



CONTROL SYSTEMS

APPLICATION GUIDELINES

The Balboa M-7 control is a revolutionary control system that provides additional reliability and ease of installation when compared to conventional spa control systems. The software-based M-7 control system makes decisions based upon temperature and flow conditions that exist within the heater. The system operates properly if there is a minimum of 20 gpm flowing through the heater under all hydraulic variables and at worst case conditions. This not only assures proper control operation, but also increases heater life. **The goal for the spa designer is to design a circulation system that, when used with the proper pump, will provide a uniform flow in either direction through the heater. This uniform flow must occur during heating and filtering cycles and must not fall below 20 gpm under any circumstances.**

These guidelines are intended to help you design your spa to achieve this goal so that you can take advantage of the new Balboa M-7 control system. **Please read these guidelines carefully and study the plumbing schematics before attempting to test the system or install it in a spa.**

Basic Spa Configurations Supported By The M-7 Control System _____

1. Non-circ system

(System that uses a 2-speed pump to heat and filter the spa.)

A. Vacuum side heater.

(A heater that is located on the suction side of the pump.)

B. Pressure side heater.

(A heater that is located on the discharge side of the pump.)

2. Circ system

(System that uses a dedicated 1-speed pump to heat and filter the spa. The pump motor must not exceed 2amp.)

NOTE: The amperage limitation for the Circ Pump must be adhered to so as not to overload the printed circuit board ampacity.

A. Vacuum side heater.

(A heater that is located on the suction side of the pump.)

B. Pressure side heater.

(A heater that is located on the discharge side of the pump.)

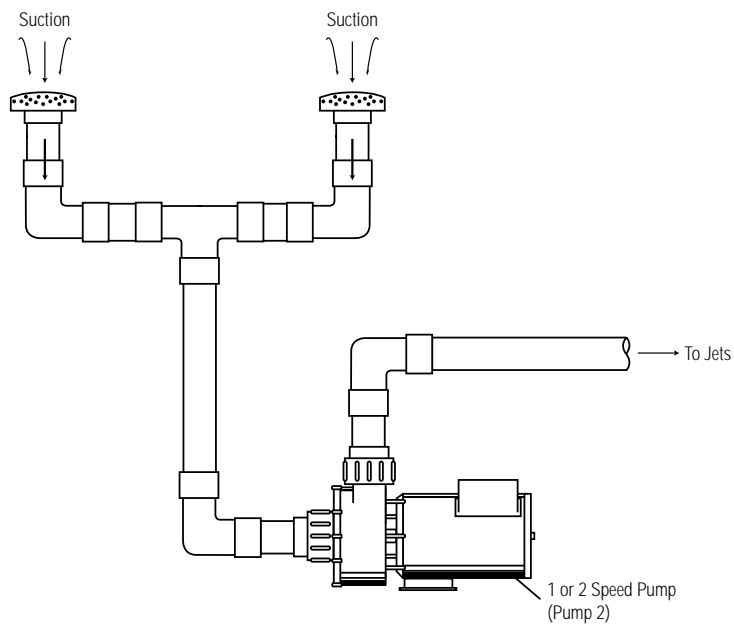
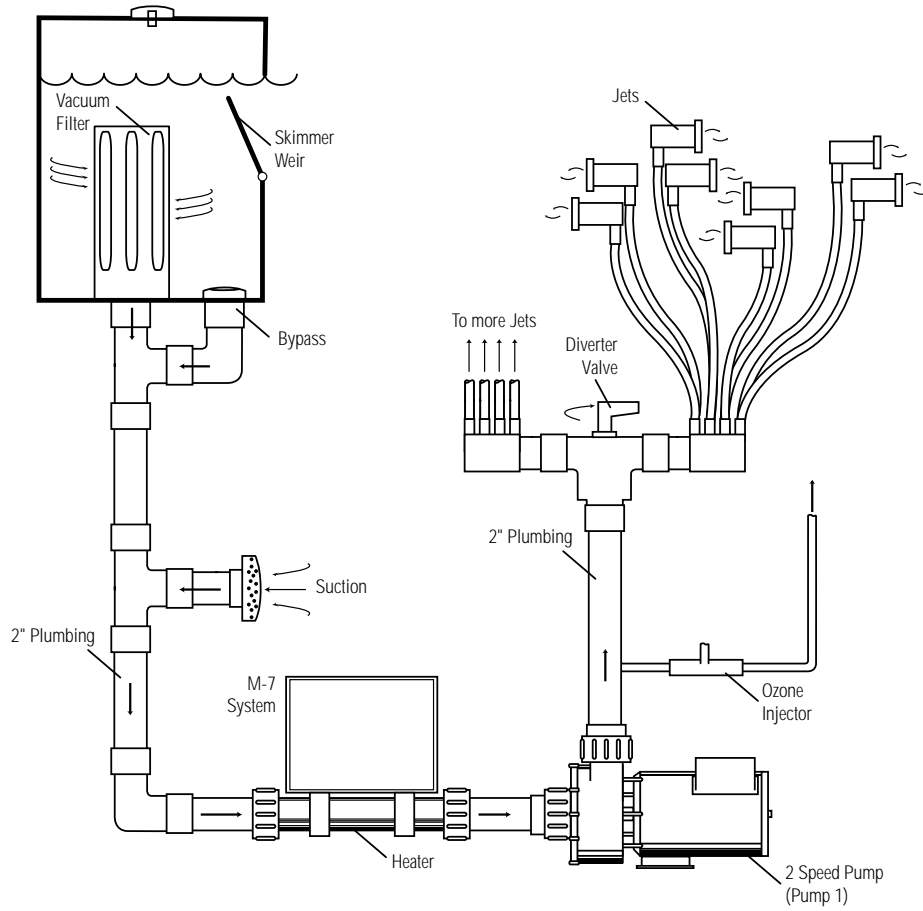


