

# Installation Suggestions



**THERAPY** *Sequencer*

**BALBOA**  
water group

P/N 52200-98

# Suggestions For Installing The Balboa Therapy Sequencer

05-28-14

## Introduction

The Balboa Therapy Sequencer consists of a controller that opens and closes valves that supply water to four groups of jets. When these jets are strategically located in a spa, they provide a sequencing massage therapy that enhances the spa experience and provides added value to a spa. The top side control panel for the system allows the user to start or stop the sequence, choose from 9 sequencing programs, select 1 of 3 sequencing speeds, and pause at any point in the current program.

The valves in the system are intended to be hydraulically powered by a dedicated 2 hp or larger pump. This pump should not be used for other operational functions such as heating or filtering. The maximum number of .312 diameter orifice jets (full size jets) that should be connected to each 1" sequencing valve is five. If .250 diameter orifice jets are being used, (euro jets) up to eight jets per sequencing valve may be connected. See Figure 1 for a basic overview of the Balboa Therapy Sequencer control system.

The Balboa Therapy Sequencer is designed to receive electrical power from a Balboa Spa Controller that is configured to energize a dedicated output for the Therapy Sequencer when the appropriate pump(s) have been energized.

## Suggestion 1. Select the proper jets.

Use a jet that has an individual air connection that accepts 3/8" I.D. tubing. The air inlet for the jet should use check valves to prevent water from backing into the air plumbing. Some jet manufacturers provide jets that are available with this feature built into the jet and some provide individual inline check valves that are installed at the air inlet port when the air tubing is installed. Regardless of which jet is selected, the check valve will prevent water from entering the air system and will enable the jet to aspirate immediately when water is supplied to the jet from the sequencing valves. Jets that do not aspirate quickly will not produce effective hydrotherapy as they are being sequenced on and off, especially during the shorter "on" times of the faster sequences. The "on" time will be used up waiting for the jet to aspirate.

In addition to using check valves in the air lines to the jets, be sure to route the air lines vertically from the jet to a manifold that is located above the maximum normal water line of the spa. Gravity will aid the removal of any water that may have accumulated in the air line as vacuum is created within the venturii of the jet. Also make sure that the plumbing in the air system does not starve the air requirement of the jets when they are all aspirating at the same time.

Use a jet that has an individual water connection that accepts 3/4" tubing or flex PVC. The tubing may in some cases be preferred because it can be disassembled. The tubing or PVC is then routed as directly as possible to a 4 or 5 port manifold ,depending on the number of jets connected to each valve. (A 4 port manifold can be made into a 5 port by adapting one of the unused through ports to accept the plumbing from the jet.) The 2" inlet to the manifold is then reduced to accept the 1" sequencing valve. **Important:** Using a manifold with a 2" inlet provides a large I.D. within the manifold that helps to reduce friction loss and back pressure which in turn enhances flow and helps to produce the maximum amount of therapy at the jet. See Figures 1 and 2.

## Suggestion 2. Select the proper pump.

The Balboa Therapy Sequencer is intended to operate with a 2 hp or larger pump. The pump selected should deliver a minimum of 140 to 150 gpm @ 15 to 18 psi. This will provide enough flow to aspirate all the jets in the system. (20 full size jets or 32 euro jets)

## Suggestion 3. Layout the jet pattern and plan the plumbing schematic in your spa to take advantage of all the selectable sequencing programs.

Design the jet layout so that each valve supplies no more than five full size jets or eight euro jets. Think about how you will plumb these jet groupings for the best mechanical as well as hydraulic efficiency. Plan the jet layout so that each valve supplies an equal number of jets. The plumbing scheme shown in Figure 1 works well. Start by building the valve/manifold assembly as shown in Figure 2. Be sure to orient the valves so that the flow arrows on the valves point toward the jets. Position the valve/manifold assembly and then systematically connect each jet to the outlet ports of the manifold. If you are using 8 euro jets per valve, use two 4-port manifolds plumbed together to provide additional ports for the additional jets. **Important:** If debris from the manufacturing process is in the plumbing of the system, blow it out with compressed air before installing the valves. This will avoid the possibility of clogging the valves during the water test

Next, assign numbers to each valve. If you have arranged the jet groupings in horizontal rows, (the best configuration) the top row should be supplied by valve number 1. Valves 2, 3, and 4 should follow below the top row in numerical order with valve number 4 supplying the bottom row. Adhere the number stickers supplied with the Therapy Sequencer to each valve and to the end of the power cable for each valve. This will aid you in connecting the valves electrically to the Therapy Sequencer in the proper order and assure that the jet zones are controlled to produce the best therapy patterns. To help you understand how the valves will be sequenced, consult the valve-sequencing chart shown in Figure 3. The chart shows 9 selectable sequencing programs, each program providing a different sequencing order.

