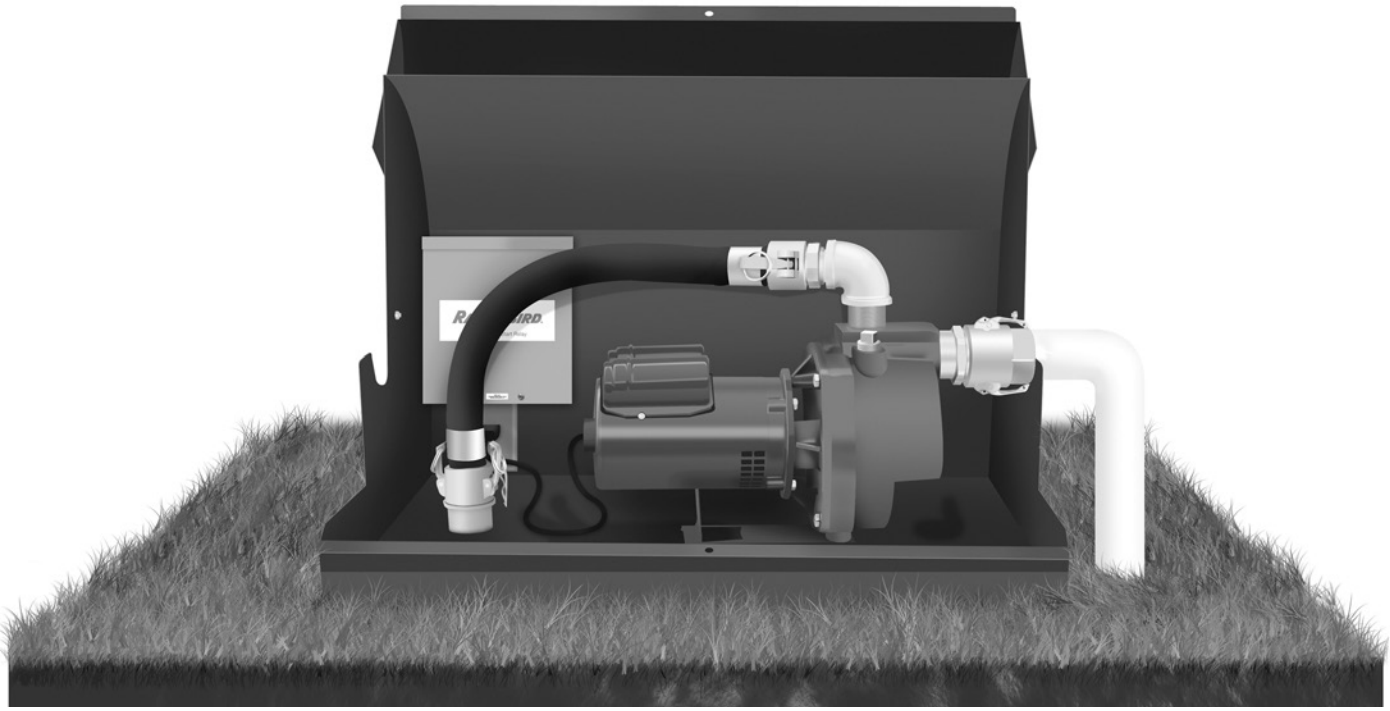
LC Series - Light Commercial Pump Station

