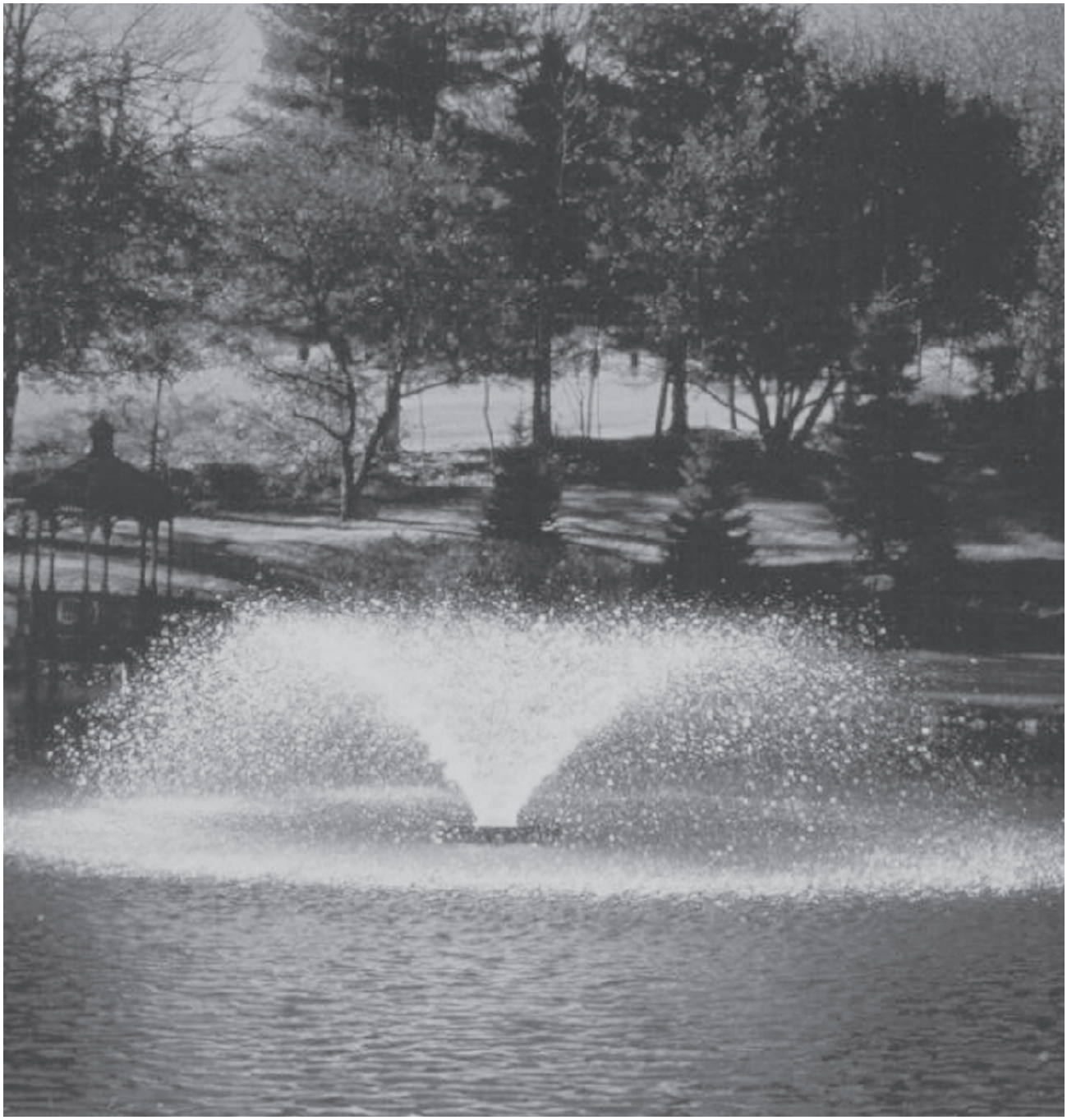
LM Service Manual



Contents

Introduction

This manual is designed to assist in the servicing of the complete line of Rain Bird® aeration products, and pumps. All of the necessary technical information and procedures needed to effectively trouble shoot any service any situation have been provided. Although it is primarily written to support Rain Bird®'s network of factory support technicians, it can be used by un-trained personnel in servicing Rain Bird® products. The manual is designed to be a stand alone reference tool. It is made up of 10 sections that pertain to a specific product line, and 2 separate sections covering Rain Bird® warranty procedures, and suggested service programs for authorized service centers. Each section follows the same format; a basic product description, a list of the required tools, flow charts for efficient problem diagnosis, a complete section depicting all repair procedures, an entire section on how to get units in and out of the water, a section depicting various optional accessories, and a section on annual maintenance.

Lake Management Aerator Product Description

The Lake Management Aerator (LM) family of aerators represents the culmination of 40 years of experience in the aeration field. All LM products are constructed of stainless steel and valox thermo-plastics. These units are corrosion resistant and approved for use in salt water.

All LM units incorporate a low speed motor which is run in an oil bath which provides cooling and lubrication. These low speed motors provide a savings in operating cost of 10 to 25% that of high speed motors. Spray patterns of all the units are interchangeable and any unit can be converted to an alternate model in a matter of minutes.

The basic LM package contains a motor unit (this includes float, support arms, and misc. mounting hardware), a pumping system, 50 feet (or 15 meters) of under water power cable, and a weather resistant power control center. As package the LM is the only aerator which is safety tested and approved. No other manufacturer can make this claim.

LM is currently available in 1 thru 5 hp and in five different models; LM10, LM11, LM20, LM30 and LMM.

LM10
Aesthetic beauty and reliability – the LM10 offers both. Its principal feature is a one-plume, geyser-like spray pattern that reses high into the air when the system is in operation.

LM11
Designed to transfer dissolved oxygen into the water with efficiency and economy, the LM11 delivers an unparalleled level of water quality management. With its well-proportioned fan-shaped spray, the LM11 is a perfect balance of form and function.

LM20
This aerator solution operates at a lower pumping rate than high-volume aeratin gunits, yet is significantly higher when compared to fountains. The dual spray pattern is not only aesthetically pleasing, but efficiently functional.

LM30
The differentiating feature of this aerator is its multi-dimensional three-plume design. Again beauty and efficiency combine to provide engaging aesthetics and ecological balance.

LMM
Primarily installed for their aesthetic appeal, these multi-pattern aerators do, however, provide limited water quality enhancement in smaller ponds and lakes.

Tools/Equipment for Rain Bird® Service Centers

QTY	DESCRIPTION
1 Set	Screwdrivers - Medium size (Flat and Phillips)
1 Set	3/8" Socket Set with following sockets 1/4",5/16",7/16",1/2",9/16",7/8",15/16",1".
1 Set	Open end wrenches - up to 5/8"
1	Channel Lock Pliers
1	Needle Nose Pliers
1	Wire Cutters
1	Wire Strippers/Crimpers
1	Bearing Puller
1 Set	Allen Wrenches including 1/8",5/16",7/32',3/8"
1	Hammer
1	Putty knife
1	Small Funnel
1	Hex Nut Driver 1/4"
1	Hex Nut Driver 5/16"
1	Snap Ring Plier
1	Small Tooth Brush
1	Wire Brush
1	Machinist Scribe with hooked end
1	Capacitance Meter
1	Water Tub for leakage testing (42"L x 24" W x 24" H)
	Electrical supply with test leads capable of delivering 115/230 volts 1ph. and 230 3ph. If a high number of 460V units are being serviced, a 460V supply is highly recommended.
1	Small Air Compressor with Regulator to supply maximum of 10 PSI

CAUTION: The air supply must have an adjustable regulator. The LM unit must only be tested at a maximum of 5 PSI. Other units may be tested to 10PSI max. Damage/physical harm may occur if a LM unit is tested at a pressure greater than 5 PSI!

Optional Equipment

1	Vacuum Supply with Gauge (to perform LM leak tests)

Custom Tools Supplied by Rain Bird®

QTY	PART NUMBER	DESCRIPTION
1	SS-10	Ceramic Seat Driver
1	SS-C230	Bearing Driver
1	SS-C350	Seal/Motor Base Plate Installation Tool
6	SS-C260	Motor Installation Bolt
12	GP5011	#10 Flat Washer
1	SS-C290	Motor Stand
1	SS-C300	Bulkhead Inserter
1	SS-C320	Air Fitting, MBP
1	SS-C330	Support Arm Brace
1	SS-C340	Torque Screwdriver, Preset 30in/lbs
1	41-0012	Oil plug hex key & dipstick
1	41-0076	Rotary seal spacer, 175
1	46-0103	Franklin submersible motor shaft height gauge
1	SS-50	Prop alignment spacer, 350

Consumable Supplies

NOTE: Vendor's Part numbers are given as reference, exact equivalent from an alternate vendor may be substituted. If equivalency is questionable, contact Rain Bird®.

Mild Soapy Water	Leak Detection
Isopropyl Alcohol	Cleaning Rotary Seals Mating Surfaces
Dri Lube with TFE Dem-Kote 2W757A	Installing C2 Motor Base Plate into S/S Housing
Locktite 819 Hylomer Permatex Hylomar HPF Gasket Dressing	Installing C2 & C3 Bulkheads & 10HP Bottom Throat O-ring
All-purpose Grease, 630-AA Lubriplate Fiske Bros. Refining	Lube Motor Shaft & Hold Wavey Washer in Place During Assembly
RTV Sealant Dow Corning 732	Installing 350,175 Motor Mount Bolts
Pipe Thread Sealer with TFE Anti Seize Technology	Installing Oil Plugs on C3,350,175
Teflon Thread Tape Anti-Seize Technology	Installing 175/350 Bulkheads
Removable Threadlocker Locktite 242	General Use, Securing bolts
Silicone Dielectric Compound P/N 48-0001	Underwater Bulkhead/Cable Connections
Oil P/N 667-002	Lubricating Seal Mating Surfaces
Seal Lubricant P/N 48-0003 P/N 48-0004	Lubricating Rotary Seal and/or components P/N 48-0003 - single use pack P/N 48-0004 - 1 pint size of lubricant

Problem Diagnosis

In solving any problem with an aerator, the following information should be obtained and recorded before visiting the site . This data will assist you reaching the proper and quickest solution and may provide enough information to resolve the issue over the phone, saving a service call. It will also be required, if a warranty claim is being made.

Aerator unit type, model, horsepower, phase, and serial number

Cable lengths and wire gauge size

Is a phase converter/transformer being used.

Running voltages and amperage readings

Description of problem

Description of spray pattern

How does unit appear in the water?

Water quality / depth

Have there been any lightening storms or brown outs lately?

Was the unit moved or reanchored?

Obtaining all this information about the site for every problem, may seem unnecessary at times. However, being consistent about data collection will save you time in the long run and prevent follow-up calls for warranty claims.

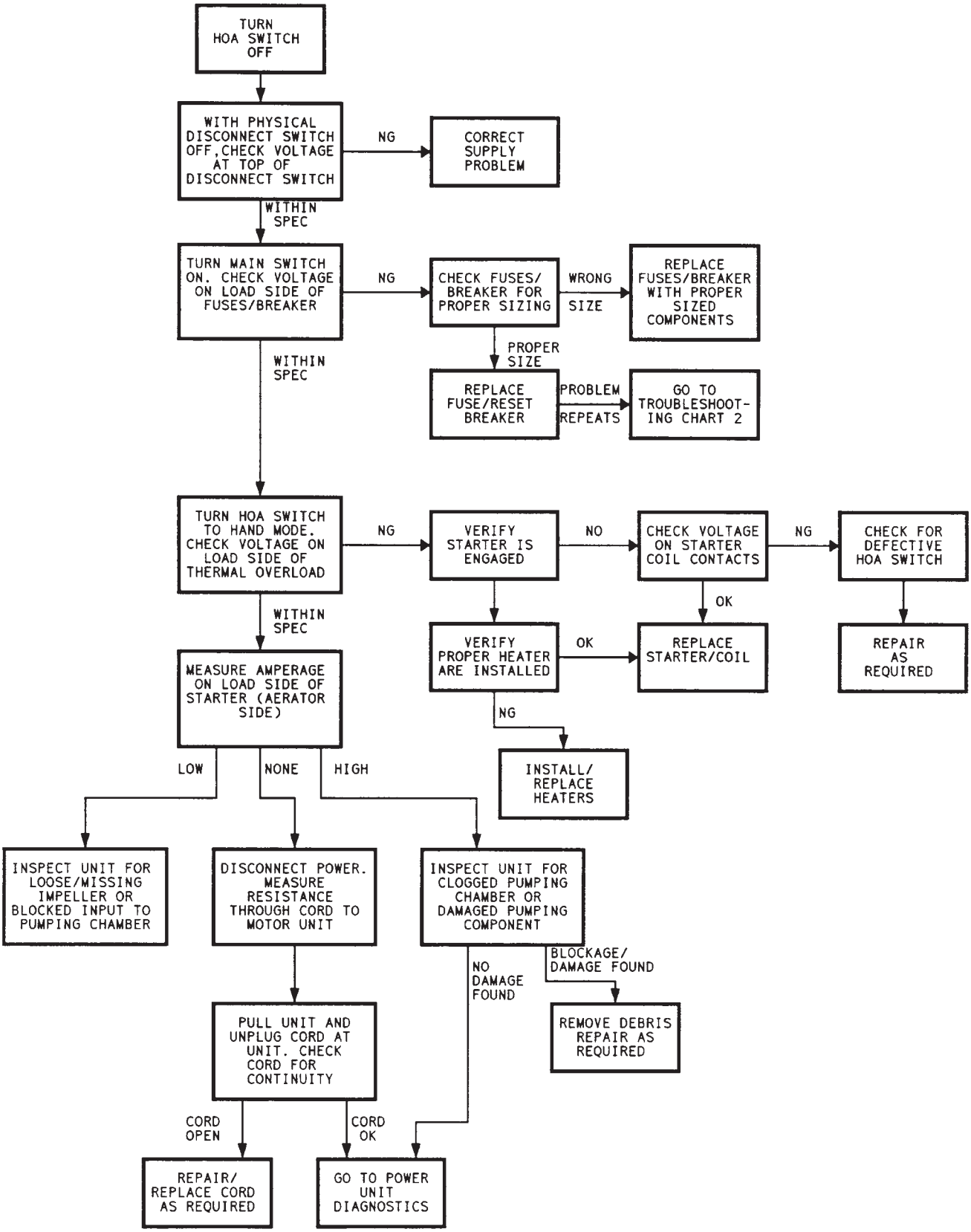
Located on the following pages are several troubleshooting charts to aid you in finding the cause of the problem. Once the site is analyzed, please refer to the appropriate flowchart.

Trouble Shooting Chart Index

These troubleshooting charts are provided to serve as a guide in locating the cause of failure. The flowcharts are designed to locate the fault in an orderly manner. Other charts are formatted, listing the major symptoms, causes, and systematic order of repair.

TROUBLESHOOTING CHART #1
UNIT NOT OPERATING - NO SYMPTOMS

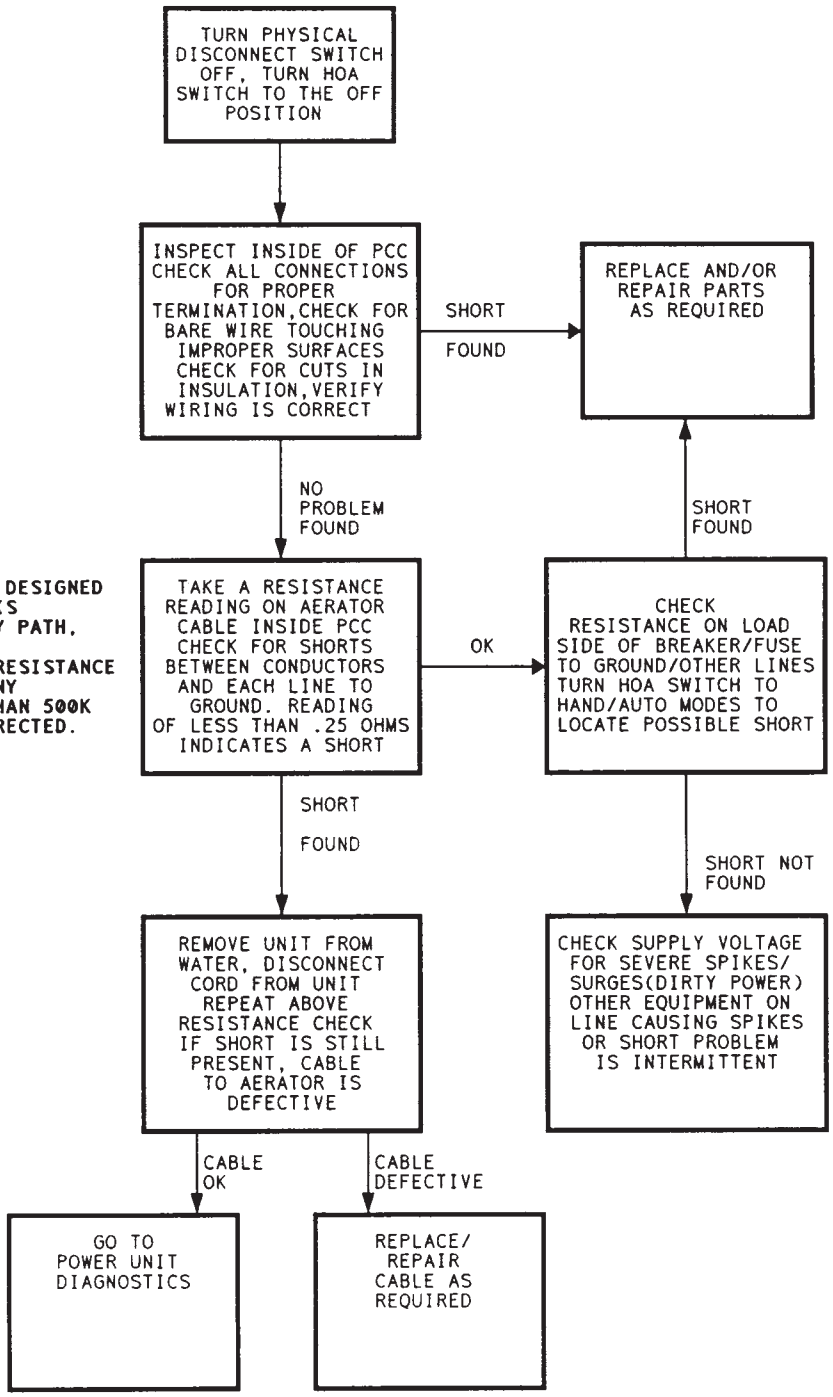
!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.



TROUBLESHOOTING CHART #2
UNIT NOT OPERATING - CIRCUIT BREAKER TRIPS/FUSE BLOWN GFCI/EPD DEVICE TRIPS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

NOTE: CIRCUIT BREAKER AND FUSES ARE DESIGNED TO PROTECT AGAINST DIRECT SHORTS BETWEEN THE LINES OR TO GROUND IF THE PROBLEM IS INTERMITTENT, USE OF A FAST RESPONSE OHM METER IS RECOMMENDED TO LOCATE THE SHORT

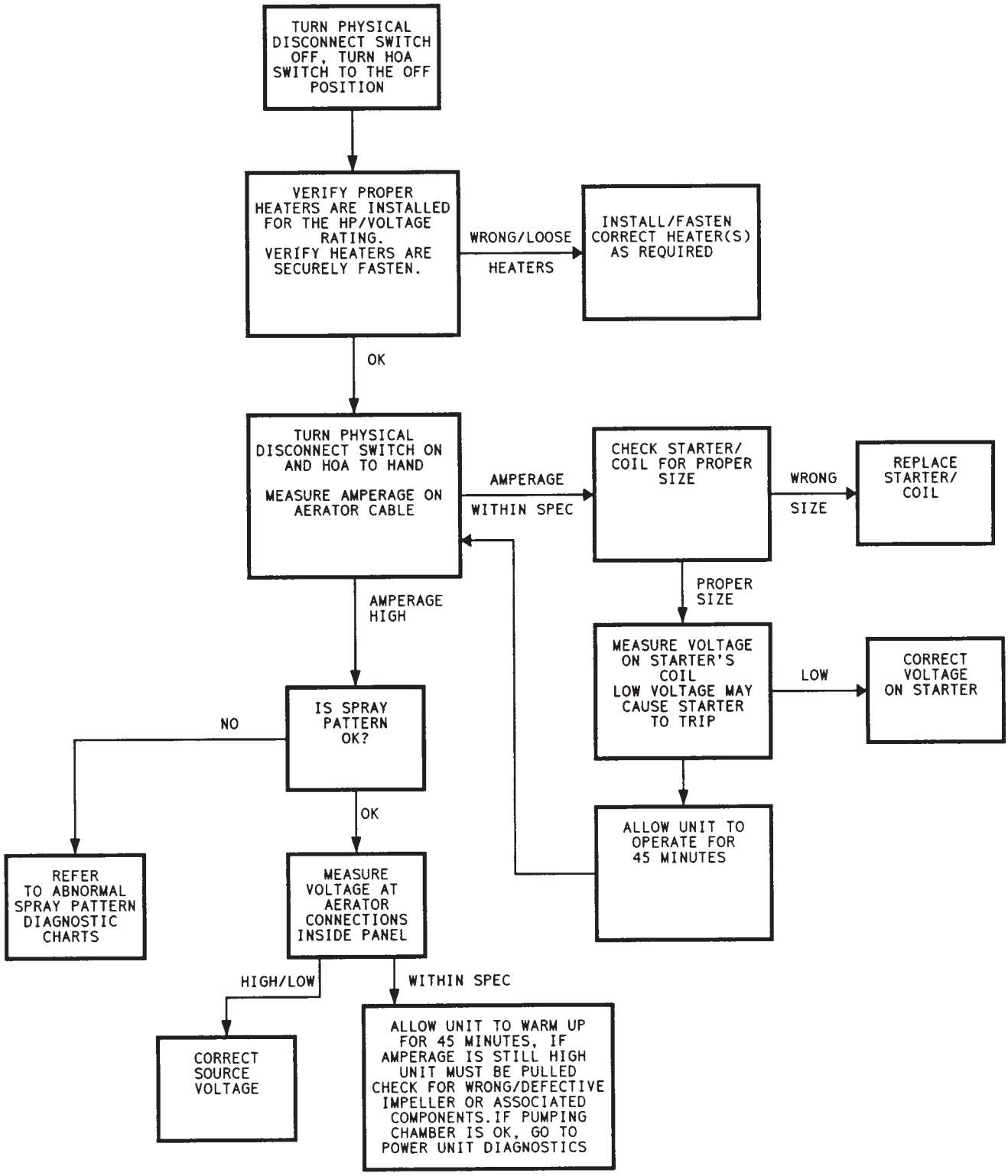


NOTE: GFI/EPD DEVICES ARE DESIGNED TO TRIP WHEN THERE IS CURRENT GOING TO ANY PATH, OTHER THAN THE MAIN CONDUCTORS. IF THE RESISTANCE TO GROUND BETWEEN ANY CONDUCTOR IS LESS THAN 500K OHM, IT MUST BE CORRECTED.

TROUBLESHOOTING CHART #3
UNIT NOT OPERATING - STARTER TRIPS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

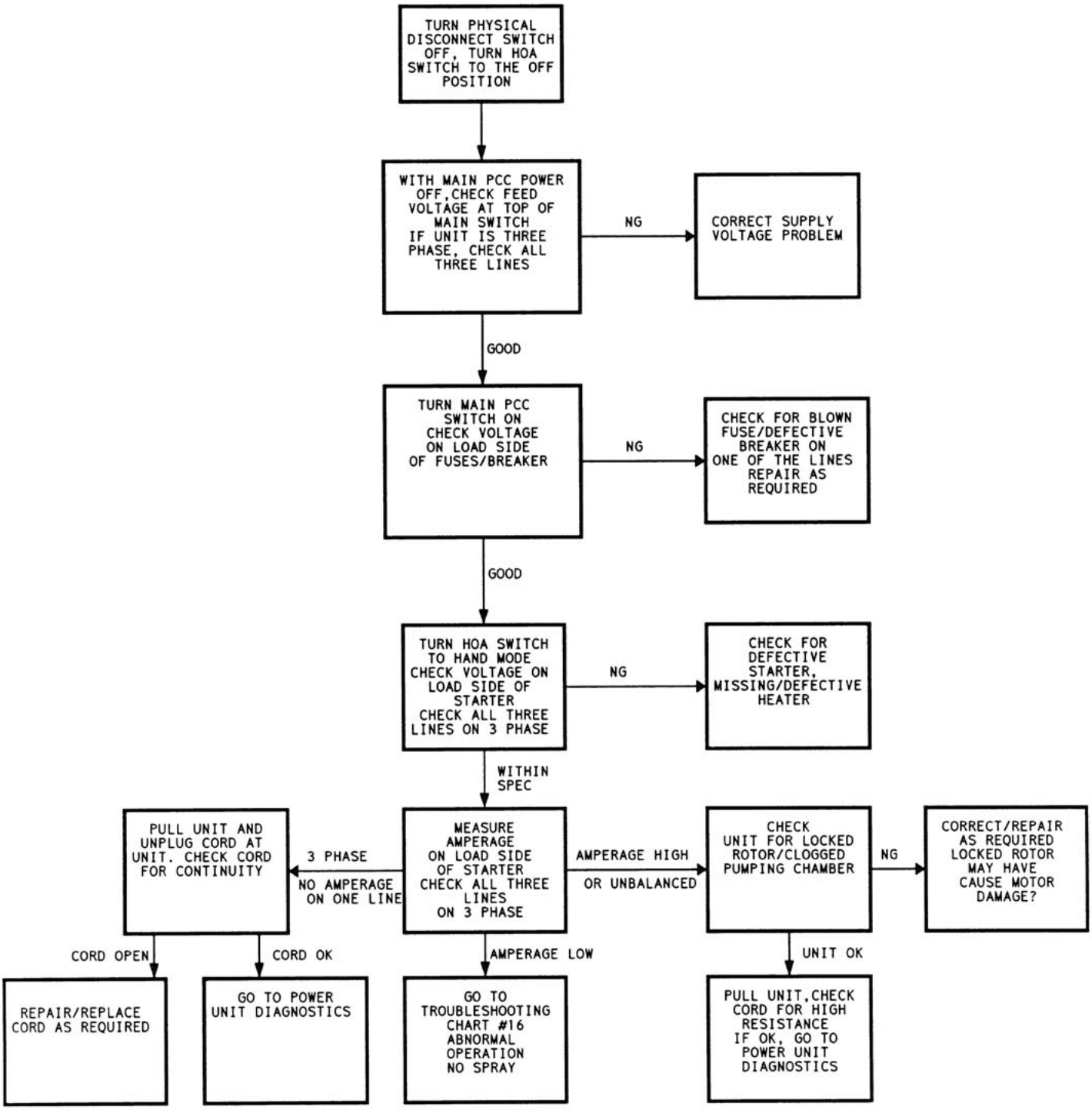
NOTE: THE THERMAL OVERLOAD IS DESIGNED TO PROTECT THE MOTOR FROM OPERATING AT HIGHER THAN NOMINAL CURRENT USING A THERMAL OVERLOAD OF A HIGHER RATING MAY CAUSE MOTOR FAILURE



TROUBLESHOOTING CHART #4
UNIT NOT OPERATING - UNIT HUMS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

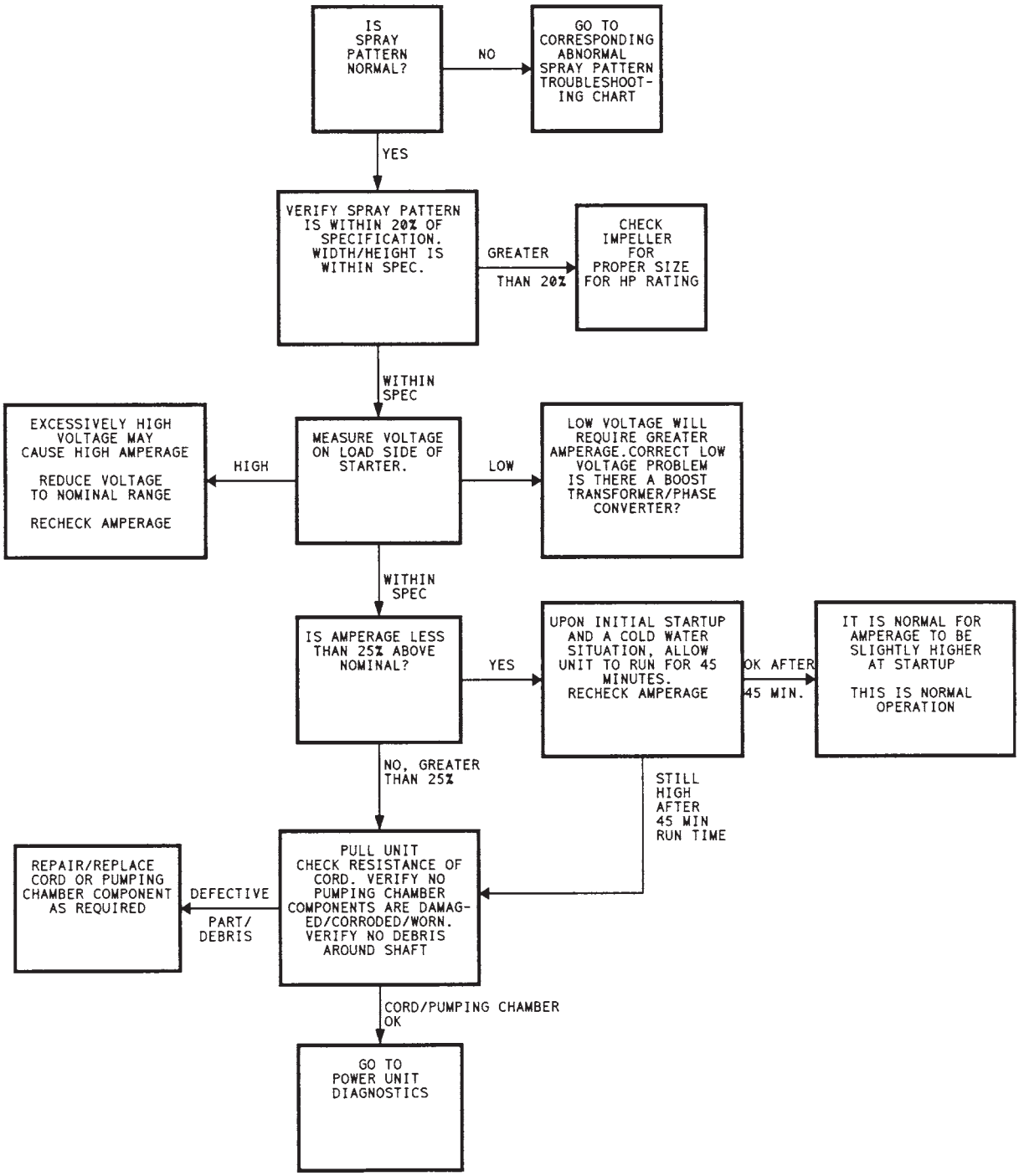
NOTE: IF THE UNIT HUMS AND NO SPRAY IS PRESENT, THE POWER SHOULD BE IMMEDIATELY DISCONNECTED TO PREVENT POSSIBLE DAMAGE TO THE UNIT. SINGLE PHASING ON THREE PHASE UNITS IS A MAJOR CAUSE OF THIS PROBLEM.



