

# Thermo-Control®

The ultimate wood burning system.



**Owner's Manual and  
Installation Guide  
for Wood Burning Boilers**

# Thermo-Control®

The ultimate wood burning system.

P. O. Box 640  
Cobleskill, New York 12043  
Telephone (518) 296-8517

February 2016

Tested & Listed by Energy Testing Laboratory of Maine according to ETLM Standard 78  
-1 & Underwriters Laboratory Standards 1482, 737 & 391.

Your Unit Serial # _____
Your Unit Model # _____
Date Purchased _____
Dealer's Name _____
Address _____
Telephone # _____

I, Frank C. Gross, a Registered Professional Engineer in the Commonwealth of Massachusetts, No. 10127, have examined the drawings as stamped and the actual construction of the Thermo-Control Wood-Burning Central Heating Units... as manufactured by Thermo-Control, PO Box 640, Cobleskill, New York 12043.

The designs of these units are based on good engineering principles and the units are built in accordance with standard engineering practices of formed 3/16" and 1/4" steel. All welds are continuous, to form a sealed combustion chamber. The combustion chamber is lined with firebrick to prevent overheating of that area. Air for combustion is regulated very effectively by a simple automatic thermostat. A gasket provides a good seal for the reinforced steel door. The chimney vent in each model is more than adequate.

If the units are installed and operated in accordance with the owner's manual and comply with State and Local requirements for clearances, size and height of chimney to give adequate draft, they will operate very satisfactorily and in a safe manner.



*Frank C. Gross*  
Frank C. Gross

NOTE: Read Sections IV through VIII BEFORE installing and using your product.

# INTRODUCTION

Congratulations on your purchase of a **Thermo-Control wood-burning boiler!** Your decision to acquire a wood-burning unit was undoubtedly one you reached after careful thought and we're proud you selected Thermo-Control. Whether this is your first venture into the art of wood burning, or if you were born with the proverbial ax in hand, we're confident you will find Thermo-Control to be a superior product.

Quality engineered to bring you the ultimate in efficiency, construction and versatility, Thermo-Control's features are many, but you'll be happy to learn that its benefits are even more numerous!

There's much to be said about wood as a source of fuel. A clean fuel, it's available in most areas, is economical to use and if harvested and used with care, it will provide a never-ending supply of dependable heat for generations to come. An excellent source of heat, wood is even more efficient when burned in Thermo-Control, a well constructed, high recovery wood-burning unit. With Thermo-Control, you can depend upon a favorable heating value ratio. Therefore, with a standard cord of seasoned hardwood, you derive the same heat as you would with a ton of coal or 200 gallons of fuel oil!

If you have access to wood, your benefits can be multiplied - you save money on fuel, with proper harvesting you improve the woodlot, and of course the health advantages should never be minimized. But even more important, when utilized in a properly constructed unit, wood can work with other fuels to provide long lasting centralized heat. As a result, you have the best of both - the money-saving qualities of wood and the convenience of more sophisticated fuels.

The purpose of Thermo-Control is to produce the most heat with the least amount of wood and a minimum of care and maintenance. Manufactured of heavy gauge hot rolled steel, Thermo-Control boasts an aquastat operated electronic draft control, which insures constant, even water temperature. The generous firebox and expansive door virtually eliminate the need for splitting wood, with some models accommodating three foot logs. If necessary you will fill your Thermo-Control only two or three times a day, and then forget it, sure that your home will be comfortably warm, despite the chill outside.

The versatility of Thermo-Control wood-burning boilers is best demonstrated by the way they can be used. Each of the three basic sizes can be equipped with interior stainless steel piping for use with your domestic hot water heating system or for heating swimming pool or hot tub water.

Versatility is the word with Thermo-Control, and as we consider the various features which make Thermo-Control superior, you'll conclude that you made a wise investment when you made the move to our top quality line!

- We ask that you follow our policy of **“KEEPING SAFETY FIRST”** when installing and using your Thermo-Control wood-burning product.
- We strongly suggest that you first read through the entire manual before installing your unit in accordance with Basic Installation starting on page 11.
- We further recommend that you solicit the aid of a qualified chimney professional when making the inspection of your chimney as outlined in Section IV of this manual. Your building codes or fire department could also be very helpful with advice regarding the proper installation of your stove, the chimney connector, and protection of combustible materials.

# FEATURES

For over thirty-eight years Thermo-Control wood burning furnaces and boilers have been known for high efficiency and durability.

This reputation is a result of properly engineered combustion techniques.

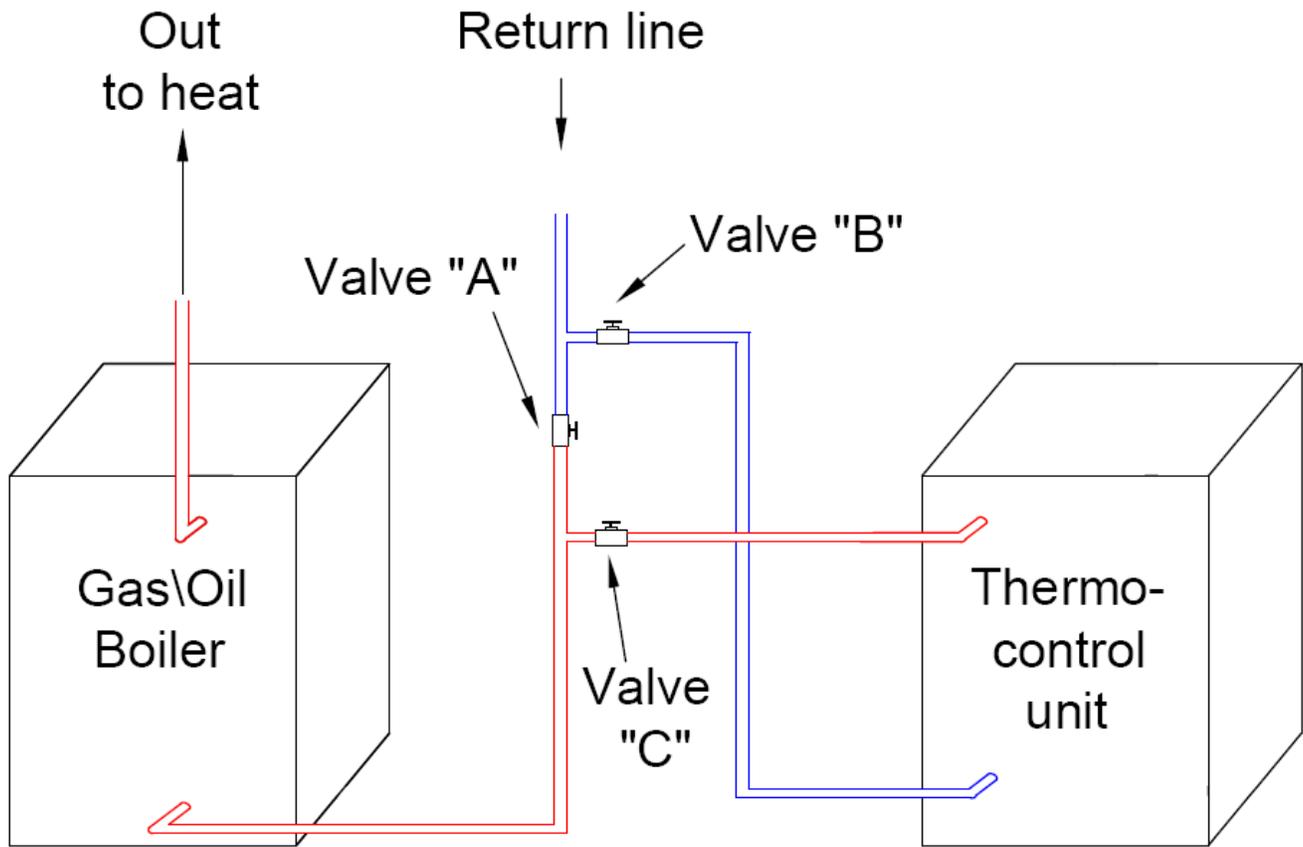
Thermo-Control boilers incorporate the combination of natural draft and a separate secondary combustion chamber for efficiency. The two specially designed combustion chambers featuring separate primary and secondary pre-heated air supplies contributes to a longer lasting, cleaner burn.

Thermo-Control units have been tested and approved to standards UL1482, UL737, UL391, ETL78-1, CSA B366 and others by independent laboratories.

- **RUGGED** — Steel construction for optimum heat transfer. 20 year warranty.
- **EFFICIENT** — Side draft baffle system. 76% overall efficiency.
- **RESPONSIVE** — Electrically controlled damper responds to help maintain constant and even water temperature.
- **EXPANSIVE** — Large capacity firebox and generous loading door for convenient fueling. Up to 15 hours of steady heat without reloading. Firebox bottom lined with firebrick.
- **VERSATILE** — Designed for installation as the prime heating source or as supplement to an existing oil or gas fired boiler.
- **ENGINEERED** — Delivers up to 300,000 BTU of useful heat with a minimum of maintenance.
- **CLEAN** — Primary and secondary air supply at strategic locations, with two scientifically designed combustion chambers for higher efficiency and a long lasting, cleaner burn.