Installation and Operation Manual



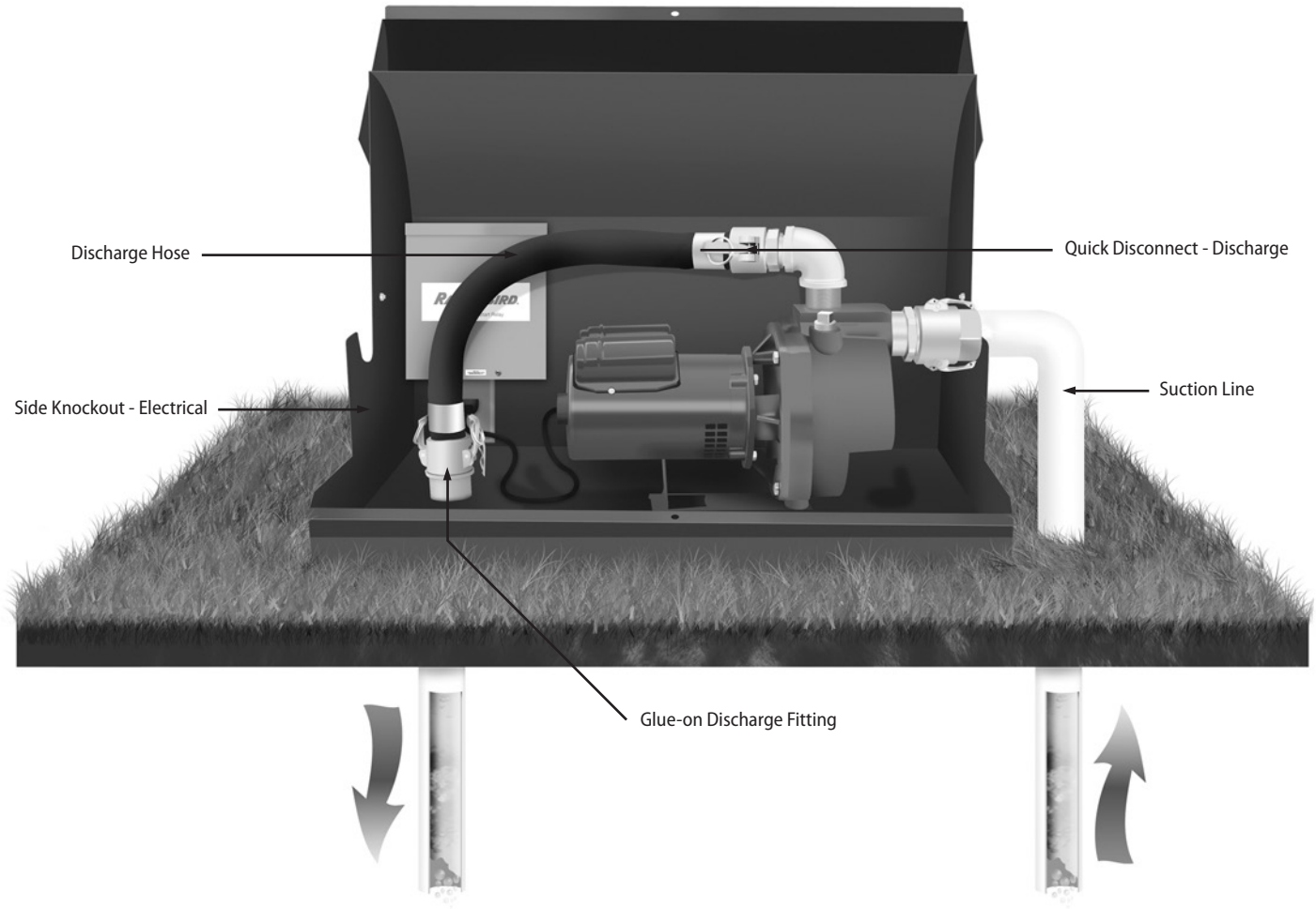
Please keep this manual with the pump station

Content

Rain Bird® LC Series Overview

Only Rain Bird is able to provide totally integrated irrigation solutions that dependably deliver healthy, beautiful landscapes while lowering utility costs, saving time and minimizing maintenance. When you install Rain Bird Pumps you can assure Increased motor life and reliability that you can always count on.

The LC Series by Rain Bird is a revolutionary complete pump package that includes a professional-grade pump, the highest quality pump protection and simple to install and operate fixtures all housed in a unique enclosure designed specifically for a pump. With this complete solution the days of retro fitting often non-compatible parts together and housing them in a makeshift enclosure are over.



READ AND FOLLOW SAFETY INSTRUCTIONS!

