

MiniMax[®] CH

POOL & SPA HEATERS

OPERATION & INSTALLATION MANUAL

⚠ WARNING

FOR YOUR SAFETY - READ BEFORE OPERATING

Warning: If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life. For additional free copies of this manual; call (800) 831-7133.



To
Consumer
Retain For
Future
Reference

U.S. Patent Numbers
6,295,980
5,318,007 - 5,228,618
5,201,307 - 4,595,825

⚠ WARNING

Warning: Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

For Your Safety

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or other appliances.

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Introduction

MiniMax CH Pool and Spa Heaters

Congratulations on your purchase of a MiniMax CH high performance heating system. Proper installation and service of your new heating system and correct chemical maintenance of the water will ensure years of enjoyment. The MiniMax CH is a compact, lightweight and efficient gas fired high performance pool and spa heater that can be directly connected to schedule 40 PVC pipe and has a built-in top. The MiniMax CH is a millivolt heater and has a self sustaining pilot and requires NO external power source.

IMPORTANT NOTICES

...For the installer and operator of the MiniMax CH pool and spa heater. The manufacturer's warranty may be void if, for any reason, the heater is improperly installed and/or operated. Be sure to follow the instructions set forth in this manual. If you need any more information, or if you have any questions regarding to this pool heater, please contact Pentair Pool Products, Inc. at (800) 831-7133.

These heaters are designed for the heating of swimming pools and spas, and should never be employed for use as space heating boilers, general purpose water heaters, in non-stationary installations, or for the heating of salt water.

⚠ CAUTION

OPERATING THIS HEATER CONTINUOUSLY AT WATER TEMPERATURE BELOW 68° F. WILL CAUSE HARMFUL CONDENSATION AND WILL DAMAGE THE HEATER AND WILL VOID THE WARRANTY.

Do not use the heater to protect pools or spas from freezing if the final maintenance temperature desired is below 68° F. as this will cause condensation related problems.

CODE REQUIREMENTS

The installation must conform with local codes or in the absence of local codes with the latest National Fuel Gas Code, ANSI Z223.1, and the latest edition of the National Electrical Code, NFPA 70.

Installation in Canada to be made in accordance with the latest CAN/CGA-B149.1 or .2 and CSA C22.1 Canadian Electric Code, part 1.



This instruction manual provides operating instructions, installation and service information for the MiniMax CH high performance heater. The information in this manual applies to the MiniMax CH 150, 200, 250, 300, 350, and 400 natural gas and propane (LP) models.

It is very important that the owner/installer read and understand the section covering installation instructions, and recognize the local and state codes before installing the MiniMax CH. History and experience has shown that most heater damage is caused by improper installation practices.

WARRANTY INFORMATION

The MiniMax CH pool heater is sold with a limited factory warranty. *Specific details are described on the warranty registration card which is included with the product.* Return the warranty registration card after filling in the serial number from the rating plate inside the heater.

Pentair Pool Products' high standards of excellence include a policy of continuous product improvement resulting in your state-of-the-art heater. We reserve the right to make improvements which change the specifications of the heater without incurring an obligation to update the current heater equipment.

PRODUCT IDENTIFICATION

To identify the heater, see rating plate on the inner front panel of the heater. There are two designators for each heater, one is the Model Number and the other is the Heater Identification Number (HIN).

a. Model Number:

Example: 400

1st through 3rd character indicated: Input rating (Btu/hr) X 1000

b. Heater Identification Number (HIN):

The following example simplifies the identification system.


| | | | | | |
|-----|-----|----|-------|-----|-------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| HTR | 400 | CH | Blank | N M | Blank |

- 1) **HTR** : Heater
- 2) **(150, 200, 250, 300, 400)** : Input rating (Btu/hr) X 1000
- 3) **CH** : MiniMax CH
- 4) **Blank** : Standard Model
- 5) **N M** : Gas type (Natural gas) & Ignition Device
- 6) Options :
 - Blank**: Standard Model
 - ASME**: ASME Certified (Bronze Headers)
 - ASHI**: ASME Certified Bronze Header & High Altitude Rating
 - HALT**: High Altitude Rating
 - CAN**: Canadian Compliance
 - CANH**: Canadian Compliance and High Altitude

Operation

SAFETY RULES

1. Spa or hot tub water temperatures should never exceed 104° F (40° C). A temperature of 100° F (38° C) is considered safe for a healthy adult. Special caution is suggested for young children.
2. Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness which could lead to unconsciousness and subsequently result in drowning.
3. Pregnant women beware! Soaking in water above 102° F (39° C) can cause fetal damage during the first three months of pregnancy (resulting in the birth of a brain-damaged or deformed child). Pregnant women should stick to the 100° F (38° C) maximum rule.
4. Before entering the spa or hot tub, the user should check the water temperature with an accurate thermometer. Spa or hot tub thermostats may err in regulating water temperatures by as much as 4° F (2.2° C).
5. Persons with a medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain their physician's advice before using spas or hot tubs.
6. Persons taking medication which induce drowsiness, such as tranquilizers, antihistamines or anticoagulants should not use spas or hot tubs.

 WARNING

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of control system and gas control which has been under water.


MINIMAX CH MILLIVOLT LIGHTING/OPERATION-NATURAL GAS & PROPANE**FOR YOUR SAFETY: READ BEFORE LIGHTING****⚠ WARNING**

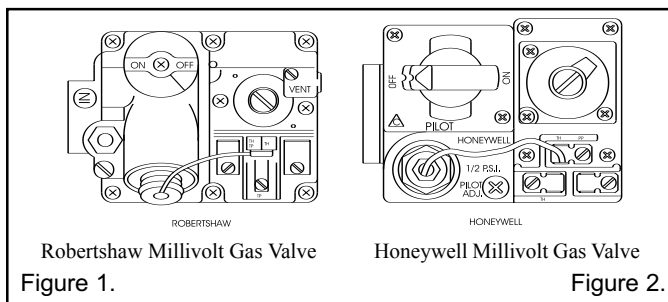
If you do not follow these instructions exactly, a fire or explosion may result causing personal injury, loss of life and property damage.

Since propane gas is heavier than air, escaping propane will accumulate and remain at ground level. Do not attempt to light the heater. If you suspect a propane leak, lighting the heater can result in a fire or explosion which can cause personal injury, death, and property damage.

- A. This heater is equipped with a pilot which must be lighted manually. When lighting the pilot, follow these instructions exactly.
 - B. **BEFORE LIGHTING** smell all around the heater area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any heater.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- C. If you cannot reach your gas supplier, call the Fire Department.
 - D. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it. Call a qualified service technician. Forced or attempted repair may result in a fire or explosion.
 - D. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of the control system and any gas control which has been under water.

LIGHTING INSTRUCTIONS



1. **STOP!** Read the safety information above.
2. Set the thermostat to the lowest setting.
3. Turn off electric power to the heater.
4. Push in gas control knob slightly and turn clockwise  to "OFF".
7. Push the control knob all the way and hold in. Immediately light the pilot with Presslite matchless ignition system by pressing the red igniter button (located at the panel next to the gas valve). Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 4 through 7.



Gas control knobs shown in "OFF" position.

NOTE

Knob cannot be turned from "Pilot" to "OFF" unless knob is pushed in slightly. **DO NOT FORCE.**

5. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
6. Push in gas control knob slightly and turn counterclockwise  to "Pilot".
8. Turn knob on gas control counterclockwise  to "ON".
9. Replace the control access door.
10. Set the thermostat to the desired setting.

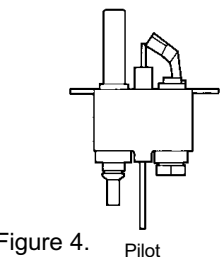
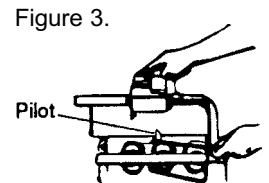



Figure 4. Pilot

TO TURN OFF GAS TO HEATER

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the heater if service is to be performed.
3. Remove control access door.
4. Push in gas control knob slightly and turn clockwise  to "OFF". **Do not force.**
5. Replace control access door.

OPERATING (CONTROLS)

Dual Temperature Control System

For convenience and economy all MiniMax CH heaters are equipped with two thermostats on the front of the heater control panel; see Figure 5.

THERMOSTAT KNOB STOPPER

Each thermostat is equipped with a mechanical stop that can be locked or unlocked with use of a screwdriver to prevent temperatures in excess of that desired by the user; see Figure 6.

The maximum setting can be adjusted by loosening the screw "A" and turning the stopper dial to desired maximum setting. Lock the setting by tightening the screw. The Mechanical stop is under the knob. Ensure that the knob is stopping at the correct position when the knob is rotated clockwise from a lower temperature position. (See Thermostat Adjustment.)

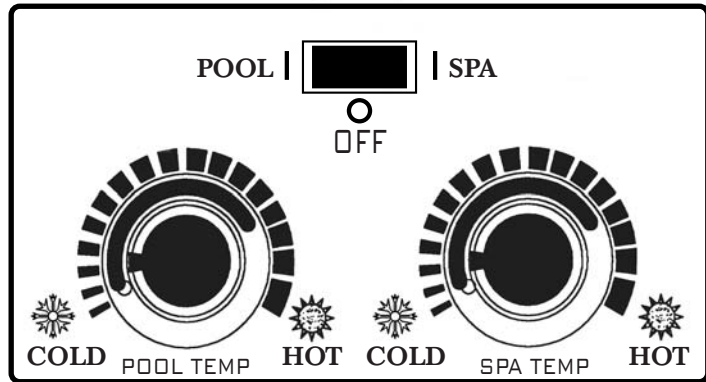


Figure 5.

NOTE

To eliminate error due to piping heat losses, measure pool temperature with an accurate thermometer directly at the pool or spa.

THERMOSTAT ADJUSTMENT

The knob with locking feature eliminates the need for constant thermostat adjustments. Set the knob pointer to the desired pool or spa temperature.

If further adjustment is needed, rotate the knob until the desired temperature is obtained. This knob position corresponding to your desired maximum pool or spa temperature may now be preset (locked) by the knob stopper which prevents the knob from being turned beyond the maximum temperature you set.

POWER (THERMOSTAT SELECT) SWITCH

The Pool/Off/Spa switch allows the heater to be turned off when heating is not desired.

1. "Pool" position - Maintains selected pool temperature.
2. "Off" position - Heater will not come on regardless of drop in pool or spa temperature.
3. "Spa" position - This allows separate control of spa water temperature or an alternate lower pool temperature.

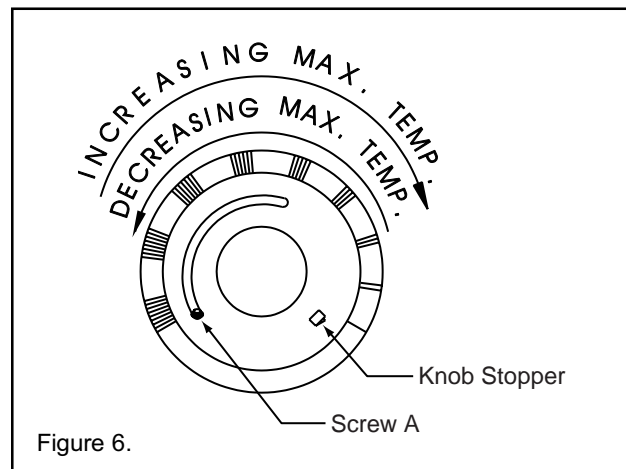


Figure 6.

Maintenance

MAINTENANCE INSTRUCTIONS

It is recommended that you check the following items at least every six months and at the beginning of every swimming season.

1. Examine the venting system. Make sure there are no obstructions in the flow of combustion and ventilation air.
2. Visually inspect the main burner and the pilot burner flame. The normal color of the flame is blue. When flame appears yellow, burners should be inspected and cleaned; see Figure 8.
3. Keep the heater area clear and free from combustibles and flammable liquids.

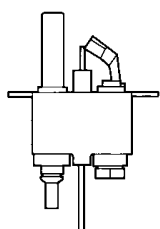


Figure 7.

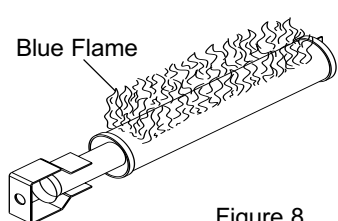


Figure 8.

⚠ CAUTION

REMOVE THE FLOW VALVE ASSEMBLY WHEN DRILLING THE HOLE TO INSTALL A PRV. OTHERWISE, YOU WILL DRILL INTO THE VALVE ASSEMBLY.

Pressure Relief Valve

In some installations, a pressure relief valve (PRV) is required on the MiniMax CH heater. To install a PRV, carefully drill a 3/8 in. hole in center of 3/4 in. NPT port (on main header) being careful to drill only thru wall at bottom of 3/4 in. NPT port and no deeper—now thread in the 3/4 NPT PRV. (*Sold separately.*)

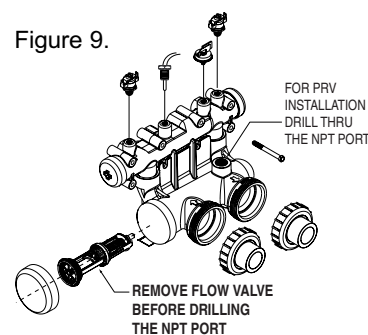


Figure 9.

ENERGY SAVING TIPS

1. If possible, keep pool or spa covered when not in use. This will not only cut heating costs, but also keep dirt and debris from settling in the pool and conserve chemicals.
2. Reduce the pool thermostat setting to 78° F. or lower. This is accepted as being the most healthy temperature for swimming by the American Red Cross.
3. Use an accurate thermometer.
4. When the proper maximum thermostat settings have been determined, tighten the thermostat knob stopper.
5. Set time clock to start circulation system no earlier than daybreak. The swimming pool loses less heat at this time.
6. For pools that are only used on the weekends, it is not necessary to leave the thermostat set at 78° F. Lower the temperature to a range that can be achieved easily in one day. Generally, this would be 10° F. to 15° F., if pool heater is sized properly.
7. During the winter or while on vacation, turn the heater off.
8. Set up a regular program of preventative maintenance for the heater each new swimming season. Check heat exchanger, controls, burners, operation, etc.

