A.Y. McDonald Mfg. Co.
27000 Series Multi-stage Super Booster Pump

A.Y. McDonald Booster pumps are intended to deliver water to higher ground or higher pressures and function if the water source is level with or slightly above the centerline of the pump impellers. These pumps are not self-priming and have limited suction capabilities of 2 to 3 feet below the impellers, and then only if a dependable foot valve is attached to the intake piping.

ATTENTION! Important information for installers and users of this equipment!!

This equipment is intended for installation and use by technically qualified personnel. Failure to install it in compliance with national and local electrical codes, and with motor suppliers recommendations, may result in electrical shock or fire hazard, unsatisfactory performance, and equipment failure. Because these pumps are capable of very high pressures extra caution is required (See Page 3). Installation information is available from pump manufacturers and directly from motor suppliers. Retain this information sheet with the equipment for future reference.

WARNING

To reduce risk of electrical shock, disconnect power before working on or around the water system. Serious or fatal electrical shock may result from failure to connect the motor, control enclosures, metal plumbing, and all other metal near the motor or cable, to the power supply ground terminal using wire no smaller than motor cable wires. (Use copper conductors only).

BEFORE YOU START

- Follow the warning regarding compliance with local codes including grounding, back flow prevention etc. If a back flow or check valve is required, it should be installed on the discharge side of the pump.
- **Be certain the motor's power source is disconnected whenever servicing your pump.**
- For your safety, these pump/motor sets should always be connected to a circuit with a **ground fault interrupter.**
- Be sure the line voltage, phase and frequency (HZ.) meet the motor's voltage requirements as received. Fractional horsepower motors are usually dual voltage. Be sure the motor's wiring or Voltage Change Device is in the proper position for your power source.
- The pump should be installed in a dry, accessible area protected from below freezing temperatures. Proper ventilation must be provided to prevent moisture damage to electrical equipment.
- Motors are not submersible on these pumps - do not spray water on or near the electric motor.
- Do not run the pump at no flow conditions i.e. with a closed shutoff valve in the line. Extreme temperatures and pressures could damage the equipment.
- Do not run the pump dry as there will be damage to the pump seal or other internal parts.
- A pressure relief valve is always required.
- These pumps are intended for use with water only.

Do not pump chemicals or corrosive liquids with the pump unless they are compatible with the pump component materials. (Contact factory (800/292-2737) for more information). Use with nonflammable liquids in a non-explosive atmosphere.

These pumps can transfer water from cisterns, tanks, or ponds with suction lifts up to 3 feet using a foot valve and priming tee. The suction lift capability will vary depending on elevation (altitude) and water temperature, and piping design.

WARNING: It is unlawful in **CALIFORNIA & VERMONT (effective 1/1/2010); MARYLAND (effective 1/1/2012); LOUISIANA (effective 1/1/2013) and the UNITED STATES OF AMERICA (effective 1/4/2014)** to use any product in the installation or repair of any public water system or any plumbing in a facility or system that provides water for human consumption if the wetted surface area of the product has a weighted average lead content greater than 0.25%. This prohibition does not extend to service saddles used in California, Louisiana or under USA Public Law 111-380.

Warning: Do not run the pump with the discharge shut-off for more than a minute. To do so, may result in temperature exceeding 200 degrees F. To avoid burns never touch the pump or motor housing, and allow them to cool after shut-down before handling the pump.

To avoid internal damage to the pump, do not operate with the water temperature above 150 degrees F.

Pump must be full of liquid before operating. Do not pump dirty or abrasive water. To do so, will cause premature seal failure. Mechanical seal materials, compatible with liquids containing abrasives, are available upon request.

Avoid air pockets in suction piping or air will accumulate at the high points, making priming difficult. (See Figure 1)