⚠ **This is the safety alert symbol.** When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

⚠ DANGER warns about hazards that **WILL** cause serious personal injury, death or major property damage if ignored.

⚠WARNING warns about hazards that **CAN** cause serious personal injury, death or major property damage if ignored.

⚠ CAUTION warns about hazards that **WILL** or **CAN** cause minor personal injury, or property damage if ignored.

The label **NOTICE** indicates special instructions which are important but not related to hazards.

Carefully read and follow all safety instructions in this manual and on pump.

⚠ WARNING

Hazardous voltage. Can shock, burn, or cause death.

Ground pump before connecting to power supply.

⚠Wire motor for correct voltage. See "Motor & Electrical" section of this manual and motor nameplate.

⚠Ground motor before connecting to power supply.

⚠Meet National Electrical Code, Canadian Electrical Code, and local codes for all wiring.

⚠Follow wiring instructions in this manual when connecting motor to power lines.

MOTOR AND ELECTRICAL:

GENERAL SAFETY - ELECTRICAL

1. Follow all local electrical and safety codes, including the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
2. ⚠Disconnect the main power before handling the unit for ANY REASON.
3. ⚠Replace damaged or worn cords immediately.
4. ⚠Use extreme caution around an operating pump and motor – it may be hot enough to cause serious burns.
5. ⚠Ground motor before connecting to power supply.
6. ⚠If unsure of electrical connection, call a licensed electrician. High voltage can shock, burn, or cause death.

GENERAL OPERATION – ELECTRICAL

1. Refer to motor nameplate to verify that supply voltage and motor wiring is the same.
2. Verify motor phase against supply power phase.

GENERAL SAFETY – MOTOR

1. ⚠Disconnect the main power before handling the unit for ANY REASON.
2. ⚠An operating motor will run at a high temperature and will be too hot to touch.
3. Keep pump motor ventilated to reduce damage due to heat.
4. Motor is not waterproof and should never be submersed into any liquid.
5. Motor is designed to work with up to a 15-degree angle of water impact. Do not allow water to spray directly onto motor. External motor protection should be used to eliminate environmental concerns.
6. To reduce the risk of electric shock, the motor must be securely and adequately grounded. Refer to National Electric Code (NEC Article 250 – Grounding) for additional information.
7. ⚠When in doubt, call a licensed electrician. High voltage can shock, burn, or cause death.

WIRING CONNECTION:

ROTATION

1. All pump motors run in a Counter-Clockwise (CCW) rotation only. (When facing the pump suction tapping) Single phase motors are pre-wired for CCW and should never be reversed.

"BUMP" ROTATION CHECK

1. All 3-phase motors should be "bumped" to check for proper rotation.
2. "Bumping" a motor is a split-second application of power to verify CCW rotation of shaft. See above.
3. Improper rotation can cause catastrophic pump failure and voids the warranty.

GENERAL WIRING INFORMATION

1. Refer to the connection diagram located on the nameplate of the motor.
2. Grounding the motor can be achieved by securing the motor to a metal raceway system. Alternately a separate grounding wire connected to bare metal on the motor frame, or to the green grounding screw located inside the motor terminal box, or other suitable means is acceptable. (Refer to NEC Article 250 – Grounding for specifics)
3. Verify voltage and phase of power source with motor nameplate before connecting to motor.

MOTOR PROTECTION

Fuses and circuit breakers are used as a safety device for the wire circuit. They do NOT offer motor protection.

1. Consult local or national electric codes for proper fuse protection based on the motor data located on the motor nameplate.

THERMAL OVERLOAD

1. All motors must be thermally protected – either within the motor or externally.
2. The internal overload is usually automatic and resets itself once the temperature has dropped to a safe point.
3. Overload helps protects the motor from burnout from overload of low voltage, high voltage and other causes.
4. Frequent tripping of the overload indicates motor or power problems. Immediate professional attention is recommended.
5. ⚠NEVER examine, make wiring changes, or touch the motor before disconnecting the electrical supply. Thermal overload protectors automatically reset and can close the electrical circuit without warning.
6. ⚠The overload should never be tampered with or removed.