SPRING AND FALL OPERATION

If the pool is being used occasionally, do not turn the heater completely off. Set the thermostat down to 65° F. This will keep the pool and the surrounding ground warm enough to bring the pool up to a comfortable swimming temperature in a shorter period of time.

WINTER OPERATION

⚠ CAUTION

OPERATING THIS HEATER CONTINUOUSLY AT WATER TEMPERATURE BELOW 68° F. WILL CAUSE HARMFUL CONDENSATION AND WILL DAMAGE THE HEATER AND WILL VOID THE WARRANTY.

If the pool won't be used for a month or more, turn the heater off at the main gas valve. For areas where there is no danger of water freezing, water should circulate through the heater all year long, even though you are not heating your swimming pool. The MiniMax CH should not be operated out doors at temperatures below 0° F. for propane and -20° F. for natural gas. Where freezing is possible, it is necessary to drain the water from the heater. This may be done by opening the drain valve located at the inlet/outlet header (see Figure 9.) allowing all water to drain out of the heater. It would be a good practice to use compressed air to blow the water out of the heat exchanger. (*See additional notes under Important Notices in Introduction on page 3.*)

CHEMICAL BALANCE

POOL AND SPA WATER

Your Pentair Pool Products pool heater was designed specifically for your spa or pool and will give you many years of trouble free service provided you keep your water chemistry in proper condition.

Three major items that can cause problems with your pool heater are improper pH, disinfectant residual, and total alkalinity. These items, if not kept properly balanced, can shorten the life of the heater and cause permanent damage.

CAUTION

Heat exchanger damage resulting from chemical imbalance is not covered by the warranty.

WHAT A DISINFECTANT DOES

Two pool guests you do not want are algae and bacteria. To get rid of them and make pool water sanitary for swimming - as well as to improve the water's taste, odor and clarity - some sort of disinfectant must be used.

Chlorine and bromine are universally approved by health authorities and are accepted disinfecting agents for bacteria control.

WHAT IS A DISINFECTANT RESIDUAL?

When you add chlorine or bromine to the pool water, a portion of the disinfectant will be consumed in the process of destroying bacteria, algae and other oxidizable materials. The disinfectant remaining is called chlorine residual or bromine residual. You can determine the disinfectant residual of your pool water with a reliable test kit, available from your local pool supply store.

You must maintain a disinfectant residual level adequate enough to assure a continuous kill of bacteria or virus introduced into pool water by swimmers, through the air, from dust, rain or other sources.

It is wise to test pool water regularly. Never allow chlorine residual to drop below 0.6 ppm (parts per million). The minimum level for effective chlorine or bromine residual is 1.4 ppm.

pH - The term pH refers to the acid/alkaline balance of water expressed on a numerical scale from 0 to 14. A test kit for measuring pH balance of your pool water is available from your local pool supply store; see Table 1.

Table 1. pH Chart

| | | |
|---------------|----------|-------------------|
| Strongly Acid | Neutral | Strongly Alkaline |
| 0 1 2 3 4 5 6 | 7 8 9 10 | 11 12 13 14 |

Muriatic Acid has a pH of about 0. Pure water is 7 (neutral). Weak Lye solution have a pH of 13-14.

RULE: 7.4 to 7.6 is a desirable pH range. It is essential to maintain correct pH, see Table 2.

If pH becomes too high (over alkaline), it has these effects:

1. Greatly lowers the ability of chlorine to destroy bacteria and algae.
2. Water becomes cloudy.
3. There is more danger of scale formation on the plaster or in the heat exchanger.
4. Filter elements may become blocked.

If pH is too low (over acid) the following conditions may occur:

1. Excessive eye burn or skin irritation.
2. Etching of the plaster.
3. Corrosion of metal fixtures in the filtration and recirculation system, which may create brown, blue, green, or sometimes almost black stains on the plaster.
4. Corrosion of copper in the heater, which may cause leaks.
5. If you have a sand and gravel filter, the alum used as a filter aid may dissolve and pass through the filter.

CAUTION: Do not test for pH when the chlorine residual is 3.0 ppm or higher, or bromine residual is 6.0 ppm or higher. See your local pool supply store for help in properly balancing your water chemistry.

RULE: Chemicals that are acid lower pH. Chemicals that are alkaline raise pH.

Table 2. pH Control Chart

| | | | | | |
|-------------------------------------|-----|----------|---------|----------|-------------|
| 6.8 | 7.0 | 7.2 | 7.4 7.6 | 7.8 | 8.0 8.2 8.4 |
| Add Soda, Ash or Sodium Bicarbonate | | Marginal | Ideal | Marginal | Add Acid |

ALKALINITY High - Low:

"Total alkalinity" is a measurement of the total amount of alkaline chemicals in the water, and control pH to a great degree. (It is not the same as pH which refers merely to the relative alkalinity/acidity balance.) Your pool water's total alkalinity should be 100 - 140 ppm to permit easier pH control.

A total alkalinity test is simple to perform with a reliable test kit. You will need to test about once a week and make proper adjustments until alkalinity is in the proper range. Then, test only once every month or so to be sure it is being maintained. See your local pool dealer for help in properly balancing the water chemistry.

Installation Instructions

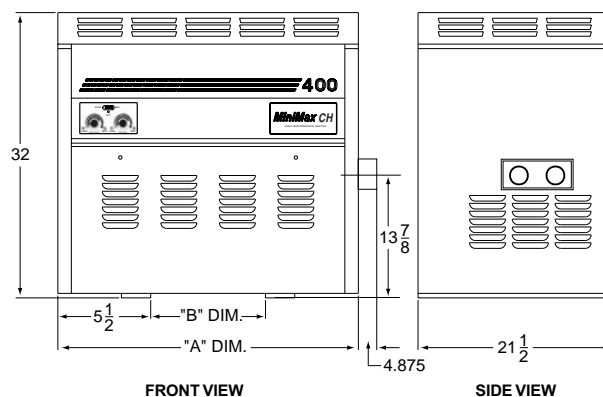
SPECIFICATIONS

IMPORTANT NOTICE: These installation instructions are designed for use by qualified personnel only, trained especially for installation of this type of heating equipment and related components. Some states require installation and repair by licensed personnel. If this applies in your state, be sure your contractor bears the appropriate license.

Outdoor installation - stackless

| Model | "A" Dim | "B" Dim |
|-------|------------|------------|
| 150 | 17 7/8 in. | 6 1/2 in. |
| 200 | 20 7/8 in. | 9 1/2 in. |
| 250 | 23 7/8 in. | 12 1/2 in. |
| 300 | 26 7/8 in. | 15 1/2 in. |
| 350 | 29 7/8 in. | 18 1/2 in. |
| 400 | 33 3/8 in. | 22 3/8 in. |

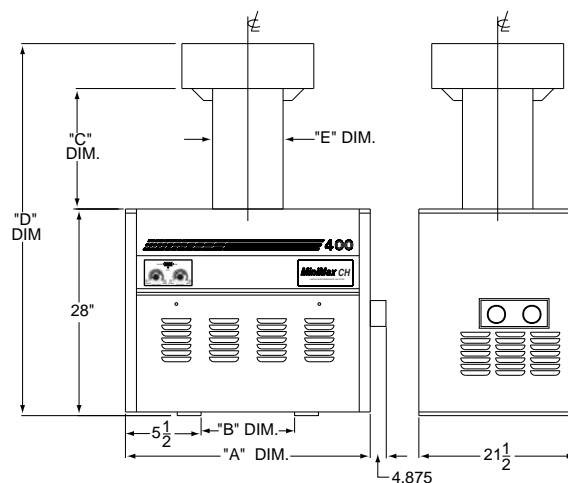
Table 3.



Outdoor installation - with vent kit

| Model | "A" Dim | "B" Dim | "C" Dim | "D" Dim |
|-------|------------|------------|------------|------------|
| 150 | 17 7/8 in. | 6 1/2 in. | 7 3/4 in. | 39 3/4 in. |
| 200 | 20 7/8 in. | 9 1/2 in. | 10 in. | 42 3/4 in. |
| 250 | 23 7/8 in. | 12 1/2 in. | 10 in. | 42 3/4 in. |
| 300 | 26 7/8 in. | 15 1/2 in. | 10 1/4 in. | 43 3/4 in. |
| 350 | 29 7/8 in. | 18 1/2 in. | 13 in. | 47 3/4 in. |
| 400 | 33 3/8 in. | 22 3/8 in. | 17 in. | 51 3/4 in. |

Table 4.

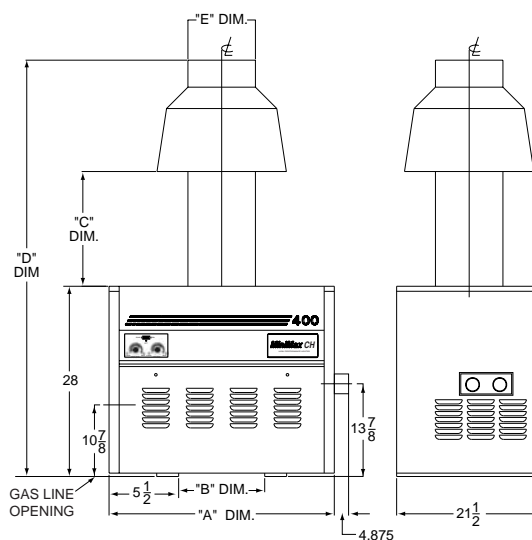


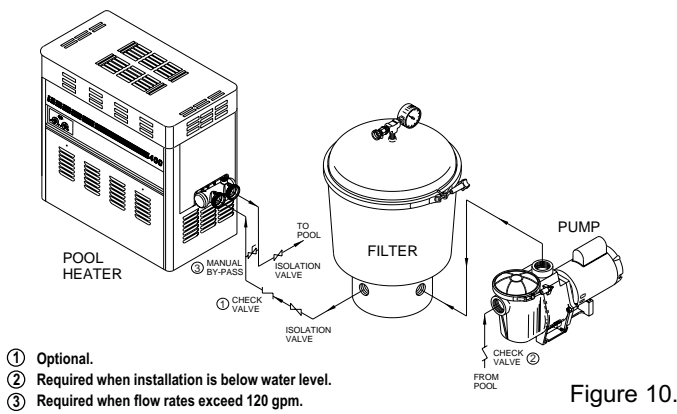
Indoor installation - stack (USA only)

Outdoor shelter installation (Canada)

| Model | "A" Dim | "B" Dim | "C" Dim | "D" Dim | "E" Dim |
|-------|------------|------------|---------|------------|---------|
| 150 | 17 7/8 in. | 6 1/2 in. | 13 in. | 52 1/4 in. | 6 in. |
| 200 | 20 7/8 in. | 9 1/2 in. | 13 in. | 53 7/8 in. | 7 in. |
| 250 | 23 7/8 in. | 12 1/2 in. | 13 in. | 53 7/8 in. | 7 in. |
| 300 | 26 7/8 in. | 15 1/2 in. | 13 in. | 55 in. | 8 in. |
| 350 | 29 7/8 in. | 18 1/2 in. | 13 in. | 56 in. | 9 in. |
| 400 | 33 3/8 in. | 22 3/8 in. | 17 in. | 60 3/4 in. | 10 in. |

Table 5.





MANUAL BY-PASS

Where the flow rate exceeds the maximum 120 GPM, a manual bypass should be installed and adjusted. After adjustments are made, the valve handle should be removed to avoid tampering.

PLUMBING CONNECTIONS

The MiniMax CH heater has the unique capability of direct schedule 40 PVC plumbing connections.

| |
|--|
| ⚠ CAUTION |
| <p>Before operating the heater on a new installation, turn on the circulation pump and bleed all the air from the filter using the air relief valve on top of the filter. Water should flow freely through the heater.</p> |

Do not operate the heater unless water in the pool/spa is at the proper level.

PLUMBING

VALVES

When any equipment is located below the surface of the pool or spa, valves should be placed in the circulation piping system to isolate the equipment from the pool or spa.

Check valves are recommended to prevent back siphon.

| |
|---|
| ⚠ CAUTION |
| <p>Exercise care when installing chemical feeders so as to not allow back siphoning of chemical into the heater, filters or pump. When chemical feeders are installed in the circulation of the piping system, make sure the feeder outlet line is down stream of the heater, and is equipped with a positive seal non-corrosive "Check Valve", (P/N R172288), between the feeder and heater.</p> |

| Model | Min. | Max. * |
|-------|------|--------|
| 150 | 20 | 120 |
| 200 | 20 | 120 |
| 250 | 30 | 120 |
| 300 | 30 | 120 |
| 350 | 40 | 120 |
| 400 | 40 | 120 |

* Do not exceed the maximum recommended flow rate for the connecting piping.

Table 6.

BELOW POOL INSTALLATION

If the heater is below water level, the pressure switch should be adjusted. This adjustment must be done by a qualified service technician. See following CAUTION.

| |
|--|
| ⚠ CAUTION |
| BELOW OR ABOVE POOL INSTALLATION |
| <p>The water pressure switch is set in the factory at 1½ PSI. This setting is for a heater installed at pool level or within 3' above or 3' below. If the heater is to be installed more that 3' above or 3' below, the water pressure switch must be adjusted by a qualified service technician.</p> |
| FLOW SWITCH |
| <p>If the heater is installed more the 6' above the pool or more than 10' below the pool level, you will be beyond the limits of the pressure switch and a flow switch must be installed. Locate and install the flow switch externally on the outlet piping from the heater, as close as possible to the heater. Connect the flow switch wires in place of the water pressure switch wires.</p> |

WATER CONNECTIONS

Reversible Inlet/Outlet Connection

The MiniMax CH heater is factory assembled with right side inlet/outlet water connections. The inlet/outlet header can be reversed for left side water connections without removing the heat exchanger.

Reversing Water Connections

Disassembly

Tools needed:

- 1/4 in Nut Driver
- 9/16 in. Socket and Wrench
- 1/2 in. & 9/16 in. Open Wrench
- Screw Driver(s) - (Flathead & Phillips)

1. Remove the inspection plates.
2. Disconnect all wires from the high-limit switches except the short jumper wire. The exact order of the disconnection is not important.