TROUBLESHOOTING CHART #5
ABNORMAL OPERATION - HIGH AMPERAGE/CURRENT

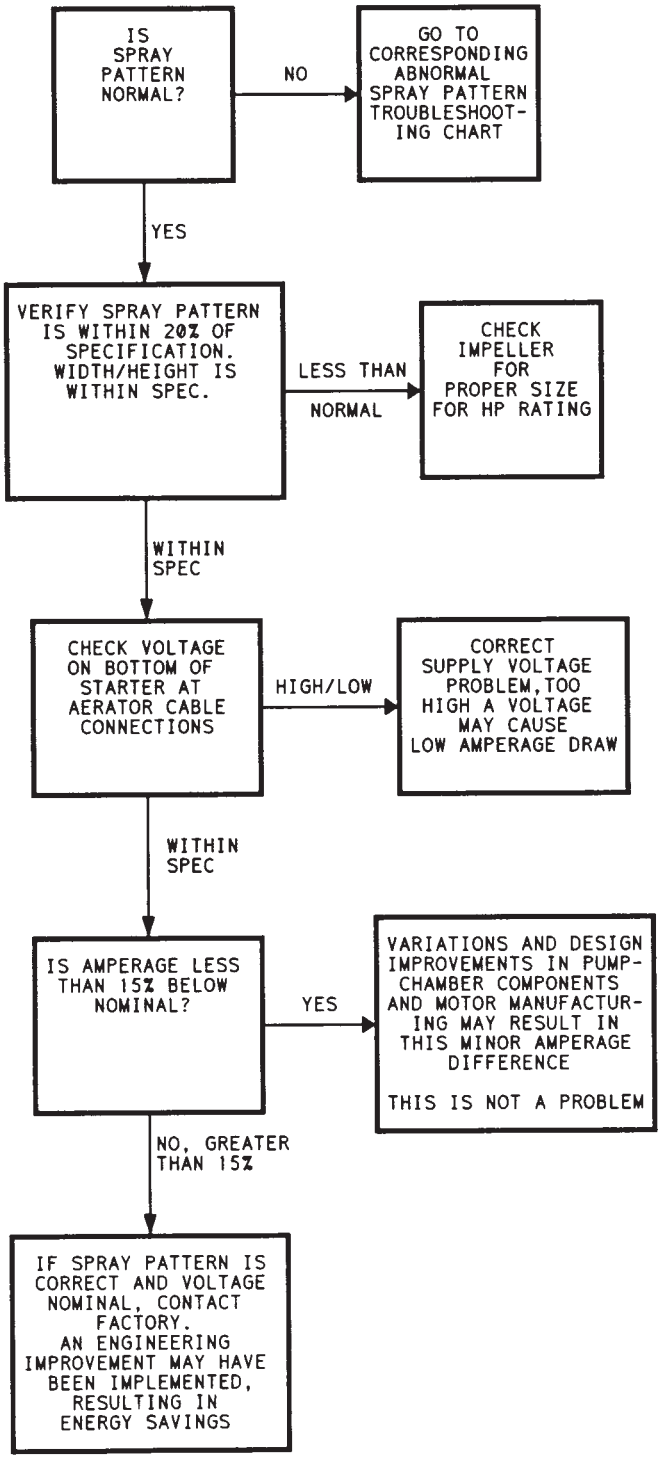
!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST BE PERFORMED BY QUALIFIED PERSONNEL.

NOTE: A UNIT RUNNING CONSTANTLY AT HIGH AMPERAGE MAY CAUSE OVERHEATING. THERMAL OVERLOADS ARE DESIGNED TO DISCONNECT POWER WHEN HIGH AMPERAGE IS PRESENT. DO NOT CONTINUIOUSLY RESET THE STARTER TO ALLOW UNIT TO OPERATE. VERIFY CORRECT HEATERS ARE INSTALLED SECURELY AND FIND CAUSE OF HIGH AMPERAGE



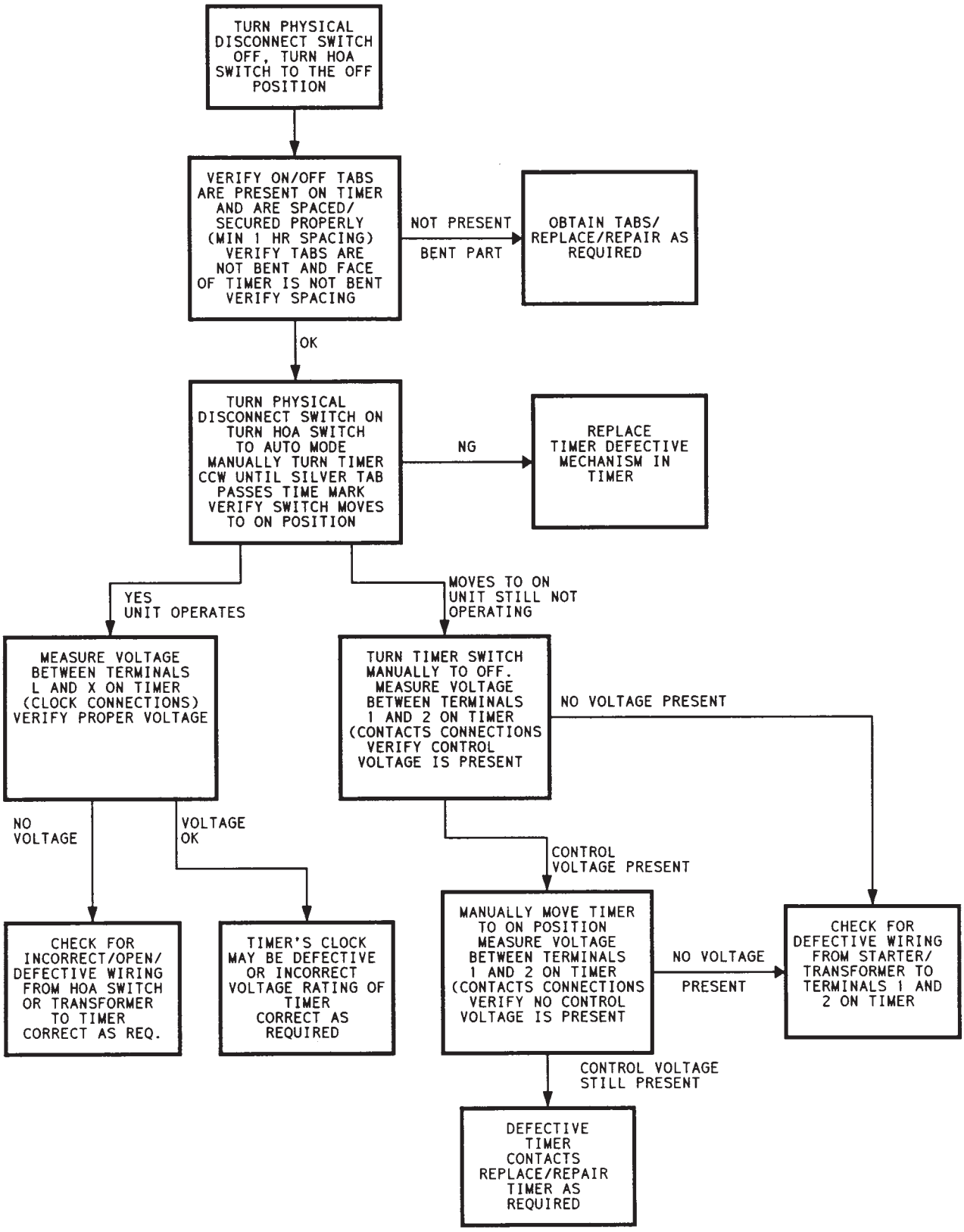
TROUBLESHOOTING CHART # 6
ABNORMAL OPERATION - LOW AMPERAGE/CURRENT

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.



TROUBLESHOOTING CHART #7
ABNORMAL OPERATION - OPERATES IN HAND MODE ONLY

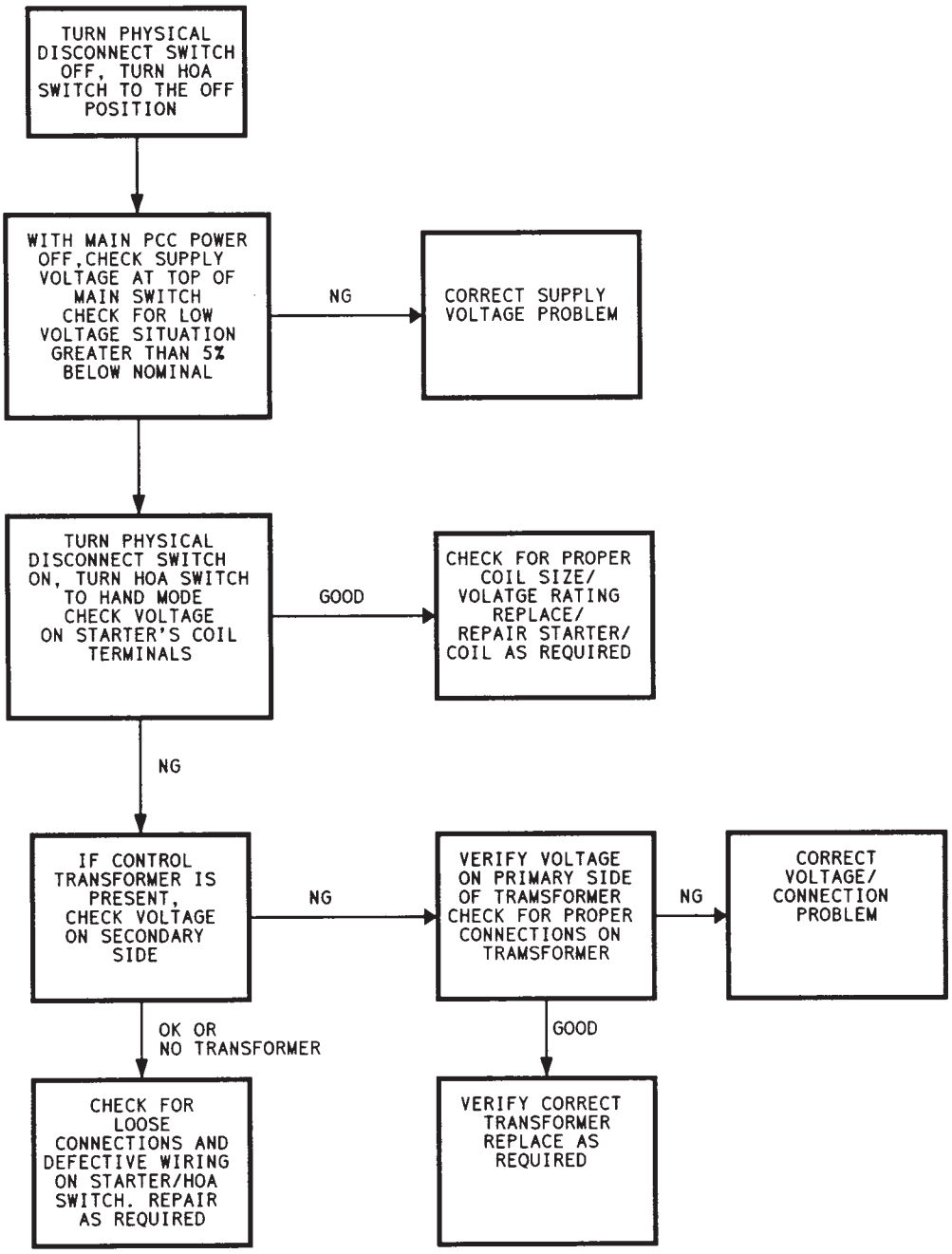
!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.



TROUBLESHOOTING CHART #8
ABNORMAL OPERATION - STARTER RELAY CHATTERS/HUMS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

NOTE: IF THE STARTER CHATTERS OR HUMS IS IS NORMALLY CAUSED BY LOW VOLTAGE ACROSS THE COIL OR THE COIL IS THE IMPROPER SIZE/RATING



Trouble Shooting Chart #9
Abnormal Operation - Unit Rotates

SYMPTOMS

- When unit is turned on, it rotates continually
- Units spins over 125 degrees when power is applied

CAUSES

- Improper anchoring / mooring of unit

SYSTEMATIC ORDER OF REPAIR

- Check that all anchor/mooring lines are attached
- Verify anchor/mooring lines are attached per installation guidelines.
  Float must be free only to rotate a maximum of 90 degrees.
- Verify unit is not touching bottom
- Check that the anchors are not too close together, refer to installation guidelines for minimum distance between anchors

Trouble Shooting Chart #10
Abnormal Operation - Excessive Vibration

SYMPTOMS

- While operating, excessive vibration is detected (unit shaking)
- High amperage draw

CAUSES

- Loose/broken motor mount bolts
- Bent motor shaft/impeller
- Broken impeller/slinger disc/support arm
- Debris caught on motor shaft
- Wrong size/type impeller

SYSTEMATIC ORDER OF REPAIR

- Inspect impeller/pumping chamber for debris/damage
- Verify proper components in pumping chamber. Verify parts are assembled correctly
- Inspect support arms assembly. Is assembly intact, bolts snug, no cracks?
- Inspect motor shaft. Is it bent?

Trouble Shooting Chart #11
Thin/Weak Spray Pattern - Cavitation

SYMPTOMS

- Very weak and wispy looking spray
- Bubbles escaping from beneath float
- Lower than normal amperage draw (low amps)
- Spray pattern will look normal then suddenly become weak and wispy
- When aerator is turned off and back on, spray will return to normal for some period of time

CAUSES

Air is building up inside the pumping chamber until the chamber becomes air blocked, resulting in ventilation and/or cavitation created by:

- Improper impeller/slinger disc/spacer (LM11)
- Clogged/damaged pumping chamber/screen
- Unit is resting on bottom
- Vent hole in throat clogged (LM11)
- Air entering chamber between throat sections (LM11)
- Excessive wave action (high winds/boat traffic)
- Improper anchoring or mooring

SYSTEMATIC ORDER OF REPAIR

- Verify anchor/mooring lines are attached per owner's manual. One side may be pulling the float down in the water, float must be free to rotate 90 degrees. High waves may cause air to enter beneath float if not anchored/moored properly
- Verify unit is not touching bottom
- Inspect for clogged screen/pumping chamber
- Inspect throat assembly. Verify silicon sealant is intact around throat sections. Verify 1/8" vent hole in throat is open to relieve any trapped air (LM11)
- Inspect impeller assembly for proper size, missing washer or wrong size spacer
- Inspect impeller assembly for damage. Replace (not repair) any bent or damaged components

Trouble Shooting Chart #12A
Uneven Spray Pattern (LM11 Models)

SYMPTOMS

- Spray pattern is not centered around float
- Spray pattern is higher on one side

CAUSES

- Unit is anchored/moored improperly
- Impeller assembly is not centered in throat
- Unit is resting on bottom

SYSTEMATIC ORDER OF REPAIR

- Verify anchor/mooring lines are attached per owner's manual. One side may be pulling the float down in the water, float must be free to rotate 90 degrees.
- Verify unit is not touching bottom, if touching shorter support arms are available
- Inspect impeller and throat assembly. Verify impeller is centered in throat. If not:

  a) If unit has adjustable support arm, adjust as required to center impeller

  b) For units without adjustable arm, remove support arms and rotate throat assembly and/or arms to obtain best centering of impeller

Trouble Shooting Chart #12B
Uneven Spray Pattern (LM10/LM20 Models)

SYMPTOMS

- Spray pattern is not full
- Side spray in addition to center spray is present (LM10)
- Outer spray pattern is heavy on one side. Center spray is off axis (LM20)
- Outer spray pattern is empty at some locations (LM20)
- Outer pattern is not centered around float (LM20)

CAUSES

- Unit is anchored/moored improperly
- Clogged pumping chamber
- Unit is resting on bottom
- Improper assembly of diffuser plate
- Diffuser plates o-ring missing or damaged (LM10)
- Badly deteriorated diffuser plate

SYSTEMATIC ORDER OF REPAIR

- Verify anchor/mooring lines are attached per owner's manual. One side may be pulling the float down in the water, float must be free to rotate 90 degrees.
- Verify unit is not touching bottom, shorter support arms are available
- Inspect diffuser plate. Check for damaged plate/ debris in holes. Clean/replace as required. Do not over tighten nylon lock nut.
- Inspect diffuser o-ring. Replace as necessary (LM10)

Trouble Shooting Chart #13
Low Spray Pattern

SYMPTOMS

- Spray pattern has good shape, but is 75% or less of the specified dimensions
- Draws less than normal amperage (low amps)
- Unit has a lower than specified pumping rate
- Unit is only bubbling out water at a decreased rate

CAUSES

- Clogged screen
- Unit riding high in water, resting on bottom of body of water
- Slinger disc is missing (LM11)
- Unit is operating backwards (3 phase units)
- Clogged lower decorative prop chamber (LM10,LM20)
- Unit has the wrong size impeller or damaged impeller

SYSTEMATIC ORDER OF REPAIR

- Verify unit is not setting on bottom
- Check amperage draw
- Inspect screen assembly and pumping chamber for debris. Clean as required.
- Inspect impeller assembly, replace or repair as required
- Verify slinger disc is present and of proper size, verify spacer is of proper size (LM11)
- On 3 phase units, check rotation of impeller. Verify impeller is turning counter clockwise when looking down at impeller.

Trouble Shooting Chart #14
Fluctuating Spray Pattern

SYMPTOMS

- Spray pattern suddenly drops and/or fades, then comes back to original size/shape.
- Spray pattern decreases and increases sporadically.

CAUSES

- High winds
- Low voltage, dirty power, (brown outs)
- Debris caught in pumping chamber, very dirty water
- Clogged lower decorative prop chamber (LM10,LM20)
- Unit touching bottom of body of water

SYSTEMATIC ORDER OF REPAIR

- Check weather conditions, when unit's spray is fluctuating. Winds will blow spray pattern. A LM20 will appear to drop and fall. A sunburst will either fall or appear distorted.
- Check for fluctuating water level; verify unit is not sporadically touching bottom
- Examine for uncommon amount of debris in water (leaves, vegetation, twigs)
- Verify slinger disc is in good shape (LM11)
- Check site voltage. Is unit on same line as other equipment? Does site have history of brown outs?

Trouble Shooting Chart #15
Enlarged/Heavy Spray Pattern

SYMPTOMS

- Larger Spray Than Specification >20%
- Thicker Pattern Than Normal
- High Amperage Draw

CAUSES

- Wrong Impeller
- Throat damaged/missing (LM11)
- Diffuser Plate Openings Worn, Oversized (LM10,LM20)
- Damaged impeller/pumping chamber component
- Wrong spacer/slinger disc (LM11)
- Wrong power unit

SYSTEMATIC ORDER OF REPAIR

- Inspect diffuser plate; Are openings worn/deteriorated beyond specifications (LM10/LM20)
- Inspect impeller assembly; Does unit have correct size impeller/slinger disc/spacer?
- Check for damaged impeller assembly/throat

Trouble Shooting Chart #16
No Spray

SYMPTOMS

- Unit operates, but no spray can be detected
- Low amperage draw (low amps)

CAUSES

- Impeller missing/loose
- Unit has damaged shaft (LM11)
- Unit riding high in water, sitting on bottom of body of water

SYSTEMATIC ORDER OF REPAIR

- Verify unit is not setting on bottom
- Inspect impeller assembly, replace or repair as required

Trouble Shooting Guide

SYMPTOM	POSSIBLE CAUSE	CORRECTION
1) No bubbles in water discharge (Aspirating model only)	Clogged air hose	Remove debris
	Cut or broken hose	Replace Hose
	Motor running clockwise	Have alectrician switch two wires at motor starter
	Unit too deep	Move unit to shallower water
2) No water discharge	Debris around impeller	Remove debris
	Broken impeller	Replace impeller
3) Aerator is wandering	Broken mooring line	Replace broken line
	Loose mooring line	Tighten mooring line
	Unit requires anchors	Add anchor kit
4) Severe vibration	Unit resting on bottom	Move to deeper water
	Broken impeller	Replace impeller
5) Motor will not start	Blown fuse/breaker	Check fuses or breaker at P.C.C.
	Relay has tripped	Check if overload relay tripped
	Broken or disconnected wires	Replace or connect wires
	GFCI devise has tripped	Reset and test GFCI devise. If devise trips again, call electrician or authorized service center.
	Short in power cable	Check condition of power cable

Note: Most problems will be found by pulling the aerator out of the water.

WARNING: DISCONNECT THE UNIT FROM THE POWER SOURCE BEFORE SERVICING THE UNIT!

Power Unit Diagnostics

NOTE: In order to complete the following diagnostic procedures, the “POWER UNIT” will need to be removed from the support arm assembly. (see page x, aerator disassembly procedure).

CAUTION: Always wear protective safety glasses when performing any of the following procedures!

STEP 1. Do a visual check of the overall integrity of the power unit. Note any abnormalities, examples: bulged can, bent shaft.

STEP 2. Take a resistance reading across the motor windings at bulkhead pins. see fig. 1-1. Note: correct resistance readings can be found in Table 1 of POWER UNIT DIAGNOSTICS.

STEP 3. Check resistance between ground pin and line pins at the bulkhead. A resistance reading of less than 1 Meg-ohms, indicates the motor is shorted to ground or the presence of water in the unit.

STEP 4. If unit is not shorted to ground, (step 3), try to start the unit and check the amperage draw at each leg. Correct readings can be found in Table 1 of POWER UNIT DIAGNOSTICS.

STEP 5. Remove oil drain plugs and drain oil. Note the condition of the oil.

a) Dark, foul smell like sulfur - possible burnt winding, unit developed extreme internal heat.

b) Milky - water present in oil.

c) Dark, molasses like in color - blown capacitor

NOTE: Dispose of the drained oil properly, DO NOT REUSE!

STEP 6. Perform a pressure and vacuum test. Insert the LM MBP air fitting (supplied by Rain Bird® in the service center tool kit P/N: SS-320) into one of the oil plug openings. Install a oil plug in the other opening. Apply air pressure.

NOTE: Use only a maximum of 5 psi air pressure to test the unit. ANY GREATER AMOUNT COULD RESULT IN SERIOUS HARM!!

Use a mild soapy water solution to locate any leaks under pressure.

OPTIONAL: Next, perform a vacuum test using equipment capable of reaching 20 in.Hg. maximum. Apply vacuum, clamp off vacuum source, and verify no drop in vacuum in unit.

NOTE: It is important that all findings from the previous diagnostics are noted and retained for future use. This information will be invaluable in determining whether the motor itself can be reused or not.

STEP 7. Evaluate results of steps 1 through 6. Any failure will result in power unit disassemble; proceed to power unit disassemble instructions.

NOTE: It is possible to reuse a motor in which some water was mixed in with the oil. Be absolutely sure that all moisture is out if the motor before reuse. Bearing must be changed if water was present in the power unit.

If the tests indicate no failure or damage, refill unit with new Rain Bird® oil, re-test no load amperage. If amperage check is good, re-assemble aerator unit, and reevaluate site/other components for cause of difficulty.

Power Unit Disassemble Instructions

NOTE: When performing the following steps, please refer to exploded view diagrams for additional assistance.

A. Using a 5/16" nut driver, remove the 6 S/S retaining bolts (Fig. X-1).

!CAUTION!: When all retaining bolts are removed, brass mount ring will fall down along S/S housing. If this does not occur, carefully slide the brass ring down by hand.

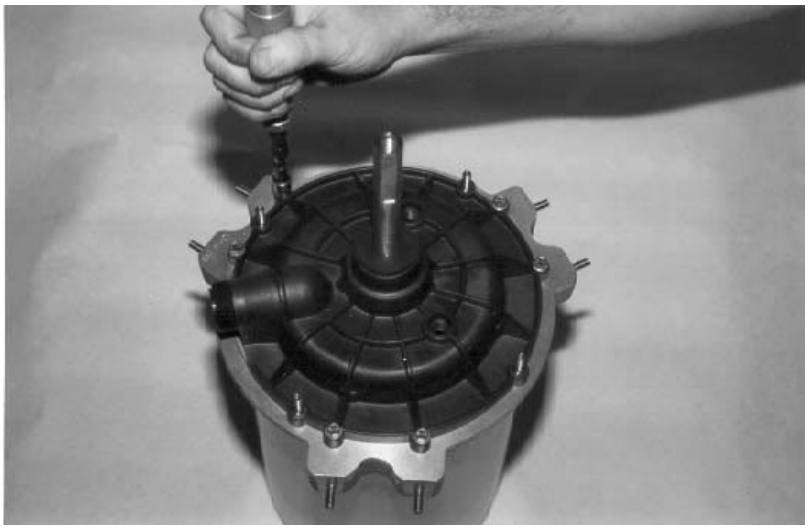


Figure X-1 Removal of (6) retaining nut bolts from the motor base plate.

B. Remove the motor/motor base plate from the S/S housing using the air fitting tool (#SS-320). Install the air fitting tool into one of the oil plug openings, and reinstall an oil plug into the other. Attach an airline to the air fitting and pressurize housing to a maximum of 5 psi. Keep two hands on top of motor base plate for safety, motor/motor base plate assembly will pop out of housing. (Fig. X-2)

NOTE: Wrapping a shop rag around the motor base plate seat will catch any residual oil that may escape as the MBP assembly pops.

!WARNING!: Do not pry on motor base assembly in order to remove, damage to seal area will occur.

Figure X-2 Hook air to motor base plate, firmly grasp motor base plate with two hands and pressurize to 5 PSI. **Note:** wrap a shop rag around motor base plate seat to catch residual oil that may escape as the assembly pops open.

C. Lift motor/MBP assembly out of housing and place it on motor stand (#SS-C290). (Fig X-3)

D. Perform a visual inspection of the motor and motor base plate assembly. Note any abnormalities. Examples: blown capacitor, burnt windings, motor wired improperly, water damage. Spin the motor shaft by hand, do the bearings seem o.k.?, are they noisy?, do they drag?.

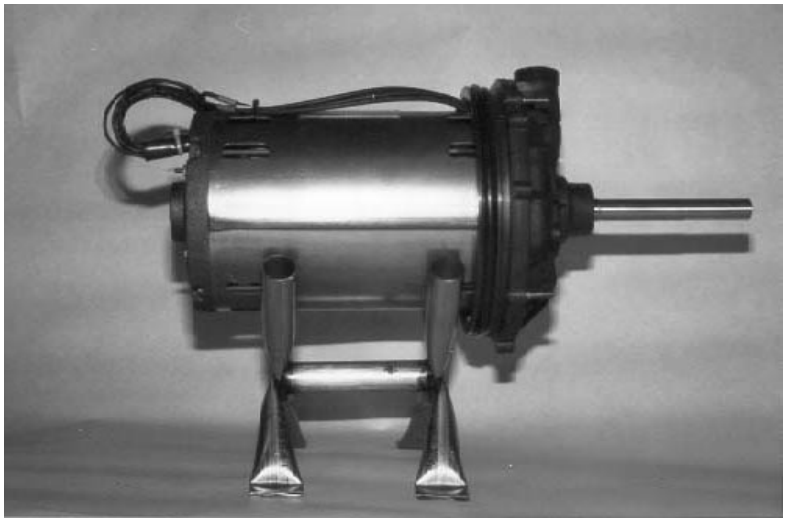


Figure X-3 Place LM motor on motor stand (#SS-C290)

E. On 1 and 2hp single phase units, a capacitor and a start switch is used (Fig X-4). 3hp single phase units have only a capacitor. If it is determined that these are the only components defective; replace these components at this time. To check the start switch,

A) check for visual damage

B) measure resistance between pins 1 and 3, verify short circuit.

