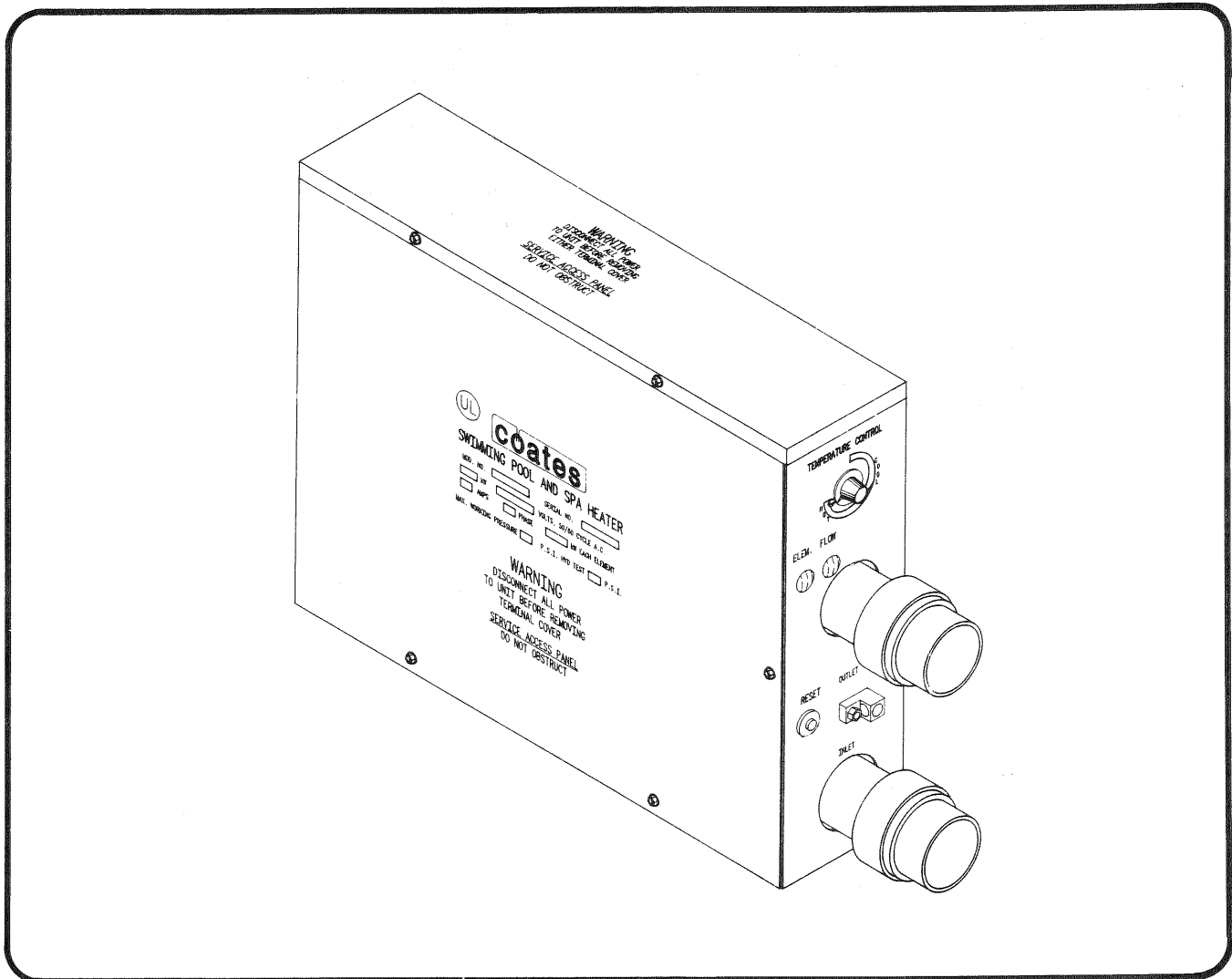




SPA HEATER

MODELS: 12406ST & 12411ST
installation, operation and maintenance



1.0 DESCRIPTION

Coates Spa Heaters are intended for use on spas or hot tubs having a forced water circulation system.

The water flow through the heater should be at least 15 GPM but should not exceed 80 GPM. Higher flow may damage the heater.