Spa Design Guidelines For The M-7 Control System

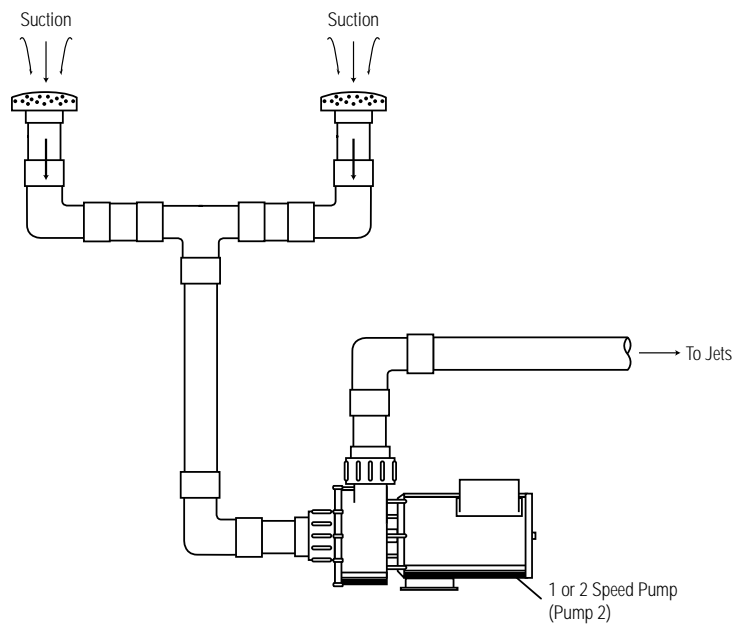
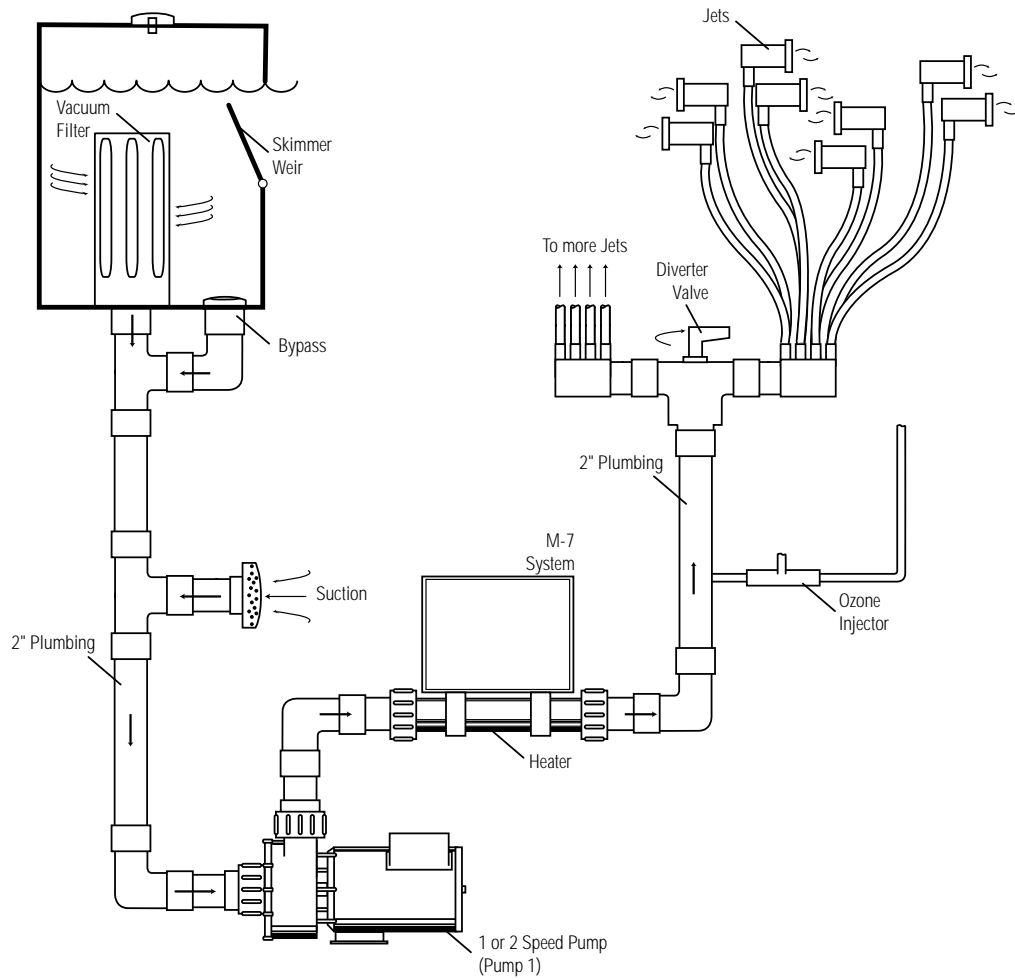
1. The suction system for the 2-speed pump or for the circ pump must be dedicated. There must not be any other pumps connected to this suction system.
2. The suction system for the 2-speed pump or for the circ pump must include the following:
 - A. 2 suction fittings, or
 - B. 1 suction fitting and a skimmer.
3. If the suction system for the 2-speed pump or for the circ pump includes a filter, it is desirable that the filter incorporate a by-pass around the filter cartridge that opens when the cartridge gets dirty. (Spring tension holding the by-pass valve closed must be overcome by the vacuum of the pump.) This by-pass should be capable of flowing a minimum of 20 gpm during the low speed operation of the 2-speed pump or during circ pump operation with the cartridge 100% blocked. The inclusion of a suction fitting appropriately plumbed into the suction circuit in conjunction with a vacuum filter may also meet this requirement.
4. The pressure system for the 2-speed pump or for the circ pump must be dedicated. There must not be any other pumps connected to this pressure system.
5. The pressure system for the 2-speed pump or for the circ pump must discharge water freely into the spa.
6. If the pressure system for the 2-speed pump includes a diverter valve, or a diverter jet, there must not be an “off” position that would stop water flow from the pump or any other position that would throttle or reduce water flow from the pump.
7. If the pressure system for the 2 speed pump includes flow adjustable jets that can be 100% closed, at least 2 non-adjustable jets must be included in each possible inlet circuit so that a minimum of 20 gpm can flow during low pump operation with all the jets closed. Any other means of by-passing flow around the closed jets is acceptable as long as the by-pass means is down stream from the heater and allows a minimum of 20 gpm to flow through the heater during low speed operation.
