



**AQUA-AEROBIC SYSTEMS, INC.**  
A Metawater Company

# Section-2

# Assembly, Installation, and Start-Up

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Aeration & Mixing | Biological Processes | Filtration | Membranes | Oxidation & Disinfection | Process Control | Aftermarket & Customer Service

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# Aqua-Jet® Surface Mechanical Aerator

## Component Assembly

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The following are selected 'brief sections from the Aqua-Aerobic Systems' assembly and installation procedures to describe the possible work required when the shipment arrives. The complete Installation, Operation and Maintenance Manual will provide all necessary instructions, details, and drawings required to complete the installation.

In general, the Aqua-Jet® Surface Mechanical Aerator sizes through 25 HP are shipped pre-assembled and will require no additional field assembly. Aerator sizes 30 HP and larger will generally be shipped in three (3) major subassemblies as follows:

- a) Power Section Assembly
- b) Float Assembly
- c) Intake Cone/Anti-Vortex Cross Assembly

For the larger aerator units that require field assembly, there will be a small box secured to the power section skid during shipment containing the special drilled head bolts, safety wire for the power section assembly, and Intake Cone bolts and hardware (Full and Jam nuts). These parts are required to complete the aerator assembly as described below.

1. Assemble the Intake Cone / Anti-Vortex Cross Assembly to the bottom side of the Float Assembly by aligning the flange holes of the Float Assembly with the flange holes of the Intake Cone / Anti-Vortex Cross Assembly. Fasten the two units together with the Intake Cone bolts and hardware provided. Refer to the exploded view diagram view within the Aerator O&M Instruction Manual located in section-5 for details.
2. Secure all Intake Cone bolts by the appropriate size torque specifications as outlined in the Bolt Torque Specification Sheet ES-1057 located in section-2.
3. Lift and set the Power Section onto the Float and Intake Cone / Anti-Vortex Cross Assembly aligning the holes of the diffusion head to the tapped holes in the top of the float flange. Fasten with the special drilled head bolts provided.
4. Secure all drilled head bolts of the power section by the appropriate size torque specifications as outlined in the Bolt Torque Specification Sheet ES-1057. Then secure all bolts together with the stainless steel safety wire provided with the units. Refer to the Safety Wiring instructions within the Aerator O&M Instruction Manual located in section-5 for details.

### NOTICE

**Threads on all fasteners should be coated with anti-seize compound to prevent galling.**

Once the unit is assembled, it may be handled and lifted in and out of the water by the motor lifting eyes on the sides of the motor. Once the unit has been placed in the water, it can be floated into place and moored in place.



### CAUTION

**Check that the motor lifting eyes are securely tightened prior to lifting the unit. Do NOT lift the entire assembled unit by any other means other than the motor lifting eyes attached to the sides of the motor.**

# Aqua-Jet<sup>®</sup> Surface Mechanical Aerator Component Assembly

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For field wiring, refer to the motor electrical wiring diagram located within section-4 of this manual, or the wiring diagram inside the motor conduit box, for all wiring connections.

Follow all Mooring Installation Procedures within the manual *if applicable*, and complete all necessary installation work and verify all hardware for optional mooring frames, etc has been secured in place before mooring the units in place.

# **DOUBLE NUT TIGHTENING PROCEDURE**

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1. Hand tighten full nut onto bolt.
2. Tighten the bolt or nut, with the torque wrench, within the given torque range for the size bolt being used per Bolt Torque Specification Sheet ES-1057.
3. Hand tighten jam nut down to full nut.
4. While holding the full nut in place, tighten the jam nut, with the torque wrench, within the given torque range for the size bolt being used per Bolt Torque Specification Sheet ES-1057.

# Bolt Torque Specification Sheet

Thread Size	304 & 316 Stainless Steel		SAE J995 Grade 2		SAE J995 Grade 5		SAE J995 Grade 8	
	Dry	Lubricated	Dry	Lubricated	Dry	Lubricated	Dry	Lubricated
	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>	in-lbs <i>N-m</i>
1/4-20 UNC	79	67	72	61	120	102	168	143
	<i>8.9</i>	<i>7.6</i>	<i>8.1</i>	<i>6.9</i>	<i>13.6</i>	<i>11.5</i>	<i>19.0</i>	<i>16.2</i>
1/4-28 UNF	99	84	90	77	150	128	211	179
	<i>11.2</i>	<i>9.5</i>	<i>10.2</i>	<i>8.7</i>	<i>16.9</i>	<i>14.5</i>	<i>23.8</i>	<i>20.2</i>
5/16-18 UNC	138	117	144	157	228	316	348	296
	<i>15.6</i>	<i>13.2</i>	<i>16.3</i>	<i>17.7</i>	<i>25.8</i>	<i>35.7</i>	<i>39.3</i>	<i>33.4</i>
5/16-24 UNF	147	125	153	173	243	346	371	315
	<i>16.6</i>	<i>14.1</i>	<i>17.3</i>	<i>19.5</i>	<i>27.5</i>	<i>39.1</i>	<i>41.9</i>	<i>35.6</i>
3/8-16 UNC	247	210	240	204	396	337	564	479
	<i>27.9</i>	<i>23.7</i>	<i>27.1</i>	<i>23.0</i>	<i>44.7</i>	<i>38.1</i>	<i>63.7</i>	<i>54.1</i>
3/8-24 UNF	271	230	263	224	434	369	619	526
	<i>30.6</i>	<i>26.0</i>	<i>29.7</i>	<i>25.3</i>	<i>49.0</i>	<i>41.7</i>	<i>69.9</i>	<i>59.4</i>
7/16-14 UNC	393	334	384	326	648	551	936	796
	<i>44.4</i>	<i>37.7</i>	<i>43.4</i>	<i>36.8</i>	<i>73.2</i>	<i>62.3</i>	<i>106</i>	<i>89.9</i>
7/16-20 UNF	418	355	408	347	689	586	996	847
	<i>47.2</i>	<i>40.1</i>	<i>46.1</i>	<i>39.2</i>	<i>77.8</i>	<i>66.2</i>	<i>113</i>	<i>95.7</i>
	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>	ft-lbs <i>N-m</i>
1/2-13 UNC	45	38	47	40	78	66	119	101
	<i>61</i>	<i>52</i>	<i>64</i>	<i>54</i>	<i>106</i>	<i>89</i>	<i>161</i>	<i>137</i>
1/2-20 UNF	47	40	49	42	81	69	124	105
	<i>64</i>	<i>54</i>	<i>66</i>	<i>57</i>	<i>110</i>	<i>94</i>	<i>168</i>	<i>142</i>
5/8-11 UNC	96	82	96	82	154	131	230	196
	<i>130</i>	<i>111</i>	<i>130</i>	<i>111</i>	<i>209</i>	<i>178</i>	<i>312</i>	<i>266</i>
5/8-18 UNF	108	92	108	92	173	147	259	220
	<i>146</i>	<i>125</i>	<i>146</i>	<i>125</i>	<i>235</i>	<i>199</i>	<i>351</i>	<i>298</i>
3/4-10 UNC	131	111	155	132	257	218	380	323
	<i>178</i>	<i>150</i>	<i>210</i>	<i>179</i>	<i>348</i>	<i>296</i>	<i>515</i>	<i>438</i>
3/4-16 UNF	129	110	153	130	253	215	374	318
	<i>175</i>	<i>149</i>	<i>207</i>	<i>176</i>	<i>343</i>	<i>292</i>	<i>507</i>	<i>431</i>
7/8-9 UNC	202	172	206	175	382	325	600	510
	<i>274</i>	<i>233</i>	<i>279</i>	<i>237</i>	<i>518</i>	<i>441</i>	<i>813</i>	<i>691</i>
7/8-14 UNF	201	171	205	174	380	323	597	507
	<i>273</i>	<i>232</i>	<i>278</i>	<i>236</i>	<i>515</i>	<i>438</i>	<i>809</i>	<i>687</i>
1-8 UNC	299	254	310	264	587	499	700	595
	<i>405</i>	<i>344</i>	<i>420</i>	<i>358</i>	<i>796</i>	<i>677</i>	<i>949</i>	<i>807</i>
1-12 UNF	270	230	275	234	510	434	802	682
	<i>366</i>	<i>312</i>	<i>373</i>	<i>317</i>	<i>691</i>	<i>588</i>	<i>1087</i>	<i>925</i>

