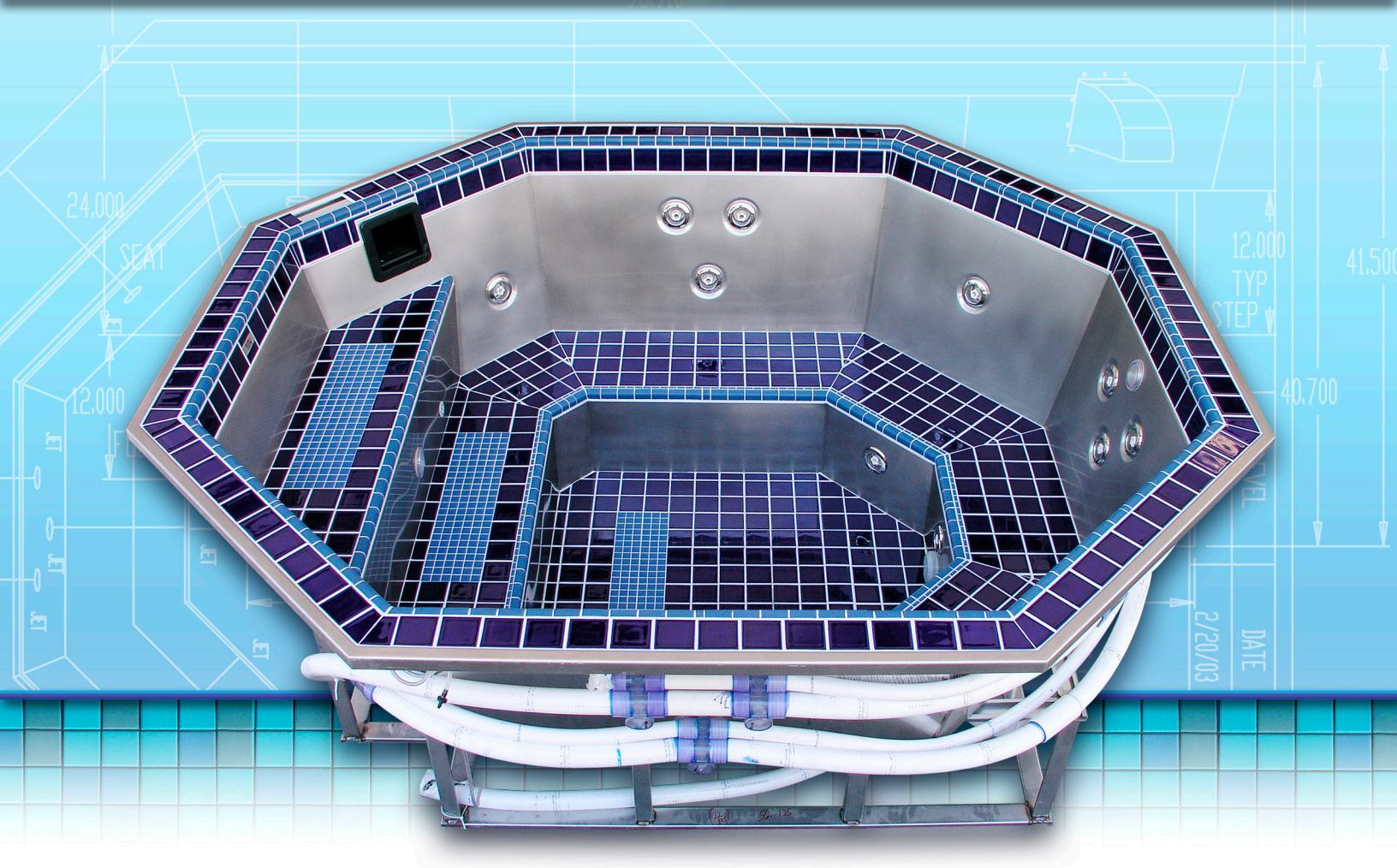


STAINLESS STEEL SPAS • SWIMSPAS® • POOLS • THERAPY VESSELS



BRADFORD | PRODUCTS®



RESIDENTIAL STAINLESS STEEL HOTTUB

BALBOA M3 INSTALLATION & OPERATION

WWW.BRADFORDPRODUCTS.COM

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Edition

February 2015

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Introduction

Congratulations on your purchase of a Bradford Spa®. Each stainless steel spa that is designed, manufactured and sold by Bradford Products, LLC is designed to provide a lifetime of enjoyment and relaxation.

Only quality products and materials are used in the manufacture of Bradford Spas®. Each spa is constructed using a combination of modern technology and old-world craftsmanship to give unparalleled service and beauty. The bright, easily cleaned stainless steel surface looks and feels like no other spa surface, giving a modern and attractive appearance to your home.




About This Document

This Installation Manual will guide you through the process of installing your spa. Before setting up or operating your spa or related equipment, you should read and understand all instructions. If you have any questions, please contact Bradford Products, your local dealer, or contractor.

For information on operating or maintaining your new spa, please see the Operations and Maintenance Manuals provided.

For your own safety, and to avoid the invalidation of your warranty, all text marked with the following symbols should be read carefully.

Table 1 : Safety Symbols

Symbol	Description
	Directions must be followed to avoid serious bodily injury or death
	Directions must be followed to avoid bodily injury
	Directions must be followed to avoid damage to your equipment

Hot Tub Overview

Bradford's engineered stainless steel spas come in various shapes and sizes to suit your exact needs. Your spa will be delivered wrapped in plastic with all plumbing connections clearly labeled for easy connection to the equipment pack.

The following table provides an overview of the various types of hot tubs and their specifications. NOTE: Weights are based on Standard Tile package, full tile will weigh more.

Table 2 : Hot Tubs Types and Specifications.

Spa Name	Occupants	Jets	Water Capacity (Gallons)	Empty Weight (lbs)	Full Weight (lbs)
Hanover	6	8/16	380	520	3665
Wilmington 75"	4-5	8	293	400	2850
Wilmington 87"	6-8	8/16	425	500	4040
Hatteras	4-6	8/16	323	400	3090
Hampton	8	8/16	445	594	4297
Carolina	4-6	8/16	324	435	3149
Newport	4-6	8/16	312	435	3049
Topsail	4-6	8/16	375	610	3750

Equipment Pack Overview

The equipment pack included with your Bradford Hot tub contains the pump(s), heater, filter, ionization system, and electronics/control module for the spa. The equipment pack will be delivered on a skid with all of the components pre-mounted and wired. The plumbing connections and stub outs will be clearly labeled. The equipment pack does not require any special weather protection.

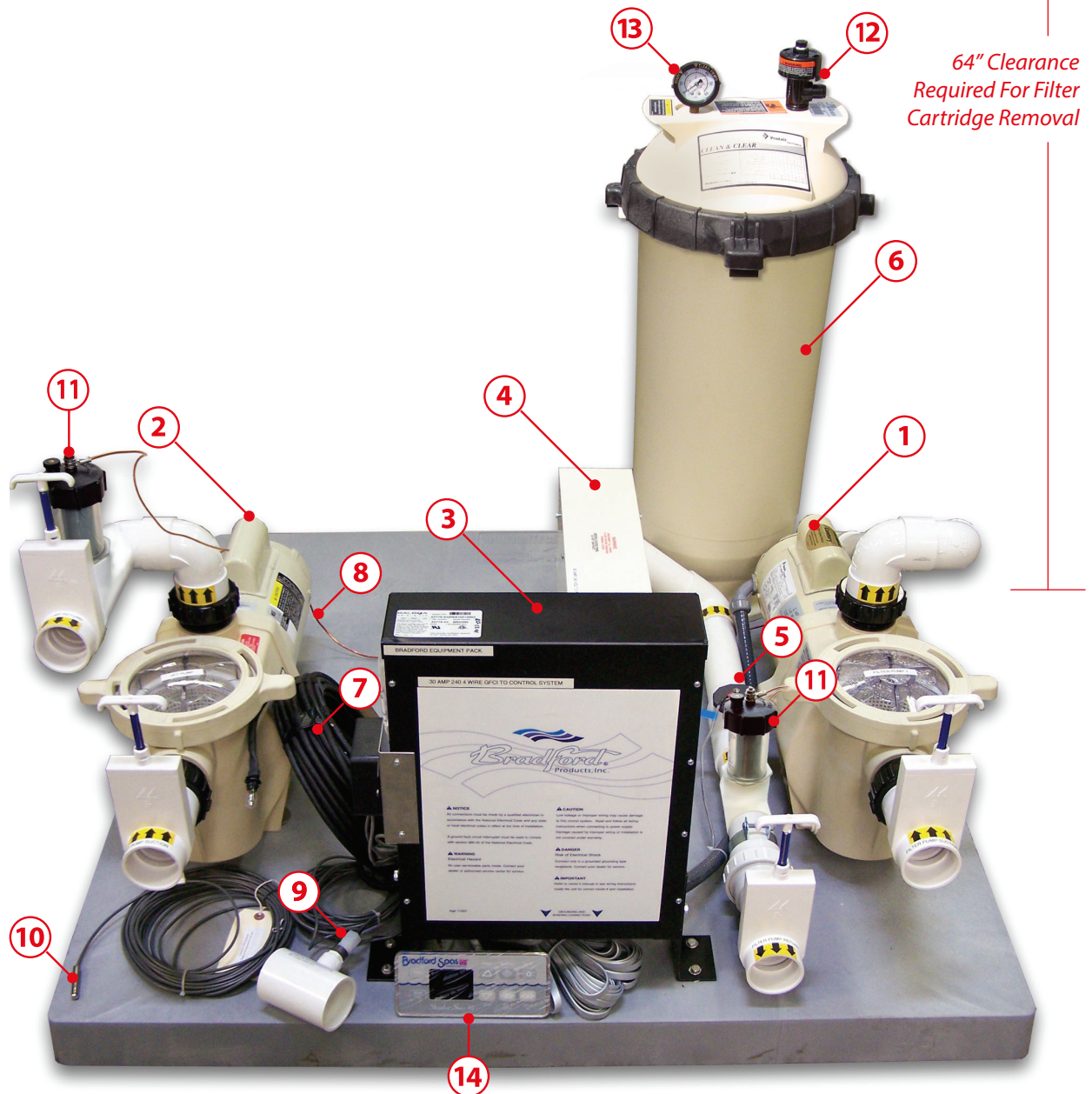
If equipment pack is "Frame Mounted" all equipment will be located under the step section of our standard hot tubs and will have a skim filter.

NOTE: The components found on the equipment pack may vary depending on your configuration.

Equipment Pack Electrical Information:

- M3 240 volt Outdoor Equipment system
- UL listed for 5.5 kW electric heater, 11 kW electric heater & Natural Gas/Propane remote heaters.

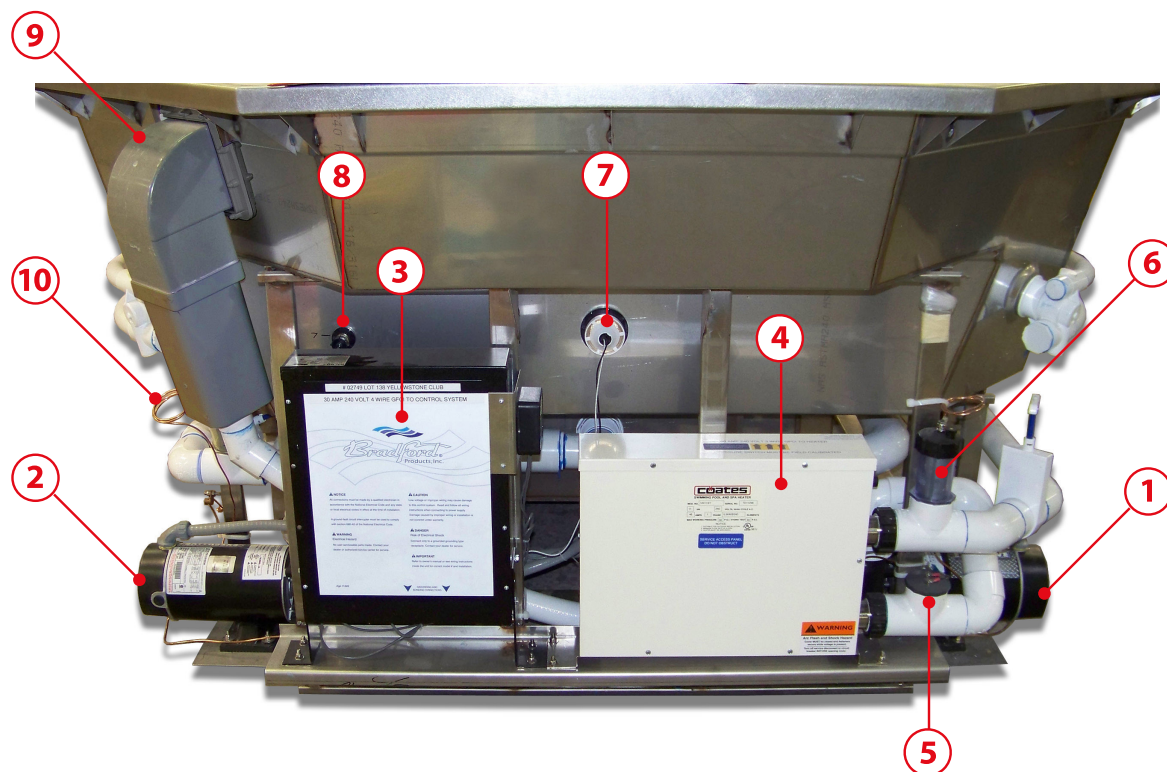
Figure 1 : Remote Equipment Pack with labeled components



- | | |
|---------------------------------|---------------------------|
| 1. Filter Pump | 8. Bonding Wire |
| 2. Jet Pump | 9. Freeze Sensor |
| 3. Electronics / Control Module | 10. Temperature Sensor |
| 4. Heater | 11. Current Collector |
| 5. Copper Silver Ionizer | 12. Air Relief Valve |
| 6. Cartridge Filter | 13. Pressure Gauge |
| 7. Light Cord | 14. Topside Control Panel |

Image for illustration only - Images & Components subject to change or slight variation without notice

Figure 2 : Frame Mounted Equipment pack with labeled components



- | | | |
|---------------------------------|--------------------------|--------------------|
| 1. Filter Pump | 5. Cooper Silver Ionizer | 9. S/S Skim Filter |
| 2. Jet Pump | 6. Current Collector | 10. Bonding Wire |
| 3. Electronics / Control Module | 7. Light & Cord | |
| 4. Heater | 8. Temperature Well | |

Image for illustration only - Images & Components subject to change or slight variation without notice

The following table lists the components on a **standard** equipment pack.