C) Check resistance between pins 1 and 2, verify open circuit. (Fig X-5)

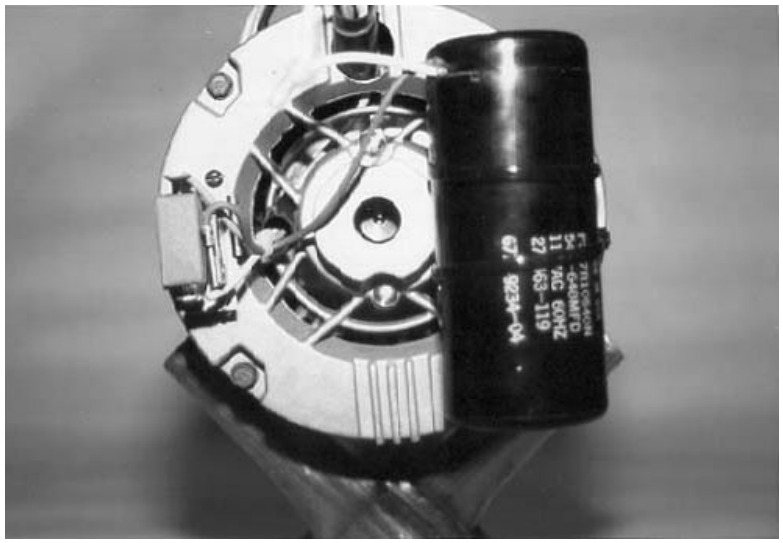


Figure X-4 LM start switch and capacitor location - 1-2 HP single phase Fraklin motors only.

NOTE: Always replace the capacitor and the start/switch as a pair, never one without the other. Check the capacitor on a capacitance meter. After components are attached the power unit can now be re-assembled without disturbing any internal seals. Refer to the power unit re-assembly section.

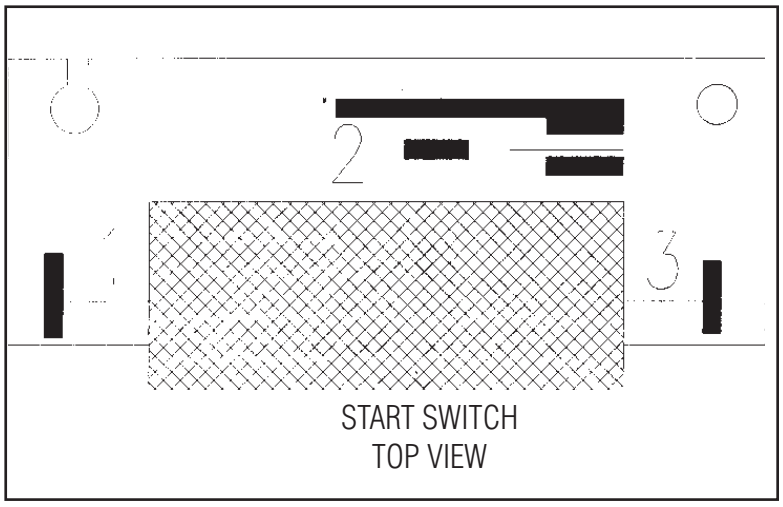


Figure X-5 LM start switch - Franklin motor

F. Motor Base Plate Removal

1. Disconnect all bulkhead wires from the motor.

2. Remove the 4 motor mount bolts. (Fig X-6)

3. Pull the motor base plate assembly away from the motor.

NOTE: Using extreme caution, it will be necessary to use a gear puller such as the one in figure X-8.

G. Remove all seals from the motor base plate assembly.

NOTE: Never reuse any seal, after disturbing them.

H. Inspect the motor base plate for abnormalities. If there is any defects, do not reuse.

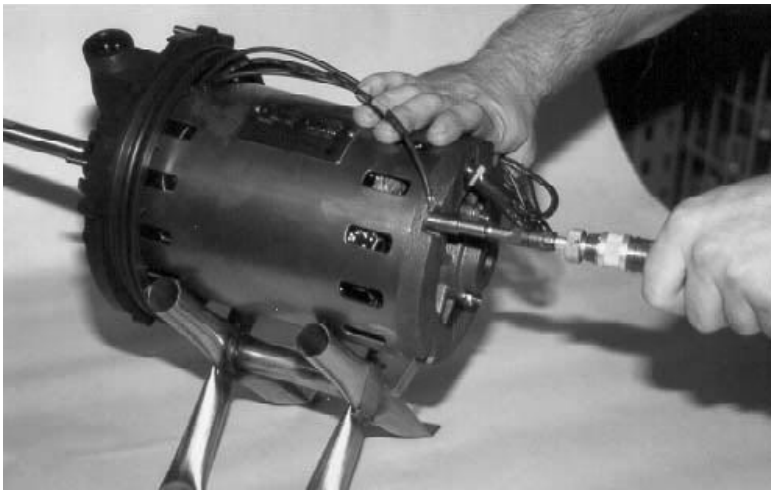


Figure X-6 Remove LM motor mount bolts (4).

I. BEARING REMOVAL/REPLACEMENT

NOTE: If the motor is being replaced, omit this step.

1. If any water was found in the unit, it is recommended that the bearings be replaced.

2. Before changing bearings, verify there was no rotor strike against the stator. If rotor strike is found, do not reuse motor, this can alter the motor's ability to run correctly.

3. Using a bearing puller, remove damaged bearings. (Fig X-8)

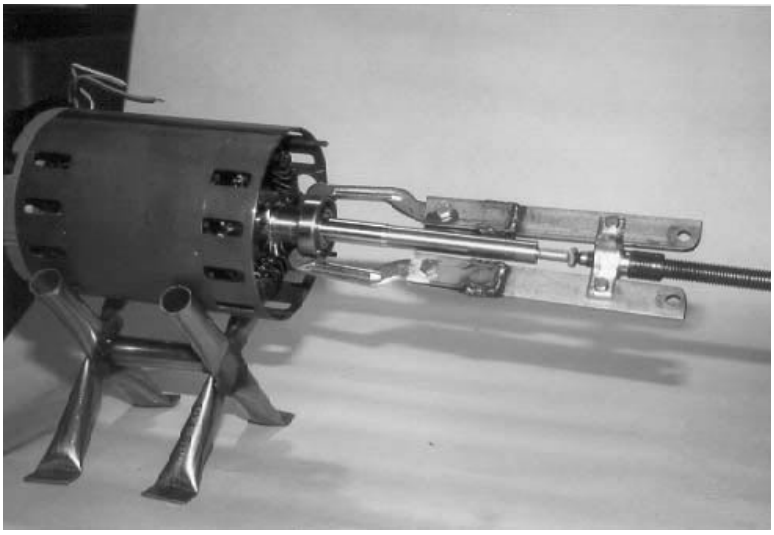


Figure X-8 LM motor bearing removal.

4. Tap the new bearings in place using the bearing driver tool. (P/N:#SS-C230) - (Fig. X-9)

!WARNING!: Never tap on the outer race of the bearing, damage will result.

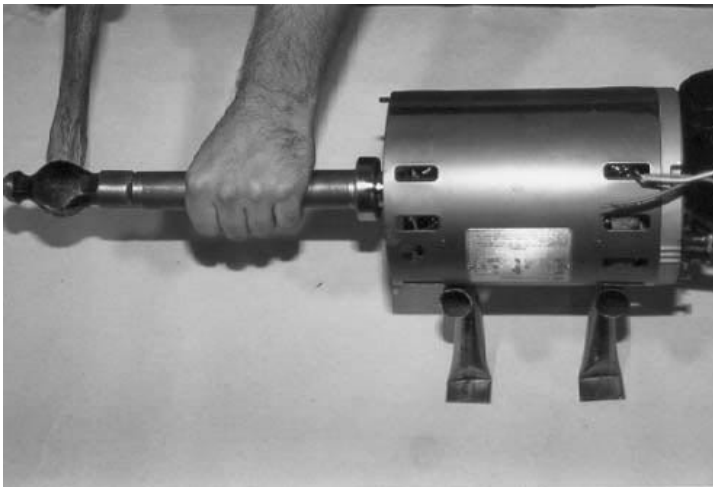


Figure X-9 LM motor bearing installation.

J. BULKHEAD REMOVAL/REPLACEMENT

NOTE: If bulkhead assembly is ok, omit this step.

1. Remove old bulkhead insert (P/N:C2-500) by pushing the inner lip of the insert through the bulkhead opening or by cutting away part of the lip.(Fig. X-10)

2. Using a needle nose pliers, grab one of the pins and pull the insert out.

K. Thoroughly clean the motor base plate. Use a de-greaser that will not leave a residue behind.

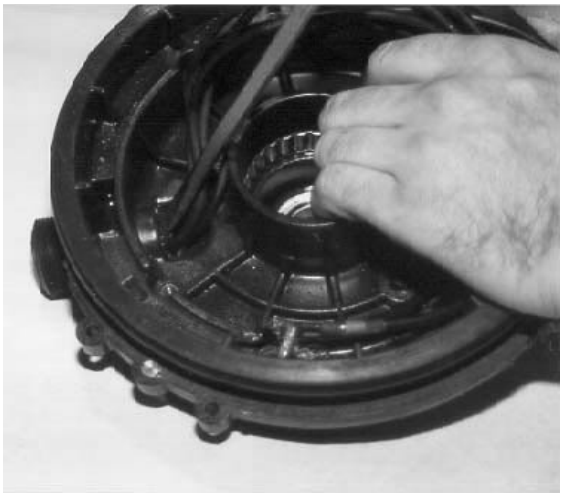


Figure X-10 LM bulkhead removal.

POWER UNIT ASSEMBLY

A. Installing New Bulkhead

NOTE: Omit this step, if new bulkhead is not being installed.

1. Place a bead of gasket dressing (Loctite 819 Hylomar gasket dressing) around the shaft of the bulkhead (barbed section). Let stand for 10 minutes. (Fig X-11).

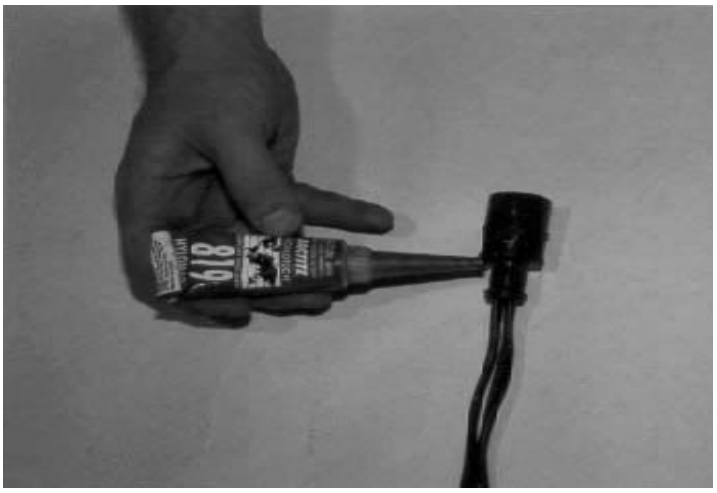


Figure X-11 Apply gasket dressing to bulkhead insert as shown.

2. Install the new bulkhead insert into the motor base plate using the bulkhead driver tool(P/N:SSC-300). (Fig X-12) There will be a popping sound when the bulkhead is seated properly.

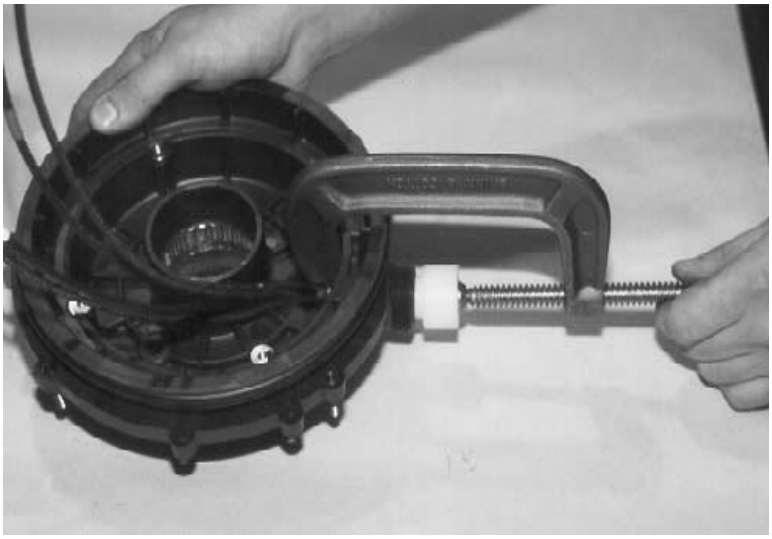


Figure X-12 LM bulkhead insert installation.

B. Install the ceramic seat into the motor base plate using the larger diameter side of the ceramic seat setter. (P/N: SS-10) Install with smooth side in (against the tool surface). Use seal lubricant P/N 48-0003 on the "o" ring of the seal. With seal setter tool, push the seat firmly into the counterbore of the MBP.(Fig. X-13)

C. Visually verify that seat is sitting squarely in the counter bore.

D. Wipe ceramic seal clean with isopropyl alcohol and a soft cotton swab.

NOTE: Both the carbon face and ceramic face of the seal must be free of dirt/fingerprints/any abnormalities. If contaminates are present, clean surfaces with alcohol and cotton swab.

E. If being replaced, slide the new tolerance ring (P/N C2-100) on the MBP in the groove below the ceramic seat. (Fig. X-14)

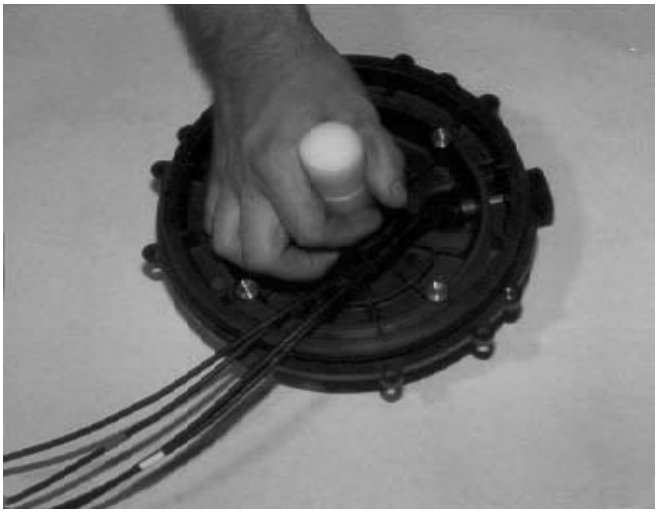


Figure X-13 Ceramic seat installation.

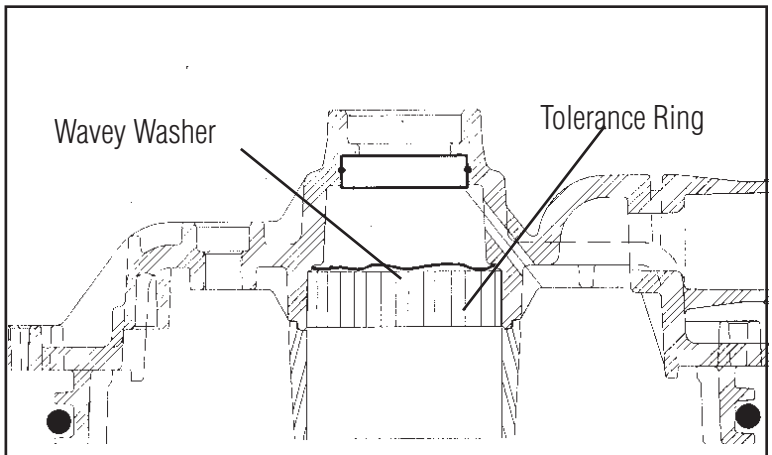


Figure X-14 LM motor base plate tolerance ring and wavey washer location.

F. Install motor housing “o” ring (P/N C2-700) on the bottom groove of the MBP. (Fig X-15)

NOTE: The old “o” ring may be reused, if it is found to be in good condition, but thoroughly clean the "o" ring of all oil residue and dirt before use.

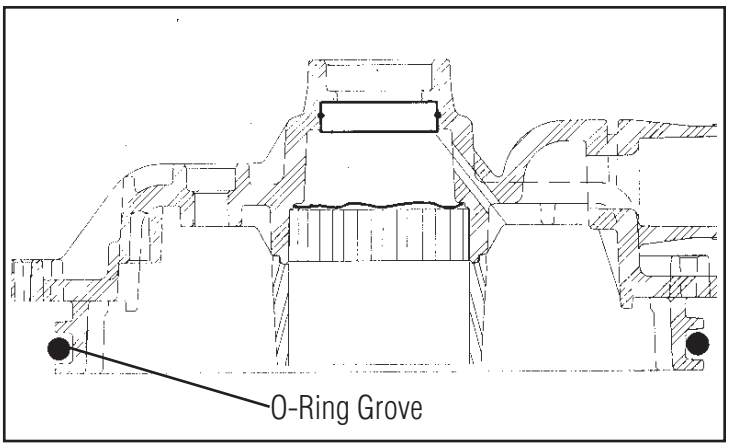


Figure X-15 LM housing "o" ring location.

G. Take wavey washer (part# C2-705) and place small dabs of grease on the high sides, (Fig X-16). Install the wavey washer into the motor base plate allowing the grease to hold it in place. (Fig. X-14)

H. Place a few drops of Rain Bird® oil on the smooth surface of the ceramic seat to pre-lubricate the seal.

I. Place new motor on the LM-motor stand. (If you are reusing the original motor, it should already be on the stand.

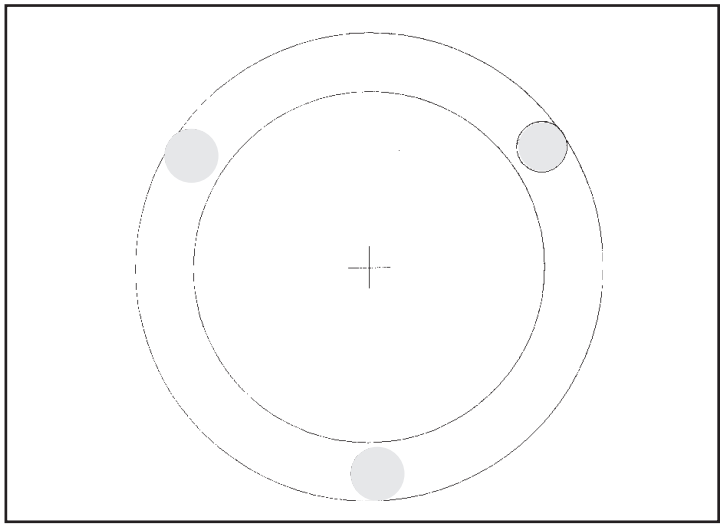


Figure X-16 Place small dabs of grease on wavey washer to help hold it in place during assembly.

J. Install bushing (part# C2-113) into the round hole located on the top side of the motor casing. (Fig. X-17)

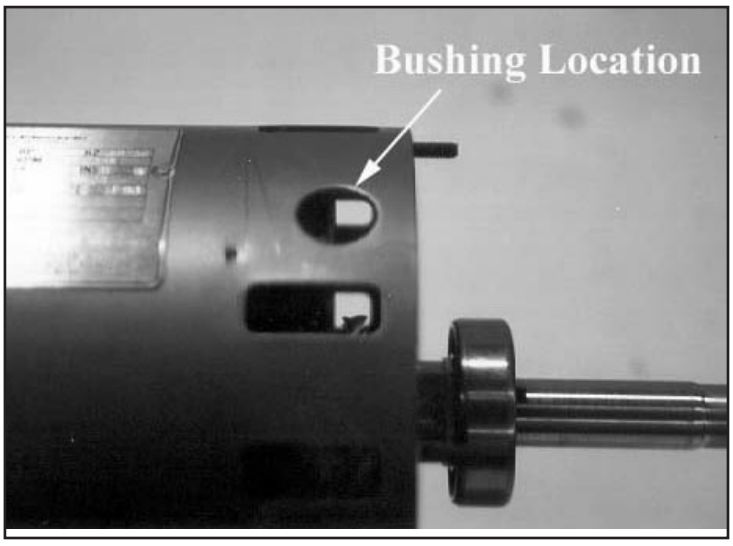


Figure X-17 Bushing installation

K. Install mechanical part of rotary seal onto motor shaft.

1. Slide the washer first, then the spring up against the motor bearing.

2. Lubricate the inside of the rotary seal and thelarge diameter section of the motor shaft with seal lubricant, P/N 48-0003 or 48-0004.

3. Install the seal up to the large step of the shaft with the carbon face out towards the endof the shaft. CAUTION: DO NOT PRESS THE SEAL BY HAND OVER THIS STEP IN THE SHAFT.

4. Place the Seal/MBP installation tool (SS#-C350) over the motor shaft. Loosen the side thumb screw to allow the tool to move freely over the shaft. Turn the tool's bolt into end of the motor shaft until it stops (hand tighten only).

5. Align the tool up to the seal so that the metal ring around the carbon face presses against the tool's surface as shown in Fig. X-18.

6. Holding the tool straight, turn the nut of the tool until the end of the tool is against the bearing. Remove the tool. THE SEAL MAY MOVE SLIGHTLY AS THE TOOL IS REMOVED. DO NOT PRESS THE SEAL BACK TO IT'S ORIGINAL POSITION. THIS IS NORMAL.

7. Clean the carbon face of the seal using isopropyl alcohol and a clean cloth.

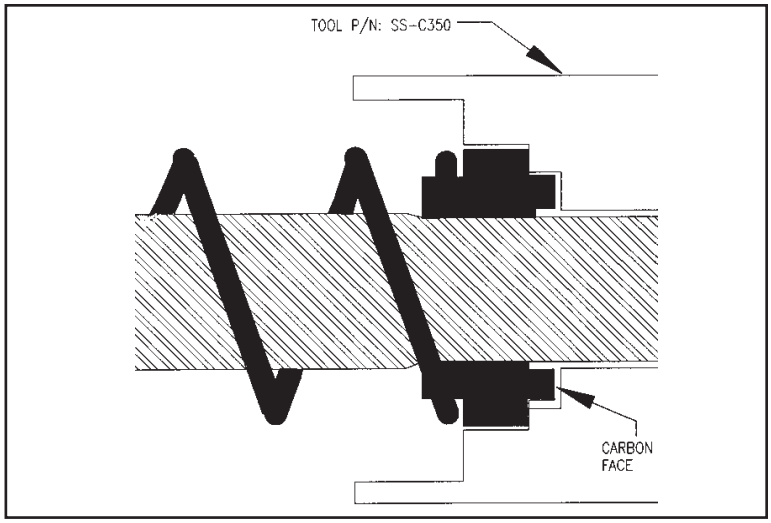


Figure X-18 Use seal lubricant, P/N 48-0003 or 48-0004 to lubricate the area.

Figure X-19 LM motor/motor base plate pre-assembly.

L. Securing motor to motor base plate.

1. Grasp motor base plate in such a manner so that bulkhead wires are in one hand and top of plate is in the other.

2. Guide the bulkhead wires through the bushing on the motor casing (start from the inside and push through, so there is just enough to grab, keeping them from falling back through). Fig. X-19

3. Using extreme caution slide the motor base plate over the motor shaft until the bearing is covered by the center hub of the plate. (Fig.X-19)

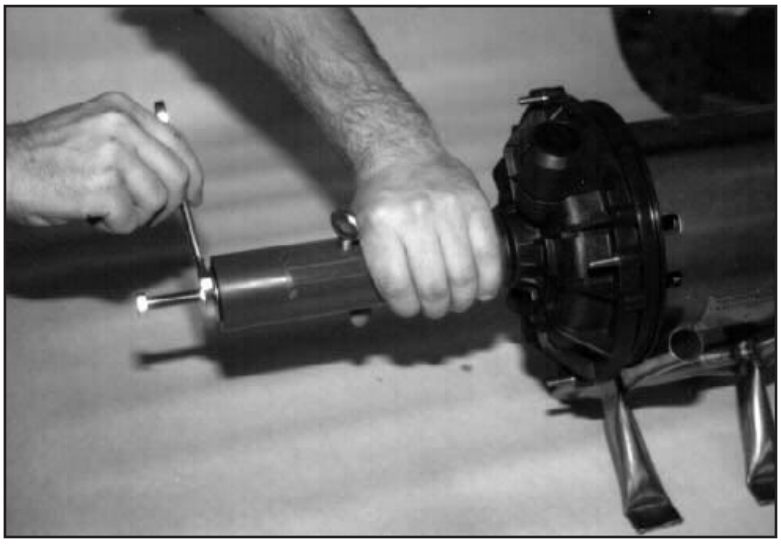


Figure X-20 LM drive sleeve tool usage.

NOTE: Do not hit the ceramic against the motor shaft, as it may chip causing failure.

4. Line up one of the (4) inserts with a motorbolt and start the treads by hand. This will insure that the motor bolts and inserts will be lined up later.

5. Slide the drive sleeve tool (#C2-350) on to the motor shaft, and thread the bolt into the motor shaft (hand tighten only).

6. Turn the thumb screw down onto the flat spot of the motor shaft. This will keep the rotor from spinning during assembly.

7. Using a 9/16" wrench, tighten down the nut on the drive sleeve tool until the motor base plate bottoms out. (Fig. X-20)

8. Pull one of the motor bolts and slip the ground lug over it then reinstall. (Fig. X-21)

9. Pull a different motor bolt, and install a ground contact (P/N:C2-510) over the bolt. (Fig. X-21)

NOTE: Ground contact should bend towards the top of the motor.

10. Line up the 4 inserts in the motor base plate with the 4 motor bolts and start to thread by hand.

11. Using the torque screwdriver (P/N:SS-C340) thread the motor bolts to 28in-lbs.

NOTE: Always use extreme caution during this procedure. The motor bolts must be tightened evenly in a cross pattern (Fig. X-22). If the bolts are tightened in a manner that cocks the MBP, the ceramic seat will hit the motor shaft consequently causing it to chip and or break!!

12. Re-check each bolt to insure they are torqued to 28 in-lbs.

13. Using the 9/16" wrench, remove the drive sleeve tool from the motor shaft.

N. Using the wiring diagrams Table 2, make all wiring connections for subsequent hp and voltage.

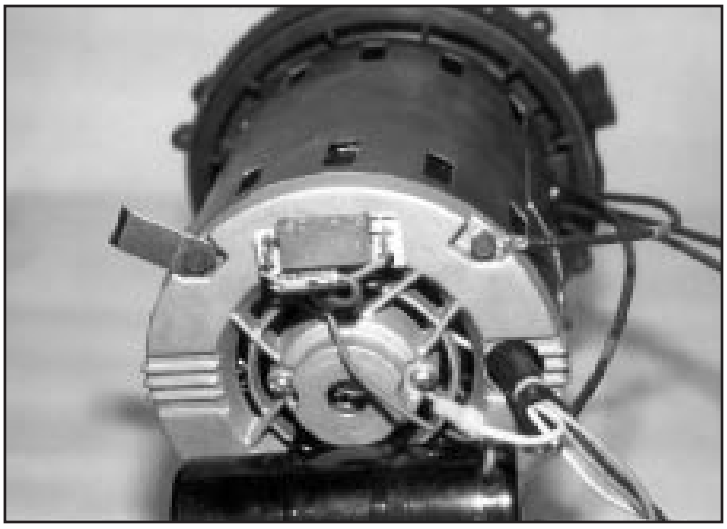


Figure X-21 Ground wire lug and ground contact installation.

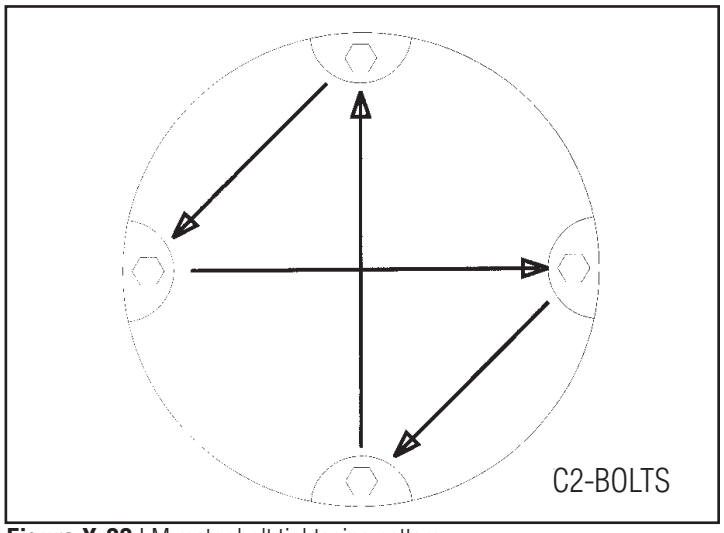


Figure X-22 LM motor bolt tightening pattern.