8. If the pressure system for the 2-speed pump includes flow adjustable jets that do not close 100%, at least 20 gpm must flow during low speed operation through each possible inlet circuit with all the jets closed.
9. If the pressure system for a 2-speed pump or for a circ pump includes a filter, the filter **must** be equipped with a by-pass around the cartridge that opens when the cartridge gets dirty. (Spring tension holding the by-pass valve closed must be overcome by the pressure of the pump.) This by-pass must be capable of flowing a minimum of 20 gpm during low pump operation with the cartridge 100% blocked.
10. If the pressure system for a 2-speed pump or for a circ pump includes branch circulation lines such as circuits intended to operate ozone injection systems, these branch circulation lines must be connected downstream from the heater.
11. Avoid inter-connection of the plumbing circuits for the 2-speed pump or for the circ pump with other pumps in the spa plumbing system for the purpose of freeze protection. The M-7 control system will provide freeze protection. There is also provision for remote sensing freeze protection if required.
12. Position inlets and jets in the spa so that they do not direct water flow towards suction fittings or skimmers. This will avoid a “thermal short circuit” and prevent excessive heater and pump cycling.
13. If service valves are a part of the circulation system for the 2-speed pump or for the circ pump, be sure to use valves that incorporate a means of “locking” in the open position.
14. If the 2-speed pump or the circ pump is replaced in the field by service personnel, the replacement used must equal or exceed the hydraulic specifications of the original pump.