Table 3 : Components of the Equipment Pack, Sub Assembly (Remote Skid Pack)

Component	Description
Filter Pump	Standard for all equipment packs, this pump can support up to eight hydrotherapy jets. Pentair Whisperflo High Performance pump: WFDS-8 208/230 volt 2 hp two-speed motor. For more information, see the manufacturer's manual included with your spa.
Jet Pump	Included only in two-pump spa configurations that support up to 16 hydrotherapy jets. Pentair Whisperflo High Performance pump: WFE-8 208/230 volt 2 hp one-speed motor. For more information, see the manufacturer's manual included with your spa.
Electronics / Control Module	Distributes power from the residence to the other components on the equipment pack.
Heater	Heats the water that is pumped into the spa. This heater is electric by default. An optional natural gas/propane heater or a heat exchanger is available upon request. <ul style="list-style-type: none"> • Electric – Coates 5.5 kW or 11 kW heater • Natural Gas/Propane – Lochinvar 150,000/400,000 Btu, sized according to the spa size and climate. For more information, see the manufacturer's manual included with your spa.
Copper Silver Ionizer	Water purification system that sterilizes the water as it goes through the plumbing. For more information, see the manufacturer's manual included with your spa.
Cartridge Filter	Removes foreign particles from the water. Pentair Clean & Clear #160316 – 100 sq. ft. cartridge style filter (Requires 62" of vertical clearance for removal of cartridge)
Light Cord	Provides power for the low-voltage underwater light. This 50' cord is connected to the light fitting in the spa upon installation.
Bonding Wire	INSTALLED BY LICENSED ELECTRICIAN Provides a safe electrical ground for the spa. The Bonding Wire must be connected to the spa bonding bar on the M3 control panel and the building load center (see electrical schematic).
Freeze Sensor	Detects freezing conditions and activates the pumps and heaters automatically. Includes a 25' cord. On a single pump (eight jet) system, place the freeze sensor after the heater at the point that is most susceptible to freezing conditions. On a two pump (16 jet) system, place the freeze sensor on the return line of the jet pump at the point most susceptible to freezing. Gas Heating Appliances must follow the appliance manufacturers instructions for placement and protection against freezing if the potential exists.
Temperature Sensor	Continually monitors your water temperature and controls the heater to maintain your selected water temperature setting. This 50' cord is connected to spa upon installation.

The following table lists the components on a **frame-mount** equipment pack.

Table 4 : Components of the Equipment Pack, Sub Assembly (Frame Mounted)

Component	Description
Filter Pump	Waterway Executive 48 #3420820 - 1A, 2hp two-speed motor 230 Volt single phase
Jet Pump	Included only in two-pump spa configurations that support up to 16 hydrotherapy jets. Waterway Executive 48, #3410830 - 1A, 2hp One-speed motor 230 Volt single phase. For more information, see the manufacturer's manual included with your spa.
Custom Stainless Steel Skim Filter	<i>Consumerables:</i> 20 sq.ft. (2x) Waterway 10 sq.ft. cartridge skim filter - # PW 1110 100 sq.ft. (2x) Waterway 50 sq.ft. cartridge skim filter - # 510-9100 (<i>upon request</i>)
Electronics / Control Module	Distributes power from the residence to the other components on the equipment pack.
Heater	Heats the water that is pumped into the spa. • Electric – Coates 5.5 kW or 11 kW (Heater Upgrade) For more information, see the manufacturer's manual included with your spa.
Copper Silver Ionizer	These items same as standard equipment pack, though located and mounted directly onto the spa frame and assembly
Cartridge Filter	
Light Cord	
Bonding Cord	
Freeze Sensor	
Temperature Sensor	

See Appendix A for the electrical requirements for each equipment pack configuration.

Preparing to Install Your Spa

CAUTION:

Read all instructions before beginning the installation. Failure to follow these instructions could cause serious body and/or property damage.

Most standard residential spas can be installed in one to two days.

NOTE:

You will need to hire a licensed electrical contractor to wire the spa equipment pack to your household electrical panel.

Unpacking Your Spa

When you first receive your spa and equipment pack, unpack it and look it over for any damage that might have occurred during shipping. An empty spa can weigh hundreds of pounds, so you will need several people to help move it. When you move the spa, you should hold it by the stainless steel support frame. Heavy work gloves will help prevent cuts and scrapes from exposed metal surfaces.

WARNING:

Do not try to carry the spa by holding the attached plumbing pipes. Doing so could break the pipes and void your warranty.

Table 3 : parts List

Component	Description
Spa Cover	Insulated to prevent heat loss from the water surface.
Spa Care Package	Provides tools for general maintenance and cleaning, including: <ul style="list-style-type: none">• Underwater light lens removal tool• Brominating floater• Spa vacuum• Stainless Steel Wire brush• Scrub sponge
Taylor K-2005 (high range) water chemistry test kit	Includes nine tests for thorough testing: total chlorine, free chlorine, bromine, pH, acid demand, base demand, total alkalinity, calcium hardness, and cyanuric acid. Includes a testing and treatment guide.
Naturally Free Metal & Scale Control	Sequestering agent to remove metals from the water

Tools and Suppliers List

The following list describes the tools you will need to perform a basic installation:

- Schedule 40 PVC cement
- Schedule 40 PVC primer
- Hacksaw or pipe cutter
- 6' level
- Tape measure
- Torpedo level
- Philips head screwdriver
- Wire fish tape
- Pry bar

In addition, you will need the following supplies to properly install your spa:

- 36 grit sandpaper
- 2" diameter non-metallic conduit
- 2" & 2.5" diameter PVC pipes (Schedule 40) pressure rated for plumbing
- 2" & 2.5" 45° or 90° couplings (Schedule 40) pressure rated for plumbing
- 2" non-metallic electrical sweeps for conduit run

If the concrete pad is not level, you will also need to shim (or level) the spa using stainless steel washers. To properly shim the spa, the washers must be placed beneath all areas that are off the ground.

Preparing the Installation Site

Before you install your Bradford Spa, first decide what type of installation you will use. Because of the stainless steel support frame, you can install the spa in a variety of ways without backfilling around the spa.

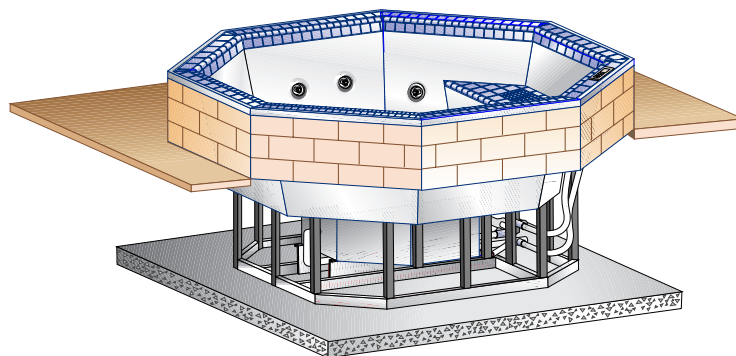
About Installation Types

There are three suggested installation types: On Grade Mount, Recessed Mount, or Flush Mount.

Recessed Mount: Use a Recessed mount when you are planning to install the spa partially recessed beneath the ground or a deck. You will need to partially dig a pit if the spa is going in the ground.

This is ideal when the spa will be placed on an elevated deck, however you will need to build a skirt around the side of the spa.

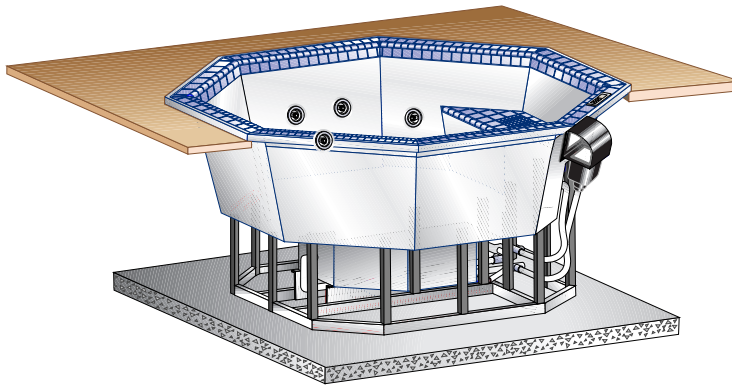
Recessed Mount Installation (Above) - Make sure to leave access for any **Frame Mounted** equipment



Flush Mount:

Use a Flush mount when you are planning to install the spa completely recessed into the ground or deck. Bradford Spas have been engineered to allow for permanent in-ground installation. You will need to dig a vault (pit) large enough to hold the entire spa.

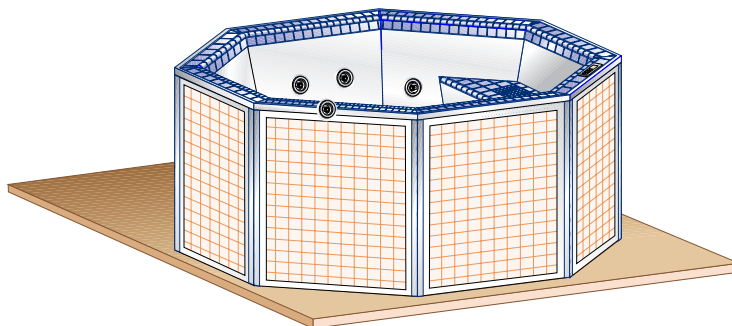
Flush Mount Installation Type (below)



On Grade Mount:

Use an On-Grade mount when you are planning to install the spa on ground level. This installation will require you to build a set of stairs on the side of the spa for ease of entry and exit and skirting around the side of the spa.

On Grade Mount Installation Type (below)



Frame Mounted Equipment:

Please provide adequate access panels & hatch locations to reach any Frame Mounted equipment that may reside below the finished spa installation or ground surface. (see page 15)

Selecting a Good Installation Site

You will need to place the Equipment Pack within the range of the equipment pack wires that run to the hot tub – approximately 40 feet or less.

For optimal performance, the equipment pack should be located below the water line of the spa.

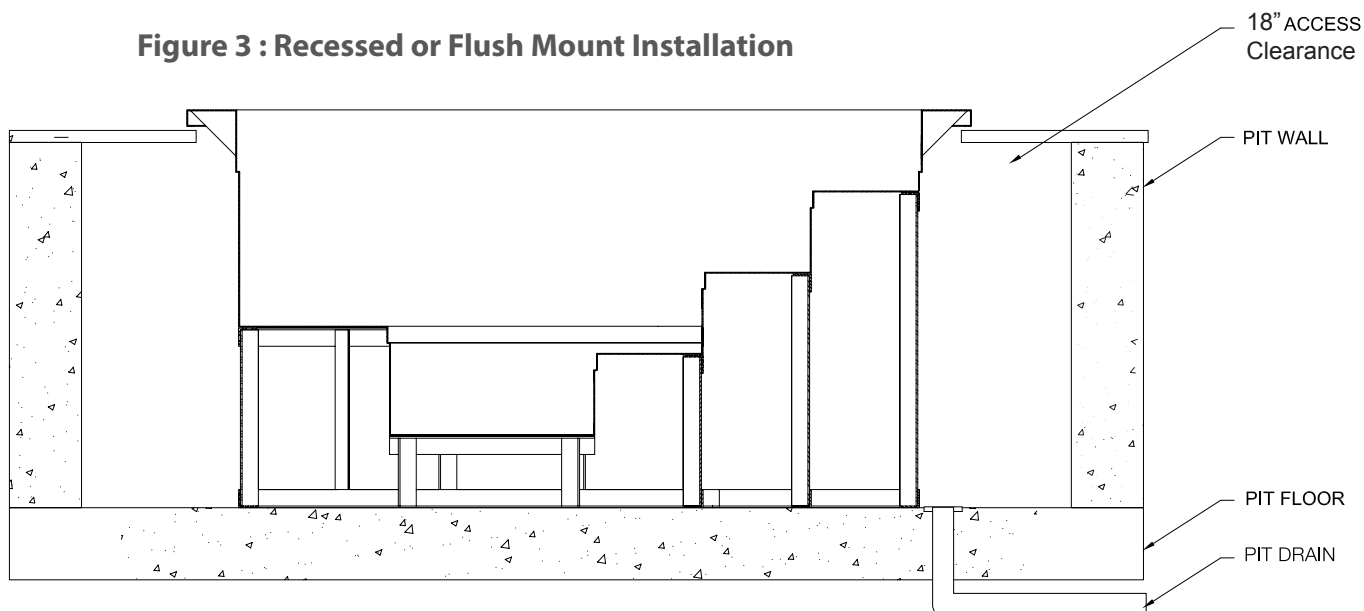
Preparing for a Recessed or Flush Mount

If you are installing your spa using a recessed or flush mount, you will need to do the following steps:

1. Dig vault
2. Prepare access area
3. Install drain
4. Pour concrete slab
5. Construct retaining wall (Pit Wall)

Figure 3 shows the vault, access area, retaining wall, drain, and concrete slab.

Figure 3 : Recessed or Flush Mount Installation



Frame Mounted Equipment:

Consideration should be given for future access and periodic maintenance to the frame mounted equipment when choosing a **Recessed** or **Flush Mount** style of installation. As the equipment is mounted on the frame towards the left and right of the entry stairs, providing an open area in this general vicinity extending approximately half-way down each side of the spa will be beneficial to access the equipment.

NOTE: 18" Clearance Inside Vault

Access inside the vault and around the exterior of the spa shell and plumbing should be considered. Bradford suggests 18" perimeter clearance around the spa. Ultimately the on-site conditions and homeowners choice of installation will dictate the allotted clearance around the spa shell. (see Appendix C for more information)

The following sections describe recommended practices for preparing for a recessed or flush mount installation.

1. Preparing the Vault

When preparing to dig the vault, there are a couple considerations:

Depth: If you are installing the spa using a flush mount, you will need to dig a vault the depth of the entire spa plus the concrete pad. The concrete pad should be at least 4 inches thick. If you are installing the spa using a recessed mount, you only need a vault that is the depth of the portion that will be underground.

Width: You will need to construct a cinder block retaining wall around the edges of the vault, so be sure to leave enough room around the edges to still install the spa. Cinder blocks are approximately 8 inches thick, so you will need to add 16 inches to the length and width of the vault.

The following table gives the dimensions for each spa type.

Table 4: Spa Vault Dimensions (with calculations for concrete pad if using a 8" cinder Block Wall)

Spa	Spa Length (Vault Length)	Spa Width (Vault Width)
Hanover	87" (125")	87" (125")
Wilmington	87" (125")	87" (125")
Hatteras	83" (121")	83" (121")
Hampton	87" (125")	99" (153")
Carolina	80" (118")	80" (118")
Newport	80" (118")	80" (118")
Topsail	84" (122")	84" (122")

2. Creating Access Area

Before installing your spa, you need to make sure that you can easily access the temperature sensor, underwater light, plumbing connections, and conduit wires for easy maintenance or repair. Ideally, the access area should allow you to access the area beneath the spa stairs. See figure 3.

3. Constructing the Retaining Wall (Pit Wall)

Construct a retaining wall (pit wall) around the sides of the vault. This will prevent soil from filling the vault and make it easier to perform maintenance and repair on your spa. We suggest using concrete reinforced blocks (cinder block) for constructing the wall. This will add durability and strength. See figure 3.

4. Installing the Drain

Install a drain on the floor of the pit. This drain will allow any water that collects in the spa pit to quickly drain away. Elevate the drain slightly to keep it from being covered by the concrete pad.

NOTE: Your contractor will be able to recommend types of drains. Bradford Products does not supply drains or instructions on installing drains.

5. Pouring the Concrete Pad

Once you have installed the drain:

1. Pour a 4-inch-thick concrete pad that extends all the way to the retaining wall.

NOTE: Do not cover the drain with concrete. Water should be able to flow freely out of the vault at all times.

2. Level the concrete pad to be within 1/8 inch of level. See figure 3.

3. Wait for the concrete to dry (cure) completely before installing the spa.

CAUTION: Do not use sectional patio pavers or gravel instead of a solid concrete pad. Your spa should sit on a level surface at all times, and both of these base types may shift over time.

WARNING: Do not put foam insulation or any other type of insulation between the concrete pad and spa. Doing so will prevent the spa from being level and could cause damage to your spa.