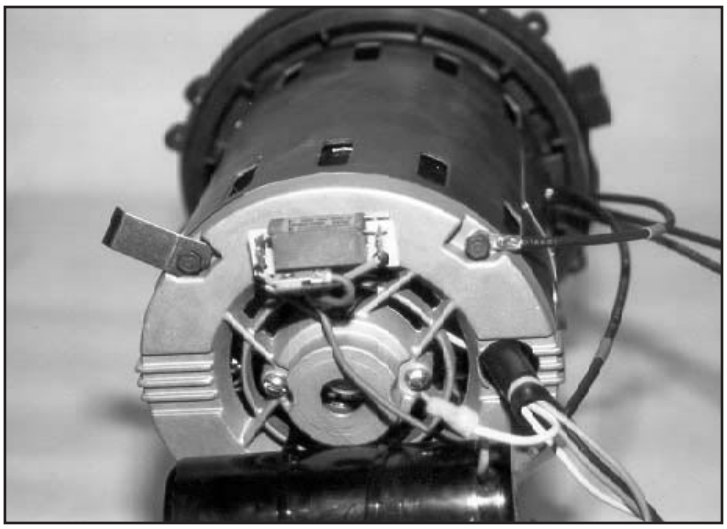


Figure X-23 Bump start (rapid on/off) procedure connection.

P. Strap the wires down using two ty-raps (P/ N:178-003B). (Fig. X-24)

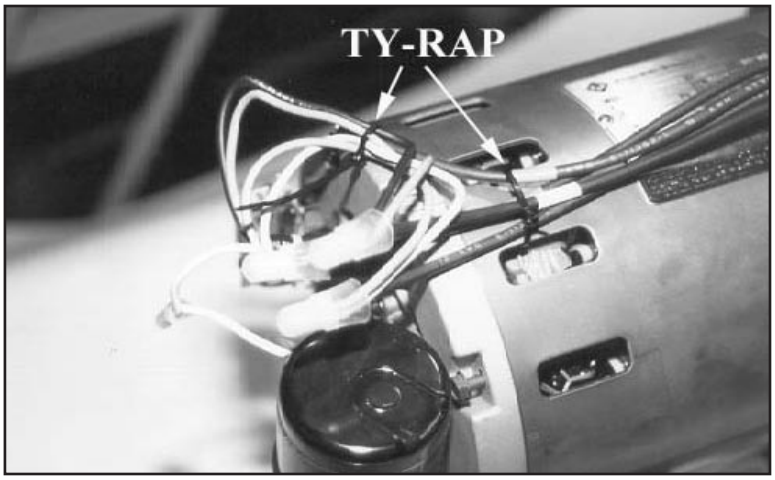


Figure X-24 Motor wire hold down method and location

POWER UNIT FINAL ASSEMBLY

A. Wipe clean the S/S housing (part# C2-210). Be sure to remove any oil deposits, and dirt.

B. Lower the motor/motor base plate assembly into the S/S housing. (Fig. X-25)

C. Spray Dry lube (DemKote 2W757A) on the housing o-ring to ease seating of the MBP in the S/S housing.

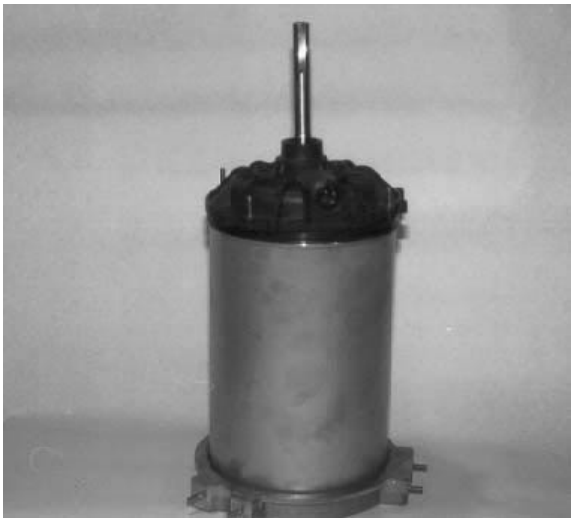


Figure X-25 LM motor/motor base plate assembly in housing.

D. Insert the (6) 1.5" bolts and (12) washers (part# SS/-C260) [supplied in the service center tool package] into the motor base plate at the proper locations. Lift the brass ring to them and start to thread them by hand. (Fig. X-26)

E. Using the torque screwdriver (SS-C340), gradually draw the brass ring and the motor base plate assembly together. Tighten each bolt a little at a time using a cross pattern until the motor base plate is seated in the S/S housing.

Figure X-26 Insert the (6) bolts and (12) washers into the motor base plate at the proper locations.

F. Remove the 1.5" bolts and replace them with the proper parts[(6) bolts part# MP2004, (6) lock washers part# 178-0003-001, and (6) flat washers part# GP-5011. Torque all the bolts to 28in-lbs.

G. Insert one oil plug into the motor base plate. Into the other hole insert the air fitting tool (P/N: SS-C320).

If vacuum is available complete step H, otherwise go to step I.

H. Hook up the vacuum line to the fitting. Apply 20 in Hg vacuum, clamp off vacuum for 5 minutes, verifying no drop in vacuum. This is a check to insure that the rotary seal is seated correctly and does not leak.

I. While the air fitting is in place, perform a pressure test.

CAUTION: DO NOT USE ANY MORE THAN 5 PSI.

Use a soapy water solution to check for leaks.

J. Once it is determined that there are no leaks, remove the air fitting and oil plug.

K. Check for continuity between the S/S housing and the ground pin on the bulkhead. This is to confirm that the ground bar is making contact. (Fig. X-27)

L. Slide the rubber shaft slinger down the motor shaft, it should not rub against the motor base plate. There must be a spacing of .015 to .045" between the slinger's outer lip and the top of the motor plate. (Fig X-28)

Figure X-27 Continuity check to S/S housing.

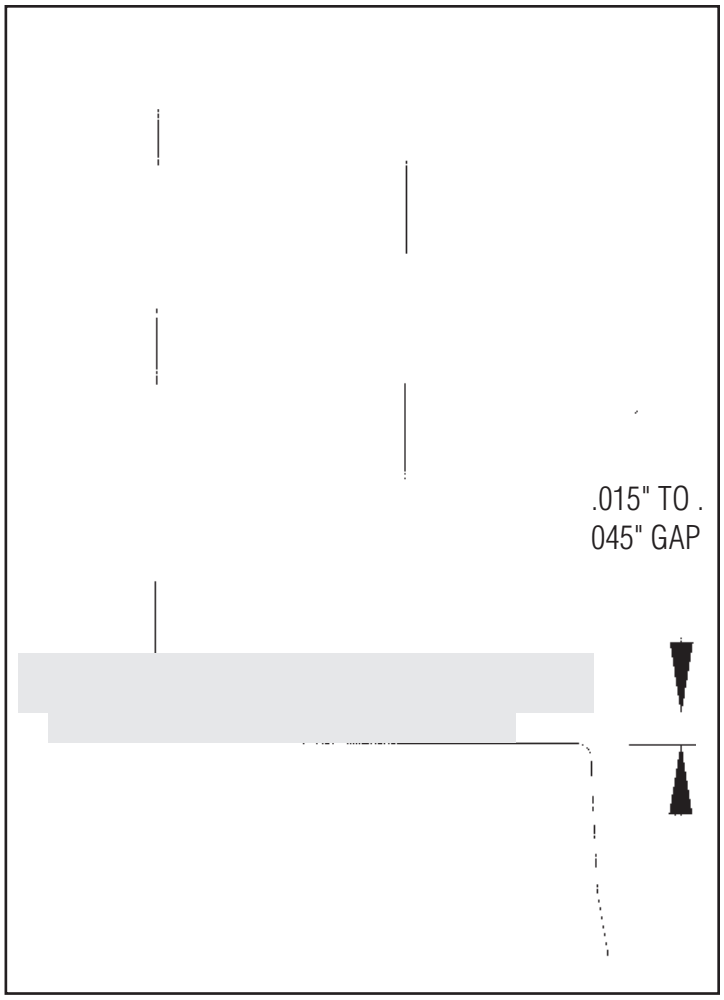


Figure X-28 LM rubber slinger location.

M. Pour Rain Bird® Oil into the unit using a funnel at the oil plug openings. Fill until the oil level measures 1.5"(3.8cm) from the top of the oil plug opening. (Fig. X-29)

NOTE: Do not overfill!!

N. If original oil plugs are to be used, replace the o-rings. Torque the oil plugs to 28 in-lbs.

O. Connect power to the motor and let run for 2 minutes in order to break in the rotary seal. Verify amperage draw is correct per Table 1.

NOTE: Do not run unit for more than two minutes, damage will occur.

P. Place silicone grease (part# 48-0001) in the bulkhead connector. This will prevent water penetration and dry rot. (Fig. X-30)

Q. This completes the unit assembly, proceed to the aerator unit assembly instruction to finish the aerator's assembly.

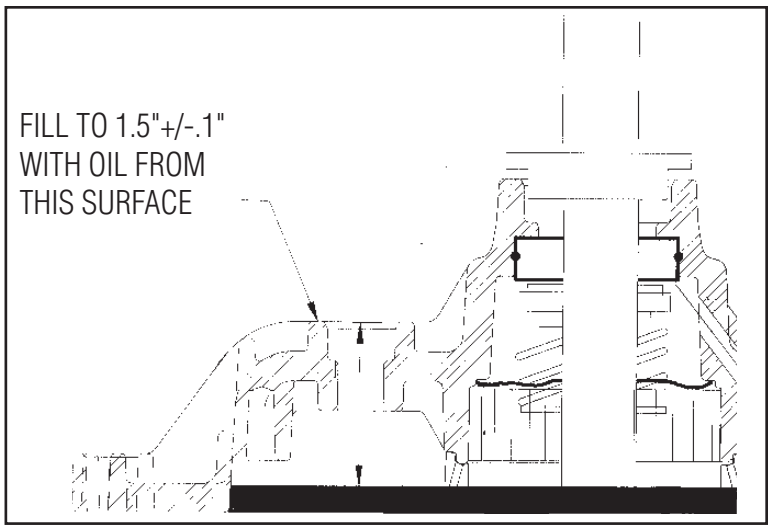


Figure X-29 Fill until the oil level measures 1.5" (3.8cm) from the top of the oil plug opening.

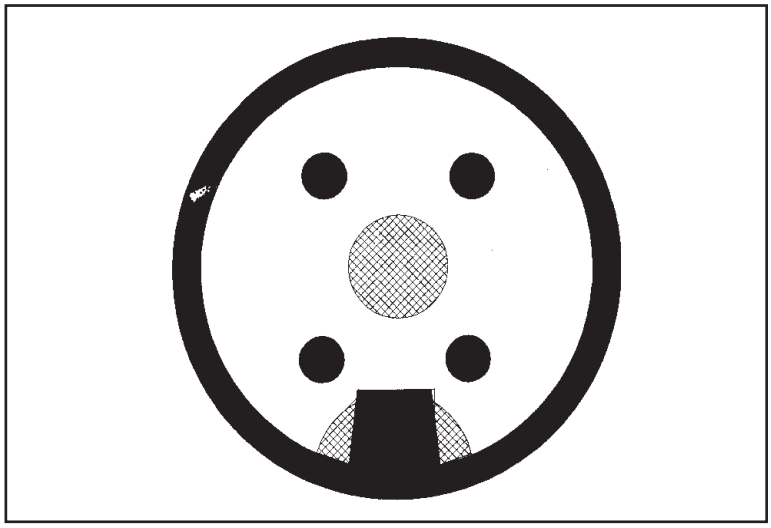


Figure X-30 Correct location for silicone dielectric compound on LM bulkhead connector.

Motor Resistance and No Load Ampere Specifications
LM

TABLE 1

FRANKLIN MOTORS

MOTOR RATING	RESISTANCE	NO LOAD AMPERE @ 60 Hz
1 Hp 115V 1ph	.5 ohms	8.5 amps
1 Hp 230V 1ph	1.7 ohms	4.0 amps
2 Hp 230V 1ph	1.2 ohms	7.0 amps
3 Hp 230V 1ph	.9 ohms	5.0 amps
3 Hp 230V 3ph	1.6 ohms	4.0 amps
3 Hp 460V 3ph	6.9 ohms	2.0 amps
5 Hp 230V 3ph	1.0 ohms	8.5 amps
5 Hp 460V 3ph	4.2 ohms	4.5 amps

CENTURY/MAGNETEK MOTORS

MOTOR RATING	RESISTANCE	NO LOAD AMPERE @ 60 Hz
1 Hp 115V 1ph	.7 ohms	8.0 amps
1 Hp 230V 1ph	2.3 ohms	4.0 amps
2 Hp 230V 1ph	1.0 ohms	7.0 amps
3 Hp 230V 1ph	.9 ohms	9.0 amps
3 Hp 230V 3ph	1.6 ohms	6.0 amps
3 Hp 460V 3ph	6.8 ohms	3.0 amps
5 Hp 230V 3ph	.9 ohms	10.0 amps
5 Hp 460V 3ph	3.3 ohms	6.0 amps

NOTE: All figures are approximate.

50 Hz Specifications
LM

MODEL / HP	VOLTAGE/ PHASE	RUNNING AMPERAGE	SPRAY HEIGHT (METERS)		SPRAY DIAMETER (METERS)	
LM11						
1	220 1ph	7.7	1.4		5.1	
2	220 1ph	11.0	1.6		7.3	
3	220 1ph	11.8	1.8		8.2	
3	380 3ph	3.4	2.1		8.2	
5	380 3ph	6.0	2.4		9.1	
LM10						
1	220 1ph	7.5	3.0		1.2	
2	220 1ph	11.6	4.4		1.2	
3	220 1ph	13.4	5.2		1.2	
3	380 3ph	4.0	5.2		1.2	
5	380 3ph	5.8	6.0		1.2	
LM20			I/S	O/S	I/S	O/S
1	220 1ph	7.3	3.0	1.0	0.6	4.0
2	220 1ph	12.0	4.0	1.4	0.6	4.6
3	220 1ph	14.5	4.2	1.7	0.9	5.8
3	380 3ph	4.3	4.2	1.7	0.9	5.8
5	380 3ph	6.2	4.6	2.2	0.9	6.1

Lake Management Aerator Technical Data 60HZ English Measure

Model	HP	Volts	Ph	Motor (RPM)	Full load amps	Spray Height (Feet)	Spray Width (Feet)	Pumping Rate (GPM) **	Induced Circ. Rate (GPM)	Min. Operating Depth	Shipping Weight (Lbs.)*
LM11											
100	1	115	1	1725	13.4	4	15	625	6,250	40”	205
		230	1	1725	6.8	4	15	625	6,250	40”	205
200	2	230	1	1725	11	6	25	1,180	11,800	40”	205
300	3	230	1	1725	12.8	7	30	1,500	15,000	40”	210
		230	3	1725	7.9	7	30	1,500	15,000	40”	210
		380	3	1680	4.7	7	28	1,460	14,600	40”	210
		460	3	1725	4	7	30	1,500	15,000	40”	210
500	5	230	3	1725	14	8	35	2,000	20,000	40”	215
		380	3	1680	7.6	7	30	1,950	19,500	40”	215
		460	3	1725	7.2	8	35	2,000	20,000	40”	215
LM10											
100	1	115	1	1725	13.4	10/12	4	300	3,000	40”	205
		230	1	1725	6.8	10/12	4	300	3,000	40”	205
200	2	230	1	1725	12	16-18	4	500	5,000	40”	205
300	3	230	1	1725	13.7	20-21	4	700	7,000	40”	210
		230	3	1725	8	20-21	4	700	7,000	40”	210
		380	3	1680	4.7	17-19	4	680	6,800	40”	210
		460	3	1725	4	20-21	4	700	7,000	40”	210
500	5	230	3	1725	14.4	23-24	4	1,000	10,000	40”	215
		380	3	1680	7.5	20-22	4	970	9,700	40”	215
		460	3	1725	7.2	23-24	4	1,000	10,000	40”	215

Lake Management Aerator Specifications - 60Hz English measure (cont.)

						Spray Dimensions (feet)						
Model	**HP**	**Volts**	**Ph**	**Motor**	**Full Load Amps**	**Height\Width**			**Pumping Rate (GPM)**	**Induced Circ. Rate (GPM)**	**Min. Operating Depth**	**Shipping Weight Lbs."**
LM30						Lower	Middle	Upper				
100	1	115	1	1725	13.4	3\11	5\7	8\1.5	600	6,000	40"	205
	-	230	1	1725	6.8	3\11	5\7	8\1.5	600	6,000	40"	205
200	2	230	1	1725	12.3	4\15	7\10	12\1.5	800	8,000	40"	210
300	3	230	1	1725	14	6\18	8\11	15\1.5	1,200	12,000	40"	210
		230	3	1725	8.2	6\18	8\11	15\1.5	1,200	12,000	40"	210
		380	3	1680	4.7	5\17	7\10	14\1.5	1,150	11,500	40"	210
		460	3	1725	4.1	6\18	8\11	15\1.5	1,200	12,000	40"	210
500	5	230	3	1725	14	7\24	10\12	16\1.5	2,000	20,000	40"	215
		380	3	1680	7.6	6\22	9\11	15\1.5	1,950	19,500	40"	215
		460	3	1725	7	7\24	10\12	16\1.5	2,000	20,000	40"	215
LM20						Lower		Upper				
100	1	115	1	1725	13.4	4\12		8\3	600	6,000	40"	205
		230	1	1725	6.8	4\12		8\3	600	6,000	40"	205
200	2	230	1	1725	12.5	6\19		12\3	800	8,000	40"	205
300	3	230	1	1725	14.3	8\23		16\3	1,200	12,000	40"	210
	-	230	3	1725	8.5	8\23		16\3	1,200	12,000	40"	210
		380	3	1680	4.9	7\21		15\3	1,150	11,500	40"	210
		460	3	1725	4.3	8\23		16\3	1,200	12,000	40"	210
500	5	230	3	1725	14.8	9\26		18\3	2,000	20,000	40"	215
	-	380	3	1680	7.9	9\26		18\3	1,950	19,500	40"	215
		460	3	1725	7.4	9\26		18\3	2,000	20,000	40"	215

*Shipping weight includes unit, 50' cable, and power control center.

Actual pumping rates, all other pumping rates based on empirical data and may vary due to voltage, elevation, and relative humidity. **NOTE: Deduct 15% from the pumping rate and spray pattern when operating on 50HZ power.

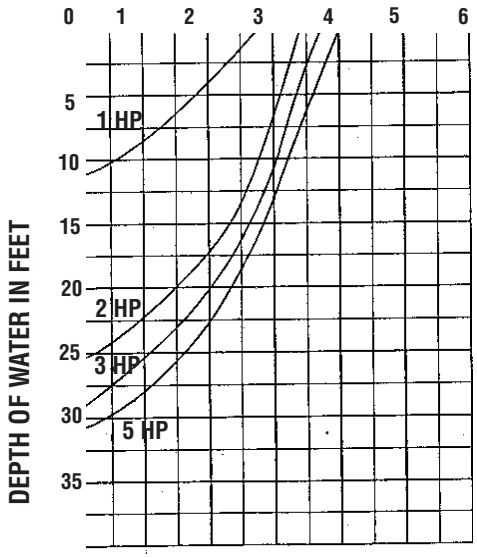
RPM - Revolutions Per Minute
GPM - Gallons Per Minute
Lbs. - Pounds
HP - Horsepower
Ph - Phase

Technical Specifications - Aspirating Model

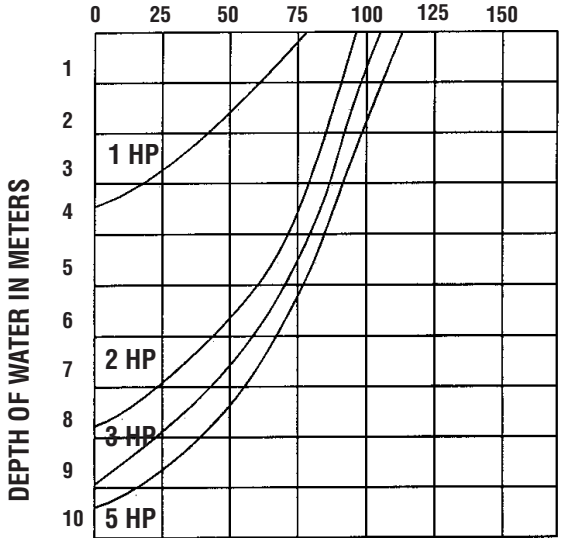
Model	HP	Voltage and Phase	Motor RPM	Running Amp Draw	**Pond Volume Influenced ft³	Min. Depth	Shipping Weight*
100	1	115 1Ph	1725@60Hz	12.6	210,000	2.5'	202 lbs.
	1	208-230 1Ph	1725@60Hz	6.5	210,000	2.5'	202 lbs.
	1	220 1Ph	1425@50Hz	7.3	794,850 liters	80 cm	92 kilos
200	2	208-230 1Ph	1725@60Hz	11.5	420,000	2.5'	202 lbs.
	2	220 1Ph	1425@50Hz	12.0	1,589,700 liters	80 cm	92 kilos
300	3	208-230 1Ph	1725@60Hz	12.5	630,000	2.5'	202 lbs.
	3	220 1Ph	1425@50Hz	14.5	2,384,550 liters	80 cm	92 kilos
	3	208-230 3Ph	1725@60Hz	8.7	630,000	2.5'	205 lbs.
	3	380 3Ph	1680 @60Hz	4.7	610,000	2.5'	205 lbs.
	3	460 3Ph	1725@60Hz	4.1	630,000	2.5'	205 lbs.
	3	380/415 3Ph	1425@50Hz	4.3	2,384,550 liters	80 cm	93 kilos
500	5	208-230 3Ph	1725@60Hz	13.5	1,050,000	2.5'	205 lbs.
	5	380 3Ph	1680 @60Hz	7.5	1,022,000	2.5'	205 lbs.
	5	460 3Ph	1725@60Hz	7.0	1,050,000	2.5'	205 lbs.
	5	380/415 3Ph	1425@50Hz	6.2	3,974,250 liters	80 cm	93 kilos

*Shipping weight includes unit, 50' or 16.7 meters of cable and power control center. **Pond Volume influenced based from empirical data and may vary due to voltage, elevation, and relative humidity.

SCFM (standard cubic feet per minute) OF AIR



CLM (CUBIC LITERS PER MINUTE) OF AIR



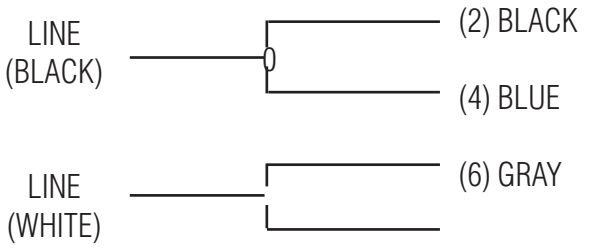
Technical Specifications - Mixer Model

Model	HP	Voltage and Phase	Motor RPM	Running Amp Draw	**Pond Volume Influenced ft³	Min. Depth	Shipping Weight*
100	1	115 1Ph	1725@60Hz	12.6	490,000	3'	202 lbs.
	1	208-230 1Ph	1725@60Hz	6.5	490,000	3'	202 lbs.
	1	220 1Ph	1425@50Hz	7.3	1,854,650 liters	1m	92 kilos
200	2	208-230 1Ph	1725@60Hz	11.5	980,000	3'	202 lbs.
	2	220 1Ph	1425@50Hz	12.0	3,709,300 liters	1m	92 kilos
300	3	208-230 1Ph	1725@60Hz	13.7	1,470,000	3'	202 lbs.
	3	220 1Ph	1425@50Hz	12.5	5,563,950 liters	1m	92 kilos
	3	208-230 3Ph	1725@60Hz	8.8	1,470,000	3'	205 lbs.
	3	460 3Ph	1725@60Hz	4.2	1,470,000	3'	205 lbs.
	3	380 3Ph	1680 @60Hz	4.7	1,430,000	3'	205 lbs.
	3	380/415 3Ph	1425@50Hz	4.0	5,563,950 liters	1m	93 kilos

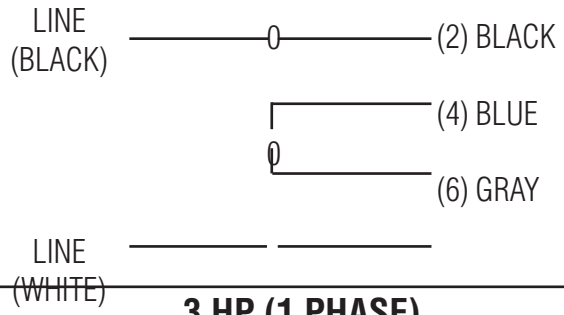
*Shipping weight includes unit, 50' or 16.7 meters of cable and power control center. **Pond Volume influenced based from empirical data and may vary due to voltage, elevation, and relative humidity.