Specifications	Model 2000	Model 2500	Model 3000
Specifications subject to change without notice.			
<b>B.T.U. Rating (equiv)</b>	125,000 B.T.U.	200,000 B.T.U	300,000 B.T.U.
<b>Overall Dimensions</b>	31"W, 48"H, 54"L	35½"W, 60"H, 56"L	48"W, 72"H, 67"L
<b>Firebox Capacity</b>	9 cu. ft.	17 cu. ft.	23 cu. ft.
<b>Flue Size</b>	8 in. dia.	8 in. dia.	10 in. dia.
<b>Max. Log Length</b>	27"	36"	38"
<b>Door Size</b>	15" X 18"	15" X 18"	24" X 30"
<b>Water Capacity</b>	130 gallons	170 gallons	300 gallons
<b>Weight</b>	885 lbs.	1,400 lbs.	1,940 lbs.

# SAMPLE INSTALLATION



Sample installation - Thermo Control Model 2000, 2500 & 3000 boilers. Add on to existing gas or oil fired boiler.

When operating wood boiler, close valve "A" and open valves "B" & "C". Reverse valve settings when wood boiler is not utilized.

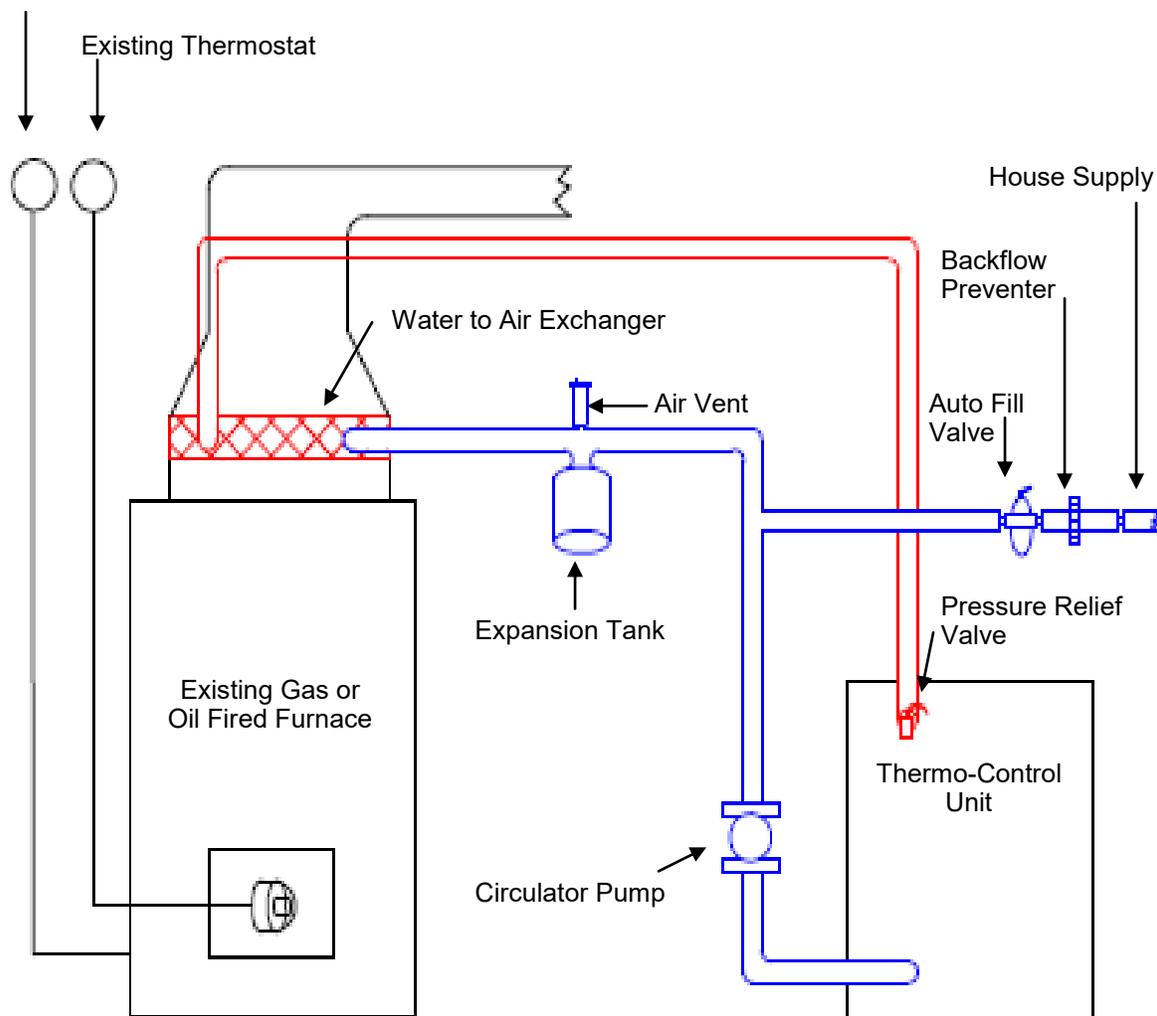
Divert return water to wood boiler where return water will pickup heat and then pass through the existing gas or oil fired boiler. Turn down the aquastat on the oil/gas boiler to a setting of 120 degrees low and 140 degrees high.

Since the wood boiler aquastat temp. is set at 160 low, 180 high, the existing boiler then acts as a back-up only.

**VERY IMPORTANT** - Valves "B" & "C" must be open prior to firing the wood boiler.

## Wood Boiler Water to Air Exchanger

New Thermostat, wired to start furnace blower



Items Not Pictured:

- 1) Fan Control Switch wired to furnace blower and new thermostat.
- 2) Ball valves on house supply as well as supply and return lines to exchanger, as desired.

# OPERATION INSTRUCTIONS

- Boiler should be set on a level concrete pad or equal.
- Proper clearance must be maintained from sides and the back of the boiler to all combustible materials. Front clearance must be minimum of 48" to combustible materials (see Listing Label).
- The chimney pipe must be screwed to the furnace smoke ring and must be braced to prevent dislodging the smoke pipe.
- The fuel loading door must be shut during boiler operation except for normal loading and/or ash removal.
- During normal operation of the boiler, pull the control rod handle out to close the baffle by-pass door. This will result in a cleaner burn, more transferable heat and considerable fuel savings.
- The baffle by-pass door should be opened by pushing the control rod handle in prior to opening the fuel loading door as this will help prevent smoke from exiting the front door during loading operations. Be sure to pull the control rod handle toward you after the front door is closed.
- The lower pipe opening in the rear of the boiler is the return line. The upper opening is the hot water supply.
- A boiler drain valve is located in the bottom back of the boiler.
- Ash removal - You will find that the most complete ash burning will occur just in front of the loading door and below the baffle at the rear of the boiler combustion chamber. The fine ash by the loading door should be removed, then the ashes further in the firebox should be raked forward and allowed to be reduced to a fine ash from further burning. From time to time, the fine ash under the rear baffle will need to be removed. **IMPORTANT:** Area under the rear baffle **MUST** be kept clear of coals and ashes for proper burning. Neglecting to do this will result in a lack of air circulation, thereby extinguishing the fire.
- The aqua-stat mounted on the boiler will open and close the air supply control that is mounted on the front loading door. You may adjust the aqua-stat temperature setting to increase or decrease the water temperature in the boiler.
- This boiler has a 30# pressure relief valve exiting the boiler. This must be installed and operational at all times and extreme care must be taken to ensure that any discharge is piped to a safe area to avoid injury to persons, animals or property.

- Possible injury to persons and damage to the boiler and/or your heating system may occur if the relief valve becomes plugged or restricted.
- Properly sized expansion tank(s) must be installed in the piping from the boiler. Please consult the expansion tank suppliers or manufacturers for proper sizing for your heating system. Expansion tank must be sized so that operational pressure does not exceed 15 lbs.
- The front of the boiler surface and loading door may be hot during operation. You must take precautions to prevent possible burns or other injury to all persons, animals or property.
- Owner/operator may choose to install a rust inhibitor when filling the boiler. However, Thermo-Control boilers are pressure vessel/closed system and do not require rust inhibitors.
- All ash must be removed at the end of each heating season. The combustion chamber must be coated with oil to aid in rust prevention during the off season.
- The smoke stack must be covered when boiler is not fired to prevent water from entering the combustion chamber as moisture and wood ashes when combined may be very destructive to the inactive boiler.

## **IMPORTANT NOTICE**

- Do not use volatile chemical or fluids to start fire.
- Load fuel carefully or damage will occur.
- Before opening the loading door, push in the Baffle Control Rod. This will open the Baffle Bypass door allowing smoke to direct vent to the flue.
- If connected to central heating, minimize any resistance to the fluid flow by opening water flow valves, removing air filter, etc.
- If connected to central heating, during prolonged power failures burn only small amounts of fuel at a time.