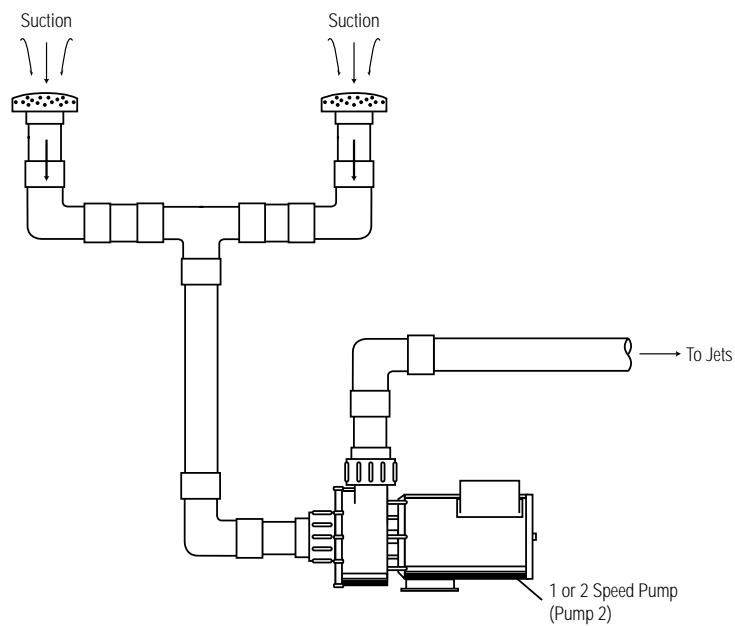
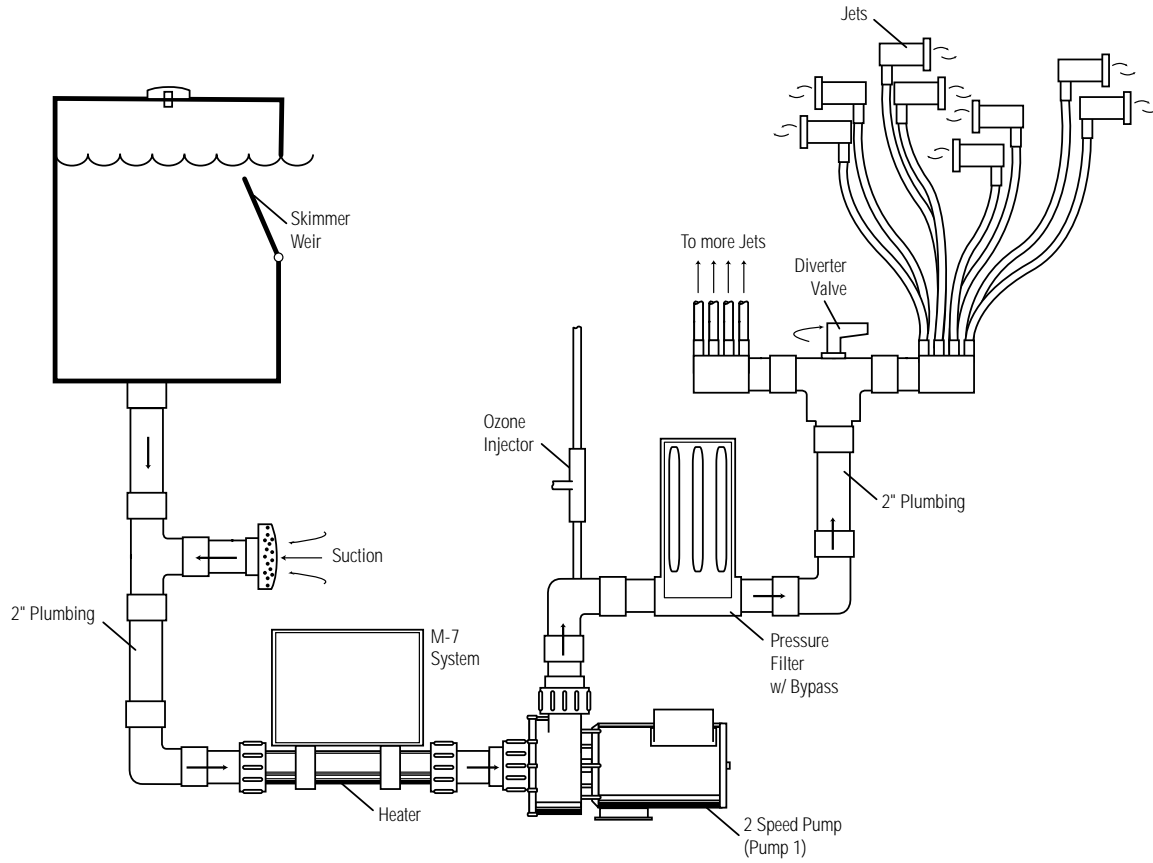
NON CIRC SYSTEM VACUUM SIDE HEATER VACUUM FILTER