TABLE 2-A
MOTOR WIRING (FRANKLIN MOTORS ONLY)

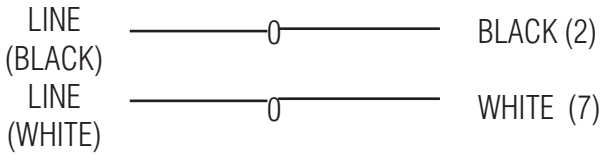
115V



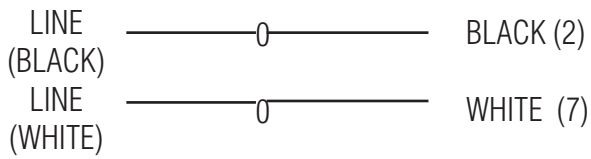
1HP (1PHASE) 208/220/230



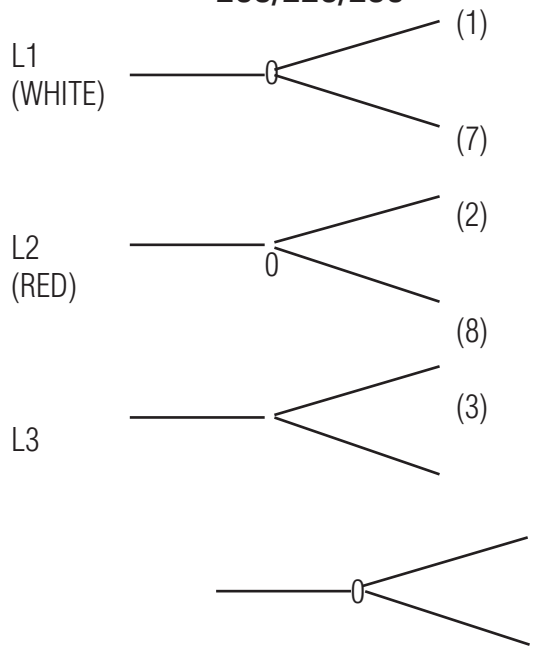
2 HP (1 PHASE) 208/220/230



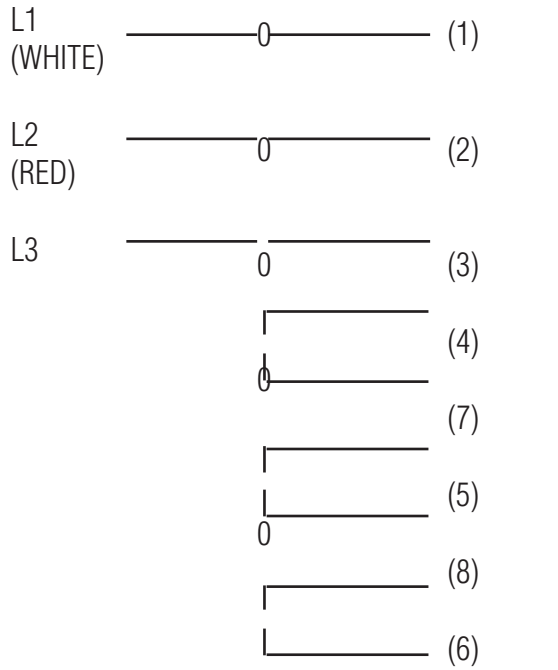
3 HP (1 PHASE) 208/220/230



3 AND 5 HP (3 PHASE) 208/220/230

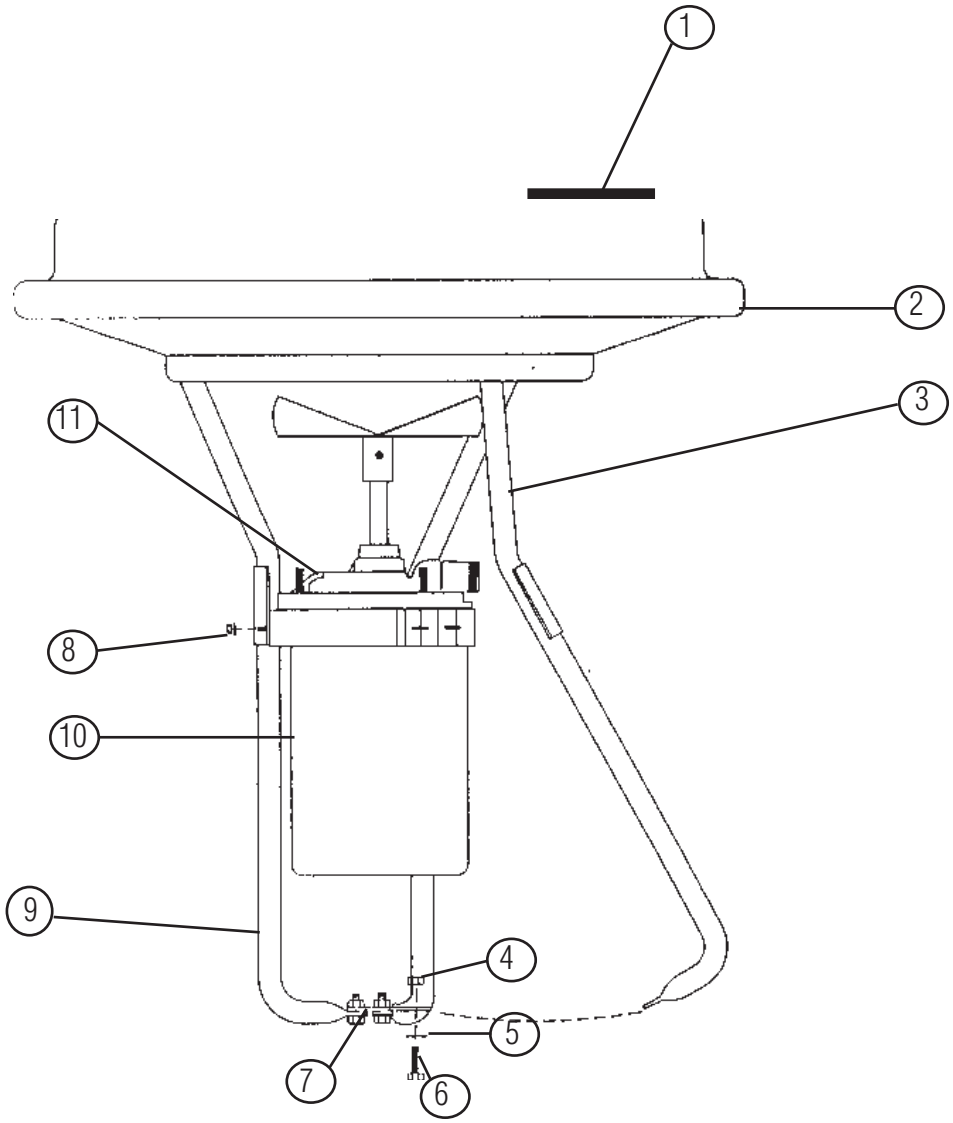


3 AND 5 HP (3 PHASE) 380/415/460



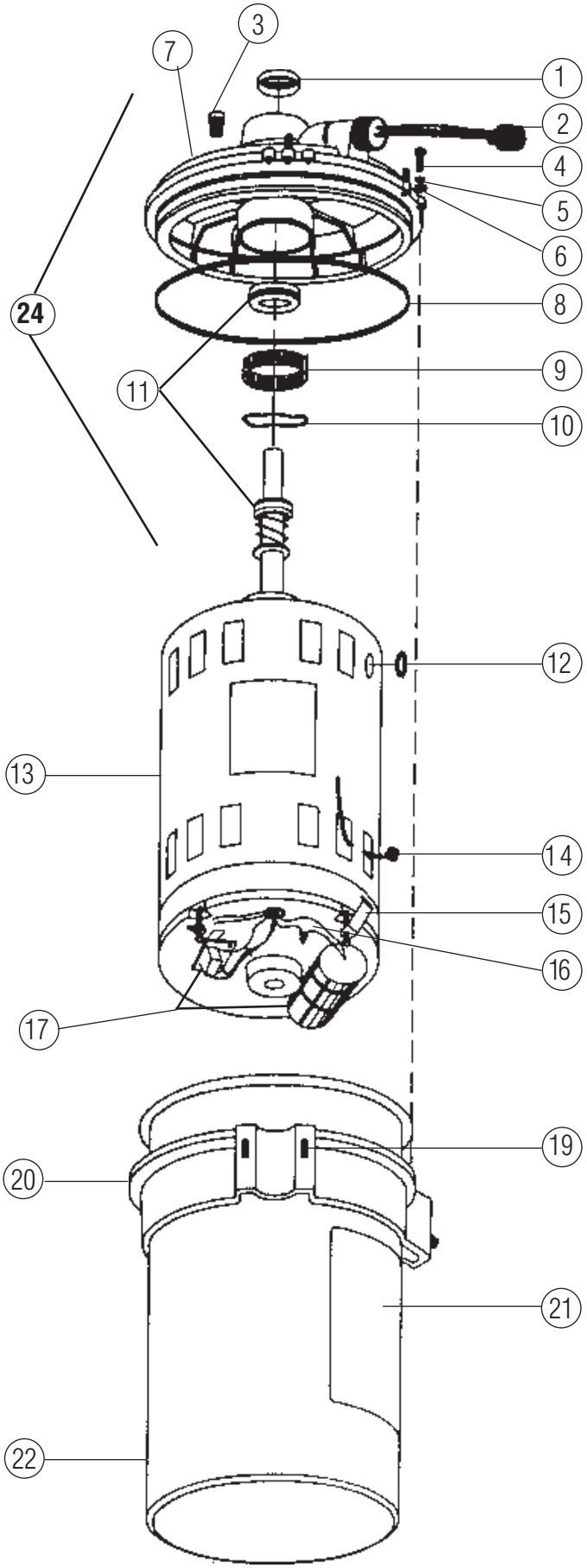
NOTE: ALWAYS CONNECT GREEN GROUND WIRE TO A MOTOR BOLT, REFER TO UNIT ASSEMBLY INSTRUCTIONS. ON SINGLE PHASE UNITS, THE RED LEAD IS NOT USED. TERMINATE THE RED WIRE USING AN INSULATED WIRE CONNECTOR.

Float and Arm Assembly LM



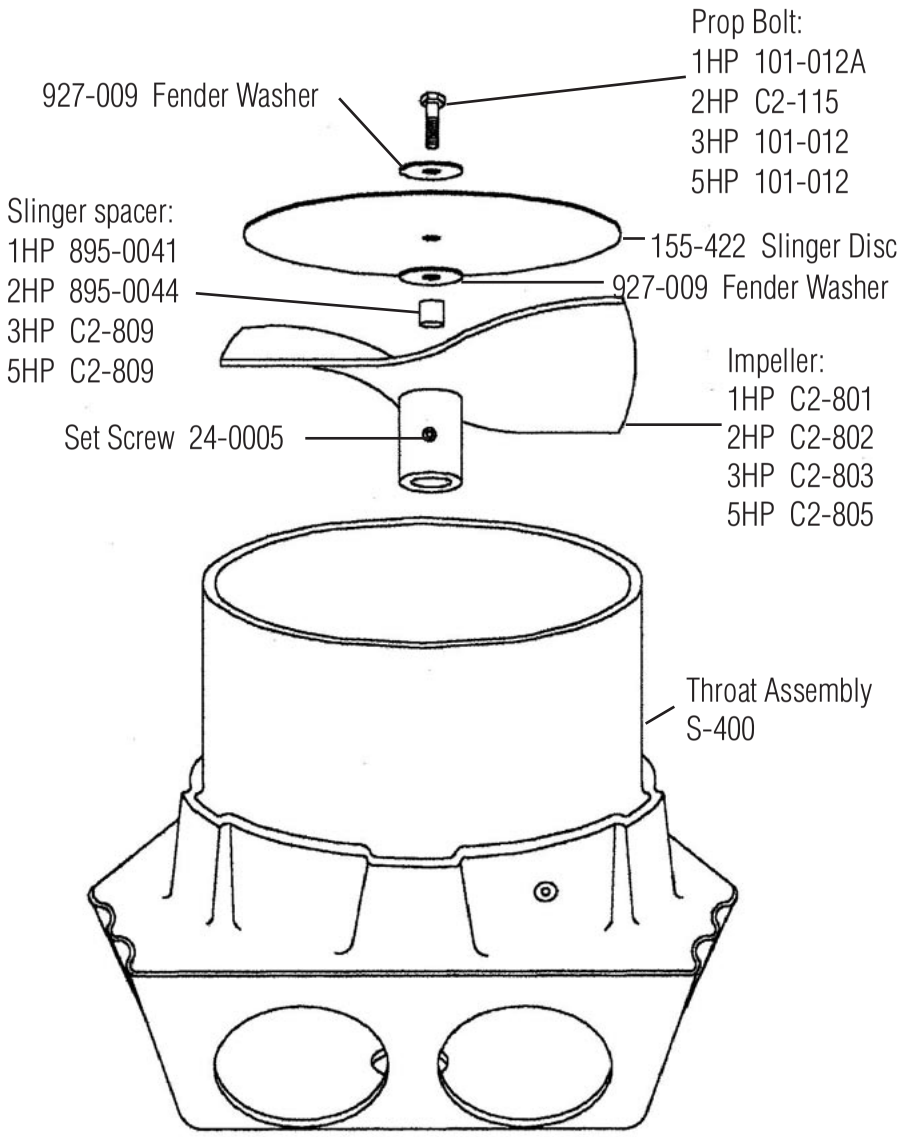
	DESCRIPTION	QTY	PART #
1	IMPELLER WARNING DECAL	1	293-005
2	LM FLOAT	1	C2-400
3	SUPPORT ARM & BRACKET	2	C2-303
4	5/16"LOCK NUT	3	GP1208
5	5/16" FLAT WASHER	3	28-0018
6	5/16"HEX BOLT	3	106-302
7	SUPPORT BRACE LM	1	C2-301
8	SERRATED FLANGE NUT	6	26-0001
9	ADJUSTABLE SUPPORT ARM & BRACKET	1	C2-304
10	MOTOR UNIT	1	---------
11	MOTOR PLATE	1	---------

Power Unit Assembly LM

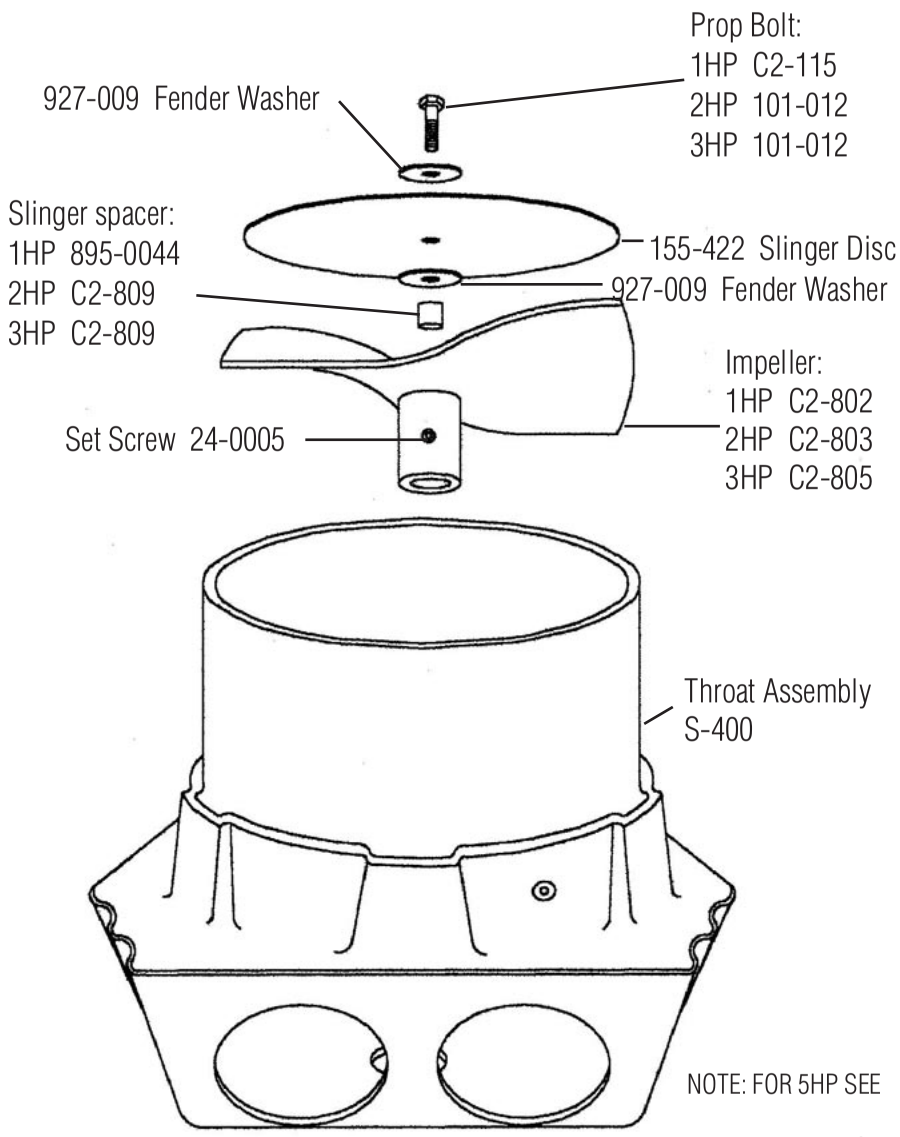


#	DESCRIPTION	QTY	PART#
1	Rubber Slinger	1	C2-720
2	Bulkhead Insert	1	09-0013
3	Oil Plug w/ "O" Ring	2	10-0004
4	Bolt	6	MP2004
5	Split Ring Washer	6	28-0003-001
6	Flat Washer	6	GP5011
7	Motor Plate	1	C2-200
8	Housing "O" Ring	1	C2-700
9	Tolerence Ring	1	C2-100
10	Wavey Washer	1	C2-705
11	Rotary Seal	1	C2-704
12	Bushing	1	C2-113
13	Motor 1 HP	1	C2-611
	Motor 2 HP	1	C2-612
	Motor 3 HP, 1 Phase	1	C2-613
	Motor 3 HP, 3 Phase	1	C2-633
	Motor 5 HP	1	C2-635
14	Ty-rap	2	BP2874
15	Ground Contact	1	47-0002
16	Crimp Wire Connector Start	4	33-0028-001
17	Swt/Capacitor 1HP	1	15-0017
	Start Swt/Capacitor 2HP	1	15-0018
	Capacitor 3 HP	1	C2-533
19	Mounting Ring Bolts	6	C2-110
20	Brass Mounting Ring	1	C2-205
21	I.D. Labels	1 1	C2-930 80-0030
22	Housing St/St	1	47-0001
24	**Base Plate Assy.**		**C2-203**

Note: Call factory for Leeson motor parts.



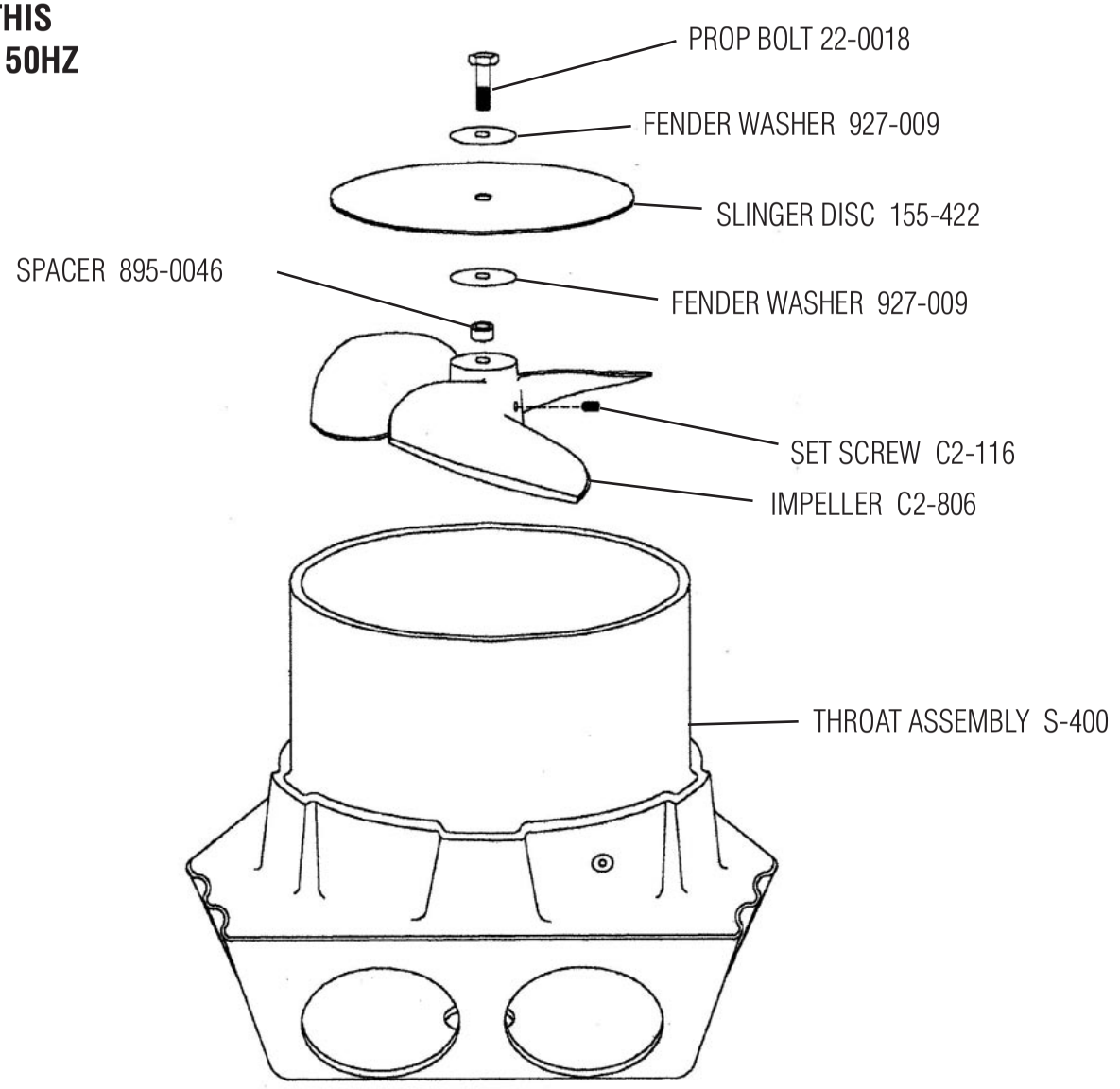
60 Hz LM11
PUMPING CHAMBER COMPONENTS



NOTE: FOR 5HP SEE NEXT PAGE

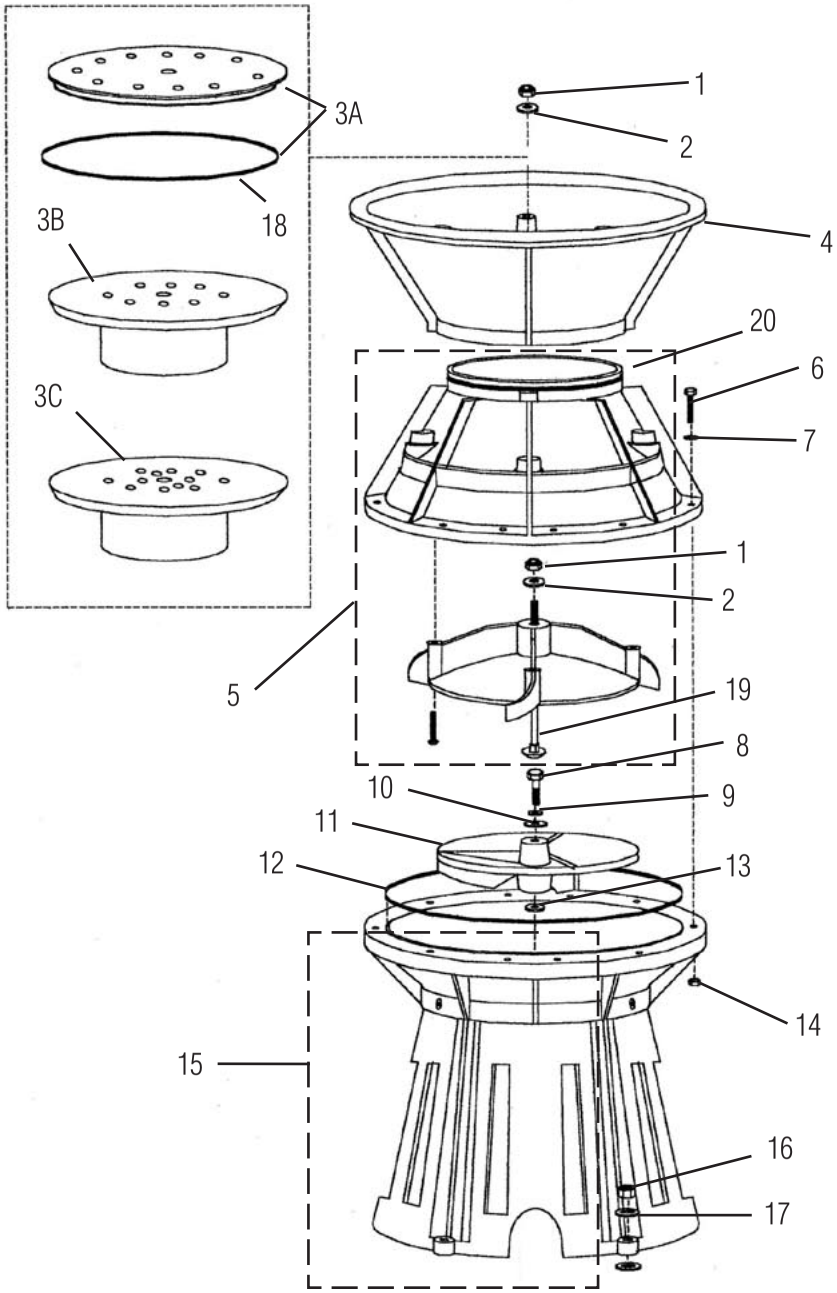
50 Hz LM11
PUMPING CHAMBER COMPONENTS

NOTE: DATA ON THIS PAGE FOR 50HZ ONLY!



5 HP 50Hz LM11 PUMPING CHAMBER COMPONENTS

60/50 Hz LM10/LM20/LM30 PUMP CHAMBER ASSEMBLY



Item	Description	Qty.	Part #
1	5/16"-18 Elastic Lock Nut	2	GP-2108
2	5/16" Flat Washer	2	28-0018
3A	LM10 Difuser Plate 3	*	C2-850
	LM10 Diffuser Plaste 6 w/O-ring	*	SR-850
3B	LM20 Diffuser Plate	*	C2-845
3C	LM30 Diffuser Plate	*	C2-870
4	Diffuser Housing	1	C2-840
5	Volute Manifold Assy	1	10-0006
6	10-24 x 1.25" Hex Cap Screw	8	MP-2004
7	#10 Flat Washer	12	GP-5011
8	10-24 x 1.25" Hex Head Bolt	1	22-0018
9	3/8 Helical Spring Lock Washer	1	EP6301
10	3/8" Flat Washer	1	927-003
11A	Impeller, 1HP/60Hz only	*	C2-811
11B	Impeller, 1HP/50Hz only	*	C2-816
11C	Impeller, 2HP/60Hz only	*	C2-812
11D	Impeller, 3HP/60Hz or 2HP/50Hz	*	C2-813
11E	Impeller, 5HP/60Hz or 3HP/50Hz	*	C2-815
11F	Impeller, 5HP/50Hz only	*	C2-817
12	O-Ring for Pump Chamber	1	C2-706
13	Spacer	1	40-0099
14	#10-24 Elastic Lock Nut	8	GP-1207
15	Strainer/Lower Chamber Assy.	1	10-0005
16	1/4-20 Elastic Lock Nut	4	C2-112
17	1/4" Flat washer	8	927-000
18	O-ring for LM10 Diffuser Plate	1	C2-708
19	Volute Bolt	1	C2-140
20	Minifold O-ring	1	49-0018
**	Depending on model and/or Horsepower		

LM Maintenance Kit Instructions

- **Part # - C2-MKIT**

- **Kit Contents:**

QTY.	DESCRIPTION	PART #
2 GAL.	Aerator oil	667-002
2	Oil plug with "o" ring	10-0004
4	Ty-rap 6"	GP5008
2	Silicone, Single Use, 1.5ml pack	48-0001

Maintenance consists of changing the oil, oil plugs & applying silicone.

LM10, LM30 or LM20:

A. Remove the diffuser assembly.
See Figure 1.

1. With the unit standing upright remove the nylon lock nut and washer from the stud in the center of the diffuser housing.
See Figure 1.

2. Grab the outside edge of the diffuser housing and pull it away from the manifold.
See Figure 1.

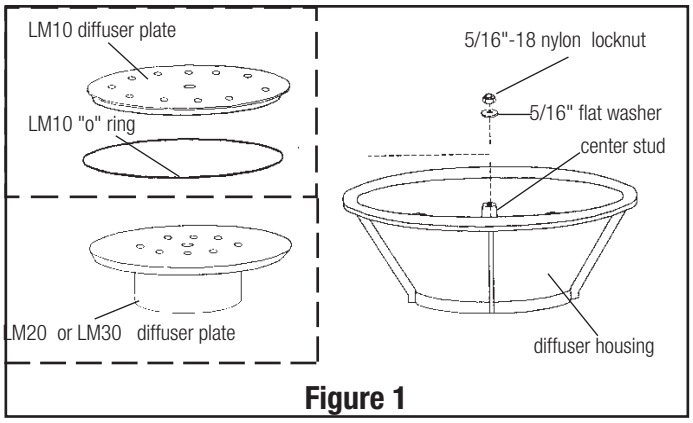


Figure 1

B. Remove two of the aerator support arms.
See Figure 2.

1. Turn the unit upside down with the float resting on the floor.

2. Choose the two support arms which will be disassembled.

3. Remove the first support arm from the mounting ring by:

   a. Removing the two flange nuts from the mounting ring. See Figure 2.

   b. Remove the second support arm from the mounting ring by repeating the directions given in #3.

4. Remove the loosened support arms from the aerator.

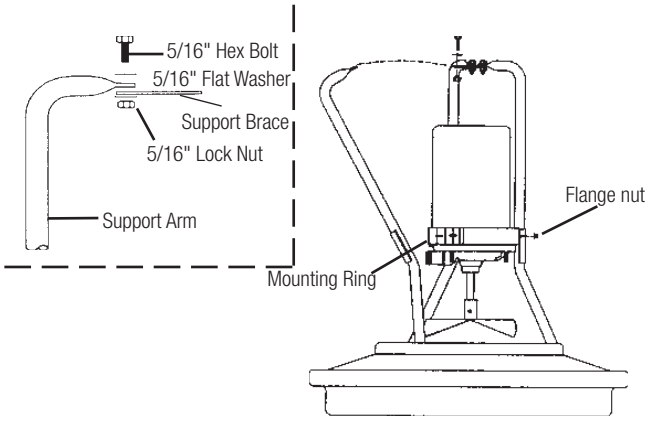


Figure 2

C. Remove the aerator manifold and pumping chamber.

1. Pivot and lift the motor unit and remaining support arm out of the float. Set the motor unit upright.

2. Remove the (8) hex cap screws from the manifold. Lift the manifold away from the pump chamber. See Figure 3.

3. Remove the "o" ring and set aside. The impeller should be exposed. See Figure 3.

4. Remove the impeller bolt and pull the impeller off of the motor shaft. Remove any spacer shims from the unit.

NOTE: Not all units have spacer shims. See Figure 4.

5. Remove the pump chamber and standoff strainer from the motor unit by removing the (4) 1/4-20 nylon locknuts from the studs attached to the motor plate. Lift off the assembly. See Figure 4.

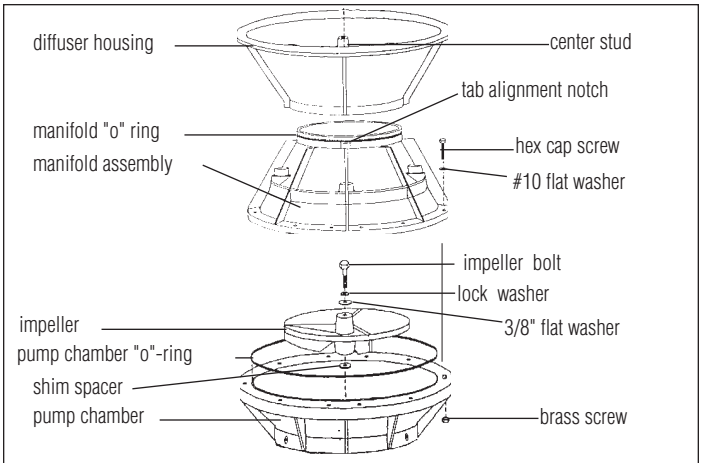


Figure 3

D. Draining oil, refilling oil and changing the "o" ring on the oil plugs.

1. Drain the oil from the motor unit and fill the unit with fresh Rain Bird® oil. Never use old oil. Refer to draining and filling instructions located on page 5-6 of these instructions for further details on this procedure.

E. Reassembling manifold and pump chamber.

1. Install the pump chamber and standoff strainer onto the motor plate with (4) 1/4-20 nylon locknuts and 8 1/4" flat washers.

NOTE: Be sure to align the pump chamber and stand off strainer to the studs on the motor plate See Figure 4.