Now you are ready to dig the conduit/plumbing trench and place the equipment pack.

Preparing for an On Grade Mount

If you are installing your spa using an on grade mount, you will need to make sure that your installation area can support the weight of the spa. See (page 7) for details on the full weight of the spa. Check with your local building officials, engineer, or architect for proper foundation and conformance to any codes.

If you are installing the spa on a wood deck or patio, make sure there are no uneven spots or gaps that could create an uneven surface for the spa. The surface should be within 1/8 inch of level.

Preparing for an Indoor Installation

The following are special considerations for installing your spa indoors:

- Ventilation – Consult with your contractor to make sure you have a sufficient ventilation system in your spa room, since steam and moisture can cause damage to the interior of your home.

Preparing for an Indoor Installation (cont.)

- Drainage – When people enter and exit a spa, water inevitably will end up on the floor. Make sure you have sufficient floor drains to keep water from accumulating and causing moisture problems.
- Ease of installation – Make sure the spa will fit through any doors. If your residence is a new construction, this may not be an issue.
- Weight – Make sure your foundation and any load-bearing floors can support the weight of a fully-loaded spa. See (page 7) for details on the full weight of the spa.
- Electrical Requirements – There may be additional National Electrical Code and/or local codes that apply to outlets, fans, and lights located near the spa. Check with a licensed electrician for more information.

Placing the Equipment Pack

1. Select an installation site for the equipment pack. It must be located within approximately 40 feet of the spa since the wires on the equipment pack wires are approximately 50 feet long and site location should take into account any elevation changes and obstacles and corners.

NOTE: If you need to place the equipment pack farther away from the spa, you will need a custom-made equipment pack. Let Bradford Products personnel know in advance to prevent delay to your project.

2. Construct a base for the equipment pack using either crushed gravel or concrete.
3. For optimal performance, place the equipment pack so it is below the water line of the spa. See (figure 4) for illustration.

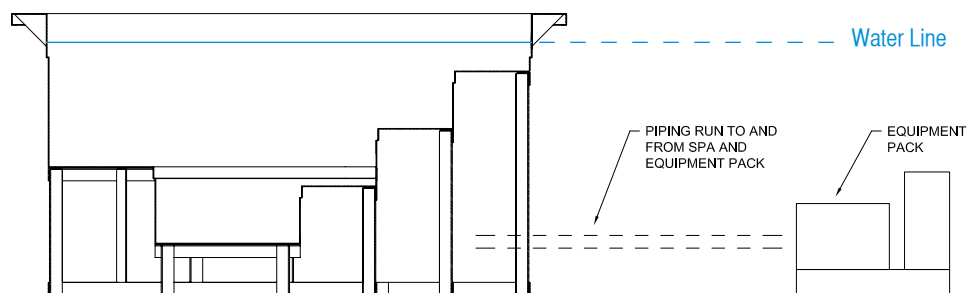


Figure 4 : Equipment Pack placement

Digging a Trench for Plumbing

WARNING: Have your utility company locate and mark any underground pipes or wires before you begin digging your trench. Failure to do so could cause injury or property damage.

If you are planning to bury the plumbing pipes and conduit for your spa, dig the trench deep enough to make sure the pipes are beneath the frost line (the depth at which the moisture in the earth freezes and thaws). This frost line can vary, depending on the area you live in. This is more important if you live in a colder climate.

This trench must be wide enough to hold all plumbing pipes and the electrical conduit. You can insulate the pipes with foam insulation if you desire.

NOTE: Do not backfill the trench until after the spa has been water tested and inspected.

Installing the Conduit

Lay a 2-inch diameter PVC conduit from the equipment pack to the spa. This conduit must be waterproof to keep moisture away from the electrical wires.

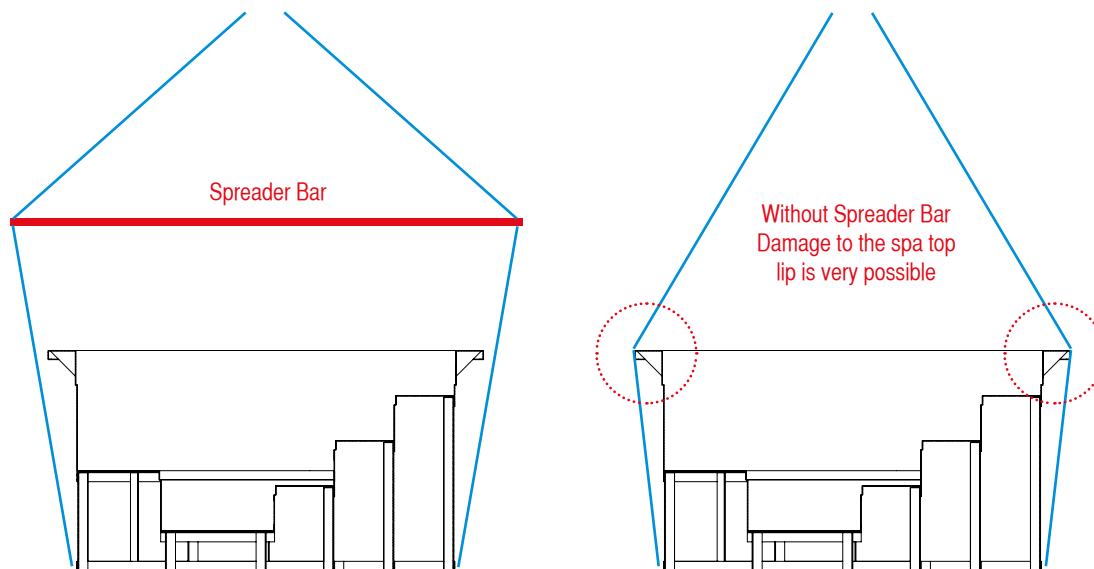
NOTE: Use PVC sweeps for bends in the conduit instead of 90-degree elbow. Elbow can make it difficult to pull the wires through the conduit.

Installing Your Spa

Once you have finished preparing the site, it is time to install your spa. This will include making all connections between the spa, equipment pack, and residence.

1. Using a crane or boom truck, insert the spa into the vault. The use of spreader bars is advised to protect the spa top lip and edge. Your crane operator should be able to provide these.

Figure 5 : Lifting the Spa With A Spreader Bar



Installing the Spa (cont.)

2. Check around the steel frame at the bottom of the spa. Each leg of the stainless steel frame must contact the ground directly.
3. If the concrete pad is not level, use a pry bar to lift the spa frame and insert stainless steel shims to make the spa level.

Remote Equipment Only - Making Spa, Equipment Pack, and Power Source Connections

Make all connections between the spa and equipment pack before connecting the equipment pack to the main power source. You will need to make the following connections:

1. Connect water temperature sensor
2. Install freeze sensor
3. Connect the equipment pack to power source
4. Make plumbing connections and fill with water
5. Connect bonding, light, and spa-side control wires

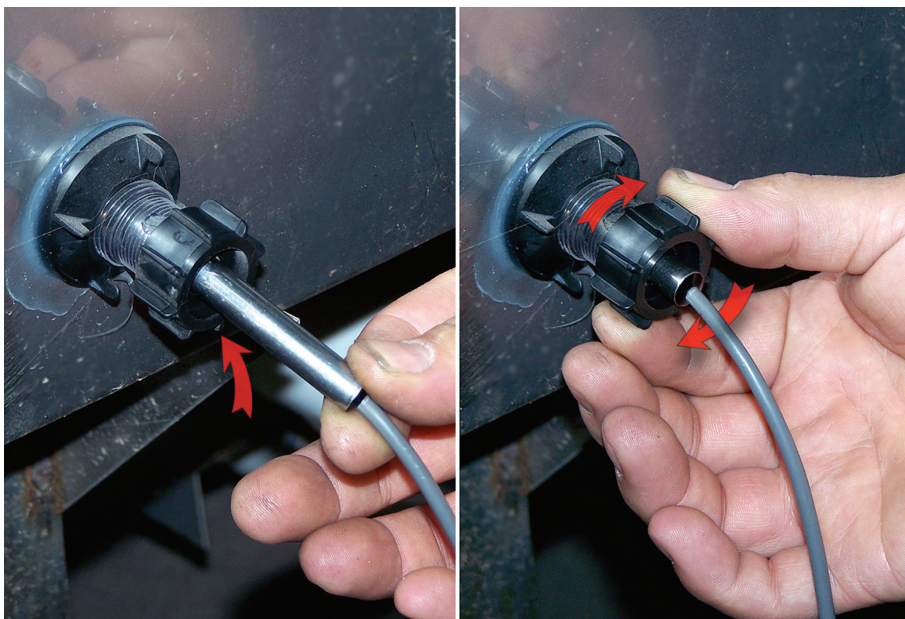
Remote Equipment Only - Connecting Water Temperature Sensor

CAUTION: Always route sensor wires away from high-voltage lines.

To connect the water temperature sensor:

1. Locate the labeled wire on the equipment pack.
2. Pull the water temperature sensor wire from the equipment pack to the spa through the conduit using a fish tape.
3. Connect the wire to the water temperature sensor on the spa. See (figure 6).

Figure 6 : Water Temperature Sensor wire



Remote Equipment Only - Installing Freeze Sensor

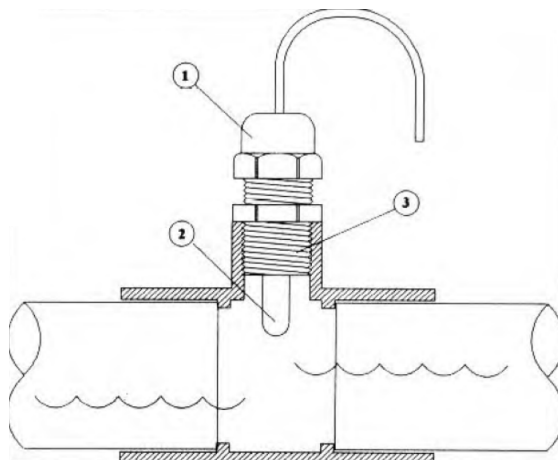
When freezing conditions are present (the temperature drops below 38°F), the freeze sensor on your equipment pack will activate on all pumps to prevent the water from freezing. The freeze sensor is connected to the equipment pack by a 25' cord.

To install the freeze sensor:

1. Locate the labeled wire connected to the freeze sensor.
2. Place the freeze sensor in the area that is most susceptible to freezing conditions.

NOTE: The area that is most susceptible to freezing will differ, depending on where you placed the equipment pack. For example, it could be an area that is not exposed to direct sunlight. For a two pump system, make sure the sensor is installed on the jet pump (return line).

To install the freeze sensor: 1.



1. Install the freeze sensor mounting into the tee location. To prevent water leaks, use Teflon tape, silicone, or a polyurethane sealant.

CAUTION: Do not use petroleum-based sealants.

2. Loosen the domed sealing nut (#1) on the fitting.
3. Insert the freeze sensor (#2) into the fitting (#3) until the cable end of the sensor is flush with the domed sealing nut (#1).
4. Tighten the domed sealing nut (#1) onto the fitting (#3). Make sure water is not leaking into the fitting.

Figure 7 : Freeze Sensor tee mounting

Connecting the Equipment Pack to Your Power Source

The Electronics/Control Module on your equipment pack must be connected to your power source before you can test your spa setup. See (Appendix A) for the electrical requirements for one and two pump configurations using both electric and gas heaters. See the appropriate manual for hooking up a gas heater or heat exchanger.

DANGER! ALL ELECTRICAL WORK MUST BE DONE BY A LICENSED ELECTRICAL CONTRACTOR IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND/OR LOCAL CODES. The following steps are for reference only, and should not be attempted by an unlicensed contractor. Failure to take precautionary steps could lead to serious injury or death.

There are two separate sets of wires running from the circuit breaker box to the equipment pack. Refer to the electrical schematics on your equipment pack.

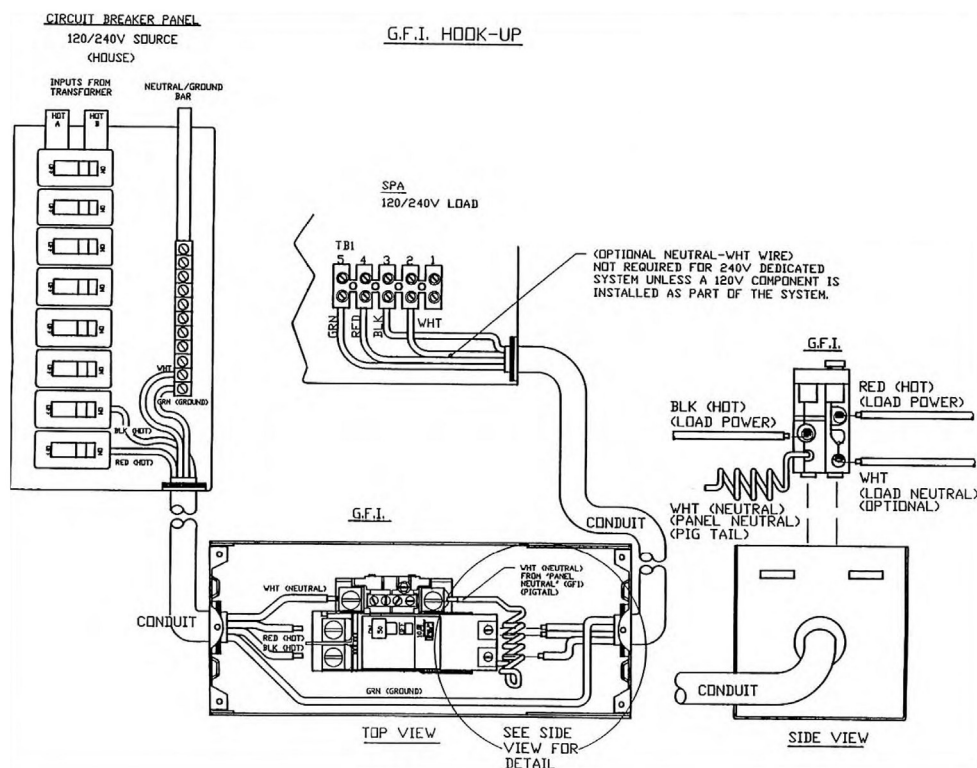
Connecting the Equipment Pack to Your Power Source (cont.)

NOTE: All spas and associated electrical components must be protected by Ground Fault Circuit Interrupters (G.F.C.I.) in accordance with the National Electrical Code, Article 680-42, January 1, 1994.

1. Have a licensed electrician run the required power line from the residential circuit breaker box to the G.F.C.I. disconnect. Wiring should follow national and local codes. The following wiring diagram shows an example of a G.F.C.I. hook-up (see figure 8).

NOTE: Always route wires through a proper electrical conduit to and from the G.F.C.I.

Figure 8: G.F.C.I. disconnect hook-up diagram



Notice in the diagram that all wires except the ground wire (green) must be routed through the G.F.C.I. including the neutral wire (white).

NOTE: Never bypass the neutral wire. If it is not included in the G.F.C.I. hook-up, then the current will be unbalanced and cause the G.F.C.I. to trip.

2. Run the wires from the G.F.C.I. to the equipment pack.
3. Connect wires to the spa electronics/control module.

DANGER! Do not turn on electrical power until all electrical work has been inspected.

Remote Equipment Only - Making Plumbing Connections

Plumbing connections and stub-outs are clearly labeled to correspond between the spa and equipment pack. Use PVC pipes & fittings that are "Schedule 40 Pressure".