## **HELPFUL HINTS**

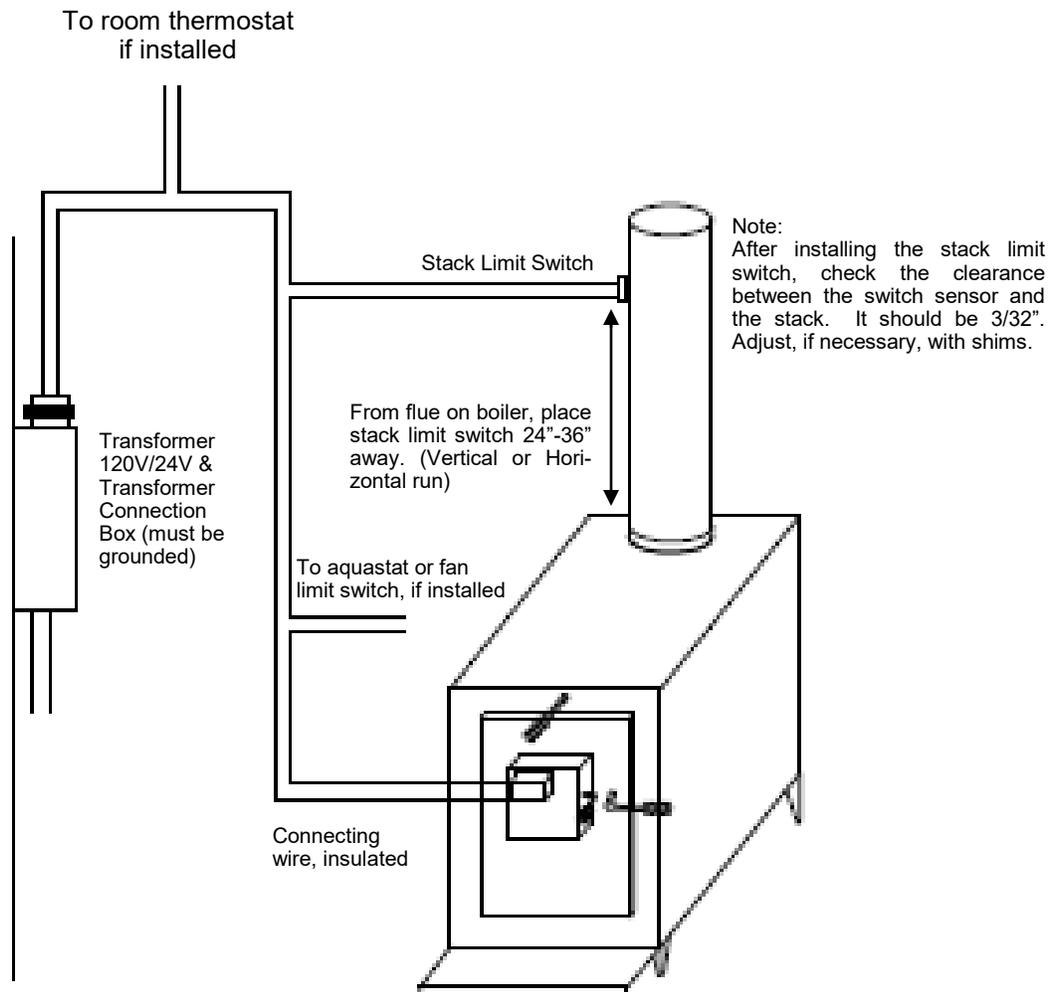
To minimize wasted fuel, you may find the following of value.

Prior to reloading fuel,

1. Scoop and remove a little of the powder ash from immediately inside the loading door.
2. Then rake all the coals toward the loading door. You will find that you will be constantly removing only pure ash rather than removing unburned chunks of coals or charcoal.
3. Approx. once every two weeks please remove the pure ash from under the rear baffle area.

### ***The Motorized Damper Control***

In this system, an electric motor controls the combustion air damper. The air damper stays open as long as the motor has power applied to it. It closes and shuts off the combustion air supply when the power is interrupted by some means. Connected in this series with the motor is the room thermostat (not provided), stack limit switch, and aquastat or limit switch.

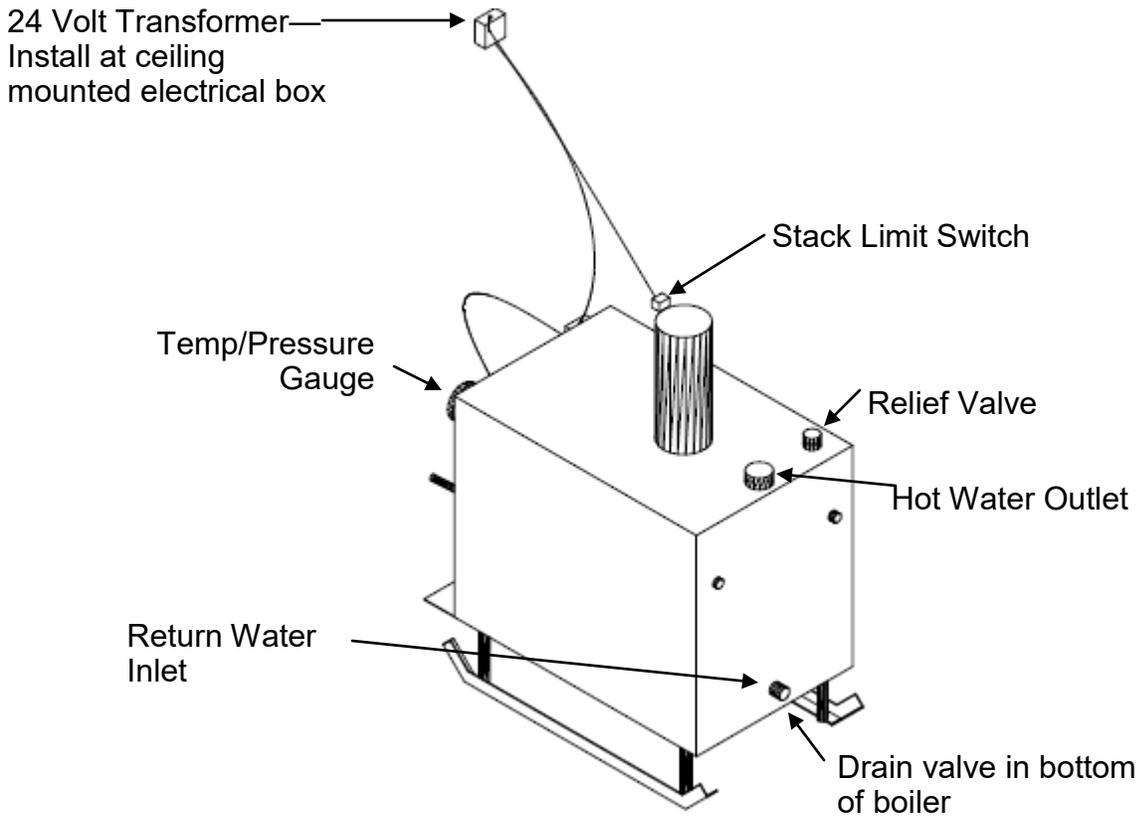
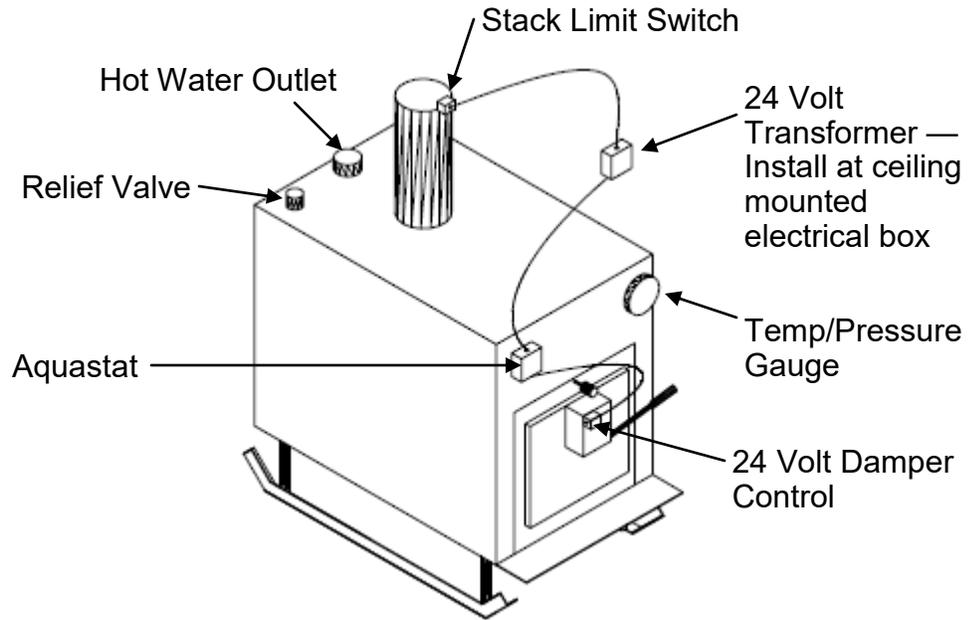


### **Motorized Combustion Chamber Air Control**

When the living space requires heat (either the room thermostat or the aquastat), the motor keeps the combustion air damper open for the entry of combustion air. When the heat demand is met, the power supply is interrupted, causing the motor to close the combustion air damper.