Notes:

1. Torque values listed are based on actual lab testing on dry or near dry fasteners wiped clean.
2. Lubricated values are 85% of dry values.
3. Torque specification applies only if fastening identical materials. Consult Engineering if materials differ or length of engagement is shorter than specified in note 4. Pre-load stress ***not*** to exceed 75% of the softest material's proof stress.
4. Bolt, screw, or stud fastened with regular height nuts. Nuts to be made of either same material or grade as fastener or stronger.

## Typical Arrangement for Positioning Spiral Wrap Abrasion Protection Sleeves

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**Spiral Wrap abrasion protection sleeve shown for reference only, attached to an aerator electrical cable.**



The spiral wrap abrasion protection sleeve is a Polyethylene expandable spiral cut wrap that offers abrasion protection for electrical cables. The Spiral wrap twists around the electrical cable easily, and can be removed and re-applied, and will retain its strength under repeated flexing and binding. It is recommended that a spiral wrap abrasion protection sleeve is attached to each electrical cable for the units protection.

When installing a spiral wrap sleeve, the spirals should be butted tightly with little or no gap to provide maximum abrasion resistance and insulation protection for the electrical cable. The spiral wrap sleeve should be positioned so the approximate **center** of the sleeve is positioned at the edge of the unit float with one-half of the spiral wrap sleeve located on the electrical cable above the edge of the unit float. The remaining half of the sleeve should be located on the electrical cable below the edge of the float. Refer to the chart on the following sheet for part numbers, and installation information, for the appropriate size spiral wrap for your electrical cable size.

### **Photo of Spiral Wrap Abrasion Protection:**



# Typical Arrangement for Positioning Spiral Wrap Abrasion Protection Sleeves

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Start with the center of the spiral wrap in one hand, and the other hand holding the electrical cable in a spot close to the edge of the float. Start wrapping the spiral wrap around the electrical cable working towards the motor conduit box, keeping the expandable spiral cuts of the wrap butted tightly together with little or no gaps. You may want to wrap a small piece of electrical tape around the mid starting point of the wrap and electrical cable, to keep it from unwrapping while you are working to wrap the protection sleeve around the electrical cable all the way to the end.

Next start back at the midpoint again, and finish wrapping it around the electrical cable in reverse direction keeping the expandable spiral cuts of the wrap butted tightly together with little or no gaps. The completed wrapped length should be very close to a measured length matching the “wrapped length” dimension from the chart below for your size electrical cable.

<b>Spiral Wrap Guide</b>							
<b>Cable Size</b>	<b>Cable Part Number</b>	<b>Cable O.D. (inches)</b>	<b>Spiral Wrap Part Number</b>	<b>Spiral Wrap O.D. (inches)</b>	<b>Wall Thickness (inches)</b>	<b>Wrap Free Length (Ft)</b>	<b>Wrapped Length (Ft)</b>
12-3	2613572	0.595	2614564	0.50	0.06	10	6.39
12-4	2607459	0.65		0.50	0.06	10	5.85
12-5	2614214	0.71		0.50	0.60	10	5.35
12-6	2609109	0.745		0.50	0.60	10	5.10
12-8	2610717	0.802		0.50	0.60	10	4.74
10-4	2607460	0.71		0.50	0.60	10	5.35
8-4	2607461	0.79		0.50	0.60	10	4.81
6-4	2607462	0.90		0.50	0.60	10	4.22
4-4	2607463	1.1	2614666	0.75	0.60	10	5.73
2-4	2607464	1.27		0.75	0.60	10	4.96
1/0-4	2607465	1.79	2614667	1.0	0.70	10	4.80
2/0-4	2607466	1.93		1.0	0.70	10	4.46
3/0-4	2607467	2.07		1.0	0.70	10	4.15
4/0-4	2607468	2.26		1.0	0.70	10	3.81

# FRP Cable Float Installation Instructions

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The fiberglass reinforced polyester (FRP) Electrical Cable Floats are provided for supporting the heavier electrical power cables on the water surface, avoiding the possibility of it dragging on the bottom and becoming tangled or being drawn into the impeller flows, and damaging the electrical cables.