NOTE

There is no reason to **remove** the high-limit and pressure switches or the thermister from the front header during the reversing procedure, as they will be in the proper location when installed on the left side.

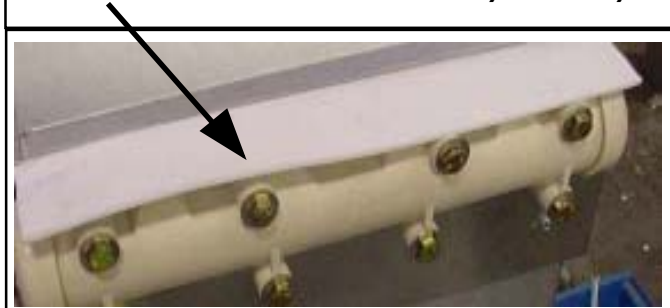
3. Disconnect the pressure switch wiring.
4. Disconnect the thermostat thermister leads from the control board.
5. Exchange the in/out header with the return header. Replace the heat exchanger tube seals with new seals provided in the Quick-Flange Accessory Bag.
6. Install the temperature sensing bulb by passing the wires through the hole provided on the left side of the brace panel. Route wires through the support bracket.
7. Reconnect all the high limit wires. Reconnect the pressure switch wiring. Route the wires through the same hole as the thermostat sensor wires and reconnect thermister to the board.
8. Reinstall the inspection plates.

INSULATING THE HIGH LIMITS

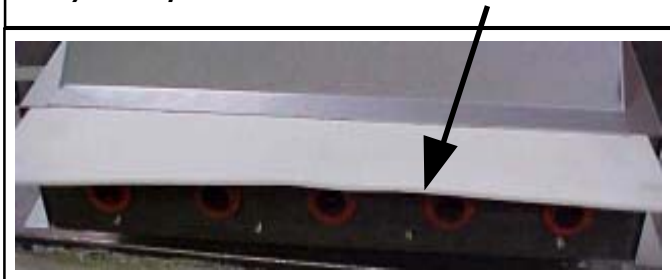
When Reversing Heads on the MiniMax CH Heater

On the MiniMax CH heater there is insulation installed by the factory on the return head side of the heaters. This insulation is there so that if the heads are reversed in the field, during initial installation of the heater, the reflected heat from the flue collector will be insulated from the high limits.

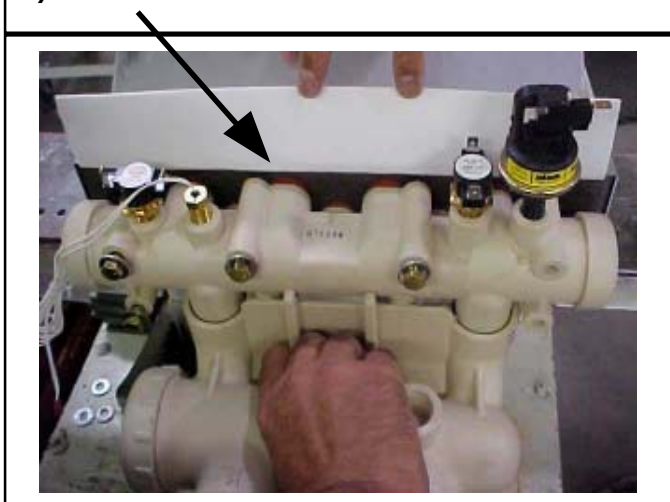
Return head in position before removal.
This view shows the insulation installed by the factory.



Return head removed and new tube seals installed. Now ready to accept the installation of the main head.



Lift the installation to allow the main head to be installed.
When head is placed into position, release the insulation; it will now shield the high limits from the heat produced by the flue collector.



GAS CONNECTIONS

GAS LINE INSTALLATIONS

Before installing the gas line, be sure to check which gas the heater has been designed to burn. This is important because different types of gas require different gas pipe sizes. The rating plate on the heater will indicate which gas the heater is designed to burn. Tables 7-9, on pages 12 and 13, shows which size pipe is required for the distance from the gas meter to the heater. The table is for natural gas at a specific gravity of .65 and propane at specific gravity of 1.5.

When sizing gas lines, calculate three (3) additional feet of straight pipe for every elbow used.

When installing the gas line, avoid getting dirt, grease or other foreign material in the pipe as this may cause damage to the gas valve, which may result in heater failure.

The gas meter should be checked to make sure that it will supply enough gas to the heater and any other appliances that may be used on the same meter.

The gas line from the meter will usually be of a larger size than the gas valve supplied with the heater. Therefore a reduction of the connecting gas pipe will be necessary. Make this reduction as close to the heater as possible.

The heater and any other gas appliances must be disconnected from the gas supply piping system during any pressure testing on that system, (greater than ½ PSIG).

The heater and its gas connection must be leak tested before placing the heater in operation. **Do not use flame to test the gas line.** Use soapy water or another nonflammable method.

A manual main shut-off valve must be installed externally to the heater.

⚠WARNING

Do not install the gas line union inside the heater cabinet. This will void your warranty.

Pipe Sized For Length Of Run In Equivalent Feet

Table 7.

| PIPE SIZING FOR GAS LINE CONNECTIONS | | | | | | | | | | | | | | |
|---|-------------|-----|-------------|------|-----------|------|---------------|------|---------------|------|-----------|------|---------------|-----|
| MAXIMUM EQUIVALENT PIPE LENGTH | | | | | | | | | | | | | | |
| Natural gas at 1000 B.T.U. per Cubic Foot | | | | | | | | | | | | | | |
| Propane Gas at 2500 B.T.U. per Cubic Foot | | | | | | | | | | | | | | |
| MODEL | 1/2" | | 3/4" | | 1" | | 1-1/4" | | 1-1/2" | | 2" | | 2-1/2" | |
| | NAT | PRO | NAT | PRO | NAT | PRO | NAT | PRO | NAT | PRO | NAT | PRO | NAT | PRO |
| 75 & 100 | 20' | 50' | 50' | 150' | 150' | 600' | - | - | - | - | - | - | - | - |
| 150 | 10' | 40' | 50' | 150' | 150' | 600' | - | - | - | - | - | - | - | - |
| 200 | - | 20' | 30' | 80' | 125' | 250' | 450' | 600' | - | - | - | - | - | - |
| 250 | - | 10' | 20' | 50' | 70' | 150' | 250' | 500' | 600' | - | - | - | - | - |
| 300 | - | - | 10' | 30' | 50' | 100' | 200' | 350' | 400' | 600' | - | - | - | - |
| 350 | - | - | 10' | 20' | 30' | 70' | 125' | 250' | 250' | 500' | 500' | - | - | - |
| 400 | - | - | - | 10' | 20' | 60' | 100' | 150' | 200' | 450' | 400' | - | - | - |
| 525 | - | - | - | 5' | 15' | 35' | 65' | 150' | 130' | 360' | 390' | 700' | - | - |
| 750 | - | - | - | - | - | 20' | 35' | 80' | 75' | 180' | 260' | 600' | - | - |
| 900 | - | - | - | - | - | 15' | 20' | 50' | 45' | 80' | 150' | 360' | 400' | - |

Pipe Sized For Length Of Run In Equivalent Feet, (cont'd.)

PROPANE 2 STAGE REGULATION

In many "RESIDENTIAL" Propane gas line installations, the gas supplier and or installer will utilize a two stage regulation process where by at the supply tank they will install the first stage gas regulator, which would be at a higher pressure, usually 10 psi and can be for longer distance and in a smaller pipe size. Then within a short distance from the heater they will install a second regulator, which is the second stage, and this would be set at the required inlet pressure of 11 inches of W.C. for all the Pentair Pool Heaters.

| Stage One "High Pressure" Gas Pipe Sizing | | | |
|---|--------------|----------------|-----------------|
| MAXIMUM EQUIVALENT PIPE LENGTH | | | |
| Model | 0 to 50 Feet | 50 to 100 Feet | 100 to 150 Feet |
| 75 & 100 | 1/2 in. | 1/2 in. | 1/2 in. |
| 150 | 1/2 in. | 1/2 in. | 1/2 in. |
| 200 | 1/2 in. | 1/2 in. | 1/2 in. |
| 250 | 1/2 in. | 1/2 in. | 1/2 in. |
| 300 | 1/2 in. | 1/2 in. | 1/2 in. |
| 350 | 1/2 in. | 1/2 in. | 1/2 in. |
| 400 | 1/2 in. | 1/2 in. | 1/2 in. |

Table 8.

| Stage Two "Low Pressure" Gas Pipe Sizing | | |
|--|--------------|---------------|
| MAXIMUM EQUIVALENT PIPE LENGTH | | |
| Model | 0 to 10 Feet | 10 to 20 Feet |
| 75 & 100 | 1/2 in. | 1/2 in. |
| 150 | 1/2 in. | 1/2 in. |
| 200 | 1/2 in. | 3/4 in. |
| 250 | 1/2 in. | 3/4 in. |
| 300 | 3/4 in. | 3/4 in. |
| 350 | 3/4 in. | 3/4 in. |
| 400 | 3/4 in. | 3/4 in. |

Table 9.

REGULATED MANIFOLD PRESSURE TEST

1. Attach the manometer to the heater jacket.
2. Shut off the main gas valve.
3. Remove 1/8 in. NPT plug on the outlet side of the valve and screw in the fitting from the manometer kit.
4. Connect the manometer hose to the fitting.
5. Fire the heater.
6. The manometer must read 4 in. WC for natural gas, 11 in. WC for propane gas, **while** the heater is operating.
7. For adjustment, remove the Regulator Adjustment Cap and using a screwdriver turn the screw clockwise to increase - counterclockwise to decrease gas pressure.

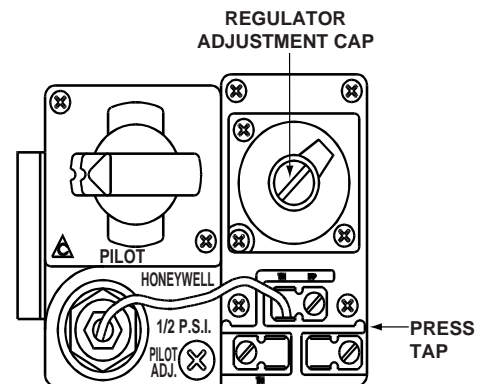


Figure 11.

MINIMAX CH GAS PRESSURE REQUIREMENTS*

| | Natural | Propane |
|----------------------------|------------|-----------|
| Maximum inlet gas pressure | 10 in. WC | 14 in. WC |
| Minimum inlet gas pressure | **5 in. WC | 12 in. WC |
| Normal manifold pressure | 4 in. WC | 11 in. WC |
| ** 6 WC for 400 model | | |

*All Readings are taken with the heater fired. Any adjustments made with heater off will give incorrect readings.

Table 10.

CAUTION

The use of Flexible Connectors (FLEX) is NOT recommended as they cause high gas pressure drops.

VENTILATION

OUTDOOR INSTALLATION ONLY

For outdoor installation with built in vent top, the heater must be placed in a suitable area on a level, noncombustible surface. Do not install the heater under an overhang with clearances less than 3 feet from the top of the heater. The area under an overhang must be open on three sides.

IMPORTANT!

In an outdoor installation it is important to protect your heater from water damage. Ensure water is diverted from overhanging eaves with a proper gutter/drainage system. The heater must be set on a level foundation for proper rain drainage.

Maintain minimum clearances as indicated below. Install a minimum of 4 feet below, and 4 feet horizontally from any opening to a building.

The heater should not be installed closer than 6 inches to any fences, walls or shrubs at any side or back, or any combustible material, nor closer than 18 inches at the plumbing side. A minimum clearance of 24 inches must be maintained at the front of the heater.

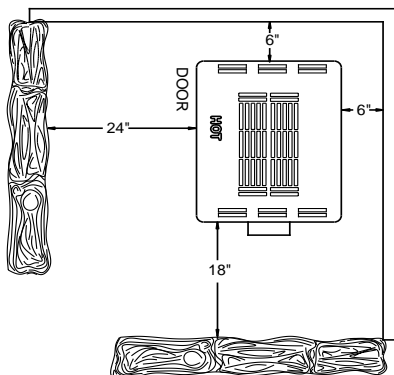


Figure 12.

IMPORTANT!

When locating the heater, consider that high winds can roll over or deflect off adjacent buildings and walls. Normally, placing the heater at least three feet from any wall will minimize downdraft.

Unusually high prevailing wind conditions and downdrafts may require the use of a stack type outdoor vent kit (available at additional cost).

NOTE

This unit shall not be operated outdoors at temperatures below 0° F. for propane and -20° F. for natural gas.

STACK TYPE OUTDOOR VENT KIT

| Model | Vent Cap | Product No. | Vent Dia. |
|-------|----------|-------------|-----------|
| 150 | OV15 | 460237 | 6 in. |
| 200 | OV20 | 460222 | 7 in. |
| 250 | OV25 | 460223 | 7 in. |
| 300 | OV30 | 460224 | 8 in. |
| 350 | OV35 | 460225 | 9 in. |
| 400 | OV40 | 460226 | 10 in. |

Table 11.

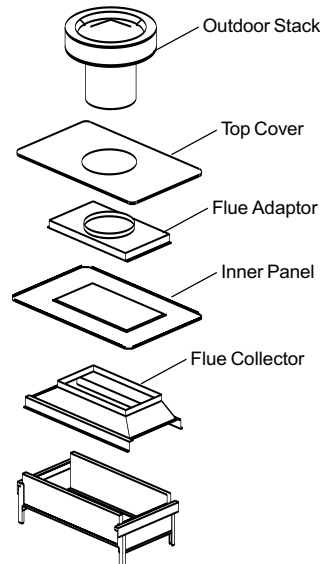


Figure 13.

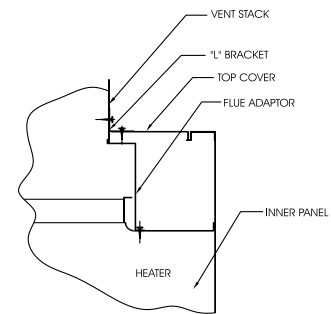


Figure 14.