The stack limit switch is a safety device which cuts off combustion air if the stove is burning too hot. This switch will override the room thermostat or aquastat and shut off the motor, even if the room heater demand is not met.

# LOCATION OF CONTROLS



\* Relief valve must be piped to safe discharge area to prevent physical or property damage.

# BASIC INSTALLATION

## A. SAFETY FIRST:

Most important for the safe and efficient use of any wood-burning unit is the owner's understanding that the "total heat assembly" — the **Unit**, the **Chimney**, and the **Chimney Connector** — must be given proper consideration. Each integral part is extremely important.

A wood furnace/boiler, well constructed and properly placed, may be connected to a structurally sound, adequately sized, and clean chimney. But if the stovepipe connecting the two is installed improperly (for example) loosely or too close to combustible materials, it renders the assembly unsafe.

Although relatively few house fires result from the use of wood burning appliances, many insurance companies will verify, as stated below, the common causes of house fires which are directly related to the use of wood burning appliances.

- If any part of a heating assembly is installed too close to combustible materials, those materials can combust spontaneously.
- If creosote is allowed to build up through improper use of the appliance a chimney fire can occur.
- Inadequate protection against sparks can cause nearby combustible materials to ignite (ex. - carpet & furniture.)
- Some owners are guilty of careless operation of the appliance.

Before you begin to install your wood-burning unit, thoroughly read the entire manual and proceed responsibly for both you and your family.

## B. THE CHIMNEY:

Your first responsibility is to thoroughly inspect and prepare your chimney, whether it is new or old, covered or exposed.

Following is a checklist and illustration to aid you in inspecting your chimney. Don't leave an item uninspected or unprepared. A cracked or unlined chimney can cause a fire! If, for example, you cannot climb a roof to inspect or repair a chimney, find someone who can.

- The chimney should be thoroughly inspected for sound construction. Loose or cracked bricks, blocks mortar joints, blocked flue tile, as well as damaged or worn chimney caps, etc. should all be replaced or repaired by a qualified mason.
- The chimney flue should be airtight and unobstructed. It should be checked along its entire length for any possible blockage or obstruction (ex. - swallows' nests or broken flue tile). The use of a strong flashlight and a mirror are sometimes helpful in inspecting. All blockages must be removed and all broken tile replaced or repaired.
- The flue should be inspected for creosote and soot buildup. If buildup exists, it should be cleaned thoroughly. A properly sized chimney cleaning brush may be purchased and its use, as directed by the manufacturer, is a standard and acceptable method of cleaning. There are many homemade tools and methods used for cleaning chimneys, but these are generally not as effective.
- Upon completion of cleaning of an existing chimney or completion of construction of a new chimney, the flue lining should be clean and smooth.
- The chimney should be insulated. It should be constructed so that the flue lining retains as much heat as possible. If masonry, it should have a continuous fire-clay tile lined flue as illustrated. If a prefabricated metal chimney is to be used it must be U.L. approved and of the double-walled, solid insulated, stainless steel type all-fuel chimney systems (or equal). We recommend this over the use of triple wall metal chimneys which utilize "flow of air" between the metal walls as an insulator, since circulating air may sometimes allow the flue lining to remain cool enough to cause condensation and creosote buildup and reduce effective draft.
- Many localities now have people established in the chimney sweep business. Some of these people are qualified not only to clean chimneys, but to inspect and even repair them. We recommend that you invest in this service.

### **IMPORTANT: Proper Draft is essential.**

Draft Required: .05 - .08 in.\wc (water column) measured 24" from flue gas ring with a manometer

**Rule of thumb test:** Before installing stovepipe, lightly crumple one sheet of newsprint and force into open thimble or chimney outlet in wall. Ignite and observe a strong suction and roaring sound. No flame or smoke should enter dwelling and consumed ash should be drawn up chimney. The test will indicate sufficient draft pressure but cannot insure again excessive draught. A suitable test should still be done by qualified personnel.

# CHIMNEY CHECKLIST

The cap should be such that it helps to prevent downdraft while providing adequate exhaust draft.

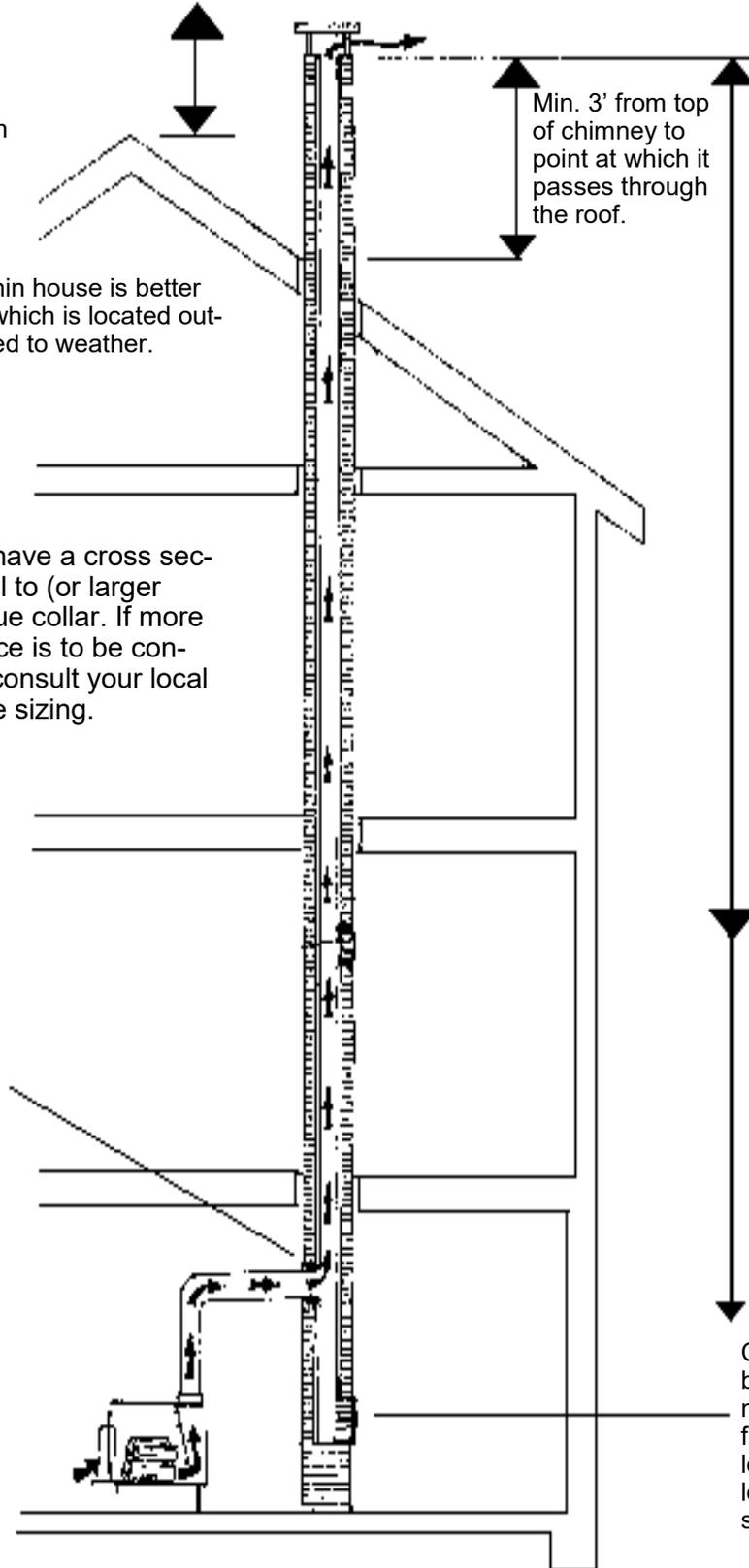
Top of chimney must be at least 2' higher than peak or highest portion of roof within 10' horizontally.

A chimney which rises within house is better insulated than a chimney which is located outside the house and exposed to weather.

The chimney flue must have a cross sectional area at least equal to (or larger than) that of the unit's flue collar. If more than one unit or appliance is to be connected to a single flue, consult your local building authority for flue sizing.

The chimney thimble should be constructed of fire clay and should have an inside diameter which is nominally equal to the outside diameter of the smoke pipe to assure a reasonably air tight fit. The thimble must not extend beyond the flue lining.

If the chimney flue is to serve more than one stove, the thimble should be separated vertically. Again, contact your local building authority.



Min. 3' from top of chimney to point at which it passes through the roof.

Recommended min. height = approx. 20'.

Flue should be of constant cross-sectional area throughout its length.

Cleanout door should be provided and it must have an airtight fit. It should not be left open for any length of time when stove is in operation.

