplex Demand 4 Float



Operations

The Installer Friendly Series' (IFS) control panel uses float switches to continuously monitor and control the liquid level in the tank.

Hand Operation - The stop/redundant off float must be raised to put panel in HAND operation. To override the stop/redundant off float, press and hold the HAND button. The pump runs until the HAND button is released. The panel then returns to the AUTO mode. If the stop/redundant off float is raised and the panel is placed in the HAND mode, and left in the HAND mode, the pump continues to run until the stop/redundant off float lowers. The panel then returns to the AUTO mode.

Off Operation - The panel is in the OFF mode.

Auto Operation - In time dose (t-dose) mode, when the panel is in the AUTO mode, the timer controls pump ON and OFF time as long as the low level float is raised. In demand (d-dose) mode, the stop and start floats control the pump.

Alarm Count - Shown on display as "AL-Ctr", counts the number of times the alarm is activated. Note: Alarm counter does not include testing operations in the total count. High alarm, floats out of sequence & auxiliary alarm add to count.

Green Control and Alarm Power Indicators - (mounted on interior circuit board) Illuminates when control power and alarm power is present. If the control fuse needs replacing, the panel sounds an alarm.

Display - Will turn off after one minute of non-use.

Float Indicators - Illuminates if the float is raised. If the float is out of sequence, the panel goes into alarm mode and display shows "FE" float error.

Timer Override Float - Overrides the OFF time and pump will run for full dose ON time. (timed dose only, optional)

Float Error Count - Shown on the display as "FE-Ct". Counts the number of times floats are out of sequence.

Timer Override Count - Shown on the display as "tO-Ct". Counts the number of times the timer override float is activated. (timed dose only)




Time left in "On" time cycle - Shown on the display as "t-On". Counts down the time left in the "On" cycle. (timed dose only)



Time left in "Off" time cycle - Shown on the display as "t-OFF". Counts down the time left in the "Off" cycle. (timed dose only)

Auxiliary alarm count - Shown on the display as "AL1Ctr" or "AL2Ctr". Counts optional auxiliary alarm counts for single phase models. Counts Pump 1 and Pump 2 fail counts for three phase models and single phase models with overloads.



Viewing Panel Settings



With control power supplied to panel:



Press  button. The display will show  for timed dose applications, or  for demand applications.



Press  button. The display will show  count in hh:mm.

Press  button. The display will show  count.


Press  button. The display will show  count. Cycle count for Duo Alarm 1 option for single phase models. **OR** Cycle count for Pump 1 Fail for three phase models and single phase models with overloads.



Press  button. The display will show  count (pump 2) in hh:mm. (duplex panels only)



Press  button. The display will show  count. (pump 2) (duplex panels only)



Press  button. The display will show  count. Cycle count for Duo Alarm 2 option for single phase models. **OR** Cycle count for Pump 2 Fail for three phase models and single phase models with overloads.




Press  button. The display will show  alarm count.

Press  button. The display will show  float error count.

Press  button. The display will show  timer override count. (timed dose mode only)


Press  button, The display will flash  , then the ON time in hh:mm:ss. (timed dose mode only)


Press  button. The display will flash  then the OFF time in hh:mm:ss. (timed dose mode only)

Press  button. The display will flash either  or  , then the time left in the ON or OFF cycle. (timed dose mode only)

Program Timer On & Off Times


With control power supplied to panel:


Press and hold  button for 3 seconds until  is displayed.

The display will flash  , then the time in hh:mm:ss.

Setting pump ON (follow Section A)


Section A

Press  button to display time in hh:mm:ss.

Press  button until desired digit flashes


Press  button until desired time is achieved.

Repeat process pressing  and  buttons until desired time is reached.

Press  button to save.

Operations

Setting pump OFF times

Press  button. The display will flash OFF and show the OFF time in hh:mm:ss. **Repeat the instructions in Section A to set OFF times.**

Press and hold  button for 3 seconds until  is displayed.






Timer programming is complete.





Program Pump Sequence


Program Pump sequence "Alt", "2-1" or "1-2" (duplex only)



With control power supplied to panel:

Press and hold  button for 3 seconds until  is displayed.

Press  button until  flashes with either ,  or  flashing.

Press  button to display , , 

Press  button until desired sequence is achieved.

Press and hold  button for 3 seconds until  is displayed.

Pump sequence programming is complete.