PUMP:

GENERAL SAFETY - PUMP

1. ⚠An operating pump, with a blocked discharge, will heat the water and pump housing. Allow pumps to cool before handling.

2. High water temperature sensors help protect plastic plumbing from disfiguring and/or expanding.
3. Running a pump without water may cause damage to the seal.

GENERAL OPERATION – PUMP

1. Locate the pump as close to the water source as is practical.
2. Pump and pipe must be drained when not in use or if there is any danger of freezing.
3. Total suction lift (vertical lift plus any friction loss in suction line) should not exceed 10' for optimal performance. Suction lift of 15' is attainable depending on elevation, water temperature, and atmospheric condition. Pump performance is affected when suction lift exceeds 15'.
4. Fill the pump case and suction pipe with water to expel as much air as possible prior to start-up. Running a pump dry may cause damage to the seal and void warranty.

PIPE CONNECTION

1. Plastic or galvanized steel pipe are most commonly used. Support pipe if needed.
2. Keep suction and discharge lines as large as possible. Avoid excess fittings when possible. Use straight runs when possible.
3. Pipe should not be smaller than the corresponding suction and discharge holes.
4. All joints and connections should have pipe-specific sealing compound applied and completely tightened.
5. Isolation valves or unions on suction and discharge allow for easy pump removal with multi-pump or positive inlet pressure applications.

OPERATION:

Initial Priming

1. Remove one priming plug from pump housing and fill the pump body and suction line completely with water.
2. Normal system start-up will take a few minutes for air to expel from system and water to begin to cycle – depending on suction lift. If no water is flowing after a few minutes, turn the pump off and refer to troubleshooting guide. Do NOT run pump dry for any period of time.
3. Unit must be full of liquid before operating. Never run dry or against a closed discharge for an extended period of time. Running a pump dry may cause damage to the seal and void the warranty.

Rotation

1. Motors are pre-wired for CCW and should never be reversed.

Maintenance - Lubrication

1. No lubrication is required. The ball bearings are permanently lubricated and sealed at the factory.

Maintenance – Freezing

1. Drain the entire system if there is a danger of freezing.
2. Drain valves are provided in both upper and lower case chambers.
3. Closing the drain valves and filling the pump case with non-toxic RV Antifreeze will reduce the oxidation in the case over the winter. Before spring start-up, drain the anti-freeze from the case.

OPTIONAL EQUIPMENT:

1. Strainer – Use of strainers prevent large debris from entering pump system through suction line.
2. Pressure Gauge – Use of a pressure gauge helps to determine if pump is working at maximum efficiency.
3. Discharge Valve – Use of a gate- or ballvalve on the discharge side of a pump allows pump isolation for removal.
4. Foot Valve – Use of a foot valve (or check valve) can aide the priming of a centrifugal pump. If suction lines are kept full, the pump does not have to evacuate the air before pumping water.

ROTARY SEAL ASSEMBLY REPLACEMENT:

⚠ CAUTION Make certain the power supply is disconnected before attempting to service the unit!

Seal Removal

1. Remove the case bolts and pump body from motor assembly.
2. Remove diffuser bolts and diffuser from motor assembly.
3. Insert an open-end 9/16" wrench into the side of the mounting ring, slowly turning the impeller until the wrench seats itself onto the flats of the shaft. Once properly seated, the wrench will keep the shaft from turning. Larger models use keyed shafts and sleaves. Removal of these impellers may require high heat to remove the shaft sleeves.
4. Expose the seal assembly by spinning the impeller counterclockwise to unthread it from the motor shaft.
5. The seal spring will release as the impeller is removed.
6. Being careful not to damage the motor shaft, remove the seal head, seat and rubber from the seal pocket. The use of a screwdriver or similar tool may be necessary.
7. Should the seal be difficult to remove, the mounting ring can be completely removed for easier access by taking out the mount ring bolts.
8. Once the seal is removed, clean the pocket removing all debris.