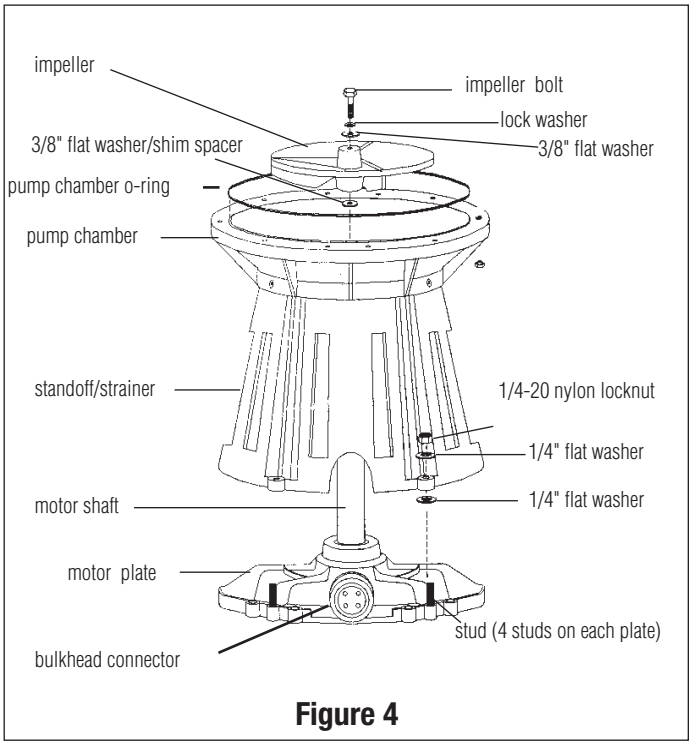


Figure 4

2. Install the impeller with the impeller bolt to the motor shaft. Reinsert any spacer shims at this point.

NOTE: Not all units have spacer shims. See Figure 4.

3. Reinsert the "o" ring into the groove in the pump chamber. Install the manifold onto the pump chamber with (8) hex cap screws. See Figure 3.

4. Pivot the motor unit into alignment with the float.

1. Insert the support arms into the pockets in the float. See Figure 2, pg. 1.
2. Install the first support arm to the mounting ring. See Figure 2, pg. 1.

    a. Attach the support arm to the mounting ring with two flange nuts. See Figure 2, pg. 1. Use the second hole down from the float in the arm bracket when attaching.

    b. Attach the second support arm to the mounting ring. See instruction #2a (above) for details.
3. Install the first support arm to the support brace.

    a. Attach the support arm to the support brace with a 5/16" hex bolt, a 5/16" locknut and a 5/16" flat washer. See Figure 2 insert, pg. 1.

    b. Attach the second support arm to the support arm brace. See instructions #3a (above) for details.

G. Assembling the diffuser.

1. Align the diffuser housing with the manifold by locating the alignment tab and notch. See Figure 3 for details.
2. Attach the diffuser housing to the center stud on the manifold with a locknut and washer. See Figure 1, pg. 1.

NOTE: Do not overtighten.

LM11:

A. Remove the impeller assembly from the motor shaft by removing the impeller bolt and loosening the set screw on the shaft.

B. Remove all of the aerator support arms.
See Figure 7.

1. Turn the unit upside down with the float resting on the floor.
2. Remove the first arm from the support brace by:

    a. Removing a 5/16" hex bolt, a 5/16" locknut and a 5/16" flat washer from the support brace. See Figure 7 insert.

    b. Remove the second and third support arms from the support brace by repeating the directions given in #2a.

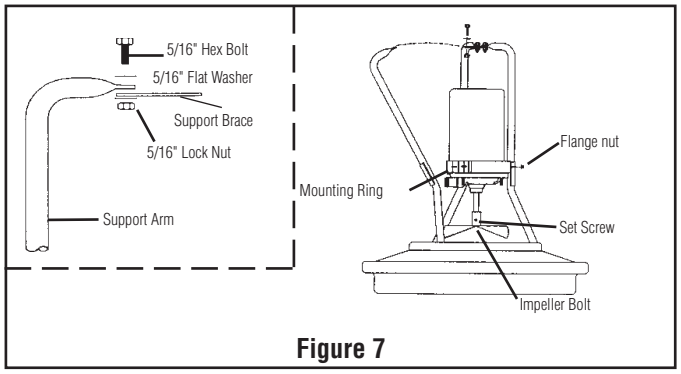


Figure 7

3. Remove the first support arm from the mounting ring by:

    a. Removing the two flange nuts from the mounting ring.

    b. Remove the second and third support arms from the support brace by repeating the directions given in #3a.

4. Remove the loosened support arms from the aerator. CAUTION: Motor unit will be unsupported when third support arm is removed.

5. Set the motor unit upright.

C. Draining oil, refilling the oil and changing the "o" ring on the oil plugs.

1. Drain the oil from the motor unit and fill the unit with fresh Rain Bird® oil. Never use old oil.

D. Assembling the support arms.

1. Place the motor unit upside down and place the motor shaft through the throat hole. See Figure 8.

2. Insert the support arms into the pockets in the float.

3. Install the first support arm to the mounting ring. See Figure 7.

   a. Attach the support arm to the mounting ring with two flange nuts. See Figure 7, insert. Use the second hole down from the float in the arm bracket when attaching.

   b. Attach the second and third support arms to the mounting ring. See instruction #3a (above) for details.

4. Install the first support arm to the support brace.

   a. Attach the support arm to the support brace with a 5/16" hex bolt, a 5/16" locknut, and a 5/16" flat washer.

   b. Attach the second and third support arms to the support brace. See instructions #4a (directly above) for details.

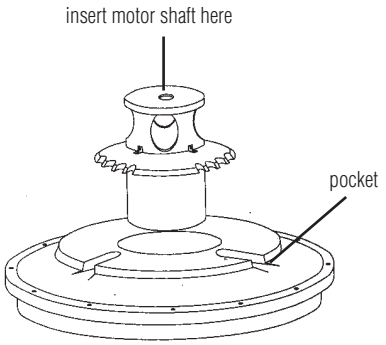


Figure 8

Draining and refilling the oil in Rain Bird® LM Aeration Systems:

A. Using a 7/32" Allen Wrench/Socket, carefully remove the oil plugs in the top of the motor base plate.

NOTE: If the oil plug becomes damaged during removal, it may be removed by carefully pressing a screwdriver (phillips type preferred) into the center of the plug and turning the plug out or by using a socket screw extractor.

B. Turn the motor unit upside down, draining the oil.

C. Allow time for all of the oil to completely drain.

D. Turn the motor unit upright and fill the housing with new Rain Bird® oil until the oil is 1.5" or 3.8cm from the top of the oil plug hole.

NOTE: Only use new Rain Bird® oil in filling the unit. Fill only to the recommended depth. Overfilling/underfilling may reduce motor life.

E. Install the new oil plugs supplied in the kit and tighten to 28 in/lbs with a torque screw driver.

NOTE: Do Not Overtighten Plugs!

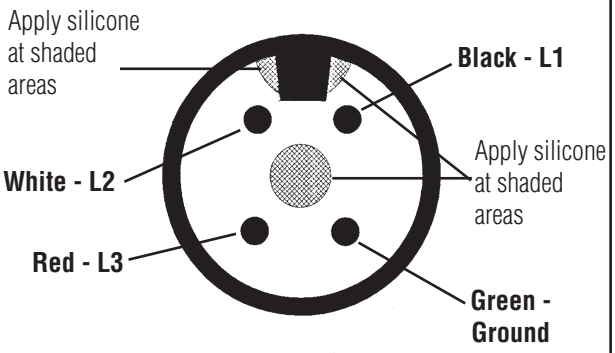


Figure 9

F. Clean the inside of the bulkhead connector of any water or contaminant. Apply dielectric silicone P/N 48-0001 to the inside of the connector.

1. Apply a dab of the silicone to the back center of the connector. See Figure 9.
2. Apply a strip to both sides of the keyway. See Figure 9.

NOTE: Clean and dry the male end of power cord before inserting into bulkhead.

G. After unit is completely assembled, secure strain relief to float. Attach cord to support arm by using two ty-raps P/N GP5008. Allow for adequate flex in cord to prevent any strain on cord/bulkhead connection. See Figure 10.

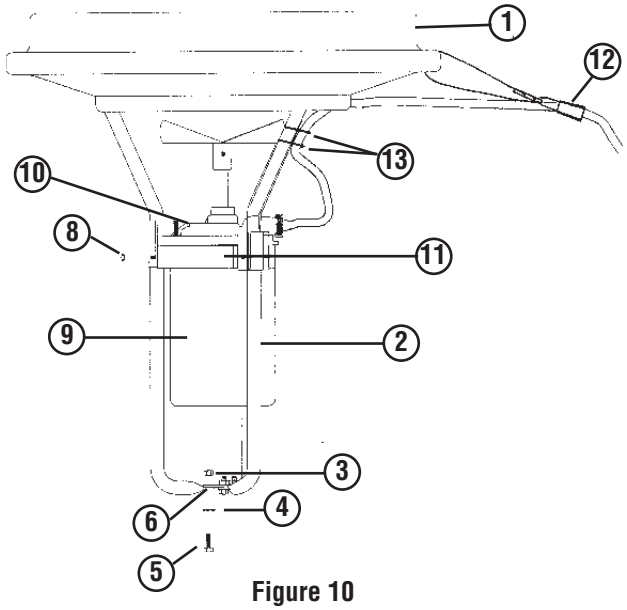


Figure 10

#	DESCRIPTION	PART #
1	LM Float	C2-400
2	Support Arm & Bracket	C2-303
3	5/16" Lock Nut	GP1208
4	5/16" Flat Washer	927-004
5	5/16" Hex Bolt	106-302
6	Support Brace C2	C2-301
8	Flange Nut	26-0001*10
9	Motor Unit	---
10	Motor Plate	---
11	Mounting Ring	---
12	Strain Relief	614-025
13	Tyraps 6"	GP5008

Electrical Installation

Your Rain Bird® Power Control Center is made exclusively for Rain Bird® by Cutler Hammer. This weather resistant NEMA 3R Power Control Center comes complete with a twenty-four hour on/off timer, magnetic starter, surge arrestor, and a fused or circuit breaker disconnect. All electrical specifications are located on the door of the Rain Bird® Power Control Center. Rain Bird® recommends that all ELECTRICAL WORK BE DONE BY A QUALIFIED LICENSED ELECTRICIAN. Make sure that all electrical work conforms with local and national electrical code.

NOTE: Rain Bird® suggests coordinating electrical installation with physical installation. The electrician will need to be on hand for a two minute dry-run test of the unit and will also need to check the running amperage after installation. These electrical tests are a crucial part of the installation process and should not be ignored.

Power Control Center

Power Control Center Open

A. Install the Rain Bird® Power Control Center as close to the pond as possible.

CAUTION: the Power Control Center should not be accessible from the water.

ATTENTION: la loite de control ne doit pas etre accessible de l'eau.

1. When mounting outdoors Rain Bird® suggests that you use a piece of exterior plywood and a sturdy 4 x 4 post.
2. When mounting indoors the Control Center can be mounted directly to the wall.

C. Bring the incoming power into the panel on the opposite side of where the aerator cable is to exit.

D. Attach incoming power cable to the top of the disconnect. Rain Bird® recommends that all exterior incoming power cable and exterior aerator cable be encased in conduit.

E. Attach aerator power cable to the contact points on the motor starter in the Power Control Center. Make sure to always use Rain Bird®/Otterbine aerator cable. If Rain Bird®/Otterbine aerator cable is not used, the WARRANTY IS VOID.

NOTE: Wiring schematics for all 60Hz units are located on the following pages. Please note on all 460V units 5 milliamp GFCI (Ground Fault Circuit Interrupter) is an optional accessory.

WARNING: Rain Bird® strongly suggests that GFCI be added to any unit where people are going to be near the water.

ADVERTISSEMENT: Rain Bird® fortement suggeste qu'au panneau de branchement electrique un interupteur avec control de defaut de masse soit installe, ou les personnes se trouberai pres de l'eau.

SATELLITE CONTROLLERS: Custom control panels are available as an option for customers using computerized irrigation controllers. These panels will interface with the computer and allow you to run your units(s)/ lights(s) remotely. See your local Rain Bird® distributor or call Rain Bird® directly for more information.

Timer Operation

NOTE: The type and model of the timer used on the unit and light control varies depending on voltage and options. Refer to the appropriate timer instructions below.

Timer Type A - timer has black face with white trip tabs.

Instructions for type A timer are as follows:

A. Push all of the white trippers on the timer inward toward the clock face .

B. Push the trippers out on the dial to set the desired ON time.

EXAMPLE: If you want your aerator on from 7:00AM - 5:00PM, push out all of the white tabs between 7:00AM - 5:00PM.

C. Turn the dial clockwise until the time of day is shown on the timer face,close the panel and apply power.
EXAMPLE, the timer pictured is set for 4PM .
In case of power failure, reset timer.

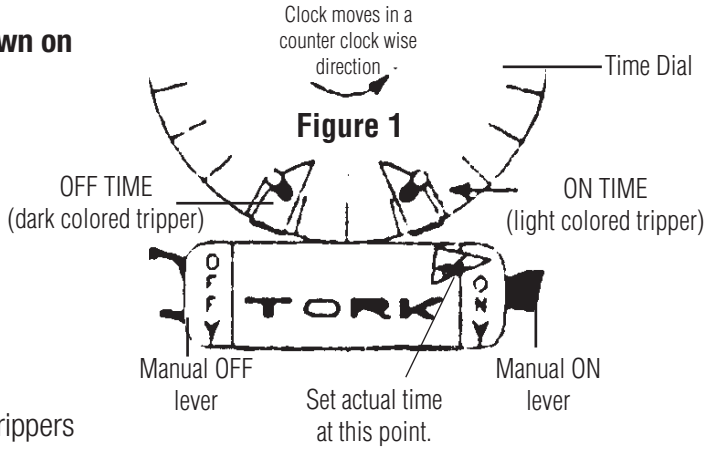


Figure 1

Timer Type B - timer has two tabs: one ON tab, one OFF tab, and manual override.

Instructions for type B timer are as follows:

A. To set on and off times: Light trippers turn ON. Dark trippers turn OFF. Place tripper on dial as shown in figure 1 and set point of each tripper to desired operating time. Tighten timer trip screws by hand.

B. Turn the dial counter clockwise. Set actual time of day by lining up the actual time of the day on the dial to the "time point" on the manual on/off switch. Close panel and apply power.

In case of power failure, reset timer.

C. For manual operation: Press down lever on right of name plate to turn ON. Press down lever on left of name plate to turn off.

Physical Installation

Prior to installation please measure your water depth. All 1-5 HP LM Rain Bird® aerators require at least

40"/1m of water to run properly. If the water is too shallow, dig out a portion of the pond bottom directly under the aerator. If high waves or large fluctuations in water depth occur, it may be necessary to allow for more than the required 40"/1m. Shorter support arms are available upon request. The shorter support arms change the minimum operating depth to 31"/77.5 cm.

A. Attach your Rain Bird® power cable to the aerator. Align the pigtail connector on the cable up to the pin configuration on the bulkhead on the aerator. HAND TIGHTEN the coupling nut onto the bulkhead connector. DO NOT OVER TIGHTEN -- OVER TIGHTENING WILL CAUSE A FRACTURE IN THE CONNECTOR AND COULD LEAD TO A SHORT CIRCUIT-- see figure 2.

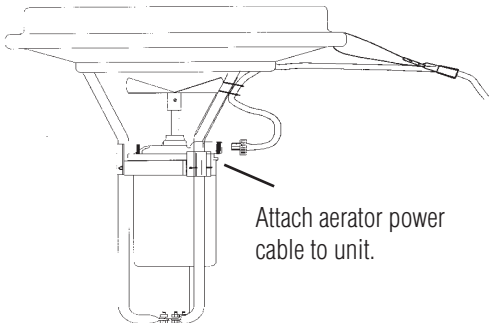


Figure 2

NOTE: You will notice a small amount of silicon compound on the female end of the aerator connector. This compound has been applied during assembly and is needed in order to make proper seal between the two connectors. DO NOT REMOVE COMPOUND! When servicing the aerator make sure to re-apply compound (Rain Bird® part# 48-0001).

CAUTION: KEEP HANDS CLEAR OF THE IMPELLER WHEN TRYING TO START THE AERATOR!

ATTENTION: BARDER VOS MAINS A DISTANCE DE LA TURBINE PORSQUE VOUS ESSAYEZ DE DE-MARRER P'AERATEUR

B. Have your electrician perform an on-shore dry-run test:

1. Check and compare the actual power supply at the site to the information on the aerator's nameplate in regard to: motor voltage, phase, and frequency. IF VOLTAGE VARIATIONS ARE NOT WITHIN THE RANGE ON THE FOLLOWING CHART, DO NOT OPERATE THE UNIT!

60 HZ	Minimum	Maximum
115	109	125
208-230	197	242
460	437	483
575	546	604

50 HZ	Minimum	Maximum
220	109	125
380	197	242
415	437	483

2. With the aerator on dry land, attach the power cable to the aerator and power supply.

3. Turn the handle mechanism on the exterior of the Power control center to the "ON" position.

4. Energize the unit by turning the "Hand, Off/Auto" switch to the "Hand" position. Run unit 2 minutes to break in seals. DO NOT RUN UNIT FOR MORE THAN 2 MINUTES -- MOTOR DAMAGE CAN OCCUR.

5. IF Steps 1-4 are successful, you are ready to install the unit in the water. Proceed with following instructions.

CAUTION: Rain Bird® aerators are designed to run in a COUNTER CLOCKWISE DIRECTION and CURRENT UNBALANCE BETWEEN THE LEGS ON 3 PHASE UNITS SHOULD NOT EXCEED 5%. Steps "L-M" on page 12 determine current unbalance.

ATTENTION: les aerateurs Rain Bird® sont designes pour fonctionner dans le sens contaire des aiguilles d'une montre et tout desequilibre entre chacune des phases de l'alimentation ne doit pas depasser 5% voir "L-M page 12 pour determiner le desequilibre.

C. Install the cable strain relief device. Pass the wire hoop through one of the holes in the float and around the aerator power cable. Re-attach the cable strain relief --see figure 3.

D. Attach your aerator power cable to one of the support arms with the ty-raps provided. In corrosive, brackish, and salt water applications use two ty-raps to attach your power cable to the support arm--see figure 3.

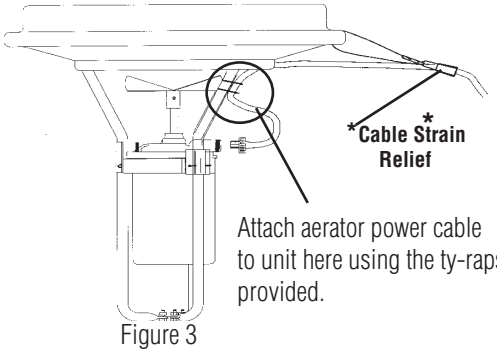


Figure 3

There are two different methods of securing your aerator, anchoring and mooring. Rain Bird® suggests mooring as it will be easier to install and service the aerator. On the next page you will find instructions for mooring the aerator; if you prefer to anchor your aerator, please see "Anchoring Your Aerator."

MOORING YOUR AERATOR:

A. Proceed to next page, follow steps E-K.

B. Proceed to page 70, follow steps L-N.

ANCHORING YOUR AERATOR:

A. Proceed to page 69, follow steps E-K.

B. Proceed to page 70, follow steps L-N.

Mooring the aerator

An illustration showing how to moor an aerator is given in Figure 1.

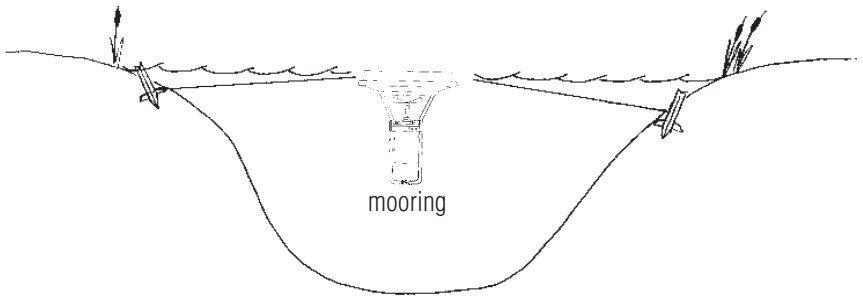


Figure 1

E. You will need the following items in order to moor your Rain Bird® aerator.

1. Use all brass and stainless steel hardware in the installation of your Rain Bird® aerator.

2. Rain Bird® recommends using 1/4"/.63 cm or 1/2"/1.25 cm polypropylene rope or stainless steel cable for your mooring lines.

3. At the mooring points themselves you will need a wooden stake, 1/2"/1.25 cm of rebar or a "duck bill" type earth anchor --see figure 2.

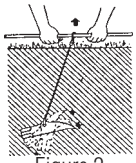


Figure 2

- Duckbill Earth Anchors are driven into the ground, using a drive rod and heavy hammer, compacting the earth as they drive downward, until they reach the recommended depth. After removing drive rod, installer pulls up on cable. This planes or rotates the anchor into load lock position, like a toggle bolt in undisturbed earth.

F. Choose a suitable location for your Rain Bird® aerator. See the aerator location chart on page 7 of the owner's manual to determine the best aerator location for the most efficient and effective aeration.

G. Secure your first mooring point. If you are using a stake or 1/2"/1.25cm rebar, make sure to pound the mooring point securely into the ground on the outer edge of the pond. If you are mooring with an earth anchor, you will need to place the earth anchor two feet into the pond and then pound the earth anchor about two feet into the pond bottom. The earth anchor will allow your mooring lines to be virtually unnoticeable as it will be hidden two feet beneath the surface of the water.

H. Attach the mooring lines to the holes in the float. Use a strong, tight knot as it will secure the Rain Bird® aerator in its place.

I. Launch your aerator into the water. Walk one mooring line around to the other side of the pond.

J. Pull your Rain Bird® aerator into your previously chosen location.

K. Put in the other anchor or stake. Tie down your Rain Bird® aerator leaving enough slack in your lines to allow the aerator to turn 90° or 1/4 turn. The slack in the lines will allow for proper start up, wave action, and fluctuations in the water level. Proceed to step L (page 70).

Anchoring an aerator

An illustration showing how to anchor an aerator is given in Figure 1.

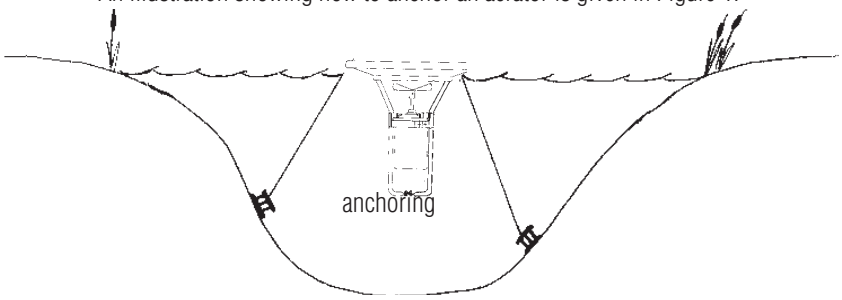


Figure 1

E. You will need the following items to anchor your Rain Bird® aerator:

1. Use all stainless steel and brass hardware in the installation of your Rain Bird® aerator.
2. Rain Bird® recommends using 1/4"/.63 cm or 1/2"/1.25 cm polypropylene rope or stainless steel cable for your anchoring lines.
3. Two 60 - 80 pound anchors/two 27 - 36 kilo anchors.
4. Small boat.

F. Choose a suitable location for your Rain Bird® aerator. See aerator location chart on page 7 so that you can place your aerator in the best location for the most efficient and effective aeration.

G. Launch your aerator into the water upside down, with the motor housing sticking up into the air. Take a piece of rope and pass it through one of the holes on the float.

H. In a small boat tow the aerator into your previously chosen location.

I. Determine where to locate the anchors. Where the anchors are located will vary depending on the depth of your pond. See the chart below to determine the best location for your anchors.

MAXIMUM DEPTH		DISTANCE BETWEEN ANCHORS	
feet	meters	feet	meters
5'	1.5m	11'	3.4m
6'	1.8m	15'	4.6m
7'	2.1m	20'	6.1m
8'	2.4m	30'	9.1m
9'	2.7m	40'	12.0m
10'	3.0m	55'	16.7m
11'	3.3m	70'	21.2m
12'	3.6m	85'	26.8m
13'	3.9m	100'	30.3m
14'	4.2m	120'	36.4m
15'	4.6m	140'	42.4m

J. Drop in the first anchor line. Place your aerator in the desired location and securely tie the anchor line to one of the holes on the outside edge of the float.

K. Drop in the second anchor line. Securely tie the anchor line to the hole on the outside edge of the float which is directly opposite of the first anchor line that was tied onto the float. Make sure the unit can rotate 90° or 1/4 turn. The slack in the anchoring lines will allow for proper start up, wave action, and fluctuations in the water level. Flip the unit over. Proceed to step L (next page).

L. Energize your unit.

M. Have your electrician do the following while the unit is in the water under load:

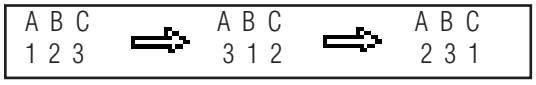
1 PHASE UNITS: Record running voltage & running amperage, power control center serial #, and cable length and size on the sticker inside the power control panel. Go to step N.

3 PHASE UNITS:

1. Check the direction of the rotation. Three-phase motors can run in either direction depending on how they are connected to the power supply. When the three cable leads are first connected to the power supply, there is a 50% chance that the motor will run in the right direction.

2. Establish the correct motor rotation by running in both directions. Change rotation by exchanging any two of the three motor leads. The rotation that gives the lowest current readings is always correct. Failure to do the above MAY CAUSE THE MOTOR TO FAIL WITHIN ONE WEEK OF RUNNING TIME. MOTOR FAILURE DUE TO REVERSED POLARITY WILL NOT BE COVERED UNDER WARRANTY.

3. Check current readings in amps on each leg using the three possible hook-ups. Roll the motor leads across the starter in the same direction to avoid motor reversal. EXAMPLE:



4. Calculate the percent of current unbalance:
   A. Add the three line amp values together.
   B. Divide the sum by three, yielding current average.
   C. Pick the amp value that is furthest from the average current (either high or low).
   D. Determine the difference between this amp value (line C) and the average (line B).
   E. Divide this difference (line D) by the average (line B).
   F. Multiply the result (line E) by 100 to determine percent of unbalance.

5. Current unbalance should not exceed 5% at the service factor load. If unbalance cannot be corrected by rolling leads, locate source of unbalance & correct it. IF Leg furthest from average stays on the same power lead, THEN the primary cause of unbalance is the power source. IF leg furthest from average moves on each of the hookups with a particular motor lead, THEN the primary cause of unbalance is the "motor side" of starter. Consider: damaged cable, leaking splice, poor connection, or faulty motor as possible causes.

6. Record running voltage & running amperage, power control center serial #, and cable length and size on the sticker inside the power control panel. Proceed to step N.

N. If GFCI or EPD is installed, have the electrician test the device for proper operation.

O. Lock your enclosure with a padlock to prevent any type of vandalism. Set the "hands off" switch located on the outside of your Power Control Center to the ON or AUTO position. The ON position on the switch will let your aerator run continuously. The AUTO position on the switch will allow the automatic timer inside your aerator to operate the unit. See page 65 for timer operating instructions. Your aerator should be running at this point and installation is complete.

CAUTION: The aerator should be allowed to run continuously for 12 hours after installation. This will allow the aerator to properly "break in."

ATTENTION: l'aerateur doit etre permi de fonctionner continuellement pendant 12 heures apres l'installation. Cel permettra a l'aerateur d'etre proprement rode.

Physical Installation

Prior to installation please measure your water depth. If the water is too shallow, dig out a portion of the pond bottom directly under the aerator. If high waves or large fluctuations in water depth occur, it may be necessary to allow for more than the required 48"/1.2m.

CAUTION: KEEP HANDS CLEAR OF THE IMPELLER WHEN STARTING THE AERATOR!

ATTENTION: BARDER VOS MAINS Á DISTANCE DE LA TURBINE LORSQUE VOUS ESSAYEZ DE DÉMARRER L'AÉRATEUR

NOTE: You will notice a small amount of silicon compound on the female end of the aerator connector. This compound has been applied during assembly and is needed in order to make proper seal between the two connectors. DO NOT REMOVE COMPOUND!
When servicing the aerator make sure to re-apply compound (Part# 48-0001).

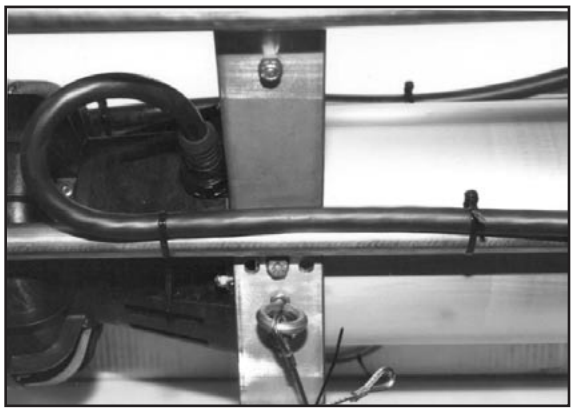


Figure 1

B. Attach your Rain Bird® power cable to the aerator. Place the unit on a flat surface with the float down. Align the pigtail connector on the cable up to the pin configuration on the bulkhead connector. HAND TIGHTEN the coupling nut onto the bulkhead connector. DO NOT OVER TIGHTEN - OVER TIGHTENING WILL CAUSE A FRACTURE IN THE CONNECTOR AND COULD RESULT IN A SHORT CIRCUIT. (See Figure 1)

C. Fasten the strain relief to the float. Using two ty-wraps secure the cable to the side of the support frame and place a small loop in the cable between the last ty-wrap and the connector. (Refer to figure 1). ONLY PLACE A SMALL LOOP IN THE CABLE, DO NOT ALLOW THE CABLE TO TOUCH THE FLOAT.