Selecting Time Dose or Demand Dose -Panels in the field

To set the panel to either Timed Dose or Demand Dose in the field:

1. Turn the control/alarm power off to the control panel.
 2. Turn the pump power off to the control panel.
 3. Place a small screwdriver or pen into the slot in the label on the inner door marked "DEMAND DOSE TIMED DOSE".
 - Move the dip switch (up) for demand dose
 - Move the dip switch (down) for Timed dose
 4. Turn the control/alarm power on to the control panel. After the display goes blank press the "NEXT" switch.
 - The display will show d-dose for demand dose.
 - The display will show t-dose for timed dose.
- WARNING:** Changing the dip switch positions will change the operation of the panel.
WARNING: If changing to timed dose, be sure to set the off and on times.
5. Turn on the pump power after all the settings are changed.
 6. **WARNING:** Check the panel for correct operation before leaving the site.

Troubleshooting

Float Controls

1. Check the floats during their entire range of operation. Clean, adjust, replace and repair damaged floats.
2. Measure the float resistance to determine if the float is operating properly.

To measure float resistance:

- a. Isolate the float by disconnecting one or both of the float leads from the float terminals.
- b. Place one ohmmeter lead on one of the float wires, and the other ohmmeter lead on the other float wire.
- c. Set the ohmmeter dial to read ohms and place on the R X 1 scale. With the float in the "off" position, the scale should read infinity (high resistance), if not replace the float.

With the float in the "on" position, the scale should read close to zero, if not replace the float. **Readings may vary depending on the accuracy of the measuring device.**

Fuse

To check the continuity of the fuse, pull the fuse out of the fuse holder. With the ohmmeter on the R X 1 scale, measure resistance. A reading of infinity (high resistance) indicates a blown fuse that must be replaced with a fuse of the same type, voltage, and amp rating.

Alarm Light

With power on, hold the test/normal/silence switch in the "test" position. The alarm light should turn on. If not, replace the light with that of the same type.

Alarm Horn

With power on, hold the test/normal/silence switch in the "test" position. The alarm horn should turn on. If not, replace the horn with that of the same type.

SJE Rhombus® Five-Year Limited Warranty

For complete terms and conditions, please visit www.sjrhombus.com.

NOTICE!

Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.



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PL-525 Filter

The PL-525 Filter is rated for 10,000 GPD (gallons per day) making it one of the largest filters in its class. It has 525 linear feet of 1/16" filtration slots. Like the Polylok PL-122, the Polylok PL-525 has an automatic shut-off ball installed with every filter. When the filter is removed for cleaning, the ball will float up and temporarily shut off the system so the effluent won't leave the tank.

Features:

- Rated for 10,000 GPD (gallons per day).
- 525 linear feet of 1/16" filtration.
- Accepts 4" and 6" SCHD 40 pipe.
- Built in gas deflector.
- Automatic shut-off ball when filter is removed.
- Alarm accessibility.
- Accepts PVC extension handle.

PL-525 Installation:

Ideal for residential and commercial waste flows up to 10,000 gallons per day (GPD).

1. Locate the outlet of the septic tank.
2. Remove the tank cover and pump tank if necessary.
3. Glue the filter housing to the 4" or 6" outlet pipe. If the filter is not centered under the access opening use a Polylok Extend & Lok or piece of pipe to center filter.
4. Insert the PL-525 filter into its housing.
5. Replace and secure the septic tank cover.

PL-525 Maintenance:

The PL-525 Effluent Filters will operate efficiently for several years under normal conditions before requiring cleaning. It is recommended that the filter be cleaned every time the tank is pumped, or at least every three years. If the installed filter contains an optional alarm, the owner will be notified by an alarm when the filter needs servicing. Servicing should be done by a certified septic tank pumper or installer.

1. Locate the outlet of the septic tank.
2. Remove tank cover and pump tank if necessary.
3. Do not use plumbing when filter is removed.
4. Pull PL-525 cartridge out of the housing.
5. Hose off filter over the septic tank. Make sure all solids fall back into septic tank.
6. Insert the filter cartridge back into the housing making sure the filter is properly aligned and completely inserted.
7. Replace and secure septic tank cover.



Outdoor SmartFilter® Alarm
 Polylok, Zabel & Best filters accept the SmartFilter® switch and alarm.

Extend & Lok™
 Easily installs into existing tanks.