OUTDOOR VENT CAP INSTALLATION

The MiniMax CH heater is shipped standard as an outdoor stackless unit. To install the outdoor vent kit:

1. Take out the louvered outer top after first removing all 1/4 in. sheet metal screws attaching it along its perimeter to the cabinet. Set it aside.
2. Place the flue adaptor over the flue collector opening. Temporarily, put the top cover, from the kit, on with the label to the front of the heater. Center the flue adaptor evenly inside the top cover flue stack opening. Remove the top cover and secure the centered flue adaptor to the inner panel with the provided #8 x 1/2 in. drill qwik screws.
3. Place the top cover, with the hole for the stack, on the heater cabinet.
4. Install the vent stack through the hole in the top cover, over the flue adaptor top ring.
5. Using a 3/32 in. drill bit, position the "L" bracket to hold the top cover and outdoor stack. Drill the pilot holes through the "L" bracket holes to accept the screws.
6. Secure the vent stack and the inner top with the #8 x 1/4 in. sheet metal screws through the "L" brackets.

**INDOOR INSTALLATION (USA ONLY)
OUTDOOR SHELTER INSTALLATION
(CANADA)**

All products of combustion and vent gases must be completely removed to the outside atmosphere through a vent pipe which is connected to the draft hood. A vent pipe extension of the same size must be connected to the draft hood and extended at least 2 feet higher than highest point of the roof within a 10 foot horizontal radius, and at least 3 ft. higher than the point at which it passes through the roof, or as permitted by local code; see Figures 15 and 16. The vent should terminate with an approved vent cap (weather cap) for protection against rain or blockage by snow. Double-wall vent pipe and an approved roof jack shall be employed through the roof penetration. The use of double-walled type B vent pipe is recommended.

The draft hood must be installed so as to be in the same atmospheric pressure zone as the combustion air inlet to the pool heater. The certified (factory) draft hood **must not** be modified in any way and must be employed in every indoor installation.

The heater must be located as close as practical to a chimney or gas vent. The heater should be installed at least 5 feet away from the pool or spa.

The heater must be placed in a suitable room on a non-combustible floor or on a non-combustible base and in an area where leakage from heat exchanger or water connections will not result in damage to the area adjacent to the heater or the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan with adequate drainage, be installed under the heater. The pan must not restrict air flow.

Installations in basements, garages, or underground structures where flammable liquids may be stored must have the heater elevated 18 inches from the floor using a non-combustible base. *The following minimum clearances from combustible materials must be provided.*

| | Side | Front | Back | Top |
|-------------------|--------|--------|-------|---------|
| Water Connection | 18 in. | 24 in. | | |
| Remaining | 6 in. | | 6 in. | |
| Ceiling Clearance | | | | 36 in.* |

*To ceiling or roof.

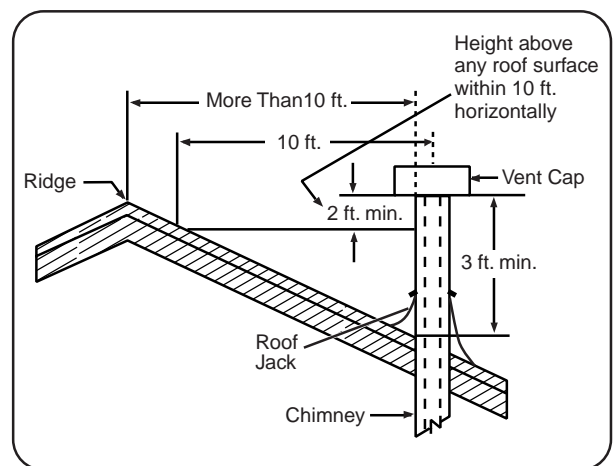


Figure 15.

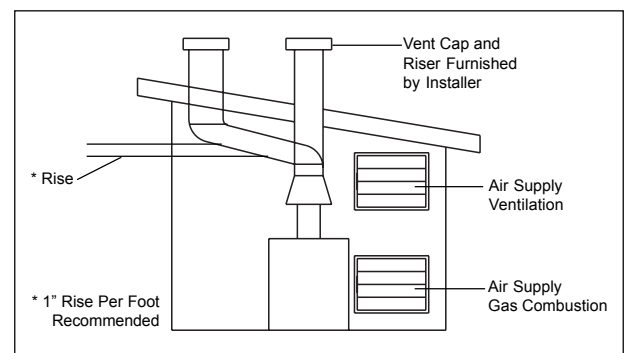


Figure 16.

NOTE

The heater requires **two uninterrupted air supply openings**; one for ventilation and one to supply oxygen for proper gas combustion. The air supply openings should be sized according to Tables 12. and 13.

Air supply requirements below apply to all MiniMax heaters

All opening sizes are minimum and unobstructed.

| All Air From Inside | | |
|---------------------|----------------------------|-------------------------|
| Model | Air for Combustion Sq. In. | Air Ventilation Sq. In. |
| 150 | 150 | 150 |
| 200 | 200 | 200 |
| 250 | 250 | 250 |
| 300 | 300 | 300 |
| 350 | 350 | 350 |
| 400 | 400 | 400 |

Table 12.

| All Air From Outside | | |
|----------------------|----------------------------|-------------------------|
| Model | Air for Combustion Sq. In. | Air Ventilation Sq. In. |
| 150 | 37 | 37 |
| 200 | 50 | 50 |
| 250 | 63 | 63 |
| 300 | 77 | 77 |
| 350 | 90 | 90 |
| 400 | 100 | 100 |

Table 13.

INSTALLATION ON FLOORS CONSTRUCTED OF COMBUSTIBLE MATERIALS

The heater may be placed on a “combustible floor” using either of the two methods listed below:

- a) Use a Non-combustible Base Kit for use on combustible floors.
- b) Construct a non-combustible base from masonry blocks as illustrated, see Figure 17.

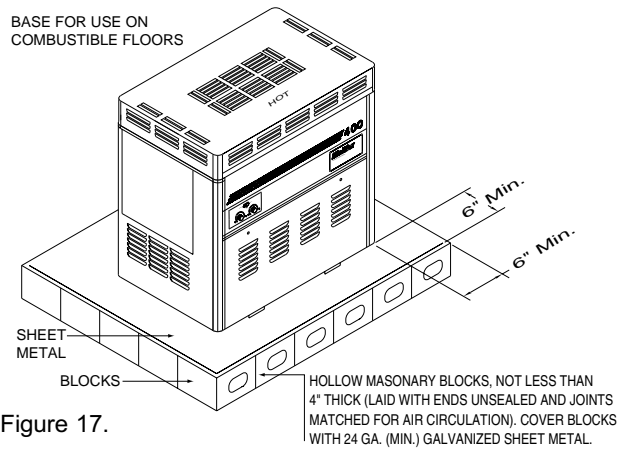


Figure 17.

CAUTION

Chemicals should not be stored near the heater installation. Combustion air can be contaminated by corrosive chemical fumes which can void the warranty.

STACK TYPE INDOOR DRAFT HOOD KIT

The proper draft hood and adaptor must be installed on the heater as shown below:

| Model | Draft Hood | Product No. | Vent Dia. |
|-------|------------|-------------|-----------|
| 150 | DH15 | 460227 | 6 in. |
| 200 | DH20 | 460228 | 7 in. |
| 250 | DH25 | 460230 | 7 in. |
| 300 | DH30 | 460231 | 8 in. |
| 350 | DH35 | 460233 | 9 in. |
| 400 | DH40 | 460234 | 10 in. |

Table 14.

INDOOR DRAFT HOOD INSTALLATION

1. Take out the louvered outer top piece after first removing the sheet metal screws, attaching it to the cabinet.
2. Install the adaptor (vent kit).
3. Install the top cover (vent kit).
4. Install the draft hood (vent kit).

Use the provided screws to secure the vent assembly.

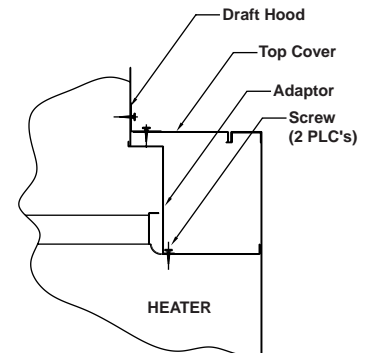


Figure 18.

ELECTRICAL

MiniMax CH Millivolt Wiring Diagram

MINIMAX WIRING DIAGRAM (MILLIVOLT) DUAL THERM (HONEYWELL ELECTRONIC)

IF ORIGINAL FACTORY WIRING MUST BE REPLACED, INSTALLER MUST SUPPLY UL OR CSA (IF CANADA) APPROVED WIRE, 18 GAUGE, 600V, 105 C° TEMPERATURE RATING. THERMAL FUSE WIRING MUST BE REPLACED WITH UL OR CSA (IF CANADA) APPROVED WIRE, 18 GAUGE, 600V, 125 C° TEMPERATURE RATING. INTERCONNECTING WIRING TO APPLIANCE MUST CONFORM TO THE NATIONAL ELECTRICAL CODE OR SUPERCEDING LOCAL (WIRING) CODES.

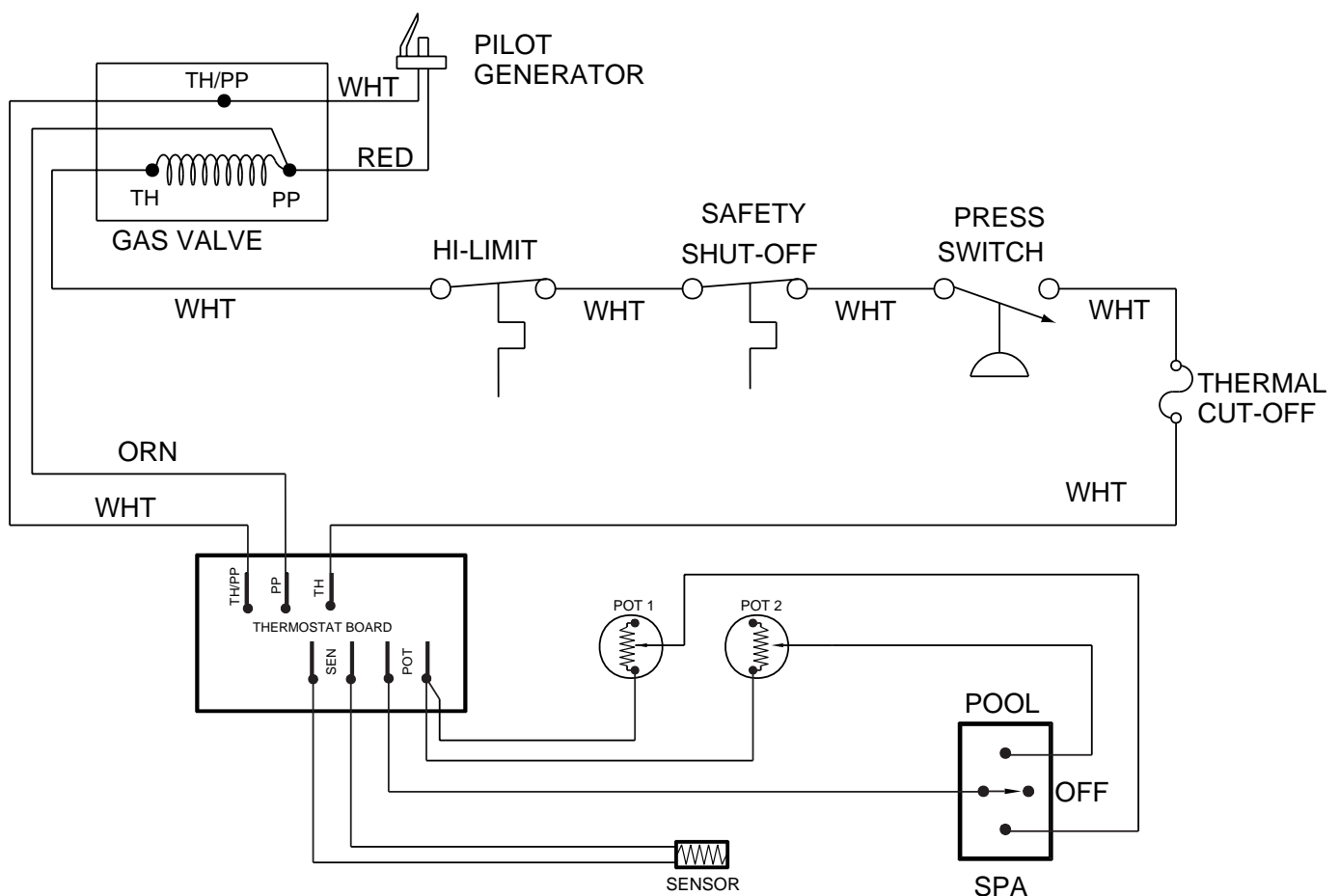


Figure 19.

NOTE: When connecting a remote control to the MiniMax CH, you must install the low voltage thermostat wires in separate conduit from **ANY** line voltage wires. Failure to follow these instructions will cause the thermostat relay to react erratically.