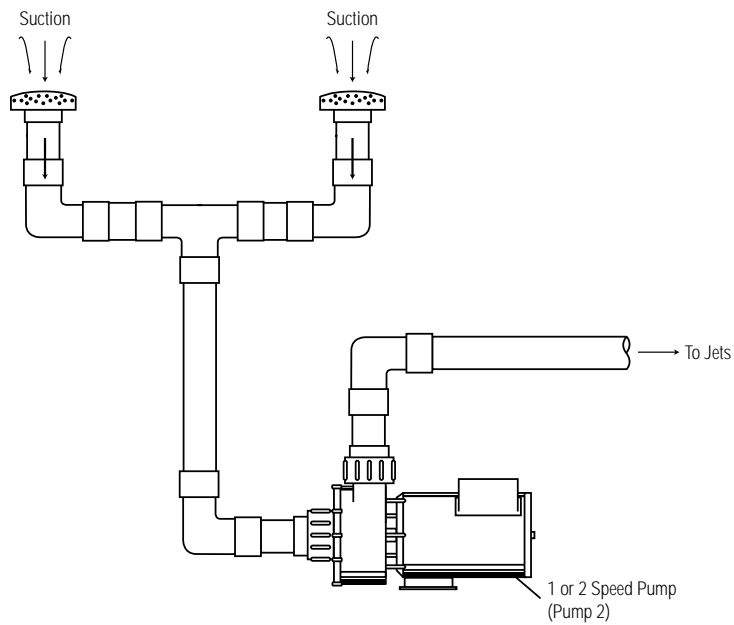
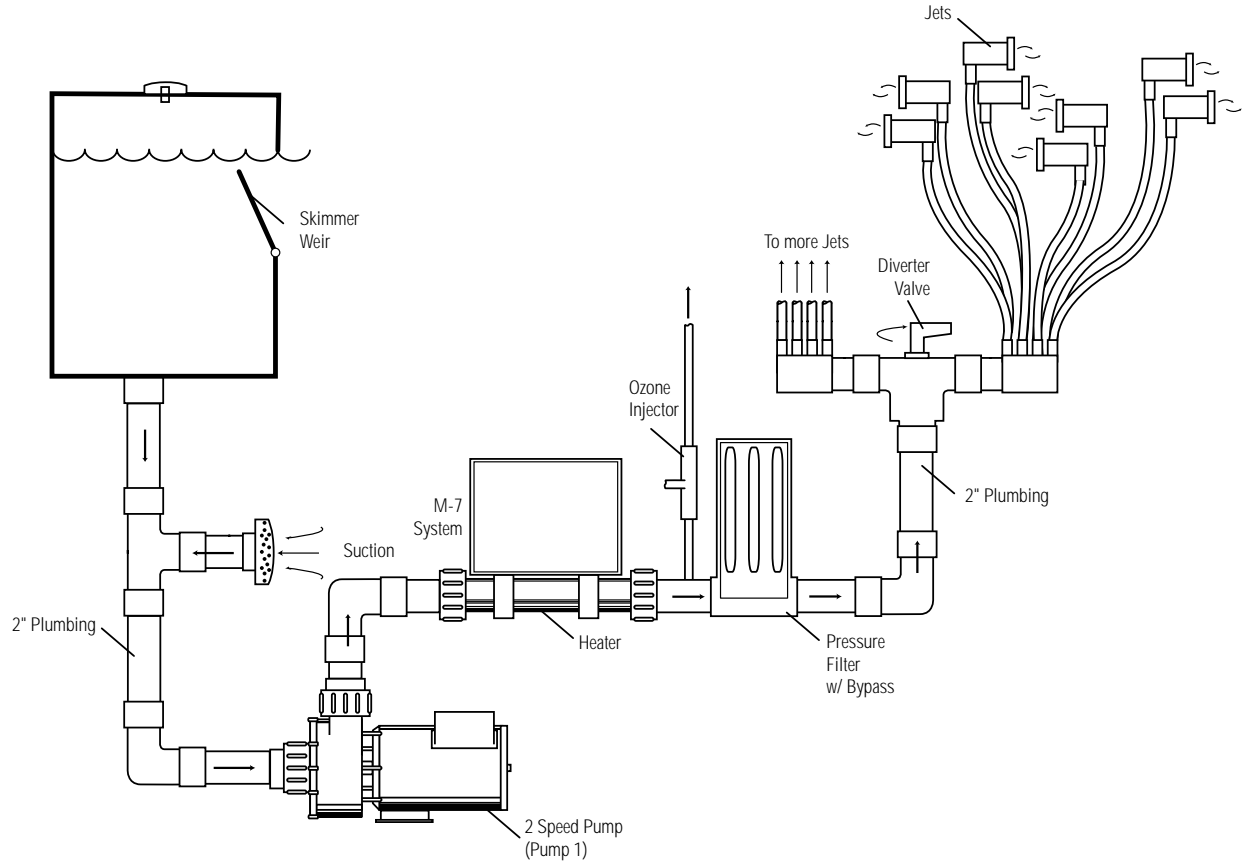
NON CIRC SYSTEM PRESSURE SIDE HEATER VACUUM FILTER