⚠ CAUTION The rotary seal assembly must be handled carefully to avoid damaging the precision lapped faces of the sealling components.

Seal Installation

NOTE: It is recommended to always install a new seal.

NOTE: Application of a light coat of multi-purpose chassis grease to the outise diameter of the rubber gasket may make installation easier. Be certain the seat is kept clean and free of dirt and/or grease at all times.

1. Insert the seal seat and rubber gasket into the recessed area of the mount ring.
2. Slip the seal head assembly onto the motor shaft.
3. Using uniform pressure, be sure the seal has completely "bottomed-out" in recessed area.
4. Place spring, install the impeller and bolt the diffuser onto the motor assembly.

Refer to Steps 2-4 above and reverse order

5. Insert rubber diffuser into pump body cavity.
6. Reassemble the pump body to the motor assembly.

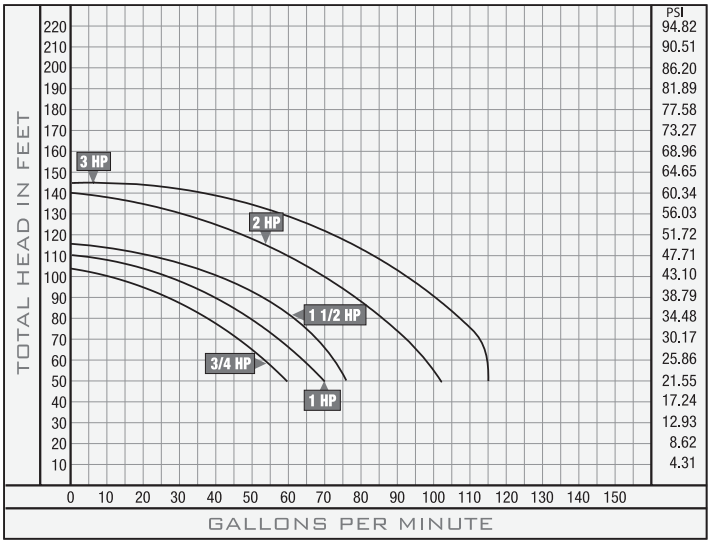
Refer to Step 1 above

PUMP PERFORMANCE

LC series - 3/4HP - 3HP

Model	HP	Capacity - U.S. Gallons per Minute Discharge Pressure (PSI) at 5' Suction Lift											Shut Off Pressure PSI	Suction Pipe Tap	Discharge Pipe Tap	Max ▲ Suction Lift
		20	25	30	35	40	45	50	55	60	65	70				
LC750	3/4	63	53	43	33	25							45	2"	1-1/2"	15 Ft.
LC1000	1	73	65	57	47	35	18						47	2"	1-1/2"	15 Ft.
LC1500	1-1/2	75	70	68	60	48	35						49	2"	1-1/2"	15 Ft.
LC2000	2	102	98	92	82	74	61	52	40				60	2"	1-1/2"	15 Ft.
LC3000	3	115	114	112	105	100	88	72	56	30			61	2"	1-1/2"	15 Ft.
	▲ Suction lift varies, depending upon elevation (altitude) and water temperatures. • MAXIMUM CASE PRESSURE --- 150 PSI															