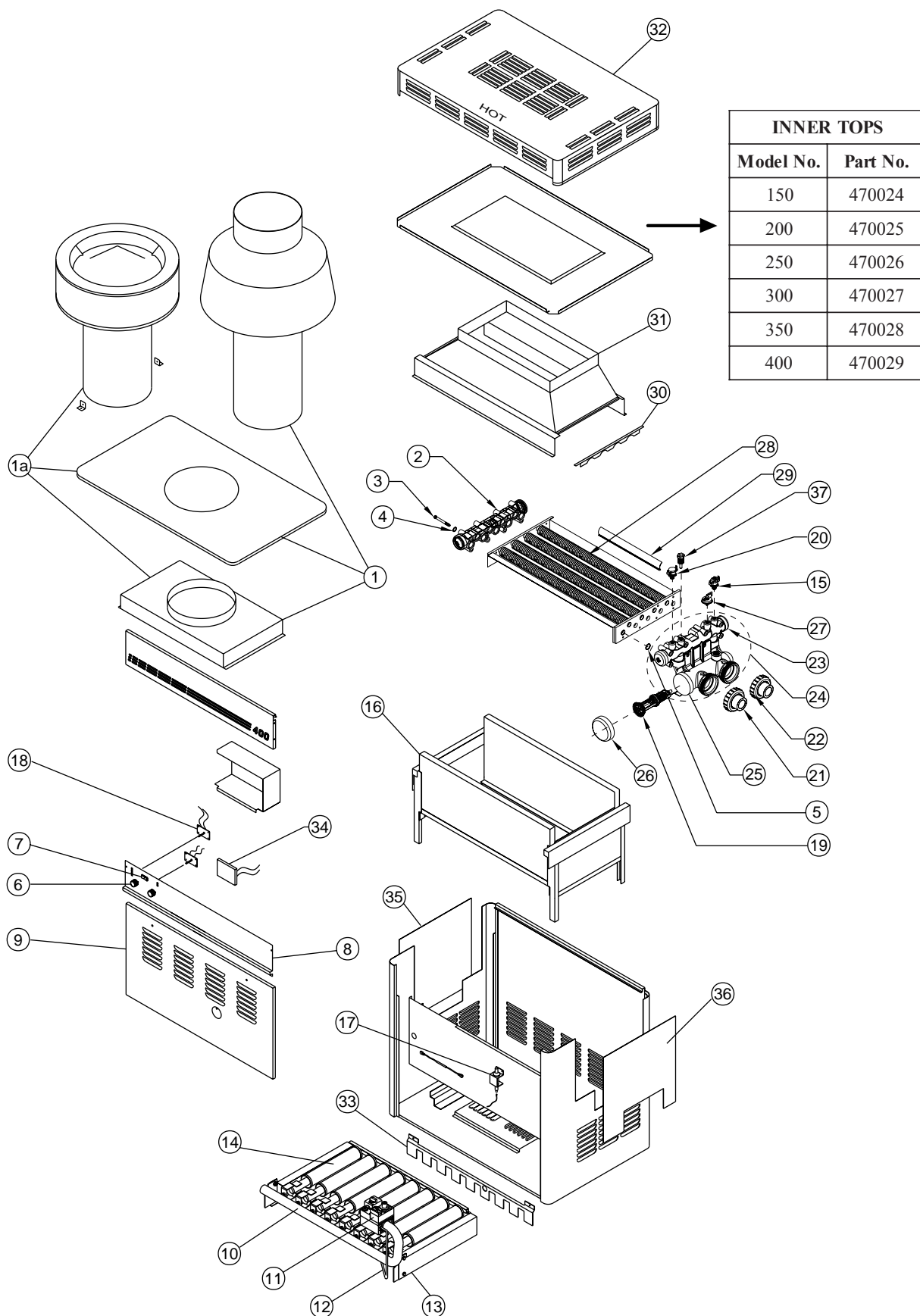
Troubleshooting - General

| <i>Possible Cause</i> | <i>Remedy</i> |
|--|--|
| Heater will not come on | |
| Pump not running | Place pump in operation |
| Pump air locked | Check for leaks |
| Filter dirty | Clean filter |
| Pump strainer clogged | Clean strainer |
| Defective wiring or connection | Repair or replace wires |
| Defective pressure switch | Replace switch |
| Defective gas controls | Call serviceperson |
| On-Off switch in "OFF" position | Turn switch to "ON" |
| Heater Short Cycling (Rapid On and Off Operation) | |
| Insufficient water flow | Clean filter and pump strainer |
| Defective wiring | Repair or replace wiring |
| Defective flow valve or out of adjustment | Call serviceperson |
| Defective hi-limit and/or thermostat | Call serviceperson |
| Heater Makes Knocking Noises, Make sure all valves on system are open | |
| Heater operating after pump has shut off | Shut off gas supply and call serviceperson |
| Heater exchanger scaled | Shut off gas supply and call serviceperson |

CAUTION

Please consult the latest edition of the "MiniMax Service Manual" for complete service and repair instructions. Repairs should only be attempted by properly trained service personnel.

MINIMAX CH HEATER - ALL MODELS



MiniMax CH Parts List

| ITEM | DESCRIPTION | QTY | 150 | 200 | 250 | 300 | 350 | 400 |
|------|--|-----|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| 1 | Vent kit assy. (indoor) | 1 | 460227 | 460228 | 460230 | 460231 | 460233 | 460234 |
| 1a | Vent kit assy. (outdoor) | 1 | 460237 | 460222 | 460223 | 460224 | 460225 | 460226 |
| 2 | Return header | 1 | 070994 | 070994 | 070994 | 070994 | 070994 | 070994 |
| 3 | Bolt, heat exchanger | 16 | 471991 | 471991 | 471991 | 471991 | 471991 | 471991 |
| 4 | Washer 3/8" ID 1" OD | 16 | 072184 | 072184 | 072184 | 072184 | 072184 | 072184 |
| 5 | Tube seal gasket | 18 | 070951 | 070951 | 070951 | 070951 | 070951 | 070951 |
| 6 | Thermostat knob | 2 | 470184 | 470184 | 470184 | 470184 | 470184 | 470184 |
| 7 | Switch rocker (single pole & double throw) | 1 | 470186 | 470186 | 470186 | 470186 | 470186 | 470186 |
| 8 | Control panel assy. (complete) - Millivolt | 1 | 472175 | 472174 | 472173 | 472172 | 472171 | 472170 |
| 9 | Door - Millivolt | 1 | 075468 | 075604 | 075488 | 075605 | 075606 | 075490 |
| 10 | Manifold burner | 1 | 070256 | 075525 | 070257 | 075526 | 075527 | 070258 |
| 11 | Gas valve natural - Millivolt | 1 | 075457 | 075457 | 075457 | 075457 | 075457 | 075457 |
| | Gas valve propane - Millivolt | 1 | 075458 | 075458 | 075458 | 075458 | 075458 | 075458 |
| 12 | Pilot tube - Millivolt | | 076084 | 076084 | 076085 | 076085 | 076086 | 076086 |
| 13 | Burner tray assy. natural (complete) - Millivolt | 1 | 075493 | 075496 | 075494 | 075497 | 075498 | 075495 |
| | Burner tray assy. propane (complete) - Millivolt | 1 | 075502 | 075505 | 075503 | 075506 | 075507 | 075504 |
| 14 | Burner | | 2 EA. 070230 | 3 EA. 070230 | 4 EA. 070230 | 5 EA. 070230 | 6 EA. 070230 | 7 EA. 070230 |
| 14a | Burner with pilot bracket (not shown) | 1 | 470550 | 470550 | 470550 | 470550 | 470550 | 470550 |
| 15 | Pressure switch | 1 | 472125 | 472125 | 472125 | 472125 | 472125 | 472125 |
| 16 | Combustion chamber assy. (complete) | 1 | 073858 | 075586 | 073857 | 075587 | 075588 | 073856 |
| 17 | Presslite igniter assy. | 1 | 075459 | 075459 | 075459 | 075459 | 075459 | 075459 |
| 18 | Potentiometer | 2 | 471678 | 471678 | 471678 | 471678 | 471678 | 471678 |
| 19 | Flow valve assy. | 1 | 471750 | 471750 | 471750 | 471750 | 471750 | 471750 |
| 20 | Hi-Limit thermostat 115° | 1 | 471587 | 471587 | 471587 | 471587 | 471587 | 471587 |
| 21 | Adaptor - bulkhead, 2 in. | 2 | 471441 | 471441 | 471441 | 471441 | 471441 | 471441 |
| 22 | Adaptor - bulkhead ring | 2 | 274440 | 274440 | 274440 | 274440 | 274440 | 274440 |
| 23 | Main manifold assy. | 1 | 471993 | 471993 | 471993 | 471993 | 471993 | 471993 |
| 24 | Main header assy. | 1 | 471992 | 471992 | 471992 | 471992 | 471992 | 471992 |
| 25 | Main manifold bottom | 1 | 471419 | 471419 | 471419 | 471419 | 471419 | 471419 |
| 26 | Cap, main manifold bottom | 1 | 471420 | 471420 | 471420 | 471420 | 471420 | 471420 |
| 27 | Hi-Limit thermostat 150° | 1 | 471694 | 471694 | 471694 | 471694 | 471694 | 471694 |
| 28 | Heat exchanger (without heads) | 1 | 472131 | 472132 | 472133 | 472134 | 472135 | 472136 |
| | Heat exchanger (with heads) | 1 | 472169 | 472168 | 472167 | 472166 | 472165 | 472164 |
| 29 | Baffle | | 8 ea. 070277 | 8 ea. 075559 | 8 ea. 070276 | 8 ea. 075560 | 16 ea. 070277 | 16 ea. 070278 |
| 30 | Baffle hold down (2) baffles on 400 | 1 | 073810 | 073810 | 073810 | 073810 | 073810 | 073810 |

MiniMax CH Parts List, *contd.*

| ITEM | DESCRIPTION | QTY | 150 | 200 | 250 | 300 | 350 | 400 |
|--------------------|--|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 31 | Flue collector | 1 | 073864 | 075622 | 073863 | 075623 | 075624 | 073862 |
| 32 | Outdoor top assy. | 1 | 470471 | 470472 | 470473 | 470474 | 470475 | 470476 |
| 33 | Lightback shield (Propane Gas units only) | 1 | 075783 | 075784 | 075785 | 075786 | 075787 | 075788 |
| 34 | Electronic thermostat (Millivolt models) | 1 | 471677 | 471677 | 471677 | 471677 | 471677 | 471677 |
| 35 | Panel (return) | 1 | 073789 | 073789 | 073789 | 073789 | 073789 | 073789 |
| 36 | Panel (in/out) | 1 | 472127 | 472127 | 472127 | 472127 | 472127 | 472127 |
| 37 | Thermistor (probe) complete (Millivolt models) | 1 | 472101 | 472101 | 472101 | 472101 | 472101 | 472101 |
| * Not Shown | | | | | | | | |
| * | Plastic mounting bracket | | 070715 | 070715 | 070715 | 070715 | 070715 | 070715 |
| * | Clips for wire harness | | 471277 | 471277 | 471277 | 471277 | 471277 | 471277 |
| * | Wire Kit - Millivolt | | 075511 | 075511 | 075511 | 075511 | 075511 | 075511 |
| * | Screw 8 x 1/4" HH | | 071703 | 071703 | 071703 | 071703 | 071703 | 071703 |
| * | Screw 8 x 1/2" HH | | 071698 | 071698 | 071698 | 071698 | 071698 | 071698 |
| * | Screw 6 x 1/4" | | 071716 | 071716 | 071716 | 071716 | 071716 | 071716 |
| * | Screw 10 -32 x 1/4" | | 071659 | 071659 | 071659 | 071659 | 071659 | 071659 |
| * | Screw 10-32 x 3/16 | | 075692 | 075692 | 075692 | 075692 | 075692 | 075692 |
| * | Bushing 1/2" | | 070551 | 070551 | 070551 | 070551 | 070551 | 070551 |
| * | Therm knob stopper | 2 | 470414 | 470414 | 470414 | 470414 | 470414 | 470414 |
| * | Bolt 5/16" - 18 x 3/4' | 2 | 073725 | 073725 | 073725 | 073725 | 073725 | 073725 |
| | | | 3 ea. N or P | 4 ea. N or P | 5 ea. N or P | 6 ea. N or P | 7 ea. N or P | 8 ea. N or P |
| * | Orifice main burner natural | | 073727 | 073727 | 073727 | 073727 | 073727 | 073727 |
| * | Orifice main burner propane | | 073728 | 073728 | 073728 | 073728 | 073728 | 073728 |
| * | Pilot - natural - Millivolt | 1 | 471292 | 471292 | 471292 | 471292 | 471292 | 471292 |
| * | Pilot - propane - Millivolt | 1 | 471291 | 471291 | 471291 | 471291 | 471291 | 471291 |
| * | Pilot - generator | 1 | 071515 | 071515 | 071515 | 071515 | 071515 | 071515 |
| * | Thermal cutoff - fusible link | 1 | 075173 | 075173 | 075173 | 075173 | 075173 | 075173 |
| * | Power element (flow-valve) | 1 | 470178 | 470178 | 470178 | 470178 | 470178 | 470178 |
| * | Pilot rainshield | 1 | 471293 | 471293 | 471293 | 471293 | 471293 | 471293 |
| * | Pilot electrode (only) | 1 | 471328 | 471328 | 471328 | 471328 | 471328 | 471328 |
| * | "L" brackets | 3 | 074540 | 074540 | 074540 | 074540 | 074540 | 074540 |
| * | Bracket adapter Q379 pilot, MV | | 471271 | 471271 | 471271 | 471271 | 471271 | 471271 |
| * | Jumper | | 072253 | 072253 | 072253 | 072253 | 072253 | 072253 |
| * | Door latch | | 071240 | 071240 | 071240 | 071240 | 071240 | 071240 |

MiniMax® CH (150 IID Model)

POOL & SPA HEATERS OPERATION & INSTALLATION MANUAL (APPENDIX)

⚠ WARNING

FOR YOUR SAFETY - READ BEFORE OPERATING

Warning: If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life. For additional free copies of this manual; call (800) 831-7133.



U.S. Patent Numbers
6,295,980
5,318,007 - 5,228,618
5,201,307 - 4,595,825

⚠ WARNING

Warning: Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

For Your Safety

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or other appliances.

Pentair Pool Products, Inc.

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MINIMAX CH (150 IID) ELECTRONIC IGNITION LIGHTING/OPERATION - NATURAL GAS

FOR YOUR SAFETY: READ BEFORE LIGHTING

⚠ WARNING





If you do not follow these instructions exactly, a fire or explosion may result causing personal injury, loss of life and property damage.

Do not attempt to light the heater if you suspect a natural gas leak. Lighting the heater can result in a fire or explosion which can cause personal injury, death, and property damage.