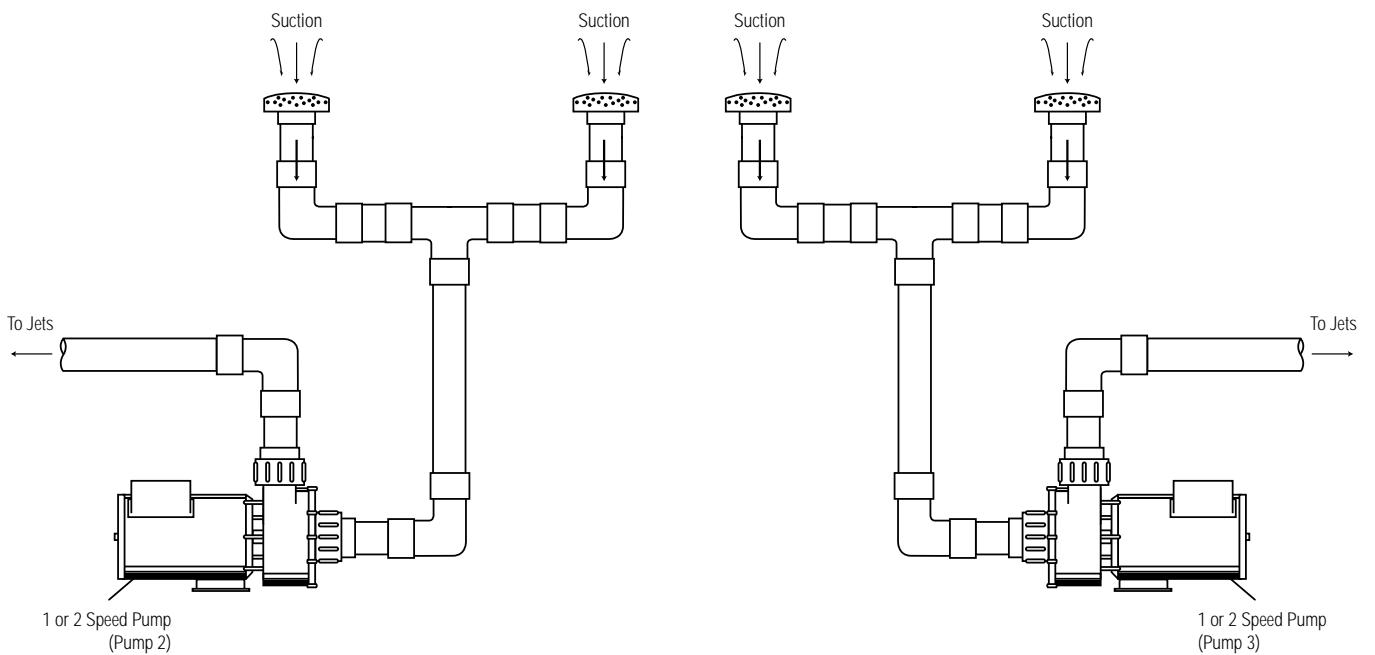
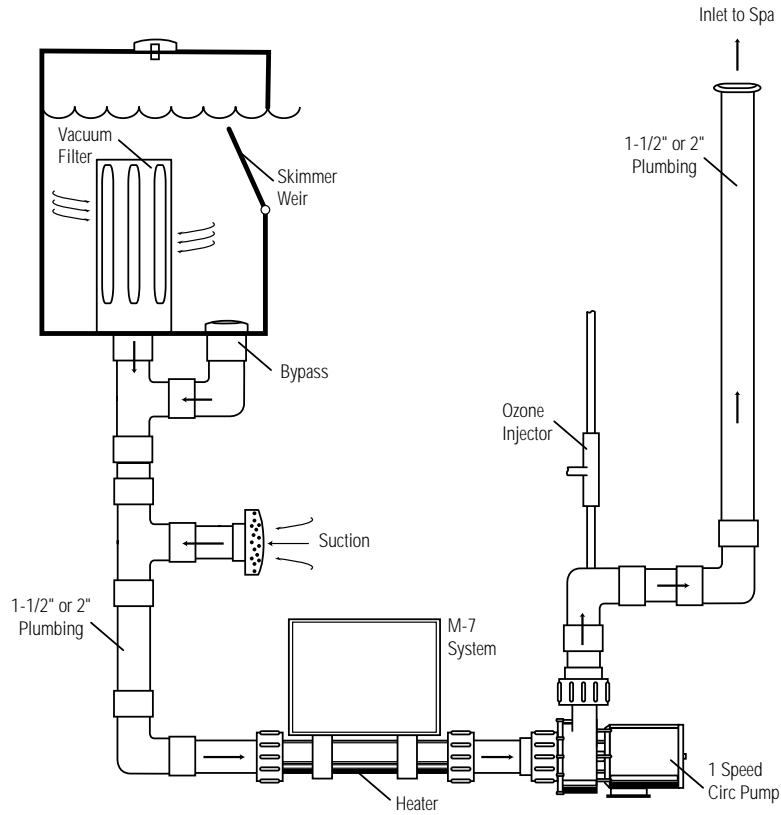
NON CIRC SYSTEM VACUUM SIDE HEATER PRESSURE FILTER



