

BIOCLERE™

BIOLOGICAL WASTEWATER TREATMENT SYSTEM

OPERATION & MAINTENANCE MANUAL

24 SERIES BIOCLERE™

AQUAPOINT
AN OBEH COMPANY

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www.aquapoint.com

BIOCLERE™

BIOLOGICAL TREATMENT SYSTEM

Congratulations on your purchase of a Bioclere biological treatment system. The Bioclere is a modification of the classic trickling filter. Trickling filters have been used for over one hundred years for the treatment of wastewater due to their reliability and simplicity of operation.

Naturally occurring microorganisms break down waste (organic matter) in the Bioclere and create harmless byproducts, mainly: water, carbon dioxide and additional microorganisms (sludge). The sludge created in the Bioclere is automatically returned and stored in your primary settling or sludge holding tank. Therefore, the Bioclere unit(s) do NOT require pumping.

However, regular pumping of your grease trap(s) (if applicable) and primary tank(s) is required. Failure to maintain a regular pumping schedule will have an adverse impact on the biology in the Bioclere system. If pumping is ignored for an extended period it may become costly to get the system back to efficient operation.

Aquapoint recommends that the grease trap(s) and primary tank(s) are checked every 3 and 6 months respectively by a certified operator or septic hauler and pumped as needed. For seasonal applications, pumping of the tanks should occur during mid-season to protect the microbiology in the filter. Failure to adhere to this pumping schedule will result in compromised treatment and will void the Bioclere warranty.

The Bioclere units are designed to reduce the effects of toxic substances that may enter the system from your facility. However, it is in your best interest to evaluate what is discharged to the system. Be aware of daily/weekly/monthly/annual activities and the quantities of chemicals that are being discharged. While the bacteria are resistant to many forms of toxic chemicals discharged in small quantities, large volumes or certain combinations of chemicals may have detrimental effects. Some items to be aware of include: cleaning agents, floor strippers, harsh chemicals, paints and solvents, as well as abnormal quantities of soaps and milk. If at any time you are unsure about using a particular chemical please call Aquapoint. If necessary, we will arrange a site meeting to evaluate your products.

Aquapoint wants you to have a good experience with your new Bioclere treatment system. If you treat the bugs with respect, they will treat you to decades of clean water and help to preserve the environment.

Please call our office if you have ANY questions concerning your new system.

Sincerely,

AQUAPOINT
(508) 985-9050

BIOCLERE™

INTRODUCTION

Refer to **Section 2** of this manual to review the treatment equipment supplied by Aquapoint.

This document specifies the equipment included with each assembly, as well as the installation and operation procedures where applicable. Applicable OSHA guidelines for construction must be followed and wiring must be done in conformance with the National and Local Electrical Codes.

The following presents the requirements to allow commissioning of the Aquapoint supplied equipment.

Aquapoint Bioclere™ WWTP Commissioning Requirements

Aquapoint will certify that the Aquapoint supplied equipment is operational upon successful completion of the following:

- Aquapoint field commissioning reports are satisfactorily completed by Aquapoint personnel. Each checklist confirms that the equipment has been installed properly and according to Aquapoint's procedures.
- Successful operational test of each process using clean potable water.

In order for Aquapoint to deploy personnel for a plant commissioning the following conditions must be met:

1) **Mechanical:**

All treatment reactors and components must be installed as depicted on the site plan and according to Aquapoint's installation instructions. This includes but is not limited to:

- All treatment reactors, tank assemblies and valves, including pumps, slide rail systems, float switches, chemical feed tanks, chemical feed assemblies and chemical feed conduits with tubing (if applicable).
- All inter-connective piping and pressure testing as specified in this manual.
- Complete or "nearly" complete final grading around treatment tanks.
- All tanks filled with potable water.

2) **Electrical:**

- Control panel(s) installed in specified location(s).
- Main breakers installed and power fed to individual control panel(s).
- Field wiring between control panels and treatment reactors. This includes the installation of disconnect switches where required and wiring to junction boxes if provided.
- All equipment must be ready for full operational testing before Aquapoint personnel arrive onsite.

3) **People required onsite during commissioning:**

- Mechanical contractor to repair, modify or replace equipment as necessary.
- Electrical contractor to repair, modify, replace or troubleshoot field wiring.
- Site design engineer to confirm equipment is operational and meets the client's requirements.
- Individual component manufacturer's representatives as determined necessary by Aquapoint. Note that this will require a minimum of 2-3 weeks' notice to schedule.

All punch list items identified at or prior to the commissioning must be addressed before Aquapoint will certify and commission the Aquapoint supplied treatment equipment.

Upon successful commissioning of the system and operator training, Aquapoint will provide the contractor the commissioning reports certifying the system has been installed and is ready to accept wastewater.

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NOTE: This Technical Manual is for the use of the owner/operator and is applicable only to the specific Bioclere installation for which it is provided. The specifications in this manual are subject to change by the manufacturer any time.

1.0 GENERAL DESCRIPTION AND FUNCTION

- 1.1 The Bioclere is a secondary wastewater treatment system. The first stage of treatment occurs in the primary tank in which the solids are settled and partially digested. Wastewater then flows from the primary tank to the Bioclere where treatment by the natural process of biochemical oxidation takes place followed by final clarification prior to discharge.
- 1.2 The wastewater enters the baffled zone located in the clarifier beneath the Bioclere filter module. It is then pumped to the distribution assembly, which doses the surface of the filter media.

The oxidation process occurs as the water trickles over the biological film that grows on the media surface. The pump operates on a timed sequence that is specific to the site's wastewater characteristics to ensure that the dosing rate optimizes filter performance.

In the filter module the biological film thickens until carbonaceous material and oxygen no longer penetrates to the bacteria on the inside surface nearest the media. When this occurs the biological film sloughs from the media and passes through the media bed into the clarifier where it settles on the bottom. A sludge return pump periodically returns the sludge to the primary tank.

Thus, the filter media is self-purging and virtually maintenance free.

- 1.3 Oxygen is provided by a fan located in the top housing of the Bioclere and is vented either through the effluent line of the system or the biofilter. The fan is sized to provide the proper supply of oxygen to the treatment process.
- 1.4 Wastewater flows by gravity through the Bioclere. The pumps are used only for the treatment process. In the event of a power or pump failure the effluent will continue to pass by gravity through the sump portion of the Bioclere to its point of discharge. However, this situation should not be allowed to continue for an extended period of time because without the pumps operating secondary treatment of the wastewater is no longer occurring.

2.0 **BIOCLERE SYSTEM SPECIFICATIONS:**

2.1	<u>BIOCLERE</u>	<u>Model</u>	<u>Media</u>	<u>Media Qty.</u>
	Stage 1	24/30-950	Flocor 230	12.5 m ³

2.2 **BIOCLERE EQUIPMENT PROVIDED**

<u>Item</u>	<u>Quantity Per Unit</u>
Filter media	(see Section 2.1 above)
Dosing assembly	1 each
Dosing pumps	2 each
Recycle pump	1 each
Fan module assembly	1 each
Control panel	1 combined
Technical Manual	3 each

2.3 **PUMP TIMER SETTINGS**

Upon commissioning of the Bioclere system the following pump timer settings are to utilized.

	<u>Stage 1</u>
Dosing pump <u>ON</u>	8 min
Dosing pump <u>OFF</u>	2 min
Recycle pump <u>ON</u>	2 min
Recycle pump <u>OFF</u>	1 hr

NOTE: Subsequent to the start-up period, recycle pump timer settings may need to be adjusted by the operator to provide ideal recycle rates for the actual average daily flow and influent characteristics. This will be critical to optimize the denitrification process. Refer to Section 6 of this manual for guidelines for determining appropriate recycle timer settings. Please contact Aquapoint as necessary before modifying the pump timers.

2.4 PRIMARY TANK:

Aquapoint recommends that the primary tank(s) be inspected quarterly or semi-annually by a certified operator or septic hauler for sludge and scum and pumped as needed.

2.5 GREASE TRAPS:

Aquapoint recommends, if applicable, that the grease trap be inspected and pumped every 3 months.

NOTE: Inadequate pumping of grease traps and primary tanks will have a detrimental effect on biological treatment. Therefore, it is imperative that pumping schedules are followed.

3.0 BIOCLERE INSTALLATION:

3.1 INTRODUCTION:

This document establishes the installation procedures for the Bioclere secondary wastewater treatment system. It is recommended that these procedures be reviewed and approved by the engineer of record to ensure compatibility with specific site characteristics.

Aquapoint assigns a project manager for each installation.

Aquapoint provides onsite supervision of the installation, the fresh water commissioning of the Bioclere system and certification that the system is operational. Effective execution of these procedures requires coordination with the site contractor.

We request that the site contractor contact Aquapoint at 508-985-9050 to coordinate delivery, installation schedule and fresh water commissioning of the system.

3.2 BIOCLERE INSTALLATION PROCEDURE:

- A. Locate Bioclere inlet/outlet inverts from site engineering plans.
- B. Excavate to 12" below base of mounting pad. De-water excavation if required.
- C. Add 12" (1.00 ft.) of clean 3/8" crushed stone.
- D. Install pre-cast mounting pad approximately centered to Bioclere location. Anchoring points on pad must not be in direct alignment with inlet/outlet of Bioclere. (See dwg. # 1244-9)
- E. Check to ensure mounting pad is level and elevation is correct. If pad is rough and uneven, smooth and level an area contained in this section 18" in diameter in the center of the pad.
- F. Carefully lower Bioclere into position with proper rigging and lifting techniques.
- G. Orient and align Bioclere to inlet and outlet directions.
- H. Center the base of the Bioclere unit onto the mounting pad. Attach the Aquapoint supplied chain & turnbuckle assemblies for securing and stabilizing the Bioclere unit. (The Chain & turnbuckle assemblies are for installation only and are not for anchoring the Bioclere to offset buoyant forces.). Check to confirm Bioclere is level and adjust turnbuckles as necessary to level unit.
- I. Once leveled, fill Bioclere with clean fresh water to bottom of outlet pipe to stabilize unit.
- J. If Bioclere is installed in groundwater refer to anchoring requirements on site plan and/or contact site engineer.
- K. If Bioclere is not installed in groundwater backfill excavation with clean 3/8" peastone and/or sand to within 12" of the inlet pipe. Check level of Bioclere.

NOTE: Use care while backfilling to prevent Bioclere movement and/or damage to Bioclere.
- L. Install inlet, outlet and vent/test port piping.
- M. Install recycle piping from Bioclere back to the inlet end of primary tank. The recycle line is 1.5" Schedule 40 PVC from the Bioclere to the outside of primary tank and Schedule 80 PVC inside the primary tank. Schedule 80 PVC to be installed against inside wall and at 1/2 the primary tanks liquid depth terminating with a 90° elbow. (see dwg. PMW/1256-7)

- N. Install wiring with watertight conduit from control location to Bioclere.
- O. Back fill around Bioclere with sand and/or peastone to final grade.
- P. Install control box in protected location, connect power feed and Bioclere wiring.
(See Appendix B)

The following items are performed by Aquapoint unless otherwise specified:

- Q. Install dosing and recycle pumps with safety ropes to the appropriate pipes.
- R. Install pump wiring by feeding wires through the filter and fan box feed-thrus.
(See Appendix B)

3.3 BIOCLERE SYSTEM DESIGN CHECKLIST:

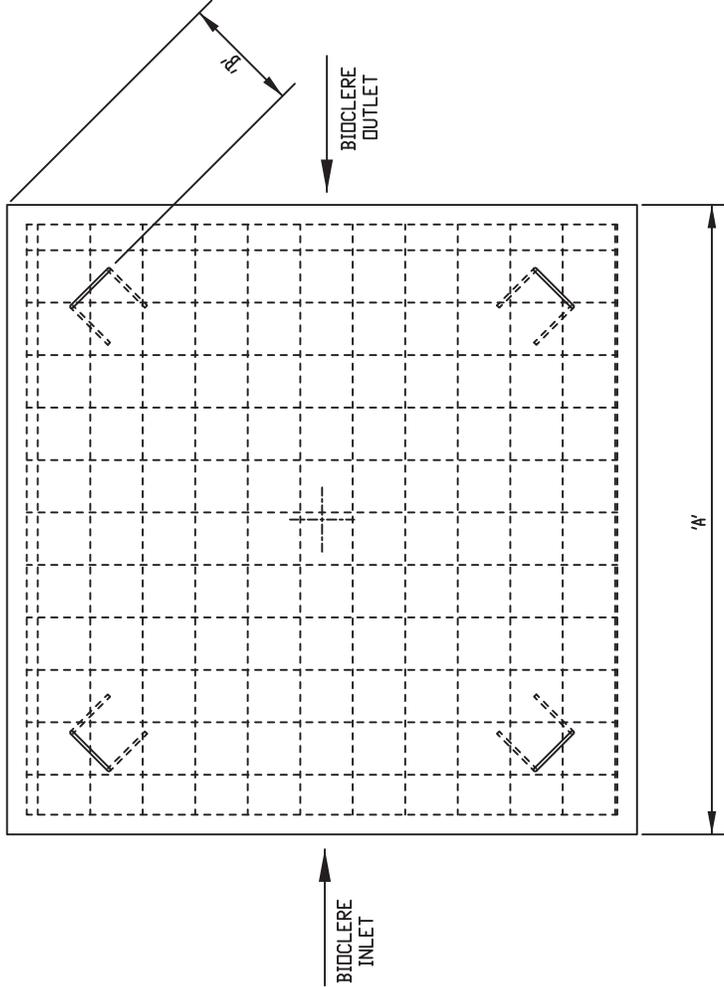
The following is a checklist for the design of an onsite wastewater treatment system that includes **Model 24 or 30 Series Bioclere Unit(s)**.

NOTE: *The following details should be shown on the site plan to facilitate installation.*

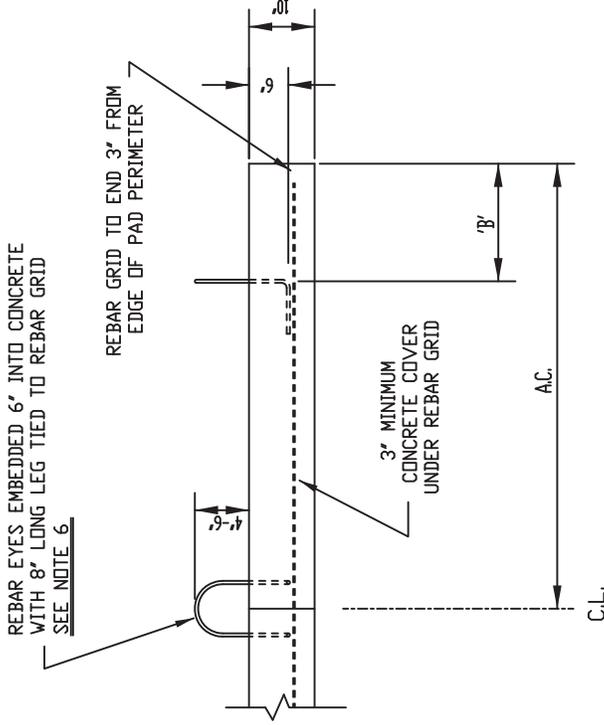
- Bioclere unit must be installed on a contractor supplied concrete mounting pad ([Lg_pad.dwg](#)). The pad should be installed on 12 inches of crushed stone.
- The recycle line is a 1.5" diameter PVC coupling originating over the Bioclere inlet ([BioRecyc.dwg](#)).
- Inlet and outlet on the Bioclere unit(s) are 6" diameter PVC couplings located 180 degrees apart. Any changes in direction between tanks should be made with pipe couplings.
- A 4" diameter PVC vent must be installed after each Bioclere ([General Flow Schematic.dwg](#)).
- Volume of concrete to be poured around the base of the Bioclere must be specified on the site plan if the unit(s) is installed in groundwater (see appropriate clarifier displacement curve). For a Bioclere model 24 series and 30 series, the concrete must extend 4 feet and 5 feet above the top of the mounting pad respectively. **If the high groundwater table will extend above the flange, please notify Aquapoint prior to manufacturing the unit(s).**
- Provide 4 feet of backfill (minimum) above the recycle line outlet on the Bioclere. Backfill to grade must be clean sand or pea stone.
- If necessary provide provisions for sampling the septic tank effluent and/or the effluent D-box/ final pump chamber.