### **C. INSTALLING THE UNIT AND CHIMNEY CONNECTOR:**

At this point, you have already checked and prepared your chimney according to the guidelines in the previous section. You are now ready to install the other two integral parts of your heat assembly — your **Thermo-Control Wood-Burning Unit** and its **Chimney Connector** (also referred to as the **Stovepipe**).

The majority of all house fires resulting from the use of wood-burning products are caused by Poor Installation or Improper Use. An essential factor in installing your unit is Providing Adequate Clearance Between the Stovepipe and Any Combustible Surface.

Listed below are guidelines and illustrations to aid you in installing your unit and chimney connector for their safe and effective use. After reading this section, please read through the sub-section of Wood Heating Systems (section V) which outlines the installation procedures for your particular hot water or hot air model.

### **THE WOOD-BURNING UNIT:**

- Locate the serial number of your Thermo-Control Wood-Burning Unit. Write this number in the space provided on the inside front cover of this manual for easy reference. Fill in also the model number and date purchased.
- Now turn to the inside back cover and fill in the warranty card, add a postage stamp, and mail it immediately.
- The wood-burning unit should be placed on a completely non-combustible floor such as concrete, brick, stone, etc. If your floor consists of wood or other combustible materials, it must be protected with a non-flammable surface.
- The unit should be installed in a space which has a total unobstructed volume equal to at least 20 times the volume of the unit (see Specifications Chart - Section III). Do not install in closets, hallways, small alcoves, or other such restrictive spaces.
- The unit should be located as close to the chimney as is practical while maintaining the following clearances:
- The Minimum Clearance between the Top, Sides, or Rear and Any Unprotected Combustible Surface or Material is 18".
- The Minimum Clearance from the front of the Wood-Burning Unit to any Combustible Material or Obstruction is 48".
- In some cases it may not be convenient to install your unit the required minimum dimension of 18" from a combustible wall or ceiling. There are many thermal protective materials on the market which can be reasonably purchased for use in this type of situation. If such a material is U.L. listed and is placed between the stove and the combustible surfaces according to the manufacturers' instructions and as required by State and Local Codes and ordinances, the minimum clearance distance may be effectively reduced.
- **A word of caution:** Many decorative bricks and materials are not fireproof. Other brands specify that they are fireproof, but keep in mind that they may not provide thermal protection to surfaces which they cover. Many of these will conduct the heat and transfer it through to the combustible surface with little reduction in temperature.
- **Note:** Combustible materials should never be heated to a point where you cannot rest your hand on it indefinitely.
- The minimum clearance from the front of your Thermo-Control unit should never be reduced.
- The protective floor covering, if required, must extend beyond the sides and rear of the unit a Minimum of 12", and it must extend beyond the front of the stove a Minimum of 18".
- When you have determined the exact location of the unit, place the protective floor covering (if required) and set the unit in place. Level the unit by adjusting each leg at the bottom.

### **IMPORTANT AQUASTAT USE AND ADJUSTMENT:**

**Aquastat differential to be set so that burn time (boiler ON) is not shorter than 45 minutes. Start at 15 Degrees and adjust through observation.**

## **IMPORTANT AQUASTAT USE AND ADJUSTMENT:**

Aquastat differential to be set so that burn time (boiler ON) is not shorter than 45 minutes. Start at 15°F and adjust through observation.

Reason: Wood fired boilers with natural draft are renowned for their efficiency and low emissions. This is because of the self balancing effect of chimney draught. A small fire needs small amounts of air; and the fire intensity gradually increases as the fire re-kindles, with increasing amounts of air. This gradual startup produces better use of fuel at startup and does not draw unneeded air through the firebox thereby cooling the water further. For proper boiler operation however the fire must at some point reach a hot intense fire. This period of high fire serves to protect the steel firebox from the corrosive effects of low temperature combustion as well as serving to drive off any moisture in the wood charge.

Aquastat water temperature is to be set so that return temperature does not fall below 140°F. Start at 170°F and adjust through observation. A thermic valve may be installed and set at 140°F for automatic operation (recommended), or a temperature gauge may be used in the return pipe to manually check water returning from heated areas.

Reason: When cooler (below 140°F) water enters the hot boiler it can cause unburned gases within the firebox to condense on the steel walls. If this continues, frequently these liquids become corrosive and will corrode the steel from the firebox side until water will begin to leak. This phenomenon is well understood within the boiler industry in general but wood boilers are particularly prone to problems because of the high amounts of acids which can form.

**This type of water leak is entirely preventable and is not covered under the Thermo-Control warranty.**

Fuel Saver: For every 3°F you can drop your boiler's system temperature, you will save 1% of your fuel costs, but minimum temperatures are critical for boiler longevity.

## THE CHIMNEY CONNECTOR (STOVEPIPE):

An approved metal stovepipe with minimum thickness of 24 gauge should be installed as per the following instructions and illustrations:

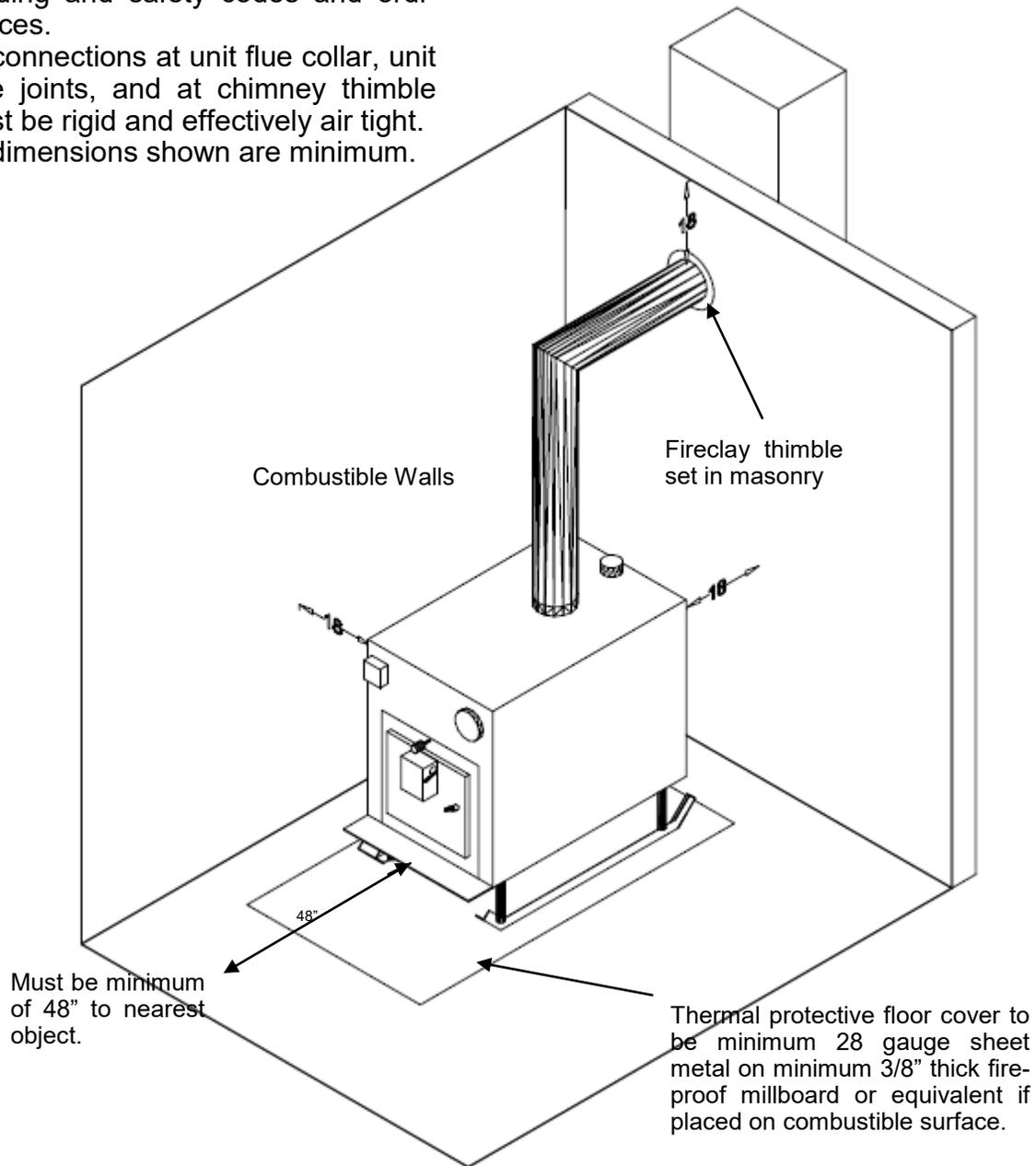
- The minimum clearance from the stovepipe to a combustible wall or ceiling is 18" for all Thermo-Control wood-burning models.
- The unit's flue collar is designed so that the crimped end of the first section of the stovepipe can be fitted inside the collar. Each subsequent length of pipe or elbow should be fitted in the same manner, with the crimped end down or, in a horizontal run, toward the unit. This will help to prevent the possibility of any creosote or tars from leaking at the joints and running down the outside of the pipe. Contrary to popular opinion, smoke will not come out of these joints.
- The stovepipe should be as short and straight as possible. Try to avoid having to use more than one elbow or more than 10 feet in total length of stovepipe.
- A horizontal run of stovepipe should be either level or, more preferably pitched slightly up toward the chimney. It must never pitch down toward the chimney.
- The smoke pipe should fit snugly and securely into the chimney thimble and must not extend beyond the chimney flue lining.
- Once the sections of stovepipe have been cut to length and snugly fit together, they should be secured at each joint with at least three (3) short self-tapping sheet metal screws spaced equally about the overlapping portion of the joint.
- The stovepipe, completely assembled, should be capable of withstanding a moderate blow (ex. - as from the side of your fist) at its mid or weakest point, without loosening or bending.
- In most cases it is not necessary to install a stovepipe damper with your Thermo-Control Unit. There are 2 exceptions however:
  1. A damper should be installed if your chimney has an unusually strong natural draft.
  2. A stovepipe damper must be installed if required by State or Local Codes or Ordinances.If a damper is to be used, it should be of heavy thickness or gauge, Specifically Designed for Use With Wood-Burning Appliances. It should be placed within the stovepipe, close to the unit, and where it is readily accessible for easy adjustment.