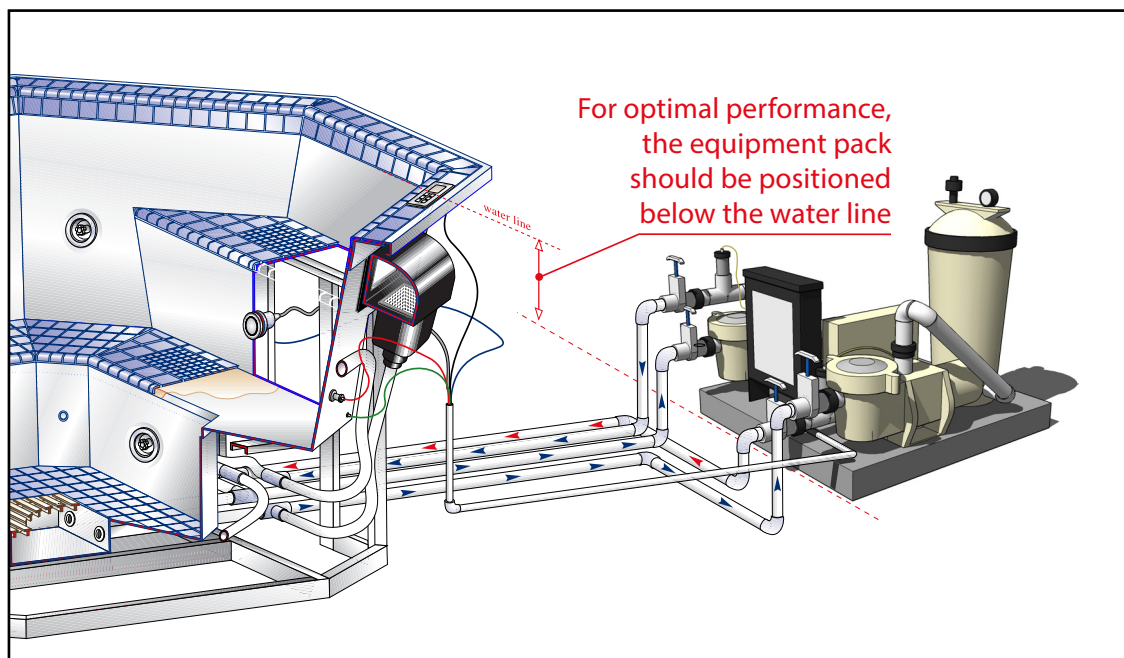
Pipe Diameter: **2.5" Filter / Jet Suction** **2.0" Filter / Jet Return**

NOTE: A two-pump spa will require eight plumbing connections (four at the spa and four at the equipment pack). A one-pump spa requires only four connections (two at each end).

1. Measure and cut the PVC pipes using a hacksaw or pipe cutter. Sand the inside and outside of the cut smooth.
2. Dry fit all pipes between the equipment pack and spa. Look at the layout to make sure there will not be any traps. Also, if the equipment pack is above the water line of the spa, you will need to install flapper-type check valves. Depending on how far above the water level the equipment pack is located - Please refer to local codes.

NOTE: Keep access area available for any future service work requirements.

Figure 9 : Example of plumbing layout between spa and equipment pack



NOTE: The standard stub-out location is beneath the spa steps.

3. Swab colored PCV cement primer generously over the pipe ends and fittings.
4. Swab blue PVC solvent glue over the primed areas at the pipe ends.
5. Slide the glued pipe ends into the fittings and twist slightly.
Hold for about 30 seconds, then release.
6. Allow all glued connections to set completely before filling the spa with water.

Remote Equipment Only - Connecting the Bonding and Light Wires

The bonding wire is an important safety feature of your spa. It grounds the spa to prevent stray electrical currents from injuring the spa occupants or damaging the spa. The light wire provides power to the low-voltage underwater light.

NOTE: All electrical work must be done by a licensed electrical contractor in strict accordance with the National Electrical Code and/or local codes.

To connect the bonding and light wires

1. Locate each labelled wire
2. Pull the bonding and light wires from the spa to the equipment through the conduit using a fish tape. See figure 10. (Below)

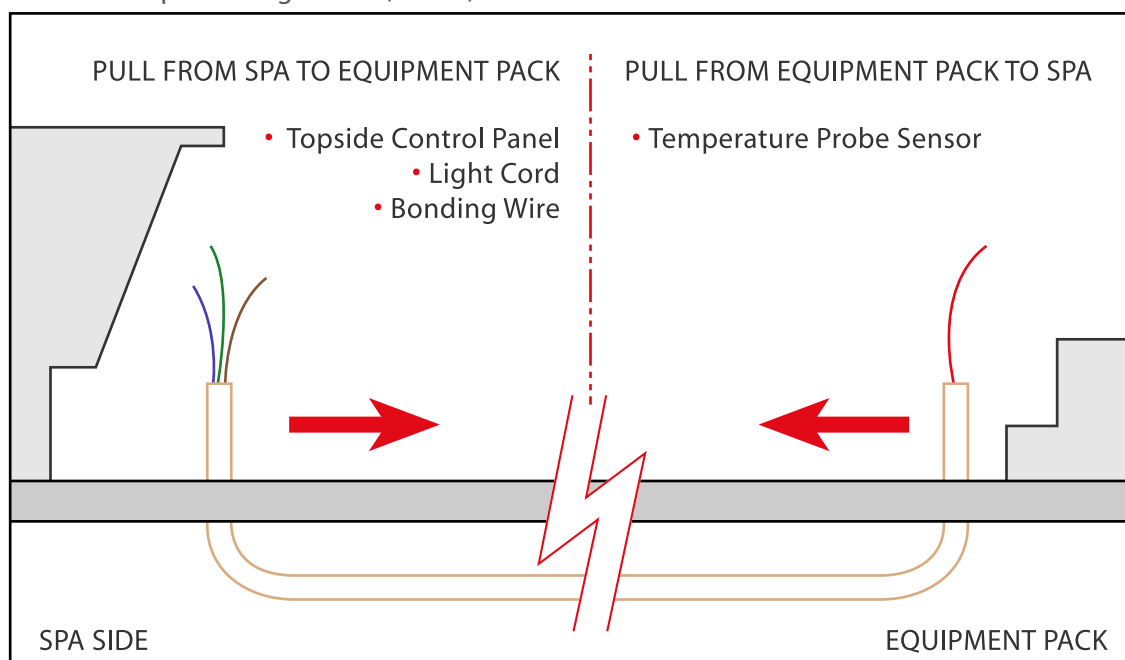


Figure 11 : Connecting the Bonding Wires (Below)

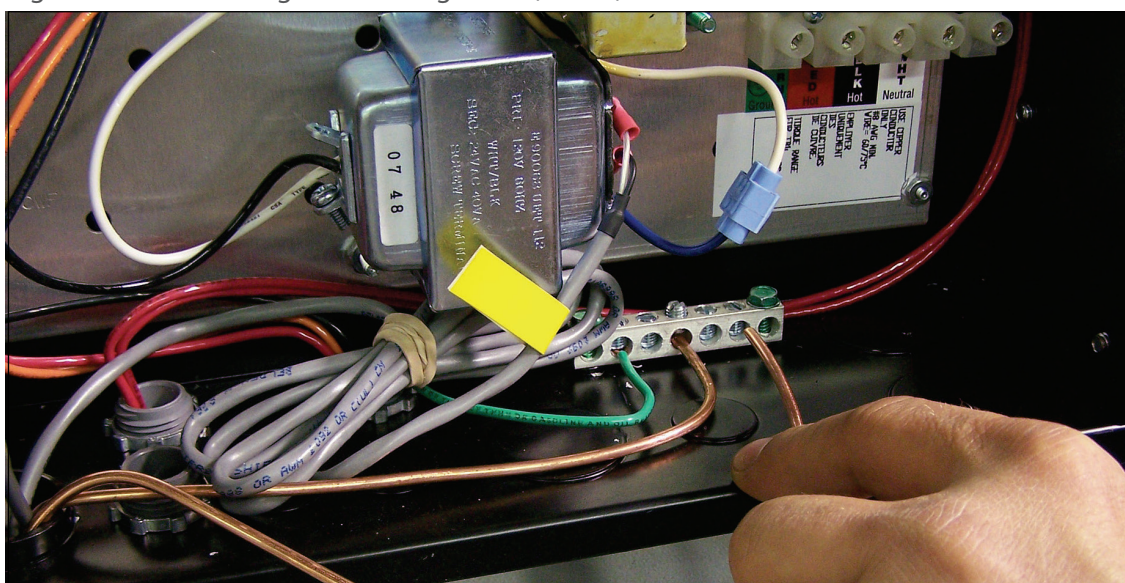
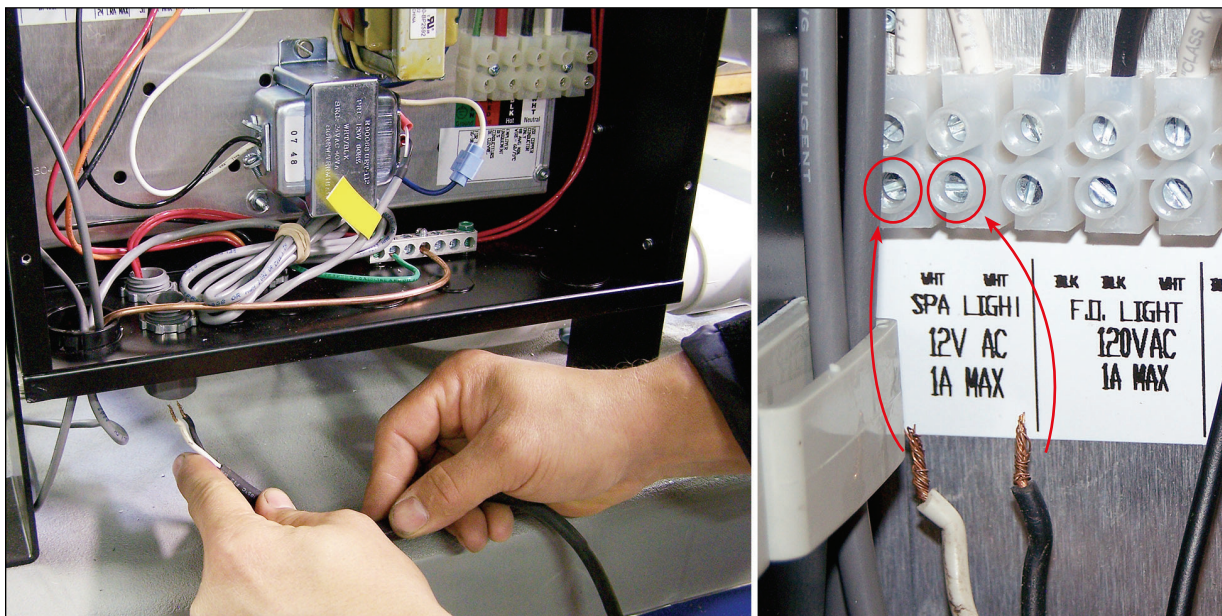


Figure 12 : Locating and Connecting Light Wire (Below)



Remote Equipment Only - Installing the Spa Side Control Panel

The included spa-side control panel allows you to operate the spa pump speed, water temperature, lights, and filter cycles. See the Operations and Maintenance Manuals for more information.

NOTE: Do not submerge the spa-side control panel in the water.

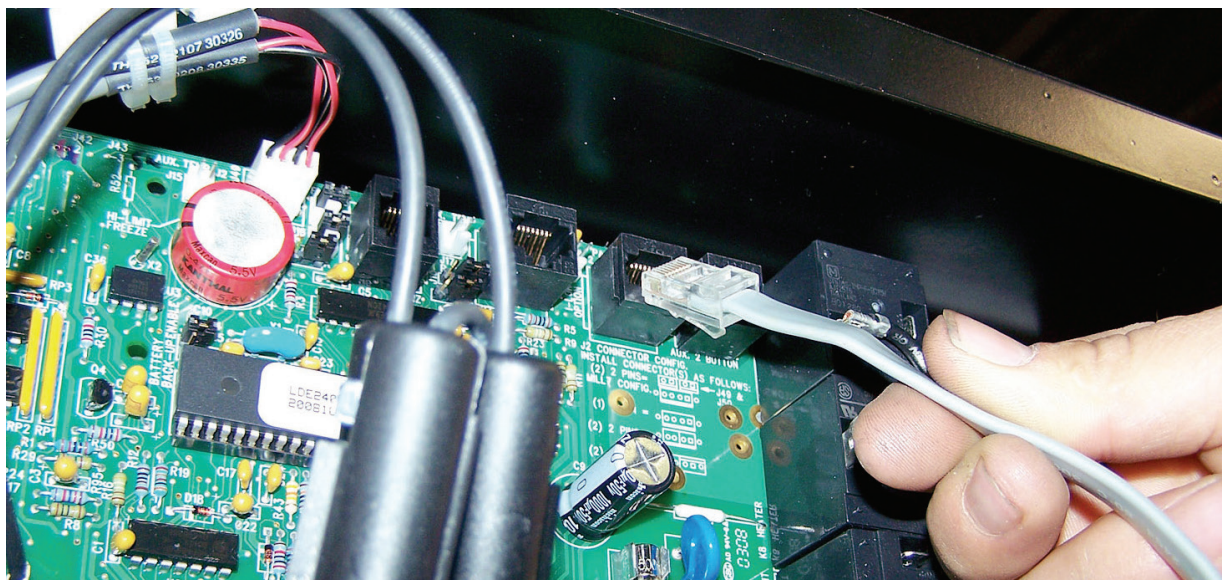
To install the spa-side control panel:

1. Mount the spa-side digital control panel into the top lip provided in the spa, making sure that the included wire is still long enough to reach the equipment pack.
2. Pull the spa-side control wires from the spa to the equipment pack through the electrical conduit using a fish tape.
3. Connect the wire to the Electronics/Control Module on the equipment pack. See (figure 13).

Cutting, splicing these wires or any other wires and cords render these components useless and voids the warranty.

WARNING: Do not turn on the spa until you have filled it with water and primed the pumps. See “testing the pumps” on page 27 for more details.

Figure 13 : Connecting the Spa-Side Control Panel Wire (Below)



For “On-Frame” Mounted Equipment ONLY

All plumbing, bonding, sensors, light and spa-side control will be already completed at the factory.

Only the supply power will need to be done in the field by a licensed electrical contractor.

Testing Your Spa Setup

Before you use your new spa, you should test the setup to make sure there are no electrical or plumbing problems. The following sections describe how to clean the spa, fill it with water, and prime the pump(s).

NOTE: Do not backfill the plumbing/conduit trench until after the spa has been successfully tested.

Cleaning the Spa

Before you fill the spa with water for the first time, clean and wash the entire vessel to remove any construction debris, dust, metal particles that may have accumulated during installation. Check to make sure no screws or nails have fallen through the floor grating and collected in the main drain, sump box, or pipes. Also check the skimmer recess and basket.

1. Remove any large particles from the spa using a wet/dry shop vacuum cleaner.
2. Clean the entire spa using the following methods:
 - For the stainless steel tub shell, use the included nylon-type “Scotch Brite” scrub brush (in a circular motion) with or without a mild abrasive cleaner.
 - For any tiles surface, use mild dish washing detergent or all-purpose surface cleaner.

WARNING: Do not use any abrasive cleaner on stainless steel or tiled surfaces, since they may damage the surface.