3.4: BIOCLERE BASE PAD DETAIL

PLAN ON SQUARE PAD
(SEE NOTE 5)



PAD ELEVATION
(ACROSS CORNERS)



NOTES: UNLESS OTHERWISE SPECIFIED:

1. CONCRETE MINIMUM STRENGTH: 4,000PSI @ 28 DAYS.
2. DEFORMED REINFORCING BARS TO BE 60,000 PSI YIELD STRENGTH.
3. EYES (4): 1/2" DIAMETER REBAR CAST IN PLACE AS SHOWN.
4. PAD TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
5. CIRCULAR PADS WITH 'A' = DIAMETER, CAN BE SUBSTITUTED FOR SQUARE PADS.
CIRCULAR PAD REBAR EYES INSTALLED 6" FROM PAD PERIMETER.
6. REBAR EYES ARE NOT DESIGNED FOR LIFTING THE CONCRETE PAD.

BIOCLERE MODEL	'A'	'B'	STEEL REINFORCEMENT GRID	APPROX PAD WEIGHT
24	8'	1'6"	#3 REBAR @ 8' D.C.	8,000 lbs
30	10'	2'0"	#3 REBAR @ 6' D.C.	12,500 lbs
36	12'	2'6"	#4 REBAR @ 10' D.C.	18,000 lbs



39 TARKILN PLACE
NEW BEDFORD, MA 02745
(508) 985-9050 FAX (508) 985-9072

TITLE: PRECAST MOUNTING PAD FOR 24, 30 & 36 SERIES BIOCLERES	
DRAWING NO: 1244-9	REVISION: A
DATE: 1 May 2009	DWN BY: P.WILLEY
SCALE: (1 : 20)	SIZE: B (A3)
SHEET #	

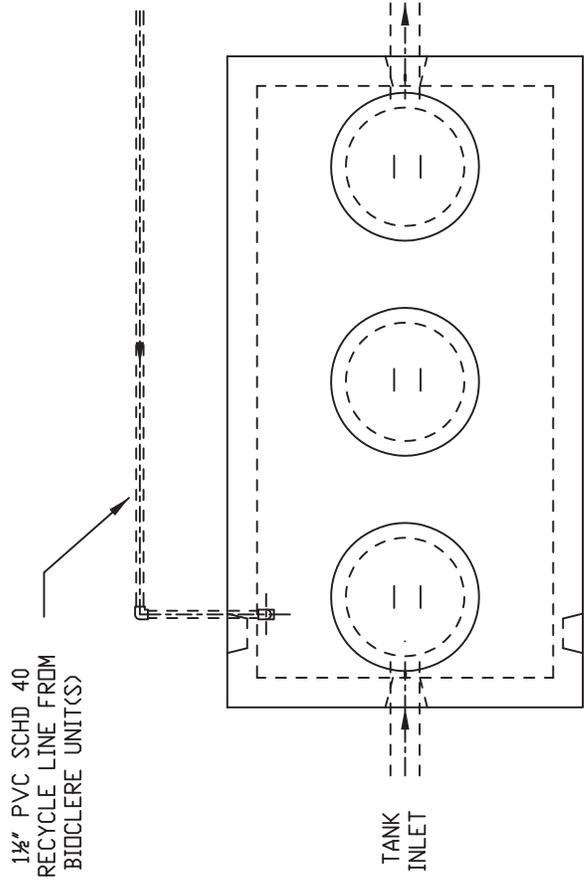
BioClere Base Pad 24_30_36.dwg

3.5: BIOCLERE RECYCLE LINE DETAIL

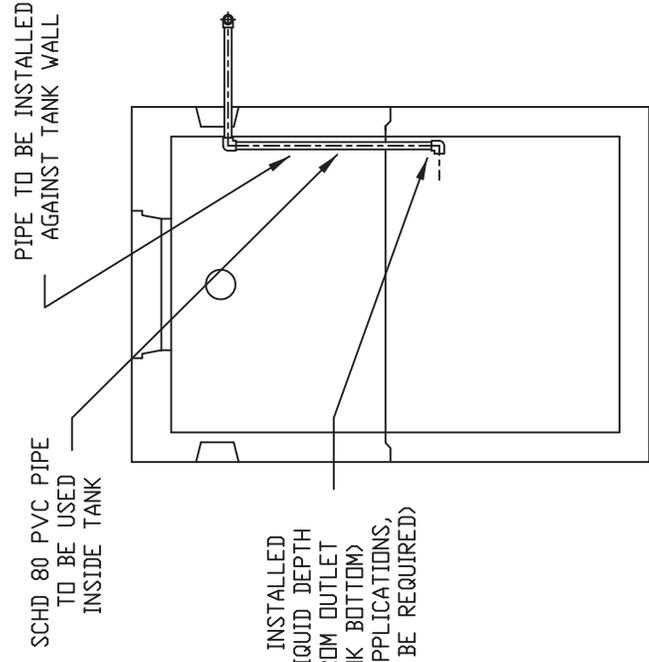
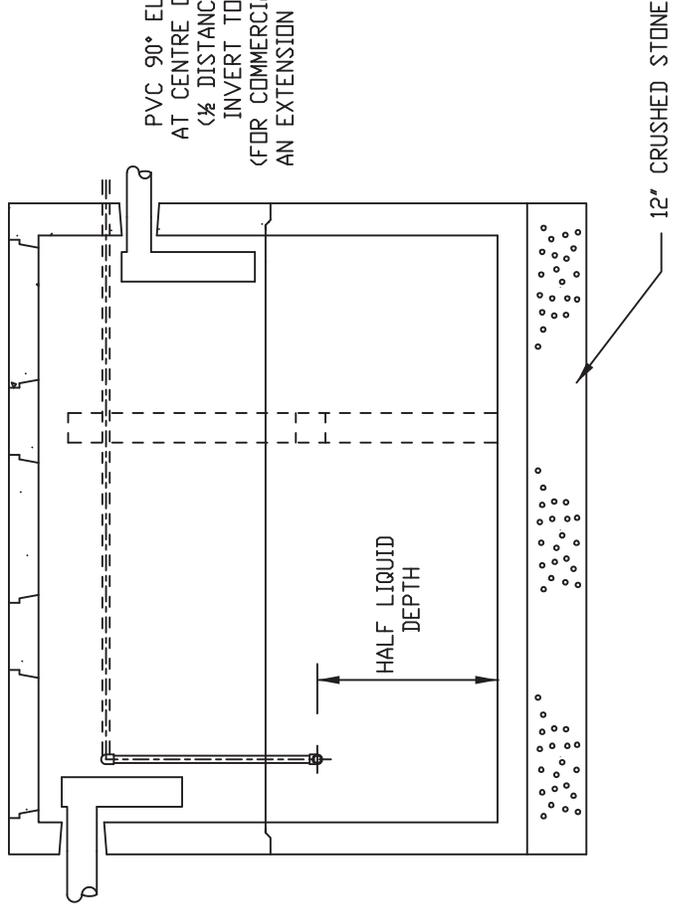
1½" Biofilter Recycle Line Installation at Primary Tank.

NOTES FOR CONTRACTOR:

1. SLOPE PIPE BACK TO SEPTIC TANK WITH NO LOW POINTS.
2. USE PRESSURE FITTINGS ONLY.



TYPICAL PRIMARY (SEPTIC) TANK



1.5BiofRecyc.dwg

TITLE: 1½" Recycle Line Installation (Primary Tank)

DRAWING NO.	PMW/1256-1
REVISION	B
DATE	9 Feb 09
DWN BY	P. WILLEY
SCALE	1 : 40
SHEET #	A / A4
	1 of 1



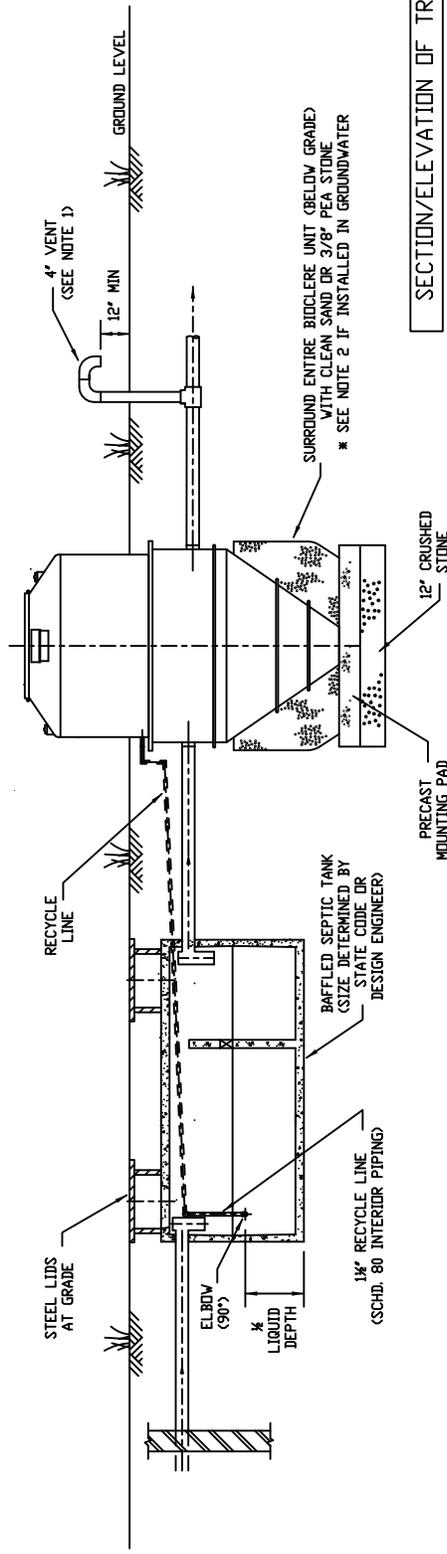
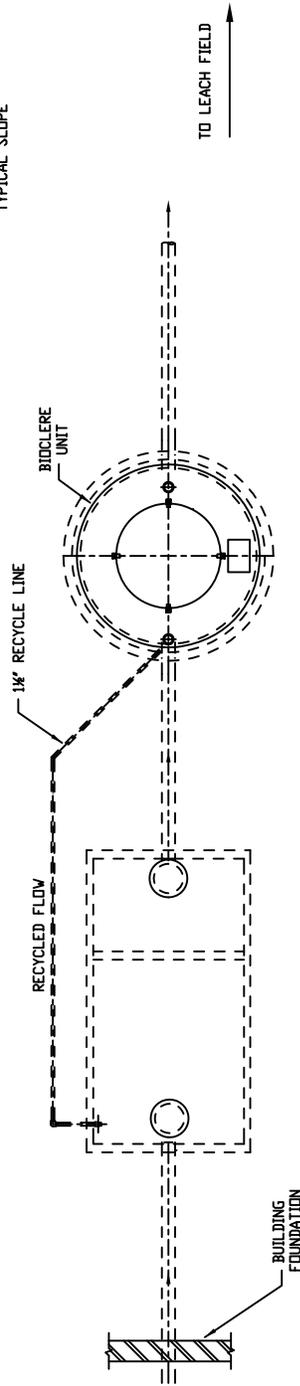
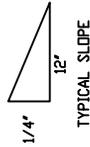
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(508) 985-9050 FAX (508) 985-9072

3.6: BIOCLERE SYSTEM LAYOUT

GENERAL FLOW SCHEMATIC

- NOTES: UNLESS OTHERWISE SPECIFIED:
1. VENT MAY BE RUN UP TO THE ROOF OF THE BUILDING.
 2. IF INSTALLED IN GROUND WATER CONTACT SITE ENGINEER FOR ANCHORING REQUIREMENTS.
 3. CONTRACTOR IS TO SUPPLY ALL CONCRETE STRUCTURES AND PERFORM INSTALLATION.

PLAN ON TREATMENT PLANT



SECTION/ELEVATION OF TREATMENT PLANT

GENERAL FLOW SCHEMATIC.dwg

TITLE:	TYPICAL GROUND INSTALLATION
DRAWING NO.:	UK.1265-5
REVISION:	D
DATE:	3/22/01
DWN BY:	P.WILLEY
SCALE:	1 : 60
SIZE:	B / A3
SHEET #:	1 of 1

AquaPoint
Performance Based Wastewater Treatment Systems

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NEW BEDFORD, MA 02745
(508) 985-9050 FAX (508) 985-9072

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DOCUMENT IS PERMITTED WITHOUT PRIOR
WRITTEN PERMISSION.

0	3'	6'	9'	12'	15'	18'	21'	24'	27'	30'
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4.0 BIOCLERE STARTUP PROCEDURE

NOTE:

During installation the Bioclere sump(s) was filled with clean water. Care should be taken to prevent foreign matter/debris from entering the unit(s).

1. Check that the Bioclere sump is full of water to the outlet invert and verify all plumbing unions are connected.
2. See Appendix B for PLR (programmable logic relay) Operating Instructions prior to turning on the system.
3. Turn Bioclere control main power disconnect switch to **ON**. The green power light should be **ON**.
4. At the Bioclere HMI PLR screen set the timers to a "**test cycle**" as follows:

<u>Test Cycle Settings</u>	ON	OFF
Dosing Pump(s)	1 min	1 min
Recycle Pump	1 min	2 min

After the test cycle is complete refer to Section 2 of the Bioclere Technical Manual for Timer Settings.

5. Verify the Tank(s) are set to **ON** using the control screen (HMI), then set the dosing pump(s) to **AUTO** in the Tank Control Screen. Each dosing pump should be set to pump for a minute and rest for a minute. Leave both dosing pumps in **AUTO**.
6. Turn recycle pump to **AUTO**. The recycle pump should be set to pump for 1 minute and rest for 2 minutes. Leave the recycle pump in **AUTO**.
7. Turn the alarm to **TEST**. The alarm should sound. Press the alarm silence, audio alarm should silence, the red alarm light should remain illuminated. Turn alarm to OFF, red alarm light should turn off. Set the alarm to **AUTO** and unsilence the alarm.
8. Proceed to the Bioclere, the fan should be on continuously. Remove the Bioclere lid. Dosing pump(s) should alternate **ON** 1 minute, **OFF** 1 minute. Verify a uniform spray pattern. The recycle pump should be **ON** 1 minute, **OFF** 2 minutes. Verify the recycle pump operation by observing the spray out of the telltale hole near the recycle pipe union at the top of the central shaft. Leave fan module switch **ON**.
9. At the Bioclere, now turn the fan module switch to **OFF**. This disconnects the

pumps and fan which should activate the audio/visual alarm. Return the fan module switch to the **ON** position and alarm should stop.

10. Close and secure the fan module box and Bioclere lid.
11. Return to the control panel to set the dosing pump(s) and recycle pump timers to the settings specified in Section 2.3 “PUMP TIMER SETTINGS”.
12. Measure each dosing and recycle pump amp draw and record.
13. Close/secure control panel.

5.0 **BIOCLERE SHUTDOWN PROCEDURE**

1. No action need be taken if there is a temporary cessation of flow to the plant for a period of time which does not exceed up to twelve weeks. Leave the plant in operation with power **ON**.
2. If it is anticipated that cessation of flow will exceed 12 weeks the following shut down procedure will apply:
 - a. On Bioclere control panel turn recycle pump switch to the **MANUAL** position for 2 minutes. Return switch to **AUTO** position.
 - b. Inspect all equipment and controls for proper functionality prior to shut down.
 - c. Measure and record all motor amperages.
 - d. Turn the main disconnect power switch **OFF**.
 - e. Lock out power to the control panel and the main circuit breaker supplying power to the control panel.
3. Upon resumption of wastewater flow to the plant the Bioclere should be re-started as described in **Section 4**.

6.0 **GENERAL MAINTENANCE PROCEDURES**

6.1 **BIOCLERE MAINTENANCE**

NOTE: Turn the main power switch to **OFF** before servicing the pump, fan or electrical panel box. An Aquapoint Field Service Report is provided in this section to facilitate Bioclere maintenance and to provide a thorough check of Bioclere components. Please refer to **Section 6.2** for process control guidelines.

Standard Monthly Maintenance:

1. Check general condition/appearance of unit.
2. Check vent flow, odor.
3. Check general condition of fan box including internal and external wiring, lock, latch, gaskets, etc.
4. Check for quiet fan operation.
5. Check condition of cover locks, latches, gaskets.
6. Check and characterize biomass (color & thicknes)
7. Check recycle pump operation, timing, effluent clarity and spray pattern.
8. Check dosing pumps operation, timing, effluent clarity and spray pattern.
9. Check general condition of dosing assembly.
10. Check general condition of control box including locks, gaskets, etc.
11. Check control box switches, alarms, timers, etc.
12. Complete and maintain service report file.

6.2 PROCESS CONTROL FOR CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND (CBOD₅) REMOVAL WITH THE BIOCLERE SYSTEM:

Primary settled wastewater flows by gravity to a baffled chamber in the clarifier of the Bioclere. Dosing pumps located in this clarifier intermittently dose the PVC filter media bed with the wastewater.