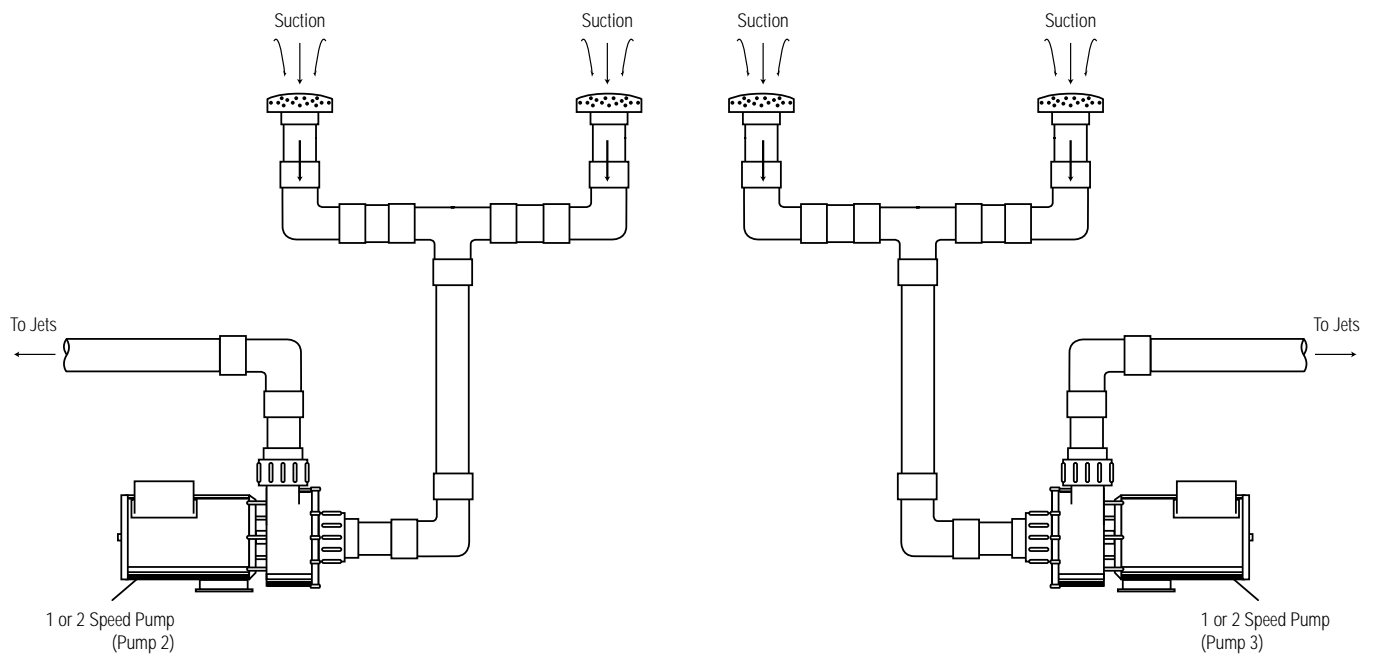
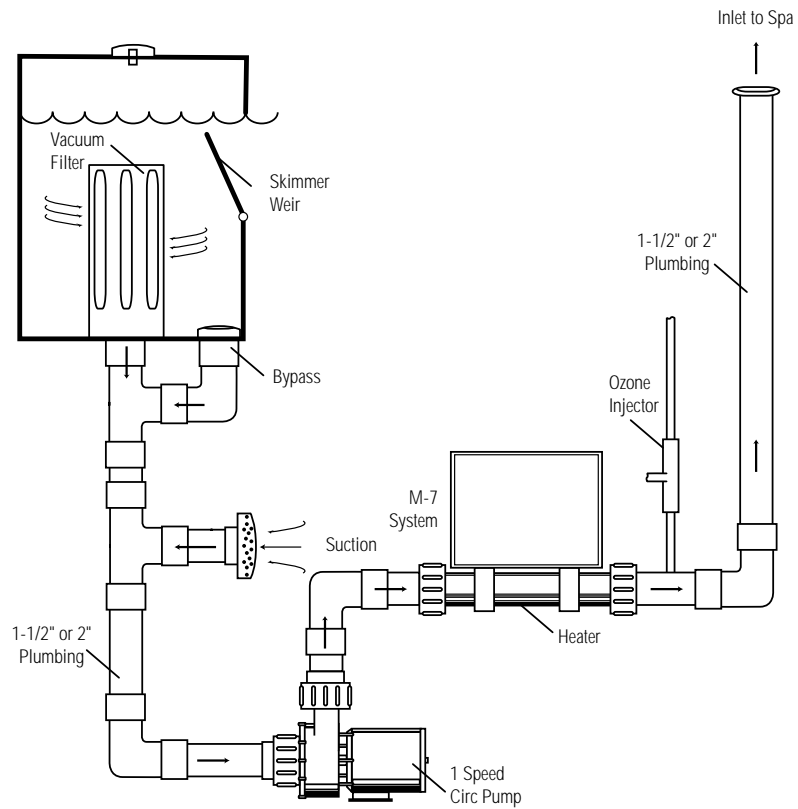
NON CIRC SYSTEM PRESSURE SIDE HEATER PRESSURE FILTER