- A. This heater is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
 - B. **BEFORE OPERATING** smell all around the heater area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any heater.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the Fire Department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it. Call a qualified service technician. Forced or attempted repair may result in a fire or explosion.
 - D. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of the control system and any gas control which has been under water.
 - E. The MiniMax CH incorporates (9) nine indicator lights to aid you in the operation of the heater, and to assist in diagnosing a failure in the heater's function.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to the lowest setting.
3. Turn off electric power to the heater.
4. This heater is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Remove the control access door.
6. Push in gas control knob slightly and turn clockwise  to "OFF".
7. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above. If you don't smell gas, go to the next step.
8. Turn knob on gas control counterclockwise  to "ON"; see Figure 1.
9. Replace the control access door.
10. Turn on the electrical power to the heater.
11. Set the thermostat to the desired setting.
12. If the heater will not operate, follow the instructions "To Turn Off Gas To Heater" and call your service technician or gas supplier.

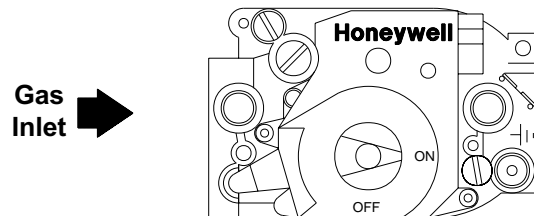



Figure 1. Gas control knob shown in "ON" position.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the heater if service is to be performed.
3. Remove control access door.
4. Push in gas control knob slightly and turn clockwise  to "OFF". **Do not force.**
5. Replace control access door.

MINIMAX CH (150 IID) ELECTRONIC IGNITION LIGHTING/OPERATION - PROPANE

FOR YOUR SAFETY: READ BEFORE LIGHTING

NOTE

The MiniMax CH propane models have special features for additional safety and protection. Read the safety instructions for natural gas (page A-2) before proceeding.

⚠ WARNING



If you do not follow these instructions exactly, a fire or explosion may result causing personal injury, loss of life and property damage.

Since propane gas is heavier than air, escaping propane will accumulate and remain at ground level. Do not attempt to light the heater. If you suspect a propane leak, lighting the heater can result in a fire or explosion which can cause personal injury, death, and property damage.



WHAT TO DO IF YOU SMELL GAS

- Do not try to light matches or lighter.
- Do not try to light any heater.
- Do not touch any electrical switch; do not use any phone in your building.
- Shut off gas line at propane tank.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the Fire Department.
- Do not tamper with the heater because it is dangerous and voids all warranties.

Safety Lockout:

This MiniMax CH Propane Heater is equipped with a 100% safety lockout feature. If the pilot does not light within a maximum of 90 seconds, lockout will occur.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to the lowest setting.
3. Turn off electric power to the heater.
4. This heater is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Remove the control access door.
6. Push in gas control knob slightly and turn clockwise  to "OFF".
7. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information on page 5. If you don't smell gas, go to the next step.
8. Turn knob on gas control counterclockwise  to "ON"; see Figure 2.
9. Replace the control access door.
10. Turn on the electrical power to the heater.
11. Set the thermostat to the desired setting.
12. If the heater will not operate, follow the instructions "To Turn Off Gas To Heater" and call your service technician or gas supplier.

Gas Inlet 

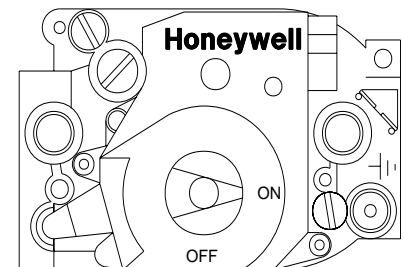



Figure 2. Gas control knob shown in "ON" position.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the heater if service is to be performed.
3. Remove control access door.
4. Push in gas control knob slightly and turn clockwise  to "OFF". **Do not force.**
5. Replace control access door.

OPERATING (CONTROLS)

Dual Temperature Control System - (Electronic and Millivolt Models)

For convenience and economy all MiniMax CH heaters are equipped with two thermostats on the front of the heater control panel; see Figure 3.

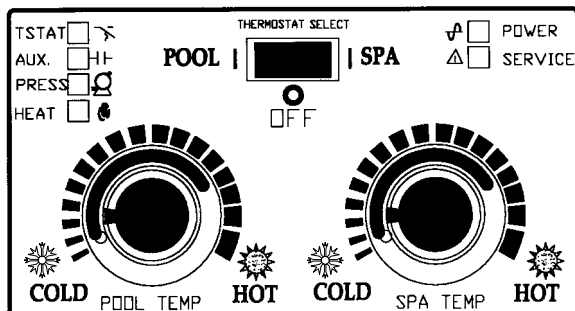


Figure 3.

THERMOSTAT KNOB STOPPER

Each thermostat is equipped with a mechanical stop that can be locked or unlocked with use of a screwdriver to prevent temperatures in excess of that desired by the user; see Figure 4.

The maximum setting can be adjusted by loosening the screw "A" and turning the stopper dial to desired maximum setting. Lock the setting by tightening the screw. The Mechanical stop is under the knob. Ensure that the knob is stopping at the correct position when the knob is rotated clockwise from a lower temperature position. (See Thermostat Adjustment.)

NOTE

To eliminate error due to piping heat losses, measure pool temperature with an accurate thermometer directly at the pool or spa.

INDICATOR LIGHT DESCRIPTION

The MiniMax Pool Heater provides nine status indicator lights, six can be seen from the front of the control panel which help you understand the operation of the heater. If something should go wrong, the lights will aid in troubleshooting the problem. Three additional lights can be seen after opening the control panel. These three lights give the service technician advanced troubleshooting capability. All the LED lights are green with the exception of the red service LED.

POWER LIGHT (POWER)

The light is on at all times, in any switch position, indicating 24 VAC power is being supplied to the control circuit. If it fails to light, no other light will be on. Possible causes are: a) external power to the heater is disconnected, check service panel circuit breaker or fuses; b) local circuit breaker inside the transformer has tripped -- investigate cause before resetting; c) transformer has failed.

THERMOSTAT (TSTAT)

This light is on when the thermostat contacts close, signaled by the water temperature falling below the setpoint, calling for the heater to fire to maintain the desired water temperature.

THERMOSTAT ADJUSTMENT

The knob with locking feature eliminates the need for constant thermostat adjustments. Set the knob pointer to the desired pool or spa temperature.

If further adjustment is needed, rotate the knob until the desired temperature is obtained. This knob position corresponding to your desired maximum pool or spa temperature may now be preset (locked) by the knob stopper which prevents the knob from being turned beyond the maximum temperature you set.

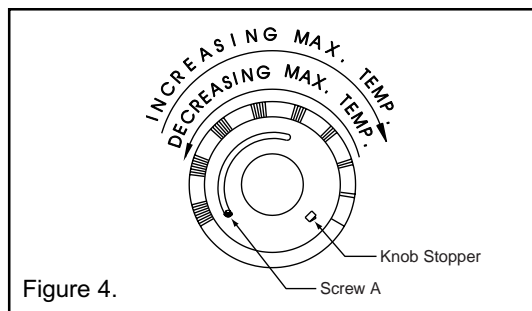


Figure 4.

POWER (THERMOSTAT SELECT) SWITCH

The Pool/Off/Spa switch allows the heater to be turned off when heating is not desired.

1. "Pool" position - Maintains selected pool temperature.
2. "Off" position - Heater will not come on regardless of drop in pool or spa temperature.
3. "Spa" position - This allows separate control of spa water temperature.

AUXILIARY (AUX)

This light is on when it indicates the remote switch contacts are closed. This allows you to observe if your remote switch is properly closing the heater control circuit. When shipped from the factory a jumper is installed to maintain closed circuit in the absence of a remote switch.

PRESSURE (PRESS)

This light is on when Spa/Pool Selector switch is on, indicates the circulation pump is running properly. If pressure light fails to light, the pump may have lost its prime or water flow may be restricted by an inadvertently closed valve or clogged filter or pump basket. If you have determined that there is no water flow restriction to the heater, you should call a qualified serviceman.

HEAT (HEAT)

The heat light is on any time the thermostat has signaled a call for heat which initializes the ignition safety firing circuit -- the light comes on to indicate successful firing of the main burners.

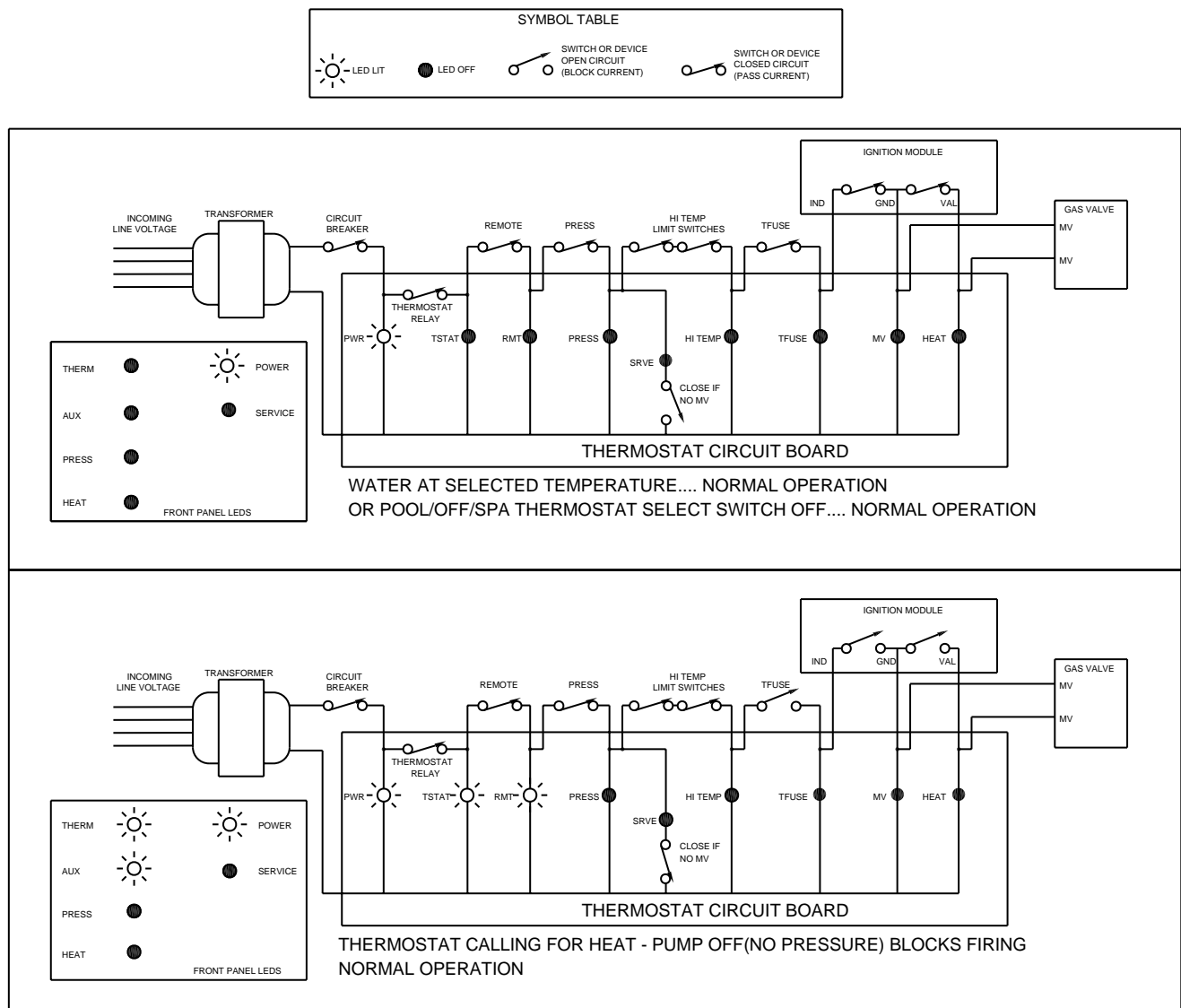
SERVICE (SERVICE)

The service light is off during normal operation of heater. The light only comes on if a problem with a control has occurred or when the heater is first firing. The problem must be investigated by the serviceman prior to attempts to fire the heater again.