INSTALLATION

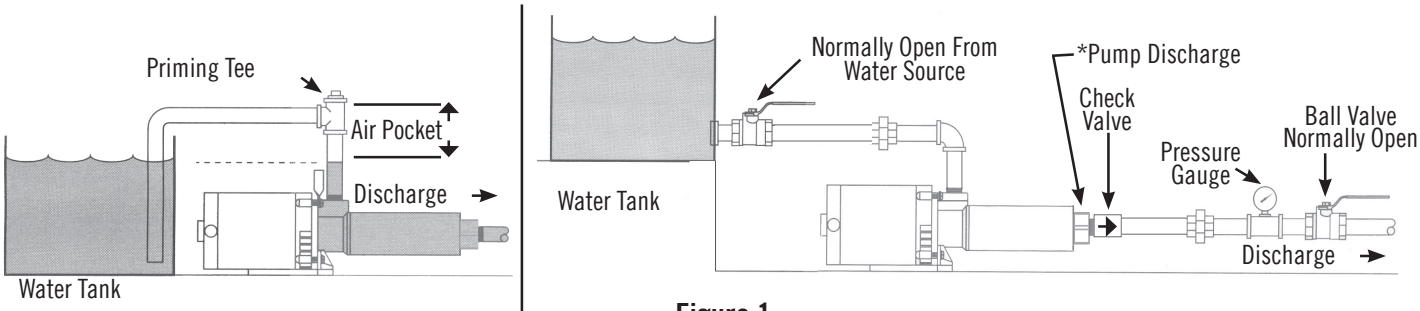
- **Locate** the pump as close to the liquid source as possible, so that a short, direct suction pipe may be used. Place the unit so that it is readily accessible for service, maintenance and allows air to circulate freely around the motor.

- **Mount** pump in a dry location, on a secure base or foundation. This will prevent noise and vibration.

- **Piping** should be galvanized, rigid plastic or other suitable pipe that will not collapse or burst when exposed to suction and discharge pressure. The pipe should be as free from turns and bends as possible, as elbows and fittings greatly increase friction loss.

Pipes must line up and not be forced into position by unions. The inlet pipe should have a minimum number of elbows and fittings to minimize friction losses.

***Always apply a wrench on the hex pump discharge when tightening or loosening the discharge piping.**



Not Recommended

Figure 1
Pump from Water Storage Tank

Recommended

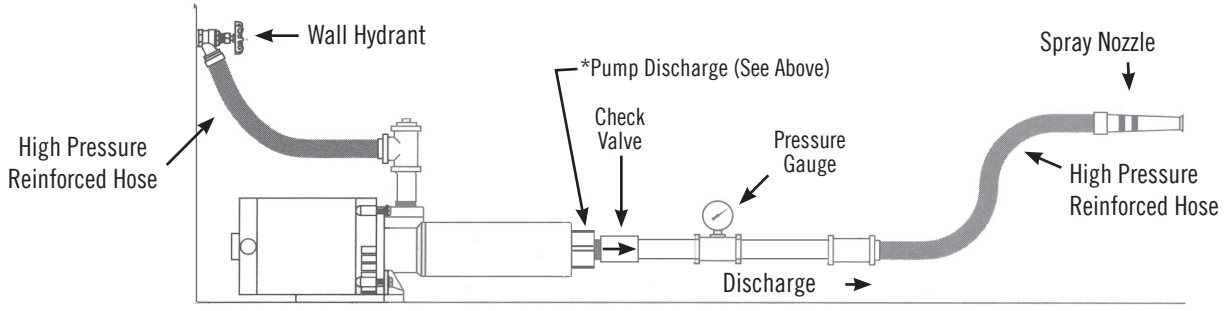


Figure 2
Pump from a Wall Faucet for Wash Down Applications

Whenever a spray nozzle is used, a pressure switch should be installed to automatically turn the pump on and off. This eliminates the possibilities of operating the booster pump at shutoff pressure, which could damage the pump due to high temperatures.

Always use piping and hoses suitable for the high pressures that can be developed with pump installations of this type.

Always use a reliable check valve as shown and never turn off the electric power if the pump is running with the discharge closed. The high pressure could back-up into the building's piping system and damage water related appliances.

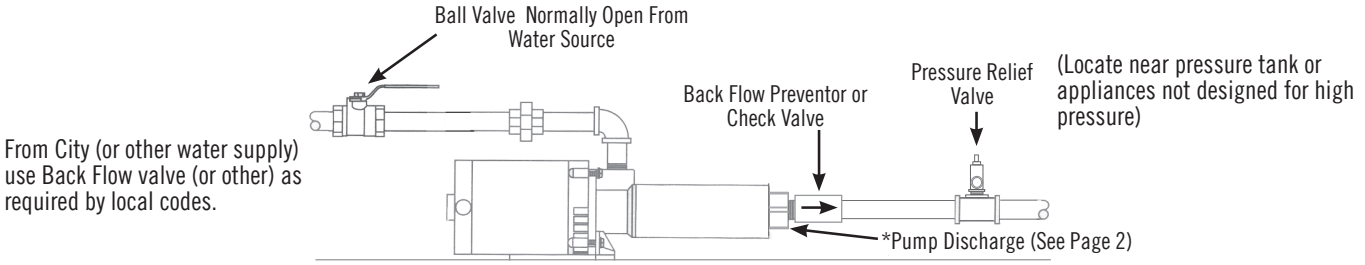


Figure 3
Pump from Water Main to Boost Pressure (e.g. Up a Hillside)