<b>Float Dimensions</b> Width x Length x Height Inch / (mm)	<b>Float Weight Capacity</b> Lbs. / (kg) (1.5 Service Factor)	<b>Float Weight Capacity</b> Lbs. / (kg) (1.2 Service Factor)	<b>Float Assembly Weight</b> Lbs. / (kg)	<b>Float Assembly Part Number</b>	<b>Replacement Float Part Number</b>
11.6 / (295.6) x 14.6 / (370.8) x 8.2 / (208.3)	16.0 / (7.3)	20.0 / (9.07)	6.0 / (2.7)	2903495	2900329

Each FRP electrical cable float requires two (2) Cable Ty-wraps secured through the eyebolt and around the cable at each end for attachment. Refer to the chart above for reference weight capacity and service factor to determine the appropriate spacing for attachment based on the weight per foot of the electrical cable being supported. The maximum recommended spacing of the FRP cable floats is twenty foot (20'-0"), and you should add 3% to the cable length to adjust for normal sag. The Float Assembly part number comes with one (1) cable float and four (4) cable Ty-wraps for field installation.



## Installation Notes:

Install the first FRP cable float a maximum distance of ten foot (10'-0") [3048 mm] from the outer edge of the unit float regardless of unit size. This will ensure the electrical cable will not be allowed to enter into the impeller with varying water levels. Install the second cable float based on the spacing determined by the weight capacities of the electrical cable, for up to a maximum of twenty foot. Continue the same spacing with all additional FRP cable floats as required covering the span to the side of the basin.



# FRP Cable Float Installation Instructions

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If multiple electrical cables are utilized, each electrical cable may be tethered together to the vinyl cable floats with the Ty-wraps however, this application must consider the weights of the multiple power cables in order to determine the quantity of cable floats and spacing required, to ensure they uphold the weight of the electrical power cables.

**Note: Space floats at distances as shown on installation drawings. If not shown on installation drawings, space floats evenly in wetted cable area (i.e., locate floats evenly throughout the length of cable that is in contact with the aqueous solution) utilizing the chart spacing for cable size below.**

<b>Electrical Cable Float Spacing (Maximum distance by weight)</b>			
<b>Electrical Cable Size</b>	<b>Electrical Cable Weight / Foot</b>	<b>Capacity (22#) 1.5 Service Factor</b>	<b>Capacity (27.5#) 1.2 Service Factor</b>
#10-4	.3 #	N/A	N/A
#8-4	.5#	N/A	N/A
#6-4	.7#	31' centers	39' centers
#4-4	1.0#	22' centers 2	27' centers
#2-4	1.4#	16' centers	20' centers
#0-4	2.2#	10' centers	12' centers
#2/0-4	2.6#	8' centers	10' centers
#4/0-4	3.5#	6' centers	8' centers

## **Multiple Units within a basin:**

When multiple units are positioned within a basin and where it would be possible for the electrical cable to float within the flow pattern or within ten foot of an adjacent unit, the electrical cable floats in that area must be located closer together to ensure the cables do not contact any other unit. The portion of the electrical cables that extends beyond a ten foot distance from an adjacent unit may be located on the recommended center distance spacing as detailed above based on the cable size.

# **Aqua-Jet<sup>®</sup> Surface Mechanical Aerator Restrained Mooring Installation Instructions**

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The Aqua-Jet<sup>®</sup> or the Aqua-Jet II<sup>®</sup> units can be moored by many different arrangements. The method selected for this project is restrained mooring.

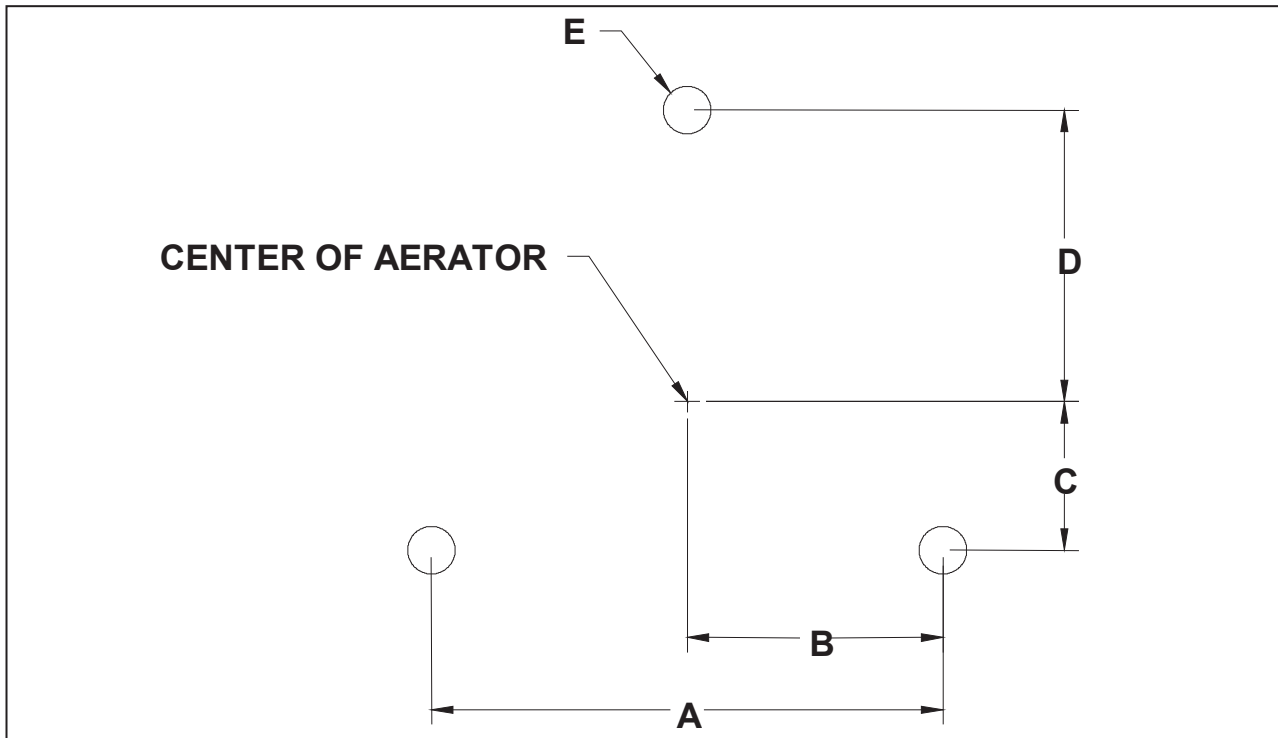
The restrained mooring system is designed to permit the floating aerators to rise and fall as water level varies, with a minimal amount of lateral movement. The normal restrained mooring system requires:

- 1) Three (3) or two (2) vertical mooring posts, located about the center of the aerator on 120 degree spacing. The supply of the mooring posts are optional however, the mooring post size and spacing requirements must be followed to ensure proper performance. Please refer to the Restrained Mooring Post Locations document within your manual for suggested and maximum mooring post sizes. This document will also detail the mooring post locations based on your aerator unit HP.
- 2) A restrained mooring frame supplied shall be supported from the mooring eyes on the side of the floats, and be positioned at the bottom of the aerator float. The restrained mooring frame is designed with three (3) or two (2) horizontal arms, which extend out past the mooring posts. Each arm includes an oversized U-bolt which encompasses the adjacent mooring post. Three mooring posts are used as a standard, and must always be used if the unit would not be allowed to rest of the basin floor.
- 3) The mooring frame assembly drawing will be provided in Section-5 of the Mechanical Drawings for instructions and part identification for field assembly.

As the water level varies, the restrained mooring frame permits the aerator to move vertically without restriction, while absorbing normal starting and operating stresses.

# Mooring Arrangement

## Restrained Mooring Post Location Dimensions for Aqua-Jet® Aerators



**NOTE:** Dimensions A, B & C also apply to two (2) post mooring, if applicable.

Aerator Unit Size (60 Hz HP)	A	B	C	D	E Std. Post Dia. (IPS)	E Max. Post Dia. (IPS)	U-Bolt Pipe Size (Bolt Dia.)
1 & 2	66"	33"	19"	38"	3"	3"	6" (1/2")
3, 5, & 7-1/2	78"	39"	22.5"	45"	3"	4"	8" (5/8")
10 & 15	86"	43"	25"	49"	4"	4"	8" (5/8")
20 & 25	99"	49.5"	28"	58"	4"	4"	8" (5/8")
30, 40, & 50	111"	55.5"	32"	64"	4"	4"	8" (5/8")
(50) 60 & 75	133"	66.5"	38"	77"	6"	8"	12" (7/8")
100, 125, & 150	150"	75"	43.25"	86.5"	6"	8"	12" (7/8")

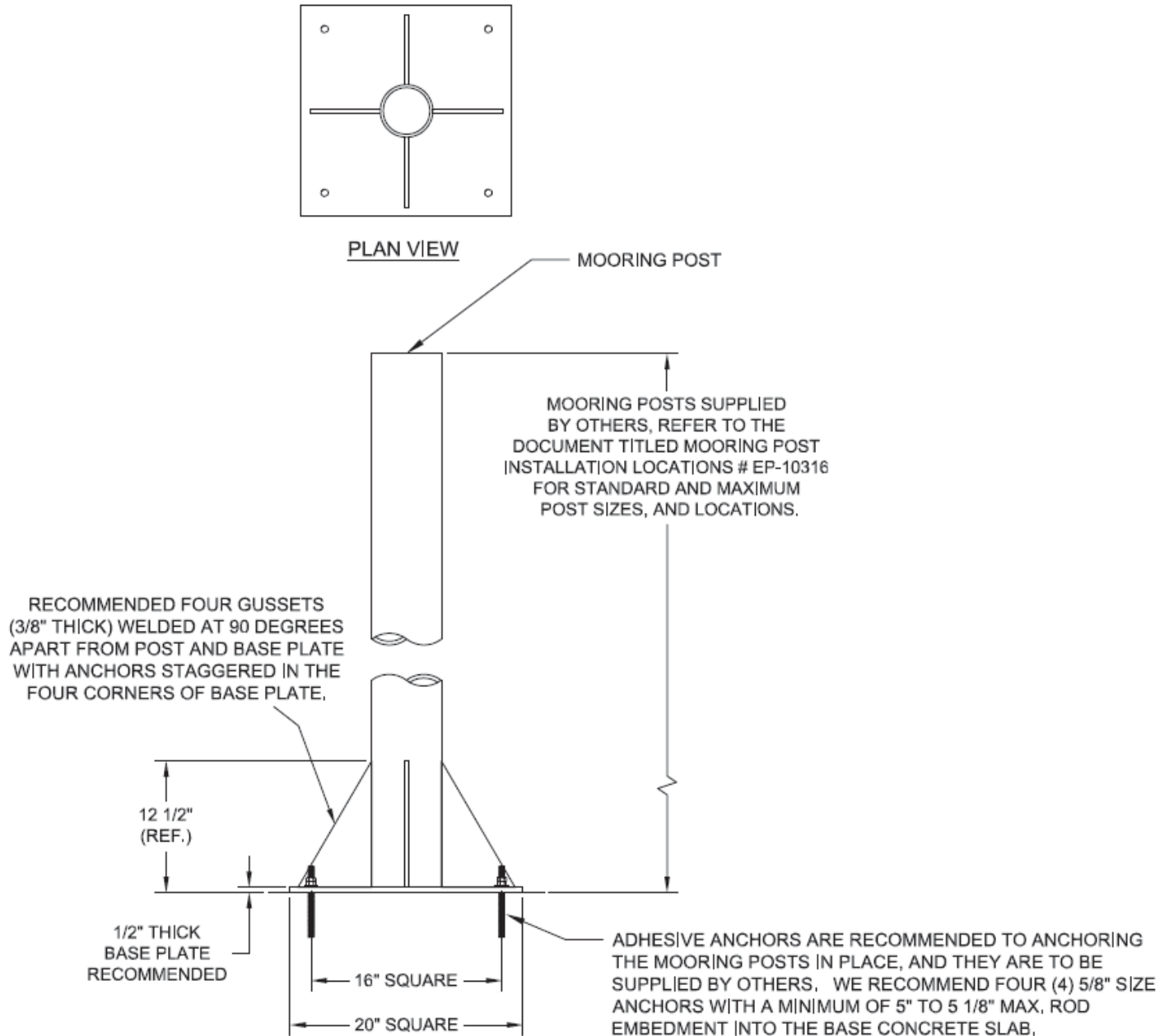
**NOTES:**

For all restrained mooring applications, it is imperative the mooring posts (by others) be:

- Positioned per AASI's assembly drawing and the above schematic and table.
- Completely filled with concrete, with a base plate anchored to the basin floor.
- Positioned so there is less than 1" tolerance from top to bottom of the post to allow the unit to move freely up and down.
- Top of post must extend a minimum of 1 ft. above the basin wall.

# 6" Restrained Mooring Post Installation Details

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### 6" MOORING POST DETAIL

NOTE: THE CONCRETE, MOORING POSTS, ANCHORS, AND ALL HARDWARE REQUIRED FOR ANCHORING THE MOORING POSTS SHALL BE SUPPLIED BY OTHERS. THE MOORING POSTS **MUST** BE FILLED WITH CONCRETE TO COMPLETE THE INSTALLATION. ALL MOORING POSTS ARE TO BE HELD VERTICAL AND PLUMB WITHIN +/- 1/4" TO ALLOW VERTICAL MOVEMENT OF THE UNIT WITH THE RESTRAINED MOORING FRAME.



**AQUA-AEROBIC  
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## **Pre-Start-up Inspection & Checklist**

The Contractor shall inspect the equipment upon arrival, and must inspect the completed installation for proper conformance to the drawings, locking of fasteners, and other recommendations, prior to conducting the required site inspection, and testing. This checklist along with the Transport & Handling, and safety documents should be reviewed prior to handling any equipment. If any of the answers to the questions below are “No”, please refer to Aqua-Aerobic Systems’ O&M Manual.

<b>Receiving, &amp; Handling Check Points:</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Has all units and accessories been inspected for any shipping / transport damage? This is critical as there is a limited time line in filing a transit damage claim report.			
Have all units and accessories been checked off against the packing list and bill of lading to ensure proper contents received? Discrepancies or shortages must be reported in writing within seven (7) working days of delivery to obtain credit.			
If units have been stored, were units stored in original shipping crates and stored according to AASI’s storage instructions?			
Has the power sections been initially stored indoors and out of the elements? This is critical as motors stored horizontally may get rain / moisture inside motor which will void any warranty.			
If forklift is to be utilized for lifting and moving equipment:			
<ul style="list-style-type: none"> <li>• Is forklift of sufficient capacity for size of equipment / crates?</li> </ul>			
<ul style="list-style-type: none"> <li>• Have forks been extended under float enough to completely support the equipment?</li> </ul>			
If equipment is to be lifted and moved by a crane:			
<ul style="list-style-type: none"> <li>• Have motor mooring eyes been checked to ensure they are tight?</li> </ul>			
<ul style="list-style-type: none"> <li>• Has a separate lifting cable or chain been attached to each motor lifting eye with a lift hook, and is the cable or chain of sufficient length to make lift?</li> </ul>			
<ul style="list-style-type: none"> <li>• Was there a proper vertical pull being placed on the lifting eyes during the lifting process?</li> </ul>			
<ul style="list-style-type: none"> <li>• Was there an equal and level lift being applied to lift the units?</li> </ul>			
If equipment has been shipped unassembled:			
<ul style="list-style-type: none"> <li>• Has all units been field assembled complete according to assembly instructions and/or diagrams? Refer to the O&amp;M Instruction Manual in Section-3 for the unit details.</li> </ul>			
<ul style="list-style-type: none"> <li>• Has safety wire been used where specified with proper drilled bolts to secure? Refer to the O&amp;M Instruction Manual for safety wiring instructions and assembly procedures in Section-3 for unit details.</li> </ul>			

**Pre-Start-up Checklist continued:**

<b>Receiving, &amp; Handling Check Points continued:</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
<ul style="list-style-type: none"> <li>Have jam nuts been used to properly lock all regular full nuts into position? Refer to the Double Nut Procedure &amp; Bolt Torques Specifications in Section-2 of your manual.</li> </ul>			
<b>Electrical Cables:</b>			
Have the electrical cables been properly tethered to prevent rubbing on basin wall or any obstruction that could possibly cause damage to the cable?			
<i>Electrical Cable Floats if Applicable;</i> Has the electrical cable floats been properly positioned to support the electrical cables and prevent them from being drawn into suction of the unit?			
<b>Optional Restrained Moored System:</b>			
Have the mooring posts been properly anchored to the concrete foundation, and located as required? Refer to the Mooring Post Installation locations document located in Section-2 for size, location, and details.			
Has the restrained mooring frame been properly assembled together with all mounting hardware secured in place with a double lock jam nut?			
Has all three J-bolt frame attachment points been tightly installed to the float mooring eyes and secured with full nuts and double lock jam nuts?			
Has the U-bolt restraints been properly assembled to the fame of the unit with two full nuts locked to the frame and a double lock jam nut on the outer full nut to secure them in place?			
Have the mooring posts that are supplied by other been filled with concrete?			
<b>Optional Stop Frame Assembly:</b>			
Has the Stop Frame Assembly been properly assembled together with the Post Support Plates, and all mounting hardware secured in place with a full nut and double lock jam nut?			
Has the Stop Frame Assembly been properly secured to the three mooring posts with U-bolts, and secured in place with a full nut and double lock jam nut? Refer to the Stop Frame Assembly drawing for details.			
<b>Equipment Start-up Check Points:</b>			
Has all environmental debris been removed from basin, lagoon, or tank prior to filling?			
Has the Power Supply Voltage been checked for unbalanced voltage of the three phases?			
Has the control panel field wiring been inspected for any faulty electrical connections?			
Has the electrical cable been inspected for any signs of damage or wear from installation?			
Has the unit electrical connections in the control panel been made to proper starter?			
Has the starter overloads been properly sized for the motor horse power rating, and the anticipated ambient temperature inside the control panel?			
Are there any visible indications that the electrical cable may be allowed to rub against the basin wall or anything that may cause damage or wear to the cable?			