Filling the Spa with Water

1. Fill the spa with clean, potable water. You can use any iron-free water source to fill the spa. In many cases, it is easiest to use a regular garden hose.
2. Make sure the water level is at least one half (1/2) of the skimmer opening. This may take a while, depending on the size of your spa.

Testing the Pumps - On Skid Mounted Equipment

To prime the pumps, close the suction and return valves, then remove the strainer basin lid.



Figure 14 : Removing the strainer basin lid

Fully fill the pump basket. Re-secure the pump lid and open the valves. Turn the pump on. If pump does not prime in 30 seconds, repeat the above procedure.

NOTE: If the equipment pack contains two pumps, repeat the process.

Turning On the Spa for the First Time

Once the spa water level reaches the skimmer, you can turn on the pumps to test the water circulation.

1. On the digital control pad, press the Jets 1 Lo-Hi button (see figure 15)
2. If your equipment pack included a second pump, press the Jets 2 Hi button (see figure 15).

Figure 15 : Bradford Products spa-side control panel



The pumps should start and begin circulating water. It may take several hours for the water to heat up. Use the included spa cover to prevent energy loss from the water surface. This will also help the water heat up faster.

NOTE: See the Operations and Maintenance Manuals for important operating instructions and safety information prior to using your Bradford Spa for the first time. Do not enter the spa until you test the water chemical levels and bring the water into balance.

Testing the Pumps - On Frame Mounted Equipment

Make sure all valves are in the open position, with the spa filled with water. Open bleed valve on pump body until you get a good stream of water then close. Turn system on, pump should prime within 30 seconds,. If pump does not prime repeat procedure above.

Finishing the Installation

Once your spa installation (including plumbing and wiring) has been inspected and tested, you can fill the piping trench, covering the conduit and plumbing pipes.

NOTE: It is suggested to NOT backfill the vault or access area, as this will allow for easier maintenance or repair if necessary.

Instruction Card for M-2 and M-3 systems equipped with Deluxe Digital control panels.

Control Panel Pads

Temperature Adjustment (80°F–104°F)  

Press either pad once, and the LCD will display the set temperature, as well as the words “SET HEAT.” Each time either of these pads is pressed again, the set temperature will increase or decrease. After three seconds, the LCD will automatically display the current spa temperature.

Aux (button for optional equipment) 

This button NOT USED on our standard 1 or 2 pump system.

Light 

Your spa light has one setting. After 30 minutes, the light will automatically turn off.

Economy & Standard Modes 

Press this pad to switch between modes. Standard mode maintains the set temperature at all times. Economy mode heats the water only during filter cycles. See the Optional Filter Cycle Programming section for more heater options.

Jets 1 Lo-Hi 

The operating sequence for the pump is low speed, high speed, then off. If left running, the low speed will automatically turn off after 30 minutes; the high speed will turn off after 30 minutes. The low speed runs when the heater is turned on, when a filter cycle is activated, or when a freeze condition is detected. When the low speed turns on automatically, it cannot be deactivated from the panel; however, the high speed may be started. For single speed pump, pressing the 2nd button will reflect no change.

Jets 2 Hi 

This pad turns the spa's second set of jets on and off, if equipped. If left running, the jets will automatically turn off after 30 minutes.

Automatic Features

Preset Filter Cycles

Your spa will automatically filter itself twice each day. The low speed of the pump and the Ionizer (Typ.) will run the duration of each filter cycle.

Filter 1

The first filter cycle is automatically activated at 8:00 PM and operates the low speed of the pump and the Ionizer (Typ.) until 10:00 PM. Again, if the heat enable feature is on, the spa will heat to the set temperature in the economy mode. The blower will run for 30 seconds to clean out the air channel.

Filter 2

The second filter cycle is automatically activated at 8:00 AM and operates the low speed of the pump and the Ionizer (Typ.) until 10:00 AM. If the heat enable feature is on, the spa will heat to the set temperature in the economy mode.

System Programming

Setting the Time of Day

When the spa is first powered up, the words "SET TIME" will flash on the display.

To set the time, press **Time** **Mode Prog** then **▲** or **▼**. After **▲** or **▼** is pressed once, the time will begin changing in one-minute increments. Press either pad to stop the time from changing.

Press to enter your correct time into the **Mode Prog** system.

Optional Filter Cycle Programming

While you are not required to set filter cycles, if you want to change them, press **Time** **Mode Prog** **Mode Prog** within 3 seconds. "SET START FILTER 1" will appear on the display.

Press **▲** or **▼** to reset the filter start time.

When "SET HEAT" is on the display, press **▲** (on) to warm the water during filtering,

or press **▼** (off) to disable the heater. Press **Mode Prog** to see "SET STOP FILTER 1" and adjust the time with the or pads as done above.

Press **Mode Prog** to see "SET START FILTER 2" and proceed as above.

Pressing **Mode Prog** will enter the new filter cycle times into the system and display the current water temperature.

Locking the Panel

Press **Time** **≡** **▲** within 3 seconds. When locked, the display will show the temperature you have chosen, along with the lock symbol. All pads are frozen except the **Time** pad.

Unlocking the Panel

Press **Time** **≡** **▼** within 2 seconds. The lock symbol will disappear and all panel pads will work again.

Locking the Temperature

While setting your spa water temperature, after you have pressed **▲** or **▼**, press **Time** **≡** **▼** within 3 seconds to activate the lock. When locked, the center display will show the spa temperature along with the lock symbol.

Unlocking the Temperature

Press **▲** or **▼** then **Time** **≡** **▼** within 2 seconds.

Freeze Protection

If the high-limit sensor detects 40°F at the heater, then all equipment is automatically activated to provide freeze protection. This is a normal spa function; no corrective action is necessary. The equipment stays on until the sensor detects 45°F at the heater. Freeze protection is enabled regardless of the status of the spa. In colder climates, an optional additional freeze sensor may be added to protect against freeze conditions. See your dealer for details.

Diagnostic Messages

Message

Meaning: No message on display. Power has been cut off to the spa.
Action Required: The control panel will be disabled until power returns.
 Spa settings will be preserved for 30 days with a battery backup.

OH

Meaning: "Overheat" - The spa has shut down. Either the spa water has reached 112°F or the highlimit sensor has detected 118°F at the heater.
Action Required: DO NOT ENTER THE WATER. Remove the spa cover and allow water to cool. At 110°F, the spa should automatically reset. If spa does not reset, shut off the power to the spa and call your dealer or service organization.

FLO

Meaning: "Flow" (Flashing) - Flow of water is inhibited.
Action Required: Check and open flow valves. Check for correct water level. Clean filter.

FLO

Meaning: "Flow" (Not flashing) - A pressure switch has malfunctioned.
Action Required: Contact dealer or service organization.

COOL

Meaning: "Cool" - Water temperature is 20°F or more below the temperature you last set.
Action Required: No action required. Spa is functioning properly.

ICE

Meaning: "Ice" - Potential freeze condition is detected.
Action Required: No action required. The pump will automatically activate regardless of spa status.

Sni

Meaning: "Sensor 1" - Spa is shut down. High-limit sensor is not working.
Action Required: Contact your dealer or service organization.

Sni

Meaning: "Sensor 3" - Spa is shut down. Water temperature sensor is not working.
Action Required: Contact your dealer or service organization.



P/N DCM2&3D 12/15/99

Warning! Shock Hazard! No User Serviceable Parts.

Do not attempt service of this control system. Contact your dealer or service organization for assistance. Follow all owner's manual power connection instructions. Installation must be performed by a licensed electrician and all grounding connections must be properly installed.

1. **Read and follow all instructions.** Failure to follow these rules and the instructions could cause serious body and/or property damage.
2. **Limit your use of the spa to 10–15 minutes per session.**
3. **Always** keep a thermometer in the water to make sure that the temperature does not exceed 104°F. Bradford Products, LLC does not recommend spa water temperatures in excess of 104°F.
4. **Consult your physician about your safety and comfort before using the spa.**
High water temperatures and prolonged periods of use can raise internal human body temperatures excessively. High body temperatures affect people differently. Elderly persons, pregnant women, children, and anyone subject to heart disease, diabetes, abnormal blood pressure or any similar disorder should not use the spa unattended and without consulting a physician.
5. **Do not enter the spa/hot tub while under the influence of alcohol or drugs.**
The physiological effects of immersion in a spa/hot tub can produce rapid and dangerous changes in body condition when the user is under the influence of medications, drugs or alcohol. Hypothermia causes drowsiness. When alcohol consumption or use of medications is added, the potential for sleepiness (and drowning) increases.
6. **Do not allow unsupervised children to enter a spa/hot tub or the area in which it is installed.** Water turbulence and depth can be beyond the capabilities of some children. Physiological effects of heated, turbulent water can be hazardous to children. Allow children to use spa/hot tub only under close adult supervision.
8. **If symptoms of dizziness, nausea, or headache occur while in the spa/hot tub, get out as quickly as possible.** Cool the body by use of a cool shower, ice packs or cold towels immediately and seek medical attention if symptoms persist.
9. **Use spa/hot tub for physical therapy and to promote ease of injuries only at the direction of a physician.** Knowledge of what types of injuries or health conditions can be aided by a proper schedule (time and temperature) of spa or hot tub immersion should be obtained only from the physician who is treating the specific condition.
10. **Do not allow persons to block off water flow from the inlet jets within the spa/hot tub.** This may cause damage to the support equipment, cause water damage to the surrounding area, or create an electrical shock hazard.
11. **Read manufacturer's safety information provided with all optional equipment.**
12. **Use care when entering and exiting.** The wet surface of the spa can be slippery.
13. **Do not use electrically connected devices** such as a television, radio, stereo, lights, or telephones **within 5 feet of the spa while the spa is being used.** Lighting fixtures must not be located above or within 5 feet of the spa. If located within 10 feet of the spa, they must be on a circuit protected by GFCI (Ground Fault Circuit Interrupter). Make sure the spa and electrical equipment are properly grounded before use. (See "electrical" section).

Spa Cleaning & Maintenance

1. For the stainless steel tub shell, a nylon-type scrub sponge with or without a mild abrasive cleaner may be used. Some "stainless steel" cleaners contain chemicals that are corrosive to stainless steel or very aggressive abrasives. Cleaning products commonly used by building cleaning contractors include Zud, Bar Keepers Friend and Bon Ami.

NOTE: The tiled surface, although tough, can be damaged by abrasive cleansers and abrasive scrub sponges. Please make sure that harsh abrasives are not used on the tiled surface. A mild dishwashing detergent or surface cleaner will provide ample cleaning power.

2. At times, you may wish to drain the spa and refill with fresh water. If so, repeat the directions as outlined in "Filling the Spa with water" - page 27.

Equipment Maintenance

1. Controls: Refer to the operation and owner's manuals supplied with your spa for specific equipment maintenance instructions.
2. Pumps: Occasionally, inspect pumps and clean skimmer basket after the circulation pumps have been running regularly to assure water is filtered and sanitized properly.

Winterization

If the spa location is in a zone where temperatures reach below freezing (32°F / 0°C) and the vessel pumps are not circulating water, there is a strong possibility of water freezing in the plumbing lines and equipment. In this instance, the water must be fully drained and removed from the entire system.

When draining vessels in preparation for winterization care must be taken to remove any trapped water that may be left in plumbing lines. Once drained all orifices such as skimmers, jets, return inlets, main drain suctions, jet, suctions, pumps and filters should be sucked dry with a wet/dry vacuum to remove the risk of trapped water left in lines or system components to freeze. Failure to do so may result in plumbing and or equipment failure and is not covered under warranty.

It is recommended that a local pool/spa professional in your area be hired to perform this task as many different scenarios can come into play.

Adding Chlorine and/or "Shocking" The Spa Water

When you shock the spa or put chlorine into the spa it releases gas initially. If that gas gets trapped under the spa cover, it is possible over time that the built up gases can mar the surface of any exposed stainless steel. Therefore, it is recommended that when you add a shocking agent or chlorine to the spa water, to leave the spa cover off for a minimum of 15 minutes after adding. This time frame will let any gases that are created during the process to escape and also help to prevent foam build up occurring on the water surface.

To thoroughly mix the chlorine and shock treatment in the spa system, run the spa jets on high and continue to have full water circulation going when adding chemicals. Please refer to individual instructions provided with the chlorine and/or shock products for specific amounts and frequency.

For the proper disinfection and sanitation of the water, you will need to balance the interaction of pH, total alkalinity and calcium hardness.

chart 1: pH

Bradford Recommended Range: 7.4 - 7.6	
Low pH problems: Corrosive water - <i>pitting of concrete</i> - <i>metals dissolve</i> - <i>staining of walls</i> Non-Balance Problems - <i>chlorine loss</i> - <i>vinyl wrinkles</i> - <i>skin/eye irritation</i> Excessive sanitizer use	High pH problems: Scaling Water - <i>plugged filters</i> - <i>reduced circulation</i> - <i>cloudy pool</i> Non-Balance Problems - <i>chlorine inefficiency</i> - <i>skin/eye irritation</i> Decreased sanitizer efficiency

chart 2: Total Alkalinity

Bradford Recommended Range: 80 - 125 PPM	
Low total alkalinity problems: Corrosive Water - <i>pitting of concrete</i> - <i>metals dissolve</i> - <i>staining of walls</i> Non-Balance Problems - <i>pH bounce</i> Water too sensitive to change pH Hard to stabilize	High total alkalinity problems: Scaling Water - <i>plugged filters</i> - <i>reduced circulation</i> - <i>cloudy pool</i> Non-Balance Problems - <i>pH drifts upward</i> Water too resistant to change pH Difficult to adjust pH

chart 3: Calcium Hardness

Bradford Recommended Range: 175 - 250 PPM	
Low calcium hardness problems: Corrosive water - <i>etching of plaster</i> - <i>pitting of concrete</i> - <i>dissolving of grout</i> - <i>pitting of pool/spa deck</i> Unbalanced water	High calcium hardness problems: Scaling Water - <i>plugged filters</i> - <i>reduced circulation</i> - <i>cloudy water</i> - <i>heater inefficiency</i> Unbalanced water

chart 4: Sanitizer

Chlorine Ideal Range: 2.0 - 4.0
Bromine Ideal Range: 2.0 - 4.0

Cautions

1. **Do not allow** the use or operation of spa if suction grate fitting is missing, broken or loose.
2. Check spa temperature before each use. **Do not enter the spa if temperature is above 104°F.**
3. Secure spa area against unauthorized access in compliance to all safety codes.
4. Keep all breakable objects, carbon steel tools, fasteners and similar objects out of the spa area.
5. Spa should not be operated during severe weather conditions, ie. electrical storms, hurricanes, tornadoes.
6. Never place electrical appliances (telephone, radio, TV, portable AC or DC TV, etc.) within five feet (5') or within reach of bathers (whichever is greater) of the spa. Portable DC-TVs also have high voltage circuits and can cause severe shock and possible loss of life.
7. **DO NOT RUN PUMPS WITHOUT WATER FLOW** - Failure to operate pumps without water flow or sufficient flow, can result in pump and/or plumbing failure due to excessive heat and pressure and is not covered under warranty. This can also result in bodily injury.

Water Maintenance

Water conditions will need to be **tested regularly** with a spa test kit and maintained at the levels as outlined on page 34. Testing on a weekly or daily basis (when required) for a residential spa is brief and very simple. Water should be clean, clear and safe. A number of specialty chemical products are available, if needed, from your local supplier to control scale, stain, algae and foam.