For additional information regarding installation, especially with regard to clearances to combustible surfaces and use of protective wall and floor coverings, see NFPA Publications NFPA No. 89M (Heat Producing Appliance Clearances) and NFPA No. 211 (Chimneys, Fireplaces, and Vents - 1977).

# INSTALLING THE UNIT AND CHIMNEY CONNECTOR

## General Notes:

- All protective wall and ceiling cover to be in accordance with state and local building and safety codes and ordinances.
- All connections at unit flue collar, unit pipe joints, and at chimney thimble must be rigid and effectively air tight.
- All dimensions shown are minimum.



# DOMESTIC HOT WATER MODEL

## SAMPLE INSTALLATION NOTES AND ILLUSTRATION

The hook-up illustrated below demonstrates how simply the Thermo-Control domestic hot water model can be installed. A 3/4" line is run from the bottom outlet of the existing water heater or storage tank to the bottom of a Thermo-Control side coil, hereafter referred to as the D coil. A 3/4" line is then run from the top of the D coil to the top of the hot water tank. With proper fittings and controls installed as shown, the unit will safely heat the water from the tank as it passes through the pipe loop by thermo-convection. Should the water temperature in the storage tank drop below the temperature setting, the existing water heater will act as a backup unit by automatically "switching-on" and bringing the water up to temperature. Following are the guidelines for this sample installation:

- The Thermo-Control domestic hot water coil must always be installed with a storage tank or storage-type hot water heater (electric/gas or oil fired).
- The storage tank or existing water heater should have a minimum storage capacity of 30 gals. It should be well constructed and insulated to prevent corrosion and heat loss. It must be rated for a minimum of 150 lbs./sq/ in/ working pressure.
- All pipes, tubing, and fittings should be non-corrosive and of minimum 3/4" inside diameter.
- Relief valve outlets should be piped to safe areas of discharge using minimum 3/4" pipe.
- Only gate valves should be used - do not use globe valves or any type of "complete-shutoff" type valves.
- Install the wood-burning unit as close to the existing water heater as is possible, leaving enough room to safely service the system. Keep length of pipe runs and number of elbows and fittings at a minimum.

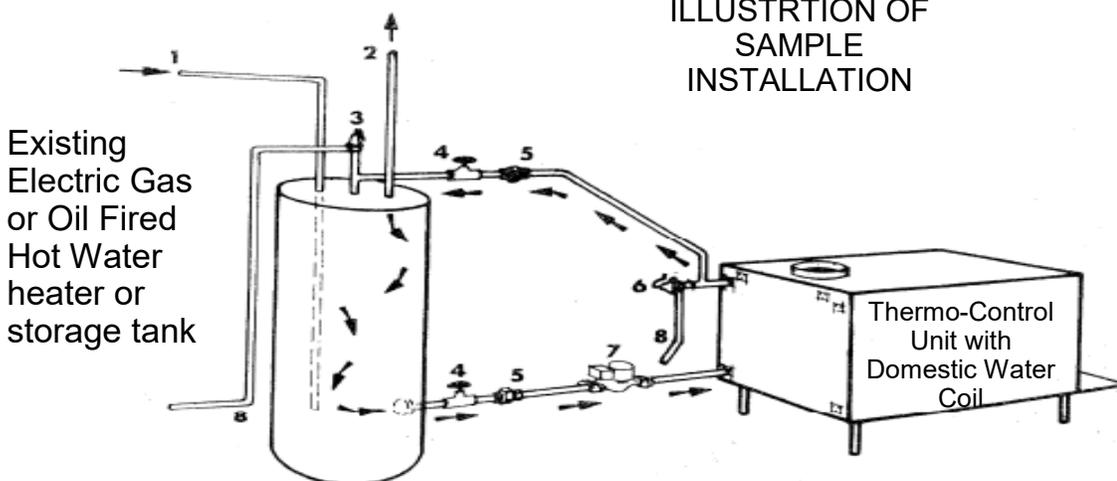
### CAUTION:

- If the unit is located above the hot water storage tank (so that heated water from the stove must travel "downhill" to reach the tank) a circulation pump must be installed.
- The gate valves (items 4 in illustration) must always be fully opened when the unit is in use and should be tagged with instructions stating such. These gate vales may be closed off during summer months (when the unit is not in use) to prevent "back-siphoning" and loss of heat through the pipe loop.

### ITEMS ILLUSTRATED AND NUMBERED:

1. COLD WATER SUPPLY LINE
2. HOT WATER SUPPLY TO HOUSE FIXTURES
3. EXISTING TEMPERATURE/PRESSURE RELIEF VALVE set in 6" long pipe nipple above new T. Its outlet should be piped to a safe area of discharge using minimum 3/4" pipe (NOTE: This valve should be tested and replaced if not in working order.)
4. 3/4" BRASS BALL VALVES (ASME APPROVED) - IMPORTANT NOTE: These should be tagged as noted above.
5. BRASS OR COPPER UNIONS
6. 3/4" TEMPERATURE/PRESSURE RELIEF VALVE (ASME APPROVED AND RATED FOR 210° F/150 lbs.) This should be set in 6" lg. pipe nipple and 3/4" T and its outlet should be piped to a safe area of discharge.
7. (OPTIONAL) CIRCULATION PUMP may be installed to compensate for poor circulation due to a long pipe loop, excessive elbows, or "downhill" travel of heated water (as stated above). The pump should have a two-speed motor and variable head adjustment and must be capable of producing flow rate of 2 GPM or LESS. It may be connected to line voltage with an "off/on" switch and should be run continuously whenever the wood stove in in operation.
8. PIPING from Temperature/Pressure Relief Valves to AREAS OF SAFE DISCHARGE. Use minimum 3/4" pipe.

### ILLUSTRATION OF SAMPLE INSTALLATION



# OPERATING PROCEDURES

Your Thermo-Control wood-burning product and heat assembly is now ready for operation. Since your Thermo-Control unit is new and has never been used it should be broken in slowly. For the first few days, the unit should be fired at low to moderate rates. It is a good idea to do this on a weekend if possible so that you can tend to the fire often and familiarize yourself with stoking procedures and operation of the thermostatic control.

During this break-in period, fumes may be given off as the heat resistant paint on your unit takes its initial cure. This is perfectly normal but proper ventilation will be necessary.

Your Thermo-Control unit has been designed to burn wood only. The best type of wood for use in your Thermo-Control could be described as good, seasoned, dry and properly sized hardwood.

Good hardwood = wood with combustion characteristics similar to that of maple, oak, and ash for example.

Seasoned = air dried outdoors but under cover for a minimum of six to eighteen months.

Dry = free of surface moisture or punky wood or bark.

Properly sized = of various diameters or split to various sizes and cut in lengths not to exceed the maximum log length listed in the specification's section.

If you live in an area where hardwoods are not available, the general rule of thumb is to avoid the use of softwoods which have a high resin content.

## THE BAFFLE AND BAFFLE BYPASS:

Whenever you tend to the fire, whether to reload, remove ashes, or simply to stir up the coals, you should always push in the Baffle Control Rod before you open the loading door. (See illustration below). This will allow the smoke to vent directly to the flue collar and prevent the smoke from back drafting into the room.

The baffle control rod operates the bypass damper at the top of the baffle. The baffle, located at the rear of the firebox, serves the following purpose:

The volatile gases given off by wood are combustible, but only in the presence of high temperature and oxygen. The baffle is physically designed to retard the exit of these gases and force them back over the fire bed to be mixed thoroughly with the primary air supply. This, together with the high temperatures at the fire bed, causes these gases to burn, thus yielding many more useable BTU's per pound of wood.

After you have tended the fire and have closed the loading door, always be sure to pull out the baffle control rod for more efficient combustion.