## Suggestion 4. Design the plumbing system for maximum hydraulic efficiency.

Starting with the suction system for the pump, use 2" flex PVC, 2" fittings and valves and two suction fittings. Be sure each suction fitting is rated for the maximum flow of the pump. On the pressure side of the pump, continue the use of 2" flex PVC and 2" fittings and valves. Route the 2" flex PVC from the pressure side of the pump to a 4 port manifold that is located adjacent to the sequencing valves.

The 4 port manifold should have a 2" inlet and four 1" socket outlets. Connect the four 1" socket outlets on the manifold to the inlets of each valve using 1" flex PVC and 1" male adapters. See Figure 1.

## Suggestion 5. Locate the Therapy Sequencer top side control panel for easy access.

Locate the top side control panel near the therapy position that is controlled by the Therapy Sequencer so that the user can easily reach it while enjoying the therapy. Cut the required opening in the spa, and after feeding the cable through the opening, and after removing the adhesive masking from the gasket on the back of the panel, adhere the panel to the spa. Route the panel cable to the equipment bay.

## Suggestion 6. Install the Therapy Sequencer in the equipment bay of the spa.

Locate the Therapy Sequencer so that its power cord will reach the dedicated output provided on the Main Spa Control System. Secure it with screws and connect the power cord.

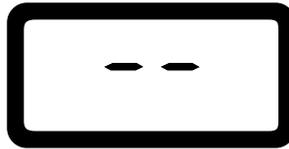
## Suggestion 7. Be sure the electrical connections to the valves have been made correctly.

Match the number on the label at the end of the power cable that you previously installed with the number adjacent to the output receptacles on the Therapy Sequencer. Insert the plugs into the receptacles. Be sure to route the wires from the valves to the Therapy Sequencer neatly. Avoid any strain on the plug/receptacle assembly.

## Suggestion 8. Water test the Therapy Sequencer for proper operation.

**Important:** Be sure you have cleaned out any debris that may be in the plumbing system as a result of previous manufacturing processes with compressed air before the sequencing valves were installed. Also, be sure to use clean water when testing the system. Debris that normally accumulates in test water should not be run through the valves. Doing so may clog the valves and require that they be disassembled to clean out the debris.

Press the “Jets” button on the main top side control panel to turn on the pump that supplies water to the sequencing valves. When the pump is energized the Therapy Sequencer will also be powered up and will open all of the valves. The LCD on the Therapy Sequencer top side panel will momentarily display “0” and then it will display two dashes. This means that the system has been energized and all valves have been opened, but the system has not been “turned on” to enable sequencing.



Push the On/Off button one time. This will change the LCD to indicate “On”. The system has been activated for sequencing but no change in operation will occur.



To start a sequencing program, push the “Program” button one time. The LCD will momentarily display “P2” and then alternately display “P2” with “S1”. The system is now running program 2 and sequencing at speed 1. (Speed 1 is the default sequencing speed)



To change programs, push the “Program” button to step through the programs. The LCD will momentarily display the next selected program “P3”, “P4”, “P5” etc. and then alternately display the selected program with the sequencing speed “S1” as shown above.

To change the sequencing speed, push the “Speed” button once. The LCD will momentarily display the next selected sequencing speed, “S1”, “S2”, or “S3”, and then alternately display the current program and the sequencing speed.



To pause at any point in the therapy sequence, push the “Pause” button. This will hold the sequencer in the current mode until the “Pause” button is pushed again to resume the sequence. The LCD will momentarily display “PA” and then alternately display “PA” and the current program number.



## Suggestion 9. Variations in jet layout.

The number of jets that can be controlled by the Therapy Sequencer can be increased to 40 full sized jets or 64 euro jets by adding 4 additional sequencing valves. The system can support either 4 or 8 valves. The 4 additional valves (valves 5, 6, 7, and 8) would be sequenced exactly like the 4 original valves. When valve 1 is energized, valve 5 is also energized and when valve 2 is energized, valve 6 is energized etc. This would allow a spa to be designed with two therapy sequencing positions or one large position. The Therapy Sequencer would operate 8 valves as described above and be controlled by one or two top side panels. Because of the additional flow requirement for the added jets, this design would require an additional pump and a duplicate hydraulic system.