In the Bioclere trickling filter the organic material in the wastewater is reduced by a population of microorganisms, which attach to the filter media and form a biological slime layer. Aerobic microorganisms accomplish treatment in the outer portion of the slime layer. As the microorganisms multiply the biological film thickens and diffused oxygen and organic substrate are consumed before penetrating the full depth of the biomass. Consequently the biological film develops aerobic, anoxic and anaerobic zones.

Absent oxygen and a sufficient organic carbon source (CBOD₅) the microorganisms near the media surface lose their ability to cling to the media. The wastewater flowing over the media washes the slime layer off the media and a new slime layer begins to form. This process of losing the slime layer is called “sloughing” and it is primarily a function of organic and hydraulic loading on the filter. This natural process allows a properly designed media bed to be self-purging and virtually maintenance free.

The sloughed biomass settles to the bottom of the clarifier as sludge. This secondary sludge is periodically pumped back to the primary tank to enhance the digestion and denitrification processes, which is further discussed in *Section 6.3.2 below*.

6.2.1 Bioclere Trickling Filter Dosing Rates:

The Bioclere uses two alternating dosing pumps to distribute wastewater over the trickling filter. It is critical to periodically clean the nozzles of excess biomass using a bottlebrush to ensure uniform distribution. The Bioclere dosing rates that were set at the time of commissioning are listed in *Section 2.0* of this manual. The dosing rates are set so that the flow of water and pollutants (CBOD₅ and ammonium) over the biofilm are maximized. This in turn, will maximize the pollutant removal efficiencies and facilitate biomass sloughing through the filter. Therefore, it is not necessary to adjust the dosing timers. In fact, the dosing timers should only be adjusted if the Bioclere receives little or no flow for extended periods.

6.2.2 Bioclere Recirculation Rates:

Recirculation of sludge and treated effluent is accomplished in each unit using a submersible stainless steel pump controlled by a fully adjustable timer. The biological solids generated in the filter are returned to the sludge storage facility at regular intervals, typically every hour. Therefore, the sludge will not collect in the secondary settling tank and a sludge blanket will not form.

The benefits of sludge and treated effluent re-circulation are numerous and include: 1) removal of biological sludge from the Bioclere so that only the primary tank(s) need periodic pumping, 2)

dilution of the influent pollutant concentrations, which results in a thinner and more effective biofilm on the media bed, 3) reduction or near elimination of odors in the primary tanks and the treatment components, 4) dilution of biological inhibitors (cleaning agent, sanitizers, etc.) that may exist in the wastewater, 5) attainment of nitrogen removal through denitrification due to the recirculation of nitrate to the primary tank.

The recirculation rates that were set at the time of commissioning are listed in *Section 2.0* of this manual. These rates may need adjusting depending on the 1) actual average daily flow, and 2) actual measured strength of the wastewater (concentrations of influent BOD₅, TKN etc.). It is typically desirable to recycle between 50% and 70% of the actual daily flow rate for secondary treatment only. Recycle rates of up to 100% of actual daily flow may be necessary to optimize denitrification when required. Please contact AQUAPOINT prior to adjusting the recirculation rates.

6.3 PROCESS CONTROL FOR NITROGEN REMOVAL WITH THE BIOCLERE SYSTEM:

Below is a brief description of how nitrogen removal is accomplished in the Bioclere. Generally BOD removal occurs in a first stage Bioclere unit and the majority of nitrification in a second stage Bioclere. However, if the actual wastewater flow is less than the design flow or if only moderate denitrification is required, a single stage Bioclere unit is capable of partial nitrification.

6.3.1 *Nitrification:*

Nitrification is the sequential biological oxidation of NH₄-N, first to nitrite (NO₂⁻-N) by *Nitrosomonas* bacteria then to nitrate (NO₃⁻-N) by *Nitrobacter* bacteria according to the following overall equation: $2\text{NH}_4^+ + 2\text{O}_2 \rightarrow \text{NO}_3^- + 2\text{H}^+ + \text{H}_2\text{O}$

Oxidation of 1 mg/l of NH₄-N requires approximately 4.6 mg/l of dissolved oxygen and produces acid resulting in the consumption of approximately 7.1 mg alkalinity as CaCO₃/mg NH₄-N oxidized. Alkalinity is the inorganic carbon source nitrifying bacteria required to oxidize ammonia. Therefore it is critical that alkalinity is monitored on a regular basis to ensure complete nitrification. Alkalinity concentrations in the Bioclere effluent must remain above 75 mg/l as CaCO₃ to allow nitrification to proceed. If the alkalinity drops below this value, it is likely that nitrification will be inhibited and the effluent may not meet permit requirements. It is best to measure the alkalinity in the Bioclere effluent using a field test kit each time you are onsite to inspect the treatment system. Bioclere effluent can be collected from the final pump chamber or the sampling port that is located on top of the Bioclere unit (see the Bioclere general arrangement drawing located in **Appendix A** for the sampling port location). The sampling port is a 4" diameter PVC pipe that extends approximately 10' through the trickling filter to the effluent in the clarifier. Effluent can be collected with a bailer.

If needed, alkalinity can be added in the form of baking soda (sodium bicarbonate). It can be purchased as a powder in 50-pound bags. A solution can be mixed using an alkalinity mixing and feed pump assembly included with this system or added manually by the operator. Alkalinity should be added daily if influent concentrations are low and nitrification is required. Contact

Aquapoint if assistance is required to determine the alkalinity-dosing rate.

Please note that nitrifying bacteria require a stable and consistent environment because of their sensitivity to numerous inhibitory and toxic substances and an array of environmental factors including temperature, pH, dissolved oxygen, and alkalinity. If nitrification is not being achieved then it will be necessary to verify the influent average daily flow, pH, BOD₅, TSS, TKN. It may also be necessary to conduct an inventory of the type and quantity of any and all cleaning and process solutions that are used that may impact the microorganisms in the Bioclere units.

6.3.2 *Denitrification:*

Dissimilating denitrification, the biological reduction of nitrate (NO₃⁻-N) to nitrite (NO₂⁻-N) and ultimately nitrogen gas in an anoxic environment (dissolved oxygen <0.5 mg/l), involves the transfer of electrons from a reduced electron donor (organic carbon substrate) to an oxidized electron acceptor (NO₃⁻-N). It is an important reaction as it restores approximately 3.57 mg alkalinity/mg of NO₃⁻-N reduced, and partially offsets the effects of nitrification in a combined nitrification/denitrification process. The microorganisms responsible for completing the reaction are facultative heterotrophic aerobes contained in the wastewater that are also responsible for CBOD₅ oxidation in the Bioclere.

Denitrification in the Bioclere system is accomplished by periodically recirculating secondary sludge and treated nitrified effluent to the primary tank which provides an anoxic environment. Recirculation typically occurs several minutes every hour via a timer in the control panel. See *Section 2.0* of this manual for Bioclere recycle and dosing rates. For typical residential strength wastewater, recirculation of treated effluent from the Bioclere to the primary tank is capable of achieving <12 mg/l total nitrogen. This is due to the fact that weight ratios of carbon to nitrate, measured as **BOD:TKN** in the influent wastewater are usually greater than the generally accepted ratio of **4:1** in which denitrification has been proven to proceed without an external carbon source.

However, many commercial applications will require a carbon source. If required, a carbon dosing rate of approximately 3:1 (COD carbon source: NO₃ in wastewater) is required to complete denitrification.

Carbon is often added in the form of a 20% methanol solution. However many other organic carbon sources can be used including glucose (sugar), sodium acetate, soda syrup etc. Contact Aquapoint if assistance is required to determine whether a carbon source is needed in the primary tank.

If the effluent dissolved oxygen concentrations from the primary tank exceed 0.5 mg/l, denitrification may be inhibited. In isolated instances, this has been documented to occur during extreme cold weather periods. If this occurs, the Bioclere fan size can be reduced to compensate for the increased dissolved oxygen levels. If the condition persists, an oxygen scavenging agent can be dosed into the primary tank to uptake the residual dissolved oxygen. Please contact Aquapoint if this condition is experienced.

How do I know when a carbon source is needed?

You must monitor the nitrate in the primary tank effluent tee with a nitrate field test kit. When nitrate is consistently >3 mg/l in the septic tank effluent, it is necessary to add an organic carbon source to the influent side of the recycle tank to achieve denitrification. You should also measure the dissolved oxygen. For denitrification to proceed a dissolved oxygen level of <0.5 mg/l is required in the primary tank effluent.

6.4 PROCESS CONTROL FIELD TESTING RECOMMENDATIONS

The following is a table of field testing that should be performed to adequately assess treatment performance in the system. This table is listed for process control, and does not reflect the sampling requirements mandated in the applicable discharge permit. Note that the testing frequency is listed as a general guideline and may be modified based on the performance of the system. If the pollutant concentrations exceed the field test kit detection limits, the samples must be diluted prior to performing the analytical procedures. This is critical to determine chemical dosing rates. In addition to the above field testing, AquaPoint strongly recommends the use of the enclosed field reports as a guideline for process control and equipment inspections.

Recommended Monitoring Parameters

Parameter	Sampling Points	Frequency	Comments
Flow Rate	Bioclere Recycle Plant Effluent	Monthly	A flow meter should be used to record effluent flow values. EQ and Bioclere recycle rates may be estimated based on known pump rates and run times
Biochemical Oxygen Demand (BOD ₅)	Plant Influent Plant Effluent	Monthly*	The BOD test takes five days to be completed. * Test weekly until reliable avg. can be determined for process control purposes.
pH	Plant Influent	Monthly	pH to be measured using portable field equipment.
Dissolved Oxygen (DO)	Primary Tank Bioclere Effluent	Monthly	DO is to be measured in each compartment using portable equipment.
Alkalinity (CaCO ₃)	Plant Influent Bioclere Effluent	Monthly	Alkalinity is to be measured in each compartment using portable field equipment.
Total Suspended Solids (TSS)	Plant Effluent	Monthly	TSS is an indicator of bacterial growth in the system.
Ammonia - N (NH ₄)	Plant Influent Plant Effluent	Monthly	Ammonia-N is to be measured in each compartment using portable field equipment.

Parameter	Sampling Points	Frequency	Comments
Nitrate - N (NO ₃)	Primary Tank Plant Effluent	Monthly	NO ₃ is to be measured in each compartment using portable equipment.
Visual Inspection of PVC Media and Spray Nozzles	Bioclere	Monthly	Used to characterize bacterial growth on the media and spray pattern.
Sludge Depth & Concentration	Primary Tank Bioclere Clarifier	Monthly	Use a sludge judge to determine sludge blanket depth. Concentration = mg/L TSS and VSS

FIELD REPORT

Date

Client

Address

City State

Inspector

Bioclere Model #(s)

Reason For Site Visit:

- O & M Commissioning
- Testing Other:

(1) Odor

- 1) Is there odor around the site? Yes No
- 2) Where is the source of odor?
- 3) If odor is present, check all that apply: Mild Medium Strong
 Musty Septic

(2) Sludge & Scum Depth Measurements

	Scum	Sludge		Scum	Sludge
Grease Trap	<input type="text"/>	<input type="text"/>	Bioclere 2A (if applicable)	<input type="text"/>	<input type="text"/>
Primary Tank #1	<input type="text"/>	<input type="text"/>	Bioclere 2B (if applicable)	<input type="text"/>	<input type="text"/>
Primary Tank #2 (if applicable)	<input type="text"/>	<input type="text"/>	Effluent Tank	<input type="text"/>	<input type="text"/>
Bioclere 1A	<input type="text"/>	<input type="text"/>	Other: _____	<input type="text"/>	<input type="text"/>
Bioclere 1B (if applicable)	<input type="text"/>	<input type="text"/>			

(3) Bioclere Venting

- 1) Record the Bioclere fan model #(s):
- 2) Is air passing through the vent(s)? Yes No
(if in doubt, put a small plastic bag around vent and allow to fill)
- 3) Is the fan operating and in good condition...
- | | | | | | |
|----------------------------------|------------------------------|-----------------------------|----------------------------------|------------------------------|-----------------------------|
| for Bioclere 1A? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | for Bioclere 2A? (if applicable) | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| for Bioclere 1B? (if applicable) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | for Bioclere 2B? (if applicable) | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

(Please provide necessary details in the report summary section)

FIELD REPORT

(4) General

	Bioclere 1A	Bioclere 1B (IF APPLICABLE)	Bioclere 2A (IF APPLICABLE)	Bioclere 2B (IF APPLICABLE)
Are there any filter flies in the unit?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
If so, how many?	<input type="checkbox"/> Many <input type="checkbox"/> Few			
Is the lid gasket in good condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Locks/latches/handles in good condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Is there any external damage to the units?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Cover, fan box, & control panel securely locked?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Does the fan box contain standing water?	<input type="checkbox"/> Yes <input type="checkbox"/> No			

(Please provide necessary details in the report summary section)

Were influent/effluent samples taken for lab analysis? Yes No

If process control test samples were taken, please provide the following information:

Sample Locations:	Alkalinity (as CaCO ₃)	<input type="text"/>	pH	<input type="text"/>	Turbidity (NTU)	<input type="text"/>
	Temperature (F)	<input type="text"/>	DO (mg/l)	<input type="text"/>	NH ₃ -N (mg/l)	<input type="text"/>
	NO ₃ -N (mg/l)	<input type="text"/>	Other:	<input type="text"/>	<input type="text"/>	<input type="text"/>

(5) Biomass Characterization

	Bioclere 1A	Bioclere 1B (IF APPLICABLE)	Bioclere 2A (IF APPLICABLE)	Bioclere 2B (IF APPLICABLE)
What is the color of the biomass?	<input type="checkbox"/> White <input type="checkbox"/> White/Gray <input type="checkbox"/> Gray <input type="checkbox"/> Gray/Brown <input type="checkbox"/> Brown <input type="checkbox"/> Red/Brown <input type="checkbox"/> Black	<input type="checkbox"/> White <input type="checkbox"/> White/Gray <input type="checkbox"/> Gray <input type="checkbox"/> Gray/Brown <input type="checkbox"/> Brown <input type="checkbox"/> Red/Brown <input type="checkbox"/> Black	<input type="checkbox"/> White <input type="checkbox"/> White/Gray <input type="checkbox"/> Gray <input type="checkbox"/> Gray/Brown <input type="checkbox"/> Brown <input type="checkbox"/> Red/Brown <input type="checkbox"/> Black	<input type="checkbox"/> White <input type="checkbox"/> White/Gray <input type="checkbox"/> Gray <input type="checkbox"/> Gray/Brown <input type="checkbox"/> Brown <input type="checkbox"/> Red/Brown <input type="checkbox"/> Black
Classify the growth of the biomass 6-12 inches below the media surface. 1=light 2=medium 3=heavy	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(6) Nozzle Spray Pattern

	Bioclere 1A	Bioclere 1B (IF APPLICABLE)	Bioclere 2A (IF APPLICABLE)	Bioclere 2B (IF APPLICABLE)
1) Does spray cover the entire media surface area? <i>(If not, clean each nozzle with a bottle brush)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No			
2) Does the spray now cover entire surface area? <i>If not, then:</i> <i>a. remove nozzles and soak them in a bleach solution.</i> <i>b. manually engage both dosing pumps for 2 min.</i> <i>c. replace nozzles</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No			
3) Does the spray now cover entire surface area? <i>If not, consult AQUAPOINT</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No			

FIELD REPORT

(7) Pumps and Control Panel

	Bioclere 1A		Bioclere 1B (IF APPLICABLE)		Bioclere 2A (IF APPLICABLE)		Bioclere 2B (IF APPLICABLE)	
What is the dosing pump timer setting?	min on: <input type="text"/>	min off: <input type="text"/>	min on: <input type="text"/>	min off: <input type="text"/>	min on: <input type="text"/>	min off: <input type="text"/>	min on: <input type="text"/>	min off: <input type="text"/>
What is the recycle pump timer setting?	min on: <input type="text"/>	hrs off: <input type="text"/>	min on: <input type="text"/>	hrs off: <input type="text"/>	min on: <input type="text"/>	hrs off: <input type="text"/>	min on: <input type="text"/>	hrs off: <input type="text"/>

For the following checklist, set dosing and recycle timers to a test cycle.