Water Testing

Test the water with a spa test kit (or take a water sample to your dealer). Pool and spa dealers have a variety of test kits and chemicals to properly care for your new spa.

Total alkalinity should be maintained at 80 – 120 PPM. This helps to stabilize the pH, which should be maintained between 7.4 – 7.6. This level provides the best conditions for bather comfort, filtration and chemical effectiveness. Operating the spa above or below this level can cause extensive damage to the tub and support equipment and will void warranty. The sanitizer (bromine or chlorine) level should be maintained at levels recommended by the chemical manufacturer.

Copper/Silver Ionization Process

During the ionization process, an element gains and loses ions. An ion is an atom or group of atoms that contain an electrical charge, and usually has an equal number of protons and electrons. An atom contains a nucleus in the center of one or more negatively charged electrons orbiting around the outside. Ionization works by passing a low-voltage direct current through a copper/silver anode positioned in the water circulation system. The low voltage charge causes other atoms of the anode to lose electrons. They become positive ions that attempt to flow across the space between the anodes and are carried into the water by the force of flow. Once copper/silver ions are released, they create a natural algacide and bactericide. See owner's manual for proper setup and installation. Ensure that water is properly balanced as per above parameters.

Stains

If you suspect that the spa water contains metals (iron, copper, etc.), or is high in minerals (well water), it is a good idea to use a sequestering agent to help prevent stains. Shock treatment is occasionally required after heavy bather loads. However, pool shock treatments and poor water management can cause stainless steel corrosion. Shock treatments should only be considered when necessary to maintain sanitation and should be performed using recommended procedures. For example, adding chlorine in the center of a water stream so that rapid thorough mixing occurs.

A water temperature of 104°F should never be exceeded.

Rust - Ferric Oxide

Over the years of creating small and very large stainless steel spas and pools, Bradford has received a small number of communications reporting "...my spa (pool) is rusting!"

Virtually every single communication of this nature is directly traceable to a lack of clean, IRON FREE feed and make up water, poor water management or carbon steel debris such as fasteners. Potable water with above average IRON concentration is so common in the United States of America that little mention is ever made by public and private water utilities.

IRON and other minerals in water can precipitate onto any pool surface including the stainless steel, ceramics and grout and cause undesirable surface discoloration, commonly known and seen as RUST. More localized staining could be caused by debris left behind by contractors or other items that fall into the pool, such as fasteners and tools made of carbon steel.

IRON in water is taken for granted as just another mineral. Responsibility for removal of IRON from the water becomes the province of the user or utility subscriber. U.S. water suppliers must provide information on the water chemistry and dissolved solids levels. This information can be obtained by calling the utility or possibly through their website.

HEATING spa or pool water can increase the rate and density of the IRON deposits many times more than the cold water rate. In many cases, the problem persists only at temperatures above 70°F.

RUST deposits ACCUMULATE because there is IRON in the water. For a number of rather technical reasons, these accumulations tend to gather in certain areas, or coalesce. As water is added and evaporates, the concentration of IRON increases. They are left behind to settle out of the water and onto the stainless steel, tile, plastic or any other surface which can provide an acceptable environment for the reddish brown deposits to form. When IRON is exposed to oxygen and moisture it becomes FERRIC OXIDE, commonly known and seen as RUST.

Your stainless steel spa or pool is not rusting, moreover it is the accumulated IRON deposits in the water turning to RUST (Ferric Oxide).

SOLUTION:

1. Prior to filling with water make sure all metal debris is removed from the vessel, such as left behind screws, nails, (even bobby-pins) from the interior of the spa, skimmer basket, plumbing lines, pump basket(s) and filters.
2. Initial filling of spa or pool should be from an IRON-FREE source. If this is not possible then repeated cleaning and care of the filters should be performed any time the filter or sand surface turns a reddish brown color. Filling a spa from a clear pool on site is quite helpful for start-up.
3. A new spa or pool filling, depending on the condition of the local water, may require the filters to be cleaned and back flushed hourly. Some potable waters appear clear in a drink glass but are saturated with dissolved and suspended solids.
4. Additional or makeup water should always be settled out and FREE OF IRON. Get additional filtering or water treatment for the spa if need be.

CONCLUSION - A correctly installed and bonded stainless steel spa or pool should be filled with clean and IRON FREE water. Failure to provide the correctly balanced water, as indicated herein, is not in the best interest of any spa/pool's service life or the owner's quest for a clean bathing environment.

Treatment for Removing Metal Accumulation

Metals are getting into your water from any one or more of the following sources:

It is possible that metals are in the water to begin with as it comes out of your water source. Along with that, during new construction or building around your pool or spa, some screws or nails may have fallen into the vessel. Also metal shavings or small particles from cutting or screwing metal studs can accumulate in the pool or spa. If the above mentioned metal particles are not completely removed during cleaning of the pool or spa prior to filling with water, or if your water feed is not free of metals, over time the metal will start precipitating out (turning into a solid form). This can appear to the viewer that the pool or spa is rusting. We have found time and time again that screws and nails that have been left in the piping runs if not removed will corrode and keep depositing metal into the body of water. Typically the metal deposits will accumulate along the tile line and begin to stain the grout—making it appear that the stainless steel is rusting.

BEFORE FILLING YOUR POOL OR SPA, BE SURE TO CLEAN AND WASH THE ENTIRE VESSEL, MAKING SURE NO CONSTRUCTION DEBRIS, SCREWS, NAILS, ETC. HAVE PASSED THROUGH THE FLOOR GRATING AND COLLECTED IN THE MAIN DRAIN, SUMP BOX AND/OR THE PIPE RUNS. ALSO CHECK INSIDE THE SKIMMER RECESS AND SKIMMER BASKET.

To further help with maintaining a beautiful pool or spa, Bradford provides a bottle of Naturally Free Metal & Scale Control with your start up kit, along with a TAYLOR “K-2005” water chemistry test kit suitable for both residential and/or commercial pools and spas.

Residential pool and/or spa water should be tested for Bromine, pH, total alkalinity and calcium hardness regularly. The water should be in balance before starting the pump system. Also take the time to read through the pool and spa water chemistry book provided with your TAYLOR “K-2005” test kit. This will tell you how and what is needed to bring your water into balance.

As for the Metal & Scale Control, please follow the directions on bottle for proper dosage for your water.

IF YOU HAVE WELL WATER, POOR WATER FROM A COMMUNITY WELL, OR POOR CITY WATER, CONTINUE AND USE THIS PRODUCT AS PART OF AN ONGOING MAINTENANCE TIME TABLE OR AS NEEDED.

Any and all products can be purchased from Bradford in the future or from your local pool and spa store.



Appendix A : Electrical Requirements

This appendix includes the electrical requirements for all of the outdoor equipment packs sold by Bradford Products. The following table lists the requirements for one and two pump systems with electric heaters, 5.5 kW and 11 kW.

Table 5 : Electrical requirements for electrical heaters

Configuration:	Requirements
BRD 155 & BRD 155F One pump system with a 5.5 kW electric heater	<ul style="list-style-type: none"> • 240 volt 2 hp two-speed pump • 5.5 kW electric heater <p>Requirement:</p> <ul style="list-style-type: none"> • 20 amp service – 240 volt, four wire (two hots, neutral,ground) to control circuit. • 30 amp service – 240 volt, three wire (two hots, ground) to electric heater
BRD 255 & 255F Two pump system with a 5.5 kW electric heater	<ul style="list-style-type: none"> • 240 volt 2 hp single-speed pump • 240 volt 2 hp two-speed pump • 5.5 kW electric heater <p>Requirement:</p> <ul style="list-style-type: none"> • 30 amp service - 240 volt, four wire (two hots, neutral, ground) to control circuit • 30 amp service - 240 volt, three wire (two hots, ground) to electric heater
BRD 111 & BRD 111F One pump system with a 11 kW electric heater	<ul style="list-style-type: none"> • 240 volt 2 hp two-speed pump • 11 kW electric heater <p>Requirement:</p> <ul style="list-style-type: none"> • 20 amp service – 240 volt, four wire (two hots, neutral,ground) to control circuit. • 60 amp service – 240 volt, three wire (two hots, ground) to electric heater
BRD 211 & BRD 211F Two pump system with a 11 kW electric heater	<ul style="list-style-type: none"> • 240 volt 2 hp single-speed pump • 240 volt 2 hp two-speed pump • 11 kW electric heater <p>Requirement:</p> <ul style="list-style-type: none"> • 30 amp service – 240 volt, four wire (two hots, neutral,ground) to control circuit. • 60 amp service – 240 volt, three wire (two hots, ground) to electric heater

The following table lists the requirements for one and two pump systems with gas/propane heaters.

Table 6 : Electrical requirements for gas/propane heaters

Configuration:	Requirements
BRD 1G one pump system with gas heater	<ul style="list-style-type: none"> • 240 volt 2 hp two-speed pump • 150,000 Btu natural or propane gas heater <p>Requirement:</p> <ul style="list-style-type: none"> • 20 amp service – 240 volt, four wire (two hots, neutral, ground) to control circuit. • 15 amp service – 120 volt, three wire (two hots, ground) to gas heater
BRD 2G Two pump system with gas heater	<ul style="list-style-type: none"> • 240 volt 2 hp single-speed pump • 240 volt 2 hp two-speed pump • 150,000 Btu natural or propane gas heater <p>Requirement:</p> <ul style="list-style-type: none"> • 30 amp service - 240 volt, four wire (two hots, neutral, ground) to control circuit • 15 amp service - 240 volt, three wire (two hots, ground) to gas heater



01/16/06
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BRD300 SYSTEM WIRING DIAGRAM

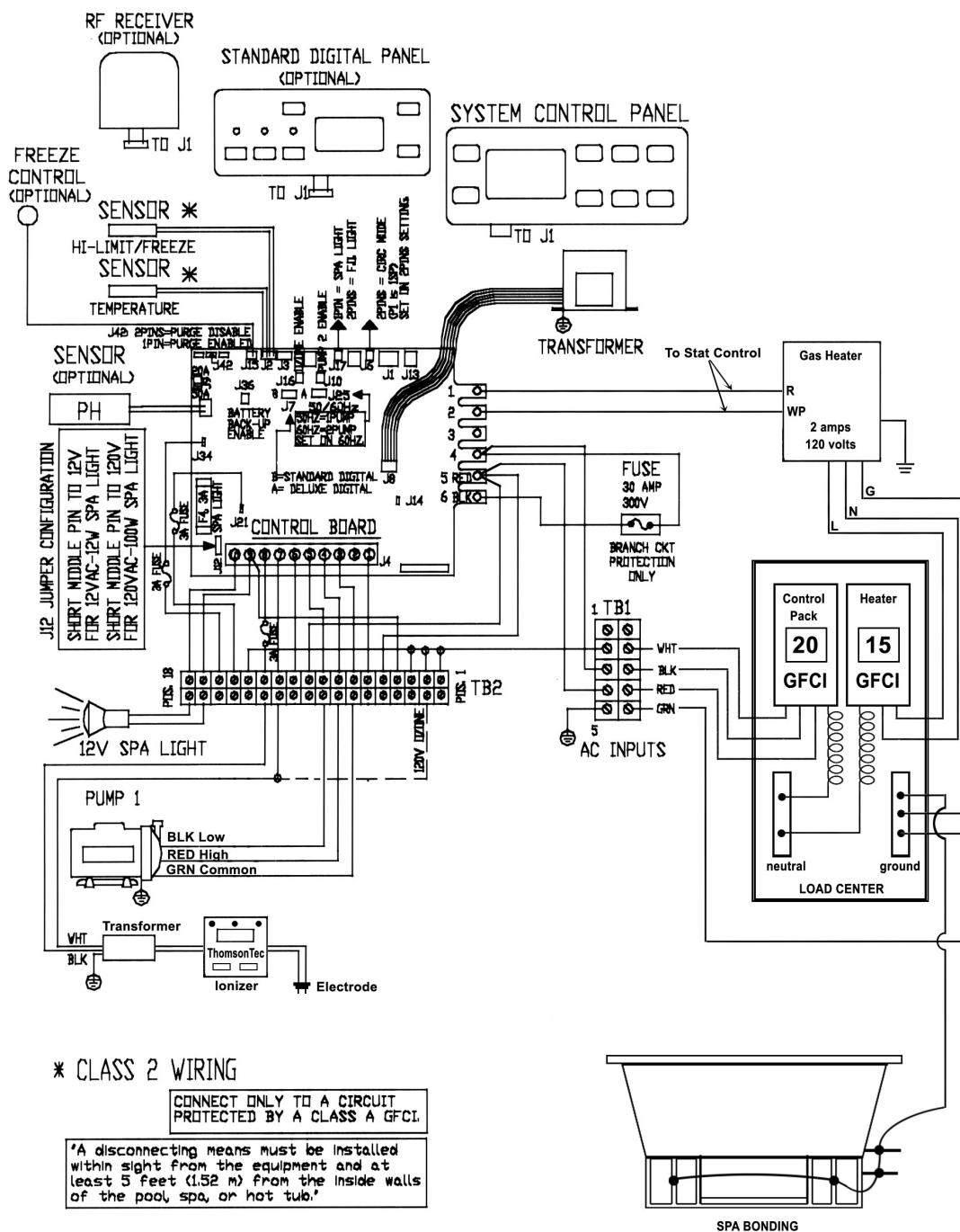
BRD1G - Sub System

One Pump System with a gas heater

- (1) 240 volt 2hp two speed
- (1) 150,000 BTU natural or propane gas heater

Requirement:

- (1) 20 amp service - 240 volt, 4 wire (2 hots, a neutral and a ground) to control circuit
- (1) 15 amp service - 120 volt to gas heater





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BRD300 SYSTEM WIRING DIAGRAM