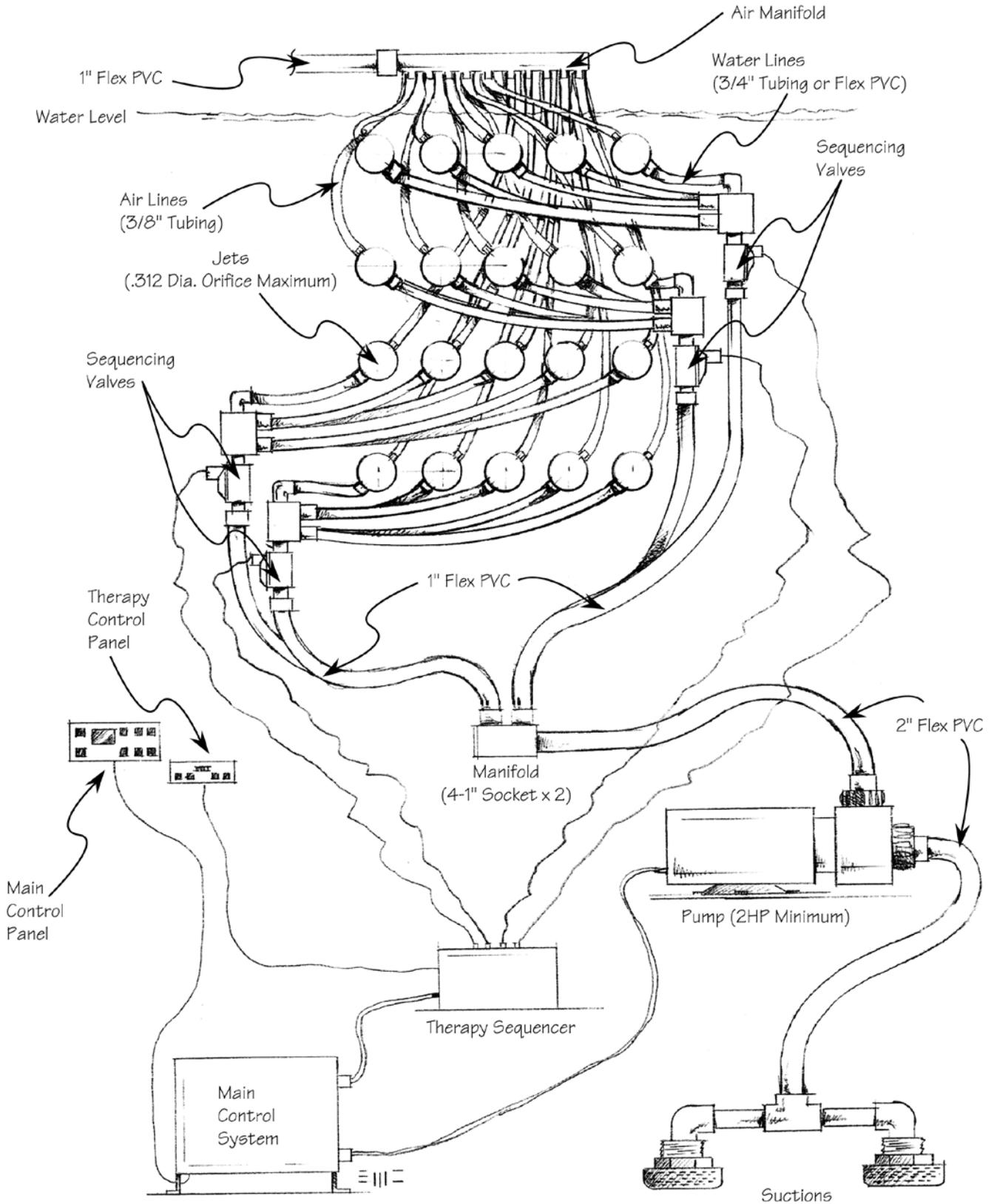
*Here are some important points to remember when you are designing a spa to use the Balboa Therapy Sequencer.*

1. Each valve can supply enough water to operate 5 full size jets or 8 euro jets.
2. Each valve represents a programmed function and the Therapy Sequencer requires 4 or 8 valves to completely operate the sequences. Example: If only 3 valves were installed, there would be an inactive blank in the sequence as the Therapy Sequencer energized the blank output.
3. Always keep in mind the hydraulic requirements to operate the jets. Make sure the pump will develop enough flow to operate all of the jets, and be sure the suction fittings are rated to handle the proposed flow. If two pumps are required, remember to consider the added electrical requirements as well as the added suction fitting requirements. Plan the jet layout in the spa and design the plumbing schematic to maintain a balanced hydraulic condition when all jets are operating.