What is the amperage of dosing pump 1?	<input type="text"/> Amps	<input type="text"/> Amps	<input type="text"/> Amps	<input type="text"/> Amps
What is the amperage of dosing pump 2?	<input type="text"/> Amps	<input type="text"/> Amps	<input type="text"/> Amps	<input type="text"/> Amps
What is the amperage of recycle pump?	<input type="text"/> Amps	<input type="text"/> Amps	<input type="text"/> Amps	<input type="text"/> Amps
Is dosing pump operating according to test cycle?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Is recycle pump operating according to test cycle?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Are the dosing pumps alternating?	<input type="checkbox"/> Yes <input type="checkbox"/> No			

(Please provide necessary details in the report summary section)

(8) Plumbing

Are the unions in the Bioclere leaking? Yes No
(If "yes", then tighten with pipe wrench)

Is the recycle siphon break weep hole operating as designed? Yes No
(If "no", clean weep hole)

(9) Final Check

- Main Power set to "On" and toggle for all pumps set to "Normal" (or "Auto")
- Alarm toggle set to the "On" position
- Recycle and dosing pump timers are set back to original cycles in control panel
- Control panel, Bioclere cover, and fan box locked
- Record daily flow rate or water meter reading (if possible):

(10) Report Summary:

Note: Contact Aquapoint for pump, fan and control component replacement parts.

Signature: _____

7.0 BIOCLERE TROUBLE SHOOTING

7.1 Before conducting any repair work on the fan or pump, replacing fuses, or doing any work on the panel or fan module:

SWITCH THE MAIN POWER PANEL SWITCH TO “OFF”- and follow applicable “lock out”, “tag out” procedures.

<u>FAULT</u>	<u>POSSIBLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
Fan not working	Power failure	Check fuse and replace if necessary.
	Fan motor failure	Check wiring and terminal connections. Replace fan if necessary.
Dosing pump not working	Power failure	Check circuit breaker.
	Pump not submerged	Check that pump is fully submerged.
	Timer control failure.	Check that power switch is “ON”. Replace timer if necessary.
	Pump failure	Replace pump.
Excessive build-up of biomass	Plant overload	Check that hydraulic and organic load are within design limits. Contact Aquapoint, Inc. if capacity is to be increased.
	High sludge or grease levels in primary tanks.	Check sludge levels in each unit and de-sludge as necessary.
Elevated solids concentration in final effluent.	High sludge level in Bioclere sump.	Check pump and timer control. De-sludge by pumper if necessary.
	Excess shedding of biomass.	investigate and eliminate any source of biofilm poisoning such as disinfectant, household bleach, acids, etc. showing up in waste.
Odorous	Inefficient treatment.	Check that dosing assembly sprinkles evenly over media surface. Clean dosing assembly.
	Inadequate air supply	Check fan and air intake. See “fan not working” above.
	Primary tank clogged.	Check inlet and outlet pipes and sludge level. De-sludge as necessary.

8.0 FINAL EFFLUENT QUALITY PROBLEMS

8.1 High suspended solids.

If effluent solids concentrations are exceeded, carry out the following checks:

1. Check operation of recycle pump from tell-tale near the top of the central shaft.
2. Examine primary settlement tank. If excessive sludge or floating matter in the chamber is discharging to the Bioclere arrange for the primary tank to be de-sludged. (See Section 2.4, 2.5)
3. If the sludge recycle pump has been out of operation for more than 8 weeks, the Bioclere sump should be de-sludged.

8.2 High B.O.D. (Biochemical Oxygen Demand)

If effluent levels are exceeded carry out the following checks:

1. Check for signs of excessive sludge in the primary tanks. (See Section 2.4, 2.5)
2. Check that the fan is operating continuously and that the air inlet to the fan is unobstructed. Clean and replace as necessary.
3. Check that the dosing assembly is clean and that the effluent is being distributed evenly to the filter media.
4. Check whether the loading to the plant has increased beyond the design basis. Consult Aquapoint if loading has increased.
5. Ensure that there are no toxic or concentrated cleansing chemicals being discharged to the plant.

8.3 High NH₃N (ammonia-nitrogen)

Carry out check procedure as for Item 8.2 B.O.D.

8.4 High NO₃ (nitrate-nitrogen)

If effluent levels are exceeded carry out the following checks:

1. Check for signs of excessive sludge in the primary tanks. (See Section 2.4, 2.5)
2. Check the Dissolved Oxygen (DO) concentrations in the primary tank and anoxic reactor. Confirm they are below 0.5 mg/l DO.

3. Check whether the loading to the plant has increased beyond the design basis. Consult Aquapoint if loading has increased.
4. Ensure that there are no toxic or concentrated cleansing chemicals being discharged to the plant.

For additional assistance contact:

Aquapoint.3, LLC
39 Tarkiln Place
New Bedford, MA 02745
Tel. 508-985-9050
Fax 508-985-9072

8.5:

WASTEWATER TREATMENT SYSTEM



TOXICITY WARNING



The wastewater treatment system at this facility has been designed to treat the waste stream generated by the facility and maintain compliance with the facilities discharge permit. Its biological treatment process is very stable.

HOWEVER, TOXIC SHOCK LOADING WILL ADVERSLY IMPACT THE EFFLUENT QUALITY FROM THE SYSTEM.

Therefore, none of the following biologically toxic substances should be introduced into the system:

1. Gasoline, kerosene, benzene, naphtha, fuel oil or other flammable or explosive liquid, solid or gas.
2. Oil based latex paints, paint thinners, paint removers or strippers.
3. Organic solvents or any liquid containing organic solvents.
4. Quaternary ammonium compounds, sanitizers or chemical solutions containing Dimethyl Benzyl Ammonium Chloride.
5. Photographic fluids including waste developer, fixer and rinse water.
6. Pesticides including insecticides, fungicides, rodenticides, and herbicides of any sort.
7. Water or waste containing toxic poisonous solids, liquids or gases in sufficient quantity to interfere with the sewage treatment process, constitute a hazard to humans or animals, create a public nuisance or create any hazard in the ground water.
8. Water or waste having a pH higher than 8.5 or lower than 6.5
9. Solid or viscous substances in quantities capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewage works such as but not limited to, ash, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, manure, hair, fleshing, entrails, paper dishes, cups, milk cartons, etc... either whole or in parts.
10. Water or waste containing fats, wax, grease or oils whether emulsified or not, in excess of 100 mg/l or containing substances which may solidify or become viscous at temperatures between 32 and 150 degrees Fahrenheit (0-65 degrees Celsius).
11. Garbage that has not been properly shredded.
12. Storm water, surface water, roof runoff or subsurface drainage.
13. Rubber gloves, gauze pads, etc... which are typically from medical facilities.

IN THE EVENT THAT THESE OR OTHER INHIBITIVE SUBSTANCES INADVERTENTLY ENTER THE WASTE STREAM, CONTACT AQUAPOINT IMMEDIATELY (508)985-9050

APPENDIX TABLE OF CONTENTS

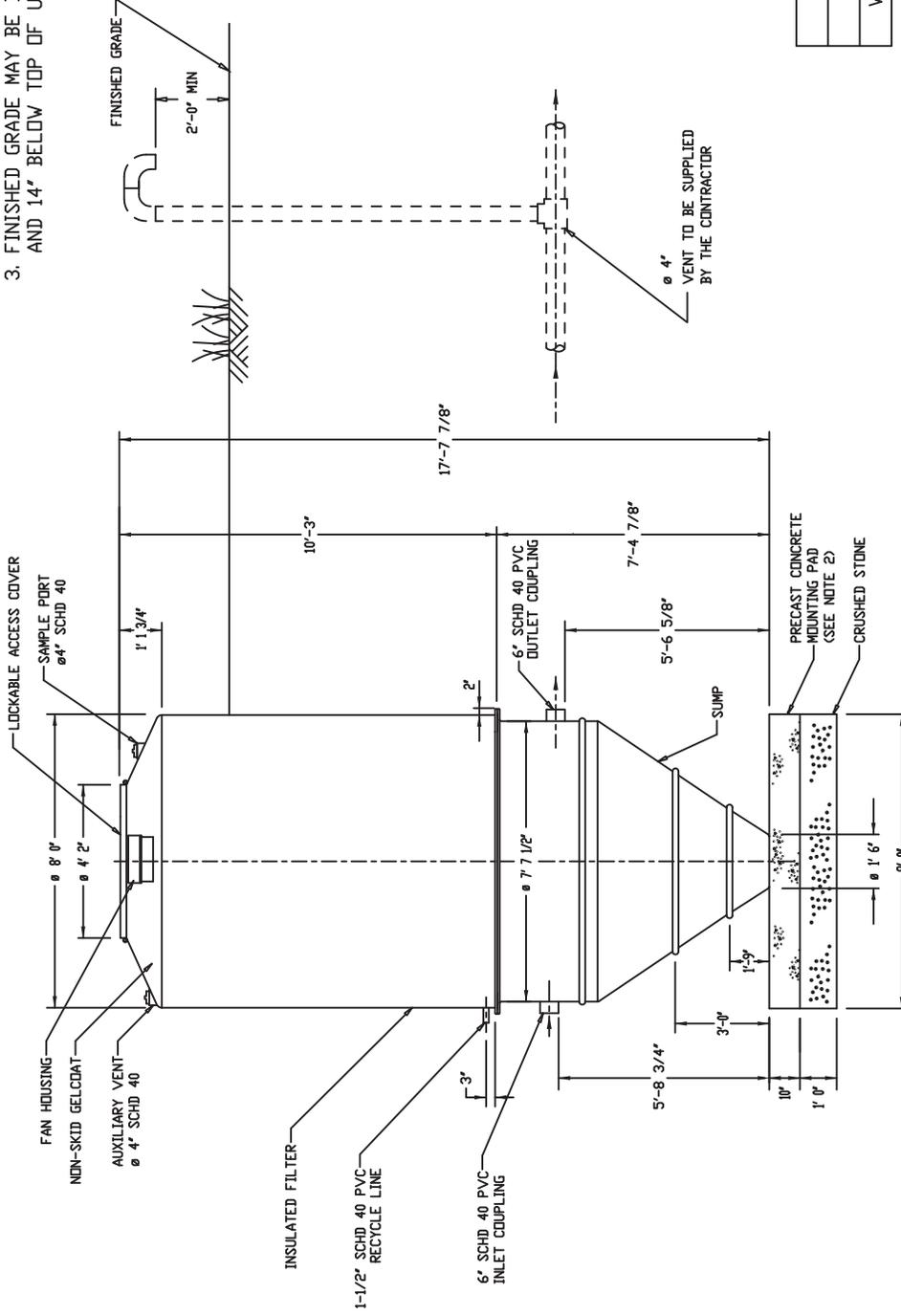
APPENDIX A:	24/30-950 BIOCLERE DRAWINGS
APPENDIX B:	CONTROL PANEL WIRING DIAGRAMS & FLOAT SWITCH SPECIFICATIONS
APPENDIX C:	PURCHASERS WARRANTY
APPENDIX D:	RECOMMENDED SPARE PARTS
APPENDIX E:	PUMP CURVES & SPECIFICATIONS

APPENDIX A

BIOCLERE DRAWINGS

NOTES:

1. VENT MAY BE RUN UP THE SIDE OF BUILDING.
2. SEE DRAWING 1244-9 FOR MOUNTING PAD CONSTRUCTION DETAILS.
3. FINISHED GRADE MAY BE BETWEEN 18" ABOVE RECYCLE LINE AND 14" BELOW TOP OF UNIT.



SHIPPING WEIGHTS	
WEIGHT DRY WITH MEDIA	= 3350 lbs
WEIGHT DRY WITH NO MEDIA	= 2100 lbs

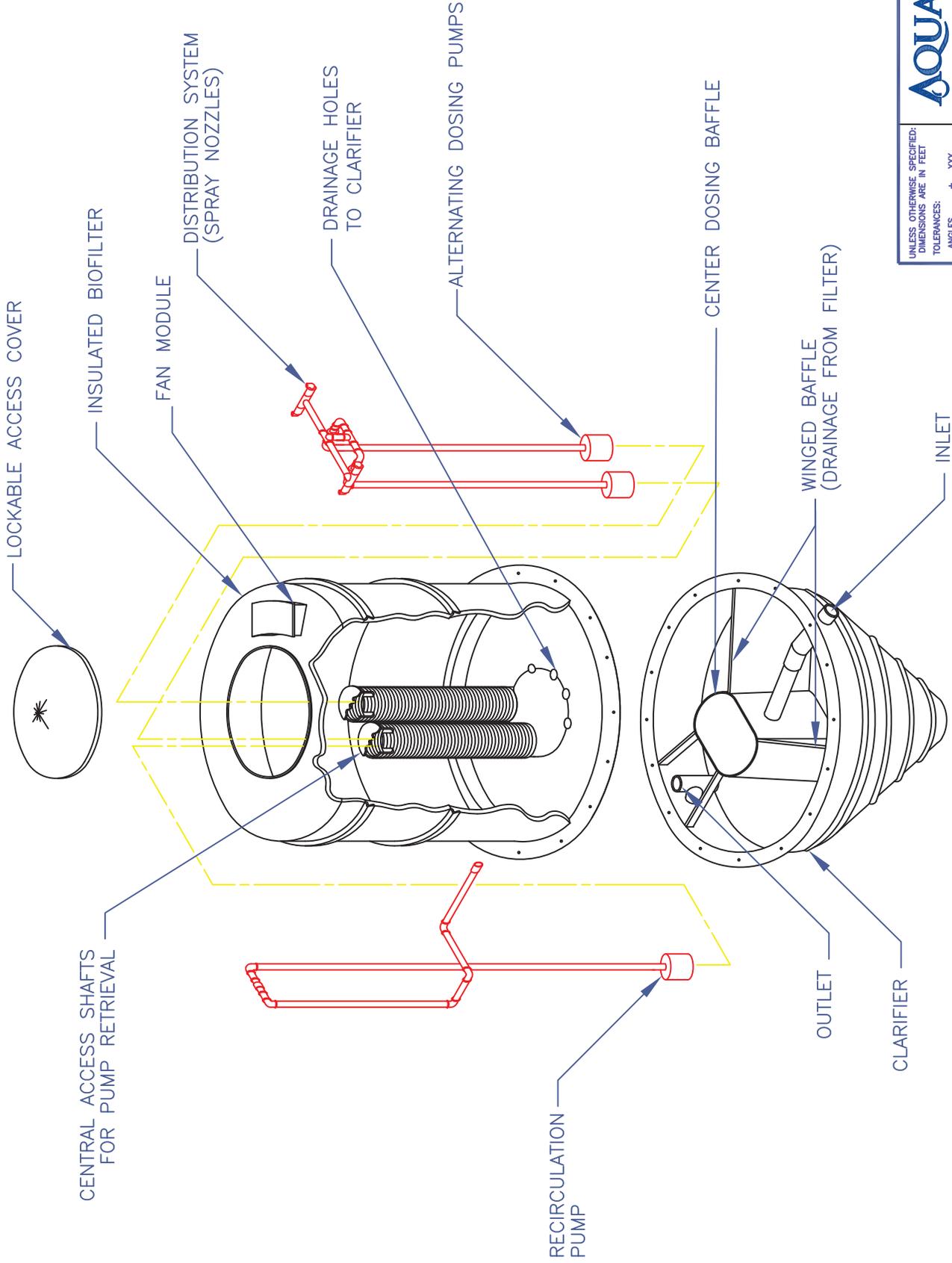
24-30+950 smp Galling	
TITLE:	BIDCLERE 24/30-950 GENERAL ARRANGEMENT
DRAWING NO.:	UK.1262-1
REVISION:	B
DATE:	May 9 2008
DWN BY:	P.Wiley
SCALE:	1 : 40
SHEET #:	1 of 1

MODEL 24/30 BIDCLERE WITH 950 GALLON CLARIFIER



39 TARKILN PLACE
 NEW BEDFORD, MA 02745
 (508) 985-9050 FAX (508) 985-9072

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DIMENSIONS ARE IN FEET

TOLERANCES:	
ANGLES	± .XXX
FRACTIONS	± .XX
2 PLACE DIM	± .XXX
3 PLACE DIM	± .XXX
DATE	12/03/96
DWN	PGA
CHKR	
APPVD	

AQUAPOINT
 39 TARKILN PLACE
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 (508) 985-9050 FAX (508) 985-9072

TITLE: **BIOCLERE -- ISOMETRIC**
 SIZE / REVISION: /
 DRAWING NO.: /
 SCALE: NONE /
 SHEET #: 1 OF 1

ISOMETRIC VIEW OF BIOCLERE

APPENDIX B

CONTROL PANEL WIRING DIAGRAMS & FLOAT SWITCH SPECIFICATIONS

BIOCLERE ELECTRICAL INFORMATION

1. **ELECTRICAL SUPPLY REQUIREMENTS:**

Aquapoint recommends that the Bioclere control panel receive a **115v/1ph/60Hz** supply rated for **30 amps**.

2. **WIRING:**

A licensed electrical contractor is responsible for wiring to meet local, state and federal codes as applicable.

Grounds are provided in both the Bioclere main control panel and fan module which must be wired to earth ground.