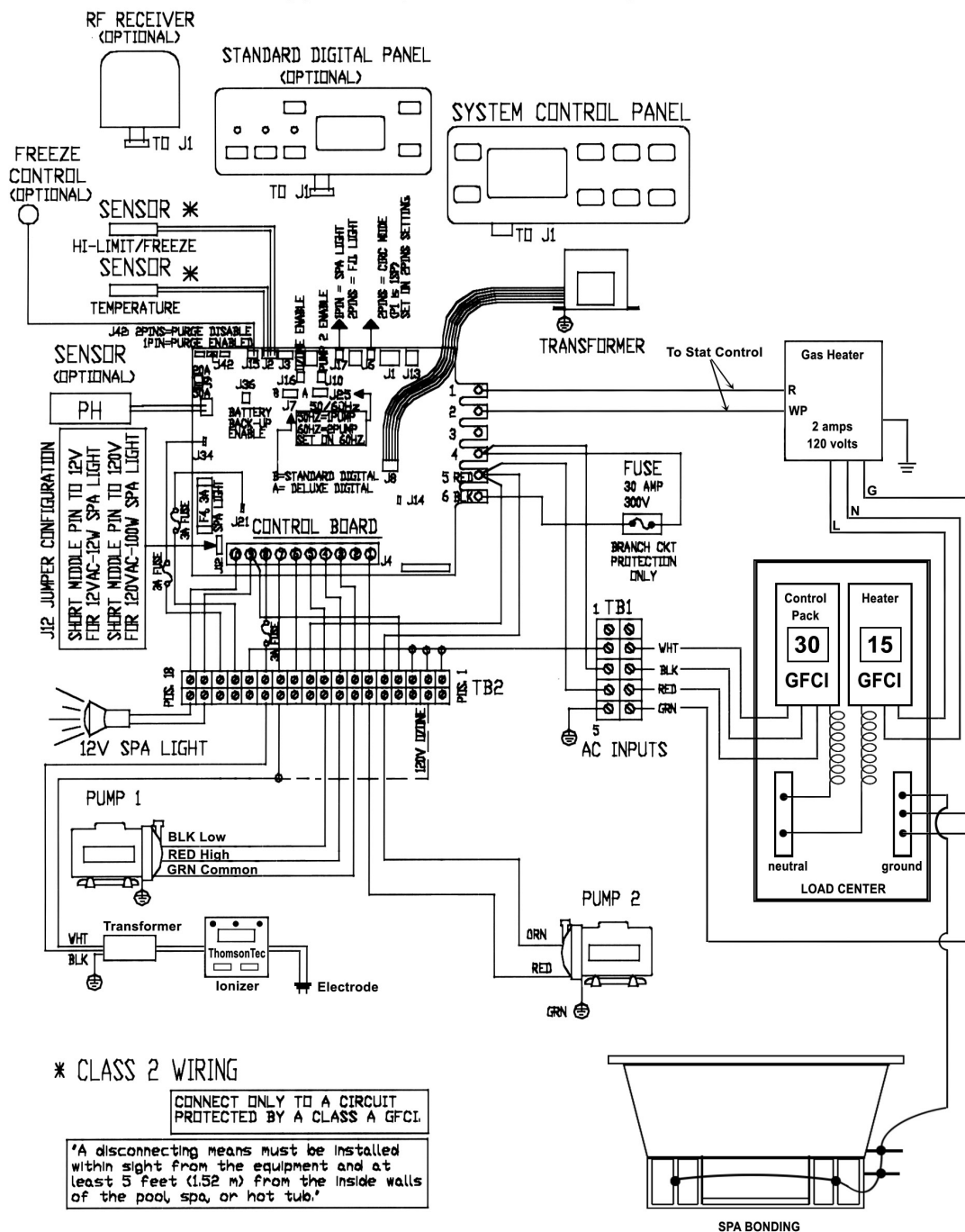
BRD2G - Sub System

Two Pump System with Gas Heater

- (1) WFE-8 240 volt 2hp single speed
- (1) WFDS-8 240 volt 2hp two speed
- (1) 150,000 BTU natural or propane gas heater

Requirement:

- (1) 30 amp service - 240 volt, 4 wire (2 hots, a neutral and a ground) to control circuit
- (1) 15 amp service - 120 volt to gas heater





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BRD300 SYSTEM WIRING DIAGRAM

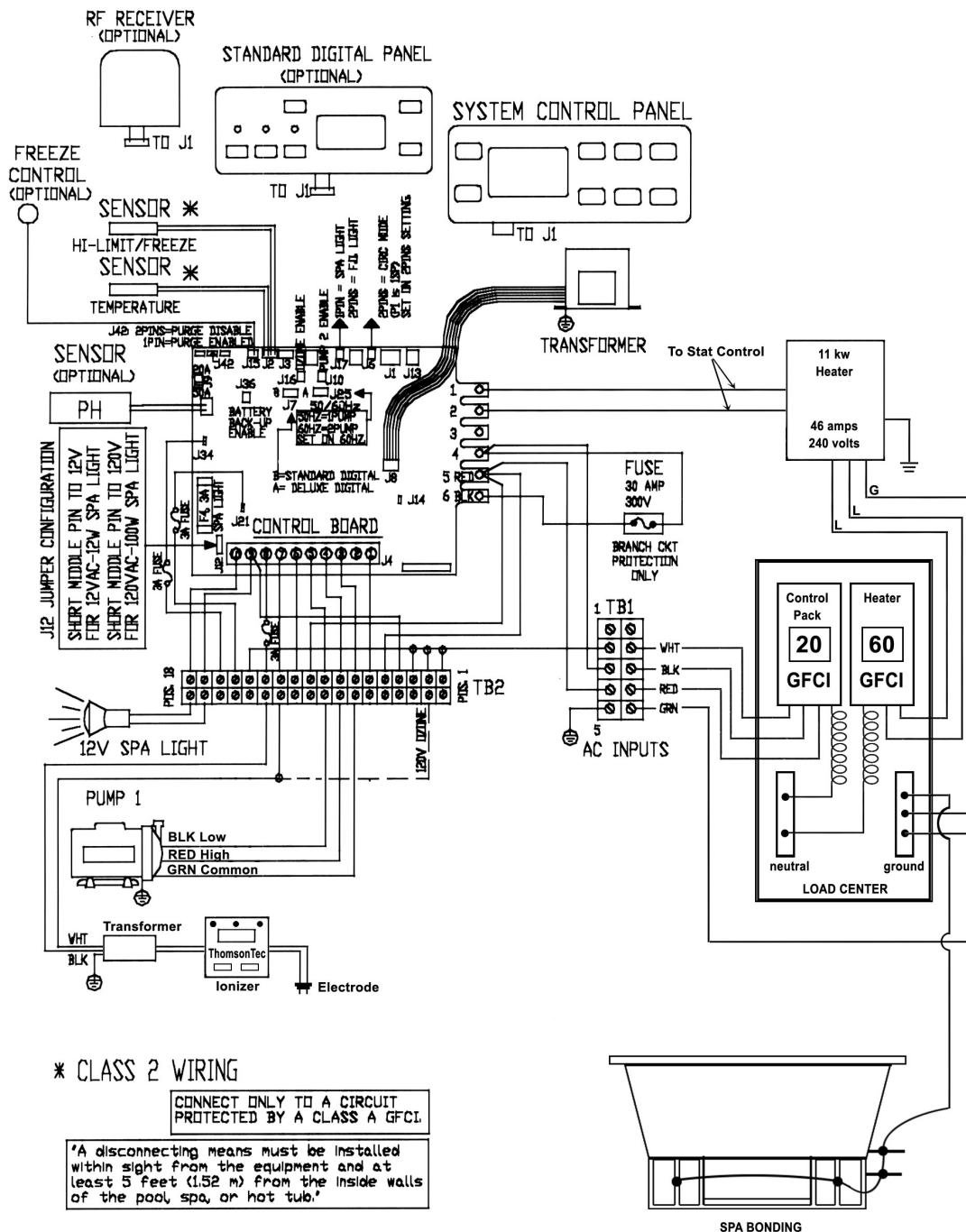
BRD111 (sub system), BRD111F (frame mounted)

One Pump System with a 11kw electric heater

- (1) 240 volt 2hp two speed
- (1) 11 kw electric heater

Requirement:

- (1) 20 amp service - 240 volt, 4 wire (2 hots, a neutral and a ground) to control circuit
- (1) 60 amp service - 240 volt, 3 wire (2 hots & a ground) to heater





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BRD300 SYSTEM WIRING DIAGRAM

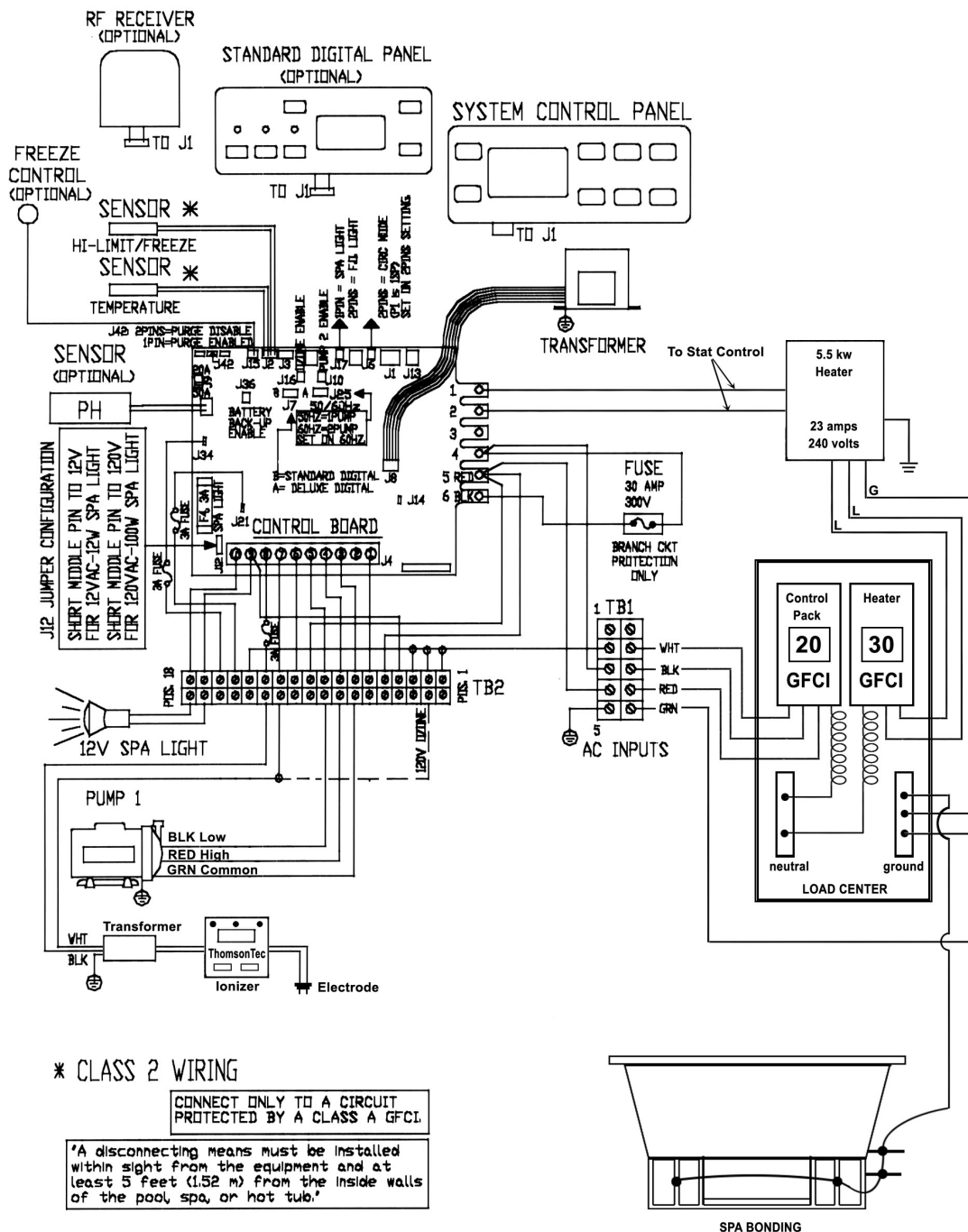
BRD155 - Sub System

One Pump System with a 5.5kw electric heater

- (1) 240 volt 2hp two speed
- (1) 5.5 kw electric heater

Requirement:

- (1) 20 amp service - 240 volt, 4 wire (2 hots, a neutral and a ground) to control circuit
- (1) 30 amp service - 240 volt, 3 wire (2 hots & a ground) to heater





BRD300 SYSTEM WIRING DIAGRAM

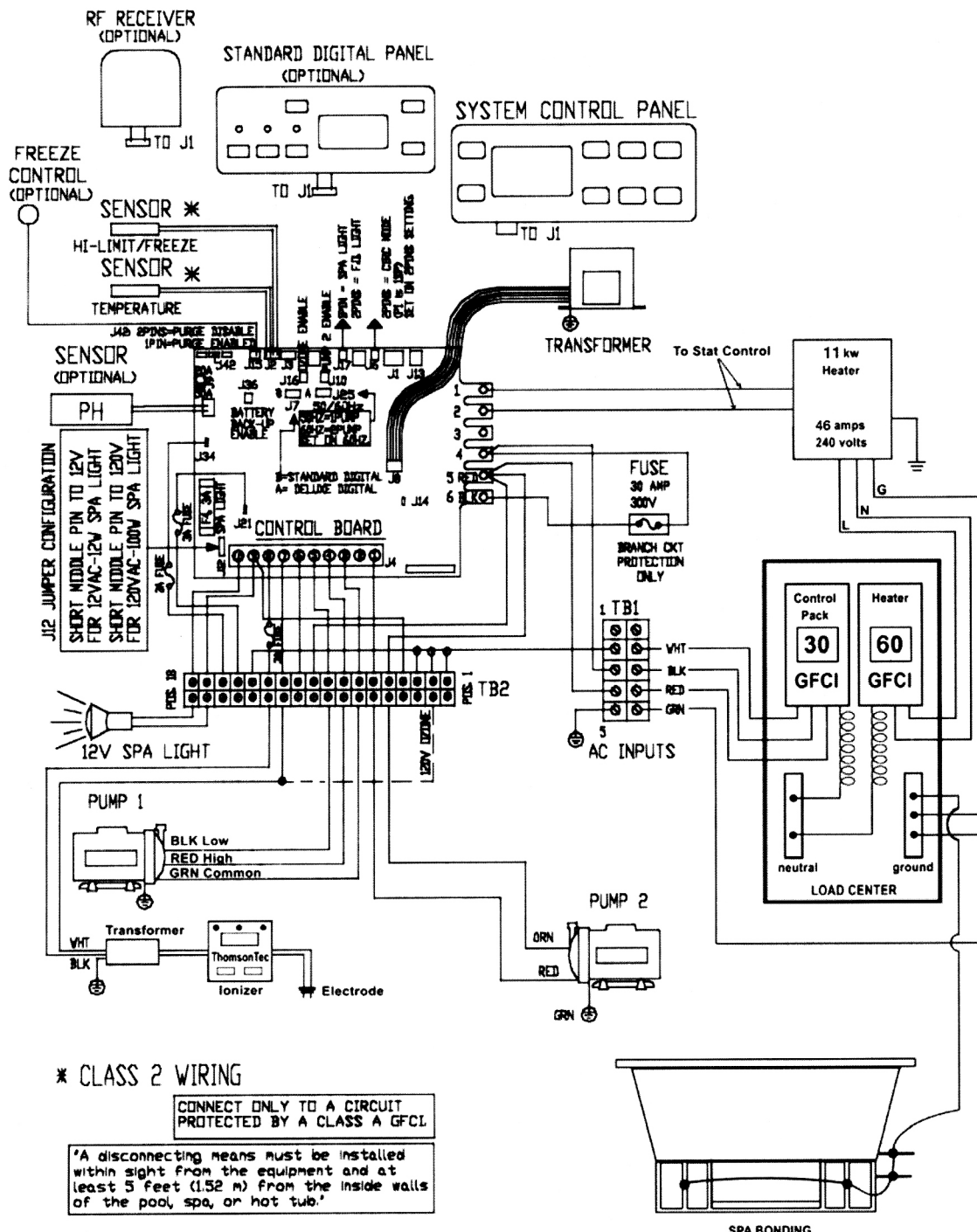
BRD211 - Sub System & BRD 211F Frame Mounted

Two Pump System with a 5.5kw electric heater

- (1) 240 volt 2hp single speed
- (1) 240 volt 2hp two speed
- (1) 11 kw Coates electric heater

Requirement:

- (1) 30 amp service - 240 volt, 4 wire (2 hots, a neutral and a ground) to control circuit
- (1) 60 amp service - 240 volt, 3 wire (2 hots & a ground) to heater