2.0 INSTALLATION

WARNING

Only qualified personnel, as defined by National Electrical Code Article 100, should install and maintain this equipment. Unauthorized alteration or improper maintenance of this unit may release the manufacturer from any warranty claims. The installation must be in accordance with the instructions in this manual and applicable local plumbing and electrical codes.

CHECK ELECTRICAL CONNECTIONS TO ALL COMPONENTS within the heater for tightness. These can become loose during shipment and handling.

2.1 Physical Placement

The Coates Spa Heater is suitable for indoor or outdoor installation. See Figure 1 for piping connections and Figures 2A and 2B for electrical connections. The heater should be securely mounted to a smooth, flat surface. It may be conveniently located next to the filtration equipment. **Leave minimum clearance of 9 inches on the left, 12 inches both above and to the front and 6 inches on the back for service entrances and access.**

2.2 Electrical Installation

CAUTION

The electrical installation must be in accordance with Article 680 of the National Electrical Code, and ANSI/NFPA 70.

The electrical supply power must be single phase, 2 wire, 240 VAC. The supply must be protected by a circuit breaker or a fused disconnect switch. An insulated ground conductor must be provided. See Figures 2A and 2B and Table 1 for supply wire and circuit sizing. A lug has been provided for attachment of the BONDING wire per the National Electric Code, 1996 Edition, Article 680-22, (a) (4). This lug is located between the inlet and outlet pipes of the heater.