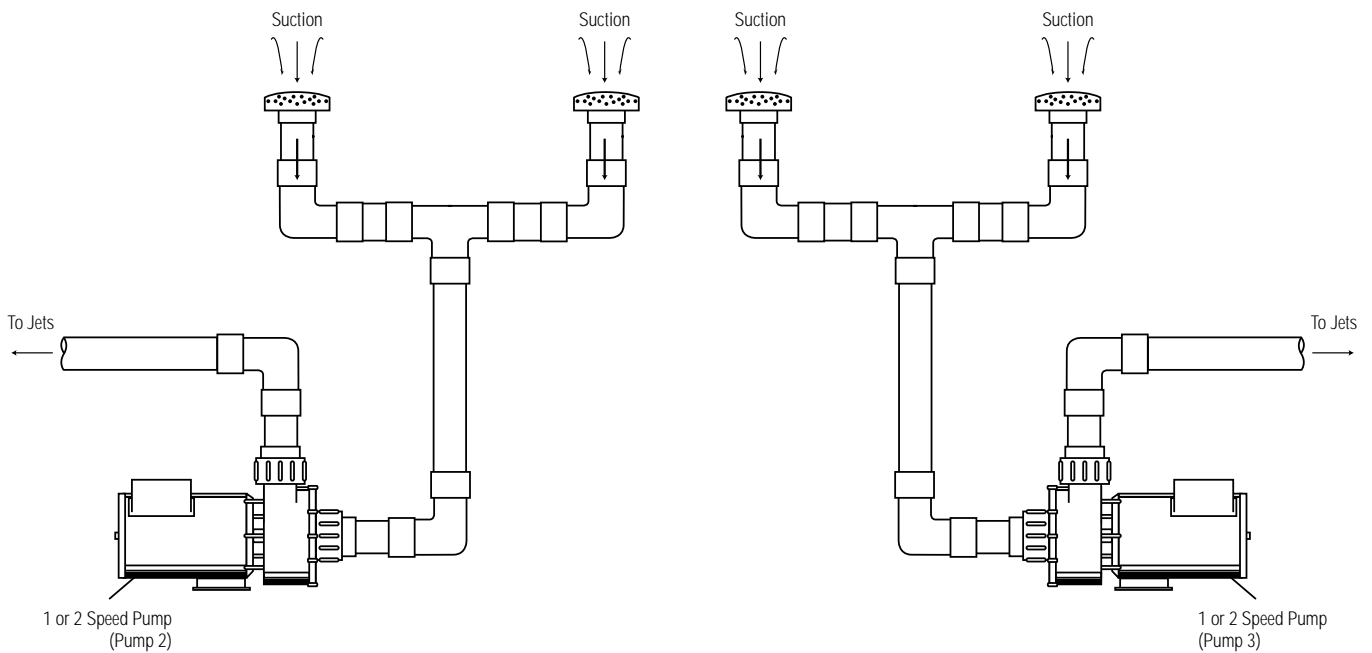
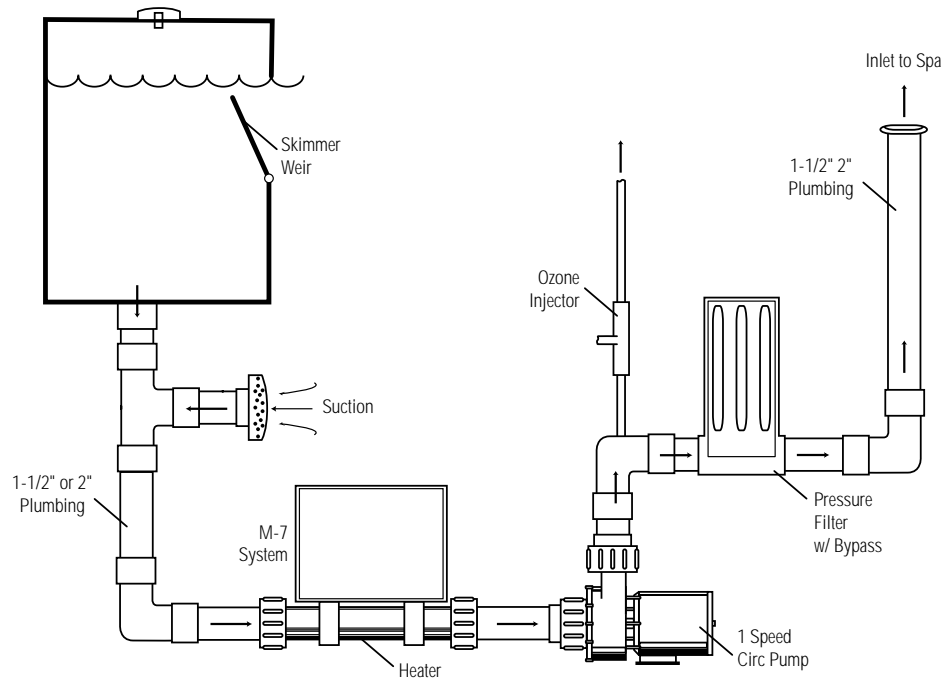
CIRC SYSTEM VACUUM SIDE HEATER VACUUM FILTER



CIRC SYSTEM PRESSURE SIDE HEATER VACUUM FILTER



CIRC SYSTEM VACUUM SIDE HEATER PRESSURE FILTER



CIRC SYSTEM PRESSURE SIDE HEATER PRESSURE FILTER