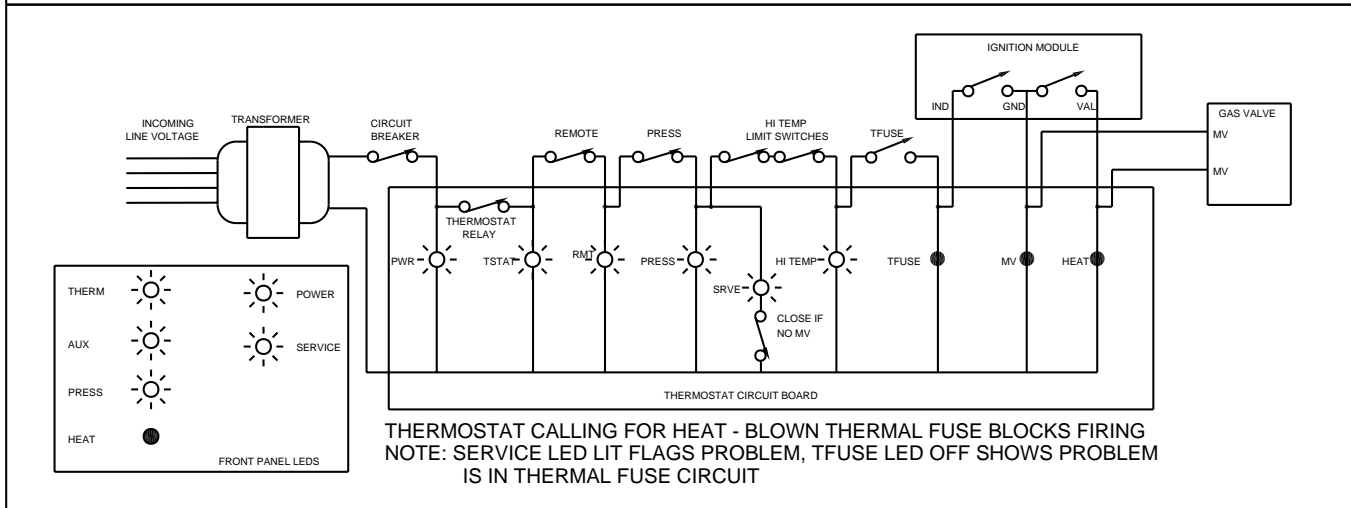
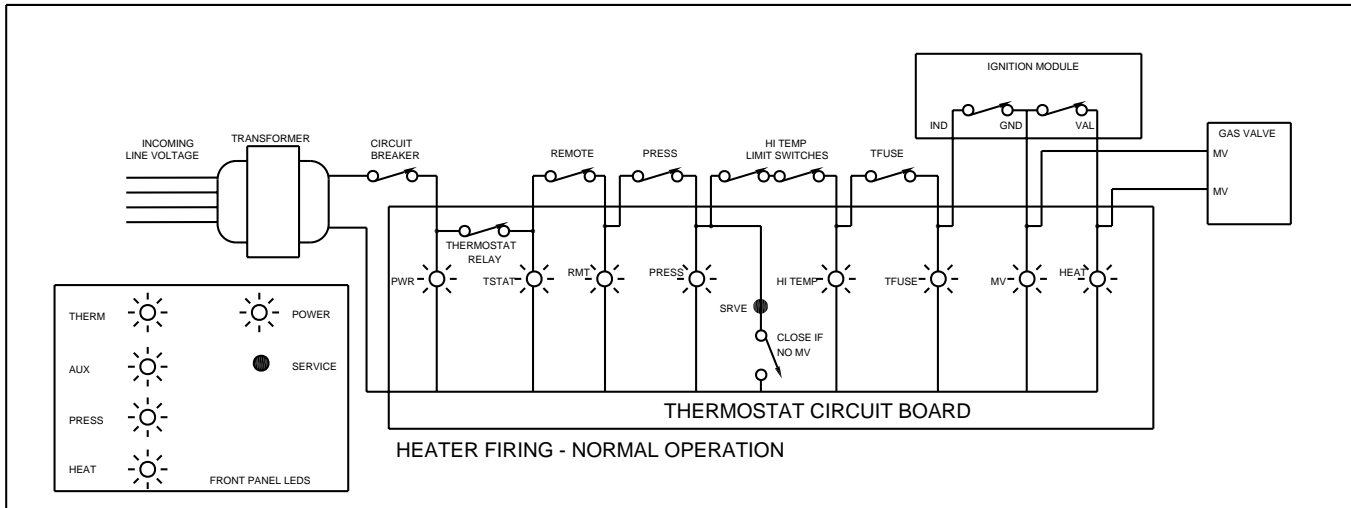
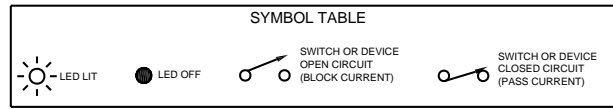
The diagrams that follow give examples of troubleshooting a malfunctioning heater using the assistance of the indicator lights.

TROUBLESHOOTING (CONTROLS)

Example of troubleshooting with the assistance of the indicator lights.

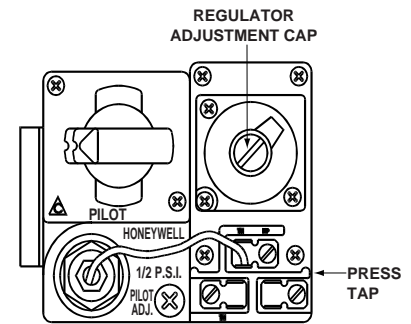
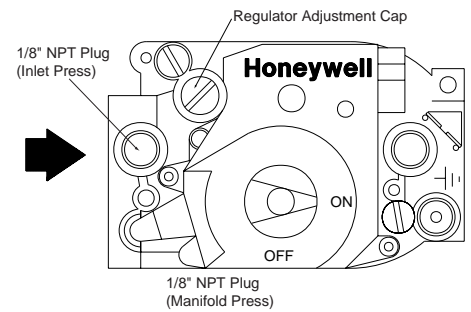


TROUBLESHOOTING (CONTROLS) - Continued



REGULATED MANIFOLD PRESSURE TEST

1. Attach the manometer to the heater jacket.
2. Shut off the main gas valve.
3. Remove 1/8 in. NPT plug on the outlet side of the valve and screw in the fitting from the manometer kit.
4. Connect the manometer hose to the fitting.
5. Fire the heater.
6. The manometer must read 4 in. WC for natural gas, 11 in. WC for propane gas, **while** the heater is operating.
7. For adjustment, remove the Regulator Adjustment Cap and using a screwdriver turn the screw clockwise to increase - counterclockwise to decrease gas pressure.



ELECTRICAL, IID ELECTRONIC UNITS

Electrical Rating

| | |
|----------|--------------------------|
| 60 Hz | 115 V.A.C. or 230 V.A.C. |
| 50/60 Hz | 208 V.A.C. or 240 V.A.C. |

NOTE

If any of the original wiring supplied with this heater must be replaced, installer must supply (No. 18 AWG 105° C. U.L. approved AWM low energy stranded) copper wire or it's equivalent.

In Canada: wires must be CSA approved.

⚠ WARNING

The heater must be electrically grounded and bonded in accordance with local codes or, in the absence of local codes, with the latest national electrical codes ANSI/NFPA No. 70.

In Canada: CSA standard C22.1 Canada Electrical Code Part 1 and/or local codes.

Always use crimp type connectors when connecting two wires.

This heater is equipped with a reversible junction box to allow line voltage to be wired from either side.

Transformer Wiring Instruction

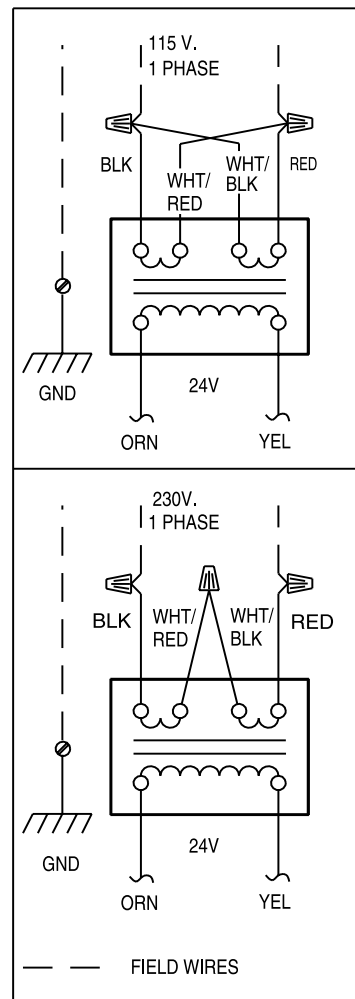


Figure 5.

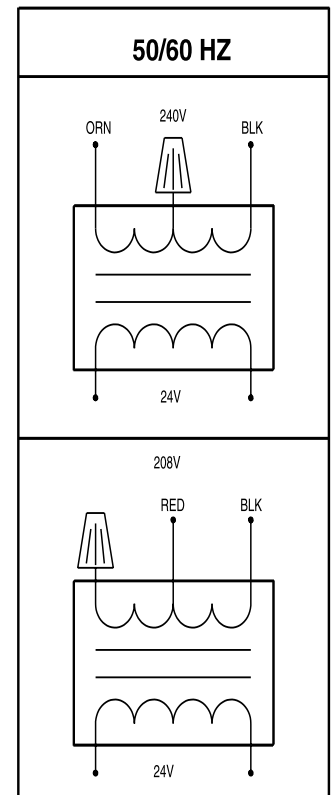


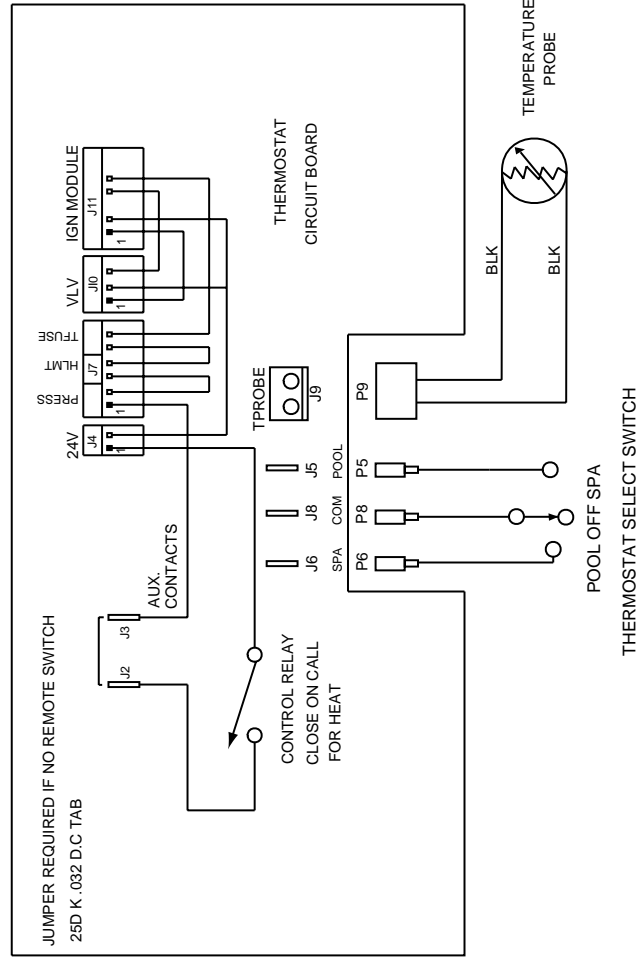
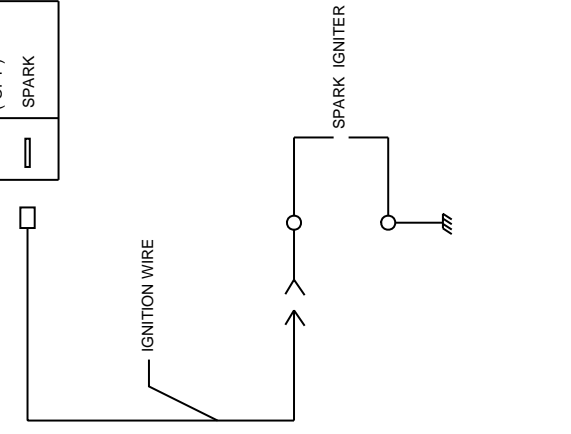
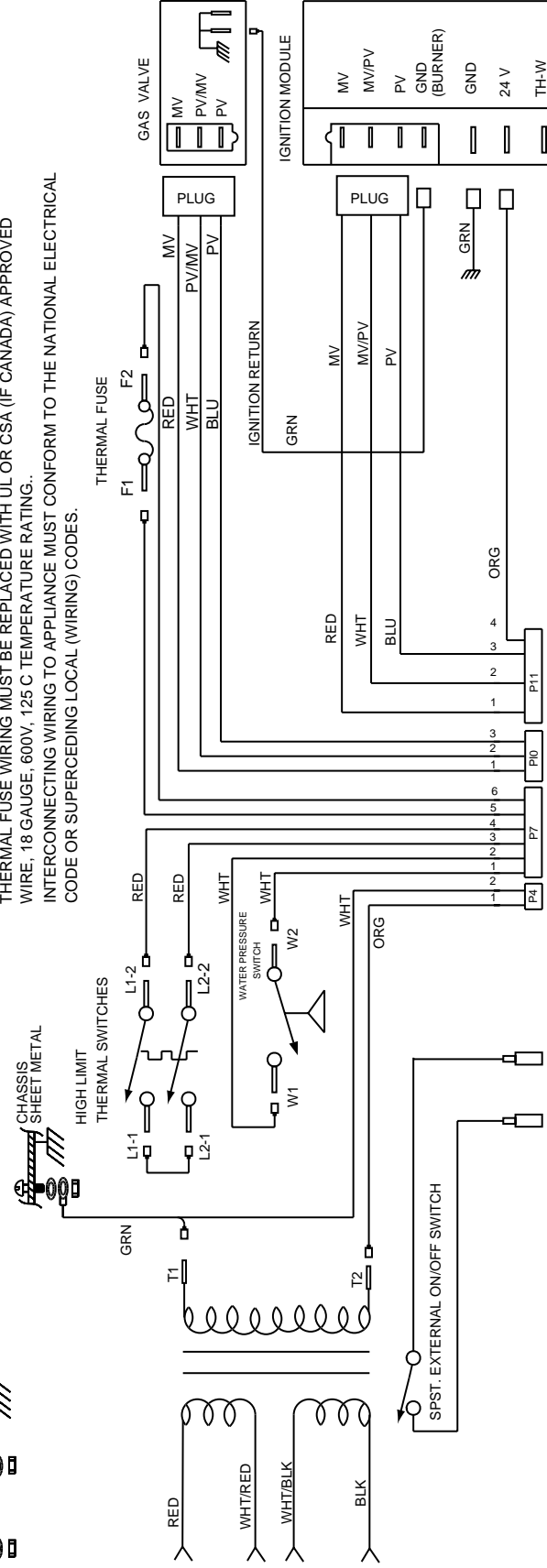
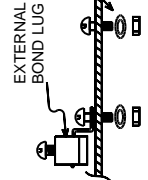
Figure 6.

MiniMax CH (150 IID Model) Electronic Ignition Wiring Diagram

MiniMax CH 150 IID Wiring Diagram

IF ORIGINAL FACTORY WIRING MUST BE REPLACED, INSTALLER MUST SUPPLY UL OR CSA (IF CANADA) APPROVED WIRE, 18 GAUGE, 600V, 105 C TEMPERATURE RATING. THERMAL FUSE WIRING MUST BE REPLACED WITH UL OR CSA (IF CANADA) APPROVED WIRE, 18 GAUGE, 600V, 125 C TEMPERATURE RATING. INTERCONNECTING WIRING TO APPLIANCE MUST CONFORM TO THE NATIONAL ELECTRICAL CODE OR SUPERCEDING LOCAL (WIRING) CODES.