**Pre-Start-up Checklist continued:**

<b>Equipment Start-up Check Points continued:</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Has the unit motor condensate drains been checked and verified to be free of any obstructions?			
Is sufficient water level present in basin, lagoon, or tank to complete the Start-up?			
Has the unit been bump started to check proper rotation for flow?			
Is the maximum water level within recommended guidelines / contract specifications?			
Are the O&M manuals readily available on site for training and Start-up?			

# AquaDDM<sup>®</sup> and/or Aqua-Jet<sup>®</sup> Equipment

## Outline for Manufacturers Training

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1. Introduction and Overview
  - 1.1. Show catalogue, parts lists, drawings, etc., in the plant files and O&M manuals.
  - 1.2. Check out the installation of the specific equipment items.
  - 1.3. Answer questions.
2. Safety
  - 2.1. Point out safety references.
  - 2.2. Discuss proper precautions around equipment.
3. Operation
  - 3.1. Point out reference literature.
  - 3.2. Explain all modes of operation (including emergency)
  - 3.3. Check out owner's personnel on proper use of the equipment (let them do it).
4. Preventative Maintenance
  - 4.1. Reference preventative maintenance list including:
    - 4.1.1. Reference material
    - 4.1.2. Daily, weekly, monthly, quarterly, semi-annual, and annual jobs.
  - 4.2. Show how to perform preventative maintenance jobs
  - 4.3. Show owner's personnel what to look for as indicators of equipment problems.
5. Corrective Maintenance
  - 5.1. List possible problems.
  - 5.2. Discuss repairs – point out special problems.
  - 5.3. Open up equipment and demonstrate procedures, where practical.
6. Parts
  - 6.1. Show how to use parts lists and order parts.
  - 6.2. Check over spare parts on hand and recommendations.
7. Local Representatives
  - 7.1. Where to order parts: name, address, telephone, facsimile
  - 7.2. Service problems:
    - 7.2.1. Who to call
    - 7.2.2. How to get emergency help.
8. Question and Answer session



# Training Session Sign-in sheet

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Attendee's Name

Firm Represented

1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
11. _____	_____
12. _____	_____
13. _____	_____
14. _____	_____
15. _____	_____

Date Training was completed: \_\_\_\_\_

Hours spent for Classroom Training: \_\_\_\_\_

Hours spent for On-Site Training: \_\_\_\_\_

Instructor: \_\_\_\_\_

# Equipment Inspection and Start-Up Report

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For Project ID # MO# 114194A / SO# 83811

Start-up date: \_\_\_\_\_

Start-up services performed by: \_\_\_\_\_

Date Equipment Shipped from Factory: \_\_\_\_\_

Please refer to AASI's Project Associates sheet for owner, engineer, and contractor contact information, as applicable.

**Job Location:** Artesian Northern Sussex Regional Water Recharge Facility  
Isaacs Road  
Milton, Delaware 19968

**Equipment Type:** Aqua-Jet® Aerators  
**Serial Numbers:** See Individual Start-up Data Sheet(s)

A) Describe general condition of jobsite, and equipment installation for proper handling and appearance.

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B) List any potential hazards observed that could impair operational success of equipment, such as ice damage in cold weather, low water levels, voltage or amperage problem, debris in water, exposure to vandalism, etc.

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# Equipment Inspection and Start-Up Report

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C) Name people present at inspection and start-up.

Name

Company


Plant Operator

Phone #

Mailing Address for the Plant:


D) Explain the inspection and start-up work performed.


E) How long were you at the job-site?


F) How long were owner's representatives at the job-site?


G) Is this the final inspection and start-up?  Yes  No

If no, explain: \_\_\_\_\_

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H) Did you leave the O & M manuals, or were they already at the jobsite?

Explain: \_\_\_\_\_


# Equipment Inspection and Start-Up Report

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- I) Did you explain the safe use of all Aqua equipment and explain the safety instructions contained in the O & M manuals?  
Yes \_\_\_\_\_ (initial)
- J) Did you explain the meaning and importance of the “warnings” contained in the O & M manuals?  
Yes \_\_\_\_\_ (initial)
- K) Did you advise the customer of factory contacts for mechanical problems/process questions: 1-800-940-5008.  
Yes \_\_\_\_\_ (initial)

**NOTE:** *The above items must be explained and initialed by the person performing start-up before start-up can be considered complete.*

SPECIAL COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Start-up Technician Name (Please print clearly) \_\_\_\_\_

Company Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

**\*Owner's acknowledgment that the contents of the above inspection and report are correct and that the explanations and advice in I) J) and K) were given to the owner.**

Owner Name (Please print clearly) \_\_\_\_\_

Title \_\_\_\_\_

Company Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Owner's comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Equipment Inspection and Start-Up Report

## AQUA-JET® AERATOR START-UP DATA SHEET

Unit Type: **FSS** HP: **75** Project ID: **MO ID # 114194A**

Float Serial Number: **Number** Tagged: **TAG # 1**

Ship date: **Date** Start-up date: \_\_\_\_\_

### PERTINENT MOTOR NAMEPLATE DATA

Motor Manufacturer  **BALDOR / RELIANCE**  **TECO**  **OTHER**

Motor Model ID: **A40-1168-0769**

Full Load Amperage: **86.9** RPM: **1200** Voltage: **460**

Motor Wired at Aqua-Aerobic Systems for:

**230 Volts**  **460 Volts**  **575 Volts**  **Other**

**\*\* NOTE: FOR VOLTAGE UNBALANCE OVER 1% OR ANY LINE AMPERAGE READING OVER NAMEPLATE, CALL AQUA'S CUSTOMER SERVICE DEPT. @ 1-800-940-5008. UNBALANCE IS DEFINED AS:**

$$\% \text{ Voltage Unbalance} = \frac{(\text{maximum voltage deviation from average voltage}) \times 100}{(\text{average voltage})}$$