All fittings, connections, etc. are to be weatherproof, watertight construction.

#12 wire is sufficient for all motor connections.

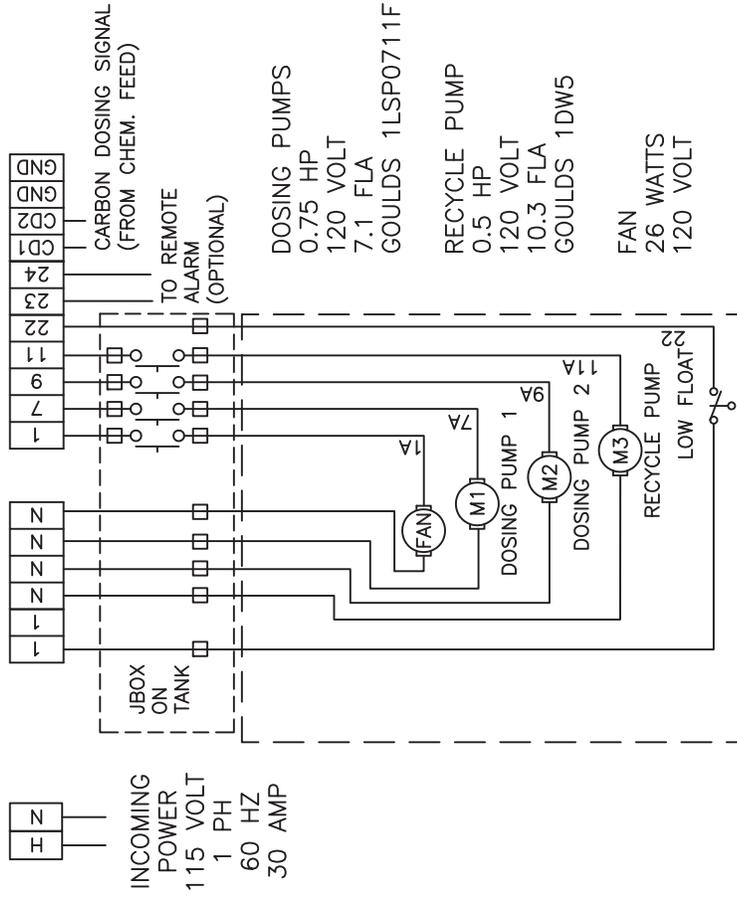
In the event more than one system is located in an enclosure, wire numbers are prefixed by "A" on the first system, "B" on the second, etc. Aquapoint would recommend care be taken not to mix wires between systems.

3. **OPERATION:**

Normal Operation: The Bioclere unit will normally operate without any need for supervision. However, from time to time conditions may occur which activate the audible/visual alarms and require correction.

Alarms provided: Each Bioclere system has a separate set of alarms which consist of a flasher light on top, and an "ON/OFF/TEST" switch on the front panel. The "ON/OFF/TEST" switch should always be in the "ON" position, otherwise the alarms are disabled. The "TEST" position is for test of the visual/audible alarms. The "OFF" position should only be used during servicing by authorized personnel

NOTES:



CONTRACTOR EXTERNAL WIRING

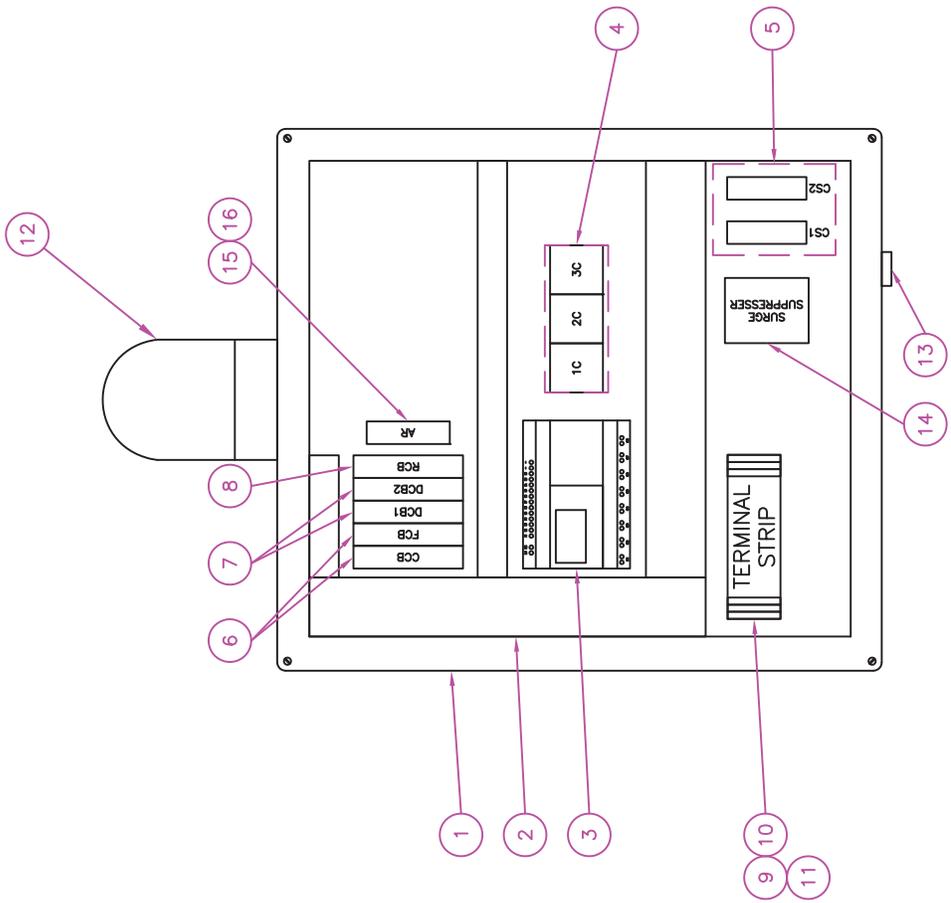
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FRACTIONS: ±
DECIMALS: ±
ANGLES: ±
PLACES: ±
DECIMALS: ±
UNITS: ±
APPROVALS:
DATE: 10-15-13
BY: [Signature]
FOR: [Signature]
SCALE: NONE
PROJECT NO.: C
REVISED BY: [Signature]
DATE: 10-15-13
PROJECT NO.: AWT3298
SHEET # 1 OF 5

AquaPoint
39 TARKLIN PLACE, NEW BEDFORD, MA 02745
(508) 985-8050 FAX (508) 985-8072

TITLE: SINGLE DOUBLE 24/30 PLR

NOTE:



ITEM NO.	QTY	MANUFACTURE	DESCRIPTION	PART NO.
16	1	IDFC	1 POLE RELAY SOCKET	RH1BLAC120
15	1	IDFC	1 POLE RELAY SOCKET	SH1B-05
14	1	SQUARE D	SURGE SUPPRESSOR	AS9003
13	1	FLOYD BELL	HORN	XC-09-201S
12	1	N. AMERICAN SIGNAL	ALARM BEACON - RED	MIP-ACRT120V RED
11	3	ENTRELEC	GROUND TERMINALS	16511316
10	19	ENTRELEC	TERMINALS	11511807
9	2	ENTRELEC	TERMINALS(H, N)	11511811
8	1	ABB	20 AMP CIRCUIT BREAKER	S201K15A
7	2	ABB	10 AMP CIRCUIT BREAKER	S201K10A
6	2	ABB	3 AMP CIRCUIT BREAKER	S201K3A
5	2	DIVERSIFIED	CURRENT SENSORS	CMG0100-20
4	3	AEG	CONTACTORS	LS07.10A0
3	1	CROUZET	PLR	PL2R 88974053
2	1	ROBROY	18 X 16 BACKPANEL	BP1816AL
1	1	ROBROY	18 X 16 ENCLOSURE	J1816HPL

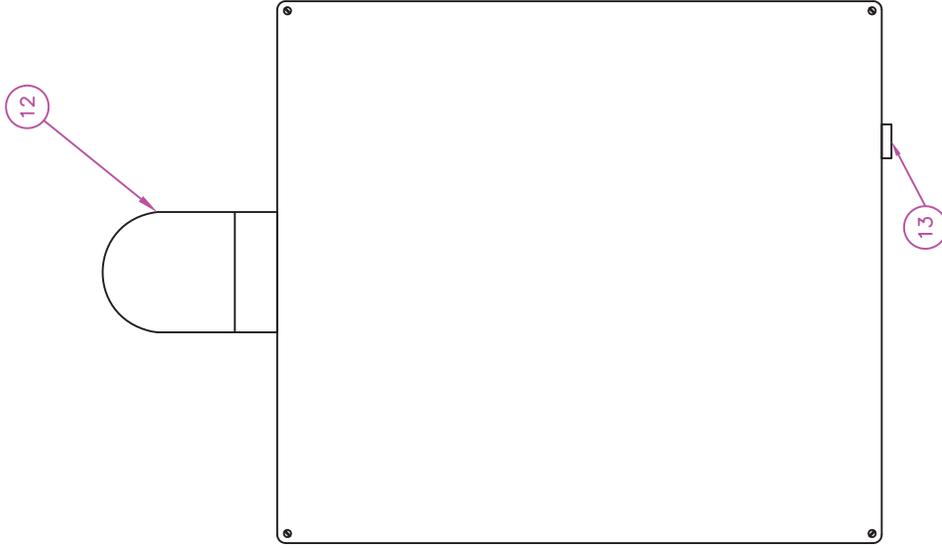
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AquaPoint
 WATER TREATMENT SYSTEMS
 10000 W. 10th Ave., Suite 100, Denver, CO 80202
 TEL: 303.751.1000 FAX: 303.751.1001
 WWW.AQUAPoint.COM

PROJECT NO.: **AWT3298**
 DRAWING NO.: **B**
 REVISION: **B**
 SCALE: **1:4** **REF 3298_2.dwg** SHEET # **2 OF 5**

TITLE: **SINGLE DOUBLE 24/30 PLR**

NOTE:

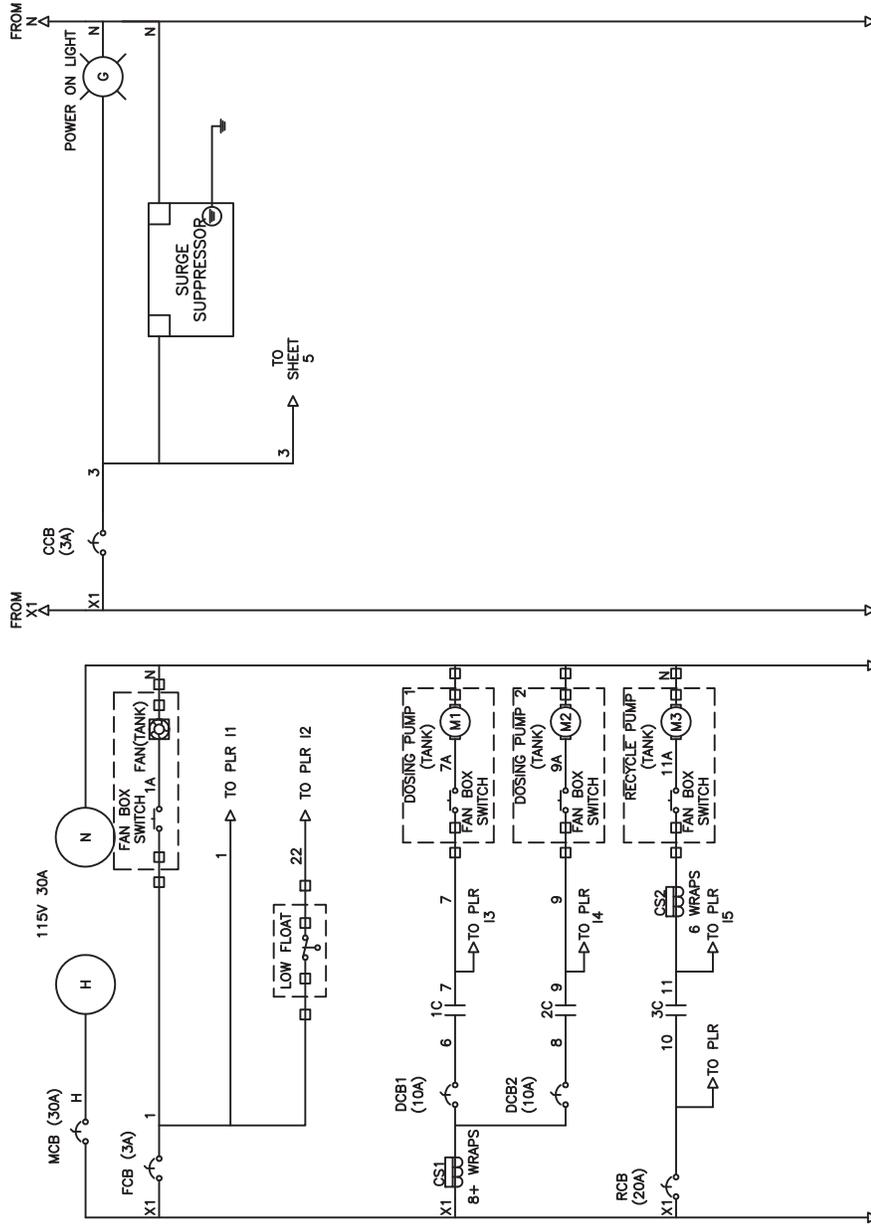


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AquaPoint
Water Treatment Systems
10000 15th Street, Suite 100
Denver, CO 80232
Tel: 303.751.1000
Fax: 303.751.1001
www.aquapoint.com

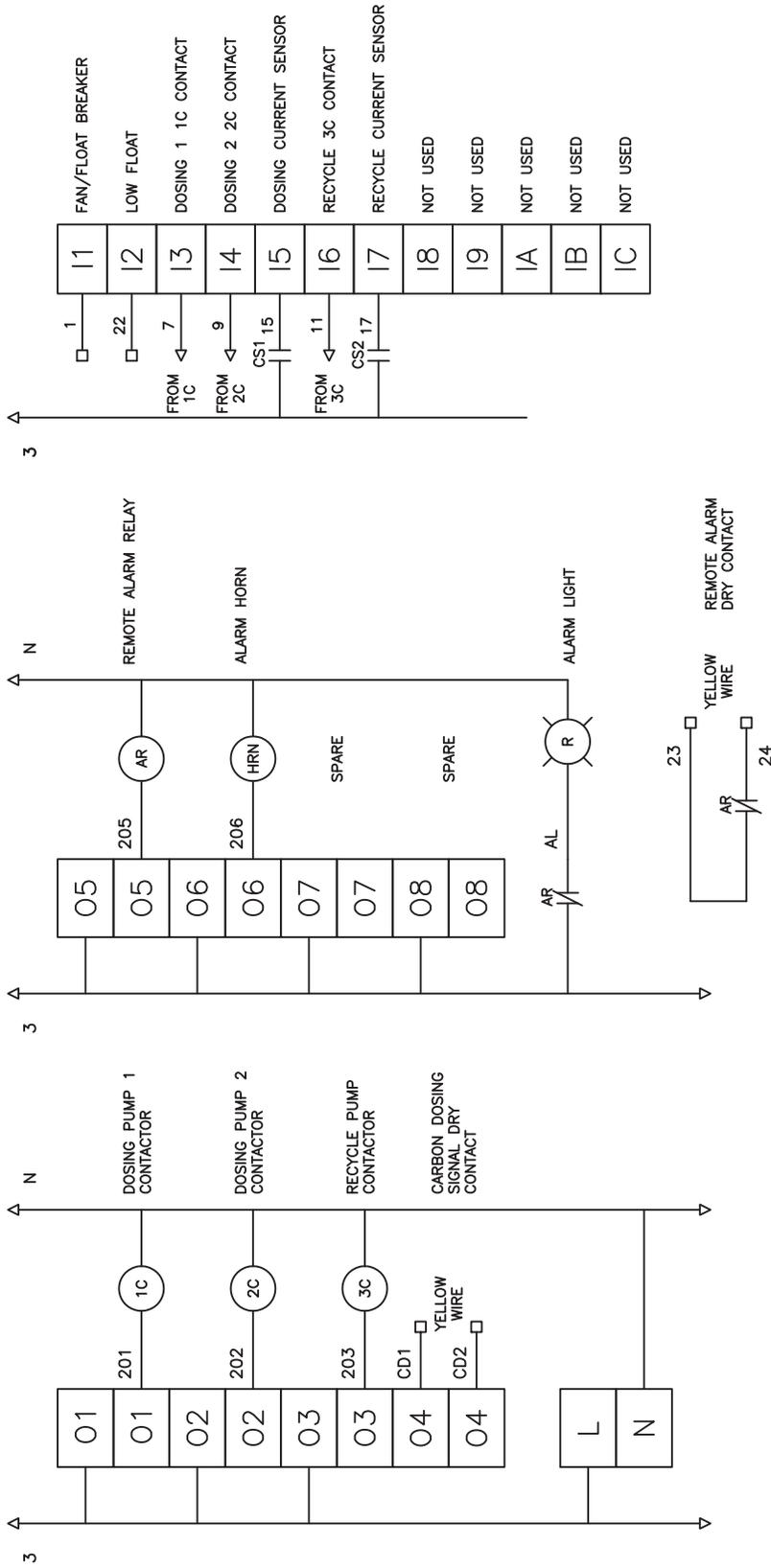
REV: 14
REVISED: B
DRAWING NO.: AMT3298
TITLE: SINGLE DOUBLE 24/30 PLR
SCALE: 1/4" = 1'-0"
SHEET # 3 OF 5

NOTES:



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NOTES:



CROUZET CD20 SMART PLR
BASE UNIT 88974053

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Aquapoint Control Systems COMMERCIAL SERIES BIOCLERE™ Programmable Logic Relay (PLR) Operating Instructions

System Description

The AquaPoint provided control panel operates a single commercial series Bioclere™ Treatment Unit. The PLR controls the Bioclere™ pump operation and alarms. A Crouzet Millenium3 Programmable Logic Relay (PLR) executes all system functions. The PLR controller has an integrated Human Machine Interface (HMI) LCD screen to provide access to timer values and to manually control pump operation. The HMI also provides the operator access to pump cumulative run times, as well as alarm status.