These installations will require the use of a pressure relief valve or pressure reducing valve (or both) to prevent excessive pressure in the piping especially if a pressure tank is used.
Warning: Failure to use these devices will cause an unsafe condition.

ELECTRICAL CONNECTIONS

Before wiring the pump to the power source, verify that the voltage of the motor matches the voltage of the power supply. See motor nameplate. The supply voltage must be within ± 10% of nameplate voltage. Incorrect voltage can cause fire or seriously damage the motor and voids the warranty.

Wire the motor according to the diagram shown on the motor nameplate.

Install ground wire and maintain this pump in compliance with the National Electrical Code (NEC) or the Canadian Electrical Code (CEC) and with all local codes and ordinances that apply. Consult your local building inspector for local code information.

The motors used on the McDonald 27000 Series Booster pumps are commonly manufactured by Nidec. 1/2 H.P. pumps are factory wired 115 volts 1 Ø. 3/4 H.P. and larger are factory wired 230 volts 1 Ø. 3 Ø Motors are either factory wired for 230 volts, or 460 volts, depending on the model number.

PRESSURE CAPABILITIES OF VARIOUS MCDONALD BOOSTER PUMPS BY HORSEPOWER AND MODEL NUMBER.

1/2 HP	27050JHB	145#	3/4 HP	27075JHB	209#	1 HP	27100JHB	257#	1 1/2 HP	27150KHB	245#
1/2 HP	27050VHB	117#	3/4 HP	27075VHB	163#	1 HP	27100VHB	203#	1 1/2 HP	27150LHB	154#
1/2 HP	27050KHB	118#	3/4 HP	27075KHB	135#	1 HP	27100KHB	171#	1 1/2 HP	27150PHB	141#
1/2 HP	27050LHB	74#	3/4 HP	27075LHB	88#	1 HP	27100LHB	114#	1 1/2 HP	27150MHB	121#
			3/4 HP	27075PHB	77#	1 HP	27100PHB	101#	2 HP	27200KHB	297#
						1 HP	27100MHB	81#	2 HP	27200LHB	179#
									2 HP	27200PHB	167#
									2 HP	27200MHB	149#

= PSIG
Pressure relief valves must be used; especially where permanent, automated, installations are left unattended.

START - UP

When pumping from a storage tank, pond or lake, etc., a spring loaded check valve or spring loaded foot valve with strainer is recommended. In this application the pump will need to be primed/filled completely with water.

Leaks on the inlet side of these pumps may cause the pumps to not build pressure and lengthen the priming time unnecessarily.

Prime the pump by pouring clean water into the pipe tee until water is coming out the discharge pipe. Especially if the pump is used in the horizontal position and to be sure the air has been purged from the pump impellers, a short vertical stand-pipe may be temporarily installed in the pipe tee and the discharge outlet. (These may be removed after priming if not required for the normal piping needs). In either case, be sure that all pipe joints in the intake piping, and the pipe plug in the priming tee do not leak - use thread sealant on male pipe threads only.

It may be neccessary to cycle the pump on and off to free the pump of trapped air. After the pump is primed and the motor is properly wired, attempt to run the pump briefly before making permanent connections of the discharging piping.

The motor should rotate clockwise looking at the motor end of the shaft. (A small screwdriver is required to remove the shaft cover for viewing or observe rotation by looking into the openings on the motor adapter). Three phase motors can be wired to run backards, but the motor is properly wired when the pump provides the highest pressure and/or capacity. Repeat the priming instructions if the pump does not build pressure quickly.

When pumping from a wall faucet or pressurized water main, priming is much less of a problem as water should automatically fill the pump. Before starting the pump, be sure water is flowing freely from the pump's outlet. Then check for pressurized flow, secure the piping and check for leaks.