- 1 BAFFLE
- 2 BAFFLE BYPASS DAMPER
- 3 BAFFLE CONTROL ROD HANDLE
- 4 PRIMARY AIR SUPPLY
- 5 PRIMARY COMBUSTION CHAMBER
- 6 SECONDARY AIR SUPPLY
- 7 SECONDARY COMBUSTION CHAMBER
- 8 VOLATILE GASES FORCED BACK OVER FIREBED TO BE BURNED
- 9 DIRECT VENTING WHEN BYPASS DAMPER IS OPENED



**CROSS SECTION ILLUSTRATING FUNCTION OF BAFFLE AND BAFFLE BYPASS**

## IMPORTANT NOTE:

Keep area below and around baffle free of coals and ash by raking to front.

As an added feature of safety and efficiency, secondary combustion takes place behind the baffle. Fresh air, rich with oxygen, is preheated and supplied through the secondary air tubes to the rear of the baffle. Here any combustible gases, which might otherwise escape, will be burned. The results are two-fold - near total combustion for optimum efficiency - and increased flue temperatures to increase draft and decrease chances of creosote buildup. It is important to keep hot coals and ashes from building up at the base of the baffle. A long handled ash rake should be used.

### **A WORD OF CAUTION:**

Your new Thermo-Control wood-burning unit is capable of putting out a lot of heat. Don't fully load your firebox or open the thermostatic control to its high settings until you have become thoroughly familiar with the operation of the unit.

### **IMPORTANT NOTE:**

If for any reason your unit overheats to a point where it may be hazardous, immediately close the flapper by putting the thermostatic handle in the "down" position. If a chimney fire should occur, follow the same procedure - immediately close the flapper, then call your local fire department.

### **STARTING A FIRE:**

1. Push the baffle bypass rod in and open the door. Place several pieces of crumpled newspaper in the center of the firebox. Crisscross a couple of handfuls of dry kindling wood (3/4" thickness or smaller) on top of the paper. Then stack several small dry pieces of firewood over the kindling.
2. Ignite the paper and close the door. Set the thermostat handle to the horizontal setting or higher. Leave the baffle bypass handle in. This will allow hot gases to vent directly to the chimney flue and quickly create draft necessary for combustion.
3. It will take a few minutes for the fire to establish itself. When it has, add larger pieces of wood. After you close the door, pull out the baffle bypass rod for normal operation. Lower the thermostat handle to desired setting. To start a fire from just a few hot coals, simply rake the remaining hot coals toward the front of the stove (fairly close to the primary air supply) and add logs so that they rest on the hot coals. If your thermostat has been on a low setting, open it a notch or two and the logs should begin burning in just a few minutes.

### **LOADING YOUR UNIT:**

One of the great features of your Thermo-Control wood-burning product is that you can fully load it, set the thermostat, and walk away knowing that the full load of wood will be efficiently burned over the next several hours, without further tending. There are, nevertheless, ways in which you can load your unit to give you maximum efficiency and reduced maintenance.

- Your unit is capable of holding very large logs. Do not, however, try to add a log that is larger than what you can easily place in the unit.
- Do not add more wood than is necessary. You will get the best efficiency when you add only the amount of wood needed until the next time you are available to stoke the fire.
- Don't be afraid to use wood of various shape, diameters, and length. Do not, however, exceed the maximum log length for your model. (See Specifications Chart - section III)
- Always try to place the logs so air can flow between them. This will enhance combustion considerably.

### **ASH REMOVAL:**

- Removal of ashes from your Thermo-Control unit should be necessary only once a week or less often. By burning properly seasoned hardwood, many 500 model owners have been able to run their units continuously for three to four weeks before having to remove ashes.
- The best time to remove ashes without letting the fire first go out, is when the wood has burned down to a small bed of hot coals, as after a long overnight burn. Simply rake the coals to one side and remove the underlying ashes. Repeat the same simple procedure for the other side.

### **ASH DISPOSAL:**

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well way from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have been thoroughly cooled.

### **TOOLS REQUIRED:**

There are four basic tools which you will need to safely tend to your fire and remove and dispose of ashes. They are (1) a long handled ash or coal rake, (2) an ash shovel, (3) a poker, and (4) a covered metal ash pan.

### **DO'S & DON'T'S:**

- Do not use your unit for burning trash - it is not an incinerator. Trash can burn too hot and it can also cause dangerous soot buildup.
- Do not ignite large masses of paper or similar light weight material in your unit.
- Do not use charcoal lighter, gasoline, kerosene, or any other liquid to start a fire. Use only the procedures described in this manual.
- Do not allow children to play with or near the unit. It is not a toy and its surface can get very hot!
- Do add only the amount of wood necessary to heat your house comfortably between stokings for best efficiency. Especially important during mild weather operation.
- Do be careful when tending your unit. Always open the door slowly and watch out for sparks.
- Do not leave your unit unattended with the loading door open - ever.
- Do not run your unit too hot!

### **REMEMBER:**

- Combustible walls, floors, ceilings, and materials should never be heated to a point where you cannot rest your hand on it indefinitely.

### **DOOR GASKET:**

- Should the gasket material around the door wear out to a point where it allows air to readily enter the unit at the edge of the door, it should be replaced immediately. Gasket kits and replacement instructions are available through your Thermo-Control dealer.

### **HEAT RESISTANT FINISH:**

- Should paint become marred or scratched it can easily be touched up or refinished. Touch-up paint is available through your Thermo-Control Dealer.

**If you have any questions on  
the installation or operation  
of your Thermo-Control  
Wood-Burning Product  
contact your dealer.**

# CREOSOTE AND CHIMNEY MAINTENANCE

**Creosote** is a natural by-product of the incomplete combustion of wood. It usually forms inside a stovepipe or chimney as a black or dark brown liquid substance. In this state it is sticky and has an acrid odor somewhat similar to that of burnt popcorn. It may bake into a hard, shellac-like coating or it may build up in dry flakes to considerable thickness. If exposed to high temperatures it can ignite and burn off at tremendous intensity - thus commonly known chimney fire.

**Since creosote can be potentially hazardous, it is important to understand how it is formed, and what measures to take to eliminate or minimize its formation and subsequent buildup.**

When wood burns a combination of water vapor, carbon, and volatile gases and acids are given off. In a Thermo-Control wood-burning product, under proper burning conditions, the water vapor is driven off harmlessly and most of the other by-products are themselves burned off and converted to useable heat. Under certain conditions however, the by-products of wood combustion may not be burned or driven off efficiently, and they may collect within the heat assembly in the form of creosote.

**Several factors may affect wood combustion to form creosote:**

1. The use of wet, cold, or unseasoned wood.
2. The use of soft woods, particularly those of high resin content.
3. Poor natural draft or an obstruction in the stovepipe or chimney flue.
4. Inadequate amount of oxygen (primary air) supplied to the combustion chamber of the unit.

All of these factors contribute to poor combustion, or more specifically, low fire temperatures. It is under these conditions of low fire temperatures that the volatile gases and moisture given off can combine to form creosote.

If creosote vapors come in contact with relatively low temperature surfaces within the heat assembly, they will condense (or collect) on those surfaces and begin to build up. As a general rule, creosote will condense on the interior surface of a stovepipe or chimney flue if the temperature of that surface is 250 degrees F or less.

**Several factors may cause the cooling of interior surfaces to temperatures which will collect creosote:**

1. Low fire or flue gas temperatures.
2. Un-insulated stovepipe or chimney flues, especially if constructed exterior to the house
3. Air leaks in the stove pipe or chimney.

## **DETECTING CREOSOTE:**

After you have installed your unit, but before you begin using it, tap the stove pipe several times with your fingernail or a pencil. Not carefully the “ping” or sharp metallic sound to remember it. Then, after you have begun using your unit, test for creosote buildup by tapping the stovepipe in the same manner. This should be done once a week. If you hear a “thud” or dull sound, a buildup should be suspected and you should disassemble the stovepipe and clean it. The chimney flue should be visually inspected and cleaned at the same time.

If, for no apparent reason, you notice that your draft is becoming poor and/or you begin to get back drafting at the unit, creosote buildup should again be suspected and the system should be cleaned.

## **PREVENTIVE MEASURES:**

The following are steps to be taken, or guidelines to be used, to eliminate or minimize the formation and buildup of creosote:

1. Be sure your chimney is airtight, properly constructed, and sized to provide adequate draft. Also be sure the flue and the stovepipe are clean and unobstructed.
2. If the chimney flue to which your unit is attached also serves another unit or appliance, that unit or appliance and its connector must be air tight and its damper(s) must be closed when it is not in use.
3. Never use un-insulated stovepipe as a chimney, especially if the chimney is to be constructed outside of the building. This type of chimney would be sure to remain relatively cool, thus reducing flue gas temperatures and causing condensation, poor draft, and eventual creosote buildup.