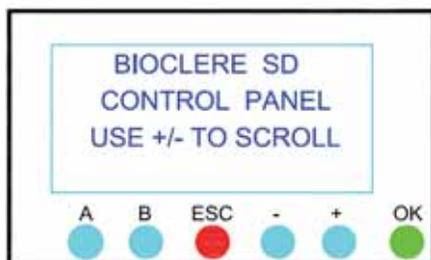
Operating Instructions

Before starting the System, it must be installed according to installation instructions, applicable national and local codes, and by a qualified professional.

The System is controlled entirely from the HMI. Upon power up, the Main HMI screen will automatically appear (pictured below).

Main Screen

#1 HMI SCREEN



Control screens for different system functions are accessed scrolling from the screen above. To move to the next HMI screen use the (+) key until the screen you are looking for appears. Press the (OK) key to access a sub-screen which provides access to a related topic. To scroll backwards through the list of HMI screens use the (-) key. If the HMI goes to sleep press the (ESC) key to restore the display. If an alarm condition takes place press the (B) key to silence the alarm. Note, the alarm horn will be silenced but the alarm light will still be eliminated and the alarm will not sound again for that event.

Press the **(A)** button to acknowledge an alarm. Note: acknowledging an alarm will reset the alarm function, stop the beacon and silences the horn. If the same alarm event takes place again, the alarm will also take place.

Overview of the Main Screen

The first two lines of the Main Screen will contain the name of the control panel. The name will include the type of equipment the panel is controlling.

The third line of the Main screen indicates how to access other HMI screens.

The fourth line of the Main screen will display the program's version letter (if provided).

Control Keys

The **(A & B)** keys are used for different functions throughout the HMI. The HMI screen will display what the keys are used for if they have a particular function on that HMI Screen.

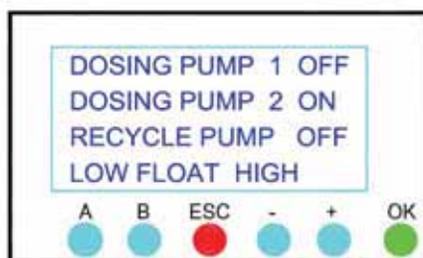
The **(ESC)** key typically allows the operator to "back up" from a sub-screen and return to the set of main screens.

Note: The **(ESC)** key is a good key to press if the HMI has gone to sleep and you want to wake it up. This is because no matter what screen the HMI has been left on pressing the **(ESC)** key will not change anything in the PLR program.

The **(-&+)** key allows the operator to scroll through a list and increase or decrease an entered value. The function will change depending on what HMI screen you are on.

The **(OK)** key is typically used as an enter key or except key.

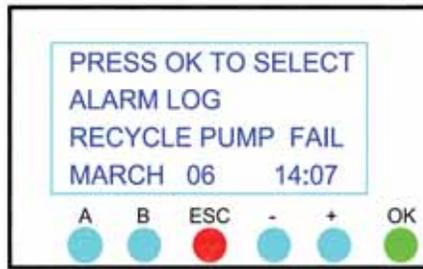
#2 HMI SCREEN



The second screen in the scrolling list of HMI Screens is the Status Screen.

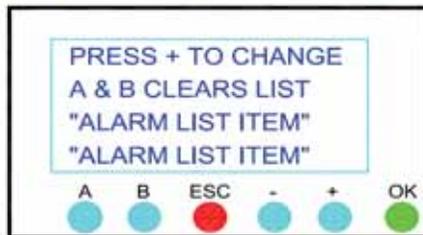
The Status Screen shows the operator the status of each device in the Bioclere™. The status of a device is the instantaneous condition of that device. It does not describe the mode of operation. For instance you can have a pump in AUTO mode but the actual condition of the pump is OFF because it is controlled by a repeat cycle timer.

#3 HMI SCREEN



The third screen in the HMI is the Alarm Log Screen. This log will display the last four alarm events that took place. If fewer than four events exist, then only the amount of events will be logged and the other lines will be blank. The date (month and day) will be recorded as well as the time of the event. To display or clear the alarm log list, press the (**OK**) button on the screen above and the screen below will appear. To scroll through the alarm list, press the (- or +) key.

#3 SCREEN'S SUBSCREEN (3A)



The Alarm Log screen above will display, at most, the last four alarm events in order of occurrence. From the screen above you can view the list by scrolling with the (-/+ buttons. You can clear the list by simultaneously pressing and holding the (**A & B**) button or the operator can press the (**ESC**) button to return to the previous screen.

#4 HMI SCREEN

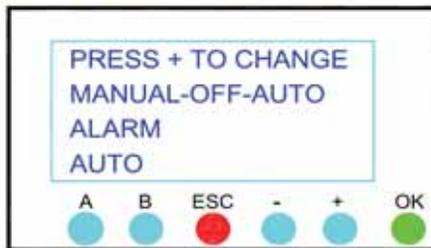


The next HMI Screen as you scroll down using the arrow key is the ALARM Mode Screen. The ALARM can be set to one of three modes of operation: Manual, Off and Auto. To change the mode of operation press the (**OK**) button and the screen below will appear. From the screen below scroll using the (+) key to the desired mode of operation. To select that mode press the (**OK**) button.

In Manual mode the alarm will sound constantly. This mode is typically used to test the alarm system. In the Off mode the Alarm will stay off regardless if the system has an alarm condition. If the Alarm System has been turned off the HMI will display a message: "The alarm is turned off". When the alarm mode is turned back on, the Alarm will sound since a defined alarm condition is if the alarm is turned off. This alarm condition will need to be silenced and reset to stop the alarm.

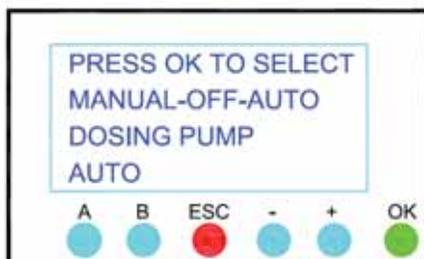
In normal operation the Alarm is set to AUTO mode. In AUTO mode the alarm horn and light will be activated if an alarm condition is detected by the system and recorded in the alarm history screen.

#4 SCREEN'S SUBSCREEN (4A)



Press the (**ESC**) key to leave the screen without making a change.

#5 & #6 HMI SCREENS

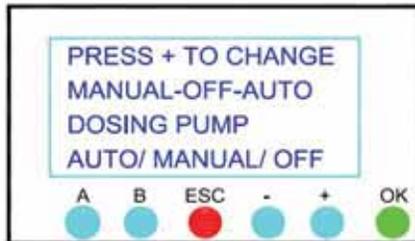


The next two HMI Screens as you scroll down using the arrow key are the Dosing Pump #1 and Dosing Pump #2 Mode Screens. There are two dosing pumps in this Bioclere and they are each operated by a separate screen. The Dosing Pumps can be set to one of three modes of operation: Manual, Off and Auto. To change the mode of operation press the (**OK**) button on the example screen above and the screen below will appear. From the screen below, scroll using the (**+**) key to the desired mode of operation. To select that mode, press the (**OK**) button. If you do not want to change the pump mode while you are in the Dosing Pump Mode Selection Screen press the (**ESC**) button.

In Manual mode the dosing pump will operate constantly. This mode is typically used to test the operation of the pump. In the Off mode the dosing pump will stay off. If the dosing pump has been turned off the System will alert the operator of this condition.

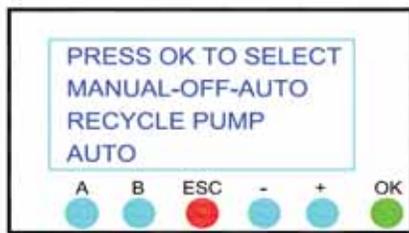
In normal operation the Dosing Pump is set to AUTO mode. In AUTO mode the Dosing Pump will operate on an ON and OFF operator adjustable timer cycle. If the pump is called to operate and does not have amperage then the alarm will sound indicating a pump failure and display this message in the alarm history screen.

#5 & #6 SCREEN'S SUBSCREEN (5A&6A)



If you are on the screen above and do not want to make a change, press the (**ESC**) button to return to the previous screen.

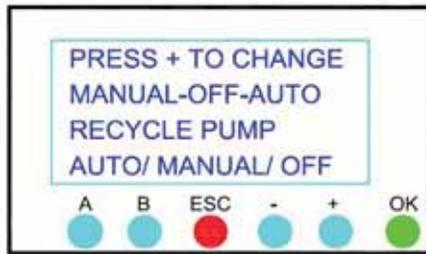
#7 HMI SCREEN



The Recycle Pump Screen is the next HMI screen as you scroll. The Recycle Pump can be set to one of three modes of operation: Manual, Off and Auto. To change the mode of operation press the (**OK**) button on the screen above and the screen below will appear. From the screen below use the (+) key to scroll to the desired mode of operation. To select that mode, press the (**OK**) button on the screen below. If you do not want to change the pump mode while you are in the Dosing Pump Mode Selection Screen press the (**ESC**) button.

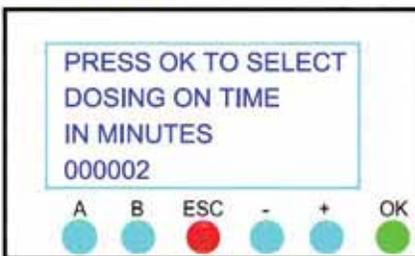
In Manual mode the recycle pump will operate constantly. This mode is typically used to test the pump operation. In the Off mode the recycle pump will stay off. If the recycle pump has been turned off the System will alert the operator. In normal operation the Recycle Pump is set to AUTO mode. In AUTO mode the Recycle Pump operates off of a PLR timer cycle and the low float condition. If the low float is closed (tipped up) the pump will operate on an ON and OFF operator adjustable timer. When the float condition opens (extended) the recycle pump will stop operation without alarming and wait for the float condition to change. If the pump is called to operate but does not have amperage, then the alarm will sound indicating a pump failure and display this message in the alarm history screen.

#7 SCREEN'S SUBSCREEN (7A)



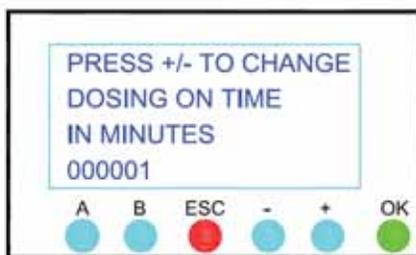
If you are on the screen above and do not want to alter the setting, press the (**ESC**) button to return you to the previous screen.

#8 HMI SCREEN



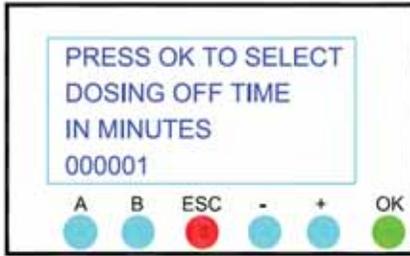
The Bioclere™ Dosing Pump On Timer Screen is accessed through the screen depicted above. The Dosing On Timer Screen allows the operator to set the ON timer settings for the Dosing Pump. All Bioclere™ timers are set in minutes. For the commercial series Bioclere™ the ON timer is set to 8-12 minutes. To adjust the ON time press the (**OK**) button and the screen below will appear. From the screen below use the (**+/-**) button to alter the timer setting and press the (**OK**) button to except the change. The new timer value will be displayed at the bottom of the screen above (000002 minutes).

#8 SCREEN'S SUBSCREEN (8A)



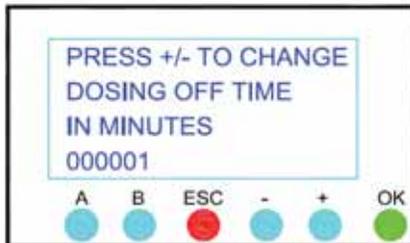
When you are on the screen above, and do not want to alter the time parameter press the (**ESC**) button.

#9 HMI SCREEN



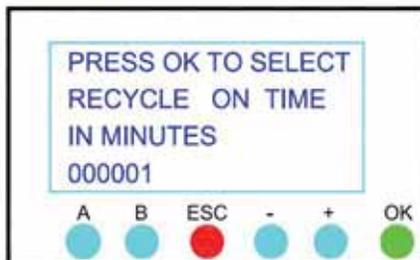
The Bioclere™ Dosing Pump Off Timer Screen is accessed through the screen depicted above and is the next screen as you scroll using the (+) button. The Dosing Off Timer Screen allows the operator to set the OFF timer settings for the Dosing Pump. All Bioclere™ timers are set in minutes. For the commercial series Bioclere™ the OFF timer is typically set to 2 minutes. To adjust the Off time press the (OK) button and the screen below will appear. From the screen below use the (+/-) keys to alter the timer setting and press the (OK) button to except the change. The new timer value will be displayed at the bottom of the screen as is shown above (000001 minutes).

#9 SCREEN'S SUBSCREEN (9A)



If you are on the screen above and do not want to alter the time parameter press the (ESC) button to return you to the previous screen.

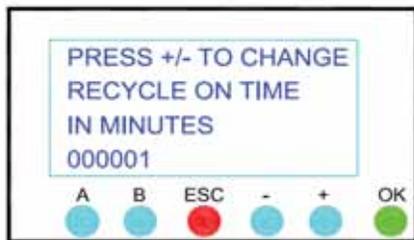
#10 HMI SCREEN



The Bioclere™ Recycle Pump On Timer Screen is accessed through the screen depicted above. The Recycle Pump On Timer Screen allows the operator to set the ON timer settings for the Recycle Pump. This is the pump that returns settled solids from the Bioclere, back to the primary tank. All Bioclere™ timers are set in minutes. For the

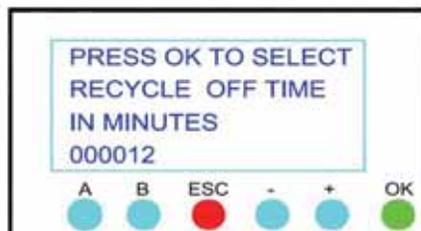
commercial series Bioclere™ the ON timer is typically set to 1-2 minutes. To adjust the ON time press the **(OK)** button from the screen above and that will bring you to the screen below. From the screen below use the **(+/-)** keys to alter the timer setting and press the **(OK)** button to except the change. The new timer value will be displayed at the bottom of the screen above as shown (000001 minutes).

#10 SCREEN'S SUBSCREEN (10A)



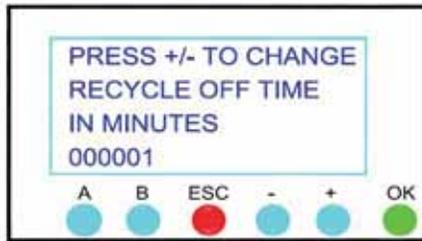
If you are on the screen above and do not want to alter the time parameter press the **(ESC)** button.