SPECIAL SERVICE FEATURE

Assembly Instructions for Booster Pump End with Motor

1. Remove the four bolts holding the handle and pump base.
2. Loosen the two set screws on the shaft extension and separate the pump end from the motor.
3. For proper shaft extension positioning use gage pictured, part #6903-303

   (Figure 1).
4. Position gage on motor up against the motor shaft so that the tabs on the gage are resting on the machined surface of the motor (See yellow arrows in Figure 2).
5. Once the gage is in place, install the pump end onto the motor until the shaft extension rests on top of the gage (See orange arrow in Figure 2). Install pump handle and base plate by tightening the four bolts in a star pattern to a torque of 15 ft-lbs.
6. The two shaft extension set screws can now be tightened and the gage removed. NOTE: Be sure that the shaft extension set screws are not tightened into the key slot on the motor shaft.
7. Figure 3 shows a booster pump and motor adapter with gage in place for correct positioning of shaft extension.
8. Test pump and inspect for leaks.

Figure 1 Gage Part #6903-303

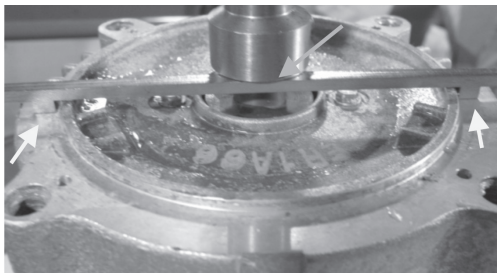


Figure 2 Gage Positioned on Motor (PICTURED WITHOUT PUMP END)

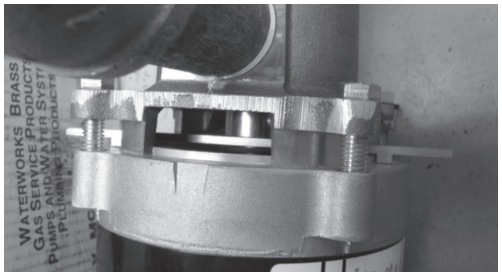


Figure 3 Assembled Booster Pump with Gage

TROUBLESHOOTING INFORMATION

A. If Motor Will Not Start:
1. Main line switch or pump switch if used may be shut off.
2. Power may have failed or may be temporarily discontinued.
3. Fuse may be blown.
4. Be sure motor shaft turns freely.
5. Check for defective wiring or loose connections.
6. Check for possible defective motor.
7. If motor does not operate properly, remove and take it to nearest authorized motor service station.

B. If Motor Runs But Water Is Not Delivered:
1. Be sure foot valve is sufficiently submerged but is not in sand or mud, also be sure screen on foot valve is clear.
2. Be sure pump is sufficiently primed.
3. Check for possible leaks in suction piping.
4. Impellers, or foot valve may be clogged with sand or other obstruction.
5. Total suction lift may be beyond that recommended.
6. Be sure motor is wired for proper rotation. Also check for improper voltage or inadequate wire size.

C. If Pump Operates But Loses Prime:
1. Check for possible leaks in suction piping.
2. Water may be drawing down below foot valve, causing pump to take excessive air.

D. If Pump Delivers Water But Volume Is Considerably Below Rating:
1. Check for possible leak in suction piping.
2. Strainer on foot valve may be partially clogged.
3. Impellers may be filled with iron bacteria or other obstruction.
4. Well water source may not yield sufficient water for pump to deliver rated capacity.
5. Total suction lift may be beyond that recommended.
6. Due to low voltage condition, motor may not be operating at full speed, or running backwards by improper wiring.
7. Pipe sizes may be smaller than recommended, causing excessive friction.

E. Pump Leaks:
1. Mechanical seal is worn from abrasives in the water.
2. Seal has cracked from sudden “cold water” after running hot from no flow.
3. Damaged o-rings.
4. Inlet pressure too high.
5. Improper liquids being pumped.

F. If Pump Is Noisy:
1. Be sure pump is mounted on substantial foundation. Pipe should be rigid and all connections tight.
2. Motor bearings may be worn.
3. Total suction lift is beyond that recommended or pump is starved for water which causes pump to cavitate (sounds like gravel in pump).
4. Impeller and motor shaft may be running out of alignment, and cause rubbing.

G. If Thermal Overload Protector Stops Pump:
1. Check for improper voltage (high amps) and be sure motor is wired properly.
2. Check for low voltage (high amp. condition) or inadequate wire size.
3. Be sure motor is properly ventilated and not subject to high temperatures.
4. Pump may be starting and stopping too often causing the motor to over heat.
5. Overload protector on motor may be defective.