EXTERNAL BOND LUG
TERMINATE SUPPLY SAFETY GROUND WIRE (GREEN) HERE
GROUND SCREW WITH PAINT CUTTING WASHER
CHASSIS SHEET METAL



POOL OFF SPA
THERMOSTAT SELECT SWITCH

REMOTE SWITCH DUAL THERM IID ONLY

3 Wire Remote

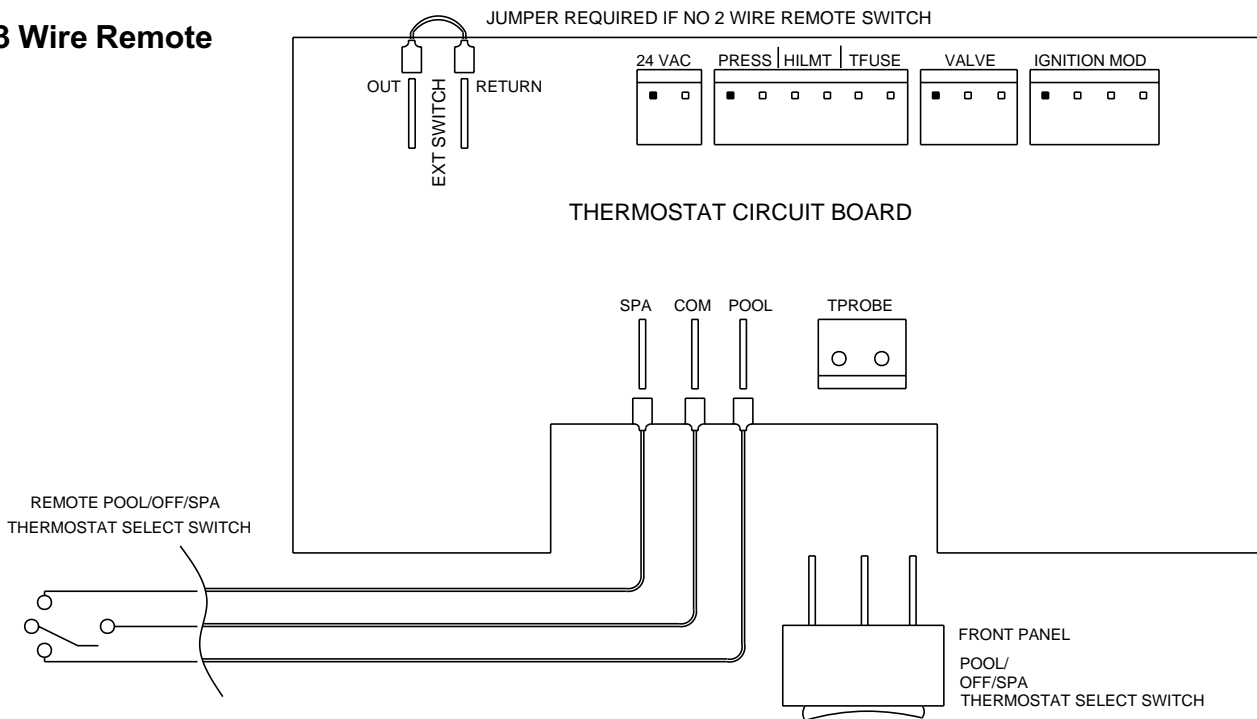


Figure 7.

2 Wire Remote

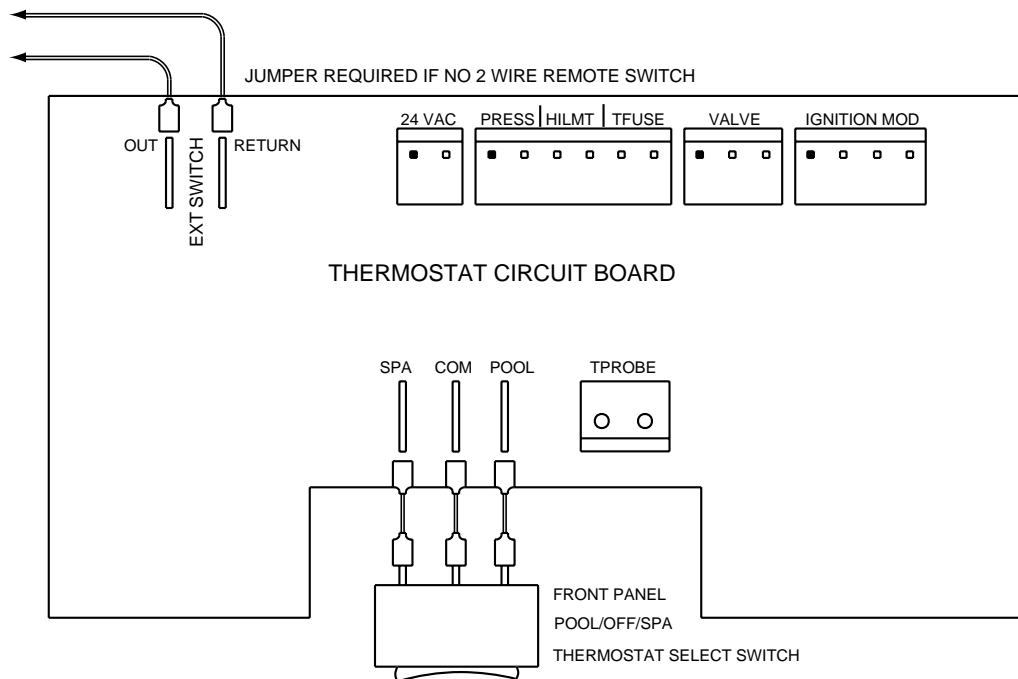
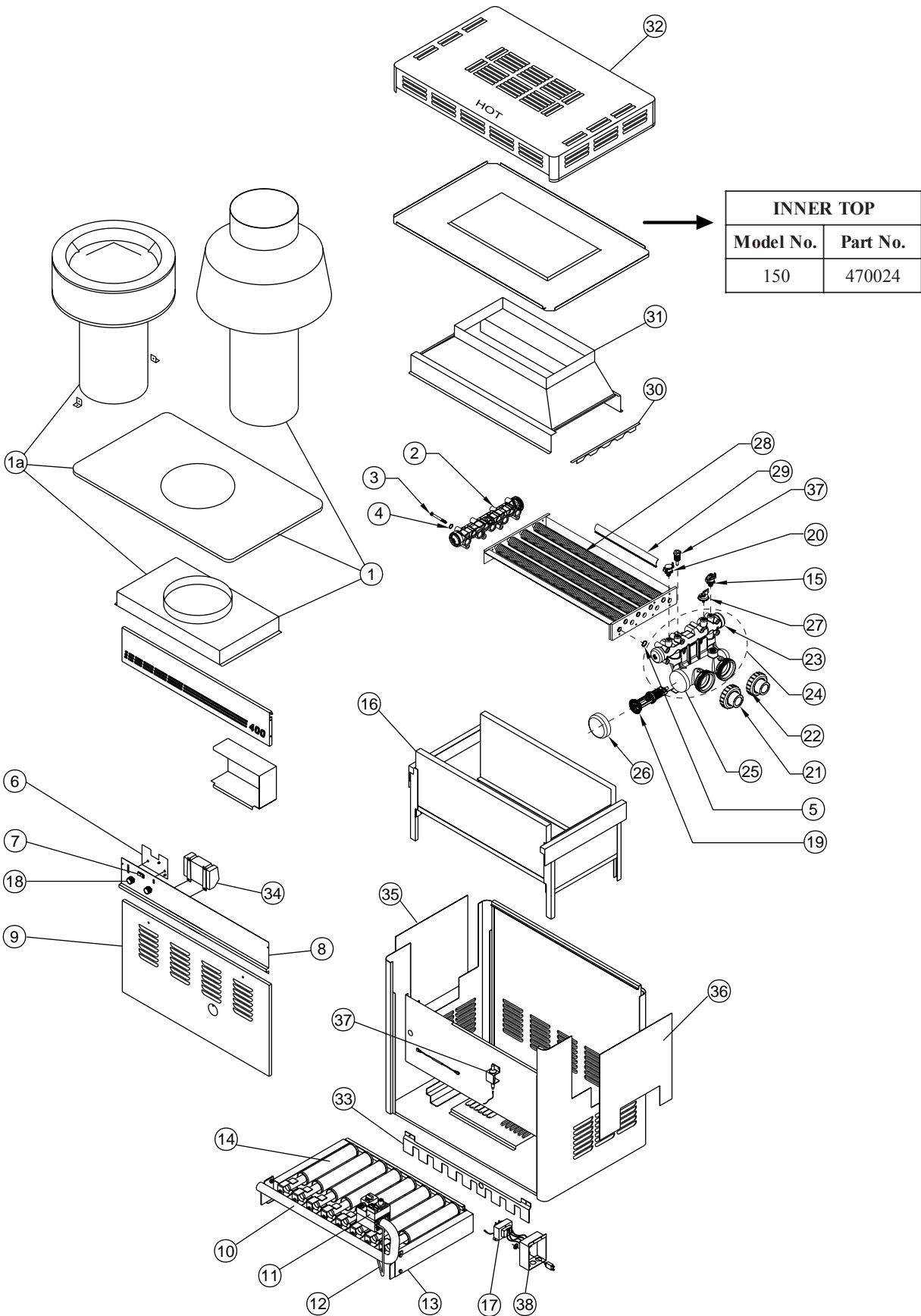


Figure 8.

NOTE: When connecting a remote control to the MiniMax CH, you must install the low voltage thermostat wires in separate conduit from **ANY** line voltage wires. Failure to follow these instructions will cause the thermostat relay to react erratically.

MINIMAX CH HEATER - 150 IID MODEL



| INNER TOP | |
|-----------|----------|
| Model No. | Part No. |
| 150 | 470024 |

MiniMax CH Parts List - 150 IID Model

| ITEM | DESCRIPTION | QTY | 150 |
|------|---|-----|-----------------|
| 1 | Vent kit assy. (indoor) | 1 | 460227 |
| 1a | Vent kit assy. (outdoor) | 1 | 460237 |
| 2 | Return header | 1 | 070994 |
| 3 | Bolt, heat exchanger | 16 | 471991 |
| 4 | Washer 3/8" ID 1" OD | 16 | 072184 |
| 5 | Tube seal gasket | 18 | 070951 |
| 6 | Electronic Thermostat circuit board - IID Model | 1 | 470179 |
| 7 | Switch rocker (single pole & double throw) | 1 | 470186 |
| 8 | Control panel assy. (complete) - IID Natural | 1 | 472151 |
| | Control panel assy. (complete) - IID Propane | 1 | 472191 |
| 9 | Door - Millivolt or IID | 1 | 075468 |
| 10 | Manifold burner | 1 | 070256 |
| 11 | Gas valve Natural - IID | 1 | 073998 |
| | Gas valve Propane - IID | 1 | 073999 |
| 12 | Pilot tube - IID | | 075191 |
| 13 | Burner tray assy. Natural (complete) - IID | 1 | 073752 |
| | Burner tray assy. Propane (complete) - IID | 1 | 073906 |
| 14 | Burner | | 2 EA. 070230 |
| 14a | Burner with pilot bracket (not shown) | 1 | 470550 |
| 15 | Pressure switch | 1 | 472125 |
| 16 | Combustion chamber assy. (complete) | 1 | 073858 |
| 17 | Transformer - w/circuit breaker - dual voltage | 1 | 471360 |
| 18 | Thermostat knob | 2 | 470184 |
| 19 | Flow valve assy. | 1 | 471750 |
| 20 | Hi-Limit thermostat 115° | 1 | 471587 |
| 21 | Adaptor - bulkhead, 2 in. | 2 | 471441 |
| 22 | Adaptor - bulkhead ring | 2 | 274440 |
| 23 | Main manifold assy. | 1 | 471993 |
| 24 | Main header assy. | 1 | 471992 |
| 25 | Main manifold bottom | 1 | 471419 |
| 26 | Cap, main manifold bottom | 1 | 471420 |
| 27 | Hi-Limit thermostat 150° | 1 | 471694 |
| 28 | Heat exchanger (without heads) | 1 | 472131 |
| | Heat exchanger (with heads) | 1 | 472169 |
| 29 | Baffle | | 8 ea. 070277 |
| 30 | Baffle hold down (2) baffles on 400 | 1 | 073810 |

MiniMax CH Parts List - 150 IID Model, *contd.*

| ITEM | DESCRIPTION | QTY | 150 |
|--------------------|---|-----|---------------------------|
| 31 | Flue collector | 1 | 073864 |
| 32 | Outdoor top assy. | 1 | 470471 |
| 33 | Lightback shield (Propane Gas units only) | 1 | 075783 |
| 34 | Module Natural Gas | 1 | 073584 |
| | Module Propane Gas | 1 | 073585 |
| 35 | Panel (return) | 1 | 073789 |
| 36 | Panel (in/out) | 1 | 472127 |
| 37 | Thermistor (probe) complete - IID | 1 | 471566 |
| 38 | Junction Box | 1 | 470122 |
| * Not Shown | | | |
| * | Plastic mounting bracket | | 070715 |
| * | Clips for wire harness | | 471277 |
| * | Wire Kit - Millivolt | | 075511 |
| * | Screw 8 x 1/4" HH | | 071703 |
| * | Screw 8 x 1/2" HH | | 071698 |
| * | Screw 6 x 1/4" | | 071716 |
| * | Screw 10 -32 x 1/4" | | 071659 |
| * | Screw 10-32 x 3/16 | | 075692 |
| * | Bushing 1/2" | | 070551 |
| * | Therm knob stopper | 2 | 470414 |
| * | Bolt 5/16" - 18 x 3/4' | 2 | 073725 |
| * | Orifice main burner natural | | 3 ea. N or P 073727 |
| * | Orifice main burner propane | | 073728 |
| * | Pilot - natural - Millivolt | 1 | 471292 |
| * | Pilot - propane - Millivolt | 1 | 471291 |
| * | Pilot - generator | 1 | 071515 |
| * | Thermal cutoff - fusible link | 1 | 075173 |
| * | Power element (flow-valve) | 1 | 470178 |
| * | Pilot rainshield | 1 | 471293 |
| * | Pilot electrode (only) | 1 | 471328 |
| * | "L" brackets | 3 | 074540 |
| * | Bracket adapter Q379 pilot, MV | | 471271 |
| * | Jumper | | 072253 |
| * | Door latch | | 071240 |

SAVE THESE INSTRUCTIONS.

Pentair Pool Products, Inc.

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