PUMP CURVES



PUMP SPECIFICATIONS

LC Series 3/4HP - 3HP

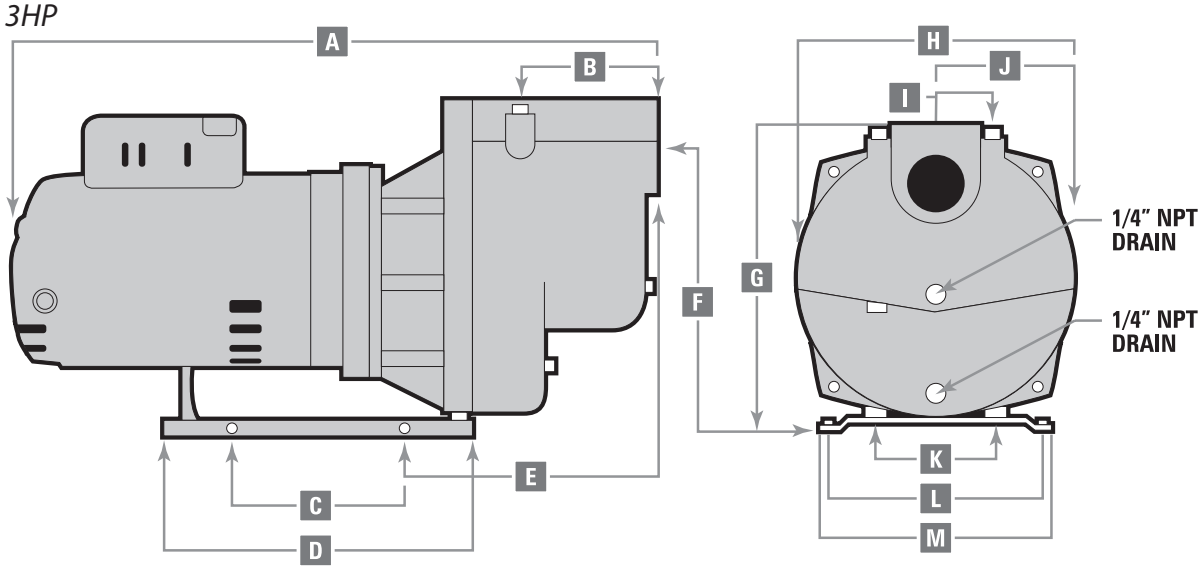
Model	HP	Motor Voltage (Factory) Connected	Type	Hz	RPM	Service Factor Motor Amps	Max Liquid Temperature
LC750	3/4	230V	Single Phase	60	3450	6.1	180˚F
LC1000	1					7.2	
LC1500	1-1/2					11	
LC2000	2					12	
LC3000	3					17	
† For amperage ratings consult motor nameplate.							

WIRING SIZE CHART

Distance From Motor Fuse Box Meter or Electrical Outlet	Minimum Copper Wire Size Chart (Gauge) Single Phase Motors					
	3/4HP	1HP	1 1/2HP	2HP	3HP	5HP
	230V	230V	230V	230V	230V	230V
0-50 Feet	12	12	12	12	10	10
50-100 Feet	12	12	12	12	10	10
100-150 Feet	12	12	12	12	10	10
150-200 Feet	12	12	10	10	10	8
200-300 Feet	12	10	10	10	8	8
Full Size (Amps)	15	15	20	20	30	24
• NOT ECONOMICAL TO RUN IN 115V, USE 230V						

MOTOR DIMENSIONS

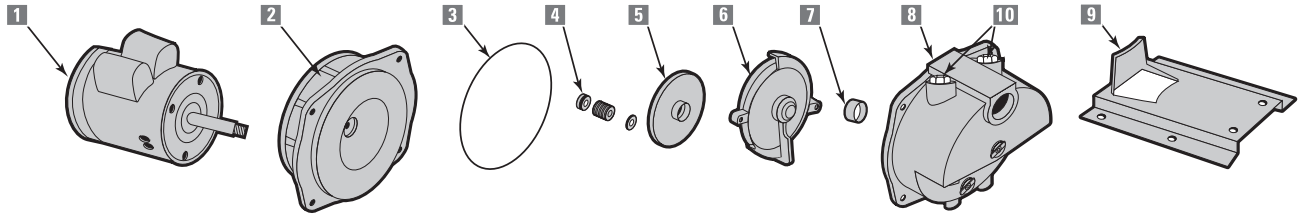
3/4HP - 3HP



HP	Discharge	Suction	A	B	C	D	E	F	G	H	I	J	K	L	M
3/4	1 1/2"	2"	17 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
1	1 1/2"	2"	17 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
1 1/2	1 1/2"	2"	17 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
2	1 1/2"	2"	18"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
3	1 1/2"	2"	18"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"