D. Have your electrician perform an on-shore dry-run test:

1. Check and compare the actual power supply at the site to the information on the aerator's nameplate in regard to: motor voltage, phase, and frequency. IF VOLTAGE VARIATIONS ARE NOT WITHIN THE RANGE ON THE FOLLOWING CHART, DO NOT OPERATE THE UNIT!

60 HZ	Minimum	Maximum
115	109	125
208-230	197	242
460	437	483
575	546	604

50 HZ	Minimum	Maximum
220	197	242
380*	380	380
415	400	436

***WARNING: A MINIMUM OF 380 VOLTS MUST BE ATTAINED OR THE PROPER STEP-UP TRANSFORMER MUST BE SPECIFIED!**

2. With the aerator on dry land, attach the power cable to the aerator and power supply.

3. Turn the handle mechanism on the exterior of the power control center to the "ON" position.

4. Energize the unit by turning the "Hand, Off/Auto" switch to the "Hand" position. Run the unit 2 minutes to break in seals. DO NOT RUN UNIT FOR MORE THAN 2 MINUTES -- MOTOR DAMAGE CAN OCCUR.

5. IF Steps 1-4 are successful, you are ready to install the unit in the water. Proceed with following mooring instructions located at the bottom of this page.

Mooring the Unit

A. You will need the following items in order to moor your Rain Bird® aerator:

1. Use all brass and stainless steel hardware in the installation of your Rain Bird® aerator.

2. Rain Bird® recommends using 3/32"/.24 cm or 1/8"/32 cm stainless steel cable or 1/2"/1.25cm polypropylene rope for your mooring lines.

3. At the mooring points themselves you will need a wooden stake, 1/2"/1.25 cm of rebar or a "duck bill" type earth anchor --See Figure 2. (Rain Bird® strongly suggests using earth anchors for installation. See your local Rain Bird® distributor for more information.)

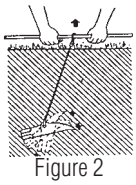
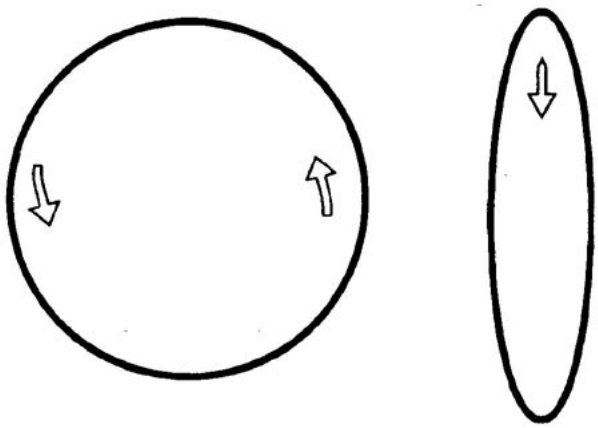


Figure 2

- Duckbill Earth Anchors are driven into the ground, using a drive rod and heavy hammer, compacting the earth as they drive downward, until they reach the recommended depth. After removing drive rod, installer pulls up on cable. This planes or rotates the anchor into load lock position, like a toggle bolt in undisturbed earth.

B. Choose a suitable location for your Rain Bird® aerator. See the aerator location chart below.



C. Place the screen assembly (PART# F-900-003) over the unit. Pull the mooring cable out through the sides of the screen at a 45 degree angle toward the front of the unit to allow proper mooring. (Figure 2)

D. Place the cord through the trough of the float. Using eight ty-wraps, fasten the screen to the support frame. Place one tyrap on each corner below the bottom side support. Using another 4 ty-raps secure the bottom of the screen to the support frame close to each corner.

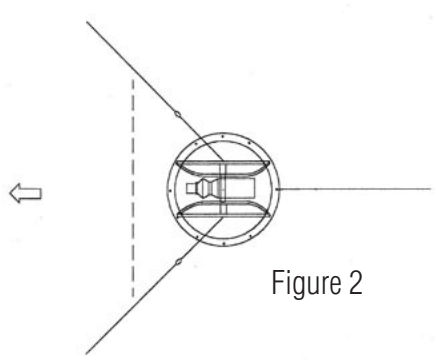


Figure 2

E. Fasten the screen to both sides of the trough containing the cable, using (2)#10 screws and (2) washer. Secure the screen to this side of the float in another location closer to the front of the unit.

F. On the opposite side, secure the screen to the float in the same manner as in step E.

G. Fasten a mooring line to the 1/2" hole in the rear of the float. Fasten a mooring line to each of mooring cables. (Refer to Figure 2)

H. Launch your aerator into the water. Secure the two front mooring lines to stakes at or near the shoreline. The angle between line 1 and line 2 should be 90 degrees.

I. Pull your Rain Bird® aerator into your previously chosen location.

J. Put in the other anchor or stake.

K Pull the third mooring line tight and secure it to a stake as mentioned above.

NOTE: Make sure all mooring lines are tight. Check them occasionally to make sure they are secure.

L. **Energize your unit.**

Physical Installation

A. Select a suitable location for your Rain Bird® aerator.

B. Measure your water depth were the unit will be located.
If the water is too shallow, a different location must be located.

Verify the measured depth of the water does not exceed the maximum depth specified in the chart for your unit.

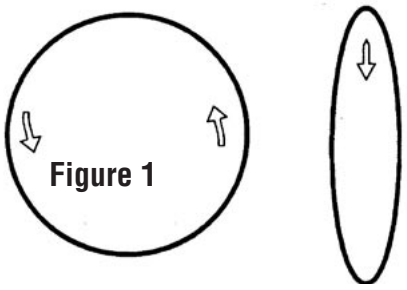


Figure 1

Horsepower	Maximum Depth
1	12' or 3.5 meters
2	21' or 6.5 meters
3	24' or 7.2 meters
5	28' or 8.5 meters

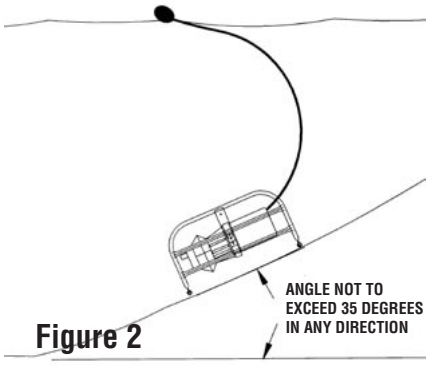


Figure 2

1. You will need the following items in order to moor your Rain Bird® aerator:

a. Use all brass and stainless steel hardware in the installation of your Rain Bird® aerator.

b. Rain Bird® recommends using 1/4"/.63 cm or 1/2"/1.25 cm polypropylene rope or stainless steel cable for your mooring lines.

c. At the mooring points themselves you will need a wooden stake, 1/2"/1.25 cm of rebar or a "duck bill" type earth anchor --See Figure 3. (Rain Bird® strongly suggests using earth anchors for installation. See your local Rain Bird® distributor for more information.)

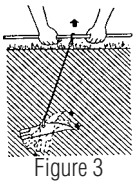
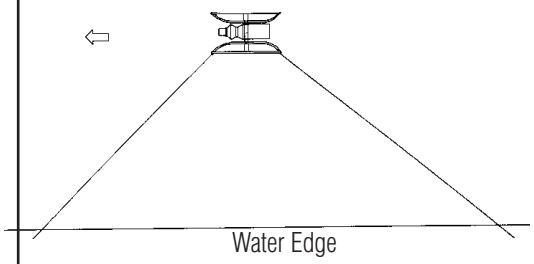


Figure 3

- Duckbill Earth Anchors are driven into the ground, using a drive rod and heavy hammer, compacting the earth as they drive downward, until they reach the recommended depth. After removing drive rod, installer pulls up on cable. This planes or rotates the anchor into load lock position, like a toggle bolt in undisturbed earth.

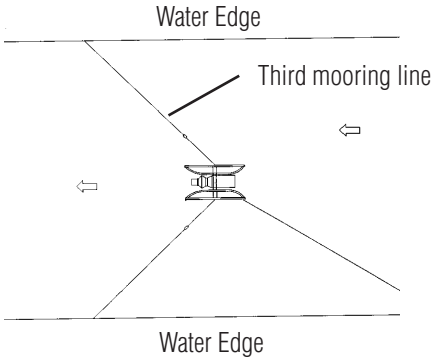
2. Choose the type of mooring you will need based on your application (water with movement/current or without movement/current). - Figures 4 & 5

Single Sided Mooring - <u>Stable Water</u>
Figuire 4



• Attach one mooring line to front of support frame, attach second mooring line to rear of support frame

Two Sided Mooring - <u>Moving Water</u>
Figure 5



• Attach third mooring line as shown

3. Secure your first mooring point. If you are using a stake or 1/2"/1.25cm rebar, make sure to pound the mooring point securely into the ground on the outer edge of the pond. If you are mooring with an earth anchor, you will need to place the earth anchor two feet into the pond and then pound the earth anchor about two feet into the pond bottom. The earth anchor will allow your mooring lines to be virtually un-noticed, as they will be hidden two feet beneath the surface of the water.

WARNING: When this unit is placed in moving water, the unit must be moored and anchored. Concrete anchor kit P/N 12-0018 must be used. This kit has forms and the necessary hardware to produce (2) 70 lb concrete weights to anchor the unit. (Concrete mix is not included in the kit.) This kit is included on all circulator units and must be installed on those units. If required contact your Rain Bird® distributor to obtain this kit.

C. If required, construct and attach the concrete weights per instructions included in the kit. Please note that the concrete must be allowed to harden at least 24 hours before being placed in the water.

D. The unit can be adjusted to allow a +/- 20 degree tilt in the discharge. To adjust, remove the top bolts securing the power unit to the support frame (one on each side). Loosen the bottom bolts, and move the unit to align the bolts with the desired holes in the support frame. Install the bolts and secure all loosen/removed bolts.

WARNING: Aiming the discharge down toward the bottom may erode the bottom in front of the unit, creating an unstable area, and allow the unit to shift. Rain Bird® does not recommend pointing the discharge down.

E. Attach your Rain Bird® power cable to the aerator. Align the pigtail connector on the cable up to the pin configuration on the bulkhead connector. HAND TIGHTEN the coupling nut onto the bulkhead connector. DO NOT OVER TIGHTEN-OVER TIGHTENING WILL CAUSE A FRACTURE IN THE CONNECTOR AND COULD RESULT IN A SHORT CIRCUIT.

F. Fasten the strain relief to the support frame. Using two ty-raps secure the cable to the side of the support frame and place a small loop in the cable between the last ty-rap and the connector. (Refer to figure 6).

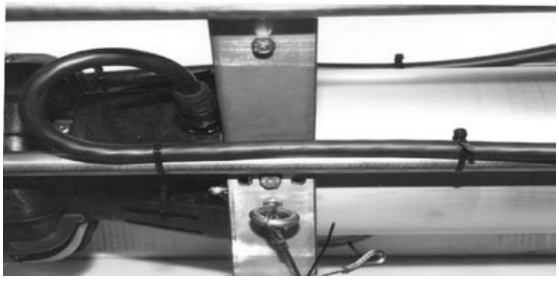


Figure 6

G. Have your electrician perform an on-shore dry-run test:

1. Check and compare the actual power supply at the site to the information on the aerator's name plate in regard to: motor voltage, phase, and frequency. IF VOLTAGE VARIATIONS ARE NOT WITHIN THE RANGE ON THE FOLLOWING CHART, DO NOT OPERATE THE UNIT!

60 HZ	Minimum	Maximum
115V	109V	125V
208-230V	197V	242V
460V	437V	483V
575V	546V	604V

50 HZ	Minimum	Maximum
220V	197V	242V
380V*	380V	380V
415V	400V	436V

***WARNING**: A MINIMUM OF 380 VOLTS MUST BE ATTAINED OR THE PROPER STEP-UP TRANSFORMER MUST BE SPECIFIED!

2. With the aerator on dry land, attach the power cable to the aerator and power supply.
3. Turn the handle mechanism on the exterior of the power control center to the "ON" position.
4. Energize the unit by turning the "Hand, Off/Auto" switch to the "hand" position. Run the unit 2 minutes to break in the seals. DO NOT RUN UNIT FOR MORE THAN 2 MINUTES - MOTOR DAMAGE CAN OCCUR
5. If Steps 1/4 are successful, you are ready to install the unit in the water.

***H. Attach the aspirator tubing to the barbed fitting on the venturi assembly.** (Refer to figure 7). Secure the tubing to the support frame using two ty-raps. Cut the tubing to the desired length, allowing for fluctuations in the water depth. Connect the float/coupling assembly to the other end.

***ON CIRCULATOR MODELS, STEP H IS OMITTED.**

NOTE: If the float is not desired, the aspirator tubing can be secured to a rod or stake (Rain Bird® recommends using a 1.5" PVC pipe) along the edge of the water. The end of the tube must be fasten above the water surface. The muffler can be removed from the float and inserted into the top of the tube. Refer to figure 8.

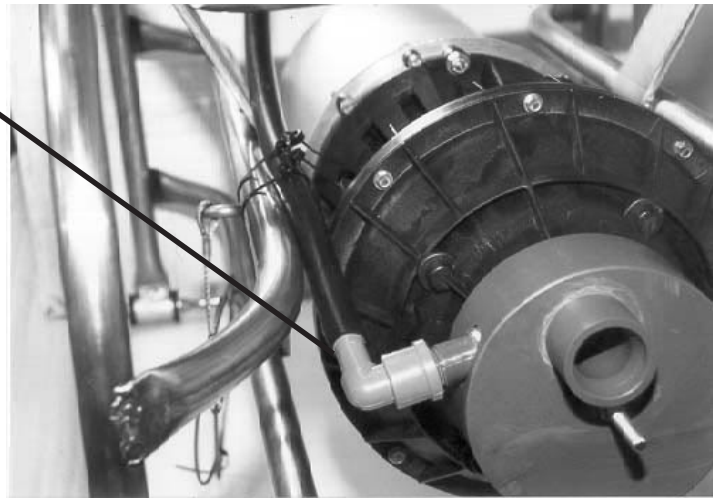


Figure 7

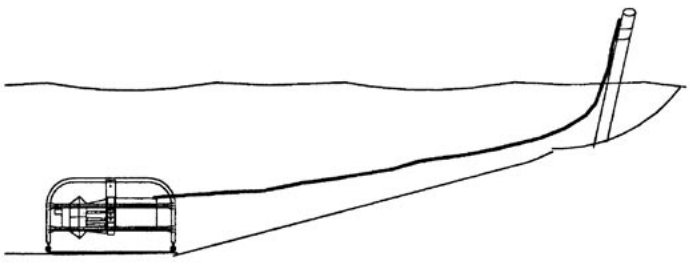


Figure 8

NOTE: The maximum length of aspirator tubing is 500 feet or 152 meters. The tubing must not be any deeper in the water than the aerator. See figures 9 & 10 below.

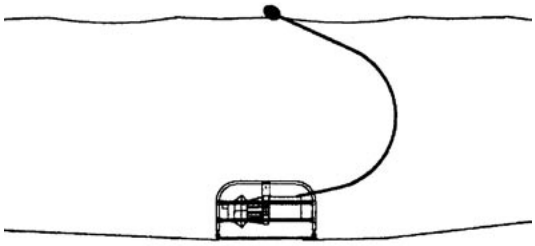


Figure 9
CORRECT

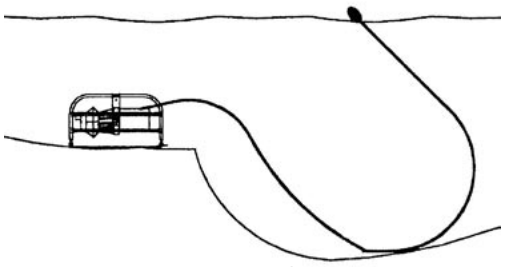


Figure 10
WRONG

I. Place the screen assembly (PART# F-900-004) over the unit. Pull the mooring cables and the aspirator tubing out through the sides/top of the unit.

J. Secure the screen to the unit, using the ty-raps provided. Use eight ty-raps to fasten the screen to the support frame. Place one ty-rap on each corner below the top side support. Use the other four ty-raps, to secure the top of the screen to the support frame at each corner. -Figure 11

K. Use several ty-wraps to secure the bottom of the screen to the barrier and the support rods on all four sides. Place a ty-rap through each of the holes of the barrier and secure the screen in position. (Refer to figure 12)

L. Use a strong tight knot as it will secure the unit in its place.

1. Secure your second and, possible third mooring points to shore (see fig. 4 & 5).

M. Place the unit in the water, lowering the unit slowly to insure that it will rest in the proper position. Verify the discharge is pointing in the proper direction.

N. Secure the mooring lines.

O. Energize your unit.

Figure 11

Figure 12

Rain Bird® Screen Installation - LM

1/4" Screen Kit #F-900-002F:

QTY	DESCRIPTION	PART #
9	1" Fender Washers	800-011
9	S/S Sheet Metal Screws	BP2803B
1	C2 1/4" Screen	15-0001

1/2" Screen Kit #F-800-001B:

QTY	DESCRIPTION	PART #
9	1" Fender Washers	800-011
9	S/S Sheet Metal Screws	BP2803B
1	C2 1/2" Screen	15-0002

A. Pull screen over motor unit and support arms until it reaches the first ridge on the float -- see figure 1.

B. Make sure the cord/cords are running through the cord trough where the float arms fit into the float (choose one cord trough for all of your cables - see figure 1-#1). Pull approximately two inches of the screen past the Mounting Ring. This is to insure that all of the cord troughs are adequately covered.

C. Fasten the screen to the float with the washers and screws provided. Fasten one screw and one washer on both sides of each cord trough-see figure 1-#1.

D. Screw the remaining screws and washers through the screen into float between the cord troughs - three places --see figure 1-#2.

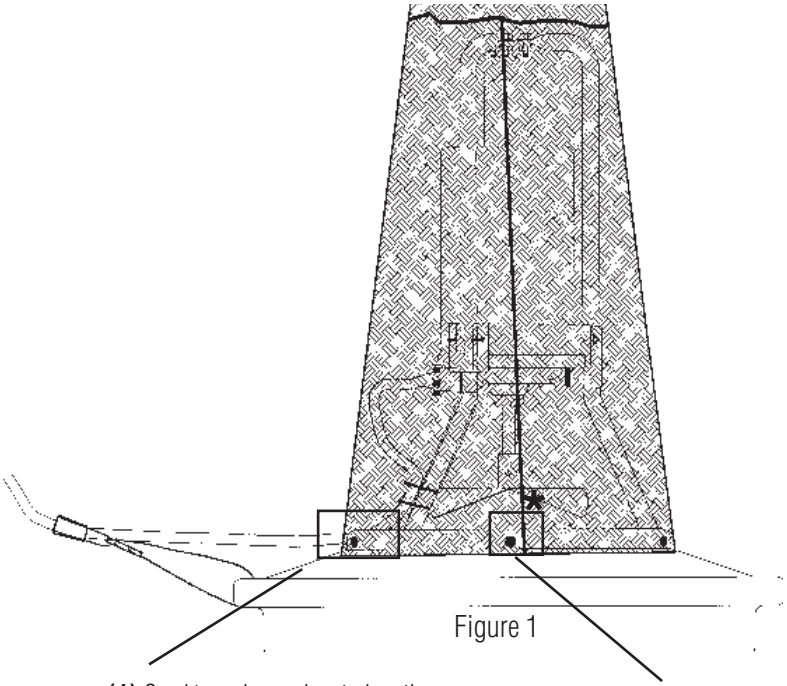


Figure 1

(1) Cord troughs are located on the float where the support arm meets the float. Fasten one screw and one washer on both sides of each cord trough (use six screws and six washers).

(2) Place a washer and screw between each cord trough (three screws and three washers).

Rain Bird® Circulator Cap Installation - LM

- **Kit Contents:**

QTY	DESCRIPTION	Part #
1	C2 Circulator Throat	S-420
3	C2 Circulator Support Arm	C2-320
1	Impeller	*
1	1-5 HV Prop Bolt	C2-111
1	Impeller Lock Washer	EP6301
3	S/S Flat Washer 5/16"	927-004
3	S/S Locknut 5/16"	GP1208
3	S/S Hex Bolt 5/16"	106-302
6	S/S Flat Washer 1/4"	28-0001-001
6	S/S Locknut 1/4"	C2-112
2	Nylon Ty-Rap	GP5008
1	Support Arm Brace	C2-301
1	Aerator Screen**	F-800-001B
9	S/S Sheet Metal Screw**	BP2803B
9	Fender Washer**	800-011

***** The impeller Part# depends on the HP rating of the aerator. Verify the proper conversion kit has been ordered per the HP rating of the aerator.
**Indicates items needed for screen installation.

HP @60Hz	Impeller Part #
1	C2-801
2	C2-802
3	C2-803
5	C2-805

WARNING: DISCONNECT THE UNIT FROM THE POWER SOURCE BEFORE SERVICING THE UNIT!

NOTE: Depending on the aerator configuration, the quantities of some items may vary. If quantities vary, please refer to your packing slip.

Aerator Disassembly Instructions - LM

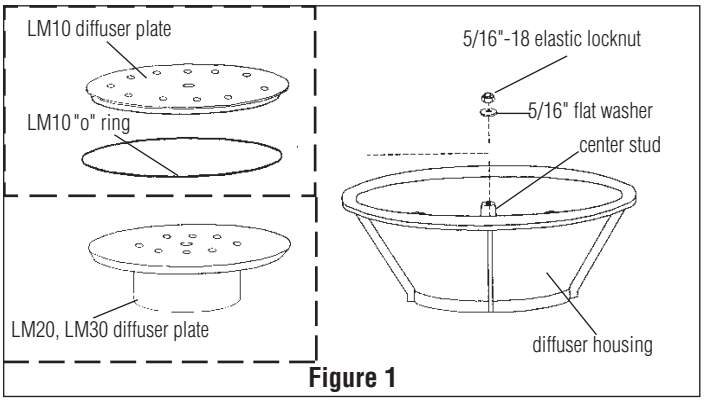


Figure 1

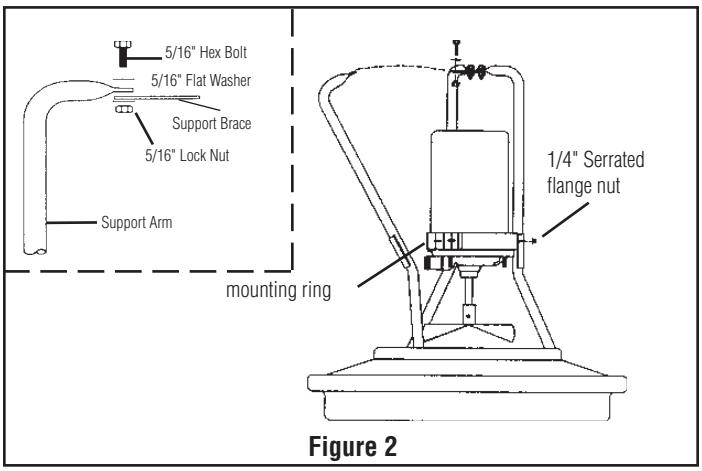


Figure 2

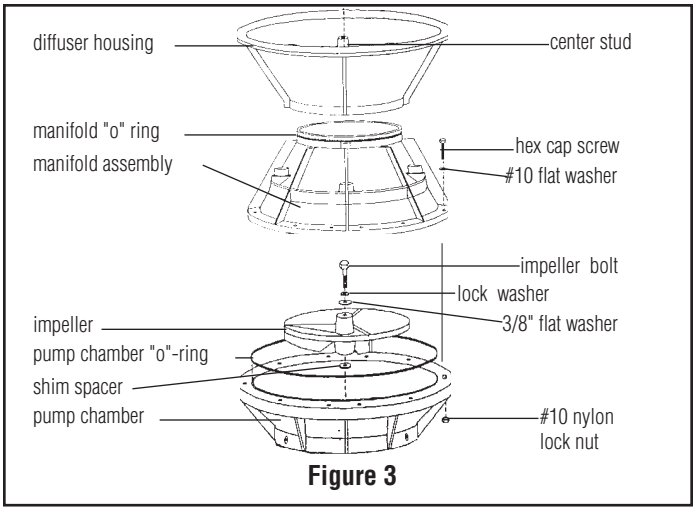


Figure 3

A. Remove any Options:

- screen
- lights and brackets, and transformer enclosure.

B. Disassembly of LM10, LM20, and LM30 units.

1. With the unit standing upright, remove the locknut and washer from the stud in the diffuser plate. Grab the outer edge of the diffuser housing and remove. See Figure 1.

2. Turn the unit upside down. Remove (2) of the 5/16" bolts and locknuts from the support arm/brace. See Figure 2.

3. Remove the 1/4" flange nuts from the mounting ring at two support arm locations. Remove the two support arms. See Figure 2.

4. Pivot and lift the support arm/motor unit from the float. Set the motor upright and remove the last arm.

5. Remove the (8) screws from the top manifold

assembly and remove the manifold assembly from the unit. Remove the chamber o-ring.

6. Remove the impeller bolt, lock washer, 3/8" flat washer and impeller.

7. Remove the (4) 1/4" locknuts holding the pumping chamber to the motor plate and lift the chamber off the plate.

C. Disassembly of LM11.

1. With the unit on its side, loosen the impeller's set screw and remove the impeller bolt. Remove the impeller assembly from the motor shaft.

2. Lay the float down on its flat side Remove (2) of the 5/16" bolts and locknuts from the support arm/brace union. See Figure 2, previous page.

3. Remove the 1/4" flange nuts from the mounting ring bolts at two support arm locations. Remove the two support arms. See Figure 2.

4. Pivot and lift the support arm/motor unit from the float. Set the motor upright and remove the last arm.

5. On LM11 units, remove the throat assembly from the float.

Circulator Cap Assembly Instructions

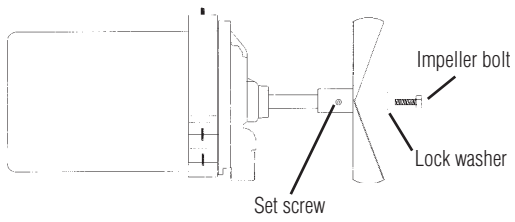


Figure 4

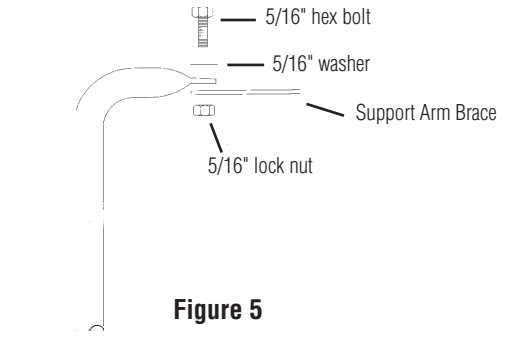


Figure 5

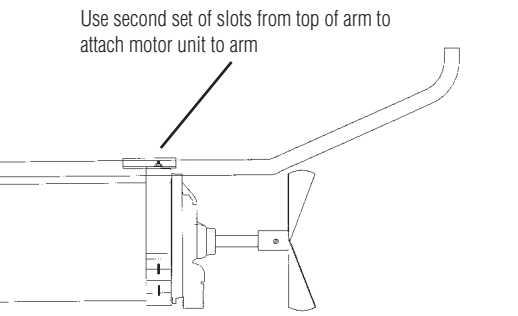


Figure 6

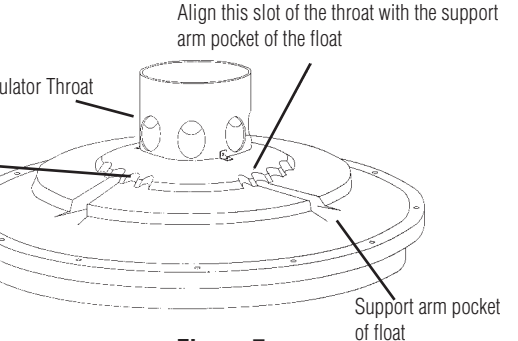


Figure 7

WARNING: The circulator must be assembled using the support arms and impeller supplied in the circulator kit. Use of the regular support arms and/or impeller may damage the unit.

1. Position the impeller onto the motor shaft.

2. Turn the impeller until the set screw is flush against the flat section of the motor shaft. Using a 1/8" hex key driver, tighten the set screw up against the flat part of the motor shaft.

3. Install the impeller bolt and lock washer. Tighten securely.

4. Using a 5/16" lock nut, 5/16" flat washer, and 5/16" hex bolt, attach the bottom of one of the circulator support arms to the support arm brace. See Figure 5.