### BEFORE STARTING

Voltage at Disconnect: L<sub>1</sub> to L<sub>2</sub> \_\_\_\_\_ L<sub>2</sub> to L<sub>3</sub> \_\_\_\_\_ L<sub>1</sub> to L<sub>3</sub> \_\_\_\_\_

Meg-Ohms to Ground from Starter: L<sub>1</sub> \_\_\_\_\_ L<sub>2</sub> \_\_\_\_\_ L<sub>3</sub> \_\_\_\_\_

Starter Size \_\_\_\_\_ Fuse Size \_\_\_\_\_ amps Heater Rating \_\_\_\_\_

### VOLTAGE AT STARTER WITH UNIT OPERATING

L<sub>1</sub> to L<sub>2</sub> \_\_\_\_\_ L<sub>2</sub> to L<sub>3</sub> \_\_\_\_\_ L<sub>1</sub> to L<sub>3</sub> \_\_\_\_\_

### AMPERAGE DRAW AT STARTER

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>
1 minute	_____	_____	_____
15 minutes	_____	_____	_____
30 minutes	_____	_____	_____
60 minutes	_____	_____	_____

How long was Unit stored before Start-up? \_\_\_\_\_ Inside \_\_\_\_\_ Outside \_\_\_\_\_

if Outside, were power sections stored upright and covered:  Yes  No

# Equipment Inspection and Start-Up Report

## AQUA-JET® AERATOR START-UP DATA SHEET

Unit Type: **FSS** HP: **75** Project ID: **MO ID # 114194A**

Float Serial Number: **Number** Tagged: **TAG # 2**

Ship date: **Date** Start-up date: \_\_\_\_\_

### PERTINENT MOTOR NAMEPLATE DATA

Motor Manufacturer  BALDOR / RELIANCE  TECO  OTHER

Motor Model ID: **A40-1168-0769**

Full Load Amperage: **86.9** RPM: **1200** Voltage: **460**

Motor Wired at Aqua-Aerobic Systems for:

230 Volts  460 Volts  575 Volts  Other

**\*\* NOTE: FOR VOLTAGE UNBALANCE OVER 1% OR ANY LINE AMPERAGE READING OVER NAMEPLATE, CALL AQUA'S CUSTOMER SERVICE DEPT. @ 1-800-940-5008. UNBALANCE IS DEFINED AS:**

$$\% \text{ Voltage Unbalance} = \frac{(\text{maximum voltage deviation from average voltage}) \times 100}{(\text{average voltage})}$$

### BEFORE STARTING

Voltage at Disconnect: L<sub>1</sub> to L<sub>2</sub> \_\_\_\_\_ L<sub>2</sub> to L<sub>3</sub> \_\_\_\_\_ L<sub>1</sub> to L<sub>3</sub> \_\_\_\_\_

Meg-Ohms to Ground from Starter: L<sub>1</sub> \_\_\_\_\_ L<sub>2</sub> \_\_\_\_\_ L<sub>3</sub> \_\_\_\_\_

Starter Size \_\_\_\_\_ Fuse Size \_\_\_\_\_ amps Heater Rating \_\_\_\_\_

### VOLTAGE AT STARTER WITH UNIT OPERATING

L<sub>1</sub> to L<sub>2</sub> \_\_\_\_\_ L<sub>2</sub> to L<sub>3</sub> \_\_\_\_\_ L<sub>1</sub> to L<sub>3</sub> \_\_\_\_\_

### AMPERAGE DRAW AT STARTER

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>
1 minute	_____	_____	_____
15 minutes	_____	_____	_____
30 minutes	_____	_____	_____
60 minutes	_____	_____	_____

How long was Unit stored before Start-up? \_\_\_\_\_ Inside \_\_\_\_\_ Outside \_\_\_\_\_

if Outside, were power sections stored upright and covered:  Yes  No

# Customer Video Recording Notice

## NOTICE

- If applicable, in consideration for allowing video recording (“Video Recording”) of Aqua-Aerobic Systems, Inc. (AASI) personnel performing maintenance service or the service of giving instruction or training, the Customer acknowledges that AASI has advised the Customer as follows:
- Customer acknowledges that AASI advises against making the Video Recording based on AASI’s opinion that the subject matter of the Video Recording is best conveyed in person and in an interactive manner. Customer further acknowledges that AASI has no control over the content or quality of the Video Recording, and, therefore, cannot endorse or approve of the Video Recording or the use of the Video Recording for any purpose. The Video Recording is used at Customer’s own risk and is not intended as a substitute for personal training, safety or operating instruction, scheduled maintenance and/or recommended service, or the operating service and maintenance manuals.
- AASI ASSUMES NO LIABILITY IN RESPECT OF THE VIDEO RECORDING, INCLUDING WITHOUT LIMITATION FOR ITS COMPLETENESS OR ACCURACY, ANY CLAIM THAT ARISES OUT OF THE PREPARATION, USE OR RELIANCE UPON THE VIDEO RECORDING IS CUSTOMER’S SOLE RESPONSIBILITY, AND CUSTOMER DOES HEREBY RELEASE, INDEMNIFY, DEFEND AND HOLD AASI HARMLESS FROM ANY CLAIM, CAUSE OF ACTION, LOSS, EXPENSE, DAMAGE OR LIABILITY THAT ARISES THEREFROM.
- Upon request Customer shall give AASI a copy of the Video Recording.
- The Video Recording shall be made at a mutually agreed upon date. The Customer’s Video Recording operator and equipment shall not hinder or distract AASI personnel during their work.
- Customer agrees not to prepare any derivative works from the Video Recording.
- The training, service, maintenance and/or demonstration actually depicted on the Video Recording are AASI’s proprietary information (the “Information”). AASI’s permission for Customer to use the Video Recording does not grant Customer any right or license, express or implied, under any patent or other intellectual property rights of AASI, except for Customer to use the Video Recording for Customer’s own operations and use. Customer’s obligations of limited use and nondisclosure with respect to the Video Recording shall continue in perpetuity.

# Shutdown and Restarting Instructions for Aqua-Jet® Surface Mechanical Aerators

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Turn the unit “off” at the control panel.