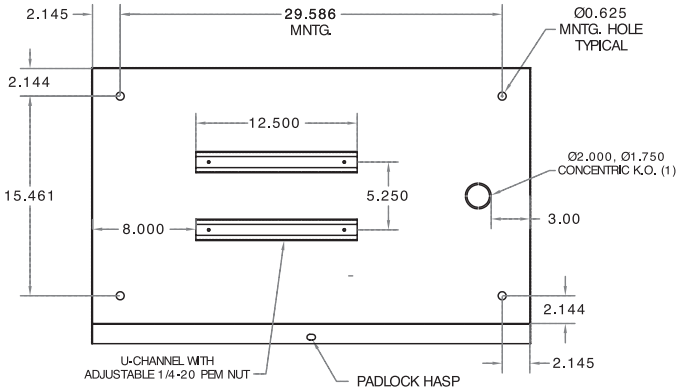
MOTOR PARTS BREAKDOWN

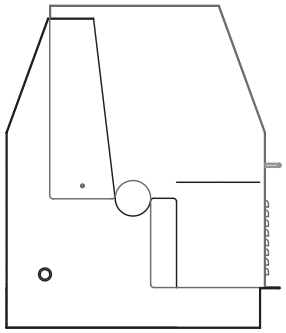
LC Series 3/4HP - 3HP



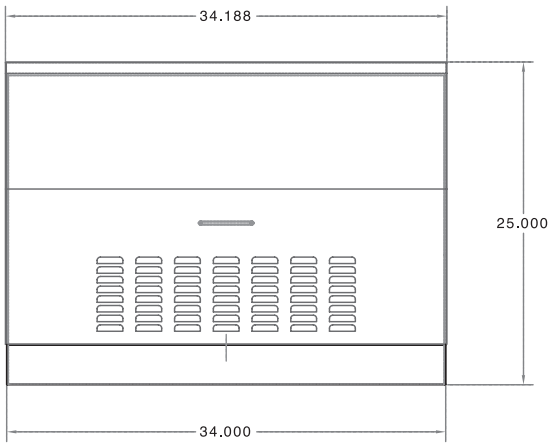
ITEM	SINGLE PHASE	HORSEPOWER	3/4	1	1 1/2	2	3
	DESCRIPTION	PART NO.					
1 ▲	Motor, Nema J - 1 Phase Motor Access Cover Screw, Access Cover		MLP26450	MLP26451	MLP26143	MLP26452	MLP26453
▲ 2 ▲ 3 4	Slinger, Washer Mounting Ring Hex hd. cap screws 3/8 x 3/4" Ring, Square Cut Seal, Rotary w/Spring	MLP5030 MLP1300 MLPB909 MLPG001 MLP1800	1 1 1 4 1	1 1 1 4 1	1 1 1 4 1	1 1 1 4 1	1 1 1 4 1
5 6 ▲ 7	Impeller, Brass "B" Models Diffuser Hex HD. Cap Screws 1/4 x 1" Rubber Diffuser	 MLP1200 MLPB903 MLPG002	MLP1407 1 2 1	MLP1410 1 2 1	MLP1415 1 2 1	MLP1420 1 2 1	MLP1430 MLP2011 2 1
8 ▲	Pump Body Hex HD. Cap Screws 7/16 x 1"	MLP1100 MLPB912	1 4	1 4	1 4	1 4	1 4
9 ▲ ▲ 10	Base - 48 Y-Frame Motor Base - 56 J-Frame Motor Hex HD. Cap Screws 3/8 x 1/2" Pet Cock 3/4" Priming Plug	MLP801048 MLP801056 MLPB907 MPL9110 •	1 -- 2	1 -- 2	1 -- 2	-- 1 2	-- 1 1
(•) Standard hardware Item ---- (▲) Not Shown							