5. Attach the support arm of step 4 to the mounting ring of the motor unit, using (2) 1/4"flange nuts.

NOTE: Use the second set of holes down from the top of the support arm to secure the motor unit. See Figure 6.

6. Lay the float down on its flat side (top side down). (See Figure 7.)

7. Install the circulator throat assembly into the float with the capped end down in the float.

8. Align the third slot (when counted clockwise) of the throat with the support arm pockets of the float. See Figure 7.

9. Place one of the two empty support arms into the float. Verify the section of the support arm with the bracket is perpendicular to the top of the float (see Figure 8). If the support arm is not perpendicular, use a different locating slot in the throat and repeat until the best possible slot is found. Remove the support arm.

10. Insert the top of the motor unit/support arm assembly into one of the float's pockets with the arm aligned with the proper slot of the throat per step 9.

NOTE: In order to install the motor unit, it may be necessary to tilt the throat toward the motor unit.

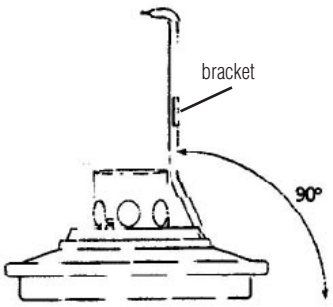


Figure 8

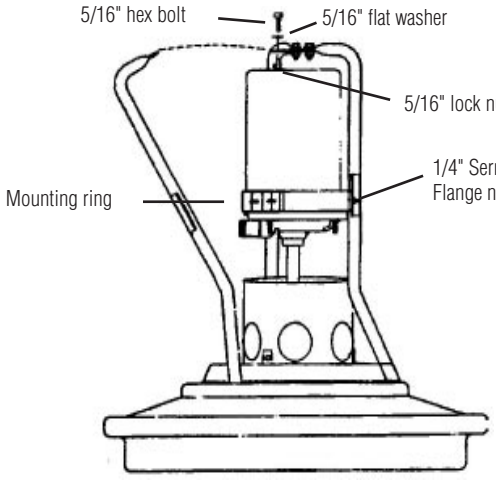


Figure 9

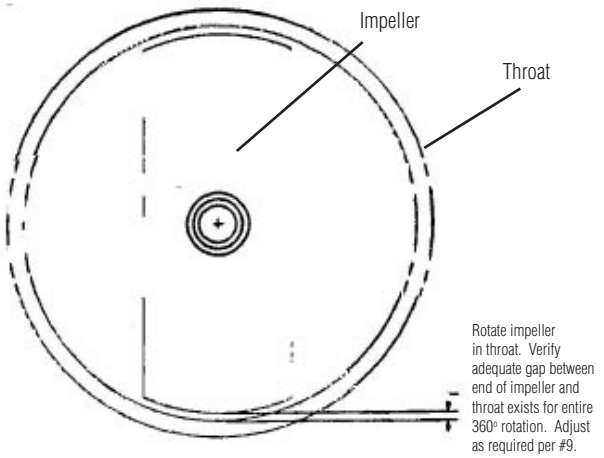


Figure 10

11. Insert the remaining two support arms in the float and attach each arm to the mounting ring using (2) 1/4" flange nuts. Do not fasten the support arm tightly to the ring at this time. Adjustment may be required later. See Figure 9. Use the second set of holes from the top of the support arm.

12. Using a 5/16" lock nut, 5/16" flat washer, and a 5/16" hex bolt for each arm, attach the bottom of the arms to the support arm brace. See Figure 9.

NOTE: When the support arms are assembled properly, a perfect triangle is formed where the arms meet at the support brace.

13. Tighten the support arms securely to the first brace and then to all six locations of the mounting ring.

14. Refer to Figure 10. Inspect for adequate clearance between the impeller and the throat. If the impeller is not properly aligned, adjustment can be made by slightly loosening the lock nuts at the mounting ring and moving the motor unit for proper clearance. If this is not adequate, use of a different set of slots in the throat assembly may be required. Refer to step 8.

15. Insure that all hardware is properly tightened.

16. Attach your aerator power cable to one of the support arms with the ty-raps provided as instructed in the "Physical Installation" section of your owner's manual.

NOTE: Due to the recirculating effect of this unit, the use of a screen is required to reduce possible damage to the impeller, throat, and motor unit. Use of the 1/2" screen is suggested for maximum flow.

17. Install the screen supplied in this kit as instructed in the "Screen Installation" section.

This completes the circulator assembly, install the circulator in the water per normal aerator instructions as explained in the owner's manual.

CAUTION: When converting the unit back to an aerator, use only the impeller and support arms originally supplied with the aerator!

ZINC ANODE KIT #614-028:

QTY.	DESCRIPTION	PART #
1	Zinc, machined	41-0001
1	S/S Locknut	C2-112
2	Flat washer	927-000
1	Hex bolt	EP5102
1	Carriage bolt	101-031
1	Bracket, mounting	40-0001

By attaching the piece of zinc to the aerator, the zinc becomes the sacrificial metal. This will save the other metal parts of the aerator from electrolysis damage.

NOTE: Good electrical contact is required. Remove any dirt or mineral buildup from the location on the aerator where the zinc and associated hardware will come in contact.

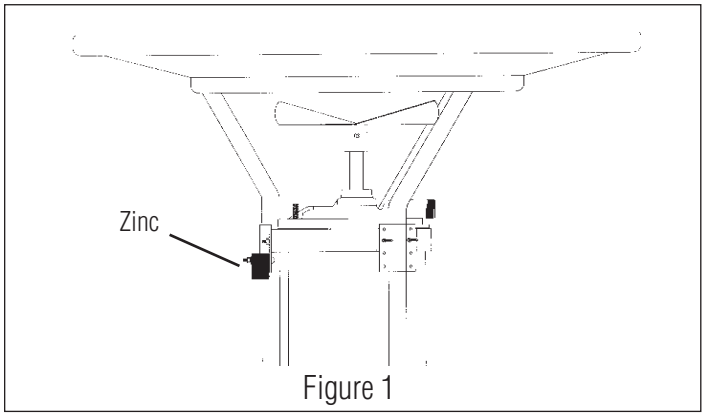


Figure 1

A. For LM units, the zinc is attached to any of the support arms through one of the empty oblong slots in the bracket.

B. Place the carriage bolt through the slot as illustrated in Figure 1.

C. Mount the piece of zinc onto the bolt, followed by a flat washer and the locknut. Fasten securely.

Assembly for 50/60Hz 1-5HP LM11

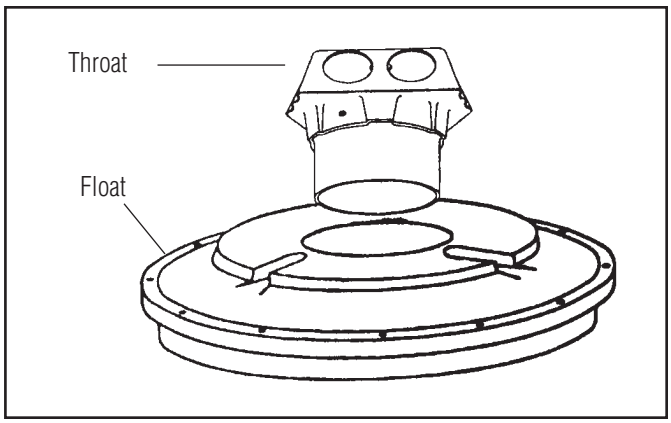


Figure 2

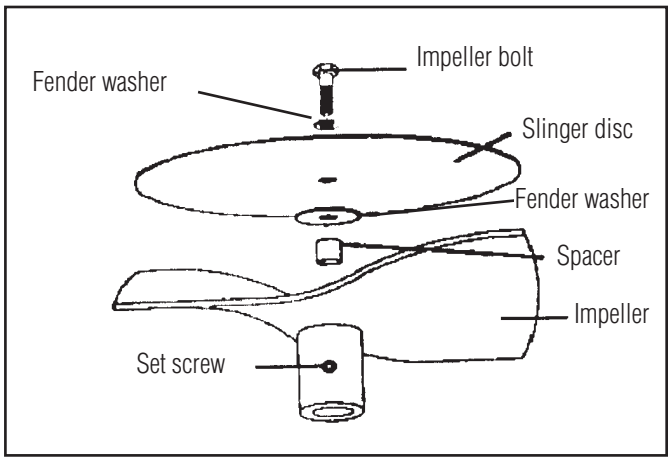


Figure 3

PROCEDURE:

A. Install the LM11 throat --see figure 2.

1. Lay the aerator float on its flat side.
2. Insert the LM11 throat into the float as shown.

B. Assemble the support arms to the float and motor unit.

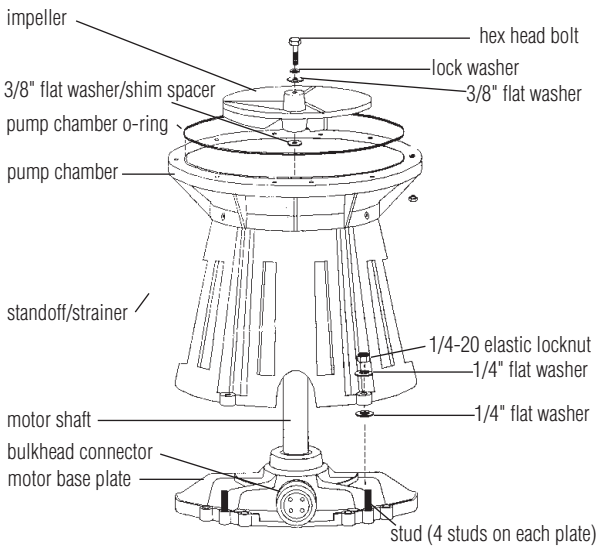
See the Support Arm Assembly section on the following pages, complete steps A - F. After you have installed all of the support arms return to this page to complete the assembly.

1. Rotate the throat so that the support arm pockets located on the float are lined up with the second support arm slot to the right on the throat.

C. Install the LM11 impeller --see figure 3.

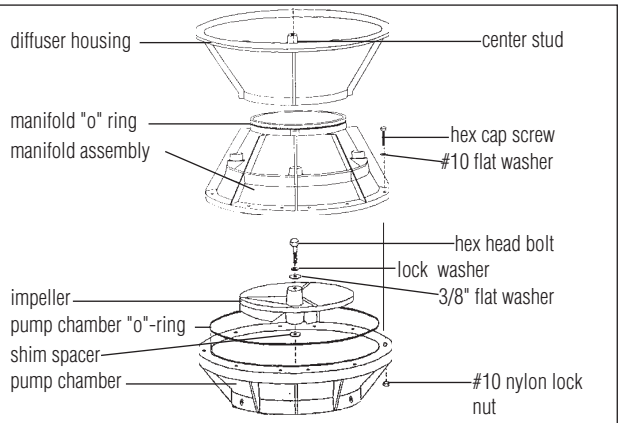
1. Install the impeller assembly onto the motor shaft.
2. Turn the impeller so that the set screw is flush against the flat part of the motor shaft. Using a 5/32" hex key driver tighten the set screw up against the flat part of the motor shaft.
3. Place the lock washer, slinger disc, fender washer, and slinger disc spacer onto the impeller shaft.
4. Tighten the impeller bolt.

Assembly for 50/60Hz 1-5HP LM10/LM20/LM30



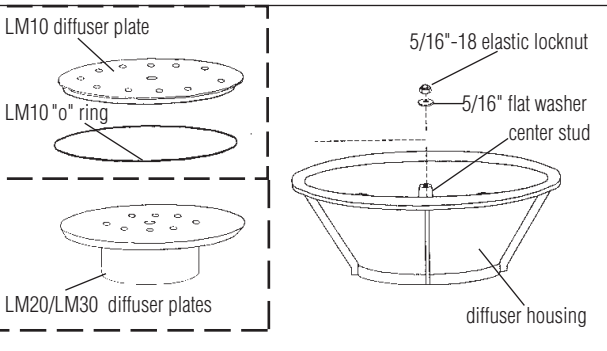
Assembly for: standoff/strainer, pump chamber and impeller.

Figure 1



Assembly for: diffuser housing

Figure 2



Assembly for: LM10, LM20 & LM30 diffuser plates

Figure 3

A. Assembly for: standoff/strainer, pump chamber and impeller --see figure 1.

1. Place 1/4" flat washer over each one of the (4) studs on the motor base plate.

2. Install the pump chamber and standoff/strainer (which have already been pre-assembled at the factory) onto the motor base plate with (4) 1/4" flat washers and (4) 1/4"-20 elastic locknuts. CAUTION: Do not over tighten.

3. Install the impeller onto the motor shaft. Install the hex head bolt, lock washer, and 3/8" flat washer onto the motor shaft. Tighten the hex head bolt.

4. Turn the impeller by hand. If the impeller rubs or hits bottom you must remove the impeller and place a shim spacer on the end of the motor shaft. Turn the impeller by hand again. If the impeller rubs or hits bottom, remove the impel-ler again and place another shim spacer on the motor shaft. If the impeller still hits bottom, call Technical Support at 800-984-2255.

NOTE: Single phase units can take up to two shim spacers. Three phase units should only take one shim spacer.

5. Insert the "o" ring into the groove on the pump chamber.

B. Assembly for: diffuser housing and manifold assembly --see figure 2.

1. Install the manifold assembly onto the pump chamber with (8) #10 flat washers and (8) hex cap screws. NOTE: The manifold has been pre-assembled at the factory with a volute which is located inside of the manifold.

C. Assemble the support arms to the float and motor unit. Go to Support Arm Assembly section on the following pages, complete steps A-F. After you have installed all of the sup-port arms return to this page to complete impeller assembly.

D. Impeller Assembly --see figure 3.

1. Attach the diffuser housing to the manifold.

NOTE: At-taching either the LM10, LM20 or the LM30 diffuser plate to the center stud on the manifold in the next step will hold the diffuser housing in place.

2. LM10 Assembly:

a. Check to insure that the LM10 diffuser plate already has the "o" ring pressed into the plate. If it does not have the required "o" ring, place one in at this time.

b. Line the diffuser plate up with the center stud on the diffuser housing and attach it to the diffuser housing using (1) 5/16" flat washer and (1) 5/16-18 elastic locknut.

CAUTION: Do not over tighten

3. LM20 & LM30 Assembly:

a. Line up the LM20 & LM30 diffuser plate with the center stud on the housing and attach it to the diffuser housing using (1) 5/16" flat washer and (1) 5/16"-18 elastic lock nut.

CAUTION: Do not over tighten.

Support Arm Assembly-50/60HZ Units

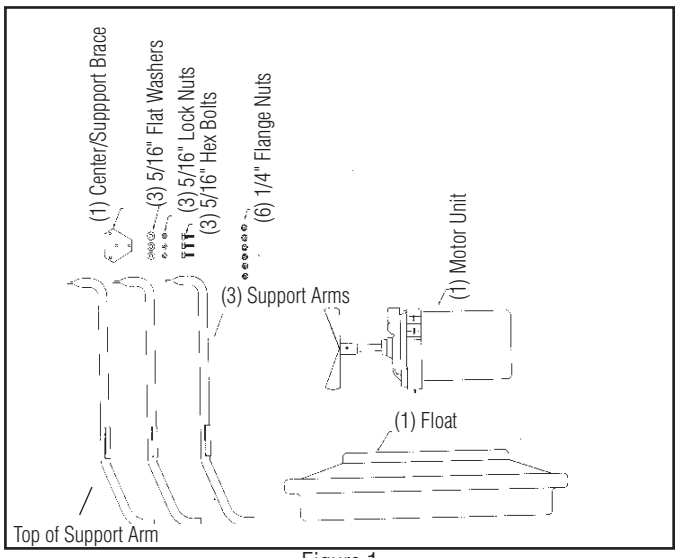


Figure 1

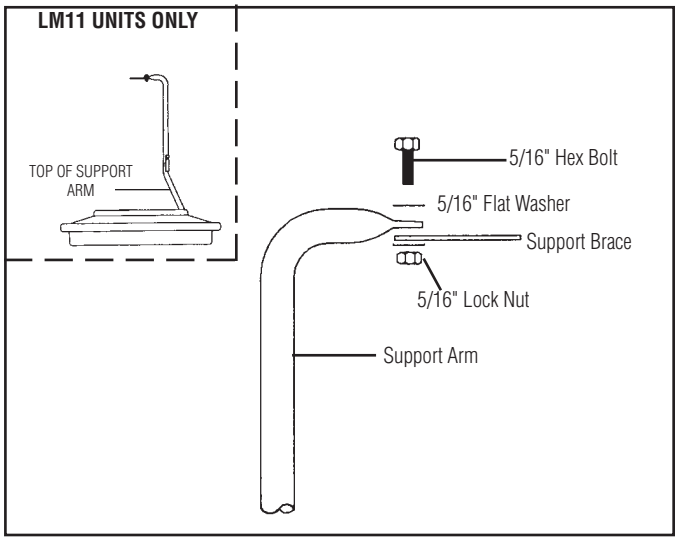


Figure 2

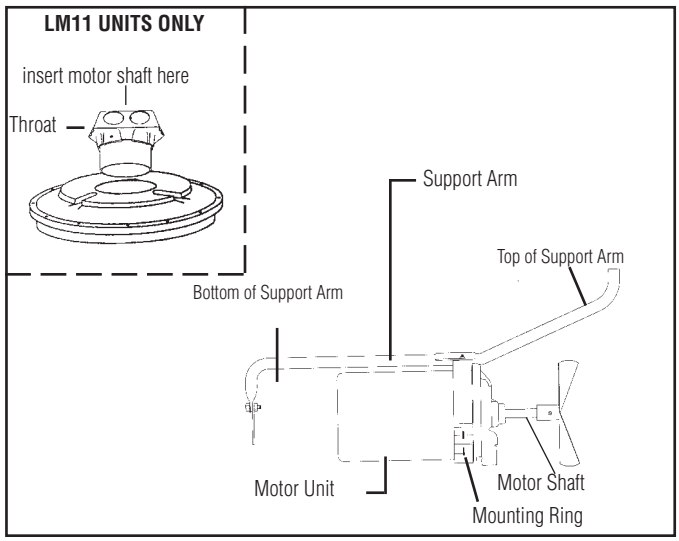


Figure 3

A. Step 1 - Materials needed --see figure 1.

1. Check that all of the materials have been received. Make sure that you have all the materials shown in the diagram, plus the desired pumping system.

2. Lay the float down on its flat side.

NOTE: on some models, selected parts have been coded to assist in assembly. In the event that the unit would require disassemble, record the support arm locations on the float. This will ease re-assembly and alignment.

B. Step 2 --see figure 2.

1. 50/60 Hz, LM10, LM20, and LM30:

   a. Using: a 5/16" lock nut, a 5/16" flat washer and a 5/16" hex bolt, attach the bottom of one of the support arms to the support arm brace.

2. Assembly for the LM11:

   a. Insert the top of the support arm into the pocket in the float.

   b. Install the other two support arms in the same manner.

C. Step 3 --see figure 3.

1. 50/60 Hz, LM10, LM20, and LM30:

   a. Attach the support arm (that was just assembled to the support arm brace) to the mounting ring using: (2) 1/4" flange nuts.

NOTE: FOR ALL 50 & 60HZ UNITS: Use the second hole down from the top of the support arm when assembling the support arms to the motor unit. When installing the adjustable support arms, center the mounting ring's bolt in the middle of the second slot from the top of the support arm.

2. Assembly for: LM11

   a. Insert the motor shaft into the Sunburst throat assembly.

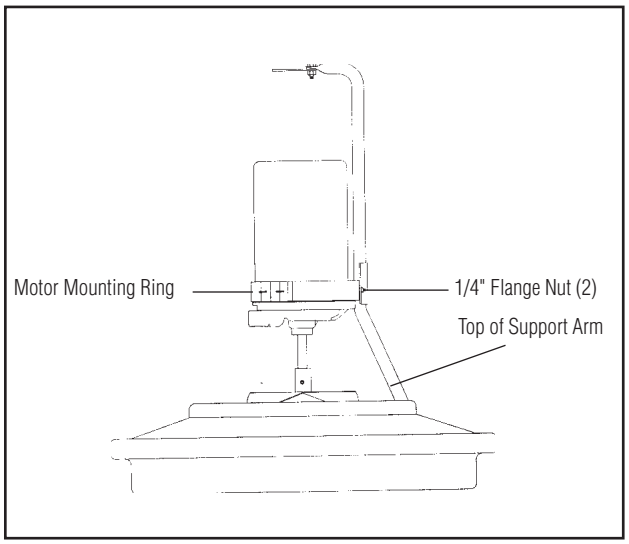


Figure 4

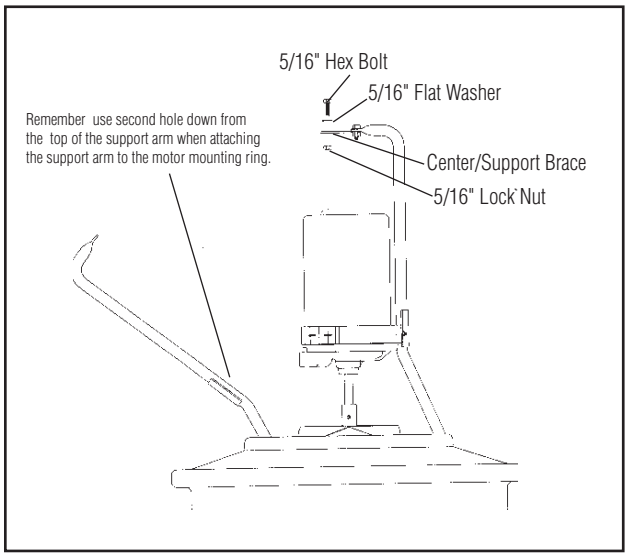


Figure 5

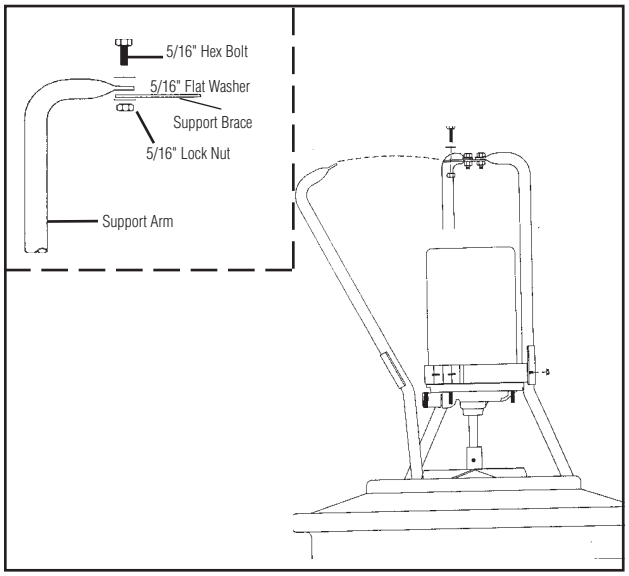


Figure 6

D. Step 4 --see figure 4.

1. 50/60 Hz, LM10, LM20, and LM30:

   a. Insert the top of the support arm, which is attached to the motor unit, into the pocket in the float. At this point, the support arm and motor unit should be able to stand upright in the float without being held.

2. Assembly for: 50/60 Hz LM11

   a. Attach one of the support arms to the mounting ring using: (2) 1/4" flange nuts.

NOTE: Do not fasten the support arm tight to the mounting ring as you will need to adjust the arms after they have been connected to the support arm brace.

E. Step 5 --see figure 5

1. 50/60 Hz, LM10, LM20, and LM30:

   a. Insert the top of the second support arm into the pocket in the float.

   b. Attach the support arm to the mounting ring with: (2) 1/4" flange nuts.

   c. Attach the bottom of the support arm to the support arm brace with: (1) 5/16" lock nut, (1) 5/16" flat washer, and (1) 5/16" hex bolt.

2. Assembly for: 50/60Hz LM11

   a. Attach remaining two support arms to the mounting ring using: (4) 1/4" flange nuts. Remember to use the second hole from the top when assembling the support arms to the mounting ring.

NOTE: Do not fasten the support arm tight to the mounting ring as you will need to adjust the arms after they have been connected to the support arm brace.

F. Step 6 --see figure 6.

1. 50/60 Hz, LM10, LM20, and LM30:

   a. Insert the top of the third support arm into the pocket in the float.

   b. Attach the support arm to the mounting ring with: (2) 1/4" flange nuts.

   c. Attach the bottom of the support arm to the support arm brace with: (1) 5/16" lock nut, (1) 5/16"flat washer and (1) 5/16" hex bolt. **Remember:** when assembling all units except 50Hz 5HP High Volume2 use the second hole down from the top of the support arms when assembling the support arms to the motor unit. When assembling 50Hz 5HP High Volume2 use the very bottom hole on the support arms when assembling the support arms to the motor unit.

2. Assembly for: LM11

   a. Using the materials shown attach all three of the support arms to the support arm brace.

   b. Tighten the support arms snug against the motor mount ring.

ALL UNITS: When the support arms are assembled correctly, a perfect triangle should form where they come together at the support arm brace. This will insure proper alignment. After proper alignment has been accomplished tighten the support arms snug against the motor mounting ring.

Rain Bird® Professional Customer Satisfaction Policy

WARRANTY: Rain Bird will repair or replace at no charge any Rain Bird professional product that fails in normal use within the warranty period stated below. You must return it to the dealer or distributor where you bought it. This commitment to repair or replace is our sole and total warranty.

Implied warranties of merchantability and fitness, if applicable, are limited to one year from the date of sale.

We will not, under any circumstances, be liable for incidental or consequential damages, no matter how they occur.

a) TURF PRODUCTS

Falcon Series rotors, the T-Bird,_Series rotors, the R-50 Series rotors, 5000 Series rotors, 1800 Series pop-up spray heads, U-Series nozzles, brass MPR nozzles, A-8S and PA-8S-PRS shrub adapters and 1300 and 1400 bubblers - 5 years.

Lake Management Aerator:
LM10, LM11, LM20, LM30 - 5 years.

Lake Management Aerator: LMM - 2 years

Lake Management Aerator Lights - 1 year

All other turf products - 3 years.

b) GOLF PRODUCTS

Golf Rotors: TG-25, DR, DH, DS, ESR and EAGLE™ series Golf rotors - 3 years.

Additionally, any TG-25, DR, DH, DS or EAGLE rotor sold and installed in conjunction with a Rain Bird swing joint - 5 years.

Proof of concurrent installation is required

Swing Joints - 5 years.

Brass and Plastic Valves: EFB and PE-B Remote Control Valves, and Brass Quick Coupling Valves and Keys - 3 years.

Filtration system controllers - 3 years.

Lake Management Aerator: LM10, LM11, LM20, LM30 - 5 years

Lake Management Aerator: LMM - 2 Years

Lake Management Aerator Lights - 1 year

All other golf products - 1 year

c) AGRICULTURAL PRODUCTS

PC Dripline - 3 years

Rain Guns - 3 years (in agricultural applications only)

Disk Fillers - 1 year

Pressure Gauges - 1 year

All agricultural products - 2 years

d) ALL OTHER PRODUCTS - one year

ADDENDUM: In freezing climates, it is necessary to properly prepare the installed system in winter shutdown in order to minimize the potential for freeze damage.

Rain Bird cannot and does not warranty against damage to equipment caused by lightning or electrical surges.

PRICE CHANGES: Prices are subject to change without notice.

DESIGN CHANGES: Rain Bird Sprinkler Mfg. Corp. reserves the right to redesign, alter or modify its products without incurring any liability from anyone's inventory of such parts or products that may become obsolete

For price and availability of service parts, please call:

OTTERBINE BAREBO, INC.

(610) 965-6018

(800) 237-8837

AERATOR STARTUP REPORT

CUSTOMER: _____ DISTRIBUTOR: _____

ADDRESS: _____ ADDRESS: _____

_____ _____

_____ _____

PHONE #: _____ PHONE #: _____

RODUCT INFORMATION:

MODEL OF AERATOR: _____ HP:_____ VOLTAGE: _____ PHASE: _____

SERIAL NUMBER OF UNIT: _____ OPTIONS (CIRCLE INSTALLED):

SCREEN ROCKCOVER

ITE INFORMATION: LIGHTS SEQUENCER

/ATER DEPTH AT AERATOR: _____ (FT) SURFACE ACERAGE: _____ (ACRES)

OWER TRANSFORMER: YES NO TYPE: BUCK BOOST SIZE: _____

HASE CONVERTER: YES NO TYPE: _____ SIZE: _____

ASIC CONDITION OF WATER: _____

_____

_____

NSTALLATION INFORMATION:

NCHORING METHOD: MOORING ANCHORS DISTANCE BETWEEN ANCHORS: _____(FT)

ABLE LENGTH & SIZE (FROM SOURCE TO CONTROL PANEL): _____

ABLE LENGTH & SIZE (FROM CONTROL PANEL TO AERATOR): _____

UPPLY VOLTAGE PRIOR TO STARTUP: (L1-L2) _____ (L1-L3) _____ (L2-L3) _____

OLTAGE WITH AERATOR ON: (L1-L2) _____ (L1-L3) _____ (L2-L3) _____

MPERAGE (2 MINUTE RUN TIME): L 1_____ L 2_____ L 3_____

MPERAGE (45 MINUTE RUN TIME): L 1_____ L 2_____ L 3_____

OTES: _____

_____

_____

_____

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