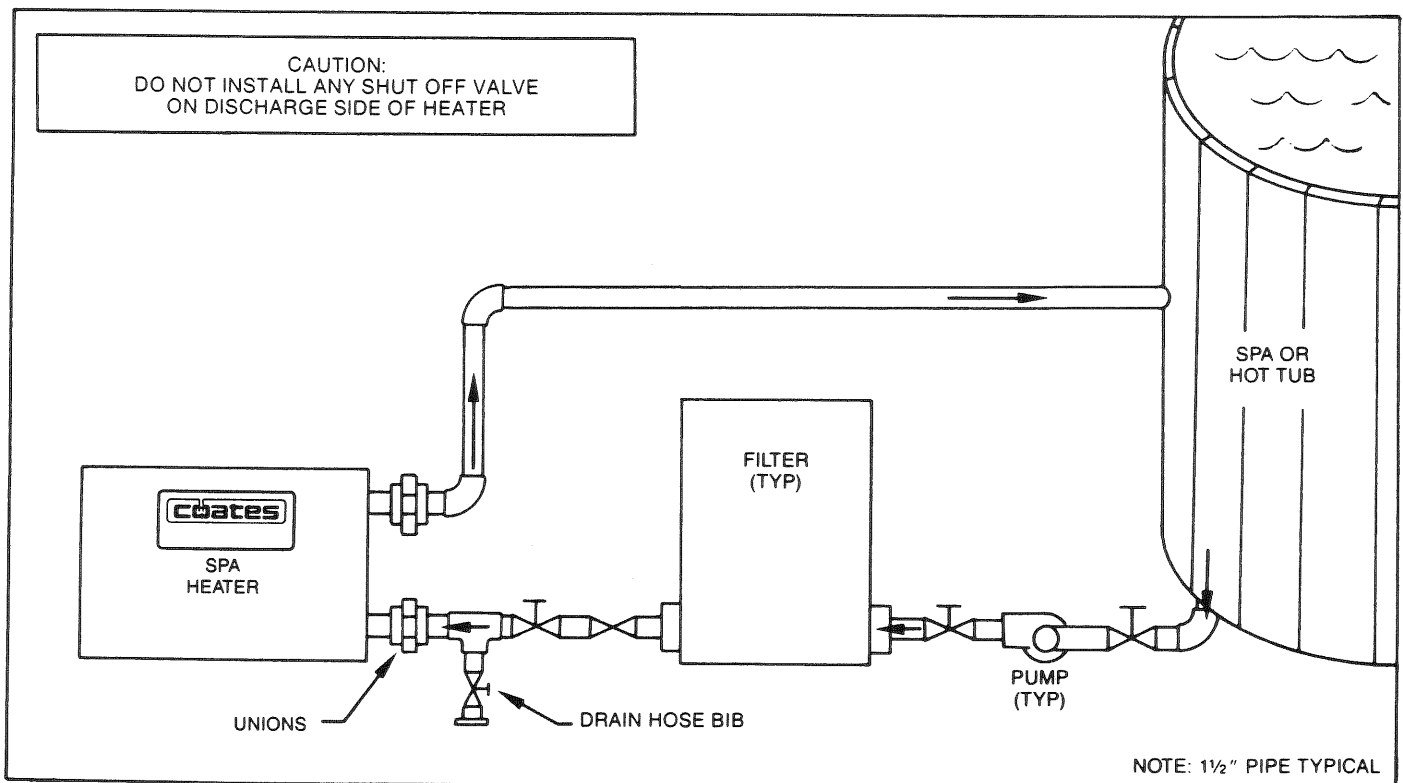


Figure 1. Piping Diagram

WARNING:

Only qualified personnel should attempt maintenance on this equipment. (N.E.C. Article 100)

HEATER TROUBLE SHOOTING GUIDE**CAUTION**

This heater incorporates 240 volt electrical circuits.
Do not open the case unless unit is disconnected from electrical power.
Use only manufacturer's parts, or U.L. listing and warranty may be void.

PROBLEM	POSSIBLE CAUSES	ACTION
Not Heating	No Power	Check circuit breaker(s). "on"
	Hi Temperature Limit Tripped	Push limit control reset. ④
	Temperature Control Inoperative	Replace control ②
	Heating Element(s) Inoperative	Replace element(s) ⑧
	Low Water Flow	Clean filter & check pump. Check system valves for open.
	Flow Switch Paddle Impeded.	Clear paddle obstruction. ③
Insufficient Heating	Heating Element(s) Inoperative	Replace element(s) as required.
	Heater Too Small For Spa	Check heater sizing. Replace with larger heater if required.
High Limit Trips	Temperature Control Failed	Replace Control ②
	High Limit Faulty	Replace Control ④
	Flow Switch Paddle Impeded "On".	Clear paddle or replace. ③
	Heater Installed in High ambient temperature.	Cool equipment room or shade heater from sun.

When flow light is on, rotate temperature control ② thru full range, element pilot light ⑥ should come on indicating element(s) ⑧ is energized. If Spa does not heat when pilot light is on, replace element(s) ⑧.

Elements ⑧ can be checked with an Ohm meter. Each element ⑧ should read approximately 10.5 Ohms.

Ambient temperatures above 120°F will cause the High Temperature Limit ④ to trip prematurely.

**PROTECTING YOUR COATES HEATER
WITH PROPER WATER CHEMISTRY**

Proper water balance is important to extending the life of your Coates Heater. While pH control is critical, the control of calcium hardness will protect against scaling and also help prevent corrosion.

DAMAGE TO HEATER	ACID							IDEAL RANGE 7.2-7.8	ALKALINE							DAMAGE TO HEATER
	CORROSIVE WATER								ALKALINE WATER							
	0	1	2	3	4	5	6		7	8	9	10	11	12	13	

The correct levels of sanitizer, pH, total alkalinity and calcium hardness will vary some depending on the type of pool (plaster, vinyl or fiberglass) and the chemical content of the fill water. **Water that is not maintained in balance can void your warranty.**