#11 HMI SCREEN



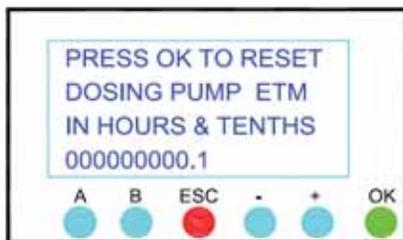
The Bioclere™ Recycle Pump Off Timer Screen is accessed through the screen depicted above and is the next screen as you scroll using the **(+)** button. The Recycle Pump Off Timer Screen allows the operator to set the OFF timer settings for the Recylce Pump. For the commercial series Bioclere™ the OFF timer is typically set to 60-180 minutes. To adjust the Off time press the **(OK)** button and it will display the screen below. On the screen below use the **(+/-)** keys to alter the timer setting and press the **(OK)** button to except the change. The new timer value will be displayed at the bottom of the screen as is shown above (000012 minutes).

#11 SCREEN'S SUBSCREEN (11A)



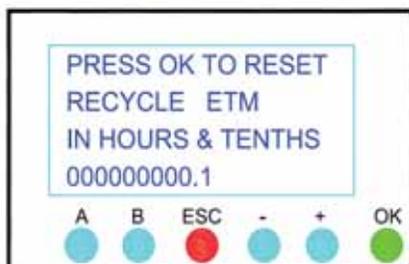
If you are on the screen above and do not want to alter the time parameter press the **(ESC)** button.

#12 & #13 HMI SCREEN



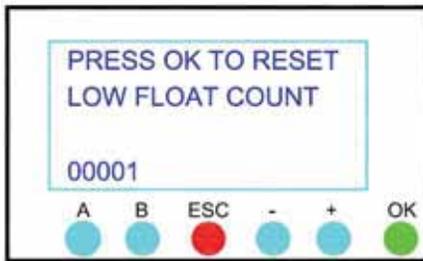
Above is the Dosing Pump elapsed time meter (ETM) screen. The screen will display the amount of cumulative time the Dosing Pump has operated, since the last time the ETM was reset. To reset the ETM value, for this pump, press the **(OK)** button. If the operator does not want to reset the ETM scroll to another screen using the **(-/+)** keys. There is an ETM screen for each of the dosing pumps.

#14 HMI SCREEN



Above is the Recycle Pump elapsed time meter (ETM) screen. The screen will display the amount of cumulative time the Recycle Pump has operated, since the last time the ETM was reset. To reset the ETM value for this pump, press the **OK** button. If the operator does not want to reset the ETM, scroll to another screen using the **(-/+)** keys.

#15 HMI SCREEN



The screen above is the Bioclere™ Low Float Counter Screen. This screen displays the amount of times the Bioclere™ low float condition has OPENED. To reset this value from the screen above, press the (**OK**) button and the value in the bottom left hand corner will return to zero.

During a low float condition the water level in the Bioclere™ clarifier is low. To prevent the level from dropping any lower the control system will stop the recycle pump normal operation until the level rises again. This signal will also make sure that the level in the Bioclere™ is high enough so the dosing pumps can operate properly and sustain the biological population in the Bioclere™.

Note: The low float OPEN condition is not an alarm condition.

ALARM/ALERT CONDITIONS/TROUBLESHOOTING

Caution: Turn off disconnect switch, lock out and tag out power, and verify prior to servicing!

Bioclere™ Fan Fail: The fan circuit breaker has tripped.

Solution: Verify the fan and inlet vent does not have debris clogging it. Verify the fan turns freely. Confirm the junction box is free from water/condensation and terminals are in good working condition. Reset fan circuit breaker.

Bioclere™ Dosing Pump Fail: Bioclere™ Dosing Pump is not running when it should be.

Solution: Possible problems or failure conditions consists of the following: pump clogged, pump internal thermal switch tripped or faulty current sensor, loose wire connection, the switch at the junction box is turned off or malfunctioning, motor contactor malfunction, or pump circuit breaker tripped/malfunction.

Bioclere™ Recycle Pump Fail: Bioclere™ Recycle Pump is not running when it should be.

Solution: Possible problems or failure conditions consists of the following: pump clogged, pump internal thermal switch tripped or faulty current sensor, loose wire connection, the switch at junction box is turned off or malfunctioning, motor contactor malfunction, or pump circuit breaker tripped/malfunction.

PLR Run Mode Failure: Bioclere™ programmable logic relay output voltage source is not functioning properly.

Solution: Possible problems or failure conditions consist of the following: Circuit breaker supplying the output power has tripped or malfunctioned.

Float Condition is Low: The Bioclere™ water level has fallen below the Low Level Float Switch. **This is not an alarm condition!** In this condition the recycle pump will not run until the clarifier level in the Bioclere™ returns to normal. This event is logged in the Alarm Log but the alarm light and horn will not be activated. This event is logged to let the operator know of the condition and when it is taking place.

SJE PUMPMASTER® PLUS Pump Switch

Mechanically-activated, wide-angle switch designed for direct control of pumps up to 3/4 HP at 120 VAC and 2 HP at 230 VAC.

This mechanically-activated, wide-angle pump switch provides automatic control of pumps in:

- potable water
- water
- sewage applications

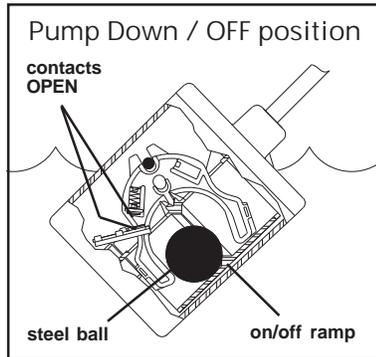
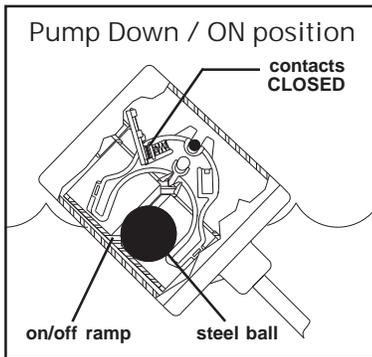
The SJE PumpMaster® Plus pump switch is not sensitive to rotation or turbulence allowing it to be used in both calm and turbulent applications.



U.S. Patent Nos. 5,087,801 & 5,142,108

FEATURES

- Passed NSF Standard 61 protocol by an approved Water Quality Association laboratory.
- Heavy-duty contacts.
- Controls pumps up to 3/4 HP at 120 VAC and 2 HP at 230 VAC.
- Adjustable pumping range of 7 to 36 inches (18 to 91 cm).
- Includes standard mounting clamp and boxed packaging.
- UL Recognized for use in water and sewage.
- CSA Certified.
- Three-year limited warranty.



OPTIONS

This switch is available:

- for pump down or pump up applications as specified by part number.
- with a 120 VAC or 230 VAC piggy-back plug.
- without a plug for direct wiring in 120 VAC or 230 VAC applications.
- in standard cable lengths of 10, 15, 20, or 30 feet and 3, 5, 6, or 10 meters (longer lengths available).

SPECIFICATIONS

CABLE: flexible 14 gauge, 2 conductor (UL, CSA) SJOW, water-resistant (CPE)

FLOAT: 3.05 inch diameter x 3.56 inch long (7.75 x 9.04 cm) high impact, corrosion resistant, PVC housing for use in sewage and water up to 140°F (60°C)

ELECTRICAL:

120 VAC 50/60Hz Single Phase:

Maximum Pump Running Current:

15 amps

Maximum Pump Starting Current:

85 amps

Recommended Pump HP:

3/4 HP or less

230 VAC 50/60Hz Single Phase:

Maximum Pump Running Current:

15 amps

Maximum Pump Starting Current:

85 amps

Recommended Pump HP:

2 HP or less

NOTE: This switch must be used with pumps that provide integral thermal overload protection.

PUMP SWITCHES
(MECHANICAL)

**SEE BACKSIDE FOR ORDERING INFORMATION.
SEE PRICE BOOK FOR LIST PRICE.**



PO Box 1708, Detroit Lakes, MN 56502

1-888-DIAL-SJE • 1-218-847-1317

1-218-847-4617 Fax

email: sje@sjerhombus.com

www.sjerhombus.com

SJE PUMPMASTER® PLUS Pump Switch

Mechanically-activated, wide-angle switch designed for direct control of pumps up to 3/4 HP at 120 VAC and 2 HP at 230 VAC.

ORDERING INFORMATION

PUMP DOWN ↓		PUMP UP ↑		Shipping Weight
Part #	Description	Part #	Description	
1003232	10PMPD1WP	1003237	10PMPU1WP	1.88 lbs.
1003233	10PMPD2WP	1003239	10PMPU2WP	1.92 lbs.
1003235	10PMPDWOP	1003241	10PMPUWOP	1.73 lbs.
1003243	15PMPD1WP	1003249	15PMPU1WP	2.23 lbs.
1003245	15PMPD2WP	1003251	15PMPU2WP	2.23 lbs.
1003247	15PMPDWOP	1003253	15PMPUWOP	2.13 lbs.
1003255	20PMPD1WP	1003261	20PMPU1WP	2.57 lbs.
1003257	20PMPD2WP	1003263	20PMPU2WP	2.61 lbs.
1003259	20PMPDWOP	1003265	20PMPUWOP	2.49 lbs.
1003267	30PMPD1WP	1003273	30PMPU1WP	3.38 lbs.
1003269	30PMPD2WP	1003275	30PMPU2WP	3.41 lbs.
1003271	30PMPDWOP	1003277	30PMPUWOP	3.30 lbs.

D = Pump Down U = Pump Up 1 = 120VAC 2 = 230VAC

WP = With Plug WOP = With Out Plug

NOTE: Descriptions are grouped by cable length measured in feet (10, 15, 20, 30).

[View List Price](#)

Passed NSF standard 61 protocol by an approved Water Quality Association laboratory.



UL Recognized for Water & Sewage



SPECIFICATIONS

PUMPING RANGE: 7 to 36 inches (18 cm to 91 cm)

CABLE: flexible 14 gauge, 2 conductor (UL, CSA) SJOW, water-resistant (CPE)

FLOAT: 3.05 inch diameter x 3.56 inch long (7.75 cm x 9.04 cm), high impact, corrosion resistant, PVC housing for use in sewage and water up to 140°F (60°C)

ELECTRICAL:

Voltage 50Hz/60Hz Single Phase	Max. Pump Run Current	Max. Pump Start Current	Recommended Pump HP
120 VAC	15 amps	85 amps	3/4 HP or less
230 VAC	15 amps	85 amps	2 HP or less

NOTE: This switch must be used with pumps that provide integral thermal overload protection.

OPTIONS

MOUNTING CLAMP is standard.

If mounting clamp is not required, specify and deduct 60¢ from list price.

CABLE WEIGHT MOUNTING

Is also available.

PACKAGING

Boxed - Standard

Bagged - Specify and deduct 40¢ from list price.

Bulk - Specify and deduct 60¢ from list price.

ADDITIONAL CABLE

Additional cable length over 30 feet is available at 80¢ per foot (list price).

OTHER INFORMATION

PUMP DOWN is normally open contacts for emptying in potable water, water, or sewage applications.

PUMP UP is normally closed contacts for filling in potable water, water, or sewage applications.

DIRECT WIRING

Units used for direct wiring (without plug) may be used in either 120 VAC or 230 VAC applications within specified amp ratings.



www.sjrhombus.com
sje@sjrhombus.com

Cat Page PN 1011928L
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Call or fax your order!

1-888-DIAL-SJE (1-888-342-5753) ■ Fax 218-847-4617

APPENDIX C

PURCHASERS WARRANTY



BIOCLERE™

PURCHASERS WARRANTY

Project/Site: _____

Commissioned date: _____

Aquapoint.3, LLC, a Massachusetts Corporation, warrants to the purchaser that the Bioclere™ wastewater treatment plant is free from defects in material and workmanship for a period of one (1) year from the date of installation. Date of warranty shall mean the day specified on the Installation Report.

Aquapoint.3, LLC shall fulfill this warranty by repairing or exchanging any component that in our judgment shows evidence of defect during the warranty period.

This warranty does not cover treatment processes, or Bioclere™ units which have been flooded by external means, which have been disassembled by unauthorized persons, which have been improperly installed, which have been subjected to external damage or which have not been operated and maintained in accordance with the manufacturer's recommended procedures.

This warranty applies only to the Bioclere™ wastewater treatment plant and does not include any of the building wiring, plumbing, drainage, or disposal systems. Aquapoint.3, LLC is not responsible for any delay or damages caused by defective components or material, or for loss incurred because of interruption of service, or for any other special or consequential damages or incidental expenses arising from the manufacture, sale or use of this treatment plant.

Aquapoint.3, LLC reserves the right to revise, change or modify the construction or design of the Bioclere™ wastewater treatment plant or any component part thereof without incurring any obligation to make such changes or modification in previously sold equipment. Aquapoint.3, LLC also reserves the right to make replacements of component parts under this warranty, to furnish component parts, which, in its judgment, are equivalent to the component part, replaced.

Under no circumstances will Aquapoint.3, LLC be responsible for any other direct or consequential damages, including but not limited to lost profits, lost income, labor charges, delays in production and/or idle production, which damages are caused by a defect in material and/or workmanship in parts.

This warranty is expressly in lieu to any other expressed or implied warranty, excluding any warranty of merchantability or fitness, and of any other obligation on the part of Aquapoint.3, LLC

Please fill out and return no later than ten (10) days after installation to:

AquaPoint.3, LLC
39 Tarkiln Place
New Bedford, MA 02745
Ph: 508-985-9050
Fax: 508-985-9072

Signed: _____
Aquapoint.3, LLC / Date

Signed: _____
Property Owner / Date

APPENDIX D

RECOMMENDED SPARE PARTS

CONTROL PANEL SPARE PARTS:

<u>Quantity</u>	<u>Description</u>	<u>Part No.</u>
One (1)	AEG Contactor	LS0710A0-120V
One (1)	Diversified current sensor	CMG-0100-20
One (1)	IDEC2 pole relay	RH2BULAC120
One (1)	IDEC2 pole relay socket	SH2B-05
One (1)	ABB 3 Amp Circuit Breakers	S201-K3
One (1)	ABB 10 Amp Circuit Breakers	S201-K15
One (1)	ABB 20 Amp Circuit Breakers	S201-K20
One (1)	ABB 30 Amp Circuit Breakers	S201-K40
Four (4)	Entrelec terminals	0115 116 07

PUMPS AND MISCELLANEOUS SPARE PARTS:

<u>Quantity</u>	<u>Description</u>	<u>Part No.</u>
One (1)	Float Switch	SJE1003259
One (1)	Bioclere Fan	Papst 4606
One (1)	Bioclere Recycle Pump	Goulds 1DW51COEA
One (1)	Bioclere Dosing Pump	Goulds LSP0711F

RETURN AND/OR MATERIAL AUTHORIZATION REQUEST FORM

FAX: 508-985-9072

Date:

Please complete all applicable fields.

Requested by:

Company Name:

Address:

City: State: ZIP:

Site Name:

Address:

City: State: ZIP:

Part #:

Description:

Qty: Date Installed (M/D/Y): Date Failed (M/D/Y):

Reason for return or additional material request (note specific equipment and pump number):

RETURN SHIPPING INFORMATION (if applicable):

AQUAPOINT.3,LLC
39 Tarkiln Place
New Bedford, MA 02745
ATTN: Returns

Please note unit # and pump # that is to be replaced:

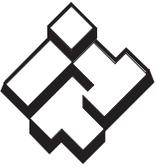
NOTE: Return freight must be prepaid. Return Material Request Form must accompany packages(s).

Approved by: _____

- Warranty Bill replacement Send replacement part Return Discard

APPENDIX E

PUMP CURVES & SPECIFICATIONS



ITT

BIOCLERE DOSING PUMPS

Wastewater

Goulds Pumps

LSP03/LSP07 Submersible Sump Pumps



LSP03AT



LSP03AV



LSP07



FEATURES

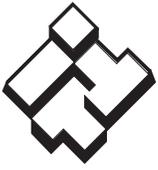
- Corrosion-resistant construction.
- Stainless Steel motor casing and fasteners.
- Glass-filled thermoplastic impeller and casing.
- Upper and lower heavy duty ball bearing construction.
- Motor is permanently lubricated for extended service life and is powered for continuous operation. All ratings are within the working limits of the motor.
- Hard coated 400 series stainless steel shaft for improved corrosion resistance.
- Float switch is adjustable for various liquid levels. Easily removed for direct pump operation or switch replacement.
- Complete unit is lightweight, portable and easy to service.
- Available in manual and automatic versions. See next page for specific order numbers.
- A double labyrinth lip seal system protects the motor. It consists of three lip seals and a V-ring in addition to an impeller counterblade system which keeps solid particles away from the seal unit.