BRD300 SYSTEM WIRING DIAGRAM

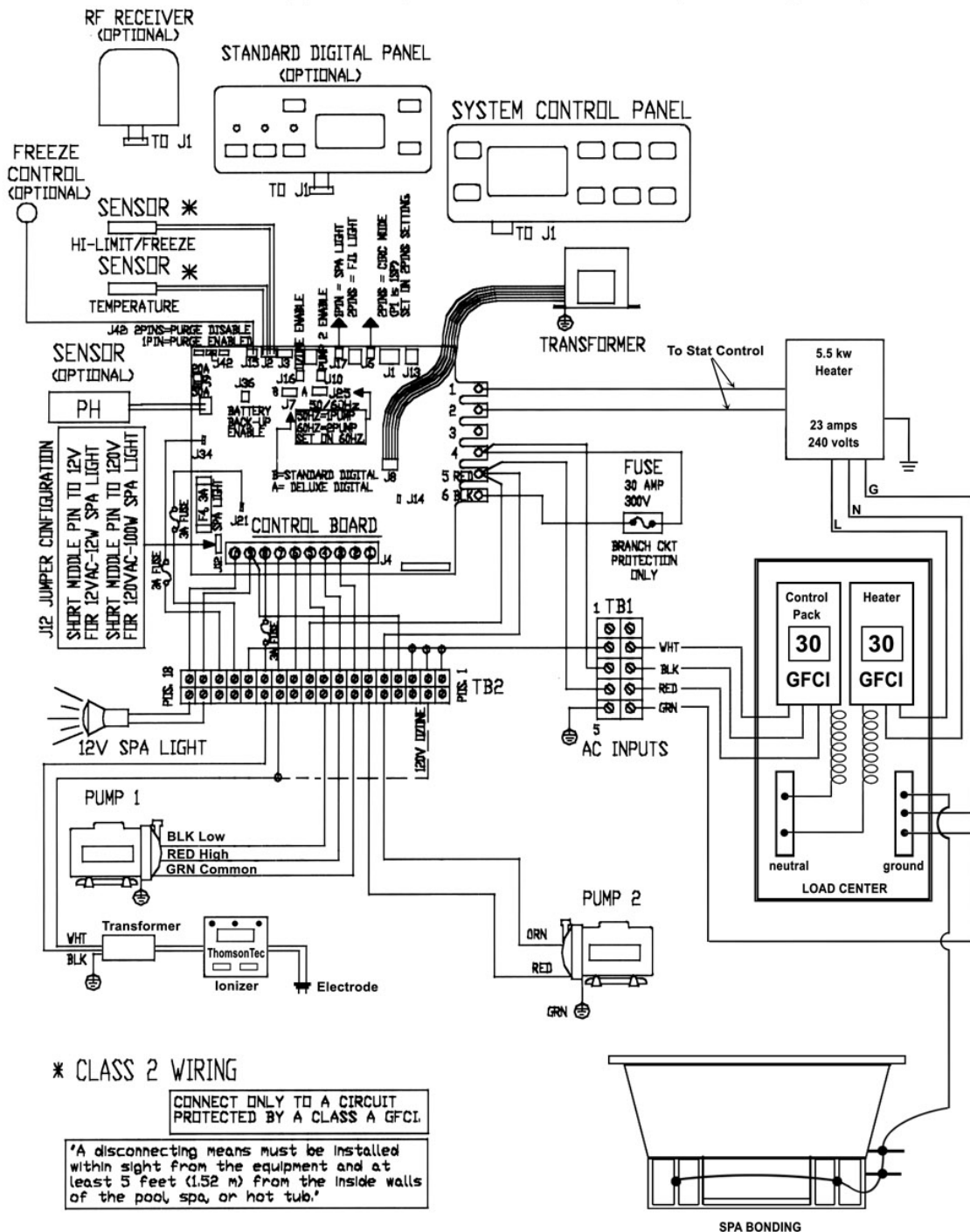
BRD255 - Sub System

Two Pump System with a 5.5kw electric heater

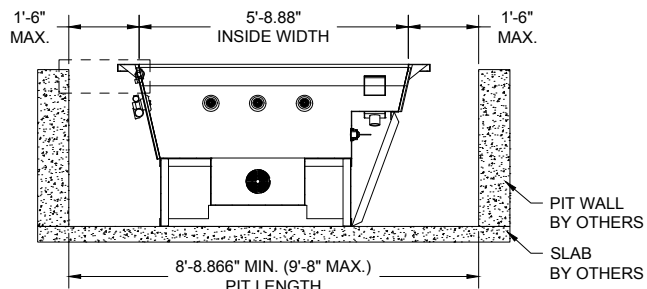
- (1) WFE-8 240 volt 2hp single speed
- (1) WFDS-8 240 volt 2hp two speed
- (1) 5.5 kw Coates electric heater

Requirement:

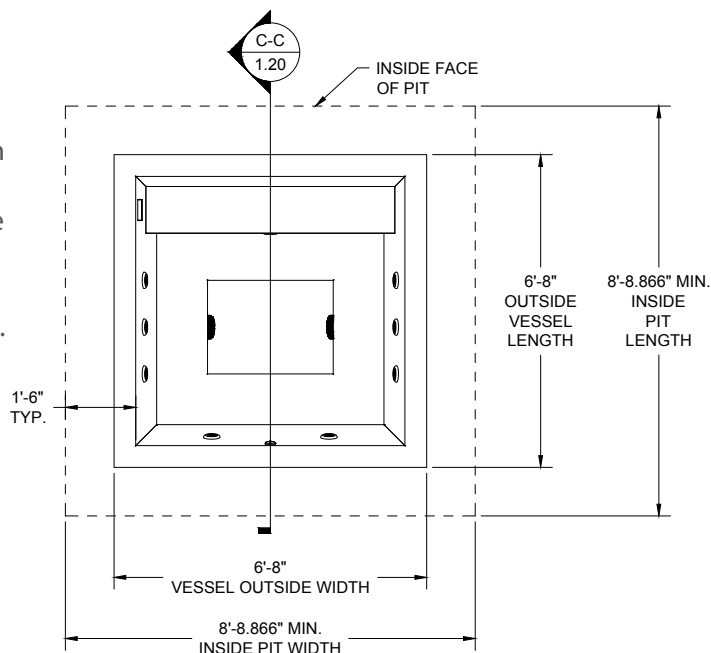
- (1) 30 amp service - 240 volt, 4 wire (2 hots, a neutral and a ground) to control circuit
- (1) 30 amp service - 240 volt, 3 wire (2 hots & a ground) to heater



Obviously every installation of a residential spa will vary based on the individual location and installation type. However Bradford **recommends** maintaining 1'-6" (18 inches) of clearance from the **Pit Wall** to the **top bend** under the spa lip. (see below) This allows for access to the plumbing lines and exterior of the spa shell, should any future maintenance issues arise.



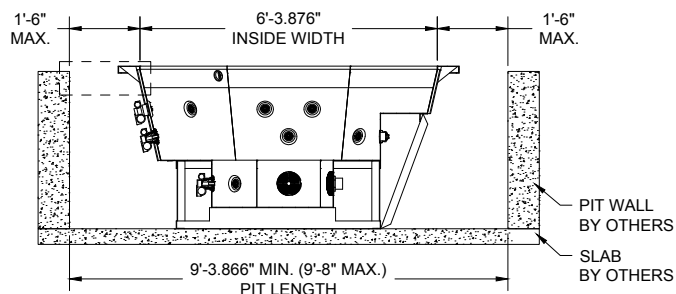
C-C
1.20
PIT SECTION



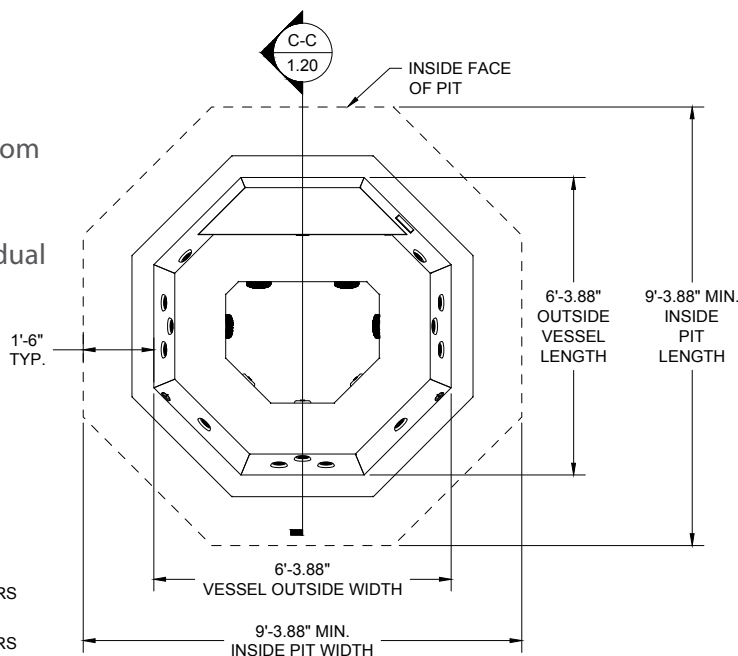
PIT PLAN

Non Square Shape Spas

The same 1'-6" (18 Inches) of clearance is recommended for all Non Square models and custom shape spas. The installer or yourself can determine the actual shape of the pit based upon your spa footprint. Depth of pit wall will be based on individual installation requirements along with cantilevered finish deck treatments.



C-C
1.20
PIT SECTION
SCALE: 1/2"=1'



PIT PLAN
SCALE: 1/2"=1'

I. Warranty and Indemnification

Products manufactured by Bradford Products, LLC are warranted to be free of defects in material and workmanship at the time of shipment. The stainless steel will not corrode to perforation for 25 years. When tile is applied and adhered by Bradford Products, LLC using our proprietary method, Bradford warrants the tile adhesion of Dal-Tile keystone mosaic's for 5 years. Any other tile or stone will be treated on a case by case basis after researching the spec's from the manufacturer of the product. The tile will be grouted using a stain resistant epoxy grout. Bradford Products, LLC will provide repair or replacement of warranty products at its sole option and in accordance with the warranty certificate issued with the product at the time of sale. Bradford Products, LLC makes no other warranties. In no event shall Bradford Products, LLC be liable for indirect, special incidental, or consequential damages arising out of abuse or misuse of any Bradford Products, LLC product. Purchaser, Contractor and Owner shall indemnify, defend, and hold Bradford Products, LLC harmless from and against all losses resulting from liability for damages due to bodily injury, personal injury, and property damage caused by a negligent act, omission, or willful misconduct of Purchaser, Contractor or Owner, any of their agents, employees, or guests. Bradford Products, LLC's liability for actual damage from any cause whatsoever, and regardless of the form of action (whether in contract, tort, product liability, or otherwise), shall be limited to the price paid to Bradford Products, LLC.

II. What Is Not Covered

(A) This warranty is necessarily limited because Bradford Products, LLC manufactures only some components. Bradford Products, LLC has no control over the builder's construction and installation work, has no control over owner's operation and maintenance practices, and has no control over adverse local conditions, or acts of God. For these reasons, this warranty does not cover failure, damage, wear or corrosion due to improper installation, mishandling in the shipping process or in the installation process, improper maintenance or use; improper use of chemicals in and around the stainless steel water vessel or stainless steel water feature; not using potable water; freezing, flooding, acid rain, improper grounding or bonding, or other acts of God; abuse or misuse by owner or any third party which could affect the grout material and does not cover any cracking of the tile that may occur from such mishandling; failure to follow all local building code rules and regulations; or site problems. All of the above conditions are beyond our control and not a condition for warranty. Due to the properties of stainless steel, vessel failure after installation may be from (1) low pH (2) oxidizer damage (3) electrolysis or (4) stray electrical currents. These conditions are beyond our control and not a condition for warranty. Use of salt/chlorine generators of any type, if not properly monitored, may adversely affect the water chemistry and could void this warranty.

(B) This warranty does not cover any labor or other costs necessary to effect removal and replacement of a warranted stainless steel water vessel or stainless steel water feature, or for the cost of water or chemicals lost or replaced as a result of such removal and replacement.

(C) Bradford Products, LLC is not responsible for any incidental or consequential damages, including injury to person or property, resulting from any condition confirmed by Bradford Products, LLC to be a valid claim under this warranty or for owner's loss of use resulting, directly or indirectly, from such a condition.

(D) Any component, material, accessory or other item not of Bradford Products, LLC's manufacture, even if supplied by Bradford Products, LLC, is not warranted by Bradford Products, LLC. In the event of any defect of any such equipment, purchaser's rights shall be only those provided by the manufacturer. Such items include, but are not limited to, skimmers, drains, jets, lights, ladders, filters, pumps and motors, brominators, electronic controllers, gauges and meters.

(E) This warranty is void if payment is not made under contract/invoice terms.

III. Claim Procedure

(A) In order to claim any rights under Bradford Products, LLC's limited warranty, the owner should (1) contact the vendor of the stainless steel water vessel or stainless steel water feature, describe the problems and request an inspection and (2) send a letter promptly with photos and written description to Sales Department, Bradford Products, LLC, 2101 Enterprise Dr. NE, Leland, NC 28451. Please identify the item of manufacture and describe its condition as well as the date of installation and by whom it was installed.

(B) Upon receipt of a properly filed and confirmed claim, Bradford Products, LLC will inform the Original Retail Purchaser as to the disposition of the warranty claim within 30 days after either (1) its receipt of the item in the stated claim at its factory for inspection and confirmation of the stated claim or (2) inspection and confirmation of the stated claim by an authorized Bradford Products, LLC representative at the site. Freight charges for any material returned to Bradford Products, LLC must be prepaid by sender.

(C) In the event the customer requests an examination of the vessel by Bradford employees, the customer will provide a valid credit card account so that Bradford's time and expenses will be paid in the event the condition does not fall under Bradford's limited warranty.

IV. The foregoing warranty specifically excludes warranties of merchantability or fitness for any purpose, as well as other express and implied agreements, representations, and warranties of any nature. There are no warranties which extend beyond those specifically stated above. Full payment is required to keep warranty coverage in force.

V. Bradford Products, LLC may modify these terms at any time by providing reasonable notice to Purchaser. These terms and conditions together with Bradford Products, LLC price quote constitute the entire agreement between the parties irrespective of any additional or different terms proposed by Purchaser in its purchase order, confirmation, acknowledgment or contract and these terms are deemed incorporated in any contract or order confirmation.⁴

VI. Arbitration/Venue/Choice of Law

The law governing this agreement shall be the laws of the State of North Carolina and any and all disputes under this agreement/warranty shall be submitted to binding arbitration under the laws and under the auspices of the American Arbitration Association (AAA). All such arbitrations shall take place in Wilmington, North Carolina, United States of America, unless otherwise agreed in writing.

Customer Record

Use this area to record all spa equipment information and serial numbers.

Spa Information

Model Name:

Serial Number:

Date of Purchase (Delivery):

Dealer:

Dealer Address:

Dealer Phone Number:

Equipment Pack Information

Equipment Pack Configuration Name (see Appendix A):

Filter Pump Serial Number:

Jet Pump Serial Number:

Electronics/Control Module Serial Number:

Heater Serial Number:

Ionizer Serial Number:

Filter Type:

Electrical Information (see manufacturing label)

Volts:

Amps:

Warranty Registration

(please print clearly)

Invoice #:

Model:

Color:

Date of Purchase (Delivery):

Dealer Information

Name:

Address:

City:

State:

Zip:

Phone # - (include area code):

Customer Information

Name:

Address:

City:

State:

Zip:

Phone # - (include area code):

I have read and accept the terms of my warranty.

Customer Signature

Date



Please return form to: **Bradford Products, LLC**
2101 Enterprise Drive NE
Leland, NC 28451
Attn: Cindy