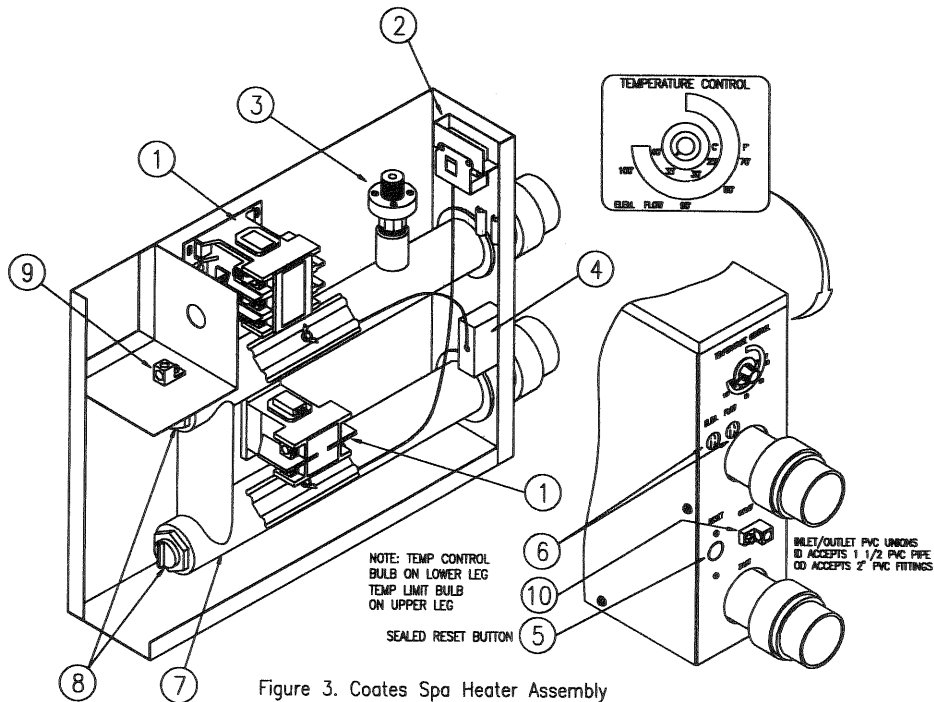


Figure 3. Coates Spa Heater Assembly

3.0 HEATER CONTROLS

The heater has a temperature controller adjustable from 60°F to 104°F, one manual reset type high temperature limit thermostat set at 122°F and a flow switch to prevent operation of heater without water flow.

3.1 Cautions and Warnings

1. Be sure to check all cautions and warnings in this manual and as displayed on the heater labels before operating or performing any maintenance on these heaters.
2. Do not remove the heater cover while electrical power is applied to the heater. Power must be interrupted at the heater supply circuit breaker or disconnect switch.
3. The MIN. setting on the temperature control dial is an OFF position. The heater will not operate at this setting regardless of water temperature.

3.2 Starting the Heater

CAUTION

Do not operate heater without water.

1. Ensure that heater case is properly grounded, and bonded.

2. Fill the system with water and start the circulating pump.
3. Turn on electrical power at the heater supply circuit breaker.
4. Set the temperature control to medium water temperature and increase gradually to desired operating temperature. DO NOT EXCEED 104°F MAXIMUM.