Goulds Pumps is a brand of ITT Residential and Commercial Water.

www.goulds.com

Engineered for life



ITT

GOULDS PUMPS Wastewater

APPLICATIONS

Specially designed for the following uses:

- Basement draining
- Water transfer
- Dewatering

SPECIFICATIONS

- Discharge size: 1 1/2" NPT.
- Capacities: to 57 GPM.
- Maximum head: 34 feet TDH.
- Max. solids: 3/8" spherical
- Temperature: 104°F (40°C) maximum liquid temperature.
- Maximum pump submergence is 10 ft. for LSP03; 16 ft. for LSP07.

MOTOR

- Single phase, 3450 RPM, 60 Hz
 - LSP03, 1/3 HP, 115 V, 2.9 maximum amps.
 - LSP07, 3/4 HP, 115 V (7.1 amps) or 230 V (3.5 amps).
- Built-in thermal overload protection with automatic reset.
- Permanent-split-capacitor type.

- Class B insulation.
- Stainless steel shaft.
- Air filled design.
- Power cord length: LSP03; 10 feet standard, 20 feet optional, LSP07; 20 feet.

FLOAT SWITCH OPTIONS

- Models are available with a float switch. Several options for automatic operation.
- "AV" models are supplied with a vertical float switch.
- "A" models are supplied with a built in float switch.
- "AT" models are supplied with a piggy-back replaceable float switch.

AGENCY LISTING



Canadian Standards Association
File #LR114251

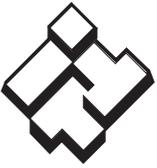


Underwriters Laboratories
File #83318

Goolds Pumps is ISO 9001 Registered.

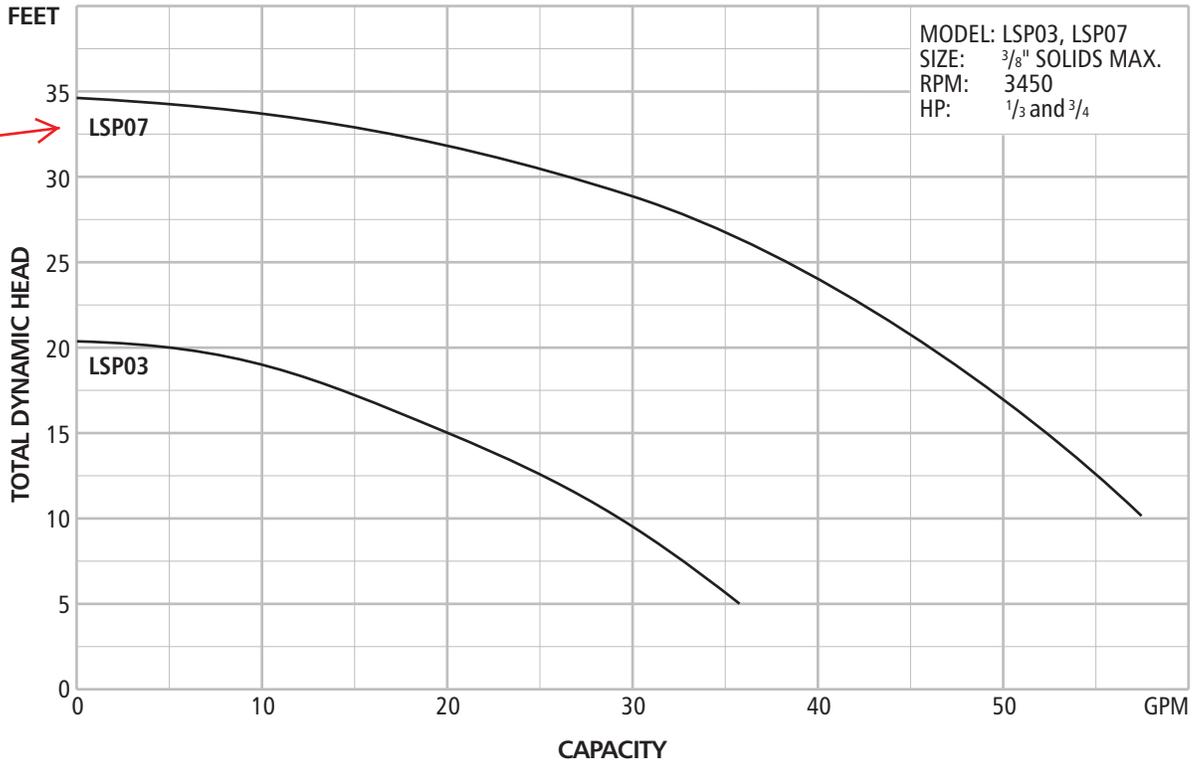
MODEL INFORMATION

Order No.	HP	Volts	Amps	Minimum Circuit Breaker	Phase	Float Switch Style	Cord Length	Discharge Connection	Min. On Level	Min. Off Level	Minimum Basin Diameter	Maximum Solids Size	Shipping Weight lbs/kg
LSP0311	1/3	115	2.9	10	1	Plug / No Switch	10'	1 1/2"	Manual	Manual	9"	3/8"	11 / 5
LSP0311A						Built-In Wide Angle			11"	5"	12"		
LSP0311AT						Piggyback Wide Angle			11"	5"	12"		
LSP0311AV						Piggyback Vertical			8.5"	2"	12"		
LSP0311F						Plug / No Switch			Manual	Manual	9"		
LSP0311AF						Built-In Wide Angle			11"	5"	12"		
LSP0311ATF	Piggyback Wide Angle	11"	5"	12"									
LSP0711F	3/4	115	7.1	10	1	Plug / No Switch	20'	1 1/2"	Manual	Manual	9"	3/8"	15 / 6.8
LSP0711AF						Built-In Wide Angle			12.5"	6.5"	12"		
LSP0711ATF						Piggyback Wide Angle			12.5"	6.5"	12"		
LSP0712F		230	3.5			Plug / No Switch			Manual	Manual	9"		
LSP0712AF						Built-In Wide Angle			12.5"	6.5"	12"		
LSP0712ATF						Piggyback Wide Angle			12.5"	6.5"	12"		



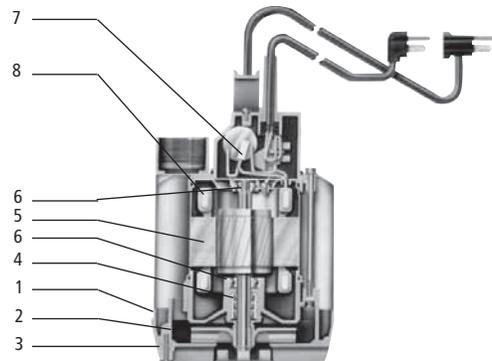
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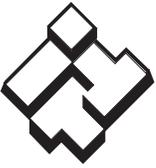
GOULDS PUMPS Wastewater



COMPONENTS

Item No.	Description
1	Casing
2	Impeller
3	Suction strainer
4	Shaft seal with cover
5	Motor
6	Ball Bearing
7	Capacitor
8	O-ring





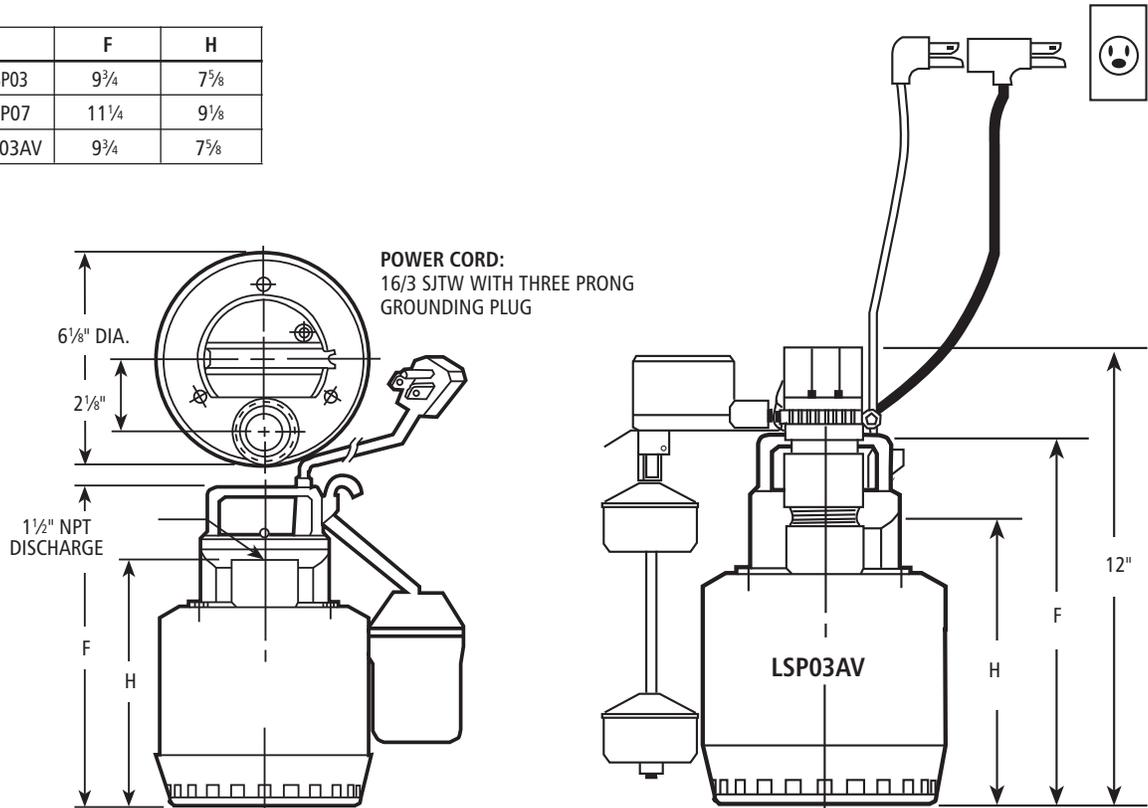
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Wastewater

DIMENSIONS

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

	F	H
LSP03	9 ³ / ₄	7 ⁵ / ₈
LSP07	11 ¹ / ₄	9 ¹ / ₈
LSP03AV	9 ³ / ₄	7 ⁵ / ₈



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SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

BLSP03 August, 2006

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Engineered for life



Submersible Dewatering Pump

SERIES 1DW

1 1/2" Dewatering Pump

APPLICATIONS

Specifically designed for the following uses:

- Handling dirty waters
- Draining ditches and pits
- Excavating in the building trades
- Water transfer
- Industrial water drainage or transfer

SPECIFICATIONS

Pump:

- Discharge size: 1 1/2" NPT.
- Capacities: up to 110 GPM.
- Total heads: up to 66 feet TDH.
- Max. solids: 3/8" spherical.
- Mechanical seal: Drive lube silicon carbide rotary/silicon carbide stationary, 300 series stainless steel metal parts, BUNA-N elastomers.
- Maximum submergence: 23'.
- Temperature limit: 120°F (50°C) maximum.
- Fasteners: 300 series stainless steel.

Motor:

- Single phase: 60 Hz, 3500 RPM, 1/2 HP, 115 and 230 V; 3/4 and 1 HP, 230 V only.
- Three phase: 60 Hz, 3500 RPM, 1/2 to 1 1/2 HP, 230 or 460 V.
- Built-in thermal overload protection with automatic reset on single phase models.

- Three phase: Overload protection must be provided in starter unit with three phase pumps.
- Power cord: 20 feet long. Single phase 115 V and 230 V models are supplied with molded NEMA plugs and built-in capacitors. Three phase models are supplied with bare leads.
- Class F insulation.

FEATURES

- **Impeller:** AISI 304 SS open impeller.
- **Diffuser Plate:** AISI 304 SS with Polyurethane coating for maximum resistance to abrasion.
- **Casing:** AISI 304 SS.
- **Mechanical Seal:** Drive lube silicon carbide sealing faces, all

metal components of AISI type 300 stainless steel running in protected oil chamber.

■ **Elastomers:** BUNA-N.

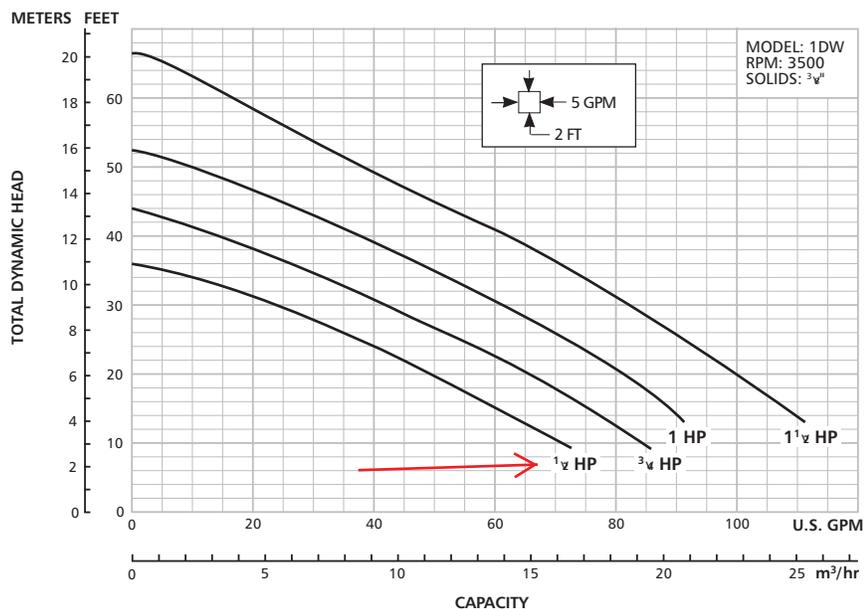
■ **Shaft:** AISI type 304 stainless steel high strength pump shaft with keyed and locking cap screw impeller fastening.

■ **Motor:** Air filled class F insulated design for continuous use.

■ **Designed for Continuous Operation:** Pump ratings are within the motor's working limits and can be operated continuously without damage.

■ **Bearings:** Upper and lower heavy duty ball bearing construction.

Component	Material
Pump body and motor casing	Stainless steel (AISI 304)
Outer sleeve	Stainless steel (AISI 304)
Impeller	Stainless steel (AISI 304)
Motor shaft	Stainless steel (AISI 304)
Suction strainer	Stainless steel (AISI 304)
Front diffuser plate	Stainless steel (AISI 304) coated with polyurethane elastomer
Lower mechanical seal	Silicon carbide/silicon carbide
Upper lip seal	Nitrile rubber
Handle	Stainless steel (AISI 304) coated with polyacetal resin



Goolds Pumps

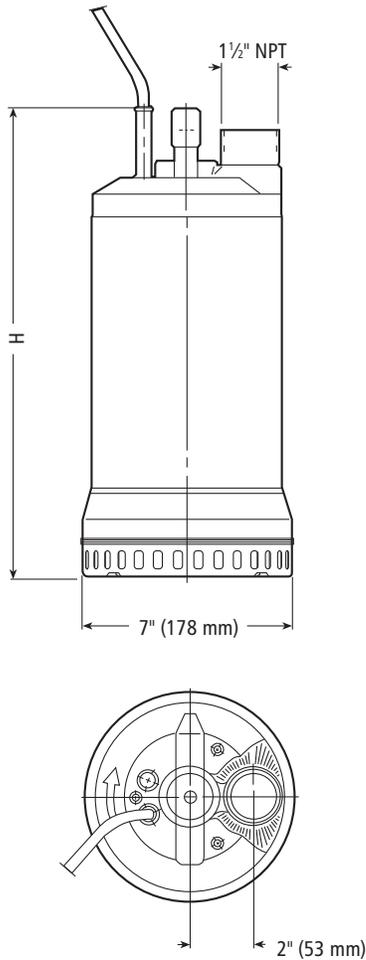


Submersible Dewatering Pump

SERIES 1DW

1 1/2" Dewatering Pump

DIMENSIONS



MECHANICAL DATA

Order No.	HP	Volts	Phase	Max. Amps.	RPM	Weight (lbs.)
1DW51C0EA	1/2	115	1	10.3	3450	29
1DW51C1EA		230		4.5		
1DW51C3EA		3	2.5	27		
1DW51C4EA	1.3					
1DW51D1EA	3/4	230	1	5.7		32
1DW51D3EA			3	3.6		29
1DW51D4EA	1.8					
1DW51E1EA	1	230	1	6.3		38
1DW51E3EA			3	4.0		33
1DW51E4EA	2.0					
1DW51F3EA	1 1/2	230	3	5.6		37
1DW51F4EA				2.7		

Series	HP	Phase	Dimensions in inches (mm)	Discharge Size
			H	
1DW	1/2	1	14 1/8 (363)	1 1/2"
		3	13 5/8 (348)	
	3/4	1	15 1/8 (383)	
		3	14 1/8 (363)	
	1	1	15 7/8 (403)	
		3	15 1/8 (383)	
	1 1/2	3	15 7/8 (403)	