4. Your wood-burning assembly may be particularly susceptible to creosote buildup during mild weather conditions as in the spring or fall of the year. Some people have a tendency to fully load their unit and then set the thermostat control to its lowest setting, allowing the logs to “smolder” for several hours at a time. This practice will almost always cause creosote to form. From both a standpoint of creosote prevention and wood burning economics, it is far better to build smaller fires and allow them to burn hotter by setting the thermostatic control at a higher setting
5. Do not use cold, green, wet or highly resinous wood. Much of the heat produced would be used to drive off water than aid in the combustion of volatile gases or help maintain proper stack temperatures. Instead use dry, well-seasoned hardwood.
6. As a general rule, at least for the beginner, even if it is not apparent that creosote exists, it is a good policy to clean your stovepipe at least twice during the heating season - once just before you begin burning and again at mid winter. Your chimney should be cleaned at least once a year just before the season begins.
7. Under average conditions, when wood burns properly in a Thermo-Control unit, the flue gas temperatures will range between 300° and 600° F. At the owners choice, a stack thermometer may be installed in the stovepipe. By observing the thermometer the unit can be regulated to help maintain these proper temperatures.

By maintaining a briskly burning fire with dry well seasoned wood you will have little or no creosote problem in your properly installed Thermo-Control unit.

## FIREWOOD

It is important to acquire some basic knowledge of wood as a fuel. Whether experienced or not, here are just a few things which you may find useful.

### AVAILABILITY:

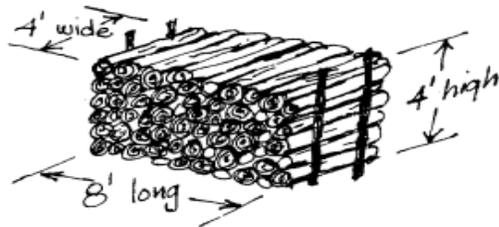
Contrary to popular opinion, the natural supply of wood available in the United States and Canada for use as fuel is not dwindling, as are other major fuel sources such as gas and oil. Wood is naturally renewable and its supply is in fact on the increase in most areas. The eastern United States especially has seen a great resurgence of forest growth in its overgrown pastures and vacated farmlands. Wood's abundance in the United States alone is measured in **hundreds of millions of cords per year!**

By combining this resurgence in the natural growth of wood with the modern forest management practices widely being used and the fact that the average person is becoming increasingly more knowledgeable regarding the sensible use of wood and woodlot management, it is apparent that there is “more than enough wood to go around” and that there will be for many, many years to come.

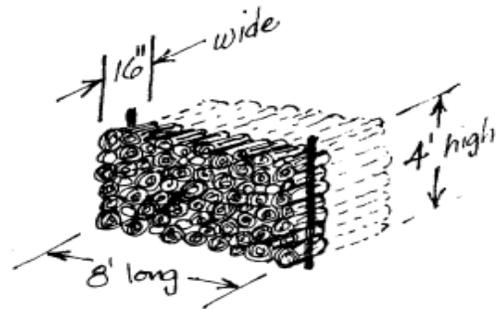
For you as a user, firewood is available in many ways. Land and woodlot owners can obtain wood by cutting it themselves or hiring a professional woodcutter do the job. The tress may be forest culls, storm blow downs, commonly seen “dead elms”, etc. If you do not own land, fire wood can be purchased already cut, split and dried from local fire wood dealers, tree surgeons, or farmers who cut wood in their spare time. Many state forestry departments provide programs whereby you can purchase at nominal cost the right to cut and remove hardwood cull trees from state lands. In addition, many times wood can be “obtained for the asking” from leftover logging operations, construction clearing operations, and state and local roadside tree removal projects.

### MEASUREMENT:

Fuel wood is usually measured and sold by the standard **cord** or a fraction of a cord. A standard cord is a stack of wood 4 feet high x 4 feet wide x 8 feet long. This is equal to 128 cubic feet of wood and air space or approximately 85 cubic feet of solid wood. A **face cord** is the most commonly sold fraction of a standard cord. A face cord measurement however, may vary, since it is a stack of wood 4 feet high x 8 feet long but varying in depth anywhere from 12 inches to 24 inches. When buying wood by the face cord, be sure to find out what the width of the stack (or length of the logs) actually is so you can make an accurate cost comparison.



**Standard Cord  
(full cord)**



**Face Cord  
(1/3 of a cord)**

### **HEATING VALUE AND MOISTURE CONTENT:**

Each type of wood has a specific gravity or density. Generally, the harder the wood, the more dense it will be and the greater its energy content (or heating capacity) will be. Because hardwoods are denser than softwoods and therefore possess more heat value, they are preferred over softwoods for use as fire wood. Hardwoods are also preferred because they possess less creosote-forming resins than softwoods.

All wood contains a certain amount of water within their structure. The amount of moisture in the wood directly affects the way in which the wood burns and the heat producing efficiency of the wood. All firewood should be air dried (or seasoned) for a minimum of six (6) months. Some firewood, depending on the type of wood and the way in which it is cut, split, and stacked may take 12 to 18 months or more to season properly.

Uncut trees, depending on the type, contain varying amounts of water. An uncut or **green** hardwood may have a 100% moisture content - i.e., equal amounts of wood fiber and water by weight.

**Properly seasoned firewood** is wood which has been cut and split to convenient sizes and stacked neatly outdoors (but under cover) with ample air circulation provided and left to dry until it has a moisture content of approximately 20%.

### **The following is an explanation which will emphasize the sensible use of wood with regard to moisture content:**

Naturally when wood is heated, the water in it is evaporated or driven off. Up to 80% of this water can be evaporated out by simply seasoning the wood outdoors during the relatively warm months of spring, summer and fall, leaving a 20% moisture content.

By burning green wood, this process of evaporation is simply speeded up. Within a few hours virtually all of the water can be evaporated out, but only at the expense of losing many BTU's of heat given up by the wood as it burns.

One pound of dry wood contains approximately 8500 BTU's of energy. Approximately 1100 BTU's are required to drive off 1 pound of water. Imagine the heat energy wasted (given off to the atmosphere through the chimney) in trying to burn green wood that has a 100% moisture content. Can you calculate how many BTU's would be wasted if 100 pounds of such green wood was burned?

In addition "green wood" fires are sometimes difficult to maintain and are sure to create creosote problems.

**Therefore, it makes sense to always be sure to use wood that is properly cured and as dry as possible.**

Many books, periodicals, and articles have been written on the use of wood as a fuel. Your local library or book store may be helpful in obtaining information regarding characteristic of wood, wood combustion, what price to pay for wood in your area, cost comparisons for wood heat versus oil/gas/coal or electricity, how to cut your own wood and what tools are needed, etc.

Your **State Agricultural Extension Service** would likely be able to supply you with excellent material covering these and similar subjects regarding wood. Or you may write to the National Solid Fuel Trades Association, P O Box 6369, Syracuse, N.Y. 13217.

# WARRANTY

- ◇ Thermo-Control Heating Systems LTD. warrants to the original owner that the fire-box and water jacket be free of defects in material and workmanship for a period of ten (10) years from the date of purchase.
- ◇ All other parts in the unit to be free from defects in material under normal use for a period of one year from date of purchase.
- ◇ The unit must be operated during each heating season according to manufacturer's instructions, within its listed capacity and with proper controls and adjustments. Note that over-firing of your Thermo-Control unit is contrary to manufacturer's instructions and may cause damage not covered by this warranty.
- ◇ Our obligation under these warranties is limited to exchange or repair of any defective part at the option of Thermo-Control Heating Systems LTD.
- ◇ The replaced/repaired parts carry a warranty for the balance of the unit's applicable period of warranty.
- ◇ Transportation charges are not included in this warranty and are to be paid by the owner.
- ◇ Manufacturer is unable to refund any expenses paid by the owner unless prior authorization has been received from the manufacturer.
- ◇ This warranty is void as to any unit which has been subjected to misuse, accident or negligent damage, damage in transit or if unit has been altered or repaired in any way that affects the reliability or detracts from the performance of the unit.
- ◇ This warranty is void in all events where installation has not been made by a qualified professional plumbing and heating contractor according to commonly accepted customs and practices for the industry, and in total compliance will all applicable statutes, ordinances, regulations, and codes.
- ◇ This warranty is in lieu of all other guarantees expressed or implied, and all warranties expressed or implied, including the warranty of merchantability or fitness for a particular purpose and all other obligations and liability on the part of Thermo-Control Heating Systems LTD. Manufacturer neither assumes nor authorizes any other person to assume for manufacturer any other liability in connection with the sale of its' products.

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

**Manufactured by THERMO-CONTROL HEATING SYSTEMS, LTD.  
P.O. Box 640 Cobleskill, NY 12043**

Fill in for your records:

Model # \_\_\_\_\_

Serial # \_\_\_\_\_

Date of Purchase \_\_\_\_\_

To place warranty in effect, detach and mail immediately to:  
**THERMO-CONTROL HEATING SYSTEMS, LTD.**  
**P. O. BOX 640 COBLESKILL, NY 12043**

PLEASE PRINT OR TYPE ALL INFORMATION:

Purchaser's Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone # : \_\_\_\_\_

Date Purchased: \_\_\_\_\_ UNIT Serial # : \_\_\_\_\_

UNIT Model # : \_\_\_\_\_

Dealer Name: \_\_\_\_\_