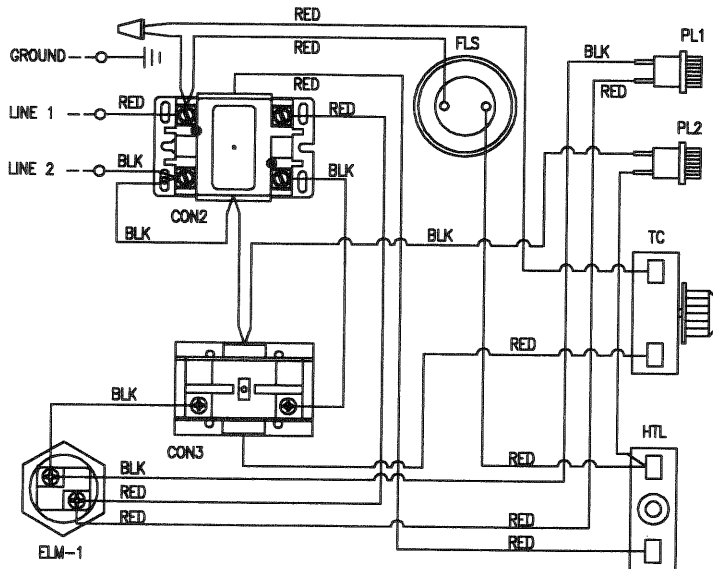
3.3 Stopping the Heater

1. Turn off electrical power at the heater supply circuit breaker before stopping the circulating pump.

4.0 MAINTENANCE

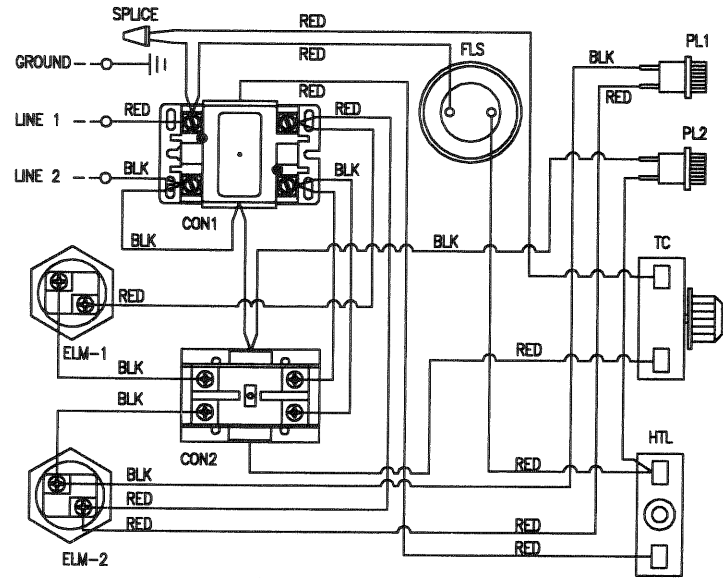
1. Keep the heater clean.
2. If high temperature causes limit thermostat to cut off the electrical power, disconnect power at disconnect switch and determine the cause before resetting thermostat. A water temperature drop is required to allow resetting of the manual reset high limit.
3. If leaks develop in the heater or connecting piping, shut down the heater and repair defective connections.
4. If heating elements are removed for replacement, use only Coates elements, see Table 2.

POWER SUPPLY
240VAC SINGLE PHASE



Model 12406ST
Figure 2A. Wiring Diagram

POWER SUPPLY
240VAC SINGLE PHASE



Model 12411ST
Figure 2B. Wiring Diagram

- HTL: HI-TEMP CUT OFF "MANUAL RESET"
- TC: TEMPERATURE CONTROL-THERMOSTAT
- ELM1-2: HEATING ELEMENT(S)
- CON1: CONTACTOR, 2-POLE 50AMP (RES)
- CON2: CONTACTOR, 2-POLE 35AMP (RES)
- CON3: CONTACTOR, 1-POLE 30AMP (RES)
- CB: CIRCUIT BREAKER (CUSTOMER SUPPLIED)
- PL1: PILOT LIGHT "ELEMENT"
- PL2: PILOT LIGHT "FLOW SWITCH"
- FLS: FLOW SWITCH
- PRS. SW. PRESSURE SWITCH (ALTERNATE)

- ▶ INSULATED GROUND CONDUCTOR, COPPER, MUST BE THE SAME SIZE AS THE SUPPLY WIRING, BUT NOT LESS THAN #12 AWG.
- ▶ FACTORY SPICED LEADS ARE PROVIDED FOR CONNECTION TO CUSTOMER SUPPLIED AUXILIARY CONTROLS. i.e. REMOTE THERMOSTAT. SEE YOUR DEALER FOR INSTALLATION INSTRUCTIONS.

- ▶ THE "ST" MODEL SPA HEATER IS AVAILABLE WITH EITHER A FLOW SWITCH, PN 23000102 OR A PRESSURE SWITCH, PN 22007210. CONFIRM WHICH DEVICE YOUR HEATER IS EQUIPPED WITH BEFORE ORDERING REPLACEMENT PARTS.

TABLE 1

MODEL NO.	HEATER KW/VOLT RATING	WIRING DIAG. FIG. NO.	NO. & KW. OF HEAT. ELEMENTS	HEATER CURRENT RATING	RECOM. CIRCUIT RATING	RECOMMENDED SUPPLY WIRING
						COPPER @ 60° C
12406 ST	5.5@240 VAC	2-A	1@5.5 KW	23 AMPS	30 AMPS	#10 AWG
12411 ST	11@240 VAC	2-B	2@5.5 KW	46 AMPS	60 AMPS	#4 AWG