Using appropriate lock-out/tag-out procedures, power from all sources should be disconnected and locked out before working on the equipment or controls. The following Safety Precautions should also be utilized.

## **Safety Precautions**

Persons involved in installing, operating or maintaining equipment are advised to observe all normal safety precautions and warnings within the manual to ensure their safety.

As with any electrical machinery, work should be done only by qualified personnel. Power from all sources should be disconnected and locked out when working on equipment or controls.

Because Aqua-Jet® Surface Mechanical Aerators operate in liquid filled basins, any work done on aerators when they are in or near a basin should be done only by persons wearing Coast Guard approved personal flotation devices. No person should work on aerators while alone. Aerators are not made for the purpose of supporting persons, and work should not be done by a person positioned on the aerator. It is recommended that any aerator being serviced be first removed to the edge of the basin.

In addition, anyone working in or around equipment operating in wastewater treatment facilities should exercise all necessary precautions with regard to personal hygiene and sanitation.

## **Service Instructions (Including Repair Procedures & Spare Parts)**

The Aqua-Jet® is relatively simple to service. Should it become necessary to repair or replace worn or damaged parts, service work should be done with care.

Aqua-Aerobic Systems maintains a competent repair facility to repair or recondition your equipment should it become necessary. Contact our plant in Loves Park, Illinois to make arrangements to return your unit or power section to the factory for service. Telephone 815/654-2501 or 800-940-5008 and ask for the Customer Service Department.

For motor service work (whether it is for repair or reconditioning), it will probably be necessary to take the motor to a factory-authorized service shop, after you have contacted Aqua-Aerobic Systems. Aqua-Aerobic Systems will see that you are directed to a service shop near you that can rebuild the motor to its original condition. To make these arrangements, contact our plant in Loves Park, Illinois by calling 815/654-2501 and asking for Customer Service.



When requesting service work, always mention the following:

- Motor horsepower rating
- Voltage
- Model
- Serial numbers

This data is found on the stainless steel nameplate on the motor frame.

Repairs not authorized by Aqua-Aerobic Systems, Inc. via our P.O. Number will be at your expense.

## **Restarting the Unit**

### **NOTICE**

**All electrical measurements and/or adjustments should be made only by qualified personnel observing all necessary safety precautions!**

### **CAUTION**

**Do not restart the unit more than four (4) starts per hour because excessive restarts can cause motor damage and/or premature failure of the unit.**

<b>Problem</b>	<b>Possible Cause</b>	<b>Suggested Procedure</b>
Unit fails to start.	Faulty wiring at motor junction box or loose connections.	Check wiring diagram on motor nameplate against connection in junction box and connectors.
	Faulty wiring at control panel or loose connections.	Check wiring in control panel.
	Improper fuses or heaters.	Check fuses and heater for proper sizes.

Refer also to the Trouble Shooting Guide within Section-3 Maintenance and Trouble Shooting for other possible causes and suggested procedures.

# Emergency Operation Instructions for Aqua-Jet® Aerators

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When an equipment malfunction occurs, the Troubleshooting Section should be utilized to diagnose the possible problem and solution. The following instructions should be utilized to shutdown an Aqua-Jet® aerator in order to prevent further damage to the system and other equipment or in the case of fire, explosion, spills, or other emergency situations:

Turn the unit “off” at the control panel.

Using appropriate lock-out/tag-out procedures, power from all sources should be disconnected and locked out BEFORE working on the equipment or controls. The following Safety Precautions should also be utilized.

## **Safety Precautions**

Persons involved in installing, operating or maintaining equipment are advised to observe all normal precautions to ensure their safety.

As with any electrical machinery, work should be done only by qualified personnel. Power from all sources should be disconnected and locked out when working on equipment or controls.

Because Aqua-Jet® aerators operate in liquid filled basins, any work done on aerators when they are in or near a basin should be done only by persons wearing Coast Guard approved personal flotation devices. No person should work on aerators while alone. Aerators are not made for the purpose of supporting persons, and work should not be done by a person positioned on the aerator. It is recommended that any aerator being serviced be first removed to the edge of the basin.

In addition, anyone working in or around equipment operating in wastewater treatment facilities should exercise all necessary precautions with regard to personal hygiene and sanitation.

## **Service Instructions (Including Repair Procedures & Spare Parts)**

The Aqua-Jet® Aerator is relatively simple to service. Should it become necessary to repair or replace worn or damaged parts, service work should be done with care.

Aqua-Aerobic Systems maintains a competent repair facility to repair or recondition your equipment should it become necessary. Contact our plant in Loves Park, Illinois to make arrangements to return your unit or power section to the factory for service. Telephone 815/654-2501 and ask for Customer Service.

For motor service work (whether it is for repair or reconditioning), it will probably be necessary to take the motor to a factory-authorized service shop, after you have contacted Aqua-Aerobic Systems. Aqua-Aerobic Systems will see that you are directed to a service shop near you that can rebuild the motor to its original condition. To make these arrangements, contact our plant in Loves Park, Illinois by calling 815/654-2501 and asking for Customer Service. When requesting service work, always mention the following:

- Motor horsepower rating
- Voltage
- Model
- Serial numbers

This data is found on the stainless steel nameplate on the motor frame.

REPAIRS NOT AUTHORIZED BY AQUA-AEROBIC SYSTEMS VIA OUR P.O. NUMBER WILL BE AT YOUR EXPENSE.

### **Restarting the Unit**

#### **NOTICE**

**ALL ELECTRICAL MEASUREMENTS AND/OR ADJUSTMENTS SHOULD BE MADE ONLY BY QUALIFIED PERSONNEL OBSERVING ALL NECESSARY SAFETY PRECAUTIONS!**

#### **CAUTION**

**Do not restart the unit more than four (4) starts per hour because excessive restarts can cause motor damage and/or premature failure of the unit.**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SUGGESTED PROCEDURE</b>
Unit fails to start.	Faulty wiring at motor junction box or loose connections.	Check wiring diagram on motor nameplate against connection in junction box and connectors.
	Faulty wiring at control panel or loose connections.	Check wiring in control panel.
	Improper fuses or heaters.	Check fuses and heater for proper sizes.

Refer also the Troubleshooting Section for additional possible causes and suggested procedures.