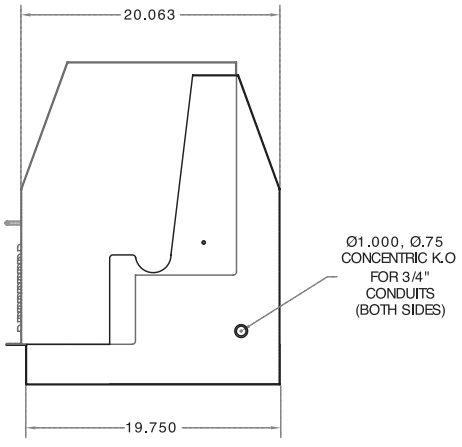
LC SERIES - PUMP STATION DIMENSIONS





All dimensions in inches.





TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Little or no discharge	1. Casing not initially filled with water to prime pump 2. Total head too high 3. Suction Lift too high, or too long 4. Impeller plugged 5. Hole or air leak in suction line 6. Foot Valve too small 7. Impeller damaged 8. Foot valve or suction line not submerged deep enough in water 9. Insufficient inlet pressure or suction head 10. Suction piping too small 11. Motor wired correctly 12. Casing gasket leaking 13. Suction or discharge line valves closed	1. Fill pump casing 2. Shorten suction lift and/or change head 3. Lower suction lift, install foot valve and prime, or shorten length of suction line 4. Clean impeller 5. Repair or replace suction line; do not use teflon tape; use pipe sealing compound. 6. Match foot valve to piping or install one size larger foot valve 7. Replace impeller 8. Submerge lower in water 9. Increase inlet pressure by adding more water to tank or increasing back pressure 10. Increase to pump inlet size or one size larger 11. Check wiring diagram for correct wiring 12. Replace Gasket 13. Open suction and/or discharge lines
Pump will not deliver water or develop pressure	1. No priming water in casing 2. mechanical seal is leaking 3. Leak in suction line 4. Discharge line is closed and priming air has no where to go 5. Suction line (or valve) is closed 6. Poor pump performance 7. Foot valve is leaking 8. Suction screen is clogged	1. Fill pump casing 2. Replace seal (See Rotary Seal Replacement) 3. Repair or replace 4. Open discharge line 5. Open Suction line or valve 6. Replace worn parts 7. Replace foot valve 8. Clean or replace screen
Loss of suction	1. Air leak in suction line 2. Suction lift is too high 3. Insufficient inlet pressure or suction head 4. Clogged foot valve or strainer	1. Repair or replace suction line 2. Lower suction lift, install foot valve and prime 3. Increase inlet pressure by adding more water to tank or increasing back pressure 4. Unclog
Pump vibrates and/or makes excessive noise	1. Mounting plate or foundation not rigid enough 2. Foreign material in pump 3. Impeller damaged 4. Worn motor bearings 5. Suction lift too high	1. Reinforce 2. Disassemble pump and clean 3. Replace impeller 4. Replace bearings 5. Lower suction lift, install foot valve and prime
Pump will not start or run	1. Improper wiring 2. Blown fuse or open circuit breaker 3. Loose or broken wiring 4. Stone or foreign object lodged in impeller 5. Motor shorted out 6. Thermal overload has opened circuit	1. Check wiring diagram on motor 2. Replace fuse or close circuit breaker 3. Tighten connections, replace broken wiring 4. Disassemble pump and remove foreign object 5. Replace 6. Allow unit to cool, restart after reason for over load has been determined
Pump leaks at shaft	1. Worn mechanical shaft	1. Replace (See Rotary Seal Replacement)

The Intelligent Use of Water.™

LEADERSHIP • EDUCATION • PARTNERSHIP • PRODUCTS

At Rain Bird®, we believe it is our responsibility to develop products and technologies that use water efficiently. Our commitment also extends to education, training and services for our industry and our communities.

The need to conserve water has never been greater. We want to do even more, and with your help, we can. Visit www.rainbird.com for more information about The Intelligent Use of Water™.

If you have any questions about this product, please visit www.rainbird.com or call 877-647-0294

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