TABLE 2

ITEM	PART NO.	DESCRIPTION	QTY
1	21000100	CONTACTOR, 2P, 50AMP, 240VAC MOD 12411ST	1
1	21000650	CONTACTOR, 2P, 35AMP, 240VAC MOD 12406 / 11ST	1
1	21000660	CONTACTOR, 1P, 30 AMP, 240VAC MOD 12406ST	1
2	22002001	TEMPERATURE CONTROL	1
3	22007210	PRESSURE SWITCH, 1-5 PSI, (used on special-P models only)	1
◊	32307050	BUSHING, 1"MIP x 1/8" FIP, (used on special-P models only)	1
3	23000102	FLOW SWITCH	1
4	22003820	HIGH TEMPERATURE LIMIT, MANUAL RESET	1
6	29034620	PILOT LIGHTS for ELEMENT and FLOW	2
7	62002605	VESSEL ASSEMBLY, STAINLESS STEEL	1
8	20005061	HEATING ELEMENT, 5.5 kW, 240 VOLT	*
9	29020025	GROUND LUG, LA-2	1
10	29020025	BONDING LUG LA-2	1

◊ BUSHING NOT SHOWN

* SEE TABLE 1 FOR ELEMENT QUANTITY

When ordering spare parts from your dealer, provide the model number and serial number of your heater.



LIMITED WARRANTY

The Company extends this limited warranty to the original purchaser of a Coates Electric Spa Heater.

Coates warrants the electrical components* and wiring (excluding enclosure, enclosure parts, knobs and accessories) in this new Spa Heater to be free from defects in materials and workmanship for one (1) year from the provable date of purchase, or eighteen (18) months from date of factory shipment, whichever occurs first. Coates further warrants the stainless steel water containment vessel to be free from defects in materials and workmanship for two (2) years from the provable date of purchase or thirty (30) months from the factory shipment, whichever occurs first. Enclosure parts, knobs and accessories have no warranty whatsoever.

*Exception: Heating elements are warranted for ninety 90 days after installation or one (1) year from date of factory shipment, whichever occurs first.

Coates will repair or replace at its option, defective component parts as explained above during the warranty period provided such parts are returned to the factory, Freight Prepaid. Factory authorization **MUST BE OBTAINED** under this warranty before returning defective parts.

Limited Warranty Does Not Cover

1. New products purchased outside the United States of America and Canada.
2. Uncrating, unpacking, set-up, installation, and/or startup of this unit.
3. Adjustments to controls normally operated by consumer purchaser.
4. This limited warranty does not extend to any defect, malfunction or failure caused by, or resulting from improper service, maintenance or repair, abuse, neglect, accident, corrosion caused by improper water chemistry or by equipment that use salt to create a sanitizer, lack of water, or any other cause beyond the control of Coates Heater Company, Inc. or to any product where the nameplate shall have been removed, altered, replaced, defaced or rendered illegible.
5. This limited warranty is void if the Spa Heater is used in a salt water system or under any extreme or unusual corrosive condition for which stainless steel metals would not be recommended.
6. This limited warranty does not extend to the repair or replacement of defective components except at Coates or a service facility authorized by Coates.

IMPLIED WARRANTIES, WHEN APPLICABLE, SHALL COMMENCE UPON THE SAME DATE AS THE EXPRESS WARRANTY PROVIDED ABOVE, AND SHALL, EXCEPT FOR WARRANTIES OF TITLE, EXTEND ONLY FOR THE DURATION OF EXPRESS WARRANTY. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THE ONLY REMEDY PROVIDED TO YOU UNDER AN APPLICABLE IMPLIED WARRANTY AND THE EXPRESS WARRANTY SHALL BE THE REMEDY PROVIDED UNDER THE EXPRESS WARRANTY, SUBJECT TO THE TERMS AND CONDITIONS CONTAINED THEREIN.

THE COMPANY SHALL NOT BE LIABLE FOR INCIDENTAL AND CONSEQUENTIAL LOSSES AND DAMAGES UNDER THE EXPRESS WARRANTY, ANY APPLICABLE IMPLIED WARRANTY, OR CLAIMS FOR NEGLIGENCE, EXCEPT TO THE EXTENT THAT THIS LIMITATION IS FOUND TO BE UNENFORCEABLE UNDER APPLICABLE STATE LAW.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.



HEATER COMPANY, INC.

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