# Balboa Therapy Sequencer

## Basic Overview

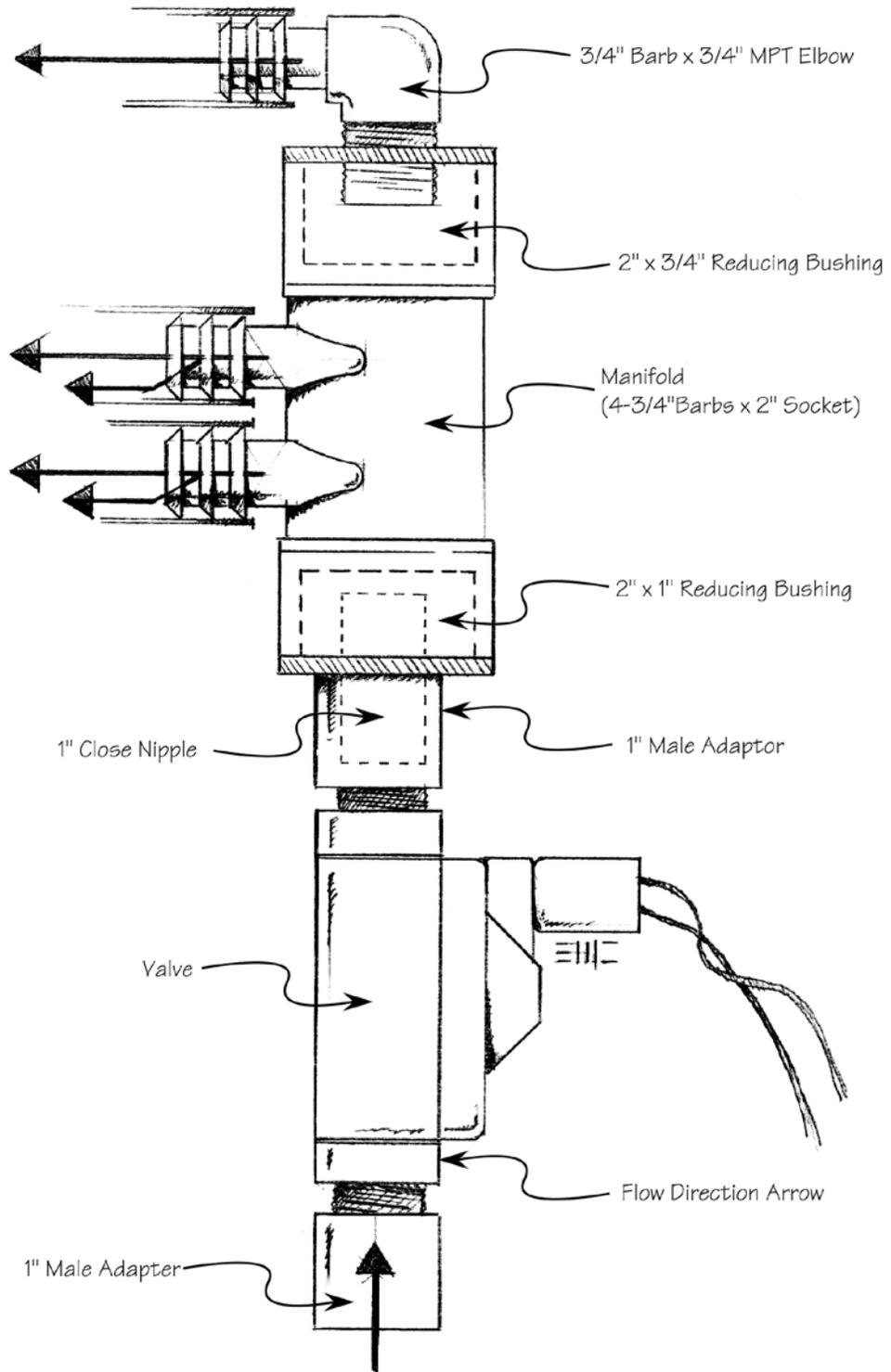
Figure 1



# Balboa Therapy Sequencer

## Valve/Manifold Assembly

Figure 2







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